

3173

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

Original Application No. 606/2018

(State of Telangana)

In the matter of:

Compliance of Municipal Solid Waste

Management Rules, 2016 **and** other environmental issues.

(In respect of State of Telangana)

And in the matter of:

The Chief Secretary to Government,

State of Telangana, Dr. B.R. Ambedkar

Telangana State Secretariat, Hyderabad.

....Respondent

**ACTION TAKEN REPORT OF STATE OF TELANGANA
IN COMPLIANCE OF THE ORDER DATED 22.08.2024**

**ADVOCATE FOR RESPONDENT
SRAVAN KUMAR KARANAM**

INDEX

Sl No	List of Annexures	Description	Page Nos.
1.		Action taken report of State of Telangana in compliance of the order dt. 22.08.2024	1-34
1a.	Annexure-A1	Photos of Bio-methanation plants & Statement of waste generation and Gap - CDMA	35-42
2	Annexure-A2	Statement of Concessionaires tie up with Cement Industries for Disposal & Before and after pictures	65/72
3	Annexure-A3	Summery report on Quantification survey of Legacy waste- Biomining	73/77
	Annexure-A3(i)	Dumping site each of ULB	78/7:
4	Annexure-A4	Processing & Disposal of Fresh MSW- GHMC	7;/97
	Annexure-A4(i)	GO notifying EPTRI as Independent Engineer	98/98
5	Annexure-A5	Bill Details for proof of 100% processing of the daily quantity of MSW generated - GHMC	99/: 7
	Annexure-A5(i)	GHMC MoU with IIT Bombay	: 8/; 7
	Annexure-A5(ii)	IIT Bombay Study report	; 8/176
	Annexure-A5(iii)	Provisional Readiness Certificate (PRC) issued by EPTRI	177-178
	Annexure-A5(iv)	Power Purchase Agreement WTE at Jawaharnagar	179-218
	Annexure-A5(v)	EPTRI certifications of collection & transportation bill	219-228
	Annexure-A5(vi)	EPTRI certifications on treatment and disposal	229-243
6	Annexure-A6	Details of completed, under construction and proposed STPs in GHMC area-HMWSSB	244-245
7	Annexure-A7	Details of each existing STP with utilization capacity under HMWSSB, GHMC,HMDA-HMWSSB	246-246
8	Annexure-A8	OCEMS data of STPs-HMWSSB	247-247
9	Annexure-A9	Details of under Construction STP's in the State (Urban other GHMC)- PHMED	248-249
10	Annexure-A10 & A10(i)	Details of Existing STP's with utilization capacity in the State Under PH&MED	250-252
11	Annexure-A11	Details of STP's in the State under PH&MED	253-253

3175

Sl. No	List of Annexures	Description	Page Nos.
		under AMRUT 2.0	
11(i)	Annexure-A11(i)	GO Rt.No.388 of MA&UD Dept, dt: 21.08.2024 (101 ULBs – Sanctioned under AMRUT-2.0)-PH&MED	244-257
11(ii)	Annexure-A11(ii)	Details of 115 STPs of 101 ULBs-PH&MED	258-261
12	Annexure-A12	Details of Existing STPs with utilization capacities & final disposal points -HMWSSB	262-263
13	Annexure-A13	EPTRI Reports of STPs-HMWSSB	264-358
	Annexure-A13(i)	TGPCB Reports of STPs-HMWSSB	359-418
14	Annexure-A14	Details of Sewerage generation, STP details in ULBs outside ORR- PHMED	419-421
15	Annexure-A15	Sanction GOs with Amounts equivalent to EC amount (A) GO Rt.No.374 of MA&UD, dt: 11.09.2020 (B) GO Rt.No.669 of MA&UD, dt: 22.09.2021 (C) GO Rt.No.344 of MA&UD, dt: 03.08.2024 (D) Govt. GOs, Proceedings and Memo (E) GO Rt.No.762 of MA&UD(UBS), dt: 29.09.2023 (F) GO Rt.No.388 of MA&UD, dt: 21.08.2024	422-443
16	Annexure-A16	Govt. Memo No.F.No.22-39/2020-IA.III, dt: 14.02.2022	444-445
17	Annexure-17	List of 68 FSTPs in ULBs-PH&MED	446-448
18	Annexure-18	Statement showing the Environmental Compensation (EC)	449-450
19	---	STP photographs of HMWSSB	451-455
20		Affidavit	456-457

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

Original Application No. 606/2018

(State of Telangana)

In the matter of:

Compliance of Municipal Solid Waste

Management Rules, 2016 **and** other environmental issues.

(In respect of State of Telangana)

And in the matter of:

The Chief Secretary to Government,

State of Telangana, Dr. B.R. Ambedkar

Telangana State Secretariat, Hyderabad.

....Respondent

**ACTION TAKEN REPORT ON BEHALF OF THE STATE OF
TELANGANA ON THE ISSUE OF MANAGEMENT OF SOLID WASTE
AND SEWAGE IN COMPLIANCE OF THE ORDER DATED 22.08.2024**

1. That this Hon'ble Tribunal is seized of the above captioned matter whereby this Hon'ble Tribunal is examining the issue of solid as well as liquid waste management in respect of all States and Union Territories, including the State of Telangana.
2. That this Hon'ble Tribunal had pointed out certain deficiencies vide its Order dated 12.12.2023; accordingly the Respondent State had submitted a detailed reply and compliance of the directions/ observations by way of the I.A No. 299 of 2024, which is pending for adjudication before this Hon'ble Tribunal.

3. That, thereafter, this Hon'ble Tribunal, vide its Order dated 22.08.2024, had highlighted certain gaps in the management of solid waste and sewage on the basis of the half-yearly progress report filed on 09.07.2024 by the State of Telangana (hereinafter, 'answering Respondent') for the period of October 2023 to March 2024. Consequently, the instant Action Taken Report is being filed to give an updated status of progress for both solid and liquid waste management.
4. That, at the outset, it is humbly submitted that the answering Respondent is fully committed to complying with the earlier Order dated 29.09.2022 of this Hon'ble Tribunal. That it is humbly submitted that to facilitate the works to be undertaken by 31.03.2025 for proper solid and liquid waste management, an amount to the tune of Rs.2140.12 Crores have been spent. Further, an amount of Rs. 1623.26 Crores have also been allocated for management of Legacy Waste and Sewage treatment. While there is a still some gap in treatment of Legacy Waste and Sewage, the answering Respondent is committed to treating hundred percent of the Sewage and Legacy Waste and have sanctioned necessary funds for the Treatment Projects according to the directions of this Hon'ble Tribunal as would be clear from the table below where the progress of the implementation of the directions are briefly mentioned.

(Rupees in crores)

Area	No. of STPs	Treatment Capacity	Status of Money	
			Spent	Allocated
Liquid Waste (MLD)				
(i) Hyderabad City (27 ULBs)	36	1435	1985	371

(ii) Rural Area ULBs (115)	7 (108)*	52.21	104	1188
Solid Waste (MT)				
ULBs (123)	-	16,90,000	51	65
Total			2140	1624
(*) Small capacity STPs in Rural areas.				

5. That the answering Respondent, apart from the above mentioned commitment, hereby submits a detailed Action Taken Report to the specific observations of the Order dated 22.08.2024 (uploaded on 12.09.2024) of this Hon'ble Tribunal.

I. RESPONSE TO OBSERVATIONS OF THIS HON'BLE TRIBUNAL IN ORDER DATED 22.08.2024

A. Observation: Gaps Identified in Solid Waste Management – Fresh Waste

“3.I Overall analysis indicates that there is no substantial progress in bridging the gap in the treatment, utilization and disposal of liquid and solid waste management. We have found following deficiencies and gaps based on examination of the Third Six Monthly Progress Report dated 9.7.2024 signed by Chief Secretary reporting progress for a period from October 2023 to March 2024: -

[Solid Waste Management]

- (i) There is a gap of 2281.0 TPD in waste processing in 141 ULBs (2475). Therefore, each day, unprocessed waste is added to the legacy waste:”

Response:

- 1) The nodal authority responsible for Solid Waste Management is the Chief Commissioner and Director of Municipal Administration (CDMA) for the State of Telangana and the Commissioner, Greater Municipal Corporation of Hyderabad (GHMC) within the Hyderabad Area. That as per the above mentioned departments in respect of the generation and management of solid waste the answering Respondent submits as under.
- 2) That the method of calculation of waste generation for ULBs is with the use of weighbridges. However, where weighment is not conducted, the waste generation per capita is assessed based on the city profile as suggested by Central Public Health and Environmental Engineering Organization (“CPHEEO”) Norms issued by the Ministry of Urban Development in 1993. Hence, for ULBs where weighment is not conducted, it is estimated as total population multiplied by 250-400 gms per capita. The said norms as provided in Table 1.5 of Section-1.4.3.3-Quantification & Composition of Waste of CPHEEO Manual (Part-2) is as below: (Note that this is based on NEERI study of 1996)

Table 1.5: Per-capita Waste Generation Rates from NEERI Study in 1996⁸

POPULATION RANGE (IN MILLION)	NO. OF CITIES SURVEYED	AVERAGE PER CAPITA VALUE (KG/CAPITA/DAY)
0.1 to 0.5	12	0.21
0.5 to 1.0	15	0.25
1.0 to 2.0	9	0.27
2.0-5.0	3	0.35
>5.0	4	0.50

This method is also in consonance with Para 6.1 of Solid Waste Management component of Swachh Bharat Mission (U) 2.0 guidelines:



SOLID WASTE MANAGEMENT

Sets out the overall approach to be taken by ULBs to put in place systems and processes to ensure that Urban India becomes Garbage Free.

6.1 Municipal Solid Waste and its management

Approximately 1,32,000 Metric Tonnes of MSW is generated from all urban areas of the country, which translates to about

300-550 grams per person per day. The waste generation is higher in larger cities and lower in smaller cities. The general trend of per capita waste generation is as follows:

S. No.	ULB Population Class	Typical Per Capita Waste Generation (in grams)
1.	>10 Lakh	550
2.	1 to 10 Lakh	450
3.	< 1 Lakh	300

- 3) Estimates for the quantity of wet and dry waste are assessed as per Swachh Bharat Mission (U) 2.0 ('SBM (U) 2.0') guidelines (Page 47, 6.2.1) i.e. Wet 60% and Dry-40%.

Waste Generation per day in 141 ULBs:

- 4) A total of 4316 TPD of fresh waste is being generated in 141 ULBs, out of which biodegradable waste is 2373 TPD (of which, 1258 TPD is processed as compost and 13.5 TPD is processed as biogas). The deficit in treatment of biodegradable waste is 1101.5 TPD. Further the non-biodegradable or dry waste is 1943 TPD of which 1000.5 TPD is processed through Dry Resource Collection Centers ('DRCC').

5) Thus, the gap in treatment is currently 2044 TPD, including biodegradable and non biodegradable waste, which has decreased from 2281 TPD as was recorded in the Order dated 22.08.2024, to 2044 TPD as described . This is because the total treatment capacity has increased from 2035 TPD (before May'24) to 2272 TPD. The measures for meeting the deficit is described below.

Photographs of Processing Units and a Chart showing ULB wise waste generation, waste processed and gap in treatment of solid waste for all 141 ULBs is provided in *Annexure-A1*.

Before dealing with the deficit it is pertinent to understand the manner of waste processing done per day at the ULB level.

Manner of Waste Processing per day at the ULB level:

- 6) 229 compost sheds have been made operational with a cumulative capacity of 1258 TPD to process the wet/biodegradable waste component.
- 7) Three Bio-methanation plants with a cumulative capacity of 13.5 TPD are in operation in 3 ULBs i.e., Greater Warangal Municipal Corporation (GWMC) (2.5 TPD), Siddipet (10 TPD), and Sircilla (1 TPD).
- 8) Dry waste is processed through 208 Dry Resource Collection Centers (DRCCs) with a cumulative capacity of 985.5 TPD to recover the recyclables that could further be sold to recycling units. Notably, 87 DRCCs are being maintained by women from Self Help Groups ('SHGs').
- 9) For the remaining quantity of dry waste, 3 RDF Plants are established in three ULBs with a cumulative capacity of 15 TPD i.e., Narayanpet (5 TPD), Manikonda (5 TPD), Peerzadiguda (5 TPD).

Efforts to bridge the gap of 2044 TPD in processing daily fresh waste:

- 10) The present gap of 2044 TPD shall be met through the establishment of new processing facilities by 31.05.2025.
- 11) In order to bridge the gap in treatment of waste collected and to address the demand for treatment for the next five years of growth, action plans at ULBs level for Solid Waste (Wet & Dry) have been prepared with an estimated cost of Rs. 387.22 Cr. and submitted to the Ministry of Housing and Urban Affairs ('MoHUA') on 14.10.2022 for funding under SBM (U) 2.0. The same has been approved by MoHUA on 17.02.2023 with Central share of Rs. 158.44 Cr. and State share of Rs.228.78 Cr. Further, the first instalment of the approved Central share i.e., Rs.63.38 Crores has already been released by MoHUA on 17.02.2023.
- 12) Tenders that had earlier been issued for establishing 2961 TPD waste processing capacities were cancelled because fresh tenders were sought after duly re-clustering ULBs and their capacities into nine clusters for establishment of scientific processing facilities with a cumulative capacity of 2974 TPD in 130 ULBs. In response, 7 bidders have submitted the bids. Specifically, the earlier tenders were cancelled because of the below developments:
- Revised Tender based on the revised procurement model duly utilising central share under SBM (U) as VGF towards capital under Hybrid Annuity Model (HAM) was submitted to Government on 24.12.2024.
 - A Waste to Energy (WTE) plant is proposed to treat approximately 800 MT of waste from 9 ULBs in Greater Warangal Municipal Corporation and Karimnagar Clusters.
 - Re-clustering of ULBs duly excluding ULBs within Outer Ring Road (ORR) and ULBs grouped in WTE cluster.

Estimated date for establishing processing facilities is May 2025.

Interim Measures Taken:

- 13) Meanwhile, until finalization of above mentioned Tenders, interim measures that have been undertaken include directing Bio-mining Concessionaires to process the unprocessed Municipal Solid Waste through existing biomining agencies. In this regard, nine clusters of Districts have been identified. The specifics of the nine clusters, names of the districts covered in such clusters, names of the agency and the cement factory with which an engagement has been made along with Photos of reclaimed sites have been attached herewith as *Annexure-A2*.
- 14) Further, startups within the dry Waste Management sector such as Waste Ventures (Narsingi Municipality), ITC WOW(Greater Warangal Municipal Corporation, Siddipet Municipality, Peerzadiguda Municipal Corporation, Husnabad, Kalwakurthy), Globus Waste Management Solutions (ULBs within ORR), Matrik (Vikarabad, Medcval, Suryapet), Scrape Q (ULBs within ORR), Recycal(Hyderabad), and Elima Recycling Pvt Ltd (ULBs within ORR) are being encouraged to engage with gated communities/ bulk waste generators in the larger ULBs for collection of dry waste and processing at their tied-up recycling facilities.
- 15) This above discussed interim measures shall support in managing further 200-250 TPD of dry waste across ULBs and also reduce the waste being transported to the processing units/ dumping yards.
- 16) Further, the below listed waste reduction measures are being implemented till the processing facilities are established:-
- Home & community level composting is being promoted across wards.
 - Bulk waste generators are being mandated to establish onsite processing of waste generated.

- 154 Reduce, Reuse, Recycle (RRR) centers have also been established across 141 ULBs to ensure that the used items from the households are collected in a systematic manner and promote reuse by the needy citizen.

These initiatives will reduce the waste being transported to the processing units/ dumping yards.

B. Observation: Gaps Identified in Solid Waste Management – Legacy Waste

“...

- (ii) There has been a change in the legacy waste figure of 59.0 lakh MT reported earlier which is now reassessed to 38.46 lakh MT. The entire waste is expected to be remediated by 30.6.2025.

...”

Response:

17) It is humbly clarified that the figure of 59.0 lakh MT of Legacy Waste was taken on assumption/adhoc basis (in the wet-status). However, a scientific survey of the Legacy Waste has been conducted on dry-status basis to assess the total quantum as 38.46 lakh MT by M/s HRP Infra Pvt. Ltd. (Multi Zone 1, Warangal region) and M/s Vibhasa Solutions (Multi Zone 2, Hyderabad region). True copy of the Survey Report conducted by M/s.Vibhasa Solutions and M/s.HRP Infra Pvt.Ltd. to arrive at the exact quantities at 38.46 lakh MT is appended herewith as *Annexure-A3*.

18) That specifically, out of 38.46 Lakh MT, 13.43 Lakh MT is remediated at site as on 31.12.2024, another 3.47 lakh MT is scheduled to be completed by March 2025 and the balance gap of 21.56 Lakh MT will be achieved by

31.12.2025. The specific action and the timeline is described in the table below:

(Qty in lakh MT)

Sl.no	Action	April 2024	December 2024	March 2025	June 2025	July 2025	Aug 2025
1	Biomining to be completed ULBs	12	04	15	20	10	10
2	Qty of waste remediated (in completed and ongoing ULBs)	7.90	5.53	3.47	5.56	2.12	2.09
3	<i>Cumulative Quantity</i>	7.90	13.43	16.90	22.46	24.58	26.67

*Table to be continued.

Sl.no	Action	Sept 2025	Oct 2025	Nov 2025	Dec 2025	Total
1	Biomining to be completed ULBs	8	15	15	14	123
2	Qty of waste remediated (in completed and ongoing ULBs)	1.88	2.44	4.66	2.81	38.46
3	<i>Cumulative Quantity</i>	28.55	30.99	35.65	38.46	-

19) That it is submitted that Five (5) agencies i.e., Ms Cube Bio-energy Pvt. Ltd, M/SDS Technologies, M/S Srushti Contech Pvt. Ltd, M/s Annapurna Constructions and M/s Sagar Motors have been engaged for completing the biomining project.

20) Bio-mining was initiated during October 2022 with a timeline of two years for completion. Due to challenges faced as mentioned below, the timeline is further extended till December 2025. Status of Biomining Process per Year / Timeline for completion is provided in the table below:

Sl.No	Year	No. of ULBs	Qty of legacy waste remediated (MT)
1	2022	4	133106
2	2023	18	492099
3	2024	24	717953
Total Qty Remediated (MT)			13,43,158

21) Further, details of the Land Fill Sites in ULBs are as below:

- Each municipality has one dumpsite (list attached in **Annexure-A3(i)**).
- Dumpsites are Government lands as allocated by the Revenue Department.
- Sanitary Land Fills (SLF) at regional level is proposed to be established post establishment of scientific processing facilities.

22) Leachate Handling in Monsoon: Leachate collected during the monsoon season is stored and is used as bacterial catalyst for decomposition of waste after windrows formation.

23) That the State of Telangana is also working on an Action Plan to deal with Legacy Waste in collaboration with the Indian Institute of Technology, Bombay and Central Pollution Control Board, New Delhi. Specifically, this is

in pursuance of the Lakshya Zero Dumpsite Program. The same would be prepared by ...

C. Observation: Gaps Identified in Solid Waste Management

“... ”

iii. We could not ascertain the details of waste being processed by GHMC which is estimated to be 7251 TPD.

...”

Response:

24) It is submitted that 100% of the municipal solid waste collected by GHMC is processed without any gap at its integrated waste processing facility at Jawaharnagar. The said facility is operated by M/s Hyderabad Integrated MSW Ltd which commenced processing with 2000 TPD from Feb’2012 and enhanced it over the years to 8000 TPD from June’2022. As per the Agreement, the Concessionaire is free to sell the by-products of processing and earn revenue.

25) The process that is followed is mechanical segregation of MSW received, which results into organic fraction (-70 mm) and inorganic material (+70 mm) . The organic fraction (-70 mm) goes for conversion into Compost and the inorganic material (+70 mm) is utilized as Refuse Derived Fuel for producing electric power in waste to energy (WTE) plants. Further, a part of it also goes to cement plants & recycling plants. The Process rejects are disposed of in scientific landfill. Additionally, there exist facilities such as a 1 MW Roof Top Solar Energy Plant, Vehicle Maintenance Area, 20 TPD Plastic Recycling Facility established in 2013, Compressed Biogas Plant operational

since October 2021, Wastewater Complex and a Laboratory. Further, Odour management measures in areas of daily operation include the use of application of bio-enzymes through fixed misting system, use of tarpaulin sheets, soil cover among others.

26) The average quantity of fresh waste collected and processed at the above said facility is 7251 TPD and it is not legacy waste. Further, the Project is being monitored and certified by a Government recognized Institute viz., Environment Protection Training and Research Institute as Independent Engineer ('EPTRI'). The details are in appended as *Annexure-A4 & A4(i)*.

27) That the by-products obtained after processing 7251 TPD of MSW is as follows (in approx. numbers):

- Refuse Derived Fuel: 3767 TPD
- Compost:366 TPD
- Inerts disposed at scientific landfill: 1272 TPD
- Recyclable Plastic: 12 TPD
- Moisture & fermentation loss: 1834 TPD

28) That the approved invoice for the month of Feb'2024 is enclosed herewith as proof of 100% processing of the daily quantity of MSW generated (page 04 of the enclosed bill) as *Annexure-A5*.

29) That it is also pertinent to mention that GHMC entered into a Memorandum of Understanding with IIT Bombay on 10.08.2022 to conduct assessment studies on suitability of Decomposed Municipal solid waste for Bio-mining at Jawaharnagar capped dumpsite (*Annexure-A5(i)*). The Final Report on the

above said study which has recommended that the capped legacy dump is not ready for biomining is **enclosed (Annexure-A5(ii))**.

30) That specifically, the Fresh Waste and Legacy Waste has been dealt with by GHMC as below:

Fresh Waste

- i. Capacity of fresh waste treatment in GHMC since 29.09.2022 is 8000 TPD [Provisional Readiness Certificate (PRC) copy issued by EPTRI for Integrated Municipal Solid Waste Management Project is enclosed **as Annexure-A5(iii)**]. The capacities are augmented based on the quantity of MSW being received at the processing facility.
- ii. The Integrated MSW Management Project of GHMC is being executed by M/s Re-sustainability Ltd through its SPV – M/s Hyderabad Integrated MSW Ltd.

Legacy Waste

- i. The legacy waste of 12 million metric tons (MMT) at Jawaharnagar was capped.
- ii. GHMC is operating a scientific landfill at Jawaharnagar since Feb' 2012 in government land which is being managed by the SPV i.e. M/s Hyderabad Integrated MSW Ltd for the Integrated Municipal Solid Waste Management Project of GHMC.
- iii. An average of 7648 TPD of solid waste collected from GHMC limits was processed for the period of Apr'2024 to Sep'2024 i.e., the period for submission of the Fourth half yearly report. If the FY 2024-25 upto Jan'2025 is considered, GHMC has collected and processed an average of 7683 TPD of solid waste.

31) Waste to Energy Plant: GHMC has established and commenced operations of the following Waste to Energy plants of cumulative capacity of 38.5 MW:

S.No	Location	Capacity	Commencement	Grid connectivity through
1	Jawaharnagar	24 MW	Aug'2020	Malkaram Substation
2	Dundigal	14.5 MW	Mar' 2024	Gummadidala Substation

- i. Further, additional 24 MW capacity WTE is under construction at Jawaharnagar and is expected to commence operations by end of Mar'2025.
- ii. Both the plants are connected to the grid. The Power Purchase Agreement of the WTE at Jawaharnagar is enclosed as Annexure A5(iv).

32) That the GHMC also envisages to establish additional decentralized processing facilities, one each at Pyranagar and Dundigal in the next 18 months.

33) Monitoring Mechanism put in place by GHMC:

(a) Fresh Waste

- i. The activities under the Municipal Solid Waste Management Project of GHMC are being monitored through inspections, certification of work executed, recording the work and subsequent certification of bills etc by a quasi government Independent Engineer viz., Environment Protection Training and Research Institute (EPTRI). Copy of

Government Order notifying EPTRI as Independent Engineer is **enclosed as Annexure-A4(i)**. Copies of certified bills towards collection, transportation, treatment and disposal are **enclosed as Annexure-A5(v) and Annexure-A5(vi)**.

- ii. The Bills certified by EPTRI are further scrutinized at the ULB level in the concerned section and subsequently by the audit section before releasing the payments to the Concessionaire.
- iii. The Telangana State Pollution Control Board also conducts regular inspections of the facilities and issues consents, permissions, notices on observations during inspections etc.

(b) Legacy Waste

- iv. The activity of capping of legacy waste at Jawaharnagar was also supervised by EPTRI such as approval of designs, compliance to the existing rules, monitoring the execution work, recording the measurement and certification of the payments.

D. Observation: Regarding mismatch in figures on capping and dumping of waste by GHMC

“...

- (iii) It has been admitted that 1,20,00,000 MT has been capped (page 2416) and whereas at another place this figure is 12MT (reported at page 2410). Hence, it is to be clarified. It is not disclosed if there is any further dumping or landfilling taking place.**

...”

Response:

34) 12 million MT of legacy waste was capped at Jawaharnagar by GHMC. The figure of 12 MT is a typographical error, which may please be read as 12 MMT. From the date of commencement of operations of the Municipal Solid Waste (MSW) Processing and Disposal Facility of GHMC at Jawaharnagar (V) on 18.02.2012, unscientific dumping of MSW generated in GHMC is not taking place. The MSW is completely being processed (i.e.100%) and the process rejects are being disposed of in sanitary landfill. Details of various activities being carried out in the MSW Processing & Disposal facility are submitted at **Annexure-A4**.

E. Observation on Sewage Waste Management

“...

- (i) **No relevant fact can be gathered in respect of sewage management from the data furnished in Annexure III (page 2507) and Annexure IV (page 2525). The data has been given in respect of polluted river stretches. Annexure IV discloses that existing 50 STPs are having treatment capacities of 1273.1 MLD but, it is not disclosed that how much sewage is actually being treated.**

...”

Response:

- (A) Hyderabad Metropolitan Water Supply and Sewage Board (HMWSSB) - within GHMC and upto ORR area:

Earlier, the data furnished in Annexure III @ pg 2507 was regarding the location, capacity and status of STPs which were under construction in the GHMC area including under the AMRUT 2.0 Scheme.

The latest position is described hereinafter. Originally 31 STPs of 1259.50 MLD were proposed in GHMC area. Due to site constraints, certain STPs were cascaded and same capacity STPs were planned at 27 locations instead of 31 locations. Out of 27 STPs, 1 STP (28 MLD) is in court case and another 6 STPs (125.5 MLD) are proposed under AMRUT-2.0 list is attached.

Now, 20 STPs are considered (1106 MLD). Out of 20, 11 STPs of 663 MLD are completed & 9 STPs of 443 MLD are programmed to be completed by April'2025.

The details of above STPs is herewith shown in *Annexure-A6*.

That further it is submitted that the data furnished in the earlier Annexure-IV pertains to the existing STPs. The latest position is as follows. In GHMC area, as on 31.12.2024, 36 STPs of capacity 1435.30 MLD are in operation with 1104.25 MLD (77%) of capacity utilization. The details of each existing STP along with utilized capacity have been described in *Annexure-A7*.

Further the consolidated Flows from OCEMS for 20 STPs is appended as **Annexure 8**.

Further, after completion of ongoing STPs, the total capacity of STPs in GHMC area would be 1878 MLD as against the sewerage generation of 1950 MLD and accounts for treatment capacity of more than 90% of sewage generated in GHMC area. The gap in treatment capacity of 72 MLD will be achieved by 2027. A snapshot of the details regarding sewage generation and treatment has been provided in the table below:

Sl. No.	Sewage Generation & Treatment	MLD
1	Sewage Generation in GHMC & upto ORR (as on the date of NGT order 29.09.2022)	1950.00
2	Existing STPs Capacity (25 Nos)	772.30
3	Newly Constructed & commissioned STPs (11 Nos)	663.00
	Total Installed STPs capacity (2) & (3)	1435.30
4	Present Utilization Capacity	1104.25 (77%)
5	New STPs under construction (9Nos - nearing completion)	443.00
6	Utilization Capacity after completion of under progress STPs (April'2025)	90%
7	Gap in Treatment Capacity, being taken up under AMRUT-2	72.00

(B) As per Engineer In Chief (ENC)-Public Health (PH) the data for the 115 ULBs in the State of Telangana:

- (a) Earlier the data furnished in Annexure III is regarding the status of under construction STPs in other than Polluted River Stretch Area (PRS). @ Pg 2511. Out of total 9 Nos of STPs in 8 ULBs, with a capacity of 178.96 MLD, 5 Nos with capacity of 54.91 MLD is projected to be completed by June 2025. Balance 4 Nos of STPs could not be materialized due to various reasons as stated in the below mentioned Annexure. The updated report of under constructions STPs in ULBs (i.e. Urban other than GHMC) is detailed in **Annexure-A9**.
- (b) As regards the details of existing STPs with utilisation capacity in the State under the PH & MED, prior to the Judgment dated 29.09.2022 and post the said judgment is as follows. In the said ULBs, as on 31.12.2024, the details of existing 16 Nos of STPs in 10 ULBs, capacity 167.80 MLD, which are in operation with 65.25 MLD capacity utilization are as detailed in **Annexure-A10&A10(i)**.
- (c) The details of STPs under Public Health and Municipal Engineering Department (Urban, other than ORR) as taken up under AMRUT 2.0 have been described in **Annexure-A11**. In this regard, it is submitted that the total capacity proposed under AMRUT 2.0 is 170.30 MLD. The gap in treatment of 102.55 MLD will be achieved by July'2027.

(d) That it is humbly submitted that in the earlier scheme (like Urban Infrastructure Development Scheme for Small and Medium Towns [UIDSSMT]) there was no provision for house service connections. Due to technical constraints in ULBs, the connections could not be given. Hence the expected flow was not reaching STPs. It is proposed to take up the same under AMRUT 2.0.

(e) That the State Government vide G.O. Rt. No. 388, dated 21-08-2024 accorded Administrative Sanction for an amount of Rs.3769.34 Crores (including O&M and Annuity payments and GST on Interest component of Annuity payments) for establishment of 115 No's of STPs in 101 ULBs other than Ramagundam (which is proposed in AMRUT 2.0. with a total capacity of 455.00 MLD in the State of Telangana under SBM 2.0. Technical sanction accorded and the Tenders will be invited shortly. The details are enclosed in *Annexure-A11(i & ii)*

F. Observation: Regarding extent of utilisation of treatment capacities of STPs and standards prescribed for Faecal Coliform

“...

- (ii) **On examination of performance data given in Annexure-V regarding functioning of STPs, we find that extent of utilization of treatment capacities and final point/ mode of disposal of treated sewage, has not been disclosed. Further, Telangana PCB is required to clarify on the Standards prescribed in CFO with regard to Faecal Coliform as they are in variance with regard to the Standards set out by the Tribunal in order dated 30.09.2018 passed in OA 1069/2018.**

...”

Response:

- 35) As per the Hyderabad Metropolitan Water Supply and Sewage Board (GHMC & ORR Area), the functioning of 36 STPs of capacity 1435.30 MLD which are in operation with 1104.25MLD (77%) (as per OCEMS data shown in Annexure 8) of capacity utilization & final disposal points as desired are now detailed in Annexure-A12.**
- 36) As per Public Health and Municipal Engineering Department or ‘ENC-PH’ (115 ULBs), the details of existing 16 Nos. of STPs capacity is 167.80 MLD, whereas operational capacity is 65.25 MLD is detailed in Annexure-A10. The Treated sewage in ULBs is disposed to nearby water bodies/ agricultural fields.**

37) That with regard the Faecal Coliform, the standards prescribed in CFO by the State Pollution Control Board adopted are as per the CPCB guidelines, which are being adhered to by the implementing authorities. The CFO standards for Faecal Coliform in compliance with the standards prescribed by this Hon'ble Tribunal are placed before the Technical Committee and its recommendations already submitted to MoEF but yet to be notified.. However, as on today the test results of Faecal Coliform at various STPs are within the limits as shown in the **Annexure-A13 and 13(i)**.

G. Observation - Sewage Generation, Treatment and Gap for each 141 ULB

“...

(iii) Annexure III and Annexure IV need to be further elaborated by giving figures of sewage generation, treatment and gap for each 141 ULB.

...”

Response:

38) **That as per information provided by the ENC-PH**, the Details of sewage generation, existing sewage treatment plants under various Schemes such as Amrut 2.0. and other Schemes such as SBM, utilisation capacity and gap for each 141 ULB including certain challenges due to land acquisition are appended in *Annexure-A14*.

H. Observation– Status on sewage generation and processing by GHMC

“...

(iv) Factual status on sewage generation for GHMC, installed capacities and utilisation of existing STPs, performance of STPs and final mode of disposal, has not been disclosed.

...”

Response:

39) That, as stated earlier, the Sewage Generation in GHMC & upto ORR (as on the date of NGT order 29.09.2022) was 1950 MLD. The capacity of existing 36 STPs (25+11) as on 31.12.2024 is 1435.30 MLD (772.30 + 663 MLD). The present utilization capacity at these 36 STPs is 1104.25 MLD (77%). Further another 9 Nos of 443 MLD capacity STPs in GHMC area are nearing completion. After its completion the total installed capacity of STPs would be 1878 MLD which accounts for more than 90% of sewage treatment.

The STP wise report on Sewage Generation, installed capacity, utilization and performance of STPs, disposal points are detailed in *Annexure-A7&A12*.

II. Additional Observations of the Hon'ble Tribunal

40) State of Telangana has sought permission to utilise environment compensation for restoration measures which is estimated to be Rs. 3,800 crores but in view of Para 50 to 53 of the order dated 29.09.2022 and observations made in the order dated 21.12.2023, no further clarification is required.

That by way of the I.A.299 of 2024, the Applicant/Answering Respondent submitted that the State of Telangana has been able to achieve substantial amount of progress in creating facilities in respect of both the Solid and Liquid Waste Management as per timelines set by this Hon'ble Tribunal as on the dates of last hearings held on 21.12.2023 & 22.08.2024 (Order dated 12.09.2024) and timelines now proposed by the respective implementing Departments. The details have been furnished in the said IA as well as by way of this Affidavit of compliance on the amounts spent and proposed to be spent specifically on the *infrastructure/remediation measures implemented* as a part of levy of Environmental Compensation of Rs. 3,800 Crores to the State of Telangana vide Order dated 29.09.2022. Permission has accordingly been sought to utilize the Environment Compensation so far spent for the purpose, for kind consideration by this Hon'ble Tribunal.

41) We find that Schedule I of MSW Rule is violated and also there is non-compliance with the provisions of Water Act, 1974 and the directions of the Hon'ble Supreme Court in Paryavaran Suraksha.

It is submitted that the Government of Telangana has no intention to violate any Rules or Provisions of the Statute or directions of the Hon'ble Supreme

Court. The Government has been putting its efforts in complying with the directions of this Hon'ble Tribunal, which have been explained in the *supra* paragraphs direction/observation-wise. A Summary of the Treatment Facilities, Government sanctions and Status of STPs, equal to the amount of Environmental Compensation of Rs. 3,800 Crores levied is provided in **Annexure A15**.

42) **Reasons for delay in implementation of treatment facilities**

A. **CDMA (Solid Waste Management):**

(a) **Power/Electricity:**

One of the main reasons for delay in treatment of the dump-sites is due to low capacity sites like 2000/3000 tons and ranges up to 10,000 tons. Like this there are 20 sites and are located in a very isolated places & outside the habitation areas and low lying sites away from the village. For arranging treatment equipments/machinery at the dump sites, power supply is main factor. It requires a minimum 120 kv power lines. Due to locations at the isolated and & outside the habitation areas, drawing power lines to such sites will be a practical difficulty, and for providing 120 kv power lines, it costs Rs. 30 to 40 lakh. Whereas the actual cost for the treatment will not be more than Rs. 20 lakh. Due to problem in providing power, which will be an additional cost and time consuming, the Projects are not being completed within the time-frame.

DG set as alternative arrangements are being provided by the concessionaires for implementing Biomining project.

(b) Intense Rainfall and Floods:

The targeted objectives for waste processing and land reclamation could not be achieved due to severe disruptions caused by intense rainfall and flash floods. These unforeseen weather events significantly hampered operations, limiting accessibility to the project sites and delaying the implementation of planned activities. Consequently, the adverse environmental conditions affected the pace and efficiency of the work, resulting in shortfalls in meeting the expected outcomes.

Biomining sites with less than 3000 MTs shall be prioritized to undertake biomining during the rainfall with measures including arrangement of temporary covers.

List of ULBs with less than 3000 MTs of Legacy waste:-

1) Adibatla, 2) Alair, 3) Alampur, 4) Amarchinta, 5) Andole-Jogipet, 6)Atmakur, 7) Bhoothpur, 8) Choppandandi, 9) Dubbaka, 10)Kodangal, 11)Maripeda, 12) Narsampet, 13) Nerducherla, 14) Pebbair, 15)Pochampally, 16)Tirumalagiri and 17) Yadagirigutta.

(c) Moisture Content:

The high moisture content in the waste, persisting even after the monsoon season, has caused frequent machinery jams and breakdowns. This excessive moisture has not only disrupted the smooth functioning of equipment but also slowed down the overall waste processing operations, further impacting productivity and efficiency.

(d) Seasonal vagaries:-

As the dump sites are located in the interior process and low laying areas, rain water is likely to accumulate in such places due to gravity, whereby the dump sites

are getting totally wet and it will take longer time to get dried up. The contracting Agencies who have undertaken the work, have to wait till the season is passed over.

Similarly, during the winter season, moisture content is heavy due to mist/fog which is very common in the locations and isolated places, heavy greenery, etc. Due to this reason the Contracting Agencies have to wait till the winter season is passed over.

Solid Waste/dump sites are being actively treated mainly during summer season in Telangana viz, March, April and May. This season the Contracting Agencies work more number of hours and the work would also get speeded up and maximum quantity of waste is possible to be treated.

B. HMWSSB & PHED (Liquid Waste Management):

- (a) It is submitted that there are certain contingent problems being faced in implementation of the Schemes for setting up of Plants, viz, land acquisition, adjacent owners disputing the border issues in the Government lands with an intention of “Not In My Back Yard” (**NIMBY**)& filing cases in Hon'ble High Court, plant erection, time & cost over-run, etc. Otherwise, there is absolute intention to comply the orders of the Hon'ble NGT in the public interest for abatement of pollution and abiding the guidelines of the Liquid/Sewage Waste Management and Solid Waste Management Rules. That the Applicant undertakes hereunder that the State shall continue to put in all efforts to achieve the 100% treatment facilities in this regard as per schedules committed by the State Government.

- (b) Setting up of STPs is mainly dependent on allotment of required land by the Government of Telangana for both HMWSSB and PH&ME Departments. The lands have been allotted by the Government out of the Government land banks available, mostly nearby water bodies. So as it will be easy and viable option for letting treated water into the existing water body(s) so that such water body would get rejuvenated. Further, the STP experts/consultants have also suggested to construct STPs near water bodies. With this, 'dual purpose' will be served viz, capturing small streams of sewage flow and diverting into the STP, will be very easy and after treatment of sewerage, the treated water will also very easy to let into water body(s).
- (c) There is an embargo that constructions of structures are not allowed within the FTL/Buffer Zone. Though, there is a special exemption sanctioned by the Government of India vide Memo No.F.No.22-39/2020-IA.III, dated 14.02.2022 whereby Para No. 6 (i) Exemption to the Water Developmental Projects (*Annexure-A16*) and STPs are being allowed to construct near water bodies. Despite Government land, some of the private individuals are obstructing the construction of STPs as proposed near the water bodies and filing cases before the Hon'ble Courts (mainly High Court-15 cases are filed and pending now). For the said reason of litigation of land and court orders, (Government Implementing Agencies - HMWSSB & PHED) are finding difficult to locate alternate lands for setting up of STPs which is main reason for delay in implementation of the STP Projects.
- (d) Further, the STPs which are proposed in the ULBs, they are very small capacities and the Department is facing difficulty in getting the contract Agencies through e-Procurement Platform; because of which earlier (2)

Tenders did not get response and the PH&MED has issued the 3rd Tender now.

6. In addition to the above STPs, as part of FSSM, the Public Health Department has taken up 68 FSTPs of 470 KLD capacity in 68 ULBs to treat Septage and progress of work is in different stages of construction and they are proposed to be completed within the period of 2 years.

A list of 68 FSTPs of 470 KLD capacity in 68 Urban Local Bodies established in Telangana State are annexed as *Annexure A17*.

7. It is humbly submitted that as explained supra, the Government of Telangana has been honoring orders of the Hon'ble Tribunal and taken necessary measures as per the earlier orders passed by this Hon'ble Tribunal, vide orders dated 22.02.2021 in OA No. 593 of 2017 (Principal Bench), and Quarterly and Half-yearly Progress Reports have also been regularly submitted to the Central Monitoring Committee (CMC), headed under the Chairmanship of the Secretary, Department of Water Resources, River Development and Ganga Rejuvenation, Ministry of Jal-Shakthi, New Delhi under "National Mission for Clean Ganga".

8. It is submitted that the following table showing the Summary of the Environmental Compensation levied by the Hon'ble NGT, adding new capacities of both Solid Waste & Liquid Waste completed up to March, 2025 and the balance capacities to be completed from April, 2025 onwards:-

(Rupees in Crores)

Sl. No	Description	Rupees in Crores	Capacities added/ completed from Sept' 2022 to December-2024		Capacities added/ completed from Jan to March - 2025.		Capacities to be completed from September-2022 to March-2025.		Capacities to be created from 01.04.2025 onwards	
			(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1)	(2)	(3)	MLD/MT	Amount	MLD/MT	Amount	MLD/MT	Amount	MLD/M	Amount
	Gap in treatment of Liquid									

1	Waste/sewage i.e. 1,824 MLD, compensation calculated @ Rs.2.00 crore per MLD for untreated liquid Waste.	3,648.00								T	
	(i) Within the City Of Hyderabad:	1178 MLD (Rs. 2356 Cr)		663	1326	329.5	659	992.50	1985	185.5	371
	(ii) Within the Telangana State excluding (i) above :	646 MLD (Rs. 1292 Cr)		33.5	70.10	17.16	34.32	52.21	104.42	594	1188
2	Un-remediated/un-processed Legacy Waste of 59,00,000 MT compensation calculated@ Rs. 300/- per MT.	177.00 115.38(R)									
	Revised figure: 38,46,000 MT(R)										
	(i) Within the City of Hyderabad :	MT	-	-	-	-	-	-	-	-	-
	(ii) Within the Telangana State excluding (i) above:	38.46 MT	13,43,000	40.29	3,47,000	10.41	16,69,000	50.70	21,56,000	65	
	Total:	3,825.00 3763.38 (R)	1436.39			703.73		2140.12		1624	
	Say Rs.	3,800.00									
									Total: Col. No. (9)	= 2140.12	
									Total: Col. No. (9) + (11)	= 3764.	
	Note: (1) (R) Revised amount, which is reduced due to reduction of quantity after Scientific Survey.										
	(2) Detailed Statement showing calculation of Environmental Compensation (EC) is enclosed Annexure-A18										

9. It may be seen from the above Table - and also from the Government G.Os referred to supra, issued with Administrative Sanctions for setting up of STPs within GHMC area, the State Government with concerted efforts and to comply with the directions of the Hon'ble NGT have been able to achieve (i) treatment capacity up to 84% of the sewage generated within GHMC/Hyderabad Limits by March - 2025 and (ii) in ULBs(Telangana State) the treatment facilities will be created within a period of two years. (Reasons for delay has been explained in Part-IV). Similarly, the Legacy Waste is being treated to the extent of 100% in GHMC/Hyderabad and 44% within the Telangana State ULBs by March - 2025.
10. It is submitted that there is a gap in treatment facilities in respect of both Sewage Waste in the Hyderabad city and Rural areas (ULBs) and Legacy Waste in ULBs in the State of Telangana. However, the Government of Telangana has sanctioned necessary funds for creating of treatment facilities

to the extent of 100% of the Sewage and Legacy Waste. At present, the State Government has been directly releasing the funds on the basis of requisition and requirement of funds to the Implementing Agencies of the Government, viz, HMWSSB, CDMA, PHED.

The gap in capacities in respect of both Liquid Waste (Sewage Waste) and Solid Waste (Legacy Waste) are shown at Column No. 17 in the above *Annexure-A18* (Reference to Table) works out to 84% (HMWSSB) & 8% (PHED) of Sewage and 45% of Legacy Waste respectively.

In terms of the compensation calculated in the above table at ColumnNo. 19 (*Annexure-A18*), the gap works out as follows;-

		(Rupees in Crores)
(i) Liquid/Sewage Waste :		
(a) HMWSSB 16% i.e., 186 MLD	=	371.00
(b) PHED 92% i.e. 594 MLD		
calculated @ of Rs. 2.00 Crore per MLD	=	1188.00
 (i) Solid/Legacy Waste: CDMA 56 % i.e., 21,56,000 MT		
Calculated @ of Rs. 0300/- per MT works out to	=	64.68

TOTAL	=	1624.00

It is submitted that the above gap/balance capacities in respect of Liquid Waste and Solid Waste will be completed from April, 2025 onwards, for which a compensation of Rs.1624 Crores, (AMRUT-2.0 and the State Government funding has already been tied up and the Administrative Sanctions are issued).

11. It is therefore humbly prayed that this Hon'ble Tribunal may please consider the I.A No. 299 of 2024 in Original Application No. 606 of 2018 and pass order or such other as the Hon'ble Tribunal may deem fit and proper in the circumstances of the case.

Filed through

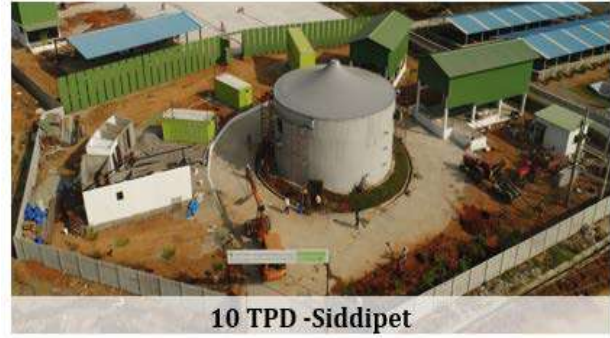
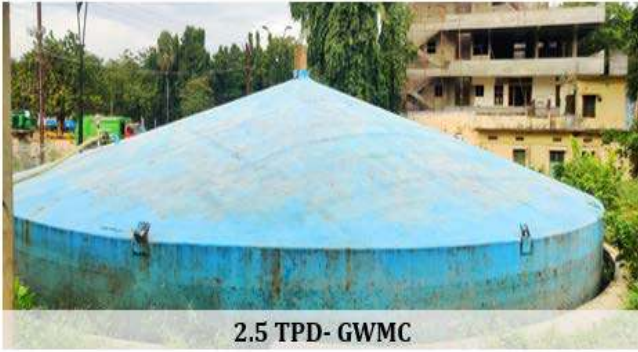
Sraavan Kumar Karanam
Advocate for Applicant

ANNEXURES

1 TO 18

Annexure- A1

Figure 1 : Wet waste processing- (bio-methanation plants)



3211

Figure 2: Compost Sheds in ULBs(windrow composting / vermi composting):



Huzurabad - 8 TPD



Narsingi - 4TPD



Siddipet - 38.4 TPD



Mahabubnagar-50 TPD



Medchal - 22 TPD



Sircilla - 13 TPD

Figure 3: DRCCs in ULBs



Kompally - 3.5 TPD



Korutla-14 TPD



Sircilla - 10 TPD



Mancheril - 35 TPD



Siddipet - 20TPD



Badangpet - 2TPD



Boduppal - 32 TPD



Mahabubnagar-50 TPD

Statement showing ULB-wise waste generation processed and gap in treatment of solid waste:-

S.No	Name of the ULB	Total Waste Generation (TPD)	Bio Degradedable			Non Bio Degradedable		Gap in treatment (TPD)
			Generation (TPD)	Processing - Compost (TPD)	Processing - Bio Gas (TPD)	Dry waste Generated (TPD)	Dry waste processed (TPD)	
1	Adilabad	90	43.5	19	0	46.5	5	66
2	Kothagudem	50	27.5	8	0	22.5	5	37
3	Manuguru	15	8.25	7	0	6.75	5	3
4	Palvancha	40	16.5	5	0	23.5	15	20
5	Yellandu	15	8.25	7	0	6.75	6	2
6	Dharmapuri	10	5.5	5	0	4.5	5	0
7	Jagityal	70	38.5	34	0	31.5	30	6
8	Korutla	30	16.5	15.5	0	13.5	12	2.5
9	Metpalli	25	13.75	11	0	11.25	10	4
10	Raikal	10	5.5	5	0	4.5	3.5	1.5
11	Jangaon	25	13.75	5	0	11.25	5	15
12	Bhupalpally	25	13.75	5.5	0	11.25	2.5	17
13	Alampur	5	2.75	1	0	2.25	1	3
14	Gadwal	30	16.5	1	0	13.5	1	28
15	leeja	15	8.25	5	0	6.75	5	5
16	Waddepalle	7.25	5	4	0	2.25	1.5	1.75
17	Banswada	15	8.25	1	0	6.75	1	13
18	Kamareddy	70	38.5	10	0	31.5	5	55
19	Yellareddy	10	5.5	6	0	4.5	3	1
20	Choppandandi	10	5.5	4.5	0	4.5	4	1.5
21	Huzurabad	20	11	5	0	9	5	10
22	Jammikunta	20	11	4	0	9	4	12
23	Karimnagar MplCorp	198.5	102	25	0	96.5	35	138.5
24	Kothapally	5	2.75	2.75	0	2.25	2.25	0
25	Khammam MplCorp	192.25	97.75	15	0	94.5	15	162.25
26	Madhira	15	8.25	1	0	6.75	1	13
27	Sattupalli	15	8.25	5.5	0	6.75	5	4.5
28	Wyra	15	8.25	5	0	6.75	5	5
29	Kagaznagar	25	13.75	5.5	0	11.25	5	14.5
30	Bhoothpur	5	2.75	1.5	0	2.25	1	2.5

S.No	Name of the ULB	Total Waste Generation (TPD)	Bio Degradedable			Non Bio Degradedable		Gap in treatment (TPD) G = (A-C-D-F)
			Generation (TPD)	Processing - Compost (TPD)	Processing - Bio Gas (TPD)	Dry waste Generated (TPD)	Dry waste processed (TPD)	
			A	B	C	D	E	
31	Jadcherla	25	13.75	7.5	0	11.25	5	12.5
32	Mahaboobnagar	150	76	35	0	74	50	65
33	Dornakal	5	3	1	0	2	1	3
34	Mahabubabad	25	13.75	12	0	11.25	10	3
35	Maripeda	10	5.5	2.5	0	4.5	2	5.5
36	Thorrur	10	5.5	3	0	4.5	2	5
37	Bellampally	25	13.75	5	0	11.25	5	15
38	Chennur	15	8.25	1	0	6.75	1	13
39	Kyathanpally	15	8.25	1	0	6.75	1	13
40	Luxettipet	15	8.25	1	0	6.75	1	13
41	Mancherial	50	27.5	8	0	22.5	5	37
42	Mandamarri	20	11	1.5	0	9	1	17.5
43	Nasipur	30	16.5	1	0	13.5	1	28
44	Medak	20	11	11	0	9	5	4
45	Narsapur	10	5.5	2	0	4.5	2	6
46	Ramayampet	10	5.5	2	0	4.5	2	6
47	Thoopran	10	5.5	3	0	4.5	2	5
48	BoduppalCorp	20	11	11	0	9	9	0
49	Dhammaiguda	29.5	25	25	0	4.5	4.5	0
50	Dundigal	20	11	11	0	9	9	0
51	Ghatkesar	15	8.25	5.5	0	6.75	6.75	2.75
52	Gundlapochampally	6	2.75	2.75	0	3.25	3.25	0
53	JawaharnagarCorp	40	20	20	0	20	20	0
54	Kompally	30	15	15	0	15	15	0
55	Medchal	24	15	15	0	9	9	0
56	Nagaram	15	8.25	8.25	0	6.75	6.75	0
57	NizampetCorp	49	40	40	0	9	9	0
58	PeerzadigudaCorp	30	15	15	0	15	15	0
59	pocharam	15	8.25	8.25	0	6.75	6.75	0
60	Thumkunta	15	8.25	8.25	0	6.75	6.75	0
61	Atchampet	15	8.25	2	0	6.75	2	11
62	Kalwakurthy	15	8.25	4	0	6.75	5	6

S.No	Name of the ULB	Total Waste Generation (TPD)	Bio Degradedable			Non Bio Degradedable		Gap in treatment (TPD) G = (A-C-D-F)
			Generation (TPD)	Processing - Compost (TPD)	Processing - Bio Gas (TPD)	Dry waste Generated (TPD)	Dry waste processed (TPD)	
			A	B	C	D	E	
63	Kollapur	15	8.25	2	0	6.75	5	8
64	Nagarkurnool	20	11	4.5	0	9	4	11.5
65	Chandur	5	2.75	2	0	2.25	2	1
66	Chityal	5	2.75	2	0	2.25	2	1
67	Devarakonda	15	8.25	5	0	6.75	2	8
68	Haliya	10	5.5	1	0	4.5	1	8
69	Miryalguda	70	38.5	9	0	31.5	5	56
70	Nakrekal	15	8.25	5	0	6.75	5	5
71	Nalgonda	100	55	45	0	45	5	50
72	Nandikonda	10	5.5	2.5	0	4.5	2	5.5
73	Kosgi	10	5.5	1	0	4.5	1	8
74	Makthal	15	8.25	3	0	6.75	6.75	5.25
75	Narayanapet	20	11	11	0	9	9	0
76	Bhainsa	20	11	4	0	9	4	12
77	Khanapur	10	5.5	2.5	0	4.5	3.5	4
78	Nirmal	50	27.5	23	0	22.5	22.5	4.5
79	Armur	25	13.75	5	0	11.25	5	15
80	Bheemgal	10	5.5	1	0	4.5	1	8
81	Bodhan	50	27.5	8	0	22.5	6	36
82	Nizamabad MplCorp	220	137.5	12	0	82.5	40	168
83	Manthani	10	5.5	2.5	0	4.5	2	5.5
84	Peddapalli	20	11	8	0	9	8	4
85	RamagundamMplCorp	150	82.5	22.5	0	67.5	25	102.5
86	Sulthanabad	10	5.5	1	0	4.5	1	8
87	Sircilla	50	27.5	13	1	22.5	5	31
88	Vemulavada	20	11	10	0	9	8	2
89	Adibatla	10	5.5	5.5	0	4.5	4.5	0
90	Amangal	15	8.25	3	0	6.75	3	9
91	Badangpet	40	25	25	0	15	15	0
92	Bandlaguda Jagir	15	8.25	8.25	0	6.75	6.75	0
93	Ibrahimpattanam	15	8.25	5	0	6.75	5	5
94	Jalpally	25	13.75	13.75	0	11.25	11.25	0

S.No	Name of the ULB	Total Waste Generation (TPD)	Bio Degradedable			Non Bio Degradedable		Gap in treatment (TPD) G = (A-C-D-F)
			Generation (TPD)	Processing - Compost (TPD)	Processing - Bio Gas (TPD)	Dry waste Generated (TPD)	Dry waste processed (TPD)	
			A	B	C	D	E	
95	Kothur	5	2.75	2.5	0	2.25	1	1.5
96	Manikonda	35.5	25.5	25.5	0	10	10	0
97	MeerpetMplCorpn	50	27.5	27.5	0	22.5	22.5	0
98	Narsingi	30	15	15	0	15	15	0
99	Pedda Amberpet	15	8.25	8.25	0	6.75	6.75	0
100	Shadnagar	25	13.75	12	0	11.25	5	8
101	Shamshabad	20	11	11	0	9	9	0
102	Shankarpally	10	5.5	1	0	4.5	1	8
103	Thukkuguda	10	5.5	5.5	0	4.5	4.5	0
104	Turkayamjal	20	11	11	0	9	9	0
105	Ameenpur	20	11	11	0	9	9	0
106	Andol-Jogipet	15	8.25	2.5	0	6.75	2	10.5
107	Bollaram	15	8.25	8.25	0	6.75	6.75	0
108	Narayankhed	10	5.5	1	0	4.5	1	8
109	Sadasivapet	20	11	1	0	9	1	18
110	Sangareddy	50	27.5	10	0	22.5	5	35
111	Tellapur	15	8.25	8.25	0	6.75	6.75	0
112	Zaheerabad	50	27.5	8	0	22.5	5	37
113	Cherial	10	5.5	1	0	4.5	1	8
114	Dubbaka	15	8.25	3.5	0	6.75	3	8.5
115	Gajwel	20	11	5	0	9	5	10
116	Husnabad	15	8.25	4	0	6.75	4	7
117	Siddipet	70	38.5	28.5	10	31.5	31.5	0
118	Huzurnagar	15	8.25	1	0	6.75	1	13
119	Kodada	30	16.5	8.5	0	13.5	6	15.5
120	Neredcherla	5	3	1	0	2	1	3
121	Suryapet	100	48.5	36	0	51.5	35	29
122	Tirumalagiri	10	5.5	1	0	4.5	1	8
123	Kodangal	5	2.5	1	0	2.5	1	3
124	Parigi	10	5.5	1.5	0	4.5	1	7.5
125	Tandur	30	16.5	5	0	13.5	5	20
126	Vikarabad	25	13.75	11	0	11.25	5	9

S.No	Name of the ULB	Total Waste Generation (TPD)	Bio Degradedable			Non Bio Degradedable		Gap in treatment (TPD)
			Generation (TPD)	Processing - Compost (TPD)	Processing - Bio Gas (TPD)	Dry waste Generated (TPD)	Dry waste processed (TPD)	
			A	B	C	D	E	
127	Amarchinta	5	2.75	1	0	2.25	1	3
128	Atmakur	5	2.75	1	0	2.25	1	3
129	Kothakota	10	5.5	2	0	4.5	1	7
130	Pebbair	10	5.5	1	0	4.5	1	8
131	Wanaparthi	30	16.5	1.5	0	13.5	4	24.5
132	Narsampet	20	11	1.5	0	9	1	17.5
133	Parkal	15	8	1.5	0	7	1	12.5
134	Wardhannapet	5	2.75	2	0	2.25	1	2
135	Warangal MplCorpn	424	230	170	2.5	194	100	151.5
136	Alair	10	5.5	1	0	4.5	1	8
137	Bhongir	25	13	9	0	12	6	10
138	Choutuppal	15	8	1	0	7	3	11
139	Mothkur	10	5.5	1	0	4.5	1	8
140	Pochampally	10	5.5	1	0	4.5	1	8
141	Yadagirigutta	10	5.5	2	0	4.5	3	5
Total		4316	2373	1258	13.5	1943	1000.5	2044

3218 Annexure-A2

Tie-up of concessionaires with cement industries for disposal of RDF

S.no	Cluster No.	Name of the District	Name of ULBs	Name of the Agency	Tie-up cement factory Name & location
1	C1	Medchal-Malkajgiri, Yadadri-Bhuvanagiri&Janag aon Districts	Nizampet,Thumkunta,Nagaram,Po charam,Ghatkesar,Jangaon,Yadagir igutta,Mothkur,Alair,Pochampally, Choutuppal,Dundigal,Bhongir	M/s. Sagar Motors Ltd.	ACC Cement factory- Wadi Gulbarga
2	C3	Ranga Reddy District	Thukkuguda,Adibatla,Shadnagar,P eddaAmberpet,Ibrahimpattam,Jal palli	M/s. Cube Bio Energy Pvt. Ltd. in joint venture with Suman Realiti and Industrial services and M/s. Sudhakara Infratech Pvt. Ltd.	Ambuja Cement factory- Chandrapur
3	C4	Khammam, BhadradriKothagudem&Mahabubabad Districts	Khammam,Sattupalli ,Madhira,Wyra,Kothagudem,Palwancha,Manuguru,Yellandu,Mahabubabad,Maripeda,Thorur,Dornakal	M/s Cube Bio Energy Pvt. Ltd.	Maha Cement factory- Ambuja Cement factory- Chandrapur Ultratech Cement factory- Budawada Ultratech Balaji cement factory- Jaggayapet
4	C5	Mahabubnagar, Nagarkurnool, Wanaparthy, Jogulamba-Gadwal&Narayan pet District	Alampur,leeja,Gadwal,Waddepalle ,Nagarkurnool,Atchampet,Kollapur ,Kalwakurthy,Kothakota,Kosgi,Bho thpur,Makthal,Pebbair,Wanaparth y,Amarchinta,Atmakur,Jadcherla, Narayanpet	M/s. SDS Technologies in joint venture with M/s. Neptune Automation and M/s. Virogreen India Pvt. Ltd.	Shree Cement factory- Kalaburagi
5	C6	Karimnagar, Jagtial, Rajanna-Sircilla, Warangal & Hanumakonda Districts.	Wardanapet,Narsampet,Parkal,Dh armpuri,Metpally,Jagitial,Korutla,R aikal,Huzurabad,Kothapally,Chopp andandi,Jammikunta,Sircilla,Vemul awada	M/s. Annapurna Constructions in joint venture with M/s. Hind Agro and Chemicals	Dalmia Cement factory- Chandrapur.
6	C7	Kamareddy, Nizamabad & Nirmal Districts	Kamareddy ,Banswada,Yellareddy ,Nizamabad,Bodhan,Armoor,Bheemgal,Nirmal,Bhainsa,Khanapur	M/s Cube Bio Energy Pvt. Ltd.	Maha Cement factory- Ambuja Cement factory- Chandrapur Ultratech Cement factory- Budawada

S.no	Cluster No.	Name of the District	Name of ULBs	Name of the Agency	Tie-up cement factory Name & location
					Ultratech Balaji cement factory- Jaggayapet
7	C8	Adilabad, Mancherial, Peddapalli, Komaram Bheem & Jayashankar Bhupalapally Districts	Adilabad, Luxettipet, Chennur, Naspur, Bellampally, Kyathanpally, Mancherial, Mandamarri, Bhupallapally, Kagaznagar, Peddapalli, Sulthanabad, Ramagundam, Manthani	M/s. Sagar Motors Ltd.	Ultratech Cement factory- Chandrapur
8	C9	Siddipet, Medak, Sangareddy & Vikarabad Districts.	Vikarabad, Zaheerabad, Kodangal, Parigi, Tandur, Bollaram, Tellapur, Andole- Jogipet, Narayankhed, Sadasivpet, Sangareddy, Thoopran, Medak, Narsapur, Ramayampet, Siddipet, Gajwel, Dubbaka, Husnabad, Cherial	M/s Shrusthi Contech Pvt. Ltd. in joint venture with M/s. Eco India Project Pvt. Ltd. and P.H. Jadhav.	Ultratech Cement factory- Kalaburagi
9	ULB	Warangal, Karimnagar, Sangareddy, Medchal-Malkajgiri, Mahabubnagar, & Suryapet Districts	Mahabubnagar, Suryapet, Dundigal, Ameenpur, Karimnagar, Warangal	M/s Leap Associates M/s Harshitha	Orient cement factory- Basanthnagar ACC cement factory- Mancherial ACC Cement factory- Wadi Gulbarga

3220

Below are the before and after pictures of the reclaimed site.

ZAHEERABAD SITE

Before

After



3221

Below are the before and after pictures of reclaimed sites

JALPALLY SITE

Before

After



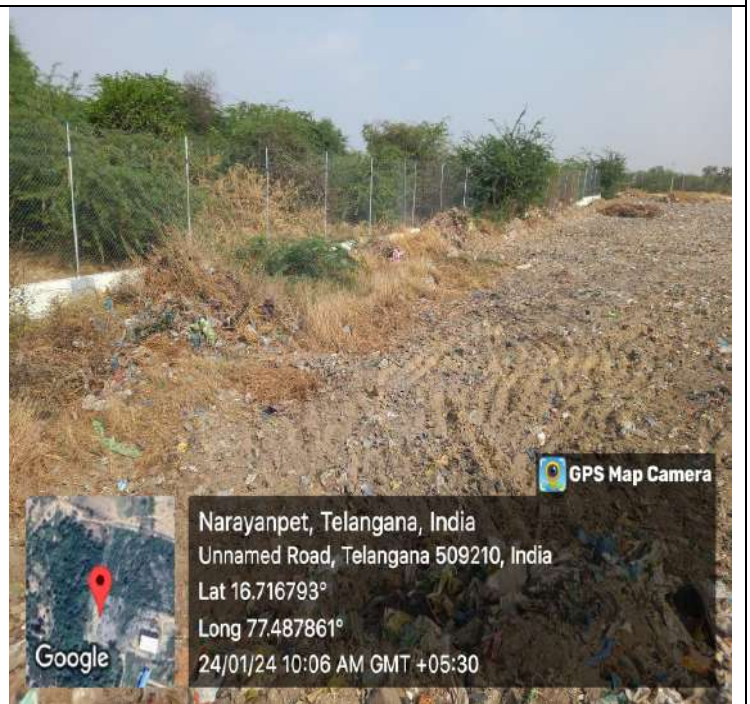
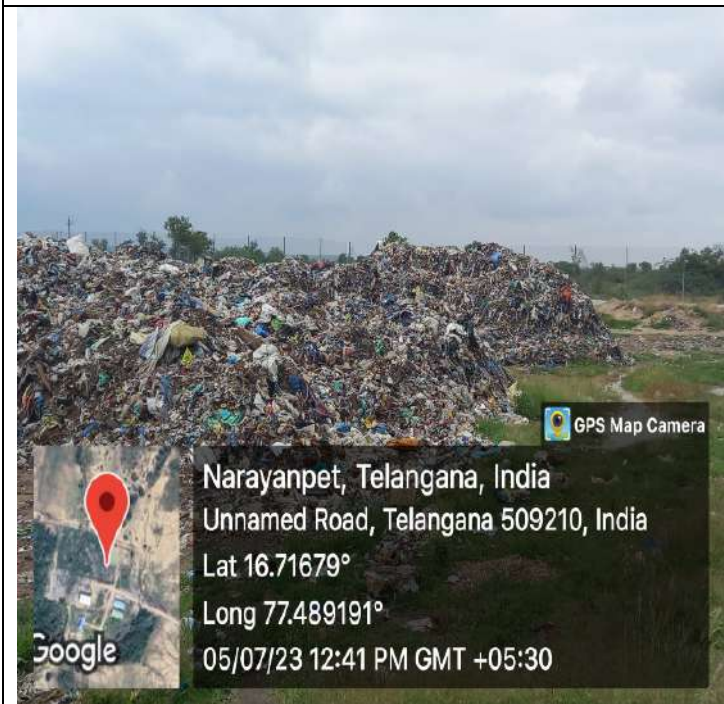
3222

Below are the before and after pictures of the reclaimed site.

NARAYANPET SITE

Before

After



3223

Below are the before and after pictures of the reclaimed site.

BHONGIR SITE

Before

After



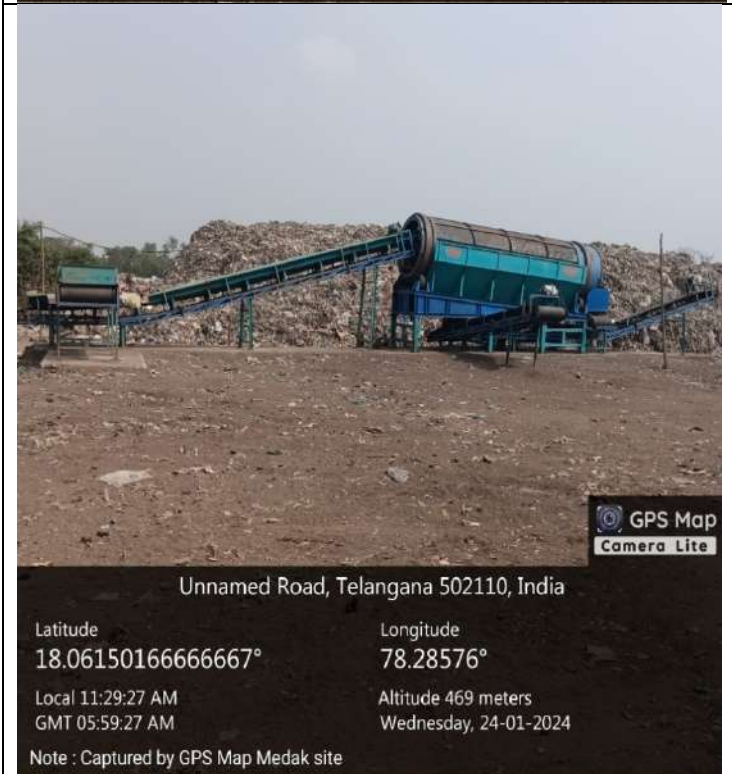
3224

Below are the before and after pictures of the reclaimed site.

MEDAK SITE

Before

After



Summary report on Quantification survey of Legacy waste- BioMining, submitted by:

1. M/s. HRP Infra Pvt Ltd. For Multi-zone 1, Warangal region.
2. M/s. Vibhasa Solutions. For Multi-zone 2, Hyderabad region.

- Out of 141 ULBs, biomining is being taken up in 123 ULBs with a legacy waste of 58 Lakh MTs. Out of the 123 ULBs, bio-mining in 05 ULBs i.e, Karimnagar, GWMC, Ameenpur, Suryapet, and Mahabubnagar is being taken up at ULB level and for 118 ULBs, all 118 ULBs are grouped into 9 clusters and work is being executed by the concessionaries and remaining 18 ULBs there is no legacy waste.
- In November 2022, the engagement of Independent Engineers, a detailed drone/ DGPS/ Total Station survey for all sites was conducted and the exact quantities lying at the dumpsites is arrived at 38.46 lakh MTs. Hence, 38.46 lakh MTs of legacy waste is considered for biomining.
- Due to the spraying of Inoculum bacteria/Bio-culture & Periodic rotations, almost 35% of the legacy waste is reduced, this is due to volume reduction. Decomposition of organic matter & release of moisture content from legacy waste.
- As per the Central Pollution Control Board (CPCB) guidelines,

"Addition of composting bio-cultures speeds up decomposition and rapidly creates biological heat within the waste that helps to dry it out and reduce its volume by 35-40%. This happens through loss of moisture and by decomposition of some of the aerated waste to carbon dioxide and water-vapor. This is called bio-remediation and makes the waste dry enough for screening."- Page-11.

Methodology of Survey:

DGPS (Differential global positioning system)- Distance from minimum 4 satellites determines position.

- Signal travel time from satellite to antenna determines the distance.
- The real-time data exists.
- 3D survey results.
- High accuracy.

Total Station Survey:

- The distance between any two points can be Calculated.
- It consists of theodolite, an EDM, and a control panel.
- High accuracy

Annexures

1. Summary table of Survey report on Quantity reduction.
2. CPCB Guidelines on Legacy Waste Management.



D. S. J.
For HRP Infra JV DGES
IAA for Bio-mining
TS-Zone-1.

S.no	ULB Name	Alotted Cluster	I.E Quantity MT	S.no	ULB Name	Alotted Cluster	I.E Quantity MT
1	Bhongir	C-1 Sagar Motors Ltd	35,104	61	Vemulawada	C-6 Annapurna	44,372
2	Dundigal		31,346	62	Sircilla		86,554
3	Choutuppal		16,824	63	Jammikunta		12,772
4	Pochampally		1,329	64	Choppandandi		2,217
5	Alair		1,185	65	Kothapally		1,231
6	Mothkur		12,572	66	Huzurabad		25,738
7	Yadagirigutta		2,196	67	Raikal		1,913
8	Jangaon		21,121	68	Korutla		65,103
9	Ghatkesar		3,370	69	Jagtial		1,57,553
10	Pocharam		0	70	Metpally		32,343
11	Nagaram		12,430	71	Dharmपुर		0
12	Thumkunta		22,321	72	Parkal		1,351
13	Nizampet		0	73	Narsampet		2,162
14	Miryalguda		33,639	74	Wardanapet		1,711
15	Nalgonda	64,278	75	Khanapur	5,444		
16	Haliya	4,446	76	Bhainsa	11,550		
17	Nandikonda	4,341	77	Nirmal	33,468		
18	Chandur	4,624	78	Bheemgal	0		
19	Chityal	3,681	79	Armoor	16,097		
20	Devarakonda	16,727	80	Bodhan	43,906		
21	Tirumalagiri	1,648	81	Nizamabad	3,51,532		
22	Huzurnagar	12,344	82	Yellareddy	0		
23	Nerducherla	2,626	83	Banswada	17,409		
24	Kodada	28,540	84	Kamareddy	77,269		
25	Jalpalli	7,666	85	Manthani	11,870		
26	Ibrahimpatnam	17,801	86	Ramagundam	14,609		
27	Pedda Amberpet	13,779	87	Sulthanabad	8,411		
28	Shadnagar	32,550	88	Peddapalli	45,479		
29	Adibatla	1,363	89	Kagaznagar	34,810		
30	Thukkuguda	8,205	90	Bhupallapally	6,151		
31	Dornakal	320	91	Mandamarri	41,736		
32	Thorrur	14,008	92	Mancherla	62,431		
33	Maripeda	2,524	93	Kyathanpally	29,945		
34	Mahabubabad	62,685	94	Bellampally	34,170		
35	Yellandu	37,602	95	Naspur	49,003		
36	Manuguru	16,410	96	Chennur	14,724		
37	Palwancha	39,914	97	Luxettipet	10,153		
38	Kothagudem	1,12,117	98	Adilabad	1,16,834		
39	Wyra	13,020	99	Cherial	0		
40	Madhira	23,725	100	Husnabad	6,412		
41	Sattupalli	12,834	101	Dubbaka	0		
42	Khammam	2,62,241	102	Gajwel	20,722		
43	Narayanpet	6,346	103	Siddipet	43,550		
44	Jadcherla	53,713	104	Ramayampet	5,234		
45	Atmakur	1,447	105	Narsapur	7,238		
46	Amarchinta	2,150	106	Medak	47,116		
47	Wanaparthy	22,338	107	Thoopran	10,036		
48	Pebbair	2,820	108	Sangareddy	1,261		
49	Makthal	11,065	109	Sadasivpet	15,648		
50	Bhoothpur	1,719	110	Narayankhed	9,291		
51	Kosgi	5,640	111	Andole-Jogipet	1,746		
52	Kothakota	7,651	112	Tellapur	22,158		
53	Kalwakurthy	8,712	113	Bollaram	16,414		
54	Kollapur	11,113	114	Tandur	6,015		
55	Atchampet	8,816	115	Parigi	9,984		
56	Nagarkurnool	8,592	116	Kodangal	1,842		
57	Waddepalle	8,817	117	Zaheerabad	53,000		
58	Gadwal	7,179	118	Vikarabad	41,557		
59	Ieeja	7,686	119	Warangal	3,91,390		
60	Alampur	2,497	120	Karimnagar	2,25,800		
			121	Ameenpur	31,620		
			122	Suryapet	80,000		
			123	Mahabubnagar	1,32,400		
			Total		38,46,210		



For HRP Infra JV DGES
IAA for Bio-mining
TS-Zone-1.

Guidelines for Disposal of Legacy Waste (Old Municipal Solid Waste)



CENTRAL POLLUTION CONTROL BOARD

(Ministry of Environment, Forest and Climate Change, Government of India)

'Parivesh Bhawan' C.B.D. Cum-Office Complex,

East Arjun Nagar, Shahdara, Delhi-110032

(February, 2019)

(zk) in absence of the potential of bio-mining and bio-remediation of dumpsite, it shall be scientifically capped as per landfill capping norms to prevent further damage to the environment.

The by-laws shall apply to every urban local body, outgrowths in urban agglomerations, Cantonment boards, Panchayat, Industrial and Institutional Townships, railways and defence establishments

Further, provisions under Schedule I (j) are given below:-

3.2 Schedule-I (j) - Closure and Rehabilitation of Old Dumps- Solid waste dumps which have reached their full capacity or those which will not receive additional waste after setting up of new and properly designed landfills should be closed and rehabilitated by examining the following options:

- (i) Reduction of waste by bio-mining and waste processing followed by placement of residues in new landfills or capping as in (ii) below.
- (ii) Capping with solid waste cover or solid waste cover enhanced with geomembrane to enable collection and flaring / utilisation of greenhouse gases.
- (iii) Capping as in (ii) above with additional measures (in alluvial and other coarse grained soils) such as cut-off walls and extraction wells for pumping and treating contaminated ground water.
- (iv) Any other method suitable for reducing environmental impact to acceptable level.

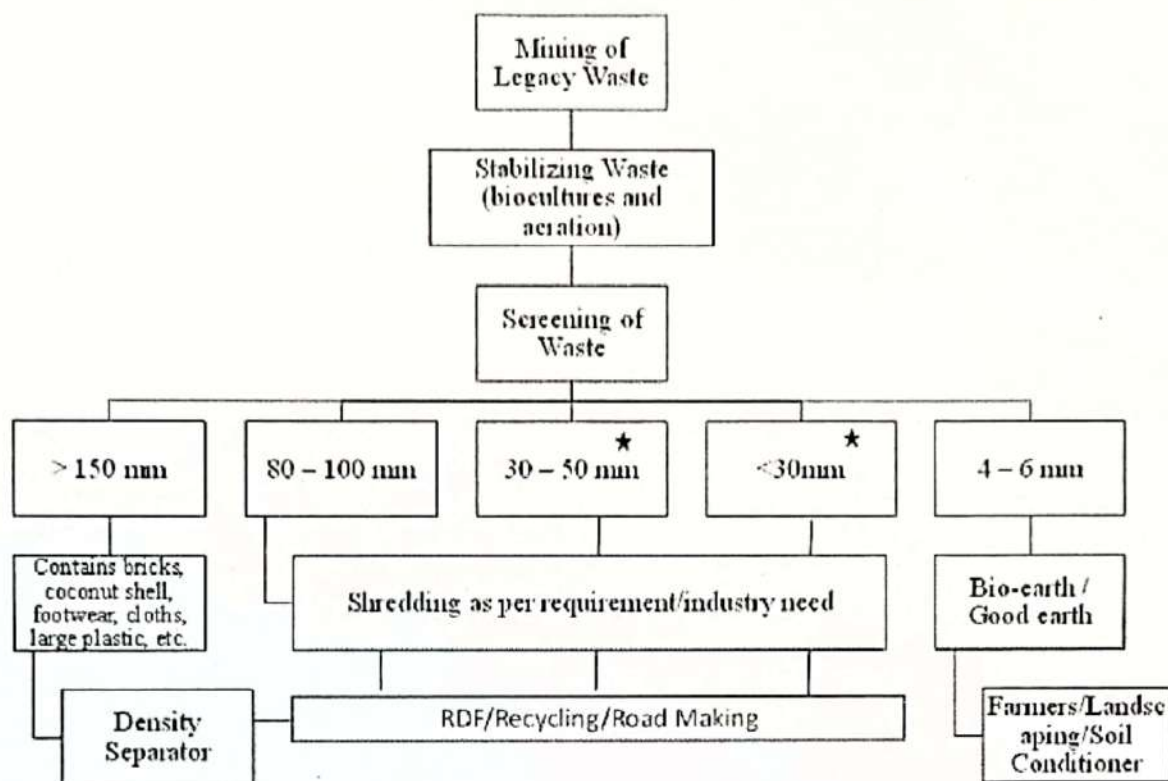
4.0 Methodology:

The treatment & disposal of Legacy MSW can be done by Bio-remediation and Bio-mining. A total station survey or drone mapping of any landfill/dumping site must be done prior to start of the project. Hence, it is suggested to ensure precursor study with history of the site, compositional analysis of waste. Site environment parameters such as baseline study of heavy metals in surface and subsurface soils and water, rainfall, soil type, surface hydrology, topography, wind direction etc. shall be studied before and after bio-mining. Periodic study should also to be carried out after completion of biomining to check for any adverse effects in the surrounding area.

4.1 Bio-remediation & Bio-mining of Old Municipal Dumpsites:

It refers to the excavation of old dumped waste and make windrow of legacy waste thereafter stabilization of the waste through bio-remediation i.e. exposure of all the waste to air along with use of composting bio-cultures, i.e. screening of the stabilized waste to recover all

valuable resources (like organic fines, bricks, stones, plastics, metals, clothes, rags etc.) followed by its sustainable management through recycling, co-processing, road making etc.



★ In Case of RDF (With Size Up to 50mm) shredding is not required

Fig. 1. Overview of Bio-remediation and Bio-mining of Legacy Waste

The first step is to excavate legacy waste, loosen it and make windrows so as the leachate can be dried off through solar exposure and all the entrapped methane is removed from the heap. All biodegradable waste, like discarded food, fruit, flower and garden waste, needs air to decompose it in an odourless way without producing leachate. So the first step in stabilizing and bringing down airless legacy waste is to expose as much of it as possible to air (Fig. 1).

Addition of composting bio-cultures speeds up decomposition and rapidly creates biological heat within the waste that helps to dry it out and reduce its volume by 35-40%. This happens through loss of moisture and by decomposition of some of the aerated waste to carbon dioxide and water vapour. This is called **bio-remediation** and makes the waste dry enough for screening. Waste is called stabilized when there is no more generation of heat or landfill gas or leachate, and seeds are able to germinate in it.

Annexure-3(i)

S.No	Name of the District	Name of the ULB	No of Dumpyards	Extent (In acres)
1	2	3	4	5
1	Adilabad	Adilabad	1	36.2
2	Bhadradi (Kothagudem)	Kothagudem	1	24
3	Bhadradi (Kothagudem)	Manuguru	1	6
4	Bhadradi (Kothagudem)	Palvancha	1	3
5	Bhadradi (Kothagudem)	Yellandu	1	5
6	Jagityal	Dharmapuri	1	3
7	Jagityal	Jagityal	2	14
8	Jagityal	Korutla	1	5.05
9	Jagityal	Metpalli	1	11.2
10	Jagityal	Raikal	1	0.25
11	Jangaon	Jangaon	1	10
12	Jayashankar	Bhupalpally	1	3
13	Jogulamba Gadwal	Alampur	1	2
14	Jogulamba Gadwal	Gadwal	1	5.19
15	Jogulamba Gadwal	Ieeja	1	4
16	Jogulamba Gadwal	Waddepalle	1	5.08
17	Kamareddy	Banswada	1	8
18	Kamareddy	Kamareddy	2	12.4
19	Kamareddy	Yellareddy	1	10
20	Karimnagar	Choppandandi	1	5
21	Karimnagar	Huzurabad	1	4
22	Karimnagar	Jammikunta	1	2.16
23	Karimnagar	Karimnagar MplCorpn	1	7.5
24	Karimnagar	Kothapally	1	5.2
25	Khammam	Khammam MplCorpn	1	48
26	Khammam	Madhira	1	5
27	Khammam	Sattupalli	1	8
28	Khammam	Wyra	1	3.2
29	Komaram Bheem	Kagaznagar	1	16.15
30	Mahaboobnagar	Bhoothpur	1	1
31	Mahaboobnagar	Jadcherla	1	6
32	Mahaboobnagar	Mahaboobnagar	1	25
33	Mahabubabad	Dornakal	3	3.5
34	Mahabubabad	Mahabubabad	1	10
35	Mahabubabad	Maripeda	1	5
36	Mahabubabad	Thorrur	1	5
37	Mancherial	Bellampally	1	10
38	Mancherial	Chennur	1	10
39	Mancherial	Kyathanpally	1	7
40	Mancherial	Luxettipet	1	1.2
41	Mancherial	Mancherial	1	21.07
42	Mancherial	Mandamarri	1	5
43	Mancherial	Naspur	1	10
44	Medak	Medak	1	7
45	Medak	Narsapur	1	5
46	Medak	Ramayampet	1	2
47	Medak	Thoopran	1	1.24
48	Medchal-Malkajgiri	BoduppallCorpn	1	4
49	Medchal-Malkajgiri	Dhammaiguda	1	1

S.No	Name of the District	Name of the ULB	No of Dumpyards	Extent (In acres)
1	2	3	4	5
50	Medchal-Malkajgiri	Dundigal	3	10.34
51	Medchal-Malkajgiri	Ghatkesar	1	3
52	Medchal-Malkajgiri	Gundlapochampally	1	1.36
53	Medchal-Malkajgiri	JawaharnagarCorpn	1	1
54	Medchal-Malkajgiri	Kompally	1	1
55	Medchal-Malkajgiri	Medchal	1	10
56	Medchal-Malkajgiri	Nagaram	1	5
57	Medchal-Malkajgiri	NizampetCorpn	1	10
58	Medchal-Malkajgiri	Peerzadiguda Corpn	1	5
59	Medchal-Malkajgiri	pocharam	1	0.5
60	Medchal-Malkajgiri	Thumkunta	1	0.16
61	Nagarkurnool	Atchampet	1	6
62	Nagarkurnool	Kalwakurthy	1	3
63	Nagarkurnool	Kollapur	1	5
64	Nagarkurnool	Nagarkurnool	1	5
65	Nalgonda	Chandur	1	1.09
66	Nalgonda	Chityal	1	2
67	Nalgonda	Devarakonda	1	6.34
68	Nalgonda	Haliya	1	1.2
69	Nalgonda	Miryalguda	1	6
70	Nalgonda	Nalgonda	1	22
71	Nalgonda	Nandikonda	1	3
72	Nalgonda	Nakrekal	1	8.05
73	Narayanapet	Kosgi	1	1.24
74	Narayanapet	Makthal	1	4
75	Narayanapet	Narayanapet	1	8.39
76	Nirmal	Bhainsa	2	15.5
77	Nirmal	Khanapur	1	2
78	Nirmal	Nirmal	1	13.22
79	Nizamabad	Armur	1	11
80	Nizamabad	Bheemgal	1	4
81	Nizamabad	Bodhan	1	22
82	Nizamabad	Nizamabad MplCorpn	1	51
83	Peddapalli	Manthani	1	1
84	Peddapalli	Peddapalli	1	6
85	Peddapalli	RamagundamMplCorpn	1	10
86	Peddapalli	Sulthanabad	1	0.2
87	Rajanna	Sircilla	1	16.25
88	Rajanna	Vemulavada	1	5.03
89	Ranga Reddy	Adibatla	1	2
90	Ranga Reddy	Amangal	1	2.04
91	Ranga Reddy	Badangpet	1	9
92	Ranga Reddy	Bandlaguda Jagir	1	2
93	Ranga Reddy	Ibrahimpattanam	1	8.04
94	Ranga Reddy	Jalpally	1	9
95	Ranga Reddy	Manikonda	1	1.23
96	Ranga Reddy	MeerpetMplCorpn	1	9
97	Ranga Reddy	Narsingi	1	5
98	Ranga Reddy	Pedda Amberpet	1	5
99	Ranga Reddy	Shadnagar	1	5
100	Ranga Reddy	Shamshabad	1	2

S.No	Name of the District	Name of the ULB	No of Dumpyards	Extent (In acres)
1	2	3	4	5
101	Ranga Reddy	Shankarpally	1	2
102	Ranga Reddy	Thukkuguda	1	2
103	Ranga Reddy	Turkayamjal	2	1.7
104	Ranga Reddy	Kothur	1	1
105	Sangareddy	Ameenpur	1	10
106	Sangareddy	Andol-Jogipet	1	2
107	Sangareddy	Bollaram	1	1
108	Sangareddy	Narayankhed	1	2
109	Sangareddy	Sadasivapet	1	5
110	Sangareddy	Sangareddy	1	4.18
111	Sangareddy	Tellapur	1	5
112	Sangareddy	Zaheerabad	1	5
113	Siddipet	Cherial	1	0.8
114	Siddipet	Dubbaka	1	6.31
115	Siddipet	Gajwel	1	10
116	Siddipet	Husnabad	1	5
117	Siddipet	Siddipet	1	10
118	Suryapet	Huzurnagar	1	10
119	Suryapet	Kodada	1	0.2
120	Suryapet	Neredcherla	1	2.36
121	Suryapet	Suryapet	2	28.23
122	Suryapet	Tirumalagiri	1	1.15
123	Vikarabad	Kodangal	1	1
124	Vikarabad	Parigi	1	4
125	Vikarabad	Tandur	1	6
126	Vikarabad	Vikarabad	1	10.03
127	Wanaparthy	Amarchinta	1	0.1
128	Wanaparthy	Atmakur	1	0.1
129	Wanaparthy	Kothakota	1	1
130	Wanaparthy	Pebbair	1	4
131	Wanaparthy	Wanaparthy	1	5
132	Hanmakonda	Warangal MplCorp	1	32
133	Hanmakonda	Parkal	1	3
134	Warangal	Narsampet	1	1
135	Warangal	Wardhannapet	1	1.8
136	YadadriBhuvanagiri	Alair	1	1
137	YadadriBhuvanagiri	Bhongir	1	5
138	YadadriBhuvanagiri	Choutuppal	1	3
139	YadadriBhuvanagiri	Mothkur	1	5
140	YadadriBhuvanagiri	Pochampally	1	6
141	YadadriBhuvanagiri	Yadagirigutta	1	5
Grand Total			150	966.73

3233 Annexure 4

Processing & Disposal of fresh MSW - GHMC

Processing & Disposal (P&D) of MSW at the Integrated MSW P&D facility located at Jawaharnagar started from 18.02.2012 and 100% of the waste collected from GHMC area and also certain surrounding gram-panchayaths, municipalities, municipal corporation, cantonment board etc is being processed and scientifically disposed.

The facility which is being operated by M/s Hyderabad Integrated MSW Ltd commenced with 2000 tons per day (TPD) treatment capacity and was enhanced over time to 8000 TPD to handle the increase in generation of MSW in the city over the years. As per the Agreement for the project, the Concessionaire is free to sell the by-products of processing and earn revenue. Following are the key activities carried out at this integrated MSW facility:

- i. Weighbridge Plaza: The MSW collected from GHMC & other surrounding local bodies is transported to the facility primarily in hermetically sealed container carrying vehicles and a few open tippers covered with tarpaulin sheets. The vehicles pass through RFID based automated weighbridge system while entering and coming out of the facility for maintaining online record of the quantities of MSW reaching the site.
- ii. Tipping Floor: The tipping floor is a concrete platform with sheet metal fencing on all sides and concrete drain network to collect leachate. Vehicles entering the facility unload the MSW at the Tipping floor. On the tipping floor, the MSW is left to dry for about a week to avoid clogging of machinery during pre-sorting.



3234

Open tipping floor



Closed Tipping floor

- iii. Pre-sorting: The MSW from the tipping floor is transported to the pre-sorting area for processing at shaft-less rotary screens called trommels (with 70 mm diameter holes) for mechanically segregating the waste into organic & inorganic fractions. The undersized material i.e., less than 70 mm in size which is predominantly compostable material is moved to the composting area. Rest of the material which is predominantly inorganic fraction will pass through a magnetic separator for separation of ferrous material and is considered as Refuse Derived Fuel (RDF).



Pre-sorting area

3235

iv. Composting Section: Aerobic Composting followed by sequential screening is done to process the organic fraction of the MSW. Following are the details:

- Biological Process: The segregated organic fraction is rearranged into trapezoidal heaps called windrows. The windrows are sprayed with EM culture (Effective Micro-organisms) and undergo weekly turning operations (for the purpose of aeration) to help bio-degradation of the organic MSW into compost. The degradation process takes about (04) weeks time. After (04) weeks, the material is tested for maturity of composting and is further taken into screening.
- Mechanical Screening: Screening is done in (02) stages:
 - i. Preparatory screening/ Coarse screening: The material is screened through 20 mm diameter holed trommels. The oversized material is sent to cement factories as fuel supplement and any excess material is disposed in the scientific landfill. The undersized material is stored in curing shed for 4 days for moisture reduction.
 - ii. Fine Screening: After curing, the material is taken up for further screening by passing through trommels with holes of 4 mm size. Undersized material below the size of 4 mm is considered as compost. Sand is separated from the compost through gravity separator. The compost so obtained is packed and marketed. The oversized material are inerts and disposed in the scientific landfill.



Windrows in closed PEB shed



Windrows in open platform



Coarse Screening of organic material



Fine Screening of organic material



Packing of compost

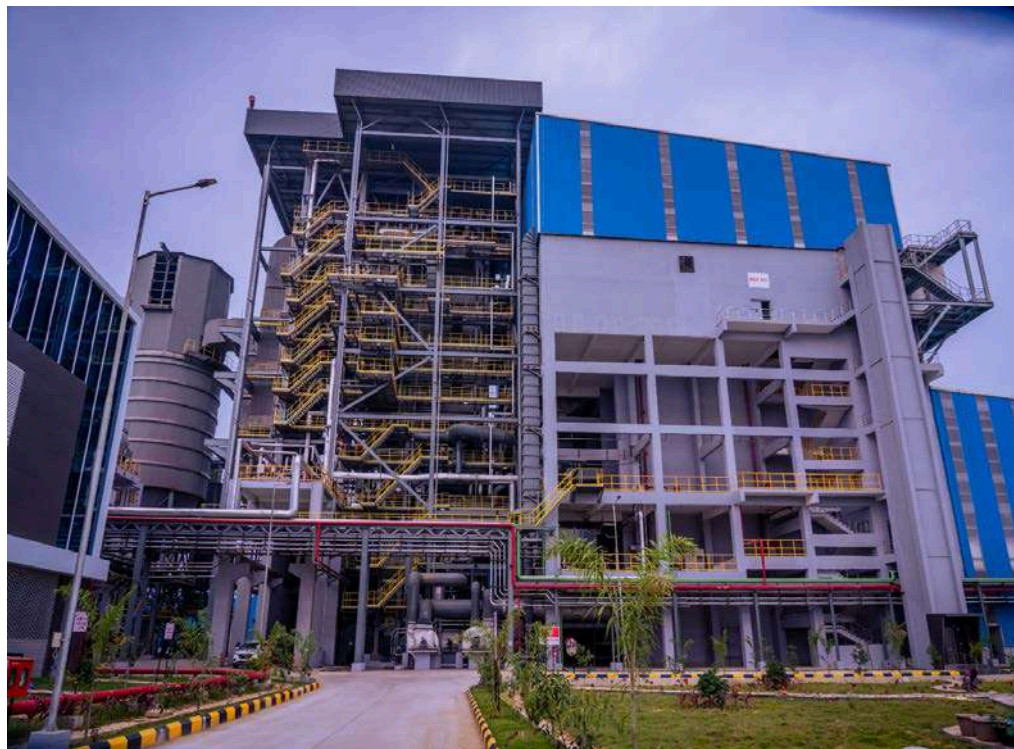
- v. Refuse Derived Fuel (RDF) Section: The RDF obtained from pre-sorting is sent to the 24 MW capacity Waste to Energy (WTE) Plant operational at the same site, 14.5 MW capacity WTE plant located at Dundigal and to a few cement plants for co-processing. To increase the off-take of RDF by cement plants a 1000 TPD capacity RDF manufacturing unit has been installed in Aug'2024 at Jawaharnagar for processing the RDF into higher quality material as required by the cement plants. The left over quantity of RDF is stored for future use in upcoming WTE plants.



RDF manufacturing unit



24 MW WTE plant at Jawaharnagar



14.5 MW WTE plant at Dundigal

- vi. Scientific/ Sanitary Landfill: The rejects/ inerts of the treatment process are disposed in scientific landfill. This landfill is constructed as per SWM Rules 2016 and CPHEEO manual including leachate collection & landfill gas collection network. Following is the quantity of rejects deposited in the scientific landfills for the period from Feb'2012 to Jan'2025:

3239

S No.	Location	Operating period	Quantity (Tons)
1	Landfill - Cell I, II, III	Feb 12 to July 2018	13,22,212
2	Landfill @ south side - Cell I to IV	Aug 2018 to March 2022	13,04,209
		April 2022 to October 2022	2,83,756
3	Landfill @ south side - Cell V	November 2022 to October 2023	4,93,884
4	Gap between Cell I-IV to RDF Units at South Side	November 2023 to Jan 2025	6,46,300
		Total :	40,50,361



Operating Landfill



Soil cover on landfill

3240

- vii. 1 MW Roof Top Solar Energy Plant: A 1 MW Solar Energy Plant is established at the facility for making effective utilization of the roof tops of the pre-sorting area sheds. The electricity generated through these solar panels is for captive usage.



1MW solar energy plant

- viii. Vehicle Maintenance Area: The vehicles being operated for transportation of MSW from city to the processing facility and vehicles operated inside the P&D facility are regularly maintained and cleaned at the Vehicle Maintenance Area established at the facility.



Vehicle maintenance area

- ix. Plastic Waste Recycling Facility: 20 TPD Plastic Waste recycling facility established in 2013 is operational at this integrated facility. The recyclable plastics are segregated, washed and processed into pellets and biomedical waste disposal bags. Presently, about 12 TPD of recyclable plastics are processed into 8 TPD of plastic granules and 3 TPD of biomedical waste disposal bags and the remaining 1 TPD process reject is mixed with RDF for further utilization as fuel in Waste to Energy Plants/co-processing in cement plants.



Extruder - Recycled Granules Making Process



Granules after recycling the plastic material



Film molding for production of bags for waste disposal

- x. Compressed Biogas plant: To utilize the landfill gas generated from the capped legacy waste dump, a 650 cum per hour input capacity CBG plant is operational since October 2021. The gas generated from the capped site is transported to the CBG plant using a common header line and after processing, it is bottled and sold to Bhagyanagar Gas Ltd under SATAT scheme. Excess gas collected is burnt using a flaring unit established at the site.



CBG plant

3243



Transportation of the CBG



Flaring of excess landfill gas from capped dump

- xi. Waste Water Complex: The leachate generated during the waste treatment process i.e., from tipping floor, pre-sorting area, compost area, RDF storage, sanitary landfill, MSW pit of WTE etc is collected at the common leachate collection sumps. The leachate is then pre-treated at the 1000 kLD capacity plant established in the site. Subsequently, the pre-treated leachate is treated in 2- stage Reverse Osmosis system with 600 kLD & 500 k LD capacity. The rejects from the RO process are treated at the 150 kLD Multi Effect Evaporator (MEE) and subsequently in the 45 kLD Agitated Thin

3244

Film Drier (ATFD) system. The permeate from RO is used to maintain greenery at the site and the condensate from MEE-ATFD is used for bottom ash quenching. The reject which is in the form of solid is mixed with RDF and utilized as fuel in the Waste to Energy Plant instead of disposing in the scientific landfill.



Waste Water Complex: Pretreatment, RO shed, MEE-ATFD system
(left to right)



Permeate used for watering green cover on top of capped dump



Permeate used to maintain greenery in the site

- xii. Laboratory: An in-house laboratory is established inside the facility for preparation of microbial-cultures, collecting-storing & analyzing leachate samples, air quality analysis, performing waste characterization studies etc.



Laboratory

3246

xiii. Odor Management measures in areas of daily operation:

Apart from capping of the legacy dump (completed) to address the major sources of odour issue, the following measures including application of Bio-enzyme through fixed misting system to replace the microorganisms in the MSW responsible for generation of odour causing by-products are being taken to address the odour generated:

- a. The daily received waste at tipping floor, RDF storage etc are covered temporarily with tarpaulin sheets, especially during winter.



- b. Soil cover on the Scientific Landfill after its saturation



- c. Spraying through Drones on the tipping floor, RDF storage and operational areas of landfill.

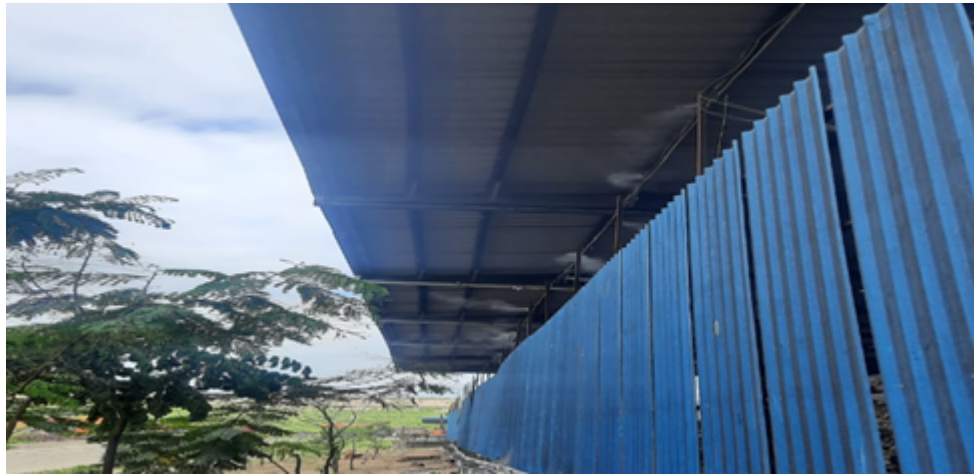


- d. Spraying of bio-enzyme through Truck mounted fog cannon at open windrows, tipping floor, RDF storage etc.



3248

- e. Fixed Misting system is erected around the entire periphery and inside working areas such as pre-sorting area, tipping floor, composting shed and monsoon shed.



- f. GI sheets are placed around the periphery of working areas to prevent suspended particles from dispersing into atmosphere.



3249

- g. Spraying of odour masking chemicals such as citronella oil is carried out in case of severe odour complaint from surrounding habitations.



X-X-X-X-X-X

GOVERNMENT OF ANDHRA PRADESH

ABSTRACT

Municipal Administration and Urban Development Department - Greater Hyderabad Municipal Corporation – H&S – Solid Waste Management – Integrated Solid Waste Management Project – Appointment of Environment Protection Training & Research Institute (EPTRI) as Independent Engineer in place of M/s. Infrastructure Corporation of Andhra Pradesh (INCAP) – Orders – Issued.

MUNICIPAL ADMINISTRATION & URBAN DEVELOPMENT (H1) DEPARTMENT

G.O.Rt.No. 843

Dated the 23rd day of July, 2010.

Read the following:-

1. G.O.Rt.No.254, MA&UD (H1) Department, dated 14.06.2010.
2. From the Commissioner, Greater Hyderabad Municipal Corporation, Hyderabad, D.O.Letter No.553/ AC(H&S)/ SWM/ GHMC/ 2010, dt:15.07.2010.

---o0o---

ORDER:-

In the reference 1st read above, Government have appointed M/s. Infrastructure Corporation of Andhra Pradesh (INCAP) as Independent Engineer for Integrated Solid Waste Management Project.

2. In the reference 2nd read above, the Commissioner, Greater Hyderabad Municipal Corporation has stated that M/s.Infastructure Corporation of Andhra Pradesh (INCAP) is not known to be an organization having domain knowledge of Solid Waste Management and stated that Environment Protection Training & Research Institute (EPTRI), a renowned Government of India Institution in environment protection, EPTRI will be more useful to perform the job of an Independent Engineer and stated that EPTRI has agreed to work as Independent Engineer, the Concessionaire (REEL) has also given consent for appointment of EPTRI as Independent Engineer. The Commissioner, Greater Hyderabad Municipal Corporation has therefore requested the Government to appoint EPTRI as an Independent Engineer for ISWM project for an initial period of three (3) years.

3. Government, after careful examination of the proposal of the Commissioner, Greater Hyderabad Municipal Corporation hereby appoint Environment Protection Training & Research Institute (EPTRI) as Independent Engineer for Integrated Solid Waste Management Project in place of M/s. Infastructure Corporation of Andhra Pradesh (INCAP) till the Independent Engineer is placed through the bidding process.

4. The Commissioner, Greater Hyderabad Municipal Corporation shall take necessary action in the matter accordingly.

(BY ORDER AND IN THE NAME OF THE GOVERNOR OF ANDHRA PRADESH)

T.S.APPA RAO,
PRINCIPAL SECRETARY TO GOVERNMENT (UD).

To

The Commissioner, Greater Hyderabad Municipal Corporation, Hyderabad.

The Director General, Environment Protection Training & Research Institute (EPTRI), Gachibowli, Hyderabad.

(through the Commissioner, Greater Hyderabad Municipal Corporation, Hyderabad)

M/s. Infastructure Corporation of Andhra Pradesh (INCAP)

(through the Commissioner, Greater Hyderabad Municipal Corporation, Hyderabad)

Copy to:

The Advisor to Government, MA&UD Department.

The PS to Principal Secretary to Chief Minister.

The PS to Minister(MA&UD).

The PS to Chief Secretary to Government,

The PS to Principal Secretary to Government(UD), MA&UD Department,

The PS to Principal Secretary to Government(MA), MA&UD Department.

SF/SC.

//FORWARDED::BY ORDER//

SECTION OFFICER

To
The Additional Commissioner (SWM),
Greater Hyderabad Municipal Corporation
4th Floor, Head Office, Tank Band Road,
Hyderabad - 500 063



EPTRI
ENVIRONMENT
PROTECTION
TRAINING & RESEARCH
INSTITUTE

Lr.No: EPTRI/ESD/78/T&D/ 2023-24/1288/Dt: 16.03.2024

Sir,

Sub: EPTRI - HiMSW - Treatment and Disposal of MSW at Jawaharnagar
IMSWM site - Tipping Fee for the month of February, 2024 - Reg.

Ref: 1. Lr. No. HiMSW/GHMC/2023-24/2481 /01.03.2024.

2. Lr.No. 703/AC (H&S)/EE (SWM) GHMC/2012 dated 05.10.2017.

The Concessionaire vide reference 1st cited has submitted the invoice for T&D bill for the month of February, 2024 for Rs. 32,55,40,679/-.

The bill has been scrutinized with agreement conditions and duly considering the remarks made by the audit team. The penalties were applied as per the above. The detailed observations and calculations are enclosed at Annexure-I.

It is recommended that the GHMC may release Rs. 20, 35, 01,631/- duly considering the penalty towards the T&D of waste for the month of February, 2024. GHMC may take a final decision on payment as deemed fit.

The GHMC shall deduct/withhold the following charges:

- Statutory deduction, such as income tax and service tax as applicable.
- 10% of the treatment and Disposal revenues receivable from GHMC. This amount shall be held in escrow amount towards post-closure Obligation.

Yours faithfully,

[Signature]
Director General - 16/03/2024

Copy to M/s. Hyderabad Integrated Municipal Solid Waste Management, Survey No.173, Jawahar Nagar Dump site, CRPF Road, Near Army Dental College, Jawahar Nagar Grampanchayat village, Shamirpet Mandal, Hyderabad-500087

Annexure- I

Name of work: GHMC IMSWM project –Treatment & Disposal (T&D) - Tipping Fee (T&D) for month of February, 2024 –Reg.

The Concessionaire has submitted the T&D tipping fee bill for the month of February, 2024 for Rs. 32, 55, 40,679/- on 01.03.2024.

The bill has been scrutinized duly considering the remarks made by the audit team and as per CA. The total penalty on account of performance indicators 11, 12 and 13 worked out to Rs. 82, 58,689 as verified by EPTRI field staff.

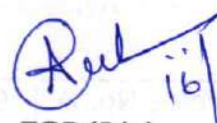
The net weight and the amount payable to the concessionaire, as per CA are given below.

Invoice No. & Date	Quantity of waste processed as per IE(Tons)	Rate / Ton (40% of Tipping Fee) as per CA (Rs.)	Amount (Rs.)	Penalty as per Schedule IV of CA (Rs.)	Recommended amount to be paid as per CA (Rs.)
HiMSW/P&D/ GHMC/February ,2024/2023-24 /J'Nagar, dt.29.02 2024.	2, 32,000.000	912.76	21,17,60,320	82,58,689	20,35,01,631


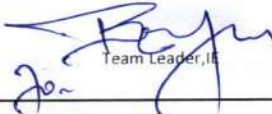
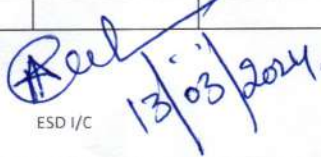
The total net weight considered for the month of February' 2024 is 2,40,466.180 tons, after deduction of Debris, tree trunks, stems waste of 444.860 tons. Details of vehicles carried the silt/ debris materials may be seen at seen Annexure- I. The quantity of waste lying at the tipping floor measured at the beginning of the month was 39,280.105 tons and the quantity of waste lying at the tipping floor as measured at the end of month was 38,522.040 tons by Drone. Therefore, the total net quantity of waste processed during the month comes to $\{2, 40, 466.180 + (39,280.105 - 38,522.040)\} = 2, 41,224.245$ tons, but as per PRC@ 8000TPD, Net quantity of waste Considered is 2, 32,000 Tons (29Days X 8000TPD = 2, 32,000) for the February, 2024.

As per the arbitration award dated 10.03.2018, the levy of penalty by GHMC was held to be unsustainable. EPTRI being a recommendatory authority has to show the amount of penalty as per Schedule IV of CA. EPTRI being a IE has to ensure the scientific treatment and disposal of the MSW and impartial & fare implementation of CA. It is, therefore, necessary to indicate the lapses and levy penalty as per performance indicator 11, 12&13. However, GHMC has to take a decision how to deal with the penalty indicated by IE.

The recommended amount duly considering the penalty is Rs. 20,35,01,631/- and without levy of penalty is Rs. 21,17,60,320/- GHMC may take a final decision on payment as deemed fit.


16/03/2024.
ESD(I/c)

3254

STATEMENT OF TIPPING FEE FOR TREATMENT AND DISPOSAL (T&D) OF MSW AT JAWAHARNAGAR, FOR THE PERIOD OF 01.02.2024 TO 29.02.2024									
Date	No. of vehicle trips claimed	No. of vehicle trips considere	Net Weight (tons)		Amount (Rs)		Net weight considered by IE	Amount considered for payment (Rs.)	Remarks
			Con	IE	Con	IE			
1-Feb-2024	720	716	7925.920	7923.240	10710216.44	7232016.54	2,40,466.18	21,94,87,910.46	Vehicle bearing Numbers in Annexure-1 contains Tree trunks waste, debris and Silt waste hence not Considered.
2-Feb-2024	746	739	8354.080	8349.360	11288784.76	7620961.83			
3-Feb-2024	756	749	8421.160	8381.660	11379429.30	7650443.98			
4-Feb-2024	720	717	8057.640	8055.520	10888208.36	7352756.44			
5-Feb-2024	723	719	7995.140	7988.860	10803752.73	7291911.85			
6-Feb-2024	763	758	8527.420	8494.720	11523017.37	7753640.63			
7-Feb-2024	773	769	8666.120	8661.440	11710441.29	7905815.97			
8-Feb-2024	768	764	8709.900	8707.340	11769600.77	7947711.66			
9-Feb-2024	792	785	8757.180	8748.620	11833489.76	7985390.39			
10-Feb-2024	751	746	8424.980	8418.500	11384591.22	7684070.06			
11-Feb-2024	710	707	8255.200	8236.080	11155169.21	7517564.38			
12-Feb-2024	715	713	8197.380	8195.920	11077037.62	7480907.94			
13-Feb-2024	799	791	9166.360	9083.600	12386410.60	8291146.74			
14-Feb-2024	764	760	8470.260	8465.760	11445777.64	7727207.10			
15-Feb-2024	765	757	8415.440	8408.440	11371699.92	7674887.69			
16-Feb-2024	658	650	6672.240	6665.080	9016131.19	6083618.42			
17-Feb-2024	791	788	8729.060	8726.760	11795491.49	7965437.46			
18-Feb-2024	785	782	8744.020	8729.060	11815706.79	7967536.81			
19-Feb-2024	746	742	8223.080	8217.480	11111765.77	7500587.04			
20-Feb-2024	758	752	8175.780	8167.760	11047849.76	7455204.62			
21-Feb-2024	769	765	8385.620	8379.780	11331404.45	7648727.99			
22-Feb-2024	746	742	8253.320	8231.020	11152628.78	7512945.82			
23-Feb-2024	717	714	7911.220	7909.720	10690352.47	7219676.03			
24-Feb-2024	751	744	8202.760	8196.140	11084307.56	7481108.75			
25-Feb-2024	722	720	8233.840	8232.640	11126305.65	7514424.49			
26-Feb-2024	726	722	8052.680	8020.820	10881505.96	7321083.66			
27-Feb-2024	753	748	8272.900	8254.300	11179087.04	7534194.87			
28-Feb-2024	768	762	8466.260	8408.580	11440372.48	7675015.48			
29-Feb-2024	747	743	8244.080	8207.980	11140142.86	7491915.82			
Total	21702	21564	2,40,911.04	2,40,466.18	32,55,40,679.24	21,94,87,910.46			
Net weight considered by I.E for the Month							2,40,466.180		
(+)- The unprocessed waste laying on the tipping floor was assessed by flying Drone at beginning of the month.							39,280.105		
(-)- The unprocessed waste laying on the tipping floor was assessed by flying Drone at end of the month.							-38,522.040		
Net weight processed							2,41,224.245		
As per PRC 8000TPD Net Quantity Processed 2,32,000 Tons (29 Days X 8000TPD)							2,32,000.000	21,17,60,320	
(-)-Penalties imposed for performance indicator nos. 11 as per schedule-4 of CA								82,58,689	
(-)-Penalties imposed for performance indicator nos 12 as per schedule-4 of CA								-	
(-)-Penalties imposed for performance indicator nos. 13 as per schedule-4 of CA								0	
Net amount considered for payment								20,35,01,631	
*Con – Concessionaire, *IE – Independent Engineer									
IE Rate: Rs.912.76 per ton (40% of Rs. 2281.91) as per article 7.1.b.iii at page 45 of C.A									
Tipping Fee Considered by Concessionaire is Rs.1351.29 per ton (40% of Rs.3378.23)									
Shift duration: 8 hrs.									
Shift timings: 06.00 - 14.00hrs, 14.00 - 22.00hrs, 22.00 - 06.00 hrs.									
<div style="display: flex; justify-content: space-between; align-items: flex-end;"> <div style="text-align: center;">  Site-In-Charge, IE </div> <div style="text-align: center;">  Team Leader, IE </div> <div style="text-align: center;">  ESD I/C </div> </div>									

Date	Net Wt (tons)	Tipping Fee according to rate approved by GHMC (Rs/ton)	Tipping Fee Allowable (TFA in Rs.)	PENALTIES						Total Penalties (Rs.)
				Indicator -11		Indicator -12		Indicator -13		
				Performance Efficiency (%)	0.1*TFA*(100-P)/100 (Rs.)	Performance Efficiency (%)	0.2*TFA*(100-P)/100 (Rs.)	Performance Efficiency (%)	0.1*TFA*(100-P)/100 (Rs.)	
1-Feb-2024	7923.24	2281.91	18080120.59	84.40	282049.88	100.00	0.00	100.00	0.00	282049.88
2-Feb-2024	8349.36	2281.91	19052488.08	84.40	297218.81	100.00	0.00	100.00	0.00	297218.81
3-Feb-2024	8381.66	2281.91	19126193.77	84.40	298368.62	100.00	0.00	100.00	0.00	298368.62
4-Feb-2024	8055.52	2281.91	18381971.64	84.40	286758.76	100.00	0.00	100.00	0.00	286758.76
5-Feb-2024	7988.86	2281.91	18229859.52	84.40	284385.81	100.00	0.00	100.00	0.00	284385.81
6-Feb-2024	8494.72	2281.91	19384186.52	84.40	302393.31	100.00	0.00	100.00	0.00	302393.31
7-Feb-2024	8661.44	2281.91	19764626.55	84.40	308328.17	100.00	0.00	100.00	0.00	308328.17
8-Feb-2024	8707.34	2281.91	19869366.22	84.40	309962.11	100.00	0.00	100.00	0.00	309962.11
9-Feb-2024	8748.62	2281.91	19963563.46	84.40	311431.59	100.00	0.00	100.00	0.00	311431.59
10-Feb-2024	8418.50	2281.91	19210259.34	84.40	299680.05	100.00	0.00	100.00	0.00	299680.05
11-Feb-2024	8236.08	2281.91	18793993.31	84.40	293186.30	100.00	0.00	100.00	0.00	293186.30
12-Feb-2024	8195.92	2281.91	18702351.81	84.40	291756.69	100.00	0.00	100.00	0.00	291756.69
13-Feb-2024	9083.60	2281.91	20727957.68	84.40	323356.14	100.00	0.00	100.00	0.00	323356.14
14-Feb-2024	8465.76	2281.91	19318102.40	84.40	301362.40	100.00	0.00	100.00	0.00	301362.40
15-Feb-2024	8408.44	2281.91	19187303.32	84.40	299321.93	100.00	0.00	100.00	0.00	299321.93
16-Feb-2024	6665.08	2281.91	15209112.70	84.40	237262.16	100.00	0.00	100.00	0.00	237262.16
17-Feb-2024	8726.76	2281.91	19913680.91	84.40	310653.42	100.00	0.00	100.00	0.00	310653.42
18-Feb-2024	8729.06	2281.91	19918929.30	84.40	310735.30	100.00	0.00	100.00	0.00	310735.30
19-Feb-2024	8217.48	2281.91	18751549.79	84.40	292524.18	100.00	0.00	100.00	0.00	292524.18
20-Feb-2024	8167.76	2281.91	18638093.22	84.40	290754.25	100.00	0.00	100.00	0.00	290754.25
21-Feb-2024	8379.78	2281.91	19121903.78	84.40	298301.70	100.00	0.00	100.00	0.00	298301.70
22-Feb-2024	8231.02	2281.91	18782446.85	84.40	293006.17	100.00	0.00	100.00	0.00	293006.17
23-Feb-2024	7909.72	2281.91	18049269.17	84.40	281568.60	100.00	0.00	100.00	0.00	281568.60
24-Feb-2024	8196.14	2281.91	18702853.83	84.40	291764.52	100.00	0.00	100.00	0.00	291764.52
25-Feb-2024	8232.64	2281.91	18786143.54	84.40	293063.84	100.00	0.00	100.00	0.00	293063.84
26-Feb-2024	8020.82	2281.91	18302789.37	84.40	285523.51	100.00	0.00	100.00	0.00	285523.51
27-Feb-2024	8254.30	2281.91	18835569.71	84.40	293834.89	100.00	0.00	100.00	0.00	293834.89
28-Feb-2024	8408.58	2281.91	19187622.79	84.40	299326.92	100.00	0.00	100.00	0.00	299326.92
29-Feb-2024	8207.98	2281.91	18729871.64	84.40	292186.00	100.00	0.00	100.00	0.00	292186.00
Total	2,40,466.180									
Quantity waste excess processed during the month of February-2024	758.065									
Total Net quantity processed	2,41,224.245									
As per PRC 8000TPD Net Quantity Processed 2,32,000 Tons (29 Days X 8000TPD)	2,32,000.000	2281.91		84.40	82,58,689	100.00	-	100.00		82,58,689.00

[Signature]
Site-In-Charge, IE

[Signature]
Team Leader, IE

[Signature]
ESD/IC
13/03/2024

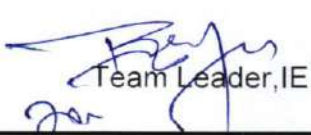
Table 1: Performance Indicator No. 11 - Extent of Functioning of Integrated Facility

SNO	Date	Integrated Facility components					Fraction of working components = working components/total components	No. Of days integrated facility functioned in a week (b)	No. Of days considered (a)	Performance P= (b/a) X 100
		Compliance to Environment Provision	Compliance to Safety rules	Compliance to Worker's health provisions/rules	House keeping of integrated Facility	Functioning of Unit Operations				
1	1-Feb-24	84.75								
2	2-Feb-24	84.63								
3	3-Feb-24	84.85								
4	4-Feb-24	84.81					5.92	7	84.561	
5	5-Feb-24	84.26								
6	6-Feb-24	84.25								
7	7-Feb-24	84.38								
8	8-Feb-24	84.50								
9	9-Feb-24	84.62								
10	10-Feb-24	84.74								
11	11-Feb-24	84.47					5.92	7	84.519	
12	12-Feb-24	84.45								
13	13-Feb-24	84.43								
14	14-Feb-24	84.41								
15	15-Feb-24	84.40								
16	16-Feb-24	84.38								
17	17-Feb-24	84.36								
18	18-Feb-24	84.34					5.90	7	84.338	
19	19-Feb-24	84.32								
20	20-Feb-24	84.30								
21	21-Feb-24	84.28								
22	22-Feb-24	84.26								
23	23-Feb-24	84.24								
24	24-Feb-24	84.22								
25	25-Feb-24	84.20								
26	26-Feb-24	84.18					6.74	8	84.19	
27	27-Feb-24	84.16								
28	28-Feb-24	84.14								
29	29-Feb-24	84.13								

Functioning of the integrated facility , P11 = $\left[\frac{24.47}{29} \times 100 \right]$
 b, i.e. Total number of days integrated facility functioned in the month
 a, i.e. Total number of days in the month
 P₁₁ = 84.40 %

Penalty for Performance Indicator 11 = $0.1 * TFA * (100 - P) / 100$


 Site-In-Charge, IE


 Team Leader, IE

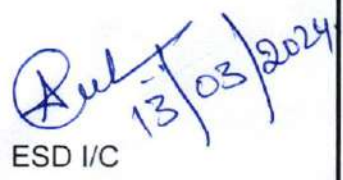

 ESD I/C
 13/03/2024

Table 2: Performance Indicator No. 12 - Extent of MSW recovered					
Date	Total quantum of waste received after deduction of silt (b)	Amount of waste processed or recycled (a)	Excess processed waste (Tons)	Performance Achieved, P=(a/b)X100	Remarks
1-Feb-24	7923.24				
2-Feb-24	8349.36				
3-Feb-24	8381.66				
4-Feb-24	8055.52				
5-Feb-24	7988.86				
6-Feb-24	8494.72				
7-Feb-24	8661.44				
8-Feb-24	8707.34				
9-Feb-24	8748.62				
10-Feb-24	8418.50				
11-Feb-24	8236.08				
12-Feb-24	8195.92				
13-Feb-24	9083.60				
14-Feb-24	8465.76				
15-Feb-24	8408.44				
16-Feb-24	6665.08				
17-Feb-24	8726.76				
18-Feb-24	8729.06				
19-Feb-24	8217.48				
20-Feb-24	8167.76				
21-Feb-24	8379.78				
22-Feb-24	8231.02				
23-Feb-24	7909.72				
24-Feb-24	8196.14				
25-Feb-24	8232.64				
26-Feb-24	8020.82				
27-Feb-24	8254.30				
28-Feb-24	8408.58				
29-Feb-24	8207.98				
Total	2,40,466.180				
					Difference in quantity waste between initial Drone assessment at the beginning of the month - quantity of waste lying on tipping floor assessed by drone at the end of month (39,280.105 - 38,522.040 = 758.065) Tons
	2,40,466.18	2,41,224.245	758.065		
			Performance	100.32	

Extent of MSW recovered , P12 = $\left(\frac{a, \text{ i.e. Amount of waste processed or recycled in tons/month}}{b, \text{ i.e. Total quantum of waste collected by concessionaire}} \right) \times 100$

P₁₂ = **100.32**

[Signature]
Site-In-Charge, IE

[Signature]
Team Leader, IE

[Signature]
ESD I/C 18/03/2024

Table 3: Performance Indicator No. 13 - Extent of Scientific Disposal of MSW

SNO	Date	Total Daily Disposed in all landfill in tons (b)	Waste being disposed at "complaint" landfill, at the active landfill cell (a)	Performance Achieved, P=(a/b)X100
1	1-Feb-24	1453.04	1453.04	100.00
2	2-Feb-24	1552.14	1552.14	100.00
3	3-Feb-24	944.26	944.26	100.00
4	4-Feb-24	680.96	680.96	100.00
5	5-Feb-24	2465.44	2465.44	100.00
6	6-Feb-24	1768.38	1768.38	100.00
7	7-Feb-24	1544.84	1544.84	100.00
8	8-Feb-24	1762.22	1762.22	100.00
9	9-Feb-24	1920.04	1920.04	100.00
10	10-Feb-24	1629.06	1629.06	100.00
11	11-Feb-24	1936.46	1936.46	100.00
12	12-Feb-24	1044.92	1044.92	100.00
13	13-Feb-24	1293.78	1293.78	100.00
14	14-Feb-24	1877.66	1877.66	100.00
15	15-Feb-24	1335.94	1335.94	100.00
16	16-Feb-24	1330.74	1330.74	100.00
17	17-Feb-24	827.20	827.20	100.00
18	18-Feb-24	1483.16	1483.16	100.00
19	19-Feb-24	1414.36	1414.36	100.00
20	20-Feb-24	980.88	980.88	100.00
21	21-Feb-24	776.52	776.52	100.00
22	22-Feb-24	1676.00	1676.00	100.00
23	23-Feb-24	2303.50	2303.50	100.00
24	24-Feb-24	2306.62	2306.62	100.00
25	25-Feb-24	2287.66	2287.66	100.00
26	26-Feb-24	2077.16	2077.16	100.00
27	27-Feb-24	1790.12	1790.12	100.00
28	28-Feb-24	2162.56	2162.56	100.00
29	29-Feb-24	1662.16	1662.16	100.00
	Total wt.	46287.78	46287.78	

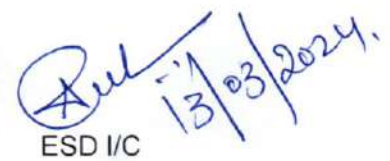
Extent of Scientific Disposal of Municipal Solid Waste, P₁₃ = $\frac{a, \text{ i.e. Total waste disposed in "complaint" landfills every landfills}}{b, \text{ i.e. Total waste disposed in all landfills every month}} \times 100$

P₁₃ = 100.00 %

Penalty for Performance Indicator 13 = 0.1*TFA*(100-P)/100


Site-In-Charge, IE


Team Leader, IE


ESD I/C
13/03/2024

EPTRI - As IE for IMSWM Project of GHMC

SUMMARY OF PENALTIES

SNO	Description	Amount	Remarks
1	Performance Indicator 11 - Functioning of Integrated Facility	₹ 82,58,689	Please see Page 1 of 4
2	Performance Indicator 12 - Extent MSW recovered	₹ 0	Please see Page 2 of 4
3	Performance Indicator 13 - Extent of scientific disposal of MSW	₹ 0.00	Please see Page 3 of 4

Total Deduction = ₹ 82,58,689


 Site-In-Charge, IE


 Team Leader, IE


 ESD I/C 13/03/2024

Annexure-A5(i)**MEMORANDUM OF UNDERSTANDING****FOR**

“Providing technical advisory services in the bid process for bio-mining of capped legacy dumpsite of GHMC at Jawaharnagar including assessment studies on suitability for Bio-mining by retrieval and characterization of Decomposed Municipal Solid Waste”


Superintending Engineer
Solid Waste Management
Greater Hyderabad Municipal Corporation





महाराष्ट्र MAHARASHTRA

● 2022 ●

08AA 770008



Memorandum of Understanding

This Memorandum of Understanding (hereinafter referred to as "MoU" is made on this 10th Day of ^{श्री दि. क. गवई} August 2022.

BY AND BETWEEN

Greater Hyderabad Municipal Corporation (GHMC) having its registered/Head Office at CC Complex, Tank Bund road, Hyderabad, Telangana 500063 represented by its Superintending Engineer (SWM), GHMC (hereinafter referred to as **GHMC**, which expression shall unless repugnant to the context or meaning thereof, include its successors and permitted assignees) of the **First Part**.

AND

Indian Institute of Technology Bombay located at Powai, Mumbai 400 076, represented by the Dean R&D's office at IITB (hereinafter referred to as **Consultant**, which expression shall, unless it be repugnant to the context thereof, shall be deemed to mean and include its successors and permitted assignees) of the **Second Part**.

Page 1 of 8

a.n.s.
Superintending Engineer
Solid Waste Management
Greater Hyderabad Municipal Corporation



3262

C 0509

जोडपत्र-9 / Annexure-1

फक्त प्रतिज्ञापत्रासाठी / Only for Affidavit

सुद्धांक विक्री नंबर वही अनु. क्रमांक/दिनांक
Sales Register Serial No/Dataसुद्धांक विकत घेतल्याचे नंबर व रहिवासी पत्ता व सी
Stamp Purchaser's Name/Place of
Residence & Signature

श्री राजन गणपत शिंदे परवानाधारक सुद्धांक विक्रेता

परवाना क्रमांक एल.एस.सी.-८०००००७

सी-३, हेमु क्लॉसिक इमारत, अल्का विहार हॉटेलच्या बाजूला,

एल.आय.सी. कॉम्प्लेक्सच्या मागे, एस.सी.रोड,

मालाड (पश्चिम), मुंबई-४०० ०५४.

ज्या कारणासाठी ज्यांनी सुद्धांक खरेदी केला त्यांची त्याच कारणासाठी

सुद्धांक खरेदी केल्यापासून ६ महिन्यात कायदेशीर बंधनकारक आहे

Tel.: 96907359 / Mob.: 9620141066

3 JUN 2022

DEEPAK A. SURVE (ADV.)
1-B, SHIVAJI BULG, SHIV NAGARI,
M. G. RD, KALBAVEBI, M-2.

- 3 JUN 2022

SSOS YAM 1 S

4/1

महाराष्ट्र शासन
महाराष्ट्र शासन
महाराष्ट्र शासन

GHMC and the Consultant are individually referred to as a 'Party' and collectively as the 'Parties' for the purpose of this MoU.

Background:

GHMC being the Urban Local Body for the City of Hyderabad is responsible for management of the Municipal Solid Waste (MSW) as per the Solid Waste Management Rules 2016 (SWM Rules 2016) issued by the MoEF&CC, GoI which includes collection, transportation, treatment and scientific disposal of the MSW. GHMC formulated the Integrated Municipal Solid Waste Management (IMSWM) project in 2008-09 and entrusted to M/s. Ramky Enviro Engineers Ltd (REEL) as PPP partner through the Concession Agreement dated 21.02.2009 and handed over the site (of 339 Acres approx.) at Sy. No:173, Jawahar Nagar(V), Kapra(M), Medchal – Malkajgiri (D), Telangana State, India where the mixed MSW has been dumped for more than a decade without treatment until 2012

GHMC decided to establish the scientific MSW treatment and disposal facility in the same Jawahar Nagar site by reclaiming the existing dumpsite area at Jawahar Nagar by shifting the untreated legacy waste spread all over the 339 acres of the site to a minimum foot print area of 125 acres. Scientific Capping of the legacy dumpsite was proposed as per the Environmental Clearance (EC) issued by the State Environment Impact Assessment Authority (SEIAA) of the Ministry of Environment & Forests, GoI vide Order No. SEIAA/AP/RRD-111/2009 dated 20.06.2012. Further, the then applicable rules such as Municipal Solid Waste (Management & Handling) Rules 2000 and Municipal Solid Waste Management Manual 2000 of the CPHEEO, MoUD, GoI were followed. Scientific capping was taken up as an immediate measure to address the pollution problems caused by the smoke due to frequent incidents of fires and uncontrolled flow of leachate due to infiltration of rain water into the dump. The capping works consist of 300 mm thick soil cover, Geosynthetic clay liner, HDPE liner, 450 mm thick vegetative soil and gas & leachate management network.

After scientific capping works reached about 80 % completion stage, the Hon'ble NGT (Principal Bench) issued directions vide the order dated 14.02.2020 in OA no.606 of 2018 that:

"...it is imperative to do bio-mining and bioremediation in the interest of environment and to save valuable scarce public resource in the form of land. The land can be used for setting up integrated waste processing facilities and developing green belt or bio-diversity park. If the State/Corporation does not have funds, the State may consider monetizing a part of the land to raise revenue for the purpose, after following due process of law. In any case, capping cannot be permitted."

After subsequent hearings on the said matter at the Hon'ble NGT, New Delhi & Chennai and also the Supreme Court of India, GHMC has floated Request for Proposal on 28.03.2022 for bio-mining & bioremediation of the capped legacy waste at Jawahar Nagar in compliance to the orders of the Hon'ble Court and Tribunal. Further, in view of no specific guidelines on how to deal with the already scientifically capped dumpsite for bio-mining and bioremediation, GHMC approached the Central Pollution Control Board (CPCB) and subsequently, based on the advice of CPCB, GHMC identified Dr. D N Singh, IIT Bombay for providing the technical guidance for bio-mining of the already capped legacy waste dumpsite of GHMC at Jawaharnagar and to assist in technical evaluation of the bids.

LoA was issued for the said consultancy work was issued vide Lr No.SWM/0049/ 2021/ AE-2(SWM)-HO dated 04.06.2022.

A. T. S.
Superintending Engineer
Solid Waste Management
Greater Hyderabad Municipal Corporation



Accordingly, on mutual understanding, this MoU is entered.

NOW IT IS THEREFORE AGREED BETWEEN THE PARTIES HERETO AS FOLLOWS:

1. OBJECTIVE:

Rendering technical advisory services by the Consultant to GHMC in all aspects on the proposed bio-mining of capped legacy dumpsite at Jawaharnagar, Hyderabad.

2. SCOPE OF SERVICES:

- i. Guiding GHMC in bidding process for the work of bio-mining of capped legacy dumpsite including evaluation of the Bids.
- ii. Conducting geophysical investigations (Multichannel Analysis of Surface Waves (MASW) and Electrical Resistivity Tomography (ERT)) on the dumpsite at different locations to understand the sub-surface features.
- iii. Extensive sampling of Decomposed Municipal Solid Waste (DMSW) samples from different locations.
- iv. Segregation and characterization of the DMSW samples for their Physico-chemical parameters.
- v. Establishing the present state of the decomposition of the Municipal solid Waste (MSW).
- vi. Characterization of leachate samples (if any) during the sampling of the DMSW from different boreholes.
- vii. A critical analysis of the way forward.
- viii. Furnishing the preliminary, interim and final report with recommendation on bio-mining.

3. DURATION OF THE SERVICE:

The Consultant shall deliver the entire scope of services in a period of fifteen (15) months from the date of entering into this MoU, or mutually extended period as may be mutually agreed. Both parties understood that certain required ground level activities such as conducting geophysical investigations etc will start within (01) week from the day of receipt of first installment by the Consultant.

4. DELIVERABLES:

- i. Guidance to the GHMC on the technical evaluation of the proposals submitted for biomining.
- ii. Submission of preliminary, interim and final reports on the status of MSW decomposition at Jawaharnagar landfill, Hyderabad and its suitability for biomining.


Superintending Engineer
Solid Waste Management
Greater Hyderabad Municipal Corporation



5. ROLES AND RESPONSIBILITIES:**a) Consultant:**

- i. Appointment of third-party consultants for performing Geophysical investigations and sampling of MSW and providing required guidance to them during this project.
- ii. Supervision of the investigations to be carried out at the site.
- iii. Complete analysis of the MSW and leachate characteristics and provision of way forward to the GHMC on the biomining.
- iv. Update on the changes, if any, in the sampling methodology and strategies adopted during the studies as per the site conditions.
- v. Delays in the work related to provision of technical services in the biomining tendering process is not the responsibility of the consultant as the process is being carried out by GHMC.

b) GHMC:

- i. Provide relevant information related to the Jawaharnagar landfill viz., location of underground utilities, the height of landfill, thickness of final cover, etc.
- ii. Provide adequate number of helpers (unskilled force) at the landfill site during sampling.
- iii. Provide refrigerators and sample storage space/facility in a closed room at their site office.
- iv. Temporary stay / local travel for the site workers (most probably hailing from Mumbai) at suitable locations (as mutually agreed) to be provided at the site so as to accelerate work and avoid unnecessary commuting.
- v. Provide Local transportation/ logistics (within GHMC premises).
- vi. GHMC required to appoint a representative during the site investigations to witness and certify the same.
- vii. Provide (any and all) documentary, technical other assistance /help that may be requested by the Consultant in order to carry out the implementation or other related activities under this MoU.

6. PAYMENT SCHEDULE:

All the payments shall be made by GHMC upon receipt of an invoice from the Consultant. Total remuneration to the Consultant shall not exceed Rs.1,99,63,125/- (Rupees One Crore Ninety Nine Lakhs Sixty Three Thousand One Hundred and Twenty five Only) plus applicable GST in any case and shall be paid as per the following schedule subject to performance of the Consultant:

- i. Sixty (60%) percent payment as 1st installment within (15) days after entering into MoU.
- ii. Thirty (30%) percent payment as 2nd installment after (06) months from the date of MoU.
- iii. Ten (10%) percent payment after submission of final report.


 Superintending Engineer
 Solid Waste Management
 Greater Hyderabad Municipal Corporation



7. TERMS AND CONDITIONS:

- i. **Job work:** Total scope of the service will be considered as a Job work including technical services and ground level works to be performed to meet the objective of this MOU which is described as follows but not limited to the following:

S.No	Description	Remuneration (in INR)
1	Providing technical advisory services in the bid process for bio-mining of capped legacy dumpsite of GHMC at Jawaharnagar including assessment studies on suitability for Bio-mining by retrieval and characterization of Decomposed Municipal Solid Waste including conducting Geophysical investigations (MASW and ERT) about 1,500 m, mobilization of machinery at the landfill, shifting of drilling rigs, steel casing pipes about 5 no's, borehole drilling and sample collection about 450 no's, testing charges for about 150 samples including consumables, manpower and outsourcing charges and manpower charges including assistance in bid process, travel and dearness allowances, institute overhead charges and contingent charges and furnishing reports and including all taxes, duties as applicable to the Consultant etc. complete	1,99,63,125

- ii. The Technical & Advisory services come under the category of pure services and hence GST is exempted as per circular no. 8294/CFA/AC(Fin)/ GHMC/2017-4 dt:19.09.2017 of the Commissioner, GHMC.
- iii. List of experiments to be performed:

Sample/test	Parameters
DMSW	Volatile solids, elemental content, total organic carbon, inorganic carbon, ammonium and nitrate nitrogen and heavy metals (total).
Leachate samples	pH, EC, TDS, salinity, TOC, COD, sulfate, phosphate, nitrate-nitrogen, ammonium-nitrogen, heavy metals
Geophysical investigations	MASW and ERT

iv. INTELLECTUAL PROPERTY RIGHTS:

All rights pertaining to any intellectual property generated/ created/ invented in the due course of the project, will be the joint property of the Parties. Terms and conditions regarding transferring /assigning /selling these rights to the First Party shall be governed by a separate written and agreed to documents if required. The expenses related to filing, processing and maintenance of the IP(s) will be borne by the Parties as mutually agreed upon

A. D. S.
 Superintending Engineer
 Solid Waste Management
 Greater Hyderabad Municipal Corporation



- v. The Consultant may take up services for other clients also in the same area, provided, to the best of it's knowledge, there is no conflict of interest in undertaking such projects.

8. FORCE MAJEURE

- a) In the event of either Party being rendered unable to perform any obligation required to be performed by it under this MoU due to a Force majeure event, it shall notify the other Party about the occurrence of such an event. On the notification of the same, the other Party may suspend the affected obligation for the period during which the effect of the Force majeure event lasts.
- b) The term Force majeure as employed herein shall mean but not limited to the acts of God (including exceptional adverse weather conditions), earthquake, fire (not caused by the negligence of either Party), war (declared or undeclared), invasion, rebellion, revolt, civil war, epidemic, pandemic, outbreak, plague, act(s) of omission/ commission by any concerned Government(s) or Government Agencies, judicial or quasi-judicial authorities.

9. CONFIDENTIALITY

- a) Both Parties shall keep confidential any and all information and data concerning these services and the other party's business or its activities that may come to the knowledge of a party hereto, its personnel or appointed representatives during or in connection with the execution of this MoU.
- b) Neither Party shall divulge or use or reproduce such data and information or make the same available to third parties without prior written consent of the other party.
- c) The obligations referred to in this article shall not apply insofar as the data and information, which is now or hereafter becomes, through no act or omission on the part of the receiving party, generally known or available within the applicable industry or enters the public domain or is disclosed to the receiving party by a third party or is independently developed by the receiving party or is required to be disclosed by the operation of law, regulation or decree.
- d) The obligations of this Article shall survive the termination or dissolution of this MOU irrespective of the reason for termination or dissolution, for a period of three (3) years thereafter.

10. TERMINATION:

The MoU will be terminated automatically after (15) months from the date of this MoU unless otherwise extended by both parties on mutual terms and conditions or unilaterally terminated by either of them by a thirty (30) days written notice subject to completion of their roles correspondingly.

11. MISCELLANEOUS

i. Notices

Any notices required or permitted to be given pursuant to this MoU shall be sent via registered post or courier, or by email to the addresses of the Parties as set forth below, or to such other address as may be specified from time to time in writing in accordance with terms of this clause. Mail communication also be sent to the addresses mentioned below:


 Superintending Engineer,
 Solid Waste Management
 Greater Hyderabad Municipal Corporation



<p>If to GHMC, Superintending Engineer (SWM), Greater Hyderabad Municipal Corporation, 4th floor, CC Complex, GHMC- Head Office, Lower TankbundRoad. Hyderabad. Telangana-500063 Email: eeswmc@gmail.com cc: achealth19.ghmc@gmail.com</p>	<p>If to Consultant, Prof. Devendra Narain Singh, D.L. Shah Chair Professor for Innovation, Department of Civil Engineering, Environmental Geotechnology Laboratory, 4th Floor, VMCC Building, Indian Institute of Technology Bombay, Powai, Mumbai- 400 076, Email: dns@civil.iitb.ac.in, Mobile: +91 9820758508.</p>
---	--

ii. **Waiver & Modification**

Any waiver, modification or amendment of any provision of this MoU will be effective only if it is in writing and signed by Parties hereto. A waiver in one (1) instance shall not constitute a continuing waiver unless expressly so stated in writing.

iii. **Representation & Warranty**

The Parties represent and warrant that they have all right, power and authority needed to enter into and carry out the obligations under this MoU.

iv. **Limitation of Liability**

Subject to the terms and conditions of this MoU, neither Party shall be liable to the other Party for any incidental, indirect or consequential damages of any kind arising out of or in connection with this MoU.

v. **Jurisdiction:**

This MoU shall be construed and interpreted, in accordance with and governed by Laws and Regulations of India and the Courts in Hyderabad shall have exclusive jurisdiction over any disputes between the Parties relating to this MoU.

vi. **Dispute Resolution**

If any dispute arises out of or in connection with this or derived there from, both parties agree to resolve amicably on mutual discussion at the level of their respective senior Officers appointed by the respective HoD's. If not resolved, the dispute will be referred to arbitration to be conducted under the Arbitration and Conciliation Act, 1996 at Hyderabad in the English language.

vii. **Severability**

The validity of this MoU shall not be affected, should one (1) or more of its stipulations be or become legally invalid so long as such stipulation is severable from and not fundamental to the obligations of either Party to this MoU. In such case, the Parties shall negotiate in good faith to replace the invalid article/ Clause by stipulation which is in accordance with the applicable law.



Superintending Engineer
Solid Waste Management
Greater Hyderabad Municipal Corporation



IN WITNESS WHEREOF, the Parties have signed and executed this MoU on the date and day first above written in the presence of their respective witnesses:

FOR AND ON BEHALF OF Greater Hyderabad
Municipal Corporation

Superintending Engineer
Solid Waste Management
Greater Hyderabad Municipal Corporation

Signature: 
Name: M. KOTESWARA RAO
Date: 10/08/2022
Designation with stamp and seal:

Witness 1

Name and Address:

C. BHANUSRI
DEPUTY EXECUTIVE ENGINEER (SWM), GHMC
4th Floor, CC Complex, Lower Tank Bund Rd,
Hyderabad - 500063.


Witness 2

Name and Address:

P. PRAVEEN
Assistant Engineer (SWM), GHMC.
4th Floor, CC-Complex
Lower Tankbund Road
Hyderabad.

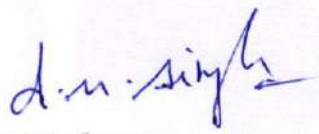
FOR AND ON BEHALF OF Indian Institute of
Technology, Bombay

संकायाध्यक्ष, शोध एवं विकास
Dean, Research and Development
कृते निदेशक, आय आय टी मुंबई
For Director, IIT Bombay

Signature: 
Name: Prof. Milind D. Atrey
Date: 10th August 2022
Designation with stamp and seal:

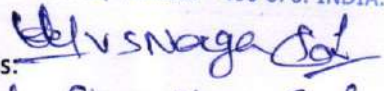
Witness 1

Name and Address:


Dr. D. N. SINGH
Professor
Department of Civil Engineering
Geotechnical Engineering Division
Indian Institute of Technology, Bombay
Powai, Mumbai - 400 076. INDIA.

Witness 2

Name and Address:


Goli Venkata Siva Naga Sai
Research scholar
C/o Environmental Geotechnology
Laboratory, 4th floor,
VMCC Building,
Dept of Civil Engineering,
IIT Bombay, Powai,
Mumbai - 400 076.



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



July 05, 2023

To,
The Municipal Commissioner
Greater Hyderabad Municipal Corporation
Hyderabad
Telangana

Subject: Providing Technical Advisory Services in the Bid Process for Biomining of Capped Legacy Dumpsite of GHMC at Jawaharnagar Including Assessment Studies on Suitability for Bio-mining by Retrieval and Characterization of Decomposed Municipal Solid Waste

Our Reference: DRD/CE/DNS-11/22-23 dated 15.06.2022

Dear sir,

It was a pleasure to be associated with you and your colleagues on this so very important project.

The proposed studies have been completed successfully, within the stipulated time, and I am submitting the final report **Studies on Suitability of Decomposed Municipal Solid Waste for Bio-mining at Jawaharnagar Capped Dumpsite, Hyderabad** to you for your kind perusal and records.

In case you have any queries/clarification, please contact the undersigned.

Also, as the project has been completed, please release the remaining 10% amount as per the MoU.

Regards!

Dr. D. N. Singh FNAE, FASCE, FICE(UK)

D.L. Shah Chair Professor for Innovation

Department of Civil Engineering

Cell: +919820758508

Email: dns@civil.iitb.ac.in

www.civil.iitb.ac.in/~dns

A Report

on

Studies on Suitability of Decomposed Municipal Solid Waste for Bio-mining at Jawaharnagar Capped Dumpsite, Hyderabad

Submitted to

Greater Hyderabad Municipal Corporation (GHMC)

by

**Goli Venkata Siva Naga Sai
Mrunal Sunil Bokade
Yogendra Narayanan
Sinny Manohar
Kamran Ilahi
Prithvendra Singh
(Research Scholars)**

**Pintu Kumar Saw
(Undergraduate student)**

and

Prof. D. N. Singh
Principal Investigator
&
D.L. Shah Chair Professor for Innovation



**ENVIRONMENTAL GEOTECHNOLOGY LABORATORY
DEPARTMENT OF CIVIL ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY BOMBAY
MUMBAI- 400076, INDIA**

July 5, 2023

Table of Contents

List of Figures	ii
List of Plates	iii
List of Tables	iv
1. Background.....	1
2. Scope of work.....	1
3. Reconnaissance survey	2
4. Proposed Investigations.....	4
4.1 Geophysical Investigations	4
4.2 Retrieval of Decomposed MSW from JLH and Characterization.....	4
4.3 Characterization of the DMSW samples.....	5
4.3.1 Physical Characteristics	5
4.3.2 Chemical Characteristics	5
5. Details of the Investigations and Results.....	5
5.1 Geophysical Investigations	5
6. Details of the MSW sampling and on-site segregation	18
7. Processing and characterization of the DMSW @ IIT Bombay Laboratory.....	27
7.1 Characteristics of the fine fractions.....	29
7.1.1 Moisture Content	29
7.1.2 Organic Matter	30
7.1.3 Specific Gravity	31
7.1.4 Analysis of Leachates	32
7.2 The calorific value of the coarse fraction.....	36
8. Conclusions and the way forward	39
Appendix A.....	40
Appendix B.....	54
Appendix C.....	68
References.....	74

List of Figures

Figure 5.1 MASW analysis results of Line-1	7
Figure 5.2 MASW analysis results of Line-2	7
Figure 5.3 MASW analysis results of Line-3	8
Figure 5.4 MASW analysis results of Line-4	8
Figure 5.5 MASW analysis results of Lines-6 and 7	9
Figure 5.6 MASW analysis results of Line-8	9
Figure 5.7 MASW analysis results of Line-9	10
Figure 5.8 MASW analysis results of Line-10	10
Figure 5.9 MASW analysis results of Line-11	11
Figure 5.10 MASW analysis results of Line-12	11
Figure 5.11 MASW analysis results of Line-13	12
Figure 5.12 MASW analysis results of Line-14	12
Figure 5.13 2D- electrical resistivity imaging map for Line-1	13
Figure 5.14 2D- electrical resistivity imaging map for Line-2	14
Figure 5.15 2D- electrical resistivity imaging map for Line-3	14
Figure 5.16 2D- electrical resistivity imaging map for Line-4	14
Figure 5.17 2D- electrical resistivity imaging map for Line-6	15
Figure 5.18 2D- electrical resistivity imaging map for Line-7	15
Figure 5.19 2D- electrical resistivity imaging map for Line-8	15
Figure 5.20 2D- electrical resistivity imaging map for Line-9	16
Figure 5.21 2D- electrical resistivity imaging map for Line-10	16
Figure 5.22 2D- electrical resistivity imaging map for Line-11	16
Figure 5.23 2D- electrical resistivity imaging map for Line-12	17
Figure 5.24 2D- electrical resistivity imaging map for Line-13	17
Figure 5.25 2D- electrical resistivity imaging map for Line-14	17

List of Plates

Plate 3.1 Photographs depicting the site visit.....	3
Plate 4.1 The Google Earth map of the JLH depicting the locations selected for Geophysical investigations.....	4
Plate 5.1 The Google Earth map exhibiting the actual stretches of the MASW and ERT investigations.....	6
Plate 6.1 Images depicting the flight auger and the sample collection procedure.....	19
Plate 6.2 Images depicting the on-site segregation, weighing and packing of the samples being witnessed by the GHMC.....	21
Plate 6.3 The photographs depicting the borehole and its closure	26
Plate 6.4 The photographs depicting the leachate and bubble formation and bursting by landfill gas emission the release of foam/bubbles/liquid from a typical borehole	26
Plate 7.1 Images depicting the laboratory segregation process of coarse fractions.....	27

List of Tables

Table 5.1 Coordinates for start and end points of MASW and ERT investigations	6
Table 5.2 The expected lithology for corresponding shear wave velocities provided by FGTL	13
Table 6.1 Details of the boreholes and number of samples collected.....	20
Table 6.2 Details of the coarse- and fine- samples obtained from the in-situ segregation	22
Table 7.1 Results obtained for the coarse-fractions of the MSW.....	28
Table 7.2 The moisture content of the fine-fractions	30
Table 7.3 Borehole-wise variation in the organic matter of fine fractions	31
Table 7.4 Borehole-wise variation in the specific gravity of fine fractions.....	32
Table 7.5 The values of pH, EC, TDS, Salinity, Hardness and Chlorides for leachates of the representative samples from different bore-holes.....	33
Table 7.6 The concentration of leachable elements from the fine-fractions.....	34
Table 7.7 The calorific value and ash content of the coarse-fractions.....	36
Table A.1 Moisture content analysis results for Borehole-01.....	40
Table A.2 Moisture content analysis results for Borehole-02.....	41
Table A.3 Moisture content analysis results for Borehole-03.....	42
Table A.4 Moisture content analysis results for Borehole-04.....	43
Table A.5 Moisture content analysis results for Borehole-05.....	44
Table A.6 Moisture content analysis results for Borehole-06.....	45
Table A.7 Moisture content analysis results for Borehole-07.....	46
Table A.8 Moisture content analysis results for Borehole-08.....	47
Table A.9 Moisture content analysis results for Borehole-09.....	47
Table A.10 Moisture content analysis results for Borehole-10.....	47
Table A.11 Moisture content analysis results for Borehole-11.....	49
Table A.12 Moisture content analysis results for Borehole-12.....	50
Table A.13 Moisture content analysis results for Borehole-13.....	51
Table A.14 Moisture content analysis results for Borehole-14.....	52
Table A.15 Moisture content analysis results for Borehole-15.....	53
Table A.16 Moisture content analysis results for Borehole-16.....	53
Table B.1 Organic matter results for Borehole-01.....	54
Table B.2 Organic matter results for Borehole-02.....	55

Table B.3 Organic matter results for Borehole-03	56
Table B.4 Organic matter results for Borehole-04	57
Table B.5 Organic matter results for Borehole-05	58
Table B.6 Organic matter results for Borehole-06	59
Table B.7 Organic matter results for Borehole-07	60
Table B.8 Organic matter results for Borehole-08	61
Table B.9 Organic matter results for Borehole-09	61
Table B.10 Organic matter results for Borehole-10	62
Table B.11 Organic matter results for Borehole-11	63
Table B.12 Organic matter results for Borehole-12	64
Table B.13 Organic matter results for Borehole-13	65
Table B.14 Organic matter results for Borehole-14	66
Table B.15 Organic matter results for Borehole-15	66
Table B.16 Organic matter results for Borehole-16	67
Table C.1 Specific gravity results for fine fraction retrieved from Borehole-01	68
Table C.2 Specific gravity results for fine fraction retrieved from Borehole-02	68
Table C.3 Specific gravity results for fine fraction retrieved from Borehole-03	68
Table C.4 Specific gravity results for fine fraction retrieved from Borehole-04	69
Table C.5 Specific gravity results for fine fraction retrieved from Borehole-05	69
Table C.6 Specific gravity results for fine fraction retrieved from Borehole-06	70
Table C.7 Specific gravity results for fine fraction retrieved from Borehole-07	70
Table C.8 Specific gravity results for fine fraction retrieved from Borehole-08	70
Table C.9 Specific gravity results for fine fraction retrieved from Borehole-09	71
Table C.10 Specific gravity results for fine fraction retrieved from Borehole-10	71
Table C.11 Specific gravity results for fine fraction retrieved from Borehole-11	71
Table C.12 Specific gravity results for fine fraction retrieved from Borehole-12	72
Table C.13 Specific gravity results for fine fraction retrieved from Borehole-13	72
Table C.14 Specific gravity results for fine fraction retrieved from Borehole-14	73
Table C.15 Specific gravity results for fine fraction retrieved from Borehole-15	73
Table C.16 Specific gravity results for fine fraction retrieved from Borehole-16	73

1. Background

Landfill biomining (LFM) of existing dumpsites and landfills has been encouraged to avoid the contamination of the geoenvironment (soil, groundwater, and air), recover the precious land occupied by these facilities, and utilization of landfill-mined residues (LMRs) such as plastics, glass, metals and combustibles and soil-like materials for different applications. Nevertheless, to decide on the feasibility of LFM, it is crucial to ascertain the state of decomposition of the MSW in the landfill/dumpsite. This would not only help in understanding the utilization potential of LMRs but also help in finding the answers to questions such as whether the MSW in the landfill is suitable to be mined, ascertaining possible issues that can arise during mining operations, and the methodology to be adopted for landfill mining, etc. In this context, the state of MSW in a landfill/dumpsite can be determined easily by characterizing the samples of DMSW collected from a landfill for their physical and chemical characteristics. Based on these investigations, a further decision on LFM should be taken. Further, geophysical investigations such as Multi-channel Analysis of Surface Waves (MASW) and Electrical resistivity tomography (ERT) would help in understanding the subsurface properties of the landfill. This would also help to identify leachate and gas pockets that could become an issue during mining activity if not known in advance.

As per the directions of the National Green Tribunal (NGT) Principal Bench, Greater Hyderabad Municipal Corporation (GHMC) is prepared to take up the biomining of capped Jawaharnagar Dumpsite, Hyderabad and called for tenders. However, as the dumpsite has been capped recently (i.e., 2018), the GHMC approached Prof. D. N. Singh, Department of Civil Engineering, Indian Institute of Technology Bombay, for help in several technical aspects such as evaluating the readiness of the capped dumpsite for biomining, evaluating the technical proposal received for biomining operation, establishing the methodology for biomining, etc. Keeping these in view, a scientific study on capped dumpsite at Jawaharnagar, Hyderabad, is planned by the Indian Institute of Technology Bombay under the supervision of Prof. D. N. Singh, IIT Bombay. In this regard, to evaluate the readiness of the capped dumpsite at Jawaharnagar, Hyderabad, for biomining, a study has been proposed by IIT Bombay. The technical aspects of the study proposed are mentioned below.

2. Scope of work

The broad scope of this proposal is to help GHMC in the bid process and carry out geophysical investigations, retrieval, and characterization of the decomposed MSW (DMSW) samples at Jawaharnagar landfill Hyderabad (referred to as JLH).

The detailed scope of the work is mentioned below:

- Guiding GHMC in the bidding process for the work of biomining of the capped legacy dumpsite.
- Conducting geophysical investigations, namely Multichannel Analysis of Surface Waves (MASW) and 2-dimensional Electrical Resistivity Tomography (2D-ERT) on the dumpsite at different locations to understand the subsurface features.
- Extensive sampling of DMSW samples from different locations.
- Segregation and characterization of the DMSW samples for their Physico-chemical parameters.
- Establishing the present state of the decomposition of the MSW.
- Characterization of leachate samples (if any) during the sampling of the DMSW from different boreholes.
- A critical analysis of the way forward.

3. Reconnaissance survey

Based on the data shared by GHMC on 22.04.2022, a proposal was prepared by IIT Bombay and shared to conduct the investigations within the scope mentioned above. The study broadly involves conducting geophysical (MASW and ERT) investigations and retrieving and characterizing the DMSW samples.

In this context, the IIT Bombay team, along with the representatives of **M/s. Ramky Enviro Engineers Ltd. (REEL)**, **Environmental Protection Training and Research Institute, Hyderabad (EPRTI)**, and **GHMC** visited the site to select the locations for conducting Geophysical investigations at the JLH site (refer to Plate 3.1). This exercise would help in selecting the subsequent locations for retrieving the samples from the landfill without causing much harm to the existing cover, gas and leachate collection systems.



(a)



(b)



(c)



(d)



(e)



(f)

Plate 3.1 Photographs depicting the site visit

4. Proposed Investigations

4.1 Geophysical Investigations

Based on the site visit and the information given by the REEL, EPTRI and GHMC representatives, locations for the Geophysical investigations have been selected, as represented in

Plate 4.1. Please refer to Lines 1 to 5 (designated as L1 to L5). Lines L1 to L4 have been selected based on the maximum height of the landfill at these locations, whereas L5 has been selected to identify the presence/absence of leachate pockets as it is a low-lying area previously and close to leachate ponds. The preliminary site survey helped us estimate that each MASW and ERT investigation should be conducted for 3000 meters.



Plate 4.1 The Google Earth map of the JLH depicting the locations selected for Geophysical investigations

4.2 Retrieval of Decomposed MSW from JLH and Characterization

The top cover (including vegetative and clay cover) and other geotextile layers will be removed manually. Followed by a flight auger (diameter ranging between 100 and 300 mm), attached to a pile-driving unit, will be inserted in the capped landfill to drill a borehole using hydraulic equipment (Mohammad et al., 2021). The DMSW and leachates obtained at different borehole depths will be collected. Borehole drilling from the top of the landfill will be initiated by inserting a mild steel casing. The casing helps in stabilizing the borehole during the drilling operation. The drilling would be continued as deep as possible based on the site conditions, considering the safety of buried utilities. A sampling of MSW will be done every 2-3 m or

wherever changes in the strata. The landfill operator should seal the boreholes after the sampling is completed. The retrieved samples will be spread on a clean geomembrane (near the borehole on the two loops) and divided into four quarters with the help of a shovel. Furthermore, the MSW samples (≈ 5 -10 kg) would be randomly collected for *three quarters* for laboratory testing. The leftover samples of MSW should be backfilled into the boreholes. Depending upon the state of the exhumed MSW samples, their storage at 4 °C, in a refrigerator at the site will be done. Subsequently, the samples will be transported to the IIT Bombay laboratory for their characterization, as mentioned in the following.

4.3 Characterization of the DMSW samples

4.3.1 Physical Characteristics

The DMSW was proposed to sieve through a 20 mm size sieve followed by the manual segregation of the retained portion into various fractions such as plastics, textiles, metals, glass, paper, etc. Further, the <20 mm fraction considered as soil-like materials was proposed to be tested for moisture content and specific gravity.

4.3.2 Chemical Characteristics

The biochemical processes involved in the decomposition of MSW in a landfill transform the organic matter (OM) present in it. With this in view, the chemical parameters of MSW, namely, volatile solids, elemental content, total organic carbon, ammonium and nitrate nitrogen and heavy metals, were proposed to be performed on the MSW samples retrieved from the landfill. In addition to the characterization of MSW, testing of a few leachate samples for their chemical parameters (viz., pH, EC, TOC, COD, sulfates, phosphates, nitrate-nitrogen, ammonium-nitrogen, and heavy metals) was proposed.

Based on the above-mentioned comprehensive testing protocol, the readiness of the JLH for booming will be established. If the dumpsite can be mined, the recommendations for initiating mining was proposed to be submitted to GHMC.

5. Details of the Investigations and Results

5.1 Geophysical Investigations

IIT Bombay engaged Fugro Geotech India Pvt. Ltd. (FGTL) to conduct MASW and 2-dimensional ERT as a part of geophysical investigations and the results are presented in the following. Please note that the results of geophysical investigations for Line-5 are not generated appropriately. So, data for line-5 is missing from the report.

Different representative locations and stretches on the JLH were selected, refer to Plate 5.1, and a total of 3000 m length was covered. The coordinates of the start and end points for each stretch are mentioned in Table 5.1.



Plate 5.1 The Google Earth map exhibiting the actual stretches of the MASW and ERT investigations

Table 5.1 Coordinates for start and end points of MASW and ERT investigations

Line Name	Start Coordinates		End Coordinates		Line Length (m)
	Easting	Northing	Easting	Northing	
Line No 01	244483.17	1938999.8	244554.78	1938725.6	284
Line No 02	244463.67	1939005.7	244538.64	1938657.9	356
Line No 03	244509.12	1938654.7	244453.77	1939005.8	356
Line No 04	244627.65	1939043.2	244724.49	1938854.1	216
Line No 06	244747.97	1938687.1	244769.86	1938790.4	108
Line No 07	244768.09	1938692.5	244799.6	1938793.8	108
Line No 08	244303.79	1939060.6	244330.64	1938704.7	356
Line No 09	244041.55	1939193.8	244004.74	1939094.2	108
Line No 10	244498.79	1938955.8	244357.72	1938962.6	144
Line No 11	244518.41	1938875	244375.79	1938876.6	144
Line No 12	244557.57	1938838.2	244355.08	1938772.7	216
Line No 13	244580.39	1938707.8	244368.13	1938706.5	216
Line No 14	244395.78	1939035.7	244481.63	1938619.3	428

The results obtained from the analysis are depicted in Figure 5.1 to 5.12.

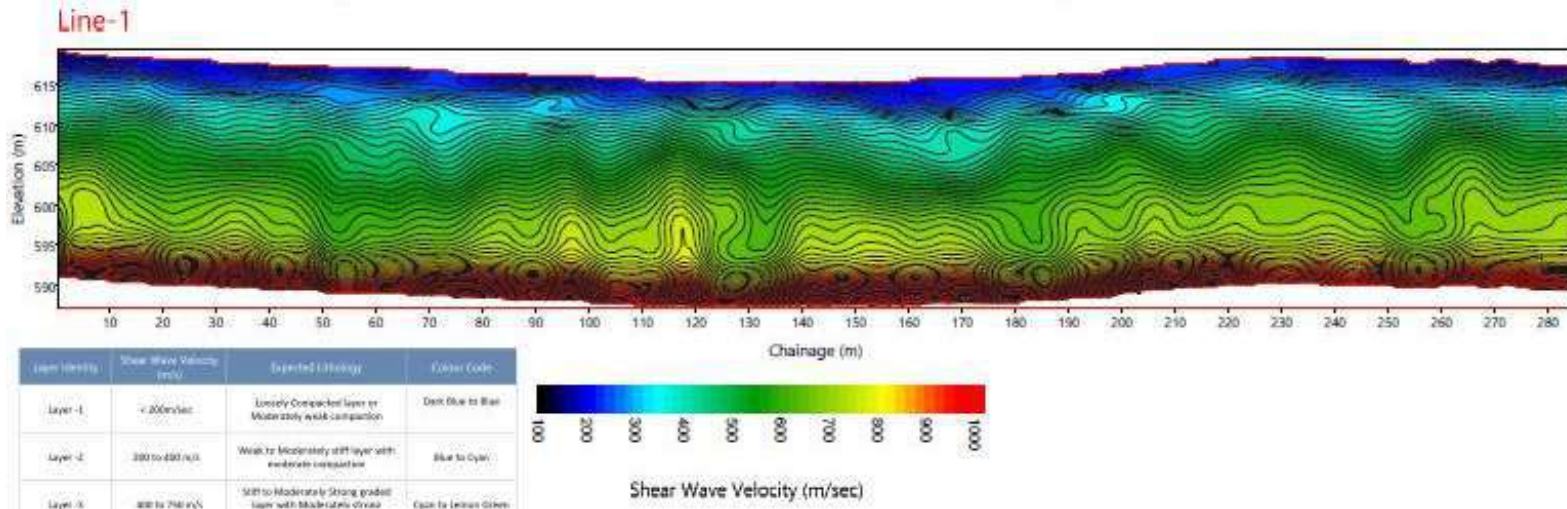


Figure 5.1 MASW analysis results of Line-1

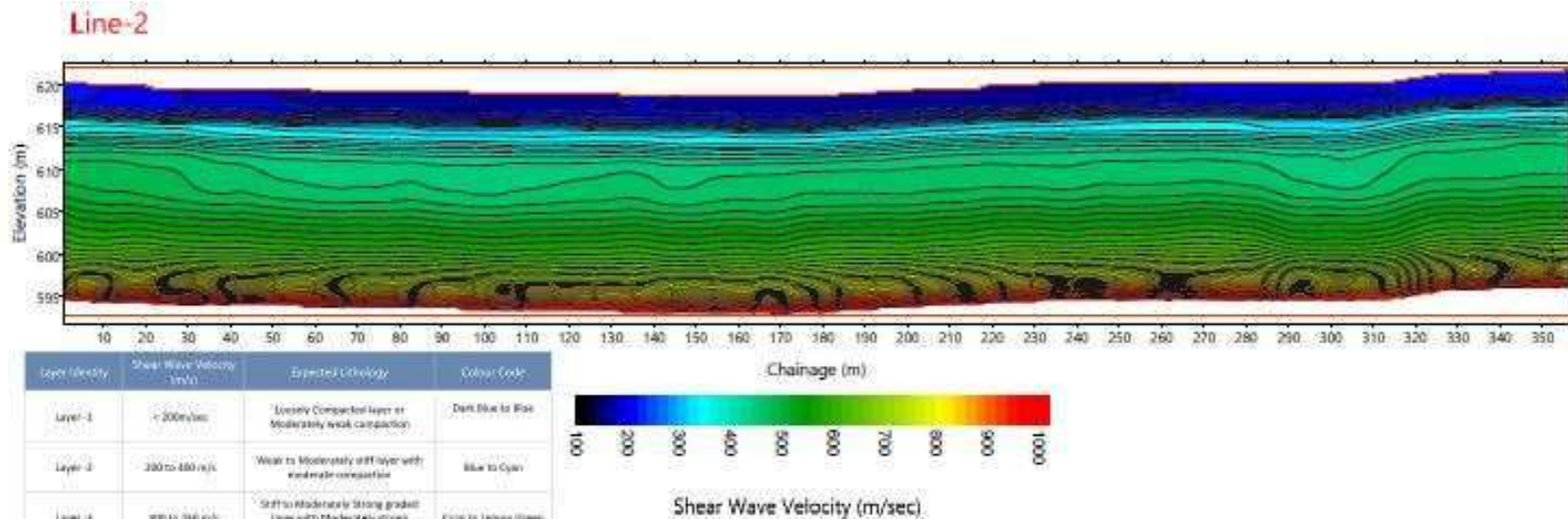


Figure 5.2 MASW analysis results of Line-2

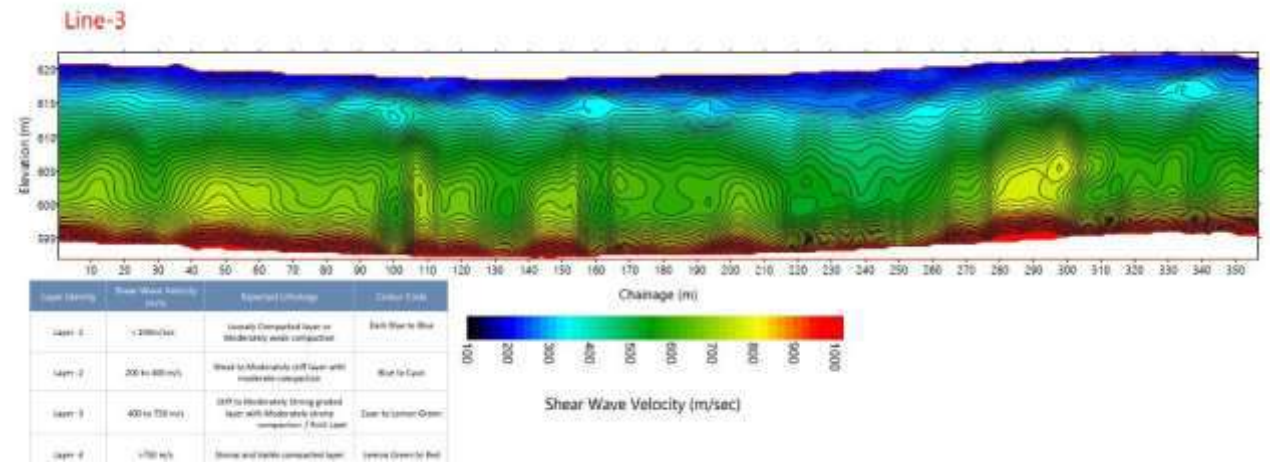


Figure 5.3 MASW analysis results of Line-3

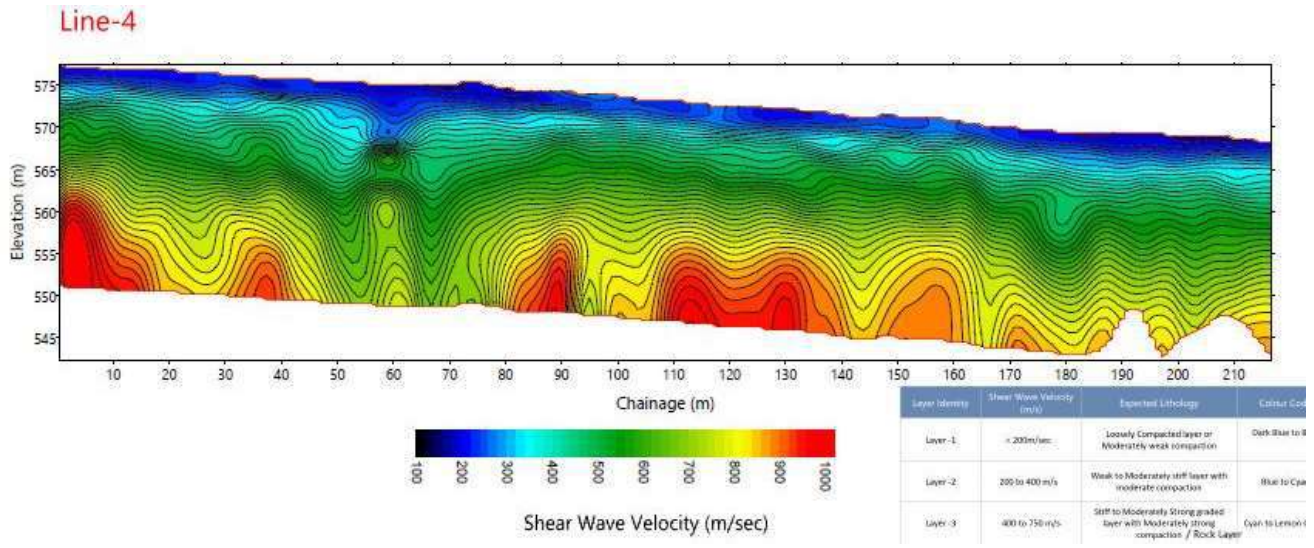


Figure 5.4 MASW analysis results of Line-4

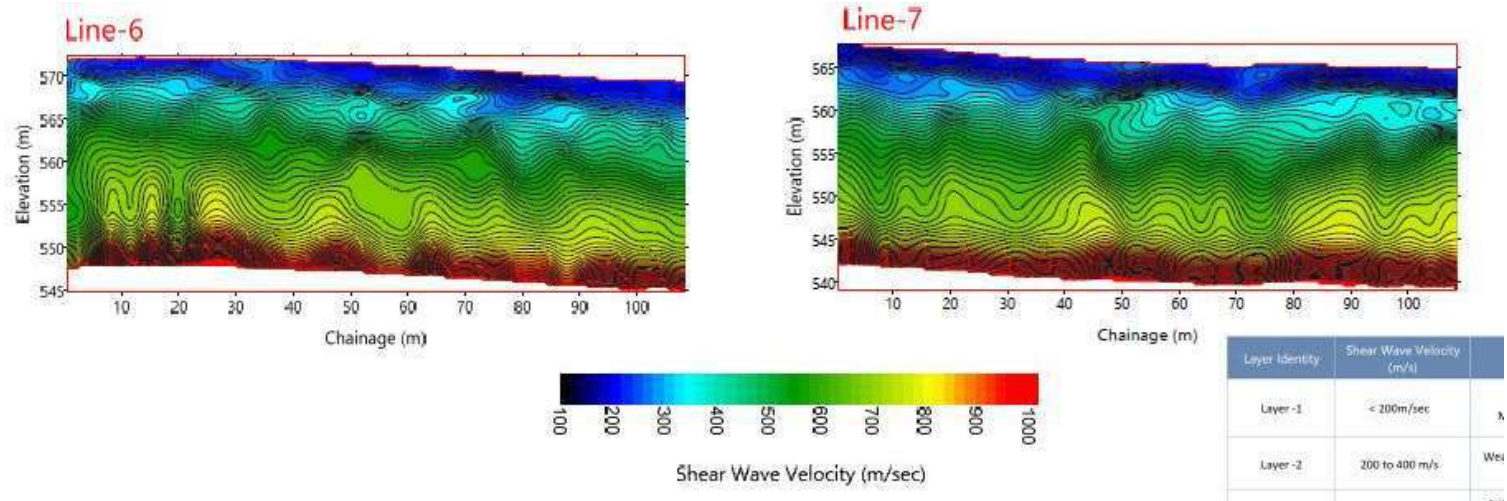


Figure 5.5 MASW analysis results of Lines-6 and 7

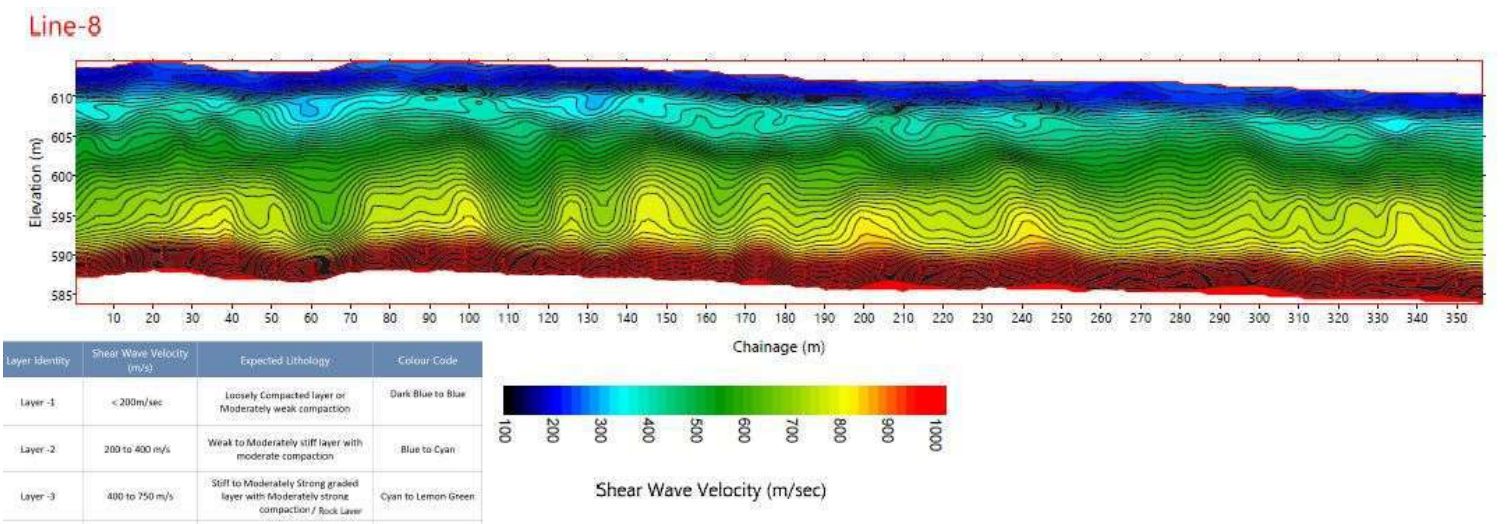


Figure 5.6 MASW analysis results of Line-8

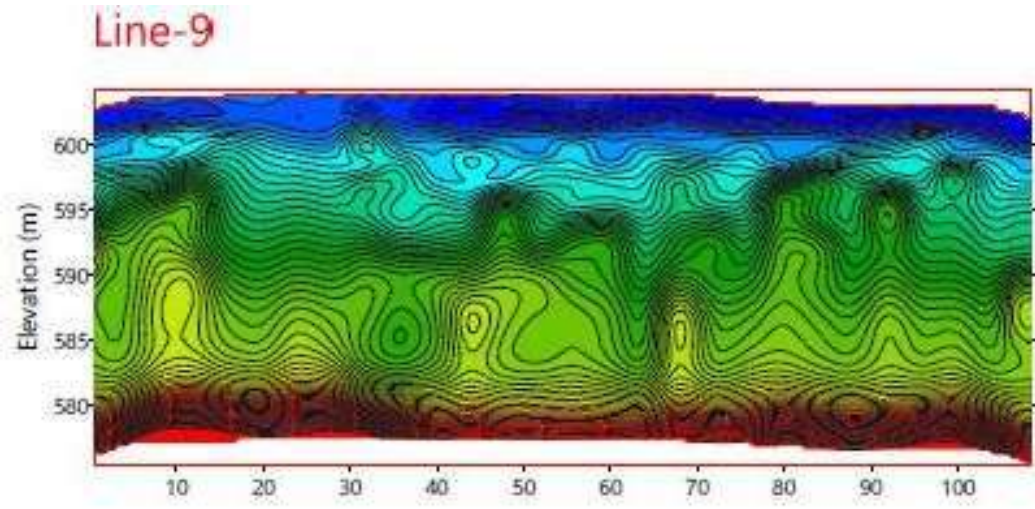


Figure 5.7 MASW analysis results of Line-9

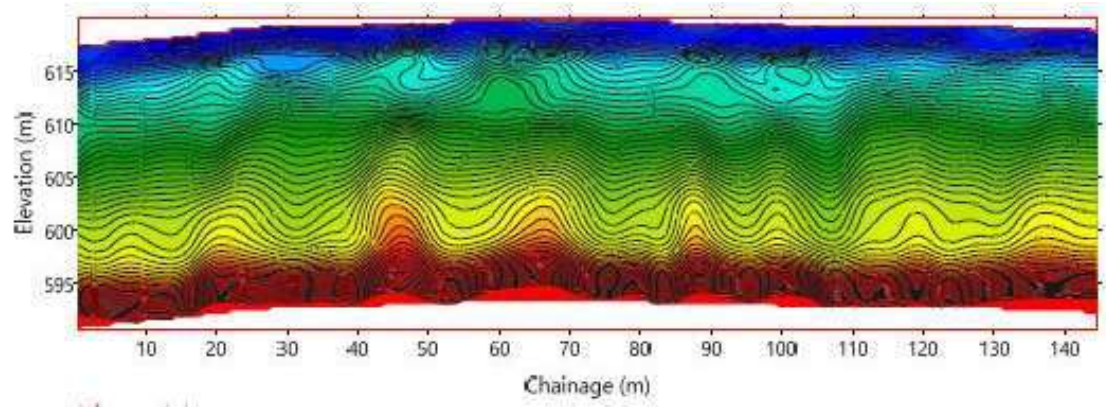


Figure 5.8 MASW analysis results of Line-10

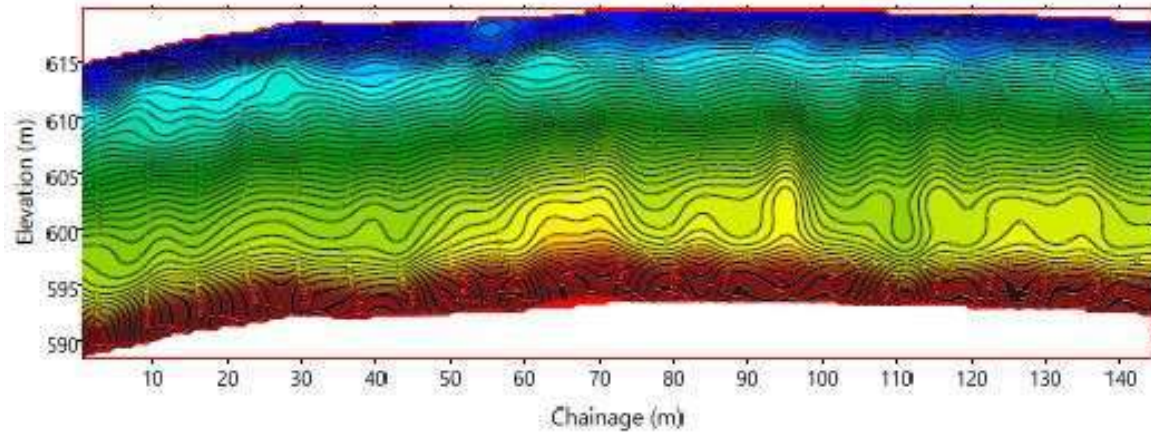


Figure 5.9 MASW analysis results of Line-11

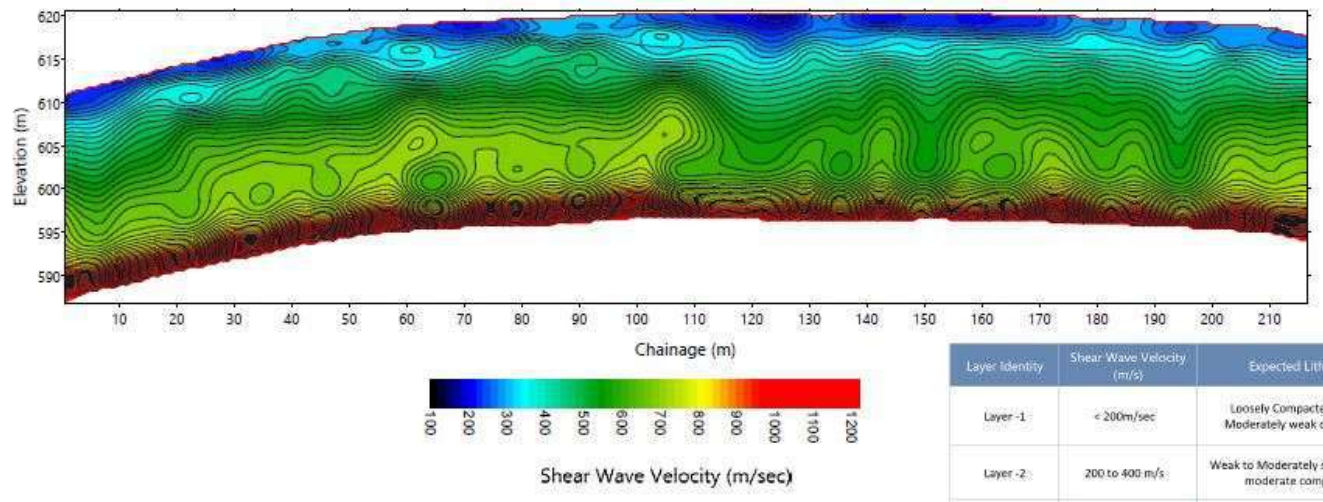


Figure 5.10 MASW analysis results of Line-12

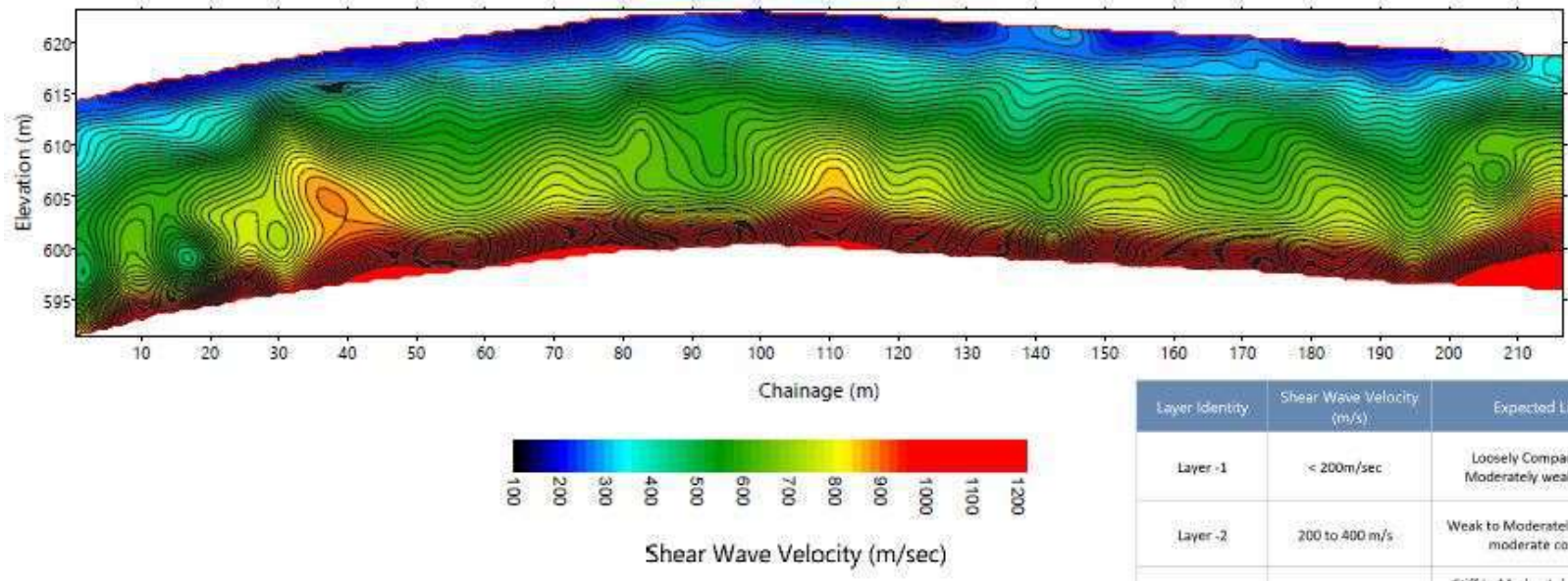


Figure 5.11 MASW analysis results of Line-13

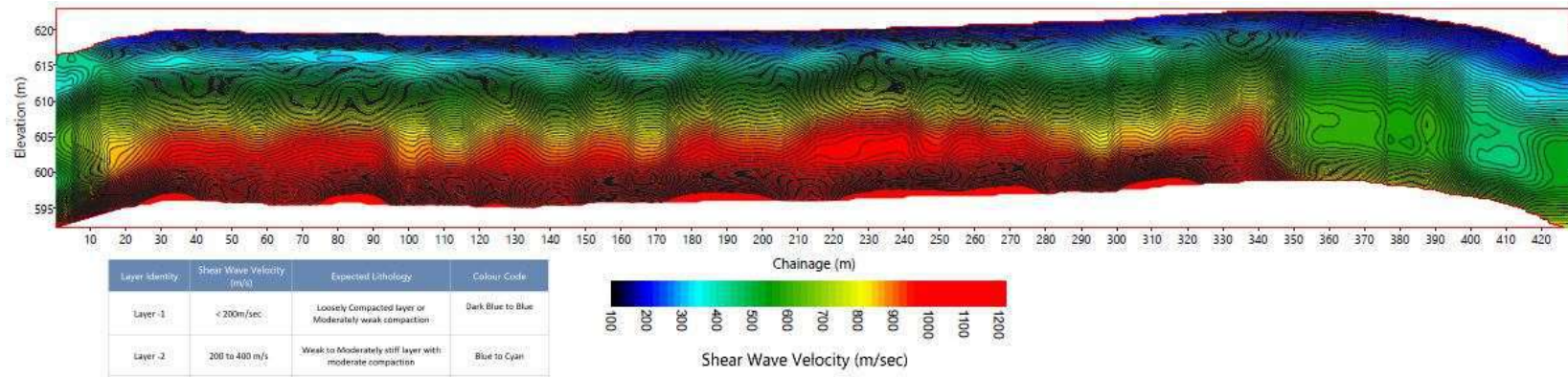


Figure 5.12 MASW analysis results of Line-14

Details of the subsurface properties obtained from the MASW are listed in Table 5.2. It can be observed from Table 5.2 and Figure 5.1 to Figure 5.12 that the majority portion of the JLH contains loosely compacted material, which can be due to the (i) presence of a high percentage of leachates and (ii) undecomposed MSW.

Table 5.2 The expected lithology for corresponding shear wave velocities provided by FGTL

Layer Identity	Shear Wave Velocity (m/s)	Expected Lithology	Colour Code
Layer -1	< 200m/sec	Loosely Compacted layer or Moderately weak compaction	Dark Blue to Blue
Layer -2	200 to 400 m/s	Weak to Moderately stiff layer with moderate compaction	Blue to Cyan
Layer -3	400 to 750 m/s	Stiff to Moderately Strong graded layer with Moderately strong compaction	Cyan to Lemon Green
Layer -4	>750 m/s	Strong and highly compacted layer	Lemon Green to Red

Further, to identify the presence of leachate and the state of the MSW, 2D-ERT investigations were conducted and the results are presented in the following (Lines 1 to 14 in Figure 5.13 to 5.25).

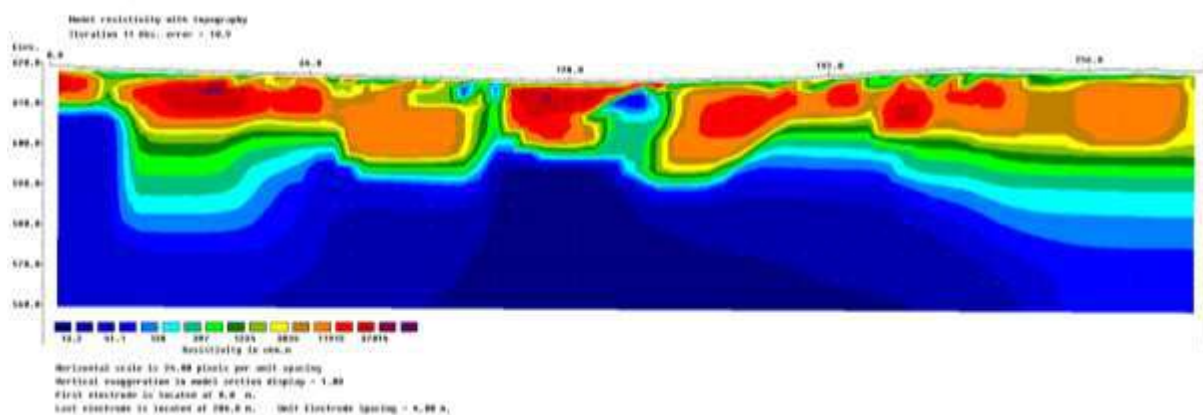


Figure 5.13 2D- electrical resistivity imaging map for Line-1

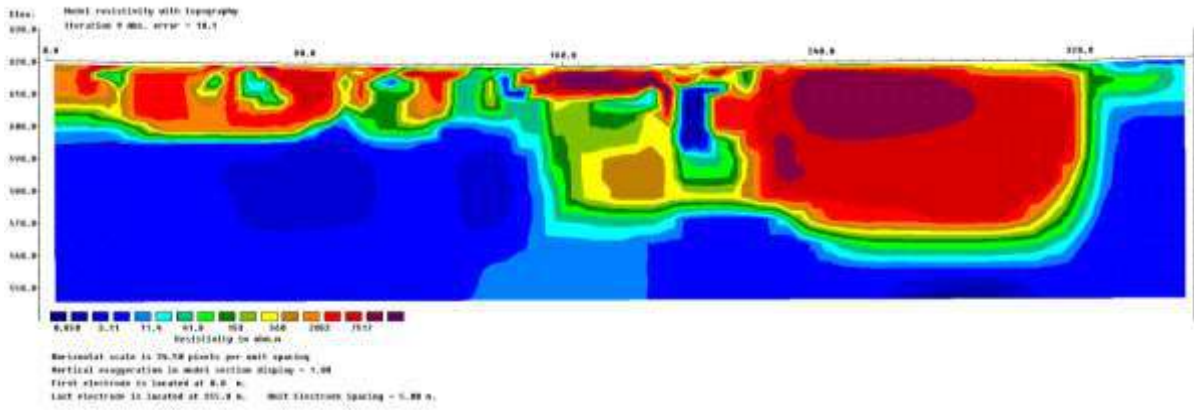


Figure 5.14 2D- electrical resistivity imaging map for Line-2

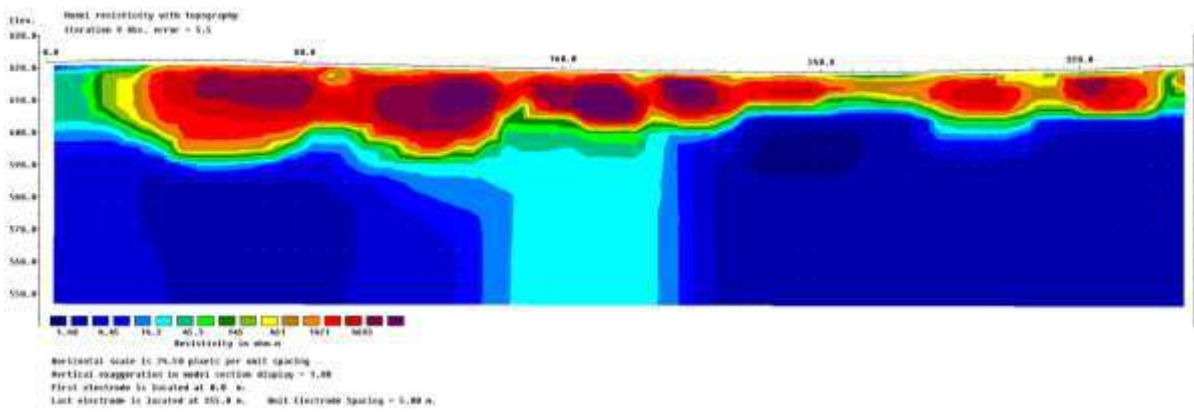


Figure 5.15 2D- electrical resistivity imaging map for Line-3

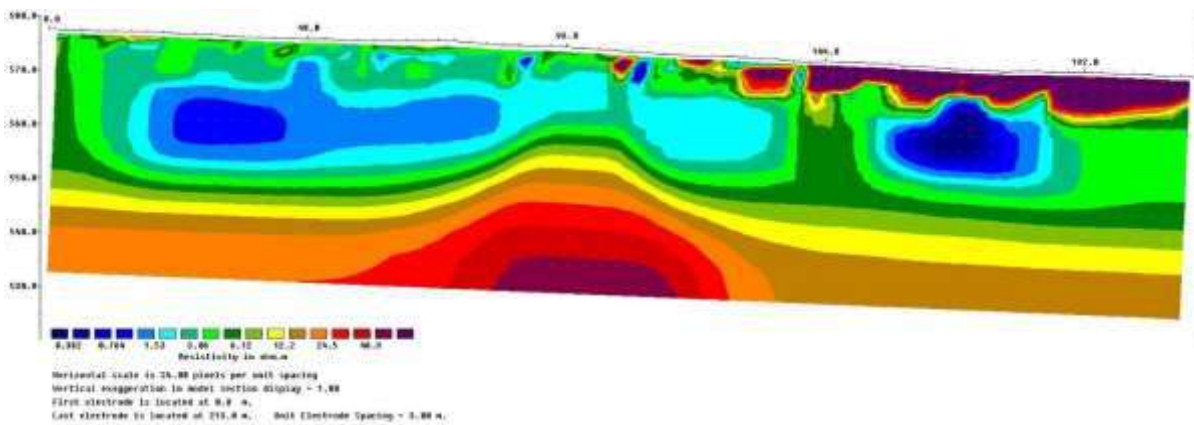


Figure 5.16 2D- electrical resistivity imaging map for Line-4

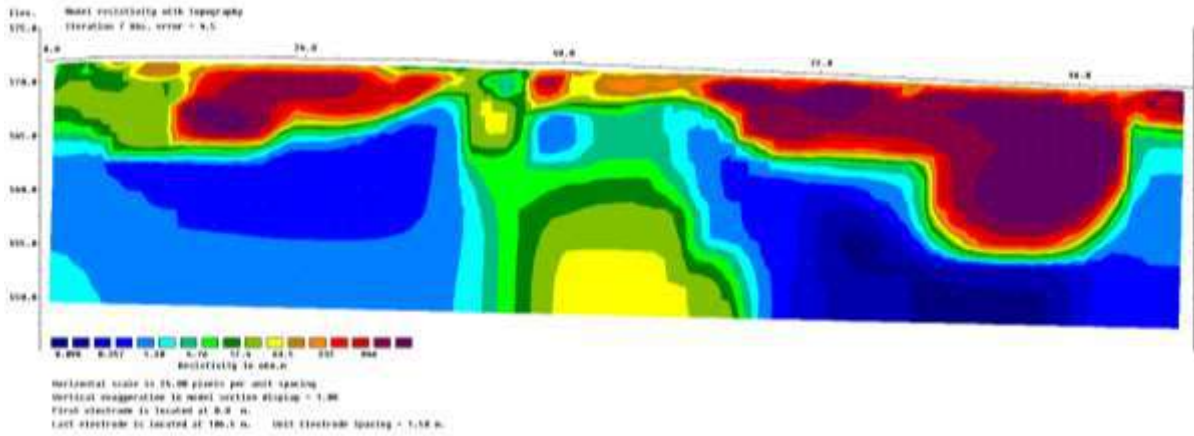


Figure 5.17 2D- electrical resistivity imaging map for Line-6

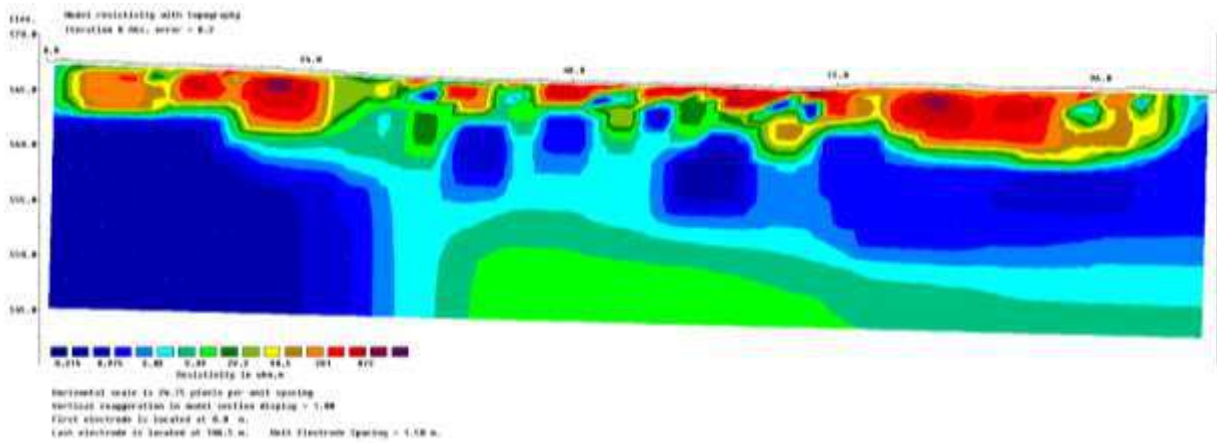


Figure 5.18 2D- electrical resistivity imaging map for Line-7

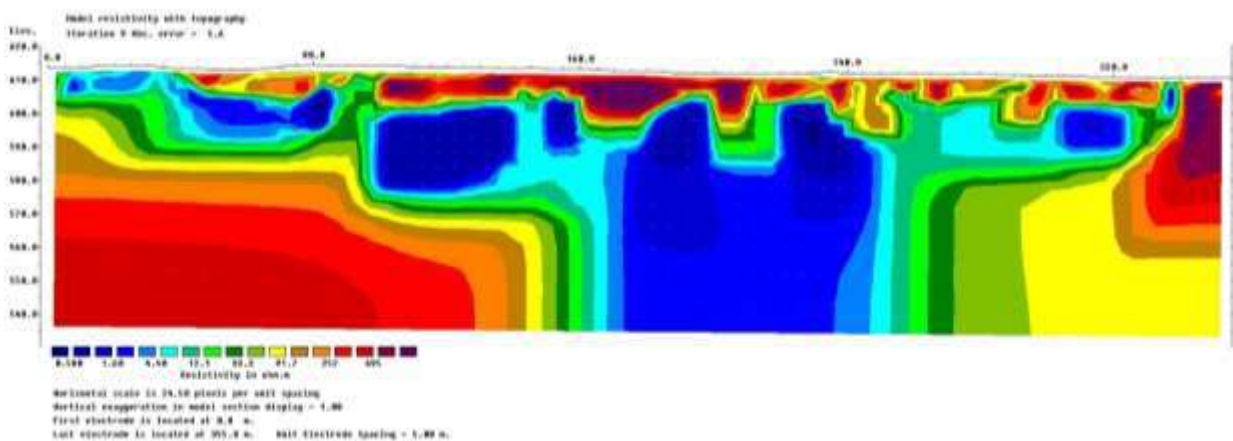


Figure 5.19 2D- electrical resistivity imaging map for Line-8

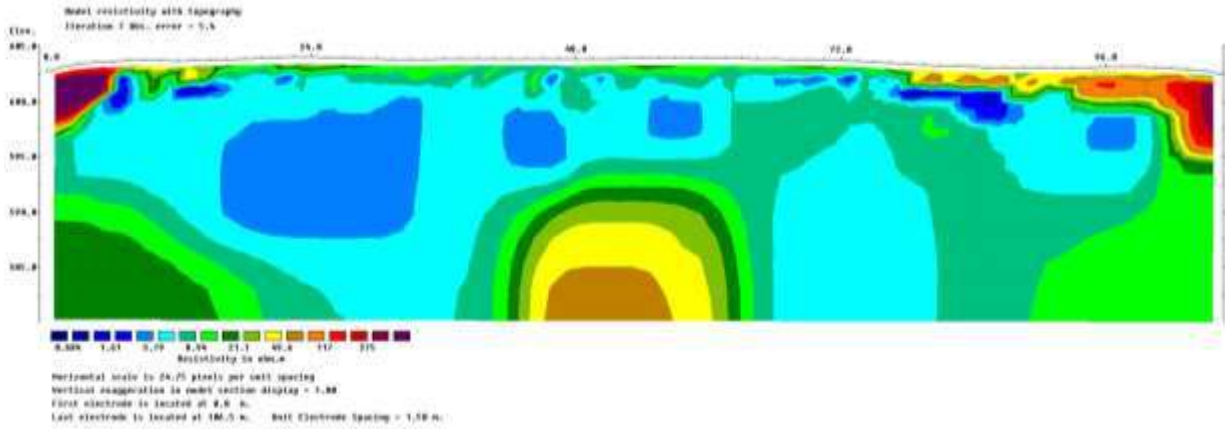


Figure 5.20 2D- electrical resistivity imaging map for Line-9

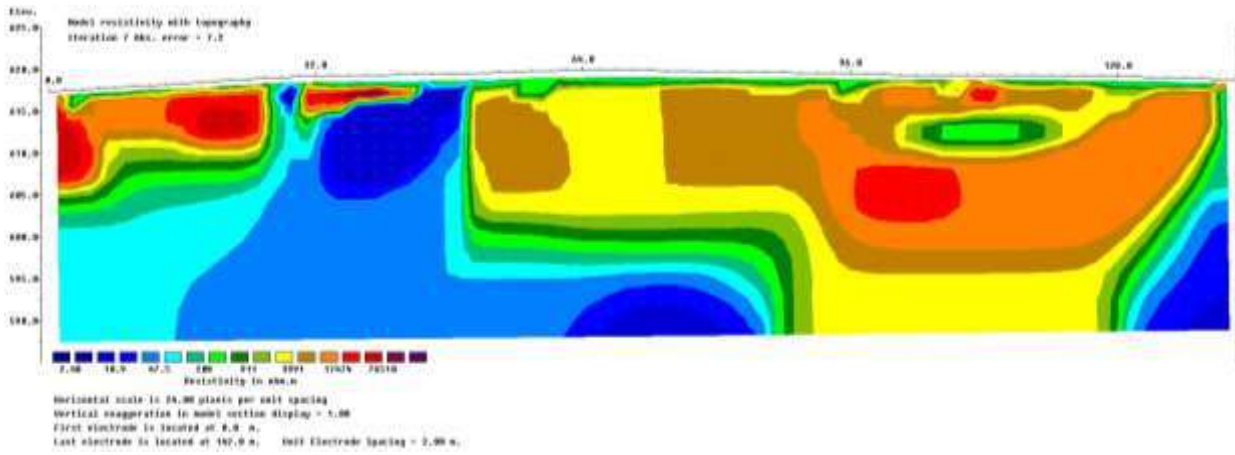


Figure 5.21 2D- electrical resistivity imaging map for Line-10

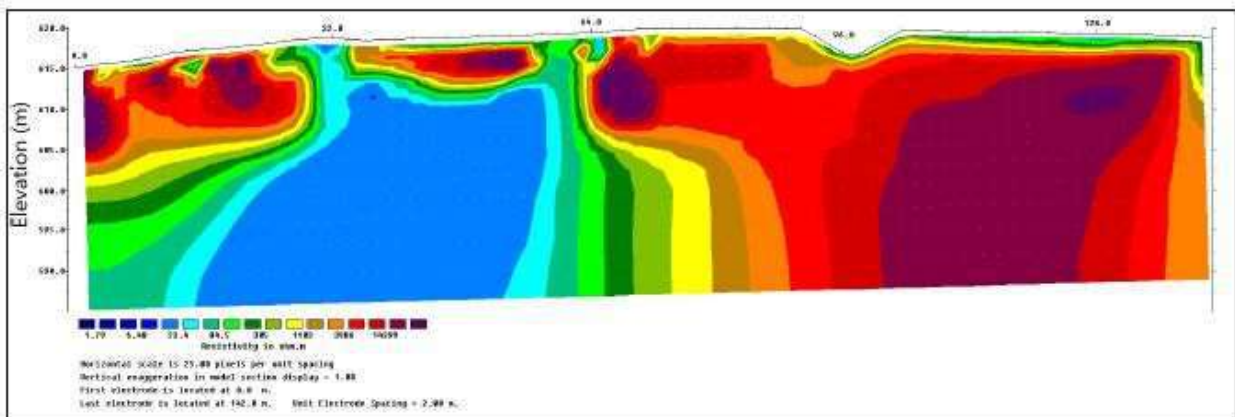


Figure 5.22 2D- electrical resistivity imaging map for Line-11

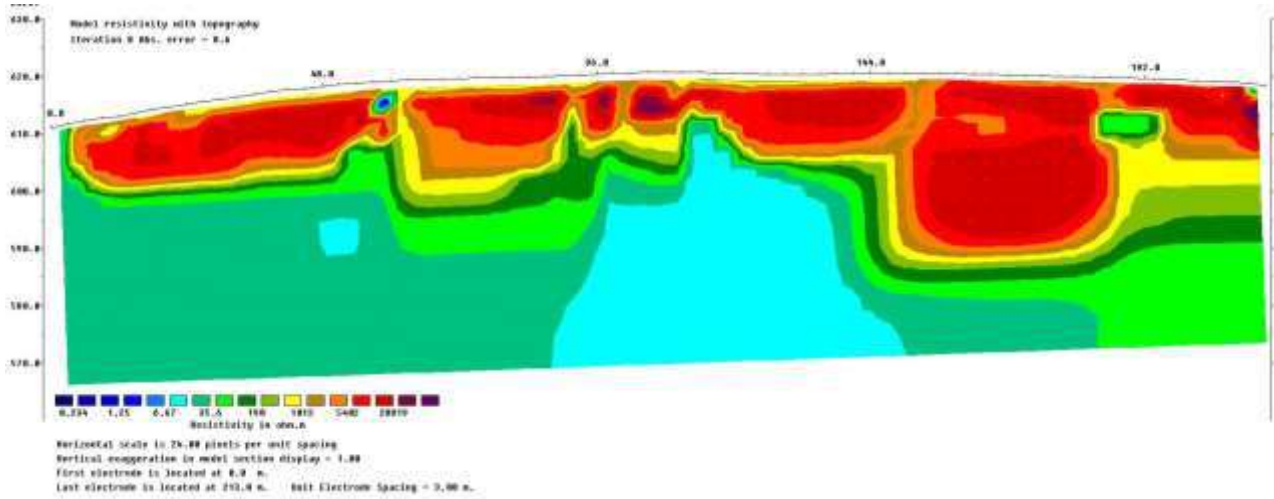


Figure 5.23 2D- electrical resistivity imaging map for Line-12

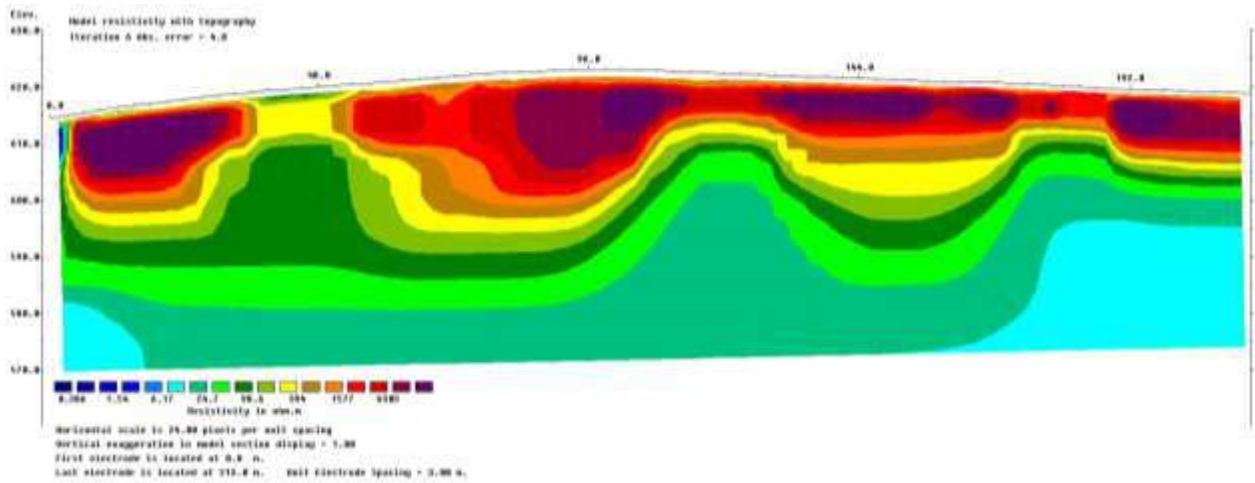


Figure 5.24 2D- electrical resistivity imaging map for Line-13

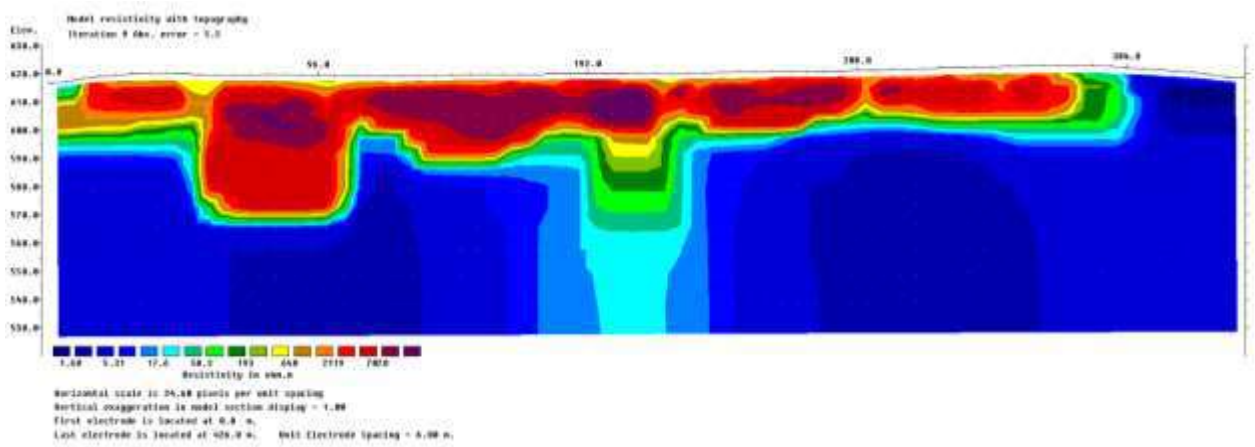


Figure 5.25 2D- electrical resistivity imaging map for Line-14

Based on the 2D ERT imaging results presented in Figures 5.13 to 5.25, it can be observed that the MSW at most of the locations of JLH possesses low electrical resistivity, which is indicative of the presence of saturated MSW with different salts and dissolved compounds. Moreover, Figures 5.12, 5.13, 5.15, 5.17 to 5.21 depict that the JLH consists of several isolated locations with extremely low electrical resistivity. Such isolated low-electrical resistivity locations could be due to the presence of saturated MSW, which is prone to decompose in due course, or conductive materials such as metals. This state of MSW will also be a root cause for the generation of combustible gases such as methane.

6. Details of the MSW sampling and on-site segregation

Before initiating sample collection, the soil cover, followed by geotextile, was removed carefully to avoid damage to the landfill cover system. Subsequently, a flight auger of ≈ 165 mm diameter attached to a drilling machine was inserted in the specific borehole location (refer to

Plate 6.1a). Samples were collected from different depths, until the hard strata or the presence of liquid interface is encountered. Details of the borehole location, termination depth, and the number of samples collected are mentioned in Table 6.1. A total of 16 boreholes were executed to retrieve 150 samples. The samples thus obtained were removed manually from the auger (refer to

Plate 6.1b-d) and sieved through a 10 mm sieve (refer to

Plate 6.2a). Subsequently, the coarse- and fine- fractions were weighed and the data is tabulated in Table 6.2. These fractions were packed in airtight press-lock bags to prevent moisture loss, if any, (refer to

Plate 6.2b and c). Subsequently, the airtight bags were packed and transported to IIT Bombay for further testing/analyses (refer to

Plate 6.2d and f). Later, the boreholes were sealed by the landfill operator (refer to Plate 6.3).

Incidentally, during the sampling, a few of the boreholes released foam/bubbles/liquid (refer to Plate 6.4a to c), which are indicative of the presence of undecomposed MSW.



(a)



(b)



(c)



(d)

Plate 6.1 Images depicting the flight auger and the sample collection procedure

Table 6.1 Details of the boreholes and number of samples collected

BH	Location	Termination Depth (ft)	Depth till Sample Collected (ft)	Termination depth (m)	Nos. of Samples Retrieved
BH-1	Near Line 13 End	85.50	80	26.06	8
BH-2	Near Line 14 End	105.50	100	32.16	10
BH-3	Near Line 1 End	88.25	80	26.90	8
BH-4	Near Line 2 End	124.50	120	37.95	12
BH-5	Near Line 13 Start	104.50	100	31.85	10
BH-6	Near Line 12 Start	126.25	120	38.48	12
BH-7	Near Line 10 Start	127.50	120	38.86	12
BH-8	Near Line 14 Start	15.75	15	4.80	3
BH-9	Near Line 3 Start	15.50	15	4.72	3
BH-10	Near Line 2 Start / Centre	139.00	139	42.37	14
BH-11	Near Line 1 Start	138.50	130	42.21	13
BH-12	Near Line 10 End / Line 8 Centre	139.00	139	42.37	14
BH-13	Near Line 9 Centre	112.25	120	34.21	13
BH-14	Near Line 9 End	19.25	15	5.87	3
BH-15	Near Line 4 Centre	111.50	110	33.99	12
BH-16	Near Line 4 End	23.50	20	7.16	3
			Total depth	449.96	150



(a)



(b)



(c)



(d)



(e)



(f)

Plate 6.2 Images depicting the on-site segregation, weighing and packing of the samples being witnessed by the GHMC

Table 6.2 Details of the coarse- and fine- samples obtained from the in-situ segregation

Sample No.	Depth (m)	Weight of sample (kg)			Percentage weight	
		Total	>10mm	<10mm	>10 mm	<10 mm
Borehole-01						
1	3	4.64	3.89	0.75	83.84	16.16
2	6	4.86	4.02	0.84	82.72	17.28
3	9	4.06	3.60	0.46	88.67	11.33
4	12	7.28	6.30	0.98	86.54	13.46
5	15	4.28	3.52	0.76	82.24	17.76
6	18	6.24	5.02	1.22	80.45	19.55
7	21	3.88	2.99	0.89	77.06	22.94
8	24	6.80	5.35	1.45	78.68	21.32
Borehole-02						
9	3	8	6.89	1.11	86.13	13.88
10	6	8.96	7.62	1.34	85.04	14.96
11	9	6.22	5.4	0.82	86.82	13.18
12	12	6.2	5.36	0.84	86.45	13.55
13	15	6.56	5.58	0.98	85.06	14.94
14	18	6.72	6.05	0.67	90.03	9.97
15	21	6.82	5.55	1.27	81.38	18.62
16	24	6.4	4.95	1.45	77.34	22.66
17	27	6.31	4.68	1.63	74.17	25.83
18	30	4.88	3.79	1.09	77.66	22.34
Borehole-03						
19	3	6.18	5.35	0.83	86.57	13.43
20	6	5.95	4.88	1.07	82.02	17.98
21	9	3.16	2.55	0.61	80.70	19.30
22	12	3.68	2.98	0.7	80.98	19.02
23	15	4.82	3.85	0.97	79.88	20.12
24	18	5.13	4.05	1.08	78.95	21.05
25	21	3.95	3.09	0.86	78.23	21.77
26	24	3.96	3.05	0.91	77.02	22.98
Borehole-04						
27	3	3.1	2.75	0.35	88.71	11.29
28	6	3.05	2.56	0.49	83.93	16.07
29	9	5.31	4.51	0.8	84.93	15.07
30	12	5.22	4.39	0.83	84.10	15.90
31	15	3.82	3.25	0.57	85.08	14.92
32	18	4.48	3.69	0.79	82.37	17.63
33	21	5.04	4.05	0.99	80.36	19.64
34	24	6.02	4.96	1.06	82.39	17.61
35	27	5.25	4.22	1.03	80.38	19.62

36	30	4.32	3.52	0.8	81.48	18.52
37	33	4.25	3.32	0.93	78.12	21.88
38	36	5.92	4.55	1.37	76.86	23.14
Borehole-05						
39	3	6.11	5.15	0.96	84.29	15.71
40	6	5.75	4.78	0.97	83.13	16.87
41	9	3.25	2.68	0.57	82.46	17.54
42	12	3.78	3.05	0.73	80.69	19.31
43	15	4.25	3.35	0.9	78.82	21.18
44	18	5.03	3.96	1.07	78.73	21.27
45	21	5.02	4.01	1.01	79.88	20.12
46	24	4.15	3.29	0.86	79.28	20.72
47	27	4.6	3.58	1.02	77.83	22.17
48	30	5.78	4.48	1.3	77.51	22.49
Borehole-06						
49	3	5.88	4.98	0.9	84.69	15.31
50	6	3.09	2.58	0.51	83.50	16.50
51	9	3.11	2.56	0.55	82.32	17.68
52	12	4.88	3.98	0.9	81.56	18.44
53	15	5.08	4.25	0.83	83.66	16.34
54	18	3.96	3.23	0.73	81.57	18.43
55	21	5.07	4.09	0.98	80.67	19.33
56	24	4.89	3.88	1.01	79.35	20.65
57	27	5.42	4.29	1.13	79.15	20.85
58	30	5.02	4.05	0.97	80.68	19.32
59	33	3.65	2.88	0.77	78.90	21.10
60	36	4.36	3.41	0.95	78.21	21.79
Borehole-07						
61	3	4.25	3.69	0.56	86.82	13.18
62	6	5.12	4.38	0.74	85.55	14.45
63	9	5.88	5.04	0.84	85.71	14.29
64	12	5.16	4.36	0.8	84.50	15.50
65	15	4.55	3.79	0.76	83.30	16.70
66	18	3.89	3.25	0.64	83.55	16.45
67	21	5.88	4.85	1.03	82.48	17.52
68	24	4.96	4.01	0.95	80.85	19.15
69	27	4.02	3.25	0.77	80.85	19.15
70	30	5.95	4.68	1.27	78.66	21.34
71	33	5.68	4.49	1.19	79.05	20.95
72	36	4.25	3.35	0.9	78.82	21.18
Borehole-08						
73	1.5	3.52	2.17	1.35	61.65	38.35
74	3	5.18	1.25	3.93	24.13	75.87

3300

75	4.5	4.30	0.80	3.50	18.60	81.40
Borehole-09						
76	5	5.27	2.16	3.11	40.99	59.01
77	10	6.56	2.16	4.40	32.93	67.07
78	15	7.25	2.80	4.45	38.62	61.38
Borehole-10						
79	3	7.24	6.25	0.99	86.33	13.67
80	6	3.38	2.89	0.49	85.50	14.50
81	9	3.30	2.75	0.55	83.33	16.67
82	12	2.82	2.38	0.44	84.40	15.60
83	15	2.65	2.25	0.40	84.91	15.09
84	18	4.32	3.89	0.43	90.05	9.95
85	21	3.32	2.78	0.54	83.73	16.27
86	24	4.44	3.76	0.68	84.68	15.32
87	27	5.62	4.62	1.00	82.21	17.79
88	30	7.15	5.79	1.36	80.98	19.02
89	33	7.05	5.58	1.47	79.15	20.85
90	36	5.92	4.65	1.27	78.55	21.45
91	39	6.44	4.99	1.45	77.48	22.52
92	41.7	2.65	2.05	0.60	77.36	22.64
Borehole-11						
93	3	4.42	3.80	0.62	85.97	14.03
94	6	5.65	4.75	0.90	84.07	15.93
95	9	5.80	4.88	0.92	84.14	15.86
96	12	4.82	3.95	0.87	81.95	18.05
97	15	6.02	4.96	1.06	82.39	17.61
98	18	5.62	4.88	0.74	86.83	13.17
99	21	4.42	3.91	0.51	88.46	11.54
100	24	5.98	4.90	1.08	81.94	18.06
101	27	4.85	3.85	1.00	79.38	20.62
102	30	5.60	4.68	0.92	83.57	16.43
103	33	6.44	5.05	1.39	78.42	21.58
104	36	4.42	3.39	1.03	76.70	23.30
105	39	5.86	4.36	1.50	74.40	25.60
Borehole-12						
106	3	6.26	5.41	0.85	86.42	13.58
107	6	6.36	5.25	1.11	82.55	17.45
108	9	6.65	5.65	1.00	84.96	15.04
109	12	5.85	4.98	0.87	85.13	14.87
110	15	5.96	5.08	0.88	85.23	14.77
111	18	4.48	3.95	0.53	88.17	11.83
112	21	4.78	3.99	0.79	83.47	16.53
113	24	6.62	5.54	1.08	83.69	16.31

114	27	4.45	3.79	0.66	85.17	14.83
115	30	6.80	5.32	1.48	78.24	21.76
116	33	5.30	4.25	1.05	80.19	19.81
117	36	7.98	6.25	1.73	78.32	21.68
118	39	6.41	5.22	1.19	81.44	18.56
119	41.7	6.84	5.44	1.40	79.53	20.47
Borehole-13						
120	3	5.68	5.04	0.64	88.73	11.27
121	6	5.25	4.36	0.89	83.05	16.95
122	9	4.35	3.79	0.56	87.13	12.87
123	12	3.88	3.25	0.63	83.76	16.24
124	15	5.25	4.65	0.60	88.57	11.43
125	18	6.25	5.58	0.67	89.28	10.72
126	21	6.62	5.65	0.97	85.35	14.65
127	24	7.02	5.78	1.24	82.34	17.66
128	27	5.22	4.22	1.00	80.84	19.16
129	30	3.89	3.18	0.71	81.75	18.25
130	31.5	5.11	4.15	0.96	81.21	18.79
131	33	4.78	3.85	0.93	80.54	19.46
132	33.6	5.88	4.65	1.23	79.08	20.92
Borehole-14						
133	1.5	9.02	2.81	6.21	31.15	68.85
134	3	6.34	2.78	3.56	43.85	56.15
135	4.5	7.96	3.96	4.00	49.75	50.25
Borehole-15						
136	3	4.11	3.69	0.42	89.78	10.22
137	6	5.11	4.38	0.73	85.71	14.29
138	9	5.62	5.04	0.58	89.68	10.32
139	12	3.65	3.15	0.50	86.30	13.70
140	15	4.18	3.59	0.59	85.89	14.11
141	18	5.01	4.19	0.82	83.63	16.37
142	21	4.29	3.72	0.57	86.71	13.29
143	24	6.11	5.02	1.09	82.16	17.84
144	27	3.65	3.02	0.63	82.74	17.26
145	30	5.42	4.38	1.04	80.81	19.19
146	33	4.45	3.55	0.90	79.78	20.22
147	33.6	3.98	3.09	0.89	77.64	22.36
Borehole-16						
148	10	3.05	2.75	0.30	90.16	9.84
149	15	3.12	2.75	0.37	88.14	11.86
150	20	4.35	3.85	0.50	88.51	11.49



(a)



(b)

Plate 6.3 The photographs depicting the borehole and its closure



(a)



(b)



(c)

Plate 6.4 The photographs depicting the leachate and bubble formation and bursting by landfill gas emission the release of foam/bubbles/liquid from a typical borehole

7. Processing and characterization of the DMSW @ IIT Bombay Laboratory

The coarse fraction, i.e., >10 mm obtained from the site, was further segregated into plastics, textiles, residues (such as fine dirt and mixed waste) and stones, and the weight of each of these fractions was recorded. For this purpose, 1/3rd of the total samples available from each borehole were selected randomly. The coarse-fraction is particularly useful for subsequent estimation of calorific values. The photographs depicting the laboratory segregation process are mentioned in Plate 7.1. Subsequently, each fraction's total weight and percentage are mentioned in Table 7.1. From Table 7.1, it can be observed that a significant fraction of the coarse fraction is plastics, followed by residues and stones. However, it can be observed that combining all together (i.e., coarse- and fine- fractions), fine fractions and residues will be a large fraction that is prone to decomposition. Hence, subsequent characterization of these fractions is a must.



Plate 7.1 Images depicting the laboratory segregation process of the coarse-fractions

Table 7.1 Results obtained for the coarse-fractions of the MSW

BH	Depth (m)	Weight (g)					Percentage weight				
		Plastics	Textile	Residues	Stones	Total	Plastics	Textile	Residues	Stones	
BH-01	12	234	157	772	0	1163	20.12	13.50	66.38	0.00	
	15	308	163	890	0	1361	22.63	11.98	65.39	0.00	
	24	445	177	1243	0	1865	23.86	9.49	66.65	0.00	
	Avg	329	166	968	0	1463	22.20	11.66	66.14	0.00	
BH-02	3	158	100	679	0	937	16.86	10.67	72.47	0.00	
	6	263	202	858	0	1323	19.88	15.27	64.85	0.00	
	9	437	104	463	0	1004	43.53	10.36	46.12	0.00	
	12	411	104	333	0	848	48.47	12.26	39.27	0.00	
	Avg	317	128	583	0	1028	32.18	12.14	55.68	0.00	
BH-03	3	284	32	283	32	631	45.01	5.07	44.85	5.07	
	21	364	108	30	0	502	72.51	21.51	5.98	0.00	
	24	274	221	115	0	610	44.92	36.23	18.85	0.00	
	Avg	307	120	143	11	581	54.15	20.94	23.23	1.69	
BH-04	15	259	99	298	7	663	39.06	14.93	44.95	1.06	
	27	333	79	6	0	418	79.67	18.90	1.44	0.00	
	30	226	98	490	79	893	25.31	10.97	54.87	8.85	
	36	194	385	87	0	666	29.13	57.81	13.06	0.00	
	Avg	253	165	220	22	660	43.29	25.65	28.58	2.48	
BH-05	15	245	96	322	0	663	36.95	14.48	48.57	0.00	
	27	270	243	315	0	828	32.61	29.35	38.04	0.00	
	30	292	57	58	0	407	71.74	14.00	14.25	0.00	
	33	361	0	29	0	390	92.56	0.00	7.44	0.00	
	Avg	292	99	181	0	572	58.47	14.46	27.07	0.00	
BH-06	6	320	20	623	4	967	33.09	2.07	64.43	0.41	
	9	244	30	667	149	1090	22.39	2.75	61.19	13.67	
	18	659	34	56	0	749	87.98	4.54	7.48	0.00	
	36	460	0	56	8	524	87.79	0.00	10.69	1.53	
	Avg	421	21	351	40	833	57.81	2.34	35.95	3.90	
BH-07	3	227	126	190	0	543	41.80	23.20	34.99	0.00	
	12	362	37	822	52	1273	28.44	2.91	64.57	4.08	
	18	329	84	723	141	1277	25.76	6.58	56.62	11.04	
	27	606	87	152	0	845	71.72	10.30	17.99	0.00	
	Avg	381	84	472	48	985	41.93	10.75	43.54	3.78	
BH-08	15	22	7	315	431	775	2.84	0.90	40.65	55.61	
BH-10	3	231	194	467	16	908	25.44	21.37	51.43	1.76	
	6	24	816	23	0	863	2.78	94.55	2.67	0.00	
	9	273	29	190	25	517	52.80	5.61	36.75	4.84	
	15	178	53	264	41	536	33.21	9.89	49.25	7.65	
	18	214	66	130	0	410	52.20	16.10	31.71	0.00	

	Avg	184	232	215	16	647	33.29	29.50	34.36	2.85
BH-11	15	204	21	533	85	843	24.20	2.49	63.23	10.08
	18	167	189	475	0	831	20.10	22.74	57.16	0.00
	33	211	49	595	0	855	24.68	5.73	69.59	0.00
	36	232	80	715	0	1027	22.59	7.79	69.62	0.00
	Avg	204	85	580	21	889	22.89	9.69	64.90	2.52
BH-12	9	316	158	347	0	821	38.49	19.24	42.27	0.00
	15	340	59	169	0	568	59.86	10.39	29.75	0.00
	18	188	293	73	6	560	33.57	52.32	13.04	1.07
	24	189	212	354	0	755	25.03	28.08	46.89	0.00
	42	395	182	147	0	724	54.56	25.14	20.30	0.00
	Avg	286	181	218	1	686	42.30	27.03	30.45	0.21
BH-13	6	208	12	462	56	738	28.18	1.63	62.60	7.59
	21	427	61	111	0	599	71.29	10.18	18.53	0.00
	30	309	241	99	0	649	47.61	37.13	15.25	0.00
	39	483	110	223	0	816	59.19	13.48	27.33	0.00
	Avg	357	106	224	14	701	51.57	15.61	30.93	1.90
BH-14	6	270	92	255	3	620	43.55	14.84	41.13	0.48
	9	342	50	296	0	688	49.71	7.27	43.02	0.00
	21	433	64	111	0	608	71.22	10.53	18.26	0.00
	Avg	348	69	221	1	639	54.82	10.88	34.14	0.16
BH-15	12	164	432	137	29	762	21.52	56.69	17.98	3.81
	33	401	100	90	4	595	67.39	16.81	15.13	0.67
	Avg	283	266	114	17	679	44.46	36.75	16.55	2.24
BH-16	6	298	26	273	32	629	47.38	4.13	43.40	5.09
	9	330	56	31	0	417	79.14	13.43	7.43	0.00
	Avg	314	41	152	16	523	63.26	8.78	25.42	2.54
Avg							42.74	16.68	37.80	2.78

7.1 Characteristics of the fine-fractions

7.1.1 Moisture Content

Moisture content was determined by keeping the sample in an oven at $110 \pm 5^\circ\text{C}$ and its weight loss was recorded intermittently. This procedure was followed until no further weight loss was observed as per the guidelines reported in the literature (ASTM International, 2020; Goli et al., 2022). The results obtained for different samples are listed in Table 7.2 (and in Tables A1 to A16).

Table 7.2 The moisture content of the fine-fractions

BH	Moisture content (%)		
	Avg (\pm SD)	Maximum	Minimum
BH-01	73.6 \pm 38.7	107.6 \pm 111.4	48.7 \pm 10.7
BH-02	62.4 \pm 28.3	75.7 \pm 22.2	43.4 \pm 7.3
BH-03	40.5 \pm 7.4	49.6 \pm 3.3	33.2 \pm 2
BH-04	50.4 \pm 12.3	72.6 \pm 2.6	34.7 \pm 2.2
BH-05	33.8 \pm 11.4	54.7 \pm 1.2	19.1 \pm 0.9
BH-06	30.7 \pm 12.1	55 \pm 1.2	20.6 \pm 1.1
BH-07	47.0 \pm 12.8	63.5 \pm 9.0	23.5 \pm 0.1
BH-08	10.50 \pm 5.80	15.6 \pm 1.20	4.30 \pm 0.30
BH-09	4.6 \pm 0.6	5.1 \pm 0.4	4.2 \pm 0.4
BH-10	42.5 \pm 11.5	60.9 \pm 3.6	29.4 \pm 3.5
BH-11	43.9 \pm 4.9	51.2 \pm 2.3	39.0 \pm 0.6
BH-12	50.5 \pm 7.5	63.1 \pm 6.3	41.6 \pm 8.7
BH-13	54.9 \pm 12.4	67.9 \pm 5.2	43.5 \pm 2.6
BH-14	20.6 \pm 9.3	25.8 \pm 0.9	7.4 \pm 9.6
BH-15	31.5 \pm 6.1	24.4 \pm 1.6	39.3 \pm 3.8
BH-16	31.2 \pm 10.2	42.0 \pm 1.6	21.7 \pm 9.4

From Table 7.2, it can be observed that the average moisture content of the fine-fractions varies between \approx 4 and 74%, which is pretty high. In fact, the maximum moisture content of some of the samples is noticed to vary between 54 % to 108 %, which can be attributed to the presence of a very high amount of organic matter. It should be noted that the samples with such high moisture content will be prone to subsequent decomposition (Patil et al., 2017).

7.1.2 Organic Matter

The organic matter (OM) present in fine fractions was determined by resorting to the loss-on-ignition (LOI) test, as suggested by Goli et al. (2022). For this purpose, approx. 25 g of the oven-dried fine fraction was taken in a ceramic crucible and placed in a muffle. The muffle temperature was increased gradually to 440°C and maintained until no further change in the weight of the residue was observed. The results obtained from moisture content determination for all samples are mentioned in Table 7.3. Further, detailed experimental results were mentioned in Tables B1 to B16.

Table 7.3 Borehole-wise variation in the organic matter of fine fractions

Borehole No	Organic matter (%)		
	Avg (\pm SD)	Max	Min
BH-01	23.49 \pm 5.51	33.27 \pm 9.47	18.10 \pm 1.38
BH-02	25.28 \pm 4.63	31.13 \pm 0.62	19.64 \pm 0.71
BH-03	16.29 \pm 2.84	11.29 \pm 1.65	18.80 \pm 1.83
BH-04	20.53 \pm 2.96	17.55 \pm 1.49	25.54 \pm 3.28
BH-05	15.05 \pm 6.27	23.06 \pm 4.63	6.26 \pm 0.64
BH-06	12.49 \pm 4.08	20.65 \pm 1.50	8.08 \pm 1.83
BH-07	17.82 \pm 4.28	22.78 \pm 2.29	12.22 \pm 1.27
BH-08	4.46 \pm 0.81	5.45 \pm 0.17	3.89 \pm 0.18
BH-09	3.17 \pm 0.53	3.21 \pm 0.34	3.13 \pm 0.77
BH-10	16.83 \pm 7.27	36.46 \pm 4.51	9.74 \pm 0.48
BH-11	16.94 \pm 4.03	24.49 \pm 4.70	12.26 \pm 0.51
BH-12	17.31 \pm 3.08	20.32 \pm 1.15	14.04 \pm 2.56
BH-13	20.74 \pm 3.99	30.10 \pm 1.99	16.42 \pm 0.96
BH-14	8.22 \pm 3.61	11.26 \pm 1.98	1.63 \pm 0.23
BH-15	12.90 \pm 3.02	17.31 \pm 1.38	10.07 \pm 0.80
BH-16	14.58 \pm 2.12	15.94 \pm 1.02	12.88 \pm 2.23

Table 7.2 shows that the organic matter (OM) in fine fractions varied from 1.63 \pm 0.23 and 36.46 \pm 4.51%, with an average value of \approx 20%. Such higher OM suggests that the DMSW is prone to further decomposition when exposed to an external environment. Moreover, the values suggest that the fine fraction is unsuitable for their utilization as structural fill material applications (Goli et al., 2022).

7.1.3 Specific Gravity

The specific gravity of the oven-dried fine fraction of the DMSW was measured by employing a helium gas pycnometer, as per the ASTM standard (ASTM D 5550, 2006). Approximately 20 g of the oven-dried sample was transferred into a pycnometer cell and He gas was purged to measure the volume of the solids. The average specific gravity of the fine fraction collected from each borehole is listed in Table 7.4, while the results for each sample are given in Tables C1 to C10.

Table 7.4 Borehole-wise variation in the specific gravity of fine fractions

Borehole No	Specific gravity		
	Average (\pm SD)	Max	Min
BH-01	2.26 \pm 0.03	2.36 \pm 0.02	2.15 \pm 0.04
BH-02	2.18 \pm 0.02	2.38 \pm 0.02	1.92 \pm 0.01
BH-03	2.23 \pm 0.01	2.34 \pm 0.01	2.07 \pm 0.01
BH-04	2.21 \pm 0.01	2.30 \pm 0.00	2.05 \pm 0.01
BH-05	2.31 \pm 0.02	2.47 \pm 0.02	2.13 \pm 0.04
BH-06	2.36 \pm 0.01	2.47 \pm 0.01	2.17 \pm 0.04
BH-07	2.28 \pm 0.01	2.41 \pm 0.02	2.17 \pm 0.02
BH-08	2.61 \pm 0.02	2.65 \pm 0.02	2.58 \pm 0.02
BH-09	2.67 \pm 0.01	2.69 \pm 0.01	2.66 \pm 0.01
BH-10	2.32 \pm 0.01	2.47 \pm 0.00	1.92 \pm 0.04
BH-11	2.30 \pm 0.01	2.37 \pm 0.00	2.18 \pm 0.01
BH-12	2.23 \pm 0.02	2.30 \pm 0.01	2.17 \pm 0.02
BH-13	2.26 \pm 0.01	2.31 \pm 0.02	2.19 \pm 0.01
BH-14	2.48 \pm 0.01	2.63 \pm 0.00	2.40 \pm 0.01
BH-15	2.48 \pm 0.00	2.46 \pm 0.00	2.38 \pm 0.00
BH-16	2.33 \pm 0.00	2.39 \pm 0.01	2.29 \pm 0.01

It can be observed that the overall average specific gravity of the fine fraction is 2.30 \pm 0.13, which is much lower as compared to the sands, silty clays, and moorum that are being used for structural fill applications. As such, the utilization of fine fractions as structural fill for the low-lying areas is not recommended. The reason being this material will not be getting properly compacted and will always be prone to long-term degradation.

7.1.4 Analysis of Leachates

The characteristics of leachates would help in evaluating the environmental suitability of the fine-fractions for different applications. In this context, the leaching characteristics were established by adopting the methodology developed by Goli et al. (2022). In this context, 10 g of sample was mixed with 200 mL of deionized water to attain a liquid-to-solid (L/S) ratio of 20 and stirred for 24 h on a magnetic stirrer. The supernatant was filtered through Whatman No. 42 ashless paper and the filtrate was tested for parameters like pH, electrical conductivity (EC), total dissolved solids (TDS) and salinity. Subsequently, the samples were analyzed for hardness, chlorides and other elements to test their concentrations. The leachate analysis was performed on 34 representative samples and the results are listed in Tables 7.5 and Table 7.6.

Table 7.5 The values of pH, EC, TDS, Salinity, Hardness and Chlorides for leachates of the representative samples from different bore-holes

BH	Depth (m)	Parameter							
		pH	EC (ms/cm)	TDS (mg/L)	Salinity (mg/L)	Hardness (mg/L)	Chlorides (mg/L)	TOC (mg/L)	TN (mg/L)
BH-01	12	7.56	1.754	968.5	983.1	400	496.51	144.58	38.97
BH-01	24	7.24	1.607	886.6	895.7	426.67	426.67	120.80	34.19
BH-02	15	7.30	1.261	795.9	695.4	413.33	331.97	107.45	29.96
BH-02	30	7.18	1.731	955.0	969.6	466.67	436.67	127.21	40.13
BH-03	12	7.26	1.142	630.9	627.8	600	280	92.32	36.87
BH-03	24	7.28	1.349	744.9	746.5	426.67	256.67	92.92	35.99
BH-04	12	7.22	1.118	617.1	613.1	506.67	396.70	83.63	32.93
BH-04	24	7.27	1.288	711.4	711.8	446.67	313.33	134.45	40.80
BH-04	36	7.33	1.239	683.6	683.2	400	346.67	116.25	33.92
BH-05	15	7.34	1.121	617.5	612.6	540	290	91.39	30.42
BH-05	30	7.50	0.933	515.4	509	346.67	296.67	79.92	28.89
BH-06	12	7.18	0.799	441.2	432.7	446.67	353.33	68.55	25.74
BH-06	24	7.08	1.507	832.7	838.5	486.67	363.33	92.22	37.14
BH-07	12	7.11	1.424	786	790.1	460	263.33	81.38	37.10
BH-07	24	7.14	1.021	563.7	558.7	340	280	104.84	28.93
BH-07	36	7.37	1.278	705.6	705.7	366.67	210	79.30	22.25
BH-08	06	7.38	0.610	337.2	328.4	466.67	140	38.19	27.76
BH-09	06	7.44	0.457	252.5	243.9	186.67	90	37.87	31.08
BH-10	15	7.37	0.972	563.3	530.4	480	180	76.91	39.89
BH-10	30	7.46	1.012	558.9	553.4	353.33	226.67	83.07	39.26
BH-10	42	7.33	1.592	879.1	888.2	466.67	430	120.83	43.86
BH-11	12	7.68	1.198	661.5	660.4	486.67	280	81.10	35.54
BH-11	24	7.36	1.720	645.4	644.2	480	267.67	54.32	30.69
BH-11	39	7.29	1.284	707.5	707.1	433.33	356.67	54.01	27.16
BH-12	15	6.98	1.293	714.4	715.3	313.33	396.67	85.65	29.16
BH-12	30	7.23	1.300	717.7	718.6	460	436.67	90.28	29.06
BH-12	42	7.25	1.426	787.8	792.5	393.33	530	121.70	39.17
BH-13	12	7.38	0.900	496.8	489.6	226.67	410	69.25	30.46
BH-13	24	7.42	1.366	753.5	755.1	513.33	413.33	93.72	31.49
BH-13	39	7.3	1.376	759.2	762.9	426.67	373.33	94.37	31.86
BH-14	09	7.6	0.636	351.1	342.7	160	167.67	36.81	29.71
BH-15	09	7.29	0.809	446.4	438.9	260	230	53.08	28.88
BH-16	06	7.36	1.110	612.6	609.6	406.67	260	100.29	46.38

Table 7.6 The concentration of leachable elements from the fine-fractions

BH	Depth (m)	Leachable elements concentration (in mg/L)												
		Al	Ba	Ca	Cr	Cu	Fe	K	Mg	Mn	Na	Ni	Zn	S
BH-01	12	0.08	0.01	16.74	BDL	0.16	0.24	101.29	6.79	0.03	320.25	0.04	0.09	21.68
BH-01	24	0.02	0.03	44.08	BDL	0.07	0.12	45.69	8.08	0.07	78.24	0.05	0.07	16.28
BH-02	15	BDL	0.04	25.89	BDL	0.03	0.04	15.41	4.61	BDL	28.38	BDL	0.04	12.98
BH-02	30	BDL	0.01	11.53	BDL	0.15	0.17	73.92	4.74	BDL	108.93	0.02	0.07	15.43
BH-03	12	0.02	0.02	30.02	0.01	0.33	0.22	234.88	9.65	0.05	204.98	0.05	0.21	29.20
BH-03	24	0.05	0.02	23.59	0.01	0.12	0.34	130.92	9.38	BDL	298.98	0.06	0.13	34.22
BH-04	12	0.01	0.03	29.99	0.01	0.13	0.23	116.84	10.01	BDL	222.14	0.04	0.09	37.73
BH-04	24	0.12	0.02	18.45	BDL	0.08	0.08	37.57	3.62	BDL	64.26	0.02	0.04	15.80
BH-04	36	0.02	0.05	63.62	BDL	0.04	0.08	69.41	10.96	0.01	110.59	0.04	0.07	37.43
BH-05	15	0.01	0.02	32.58	BDL	0.13	0.15	86.44	9.63	0.03	207.34	0.04	0.12	33.61
BH-05	30	0.04	0.02	25.53	0.01	0.12	0.30	115.58	7.69	0.02	301.89	0.04	0.12	25.99
BH-06	12	0.07	0.02	22.46	BDL	0.13	0.24	69.54	7.07	0.04	118.81	0.03	0.09	17.86
BH-06	24	0.03	0.03	36.29	BDL	0.08	0.09	64.25	7.89	BDL	101.40	0.03	0.10	19.77
BH-07	12	0.05	0.02	31.61	0.01	0.24	0.34	240.16	10.64	BDL	225.09	0.05	0.12	33.71
BH-07	24	0.06	0.02	36.70	BDL	0.06	0.09	84.07	11.70	0.05	125.90	0.03	0.10	38.28
BH-07	36	0.08	0.01	17.73	BDL	0.25	0.29	88.03	5.28	BDL	130.96	0.04	0.08	24.18
BH-08	06	0.06	0.02	24.06	0.01	0.12	0.37	117.23	7.56	0.03	153.11	0.04	0.12	14.78
BH-09	06	0.07	0.03	36.01	0.01	0.18	0.35	107.11	10.33	0.03	178.62	0.05	0.13	29.21
BH-10	15	0.04	0.03	55.16	BDL	0.22	0.17	109.47	8.67	0.02	199.06	0.04	0.09	40.08
BH-10	30	0.10	0.01	19.22	BDL	0.14	0.21	53.00	5.19	0.03	94.766	0.03	0.08	18.80
BH-10	42	0.03	0.04	39.93	BDL	0.04	0.07	89.45	11.89	BDL	247.20	0.03	0.05	34.41
BH-11	12	0.03	0.03	25.55	BDL	0.10	0.14	61.60	8.09	0.02	113.85	0.03	0.12	18.94
BH-11	24	0.04	0.02	18.48	BDL	0.13	0.24	124.15	5.88	0.02	222.82	0.04	0.11	14.22
BH-11	39	0.03	0.02	37.28	0.01	0.15	0.30	155.45	10.74	BDL	224.47	0.05	0.21	34.09
BH-12	15	0.03	0.02	37.68	BDL	0.17	0.28	110.55	11.10	BDL	218.72	0.06	0.16	21.06
BH-12	30	0.09	0.02	21.13	BDL	0.17	0.45	110.77	6.87	BDL	275.71	0.04	0.32	22.86
BH-12	42	0.03	0.03	40.33	BDL	0.10	0.16	92.18	9.08	0.04	282.03	0.04	0.14	31.92

BH-13	12	0.02	0.02	36.04	0.01	0.13	0.22	114.72	11.87	0.02	229.52	0.04	0.13	31.05
BH-13	24	0.02	0.03	43.54	BDL	0.08	0.18	83.37	9.82	0.01	242.62	0.04	0.09	24.14
BH-13	39	0.04	BDL	20.61	BDL	0.06	0.21	97.20	7.50	BDL	271.77	0.04	0.07	27.53
BH-14	09	0.05	0.02	24.36	BDL	0.28	0.35	111.48	7.84	0.04	232.84	0.05	0.08	22.79
BH-15	09	0.05	0.02	24.68	BDL	0.28	0.35	112.12	7.80	0.04	194.93	0.05	0.08	22.76
BH-16	06	0.03	0.02	18.20	0.01	0.16	0.16	77.34	7.71	0.04	317.39	0.04	0.09	17.37

Note:

- BDL represents *below detection limit* (i.e., 0.01 mg/L)
- Concentrations of Ag, Co, Cd, Hg, Pb, Ti and Mo in all samples is BDL

From these results, it can be observed that the concentrations of the leachable heavy metals are within the permissible limits as far as their disposal in land surface waters is concerned. However, the concentrations of metals like Na, K and Cl are high, indicating that the fine-fractions are contaminated with salts. Moreover, the higher concentration of S in all the samples can be attributed to the presence of decomposable organic matter in these fractions, which corroborates the findings from the organic matter determination test. Similarly, the TOC and TN concentrations also indicate the presence of leachable organic matter, which has a potential for further biological degradation due to microbial activities. Based on the characteristics of the leachate obtained from these fractions and the foam/bubble formation, it can also be opined that the leachate present in the JLH is yet to decompose. Hence, treating the leachates obtained from landfills using an appropriate treatment technique becomes mandatory.

7.2 The calorific value of the coarse-fractions

The calorific value of the coarse-fractions was obtained using a portable bomb calorimeter. For this purpose, 2 g of the oven-dried sample was shredded to a size of <10 mm and placed in the sample holder. Subsequently, the experiment was performed following the guidelines proposed in the literature (Goli et al., 2022). Approximately 75 randomly collected samples were tested to get a representative calorific value and ash content and the results are presented in Table 7.7.

Table 7.7 The calorific value and ash content of the coarse-fractions

BH	Depth (m)	Ash content (%)	Calorific Value (kCal/kg)
BH-01	03	37.77	2888.33
	09	37.59	1833.61
	12	54.03	3692.96
	15	28.90	1812.09
	18	41.09	2774.04
	21	36.32	1299.90
BH-02	03	57.93	1554.83
	06	32.70	2145.12
	09	41.07	2462.62
	12	42.05	2554.88
	15	53.18	5828.55
	18	40.02	3280.21
	24	24.67	3653.43
	27	38.27	756.91
	30	41.54	1056.45

BH-03	03	29.29	3198.43
	06	43.27	1292.39
	09	11.25	4579.96
	12	45.80	3344.65
	15	31.94	3528.52
	18	35.17	3184.88
	21	33.72	3288.56
	24	28.28	3328.54
BH-05	03	45.69	2704.60
	06	29.62	3707.45
	09	36.79	1954.29
	12	40.52	4083.77
	15	33.83	1457.86
	18	38.67	4743.62
	21	57.29	2253.79
	27	47.26	4974.84
	30	44.33	3361.18
	33	53.35	2209.93
BH-08	1.5	69.81	3989.55
	3.0	55.33	2142.39
	4.5	50.72	3796.90
BH-09	1.5	38.91	3092.25
	4.5	27.24	2393.13
BH-10	03	28.77	1147.96
	06	42.12	934.39
	09	44.06	3411.75
	12	28.13	2701.66
	15	30.41	3144.37
	18	38.79	5300.08
	21	35.24	2948.88
	24	11.86	1363.64
	27	25.27	3391.50
	30	37.15	3250.11
	33	42.18	1163.73
	36	43.07	2947.22
	39	53.36	2651.48
	41.7	44.46	2039.41
BH-12	03	33.49	3034.28
	09	47.78	3574.57
	15	40.63	3994.90
	18	37.35	3386.92
	21	23.21	4291.47

	24	42.78	4024.64
	27	33.39	1126.19
	30	48.88	2491.54
	33	38.00	2600.81
	36	45.45	2998.08
	39	45.95	2489.12
	41.70	39.28	3168.18
BH-13	03	30.26	4747.82
	06	39.12	1039.74
	09	26.18	1484.19
	15	23.37	3165.62
	18	13.39	3982.31
	21	11.62	4479.63
	24	42.79	5556.29
	27	54.31	3184.01
	30	21.80	3697.30
	31.5	31.68	3361.36
	33	50.42	2182.17
	33.6	50.97	4838.59

The data presented in Table 7.7 indicates that the calorific value of the coarse-fractions varies between 934 to 5556 kCal/kg and for most of the samples, this value is >1500 kCal/kg, which indicates their suitability as a refuse-derived fuel. However, it's noteworthy that the ash content of these samples is >20%, which is a big concern as per the guidelines laid down by the Ministry of Urban Affairs (2018).

8. Conclusions and the way forward

- MASW results indicate the presence of saturated and loosely compacted MSW up to greater depths, which confirms the presence of yet to stabilize MSW.
- ERT results indicate the presence of low-resistivity pockets in the MSW, which can be attributed to the presence of saturated or moist MSW (read the yet-to-decompose waste).
- The segregation of DMSW samples indicates the dominance of plastics and fine-fractions (<10 mm) of the waste matrix up to $\approx 40\%$ (each) by weight.
- The organic matter (up to 35%) and moisture content (>100%) of the fine-fractions are very high, which indicates their susceptibility to get decomposed in the long run.
- The specific gravity of the fine fractions is around 2.30, which makes it an unpreferred, if not unsuitable, material for infrastructural development (viz., making foundation pads, reclamation, etc.).
- The emission of foam/gas/leachate from the JLH indicates the ongoing decomposition of the MSW. **Hence, the biomining of JLH at this point in time is not recommended.**
- Though the calorific value of most of the samples of the coarse-fractions is >1500 kCal/kg, their ash content is also about 60%. Such a situation makes these fractions **unsuitable for their application as refuse-derived fuel.**
- Higher Na^+ concentration in fine-fractions would form sodic soil when used as a soil amending agent for agricultural applications.
- Higher TOC, TN and S concentrations in leachate generated from the fine-fractions indicate their potential for subsequent degradation. Hence, it becomes mandatory to **treat the leachates generated in the JLH** appropriately.
- Based on the present state of the decomposed MSW and foam observed during borehole drilling, it can be concluded that the waste is **yet to decompose. Hence, the JLH is not ready for biomining.**

Disclaimer

Results from these investigations are not valid forever, and hence cannot be employed to determine the time for initiation of biomining at the JLH. Periodic sampling followed by extensive testing should be performed to ascertain the threadiness of the JLH for biomining.

Appendix A

Table A.1 Moisture content analysis results for Borehole-01

Depth (m)	Sample No.	W ₁ (g)	W ₂ (g)	W ₃ (g)	Moisture content (%)	Avg. (\pm SD) Moisture content (%)
3	1A	23.01	28.50	26.39	62.5	58.8 \pm 8.8
	1B	24.73	30.38	28.53	48.8	
	1C	22.70	26.66	25.10	65.1	
6	2A	22.88	28.98	25.97	97.5	89.8 \pm 11.4
	2B	23.86	29.32	26.95	76.7	
	2C	22.68	26.38	24.57	95.3	
9	3A	20.99	28.31	25.42	65.3	64.7 \pm 14.5
	3B	35.23	40.19	38.00	78.8	
	3C	19.95	24.87	23.23	49.9	
12	4A	22.53	26.71	24.97	71.3	72.0 \pm 12.5
	4B	22.18	25.44	24.22	59.9	
	4C	22.72	26.92	24.99	84.8	
15	5A	21.64	25.66	23.82	84.4	85.9 \pm 6.3
	5B	24.80	29.70	27.34	92.8	
	5C	24.63	26.83	25.85	80.5	
18	6A	21.73	26.94	25.55	36.4	48.7 \pm 10.7
	6B	22.44	26.40	24.99	55.3	
	6C	25.90	29.87	28.47	54.4	
21	7A	21.99	27.66	25.36	68.3	61.2 \pm 11.7
	7B	21.88	26.00	24.67	47.7	
	7C	22.41	25.73	24.39	67.6	
24	8A	22.93	27.77	26.36	41.0	107.6 \pm 111.4
	8B	21.49	26.62	25.01	45.7	
	8C	22.97	29.48	24.91	236.3	
				Avg (\pmSD)	73.6\pm38.7	

Table A.2 Moisture content analysis results for Borehole-02

Depth (m)	Sample No.	W ₁ (g)	W ₂ (g)	W ₃ (g)	Moisture content (%)	Avg. (\pm SD) Moisture content (%)
3	1A	22.75	28.08	26.32	49.5	57.0 \pm 10.9
	1B	22.60	30.24	27.63	52.1	
	1C	22.27	28.08	25.70	69.5	
6	2A	34.76	42.58	37.68	167.2	74.5 \pm 84.2
	2B	33.25	39.87	39.69	2.8	
	2C	35.29	44.82	41.50	53.5	
9	3A	35.35	56.75	51.99	28.7	53.4 \pm 24.0
	3B	37.08	62.36	53.40	54.9	
	3C	34.16	61.30	49.53	76.6	
12	4A	36.09	57.41	48.91	66.3	73.8 \pm 10.2
	4B	36.59	59.36	48.87	85.4	
	4C	22.98	35.27	30.23	69.7	
15	5A	23.85	37.29	32.79	50.3	52.6 \pm 2.5
	5B	23.32	40.84	34.60	55.3	
	5C	20.46	36.47	30.97	52.2	
18	6A	22.62	37.26	30.22	92.7	75.7 \pm 22.2
	6B	22.11	39.53	33.68	50.5	
	6C	23.62	40.12	32.59	83.9	
21	7A	27.31	44.12	35.16	114.3	73.4 \pm 35.6
	7B	16.07	26.33	22.92	49.7	
	7C	16.75	33.51	27.47	56.2	
24	8A	22.47	41.63	36.64	35.2	43.4 \pm 7.3
	8B	22.73	41.30	35.50	45.4	
	8C	22.56	47.08	38.97	49.4	
27	9A	22.34	37.85	31.95	61.4	63.5 \pm 9.1
	9B	21.02	33.43	28.18	73.4	
	9C	24.83	42.31	36.06	55.7	
30	10A	16.89	36.27	29.61	52.4	56.5 \pm 4.7
	10B	23.03	42.73	35.69	55.6	
	10C	20.52	35.55	29.82	61.7	
				Avg (\pmSD)	62.4\pm28.3	

Table A.3 Moisture content analysis results for Borehole-03

Depth (m)	Sample No.	W ₁ (g)	W ₂ (g)	W ₃ (g)	Moisture content (%)	Avg. (\pm SD) Moisture content (%)
3	1A	21.75	35.08	30.65	49.7	49.1 \pm 2.1
	1B	24.79	38.93	34.42	46.8	
	1C	23.89	36.42	32.20	50.8	
6	2A	19.97	32.04	28.07	49.1	45.8 \pm 3.0
	2B	21.51	35.99	31.64	43.0	
	2C	22.21	35.87	31.59	45.5	
9	3A	22.91	38.08	34.74	28.2	32.1 \pm 4.8
	3B	22.72	32.72	29.99	37.4	
	3C	22.03	34.96	31.94	30.6	
12	4A	22.95	39.30	34.88	37.0	37.2 \pm 1.6
	4B	22.71	35.07	31.82	35.7	
	4C	22.44	33.90	30.69	38.9	
15	5A	21.01	38.93	33.91	38.9	41.5 \pm 2.3
	5B	23.03	40.16	34.99	43.2	
	5C	24.75	40.38	35.72	42.5	
18	6A	21.66	41.15	36.35	32.6	33.2 \pm 2.0
	6B	22.99	39.98	35.90	31.6	
	6C	22.46	40.74	35.95	35.5	
21	7A	22.74	37.35	32.86	44.4	35.5 \pm 7.7
	7B	22.55	41.92	37.36	30.7	
	7C	25.92	42.24	38.33	31.5	
24	8A	24.65	45.31	38.16	52.9	49.6 \pm 3.3
	8B	21.91	37.42	32.29	49.3	
	8C	35.25	58.45	51.09	46.4	
				Avg (\pmSD)	40.5\pm7.4	

Table A.4 Moisture content analysis results for Borehole-04

Depth (m)	Sample No.	W ₁ (g)	W ₂ (g)	W ₃ (g)	Moisture content (%)	Avg. (\pm SD) Moisture content (%)
3	1A	23.62	42.48	38.46	27.1	27.7 \pm 0.5
	1B	22.76	39.44	35.80	27.9	
	1C	22.98	38.17	34.85	28.0	
6	2A	20.46	37.22	32.29	41.7	39.9 \pm 1.6
	2B	27.31	45.15	40.19	38.5	
	2C	16.78	35.71	30.35	39.5	
9	3A	22.10	39.56	35.27	32.6	34.7 \pm 2.2
	3B	22.59	40.11	35.61	34.6	
	3C	23.84	40.85	36.26	36.9	
12	4A	37.09	64.48	56.36	42.1	43.3 \pm 1.1
	4B	35.29	71.27	60.24	44.2	
	4C	36.09	63.85	55.42	43.6	
15	5A	34.16	66.94	55.14	56.3	56.8 \pm 5.5
	5B	33.27	64.61	52.55	62.5	
	5C	36.60	69.77	58.49	51.5	
18	6A	34.76	65.86	54.91	54.3	52.0 \pm 2.0
	6B	35.35	73.00	60.37	50.5	
	6C	16.09	28.72	24.44	51.3	
21	7A	23.35	42.28	35.98	49.9	54.1 \pm 3.6
	7B	22.30	41.74	34.77	55.9	
	7C	22.64	40.07	33.77	56.6	
24	8A	21.76	38.63	33.09	48.8	48.9 \pm 1.8
	8B	24.82	44.24	37.70	50.8	
	8C	23.92	48.55	40.65	47.3	
27	9A	21.53	41.90	35.03	50.9	54.4 \pm 5.1
	9B	23.04	42.56	35.87	52.2	
	9C	21.95	42.31	34.65	60.3	
30	10A	24.68	49.60	40.71	55.5	60.0 \pm 4.5
	10B	22.08	42.42	34.44	64.5	
	10C	23.37	49.06	39.43	60.0	
33	11A	23.88	45.71	36.59	71.7	72.6 \pm 2.6
	11B	22.51	50.59	38.97	70.6	
	11C	22.81	51.78	39.31	75.6	
36	12A	27.34	50.11	41.33	62.8	60.0 \pm 2.4
	12B	25.95	46.73	39.08	58.3	
	12C	23.07	52.56	41.62	58.9	
				Avg (\pmSD)	50.4\pm12.3	

Table A.5 Moisture content analysis results for Borehole-05

Depth (m)	Sample No.	W ₁ (g)	W ₂ (g)	W ₃ (g)	Moisture content (%)	Avg. (\pm SD) Moisture content (%)
3	1A	22.71	39.56	33.64	54.1	54.7 \pm 1.2
	1B	21.01	38.62	32.29	56.1	
	1C	22.21	40.40	34.03	53.8	
6	2A	24.76	46.00	39.00	47.9	46.4 \pm 2.5
	2B	23.91	40.38	35.38	43.6	
	2C	22.72	42.68	36.22	47.8	
9	3A	21.51	38.75	33.95	38.6	38.5 \pm 3.2
	3B	24.65	45.14	39.80	35.2	
	3C	23.03	41.35	35.97	41.6	
12	4A	22.92	39.89	35.47	35.2	38.2 \pm 3.7
	4B	22.04	38.97	34.08	40.6	
	4C	22.94	42.09	36.75	38.7	
15	5A	25.92	43.32	38.19	41.8	39.5 \pm 2.6
	5B	19.97	39.56	34.31	36.6	
	5C	22.54	38.56	33.98	40.1	
18	6A	22.44	49.01	44.03	23.1	24.1 \pm 1.4
	6B	21.91	43.04	38.72	25.7	
	6C	22.99	49.06	44.08	23.6	
21	7A	22.44	48.62	44.59	18.2	19.1 \pm 0.9
	7B	21.69	54.95	49.59	19.2	
	7C	21.75	50.21	45.48	19.9	
24	9A	22.46	46.91	42.24	23.6	21.8 \pm 2.5
	9B	24.79	49.05	45.18	18.9	
	9C	35.25	69.05	62.78	22.8	
27	10A	36.17	84.42	72.45	33.0	29.6 \pm 7.4
	10B	35.31	82.59	74.36	21.1	
	10C	35.35	85.64	72.70	34.6	
30	11A	36.67	79.40	70.79	25.3	26.0 \pm 0.8
	11B	34.80	79.29	69.89	26.8	
	11C	37.14	81.61	72.48	25.9	
				Avg (\pmSD)	33.8\pm11.4	

Table A.6 Moisture content analysis results for Borehole-06

Depth (m)	Sample No.	W ₁ (g)	W ₂ (g)	W ₃ (g)	Moisture content (%)	Avg. (\pm SD) Moisture content (%)
3	1A	22.78	48.04	40.40	43.3	41.2 \pm 2.0
	1B	27.32	47.22	41.59	39.4	
	1C	23.63	46.74	40.04	40.8	
6	2A	34.18	73.99	64.92	29.5	26.5 \pm 2.9
	2B	35.31	75.45	67.74	23.8	
	2C	37.10	75.70	67.72	26.1	
9	3A	23.00	49.37	43.95	25.9	24.7 \pm 1.2
	3B	20.48	43.92	39.28	24.7	
	3C	22.65	48.72	43.75	23.6	
12	4A	35.37	83.99	75.53	21.1	21.1 \pm 0.2
	4B	33.29	78.75	70.91	20.8	
	4C	34.78	82.16	73.83	21.3	
15	5A	22.12	46.67	42.44	20.8	20.7 \pm 0.4
	5B	23.34	51.88	47.07	20.3	
	5C	22.31	46.82	42.57	21.0	
18	6A	36.11	82.60	74.32	21.7	21.6 \pm 0.0
	6B	36.62	85.59	76.89	21.6	
	6C	16.10	35.70	32.21	21.7	
21	7A	16.81	44.65	39.88	20.6	20.6 \pm 1.1
	7B	23.85	54.12	49.20	19.4	
	7C	22.62	47.07	42.73	21.6	
24	8A	33.33	66.72	54.79	55.6	55.0 \pm 1.2
	8B	35.41	78.58	63.51	53.6	
	8C	34.21	79.52	63.31	55.7	
27	9A	21.69	49.83	43.24	30.6	30.4 \pm 1.4
	9B	22.14	46.70	41.18	29.0	
	9C	22.72	42.66	37.86	31.7	
30	10A	22.23	45.35	41.66	19.0	20.8 \pm 5.4
	10B	16.15	31.42	29.26	16.5	
	10C	22.65	45.24	40.47	26.8	
33	11A	20.00	45.51	38.43	38.4	43.8 \pm 4.9
	11B	23.67	45.43	38.69	44.9	
	11C	22.67	47.28	39.29	48.1	
36	12A	22.69	54.11	43.63	50.1	48.2 \pm 1.8
	12B	22.99	49.30	40.95	46.5	
	12C	22.67	39.29	33.89	48.1	
				Avg (\pmSD)	31.2\pm12.3	

Table A.7 Moisture content analysis results for Borehole-07

Depth (m)	Sample No.	W ₁ (g)	W ₂ (g)	W ₃ (g)	Moisture content (%)	Avg. (\pm SD) Moisture content (%)
3	1A	22.78	37.38	31.77	62.4	59.2 \pm 3.0
	1B	22.99	40.24	33.85	58.9	
	1C	24.65	41.21	35.24	56.3	
6	2A	19.97	34.25	28.71	63.4	56.3 \pm 7.0
	2B	24.76	41.70	35.59	56.3	
	2C	20.99	43.78	36.25	49.3	
9	3A	22.54	41.08	34.79	51.3	48.4 \pm 2.6
	3B	24.79	41.99	36.49	47.0	
	3C	21.76	41.08	34.93	46.7	
12	4A	21.51	37.83	31.80	58.5	51.9 \pm 5.9
	4B	22.93	40.93	34.95	49.7	
	4C	22.20	37.74	32.74	47.4	
15	5A	21.67	43.93	36.72	47.9	45.6 \pm 2.0
	5B	22.05	37.64	32.84	44.5	
	5C	22.44	44.17	37.48	44.5	
18	6A	23.05	43.45	39.59	23.5	23.5 \pm 0.1
	6B	23.90	40.11	37.01	23.7	
	6C	21.92	42.90	38.91	23.4	
21	7A	22.71	40.97	35.81	39.4	41.2 \pm 2.6
	7B	22.70	45.20	38.78	40.0	
	7C	25.93	47.77	41.07	44.2	
24	8A	22.94	46.05	37.01	64.2	58.7 \pm 5.8
	8B	22.46	39.77	33.33	59.3	
	8C	35.25	70.35	58.26	52.6	
27	9A	25.95	53.94	46.44	36.6	36.4 \pm 0.6
	9B	23.93	49.80	42.99	35.8	
	9C	21.01	45.79	39.11	36.9	
30	10A	22.74	43.38	35.16	66.1	63.5 \pm 9.0
	10B	22.51	44.56	36.88	53.5	
	10C	24.69	46.41	37.39	70.9	
33	11A	23.07	51.34	45.11	28.3	28.2 \pm 1.9
	11B	23.39	44.50	39.63	30.0	
	11C	22.81	44.62	40.08	26.3	
36	12A	22.48	45.34	37.12	56.2	51.3 \pm 5.4
	12B	22.73	48.22	40.25	45.5	
	12C	24.84	46.54	39.09	52.2	
				Avg (\pmSD)	47.0\pm12.8	

Table A.8 Moisture content analysis results for Borehole-08

Depth (m)	Sample No.	W ₁ (g)	W ₂ (g)	W ₃ (g)	Moisture content (%)	Avg. (\pm SD) Moisture content (%)
1.5	1A	23.86	30.54	29.63	15.8	11.5 \pm 6.0
	1B	22.77	46.31	45.26	4.7	
	1C	22.63	34.07	32.65	14.2	
3	2A	34.19	49.28	47.16	16.3	15.6 \pm 1.2
	2B	35.32	46.04	44.55	16.2	
	2C	35.26	47.93	46.36	14.2	
4.5	3A	22.06	35.13	34.63	4.0	4.3 \pm 0.3
	3B	22.99	34.07	33.58	4.6	
	3C	21.67	30.67	30.29	4.3	
				Avg (\pmSD)	10.5\pm5.8	

Table A.9 Moisture content analysis results for Borehole-09

Depth (m)	Sample No.	W ₁ (g)	W ₂ (g)	W ₃ (g)	Moisture content (%)	Avg. (\pm SD) Moisture content (%)
1.5	1A	23.02	45.84	44.84	4.6	4.2 \pm 0.4
	1B	20.50	30.48	30.08	4.2	
	1C	34.78	47.90	47.42	3.8	
4.5	2A	23.65	31.93	31.50	5.5	5.1 \pm 0.4
	2B	22.32	30.77	30.39	4.7	
	2C	23.35	36.92	36.27	5.0	
				Avg (\pmSD)	4.6\pm0.6	

Table A.10 Moisture content analysis results for Borehole-10

Depth (m)	Sample No.	W ₁ (g)	W ₂ (g)	W ₃ (g)	Moisture content (%)	Avg. (\pm SD) Moisture content (%)
3	1A	22.74	27.39	25.58	64.1	60.9 \pm 3.6
	1B	24.66	31.71	29.15	57.0	
	1C	37.12	44.00	41.37	61.7	
6	2A	21.76	30.38	28.23	33.2	43.7 \pm 9.1
	2B	22.97	30.36	27.89	50.2	
	2C	23.01	29.11	27.15	47.5	
9	3A	22.20	29.04	27.22	36.4	41.7 \pm 5.1
	3B	22.44	40.07	34.47	46.5	
	3C	23.91	38.65	34.28	42.1	
12	4A	22.67	43.88	38.35	35.2	36.0 \pm 1.9
	4B	22.12	43.24	37.81	34.6	
	4C	19.98	42.30	36.14	38.1	

3324

15	5A	22.55	48.68	42.61	30.3	29.5±0.6
	5B	24.79	51.79	45.71	29.0	
	5C	23.06	47.53	41.98	29.3	
18	6A	21.01	39.65	34.95	33.7	33.1±0.9
	6B	27.33	46.18	41.46	33.4	
	6C	25.93	45.33	40.63	32.0	
21	7A	22.48	45.56	38.47	44.3	42.3±4.8
	7B	21.92	45.59	39.21	36.9	
	7C	16.84	32.75	27.75	45.8	
24	8A	21.52	44.11	38.63	32.1	29.6±3.3
	8B	22.71	45.80	40.33	31.0	
	8C	24.78	53.66	47.74	25.8	
27	9A	16.13	34.65	28.19	53.5	45.7±10.3
	9B	36.64	56.30	49.78	49.6	
	9C	33.32	55.61	49.95	34.1	
30	10A	36.14	62.46	56.74	27.8	29.4±3.5
	10B	35.38	64.01	56.84	33.4	
	10C	22.71	45.31	40.52	26.9	
33	11A	22.34	43.35	35.99	53.9	41.9±12.7
	11B	14.84	40.40	34.72	28.5	
	11C	24.68	44.25	38.34	43.3	
36	12A	23.08	48.21	40.26	46.3	59.5±11.5
	12B	20.55	33.51	28.41	64.9	
	12C	22.52	40.56	33.30	67.4	
39	13A	22.82	43.89	36.67	52.1	50.0±5.2
	13B	23.39	42.32	35.70	53.8	
	13C	22.09	41.12	35.30	44.0	
41.7	14A	21.02	40.67	34.19	49.1	51.1±11.7
	14B	23.88	41.32	35.32	52.5	
	14C	21.54	41.33	34.59	51.6	
				Avg (±SD)	42.5±11.5	

Table A.11 Moisture content analysis results for Borehole-11

Depth (m)	Sample No.	W ₁ (g)	W ₂ (g)	W ₃ (g)	Moisture content (%)	Avg. (\pm SD) Moisture content (%)
3	1A	22.34	46.22	39.56	38.7	40.5 \pm 2.1
	1B	23.37	48.29	40.82	42.8	
	1C	22.72	39.23	34.50	40.1	
6	2A	23.08	48.80	41.47	39.9	39.0 \pm 0.8
	2B	20.51	39.62	34.28	38.8	
	2C	25.93	46.29	40.64	38.4	
9	3A	23.92	41.87	36.14	46.8	46.2 \pm 1.0
	3B	21.03	40.49	34.30	46.6	
	3C	22.23	43.45	36.87	45.0	
12	4A	21.95	40.23	34.32	47.8	46.8 \pm 2.1
	4B	22.07	42.11	35.95	44.3	
	4C	16.89	33.89	28.37	48.1	
15	5A	22.13	47.43	39.60	44.8	39.2 \pm 5.0
	5B	21.76	45.70	39.50	34.9	
	5C	24.80	48.37	41.88	38.0	
18	6A	22.47	40.01	35.10	38.9	39.0 \pm 0.6
	6B	23.68	46.39	40.07	38.5	
	6C	22.65	43.73	37.75	39.7	
21	7A	20.00	41.45	35.49	38.4	39.7 \pm 1.8
	7B	23.02	41.89	36.33	41.8	
	7C	24.81	43.32	38.12	39.0	
24	8A	23.67	44.46	38.07	44.4	43.7 \pm 0.9
	8B	21.55	42.15	35.98	42.7	
	8C	22.34	45.35	38.33	43.9	
27	9A	37.14	65.43	55.82	51.4	50.6 \pm 4.5
	9B	34.31	63.15	54.09	45.8	
	9C	35.41	67.61	56.23	54.6	
30	10A	34.81	65.65	55.35	50.1	48.2 \pm 1.9
	10B	35.32	60.47	52.31	48.0	
	10C	36.49	71.76	60.59	46.3	
33	11A	22.09	43.82	37.21	43.7	42.3 \pm 1.7
	11B	23.04	46.52	39.50	42.6	
	11C	20.01	38.04	32.84	40.5	
36	12A	21.76	39.92	34.69	40.4	44.6 \pm 5.7
	12B	22.95	46.92	38.81	51.1	
	12C	35.35	63.81	55.35	42.3	
39	13A	36.18	70.78	59.09	51.0	51.2 \pm 2.3
	13B	25.39	45.93	39.17	49.0	
	13C	36.67	77.32	63.15	53.6	
				Avg (\pmSD)	43.9\pm4.9	

Table A.12 Moisture content analysis results for Borehole-12

Depth (m)	Sample No.	W ₁ (g)	W ₂ (g)	W ₃ (g)	Moisture content (%)	Avg. (\pm SD) Moisture content (%)
3	1A	22.72	40.65	35.01	45.9	49.5 \pm 4.0
	1B	23.00	39.88	34.35	48.8	
	1C	21.68	38.91	32.89	53.7	
6	2A	23.76	38.70	33.49	53.5	50.5 \pm 2.6
	2B	24.81	40.46	35.33	48.7	
	2C	22.23	45.17	37.60	49.3	
9	3A	21.02	41.49	34.38	53.2	50.6 \pm 2.3
	3B	21.53	42.09	35.31	49.2	
	3C	19.98	42.50	35.06	49.3	
12	4A	22.49	43.63	37.15	44.2	44.8 \pm 1.6
	4B	24.66	46.75	39.72	46.7	
	4C	22.34	43.22	36.88	43.6	
15	5A	22.13	42.40	35.97	46.5	48.3 \pm 4.2
	5B	23.07	44.99	37.39	53.0	
	5C	23.66	51.47	42.80	45.3	
18	6A	22.94	46.41	39.20	44.4	51.5 \pm 6.4
	6B	21.76	41.72	34.79	53.2	
	6C	22.72	42.85	35.55	56.9	
21	7A	22.81	42.86	36.22	49.5	47.4 \pm 2.1
	7B	23.87	47.18	39.92	45.2	
	7C	16.14	29.74	25.36	47.5	
24	8A	34.20	70.72	59.59	43.8	43.4 \pm 1.2
	8B	35.34	69.07	58.71	44.3	
	8C	36.68	79.15	66.60	42.0	
27	9A	23.93	46.47	39.05	49.1	51.4 \pm 2.5
	9B	23.67	45.97	38.44	50.9	
	9C	25.95	50.85	42.11	54.0	
30	10A	22.99	45.56	37.47	55.8	63.1 \pm 6.3
	10B	22.73	46.77	37.24	65.7	
	10C	22.69	46.59	36.95	67.6	
33	11A	21.76	41.75	34.39	58.3	62.0 \pm 5.5
	11B	22.73	40.67	33.39	68.3	
	11C	22.56	44.46	36.31	59.3	
36	12A	27.34	44.80	38.01	63.7	59.2 \pm 4.6
	12B	21.68	47.84	38.62	54.5	
	12C	20.00	38.43	31.57	59.4	
39	13A	35.32	68.30	58.98	39.4	41.6 \pm 8.7
	13B	37.14	70.69	62.15	34.1	
	13C	34.80	73.89	60.65	51.2	
41.7	14A	33.33	75.21	62.25	44.8	44.6 \pm 0.9
	14B	35.35	72.61	60.99	45.4	
	14C	35.41	73.78	62.14	43.5	
				Avg (\pmSD)	50.5\pm7.5	

Table A.13 Moisture content analysis results for Borehole-13

Depth (m)	Sample No.	W ₁ (g)	W ₂ (g)	W ₃ (g)	Moisture content (%)	Avg. (±SD) Moisture content (%)
3	1A	23.00	44.74	37.98	45.1	44.0±1.0
	1B	23.35	48.16	40.69	43.0	
	1C	22.55	44.24	37.62	44.0	
6	2A	25.93	46.31	39.57	49.5	45.6±3.4
	2B	22.68	45.41	38.52	43.5	
	2C	22.64	45.16	38.30	43.8	
9	3A	20.51	41.11	34.91	43.0	43.5±2.6
	3B	24.73	44.57	38.31	46.3	
	3C	22.07	46.16	39.13	41.2	
12	4A	21.93	43.54	36.75	45.8	45.5±1.6
	4B	22.46	39.85	34.56	43.8	
	4C	23.03	43.27	36.81	46.9	
15	5A	16.85	38.47	32.06	42.2	45.0±2.8
	5B	27.33	47.18	40.75	47.9	
	5C	23.91	43.46	37.42	44.8	
18	6A	33.32	78.35	63.91	47.2	47.5±1.0
	6B	37.12	80.07	66.02	48.6	
	6C	35.29	81.71	66.94	46.7	
21	7A	35.39	74.99	63.13	42.7	46.1±3.1
	7B	35.79	71.83	60.39	46.5	
	7C	36.16	76.79	63.45	48.9	
24	8A	22.99	44.41	35.33	73.7	67.9±5.2
	8B	16.93	43.99	33.21	66.2	
	8C	22.15	38.82	32.33	63.7	
27	9A	22.57	43.69	35.51	63.1	64.0±1.0
	9B	23.02	43.96	35.79	63.9	
	9C	23.54	57.68	44.22	65.1	
30	10A	23.88	56.88	44.66	58.8	56.2±5.7
	10B	27.34	60.69	49.63	49.6	
	10C	20.54	44.50	35.51	60.1	
31.5	11A	22.65	49.39	39.89	55.1	55.6±2.4
	11B	34.20	75.96	60.58	58.3	
	11C	35.84	67.59	56.52	53.5	
33	12A	21.94	38.07	30.69	84.4	80.0±4.8
	12B	22.82	41.73	33.28	80.8	
	12C	24.81	61.91	46.03	74.9	
33.6	13A	16.15	38.96	29.15	75.4	72.3±2.8
	13B	21.68	50.30	38.53	69.9	
	13C	22.24	53.75	40.61	71.6	
				Avg (±SD)	54.9±12.4	

Table A.14 Moisture content analysis results for Borehole-14

Depth (m)	Sample No.	W ₁ (g)	W ₂ (g)	W ₃ (g)	Moisture content (%)	Avg. (\pm SD) Moisture content (%)
1.5	1A	34.19	93.09	88.01	9.4	22.6 \pm 12.8
	1B	35.39	99.19	82.64	35.0	
	1C	33.32	88.88	78.37	23.3	
3	2A	37.13	91.48	79.99	26.8	25.8 \pm 0.9
	2B	36.18	94.94	83.00	25.5	
	2C	34.80	94.76	82.72	25.1	
4.5	3A	35.40	87.20	77.99	21.6	21.7 \pm 0.4
	3B	36.68	93.11	83.17	21.4	
	3C	35.29	92.80	82.38	22.1	
6	4A	21.69	49.80	44.18	25.0	25.6 \pm 0.8
	4B	23.87	49.20	43.90	26.5	
	4C	22.68	48.14	42.99	25.3	
9	5A	27.34	57.13	56.68	1.5	7.4 \pm 9.6
	5B	22.98	48.07	44.16	18.5	
	5C	22.77	61.59	60.77	2.2	
				Avg (\pmSD)	20.6\pm9.3	

Table A.15 Moisture content analysis results for Borehole-15

Depth (m)	Sample No.	W ₁ (g)	W ₂ (g)	W ₃ (g)	Moisture content (%)	Avg. (\pm SD) Moisture content (%)
3	1A	36.49	90.92	80.05	25.0	24.4 \pm 1.6
	1B	35.84	84.40	74.49	25.6	
	1C	34.31	89.28	79.12	22.7	
6	2A	25.39	54.47	48.69	24.8	27.3 \pm 2.5
	2B	22.83	52.18	45.91	27.1	
	2C	20.63	46.91	40.86	29.9	
9	3A	23.54	52.12	45.10	32.5	30.5 \pm 1.8
	3B	22.95	49.64	43.52	29.8	
	3C	22.77	52.99	46.19	29.1	
12	4A	21.94	46.67	40.45	33.6	36.2 \pm 2.2
	4B	22.48	46.98	40.33	37.3	
	4C	22.08	44.27	38.19	37.7	
15	5A	23.02	47.02	40.70	35.7	39.3 \pm 3.8
	5B	16.92	41.96	34.94	38.9	
	5C	23.03	45.18	38.48	43.4	
				Avg (\pmSD)	31.5\pm6.1	

Table A.16 Moisture content analysis results for Borehole-16

Depth (m)	Sample No.	W ₁ (g)	W ₂ (g)	W ₃ (g)	Moisture content (%)	Avg. (\pm SD) Moisture content (%)
3	1A	22.50	48.28	43.60	22.2	21.7 \pm 9.4
	1B	23.04	50.46	47.51	12.1	
	1C	22.95	47.18	41.45	30.9	
4.5	2A	21.54	40.29	34.73	42.1	42.0 \pm 1.6
	2B	22.56	46.48	39.23	43.5	
	2C	22.81	48.94	41.43	40.4	
6	3A	22.74	46.04	41.10	26.9	29.9 \pm 3.2
	3B	24.67	49.79	43.53	33.2	
	3C	16.15	32.97	29.12	29.7	
				Avg (\pmSD)	31.2\pm10.2	

Appendix B

Table B.1 Organic matter results for Borehole-01

Depth (m)	Sample No.	W ₁ (g)	W ₂ (g)	W ₃ (g)	Organic matter (%)	Avg. (\pm SD) Organic matter (%)
3	1A	93.86	97.84	97.08	19.04	21.52 \pm 2.92
	1B	105.87	108.98	108.21	24.74	
	1C	101.33	105.48	104.62	20.79	
6	2A	93.96	97.13	96.43	22.22	22.15 \pm 1.02
	2B	101.33	105.60	104.70	21.09	
	2C	105.86	108.22	107.67	23.13	
9	3A	96.32	100.25	99.52	18.46	18.10 \pm 1.38
	3B	102.42	105.47	104.88	19.28	
	3C	109.74	113.36	112.76	16.58	
12	4A	102.42	105.37	104.72	21.92	22.05 \pm 2.61
	4B	96.33	99.87	99.00	24.72	
	4C	109.74	114.12	113.26	19.51	
15	5A	96.32	100.03	99.10	25.12	25.17 \pm 1.45
	5B	102.42	106.19	105.19	26.65	
	5C	109.74	113.32	112.47	23.75	
18	6A	101.33	104.68	103.68	29.81	33.27 \pm 9.47
	6B	93.96	96.42	95.34	43.98	
	6C	105.87	111.13	109.76	26.02	
21	7A	102.43	106.60	105.78	19.77	22.14 \pm 5.71
	7B	96.32	100.12	99.44	18.00	
	7C	109.74	111.91	111.29	28.65	
24	8A	101.33	104.69	103.85	24.97	23.57 \pm 1.26
	8B	105.87	108.72	108.06	23.20	
	8C	93.97	98.50	97.48	22.54	
				Avg (\pmSD)	23.49\pm5.51	

Table B.2 Organic matter results for Borehole-02

Depth (m)	Sample No.	W ₁ (g)	W ₂ (g)	W ₃ (g)	Organic matter (%)	Avg. (\pm SD) Organic matter (%)
3	1A	93.96	96.40	95.93	19.35	19.64 \pm 0.71
	1B	101.33	103.48	103.07	19.11	
	1C	105.87	107.99	107.56	20.45	
6	2A	102.43	105.33	104.74	20.20	21.05 \pm 2.14
	2B	96.33	98.98	98.47	19.46	
	2C	109.75	112.50	111.85	23.48	
9	3A	93.97	97.03	96.22	26.30	28.13 \pm 4.04
	3B	101.33	104.00	103.13	32.76	
	3C	105.87	108.87	108.11	25.33	
12	4A	109.74	113.03	112.09	28.54	26.88 \pm 1.98
	4B	96.33	99.41	98.65	24.68	
	4C	102.43	105.99	105.01	27.42	
15	5A	101.33	105.21	104.44	19.71	22.92 \pm 4.84
	5B	105.86	109.67	108.88	20.56	
	5C	93.96	97.23	96.30	28.49	
18	6A	105.86	108.63	107.85	28.15	30.75 \pm 2.25
	6B	93.96	96.57	95.74	32.02	
	6C	101.33	104.39	103.40	32.07	
21	7A	93.96	97.37	96.56	23.92	25.68 \pm 2.55
	7B	101.33	104.06	103.28	28.61	
	7C	105.88	107.97	107.46	24.51	
24	8A	101.33	104.17	103.57	21.10	19.87 \pm 1.45
	8B	105.87	109.40	108.69	20.23	
	8C	93.97	97.64	96.97	18.27	
27	9A	102.42	105.37	104.64	24.62	26.80 \pm 2.20
	9B	96.33	99.83	98.89	26.77	
	9C	109.75	112.38	111.61	29.01	
30	10A	105.87	109.33	108.23	31.84	31.13 \pm 0.62
	10B	101.33	103.85	103.08	30.69	
	10C	93.96	97.53	96.43	30.87	
				Avg (\pmSD)	25.28\pm4.63	

Table B.3 Organic matter results for Borehole-03

Depth (m)	Sample No.	W ₁ (g)	W ₂ (g)	W ₃ (g)	Organic matter (%)	Avg. (\pm SD) Organic matter (%)
3	1A	93.97	97.74	97.03	18.64	17.31 \pm 1.16
	1B	101.34	105.12	104.49	16.50	
	1C	105.87	109.62	108.99	16.80	
6	2A	109.75	113.55	112.84	18.57	19.10 \pm 0.89
	2B	102.43	106.60	105.83	18.60	
	2C	96.36	100.19	99.42	20.13	
9	3A	93.97	98.05	97.44	14.76	14.88 \pm 1.66
	3B	105.87	109.16	108.72	13.29	
	3C	101.34	105.15	104.51	16.60	
12	4A	109.75	113.51	112.85	17.54	18.81 \pm 1.83
	4B	102.43	105.64	104.97	20.90	
	4C	96.32	99.72	99.11	17.97	
15	5A	102.43	105.99	105.39	16.88	17.12 \pm 0.87
	5B	109.75	113.43	112.83	16.40	
	5C	96.33	100.60	99.83	18.08	
18	6A	101.34	105.26	104.75	13.14	11.30 \pm 1.65
	6B	105.87	111.06	110.50	10.81	
	6C	93.97	98.70	98.23	9.94	
21	7A	102.43	106.42	105.93	12.33	13.96 \pm 1.41
	7B	109.75	113.93	113.32	14.72	
	7C	96.33	100.27	99.69	14.84	
24	8A	105.87	109.44	108.83	17.06	17.81 \pm 1.71
	8B	101.34	105.75	105.02	16.60	
	8C	93.97	98.71	97.78	19.77	
				Avg (\pmSD)	16.29\pm2.84	

Table B.4 Organic matter results for Borehole-04

Depth (m)	Sample No.	W ₁ (g)	W ₂ (g)	W ₃ (g)	Organic matter (%)	Avg. (\pm SD) Organic matter (%)
3	1A	105.87	109.28	108.68	17.68	17.55 \pm 1.49
	1B	93.96	96.84	96.38	16.00	
	1C	101.33	104.49	103.89	18.97	
6	2A	102.42	105.94	105.20	21.04	20.94 \pm 0.62
	2B	109.74	112.63	112.01	21.51	
	2C	96.32	100.19	99.41	20.28	
9	3A	93.96	97.21	96.58	19.51	19.23 \pm 1.94
	3B	101.33	104.23	103.73	17.16	
	3C	105.87	109.49	108.73	21.01	
12	4A	102.43	106.21	105.53	17.88	18.98 \pm 0.95
	4B	96.33	100.15	99.40	19.58	
	4C	109.74	113.83	113.03	19.49	
15	5A	109.75	112.99	112.18	25.15	22.34 \pm 2.52
	5B	96.33	100.05	99.25	21.62	
	5C	102.43	106.71	105.84	20.27	
18	6A	102.42	105.25	104.64	21.80	25.54 \pm 3.28
	6B	96.32	99.52	98.66	26.89	
	6C	109.75	112.90	112.02	27.93	
21	7A	105.87	109.28	108.55	21.60	22.52 \pm 2.37
	7B	93.97	97.59	96.67	25.21	
	7C	101.34	105.93	104.98	20.74	
24	8A	105.87	109.60	108.92	18.06	17.66 \pm 2.06
	8B	93.97	97.38	96.72	19.49	
	8C	101.33	106.96	106.09	15.43	
27	9A	96.33	100.18	99.35	21.55	20.01 \pm 1.94
	9B	102.43	107.31	106.44	17.82	
	9C	109.75	113.40	112.64	20.65	
30	10A	93.96	99.35	98.52	15.34	20.06 \pm 4.24
	10B	105.87	109.00	108.27	23.57	
	10C	101.33	105.69	104.76	21.27	
33	11A	102.43	106.68	105.88	18.82	20.59 \pm 2.05
	11B	96.33	100.79	99.77	22.83	
	11C	109.75	114.80	113.78	20.12	
36	12A	102.42	106.81	105.72	24.81	20.88 \pm 3.44
	12B	109.75	114.39	113.53	18.47	
	12C	96.31	100.14	99.40	19.36	
				Avg (\pmSD)	20.53\pm2.96	

Table B.5 Organic matter results for Borehole-05

Depth (m)	Sample No.	W ₁ (g)	W ₂ (g)	W ₃ (g)	Organic matter (%)	Avg. (\pm SD) Organic matter (%)
3	1A	102.42	104.88	104.26	25.12	22.53 \pm 2.31
	1B	96.32	99.57	98.86	21.79	
	1C	109.74	113.26	112.53	20.68	
6	2A	109.74	112.71	112.09	20.73	23.07 \pm 4.63
	2B	96.32	100.29	99.49	20.08	
	2C	102.43	105.94	104.94	28.40	
9	3A	105.87	108.68	108.02	23.36	20.83 \pm 2.64
	3B	93.96	96.28	95.79	21.03	
	3C	101.33	105.41	104.68	18.09	
12	4A	96.32	99.71	99.11	17.78	18.58 \pm 1.39
	4B	102.42	105.71	105.05	20.19	
	4C	109.74	113.18	112.57	17.77	
15	5A	93.97	97.09	96.54	17.52	18.52 \pm 0.86
	5B	101.33	104.17	103.63	18.98	
	5C	105.87	109.92	109.15	19.05	
18	6A	93.96	98.62	98.11	10.83	10.72 \pm 0.67
	6B	101.33	105.68	105.24	10.00	
	6C	105.87	110.70	110.15	11.32	
21	7A	96.32	100.78	100.49	6.46	6.26 \pm 0.64
	7B	102.42	107.61	107.26	6.77	
	7C	109.74	114.78	114.50	5.53	
24	9A	102.43	107.93	107.44	8.97	9.15 \pm 0.21
	9B	96.33	102.45	101.88	9.39	
	9C	109.74	115.35	114.84	9.10	
27	10A	102.42	106.66	106.32	7.94	9.46 \pm 1.89
	10B	96.31	102.03	101.37	11.58	
	10C	109.75	117.03	116.38	8.87	
30	11A	93.96	99.70	99.04	11.40	11.43 \pm 0.02
	11B	101.33	106.77	106.14	11.44	
	11C	105.87	110.54	110.00	11.45	
				Avg (\pmSD)	15.05\pm6.27	

Table B.6 Organic matter results for Borehole-06

Depth (m)	Sample No.	W ₁ (g)	W ₂ (g)	W ₃ (g)	Organic matter (%)	Avg. (\pm SD) Organic matter (%)
3	1A	109.74	113.86	113.14	17.46	16.34 \pm 1.15
	1B	102.43	106.48	105.87	15.16	
	1C	96.33	100.57	99.87	16.39	
6	2A	101.33	106.63	106.01	11.77	10.58 \pm 1.80
	2B	93.96	98.47	98.09	8.51	
	2C	105.86	110.43	109.91	11.47	
9	3A	109.74	114.95	114.38	10.86	10.68 \pm 0.72
	3B	96.32	99.95	99.59	9.89	
	3C	102.42	107.67	107.08	11.30	
12	4A	93.96	100.08	99.48	9.73	8.08 \pm 1.83
	4B	101.33	105.62	105.36	6.11	
	4C	105.86	112.63	112.06	8.41	
15	5A	96.32	100.36	99.97	9.60	8.79 \pm 0.74
	5B	102.42	107.65	107.20	8.62	
	5C	109.74	115.84	115.34	8.15	
18	6A	105.86	111.19	110.67	9.77	9.67 \pm 0.16
	6B	101.33	105.69	105.27	9.75	
	6C	93.96	101.19	100.50	9.49	
21	7A	102.42	108.26	107.69	9.74	9.65 \pm 1.15
	7B	109.74	116.02	115.49	8.45	
	7C	96.32	102.09	101.47	10.75	
24	8A	105.86	109.64	108.91	19.30	20.65 \pm 1.50
	8B	93.96	98.64	97.59	22.26	
	8C	101.33	105.31	104.49	20.39	
27	9A	109.74	113.90	113.53	8.94	11.24 \pm 2.02
	9B	102.43	105.92	105.50	12.04	
	9C	96.33	101.46	100.81	12.75	
30	10A	101.33	105.24	104.78	11.72	11.95 \pm 0.35
	10B	93.96	97.13	96.73	12.36	
	10C	105.86	109.31	108.91	11.77	
33	11A	109.75	116.12	115.33	12.44	15.77 \pm 4.78
	11B	96.33	98.76	98.24	21.25	
	11C	102.43	107.42	106.74	13.63	
36	12A	101.33	105.73	105.08	14.81	16.48 \pm 1.82
	12B	105.87	109.56	108.96	16.22	
	12C	93.97	96.67	96.17	18.42	
				Avg (\pmSD)	12.49\pm4.08	

Table B.7 Organic matter results for Borehole-07

Depth (m)	Sample No.	W ₁ (g)	W ₂ (g)	W ₃ (g)	Organic matter (%)	Avg. (\pm SD) Organic matter (%)
3	1A	105.86	108.79	108.04	25.40	22.78 \pm 2.29
	1B	93.96	96.86	96.25	21.15	
	1C	101.33	104.28	103.64	21.79	
6	2A	96.33	99.29	98.64	21.92	22.19 \pm 3.42
	2B	102.42	105.91	105.25	18.90	
	2C	109.74	112.16	111.53	25.73	
9	3A	105.86	109.26	108.73	15.49	17.66 \pm 2.15
	3B	101.33	105.25	104.56	17.69	
	3C	93.96	96.88	96.30	19.79	
12	4A	102.42	104.60	104.00	27.44	22.22 \pm 4.55
	4B	109.74	112.17	111.68	20.15	
	4C	96.32	99.59	98.96	19.08	
15	5A	93.96	97.63	97.08	14.88	18.63 \pm 3.81
	5B	105.86	109.44	108.64	22.50	
	5C	101.33	104.83	104.18	18.50	
18	6A	109.74	114.11	113.44	15.40	14.51 \pm 0.92
	6B	96.33	98.48	98.19	13.56	
	6C	102.43	106.59	105.98	14.59	
21	7A	105.86	109.29	108.66	18.35	16.65 \pm 1.49
	7B	93.96	97.56	97.00	15.55	
	7C	101.33	104.56	104.04	16.07	
24	8A	102.42	107.57	106.81	14.84	17.24 \pm 2.81
	8B	96.32	99.94	99.21	20.33	
	8C	109.74	114.03	113.32	16.55	
27	9A	102.43	107.34	106.76	11.73	12.56 \pm 1.27
	9B	96.33	100.75	100.23	11.92	
	9C	109.74	113.52	112.99	14.02	
30	10A	105.87	108.86	108.20	21.92	21.91 \pm 2.92
	10B	93.96	97.09	96.49	18.99	
	10C	101.33	104.12	103.43	24.83	
33	11A	102.42	107.96	107.38	10.60	12.22 \pm 1.86
	11B	96.33	99.20	98.86	11.83	
	11C	109.74	113.26	112.76	14.25	
36	12A	93.96	97.52	96.96	15.74	15.33 \pm 1.36
	12B	105.86	110.18	109.58	13.81	
	12C	101.33	107.54	106.52	16.44	
				Avg (\pmSD)	17.83\pm4.28	

Table B.8 Organic matter results for Borehole-08

Depth (m)	Sample No.	W ₁ (g)	W ₂ (g)	W ₃ (g)	Organic matter (%)	Avg. (\pm SD) Organic matter (%)
1.5	1A	93.96	98.60	98.43	3.68	3.89 \pm 0.18
	1B	105.87	111.12	110.91	3.96	
	1C	101.33	105.24	105.08	4.02	
3	2A	105.86	108.95	108.78	5.34	5.45 \pm 0.17
	2B	101.33	106.68	106.38	5.64	
	2C	93.97	99.32	99.03	5.36	
4.5	3A	102.42	107.27	107.06	4.34	4.03 \pm 0.57
	3B	96.32	100.06	99.89	4.39	
	3C	109.74	113.54	113.41	3.37	
				Avg (\pmSD)	4.46\pm0.81	

Table B.9 Organic matter results for Borehole-09

Depth (m)	Sample No.	W ₁ (g)	W ₂ (g)	W ₃ (g)	Organic matter (%)	Avg. (\pm SD) Organic matter (%)
1.5	1A	109.74	114.27	114.16	2.58	3.13 \pm 0.77
	1B	102.42	107.12	106.99	2.81	
	1C	96.32	100.14	99.99	4.01	
4.5	2A	102.43	106.45	106.31	3.53	3.21 \pm 0.35
	2B	109.75	114.85	114.70	2.84	
	2C	96.32	101.50	101.33	3.25	
				Avg (\pmSD)	3.17\pm0.53	

Table B.10 Organic matter results for Borehole-10

Depth (m)	Sample No.	W ₁ (g)	W ₂ (g)	W ₃ (g)	Organic matter (%)	Avg. (\pm SD) Organic matter (%)
3	1A	105.87	109.46	108.28	32.85	36.46 \pm 4.51
	1B	101.33	106.06	104.41	35.02	
	1C	93.97	95.72	94.99	41.52	
6	2A	102.42	105.32	104.85	16.10	16.06 \pm 2.48
	2B	96.33	100.58	99.80	18.53	
	2C	109.74	114.61	113.95	13.57	
9	3A	102.43	106.82	106.19	14.33	15.67 \pm 1.48
	3B	96.33	100.70	100.03	15.42	
	3C	109.75	114.10	113.35	17.26	
12	4A	96.32	100.00	99.47	14.60	13.99 \pm 1.70
	4B	102.44	107.76	106.94	15.30	
	4C	109.75	113.39	112.95	12.07	
15	5A	105.87	110.19	109.79	9.34	9.74 \pm 0.48
	5B	93.96	99.40	98.88	9.61	
	5C	101.33	105.28	104.88	10.28	
18	6A	102.42	106.59	106.00	14.08	14.58 \pm 1.12
	6B	96.32	100.50	99.92	13.80	
	6C	109.74	113.62	113.01	15.86	
21	7A	93.97	98.00	97.45	13.66	14.88 \pm 1.19
	7B	101.33	106.07	105.36	14.94	
	7C	105.87	110.68	109.91	16.03	
24	8A	93.96	98.41	97.94	10.56	10.05 \pm 1.05
	8B	101.33	104.78	104.41	10.74	
	8C	105.87	110.92	110.47	8.84	
27	9A	101.33	106.03	105.36	14.43	14.08 \pm 0.68
	9B	93.97	98.21	97.59	14.52	
	9C	105.87	109.95	109.41	13.30	
30	10A	96.32	102.56	101.85	11.33	10.51 \pm 0.71
	10B	109.75	113.92	113.50	10.04	
	10C	102.42	106.95	106.49	10.16	
33	11A	96.33	99.96	99.12	23.15	23.04 \pm 1.21
	11B	102.43	105.86	105.03	24.19	
	11C	109.74	113.34	112.55	21.79	
36	12A	105.86	109.20	108.27	27.98	26.17 \pm 3.43
	12B	101.33	105.53	104.60	22.21	
	12C	93.96	97.93	96.81	28.31	
39	13A	102.43	106.85	106.21	14.34	16.09 \pm 1.52
	13B	109.74	113.27	112.68	16.78	
	13C	96.33	99.81	99.21	17.15	
41.7	14A	105.87	109.18	108.83	10.68	14.35 \pm 3.53
	14B	101.33	105.60	104.98	14.65	
	14C	93.97	98.19	97.44	17.71	
				Avg (\pmSD)	16.83\pm7.28	

Table B.11 Organic matter results for Borehole-11

Depth (m)	Sample No.	W ₁ (g)	W ₂ (g)	W ₃ (g)	Organic matter (%)	Avg. (\pm SD) Organic matter (%)
3	1A	93.96	97.93	97.29	16.13	17.33 \pm 2.32
	1B	101.33	104.19	103.62	20.01	
	1C	105.87	111.14	110.30	15.86	
6	2A	96.32	99.62	98.97	19.68	17.87 \pm 1.88
	2B	102.42	107.19	106.33	17.99	
	2C	109.74	113.93	113.27	15.92	
9	3A	93.96	99.14	98.34	15.43	17.07 \pm 3.23
	3B	105.86	110.40	109.46	20.79	
	3C	101.33	106.37	105.61	15.00	
12	4A	109.74	112.33	111.68	25.44	24.49 \pm 4.70
	4B	102.43	104.99	104.25	28.64	
	4C	96.33	100.83	99.96	19.40	
15	5A	109.74	112.91	112.29	19.39	16.75 \pm 2.89
	5B	102.43	107.47	106.60	17.21	
	5C	96.33	100.32	99.78	13.65	
18	6A	105.87	111.30	110.54	14.10	13.74 \pm 0.83
	6B	93.96	99.07	98.41	12.80	
	6C	101.33	105.91	105.25	14.33	
21	7A	96.32	100.17	99.68	12.80	16.23 \pm 3.67
	7B	109.74	114.98	113.93	20.10	
	7C	102.43	108.06	107.17	15.78	
24	8A	105.87	110.07	109.43	15.14	14.02 \pm 1.21
	8B	101.33	105.47	104.95	12.73	
	8C	93.97	97.77	97.23	14.20	
27	9A	93.97	99.56	98.45	19.81	21.39 \pm 1.39
	9B	101.33	105.83	104.85	21.93	
	9C	105.87	111.52	110.25	22.43	
30	10A	102.43	107.99	107.06	16.70	15.58 \pm 0.99
	10B	96.33	103.25	102.20	15.21	
	10C	109.74	113.59	113.02	14.84	
33	11A	105.86	109.86	109.31	13.76	14.19 \pm 1.59
	11B	93.96	97.86	97.24	15.95	
	11C	101.33	106.73	106.03	12.86	
36	12A	102.43	105.91	105.08	23.88	19.33 \pm 6.00
	12B	96.32	101.40	100.76	12.53	
	12C	109.74	113.39	112.61	21.58	
39	13A	102.43	106.86	106.32	12.03	12.26 \pm 0.51
	13B	96.33	100.42	99.93	11.90	
	13C	109.75	114.66	114.03	12.85	
				Avg (\pmSD)	16.94\pm4.03	

Table B.12 Organic matter results for Borehole-12

Depth (m)	Sample No.	W ₁ (g)	W ₂ (g)	W ₃ (g)	Organic matter (%)	Avg. (\pm SD) Organic matter (%)
3	1A	101.33	105.07	104.27	21.55	20.32 \pm 1.15
	1B	93.96	97.04	96.42	20.14	
	1C	105.87	110.11	109.29	19.27	
6	2A	105.87	110.44	109.65	17.25	19.05 \pm 3.05
	2B	101.33	105.00	104.36	17.33	
	2C	93.96	96.64	96.03	22.57	
9	3A	96.33	99.07	98.60	17.36	18.17 \pm 2.12
	3B	102.42	104.86	104.36	20.57	
	3C	109.74	112.93	112.41	16.57	
12	4A	109.75	113.32	112.83	13.74	15.20 \pm 2.33
	4B	102.43	106.03	105.52	13.96	
	4C	96.33	100.57	99.81	17.88	
15	5A	96.32	100.41	99.77	15.70	15.96 \pm 1.39
	5B	102.42	107.53	106.78	14.73	
	5C	109.75	113.47	112.82	17.47	
18	6A	105.87	107.99	107.51	22.91	20.19 \pm 3.43
	6B	101.32	104.91	104.14	21.34	
	6C	93.95	99.19	98.34	16.34	
21	7A	102.43	105.39	104.90	16.63	18.71 \pm 2.22
	7B	96.33	99.50	98.83	21.05	
	7C	109.74	114.05	113.26	18.45	
24	8A	93.97	97.65	96.88	20.84	17.52 \pm 2.90
	8B	105.87	110.51	109.76	16.18	
	8C	101.34	106.75	105.91	15.52	
27	9A	102.43	106.93	106.26	14.72	14.30 \pm 0.37
	9B	109.75	113.47	112.94	14.14	
	9C	96.33	101.68	100.92	14.05	
30	10A	101.34	105.44	104.86	14.17	16.46 \pm 2.54
	10B	93.97	97.25	96.73	16.02	
	10C	105.87	109.55	108.84	19.20	
33	11A	105.87	109.36	108.88	13.80	19.99 \pm 3.33
	11B	101.34	105.15	104.40	19.73	
	11C	93.96	98.61	97.38	26.45	
36	12A	96.33	100.38	99.62	18.71	16.90 \pm 1.84
	12B	109.75	113.45	112.89	15.04	
	12C	102.43	106.05	105.44	16.94	
39	13A	105.87	110.45	109.75	15.29	15.56 \pm 0.43
	13B	101.33	106.75	105.92	15.33	
	13C	93.97	97.70	97.10	16.06	
41.7	14A	96.32	100.71	100.09	14.13	14.04 \pm 2.56
	14B	102.42	108.21	107.55	11.44	
	14C	109.74	114.43	113.65	16.56	
				Avg (\pmSD)	17.31\pm3.08	

Table B.13 Organic matter results for Borehole-13

Depth (m)	Sample No.	W ₁ (g)	W ₂ (g)	W ₃ (g)	Organic matter (%)	Avg. (\pm SD) Organic matter (%)
3	1A	93.96	98.39	97.52	19.58	19.97 \pm 2.46
	1B	101.33	104.43	103.88	17.73	
	1C	105.87	108.91	108.22	22.59	
6	2A	109.74	113.95	113.18	18.39	19.81 \pm 2.19
	2B	102.43	105.31	104.67	22.33	
	2C	96.32	100.42	99.66	18.70	
9	3A	93.96	96.92	96.39	17.89	17.36 \pm 1.55
	3B	101.33	105.03	104.35	18.57	
	3C	105.87	109.92	109.29	15.62	
12	4A	101.33	106.06	105.17	18.95	19.91 \pm 1.02
	4B	105.87	110.34	109.40	20.98	
	4C	93.98	98.81	97.86	19.79	
15	5A	96.33	99.63	99.00	19.04	21.46 \pm 4.44
	5B	109.74	112.59	111.84	26.59	
	5C	102.42	106.44	105.69	18.76	
18	6A	105.86	111.07	110.21	16.54	18.05 \pm 1.35
	6B	93.96	99.26	98.28	18.47	
	6C	101.33	107.26	106.13	19.14	
21	7A	96.33	101.22	100.46	15.40	18.04 \pm 3.81
	7B	109.75	116.19	115.14	16.31	
	7C	102.43	107.08	106.04	22.40	
24	8A	101.33	104.11	103.21	32.21	30.10 \pm 1.99
	8B	105.87	109.07	108.16	28.25	
	8C	93.96	96.47	95.72	29.85	
27	9A	105.87	109.70	108.86	21.88	20.66 \pm 1.74
	9B	93.96	98.90	97.98	18.67	
	9C	101.33	104.63	103.92	21.42	
30	10A	109.75	116.75	115.48	18.09	21.76 \pm 3.38
	10B	102.43	108.27	106.96	22.44	
	10C	96.34	100.40	99.39	24.74	
31.5	11A	101.33	107.25	106.34	15.31	16.42 \pm 0.96
	11B	93.97	98.46	97.70	16.91	
	11C	105.87	110.20	109.46	17.04	
33	12A	109.74	113.19	112.33	24.83	24.08 \pm 1.02
	12B	102.42	107.57	106.39	22.92	
	12C	96.32	99.70	98.87	24.48	
33.6	13A	102.43	106.53	105.75	19.16	22.05 \pm 3.03
	13B	109.74	114.26	113.12	25.20	
	13C	96.33	100.77	99.80	21.79	
				Avg (\pmSD)	20.74\pm3.99	

Table B.14 Organic matter results for Borehole-14

Depth (m)	Sample No.	W ₁ (g)	W ₂ (g)	W ₃ (g)	Organic matter (%)	Avg. (\pm SD) Organic matter (%)
1.5	1A	102.42	107.54	107.06	9.37	9.72 \pm 0.46
	1B	96.33	100.59	100.15	10.25	
	1C	109.75	113.96	113.56	9.55	
3	2A	93.96	98.11	97.69	9.99	9.86 \pm 0.28
	2B	101.33	106.00	105.55	9.54	
	2C	105.87	110.82	110.32	10.04	
4.5	3A	105.86	110.53	110.09	9.29	8.61 \pm 0.60
	3B	93.97	99.02	98.61	8.15	
	3C	101.33	107.63	107.10	8.40	
6	4A	96.32	101.26	100.76	10.09	11.26 \pm 1.98
	4B	102.42	108.39	107.78	10.14	
	4C	109.74	113.97	113.40	13.54	
9	5A	105.87	112.39	112.27	1.90	1.63 \pm 0.23
	5B	101.34	108.51	108.40	1.53	
	5C	93.96	101.06	100.96	1.47	
				Avg (\pmSD)	8.22\pm3.61	

Table B.15 Organic matter results for Borehole-15

Depth (m)	Sample No.	W ₁ (g)	W ₂ (g)	W ₃ (g)	Organic matter (%)	Avg. (\pm SD) Organic matter (%)
3	1A	109.75	113.86	113.41	10.78	10.07 \pm 0.80
	1B	102.43	107.88	107.33	10.21	
	1C	96.33	100.82	100.41	9.20	
6	2A	101.33	105.27	104.89	9.67	10.80 \pm 1.31
	2B	105.87	111.66	111.05	10.49	
	2C	93.97	98.36	97.82	12.24	
9	3A	109.74	113.49	112.89	16.13	12.60 \pm 3.28
	3B	96.32	101.05	100.48	11.99	
	3C	102.43	108.53	107.94	9.66	
12	4A	93.96	97.37	96.91	13.44	13.71 \pm 0.25
	4B	105.87	111.12	110.40	13.78	
	4C	101.33	106.95	106.16	13.92	
15	5A	102.43	106.38	105.67	18.08	17.31 \pm 1.38
	5B	109.75	113.90	113.15	18.13	
	5C	96.33	100.91	100.19	15.72	
				Avg (\pmSD)	12.90\pm3.02	

Table B.16 Organic matter results for Borehole-16

Depth (m)	Sample No.	W ₁ (g)	W ₂ (g)	W ₃ (g)	Organic matter (%)	Avg. (\pm SD) Organic matter (%)
3	1A	96.32	100.31	99.66	16.25	14.92 \pm 2.16
	1B	102.43	107.09	106.34	16.08	
	1C	109.75	114.69	114.07	12.43	
4.5	2A	101.33	105.11	104.46	17.06	15.94 \pm 1.02
	2B	93.97	98.14	97.48	15.71	
	2C	105.87	110.94	110.17	15.05	
6	3A	93.96	98.36	97.70	15.01	12.88 \pm 2.23
	3B	105.87	110.93	110.39	10.55	
	3C	101.33	105.42	104.89	13.07	
				Avg (\pmSD)	14.58\pm2.12	

Appendix C

Table C.1 Specific gravity results for fine fraction retrieved from Borehole-01

Depth (m)	Specific gravity			Avg. (\pm SD) Specific gravity
	Trail-1	Trail-2	Trail-3	
3	2.18	2.26	2.28	2.24 \pm 0.05
6	2.11	2.19	2.15	2.15 \pm 0.04
9	2.25	2.27	2.29	2.27 \pm 0.02
12	2.29	2.32	2.33	2.32 \pm 0.02
15	2.16	2.19	2.20	2.18 \pm 0.02
18	2.22	2.31	2.32	2.29 \pm 0.05
21	2.34	2.39	2.36	2.36 \pm 0.02
24	2.25	2.26	2.26	2.26 \pm 0.01

Table C.2 Specific gravity results for fine fraction retrieved from Borehole-02

Depth (m)	Specific gravity			Avg. (\pm SD) Specific gravity
	Trail-1	Trail-2	Trail-3	
3	2.37	2.39	2.39	2.38 \pm 0.02
6	2.18	2.24	2.24	2.22 \pm 0.03
9	2.10	2.15	2.16	2.14 \pm 0.03
12	2.21	2.24	2.26	2.24 \pm 0.02
15	2.20	2.24	2.24	2.23 \pm 0.02
18	2.08	2.09	2.10	2.09 \pm 0.01
21	2.23	2.25	2.25	2.25 \pm 0.01
24	2.21	2.23	2.24	2.23 \pm 0.02
27	1.91	1.93	1.93	1.92 \pm 0.01
30	2.08	2.09	2.11	2.10 \pm 0.01

Table C.3 Specific gravity results for fine fraction retrieved from Borehole-03

Depth (m)	Specific gravity			Avg. (\pm SD) Specific gravity
	Trail-1	Trail-2	Trail-3	
3	2.22	2.24	2.25	2.24 \pm 0.02
6	2.13	2.16	2.18	2.16 \pm 0.03
9	2.26	2.29	2.30	2.29 \pm 0.02
12	2.13	2.16	2.16	2.15 \pm 0.02
15	2.06	2.07	2.08	2.07 \pm 0.01
18	2.33	2.34	2.35	2.34 \pm 0.01
21	2.28	2.29	2.29	2.29 \pm 0.01
24	2.28	2.28	2.28	2.28 \pm 0.00

Table C.4 Specific gravity results for fine fraction retrieved from Borehole-04

Depth (m)	Specific gravity			Avg. (\pm SD) Specific gravity
	Trail-1	Trail-2	Trail-3	
3	2.30	2.30	2.30	2.30 \pm 0.00
6	2.23	2.25	2.24	2.24 \pm 0.01
9	2.25	2.25	2.26	2.25 \pm 0.00
12	2.16	2.17	2.17	2.17 \pm 0.01
15	2.12	2.13	2.12	2.12 \pm 0.01
18	2.14	2.15	2.14	2.15 \pm 0.00
21	2.03	2.06	2.06	2.05 \pm 0.01
24	2.24	2.27	2.28	2.26 \pm 0.02
27	2.21	2.24	2.25	2.23 \pm 0.02
30	2.26	2.28	2.28	2.27 \pm 0.01
33	2.19	2.21	2.27	2.22 \pm 0.05
36	2.20	2.22	2.23	2.22 \pm 0.01

Table C.5 Specific gravity results for fine fraction retrieved from Borehole-05

Depth (m)	Specific gravity			Avg. (\pm SD) Specific gravity
	Trail-1	Trail-2	Trail-3	
3	2.09	2.14	2.16	2.13 \pm 0.04
6	2.17	2.20	2.22	2.20 \pm 0.02
9	2.20	2.23	2.23	2.22 \pm 0.02
12	2.23	2.26	2.27	2.26 \pm 0.02
15	2.17	2.21	2.22	2.20 \pm 0.03
18	2.42	2.44	2.45	2.44 \pm 0.02
21	2.45	2.48	2.48	2.47 \pm 0.02
27	2.42	2.44	2.45	2.44 \pm 0.01
30	2.42	2.44	2.45	2.43 \pm 0.01
33	2.33	2.36	2.36	2.35 \pm 0.02

Table C.6 Specific gravity results for fine fraction retrieved from Borehole-06

Depth (m)	Specific gravity			Avg. (\pm SD) Specific gravity
	Trail-1	Trail-2	Trail-3	
3	2.29	2.29	2.30	2.30 \pm 0.00
6	2.30	2.32	2.33	2.32 \pm 0.01
9	2.42	2.45	2.43	2.44 \pm 0.02
12	2.44	2.45	2.47	2.46 \pm 0.01
15	2.46	2.47	2.47	2.47 \pm 0.01
18	2.45	2.46	2.46	2.46 \pm 0.01
21	2.44	2.45	2.45	2.45 \pm 0.01
24	2.18	2.19	2.19	2.19 \pm 0.01
27	2.38	2.39	2.40	2.39 \pm 0.01
30	2.35	2.38	2.39	2.37 \pm 0.02
33	2.29	2.32	2.34	2.32 \pm 0.02
36	2.21	2.14	2.16	2.17 \pm 0.04

Table C.7 Specific gravity results for fine fraction retrieved from Borehole-07

Depth (m)	Specific gravity			Avg. (\pm SD) Specific gravity
	Trail-1	Trail-2	Trail-3	
3	2.15	2.17	2.18	2.17 \pm 0.02
6	2.17	2.20	2.20	2.19 \pm 0.01
9	2.23	2.24	2.25	2.24 \pm 0.01
12	2.18	2.21	2.22	2.21 \pm 0.02
15	2.18	2.21	2.21	2.20 \pm 0.01
18	2.33	2.34	2.34	2.34 \pm 0.01
21	2.30	2.32	2.33	2.32 \pm 0.02
24	2.27	2.28	2.25	2.26 \pm 0.02
27	2.40	2.41	2.42	2.41 \pm 0.01
30	2.25	2.28	2.28	2.27 \pm 0.02
33	2.39	2.41	2.42	2.41 \pm 0.02
36	2.28	2.30	2.31	2.30 \pm 0.01

Table C.8 Specific gravity results for fine fraction retrieved from Borehole-08

Depth (m)	Specific gravity			Avg. (\pm SD) S/pacific gravity
	Trail-1	Trail-2	Trail-3	
1.5	2.60	2.61	2.62	2.61 \pm 0.01
3	2.55	2.58	2.59	2.58 \pm 0.02
4.5	2.62	2.66	2.66	2.65 \pm 0.02

Table C.9 Specific gravity results for fine fraction retrieved from Borehole-09

Depth (m)	Specific gravity			Avg. (\pm SD) Specific gravity
	Trail-1	Trail-2	Trail-3	
1.5	2.65	2.66	2.66	2.66 \pm 0.01
4.5	2.68	2.69	2.69	2.69 \pm 0.01

Table C.10 Specific gravity results for fine fraction retrieved from Borehole-10

Depth (m)	Specific gravity			Avg. (\pm SD) Specific gravity
	Trail-1	Trail-2	Trail-3	
3	1.88	1.93	1.95	1.92 \pm 0.04
6	2.38	2.40	2.40	2.40 \pm 0.01
9	2.36	2.37	2.37	2.37 \pm 0.00
12	2.34	2.35	2.35	2.35 \pm 0.00
15	2.47	2.48	2.47	2.47 \pm 0.00
18	2.38	2.40	2.40	2.40 \pm 0.02
21	2.33	2.33	2.34	2.34 \pm 0.01
24	2.43	2.45	2.45	2.44 \pm 0.01
27	2.23	2.26	2.26	2.25 \pm 0.02
30	2.36	2.42	2.42	2.40 \pm 0.04
33	2.31	2.34	2.34	2.33 \pm 0.02
36	2.23	2.23	2.25	2.24 \pm 0.01
39	2.25	2.26	2.26	2.26 \pm 0.01
41.7	2.25	2.27	2.29	2.27 \pm 0.02

Table C.11 Specific gravity results for fine fraction retrieved from Borehole-11

Depth (m)	Specific gravity			Avg. (\pm SD) Specific gravity
	Trail-1	Trail-2	Trail-3	
3	2.34	2.35	2.36	2.35 \pm 0.01
6	2.28	2.30	2.31	2.30 \pm 0.01
9	2.15	2.19	2.20	2.19 \pm 0.03
12	2.16	2.18	2.19	2.18 \pm 0.01
15	2.32	2.35	2.35	2.34 \pm 0.02
18	2.31	2.30	2.34	2.32 \pm 0.02
21	2.28	2.30	2.32	2.30 \pm 0.02
24	2.37	2.37	2.37	2.37 \pm 0.00
27	2.31	2.31	2.31	2.31 \pm 0.00
30	2.27	2.27	2.27	2.27 \pm 0.00
33	2.31	2.34	2.35	2.34 \pm 0.02
36	2.30	2.32	2.32	2.32 \pm 0.01
39	2.34	2.34	2.34	2.34 \pm 0.00

Table C.12 Specific gravity results for fine fraction retrieved from Borehole-12

Depth (m)	Specific gravity			Avg. (\pm SD) Specific gravity
	Trail-1	Trail-2	Trail-3	
3	2.17	2.19	2.20	2.19 \pm 0.02
6	2.15	2.18	2.19	2.17 \pm 0.02
9	2.23	2.23	2.24	2.24 \pm 0.00
12	2.24	2.26	2.27	2.26 \pm 0.02
15	2.21	2.25	2.26	2.24 \pm 0.03
18	2.18	2.21	2.22	2.21 \pm 0.02
21	2.22	2.25	2.25	2.24 \pm 0.02
24	2.22	2.25	2.25	2.24 \pm 0.02
27	2.29	2.30	2.31	2.30 \pm 0.01
30	2.17	2.21	2.23	2.21 \pm 0.03
33	2.17	2.19	2.20	2.19 \pm 0.02
36	2.17	2.21	2.22	2.20 \pm 0.03
39	2.26	2.28	2.27	2.27 \pm 0.01
41.7	2.26	2.26	2.26	2.26 \pm 0.01

Table C.13 Specific gravity results for fine fraction retrieved from Borehole-13

Depth (m)	Specific gravity			Avg. (\pm SD) Specific gravity
	Trail-1	Trail-2	Trail-3	
3	2.22	2.24	2.24	2.23 \pm 0.01
6	2.20	2.22	2.22	2.22 \pm 0.01
9	2.31	2.31	2.32	2.31 \pm 0.01
12	2.27	2.29	2.29	2.28 \pm 0.01
15	2.24	2.25	2.25	2.25 \pm 0.01
18	2.26	2.27	2.27	2.27 \pm 0.01
21	2.18	2.21	2.22	2.21 \pm 0.02
24	2.26	2.28	2.29	2.28 \pm 0.01
27	2.28	2.28	2.28	2.28 \pm 0.01
30	2.27	2.28	2.29	2.28 \pm 0.01
31.5	2.29	2.32	2.33	2.31 \pm 0.02
33	2.23	2.25	2.26	2.24 \pm 0.02
33.6	2.18	2.19	2.21	2.19 \pm 0.01

Table C.14 Specific gravity results for fine fraction retrieved from Borehole-14

Depth (m)	Specific gravity			Avg. (\pm SD) Specific gravity
	Trail-1	Trail-2	Trail-3	
1.5	2.50	2.51	2.51	2.51 \pm 0.00
3	2.42	2.43	2.43	2.43 \pm 0.01
4.5	2.45	2.46	2.46	2.46 \pm 0.00
6	2.39	2.40	2.40	2.40 \pm 0.01
9	2.62	2.63	2.63	2.63 \pm 0.00

Table C.15 Specific gravity results for fine fraction retrieved from Borehole-15

Depth (m)	Specific gravity			Avg. (\pm SD) Specific gravity
	Trail-1	Trail-2	Trail-3	
3	2.46	2.45	2.45	2.46 \pm 0.00
6	2.47	2.46	2.46	2.46 \pm 0.00
9	2.38	2.38	2.37	2.38 \pm 0.00
12	2.70	2.70	2.70	2.71 \pm 0.00
15	2.38	2.38	2.38	2.38 \pm 0.00

Table C.16 Specific gravity results for fine fraction retrieved from Borehole-16

Depth (m)	Specific gravity			Avg. (\pm SD) Specific gravity
	Trail-1	Trail-2	Trail-3	
3	2.33	2.32	2.32	2.33 \pm 0.01
4.5	2.27	2.29	2.29	2.29 \pm 0.01
6	2.38	2.39	2.39	2.39 \pm 0.01

References

- ASTM D 5550, 2006. Standard test: method for specific gravity of soil solids by helium gas pycnometer. American Society of Testing and Materials 19428–2959.
- ASTM International, 2020. ASTM D2974-2020: Standard Test Methods for Determining the Water (Moisture) Content, Ash Content, and Organic Material of Peat and Other Organic Soils, ASTM International. United States of America.
- Goli, V.S.N.S., Singh, P., Singh, D.N., Tak, L.K., 2022. Investigations on characteristics of landfill-mined-soil-like-fractions and their dependency on organic matter. *Process Safety and Environmental Protection* 162, 795–812. <https://doi.org/10.1016/j.psep.2022.04.052>
- Mohammad, A., Goli, V.S.N.S., Chembukavu, A.A., Singh, D.N., 2021. DecoMSW: A Methodology to Assess Decomposition of Municipal Solid Waste for Initiation of Landfill Mining Activities. *The Journal of Solid Waste Technology and Management* 47, 465–481. <https://doi.org/10.5276/JSWTM/2021.465>
- Patil, B.S., Agnes Anto, C., Singh, D.N., 2017. Simulation of municipal solid waste degradation in aerobic and anaerobic bioreactor landfills. *Waste Management and Research*. <https://doi.org/10.1177/0734242X16679258>

Lr. No. EPTRI/ESD/78/ Vol. X/ 2023-24/ 847
Dt.06.11.2023



**PROVISIONAL READINESS CERTIFICATE FOR TREATMENT & DISPOSAL (T&D)
OPERATIONS AT JAWAHARNAGAR SITE OF THE HYDERABAD
INTEGRATED MUNICIPAL SOLID WASTE MANAGEMENT PROJECT**

EPTRI vide Letter dated 11th August, 2023 issued "Provisional Readiness Certificate(PRC)" for 8000 Tons Per Day (TPD) for Jawaharnagar Integrated Waste Management Facility (P&D) for three (03) months w.e.f. 01.06.2023 as per Article 5.4h of C.A on a temporary basis with the punch list items.

As there is no availability of alternative facility in GHMC area and the quantity of waste received to the Jawaharnagar T&D facility is about @ 8000 TPD, the PRC is renewed to 8000 TPD for Jawaharnagar Integrated Facility w.e.f. 01.09.2023 to till the alternative facility is under operation with the following conditions.

Following punch list items has to be completed by the concessionaire as per Article 5.4.h of C.A.

1. Completion of expansion of minimum windrow area about 3,000 sqm to accommodate required number of windrows and for vehicular movement during the windrow operation.
2. Construction of Lined storage ponds to store the leachate generated in the facility
3. Enhancement of required RO rejects treatment capacity.

The other activities (Annexure-I) shall be completed as and when the dispute related to project scope, cost sharing and titular issues are resolved.

A. Vani Prasad
Director General
Seal 6/11/2023

The Project Head,
M/s. Hyderabad Integrated Municipal Solid
Waste Management
Survey No.173, Jawahar Nagar Dump site,
CRPF Road, Near Army Dental College,
Jawahar Nagar Grampanchayat village,
Shamirpet Mandal, Hyderabad-500087

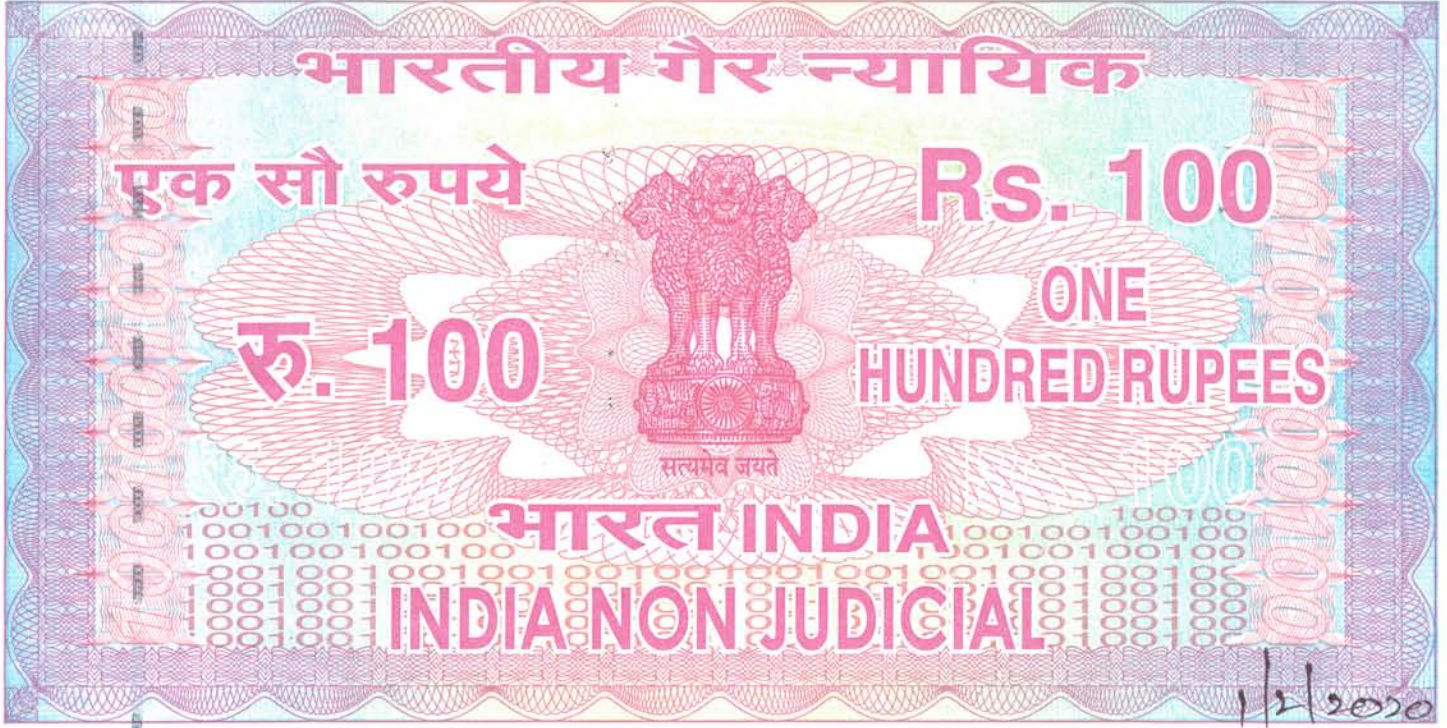
The Commissioner,
Greater Hyderabad Municipal Corporation,
4th Floor, Head Office, Tank Bund Road,
Hyderabad - 500 063.

Annexure-I

Activities mentioned below shall be complete as and when the disputes related to project scope cost sharing and titular issues are resolved.

1. Roads including storm water drainage system shall be laid as per clause 7.9 in schedule 2 of CA.
2. Completion of balance compound wall works.
3. Development of green belt.
4. Reclamation of existing dumpsites of Shamshiguda and Gandhamguda clause 5.17 of C.A.
5. Leachate storage ponds.

3353



తెలంగాణ తెలంగాణ TELANGANA

Z 553037

S.No. 150 Date 1/2/2020 Rs. 100/-

Sold To k. Vasudeva Reddy

S/o. D/o. V/o. Hanraiah

For Whom M/s. Hyderabad MSW Energy Solutions Pvt. Ltd. R/o. Hyd

Bhagya

V BHAGYA LAKSHMI
 LICENSED STAMP VENDOR
 License No 16-09-012/2017
 Renewal No. 16-09-008/2020
 No. 4 & 5, Block-E, 1st Floor, Sail Colony
 New Bowenpally, Secunderabad

**POWER PURCHASE AGREEMENT
 BETWEEN**

**SOUTHERN POWER DISTRIBUTION COMPANY OF TELANGANA LIMITED
 AND**

M/s. HYDERABAD MSW ENERGY SOLUTIONS PRIVATE LIMITED

NCE PPA No. 01/2020

**(Project: 19.8 MW RDF based Power Project at Jawaharnagar (V), Kapra (M),
 Medchal District)**

This Power Purchase Agreement ("Agreement") made and executed on this 14th day of February, 2020, between Southern Power Distribution Company of Telangana Limited, incorporated by the Government of Telangana in accordance with the Telangana Electricity Reform Act 1998 (Act No.30 of 1998), under the provisions of Companies Act, 1956, having its office at 6-1-50, Mint Compound, Hyderabad – 500063, Telangana, India represented by its Chief General Manager (IPC & RAC) (Hereinafter referred to as the "TSSPDCL" or "DISCOM" as the case may be) which expression shall, unless repugnant to the context or meaning thereof, include its successors and assignees as the first party


 CHIEF GENERAL MANAGER/IPC & RAC
 TSSPDCL, Corporate Office,
 6-1-50, Mint Compound,
 HYDERABAD-500 063.



AND

M/s. Hyderabad MSW Energy Solutions Private Limited, having registered under the provisions of Companies Act, 1956, office at 13th Floor, Ramky Grandiose, Ramky Towers, Gachibowli, Hyderabad – 500 032, Telangana, India represented by Mr. Bapanna Sastry Chamarty, aged 56 years, R/o. Lanco Hills, Manikonda, Hyderabad, Additional Director hereinafter referred to as the “Developer” or “Company” as the case may be which expression shall, unless repugnant to the context or meaning thereof, include its successors and assignees as the second party.

2. WHEREAS, the company is establishing the integrated municipal solid waste management with a capacity of 19.8 MW RDF based power project at Jawaharnagar village, Kapra mandal, Medchal District, as detailed in Schedule-1 attached herewith, hereinafter called as the **Project** and state nodal agency that is, Telangana State Renewable Energy Development Corporation Limited (TSREDCO) has accorded approval to the said proposal through Ref: TSREDCO/MSW/HiMSW Ltd/101/2018-19 dated 06.06.2018 and the company entered into an agreement with TSREDCO on 06.06.2018 to execute the project and copies whereof are attached as Schedules -2 and 3 respectively.

3. WHEREAS, the company offered to sell power generated by it at the tariff that may be determined by TSERC and whereas the DISCOM agreed to purchase the power from the company in accordance with the tariff determined by TSERC.

4. NOW, this agreement witnesseth:

- (i) That the company shall fulfill the conditions of agreement entered with TSREDCO and obtain extensions wherever required till the project is completed. In the event of cancellation of the project allotted to the company by TSREDCO for any reason, the agreement with DISCOM will automatically gets cancelled.
- (ii) That it has been agreed by the parties herein that the company shall design, engineer, construct and operate the project with reasonable diligence, subject to all applicable Indian laws, rules, regulations and orders having the force of law including grid code issued by Central and State ERCs;
- (iii) That this agreement is enforceable subject to obtaining consent of Telangana State Electricity Regulatory Commission (TSERC) as per section 21 of Telangana Electricity Reform Act 1998 (Act No.30 of 1998);


CHIEF GENERAL MANAGER/IPC & RAC
 TSSPDCL, Corporate Office,
 6-1-50, Mint Compound,
 HYDERABAD-500 063.



(iv) That the company shall not be eligible for obtaining renewable energy certificates (RECs), invoking regulations issued by Central Electricity Regulatory Commission (CERC) and TSERC from time to time, for energy generated from this project and supplied to DISCOM under this agreement and that the DISCOM is entitled to meet the RPPO to the extent of energy received.

(v) Electricity Act, 2003

NOW THEREFORE, in consideration of the foregoing premises and their mutual covenants herein, and for other valuable consideration, the receipt and sufficiency of which are acknowledged, the parties hereto, intending to be legally bound hereby agree as follows:


CHIEF GENERAL MANAGER/IPC & RAC
TSSPDCL, Corporate Office,
6-1-50, Mint Compound,
HYDERABAD-500 063.



ARTICLE 1
DEFINITIONS

Unless the context otherwise expressed in this agreement, the following terms shall have the meanings set forth herein below. Defined terms of singular number shall include the plural and vice-versa.

- 1.1 **“Act or Act, 2003”** means the Electricity Act, 2003 and includes any modifications, amendments and substitution from time to time;
- 1.2 **“Agreement”** means this power purchase agreement (PPA), including the articles, schedules, amendments, modifications and supplements made in writing by the parties from time to time;
- 1.3 **“Appropriate Commission”** means TSERC or CERC under the Electricity Act, 2003 as the case may be;
- 1.4 **“Billing Date”** means the fifth (5th) day after the meter reading date;
- 1.5 **“Billing Month”** means the period commencing from 25th of the calendar month and ending on the 24th of the next calendar month;
- 1.6 **“CERC”** means the Central Electricity Regulatory Commission formed under Section 76 of the Act, 2003;
- 1.7 **“Change in Law”** means any change or amendment to the provisions of electricity law in force, regulations, directions, notifications issued by the competent authorities and Government of India (GoI), Government of Telangana State (GoTS) from time to time;
- 1.8 **“Commercial Operation Date (COD)”** means, with respect to each generating unit, the date on which such generating unit is declared by the company to be operational in the presence of TSTRANSCO/DISCOM authorized representatives, provided that the company shall not declare a generating unit to be operational until such generating unit has completed its performance acceptance test as per standards notified in coordination by DISCOM/TSTRANSCO/TDREDCO authorities;



CHIEF GENERAL MANAGER / IPC & RAC
TSSPDCL, Corporate Office,
6-1-50, Mint Compound,
HYDERABAD-500 063.



Explanation: In respect of renewable energy based power projects, the date of synchronization of the first unit of the project will be treated as the commercial operation date of the project, since Ministry of New and Renewable Energy, GoI has not specified any guidelines for declaration of the COD;

1.9 **"Contracted Capacity"** means an integrated municipal solid waste management with a capacity of 19.8 MW contracted with DISCOM for supply by the company to the DISCOM at the interconnection point from the project and same shall not be more than the installed capacity. Contracted capacity shall be in MW measured in alternate current (AC) terms and shall not change during the tenure of this agreement.

1.10 **"Delivered Energy"** means with respect to any billing month, the Kilo Watt hours (KWh) of electrical energy generated by the project and delivered to the DISCOM at the interconnection point, as defined in clause 1.18 and as measured by the energy meters at the interconnection point during that billing month at the designated substation of TSTRANSCO or the DISCOM;

Explanation 1: For removal of doubts, the delivered energy, excludes all energy consumed in the project, by the main plant and equipment, lighting and other loads of the project from the energy generated and as recorded by the energy meter at interconnection point.

Explanation 2: The delivered energy in a billing month shall be limited to the energy calculated at 100% PLF of net exportable capacity that is after deducting capacities for auxiliary consumption from the installed capacity as mentioned in this agreement for sale to DISCOM, based on the contracted capacity in KW multiplied with number of hours and fraction thereof, the project is in operation during that billing month. Whenever generation exceeds by installed capacity such energy delivered into the grid by the project above 100% PLF during such period shall be considered payment or otherwise in terms of the rules and regulations in vogue.

Explanation 3: The delivered energy shall be purchased by the DISCOM at a tariff for that year stipulated in Article 2.2 of this agreement.

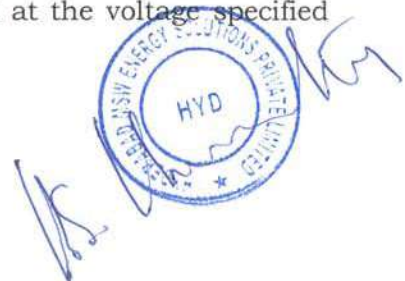


CHIEF GENERAL MANAGER/IPC & RAC
TSSPDCL, Corporate Office,
6-1-50, Mint Compound,
HYDERABAD-500 063.



- 1.11 **“Delivery Point”** means the interconnection point at which the power plant delivers power to the TSTRANSCO or DISCOM substation;
- 1.12 **“Due Date of Payment”** means the date on which the amount payable by the DISCOM to the company hereunder for delivered energy, if any, supplied during a billing month becomes due for payment, which date shall be thirty (30) days from the date of invoice. If the bill is received after 5 days of metering date in a particular month, the due date shall be reckoned from the date of receipt of invoice. In the case of any supplemental or other bill or claim, if any, the due date of payment shall be thirty (30) days from the date of the presentation of such bill or claim to the designated officer of the DISCOM/TSTRANSCO;
- 1.13 **“Effective Date”** means the date of execution of this power purchase agreement (PPA) by both the parties;
- 1.14 **“Financial Year”** means with respect to the initial financial year, the period beginning on the commercial operation date and ending at 12.00 midnight on the following 31st of March. Each successive financial year shall begin on 1st of April and end on the following 31st of March, except that the final financial year shall end on the date of expiry of the term or on termination of this agreement as per the provisions contained herein;
- 1.15 **“Grid Code”** means the Indian Electricity Grid Code issued by CERC and amended or modified from time to time and the TS Grid Code issued by TSERC as modified and amended from time to time. In case of any conflict between the Indian Electricity Grid Code and TS Grid Code, the provisions of TS Grid Code shall prevail;
- 1.16 **“Installed Capacity”** means 19.8 MW that is the total rated capacity in Mega-Watts of all the generators installed;
- 1.17 **“Interconnection Facilities”** means all the equipment and facilities, including, but not limited to, all metering facilities, 0.2s class CTs, 0.2 class PTs, switchgear, substation facilities, transmission lines and related infrastructure, to be installed by the company by laying independent line to the designated substation of TSTRANSCO/DISCOM at the voltage specified


 CHIEF GENERAL MANAGER / IPC & RAC
 TSSPDCL, Corporate Office,
 6-1-50, Mint Compound,
 HYDERABAD-500 063.



in Article 1.20 at the company's expense from time to time throughout the term of this agreement, necessary to enable the DISCOM/TSTRANSCO to economically, reliably and safely receive delivered energy from the project in accordance with the terms of this agreement;

Explanation: *The company based on renewable energy projects viz; biomass, bagasse, mini hydel and municipal solid waste, RDF, industrial waste based projects, etc., have to bear the entire expenditure of interconnection facilities for power evacuation as per the sanctioned estimate by the respective field officers;*

- 1.18 **“Interconnection Point”** means the point or points where the project and the TSTRANSCO/DISCOM’s grid system are interconnected at designated TSTRANSCO/DISCOM substation. The metering for the project will be provided at the interconnection point as per Article 4.1;

Explanation: *In case of power projects based on waste to energy (RDF based) the interconnection point will be at designated TSTRANSCO/DISCOM substation, based on voltage level of evacuation.*

- 1.19 **“Interconnection Substation”** means the designated substation viz., 400 KV Malkaram SS for connecting the project to the state transmission system;
- 1.20 **“Injection voltage or voltage of delivery”** means the voltage at which the company injects the power at the interconnection point agreed in the PPA that is 132 KV;
- 1.21 **“Metering Date”** means mid-day (i.e., noon) of the 24th (twenty-fourth) day of each calendar month, at the interconnection point;
- 1.22 **“Plant Load Factor (PLF)”** means the ratio of total KWh (units) of power generated by plant in a tariff year, as decided by TSERC and contracted capacity in KW multiplied with number of hours in the same tariff year;
- 1.23 **“Project”** means an integrated municipal solid waste management with a capacity of 19.8 MW RDF located power project at Jawaharnagar village, Kapra mandal, Medchal District, Telangana, as detailed in Schedule-1 attached herewith, entrusted to the company for construction

U/S

CHIEF GENERAL MANAGER/IPC & RAC
TSSPDCL, Corporate Office,
6-1-50, Mint Compound,
HYDERABAD-500 063.

7



and operation as detailed in agreement entered into with TSREDCO as shown in Schedule-3 attached herewith;

1.24 **“Prudent Utility Practices”** means those practices, methods, techniques and standards, that are generally accepted for use in electric utility industries taking into account conditions in India and commonly used in prudent electric utility engineering and operations to design, engineer, construct, test, operate and maintain equipment lawfully, safely, efficiently and economically as applicable to power stations of the size, service and type of the project and that generally conform to the manufacturers' operation and maintenance guidelines;

1.25 **“Refuse Derived Fuel (RDF) based power project”**: A project shall qualify to be termed as a Refuse Derived Fuel (RDF) based power project, if it is using the new plant and machinery based on the Rankine Cycle Technology (RCT) and using the RDF as fuel sources;

Explanation 1: “Refuse Derived Fuel” means segregated combustible fraction of solid waste other than chlorinated plastics in the form of pellets or fluff produced by drying, de-stoning, shredding, de-hydrating and compacting combustible components of solid waste that can be used as fuel.

Explanation 2: The new plant and machinery installed in a RDF based project using the RCT should not have been used for generation of power in a project anywhere in India prior to its installation in a RDF based power project in the state of Telangana.

1.26 **“Scheduled Commercial Operation Date (SCOD) or Scheduled Date of Commercial Operations”** means the date whereupon the project is required to start injecting power from the power project to the delivery point as per approval of TSREDCO from time to time;

1.27 **“SERC”** means the Telangana State Electricity Regulatory Commission constituted under Section-82 of the Act, 2003 or its successors, and includes a Joint Commission constituted under sub-section (1) of Section 83 of the Act 2003;



CHIEF GENERAL MANAGER/IPC & RAC
TSSPDCL, Corporate Office,
6-1-50, Mint Compound,
HYDERABAD-500 063.



- 1.28 **“SLDC”** means the State Load Dispatch Center as notified by the Telangana State Government under the provisions of the Act, 2003;
- 1.29 **“System Emergency”** means a condition affecting the TSTRANSCO/DISCOM’s electrical system, which threatens the safe and reliable operation of such system or which is likely to result in the disruption of safe, adequate and continuous electric supply by the TSTRANSCO/DISCOM, or which endangers life or property, which condition is affected or aggravated by the continued delivery of delivered energy from the project;
- 1.30 **“Tariff”** shall have the same meaning as ascribed in clause 2.2 of this agreement;
- 1.31 **“Unit”** when used in relation to the generating equipment, means one set of turbine generator and auxiliary equipment and facilities forming part of the project and when used in relation to electrical energy, means Kilo Watt Hour (KWH);
- 1.32 **“Voltage of Delivery”** means 132 KV voltage at which the electrical energy generated by the project is required to be delivered to the TSTRANSCO/DISCOM at the interconnection point by erecting an exclusive 132 KV feeder;
- 1.33 **“Tariff Year”** means each period of 12 months commencing from the COD of the project. The last tariff year of this agreement shall end on the date of expiry of this agreement;
- 1.34 **“Term of the Agreement”** shall have the same meaning as provided for in Article 8 of this agreement;
- 1.35 **“TSTRANSCO”** means Transmission Corporation of Telangana Limited, incorporated under the Companies Act, 1956;

All other words and expressions used herein and not defined herein but defined in the Electricity Act, 2003, Electricity Duty Act 1939 and its subsequent amendments and Telangana Electricity Reform Act 1998. shall have the meanings respectively assigned to them in the said Acts and applicable state and central regulations on grid code and others from time to time.


 CHIEF GENERAL MANAGER/IPC & RAC
 TSSPDCL, Corporate Office,
 6-1-50, Mint Compound,
 HYDERABAD-500 063.



ARTICLE 2

PURCHASE OF DELIVERED ENERGY AND TARIFF

- 2.1 All the delivered energy at the interconnection point for sale to DISCOM (net capacity) will be purchased at the tariff provided for in Article 2.2 from and after the date of commercial operation of the project. Title to delivered energy purchased shall pass from the company to the DISCOM at the interconnection point.
- 2.2 The company shall be paid the tariff for the net energy delivered at the interconnection point for sale to DISCOM at the tariff as determined by TSERC from time to time. No tariff will be paid for the energy delivered at the interconnection point beyond contracted capacity. The orders of TSERC are enforceable in entirety and shall be considered for the purposes of computation of tariff.
- 2.3 The tariff payable by DISCOM shall be inclusive of all taxes, duties and levies or any other statutory liability, as applicable from time to time.
- 2.4 No transmission or wheeling charges or other charges or assessments charges shall be levied by the TSTRANSCO/DISCOM on purchased energy.
- a) Where in any billing month, the company is entitled to draw the energy from DISCOM/TSTRANSCO grid restricted to its auxiliary consumption during shut down periods, maintenance periods and plant tripping periods only. The company shall not draw any power from DISCOM/TSTRANSCO during plant running period. The contracted load of the plant shall be taken as the auxiliary consumption that is, 11% of installed capacity for RDF based projects. The energy supplied by the DISCOM to the company, shall be billed by the DISCOM and the company shall pay the DISCOM for such electricity supplies, at the DISCOM the then-effective TSERC applicable tariff to high tension category-I consumers as determined by TSERC from time to time.
- b) For this purpose, the maximum demand recorded during such periods in a billing cycle shall be considered, in shut down period, the


 CHIEF GENERAL MANAGER/IPC & RAC
 TSSPDCL, Corporate Office,
 6-1-50, Mint Compound,
 HYDERABAD-500 063.



billing demand would be 80% of auxiliary consumption or recorded maximum demand whichever is more.

- c) **Billing Energy:** 50 KVAH per KVA of billing demand or actual units recorded whichever is more.
- d) For the purpose of billing TOD tariff, TOD compatible meters may be installed.
- e) However, the minimum HT-I category billing shall be made applicable to the company in a billing cycle that may be decided by TSERC from time to time, based on the voltage of the generator.

Explanation: *The generating plants viz., power projects based on waste to energy during the plant shut down periods, maintenance works, plant tripping periods etc., shall draw the energy from TSTRANSCO/DISCOM only for the essentials loads during no generation periods.*


CHIEF GENERAL MANAGER/IPC & RAC
TSSPDCL, Corporate Office,
6-1-50, Mint Compound,
HYDERABAD-500 063.



ARTICLE 3

**INTERCONNECTION FACILITIES, SYNCHRONIZATION, COMMISSIONING AND
COMMERCIAL OPERATION**

Interconnection Facilities

- 3.1 Upon receipt of a requisition from the company, TSTRANSCO or DISCOM shall prepare an estimate of cost for arranging the interconnection facilities for power evacuation at the voltage of delivery. The company has to bear the entire cost of the interconnection facilities as per the approved estimate made by TSTRANSCO or DISCOM and also take care of right of way issues. The TSTRANSCO or DISCOM shall evaluate, design, install, own, operate and maintain the interconnection facilities and perform all work, at the company's expense, necessary to economically, reliably and safely connect the DISCOMs existing system to the project switchyard.

Provided that the TSTRANSCO or DISCOM may allow the company to execute the interconnection facilities for power evacuation as per the approved estimate at its discretion duly collecting the supervision charges as per the procedures in vogue.

In case the project connects to a 33/11 KV or EHT interconnection substation where available capacity is subject to bay extension and bay extension is not feasible, then the company shall procure land and undertake bay extension at its own cost.

- 3.2 The company shall own, operate and maintain interconnection facilities from project to grid substation from time to time and shall bear the necessary expenditure. The maintenance work of the connected bay together with equipment at the grid substation has to be done in coordination with the TSTRANSCO and DISCOM personnel. Where TSTRANSCO or DISCOM carries out the maintenance work, the developer shall pay the expenses to TSTRANSCO or DISCOM as applicable.
- 3.3 DISCOM has been vested with the right to add any additional loads on the feeder without detrimental to the interests of the existing generating company.


CHIEF GENERAL MANAGER / IPC & RAC
 TSSPDCL, Corporate Office,
 6-1-50, Mint Compound,
 HYDERABAD-500 063.



- 3.4 Any modifications or procedures or changes in arranging interconnection facilities for power evacuations rests with GoTS/DISCOM/TSTRANSCO.
- 3.5 The company shall allow entry to the site of the project free of all encumbrances at all times during the term of the agreement to the personnel of TSTRANSCO or DISCOM for inspection and verification of the works being carried out by the company at the site of the project.
- 3.6 The TSTRANSCO or DISCOM or its representative may verify the construction works or operation of the project being carried out by the company and if it is found that the construction works or operation of the project is not as per the prudent utility practices, it may seek clarifications from the company or require the works to be stopped or to comply with their instructions.
- 3.7 During the period prior to the commercial operation date, on the request of the company, the DISCOM will supply energy to the project for any purpose, on the terms and conditions and at the tariff rates that are applicable from time to time to the category of consumers of the DISCOM to which the company belongs, provided separate metering arrangements as may be required under the terms and conditions of such tariff have been installed at the project.

Synchronization, Commissioning and Commercial Operation

- 3.8 The company shall give a notice in writing to the SLDC and DISCOM, at least (15) days before the date on which it intends to synchronize the project to the grid system.
- 3.9 The project may be synchronized by the company to the grid system when it complies with all the connectivity conditions specified in the grid code in force.
- 3.10 The synchronization equipment shall be installed by the company at the generation facility of the project at its own cost. The company shall synchronize its system with the grid system only after the approval of synchronization scheme under the supervision of the concerned authorities of the grid system.



CHIEF GENERAL MANAGER/IPC & RAC
TSSPDCL, Corporate Office,
6-1-50, Mint Compound,
HYDERABAD-500 063.



- 3.11 The company shall immediately after synchronization/tripping of generator, inform the SLDC and substation of the grid system to which the project is electrically connected in accordance with the grid code in force.
- 3.12 The company shall commission the project within timelines specified in this agreement from the effective date for projects connected and any delay in commissioning of the project shall be subject to the penalties as stipulated. After commissioning of the project, the company shall invariably register the project with SLDC.
- 3.13 The company may undertake the commissioning of the project in phases and provisions of clauses 3.8 to 3.10 and said clauses shall apply mutatis-mutandis for generating units commissioned in phases. However, prior to the completion of the synchronization of the entire project, the company shall obtain certification for full contracted capacity from the competent authority duly demonstrating the full commissioning of the contracted capacity.
- 3.14 The company shall ensure the connectivity standards as per technical norms of TSTRANSCO/DISCOM.




CHIEF GENERAL MANAGER/IPC & RAC
TSSPDCL, Corporate Office,
6-1-50, Mint Compound,
HYDERABAD-500 063.



ARTICLE 4
METERING AND PROTECTION

- 4.1 The company shall install main meters and check meter of static type 0.2s class accuracy having both ABT & trivector features and online data transfer facility (V-SAT) at the interconnection point and the company shall also install standby meter of static type at the same point and of the same accuracy. The connected metering CTs and PTs shall be of 0.2s and 0.2 class of accuracy respectively as per the norms specified in the T.O.O. (CE-Construction-2) Ms.No.488, dated 17.03.2012, metering code by CEA or norms of TSERC and any changes made applicable from time to time. The main meters, check meters and standby meter shall each consist of a pair of export and import parameters with facility for recording meter readings using Meter Recording Instrument and configured with ToD software compatible to TSTRANSCO EBC data base. For the purpose of uniformity the company shall follow metering specification as developed by DISCOM.
- 4.2 All the meters required to be installed pursuant to Article 4.1 above shall be jointly inspected and sealed on behalf of both parties, that is DISCOM and company and shall not be interfered with, tested or checked except in the presence of representatives of both parties.
- 4.3 Though all the reading of main, check and standby meters have to be taken, the meter readings from the main meters will form the basis of billing. If any of the meters required to be installed pursuant to Article 4.1 above are found to be registering inaccurately, the affected meter will be replaced immediately.
- 4.4 Wherein the half yearly meter check indicates an error in one of the main meter/meter(s) beyond the limits of errors, for such meter(s), but no such error is indicated in the corresponding check meter/meters, billing for the month will be done on the basis of the reading on the check meter/meters and the main meter will be replaced immediately.
- 4.5 If during the half yearly test checks, both the main meters and the corresponding check meters are found to be beyond permissible limits of error, standby meters readings shall be taken into consideration and both


CHIEF GENERAL MANAGER / IPC & RAC
TSSPDCL, Corporate Office,
6-1-50, Mint Compound,
HYDERABAD-500 063.



main and check meters shall be immediately replaced. If all the meters during yearly checking found to be faulty and the correction applied to the consumption registered by the main meter to arrive at the correct delivered energy for billing purposes for the period of the one month up to the time of such test check, computation of delivered energy for the period thereafter till the next monthly meter reading shall be as per the replaced main meter. Alternatively, the energy will be computed on a mutually agreeable basis for that period of defect.

- 4.6 Corrections in delivered energy billing, whenever necessary, shall be applicable to the period between the previous monthly meter reading and the date and time of the test calibration in the current month when the error is observed and this correction shall be for the full value of the absolute error. For the purpose of determining the correction to be applied to any meter registering inaccurately, the meter shall be tested under conditions simulating 100, 50, 20 and 10 percent load at unity power factor and 0.5 power factor. Of these eight values, the error at the load and power factor nearest to the average monthly load served at the interconnection point during the applicable period shall be taken as the error to be applied for correction.
- 4.7 If both the main and check meters fail to record or if any of the PT fuses are blown out, then the energy will be computed on a mutually agreeable basis for that period of defect.
- 4.8 The billing meters, main, check and standby, shall be tested and calibrated utilizing a standard meter. The standard meter shall be calibrated once in every year at the approved laboratory by GoI/GoTS, as per General Terms and Conditions of Supply (GTCS).
- 4.9 All the billing meters, main, check and standby, tests shall be jointly conducted by the authorized representatives of both parties and the results and correction so arrived at mutually will be applicable and binding on both the parties.



CHIEF GENERAL MANAGER/IPC & RAC
TSSPDCL, Corporate Office,
6-1-50, Mint Compound,
HYDERABAD-500 063.



- 4.10 On the metering date, each month meter readings shall be taken and an acknowledgement thereof is signed by the authorized representatives of both parties.
- 4.11 Within six (6) months, following the execution of this agreement, the company and the DISCOM shall mutually agree to technical and performance specifications, including, but not limited to the metering configuration for the project concerning the design and operation of the facilities required to be installed by the company in order for the company to operate in parallel with the TSTRANSCO/DISCOM's grid. Thereafter, any change in such specifications shall be subject to mutual agreement of the parties.
- 4.12 The project shall be operated and maintained in accordance with good and generally prudent accepted utility standards with respect to synchronizing, voltage, frequency and reactive power control.
- 4.13 The company shall install communication system involving latest technology on information in the project and at the designated sub-station at the cost of the company, to establish contact with the sub-station to which it is interconnected for co-ordination of the project operation. The regular maintenance of technologies on information is to be carried out by the company at its cost.
- 4.14 Voltage regulation shall be such as to enable continued paralleling and synchronization with the grid voltage at the point of interconnection.
- 4.15 The equipment of the company shall be designed for fluctuations in the frequency maintained as per Indian Electricity Grid Code (IEGC) between 49.90 cycles per second to 50.05 cycles per second of the standard frequency of 50 cycles per second or as amended from time to time.
- 4.16 The company shall ensure that the power factor of the power delivered to the TSTRANSCO/DISCOM is maintained at or above the minimum power factor as per tariff notification, or otherwise pay surcharge as per tariff notification in force.



CHIEF GENERAL MANAGER/IPC & RAC
TSSPDCL, Corporate Office,
6-1-50, Mint Compound,
HYDERABAD-500 063.

17



- 4.17 Any change in rupturing capacity of switch-gear, settings of the relays, etc., shall be subject to approval of the TSTRANSCO/DISCOM as the case may be.
- 4.18 As the project's generator may carry fault currents that may occur on the TSTRANSCO/DISCOM's grid, the company shall provide adequate generator and switchgear protection against such faults. The DISCOM is not responsible for damage, if any, caused to the project's generator and allied equipment during parallel operation of the generator with the TSTRANSCO/DISCOM's grid.
- 4.19 The company shall make a good faith effort to operate the project in such a manner as to avoid fluctuations and disturbances to the TSTRANSCO/DISCOM's grid due to parallel operation with the grid.
- 4.20 The company shall control and operate the project. The SLDC/TSTRANSCO/DISCOM shall only be entitled to request the company to reduce electric power and energy deliveries from the project during a system emergency and then only to the extent that in the SLDC/TSTRANSCO/DISCOM's reasonable judgment such a reduction will alleviate the emergency. The SLDC/TSTRANSCO/DISCOM shall give the company as much advance notice of such a reduction as is practicable under the circumstances and shall use all reasonable efforts to remedy the circumstance causing the reduction as soon as possible. Any reduction required of the company hereunder shall be implemented in a manner consistent with safe operating procedures.
- 4.21 The company has to establish protection system, online data scheme, its allied equipment to conform with grid code from time to time. Also, the protection system shall conform with the TSTRANSCO/DISCOM norms.


CHIEF GENERAL MANAGER/IPC & RAC
TSSPDCL, Corporate Office,
6-1-50, Mint Compound,
HYDERABAD-500 063.



ARTICLE 5
CHANGE IN LAW

In this Article, the following terms shall have the following meanings:

- 5.1 "Change in Law" means the occurrence of any of the following events after the date on which PPA is signed, resulting into any additional recurring/non-recurring expenditure by the company or any income to the company, the enactment, coming into effect, adoption, promulgation, amendment, modification or repeal without re-enactment or consolidation in India, of any law, including rules and regulations framed pursuant to such law and any notifications issued thereunder.
- (a) change in the interpretation or application of any law by any Indian governmental instrumentality having the legal power to interpret or apply such law, or any competent court of law, the imposition of a requirement for obtaining any consents, clearances and permits which was not required earlier;
 - (b) a change in the terms and conditions prescribed for obtaining any consents, clearances and permits or the inclusion of any new terms or conditions for obtaining such consents, clearances and permits; except due to any default of the company;
 - (c) any change in tax or introduction of any tax made applicable for supply of power by the company as per the terms of this agreement but shall not include:
 - (i) any change in any withholding tax on income or dividends distributed to the shareholders of the company, or
 - (ii) change in respect of UI Charges or frequency intervals by CERC or TSERC, or
 - (iii) any change on account of regulatory measures by the CERC or TSERC including calculation of availability.


CHIEF GENERAL MANAGER / IPC & RAC
TSSPDCL, Corporate Office,
6-1-50, Mint Compound,
HYDERABAD-500 063.



ARTICLE 6
BILLING AND PAYMENT

- 6.1 For delivered energy purchased, the company shall furnish a bill to the DISCOM calculated at the rate provided for in Article 2.2, in such form as may be mutually agreed between the DISCOM and the company, for the billing month on or before the 5th working day following the metering date.
- 6.2 Any payment made beyond the due date of payment, the DISCOM shall pay simple interest at prevailing base prime lending rate of State Bank of India and in case this rate is increased / reduced, such an increased / reduced rate is applicable from the date of such notification.
- 6.3 The DISCOM shall make payment for the bills on monthly basis as per Article 6.1, by opening a revolving Letter of Credit for a minimum period of one year in favour of the company.
- 6.4 **Letter of Credit:** Not later than 30 days prior to the SCOD of the first generating unit, DISCOM shall cause to be in effect an irrevocable revolving Letter of Credit issued in favour of the company by a scheduled bank for one monthly billing value. Each Letter of Credit shall
- a) on the date it is issued, have a term of one year;
 - b) be payable upon the execution and presentation by an officer of the company of a sight draft to issuer of such Letter of Credit supported by a meter reading statement accepted and signed by both the parties or a certification from the company that the DISCOM failed to sign the meter reading statements within five (5) days of the metering date or that a supplemental bill has been issued and remains unpaid until the due date of payment;
 - c) provided that the company shall have the right to draw upon such Letter of Credit notwithstanding any failure by the DISCOM to reimburse the issue therefore for any draw down made under, and
 - d) not less than thirty (30) days prior to the expiration of any Letter of Credit, the DISCOM shall provide a new or replacement Letter of



CHIEF GENERAL MANAGER / IPC & RAC
TSSPDCL, Corporate Office,
6-1-50, Mint Compound,
HYDERABAD-500 063.



Credit. Each monthly bill or supplemental bill shall be presented at the said scheduled bank for payment under the Letter of Credit and shall become payable thereunder. The opening charges for Letter of Credit (L/C) and negotiation charges will be borne by the beneficiary that is the company.

- e) The DISCOM is entitled for a discount of 1% on exported energy, if the payment is made within the due date.

6.5 **Direct Payment:** Notwithstanding the fact that a Letter of Credit has been opened, in the event that through the actions of DISCOM, the company is not able to make a draw upon the Letter of Credit for the full amount of any bill, the company shall have the right to require in writing the DISCOM to make direct payment of any bill by cheque or otherwise on or before the due date of payment by delivering such requisition to the DISCOM on or prior to the due date of payment of such bill requiring payment in the foregoing manner. Without prejudice to the right of the company to draw upon the Letter of Credit if payment is not received in full, the DISCOM shall have the right to make direct payment by cheque or otherwise of any bill as such, within 30 days after the date of its presentation to the designated officer of the DISCOM, the company shall receive payment in full for such bill. When either such direct payment is made, the company shall not present the same bill to the scheduled bank for payment against the Letter of Credit.

6.6 **Billing disputes:** The DISCOM shall pay the bills of the company promptly subject to the provisions in Article 2 and in accordance with tariff determined by TSERC from time to time.

The DISCOM shall notify the company in respect of any disallowed amount on account of any dispute as to all or any portion of the bill. The company shall immediately take up the issue with all relevant information with the DISCOM which shall be rectified by the DISCOM, if found satisfactory. Otherwise the DISCOM shall notify its rejection of the disputed claim within reasonable time with the reasons recorded in writing there for. The dispute may also be decided by mutual agreement. If the resolution of any dispute requires the DISCOM to reimburse the company, the amount to be reimbursed shall bear simple interest at prevailing base prime lending rate of



CHIEF GENERAL MANAGER/IPC & RAC
TSSPDCL, Corporate Office,
6-1-50, Mint Compound,
HYDERABAD-500 063.



State Bank of India from the date of disallowance to the date of reimbursement.

- 6.7 All payments by the DISCOM to the company hereunder shall be made to such address as may be designated by the company to the DISCOM in writing from time to time.

Address : M/s. Hyderabad MSW Energy Solutions Private Limited, 13th Floor, Ramky Grandiose, Ramky Towers, Gachibowli, Hyderabad – 500032, India.

Telephone No. :

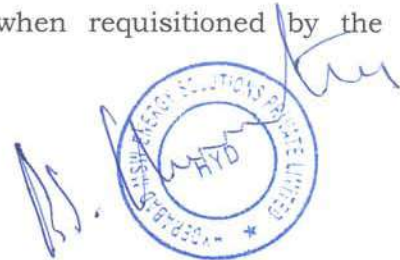
Fax No. :

Email :

- 6.8 The DISCOM is at liberty to make direct payment using the modern financial online transactional facilities including but not limited to RTGS and NEFT wherever it is permissible and acceptable to company, as are available in the banking and financial sector, for which the company may provide the necessary details as and when requisitioned by the DISCOM.



CHIEF GENERAL MANAGER/IPC & RAC
TSSPDCL, Corporate Office,
6-1-50, Mint Compound,
HYDERABAD-500 063.



ARTICLE 7
UNDERTAKING

- 7.1 The company shall be responsible:
- (i) For the proper maintenance of the project in accordance with established prudent utility practices.
 - (ii) For the operation, maintenance, overhaul of the plant, equipment, works, switch yard and transmission lines and equipment up to the interconnection point of the project in close coordination with the DISCOM.
 - (iii) The company shall furnish the generation and maintenance schedules every year.
 - (iv) For making all payments on account of any taxes, cesses, duties, or levies imposed by any government or competent statutory authority on the land, equipment, material or works of the project or on the energy generated or consumed by the project or the company or on the income or assets of the company.
 - (v) For obtaining necessary approvals, permits or licenses for operation of the project and sale of energy to TSTRANSCO/DISCOM therefrom under the provision of the relevant laws.
 - (vi) To share clean development mechanism ("CDM") benefit with the DISCOM as provided in CERC (Terms and Conditions for the Tariff determination from Renewable Energy Sources) Regulations, 2012 and as amended from time to time to the extent indicated below:

The proceeds of carbon credit from the approved CDM project shall be shared between the Company and the DISCOM in the following manner, namely,

- a) 100% of the gross proceeds on account of CDM benefit to be retained by the company in the first year after the date of commercial operation of the generating station;
- b) in the second year after COD, the share of the DISCOM shall be 10% which shall be progressively increased by 10% every year i.e., in the third year after COD it shall be 20% and so on till it


CHIEF GENERAL MANAGER / IPC & RAC
TSSPDCL, Corporate Office,
6-1-50, Mint Compound,
HYDERABAD-500 063.



reaches 50%, where after the proceeds shall be shared in equal proportion, by the company/power developer and the DISCOM.

- (vii) For payment of any charges as fixed by TSERC from time to time and levied by the DISCOM.
- (viii) The company has to comply with the provisions of the T.S. Code of Technical Interface (Grid Code).

7.2 The DISCOM agrees:

- (i) to make all reasonable efforts for making arrangements for evacuation of power from the project at the company's expense which has been completed prior to the COD of the project subject to Article 3.
- (ii) for purchase of delivered energy from the project as per Article 2.2.
- (iii) for providing grid support for the essential load of the power plant.


CHIEF GENERAL MANAGER/IPC & RAC
TSSPDCL, Corporate Office,
6-1-50, Mint Compound,
HYDERABAD-500 063.

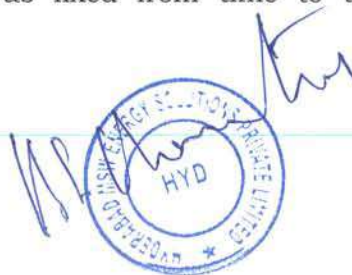


ARTICLE 8
DURATION OF AGREEMENT

This agreement shall be effective upon its execution and delivery thereof between parties hereto and shall continue in force from the COD and until the twentieth (20th) anniversary that is for a period of twenty years from the COD. This agreement may be renewed for such further period of time on such terms and conditions as may be mutually agreed upon by the parties, 90 days prior to the expiry of the said period of twenty years, subject to the consent of the TSERC. Any tariff and all incentives/conditions envisaged in the Articles of this agreement are subject to modification/amendment as per the directions of TSERC, Government of Telangana and DISCOM, at the rates specified, notified or as fixed from time to time, whichever is lower during the agreement period.



CHIEF GENERAL MANAGER/IPC & RAC
TSSPDCL, Corporate Office,
6-1-50, Mint Compound,
HYDERABAD-500 063.



ARTICLE 9
NOTICES

- 9.1 Except as otherwise expressly provided in this agreement, all notices or other communications which are required or permitted hereunder shall be in writing and sufficient, if delivered personally or sent by registered post or certified mail, telex addressed as follows:

If to the Company:

Attention : M/s. Hyderabad MSW Energy Solutions Private Limited., 13th Floor, Ramky Grandiose, Ramky Towers, Gachibowli, Hyderabad – 500032, India.

Telephone No. :

Fax No. :

E-mail :

If to the DISCOM:

Attention : Chief General Manager (IPC& RAC)
TSSPDCL, Mint Compound,
Hyderabad-500 004.

Fax No. : 040 23431452

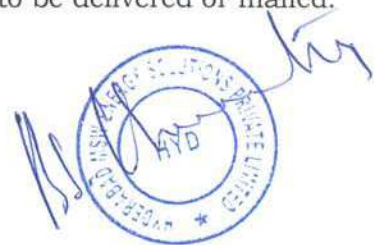
Telephone No. : 040 2343 1008, 2343 1453

E-mail : seipc@tssouthernpower.com

- 9.2 All notices or communications given by fax or email shall be confirmed by depositing a copy of the same in the post office in an envelope properly addressed to the appropriate party for delivery by registered or certified mail having proof of mailing the same. All notices shall be deemed delivered upon receipt, including notices given by fax or email regardless of the date the confirmation of such notice is received.
- 9.3 Any party may by written notice change the address and/or addresses to which such notices and communications to it are to be delivered or mailed.



CHIEF GENERAL MANAGER/IPC & RAC
TSSPDCL, Corporate Office,
6-1-50, Mint Compound,
HYDERABAD-500 063.



ARTICLE 10
SPECIAL PROVISIONS

- 10.1 The waiver of any breach or failure to enforce any of the terms, covenants or conditions of this agreement shall not in any way affect, limit, modify or waive the future enforcement of such terms, covenants or conditions.
- 10.2 No oral or written modification of this Agreement either before or after its execution shall have any force or effect unless such modification is in writing and signed by the duly authorized representatives of the company and the DISCOM, subject to the condition that any further modification of the agreement shall be done only with the prior approval of TSERC. However, the amendments to the agreement as per the respective orders of TSERC from time to time shall be carried out. All the conditions mentioned in the agreement are with the consent of TSERC.
- 10.3 However, in respect of power evacuation, the voltage levels for interfacing with TSTRANSCO/DISCOM's grid will be as per Article 1.32. The costs of interconnection facilities have to be borne by the company as per Article 3.
- 10.4 The invalidity or unenforceability for any reason of any provision of this agreement shall not prejudice or affect the validity or enforceability of any other provision of this agreement.
- 10.5 The failure of any party to insist in one or more instances upon the strict performance of any of the provisions of this agreement or to take advantage of any of its rights hereunder shall not be construed as a waiver of any such provisions or relinquishment of any such rights but the same shall continue in full force and effect.
- 10.6 Unless the context otherwise requires, every arrangement, procedure or any other matter which is, under any of the provisions of this agreement, required to be mutually agreed upon between the parties, shall be concluded by a written agreement between the parties not later than the date specified in the relevant clause of this agreement, subject to the consent of the TSERC.


CHIEF GENERAL MANAGER/IPC & RAC
TSSPDCL, Corporate Office,
6-1-50, Mint Compound,
HYDERABAD-500 063.



- 10.7 This agreement, including Schedules 1, 1A, 2, 3 and 4 attached hereto, constitute the entire agreement between the parties with respect to the subject matter hereof, and there are no oral or written understandings, representations or commitments of any kind, express or implied, not set forth herein.
- 10.8 The headings contained herein are included solely for the convenience of the parties and are not to be used as a basis for interpreting the various clauses of this agreement.
- 10.9 That each of the parties agree to act in good faith in implementing the terms and conditions of this agreement and in carrying out their respective obligations hereunder.
- 10.10 In the event of the merger or reorganization of DISCOM, if the resulting entity is able to perform DISCOM's obligations hereunder in no less a manner than DISCOM, the resulting entity shall take the right and responsibility for performance of DISCOM's obligation.
- 10.11 In the event of the merger or reorganization of company, if the resulting entity is able to perform company's obligations hereunder in no less a manner than company, the resulting entity shall take the right and responsibility for performance of company's obligation.
- 10.12 **Assignment and Financing:** Neither party shall assign this agreement or any portion thereof to any third party without the prior written consent of the other party which consent shall not be unreasonably withheld.



CHIEF GENERAL MANAGER/IPC & RAC
TSSPDCL, Corporate Office,
6-1-50, Mint Compound,
HYDERABAD-500 063.



ARTICLE 11
FORCE MAJEURE

11.1 Definition of Force Majeure:

- (a) "Force Majeure" shall mean any event or circumstance or combination of events or circumstances that materially and adversely affects the performance by either party (the "affected party") of its obligations pursuant to the terms of this agreement (including by preventing, hindering or delaying such performance), but only if and to the extent that such events and circumstances are not within the affected party's reasonable control and were not reasonably foreseeable and the effects of which the affected party could not have prevented by prudent utility practices or, in the case of construction activities, by the exercise of reasonable skill and care. Any events or circumstances meeting the description of force majeure which have the same effect upon the performance of any of the company power project setup and which therefore materially and adversely affect the ability of the project or, as the case may be, the DISCOM to perform its obligations hereunder shall constitute force majeure with respect to the company or the DISCOM, respectively.
- (b) Force majeure circumstances and events shall include the following events to the extent, that they or their consequences satisfy the above requirements.
- (i) Non political events such as acts of GOD including but not limited to any storm, flood, drought, lightning, earthquake or other natural calamities, fire, accident, explosion, strikes, labour difficulties, epidemic, plague or quarantine, air crash, shipwreck, train wrecks or failure ("Non Political Events").
- (ii) Indirect political events such as acts of war sabotage, terrorism or act of public enemy, blockades, embargoes, civil disturbance, revolution or radioactive contamination ("Indirect Political Events").
- (iii) Direct political events such as any government agencies' or the DISCOM's unlawful or discriminatory delay, modification,



CHIEF GENERAL MANAGER/IPC & RAC
TSSPDCL, Corporate Office,
6-1-50, Mint Compound,
HYDERABAD-500 063.



denial or refusal to grant or renew, or any revocation of any required permit or change in law ("Direct Political Events").

- (iv) In the event of a delay in COD due to:
- (a) Force majeure events affecting the company;
- or
- (b) DISCOM event of default as defined in 11.2, the scheduled COD shall be deferred, for a reasonable period but not less than 'day-to-day' basis subject to a maximum period of 12 months, to permit the company or to overcome the effects of the force majeure events affecting the company or DISCOM, or till such time such event of default is rectified by the Company or the DISCOM, whichever is earlier. Provided further that, the validity of performance bank guarantee shall be extended suitably covering the extended period.

11.2 DISCOM Event of Default

11.2.1 The occurrence and the continuation of any of the following events, unless any such event occurs as a result of a force majeure event or a breach by the company of its obligations under this agreement, shall constitute the event of default on the part of defaulting DISCOM ("DISCOM Event of Default"):

- (i) DISCOM fails to pay (with respect to payments due to the company according to Article 2), for a period of ninety (90) days after the due date of payment and the company is unable to recover the amount outstanding through the Letter of Credit, or
- (ii) DISCOM repudiates this agreement and does not rectify such a breach within a period of thirty (30) days from a notice in writing from the company in this regard; or
- (iii) except where due to any company's failure to comply with its obligations, DISCOM is in material breach of any of its obligations pursuant to this agreement and such material breach is not rectified by DISCOM within thirty (30) days of receipt of notice in writing in this regard from the company to DISCOM; or

CHIEF GENERAL MANAGER/IPC & RAC
TSSPDCL, Corporate Office,
6-1-50, Mint Compound,
HYDERABAD-500 063.



(iv) if:-


- DISCOM becomes voluntarily or involuntarily the subject of any bankruptcy or insolvency or winding up proceedings and such proceedings remain uncontested for a period of thirty (30) days, or any winding up or bankruptcy or insolvency order is passed against DISCOM, or
- DISCOM goes into liquidation or dissolution or a receiver or any similar officer is appointed over all or substantially all of its assets or official liquidator is appointed to manage its affairs, pursuant to law,
- Provided that it shall not constitute a DISCOM Event of Default, where such dissolution or liquidation of DISCOM or DISCOM is for the purpose of a merger, consolidation or reorganization and where the resulting entity has the financial standing to perform its obligations under this agreement and has creditworthiness similar to DISCOM and expressly assumes all obligations of DISCOM and is in a position to perform them; or

- (v) If DISCOM is subject to any of the above defaults and DISCOM does not designate another DISCOM for purchase of power; or
- (vi) Occurrence of any other event which is specified in this agreement to be a material breach or default of DISCOM.

11.3 Company Event of Default:

11.3.1 The occurrence and continuation of any of the following events, unless any such event occurs as a result of a force majeure event or a breach by DISCOM of its obligations under this agreement, shall constitute a company event of default ("Company Event of Default"):

- (i) if
- (a) the company assigns, mortgages or charges or purports to assign, mortgage or charge any of its assets or rights related to the project in contravention of the provisions of this agreement; or


 CHIEF GENERAL MANAGER/IPC & RAC
 TSSPDCL, Corporate Office,
 6-1-50, Mint Compound,
 HYDERABAD-500 063.



- (b) the company transfers or novates any of its rights and / or obligations under this agreement, in a manner contrary to the provisions of this agreement; except where such transfer
- is in pursuance of a law; and does not affect the ability of the transferee to perform, and such transferee has the financial capability to perform, its obligations under this agreement or
 - is to a transferee who assumes such obligations under this agreement and the agreement remains effective with respect to the transferee;
- (ii) if
- (a) the company becomes voluntarily or involuntarily the subject of any bankruptcy or insolvency or winding up proceedings and such proceedings remain uncontested for a period of thirty (30) days, or
 - (b) any winding up or bankruptcy or insolvency order is passed against the company, or
 - (c) the company goes into liquidation or dissolution or has a receiver or any similar officer appointed over all or substantially all of its assets or official liquidator is appointed to manage its affairs, pursuant to law,
- Provided that a dissolution or liquidation of the company will not be a company event of default if such dissolution or liquidation is for the purpose of a merger, consolidation or reorganization and where the resulting company retains creditworthiness similar to the company and expressly assumes all obligations of the company under this agreement and is in a position to perform them; or
- (iii) the company repudiates this agreement and does not rectify such breach within a period of thirty (30) days from a notice from DISCOM in this regard; or



- (iv) except where due to any DISCOM's failure to comply with its material obligations, the company is in breach of any of its material obligations pursuant to this agreement, and such material breach is not rectified by the company within thirty (30) days of receipt of first notice in this regard given by DISCOM; or
- (v) occurrence of any other event which is specified in this agreement to be a material breach / default of the company.
- (vi) default has occurred under any of the financing agreements and any of the lenders to the project has recalled its financial assistance and demanded payment of the amounts outstanding under the financing documents or any of them as applicable and the lenders shall issue a written notice to the DISCOM to this effect.

11.4 In case of occurrence of an event of default as provided in clauses 11.2 and 11.3 of this agreement, the non-defaulting party shall issue a default notice to the defaulting party in accordance with Article 14 of this agreement.


CHIEF GENERAL MANAGER / IPC & RAC
TSSPDCL, Corporate Office,
6-1-50, Mint Compound,
HYDERABAD-500 063.



ARTICLE 12

DATA ACQUISITION SYSTEM & DAY-AHEAD SCHEDULES

- 12.1 The company shall establish data acquisition system with necessary communication facilities in line with TSTRANSCO procedures and ensure that the online data shall be completely integrated with SLDC within one month from date of COD. The company shall furnish block-wise availability on day ahead basis to SLDC and abide by the scheduling procedures as per the orders, regulations, policies, suo-motu orders, directions issued by the Indian Grid Code and State Grid Code, CEA, MNRE any other statutory government agency etc., from time to time.
- 12.2 The revision of declared capacity by the generator having two part tariff and requisition by beneficiary for the remaining period of the day shall be permitted with advance notice. Revised schedules/declared capacity in such cases shall become effective from the 4th time block, counting the time block in which the request for revision has been received to be the first one.


CHIEF GENERAL MANAGER/IPC & RAC
TSSPDCL, Corporate Office,
6-1-50, Mint Compound,
HYDERABAD-500 063.



ARTICLE 13
OTHER PROVISIONS

The company shall abide by the following conditions as stipulated vide TSERC order in O.P.No.18 of 2016 dated 13.06.2016:

13.1 **Usage of Secondary Fuel:** Secondary fuel may be used for giving necessary support during the start-up operations only. The National Tariff Policy issued in January 2016, mandates the must-run status for the waste to energy projects and to demonstrate this requirement, the developer is required to maintain the records of such start-up operations including the secondary fuel consumption for such operations.

13.2 **Inspection of the Project regularly:** The DISCOM in whose jurisdiction, the project is located shall make an inspection of the power project regarding the usage of the fuel by a team of three engineers' once in four months and submit a report that no fossil fuel other than the RDF is being used as a fuel by the generator. Further, the DISCOMs shall ensure that the team which conducts the inspection in the next quarter shall not comprise of the same engineers' who had conducted the previous inspection. In other words, the team should comprise of different engineers' among its employees other than the engineers' who conducted the earlier inspection and a copy of the report prepared by such a team shall also be sent to the Commission for its perusal and verification.


If the company is found to be using coal, or biomass or diesel or any fossil fuel for running the power projects except for starting operations, the DISCOMs shall be at liberty to terminate the PPA with the generator by giving two months' notice or any period as per the suppliers' default covenant in this PPA entered into by a Developer/Generator with the DISCOM(S).

13.3 **Incentives:** Any incentives, including but not limited to tipping fees, interest rates, government grants, generation based incentives shall be passed on to DISCOM.


CHIEF GENERAL MANAGER/IPC & RAC
TSSPDCL, Corporate Office,
6-1-50, Mint Compound,
HYDERABAD-500 063.



- 13.4 **Income Tax liability:** The DISCOM shall reimburse the income tax liability on the income derived from the power project by the company and it shall not reimburse any tax on income not derived from the power project by the company. In other words, income tax on any income other than the income derived from the power project shall be borne by the company.
- 13.4 **Scheduling and Dispatch:** The waste-to-energy power projects in the state of Telangana shall be treated as must-run stations, thus are not subjected to the Merit Order Dispatch. The generating company has to furnish the day-ahead schedule and maintain it. However, for the purpose of grid stability and discipline in the event of contingencies arise and when no other means of grid discipline is available, the schedule can be changed by the State Load Dispatch Centre (SLDC) keeping in view the CERC (Indian Electricity Grid Code) Regulation, 2010 as amended from time to time and CERC (Unscheduled Interchange and related matters), Regulations, 2009 as amended from time to time.


CHIEF GENERAL MANAGER/IPC & RAC
TSSPDCL, Corporate Office,
6-1-50, Mint Compound,
HYDERABAD-500 063.

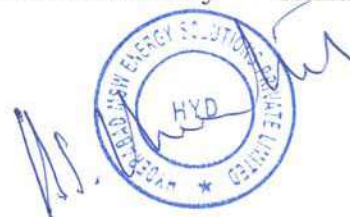


ARTICLE 14**DEFAULT**

- 14.1 The company shall achieve COD as per approval of TSREDCO from time to time, default of which, the agreement is liable for termination and the same can be done at the option of DISCOM with due notice.
- 14.2 In the event, DISCOM commits a breach of any of the terms of this agreement, the company shall be entitled to specific performance of this agreement or claim such damages as would be available under law or both, at its option, by giving 30 days notice to DISCOM.
- 14.3 In the event, company commits a breach of any of the terms of this agreement, the DISCOM shall be entitled to specific performance of this agreement or claim such damages as would be available under law or both, at its option, by giving 30 days notice to the company.
- 14.4 If the default continues for a period of 30 days or more, either party will have a right to issue a preliminary notice for termination of the this agreement. If the default is not cured within 30 days thereafter, either party can terminate this agreement and can claim damages. at its option.
- 14.5 In the event of cancellation of the project allotted to the company by TSREDCO for any reason, the PPA with DISCOM will automatically stand cancelled.



CHIEF GENERAL MANAGER/IPC & RAC
TSSPDCL, Corporate Office,
6-1-50, Mint Compound,
HYDERABAD-500 063.



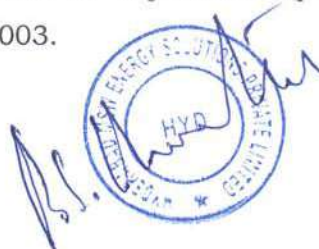
The stamp is circular with the text "HYDRAPOWER ENERGY SOLUTIONS PRIVATE LIMITED" around the perimeter and "HYD" in the center. There is a handwritten signature over the stamp.

ARTICLE 15
DISPUTE RESOLUTION

- 15.1 Each party shall designate in writing to the other party a representative, who shall be authorized to resolve any dispute arising under this agreement in an equitable manner.
- 15.2 Following notice by one party to the other setting out the particulars of the dispute, if the designated representatives are unable to resolve a dispute under this agreement within 15 days, such dispute shall be referred by such representatives to a senior officer designated by the company and a senior officer designated by the TSSPDCL respectively, who shall attempt to resolve the dispute within a further period of 15 days.
- 15.3 The parties hereto agree to use their best efforts to attempt to resolve all disputes arising hereunder promptly, equitably and in good faith and further agree to provide each other with reasonable access during normal business hours to any and all non-privileged records, information and data pertaining to any such dispute.
- 15.4 Failing resolution of the disputes in terms of above provisions or even otherwise, any party may approach the TSERC to adjudicate upon the dispute in terms of section 86(1)(f) of the Act, 2003.



CHIEF GENERAL MANAGER/IPC & RAC
TSSPDCL, Corporate Office,
6-1-50, Mint Compound,
HYDERABAD-500 063.



A circular blue stamp with the text "TSSPDCL" at the top, "HYD" in the center, and "TAMIL NADU STATE POWER CORPORATION LIMITED" around the bottom edge. A handwritten signature is written over the stamp.

IN WITNESS WHEREOF, the Company and the DISCOM have caused this agreement to be executed as of the date and the year first set forth above.

for and behalf of

[Handwritten signature]

(C. SARRABA)
CHIEF GENERAL MANAGER/IPC & RAC
SOUTHERN POWER DISTRIBUTION
COMPANY OF TELANGANA LIMITED
6-1-50, Mint Compound
HYDERABAD-500 065.

Witness by:

1. *[Handwritten signature]*
(K-SATISH KUMAR) DE/RAC/ISS/DCL

2. *[Handwritten signature]*
DR K. RAO

for and behalf of

[Handwritten signature]


M/s. HYDERABAD MSW ENERGY
SOLUTIONS PRIVATE LIMITED

Witness by:

1. *[Handwritten signature]*
(V.S. VENKATESAN)
Head - Corporate Affairs
REEL - Hyderabad

2. *[Handwritten signature]*
(K. APPI REDDY)
AVP - REEL Hyderabad.

SCHEDULE-1**Particulars of the Project****(Referred to in the Preamble to the Agreement)**

Name of the Project and Address	Injection Voltage	Interconnection Point/ Interconnection SS	Type of Project	Capacity of the Project
M/s. Hyderabad MSW Energy Solutions Pvt. Ltd., at Jawaharnagar (V), Kapra (M), Medchal District	132 KV	400KV Malkaram SS	RDF based	19.8 MW*

(*) *Out of which 2.178 MW is for auxiliary consumption and balance 17.622 MW is for export to grid for sale to DISCOM at interconnection point. Auxiliary consumption is 11% of installed capacity for RDF based projects.*

SCHEDULE-1A

The tariff as determined by the TSERC

SCHEDULE-2

TSREDCO Proceedings

SCHEDULE-3

TSREDCO Agreement

SCHEDULE-4

T.O.O. (CE-Construction-2) Ms.No.488, dated 17.03.2012


CHIEF GENERAL MANAGER/IPC & RAC
 TSSPDCL, Corporate Office,
 6-1-50, Mint Compound,
 HYDERABAD-500 063.



3393
Annexure-A5(v)

Ahmad Nadeem, IAS
Pr. Secretary to Govt., &
Director General.



To
The Additional Commissioner (SWM),
Greater Hyderabad Municipal Corporation (GHMC)
4th Floor, Head Office, Tank Bund Road
Hyderabad - 500 063.

Lr.No. EPTRI/ESD/C&T/2024-25/703/Dt: 15.10.2024

Sir,

Sub: GHMC IMSWM project -Tipping Fee bill for Secondary Collection & Transportation of waste from Kapra & Uppal Circles, Transfer Stations (TS), Secondary Collection & Transfer Points (SCTPs) and water hyacinth with and without penalty for August, 2024 -Reg. **C&T**

- Ref:**
1. Lr.No.HiMSW/GHMC/24-25/2553 dt.02.09.2024, addressed to I.E.and copy marked to the Commissioner, GHMC Hyderabad.
 2. Lr.No.SEM/MS/FOA/0020/2021/AE/TRANSSZ/1 dt.04.09.2021.
 - 3 Lr.No.HiMSW/ GHMC/ 2024-25/2554 dt.02.09.2024
 4. Lr.No.SWM/0083/2018/AE-2(CS)SWM-HO dt.17.10.2022.
 5. Your office email dt.14.11.2022.

The Concessionaire vide ref. 1st and 3rd cited has submitted the tipping fee bill for the C&T of waste from Kapra & Uppal Circles, TS & SCTPs and GHMC own Vehicles for an amount of Rs. 48,84,58,948 /- and Rs. 1,60,48,336/- respectively for the month of August, 2024.

The bill has been scrutinized with respect to the Concession Agreement conditions and the EPTRI field staff recordings. The detailed observations and calculations are herewith attached as Annexure-I.

It is recommended that the GHMC is to release payment of Rs. 25, 80, 79,958/- to the Concessionaire towards C&T of waste for the month of August, 2024.

Yours faithfully,

(Signature)
15/10/2024
Director General

Encl: a/a

Copy to M/s. Hyderabad Integrated Municipal Solid Waste Management, Survey No.173, Jawahar Nagar Dump site, CRPF Road, Near Army Dental College, Jawahar Nagar Grampanchayat village, Shamirpet Mandal, Hyderabad-500087.

DEE
17/10
EE(SWM)
R
18/10

17/10/24
16/10/24

SE(SWM)
M
16/10

524/SWM
17/10/24

3394 Annexure I

GHMC IMSWM project -Tipping Fee bill for Secondary Collection & Transportation of waste from Kapra & Uppal Circles, Transfer Stations (TS), Secondary Collection & Transfer Points (SCTPs) with and without penalty and GHMC own vehicles for August, 2024 -Reg.

.....

1. Concessionaire has submitted invoice for the month of August, 2024 for C&T of waste from Kapra & Uppal Circles, TS&SCTPs, ~~and~~ Water hyacinth and GHMC own vehicles for **2, 47,134.12** tons vide letter dated 02.09.2024.
2. The daily trip sheets provided by the Concessionaire have been verified with the source document of the weight bridges at Jawahar Nagar by the I.E staff.
3. After scrutiny of the trip sheets the total net weight considered for the month of August, 2024 for the C&T of waste for the following locations are as follows:

Sl. No	Description	Tons
1	TS&SCTP, Kapra & Uppal and RCV with penalty	1,34,297.06
2	Open tippers	1,01,229.70
3	GHMC Vehicles	11,607.36
	Total	2,47,134.12

4. **Recommendation on quantity of waste collected under Secondary Collection and Transportation (C&T) from entire GHMC Circles:**

Total quantity of secondary collection and transportation of waste is 2,47,134.12 tons (Total quantity of waste received to the Jawahar Nagar weighbridge during the August'2024 is {(2, 76, 167.24tons. - (Quantity of waste received from ULB's -29,033.12 tons).

To ensure due performance and guard against performance breaches, Schedule 4 sets out certain penalties for noncompliance to the O&M requirements of the Concession Agreement. GHMC shall start levying the penalties only after six (6) months from COD - C&T as per clause 5.22 of CA. As concessionaire has started secondary collection and transportation first time from 6th June, 2022 performance to be evaluated from December, 2022 onwards.

Following are the Performance indicators are applicable:
Performance indicator 02- Number of bins attended daily

Performance indicator 03- Maintenance of bins

Performance indicator 05- MSW management vehicles on the road-
Secondary collection & Transportation

It is recommended to withhold the 10% of the secondary collection amount towards the penalty which may be adjusted after finalization of points raised during the project review meeting.

5. The I.E. Certification:

waste quantity received at the weighbridge (Ton)	Tipping Fee Rate@ 30% of TFA	Gross Amount	With hold (10%) of Gross amount towards Penalty	Net amount considered for payment
1	2	3=1*2	4	5 = 3 - 4
2,47,134.12	688.25	17,00,90,058	1,70,09,006	15,30,81,052

6. Hence, an amount of **Rs.15, 30, 81,052** /-is recommended for payment.

7. **Recommendation on quantity of waste Collected and Transported (C&T) from TS&SCTPs and RCVwith penalty:**

The total net weight received from the following transfer stations (TS), secondary collection and transportation points (SCTP's) and RVC which have completed six months operation period is **1,34,297.06 tons**.

SL. NO:	Name of the TS/ SCTP's	Quantity of waste received at weigh bridges (Tons)
1	Kapra & Uppal	1,489.16
2	Hastinapuram (SCTP)	2,549.72
3	Auto Nagar (SCTP)	4,880.28
4	Fathe Nagar Nala (SCTP)	979.84
5	Moosapet Metro mall back side (SCTP)	1,393.10
6	Peoples Plaza (SCTP)	1,265.88
7	Khajaguda (SCTP)	1,955.40
8	Vayupuri (SCTP)	

		1,426.28
9	Chachanaheru park (SCTP) (Open Operation)	1,054.64
10	Bandlaguda (SCTP)	2,145.90
11	Jubilee hills #51 (SCTP)	1,381.08
12	Hasmathpet Lake SCTP	1,210.02
13	Devender Nagar (SCTP)	5,271.10
14	Vengalrao Park (SCTP) (Open Operation)	1,161.26
15	Sainikpuri (SCTP)	1,286.84
16	Chandanagar (SCTP)	1,394.36
17	Sanathnagar (SCTP) (Open Operation)	1,322.14
18	Ram Nagar open SCTP	865.12
19	Kukatpally Road No:1 (SCTP)	1,239.40
20	Karmikanagar (SCTP) (Open Operation)	349.50
21	Yellammabanda (SCTP)	1,534.76
22	Mir Alam Tank (SCTP)	5,704.20
23	Jagadgiri Gutta (SCTP)	11,871.30
24	Mallapur (TS)	2,104.24
25	Saket (TS) (Open Operation)	1,076.54
26	Kattedan (TS)	4,208.34
27	Sanjeevaiah park (TS)	3,298.18
28	Amberpet (TS)	2,509.20
29	Jiyaguda (TS)	7,407.96
30	Patancheruvu (TS)	2,346.78
31	Kaitalapur (TS)	14,223.42
32	Tank bund (TS)	14,886.96
33	Yousufguda (TS)	13,042.86
34	Deepthi Sri Nagar (TS)	3,580.24

35	Nagole (TS)	10,952.48
36	RFC- Seetaphal Mandi	207.42
37	RFC- Anutex Malkajgiri	311.80
38	RFC- Kachiguda Railway Station	296.64
39	RFC- Tarnaka Flyover	112.72
	Total:	1,34,297.06

8. Performance indicators 06, 07 and 10 to be monitored by I.E. Performance was monitored by IE field staff with respect to the applicable indicators. Accordingly, penalty was levied for the indicators which have not met the performance as per the Schedule 4 of C.A. the details are given in table 1, table2, table 3.

9. Summary of penalties:

SL. NO:	Name of the TS/ SCTP's	Indicator No:06 (MSW Management Vehicles on The Road)	Performance Indicator No. 07-(Hygienic Transportation of MSW)	Performance Indicator No. 10-(Transfer Stations Management)	Net Penalty (Rs)
1	Kapra & Uppal	1,24,899	9,819	-	1,34,718
2	Hastinapuram (SCTP)	-	9,926	11,699	21,625
3	Auto Nagar (SCTP)	-	26,693	27,990	54,683
4	Fathe Nagar Nala (SCTP)	-	6,660	5,620	12,280
5	Moosapet Metro mall back side (SCTP)	-	9,520	6,392	15,912
6	Peoples Plaza (SCTP)	-	5,403	7,260	12,663
7	Khajaguda (SCTP)	-	16,190	11,215	27,405
8	Vayupuri (SCTP)	-	7,113	6,544	13,657
9	Chachanaheru park (SCTP) (Open Operation)	-	5,761	12,098	17,859
10	Bandlaguda (SCTP)	-	16,641	12,308	28,949

11	Jubilee hills #51 (SCTP)	-	7,284	7,921	15,205
12	Hasmathpet Lake SCTP	-	6,798	5,552	12,350
13	Devender Nagar (SCTP)	-	25,684	30,232	55,916
14	Vengalrao Park (SCTP) (Open Operation)	-	6,745	13,321	20,066
15	Sainikpuri (SCTP)	-	6,710	5,904	12,614
16	Chandanagar (SCTP)	-	7,354	6,398	13,752
17	Sanathnagar (SCTP) (Open Operation)	-	6,016	15,166	21,182
18	Ram Nagar open SCTP	-	4,841	9,924	14,765
19	Kukatpally Road No:1 (SCTP)	-	6,935	7,108	14,043
20	Karmikanagar (SCTP) (Open Operation)	10,346	-	13,838	24,184
21	Yellammabanda (SCTP)	-	4,580	8,802	13,382
22	Mir Alam Tank (SCTP)	92,870	20,192	26,173	1,39,235
23	Jagadgiri Gutta (SCTP)	-	61,843	68,086	1,29,929
24	Mallapur (TS)	-	9,133	9,655	18,788
25	Saket (TS) (Open Operation)	15,934	6,333	27,486	49,753
26	Kattedan (TS)	46,716	16,857	24,136	87,709
27	Sanjeevaiah park (TS)	40,680	17,213	18,916	76,809
28	Amberpet (TS)	27,854	14,098	14,391	56,343
29	Jiyaguda (TS)	-	53,930	33,990	87,920
30	Patancheruvu (TS)	8,684	8,672	13,460	30,816
31	Kaitalapur (TS)	10,526	62,288	65,261	1,38,075

3399

32	Tank bund (TS)	48,965	67,463	68,306	1,84,734
33	Yousufguda (TS)	10,725	69,535	74,806	1,55,066
34	Deepthi Sri Nagar (TS)	1,00,683	30,142	16,427	1,47,252
35	Nagole (TS)	16,211	49,377	50,253	1,15,841
36	RFC- Seetaphal Mandi	19,955	-	-	19,955
37	RFC- Anutex Malkajgiri	9,230	-	-	9,230
38	RFC- Kachiguda Railway Station	13,172	-	-	13,172
39	RFC- Tarnaka Flyover	17,518	-	-	17,518
	Total:	6,14,968	6,83,749	7,36,638	20,35,355

10. The I.E. Certification:

waste quantity received at the weighbridge (Ton)	Tipping Fee Rate@ 20% of TFA	Gross Amount	Total Penalty	Net amount considered for payment
1	2	3=1*2	4	5=3-4
1,34,297.06	458.83	6,16,19,520	20,35,355	5,95,84,165

11. Hence, an amount of **Rs.5, 95, 84,165/-** is recommended for payment.

12. Recommendation on quantity of waste Collected and Transported (C&T) from Open Tippers:

The total net weight received from the following transfer stations through open tippers is **1, 01,229.70 tons**.

SL. NO:	Name of the TS/ SCTP's	Quantity of waste received weighing bridges (Tons)	Date of Commencement of operation by Concessionaire	Penalty to be levied from month
1	TS02- Saket TS (Open Operation)	3,970.02	01.01.2021	Land is not handover by GHMC for construction of
2	TS04-Nagole TS	378.40		
3	TS05-Imlibun TS			

		3400	
4	TS06-Katedan TS	25,438.48	Transfer stations. As per the 5.ii.i.b of GHMC letter Lr.No.SWM- MIS/1/2014-EE- SWM Dated: .04.2021, performance of the Concessionaire will be evaluated from the date of handover of the site for TS management. Hence, penalties levied for P6, P7 & P10 indicators only.
5	TS07-Jiyaguda TS	6,990.74	
6	TS08-Yousafguda TS	12,879.68	
7	TS09-Deepthisri Nagar TS	2,420.32	
8	TS11-Khaitlapur TS	22,313.66	
9	TS13-Machabollaram TS (Open Operation)	4,151.00	
10	TS14-Neredmet TS (Open Operation)	8,267.30	
11	TS16-Tankbund TS	1,755.76	
12	TS17-Amberpet TS	4,155.40	
		8,488.94	
		1,01,229.70	
	Total:		

13. Summary of penalties:

SL. NO:	Name of the TS/ SCTP's	Indicator No:06 (MSW Management Vehicles on The Road)	Performance Indicator No. 07 - (Hygienic Transportation of MSW)	Performance Indicator No. 10 - (Transfer of Stations Management)	Net Penalty (Rs)
1	TS02- Saket TS (Open Operation)	-	17,966	1,01,361	1,19,327
2	TS04-Nagole TS	-	3,110	1,736	4,846
3	TS05-Imlibun TS	-	1,11,449	-	1,11,449
4	TS06-Katedan TS	-	50,151	40,095	90,246
5	TS07-Jiyaguda TS	-	71,799	59,096	1,30,895
6	TS08-Yousafguda TS	-	17,833	13,881	31,714
7	TS09-Deepthisri Nagar TS	-	1,26,985	1,02,382	2,29,367

3401

8	TS11- Khaltapur TS	27,603	33,247	19,046	79,896
9	TS13- Machabollaram TS (Open Operation)	-	59,709	-	59,709
10	TS14- Neredmet TS (Open Operation)	-	12,855	-	12,855
11	TS16- Tankbund TS	-	36,238	19,066	55,304
12	TS17- Amberpet TS	-	58,187	48,687	1,06,874
	Total:	27,603	5,99,529	4,05,350	10,32,482

14. The IE Certification: Open tippers

Quantity of waste collected & transported as per IE (Tons)	Rate / Ton	Gross Amount	Total Penalty	Net amount considered for payment
1	2	3=1*2	4	5=3-4
1,01,229.70	458.83	4,64,47,223	10,32,482	4,54,14,741

15. Hence, an amount of **Rs. 4, 54, 14,741/-** is recommended for payment.

16. Recommendation on quantity of waste water hyacinth Transported from Open Tippers with penalty:

GHMC vide letter dt:04.09.2021, informed that HMDA removed water hyacinth from the Mir Alam tank, Rajender Nagar Circle and Kapara lake HiMSW requested to lift the water hyacinth removed by HMDA and transported to MSW T&D facility at Jawahar Nagar for P&D.

It is informed that IMSWM facility has not received water hyacinth during August, 2024 as per the field verification and weighbridge data.

3402

17. Total amount to be recommended towards the C&T of waste for the month of August, 2024 is as follows:

Sl. No	Description	Net amount Recommended (Rs.)
1	Secondary collection at GVP's	15,30,81,052
2	TS&SCTP, Kapra & Uppal and RCV with penalty	5,95,84,165
3	Open tippers	4,54,14,741
	Total	25,80,79,958

18. An amount of **Rs.25, 80, 79,958/-** is recommended for payment towards the C&T of waste for the month of August, 2024 to Concessionaire.


ESD I/c 15/10/2024.

3403
Annexure-A5(vi)

Ahmad Nadeem, IAS
Prl. Secretary to Govt., &
Director General.



EPTRI
ENVIRONMENT
PROTECTION
TRAINING & RESEARCH
INSTITUTE

To
The Additional Commissioner (SWM),
Greater Hyderabad Municipal Corporation
4th Floor, Head Office, Tank Band Road,
Hyderabad – 500 063

Lr.No: EPTRI/ESD/78/T&D/ 2024-25/733/Dt: 19.10.2024.

Sir,

Sub: EPTRI – HiMSW - Treatment and Disposal of MSW at Jawaharnagar
IMSWM site - Tipping Fee for the month of September, 2024 – Reg.

Ref: 1. Lr. No. HiMSW/GHMC/2024-25/2567/01.10.2024.

2. Lr.No. 703/AC (H&S)/EE (SWM) GHMC/2012 dated 05.10.2017.

The Concessionaire vide reference 1st cited has submitted the invoice for T&D bill for the month of September, 2024 for Rs. 37,00,00,593/-.

The bill has been scrutinized with agreement conditions and duly considering the remarks made by the audit team. The penalties were applied as per the above. The detailed observations and calculations are enclosed at Annexure-I.

It is recommended that the GHMC may release Rs. 20, 41, 14,435 /- duly considering the penalty towards the T&D of waste for the month of September, 2024. GHMC may take a final decision on payment as deemed fit.

The GHMC shall deduct/withhold the following charges:

- Statutory deduction, such as income tax and service tax as applicable.
- 10% of the treatment and Disposal revenues receivable from GHMC. This amount shall be held in escrow amount towards post-closure Obligation.

Yours faithfully,

A. Paul
19/10/2024
Director General

Copy to M/s. Hyderabad Integrated Municipal Solid Waste Management, Survey No.173, Jawahar Nagar Dump site, CRPF Road, Near Army Dental College, Jawahar Nagar Grampanchayat village, Shamirpet Mandal, Hyderabad-500087

DEC
22/10

EE/SWM
R
24/10

1023/He(san)
22/10/24
SE (SWM)
19/10

Annexure- I

Name of work: GHMC IMSWM project –Treatment &Disposal (T&D) - Tipping Fee (T&D) for month of September, 2024 –Reg.


.....

1. Concessionaire has submitted the tipping fee bill for the month of September, 2024 for T&D vide letter dated 01.10.2024.
2. The bill has been scrutinized duly considering the remarks made by the audit team and as per CA. The total penalty on account of performance indicators 11, 12 and 13 worked out to Rs. 1,61,23,965/- as verified by EPTRI field staff.
3. The net weight and the amount payable to the concessionaire, as per CA are given below.




Invoice No. & Date	Quantity of waste processed as per IE(Tons)	Rate / Ton (40% of Tipping Fee) as per CA (Rs.)	Amount (Rs.)	Penalty as per Schedule IV of CA (Rs.)	Recommended amount to be paid as per CA (Rs.)
HIMSW/P&D/GH MC/September 24/2024-25 /J'Nagar, dt.30.09.2024.	2,40,000	917.66	22,02,38,400	1,61,23,965	20,41,14,435

4. The total net weight considered for the month of September, 2024 is 2,65,612.040 tons, after deduction of Ganesh Ideals Immersion, Debris, tree trunks and stems waste of 4169.96 tons. Details of vehicles carried the silt/debris materials waste may be seen at seen Annexure- I. The quantity of waste lying at the tipping floor measured at the beginning of the month was 74,959.868 tons by Drone and the quantity of waste lying at the tipping floor as measured at the end of month was 92,911.188 tons by Drone measurement. Therefore, the total net quantity of waste processed during the month comes to $\{2,65,612.040 + (74,959.868 - 92,911.188)\} = 2,47,660.720$ tons. However, As per existing PRC @8000TPD, the net quantity considered for the month of September, 2024 is 2,40,000 Tons (30 Days X 8000TPD).

5. Further, as per the letters received from GHMC on 02.09.2024, 04.09.2024 and the field verification, the concessionaire has failed to contain the overflow of contaminated storm water/Leachate from the facility during rains in September, 2024.
6. Hence, I.E has considered the rainfall data 01.09.2024 to 24.09.2024 for calculating the storm water mixed with leachate generated from open areas of 61,775 sq.m pertaining to IMSWM facility. a total of 27,335.44 KI of contaminated storm water/Leachate overflow into nearest lakes. The detailed statement is enclosed as Annexure II.
7. As the rate for per KL of leachate treatment is not available in the Concession Agreement, the quotations for rate on per KL treatment of leachate to ZLD is requested from the operators of LTPs. Penalty will be calculated and corresponding amount will be deducted in the next bill after the receipt of the quotations.
8. As per the arbitration award dated 10.03.2018, the levy of penalty by GHMC was held to be unsustainable. EPTRI being a recommendatory authority has to show the amount of penalty as per Schedule IV of CA. EPTRI being a IE has to ensure the scientific treatment and disposal of the MSW and impartial & fare implementation of CA. It is, therefore, necessary to indicate the lapses and levy penalty as per performance indicator 11, 12&13. However, GHMC as to take a decision how to deal with the penalty indicated by IE.
9. The recommended amount duly considering the penalty is Rs. 20,41,14,435/- and without levy of penalty is Rs. 22,02,38,400/- GHMC may take a final decision on payment as deemed fit.


ESD(I/C) 19/09/2024

3406

STATEMENT OF TIPPING FEE FOR TREATMENT AND DISPOSAL (T&D) OF MSW AT JAWAHARNAGAR, FOR THE PERIOD OF 01.09.2024 TO 30.09.2024									
Date	No. of vehicle trips claimed	No. of vehicle trips considere	Net Weight (tons)		Amount (Rs)		Net weight considered by IE	Amount considered for payment (Rs.)	Remarks
			Con*	IE*	Con	IE			
1-Sep-2024	551	545	7308.700	7242.280	10105008.62	6645950.66	2,65,612.04	24,37,41,544.63	Vehicle bearing Numbers in Annexure-1 contains Tree trunks waste,Ganesh Ideals Immertion waste and debris hence not Considered in T&D bill.
2-Sep-2024	693	680	9085.960	9016.840	12562248.30	8274393.39			
3-Sep-2024	742	736	9530.440	9496.360	13176786.34	8714429.72			
4-Sep-2024	652	646	8288.780	8235.860	11460067.23	7557719.29			
5-Sep-2024	689	684	8877.940	8842.860	12274639.84	8114738.91			
6-Sep-2024	686	678	8356.940	8307.380	11554305.24	7623350.33			
7-Sep-2024	718	700	9081.500	8935.620	12556081.90	8199861.05			
8-Sep-2024	743	730	9038.820	8912.820	12497072.53	8178938.40			
9-Sep-2024	597	592	6803.100	6775.540	9405966.06	6217642.04			
10-Sep-2024	678	677	8205.180	8197.360	11344481.87	7522389.38			
11-Sep-2024	762	757	9501.620	9455.880	13136939.81	8677282.84			
12-Sep-2024	793	791	9634.100	9626.860	13320106.66	8834184.35			
13-Sep-2024	798	796	9367.980	9362.080	12952169.15	8591206.33			
14-Sep-2024	772	771	9386.480	9380.960	12977747.25	8608531.75			
15-Sep-2024	767	755	9207.120	9087.620	12729764.11	8339345.37			
16-Sep-2024	774	759	9377.320	9243.800	12965082.63	8482665.51			
17-Sep-2024	780	709	9434.340	8627.500	13043918.48	7917111.65			
18-Sep-2024	781	747	9118.060	8773.460	12606629.76	8051053.30			
19-Sep-2024	855	847	10193.440	10143.860	14093450.14	9308614.57			
20-Sep-2024	810	796	9444.320	9281.720	13057716.83	8517463.18			
21-Sep-2024	730	712	8793.340	8576.360	12157671.88	7870182.52			
22-Sep-2024	738	676	9315.200	8531.620	12879195.52	7829126.41			
23-Sep-2024	795	787	9909.880	9815.280	13701400.09	9007089.84			
24-Sep-2024	773	724	9583.760	9036.260	13250506.58	8292214.35			
25-Sep-2024	514	509	6584.720	6539.820	9104033.87	6001331.22			
26-Sep-2024	756	751	9198.500	9130.800	12717846.10	8378969.93			
27-Sep-2024	783	781	9570.360	9549.340	13231979.74	8763047.34			
28-Sep-2024	723	722	8531.320	8515.520	11795403.03	7814352.08			
29-Sep-2024	748	740	9016.960	8947.200	12466848.90	8210487.55			
30-Sep-2024	840	839	10035.820	10023.180	13875524.73	9197871.36			
Total	22041	21637	2,69,782.000	2,65,612.040	37,30,00,593.20	24,37,41,544.63			
Net weight considered by IE for the Month							2,65,612.040		
(+) The unprocessed waste laying on the tipping floor was assessed by flying Drone at beginning of the month.							74,959.868		
(-) The unprocessed waste laying on the tipping floor was assessed by flying Drone at end of the month.							-92,911.188		
Net weight processed							2,47,660.720		
As per PRC 8000TPD Net Quantity Processed 2,40,000 Tons (30 Days X 8000TPD)							2,40,000.000	22,02,38,400	
(-)Penalties imposed for performance indicator nos. 11 as per schedule-4 of CA								86,81,588	
(-)Penalties imposed for performance indicator nos 12 as per schedule-4 of CA								74,42,377	
(-)Penalties imposed for performance indicator nos. 13 as per schedule-4 of CA								0	
Net amount considered for payment								20,41,14,435	
*Con – Concessionaire, *IE – Independent Engineer									
IE Rate: Rs.917.66 per ton (40% of Rs. 2294.15) as per article 7.1.b.iii at page 45 of C.A									
Tipping Fee Considered by Concessionaire is Rs.1382.60 per ton (40% of Rs.3456.50)									
Shift duration: 8 hrs.									
Shift timings: 06.00 - 14.00hrs, 14.00 - 22.00hrs, 22.00 - 06.00 hrs.									
									
									
									
19/10/2024									

Date	Net Wt (tons)	Tipping Fee according to rate approved by GHMC (Rs/ton)	Tipping Fee Allowable (TFA in Rs.)	PENALTIES						Total Penalties (Rs.)
				Indicator -11		Indicator -12		Indicator -13		
				Performance Efficiency (%)	0.1*TFA*(100-P)/100 (Rs.)	Performance Efficiency (%)	0.2*TFA*(100-P)/100 (Rs.)	Performance Efficiency (%)	0.1*TFA*(100-P)/100 (Rs.)	
1-Sep-2024	7242.28	2294.15	16614876.66	84.23	261977.05	93.24	224582.42	100.00	0.00	486559.46
2-Sep-2024	9016.84	2294.15	20685983.49	84.23	326168.71	93.24	279611.35	100.00	0.00	605780.06
3-Sep-2024	9496.36	2294.15	21786074.29	84.23	343514.52	93.24	294481.22	100.00	0.00	637995.74
4-Sep-2024	8235.86	2294.15	18894298.22	84.23	297918.10	93.24	255393.24	100.00	0.00	553311.33
5-Sep-2024	8842.86	2294.15	20286847.27	84.23	319875.28	93.24	274216.25	100.00	0.00	594091.53
6-Sep-2024	8307.38	2294.15	19058375.83	84.23	300505.21	93.24	257611.07	100.00	0.00	558116.28
7-Sep-2024	8935.62	2294.15	20499652.62	84.23	323230.71	93.24	277092.73	100.00	0.00	600323.44
8-Sep-2024	8912.82	2294.15	20447346.00	84.23	322405.96	93.24	276385.70	100.00	0.00	598791.66
9-Sep-2024	6775.54	2294.15	15544105.09	84.23	245093.53	93.24	210108.85	100.00	0.00	455202.38
10-Sep-2024	8197.36	2294.15	18805973.44	84.23	296525.43	93.24	254199.36	100.00	0.00	550724.78
11-Sep-2024	9455.88	2294.15	21693207.10	84.23	342050.23	93.24	293225.94	100.00	0.00	635276.17
12-Sep-2024	9626.86	2294.15	22085460.87	84.23	348235.13	93.24	298528.02	100.00	0.00	646763.15
13-Sep-2024	9362.08	2294.15	21478015.83	84.23	338657.17	93.24	290317.21	100.00	0.00	628974.38
14-Sep-2024	9380.96	2294.15	21521329.38	84.23	339340.12	93.24	290902.68	100.00	0.00	630242.80
15-Sep-2024	9087.62	2294.15	20848363.42	84.23	328729.05	93.24	281806.23	100.00	0.00	610535.29
16-Sep-2024	9243.80	2294.15	21206663.77	84.23	334378.60	93.24	286649.36	100.00	0.00	621027.96
17-Sep-2024	8627.50	2294.15	19792779.13	84.23	312085.00	93.24	267537.96	100.00	0.00	579622.96
18-Sep-2024	8773.46	2294.15	20127633.26	84.23	317364.85	93.24	272064.16	100.00	0.00	589429.02
19-Sep-2024	10143.86	2294.15	23271536.42	84.23	366936.72	93.24	314560.14	100.00	0.00	681496.86
20-Sep-2024	9281.72	2294.15	21293657.94	84.23	335750.29	93.24	287825.26	100.00	0.00	623575.54
21-Sep-2024	8576.36	2294.15	19675456.29	84.23	310235.10	93.24	265952.11	100.00	0.00	576187.21
22-Sep-2024	8531.62	2294.15	19572816.02	84.23	308616.71	93.24	264564.73	100.00	0.00	573181.43
23-Sep-2024	9815.28	2294.15	22517724.61	84.23	355050.90	93.24	304370.90	100.00	0.00	659421.80
24-Sep-2024	9036.26	2294.15	20730535.88	84.23	326871.19	93.24	280213.57	100.00	0.00	607084.76
25-Sep-2024	6539.82	2294.15	15003328.05	84.23	236566.76	93.24	202799.20	100.00	0.00	439365.96
26-Sep-2024	9130.80	2294.15	20947424.82	84.23	330291.01	93.24	283145.24	100.00	0.00	613436.26
27-Sep-2024	9549.34	2294.15	21907618.36	84.23	345430.98	93.24	296124.13	100.00	0.00	641555.11
28-Sep-2024	8515.52	2294.15	19535880.21	84.23	308034.32	93.24	264065.47	100.00	0.00	572099.78
29-Sep-2024	8947.20	2294.15	20526218.88	84.23	323649.60	93.24	277451.82	100.00	0.00	601101.42
30-Sep-2024	10023.18	2294.15	22994678.40	84.23	362571.33	93.24	310817.86	100.00	0.00	673389.19
Total	2,65,612.040									
Quantity of waste not processed during the month of September-2024	-17,951.320									
Total Net quantity processed	2,47,660.720									
As per PRC 8000TPD Net Quantity Considered 2,40,000 Tons (30 Days X 8000TPD)	2,40,000.000	2,294.15		84.23	86,81,588	93.24	74,42,377	100.00	0	1,61,23,965.00

[Signature]
Site In-Charge, IE

[Signature]
Team Leader, IE

[Signature]
ESD/IC
19/10/2024

Table 1: Performance Indicator No. 11 - Extent of Functioning of Integrated Facility

SNO	Date	Integrated Facility components					Fraction of working components = working components/total components	No. Of days integrated facility functioned in a week (b)	No. Of days considered (a)	Performance P= (b/a) X 100
		Compliance to Environment Provision	Compliance to Safety rules	Compliance to Worker's health provisions/rules	House keeping of Integrated Facility	Functioning of Unit Operations				
1	1-Sep-24	84.54				0.85				
2	2-Sep-24	84.53				0.85				
3	3-Sep-24	84.77				0.85				
4	4-Sep-24	84.30				0.84	5.92	7	84.594	
5	5-Sep-24	84.49				0.84				
6	6-Sep-24	84.69				0.85				
7	7-Sep-24	84.85				0.85				
8	8-Sep-24	84.75				0.85				
9	9-Sep-24	84.75				0.85				
10	10-Sep-24	84.97				0.85				
11	11-Sep-24	85.30				0.85	5.95	7	85.026	
12	12-Sep-24	85.09				0.85				
13	13-Sep-24	85.17				0.85				
14	14-Sep-24	85.14				0.85				
15	15-Sep-24	84.54				0.85				
16	16-Sep-24	84.77				0.85				
17	17-Sep-24	84.87				0.85				
18	18-Sep-24	84.45				0.84	5.89	7	84.117	
19	19-Sep-24	84.10				0.84				
20	20-Sep-24	81.93				0.82				
21	21-Sep-24	84.16				0.84				
22	22-Sep-24	83.89				0.84				
23	23-Sep-24	83.03				0.83				
24	24-Sep-24	84.07				0.84				
25	25-Sep-24	80.77				0.81				
26	26-Sep-24	81.63				0.82	7.51	9	83.42	
27	27-Sep-24	83.71				0.84				
28	28-Sep-24	84.82				0.85				
29	29-Sep-24	84.38				0.84				
30	30-Sep-24	84.51				0.85				

25.27 30

Functioning of the integrated facility, P11

$$P_{11} = \left[\frac{\text{b, i.e. Total number of days integrated facility functioned in the month}}{\text{a, i.e. Total number of days in the month}} * 100 \right]$$

84.23 %

Penalty for Performance Indicator 11 =

$$0.1 * TFA * (100 - P) / 100$$

[Signature]
Site-In-Charge, IE

[Signature]
Team Leader, IE

[Signature]
ESD I/C 19/10/2024

Table 2: Performance Indicator No. 12 - Extent of MSW recovered

Date	Total quantum of waste received after deduction of silt (b)	Amount of waste processed or recycled (a)	Excess processed waste (Tons)	Performance Achieved, P=(a/b)X100	Remarks
1-Sep-24	7242.28				
2-Sep-24	9016.84				
3-Sep-24	9496.36				
4-Sep-24	8235.86				
5-Sep-24	8842.86				
6-Sep-24	8307.38				
7-Sep-24	8935.62				
8-Sep-24	8912.82				
9-Sep-24	6775.54				
10-Sep-24	8197.36				
11-Sep-24	9455.88				
12-Sep-24	9626.86				
13-Sep-24	9362.08				
14-Sep-24	9380.96				
15-Sep-24	9087.62				
16-Sep-24	9243.80				
17-Sep-24	8627.50				
18-Sep-24	8773.46				
19-Sep-24	10143.86				
20-Sep-24	9281.72				
21-Sep-24	8576.36				
22-Sep-24	8531.62				
23-Sep-24	9815.28				
24-Sep-24	9036.26				
25-Sep-24	6539.82				
26-Sep-24	9130.80				
27-Sep-24	9549.34				
28-Sep-24	8515.52				
29-Sep-24	8947.20				
30-Sep-24	10023.18				
Total	2,65,612.040				
	2,65,612.04	2,47,660.720	-17,951.320	Performance 93.24	Difference in quantity waste between initial Drone assessment at the beginning of the month - quantity of waste lying on tipping floor assessed by drone at the end of month (74,959.868 - 92,911.188) = -17,951.320 Tons.

Extent of MSW recovered, P12 = $\left(\frac{\text{a, i.e. Amount of waste processed or recycled in tons/month}}{\text{b, i.e. Total quantum of waste collected by concessionaire}} \right) \times 100$

P₁₂ = **93.24**

[Signature]
Site-In-Charge, IE

[Signature]
Team Leader, IE

[Signature] 19/10/2024.
ESD I/C

EPTRI - As IE for IMSWM Project of GHMC

Table 3: Performance Indicator No. 13 - Extent of Scientific Disposal of MSW

SNO	Date	Total Daily Disposed in all landfill in tons (b)	Waste being disposed at "complaint" landfill, at the active landfill cell (a)	Performance Achieved, P=(a/b)X100
1	1-Sep-24	600.24	600.24	100.00
2	2-Sep-24	774.44	774.44	100.00
3	3-Sep-24	279.12	279.12	100.00
4	4-Sep-24	502.62	502.62	100.00
5	5-Sep-24	1353.54	1353.54	100.00
6	6-Sep-24	1190.22	1190.22	100.00
7	7-Sep-24	996.04	996.04	100.00
8	8-Sep-24	600.82	600.82	100.00
9	9-Sep-24	920.90	920.90	100.00
10	10-Sep-24	553.50	553.50	100.00
11	11-Sep-24	1326.00	1326.00	100.00
12	12-Sep-24	1161.98	1161.98	100.00
13	13-Sep-24	614.74	614.74	100.00
14	14-Sep-24	1031.32	1031.32	100.00
15	15-Sep-24	1029.86	1029.86	100.00
16	16-Sep-24	633.78	633.78	100.00
17	17-Sep-24	1129.42	1129.42	100.00
18	18-Sep-24	1205.80	1205.80	100.00
19	19-Sep-24	1164.56	1164.56	100.00
20	20-Sep-24	2164.86	2164.86	100.00
21	21-Sep-24	1160.34	1160.34	100.00
22	22-Sep-24	2273.56	2273.56	100.00
23	23-Sep-24	1916.52	1916.52	100.00
24	24-Sep-24	1817.94	1817.94	100.00
25	25-Sep-24	1694.58	1694.58	100.00
26	26-Sep-24	1438.66	1438.66	100.00
27	27-Sep-24	2070.44	2070.44	100.00
28	28-Sep-24	1781.82	1781.82	100.00
29	29-Sep-24	1547.38	1547.38	100.00
30	30-Sep-24	1805.80	1805.80	100.00
	Total wt.	36,740.80	36,740.80	

Extent of Scientific Disposal of Municipal Solid Waste, $P_{13} = \frac{a, \text{ i.e. Total waste disposed in "complaint" landfills every landfills}}{b, \text{ i.e. Total waste disposed in all landfills every month}} \times 100$

$P_{13} = 100.00 \%$

Penalty for Performance Indicator 13 = $0.1 * TFA * (100 - P) / 100$


Site-In-Charge, IE


Team Leader, IE

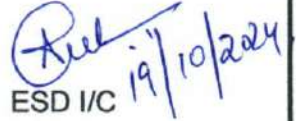

ESD I/C 19/10/2024.

EPTRI - As IE for IMSWM Project of GHMC

SUMMARY OF PENALTIES

SNO	Description	Amount	Remarks
1	Performance Indicator 11 - Functioning of Integrated Facility	₹ 86,81,588	Please see Page 1 of 4
2	Performance Indicator 12 - Extent MSW recovered	₹ 74,42,377	Please see Page 2 of 4
3	Performance Indicator 13 - Extent of scientific disposal of MSW	₹ 0.00	Please see Page 3 of 4

Total Deduction = ₹ 1,61,23,965


Site-In-Charge, IE
Team Leader, IE
ESD I/C 19/10/2024

Sl. No.	Waste ID	Vehicle No.	Zone	Transfer Site/Location	Transporter	Date	Time In	Gross Weight	Net Weight	Date Out	Remarks	
1	WB1-964447	AP11X7254	SECUNDERABAD ZONE	TS14-NEREDMET TS	GHMC	Sep 2 2024	2024-09-01 08:49:03.754	19460	10120	9340	2024-09-01 08:58:45.981	Horticulture waste
2	WB1-964573	AP11X7254	SECUNDERABAD ZONE	TS14-NEREDMET TS	GHMC	Sep 2 2024	2024-09-01 13:33:57.309	18500	10140	8340	2024-09-01 13:34:18.222	Horticulture waste
3	WB1-964582	AP29W1691	SECUNDERABAD ZONE	TS14-NEREDMET TS	GHMC	Sep 2 2024	2024-09-01 16:07:22.116	26390	11940	14420	2024-09-01 16:07:41.470	Horticulture waste
4	WB1-964646	AP39UQ4204	SHERLINGAMPALLY ZONE	TS09-DEEPTHSIRI NAGAR TS	PRIVATE	Sep 2 2024	2024-09-01 22:00:30.705	23380	10380	15000	2024-09-01 22:48:51.931	Horticulture waste
5	WB1-964757	AP39UQ4077	SECUNDERABAD ZONE	TS14-NEREDMET TS	GHMC	Sep 2 2024	2024-09-01 23:46:17.770	27420	12180	15240	2024-09-02 00:02:00.12701	Horticulture waste
6	WB1-964931	AP29W1691	SECUNDERABAD ZONE	TS14-NEREDMET TS	GHMC	Sep 2 2024	2024-09-02 06:34:48.399	14340	7460	6880	2024-09-02 06:47:57.360	Horticulture waste
7	WB1-965013	AP29W1691	SECUNDERABAD ZONE	TS14-NEREDMET TS	GHMC	Sep 2 2024	2024-09-02 09:31:46.195	12640	7480	5380	2024-09-02 09:50:16.922	Horticulture waste
8	WB1-965033	TS08U31723	LB NAGAR ZONE	JAWAHARNAGAR	ULB	Sep 2 2024	2024-09-02 10:09:05.182	9920	3800	6120	2024-09-02 10:20:14.702	Debris
9	WB1-965036	TS08U31723	LB NAGAR ZONE	JAWAHARNAGAR	ULB	Sep 2 2024	2024-09-02 10:10:33.138	4420	3640	780	2024-09-02 10:20:12.043	Horticulture waste
10	WB1-965118	AP29W1691	SECUNDERABAD ZONE	TS14-NEREDMET TS	GHMC	Sep 2 2024	2024-09-02 11:56:18.095	15460	7640	7820	2024-09-02 12:10:33.616	Horticulture waste
11	WB1-965146	AP29U3302	SECUNDERABAD ZONE	TS14-TANKBUND TS	GHMC	Sep 2 2024	2024-09-02 13:18:04.041	18020	9620	8000	2024-09-02 13:28:27.267	Horticulture waste
12	WB1-965179	TS08UJ1732	LB NAGAR ZONE	JAWAHARNAGAR	ULB	Sep 2 2024	2024-09-02 13:24:13.949	4780	3920	860	2024-09-02 13:31:46.948	Horticulture waste
13	WB1-965238	AP29W1691	SECUNDERABAD ZONE	TS14-NEREDMET TS	GHMC	Sep 2 2024	2024-09-02 15:05:44.367	14420	7420	7000	2024-09-02 15:07:59.222	Horticulture waste
14	WB1-965240	AP29C8862	CHARMINAR ZONE	TS06-KATEDJAN TS	PRIVATE	Sep 2 2024	2024-09-02 15:07:49.783	20940	10580	10360	2024-09-02 15:09:59.222	C&D waste
15	WB1-965305	TS08UJ1718	LB NAGAR ZONE	JAWAHARNAGAR	ULB	Sep 2 2024	2024-09-02 17:12:24.661	5260	3900	1360	2024-09-02 17:39:22.805	Horticulture waste
16	WB1-965306	TS06AP1661	LB NAGAR ZONE	JAWAHARNAGAR	ULB	Sep 2 2024	2024-09-02 17:14:22.425	2100	1280	800	2024-09-02 17:28:08.065	Horticulture waste
17	WB1-965347	AP31D1586	SHERLINGAMPALLY ZONE	TS09-DEEPTHSIRI NAGAR TS	PRIVATE	Sep 2 2024	2024-09-02 19:29:05.905	17380	10580	6800	2024-09-02 20:05:17.991	Horticulture waste
18	WB1-965398	AP31D1586	LB NAGAR ZONE	NAGARAM	ULB	Sep 3 2024	2024-09-03 11:40:33.517	1700	1240	460	2024-09-03 12:00:19.367	Horticulture waste
19	WB1-965398	AP31D1586	LB NAGAR ZONE	TS04-NAGOLE TS	PRIVATE	Sep 3 2024	2024-09-03 13:18:35.890	15640	10840	4800	2024-09-03 14:09:23.920	Horticulture waste
20	WB1-965398	AP31D1586	LB NAGAR ZONE	TS04-NAGOLE TS	PRIVATE	Sep 3 2024	2024-09-03 13:18:35.890	15640	10840	4800	2024-09-03 14:09:23.920	Horticulture waste
21	WB1-966041	AP31D17497	LB NAGAR ZONE	TS04-NAGOLE TS	PRIVATE	Sep 3 2024	2024-09-03 12:18:35.890	15640	10840	4800	2024-09-03 14:09:23.920	Horticulture waste
22	WB1-966041	AP31D17497	LB NAGAR ZONE	TS04-NAGOLE TS	PRIVATE	Sep 3 2024	2024-09-03 12:18:35.890	15640	10840	4800	2024-09-03 14:09:23.920	Horticulture waste
23	WB1-966041	AP31D17497	LB NAGAR ZONE	TS04-NAGOLE TS	PRIVATE	Sep 3 2024	2024-09-03 12:18:35.890	15640	10840	4800	2024-09-03 14:09:23.920	Horticulture waste
24	WB1-966041	AP31D17497	LB NAGAR ZONE	TS04-NAGOLE TS	PRIVATE	Sep 3 2024	2024-09-03 12:18:35.890	15640	10840	4800	2024-09-03 14:09:23.920	Horticulture waste
25	WB1-966045	AP39UQ4204	SHERLINGAMPALLY ZONE	TS09-DEEPTHSIRI NAGAR TS	PRIVATE	Sep 3 2024	2024-09-03 17:08:03.715	27080	11780	15300	2024-09-03 17:38:34.223	Water Hyacinth
26	WB1-966349	TS12UC2982	LB NAGAR ZONE	TS09-DEEPTHSIRI NAGAR TS	PRIVATE	Sep 3 2024	2024-09-04 04:45:18.316	22500	10700	11860	2024-09-04 07:34:55.200	Horticulture waste
27	WB1-966372	AP39UQ4204	SHERLINGAMPALLY ZONE	TS09-DEEPTHSIRI NAGAR TS	PRIVATE	Sep 3 2024	2024-09-04 05:33:43.122	27040	11940	15100	2024-09-04 08:01:16.052	Horticulture waste
28	WB1-966384	TS02U43609	CHARMINAR ZONE	TS05-ILMILBUN TS	PRIVATE	Sep 3 2024	2024-09-04 06:52:24.504	17080	11140	5900	2024-09-04 08:01:27.923	Horticulture waste
29	WB1-966487	TS08UJ1732	LB NAGAR ZONE	DAMMAIGUDA	ULB	Sep 4 2024	2024-09-04 10:11:40.070	4120	3640	480	2024-09-04 10:44:21.222	Horticulture waste
30	WB1-966511	TS12UC2982	LB NAGAR ZONE	TS04-NAGOLE TS	PRIVATE	Sep 4 2024	2024-09-04 11:17:28.006	13840	9480	4160	2024-09-04 12:30:04.256	Horticulture waste
31	WB1-966599	TS12UC1321	SECUNDERABAD ZONE	TS14-TANKBUND TS	PRIVATE	Sep 4 2024	2024-09-04 13:06:09.959	25440	10060	15380	2024-09-04 15:04:08.495	C&D waste
32	WB1-966754	TS12UC2982	SECUNDERABAD ZONE	TS14-NEREDMET TS	GHMC	Sep 5 2024	2024-09-05 06:44:24.221	20960	10760	10200	2024-09-05 07:26:16.300	C&D waste
33	WB1-966754	TS12UC2982	SECUNDERABAD ZONE	TS14-NEREDMET TS	GHMC	Sep 5 2024	2024-09-05 06:44:24.221	20960	10760	10200	2024-09-05 07:26:16.300	C&D waste
34	WB1-966754	TS12UC2982	SECUNDERABAD ZONE	TS14-NEREDMET TS	GHMC	Sep 5 2024	2024-09-05 06:44:24.221	20960	10760	10200	2024-09-05 07:26:16.300	C&D waste
35	WB1-966754	TS12UC2982	SECUNDERABAD ZONE	TS14-NEREDMET TS	GHMC	Sep 5 2024	2024-09-05 06:44:24.221	20960	10760	10200	2024-09-05 07:26:16.300	C&D waste
36	WB1-966754	TS12UC2982	SECUNDERABAD ZONE	TS14-NEREDMET TS	GHMC	Sep 5 2024	2024-09-05 06:44:24.221	20960	10760	10200	2024-09-05 07:26:16.300	C&D waste
37	WB1-966754	TS12UC2982	SECUNDERABAD ZONE	TS14-NEREDMET TS	GHMC	Sep 5 2024	2024-09-05 06:44:24.221	20960	10760	10200	2024-09-05 07:26:16.300	C&D waste
38	WB1-966754	TS12UC2982	SECUNDERABAD ZONE	TS14-NEREDMET TS	GHMC	Sep 5 2024	2024-09-05 06:44:24.221	20960	10760	10200	2024-09-05 07:26:16.300	C&D waste
39	WB1-966754	TS12UC2982	SECUNDERABAD ZONE	TS14-NEREDMET TS	GHMC	Sep 5 2024	2024-09-05 06:44:24.221	20960	10760	10200	2024-09-05 07:26:16.300	C&D waste
40	WB1-966754	TS12UC2982	SECUNDERABAD ZONE	TS14-NEREDMET TS	GHMC	Sep 5 2024	2024-09-05 06:44:24.221	20960	10760	10200	2024-09-05 07:26:16.300	C&D waste
41	WB1-966754	TS12UC2982	SECUNDERABAD ZONE	TS14-NEREDMET TS	GHMC	Sep 5 2024	2024-09-05 06:44:24.221	20960	10760	10200	2024-09-05 07:26:16.300	C&D waste
42	WB1-966754	TS12UC2982	SECUNDERABAD ZONE	TS14-NEREDMET TS	GHMC	Sep 5 2024	2024-09-05 06:44:24.221	20960	10760	10200	2024-09-05 07:26:16.300	C&D waste
43	WB1-966754	TS12UC2982	SECUNDERABAD ZONE	TS14-NEREDMET TS	GHMC	Sep 5 2024	2024-09-05 06:44:24.221	20960	10760	10200	2024-09-05 07:26:16.300	C&D waste
44	WB1-966754	TS12UC2982	SECUNDERABAD ZONE	TS14-NEREDMET TS	GHMC	Sep 5 2024	2024-09-05 06:44:24.221	20960	10760	10200	2024-09-05 07:26:16.300	C&D waste
45	WB1-966754	TS12UC2982	SECUNDERABAD ZONE	TS14-NEREDMET TS	GHMC	Sep 5 2024	2024-09-05 06:44:24.221	20960	10760	10200	2024-09-05 07:26:16.300	C&D waste
46	WB1-966754	TS12UC2982	SECUNDERABAD ZONE	TS14-NEREDMET TS	GHMC	Sep 5 2024	2024-09-05 06:44:24.221	20960	10760	10200	2024-09-05 07:26:16.300	C&D waste
47	WB1-966754	TS12UC2982	SECUNDERABAD ZONE	TS14-NEREDMET TS	GHMC	Sep 5 2024	2024-09-05 06:44:24.221	20960	10760	10200	2024-09-05 07:26:16.300	C&D waste
48	WB1-966754	TS12UC2982	SECUNDERABAD ZONE	TS14-NEREDMET TS	GHMC	Sep 5 2024	2024-09-05 06:44:24.221	20960	10760	10200	2024-09-05 07:26:16.300	C&D waste
49	WB1-966754	TS12UC2982	SECUNDERABAD ZONE	TS14-NEREDMET TS	GHMC	Sep 5 2024	2024-09-05 06:44:24.221	20960	10760	10200	2024-09-05 07:26:16.300	C&D waste
50	WB1-966754	TS12UC2982	SECUNDERABAD ZONE	TS14-NEREDMET TS	GHMC	Sep 5 2024	2024-09-05 06:44:24.221	20960	10760	10200	2024-09-05 07:26:16.300	C&D waste
51	WB1-966754	TS12UC2982	SECUNDERABAD ZONE	TS14-NEREDMET TS	GHMC	Sep 5 2024	2024-09-05 06:44:24.221	20960	10760	10200	2024-09-05 07:26:16.300	C&D waste
52	WB1-966754	TS12UC2982	SECUNDERABAD ZONE	TS14-NEREDMET TS	GHMC	Sep 5 2024	2024-09-05 06:44:24.221	20960	10760	10200	2024-09-05 07:26:16.300	C&D waste
53	WB1-966754	TS12UC2982	SECUNDERABAD ZONE	TS14-NEREDMET TS	GHMC	Sep 5 2024	2024-09-05 06:44:24.221	20960	10760	10200	2024-09-05 07:26:16.300	C&D waste
54	WB1-966754	TS12UC2982	SECUNDERABAD ZONE	TS14-NEREDMET TS	GHMC	Sep 5 2024	2024-09-05 06:44:24.221	20960	10760	10200	2024-09-05 07:26:16.300	C&D waste
55	WB1-966754	TS12UC2982	SECUNDERABAD ZONE	TS14-NEREDMET TS	GHMC	Sep 5 2024	2024-09-05 06:44:24.221	20960	10760	10200	2024-09-05 07:26:16.300	C&D waste
56	WB1-966754	TS12UC2982	SECUNDERABAD ZONE	TS14-NEREDMET TS	GHMC	Sep 5 2024	2024-09-05 06:44:24.221	20960	10760	10200	2024-09-05 07:26:16.300	C&D waste
57	WB1-966754	TS12UC2982	SECUNDERABAD ZONE	TS14-NEREDMET TS	GHMC	Sep 5 2024	2024-09-05 06:44:24.221	20960	10760	10200	2024-09-05 07:26:16.300	C&D waste
58	WB1-966754	TS12UC2982	SECUNDERABAD ZONE	TS14-NEREDMET TS	GHMC	Sep 5 2024	2024-09-05 06:44:24.221	20960	10760	10200	2024-09-05 07:26:16.300	C&D waste
59	WB1-966754	TS12UC2982	SECUNDERABAD ZONE	TS14-NEREDMET TS	GHMC	Sep 5 2024	2024-09-05 06:44:24.221	20960	10760	10200	2024-09-05 07:26:16.300	C&D waste
60	WB1-966754	TS12UC2982	SECUNDERABAD ZONE	TS14-NEREDMET TS	GHMC	Sep 5 2024	2024-09-05 06:44:24.221	20960	10760	10200	2024-09-05 07:26:16.300	C&D waste
61	WB1-966754	TS12UC2982	SECUNDERABAD ZONE	TS14-NEREDMET TS	GHMC	Sep 5 2024	2024-09-05 06:44:24.221	20960	10760	10200	2024-09-05 07:26:16.300	C&D waste
62	WB1-966754	TS12UC2982	SECUNDERABAD ZONE	TS14-NEREDMET TS	GHMC	Sep 5 2024	2024-09-05 06:44:24.221	20960	10760	10200	2024-09-05 07:26:16.300	C&D waste
63	WB1-966754	TS12UC2982	SECUNDERABAD ZONE	TS14-NEREDMET TS	GHMC	Sep 5 2024	2024-09-05 06:44:24.221	20960	10760	10200	2024-09-05 07:26:16.300	C&D waste
64	WB1-966754	TS12UC2982	SECUNDERABAD ZONE	TS14-NEREDMET TS	GHMC	Sep 5 2024						

377	WB3 - 654320	TSDMUR266	SHERLINGAMPALLY ZONE	TSD-DEEPTHSRI NAGAR TS	PRIVATE	Sep 24 2024	2024-09-24 15:05:02.691	21940	10840	10000	2024-09-24 16:09:54.760	Post Ganesh festival rejects
378	WB3 - 654321	T312UR6475	SHERLINGAMPALLY ZONE	TSD-DEEPTHSRI NAGAR TS	PRIVATE	Sep 24 2024	2024-09-24 15:05:46.933	22500	10580	11920	2024-09-24 16:10:43.414	Post Ganesh festival rejects
379	WB3 - 654334	AP211E9969	KUKATPALLY ZONE	T311-KHAILAPUR TS	PRIVATE	Sep 24 2024	2024-09-24 15:26:13.333	23960	10980	12280	2024-09-24 16:43:58.808	Post Ganesh festival rejects
380	WB3 - 654554	T312UE1366	SHERLINGAMPALLY ZONE	TSD-DEEPTHSRI NAGAR TS	PRIVATE	Sep 24 2024	2024-09-24 16:14:55.163	24220	11200	13020	2024-09-24 17:08:42.738	Post Ganesh festival rejects
381	WB3 - 654561	TSDMUR2669	LB NAGAR ZONE	TSD-NAGOLE TS	PRIVATE	Sep 24 2024	2024-09-24 16:22:28.699	20040	10840	9200	2024-09-24 17:55:05.618	Post Ganesh festival rejects
382	WB3 - 654562	TSDMUR2659	LB NAGAR ZONE	TSD-NAGOLE TS	PRIVATE	Sep 24 2024	2024-09-24 16:24:25.641	22460	10420	11840	2024-09-24 17:53:32.138	Post Ganesh festival rejects
383	WB2 - 1021131	TSD7UP1832	LB NAGAR ZONE	TSD-NAGOLE TS	PRIVATE	Sep 25 2024	2024-09-25 16:21:34.966	20580	10620	9940	2024-09-25 16:31:34.003	Post Ganesh festival rejects
384	WB2 - 1021131	TSD7UP1832	LB NAGAR ZONE	TSD-NAGOLE TS	PRIVATE	Sep 25 2024	2024-09-25 16:21:34.966	20580	10620	9940	2024-09-25 16:31:34.003	Post Ganesh festival rejects
385	WB2 - 1021140	T326T1997	LB NAGAR ZONE	TSD-NAGOLE TS	PRIVATE	Sep 25 2024	2024-09-25 16:33:08.626	22760	10620	12140	2024-09-25 16:54:13.310	Post Ganesh festival rejects
386	WB2 - 1021142	T312KZ7997	LB NAGAR ZONE	TSD-NAGOLE TS	PRIVATE	Sep 25 2024	2024-09-25 16:34:43.383	18100	9120	8480	2024-09-25 16:52:50.113	Post Ganesh festival rejects
387	WB3 - 657070	AP21414149	LB NAGAR ZONE	TSD-NAGOLE TS	PRIVATE	Sep 25 2024	2024-09-25 17:25:58.837	14340	9980	4360	2024-09-25 18:21:15.334	Horticulture waste
388	WB3 - 657204	TSDMUR2669	LB NAGAR ZONE	TSD-NAGOLE TS	PRIVATE	Sep 26 2024	2024-09-26 15:03:20.178	25360	10780	14580	2024-09-26 16:50:29.896	Post Ganesh festival rejects
389	WB3 - 657204	TSDMUR2669	LB NAGAR ZONE	TSD-NAGOLE TS	PRIVATE	Sep 26 2024	2024-09-26 15:03:20.178	25360	10780	14580	2024-09-26 16:50:29.896	Post Ganesh festival rejects
390	WB3 - 657733	T326T1997	LB NAGAR ZONE	TSD-NAGOLE TS	PRIVATE	Sep 26 2024	2024-09-26 15:54:30.957	23220	10420	12600	2024-09-26 17:43:40.091	Post Ganesh festival rejects
391	WB3 - 657747	TSDMUR2630	LB NAGAR ZONE	TSD-NAGOLE TS	PRIVATE	Sep 26 2024	2024-09-26 16:22:32.935	24340	10340	14000	2024-09-26 17:47:26.850	Post Ganesh festival rejects
392	WB3 - 657752	T312UB9551	SECUNDERABAD ZONE	T316-TANERUND TS	PRIVATE	Sep 26 2024	2024-09-26 16:40:25.220	22940	11000	11940	2024-09-26 17:31:14.070	Post Ganesh festival rejects
393	WB3 - 658047	T312UD6307	LB NAGAR ZONE	TSD-NAGOLE TS	PRIVATE	Sep 27 2024	2024-09-27 02:11:41.104	19020	10400	8620	2024-09-27 03:48:33.857	Horticulture waste
394	WB3 - 658366	TSDMUR2659	LB NAGAR ZONE	TSD-NAGOLE TS	PRIVATE	Sep 27 2024	2024-09-27 11:39:50.960	23000	10600	12400	2024-09-27 12:58:36.239	Horticulture waste
395	WB3 - 659130	TSDMUR2659	LB NAGAR ZONE	TSD-NAGOLE TS	PRIVATE	Sep 28 2024	2024-09-28 11:56:47.018	26360	10540	13800	2024-09-28 13:20:13.195	Post Ganesh festival rejects
396	WB3 - 659856	TSDMUR2669	LB NAGAR ZONE	TSD-NAGOLE TS	PRIVATE	Sep 29 2024	2024-09-29 12:12:07.412	20920	10900	10000	2024-09-29 12:25:36.495	Post Ganesh festival rejects
397	WB3 - 659878	TSDMUR2659	LB NAGAR ZONE	TSD-NAGOLE TS	PRIVATE	Sep 29 2024	2024-09-29 12:41:29.703	21020	10980	10440	2024-09-29 13:00:16.180	Post Ganesh festival rejects
398	WB3 - 659908	T326T1997	LB NAGAR ZONE	TSD-NAGOLE TS	PRIVATE	Sep 29 2024	2024-09-29 13:28:14.146	21400	10460	10940	2024-09-29 13:43:45.172	Post Ganesh festival rejects
399	WB3 - 659933	AP211E9999	KUKATPALLY ZONE	T311-KHAILAPUR TS	PRIVATE	Sep 29 2024	2024-09-29 14:05:55.298	16380	10680	5400	2024-09-29 15:07:00.810	Post Ganesh festival rejects
400	WB3 - 659940	T331T1182	LB NAGAR ZONE	TSD-NAGOLE TS	PRIVATE	Sep 29 2024	2024-09-29 14:16:06.908	19420	10400	9020	2024-09-29 15:01:51.292	Post Ganesh festival rejects
401	WB3 - 659955	TSDMUR2639	LB NAGAR ZONE	TSD-NAGOLE TS	PRIVATE	Sep 29 2024	2024-09-29 14:44:05.874	19080	10820	8260	2024-09-29 15:33:52.617	Post Ganesh festival rejects
402	WB3 - 659968	AP11XZ943	CHARMINAR ZONE	T325-AMBUN TS	GHMC	Sep 29 2024	2024-09-29 15:02:11.540	14340	9900	4440	2024-09-29 15:59:51.689	Horticulture waste
403	WB3 - 659985	TSDMUR2659	LB NAGAR ZONE	TSD-NAGOLE TS	PRIVATE	Sep 29 2024	2024-09-29 15:25:54.184	21600	10540	11040	2024-09-29 16:45:07.985	Post Ganesh festival rejects
404	WB3 - 660701	T312UB6678	SHERLINGAMPALLY ZONE	TSD-DEEPTHSRI NAGAR TS	PRIVATE	Sep 30 2024	2024-09-30 13:29:13.752	20140	10500	12640	2024-09-30 14:48:50.948	Post Ganesh festival rejects
								TOTAL			4189940	

*B. Kotamrao
T, R, E*

3417

17		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20		73.90	461.88	2078.44	206.92	354.72	354.72	1108.50	4565.17
21		59.70	373.13	1679.06	167.16	286.56	286.56	895.50	3687.97
22		3.00	18.75	84.38	8.40	14.40	14.40	45.00	185.33
23		21.80	136.25	613.13	61.04	104.64	104.64	327.00	1346.70
24		89.90	561.88	2528.44	251.72	431.52	431.52	1348.50	5553.57
		442.50	2,765.63	12,445.31	1,239.00	2,124.00	2,124.00	6,637.50	27,335.44

[Signature]
17/10/24

B. Koteswara Rao
Team leader, JE

Recd. 19/10/2024.
ESD (E/C)

Annexure-A6

Hyderabad Metropolitan Water Supply and Sewerage Board

Status of completed & under construction STPs in GHMC area
and Proposed STPs under AMRUT.2.0

Sl.No	Location	Capacity (MLD)	Technology	Physical Progress	Tentative date of Completion/ Commissioning
1	Durgam Cheruvu	7	SBR	Completed	-
2	Kokapet	15	SBR	Completed	-
3	Peddacheruvu	17.5	SBR	Completed	-
4	Nallacheruvu-I	86.5	SBR	Completed	-
5	Safilguda	5.5	SBR	Completed	-
6	Miralam Site-I	41.5	SBR	Completed	-
7	Miyapur Patelcheruvu	7	SBR	Completed	-
8	Nagole	320	SBR	Completed	-
9	Khajakunta	20	SBR	Completed	-
10	Fathenagar-I	133	SBR	Completed	-
11	Vennelagadda	10	SBR	Completed	-
12	Palapitta Park	7	SBR	90% work completed	Jan-25
13	Shivalaynagar	14	SBR	90% work completed	Feb-25
14	Mullakathuwa Cheruvu	25	SBR	80% work completed	Feb-25
15	Nallagandla	7	SBR	85% work completed	Feb-25
16	Attapur-1	64	SBR	75% work completed	Feb-25
17	Amberpet	212.5	SBR	75% work completed	Mar-25
18	Rainbow Vista	43.5	SBR	60% work completed	Apr-25
19	Ramacheruvu	30	SBR	65% work completed	Apr-25
20	Attapur-2	40	SBR	45% work completed	Apr-25
Sub Total		1106			

List of 6 STPs proposed under AMRUT-2.0

Sl.No	Location	Capacity (MLD)	Technology	Present Status	Tentative date of Completion/ Commissioning
1	Nallacheruvu-2	36.5	SBR	Tender Stage	24 months
2	Kapra	5.5	SBR		
3	Hyderabad Public School	36.5	SBR		
4	Fathenagar-2	20	SBR		
5	Chitrapuri Colony	20	SBR		
6	Patel Cheruvu	7	SBR		
Sub-total		125.5			
7	Pariki Cheruvu	28.00		In Court Case	

--	--	--	--	--	--

Page Ends

3420

Annexure-A7

Hyderabad Metropolitan Water Supply and Sewerage Board

Details of each existing STP with utilization capacity under HMWSSB, GHMC, HMDA

Sl.No.	Location	Existing STP Capacity	Technology	Maintained by	Capacity Utilized	Operational Status of STP	Compliance Status of STP by PCB, EPTRI, OCEMS
1	2	3	4	5	6	7	8
1	Amberpet	339	UASB	HMWSSB	314	Working	Complied
2	Nagole	172	UASB	HMWSSB	172	Working	Complied
3	Nallacheruvu	30	UASB	HMWSSB	29.9	Working	Complied
4	Attapur 1	51	SBR	HMWSSB	43	Working	Complied
5	Attapur 2	23	SBR	HMWSSB	18	Working	Complied
6	Pedda Cheruvu, Nacharam	10	Extended	HMWSSB	10	Working	Complied
7	Miralam Tank 1	10	Extended	HMWSSB	8.4	Working	Complied
8	Miralam Tank 2	5	Extended	HMWSSB	4.32	Working	Complied
9	Durgam Cheruvu, SLP	5	Extended	HMWSSB	4.8	Working	Complied
10	Patel Cheruvu, Nacharam	2.5	Extended	HMWSSB	2.5	Working	Complied
11	Saroor Nagar	2.5	Extended	HMWSSB	2.5	Working	Complied
12	Langer House	1.2	Extended	HMWSSB	1.23	Working	Complied
13	Noor Mohammad Kunta	4	Extended	HMWSSB	4	Working	Complied
14	Safilguda, Malkajgiri	0.6	Extended	HMWSSB	0.6	Working	Complied
15	Khajakunta, Metro, KKP	12	MBBR	HMWSSB	12	Working	Complied
16	Khajaguda, Gachibowli	7	MBBR	HMWSSB	7	Working	Complied
17	Nanakramguda, Gachibowli	4.5	MBBR	HMWSSB	4.5	Working	Complied
18	JVR Park, Nagarjuna Circle	0.5	Extended	HMWSSB	0.5	Working	Complied
19	Lingam Kunta, BHEL	30	MBBR	HMWSSB	18	Working	Complied
20	Gopanapally, SLP	4.5	MBBR	HMWSSB	4.5	Working	Complied
21	Durgam Cheruvu	7	SBR	HMWSSB	7	Working	Complied
22	Kokapet	15	SBR	HMWSSB	15	Working	Complied
23	Peddacheruvu	17.5	SBR	HMWSSB	15	Working	Complied
24	Nallacheruvu-I	86.5	SBR	HMWSSB	55	Working	Complied
25	Safilguda	5.5	SBR	HMWSSB	4.5	Working	Complied
26	Miralam Site-I	41.5	SBR	HMWSSB	10	Working	Complied
27	Miyapur Patelcheruvu	7	SBR	HMWSSB	3	Working	Complied
28	Nagole	320	SBR	HMWSSB	170	Working	Complied
29	Khajakunta	20	SBR	HMWSSB	6	Working	Complied
30	Fathenagar-I	133	SBR	HMWSSB	100	Working	Complied
31	Vennelagadda	10	SBR	HMWSSB	2	Trial run	Under compliance to PCB OCEMS
32	Necklace Road	20	EA SBR	HMDA	20	Working	-
33	Pattigadda	30	EA BNR	HMDA	30	Working	-
34	Rangadhamini Lake, KKP	5	Extended	HMDA	5	Working	-
35	Krishnakanth Park,	0.5	Extended	GHMC	-	-	-
36	Amber Cheruvu, Pragatinagar	2.5	Extended	GHMC	-	-	-
		1435.3			1104.25		

Abstract

Sl. No.	Sewage Generation & Treatment	MLD
1	Sewage Generation in GHMC & upto ORR (as on the date of NGT order 29.09.2022)	1950.00 MLD
2	Existing STPs Capacity (25 Nos)	772.30 MLD
3	Newly Constructed & commissioned STPs (11 Nos)	663.00 MLD
	Total Installed STPs capacity (2) & (3)	1435.30 MLD
4	Present Utilization Capacity	1104.25 MLD (77%)
5	New STPs under construction (nearing completion)	443.00 MLD
6	Utilization Capacity after completion of under progress STPs	90%
7	Gap in Treatment Capacity	72 MLD Being taken up under AMRUT-2

Annexure- A8

Hyderabad Metropolitan Water Supply and Sewerage Board

Consolidated Flows from OCEMS

Sl.No	Name of STP	Capacity in MLD	Technology	Flow in the month of JULY'2024	Flow in the month of AUG'2024	Flow in the month of SEP'2024	Flow in the month of Nov'2024	Flow in the month of DEC'2024
Project Division-I								
1	Amberpet	339.00	UASB	308.29	308.06	307.84	314.85	314.91
2	Nallacheruvu	30.00	Extended Aeration	29.6	29.9	29.6	39.21	29.19
3	Peddacheruvu	10.00	Extended Aeration	9.79	9.79	9.79	16.37	9.79
4	Miralam	10.00	Extended Aeration	8.23	8.04	8.23	9.57	5.61
5	Miralam 2	5.00	UASB	3.78	4.32	4.92	12	4.98
6	NM Kunta	4.00	Extended Aeration	3.21	3.21	3.36	6.4	3.51
7	Patelcheruvu	2.50	Extended Aeration	2.5	2.5	2.5	4.99	2.5
8	Saroonnagar	2.50	Extended Aeration	2.1	2.1	2.1	4.22	2.31
9	Langer House	1.23	Extended Aeration	1.231	1.231	1.231	2.79	1.232
10	Safilguda	0.60	Extended Aeration	0.6	0.6	0.6	0.6	6.00
	Sub Total	404.83		369.331	369.751	370.171	411	380.032
Project Division-IV								
11	Nagole	172.00	SBR	171.9	171.9	171.9	171.9	150.4
12	Attapur	51.00	SBR	40.34	38.14	43.47	43.13	45.87
13	Lingamkunta	30.00		17.62	17.78	18.04	17.08	16.6
14	Attapur	23.00	MBBR	16.2	19.41	19.03	18.48	21.5
15	Khajakunta	12.00	MBBR	12	12	12	12	12
16	Khajaguda	7.00	UASB	6.7	6.4	6.7	6.4	6.4
17	Durgam Cheruvu	5.00	Extended Aeration	4.36	4.16	4.16	4.99	4.99
18	Goapanpally	4.50	MBBR	3.51	4.3	5.07	4.64	3.38
19	Nanakramguda	4.50	Extended Aeration	4.4	2.03	2.98	3.15	2.85
20	JVR Park	0.50	MBBR	0.5	0.5	0.5	0.5	0.5
	Sub Total	309.50		272.13	269.79	279.8	276.97	257.79
	TOTAL CAPACITY	714.30		635.305	633.988	641.226	644.882	630.322
	Percentage			89%	89%	90%	90%	88%

Annexure- A9 - PHMED							
Details of under Construction STP's in the State (Urban other GHMC)							
S.No.	City & Funding	Location of STP	Capacity of STP in MLD	Technology	Physical Progress in %	Tentative date of Completion/ Commissioning	Remarks
1	Miryalguda (UIDSSMT & TUFIDC Rs.85.52 Cr (Rs.45.51 Cr+Rs.33.01Cr.)+ Rs.7.00 (TUFIDC)	Ramnagar Bandam	5.45	WSP	Physically Completed. Commissioning under progress. Interconnection and gap closing works pending.	30-06-2025	Agency M/s. Krushi Pvt Ltd not completing the balance works and commissioning. Final noticeS issued to agency to complete and commission the scheme, proposal for termination under process. Commissioning will be completed after replacement of Pump Sets and motors. <i>Progress of work slowed due to delay in payments and paucity of funds</i>
2	Nalgonda UIDSSMT & TUFIDC Rs.107.78 Cr (Rs.56.79+Rs.32.99Cr.)+ Rs.18.00 Cr (TUFIDC)	Sheshammagude m	17.16	WSP	99%	31-03-2025	Interconnection and gap closing works needs to be completed to commission the STP.Commissioning will be completed after replacement of Pump Sets and motors. <i>Progress of work slowed due to delay in payments and paucity of funds</i>
3	Nagar Kurnool SDF+TUFIDC Rs.35.00Cr+30.00Cr	Bus Depot Backside	3.20	Phytorid	100%	6/30/2025	STP has been completed and commissioned. Intermittent Pump house to be taken up & completed for sewage pumping to STP. Revised AS awaited.
4	Khammam CM Assurance Rs.100 Cr (Rs.70Cr.+Rs.30Cr)	Dhamsalapuram	20.00	SBR	25%	-	work held up due to paucity of funds. Being proposed under AMRUT 2.0 depending on funds availability. So not considered.
5	Suryapet TUFIDC Rs.118.00Cr. (Rs.81.41 Cr. +Rs.36.59 Cr.)	Nalla cheruvu	10.00	SBR	85%	6/30/2025	<i>Progress of work slowed due to delay in payments and paucity of funds.</i>
6	Sircilla Rs.61.25 Cr MB (Urban)- Subject to reimbursement from RWS&S Dept.	Shanthinagar behind 2BHK Colony	19.10	SBR	90%	30-04-2025	<i>Progress of work slowed due to delay in payments and paucity of funds.</i>
		Sub-Total	74.91				

S.No.	City & Funding	Location of STP	Capacity of STP in MLD	Technology	Physical Progress in %	Tentative date of Completion/Commissioning	Remarks
Details of sanctioned STPs but not executed.							
7	Devarakonda	Peta Cheruvu	1.50	SBT	0% Will not be executed.		1.50 MLD at peta Cheruvu will be not taken up since intially House Sewerage connections are not proposed in the Scheme due to Paucity of funds. In order to complete the Sewerage connections in Nainoni Kunta catchment and commission the 1.50 MLD at Nainoni Kunta, 1.50 MLD STP at Peta Cheruvu is not taken up.
8	GWMC	Reddypuram	100.00	SBR	Work cancelled due to land acquisition issue under Smart city 11%		Work cancelled due to land acquisition issue. Revised Proposal submitted by Commissioner, GWMC to CDMA, Hyderabad for AS.
9	Nalgonda	Arjalabavi	2.55	MBBR	(held up and will not be executed)	-	Submergence of STP Site & due to objection from local people, the construction of STP is stopped.Hence above work is held up and the sewerage generated will be connected to 17.16 MLD STP and treated.
		Sub-Total	104.05				
		Grand Total In MLD	178.96				

Total No.of STPs: 9 Nos (in 8 ULBs)

Total capacity: 178.96 MLD

Annexure -A10- PHMED							
Details of Existing STP's with utilization capacity in the State Under PH&MED							
Before Judgement Order i.e., on 29-09-2022							
S.No.	City/Town	Location of STP	Existing Capacity of STP in MLD	Technology	Capacity utilized in MLD	Operational Status	Remarks
1	Karimnagar	Bommakal Road (Near Housing Board Colony)	38.00	MBBR	3.00	Operational	Inspection chambers, Sewerage connections are not taken up in UIDSSMT Scheme due to paucity of funds. Now 19500 Nos of Inspection chambers are proposed in Karimnagar Smart City Project (So that utilization can be improved).It is also proposed to complete the balance and all additional components under AMRUT 2.0.
2	Vikarabad	Chakali Gadda, Allampally	13.00	MBBR	7.50	Operational	STP is designed for prospective year demand (2026).Present requirement is less than 2026 requirement. At present 9.0 MLD water is being supplied and the utilization is matching with 80% of the water supply.
3	Nizamabad	Dubba	31.50	MBBR	7.50	Operational	Network not fully laid due to paucity of funds.It is also proposed to complete the balance, Sewerage connections and all additional components under AMRUT 2.0.
		Yellammagutta	15.00	MBBR	3.50	Operational	
4	Miryalguda	Thallagadda	11.50	WSP	-	Non- Operational	Presently, Motors and pumpsets are under repair and will be replaced soon.To utilise the 11.50 MLD capacity STP, sewerage connections are proposed under AMRUT 2.0 .
5	Siddipet	Chinthala Cheruvu	7.25	MBBR	7.00	Operational	
		Narsapur Cheruvu	11.00	SBR	10.00	Operational	
		Rajareddy Pally	1.50	Phytorid	1.50	Operational	
6 (a)	Gajwel	Pidichedu Road	3.50	Phytorid	3.00	Operational	
		Pandavula Chervu	0.50	Phytorid	0.50	Operational	
Sub Total			132.75		43.50		

S.No.	City/Town	Location of STP	Existing Capacity of STP in MLD	Technology	Capacity utilized in MLD	Operational Status	Remarks
After Judgement Order i.e., on 29-09-2022							
6(b)	Gajwel	Pragnapur (By-Pass Road)	1.25	Phytorid	0.75	Operational	
7	Suryapet	Pullareddy cheruvu	10.00	SBR	3.00	Operational	Network not fully laid due to paucity of funds.It is also proposed to complete the balance, Sewerage connections and all additional components under AMRUT 2.0.
8	GWMC	Ursugutta	5.00	SBR	3.50	Operational	
		Pragathinagar	15.00	SBR	12.50	Operational	
9	Devarakonda	Nainoni Kunta	1.50	SBT	1.00	Operational	
10	Nagar Kurnool	Bus Depot Backside	2.30	Phytorid	1.00	Operational	STP has been commisioned recently.
		Sub Total	35.05		21.75		
		Total	167.80		65.25		

Total No.of STPs completed: 16 Nos (in 10 ULBs)

Total installed capacity: 167.80 MLD

3426

Annexure- A10(i)

Details of Status of CFO and disposal of STP's in the State under PH & ME Department (Urban other than ORR)

Sl. No.	City/Town	Location of STP	Capacity of STP in MLD	Technology	Capacity Utilized in MLD	Whether CFO (Consent for Operation) obtained (Yes/No)	Remarks	Disposal of treated Sewage
1	Karimnagar	Bommakal Road (Near Housing Board Colony)	38.00	MBBR	3.00	No	To be applied	Gopal Cheruvu
2	Vikarabad	Chakali Gadda, Allampally	13.00	MBBR	7.50	No	To be applied	Use in Golf course greenery
3	Nizamabad	Dubba	31.50	MBBR	7.50	Yes	Valid upto 31.01.2026	Yelliah Cheruvu
		Yellammagutta	15.00	MBBR	3.50	Yes	Valid upto 31.01.2026	Phulong Vagu
4	Siddipet	Chinthala Cheruvu	7.25	MBBR	7.00	No		Surplus Channel of Chinthala Cheruvu
		Narsapur Cheruvu	11.00	SBR	10.00	No		Narsapur Cheruvu
5	Gajwel	Rajareddy Pally	1.50	Phytorid	1.50	No		Rajareddy Pally Cheruvu
		Pidichedu Road	3.50	Phytorid	3.00	No		Local Stream/Vagu
		Pandavula Chervu	0.50	Phytorid	0.50	No		Pandavula Chervu
		Pragnapur (By-Pass Road)	1.25	Phytorid	0.75	No		Existing field channels
6	Miryalguda	Thallagadda	11.50	WSP	0.00	No	To be applied	Local Vagu
7	Nagar Kurnool	Bus Depot Backside	2.30	Phytorid	1.00	No	To be applied	Agricultural field channel
8	Suryapet	Pullareddy cheruvu	10.00	SBR	3.00	No	To be applied	Pullareddy cheruvu
9	GWMC	Ursugutta	5.00	SBR	3.50	No	To be applied	Ursucheruvu
		Pragathinagar	15.00	SBR	12.50	No	To be applied	Bandam Cheruvu
10	Devarakonda	Nainoni Kunta	1.50	SBT	1.00	No	To be applied	Khilla Park

Annexure- I (D)

Details of STP's in the State under PH&MED under AMRUT 2.0

Sl. No	ULB	District	Project Cost (including O&M in Cr)	No.of STPs proposed in AMRUT 2.0	Sewage treatment capacity (MLD)	Details of Package in which STP was included and total capacity in package	Remarks
Package-I							
1	ADILABAD	ADILABAD	225.46	4	31.50	Package-I (Total Capacity:65.00 MLD) Project Cost : Rs.560.85 Cr	Package-I: LOA issued on 07-03-2024 & agreement concluded. Work grounded.
2	KARIMNAGAR	KARIMNAGAR	79.57	-	-		
3	RAMAGUNDAM	PEDDAPALLI	255.82	5	33.50		
Package-II							
4	MIRYALAGUDA	NALGONDA	173.07	1	6.00	Package-II (Total Capacity:63.30 MLD) Project Cost : Rs.955.55 Cr	Package-II: LOA issued on 07-03-2024 & agreement concluded. Work grounded.
5	NALGONDA		216.19	1	3.80		
6	SURYAPET	SURYAPET	316.77	-	-		
7	KHAMMAM	KHAMMAM	249.52	2	53.50		
Package-III							
8	NIZAMABAD	NIZAMABAD	162.81	-	-	Package-III (Total Capacity:42.00 MLD) Project Cost : Rs.439.61 Cr	Package-III: LOA issued on 01-07-2024 & agreement concluded. Work grounded.
9	MAHBUBNAGAR	MAHBUBNAGAR	276.8	3	42.00		
Total for 9 ULBs			1956.01	16	170.30		
Total No.of STPs proposed under AMRUT 2.0: 16 Nos (in 9 ULBs)							
Total capacity proposed under AMRUT 2.0: 170.30 MLD							

ABSTRACT

MA&UD Department - Engineering- PH&ME- Hon'ble NGT Directions (not to discharge untreated waste water into water bodies & rivers) - Construction of Sewage Treatment Plants in all Urban Local Bodies of Telangana - Administrative sanction for an amount Rs.3769.34 crores (including O&M and Annuity Payments and GST on Interest Component of Annuity Payments) for "Sewerage Projects in 101 ULBs in the State of Telangana under SBM 2.0" - Accorded - Orders Issued.

MUNICIPAL ADMINISTRATION & URBAN DEVELOPMENT (ENGG.) DEPARTMENT

G.O. Rt. No.388

Dated:21.08.2024

Read the following:-

1. From the ENC(PH), Hyderabad, Lr.No.: T1/SBM 2.0/STPs & I&Ds /2022-23,Dt.: 15.04.2023.
2. Govt., Memo No. 6361/Engg.2/2023, Dt.02-02-2024]
3. From the ENC (PH), Hyderabad, Lr.No.T1/SBM 2.0/STPs & I&Ds/2023-24, Dt: 07.02.2024.

-000-

ORDER:

In the reference 1st read above, the Engineer-in-Chief (Public Health) Hyderabad has informed that, the Director (SBM), MoHUA, GoI has communicated the Minutes of Meeting of 7th NARC of SBM Urban duly mentioning that Action Plans submitted by the Govt. of Telangana for Urban Water Management have been approved containing proposals costing Rs. 934.60 Crores towards establishment of STPs and I&D for Urban Water Management have been approved in 101 ULBs and requested to issue the RFP for engagement of agencies for establishment, O&M of STPs and construction of I&D structures and to take further action for effective UWM under SBM Urban 2.0.

2. The Engineer-in-Chief (Public Health), Hyderabad has further informed that, the Hon'ble National Green Tribunal have given directions to take measures not to discharge untreated waste water into water bodies & rivers. Government of Telangana has either established or is in the process of establishing STPs in the ULBs of Warangal, Karimnagar, Nizamabad, Siddipet, Nalgonda, Miryalaguda, Suryapet, Sircilla, Gajwel, Vikarabad, Nagar Kurnool, Devarakonda, Alampur, Khammam besides GHMC to meet the requirements of respective prospective years. The ENC (PH) has requested the Government to give suitable directions on taking up STPs in 103 ULBs which are to be funded through SBM 2.0 Scheme.

3. In the reference 2nd read above, Government have requested the ENC (PH) to furnish the proposal, duly revising the installed capacity as per the discussions held in this regard by the Principal Secretary to Government MA&UD Department with the Engineer-in-Chief (Public Health), Hyderabad for taking further action in the matter.

4. In the reference 3rd read above, the Engineer-in-Chief (Public Health) has stated that previously they have submitted the proposals of SBM 2.0 to the Government for construction of 344 No. of STPs (total capacity of 789.20 MLD, considering 2038 as prospective year) along with I&D Structures with 10 years O&M with a tentative financial implication of about Rs. 5503.107 crores, along with a request to accord permission to

(PTO)

invite tenders with open technology on RFP mode in Hybrid Annuity Model without mentioning Internal Bench Mark, pending Administrative Sanction. It was also indicated therein that Administrative Sanction would be sought along with tender approval after finalization of the tenders.

5. The Engineer-in-Chief (Public Health) has further stated that, during the review meeting with the Principal Secretary to Government, MA&UD Dept. on 11-01-2024; the proposals of SBM 2.0 were placed before the Government and it was instructed to take up the proposals in two phases, duly utilizing the GoI share under SBM 2.0 in Phase-I as upfront payment, keeping in view the financial implication, and in single package in order to create healthy competition among available agencies who have experience in executing similar projects in HAM mode.

6. The Engineer-in-Chief (Public Health) has further stated that, after detailed deliberations, it has been decided in the above meeting on the following proposals under SBM 2.0:-

- Proposals under Phase-I: To consider STPs of only certain catchments of the ULB for the prospective year 2038 satisfying the criteria of SBM 2.0 Guidelines that all towns will need to prepare a DPR containing the provision of minimum one STP (for 70% of current (2025) population).

Where there is marginal difference in capacity of STP of the catchment corresponding to the prospective year 2038 when compared to the intended capacity in Phase I (corresponding to 70% of current (2025) population of the town), those STP capacities are further reduced to meet the criteria of SBM 2.0 guidelines with a contemplation to take up capacity augmentation of these STPs as and when required on case to case basis.

- Proposals under Phase-II: Capacity augmentation (on modular basis) of the catchments under consideration in Phase I along with the new catchments deferred in Phase I can be considered in Phase II proposals.

7. The Engineer-in-Chief (Public Health) has also informed that, it has been decided to prepare estimates with the same rates as adopted for AMRUT 2.0 projects i.e., SSR 2022-23 with the cement & steel rates for the month of April 2023 and STP rates from GWSSB SOR for the year 2022-23, since the original proposal was submitted to Govt. on Dt. 15-04-2023. The estimated Operation and Maintenance cost of 115 STPs for 10 years is Rs.1608.50 Crores (*considering 5% non compounding increase on each year's O&M cost*) based on CPHEEO Guidelines, Consortium of IITs report of Ganga River Basin Environment Management Plan and common SSR-2022-23 of Government of Telangana.

8. Stating the above position, the Engineer-in-Chief (Public Health) T.G, Hyderabad has finally requested the Govt., to accord permission on the following:-

- i. Administrative sanction for an amount Rs.3769.34 crores (including O&M and Annuity Payments and GST on Interest Component of Annuity Payments) for "Sewerage Projects in 101 ULBs in the State of Telangana under SBM 2.0".

Cont.P. 3

- ii. Permission to invite tenders in single package under LS contract system with Hybrid Annuity Model (35% upfront and 65% deferred), duly cancelling the G.O.Rt.No.343, MA&UD (UBS) Department, Dt. 29-05-2023.
 - iii. Request to address the Govt. of India for permission to utilize the GOI share as upfront payment (35%) during the construction period of initial 2 years and balance (65%) to be paid in 10 annuities by the State Government along with O&M payments, considering the present financial situation of the State Government.
 - iv. Permission to invite tenders pending acquisition of land, in relaxation of G.O.Ms.No. 94, I&CAD (PW-COD) Department, Dated: 01-07-2023 and G.O.Ms.No. 1, Finance (Works & Projects-F7) Department, Dt. 25-02-2012 and to initiate the Land Acquisition process parallelly. In case the tender process is postponed till completion of land acquisition process, it may have a cascading effect resulting in cost escalation. Also, GoI is pursuing with the State Government constantly regarding award of the projects under SBM 2.0.
 - v. Land Acquisition costs will be submitted to the Government and administrative sanction for those amounts will be sought in due course.
 - vi. Permission from State Government to entrust the O&M of sewerage projects under SBM 2.0 for 10 years on completion of capital work at the same tender percentage of capital work, by concluding a separate agreement with the same agency by the ULB.
 - vii. To give directions to the DMA, Hyderabad to instruct the Commissioners of the respective ULBs (falling in SBM 2.0) to conclude separate agreements with the same agencies (entrusted with the capital works) for O&M of sewerage schemes proposed under Phase I of SBM 2.0.
 - viii. To give directions to the DMA, Hyderabad to instruct the Commissioners of all the respective ULBs for identification of potential users/ industries of treated waste water (minimum of 20%), which enables ULBs to avail 15th Finance Commission tied grants.
 - ix. The draft bid document for the LS Contract System with Hybrid Annuity Model is under preparation and the same will be submitted to the Government in due course for approval.
9. Government after careful examination of the matter, hereby accord permission on the following:-
- i. Administrative sanction is accorded for an amount Rs.3769.34 Crores (including O&M and Annuity Payments and GST on Interest Component of Annuity Payments) for "Sewerage Projects in 101 ULBs in the State of Telangana under SBM 2.0"

Cont. P.4

::4::

- ii. Permission is accorded to invite tenders In single package under LS contract system with Hybrid Annuity Model (35% upfront and 65% deferred), duly cancelling the G.O.Rt.No.343, MA&UD (UBS) Department, Dt. 29-05-2023.
- iii. The Director of Municipal Administration, being the State Mission Director, SBM 2.0 is directed to address the Govt. of India for permission to utilize the GOI share as upfront payment (35%) during the construction period of initial 2 years and balance (65%) to be paid in 10 annuities by the State Government along with O&M payments.
- iv. Permission is accorded to invite tenders pending acquisition of land, in relaxation of G.O.Ms.No.94, I&CAD (PW-COD) Dept.,Dt.01-7-2023 and G.O.Ms.No.1, Finance (Works & Projects-F7) Dept., Dt. 25-02-2012 and to initiate the Land Acquisition process parallelly, and to submit the proposals of Administrative Sanction for land acquisition if required.
- v. Permission is accorded to entrust the O&M of sewerage projects under SBM 2.0 for 10 years on completion of capital work at the same tender percentage of capital work, by concluding a separate agreement with the same agency by the ULB.
- vi. DMA, Hyderabad is directed to instruct the Commissioners of the respective ULBs (falling in SBM 2.0) to conclude separate agreements with the same agencies (entrusted with the capital works) for O&M of sewerage schemes proposed under Phase I of SBM 2.0.
- vii. DMA, Hyderabad is directed to instruct the Commissioners of all the respective ULBs for identification of potential users/ industries of treated waste water (minimum of 20%), which enables ULBs to avail 15th Finance Commission tied grants.

10. The Engineer-in-Chief, Public Health/ the Director of Municipal Administration, Telangana, Hyderabad shall take further necessary action accordingly.

(BY ORDER AND IN THE NAME OF THE GOVERNOR OF TELANGANA)

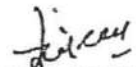
M. DANA KISHORE
PRINCIPAL SECRETARY TO GOVERNMENT

To
The Engineer-In-Chief (PH), Telangana, Hyderabad.
The Director of Municipal Administration, Telangana, Hyderabad.

Copy to:

The OSD to Spl. Secretary to Chief Minister.
OSD to Prl. Secretary to Govt., MA&UD Department.
Sf/Sc

// FORWARDED :: BY ORDER //


SECTION OFFICER

Annexure- A11(ii) - PHMED										
:Details of STPs proposed in the State in 101 ULBs under PH&MED under SBM 2.0										
Sl No	Name of the ULB	Name of the District	No of STPs	STP 1	STP 2	STP 3	STP 4	STP 5	Total Capacity of STPs in MLD	Remarks
1	Kothagudem		1	9.0					9.0	<ul style="list-style-type: none"> •Earlier total 72 No. of STP's of capacity 315.02 MLD in 30 ULB's was proposed to be taken up by the PH&ME Department for a tentative amount of Rs.2828.24 Crores and the same was submitted to the Govt. for according Administrative Sanction vide T/o Lr Dt:13-04-2020 & 03-10-2020. • Further, as per instructions of Govt. Vide Memo Dt:25.05.2021 of MA & UD (TP&E.2), it was proposed to take up the above under Hybrid Annuity Model. •Govt. vide G.O.Rt.No.478, Dt:15-07-2022 accorded administrative sanction for appointment of consultant M/s. Green Design and Engineering Services Pvt., Ltd for preparation of DPRs. (including updating existing DPRs) • Further, it was proposed to take up UGD Scheme in Ramagundam Municipal Corporation (one of the ULB under NGT 30 ULBs under polluted River Stretches) under AMRUT 2.0. • It is to submit that Govt. of India has sanctioned SBM 2.0 for Telangana State which includes construction of STPs and I&D Structures in ULBs. It is proposed to take up STPs in 103 ULBs (other than GHMC, 26 ORR ULBS, 11 AMRUT Towns, Siricilla but including 29 NGT ULBs) under SBM 2.0 in Hybrid Annuity Model. • The funding for STPs under SBM 2.0 is restricted to 2025 population only (that too @70%), whereas as per CPHEEO Manual, STPs are to be designed for 15 years (Prospective) and 30 years (ultimate). Accordingly, STPs capacities are calculated as per Prospective population Demand for 2038 and Ultimate population Demand for 2053. • Hence, the sanctioned amount under SBM 2.0 is not sufficient to meet the construction of STPs as per CPHEEO Manual Design. • Hence, it is proposed to float tenders on Hybrid Annuity Model by utilising the SBM provision as Viability Gap Funding. <p>Addressed to Govt. for according approval to call tenders with open technology on RFP mode pending administrative sanction for taking up construction of 344 Nos of STPs in 103 ULBs for capacity of 789.20 MLD under SBM 2.0.</p> <p>Further, the Govt. vide Memo No. 6361/Engg.2/2023 of MA&UD (Engg.) Dept., Dt. 02-02-2024 has directed to submit revised proposals revising the capacities duly utilizing the GoI share under SBM 2.0 in Phase I as upfront payment, keeping in view the financial implication.</p> <p>Accordingly, this office vide letter Dt:07-02-2024 has submitted revised proposals and requested Govt. to accord Administrative sanction for an amount Rs. 3769.34 crores (including O&M and Annuity Payments and GST on Interest Component of Annuity Payments) for "Sewerage Projects in 101 ULBs in the state of Telangana under SBM 2.0)</p> <p>Govt. vide G.O.Rt.No.388, Dt:21-08-2024 accorded administrative sanction for an amount of Rs.3769.34 Crores (including O&M and Annuity payments and GST on Interest component of Annuity payments) for "sewerage projects in 101 ULBS in the state of Telangana under SBM 2.0"). Tender invited and no bidders participated in 1st call. Tender is being recalled.</p>
2	Manuguru	Bhadradi	1	4.0					4.0	
3	palvancha	Kothagudem	1	10.0					10.0	
4	Yellandu		1	4.00					4.0	
5	Madhira		1	4.00					4.0	
6	Sattupalli	Khammam	2	3.00		1.00			4.0	
7	Wyra		1	4.00					4.0	
8	Mahabubabad		1	8.00					8.0	
9	Dornakal	Mahabubabad	1	1.70					1.7	
10	Maripeda		1	2.50					2.5	
11	Thorrur		1	2.30					2.3	
12	Alampur		1	1.70					1.7	
13	Gadwal	Jogulaba	1		8.00				8.0	
14	Ieeja	Gadwal	1		3.30				3.3	
15	Waddepalle		1			2.00			2.0	
16	Bhoothpur	Mahabubnagar	2	0.80	0.90				1.7	
17	Jadcherla		1	7.30					7.3	
18	Atchampet		1	4.00					4.0	
19	Kalwakurthy	Nagarkurnool	1		4.00				4.0	
20	Kollapur		1			3.00			3.0	
21	Nagarkurnool		0						0.0	
22	Kosgi		1	3.30					3.3	
23	Makthal	Narayanpet	1		3.60				3.6	
24	Narayanapet		1		5.00				5.0	
25	Amarchinta		1	2.00					2.0	
26	Atmakur		1	2.90					2.9	
27	Kothakota	Wanaparthy	1	3.20					3.2	
28	Pebbair		1				3.00		3.0	
29	Wanaparthy		1	8.00					8.0	

Sl No	Name of the ULB	Name of the District	No of STPs	STP 1	STP 2	STP 3	STP 4	STP 5	Total Capacity of STPs in MLD	Remarks
30	Banswada		1	3.50					3.5	
31	Kamareddy	Kamareddy	1		12.00				12.0	
32	Yellareddy		2	1.30		1.00			2.3	
33	Armoor		2	5.30				2.20	7.5	
34	Bheemgal	Nizamabad	1	1.90					1.9	
35	Bodhan		1	10.00					10.0	
36	Jagtial		2		2.00			10.00	12.0	
37	Korutla		1		8.60				8.6	
38	Metpally	Jagtial	1			6.10			6.1	
39	Dharmapuri		1		2.00				2.0	
40	Raikal		2	1.20	1.00				2.2	
41	Huzurabad		2		2.50	3.50			6.0	
42	Jammikunta	karimnagar	1		5.00				5.0	
43	Kothapalli		1		1.40				1.4	
44	Choppadandi		1	2.40					2.4	
45	Peddapalli		2		4.90			0.80	5.7	
46	Sultanabad	Pedapalli	1	3.00					3.0	
47	Manthani		1	3.00					3.0	
48	Vemulawada	Rajanna Sircilla	1	5.50					5.5	
49	Sircilla		0	0.00					0.0	
50	Parkal	Hanamkonda	1		4.00				4.0	
51	Bhupalpally	Jayashankar Bhupalpally	1			7.00			7.0	
52	Jangoan	Jangoan	1		6.00				6.0	
53	Wardhannapet	Warangal	2		1.00		0.60		1.6	
54	Narsampet		1	4.20					4.2	
55	Bhainsa		1			6.00			6.0	
56	Nirmal	Nirmal	2	10.00		1.50			11.5	
57	Khanapur		1	2.30					2.3	
58	Bellampally		1		6.50				6.5	
59	Mandamari		1			6.00			6.0	
60	Manchiriyal		2	8.00			2.00		10.0	
61	Kethanapally	Mancherial	1		4.00				4.0	

Sl No	Name of the ULB	Name of the District	No of STPs	STP 1	STP 2	STP 3	STP 4	STP 5	Total Capacity of STPs in MLD	Remarks
62	Luxettipet		1		3.00				3.0	
63	Chennur		1			3.00			3.0	
64	Naspur		1	8.50					8.5	
65	Kagaznagar	Komaram Bheem Asifabad	1				6.70		6.7	
66	Medak		1		6.00				6.0	
67	Narsapur	Medak	1			2.10			2.1	
68	Ramayampet		1	2.00					2.0	
69	Thoopran		1	3.00					3.0	
70	Andol-Jogipet		1				3.00		3.0	
71	Narayankhed		1	2.50					2.5	
72	Sadasivapet	Sangareddy	2		3.70	1.40			5.1	
73	Sangareddy		1		10.40				10.4	
74	Zaheerabad		1	10.10					10.1	
75	Cherial		1		2.30				2.3	
76	Dubbaka		1					3.50	3.5	
77	Gajwel	Siddipet	0	0.00					0.0	
78	Husnabad		1		2.70				2.7	
79	Chandur		1	1.70					1.7	
80	Chityal		1		1.90				1.9	
81	Devarakonda		1		2.00				2.0	
82	Haliya	Nalgonda	1	2.00					2.0	
83	Nakrekal		1	3.50					3.5	
84	Nandikonda		1	2.00					2.0	
85	Huzurnagar		1				4.50		4.5	
86	Kodada		1		8.50				8.5	
87	Neredcherla	Suryapet	1		1.80				1.8	
88	Tirumalagiri		1		2.10				2.1	
89	Alair		1	2.30					2.3	

Sl No	Name of the ULB	Name of the District	No of STPs	STP 1	STP 2	STP 3	STP 4	STP 5	Total Capacity of STPs in MLD	Remarks
90	Bhongir		2	2.20		4.60			6.8	
91	Choutuppal	Yadadri	1	4.20					4.2	
92	Mothkur	Bhuvanagiri	1	2.30					2.3	
93	Pochampally		2		1.20			1.00	2.2	
94	Yadagirigutta		1	2.50					2.5	
95	Amangal		1	3.00					3.0	
96	Ibrahimpattanam		1	4.50					4.5	
97	Kothur	Rangareddy	1		2.00				2.0	
98	Shadnagar		2	2.70	4.30				7.0	
99	Shankarpally		1	3.60					3.6	
100	Kodangal		1	2.40					2.4	
101	Parigi	Vikarabad	1		2.10				2.1	
102	Tandur		1		8.00				8.0	
103	Vikarabad		0		0.00	0.00			0.0	
104	Medchal	Medchal Mlakajiri	1		9.50				9.5	
Total			115						455.0	

Total No. of STPs proposed under SBM 2.0: 115 Nos (in 101 ULBs excluding Nagarkurnool, Gajwel, Vikarabad & tertiary treatment proposed for STP in Siricilla)

Total capacity proposed under SBM 2.0: 455.00 MLD

3436

Annexure-A12

Hyderabad Metropolitan Water Supply and Sewerage Board

Details of Existing STPs with utilization capacities & final disposal points

Sl.No	Location of STP With coordinates (Latitude and Longitude)	Status (Operational/ Non-Operational/ Under Construction)	Technology	Installed Capacity of STP (in MLD)	Actual utilization of installed capacity (in MLD)	Location of disposal of treated sewage
1	Amberpet - STP Latitude :17.383889 Longitude:78.53778	Operational	UASB	339	314	Disposal to Musi River
2	Nagore - STP Latitude : 17.2258 Longitude: 78.3424	Operational	UASB	172	172	Disposal to Musi River
3	Nana Cheruvu - STP Latitude : 17.40053 Longitude: 78.57617	Operational	UASB	30	29.9	Disposal to Musi River
4	Miralam Tank - STP-1 Latitude :17.33809 Longitude:78.44909	Operational	Extended Aeration	10	8.4	Disposal to Miralam tank
5	Miralam Tank - STP-2 Latitude :17.33809 Longitude:78.44909	Operational	Extended Aeration	5	4.32	Disposal to Miralam tank
6	Khanabadi - STP Latitude :17.41675 Longitude: 78.46438	Operational	EA SBR ultra filtration Membrane	20	20	Disposal to Hussainsagar Lake
7	KIMS - STP (PICKET) Begumpet opposite KIMS Hospital Latitude :17.43737 Longitude: 78.47848	Operational	EA BNR	30	30	Disposal to Hussainsagar Lake.
8	Nacharam - STP (Pedda Cheruvu) Latitude : 17.42344 Longitude: 78.55092	Operational	Extended Aeration	10	10	Disposal to Pedda cheruvu tank
9	Durgam Cheruvu - STP-1, Kaveri hills, Madhapur, Hyderabad Latitude : 17.4372 Longitude: 78.39243	Operational	Extended Aeration	5	4.8	Disposal to Durgam cheruvu and water added to shilpaparam and KBRN park for gardening
10	Durgam Cheruvu - STP-2, Kaveri hills, Madhapur, Hyderabad Latitude : 17.4365883 Longitude: 78.3918677	Operational	SBR	7	7	Disposal to Durgam cheruvu
11	Saroornagar - STP Thrimurthy colony, Besides priyadarshini park, kharmanghat road, Hyderabad. Latitude :17.35375 Longitude: 78.53017	Operational	Extended Aeration	2.5	2.5	Disposal to Saroornagar Cheruvu
12	Langer House - STP Latitude : 17.38260 Longitude: 78.41408	Operational	Extended Aeration	1.2	1.23	Disposal to Langer House Lake
13	Saifilguda - STP Latitude : 17.46655 Longitude: 78.53472	Operational	Extended Aeration	0.6	0.6	Disposal to Saifilguda lake
14	Attapur - STP-1, Pinar NO. 123, backside of M/s. SNR Gardens , Attapur, Latitude : 17.373 Longitude: 78.43308	Operational	SBR	23	18	Disposal to River Musi
15	Attapur - STP-2, Pinar NO. 123, backside of M/s. SNR Gardens , Attapur, Latitude : 17.37309 Longitude: 78.4322	Operational	SBR	51	43	Disposal to River Musi
16	Nanakramguda - STP (Pedda Cheruvu) Narakramguda, Besides old rama naidu studios.	Operational	MBBR	4.5	4.5	Disposal to Bhagiradha Cheruvu (Manikonda cheruvu)
17	Khajaguda - STP Latitude : 17.4153 Longitude: 78.35948	Operational	MBBR	7	7	Disposal to Khajaguda lake
18	Khazakunta 12 MLD, STP Latitude :17.48243 Longitude: 78.42365	Operational	MBBR	12	12	Disposal to Khazakunta lake

3437

19	Pragathi Nagar - STP, Kukatpally, Medchal, Malkagiri Dist. Latitude : Longitude:	Operational	Extended Aeration	2.5	-	Disposal to Pragathi Nagar Lake
20	Lingamkunta - STP, Chandanagar, Serlingampally, Rangareddy Dist Latitude : Longitude:	Operational	MBBR	30	18	Disposal to Lingamkunta lake
21	Rangadhamuni STP, Kukatpally (V &M), Medchal District, Latitude : 17.47678 Longitude: 78.41299	Operational	Extended Aeration	5	5	Disposal to Rangadhamuni Cheruvu
22	Noor-Mohammed Kunta - STP, Rajendra Nagar, Latitude : 17.31452 Longitude: 78.42606	Operational	Extended Aeration	4	4	Disposal To Noor Mohd Kunta lake
23	Patel Cheruvu - STP Nacharam , Baba nagar, Rangareddy District. Latitude : 17.43494 Longitude: 78.548	Operational	Extended Aeration	2.5	2.5	Disposal to Patel cheruvu, nacharam
24	Krishna Ranjan Park - STP Hyderabad. Latitude : 17.43921 Longitude: 78.42915	Not In Operation	Extended Aeration	0.5	-	
25	Changam Sagar Lake - STP Park, Road No. 1, Banjara Hills, Hyderabad. Latitude : 17.42393 Longitude: 78.44639	Operational	Extended Aeration	0.5	0.5	Gardening and discharging Into small lake inside the Park.
26	Gopannapally – STP Serilingampally, Rangareddy District. Latitude : 17.4521 Longitude: 78.30468	Operational	MBBR	4.5	4.5	Disposal to Gopanpally Cheruvu.
27	Kokapet Latitude- 17.4060892, Longitude - 78.3281609	Operational	SBR	15	15	Disposal to kokapet
28	Miralam Site-1 Latitude - 17.3373884 Longitude- 78.4493804	Operational	SBR	41.5	10	Disposal to Miralam tank
29	Peddacheruvu Latitude - 17.424279 Longitude- 78.551428	Operational	SBR	17.5	15	Disposal to peddacheruvu
30	Nallacheruvu-1 Latitude - 17.3976436 Longitude - 78.5762743	Operational	SBR	86.5	55	Disposal to River Musi
31	Miyapur-Patecheruvu Latitude - 17.496261 Longitude 78.349059	Operational	SBR	7	3	Disposal to Lake
32	Saifiguda Latitude - 17.2758 Longitude 78.3260	Operational	SBR	5.5	4.5	Disposal to Lake
33	Knajakunta Latitude - 17.28595 Longitude 78.25265	Operational & OCEMS is under process	SBR	20	6	Disposal to Lake
34	Fathenagar-1 Latitude - 17.455665 Longitude 78.452845	Operational & OCEMS is under process	SBR	133	100	Disposal to Hussainsagar Lake
35	vennelagadda Latitude - N17°30'26" Longitude- E78°28'31"	Operational & OCEMS is under process	SBR	10	2	Disposal to Lake
36	Nagole Latitude - 17.2258 Longitude 78.3424	Operational & OCEMS is under process	SBR	320	170	Disposal to River Musi
Total in (MLD)				1435.3	1104.25	

Annexure - 13



ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE
 91/4 Gachibowli, Hyderabad - 500 032, Telangana State., India
 Phone: 040-23451395/396/397, Fax: 040-23451355
 E-Mail: eptri.lab@gmail.com, Web Page : <http://eptri.telangana.gov.in>

CPCB & DSIR
 ISO 14001:2015; ISO 9001:2015; ISO 45001:2018 Certified Laboratory


ANALYSIS REPORT

Registration Number : 24/WCS-432 Issue Date : 23.11.2024
 Sample Received : 23.10.2024 Customer Ref : Your W.O/GA/JA/HMWSSB/MOM
 STPs/2024-25/59, dt. 20.10.2024
 Date of Commencement : 23.10.2024 Lr. No & Date : 23.10.2024,
 Date of Completion : 09.11.2024
 Name & Address of the customer : Sri S. Subrahmanyam,
 General Manager(E),
 STP Division -I, HMWS&SB,
 Amberpet, Hyderabad - 500 013.
 Sample Particulars : Waste water samples
 Qty Received : ~2 Ltr + 300 mL + 300 mL each- in plastic containers and glass
 bottles
 Type of Sampling : Grab samples
 Sample condition : Suitable for analysis
 Sampling Procedure : Sample collected and submitted by EPTRI as per SOP 100
 Sample Code
 WCS-1 : HMWSSB STPs Raw Sewage water Inlet sample collected from
 339 MLD STP division-I at Amberpet, Hyderabad - 500 013
 WCS-2 : HMWSSB STPs Treated Sewage water Outlet sample collected
 from 339 MLD STP division-I at Amberpet Hyderabad - 500 013
 Sri S.Subrahmanyam, G. M (E) (HMWS&SB)
 Date of Sampling : 23.10.2024
 Sampled By : EPTRI
 Industry Representative : M/s. Ramky Infrastructure Limited
 Sub Contracting : Sub-Contracting was not awarded
 Deviation from Standard Methods : No deviation in the test method
 Sample Tested : As per the Standard Methods for the Examination of water &
 Wastewater by APHA, 24th Edition, 2023 & IS Method.
 Remarks : NIL

NABL Web Site



[Signature]
 Reviewed by
 Lab Representative

[Signature]
 Authorised by
 Dr. J. Sesa Srinivas
 Technical Manager

Issue No.	02	Issue Date	06.02.2020	Form No.	EPTRI/F/07A-ANR
Amend. No.	02	Amend. Date	09.01.2023	Page No.	1 of 4

3439



ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE
 91/4 Gachibowli, Hyderabad - 500 032, Telangana State., India
 Phone: 040-23451395/396/397, Fax: 040-23451355
 E-Mail: eptri.lab@gmail.com, Web Page : http://eptri.telangana.gov.in

CPCB & DSIR
 ISO 14001:2015; ISO 9001:2015; ISO 45001:2018 Certified Laboratory


ANALYSIS REPORT**TEST RESULTS**

Encl. Report No.24/WCS-432

Sl No	Test Parameter(s)	Remark	Unit	Test Method [APHA, 24 th Edition, 2023]	WCS-1	WCS-2
1	pH (25°C)	Accredited by NABL	-	4500-H+B, (Electrometric)	7.4	8.0
2	Turbidity	Accredited by NABL	NTU	2130. B, (Nephelometric)	25.1	1.29
3	Total Suspended Solids at 105°C	Accredited by NABL	mg/L	2540. D, (Gravimetric)	78	10
4	Oil & Grease	Accredited by NABL	mg/L	5520. B, (Partition-Gravimetric)	12	<1
5	Biochemical Oxygen Demand (3 days at 27°C)	Accredited by NABL	mg/L	IS 3025 (Part 44)	112	8
6	Chemical Oxygen Demand	Accredited by NABL	mg/L	5220-B, (open reflux)	188	28
7	Total Phosphate as PO ₄	Accredited by NABL	mg/L	4500- P.D, (Spectrophotometric)	1.6	1.2
8	Total Kjeldahl Nitrogen as N	Accredited by NABL	mg/L	4500- Norg.B, (Macro-Kjeldahl)	70	BDL

BDL - Below Detection Limit,

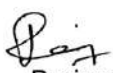
Detection Limit - Total Kjeldahl Nitrogen as N-5 mg/L;

Opinion and Interpretation: Not Applicable.

Note: 1) The results relate only to the items tested.

2) The results shall not be reproduced except in full without approval of lab.

3) Customer provided information may effect the validity of the test report.


 Reviewed by
 Lab Representative


 Authorised by
 Dr. J. Sessa Srinivas
 Technical Manager

*****END OF THE REPORT*****

Issue No.	02	Issue Date	06.02.2020	Form No.	EPTRI/F/07A-ANR
Amend. No.	02	Amend. Date	09.01.2023	Page No.	2 of 4

3440



ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE
 91/4 Gachibowli, Hyderabad - 500 032, Telangana State., India
 Phone: 040-23451395/396/397, Fax: 040-23451355
 E-Mail: eptri.lab@gmail.com, Web Page : http://eptri.telangana.gov.in



CPCB & DSIR
 ISO 14001:2015; ISO 9001:2015; ISO 45001:2018 Certified Laboratory

ANALYSIS REPORT

Registration Number : 24/MWC-329 Issue Date : 23.11.2024
 Sample Received : 23.10.2024 Customer Ref : Your W.O/GAJA/HMWSSB/MOM
 STPs/2024-25/59, dt. 20.10.2024
 Date of Commencement : 23.10.2024 Lr. No & Date : 23.10.2024,
 Date of Completion : 25 10.2024
 Name & Address of the customer : Sri S. Subrahmanyam,
 General Manager(E),
 STP Division -I, HMWS&SB,
 Amberpet, Hyderabad – 500 013.
 Sample Particulars : Waste water samples
 Qty Received : ~2 Ltr + 300 mL + 300 mL each- in plastic containers and glass
 bottles
 Type of Sampling : Grab samples
 Sample condition : Suitable for analysis
 Sampling Procedure : Sample collected and submitted by EPTRI as per SOP 100
 Sample Code
 WCS-1 : HMWSSB STPs Raw Sewage water Inlet sample collected from
 339 MLD STP division-I at Amberpet, Hyderabad – 500 013
 WCS-2 : HMWS SB STPs Treated Sewage water Outlet sample collected
 from 339 MLD STP division-I at Amberpet Hyderabad – 500 013
 Sri S. Subrahmanyam, G. M (E) (HMWS&SB)
 Date of Sampling : 23.10.2024
 Sampled By : EPTRI
 Industry Representative : M/s. Ramky Infrastructure Limited
 Sub Contracting : Sub-Contracting was not awarded
 Deviation from Standard Methods : No deviation in the test method
 Sample Tested : As per the Standard Methods for the Examination of water &
 Wastewater by APHA, 24th Edition, 2023.
 Remarks : NIL

NABL Web Site



Rj
 Reviewed by
 Lab Representative

K. Vamsi Krishna
 Authorised by
 K. Vamsi Krishna
 Project Faculty

Issue No.	02	Issue Date	06.02.2020	Form No.	EPTRI/F/07A-ANR
Amend. No.	02	Amend. Date	09.01.2023	Page No.	3 of 4

3441



ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE
 91/4 Gachibowli, Hyderabad - 500 032, Telangana State., India
 Phone: 040-23451395/396/397, Fax: 040-23451355
 E-Mail: eptri.lab@gmail.com, Web Page : http://eptri.telangana.gov.in

CPCB & DSIR
 ISO 14001:2015, ISO 9001:2015, ISO 45001:2018 Certified Laboratory



ANALYSIS REPORT

TEST RESULTS

Encl. Report No.24/MWC-329


SI No	Test Parameter(s)	Remark	Unit	Test Method [APHA, 24 th Edition, 2023]	WCS-1	WCS-2
1	Total Coliforms	Accredited by NABL	MPN/100 ml	9221 B	110000	4.5

Opinion and Interpretation: Not Applicable.

Note: 1) The results relate only to the items tested.

- 2) The results shall not be reproduced except in full without approval of lab.
 3) Customer provided information may effect the validity of the test report.




 Reviewed by
 Lab Representative


 Authorised by
 K. Vamsi Krishna
 Project Faculty

*****END OF THE REPORT*****

Issue No.	02	Issue Date	06.02.2020	Form No.	EPTRI/F/07A-ANR
Amend. No.	02	Amend. Date	09.01.2023	Page No.	4 of 4

3442

 EPTRI <small>ISIR</small> <small>Recognized Laboratory</small>	ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE 91/4 Gachibowli, Hyderabad - 500 032, Telangana State., India Phone: 040-23451395/396/397, Fax: 040-23451355 E-Mail: eptri.lab@gmail.com, Web Page : http://eptri.telangana.gov.in <small>ISO 14001:2015; ISO 9001:2015; ISO 45001:2018 Certified Laboratory</small>	 EPTRI <small>CPCR</small> <small>Recognized Laboratory</small>
--	--	--



ANALYSIS REPORT

Registration Number	: 24/WCS-432	Issue Date	: 23.11.2024
Sample Received	: 23.10.2024	Customer Ref	: Your W.O/GAJA/HMWSSB/MOM STPs/2024-25/59, dt. 20.10.2024
Date of Commencement	: 23.10.2024	Lr. No & Date	: 23.10.2024,
Date of Completion	: 09.11.2024		
Name & Address of the customer	: Sri S. Subrahmanyam, General Manager(E), STP Division -I, HMWS&SB, Amberpet, Hyderabad – 500 013.		
Sample Particulars	: Waste water samples		
Qty Received	: ~2 Ltr + 300 mL + 300 mL each- in plastic containers and glass bottles		
Type of Sampling	: Grab samples		
Sample condition	: Suitable for analysis		
Sampling Procedure	: Sample collected and submitted by EPTRI as per SOP 100		
Sample Code			
WCS-1	: HMWSSB STPs Raw Sewage water Inlet sample collected from 339 MLD STP division-I at Amberpet, Hyderabad – 500 013		
WCS-2	: HMWS SB STPs Treated Sewage water Outlet sample collected from 339 MLD STP division-I at Amberpet, Hyderabad – 500 013 Sri S. Subrahmanyam, G. M (E) (HMWS&SB)		
Date of Sampling	: 23.10.2024		
Sampled By	: EPTRI		
Industry Representative	: M/s. Ramky Infrastructure Limited		
Sub Contracting	: Sub-Contracting was not awarded		
Deviation from Standard Methods	: No deviation in the test method		
Sample Tested	: As per the Standard Methods for the Examination of water & Wastewater by APHA, 24 th Edition, 2023.		
Remarks	: NIL		


 Reviewed by
 Lab Representative


 Authorised by
 Dr. J. Sessa Srinivas
 Technical Manager

3443

 EPTRI <small>DSIR Recognized Laboratory</small>	ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE 91/4 Gachibowli, Hyderabad - 500 032, Telangana State., India Phone: 040-23451395/396/397, Fax: 040-23451355 E-Mail: eptri.lab@gmail.com, Web Page : http://eptri.telangana.gov.in ISO 14001:2015; ISO 9001:2015; ISO 45001:2018 Certified Laboratory	 EPTRI <small>CPEB Recognized Laboratory</small>
---	---	---

ANALYSIS REPORT

TEST RESULTS

Encl. Report No.24/WCS-432

Sl No	Test Parameter(s)	Remark	Unit	Test Method [APHA, 24 th Edition, 2023]	WCS-1	WCS-2
1	Dissolved Oxygen	Not Accredited by NABL	mg/L	4500-O.C	NIL	4.8
2	Colour	Not Accredited by NABL	CU	2120. B, (Visual Comparison)	30	20

Opinion and Interpretation: Not Applicable.

Note: 1) The results relate only to the items tested.

2) The results shall not be reproduced except in full without approval of lab.

3) Customer provided information may effect the validity of the test report.


 Reviewed by
 Lab Representative


 Authorised by
 Dr. J. Sesha Srinivas
 Technical Manager

*****ENDOF THE REPORT*****

3444



ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE
 91/4 Gachibowli, Hyderabad - 500 032, Telangana State., India
 Phone: 040-23451395/396/397, Fax: 040-23451355
 E-Mail: eptri.lab@gmail.com, Web Page : http://eptri.telangana.gov.in
 CPCB & DSIR
 ISO 14001:2015; ISO 9001:2015; ISO 45001:2018 Certified Laboratory




ANALYSIS REPORT

Registration Number : 24/WCS-429 **Issue Date** : 23.11.2024
Sample Received : 22.10.2024 **Customer Ref** : Your W.O/GAJA/HMWSSB/MOM
 STPs/2024-25/59, dt. 20.10.2024
Date of Commencement : 22.10.2024 **Lr. No & Date** : 22.10.2024,
Date of Completion : 09.11.2024
Name & Address of the customer : Sri S. Subrahmanyam,
 General Manager(E),
 STP Division -I, HMWS&SB,
 Amberpet, Hyderabad - 500 013.
Sample Particulars : Waste water samples
Qty Received : ~2 Ltr + 300 mL + 300 mL each- in plastic containers and glass
 bottles
Type of Sampling : Grab samples
Sample condition : Suitable for analysis
Sampling Procedure : Sample collected and submitted by EPTRI as per SOP 100
Sample Code
WCS-1 : HMWSSB STPs Raw Sewage water Inlet sample collected
 from 5 MLD STP division-I at Miralam Tank Madhapur,
WCS-2 : HMWSSB STPs Treated Sewage water Outlet sample collected
 from 5 MLD STP division-I at Miralam Tank (Amberpet
 Hyderabad- 500 013) Sri S.Subrahmanyam, G.M(E)(HMWS&SB)
Date of Sampling : 22.10.2024
Sampled By : EPTRI
Industry Representative : M/s. Ramky Infrastructure Limited
Sub Contracting :Sub-Contracting was not awarded
Deviation from Standard Methods :No deviation in the test method
Sample Tested : As per the Standard Methods for the Examination of water &
 Wastewater by APHA, 24th Edition, 2023 & IS Method.
Remarks : NIL

NABL Web Site




 Reviewed by
 Lab Representative


 Authorised by
 Dr. J. Sesa Srinivas
 Technical Manager

Issue No.	02	Issue Date	06.02.2020	Form No.	EPTRI/F/07A-ANR
Amend. No.	02	Amend. Date	09.01.2023	Page No.	1 of 4

3445



ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE
 91/4 Gachibowli, Hyderabad - 500 032, Telangana State., India
 Phone: 040-23451395/396/397, Fax: 040-23451355
 E-Mail: eptri.lab@gmail.com, Web Page : http://eptri.telangana.gov.in

CPCB & DSIR
 ISO 14001:2015, ISO 9001:2015, ISO 45001:2018 Certified Laboratory



TC-7709

ANALYSIS REPORT**TEST RESULTS**

Encl. Report No.24WCS-429

Sl No	Test Parameter(s)	Remark	Unit	Test Method [APHA, 24 th Edition, 2023]	WCS-1	WCS-2
1	pH (25°C)	Accredited by NABL	-	4500-H+B, (Electrometric)	7.2	7.7
2	Turbidity	Accredited by NABL	NTU	2130. B, (Nephelometric)	7.99	1.82
3	Total Suspended Solids at 105°C	Accredited by NABL	mg/L	2540. D, (Gravimetric)	78	14
4	Oil & Grease	Accredited by NABL	mg/L	5520. B, (Partition-Gravimetric)	10	<1
5	Biochemical Oxygen Demand (3 days at 27°C)	Accredited by NABL	mg/L	IS 3025 (Part 44)	118	12
6	Chemical Oxygen Demand	Accredited by NABL	mg/L	5220-B, (open reflux)	198	40
7	Total Phosphate as PO ₄	Accredited by NABL	mg/L	4500- P.D, (Spectrophotometric)	5.0	1.2
8	Total Kjeldahl Nitrogen as N	Accredited by NABL	mg/L	4500- Norg.B, (Macro-Kjeldahl)	84	BDL

BDL - Below Detection Limit,

Detection Limit - Total Kjeldahl Nitrogen as N-5 mg/L;

Opinion and Interpretation: Not Applicable.

Note: 1) The results relate only to the items tested.

2) The results shall not be reproduced except in full without approval of lab.


3) Customer provided information may effect the validity of the test report.


 Reviewed by
 Lab Representative


 Authorised by
 Dr. J. Sesa Srinivas
 Technical Manager

*****END OF THE REPORT*****


Issue No.	02	Issue Date	06.02.2020	Form No.	EPTRI/F/07A-ANR
Amend. No.	02	Amend. Date	09.01.2023	Page No.	2 of 4



3447

ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE
 91/4 Gachibowli, Hyderabad - 500 032, Telangana State., India
 Phone: 040-23451395/396/397, Fax: 040-23451355
 E-Mail: eptri.lab@gmail.com, Web Page : http://eptri.telangana.gov.in

CPCB & DSIR
 ISO 14001:2015; ISO 9001:2015; ISO 45001:2018 Certified Laboratory



TC-7709

ANALYSIS REPORT

TEST RESULTS

Encl. Report No.24/MWC-326

SINo	Test Parameter(s)	Remark	Unit	Test Method [APHA, 24 th Edition, 2023]	WCS-1	WCS-2
1	Total Coliforms	Accredited by NABL	MPN/100 ml	9221 B	110000	7.8


Opinion and Interpretation: Not Applicable.

Note: 1) The results relate only to the items tested.

2) The results shall not be reproduced except in full without approval of lab.

3) Customer provided information may effect the validity of the test report.




 Reviewed by
 Lab Representative


 Authorised by
 K. Vamsi Krishna
 Project Faculty

*****END OF THE REPORT*****

Issue No.	02	Issue Date	06.02.2020	Form No.	EPTRI/F/07A-ANR
Amend. No.	02	Amend. Date	09.01.2023	Page No.	4 of 4

3449

 EPTRI <small>DSIR Recognized Laboratory</small>	ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE 91/4 Gachibowli, Hyderabad - 500 032, Telangana State., India Phone: 040-23451395/396/397, Fax: 040-23451355 E-Mail: eptri.lab@gmail.com, Web Page : http://eptri.telangana.gov.in ISO 14001:2015; ISO 9001:2015; ISO 45001:2018 Certified Laboratory	 EPTRI <small>DSIR Recognized Laboratory</small>
---	---	---

ANALYSIS REPORT

TEST RESULTS

Encl. Report No.24/WCS-429

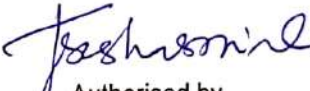
SINo	Test Parameter(s)	Remark	Unit	Test Method [APHA, 24 th Edition, 2023]	WCS-1	WCS-2
1	Dissolved Oxygen	Not Accredited by NABL	mg/L	4500-O.C	NIL	3.3
2	Colour	Not Accredited by NABL	CU	2120. B, (Visual Comparison)	30	10

Opinion and Interpretation: Not Applicable.

Note: 1) The results relate only to the items tested.


- 2) The results shall not be reproduced except in full without approval of lab.
 3) Customer provided information may effect the validity of the test report.


 Reviewed by
 Lab Representative


 Authorised by
 Dr. J. Sesa Srinivas
 Technical Manager

*****END OF THE REPORT*****

3451



ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE
 91/4 Gachibowli, Hyderabad - 500 032, Telangana State., India
 Phone: 040-23451395/396/397, Fax: 040-23451355
 E-Mail: eptri.lab@gmail.com, Web Page : http://eptri.telangana.gov.in

CPCB & DSIR
 ISO 14001:2015; ISO 9001:2015; ISO 45001:2018 Certified Laboratory



ANALYSIS REPORT**TEST RESULTS**

Encl. Report No.24/WCS-431

Sl No	Test Parameter(s)	Remark	Unit	Test Method [APHA, 24 th Edition, 2023]	WCS-1	WCS-2
1	pH (25°C)	Accredited by NABL	-	4500-H+B, (Electrometric)	7.4	7.8
2	Turbidity	Accredited by NABL	NTU	2130. B, (Nephelometric)	13.0	1.12
3	Total Suspended Solids at 105°C	Accredited by NABL	mg/L	2540. D, (Gravimetric)	81	13
4	Oil & Grease	Accredited by NABL	mg/L	5520. B, (Partition-Gravimetric)	9	<1
5	Biochemical Oxygen Demand (3 days at 27°C)	Accredited by NABL	mg/L	IS 3025 (Part 44)	110	8.4
6	Chemical Oxygen Demand	Accredited by NABL	mg/L	5220-B, (open reflux)	184	28
7	Total Phosphate as PO ₄	Accredited by NABL	mg/L	4500- P.D, (Spectrophotometric)	5.0	1.2
8	Total Kjeldahl Nitrogen as N	Accredited by NABL	mg/L	4500- Norg.B, (Macro-Kjeldahl)	98	BDL

BDL - Below Detection Limit,

Detection Limit - Total Kjeldahl Nitrogen as N-5 mg/L;

Opinion and Interpretation: Not Applicable.

Note: 1) The results relate only to the items tested.

2) The results shall not be reproduced except in full without approval of lab.

3) Customer provided information may effect the validity of the test report.


 Reviewed by
 Lab Representative


 Authorised by
 Dr. J. Sessa Srinivas
 Technical Manager

*****END OF THE REPORT*****

Issue No.	02	Issue Date	06.02.2020	Form No.	EPTRI/F/07A-ANR
Amend. No.	02	Amend. Date	09.01.2023	Page No.	2 of 4

3453



ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE
 91/4 Gachibowli, Hyderabad - 500 032, Telangana State., India
 Phone: 040-23451395/396/397, Fax: 040-23451355
 E-Mail: eptri.lab@gmail.com, Web Page : http://eptri.telangana.gov.in

CPCB & DSIR
 ISO 14001:2015; ISO 9001:2015; ISO 45001:2018 Certified Laboratory



TC-7709

ANALYSIS REPORT**TEST RESULTS**

Encl. Report No.24/MWC-328

Sl No	Test Parameter(s)	Remark	Unit	Test Method [APHA, 24 th Edition, 2023]	WCS-1	WCS-2
1	Total Coliforms	Accredited by NABL	MPN/100 ml	9221 B	110000	4.5

Opinion and Interpretation: Not Applicable.

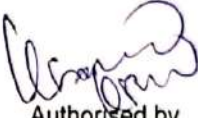
Note: 1) The results relate only to the items tested.

2) The results shall not be reproduced except in full without approval of lab.

3) Customer provided information may effect the validity of the test report.



Reviewed by
Lab Representative





Authorised by
K. Vamsi Krishna
Project Faculty

*****END OF THE REPORT*****

Issue No.	02	Issue Date	06.02.2020	Form No.	EPTRI/F/07A-ANR
Amend. No.	02	Amend. Date	09.01.2023	Page No.	4 of 4

3455

ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE
 91/4 Gachibowli, Hyderabad - 500 032, Telangana State., India
 Phone: 040-23451395/396/397, Fax: 040-23451355
 E-Mail: eptri.lab@gmail.com, Web Page : http://eptri.telangana.gov.in
 ISO 14001:2015, ISO 9001:2015, ISO 45001:2018 Certified Laboratory



ANALYSIS REPORT**TEST RESULTS**

Encl. Report No.24/WCS-431

Sl No	Test Parameter(s)	Remark	Unit	Test Method [APHA, 24 th Edition, 2023]	WCS-1	WCS-2
1	Dissolved Oxygen	Not Accredited by NABL	mg/L	4500-O.C	NIL	4.9
2	Colour	Not Accredited by NABL	CU	2120. B, (Visual Comparison)	30	10

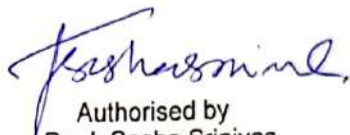
Opinion and Interpretation: Not Applicable.

Note: 1) The results relate only to the items tested.

2) The results shall not be reproduced except in full without approval of lab.


3) Customer provided information may effect the validity of the test report.


 Reviewed by
 Lab Representative


 Authorised by
 Dr. J. Sessa Srinivas
 Technical Manager

*****END OF THE REPORT*****

3456

	ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE 91/4Gachibowli, Hyderabad-500032, Telangana State., India Phone: 040-23451395/396/397, Fax: 040-23451355 E-Mail: eptri.lab@gmail.com, Web Page : http://eptri.telangana.gov.in CPCB & DSIR ISO 14001:2015; ISO 9001:2015; ISO 45001:2018 Certified Laboratory		

ANALYSIS REPORT

Registration Number : 24/WCS-430 Issue Date : 23.11.2024
 Sample Received : 23.10.2024 Customer Ref : Your W.O/GAJA/HMWSSB/MOM
 STPs/2024-25/59, dt. 20.10.2024
 Date of Commencement : 23.10.2024 Lr. No & Date : 23.10.2024,
 Date of Completion : 09.11.2024
 Name & Address of the customer : Sri S.Subramanyam,
 General Manager(E),
 STP Division -I, HMWS&SB,
 Amberpet, Hyderabad-500013.
 Sample Particulars : Waste water samples
 Qty Received : ~2 Ltr + 300 mL + 300 mL each- in plastic containers and glass
 bottles
 Type of Sampling : Grab samples
 Sample condition : Suitable for analysis
 Sampling Procedure : Sample collected and submitted by EPTRI as per SOP 100
 Sample Code
 WCS-1 : HMWSSB STPs Raw Sewage water Inlet sample collected from
 1.2 MLD STP division-I at Langer House
 WCS-2 : HMWSSB STPs Treated Sewage water Outlet sample collected from
 1.2 MLD STP division-I at Langer House (Amberpet Hyderabad –
 500 013. Sri S.Subrahmanyam, G. M(E)(HMWS&SB)
 Date of Sampling : 23.10.2024
 Sampled By : EPTRI
 Industry Representative : M/s. Ramky Infrastructure Limited
 Sub Contracting : Sub-Contracting was not awarded
 Deviation from Standard : No deviation in the test method
 Methods
 Sample Tested : As per the Standard Methods for the Examination of water &
 Wastewater by APHA, 24th Edition, 2023 & IS Method.
 Remarks : NIL

NABL Web Site




 Reviewed by
 Lab Representative


 Authorised by
 Dr. J. Sesha Srinivas
 Technical Manager

Issue No.	02	Issue Date	06.02.2020	Form No.	EPTRI/F/07A-ANR
Amend. No.	02	Amend. Date	09.01.2023	Page No.	1 of 4

3457



ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE
91/4Gachibowli, Hyderabad-500032, Telangana State, India
Phone: 040-23451395/396/397, Fax: 040-23451355
E-Mail: eptri.lab@gmail.com, Web Page : http://eptri.telangana.gov.in

CPCB AOSMR
ISO 14001:2015, ISO 9001:2015, ISO 45001:2018 Certified Laboratory



EC-1799

ANALYSIS REPORT**TEST RESULTS**

Encl. Report No.24/WCS-430

Sl No	Test Parameter(s)	Remark	Unit	Test Method [APHA, 24 th Edition, 2023]	WCS-1	WCS-2
1	pH (25°C)	Accredited by NABL	-	4500-H+B, (Electrometric)	7.6	8.1
2	Turbidity	Accredited by NABL	NTU	2130. B, (Nephelometric)	11.6	1.19
3	Total Suspended Solids at 105°C	Accredited by NABL	mg/L	2540. D, (Gravimetric)	82	10
4	Oil & Grease	Accredited by NABL	mg/L	5520. B, (Partition-Gravimetric)	10	<1
5	Biochemical Oxygen Demand (3 days at 27°C)	Accredited by NABL	mg/L	IS 3025 (Part 44)	130	10
6	Chemical Oxygen Demand	Accredited by NABL	mg/L	5220-B, (open reflux)	216	36
7	Total Phosphate as PO ₄	Accredited by NABL	mg/L	4500- P.D, (Spectrophotometric)	0.6	4.8
8	Total Kjeldahl Nitrogen as N	Accredited by NABL	mg/L	4500-Norg.B, (Macro- Kjeldahl)	50	BDL

BDL - Below Detection Limit,

Detection Limit - Total Kjeldahl Nitrogen as N-5 mg/L;

Opinion and Interpretation: Not Applicable.

Note: 1) The results relate only to the items tested.

2) The results shall not be reproduced except in full without approval of lab.

3) Customer provided information may effect the validity of the test report.


Reviewed by
Lab Representative


Authorised by
Dr. J. Sesha Srinivas
Technical Manager

*****END OF THE REPORT*****

Issue No.	02	Issue Date	06.02.2020	Form No.	EPTRI/F/07A-ANR
Amend. No.	02	Amend. Date	09.01.2023	Page No.	2 of 4

3458


ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE

91/4Gachibowli,Hyderabad-500032,TelanganaState.,India

Phone: 040-23451395/396/397, Fax: 040-23451355

E-Mail: eptri.lab@gmail.com, Web Page : http://eptri.telangana.gov.in

CPCB & DSIR

ISO 14001:2015; ISO 9001:2015; ISO 45001:2018 Certified Laboratory



ANALYSIS REPORT

Registration Number : 24/MWC-327 **Issue Date** : 23.11.2024
Sample Received : 23.10.2024 **Customer Ref** : Your W.O/GAJA/HMWSSB/MOM
 STPs/2024-25/31, dt.20.10.2024
Date of Commencement : 23.10.2024 **Lr. No & Date** : 23.10.2024,
Date of Completion : 25.10.2024
Name & Address of the customer : Sri S.Subramanyam,
 General Manager(E),
 STP Division -I, HMWS&SB,
 Amberpet,Hyderabad-500013.
Sample Particulars : Waste water samples
Qty Received : ~2 Ltr + 300 mL + 300 mL each- in plastic containers and glass
 bottles
Type of Sampling : Grab samples
Sample condition : Suitable for analysis
Sampling Procedure : Sample collected and submitted by EPTRI as per SOP100
Sample Code
WCS-1 : HMWSSB STPs Raw Sewage water Inlet sample collected from
 1.2 MLD STP division-I at Langer House
WCS-2 : HMWSSB STPs Treated Sewage water Outlet sample collected
 from 1.2 MLD STP division-I at Langer House (Amberpet
 Hyderabad – 500 013. Sri S. Subrahmanyam, G. M(E) (HMWS&SB)
Date of Sampling : 23.10.2024
Sampled By : EPTRI
Industry Representative : M/s. Ramky Infrastructure Limited
Sub Contracting : Sub-Contracting was not awarded
Deviation from Standard Methods : No deviation in the test method
Sample Tested : As per the Standard Methods for the Examination of water &
 Wastewater by APHA, 24th Edition, 2023.
Remarks : NIL

NABL Web Site




 Reviewed by
 Lab Representative


 Authorised by
 K. Vamsi Krishna
 Project Faculty


Issue No.	02	Issue Date	06.02.2020	Form No.	EPTRI/F/07A-ANR
Amend. No.	02	Amend. Date	09.01.2023	Page No.	3 of 4

3459



ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE
91/4Gachibowli, Hyderabad-500032, Telangana State., India
Phone: 040-23451395/396/397, Fax: 040-23451355
E-Mail: eptri.lab@gmail.com, Web Page : <http://eptri.telangana.gov.in>

CPCB & DSIR
ISO 14001:2015, ISO 9001:2015, ISO 45001:2018 Certified Laboratory



TC-7799

ANALYSIS REPORT**TEST RESULTS**

Encl. Report No.24/MWC-327

SI No	Test Parameter(s)	Remark	Unit	Test Method [APHA, 24 th Edition, 2023]	WCS-1	WCS-2
1	Total Coliforms	Accredited by NABL	MPN/100 ml	9221 B	130000	6.8

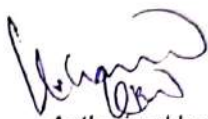
Opinion and Interpretation: Not Applicable.

Note: 1) The results relate only to the items tested.

2) The results shall not be reproduced except in full without approval of lab.

3) Customer provided information may effect the validity of the test report.


Reviewed by
Lab Representative


Authorised by
K. Vamsi Krishna
Project Faculty

*****END OF THE REPORT*****

Issue No.	02	Issue Date	06.02.2020	Form No.	EPTRI/F/07A-ANR
Amend. No.	02	Amend. Date	09.01.2023	Page No.	4 of 4

3460



ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE
 91/4 Gachibowli, Hyderabad-500032, Telangana State., India
 Phone: 040-23451395/396/397, Fax: 040-23451355
 E-Mail: eptri.lab@gmail.com, Web Page : <http://eptri.telangana.gov.in>
 ISO 14001:2015; ISO 9001:2015; ISO 45001:2018 Certified Laboratory




ANALYSIS REPORT

Registration Number : 24/WCS-430 Issue Date : 23.11.2024
 Sample Received : 23.10.2024 Customer Ref : Your W.O/GA/JA/HMWSSB/MOM
 STPs/2024-25/59, dt.20.10.2024
 Date of Commencement : 23.10.2024 Lr. No & Date : 23.10.2024,
 Date of Completion : 09.11.2024
 Name & Address of the customer : Sri S.Subrahmanyam,
 General Manager(E),
 STP Division -I, HMWS&SB,
 Amberpet, Hyderabad-500013.
 Sample Particulars : Waste water samples
 Qty Received : ~2 Ltr + 300 mL + 300 mL each- in plastic containers and glass
 bottles
 Type of Sampling : Grab samples
 Sample condition : Suitable for analysis
 Sampling Procedure : Sample collected and submitted by EPTRI as per SOP100
 Sample Code :
 WCS-1 : HMWSSB STPs Raw Sewage water Inlet sample collected from
 1.2 MLD STP division-I at Langer House
 WCS-2 : HMWSSB STPs Treated Sewage water Outlet sample collected from
 1.2 MLD STP division-I at Langer House (Amberpet Hyderabad –
 500 013. Sri S.Subrahmanyam, G. M(E)(HMWS&SB)
 Date of Sampling : 23.10.2024
 Sampled By : EPTRI
 Industry Representative : M/s. Ramky Infrastructure Limited
 Sub Contracting : Sub-Contracting was not awarded
 Deviation from Standard Methods : No deviation in the test method
 Sample Tested : As per the Standard Methods for the Examination of water &
 Wastewater by APHA, 24th Edition, 2023.
 Remarks : NIL



 Reviewed by
 Lab Representative


 Authorised by
 Dr. J. Sesha Srinivas
 Technical Manager

3461



ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE
 91/4Gachibowli, Hyderabad-500032, Telangana State., India
 Phone: 040-23451395/396/397, Fax: 040-23451355
 E-Mail: eptri.lab@gmail.com, Web Page : http://eptri.telangana.gov.in
 ISO 14001:2015; ISO 9001:2015; ISO 45001:2018 Certified Laboratory



ANALYSIS REPORT
TEST RESULTS

Encl. Report No.24/WCS-430

SI No	Test Parameter(s)	Remark	Unit	Test Method [APHA, 24 th Edition, 2023]	WCS-1	WCS-2
1	Dissolved Oxygen	Not Accredited by NABL	mg/L	4500-O.C	NIL	2.4
2	Colour	Not Accredited by NABL	CU	2120.B,(Visual Comparison)	30	10

Opinion and Interpretation: Not Applicable.

Note: 1) The results relate only to the items tested.

2) The results shall not be reproduced except in full without approval of lab.

3) Customer provided information may effect the validity of the test report.

Raj
Reviewed by
Lab Representative

J. S. Srinivas
Authorised by
Dr. J. S. Srinivas
Technical Manager

*****END OF THE REPORT*****

3463



ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE
91/4 Gachibowli, Hyderabad - 500 032, Telangana State., India
Phone: 040-23451395/396/397, Fax: 040-23451355
E-Mail: eptri.lab@gmail.com, Web Page : http://eptri.telangana.gov.in



CPCB & DSIR
ISO 14001:2015; ISO 9001:2015; ISO 45001:2018 Certified Laboratory

ANALYSIS REPORT

TEST RESULTS

Encl. Report No.24/WCS-423

Sl No	Test Parameter(s)	Remark	Unit	Test Method [APHA, 24 th Edition, 2023]	WCS-1	WCS-2
1	pH (25°C)	Accredited by NABL	-	4500-H+B, (Electrometric)	7.3	7.9
2	Turbidity	Accredited by NABL	NTU	2130. B, (Nephelometric)	11.6	0.59
3	Total Suspended Solids at 105°C	Accredited by NABL	mg/L	2540. D, (Gravimetric)	124	10
4	Oil & Grease	Accredited by NABL	mg/L	5520. B, (Partition-Gravimetric)	12	<1
5	Biochemical Oxygen Demand (3 days at 27°C)	Accredited by NABL	mg/L	IS 3025 (Part 44)	172	14
6	Chemical Oxygen Demand	Accredited by NABL	mg/L	5220-B, (open reflux)	288	44
7	Total Phosphate as PO ₄	Accredited by NABL	mg/L	4500- P.D, (Spectrophotometric)	0.5	0.4
8	Total Kjeldahl Nitrogen as N	Accredited by NABL	mg/L	4500- Norg.B, (Macro-Kjeldahl)	134	BDL

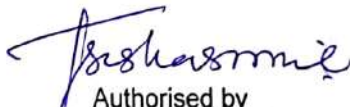
BDL - Below Detection Limit,
Detection Limit - Total Kjeldahl Nitrogen as N-5 mg/L;
Opinion and Interpretation: Not Applicable.

Note: 1) The results relate only to the items tested.

2) The results shall not be reproduced except in full without approval of lab.

3) Customer provided information may effect the validity of the test report.


 Reviewed by
 Lab Representative


 Authorised by
 Dr. J. Sessa Srinivas
 Technical Manager

*****END OF THE REPORT*****

Issue No.	02	Issue Date	06.02.2020	Form No.	EPTRI/F/07A-ANR
Amend. No.	02	Amend. Date	09.01.2023	Page No.	2 of 4

3464



ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE
 91/4 Gachibowli, Hyderabad - 500 032, Telangana State., India
 Phone: 040-23451395/396/397, Fax: 040-23451355
 E-Mail: eptri.lab@gmail.com, Web Page : <http://eptri.telangana.gov.in>

CPCB & DSIR
 ISO 14001:2015; ISO 9001:2015; ISO 45001:2018 Certified Laboratory



ANALYSIS REPORT

Registration Number	: 24/MWC-320	Issue Date	: 23.11.2024
Sample Received	: 22.10.2024	Customer Ref	: Your W.O/GAJA/HMWSSB/MOM STPs/2024-25/59, dt. 20.10.2024
Date of Commencement	: 22.10.2024	Lr. No & Date	: 22.10.2024,
Date of Completion	: 24.10.2024		
Name & Address of the customer	: Sri S. Subrahmanyam, General Manager(E), STP Division -I, HMWS&SB, Amberpet, Hyderabad – 500 013.		
Sample Particulars	: Waste water samples		
Qty Received	: ~2 Ltr + 300 mL + 300 mL each- in plastic containers and glass bottles		
Type of Sampling	: Grab samples		
Sample condition	: Suitable for analysis		
Sampling Procedure	: Sample collected and submitted by EPTRI as per SOP 100		
Sample Code	:		
WCS-1	: HMWSSB STPs Raw Sewage water Inlet sample collected from 4 MLD STP division-I at Noor Mohmad Kunta		
WCS-2	: HMWSSB Treated Sewage water Outlet sample collected from 4 MLD STP division-I at Noor Mohmad Kunta (Amberpet Hyderabad – 500 013) Sri S.Subrahmanyam, G. M(E)(HMWS&SB)		
Date of Sampling	: 22.10.2024		
Sampled By	: EPTRI		
Industry Representative	: M/s. Ramky Infrastructure Limited		
Sub Contracting	: Sub-Contracting was not awarded		
Deviation from Standard Methods	: No deviation in the test method		
Sample Tested	: As per the Standard Methods for the Examination of water & Wastewater by APHA, 24 th Edition, 2023.		
Remarks	: NIL		

NABL Web Site





Reviewed by
Lab Representative


Authorised by
K. Vamsi Krishna
Project Faculty


Issue No.	02	Issue Date	06.02.2020	Form No.	EPTRI/F/07A-ANR
Amend. No.	02	Amend. Date	09.01.2023	Page No.	3 of 4

3465



ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE
 91/4 Gachibowli, Hyderabad - 500 032, Telangana State., India
 Phone: 040-23451395/396/397, Fax: 040-23451355
 E-Mail: eptri.lab@gmail.com, Web Page : <http://eptri.telangana.gov.in>

CPCB & DSIR
 ISO 14001:2015; ISO 9001:2015; ISO 45001:2018 Certified Laboratory



TC-7799

ANALYSIS REPORT**TEST RESULTS**

Encl. Report No.24/MWC-320

SI No	Test Parameter(s)	Remark	Unit	Test Method [APHA, 24 th Edition, 2023]	WCS-1	WCS-2
1	Total Coliforms	Accredited by NABL	MPN/100 ml	9221 B	140000	7.8


Opinion and Interpretation: Not Applicable.

Note: 1) The results relate only to the items tested.

2) The results shall not be reproduced except in full without approval of lab.

3) Customer provided information may effect the validity of the test report.




 Reviewed by
 Lab Representative


 Authorised by
 K. Vamsi Krishna
 Project Faculty

*****END OF THE REPORT*****

Issue No.	02	Issue Date	06.02.2020	Form No.	EPTRI/F/07A-ANR
Amend. No.	02	Amend. Date	09.01.2023	Page No.	4 of 4


3466

 EPTRI <small>DSIR</small> <small>Recognized Laboratory</small>	ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE 91/4 Gachibowli, Hyderabad - 500 032, Telangana State., India Phone: 040-23451395/396/397, Fax: 040-23451355 E-Mail: eptri.lab@gmail.com, Web Page : http://eptri.telangana.gov.in <small>ISO 14001:2015; ISO 9001:2015; ISO 45001:2018 Certified Laboratory</small>	 EPTRI <small>CPCB</small> <small>Recognized Laboratory</small>
---	--	---

ANALYSIS REPORT


Registration Number Sample Received Date of Commencement Date of Completion Name & Address of the customer Sample Particulars Qty Received Type of Sampling Sample condition Sampling Procedure Sample Code WCS-1 WCS-2 Date of Sampling Sampled By Industry Representative Sub Contracting Deviation from Standard Methods Sample Tested Remarks	: 24/WCS-423 : 22.10.2024 : 22.10.2024 : 09.11.2024 : Sri S. Subrahmanyam, General Manager(E), STP Division -I, HMWS&SB, Amberpet, Hyderabad – 500 013. : Waste water samples : ~2 Ltr + 300 mL + 300 mL each- in plastic containers and glass bottles : Grab samples : Suitable for analysis : Sample collected and submitted by EPTRI as per SOP 100 : HMWSSB STPs Raw Sewage water Inlet sample collected from 4 MLD STP division-I at Noor Mohmad Kunta : HMWSSB Treated Sewage water Outlet sample collected from 4 MLD STP division-I at Noor Mohmad Kunta (Amberpet Hyderabad – 500 013) Sri S.Subrahmanyam, G. M(E)(HMWS&SB) : 22.10.2024 : EPTRI : M/s. Ramky Infrastructure Limited : Sub-Contracting was not awarded : No deviation in the test method : As per the Standard Methods for the Examination of water & wastewater by APHA, 24 th Edition, 2023. : NIL	Issue Date : 23.11.2024 Customer Ref : Your W.O/GAJA/HMWSSB/MOM STPs/2024-25/59, dt.20.10.2024 Lr. No & Date : 22.10.2024,
--	---	---


 Reviewed by
 Lab Representative



 Authorised by
 Dr. J. Sesa Srinivas
 Technical Manager

3467

ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE
 91/4 Gachibowli, Hyderabad - 500 032, Telangana State., India
 Phone: 040-23451395/396/397, Fax: 040-23451355
 E-Mail: eptri.lab@gmail.com, Web Page : http://eptri.telangana.gov.in
 ISO 14001:2015, ISO 9001:2015, ISO 45001:2018 Certified Laboratory



EPTRI
ISIR
Recognized Laboratory



EPTRI
CPCL
Recognized Laboratory

ANALYSIS REPORT**TEST RESULTS**

Encl. Report No.24/WCS-423

SI No	Test Parameter(s)	Remark	Unit	Test Method [APHA, 24 th Edition, 2023]	WCS-1	WCS-2
1	Dissolved Oxygen	Not Accredited by NABL	mg/L	4500-O.C	NIL	4.7
2	Colour	Not Accredited by NABL	CU	2120. B, (Visual Comparison)	40	20

Opinion and Interpretation: Not Applicable.

Note: 1) The results relate only to the items tested.

2) The results shall not be reproduced except in full without approval of lab.

3) Customer provided information may effect the validity of the test report.


 Reviewed by
 Lab Representative


 Authorised by
 Dr. J. Sessa Srinivas
 Technical Manager

*****END OF THE REPORT*****

3468



ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE
 91/4 Gachibowli, Hyderabad - 500 032, Telangana State., India
 Phone: 040-23451395/396/397, Fax: 040-23451355
 E-Mail: eptri.lab@gmail.com, Web Page : http://eptri.telangana.gov.in
 CPCB & DSIR
 ISO 14001:2015; ISO 9001:2015; ISO 45001:2018 Certified Laboratory



ANALYSIS REPORT

Registration Number : 24/WCS-428 Issue Date : 23.11.2024
 Sample Received : 22.10.2024 Customer Ref : Your W.O/GAJA/HMWSSB/MOM
 STPs/2024-25/31, dt./ 20.10.2024
 Date of Commencement : 22.10.2024 Lr. No & Date : 22.10.2024,
 Date of Completion : 09.11.2024
 Name & Address of the customer : Sri S. Subrahmanyam,
 General Manager(E),
 STP Division -I, HMWS&SB,
 Amberpet, Hyderabad - 500 013.
 Sample Particulars : Waste water samples
 Qty Received : ~2 Ltr + 300 mL + 300 mL each- in plastic containers and glass
 bottles
 Type of Sampling : Grab samples
 Sample condition : Suitable for analysis
 Sampling Procedure : Sample collected and submitted by EPTRI as per SOP 100
 Sample Code
 WCS-1 : HMWSSB STPs Raw Sewage water Inlet sample collected from
 10 MLD STP division-1 at Pedda Cheruvu
 WCS-2 : HMWS SB STPs Treated Sewage water Outlet sample collected from
 10 MLD STP division-1 at Pedda Cheruvu (Amberpet, Hyderabad -
 500 013) Sri S. Subrahmanyam, G. M(E)(HMWS&SB)
 Date of Sampling : 22.10.2024
 Sampled By : EPTRI
 Industry Representative : M/s. Ramky Infrastructure Limited
 Sub Contracting : Sub-Contracting was not awarded
 Deviation from Standard Methods : No deviation in the test method
 Sample Tested : As per the Standard Methods for the Examination of water &
 Wastewater by APHA, 23rd Edition, 2017 & IS Method.
 Remarks : NIL

NABL Web Site



Rei
 Reviewed by
 Lab Representative

J. S. Srinivas
 Authorised by
 Dr. J. Sessa Srinivas
 Technical Manager

Issue No.	02	Issue Date	06.02.2020	Form No.	EPTRI/F/07A-ANR
Amend. No.	02	Amend. Date	09.01.2023	Page No.	1 of 4

3469



ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE
 91/4 Gachibowli, Hyderabad - 500 032, Telangana State., India
 Phone: 040-23451395/396/397, Fax: 040-23451355
 E-Mail: eptri.lab@gmail.com, Web Page : http://eptri.telangana.gov.in
 CPCB & DSIR
 ISO 14001:2015; ISO 9001:2015; ISO 45001:2018 Certified Laboratory



ANALYSIS REPORT

TEST RESULTS

Encl. Report No.24/WCS-428

Sl No	Test Parameter(s)	Remark	Unit	Test Method [APHA, 24 th Edition, 2023]	WCS-1	WCS-2
1	pH (25°C)	Accredited by NABL	-	4500-H+B, (Electrometric)	7.9	8.1
2	Turbidity	Accredited by NABL	NTU	2130. B, (Nephelometric)	7.34	1.34
3	Total Suspended Solids at 105°C	Accredited by NABL	mg/L	2540. D, (Gravimetric)	119	14
4	Oil & Grease	Accredited by NABL	mg/L	5520. B, (Partition-Gravimetric)	12	<1
5	Biochemical Oxygen Demand (3 days at 27°C)	Accredited by NABL	mg/L	IS 3025 (Part 44)	124	10
6	Chemical Oxygen Demand	Accredited by NABL	mg/L	5220-B, (open reflux)	208	36
7	Total Phosphate as PO ₄	Accredited by NABL	mg/L	4500- P.D, (Spectrophotometric)	0.65	0.62
8	Total Kjeldahl Nitrogen as N	Accredited by NABL	mg/L	4500- Norg.B, (Macro-Kjeldahl)	67.2	BDL

BDL - Below Detection Limit,

Detection Limit - Total Kjeldahl Nitrogen as N-5 mg/L;

Opinion and Interpretation: Not Applicable.

Note: 1) The results relate only to the items tested.

2) The results shall not be reproduced except in full without approval of lab.

3) Customer provided information may effect the validity of the test report.




 Reviewed by
 Lab Representative


 Authorised by
 Dr. J. Sesha Srinivas
 Technical Manager

*****END OF THE REPORT*****

Issue No.	02	Issue Date	06.02.2020	Form No.	EPTRI/F/07A-ANR
Amend. No.	02	Amend. Date	09.01.2023	Page No.	2 of 4

3471

	ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE 91/4 Gachibowli, Hyderabad - 500 032, Telangana State., India Phone: 040-23451395/396/397, Fax: 040-23451355 E-Mail: eptri.lab@gmail.com, Web Page : http://eptri.telangana.gov.in		
	CPCB & DSIR ISO 14001:2015; ISO 9001:2015; ISO 45001:2018 Certified Laboratory		

ANALYSIS REPORT

TEST RESULTS

Encl. Report No.24/MWC-325

SI No	Test Parameter(s)	Remark	Unit	Test Method [APHA, 24 th Edition, 2023]	WCS-1	WCS-2
1	Total Coliforms	Accredited by NABL	MPN/100 ml	9221 B	110000	4.5

Opinion and Interpretation: Not Applicable.

Note: 1) The results relate only to the items tested.

2) The results shall not be reproduced except in full without approval of lab.

3) Customer provided information may effect the validity of the test report.



Reviewed by
Lab Representative




Authorised by
K. Vamsi Krishna
Project Faculty


*****END OF THE REPORT*****

Issue No.	02	Issue Date	06.02.2020	Form No.	EPTRI/F/07A-ANR
Amend. No.	02	Amend. Date	09.01.2023	Page No.	4 of 4

3472



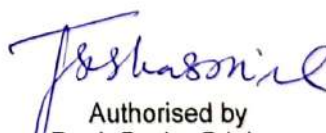
ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE
 91/4 Gachibowli, Hyderabad - 500 032, Telangana State., India
 Phone: 040-23451395/396/397, Fax: 040-23451355
 E-Mail: eptri.lab@gmail.com, Web Page : http://eptri.telangana.gov.in
 ISO 14001:2015; ISO 9001:2015; ISO 45001:2018 Certified Laboratory



ANALYSIS REPORT

Registration Number	: 24/WCS-428	Issue Date	: 23.11.2024
Sample Received	: 22.10.2024	Customer Ref	: Your W.O/GAJA/HMWSSB/MOM STPs/2024-25/59, dt. 20.10.2024
Date of Commencement	: 22.10.2024	Lr. No & Date	: 22.10.2024,
Date of Completion	: 09.11.2024		
Name & Address of the customer	: Sri S. Subrahmanyam, General Manager(E), STP Division -I, HMWS&SB, Amberpet, Hyderabad - 500 013.		
Sample Particulars	: Waste water samples		
Qty Received	: ~2 Ltr + 300 mL + 300 mL each- in plastic containers and glass bottles		
Type of Sampling	: Grab samples		
Sample condition	: Suitable for analysis		
Sampling Procedure	: Sample collected and submitted by EPTRI as per SOP 100		
Sample Code			
WCS-1	: HMWSSB STPs Raw Sewage water Inlet sample collected from 10 MLD STP division-1 at Pedda Cheruvu		
WCS-2	: HMWS SB STPs Treated Sewage water Outlet sample collected from 10 MLD STP division-1 at Pedda Cheruvu (Amberpet, Hyderabad- 500 013) Sri S.Subrahmanyam, G. M(E)(HMWS&SB)		
Date of Sampling	: 22.10.2024		
Sampled By	: EPTRI		
Industry Representative	: M/s. Ramky Infrastructure Limited		
Sub Contracting	: Sub-Contracting was not awarded		
Deviation from Standard Methods	: No deviation in the test method		
Sample Tested	: As per the Standard Methods for the Examination of water & Wastewater by APHA, 24 th Edition, 2023.		
Remarks	: NIL		


 Reviewed by
 Lab Representative


 Authorised by
 Dr. J. Sesha Srinivas
 Technical Manager

3473



ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE
 91/4 Gachibowli, Hyderabad - 500 032, Telangana State., India
 Phone: 040-23451395/396/397, Fax: 040-23451355
 E-Mail: eptri.lab@gmail.com, Web Page : <http://eptri.telangana.gov.in>
 ISO 14001:2015; ISO 9001:2015; ISO 45001:2018 Certified Laboratory



ANALYSIS REPORT

TEST RESULTS

Encl. Report No.24/WCS-428

Sl No	Test Parameter(s)	Remark	Unit	Test Method [APHA, 24 th Edition, 2023]	WCS-1	WCS-2
1	Dissolved Oxygen	Not Accredited by NABL	mg/L	4500-O.C	NIL	5.4
2	Colour	Not Accredited by NABL	CU	2120. B, (Visual Comparison)	40	20

Opinion and Interpretation: Not Applicable.

Note: 1) The results relate only to the items tested.

2) The results shall not be reproduced except in full without approval of lab.

3) Customer provided information may effect the validity of the test report.


 Reviewed by
 Lab Representative


 Authorised by
 Dr. J. Sesa Srinivas
 Technical Manager

*****END OF THE REPORT*****

3474



ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE
 91/4 Gachibowli, Hyderabad - 500 032, Telangana State., India
 Phone: 040-23451396/396/397, Fax: 040-23451355
 E-Mail: eptri.lab@gmail.com, Web Page : <http://eptri.telangana.gov.in>
 GPCB & DSIR
 ISO 14001:2015, ISO 9001:2015, ISO 45001:2018 Certified Laboratory



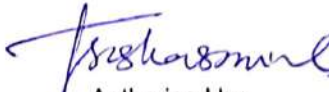
ANALYSIS REPORT

Registration Number : 24/WCS-427 Issue Date : 23.11.2024
 Sample Received : 22.10.2024 Customer Ref : Your W.O/GA/JA/HMWS&SB/MOM
 STPs/2024-26/59, dt. 20.10.2024
 Date of Commencement : 22.10.2024 Lr. No & Date : 22.10.2024,
 Date of Completion : 09.11.2024
 Name & Address of the customer : Sri S. Subrahmanyam,
 General Manager(E),
 STP Division -I, HMWS&SB,
 Amberpet, Hyderabad - 500 013.
 Sample Particulars : Waste water samples
 Qty Received : ~2 Ltr + 300 mL + 300 mL each- in plastic containers and glass
 bottles
 Type of Sampling : Grab samples
 Sample condition : Suitable for analysis
 Sampling Procedure : Sample collected and submitted by EPTRI as per SOP 100
 Sample Code
 WCS-1 : HMWS&SB STPs Raw Sewage water Inlet sample collected from
 2.5 MLD STP division-1 at Patel Cheruvu
 WCS-2 : HMWS&SB STPs Treated Sewage water Outlet sample collected
 from 2.5 MLD STP division-1 at Patel Cheruvu (Amberpet,
 Hyderabad- 500 013) Sri S.Subrahmanyam, G. M(E)(HMWS&SB)
 Date of Sampling : 22.10.2024
 Sampled By : EPTRI
 Industry Representative : M/s. Ramky Infrastructure Limited
 Sub Contracting : Sub-Contracting was not awarded
 Deviation from Standard Methods : No deviation in the test method
 Sample Tested : As per the Standard Methods for the Examination of water &
 Wastewater by APHA, 24th Edition, 2023 & IS Method.
 Remarks : NIL

NABL Web Site





 Reviewed by
 Lab Representative


 Authorised by
 Dr. J. Sesha Srinivas
 Technical Manager


Issue No.	02	Issue Date	06.02.2020	Form No.	EPTRI/F/07A-ANR
Amend. No.	02	Amend. Date	09.01.2023	Page No.	1 of 4

3475



ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE
 91/4 Gachibowli, Hyderabad - 500 032, Telangana State., India
 Phone: 040-23451395/396/397, Fax: 040-23451355
 E-Mail: eptri.lab@gmail.com, Web Page : http://eptri.telangana.gov.in

CPCB & DSR
 ISO 14001:2015, ISO 9001:2015, ISO 45001:2018 Certified Laboratory



ANALYSIS REPORT
TEST RESULTS

Encl. Report No.24/WCS-427

Sl No	Test Parameter(s)	Remark	Unit	Test Method [APHA, 24 th Edition, 2023]	WCS-1	WCS-2
1	pH (25°C)	Accredited by NABL	-	4500-H+B, (Electrometric)	7.7	8.2
2	Turbidity	Accredited by NABL	NTU	2130. B, (Nephelometric)	3.05	0.52
3	Total Suspended Solids at 105°C	Accredited by NABL	mg/L	2540. D, (Gravimetric)	110	08
4	Oil & Grease	Accredited by NABL	mg/L	5520. B, (Partition-Gravimetric)	8	<1
5	Biochemical Oxygen Demand (3 days at 27°C)	Accredited by NABL	mg/L	IS 3025 (Part 44)	136	14
6	Chemical Oxygen Demand	Accredited by NABL	mg/L	5220-B, (open reflux)	228	48
7	Total Phosphate as PO ₄	Accredited by NABL	mg/L	4500- P.D, (Spectrophotometric)	0.7	1.07
8	Total Kjeldahl Nitrogen as N	Accredited by NABL	mg/L	4500- Norg.B, (Macro-Kjeldahl)	56	BDL

BDL - Below Detection Limit,

Detection Limit - Total Kjeldahl Nitrogen as N-5 mg/L;

Opinion and Interpretation: Not Applicable.

Note: 1) The results relate only to the items tested.

2) The results shall not be reproduced except in full without approval of lab.

3) Customer provided information may effect the validity of the test report.


 Reviewed by
 Lab Representative


 Authorised by
 Dr. J. Sesa Srinivas
 Technical Manager

*****END OF THE REPORT*****

Issue No.	02	Issue Date	06.02.2020	Form No.	EPTRI/F/07A-ANR
Amend. No.	02	Amend. Date	09.01.2023	Page No.	2 of 4

3476



ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE
 91/4 Gachibowli, Hyderabad - 500 032, Telangana State., India
 Phone: 040-23451395/396/397, Fax: 040-23451355
 E-Mail: eptri.lab@gmail.com, Web Page : http://eptri.telangana.gov.in
 CPCB & DSIR
 ISO 14001:2015; ISO 9001:2015; ISO 45001:2018 Certified Laboratory




ANALYSIS REPORT

Registration Number : 24/MWC-324 Issue Date : 23.11.2024
 Sample Received : 22.10.2024 Customer Ref : Your W.O/GAJA/HMWSSB/MOM
 STPs/2024-25/59, dt. 20.10.2024
 Date of Commencement : 22.10.2024 Lr. No & Date : 22.10.2024,
 Date of Completion : 24.10.2024
 Name & Address of the customer : Sri S. Subrahmanyam,
 General Manager(E),
 STP Division -I, HMWS&SB,
 Amberpet, Hyderabad - 500 013.
 Sample Particulars : Waste water samples
 Qty Received : ~2 Ltr + 300 mL + 300 mL each- in plastic containers and glass
 bottles
 Type of Sampling : Grab samples
 Sample condition : Suitable for analysis
 Sampling Procedure : Sample collected and submitted by EPTRI as per SOP 100
 Sample Code
 WCS-1 : HMWSSB STPs Raw Sewage water Inlet sample collected from
 2.5 MLD STP division-1 at Patel Cheruvu
 WCS-2 : HMWSSB STPs Treated Sewage water Outlet sample collected
 from 2.5 MLD STP division-1 at Patel Cheruvu (Amberpet,
 Hyderabad- 500 013) Sri S.Subrahmanyam, G. M(E)(HMWS&SB)
 Date of Sampling : 22.10.2024
 Sampled By : EPTRI
 Industry Representative : M/s. Ramky Infrastructure Limited
 Sub Contracting : Sub-Contracting was not awarded
 Deviation from Standard Methods : No deviation in the test method
 Sample Tested : As per the Standard Methods for the Examination of water &
 Wastewater by APHA, 24th Edition, 2023.
 Remarks : NIL

NABL Web Site




 Reviewed by
 Lab Representative


 Authorised by
 K. Vamsi Krishna
 Project Faculty

Issue No.	02	Issue Date	06.02.2020	Form No.	EPTRI/F/07A-ANR
Amend. No.	02	Amend. Date	09.01.2023	Page No.	3 of 4

3477



ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE
 91/4 Gachibowli, Hyderabad - 500 032, Telangana State., India
 Phone: 040-23451395/396/397, Fax: 040-23451355
 E-Mail: eptri.lab@gmail.com, Web Page : http://eptri.telangana.gov.in

GPCB & DSIR
 ISO 14001:2015, ISO 9001:2015, ISO 45001:2018 Certified Laboratory


ANALYSIS REPORT**TEST RESULTS**

Encl. Report No.24/MWC-324

Sl No	Test Parameter(s)	Remark	Unit	Test Method [APHA, 24 th Edition, 2023]	WCS-1	WCS-2
1	Total Coliforms	Accredited by NABL	MPN/100 ml	9221 B	130000	7.8

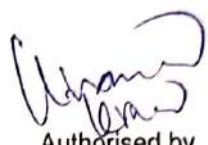
Opinion and Interpretation: Not Applicable.

Note: 1) The results relate only to the items tested.

2) The results shall not be reproduced except in full without approval of lab.



3) Customer provided information may effect the validity of the test report.


 Reviewed by
 Lab Representative


 Authorised by
 K. Vamsi Krishna
 Project Faculty

*****END OF THE REPORT*****

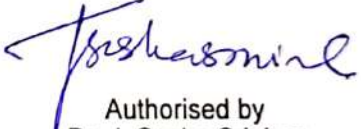
Issue No.	02	Issue Date	06.02.2020	Form No.	EPTRI/F/07A-ANR
Amend. No.	02	Amend. Date	09.01.2023	Page No.	4 of 4

 EPTRI <small>1998</small> <small>Recognized Laboratory</small>	ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE 91/4 Gachibowli, Hyderabad - 500 032, Telangana State., India Phone: 040-23451395/396/397, Fax: 040-23451355 E-Mail: eptri.lab@gmail.com, Web Page : http://eptri.telangana.gov.in <small>ISO 14001:2015; ISO 9001:2015; ISO 45001:2018 Certified Laboratory</small>	 EPTRI <small>1998</small> <small>Recognized Laboratory</small>
---	--	---



ANALYSIS REPORT

Registration Number	: 24/WCS-427	Issue Date	: 23.11.2024
Sample Received	: 22.10.2024	Customer Ref	: Your W.O/GA.JAHMNSSB/MOM STPs/2024-25/59,dt. 20.10.2024
Date of Commencement	: 22.10.2024	Lr. No & Date	: 22.10.2024,
Date of Completion	: 09.11.2024		
Name & Address of the customer	: Sri S. Subrahmanyam, General Manager(E), STP Division -I, HMWS&SB, Amberpet, Hyderabad - 500 013.		
Sample Particulars	: Waste water samples		
Qty Received	: ~2 Ltr + 300 mL + 300 mL each- in plastic containers and glass bottles		
Type of Sampling	: Grab samples		
Sample condition	: Suitable for analysis		
Sampling Procedure	: Sample collected and submitted by EPTRI as per SOP 100		
Sample Code			
WCS-1	: HMWSSB STPs Raw Sewage water Inlet sample collected from 2.5 MLD STP division-1 at Patel Cheruvu		
WCS-2	: HMWSSB STPs Treated Sewage water Outlet sample collected from 2.5 MLD STP division-1 at Patel Cheruvu (Amberpet, Hyderabad- 500 013) Sri S.Subrahmanyam, G. M(E)(HMWS&SB)		
Date of Sampling	: 22.10.2024		
Sampled By	: EPTRI		
Industry Representative	: M/s. Ramky Infrastructure Limited		
Sub Contracting	: Sub-Contracting was not awarded		
Deviation from Standard Methods	: No deviation in the test method		
Sample Tested	: As per the Standard Methods for the Examination of water & Wastewater by APHA, 24 th Edition, 2023.		
Remarks	: NIL		


 Reviewed by
 Lab Representative


 Authorised by
 Dr. J. Sesha Srinivas
 Technical Manager

3479

 EPTRI <small>DSIR</small> <small>Recognized Laboratory</small>	ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE 91/4 Gachibowli, Hyderabad - 500 032, Telangana State., India Phone: 040-23451395/396/397, Fax: 040-23451355 E-Mail: eptri.lab@gmail.com, Web Page : http://eptri.telangana.gov.in <small>ISO 14001:2015; ISO 9001:2015; ISO 45001:2018 Certified Laboratory</small>	 EPTRI <small>CPCB</small> <small>Recognized Laboratory</small>
---	--	---

ANALYSIS REPORT

TEST RESULTS

Encl. Report No.24/WCS-427

Sl No	Test Parameter(s)	Remark	Unit	Test Method [APHA, 24 th Edition, 2023]	WCS-1	WCS-2
1	Dissolved Oxygen	Not Accredited by NABL	mg/L	4500-O.C	NIL	5.0
2	Colour	Not Accredited by NABL	CU	2120. B, (Visual Comparison)	30	20

Opinion and Interpretation: Not Applicable.

Note: 1) The results relate only to the items tested.

2) The results shall not be reproduced except in full without approval of lab.



3) Customer provided information may effect the validity of the test report.


 Reviewed by
 Lab Representative


 Authorised by
 Dr. J. Sesha Srinivas
 Technical Manager

***** END OF THE REPORT *****

3480

	ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE 91/4 Gachibowli, Hyderabad - 500 032, Telangana State., India Phone: 040-23451395/396/397, Fax: 040-23451355 E-Mail: eptri.lab@gmail.com, Web Page : http://eptri.telangana.gov.in		
	CPCB & DSIR ISO 14001:2015; ISO 9001:2015; ISO 45001:2018 Certified Laboratory		

ANALYSIS REPORT

Registration Number	: 24/WCS-426	Issue Date	: 23.11.2024
Sample Received	: 22.10.2024	Customer Ref	: Your W.O/GAJA/HMWSSB/MOM STPs/2024-25/59, dt. 20.10.2024
Date of Commencement	: 22.10.2024	Lr. No & Date	: 21.09.2024,
Date of Completion	: 09.11.2024		
Name & Address of the customer	: Sri S.A.L Kumar, General Manager(E), STP Division –II, HMWS&SB, Durgam Cheruvu, Hyderabad – 500 081.		
Sample Particulars	: Waste water samples		
Qty Received	: ~2 Ltr + 300 mL + 300 mL each- in plastic containers and glass bottles		
Type of Sampling	: Grab samples		
Sample condition	: Suitable for analysis		
Sampling Procedure	: Sample collected and submitted by EPTRI as per SOP 100		
Sample Code			
WCS-1	: HMWSSB STPs Raw Sewage water Inlet sample collected from 30 MLD STP division-II at Nalla Cheruvu, Goshamahal ,		
WCS-2	: HMWSSB STPs Treated Sewage water Outlet sample collected from 30 MLD STP division-II at Nalla Cheruvu, Goshamahal , Hyderabad – 500 012		
Date of Sampling	: 22.10.2024		
Sampled By	: EPTRI		
Industry Representative	: M/s. Ramky Infrastructure Limited		
Sub Contracting	: Sub-Contracting was not awarded		
Deviation from Standard Methods	: No deviation in the test method		
Sample Tested	: As per the Standard Methods for the Examination of water & wastewater by APHA, 24 th Edition, 2023 & IS Method.		
Remarks	: NIL		

NABL Web Site





 Reviewed by
 Lab Representative


 Authorised by
 Dr. J. Sesha Srinivas
 Technical Manager


Issue No.	02	Issue Date	06.02.2020	Form No.	EPTRI/F/07A-ANR
Amend. No.	02	Amend. Date	09.01.2023	Page No.	1 of 4

3481



ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE
91/4 Gachibowli, Hyderabad - 500 032, Telangana State., India
Phone: 040-23451395/396/397, Fax: 040-23451355
E-Mail: eptri.lab@gmail.com, Web Page : http://eptri.telangana.gov.in

CPCB & DSIR
ISO 14001:2015; ISO 9001:2015; ISO 45001:2018 Certified Laboratory



TC-7709

ANALYSIS REPORT**TEST RESULTS**

Encl. Report No.24/WCS-426

Sl No	Test Parameter(s)	Remark	Unit	Test Method [APHA, 24 th Edition, 2023]	WCS-1	WCS-2
1	pH (25°C)	Accredited by NABL	-	4500-H+B, (Electrometric)	7.5	8.3
2	Turbidity	Accredited by NABL	NTU	2130. B, (Nephelometric)	3.35	0.48
3	Total Suspended Solids at 105°C	Accredited by NABL	mg/L	2540. D, (Gravimetric)	91	10
4	Oil & Grease	Accredited by NABL	mg/L	5520. B, (Partition-Gravimetric)	11	<1
5	Biochemical Oxygen Demand (3 days at 27°C)	Accredited by NABL	mg/L	IS 3025 (Part 44)	112	8
6	Chemical Oxygen Demand	Accredited by NABL	mg/L	5220-B, (open reflux)	186	28
7	Total Phosphate as PO ₄	Accredited by NABL	mg/L	4500- P.D, (Spectrophotometric)	0.15	0.87
8	Total Kjeldahl Nitrogen as N	Accredited by NABL	mg/L	4500- Norg.B, (Macro-Kjeldahl)	16.8	BDL

BDL - Below Detection Limit,

Detection Limit - Total Kjeldahl Nitrogen as N-5 mg/L;

Opinion and Interpretation: Not Applicable.

Note: 1) The results relate only to the items tested.

2) The results shall not be reproduced except in full without approval of lab.

3) Customer provided information may effect the validity of the test report.




Reviewed by
Lab Representative


Authorised by
Dr. J. Sesha Srinivas
Technical Manager

***** END OF THE REPORT *****

Issue No.	02	Issue Date	06.02.2020	Form No.	EPTRI/F/07A-ANR
Amend. No.	02	Amend. Date	09.01.2023	Page No.	2 of 4

3482

	ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE 91/4 Gachibowli, Hyderabad - 500 032, Telangana State., India Phone: 040-23451395/396/397, Fax: 040-23451355 E-Mail: eptri.lab@gmail.com, Web Page : http://eptri.telangana.gov.in CFCB & DSIR ISO 14001:2015, ISO 9001:2015, ISO 45001:2018 Certified Laboratory		

ANALYSIS REPORT

Registration Number	: 24/MWC-323	Issue Date	: 23.11.2024
Sample Received	: 22.10.2024	Customer Ref	: Your W.O/GA/JA/HMWSSB/MOM STPs/2024-25/59.dt. 20.10.2024
Date of Commencement	: 22.10.2024	Lr. No & Date	: 22.10.2024,
Date of Completion	: 24.10.2024		
Name & Address of the customer	: Sri S.A.L Kumar, General Manager(E), STP Division -II, HMWS&SB, Durgam Cheruvu, Hyderabad – 500 081.		
Sample Particulars	: Waste water samples		
Qty Received	: ~2 Ltr + 300 mL + 300 mL each- in plastic containers and glass bottles		
Type of Sampling	: Grab samples		
Sample condition	: Suitable for analysis		
Sampling Procedure	: Sample collected and submitted by EPTRI as per SOP 100		
Sample Code			
WCS-1	: HMWSSB STPs Raw Sewage water Inlet sample collected from 30 MLD STP division-II at Nalla Cheruvu, Goshamahal ,		
WCS-2	: HMWSSB STPs Treated Sewage water Outlet sample collected from 30 MLD STP division-II at Nalla Cheruvu, Goshamahal , Hyderabad – 500 012		
Date of Sampling	: 22.10.2024		
Sampled By	: EPTRI		
Industry Representative	: M/s. Ramky Infrastructure Limited		
Sub Contracting	: Sub-Contracting was not awarded		
Deviation from Standard Methods	: No deviation in the test method		
Sample Tested	: As per the Standard Methods for the Examination of water & Wastewater by APHA, 24 th Edition, 2023.		
Remarks	: NIL		

NABL Web Site




Reviewed by
Lab Representative

Authorised by
K. Vamsi Krishna
Project Faculty


Issue No.	02	Issue Date	06.02.2020	Form No.	EPTRI/F/07A-ANR
Amend. No.	02	Amend. Date	09.01.2023	Page No.	3 of 4

3483



ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE
 91/4 Gachibowli, Hyderabad - 500 032, Telangana State., India
 Phone: 040-23451395/396/397, Fax: 040-23451355
 E-Mail: eptri.lab@gmail.com, Web Page : http://eptri.telangana.gov.in

EPTRI
 CPCB & DSIR
 ISO 14001:2015; ISO 9001:2015; ISO 45001:2018 Certified Laboratory



TC-1709

ANALYSIS REPORT**TEST RESULTS**

Encl. Report No.24/MWC-323

SI No	Test Parameter(s)	Remark	Unit	Test Method [APHA, 24 th Edition, 2023]	WCS-1	WCS-2
1	Total Coliforms	Accredited by NABL	MPN/100 ml	9221 B	110000	4

Opinion and Interpretation: Not Applicable.

Note: 1) The results relate only to the items tested.

2) The results shall not be reproduced except in full without approval of lab.

3) Customer provided information may effect the validity of the test report.




 Reviewed by
 Lab Representative


 Authorised by
 K. Vamsi Krishna
 Project Faculty

*****END OF THE REPORT*****

Issue No.	02	Issue Date	06.02.2020	Form No.	EPTRI/F/07A-ANR
Amend. No.	02	Amend. Date	09.01.2023	Page No.	4 of 4


3484

 EPTRI <small>ISO 17025</small> <small>Recognized Laboratory</small>	ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE 91/4 Gachibowli, Hyderabad - 500 032, Telangana State., India Phone: 040-23451395/396/397, Fax: 040-23451355 E-Mail: eptri.lab@gmail.com, Web Page : http://eptri.telangana.gov.in <small>ISO 14001:2015, ISO 9001:2015, ISO 45001:2018 Certified Laboratory</small>	 EPTRI <small>ISO 17025</small> <small>Recognized Laboratory</small>
---	--	---


ANALYSIS REPORT

Registration Number	: 24/WCS-426	Issue Date	: 23.11.2024
Sample Received	: 22.10.2024	Customer Ref	: Your W.O/GAJA/HMWSSB/MOM STPs/2024-25/59, dt. 20.10.2024
Date of Commencement	: 22.10.2024	Lr. No & Date	: 22.10.2024,
Date of Completion	: 09.11.2024		
Name & Address of the customer	: Sri S.A.L Kumar, General Manager(E), STP Division -II, HMWS&SB, Durgam Cheruvu, Hyderabad – 500 081.		
Sample Particulars	: Waste water samples		
Qty Received	: ~2 Ltr + 300 mL + 300 mL each- in plastic containers and glass bottles		
Type of Sampling	: Grab samples		
Sample condition	: Suitable for analysis		
Sampling Procedure	: Sample collected and submitted by EPTRI as per SOP 100		
Sample Code			
WCS-1	: HMWSSB STPs Raw Sewage water Inlet sample collected from 30 MLD STP division-II at Nalla Cheruvu, Goshamahal ,		
WCS-2	: HMWSSB STPs Treated Sewage water Outlet sample collected from 30 MLD STP division-II at Nalla Cheruvu, Goshamahal , Hyderabad – 500 012		
Date of Sampling	: 22.10.2024		
Sampled By	: EPTRI		
Industry Representative	: M/s. Ramky Infrastructure Limited		
Sub Contracting	: Sub-Contracting was not awarded		
Deviation from Standard Methods	: No deviation in the test method		
Sample Tested	: As per the Standard Methods for the Examination of water & wastewater by APHA, 24 th Edition, 2023.		
Remarks	: NIL		



 Reviewed by
 Lab Representative


 Authorised by
 Dr. J. Sesha Srinivas
 Technical Manager

3485



ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE
 91/4 Gachibowli, Hyderabad - 500 032, Telangana State., India
 Phone: 040-23451395/396/397, Fax: 040-23451355
 E-Mail: eptri.lab@gmail.com, Web Page : http://eptri.telangana.gov.in
 ISO 14001:2015; ISO 9001:2015; ISO 45001:2018 Certified Laboratory



EPTRI
 DSIR
 Recognized Laboratory

EPTRI
 CPCB
 Recognized Laboratory

ANALYSIS REPORT**TEST RESULTS**

Encl. Report No.24/WCS-426

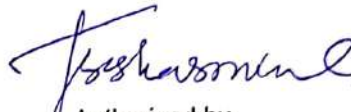
SI No	Test Parameter(s)	Remark	Unit	Test Method [APHA, 24 th Edition, 2023]	WCS-1	WCS-2
1	Dissolved Oxygen	Not Accredited by NABL	mg/L	4500-O.C	NIL	4.5
2	Colour	Not Accredited by NABL	CU	2120. B, (Visual Comparison)	30	20

Opinion and Interpretation: Not Applicable.

Note: 1) The results relate only to the items tested.

2) The results shall not be reproduced except in full without approval of lab.

3) Customer provided information may effect the validity of the test report.


Reviewed by
Lab Representative

Authorised by
Dr. J. Sessa Srinivas
Technical Manager

*****END OF THE REPORT*****

3487



ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE
 91/4 Gachibowli, Hyderabad - 500 032, Telangana State., India
 Phone: 040-23451395/396/397, Fax: 040-23451355
 E-Mail: eptri.lab@gmail.com, Web Page : http://eptri.telangana.gov.in

CPCB & DSIR
 ISO 14001:2015, ISO 9001:2015, ISO 45001:2018 Certified Laboratory



TC-7709

ANALYSIS REPORT
TEST RESULTS

Encl. Report No.24/WCS-424

Sl No	Test Parameter(s)	Remark	Unit	Test Method [APHA, 24 th Edition, 2023]	WCS-1	WCS-2
1	pH (25°C)	Accredited by NABL	-	4500-H+B, (Electrometric)	7.5	7.9
2	Turbidity	Accredited by NABL	NTU	2130. B, (Nephelometric)	4.78	0.49
3	Total Suspended Solids at 105°C	Accredited by NABL	mg/L	2540. D, (Gravimetric)	62	13
4	Oil & Grease	Accredited by NABL	mg/L	5520. B, (Partition-Gravimetric)	11	<1
5	Biochemical Oxygen Demand (3 days at 27°C)	Accredited by NABL	mg/L	IS 3025 (Part 44)	108	8
6	Chemical Oxygen Demand	Accredited by NABL	mg/L	5220-B, (open reflux)	180	26
7	Total Phosphate as PO ₄	Accredited by NABL	mg/L	4500- P.D, (Spectrophotometric)	6.6	2.5
8	Total Kjeldahl Nitrogen as N	Accredited by NABL	mg/L	4500- Norg.B, (Macro-Kjeldahl)	131	BDL

BDL - Below Detection Limit,

Detection Limit - Total Kjeldahl Nitrogen as N-5 mg/L;

Opinion and Interpretation: Not Applicable.

Note: 1) The results relate only to the items tested.

2) The results shall not be reproduced except in full without approval of lab.

3) Customer provided information may effect the validity of the test report.



Reviewed by
 Lab Representative



Authorised by
 Dr. J. Sessa Srinivas
 Technical Manager

*****END OF THE REPORT*****

Issue No.	02	Issue Date	06.02.2020	Form No.	EPTRI/F/07A-ANR
Amend. No.	02	Amend. Date	09.01.2023	Page No.	2 of 4

3488

ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE
 91/4 Gachibowli, Hyderabad - 500 032, Telangana State., India
 Phone: 040-23451395/396/397, Fax: 040-23451355
 E-Mail: eptri.lab@gmail.com, Web Page : http://eptri.telangana.gov.in

CPCB & DSIR
 ISO 14001:2015, ISO 9001:2015, ISO 45001:2018 Certified Laboratory

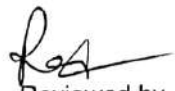



ANALYSIS REPORT

Registration Number : 24/MWC-321 Issue Date : 23.11.2024
 Sample Received : 22.10.2024 Customer Re : Your W.O/GAJA/HMWSSB/MOM
 STPs/2024-25/59, dt. 20.10.2024
 Date of Commencement : 22.10.2024 Lr. No & Date : 22.10.2024,
 Date of Completion : 24.10.2024
 Name & Address of the customer : Sri S. Subrahmanyam,
 General Manager(E),
 STP Division -I, HMWS&SB,
 Amberpet, Hyderabad – 500 013.
 Sample Particulars : Waste Water Samples
 Qty Received : ~2 Ltr + 300 mL + 300 mL each- in plastic containers and glass
 bottles
 Type of Sampling : Grab samples
 Sample condition : Suitable for analysis
 Sampling Procedure : Sample collected and submitted by EPTRI as per SOP 100
 Sample Code
 WCS-1 : HMWSSB STPs Raw Sewage water Inlet sample collected from
 2.5 MLD STP division-I at Saroor Nagar Cheruvu
 WCS-2 : HMWSSB STPs Treated Sewage water Outlet sample collected
 from 2.5 MLD STP division-I at Saroor Nagar Cheruvu, Amberpet,
 Hyderabad– 500 013 Sri S.Subrahmanyam, G. M(E)(HMWS&SB)
 Date of Sampling : 22.10.2024
 Sampled By : EPTRI
 Industry Representative : M/s. Ramky Infrastructure Limited
 Sub Contracting : Sub-Contracting was not awarded
 Deviation from Standard Methods : No deviation in the test method
 Sample Tested : As per the Standard Methods for the Examination of water &
 wastewater by APHA, 24th Edition, 2023.
 Remarks : NIL

Remarks
 NABL Web Site




 Reviewed by
 Lab Representative


 Authorised by
 K. Vamsi Krishna
 Project Faculty

Issue No.	02	Issue Date	06.02.2020	Form No.	EPTRI/F/07A-ANR
Amend. No.	02	Amend. Date	09.01.2023	Page No.	3 of 4

3489



ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE
 91/4 Gachibowli, Hyderabad - 500 032, Telangana State., India
 Phone: 040-23451395/396/397, Fax: 040-23451355
 E-Mail: eptri.lab@gmail.com, Web Page : <http://eptri.telangana.gov.in>
 CPCB & DSIR
 ISO 14001:2015; ISO 9001:2015; ISO 45001:2018 Certified Laboratory


ANALYSIS REPORT**TEST RESULTS**

Encl. Report No.24/MWC-321


Sl No	Test Parameter(s)	Remark	Unit	Test Method [APHA, 24 th Edition, 2023]	WCS-1	WCS-2
1	Total Coliforms	Accredited by NABL	MPN/100 ml	9221 B	94000	4.5

Opinion and Interpretation: Not Applicable.

Note: 1) The results relate only to the items tested.

2) The results shall not be reproduced except in full without approval of lab.


3) Customer provided information may effect the validity of the test report.

Reviewed by
Lab Representative



Authorised by
K. Vamsi Krishna
Project Faculty

*****END OF THE REPORT*****

Issue No.	02	Issue Date	06.02.2020	Form No.	EPTRI/F/07A-ANR
Amend. No.	02	Amend. Date	09.01.2023	Page No.	4 of 4



ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE
 91/4 Gachibowli, Hyderabad - 500 032, Telangana State., India
 Phone: 040-23451395/396/397, Fax: 040-23451355
 E-Mail: eptri.lab@gmail.com, Web Page : <http://eptri.telangana.gov.in>
 ISO 14001:2015; ISO 9001:2015; ISO 45001:2018 Certified Laboratory





ANALYSIS REPORT

Registration Number	: 24/WCS-424	Issue Date	: 23.11.2024
Sample Received	: 22.10.2024	Customer Ref	: Your W.O/GAJA/HMWSSB/MOM STPs/2024-25/59, dt. 20.10.2024
Date of Commencement	: 22.10.2024	Lr. No & Date	: 22.10.2024,
Date of Completion	: 09.11.2024		
Name & Address of the customer	: Sri S. Subrahmanyam, General Manager(E), STP Division -I, HMWS&SB, Amberpet, Hyderabad – 500 013.		
Sample Particulars	: Waste water samples		
Qty Received	: ~2 Ltr + 300 mL + 300 mL each- in plastic containers and glass bottles		
Type of Sampling	: Grab samples		
Sample condition	: Suitable for analysis		
Sampling Procedure	: Sample collected and submitted by EPTRI as per SOP 100		
Sample Code	: HMWSSB STPs Raw Sewage water Inlet sample collected from 2.5 MLD STP division-I at Saroor Nagar Cheruvu		
WCS-1	: HMWSSB STPs Treated Sewage water Outlet sample collected from 2.5 MLD STP division-I at Saroor Nagar Cheruvu, Amberpet, Hyderabad – 500 013, Sri S.Subrahmanyam, G. M(E), (HMWS&SB)		
WCS-2	: HMWSSB STPs Treated Sewage water Outlet sample collected from 2.5 MLD STP division-I at Saroor Nagar Cheruvu, Amberpet, Hyderabad – 500 013, Sri S.Subrahmanyam, G. M(E), (HMWS&SB)		
Date of Sampling	: 22.10.2024		
Sampled By	: EPTRI		
Industry Representative	: M/s. Ramky Infrastructure Limited		
Sub Contracting	: Sub-Contracting was not awarded		
Deviation from Standard Methods	: No deviation in the test method		
Sample Tested	: As per the Standard Methods for the Examination of water & Wastewater by APHA, 24 th Edition, 2023.		
Remarks	: NIL		


 Reviewed by
 Lab Representative


 Authorised by
 Dr. J. Sesha Srinivas
 Technical Manager

3491

 EPTRI <small>DSIR</small> <small>Recognized Laboratory</small>	ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE 91/4 Gachibowli, Hyderabad - 500 032, Telangana State., India Phone: 040-23451395/396/397, Fax: 040-23451355 E-Mail: eptri.lab@gmail.com, Web Page : http://eptri.telangana.gov.in <small>ISO 14001:2015; ISO 9001:2015; ISO 45001:2018 Certified Laboratory</small>	 EPTRI <small>DSIR</small> <small>Recognized Laboratory</small>
--	--	---

ANALYSIS REPORT

TEST RESULTS

Encl. Report No.24/WCS-424

SI No	Test Parameter(s)	Remark	Unit	Test Method [APHA, 24 th Edition, 2023]	WCS-1	WCS-2
1	Dissolved Oxygen	Not Accredited by NABL	mg/L	4500-O.C	NIL	3.9
2	Colour	Not Accredited by NABL	CU	2120. B, (VisualComparison)	30	20

Opinion and Interpretation: Not Applicable.

Note: 1) The results relate only to the items tested.

2) The results shall not be reproduced except in full without approval of lab.


3) Customer provided information may effect the validity of the test report.


 Reviewed by
 Lab Representative


 Authorised by
 Dr. J. Sesha Srinivas
 Technical Manager


***** END OF THE REPORT *****

3493



ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE
91/4 Gachibowli, Hyderabad - 500 032, Telangana State., India
Phone: 040-23451395/396/397, Fax: 040-23451355
E-Mail: eptri.lab@gmail.com, Web Page: http://eptri.telangana.gov.in

CPCB & DSIR
ISO 14001:2015; ISO 9001:2015; ISO 45001:2018 Certified Laboratory



TC-7799

ANALYSIS REPORT**TEST RESULTS**

Encl. Report No.24/WCS-413

SI No	Test Parameter(s)	Remark	Unit	Test Method [APHA, 24 th Edition, 2023]	WCS-1	WCS-2
1	pH (25°C)	Accredited by NABL	-	4500-H+B, (Electrometric)	7.1	8.1
2	Turbidity	Accredited by NABL	NTU	2130. B, (Nephelometric)	19.5	0.57
3	Total Suspended Solids at 105°C	Accredited by NABL	mg/L	2540. D, (Gravimetric)	80	10
4	Oil & Grease	Accredited by NABL	mg/L	5520. B, (Partition-Gravimetric)	9	<1
5	Biochemical Oxygen Demand (3 days at 27°C)	Accredited by NABL	mg/L	IS 3025 (Part 44):1993	112	7
6	Chemical Oxygen Demand	Accredited by NABL	mg/L	5220-B, (open reflux)	320	24
7	Total Phosphate as PO ₄	Accredited by NABL	mg/L	4500- P.D, (Spectrophotometric)	5.1	3.6
8	Total Kjeldahl Nitrogen as N	Accredited by NABL	mg/L	4500- Norg.B, (Macro-Kjeldahl)	44.8	BDL

BDL - Below Detection Limit,

Detection Limit - Total Kjeldahl Nitrogen as N-5 mg/L;

Opinion and Interpretation: Not Applicable.

Note: 1) The results relate only to the items tested.

2) The results shall not be reproduced except in full without approval of lab.

3) Customer provided information may effect the validity of the test report.



Reviewed by
Lab Representative



Authorised by
Dr. J. Sessa Srinivas
Technical Manager

*****END OF THE REPORT*****

Issue No.	02	Issue Date	06.02.2020	Form No.	EPTRI/F/07A-ANR
Amend. No.	02	Amend. Date	09.01.2023	Page No.	2 of 4

3494

	ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE 91/4 Gachibowli, Hyderabad - 500 032, Telangana State., India Phone: 040-23451395/396/397, Fax: 040-23451355 E-Mail: eptri.lab@gmail.com, Web Page: http://eptri.telangana.gov.in CPCR & DSIR ISO 14001:2015; ISO 9001:2015; ISO 45001:2018 Certified Laboratory	 TC-7709


ANALYSIS REPORT

Registration Number	: 24/MWC-314	Issue Date	: 23.11.2024
Sample Received	: 21.10.2024	Customer Ref	: Your W.O/GAJA/HMWSSB/MOM STPs/2024-25/59, dt. 20.10.2024
Date of Commencement	: 21.10.2024	Lr. No & Date	: 21.10.2024,
Date of Completion	: 23.10.2024		
Name & Address of the customer	: Sri S. Subrahmanyam, General Manager(E), STP Division -I, HMWS&SB, Amberpet, Hyderabad – 500 013.		
Sample Particulars	: Waste Water Samples		
Qty Received	: ~2 Ltr + 300mL + 300 mL each- in plastic containers and glass bottles		
Type of Sampling	: Grab samples		
Sample condition	: Suitable for analysis		
Sampling Procedure	: Sample collected and submitted by EPTRI as per SOP 100		
Sample Code			
WCS-1	: HMWSSB STPs Raw Sewage water Inlet sample collected from 0.6 MLD STP division-1 at Safilguda		
WCS-2	: HMWS SB STPs Treated Sewage water Outlet sample collected from 0.6 MLD STP division-I at Safilguda (Amberpet, Hyderabad – 500 013) Sri S.Subrahmanyam, G. M (E) (HMWS&SB)		
Date of Sampling	: 21.10.2024		
Sampled By	: EPTRI		
Industry Representative	: M/s. Ramky Infrastructure Limited		
Sub Contracting	: Sub-Contracting was not awarded		
Deviation from Standard Methods	: No deviation in the test method		
Sample Tested	: As per the Standard Methods for the Examination of water & wastewater by APHA, 24 th Edition, 2023 .		
Remarks	: NIL		

Remarks
NABL Web Site





 Reviewed by
 Lab Representative


 Authorised by
 K. Vamsi Krishna
 Project Faculty


Issue No.	02	Issue Date	06.02.2020	Form No.	EPTRI/F/07A-ANR
Amend. No.	02	Amend. Date	09.01.2023	Page No.	3 of 4

3495



ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE
 91/4 Gachibowli, Hyderabad - 500 032, Telangana State., India
 Phone: 040-23451395/396/397, Fax: 040-23451355
 E-Mail: eptri.lab@gmail.com, Web Page: http://eptri.telangana.gov.in

CPCB & DSIR
 ISO 14001:2015; ISO 9001:2015; ISO 45001:2018 Certified Laboratory


ANALYSIS REPORT**TEST RESULTS**

Encl. Report No.24/MWC-314

Sl No	Test Parameter(s)	Remark	Unit	Test Method [APHA, 24 th Edition, 2023]	WCS-1	WCS-2
1	Total Coliforms	Accredited by NABL	MPN/100 ml	9221 B	110000	4.5

Opinion and Interpretation: Not Applicable.

Note: 1) The results relate only to the items tested.

2) The results shall not be reproduced except in full without approval of lab.

3) Customer provided information may effect the validity of the test report.


Reviewed by
Lab Representative

Authorised by
K. Vamsi Krishna
Project Faculty

*****END OF THE REPORT*****

Issue No.	02	Issue Date	06.02.2020	Form No.	EPTRI/F/07A-ANR
Amend. No.	02	Amend. Date	09.01.2023	Page No.	4 of 4

3496

ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE
 91/4 Gachibowli, Hyderabad - 500 032, Telangana State., India
 Phone: 040-23451395/396/397, Fax: 040-23451355
 E-Mail: eptri.lab@gmail.com, Web Page : <http://eptri.telangana.gov.in>
 ISO 14001:2015, ISO 9001:2015, ISO 45001:2018 Certified Laboratory

EPTRI
CPDR
 Recognized Laboratory


ANALYSIS REPORT


Registration Number : 24/WCS-413 Issue Date : 23.11.2024
 Sample Received : 21.10.2024 Customer Ref : Your W.O/GAJA/HMWSSB/MOM
 STPs/2024-25/59,dt. 20.10.2024
 Date of Commencement : 21.10.2024 Lr. No & Date : 21.10.2024,
 Date of Completion : 11.11.2024
 Name & Address of the customer : Sri S. Subrahmanyam,
 General Manager(E),
 STP Division -I, HMWS&SB,
 Amberpet, Hyderabad – 500 013.
 Sample Particulars : Waste Water Samples
 Qty Received : ~2 Ltr + 300mL+ 300 mL each- in plastic containers and glass
 bottles
 Type of Sampling : Grab samples
 Sample condition : Suitable for analysis
 Sampling Procedure : Sample collected and submitted by EPTRI as SOP 100.
 Sample Code
 WCS-1 : HMWSSB STPs Raw Sewage water Inlet sample collected
 from 0.6 MLD STP division-1 at Safilguda
 WCS-2 : HMWS SB STPs Treated Sewage water Outlet sample collected
 from 0.6 MLD STP division-I at Safilguda (Amberpet,Hyderabad –
 500 013) Sri S.Subrahmanyam, G. M (E) (HMWS&SB)
 Date of Sampling : 21.10.2024
 Sampled By : EPTRI
 Industry Representative : M/s. Ramky Infrastructure Limited
 Sub Contracting : Sub-Contracting was not awarded
 Deviation from Standard Methods : No deviation in the test method
 Sample Tested : As per the Standard Methods for the Examination of water &
 wastewater by APHA, 24th Edition, 2023.
 Remarks : NIL


 Reviewed by
 Lab Representative


 Authorised by
 Dr. J. Sesa Srinivas
 Technical Manager

ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE
 91/4 Gachibowli, Hyderabad - 500 032, Telangana State., India
 Phone: 040-23451395/396/397, Fax: 040-23451355
 E-Mail: eptri.lab@gmail.com, Web Page : http://eptri.telangana.gov.in
 ISO 14001:2015; ISO 9001:2015; ISO 45001:2018 Certified Laboratory


EPTRI
DSIR
Recognized Laboratory


EPTRI
CPCB
Recognized Laboratory

ANALYSIS REPORT
TEST RESULTS

Encl. Report No.24/WCS-413

Sl No	Test Parameter(s)	Remark	Unit	Test Method	WCS-1	WCS-2
1	Dissolved Oxygen	Not Accredited by NABL	mg/L	4500-O.C	NIL	6.0
2	Colour	Not Accredited by NABL	CU	2120. B, (Visual Comparison)	30	10

Opinion and Interpretation: Not Applicable.
 Note: 1) The results relate only to the items tested.
 2) The results shall not be reproduced except in full without approval of lab.
 3) Customer provided information may effect the validity of the test report.


 Reviewed by
 Lab Representative


 Authorised by
 Dr. J. Sesha Srinivas
 Technical Manager

*****END OF THE REPORT*****



ENVIRONMENT PROTECTION & RESEARCH INSTITUTE
 91/4 Gachibowli, Hyderabad - 500 032, Telangana State., India
 Phone: 040-23451395/396/397, Fax: 040-23451355
 E-Mail: eptri.lab@gmail.com, Web Page : http://eptri.telangana.gov.in

CPCB & DSIR
 ISO 14001:2015; ISO 9001:2015; ISO 45001:2018 Certified Laboratory



ANALYSIS REPORT

Registration Number : 24/WCS-418 Issue Date : 23.11.2024
 Sample Received : 22.10.2024 Customer Ref : Your W.O/GAJA/HMWSSB/MOM
 STPs/2024-25/59,dt. 20.10.2024
 Date of Commencement : 22.10.2024 Lr. No & Date : 22.10.2024,
 Date of Completion : 11.11.2024
 Name & Address of the customer : Sri S.A.L Kumar,
 General Manager(E),
 STP Division -II, HMWS&SB,
 Durgam Cheruvu, Hyderabad – 500 081.
 Sample Particulars : Waste water samples
 Qty Received : ~2 Ltr + 300 mL + 300 mL each- in plastic containers and glass
 bottles
 Type of Sampling : Grab samples
 Sample condition : Suitable for analysis
 Sampling Procedure : Sample collected and submitted by EPTRI as per SOP 100
 Sample Code
 WCS-1 : HMWSSB STPs Raw Sewage water Inlet sample collected from
 5 MLD STP division-II at Durgam Cheruvu
 WCS-2 : HMWSSB STPs Treated Sewage water Outlet sample collected
 from 5 MLD STP division-II at Durgam Cheruvu (Durgam
 Cheruvu-Hyd-500081 Sri S.A.L Kumar G. M (E) (HMWS&SB)
 Date of Sampling : 22.10.2024
 Sampled By : EPTRI
 Industry Representative : M/s. Ramky Infrastructure Limited
 Sub Contracting : Sub-Contracting was not awarded
 Deviation from Standard Methods : No deviation in the test method
 Sample Tested : As per the Standard Methods for the Examination of water &
 wastewater by APHA, 24th Edition, 2023 & IS Method.
 Remarks : NIL

Remarks
 NABL Web Site




 Reviewed by
 Lab Representative


 Authorised by
 Dr. J. Sessa Srinivas
 Technical Manager

Issue No.	02	Issue Date	06.02.2020	Form No.	EPTRI/F/07A-ANR
Amend. No.	02	Amend. Date	09.01.2023	Page No.	1 of 4



ANALYSIS REPORT
TEST RESULTS

Encl. Report No.24/WCS-418

SI No	Test Parameter(s)	Remark	Unit	Test Method [APHA, 24 th Edition, 2023]	WCS-1	WCS-2
1	pH (25°C)	Accredited by NABL	-	4500-H+B, (Electrometric)	7.3	8.0
2	Turbidity	Accredited by NABL	NTU	2130. B, (Nephelometric)	13.1	0.56
3	Total Suspended Solids at 105°C	Accredited by NABL	mg/L	2540. D, (Gravimetric)	38	10
4	Oil & Grease	Accredited by NABL	mg/L	5520. B, (Partition-Gravimetric)	8	<1
5	Biochemical Oxygen Demand (3 days at 27°C)	Accredited by NABL	mg/L	IS 3025 (Part 44)	74	12
6	Chemical Oxygen Demand	Accredited by NABL	mg/L	5220-B, (open reflux)	124	32
7	Total Phosphate as PO4	Accredited by NABL	mg/L	4500- P.D, (Spectrophotometric)	6.9	2.8
8	Total Kjeldahl Nitrogen as N	Accredited by NABL	mg/L	4500- N _{org} -B, (Macro-Kjeldahl)	50	BDL

BDL - Below Detection Limit,
 Detection Limit - Total Phosphate as PO4 – mg/L; Total Kjeldahl Nitrogen as N-5 mg/L;
 Opinion and Interpretation: Not Applicable.
 Note: 1) The results relate only to the items tested.
 2) The results shall not be reproduced except in full without approval of lab.
 3) Customer provided information may effect the validity of the test report.

Rj
 Reviewed by
 Lab Representative

J. S. Srinivas
 Authorised by
 Dr. J. Sesha Srinivas
 Technical Manager

*****END OF THE REPORT*****

Issue No.	02	Issue Date	06.02.2020	Form No.	EPTRI/F/07A-ANR
Amend. No.	02	Amend. Date	09.01.2023	Page No.	2 of 4



ANALYSIS REPORT
TEST RESULTS

Encl. Report No.24/MWC-315

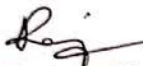
Sl No	Test Parameter(s)	Remark	Unit	Test Method [APHA, 24 th Edition, 2023]	WCS-1	WCS-2
1	Total Coliforms	Accredited by NABL	MPN/100 ml	9221 B	70000	6.8


Opinion and Interpretation: Not Applicable.

Note: 1) The results relate only to the items tested.

2) The results shall not be reproduced except in full without approval of lab.

3) Customer provided information may effect the validity of the test report.


Reviewed by
Lab Representative


Authorised by
K. Vamsi Krishna
Project Faculty

*****END OF THE REPORT*****

Issue No.	02	Issue Date	06.02.2020	Form No.	EPTRI/F/07A-ANR
Amend. No.	02	Amend. Date	09.01.2023	Page No.	4 of 4

ANALYSIS REPORT
TEST RESULTS

Encl. Report No.24/WCS-418

SI No	Test Parameter(s)	Remark	Unit	Test Method [APHA, 24 th Edition, 2023]	WCS-1	WCS-2
1	Dissolved Oxygen	Not Accredited by NABL	mg/L	4500-O.C	NIL	1.2
2	Colour	Not Accredited by NABL	CU	2120. B, (Visual Comparison)	20	10

Opinion and Interpretation: Not Applicable.

Note: 1) The results relate only to the items tested.

2) The results shall not be reproduced except in full without approval of lab.

3) Customer provided information may effect the validity of the test report.


 Reviewed by
 Lab Representative


 Authorised by
 Dr. J/Sesha Srinivas
 Technical Manager

***** END OF THE REPORT *****



ENVIRONMENT PROTECTION TESTING & RESEARCH INSTITUTE
 91/4 Gachibowli, Hyderabad - 500 032, Telangana State., India
 Phone: 040-23451395/396/397, Fax: 040-23451355
 E-Mail: eptri.lab@gmail.com, Web Page : http://eptri.telangana.gov.in



CPCB & DSIR
 ISO 14001:2015; ISO 9001:2015; ISO 45001:2018 Certified Laboratory

ANALYSIS REPORT


Registration Number : 24/WCS-433 Issue Date : 23.11.2024
 Sample Received : 23.10.2024 Customer Ref : Your W.O/GAJA/HMWSSB/MOM
 STPs/2024-25/59,dt.20.10.2024
 Date of Commencement : 23.10.2024 Lr. No & Date : 23.10.2024,
 Date of Completion : 09.11.2024
 Name & Address of the customer : Sri S.A.L Kumar,
 General Manager(E),
 STP Division -II, HMWS&SB,
 Durgam Cheruvu, Hyderabad - 500 081.
 Sample Particulars : Waste water samples
 Qty Received : ~2 Ltr + 300 mL + 300 mL each- in plastic containers and glass
 bottles
 Type of Sampling : Grab samples
 Sample condition : Suitable for analysis
 Sampling Procedure : Sample collected and submitted by EPTRI as per SOP 100
 Sample Code :
 WCS-1 : HMWSSB STPs Raw Sewage water Inlet sample collected from
 0.5 MLD STP division-II at JVR Park
 WCS-2 : HMWSSB STPs Treated Sewage water Outlet sample collected
 from 0.5 MLD STP division-II at JVR Park (Durgam Cheruvu-
 Hyd-500 081) Sri S.A.L Kumar G. M (E)(HMWS&SB)
 Date of Sampling : 23.10.2024
 Sampled By : EPTRI
 Industry Representative : M/s. Ramky Infrastructure Limited
 Sub Contracting : Sub-Contracting was not awarded
 Deviation from Standard Methods : No deviation in the test method
 Sample Tested : As per the Standard Methods for the Examination of water &
 wastewater by APHA, 24th Edition, 2023 & IS Method.
 Remarks : NIL

Remarks

NABL Web Site




 Reviewed by
 Lab Representative


 Authorised by
 Dr. J. Sesha Srinivas
 Technical Manager

Issue No.	02	Issue Date	06.02.2020	Form No.	EPTRI/F/07A-ANR
Amend. No.	02	Amend. Date	09.01.2023	Page No.	1 of 4



ENVIRONMENT PROTECTION TESTING & RESEARCH INSTITUTE
 91/4 Gachibowli, Hyderabad - 500 032, Telangana State., India
 Phone: 040-23451395/396/397, Fax: 040-23451355
 E-Mail: eptri.lab@gmail.com, Web Page : http://eptri.telangana.gov.in



CPCB & DSIR
 ISO 14001:2015; ISO 9001:2015; ISO 45001:2018 Certified Laboratory

ANALYSIS REPORT

TEST RESULTS

Encl. Report No.24/WCS-433

Sl No	Test Parameter(s)	Remark	Unit	Test Method [APHA, 24 th Edition, 2023]	WCS-1	WCS-2
1	pH (25°C)	Accredited by NABL	-	4500-H+B, (Electrometric)	7.2	7.4
2	Turbidity	Accredited by NABL	NTU	2130. B, (Nephelometric)	17.0	1.3
3	Total Suspended Solids at 105°C	Accredited by NABL	mg/L	2540. D, (Gravimetric)	76	13
4	Oil & Grease	Accredited by NABL	mg/L	5520. B, (Partition-Gravimetric)	7	<1
5	Biochemical Oxygen Demand (3 days at 27°C)	Accredited by NABL	mg/L	IS 3025 (Part 44)	114	10
6	Chemical Oxygen Demand	Accredited by NABL	mg/L	5220-B, (open reflux)	192	32
7	Total Phosphate as PO ₄	Accredited by NABL	mg/L	4500- P.D, (Spectrophotometric)	3.4	0.4
8	Total Kjeldahl Nitrogen as N	Accredited by NABL	mg/L	4500- Norg.B, (Macro-Kjeldahl)	64	BDL

BDL - Below Detection Limit,
 Detection Limit - Total Kjeldahl Nitrogen as N-5 mg/L;
 Opinion and Interpretation: Not Applicable.

- Note: 1) The results relate only to the items tested.
 2) The results shall not be reproduced except in full without approval of lab.
 3) Customer provided information may effect the validity of the test report.


 Reviewed by
 Lab Representative


 Authorised by
 Dr. J. Sessa Srinivas
 Technical Manager

***** END OF THE REPORT *****

Issue No.	02	Issue Date	06.02.2020	Form No.	EPTRI/F/07A-ANR
Amend. No.	02	Amend. Date	09.01.2023	Page No.	2 of 4

3504



ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE
 91/4 Gachibowli, Hyderabad - 500 032, Telangana State., India
 Phone: 040-23451395/396/397, Fax: 040-23451355
 E-Mail: eptri.lab@gmail.com, Web Page : http://eptri.telangana.gov.in



CPCB & DSIR
 ISO 14001:2015; ISO 9001:2015; ISO 45001:2018 Certified Laboratory

ANALYSIS REPORT

TEST RESULTS

Encl. Report No.24/MWC-330


SI No	Test Parameter(s)	Remark	Unit	Test Method [APHA, 24 th Edition, 2023]	WCS-1	WCS-2
1	Total Coliforms	Accredited by NABL	MPN/100 ml	9221 B	110000	6.8

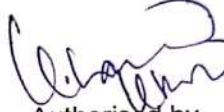
Opinion and Interpretation: Not Applicable.

Note: 1) The results relate only to the items tested.

2) The results shall not be reproduced except in full without approval of lab.

3) Customer provided information may effect the validity of the test report.


 Reviewed by
 Lab Representative



 Authorised by
 K. Vamsi Krishna
 Project Faculty


*****END OF THE REPORT*****

Issue No.	02	Issue Date	06.02.2020	Form No.	EPTRI/F/07A-ANR
Amend. No.	02	Amend. Date	09.01.2023	Page No.	4 of 4

3505

ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE
 91/4 Gachibowli, Hyderabad - 500 032, Telangana State., India
 Phone: 040-23451395/396/397, Fax: 040-23451355
 E-Mail: eptri.lab@gmail.com, Web Page : http://eptri.telangana.gov.in
 ISO 14001:2015; ISO 9001:2015; ISO 45001:2018 Certified Laboratory


EPTRI
DSIR
Recognized Laboratory


EPTRI
CPCB
Recognized Laboratory

ANALYSIS REPORT
TEST RESULTS

Encl. Report No.24/WCS-433

SI No	Test Parameter(s)	Remark	Unit	Test Method [APHA, 24 th Edition, 2023]	WCS-1	WCS-2
1	Dissolved Oxygen	Not Accredited by NABL	mg/L	4500-O.C	NIL	5.3
2	Colour	Not Accredited by NABL	CU	2120. B, (Visual Comparison)	20	10

Opinion and Interpretation: Not Applicable.

Note: 1) The results relate only to the items tested.

2) The results shall not be reproduced except in full without approval of lab.

3) Customer provided information may effect the validity of the test report.


 Reviewed by
 Lab Representative


 Authorised by
 Dr. J. Sesa Srinivas
 Technical Manager

*****END OF THE REPORT*****



3506 ENVIRONMENT PROTECTION TESTING & RESEARCH INSTITUTE

91/4 Gachibowli, Hyderabad - 500 032, Telangana State., India

Phone: 040-23451395/396/397, Fax: 040-23451355

E-Mail: eptri.lab@gmail.com, Web Page : <http://eptri.telangana.gov.in>

CPCB & DSIR

ISO 14001:2015; ISO 9001:2015; ISO 45001:2018 Certified Laboratory



TC-7709

ANALYSIS REPORT

Registration Number : 24/WCS-425 Issue Date : 23.11.2024
 Sample Received : 22.10.2024 Customer Ref : Your W.O/GAJA/HMWSSB/MOM
 STPs/2024-25/59,dt. 20.10.2024
 Date of Commencement : 22.10.2024 Lr. No & Date : 22.10.2024,
 Date of Completion : 09.11.2024
 Name & Address of the customer : Sri S.A.L Kumar,
 General Manager(E),
 STP Division -II, HMWS&SB,
 Durgam Cheruvu, Hyderabad – 500 081.
 Sample Particulars : Waste water samples
 Qty Received : ~2 Ltr + 300 mL + 300 mL each- in plastic containers and glass
 bottles
 Type of Sampling : Grab samples
 Sample condition : Suitable for analysis
 Sampling Procedure : Sample collected and submitted by EPTRI as per SOP 100
 Sample Code
 WCS-1 : HMWSSB STPs Raw Sewage water Inlet sample collected from
 172 MLD STP division-II at Nagole
 WCS-2 : HMWSSB STPs Treated Sewage water Outlet sample collected
 from 172 MLD STP division-II at Nagole (Durgam Cheruvu-Hyd-
 500081) Sri S.A.L Kumar G. M (E) (HMWS&SB)
 Date of Sampling : 22.10.2024
 Sampled By : EPTRI
 Industry Representative : M/s. Ramky Infrastructure Limited
 Sub Contracting : Sub-Contracting was not awarded
 Deviation from Standard Methods : No deviation in the test method
 Sample Tested : As per the Standard Methods for the Examination of water &
 Wastewater APHA, 24th Edition, 2023 & IS Method.
 Remarks : NIL

Remarks

NABL Web Site



Ret
 Reviewed by
 Lab Representative

J. Sesha Srinivas
 Authorised by
 Dr. J. Sesha Srinivas
 Technical Manager

Issue No.	02	Issue Date	06.02.2020	Form No.	EPTRI/F/07A-ANR
Amend. No.	02	Amend. Date	09.01.2023	Page No.	1 of 4



ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE

91/4 Gachibowli, Hyderabad - 500072, Telangana State., India

Phone: 040-23451395/396/397, Fax: 040-23451355

E-Mail: eptri.lab@gmail.com, Web Page : http://eptri.telangana.gov.in

CPCB & DSIR

ISO 14001:2015; ISO 9001:2015; ISO 45001:2018 Certified Laboratory



TC-7709

ANALYSIS REPORT

TEST RESULTS

Encl. Report No.24/WCS-425

SI No	Test Parameter(s)	Remark	Unit	Test Method [APHA, 24 th Edition, 2023]	WCS-1	WCS-2
1	pH (25°C)	Accredited by NABL	-	4500-H+B, (Electrometric)	7.8	8.0
2	Turbidity	Accredited by NABL	NTU	2130. B, (Nephelometric)	9.82	1.14
3	Total Suspended Solids at 105°C	Accredited by NABL	mg/L	2540. D, (Gravimetric)	79	16
4	Oil & Grease	Accredited by NABL	mg/L	5520. B, (Partition-Gravimetric)	13	<1
5	Biochemical Oxygen Demand (3 days at 27°C)	Accredited by NABL	mg/L	IS 3025 (Part 44)	116	12
6	Chemical Oxygen Demand	Accredited by NABL	mg/L	5220-B, (open reflux)	192	40
7	Total Phosphate as PO ⁴	Accredited by NABL	mg/L	4500- P.D, (Spectrophotometric)	0.8	BDL
8	Total Kjeldahl Nitrogen as N	Accredited by NABL	mg/L	4500- Norg.B, (Macro-Kjeldahl)	64	BDL

BDL - Below Detection Limit,

Detection Limit - Total Kjeldahl Nitrogen as N-5 mg/L, Total Phosphate as PO⁴ - 0.02 mg/L

Opinion and Interpretation: Not Applicable.

Note: 1) The results relate only to the items tested.

2) The results shall not be reproduced except in full without approval of lab.

3) Customer provided information may effect the validity of the test report.

Raj
Reviewed by
Lab Representative

J. S. Srinivas
Authorised by
Dr. J. Sessa Srinivas
Technical Manager

***** END OF THE REPORT *****

Issue No.	02	Issue Date	06.02.2020	Form No.	EPTRI/F/07A-ANR
Amend. No.	02	Amend. Date	09.01.2023	Page No.	2 of 4



3508

ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE
 91/4 Gachibowli, Hyderabad - 500 032, Telangana State., India
 Phone: 040-23451395/3967397, Fax: 040-23451355
 E-Mail: eptri.lab@gmail.com, Web Page : http://eptri.telangana.gov.in
 CPCB & DSIR
 ISO 14001:2015; ISO 9001:2015; ISO 45001:2018 Certified Laboratory



ANALYSIS REPORT
TEST RESULTS

Encl. Report No.24/MWC-322

SI No	Test Parameter(s)	Remark	Unit	Test Method [APHA, 24 th Edition, 2023]	WCS-1	WCS-2
1	Total Coliforms	Accredited by NABL	MPN/100 ml	9221 B	110000	6.8

Opinion and Interpretation: Not Applicable.

- Note: 1) The results relate only to the items tested.
 2) The results shall not be reproduced except in full without approval of lab.
 3) Customer provided information may effect the validity of the test report.

Raj
 Reviewed by
 Lab Representative

K. Vamsi Krishna
 Authorised by
 K. Vamsi Krishna
 Project Faculty

*****END OF THE REPORT*****

Issue No.	02	Issue Date	06.02.2020	Form No.	EPTRI/F/07A-ANR
Amend. No.	02	Amend. Date	09.01.2023	Page No.	4 of 4



ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE
 91/4 Gachibowli, Hyderabad 350902, Telangana State., India
 Phone: 040-23451395/396/397, Fax: 040-23451355
 E-Mail: eptri.lab@gmail.com, Web Page : http://eptri.telangana.gov.in
 ISO 14001:2015; ISO 9001:2015; ISO 45001:2018 Certified Laboratory



ANALYSIS REPORT

TEST RESULTS

Encl. Report No.24/WCS-425

SI No	Test Parameter(s)	Remark	Unit	Test Method [APHA, 24 th Edition, 2023]	WCS-1	WCS-2
1	Dissolved Oxygen	Not Accredited by NABL	mg/L	4500-O.C	NIL	5.4
2	Colour	Not Accredited by NABL	CU	2120. B, (Visual Comparison)	30	20

Opinion and Interpretation: Not Applicable.

Note: 1) The results relate only to the items tested.

2) The results shall not be reproduced except in full without approval of lab.

3) Customer provided information may effect the validity of the test report.


 Reviewed by
 Lab Representative


 Authorised by
 Dr. J. Sesha Srinivas
 Technical Manager

*****END OF THE REPORT*****



ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE
 91/4 Gachibowli, Hyderabad - 500 052, Telangana State., India
 Phone: 040-23451395/396/397, Fax: 040-23451355
 E-Mail: eptri.lab@gmail.com, Web Page : http://eptri.telangana.gov.in



CPCB & DSIR
 ISO 14001:2015; ISO 9001:2015; ISO 45001:2018 Certified Laboratory

ANALYSIS REPORT

Registration Number	: 24/WCS-422	Issue Date	: 23.11.2024
Sample Received	: 22.10.2024	Customer Ref	: Your W.O/GAJA/HMWSSB/MOM STPs/2024-25/59, dt. 20.10.2024
Date of Commencement	: 22.10.2024	Lr. No & Date	: 22.10.2024,
Date of Completion	: 09.11.2024		
Name & Address of the customer	: Sri S.A.L Kumar, General Manager(E), STP Division -II, HMWS&SB, Durgam Cheruvu, Hyderabad – 500 081.		
Sample Particulars	: Waste water samples		
Qty Received	: ~2 Ltr + 300 mL + 300 mL each- in plastic containers and glass bottles		
Type of Sampling	: Grab samples		
Sample condition	: Suitable for analysis		
Sampling Procedure	: Sample collected and submitted by EPTRI as per SOP 100		
Sample Code			
WCS-1	: HMWSSB STPs Raw Sewage water Inlet sample collected from 51 MLD STP division-II at Attapur		
WCS-2	: HMWSSB STPs Treated Sewage water Outlet sample collected from 51 MLD STP division-II at Attapur (Durgam Cheruvu-Hyd-500081 Sri S.A.L Kumar G. M (E)(HMWS&SB)		
Date of Sampling	: 22.10.2024		
Sampled By	: EPTRI		
Industry Representative	: M/s. Ramky Infrastructure Limited		
Sub Contracting	: Sub-Contracting was not awarded		
Deviation from Standard Methods	: No deviation in the test method		
Sample Tested	: As per the Standard Methods for the Examination of water & wastewater by APHA, 24 th Edition, 2023 & IS Method.		
Remarks	: NIL		

NABL Web Site



[Signature]
 Reviewed by
 Lab Representative

[Signature]
 Authorised by
 Dr. J. Sessa Srinivas
 Technical Manager

Issue No.	02	Issue Date	06.02.2020	Form No.	EPTRI/F/07A-ANR
Amend. No.	02	Amend. Date	09.01.2023	Page No.	1 of 4



ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE
 91/4 Gachibowli, Hyderabad - 500 032, Telangana State., India
 Phone: 040-23451395/396/397, Fax: 040-23451355
 E-Mail: eptri.lab@gmail.com, Web Page : http://eptri.telangana.gov.in



337

CPCB & DSIR
 ISO 14001:2015; ISO 9001:2015; ISO 45001:2018 Certified Laboratory

ANALYSIS REPORT

TEST RESULTS

Encl. Report No.24/WCS-422

Sl No	Test Parameter(s)	Remark	Unit	Test Method [APHA, 24 th Edition, 2023]	WCS-1	WCS-2
1	pH (25°C)	Accredited by NABL	-	4500-H+B, (Electrometric)	7.6	7.8
2	Turbidity	Accredited by NABL	NTU	2130. B, (Nephelometric)	7.55	0.54
3	Total Suspended Solids at 105°C	Accredited by NABL	mg/L	2540. D, (Gravimetric)	89	10
4	Oil & Grease	Accredited by NABL	mg/L	5520. B, (Partition-Gravimetric)	9	<1
5	Biochemical Oxygen Demand (3 days at 27°C)	Accredited by NABL	mg/L	IS 3025 (Part 44)	106	10
6	Chemical Oxygen Demand	Accredited by NABL	mg/L	5220-B, (open reflux)	176	36
7	Total Phosphate as PO ₄	Accredited by NABL	mg/L	4500- P.D, (Spectrophotometric)	2.5	1.8
8	Total Kjeldahl Nitrogen as N	Accredited by NABL	mg/L	4500- Norg.B, (Macro-Kjeldahl)	50	BDL

BDL - Below Detection Limit,

Detection Limit - Total Kjeldahl Nitrogen as N-5 mg/L;

Opinion and Interpretation: Not Applicable.

Note: 1) The results relate only to the items tested.

2) The results shall not be reproduced except in full without approval of lab.

3) Customer provided information may effect the validity of the test report.


 Reviewed by
 Lab Representative


 Authorised by
 Dr. J. Sessa Srinivas
 Technical Manager

***** END OF THE REPORT *****

Issue No.	02	Issue Date	06.02.2020	Form No.	EPTRI/F/07A-ANR
Amend. No.	02	Amend. Date	09.01.2023	Page No.	2 of 4



ENVIRONMENT PROTECTION & RESEARCH INSTITUTE
 91/4 Gachibowli, Hyderabad - 500 032, Telangana State., India
 Phone: 040-23451395/396/397, Fax: 040-23451355
 E-Mail: eptri.lab@gmail.com, Web Page : http://eptri.telangana.gov.in
 CPCB & DSIR
 ISO 14001:2015; ISO 9001:2015; ISO 45001:2018 Certified Laboratory



ANALYSIS REPORT
TEST RESULTS

Encl. Report No.24/MWC-319

SI No	Test Parameter(s)	Remark	Unit	Test Method [APHA, 24 th Edition, 2023]	WCS-1	WCS-2
1	Total Coliforms	Accredited by NABL	MPN/100 ml	9221 B	94000	6.8

Opinion and Interpretation: Not Applicable.
 Note: 1) The results relate only to the items tested.
 2) The results shall not be reproduced except in full without approval of lab.
 3) Customer provided information may effect the validity of the test report.

[Signature]
 Reviewed by
 Lab Representative

[Signature]
 Authorised by
 K. Vamsi Krishna
 Project Faculty

*****END OF THE REPORT*****

Issue No.	02	Issue Date	06.02.2020	Form No.	EPTRI/F/07A-ANR
Amend. No.	02	Amend. Date	09.01.2023	Page No.	4 of 4

ANALYSIS REPORT
TEST RESULTS

Encl. Report No.24/WCS-422

Sl No	Test Parameter(s)	Remark	Unit	Test Method [APHA, 24 th Edition, 2023]	WCS-1	WCS-2
1	Dissolved Oxygen	Not Accredited by NABL	mg/L	4500-O.C	NIL	5.6
2	Colour	Not Accredited by NABL	CU	2120. B, (Visual Comparison)	40	20

Opinion and Interpretation: Not Applicable.

- Note: 1) The results relate only to the items tested.
 2) The results shall not be reproduced except in full without approval of lab.
 3) Customer provided information may effect the validity of the test report.

Refendie
 Reviewed by
 Lab Representative

J. S. Srinivas
 Authorised by
 Dr. J. Sesa Srinivas
 Technical Manager

*****END OF THE REPORT*****



ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE
 91/4 Gachibowli, Hyderabad 501002, Telangana State., India
 Phone: 040-23451395/396/397, Fax: 040-23451355
 E-Mail: eptri.lab@gmail.com, Web Page : http://eptri.telangana.gov.in



CPCB & DSIR
 ISO 14001:2015; ISO 9001:2015; ISO 45001:2018 Certified Laboratory

ANALYSIS REPORT

Registration Number : 24/WCS-420 Issue Date : 23.11.2024
 Sample Received : 22.10.2024 Customer Ref : Your W.O/GAJA/HMWSSB/MOM
 STPs/2024-25/59,dt. 20.10.2024
 Date of Commencement : 22.10.2024 Lr. No & Date : 22.10.2024,
 Date of Completion : 11.11.2024
 Name & Address of the customer : Sri S.A.L Kumar,
 General Manager(E),
 STP Division -II, HMWS&SB,
 Durgam Cheruvu, Hyderabad – 500 081.
 Sample Particulars : Waste water samples
 Qty Received : ~2 Ltr + 300 mL + 300 mL each- in plastic containers and glass
 bottles
 Type of Sampling : Grab samples
 Sample condition : Suitable for analysis
 Sampling Procedure : Sample collected and submitted by EPTRI as per SOP 100
 Sample Code
 WCS-1 : HMWSSB STPs Raw Sewage water Inlet sample collected from
 4.5 MLD STP division-II at Nanakramguda
 WCS-2 : HMWS SB STPs Treated Sewage water Outlet sample collected
 from 4.5 MLD STP division-II at Nanakramguda Durgam
 Cheruvu-Hyd-500081 Sri S.A.L Kumar G. M (E)(HMWS&SB)
 Date of Sampling : 22.10.2024
 Sampled By : EPTRI
 Industry Representative : M/s. Ramky Infrastructure Limited
 Sub Contracting : Sub-Contracting was not awarded
 Deviation from Standard Methods : No deviation in the test method
 Sample Tested : As per the Standard Methods for the Examination of water &
 wastewater by APHA, 24th Edition, 2023 & IS Method.
 Remarks : NIL



[Signature]
 Reviewed by
 Lab Representative

[Signature]
 Authorised by
 Dr. J. Sessa Srinivas
 Technical Manager

Issue No.	02	Issue Date	06.02.2020	Form No.	EPTRI/F/07A-ANR
Amend. No.	02	Amend. Date	09.01.2023	Page No.	1 of 4

3515



ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE
 91/4 Gachibowli, Hyderabad - 500 032, Telangana State., India
 Phone: 040-23451395/396/397, Fax: 040-23451355
 E-Mail: eptri.lab@gmail.com, Web Page : http://eptri.telangana.gov.in
 CPCB & DSIR
 ISO 14001:2015; ISO 9001:2015; ISO 45001:2018 Certified Laboratory



ANALYSIS REPORT

TEST RESULTS

Encl. Report No.24/WCS-420

Sl No	Test Parameter(s)	Remark	Unit	Test Method [APHA, 24 th Edition, 2023]	WCS-1	WCS-2
1	pH (25°C)	Accredited by NABL	-	4500-H+B, (Electrometric)	7.6	7.9
2	Turbidity	Accredited by NABL	NTU	2130. B, (Nephelometric)	7.06	1.29
3	Total Suspended Solids at 105°C	Accredited by NABL	mg/L	2540. D, (Gravimetric)	50	12
4	Oil & Grease	Accredited by NABL	mg/L	5520. B, (Partition-Gravimetric)	8	<1
5	Biochemical Oxygen Demand (3 days at 27°C)	Accredited by NABL	mg/L	IS 3025 (Part 44)	86	10
6	Chemical Oxygen Demand	Accredited by NABL	mg/L	5220-B, (open reflux)	144	36
7	Total Phosphate as PO ₄	Accredited by NABL	mg/L	4500- P.D, (Spectrophotometric)	2.6	3.1
8	Total Kjeldahl Nitrogen as N	Accredited by NABL	mg/L	4500- Norg.B, (Macro-Kjeldahl)	128	BDL

BDL - Below Detection Limit,

Detection Limit - Total Kjeldahl Nitrogen as N-5 mg/L;

Opinion and Interpretation: Not Applicable.

Note: 1) The results relate only to the items tested.

2) The results shall not be reproduced except in full without approval of lab.

3) Customer provided information may effect the validity of the test report.


 Reviewed by
 Lab Representative


 Authorised by
 Dr. J. Sessa Srinivas
 Technical Manager

***** END OF THE REPORT *****

Issue No.	02	Issue Date	06.02.2020	Form No.	EPTRI/F/07A-ANR
Amend. No.	02	Amend. Date	09.01.2023	Page No.	2 of 4



ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE
 91/4 Gachibowli, Hyderabad - 500 032, Telangana State., India
 Phone: 040-23451395/396/397, Fax: 040-23451355
 E-Mail: eptri.lab@gmail.com, Web Page : http://eptri.telangana.gov.in

CPCB & DSIR
 ISO 14001:2015; ISO 9001:2015; ISO 45001:2018 Certified Laboratory



TC-7709

ANALYSIS REPORT

TEST RESULTS

Encl. Report No.24/MWC-317


SI No	Test Parameter(s)	Remark	Unit	Test Method [APHA, 24 th Edition, 2023]	WCS-1	WCS-2
1	Total Coliforms	Accredited by NABL	MPN/100 ml	9221 B	79000	4.5

Opinion and Interpretation: Not Applicable.

Note: 1) The results relate only to the items tested.

2) The results shall not be reproduced except in full without approval of lab.

3) Customer provided information may effect the validity of the test report.


 Reviewed by
 Lab Representative


 Authorised by
 K. Vamsi Krishna
 Project Faculty

***** END OF THE REPORT *****

Issue No.	02	Issue Date	06.02.2020	Form No.	EPTRI/F/07A-ANR
Amend. No.	02	Amend. Date	09.01.2023	Page No.	4 of 4



3517

ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE
 91/4 Gachibowli, Hyderabad - 500 032, Telangana State., India
 Phone: 040-23451395/396/397, Fax: 040-23451355
 E-Mail: eptri.lab@gmail.com, Web Page : http://eptri.telangana.gov.in
 ISO 14001:2015; ISO 9001:2015; ISO 45001:2018 Certified Laboratory



ANALYSIS REPORT
TEST RESULTS

Encl. Report No.24/WCS-420

Sl No	Test Parameter(s)	Remark	Unit	Test Method [APHA, 24 th Edition, 2023]	WCS-1	WCS-2
1	Dissolved Oxygen	Not Accredited by NABL	mg/L	4500-O.C	NIL	3.0
2	Colour	Not Accredited by NABL	CU	2120. B, (Visual Comparison)	30	20

Opinion and Interpretation: Not Applicable.

Note: 1) The results relate only to the items tested.

2) The results shall not be reproduced except in full without approval of lab.

3) Customer provided information may effect the validity of the test report.


 Reviewed by
 Lab Representative


 Authorised by
 Dr. J. Sessa Srinivas
 Technical Manager

*****END OF THE REPORT*****



ENVIRONMENT PROTECTION TESTING & RESEARCH INSTITUTE
 91/4 Gachibowli, Hyderabad - 500 032, Telangana State., India
 Phone: 040-23451395/396/397, Fax: 040-23451355
 E-Mail: eptri.lab@gmail.com, Web Page : http://eptri.telangana.gov.in



CPCB & DSIR
 ISO 14001:2015; ISO 9001:2015; ISO 45001:2018 Certified Laboratory

ANALYSIS REPORT

Registration Number : 24/WCS-421 Issue Date : 23.11.2024
 Sample Received : 22.10.2024 Customer Ref : Your W.O/GAJA/HMWSSB/MOM
 STPs/2024-25/59, dt. 20.10.2024
 Date of Commencement : 22.10.2024 Lr. No & Date : 22.10.2024,
 Date of Completion : 09.11.2024
 Name & Address of the customer : Sri S.A.L Kumar,
 General Manager(E),
 STP Division -II, HMWS&SB,
 Durgam Cheruvu, Hyderabad - 500 081.
 Sample Particulars : Waste water samples
 Qty Received : ~2 Ltr + 300 mL + 300 mL each- in plastic containers and glass
 bottles
 Type of Sampling : Grab samples
 Sample condition : Suitable for analysis
 Sampling Procedure : Sample collected and submitted by EPTRI as per SOP 100
 Sample Code :
 WCS-1 : HMWSSB STPs Raw Sewage water Inlet sample collected from
 23 MLD STP division-II at Attapur
 WCS-2 : HMWSSB STPs Treated Sewage water Outlet sample collected
 from 23 MLD STP division-II at Attapur (Durgam Cheruvu-Hyd-
 500081 Sri S.A.L Kumar G. M (E)(HMWS&SB)
 Date of Sampling : 22.10.2024
 Sampled By : Customer
 Industry Representative :M/s. Ramky Infrastructure Limited
 Sub Contracting :Sub-Contracting was not awarded
 Deviation from Standard Methods :No deviation in the test method
 Sample Tested : As per the Standard Methods for the Examination of water &
 wastewater by APHA, 24th Edition, 2023 & IS Method.
 Remarks : NIL

Remarks

NABL Web Site



Rajendra
 Reviewed by
 Lab Representative

Jesha Srinivas
 Authorised by
 Dr. J. Sesha Srinivas
 Technical Manager

Issue No.	02	Issue Date	06.02.2020	Form No.	EPTRI/F/07A-ANR
Amend. No.	02	Amend. Date	09.01.2023	Page No.	1 of 4



ANALYSIS REPORT
TEST RESULTS

Encl. Report No.24/WCS-421

Sl No	Test Parameter(s)	Remark	Unit	Test Method [APHA, 24 th Edition, 2023]	WCS-1	WCS-2
1	pH (25°C)	Accredited by NABL	-	4500-H+B, (Electrometric)	7.7	6.9
2	Turbidity	Accredited by NABL	NTU	2130. B, (Nephelometric)	6.39	0.45
3	Total Suspended Solids at 105°C	Accredited by NABL	mg/L	2540. D, (Gravimetric)	98	12
4	Oil & Grease	Accredited by NABL	mg/L	5520. B, (Partition-Gravimetric)	11	<1
5	Biochemical Oxygen Demand (3 days at 27°C)	Accredited by NABL	mg/L	IS 3025 (Part 44)	112	12
6	Chemical Oxygen Demand	Accredited by NABL	mg/L	5220-B, (open reflux)	188	40
7	Total Phosphate as PO ₄	Accredited by NABL	mg/L	4500- P.D, (Spectrophotometric)	1.8	2.1
8	Total Kjeldahl Nitrogen as N	Accredited by NABL	mg/L	4500- Norg.B, (Macro-Kjeldahl)	154	BDL

BDL - Below Detection Limit,
Detection Limit - Total Kjeldahl Nitrogen as N-5 mg/L;
Opinion and Interpretation: Not Applicable.

- Note: 1) The results relate only to the items tested.
2) The results shall not be reproduced except in full without approval of lab.
3) Customer provided information may effect the validity of the test report.


Reviewed by
Lab Representative


Authorised by
Dr. J. Sesha Srinivas
Technical Manager

***** END OF THE REPORT *****

Issue No.	02	Issue Date	06.02.2020	Form No.	EPTRI/F/07A-ANR
Amend. No.	02	Amend. Date	09.01.2023	Page No.	2 of 4



ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE
 91/4 Gachibowli, Hyderabad - 500 032, Telangana State., India
 Phone: 040-23451395/396/397, Fax: 040-23451355
 E-Mail: eptri.lab@gmail.com, Web Page : http://eptri.telangana.gov.in



CPCB & DSIR
 ISO 14001:2015; ISO 9001:2015; ISO 45001:2018 Certified Laboratory
 TC-7709

ANALYSIS REPORT

TEST RESULTS

Encl. Report No.24/MWC-318

Sl No	Test Parameter(s)	Remark	Unit	Test Method [APHA, 24 th Edition, 2023]	WCS-1	WCS-2
1	Total Coliforms	Accredited by NABL	MPN/100 ml	9221 B	110000	6.8

Opinion and Interpretation: Not Applicable.
 Note: 1) The results relate only to the items tested.
 2) The results shall not be reproduced except in full without approval of lab.
 3) Customer provided information may effect the validity of the test report.

[Signature]
 Reviewed by
 Lab Representative

[Signature]
 Authorised by
 K. Vamsi Krishna
 Project Faculty

*****END OF THE REPORT*****

Issue No.	02	Issue Date	06.02.2020	Form No.	EPTRI/F/07A-ANR
Amend. No.	02	Amend. Date	09.01.2023	Page No.	4 of 4

ANALYSIS REPORT
TEST RESULTS

Encl. Report No.24/WCS-421

SI No	Test Parameter(s)	Remark	Unit	Test Method [APHA, 24 th Edition, 2023]	WCS-1	WCS-2
1	Dissolved Oxygen	Not Accredited by NABL	mg/L	4500-O.C	NIL	5.3
2	Colour	Not Accredited by NABL	CU	2120. B, (Visual Comparison)	40	10

Opinion and Interpretation: Not Applicable.

Note: 1) The results relate only to the items tested.

2) The results shall not be reproduced except in full without approval of lab.

3) Customer provided information may effect the validity of the test report.


Reviewed by
Lab Representative


Authorised by
Dr. J. Sessa Srinivas
Technical Manager

*****END OF THE REPORT*****

3522


ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE

91/4 Gachibowli, Hyderabad - 500 032, Telangana State., India

Phone: 040-23451395/396/397 Fax: 040-23451355

E-Mail: eptri.lab@gmail.com Web Page : http://eptri.telangana.gov.in

CPCB & DSIR

ISO 14001:2015; ISO 9001:2015; ISO 45001:2018 Certified Laboratory



TC-7709

ANALYSIS REPORT

Registration Number : 24/WCS-412 Issue Date : 23.11.2024
 Sample Received : 21.10.2024 Customer Ref : Your W.O/GAJA/HMWSSB/MOM
 STPs/2024-25/59, dt. 20.10.2024
 Date of Commencement : 21.10.2024 Lr. No & Date : 21.10.2024,
 Date of Completion : 11.11.2024
 Name & Address of the customer : Sri S.A.L Kumar,
 General Manager(E),
 STP Division -II, HMWS&SB,
 Durgam Cheruvu, Hyderabad - 500 081.

Sample Particulars : Waste water samples
 Qty Received : ~2 Ltr + 300 mL + 300 mL each- in plastic containers and glass
 bottles
 Type of Sampling : Grab samples
 Sample condition : Suitable for analysis
 Sampling Procedure : Sample collected and submitted by EPTRI as per SOP 100
 Sample Code
 WCS-1 : HMWSSB STPs Raw Sewage water Inlet sample collected from
 12 MLD STP division-II at Khajakunta
 WCS-2 : HMWSSB STPs Treated Sewage water Outlet sample collected
 from 12 MLD STP division-II at Khajakunta (Durgam Cheruvu
 Hyderabad-500081) Sri S.A.L Kumar G. M (E) (HMWS&SB)
 Date of Sampling : 21.10.2024
 Sampled By : EPTRI
 Industry Representative : M/s. Ramky Infrastructure Limited
 Sub Contracting : Sub-Contracting was not awarded
 Deviation from Standard Methods : No deviation in the test method
 Sample Tested : As per the Standard Methods for the Examination of water &
 wastewater by APHA, 24th Edition, 2023 & IS Method.

Remarks : NIL

Remarks

NABL Web Site




 Reviewed by
 Lab Representative


 Authorised by
 Dr. J. Sessa Srinivas
 Technical Manager

Issue No.	02	Issue Date	06.02.2020	Form No.	EPTRI/F/07A-ANR
Amend. No.	02	Amend. Date	09.01.2023	Page No.	1 of 4



3520
ENVIRONMENT PROTECTION ENGINEERING & RESEARCH INSTITUTE
 91/4 Gachibowli, Hyderabad - 500 032, Telangana State., India
 Phone: 040-23451395/396/397 Fax: 040-23451355
 E-Mail: eptri.lab@gmail.com Web Page : http://eptri.telangana.gov.in
 CPCB & DSIR
 ISO 14001:2015; ISO 9001:2015; ISO 45001:2018 Certified Laboratory



ANALYSIS REPORT

TEST RESULTS

Encl. Report No.24/WCS-412

SI No	Test Parameter(s)	Remark	Unit	Test Method [APHA, 24 th Edition, 2023]	WCS-1	WCS-2
1	pH (25°C)	Accredited by NABL	-	4500-H+B, (Electrometric)	7.3	7.8
2	Turbidity	Accredited by NABL	NTU	2130. B, (Nephelometric)	16.2	0.56
3	Total Suspended Solids at 105°C	Accredited by NABL	mg/L	2540. D, (Gravimetric)	76	08
4	Oil & Grease	Accredited by NABL	mg/L	5520. B, (Partition-Gravimetric)	10	<1
5	Biochemical Oxygen Demand (3 days at 27°C)	Accredited by NABL	mg/L	IS 3025 (Part 44)	106	18
6	Chemical Oxygen Demand	Accredited by NABL	mg/L	5220-B, (open reflux)	304	52
7	Total Phosphate as PO ₄	Accredited by NABL	mg/L	4500- P.D, (Spectrophotometric)	2.2	3.7
8	Total Kjeldahl Nitrogen as N	Accredited by NABL	mg/L	4500- Norg.B, (Macro-Kjeldahl)	53	BDL

BDL - Below Detection Limit,
 Detection Limit - Total Kjeldahl Nitrogen as N-5 mg/L;

Opinion and Interpretation: Not Applicable.

Note: 1) The results relate only to the items tested.

2) The results shall not be reproduced except in full without approval of lab.

3) Customer provided information may effect the validity of the test report.

Reviewed by
 Lab Representative

Authorised by
 Dr. J. Sessa Srinivas
 Technical Manager

***** END OF THE REPORT *****

Issue No.	02	Issue Date	06.02.2020	Form No.	EPTRI/F/07A-ANR
Amend. No.	02	Amend. Date	09.01.2023	Page No.	2 of 4

3524



ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE
 91/4 Gachibowli, Hyderabad - 500 032, Telangana State., India
 Phone: 040-23451395/396/397 Fax: 040-23451355
 E-Mail: eptri.lab@gmail.com Web Page : http://eptri.telangana.gov.in
 CPCB & DSIR
 ISO 14001:2015; ISO 9001:2015; ISO 45001:2018 Certified Laboratory




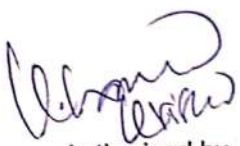
ANALYSIS REPORT
TEST RESULTS

Encl. Report No.24/MWC-313

Sl No	Test Parameter(s)	Remark	Unit	Test Method [APHA, 24 th Edition, 2023]	WCS-1	WCS-2
1	Total Coliforms	Accredited by NABL	MPN/100 ml	9221 B	94000	7.8

Opinion and Interpretation: Not Applicable.
 Note: 1) The results relate only to the items tested.
 2) The results shall not be reproduced except in full without approval of lab.
 3) Customer provided information may effect the validity of the test report.


 Reviewed by
 Lab Representative


 Authorised by
 K. Vamsi Krishna
 Project Faculty

*****END OF THE REPORT*****

Issue No.	02	Issue Date	06.02.2020	Form No.	EPTRI/F/07A-ANR
Amend. No.	02	Amend. Date	09.01.2023	Page No.	4 of 4

**ANALYSIS REPORT****TEST RESULTS**

Encl. Report No.24/WCS-412

Sl No	Test Parameter(s)	Remark	Unit	Test Method [APHA, 24 th Edition, 2023]	WCS-1	WCS-2
1	Dissolved Oxygen	Not Accredited by NABL	mg/L	4500-O.C	NIL	4.3
2	Colour	Not Accredited by NABL	CU	2120. B, (Visual Comparison)	20	10

Opinion and Interpretation: Not Applicable.

Note: 1) The results relate only to the items tested.

2) The results shall not be reproduced except in full without approval of lab.

3) Customer provided information may effect the validity of the test report.

Reviewed by
Lab Representative

Authorised by
Dr. J. Sesha Srinivas
Technical Manager

*****END OF THE REPORT*****

3526

ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE

91/4 Gachibowli, Hyderabad - 500 032, Telangana State., India

Phone: 040-23451395/396/397, Fax: 040-23451355

E-Mail: eptri.lab@gmail.com, Web Page : http://eptri.telangana.gov.in

EPTRI

CPCB & DSIR
ISO 14001:2015; ISO 9001:2015; ISO 45001:2018 Certified Laboratory

TC-7709

ANALYSIS REPORT

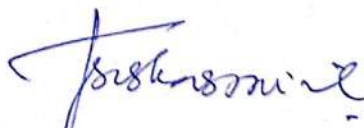
Registration Number : 24/WCS-419 Issue Date : 23.11.2024
 Sample Received : 22.10.2024 Customer Ref : Your W.O/GAJA/HMWSSB/MOM
 STPs/2024-25/59,dt. 20.10.2024
 Date of Commencement : 22.10.2024 Lr. No & Date : 22.10.2024,
 Date of Completion : 11.11.2024
 Name & Address of the customer : Sri S.A.L Kumar,
 General Manager(E),
 STP Division -II, HMWS&SB,
 Durgam Cheruvu, Hyderabad - 500 081.
 Sample Particulars : Waste water samples
 Qty Received : ~2 Ltr + 300 mL + 300 mL each- in plastic containers and glass
 bottles
 Type of Sampling : Grab samples
 Sample condition : Suitable for analysis
 Sampling Procedure : Sample collected and submitted by EPTRI as per SOP 100
 Sample Code
 WCS-1 : HMWSSB STPs Raw Sewage water Inlet sample collected from
 7 MLD STP division-II at Khajaguda (Durgam Cheruvu-Hyd-
 500081)
 WCS-2 : HMWSSB STPs Treated Sewage water Outlet sample collected
 from 7 MLD STP division-II at Khajaguda (Durgam Cheruvu-Hyd-
 500081) Sri S.A.L Kumar G. M (E)(HMWS&SB)
 Date of Sampling : 22.10.2024
 Sampled By : EPTRI
 Industry Representative : M/s. Ramky Infrastructure Limited
 Sub Contracting : Sub-Contracting was not awarded
 Deviation from Standard Methods : No deviation in the test method
 Sample Tested : As per the Standard Methods for the Examination of water &
 wastewater by APHA, 24th Edition, 2023 & IS Method.
 Remarks : NIL

Remarks

NABL Web Site




 Reviewed by
 Lab Representative


 Authorised by
 Dr. J. Sesha Srinivas
 Technical Manager

Issue No.	02	Issue Date	06.02.2020	Form No.	EPTRI/F/07A-ANR
Amend. No.	02	Amend. Date	09.01.2023	Page No.	1 of 4

3527

ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE
 91/4 Gachibowli, Hyderabad - 500 032, Telangana State., India
 Phone: 040-23451395/396/397, Fax: 040-23451355
 E-Mail: eptri.lab@gmail.com, Web Page : http://eptri.telangana.gov.in
CPCB & DSIR
 ISO 14001:2015; ISO 9001:2015; ISO 45001:2018 Certified Laboratory



ANALYSIS REPORT
TEST RESULTS

Encl. Report No.24/WCS-419

SI No	Test Parameter(s)	Remark	Unit	Test Method [APHA, 24 th Edition, 2023]	WCS-1	WCS-2
1	pH (25°C)	Accredited by NABL	-	4500-H+B, (Electrometric)	7.1	7.6
2	Turbidity	Accredited by NABL	NTU	2130. B, (Nephelometric)	15.0	0.59
3	Total Suspended Solids at 105°C	Accredited by NABL	mg/L	2540. D, (Gravimetric)	48	10
4	Oil & Grease	Accredited by NABL	mg/L	5520. B, (Partition-Gravimetric)	10	<1
5	Biochemical Oxygen Demand (3 days at 27°C)	Accredited by NABL	mg/L	IS 3025 (Part 44)	70	14
6	Chemical Oxygen Demand	Accredited by NABL	mg/L	5220-B, (open reflux)	200	40
7	Total Phosphate as PO ₄	Accredited by NABL	mg/L	4500- P.D, (Spectrophotometric)	1.1	0.95
8	Total Kjeldahl Nitrogen as N	Accredited by NABL	mg/L	4500- Norg.B, (Macro-Kjeldahl)	89.6	BDL

BDL - Below Detection Limit,
 Detection Limit - Total Kjeldahl Nitrogen as N-5 mg/L;
 Opinion and Interpretation: Not Applicable.
 Note: 1) The results relate only to the items tested.
 2) The results shall not be reproduced except in full without approval of lab.
 3) Customer provided information may effect the validity of the test report.


 Reviewed by
 Lab Representative


 Authorised by
 Dr. J. Sesha Srinivas
 Technical Manager

***** END OF THE REPORT *****

Issue No.	02	Issue Date	06.02.2020	Form No.	EPTRI/F/07A-ANR
Amend. No.	02	Amend. Date	09.01.2023	Page No.	2 of 4



3528

3 4

ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE
91/4 Gachibowli, Hyderabad - 500 032, Telangana State., India
Phone: 040-23451395/396/397, Fax: 040-23451355
E-Mail: eptri.lab@gmail.com, Web Page : http://eptri.telangana.gov.in
CPCB & DSIR
ISO 14001:2015; ISO 9001:2015; ISO 45001:2018 Certified Laboratory



ANALYSIS REPORT
TEST RESULTS

Encl. Report No.24/MWC-316

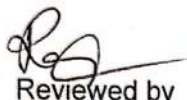
SI No	Test Parameter(s)	Remark	Unit	Test Method [APHA, 24 th Edition, 2023]	WCS-1	WCS-2
1	Total Coliforms	Accredited by NABL	MPN/100 ml	9221 B	70000	7.8


Opinion and Interpretation: Not Applicable.

Note: 1) The results relate only to the items tested.

2) The results shall not be reproduced except in full without approval of lab.

3) Customer provided information may effect the validity of the test report.


Reviewed by
Lab Representative


Authorised by
K. Vamsi Krishna
Project Faculty

*****END OF THE REPORT*****

Issue No.	02	Issue Date	06.02.2020	Form No.	EPTRI/F/07A-ANR
Amend. No.	02	Amend. Date	09.01.2023	Page No.	4 of 4



ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE
 91/4 Gachibowli, Hyderabad - 500 682, Telangana State., India
 Phone: 040-23451395/396/397, Fax: 040-23451355
 E-Mail: eptri.lab@gmail.com, Web Page : <http://eptri.telangana.gov.in>
 ISO 14001:2015; ISO 9001:2015; ISO 45001:2018 Certified Laboratory



ANALYSIS REPORT

TEST RESULTS

Encl. Report No.24/WCS-419

SI No	Test Parameter(s)	Remark	Unit	Test Method [APHA, 24 th Edition, 2023]	WCS-1	WCS-2
1	Dissolved Oxygen	Not Accredited by NABL	mg/L	4500-O.C	NIL	3.5
2	Colour	Not Accredited by NABL	CU	2120. B, (VisualComparison)	30	20

Opinion and Interpretation: Not Applicable.

Note: 1) The results relate only to the items tested.

2) The results shall not be reproduced except in full without approval of lab.

3) Customer provided information may effect the validity of the test report.


 Reviewed by
 Lab Representative


 Authorised by
 Dr. J. Sessa Srinivas
 Technical Manager

*****END OF THE REPORT*****



ISO 14001:2015, ISO 9001:2015, ISO 45001:2018 Certified Laboratory

ANALYSIS REPORT

Registration Number : 24/WCS-403 Issue Date : 26.10.2024
Sample Received : 08.10.2024 Customer Ref : NIL
Date of Commencement : 08.10.2024 Lr. No & Date : 08.10.2024
Date of Completion : 24.10.2024

Name & Address of the customer : Sri Rama Krishna
Plant Engineer
M/s.Ramky Infrastructure Ltd
Ramky Grandiose, 15 th Floor,
Sy. No: 136/2 & 4,
Gachibowli, Hyderabad – 500 032

Sample Particulars : Waste water samples
Qty Received : ~2 Ltrs each in Plastic containers
Type of Sampling : Grab samples
Sample condition : Suitable for analysis
Sampling Procedure : Sample collected and submitted by Customer

Sample Code : WCS#1 : Inlet sample collected 30 MLD Sewage treatment plant at Reddy Colony, Chanda Nagar, Serilingampalli, HMWSSB, Hyderabad.
WCS#2 : Out let sample collected 30 MLD Sewage treatment plant at Reddy Colony, Serilingampalli, Chanda Nagar, HMWSSB, Hyderabad.

Date of Sampling : 08.10.2024
Sampled By : Customer
Industry Representative : Sri Rama Krishna, Plant Engineer
M/s.Ramky Infrastructure Ltd
Sub-Contracting : Sub-Contracting was not awarded
Deviation from Standard Methods : No deviation in the test method
Sample Tested : As per the Standard Methods for the Examination of water & wastewater by APHA, 24th Edition, 2023 & IS Method.
Remarks : NIL

NABL Web Site:

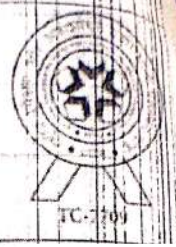


[Signature]
Reviewed by
Lab Representative

[Signature]
Authorised by
Dr. J. Sessa Srinivas
Technical Manager



ENVIRONMENT PROTECTION TRAINING & RESEARCH INSTITUTE
 91/4 Gachibowli, Hyderabad - 500032, Telangana State., India
 Phone: 040-23451395/396/397 Fax: 040-23451355
 E-Mail: eptri.lab@gmail.com Web Page : http://eptri.telangana.gov.in
 CPCB & DSIR
 ISO 14001:2015; ISO 9001:2015; ISO 45001:2018 Certified Laboratory



ANALYSIS REPORT
TEST RESULTS

Encl. Report No 24/WCS-403

Sl No	Test Parameter(s)	Remark	Unit	Test Method [APHA, 24th Edition, 2023]	WCS-1	WCS-2
1	pH (25°C)	Accredited by NABL	-	4500-H+B, (Electrometric)	7.2	7.7
2	Biochemical Oxygen Demand (3 days at 27°C)	Accredited by NABL	mg/L	IS 3025 (Part 44)	110	15
3	Chemical Oxygen Demand	Accredited by NABL	mg/L	5220-B, (open reflux)	180	50
4	Total Suspended Solids at 105°C	Accredited by NABL	mg/L	2540. D, (Gravimetric)	32	12

Opinion and Interpretation: Not Applicable.
 Note: 1) The results relate only to the items tested.
 2) The results shall not be reproduced except in full without approval of lab.
 3) Customer provided information may effect the validity of the test report.

[Signature]
 Reviewed by
 Lab Representative

[Signature]
 Authorised by
 Dr. J. Sessa Srinivas
 Technical Manager

*****END OF THE REPORT*****

Issue No	02	Issue Date	06 02 2020	Form No	EPTRI/F/07/ANR
Amend No	01	Amend Date	02 11 2020	Page No	2 of 4



ANALYSIS REPORT
TEST RESULTS

Encl. Report No.24/MWC-305

S/No.	Test Parameter(s)	Remark	Unit	Test Method [APHA, 24th Edition, 2023]	WCS-1	WCS-2
	Faecal Coliforms	Accredited by NABL	MPN/100 mL	9221 E	33000	2

Opinion and Interpretation: Not Applicable.
 Note: 1) The results relate only to the items tested.
 2) The results shall not be reproduced except in full without approval of lab
 3) Customer provided information may effect the validity of the test report.

[Signature]
 Reviewed by
 Lab Representative

[Signature]
 Authorised by
 K. Vamsi Krishna
 Project Faculty

*****END OF THE REPORT*****

Issue No.	02	Issue Date	05.02.2020	Form No.	EPTRI/F/07A-ANR
Amend No.	01	Amend. Date	02.11.2020	Page No.	4 of 4



3533
TELANGANA POLLUTION CONTROL BOARD
 Paryavarana Bhavan, A-3, Industrial Estate, Sanathnagar, Hyderabad – 500 018
 Ph: 040-23887500



TC-12641

CENTRAL LABORATORY

Analysis Report

Reg. No.SR/05/TGPCB/HO/R00/LAB/2024/11/398-399

Collected by: AES, RO-HYD along with HMWSSB.

Collected on: 16/11/2024

Received on: 18/11/2024

Test method: Standard Methods of APHA, 24th Edition

Quantity of the sample: 1 Ltr. sample each

Issue date: 25/11/2024

Page No.: 1 of 2


Sample code : Sample details / collection point

24/11/398 - Sample collected from Inlet of Jalagam Vengal Rao 0.5 MLD STP.

24/11/399 - Sample collected from Outlet of Jalagam Vengal Rao 0.5 MLD STP.

Parameters	Method No.	Unit	Results		As per CFO Order Standards
			24/11/398	24/11/399	
pH at 25° c	4500-H + B	-	7.40	6.88	5.5 - 9.0
Electrical conductivity at 25° c	2510-B	µS/cm	1092	988	-
Total Suspended Solids	2540 - D	mg/L	60	<5	100
Total Dissolved Solids	2540 - C	mg/L	670	592	-
Chemical Oxygen Demand (COD)	5220 - B	mg/L	160	44	250
BOD 3 at 27°C	IS 3025, 1993	mg/L	31	9	30
Total Kjeldhal Nitrogen (TKN)	4500-N _{org} B	mg/L	-	<5	100
Ammonical Nitrogen	4500-NH ₃ C	mg/L	-	<5	50
Oil & Grease (O&G)	5520 - B	mg/L	-	<5	10

Note: Results related to sample as received.


 Joint Chief Environmental Scientist



CENTRAL LABORATORY

Analysis Report

Reg. No.SR/05/TGPCB/HO/R00/LAB/2024/11/398-399

Collected by: AES, RO-HYD along with
HMWSSB.

Collected on: 16/11/2024

Received on: 18/11/2024

Test method: Standard Methods of APHA, 24th Edition

Quantity of the sample: 1 Ltr. sample each

Issue date: 25/11/2024

Page No.: 2 of 2

Sample code : Sample details / collection point

24/11/398 - Sample collected from Inlet of Jalagam Vengal Rao 0.5 MLD STP


24/11/399 - Sample collected from Outlet of Jalagam Vengal Rao 0.5 MLD STP

Parameters	Method No.	Unit	Results		As per CFO Order Standards
			24/11/398	24/11/399	
Dissolved oxygen	4500 – O C	mg/L	-	5.4	-
Free Ammonia	Calculation Method	mg/L	-	BDL	5.0
Total coliform	9221 – B, C	MPN/100ml	-	110	< 500
Fecal coliform	9221 – B, C	MPN/100ml	-	<1.8	-
Heavy Metals					
Copper	3111- B	mg/L	-	ND	3.0
Zinc	3111- B	mg/L	-	0.016	5.0
Cadmium	3111- B	mg/L	-	ND	2.0
Lead	3111- B	mg/L	-	ND	0.1
Nickel	3111 B	mg/L	-	ND	3.0
Total Chromium	3111 D	mg/L	-	0.120	2.0

Note: Results related to sample as received.

BDL – Below Detectable Limit.

ND - Not Detected.


Joint Chief Environmental Scientist



CENTRAL LABORATORY

Analysis Report

Reg. No. SR/05/TGPCB/HO/R00/LAB/2024/11/400-401

Collected by: AES, RO-HYD along with
HMWSSB.

Collected on: 16/11/2024

Received on: 18/11/2024

Test method: Standard Methods of APHA, 24th Edition

Quantity of the sample: 1 Ltr. sample each

Issue date: 25/11/2024

Page No.: 1 of 2


Sample code : Sample details / collection point

24/11/400 - Sample collected from Inlet of Miralam Tank 10.0 MLD STP.

24/11/401 - Sample collected from Outlet of Miralam Tank 10.0 MLD STP.

Parameters	Method No.	Unit	Results		As per CFO Order Standards
			24/11/400	24/11/401	
pH at 25° c	4500-H + B	-	6.70	7.11	5.5 - 9.0
Electrical conductivity at 25° c	2510-B	µS/cm	1792	1336	-
Total Suspended Solids	2540 - D	mg/L	114	52	100
Total Dissolved Solids	2540 - C	mg/L	1084	840	-
Chemical Oxygen Demand (COD)	5220 - B	mg/L	342	32	250
BOD ₃ at 27°C	IS 3025, 1993	mg/L	102	17	30
Total Kjeldhal Nitrogen (TKN)	4500-N _{org} B	mg/L	-	<5	100
Ammonical Nitrogen	4500-NH ₃ C	mg/L	-	<5	50
Oil & Grease (O&G)	5520 - B	mg/L	-	<5	10

Note: Results related to sample as received.


Joint Chief Environmental Scientist



3536
TELANGANA POLLUTION CONTROL BOARD
 Paryavaran Bhavan, A-3, Industrial Estate, Sanathnagar, Hyderabad – 500 018
 Ph: 040-23887500

CENTRAL LABORATORY

Analysis Report

Reg. No.SR/05/TGPCB/HO/R00/LAB/2024/11/400-401

Collected by: AES, RO-HYD along with
HMWSSB.

Collected on: 16/11/2024

Received on: 18/11/2024

Test method: Standard Methods of APHA, 24th Edition

Quantity of the sample: 1 Ltr. sample each

Issue date: 25/11/2024

Page No.: 2 of 2


Sample code : Sample details / collection point

24/11/400 - Sample collected from Inlet of Miralam Tank 10.0 MLD STP.

24/11/401 - Sample collected from Outlet of Miralam Tank 10.0 MLD STP.

Parameters	Method No.	Unit	Results		As per CFO Order Standards
			24/11/400	24/11/401	
Dissolved oxygen	4500 – O C	mg/L	-	4.9	-
Free Ammonia	Calculation Method	mg/L	-	BDL	5.0
Total coliform	9221 – B, C	MPN/100ml	-	110	< 500
Fecal coliform	9221 – B, C	MPN/100ml	-	1.8	-
Heavy Metals					
Copper	3111- B	mg/L	-	0.033	3.0
Zinc	3111- B	mg/L	-	0.043	5.0
Cadmium	3111- B	mg/L	-	ND	2.0
Lead	3111- B	mg/L	-	0.072	0.1
Nickel	3111 B	mg/L	-	ND	3.0
Total Chromium	3111 D	mg/L	-	0.068	2.0

Note: Results related to sample as received.
 BDL – Below Detectable Limit.
 ND - Not Detected.


Joint Chief Environmental Scientist



CENTRAL LABORATORY

Analysis Report

Reg. No.SR/05/TGPCB/HO/R00/LAB/2024/11/402-403

Collected by: AES, RO-HYD along with
HMWSSB.

Collected on: 16/11/2024

Received on: 18/11/2024

Test method: Standard Methods of APHA, 24th Edition

Quantity of the sample: 1 Ltr. sample each

Issue date: 25/11/2024

Page No.: 1 of 2

Sample code : Sample details / collection point

24/11/402 - Sample collected from Inlet of Langer House 1.25 MLD STP.

24/11/403 - Sample collected from Outlet of Langer House 1.25 MLD STP.

Parameters	Method No.	Unit	Results		As per CFO Order Standards
			24/11/402	24/11/403	
pH at 25° c	4500-H + B	-	7.28	7.11	5.5 - 9.0
Electrical conductivity at 25° c	2510-B	µS/cm	1235	875	-
Total Suspended Solids	2540 - D	mg/L	125	5	100
Total Dissolved Solids	2540 - C	mg/L	724	523	-
Chemical Oxygen Demand (COD)	5220 - B	mg/L	112	28	250
BOD ₃ at 27°C	IS 3025, 1993	mg/L	24	6	30
Total Kjeldhal Nitrogen (TKN)	4500-N _{org} B	mg/L	-	<5	100
Ammonical Nitrogen	4500-NH ₃ C	mg/L	-	<5	50
Oil & Grease (O&G)	5520 - B	mg/L	-	<5	10

Note: Results related to sample as received.


Joint Chief Environmental Scientist



3538
TELANGANA POLLUTION CONTROL BOARD
 Paryavaran Bhavan, A-3, Industrial Estate, Sanathnagar, Hyderabad – 500 018
 Ph: 040-23887500

CENTRAL LABORATORY

Analysis Report

Reg. No. SR/05/TGPCB/HO/R00/LAB/2024/11/402-403

Collected by: AES, RO-HYD along with HMWSSB.

Collected on: 16/11/2024

Received on: 18/11/2024

Test method: Standard Methods of APHA, 24th Edition

Quantity of the sample: 1 Ltr. sample each

Issue date: 25/11/2024

Sample code : Sample details / collection point

24/11/402 - Sample collected from Inlet of Langer House 1.25 MLD STP.

24/11/403 - Sample collected from Outlet of Langer House 1.25 MLD STP.

Parameters	Method No.	Unit	Results		As per CFO Order Standards
			24/11/402	24/11/403	
Dissolved oxygen	4500 – O C	mg/L	-	5.1	-
Free Ammonia	Calculation Method	mg/L	-	BDL	5.0
Total coliform	9221 – B, C	MPN/100ml	-	210	< 500
Fecal coliform	9221 – B, C	MPN/100ml	-	<1.8	-
Heavy Metals					
Copper	3111- B	mg/L	-	ND	3.0
Zinc	3111- B	mg/L	-	0.078	5.0
Cadmium	3111- B	mg/L	-	ND	2.0
Lead	3111- B	mg/L	-	ND	0.1
Nickel	3111 B	mg/L	-	ND	3.0
Total Chromium	3111 D	mg/L	-	0.068	2.0

Note: Results related to sample as received.

BDL – Below Detectable Limit.

ND - Not Detected.


 Joint Chief Environmental Scientist



CENTRAL LABORATORY

Analysis Report

Reg. No.SR/05/TGPCB/HO/R00/LAB/2024/11/404-405

Collected by: AES, RO-HYD along with
HMWSSB.

Collected on: 16/11/2024

Received on: 18/11/2024

Test method: Standard Methods of APHA, 24th Edition

Quantity of the sample: 1 Ltr. sample each

Issue date: 25/11/2024

Page No.: 1 of 2

Sample code : Sample details / collection point

24/11/404 - Sample collected from Inlet of Amberpet 339 MLD, STP.

24/11/405 - Sample collected from Outlet of Amberpet 339 MLD, STP.

Parameters	Method No.	Unit	Results		As per CFO Order Standards
			24/11/404	24/11/405	
pH at 25° c	4500-H + B	-	7.04	7.23	5.5 - 9.0
Electrical conductivity at 25° c	2510-B	µS/cm	1388	1365	-
Total Suspended Solids	2540 - D	mg/L	181	10	100
Total Dissolved Solids	2540 - C	mg/L	834	805	-
Chemical Oxygen Demand (COD)	5220 - B	mg/L	200	88	250
BOD ₃ at 27°C	IS 3025, 1993	mg/L	48	17	30
Total Kjeldhal Nitrogen (TKN)	4500-N _{org} B	mg/L	-	<5	100
Ammonical Nitrogen	4500-NH ₃ C	mg/L	-	<5	50
Oil & Grease (O&G)	5520 - B	mg/L	-	<5	10

Note: Results related to sample as received.

Joint Chief Environmental Scientist



3540
TELANGANA POLLUTION CONTROL BOARD
 Paryavaran Bhavan, A-3, Industrial Estate, Sanathnagar, Hyderabad – 500 018
 Ph: 040-23887500

CENTRAL LABORATORY

Analysis Report

Reg. No.SR/05/TGPCB/HO/R00/LAB/2024/11/404-405

Collected by: AES, RO-HYD along with
HMWSSB.

Collected on: 16/11/2024

Received on: 18/11/2024

Test method: Standard Methods of APHA, 24th Edition

Quantity of the sample: 1 Ltr. sample each

Issue date: 25/11/2024

Page No.: 2 of 2

Sample code : Sample details / collection point

24/11/404 - Sample collected from Inlet of Amberpet 339 MLD, STP.


24/11/405 - Sample collected from Outlet of Amberpet 339 MLD, STP.

Parameters	Method No.	Unit	Results		As per CFO Order Standards
			24/11/404	24/11/405	
Dissolved oxygen	4500 – O C	mg/L	-	0.9	-
Free Ammonia	Calculation Method	mg/L	-	BDL	5.0
Total coliform	9221 – B, C	MPN/100ml	-	540	< 500
Fecal coliform	9221 – B, C	MPN/100ml	-	2.0	-
Heavy Metals					
Copper	3111- B	mg/L	-	ND	3.0
Zinc	3111- B	mg/L	-	0.026	5.0
Cadmium	3111- B	mg/L	-	ND	2.0
Lead	3111- B	mg/L	-	0.027	0.1
Nickel	3111 B	mg/L	-	ND	3.0
Total Chromium	3111 D	mg/L	-	0.172	2.0

Note: Results related to sample as received.

BDL – Below Detectable Limit.

ND - Not Detected.


Joint Chief Environmental Scientist



CENTRAL LABORATORY

Analysis Report

Reg. No. SR/05/TGPCB/HO/R00/LAB/2024/11/392-393
 Collected on: 16/11/2024
 Test method: Standard Methods of APHA, 24th Edition
 Issue date: 25/11/2024

Collected by: AES, RO-HYD.
 Received on: 18/11/2024
 Quantity of the sample: 1 Ltr. sample each
 Page No.: 1 of 2


Sample code : Sample details / collection point

24/11/392 - Sample collected from Inlet of Khairatabad 20 MLD STP.

24/11/393 - Sample collected from Outlet of Khairatabad 20 MLD STP.

Parameters	Method No.	Unit	Results	
			24/11/392	24/11/393
pH at 25° c	4500-H + B	-	6.89	7.08
Electrical conductivity at 25° c	2510-B	µS/cm	1234	1014
Total Suspended Solids	2540 - D	mg/L	114	<5
Total Dissolved Solids	2540 - C	mg/L	727	601
Chemical Oxygen Demand	5220 - B	mg/L	268	40
BOD 3 at 27°C	IS 3025, 1993	mg/L	66	8
Total Kjeldhal Nitrogen	4500-N _{org} B	mg/L	-	<5
Ammonical Nitrogen	4500-NH ₃ C	mg/L	-	<5
Oil & Grease	5520 - B	mg/L	-	<5

Note: Results related to sample as received.


 Joint Chief Environmental Scientist



CENTRAL LABORATORY

Analysis Report

Reg. No.SR/05/TGPCB/HO/R00/LAB/2024/11/392-393
 Collected on: 16/11/2024
 Test method: Standard Methods of APHA, 24th Edition
 Issue date: 25/11/2024

Collected by: AES, RO-HYD.
 Received on: 18/11/2024
 Quantity of the sample: 1 Ltr. sample each
 Page No.: 2 of 2

Sample code : Sample details / collection point

- 24/11/392 - Sample collected from Inlet of Khairatabad 20 MLD STP.
 24/11/393 - Sample collected from Outlet of Khairatabad 20 MLD STP.

Parameters	Method No.	Unit	Results	
			24/11/392	24/11/393
Dissolved oxygen	4500 – O C	mg/L	-	4.2
Free Ammonia	Calculation Method	mg/L	-	BDL
Total coliform	9221 – B, C	MPN/100ml	-	140
Fecal coliform	9221 – B, C	MPN/100ml	-	<1.8
Heavy Metals				
Copper	3111 B	mg/L	-	ND
Nickel	3111 B	mg/L	-	ND
Zinc	3111 B	mg/L	-	0.015
Lead	3111 B	mg/L	-	ND
Cadmium	3111 B	mg/L	-	ND
Total Chromium	3111 D	mg/L	-	0.068

Note: Results related to sample as received.
 BDL – Below Detectable Limit.
 ND - Not Detected.


Joint Chief Environmental Scientist



CENTRAL LABORATORY

Analysis Report

Reg. No. SR/05/TGPCB/HO/R00/LAB/2024/11/394-395
 Collected on: 16/11/2024
 Test method: Standard Methods of APHA, 24th Edition
 Issue date: 25/11/2024


Collected by: AES, RO-HYD.
 Received on: 18/11/2024
 Quantity of the sample: 1 Ltr. sample each
 Page No.: 1 of 2

Sample code : Sample details / collection point

- 24/11/394 - Sample collected from Inlet of KIMS (Picket) 30 MLD STP, Begumpet, Opposite KIMS Hospital.
 24/11/395 - Sample collected from Outlet of KIMS (Picket) 30 MLD STP, Begumpet, Opposite KIMS Hospital.

Parameters	Method No.	Unit	Results	
			24/11/394	24/11/395
pH at 25° c	4500-H + B	-	7.44	7.56
Electrical conductivity at 25° c	2510-B	µS/cm	1499	1343
Total Suspended Solids	2540 - D	mg/L	99	<5
Total Dissolved Solids	2540 - C	mg/L	855	808
Chemical Oxygen Demand	5220 - B	mg/L	128	40
BOD 3 at 27°C	IS 3025, 1993	mg/L	27	8
Total Kjeldhal Nitrogen	4500-N _{org} B	mg/L	-	<5
Ammonical Nitrogen	4500-NH ₃ C	mg/L	-	<5
Oil & Grease	5520 - B	mg/L	-	<5

Note: Results related to sample as received.


Joint Chief Environmental Scientist



CENTRAL LABORATORY

Analysis Report

Reg. No. SR/05/TGPCB/HO/R00/LAB/2024/11/394-395
Collected on: 16/11/2024
Test method: Standard Methods of APHA, 24th Edition
Issue date: 25/11/2024

Collected by: AES, RO-HYD.
Received on: 18/11/2024
Quantity of the sample: 1 Ltr. sample each
Page No.: 2 of 2

Sample code : Sample details / collection point

- 24/11/394 - Sample collected from Inlet of KIMS (Picket) 30 MLD STP, Begumpet, Opposite KIMS Hospital.
 24/11/395 - Sample collected from Outlet of KIMS (Picket) 30 MLD STP, Begumpet, Opposite KIMS Hospital.

Parameters	Method No.	Unit	Results	
			24/11/394	24/11/395
Dissolved oxygen	4500 – O C	mg/L	-	5.8
Free Ammonia	Calculation Method	mg/L	-	BDL
Total coliform	9221 – B, C	MPN/100ml	-	220
Fecal coliform	9221 – B, C	MPN/100ml	-	1.8
Heavy Metals				
Copper	3111 B	mg/L	-	ND
Nickel	3111 B	mg/L	-	ND
Zinc	3111 B	mg/L	-	0.022
Lead	3111 B	mg/L	-	ND
Cadmium	3111 B	mg/L	-	ND
Total Chromium	3111 B	mg/L	-	0.094

Note: Results related to sample as received.
 BDL – Below Detectable Limit.
 ND - Not Detected.

Joint Chief Environmental Scientist



CENTRAL LABORATORY

Analysis Report

Reg. No.SR/05/TGPCB/HO/R00/LAB/2024/11/396-397
 Collected on: 16/11/2024
 Test method: Standard Methods of APHA, 24th Edition
 Issue date: 25/11/2024

Collected by: AES, RO-HYD.
 Received on: 18/11/2024
 Quantity of the sample: 1 Ltr. sample each
 Page No.: 1 of 2

Sample code : Sample details / collection point

24/11/396 - Sample collected from Inlet of Miralam Tank 41.5 MLD, STP.

24/11/397 - Sample collected from Outlet of Miralam Tank 41.5 MLD, STP.

Parameters	Method No.	Unit	Results		As per CFO Order Standards
			24/11/396	24/11/397	
pH at 25° c	4500-H ⁺ B	-	6.86	6.68	5.5 - 9.0
Electrical conductivity at 25° c	2510-B	μS/cm	635	627	-
Total Suspended Solids	2540 - D	mg/L	179	<5	100
Total Dissolved Solids	2540 - C	mg/L	405	392	-
Chemical Oxygen Demand (COD)	5220 - B	mg/L	196	76	250
BOD 3 at 27°C	IS 3025, 1993	mg/L	39	16	≤10
Total Kjeldhal Nitrogen (TKN)	4500-N _{org} B	mg/L	-	<5	100
Ammonical Nitrogen	4500-NH ₃ C	mg/L	-	<5	50
Oil & Grease (O&G)	5520 - B	mg/L	-	<5	20

Note: Results related to sample as received.

Remarks: BOD value is exceeding the standard limit.


 Joint Chief Environmental Scientist



3546
TELANGANA POLLUTION CONTROL BOARD
 Paryavaran Bhavan, A-3, Industrial Estate, Sanathnagar, Hyderabad – 500 018
 Ph: 040-23887500

CENTRAL LABORATORY

Analysis Report

Reg. No.SR/05/TGPCB/HO/R00/LAB/2024/11/396-397
 Collected on: 16/11/2024
 Test method: Standard Methods of APHA, 24th Edition
 Issue date: 25/11/2024

Collected by: AES, RO-HYD.
 Received on: 18/11/2024
 Quantity of the sample: 1 Ltr. sample each
 Page No.: 2 of 2

Sample code : Sample details / collection point

24/11/396 - Sample collected from Inlet of Miralam Tank 41.5 MLD, STP.


24/11/397 - Sample collected from Outlet of Miralam Tank 41.5 MLD, STP.

Parameters	Method No.	Unit	Results		As per CFO Order Standards
			24/11/396	24/11/397	
Dissolved oxygen	4500 – O C	mg/L	-	5.2	-
Free Ammonia	Calculation Method	mg/L	-	BDL	5.0
Total coliform	9221 – B, C	MPN/100ml	-	220	< 500
Fecal coliform	9221 – B, C	MPN/100ml	-	<1.8	-
Heavy Metals					
Copper	3111 B	mg/L	-	0.018	3.0
Nickel	3111 B	mg/L	-	0.013	5.0
Zinc	3111 B	mg/L	-	0.070	2.0
Lead	3111 B	mg/L	-	0.052	0.1
Cadmium	3111 B	mg/L	-	ND	3.0
Total Chromium	3111 D	mg/L	-	0.120	2.0

Note: Results related to sample as received.

ND - Not Detected.

BDL - Below Detectable Limit.


 Joint Chief Environmental Scientist



3547 TELANGANA POLLUTION CONTROL BOARD

Paryavarana Bhavan, A-3, Industrial Estate, Sanathnagar, Hyderabad – 500 018
Ph: 040-23887500



TC-12641

CENTRAL LABORATORY

Analysis Report

Reg. No.SR/05/TGPCB/HO/R00/LAB/2024/11/471-472
Collected on: 20/11/2024
Test method: Standard Methods of APHA, 24th Edition
Issue date: 28/11/2024


Collected by: AES-II, RO-RRD
Received on: 21/11/2024
Quantity of the sample: 1 Ltr. sample each
Page No.: 1 of 2

Sample code : Sample details / collection point

- 24/11/471 - Sample collected from Inlet of Gopanpally 4.5 MLD STP, Gopanpally (V), Serilingampally (M), Rangareddy District.
24/11/472 - Sample collected from Outlet of Gopanpally 4.5 MLD STP, Gopanpally (V), Serilingampally (M), Rangareddy District.

Parameters	Method No.	Unit	Results		As per CFO Order Standards
			24/11/471	24/11/472	
pH at 25° c	4500-H + B	-	6.56	7.22	5.5 - 9.0
Electrical conductivity at 25° c	2510-B	µS/cm	1164	1054	-
Total Suspended Solids	2540 - D	mg/L	103	47	100
Total Dissolved Solids	2540 - C	mg/L	675	622	-
Chemical Oxygen Demand	5220 - B	mg/L	148	32	250
BOD ₃ at 27°C	IS 3025, 1993	mg/L	31	9	≤10
Total Kjeldhal Nitrogen	4500-N _{org} B	mg/L	-	44	100
Ammonical Nitrogen	4500-NH ₃ C	mg/L	-	15	50
Oil & Grease	5520 - B	mg/L	-	<5	20

Note: Results related to sample as received.


 Joint Chief Environmental Scientist



CENTRAL LABORATORY

Analysis Report

Reg. No.SR/05/TGPCB/HO/R00/LAB/2024/11/471-472
 Collected on: 20/11/2024
 Test method: Standard Methods of APHA, 24th Edition
 Issue date: 28/11/2024

Collected by: AES-II, RO-RRD
 Received on: 21/11/2024
 Quantity of the sample: 1 Ltr. sample each
 Page No.: 2 of 2

Sample code : Sample details / collection point

- 24/11/471 - Sample collected from Inlet of Gopanpally 4.5 MLD STP, Gopanpally (V), Serilingampally (M), Rangareddy District.
 24/11/472 - Sample collected from Outlet of Gopanpally 4.5 MLD STP, Gopanpally (V), Serilingampally (M), Rangareddy District.

Parameters	Method No.	Unit	Results		As per CFO Order Standards
			24/11/471	24/11/472	
Dissolved oxygen	4500 – O C	mg/L	-	2.6	-
Free Ammonia	Calculation Method	mg/L	-	0.13	5.0
Total coliform	9221 – B, C	MPN/100ml	-	220	<500
Fecal coliform	9221 – B, C	MPN/100ml	-	1.8	-

Note: Results related to sample as received.


Joint Chief Environmental Scientist



CENTRAL LABORATORY

Analysis Report

Reg. No. SR/05/TGPCB/HO/R00/LAB/2024/11/473-474
 Collected on: 20/11/2024
 Test method: Standard Methods of APHA, 24th Edition
 Issue date: 28/11/2024

Collected by: AES-II, RO-RRD
 Received on: 21/11/2024
 Quantity of the sample: 1 Ltr. sample each
 Page No.: 1 of 2

Sample code : Sample details / collection point

- 24/11/473 - Sample collected from Inlet of Lingam kunta 30 MLD STP, Lingampally (V), Serilingampally (M), Rangareddy District.
 24/11/474 - Sample collected from Outlet of Lingam kunta 30 MLD STP, Lingampally (V), Serilingampally (M), Rangareddy District.

Parameters	Method No.	Unit	Results		As per CFO Order Standards
			24/11/473	24/11/474	
pH at 25° c	4500-H + B	-	6.96	7.21	5.5 - 9.0
Electrical conductivity at 25° c	2510-B	µS/cm	1323	1214	-
Total Suspended Solids	2540 - D	mg/L	102	8	100
Total Dissolved Solids	2540 - C	mg/L	766	689	-
Chemical Oxygen Demand	5220 - B	mg/L	76	60	250
BOD ₃ at 27°C	IS 3025, 1993	mg/L	16	12	≤10
Total Kjeldhal Nitrogen	4500-N _{org} B	mg/L	-	20	100
Ammonical Nitrogen	4500-NH ₃ C	mg/L	-	7	50
Oil & Grease	5520 - B	mg/L	-	<5	20

Note: Results related to sample as received.

Remarks: BOD value is exceeding the CFO limit.


 Joint Chief Environmental Scientist



CENTRAL LABORATORY

Analysis Report

Reg. No.SR/05/TGPCB/HO/R00/LAB/2024/11/473-474
Collected on: 20/11/2024
Test method: Standard Methods of APHA, 24th Edition
Issue date: 28/11/2024

Collected by: AES-II, RO-RRD
Received on: 21/11/2024
Quantity of the sample: 1 Ltr. sample each
Page No.: 2 of 2

Sample code : Sample details / collection point

- 24/11/473 - Sample collected from Inlet of Lingam kunta 30 MLD STP, Lingampally (V), Serilingampally (M), Rangareddy District.
- 24/11/474 - Sample collected from Outlet of Lingam kunta 30 MLD STP, Lingampally (V), Serilingampally (M), Rangareddy District.

Parameters	Method No.	Unit	Results		As per CFO Order Standards
			24/11/473	24/11/474	
Dissolved oxygen	4500 – O C	mg/L	-	3.8	-
Free Ammonia	Calculation Method	mg/L	-	0.06	5.0
Total coliform	9221 – B, C	MPN/100ml	-	110	<500
Fecal coliform	9221 – B, C	MPN/100ml	-	1.8	-

Note: Results related to sample as received.


Joint Chief Environmental Scientist



CENTRAL LABORATORY

Analysis Report

Reg. No.SR/05/TGPCB/HO/R00/LAB/2024/11/475-476
 Collected on: 20/11/2024
 Test method: Standard Methods of APHA, 24th Edition
 Issue date: 28/11/2024


Collected by: AES-II, RO-RRD
 Received on: 21/11/2024
 Quantity of the sample: 1 Ltr. sample each
 Page No.: 1 of 2

Sample code : Sample details / collection point

- 24/11/475 - Sample collected from Inlet of Miyapur 7MLD STP, Serlingampally (M), Rangareddy District.
 24/11/476 - Sample collected from Outlet of Miyapur 7MLD STP, Serlingampally (M), Rangareddy District.

Parameters	Method No.	Unit	Results	
			24/11/475	24/11/476
pH at 25° c	4500-H + B	-	7.10	7.14
Electrical conductivity at 25° c	2510-B	µS/cm	1300	1162
Total Suspended Solids	2540 - D	mg/L	41	<5
Total Dissolved Solids	2540 - C	mg/L	786	651
Chemical Oxygen Demand	5220 - B	mg/L	188	28
BOD 3 at 27°C	IS 3025, 1993	mg/L	37	6
Total Kjeldhal Nitrogen	4500-N _{org} B	mg/L	-	21
Ammonical Nitrogen	4500-NH ₃ C	mg/L	-	7
Oil & Grease	5520 - B	mg/L	-	<5

Note: Results related to sample as received.


Joint Chief Environmental Scientist



CENTRAL LABORATORY

Analysis Report

Reg. No. SR/05/TGPCB/HO/R00/LAB/2024/11/475-476
Collected on: 20/11/2024
Test method: Standard Methods of APHA, 24th Edition
Issue date: 28/11/2024

Collected by: AES-II, RO-RRD
Received on: 21/11/2024
Quantity of the sample: 1 Ltr. sample each
Page No.: 2 of 2

Sample code : Sample details / collection point

- 24/11/475 - Sample collected from Inlet of Miyapur 7MLD STP, Serlingampally (M), Rangareddy District.
 24/11/476 - Sample collected from Outlet of Miyapur 7MLD STP, Serlingampally (M), Rangareddy District.

Parameters	Method No.	Unit	Results	
			24/11/475	24/11/476
Dissolved oxygen	4500 – O C	mg/L	-	4
Free Ammonia	Calculation Method	mg/L	-	0.05
Total coliform	9221 – B, C	MPN/100ml	-	280
Fecal coliform	9221 – B, C	MPN/100ml	-	1.8

Note: Results related to sample as received.


Joint Chief Environmental Scientist



CENTRAL LABORATORY

Analysis Report

Reg. No. SR/05/TGPCB/HO/R00/LAB/2024/11/477-478
Collected on: 20/11/2024
Test method: Standard Methods of APHA, 24th Edition
Issue date: 28/11/2024

Collected by: AES-II, RO-RRD
Received on: 21/11/2024
Quantity of the sample: 1 Ltr. sample each
Page No.: 1 of 2

Sample code : Sample details / collection point

24/11/477 - Sample collected from Inlet of Kokapet 15 MLD STP, Gandipet, Rangareddy District.

24/11/478 - Sample collected from Outlet of Kokapet 15 MLD STP, Gandipet, Rangareddy District.

Parameters	Method No.	Unit	Results	
			24/11/477	24/11/478
pH at 25° c	4500-H + B	-	7.41	7.36
Electrical conductivity at 25° c	2510-B	µS/cm	1287	1248
Total Suspended Solids	2540 - D	mg/L	106	18
Total Dissolved Solids	2540 - C	mg/L	805	750
Chemical Oxygen Demand	5220 - B	mg/L	244	16
BOD 3 at 27°C	IS 3025, 1993	mg/L	64	9
Total Kjeldhal Nitrogen	4500-N _{org} B	mg/L	-	<5
Ammonical Nitrogen	4500-NH ₃ C	mg/L	-	<5
Oil & Grease	5520 - B	mg/L	-	<5

Note: Results related to sample as received.


Joint Chief Environmental Scientist



CENTRAL LABORATORY

Analysis Report

Reg. No.SR/05/TGPCB/HO/R00/LAB/2024/11/477-478
 Collected on: 20/11/2024
 Test method: Standard Methods of APHA, 24th Edition
 Issue date: 28/11/2024

Collected by: AES-II, RO-RRD
 Received on: 21/11/2024
 Quantity of the sample: 1 Ltr. sample each
 Page No.: 2 of 2

Sample code : Sample details / collection point

- 24/11/477 - Sample collected from Inlet of Kokapet 15 MLD STP, Gandipet, Rangareddy District.
 24/11/478 - Sample collected from Outlet of Kokapet 15 MLD STP, Gandipet, Rangareddy District.

Parameters	Method No.	Unit	Results	
			24/11/477	24/11/478
Dissolved oxygen	4500 – O C	mg/L	-	5.2
Free Ammonia	Calculation Method	mg/L	-	BDL
Total coliform	9221 – B, C	MPN/100ml	-	220
Fecal coliform	9221 – B, C	MPN/100ml	-	2.0

Note: Results related to sample as received.
 BDL : Below Detectable Limit.


Joint Chief Environmental Scientist



CENTRAL LABORATORY

Analysis Report

Reg. No. SR/05/TGPCB/HO/R00/LAB/2024/11/704-705

Collected by: AES-II, RO-RRD officials along with EPTRI Officials

Collected on: 28/11/2024

Received on: 29/11/2024

Test method: Standard Methods of APHA, 24th Edition

Quantity of the sample: 1 Ltr. sample each

Issue date: 06/12/2024

Page No.: 1 of 2

Sample code : **Sample details / collection point**

- 24/11/704 - Sample collected from Inlet of Nanakramguda 4.5 MLD STP, Nanakramguda (V), Serlingampally (M), Rangareddy District.
- 24/11/705 - Sample collected from Outlet of Nanakramguda 4.5 MLD STP, Nanakramguda (V), Serlingampally (M), Rangareddy District.

Parameters	Method No.	Unit	Results		As per CFO Order Standards
			24/11/704	24/11/705	
pH at 25° c	4500-H + B	-	7.37	6.62	5.5 - 9.0
Electrical conductivity at 25° c	2510-B	µS/cm	1653	1346	-
Total Suspended Solids	2540 - D	mg/L	106	35	100
Total Dissolved Solids	2540 - C	mg/L	940	760	-
Chemical Oxygen Demand (COD)	5220 - B	mg/L	176	72	250
BOD 3 at 27°C	IS 3025, 1993	mg/L	34	14	≤10
Total Kjeldhal Nitrogen (TKN)	4500-N _{org} B	mg/L	-	29	100
Ammonical Nitrogen	4500-NH ₃ C	mg/L	-	10	50
Oil & Grease (O&G)	5520 - B	mg/L	-	<5	20

Note: Results related to sample as received.

Remarks: BOD value is exceeding the standard limit.

Joint Chief Environmental Scientist



CENTRAL LABORATORY

Analysis Report

Reg. No. SR/05/TGPCB/HO/R00/LAB/2024/11/704-705

Collected by: AES-II, RO-RRD officials along with EPTRI Officials

Collected on: 28/11/2024

Received on: 29/11/2024

Test method: Standard Methods of APHA, 24th Edition

Quantity of the sample: 1 Ltr. sample each

Issue date: 06/12/2024

Page No.: 2 of 2

Sample code : Sample details / collection point

- 24/11/704 - Sample collected from Inlet of Nanakramguda 4.5 MLD STP, Nanakramguda (V), Serlingampally (M), Rangareddy District.
- 24/11/705 - Sample collected from Outlet of Nanakramguda 4.5 MLD STP, Nanakramguda (V), Serlingampally (M), Rangareddy District.

Parameters	Method No.	Unit	Results		As per CFO Order Standards
			24/11/704	24/11/705	
Dissolved oxygen	4500 – O C	mg/L	-	1.4	-
Free Ammonia	Calculation Method	mg/L	-	0.02	5.0
Total coliform	9221 – B, C	MPN/100ml	-	350	< 500
Fecal coliform	9221 – B, C	MPN/100ml	-	1.8	-

Note: Results related to sample as received.


Joint Chief Environmental Scientist



TELANGANA POLLUTION CONTROL BOARD
Paryavarana Bhavan, A-3, Industrial Estate, Sanathnagar, Hyderabad – 500 018
Ph: 040-23887500



TC-12641

CENTRAL LABORATORY**Analysis Report**

Reg. No. SR/05/TGPCB/HO/R00/LAB/2024/11/351-352

Collected by: AES-II, RO-RRD officials along with EPTRI Officials

Collected on: 14/11/2024

Received on: 16/11/2024

Test method: Standard Methods of APHA, 24th Edition

Quantity of the sample: 1 Ltr. sample each

Issue date: 25/11/2024

Page No.: 1 of 2


Sample code : Sample details / collection point

24/11/351 - Sample collected from Inlet of Durgam Cheruvu 5.0 MLD, STP.

24/11/352 - Sample collected from Outlet of Durgam Cheruvu 5.0 MLD, STP.

Parameters	Method No.	Unit	Results		As per CFO Order Standards
			24/11/351	24/11/352	
pH at 25° c	4500-H + B	-	6.92	7.46	5.5 - 9.0
Electrical conductivity at 25° c	2510-B	µS/cm	1441	1301	-
Total Suspended Solids	2540 - D	mg/L	196	5	100
Total Dissolved Solids	2540 - C	mg/L	851	776	-
Chemical Oxygen Demand (COD)	5220 - B	mg/L	212	48	250
BOD 3 at 27°C	IS 3025, 1993	mg/L	40	9	≤10
Total Kjeldhal Nitrogen (TKN)	4500-N _{org} B	mg/L	-	8	100
Ammonical Nitrogen	4500-NH ₃ C	mg/L	-	<5	50
Oil & Grease (O&G)	5520 - B	mg/L	-	<5	10

Note: Results related to sample as received.



Joint Chief Environmental Scientist



CENTRAL LABORATORY

Analysis Report

Reg. No. SR/05/TGPCB/HO/R00/LAB/2024/11/351-352

Collected by: AES-II, RO-RRD officials along with EPTRI Officials

Collected on: 14/11/2024

Received on: 16/11/2024

Test method: Standard Methods of APHA, 24th Edition

Quantity of the sample: 1 Ltr. sample each

Issue date: 25/11/2024

Page No.: 2 of 2


Sample code : Sample details / collection point

24/11/351 - Sample collected from Inlet of Durgam Cheruvu 5.0 MLD, STP.

24/11/352 - Sample collected from Outlet of Durgam Cheruvu 5.0 MLD, STP.

Parameters	Method No.	Unit	Results		As per CFO Order Standards
			24/11/351	24/11/352	
Dissolved oxygen	4500 – O C	mg/L	-	5.1	-
Free Ammonia	Calculation Method	mg/L	-	0.04	5.0
Total coliform	9221 – B, C	MPN/100ml	-	110	< 500
Fecal coliform	9221 – B, C	MPN/100ml	-	9.3	-

Note: Results related to sample as received.


Joint Chief Environmental Scientist



CENTRAL LABORATORY

Analysis Report

Reg. No. SR/05/TGPCB/HO/R00/LAB/2024/11/353-354

Collected by: AES-II, RO-RRD officials along with
EPTRI Officials

Collected on: 14/11/2024

Received on: 16/11/2024

Test method: Standard Methods of APHA, 24th Edition

Quantity of the sample: 1 Ltr. sample each

Issue date: 25/11/2024

Page No.: 1 of 2


Sample code : Sample details / collection point

24/11/353 - Sample collected from Inlet of Durgam Cheruvu 7.0 MLD, STP, Rangareddy District.

24/11/354 - Sample collected from Outlet of Durgam Cheruvu 7.0 MLD, STP, Rangareddy District.

Parameters	Method No.	Unit	Results		As per CFO Order Standards
			24/11/353	24/11/354	
pH at 25° c	4500-H + B	-	6.92	7.22	5.5 - 9.0
Electrical conductivity at 25° c	2510-B	µS/cm	1389	1185	-
Total Suspended Solids	2540 - D	mg/L	112	5	100
Total Dissolved Solids	2540 - C	mg/L	778	695	-
Chemical Oxygen Demand (COD)	5220 - B	mg/L	184	26	250
BOD 3 at 27°C	IS 3025, 1993	mg/L	35	5	≤10
Total Kjeldhal Nitrogen (TKN)	4500-N _{org} B	mg/L	-	12	100
Ammonical Nitrogen	4500-NH ₃ C	mg/L	-	5	50
Oil & Grease (O&G)	5520 - B	mg/L	-	<5	10

Note: Results related to sample as received.


Joint Chief Environmental Scientist



3560
TELANGANA POLLUTION CONTROL BOARD
 Paryavaran Bhavan, A-3, Industrial Estate, Sanathnagar, Hyderabad – 500 018
 Ph: 040-23887500

CENTRAL LABORATORY

Analysis Report

Reg. No.SR/05/TGPCB/HO/R00/LAB/2024/11/353-354

Collected by: AES-II, RO-RRD officials along with EPTRI Officials

Collected on: 14/11/2024

Received on: 16/11/2024

Test method: Standard Methods of APHA, 24th Edition

Quantity of the sample: 1 Ltr. sample each

Issue date: 25/11/2024

Page No.: 2 of 2

Sample code : Sample details / collection point

24/11/353 - Sample collected from Inlet of Durgam Cheruvu 7.0 MLD, STP, Rangareddy District.

24/11/354 - Sample collected from Outlet of Durgam Cheruvu 7.0 MLD, STP, Rangareddy District.

Parameters	Method No.	Unit	Results		As per CFO Order Standards
			24/11/353	24/11/354	
Dissolved oxygen	4500 – O C	mg/L	-	6.3	-
Free Ammonia	Calculation Method	mg/L	-	0.04	5.0
Total coliform	9221 – B, C	MPN/100ml	-	280	< 500
Fecal coliform	9221 – B, C	MPN/100ml	-	1.8	-

Note: Results related to sample as received.

BDL: Below Detectable Limit.


Joint Chief Environmental Scientist



3561 TELANGANA POLLUTION CONTROL BOARD

Paryavarana Bhavan, A-3, Industrial Estate, Sanathnagar, Hyderabad – 500 018
Ph: 040-23887500



TC-12641

CENTRAL LABORATORY

Analysis Report

Reg. No.SR/05/TGPCB/HO/R00/LAB/2024/11/355-356

Collected by: AES-II, RO-RRD officials along with EPTRI Officials

Collected on: 14/11/2024

Received on: 16/11/2024

Test method: Standard Methods of APHA, 24th Edition

Quantity of the sample: 1 Ltr. sample each

Issue date: 25/11/2024


Page No.: 1 of 2

Sample code : Sample details / collection point

- 24/11/355 - Sample collected from Inlet of Khajaguda (Pedda Cheruvu) 7 MLD, STP, Khajaguda (V), Serlingampally (M), Rangareddy District.
- 24/11/356 - Sample collected from Outlet of Khajaguda (Pedda Cheruvu) 7 MLD, STP, Khajaguda (V), Serlingampally (M), Rangareddy District.

Parameters	Method No.	Unit	Results		As per CFO Order Standards
			24/11/355	24/11/356	
pH at 25° c	4500-H + B	-	6.63	7.33	5.5 - 9.0
Electrical conductivity at 25° c	2510-B	µS/cm	1770	1650	-
Total Suspended Solids	2540 - D	mg/L	200	18	100
Total Dissolved Solids	2540 - C	mg/L	1056	924	-
Chemical Oxygen Demand (COD)	5220 - B	mg/L	272	56	50
BOD 3 at 27°C	IS 3025, 1993	mg/L	53	9	≤10
Total Kjeldhal Nitrogen (TKN)	4500-N _{org} B	mg/L	-	<5	100
Ammonical Nitrogen	4500-NH ₃ C	mg/L	-	<5	50
Oil & Grease (O&G)	5520 - B	mg/L	-	<5	10

Note: Results related to sample as received.


 Joint Chief Environmental Scientist



3562
TELANGANA POLLUTION CONTROL BOARD
 Paryavaran Bhavan, A-3, Industrial Estate, Sanathnagar, Hyderabad – 500 018
 Ph: 040-23887500

CENTRAL LABORATORY

Analysis Report

Reg. No. SR/05/TGPCB/HO/R00/LAB/2024/11/355-356

Collected by: AES-II, RO-RRD officials along with EPTRI Officials

Collected on: 14/11/2024

Received on: 16/11/2024

Test method: Standard Methods of APHA, 24th Edition

Quantity of the sample: 1 Ltr. sample each

Issue date: 25/11/2024

Page No.: 2 of 2

Sample code : Sample details / collection point

- 24/11/355 - Sample collected from Inlet of Khajaguda (Pedda Cheruvu) 7 MLD, STP, Khajaguda (V), Serlingampally (M), Rangareddy District.
- 24/11/356 - Sample collected from Outlet of Khajaguda (Pedda Cheruvu) 7 MLD, STP, Khajaguda (V), Serlingampally (M), Rangareddy District.

Parameters	Method No.	Unit	Results		As per CFO Order Standards
			24/11/355	24/11/356	
Dissolved oxygen	4500 – O C	mg/L	-	3.3	-
Free Ammonia	Calculation Method	mg/L	-	BDL	5.0
Total coliform	9221 – B, C	MPN/100ml	-	27	< 500
Fecal coliform	9221 – B, C	MPN/100ml	-	8.3	-

Note: Results related to sample as received.
 BDL: Below Detectable Limit.


Joint Chief Environmental Scientist



CENTRAL LABORATORY

Analysis Report

Reg. No. SR/05/TGPCB/HO/R00/LAB/2024/11/357-358

Collected by: AES-II, RO-RRD officials along with EPTRI Officials

Collected on: 14/11/2024

Received on: 16/11/2024

Test method: Standard Methods of APHA, 24th Edition

Quantity of the sample: 1 Ltr. sample each

Issue date: 25/11/2024

Page No.: 1 of 2

Sample code : Sample details / collection point

- 24/11/357 - Sample collected from Inlet of Nanakramguda 4.5 MLD STP, Nanakramguda (V), Serlingampally (M), Rangareddy District.
- 24/11/358 - Sample collected from Outlet of Nanakramguda 4.5 MLD STP, Nanakramguda (V), Serlingampally (M), Rangareddy District.

Parameters	Method No.	Unit	Results		As per CFO Order Standards
			24/11/357	24/11/358	
pH at 25° c	4500-H + B	-	7.15	7.18	5.5 - 9.0
Electrical conductivity at 25° c	2510-B	μS/cm	1395	1229	-
Total Suspended Solids	2540 - D	mg/L	113	10	100
Total Dissolved Solids	2540 - C	mg/L	820	718	-
Chemical Oxygen Demand (COD)	5220 - B	mg/L	96	32	250
BOD 3 at 27°C	IS 3025, 1993	mg/L	27	6	≤10
Total Kjeldhal Nitrogen (TKN)	4500-N _{org} B	mg/L	-	7	100
Ammonical Nitrogen	4500-NH ₃ C	mg/L	-	<5	50
Oil & Grease (O&G)	5520 - B	mg/L	-	<5	20

Note: Results related to sample as received.


Joint Chief Environmental Scientist



3564
TELANGANA POLLUTION CONTROL BOARD
 Paryavaran Bhavan, A-3, Industrial Estate, Sanathnagar, Hyderabad – 500 018
 Ph: 040-23887500

CENTRAL LABORATORY

Analysis Report

Reg. No.SR/05/TGPCB/HO/R00/LAB/2024/11/357-358

Collected by: AES-II, RO-RRD officials along with
EPTRI Officials

Collected on: 14/11/2024

Received on: 16/11/2024

Test method: Standard Methods of APHA, 24th Edition

Quantity of the sample: 1 Ltr. sample each

Issue date: 25/11/2024


Page No.: 2 of 2

Sample code : Sample details / collection point

- 24/11/357 - Sample collected from Inlet of Nanakramguda 4.5 MLD STP, Nanakramguda (V), Serlingampally (M), Rangareddy District.
- 24/11/358 - Sample collected from Outlet of Nanakramguda 4.5 MLD STP, Nanakramguda (V), Serlingampally (M), Rangareddy District.

Parameters	Method No.	Unit	Results		As per CFO Order Standards
			24/11/357	24/11/358	
Dissolved oxygen	4500 – O C	mg/L	-	3.1	-
Free Ammonia	Calculation Method	mg/L	-	0.02	5.0
Total coliform	9221 – B, C	MPN/100ml	-	140	< 500
Fecal coliform	9221 – B, C	MPN/100ml	-	2.0	-

Note: Results related to sample as received.


Joint Chief Environmental Scientist



TELANGANA POLLUTION CONTROL BOARD
Paryavarana Bhavan, A-3, Industrial Estate, Sanathnagar, Hyderabad – 500 018
Ph: 040-23887500



TC-12641

CENTRAL LABORATORY**Analysis Report**

Reg. No. SR/05/TGPCB/HO/R00/LAB/2024/11/359-360

Collected by: AES-II, RO-RRD officials along with EPTRI Officials

Collected on: 14/11/2024

Received on: 16/11/2024

Test method: Standard Methods of APHA, 24th Edition

Quantity of the sample: 1 Ltr. sample each

Issue date: 25/11/2024


Page No.: 1 of 2

Sample code : Sample details / collection point

- 24/11/359 - Sample collected from Inlet of Attapur 51.0 MLD, STP, Attapur (V), Rajendranagar (M), Rangareddy District.
- 24/11/360 - Sample collected from Outlet of Attapur 51.0 MLD, STP, Attapur (V), Rajendranagar (M), Rangareddy District.

Parameters	Method No.	Unit	Results		As per CFO Order Standards
			24/11/359	24/11/360	
pH at 25° c	4500-H + B	-	6.94	7.19	5.5 - 9.0
Electrical conductivity at 25° c	2510-B	µS/cm	1126	1067	-
Total Suspended Solids	2540 - D	mg/L	138	5	100
Total Dissolved Solids	2540 - C	mg/L	726	612	-
Chemical Oxygen Demand (COD)	5220 - B	mg/L	148	12	250
BOD ₃ at 27°C	IS 3025, 1993	mg/L	28	5	≤10
Total Kjeldhal Nitrogen (TKN)	4500-N _{org} B	mg/L	-	<5	100
Ammonical Nitrogen	4500-NH ₃ C	mg/L	-	<5	50
Oil & Grease (O&G)	5520 - B	mg/L	-	<5	20

Note: Results related to sample as received.



Joint Chief Environmental Scientist



3566
TELANGANA POLLUTION CONTROL BOARD
 Paryavaran Bhavan, A-3, Industrial Estate, Sanathnagar, Hyderabad – 500 018
 Ph: 040-23887500

CENTRAL LABORATORY

Analysis Report

Reg. No.SR/05/TGPCB/HO/R00/LAB/2024/11/359-360

Collected by: AES-II, RO-RRD officials along with
EPTRI Officials

Collected on: 14/11/2024

Received on: 16/11/2024

Test method: Standard Methods of APHA, 24th Edition

Quantity of the sample: 1 Ltr. sample each

Issue date: 25/11/2024

Page No.: 2 of 2

Sample code : Sample details / collection point

- 24/11/359 - Sample collected from Inlet of Attapur 51.0 MLD, STP, Attapur (V), Rajendranagar (M), Rangareddy District.
- 24/11/360 - Sample collected from Outlet of Attapur 51.0 MLD, STP, Attapur (V), Rajendranagar (M), Rangareddy District.

Parameters	Method No.	Unit	Results		As per CFO Order Standards
			24/11/359	24/11/360	
Dissolved oxygen	4500 – O C	mg/L	-	5.9	-
Free Ammonia	Calculation Method	mg/L	-	BDL	5.0
Total coliform	9221 – B, C	MPN/100ml	-	79	< 500
Fecal coliform	9221 – B, C	MPN/100ml	-	1.8	-

Note: Results related to sample as received.
BDL: Below Detectable Limit.


Joint Chief Environmental Scientist



CENTRAL LABORATORY

Analysis Report

Reg. No.SR/05/TGPCB/HO/R00/LAB/2024/11/361-362

Collected by: AES-II, RO-RRD officials along with
EPTRI Officials

Collected on: 14/11/2024

Received on: 16/11/2024

Test method: Standard Methods of APHA, 24th Edition

Quantity of the sample: 1 Ltr. sample each

Issue date: 25/11/2024


Page No.: 1 of 2

Sample code : Sample details / collection point

- 24/11/361 - Sample collected from Inlet of Attapur 23.0 MLD, STP, Attapur (V), Rajendranagar (M), Rangareddy District.
- 24/11/362 - Sample collected from Outlet of Attapur 23.0 MLD, STP, Attapur (V), Rajendranagar (M), Rangareddy District.

Parameters	Method No.	Unit	Results		As per CFO Order Standards
			24/11/361	24/11/362	
pH at 25° c	4500-H + B	-	6.65	7.26	5.5 - 9.0
Electrical conductivity at 25° c	2510-B	µS/cm	1887	1658	-
Total Suspended Solids	2540 - D	mg/L	60	6	100
Total Dissolved Solids	2540 - C	mg/L	1086	917	-
Chemical Oxygen Demand (COD)	5220 - B	mg/L	236	46	250
BOD 3 at 27°C	IS 3025, 1993	mg/L	48	9	≤10
Total Kjeldhal Nitrogen (TKN)	4500-N _{org} B	mg/L	-	<5	100
Ammonical Nitrogen	4500-NH ₃ C	mg/L	-	<5	50
Oil & Grease (O&G)	5520 - B	mg/L	-	<5	20

Note: Results related to sample as received.


Joint Chief Environmental Scientist



CENTRAL LABORATORY

Analysis Report

Reg. No.SR/05/TGPCB/HO/R00/LAB/2024/11/361-362

Collected by: AES-II, RO-RRD officials along with EPTRI Officials

Collected on: 14/11/2024

Received on: 16/11/2024

Test method: Standard Methods of APHA, 24th Edition

Quantity of the sample: 1 Ltr. sample each

Issue date: 25/11/2024

Page No.: 2 of 2

Sample code : Sample details / collection point

- 24/11/361 - Sample collected from Inlet of Attapur 23.0 MLD, STP, Attapur (V), Rajendranagar (M), Rangareddy District.
- 24/11/362 - Sample collected from Outlet of Attapur 23.0 MLD, STP, Attapur (V), Rajendranagar (M), Rangareddy District.

Parameters	Method No.	Unit	Results		As per CFO Order Standards
			24/11/361	24/11/362	
Dissolved oxygen	4500 – O C	mg/L	-	1.7	-
Free Ammonia	Calculation Method	mg/L	-	BDL	5.0
Total coliform	9221 – B, C	MPN/100ml	-	48	< 500
Fecal coliform	9221 – B, C	MPN/100ml	-	1.8	-

Note: Results related to sample as received.
BDL: Below Detectable Limit.

Joint Chief Environmental Scientist



CENTRAL LABORATORY

Analysis Report

Reg. No. SR/05/TGPCB/HO/R00/LAB/2024/11/363-364

Collected by: AES-II, RO-RRD officials along with EPTRI Officials

Collected on: 14/11/2024

Received on: 16/11/2024

Test method: Standard Methods of APHA, 24th Edition

Quantity of the sample: 1 Ltr. sample each

Issue date: 25/11/2024


Page No.: 1 of 2

Sample code : Sample details / collection point

- 24/11/363 - Sample collected from Inlet of Miralam 5.0 MLD, STP, Shivarampally (V), Rajendranagar (M), Rangareddy District.
- 24/11/364 - Sample collected from Outlet of Miralam 5.0 MLD, STP, Shivarampally (V), Rajendranagar (M), Rangareddy District.

Parameters	Method No.	Unit	Results		As per CFO Order Standards
			24/11/363	24/11/364	
pH at 25° c	4500-H + B	-	6.91	7.34	5.5 - 9.0
Electrical conductivity at 25° c	2510-B	µS/cm	1707	1611	-
Total Suspended Solids	2540 - D	mg/L	257	13	100
Total Dissolved Solids	2540 - C	mg/L	968	889	-
Chemical Oxygen Demand (COD)	5220 - B	mg/L	231	32	250
BOD 3 at 27°C	IS 3025, 1993	mg/L	49	5	≤10
Total Kjeldhal Nitrogen (TKN)	4500-N _{org} B	mg/L	-	10	100
Ammonical Nitrogen	4500-NH ₃ C	mg/L	-	6	50
Oil & Grease (O&G)	5520 - B	mg/L	-	<5	20

Note: Results related to sample as received.


Joint Chief Environmental Scientist



CENTRAL LABORATORY

Analysis Report

Reg. No.SR/05/TGPCB/HO/R00/LAB/2024/11/363-364

Collected by: AES-II, RO-RRD officials along with EPTRI Officials

Collected on: 14/11/2024

Received on: 16/11/2024

Test method: Standard Methods of APHA, 24th Edition

Quantity of the sample: 1 Ltr. sample each

Issue date: 25/11/2024


Page No.: 2 of 2

Sample code : Sample details / collection point

- 24/11/363 - Sample collected from Inlet of Miralam 5.0 MLD, STP, Shivarampally (V), Rajendranagar (M), Rangareddy District.
- 24/11/364 - Sample collected from Outlet of Miralam 5.0 MLD, STP, Shivarampally (V), Rajendranagar (M), Rangareddy District.

Parameters	Method No.	Unit	Results		As per CFO Order Standards
			24/11/363	24/11/364	
Dissolved oxygen	4500 – O C	mg/L	-	4.2	-
Free Ammonia	Calculation Method	mg/L	-	0.06	5.0
Total coliform	9221 – B, C	MPN/100ml	-	220	< 500
Fecal coliform	9221 – B, C	MPN/100ml	-	11	-

Note: Results related to sample as received.


Joint Chief Environmental Scientist



CENTRAL LABORATORY

Analysis Report

Reg. No. SR/05/TGPCB/HO/R00/LAB/2024/11/365-366

Collected by: AES-II, RO-RRD officials along with EPTRI Officials

Collected on: 14/11/2024

Received on: 16/11/2024

Test method: Standard Methods of APHA, 24th Edition

Quantity of the sample: 1 Ltr. sample each

Issue date: 25/11/2024


Page No.: 1 of 2

Sample code : Sample details / collection point

- 24/11/365 - Sample collected from Inlet of Noor Mohammed Kunta 4.0 MLD, STP, Rajendranagar (M), Rangareddy District.
- 24/11/366 - Sample collected from Outlet of Noor Mohammed Kunta 4.0 MLD, STP, Rajendranagar (M), Rangareddy District.

Parameters	Method No.	Unit	Results		As per CFO Order Standards
			24/11/365	24/11/366	
pH at 25° c	4500-H + B	-	6.98	7.19	5.5 - 9.0
Electrical conductivity at 25° c	2510-B	µS/cm	1952	1895	-
Total Suspended Solids	2540 - D	mg/L	212	7	100
Total Dissolved Solids	2540 - C	mg/L	1196	1075	-
Chemical Oxygen Demand (COD)	5220 - B	mg/L	240	36	250
BOD ₃ at 27°C	IS 3025, 1993	mg/L	45	5	≤10
Total Kjeldhal Nitrogen (TKN)	4500-N _{org} B	mg/L	-	<5	100
Ammonical Nitrogen	4500-NH ₃ C	mg/L	-	<5	50
Oil & Grease (O&G)	5520 - B	mg/L	-	<5	20

Note: Results related to sample as received.


Joint Chief Environmental Scientist



CENTRAL LABORATORY

Analysis Report

Reg. No.SR/05/TGPCB/HO/R00/LAB/2024/11/365-366

Collected by: AES-II, RO-RRD officials along with
EPTRI Officials

Collected on: 14/11/2024

Received on: 16/11/2024

Test method: Standard Methods of APHA, 24th Edition

Quantity of the sample: 1 Ltr. sample each

Issue date: 25/11/2024

Page No.: 2 of 2

Sample code : Sample details / collection point

- 24/11/365 - Sample collected from Inlet of Noor Mohammed Kunta 4.0 MLD, STP, Rajendranagar (M), Rangareddy District.
- 24/11/366 - Sample collected from Outlet of Noor Mohammed Kunta 4.0 MLD, STP, Rajendranagar (M), Rangareddy District.

Parameters	Method No.	Unit	Results		As per CFO Order Standards
			24/11/365	24/11/366	
Dissolved oxygen	4500 – O C	mg/L	-	5.3	-
Free Ammonia	Calculation Method	mg/L	-	BDL	-
Total coliform	9221 – B, C	MPN/100ml	-	430	< 500
Fecal coliform	9221 – B, C	MPN/100ml	-	1.8	-

Note: Results related to sample as received.

BDL: Below Detectable Limit.


Joint Chief Environmental Scientist



CENTRAL LABORATORY

Analysis Report

Reg. No. SR/05/TGPCB/HO/R00/LAB/2024/11/367-368

Collected by: AES-II, RO-RRD officials along with EPTRI Officials

Collected on: 14/11/2024

Received on: 16/11/2024

Test method: Standard Methods of APHA, 24th Edition

Quantity of the sample: 1 Ltr. sample each

Issue date: 25/11/2024


Page No.: 1 of 2

Sample code : Sample details / collection point

- 24/11/367 - Sample collected from Inlet of Saroornagar 2.5 MLD, STP, Saroornagar (V & M), Rangareddy District.
- 24/11/368 - Sample collected from Outlet of Saroornagar 2.5 MLD, STP, Saroornagar (V & M), Rangareddy District.

Parameters	Method No.	Unit	Results		As per CFO Order Standards
			24/11/367	24/11/368	
pH at 25° c	4500-H + B	-	6.88	7.02	5.5 - 9.0
Electrical conductivity at 25° c	2510-B	µS/cm	1504	1337	-
Total Suspended Solids	2540 - D	mg/L	108	5	100
Total Dissolved Solids	2540 - C	mg/L	836	747	-
Chemical Oxygen Demand (COD)	5220 - B	mg/L	175	41	250
BOD 3 at 27°C	IS 3025, 1993	mg/L	49	9	≤10
Total Kjeldhal Nitrogen (TKN)	4500-N _{org} B	mg/L	-	03	100
Ammonical Nitrogen	4500-NH ₃ C	mg/L	-	<5	50
Oil & Grease (O&G)	5520 - B	mg/L	-	<5	20

Note: Results related to sample as received.


Joint Chief Environmental Scientist



CENTRAL LABORATORY

Analysis Report

Reg. No. SR/05/TGPCB/HO/R00/LAB/2024/11/367-368

Collected by: AES-II, RO-RRD officials along with EPTRI Officials

Collected on: 14/11/2024

Received on: 16/11/2024

Test method: Standard Methods of APHA, 24th Edition

Quantity of the sample: 1 Ltr. sample each

Issue date: 25/11/2024

Page No.: 2 of 2

Sample code : Sample details / collection point

- 24/11/367 - Sample collected from Inlet of Saroornagar 2.5 MLD, STP, Saroornagar (V & M), Rangareddy District.
- 24/11/368 - Sample collected from Outlet of Saroornagar 2.5 MLD, STP, Saroornagar (V & M), Rangareddy District.

Parameters	Method No.	Unit	Results		As per CFO Order Standards
			24/11/367	24/11/368	
Dissolved oxygen	4500 – O C	mg/L	-	4.6	-
Free Ammonia	Calculation Method	mg/L	-	BDL	-
Total coliform	9221 – B, C	MPN/100ml	-	110	< 500
Fecal coliform	9221 – B, C	MPN/100ml	-	10	-

Note: Results related to sample as received.
BDL: Below Detectable Limit.

Joint Chief Environmental Scientist



CENTRAL LABORATORY

Analysis Report

Reg. No. SR/05/TGPCB/HO/R00/LAB/2024/11/369-370

Collected by: AES-II, RO-RRD officials along with EPTRI Officials

Collected on: 14/11/2024

Received on: 16/11/2024

Test method: Standard Methods of APHA, 24th Edition

Quantity of the sample: 1 Ltr. sample each

Issue date: 25/11/2024

Page No.: 1 of 2

Sample code : Sample details / collection point

- 24/11/369 - Sample collected from Inlet of Uppal Nalla cheruvu 30.0 MLD, STP, Uppal (V &M), Medchal District.
- 24/11/370 - Sample collected from Outlet of Uppal Nalla cheruvu 30.0 MLD, STP, Uppal (V &M), Medchal District.

Parameters	Method No.	Unit	Results		As per CFO Order Standards
			24/11/369	24/11/370	
pH at 25° c	4500-H + B	-	7.24	7.49	5.5 - 9.0
Electrical conductivity at 25° c	2510-B	µS/cm	1369	1330	-
Total Suspended Solids	2540 - D	mg/L	41	5	50
Total Dissolved Solids	2540 - C	mg/L	774	738	-
Chemical Oxygen Demand (COD)	5220 - B	mg/L	114	73	250
BOD 3 at 27°C	IS 3025, 1993	mg/L	37	23	< 30
Total Kjeldhal Nitrogen (TKN)	4500-N _{org} B	mg/L	-	68	100
Ammonical Nitrogen	4500-NH ₃ C	mg/L	-	22	50
Oil & Grease (O&G)	5520 - B	mg/L	-	<5	10

Note: Results related to sample as received.


Joint Chief Environmental Scientist



3576
TELANGANA POLLUTION CONTROL BOARD
 Paryavaran Bhavan, A-3, Industrial Estate, Sanathnagar, Hyderabad – 500 018
 Ph: 040-23887500

CENTRAL LABORATORY

Analysis Report

Reg. No.SR/05/TGPCB/HO/R00/LAB/2024/11/369-370

Collected by: AES-II, RO-RRD officials along with
EPTRI Officials

Collected on: 14/11/2024

Received on: 16/11/2024

Test method: Standard Methods of APHA, 24th Edition

Quantity of the sample: 1 Ltr. sample each

Issue date: 25/11/2024

Page No.: 2 of 2

Sample code : Sample details / collection point

- 24/11/369 - Sample collected from Inlet of Uppal Nalla cheruvu 30.0 MLD, STP, Uppal (V &M), Medchal District.
- 24/11/370 - Sample collected from Outlet of Uppal Nalla cheruvu 30.0 MLD, STP, Uppal (V &M), Medchal District.

Parameters	Method No.	Unit	Results		As per CFO Order Standards
			24/11/369	24/11/370	
Dissolved oxygen	4500 – O C	mg/L	-	4.2	-
Free Ammonia	Calculation Method	mg/L	-	0.37	5.0
Total coliform	9221 – B, C	MPN/100ml	-	94	< 500
Fecal coliform	9221 – B, C	MPN/100ml	-	1.8	-

Note: Results related to sample as received.
BDL-Below Detectable Limit.


Joint Chief Environmental Scientist



3577
TELANGANA POLLUTION CONTROL BOARD
 Paryavarana Bhavan, A-3, Industrial Estate, Sanathnagar, Hyderabad – 500 018
 Ph: 040-23887500



TC-12641

CENTRAL LABORATORY

Analysis Report

Reg. No. SR/05/TGPCB/HO/R00/LAB/2024/11/371-372

Collected by: AES-II, RO-RRD officials along with EPTRI Officials

Collected on: 14/11/2024

Received on: 16/11/2024

Test method: Standard Methods of APHA, 24th Edition

Quantity of the sample: 1 Ltr. sample each

Issue date: 25/11/2024

Page No.: 1 of 2

Sample code : Sample details / collection point

- 24/11/371 - Sample collected from Inlet of Uppal Nalla cheruvu 86.5 MLD, STP, Uppal (V &M), Medchal District.
- 24/11/372 - Sample collected from Outlet of Uppal Nalla cheruvu 86.5 MLD, STP, Uppal (V &M), Medchal District.

Parameters	Method No.	Unit	Results	
			24/11/371	24/11/372
pH at 25° c	4500-H + B	-	7.20	7.22
Electrical conductivity at 25° c	2510-B	µS/cm	1324	1235
Total Suspended Solids	2540 - D	mg/L	48	14
Total Dissolved Solids	2540 - C	mg/L	750	688
Chemical Oxygen Demand (COD)	5220 - B	mg/L	130	73
BOD 3 at 27°C	IS 3025, 1993	mg/L	42	19
Total Kjeldhal Nitrogen (TKN)	4500-N _{org} B	mg/L	-	<5
Ammonical Nitrogen	4500-NH ₃ C	mg/L	-	<5
Oil & Grease (O&G)	5520 - B	mg/L	-	<5

Note: Results related to sample as received.


Joint Chief Environmental Scientist



3578
TELANGANA POLLUTION CONTROL BOARD
 Paryavaran Bhavan, A-3, Industrial Estate, Sanathnagar, Hyderabad – 500 018
 Ph: 040-23887500

CENTRAL LABORATORY

Analysis Report

Reg. No. SR/05/TGPCB/HO/R00/LAB/2024/11/371-372

Collected by: AES-II, RO-RRD officials along with EPTRI Officials

Collected on: 14/11/2024

Received on: 16/11/2024

Test method: Standard Methods of APHA, 24th Edition

Quantity of the sample: 1 Ltr. sample each

Issue date: 25/11/2024


Page No.: 2 of 2

Sample code : Sample details / collection point

- 24/11/371 - Sample collected from Inlet of Uppal Nalla cheruvu 86.5 MLD, STP, Uppal (V &M), Medchal District.
- 24/11/372 - Sample collected from Outlet of Uppal Nalla cheruvu 86.5 MLD, STP, Uppal (V &M), Medchal District.

Parameters	Method No.	Unit	Results		As per CFO Order Standards
			24/11/371	24/11/372	
Dissolved oxygen	4500 – O C	mg/L	-	5.2	-
Free Ammonia	Calculation Method	mg/L	-	BDL	5.0
Total coliform	9221 – B, C	MPN/100ml	-	70	< 500
Fecal coliform	9221 – B, C	MPN/100ml	-	1.8	-

Note: Results related to sample as received.
 BDL-Below Detectable Limit.


Joint Chief Environmental Scientist



CENTRAL LABORATORY

Analysis Report

Reg. No.SR/05/TGPCB/HO/R00/LAB/2024/11/373-374

Collected by: AES-II, RO-RRD officials along with
EPTRI Officials

Collected on: 14/11/2024

Received on: 16/11/2024

Test method: Standard Methods of APHA, 24th Edition

Quantity of the sample: 1 Ltr. sample each

Issue date: 25/11/2024

Page No.: 1 of 2

Sample code : Sample details / collection point

- 24/11/373 - Sample collected from Inlet of Nacharam Patel Cheruvu 2.5 MLD, STP, Nacharam (V), Uppal (M), Medchal District.
- 24/11/374 - Sample collected from Outlet of Nacharam Patel Cheruvu 2.5 MLD, STP, Nacharam (V), Uppal (M), Medchal District.

Parameters	Method No.	Unit	Results		As per CFO Order Standards
			24/11/373	24/11/374	
pH at 25° c	4500-H ⁺ B	-	7.06	7.10	5.5 - 9.0
Electrical conductivity at 25° c	2510-B	µS/cm	1436	1284	-
Total Suspended Solids	2540 - D	mg/L	110	5	100
Total Dissolved Solids	2540 - C	mg/L	789	739	-
Chemical Oxygen Demand (COD)	5220 - B	mg/L	293	85	250
BOD ₅ at 27 ^o C	IS 3025, 1993	mg/L	90	19	≤10
Total Kjeldhal Nitrogen (TKN)	4500-N _{org} B	mg/L	-	05	100
Ammonical Nitrogen	4500-NH ₃ C	mg/L	-	<5	50
Oil & Grease (O&G)	5520 - B	mg/L	-	<5	10

Note: Results related to sample as received.

Remarks: BOD value is exceeding the standard limit.

Joint Chief Environmental Scientist



CENTRAL LABORATORY

Analysis Report

Reg. No. SR/05/TGPCB/HO/R00/LAB/2024/11/373-374

Collected by: AES-II, RO-RRD officials along with EPTRI Officials

Collected on: 14/11/2024

Received on: 16/11/2024

Test method: Standard Methods of APHA, 24th Edition

Quantity of the sample: 1 Ltr. sample each

Issue date: 25/11/2024

Page No.: 2 of 2

Sample code : Sample details / collection point

- 24/11/373 - Sample collected from Inlet of Nacharam Patel Cheruvu 2.5 MLD, STP, Nacharam (V), Uppal (M), Medchal District.
- 24/11/374 - Sample collected from Outlet of Nacharam Patel Cheruvu 2.5 MLD, STP, Nacharam (V), Uppal (M), Medchal District.

Parameters	Method No.	Unit	Results		As per CFO Order Standards
			24/11/373	24/11/374	
Dissolved oxygen	4500 – O C	mg/L	-	3.8	-
Free Ammonia	Calculation Method	mg/L	-	BDL	5.0
Total coliform	9221 – B, C	MPN/100ml	-	540	< 500
Fecal coliform	9221 – B, C	MPN/100ml	-	6.8	-

Note: Results related to sample as received.
 BDL-Below Detectable Limit.


Joint Chief Environmental Scientist



CENTRAL LABORATORY

Analysis Report

Reg. No.SR/05/TGPCB/HO/R00/LAB/2024/11/375-376

Collected by: AES-II, RO-RRD officials along with
EPTRI Officials

Collected on: 14/11/2024

Received on: 16/11/2024

Test method: Standard Methods of APHA, 24th Edition

Quantity of the sample: 1 Ltr. sample each

Issue date: 25/11/2024

Page No.: 1 of 2

Sample code : Sample details / collection point

- 24/11/375 - Sample collected from Inlet of Nacharam Pedda Cheruvu 10.0 MLD, STP, Nacharam (V), Uppal (M), Medchal District.
 24/11/376 - Sample collected from Outlet of Nacharam Pedda Cheruvu 10.0 MLD, STP, Nacharam (V), Uppal (M), Medchal District.

Parameters	Method No.	Unit	Results		As per CFO Order Standards
			24/11/375	24/11/376	
pH at 25° c	4500-H ⁺ B	-	7.11	7.33	5.5 - 9.0
Electrical conductivity at 25° c	2510-B	µS/cm	1466	1441	-
Total Suspended Solids	2540 - D	mg/L	141	13	100
Total Dissolved Solids	2540 - C	mg/L	842	788	-
Chemical Oxygen Demand (COD)	5220 - B	mg/L	252	85	250
BOD ₃ at 27° C	IS 3025, 1993	mg/L	67	21	≤10
Total Kjeldhal Nitrogen (TKN)	4500-N _{org} B	mg/L	-	72	100
Ammonical Nitrogen	4500-NH ₃ C	mg/L	-	27	50
Oil & Grease (O&G)	5520 - B	mg/L	-	<5	10

Note: Results related to sample as received.

Remarks: BOD value is exceeding the standard limit.


Joint Chief Environmental Scientist



CENTRAL LABORATORY

Analysis Report

Reg. No.SR/05/TGPCB/HO/R00/LAB/2024/11/375-376

Collected by: AES-II, RO-RRD officials along with
EPTRI Officials

Collected on: 14/11/2024

Received on: 16/11/2024

Test method: Standard Methods of APHA, 24th Edition

Quantity of the sample: 1 Ltr. sample each

Issue date: 25/11/2024

Page No.: 2 of 2

Sample code : Sample details / collection point

- 24/11/375 - Sample collected from Inlet of Nacharam Pedda Cheruvu 10.0 MLD, STP, Nacharam (V), Uppal (M), Medchal District.
- 24/11/376 - Sample collected from Outlet of Nacharam Pedda Cheruvu 10.0 MLD, STP, Nacharam (V), Uppal (M), Medchal District.

Parameters	Method No.	Unit	Results		As per CFO Order Standards
			24/11/375	24/11/376	
Dissolved oxygen	4500 – O C	mg/L	-	4.6	-
Free Ammonia	Calculation Method	mg/L	-	0.32	5.0
Total coliform	9221 – B, C	MPN/100ml	-	430	< 500
Fecal coliform	9221 – B, C	MPN/100ml	-	1.8	-

Note: Results related to sample as received.


Joint Chief Environmental Scientist



CENTRAL LABORATORY

Analysis Report

Reg. No.SR/05/TGPCB/HO/R00/LAB/2024/11/377-378

Collected by: AES-II, RO-RRD officials along with EPTRI Officials

Collected on: 14/11/2024

Received on: 16/11/2024

Test method: Standard Methods of APHA, 24th Edition

Quantity of the sample: 1 Ltr. sample each

Issue date: 25/11/2024

Page No.: 1 of 2

Sample code : Sample details / collection point

- 24/11/377 - Sample collected from Inlet of Nacharam Pedda Cheruvu 17.5 MLD, STP, Nacharam (V), Uppal (M), Medchal District.
- 24/11/378 - Sample collected from Outlet of Nacharam Pedda Cheruvu 17.5 MLD, STP, Nacharam (V), Uppal (M), Medchal District.

Parameters	Method No.	Unit	Results	
			24/11/377	24/11/378
pH at 25° c	4500-H ⁺ B	-	6.87	7.17
Electrical conductivity at 25° c	2510-B	µS/cm	1542	1310
Total Suspended Solids	2540 - D	mg/L	2117	08
Total Dissolved Solids	2540 - C	mg/L	918	712
Chemical Oxygen Demand (COD)	5220 - B	mg/L	886	65
BOD ₅ at 27° C	IS 3025, 1993	mg/L	261	17
Total Kjeldhal Nitrogen (TKN)	4500-N _{org} B	mg/L	-	<5
Ammonical Nitrogen	4500-NH ₃ C	mg/L	-	<5
Oil & Grease (O&G)	5520 - B	mg/L	-	<5

Note: Results related to sample as received.


Joint Chief Environmental Scientist



CENTRAL LABORATORY

Analysis Report

Reg. No.SR/05/TGPCB/HO/R00/LAB/2024/11/377-378

Collected by: AES-II, RO-RRD officials along with
EPTRI Officials

Collected on: 14/11/2024

Received on: 16/11/2024

Test method: Standard Methods of APHA, 24th Edition

Quantity of the sample: 1 Ltr. sample each

Issue date: 25/11/2024

Page No.: 2 of 2

Sample code : Sample details / collection point

- 24/11/377 - Sample collected from Inlet of Nacharam Pedda Cheruvu 17.5 MLD, STP, Nacharam (V), Uppal (M), Medchal District.
- 24/11/378 - Sample collected from Outlet of Nacharam Pedda Cheruvu 17.5 MLD, STP, Nacharam (V), Uppal (M), Medchal District.

Parameters	Method No.	Unit	Results	
			24/11/377	24/11/378
Dissolved oxygen	4500 – O C	mg/L	-	4.8
Free Ammonia	Calculation Method	mg/L	-	BDL
Total coliform	9221 – B, C	MPN/100ml	-	540
Fecal coliform	9221 – B, C	MPN/100ml	-	1.8

Note: Results related to sample as received.
BDL-Below Detectable Limit.


Joint Chief Environmental Scientist



CENTRAL LABORATORY

Analysis Report

Reg. No.SR/05/TGPCB/HO/R00/LAB/2024/11/343-344
 Collected on: 16/11/2024
 Test method: Standard Methods of APHA, 24th Edition
 Issue date: 25/11/2024

Collected by: EE, RO- Medchal.
 Received on: 16/11/2024
 Quantity of the sample: 1 Ltr. sample each
 Page No: 1 of 2

Sample code : Sample details / collection point

- 24/11/343 - Sample collected from Inlet of Khazakunta Lake 12 MLD, STP, Back side of Metro Mall, Kukatpally, Medchal-Malkajgiri District.
- 24/11/344 - Sample collected from Outlet of Khazakunta Lake 12 MLD, STP, Back side of Metro Mall, Kukatpally, Medchal-Malkajgiri District.

Parameters	Method No.	Unit	Results		As per CFO Order Standards
			24/11/343	24/11/344	
pH at 25° c	4500-H + B	-	6.78	7.21	5.5 - 9.0
Electrical conductivity at 25° c	2510-B	µS/cm	1503	1215	-
Total Suspended Solids	2540 - D	mg/L	60	<5	100
Total Dissolved Solids	2540 - C	mg/L	855	698	-
Chemical Oxygen Demand (COD)	5220 - B	mg/L	132	60	250
BOD 3 at 27°C	IS 3025, 1993	mg/L	26	8	≤10
Total Kjeldhal Nitrogen (TKN)	4500-N _{org} B	mg/L	-	65	100
Ammonical Nitrogen	4500-NH ₃ C	mg/L	-	22	50
Oil & Grease (O&G)	5520 - B	mg/L	-	<5	10

Note: Results related to sample as received.


 Joint Chief Environmental Scientist



3586
TELANGANA POLLUTION CONTROL BOARD
 Paryavaran Bhavan, A-3, Industrial Estate, Sanathnagar, Hyderabad – 500 018
 Ph: 040-23887500

CENTRAL LABORATORY

Analysis Report

Reg. No.SR/05/TGPCB/HO/R00/LAB/2024/11/343-344
 Collected on: 16/11/2024
 Test method: Standard Methods of APHA, 24th Edition
 Issue date: 25/11/2024


Collected by: EE, RO- Medchal.
 Received on: 16/11/2024
 Quantity of the sample: 1 Ltr. sample each
 Page No: 2 of 2

Sample code : Sample details / collection point

- 24/11/343 - Sample collected from Inlet of Khazakunta Lake 12 MLD, STP, Back side of Metro Mall, Kukatpally, Medchal-Malkajgiri District.
- 24/11/344 - Sample collected from Outlet of Khazakunta Lake 12 MLD, STP, Back side of Metro Mall, Kukatpally, Medchal-Malkajgiri District.

Parameters	Method No.	Unit	Results		As per CFO Order Standards
			24/11/343	24/11/344	
Dissolved oxygen	4500 – O C	mg/L	-	0.9	-
Free Ammonia	Calculation Method	mg/L	-	0.20	5.0
Total coliform	9221 – B, C	MPN/100ml	-	280	< 500
Fecal coliform	9221 – B, C	MPN/100ml	-	1.8	-

Note: Results related to sample as received.


Joint Chief Environmental Scientist



CENTRAL LABORATORY

Analysis Report

Reg. No.SR/05/TGPCB/HO/R00/LAB/2024/11/345-346
 Collected on: 16/11/2024
 Test method: Standard Methods of APHA, 24th Edition
 Issue date: 25/11/2024


Collected by: EE, RO- Medchal.
 Received on: 16/11/2024
 Quantity of the sample: 1 Ltr. sample each
 Page No: 1 of 2

Sample code : Sample details / collection point

- 24/11/345 - Sample collected from Inlet of Pragathi nagar 2.5 MLD STP, Kukatpally, Medchal-Malkajgiri District
 24/11/346 - Sample collected from Outlet of Pragathi nagar 2.5 MLD STP, Kukatpally, Medchal-Malkajgiri District

Parameters	Method No.	Unit	Results	
			24/11/345	24/11/346
pH at 25° C	4500-H ⁺ B	-	7.09	7.32
Electrical conductivity at 25° C	2510-B	µS/cm	1431	1365
Total Suspended Solids	2540 - D	mg/L	42	<5
Total Dissolved Solids	2540 - C	mg/L	830	781
Chemical Oxygen Demand (COD)	5220 - B	mg/L	144	40
BOD ₃ at 27°C	IS 3025, 1993	mg/L	31	8
Total Kjeldhal Nitrogen (TKN)	4500-N _{org} B	mg/L	-	40
Ammonical Nitrogen	4500-NH ₃ C	mg/L	-	13
Oil & Grease (O&G)	5520 - B	mg/L	-	<5

Note: Results related to sample as received.


 Joint Chief Environmental Scientist



3588
TELANGANA POLLUTION CONTROL BOARD
 Paryavaran Bhavan, A-3, Industrial Estate, Sanathnagar, Hyderabad – 500 018
 Ph: 040-23887500

CENTRAL LABORATORY

Analysis Report

Reg. No. SR/05/TGPCB/HO/R00/LAB/2024/11/345-346
 Collected on: 16/11/2024
 Test method: Standard Methods of APHA, 24th Edition
 Issue date: 25/11/2024

Collected by: EE, RO- Medchal.
 Received on: 16/11/2024
 Quantity of the sample: 1 Ltr. sample each
 Page No: 2 of 2

Sample code : Sample details / collection point

- 24/11/345 - Sample collected from Inlet of Pragathi nagar 2.5 MLD STP, Kukatpally, Medchal-Malkajgiri District
 24/11/346 - Sample collected from Outlet of Pragathi nagar 2.5 MLD STP, Kukatpally, Medchal-Malkajgiri District

Parameters	Method No.	Unit	Results	
			24/11/345	24/11/346
Dissolved oxygen	4500 – O C	mg/L	-	2.8
Free Ammonia	Calculation Method	mg/L	-	0.16
Total coliform	9221 – B, C	MPN/100ml	-	110
Fecal coliform	9221 – B, C	MPN/100ml	-	1.8

Note: Results related to sample as received.

Joint Chief Environmental Scientist



CENTRAL LABORATORY

Analysis Report

Reg. No.SR/05/TGPCB/HO/R00/LAB/2024/11/347-348
 Collected on: 16/11/2024
 Test method: Standard Methods of APHA, 24th Edition
 Issue date: 25/11/2024

Collected by: EE, RO- Medchal.
 Received on: 16/11/2024
 Quantity of the sample: 1 Ltr. sample each
 Page No: 1 of 2

Sample code : Sample details / collection point

- 24/11/347 - Sample collected from Inlet of Rangadhamuni Lake 5 MLD STP, Kukatpally, Medchal-Malkajgiri District.
 24/11/348 - Sample collected from Outlet of Rangadhamuni Lake 5 MLD STP, Kukatpally, Medchal-Malkajgiri District.

Parameters	Method No.	Unit	Results	
			24/11/347	24/11/348
pH at 25° c	4500-H ⁺ B	-	7.15	7.32
Electrical conductivity at 25° c	2510-B	μS/cm	1623	1325
Total Suspended Solids	2540 - D	mg/L	114	<5
Total Dissolved Solids	2540 - C	mg/L	978	796
Chemical Oxygen Demand (COD)	5220 - B	mg/L	152	52
BOD ₃ at 27°C	IS 3025, 1993	mg/L	32	10
Total Kjeldhal Nitrogen (TKN)	4500-N _{org} B	mg/L	-	<5
Ammonical Nitrogen	4500-NH ₃ C	mg/L	-	<5
Oil & Grease (O&G)	5520 - B	mg/L	-	<5

Note: Results related to sample as received.


Joint Chief Environmental Scientist



3590
TELANGANA POLLUTION CONTROL BOARD
 Paryavaran Bhavan, A-3, Industrial Estate, Sanathnagar, Hyderabad – 500 018
 Ph: 040-23887500

CENTRAL LABORATORY

Analysis Report

Reg. No. SR/05/TGPCB/HO/R00/LAB/2024/11/347-348
Collected on: 16/11/2024
Test method: Standard Methods of APHA, 24th Edition
Issue date: 25/11/2024

Collected by: EE, RO- Medchal.
Received on: 16/11/2024
Quantity of the sample: 1 Ltr. sample each
Page No: 2 of 2

Sample code : Sample details / collection point

- 24/11/347 - Sample collected from Inlet of Rangadhamuni Lake 5 MLD STP, Kukatpally, Medchal-Malkajgiri District.
 24/11/348 - Sample collected from Outlet of Rangadhamuni Lake 5 MLD STP, Kukatpally, Medchal-Malkajgiri District.

Parameters	Method No.	Unit	Results	
			24/11/347	24/11/348
Dissolved oxygen	4500 – O C	mg/L	-	2.7
Free Ammonia	Calculation Method	mg/L	-	BDL
Total coliform	9221 – B, C	MPN/100ml	-	110
Fecal coliform	9221 – B, C	MPN/100ml	-	1.8

Note: Results related to sample as received.
 BDL – Below Detectable Limit.


Joint Chief Environmental Scientist



CENTRAL LABORATORY

Analysis Report

Reg. No.SR/05/TGPCB/HO/R00/LAB/2024/11/349-350
 Collected on: 16/11/2024
 Test method: Standard Methods of APHA, 24th Edition
 Issue date: 25/11/2024

Collected by: EE, RO- Medchal.
 Received on: 16/11/2024
 Quantity of the sample: 1 Ltr. sample each
 Page No: 1 of 2

Sample code : Sample details / collection point

- 24/11/349 - Sample collected from Inlet of Safilguda lake 0.6 MLD STP, Malkajgiri, Medchal Malkajgiri District.
 24/11/350 - Sample collected from Outlet of Safilguda lake 0.6 MLD STP, Malkajgiri, Medchal Malkajgiri District.

Parameters	Method No.	Unit	Results		As per CFO Order Standards
			24/11/349	24/11/350	
pH at 25° c	4500-H ⁺ B	-	7.25	7.80	5.5 - 9.0
Electrical conductivity at 25° c	2510-B	μS/cm	1920	1666	-
Total Suspended Solids	2540 - D	mg/L	259	<5	100
Total Dissolved Solids	2540 - C	mg/L	1128	1006	-
Chemical Oxygen Demand	5220 - B	mg/L	114	28	250
BOD ₃ at 27°C	IS 3025, 1993	mg/L	23	6	≤10
Total Kjeldhal Nitrogen	4500-N _{org} B	mg/L	-	<5	100
Ammonical Nitrogen	4500-NH ₃ C	mg/L	-	<5	50
Oil & Grease	5520 - B	mg/L	-	<5	20

Note: Results related to sample as received.


Joint Chief Environmental Scientist



CENTRAL LABORATORY

Analysis Report

Reg. No.SR/05/TGPCB/HO/R00/LAB/2024/11/349-350
 Collected on: 16/11/2024
 Test method: Standard Methods of APHA, 24th Edition
 Issue date: 25/11/2024

Collected by: EE, RO- Medchal.
 Received on: 16/11/2024
 Quantity of the sample: 1 Ltr. sample each
 Page No: 2 of 2

Sample code : Sample details / collection point

- 24/11/349 - Sample collected from Inlet of Safilguda lake 0.6 MLD STP, Malkajgiri, Medchal Malkajgiri District.
 24/11/350 - Sample collected from Outlet of Safilguda lake 0.6 MLD STP, Malkajgiri, Medchal Malkajgiri District.

Parameters	Method No.	Unit	Results		As per CFO Order Standards
			24/11/349	24/11/350	
Dissolved oxygen	4500 – O C	mg/L	-	5.1	-
Free Ammonia	Calculation Method	mg/L	-	BDL	5.0
Total coliform	9221 – B, C	MPN/100ml	-	220	< 500
Fecal coliform	9221 – B, C	MPN/100ml	-	1.8	-

Note: Results related to sample as received.
 BDL – Below Detectable Limit.


 Joint Chief Environmental Scientist

Annexure-A14 - PHMED

Details of Sewerage generation, STP details in ULBs outside ORR													
S.No	Name of ULB	Sewerage generation (in MLD)	Existing Sewerage treatment Plant		Utilization capacity in MLD	Sewerage treatment Plant Under Construction under other Schemes		Sewerage treatment Plant approved and to be grounded under AMRUT 2.0		Under tendering/ Awaiting Sanction/ Formulation Stage under SBM 2.0/others (in MLD)		Total Sewerage treatment Plant Capacity	
			Present as per DWS	No.s		Capacity in MLD	No.s	Capacity in MLD	No.s	Capacity in MLD	No.s	Capacity in MLD	No.s
1	Adilabad	19.20	0	0.00	0.00	0	0.00	4	31.50	0	0.00	4	31.50
2	Khanapur	2.11	0	0.00	0.00	0	0.00	0	0.00	1	2.30	1	2.30
3	Bhainsa	7.20	0	0.00	0.00	0	0.00	0	0.00	1	6.00	1	6.00
4	Nirmal	15.04	0	0.00	0.00	0	0.00	0	0.00	2	11.50	2	11.50
5	Mancherial	13.60	0	0.00	0.00	0	0.00	0	0.00	2	10.00	2	10.00
6	Bellampalli	8.13	0	0.00	0.00	0	0.00	0	0.00	1	6.50	1	6.50
7	Nasipur	5.76	0	0.00	0.00	0	0.00	0	0.00	1	8.50	1	8.50
8	Chennur	1.24	0	0.00	0.00	0	0.00	0	0.00	1	3.00	1	3.00
9	Mandamarry	4.48	0	0.00	0.00	0	0.00	0	0.00	1	6.00	1	6.00
10	Kyathanpally	2.72	0	0.00	0.00	0	0.00	0	0.00	1	4.00	1	4.00
11	Luxettipet	1.76	0	0.00	0.00	0	0.00	0	0.00	1	3.00	1	3.00
12	Asifabad	3.12	0	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00
13	Kag haznagar	8.80	0	0.00	0.00	0	0.00	0	0.00	1	6.70	1	6.70
14	Jagityal	14.00	0	0.00	0.00	0	0.00	0	0.00	2	12.00	2	12.00
15	Korutla	8.80	0	0.00	0.00	0	0.00	0	0.00	1	8.60	1	8.60
16	Metpalli	4.40	0	0.00	0.00	0	0.00	0	0.00	1	6.10	1	6.10
17	Raikal	0.56	0	0.00	0.00	0	0.00	0	0.00	2	2.20	2	2.20
18	Dharmapuri	2.32	0	0.00	0.00	0	0.00	0	0.00	1	2.00	1	2.00
19	Karimnagar	52.00	1	38.00	3.00	0	0.00	0	0.00	0	0.00	1	38.00
20	Jammikunta	5.36	0	0.00	0.00	0	0.00	0	0.00	1	5.00	1	5.00
21	Huzurabad	4.80	0	0.00	0.00	0	0.00	0	0.00	2	6.00	2	6.00
22	Choppadandi	0.48	0	0.00	0.00	0	0.00	0	0.00	1	2.40	1	2.40
23	Kothapally	0.32	0	0.00	0.00	0	0.00	0	0.00	1	1.40	1	1.40
24	Peddapalli	4.40	0	0.00	0.00	0	0.00	0	0.00	2	5.70	2	5.70
25	Sulthanabad	1.02	0	0.00	0.00	0	0.00	0	0.00	1	3.00	1	3.00
26	Ramagundam	32.00	0	0.00	0.00	0	0.00	5	33.50	0	0.00	5	33.50
27	Manthani	1.44	0	0.00	0.00	0	0.00	0	0.00	1	3.00	1	3.00
28	Sircilla	12.00	0	0.00	0.00	1	19.10	0	0.00	0	0.00	1	19.10
29	Vemulawada	5.60	0	0.00	0.00	0	0.00	0	0.00	1	5.50	1	5.50
30	Jangaon	7.36	0	0.00	0.00	0	0.00	0	0.00	1	6.00	1	6.00
31	Bhupalpally	8.00	0	0.00	0.00	0	0.00	0	0.00	1	7.00	1	7.00
32	Parkal	4.80	0	0.00	0.00	0	0.00	0	0.00	1	4.00	1	4.00
33	Warangal Corp	164.33	2	20.00	16.00	0	0.00	0	0.00	0	0.00	2	20.00
34	Narsampet	4.40	0	0.00	0.00	0	0.00	0	0.00	1	4.20	1	4.20
35	Wardhannapet	1.00	0	0.00	0.00	0	0.00	0	0.00	2	1.60	2	1.60
36	Khammam Mpl. Corporation	55.20	0	0.00	0.00	0	0.00	2	53.50	0	0.00	2	53.50
37	Madhira	3.60	0	0.00	0.00	0	0.00	0	0.00	1	4.00	1	4.00
38	Sathupally	3.80	0	0.00	0.00	0	0.00	0	0.00	2	4.00	2	4.00

39	Wyra	3.44	0	0.00	0.00	0	0.00	0	0.00	1	4.00	1	4.00
40	Kothagudem	11.60	0	0.00	0.00	0	0.00	0	0.00	1	9.00	1	9.00
41	Manuguru	4.16	0	0.00	0.00	0	0.00	0	0.00	1	4.00	1	4.00
42	Palvancha	11.20	0	0.00	0.00	0	0.00	0	0.00	1	10.00	1	10.00
43	Yellandu	5.20	0	0.00	0.00	0	0.00	0	0.00	1	4.00	1	4.00
44	Mahabubabad	10.40	0	0.00	0.00	0	0.00	0	0.00	1	8.00	1	8.00
45	Dornakal	1.09	0	0.00	0.00	0	0.00	0	0.00	1	1.70	1	1.70
46	Maripeda	1.28	0	0.00	0.00	0	0.00	0	0.00	1	2.50	1	2.50
47	Thorrur	1.84	0	0.00	0.00	0	0.00	0	0.00	1	2.30	1	2.30
48	Mahabubnagar	22.40	0	0.00	0.00	0	0.00	3	42.00	0	0.00	3	42.00
49	Jadcherla	9.12	0	0.00	0.00	0	0.00	0	0.00	1	7.30	1	7.30
50	Bhoothpur	1.52	0	0.00	0.00	0	0.00	0	0.00	2	1.70	2	1.70
51	Nagarkurnool	2.16	1	2.30	1.00	1	3.20	0	0.00	0	0.00	2	5.50
52	Achampet	3.20	0	0.00	0.00	0	0.00	0	0.00	1	4.00	1	4.00
53	Kollapur	2.40	0	0.00	0.00	0	0.00	0	0.00	1	3.00	1	3.00
54	Kalwakurthy	3.60	0	0.00	0.00	0	0.00	0	0.00	1	4.00	1	4.00
55	Wanaparthy	10.80	0	0.00	0.00	0	0.00	0	0.00	1	8.00	1	8.00
56	Pebbair	2.02	0	0.00	0.00	0	0.00	0	0.00	1	3.00	1	3.00
57	Kothakota	3.04	0	0.00	0.00	0	0.00	0	0.00	1	3.20	1	3.20
58	Atmakur	2.40	0	0.00	0.00	0	0.00	0	0.00	1	2.90	1	2.90
59	Amarchintha	1.60	0	0.00	0.00	0	0.00	0	0.00	1	2.00	1	2.00
60	Gadwal	10.00	0	0.00	0.00	0	0.00	0	0.00	1	8.00	1	8.00
61	Alampur	1.28	0	0.00	0.00	0	0.00	0	0.00	1	1.70	1	1.70
62	Waddepally	1.28	0	0.00	0.00	0	0.00	0	0.00	1	2.00	1	2.00
63	Ieeja	3.44	0	0.00	0.00	0	0.00	0	0.00	1	3.30	1	3.30
64	Narayanpet	5.76	0	0.00	0.00	0	0.00	0	0.00	1	5.00	1	5.00
65	Makthal	2.24	0	0.00	0.00	0	0.00	0	0.00	1	3.60	1	3.60
66	Kosgi	1.52	0	0.00	0.00	0	0.00	0	0.00	1	3.30	1	3.30
67	Banswada	5.48	0	0.00	0.00	0	0.00	0	0.00	1	3.50	1	3.50
68	Yellareddy	2.30	0	0.00	0.00	0	0.00	0	0.00	2	2.30	2	2.30
69	Kamareddy	7.67	0	0.00	0.00	0	0.00	0	0.00	1	12.00	1	12.00
70	Nizamabad	36.00	2	46.50	11.00	0	0.00	0	0.00	0	0.00	2	46.50
71	Bodhan	12.00	0	0.00	0.00	0	0.00	0	0.00	1	10.00	1	10.00
72	Armoor	6.43	0	0.00	0.00	0	0.00	0	0.00	2	7.50	2	7.50
73	Bheemgal	1.46	0	0.00	0.00	0	0.00	0	0.00	1	1.90	1	1.90
74	Medchal	3.20	0	0.00	0.00	0	0.00	0	0.00	1	9.50	1	9.50
75	Shadnagar	6.80	0	0.00	0.00	0	0.00	0	0.00	2	7.00	2	7.00
76	Ibrahimpatnam	3.28	0	0.00	0.00	0	0.00	0	0.00	1	4.50	1	4.50
77	Shankerpally	1.20	0	0.00	0.00	0	0.00	0	0.00	1	3.60	1	3.60
78	Amangal	2.00	0	0.00	0.00	0	0.00	0	0.00	1	3.00	1	3.00
79	Kothur	1.44	0	0.00	0.00	0	0.00	0	0.00	1	2.00	1	2.00
80	Vikarabad	8.24	1	13.00	7.50	0	0.00	0	0.00	0	0.00	1	13.00
81	Tandur	6.40	0	0.00	0.00	0	0.00	0	0.00	1	8.00	1	8.00
82	Parigi	1.76	0	0.00	0.00	0	0.00	0	0.00	1	2.10	1	2.10

83	Kodangal	1.36	0	0.00	0.00	0	0.00	0	0.00	1	2.40	1	2.40
84	Medak	10.28	0	0.00	0.00	0	0.00	0	0.00	1	6.00	1	6.00
85	Narsapur	2.52	0	0.00	0.00	0	0.00	0	0.00	1	2.10	1	2.10
86	Thoopran	2.56	0	0.00	0.00	0	0.00	0	0.00	1	3.00	1	3.00
87	Ramayampet	1.28	0	0.00	0.00	0	0.00	0	0.00	1	2.00	1	2.00
88	Sangareddy	10.00	0	0.00	0.00	0	0.00	0	0.00	1	10.40	1	10.40
89	Zaheerabad	9.76	0	0.00	0.00	0	0.00	0	0.00	1	10.10	1	10.10
90	Narayankhed	2.00	0	0.00	0.00	0	0.00	0	0.00	1	2.50	1	2.50
91	Sadasivapet	3.52	0	0.00	0.00	0	0.00	0	0.00	2	5.10	2	5.10
92	Andol-Jogipet	3.28	0	0.00	0.00	0	0.00	0	0.00	1	3.00	1	3.00
93	Siddipet	20.87	2	18.25	17.00	0	0.00	0	0.00	0	0.00	2	18.25
94	Husnabad	3.47	0	0.00	0.00	0	0.00	0	0.00	1	2.70	1	2.70
95	Cherial	1.60	0	0.00	0.00	0	0.00	0	0.00	1	2.30	1	2.30
96	Dubbaka	3.01	0	0.00	0.00	0	0.00	0	0.00	1	3.50	1	3.50
97	Gajwel	5.80	4	6.75	5.75	0	0.00	0	0.00	0	0.00	4	6.75
98	Chandur	1.12	0	0.00	0.00	0	0.00	0	0.00	1	1.70	1	1.70
99	Chityala	1.90	0	0.00	0.00	0	0.00	0	0.00	1	1.90	1	1.90
100	Devarkonda	3.20	1	1.50	1.00	0	0.00	0	0.00	1	2.00	2	3.50
101	Haliya	1.20	0	0.00	0.00	0	0.00	0	0.00	1	2.00	1	2.00
102	Miryalaguda	11.60	1	11.50	0.00	1	5.45	1	6.00	0	0.00	3	22.95
103	Nakrekal	1.92	0	0.00	0.00	0	0.00	0	0.00	1	3.50	1	3.50
104	Nandikonda	2.55	0	0.00	0.00	0	0.00	0	0.00	1	2.00	1	2.00
105	Nalgonda	29.60	0	0.00	0.00	1	17.16	1	3.80	0	0.00	2	20.96
106	Huzurnagar	2.40	0	0.00	0.00	0	0.00	0	0.00	1	4.50	1	4.50
107	Kodada	4.80	0	0.00	0.00	0	0.00	0	0.00	1	8.50	1	8.50
108	Nereducherla	0.44	0	0.00	0.00	0	0.00	0	0.00	1	1.80	1	1.80
109	Thirumalagiri	2.08	0	0.00	0.00	0	0.00	0	0.00	1	2.10	1	2.10
110	Suryapet	15.20	1	10.00	3.00	1	10.00	0	0.00	0	0.00	2	20.00
111	Alair	1.00	0	0.00	0.00	0	0.00	0	0.00	1	2.30	1	2.30
112	Bhongir	4.37	0	0.00	0.00	0	0.00	0	0.00	2	6.80	2	6.80
113	Choutuppal	2.00	0	0.00	0.00	0	0.00	0	0.00	1	4.20	1	4.20
114	Mothkur	1.28	0	0.00	0.00	0	0.00	0	0.00	1	2.30	1	2.30
115	Pochampally	0.88	0	0.00	0.00	0	0.00	0	0.00	2	2.20	2	2.20
116	Yadagirigutta	1.20	0	0.00	0.00	0	0.00	0	0.00	1	2.50	1	2.50
Total of ULBs outside ORR		910.85	16	167.80	65.25	5	54.91	16	170.30	115	455.00	152	848.01

** 100 MLD sanctioned earlier under SMART CITY in GWMC which couldn't be taken up due to land acquisition will be taken up later and not shown in present proposals.

3596
Municipal Administration & Urban Development Department - Hyderabad Metropolitan Water Supply and Sewerage Board - Construction of (17) STPs along River Musi and at Kukatpally Nala Catchment (Hussain Sagar Lake catchment) under Sewerage Improvement Project of Sewerage Master Plan of Hyderabad Urban Agglomeration - Administrative Sanction for an amount of Rs.512.87 Crores for two years i.e. Rs.256.175 Crores each year - Orders - Issued.

MUNICIPAL ADMINISTRATION & URBAN DEVELOPMENT (ENGG.) DEPARTMENT

G.O.Rt. No,374.

Dated: 11.09.2020

Read:

From the M.D., HMWS&SB, Hyderabad, Lr.No.HMWSSB/MD/STPs-Project/AS/2020-21/dated: 22.08.2020

ORDER:

In the reference read above the Managing Director, HMWSSB, Hyderabad has submitted a proposal for construction of 17 STPs with a total capacity of 376.5 MLD which will address the issue of pollution from catchment area of Hussain Sagar effectively on a permanent basis. The Total cost of this project including O&M is Rs.1280.87 Crores. The Detailed Project Report along with site locations are ready. It is proposed on HAM model, wherein 40% of the cost is to be borne by the State Government and the balance will be met by the concessionaire agency. The 40% of Government share i.e., Rs.512.35 crores is to be provided in two years i.e. Rs.256.175 Crores each in 1st and 2nd year respectively.

2. After careful examination of the matter Government hereby accords administrative approval for construction of 17 STPs in the catchment nalas of Hussain Sagar, under HAM mode of Contract, along with concurrence to meet the 40% of Government share coming to Rs. 512.35 Crores which is to be provided in two years i.e. Rs. 256.175 Crores each from Hyderabad Urban Agglomeration budget.

3. The Managing Director, Hyderabad Metropolitan Water Supply and Sewerage Board, Hyderabad shall take further action accordingly.

(BY ORDER AND IN THE NAME OF THE GOVERNOR OF TELANGANA)

ARVIND KUMAR
PRINCIPAL SECRETARY TO GOVERNMENT

To

✓ The Managing Director, Hyderabad Metropolitan Water Supply and Sewerage Board, Hyderabad.

Copy to:

The Prl. Secretary to Hon'ble C.M.

OSD to Hon'ble M(MA&UD).

P.S. to Principal Finance Secretary, Finance Department.

P.S. to Prl. Secretary to Govt., MA&UD Dept.,

P.A. to Secretary to Government, MA&UD.

The Finance (DCM) Dept.

SF/SC.

//FORWARDED :: BY ORDER//

Arvind

ABSTRACT

MA&UD Dept., HMWSSB - Comprehensive Sewerage Master Plan for Hyderabad - Construction of (31) STPs in three Packages under Sewerage Improvement - Administration sanction for Package-I and Package -II (Musi River Catchment) and budget allocation - Orders -Issued.

MUNICIPAL ADMINISTRATION & URBAN DEVELOPMENT (ENGG.2) DEPARTMENT

G.O. Rt. No.669

25 SEP 2021

Dated:22.09.2021

Read the following:-

1. G.O.Rt. No. 518, MA&UD(Engg) Dept., Dated 02.07.2018.
2. From the M.D., HMWSSB, Hyderabad Letter No. HMWSSB/MD/STPs-Projects/as/2020-21, Dated: 19.08.2020.
3. G.O.Rt.No. 374, MA&UD(Engg.2) Dept., Dated 11.09.2020.
4. From the MD., HMWSSB, Letter No. HMWSSB/MD/STPs-Projects/as/2020-21/34 and note Dated:04.02.2021.

ORDER:-

It was reported by the Managing Director, Hyderabad Metropolitan Water Supply & Sewerage Board, that the existing sewerage system is having the sewer network and sewage treatment plants. The present sewage generation in GHMC area is 1650 MLD.

2. It was reported that the present sewage treatment capacity is 772MLD through 25 STPs existing in GHMC area which accounts for 46.78% of treatment capacity.

3. It was reported that, in GHMC area, the gap of sewage treatment is 878 MLD which is mostly flowing through river Musi. Further it was reported that, the service area of HMWSSB was extended upto ORR by the Government. After detailed review of sewerage status, the Government has appointed M/s.Shah Technical Consultants, Mumbai for preparation of Comprehensive Sewerage Master Plan for Hyderabad Urban Agglomeration (HUA) vide reference 1st cited.

4. The Managing Director, Hyderabad Metropolitan Water Supply & Sewerage Board reported that, the consultant has conducted the detailed study of planning, survey, investigation, design, estimations and furnished the "Comprehensive Sewerage Master Plan (CSMP)" for HUA. As per the study of M/s.Shah Technical Consultants, Mumbai, it was reported that the total generation of sewage for the year 2021 is 1950 Mld i.e. 1650 MLD in GHMC and 300 MLD in ORR area. The estimated sewage flows for the year 2036 is 2814Mld and for the year 2051 is 3715 Mld. The consultants have recommended for construction of 62 STPs for the estimated sewage flows of year 2036.

5. Further the consultants have prioritized 31 STPs for GHMC in 3 packages for immediate phase as under:-

Package-1: 8 STPs of 402.5MLD capacity at a cost of Rs.1230.21 Crores including O&M for 15 years for North of Musi.

Package-2: 6 STPs of 480.5MLD at a cost of Rs.1355.13 Crores including O&M for 15 years for South of Musi.

Package-3: 17 STPs of 376.5 MLD capacity at a cost of Rs.1280.87 Crores including O&M for 15 years for Kukatpally-H.S.Lake Catchment.

6. The consultants have reported that, by implementation of 3 Packages as above, the 100% sewage treatment will takes place in GHMC area. In the reference 2nd read above, the M.D., HMWSSB, has submitted the proposals for 31 STPs in 3 packages to the Government for administrative sanction to take up under HAM mode of contracts i.e. 60% investment by agency and 40% cost by the Government, with project implementation period of 2 years and O & M

Period of 15 years as above. In the reference 3rd read above, Government have accorded administrative approval for construction of 17 STPs in the catchment Nalas of Hussain Sagar, under HAM Mode of contract, to meet the 40% of Government share coming to Rs.512.35 Crores which is to be provided in two years i.e. Rs. 256.175 Crores per year from Hyderabad Urban Agglomeration Budget. In the reference 4th read above, the MD., HMWSSB has requested the Government for Administrative sanction for the Package-I and Package-II STPs of Musi River Catchment with budget allocation of all three packages to the HMWSSB for implementation under HAM mode of contract. It was also reported that, the Hon'ble NGT is constantly issuing directions for establishment of STPs for all urban cities including Hyderabad City. Further MD, HMWSSB reported that, as there is trend of positive responses to the investments by the private agencies to the STPs projects under HAM mode of contracts, it is proposed to consider the implementation of these 2 STP projects under HAM (60:40) mode.

7. The budgetary requirement towards 40% share of the Government to be provided in 2 years during 1st year & 2nd year for all three STP packages is submitted as below:-

STP Project Name & Package	Total Project Cost (Rs. inCr.)	Total Government shares towards 40% cost (Rs.in Cr.)	Government share during 1 st year (2021-22) (Rs. In Cr.)	Government share during 1 st year (2022-23) (rs. In Cr.)
Package-3 - Hussainsagar Lake Catchment area STPs Project (already accorded administrative sanction vide GO Rt.No.374, dt: 11.9.2020)	1280.87	512.35	256.175	256.175
Package-1 - North of Musi STPs Project	1230.21	492.084	246.042	246.042
Package-2 - South of Musi STPs Project	1355.13	542.052	271.026	271.026
Total	3866.21	1546.486	773.243	773.243

The Managing Director, Hyderabad Metropolitan Water Supply & Sewerage Board has requested the Government for Administrative Sanction to the two packages of Package-I and Package-II (Musi River Catchment) for implementation.

8. After careful examination of the entire matter, the Government hereby accord administrative sanction for the STPs of Package-I & Package-II under HAM mode of contract (60% investment by agency & 40% share through Government budget) for implementation of the projects in 2 years period:-

Package-1: Construction of 8 STPs of 402.5MLD capacity at a cost of Rs.1230.21 Crores including O&M for 15 years with budgetary support of Rs.246.042 Cr in 1st year & Rs.246.042 Cr for 2nd year.

Package-2: Construction of 6 STPs of 480.5 MLD capacity at a cost of Rs.1355.13 Crores including O&M for 15 years with budgetary support of Rs.271.026 Cr in 1st year & Rs.271.026 Cr for 2nd year.

9. The Hyderabad Metropolitan Water Supply & Sewerage Board shall ensure that on implementation of the STP projects of Package-I, II & III by construction of 31 STPs, the 100% sewage generated in GHMC area shall be processed, treated and disposed.

10. The Managing Director, Hyderabad Metropolitan Water Supply & Sewerage Board shall take further action accordingly.

11. This order issued with the concurrence of Finance (DCM) Department vide their U.O. No. 2248/227/A2/DCM/2020, Dated :07.01.2021.

(BY ORDER AND IN THE NAME OF THE GOVERNOR OF TELANGANA)

**ARVIND KUMAR
SPECIAL CHIEF SECRETARY TO GOVERNMENT**

To
The M.D., HMWS&SB, Hyderabad.

::3::

Copy to:

The P.S. to Prl. Secretary to C.M.

OSD to Minister (MAUD)

The Finance (DCM) Department,

The G.A.(Cabinet) Department.

P.S. Spl. C.S. to Government, MA&UD Dept.

P.A. to Secretary to Government, MA&UD Dept.

Sf/Sc

//FORWARDED:: BY ORDER//

Jivan
SECTION OFFICER*YK*

**GOVERNMENT OF TELANGANA
A B S T R A C T**

Municipal Administration and Urban Development Department – HMWSSB- Sewerage Projects-Construction of 1STP in PPP mode and 38 STPs in HAM mode-Administrative sanction for an amount of Rs.3849.10 crores under AMRUT 2.0 (TRANCHE-III)-Accorded-Orders-Issued.

MUNICIPAL ADMINISTRATION & URBAN DEVELOPMENT (UBS) DEPARTMENT

G.O.Rt.No. 344

Dated: 03 .08.2024

Read the following:

1. Government Memo No 681/UBS/2024, dated:20.1.2024.
2. State Level High Powered Steering Committee CR No:05, dated:5.2.2024.
3. Approval of Appex Committee of AMRUT 2.0, GOI, New Delhi, dated:14.3.2024.
4. From Managing Director, HMWSSB Lr No HMWSSB/MD/Musi Riverfront/AMRUT-2.0/STPs-ORR/AS/2023-24/150, dated:26.4.2024.
5. From Vice Chairman & Managing Director, Hyderabad Lr No 21/TUFIDC/AMRUT 2.0/TRANCHE-III/2024, dated:15.5.2024.

-o0o-

ORDER:

In the circumstances reported in the references 4th and 5th read above and after careful examination , Government hereby accord administrative sanction for an amount of Rs.3849.10 crores (Rupees Three Thousand Eight Hundred Forty Nine crores and Ten lakh only) for construction of STPs for ULBs between GHMC & ORR area under Hyderabad Agglomeration as part of Musi Riverfront-Musi Cleanup in 3 sewerage projects with the following funding pattern

(Rs. In crores)

Sector	No. of projects	Total project cost excluding O&M	Funding Breakup of Project cost			ULB Contribution O&M for 15 years	Total project cost including O&M
			Central share (30%)	State share (30%)	PPP (40%)		
Sewerage Project - 1 STP in PPP	1	51.37	15.41	15.41	20.55	12.74	64.11
Sub Total	1	51.37	15.41	15.41	20.55	12.74	64.11
Sector	No. of projects	Total project cost excluding O&M	Funding Breakup of Project cost			ULB Contribution O&M for 15 years	Total project cost including O&M
			Central share (25%)	State share (35%)	HAM (40%)		
Sewerage Project -16 STPs in HAM (Package.-I)	1	1251.90	312.98	438.18	500.75	626.65	1878.55
Sewerage Project -22 STPs in HAM (Package.-II)	1	1266.54	316.64	443.31	506.60	639.90	1906.44
Sub Total :	2	2518.44	629.61	881.48	1007.35	1266.55	3784.99
Total :	3	2569.81	645.02	896.89	1027.90	1279.29	3849.10

2. Government also accord permission to Managing Director, HMWSSB, Hyderabad to adopt the approved terms and conditions of ongoing STP projects taken up under the HAM mode in HMWSSB.

[P.T.O.]

//2//

3. The Managing Director, HMWSSB, Hyderabad / the Vice Chairman & Managing Director, TUFIDC, Hyderabad shall take necessary further action in the matter accordingly.

4. This order issues with the concurrence of Finance Department vide their U.O.No 2558353-A/153/PF/2024, dated: 22.6.2024.

(BY ORDER AND IN THE NAME OF THE GOVERNOR OF TELANGANA)

M.DANA KISHORE
PRINCIPAL SECRETARY TO GOVERNMENT

To

The Managing Director, HMWSSB, Hyderabad

The Vice Chairman & Managing Director, TUFIDC, Hyderabad

Copy to:

The Metropolitan Commissioner, HMDA, Hyderabad

The Commissioner, GHMC, Hyderabad

The Managing Director, MRDCL, Hyderabad

The Director of Municipal Administration, Hyderabad

The Engineer-in-Chief (PH), Hyderabad

The Director, Town & Country Planning, Hyderabad

The Member Secretary, Telangana Pollution Control Board, Hyderabad

The MA&UD (TP&E) Department

The Finance (DCM) Department

The OSD to Spl. Secretary to Hon'ble C.M.

The OSD to Pri. Secretary to Government

Sf/sc

//FORWARDED::BY ORDER//


ASSISTANT DIRECTOR

3602
Annexure A15 (D)

Sl. No	G.O.No. and date	Capacity (MLD)	Amount sanctioned (Rs in Crs)	Package No.	Catchment area/ULB	No. of STPs
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1.	MD & CEO, GWSCCL Proc. No. GWSCCL/WGL/ CEO/24/2019, dt: 16-02- 2019 • (5.00 MLD, 15.00 MLD & 100.00 MLD)	120	200.00	1	GWMC	3
2.	Govt. Memo No. 2899/Plg.VI/2018, Dt:02.11.2019 G.O.Rt.No.15, Planning (VI) Dept., Dt:19.01.2023 • (1.50 MLD, 3.50 MLD, 1.25 MLD & 0.50 MLD) • 99.00 + 56.00 Addl. Sanction	6.75	155.00	1	Gajwel	04
3.	G.O. Rt. No. 834 of MA&UD (UBS) Dept, Dt: 15-11-2021	11.00	155.13	1	Siddipet	01
4.	G.O.Rt.No.549, Dt: 06-08- 2019 of MA&UD (UBS) Department Revised AS - Govt .Memo.No.9138/UBS/2023, Dt.01-07-2023 • (23.20 + 1.80 Addl. Sanction)	1.50	25.00	1	Devarakonda	1
5.	G. O. Rt. No. 558, MA&UD (Engg.-2) Dept., dt: 06-08-2021	19.10	61.25	1	Sircilla	1
6.	G. O. Rt. No. 4, MA&UD (Engg.) Dept., dt: 04-01- 2022	20.00	100.00	1	Khammam	1
7.	G.O. Rt. No. 139 of MA&UD (UBS) Dept, Dt: 06-03-2018 Revised AS - G.O. Rt. No. 409 of MA&UD (UBS) Dept, Dt: 22-06-2022 • (10 MLD & 10 MLD) • (81.41 + 36.59 Addl. Sanction)	20	118.00	1	Suryapet	2

8.	GO Rt.No.637, MA & UD (UBS) Dept, dated:23-08-2023	1.50	30.00	1	Devarakonda	1
9.	G. O. Rt. No. 132, MA&UD (UBS) Dept., dt: 12-03-2024 • (5.00 MLD, 0.90 MLD, 0.40 MLD & 0.50 MLD)	6.80	128.00	1	Madhira	4
10.	G. O. Rt. No. 522, MA&UD (UBS) Dept., dt: 02-07-2018 Revised AS - G. O. Rt. No. 22, MA&UD (UBS) Dept., dt: 18-01-2025 • (2.30 MLD & 3.20 MLD) • (65.00 + 25.00 Addl. Sanction)	5.50	90.00	1	Nagarkurnool	2
Total		212.15	1062.38	10		20

GOVERNMENT OF TELANGANA
ABSTRACT

Municipal Administration and Urban Development Department - AMRUT 2.0 – 98 Water Supply Projects and 9 Sewerage Projects in three (3) packages under AMRUT 2.0 – Administrative Sanction – Accorded – Orders – Issued.

MUNICIPAL ADMINISTRATION & URBAN DEVELOPMENT (UBS) DEPARTMENT

G.O. Rt. No.762

Dated: 29-09-2023

Read the following: -

1. G.O. Rt. No. 831, MA&UD (UBS) Department, Dated:12.11.2021.
2. G.O. Rt. No. 832, MA&UD (UBS) Department, Dated:12.11.2021.
3. State High Power Steering Committee CR No. 1, Dated:11.3.2022.
4. 1st APEX Committee, MoHUA, GOI, New Delhi, Dated:16.3.2022.
5. 4th APEX Committee, MoHUA, GOI, New Delhi, Dated:12.8.2022.
6. State Level Technical Committee CR No.1, Dated: 27.8.2022.
7. GoRt No 312, MA&UD (UBS) Department, Dated:20.5.2023
8. From ENC (PH), Hyderabad letter No 21/T1/AMRUT2.0./ General/2023-24, dated: 24.6.2023
9. From ENC (PH), Hyderabad letter No 21/T1/AMRUT2.0./ General/2023-24, dated: 20.7.2023.

<<>><<>>

ORDER :-

In the circumstances reported by the Engineer-in-Chief (Public Health), Telangana Hyderabad in the reference 9th read above and in partial modification of the orders issued in G.O. 7th read above and after careful examination, Government hereby accord administrative sanction for an amount of Rs. 5385.05 crores for the following 98 Water Supply Projects and 9 Sewerage Projects in three packages (3) under AMRUT 2.0. The ULB-wise funding pattern for 98 Water Supply Projects and 9 sewerage projects appended to this order.

Rs. in Crores

Sl. No.	Package No.	Details of the Package	Project Cost as per approved SWAP excluding O&M cost	Central Share	State share	XV FC Grant	ULB Share O&M Cost	Total Project Cost including O&M	Land Acquisition (LA) for STPs	Total Project Cost including O&M and LA
1	I	Water Supply Projects in 30 ULBs and Sewerage projects in 03 ULBs under AMRUT 2.0 under the jurisdiction of Adilabad, Karimnagar and Warangal PH Divisions	1541.630	652.084	726.456	163.090	190.450	1732.080	13.000	1745.080
2	II	Water Supply Projects in 25 ULBs and Sewerage projects in 04 ULBs under AMRUT 2.0 under the jurisdiction of Nalgonda and Khammam PH Divisions	1540.740	607.442	817.558	115.740	210.620	1751.360	7.000	1758.360
3	III	Water Supply Projects in 42 ULBs and Sewerage projects in 02 ULBs under AMRUT 2.0 under the jurisdiction of Sangareddy, Rangareddy, Nizamabad, and Mahabubnagar PH Divisions	1682.550	721.060	782.490	179.000	189.060	1871.610	10.000	1881.610
Total			4764.920	1980.586	2326.504	457.830	590.130	5355.050	30.000	5385.050

-2-

2. The Government also issues the following:
- (1) To accord permission to cancel the tenders invited for 98 Water supply projects in 09 packages.
 - (2) To accord permission for inviting the tenders of 98 water supply and 09 sewerage projects into 3 packages as per Para above.
 - (3) Approval for stipulating certain parameters and tender conditions in the bid document, slightly deviating from the standard procedure as per codal rules keeping in view the specific requirements of the water supply projects.
 - (4) To accord permission to incorporate requisite parameters and tender conditions for Sewerage projects on the similar lines of water supply projects as sought for by the Engineer-in-Chief (PH) vide reference 8th cited.
 - (5) To entrust the O&M of water supply system and sewerage system for 5 years (for existing infrastructure as well as new infrastructure to be added under AMRUT 2.0) on completion of capital work under AMRUT 2.0 at the same tender percentage of capital work.
 - (6) Approval for bringing PH division, Khammam under control of SE (PH), TUFIDC, Nalgonda to the extent of AMRUT 2.0 project works.
3. The Telangana Urban Finance and Infrastructure Development Corporation (TUFIDC), Hyderabad shall be the Nodal Agency for release of funds under AMRUT 2.0.
4. The Government direct the Director of Municipal Administration, Telangana, Hyderabad to release the share of 15th FC grants in proportion to Gol & GoTs share to TUFIDC.
5. The Government also direct the Director of Municipal Administration, Telangana, Hyderabad to issue instructions to the Commissioners of AMRUT 2.0 ULBs to conclude separate agreements with the same agencies (entrusted with the capital works) for O&M of water supply system and sewerage system for 5 years (as provided in the bid document of AMRUT 2.0 capital work).
6. This order issues with the concurrence of Finance Department vide their U.O. No. 1696307/239/A2/DCM/2022/Finance (DCM) Department, dated 28.11.2022.
7. The Engineer-in-Chief (PH), Telangana, Hyderabad / Vice Chairman & Managing Director, TUFIDC, Hyderabad / Director of Municipal Administration, Telangana, Hyderabad shall take action accordingly in the matter.

(BY ORDER AND IN THE NAME OF THE GOVERNOR OF TELANGANA)

ARVIND KUMAR
SPECIAL CHIEF SECRETARY TO GOVERNMENT

To
The Engineer-in-Chief (Public Health), Telangana, Hyderabad. (100)
The Vice Chairman & Managing Director, TUFIDC, Hyderabad. (100)
The Director of Municipal Administration, Telangana, Hyderabad. (100)

Copy to:

The Commissioner, Greater Hyderabad Municipal Corporation, Hyderabad. (100)
The Managing Director, HMWSSB, Hyderabad. (100)
The Director of Town & Country Planning, Telangana, Hyderabad. (100)
OSD to Hon'ble Minister (MA&UD).
OSD to Special Chief Secretary to Government, MA&UD Department.
SF/SC.

//FORWARDED :: BY ORDER//

ASSISTANT DIRECTOR

Annexure to G.O. Rt. No. 762, MA& UD (UBS) Department, dated 29-09-2023

Package Wise details of 98 Water Supply and 09 Sewerage Projects under AMRUT 2.0

PACKAGE-I

Sl. No.	PH Division / Old District	New District	ULB	Sector	Project Cost as per approved SWAP excluding O&M	Central Share	State Share	XV FC grant	ULB Share O&M Cost	Total Project Cost including O&M	Land Acquisition (LA) for STPs	Total Project Cost including O&M and LA	
1	Adilabad	Nirmal	Khanapur	Water Supply	20.880	10.440	8.710	1.730	1.620	22.500		22.500	
2			Nirmal	Water Supply	57.940	28.970	20.970	8.000	4.560	62.500		62.500	
		Sub Total for Nirmal District				78.820	39.410	29.680	9.730	6.180	85.000	0.000	85.000
3		Mancherial	Luxettipet	Water Supply	18.540	9.270	7.450	1.820	1.460	20.000		20.000	
4			Naspur	Water Supply	67.650	33.830	27.620	6.200	5.350	73.000		73.000	
5			Chennur	Water Supply	28.760	14.380	12.390	1.990	2.240	31.000		31.000	
6			Kyathanpally	Water Supply	38.490	19.250	16.310	2.930	3.010	41.500		41.500	
7			Mancherial	Water Supply	44.950	22.480	15.150	7.320	3.550	48.500		48.500	
8			Bellampalle	Water Supply	56.990	28.500	23.780	4.710	4.510	61.500		61.500	
9		Mandamarri	Water Supply	28.270	14.135	9.725	4.410	2.230	30.500		30.500		
		Sub Total for Mancherial District				283.650	141.845	112.425	29.380	22.350	306.000	0.000	306.000
10	Adilabad	Adilabad	Adilabad	Water Supply	88.490	29.497	52.423	6.570	7.010	95.500		95.500	
11			Adilabad	✓ Sewerage	177.620	59.200	111.860	6.560	37.840	215.460	10.000	225.460	
	Sub Total for Adilabad District				266.110	88.697	164.283	13.130	44.850	310.960	10.000	320.960	
	Total for Adilabad Division				628.580	269.952	306.388	52.240	73.380	701.960	10.000	711.960	

Sl. No.	PH Division / Old District	New District	ULB	Sector	Project Cost as per approved SWAP excluding O&M	Central Share	State Share	XV FC grant	ULB Share O&M Cost	Total Project Cost including O&M	Land Acquisition (LA) for STPs	Total Project Cost including O&M and LA	
12	Karimnagar	Jagtial	Raikal	Water Supply	13.800	6.900	5.610	1.290	1.400	15.200		15.200	
13			Dharmपुरi	Water Supply	20.800	10.400	9.060	1.340	2.200	23.000		23.000	
14			Jagtial	Water Supply	35.000	11.670	14.420	8.910	3.600	38.600		38.600	
15			Kortulla	Water Supply	37.750	18.880	13.010	5.860	3.750	41.500		41.500	
16			Metpalli	Water Supply	17.600	8.800	4.220	4.580	1.800	19.400		19.400	
		Sub Total for Jagtial District				124.950	56.650	46.320	21.980	12.750	137.700	0.000	137.700
17		Karimnagar	Karimnagar	Choppandandi	Water Supply	33.000	16.500	15.110	1.390	3.300	36.300		36.300
18				Kothapally	Water Supply	23.750	11.875	10.945	0.930	2.400	26.150		26.150
19				Jammikunta	Water Supply	30.000	15.000	11.280	3.720	3.000	33.000		33.000
20				Huzurabad	Water Supply	14.750	7.380	4.460	2.910	1.500	16.250		16.250
21				Karimnagar	Water Supply	132.200	44.067	75.743	12.390	13.300	145.500		145.500
22		✓ Karimnagar	Sewerage	72.570	24.190	35.990	12.390	7.000	79.570	0.000	79.570		
		Sub Total for Karimnagar District				306.270	119.012	153.528	33.730	30.500	336.770	0.000	336.770
23		Peddapalli	Peddapalli	Sultanabad	Water Supply	16.700	8.350	6.680	1.670	1.700	18.400		18.400
24				Manthani	Water Supply	11.000	5.500	3.970	1.530	1.100	12.100		12.100
25				Peddapalli	Water Supply	23.250	11.625	7.345	4.280	2.350	25.600		25.600
26				✓ Ramagundam	Sewerage	206.660	68.880	118.430	19.350	46.160	252.820	3.000	255.820
		Sub Total for Peddapalli District				257.610	94.355	136.425	26.830	51.310	308.920	3.000	311.920
27		Rajanna sircilla	Rajanna sircilla	Sircilla	Water Supply	94.750	47.375	39.625	7.750	9.500	104.250		104.250
28				Vemulawada	Water Supply	12.100	6.050	2.140	3.910	1.250	13.350		13.350
		Sub Total for Rajanna sircilla District				106.850	53.425	41.765	11.660	10.750	117.600	0.000	117.600

		Total for Karimnagar Division			795.680	323.442	378.038	94.200	105.310	900.990	3.000	903.990	
29	Warangal	Warangal	Wardhannapet	Water Supply	30.980	15.490	14.330	1.160	3.100	34.080		34.080	
30			Narsampet	Water Supply	27.710	13.855	10.735	3.120	2.780	30.490		30.490	
		Sub Total for Warangal District				58.690	29.345	25.065	4.280	5.880	64.570	0.000	64.570
31		Hanmakonda	Parkala	Water Supply	10.670	5.340	2.410	2.920	1.070	11.740		11.740	
		Sub Total for Hanmakonda District				10.670	5.340	2.410	2.920	1.070	11.740	0.000	11.740
32		Jangaon	Jangaon	Water Supply	30.750	15.375	10.935	4.440	3.080	33.830		33.830	
		Sub Total for Jangaon District				30.750	15.375	10.935	4.440	3.080	33.830	0.000	33.830
33		Jayshankar bhupalpally	Bhupalpalli	Water Supply	17.260	8.630	3.620	5.010	1.730	18.990		18.990	
		Sub Total for Jayshankar bhupalpally District				17.260	8.630	3.620	5.010	1.730	18.990	0.000	18.990
		Total for Warangal Division				117.370	58.690	42.030	16.650	11.760	129.130	0.000	129.130
Grand Total for Package - I					1541.630	652.084	726.456	163.090	190.450	1732.080	13.000	1745.080	

[PACKAGE-II Contd...]

PACKAGE-II

Sl. No.	PH Division / Old District	New District	ULB	Sector	Project Cost as per approved SWAP excluding O&M	Central Share	State Share	XV FC grant	ULB Share O&M Cost	Total Project Cost including O&M	Land Acquisition (LA) for STPs	Total Project Cost including O&M and LA	
1	Nalgonda	Nalgonda	Chityal	Water Supply	11.600	5.800	4.540	1.260	0.900	12.500		12.500	
2			Chandur	Water Supply	9.090	4.550	3.450	1.090	0.710	9.800		9.800	
3			Haliya	Water Supply	14.100	7.050	5.590	1.460	1.100	15.200		15.200	
4			Nakrekal	Water Supply	23.240	11.620	9.170	2.450	1.760	25.000		25.000	
5			Nandikonda	Water Supply	40.780	20.390	19.050	1.340	3.220	44.000		44.000	
6			Nalgonda	Water Supply	52.530	17.510	28.050	6.970	4.220	56.750		56.750	
7			Miryalaguda	Water Supply	86.500	28.830	53.080	4.590	6.900	93.400		93.400	
8			Nalgonda	Sewerage	195.270	65.080	123.230	6.960	20.920	216.190	0.000	216.190	
9			Miryalaguda	Sewerage	152.070	50.680	96.810	4.580	21.000	173.070	0.000	173.070	
		Sub Total for Nalgonda District				585.180	211.510	342.970	30.700	60.730	645.910	0.000	645.910
10		Suryapet	Suryapet	Neredcherla	Water Supply	10.210	5.110	3.850	1.250	0.790	11.000		11.000
11				Tirumalagiri	Water Supply	27.810	13.905	12.345	1.560	2.190	30.000		30.000
12				Kodada	Water Supply	23.940	11.970	5.640	6.330	1.860	25.800		25.800
13				Suryapet	Water Supply	41.870	13.960	22.450	5.460	3.130	45.000		45.000
14				Suryapet	Sewerage	266.670	88.880	172.340	5.450	50.100	316.770	0.000	316.770
		Sub Total for Suryapet District				370.500	133.825	216.625	20.050	58.070	428.570	0.000	428.570
15		Yadadri bhuvanagiri	Yadadri bhuvanagiri	Alair	Water Supply	11.130	5.570	4.120	1.440	0.870	12.000		12.000
16				Choutuppal	Water Supply	19.470	9.735	7.105	2.630	1.530	21.000		21.000
17	Mothkur			Water Supply	11.120	5.560	4.220	1.340	0.880	12.000		12.000	
18	Pochampally			Water Supply	16.240	8.120	6.690	1.430	1.260	17.500		17.500	

19	Nalgonda	Yadadri bhuvanagiri	Yadagirigutta	Water Supply	35.800	17.900	16.580	1.320	2.840	38.640		38.640	
20			Bhongir	Water Supply	20.250	10.125	5.085	5.040	1.550	21.800		21.800	
		Sub Total for Yadadri bhuvanagiri District				114.010	57.010	43.800	13.200	8.930	122.940	0.000	122.940
		Total for Nalgonda Division				1069.690	402.345	603.395	63.950	127.730	1197.420	0.000	1197.420
21	Khammam	Khammam	Wyra	Water Supply	24.870	12.440	9.810	2.620	2.000	26.870		26.870	
22			Madhira	Water Supply	15.830	7.920	5.220	2.690	1.260	17.090		17.090	
23			Sathupalle	Water Supply	17.820	8.910	6.140	2.770	1.420	19.240		19.240	
24			Khammam	Sewerage	182.660	60.887	97.653	24.120	59.860	242.520	7.000	249.520	
		Sub Total for Khammam District				241.180	90.157	118.823	32.200	64.540	305.720	7.000	312.720
25		Mahabubabad	Mahabubabad	Dornakal	Water Supply	23.400	11.700	10.480	1.220	1.870	25.270		25.270
26				Maripeda	Water Supply	23.690	11.845	10.355	1.490	1.890	25.580		25.580
27				Thorrur	Water Supply	25.390	12.700	11.080	1.610	2.030	27.420		27.420
28				Mahabubabad	Water Supply	26.330	13.165	7.325	5.840	2.100	28.430		28.430
		Sub Total for Mahabubabad District				98.810	49.410	39.240	10.160	7.890	106.700	0.000	106.700
29	Bhadradi kothagudem	Kothagudem	Water Supply	115.280	57.640	50.910	6.730	9.200	124.480		124.480		
30			Manuguru	Water Supply	15.780	7.890	5.190	2.700	1.260	17.040		17.040	
		Sub Total for Bhadradi Kothagudem District				131.060	65.530	56.100	9.430	10.460	141.520	0.000	141.520
	Total for Khammam Division				471.050	205.097	214.163	51.790	82.890	553.940	7.000	560.940	
Grand Total for Package - II					1540.740	607.442	817.558	115.740	210.620	1751.360	7.000	1758.360	

[PACKAGE-III Contd...]

PACKAGE-III

Sl. No.	PH Division / Old District	New District	ULB	Sector	Project Cost as per approved SWAP excluding O&M	Central Share	State Share	XV FC grant	ULB Share O&M Cost	Total Project Cost including O&M	Land Acquisition (LA) for STPs	Total Project Cost including O&M and LA	
1	Sangareddy	Medak	Narsapur	Water Supply	11.160	5.580	3.990	1.590	0.840	12.000		12.000	
2			Thoopran	Water Supply	8.360	4.180	2.400	1.780	0.640	9.000		9.000	
3			Ramayampet	Water Supply	6.530	3.270	1.750	1.510	0.470	7.000		7.000	
4			Medak	Water Supply	27.820	13.910	9.610	4.300	2.180	30.000		30.000	
		Sub Total for Medak District				53.870	26.940	17.750	9.180	4.130	58.000	0.000	58.000
5		Sangareddy	Sangareddy	Narayankhed	Water Supply	12.520	6.260	4.720	1.540	0.980	13.500		13.500
6				Sangareddy	Water Supply	40.830	20.415	12.935	7.480	3.170	44.000		44.000
7				Zaheerabad	Water Supply	61.220	30.610	23.020	7.590	4.780	66.000		66.000
8				Sadasivpet	Water Supply	7.900	3.950	0.260	3.690	0.600	8.500		8.500
		Sub Total for Sangareddy District				122.470	61.235	40.935	20.300	9.530	132.000	0.000	132.000
9		Siddipet	Siddipet	Cherial	Water Supply	12.520	6.260	4.720	1.540	0.980	13.500		13.500
10				Gajwel	Water Supply	25.980	12.990	9.870	3.120	2.020	28.000		28.000
11				Siddipet	Water Supply	81.130	27.040	49.170	4.920	6.370	87.500		87.500
		Sub Total for Siddipet District				119.630	46.290	63.760	9.580	9.370	129.000	0.000	129.000
		Total for Sangareddy Division				295.970	134.465	122.445	39.060	23.030	319.000	0.000	319.000
12	Rangareddy	Vikarabad	Kodangal	Water Supply	4.190	2.100	0.890	1.200	0.310	4.500		4.500	
13			Parigi	Water Supply	14.380	7.190	5.650	1.540	1.120	15.500		15.500	
14			Vikarabad	Water Supply	11.180	5.590	0.230	5.360	0.820	12.000		12.000	
15			Tandur	Water Supply	25.540	12.770	6.790	5.980	1.960	27.500		27.500	
	Sub Total for Vikarabad District				55.290	27.650	13.560	14.080	4.210	59.500	0.000	59.500	

16	Ranga Reddy	Ranga Reddy	Shankarpally	Water Supply	32.470	16.240	14.480	1.750	2.530	35.000		35.000	
17			Amangal	Water Supply	29.740	14.870	12.730	2.140	2.260	32.000		32.000	
18			Kothur	Water Supply	17.180	8.590	7.410	1.180	1.320	18.500		18.500	
19			Shadnagar	Water Supply	25.530	12.770	8.170	4.590	1.970	27.500		27.500	
		Sub Total for Ranga Reddy District				104.920	52.470	42.790	9.660	8.080	113.000	0.000	113.000
20		Medchal-malkajiri	Medchal	Water Supply	35.230	17.615	14.135	3.480	2.770	38.000		38.000	
		Sub Total for Medchal-Malkajiri District				35.230	17.615	14.135	3.480	2.770	38.000	0.000	38.000
		Total for Ranga Reddy Division				195.440	97.735	70.485	27.220	15.060	210.500	0.000	210.500
21		Nizamabad	Kamareddy	Banswada	Water Supply	48.250	24.130	21.600	2.520	3.750	52.000		52.000
22				Yallareddy	Water Supply	32.520	16.260	14.600	1.660	2.480	35.000		35.000
23	Kamareddy			Water Supply	86.250	28.750	48.700	8.800	6.750	93.000		93.000	
	Sub Total for Kamareddy District				167.020	69.140	84.900	12.980	12.980	180.000		180.000	
24	Nizamabad		Nizamabad	Bheemgal	Water Supply	23.300	11.650	10.350	1.300	1.700	25.000		25.000
25				Bodhan	Water Supply	46.400	23.200	16.230	6.970	3.600	50.000		50.000
26				Armoor	Water Supply	39.960	19.980	14.310	5.670	3.040	43.000		43.000
27				Nizamabad	Water Supply	201.180	67.060	119.150	14.970	15.820	217.000		217.000
28				Nizamabad	Sewerage	148.770	49.590	84.220	14.960	14.040	162.810	0.000	162.810
	Sub Total for Nizamabad District				459.610	171.480	244.260	43.870	38.200	497.810	0.000	497.810	
	Total for Nizamabad Division				626.630	240.620	329.160	56.850	51.180	677.810	0.000	677.810	
29	Mahabubnagar	Jogulamba gadwal	Alampur	Water Supply	13.450	6.730	5.600	1.120	1.350	14.800		14.800	
30			Waddepalle	Water Supply	10.370	5.190	4.060	1.120	1.040	11.410		11.410	
31			Gadwal	Water Supply	57.500	28.750	22.790	5.960	5.750	63.250		63.250	
		Sub Total for Jogulamba Gadwal District				81.320	40.670	32.450	8.200	8.140	89.460	0.000	89.460

32	Mahabubnagar	Narayanpet	Kosgi	Water Supply	11.390	5.695	3.895	1.800	1.140	12.530		12.530	
33			Makthal	Water Supply	13.980	6.990	5.120	1.870	1.400	15.380		15.380	
34			Narayanpet	Water Supply	25.150	12.575	9.055	3.520	2.510	27.660		27.660	
		Sub Total for Narayanpet District				50.520	25.260	18.070	7.190	5.050	55.570	0.000	55.570
35		Mahabubnagar	Mahabubnagar	Bhootpur	Water Supply	15.860	7.930	6.840	1.090	1.590	17.450		17.450
36				Jadcherla	Water Supply	41.840	20.920	16.530	4.390	5.160	47.000		47.000
37				Mahabubnagar	Sewerage	204.160	68.050	117.810	18.300	62.640	266.800	10.000	276.800
		Sub Total for Mahabubnagar District				261.860	96.900	141.180	23.780	69.390	331.250	10.000	341.250
38		Wanaparthy	Wanaparthy	Almakur	Water Supply	15.660	7.830	6.560	1.270	1.560	17.220		17.220
39				Amarchinta	Water Supply	11.820	5.910	4.960	0.950	1.180	13.000		13.000
40				Kothakota	Water Supply	13.600	6.800	5.200	1.600	1.350	14.950		14.950
41				Pebbair	Water Supply	9.780	4.890	3.580	1.310	0.980	10.760		10.760
42				Wanaparthy	Water Supply	65.780	32.890	26.960	5.930	6.580	72.360		72.360
		Sub Total for Wanaparthy District				116.640	58.320	47.260	11.060	11.650	128.290	0.000	128.290
43		Nagarkurnool	Nagarkurnool	Nagarkurnool	Water Supply	32.940	16.470	13.360	3.110	3.290	36.230		36.230
44				Kalwakurthy	Water Supply	21.230	10.620	8.080	2.530	2.270	23.500		23.500
		Sub Total for Nagarkurnool District				54.170	27.090	21.440	5.640	5.560	59.730	0.000	59.730
		Total for Mahabubnagar Division				564.510	248.240	260.400	55.870	99.790	664.300	10.000	674.300
		Grand Total for Package - III				1682.550	721.060	782.490	179.000	189.060	1871.610	10.000	1881.610
		Grand Total for 98 WS and 09 Sewerage Projects				4764.920	1980.586	2326.504	457.830	590.130	5355.050	30.000	5385.050

ARVIND KUMAR
SPECIAL CHIEF SECRETARY TO GOVERNMENT

MA&UD Department - Engineering- PH&ME- Hon'ble NGT Directions (not to discharge untreated waste water into water bodies & rivers) - Construction of Sewage Treatment Plants in all Urban Local Bodies of Telangana - Administrative sanction for an amount Rs.3769.34 crores (including O&M and Annuity Payments and GST on Interest Component of Annuity Payments) for "Sewerage Projects in 101 ULBs in the State of Telangana under SBM 2.0" - Accorded - Orders Issued.

MUNICIPAL ADMINISTRATION & URBAN DEVELOPMENT (ENGG.) DEPARTMENT

G.O. Rt. No.388

Dated:21.08.2024

Read the following:-

1. From the ENC(PH), Hyderabad, Lr.No.: T1/SBM 2.0/STPs & I&Ds /2022-23,Dt.: 15.04.2023.
2. Govt., Memo No. 6361/Engg.2/2023, Dt.02-02-2024]
3. From the ENC (PH), Hyderabad, Lr.No.T1/SBM 2.0/STPs & I&Ds/2023-24, Dt: 07.02.2024.

-000-

ORDER:

In the reference 1st read above, the Engineer-in-Chief (Public Health) Hyderabad has informed that, the Director (SBM), MoHUA, GoI has communicated the Minutes of Meeting of 7th NARC of SBM Urban duly mentioning that Action Plans submitted by the Govt. of Telangana for Urban Water Management have been approved containing proposals costing Rs. 934.60 Crores towards establishment of STPs and I&D for Urban Water Management have been approved in 101 ULBs and requested to issue the RFP for engagement of agencies for establishment, O&M of STPs and construction of I&D structures and to take further action for effective UWM under SBM Urban 2.0.

2. The Engineer-in-Chief (Public Health), Hyderabad has further informed that, the Hon'ble National Green Tribunal have given directions to take measures not to discharge untreated waste water into water bodies & rivers. Government of Telangana has either established or is in the process of establishing STPs in the ULBs of Warangal, Karimnagar, Nizamabad, Siddipet, Nalgonda, Miryalaguda, Suryapet, Sircilla, Gajwel, Vikarabad, Nagar Kurnool, Devarakonda, Alampur, Khammam besides GHMC to meet the requirements of respective prospective years. The ENC (PH) has requested the Government to give suitable directions on taking up STPs in 103 ULBs which are to be funded through SBM 2.0 Scheme.

3. In the reference 2nd read above, Government have requested the ENC (PH) to furnish the proposal, duly revising the installed capacity as per the discussions held in this regard by the Principal Secretary to Government MA&UD Department with the Engineer-in-Chief (Public Health), Hyderabad for taking further action in the matter.

4. In the reference 3rd read above, the Engineer-in-Chief (Public Health) has stated that previously they have submitted the proposals of SBM 2.0 to the Government for construction of 344 No. of STPs (total capacity of 789.20 MLD, considering 2038 as prospective year) along with I&D Structures with 10 years O&M with a tentative financial implication of about Rs. 5503.107 crores, along with a request to accord permission to

(PTO)

invite tenders with open technology on RFP mode In Hybrid Annuity Model without mentioning Internal Bench Mark, pending Administrative Sanction. It was also indicated therein that Administrative Sanction would be sought along with tender approval after finalization of the tenders.

5. The Engineer-in-Chief (Public Health) has further stated that, during the review meeting with the Principal Secretary to Government, MA&UD Dept. on 11-01-2024; the proposals of SBM 2.0 were placed before the Government and it was instructed to take up the proposals in two phases, duly utilizing the GoI share under SBM 2.0 in Phase-I as upfront payment, keeping in view the financial implication, and in single package in order to create healthy competition among available agencies who have experience in executing similar projects in HAM mode.

6. The Engineer-in-Chief (Public Health) has further stated that, after detailed deliberations, it has been decided in the above meeting on the following proposals under SBM 2.0:-

- Proposals under Phase-I: To consider STPs of only certain catchments of the ULB for the prospective year 2038 satisfying the criteria of SBM 2.0 Guidelines that all towns will need to prepare a DPR containing the provision of minimum one STP (for 70% of current (2025) population).

Where there is marginal difference in capacity of STP of the catchment corresponding to the prospective year 2038 when compared to the intended capacity in Phase I (corresponding to 70% of current (2025) population of the town), those STP capacities are further reduced to meet the criteria of SBM 2.0 guidelines with a contemplation to take up capacity augmentation of these STPs as and when required on case to case basis.

- Proposals under Phase-II: Capacity augmentation (on modular basis) of the catchments under consideration in Phase I along with the new catchments deferred in Phase I can be considered in Phase II proposals.

7. The Engineer-in-Chief (Public Health) has also informed that, it has been decided to prepare estimates with the same rates as adopted for AMRUT 2.0 projects i.e., SSR 2022-23 with the cement & steel rates for the month of April 2023 and STP rates from GWSSB SOR for the year 2022-23, since the original proposal was submitted to Govt. on Dt. 15-04-2023. The estimated Operation and Maintenance cost of 115 STPs for 10 years is Rs.1608.50 Crores (considering 5% non compounding increase on each year's O&M cost) based on CPHEEO Guidelines, Consortium of IITs report of Ganga River Basin Environment Management Plan and common SSR-2022-23 of Government of Telangana.

8. Stating the above position, the Engineer-in-Chief (Public Health) T.G, Hyderabad has finally requested the Govt., to accord permission on the following:-

- i. Administrative sanction for an amount Rs.3769.34 crores (including O&M and Annuity Payments and GST on Interest Component of Annuity Payments) for "Sewerage Projects in 101 ULBs in the State of Telangana under SBM 2.0".

- ii. Permission to invite tenders in single package under LS contract system with Hybrid Annuity Model (35% upfront and 65% deferred), duly cancelling the G.O.Rt.No.343, MA&UD (UBS) Department, Dt. 29-05-2023.
 - iii. Request to address the Govt. of India for permission to utilize the GOI share as upfront payment (35%) during the construction period of initial 2 years and balance (65%) to be paid in 10 annuities by the State Government along with O&M payments, considering the present financial situation of the State Government.
 - iv. Permission to invite tenders pending acquisition of land, in relaxation of G.O.Ms.No. 94, I&CAD (PW-COD) Department, Dated: 01-07-2023 and G.O.Ms.No. 1, Finance (Works & Projects-F7) Department, Dt. 25-02-2012 and to initiate the Land Acquisition process parallelly. In case the tender process is postponed till completion of land acquisition process, it may have a cascading effect resulting in cost escalation. Also, GoI is pursuing with the State Government constantly regarding award of the projects under SBM 2.0.
 - v. Land Acquisition costs will be submitted to the Government and administrative sanction for those amounts will be sought in due course.
 - vi. Permission from State Government to entrust the O&M of sewerage projects under SBM 2.0 for 10 years on completion of capital work at the same tender percentage of capital work, by concluding a separate agreement with the same agency by the ULB.
 - vii. To give directions to the DMA, Hyderabad to instruct the Commissioners of the respective ULBs (falling in SBM 2.0) to conclude separate agreements with the same agencies (entrusted with the capital works) for O&M of sewerage schemes proposed under Phase I of SBM 2.0.
 - viii. To give directions to the DMA, Hyderabad to instruct the Commissioners of all the respective ULBs for identification of potential users/ industries of treated waste water (minimum of 20%), which enables ULBs to avail 15th Finance Commission tied grants.
 - ix. The draft bid document for the LS Contract System with Hybrid Annuity Model is under preparation and the same will be submitted to the Government in due course for approval.
9. Government after careful examination of the matter, hereby accord permission on the following:-
- i. Administrative sanction is accorded for an amount Rs.3769.34 Crores (including O&M and Annuity Payments and GST on Interest Component of Annuity Payments) for "Sewerage Projects in 101 ULBs in the State of Telangana under SBM 2.0"

3617

::4::

- ii. Permission is accorded to invite tenders in single package under LS contract system with Hybrid Annuity Model (35% upfront and 65% deferred), duly cancelling the G.O.Rt.No.343, MA&UD (UBS) Department, Dt. 29-05-2023.
- iii. The Director of Municipal Administration, being the State Mission Director, SBM 2.0 is directed to address the Govt. of India for permission to utilize the GOI share as upfront payment (35%) during the construction period of initial 2 years and balance (65%) to be paid in 10 annuities by the State Government along with O&M payments.
- iv. Permission is accorded to invite tenders pending acquisition of land, in relaxation of G.O.Ms.No.94, I&CAD (PW-COD) Dept.,Dt.01-7-2023 and G.O.Ms.No.1, Finance (Works & Projects-F7) Dept., Dt. 25-02-2012 and to initiate the Land Acquisition process parallelly, and to submit the proposals of Administrative Sanction for land acquisition if required.
- v. Permission is accorded to entrust the O&M of sewerage projects under SBM 2.0 for 10 years on completion of capital work at the same tender percentage of capital work, by concluding a separate agreement with the same agency by the ULB.
- vi. DMA, Hyderabad is directed to instruct the Commissioners of the respective ULBs (falling in SBM 2.0) to conclude separate agreements with the same agencies (entrusted with the capital works) for O&M of sewerage schemes proposed under Phase I of SBM 2.0.
- vii. DMA, Hyderabad is directed to instruct the Commissioners of all the respective ULBs for identification of potential users/ industries of treated waste water (minimum of 20%), which enables ULBs to avail 15th Finance Commission tied grants.

10. The Engineer-in-Chief, Public Health/ the Director of Municipal Administration, Telangana, Hyderabad shall take further necessary action accordingly.

(BY ORDER AND IN THE NAME OF THE GOVERNOR OF TELANGANA)

M. DANA KISHORE
PRINCIPAL SECRETARY TO GOVERNMENT

To
The Engineer-in-Chief (PH), Telangana, Hyderabad.
The Director of Municipal Administration, Telangana, Hyderabad.

Copy to:

The OSD to Spl. Secretary to Chief Minister.
OSD to Prl. Secretary to Govt., MA&UD Department.
Sf/Sc

// FORWARDED :: BY ORDER //


SECTION OFFICER

F. No. 22-39/2020-IA.III
 Government of India
 Ministry of Environment, Forest and Climate Change
 Impact Assessment Division

Indira Paryavaran Bhawan
 Jor Bagh Road, Aliganj
 New Delhi - 110003
 diriapolicy-moefcc@gov.in

Date: 14th February, 2022

Office Memorandum

Subject: Guidelines for siting industries which are in close proximity with the river – reg.

In light of various court directions about the criteria for siting of industries, which are in close proximity to a river, the requirement for framing specific criteria with regards to siting of industries has arisen.

2. The "Environmental guidelines for industries" of the Ministry with regard to siting of industries prescribes that industrial sites shall maintain at least ½ km., from flood plain or modified flood plain affected by dam in the upstream or by flood control systems.

3. The Hon'ble National Green Tribunal while considering restoration measures for Yamuna and Ganga rivers dealt with the issue of flood plains vide judgment dated 13.01.2015 in OA No. 6/2012 and O.A. No. 300/2013, in the context of river Yamuna, observed that, "*it is necessary to call upon the authorities to demarcate the floodplain for the flood of once in 25 years and to prohibit any kind of development activity in the area in question*".

4. Further vide judgement dated 13.07.2017 in OA No. 200/2014, M.C. Mehta vs. Union of India & Ors. reported in 2017 NGTR (3) PB1 in the context of river Ganga, it was observed that "*till the demarcation of the floodplains and identification of permissible and non-permissible activities by the State Government of this judgement, we direct that 100 meters from the edge of the river would be treated as no development/ construction zone in Segment-B of Phase-I (Haridwar to Unnao, Kanpur)*".

5. Based on the above, the aspect related to siting of industries was deliberated in the Ministry and suggestions/comments/observations were sought from different Ministries including Ministry of Jal Shakti (MoJS). Based on the inputs received, it is hereby directed that the following criteria for siting of industries in close proximity to rivers shall be followed:

"Industries shall not be located within the river flood plain corresponding to one in 25 years flood, as certified by concerned District Magistrate/ Executive Engineer from state water resource Deptt. or any other officer authorised by State Govt. for this purpose."

6. This above criterion is subjected to following conditions:
- i. The activities undertaken under Namami Gange Programme like construction/development / renovation of STPs, CETPs, RFDs, bathing ghats, crematoria, toilets etc. for pollution abatement of river Ganga and its tributaries are not prohibited. Further, any "developmental project" taken by MoJS under the said program are also exempted from these guidelines.
 - ii. River Ganga (Rejuvenation, Protection and Management) Authorities Order notified vide Notification no. S.O. 3187(E) dated 07.10.2016 which defines the floodplain as such area of river Ganga and its tributaries which comes under water on either side of it due to floods corresponding to its greatest flow or with water on either side of it due to floods corresponding to its greatest crown or with a flood or frequency once in hundred years, will prevail over any other guideline.
 - iii. Further, in respect of regulatory activities in floodplain of the river Ganga and its tributaries, prior approval of National Mission on Clean Ganga (NMCG) is required to be taken by the concerned authorities/ departments/agencies /persons.
 - iv. As per the draft Flood Plain Zoning Bill, 2020 prepared by Central Water Commission (CWC), a Flood Plain Zoning Authority shall, on the basis of the remote sensing/modeling results/ground survey, establish flood plain zones of different frequencies. After its creation, guidelines/decisions/orders of Flood Plain Zoning Authority will prevail over above guidelines.
 - v. Any other directions/judgments of Courts/Tribunals with regard to siting of Industries in the proximity of rivers and/or demarcation of flood plain.
7. The siting criteria prescribed in "Environmental guidelines for industries" in respect of flood plains of the riverine systems shall get modified to this extent.
8. This is issued with the approval of the competent authority.


 (A K Agrawal)
 Director

To

1. Chairman of all the Expert Appraisal Committees
2. Chairperson/Member Secretaries of all the SEIAAs/SEACs
3. Chairperson of all State/UT Pollution Control Boards and Pollution Control Committees

Copy for information to

1. PS to Hon'ble Minister for Environment, Forest and Climate Change
2. PS to Hon'ble MoS (EF&CC)
3. PPS to Secretary (EF&CC)
4. PPS to AS (TK)/ AS(RS)/ AS (NPG)/JS (SKB)
5. Website MoEF&CC/Guard file

Construction of FSTPs in 68 new ULBs - 2 nd Phase - Status Report								
S.No	Package No & Name of the Agency	Name of the District	Name of the ULB	CAPEX Cost including taxes and provisions (in Rs Lakhs)	Design Capacity (in KLD)	Work status	Progress in %	
1	2	3	4	5	6	10	11	
1	PACKAGE_1 M/s.Earthin Projects Ltd	Nalgonda	Chityal	92.495	5	Yet to be started	-	
2			Chandur	92.495	5	In progress	90%	
3			Haliya	92.495	5	In progress	5%	
4			Nakrekal	184.99	10	Yet to be started	-	
5			Nandikonda	92.495	5	In progress	40%	
6		Suryapet		Neredcherla	92.495	5	Yet to be started	-
7				Tirumalgiri	92.495	5	Yet to be started	-
8		Yadadri Bhuvangiri		Alair	92.495	5	Yet to be started	-
9				Chotuppal	184.99	10	Yet to be started	-
10		Yadadri Bhuvangiri		Mothkur	92.495	5	In progress	15%
11				Pochampally	92.495	5	Yet to be started	-
12				Yadagirigutta	92.495	5	In progress	80%
13	PACKAGE_2 M/s Envision Env Engg	Medchal Malkajgiri	Jawaharnagar	91.551	10	In progress	55%	
14			Nizampet	91.551	10	In progress	15%	
15			Dhammaiguda	91.551	10	In progress	10%	
16			Dundigal	91.551	10	Completed	100%	
17			Ghatkesar	91.551	10	Completed	100%	
18			Gundlapochampally	45.776	5	In progress	10%	
19			Kompally	91.551	10	Yet to be started	-	
20			Nagaram	91.551	10	In progress	5%	
21			Pocharam	91.551	10	In progress	30%	
22			Thumkunta	91.554	10	In progress	10%	

S.No	Package No & Name of the Agency	Name of the District	Name of the ULB	CAPEX Cost including taxes and provisions (in Rs Lakhs)	Design Capacity (in KLD)	Work status	Progress in %	
1	2	3	4	5	6	10	11	
23	PACKAGE -3 M/s.Revolve Engineers Pvt Ltd	Mahabub-nagar	Bhoothpur	80.155	5	In progress	10%	
24		Narayan-pet	Kosgi	80.155	5	Not started	-	
25			Makthal	160.312	10	Not started	-	
26		Wanaparthy	Atmakur	80.155	5	In progress	95%	
27			Amarchintha	80.155	5	In progress	95%	
28			Kothakota	80.155	5	Yet to be started	-	
29			Pebbair	80.155	5	In progress	10%	
30		Jogulamba Gadwal	Alampur	80.155	5	Dropped	-	
31			Waddepalli	80.155	5	In progress	60%	
32			Vikarabad	Kodangal	80.155	5	Land not identified	-
33				Parigi	80.159	5	In progress	95%
34		PACKAGE -4 M/s.Revolve Engineers Pvt Ltd	Kamareddy	Yellareddy	71.353	5	In progress	85%
35			Nizamabad	Bheemgal	71.353	5	Yet to be started	-
36			Medak	Narsapur	71.353	5	In progress	90%
37	Thoopran			71.353	5	In progress	10%	
38	Ramayampet			71.353	5	In progress	10%	
39	Sangareddy		Narayankhed	71.353	5	In progress	10%	
40			Ameenpur	142.706	10	Yet to be started	-	
41			Bollaram	142.706	10	In progress	10%	
42			Tellapur	142.706	10	Completed	100%	
43	Siddipet		Cherial	71.352	5	Not started	-	

3622							
S.No	Package No & Name of the Agency	Name of the District	Name of the ULB	CAPEX Cost including taxes and provisions (in Rs Lakhs)	Design Capacity (in KLD)	Work status	Progress in %
1	2	3	4	5	6	10	11
44	PACKAGE -5 M/s Envision Env Engg	Ranga Reddy	Bandlaguda jagir	101.179	10	In progress	20%
45			Shamshabad	101.179	10	In progress	20%
46			Turkayamjal	101.179	10	In progress	25%
47			Adibatla	50.59	5	Completed	100%
48			Shankarpally	50.59	5	Land not identified	-
49			Thukkuguda	50.59	5	In progress	5%
50			Amangal	101.179	10	In progress	5%
51			Manikonda	50.59	5	Dropped	-
52			Narsingi	101.179	10	Completed	100%
53			PACKAGE -6 M/s.Annapurna Constructions	Karimnagar	Choppadandi	95.055	5
54	Kothapalli	95.055			5	Completed	100%
55	Peddapalli	Manthani		95.055	5	In progress	90%
56		Sultanabad		95.055	5	In progress	15%
57	Khammam	Wyra		190.109	10	In progress	90%
58	Mahabubabad	Dornakal		95.055	5	In progress	95%
59		Marripeda		95.055	5	In progress	95%
60		Thorrur		95.055	5	In progress	95%
61	Warangal Rural	Wardhannapet		95.055	5	Completed	100%
62	PACKAGE -7 M/s.Annapurna Constructions	Nirmal		Khanapur	61.575	5	Completed
63		Mancherial	Chennur	123.149	10	Completed	100%
64			Kyathanpally	123.149	10	Completed	100%
65			Luxettipet	123.149	10	Completed	100%
66			Naspur	184.724	15	Yet to be started	-
67		Jagtial	Dharmapuri	61.575	5	Not started	-
68			Raikal	61.575	5	In progress	10%
Total				6451.82	470.00		

Annexure-A18

HON'BLE NGT, PRINCIPAL BENCH, NEW DELHI - O.A. No. 606 of 2018 (TELANGANA STATE)

Statement showing calculation of Environmental Compensation (EC)

LIQUID / SEWAGE WASTE

(Rs.in Crores)

Sl. No.	Description	Total EC levied by NGT		Total capacities added from September 2022 to December - 2024			Capacities to be completed from January to March- 2025			Total capacities added from September 2022 to March - 2025			Gap in capacities to be completed from April – 2025 onwards			Remarks
		Qty (MLD/ MT)	Rs. in crores	Qty (MLD/ MT)	%	Amount	Qty (MLD/ MT)	%	Amount	Qty (MLD/ MT)	%	Amount	Quantity (MLD/ MT)	%	EC - Rs. in Crores	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(17)	(18)	(19)	(20)
1	Gap in treatment of Liquid Waste/Sewage i.e. 1,824 MLD, EC calculated @ Rs.2.00 Cr per MLD for untreated liquid waste.	1,824	3,648.00													
	(i) Within the City of Hyderabad Gap is: 1,178 MLD.															
	(a) HMWSSB	1178	2356	663	56%	1326.00	329.5	28%	659	992.50	84.25%	1985.00	185.5	15.75%	371.00	(#)
	Total (A)	1178	2356	663	56%	1326.00	329.5	28%	659	992.50	84.25%	1985.00	185.5	15.75%	371.00	
	(ii) Within the Telangana State Gap is: 646 MLD, excluding (i) above															
	(a) Public Health Department	646	1292	35.05	5.43%	70.10	17.16	2.65%	34.32	52.21	8.08%	104.42	593.79 (**)	91.91%	1187.58	AMRUT 2.0, SBM 2.0
	Total (B)	646	1292	35.05	5.43%	70.10	17.16	2.65%	34.32	52.21	8.08%	104.42	593.79 (**)	91.91%	1187.58	
	Total: (C)= (A) + (B)	1,824	3648			1396.10			693.32			2089.42			1558.58	

3624

SOLID WASTE

(Rs. In Crores)

Sl. No.	Description	Total EC levied by NGT		Quantity Processed from September 2022 to December-2024			Quantity to be completed from January to March - 2025			Total Targeted Quantity from September 2022 to March- 2025			Gap in quantity to be completed from April – 2025 onwards			Remarks
		Qty (MT)	Rs. in crores	Qty (LMT)	%	Amount	Qty (LMT)	%	Amount	Qty (LMT)	%	Amount	Quantity (LMT)	%	EC - Rs. in Crores	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(17)	(18)	(19)	(20)
2	Un-remediated/un-processed Legacy Waste of 59,00,000 MT, EC calculated @Rs. 300/- per MT. (\$)	59,00,000	177.00													
	Entire State of Telangana including Hyderabad City Gap 38,46,000 MT (R)															
	(a) CDMA	38,46,000	115.38	13.43	34.92%	40.29	3.47	9.01%	10.41	16.9	43.94%	50.7	21.56	56.05%	64.68	
	Total (D)	38,46,000	115.38	13.43	34.92%	40.29	3.47	9.01%	10.41	16.9	43.94%	50.7	21.56	56.05%	64.68	
	Grand Total: (C+D)		3763.38			1436.39			703.73			2140.12			1623.26	
	Say Rs.		3800.00									2140.12			1623.26	

Note:

(**) Sewage Waste: includes ongoing 5 STPs of combined capacity of 54.10 MLD which are likely to be completed by June -2025. 16 No's of STPs of combined capacity of 170.30 MLD sanctioned under AMRUT 2.0. Agreements completed and will be completed in 24 months from date of agreement. 115 No's of STPs in 101 ULBs of combined capacity of 455.00 MLD sanctioned under SBM 2.0. Tender invited and no bidders participated in 1st call. Tender is being recalled. Will be completed in 24 months from date of agreement.

(\$)(i) The figure 59,00,000 MT of Legacy Waste was taken on assumption/adhoc basis (in the wet-status).

(ii) Now, the realistic survey of Legacy Waste was conducted in a scientific manner and figure is worked out on dry-status basis as 38,46,000 MT.

(R) Revised figures. ---

(#) The total capacity of 1106 MLD is programmed to complete by April'2025. The balance 72 MLD capacities could not be materialized due to court cases. In addition to 72 MLD the STPs with the capacity of 900 MLD in ULBs upto ORR are sanctioned under AMRUT 2.0 which are in tender stage. The above STPs capacities will cater to the needs of 2036 requirements in GHMC & upto ORR limits.

Photo Exhibits of STPs recently completed in GHMC area

320 MLD STP at Nagole



133 MLD STP at Fathenagar



3626 86.5 MLD STP at Nallacheruvu



41.5 MLD STP at Miralam





17.5 MLD STP at Peddacheruvu



3628
15 MLD STP at Kokapet



7 MLD STP at Miyapur-Patel Cheruvu



3629
7 MLD STP at Durgam Cheruvu



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

I.A No. 299 of 2024
(State of Telangana)

In

Original Application No. 606/2018
(State of Telangana)

In the matter of:

Compliance of Municipal Solid Waste
Management Rules, 2016 and other
environmental issues.
(In respect of State of Telangana)

And in the matter of:

The Chief Secretary to Government,
State of Telangana, Dr. B.R. Ambedkar
Telangana State Secretariat, Hyderabad.


.....Applicant

AFFIDAVIT


I, Sri M. Dana Kishore, IAS, S/o Sri Mejuri (late), Aged 58 years, Resident of Hyderabad, Occupation: Government Service, Principal Secretary to Government, MAUD, State of Telangana, duly authorized by the Chief Secretary to represent on her behalf, do hereby sincerely state on oath as follows:-

1. I submit that I am the authorized representative of Appellant in I.A No. 299 of 2024 in O.A No. 606/2018, I am working as the Principal Secretary to Government, State of Telangana, and as such I am well acquainted with the facts of the case as also I am competent and authorized to file this Affidavit in I.A on behalf the Government of Telangana.




Principal Secretary to Government
Municipal Administration & Urban
Development Department
Telangana Secretariat, Hyderabad - 22.

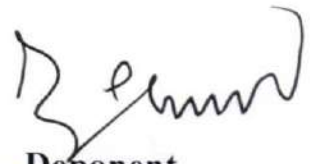
2. That I have read the contents of the Status Report and they are true and correct as per my knowledge, belief and record. I state that I have instructed my Counsel to draft the Application on my behalf and as per my instructions, the legal submissions are drawn by my Counsel.
3. That the Annexures annexed with the Application are true copies of the respective originals.
4. The photographs attached are obtained from the locations mentioned on respective date.



Deponent
Principal Secretary to Government
Municipal Administration & Urban
Development Department
Telangana Secretariat, Hyderabad - 22.

VERIFICATION

I, Sri M. Dana Kishore, IAS, Principal Secretary to Government (MAUD Department), State of Telangana do hereby verify and declare that the contents of the above Additional Affidavit are true to the best of my knowledge, information, as per official records, legal advice and believe the same to be true, hence verified on this the 3rd day of March, 2025 at Hyderabad.



Deponent
Principal Secretary to Government
Municipal Administration & Urban
Development Department
Telangana Secretariat, Hyderabad - 22.



ATTESTED

[Handwritten Signature]
3/3/2025

K. NARASIMHA RAO, B.A., LL.B
ADVOCATE / NOTARY
Appointed by the Govt. of T.S
10-1-891/401, A.C. Guards
Khairatabad. HYDERABAD