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Plot No.48A, 2nd Main Road,
Ram Nagar, South Extension,
Pallikkaranai, Chennai - 600 100.
GST NO. 33AADCE6103A2ZH
PAN NO. AADCE6103A

Eco Tech Labs Pvt Ltd

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CIN : U74900TN2014PTC094895

To

The Member Secretary,
Chennai Metropolitan Development Authority
Thalamuthu- Natarajan Building
No.1 Gandhi-Irwin Road
Egmore, Chennai -600008

Sir,

Sub: Concurrence for the design of proposed in-situ Sewage Treatment Plant of **150 KLD** for the Proposed Construction of residential development at T.S.No: 19/1, 19/2, 19/6, 19 /7, 19/8 Kannadapalayam Village, Tambaram Taluk, Chengalpattu District by M/s LML Homes LLP- Reg.

With reference to above subject "CMWSSB had been issuing Concurrence for the design of sewage treatment plants. Based on the request from the project proponents in the 253rd Authority meeting of CMDA held on 21.07.2016, the Authority resolved that the NOC from CMWSSB for STP design clearance and Swimming pool need not be insisted either for issuing Planning Permission or Completion Certificate and the design sufficiency certificate issued by registered professionals/ institutions shall be accepted" based on the above reference letter the proponent has approached me for the design sufficiency certificate vide reference cited 1st above for their Sewage treatment plant of capacity of **150 KLD**.

I, Dr. A. Dhamodharan – Environmental Specialist (Approved Water Pollution Expert by NABET –Quality council of India) &Managing Director of Eco Tech Labs Pvt Ltd, Registered Functional Area Expert as Water & wastewater Specialist by QCI NABET Govt India, for Building & construction projects (NABET certificate Number: NABET/ EIA/2124/ SA 0147) & Adjunct Faculty in Civil Engineering Department at R.M.K. Engineering College, R.S.M. Nagar, Kavaraipettai.

The design and drawings submitted by the proponent has been scrutinized for design feasibility as per CPHEEO norms, and suggestions and correction intimated to the proponent, and same has been corrected and submitted by the client for the STPs capacity of **150 KLD**. The design adequacy calculation and drawings enclosed along with this letter with the following recommendations,

1. The capacity of STP **150 KLD** – Sequential Batch reactor (SBR) – domestic determined by the proponent in scrutiny of design of proposed in situ STP.

2. The effluent characteristics for domestic sewage generated from the development and effluent characteristics in the effluent of STP as assumed and given by the applicant has been considered as basic data in scrutiny of the design of the in situ STP and is furnished below

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Description	Influent characteristics	Effluent characteristics
pH	6.5 - 8	6.5 – 8
Total Suspended solids	450 mg/L	< 20
BOD at 27. C	350 mg/L	< 20
Oil & Grass	20 mg/L	< 10

3. The treatment units are proposed to be constructed below GL with access from Manhole opening provided at ground level. The panel board and air blowers are to be placed on the platform of STP. The air inflow pipe to blowers and air vent pipe to be laid below drive way and fixed in the compound wall for air circulations.

4. The proponent ensured that the structures provided for the underground treatment units are waterproof. And also rain water entry in the site is insisted to be prevented to the STP tanks.

5. The treatment units are placed below the ground level and hence the sufficient air circulation through duct and also the methane gas detectors is recommended during operation phase to ensure the safety of operators.

6. The treated water is proposed for gardening and flushing and hence the proper disinfection by UV is recommended during operation phase, routine check up for microbiological growth is recommended during operation phase.

7. The sludge generated in the STP is recommended to compost and reuse as gardening manure hence it is purely organic in nature.

With the above recommendations, I certify that the proposed STP design (Plan enclosed) is adequate to treat the sewage generated in the above residential complex, the attested drawings and design calculation in enclosed along with this letter. The concurrence certificate is issued based on the design submitted and standard design check done with reference to CPHEEO manual.

Thanking You,
Yours Sincerely

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Dr.A.Dhamodharan
Environmental Specialist (Approved Water Pollution Expert – NABET)
Managing Director
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STP DESIGN EVALUATION REPORT

For

150 KLD SEWAGE TREATMENT PLANT

Constructed for the residential group development

Technical Specification

Technical specification and design adequacy calculations

Design Basis

Design capacity	: 150 KLD
Operating Hours	: 24 hrs
Plant Flow Rate/Phase	: 6.25 m^3 / hr
Design Flow Rate	**: 6.25 m^3 / hr**

Quality logistics

S.No	Description	Unit	Inlet	Outlet	Standards
1	pH		7 - 8	7 – 7.5	6.5 – 8.5
2	TSS	mg/ l	200 – 250	<20	<30
3	BOD	mg/ l	350 – 400	<10	<20
4	COD	mg/ l	400 – 500	<50	<250

TREATMENT SCHEME:-

The following treatment steps for achieving required outlet water quality.

01. Primary Treatment.

02. Secondary Treatment.

03. Tertiary Treatment.

04. Sludge Treatment with Filter Press.

1. Primary Treatment:-

Screen Chamber:-

The sewage enters in to the screen chamber by gravity flow where Screen is fixed in the Screen Chamber to remove the large debris entering into the collection sump. Manual cleaning of the chamber will be done weekly basis.

Personnel protective Equipment: Gloves.

Equalisation tank:-

The Screen Chamber outlet is collected in the Equalisation tank, from where the sewage is pumped to Sequential Batch Reactor.

Raw sewage pump: Daily checking of incoming power supply and flow.

Protection: Dry run protection.

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Maintenance: lifting chain is provided.

Personnel protective Equipment: Gloves.

2. Secondary Treatment:-

Sequential Batch Reactor:-

The SBR is a fill and draw activated sludge treatment system. The activated sludge is a large population of bacteria and other microorganisms that breaks down organic matter and can stimulate de-nitrification of nitrogen if appropriate conditions are provided. Fill and draw means that it is run as sequences of partial filling of the SBR tank with manure, followed by an aeration phase, a settling phase where the bacteria settle onto the bottom and decant phase where treated liquid is removed from the top of the tank. Following the decant phase sludge's are removed from the bottom of the tank.

Blower: Cleaning of suction filter weekly, changing oil 15days once – 1 liters/15days.

Personnel protective Equipment: Ear plugs.

3. Tertiary Treatment:-

Filter Feed pump: Daily checking of incoming power supply and flow.

Protection: Dry run protection.

Personnel protective Equipment: Gloves

Pressure Sand Filter:-

The Pressure Vessel in MSEP composition with graded filter media supported on layers consists of pebbles and sand. The filtration media is chosen from carefully cleaned, sieved and graded filter sand.

A mixture of coarse and fine sand in predetermined proportion facilitates in depth filtration. In-depth filtration provides longer runs between backwashes and better quality of filtrate compared to surface filtration.

Operation: 8 hours.

Backwash: 20 -30 mins.

Resin: 10- 15mins.

Backwash mode: Manually.

Media change: yearly once.

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Activated Carbon Filter:-

The Pressure Vessel in MSEP composition with graded filter media supported on layers consists of pebbles, sand and activated carbon. The filtration media is chosen from carefully cleaned, sieved and graded filter sand.

A mixture of coarse, fine sand and activated carbon in predetermined proportion facilitates in depth filtration. In-depth filtration provides longer runs between backwashes and better quality of filtrate compared to surface filtration.

Operation: 8 hours.

Backwash: 20 -30 mins.

Backwash mode: Manually.

Media change: yearly once.

Spent carbon disposal: given to cement klin.

Disinfection:-

UV is used as disinfectant

UV System:-

UV system used for kills the microbes (Disinfection System)

Type - Shell and Tube type with UV tubes inside the shell.

Shell MOC - Polished SS 304.

UV lamp - Low pressure mercury vapour & 254nm wave length.

UV system capacity - 8,500 LPH.

UV lamp covers tube - Quartz jacket tube

Dos and Don'ts

1. In collection tank the water level must be maintain minimum 50% capacity.
2. Blower must be operated continuously (24x7).
3. Filter feed pumps should be changed every 8 hours.
4. Hypo should be dosed during the Filter Feed pump running hrs.
5. The sewage pumped to the Aeration Tank should not exceed the liquid depth level marked in the tank.
6. Do not run the pumps in dry condition.
7. If any abnormal sound noted from any equipments and leakage from any pipe line should be checked and informed to appropriate person.
8. Log sheet has to be maintained regularly.

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Adequacy Evaluation of the Sewage Treatment Plant

SPECIFICATION OF COLLECTION TANK

Adequacy Calculation

Size of the Collection Tank : 6.3m x 5.8m x 2.5 m (LD)

Volume of the Collection Tank, V: 91.35m^3

Flow Rate, Q : 6.25 m^3 /hr

Retention Time : 91.35/6.25

: 14 hours

Standard Retention hours for Collection Tank is 8-12 hrs

Provided Retention hours is = or > standard retention hours.

Hence it is adequate

SPECIFICATION OF SBR TANK

Adequacy Calculation

Design flow	: 150 KLD
No of reactor	: 1
No of cycle	: 5
Period of each cycle	: 4 hours
Fill & reaction Period for each cycle	: 2 hour
Settling Period in each cycle	: 1 hour
Decanting Period in each cycle	: 1 hour
Volume sewage to be Treated per cycle	: 150/5= 30 Cu.m
Volume required for SBR tank	: 30*3 = 90 cum
Size of the SBR Tank	: 6.8m x 5.8m x 3.2 m (LD)
Provided Volume of the SBR Tank, V	: 126 m^3

Provided volume of the SBR Tank is more than required volume.

Hence ok

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SPECIFICATION OF CLARIFIED WATER TANK

Adequacy Calculation

Size of the Decant Water Valve	: 4.1m x 5.8m x 1.59 m (LD)
Volume of the Decant Tank, V	:37.8 m^3
Flow Rate, Q	: 6.25 m^3/hr
Retention Time	: 37.8 /6.25
	: 6 hours
Hence it is adequate	

Air Calculation:

Specification of Air Blower:

BOD load per day = 350 mg/lit x 150000 lit/day
= 52.5 kgs/day

Oxygen Required For Reduction Of 1Kg of BOD we Require 2.0 Kgs of Oxygen

Oxygen required for
Reduction of 52.5 Kgs of BOD = 52.5 x 2
= 105 kgs/day

Air flow required per hr = $\frac{\text{Oxygen required per day}}{24 \times 1.203 \times 0.232 \times 0.5 \times 0.272}$
=115 m^3/hr.

Hence Air flow rate is designed for adequate capacity

SPECIFICATION OF TREATED WATER TANK

Adequacy Calculation

Size of the Treated water Tank	: 2.1m x 5.8m x 3.2m (LD)
Volume of the Treated water Tank, V	: 38.9 m^3
Flow Rate, Q	: 6.25 m^3/hr
Retention Time	:38.9/6.25

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:6 hours

Hence adequate

SPECIFICATION OF SLUDGE HOLDING TANK

Adequacy Calculation

Size of the Sludge Holding Tank	: 1.3m x 5.8m x 3.2 m (LD)
Volume of the Sludge Holding Tank, V	:24.1 m^3
Flow Rate, Q	:6.25 m^3/hr
Retention Time	: 24.1/6.25
	: 3.8 hours.

Hence adequate

SPECIFICATION OF PRESSURE SAND FILTER

Adequacy Calculation

Flow rate Q	:6.25 m^3 / hr
Filtration rate for PSF (V)	: 15 m^3 / m^2 hr
Q	: A x V
A	: 6.25/ 15
	: 0.4166 m^2
D^2	: 0.4166 x 4 / 3.14
	: 0.529
D	: 0.7 m

Hence adequate

SPECIFICATION OF ACTIVATED CARBON FILTER

Adequacy Calculation

Flow rate Q	:6.25 m^3 / hr
Filtration rate for PSF (V)	: 15 m^3 / m^2 hr
Q	: A x V

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A	: 6.25/ 15
	: 0.4166 m^2
D^2	: 0.4166 x 4 / 3.14
	: 0.529
D	: 0.7 m

Hence adequate

SPECIFICATION OF UF TREATED WATER TANK

Adequacy Calculation

Size of the UF Treated water Tank	: 1m x 5.8m x 3.2m (LD)
Volume of the UF Treated water Tank. V	: 18.56 m^3
Flow Rate, Q	: 6.25 m^3/hr
Retention Time	: 18.56/6.25
	:3 hours

Hence adequate

CONCLUSION AND RECOMMENDATIONS

Considering the following as the influent sewage load,

Suspended solids - 150-200 mg/L

BOD - 300-350 mg/L

The final BOD of the treated wastewater from the proposed sewage treatment plant will be below 10 mg/L and the suspended solids concentration will be below 30 mg/L based on the above evaluation.

REFERENCES

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2. Wastewater engineering, Metcalf & Eddy, Tata McGraw-Hill Edition 2003

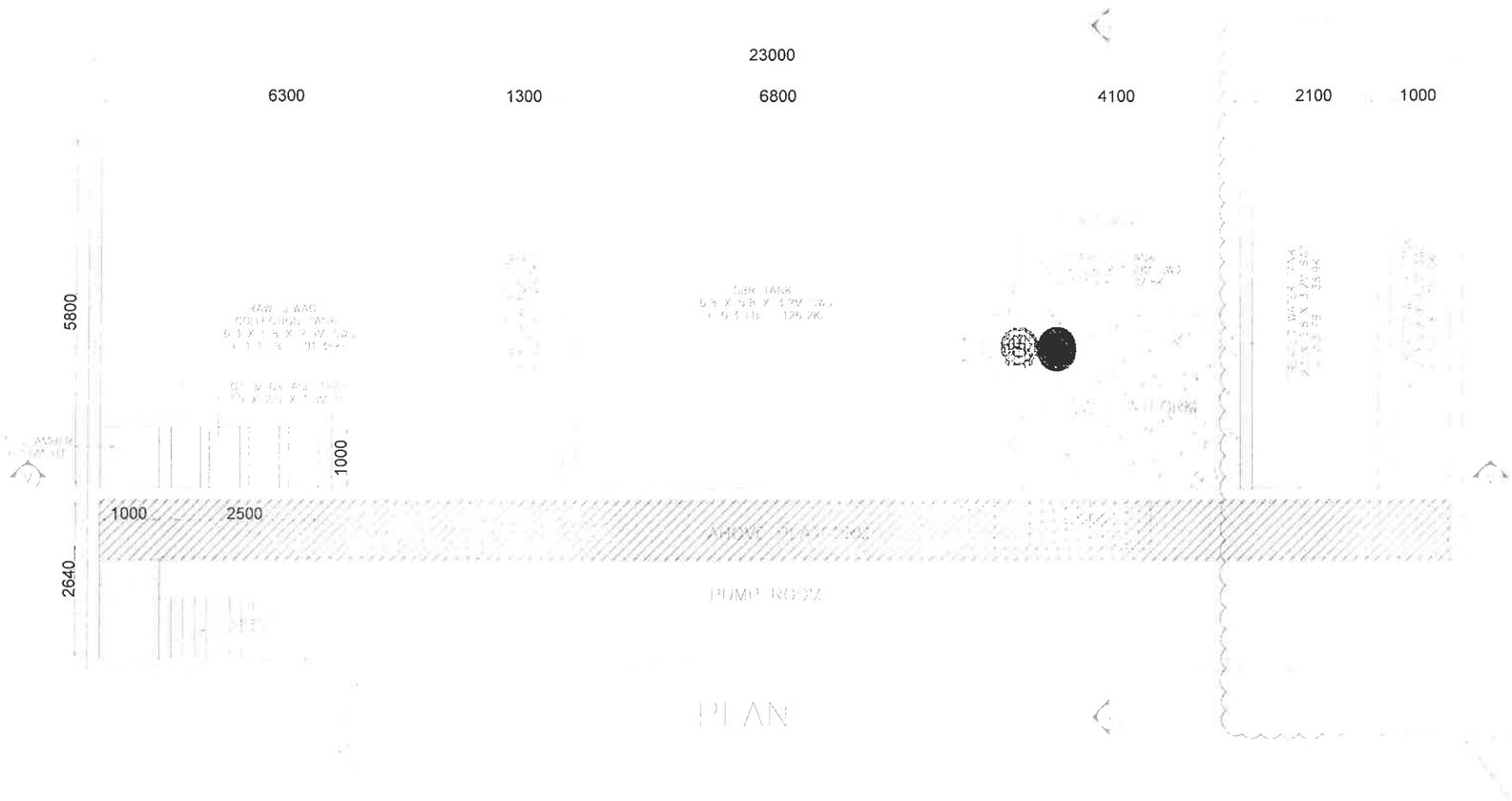
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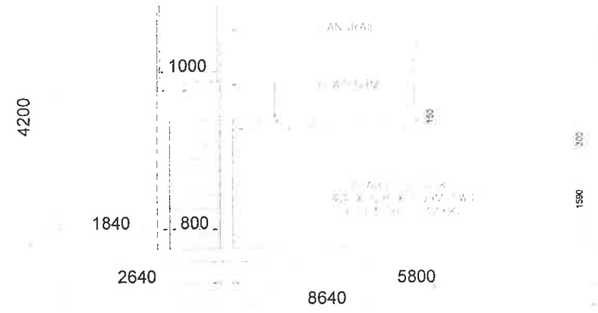
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**********End of report **********

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LIST OF STP CIVIL UNITS :-

MARKS	DESCRIPTIONS	SIZE	SWD.VOL	QTY	MOC
BSC	BARSCREEN CHAMBER	1.0 x 1.0 x 1.0m Ht	-	01	RCC
OGT	OIL & GREASE TRAP	1.0 x 2.5 x 1.5m Ht	-	01	RCC
CT	COLLECTION TANK	6.3 x 5.8 x 2.5m SWD + 1.0m FB	91.35KL	01	RCC
SHT	SLUDGE HOLDING TANK	1.3 x 5.8 x 3.2m SWD+0.3M FB	24.1KL	01	RCC
SBR	SEQUENTIAL BATCH REACTOR	6.8 x 5.8 x 3.2m SWD + 0.3m FB	126.2KL	01	RCC
CWT	CLARIFIED WATER TANK	4.1 x 5.8 x 1.59m SWD +0.3mFB	37.8KL	01	RCC
TWT	STP TREATED WATER TANK	2.1 x 5.8 x 3.2m SWD + 0.3m FB	38.9KL	01	RCC
UFTWT	UF TREATED WATER TANK	1.0 x 5.8 x 3.2m SWD + 0.3m FB	18.56KL	01	RCC

* SWD- SIDE WATER DEPTH, FB- FREE BOARD.

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DRAWN	VIJAY	CLIENT:-	M/S. CHERALATHAN
CHKD	UDAI	SITE:-	KANNADAPALAYAM
APPD	SB	PROJECT:-	150 KLD SEWAGE TREATMENT PLANT-SBR
DATE	03/02/2023	TITLE:-	PROPOSED DRAWING

DWG. NO:-

SHEET NO:- 01 OF 01 REV 00



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