



# KERALA STATE POLLUTION CONTROL BOARD AWARD 2024

Presentation by,

**MAR SLEEVA MEDICITY, PALAI**





## ABOUT MAR SLEEVA MEDICITY



01

### Quaternary Care Superspeciality Hospital

- With 648 Beds - 368 IP Room Beds, 25 IP Ward bed, 115 Transition Beds, 140 ICU Beds
- Four+ years since inception
- 28 Acres of land
- Average occupancy per day - 301
- Average OP per day - 1166

02

### Allopathy, Ayurveda, Homeopathy and Naturopathy

- 200+ Doctors and 49 Specialties

03

### NABH Accredited Hospital

- With NABH NE Certification

04

### Compliance to Statutory Law/Requirements

- LSGD, KSPCB
- Fire NOC
- KSEB, Electrical Inspectorate
- Drug Control Department, Kerala State Excise Department
- AERB, PESO, IMA
- Food Safety Department
- Department of Factories and Boilers
- KSMHA

05

### Green Protocol Policies

- Environmental Policy
- Waste Management Policy
- SOPs
- Ministry of Environment, Forest and Climate Change



INTEGRATED CLEARANCE NUMBER (ICO/ ICOR)	Date	Validity
KSPCB/KIT/ICO/10004663/VAR/2023	19.04.2023	30.06.2025
KSPCB/KT/ICO/10044693/VAR/2023	28-12-2023	30.06.2025
PCB/HO/KTYM/ICO/06/2019	31.08.2019	30.06.2024

CAPITAL INVESTMENT	
Total (Land + Building + Machinery)	Rs. 293,04,14,710/-
Investment made for Pollution Control Measure	Rs. 6,46,75,627/- (2.2 % of Capital Investment)
Average Monthly Recurring Expenditure for Pollution Control Board Measures - Rs. 345000/-	





# ENGINEERING TEAM

**Rev. Fr. Jose Keeranchira**  
Director Projects & Hospital Operations



**Dr. Reshmi Nair**  
Chief Operating Officer

**Mr. Polly Thomas**  
Manager Engineering



**Ms. Rinnu Gregory**  
Engineer



**Mr. Liju Thomas**  
Engineer



**Mr. Jomon Jose**  
Engineer



**Mr. Joyal Philip**  
Engineer



024 - MAR SLEEVA



# WATER QUALITY MANAGEMENT



## 240KL RAIN WATER HARVESTING SYSTEM



## 1600KL EARTH WATER RECHARGE SYSTEM



## VFD CONTROLLED HNS SYSTEM FOR EFFICIENT WATER DISTRIBUTION



## WATER EFFICIENT FIXTURES FOR SAVING







**WASTE WATER TREATMENT AND REUSE - STP**

**STP PARAMETER ONLINE MONITORING SYSTEM – pH, TSS, OIL Content, COD, BOD**



**STP DETAILS**

Capacity	480KLD
Technology	MBBR
Sludge Digester Capacity	212 m3

Effluent Quantity	Parameter	Unit	Concentration	Prescribed Limit
233 m3/day	pH		7.4	6.5 - 8.5
	TSS	mg/l	9	<20
	BOD	mg/l	2.11	<3
	COD	mg/l	15.6	<25
	Oil and Grease	mg/l	BDL	<1



**WATER REUSE DETAILS**

Irrigation/ Gardening	5	200 KL
Flushing		33 KL

KSPCB AWARDS 2024 - MAR SLEEVA MEDICITY PALAI





# AIR QUALITY MANAGEMENT



## AIR QUALITY PARAMETERS

<b>Details of Emission sources</b>	<ol style="list-style-type: none"> <li>1. Incinerator</li> <li>2. Autoclave</li> <li>3. Boiler</li> <li>4. Diesel Generator</li> <li>5. Kitchen Exhaust</li> </ol>
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## CONTROL MEASURES TAKEN

1. Incinerator	<ul style="list-style-type: none"> <li>• Stack height of 30m</li> <li>• Multi Stage Emission Cleaning System</li> <li>• Wet Scrubber with 1HP Water circulation pump</li> </ul>
2. Autoclave	<ul style="list-style-type: none"> <li>• Stack height of 35m</li> <li>• Ethylene oxide sterilization system</li> </ul>
3. Boiler	<ul style="list-style-type: none"> <li>• Stack height of 30m</li> <li>• Dust collector</li> </ul>
4. Diesel generator	<ul style="list-style-type: none"> <li>• Stack Height of 35m</li> <li>• Acoustic Enclosure</li> <li>• Emission control device</li> </ul>
5. Kitchen Exhaust	<ul style="list-style-type: none"> <li>• Advanced ESP Kitchen extract system</li> </ul>

<b>Concentration of Pollution</b>	<ul style="list-style-type: none"> <li>• Particulate matter - 44.7 mg/Nm<sup>3</sup></li> <li>• SO<sub>2</sub> - 10.6 mg/Nm<sup>3</sup></li> <li>• NO<sub>x</sub> - 38.5 mg/Nm<sup>3</sup></li> <li>• Volume of emission - 391 Nm<sup>3</sup>/Hr</li> </ul>
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**DIESEL GENERATOR WITH ACOUSTIC ENCLOSURE, CHIMNEY AND EMISSION CONTROLLER**



**ADVANCED ESP KITCHEN EXTRACT SYSTEM**



**WOOD FIRED BOILER WITH CHIMNEY**



**INCINERATOR**





**AUTOCLAVE MACHINE**





# WASTE MANAGEMENT



Waste category as per schedule 1 of BMW (Management & Handling) Rules	Quantity	Mode of treatment/disposal	WASTE HANDLING AGENCY DETAILS			SOLID WASTE DETAILS	
			CATEGORY OF WASTE	AGENCY	COMMENTS		
<b>Yellow</b> (a) Anatomical waste (b) Expired medicine (c) Linen (d) Blood bag (e) Lab waste	82850 kg	IMAGE	<b>Vegetable Oil Waste</b>	Trieco Green Pvt. Ltd	Central Govt. approved While Labelled Company	General Waste Generation	30.107 T/Yr
<b>Red</b> (a) Recyclable waste (b) Latex and tunings	73799 kg	IMAGE	<b>Food Waste</b>	Organic waste converter	In-house	Biomedical Waste Generation	171.327 T/Yr
<b>White (Metallic Sharp)</b>	1642 kg	IMAGE	<b>Biomedical Waste</b>	IMAGE - IMA	PCB Approved	 	
<b>Blue</b> (a) Glassware (b) Metal implants	13036 kg	IMAGE	<b>Plastic/ General Waste</b>	Green Worms	PCB Approved		
			<b>Hazardous Waste</b>	IMAGE - IMA	PCB Approved	 	
			<b>E- Waste</b>	Under replacement warranty, Kerala Enviro Infrastructure Ltd (KEIL)			
			<b>Battery Waste</b>	Under buy-back policy			

**BIOMEDICAL WASTE HANDLING BY IMAGE**



**GENERAL WASTE HANDLING BY GREEN WORMS**



**WASTE SEGREGATION AT SOURCE**



**FOOD COMPOST MACHINE**



**HAZARDOUS WASTE MANAGEMENT**







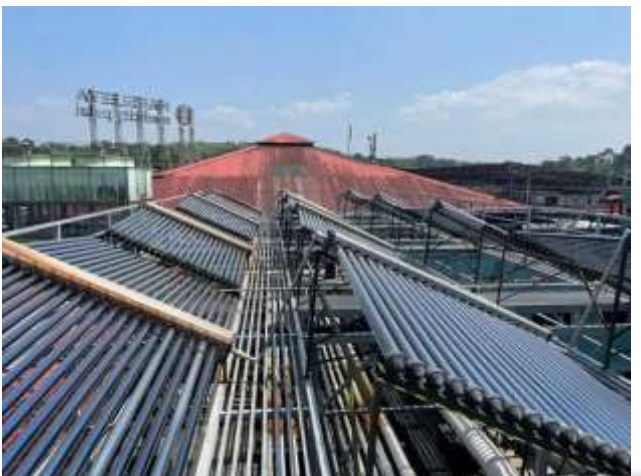
# ENERGY SAVING INITIATIVES



**ENERGY EFFICIENT LIGHTING**



**10000L SOLAR WATER HEATER**



**205kWP SOLAR POWER PLANT**



**UTILIZATION OF NATURAL LIGHT**



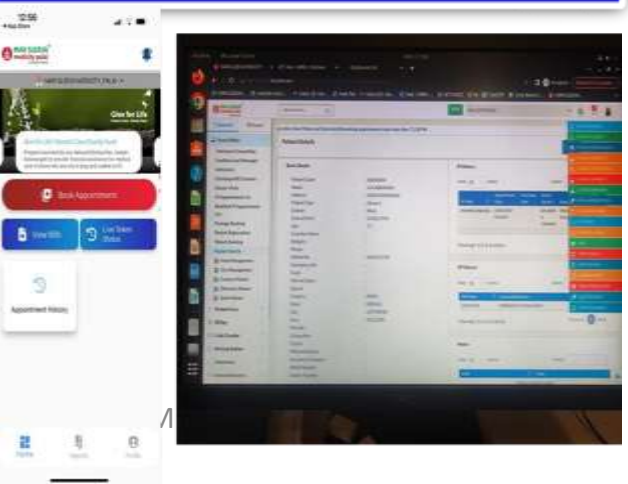
**UTILIZATION OF STP GAS FOR COOKING**



**HEAT RECOVERY WHEEL**



**DIGITAL HEALTH SOLUTION - PAPER FREE**



**BMS INTEGRATED TEMPERATURE CONTROLLER**





### INSTALLATION OF SMART SWITCHES



### 5 STAR RATED EQUIPMENTS



### LIGHT WELL



### EV CHARGING



### WATER COOLED CHILLER PLANT



### VFD FOR ENERGY EFFICIENCY



### DOUBLE GLAZED WINDOW WITH UV PROTECTION







# GREEN INITIATIVES



## USE OF PAPER / BIO DEGRADABLE BAG



## NON-PLASTIC ECO-FRIENDLY CUTLERY



## ENVIRONMENT DAY CELEBRATION



## VEGETATION



## COMMUNITY SUPPORT PROGRAMS - CSR



## Glimpse







# UNIQUE GREEN PRACTICES



## 1. BUD OF NEW LIFE



## 2. ANTIBIOTIC PREVENTIVE INITIATIVE



## 3. INTELLIGENT SENSOR BASED HOT WATER CONTROL SYSTEM



## AWARDS/ ACREDITATIONS/ ACHIEVEMENTS



Mar Sreeva Medicity bestowed "Best Healthcare Brand 2022" by Economic Times



IMA IMAGE PARISTHITHI MITHRA AWARD 2023 State Level 1<sup>st</sup> Prize

## 4. ZERO WATER WASTAGE

The STP treated water is used for

1. Gardening
2. Irrigation
3. Flushing
4. Cooling Tower

## 5. STP ONLINE MONITORING SYSTEM





# SAVINGS THROUGH OUTCOMES

## Complaints/ Cases

Nil

## Air & Sound Quality

- Emission controller
- Acoustic enclosure
- Planting trees
- **Emission Reduced = 90%**
- **CFR = 200kg/day**

## Water Quality

- Rainwater harvesting
- Groundwater recharge
- Gravity pumping
- Water efficient fixtures
- Zero water wastage
- **Energy Saved = 300kWh/day**
- **CFR = 237kg/day**

## Waste Management

- Recycling
- Oil recycling
- Compost machine
- Food waste management
- General waste management
- **Energy Saved = 80kWh/day**
- **CFR = 63.2kg/day**

## Energy Saving Initiatives

- Smart and Intelligent installations
- Non-renewables
- Water cooled chiller
- **Energy Saved = 5333kWh/day**
- **CFR = 4213kg/day**

### TOTAL SAVINGS (approx.)

**Total Energy Saved = 5966kWh/day**  
**Total CFR = 4713.2kg/day**





# SAVINGS THROUGH OUTCOMES



### Analysis Report

Analysis Report No.	2080	Date	16/08/2023	Format No. 01
Application No. Received From	PC/MS/NTM/COGN/20180186/72019	Date of collection	25/08/2023	
No. of Sample	1	Period of Analysis	25/08/2023 - 11/09/2023	
Source	Marineva Medcity, Cherupakkal, Palai	Scientist in charge	POHRY G. NATH	
Sample Condition	Fit for analysis	Sample Type	Water	
Sample Collected By	SEI	Sample volume & container type	2 L, Plastic container	
Sample Preservation	42 per APHA/IS:3025(Part-1)			
Sample ID: Marineva Medcity, Cherupakkal, Palai				

Sr. No.	Parameters	Unit	Value	Test Method	Limit
1.	pH	---	7.8	IS Part 44	5.5-8.0
2.	BOD	mg/L	8	APHA 520 B, S-28 to S-33	50
3.	SS	mg/L	32	APHA 2540	300.0
4.	Oil and Grease	Mg/L	801	APHA 5520B	10.0

Checked by:   
 Authorized by:   
 Assistant Scientist



### TEST REPORT

Client Name: **MAR SLEVA MEDICITY**  
 Sample Type: **Effluent water, Sewerage effluent, Wastewater, Chlorine free, Calcium free water, Treated water**  
 Sample Code: **1685-1077-A, B, C, D, E, F**  
 Sample receiving date: **09/08/2024**  
 Analysis on the day: **09/08/2024**  
 Analysis completion date: **09/08/2024**

Parameter	Test Method	Regulation	Acceptable	Result	Complies
pH	IS 3025 (Part 1) - 1992	5.00	5.00	8.24	5.00
Total Suspended Solids (mg/l)	IS 3025 (Part 1) - 1992	100.00	750.00	130.00	100.00
BOD (mg/l)	IS 3025 (Part 1) - 1992	50.00	100.00	45.21	50.00
TSS (mg/l)	IS 3025 (Part 1) - 1992	100.00	250.00	127.14	100.00
Oil & Grease (mg/l)	IS 3025 (Part 1) - 1992	10.00	10.00	6.04	10.00

Parameter	Test Method	Regulation	Acceptable	Result	Complies
pH	IS 3025 (Part 1) - 1992	7.00	7.00	7.8	7.00
Total Suspended Solids (mg/l)	IS 3025 (Part 1) - 1992	20.00	5.00	<20	20.00
BOD (mg/l)	IS 3025 (Part 1) - 1992	5.00	5.00	5.15	5.00
TSS (mg/l)	IS 3025 (Part 1) - 1992	40.00	10.00	13.80	40.00
Oil & Grease (mg/l)	IS 3025 (Part 1) - 1992	1.00	1.00	0.88	1.00

Authorized Signature:   
 Checked by:   
 The above results are valid only for the samples submitted for analysis.   
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 www.gmelab.com

### COCHIN TEST HOUSE

#### ANALYTICAL SERVICES & TESTING LABORATORY

##### TEST REPORT

Report No.: **CTH/2023/042** Date: **16/08/2023**  
 Client Name: **Marineva Medcity, Cherupakkal, Palai**  
 Sample Type: **Water**  
 Sample Code: **1685-1077-A, B, C, D, E, F**  
 Sample receiving date: **09/08/2024**  
 Analysis on the day: **09/08/2024**  
 Analysis completion date: **09/08/2024**

Sr. No.	Parameter	Unit	Method	Result	Regulation Limit
1.	pH	---	IS Part 44	7.8	5.5-8.0
2.	BOD	mg/L	APHA 520 B, S-28 to S-33	8	50
3.	SS	mg/L	APHA 2540	32	300.0
4.	Oil and Grease	Mg/L	APHA 5520B	801	10.0

Checked by:   
 Authorized by:   
 The test results are valid only for the samples submitted for analysis.   
 The test report shall not be reproduced except in full without the written approval of the laboratory.

### COCHIN TEST HOUSE

#### ANALYTICAL SERVICES & TESTING LABORATORY

##### AMBIENT AIR QUALITY MONITORING REPORT

Report No.: **CTH/2023/042** Date: **16/08/2023**  
 Client Name: **Marineva Medcity, Cherupakkal, Palai**  
 Sample Type: **Ambient Air Quality Monitoring**  
 Sample Code: **1685-1077-A, B, C, D, E, F**  
 Sample receiving date: **09/08/2024**  
 Analysis on the day: **09/08/2024**  
 Analysis completion date: **09/08/2024**

Sr. No.	Parameter	Unit	Method	Result	Regulation Limit
1.	Particulate Matter (PM <sub>10</sub> )	µg/m <sup>3</sup>	IS 3025 (Part 1) - 1992	18.41	100
2.	Particulate Matter (PM <sub>2.5</sub> )	µg/m <sup>3</sup>	IS 3025 (Part 1) - 1992	12.21	50
3.	Carbon Dioxide (CO <sub>2</sub> )	ppm	IS 3025 (Part 1) - 1992	400	400
4.	Sulphur Dioxide (SO <sub>2</sub> )	ppm	IS 3025 (Part 1) - 1992	0.01	0.05
5.	Nitrogen Dioxide (NO <sub>2</sub> )	ppm	IS 3025 (Part 1) - 1992	0.01	0.05

Checked by:   
 Authorized by:   
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### COCHIN TEST HOUSE

#### ANALYTICAL SERVICES & TESTING LABORATORY

##### NOISE LEVEL MONITORING REPORT

Report No.: **CTH/2023/042** Date: **16/08/2023**  
 Client Name: **Marineva Medcity, Cherupakkal, Palai**  
 Sample Type: **Ambient Noise Level Monitoring**  
 Sample Code: **1685-1077-A, B, C, D, E, F**  
 Sample receiving date: **09/08/2024**  
 Analysis on the day: **09/08/2024**  
 Analysis completion date: **09/08/2024**

Sr. No.	Monitoring Location Details	Result	Limit
1.	Ambient Sound Level (A-weighted) at a distance of 1.5 meter inside boundary	Day: 51.2, Night: 42.1	55
2.	Ambient Sound Level (A-weighted) at a distance of 1.5 meter outside boundary	Day: 45.4, Night: 35.8	55

Checked by:   
 Authorized by:   
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### COCHIN TEST HOUSE

#### ANALYTICAL SERVICES & TESTING LABORATORY

##### STACK EMISSION MONITORING REPORT

Report No.: **CTH/2023/042** Date: **16/08/2023**  
 Client Name: **Marineva Medcity, Cherupakkal, Palai**  
 Sample Type: **Stack Emission Monitoring**  
 Sample Code: **1685-1077-A, B, C, D, E, F**  
 Sample receiving date: **09/08/2024**  
 Analysis on the day: **09/08/2024**  
 Analysis completion date: **09/08/2024**

Sr. No.	Parameter	Unit	Method	Result
1.	Particulate Matter	mg/m <sup>3</sup>	IS 3025 (Part 1) - 1992	0.0
2.	Sulphur Dioxide (SO <sub>2</sub> )	ppm	IS 3025 (Part 1) - 1992	0.0
3.	Nitrogen Dioxide (NO <sub>2</sub> )	ppm	IS 3025 (Part 1) - 1992	0.0
4.	Hydrogen Sulphide (H <sub>2</sub> S)	ppm	IS 3025 (Part 1) - 1992	0.0

Checked by:   
 Authorized by:   
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**THANK  
YOU**