



**Status Report on the Compliance by the State Of Kerala**  
with the directions of  
The Hon'ble National Green Tribunal, Principal Bench, New Delhi

As per the  
Order dated 16-1-2019 in O.A. No.606/2018  
and  
Order Dated 19-2-2019 in O.A. No. 593/2017

Submitted by  
The Chief Secretary, Government of Kerala

25<sup>th</sup> April, 2019



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## List of Acronyms

<b>Acronym</b>	<b>Expansion</b>
AMC	Annual Maintenance Contract
AYUSH	Ayurveda, Yoga and Naturopathy, Unani, Siddha and Homoeopathy
BMWM	Bio-Medical Waste Management Rules
CAAQMS	Continuous Ambient Air Quality Monitoring Station
CBMWTF	Common Biomedical Waste Treatment Facility
CC	Closed Circuit
CEPI	Comprehensive Environmental Pollution Index
CETP	Common Effluent Treatment Plant
CPA	Critically Polluted Area
CPCB	Central Pollution Control Board
D2D	Door to Door
DG	Diesel Generator
EPR	Extended Producer Responsibility
ETP	Effluent Treatment Plant
GKA	Greater Kochi Area
GO	Government Order
HCI	Health Care Institutions
HKS	Haritha Karma Sena
IEC	Information Education and Communication
IMAGE	Indian Medical Association Goes Eco-friendly
KIFB	Kerala Infrastructure Investment Fund Board
KINFRA	Kerala Industrial Infrastructure Development Corporation
KSIDC	Kerala State Industrial Development Corporation
KWA	Kerala Water Authority
KWIL	Kerala Waterways and Infrastructure Development Ltd
MCF	Material Collection Facilities
MGNREGA	Mahatma Gandhi National Rural Employment Guarantee Act, 2005
MLD	Million litre Per Day
MoEF&CC	Union Ministry of Environment, Forests and Climate Change
MRF	Material Recovery Facility
MT	Metric Tons
NAMP	National Ambient Air Quality Monitoring Programme
NCAP	National Clean Air Program
NGT	National Green Tribunal
NWMP	National Water Quality Monitoring Programme
OA	Original Application
PET	Polyethylene Terephthalate

PPP	Public-Private Partnership
RRC	Resource Recovery Centre
RRF	Resource Recovery Facility
SAMP	State Ambient Air Quality Monitoring Programme
SLAC	State Level Advisory Committee
STP	Sewage Treatment Plant
SWM 2016	Solid Waste Management Rules, 2016
SWMP	State Water Monitoring Programme
TPA	Tonnes per Annum
TPD	Tonnes Per Day
TVM	Thiruvananthapuram Municipal Corporation
VGF	Viability Gap Funding

# 1. The Context and Background

1.1. It is estimated that 62 million tonnes of waste is generated annually in India at present, out of which 5.6 million tonnes is plastic waste, 0.17 million tonnes is biomedical waste, hazardous waste generation is 7.90 million tonnes per annum and 15 lakh tonnes is e-waste. Only about 75-80% of the municipal waste gets collected and only 22-28% of this waste is processed and treated<sup>1</sup>. Establishing effective systems and processes for scientific disposal and management of these wastes is imperative for avoiding health and environmental implications. In 2016, the Union Ministry of Environment, Forests and Climate Change (MoEF&CC) released the Solid Waste Management (SWM) Rules, 2016; these rules replaced the Municipal Solid Wastes (Management and Handling) Rules, 2000 which had been in place for 16 years. The highlights of the SWM 2016 are<sup>2</sup>:-

- Waste segregation at source is mandatory. Waste generators have to segregate waste into three streams - Organic or Biodegradable waste, Dry waste (Plastic, Paper, Metal, Wood, etc.) and Domestic Hazardous waste (diapers, napkins, mosquito repellants, cleaning agents etc.). Further, bulk waste generators such as hotels, hospitals etc. are expected to treat organic waste either onsite or by collaborating with the urban local body.
- Municipalities and urban local bodies have been directed to include informal waste pickers and rag pickers into their waste management process. Thus, this is the first time that national policy has acknowledged and included the informal sector into the waste management process.
- FMCG product manufacturers that use non-biodegradable packaging for their products must put in place a system to collect the packaging waste generated due to their production.
- Urban local bodies have been given a provision to charge bulk generators a user fee to collect and process their waste, additionally spot fines may be levied on user's burning garbage or throwing it in a public place.
- No non-recyclable waste having a calorific value of 1,500 Kcal/kg or more should be disposed in the landfills. It should either be utilized for generating energy or can be used for preparing refuse derived fuel or it can be used for co-processing in cement or thermal power plants.

1.2. It is estimated that Kerala generates 3.7 million tonnes of municipal solid wastes annually<sup>3</sup>. 45% is generated by the Municipalities, 41% by the GPs, and 14% by the City Corporations. 77% of the

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<sup>1</sup> Remarks made by the Union Minister of State for Environment, Forests and Climate Change in September 2018

<sup>2</sup> SWM Rules, 2016

<sup>3</sup> Sectoral status study on solid waste management sponsored by the Water and Sanitation Project- South Asia (World Bank)

wastes are biodegradable, 18% are non-biodegradable, and 5% are inerts<sup>4</sup>. To facilitate effective solutions for scientific management of wastes and to reiterate its commitment towards realizing the goals of the SWM Rules 2016, the Government of Kerala notified the State Policy on Solid Waste Management in 2016, with an overall goal of transformation of Kerala into a garbage-free and environmentally healthy State. The key strategies prescribed were:-

- Mandatory segregation of waste at source, based on primary characteristics.
- Aerobic or anaerobic composting of biodegradable waste at source (household and institutions) as far as possible.
- Ensure decentralized community facilities for biodegradable waste that overflows from source'.
- Establish door to door collection of non-biodegradable waste.
- Establish procedure for handling domestic hazardous waste and promote its implementation.
- Promote usage of storage bins for dumping wet and dry waste by all vendors and institutions.
- Enforce captive waste management systems for the bulk waste generators.
- Promote modern centralized waste processing facilities in major cities using state-of-the-art technologies.
- Make use of the enabling environment created under the Haritha Keralam Mission to integrate the use of treated waste products, enhance organic agriculture and upkeep of fragile ecosystems.
- Develop regional sanitary landfill facility to dispose of ultimately unusable materials.
- Undertake appropriate IEC campaigns.
- Implement appropriate capacity building programmes for stakeholders.
- Network with academic and research & development institutions for upgrading of technologies and application protocols.

1.3. The NGT Order O.A. No. 606/2018 highlighted serious deficiencies in the implementation of waste management initiatives, as reported by various States in their annual reports<sup>5</sup>. The NGT conducted discussions with the relevant officials of the States and UTs on the following matters:- (i) Preparation of State-wise Action Plan with timelines and budgetary support/provision for management of MSW, (ii) Coverage of each city/town/urban local body under the said Plan and individual Action Plan with timelines and budgetary provisions, (iii) Time fixed to completely comply with the provisions of the Rules, 2016, and (iv) Main constraints leading to non-compliance of Rules, 2016. During the discussions by NGT, it was realized that, with few exceptions, most of the States and Union Territories, including Kerala, are lagging behind in compliance of the Rules, 2016. In many cases, Action plans have yet not been prepared even after more than 2 years after the Rules, 2016 have been in operation and in spite of binding directions in the Judgment of the Tribunal vide order dated 22.12.2016.

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<sup>4</sup> Presentation of the Local Self Government Department, Government of Kerala (<http://sanitation.kerala.gov.in/wp-content/uploads/2019/01/NGT-Regional-Monitoring-Committee-review-kochi-25.01.19.pdf>)

<sup>5</sup> <http://www.greentribunal.gov.in>

1.4. The enclosed report summarizes the actions taken by the Government of Kerala to abide by the Order dated 16-1-2019 in O.A. 606/2018(para.40), and order in O.A. 593/2017 dated 19-2-2019. It outlines the status of different interventions, the timelines set for meeting the targets, and the estimated budget.

## 2. The Status of Implementation of Interventions

A snapshot of the status of interventions is provided in the table given below, while the detailed status is outlined in the subsequent sections.

The colour coding for the cases is presented below:

Colour	Status
Green	Complete
Yellow	In Progress
Red	Yet to be initiated
Blue	Not Applicable to State Context

Sl. No.	Cases	Status	Page No.
1	Status of compliance of Solid Waste Management Rules, 2016 (OA No.606/2018)-Item (a) of para 40 of the order dated 16-1-2019 in 606/2018	The State has ensured compliance to Rules 11, 22, 23 and 24.	9
2	Status of compliance of Plastic Waste Management Rules, 2016 (OA No.606/2018)- Item (a) of para 40 of the order dated 16-1-2019 in 606/2018	The State has complied with Rules 16 and 17, and has set up monitoring committee and regulatory mechanisms.	17
3	Status of compliance of Bio medical waste Management Rule, 2016 (OA No. 606/2018)- Item (a) of para40 of the order dated 16-1-2019 in 606/2018	The State has complied with Rule 13 and initiated capacity-building, regulatory and monitoring mechanisms in collaboration with public and private institutions.	18
4	Status of E-waste Management Rules	The State has complied with Rule 18, and is setting up a waste processing unit which will become operational in 2020.	23
5.	Status of functioning of Committees constituted by this order – Item (b) of para 40 of the order dated 16-1-2019 in 606/2018	The State has complied with the order, and formed a State Level Monitoring Committee. Field visits have been undertaken.	24
6.	Status of the Action Plan in compliance vide order dated 20-9-2018 in the New Item published in "The Hindu" authored by Sri. Jacob Koshi titled "More river stretches are now critically polluted, CPCB (Original application No. 673/2018)- Item (c) of para 40 of order dated 16-1-2019 in 606/2018. (a) Karamana River (OA No. 581/2018)	The Action Plan approved by River Rejuvenation Committee was submitted in April 2019 to Central Pollution Control Board. Action Plans for Priority IV & V Polluted stretches have been filed before NGT. Budget and timeline provisions will be intimated.	25



	and Priority I-stretch of O. A. No. 673/208 (b) Tirur-Ponnani river (OA No.582/2018) (c) Polluted river stretches (OA No.673/2018)		
7.	Status of functioning of Committees constituted in News Item published in "The Times of India" authored by Sri. Vishwa Mohan titled "NCAP with multiple timelines to Clean Air in 102 cities to be released around August 15 dated 8-10-2018 --Non-attainment cities (OA No.681/2018) - Item (d) of para 40 of order dated 16-1-2019 in 606/2018	None of the cities in Kerala is included in the Non-attainment cities. However, the action plan to expand the ambient air-quality monitoring network is to be developed and the details were submitted to CPCB. Continuous Real-Time Monitoring has been initiated in several locations.	47
8.	Status of Action Plan with regard to identification of industrial clusters in O. A. No. 1038/2018, news item published in "The Asian Age" authored by Sanjay titled "CPCB to rank industrial units on pollution levels" dated 13-12-2018- Item (e) of para 40 of order dated 16-1-2019 in 606/2018	Greater Kochi was identified as critically polluted in 2009. The score was again calculated in 2011 and the moratorium imposed for developmental activities in the Greater Kochi Area as CPA was lifted vide office memorandum No. J-11013/5/2010-1A II (I) dated 23.05.2011 by Ministry of Environment and Forest.	53
9.	Status of the work in compliance of the directions passed in O.A.No. 173/2018. Sudarsan Das Vs. State of West Bengal and othes order dated 4-9-2018- Item (f) of para 40 of order dated 16-1-2019 in 606/2018	Not Applicable	Not Applicable
10.	Total amount collected from erring industries on the basis of "Polluter Pays Principle" "Precautionary Principle and details of utilization of funds collected- Item (g) of para 40 of order dated 16-1-2019 in 606/2018	15 Industries have been fined and more than INR 7.25 Crores have been collected.	54
11.	Status of identification and development of Model Cities and Towns in the State in the first phase which can be replicated late for other cities and towns of the State Item (h) of para 40 of order dated 16-1-2019 in 606/2018	Not identified	
12.	Primary Effluent Treatment Plant as per order dated 19-2-2019 in O.A. No. 593/2017	Inspected CETPs and ETPs. Non-functioning ETPs have been identified and further action has been initiated. The reports for the term upto March 2019 have been submitted.	55

## 2.1. Status of implementation of Solid Waste Management Rules, 2016

The Government of Kerala has taken efforts to implement the Solid Waste Management Rules, 2016 in the State. There are 6 Corporations, 87 Municipalities and 941 GPs in the State. The Kerala State Pollution Control Board (KPSCB) issued repeated directions to all local bodies to ensure compliance of the Solid Waste Management Rules, 2016. 3831.6 TPD of solid waste is generated from the cities and towns.

The Government of Kerala constituted a State Level Advisory Committee on Waste Management chaired by the Chief Secretary; this Committee has conducted 24 meetings, till date, for monitoring solid waste management on monthly basis.

### 2.1.1. Compliance of the Rules

- **Submission of annual report (Rule 24)** - Annual report was submitted to the Central Pollution Control Board on 26-9-2018 (Rule 24).
- **State Level Advisory Body (SLAB)(Rule 23)** - SLAB was constituted in the State vide order G.O. (RT). No.140/2018/LSGD dtd 16/01/2018
- **Compliance of Rule 22 - The detailed action** taken report furnished by the Local Self Government Department is submitted within Annexure 3.1.

### 2.1.2. Activities and Action Taken

2.1.2.1. **Activity** - Identification of suitable **sites for setting up solid** waste processing facilities

**Action taken** - Government identified the following sites in all census towns in Kerala for setting up solid waste processing facilities.

Sl. No	Corporation/ Municipality	Identified site	Area (acre)	Status	Completion date
a)	Kollam	Kureepuzha (Govt. land)	7.05	Floated Global Tender for the setting up of Waste to Energy Plant	2 years from the date of obtaining environmental clearance.
b)	Ernakulam	Brahmapuram (Govt. land)	20	Work awarded to M/s G.J Ecco Power Pvt. Ltd.	2 years from the date of obtaining environmental clearance.
c)	Palakkad	Kanjikode (Land taken over from Kerala State Electricity Board Ltd. in advance possession)	15	Floated Global Tender for the setting up of Waste to Energy Plant	2 years from the date of obtaining environmental clearance.

Sl. No	Corporation/ Municipality	Identified site	Area (acre)	Status	Completion date
d)	Kozhikode	Njaliyanparambu (Govt. land)	12.67	Tender process completed. Decided to award the work to M/s Zonta Infratech Pvt. Ltd.	2 years from the date of obtaining environmental clearance.
e)	Kannur	Chelora (Govt. Land)	9.7	Floated Global Tender for the setting up of Waste to Energy Plant	2 years from the date of obtaining environmental clearance.
f)	Wayanad	Sulthan Bathery (Govt. Land)	0.5	Construction of the plant is going on.	Expected to be commissioned by August 2019
g)	Thiruvananthapuram	Peringamala (Govt. Land)	15	Stakeholder meetings have been conducted. Further action is being taken.	2 years from the date of obtaining environmental clearance.
h)	Thrissur	Laloor (Govt. Land)	15	Stakeholder meetings have been conducted. Further action to tender the work will be initiated soon.	2 years from the date of obtaining environmental clearance.
i)	Malappuram	Panakkad (Land in possession with Kerala State Industrial Development Corporation)	10	Further action is being taken	2 years from the date of obtaining environmental clearance.
j)	Idukki	Munnar (Land handed over by M/s Kannan Devan Hills Plantations Pvt. Ltd)	2	Decided to award the work to M/s AG Dauters Waste Processing Pvt. Ltd.	2 years from the date of obtaining environmental clearance.

2.1.2.2. **Activity** - Identification of suitable sites for setting up common regional sanitary landfill facilities for suitable clusters of local authorities under 0.5 million population and for setting up common regional sanitary landfill facilities or stand-alone sanitary landfill facilities by all local authorities having a population of 0.5 million or more.

**Action Taken** - 6 Regional Sanitary landfill sites were identified by Suchitwa Mission based on the criteria for locating landfills, using satellite imagery.

- For Palakkad, detailed study was conducted to establish a pilot sanitary landfill but the Committee appointed by the District Collector found the land to be unsuitable.
- At Thiruvananthapuram and Kollam, work was started at Vilappilsala and Kureepuzhabut had to be abandoned due to public protest.

2.1.2.3. **Activity** - Procurement of suitable sites for setting up solid waste processing facility and sanitary landfill facilities

**Action Taken** - Government has identified appropriate land for establishing centralized Waste to Energy Plants in Kannur, Kozhikode, Malappuram, Palakkad, Thrissur, Kollam and Thiruvananthapuram and permitted the handing over of the land for the purpose vide G. O (Ms) no.82/2018/LSGD dated 11/06/18. These projects are planned in Design, Build, Finance, Operate and Transfer (DBFOT) basis through Public-Private Partnership (PPP) mode. In addition, suitable land has been identified and handed over for establishing Centralized Waste Management Plant in Ernakulam, Idukki and Wayanad districts. Efforts to establish sanitary landfills in Thiruvananthapuram and Kollam City Corporations, respectively at Vilappilsala and Kureeppuzha, were abandoned due to public protest and judicial intervention. The Perumbavoor Municipality purchased 158 cents of land in Corporation Ward 26 at Parappuram for similar objectives.

2.1.2.4. **Activity** - Enforcing waste generators to practice segregation of bio degradable, recyclable, combustible, sanitary waste domestic hazardous and inert solid wastes at source.

**Action Taken** –

- Overflow waste management system operational in the State; thus the priority is to treat the biodegradable waste at the source itself.
- About 4 lakh households, 30,000 institutions and 2000 community locations have facilities for treating biodegradable waste and, thus, practice segregation of waste at source
- 62 Urban Local Governments and 484 Grama Panchayats implement door-to-door collection of segregated non-biodegradable waste through Haritha Karma Sena\*.
- The details submitted by the LSGD are given in Annexure 3.1. The summary is given below:
  - 79.6% of Urban local bodies have source level composting facilities for the processing of biodegradable waste at household, institutional and at community level.
  - 82.8% of Urban local bodies have door to door collection of non-biodegradable waste
  - 54% of Urban local bodies where captive waste management system is enforced for the bulk waste generator.
  - 66.7% of Urban local bodies have formed, trained and started functioning of Haritha Karma Sena.
  - 66.7% of Urban local bodies have Material Collection Facility is available.
  - 57% of local bodies have Resource Recovery Facility is available.

\*Haritha Karma Sena (HKS), an enterprise group formed through the State Poverty Eradication Mission (Kudumbasree). The enterprise group is designed to have two persons for each ward for door-to-door collection of non-biodegradable waste on a regular basis and help in managing the household-institutional-community systems for composting biodegradable waste.

- The user fee is fixed by the respective local government depending on the services rendered and based on the guidelines issued vide G.O(Rt)No.2420/2017/ LSGD dated 15.07.2017.
- In order to sustain the operation of the door-to-door collection system, Government provided a Viability Gap Fund (VGF) support initially for 6 months so as to make up the shortage of user fee collection in the initial stages such that each member of the group get atleast minimum wage decided by the government.
- The VGF support is extended for 6 more months at half the rate of that provided during the first six months in order to ensure that the HKS operation is sustainable in financial terms. In order to improve the sustainability of HKS, actions are also being taken to include more value-added household level services in the functioning of HKS.
- The HKS is to be trained and their operation ensured through a technical support mechanism namely Haritha Sahaya Sthapanam (HSS), a Green Support Organization mostly drawn from non-governmental organizations having experience in waste management services.
- There are 36 HSS deployed in the State at the ULB and Block Panchayat level. All the 941 Gram Panchayats (GP) have taken actions to form HKS. HKS is now functional in 484 GPs for door to door collection of segregated non-biodegradable waste.

2.1.2.5. **Activity** - Ensure door-to-door collection of segregated waste and its transportation in covered vehicles to processing or disposal facilities

**Action Taken**

- Door-to-door collection system is widely operational for biodegradable waste. D2D will be implemented\* in wards having decentralized organic waste composting facilities, and will be undertaken by the Haritha Karma Sena (HKS)
- 82.8% of Urban local bodies have door to door collection of non-biodegradable waste\*
- Full D2D is to be implemented on commissioning of Waste to Energy(WtE) plants in all 7 census towns in Kerala\*.

2.1.2.6. **Activity** - Ensure separate storage, collection and transportation of construction and demolition wastes

**Action Taken**

- Local Self Government Institutions have received directions to identify suitable sites for the storage of Construction & Demolishing Waste.
- There is no treatment facility in the State for processing C&D waste at present.

- All the projects that generate construction and demolition waste and that require environmental clearance are directed to store the C&D waste separately and reuse or recycle it during the construction phase.
- Government proposes to establish a C&D waste management facility for which fund is earmarked under the budget provision for 2019-20.
- It is proposed to establish the facility in collaboration with major stakeholders for management of construction and demolition waste such as building materials, debris, rubbles resulting from construction, re-modelling, repair and demolition of any civil structure of individual or organisation or authority.
- Preliminary discussions have been held with Swachch Bharat Mission (Urban) in the Ministry of Housing and Urban Affairs, Govt. of India for technical support.

2.1.2.7. **Activity** - Setting up solid waste processing facilities by all local bodies having 1 Lakh or more population

**Action Taken** - Government has accorded sanction for establishing Waste to Energy plants in the following 8 cites identified on cluster basis of local bodies having 1 Lakh or more population:

Sl. No	Corporation/ Municipality	Identified site	Area in acre	Status	Completion date
a)	Kollam	Kureepuzha (Govt land)	7.05	Floated Global Tender for the setting up of Waste to Energy Plant	2 years from the date of obtaining environmental clearance
b)	Ernakulam	Brahmapuram (Govt land)	20	Work awarded to M/s G.J Ecco Power Pvt Ltd.	2 years from the date of obtaining environmental clearance
c)	Palakkad	Kanjikode (Land taken over from Kerala State Electricity Borad Ltd. in advance possession)	15	Floated Global Tender for the setting up of Waste to Energy Plant	2 years from the date of obtaining environmental clearance
d)	Kozhikode	Njaliyanparambu (Govt. land)	12.67	Tender process completed. Decided to award the work to M/s Zonta Infratech Pvt Ltd.	2 years from the date of obtaining environmental clearance
e)	Kannur	Chelora (Govt. Land)	9.7	Floated Global Tender for the setting up of Waste to Energy Plant	2 years from the date of obtaining environmental clearance
f)	Thiruvananthapuram	Peringamala (Govt. Land)	15	Stake holder meetings have been conducted. Further action is being	2 years from the date of obtaining

				taken	environmental clearance
g)	Thrissur	Laloor (Govt. Land)	15	Stake holder meetings have been conducted. Further action to tender the work will be initiated soon	2 years from the date of obtaining environmental clearance
h)	Malappuram	Panakkad (Land in possession with Kerala State Industrial Development Corporation)	10	Further action is being taken	2 years from the date of obtaining environmental clearance

2.1.2.8. **Activity** – Setting up solid waste processing facilities by local bodies and census towns below 100,000 population.

**Action Taken**

Local Body	Nature of Plant	Status/Time of completion
SulthanBathery Municipality in Wayanad District	5 TPD modern bio gas plant	Construction of plant is going on. Expected to be commissioned by August 2019.
Munnar and Devikulam Grama Panchayat in Idukki District	Modern Waste to Energy Plant	Decided to award the work to M/s AG Dauters Waste ProcessingPvt. Ltd. Expected to be completed within two years from April, 2019.
Perinthalmanna Municipality.	Modern Waste to Energy bio gas plant of two tone/day capacity.	Work awarded to GPS Renewables, Bangalore.Expected to be completed within 12 monthsfrom April, 2019.

2.1.2.9. **Activity** – Setting up common or stand-alone sanitary landfills by or for all local bodies having 0.5 million or more population for the disposal of only such residual wastes from the processing facilities as well as untreatable inert wastes as permitted under the Rules.

**Action Taken** - Even though suitable land had been identified to establish sanitary landfill in Urban Local Bodies having 0.5 million or more population such as Thiruvananthapuram and Kollam City Corporations respectively at Vilappilsala and Kureppuzha, plans were abandoned due to public protest and judicial intervention.

2.1.2.10. **Activity**- Setting up common or regional sanitary landfills by all local bodies and census towns under 0.5 million population for the disposal of permitted waste under the rules.

**Action Taken**

- A study has been conducted with the support of the World Bank and it has been recommended that there is a requirement of 6 regional sanitary landfill facility in the state.

- Based on the criteria for locating sanitary landfill sites, the study proposed 6 probable sites, one each for Kasaragod and Kannur District, Kozhikode and Wayanad district, Malappuram and Palakkad district, Thrissur and Ernakulum district, Kottayam, Idukki and Pathanamthitta district and Alappuzha, Kollam and Thiruvananthapuram districts.
- A Committee appointed by the District Collector had conducted a detailed study in Palakkad district to establish a pilot sanitary landfill.
- The findings of the Committee are not favorable and hence an alternate site will be found.

#### 2.1.2.11. **Activity** – Bio-remediation or capping of old and abandoned dump sites

##### **Action Taken:**

<b>Sl. No</b>	<b>Census town</b>	<b>Site</b>	<b>Status</b>	<b>Completion date</b>
a)	Thiruvananthapuram	Vilapilsala	Capped	Capped
b)	Kollam	Kureepuzha	Tendering	Expected to be completed within the next 6 months
c)	Ernakulum	Brahmapuram	Commenced	Expected to be completed within the next 6 months
d)	Thrissur	Laloor	The site is proposed for the setting up of Waste to Energy Plant.	
e)	Kozhikode	Njeliyamparamab	Since the site is proposed for the setting up of Waste to Energy Plant, capping of waste at the site is not practicable. Action has been initiated to store the accumulated waste to another suitable place till commissioning of Waste to Energy Plant.	Expected to be completed within the next 6 months
f)	Kannur	Chelora	The site is proposed for the setting up of Waste to Energy Plant.	

#### 2.1.2.12. **Compliance to Rule 11 (Secretary Urban Development)**

- State level policy for the State was published and the action is taken on the basis of the policy.
- State level strategy of solid waste management has been developed.

#### 2.1.3. **Proposed Kerala Waste Management Authority**

The Government of Kerala has amended the Panchayath Raj Act to take over the powers of local bodies in waste disposal and is working on the proposal to set up Kerala Waste Management Authority in the State especially for the setting up of modern solid waste treatment plants, rendering plant, slaughter house, sanitary landfills, and common biomedical waste treatment facilities. This Authority shall take care of the wastes that are not presently handled by the local



bodies and the Kerala Water Authority (KWA). Real-time monitoring of water quality of water bodies shall be made available to the authority.

#### 2.1.4 Project Green Grass in Forest Area

2.1.4.1 Following the NGT Order in OA No. 585/2018, 126 waste dumping sites in forest areas were mapped in the State. Rs. 51 lakh was the project outlay and waste from Thalekkod to Valara in NH 85 passing through Munnar was successfully removed by DFO with the help of Ex-service men Trust. Following this, Chief Wildlife Warden has initiated action for bringing all 11 WL Division, 17 WL Sancturies, 5 National Parks under the project.

2.1.4.2 Tourism department has implemented the following three projects

No.	Project	Amount in Rs.	Remarks
1.	Nilakurinji Waste Management	89,66,600	Waste disposal-35km road from Adimali to Munnar
2.	Save Road-Save Tourism	48,41,760	Waste removal twice
3.	Solid waste management in Idukki district	70,20,000	Waste removal twice in a week from eight destinations

#### 2.1.5 Removal of garbage on road sides

Public Works Department is in the process of mapping the garbage dumped on the sides of all PWD roads. The garbage will be kept in the material recovery centers till its proper disposal.

2.1.6 **Removal of waste has been declared as a priority activity of all departments;** by earmarking 5% of the departmental budget for waste reduction, collection and treatment. Power Department is mapping waste in hydal tourism sites and dams; Irrigation department is mapping wastes in dam sites; Devaswom Department is mapping waste disposal from pilgrim centers and Health department from hospitals.

## **2.2. Status of implementation of Plastic Waste Management Rules, 2016**

### **2.2.1. Compliance of the Rules**

#### **2.2.1.1 Submission of annual report (Rule 17)**

The Annual Report on Plastic Waste Management Rules 2017-18 was submitted to CPCB vide letter number PCB/HO/PLA/AR/20/2017-18 dated 30/11/2018 and the same was uploaded in E-Samyojan.

#### **2.2.1.2. State Level Monitoring Committee (Rule 16 3)–**

State Level Monitoring Committee was constituted vide order G.O. (Rt). No.2732/2016/LSGD dtd 24/09/2016. The meeting of the State Level Monitoring Committee on Plastic Waste Management Rules was conducted in April 2018.

#### **2.2.1.3. Manufacturers of Plastic products**

Kerala State Pollution Control Board issued registration to 1005 plastic units. The Board inspected the units and verified the thickness of carry bags. The Board also verified whether the Conditions of Consent were complied with.

#### **2.2.1.4. Registered recycling units**

There are 101 registered recycling units in the State. The list is available to Local bodies, Suchitwa Mission, Clean Kerala Company. It is also available in the Board's website.

#### **2.2.1.5. Registration to producers, brand owners**

The concept of Extended Producer Responsibility was brought to the notice of producers, and brand owners through several workshops. The agencies namely Milma, Kera etc., were also addressed in this regard. The matter is being followed up.

#### **2.2.1.6. Technical Committee Report on Regulation of Single use plastic**

The Government has constituted an Expert Committee vide Order No. G.O (Rt) No.134/2018/Envvt dated 12/12/2018 to list the plastic products/items that need to be brought into the ambit of complete ban. The Committee submitted their report April 2019 before the Government.

The Committee recommended the introduction of a 'return-and-earn' scheme ("Return-Deposit-Refund" scheme) for carry-bags and bottles to prevent littering. The Committee recommended a ban on plastic flags, plastic decorative festoons/ buntings, single use food plates, cups made of multi-laminated board / aseptic liquid paperboard, also known as 'Tetra pack' paperboard.

The government order on banning of single use plastic products will be issued on 5th June 2019 and the implementation of the same will come into effect from 1st January 2020.

## **2.3. Status on compliance of Biomedical Waste Management Rules, 2016**

### **2.3.1. General**

Kerala has numerous healthcare institutions (HCIs) such as Medical colleges, hospitals, specialty hospitals, clinics, clinical laboratories, bio-research institute etc. Health care facilities in the Government sector comprising primary and community health centers and having only out patients facilities are counted as clinics. Veterinary hospitals and AYUSH centres fall under the purview of the Biomedical Waste Management Rules.

### **2.3.2. Status of health care institutions in Kerala**

In Kerala, there are 9,331 HCIs: 2,011 are hospitals, 1,335 are clinics, 3,222 are clinical laboratories, and 2,732 are dental institutions. Of the 9,331 HCIs identified, 759 are in Government sector and 8,572 in private sector. There are 2,967 institutions with in-patient facilities with 118,649 beds. All others except clinical laboratories and dental institutions are considered clinics. Thus, this category includes nursing homes, dispensaries, primary health centers without inpatient facilities, sub centers under primary health centers etc. There are 28 hospitals (2%) with capacity of 500 beds and more, of which 17 are in the private sector and 11 in the Government sector. 108 hospitals (5%) have capacities between 200 and 499. 76 of them are in the private sector and 32 in the Government sector. The majority of hospitals (79%) have less than 50 beds and majority of them are in private sector.

### **2.3.3. Compliance of the Rules**

#### **2.3.3.1. Submission of annual report(Rule 24)**

Annual report was submitted to the Central Pollution Control Board on 26-9-2018 (Rule13)

<b>Sl. No.</b>	<b>Type*</b>	<b>No</b>
a)	Bedded hospitals and nursing homes	<b>2130</b>
b)	Clinics and dispensaries	5280
c)	<b>Veterinary institutions</b>	<b>150</b>
d)	<b>Animal houses</b>	<b>1</b>
e)	Pathological laboratories	882
f)	Blood banks	14
g)	Clinical establishments	955
h)	Research institutions	0
i)	AYUSH	216
	Total	9,628

#### **2.3.3.2. State Level Advisory Committee for Biomedical Waste Management**

SLAC was constituted in the State wide order G.O. (Ms). No.02/0/Env. **dated 6-3-2010** and again re-constituted vide G.O. No. (Rt) No. 15/1/Env. dated 24-10-2011. Meeting of the SLAC was conducted.

State Advisory Committee is to be reconstituted as per BMW Rules, 2016. District Level Monitoring Committee as per BMW Rules, 2016 is to be constituted by the Health Department. District level committees as per the new rules are to be constituted. The matter was brought to the notice of the Health Department by the Kerala State Pollution control Board. It is proposed that the constitution of the committees will happen after the conclusion of the Lok Sabha elections.

#### **2.3.4. Category-wise biomedical waste generated in Kerala**

In Kerala, 13,771.4 tonnes of biomedical wastes is generated annually. Details are as follows:

<b>Category</b>	<b>Production</b>
Red*	6,364 tonnes
Yellow	4,705.8 tonnes
White	1,613 tonnes
Blue	1,088 tonnes

*\*red category wastes are recyclable after treatment such as autoclaving.*

The maximum quantity is produced in Ernakulum district (4277 tonne/annum) followed by Thrissur(1669 tonne/annum), Kozhikode (1164 tonne/annum), Kottayam(50 tonne/annum), Thiruvananthapuram(1122 tonne/annum) and Malappuram(977 tonne/annum). The minimum quantity is produced in Wayanad (120 tonne/annum) and Idukki(137 tonne/annum).

The total quantity of biomedical wastes generated is 13,771 tonne per annum of bio-medical waste. Around 11,361 tonne per annum of bio-medical wastes in generated in hospitals. 82.5% of biomedical waste is generated in hospitals.

#### **2.3.5. Common biomedical Waste treatment facility in the State (CBMWTF)**

##### **2.3.5.1 Existing facility**

The common biomedical waste treatment facility is located at Kanjikode, Palakkad. It has a capacity of 37TPD. There are 5 incinerators, and 5 autoclaves in the plant. Around 13,000 institutions are disposing the biomedical wastes into the common biomedical treatment facility.

- a) IMAGE started Bar-code based biomedical waste collection as per the directions of Central & State Pollution Control Boards as well as the Biomedical Waste Management Rules 2016; from 5th January 2018 onwards
- b) Tracking of bar-codes will be started right from receiving the order for purchase of colour coded bar-coded bags from the Healthcare Institutions. As bar-code will be printed against each bags

supplying; the monitoring will be continuously carried out from the collection point till disposal at IMAGE Plant.

- c) IMA PEPS has developed the software for Bar-coding and has authorized four Regional Dealers to implement and to supply the colour coded bar-coded bags to all Health Care Institutions affiliated with IMAGE
- d) Kerala State Pollution Control Board can monitor the movement of all the bar-coded bags & containers from each Health Care Institution to the Bio-medical Waste Treatment Plant of IMAGE with the help of online link provided to them.
- e) IMAGE runs 53 GPS installed covered vehicles for collection of biomedical waste within 24 hours
- f) All these vehicles are monitored through GPS Satellite Monitoring using AVL View Software Application. The movement of waste collection vehicles is monitored through GPS system and the waste collection is monitored through the mobile application system
- g) Phasing out of plastic bags has been implemented
- h) The affiliation process for joining IMAGE by Healthcare establishments has been made online through [www.imageima.org](http://www.imageima.org)
- i) Online Continuous Stack Emission Monitoring System (CSEMS) are being installed in IMAGE plant as per the request of Pollution Control Board authorities for the measurement of pollutants within the stack emission. Monitoring within the stack presents a number of problems due to extreme of temperature, velocity of sample and pressure. CSEMS is used for continuous emissions monitoring in waste incinerators. Typically, concentrations of CO<sub>2</sub>, CO, NO, NO<sub>2</sub>, O<sub>2</sub>, primary temperature and secondary temperatures are continuously measured.

#### **2.3.5.2 Facilities proposed**

The Government proposes to set-up Common Biomedical Waste Treatment Plants in

- Ambalamedu, Ernakulam,
- Kinalur, Kozhikode
- Unidentified site, Thiruvananthapuram

#### **A) CBMWTF facility at Kinalur, Kozhikode**

- Integrated Consent to Establish having validity upto 31-12-2016 was issued to Sri. P. S. Deepthikumar 4-4-2014 for setting a Common Biomedical Waste Treatment Facility (Incinerator – 100kg/hr; autoclave -1000l; shredder of 100kg/hr) in the industrial estate of Kerala State Industrial Development Corporation (KSIDC) in Re-survey No. 95/1, Kinalur village, Koyilandy taluk, Kozhikode district. Consent was renewed on 5-9-2017 for a term upto 31-12-2020.
- Environmental Clearance was issued on 26<sup>th</sup> June 2015 for CBMWTF with two numbers of incinerators 200 and 300kg/hr.; two numbers of autoclave (2Nos) of 400kg/hr. each and a shredder of 700kg/hr.

- Due to public resistance to construction, several meetings were conducted at the level of District Collector and the level of Minister. In the meeting conducted by Hon'ble Excise Minister, relocating the location CBWMTF to a location within the KSIDC Industrial estate was suggested. The Board was directed to identify a new location for Common Biomedical Treatment plant within the Kinalur Industrial Estate.
- Based on the direction received from office of the District Collector on 21-5-2018, inspection was conducted on 22-5-2018 by Tahasildar, Thamarassery Taluk, Assistant Manager, KSIDC and a new location was identified by KSIDC officials.
- The proposed new location is 1 km away from the previous approved location for which Integrated to Establish was issued. This land is being surveyed by KSIDC.
- The applicant will have to apply for consent Variation order for the new location and to amend the Survey no in the EC.

**B) CBMWTF facility by Kerala Enviro Infrastructure Limited, Ambalamedu, Ernakulum**

- Consent was issued vide consent No. PCB/HO/EKM/ICE/08/204 dated 10-3-2014 to Kerala Enviro Infrastructure Limited for setting up CBMWTF in 3.5 acres of land within 50 acres of land owned by KEIL. The waste handling capacity for which consent issued was for 14-16TPD with two incinerators, two autoclaves and a shredder. It was renewed for a term upto 30-6-2019 vide Consent No. PCB/HO/EKM-II/ICE-R/02/2017 dated 5-10-2017.
- Public hearing was conducted on 7-11-2016 at District Collectorate, Ernakulum and there was strong public protest at that time and report was submitted to MoEF on 14-1-2016. Environment Clearance was issued in 2017.
- Loan facility from KSIDC/banks will be availed and the project execution will start immediately on financial closure.

**C) CBMWTF facility by Indian Medical Association at Peringamala, Thiruvananthapuram**

- Consent was issued vide consent No. PCB/HO/PLKD/ICO/2009 dated 4-4-2009 with validity upto 30-6-2012 for setting up CBWTF to manage and handle biomedical wastes for an incinerator of 200kg/hour.
- Two public hearings were conducted in February 2017. The minutes of the public hearing submitted to SEIAA. There is public resistance to the project at Peringamala.

**2.3.6. Authorization from the Board**

7314 Health care institutions have obtained authorization from the Board.

**2.3.7. Others**

SI No:	Action Points	Action taken
a)	Inventory of healthcare facilities	The Inventory of healthcare facilities for the year 2017 was submitted to CPCB vide letter No.PCB/HO/RULES/BMW-

SI No:	Action Points	Action taken
		INVENTORY/2017/48/2017 dated 5.01.2019.
b)	Submission of Annual Reports to CPCB	The annual report for the period 2017 was submitted to CPCB vide Letter No.PCB/HO/BMW/EE-1/AR-2017/10/2018 dated 26.12.2018.Annual report for the year 2018 is under preparation.
c)	Constitution of State Advisory Monitoring Committee and District Level Monitoring Committee	The State Level Advisory Body was reconstituted vide Order no: G.O(M.S) No.02/10/Envvt dated 6.03.2010.Additional Chief Secretary, Health has been addressed to constitute State Advisory Committee and District Level Monitoring Committee as per BMW Rules,2016.
d)	Authorization to all Healthcare facilities including non-bedded HCFs.	As per the Bio Medical Waste Inventory,2017, there are 9,331 Health Care Facilities operating in Kerala out of which Board has issued authorisation to 7,314 HCFs including non-bedded HCFs. Action is being taken to bring all the HCFs under the purview of Authorisation.
e)	Implementation status of Barcode system	Barcode system has been implemented.
f)	Monitoring of compliance to BMWM Rules 2016 by Healthcare facilities including Veterinary Hospitals,AnimalHouses,AYUSH Hospitals	Authorisation has been issued to 150 Veterinary hospitals and one Animal House. Direction has been issued to Department of Animal Husbandry to bring all these institutions to manage Bio Medical Waste as per BMW Rules 2016 and to obtain authorisation. 216 AYUSH hospitals have been brought under the authorisation of the Board.
g)	Coverage of Common Biomedical Waste Treatment Facilities(CBWTFs)in the entire State/UT.	One CBMWTF operational at Palakkad, having a capacity of 37 Tonnes/day. The total quantity of biomedical waste generated in the state is 13771 TPA. Three more CBMWTFs have been have been proposed in order to comply with distance norms from source to plant.
h)	Compliance of CBWTFs to new emission standards prescribed BMWM Rules 2016.	Periodical inspection is being carried out by the Board officials for compliance verification at IMAGE. Show Cause Notice has been served to IMAGE for not upgrading their existing incinerators to the emission standards prescribed under the BMW Rules 2016.
i)	Capacity Building programmes/training programmes to SPCBs/PCCs officials and HCFs.	18 trainings on Bio Medical Waste have been conducted by the Board. More training will be conducted in this regard.

## **2.4. E-Waste Management Rules, 2016**

### **2.4.1. Submission of Annual Report (Rule 18)**

Annual report was submitted to the Central Pollution Control Board on 26-9-2018 (Rule 18)

### **2.4.2. Collection Centres**

2.4.2.1. **Brand owners:** As per the Action plan submitted by Producers/Brand owners, there are 105 collection centres. The collection centres of 12 producers in Thiruvananthapuram were inspected by Kerala State Pollution Control Board. The Collection centers were not in operation. The matter was reported to the Central Pollution Control Board. EPR authorization of 10 Producers including Samsung was withdrawn. They have submitted revised proposal to Central Pollution Control Board. The matter is being pursued for bringing their collection centers to consent purview. Kerala State Pollution Control Board is considering enforcing 'Buy back Scheme', on producers and the retail establishments are also forced to channelize the e-wastes to Registered recyclers and for reporting through Annual returns to the Board.

The EPR authorization of those producers and brand producers have been cancelled by CPCB. The cancellations are kept in abeyance pending the report from SPCB.

2.4.2.2. **Recyclers:** There are no recyclers. In the absence, materials are going to registered recyclers in other States.

### **2.4.3. Registered Recycler**

The Government has established the Clean Kerala Company for the collection of plastic and e-waste and channelization of e-waste to Registered recyclers. They had collected 736 TPA of e-waste in the year 2017-18, and 1,229 MT during 2016-19. The Company has a proposal to set up E- Waste management facility and Integrated Plastic waste management facility at Kerala Industrial Infrastructure Development Corporation -KINFRA – park at Kuttippuram, Malappuram District. The KINFRA Management has allotted two plots of 1.50 acres for this purpose. The plant will be commissioned by March 2020. In addition, 40 tonnes of e-hazardous waste from different Local Bodies of the State was collected and handed over to Kerala Enviro Infrastructure Limited for safe disposal.

### **Earmarking or allocation of industrial space or shed for e-waste dismantling and recycling**

The Department of Industries has agreed to allocate space in the Industrial park. A copy of the letters is enclosed. They have identified land at two places and the matter is being pursued.



## **2.5. Compliance of NGT order dated 16-1-2019 in OA 606/2018**

In compliance with the Order dated 16/01/2019 of the Hon'ble NGT on in O.A. no. 606/2018, the State Level Monitoring Committee was constituted under the Chairmanship of Hon'ble Justice A.V. Ramakrishna Pillai, Former Judge, High Court of Kerala, and Member Secretary, Kerala State Pollution Control Board as the Member Secretary of the Committee.

Other members are Additional Chief Secretary - Local Self-Government Department; Additional Chief Secretary - Health, Family Welfare Department; and the Principal Secretary - Environment Department.

The Committee held three meetings during February - April 2019. Field visits were conducted in April 2019 to study the Brahmapuram plant at Ernakulum and Karamana river.

## 2.6. Polluted river stretches in O.A. No. 673/2018

There are 21 polluted river stretches in Kerala. Critically Polluted (Priority 1) is the Karamanariver stretch from Melekadu to Moonnattumukku. The other rivers fall in Priority 4 and 5. The pictorial representation in this section depicts the pollution load through storm-water drains into Karamana River.

For River Karamana, there is a connected OA 581/2018. For Tirur-Ponnaniriver, there is a connected OA 582/2018.

### 2.6.1. River Karamana

The Concept plan was approved on 28-12-2017. For the co-ordination of different departments, seven meetings were conducted by the Chief Secretary and Additional Secretary from January 2018 to

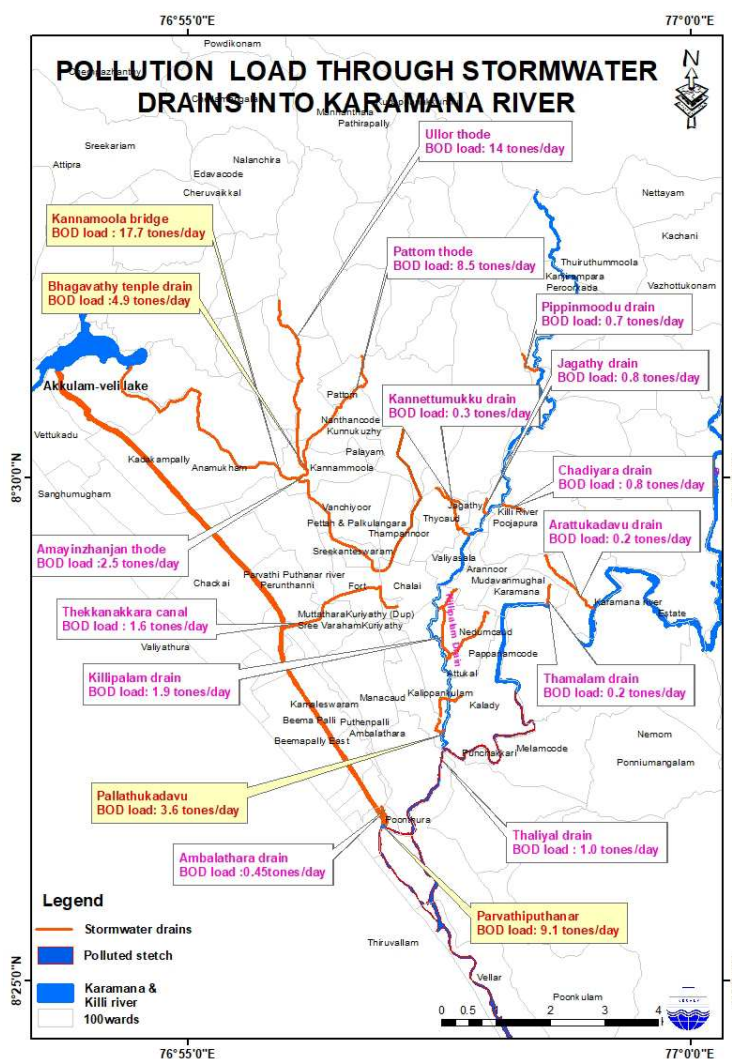
March 2019. The meetings discussed the preparation of Action Plan for River Karamana. The five meetings of River Rejuvenation Committee were conducted March and April 2019.

The Karamana Action Plan has been approved by River Rejuvenation Committee on 17-4-2019 and submitted to the Central Pollution Control Board.

The action taken by Pollution Control Board, Kerala Water Authority, Irrigation Department and Thiruvananthapuram Corporation is as follows:

#### 2.6.1.1. Works done by different departments

S No	Department	Action taken
a)	Kerala State Pollution Control Board	<ul style="list-style-type: none"> <li>Determination of pollution load into Karamana from storm-water drains used for sewage disposal</li> <li>Sanitation survey of Karamana River, Killiyar (250 m on either side of the river) and polluted drains(10 m on either side of the identified polluted</li> </ul>



S No	Department	Action taken																																	
		<p>drain)<a href="http://117.232.111.146/envisan/">http://117.232.111.146/envisan/</a>– <b>Rs.11.775 lakh</b></p> <ul style="list-style-type: none"> <li>• GIS database has been developed. Web portal is available in related links of websitekeralapcb.nic.in as Enviclean-<b>Rs. 35 lakh</b></li> <li>• Draft river action plan submitted to Central PCB on 13-12-2018 and CPCB approved with conditions on 11-2-2019. Five meetings of River Rejuvenation Committee were over. Karamana action plan has been submitted to Central Pollution Control Board by the River Rejuvenation Committee on 17-4-2019.</li> <li>• Action plan has been finalized at the Government level and by River Rejuvenation Committee.</li> <li>• Inspected 79 units namely flats, hospitals commercial establishment. Notice was issued to 17 units and instructions were given to 15 units on finding the defects</li> <li>• Monitoring of all water bodies. Pollution load from the drains was identified.</li> </ul>																																	
b)	Kerala Water Authority	<ul style="list-style-type: none"> <li>• Common Sewage treatment plant of 107 MLD</li> <li>• Sewerage Network Rehabilitation by laying new lines increasing size of undersized main and reconstruction by dilapidated manholes for the last 3 years</li> </ul> <table border="1"> <thead> <tr> <th>Works</th> <th>No.</th> <th>Cost (crores)</th> </tr> </thead> <tbody> <tr> <td>Completed</td> <td>48</td> <td>9.1</td> </tr> <tr> <td>In progress</td> <td>45</td> <td>11.6</td> </tr> <tr> <td>On Tender</td> <td>33</td> <td>7.6</td> </tr> </tbody> </table> <ul style="list-style-type: none"> <li>• Extension of sewer network wherever technically feasible in new areas of existing blocks</li> </ul> <table border="1"> <thead> <tr> <th>Works</th> <th>No.</th> <th>Fund (crores)</th> </tr> </thead> <tbody> <tr> <td>Completed</td> <td>42</td> <td>10.3</td> </tr> <tr> <td>In progress</td> <td>17</td> <td>5.5</td> </tr> <tr> <td>On Tender</td> <td>12</td> <td>19.6</td> </tr> </tbody> </table> <ul style="list-style-type: none"> <li>• Annual maintenance contracts for O&amp; M dividing the entire area into different maintenance zones (2.66 crores).</li> <li>• Procurement of sewer cleaning machines and equipment maintenance-under progress (3.17 crores)</li> <li>• Emergency brigade for urgent blockage rectification works to clean temporary overflows.</li> <li>• Establishment of six additional zones</li> </ul> <table border="1"> <thead> <tr> <th>Work</th> <th>No.</th> <th>Fund (crores)</th> </tr> </thead> <tbody> <tr> <td>Completed</td> <td>2</td> <td>2.33</td> </tr> <tr> <td>In Progress</td> <td>7</td> <td>69.59</td> </tr> </tbody> </table>	Works	No.	Cost (crores)	Completed	48	9.1	In progress	45	11.6	On Tender	33	7.6	Works	No.	Fund (crores)	Completed	42	10.3	In progress	17	5.5	On Tender	12	19.6	Work	No.	Fund (crores)	Completed	2	2.33	In Progress	7	69.59
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S No	Department	Action taken		
		On Tender	13	43.33
c)	Irrigation department	<ul style="list-style-type: none"> <li>• Chain linked fencing both sides of various bridges upstream and Providing fencing-GI instream along Killi and Karamana River and Thiruvallomthodu - Rs. 1.95 Crore</li> <li>• Integrated Solid waste management at Thiruvallom-Balikkadavu providing Grated flushing arrangements, renovation of drains with silt traps at Myladikkadavu surveillance system(CC Camera) from Myladikkadavu to Attakal bridge- Rs. 1.86 Crore</li> <li>• Constructing biodiversity park on the bank of Karamana river-52.65 lakh</li> <li>• Solid waste removal, side wall renovation rcc slotted slabs and fencing of sensitive areas of Thekkenekkara canal- Rs. 1.241Crore</li> <li>• Construction of check dam in Karamana river at Kalady to prevent the salt water intrusion and scarcity of water during dry season- Rs. 61.68 lakh</li> </ul>		
d)	Thiruvananthapuram Corporation	<ul style="list-style-type: none"> <li>• Health wing of TMC conducted survey. The following actions were taken <ul style="list-style-type: none"> <li>• Notice issued- 2,939 <ul style="list-style-type: none"> <li>➤ Houses-1047</li> <li>➤ Institution-49</li> <li>➤ Rectified-1,013</li> <li>➤ Departmental action initiated-1,843</li> <li>➤ Fine imposed and realized-1006960</li> </ul> </li> </ul> </li> <li>• Mass cleaning organized on 26/2/2019 by TMC for Rs. 50 lakh</li> <li>• 21 community toilets at Rs. 57 lakh</li> <li>• RRF completed at three locations(Muttathara, Manacadu, Vattiyookavu)</li> <li>• MRF -44 completed at Rs. 25 lac</li> <li>• Biogas plant at Rs. 25 lakh</li> <li>• 40 public toilets at Rs. 20 lakh</li> <li>• 3 mobile toilets at Rs. 40lakh</li> <li>• Three septage sucking machine at Rs. 1 Crore</li> <li>• 4257 individual toilets at Rs. 4.45 Crore</li> </ul>		

### 2.6.1.2. Action Plan for River Karamana

#### 2.6.1.2.1. OA 581/2018 Karamana River Pollution

The pollution of River Karamana is primarily from Thiruvananthapuram City sewage discharge. The City has STP of capacity 107 MLD. However, only 50 MLD reaches the STP, as the sewage network does not cover all areas of the City. Sewage flows into storm water drains and reaches River Karamana and the Akkulam-Veli lake connected to the river. In the short-term, resolving bottlenecks and overflows in the existing sewerage system can convey another 10 MLD into the STP. Action has been initiated and works are in progress.

The pollution load due to sewage entering the River Karamana system through various drains has been determined. The pollution load sorted in order of importance is given in the following table:-

S No	Drain	Pollution loadBODin TPD
a)	Kannamoola stream into Akkulam-Veli lake	17.7
b)	Ulloor thodu	14
c)	Parvathiputhanar	9
d)	Pattom thodu	3.8
e)	Killiyar river	3.5
f)	Amayizhanchal	2.5
g)	Killippalam drain	1.9
h)	Thekkanakkara canal	1.6
i)	Thaliyal drain`	1.0
j)	Chadiyara drain	0.8
k)	Jagathy drain	0.8
l)	Pippinmoodu drain	0.7
m)	Amabalathara drain`	0.45
n)	Kannettumukku drain	0.3
o)	Arattukadavu drain	0.2
p)	Thamalam drain	0.2

### 2.6.1.3. Short term plan

#### 2.6.1.3.1. Maintenance and de-bottlenecking of existing sewerage network

No.	Activity	Implementing agency	Cost Rs. Cr.	Source of fund	Time line	Expected outcome
a)	Pumping lines from the terminal pumping station Kuriyathi, to be connected directly to STP at Muttathara	Kerala Water Authority	3.375	Amrut	May 2019	Reduced pollution load in Parvathiputhanar
b)	Rehabilitation/upgradation of Thaliyal and Aranoor Sewerage Pump house by rehabilitation of existing well, construction of new well and grit chamber, installation of new pump sets	Kerala Water Authority	2.37	Plan scheme	May 2020	Reduced pollution load in Thaliyal drain leading to Killiyar
c)	5 MLD sewage treatment plant at Medical College	Kerala Water Authority	19.2	Amrut	May 2020	Reduced sewage load in City network
d)	Installation of adequate pumps in Mudavanmughal and Enchakkal pumping stations	Kerala Water Authority	0.23	Plan scheme	March 2020	Reduced pollution load in the drains
e)	DG sets in all lift and pumping stations – Mudavanmughal, Aranoor, Thaliyal, Kuriyathi, Pattoor, Kannammola,	Kerala Water Authority	0.92	Plan scheme	May 2020	Reduced pollution load in the drains

No.	Activity	Implementing agency	Cost Rs. Cr.	Source of fund	Time line	Expected outcome
	Pattom, Murinjapalam and Enchakkal					
f)	Reconnect sewer at Rajaji Nagar, stop outflow of sewage into Amayizhanchan thodu, control stormwater entry into sewer to avoid overflow in Thampanoor area Sewage generated in Rajaji Nagar shall be diverted to main sewerline. Sewage generated in Thoppil area shall be diverted main sewerline	Kerala Water Authority	0.10	Mace	Dec 2019	Reduced pollution load in Amayizhanchan thodu storm water drain
g)	Divert the sewer line from the School compound of Government Karamana High School	Kerala Water Authority	0.42	Plan Scheme	May 2020	Stop overflow of sewage through manholes in the school compound
h)	Rehabilitation by laying new lines increasing size of undersized main and reconstruction by dilapidated manholes for the last 3 years Total works in progress (45No.) Works in tendering (33No.)	Kerala Water Authority	11.6 7.6	Plan Scheme/ Amrut	May 2020	Reduced pollution load in the drains
i)	Extension of sewer network wherever technically feasible in new areas of existing blocks:- <ul style="list-style-type: none"> <li>• In progress(17No.)</li> <li>• Tendering(12No.)</li> </ul>	Kerala Water Authority	5.5 19.6	Plan scheme / Amrut	May 2020	Reduced pollution load in the drains
j)	Around 155 Houses in Kurukuvilakom, Kannettumukku shall be provided with septic treatment system	Kerala Water Authority	To be estimated			Reduced pollution load in the drains
k)	Procurement of sewer cleaning machines and equipment maintenance	Kerala Water Authority	3.17	Plan Scheme	May 2020	Reduced pollution load in the drains
l)	Establishment of six additional blocks in uncovered areas In Progress (7 nos.) Tendering (13 nos)	Kerala Water Authority	69.59 43.33	Jnnurm & Amrut	May 2020	Reduced pollution load in the drains

#### 2.6.1.3.2. Solid Waste Management Action Plan

Sl.No	Activity	Implementing Agency	Unit	No of units	Cost in Rs Cr	Source of fund	Time for completion
a)	Slaughterhouse and poultry waste	Thiruvananthapuram Corporation	Rendering plant	1	9.6	Plan fund	March 2021
b)	Sanitation facility and treat of waste water in the markets of Pangode, Kumarichanda	Thiruvananthapuram corporation	Treatment plant Portable aerobic bins	2 4	0.3	Plan Fund	Dec 2019
c)	Provide facility for the treatment of sewage, sullage and garbage generated in the poonthura slum area between Karamana river and sea	Thiruvananthapuram Corporation	Aero bins at various places(28)	28	3.36	Plan fund	March 2020
d)	The discharge of waste water from the surrounding houses to the pond at Jagathy is to be stopped	Thiruvananthapuram Corporation	-Pond desilting -Issued notices to the household -project is prepared for desilting the pond	61	0.50	Plan Fund	March 2020
e)	Identification of illegal outlets into storm water drains and fine shall be imposed on such units	Thiruvananthapuram Corporation	-Total no of notice served -fine imposed and prosecution initiated	2939 336	1006960 fine	Collected from the individual- 1006960	Going on
f)	Biodegradable waste	Thiruvananthapuram Corporation	Bio-Composter	50,000	9	Plan fund	May 2020
g)			Thumbboormuzhi aerobic bins	154	11.97		
h)			Community biogas	12	2.1		

Sl.No	Activity	Implementing Agency	Unit	No of units	Cost in Rs Cr	Source of fund	Time for completion
i)		Thiruvananthapuram Corporation	Organic Waste Converter	1	0.4		
j)			Portable biogas	200	0.21		
k)			Portable aero bins	100	1.50		
l)			Ring compost	500	0.13		
m)			Segregation bins	1,00,000	4		
n)	Biodegradable waste	Thiruvananthapuram Corporation	RRC	7	7		
o)			Plastic Recycling unit	1	1.36		
p)			Mobile MRF	5	1.3		
q)			Electronic Weigh bridge	1	0.1		
r)			Solar electrical cart	25	0.5		
s)			Swaps shops	4	0.2		
t)			PET bottle crushing	15	0.05		
u)			Community level unit	102	0.35		
					Napkin destroyer		
v)		Thiruvananthapuram Corporation	Animal Crematorium at Kattela	1	1	Plan fund	May 2020
w)		Thiruvananthapuram Corporation	Urban Gardening	10	0.5		
x)		Thiruvananthapuram Corporation	Upgradation of present facilities	42	1.86		
y)		Thiruvananthapuram Corporation	Capacity Building & IEC	14	0.7		
z)		Thiruvananthapuram Corporation	Viability gap Fund	15	0.92		
aa)	Prevent entry of storm-water into sewer line along with KWA	Thiruvananthapuram Corporation	KWA is authorized to prepare and implement proper sewerage lines under Amrut scheme	112	154	AMRUT	May 2020



Sl.No	Activity	Implementing Agency	Unit	No of units	Cost in Rs Cr	Source of fund	Time for completion
bb)	Take steps to prevent the solid wastes in sewer line as reported by KWA	Thiruvananthapuram Corporation	Squad and Fines No of waste dumping cases  (Special squad is formed at corporation level. Health Inspectors are authorized for regularly monitoring and preventing the waste discharge	27	65740	Fine collected from the individuals	May 2020

#### 2.6.1.3.3. Monitoring

S No	Activity	Implementing agency	Cost	Source of fund	Time line	Remarks
a)	River water quality monitoring -Killiyar, Karamana, Parvathiputhanar, Akkulam-Veli lake	Kerala State Pollution Control Board	Rs. 3000 per sample	National Water Quality Monitoring Programme (NWMP), CPCB fund	Ongoing; monthly frequency	Monitoring of water quality
b)	Storm drains monitoring - Amayizhanchan thodu, Ulloorthodu, Pattom thodu, Kannamoola thodu, Thekkanakkara canal	Kerala State Pollution Control Board	Rs. 3000 per sample	State Water Monitoring Programme, KSPCB fund (SWMP), KSPCB fund	Ongoing Seasonal monitoring – pre-monsoon, monsoon, post-monsoon	Notice issued to TVM Corporation
c)	Inspection and effluent quality monitoring of the flats, industrial units, service stations, hospitals, hotels etc. in Thiruvananthapuram Corporation area	Kerala State Pollution Control Board	As per sampling charge	KSPCB funds,	Ongoing Interval: Red – 1 month. Orange – 3 m. Green – 6 m.	Monitoring of establishments, service stations, flats, industrial units

#### 2.6.1.4. Long term Plan

##### 2.6.1.4.1. Sewerage network

S No	Long term measures proposed	Implementing agency	Amount Required(Rs.in Crore)	Time line	Remarks
a)	Extension of sewerage system to Block F to G coastal belt	Kerala Water Authority	200	Three years	DPR Preparation in 6 months (through consultants)
b)	Extension of sewerage system to Block H to R	Kerala Water Authority	700		
c)	Extension of sewerage system to Newly added areas of corporation viz, Kazhakootam, Sreekaryam, Kudappanakunnu, Vattiyookavu & Vizhinjam	Kerala Water Authority	300		
d)	Providing sewerage system in Block A to E	Kerala Water Authority	100		
e)	Rehabilitation of existing network and pump house in block A to E	Kerala Water Authority	100		
f)	Procurements of equipment for maintenance sewerage system	Kerala Water Authority	10		
g)	Additional STP requirement	Kerala Water Authority	60		
h)	Total Amount required	Kerala Water Authority	1,470		

##### 2.6.1.4.2. Solid waste management

S No	Long term measures proposed	Implementing agency	Amount Required (Rs.in Crore)	Time line
a)	Acquire 58 acres of land and rehabilitate 8150 families from the banks of River Karamana, Killiyar and Parvathi-puthanar	Thiruvananthapuram Corporation	600	3 years ( INR 25cr is earmarked under plan project for the year 2019-2020 under life scheme for land acquisition and flat construction

##### 2.6.1.4.3. Desilting and development

S No.	Activity	Implementing agency	Amount allotted Rs. Crore	Department	Timeline
a)	Development package for Parvathy Puthanar	Irrigation department	150	Irrigation department Included in KIFB by KWIL includes cleaning of canal	3 years
b)	Desilting and development of Amayizhanchan Thodu	Irrigation Department	25	Irrigation department	1.5 years
c)	Improvements to Thekkenekara canal and desilting	Irrigation Department	5 (under preparation)	Irrigation department	1 year
d)	Karimadam tank improvements, desilting sheet piling/under preparation and providing fencing	Irrigation Department	4.5 (under preparation)	Irrigation department	1.5 years
e)	Development of Karamana basin	Irrigation Department	6.77 crores/under preparation	Irrigation department	1.5 years

## 2.6.2. River Tirur-Ponnani

The action plan is under the consideration of River Rejuvenation Committee. The Board prepared the frame work of the action plan. This draft plan was placed before the committee members and discussed In the two meetings of the River Rejuvenation Committee. It was also shared with different line departments. The action plan will be finalized on getting the details from the different departments.\*\*

### 2.6.2.1. Macro-level Action Plan Proposed For Tirur Municipality

Sl.No.	Action	Implementing Agency	Estimated Expenditure in Crore	Fund Approved In Crore	Funding Agency	Time Line
a)	Septic Tank for nearest 500 houses	Tirur Municipality	1	0.02	Shuchithwa Mission & Plan Fund	2019-20
b)	Solid & liquid waste Treatment plant	Tirur Municipality	6	0.27	Plan Fund	June 2019

Sl.No.	Action	Implementing Agency	Estimated Expenditure in Crore	Fund Approved In Crore	Funding Agency	Time Line
	a. RRF					
c)	Plastic Shredding Unit	Tirur Municipality	0.1	0.098	Plan Fund	2019-20
d)	Slaughtering	Tirur Municipality	1	0.58	Directorate of Urban Affairs	Civil work completed. New DPR prepared for mechanical fittings
e)	Crematorium	Tirur Municipality	0.5	0.54	World Bank	Completed
f)	De silting and river training works	Tirur Municipality	1	**	No fund received.  De-silting work done by Irrigation Department	**
g)	Fencing	Tirur Municipality	**	**	**	**
h)	Bamboo	Tirur Municipality	**	**	**	**
i)	Installation of CCTV Camera	Tirur Municipality	**	**	**	**
j)	Monitoring	a. Municipality b. Police Department c. Pollution Control Board	**	**	**	**
k)	Proposal of VCB at Tributaries for not entering salt water	Irrigation department	2*	**	**	**
l)	Repair and maintenance of Kootayi Regulator	Irrigation department	10*	**	**	**

\*Amounts as per the report of Executive Engineer, Irrigation Department, Malappuram

#### 2.6.2.2. Action taken report for Tirur-Ponnani river

Sl. No.	Action	Implementing agency	Action taken	Action proposed
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Sl. No.	Action	Implementing agency	Action taken	Action proposed
a)	Effluent treatment plant @ fish market	Tirur Municipality	Work awarded for 23,70,800/- Amount Paid – 15,00,000/- AMC commitment amount- 3,53,500/- Amount paid- 1,76,750/-	AMC Awarded to Hydrad Waste Water management System, Tirur
b)	Fine Collected from households/ commercial establishments	Tirur Municipality	Rs. 2,010/- collected	Notice Issued To Commercial ,Establishment, Hotels etc
c)	RRF	Social Economic Foundation Malappuram	Work on going Amount of TS- 27,08,000/- Amount spent 5,42,000 Will be completed by June 2019	Work In Progress
d)	The construction of Effluent Treatment Plant to be completed at the earliest possible and divert the existing drains near the Tirur Railway Bridge and rear side of market.	Tirur Municipality AMC Awarded to Hydrad Waste Water management System, Tirur	Work Awarded For Rupees 53,16,712/-	STP construction (Work In Progress)
e)	Two drains joining the river near Thazhepalam is containing blackish water. These drains are coming from the township. As an immediate measure all the outlets of establishments make their own arrangements for discharge in to the soak away pits after giving preliminary treatments.	Tirur Municipality	Work Awarded To PWD Contractor Sri.K.Sidhique For An Amount Of Rupees 8430000/- (Construction Of RCC Drain along the central line of the road for preventing the liquid and toilet waste from Commercial Buildings, Hotel Buildings etc.)	Work nearing Completion
f)	Where the canal joining the river at Vallikanjeeram, the flow is disrupted. The water is stagnant there. Action is to be taken to make continuous flow in the area. The discharge of any waste in to the canal is to be stopped.	Tirur Municipality	Thodu Located in Nirmaruthur panchayath (Nirmaruthur Village). Work taken by Tanur Block panchayath.(Report Sent to District Collector Malappuram)	
g)	Dumping of solid wastes on both banks of the river at	Vettom GramaPanchayath	CCTV Installation and collection	Work awarded for Rs.

Sl. No.	Action	Implementing agency	Action taken	Action proposed
	Ettirikadavu bridge is to be stopped with the help of police		of plastic waste from river banks implemented	1,250,000+900,000 =2,150,000. Amount Paid 6,48,285. Projects will be completed by July 2019
h)	Dumping of solid wastes on both banks of the river at Mangattiri Bridge is to be stopped with the help of police	Vettom GramaPanchayath	CCTV Installation and collection of plastic waste from river banks implemented	Work awarded for Rs. 1,250,000+900,000 =2,150,000. Amount Paid 6,48,285. Projects will be completed by July 2019
i)	The canal joining the river through the side of CV Land Water Theme, Park is to be cleaned and protected.	Vettom GramaPanchayath	CCTV Installation and collection of plastic waste from river banks implemented	Work awarded for Rs. 1,250,000+900,000 =2,150,000. Amount Paid 6,48,285. Projects will be completed by July 2019
j)	The island formed on the middle of the river is to be cleaned and protected. This can be used as a tourist spot.	Vettom GramaPanchayath	CCTV Installation	Work awarded for Rs. 1,250,000+900,000 =2,150,000. Amount Paid 6,48,285. Projects will be completed by July 2019
k)	The drains/canals reaching the river at 6 places in Mangalam Grama Panchayath area is to be cleaned and all types of waste discharged in to the drains is to be restricted.	**	**	**
l)	The Mangalam shutter is to be opened and allowed flushing as easily as possible as the river water quality will start deteriorate in March-April season	**	**	**

### 2.6.3. Other polluted stretches

Report was filed before NGT on 15-12-2018.

Of the 20 stretches, for the seven stretches, i.e for the stretches of Pamba – Mannar- Thakazhi; Manimala River –Kalloorpara-Thondra, Kuttiyadi, Kavvayi, Morgal, Uppala and Bhavani, BOD is within the limit of 3 mg/l. Hence Central Pollution Control Board was addressed vide the letter no. dated 16-4-2019 to exclude those eight stretches from the list of polluted stretches. For the remaining 12 stretches, the budget provisions and time line are to be included in the action plan. The budget details and time line are being calculated.

S No.	River	Priority	River stretch	District	Corporation near the polluted stretch	Municipality near the polluted stretch	Panchayath near the polluted stretch th	Remarks
a)	Pamba	IV	Mannar - Thakazhi	Alappuzha	Nil	Nil	Mannar Thakazhi	As per the analysis done on 2017-2018 the BOD of the river is within the limit i.e. below 3 mg/L
b)	Manimala	IV	Kalloorpara-Thondra	Alappuzha	Nil	Nil	Kuttor Iraviperoor Puramattom	As per the analysis done on 2018 the BOD of the river is within the limit i.e. below 3 mg/L
c)	Chithrapuzha	V	Irumpanam - Karingachira	Ernakulam	Kochi	Thikkakara Kalamassery	-	Budgetary details and timeline are collected.
d)	Kadambrayar	IV	Manckakadavu-Brahmapuram	Nil	Nil	Thrikkakara	Edathala Kizhakkathala Kunnathunadu	Budgetary details and timeline are collected.
e)	Periyar	V	Aluva, Elloor - Kalamassery	Ernakulam	Kochi	Aluva Eloor	Kadungallur	Budgetary details and

S No.	River	Priority	River stretch	District	Corporation near the polluted stretch	Municipality near the polluted stretch	Panchayath near the polluted stretch th	Remarks
						Kalamassery		timeline are collected.
f)	Karuvannur	V	Karuvannur	Thrissur	Thrissur	Vadakkanchery Irinjalakuda	Vallachira Cherppu	Budgetary details and timeline are collected.
g)	Kechery	IV	Puliyannor- Kechery	Thrissur	Nil	Vadakkanchery	-	Budgetary details and timeline are collected.
h)	Puzhakkal	V	Olarikkara- Puzhakkal	Thrissur	Thrissur	Vadakkanchery	Arimpoor	-
i)	Bharathapuzha	IV	Pattambi	Palakkad	Nil	Pattambi Shornur Ottapalam	-	Budgetary details and timeline are collected.
j)	Tirur	V	Naduvilangadi- Thalakandathur	Malappuram	Nil	Tirur Ponnani	Thalakkad Vettom Mangalam Purathur	Specified in
k)	Kadalundy	V	Hajiyarpalli	Malappuram	Nil	Malappuram	Kadalundi	Budgetary details and timeline are collected.
l)	Kallai	V	Thekkepuram- Arakkinar	Kozhikode	Kozhikode	-	Kallai	Budgetary details and timeline are collected.
m)	Kuttiyadi	V	Kuttiyadi	Kozhikode	Kozhikode	-	Kuttiyadi	As per the



S No.	River	Priority	River stretch	District	Corporation near the polluted stretch	Municipality near the polluted stretch	Panchayath near the polluted stretch th	Remarks
								analysis done on 2018 the BOD of the river is within the limit i.e. below 3 mg/L .
n)	Kavvai	V	Kavvai	Kannur	Nil	Payyannur	Thrikaripur	As per the analysis done on 2018 the BOD of the river is within the limit i.e. below 3 mg/L
o)	Kuppam	V	Thalipparamba-Vellichangool	Kannur	Nil	Thaliparamba	Pariyaram	As per the analysis done on 2018 the BOD of the river is within the limit i.e. below 3 mg/L
p)	Peruvamba	V	Peruvamba	Kannur	Nil	Payyanur	Erimam Kuttor	
q)	Ramapuram	V	Ramapuram	Kannur	Nil	Nil	Ramapuram	
r)	Morgal	V	Morgal	Kasargode		Kasargod	Morgal Puthur	As per the analysis done on 2018 the BOD of the river is within the limit i.e. below 3 mg/L
s)	Uppala	V	Poyya- Mulinja	Kasargode	Nil	Kasargod	Manjeshwaram Mangalpandy Meenja	As per the analysis done on 2018 the BOD of the river is within the limit i.e.

S No.	River	Priority	River stretch	District	Corporation near the polluted stretch	Municipality near the polluted stretch	Panchayath near the polluted stretch th	Remarks
								below 3 mg/L
t)	Bhavani	V	Elachivazhi	Palakkad	Nil	Nil		As per the analysis done on 2018 the BOD of the river is within the limit i.e. below 3 mg/L

### 2.6.3.1. Action Plan of Perumbavoor Municipality

Sl. No.	Activity	No.	Timeline
a)	Bio gas planhousehold level	62	October 2019
b)	Ring compost household level	720	October 2019
c)	Bio gas plant	1	April 2019
d)	Aerobic bin compost unit	1	March 2020
e)	Aerobic bin compost unit	13	October 2019
f)	MCF plant	4	October 2019
g)	RRF	2	October 2019
h)	Swap shop	1	October 2019

### 2.6.3.2. Action Taken Report of Perumbavoor Municipality

Sl. No.	Activity	Status
a)	Waste disposal sites identification	The space has been decided for providing waste treatment facilities.
b)	Identification of sanitary land filling sites for population below 5000	158 cents of land procured for Parappuram sanitary land filling in ward 26.
c)	Procurement of suitable sites for solid waste disposal & sanitary land filling	158 cents of land procured for Parappuram sanitary land filling in ward 26.
d)	Directions issued for waste producers for classification of wastes, Bio degradable wastes, recycling wastes and wastes disposed through burning	Household wastes, hazardous wastes and other wastes from commercial establishments are disposed after segregation. Biomedical wastes are disposed through IMAGE. The direction is issued to waste producers regarding the waste disposed from source.
e)	Collection & transportation of segregated waste from houses & commercial establishments to treatment site in closed vehicles.	Haritha Karma Sena is collecting the segregated plastic waste from houses & commercial establishments.
f)	Collection, storage, transportation of the construction & demolition waste	No action plan.
g)	Solid waste disposal treatment facility to be provided in areas having more than 1 lakh population rate.	Not applicable.
h)	Solid waste disposal treatment facility to be provided in areas having less than 1 lakh population rate.	Work will be completed in October 2019.
i)	Public or private sanitary land filling facility should be provided in areas having more than 5 lakh population rate.	Not applicable.
j)	Public or private sanitary land filling facility should be provided in areas having less than 5 lakh population rate.	158 cents of land procured for Parappuram sanitary land filling in ward 26.
k)	Deactivate the old or unwanted dumping sites through biological measures.	Not applicable.

### 2.6.3.3. Action Plan of Eloor Municipality-Periyar stretch

Activity	Fund and Source	Timeline
Bio-gas plant	Central Government –Rs. 4.7 Lakhs State Government - Rs. 3.1 Lakhs Beneficiary Contribution - Rs. 5.6 lakhs	2020 March
Bucket compost	Central Government - Rs. 10.5 Lakhs State Government - Rs. 7 Lakhs Beneficiary Contribution - Rs. 12.5 Lakhs	2020 March
VGF	Plan fund - Rs. 5 Lakhs Central Government - Rs. 3.3 Lakhs Own Fund - Rs. 11.7 Lakhs	2019-2021
Aerobic bin	Plan fund - Rs. 13.3 Lakhs Central Government - Rs. 11.2 Lakhs State Government - Rs. 7.4 Lakhs	2019-2020
MCF	State Government - Rs. 17.7 Plan fund - Rs. 31.7 Lakhs Central Government - Rs. 26.6 Lakhs	2019-2020
RRF	Central Government - Rs. 8.6 Lakhs State Government - Rs. 5.7 Lakhs Plan fund - Rs. 10.2 Lakhs	2019-2020

#### 2.6.4. Actions by various municipalities

River	District	Panchayath	Remarks	Works Done	Amount Spent	Proposed Work	Fund Required	Timeline	Funding Agency
<b>Pamba</b>	Alappuzha	Mannar	As per the analysis done on 2017-2018 the BOD is within the limit i.e. below 3 mg/L.	Deepening & purification of Kuttamperoor river	5 Lakhs	Reconstruction of river bank	10 Lakhs	30/10/19	Own fund, Plan fund
		Thakazhi	As per the analysis done on 2017-2018 the BOD is within the limit i.e. below 3 mg/L.	Deepening & purification of canals inThakazhi	14,000	Reconstruction of river bank		30/10/19	Own fund
<b>Kadambrayar</b>	Ernakulam	Kunnathunadu		Nil	Nil	Installation of CCTV camera at Manakkakadavu	1 Lakh	2019-2020	CSR fund Wonderla
		Kizhakkambalam		Nil	Nil	Nil	Nil	Nil	Nil
		Edathala		Nil	Nil	Nil	Nil	Nil	Nil
		Vadavukodu puthen cruz		Nil	Nil	Nil	Nil	Nil	Nil
<b>Periyar</b>	Ernakulam	Kadungallur		Nil	Nil	Nil	Nil	Nil	Nil
		Eloor	Given above in Table 6.1.4.b						
<b>Tirur-Ponnani</b>			Given above in Table 6.1.3a						

River	District	Panchayath	Remarks	Works Done	Amount Spent	Proposed Work	Fund Required	Timeline	Funding Agency
Kuppam	Kannur	Pariyaram	As per the analysis done on 2017-2018 the BOD is within the limit i.e. below 3 mg/L	Cleaning river bank		Bamboo oxygen park	1.1 Lakhs	2020 January	MGNREGA

### **2.6.5 National Hydrology Project**

Under the National Hydrology Project, a study is planned on 5 major rivers, namely Meenachil, Periyar, Bharathapuzha, Kallai and Valapatnam. The bids for the study will be called once the Model Code of Conduct (MCC) is withdrawn.

### **2.6.6 Urban Regeneration and Integrated Water Transport System in Cochin**

A project titled Urban Regeneration and Integrated Water Transport System in Cochin with a project outlay of Rs 1365.16 crores has been appraised by KIIFB for funding. It is intended to regenerate the urban area in and around the 5 canals in Kochi, rehabilitate the slum dwellers and make use of the commercial area near the canal along with creation of tourism destinations and navigation through the canals. In principle, approval has been given for KIIFB funding for Rs 566.51 crores for land acquisition and building compensation in 2 Phases, namely Phase 1 for Rs 340.69 crores and Phase 2 for Rs 225.82 crores. Kochi Metro Limited is the Special Purpose Vehicle for this project.

### **2.6.7. Akkulam Lake Rejuvenation**

A project titled Akkulam Lake Rejuvenation with a project outlay of Rs 126 crores has been appraised by KIIFB for funding. In principle, sanction has been accorded for conducting bathymetric and other studies for Rs 4 crores, as the 1st step. Translational Engineering Centre at Barton Hill Engineering College is the project consultant. WAPCOS is the Special Purpose Vehicle for the project.

## 2.6. Ambient Air Quality (681/2018)

### 2.7.1. Online Continuous Real Time Monitoring Data Of Industries/Public Places

Sl. No.	Site Name	Industry	City	District	Status
a)	Adani Vizhinjam Port Private Limited	Power Plant	Vizhinjam	Ernakulum	Active
b)	Amrita Institute of Medical Sciences and Research Centre	Public Location	Ernakulum	Ernakulum	In Active
c)	Apollo Tyres Limited	Manufacturing	Kalamassery	Ernakulum	Active
d)	Brahmapuram Diesel Power Plant	Power Plant	Kakkanad	Ernakulum	In Active
e)	Canara Paper Mills Pvt. Ltd	Pulp And Paper	Changanacherry	Kottayam	Active
f)	Cochin Cements Ltd	Cement	Kottayam	Kottayam	In Active
g)	Cochin Special Economic Zone Authority	CBMWTF	Cochin	Ernakulum	In Active
h)	Fertilisers And Chemicals Travancore Ltd (FACT) Cochin Division	Fertilizer	Ambalamedu	Ernakulum	In Active
i)	Fertilisers And Chemicals Travancore Ltd (FACT) Udyogamandal Complex- Fertiliser Plants	Fertilizer	Eloor	Ernakulum	Active
j)	Fertilisers And Chemicals Travancore Ltd (FACT) Udyogamandal Complex- Petrochemical Plants	Petrochemical	Ernakulum	Ernakulum	Active
k)	Gramox Paper and Boards Ltd	Pulp And Paper	Muvattupuzha	Ernakulum	In Active
l)	Greenland Paper Mills Ltd	Pulp And Paper	Kollam	Ernakulum	Partial
m)	Hindustan Insecticides Limited	Pesticide	Eloor	Ernakulum	Active
n)	Hindustan Newsprint Ltd	Pulp And Paper	Kottayam	Kottayam	Active
o)	Hindustan Organic Chemicals Limited	Petrochemical	Ernakulum	Ernakulum	Active
p)	Indian Medical Association Goes Ecofriendly	CBMWTF	Palakkad	Palakkad	Partial
q)	Kairali Steels And Alloys Private Limited	Iron And Steel	Kanjikode	Palakkad	Active



Sl. No.	Site Name	Industry	City	District	Status
r)	Kerala Minerals And Metals Ltd	Iron And Steel	Kollam	Ernakulum	Active
s)	Kozhikode Diesel Power Project Kerala State Electricity Board Limited	Power Plant	Kozhikode	Ernakulum	Active
t)	Kspcb Calicut Palayam Station	Public Location	Calicut	Ernakulum	Active
u)	Kspcb Eloor Station	Public Location	Eloor	Ernakulum	Partial
v)	Kspcb Ernakulum Mg Road Station	Public Location	MG Road Cochin	Ernakulum	Active
w)	Kspcb Ernakulum Vyttila Station	Public Location	Ernakulum	Ernakulum	Active
x)	Kspcb Trivandrum Plamood Station	Public Location	Trivandrum	Ernakulam	Active
y)	Kunnath Paper Mills Ltd	Pulp And Paper	Meenkaradam	Palakkad	Active
z)	Malabar Cements Ltd	Cement	Pallakad	Palakkad	In Active
aa)	NTPC Limited; Rajiv Gandhi Combined Cycle Power Project	Power Plant	Allapuzha	Ernakulum	In Active
bb)	P P S Steels Pvt Ltd	Iron And Steel	Kanjikode	Palakkad	In Active
cc)	Prince Rollings Private Limited	Iron And Steel	Ottapalam	Palakkad	In Active
dd)	Prodair Air Products India Pvt Ltd	Chemical	Ernakulum	Ernakulum	In Active
ee)	RPC Paper Mills	Pulp And Paper	Punalur	Ernakulum	Active
ff)	Rubber Park India Private Limited	CETP	Ernakulum	Ernakulum	In Active
gg)	Southern Ispat& Energy Ltd	Iron And Steel	Palakkad	Palakkad	In Active
hh)	TMS Leathers	Tannery	Edayar	Ernakulum	Active
ii)	Travancore Cement Ltd	Cement	Nattacom	Kottayam	Active
jj)	Travancore Cochin Chemicals Limited	Chlor Alkali	Eloor	Ernakulum	Active

### 2.7.2. Ambient air quality data map is available in the website

<https://keralapcb.glensserver.com/public/graph.html> is the link on which the data map can be accessed.

### 2.7.3. Ambient air quality data of public places

Ambient air quality data of 5 real time ambient monitoring stations in the State located at Plamoodu (Thiruvananthapuram-State Capital), Eloor (Industrial Hub of the State), MG Road (Ernakulum- Central City), Vyttila Bus Stand (Ernakulum- Commercial Area), Palayam Bus Stand(Kozhikode-Commercial Area) are also included in 6.1 and 6.2.

#### 2.7.4. Ambient air quality stations:

Apart from the real time ambient air quality monitoring stations, the Board monitors the ambient air quality at prominent stations under the NAMP (National Ambient Air Quality Monitoring Programme) and SAMP (State Ambient Air Quality Monitoring Programme).

##### 2.7.4.1. Ambient air quality stations under National Ambient Air Quality Programme

Sl. No.	Location	District	
a)	COSMO Politian Hospital, Pattom	Thiruvananthapuram	NAMP
b)	SMV Govt. Model High School over bridge	Thiruvananthapuram	NAMP
c)	Filatex, Veli	Thiruvananthapuram	NAMP
d)	Kerala State Pollution Control Board, District Office, Plamood, Thiruvananthapuram	Thiruvananthapuram	NAMP
e)	Krishna Leela Tower Kadapakkada Kollam	Kollam	NAMP
f)	Chavra KMML Guest House, Chavara, Kollam	Kollam	NAMP
g)	Kerala State Pollution Control Board District Office Pathanamthitta	Pathanamthitta	NAMP
h)	D C Mills Pvt Ltd Pathirapilly Alappuzha	Alappuzha	NAMP
i)	Kerala State Pollution Control Board District Office Thondankualgara, Alappuzha	Alappuzha	NAMP
j)	Kerala State Pollution Control Board V-Publishers Building Kottayam	Kottayam	NAMP
k)	MRF Ltd, Vadavathoor, Kottayam	Kottayam	NAMP
l)	Ernakulum (South Over Bridge)	Ernakulum	NAMP
m)	Ernakulum MG Road	Ernakulum	NAMP
n)	Vytila FCI-OEN Connecters Ernakulum	Ernakulum	NAMP
o)	Irumbanam, Thripunithara	Ernakulum	NAMP
p)	Womens Apparel Park Industrial Area Kalamassery	Ernakulum	NAMP
q)	Travancore Kochin Chemical Udyogamandal	Ernakulum	NAMP
r)	Building No.EP.III-348 Methanam, North Eloor,	Ernakulum	NAMP
s)	Poonkunnam Thrissur	Thrissur	NAMP
t)	SEPR Refractories India Pvt Ltd Kanchikode West Palakkad	Palakkad	NAMP
u)	Synthite Industries Ltd, Kakkenchery, Malappuram	Malappuram	NAMP
v)	Nallalam Diesel Power Project Nallalam Kozhikode	Kozhikode	NAMP
w)	Women and Children Hospital Complex Kottaparamb Kozhikode	Kozhikode	NAMP
x)	SulthanBatheryNearGramapanchayath Office Wayanad	Wayanad	NAMP

##### 2.7.4.2. Ambient air quality stations under State Ambient Air Quality Programme

Sl. No.	Location	District	
a)	Kannur	Kannur	SWMP
b)	Mangattuparambu	Kannur	SWMP
c)	Kasargod	Kasargod	SWMP
d)	Kanjangad	Kasargod	SWMP
e)	Thodupuzha	Idukki	SWMP
f)	St.Jacobs Church, Kuttipadam, Perumbavoor.	Ernakulum	SWMP

Air quality index falls within acceptable levels except some parameters occasionally exceeded in certain stations. These exceeding values may be due to some construction activities and heavy vehicle traffic. The results are available in the Board's website and the copies sent to concerned departments. Generally, air quality in the State is generally found good as per monitoring results.

The proposal submitted by the Kerala State Pollution Control Board to the Central Pollution Control Board on strengthening of the air quality stations is as follows:

Draft format for status of CAAQMS / NAMP Monitoring station under SPCB's /PCC's –reg.									
Sl. No.	Population as per census 2011	Name of the State	Number of Towns/cities	Name of Towns/cities	Manual ambient air quality monitoring stations		Continuous ambient air quality monitoring stations		Remarks
					Existing Stations	Required Stations	Existing Stations	Required Stations	
1.	1,00,000- <5,00,000	Kerala	5	Kozhikode	Commercial /Residential-2	1- Background	1- Commercial	1- Residential	Supply Order issued for setting up CAAQMS, one each at Kollam and Thrissur. Action initiated for setting up CAAQMS at Palakkad with financial support from industries. One CAAQMS will be installed in Alapuzha during 2019-20
				Kollam	Commercial /Residential-2	1- Background	Nil	1- Residential (Proposed 2019-20)	
				Trissur	Residential-1	1- Background 1- Residential / Commercial	Nil	1- Residential (Proposed 2019-20)	
				Alappuzha	Commercial /Residential-2	1- Background	Nil	1- Residential (Proposed 2019-20)	
				Palakad	Industrial-2	1- Background 2- Residential / Commercial	Nil	1- Residential (Proposed 2019-20)	
2.	5,00,000- <10,00,000	Kerala	2	Thiruvananthapuram	Residential /Commercial-3 Industrial-1	1- Background	1- Traffic	1- Residential (proposed) 1- Commercial	Supply Order issued for setting up one CAAQMS at Thiruvananthapuram with 50% fund from the CPCB under project setting up of CAAQMS in million plus cities and State capitals

				Kochi	Residential-5 Industrial-3	1- Background	1-Traffic 1- Commercial 1-Industrial	1- Residential	CAAQMSinstall ed at Eloor, MG Road and Vytila
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## **2.8. Industrially Polluted clusters (OA 1038 of 2018)**

- The order dated 13.12.2018 in O.A.No. 1038 of 2018 by the Hon'ble NGT is based on the CEPI score of Greater Cochin Area done in 2009. The CEPI assessment was done in 2009 by the Central Pollution Control Board (CPCB) in collaboration with IIT Delhi as part of their comprehensive environmental assessment of 88 industrial clusters in the Country.
- Out of these 88 industrial clusters, 32 industrial clusters having CEPI score in between 60 and 70 were categorized as severely polluted area (SPA). Further, 43 industrial clusters in 16 states having CEPI score of 70 & above were identified as Critically Polluted Area(CPA). Greater Kochi Area (GKA) was identified in Kerala. The CEPI score for the area as reported by Central Pollution Control Board was 75.08, and the GKA subsequently termed as CPA.
- During 2011, CPCB again estimated CEPI score as per the monitoring data of 2011 with same criteria pollutants as considered by IIT Delhi and the score was 57.39 and the moratorium imposed for developmental activities in the Greater Kochi Area as CPA was lifted vide office memorandum No. J-11013/5/2010-1A II (I) dated 23.05.2011 by Ministry of Environment and Forest.
- After lifting the moratorium, monitoring was conducted in the year 2013 by CPCB but not published. The CEPI score using the third party monitoring data was 45.29 in the year 2013.
- While CPCB had conducted monitoring in 2018, the Board also had engaged an accredited agency as third party for the monitoring and the score obtained was 44.68. The monitoring by KSPCB indicates that the current score is well within the limit of 60, above which the area is confirmed as severely polluted area (CPA).

**2.9. Total amount collected from erring industries on the basis of Polluter Pay's principle 'Precautionary principle and details of utilization of funds collected**

S No	Company	Amount Collected (INR Crore)	Utilization of fund	Remarks
a)	Binani Zinc Ltd, Ernakulum	0.5	Drinking water supply to nearby residents Edyar area in Kadungalloor Grama Panchayath	As per the order of Supreme Court Monitoring Committee
b)	FACT Ltd., Ernakulum	1.25	Kuzhikandom cleaning	Kuzhikandom
c)	FACT Ltd., Ernakulum	0.35	Drinking water supply to nearby residents(Eloor Municipality)	As per the order of Supreme Court Monitoring Committee
d)	Hindustan Insecticide Limited, Ernakulum	1.24	Kuzhikandom cleaning	Kuzhikandom
e)	Hindustan Insecticide Limited, Ernakulum	0.35	Drinking water supply to nearby residents(Eloor Municipality)	As per the order of Supreme Court Monitoring Committee
f)	Indian Rare Earths Limited	1.25	Kuzhikandom cleaning	Kuzhikandom
g)	Indian Rare Earths Limited, Ernakulum	0.35	Drinking water supply to nearby residents(Eloor Municipality)	As per the order of Supreme Court Monitoring Committee
h)	Kerala Minerals and Rutiles Limited, Kollam	1	Remediation and/or distribution to affected persons either as per the direction of Tribunal or as per the decision of State Govt.	As per NGT order dated 31-8-2017 in Application No.142,290, 453 of 2013
i)	Marthoma Granites, Thodupuzha	0.258516	Protection of environment	Environment Protection Fund
j)	Merchem Limited, Ernakulum	0.0875	Drinking water supply to nearby residents(Eloor Municipality)	As per the order of Supreme Court Monitoring Committee
k)	New Hotel/Lodging House, Idukki	0.01	Environment protection in Idukki	Environment Protection Fund
l)	Organo fertilizers Ernakulum	0.025	Board's account	Forfeiting of bank guarantee
m)	Sree Sakthi Limited, Ernakulum	0.24	Removal of plastic waste in thei premises	Forfeiting of bank guarantee
n)	Vijay Construction, Ernakulam	0.02	Board's account	Forfeiting of bank guarantee

**2.10 Primary Effluent Treatment Plant as per order dated 19-2-2019 in O.A. No. 593/2017**

The report for the month upto March 2019 was submitted to Central Pollution Control Board.. As per the reports upto March 2019, 4,017 units requiring ETP were inspected. Of these, 3,996 units have provided functional ETP. 18 units were found to be operating without ETP. Closure direction was issued to four units, and show cause notice was issued to eleven. 3,930 units complied with the effluent standards. For the remaining 66 units, the Board has taken action for its compliance.

Around 2,267 STP units were inspected. Of these, 2,263 units have provided functional STP. Four STPs were found to be non-complying. Show cause notice was issued to three units and action is under processing against one unit.

Regarding CETP, six units were inspected and found compliant and one CETP is under construction.



## **2. Annexure**

***Annexure 3.1: Report from Local Self Government Department (LSGD)  
on Solid Waste Management***