BEFORE THE HONOURABLE NATIONAL GREEN TRIBUNAL

SOUTHERN BENCH, CHENNAI

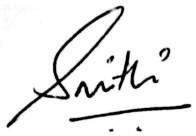
Original Application No.27 of 2021 (SZ)

Tribunal on its own motion Suo Motu based on the news item in The Hindu E-Paper, Edition dt. 28.01.2021, "Faecal contamination high in Perandoor, Edappally Canals" : Applicant(s)

Vs

The Principal Secretary to Govt. of Kerala, Environment Department & Ors. : Respondent(s)

REPORT FILED BY THE CHIEF ENVIRONMENTAL ENGINEER FOR AND ON BEHALF OF THE KERALA STATE POLLUTION CONTROL BOARD



Standing counsel for the 4th respondent

Rema Smrithi. V. K., Advocate
Additional Standing Counsel, National
Green Tribunal, (SZ), CHENNAI

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VOLUME – I

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Dated this the 21st day of December, 2024.

Rema Smrithi. V. K., Advocate

Standing Counsel for the 4th Respondent

BEFORE THE HONOURABLE NATIONAL GREEN TRIBUNAL

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VOLUME – II

ANNEXURES

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	Annexure 2 – Minutes of the meeting conducted by the Member Secretary on 02.11.2024	37-39

Dated this the 21st day of December, 2024.

Rema Smrithi. V. K., Advocate

Standing Counsel for the 4th Respondent

BEFORE THE HONOURABLE NATIONAL GREEN TRIBUNAL

SOUTH ZONE, CHENNAI

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Vs

The Principal Secretary to Govt. of Kerala, Environment Department & Ors.	:	Respondent(s)

REPORT FILED BY THE CHIEF ENVIRONMENTAL ENGINEER FOR AND ON BEHALF OF THE KERALA STATE POLLUTION CONTROL BOARD

I, Baburajan P K, aged 53 years, am the Chief Environmental Engineer, Regional Office, Kerala State Pollution Control Board, Ernakulam. I am competent to and duly authorized to represent the 4th Respondent in the above application. I know the facts and circumstances of the case. The factual submissions made here under are true and correct to the best of my knowledge ,information and belief. In these circumstances, it is just and necessary that this Hon'ble Tribunal may be pleased to accept the accompanying information on file and it is so humbly prayed in the interests of justice in this case.

BABURAJAN P.K.
Chief Environmental Engineer

1. In continuation to the report submitted on 29/04/2024 by Kerala State Pollution Control Board, wherein it was reported that The Kerala State Pollution Control Board (KSPCB) has been coordinating a study with CSIR-NEERI based on which CSIR-NEERI team conducted filed visit, data collection, monitoring, measurement and collection of wastewater samples for the project activities at Cochin from April 15-16, 2024. A detailed feasibility study, essentially covering data in pre-monsoon season (representing the worst scenario) was reported as essential for the development of a scientific and technically sound process package that would ensure environmental compliance in the long term. The Board has taken utmost interest and urgent action to get the project done through NEERI in compliance with the order of Hon'ble NGT.

2. NEERI has submitted an interim status report on 12.09.2024. The time line of the progress is shown in the report. The base map of canal/drains have been prepared and water quality analysis of the samples collected from the canals are included in the report. Copy of report is attached as **Annexure 1.**

3. NEERI officials had visited Edapally and Perandoor canal for second field visit on 15th, 16th and 17th of October 2024. Samples were taken from all the same locations from where pre monsoon samples were collected and sent to NEERI lab at Nagpur for further analysis.

4. NEERI has requested for secondary data from stakeholder departments for completion of their report. In the light of this, a review meeting was conducted by the Member Secretary on 02/11/2024 to discuss the way forward. Accordingly, the concerned authorities were again requested to provide the secondary data available. Copy of Minutes of the meeting is attached as **Annexure 2.** Letters were issued to concerned stakeholder departments namely Kerala Water Authority, Suchitwa Mission, Irrigation Department, Kochi Corporation, Kollam Corporation, Karunagapally municipality & secondary data is being collected. Details received are shared with CSIR-NEERI.

5. The Board has released the 2nd installment of financial assistance of Rs 10,62,000/- through proceedings KSPCB/1038/2023-AE-10 dated 30.11.2024 as per the Memorandum of Agreement signed between Board and NEERI

6. It is humbly submitted that the matter is being followed up to get the feasibility project done through CSIR-NEERI, in compliance with the order of Hon'ble NGT.

BABURAJAN P.K.
Chief Environmental Engineer

All that is stated above are true to the best of my knowledge information and belief.

Dated this the 21st day of December, 2024.

BABURAJAN P.K.
Chief Environmental Engineer

Chief Environmental Engineer

सी. एस. आय. आर. - राष्ट्रीय पर्यावरण अभियांत्रिकी अनुसंधान संस्थान
CSIR - National Environmental Engineering Research Institute
नेहरू मार्ग, नागपुर - ४४० ०२०, महाराष्ट्र, भारत Nehru Marg, Nagpur 440 020, Maharashtra, India
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Speed Post/ E-mail

WWM/PM/ KSPCB/10
September 12, 2024

To,
The Member Secretary,
Kerala State Pollution Control Board (KSPCB)
Pattom, P.O., Thiruvananthapuram- 695 004

Sub: Submission of the Draft Interim Report.

Ma'am,

This is in reference to your Letter [No. KSPCB/245/2023-AE-13] dated September 05, 2024, received on WhatsApp on September 10, 2024 regarding submission of the progress activities. Kindly find herewith the Draft Interim Report (copy enclosed) based on the first round of monitoring for the project entitled "Feasibility Study on Development of Process Package for Treatment of Domestic Sewage (Edappally, Perandoor, Pattolit, and Valiyat Canals) to Meet Environmental Compliance" for your kind perusal and comments, please.

Looking forward to your earliest response in this matter.

Thank you, and warm regards,

Copy Encl.: Draft Interim Report

Your's Sincerely

Pravin Manekar

Draft Interim Report

Feasibility Study on Development of Process Package for Treatment of Domestic Sewage (Edappally, Perandoor, Pattolit and Valiyat Canals) to Meet Environmental Compliance

Sponsor

Kerala State Pollution Control Board,
Thiruvananthapuram

CSIR-National Environmental Engineering Research Institute
Nehru Marg, Nagpur – 440 020

September 12, 2024

Draft Interim Report

Feasibility Study on Development of Process Package for Treatment of Domestic Sewage (Edappally, Perandoor, Pattolit and Valiyat Canals) to Meet Environmental Compliance

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Nehru Marg, Nagpur – 440 020

September 12, 2024

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Draft Interim Report

Feasibility Study on Development of Process Package for Treatment of Domestic Sewage (Edappally, Perandoor, Pattolit and Valiyat Canals) to Meet Environmental Compliance

1.0 Preamble

As per Kerala State Pollution Control Board (KSPCB), Thiruvananthapuram, requested vide letter [No. PCB/HO/EE3/ O.A/ No.27 / 2021 (SZ)/ 2021] dated May 08, 2023, addressed to the Director, CSIR-National Environmental Engineering Research Institute(CSIR-NEERI), Nagpur, regarding the visit of two experts for a site visit to examine the feasibility of the Phytorid Wastewater Treatment Technology or any other similar technology for liquid waste management and submit the site visit report. Accordingly, a two-member team from CSIR-NEERI, Nagpur, and officials of different Departments of Kerala visited the concerned sites during May 11-13, 2023. During this visit, locations of Canal/Drain/Nallah/River/Lake were identified, which carry untreated domestic wastewater as well as solid and plastic wastes from different locations or municipal areas.

Based on the site visit and preliminary discussions with the officials of KSPCB and different Government departments, the Site Visit Report based on observations also way forward for managing the discharge of untreated domestic sewage/septage, and effluent from the respective municipalities, houseboats, and prawn peeling industries into different water bodies was submitted to the KSPCB, Thiruvananthapuram on May 30, 2023. Thereafter, based on the CSIR-NEERI's Site Visit Report, KSPCB requested CSIR-NEERI, Nagpur vide letter [No. PCB/HO/EE3/OA. No. 27/2021(SZ)/2021] dated July 04, 2023, to submit the Project Proposal with the scope of the work and financial budget. The Project Proposal for a feasibility study for developing a process package for domestic sewage to meet Environmental Compliance was submitted to KSPCB on July 28, 2023.

Lateral, the Member Secretary of the KSPCB requested through email, dated August 23, 2023, to submit a proposal for a feasibility study on the development of a process package for domestic sewage to meet environmental compliance for two sites, Pattolit and Valiyat Canals discharging sewage into Pallikalar River and Edappally and Perandoor canals. Accordingly, CSIR-NEERI submitted the proposal and

subsequently issued a work order to conduct a feasibility study on developing a process package for treating domestic sewage of Edappally, Perandoor, Pattolit, and Valiyat canals to meet environmental Compliance. The first installment of the said study was released by KSPCB on February 26, 2024. Work was immediately taken up after that. A complete Project chronology is given in **Table 1.**

Table 1: Project Chronology

Sr. No.	Description	Dates
1.	Request from Member Secretary of Kerala State Pollution Control Board (KSPCB) Thiruvananthapuram for site visit of CSIR-NEERI Scientist	May 08, 2023
2.	Thesite visit is carried out by CSIR-NEERI	May 11-13, 2023
3.	The Site Visit Report submitted to KSPCB, Thiruvananthapuram	May 30, 2023
4.	Request for submitting the project proposal based on site visit Report	July 04, 2023
5.	Submission of three project proposals for domestic sewage, septage, and prawn peeling industries	July 28, 2023
6.	Out of three proposals, accept one proposal on domestic sewage and request to add the site of Pallikalar (Karunagapally municipality)	August 23, 2023
7.	Submission of the revised proposal	September 22, 2023
8.	Work order issue date	September 23, 2023
9.	Requesting CSIR-NEERI to reduce the time period of the project from 15 months to 12 months	October 30, 2023
10.	Letter from CSIR-NEERI for trying to complete the study in 12 months	November 6, 2023
11.	Draft MoA submitted to KSPCB	November 28, 2023
12.	Final project proposal submission to sponsor	January 24, 2024
13.	Invoice raised by CSIR-NEERI	January 24, 2024
14.	MoA final	February 19, 2024
15.	First instalment received	February 26, 2024
16.	First monitoring started by CSIR-NEERI	April 14-19, 20024
17.	Submission of Progress Report based on the first round of monitoring to KSPCB, Trivandrum	April 25, 2024
18.	Request letter and email for secondary data sent to official KSPCB, Trivandrum	May 1, 2024
19.	Shapefile received from the KSPCB	June 15, 2024
20.	Request for secondary data sent to official of KSPCB, Trivandrum by Whatsapp	August 28, 2024

2.0 Need for Feasibility Study

Development of a process package for the treatment of Domestic waste in natural systems is a complex task as it has to address:

- Variation in wastewater flow and characteristics which is diurnal as well as seasonal.
- The topographical and site-specific conditions.
- Different sources of pollution and their contributions.
- Selection of appropriate technology or combinations thereof to ensure compliance with the prescribed norms by the National Green Tribunal (NGT).
- Decision on single or multiple decentralized treatment units
- Delineation of an appropriate treatment scheme/train, sludge management, treated water discharge, etc.

Therefore, a detailed feasibility study, essentially covering data in pre-monsoon season (representing the worst scenario), is essential for the development of a scientific and technically sound process package that would ensure environmental compliance in the long term. It also assesses the performance viability of various treatment processes and delineates the most appropriate treatment scheme with design specifications, including tentative CAPEX and operating and maintenance costs required to treat wastewater for environmental compliance. A detailed project report (DPR) has to be prepared based on the feasibility report for its full-scale implementation. A process package thus developed based on a scientific feasibility study will be key for the successful implementation of the techno-economically viable scheme for treating domestic sewage to meet environmental compliance.

3.0 Objective

The project aims to prepare the feasibility report for developing the process package for domestic sewage from the various canals to meet Environmental Compliance.

4.0 Scope of Work:

Based on the above objective, the following is the project scope of work:

- Delineation of the stormwater and raw sewage catchment area discharged into the Canal/Nallah/Drain.

- Physico-chemical characterization of two seasons (based on the primary data) and quantification (based on the secondary data) of domestic sewage from different municipalities flowing into the Canal/Nallah/Drain.
- Population forecasting for designing the hydraulic load on the treatment scheme.
- Estimation of pollution loads of sewage discharge from different areas of municipalities.
- Evaluation of Drain/Canal/Nallah configuration for the feasibility of In-situ or Ex-situ treatment.
- Delineation of the site-specific In-situ or Ex-situ treatment scheme to meet Environmental Compliance.
- A topography survey of the Drain/Canal/Nallah as per In-situ or Ex-situ treatment
- Delineation of conceptual frame design of the recommended treatment scheme with basic engineering design details and specifications (excluding the detailed engineering) for treating the domestic sewage flowing into the Nallah /drain/Canal.
- Tentative cost estimation of the recommended In-situ or Ex-situ treatment schemes.
- Project implementation strategy and schedule for in-situ or Ex-situ treatment
- Preparation of process package for In-situ or Ex-situ treatment for sewage from the above-mentioned municipalities flowing into Nallah/Canal/drain.
- Submission of Report.

5.0 Study Area

The study area lies in the Ernakulam and Kollam districts of Kerala State. The base map of the study area is prepared based on Survey of India topo sheets [Nos. 58B/4, 58B/10, and 58C/5] for Ernakulam and Kollam 58C/12 districts and the digital information received from KSPCB shown in **Figures 1 and 2**, respectively. The Edappally and Thevara-Perandoor (TP) canals are situated in Ernakulam district. The length of the Edappally canal is approximately 12 km, which originates from the Periyar River and the confluence with the Chambakkara canal. The Thevara-Perandoor (TP) canal originates between the interconnection of the Thevara canal, and at

approximately 10 km downstream, the canal is the confluence with the Perandoor canal within Kochi City. TP canal was previously used for business purposes, namely, navigation and trading. Both canals receive stormwater and domestic sewage from different Municipalities and are discharged into different water bodies (**Figure 1)**. The Pattolit and the Valiyat canals are situated in the Kollam districts, which also receive stormwater and domestic sewage from the Karunagapally Municipality area and finally discharged into the Pallikal River (**Figure 2)**.

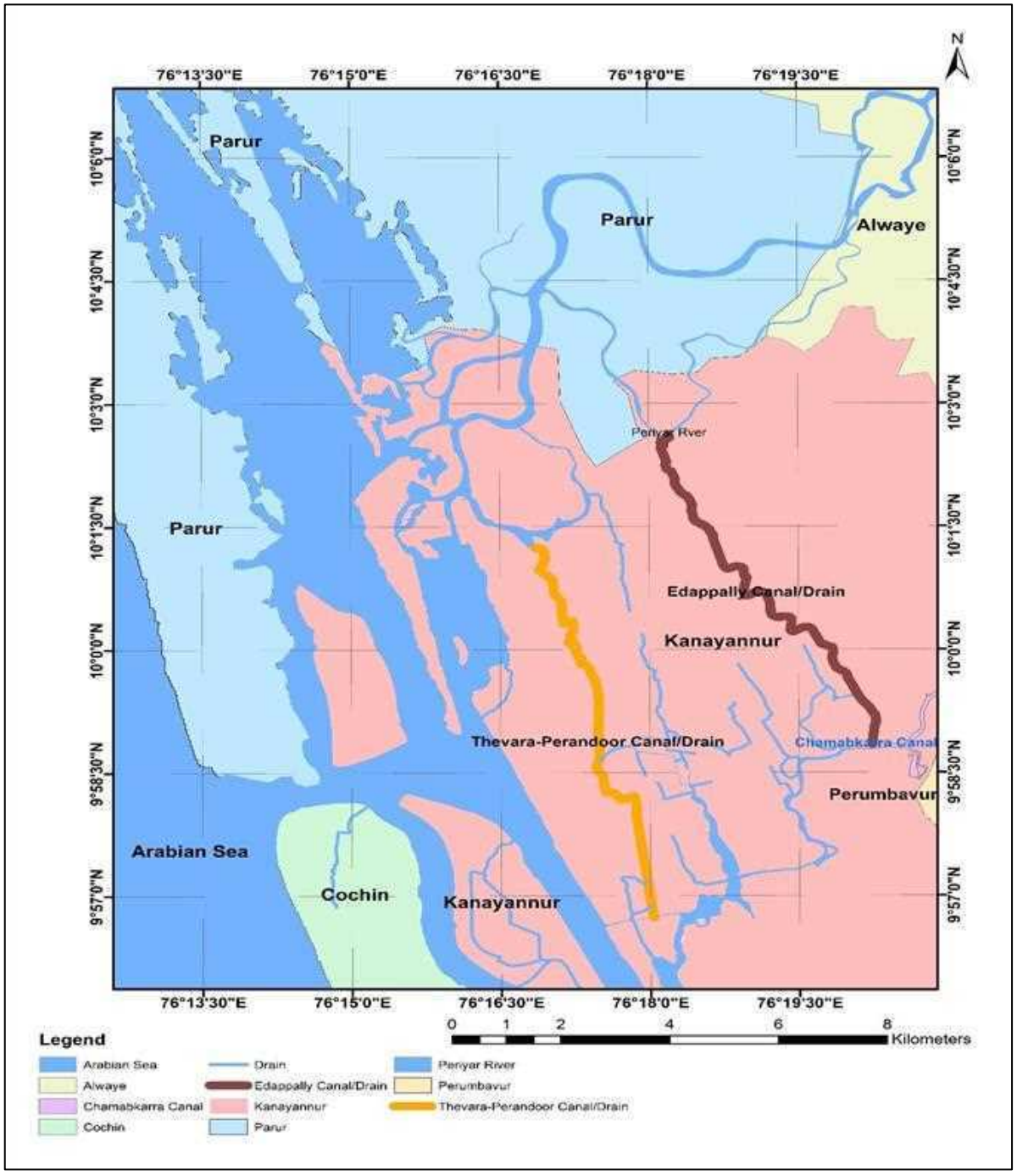


Figure 1: Base map of Edappally and Thevara-Perandoor (TP) Canals/Drain

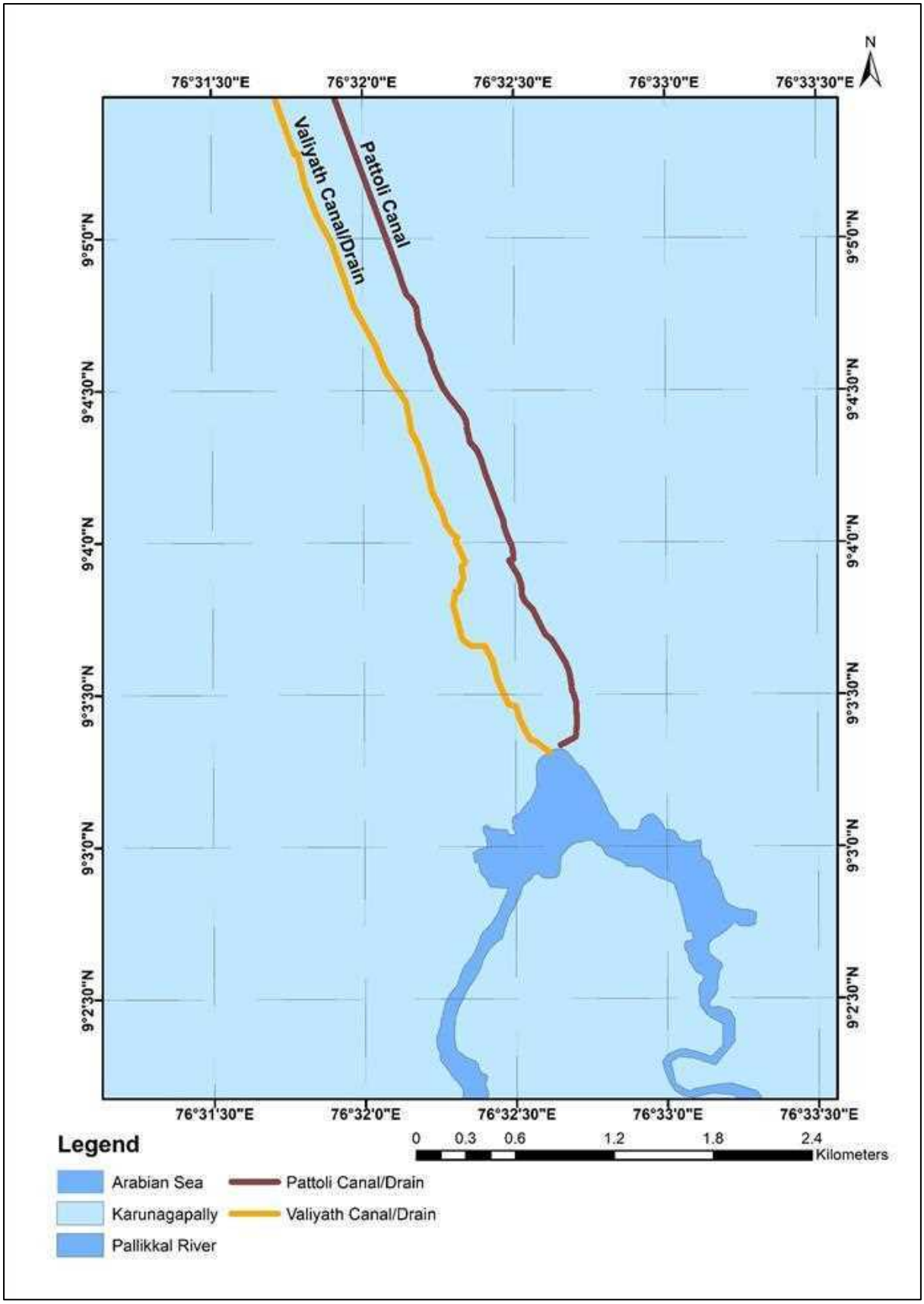


Figure 2: Base map of Pattolit and Valiyat Canals/Drain

6.0 Site Observations

The following are site-specific observations of the Edappally, Thevara-Perandoor canals situated in Ernakulam district and Pattolit and Valiyat canals located in Kollam district:

- The aerial length of the Edappally canal is approximately 12 km, which originates from the Periyar River and the confluence with the Chambakkara canal. The configuration of the canal throughout its length is not uniform in terms of width and depth. There is the tidal effect in the canal, which allows the flow of water/wastewater in both directions. The main purpose of the canal was navigation and trading. Presently, it carries stormwater and domestic sewage generated from the Kochi Municipal Corporation area.
- The Edappally canal passing adjacent to Lulu Mall was found covered with water hyacinth at the top surface and sludge deposited at the bottom. Therefore, monitoring the flow and collecting the wastewater samples was difficult. However, the sample collection and flow monitoring were shifted to 40m upstream from the bridge near the Lulu Mall.
- Harvesting of fish by the local people was carried out during monitoring near the confluence of Edappally and Champakkara canals (**Plate 1)**.
- The Thevara-Perandoor (TP) canal originates between the interconnection of the Thevara canal, and at approximately 10 km downstream, the canal is the confluence with the Perandoor canal within Kochi City. This canal was previously used for business purposes, namely, navigation and trading. The configuration of the canal throughout its length is not uniform. The tidal effect in the canal allows the flow of water/wastewater in both directions. Presently, it carries stormwater and domestic sewage generated from the Kochi Municipal Corporation area.
- Pattolit and Valiyat canals carry stormwater and untreated domestic sewage from the inhabitants of the Karunagapally Municipality area, which is finally discharged into the Pallikal River. The configuration of both canals, as monitored, is not uniform in terms of width and depth. During the monitoring, the septic condition and water hyacinth were also observed. Some portion of the canals at the top was also covered with concrete slabs.
- As per the KSPCB, Kollam households have been facilitated with the septic tank, and its overflow is discharged into the canal. This indicates that there is

no sewerage system or sewage treatment plant to carry and treat domestic sewage generated by households. Therefore, the sewage is discharged into the above-mentioned canals.

7.0 Details/Inputs of Secondary Data From KSPCB

The project activities entitled Feasibility Study on Development of Process Package for Treatment of Domestic Sewage (Edappally, Perandoor, Pattolit, and Valiyat Canals) to Meet Environmental Compliance depend on details of the primary and secondary data. CSIR-NEERI collected the primary data during the field monitoring and requested the details of the secondary data from KSPCB, Thiruvananthapuram, the Chief Environmental Engineer, Thiruvananthapuram/Ernakulam, and the Environmental Engineer, Kollam, as presented in **Tables 2 and 3**. However, some of the data has been received from the Head Office of KSPCB, Thiruvananthapuram. Once again, it is requested KSPCB, Thiruvananthapuram, expedite the secondary data for report preparation. After receiving the secondary data, it will be reviewed and utilized to finalize the report.

Table 2: Details/inputs of secondary data of Edapally and Perandoor Canals/Drains in Ernakulam/ Kochi city required from the concerned department through KSPCB

Sr.No.	Details/Input of secondary data from KSPCB	Response
	Edapally and Perandoor Canals/Drains in Ernakulam/ Kochi city	
1.	Administrative boundary of Ernakulam/ Kochi cites and canals/drains **(Annexure-I)**	Data has been received
2.	Catchment plan of the canals/drains	Data yet to be received
3.	Secondary data regarding any ward boundary, drainage network, or minor and major road network in drawings, maps, reports, etc **(Annexure-I)**	Some data has been received
4.	Detailed Project Reports, if available, of similar or any other work carried out in the area.	Data yet to be received
5.	The point and non-point sources of domestic wastewater, industrial, or other wastewater discharged into the four identified canals/drains.	
6.	Details of identified four canals/drains concerning depth, width, length, and wastewater flow (if any).	
7.	Details of the canals/ drains cleaning frequency.	

8.	Existing and future plans for Ernakulam/ Kochi canals	Data yet to be received
9.	Population data of Ernakulam/ Kochi (Last 40 years) along the canals/drains.	
10.	Current water supply for the cities and future plans.	
11.	Details of any existing sewerage system and sewage treatment plants (STPs), including sewage collection, conveyance, treatment, disposal, including fecal sludge treatment along the canals/drains.	
12.	Secondary data of physicochemical and bacteriological (total count and fecal counts) analysis of wastewater flowing into four identified canals/drains at different locations (if any).	
13.	Quantity of Dry Weather Flow (DWF) and Wet Weather Flow (WWF), if any.	
14.	Data information related to the identified drains in digital format / GIS format (shape file) / Auto-Cad format for project conceptualization and formulation.	
15	Details of the space available under government bodies for treating the incoming and flowing wastewater from the identified canals/drains.	
16.	If any other data relevant to the study is given by KSPCB for report preparation, it will be appreciable.	

Table 3: Details/inputs of secondary data of Pattolit and Valiyat canals/drains in Kollam city required from the concerned department through KSPCB

Sr.No.	**Details/Input of secondary data from KSPCB**	**Response**
	Pattolit and Valiyat canals/drains in Kollam city	
1.	Administrative boundary of Kollam cites and canals/drains**(Annexure-II)**	Data has been received
2.	Catchment plan of the canals/drains	Data yet to be received
3.	Secondary data regarding any ward boundary, drainage network, or minor and major road network in drawings, maps, reports, etc. **(Annexure-II)**	Some data has been received
4.	Detailed Project Reports, if available, of similar or any other work carried out in the area.	Data yet to be received
5.	The point and non-point sources of domestic wastewater, industrial, or other wastewater discharged into the four identified canals/drains.	
6.	Details of identified four canals/drains concerning depth, width, length, and wastewater flow (if any).	
7.	Details of the cleaning frequency of canals/ drains.	
8.	Existing and future plans for Pattolit and Valiyat canals.	
9.	Population data of Kollam (Last 40 years) along the canals/drains.	
10.	Current water supply for the cities and future plans.	
11.	Details of any existing sewerage system and sewage treatment plants (STPs), including sewage collection, conveyance, treatment, disposal, including fecal sludge treatment along the canals/drains.	
12.	Secondary data of physicochemical and bacteriological (total count and fecal counts) analysis	

	of wastewater flowing into four identified canals/drains at different locations (if any).	
13.	Quantity of Dry Weather Flow (DWF) and Wet Weather Flow (WWF), if any.	
14.	Data information related to the identified drains in digital format / GIS format (shape file) / Auto-Cad format for project conceptualization and formulation.	
15	Details of the space available under government bodies for treating the incoming and flowing wastewater from the identified canals/drains.	
16.	If any other data relevant to the study is given by KSPCB for report preparation, it will be appreciable.	

8.0 Flow Monitoring & Sampling and Analysis

Field monitoring comprises flow measurement and on-site monitoring of physical parameters of collected samples from different water bodies. The monitoring was carried out from April 15-18, 2024, to determine its water/wastewater quality and quantity and to identify various issues of the canals. The onsite flow measurement of different canals was carried out with an area velocity flow meter. The grab samples were collected from different locations of the four significant canals/drains, namely Edappally, Thevara-Perandoor, Pattolit, and Valiyath canals, and one water body, such as the Periyar River.

One water sample was collected from the Periyar River (**Plate 2**). Three samples were collected at different locations of the Edappally canal, starting from the Periyar River to the Chambakkara canal (**Plates 3-5**). Three wastewater samples were collected at different locations of the Thevara-Perandoor (TP) (**Plates 6-8**), starting from the interconnection of the Thevara canal upstream and downstream at the confluence with the Perandoor canal. The five and six wastewater samples were also collected from the Pattolit (**Plates 9-13**)and Valiyath canals (**Plates 14-19**), respectively. The details of the sampling locations, along with coordinates of the Periyar River, Edappally, Thevara-Perandoor, Pattolit, and Valiyat canals, are presented in **Table 4**. **Figures 3 and 4** present the Geographic Information System (GIS) based map indicating the corresponding sampling location respective study area.

Table 4: Details of the sampling location of Periyar River, Edappally, Thevara-Perandoor, Pattolit, and Valiyat canals

Site ID	Sample ID	Particulars	Latitude (N)	Longitude (E)
Periyar River (PR)				
EC-02	PR	Located at 50 m upstream of the starting point of the Edappally canal.	10°2'48"	76°18'11"
Edappally Canal/Drain (EC)				
EC-01	EC-01	Located at 30 m downstream of the confluence of the Periyar River and Edappally canal.	10° 2'36."	76°18'12."
EC-04	EC-02	Located at 2.25 km downstream of the EC-01 and 40 m upstream of the bridge near Lulu Mall.	10°1'36"	76°18'26"
EC-05	EC-03	Located at 7.25km downstream of EC-02 and 0.1km upstream of the Champakkara canal.	9°58'51"	76°20'14"
Thevara-Perandoor Canal/Drain (TPC)				
PC-01	TPC-02	Located at 3 km downstream of TPC-01.	9°58'11"	76°17'41"
PC-02	TPC-01	Located at 0.1 km downstream of the interconnection of the Thevara canal near the Thevara Railway line.	9°56'46"	76°18'1"
PC-03	TPC-03	Located at 3.25 km downstream of TPC-02 near Gokulam Convention Centre.	9°59'43"	76°17'24"
Pattolit Canal/Drain (PC)				
PT-01	PC-01	Located at 0.1 km upstream of the Pallikal River.	9° 3'20.01"	76°32'38.72"
PT-02	PC-02	Located at 0.9 km upstream of the Pallikal River	9° 3'41.48"	76°32'36.39"
PC-03	PC-03	Located at 1.7 km upstream of the Pallikal River	9° 4'8.31"	76°32'26.05"
PC-04	PC-04	Located at 2.9 km upstream of the Pallikal River.	9° 4'42.39	76°32'11.10"
PC-05	PC-05	Located at 3.4 km upstream of the Pallikal River.	9° 4'55.62"	76°32'6.25"
Valiyath Canal/Drain (VC)				
VC-01	VC-01	Located at 0.1 km upstream of the Pallikal River.	9° 3'25.04"	76°32'30.56"
VC-02	VC-02	Located at 0.75 km upstream of the Pallikal River.	9° 3'38.09"	76°32'23.61"
VC-03	VC-03	Located at 1.10 km upstream of the Pallikal River.	9° 3'46.10"	76°32'17.59"
VC-04	VC-04	Located at 1.30 km upstream of the Pallikal River.	9° 3'51.00"	76°32'19.00"
VC-07	VC-05	Located at 1.80 km upstream of the Pallikal River.	9° 4'8/17"	76°32'14.20"
VCS	VC-06	Located at 3.0 km upstream of the Pallikal River.	9° 4'38.76"	76°32'2.30"

Measurements of pH, temperature, and total dissolved solids were made onsite. Further analysis of these samples for physicochemical parameters is initiated at CSIR-NEERI, Nagpur, and is being analyzed according to Standard Methods for the Examination of Water and Wastewater, 23rd. Ed., American Public Health Association, American Water Works Association, & Water Environment Federation, Washington, DC, 2017 (APHA 2017).

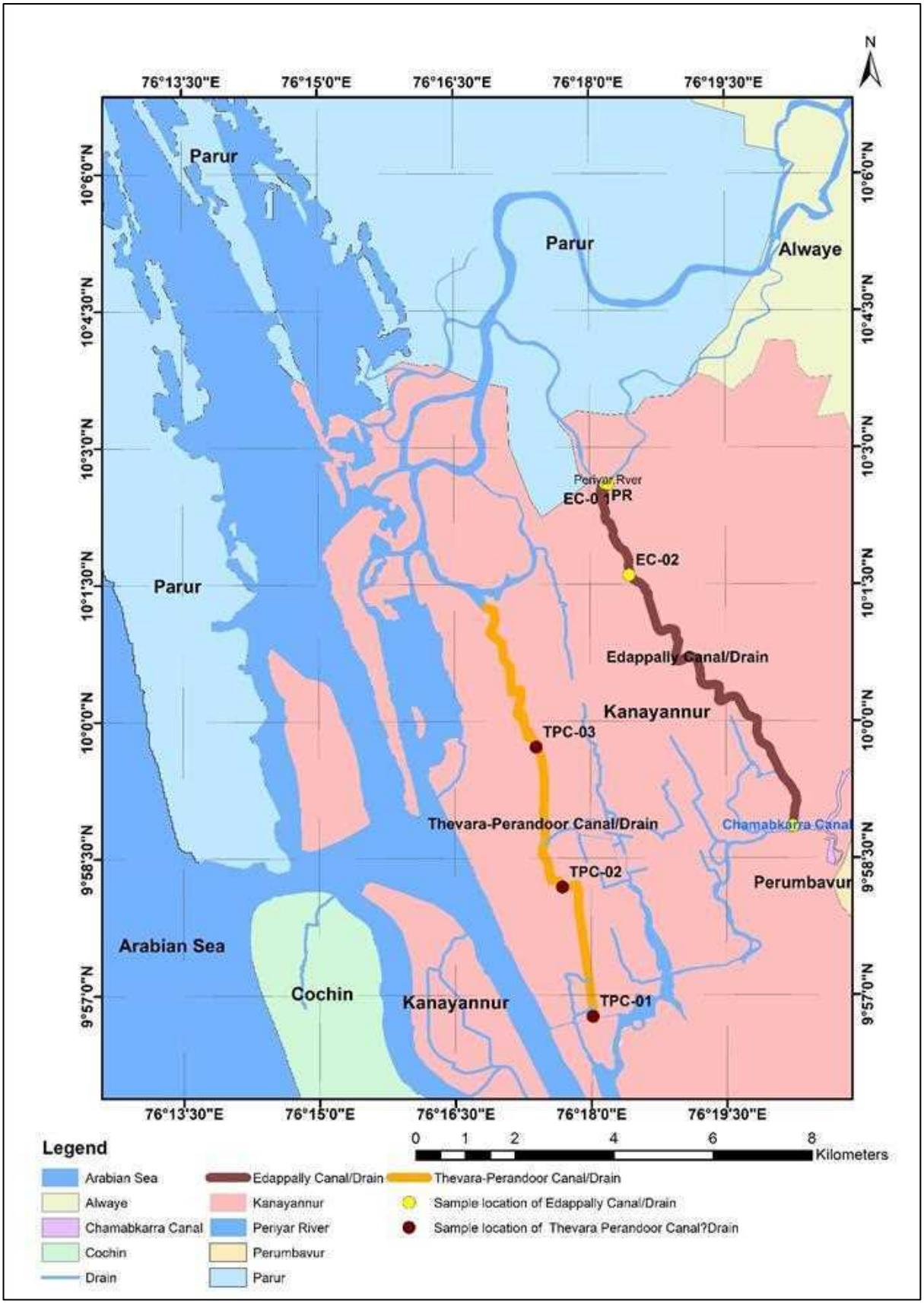


Figure 3: Sampling location of Edappally and Thevara-Perandoor (TP) Canals/Drains and Periyar River

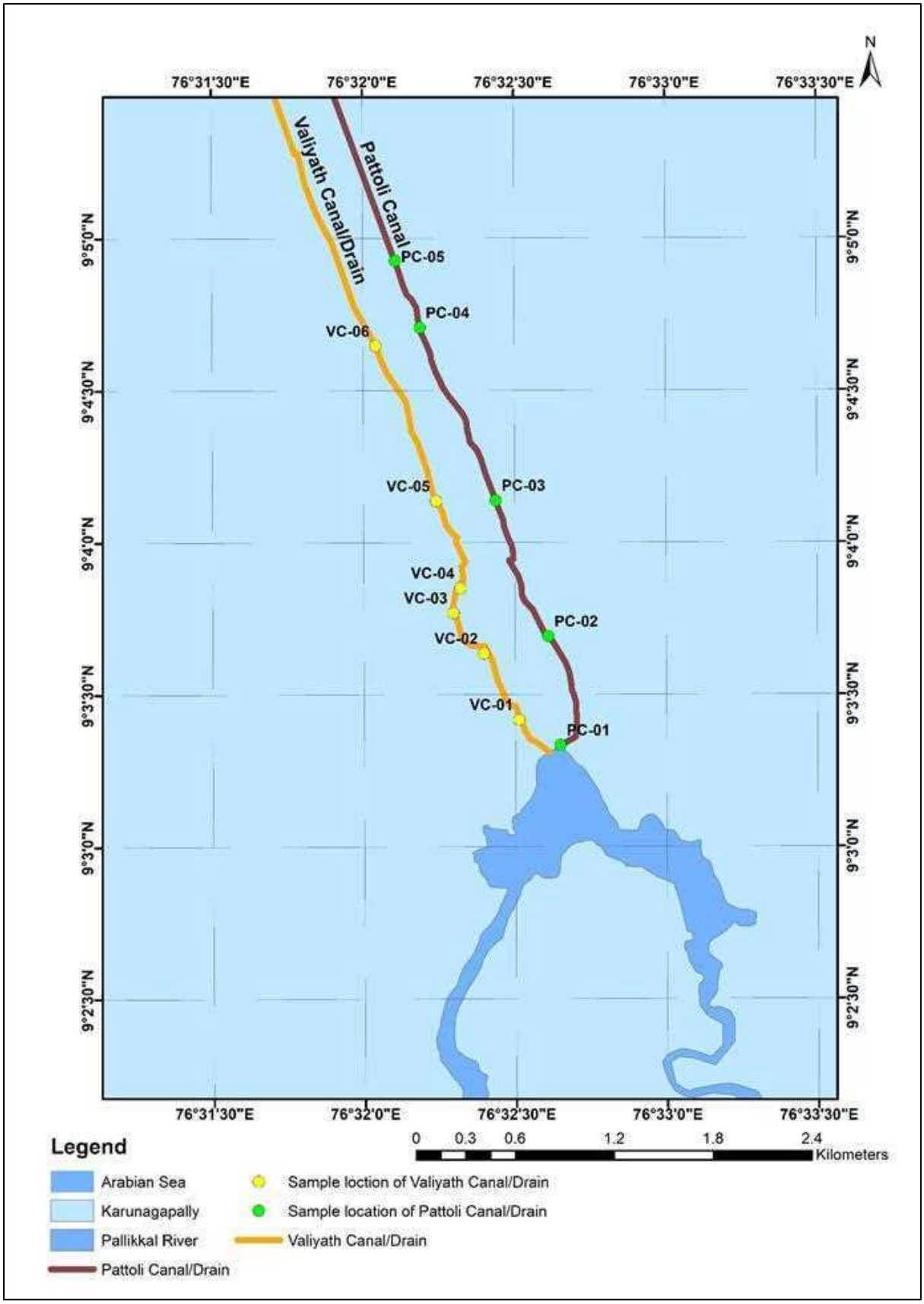


Figure 4: Sampling location of Pattolit and Valiyat Canals/Drains

9.0 Physicochemical Characteristics and Heavy Metals of Canals/Drains and Water Body

The physicochemical characteristics, including heavy metals of water samples collected from Edappally, Thevara**-**Perandoor, Pattolit, and Valiyath drains/canals and Periyar River, are presented in **Tables 5 through 8**. The results of the sampling events conducted during April 15-18, 2024, are detailed hereunder.

9.1 Edappally Canal/Drain and Periyar River

The water quality of the Edappally canal/drain was monitored at three locations (EC-01 to EC-03), as delineated in **Table 5**. The monitored pH values of the water samples at different locations varied from acidic to alkaline (6.4 - 7.3), with temperatures of 32.6 to 35.1^{o}C. The high suspended solids content in the water sample registered at locations EC-01, 02, and 03 were 276, 368, and 372 mg/l, respectively. The O&G concentrations in the three different locations of water samples ranged between 15-25 mg/L. TDS of the samples at EC-01 to EC-03 ranged between 500-1990 mg/L. The measured organic content in the water samples concerning COD and BOD values at (EC-01, 02, and 03) were 110 & 30, 282 & 120, and 91 & 10 mg/L, respectively. TKN (as N), ammoniacal nitrogen (NH_3-N), nitrate (as NO_3-), and phosphorous concentrations of the samples were in the range of 12–21, BDL–4, 0.54 -3.4 and 1.6-8.1 mg/L, respectively.

The heavy metal analysis of these three samples indicates that toxic elements, namely arsenic (as As), cobalt (as Co), cadmium (as Cd), chromium (as Cr), and cobalt (as Co), were either below the detectable limit or present in extremely low concentrations. aluminum (as Al), iron (as Fe), lead (as Pb), manganese (as Mn), Copper (as Cu), nickel, and zinc (as Zn) concentrations were found in the range 0.152-0.193, BDL–0.012, 0.040–0.087, BDL-0.004, **0.002-0.003,** BDL-0.012, and 0.066-0.158 mg/L, respectively.

The physicochemical characteristics of the Edappally canal/drain water samples (EC-01 to EC-03) were low in organics, inorganic, and nutrients and thus classified as low-strength. The heavy metal analysis of these water samples indicates below the detectable limit or present in extremely low concentrations. The water quality of Periyar River at sample location PR-01, i.e., upstream of the Edappally canal/drain, was similar to that of EC-01 due to the impact of the tidal effect.

Table 5: Physicochemical characteristics and heavy metals of water samples of Periyar River and Edappally Canal/Drain
(Monitoring 15-16 April 2024)

Sr. No.	Parameters	Water samples: Periyar River and Edappally Canal/Drain			
		PR-01	EC-01	EC-02	EC-03
1.	pH	6.7	7.3	6.4	6.5
2.	Temperature (℃)	31.8	32.6	33.4	35.1
3.	Oil & Grease	10	16	25	15
4.	Suspended solids	312	276	368	372
5.	Total dissolved solids	410	760	500	1990
6.	Chemical oxygen demand	97	110	282	91
7.	BOD	12	30	120	10
8.	TKN	8	12	21	15
9.	Ammoniacal nitrogen	BDL	BDL	4	2
10	Nitrate	1.0	3.4	0.54	0.87
11.	Phosphorous	0.81	1.6	8.1	3.5
Heavy metals					
12.	Aluminum (Al)	0.142	0.193	0.167	0.152
13.	**Arsenic (As)**	BDL	BDL	BDL	BDL
14.	**Cadmium (Cd)**	BDL	BDL	BDL	BDL
15.	**Chromium (Cr)**	BDL	BDL	BDL	BDL
16.	**Cobalt (Co)**	BDL	BDL	BDL	BDL
17.	Copper (Cu)	0.002	0.002	0.003	0.002
18.	Iron (Fe)	0.012	BDL	BDL	BDL
19.	Lead (Pb)	0.058	0.087	0.048	0.040
20.	Manganese (Mn)	0.004	BDL	BDL	BDL
21.	Nickel (Ni)	0.010	0.012	BDL	0.004
22.	Zinc (Zn)	0.158	0.103	0.066	0.127
23.	Flow, m^3/sec	NM	0.438	0.271	7.71

PR- Periyar River; EC- Edappally Canal; All values are expressed in mg/l except pH and temperature; BDL- BDL- Below detectable limit.

9.2 Thevara-Perandoor Canal/Drain

The water quality of the Thevara-Perandoor canal/drain was monitored at three different locations (TPC-01 to TPC-03), as presented in **Table 6**. The observed pH values at different locations varied from acidic to alkaline (6.3 - 7.3), with temperatures of 30.6 to 34.5ºC. The O&G concentration in the three different locations of water samples ranged between 08-18 mg/L. The high suspended solids content in the water sample registered at locations TPC -01, 02, and 03 were 316, 393, and 272 mg/l, respectively. TDS of the samples at TPC-01 was very high, 9450 mg/l, due to the tidal effect, and at the remaining two locations, it was 300 mg/L. The measured organic content in the water samples concerning COD and BOD values at (TPC -01, 02, and 03) were 300 & 30, 134 & 40, and 200 & 60 mg/L, respectively. TKN (as N),

ammoniacal nitrogen (NH_3-N), nitrate (as NO_3-), and phosphorous concentrations of the samples were in the range of 12–22, 1–4 and 1.7 -2.5 mg/L, respectively.

The heavy metal analysis of these three samples indicates that toxic elements, namely arsenic (as As), cadmium (as Cd), chromium (as Cr), cobalt (as Co), copper (as Cu), iron (as Fe), lead (as Pb) and manganese (as Mn), were either below the detectable limit or present in extremely low concentrations aluminum (as Al), nickel, and zinc (as Zn) concentrations were found in the range 0.132–0.149, BDL-0.004, and 0.070-0.127 mg/L, respectively.

The physicochemical characteristics of the Thevara-Perandoor canal/drain water samples (TPC-01 to TPC -03) were low in organics, inorganic except at TPC-01, and nutrients, thus classified as low-strength. The heavy metal analysis of these water samples indicates below the detectable limit or present in extremely low concentrations.

Table 6: Physicochemical characteristics and heavy metals of water sample of TP Canal/Drain
(Monitoring 15-16 April 2024)

Sr. No.	Parameters	Water sample: Thevara-Perandoor Canal/Drain		
		TPC-01	TPC-02	TPC-03
1.	pH	6.3	6.6	7.3
2.	Temperature (℃)	34.5	32.5	30.6
3.	Oil & Grease	08	12	18
4.	Suspended solids	316	393	272
5.	Total dissolved solids	9450	300	300
6.	Chemical oxygen demand	300	134	200
7.	BOD	30	40	60
8.	TKN	12	22	12
9.	Ammoniacal nitrogen	2	4	1
10	Nitrate	0.49	2.54	0.25
11.	Phosphorous	2.0	1.7	2.5
Heavy Metals				
12.	Aluminum (Al)	0.149	0.132	0.145
13.	Arsenic (As)	BDL	BDL	BDL
14.	Cadmium (Cd)	BDL	BDL	BDL
15.	Chromium (Cr)	BDL	BDL	BDL
16.	Cobalt (Co)	BDL	BDL	BDL
17.	Copper (Cu)	BDL	BDL	BDL
18.	Iron (Fe)	BDL	BDL	BDL
19.	Lead (Pb)	BDL	0.017	0.001
20.	Manganese (Mn)	BDL	BDL	BDL
21.	Nickel (Ni)	BDL	0.002	0.004

22.	Zinc (Zn)	0.079	0.070	0.127
23.	Flow, m^3/sec	2.02	2.08	1.371

C- Thevara-Perandoor Canal; All values are expressed in mg/l except pH and temperature; BDL- Below detectable limit

9.3 Pattolit Canal /Drain

The water quality of the Pattolit canal /drain was monitored at five locations (PC-01 to PC-05), as shown in **Table 7**. The observed pH values at different locations varied from acidic to alkaline (6.4 - 7.1), with temperatures of 30.0 to 33.2^{o}C. The high suspended solids content in the water sample registered at five locations PC -01 to PC -05) ranged from 256-412 mg/l, respectively. The O&G concentration in the five different locations of water samples ranged between 04-25 mg/L. TDS of the samples at PC-01 to PC-05 ranged between 180-610 mg/L. The measured low organic content in the water samples concerning COD values at PC-01, PC-02, PC-03, PC-04, and PC-04 were 48, 64, 78, and 64 mg/l, respectively, and at PC-05 was 132 mg/l. Meanwhile, BOD values from PC-01 to PC-04 were less than 10, and PC-05 was 20 mg/l. TKN (as N), nitrate (as NO_3-), and phosphorous concentrations of the samples were in the range of 2–10, 2.3-3.6, and 1.3 -1.8 mg/L, respectively. Ammoniacal nitrogen (NH_3-N) registered in all the sample locations was below detectable limits.

The heavy metal analysis of these three samples indicates that toxic elements, namely arsenic (as As), cadmium (as Cd), chromium (as Cr), cobalt (as Co), copper (as Cu), iron (as Fe), lead (as Pb), manganese (as Mn), and nickel (as Ni) were either below the detectable limit or present in extremely low concentrations of aluminum (as Al), and zinc (as Zn) concentrations were found in the range 0.132–0.194 and 0.106-0.139 mg/L, respectively.

The physicochemical characteristics of the Pattolit canal /drain water samples (PC-01 to PC-06) were low in organics, inorganic, and nutrients and thus classified as low-strength. The heavy metal analysis of these water samples indicates below the detectable limit or present in extremely low concentrations.

Table 7: Physicochemical characteristics and heavy metals of Pattolit Canal/Drain *(Monitoring 16-17 April 2024)*

Sr. No.	Parameters	Water sample: Pattolit canal				
		PC-01	PC-02	PC-03	PC-04	PC-05
1.	pH	7.1	6.8	6.5	6.7	6.4
2.	Temperature (℃)	31.3	33.2	30	30.2	30

3.	Oil & Grease	15	25	04	08	10
4.	Suspended solids	256	408	396	412	404
5.	Total dissolved solids	610	180	200	190	180
6.	Chemical oxygen demand	48	64	78	64	132
7.	BOD	<10	<10	<10	<10	20
8.	TKN	2	5	9	5	10
9.	Ammoniacal nitrogen	BDL	BDL	BDL	BDL	BDL
10	Nitrate	2.3	2.8	3.6	2.5	3.0
11.	Phosphorous	1.3	1.3	2.7	1.6	1.8
Heavy metals						
12.	Aluminum (Al)	0.194	0.145	0.139	0.132	0.147
13.	Arsenic (As)	BDL	BDL	BDL	BDL	BDL
14.	Cadmium (Cd)	BDL	BDL	BDL	BDL	BDL
15.	Chromium (Cr)	BDL	BDL	BDL	BDL	BDL
16.	Cobalt (Co)	BDL	BDL	BDL	BDL	BDL
17.	Copper (Cu)	BDL	BDL	BDL	BDL	BDL
18	Iron (Fe)	BDL	BDL	BDL	BDL	BDL
19.	Lead (Pb)	BDL	BDL	BDL	BDL	BDL
20.	Manganese (Mn)	BDL	BDL	BDL	BDL	BDL
21.	Nickel (Ni)	BDL	BDL	BDL	BDL	BDL
22.	Zinc (Zn)	0.106	0.123	0.139	0.129	0.113
23.	Flow,m^3/sec	NP	NP	NP	0.005	NP

PC- Pattolit canal. All values are expressed in mg/l except pH and temperature; BDL- Below detectable limit. NP- Flow not possible.

9.4 Valiyath Canal /Drain

The water quality of the Valiyath canal /drain was monitored at six locations (VC-01 to VC-06), as delineated in **Table 8**. The observed pH values at different locations varied from acidic (6.3 – 6.8), with temperatures of 30.0 to 35.0^{o}C. The O&G concentrations in the six different locations of water samples ranged between 06-14 mg/L. The high suspended solids content in the water sample registered at three locations, VC-01 and VC-03, was 632 and 508 mg/l, respectively. However, at VC-02: 384 mg/l, VC-04 to VC-06, it was ranged between 232-384 mg/l. TDS of the samples at VC-01 to VC-06 ranged between 220-480 mg/L. The measured low organic content in the water samples concerning COD and BOD values at VC-01 to VC-06 ranged from 80-160 and <10 to 18 mg/l, respectively. TKN (as N), nitrate (as NO_3-), and phosphorous concentrations of the samples were in the range of 4–18, BDL-4.3, and 1.5 -2.7 mg/L, respectively. Ammoniacal nitrogen (NH_3-N) registered in all the sample locations was below detectable limits.

The heavy metal analysis of these three samples indicates that toxic elements, namely arsenic (as As), cadmium (as Cd), chromium (as Cr), cobalt (as Co), copper (as Cu),

iron (as Fe), lead (as Pb), manganese (as Mn), and nickel (as Ni) were either below the detectable limit or present in extremely low concentrations of aluminum (as Al), and zinc (as Zn) concentrations were found in the range 0.1342–0.161 and 0.076-0.159 mg/L, respectively.

The physicochemical characteristics of the Valiyath canal /drain water samples (PC-01 to PC-05) were low in organics, inorganic, and nutrients and thus classified as low-strength. The heavy metal analysis of these water samples indicates below the detectable limit or present in extremely low concentrations.

Table 8: Physicochemical characteristics and heavy metals of Valiyath Canal/Drain *(Monitoring 16-17 April 2024)*

Sr. No.	Parameters	Water sample: Valiyath Canal/Drain					
		VC-01	VC-02	VC-03	VC-04	VC-05	VC-06
1.	pH	6.3	6.8	6.7	6.5	6.5	6.4
2.	Temperature (℃)	35	30	32	30	32	33.1
3.	Oil & Grease	06	10	12	14	10	08
4.	Suspended solids	632	384	508	384	420	232
5.	Total dissolved solids	480	260	220	200	200	260
6.	Chemical oxygen demand	80	85	144	124	160	84
7.	BOD	<10	<10	16	13	18	<10
8.	TKN	6	4	10	18	5	5
9.	Ammoniacal nitrogen	BDL	BDL	BDL	BDL	BDL	BDL
10	Nitrate	BDL	4.3	5.2	2.1	3.4	2.2
11.	Phosphorous	2.1	2.7	1.5	2.5	2.3	2.2
Heavy Metals							
12.	Aluminum (Al)	0.161	0.151	0.145	0.134	0.143	0.145
13.	Arsenic (As)	BDL	BDL	BDL	BDL	BDL	BDL
14.	Cadmium (Cd)	BDL	BDL	BDL	BDL	BDL	BDL
15.	Chromium (Cr)	BDL	BDL	BDL	BDL	BDL	BDL
16.	Cobalt (Co)	BDL	BDL	BDL	BDL	BDL	BDL
17.	Copper (Cu)	BDL	BDL	BDL	BDL	BDL	BDL
18	Iron (Fe)	BDL	BDL	BDL	BDL	BDL	BDL
19.	Lead (Pb)	BDL	BDL	BDL	BDL	BDL	BDL
20.	Manganese (Mn)	BDL	BDL	BDL	BDL	BDL	BDL
21.	Nickel (Ni)	BDL	BDL	BDL	BDL	BDL	BDL
22.	Zinc (Zn)	0.159	0.156	0.083	0.097	0.076	0.160
23.	Flow, m^3/sec	0.080	NP	NF	0.015	MF	NF

VC- Valiyath Canal; All values are expressed in mg/l except pH and temperature; BDL- Below detectable limit. NP-Flow not possible; NF-No flow; MF-Meger flow.

The major physicochemical characteristics of water samples of Edappally, Thevara-Perandoor, Pattolit, and Valiyath, including Periyar, are presented in **Figures 5 and 6**. Based on the physicochemical parameters of the water samples collected at different locations of the four canals/drains, Edappally, Thevara-Perandoor, Pattolit, and Valiyath indicate that there is the discharge of stormwater and domestic sewage from the households of the different municipalities.

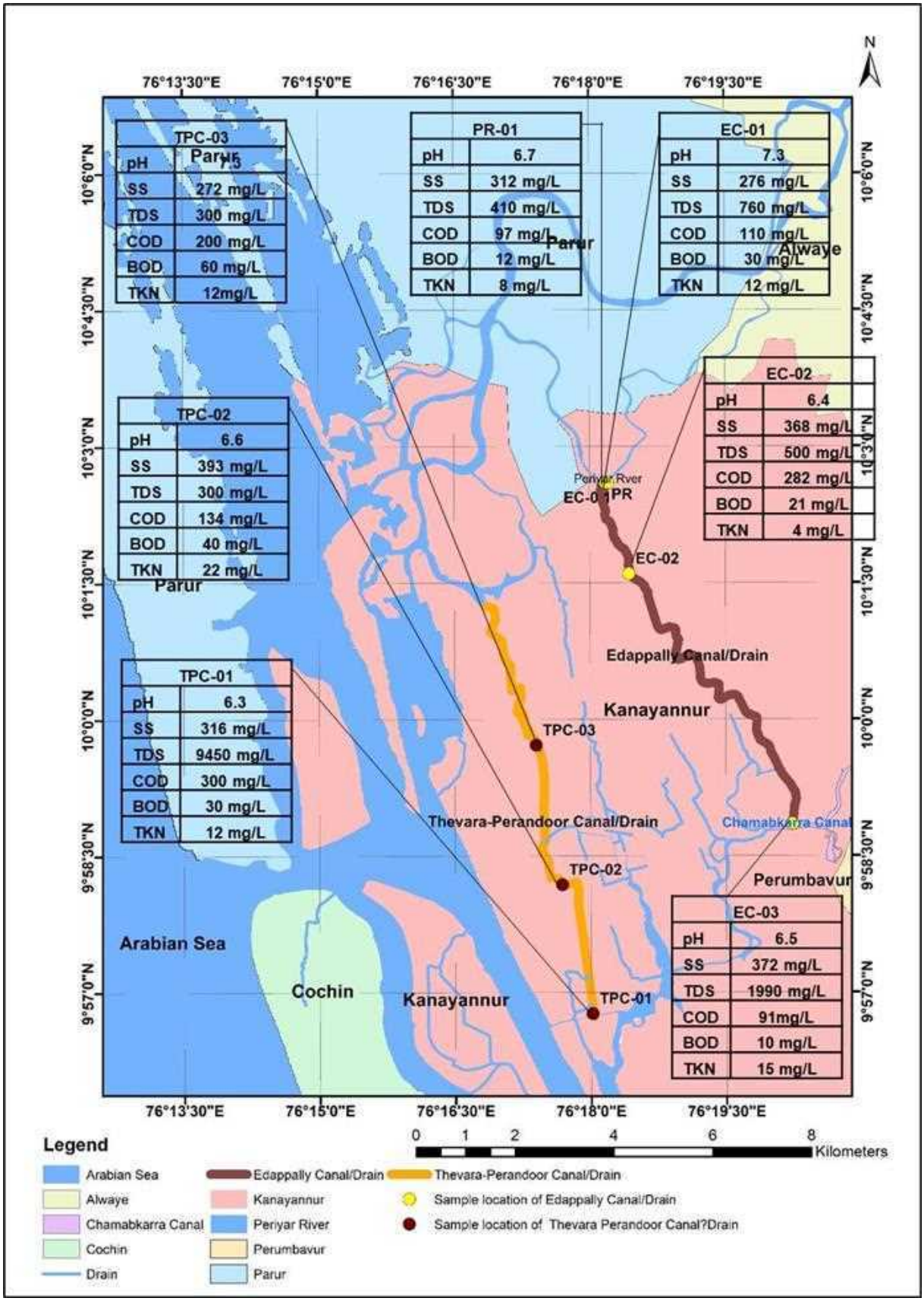


Figure 5: Spatial distribution of Edappally and Thevara-Perandoor (TP) Canal/Drains and Periyar River water quality concerning critical parameters

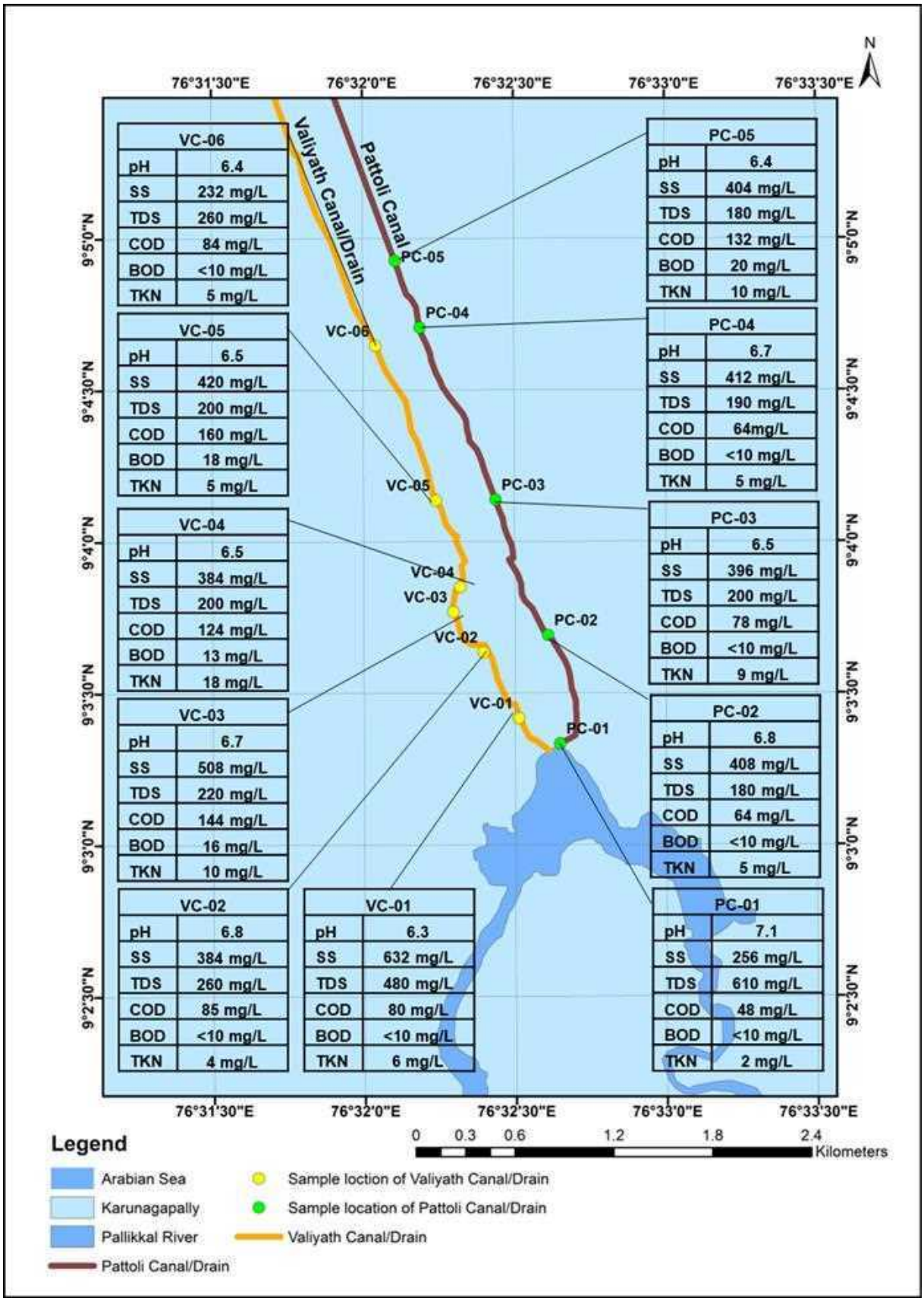


Figure 6: Spatial distribution of the Pattoli and Valiyath Canal/Drains Water quality concerning critical parameters

10.0 Future Course of Work

The second round of monitoring will be carried out either the last week of September 2024 or the first week of October 2024. The following activities of the work are to be carried out to prepare the Feasibility Study on the Development of a Process Package for the Treatment of Domestic Sewage (Edappally, Perandoor, Pattolit, and Valiyat Canals) to Meet Environmental Compliance:

- Identification of different point sources of domestic sewage and stormwater discharging along the length of the above four Canal/Drains (Second round of monitoring).
- Additional sampling locations will be identified along the stretch of the Canals/ Drains to determine the pollution status(Second round of monitoring)..
- Physico-chemical characterization of the collected water and wastewater samples for the identified locations of Edappally, Thevara-Perandoor, Pattolit, and Valiyat canals, including Periyar River(Second round of monitoring).
- Population forecasting for designing the hydraulic load on the treatment scheme (after receiving the secondary data).
- Estimation of pollution loads of sewage discharge from different areas of municipalities(after receiving the secondary data).
- Evaluation of Drain/Canal/Nallah configuration for the feasibility of In-situ or Ex-situ treatment.
- Based on the selection of treatment options, design, and basic engineering details and specifications will be prepared with project implementation strategy and submission of report.

Plate 1: Fish harvesting by local people near confluence of Edappally & Champakkara canals (Lat.:9°58'51"and Long. 76°20'14")

Plate 2: Pariyar Rive (PC) at 50 m upstream of the starting point of the Edappally canal(Lat.: 10°2'48"and Long.: 76°18'11")

Plate 3: Edappally Canal (EC-01) at 30 m downstream of the confluence of the Periyar River and Edappally Canal (Lat.: 10° 2'36." and Long.: 76°18'12.")

Plate 4: Edappally Canal (EC-02) at 2.25 km downstream of the EC-01 and 40 m upstream of the bridge near Lulu Mall.Edappally canal (Lat.:10°1'36" and Long.: 76°18'26")

Plate 5: Edappally canal (EC-03) at 7.25km downstream of EC-02 and 0.1km upstream of the Chabakarra canal (Lat.:9°58'51"and Long. 76°20'14")

Plate 6: Thevara-Perandoor (TPC-01) Located at 0.1 km downstream of the interconnection of the Thevara canal near the Thevara Railway line (Lat.: 9°56'46" and Long.: 76°18'1")

Plate 7 :Thevara-Perandoor (TPC-02) located at 3 km downstream of TPC-01 (Lat.: 9°58'11" and Long.: 76°17'41")

Plate 8: Thevara-Perandoor (TPC-03) Located at 3.25 km downstream of TPC-02 near Gokulam Convention Centre (Lat.: 9°59'43" and Long.:76°17'24")

Plate 9: Pattoli Canal (PC-01) located at 0.1 km upstream of the Pallikal River (Lat.:9° 3'20.01"and Long.:76°32'38.72")

Plate 10: Pattoli Canal (PC-02) located at 0.9 km upstream of the Pallikal River (Lat.: 9° 3'41.48"and Long.: 76°32'36.39")

Plate 11: Pattoli Canal (PC-03) located at 1.7 km upstream of the Pallikal River (Lat.: 9° 4'8.31"and Long.: 76°32'26.05")

Plate 12: Pattoli Canal (PC-04) located at 2.9 km upstream of the Pallikal River (Lat.: 9° 4'42.39and Long.: 76°32'11.10")

Plate 13: Pattoli Canal (PC-05) located at 3.4 km upstream of the Pallikal River (Lat.: 9° 4'55.62" and Long.: 76°32'6.25")

Plate 14: Valiyath Canal (VC-01) located at 0.1 km upstream of the Pallikal River (Lat.: 9° 3'25.04" and Long.: 76°32'30.56")

Plate 15: Valiyath Canal (VC-02) located at 0.75 km upstream of the Pallikal River (Lat.: 9° 3'38.09"and Long.: 76°32'23.61")

Plate 16: Valiyath Canal (VC-03) located at 1.11 km upstream of the Pallikal River (Lat.: 9° 3'46.10" and Long.: 76°32'17.59")

Plate 17: Valiyath Canal (VC-04) located at 1.30 km upstream of the Pallikal River (Lat.: 9° 3'51.00" and Long.: 76°32'19.00")

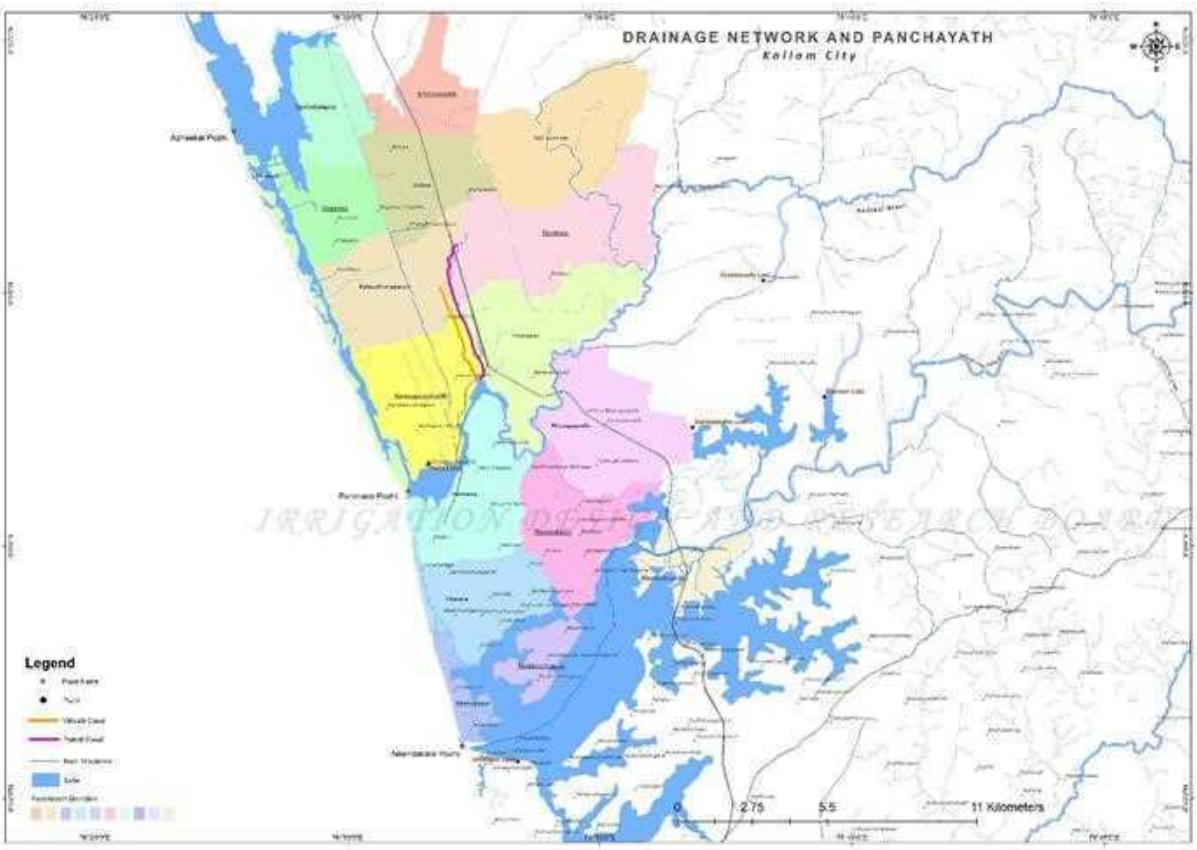
Plate 18: Valiyath Canal (VC-05) located at 1.8 km upstream of the Pallikal River (Lat.: 9° 4'8/17" and Long.: 76°32'14.20")

Plate 19: Valiyath Canal (VC-06) located at 3.0 km upstream of the Pallikal River (Lat.: 9° 4'38.76" and Long.: 76°32'2.30")

Annexure-I

Seconday data provided by KSPCB for Edappally-and Thevara -Perandoor Canals/Drain

Annexure-II



Seconday data provided by KSPCB for Pattolit and Valiyat Canals/Drain

Minutes of the VC meeting chaired by Member Secretary, KSPCB on 02.11.2024 regarding collection of secondary data requested by CSIR-NEERI in connection to OA 141/2021 & 27/2021

VC Meeting commenced at 3 pm with Member Secretary,KSPCB presiding. The Following officials were present in the meeting

1. Er. Vinaya K. S., Chief Environmental Engineer, Regional Office,Thiruvananthapuram
2. Er. Sreelakshmy P. B., Environmental Engineer, District Office-1,Ernakulam
3. Er. Rachel Thomas, Environmental Engineer, District Office, Kollam
4. Er. Pravitha P. K.,Assistant Environmental Engineer, Head Office, Thiruvananthapuram
5. Er. Sreetha A.M., Assistant Environmental Engineer, Regional Office,Thiruvananthapuram
6. Er. Ivan Biju Varghese, Assistant Engineer, Head Office, Thiruvananthapuram

Member Secretary welcomed all the participants. Member Secretary explained that the meeting is convened to discuss the actions to be taken in OA 141/2021 and OA 27/2024 related pollution of Perandoor- Edapally canals and Pallikkalar river. She added that in the latest order in both cases of Hon'ble NGT has directed Board to coordinate with CSIR- NEERI in finalizing the report at the earliest. CSIR–NEERI has requested secondary data for completing the report, which are forwarded to stakeholder departments through concerned district offices. The secondary data obtained from stakeholder departments were submitted to CSIR – NEERI , but the data obtained is not complete. Member Secretary expressed her concern that, in light of the latest order from the Hon'ble NGT directing CSIR-NEERI to submit its report, any reference to the unavailability of secondary data could reflect poorly on the Board.

Edapally-Perandoor Canal

DO-1 Ernakulam

Environmental Engineer DO-1 Ernakulam reported that data concerning the catchment plan of canals/drains, population statistics, and sources of pollution had been requested from Kochi Corporation and Irrigation Department. Irrigation department has provided the data available with them. However, the Corporation has not yet responded positively. As the Corporation is also a party in OA 27/2021, a follow-up will be conducted to seek an explanation for the non-cooperation in providing the requested data. Member Secretary instructed to follow up.

EE further informed that the entire canal is within the Corporation area. Member Secretary recommended using the ENVICLEAN mobile application for survey by project assistants to identify pollution sources and discharge points from major establishments. Once the survey is conducted using ENVICLEAN, a map can be generated and data can be directly provided to CSIR-NEERI.

The EE mentioned that the apartments and flats had already been manually mapped with their respective latitude and longitude coordinates. Member Secretary pointed out that the ENVICLEAN app now includes a new feature that allows users to add latitude and longitude without needing to visit the coordinates physically. GIS specialist will give training for using of ENVICLEAN App.

MS inquired about any similar studies conducted on these canals. Environmental Engineer responded that a study had previously been conducted on Edappally Thodu related to the Periyar River, and it can be shared. However, no such study has been done on Perandoor Canal. Regarding future plans for the Kochi Canals, Environmental Engineer explained that KMRL has proposed four

projects, and there is an STP project for the Perandoor Canal of GCDA, which will be implemented by the Kerala Water Authority. EE DO 1, Ernakulam said that those details will be collected and shared.

Water supply for city and Future plan- Environmental Engineer said that water supply for the area is from Periyar and details will be requested to Kerala Water Authority.

Physiochemical and bacteriological analysis of waste water – Environmental Engineer said the water sampling analysis results will be shared.

Space available under government bodies for treating the incoming and flowing wastewater from the canals- Member Secretary highlighted the importance of gathering data from the Revenue Department, as it is essential for the design of the treatment facility after the DPR is completed.

The Environmental Engineer, District Office-1, Ernakulam, stated that a committee exists in relation to OA 27/2021, with Kochi Corporation serving as the convener. It was discussed in the DLTC meeting to convene a meeting of the committee. Environmental Engineer said all these items will be presented in the committee meeting. Member Secretary instructed to follow-up the matter.

Pallikalar

District Office, Kollam

The Environmental Engineer, Kollam said there is difficulty in identifying the quality of water used since residences in the area have well also. Environmental Engineer said that Pattoli Canal and Valliyathu Thodu from Kayamkulam Kayal extends to Palllikkalar. CSIR- NEERI conducts the study in these areas and sampling also done in these areas. Since, it is widely spread out of municipal area, no data available.

MS instructed to collect data regarding the non point and point sources by conducting a survey in the major wastewater generating units using ENVICLEAN mobile application.

EE said that a proposal for 5 KLD septage plant is made by Suchitwa Mission. Member Secretary instructed to collect the project proposal data from Suchitwa Mission, in which some of these secondary data will be available.

MS instructed to submit waste quality analysis reports of establishments and to collect space availability for treating wastewater from Revenue department.

The Environmental Engineer, District Office , Kollam requested an Assistant Engineer from Regional Office , Thiruvananthapuram for survey of establishments , non points and points sources.

The Chief Environmental engineer, Regional Office said that only 2 Assistant Engineers are currently available since 1 Assistant Engineer is on maternity leave and service of one project assistant is available in Regional Office , Thiruvananthapuram can be utilized for the work .

MS instructed to spare Project Assistant of RO Trivandrum to District Office, Kollam for the survey. Environmental Engineer agreed the same. Member Secretary said any training for the survey will be given by GIS specialist of Board.

Member Secretary once again requested CEE, Trivandrum and Environmental Engineer DO-1 Ernakulam and Kollam to follow up the matter and to submit details urgently.

Meeting concluded by 3:30 pm

MEMBER SECRETARY

Copy to:

1. The CEE, RO, Trivandrum/Ernakulam
2. The EE, DO-1 Ernakulam / DO Kollam