BEFORE THE HONOURABLE NATIONAL GREEN TRIBUNAL

SOUTHERN ZONE, CHENNAI

Original Application no. 141/2021 (SZ)

State of Kerala & Others : Respondent(s)

Report filed by the Chief Environmental Engineer,
Kerala State Pollution Control Board, Regional Office, Thiruvananthapuram
on behalf of the Kerala State Pollution Control Board,
in Original Application No. 141/2021 (SZ)

Adv.**Remasmrithi.**V.K

ADDITIONAL STANDING COUNSEL

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Dated this the 16th day of August 2021.

Remasmrithi. V.K, Advocate
Additional Standing Counsel

BEFORE THE HONOURABLE NATIONAL GREEN TRIBUNAL

SOUTHERN ZONE, CHENNAI

Original Application no. 141/2021 (SZ)

State of Kerala & Others : Respondent(s)

VOLUME 2

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Dated this the 16th day of August 2021.

Remasmrithi V.K, Advocate
Additional Standing Counsel

BEFORE THE HONOURABLE NATIONAL GREEN TRIBUNAL
SOUTHERN ZONE, CHENNAI

Original Application no. 141/2021

State of Kerala & Others : Respondent(s)

Report filed by Chief Environmental Engineer, Kerala State Pollution Control Board, Regional Office, Thiruvananthapuram on behalf of the Kerala State Pollution Control Board, in Original Application No. 141/2021.

Introduction

It is respectfully submitted that the Chief Environmental Engineer, Regional Office, Trivandrum was authorized to represent the 5th respondent, Chairman, Kerala State Pollution Control Board in this Original Application. A copy of the authorization letter is produced herewith and marked as **Annexure 1.**

The issue under consideration in OA 141/2021 is pollution of the Pallikkal River which flows through three districts Pathanamthitta, Alappuzha and Kollam. The Original Application was registered by the Hon'ble NGT based on a newspaper report published in Kerala Kaumudi, web edition on 06.06.2021. As per the newspaper report the river bears semi decomposed waste from slaughter houses and huge amount of plastic waste which has settled down in the bottom of the river. The Hon'ble NGT has directed the District Collectors of Pathanamthitta, Alappuzha, Secretary, Karunagappally Municipality and Kerala State Pollution Control Board to file independent report including

KERALA STATE POLLUTION CONTROL BOARD * REGIONAL OFFICE * THIRUVANANTHAPURAM

BABURAJAN P.K.
Chief Environmental Engineer

the action taken by the departments to solve the issue and also to report the actions taken for the violations if any noticed. The Hon'ble NGT has also directed the Board to take samples of water and sediments from Pallickkal river in different areas and to suggest remedial measures and to take action against the responsible parties including imposing of environmental compensation if the water body is found to be contaminated.

Preliminary Report

As the river passes through three districts, Pathanamthitta, Kollam and Alappuzha, report including basic information were called for from the respective district offices of the Board and accordingly a preliminary report is furnished as below.

It is respectfully submitted that

1. The Pallickal River is a river in Kerala which originates from the lower foothills of the Western Ghats near Kodumon, Pathanamthitta district. It initially flows through several towns towards west. It passes through the towns of Adoor, Vadakkathukavu, Peringanad, Nooranad, Pallickal, Sooranad, Pavumpa,Pavumpa- Churuli, Thodiyur, Vadakkumthala, Kuttivattom, Mynagapally, Karunagapally, Ayanivelikulangara and Kandathil. On reaching Ponmana near Karunagapally the river empties into the Arabian Sea through Ashtamudi Lake. The flow of Pallikkal River and Pavumpa stream together forming the Vattakayal Lake which is surrounded by Pavumpa, Pavumpa - Churuli, Pavumpa-Manappally and Thodiyur. Pavumpa-Churuli, one of the most beautiful places in Karunagappaly is lying in between the Vattakkayal and Pallikal river (Pallikkalaru). The river has a length of 42 km with a drainage area of 220 square kilometres and falls into the Vattakayal Lake near Karunagappally.

KERALA STATE POLLUTION CONTROL BOARD * REGIONAL OFFICE *

BABURAJAN P.K.
Chief Environmental Engineer

2. In Pathanamthitta district a preliminary survey was conducted and it is understood that the river originates as a small creek (width less than 1 m) from the upstream side of Ezhamkulam Grama panchayat near Puthumala & flows towards the southern direction passing through 5 local bodies namely Erathu panchayath, Adoor municipality, Kadambanad panchayath, pallickal panchayath & leaves Pathanamthitta District at Anayadi near North Sooranad. The length of stretch of the river in the district is approximately 17 km and falls into Vattakayal Lake near Karunagappally. Field inspection & sampling of the Pallickal River at various locations was conducted on 11/08/2021 & 12/08/2021 after consultation with Irrigation department & Adoor taluk office. Water samples & sediment samples from 10 locations were collected, in consideration with at least one sample from each local body. Collected samples are forwarded to Central lab of the Board for analysis.

3. From preliminary observation it is understood that the river passes through agricultural land, residential area & commercial area. Major towns included are located in Ezhamkulam Grama Panchayat & Adoor municipality. Possibilities of pollution are due to solid waste disposal, pesticide disposal from agricultural land, sewage discharge from commercial & residential area. Industrial units are not located in immediate proximity of the river. More chances of liquid/ solid waste discharge are in Ezhamkulam Grama Panchayat & Adoor municipality.

4. The river as such is not flowing through Alappuzha District. However a preliminary enquiry was conducted on 26.07.2021. It is understood that a rivulet which flows downstream from Thamarakulam meets Pallickal river at Airottupalam in Shooranad north panchayath, Kollam Dist. Also another rivulet of the Pallickal River flows through Chooran Vayal which forms boundary with

BABURAJAN P.K.
Chief Environmental Engineer

KERALA STATE POLLUTION CONTROL BOARD
REGIONAL OFFICE
THIRUVANANTHAPURAM

Pathanamthitta district. Site enquiry was conducted at Erappan para(S1) and Kurunankulangara (S2) which are points(P1,P2) from the same rivulet in Thamarakulam Gramapanchayath. The rivulet flows from Kurunankulangara to Erappanpara and joins Pallickal river which is flowing through Kollam district. Another location was identified at Chooran vayal which flows through the boundary of Alappuzha district. This is a rivulet of Pallickalar. Sample (S3) was taken from the identified location at Chooran vayal(P3) .

5. Water samples were taken from the identified three points in the rivulets and analysed for general parameters. The analysis reports produced herewith and marked as **Annexure 2.** From the analysis result of samples, it found that the water quality is not much affected. There is neither any polluting industries nor hospitals nor commercial complex. Markets are located near the banks of the rivulet. It was noticed that the people living in and around the banks of rivulet are mainly depending on agriculture sector for their livelyhood. A detailed survey is required in consultation with Irrigation department to identify any other rivulets in the district joining the Pallikkal river.

6. It is understood that major portion about 25 km of the river flows through Kollam district. The Grama Panchayats of Poruvazhy, Sooranad North, Sooranad South, Thazhava, Thodiyoor and Mynagappally and the Municipality of Karunagappally of Kollam district are located on the banks of the river. The Board is collecting water samples every month from three stations viz. Adoor, Nellimugal (both in Pathanamthitta district) and Thodiyoor (Kollam district) under State Water Quality Monitoring Programme. The analysis reports from January 2019 to June 2021 is produced herewith and marked as **Annexure 3**.

7. The water quality analysis reports do not show any sign of industrial pollution. However, the presence of fecal coliform

BABURAJAN P.K.
Chief Environmental Engineer

KERALA STATE POLLUTION CONTROL BOARD * REGIONAL OFFICE * THIRUVANANTHAPURAM *

indicates pollution from domestic effluent. As informed by the LSGIs concerned, the main problem is encroachment that has reduced the width of the stream considerably at many places. Detailed survey and investigation needs to be conducted jointly with the Departments such as Revenue, Irrigation and concerned local bodies to identify potential sources of pollution and the effect of encroachment.

Based on the preliminary observations and available details, the Board suggests for a detailed investigation including survey in consultation with Irrigation and Revenue department and concerned local bodies to identify the sources of pollution and suggest remedial measures in case of contamination and further course of action. The analysis of the river samples and sediments from major locations will be conducted based on the survey and investigation.

Hence it is humbly requested that the Hon'ble NGT may kindly grant 4 months to conduct a detailed survey and investigation in association with the concerned departments to identify the sources of pollution, sampling and analysis of water and sediment samples and to suggest remedial measures in case of contamination of the river.

All that stated above are true to the best of our knowledge and belief.

Dated 16th day of August 2021.

KERALA STATE POLLUTION CONTROL BOARD * REGIONAL OFFICE * THIRUVANANTHAPURAM *

BABURAJAN P.K.
Chief Environmental Engineer

Baburajan.P.K
Chief Environmental Engineer
KSPCB

Solemnly affirmed and signed by the deponent who is known to me on this the 16th day of August 2021.

BEFORE THE HONOURABLE NATIONAL GREEN TRIBUNAL
SOUTHERN ZONE, CHENNAI

Original Application no. 141/2021 (SZ)

State of Kerala & Others : Respondent(s)

VERIFICATION

I, Baburajan. P.K., Chief Environmental Engineer, Kerala State Pollution Control Board, Regional Office, Thiruvananthapuram, do hereby verify on this the 16th day of August 2021, that all what is stated above are true and correct to the best of my knowledge, information and belief.

Baburajan. P.K
Chief Environmental Engineer
KSPCB

BABURAJAN P.K.
Chief Environmental Engineer

Annexure 1

☎: General: 0471- 2312910, 2318153, 2318154, 2318155 Chairman: 2318150 Member Secretary: 2318151
E-mail: ms.kspcb@gov.in FAX: 0471 – 2318134, 2318152 web: www.keralapcb.nic.in

KERALA STATE POLLUTION CONTROL BOARD
കേരള സംസ്ഥാന മലിനീകരണ നിയന്ത്രണ ബോർഡ്
Pattom P.O., Thiruvananthapuram – 695 004
പട്ടം പി.ഒ., തിരുവനന്തപുരം - 695 004

PCB/HO/EE4/NGT/OA. No141/2021 (SZ) Dated: 23/07/2021

AUTHORISATION

Sub: O. A. No141/2021 (SZ) before the Hon'ble NGT

The Chief Environmental Engineer, Regional Office, Thiruvananthapuram is hereby authorized to represent the Board (5th respondent) in the above O.A.

For and on behalf of the
KERALA STATE POLLUTION CONTROL BOARD

CHAIRMAN

To

The Chief Environmental Engineer
Regional Office
Thiruvananthapuram

Copy to:

The Environmental Engineer
District Office
Kollam/Pathanamthitta/Alappuzha
Adv. Rema Smrithi V.K.
No.2, Temple Glade Apartments
Kalakshetra Colony
Beach Road
Besant Nagar
Chennai – 600090

Analysis Result from Irappanpara (P1), Kurunnankulangara(P2), Chooralvayal (P3)

Sl.No	Parameter	P1	P2	P3
1	pH	6.4	6.5	6.7
2	Turbidity,NTU	3.01	2.73	3.41
3	Electrical Conductivity,µ/cm	88.3	99.26	143.2
4	DO,mg/l	7.2	7.2	7.3
5	BOD,mg/l	1.4	1.3	1.3
6	COD,mg/l	4	8	4
7	NH3N,mg/l	BDL	BDL	BDL
8	Nitrate,mg/l	0.0343	0.0669	0.0763
9	Chloride,mg/l	20	20	30
10	Phosphate,mg/l	BDL	BDL	BDL
11	Total Alkalinity,mg/l	20	30	30
12	Total Hardness,mg/l	30	40	50
13	Calcium,mg/l	8.016	8.016	8.016
14	Magnesium,mg/l	2.43	4.86	7.29
15	Sodium,mg/l	10.7	10.6	15.6
16	Potassium,mg/l	0.2	0.2	0.9
17	Boron,mg/l	BDL	BDL	BDL
18	SAR	0.8494	0.7287	0.9592
19	TC,cfc/100ml	300	200	0
20	FC,cfc/100ml	100	0	0
21	Fecal Streptococcus	0	0	0

ANNUAL DATA OF STATE WATER MONITORING PROGRAMME (SWMP) 2019

PALLICKAL RIVER-ADOOR

Parameter	JAN	FEB	MARCH	APR	MAY	JUN	JULY	AUG
Temperature,0C						19	19.5	20
PH	7.1	7.2	7.3	7.4	6.9	6.9	6.4	7.1
Turbidity,NTU						2.1	2	2.5
ctrical Conductivity,µ/	157	148	196	135	98	118	125	218
Dissolved Oxygen,mg/	6.5	6.3	5.8	5.4	6.1	7.3	7.1	7.1
BOD,mg/l	1.3	1.7	1.5	0.9	1.5	1.3	1.6	1.3
NH3-N,mg/l						BDL	BDL	BDL
Free Ammonia						BDL	BDL	BDL
Nitrate Nitrogen,mg/l						0.48	0.56	0.46
Chloride,mg/l						44	42	48
Phosphate,mg/l						BDL	BDL	BDL
Total Alkalinity,mg/l						36	34	38
Total Hardness,mg/l						46	44	46
Calcium,mg/l						34	34	24
Magnesium,mg/l						12	10	22
Sodium,mg/l						10.96	11.5	11.85
Potassium,mg/l						4.46	5.12	4.18
Boron,mg/l						BDL	BDL	BDL
Sulphate,mg/l						BDL	BDL	BDL
SAR						0.6243	0.6790	0.6228
TC,cfu/100ml	630	420	680	570	410	670	680	760
FC,cfu/100ml	190	130	300	160	170	130	100	130

ANNUAL DATA OF STATE WATER MONITORING PROGRAMME (SWMP) 2019

PALLICKAL RIVER-NELLIMUGAL

Parameter	JAN	FEB	MARCH	APR	MAY	JUN	JULY	AUG
Temperature,0C						20.4	20.1	19.8
PH	7.1	6.9	7.3	7.4	7.5	6.7	6.8	6.7
Turbidity,NTU						0.5	1.9	2
ctrical Conductivity,µ/	231.5	148	175.5	138	160	124	126	122
Dissolved Oxygen,mg/	6.9	7.2	7.1	5.3	6.8	6.3	6.4	6.6
BOD,mg/l	1.2	1.1	1.3	1.2	1.3	2	1.8	1.8
NH3-N,mg/l						BDL	BDL	BDL
Free Ammonia						BDL	BDL	BDL
Nitrate Nitrogen,mg/l						0.72	0.76	0.7

Chloride,mg/l						32	34	30
Phosphate,mg/l						BDL	BDL	BDL
Total Alkalinity,mg/l						26	28	160
Total Hardness,mg/l						48	46	48
Calcium,mg/l						32	30	32
Magnesium,mg/l						16	16	16
Sodium,mg/l						12.2	12.4	12.8
Potassium,mg/l						2	2.1	2.2
Boron,mg/l						BDL	BDL	BDL
Sulphate,mg/l						BDL	BDL	BDL
SAR						0.6613	0.682907	0.6938
TC,cfu/100ml	480	370	490	520	580	390	360	330
FC,cfu/100ml	140	170	180	210	190	120	190	140

ANNUAL DATA OF STATE WATER MONITORING PROGRAMME (SWMP) 2019

PALLICKAL RIVER-THODIYOOR

Parameter	JAN	FEB	MARCH	APR	MAY	JUN	JULY	AUG
Temperature,0C						19.5	19	19.5
PH	7.1	7.3	7.2	7.4	7.1	7.4	7.1	6.9
Turbidity,NTU						2.4	1.5	1.9
ctrical Conductivity,µ/	110	135	120	198	130	148	152	135
Dissolved Oxygen,mg/	5.8	5.1	6.1	6	5.9	5.4	5.9	5.3
BOD,mg/l	1.7	1.3	1.2	1.1	1.5	1.6	1.5	1.9
NH3-N,mg/l						BDL	BDL	BDL
Free Ammonia						BDL	BDL	BDL
Nitrate Nitrogen,mg/l						0.74	0.66	0.76
Chloride,mg/l						32	34	32
Phosphate,mg/l						BDL	BDL	BDL
Total Alkalinity,mg/l						28	30	36
Total Hardness,mg/l						38	34	38
Calcium,mg/l						24	22	24
Magnesium,mg/l						14	12	14
Sodium,mg/l						8.78	7.12	7.98
Potassium,mg/l						3.56	3.5	3.26
Boron,mg/l						BDL	BDL	BDL
Sulphate,mg/l						BDL	BDL	BDL
SAR						0.5279	0.5444	0.4798
TC,cfu/100ml	650	620	710	520	410	860	680	870
FC,cfu/100ml	130	180	70	130	210	200	120	230

SEPT	OCT	NOV	DEC
20.1	20.5	20	20.5
6.7	6.8	7.6	6.8
2	2.71	1.9	2.71
135	143.5	135.8	143.5
7.1	7	6.8	7
1.3	1.5	1.6	1.5
BDL	BDL	BDL	BDL
BDL	BDL	BDL	BDL
0.41	0.51	0.64	0.51
44	48	42	48
BDL	BDL	BDL	BDL
18	24	32	24
40	4	48	4
22	24	34	24
18	16	14	16
11.85	12.5	12.5	12.5
4.16	4.15	5.6	4.15
BDL	BDL	BDL	BDL
BDL	BDL	BDL	BDL
0.6745	0.7242	0.6886	0.7242
630	580	290	580
120	210	110	210

SEPT	OCT	NOV	DEC
18.4	19.5	19.8	19.2
6.9	7.1	7.2	7.1
1	1	1.2	1
128	124	126	122
6.9	7	7.1	6.9
1.4	1.2	1.6	1.4
BDL	BDL	BDL	BDL
BDL	BDL	BDL	BDL
0.63	0.62	0.68	0.64

34	32	30	28
BDL	BDL	BDL	BDL
30	28	26	26
46	42	46	42
30	28	30	28
16	14	16	14
12.4	14	11.8	12
2	1.8	2	2
BDL	BDL	BDL	BDL
BDL	BDL	BDL	BDL
0.6829	0.6717	0.6498	0.6954
310	270	300	260
160	100	130	110

SEPT	OCT	NOV	DEC
19.5	20	20.6	20
7.3	7.5	6.8	7.5
1	1.7	2.1	1.7
142	163	130	163
5.4	5.1	6.7	5.1
2	2	1.4	2
BDL	BDL	BDL	BDL
BDL	BDL	BDL	BDL
0.71	0.73	0.64	0.73
36	34	36	34
BDL	BDL	BDL	BDL
28	20	36	20
42	32	40	32
22	30	30	30
20	20	10	20
8.7	10	10.8	10
2.66	2.1	4.5	2.1
BDL	BDL	BDL	BDL
BDL	BDL	BDL	BDL
0.4789	0.5182	0.6626	0.5182
960	430	290	430
130	170	120	170

ANNUAL DATA OF STATE WATER MONITORING PROGRAMME (S

PALLICKAL RIVER-ADOOR

SL.NO.	Parameter	JAN	FEB	MARCH	APR	MAY	JUN	JULY
1	Temperature,0C	21.2	21.7	22.1	22	21.3	21	20.8
2	PH	6.9	7.1	7.2	7	7.4	7.4	7.3
3	Turbidity,NTU	2	1.8	1.6	1.4	1.5	1.4	1.4
4	ctrical Conductivity,µ/	144	148	152	160	164	162	158
5	Dissolved Oxygen,mg/	6.8	6.1	6	6.6	6.4	6.5	6.5
6	BOD,mg/l	1.4	1.6	1.8	1.6	1.8	1.9	1.9
7	NH3-N,mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL
8	Nitrate Nitrogen,mg/l	0.62	0.64	0.64	0.66	0.67	0.68	0.67
9	Chloride,mg/l	46	44	48	50	44	42	40
10	Phosphate,mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL
11	Total Alkalinity,mg/l	26	24	22	24	26	28	30
12	Total Hardness,mg/l	42	44	42	46	48	46	42
13	Calcium,mg/l	24	26	26	26	28	24	24
14	Magnesium,mg/l	18	18	16	20	20	22	18
15	Sodium,mg/l	12.8	13.1	18.8	19.9	19.87	19	19
16	Potassium,mg/l	4.3	4.2	5.2	5	4.4	4.2	4.2
17	Sulphate,mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18	Free Ammonia	BDL	BDL	BDL	BDL	BDL	BDL	BDL
19	Boron,mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL
20	SAR	0.7163	0.7213	0.7213	1.061	1.044	1.044	1.044
21	TC,cfu/100ml	340	260	280	180	240	260	240
22	FC,cfu/100ml	120	90	100	60	90	100	90

ANNUAL DATA OF STATE WATER MONITORING PROGRAMME (S

PALLICKAL RIVER-NELLIMUGAL

SL.NO.	Parameter	JAN	FEB	MARCH	APR	MAY	JUN	JULY
1	Temperature,0C	20.5	21.5	21.8	21.7	21	21	20.5
2	PH	7.7	7.6	8.1	8.1	7.6	7.9	7.68
3	Turbidity,NTU	1	1	2	1.3	1	2	1.5
4	Electrical Conductivity	168	178	183	185.2	182.5	190.8	185.5
5	Dissolved Oxygen,mg/	6	6.3	6.5	6.9	6.8	6.9	6.8
6	BOD,mg/l	2.2	2.6	2.7	1.8	1.9	1.8	1.7
7	NH3-N,mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL
8	Nitrate ,mg/l	0.76	0.77	0.78	0.73	0.72	0.71	0.7
9	Chloride,mg/l	36	40	40	42	40	38	30
10	Phosphate,mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL
11	Total Alkalinity,mg/l	34	36	38	36	32	30	34

12	Total Hardness,mg/l	44	54	30	54	50	44	42
13	Calcium,mg/l	26	32	38	36	30	30	32
14	Magnesium,mg/l	18	22	22	18	20	14	10
15	Sodium,mg/l	18.3	18.3	16.8	17.3	18.8	17.65	18.2
16	Potassium,mg/l	7.2	6.8	6.8	6.6	5.8	5.4	5.1
17	Sulphate,mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18	Free Ammonia	BDL	BDL	BDL	BDL	BDL	BDL	BDL
19	Boron,mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL
20	SAR	1.0076	0.9107	0.8	0.88	0.974	1.005	1.005
21	TC,cfu/100ml	370	390	380	200	190	200	290
22	FC,cfu/100ml	160	180	160	60	70	80	80

ANNUAL DATA OF STATE WATER MONITORING PROGRAMME (S

PALLICKAL RIVER-THODIYOOR

SL.NO.	Parameter	JAN	FEB	MARCH	APR	MAY	JUN	JULY
1	Temperature,0C	21.6	21.8	21.6	22.1	21.4	19.9	19.9
2	PH	7.6	7.5	7.8	7.6	7.45	7.5	7.5
3	Turbidity,NTU	1.8	1.8	1.8	1.6	1.6	1.6	1.5
4	Electrical Conductivity	166	168	170	178	182.8	180.2	176
5	Dissolved Oxygen,mg/	5	5.3	5.2	6	5.9	6	6.1
6	BOD,mg/l	2.1	2	2.2	1.8	2	2	2
7	NH3-N,mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL
8	Nitrate ,mg/l	0.78	0.76	0.76	0.72	0.7	0.69	0.69
9	Chloride,mg/l	36	38	36	36	38	36	34
10	Phosphate,mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL
11	Total Alkalinity,mg/l	24	28	30	24	22	24	26
12	Total Hardness,mg/l	38	40	42	44	48	46	42
13	Calcium,mg/l	24	24	24	24	28	26	24
14	Magnesium,mg/l	14	16	18	20	20	20	18
15	Sodium,mg/l	11.2	11.6	16	16.6	18.1	18	18
16	Potassium,mg/l	2.4	2.5	2.8	2	2.2	2.2	3.2
17	Sulphate,mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18	Free Ammonia	BDL	BDL	BDL	BDL	BDL	BDL	BDL
19	Boron,mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL
20	SAR	0.6734	0.672	0.672	0.899	0.951	0.951	0.951
21	TC,cfu/100ml	340	290	310	190	260	280	260
22	FC,cfu/100ml	130	100	120	80	110	110	100

SWMP) 2020

AUG	SEPT	OCT	NOV	DEC
20.1	20	22	22	22.5
7.4	7.5	7.4	7.4	7.2
1.5	1.5	1.4	1.4	1.8
154	150	152	152	180.9
6.6	6.6	6.6	6.6	6.8
1.8	1.7	1.7	1.7	1.8
BDL	BDL	BDL	BDL	BDL
0.68	0.67	0.65	0.65	0.73
34	32	30	30	34
BDL	BDL	BDL	BDL	BDL
28	26	24	24	36
40	38	36	36	46
26	26	20	20	36
14	12	16	16	10
18	18.2	18.4	18.4	18.1
4.1	4	3.8	3.8	4.9
BDL	BDL	BDL	BDL	BDL
BDL	BDL	BDL	BDL	BDL
BDL	BDL	BDL	BDL	BDL
1.06	1.06	1.1	1.1	1.04
200	200	220	220	390
90	80	100	100	110

SWMP) 2020

AUG	SEPT	OCT	NOV	DEC
19.9	20	20.5	20.5	22.5
6.85	7.21	7.5	75	7.2
1.8	2	2	2	1.8
176.2	174	182.5	182.5	180.9
6.9	6.8	6.6	6.6	6.8
1.6	1.5	1.6	1.6	1.8
BDL	BDL	BDL	BDL	BDL
0.69	0.68	0.72	0.72	0.73
32	30	34	34	34
BDL	BDL	BDL	BDL	BDL
30	30	34	34	36

44	38	38	38	46
28	24	28	28	36
16	14	10	10	10
16.8	16.89	17.82	17.82	18.1
4.7	4.6	4.8	4.8	4.9
BDL	BDL	BDL	BDL	BDL
BDL	BDL	BDL	BDL	BDL
BDL	BDL	BDL	BDL	BDL
0.94	1.01	1.11	1.11	1.04
280	290	340	340	390
80	100	130	130	110

SWMP) 2020

AUG	SEPT	OCT	NOV	DEC
20	20.2	22.1	22.1	23.1
7.4	7.2	7.3	7.3	6.9
1.5	1.5	1.4	1.4	1.3
170	164	166.4	166.4	168.8
6.2	6.3	6.4	6.4	6.6
2	2	1.9	1.9	1.6
BDL	BDL	BDL	BDL	BDL
0.68	0.66	0.65	0.65	0.65
34	34	32	32	32
BDL	BDL	BDL	BDL	BDL
28	26	28	28	28
40	36	36	36	38
24	24	22	22	26
16	12	14	14	12
18.4	18	18.2	18.2	18.8
3.5	3.6	3.6	3.6	3.4
BDL	BDL	BDL	BDL	BDL
BDL	BDL	BDL	BDL	BDL
BDL	BDL	BDL	BDL	BDL
1.066	1.066	1.115	1.115	1.15
260	220	200	200	240
100	90	80	80	100

STATE WATER MONITORING PROGRAMME (SWMP) 2021				
Analysis report for the month of **January 2021**				
Name of River		**Pallikkal River**		
Date & Time of sample collection		06.01.2021		
Method of analysis		**APHA**		
Sl. No.	**Parameters**	**Name of Station**		
		1.Adoor (PR1)	**2.Nellimugal (PR2)**	**3.Thodiyoor (PR3)**
1	Temparature, ^{0}C	22.9	21.6	23
2	pH	6.8	6.8	6.7
3	Turbidity NTU	1.4	1.9	1.3
4	Electrical Conductivity, µ/cm	156	182.9	170.2
5	DO,mg/l	6.6	6.8	6.6
6	BOD, mg/l	1.5	1.9	1.6
7	NH3N, mg/l	BDL	BDL	BDL
8	Nitrate, mg/l	BDL	BDL	BDL
9	Chloride, mg/l	32	36	32
10	Phosphate mg/l	BDL	BDL	BDL
11	Total Alkalinity, mg/l	30	38	26
12	Total Hardness, mg/l	42	48	36
13	Calcium, mg/l	26	36	24
14	Magnesium, mg/l	16	12	12
15	Sodium, mg/l	19.6	18.3	19.2
16	Potassium, mg/l	3.2	5	3.4
17	Sulphate, mg/l	BDL	BDL	BDL
18	Free Ammonia,mg/l	BDL	BDL	BDL
19	Boron, mg/l	BDL	BDL	BDL
20	SAR	1.11	1.02	1.2
21	TC, cfu/100ml	280	400	260
22	FC,cfu/100ml	90	120	110

STATE WATER MONITORING PROGRAMME (SWMP) 2021				
Analysis report for the month of **february 2021**				
Name of River		**Pallikkal River**		
Date & Time of sample collection		04.02.2021		
Method of analysis		**APHA**		
Sl. No.	**Parameters**	**Name of Station**		
		1.Adoor (PR1)	**2.Nellimugal (PR2)**	**3.Thodiyoor (PR3)**

1	Temparature, ^{0}C	23.1	22.6	23.2
2	pH	6.9	7.2	6.9
3	Turbidity NTU	1.2	1.7	1.2
4	Electrical Conductivity, µ/cm	161.2	185.9	179.8
5	DO,mg/l	6.4	6.2	6.7
6	BOD, mg/l	1.4	2	1.7
7	NH3N, mg/l	BDL	BDL	BDL
8	Nitrate, mg/l	BDL	BDL	BDL
9	Chloride, mg/l	34	38	34
10	Phosphate mg/l	BDL	BDL	BDL
11	Total Alkalinity, mg/l	32	36	28
12	Total Hardness, mg/l	40	50	38
13	Calcium, mg/l	26	38	24
14	Magnesium, mg/l	14	12	14
15	Sodium, mg/l	19.7	19.4	19.5
16	Potassium, mg/l	3.5	5.3	3.6
17	Sulphate, mg/l	BDL	BDL	BDL
18	Free Ammonia,mg/l	BDL	BDL	BDL
19	Boron, mg/l	BDL	BDL	BDL
20	SAR	1.162	1.06	1.172
21	TC, cfu/100ml	320	410	290
22	FC,cfu/100ml	90	110	100

STATE WATER MONITORING PROGRAMME (SWMP) 2021				
Analysis report for the month of **March 2021**				
Name of River		**Pallikkal River**		
Date & Time of sample collection		10.03.2021		
Method of analysis		**APHA**		
Sl. No.	**Parameters**	**Name of Station**		
		1.Adoor (PR1)	**2.Nellimugal (PR2)**	**3.Thodiyoor (PR3)**
1	Temparature, ^{0}C	23.1	22.6	23.2
2	pH	6.9	7.2	6.9
3	Turbidity NTU	1.2	1.7	1.2
4	Electrical Conductivity, µ/cm	161.2	185.9	179.8
5	DO,mg/l	6.4	6.2	6.7
6	BOD, mg/l	1.4	2	1.7
7	NH3N, mg/l	BDL	BDL	BDL
8	Nitrate, mg/l	BDL	BDL	BDL
9	Chloride, mg/l	34	38	34
10	Phosphate mg/l	BDL	BDL	BDL

11	Total Alkalinity, mg/l	32	36	28
12	Total Hardness, mg/l	40	50	38
13	Calcium, mg/l	26	38	24
14	Magnesium, mg/l	14	12	14
15	Sodium, mg/l	19.7	19.4	19.5
16	Potassium, mg/l	3.5	5.3	3.6
17	Sulphate, mg/l	BDL	BDL	BDL
18	Free Ammonia,mg/l	BDL	BDL	BDL
19	Boron, mg/l	BDL	BDL	BDL
20	SAR	1.162	1.06	1.172
21	TC, cfu/100ml	320	410	290
22	FC,cfu/100ml	90	110	100

STATE WATER MONITORING PROGRAMME (SWMP) 2021				
Analysis report for the month of **APRIL 2021**				
Name of River		**Pallikkal River**		
Date & Time of sample collection		06.04.2021		
Method of analysis		**APHA**		
Sl. No.	**Parameters**	**Name of Station**		
		1.Adoor (PR1)	**2.Nellimugal (PR2)**	**3.Thodiyoor (PR3)**
1	Temparature, ^{0}C	23.6	22.8	23.6
2	pH	6.5	7.5	7.1
3	Turbidity NTU	1.3	1.9	1.5
4	Electrical Conductivity, µ/cm	165.2	190.6	182.6
5	DO,mg/l	6.7	6.5	6.9
6	BOD, mg/l	1.6	2.1	1.9
7	NH3N, mg/l	BDL	BDL	BDL
8	Nitrate, mg/l	BDL	BDL	BDL
9	Chloride, mg/l	36	35	38
10	Phosphate mg/l	BDL	BDL	BDL
11	Total Alkalinity, mg/l	34	34	30
12	Total Hardness, mg/l	42	54	40
13	Calcium, mg/l	27	39	25
14	Magnesium, mg/l	15	15	15
15	Sodium, mg/l	20	19.6	19.8
16	Potassium, mg/l	3.6	5.5	3.9

STATE WATER MONITORING PROGRAMME (SWMP) 2021

Analysis report for the month of **MAY 2021**				
Name of River		**Pallikkal River**		
Date & Time of sample collection		07.05.2021		
Method of analysis		**APHA**		
Sl. No.	**Parameters**	**Name of Station**		
		1.Adoor (PR1)	**2.Nellimugal (PR2)**	**3.Thodiyoor (PR3)**
1	Temparature, ^{0}C	23	23	22.5
2	pH	6.6	7.6	7.2
3	Turbidity NTU	1.2	1.8	1.6
4	Electrical Conductivity, µ/cm	168.2	195.6	186.5
5	DO,mg/l	6.8	6.8	7
6	BOD, mg/l	1.8	2.8	1.8
7	NH3N, mg/l	BDL	BDL	BDL
8	Nitrate, mg/l	BDL	BDL	BDL
9	Chloride, mg/l	38	38	40
10	Phosphate mg/l	BDL	BDL	BDL
11	Total Alkalinity, mg/l	38	38	36
12	Total Hardness, mg/l	45	60	45
13	Calcium, mg/l	30	40	28
14	Magnesium, mg/l	15	20	17
15	Sodium, mg/l	22	20.6	20.1
16	Potassium, mg/l	3.8	5.8	4.1
17	Sulphate, mg/l	BDL	BDL	BDL
18	Free Ammonia,mg/l	BDL	BDL	BDL
19	Boron, mg/l	BDL	BDL	BDL
20	SAR	1.2317	0.9988	1.1069
21	TC, cfu/100ml	320	430	310
22	FC,cfu/100ml	100	120	120

STATE WATER MONITORING PROGRAMME (SWMP) 2021				
Analysis report for the month of **JUNE 2021**				
Name of River		**Pallikkal River**		
Date & Time of sample collection		05.06.2021		
Method of analysis		**APHA**		
Sl. No.	**Parameters**	**Name of Station**		
		1.Adoor (PR1)	**2.Nellimugal (PR2)**	**3.Thodiyoor (PR3)**
1	Temparature, ^{0}C	23.5	23.4	23
2	pH	6.4	6.8	6.8

3	Turbidity NTU	1.3	1.5	1.5
4	Electrical Conductivity, µ/cm	170.5	190.5	180.6
5	DO,mg/l	6.9	6.5	6.5
6	BOD, mg/l	1.5	2.4	1.8
7	NH3N, mg/l	BDL	BDL	BDL
8	Nitrate, mg/l	BDL	BDL	BDL
9	Chloride, mg/l	34	36	38
10	Phosphate mg/l	BDL	BDL	BDL
11	Total Alkalinity, mg/l	34	34	35
12	Total Hardness, mg/l	40	56	40
13	Calcium, mg/l	30	40	30
14	Magnesium, mg/l	10	16	10
15	Sodium, mg/l	20	19.5	19.8
16	Potassium, mg/l	3.5	4.5	4.2
17	Sulphate, mg/l	BDL	BDL	BDL
18	Free Ammonia,mg/l	BDL	BDL	BDL
19	Boron, mg/l	BDL	BDL	BDL
20	SAR	1.2269	0.9967	1.2147
21	TC, cfu/100ml	300	400	300
22	FC,cfu/100ml	90	110	110

Annexure 1

☎: General: 0471- 2312910, 2318153, 2318154, 2318155 Chairman: 2318150 Member Secretary: 2318151
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KERALA STATE POLLUTION CONTROL BOARD
കേരള സംസ്ഥാന മലിനീകരണ നിയന്ത്രണ ബോർഡ്
Pattom P.O., Thiruvananthapuram – 695 004
പട്ടം പി.ഒ., തിരുവനന്തപുരം - 695 004

PCB/HO/EE4/NGT/OA. No141/2021 (SZ) Dated: 23/07/2021

AUTHORISATION

Sub: O. A. No141/2021 (SZ) before the Hon'ble NGT

The Chief Environmental Engineer, Regional Office, Thiruvananthapuram is hereby authorized to represent the Board (5th respondent) in the above O.A.

For and on behalf of the
KERALA STATE POLLUTION CONTROL BOARD

CHAIRMAN

To

The Chief Environmental Engineer
Regional Office
Thiruvananthapuram

Copy to:

The Environmental Engineer
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Kollam/Pathanamthitta/Alappuzha
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BABURAJAN P.K.
Chief Environmental Engineer

KERALA STATE POLLUTION CONTROL BOARD * REGIONAL OFFICE * THIRUVANANTHAPURAM

Annexure 2

Analysis Result from Irappanpara (P1), Kurunnankulangara(P2), Chooralvayal (P3)

Sl.No	Parameter	P1	P2	P3
1	pH	6.4	6.5	6.7
2	Turbidity,NTU	3.01	2.73	3.41
3	Electrical Conductivity,µ/cm	88.3	99.26	143.2
4	DO,mg/l	7.2	7.2	7.3
5	BOD,mg/l	1.4	1.3	1.3
6	COD,mg/l	4	8	4
7	NH3N,mg/l	BDL	BDL	BDL
8	Nitrate,mg/l	0.0343	0.0669	0.0763
9	Chloride,mg/l	20	20	30
10	Phosphate,mg/l	BDL	BDL	BDL
11	Total Alkalinity,mg/l	20	30	30
12	Total Hardness,mg/l	30	40	50
13	Calcium,mg/l	8.016	8.016	8.016
14	Magnesium,mg/l	2.43	4.86	7.29
15	Sodium,mg/l	10.7	10.6	15.6
16	Potassium,mg/l	0.2	0.2	0.9
17	Boron,mg/l	BDL	BDL	BDL
18	SAR	0.8494	0.7287	0.9592
19	TC,cfc/100ml	300	200	0
20	FC,cfc/100ml	100	0	0
21	Fecal Streptococcus	0	0	0

RAJAN P.K.
Chief E... ...tal Engineer

KERALA STATE POLLUTION CONTROL BOARD * REGIONAL OFFICE * KERALA

Annexure 3

ANNUAL DATA OF STATE WATER MONITORING PROGRAMME (SWMP) 2019

PALLICKAL RIVER-ADOOR

Parameter	JAN	FEB	MARCH	APR	MAY	JUN	JULY	AUG	SEPT	OCT	NOV	DEC
Temperature,0C						19	19.5	20	20.1	20.5	20	20.5
PH	7.1	7.2	7.3	7.4	6.9	6.9	6.4	7.1	6.7	6.8	7.6	6.8
Turbidity,NTU						2.1	2	2.5	2	2.71	1.9	2.71
ctrical Conductivity,µ/	157	148	196	135	98	118	125	218	135	143.5	135.8	143.5
Dissolved Oxygen,mg/l	6.5	6.3	5.8	5.4	6.1	7.3	7.1	7.1	7.1	7	6.8	7
BOD,mg/l	1.3	1.7	1.5	0.9	1.5	1.3	1.6	1.3	1.3	1.5	1.6	1.5
NH3-N,mg/l						BDL	BDL	BDL	BDL	BDL	BDL	BDL
Free Ammonia						BDL	BDL	BDL	BDL	BDL	BDL	BDL
Nitrate Nitrogen,mg/l						0.48	0.56	0.46	0.41	0.51	0.64	0.51
Chloride,mg/l						44	42	48	44	48	42	48
Phosphate,mg/l						BDL	BDL	BDL	BDL	BDL	BDL	BDL
Total Alkalinity,mg/l						36	34	38	18	24	32	24
Total Hardness,mg/l						46	44	46	40	4	48	4
Calcium,mg/l						34	34	24	22	24	34	24
Magnesium,mg/l						12	10	22	18	16	14	16
Sodium,mg/l						10.96	11.5	11.85	11.85	12.5	12.5	12.5
Potassium,mg/l						4.46	5.12	4.18	4.16	4.15	5.6	4.15
Boron,mg/l						BDL	BDL	BDL	BDL	BDL	BDL	BDL
Sulphate,mg/l						BDL	BDL	BDL	BDL	BDL	BDL	BDL
SAR						0.6243	###	0.6228	0.6745	0.7242	0.6886	0.7242
TC,cfu/100ml	630	420	680	570	410	670	680	760	630	580	290	580
FC,cfu/100ml	190	130	300	160	170	130	100	130	120	210	110	210

KERALA STATE POLLUTION CONTROL BOARD * REGIONAL OFFICE

BABURAJA
Chief Environmen... Engineer

ANNUAL DATA OF STATE WATER MONITORING PROGRAMME (SWMP) 2019

PALLICKAL RIVER-NELLIMUGAL

Parameter	JAN	FEB	MARCH	APR	MAY	JUN	JULY	AUG	SEPT	OCT	NOV	DEC
Temperature,0C						20.4	20.1	19.8	18.4	19.5	19.8	19.2
PH	7.1	6.9	7.3	7.4	7.5	6.7	6.8	6.7	6.9	7.1	7.2	7.1
Turbidity,NTU						0.5	1.9	2	1	1	1.2	1
ctrical Conductivity,µ/	232	148	175.5	138	160	124	126	122	128	124	126	122
Dissolved Oxygen,mg/l	6.9	7.2	7.1	5.3	6.8	6.3	6.4	6.6	6.9	7	7.1	6.9
BOD,mg/l	1.2	1.1	1.3	1.2	1.3	2	1.8	1.8	1.4	1.2	1.6	1.4
NH3-N,mg/l						BDL	BDL	BDL	BDL	BDL	BDL	BDL
Free Ammonia						BDL	BDL	BDL	BDL	BDL	BDL	BDL
Nitrate Nitrogen,mg/l						0.72	0.76	0.7	0.63	0.62	0.68	0.64
Chloride,mg/l						32	34	30	34	32	30	28
Phosphate,mg/l						BDL	BDL	BDL	BDL	BDL	BDL	BDL
Total Alkalinity,mg/l						26	28	160	30	28	26	26
Total Hardness,mg/l						48	46	48	46	42	46	42
Calcium,mg/l						32	30	32	30	28	30	28
Magnesium,mg/l						16	16	16	16	14	16	14
Sodium,mg/l						12.2	12.4	12.8	12.4	14	11.8	12
Potassium,mg/l						2	2.1	2.2	2	1.8	2	2
Boron,mg/l						BDL	BDL	BDL	BDL	BDL	BDL	BDL
Sulphate,mg/l						BDL	BDL	BDL	BDL	BDL	BDL	BDL
SAR						0.6613	0.68	0.6938	0.6829	0.6717	0.6498	0.6954
TC,cfu/100ml	480	370	490	520	580	390	360	330	310	270	300	260
FC,cfu/100ml	140	170	180	210	190	120	190	140	160	100	130	110

KERALA STATE POLLUTION CONTROL BOARD REGIONAL OFFICE

BABURAJAN P.K.
Chief Environmental Engineer

ANNUAL DATA OF STATE WATER MONITORING PROGRAMME (SWMP) 2019

PALLICKAL RIVER-THODIYOOR

Parameter	JAN	FEB	MARCH	APR	MAY	JUN	JULY	AUG	SEPT	OCT	NOV	DEC
Temperature,0C						19.5	19	19.5	19.5	20	20.6	20

4	Electrical Conductivity,	166	168	170	178	182.8	180.2	176	170	164	166	166.4	168.8
5	Dissolved Oxygen,mg/	5	5.3	5.2	6	5.9	6	6.1	6.2	6.3	6.4	6.4	6.6
6	BOD,mg/l	2.1	2	2.2	1.8	2	2	2	2	2	1.9	1.9	1.6
7	NH3-N,mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
8	Nitrate ,mg/l	0.78	0.76	0.76	0.72	0.7	0.69	0.69	0.68	0.66	0.65	0.65	0.65
9	Chloride,mg/l	36	38	36	36	38	36	34	34	34	32	32	32
10	Phosphate,mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
11	Total Alkalinity,mg/l	24	28	30	24	22	24	26	28	26	28	28	28
12	Total Hardness,mg/l	38	40	42	44	48	46	42	40	36	36	36	38
13	Calcium,mg/l	24	24	24	24	28	26	24	24	24	22	22	26
14	Magnesium,mg/l	14	16	18	20	20	20	18	16	12	14	14	12
15	Sodium,mg/l	11.2	11.6	16	16.6	18.1	18	18	18.4	18	18.2	18.2	18.8
16	Potassium,mg/l	2.4	2.5	2.8	2	2.2	2.2	3.2	3.5	3.6	3.6	3.6	3.4
17	Sulphate,mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18	Free Ammonia	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
19	Boron,mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
20	SAR	0.6734	0.672	0.672	0.899	0.951	0.951	0.951	1.066	1.066	1.12	1.115	1.15
21	TC,cfu/100ml	340	290	310	190	260	280	260	260	220	200	200	240
22	FC,cfu/100ml	130	100	120	80	110	110	100	100	90	80	80	100

BABURAJAN P.K.
Chief Environmental Engineer

KERALA STATE POLLUTION CONTROL BOARD
REGIONAL OFFICE

ANNUAL DATA OF STATE WATER MONITORING PROGRAMME (SWMP) 2020

PALLICKAL RIVER-ADOOR

SL.NO.	Parameter	JAN	FEB	MARCH	APR	MAY	JUN	JULY	AUG	SEPT	OCT	NOV	DEC
1	Temperature,0C	21.2	21.7	22.1	22	21.3	21	20.8	20.1	20	22	22	22.5
2	PH	6.9	7.1	7.2	7	7.4	7.4	7.3	7.4	7.5	7.4	7.4	7.2
3	Turbidity,NTU	2	1.8	1.6	1.4	1.5	1.4	1.4	1.5	1.5	1.4	1.4	1.8
4	ctrical Conductivity,µ/	144	148	152	160	164	162	158	154	150	152	152	180.9
5	Dissolved Oxygen,mg/l	6.8	6.1.	6	6.6	6.4	6.5	6.5	6.6	6.6	6.6	6.6	6.8
6	BOD,mg/l	1.4	1.6	1.8	1.6	1.8	1.9	1.9	1.8	1.7	1.7	1.7	1.8
7	NH3-N,mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
8	Nitrate Nitrogen,mg/l	0.62	0.64	0.64	0.66	0.67	0.68	0.67	0.68	0.67	0.65	0.65	0.73
9	Chloride,mg/l	46	44	48	50	44	42	40	34	32	30	30	34
10	Phosphate,mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
11	Total Alkalinity,mg/l	26	24	22	24	26	28	30	28	26	24	24	36
12	Total Hardness,mg/l	42	44	42	46	48	46	42	40	38	36	36	46
13	Calcium,mg/l	24	26	26	26	28	24	24	26	26	20	20	36
14	Magnesium,mg/l	18	18	16	20	20	22	18	14	12	16	16	10
15	Sodium,mg/l	12.8	13.1	18.8	19.9	19.87	19	19	18	18.2	18.4	18.4	18.1
16	Potassium,mg/l	4.3	4.2	5.2	5	4.4	4.2	4.2	4.1	4	3.8	3.8	4.9
17	Sulphate,mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18	Free Ammonia	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
19	Boron,mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
20	SAR	0.7163	0.7213	0.7213	1.061	1.044	1.044	1.044	1.06	1.06	1.1	1.1	1.04
21	TC,cfu/100ml	340	260	280	180	240	260	240	200	200	220	220	390
22	FC,cfu/100ml	120	90	100	60	90	100	90	90	80	100	100	110

BABURAJAN P.K.
Chief Environmental Engineer

KERALA STATE POLLUTION CONTROL BOARD * REGIONAL OFFICE * THIRUVANANTHAPURAM

ANNUAL DATA OF STATE WATER MONITORING PROGRAMME (SWMP) 2020

PALLICKAL RIVER-NELLIMUGAL

SL.NO.	Parameter	JAN	FEB	MARCH	APR	MAY	JUN	JULY	AUG	SEPT	OCT	NOV	DEC
1	Temperature,0C	20.5	21.5	21.8	21.7	21	21	20.5	19.9	20	20.5	20.5	22.5
2	PH	7.7	7.6	8.1	8.1	7.6	7.9	7.68	6.85	7.21	7.5	75	7.2
3	Turbidity,NTU	1	1	2	1.3	1	2	1.5	1.8	2	2	2	1.8
4	Electrical Conductivity,	168	178	183	185.2	182.5	190.8	185.5	176.2	174	183	182.5	180.9
5	Dissolved Oxygen,mg/	6	6.3	6.5	6.9	6.8	6.9	6.8	6.9	6.8	6.6	6.6	6.8
6	BOD,mg/l	2.2	2.6	2.7	1.8	1.9	1.8	1.7	1.6	1.5	1.6	1.6	1.8
7	NH3-N,mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
8	Nitrate ,mg/l	0.76	0.77	0.78	0.73	0.72	0.71	0.7	0.69	0.68	0.72	0.72	0.73
9	Chloride,mg/l	36	40	40	42	40	38	30	32	30	34	34	34
10	Phosphate,mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
11	Total Alkalinity,mg/l	34	36	38	36	32	30	34	30	30	34	34	36
12	Total Hardness,mg/l	44	54	30	54	50	44	42	44	38	38	38	46
13	Calcium,mg/l	26	32	38	36	30	30	32	28	24	28	28	36
14	Magnesium,mg/l	18	22	22	18	20	14	10	16	14	10	10	10
15	Sodium,mg/l	18.3	18.3	16.8	17.3	18.8	17.65	18.2	16.8	16.89	17.8	17.82	18.1
16	Potassium,mg/l	7.2	6.8	6.8	6.6	5.8	5.4	5.1	4.7	4.6	4.8	4.8	4.9
17	Sulphate,mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18	Free Ammonia	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
19	Boron,mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
20	SAR	1.0076	0.9107	0.8	0.88	0.974	1.005	1.005	0.94	1.01	1.11	1.11	1.04
21	TC,cfu/100ml	370	390	380	200	190	200	290	280	290	340	340	390
22	FC,cfu/100ml	160	180	160	60	70	80	80	80	100	130	130	110

ANNUAL DATA OF STATE WATER MONITORING PROGRAMME (SWMP) 2020

PALLICKAL RIVER-THODIYOOR

SL.NO.	Parameter	JAN	FEB	MARCH	APR	MAY	JUN	JULY	AUG	SEPT	OCT	NOV	DEC
1	Temperature,0C	21.6	21.8	21.6	22.1	21.4	19.9	19.9	20	20.2	22.1	22.1	23.1
2	PH	7.6	7.5	7.8	7.6	7.45	7.5	7.5	7.4	7.2	7.3	7.3	6.9
3	Turbidity,NTU	1.8	1.8	1.8	1.6	1.6	1.6	1.5	1.5	1.5	1.4	1.4	1.3
4	Electrical Conductivity,	166	168	170	178	182.8	180.2	176	170	164	166	166.4	168.8
5	Dissolved Oxygen,mg/	5	5.3	5.2	6	5.9	6	6.1	6.2	6.3	6.4	6.4	6.6
6	BOD,mg/l	2.1	2	2.2	1.8	2	2	2	2	2	1.9	1.9	1.6
7	NH3-N,mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
8	Nitrate ,mg/l	0.78	0.76	0.76	0.72	0.7	0.69	0.69	0.68	0.66	0.65	0.65	0.65
9	Chloride,mg/l	36	38	36	36	38	36	34	34	34	32	32	32
10	Phosphate,mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
11	Total Alkalinity,mg/l	24	28	30	24	22	24	26	28	26	28	28	28
12	Total Hardness,mg/l	38	40	42	44	48	46	42	40	36	36	36	38
13	Calcium,mg/l	24	24	24	24	28	26	24	24	24	22	22	26
14	Magnesium,mg/l	14	16	18	20	20	20	18	16	12	14	14	12
15	Sodium,mg/l	11.2	11.6	16	16.6	18.1	18	18	18.4	18	18.2	18.2	18.8
16	Potassium,mg/l	2.4	2.5	2.8	2	2.2	2.2	3.2	3.5	3.6	3.6	3.6	3.4
17	Sulphate,mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18	Free Ammonia	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
19	Boron,mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
20	SAR	0.6734	0.672	0.672	0.899	0.951	0.951	0.951	1.066	1.066	1.12	1.115	1.15
21	TC,cfu/100ml	340	290	310	190	260	280	260	260	220	200	200	240
22	FC,cfu/100ml	130	100	120	80	110	110	100	100	90	80	80	100

KERALA STATE POLLUTION CONTROL BOARD REGIONAL OFFICE THIRUVANANTHAPURAM

Chief Environmental Engineer

STATE WATER MONITORING PROGRAMME (SWMP) 2021

Analysis report for the month of **January 2021**

Name of River	**Pallikkal River**
Date & Time of sample collection	06.01.2021
Method of analysis	**APHA**

Sl. No.	Parameters	Name of Station		
		1.Adoor (PR1)	2.Nellimugal (PR2)	3.Thodiyoor (PR3)
1	Temparature, ^{0}C	22.9	21.6	23
2	pH	6.8	6.8	6.7
3	Turbidity NTU	1.4	1.9	1.3
4	Electrical Conductivity, μ/cm	156	182.9	170.2
5	DO,mg/l	6.6	6.8	6.6
6	BOD, mg/l	1.5	1.9	1.6
7	NH3N, mg/l	BDL	BDL	BDL
8	Nitrate, mg/l	BDL	BDL	BDL
9	Chloride, mg/l	32	36	32
10	Phosphate mg/l	BDL	BDL	BDL
11	Total Alkalinity, mg/l	30	38	26
12	Total Hardness, mg/l	42	48	36
13	Calcium, mg/l	26	36	24
14	Magnesium, mg/l	16	12	12
15	Sodium, mg/l	19.6	18.3	19.2
16	Potassium, mg/l	3.2	5	3.4
17	Sulphate, mg/l	BDL	BDL	BDL
18	Free Ammonia,mg/l	BDL	BDL	BDL
19	Boron, mg/l	BDL	BDL	BDL
20	SAR	1.11	1.02	1.2
21	TC, cfu/100ml	280	400	260
22	FC,cfu/100ml	90	120	110

BABURAJAN P.K.
Chief Environmental Engineer

KERALA STATE POLLUTION CONTROL BOARD
REGIONAL OFFICE

STATE WATER MONITORING PROGRAMME (SWMP) 2021				
Analysis report for the month of **february 2021**				
Name of River		**Pallikkal River**		
Date & Time of sample collection		04.02.2021		
Method of analysis		**APHA**		
Sl. No.	**Parameters**	**Name of Station**		
		1.Adoor (PR1)	**2.Nellimugal (PR2)**	**3.Thodiyoor (PR3)**
1	Temparature, ^{0}C	23.1	22.6	23.2
2	pH	6.9	7.2	6.9
3	Turbidity NTU	1.2	1.7	1.2
4	Electrical Conductivity, µ/cm	161.2	185.9	179.8
5	DO,mg/l	6.4	6.2	6.7
6	BOD, mg/l	1.4	2	1.7
7	NH3N, mg/l	BDL	BDL	BDL
8	Nitrate, mg/l	BDL	BDL	BDL
9	Chloride, mg/l	34	38	34
10	Phosphate mg/l	BDL	BDL	BDL
11	Total Alkalinity, mg/l	32	36	28
12	Total Hardness, mg/l	40	50	38
13	Calcium, mg/l	26	38	24
14	Magnesium, mg/l	14	12	14
15	Sodium, mg/l	19.7	19.4	19.5
16	Potassium, mg/l	3.5	5.3	3.6
17	Sulphate, mg/l	BDL	BDL	BDL
18	Free Ammonia,mg/l	BDL	BDL	BDL
19	Boron, mg/l	BDL	BDL	BDL
20	SAR	1.162	1.06	1.172
21	TC, cfu/100ml	320	410	290
22	FC,cfu/100ml	90	110	100

BABURAJAN P.K.
Chief Environmental Engineer

KERALA STATE POLLUTION CONTROL BOARD * REGIONAL OFFICE * KANNAPURAM

STATE WATER MONITORING PROGRAMME (SWMP) 2021				
Analysis report for the month of **March 2021**				
Name of River		**Pallikkal River**		
Date & Time of sample collection		10.03.2021		
Method of analysis		**APHA**		
Sl. No.	**Parameters**	**Name of Station**		
		1.Adoor (PR1)	**2.Nellimugal (PR2)**	**3.Thodiyoor (PR3)**
1	Temparature, ^{0}C	23.1	22.6	23.2
2	pH	6.9	7.2	6.9
3	Turbidity NTU	1.2	1.7	1.2
4	Electrical Conductivity, µ/cm	161.2	185.9	179.8
5	DO,mg/l	6.4	6.2	6.7
6	BOD, mg/l	1.4	2	1.7
7	NH3N, mg/l	BDL	BDL	BDL
8	Nitrate, mg/l	BDL	BDL	BDL
9	Chloride, mg/l	34	38	34
10	Phosphate mg/l	BDL	BDL	BDL
11	Total Alkalinity, mg/l	32	36	28
12	Total Hardness, mg/l	40	50	38
13	Calcium, mg/l	26	38	24
14	Magnesium, mg/l	14	12	14
15	Sodium, mg/l	19.7	19.4	19.5
16	Potassium, mg/l	3.5	5.3	3.6
17	Sulphate, mg/l	BDL	BDL	BDL
18	Free Ammonia,mg/l	BDL	BDL	BDL
19	Boron, mg/l	BDL	BDL	BDL
20	SAR	1.162	1.06	1.172
21	TC, cfu/100ml	320	410	290
22	FC,cfu/100ml	90	110	100

BABURAJAN P.K.
Chief Environmental Engineer

KERALA STATE POLLUTION CONTROL BOARD
REGIONAL OFFICE

STATE WATER MONITORING PROGRAMME (SWMP) 2021				
Analysis report for the month of **APRIL 2021**				
Name of River		**Pallikkal River**		
Date & Time of sample collection		06.04.2021		
Method of analysis		**APHA**		
Sl. No.	**Parameters**	**Name of Station**		
		1.Adoor (PR1)	**2.Nellimugal (PR2)**	**3.Thodiyoor (PR3)**
1	Temparature, ^{0}C	23.6	22.8	23.6
2	pH	6.5	7.5	7.1
3	Turbidity NTU	1.3	1.9	1.5
4	Electrical Conductivity, µ/cm	165.2	190.6	182.6
5	DO,mg/l	6.7	6.5	6.9
6	BOD, mg/l	1.6	2.1	1.9
7	NH3N, mg/l	BDL	BDL	BDL
8	Nitrate, mg/l	BDL	BDL	BDL
9	Chloride, mg/l	36	35	38
10	Phosphate mg/l	BDL	BDL	BDL
11	Total Alkalinity, mg/l	34	34	30
12	Total Hardness, mg/l	42	54	40
13	Calcium, mg/l	27	39	25
14	Magnesium, mg/l	15	15	15
15	Sodium, mg/l	20	19.6	19.8
16	Potassium, mg/l	3.6	5.5	3.9

RA[illegible]AN P.K.
Chief [illegible]ental Engineer

KERALA STATE POLLUTION CONTROL BOARD * REGIONAL OFFICE * KANNANTHANAM

STATE WATER MONITORING PROGRAMME (SWMP) 2021				
Analysis report for the month of **MAY 2021**				
Name of River		**Pallikkal River**		
Date & Time of sample collection		07.05.2021		
Method of analysis		**APHA**		
Sl. No.	**Parameters**	**Name of Station**		
		1.Adoor (PR1)	**2.Nellimugal (PR2)**	**3.Thodiyoor (PR3)**
1	Temparature, ^0C	23	23	22.5
2	pH	6.6	7.6	7.2
3	Turbidity NTU	1.2	1.8	1.6
4	Electrical Conductivity, µ/cm	168.2	195.6	186.5
5	DO,mg/l	6.8	6.8	7
6	BOD, mg/l	1.8	2.8	1.8
7	NH3N, mg/l	BDL	BDL	BDL
8	Nitrate, mg/l	BDL	BDL	BDL
9	Chloride, mg/l	38	38	40
10	Phosphate mg/l	BDL	BDL	BDL
11	Total Alkalinity, mg/l	38	38	36
12	Total Hardness, mg/l	45	60	45
13	Calcium, mg/l	30	40	28
14	Magnesium, mg/l	15	20	17
15	Sodium, mg/l	22	20.6	20.1
16	Potassium, mg/l	3.8	5.8	4.1
17	Sulphate, mg/l	BDL	BDL	BDL
18	Free Ammonia,mg/l	BDL	BDL	BDL
19	Boron, mg/l	BDL	BDL	BDL
20	SAR	1.2317	0.9988	1.1069
21	TC, cfu/100ml	320	430	310
22	FC,cfu/100ml	100	120	120

BAR[illegible] PK.
Chief En[illegible]

KERALA STATE POLLUTION CONTROL BOARD * REGIONAL OFFICE * THIRUVANANTHAPURAM

STATE WATER MONITORING PROGRAMME (SWMP) 2021				
Analysis report for the month of **JUNE 2021**				
Name of River		**Pallikkal River**		
Date & Time of sample collection		05.06.2021		
Method of analysis		**APHA**		
Sl. No.	**Parameters**	**Name of Station**		
		1.Adoor (PR1)	**2.Nellimugal (PR2)**	**3.Thodiyoor (PR3)**
1	Temparature, ^{0}C	23.5	23.4	23
2	pH	6.4	6.8	6.8
3	Turbidity NTU	1.3	1.5	1.5
4	Electrical Conductivity, µ/cm	170.5	190.5	180.6
5	DO,mg/l	6.9	6.5	6.5
6	BOD, mg/l	1.5	2.4	1.8
7	NH3N, mg/l	BDL	BDL	BDL
8	Nitrate, mg/l	BDL	BDL	BDL
9	Chloride, mg/l	34	36	38
10	Phosphate mg/l	BDL	BDL	BDL
11	Total Alkalinity, mg/l	34	34	35
12	Total Hardness, mg/l	40	56	40
13	Calcium, mg/l	30	40	30
14	Magnesium, mg/l	10	16	10
15	Sodium, mg/l	20	19.5	19.8
16	Potassium, mg/l	3.5	4.5	4.2
17	Sulphate, mg/l	BDL	BDL	BDL
18	Free Ammonia,mg/l	BDL	BDL	BDL
19	Boron, mg/l	BDL	BDL	BDL
20	SAR	1.2269	0.9967	1.2147
21	TC, cfu/100ml	300	400	300
22	FC,cfu/100ml	90	110	110

BABUR[illegible] P.K.
Chief Environmental Engineer

KERALA STATE POLLUTION CONTROL BOARD * REGIONAL OFFICE * THRISSUR *