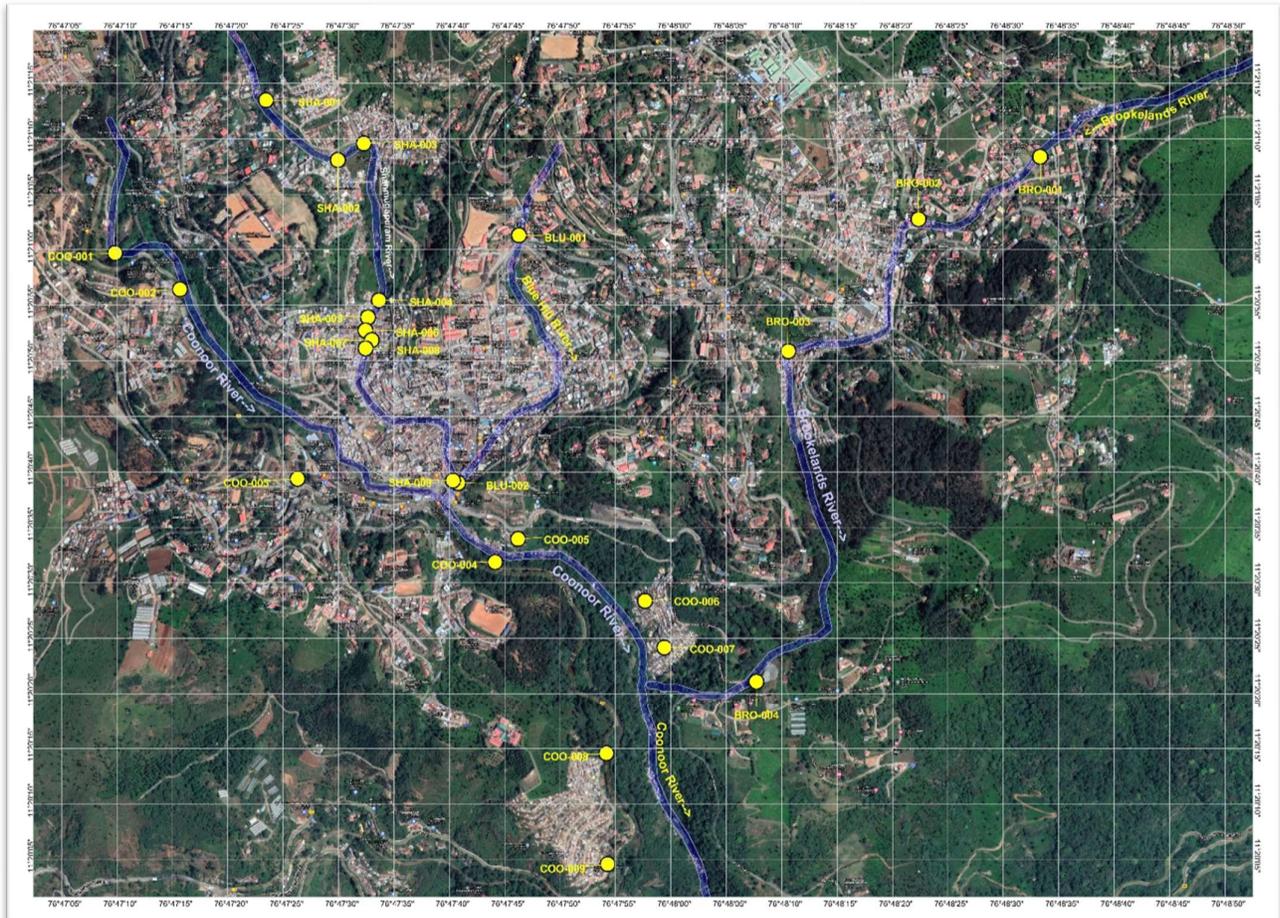


Wastewater Outfall Study Report for Pollution Abatement in Coonor River, Blue Hill River, Brookelands River and Shanmugapuram River Stretches within Coonor Municipality

Draft Report



Prepared by

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Table of Contents

EXECUTIVE SUMMARY	4
1. Introduction.....	7
2. Need for the Project.....	7
2.1. Need for Protective Rehabilitation	8
3. About Cauvery Basin.....	8
4. Coonoor Municipality Profile.....	10
4.1. Population:.....	12
4.2. Industries.....	12
4.3 Geology.....	12
4.4. Climate.....	13
4.5 Rainfall	13
4.6. Drainage and Water bodies.....	13
4.7. Water Supply	13
4.7.1. Service Reservoirs	14
4.8. Sewerage System.....	15
4.8.1. Sanitation Facilities.....	15
4.8.2. Storm Water Drainage	15
4.8.3 Solid Waste Management	16
5. Scope of Work	17
5.1. Exclusion from Scope of Work	17
6. Approach and Methodology of the Study.....	18
6.1. Activities carried out in Outfall Study.....	18
6.2. Objectives	19
6.3. Stakeholder Meetings	19
6.4. Data Collection	21
7. Existing Scenario	21
8. Field Investigation	22
8.1 General – Reconnaissance Survey.....	22
8.2. Spatial Mapping of Sewage Outfalls	23
8.2.1. Wastewater Out fall data collection using Mobile APP	23
8.2.2 Location of Outfall.....	26
8.3. Flow Measurement	29
8.3.1 Float Method.....	29
8.3.2. Volumetric Method.....	29
8.3.3. Sewage Sampling and Analysis.....	30
9. Wastewater Flow measurement.....	30
10. Field Observation.....	32

List of Tables:

Table 1: Salient features of Coonoor Town	11
Table 2: Coonoor Ward wise Population	12
Table 3: Yearly Rainfall - 2010- 2019	13
Table 4: Storm water drain details	16
Table 5: Approach and Methodology.....	18
Table 6: Status of Data Collection	21
Table 7: Wastewater outfall location.....	26
Table 8: Peak factor.....	30
Table 9: River wise number of wastewater outfalls	30
Table 10: Summary of Wastewater discharge location & estimated discharge quantity ..	31

List of Figures:

Figure 1: Map of Cauvery Basin	9
Figure 2: Coonoor Municipality.....	11
Figure 3: Flow Diagram of Work.....	19
Figure 4: Photograph of Stake holder Meeting	20
Figure 5: Coonoor Municipality Walk-through survey.....	22
Figure 6: Snap-shot of Mobile App.....	23
Figure 7: Snap-shot of Web-Portal.....	24
Figure 8: Field Data Capture Format	25
Figure 9: Map showing wastewater outfall location	28
Figure 10: Wastewater Outfall sample collection and testing.....	28

Annexure – 1 The High-resolution satellite imagery showing the outfall locations and its estimated quantity of wastewater discharge

Annexure – 2 The outfall location wise flow measurement statement

Annexure – 3 The outfall location wise photographs

Annexure – 4 The individual pipe discharge in to Shanmugapuram River photographs

EXECUTIVE SUMMARY

1.	Name of the River	Coonoor River, Brookelands River, Blue Hill river and Shanmugapuram River				
2.	River Stretch & Town	Coonoor Municipality				
3.	District	The Nilgiris District				
4.	Type of Outfall	Domestic Sewage				
5.	Mode of Discharge	Untreated sewerage is being let out in the Coonoor River, Brookelands River, Blue Hill river and Shanmugapuram River				
6.	No. of Identified Outfalls	Coonoor River	Brookelands River	Blue Hill	Shanmugapuram River	Total
		9	4	2	9	24
7.	Untreated Sewage Flow into the river (Estimated in MLD)	Coonoor River	Brookelands River	Blue Hill	Shanmugapuram River	Total
		0.84	1.13	0.63	1.89	4.49
8.	Existing Sewage Treatment Plants Capacities	No STP				
9.	Current sewage inflow into STP	No STP Installed				
10	Unique features of feasibility study	<ul style="list-style-type: none"> i) Generation of Geo-Referenced Scale High Resolution Satellite Imagery on 1:2750 scale for 1 Km Buffer Zone from Rivers falling in Coonoor Municipality in Tamil Nadu ii) Mobile App based data collection system iii) Web based data retrieval System iv) A compact Disc containing Satellite imagery as KML file for showing the wastewater outfall with geo referenced in the Coonoor Municipality in the stretch of Rivers which can be viewed using Google Earth Software 				

<p>11</p>	<p>Existing Scenario</p>	<p>Coonoor Municipality - Water supply and Wastewater Flow Diagram</p> <p>Water Supply Schemes</p> <ol style="list-style-type: none"> 1) Ralliah Dam 2) Bandam Source 3) Old Forest Stream 4) High Field Source 5) Cymkhana Source 6) Upputhotti Source 7) Bellatimattam Source 8) Currency Source 9) Karadipallam Source <p>4.52 MLD</p> <p>4.52 MLD Water Demand</p> <p>Wastewater generation for the Present Supply (80 % of Present Water Supply) 3.62 MLD</p> <p>Number of Wastewater outfall Identified and Estimated Flow 24 4.69 MLD</p> <table border="1"> <thead> <tr> <th>Number of Households</th> <th>Number of HSC</th> <th>% age of Coverage</th> </tr> </thead> <tbody> <tr> <td>12584</td> <td>7147</td> <td>57</td> </tr> </tbody> </table> <p>Level of Supply : 82 LPCD</p> <p>Blue Hill River 2 0.63 MLD</p> <p>Brooklands River 4 1.13 MLD</p> <p>Coonoor River 9 0.84 MLD</p> <p>Shanmugapuram River 9 1.89 MLD</p> <p>No STP</p> <p>Wastewater discharged in to Blue Hill River</p> <p>Wastewater discharged in to Brooklands River</p> <p>Wastewater discharged in to Coonoor River</p> <p>Wastewater discharged in to Shanmugapuram River</p>	Number of Households	Number of HSC	% age of Coverage	12584	7147	57
Number of Households	Number of HSC	% age of Coverage						
12584	7147	57						
<p>12</p>	<p>Observation</p>	<p>Snap-shots of wastewater discharge into river</p>						
<p>13</p>	<p>Field Observation</p>	<ol style="list-style-type: none"> 1. The total quantity sewage measured in the 24 outfall locations were slightly higher than Municipality water supply. It indicates that there is ground water usage in the municipality. 2. During walkthrough survey onsite TDS was measured in all locations and found that the TDS value was 100 mg/l. TDS of the River downstream of the Municipality is around 900 mg/l, which indicates that there is no industrial effluent discharge. 3. The expected sewage generation is about 3.62 MLD (As per the CPHEEO 80% of water supply is considered as wastewater). 						

		<p>4. Calculated sewage quantity from 24 outfall locations is about 4.69 MLD. This is exceeding the maximum demand for water supply of 4.52 MLD. This indicates considerable utilization of spring water / ground water beyond demand (i.e., about 4.52 MLD) of the current population. This needs to be further investigated at the time of implementation.</p> <p>5. On both sides of Shanmugapuram river, the wastewater from the individual household is being discharged in the the river.</p> <p>6. The above discharge points need to be plugged and diverted to a common collection point in the downstream side.</p> <p><i>Note: During the field investigation it was observed that the stream / river flow was observed due the spring discharge.</i></p>
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1. Introduction

Rivers are life line of all things living. River water is used for irrigation, domestic purpose, industrial and commercial use, which in return gives food to the people, economic growth and basic needs for the people. Rivers also have historical, cultural and religious significance for its people. An area without a river is considered poor. Hence, it is needed to maintain the ecology of the river and bring prosperity. Unfortunately, over the years, the river water quality has deteriorated at a rapid pace. One of the major reasons for this is the untreated wastewater being released to the rivers, turning them to be a dirty drain. In the State of Tamil Nadu most of the rivers are experiencing the same scenario over several decades.

Principal Secretary to Government MA&WS directed the Commissioner of Municipal Administration (CMA) to take necessary action to avoid contamination of river and to preserve water source through preventing sewage entering into river from municipal area and to evade from Infectious disease caused by mixing of sewage in drinking water source. In this Regard, Commissioner Coonoor Municipality has issued work order to M/s. ENSYS Technologies (I) Pvt. Ltd., Chennai (WO letter ROC No. H2 / 1659 / 2020 Dated 25 / 01 / 2021) to provide consultancy services for preparation of wastewater outfall study for pollution abatement in Coonoor Municipality.

2. Need for the Project

Water is a prime source for all the living creatures and its existence in this world. It exists in the form of surface water as rivers, lakes, ponds etc., as well as ground water. Rivers have a special attention in the lives of the Indians. River water is used for irrigation, domestic purpose, industrial and commercial use, which in return gives food to the people, economic growth and basic needs for the people. It is often emphasising and stressed the need to maintain the ecology of the river and bring prosperity.

Unfortunately, over the years, the river water quality has been deteriorated at a rapid pace. One common problem in the state of Tamil Nadu is that most of the rivers gets polluted by human intervention by way of discharging domestic sewage into the rivers / lakes / ponds and dumping of solid waste in water bodies. In addition, rapid growth of industries has also played a major role in polluting water bodies by the way of disposing the industrial effluents into the water bodies.

Growth of industries had also played a major role in polluting water bodies by the way of disposing the industrial effluents into the water bodies

2.1. Need for Protective Rehabilitation

Lack of proper infrastructure such as Under Ground Drainage (UGD), Sewage Treatment Plant (STP), and lack in proper treatment processes leads to the problem of environmental degradation as well as pollution of water bodies. Hence it is essentially needed to protect the surface water bodies especially Rivers and its ecology from pollution. CPCB has identified six polluted river stretches in Tamil Nadu for exceeding the prescribed standard limit of Bio-chemical Oxygen Demand

3. About Cauvery Basin

Tamil Nadu is drained by 17 river basins. The Cauvery river basin is one of the major basins. The Cauvery River rises in the Western Ghats and flows in eastwardly direction passing through the states of Karnataka, Tamil Nadu, Kerala and Pondicherry before it drains into Bay of Bengal. The basin lies between latitudes $10^{\circ}05'$ N and $13^{\circ}30'$ N and longitudes $75^{\circ}30'$ E and $79^{\circ}45'$ E. It is bounded on the west by the Western Ghats, on the east and south by the Eastern Ghats and on the north by the ridges separating it from the Tungabhadra (Krishna) and Pennar basins.

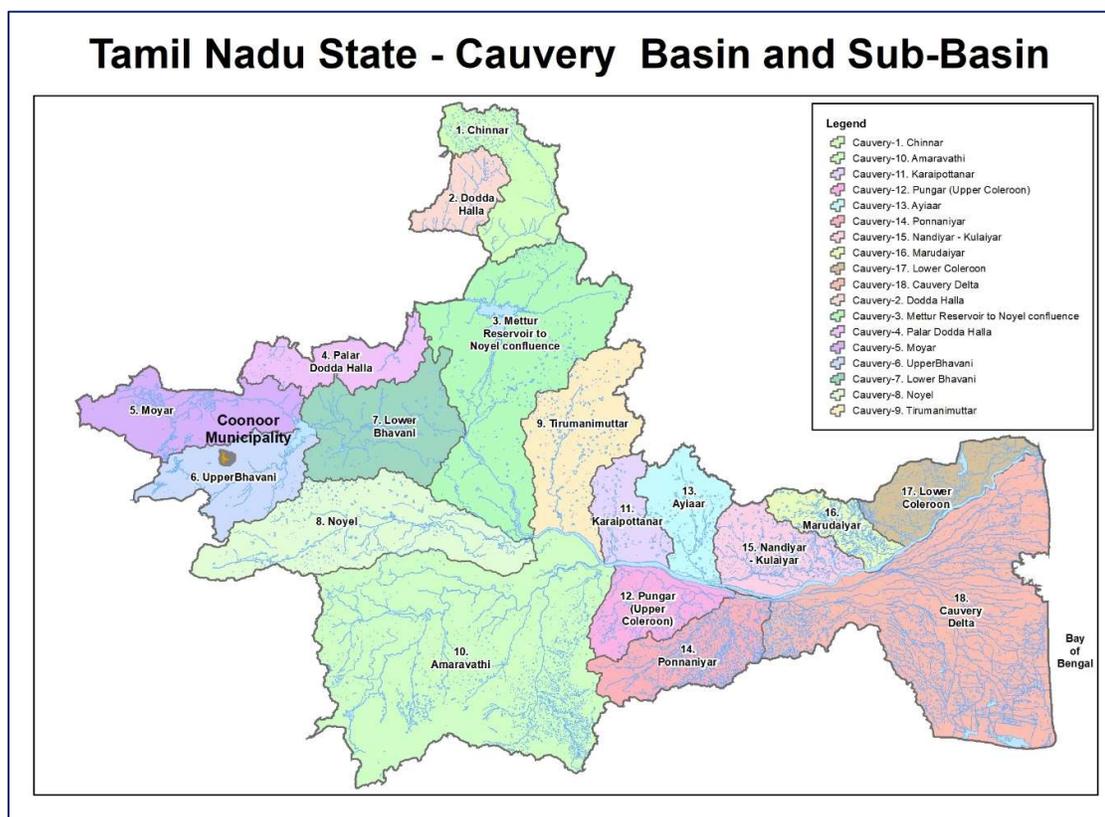
The total length of the river from source to its outfall into Bay of Bengal is about 800 km. Of this, 320 km is in Karnataka, 416 km is in Tamil Nadu and 64 km forms the common boundary between Karnataka and Tamil Nadu States. The Cauvery basin extends over an area of 81,155 km², which is nearly 24.7% of the total geographical area of the country

The basin lies in the States of Tamil Nadu, Karnataka, Kerala and Pondicherry. The shape of the basin is somewhat rectangular with a maximum length and breadth of 360 km and 200 km, respectively.

The important tributaries joining Cauvery in the Coorg district are the Kakkabe, the Kadanur and the Kummahle. Cauvery then enters the Mysore district where important tributaries joining the river from the left are the Harangi, the Hemavathi, the Shimsha and the Arkavathi. The tributaries joining it from the right are the Lakshmanathirtha, the Kabbani and the Survanavathi. Further down, the river enters Tamil Nadu State where the many tributaries, namely, the Bhavani, the Noyil and the Amaravathi join Cauvery. In the Cauvery delta zone, rice is the principal crop. In the rice based cropping system, it

is either single or double cropped. Pulses, blackgram and greengram are next importance grown in the rice follows throughout the delta region from January onwards. Gingelly is also sown in April in prepared fields subsequent to summer showers. In addition, money crops, flowers also major crops in the Cauvery delta region. Vegetables like brinjal, chillies and greens are grown during summer months in limited area in the well-drained fertile lands depending upon the underground water sources. In light clay soils under garden land condition is brought out where crops like groundnut, maize, gingelly and irrigated pulses and altered. Banana, sugarcane and ornamentals like jasmine, rose, chrysanthemum, are occupying the land for more than one year for the successive returns. Coconut gardens, bamboo and wood lots are scattered in the delta in different densities. Mango, jack, citrus, guava, pomegranate, custard, apple etc., are the more prevalent fruit trees in addition to cashew in specific pockets. Map of Cauvery river basin is shown in figure 1

Figure 1: Map of Cauvery Basin



Source: Water Resources Organisation, PWD, and Government of Tamil Nadu.

4. Coonoor Municipality Profile

Coonoor Municipality was constituted in the year 1866 during British Rule which indicates that this is one of the oldest Municipalities in Tamilnadu State. Coonoor is located at 11.35°N 76.82°E.^[8] It has an average elevation of 1,850 metres (6,070 feet) above sea level. The town is the second largest in the Nilgiri hills after Ooty, the district headquarters. Coonoor is a Municipality city in district of The Nilgiris, Tamil Nadu.

It is located at a distance of 27.6 KM from Udthagamandalam, Head Quarters of Nilgiris District and 28 Km from Mettupalayam. Coonoor is also known as the “Jewel of the Nilgiris”. It is famous for its verdant environs and variety of wild flowers and birds.

The Coonoor city is divided into 30 wards for which elections are held every 5 years. The Coonoor Municipality has population of 45,494 of which 22,107 are males while 23,387 are females as per report released by Census India 2011.

The town of Coonoor is broadly divided into two geographies - Lower Coonoor and Upper Coonoor. Lower Coonoor hosts the main Bus Depot, the Railway Station as also the bustling market complex. Upper Coonoor hosts locations like UPASI, Bedford, and Sim's Park.

Coonoor is connected by train from Mettupalayam, the famous textile center of Tamil Nadu via Mettupalayam, from where the historic narrow gauge mountain railway begins and reaches Udthagamandalam on the hilly tracks amidst the panorama of natural scenario.

Coonoor is Taluk headquarters, responsible for 6 Panchayat villages, namely, Bandishola, Bearhatty, Burliar, Hubbathalai, Melur and Yedapalli. The Coonoor block contains the revenue village Adigaratty, Burliar, Coonoor, Yedapalli, Hubbathalai, Hullickal, Ketti, Melur. Coonoor assembly constituency (SC) is part of Nilgiris (Lok Sabha constituency) The major occupation of this town is agriculture. Tea Estates. Tea industry is very prominent here.

Figure 2: Coonor Municipality

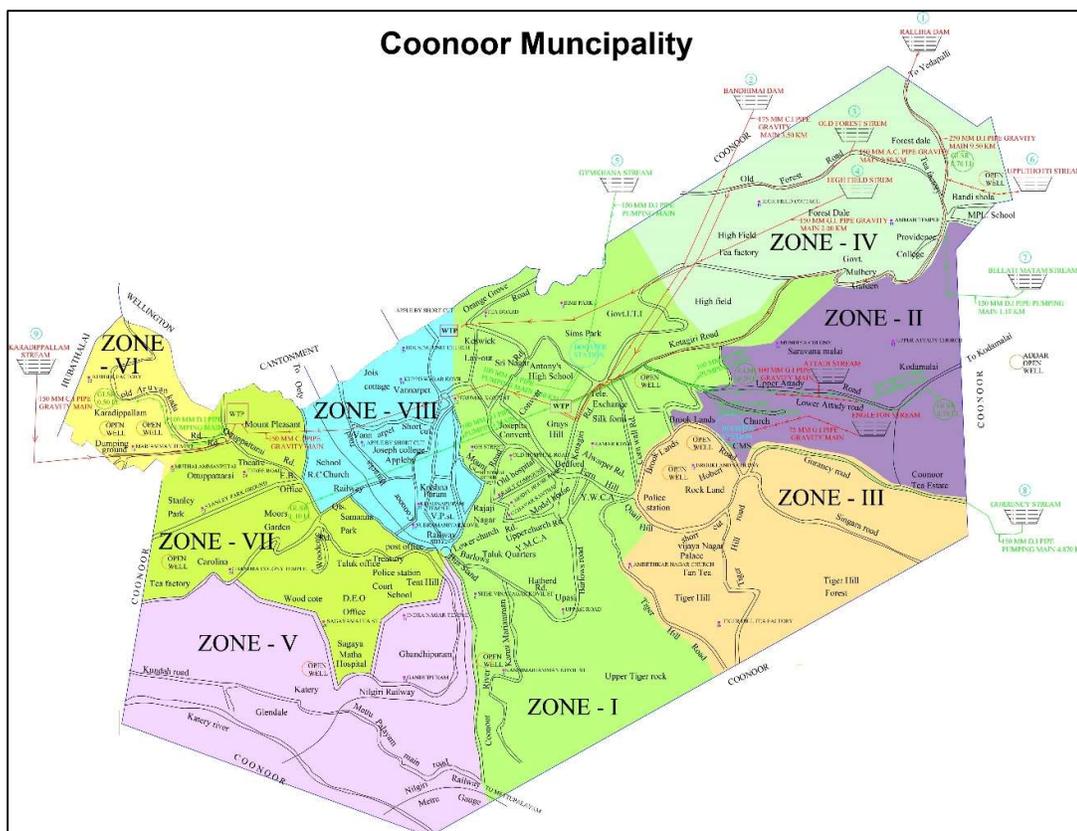


Table 1: Salient features of Coonor Town

Total area	15.05 Sq. Km
Total population as on 2011	45494
Projected Population for 2019	47728
No. of wards	30
Total length of roads	69.255 kms
Source of water supply	Ralliah Dam, Bandhimai Dam, Bellattimattam Stream, Brooklands Openwell, Gurrency Stream, Gymkhana Stream, Old Forest Stream, High Field Emerald Dam (TWAD Board)
Per Capita water supply	82 LPCD
No. of open wells	10
Total length of pumping main	12.10 km
Total length of distribution line	63.00 km
Storm water drains length	28.01 km
No. of house service connections	7147
Extent of compost yard	12.35 Acres
Quantity of garbage generation	14.005 MT

4.1. Population:

The Coonoor Municipality population of 45,494 of which 22,107 are males while 23,387 are females as per report released by Census India 2011.

Ward wise population of the Municipality is presented below:

Table 2: Coonoor Ward wise Population

Ward No	Population	Ward No	Population	Ward No	Population
Ward 1	948	Ward 11	970	Ward 21	1094
Ward 2	1499	Ward 12	1583	Ward 22	1230
Ward 3	1856	Ward 13	1952	Ward 23	1493
Ward 4	2501	Ward 14	1607	Ward 24	543
Ward 5	1968	Ward 15	773	Ward 25	1631
Ward 6	1500	Ward 16	1210	Ward 26	1196
Ward 7	1575	Ward 17	911	Ward 27	2267
Ward 8	2443	Ward 18	1224	Ward 28	1859
Ward 9	1355	Ward 19	1342	Ward 29	1999
Ward 10	251	Ward 20	1560	Ward 30	1154

4.2. Industries

Coonoor Town is a taluk headquarters and is known for tea industries. The town is surrounded by number of tea estates and there are many tea factories within the Municipal area. The high grown tea is very famous for its flavour and taste and tea auctioning centre is functioning here. There are many Tea factories located in and around this town. The prominent factories include High field tea factory in Ward 1, Coonoor Tea factory and Bandisholai Tea Factory in Ward 2, Tiger Hill Tea Factory and Glendale Tea Factory in Ward 3 and Indcoserve Tea Factory in Ward 4.

This Town has been developed based on the importance gained in Tea-Plantation activities and settlement of industrial workers who are engaged in Kundah Hydro Electric project in the hilly area.

Besides tea industry tourism is the other aspect attached to this hill town

4.3 Geology

Predominantly, the municipal area is covered by hard rock formations of Gneiss and Charnockites.

4.4. Climate

Coonoor is having a very smooth and enjoyable climatical conditions which attracts tourists from all over the world the climate is hot and dry in many parts of the year and the variation in temperature from day to night is little. Maximum temperature here reaches up to 22.1°C and minimum temperature goes down to 13.1°C.

4.5 Rainfall

The average rain fall for Nilgiris district is 1590.7 mm. (Source: IMD). the bulk of which is collected during the north – west monsoon period (i.e.) from October to December. The total number of rainy days in a year ranges from 75 to 84 days on an average. The region experiences four main seasons: Cool Months - December to February; Summer Months - March to May; Windy Months - June to August; and Rainy Months - September to November.

Rainfall pattern data of Nilgiris District for the year 2010 to 2019 is as in Table 3: - (Data Source: Indian Meteorological Department)

Table 3: Yearly Rainfall - 2010- 2019

Normal Rainfall in mm	Actual Rainfall in mm during the year									
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
967	2031	1653	1468	1534	1960	1721	888	1469	1700	2227

4.6. Drainage and Water bodies

Coonoor Municipality situated in the Cauvery river basin and Upper Bhavani sub basin . The Rivers – Coonoor, Shanmugapuram River and the Brookelands River Blue Hills. The Krishnapuram Stream, MGR Nagar Stream and Model House Stream are the Major Water Bodies available within the municipal limits. The drainage pattern is the dendritic and sub-dendritic.

4.7. Water Supply

The prime functions of the Municipality as contemplated in Tamilnadu District Municipalities Act 1920 are providing protected Water Supply, Street Light facilities to the Public and ensuring sanitation of the town on an average This Municipality is supplying

90 litres of water per day per head which is adequate at present. The water supply is effected through 9 different sources in Coonoor Municipality. The sources of water are from the Dams – Ralial Dam (2.01 Million litres) and Bandhumi Dam (0.29 Million litres) apart from the Emerald Scheme and from the 7 streams namely Bellatimattam, Gurrency, Gymkhana, Old Forest, High field, Attadi and Uppu Thotti accounting for 1.91 million litres. Apart from the above sources 10 numbers of Open wells in Brook lands are available within the municipality limits accounting for 0.30 million litres. The drinking water demand for Coonoor Municipality is **3.30 mld** at the rate of **82 lpcd**.

From all the above sources, **4.52 MLD** of water is drawn during the rainy season for about 6 months (From October to March) and distributed to the public at the rate of 90 LPCD. During summer and drought seasons, (From April to September) the drawal gets reduced to 3.51 MLD and is distributed to the public at the rate of 70 LPCD.

Out of 4.52MLD drawn during raining seasons, 3.15 MLD is from the following sources.

- Ralial Dam.
- Bandumi Dam.
- Gymkhana Stream.

The catchment areas of Ralial Dam and Bandumi Dam is 310 acres and 200 acres respectively. These two dams get filled up with water during north east monsoon and this water is distributed to the public to their full requirements for a period of 6 months.

During summer seasons, water level goes down and water drawn from these sources decreases fully and there is scarcity of water prevailing in the town. Water is distributed to the public residing at high level areas once in five days and in the low-level areas once in two days only. Water is supplied to the public residing at very high-level areas through water lorries, 2 owned by the municipality and by hiring.

4.7.1. Service Reservoirs

5 Numbers of Ground Level Service Reservoirs (GLSRs) with total combined Capacity of 16.36 lakh litres is available within the municipality limits at Gray Hills (8.0 Lakh Litres) Vannarpet(4.0 Lakh Litres), Mount Pleasant(4.25 Lakh Litres), Moorse Garden(0.06 Lakh Litres) and Uppu Thotti(0.05 Lakh Litres) The length of the Pumping main is 12.10 km and that of the distribution mains is 63.00 km. Water supply is provided through 282 numbers of Public Fountains apart from the 7147 House Service Connections.

4.8. Sewerage System

There is no underground drainage system in Coonoor. Disposal of Night Soil is normally by way of individual facilities and liquid waste (Sullage and Kitchen Waste) is through the open drains. The main mode of individual disposal in the town is through septic tanks, low-Cost Sanitation units and through public conveniences. A phenomenal 38% of the population do not have access to safe disposal systems. 45 % percent of the population has resorted to private arrangements, in the form of septic tanks.

Currently, Under Ground Sewerage System (UGSS) and Sewage Treatment Plant (STP) are not implemented in Coonoor municipality. The untreated sewerage is being let out to the Rivers and streams. Coonoor Municipality has a proposal for establishment of a Decentralized STP is under consideration.

4.8.1. Sanitation Facilities

7 nos of Public Toilets and 30 numbers of Community Toilets exists within the Municipal limits. Disposal of Night Soil is normally by way of individual facilities and liquid waste (Sullage and Kitchen Waste) is through the open drains. The main mode of individual disposal in the town is through septic tanks. Out of 12584 households in the Municipality, 11388 house hold have toilet facility and the remaining 1196 house holds do not have the toilet facility. Out of the 11388 house holds with toilet facility 1724 household have both septic tank and soak pits, 2471 have septic tank only, 2474 have only soak pits and the remaining **4719 have toilets only leaving the sewage into drain/stream.**

4.8.2. Storm Water Drainage

The existing drainage condition of Coonoor consists of natural river and man – made drainage system (Strom water open drains). Due to the nature terrain condition, all the man – made Strom water drains are connected with natural river system Coonoor River.

The present condition of Strom water drains also carries the sullage and sewage water, which ultimately carried by the Coonoor River in the down steams area and mix with the Bhavani River. This pose a health and environmental hazard to the natural water system need to be addressed through a proper treatment facility for the sewage water let into Coonoor River. This aspect requires immediate attention as the river water is also used by the wayside villages for drinking purpose.

Altogether the existing Storm water drains characterized by the low carrying capacity due to encroachments in the urban area, which reduces the regular flow and add constraint to the existing drainage system. In nature the Coonoor town has steeper slopes, which drain the Storm water. Moreover, the Urban Local Body also provides pucca water drainage facility in the major portion of the town. The existing Storm water drains mainly carry the wastewater disposal and in many places the Storm water drains are functioning as wastewater drains, which create environmental problems and need regular maintenance by the ULB, is shown in Table-4.

The information provided in the above Table indicates that nearly 48.40% of the roads are provided with Storm water drainage facilities and the rest of 51.60% roads are not provided with drains, which are drained through available natural terrain condition. The observation relating to Storm water drainage facility indicates inadequate planning and designing, as majority of the drains are provided in bits and pieces without any integration between the drains, this is due to the presence of scattered development and undulated terrain condition in Coonoor town.

Table 4: Storm water drain details

Drain Type	Length (KM)	Percentage Coverage (%)
Open pucca/surfaced	19.09	27.82
Kutch/Unlined	14.12	20.58
Total drains (Km)	33.21	48.40
No drainage facilities	35.41	51.60
Total road length (Km)	68.62	100.00

4.8.3 Solid Waste Management

In the Coonoor Municipality, 14.0 MT of solid waste are generated daily. Presently, the collection of waste is managed by 155 municipals sanitary workers⁵ Sanitary Supervisors and 1 Sanitary Inspector. by door-to-door collection of waste by utilizing 12 tipper autos. In town area wastes are collected on a day-to-day basis and the coverage is reported as 90 %.

5. Scope of Work

1. Collecting information and understanding of requirements and possible list of beneficiaries under this project.
2. Collection of secondary data from Municipalities/Corporations, Public Works Department (PWD), Water Supply and Sewerage Board and other line departments.
3. Conducting walkthrough survey in the River stretch of about 10 kms (approximately) to verify outfalls and quantity of wastewater mixing in the river stretches and its spatial mapping on Google Earth (Satellite Image) using Latitude/Longitude.
4. Collection of River Water in upstream & downstream of the River stretches and Sewage Sampling (Grab and Composite) in the confluence points and analysis through NABL Accredited Laboratory agency.
5. Detailed analysis of data collected during field studies.
6. Identification of treated sewage outfalls from existing STPs (If any) and any illegal industrial discharges will be done, these will be isolated from the proposed baby canal.
7. Measurement of quantum of wastewater mixing in the Rivers using float method and volumetric method.
8. Submission of separate Detailed outfall study Report for each Municipality after incorporation of comments.

5.1. Exclusion from Scope of Work

1. Industrial effluents (if any) and their inflows into the selected stretches of the river will not be covered under this mandate. However, identified Industrial wastewater confluence during the survey will be reported to TNPCB to initiate necessary actions as required.
2. Solid Waste Management, which shall be handed by Municipality.
3. The costs for conducting Stakeholder's meeting including arranging hall, snacks & other miscellaneous costs for the meeting are excluded in the scope & are to be provided by the respective Municipalities.

4. Topographical Survey & Geo-technical Survey in the proposed project site which will be carried out by the EPC contractor after award of the Contracts.
5. Environment Impact Assessment (EIA) study for the proposed project, which shall be conducted through NABET approved agency prior to commencement of the project implementation works. The costs for the EIA study shall be borne by CMA.

6. Approach and Methodology of the Study

Table 5: Approach and Methodology

Phase	Stage of works
Phase - I	Estimation of wastewater outfall – Draft Report
Phase II	Final Report incorporating all the corrections

This Outfall Study Report for Pollution abatement in the river is being submitted under as per scope of work of this project.

6.1. Activities carried out in Outfall Study

- As a first activity of the study, a walkthrough survey was conducted in the River stretch on 25-27 Feb-2021. after discussion with Municipality Officials and Field level staff on 29-Jan-2021
- Collection of secondary data from different line departments such as local bodies, Public Works Department (PWD), Tamil Nadu Pollution Control Board (TNPCB) have been carried out.
- Collection of primary data by conducting Field survey to identify and locate the sewage outfalls in the rivers, flow measurement carried to quantify the sewage discharge.
- Compilation of available secondary data and detailed analysis of data collected during field studies for proposing approach and technology.
- Feasibility study to address the problem of sewage mixing into the rivers by forming baby canal near to the banks of the rivers.

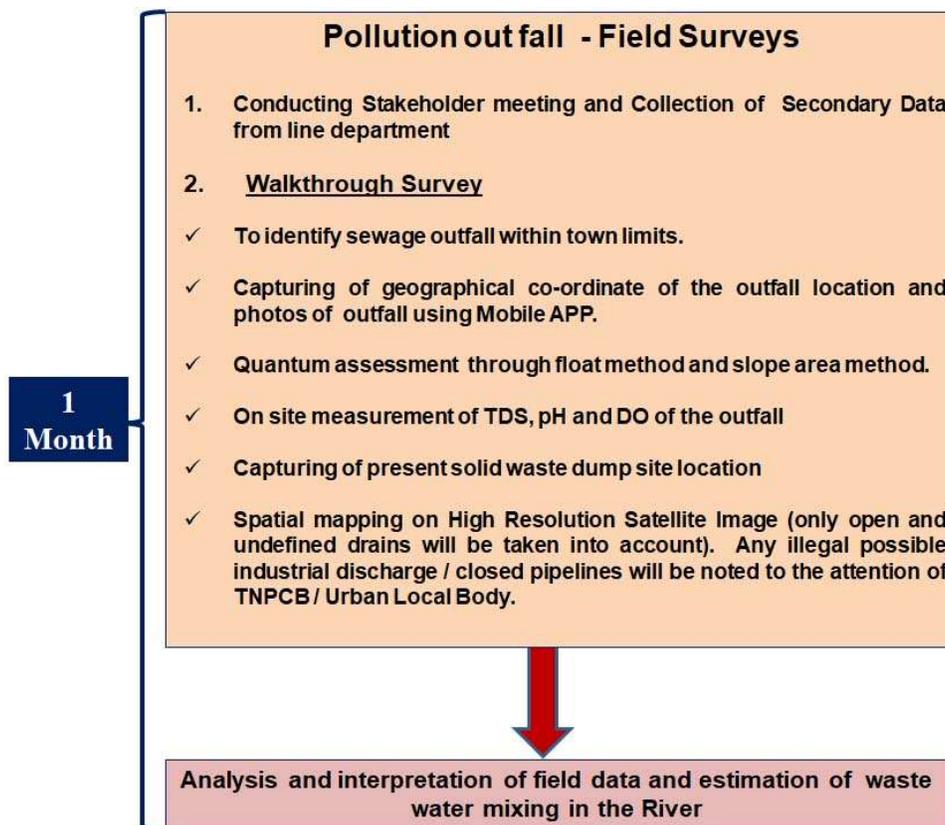
6.2. Objectives

It is essential to prepare a coherent methodology to meet the objectives of pollution abatement in the Coonoor River and its tributaries stretch in Coonoor Municipality limit with the possible treatment options. The specific objectives are.

1. To identify the wastewater outfalls along the banks of the River within the Municipality limit.
2. To map the outfall points spatially using its Geo Coordinates.
3. To quantify the untreated sewage from each outfall using Float method / volumetric method in the Coonoor Municipality limit.
4. On-site Measurement of TDS, pH and DO in the outfall locations

The objective flow diagram is given in figure.4

Figure 3: Flow Diagram of Work



6.3. Stakeholder Meetings

In order to understand and collect relevant details, stakeholder meeting has been conducted at Coonoor Municipality office. The Commissioner, Municipal Engineer and other

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officials have been interacted and the required details have been collected. The Municipal Engineer has given instructions to the Health Inspector and other officials to coordinate with the field team to collect the field data.

The below Figure 4 photographs show the stakeholder meeting.

Figure 4: Photograph of Stake holder Meeting



6.4. Data Collection

Availability of information is vital for bringing out the best in the study and successful completion of any project. For this project, the status of data collection is indicated in table 5

Table 6: Status of Data Collection

S. No	Type of Data / Name	Authority	Status
1	Population Data	Municipality	Collected
2	Actual Demand and Present supply of water	Municipality	Collected
3	Present Sewage Generation	Municipality	Collected
4	Present Water Supply Scheme	Municipality	Collected
5	Areal Extent of UGD and Uncovered areas	Municipality	Collected
6	List of Sewage Pumping stations and its location	Municipality	Collected
7	Existing STPs details and its present operation capacity	Municipality	Collected
8	Storm Water Drain network in town panchayat limit	Municipality	Collected
9	Ownership of river / canals	PWD	Collected
10	River water quality data	Field team	Field team

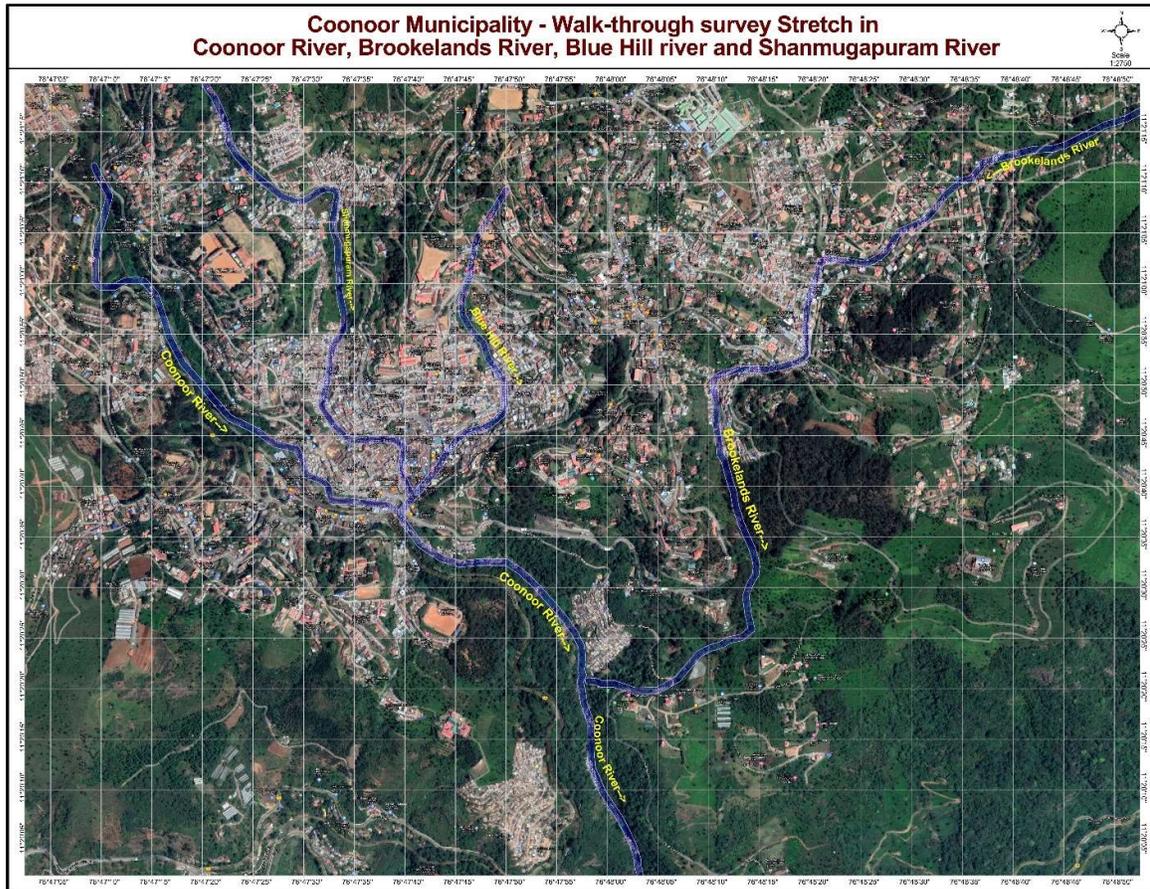
7. Existing Scenario

The Rivers – Coonoor, Shanmugapuram River and the Brookelands River- and the Krishnapuram Stream, MGR Nagar Stream and Model House Stream flows within the Coonoor Municipality limit runs to a length of approximately 14 kms. The untreated sewer and domestic wastewater are being discharged in Vasishta River and its tributaries.

The Major contributors of river pollution in the Model House Stream is from the Ward Numbers 8,9,18(from 1156 Households) and in respect of the Krishnapuram Stream the contribution is from Ward numbers 14,15,16,21,22 (from 1206 Households). The minor Contributors of river/ drainage pollution is from Ward 19,4,25,3,5 (1076 households).

In order to study the outfall, the walkthrough survey in the river and the streams has been started from River Entry Point and Outfall locations.

Figure 5: Coonoor Municipality Walk-through survey



8. Field Investigation

Field Work was under taken to collect the location of wastewater outfall location and its flow. Apart from the above details such as location of proposed STP and sold waste dump site etc.,

8.1 General – Reconnaissance Survey

One team was deployed in the River stretch to carry out the field activity. A complete reconnaissance survey was carried out in the River stretch to study the outfall points, its approach to collect and quantify the sewage etc., a team consists of One Team Leader assisted by Technical Assistant, Lab Chemist and Helper. Flow of sewage was measured during the period 7.00 A.M to 9.00 A.M. The outfall points were noted and its Geo Coordinates were recorded, on site TDS and DO meters were used to check the TDS at the site itself. Flow was measured in two ways using Float Method and Volumetric Method based on the mode of discharge.

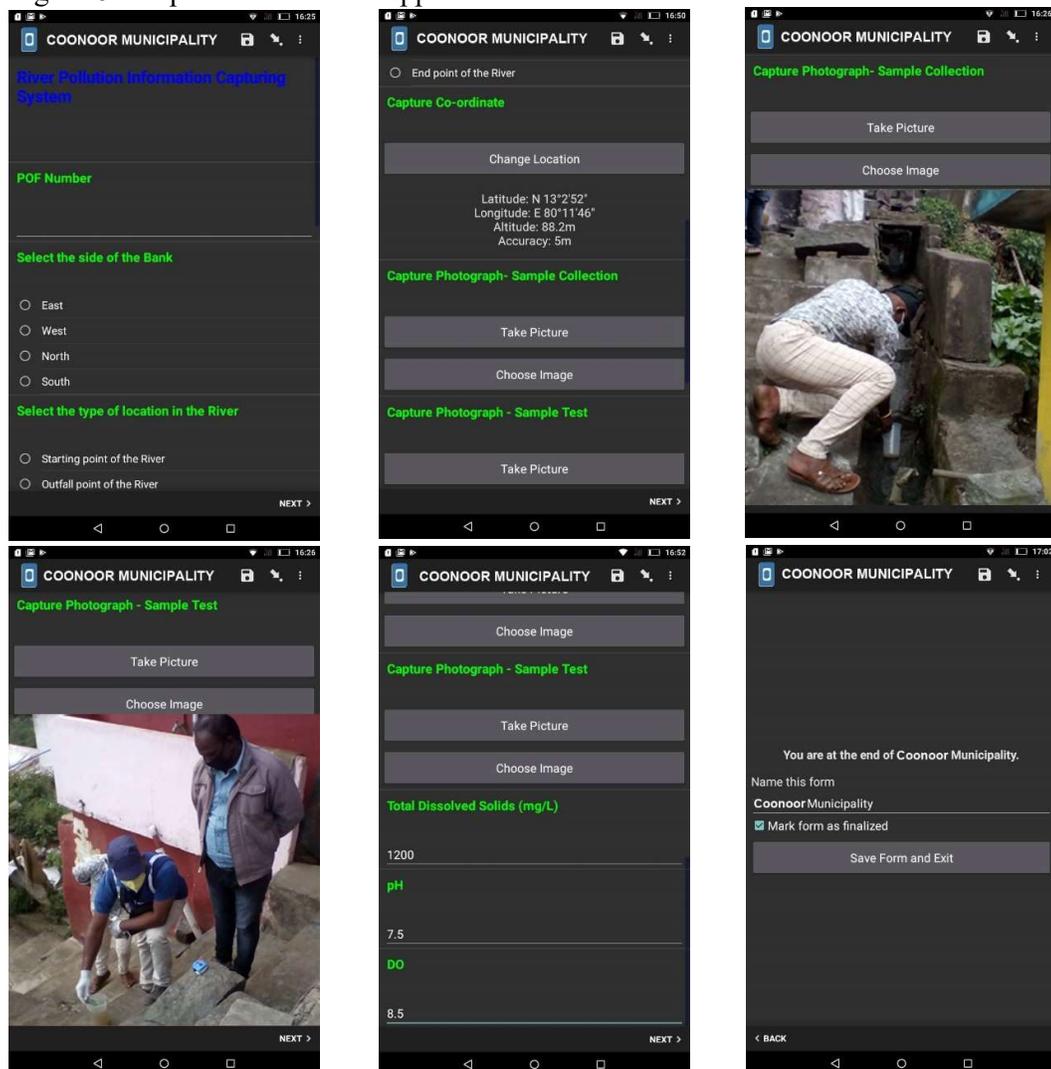
8.2. Spatial Mapping of Sewage Outfalls

In order to map the outfall points, a walkthrough survey was conducted on either side of the river bank. The team was equipped with GPS enabled Mobile and GPS software in Mobile. The sewage outfalls were noted and recorded precisely using GPS software in mobile, the outfall photographs were taken with the stamps of its Geo Coordinates. Then the GPS points were transferred to Google Earth pro software and it has been checked for its accuracy.

8.2.1. Wastewater Out fall data collection using Mobile APP

In order to collect the field data such as the location of outfall (Latitude, Longitude), Photograph of the outfall, TDS, and flow a mobile base APP “Pollution Outfall Location Information System” (POLIS) has been developed. The APP is easy to use in the field and the captured field data can be sent to the Server for further analysis. The snap-shot of the App is as in figure 8.

Figure 6: Snap-shot of Mobile App

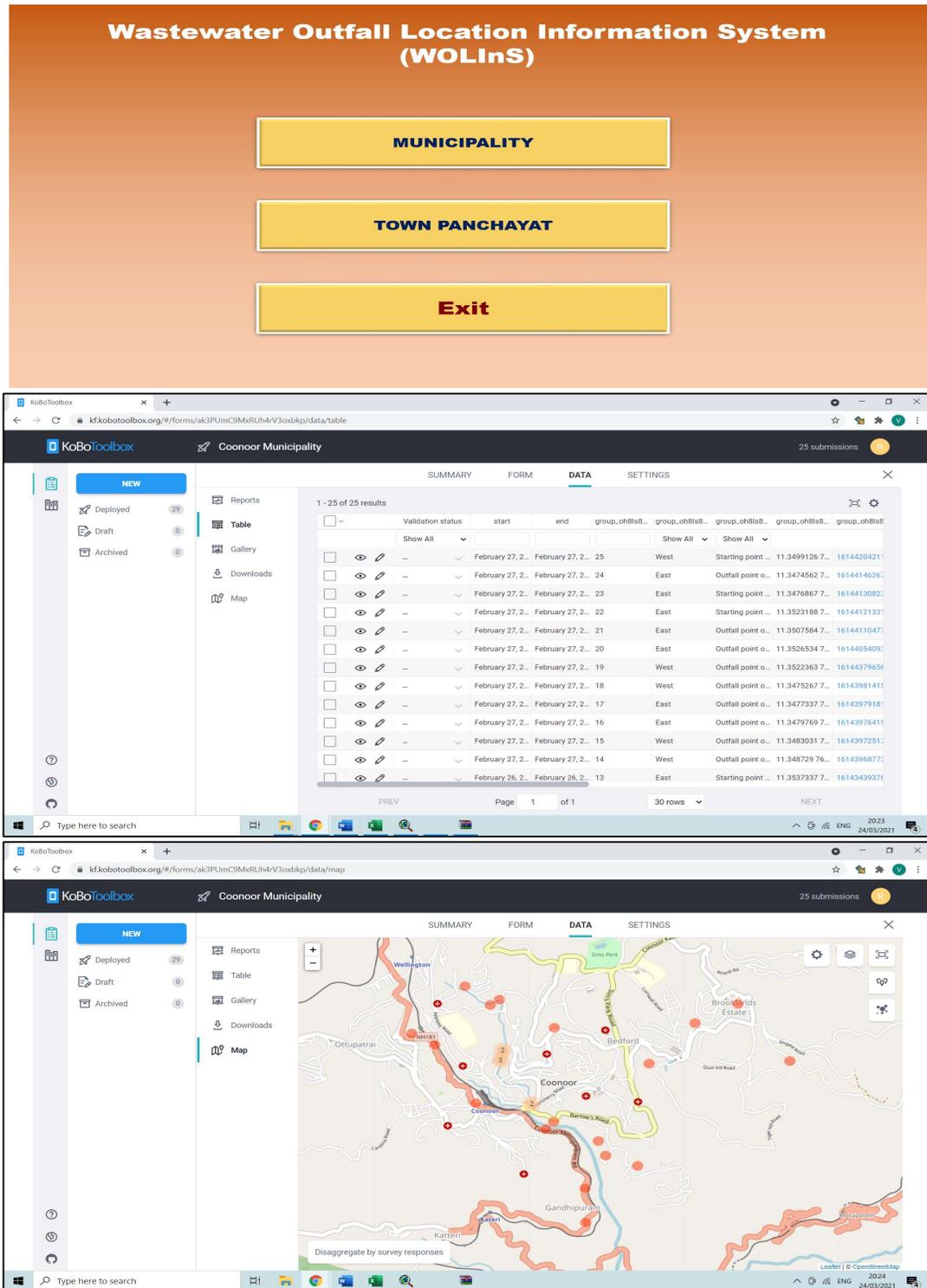


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Above Mobile APP has been used to capture the wastewater outfall location which will give geo-tagged information.

Separate web portal has been developed to receive the data, photos collected from the field for further analysis and reporting. Figure 9

Figure 7: Snap-shot of Web-Portal



Field data captured format has been created to collect in the filed itself. Figure 8
 Figure 8: Field Data Capture Format

Coonoor Municipality								
Wastewater Outfall Location Survey								
Date & Time:								
1	Location	District	ULB Name		Code			
2	Name of the River							
3	Type of Location							
4	Point of Survey / Location							
5	Nearest landmark (if any)							
6	Geographic Co-Ordinate	Latitude :			Longitude			
7	Photos (Number / Code)							
8	Type of discharge	Storm water & Domestic Sewage						
9	Flow pattern	Continuous (YES / NO)		Hours in a day		Months in a year		
		Intermittent						
10	Mode of discharge	Open drain / undefined drain / Closed Pipe line						
		Type of ownership	PWD / Local Body / Private / Others					
11	Dimensions of the drain	(dia (m) or L x B (m) and approx length, wherever possible)						
12	Flow measurement using float method (Open Channel)	Measuring Distance between 2 Points (Upstream & Down stream of drain) (m)	Flow travel Time (sec)				Actual Velocity in (m/sec)	Velocity Considered 85%
			Reading 1	Reading 2	Reading 3	Average		
		Depth of the Drain (m)	Point 1	Point 2	Point 3	Point 4	Point 5	Avg. Depth (m)
								0
		Top Width of the drain (m)	Point 1	Point 2	Point 3	Point 4	Avg. Top Width (m)	Average Width of the drain
		Bottom Width of the drain (For unlined drain) (m)	Point 1	Point 2	Point 3	Point 4	Avg. Bottom Width (m)	0.000
		Area of the drain						0.000
		Flow in cu.m/Sec						0.000
Flow in lit/Day						0		
12 A	Flow measurement using vessel (bucket) for closed pipe	Diameter of pipe in m	Trial 1 in sec	Trial 2 in sec	Trial 3 in sec	Average Time in s	Flow in l/sec	
							0.000	0.0000
		Capacity of the bucket in lts						0.000

Coonoor Municipality							
Wastewater Outfall Location Survey							
Parameters (sewage Outfall)							
13	TDS (ppm)						
	Ph						
	DO (ppm)						
	Colour (Visible)						
14	Composite sample	Collected / Not collected (In case of TDS exceeds domestic sewage)					
15	River Quality						
15	DO (Surface/ Depth at m)						
15	TDS (ppm)						
16	Photo taken						
17	Land Availability along river bund to form Baby Canal (Yes / No)						
18	Possibility location of Sewage Collection well / STP	Latitude			Longitude		
19	Solid waste Dumping in river Bank/Bund	Latitude			Longitude		
Remarks (Bund condition - Revetment, Pitching, Lined/Encroachment/ Settlement/Land availability/Road side drain if road on river bund etc...)							
Name of the Supervisor					Chemist		

8.2.2 Location of Outfall

24 numbers of Outfall location of wastewater discharge have been identified within the municipal limits and the details are furnished in the Table 6. The outfall location map is given in figure 9 and the photographs are given in figure 10.

Table 7: Wastewater outfall location

Sl. No	Survey Tag No	Location Name	Wastewater Contributing Wards	Latitude	Longitude
Blue Hill River					
1	BLU-001	River Starting Point Blue Hill Lodge-Near Road		N 11° 21' 1.284"	E 76° 47' 46.265"
2	BLU-002	River Exit Point Bus Stand Bridge-Near sanitary Complex		N 11° 20' 38.988"	E 76° 47' 40.788"
Brookelands River					
1	BRO-001	River Starting Point Brookelands Ward 3 Part-Near Municipal Headworks (Well Field)	3 Part	N 11° 21' 8.348"	E 76° 48' 33.305"
2	BRO-002	Outfall Brookelands Ward 3 Part-Near SV Gas Godown	3 Part	N 11° 21' 2.73"	E 76° 48' 22.338"
3	BRO-003	Outfall Ambedkar Nagar Ward 4-Near John Bhaskar House	4 Part	N 11° 20' 50.842"	E 76° 48' 10.581"
4	BRO-004	River Exit Point Kannimariyamman koil end Ward 3,4,5 Part-Near Bridge	3,4,5 Part	N 11° 20' 21.086"	E 76° 48' 7.692"
Coonor River					
1	COO-001	River Starting Point Munipal Limit Ooty Road-Near LPG Crematorium		N 11° 20' 59.685"	E 76° 47' 9.804"
2	COO-002	Outfall Mount Pleasant Backside Ward no 25 Part-Near Petrol Bunk	25 Part	N 11° 20' 56.414"	E 76° 47' 15.671"
3	COO-003	Outfall State Bank Line Ward 24 Part-Near Railway Quarters	24 Part	N 11° 20' 39.356"	E 76° 47' 26.287"
4	COO-004	Outfall T.Caravan Ward 20 Part-Near Road	20 Part	N 11° 20' 31.858"	E 76° 47' 44.117"
5	COO-005	Outfall Siddivinayagar Theru Ward 19 Part-Near River	19 Part	N 11° 20' 33.936"	E 76° 47' 46.193"

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Sl. No	Survey Tag No	Location Name	Wastewater Contributing Wards	Latitude	Longitude
6	COO-006	Outfall Kannimariyamman Koil Ward 19 Part Near River		N 11° 20' 28.356"	E 76° 47' 57.644"
7	COO-007	Outfall Kannimariyamman koil Ward 19 Part-Near River	19 Part	N 11° 20' 24.159"	E 76° 47' 59.388"
8	COO-008	Outfall Indira Nagar Ward 29 Part-Near Culvert	29 Part	N 11° 20' 14.541"	E 76° 47' 54.153"
9	COO-009	Outfall Gandhipuram Ward 29 Part- Near Culvert	29 Part	N 11° 20' 4.528"	E 76° 47' 54.271"
Shanmugapuram River					
1	SHA-001	River Starting Point Mount Pleasant Backside Ward no 25Part-Near Bridge	25 Part	N 11° 21' 13.441"	E 76° 47' 23.436"
2	SHA-002	Outfall Vinayagar koil Street-Near Throupathiamman Koil		N 11° 21' 8.051"	E 76° 47' 29.923"
3	SHA-003	Outfall SM Nagar-Near MSM agency		N 11° 21' 9.552"	E 76° 47' 32.272"
4	SHA-004	Outfall Nanjegounder Line Ward 14 Part-Near Black Mariyamman temple	14 Part	N 11° 20' 55.424"	E 76° 47' 33.627"
5	SHA-005	Outfall Ummari Cottage Ward 14 Part- Near Valli House	14 Part	N 11° 20' 53.891"	E 76° 47' 32.648"
6	SHA-006	Outfall Parasuram Street Ward 14 Part- Near Ramasamy House	14 Part	N 11° 20' 52.717"	E 76° 47' 32.409"
7	SHA-007	Outfall Parasuram Street Ward 14 Part- Near Lurdhumary House	14 Part	N 11° 20' 51.841"	E 76° 47' 32.977"
8	SHA-008	Outfall Krishnapuram Ward 14 Part- Near Pettikadai	14 Part	N 11° 20' 51.096"	E 76° 47' 32.42"
9	SHA-009	River Exit Point Market Bridge-Near sanitary Complex		N 11° 20' 39.194"	E 76° 47' 40.309"

8.3. Flow Measurement

Flow measurement was carried out in the identified sewage outfalls (Open drain and Closed drain) using two standard methods as follows,

- i. Float Method – For open drain
- ii. Volumetric Method – For closed drain

Current meters will not yield precise Discharge measurement in sewage as it is limited to clear water.

8.3.1 Float Method

A straight stretch of channel is selected for flow measurement, and a float is allowed to move over the water surface, the time taken to reach the float is noted using stop watch, velocity of the water is then calculated. The Discharge is calculated using the formula as given below.

$$\text{Discharge} = 0.85 (a/2 + b/2) H \times V$$

were,

- ✓ a and b are average wetted top and bottom widths of channel in m,
- ✓ H is the average wetted depth of channel in m,
- ✓ V is the Velocity in m/sec.

Three trials were made to arrive the mean discharge in the selected drains. Most of the drains are open and undefined however the maximum efforts were taken during the field survey to calculate the discharge.

8.3.2. Volumetric Method

A container of known capacity is taken for measuring the flow in case of non-availability of open drains or in the case of very short length of open drains or in the case of closed conduit connected into the river. The time taken to fill the container is noted using stop watch; three trails were made to arrive the mean discharge.

Discharge L/s = Volume of the container in Litre/ average Time taken to fill the container in seconds. Total Flow into the river is the summation of peak flow and average flow, where peak flow is the one measured in the field and average flow is peak flow divided by the peak factor (ref Table 7).

$$\text{Total Flow} = \text{Peak Flow} + \text{Average Flow}$$

$$\text{Peak Flow} = \text{Flow measured during field survey (Float/ Volumetric method)}$$

Average Flow = Peak Flow / Peak Factor

Table 8: Peak factor

Contributory Population	Peak Factor
Up to 20,000	3.00
Above 20,001 to 50,000	2.50
Above 50,001 to 7,50,000	2.25
Above 7,50,001	2.00

(Source: Central Public Health and Environmental Engineering Organization Manual on Sewerage and Sewage treatment/2013/ Chapter – 3 Design and Construction of Sewer/Page Number-4)

8.3.3. Sewage Sampling and Analysis

During walkthrough survey, on-site TDS and pH values, using portable instruments, were checked. Based on the TDS value, the outlets points were categorized as Domestic Sewage and Industrial Effluent

9. Wastewater Flow measurement

Walk through survey were conducted in both side of the river bank. During the field visit the wastewater was discharged in to Shanmugapuram river through pipes from individual houses. The quantity of flow in Shanmugapuram river is inclusive of individual pipe discharge. The river wise and river bank wise number of outfalls is presented in Table – 9

Table 9: River wise number of wastewater outfalls

Sl.No	Name of River	River bank	Number of Outfall
1	Blue Hill river	East	2
2	Brookelands River	East	4
3	Coonoor River	East	3
4	Coonoor River	West	6
5	Shanmugapuram River	East	5
6	Shanmugapuram River	West	4
Total			24

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The total quantity of sewage discharge in the 4 river is about 4.69 MLD. The quantity of discharge in each location are given in Table-10

Table 10: Summary of Wastewater discharge location & estimated discharge quantity

Coonoor Municipality															
Summary of Wastewater discharge location & estimated discharge quantity into Coonoor River, Tiger Hill River, Brooklands River and Shanmugapuram River															
S.No.	Survey Tag No.	Survey Tag No.	Name of River	Location Name	River Bank	Waste water Contributing Wards (Ward Number)	Latitude	Longitude	Peak Quantity in litres/Day	Quantity in Cum / Day	Average Flow Cum / Day	Total Flow Cum / Day	TDS ppm	pH	Do
1	POF 12	BLU-001	Blue Hill river	River Starting Point Blne Hill Lodge-Near Road	East		N 11° 21' 1.284"	E 76° 47' 46.265"	39533	39.53	13.18	52.71	100	7.4	13.2
2	POF 10	BLU-002	Blue Hill river	River Exit Point Bus Stand Bridge-Near sanitary Complex	East		N 11° 20' 38.988"	E 76° 47' 40.788"	433929	433.93	144.64	578.57	200	7.3	6.6
Blue Hill River									473462	473	158	631			
1	POF 22	BRO-001	Brooklands River	River Starting Point Brooklands Ward 3 Part-Near Municipal Headworks (Well Field)	East	3 Part	N 11° 21' 8.348"	E 76° 48' 33.305"	89670	89.67	29.89	119.56	100	7.7	15.9
2	POF 21	BRO-002	Brooklands River	Outfall Brooklands Ward 3 Part-Near SV Gas Godown	East	3 Part	N 11° 21' 2.73"	E 76° 48' 22.338"	248481	248.48	82.83	331.31	100	7.5	14.5
3	POF 24	BRO-003	Brooklands river	Outfall Ambedkar Nagar Ward 4-Near John Blaskar House	East	4 Part	N 11° 20' 50.842"	E 76° 48' 10.581"	282606	282.61	94.20	376.81	100	7.3	14.8
4	POF 8	BRO-004	Brooklands River	River Exit Point Kannimariyanman koil end Ward 3,4,5 Part-Near Bridge	East	3,4,5 Part	N 11° 20' 21.086"	E 76° 48' 7.692"	224587	224.59	74.86	299.45	100	7.8	16.6
Brooklands River									845345	845	282	1127			
1	POF 25	COO-001	Coonoor river	River Starting Point Municipal Limit Ooty Road-Near LPG Crematorium	West		N 11° 20' 59.685"	E 76° 47' 9.804"	159375	159.38	53.13	212.50	400	7.3	14.2
2	POF 1	COO-002	Coonoor River	Outfall Mount Pleasant Backside Ward no 25Part-Near Petrol Bunk	West	25 Part	N 11° 20' 56.414"	E 76° 47' 15.671"	73169	0.07	0.02	0.10	500	8.3	6.1
3	POF 2	COO-003	Coonoor River	Outfall State Bank Line Ward 24 Part-Near Railway Quarters	West	24 Part	N 11° 20' 39.356"	E 76° 47' 26.287"	89601	89.60	29.87	119.47	200	7.8	6.9
4	POF 3	COO-004	Coonoor River	Outfall T.Caravan Ward 20 Part-Near Road	West	20 Part	N 11° 20' 31.858"	E 76° 47' 44.117"	63408	0.06	0.02	0.08	400	7.5	9.1
5	POF 9	COO-005	Coonoor River	Outfall Siddivinayagar Theru Ward 19 Part-Near River	East	19 Part	N 11° 20' 33.936"	E 76° 47' 46.193"	3664	3.66	1.22	4.89	500	7.6	11.3
6	POF 6	COO-006	Coonoor River	Outfall Kannimariyanman Koil Ward 19 Part Near River	East		N 11° 20' 28.356"	E 76° 47' 57.644"	8606	8.61	2.87	11.48	700	7.6	9.4
7	POF 7	COO-007	Coonoor River	Outfall Kannimariyanman koil Ward 19 Part-Near River	East	19 Part	N 11° 20' 24.159"	E 76° 47' 59.388"	15608	15.61	5.20	20.81	300	7.8	10.6
8	POF 4	COO-008	Coonoor River	Outfall Indira Nagar Ward 29 Part-Near Culvert	West	29 Part	N 11° 20' 14.541"	E 76° 47' 54.153"	267704	267.70	89.23	356.94	500	7.6	3.9
9	POF 5	COO-009	Coonoor River	Outfall Gandhipuram Ward 29 Part-Near Culvert	West	29 Part	N 11° 20' 4.528"	E 76° 47' 54.271"	85342	85.34	28.45	113.79	500	7.1	8.7
Coonoor River									766477	630	210	840			
1	POF 13	SHA-001	Shanmugapuram River	River Starting Point Mount Pleasant Backside Ward no 25Part-Near Bridge	East	25 Part	N 11° 21' 13.441"	E 76° 47' 23.436"	73169	73.17	24.39	97.56	100	7.6	15.9
2	POF 19	SHA-002	Shanmugapuram River	Outfall Vinayagar koil Street-Near Throopathianman Koil	West		N 11° 21' 8.051"	E 76° 47' 29.923"	359295	359.30	119.77	479.06	100	7.7	16.9
3	POF 20	SHA-003	Shanmugapuram River	Outfall SM Nagar-Near MSM agency	East		N 11° 21' 9.552"	E 76° 47' 32.272"	196802	196.80	65.60	262.40	200	6.7	9.8
4	POF 14	SHA-004	Shanmugapuram River	Outfall Nanjegounder Line Ward 14 Part-Near Black Mariyanman temple	West	14 Part	N 11° 20' 55.424"	E 76° 47' 33.627"	15144	15.14	5.05	20.19	500	7.6	11.4
5	POF 15	SHA-005	Shanmugapuram River	Outfall Ummari Cottage Ward 14 Part-Near Valli House	West	14 Part	N 11° 20' 53.891"	E 76° 47' 32.648"	10182	10.18	3.39	13.58	900	7.2	7.3
6	POF 16	SHA-006	Shanmugapuram River	Outfall Parasuram Street Ward 14 Part-Near Ramasamy House	East	14 Part	N 11° 20' 52.717"	E 76° 47' 32.409"	15188	15.19	5.06	20.25	600	7.4	10.5
7	POF 17	SHA-007	Shanmugapuram River	Outfall Parasuram Street Ward 14 Part-Near Lardhnamary House	East	14 Part	N 11° 20' 51.841"	E 76° 47' 32.977"	12950	12.95	4.32	17.27	700	7.2	10.8
8	POF 18	SHA-008	Shanmugapuram River	Outfall Krishnapuram Ward 14 Part-Near Pentkudai	West	14 Part	N 11° 20' 51.096"	E 76° 47' 32.42"	11165	11.16	3.72	14.89	900	7.4	8.4
9	POF 11	SHA-009	Shanmugapuram River	River Exit Point Market Bridge-Near sanitary Complex	East		N 11° 20' 39.194"	E 76° 47' 40.309"	721730	721.73	240.58	962.31	100	7.2	12.3
Shanmugapuram River									1415625	1416	472	1888			
Total wastewater discharge quantity									3500910	3364	1121	4486			
Total sewage discharge quantity											4.49	MLD			

The High-resolution satellite imagery showing the outfall locations and its estimated quantity of wastewater discharge is presented in Annexure 1

The outfall location wise flow measurement statement and photographs are presented in Annexure – 2 & 3

The individual pipe discharge in to Shanmugapuram River photographs are presented in Annexure 4

10. Field Observation

- The total quantity sewage measured in the 24 outfall locations were slightly higher than Municipality water supply. It indicates that there is ground water usage in the municipality.
- During walkthrough survey onsite TDS was measured in all locations and found that the TDS value was 100 mg/l. TDS of the River downstream of the Municipality is around 900 mg/l, which indicates that there is no industrial effluent discharge.
- The expected sewage generation is about 3.62 MLD (As per the CPHEEO 80% of water supply is considered as wastewater).
- Calculated sewage quantity from 24 outfall locations is about 4.69. MLD. This is exceeding the maximum demand for water supply of 4.52 MLD. This indicates considerable utilization of spring water / ground water beyond demand (i.e., about 4.52 MLD) of the current population. This needs to be further investigated at the time of implementation.
- On both sides of Shanmugapuram river, the wastewater from the individual household is being discharged in the the river.
- The above discharge points need to be plugged and diverted to a common collection point in the downstream side.

Note: During the field investigation it was observed that the stream / river flow was observed due the spring discharge.

Coonoor Municipality									
Wastewater Outfall Location Survey									
Date & Time:									
1	Location	District	Nilgiris	ULB Name	Coonoor Municipality	Code	BLU-001		
2	Name of the River	Blue Hill river							
3	Type of Location	Starting Point							
4	Point of Survey / Location	Blue Hill Lodge							
5	Nearest landmark (if any)	Near Road							
6	Geographic Co-Ordinate	Latitude :	11 21 1	Longitude	76 47 46				
7	Photos (Number / Code)								
8	Type of discharge	Storm water & Domestic Sewage							
9	Flow pattern	Continuous (YES / NO)	Yes			Months in a year			
		Intermittent							
10	Mode of discharge	Open drain / undefined drain / Closed Pipe line				Open Drain			
		Type of ownership	PWD / Local Body / Private / Others			Local Body			
11	Dimensions of the drain	(dia (m) or L x B (m) and approx length, wherever possible)					1X0.8X0.4		
12	Flow measurement using float method (Open Channel)	Measuring Distance between 2 Points (Upstream & Down stream of drain) (m)	Flow travel Time (sec)				Actual Velocity in (m/sec)	Velocity Considered 85%	
			Reading 1	Reading 2	Reading 3	Average			
			1	18.85	18.56	18.32	18.58	0.0538	0.0458
		Depth of the Drain (m)	Point 1	Point 2	Point 3	Point 4	Point 5	Avg. Depth (m)	
			0.05	0.05	0.05	0.05		0.05	
		Top Width of the drain (m)	Point 1	Point 2	Point 3	Point 4	Avg. Top Width (m)	Average Width of the drain	
			0.8	0.8	0.8	0.8	0.8		
		Bottom Width of the drain (For unlined drain) (m)	Point 1	Point 2	Point 3	Point 4	Avg. Bottom Width (m)	0.800	
			0.8	0.8	0.8	0.8	0.8		
								Area of the drain	0.040
						Flow in cu.m/Sec	0.002		
						Flow in lit/Day	39533		
12	Flow measurement using vessel A (bucket) for closed pipe	Diameter of pipe in m	Trial 1 in sec	Trial 2 in sec	Trial 3 in sec	Average Time in s	Flow in l/sec		
							Flow in l/day		
Capacity of the bucket in lts									
Parameters (sewage Outfall)									
	TDS (ppm)	100							
13	Ph	7.4							
	DO (ppm)	13.2							
	Colour (Visible)	Colourless							

Coonoor Municipality									
Wastewater Outfall Location Survey									
Date & Time:									
1	Location	District	Nilgiris	ULB Name	Coonoor Municipality	Code	BLU-002		
2	Name of the River	Blue Hill river							
3	Type of Location	End point							
4	Point of Survey / Location	Bus Stand Bridge							
5	Nearest landmark (if any)	Near sanitary Complex							
6	Geographic Co-Ordinate	Latitude :	11 20 38	Longitude	76 47 40				
7	Photos (Number / Code)								
8	Type of discharge	Storm water & Domestic Sewage							
9	Flow pattern	Continuous (YES / NO)	Yes			Months in a year			
		Intermittent							
10	Mode of discharge	Open drain / undefined drain / Closed Pipe line				Open Drain			
		Type of ownership	PWD / Local Body / Private / Others			Local Body			
11	Dimensions of the drain	(dia (m) or L x B (m) and approx length, wherever possible)					3X3X0.9		
12	Flow measurement using float method (Open Channel)	Measuring Distance between 2 Points (Upstream & Down stream of drain) (m)	Flow travel Time (sec)				Actual Velocity in (m/sec)	Velocity Considered 85%	
			Reading 1	Reading 2	Reading 3	Average			
			1.5	9.69	9.33	9.54	9.52	0.1576	0.1339
		Depth of the Drain (m)	Point 1	Point 2	Point 3	Point 4	Point 5	Avg. Depth (m)	
			0.1	0.1	0.1	0.1		0.1	
		Top Width of the drain (m)	Point 1	Point 2	Point 3	Point 4	Avg. Top Width (m)	Average Width of the drain	
			1.5	1.5	1.5	1.5	1.5		
		Bottom Width of the drain (For unlined drain) (m)	Point 1	Point 2	Point 3	Point 4	Avg. Bottom Width (m)	1.500	
			1.5	1.5	1.5	1.5	1.5		
								Area of the drain	0.150
						Flow in cu.m/Sec	0.020		
						Flow in lit/Day	433929		
12	Flow measurement using vessel A (bucket) for closed pipe	Diameter of pipe in m	Trial 1 in sec	Trial 2 in sec	Trial 3 in sec	Average Time in s	Flow in l/sec		
							Flow in l/day		
Capacity of the bucket in lts									
Parameters (sewage Outfall)									
	TDS (ppm)	200							
13	Ph	7.3							
	DO (ppm)	6.6							
	Colour (Visible)	Colourless							

Coonoor Municipality									
Wastewater Outfall Location Survey									
Date & Time:									
1	Location	District	Nilgiris	ULB Name	Coonoor Municipality	Code	BRO-001		
2	Name of the River	Brooklands River							
3	Type of Location	Starting Point							
4	Point of Survey / Location	Brooklands Ward 3 Part							
5	Nearest landmark (if any)	Near Municipal Headworks (Well Field)							
6	Geographic Co-Ordinate	Latitude :	11 21 8	Longitude	76 48 33				
7	Photos (Number / Code)								
8	Type of discharge	Storm water & Domestic Sewage							
9	Flow pattern	Continuous (YES / NO)	Yes			Months in a year			
		Intermittent	Hours in a day						
10	Mode of discharge	Open drain / undefined drain / Closed Pipe line				Open Drain			
		Type of ownership	PWD / Local Body / Private / Others			Local Body			
11	Dimensions of the drain	(dia (m) or L x B (m) and approx length, wherever possible)					3X2.4X0.4		
12	Flow measurement using float method (Open Channel)	Measuring Distance between 2 Points (Upstream & Down stream of drain) (m)	Flow travel Time (sec)				Actual Velocity in (m/sec)	Velocity Considered	
			Reading 1	Reading 2	Reading 3	Average			
			1	16.68	16.34	16.12	16.38	0.0611	0.0519
			Depth of the Drain (m)	Point 1	Point 2	Point 3	Point 4	Point 5	Avg. Depth (m)
		0.08		0.08	0.08	0.08		0.08	
		Top Width of the drain (m)	Point 1	Point 2	Point 3	Point 4	Avg. Top Width (m)	Average Width of the drain	
			1	1	1	1	1		
		Bottom Width of the drain (For unlined drain) (m)	Point 1	Point 2	Point 3	Point 4	Avg. Bottom Width (m)	1.000	
			1	1	1	1	1		
								Area of the drain	0.080
						Flow in cu.m/Sec	0.004		
						Flow in lit/Day	89670		
12 A	Flow measurement using vessel (bucket) for closed pipe	Diameter of pipe in m	Trial 1 in sec	Trial 2 in sec	Trial 3 in sec	Average Time in s	Flow in l/sec		
						0.000	0.0000		
		Capacity of the bucket in lts						0.000	
Parameters (sewage Outfall)									
13	TDS (ppm)	100							
	Ph	7.7							
	DO (ppm)	15.9							
	Colour (Visible)	Colourless							

Coonoor Municipality									
Wastewater Outfall Location Survey									
Date & Time:									
1	Location	District	Nilgiris	ULB Name	Coonoor Municipality	Code	BRO-002		
2	Name of the River	Brooklands River							
3	Type of Location	Outfall							
4	Point of Survey / Location	Brooklands Ward 3 Part							
5	Nearest landmark (if any)	Near SV Gas Godown							
6	Geographic Co-Ordinate	Latitude :	11 21 2	Longitude	76 48 22				
7	Photos (Number / Code)								
8	Type of discharge	Storm water & Domestic Sewage							
9	Flow pattern	Continuous (YES / NO)	Yes			Months in a year			
		Intermittent	Hours in a day						
10	Mode of discharge	Open drain / undefined drain / Closed Pipe line				Open Drain			
		Type of ownership	PWD / Local Body / Private / Others			Local Body			
11	Dimensions of the drain	(dia (m) or L x B (m) and approx length, wherever possible)					3X1.6X1.8		
12	Flow measurement using float method (Open Channel)	Measuring Distance between 2 Points (Upstream & Down stream of drain) (m)	Flow travel Time (sec)				Actual Velocity in (m/sec)	Velocity Considered	
			Reading 1	Reading 2	Reading 3	Average			
			1	6.28	6.98	6.69	6.65	0.1504	0.1278
			Depth of the Drain (m)	Point 1	Point 2	Point 3	Point 4	Point 5	Avg. Depth (m)
		0.09		0.09	0.09	0.09		0.09	
		Top Width of the drain (m)	Point 1	Point 2	Point 3	Point 4	Avg. Top Width (m)	Average Width of the drain	
			1	1	1	1	1		
		Bottom Width of the drain (For unlined drain) (m)	Point 1	Point 2	Point 3	Point 4	Avg. Bottom Width (m)	1.000	
			1	1	1	1	1		
								Area of the drain	0.090
						Flow in cu.m/Sec	0.012		
						Flow in lit/Day	248481		
12 A	Flow measurement using vessel (bucket) for closed pipe	Diameter of pipe in m	Trial 1 in sec	Trial 2 in sec	Trial 3 in sec	Average Time in s	Flow in l/sec		
						0.000	0.0000		
		Capacity of the bucket in lts						0.000	
Parameters (sewage Outfall)									
13	TDS (ppm)	100							
	Ph	7.5							
	DO (ppm)	14.5							
	Colour (Visible)	Colourless							

Coonoor Municipality									
Wastewater Outfall Location Survey									
Date & Time:									
1	Location	District	Nilgiris	ULB Name	Coonoor Municipality	Code	BRO-003		
2	Name of the River	Brooklands river							
3	Type of Location	Outfall							
4	Point of Survey / Location	Ambedkar Nagar Ward 4							
5	Nearest landmark (if any)	Near John Bhaskar House							
6	Geographic Co-Ordinate	Latitude :	11 20 50	Longitude	76 48 10				
7	Photos (Number / Code)								
8	Type of discharge	Storm water & Domestic Sewage							
9	Flow pattern	Continuous (YES / NO)	Yes				Months in a year		
		Intermittent							
10	Mode of discharge	Open drain / undefined drain / Closed Pipe line				Open Drain			
		Type of ownership	PWD / Local Body / Private / Others				Local Body		
11	Dimensions of the drain	(dia (m) or L x B (m) and approx length, wherever possible)					3X4.8X2.6		
12	Flow measurement using float method (Open Channel)	Measuring Distance between 2 Points (Upstream & Down stream of drain) (m)	Flow travel Time (sec)				Actual Velocity in (m/sec)	Velocity Considered 85%	
		2	Reading 1	Reading 2	Reading 3	Average	0.3079	0.2617	
			6.36	6.48	6.65	6.50			
		Depth of the Drain (m)	Point 1	Point 2	Point 3	Point 4	Point 5	Avg. Depth (m)	
			0.05	0.05	0.05	0.05		0.05	
		Top Width of the drain (m)	Point 1	Point 2	Point 3	Point 4	Avg. Top Width (m)	Average Width of the drain	
			1	1	1	1	1		
		Bottom Width of the drain (For unlined drain) (m)	Point 1	Point 2	Point 3	Point 4	Avg. Bottom Width (m)		
				1	1	1	1	1	1.000
		Area of the drain						0.050	
Flow in cu.m/Sec						0.013			
Flow in lit/Day						282606			
12	Flow measurement using vessel (bucket) for closed pipe	Diameter of pipe in m	Trial 1 in sec	Trial 2 in sec	Trial 3 in sec	Average Time in s	Flow in l/sec		
A						0.000	0.0000		
		Capacity of the bucket in lts							
Parameters (sewage Outfall)									
	TDS (ppm)	100							
13	Ph	7.3							
	DO (ppm)	14.8							
	Colour (Visible)	Colourless							

Coonoor Municipality									
Wastewater Outfall Location Survey									
Date & Time:									
1	Location	District	Nilgiris	ULB Name	Coonoor Municipality	Code	BRO-004		
2	Name of the River								
3	Type of Location	End Point							
4	Point of Survey / Location	Kannimariyamman koil end Ward 3,4,5 Part							
5	Nearest landmark (if any)	Near Bridge							
6	Geographic Co-Ordinate	Latitude :	11 20 21	Longitude	76 48 7				
7	Photos (Number / Code)								
8	Type of discharge	Storm water & Domestic Sewage							
9	Flow pattern	Continuous (YES / NO)	Yes				Months in a year		
		Intermittent							
10	Mode of discharge	Open drain / undefined drain / Closed Pipe line				Open Drain			
		Type of ownership	PWD / Local Body / Private / Others				Local Body		
11	Dimensions of the drain	(dia (m) or L x B (m) and approx length, wherever possible)					2.5X2.7X0.6		
12	Flow measurement using float method (Open Channel)	Measuring Distance between 2 Points (Upstream & Down stream of drain) (m)	Flow travel Time (sec)				Actual Velocity in (m/sec)	Velocity Considered 85%	
		2	Reading 1	Reading 2	Reading 3	Average	0.1223	0.1040	
			16.82	15.98	16.25	16.35			
		Depth of the Drain (m)	Point 1	Point 2	Point 3	Point 4	Point 5	Avg. Depth (m)	
			0.1	0.1	0.1	0.1		0.1	
		Top Width of the drain (m)	Point 1	Point 2	Point 3	Point 4	Avg. Top Width (m)	Average Width of the drain	
			1	1	1	1	1		
		Bottom Width of the drain (For unlined drain) (m)	Point 1	Point 2	Point 3	Point 4	Avg. Bottom Width (m)		
				1	1	1	1	1	1.000
		Area of the drain						0.100	
Flow in cu.m/Sec						0.010			
Flow in lit/Day						224587			
12	Flow measurement using vessel (bucket) for closed pipe	Diameter of pipe in m	Trial 1 in sec	Trial 2 in sec	Trial 3 in sec	Average Time in s	Flow in l/sec		
A									
		Capacity of the bucket in lts							
Parameters (sewage Outfall)									
	TDS (ppm)	100							
13	Ph	7.8							
	DO (ppm)	16.6							
	Colour (Visible)	Colourless							

Coonoor Municipality									
Wastewater Outfall Location Survey									
Date & Time:									
1	Location	District	Nilgiris	ULB Name	Coonoor Municipality	Code	COO-001		
2	Name of the River	Coonoor river							
3	Type of Location	Starting Point							
4	Point of Survey / Location	Municipal Limit Ooty Road							
5	Nearest landmark (if any)	Near LPG Crematorium							
6	Geographic Co-Ordinate	Latitude :	11 20 59	Longitude	76 47 9				
7	Photos (Number / Code)								
8	Type of discharge	Storm water & Domestic Sewage							
9	Flow pattern	Continuous (YES / NO)	Yes				Months in a year		
		Intermittent	Hours in a day						
10	Mode of discharge	Open drain / undefined drain / Closed Pipe line				Open Drain			
		Type of ownership	PWD / Local Body / Private / Others				Local Body		
11	Dimensions of the drain	(dia (m) or L x B (m) and approx length, wherever possible)					3X1.2X0.6		
12	Flow measurement using float method (Open Channel)	Measuring Distance between 2 Points (Upstream & Downstream of drain) (m)	Flow travel Time (sec)				Actual Velocity in (m/sec)	Velocity Considered	
			Reading 1	Reading 2	Reading 3	Average		85%	
			1	5.74	5.89	5.65	5.76	0.1736	0.1476
			Depth of the Drain (m)	Point 1	Point 2	Point 3	Point 4	Point 5	Avg. Depth (m)
				0.1	0.1	0.1	0.1	0.1	0.1
		Top Width of the drain (m)	Point 1	Point 2	Point 3	Point 4	Avg. Top Width (m)	Average Width of the drain	
			0.5	0.5	0.5	0.5	0.5		
		Bottom Width of the drain (For unlined drain) (m)	Point 1	Point 2	Point 3	Point 4	Avg. Bottom Width (m)	0.500	
			0.5	0.5	0.5	0.5	0.5		
								Area of the drain	0.050
						Flow in cu.m/Sec	0.007		
						Flow in lit/Day	159375		
12 A	Flow measurement using vessel (bucket) for closed pipe	Diameter of pipe in m	Trial 1 in sec	Trial 2 in sec	Trial 3 in sec	Average Time in s	Flow in l/sec		
						0.000	0.0000		
		Capacity of the bucket in lts						Flow in l/day	
Parameters (sewage Outfall)									
	TDS (ppm)	400							
13	Ph	7.3							
	DO (ppm)	14.2							
	Colour (Visible)	Colourless							

Coonoor Municipality									
Wastewater Outfall Location Survey									
Date & Time:									
1	Location	District	Nilgiris	ULB Name	Coonoor Municipality	Code	COO-002		
2	Name of the River	Coonoor River							
3	Type of Location	Outfall							
4	Point of Survey / Location	Mount Pleasant Backside Ward no 25Part							
5	Nearest landmark (if any)	Near Petrol Bunk							
6	Geographic Co-Ordinate	Latitude :	11 20 56	Longitude	76 47 15				
7	Photos (Number / Code)								
8	Type of discharge	Storm water & Domestic Sewage							
9	Flow pattern	Continuous (YES / NO)	Yes				Months in a year		
		Intermittent	Hours in a day						
10	Mode of discharge	Open drain / undefined drain / Closed Pipe line				Open Drain			
		Type of ownership	PWD / Local Body / Private / Others				Local Body		
11	Dimensions of the drain	(dia (m) or L x B (m) and approx length, wherever possible)					2X0.6X0.4		
12	Flow measurement using float method (Open Channel)	Measuring Distance between 2 Points (Upstream & Downstream of drain) (m)	Flow travel Time (sec)				Actual Velocity in (m/sec)	Velocity Considered	
			Reading 1	Reading 2	Reading 3	Average		85%	
			2	9	9.2	8.9	9.03	0.2214	0.1882
			Depth of the Drain (m)	Point 1	Point 2	Point 3	Point 4	Point 5	Avg. Depth (m)
				0.03	0.03	0.03	0.03	0.03	0.03
		Top Width of the drain (m)	Point 1	Point 2	Point 3	Point 4	Avg. Top Width (m)	Average Width of the drain	
			0.6	0.6	0.6	0.6	0.6		
		Bottom Width of the drain (For unlined drain) (m)	Point 1	Point 2	Point 3	Point 4	Avg. Bottom Width (m)	0.600	
			0.6	0.6	0.6	0.6	0.6		
								Area of the drain	0.018
						Flow in cu.m/Sec	0.003		
						Flow in lit/Day	73169		
12 A	Flow measurement using vessel (bucket) for closed pipe	Diameter of pipe in m	Trial 1 in sec	Trial 2 in sec	Trial 3 in sec	Average Time in s	Flow in l/sec		
		Capacity of the bucket in lts						Flow in l/day	
Parameters (sewage Outfall)									
	TDS (ppm)	500							
13	Ph	8.3							
	DO (ppm)	6.1							
	Colour (Visible)	Grey							

Coonoor Municipality								
Wastewater Outfall Location Survey								
Date & Time:								
1	Location	District	Nilgiris	ULB Name	Coonoor Municipality	Code	COO-003	
2	Name of the River	Coonoor River						
3	Type of Location	Outfall						
4	Point of Survey / Location	State Bank Line Ward 24 Part						
5	Nearest landmark (if any)	Near Railway Quarters						
6	Geographic Co-Ordinate	Latitude :	11 20 39	Longitude	76 47 26			
7	Photos (Number / Code)							
8	Type of discharge	Storm water & Domestic Sewage						
9	Flow pattern	Continuous (YES / NO)	Yes			Months in a year		
		Intermittent	Hours in a day					
10	Mode of discharge	Open drain / undefined drain / Closed Pipe line				Open Drain		
		Type of ownership	PWD / Local Body / Private / Others			Local Body		
11	Dimensions of the drain	(dia (m) or L x B (m) and approx length, wherever possible)					2X0.6X0.5	
12	Flow measurement using float method (Open Channel)	Measuring Distance between 2 Points (Upstream & Down stream of drain) (m)	Flow travel Time (sec)				Actual Velocity in (m/sec)	Velocity Considered 85%
			Reading 1	Reading 2	Reading 3	Average		
			2	7.64	6.69	7.8		
		Depth of the Drain (m)	Point 1	Point 2	Point 3	Point 4	Point 5	Avg. Depth (m)
			0.03	0.03	0.03	0.03	0.03	
		Top Width of the drain (m)	Point 1	Point 2	Point 3	Point 4	Avg. Top Width (m)	Average Width of the drain
			0.6	0.6	0.6	0.6	0.6	
		Bottom Width of the drain (For unlined drain) (m)	Point 1	Point 2	Point 3	Point 4	Avg. Bottom Width (m)	0.600
			0.6	0.6	0.6	0.6	0.6	
							Area of the drain	0.018
					Flow in cu.m/Sec	0.004		
					Flow in lit/Day	89601		
12 A	Flow measurement using vessel (bucket) for closed pipe	Diameter of pipe in m	Trial 1 in sec	Trial 2 in sec	Trial 3 in sec	Average Time in s	Flow in l/sec	
		Capacity of the bucket in lts						
Parameters (sewage Outfall)								
13	TDS (ppm)	200						
	Ph	7.8						
	DO (ppm)	6.9						
	Colour (Visible)	Grey						

Coonoor Municipality								
Wastewater Outfall Location Survey								
Date & Time:								
1	Location	District	Nilgiris	ULB Name	Coonoor Municipality	Code	COO-004	
2	Name of the River	Coonoor River						
3	Type of Location	Outfall						
4	Point of Survey / Location	T.Caravan Ward 20 Part						
5	Nearest landmark (if any)	Near Road						
6	Geographic Co-Ordinate	Latitude :	11 20 31	Longitude	76 47 44			
7	Photos (Number / Code)							
8	Type of discharge	Storm water & Domestic Sewage						
9	Flow pattern	Continuous (YES / NO)	Yes			Months in a year		
		Intermittent	Hours in a day					
10	Mode of discharge	Open drain / undefined drain / Closed Pipe line				Open Drain		
		Type of ownership	PWD / Local Body / Private / Others			Local Body		
11	Dimensions of the drain	(dia (m) or L x B (m) and approx length, wherever possible)					2X0.6X0.35	
12	Flow measurement using float method (Open Channel)	Measuring Distance between 2 Points (Upstream & Down stream of drain) (m)	Flow travel Time (sec)				Actual Velocity in (m/sec)	Velocity Considered 85%
			Reading 1	Reading 2	Reading 3	Average		
			2	17.23	17.17	17.72		
		Depth of the Drain (m)	Point 1	Point 2	Point 3	Point 4	Point 5	Avg. Depth (m)
			0.05	0.05	0.05	0.05	0.05	
		Top Width of the drain (m)	Point 1	Point 2	Point 3	Point 4	Avg. Top Width (m)	Average Width of the drain
			0.6	0.6	0.6	0.6	0.6	
		Bottom Width of the drain (For unlined drain) (m)	Point 1	Point 2	Point 3	Point 4	Avg. Bottom Width (m)	0.600
			0.6	0.6	0.6	0.6	0.6	
							Area of the drain	0.030
					Flow in cu.m/Sec	0.003		
					Flow in lit/Day	63408		
12 A	Flow measurement using vessel (bucket) for closed pipe	Diameter of pipe in m	Trial 1 in sec	Trial 2 in sec	Trial 3 in sec	Average Time in s	Flow in l/sec	
		Capacity of the bucket in lts						
Parameters (sewage Outfall)								
13	TDS (ppm)	400						
	Ph	7.5						
	DO (ppm)	9.1						
	Colour (Visible)	Grey						

Coonoor Municipality									
Wastewater Outfall Location Survey									
Date & Time:									
1	Location	District	Nilgiris	ULB Name	Coonoor Municipality	Code	COO-005		
2	Name of the River	Coonoor River							
3	Type of Location	Outfall							
4	Point of Survey / Location	Siddivinayagar Thern Ward 19 Part							
5	Nearest landmark (if any)	Near River							
6	Geographic Co-Ordinate	Latitude :	11 20 33	Longitude	76 47 46				
7	Photos (Number / Code)								
8	Type of discharge	Storm water & Domestic Sewage							
9	Flow pattern	Continuous (YES / NO)	Yes						
		Intermittent	Hours in a day						
10	Mode of discharge	Open drain / undefined drain / Closed Pipe line					Open Drain		
		Type of ownership	PWD / Local Body / Private / Others					Local Body	
11	Dimensions of the drain	(dia (m) or L x B (m) and approx length, wherever possible)							
12	Flow measurement using float method (Open Channel)	Measuring Distance between 2 Points (Upstream & Down stream of drain) (m)		Flow travel Time (sec)			Actual Velocity in (m/sec)	Velocity Considered 85%	
		1	12.54	12.35	12.69	12.53	0.0798	0.0679	
		Depth of the Drain (m)	Point 1	Point 2	Point 3	Point 4	Point 5	Avg. Depth (m)	
		0.005	0.005	0.005	0.005	0.005		0.005	
		Top Width of the drain (m)	Point 1	Point 2	Point 3	Point 4	Avg. Top Width (m)	Average Width of the drain	
		0.5	0.5	0.5	0.5	0.5	0.5		
		Bottom Width of the drain (For unlined drain) (m)	Point 1	Point 2	Point 3	Point 4	Avg. Bottom Width (m)		
		0.5	0.5	0.5	0.5	0.5	0.5	0.500	
								Area of the drain	0.003
								Flow in cu.m/Sec	0.000
								Flow in lit/Day	3664
		12	Flow measurement using vessel (bucket) for closed pipe	Diameter of pipe in m	Trial 1 in sec	Trial 2 in sec	Trial 3 in sec	Average Time in s	Flow in l/sec
		Capacity of the bucket in lts							
Parameters (sewage Outfall)									
	TDS (ppm)	500							
13	Ph	7.6							
	DO (ppm)	11.3							
	Colour (Visible)	Grey							

Coonoor Municipality									
Wastewater Outfall Location Survey									
Date & Time:									
1	Location	District	Nilgiris	ULB Name	Coonoor Municipality	Code	COO-006		
2	Name of the River	Coonoor River							
3	Type of Location	Outfall							
4	Point of Survey / Location	Kannimariyamman koi Ward 19 Part							
5	Nearest landmark (if any)	Near River							
6	Geographic Co-Ordinate	Latitude :	11 20 28	Longitude	76 47 57				
7	Photos (Number / Code)								
8	Type of discharge	Storm water & Domestic Sewage							
9	Flow pattern	Continuous (YES / NO)	Yes						
		Intermittent	Hours in a day						
10	Mode of discharge	Open drain / undefined drain / Closed Pipe line					Open Drain		
		Type of ownership	PWD / Local Body / Private / Others					Local Body	
11	Dimensions of the drain	(dia (m) or L x B (m) and approx length, wherever possible)							
12	Flow measurement using float method (Open Channel)	Measuring Distance between 2 Points (Upstream & Down stream of drain) (m)		Flow travel Time (sec)			Actual Velocity in (m/sec)	Velocity Considered 85%	
		1	12.45	13.1	12.85	12.80	0.0781	0.0664	
		Depth of the Drain (m)	Point 1	Point 2	Point 3	Point 4	Point 5	Avg. Depth (m)	
		0.01	0.01	0.01	0.01	0.01		0.01	
		Top Width of the drain (m)	Point 1	Point 2	Point 3	Point 4	Avg. Top Width (m)	Average Width of the drain	
		0.6	0.6	0.6	0.6	0.6	0.6		
		Bottom Width of the drain (For unlined drain) (m)	Point 1	Point 2	Point 3	Point 4	Avg. Bottom Width (m)		
		0.6	0.6	0.6	0.6	0.6	0.6	0.600	
								Area of the drain	0.006
								Flow in cu.m/Sec	0.000
								Flow in lit/Day	8606
		12	Flow measurement using vessel (bucket) for closed pipe	Diameter of pipe in m	Trial 1 in sec	Trial 2 in sec	Trial 3 in sec	Average Time in s	Flow in l/sec
		Capacity of the bucket in lts							
Parameters (sewage Outfall)									
	TDS (ppm)	700							
13	Ph	7.6							
	DO (ppm)	9.4							
	Colour (Visible)	Grey							

Coonoor Municipality									
Wastewater Outfall Location Survey									
Date & Time:									
1	Location	District	Nilgiris	ULB Name	Coonoor Municipality	Code	COO-007		
2	Name of the River	Coonoor River							
3	Type of Location	Outfall							
4	Point of Survey / Location	Kannimariyamman koi Ward 19 Part							
5	Nearest landmark (if any)	Near River							
6	Geographic Co-Ordinate	Latitude :	11 20 24	Longitude	76 47 59				
7	Photos (Number / Code)								
8	Type of discharge	Storm water & Domestic Sewage							
9	Flow pattern	Continuous (YES / NO)	Yes			Months in a year			
		Intermittent	Hours in a day						
10	Mode of discharge	Open drain / undefined drain / Closed Pipe line				Open Drain			
		Type of ownership	PWD / Local Body / Private / Others			Local Body			
11	Dimensions of the drain	(dia (m) or L x B (m) and approx length, wherever possible)					2X0.5X0.5		
12	Flow measurement using float method (Open Channel)	Measuring Distance between 2 Points (Upstream & Down stream of drain) (m)	Flow travel Time (sec)				Actual Velocity in (m/sec)	Velocity Considered 85%	
			Reading 1	Reading 2	Reading 3	Average			
			2	11.86	11.58	11.85	11.76	0.1700	0.1445
			Depth of the Drain (m)	Point 1	Point 2	Point 3	Point 4	Point 5	Avg. Depth (m)
				0.01	0.01	0.01	0.01		0.01
		Top Width of the drain (m)	Point 1	Point 2	Point 3	Point 4	Avg. Top Width (m)	Average Width of the drain	
			0.5	0.5	0.5	0.5	0.5		
		Bottom Width of the drain (For unlined drain) (m)	Point 1	Point 2	Point 3	Point 4	Avg. Bottom Width (m)		
			0.5	0.5	0.5	0.5	0.5		0.500
							Area of the drain	0.005	
					Flow in cu.m/Sec	0.001			
					Flow in lit/Day	15608			
12	Flow measurement using vessel A (bucket) for closed pipe	Diameter of pipe in m	Trial 1 in sec	Trial 2 in sec	Trial 3 in sec	Average Time in s	Flow in l/sec		
							Flow in l/day		
		Capacity of the bucket in lts							
Parameters (sewage Outfall)									
	TDS (ppm)	300							
13	Ph	7.8							
	DO (ppm)	10.6							
	Colour (Visible)	Grey							

Coonoor Municipality									
Wastewater Outfall Location Survey									
Date & Time:									
1	Location	District	Nilgiris	ULB Name	Coonoor Municipality	Code	COO-008		
2	Name of the River	Coonoor River							
3	Type of Location	Outfall							
4	Point of Survey / Location	Indira Nagar Ward 29 Part							
5	Nearest landmark (if any)	Near Culvert							
6	Geographic Co-Ordinate	Latitude :	11 20 14	Longitude	76 47 54				
7	Photos (Number / Code)								
8	Type of discharge	Storm water & Domestic Sewage							
9	Flow pattern	Continuous (YES / NO)	Yes			Months in a year			
		Intermittent	Hours in a day						
10	Mode of discharge	Open drain / undefined drain / Closed Pipe line				Open Drain			
		Type of ownership	PWD / Local Body / Private / Others			Local Body			
11	Dimensions of the drain	(dia (m) or L x B (m) and approx length, wherever possible)					2X1X1		
12	Flow measurement using float method (Open Channel)	Measuring Distance between 2 Points (Upstream & Down stream of drain) (m)	Flow travel Time (sec)				Actual Velocity in (m/sec)	Velocity Considered 85%	
			Reading 1	Reading 2	Reading 3	Average			
			2	13.2	14.1	13.85	13.72	0.1458	0.1239
			Depth of the Drain (m)	Point 1	Point 2	Point 3	Point 4	Point 5	Avg. Depth (m)
				0.1	0.1	0.1	0.1		0.1
		Top Width of the drain (m)	Point 1	Point 2	Point 3	Point 4	Avg. Top Width (m)	Average Width of the drain	
			1	1	1	1	1		
		Bottom Width of the drain (For unlined drain) (m)	Point 1	Point 2	Point 3	Point 4	Avg. Bottom Width (m)		
			1	1	1	1	1		1.000
							Area of the drain	0.100	
					Flow in cu.m/Sec	0.012			
					Flow in lit/Day	267704			
12	Flow measurement using vessel A (bucket) for closed pipe	Diameter of pipe in m	Trial 1 in sec	Trial 2 in sec	Trial 3 in sec	Average Time in s	Flow in l/sec		
							Flow in l/day		
		Capacity of the bucket in lts							
Parameters (sewage Outfall)									
	TDS (ppm)	500							
13	Ph	7.6							
	DO (ppm)	3.9							
	Colour (Visible)	Grey							

Coonoor Municipality									
Wastewater Outfall Location Survey									
Date & Time:									
1	Location	District	Nilgiris	ULB Name	Coonoor Municipality	Code	COO-009		
2	Name of the River	Coonoor River							
3	Type of Location	Outfall							
4	Point of Survey / Location	Gandhipuram Ward 29 Part							
5	Nearest landmark (if any)	Near Culvert							
6	Geographic Co-Ordinate	Latitude :	11 20 4	Longitude	76 47 54				
7	Photos (Number / Code)								
8	Type of discharge	Storm water & Domestic Sewage							
9	Flow pattern	Continuous (YES / NO)	Yes						
		Intermittent	Hours in a day						
							Months in a year		
10	Mode of discharge	Open drain / undefined drain / Closed Pipe line					Open Drain		
		Type of ownership	PWD / Local Body / Private / Others					Local Body	
11	Dimensions of the drain	(dia (m) or L x B (m) and approx length, wherever possible)							
12	Flow measurement using float method (Open Channel)	Measuring Distance between 2 Points (Upstream & Down stream of drain) (m)		Flow travel Time (sec)			Actual Velocity in (m/sec)	Velocity Considered 85%	
			Reading 1	Reading 2	Reading 3	Average			
		1	10.88	10.54	10.85	10.76	0.0930	0.0790	
		Depth of the Drain (m)	Point 1	Point 2	Point 3	Point 4	Point 5	Avg. Depth (m)	
			0.05	0.05	0.05	0.05		0.05	
		Top Width of the drain (m)	Point 1	Point 2	Point 3	Point 4	Avg. Top Width (m)	Average Width of the drain	
			1	1	1	1	1		
		Bottom Width of the drain (For unlined drain) (m)	Point 1	Point 2	Point 3	Point 4	Avg. Bottom Width (m)		
			1	1	1	1	1	1.000	
								Area of the drain	0.050
								Flow in cu.m/Sec	0.004
								Flow in lit/Day	85342
12	Flow measurement using vessel (bucket) for closed pipe	Diameter of pipe in m	Trial 1 in sec	Trial 2 in sec	Trial 3 in sec	Average Time in s	Flow in l/sec		
							Flow in l/day		
		Capacity of the bucket in lts							
Parameters (sewage Outfall)									
13	TDS (ppm)	500							
	Ph	7.1							
	DO (ppm)	8.7							
	Colour (Visible)	Grey							

Coonoor Municipality									
Wastewater Outfall Location Survey									
Date & Time:									
1	Location	District	Nilgiris	ULB Name	Coonoor Municipality	Code	SHA-001		
2	Name of the River	Shanmugapuram River							
3	Type of Location	Starting Point							
4	Point of Survey / Location	Shanmugapuram							
5	Nearest landmark (if any)	Near Bridge							
6	Geographic Co-Ordinate	Latitude :	11 21 13	Longitude	76 47 23				
7	Photos (Number / Code)								
8	Type of discharge	Storm water & Domestic Sewage							
9	Flow pattern	Continuous (YES / NO)	Yes						
		Intermittent	Hours in a day						
							Months in a year		
10	Mode of discharge	Open drain / undefined drain / Closed Pipe line					Open Drain		
		Type of ownership	PWD / Local Body / Private / Others					Local Body	
11	Dimensions of the drain	(dia (m) or L x B (m) and approx length, wherever possible)							
12	Flow measurement using float method (Open Channel)	Measuring Distance between 2 Points (Upstream & Down stream of drain) (m)		Flow travel Time (sec)			Actual Velocity in (m/sec)	Velocity Considered 85%	
			Reading 1	Reading 2	Reading 3	Average			
		2	8.85	8.56	8.32	8.58	0.2332	0.1982	
		Depth of the Drain (m)	Point 1	Point 2	Point 3	Point 4	Point 5	Avg. Depth (m)	
			0.2	0.2	0.2	0.2		0.2	
		Top Width of the drain (m)	Point 1	Point 2	Point 3	Point 4	Avg. Top Width (m)	Average Width of the drain	
			1.2	1.2	1.2	1.2	1.2		
		Bottom Width of the drain (For unlined drain) (m)	Point 1	Point 2	Point 3	Point 4	Avg. Bottom Width (m)		
			1.2	1.2	1.2	1.2	1.2	1.200	
								Area of the drain	0.240
								Flow in cu.m/Sec	0.048
								Flow in lit/Day	1027532
12	Flow measurement using vessel (bucket) for closed pipe	Diameter of pipe in m	Trial 1 in sec	Trial 2 in sec	Trial 3 in sec	Average Time in s	Flow in l/sec		
							Flow in l/day		
		Capacity of the bucket in lts							
Parameters (sewage Outfall)									
13	TDS (ppm)	100							
	Ph	7.6							
	DO (ppm)	15.9							
	Colour (Visible)	Colourless							

Coonoor Municipality									
Wastewater Outfall Location Survey									
Date & Time:									
1	Location	District	Nilgiris	ULB Name	Coonoor Municipality	Code	SHA-002		
2	Name of the River	Shanmugapuram River							
3	Type of Location	Outfall							
4	Point of Survey / Location	Vinayagar koil Street							
5	Nearest landmark (if any)	Near Throupathiamman Koil							
6	Geographic Co-Ordinate	Latitude :	11 21 8	Longitude	76 47 28				
7	Photos (Number / Code)								
8	Type of discharge	Storm water & Domestic Sewage							
9	Flow pattern	Continuous (YES / NO)	Yes			Months in a year			
		Intermittent							
10	Mode of discharge	Open drain / undefined drain / Closed Pipe line				Open Drain			
		Type of ownership	PWD / Local Body / Private / Others			Local Body			
11	Dimensions of the drain	(dia (m) or L x B (m) and approx length, wherever possible)							
12	Flow measurement using float method (Open Channel)	Measuring Distance between 2 Points (Upstream & Down stream of drain) (m)	Flow travel Time (sec)				Actual Velocity in (m/sec)	Velocity Considered 85%	
			Reading 1	Reading 2	Reading 3	Average			
			2	10.17	10.25	10.24	10.22	0.1957	0.1663
			Depth of the Drain (m)	Point 1	Point 2	Point 3	Point 4	Point 5	Avg. Depth (m)
		0.1		0.1	0.1	0.1		0.1	
		Top Width of the drain (m)	Point 1	Point 2	Point 3	Point 4	Avg. Top Width (m)	Average Width of the drain	
			1	1	1	1	1		
		Bottom Width of the drain (For unlined drain) (m)	Point 1	Point 2	Point 3	Point 4	Avg. Bottom Width (m)	1.000	
			1	1	1	1	1		
		Area of the drain						0.100	
		Flow in cu.m/Sec						0.017	
		Flow in lit/Day						359295	
12 A	Flow measurement using vessel (bucket) for closed pipe	Diameter of pipe in m	Trial 1 in sec	Trial 2 in sec	Trial 3 in sec	Average Time in s	Flow in l/sec		
						0.000	0.0000		
		Capacity of the bucket in lts					0.000		
Parameters (sewage Outfall)									
13		TDS (ppm)	100						
		Ph	7.7						
		DO (ppm)	16.9						
		Colour (Visible)	Colourless						

Coonoor Municipality									
Wastewater Outfall Location Survey									
Date & Time:									
1	Location	District	Nilgiris	ULB Name	Coonoor Municipality	Code	SHA-003		
2	Name of the River	Shanmugapuram River							
3	Type of Location	Outfall							
4	Point of Survey / Location	SM Nagar							
5	Nearest landmark (if any)	Near MSM agency							
6	Geographic Co-Ordinate	Latitude :	11 21 9	Longitude	76 47 29				
7	Photos (Number / Code)								
8	Type of discharge	Storm water & Domestic Sewage							
9	Flow pattern	Continuous (YES / NO)	Yes			Months in a year			
		Intermittent							
10	Mode of discharge	Open drain / undefined drain / Closed Pipe line				Open Drain			
		Type of ownership	PWD / Local Body / Private / Others			Local Body			
11	Dimensions of the drain	(dia (m) or L x B (m) and approx length, wherever possible)							
12	Flow measurement using float method (Open Channel)	Measuring Distance between 2 Points (Upstream & Down stream of drain) (m)	Flow travel Time (sec)				Actual Velocity in (m/sec)	Velocity Considered 85%	
			Reading 1	Reading 2	Reading 3	Average			
			2	7.49	7.25	7.65	7.46	0.2680	0.2278
			Depth of the Drain (m)	Point 1	Point 2	Point 3	Point 4	Point 5	Avg. Depth (m)
		0.02		0.02	0.02	0.02		0.02	
		Top Width of the drain (m)	Point 1	Point 2	Point 3	Point 4	Avg. Top Width (m)	Average Width of the drain	
			2	2	2	2	2		
		Bottom Width of the drain (For unlined drain) (m)	Point 1	Point 2	Point 3	Point 4	Avg. Bottom Width (m)	2.000	
			2	2	2	2	2		
		Area of the drain						0.040	
		Flow in cu.m/Sec						0.009	
		Flow in lit/Day						196802	
12 A	Flow measurement using vessel (bucket) for closed pipe	Diameter of pipe in m	Trial 1 in sec	Trial 2 in sec	Trial 3 in sec	Average Time in s	Flow in l/sec		
						0.000	0.0000		
		Capacity of the bucket in lts					0.000		
Parameters (sewage Outfall)									
13		TDS (ppm)	200						
		Ph	6.7						
		DO (ppm)	9.8						
		Colour (Visible)	Colourless						

Coonoor Municipality									
Wastewater Outfall Location Survey									
Date & Time:									
1	Location	District	Nilgiris	ULB Name	Coonoor Municipality	Code	SHA-004		
2	Name of the River	Shanmugapuram River							
3	Type of Location	Outfall							
4	Point of Survey / Location	Nanjegounder Line Ward 14 Part							
5	Nearest landmark (if any)	Near Black Mariyamman temple							
6	Geographic Co-Ordinate	Latitude :	11 20 55	Longitude	76 47 33				
7	Photos (Number / Code)								
8	Type of discharge	Storm water & Domestic Sewage							
9	Flow pattern	Continuous (YES / NO)	Yes			Months in a year			
		Intermittent	Hours in a day						
10	Mode of discharge	Open drain / undefined drain / Closed Pipe line				Open Drain			
		Type of ownership	PWD / Local Body / Private / Others			Local Body			
11	Dimensions of the drain	(dia (m) or L x B (m) and approx length, wherever possible)					3X0.5X0.5		
12	Flow measurement using float method (Open Channel)	Measuring Distance between 2 Points (Upstream & Down stream of drain) (m)	Flow travel Time (sec)				Actual Velocity in (m/sec)	Velocity Considered	
			Reading 1	Reading 2	Reading 3	Average			
			2	11.85	12.2	12.32	12.12	0.1650	85%
			Depth of the Drain (m)	Point 1	Point 2	Point 3	Point 4	Point 5	Avg. Depth (m)
				0.01	0.01	0.01	0.01	0.01	
		Top Width of the drain (m)	Point 1	Point 2	Point 3	Point 4	Avg. Top Width (m)	Average Width of the drain	
			0.5	0.5	0.5	0.5			0.5
		Bottom Width of the drain (For unlined drain) (m)	Point 1	Point 2	Point 3	Point 4	Avg. Bottom Width (m)	0.500	
			0.5	0.5	0.5	0.5			0.5
								Area of the drain	0.005
						Flow in cu.m/Sec	0.001		
						Flow in lit/Day	15144		
12 A	Flow measurement using vessel (bucket) for closed pipe	Diameter of pipe in m	Trial 1 in sec	Trial 2 in sec	Trial 3 in sec	Average Time in s	Flow in l/sec		
						0.000	0.0000		
		Capacity of the bucket in lts						Flow in l/day	0.000
Parameters (sewage Outfall)									
	TDS (ppm)	500							
13	Ph	7.6							
	DO (ppm)	11.4							
	Colour (Visible)	Grey							

Coonoor Municipality									
Wastewater Outfall Location Survey									
Date & Time:									
1	Location	District	Nilgiris	ULB Name	Coonoor Municipality	Code	SHA-005		
2	Name of the River	Shanmugapuram River							
3	Type of Location	Outfall							
4	Point of Survey / Location	Ummari Cottage Ward 14 Part							
5	Nearest landmark (if any)	Near Valli House							
6	Geographic Co-Ordinate	Latitude :	11 20 53	Longitude	76 47 32				
7	Photos (Number / Code)								
8	Type of discharge	Storm water & Domestic Sewage							
9	Flow pattern	Continuous (YES / NO)	Yes			Months in a year			
		Intermittent	Hours in a day						
10	Mode of discharge	Open drain / undefined drain / Closed Pipe line				Open Drain			
		Type of ownership	PWD / Local Body / Private / Others			Local Body			
11	Dimensions of the drain	(dia (m) or L x B (m) and approx length, wherever possible)					3X0.5X0.5		
12	Flow measurement using float method (Open Channel)	Measuring Distance between 2 Points (Upstream & Down stream of drain) (m)	Flow travel Time (sec)				Actual Velocity in (m/sec)	Velocity Considered	
			Reading 1	Reading 2	Reading 3	Average			
			3	13.25	13.54	13.78	13.52	0.2218	85%
			Depth of the Drain (m)	Point 1	Point 2	Point 3	Point 4	Point 5	Avg. Depth (m)
				0.005	0.005	0.005	0.005	0.005	
		Top Width of the drain (m)	Point 1	Point 2	Point 3	Point 4	Avg. Top Width (m)	Average Width of the drain	
			0.5	0.5	0.5	0.5			0.5
		Bottom Width of the drain (For unlined drain) (m)	Point 1	Point 2	Point 3	Point 4	Avg. Bottom Width (m)	0.500	
			0.5	0.5	0.5	0.5			0.5
								Area of the drain	0.003
						Flow in cu.m/Sec	0.000		
						Flow in lit/Day	10182		
12 A	Flow measurement using vessel (bucket) for closed pipe	Diameter of pipe in m	Trial 1 in sec	Trial 2 in sec	Trial 3 in sec	Average Time in s	Flow in l/sec		
						0.000	0.0000		
		Capacity of the bucket in lts						Flow in l/day	0.000
Parameters (sewage Outfall)									
	TDS (ppm)	900							
13	Ph	7.2							
	DO (ppm)	7.3							
	Colour (Visible)	Grey							

Coonoor Municipality									
Wastewater Outfall Location Survey									
Date & Time:									
1	Location	District	Nilgiris	ULB Name	Coonoor Municipality	Code	SHA-006		
2	Name of the River	Shanmugapuram River							
3	Type of Location	Outfall							
4	Point of Survey / Location	Parasuram Street Ward 14 Part							
5	Nearest landmark (if any)	Near Ramasamy House							
6	Geographic Co-Ordinate	Latitude :	11 20 52	Longitude	76 47 32				
7	Photos (Number / Code)								
8	Type of discharge	Storm water & Domestic Sewage							
9	Flow pattern	Continuous (YES / NO)	Yes			Months in a year			
		Intermittent	Hours in a day						
10	Mode of discharge	Open drain / undefined drain / Closed Pipe line				Open Drain			
		Type of ownership	PWD / Local Body / Private / Others			Local Body			
11	Dimensions of the drain	(dia (m) or L x B (m) and approx length, wherever possible)					3X0.7X0.6		
12	Flow measurement using float method (Open Channel)	Measuring Distance between 2 Points (Upstream & Down stream of drain) (m)	Flow travel Time (sec)				Actual Velocity in (m/sec)	Velocity Considered 85%	
			Reading 1	Reading 2	Reading 3	Average			
			3	12.8	12.5	12.78	12.69	0.2363	0.2009
			Depth of the Drain (m)	Point 1	Point 2	Point 3	Point 4	Point 5	Avg. Depth (m)
		0.005		0.005	0.005	0.005	0.005		
		Top Width of the drain (m)	Point 1	Point 2	Point 3	Point 4	Avg. Top Width (m)	Average Width of the drain	
			0.7	0.7	0.7	0.7	0.7		
		Bottom Width of the drain (For unlined drain) (m)	Point 1	Point 2	Point 3	Point 4	Avg. Bottom Width (m)	0.700	
			0.7	0.7	0.7	0.7	0.7		
		Area of the drain						0.004	
		Flow in cu.m/Sec						0.001	
		Flow in lit/Day						15188	
12 A	Flow measurement using vessel (bucket) for closed pipe	Diameter of pipe in m	Trial 1 in sec	Trial 2 in sec	Trial 3 in sec	Average Time in s	Flow in l/sec		
						0.000	0.0000		
		Capacity of the bucket in lts					0.000		
Parameters (sewage Outfall)									
	TDS (ppm)	600							
13	Ph	7.4							
	DO (ppm)	10.5							
	Colour (Visible)	Grey							

Coonoor Municipality									
Wastewater Outfall Location Survey									
Date & Time:									
1	Location	District	Nilgiris	ULB Name	Coonoor Municipality	Code	SHA-007		
2	Name of the River	Shanmugapuram River							
3	Type of Location	Outfall							
4	Point of Survey / Location	Parasuram Street Ward 14 Part							
5	Nearest landmark (if any)	Near Lurdhumary House							
6	Geographic Co-Ordinate	Latitude :	11.3477337	Longitude	76.7924935				
7	Photos (Number / Code)								
8	Type of discharge	Storm water & Domestic Sewage							
9	Flow pattern	Continuous (YES / NO)	Yes			Months in a year			
		Intermittent	Hours in a day						
10	Mode of discharge	Open drain / undefined drain / Closed Pipe line				Open Drain			
		Type of ownership	PWD / Local Body / Private / Others			Local Body			
11	Dimensions of the drain	(dia (m) or L x B (m) and approx length, wherever possible)					3X0.5X0.9		
12	Flow measurement using float method (Open Channel)	Measuring Distance between 2 Points (Upstream & Down stream of drain) (m)	Flow travel Time (sec)				Actual Velocity in (m/sec)	Velocity Considered 85%	
			Reading 1	Reading 2	Reading 3	Average			
			3	10.5	10.8	10.6	10.63	0.2821	0.2398
			Depth of the Drain (m)	Point 1	Point 2	Point 3	Point 4	Point 5	Avg. Depth (m)
		0.005		0.005	0.005	0.005	0.005		
		Top Width of the drain (m)	Point 1	Point 2	Point 3	Point 4	Avg. Top Width (m)	Average Width of the drain	
			0.5	0.5	0.5	0.5	0.5		
		Bottom Width of the drain (For unlined drain) (m)	Point 1	Point 2	Point 3	Point 4	Avg. Bottom Width (m)	0.500	
			0.5	0.5	0.5	0.5	0.5		
		Area of the drain						0.003	
		Flow in cu.m/Sec						0.001	
		Flow in lit/Day						12950	
12 A	Flow measurement using vessel (bucket) for closed pipe	Diameter of pipe in m	Trial 1 in sec	Trial 2 in sec	Trial 3 in sec	Average Time in s	Flow in l/sec		
						0.000	0.0000		
		Capacity of the bucket in lts					0.000		
Parameters (sewage Outfall)									
	TDS (ppm)	700							
13	Ph	7.2							
	DO (ppm)	10.8							
	Colour (Visible)	Grey							

Coonoor Municipality									
Wastewater Outfall Location Survey									
Date & Time:									
1	Location	District	Nilgiris	ULB Name	Coonoor Municipality	Code	SHA-008		
2	Name of the River	Shanmugapuram River							
3	Type of Location	Outfall							
4	Point of Survey / Location	Krishnapuram Ward 14 Part							
5	Nearest landmark (if any)	Near Pettikadai							
6	Geographic Co-Ordinate	Latitude :	11 20 51	Longitude	76 47 29				
7	Photos (Number / Code)								
8	Type of discharge	Storm water & Domestic Sewage							
9	Flow pattern	Continuous (YES / NO)	Yes			Months in a year			
		Intermittent	Hours in a day						
10	Mode of discharge	Open drain / undefined drain / Closed Pipe line				Open Drain			
		Type of ownership				Local Body			
		PWD / Local Body / Private / Others							
11	Dimensions of the drain	(dia (m) or L x B (m) and approx length, wherever possible)					3X1X0.4		
12	Flow measurement using float method (Open Channel)	Measuring Distance between 2 Points (Upstream & Down stream of drain) (m)	Flow travel Time (sec)				Actual Velocity in (m/sec)	Velocity Considered 85%	
			Reading 1	Reading 2	Reading 3	Average			
			3	14.5	15.1	14.8	14.80	0.2027	0.1723
			Point 1	Point 2	Point 3	Point 4	Point 5	Avg. Depth (m)	
		Depth of the Drain (m)	0.003	0.003	0.003	0.003	0.003		
		Top Width of the drain (m)	Point 1	Point 2	Point 3	Point 4	Avg. Top Width (m)	Average Width of the drain	
		1	1	1	1	1			
		Bottom Width of the drain (For unlined drain) (m)	Point 1	Point 2	Point 3	Point 4	Avg. Bottom Width (m)		
		1	1	1	1	1	1	1.000	
							Area of the drain	0.003	
					Flow in cu.m/Sec	0.001			
					Flow in lit/Day	11165			
12	Flow measurement using vessel (bucket) for closed pipe	Diameter of pipe in m	Trial 1 in sec	Trial 2 in sec	Trial 3 in sec	Average Time in s	Flow in l/sec		
A						0.000	0.0000		
		Capacity of the bucket in lts					0.000		
Parameters (sewage Outfall)									
13	TDS (ppm)	900							
	Ph	7.4							
	DO (ppm)	8.4							
	Colour (Visible)	Grey							

Coonoor Municipality									
Wastewater Outfall Location Survey									
Date & Time:									
1	Location	District	Nilgiris	ULB Name	Coonoor Municipality	Code	SHA-009		
2	Name of the River	Shanmugapuram River							
3	Type of Location	End point							
4	Point of Survey / Location	Market Bridge							
5	Nearest landmark (if any)	Near sanitary Complex							
6	Geographic Co-Ordinate	Latitude :	11 20 39	Longitude	76 47 40				
7	Photos (Number / Code)								
8	Type of discharge	Storm water & Domestic Sewage							
9	Flow pattern	Continuous (YES / NO)	Yes			Months in a year			
		Intermittent	Hours in a day						
10	Mode of discharge	Open drain / undefined drain / Closed Pipe line				Open Drain			
		Type of ownership				Local Body			
		PWD / Local Body / Private / Others							
11	Dimensions of the drain	(dia (m) or L x B (m) and approx length, wherever possible)					3X3X0.8		
12	Flow measurement using float method (Open Channel)	Measuring Distance between 2 Points (Upstream & Down stream of drain) (m)	Flow travel Time (sec)				Actual Velocity in (m/sec)	Velocity Considered 85%	
			Reading 1	Reading 2	Reading 3	Average			
			2	14.58	15.7	15.51	15.26	0.1310	0.1114
			Point 1	Point 2	Point 3	Point 4	Point 5	Avg. Depth (m)	
		Depth of the Drain (m)	0.15	0.15	0.15	0.15	0.15		
		Top Width of the drain (m)	Point 1	Point 2	Point 3	Point 4	Avg. Top Width (m)	Average Width of the drain	
		2	2	2	2	2			
		Bottom Width of the drain (For unlined drain) (m)	Point 1	Point 2	Point 3	Point 4	Avg. Bottom Width (m)		
		2	2	2	2	2	2	2.000	
							Area of the drain	0.300	
					Flow in cu.m/Sec	0.033			
					Flow in lit/Day	721730			
12	Flow measurement using vessel (bucket) for closed pipe	Diameter of pipe in m	Trial 1 in sec	Trial 2 in sec	Trial 3 in sec	Average Time in s	Flow in l/sec		
A									
		Capacity of the bucket in lts							
Parameters (sewage Outfall)									
13	TDS (ppm)	100							
	Ph	7.2							
	DO (ppm)	12.3							
	Colour (Visible)	Colourless							

S. No	Survey Tag No.	Outfall Location Photo	Onsite Sample Testing Photo
Blue Hill River			
1	BLU-001		
2	BLU-002		
Brookelands River			
3	BRO-001		
4	BRO-002		

5	BRO-003		
6	BRO-004		
Coonor River			
7	COO-001		
8	COO-002		
9	COO-003		

DRAFT REPORT

10	COO-004		
11	COO-005		
12	COO-006		
13	COO-007		
14	COO-008		

15	COO-009		
Shanmugapuram River			
16	SHA-001		
17	SHA-002		
18	SHA-003		
19	SHA-004		

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21	SHA-005		
21	SHA-006		
22	SHA-007		
23	SHA-008		
24	SHA-009		

