

PROJECT REPORT

SAND AUDIT OF RIVERS IN KANNUR DISTRICT

Submitted to

THE DEPARTMENT OF REVENUE AND DISASTER MANAGEMENT

GOVERNMENT OF KERALA

By



CENTRE FOR ENVIRONMENT AND DEVELOPMENT

THIRUVANANTHAPURAM

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FOREWORD

Kannur district is located in the northern part of the Kerala State with a geographical area of 2966 sq.km. It is bounded by the Western Ghats in the east and Lakshadweep Sea in the west. The major rivers of the district are Perumba, Kuppam, Valapatnam, Thalassery, Mahi, and Ancharakandy originated in the highlands of Western Ghats and drain in to the sea.

In recent years, rapid development has led to an increased demand for river sand as a source of construction material. This has resulted in a mushrooming of illegal river sand mining activities which have given rise to various problems that require urgent action by the authorities. These include river bank erosion, river bed degradation, river buffer zone encroachment and deterioration of river water quality. Very often, over-mining occurs which jeopardises the health of the river and the environment in general.

There is a need for the Revenue Department, Local Administration Department (LAD) and Irrigation Department to be equipped with the necessary planning and management tools to deal with the problems that arise from river sand mining and the preparation of this guideline is an effort in this direction. The District Collector, Kannur has conducted a DLEC meeting in his chamber on 24-02-2014 and taken a decision for carry out River Bank Mapping and Sand Auditing of 4 rivers in Kannur District and requested the Centre For Environment and Development, Thiruvananthapuram to carry out the study and submit the report based on it.

Based on the above The CED agreed to take up the study. This report is prepared on the basis of the detailed Total Station survey and investigation carried out by our experts. We sincerely hope that this report will be very useful for planning and management of various resources in the rivers of Kannur District.

Dr. Babu Ambat
Executive Director
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1.0 INTRODUCTION

1.1 Background

Sand and gravel have long been used as aggregate for construction of roads and buildings. Today, the demand for these materials continues to rise. In Kerala, the main source of sand is from in-stream mining. In-stream sand mining is a common practice in the streams and rivers of Kerala.

In-stream sand mining can damage private and public properties as well as aquatic habitats. Excessive removal of sand may significantly distort the natural equilibrium of a stream channel. By removing sediment from the active channel bed, in-stream mines interrupt the continuity of sediment transport through the river system, disrupting the sediment mass balance in the river downstream and inducing channel adjustments extending considerable distances (commonly 1 km or more) beyond the extraction site itself. The magnitude of the impact basically depends on the magnitudes of the extraction relative to bed load sediment supply and transport through the reach.

1.2 Environmental Impact of Excessive Sand Mining in Streams

Excessive in-stream sand-and-gravel mining causes the degradation of rivers. In-stream mining lowers the stream bottom, which may lead to bank erosion. Depletion of sand in the streambed and along coastal areas causes the deepening of rivers and estuaries, and the enlargement of river mouths and coastal inlets. It may also lead to saline-water intrusion from the nearby sea. The effect of mining is compounded by the effect of sea level rise.



Any volume of sand exported from streambeds and coastal areas is a loss to the system. The major impacts in Kerala due to excessive and illegal sand mining are :

- Sand mining from almost all the rivers in Kerala goes on unabated despite the restrictions and controls imposed by the State Government;
- It has not only deepened the river beds to below the sea level but threatens the existence of several road bridges across these rivers;

- As a result of the fall in the riverbed level to below the sea level, the water available in 20-30 km stretch of several rivers from their confluences to upward has become saline;
- Besides, the water level in the wells on the embankments has fallen sharply after the monsoon season ;
- Another concern is that the indiscriminate mining has bared the bases of the pillars of the bridges to the extent that the well foundation that are supposed to remain under the riverbed are now exposed by several metres;



Fig 1 : Bared well-foundations of a bridge facing threat of collapse

- When the extraction rate exceeds the replenishment rate, significant and potentially irreversible changes occur in the hydraulic conditions and channel stability;



Fig 2: Indiscriminate sand mining has exposed the foundations of the bridge

- Slumping of river banks, marked changes in riverbed configuration, mining of sand from prohibited areas close to engineering structures and over-deepening of river channels are some of the problems that need immediate attention;
- Apart from in-stream mining, mining of sand from land areas such as paddy fields and floodplains is also practised in many panchayats;
- The layers of sand inter-bedded within floodplain areas have been exploited as an alternative to river sand;
- The floodplain mining also damages the environmental setting of the area;
- The removal of sediments and creation of deep pits by way of mining sand will result in lowering of water table to deeper levels.

Many bridges across rivers are facing threat of collapsing owing indiscriminate sand-mining. Though sand-mining from the 500-metre limits of bridges is strictly prohibited as per the River Bank Protection and Regulation of Sand Mining Act-2001, sand is being mined illegally even from the close vicinity of the bridge piers, leaving the concrete structures in a precarious condition.



Figure 3: Exposed bank of a river due to unrestricted mining activities

1.3 Sand and Gravel Mining Policy and Guideline



Figure 4: Exposed bridge foundation due to unrestricted mining activities

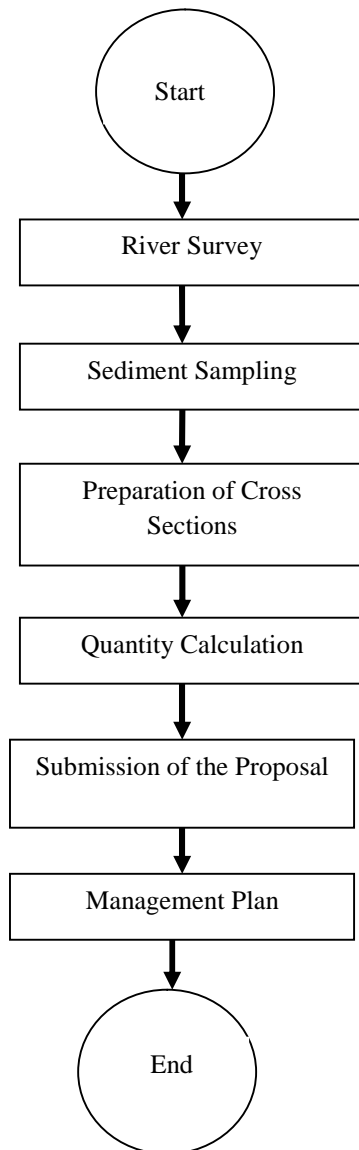
The following policies should be taken into consideration before approving sand and gravel mining permits.

- a) Ensure conservation of the river equilibrium and its natural environment
- b) Avoid aggradations at the downstream reach especially those with hydraulic structures such as jetties, water intakes etc.
- c) Ensure that the rivers are protected from bank and bed erosion beyond its stable profile.
- d) Avoid interfering the river maintenance work by Department of Irrigation and Revenue Department or other agencies.
- e) No obstruction should be done to the river flow and water transport.
- f) Avoid pollution of river water leading to water quality deterioration.
- g) Outline the process required in determining the locations, periods and quantity for sand and gravel mining.

The general guidelines for sand and gravel mining are as follows:

- a) Parts of the river reaches that experience deposition or aggradations shall be identified first. Operators may be allowed to extract the sand and gravel deposit in these locations to lessen aggradation problem.
- b) The distance between sites for sand and gravel mining shall depend on the replenishment rate of the river. Sediment rating curve for the potential sites shall be developed and checked against the extracted volumes of sand and gravel.
- c) Sand and gravel may be extracted across the entire active channel during the dry season (January to May and August to November).
- d) Layers of sand and gravel which could be removed from the river bed shall depend on the width of the river and replenishment rate of the river.
- e) Sand and gravel shall not be allowed to be extracted where erosion may occur, such as at the concave bank.
- f) Sand and gravel shall not be extracted within 500 meter from any crucial hydraulic structure such as pumping station, water intakes, bridges, buildings and such structures.
- g) Sand and gravel mining could be extracted from the downstream of the sand bar at river bends.
- g) Flood discharge capacity of the river could be maintained in areas where there are significant flood hazard to existing structures or infrastructure. Sand and gravel mining may be allowed to maintain the natural flow capacity based on surveyed cross-section history

Details of the criteria needed to ensure that sand and gravel extraction is carried out in a sustainable way are given in Chapter 6 of this guidelines



The Cross – section survey should cover the entire length of the river except the CRZ zone at downstream. Minimum intervals of the cross section is twice the width of the river subject to the minimum of 500 M.

The sediment sampling should be verified on the each cross-sections including the depth of the sand deposit by penetration of iron rod.

Cross section should be prepared with highlighting the cross section area of sand deposit and area of sand up to the depth of 2.00 M from the water level to be marked.

Calculate the quality of the sand deposit for mining by Panchayat wise.

Submit the proposal with all cross sections longitudinal section of the river with quantity calculation and necessary instructions.

Concerned Local Body and Revenue Department should manage the sand mining as per the prepared management plan.

1.4 Sand Audit or Budget

Determining the sand budget for a particular stream reach requires site-specific topographic, hydrologic, and hydraulic information. This information is used to determine the amount of sand that can be removed from the area without causing undue erosion or degradation, either at the site or at a nearby location, upstream or downstream

1.5 Sand and Gravel Mining Management

A summary of recommendations for the management of sand and gravel mining is given herein.

a) Permit mining volume based on measured annual replenishment

A volume equal to the estimated annual replenishment could be extracted from the reach of the channel. Replenishment (up to the elevation of the selected channel configuration) would need to occur before subsequent extraction could take place.

Maintain a record of annual replenishment accounts for the episodic nature of sediment transport. For example, during wet periods with high stream flows, and a high contribution of sediment from hillslopes and tributaries, the data through monitoring would show that sand and gravel bars are replenished quickly. During drought periods with low streamflow, and little sediment supply or transport, the data would likely show that bars were replenished at a slower rate. The use of monitoring data is essential in measuring when actual replenishment occurs. The use of the concept of annual replenishment protects long-term channel stability as well as aquatic and riparian habitat by extracting a volume sustainable by watershed processes.

It is important to develop a system to allocate the total estimated annual replenishment between all of the operators.

b) Establish an absolute elevation below which no extraction may occur

(Minimum Enveloped Level or Redline)

The absolute elevation below which no mining could occur or “redline” would be surveyed on a site-specific basis in order to avoid impacts to structures such as bridges and to avoid impacts on vegetation associated with downcutting due to excessive removal of sediment. An extraction site can be determined after setting the deposition level at 2 m below the summer water level.

c) Review cumulative effects of sand and gravel extraction

The cumulative impact of all mining proposals should be reviewed on an annual basis to determine if cumulative revering effects are likely and to ensure that permits are distributed in a manner that minimizes long-term impacts and inequities in permits between adjacent mining operations.

d) Maintain flood capacity

Flood capacity in the river should be maintained in areas where there are significant flood hazards to existing structures or infrastructure.

e) Establish a long-term monitoring program

Monitoring of changes in bed elevation and channel morphology, and aquatic and riparian habitat upstream and downstream of the extraction would identify any impacts of sand and gravel extraction to biologic resources.

i) Retain vegetation buffer at edge of water and against river bank

Riparian vegetation performs several functions essential to the proper maintenance of geomorphic and biological processes in rivers. It shields river banks and bars from erosion. Additionally, riparian vegetation, including roots and downed trees, serves as cover for fish, provides food source, works as a filter against sediment inputs, and aids in nutrient cycling. More broadly, the riparian zone is necessary to the integrity of the ecosystem providing habitat for invertebrates, birds and other wildlife. So removal of the vegetation from the river bank while mining should be strictly restricted.

j) Limit in-stream operations to the period between January to May and September to November.

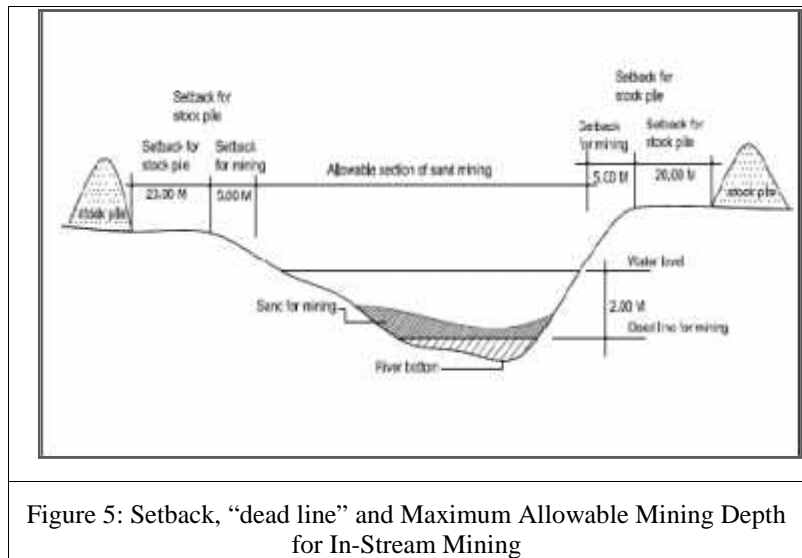
The in-stream mining should only be allowed during the dry season.

k) An annual Status and Trends Report

This report should review permitted extraction quantities in the light of results of the monitoring program, or as improved estimates of replenishment become available. The report should document changes in bed elevation, channel morphology and aquatic and riparian habitat. The report should also include a record of extraction volumes permitted and excavation location. Finally, recommendations for reclamation, if needed should be documented.

Setbacks and Mining Envelope Levels for In-Stream Mining

- The excavation must be carried out giving a setback of minimum of 5 m from the main channel bank toward the flow channel (Figure 5).
- The stockpile must be located beyond 20 m to the left or right of the main channel bank (Figure 5).
- The maximum allowable mining depth is 2 m from the water level as shown in Figure 5.



2.0 OBJECTIVES OF THE PRESENT STUDY

The District Administration in each District is responsible to ensure that sand and gravel extraction is carried out in a sustainable way in the rivers, to maintain the river equilibrium with the application of sediment transport principles in determining the locations, period and quantity to be extracted and also to identify the suitable locations, period and quantity that can be extracted. Generation of necessary information is essential to plan the above mentioned activities.

The basic objectives of the present study are

- (i) To generate basic information on the volume of sand deposit and the amount of possible extraction in the five rivers of Kannur district;
- (ii) To set up guidelines for controlling and management of sand mining by the authorities and to formulate policies for sand and gravel mining.
- (iii) To carryout Resource Mapping of the two sides of the rivers, 500 metres in both sides
- (iv) To ensure conservation of the river equilibrium and its natural environment.

3.0 STUDY AREA

Kannur district is located in the northern part of the Kerala State with a geographical area of 2966 sq.km within the latitudes 11⁰ 40' to 12⁰ 48' North and longitudes 75⁰ 52' to 76⁰ 07' East. The boundary of the district are Kasargod district in the north, Western Ghats in the east (Karnataka) Kozhikode and Wayanad districts in the south and Lakshadweep Sea in the west. More than 50% of its residents living in urban areas. The district has good biodiversity including wetlands, Rivers, Mangroves and evergreen forests.

The district has two distinct monsoon seasons- South West Monsoon starts in June and continues till the end of September and the North East monsoon season is from October to end of February.

The study area consists of the major rivers of the district such as Perumba, Kuppam, Valapatnam, Thalassery, Mahi, and Ancharakandy originated in the highlands of Western Ghats and draining in to the sea.

Rivers of Kannur District

Valapattanam River is the largest River in the Kannur District. Valapattanam River originates from the Brahmagiri of Western Ghats in Coorg district, Karnataka at an altitude of 900-1350m above mean sea level. This river drains into Arabian sea along with Kuppam river near Azheekal. After flowing through Karnataka for about 19 km, it passes through Iritty Irrikur, Kalliasseri and Valapattanam villages. Major tributaries of the river are Sreekandapuram River, Valiyapuzha, Barapole, Venipuzha and the Aralampuzha. Total drainage area of the river basin is 1867 sq.km of which 564 sq.km lie in Karnataka. The river has a length of 110 km of which 44.8 km are suitable for navigation. Valapattanam River is well known for its wood-based industries. Valapattanam is also a famous fishing harbour as well as the main source of the irrigation project (Pazhassi Dam) in the district. Considerable number of human population depends on this river for their daily livelihood. A wood factory called as Western India Plywoods located near the river was the largest wood industry in India and was also biggest plywood factory in Asia till some years back. On the banks of this river lies the Valapattanam town and the famous pilgrim center Parassinikadavu Muthappan Temple. Boating facilities are available here and the people coming to the temple make it a point to plan a boat cruise. A river viewing project has been launched by the Kerala District Tourism Council in order to popularize the Kettuvallam as part of tourism

promotion. This helps to make the people know more about the Valapattanam River as well.

Perumba River is a freshwater river which flows through the Malabar region. It passes through



Payyanur in Kannur district. A tributary of Perumba which is called as Vannathi River flows through the Mathamangalam. Perumba is called as Panappuzha in the Mathamangalam area. Another tributary is the Kallamkulam Totti that originates from

Kallamkundu and flows through Totti and finally merges with the Murikkum Thazkam. Transportation of goods are carried through this river.

Kuppam River originates from the Padinalkadu Ghat forests in Coorg district of Kamataka and it flows almost parallel to the Valapattanam River. It flows through Kannur and Taliparamba taluks. Before it exit into the Arabian sea, it joins with the Valapattanam River from a place called Mattool near Azheekal. Total drainage area of the river is 539 sq.km of which 70 sq.km is in Kamataka. The main tributaries of this river are Pakkatupuzha, Alakuttathode, Kuttillolpuzha, Mukkuttathodu and Chiriyathode rivers. Total length of the river is 82 km and the navigable length is only 24 km. This river is also known by the name Mattol River. Earlier people travelled through the Kuppam River in order to travel through the hilly regions of Kannur district. But with the construction of the Kuppam Bridge passenger boats are nowhere to be seen. The Azhikkal minor port is at the mouth of the river.

Table 1

Details of the Study Area

No	Name of River	District	Length	Starting point	End point	
1	Valapattanam River	Kannur	34.80 Km.	Pazhassi Dam	Parassinikadavu Bridge	
2	Thalassery River	Kannur	2.85 Km.	Eranjolikavu Bridge	Koduvally Bridge	
3	Perumba River	Kannur	13.32 Km	Meenkuzhi Dam	Shangakire Railway Bridge	
4	Mahi River	Kannur	19.80 Km.	Kadavathure Kadave	Mahe road Bridge	
5	Kuppam River	Kannur	18.10	Chapparapadave Bridge	Kuppam Bridge	

Tellicherry River is also known as Ponniumpuzha or Eranjoliupuzha. It originates in the Kannothe forest of the Westem Ghats. The only tributary joins the main river about 14 km away from its mouth near Koduvally, about 3 km. north of Thalasseri town. The river flows through the villages of Cheruvancheri, Mudiyanaga, Patyam, Mokeri and Padakkal. This is one of the smallest rivers in Kerala having a length of 28 km with a drainage area of 132 sq.km. Navigable length of the river is about 21.6 km.

Mahe River is located in Mahe belonging to Pondicherry UT. Mahe river or Mayyazhipuzha originates from the western slopes of Wayanad hills. It flows through Naripetta, Vanimel, Iyyancode, Bhekiyad, Iringannore, Tripangathur, Peringalam, Edacheriy, Kacheri, Eramala,

Kariyad, Olavilam, Kunnumakkara, Azhiyoor and Mahe before falling into Arabian sea about 6 km south of Thalasseri. The river has a length of about 54 km and it drains an area of 394 sq.km. During the rule of the British, Mahe River was popularly called as the English Channel. It was named so as this river separated British ruled Thalassery and French ruled Mahe. The river originates from the forests of Wayanad and has a length of 54 km. Some of the villages through which the river passes are Vanimel, Iringanoor Peringalam, Edachery, Eramala, Kariyad, Mahe etc. After travelling through all these villages, it empties into the Arabian Sea. Mahe River has no major tributaries but is fed by numerous rivulets from both sides. Long ago, this river was used for transporting both men and material. Plans have been put forward by the Pondicherry government to construct a fishing harbor and a Riverside Walkway. The Water Sports Complex is located on the river banks.

4.0 METHOD OF STUDY

The following methodology was adopted for the assessment of volume of sand

- Divided the river channel in to segments, based on the reaches panchayat-wise;
- Calculated the thickness of the sand resource in the river channel using methods such as pitting, coring and spiking (measure the depth of sand deposit by penetrating an iron rod);
- Took profiles across the river at an interval of two times the width of the river or 500 m, whichever is less using leveling equipment;
- The profile should have a reading at the middle and two edges and in between every 20 m distance;
- Took the water level during the time of survey and connected it to a permanent identified bench mark.
- Noted the thickness of the sand bed up to 2 m depth from the summer water level for computation purposes;
- Computed the volume of sand in each reaches panchayat- wise;
- Deducted the volume of sand deposit available in prohibited areas.
- A map (longitudinal section) of the river has been prepared marking the locations of all bench marks, profiles, permanent structures like bridges, water intake point, waste water/drainage discharge points, ferry gat/ boat landing centre, road very near to river, dam, check dam, kadave etc.

Prohibited areas

- Notified biological hot spots and sensitive areas
- Reaches with placers and other economic minerals
- River reaches critically affected by bank sliding/slumping/bank erosion
- Constructed areas such as bridges, water intake, tanks etc.
- Any other reach that need protection as decided by experts
- Areas mentioned in the Act (**Kerala Protection of River Banks and Regulation of Removal of Sand Act, 2001**)

5. RESULTS AND RECOMMENDATION OF THE STUDY

The result of the study carried out in each river is described below with the recommendations.

5.1 Valapattanam River:

- The Valapattanam River is flowing from the Western Ghats to the Sea. The survey works started from the Pazhassi dam outlet to Parassini Bridge with a total length of 34.80 km. length.
- Width of the river is varying from 66.00 m to 569.00 m. and the maximum depth recorded is 10.69 m at Kuttiyattur panchayat, 800.00 m to Paavannur Bridge.
- The river is passing through 9 panchayats (4 in left bank, 5 in right bank) and two municipalities.
- The panchayats are Koodali, Kuttiyattur, Mayyil and Thannoor in left bank and Malappattanam, Chengali, Irrikur, Padiyoor and Kurumayhoor in right bank. The Thalipparambu municipality is in right bank and Mattannur Municipality is in left bank of the river.
- Total 8 bridges are crossing this river (Valapattanam railway bridge, Valapattanam road bridge, Parassini bridge, Therthala bridge, Malappattanam Munambu bridge, Manpur bridge, Irrukur bridge and Paavannoor bridge)
- Total 127 profiles (cross sections) has been taken at a distance varying from 150 m to 500 m according to the width of the river. The profiles are marked on the longitudinal section.
- The bench mark from the top of the Valapattanam bridge has been transferred to the permanent structures available on the bank of the river for further reference.
- All the permanent structures such as bridges, kadavus, Parassini temple, panchayat well and islands are marked on the longitudinal section.

Result of study:**Valapattanam River Sand Volume Calculation Sheet**

PF.No.	Avarage distance before (L1)	Avarage distance after (L2)	Zone of influence L= L1+L2 /2 m	Area of cross section (m2)	Volume of sand (m3) V	Volume of sand for RB Panchayat V/2 m3	Volume of sand for LB Panchayat V/2 m3
11	518.69	468.18	493.435	5.89	2906.33	1453.17	1453.17
12	468.18	495.73	481.955	6.92	3335.13	1667.56	1667.56
13	495.73	380.22	437.975	33.51	14676.54	7338.27	7338.27
14	380.27	307.18	343.725	9.92	3409.75	1704.88	1704.88
15	307.18	244.34	275.76	12.52	3452.52	1726.26	1726.26
16	244.34	391.26	317.8	14.49	4604.92	2302.46	2302.46
17	391.26	251.98	321.62	11.30	3634.31	1817.15	1817.15
18	251.98	267.01	259.495	12.74	3305.97	1652.98	1652.98
19	267.01	323.74	295.375	10.37	3063.04	1531.52	1531.52
20	323.74	251.78	287.76	11.16	3211.40	1605.70	1605.70
21	251.78	269.87	260.825	24.07	6278.06	3139.03	3139.03
22	269.87	179.58	224.725	13.39	3009.07	1504.53	1504.53
23	179.58	447.05	313.315	9.35	2929.50	1464.75	1464.75
24	391.72	381.53	386.625	9.87	3815.99	1907.99	1907.99
25	447.05	294.82	370.935	9.46	3509.05	1754.52	1754.52
26	294.82	338.29	316.555	28.72	9091.46	4545.73	4545.73
27	338.29	257.05	297.67	14.70	4375.75	2187.87	2187.87
28	176.49	259.72	218.105	14.35	3129.81	1564.90	1564.90
29	257.09	277.35	267.22	22.59	6036.50	3018.25	3018.25
30	277.35	222.34	249.845	18.05	4509.70	2254.85	2254.85
31	222.34	403.38	312.86	0.00	0.00	0.00	0.00
32	403.38	398.07	400.725	7.80	3125.66	1562.83	1562.83
33	398.07	305.56	351.815	13.71	4823.38	2411.69	2411.69
34	264.17	151.61	207.89	0.00	0.00	0.00	0.00
35	151.67	129.96	140.815	1.18	166.16	83.08	83.08
36	129.96	175.45	152.705	1.65	251.96	125.98	125.98
37	175.45	214.47	194.96	10.04	1957.40	978.70	978.70
38	214.47	202.1	208.285	3.65	760.24	380.12	380.12
39	202.1	96.79	149.445	12.81	1914.39	544.50	544.50
40	96.79	156.02	126.405	5.19	656.04	328.02	328.02
41	156.02	219.47	187.745	3.62	679.64	339.82	339.82
42	219.47	195.34	207.405	19.57	4058.92	2029.46	2029.46
43	195.34	259.72	227.53	4.57	1039.81	519.91	519.91
44	305.56	352.75	329.155	13.14	4325.10	2162.55	2162.55
45	352.75	358.05	355.4	4.96	1762.78	881.39	881.39
46	358.05	207.08	282.565	5.62	1588.02	794.01	794.01

47	207.08	225.92	216.5	5.03	1089.00	544.50	544.50
48	225.92	245.32	235.62	9.66	2276.09	1138.04	1138.04
49	245.32	248.78	247.05	1.12	276.70	138.35	138.35
50	248.78	238.21	243.495	0.00	0.00	0.00	0.00
51	238.21	308.82	273.515	0.66	180.52	90.26	90.26
52	308.82	411.25	360.035	12.03	4331.22	2165.61	2165.61
53	411.25	348.09	379.67	33.19	12601.25	6300.62	6300.62
54	348.09	140.67	244.38	1.04	254.16	877.12	877.12
55	140.67	260.3	200.485	8.75	1754.24	877.12	877.12
56	260.3	275.55	267.925	11.50	3081.14	1540.57	1540.57
57	275.55	338.24	306.895	9.26	2841.85	1420.92	1420.92
58	338.24	293.5	315.87	16.60	5243.44	2621.72	2621.72
59	293.5	251.84	272.67	8.50	2317.70	1158.85	1158.85
60	251.84	175.31	213.575	8.07	1723.55	861.78	861.78
61	402.01	376.98	389.495	4.20	1635.88	817.94	817.94
62	175.31	225.77	200.54	0.94	188.51	94.25	94.25
63	225.77	214.44	220.105	0.22	48.42	24.21	24.21
64	214.44	140.66	177.55	7.44	1320.97	660.49	660.49
65	140.66	182.82	161.74	0.13	21.03	10.51	10.51
66	182.82	213.6	198.21	50.25	9960.05	4980.03	4980.03
67	213.6	209.43	211.515	12.97	2743.35	1371.67	1371.67
68	209.43	175.67	192.55	0.00	0.00	0.00	0.00
69	175.67	151.56	163.615	0.00	0.00	0.00	0.00
70	151.56	176.6	164.08	0.00	0.00	0.00	0.00
71	176.6	160.74	168.67	0.00	0.00	0.00	0.00
72	160.74	248.07	204.405	2.15	439.47	219.74	219.74
73	248.07	173.02	210.545	2.12	446.36	223.18	223.18
74	173.02	132.17	152.595	4.54	692.78	346.39	346.39
75	132.17	202.19	167.18	0.00	0.00	0.00	0.00
76	202.19	209.95	206.07	0.30	61.82	30.91	30.91
77	209.95	249.58	229.765	3.83	880.00	440.00	440.00
78	249.58	246.93	248.255	0.15	37.24	18.62	18.62
79	246.93	191.28	219.105	4.59	1005.69	502.85	502.85
80	191.28	198.79	195.035	3.65	711.88	355.94	355.94
81	198.79	207.28	203.035	0.00	0.00	0.00	0.00
82	207.28	142.71	174.995	1.17	204.74	102.37	102.37
83	142.71	139.71	141.21	0.00	0.00	0.00	0.00
84	139.71	176.82	158.265	13.10	2073.27	1036.64	1036.64
85	176.82	221.99	199.405	2.49	496.52	248.26	248.26
86	221.99	157.86	189.925	3.36	638.15	319.07	319.07
87	157.86	188.34	173.1	9.32	1613.29	806.65	806.65
88	315.00	470.00	392.50	10.32	4050.60	2025.30	2025.30
89	470.00	295.00	382.50	9.05	3461.63	1730.82	1730.82
90	295.00	330.00	312.50	9.23	2884.38	1442.19	1442.19
91	330.00	405.00	367.50	8.92	3278.10	1639.05	1639.05
92	405.00	250.00	327.50	11.08	3628.70	1814.35	1814.35

93	250.00	450.00	350.00	12.46	4361.00	2180.50	2180.50
94	450.00	230.00	340.00	11.98	4073.20	2036.60	2036.60
95	230.00	290.00	260.00	12.85	3341.00	1670.50	1670.50
96	290.00	440.00	365.00	8.51	3106.15	1553.08	1553.08
97	440.00	280.00	360.00	9.52	3427.20	1713.60	1713.60
98	280.00	350.00	315.00	0.00	0.00	0.00	0.00
99	350.00	660.00	505.00	0.00	0.00	0.00	0.00
100	660.00	600.00	630.00	0.00	0.00	0.00	0.00
101	600.00	300.00	450.00	4.50	2025.00	1012.50	1012.50
102	300.00	580.00	440.00	17.10	7524.00	3762.00	3762.00
103	580.00	170.00	375.00	9.90	3712.50	1856.25	1856.25
104	170.00	470.00	320.00	28.78	9209.60	4604.80	4604.80
105	470.00	300.00	385.00	8.76	3372.60	1686.30	1686.30
106	300.00	450.00	375.00	9.80	3675.00	1837.50	1837.50
107	450.00	450.00	450.00	10.73	4828.50	2414.25	2414.25
108	450.00	320.00	385.00	13.66	5259.10	2629.55	2629.55
109	320.00	350.00	335.00	5.50	1842.50	921.25	921.25
110	350.00	540.00	445.00	6.10	2714.50	1357.25	1357.25
111	540.00	220.00	380.00	7.26	2758.80	1379.40	1379.40
112	220.00	270.00	245.00	0.00	0.00	0.00	0.00
113	270.00	500.00	385.00	0.00	0.00	0.00	0.00
114	500.00	170.00	335.00	7.34	2458.90	1229.45	1229.45
115	170.00	970.00	570.00	11.81	6731.70	3365.85	3365.85
116	970.00	530.00	750.00	6.16	4620.00	3137.88	3137.88
117	530.00	150.00	340.00	3.42	1162.80	581.40	581.40
118	150.00	300.00	225.00	5.41	1217.25	608.63	608.63
119	300.00	100.00	200.00	6.12	1224.00	612.00	612.00
120	100.00	250.00	175.00	8.19	1433.25	716.63	716.63
121	250.00	470.00	360.00	4.91	1767.60	883.80	883.80
122	470.00	200.00	335.00	5.11	1711.85	855.93	855.93
123	200.00	350.00	275.00	0.00	0.00	0.00	0.00
124	350.00	300.00	325.00	19.31	6275.75	3137.88	3137.88
125	300.00	350.00	325.00	19.44	6318.00	3159.00	3159.00
126	350.00	500.00	425.00	0.00	0.00	0.00	0.00
127	500.00	500.00	500.00	0.00	0.00	0.00	0.00
		34321.6			300039.69		

Valappattanam River Sand Volume Calculation Sheet - Panchayat wise

MAYIL PANCHAYAT				
PF. No.	Volume of sand in RB	Volume of sand in LB	Total Volume	Remarks
11	1453.17	0.00	1453.17	Near Parassini Bridge
12	1667.56	0.00	1667.56	
13	7338.27	0.00	7338.27	
14	1704.88	0.00	1704.88	
15	1726.26	0.00	1726.26	
16	2302.46	0.00	2302.46	
17	1817.15	0.00	1817.15	
18	1652.98	0.00	1652.98	
19	1531.52	0.00	1531.52	
20	1605.70	0.00	1605.70	
21	3139.03	0.00	3139.03	
22	1504.53	0.00	1504.53	
23	1464.75	0.00	1464.75	
24	1907.99	0.00	1907.99	
25	1754.52	0.00	1754.52	
26	4545.73	0.00	4545.73	
27	2187.87	0.00	2187.87	
29	3018.25	3018.25	6036.50	
30	2254.85	2254.85	4509.70	
31	0.00	0.00	0.00	
32	1562.83	1562.83	3125.66	
33	2411.69	0.00	2411.69	
34	0.00	0.00	0.00	
35	83.08	0.00	83.08	
36	125.98	0.00	125.98	
37	978.70	0.00	978.70	
38	380.12	0.00	380.12	
39	544.50	0.00	544.50	
40	328.02	0.00	328.02	
41	339.82	0.00	339.82	
42	2029.46	0.00	2029.46	
43	519.91	0.00	519.91	
44	2162.55	0.00	2162.55	
45	881.39	0.00	881.39	
46	794.01	0.00	794.01	
47	544.50	0.00	544.50	
48	1138.04	0.00	1138.04	

49	138.35	0.00	138.35	
50	0.00	0.00	0.00	
51	90.26	0.00	90.26	
52	2165.61	0.00	2165.61	
53	6300.62	0.00	6300.62	
54	877.12	0.00	877.12	
55	877.12	0.00	877.12	Near Malapattanam Munambe Bridge
56	1540.57	0.00	1540.57	Do
57	1420.92	0.00	1420.92	Do
58	2621.72	0.00	2621.72	Do
61	817.94	817.94	817.94	Do
	Total		83088.24	

Deduct volume of sand in prohibited area				
11	1453.17	0.00	1453.17	Near Parassini Bridge
55	877.12	0.00	877.12	Near Malapattanam Munambe Bridge
56	1540.57	0.00	1540.57	Do
57	1420.92	0.00	1420.92	Do
58	2621.72	0.00	2621.72	Do
61	817.94	817.94	817.94	Do
	Total deduction		8731.44	
Net volume of sand			74357.00	

Kuttiyattoor Panchayat				
PF. No.	Volume of sand in RB	Volume of sand in LB	Total Volume	Remarks
62	94.25	0.00	94.25	
63	24.21	0.00	24.21	
64	660.49	0.00	660.49	
65	10.51	0.00	10.51	
66	4980.03	0.00	4980.03	
67	1371.67	0.00	1371.67	
68	0.00	0.00	0.00	
69	0.00	0.00	0.00	
70	0.00	0.00	0.00	
71	0.00	0.00	0.00	
72	219.74	0.00	219.74	Near Paavannoor Bridge
73	223.18	0.00	223.18	Do
74	346.39	0.00	346.39	Do
75	0.00	0.00	0.00	Do

76	30.91	0.00	30.91	Do
77	440.00	0.00	440.00	Do
78	18.62	0.00	18.62	Do
79	502.85	0.00	502.85	
80	355.94	0.00	355.94	
81	0.00	0.00	0.00	
	Total		9278.78	
Deduct volume of sand in prohibited area				
72	219.74	0.00	219.74	Near Paavannoor Bridge
73	223.18	0.00	223.18	Do
74	346.39	0.00	346.39	Do
75	0.00	0.00	0.00	Do
76	30.91	0.00	30.91	Do
77	440.00	0.00	440.00	Do
78	18.62	0.00	18.62	Do
	Total Deduction		1278.83	
	Net volume of sand		8000.00	

Koodali Panchayat				
PF. No.	Volume of sand in RB	Volume of sand in LB	Total Volume	Remarks
82	102.37	0.00	102.37	
83	0.00	0.00	0.00	
84	1036.64	0.00	1036.64	
85	248.26	0.00	248.26	
86	319.07	0.00	319.07	
87	806.65	0.00	806.65	
88	2025.30	0.00	2025.30	
89	1730.82	0.00	1730.82	
90	1442.19	0.00	1442.19	
91	1639.05	0.00	1639.05	
92	1814.35	0.00	1814.35	
93	2180.50	0.00	2180.50	
94	2036.60	0.00	2036.60	
95	1670.50	0.00	1670.50	
96	1553.08	0.00	1553.08	
97	1713.60	0.00	1713.60	
98	0.00	0.00	0.00	
99	0.00	0.00	0.00	Near Irrikkur Bridge

100	0.00	0.00	0.00	Do
101	1012.50	0.00	1012.50	Do
102	3762.00	0.00	3762.00	Do
103	1856.25	0.00	1856.25	
104	4604.80	0.00	4604.80	
105	1686.30	0.00	1686.30	
106	1837.50	0.00	1837.50	
107	2414.25	0.00	2414.25	Near Manpur bridge
108	2629.55	0.00	2629.55	Do
109	921.25	0.00	921.25	Do
	Total		41043.37	
Deduct volume of sand in prohibited area				
99	0.00	0.00	0.00	Near Irrikkur Bridge
100	0.00	0.00	0.00	Do
101	1012.50	0.00	1012.50	Do
102	3762.00	0.00	3762.00	Do
107	2414.25	0.00	2414.25	Near Manpur bridge
108	2629.55	0.00	2629.55	Do
109	921.25	0.00	921.25	Do
	Total Deduction		10739.55	
	Net volume of sand		30303.00	

Mattannur Municipality				
PF. No.	Volume of sand in RB	Volume of sand in LB	Total Volume	Remarks
110	1357.25	0.00	1357.25	Near Manpur bridge
111	1379.40	0.00	1379.40	Do
112	0.00	0.00	0.00	
113	0.00	0.00	0.00	
114	1229.45	0.00	1229.45	
115	3365.85	0.00	3365.85	
116	3137.88	0.00	3137.88	
117	581.40	0.00	581.40	
118	608.63	0.00	608.63	
119	612.00	0.00	612.00	
120	716.63	0.00	716.63	
121	883.80	0.00	883.80	
122	855.93	0.00	855.93	
123	0.00	0.00	0.00	Near Pazhasi dam

124	3137.88	0.00	3137.88	Do
125	3159.00	0.00	3159.00	Do
126	0.00	0.00	0.00	Do
127	0.00	0.00	0.00	Do
	Total		21025.08	
Deduct volume of sand in prohibited area				
110	1357.25	0.00	1357.25	Near Manpur bridge
111	1379.40	0.00	1379.40	Do
123	0.00	0.00	0.00	Near Pazhasi dam
124	3137.88	0.00	3137.88	Do
125	3159.00	0.00	3159.00	Do
126	0.00	0.00	0.00	Do
127	0.00	0.00	0.00	Do
	Total Deduction		9033.53	
	Net volume of sand		11991.00	

Thalipparambe Municipality				
PF. No.	Volume of sand in RB	Volume of sand in LB	Total Volume	Remarks
11	0.00	1453.17	1453.17	Near Parsini Bridge
12	0.00	1667.56	1667.56	
13	0.00	7338.27	7338.27	
	Total		10459.00	
Deduct volume of sand in prohibited area				
11	0.00	1453.17	1453.17	Near Parsini Bridge
	Net volume of sand		9006.00	

Kurumayhoo Panchayat				
PF. No.	Volume of sand in RB	Volume of sand in LB	Total Volume	Remarks
14	0.00	1704.88	1704.88	
15	0.00	1726.26	1726.26	

16	0.00	2302.46	2302.46	
17	0.00	1817.15	1817.15	
18	0.00	1652.98	1652.98	
19	0.00	1531.52	1531.52	
	Total	10735.25	10735.25	

Chengalal Panchayat				
PF. No.	Volume of sand in RB	Volume of sand in LB	Total Volume	Remarks
20	0.00	1605.70	1605.70	
21	0.00	3139.03	3139.03	
22	0.00	1504.53	1504.53	
23	0.00	1464.75	1464.75	
24	0.00	1907.99	1907.99	
25	0.00	1754.52	1754.52	
26	0.00	4545.73	4545.73	
27	0.00	2187.87	2187.87	
28	1564.90	1564.90	3129.80	
29	0.00	3018.25	3018.25	
30	0.00	2254.85	2254.85	
31	0.00	0.00	0.00	
32	0.00	1562.83	1562.83	
33	0.00	2411.69	2411.69	
34	0.00	0.00	0.00	
35	83.08	83.08	166.16	
36	125.98	125.98	251.96	
37	978.70	978.70	1957.40	
38	380.12	380.12	760.24	Near Therthala Bridge
39	544.50	544.50	1914.39	Do
40	328.02	328.02	656.04	Do
41	339.82	339.82	679.64	Do
42	2029.46	2029.46	4058.92	Do
43	519.91	519.91	1039.81	Do
44	0.00	2162.55	2162.55	
45	0.00	881.39	881.39	
46	0.00	794.01	794.01	
47	0.00	544.50	544.50	
48	0.00	1138.04	1138.04	
49	0.00	138.35	138.35	
50	0.00	0.00	0.00	
51	0.00	90.26	90.26	
52	0.00	2165.61	2165.61	

53	0.00	6300.62	6300.62	
54	0.00	877.12	877.12	
55	0.00	877.12	877.12	Near Malapattanam Munambe Bridge
	Total		57941.69	
Deduct volume of sand in prohibited area				
38	380.12	380.12	760.24	Near Therthala Bridge
39	544.50	544.50	1914.39	Do
40	328.02	328.02	656.04	Do
41	339.82	339.82	679.64	Do
42	2029.46	2029.46	4058.92	Do
43	519.91	519.91	1039.81	Do
55	0.00	877.12	877.12	Near Malapattanam Munambe Bridge
	Total Deduction		9986.16	
	Net volume of sand		47956.00	

Malapattanam Panchayat				
PF. No.	Volume of sand in RB	Volume of sand in LB	Total Volume	Remarks
56	0.00	1540.57	1540.57	Near Malapattanam Munambe Bridge
57	0.00	1420.92	1420.92	Do
58	0.00	2621.72	2621.72	Do
59	1158.85	1158.85	2317.70	Do
60	861.78	861.78	1723.55	Do
61	0.00	817.94	817.94	Do
62	0.00	94.25	94.25	
63	0.00	24.21	24.21	
64	0.00	660.49	660.49	
65	0.00	10.51	10.51	
66	0.00	4980.03	4980.03	
67	0.00	1371.67	1371.67	
68	0.00	0.00	0.00	
69	0.00	0.00	0.00	
70	0.00	0.00	0.00	
71	0.00	0.00	0.00	
72	0.00	219.74	219.74	
73	0.00	223.18	223.18	Near Pavannoor Bridge
74	0.00	346.39	346.39	Do
75	0.00	0.00	0.00	Do

76	0.00	30.91	30.91	Do
77	0.00	440.00	440.00	Do
78	0.00	18.62	18.62	Do
79	0.00	502.85	502.85	
80	0.00	355.94	355.94	
81	0.00	0.00	0.00	
82	0.00	102.37	102.37	
83	0.00	0.00	0.00	
84	0.00	1036.64	1036.64	
85	0.00	248.26	248.26	
86	0.00	319.07	319.07	
87	0.00	806.65	806.65	
88	0.00	2025.30	2025.30	
	Total		24259.47	
Deduct volume of sand in prohibited area				
56	0.00	1540.57	1540.57	Near Malapattanam Munambe Bridge
57	0.00	1420.92	1420.92	Do
58	0.00	2621.72	2621.72	Do
59	1158.85	1158.85	2317.70	Do
60	861.78	861.78	1723.55	Do
61	0.00	817.94	817.94	Do
73	0.00	223.18	223.18	Near Pavannoor Bridge
74	0.00	346.39	346.39	Do
75	0.00	0.00	0.00	Do
76	0.00	30.91	30.91	Do
77	0.00	440.00	440.00	Do
78	0.00	18.62	18.62	Do
	Total Deduction		11501.50	
	Net volume of sand		13207.00	

Irikkur Panchayat				
PF. No.	Volume of sand in RB	Volume of sand in LB	Total Volume	Remarks
89	0.00	1730.82	1730.82	
90	0.00	1442.19	1442.19	
91	0.00	1639.05	1639.05	
92	0.00	1814.35	1814.35	
93	0.00	2180.50	2180.50	

94	0.00	2036.60	2036.60	
95	0.00	1670.50	1670.50	
96	0.00	1553.08	1553.08	
97	0.00	1713.60	1713.60	
98	0.00	0.00	0.00	
99	0.00	0.00	0.00	Near Irrikkur bridge
100	0.00	0.00	0.00	Do
101	0.00	1012.50	1012.50	Do
102	0.00	3762.00	3762.00	Do
103	0.00	1856.25	1856.25	
104	0.00	4604.80	4604.80	
105	0.00	1686.30	1686.30	
106	0.00	1837.50	1837.50	
107	0.00	2414.25	2414.25	
108	0.00	2629.55	2629.55	Near Manpure bridge
109	0.00	921.25	921.25	Do
110	0.00	1357.25	1357.25	Do
	Total		37862.33	
Deduct volume of sand in prohibited area				
99	0.00	0.00	0.00	Near Irrikkur bridge
100	0.00	0.00	0.00	Do
101	0.00	1012.50	1012.50	Do
102	0.00	3762.00	3762.00	Do
108	0.00	2629.55	2629.55	Near Manpure bridge
109	0.00	921.25	921.25	Do
110	0.00	1357.25	1357.25	Do
	Toral deduction		9682.55	
	Net volume of sand		28179.00	

Padiyoor Panchayat				
PF. No.	Volume of sand in RB	Volume of sand in LB	Total Volume	Remarks
111	0.00	1379.40	1379.40	Near Manpur bridge
112	0.00	0.00	0.00	Do
113	0.00	0.00	0.00	
114	0.00	1229.45	1229.45	
115	0.00	3365.85	3365.85	
116	0.00	3137.88	3137.88	

117	0.00	581.40	581.40	
118	0.00	608.63	608.63	
119	0.00	612.00	612.00	
120	0.00	716.63	716.63	
121	0.00	883.80	883.80	
122	0.00	855.93	855.93	
123	0.00	0.00	0.00	Near Pazhasi dam
124	0.00	3137.88	3137.88	Do
125	0.00	3159.00	3159.00	Do
126	0.00	0.00	0.00	Do
127	0.00	0.00	0.00	Do
	Total		19667.83	
Deduct volume of sand in prohibited area				
111	0.00	1379.40	1379.40	Near Manpur bridge
112	0.00	0.00	0.00	Do
123	0.00	0.00	0.00	Near Pazhasi dam
124	0.00	3137.88	3137.88	Do
125	0.00	3159.00	3159.00	Do
126	0.00	0.00	0.00	Do
127	0.00	0.00	0.00	Do
	Total Deduction		7676.28	
	Net volume of sand		11992.00	

Valapattanam River Volume of sand for mining in Panchayat wise						
Sl.No.	Name of Local Body or Village	Stretch in Km.	Volume of sand deposit in m3	Volume prohibited for mining	Net volume in m3	No. of Lorry loads
1	Mayil Panchayat (LB)	14.30 Km.	83088.00	8731.00	74357.00	21244.00
2	Kuttiyattur Panchayat (LB)	3.90 Km.	9279.00	1279.00	8000.00	2285.00
3	Koodali Panchayat (LB)	7.40 Km.	41043.00	10740.00	30303.00	8658.00
4	Mattannur Municipality (LB)	7.30 Km.	21025.00	9034.00	11991.00	3426.00
5	Thalipparambe Municipality (RB)	1.30 Km.	10459.00	1453.00	9006.00	2573.00
6	Kurumayhoo Panchayat (RB)	1.80 Km.	10735.00	0.00	10735.00	3067.00
7	Ghengalai Panchayat (RB)	9.40 Km.	57942.00	9986.00	47956.00	13701.00
8	Malapattanam Panchayat (RB)	7.10 Km.	24259.00	11502.00	13207.00	3773.00
9	Irikkur Panchayat (RB)	6.90 Km.	37862.00	9683.00	28180.00	8051.00
10	Padiyoor Panchayat (RB)	7.30 Km.	19668.00	7676.00	11992.00	3426.00
	Total	34.80 Km.	315360.00	70084.00	245727.00	70204.00

Unit weight of river sand	2250 Kg/m ³
One lorry load is referred as	8 Tonnes
Sand Volume of on lorry load	is 3.50 m ³

5.2 Thalassery River:

- The Thalassery River is flowing from the Western Ghats to the Sea. The survey works started from the Eranjolicavu Bridge to Koduvally Bridge, total 2.85 Km. length.
- Width of the river is varying from 55.00 m to 140.00 m. and the maximum depth recorded is 3.60 m at PF-12.
- The river is passing through only two panchayats Koduvally on right bank and Thalassery on left bank.
- Total 2 bridges are crossing this stretch, Eranjolicave bridge at starting point and Koduvally at finishing point.
- Total 20 profiles (cross sections) has been taken at a distance of maximum 150 m according to the width of the river. The profiles are marked on the longitudinal section.
- The bench mark from the top of the Koduvally bridge has transfered to the permanent structures available on the bank of the river for further reference.
- All the permanent structures such as bridges, kadaves, temple, Panchayath well etc are marked on the longitudinal section.

Thalassery River Sand volume calculation sheet								
PF NO	Chainage	Average distance before (L1)	Average distance after (L2)	Zone of influence L= L1+L2 /2 m	Area of cross section (m ²)	Volume of sand (m ³) V	Volume of sand for RB Panchayat V/2 m ³	Volume of sand for LB Panchayat V/2 m ³
1	0	0	150	75	3.357	251.775	125.888	125.888
2	150	150	150	150	0.928	139.200	69.600	69.600
3	300	150	150	150	0.967	145.050	72.525	72.525
4	450	150	150	150	4.633	694.950	347.475	347.475
5	600	150	150	150	0.426	63.900	31.950	31.950
6	750	150	150	150	1.448	217.200	108.600	108.600
7	900	150	150	150	2.457	368.550	184.275	184.275
8	1050	150	150	150	1.966	294.900	147.450	147.450
9	1200	150	150	150	1.844	276.600	138.300	138.300
10	1350	150	150	150	8.004	1200.600	600.300	600.300
11	1500	150	150	150	3.995	599.250	299.625	299.625
12	1650	150	150	150	1.530	229.500	114.750	114.750
13	1800	150	150	150	4.606	690.900	345.450	345.450
14	1950	150	150	150	7.637	1145.550	572.775	572.775

15	2100	150	150	150	7.487	1123.050	561.525	561.525
16	2250	150	150	150	28.411	4261.650	2130.825	2130.825
17	2400	150	150	150	23.964	3594.600	1797.300	1797.300
18	2550	150	150	150	2.946	441.900	220.950	220.950
19	2700	150	150	150	2.011	301.650	150.825	150.825
20	2850	150	150	150	0.000	0.000	0.000	0.000
TOTAL						16040.775	8020.388	8020.388

Thalassery River Sand volume calculation sheet In Panchayat wise				
Koduvally Panchayat				
PF. No.	Volume of sand in RB	Volume of sand in LB	Total Volume in m3	Remarks
1	125.888	0.00	125.89	Near Eranjolikavu bridge
2	69.600	0.00	69.60	Do
3	72.525	0.00	72.53	Do
4	347.475	0.00	347.48	
5	31.950	0.00	31.95	
6	108.600	0.00	108.60	
7	184.275	0.00	184.28	
8	147.450	0.00	147.45	
9	138.300	0.00	138.30	
10	600.300	0.00	600.30	
11	299.625	0.00	299.63	
12	114.750	0.00	114.75	
13	345.450	0.00	345.45	
14	572.775	0.00	572.78	
15	561.525	0.00	561.53	
16	2130.825	0.00	2130.83	
17	1797.300	0.00	1797.30	Near Koduvally bridge
18	220.950	0.00	220.95	Do
19	150.825	0.00	150.83	Do
20	0.000	0.00	0.00	Do
Total			8020.39	
Deduct the volume of sand in prohibited area				
1	125.888	0.00	125.89	Near Eranjolikavu bridge
2	69.600	0.00	69.60	Do
3	72.525	0.00	72.53	Do
17	1797.300	0.00	1797.30	Near Koduvally bridge
18	220.950	0.00	220.95	Do
19	150.825	0.00	150.83	Do
20	0.000	0.00	0.00	Do

	Total deduction		2437.09	
	Net volume of sand		5583.00	
Thalassery Panchayat				
PF. No.	Volume of sand in RB	Volume of sand in LB	Total Volume in m3	Remarks
1	0.000	125.89	125.89	Near Eranjolicavu bridge
2	0.000	69.60	69.60	Do
3	0.000	72.53	72.53	Do
4	0.000	347.48	347.48	
5	0.000	31.95	31.95	
6	0.000	108.60	108.60	
7	0.000	184.28	184.28	
8	0.000	147.45	147.45	
9	0.000	138.30	138.30	
10	0.000	600.30	600.30	
11	0.000	299.63	299.63	
12	0.000	114.75	114.75	
13	0.000	345.45	345.45	
14	0.000	572.78	572.78	
15	0.000	561.53	561.53	
16	0.000	2130.83	2130.83	
17	0.000	1797.30	1797.30	Near Koduvally bridge
18	0.000	220.95	220.95	Do
19	0.000	150.83	150.83	Do
20	0.000	0.00	0.00	Do
Total			8020.39	
Deduct the volume of sand in prohibited area				
1	125.888	0.00	125.89	Near Eranjolicavu bridge
2	69.600	0.00	69.60	Do
3	72.525	0.00	72.53	Do
17	1797.300	0.00	1797.30	Near Koduvally bridge
18	220.950	0.00	220.95	Do
19	150.825	0.00	150.83	Do
20	0.000	0.00	0.00	Do
	Total deduction		2437.09	
	Net volume		5583.00	

Thalassery River Volume of sand for mining in Panchayat wise						
Sl.No.	Name of Local Body or Village	Stretch in Km.	Volume of sand deposit in m3	Volume prohibited for mining	Net volume in m3	No. of Lorry loads
1	Koduvally Panchayat (RB)	2.85 Km.	8020.00	2437.00	5583.00	1595.00
2	Thalassery Panchayat (LB)	2.85 Km.	8020.00	2437.00	5583.00	1595.00
	Total	2.85 Km.	16040.00	4874.00	11166.00	3190.00
	Unit weight of river sand 2250 Kg/m ³					
	One lorry load is referred as 8 Tonnes					
	Sand Volume of on lorry load is 3.50 m ³					

5.3 Perumpa River:

- The Perumpa River is flowing from the Western Ghats to the Sea. The survey works started from the Meenkuzhi dam outlet to Shangakiri Railway Bridge, total 13.32 Km. length.
- Width of the river is varying from 54.00 m to 160.00 m. and the maximum depth recorded is 5.00 m at PF-72 Kunjimangalam.
- The river is passing through 3 panchayats and one municipality.
- The Panchayats are Kadannappally, Cheruthazham, Kunjimangalam in left bank and Payyannur Municipality in right bank.
- Total 3 bridges are crossing this river (Shangakiri railway bridge, Thottamkadavu road bridge and Perumpa bridge)
- Total 90 profiles (cross sections) has been taken at a distance of maximum 150 m according to the width of the river. The profiles are marked on the longitudinal section.
- The bench mark from the top of the Shangakiri Railway bridge has transferred to the permanent structures available on the bank of the river for further reference.
- All the permanent structures such as bridges, kadaves, temple, Panchayath well etc are marked on the longitudinal section.

Perumpa River Sand volume calculation sheet								
PF NO	Chainage	Avarage distance before (L1)	Avarage distance after (L2)	Zone of influence L= L1+L2 /2 m	Area of cross section (m2)	Volume of sand (m3) V	Volume of sand for RB Panchayat V/2 m3	Volume of sand for LB Panchayat V/2 m3
1	0	0	150	75	1.104	82.800	41.400	41.400
2	150	150	150	150	7.253	1087.950	543.975	543.975
3	300	150	150	150	1.141	171.150	85.575	85.575
4	450	150	150	150	5.253	787.950	393.975	393.975
5	600	150	150	150	4.702	705.300	352.650	352.650
6	750	150	150	150	2.806	420.900	210.450	210.450
7	900	150	150	150	4.355	653.250	326.625	326.625
8	1050	150	150	150	3.538	530.700	265.350	265.350
9	1200	150	150	150	1.582	237.300	118.650	118.650
10	1350	150	150	150	1.283	192.450	96.225	96.225
11	1500	150	150	150	0.776	116.400	58.200	58.200
12	1650	150	150	150	0.000	0.000	0.000	0.000
13	1800	150	150	150	0.000	0.000	0.000	0.000
14	1950	150	150	150	0.000	0.000	0.000	0.000
15	2100	150	150	150	0.000	0.000	0.000	0.000
16	2250	150	150	150	0.000	0.000	0.000	0.000
17	2400	150	150	150	0.000	0.000	0.000	0.000
18	2550	150	150	150	1.404	210.600	105.300	105.300
19	2700	150	150	150	0.000	0.000	0.000	0.000
20	2850	150	150	150	0.000	0.000	0.000	0.000
21	3000	150	150	150	0.661	99.150	49.575	49.575
22	3150	150	150	150	1.940	291.000	145.500	145.500
23	3300	150	150	150	0.883	132.450	66.225	66.225
24	3450	150	150	150	0.676	101.400	50.700	50.700
25	3600	150	150	150	0.000	0.000	0.000	0.000
26	3750	150	150	150	0.000	0.000	0.000	0.000
27	3900	150	150	150	0.000	0.000	0.000	0.000
28	4050	150	150	150	0.293	43.950	21.975	21.975
29	4200	150	150	150	0.342	51.300	25.650	25.650
30	4350	150	150	150	0.320	48.000	24.000	24.000
31	4500	150	150	150	1.793	268.950	134.475	134.475
32	4650	150	150	150	0.530	79.500	39.750	39.750
33	4800	150	150	150	0.000	0.000	0.000	0.000
34	4950	150	150	150	0.000	0.000	0.000	0.000
35	5100	150	150	150	0.000	0.000	0.000	0.000
36	5250	150	150	150	0.261	39.150	19.575	19.575
37	5400	150	150	150	0.681	102.150	51.075	51.075
38	5550	150	150	150	0.000	0.000	0.000	0.000
39	5700	150	150	150	0.000	0.000	0.000	0.000
40	5850	150	150	150	0.000	0.000	0.000	0.000

41	6000	150	150	150	0.000	0.000	0.000	0.000
42	6150	150	150	150	0.000	0.000	0.000	0.000
43	6300	150	150	150	0.000	0.000	0.000	0.000
44	6450	150	150	150	0.000	0.000	0.000	0.000
45	6600	150	150	150	0.000	0.000	0.000	0.000
46	6750	150	150	150	0.000	0.000	0.000	0.000
47	6900	150	150	150	0.000	0.000	0.000	0.000
48	7050	150	150	150	0.000	0.000	0.000	0.000
49	7200	150	150	150	0.000	0.000	0.000	0.000
50	7350	150	150	150	0.000	0.000	0.000	0.000
51	7500	150	150	150	0.000	0.000	0.000	0.000
52	7650	150	150	150	0.000	0.000	0.000	0.000
53	7800	150	150	150	0.000	0.000	0.000	0.000
54	7950	150	150	150	0.000	0.000	0.000	0.000
55	8100	150	150	150	0.000	0.000	0.000	0.000
56	8250	150	150	150	0.000	0.000	0.000	0.000
57	8400	150	150	150	0.281	42.150	21.075	21.075
58	8550	150	150	150	0.328	49.200	24.600	24.600
59	8700	150	150	150	0.642	96.300	48.150	48.150
60	8850	150	150	150	2.660	399.000	199.500	199.500
61	9000	150	150	150	0.000	0.000	0.000	0.000
62	9150	150	150	150	0.000	0.000	0.000	0.000
63	9300	150	150	150	0.000	0.000	0.000	0.000
64	9450	150	150	150	0.000	0.000	0.000	0.000
65	9600	150	150	150	0.000	0.000	0.000	0.000
66	9750	150	150	150	0.000	0.000	0.000	0.000
67	9900	150	150	150	0.000	0.000	0.000	0.000
68	10050	150	150	150	0.000	0.000	0.000	0.000
69	10200	150	150	150	0.000	0.000	0.000	0.000
70	10350	150	150	150	0.000	0.000	0.000	0.000
71	10500	150	150	150	0.000	0.000	0.000	0.000
72	10650	150	150	150	0.000	0.000	0.000	0.000
73	10800	150	150	150	0.000	0.000	0.000	0.000
74	10950	150	150	150	0.000	0.000	0.000	0.000
75	11100	150	150	150	0.000	0.000	0.000	0.000
76	11250	150	150	150	0.000	0.000	0.000	0.000
77	11400	150	150	150	0.000	0.000	0.000	0.000
78	11550	150	150	150	0.000	0.000	0.000	0.000
79	11700	150	150	150	0.000	0.000	0.000	0.000
80	11850	150	150	150	0.000	0.000	0.000	0.000
81	12000	150	150	150	0.000	0.000	0.000	0.000
82	12150	150	150	150	0.000	0.000	0.000	0.000
83	12300	150	150	150	0.000	0.000	0.000	0.000
84	12450	150	150	150	0.000	0.000	0.000	0.000
85	12600	150	150	150	3.430	514.500	257.250	257.250
86	12750	150	150	150	54.518	8177.700	4088.850	4088.850

87	12900	150	150	150	33.331	4999.650	2499.825	2499.825
88	13050	150	150	150	30.896	4634.400	2317.200	2317.200
89	13200	150	150	150	5.619	842.850	421.425	421.425
90	13320.335	150	150	150	0.991	148.650	74.325	74.325
TOTAL						26358.150	13179.075	13179.075

Perumba River Sand volume calculation sheet in Panchayat wise				
Kadannapally Panchayat				
PF. No.	Volume of sand in RB	Volume of sand in LB	Total Volume	Remarks
1	0.00	41.40	41.40	Near Meenkuzhi Dam
2	0.00	543.98	543.98	D0
3	0.00	85.58	85.58	D0
4	0.00	393.98	393.98	D0
5	0.00	352.65	352.65	D0
6	0.00	210.45	210.45	Thottamkadave Bridge
7	0.00	326.63	326.63	D0
8	0.00	265.35	265.35	D0
	Total		2220.00	
Deduct the volume of sand in prohibited area				
1	0.00	41.40	41.40	Near Meenkuzhi Dam
2	0.00	543.98	543.98	D0
3	0.00	85.58	85.58	D0
4	0.00	393.98	393.98	D0
5	0.00	352.65	352.65	D0
6	0.00	210.45	210.45	Thottamkadave Bridge
7	0.00	326.63	326.63	D0
8	0.00	265.35	265.35	D0
	Total deduction		2220.00	
	Net volume of sand		0.00	
Cheruthazham Panchayat				
PF. No.	Volume of sand in RB	Volume of sand in LB	Total Volume	Remarks
9	0.00	118.65	118.65	Near Thottamkadave bridge
10	0.00	96.23	96.23	Do
11	0.00	58.20	58.20	Do
12	0.00	0.00	0.00	

13	0.00	0.00	0.00	
14	0.00	0.00	0.00	
15	0.00	0.00	0.00	
16	0.00	0.00	0.00	
17	0.00	0.00	0.00	
18	0.00	105.30	105.30	
19	0.00	0.00	0.00	
20	0.00	0.00	0.00	
21	0.00	49.58	49.58	
22	0.00	145.50	145.50	
23	0.00	66.23	66.23	
24	0.00	50.70	50.70	
25	0.00	0.00	0.00	
26	0.00	0.00	0.00	
27	0.00	0.00	0.00	
28	0.00	21.98	21.98	
29	0.00	25.65	25.65	
30	0.00	24.00	24.00	
31	0.00	134.48	134.48	
32	0.00	39.75	39.75	
33	0.00	0.00	0.00	
	Total		936.23	
Deduct the volume of sand in prohibited area				
9	0.00	118.65	118.65	Near Thottamkadave bridge
10	0.00	96.23	96.23	Do
11	0.00	58.20	58.20	Do
	Total deduction		273.08	
	Net volume of sand		663.00	
Kunjimangalam Panchayat				
PF. No.	Volume of sand in RB	Volume of sand in LB	Total Volume	Remarks
34	0.00	0.00	0.00	
35	0.00	0.00	0.00	
36	0.00	19.58	19.58	
37	0.00	51.08	51.08	
38	0.00	0.00	0.00	
39	0.00	0.00	0.00	
40	0.00	0.00	0.00	
41	0.00	0.00	0.00	
42	0.00	0.00	0.00	
43	0.00	0.00	0.00	

44	0.00	0.00	0.00	
45	0.00	0.00	0.00	
46	0.00	0.00	0.00	
47	0.00	0.00	0.00	
48	0.00	0.00	0.00	
49	0.00	0.00	0.00	
50	0.00	0.00	0.00	
51	0.00	0.00	0.00	Sharp bend and road on the bank
52	0.00	0.00	0.00	Do
53	0.00	0.00	0.00	Do
54	0.00	0.00	0.00	Do
55	0.00	0.00	0.00	Do
56	0.00	0.00	0.00	Near Perumba Bridge
57	0.00	21.08	21.08	Do
58	0.00	24.60	24.60	Do
59	0.00	48.15	48.15	Do
60	0.00	199.50	199.50	Do
61	0.00	0.00	0.00	
62	0.00	0.00	0.00	
63	0.00	0.00	0.00	
64	0.00	0.00	0.00	
65	0.00	0.00	0.00	
66	0.00	0.00	0.00	
67	0.00	0.00	0.00	Sharp bend and Temple on the bank
68	0.00	0.00	0.00	Do
69	0.00	0.00	0.00	
70	0.00	0.00	0.00	
71	0.00	0.00	0.00	
72	0.00	0.00	0.00	
73	0.00	0.00	0.00	
74	0.00	0.00	0.00	
75	0.00	0.00	0.00	
76	0.00	0.00	0.00	
77	0.00	0.00	0.00	
78	0.00	0.00	0.00	
79	0.00	0.00	0.00	Overhead Water tank on the bank
80	0.00	0.00	0.00	Do
81	0.00	0.00	0.00	Do
82	0.00	0.00	0.00	Do
83	0.00	0.00	0.00	Do
84	0.00	0.00	0.00	
85	0.00	257.25	257.25	
86	0.00	4088.85	4088.85	
87	0.00	2499.83	2499.83	Sangakiri Railway Bridge
88	0.00	2317.20	2317.20	Do
89	0.00	421.43	421.43	Do

90	0.00	74.33	74.33	Do
	Total		10022.85	
Deduct the volume of sand in prohibited area				
51	0.00	0.00	0.00	Sharp bend and road on the bank
52	0.00	0.00	0.00	Do
53	0.00	0.00	0.00	Do
54	0.00	0.00	0.00	Do
55	0.00	0.00	0.00	Do
56	0.00	0.00	0.00	Near Perumba Bridge
57	0.00	21.08	21.08	Do
58	0.00	24.60	24.60	Do
59	0.00	48.15	48.15	Do
60	0.00	199.50	199.50	Do
67	0.00	0.00	0.00	Sharp bend and Temple on the bank
68	0.00	0.00	0.00	Do
79	0.00	0.00	0.00	Overhead Water tank on the bank
80	0.00	0.00	0.00	Do
81	0.00	0.00	0.00	Do
82	0.00	0.00	0.00	Do
83	0.00	0.00	0.00	Do
84	0.00	0.00	0.00	
85	0.00	257.25	257.25	
87	0.00	2499.83	2499.83	Sangakiri Railway Bridge
88	0.00	2317.20	2317.20	Do
89	0.00	421.43	421.43	Do
90	0.00	74.33	74.33	Do
	Total deduction		5863.35	
	Net volume of sand		4160.00	
Payyannur Municipality				
PF. No.	Volume of sand in RB	Volume of sand in LB	Total Volume	Remarks
1	41.40	0.00	41.40	Near Meenkuzhi Dam
2	543.98	0.00	543.98	D0
3	85.58	0.00	85.58	D0
4	393.98	0.00	393.98	D0
5	352.65	0.00	352.65	D0
6	210.45	0.00	210.45	Thottamkadave Bridge
7	326.63	0.00	326.63	D0
8	265.35	0.00	265.35	D0

9	118.65	0.00	118.65	Near Thottamkadave bridge
10	96.23	0.00	96.23	Do
11	58.20	0.00	58.20	Do
12	0.00	0.00	0.00	
13	0.00	0.00	0.00	
14	0.00	0.00	0.00	
15	0.00	0.00	0.00	
16	0.00	0.00	0.00	
17	0.00	0.00	0.00	
18	105.30	0.00	105.30	
19	0.00	0.00	0.00	
20	0.00	0.00	0.00	
21	49.58	0.00	49.58	
22	145.50	0.00	145.50	
23	66.23	0.00	66.23	
24	50.70	0.00	50.70	
25	0.00	0.00	0.00	
26	0.00	0.00	0.00	
27	0.00	0.00	0.00	
28	21.98	0.00	21.98	
29	25.65	0.00	25.65	
30	24.00	0.00	24.00	
31	134.48	0.00	134.48	
32	39.75	0.00	39.75	
33	0.00	0.00	0.00	
34	0.00	0.00	0.00	
35	0.00	0.00	0.00	
36	19.58	0.00	19.58	
37	51.08	0.00	51.08	
38	0.00	0.00	0.00	
39	0.00	0.00	0.00	
40	0.00	0.00	0.00	
41	0.000	0.00	0.00	
42	0.000	0.00	0.00	
43	0.000	0.00	0.00	
44	0.000	0.00	0.00	
45	0.000	0.00	0.00	
46	0.000	0.00	0.00	
47	0.000	0.00	0.00	
48	0.000	0.00	0.00	
49	0.000	0.00	0.00	
50	0.000	0.00	0.00	
51	0.000	0.00	0.00	Sharp bend and road on the bank
52	0.000	0.00	0.00	Do
53	0.000	0.00	0.00	Do
54	0.000	0.00	0.00	Do

55	0.000	0.00	0.00	Do
56	0.000	0.00	0.00	Near Perumba Bridge
57	21.075	0.00	21.08	Do
58	24.600	0.00	24.60	Do
59	48.150	0.00	48.15	Do
60	199.500	0.00	199.50	Do
61	0.000	0.00	0.00	
62	0.000	0.00	0.00	
63	0.000	0.00	0.00	
64	0.000	0.00	0.00	
65	0.000	0.00	0.00	
66	0.000	0.00	0.00	
67	0.000	0.00	0.00	Sharp bend and Temble on the bank
68	0.00	0.00	0.00	Do
69	0.00	0.00	0.00	
70	0.00	0.00	0.00	
71	0.00	0.00	0.00	
72	0.00	0.00	0.00	
73	0.00	0.00	0.00	
74	0.00	0.00	0.00	
75	0.00	0.00	0.00	
76	0.00	0.00	0.00	
77	0.00	0.00	0.00	
78	0.00	0.00	0.00	
79	0.00	0.00	0.00	Overhead Water tank on the bank
80	0.00	0.00	0.00	Do
81	0.00	0.00	0.00	Do
82	0.00	0.00	0.00	Do
83	0.00	0.00	0.00	Do
84	0.00	0.00	0.00	
85	257.25	0.00	257.25	
86	4088.85	0.00	4088.85	
87	2499.83	0.00	2499.83	Sangakiri Railway Bridge
88	2317.20	0.00	2317.20	Do
89	421.43	0.00	421.43	Do
90	74.33	0.00	74.33	Do
	Total		13179.08	
Deduct the volume of sand in prohibited area				
1	41.40	0.00	41.40	Near Meenkuzhi Dam
2	543.98	0.00	543.98	D0
3	85.58	0.00	85.58	D0
4	393.98	0.00	393.98	D0
5	352.65	0.00	352.65	D0
6	210.45	0.00	210.45	Thottamkadave Bridge

7	326.63	0.00	326.63	D0
8	265.35	0.00	265.35	D0
9	118.65	0.00	118.65	Near Thottamkadave bridge
10	96.23	0.00	96.23	Do
11	58.20	0.00	58.20	Do
51	0.000	0.00	0.00	Sharp bend and road on the bank
52	0.000	0.00	0.00	Do
53	0.000	0.00	0.00	Do
54	0.000	0.00	0.00	Do
55	0.000	0.00	0.00	Do
56	0.000	0.00	0.00	Near Perumba Bridge
57	21.075	0.00	21.08	Do
58	24.600	0.00	24.60	Do
59	48.150	0.00	48.15	Do
60	199.500	0.00	199.50	Do
67	0.000	0.00	0.00	Sharp bend and Temple on the bank
68	0.00	0.00	0.00	Do
79	0.00	0.00	0.00	Overhead Water tank on the bank
80	0.00	0.00	0.00	Do
81	0.00	0.00	0.00	Do
82	0.00	0.00	0.00	Do
83	0.00	0.00	0.00	Do
87	2499.83	0.00	2499.83	Sangakiri Railway Bridge
88	2317.20	0.00	2317.20	Do
89	421.43	0.00	421.43	Do
90	74.33	0.00	74.33	Do
	Total deduction		8099.18	
	Net volume of sand		5080.00	

**Perumba River Volume of sand for mining
in Panchayat wise**

Sl.No.	Name of Local Body or Village	Stretch in Km.	Volume of sand deposit in m3	Volume prohibited for mining	Net volume in m3	No. of Lorry loads
1	Kadannapally Panchayat (LB)	1.20 Km.	2220.00	2220.00	0.00	0.00
2	Cheruthazham Panchayat (LB)	3.75 Km.	936.00	273.00	663.00	189.00
3	Kunjimangalam Panchayat (LB)	8.55 Km.	10023.00	5863.00	4160.00	1188.00
4	Payyannur Municipality (RB)	13.50 Km.	13179.00	8099.00	5080.00	1451.00

	Total	13.5 Km.	26358.00	16455.00	9903.00	2828.00

Unit weight of river sand	2250 Kg/m ³
One lorry load is referred as	8 Tonnes
Sand Volume of on lorry load	is 3.50 m ³

5.4 Mahe River:

- The Thalassery River is flowing from the Western Ghats to the Sea. The survey works started from Kadavathure kadave to Mahe road Bridge, total 19.80 Km. length.
- Width of the river is varying from 37.00 m to 268.00 m. and the maximum depth recorded is 8.00 m at starting point.
- The river is passing through 4 panchayats and New Mahe on right bank and Kozhicode district on left bank.
- Total 5 bridges are crossing this stretch, Chovva Bypass bridge, Kunnummakara bridge, Monthal bridge, Mahe railway bridge and Mahe road bridge at finishing point.
- Total 133 profiles (cross sections) has been taken at a distance of maximum 150 m according to the width of the river. The profiles are marked on the longitudinal section.
- The bench mark from the top of the Mahe road bridge has trnsferd to the permanent structures available on the bank of the river for further reference.
- All the permanent structures such as bridges, kadaves, temple, etc are marked on the longitudinal section.

Mahe River Sand Volume Calculation Sheet								
PF NO	Chainage	Avarage distance before (L1)	Avarage distance after (L2)	Zone of influence L= L1+L2 /2 m	Area of cross section (m ²)	Volume of sand (m ³) V	Volume of sand for RB Panchayat V/2 m ³	Volume of sand for LB Panchayat V/2 m ³
1	0	0	150	75	0.848	63.600	31.800	31.800
2	150	150	150	150	0.000	0.000	0.000	0.000
3	300	150	150	150	0.575	86.250	43.125	43.125
4	450	150	150	150	0.474	71.100	35.550	35.550
5	600	150	150	150	0.604	90.600	45.300	45.300
6	750	150	150	150	0.000	0.000	0.000	0.000
7	900	150	150	150	0.514	77.100	0.514	38.550
8	1050	150	150	150	0.696	104.400	0.696	52.200
9	1200	150	150	150	0.428	64.200	32.100	32.100

10	1350	150	150	150	0.000	0.000	0.000	0.000
11	1500	150	150	150	0.000	0.000	0.000	0.000
12	1650	150	150	150	0.148	22.200	11.100	11.100
13	1800	150	150	150	0.803	120.450	60.225	60.225
14	1950	150	150	150	0.000	0.000	0.000	0.000
15	2100	150	150	150	1.199	179.850	89.925	89.925
16	2250	150	150	150	0.945	141.750	70.875	70.875
17	2400	150	150	150	0.930	139.500	69.750	69.750
18	2550	150	150	150	0.514	77.100	38.550	38.550
19	2700	150	150	150	0.900	135.000	67.500	67.500
20	2850	150	150	150	0.197	29.550	14.775	14.775
21	3000	150	150	150	0.998	149.700	74.850	74.850
22	3150	150	150	150	1.249	187.350	93.675	93.675
23	3300	150	150	150	0.000	0.000	0.000	0.000
24	3450	150	150	150	0.375	56.250	28.125	28.125
25	3600	150	150	150	0.000	0.000	0.000	0.000
26	3750	150	150	150	0.000	0.000	0.000	0.000
27	3900	150	150	150	0.000	0.000	0.000	0.000
28	4050	150	150	150	0.000	0.000	0.000	0.000
29	4200	150	150	150	0.000	0.000	0.000	0.000
30	4350	150	150	150	0.855	128.250	64.125	64.125
31	4500	150	150	150	0.671	100.650	50.325	50.325
32	4650	150	150	150	2.916	437.400	218.700	218.700
33	4800	150	150	150	0.887	133.050	66.525	66.525
34	4950	150	150	150	1.195	179.250	89.625	89.625
35	5100	150	150	150	0.793	118.950	59.475	59.475
36	5250	150	150	150	1.363	204.450	102.225	102.225
37	5400	150	150	150	0.663	99.450	49.725	49.725
38	5550	150	150	150	0.000	0.000	0.000	0.000
39	5700	150	150	150	0.000	0.000	0.000	0.000
40	5850	150	150	150	0.000	0.000	0.000	0.000
41	6000	150	150	150	0.339	50.850	25.425	25.425
42	6150	150	150	150	0.571	85.650	42.825	42.825
43	6300	150	150	150	1.004	150.600	75.300	75.300
44	6450	150	150	150	1.701	255.150	127.575	127.575
45	6600	150	150	150	0.000	0.000	0.000	0.000
46	6750	150	150	150	0.000	0.000	0.000	0.000
47	6900	150	150	150	0.805	120.750	60.375	60.375
48	7050	150	150	150	1.981	297.150	148.575	148.575
49	7200	150	150	150	1.944	291.600	145.800	145.800
50	7350	150	150	150	2.214	332.100	166.050	166.050
51	7500	150	150	150	1.234	185.100	92.550	92.550
52	7650	150	150	150	0.839	125.850	62.925	62.925
53	7800	150	150	150	1.348	202.200	101.100	101.100
54	7950	150	150	150	1.526	228.900	114.450	114.450
55	8100	150	150	150	1.718	257.700	128.850	128.850

56	8250	150	150	150	2.964	444.600	222.300	222.300
57	8400	150	150	150	0.000	0.000	0.000	0.000
58	8550	150	150	150	0.000	0.000	0.000	0.000
59	8700	150	150	150	1.958	293.700	146.850	146.850
60	8850	150	150	150	2.098	314.700	157.350	157.350
61	9000	150	150	150	5.680	852.000	426.000	426.000
62	9150	150	150	150	0.110	16.500	8.250	8.250
63	9300	150	150	150	7.100	1065.000	532.500	532.500
64	9450	150	150	150	16.053	2407.950	1203.975	1203.975
65	9600	150	150	150	16.821	2523.150	1261.575	1261.575
66	9750	150	150	150	13.742	2061.300	1030.650	1030.650
67	9900	150	150	150	8.604	1290.600	645.300	645.300
68	10050	150	150	150	7.951	1192.650	596.325	596.325
69	10200	150	150	150	9.147	1372.050	686.025	686.025
70	10350	150	150	150	13.287	1993.050	996.525	996.525
71	10500	150	150	150	8.277	1241.550	620.775	620.775
72	10650	150	150	150	3.338	500.700	250.350	250.350
73	10800	150	150	150	7.302	1095.300	547.650	547.650
74	10950	150	150	150	7.976	1196.400	598.200	598.200
75	11100	150	150	150	4.425	663.750	331.875	331.875
76	11250	150	150	150	4.554	683.100	341.550	341.550
77	11400	150	150	150	3.827	574.050	287.025	287.025
78	11550	150	150	150	2.545	381.750	190.875	190.875
79	11700	150	150	150	0.000	0.000	0.000	0.000
80	11850	150	150	150	4.500	675.000	337.500	337.500
81	12000	150	150	150	2.146	321.900	160.950	160.950
82	12150	150	150	150	3.965	594.750	297.375	297.375
83	12300	150	150	150	6.353	952.950	476.475	476.475
84	12450	150	150	150	1.613	241.950	120.975	120.975
85	12600	150	150	150	2.620	393.000	196.500	196.500
86	12750	150	150	150	3.355	503.250	251.625	251.625
87	12900	150	150	150	2.930	439.500	219.750	219.750
88	13050	150	150	150	2.929	439.350	219.675	219.675
89	13200	150	150	150	5.468	820.200	410.100	410.100
90	13350	150	150	150	6.665	999.750	499.875	499.875
91	13500	150	150	150	14.007	2101.050	1050.525	1050.525
92	13650	150	150	150	44.744	6711.600	3355.800	3355.800
93	13800	150	150	150	9.501	1425.150	712.575	712.575
94	13950	150	150	150	17.148	2572.200	1286.100	1286.100
95	14100	150	150	150	4.023	603.450	301.725	301.725
96	14250	150	150	150	7.018	1052.700	526.350	526.350
97	14400	150	150	150	5.678	851.700	425.850	425.850
98	14550	150	150	150	5.866	879.900	439.950	439.950
99	14700	150	150	150	8.334	1250.100	625.050	625.050
100	14850	150	150	150	10.028	1504.200	752.100	752.100
101	15000	150	150	150	34.889	5233.350	2616.675	2616.675

6	0.000	0.00	0.00	
7	0.514	0.00	0.51	Channel intersection
8	0.696	0.00	0.70	Sharp bend
9	32.100	0.00	32.10	Do
10	0.000	0.00	0.00	Do
11	0.000	0.00	0.00	
12	11.100	0.00	11.10	
13	60.225	0.00	60.23	
14	0.000	0.00	0.00	
15	89.925	0.00	89.93	
16	70.875	0.00	70.88	
17	69.750	0.00	69.75	
18	38.550	0.00	38.55	
Total			529.51	
Deduct the volume of sand in prohibited area				
7	0.514	0.00	0.51	Chanal intersection
8	0.696	0.00	0.70	Sharp bend
9	32.100	0.00	32.10	Do
10	0.000	0.00	0.00	Do
	Total deduction		33.31	
Net volume of sand			497.00	
Peringalam				
PF. No.	Volume of sand in RB	Volume of sand in LB	Total Volume	Remarks
19	67.500	0.00	67.50	Near Temple
20	14.775	0.00	14.78	Do
21	74.850	0.00	74.85	
22	93.675	0.00	93.68	
23	0.000	0.00	0.00	
24	28.125	0.00	28.13	
25	0.000	0.00	0.00	
26	0.000	0.00	0.00	Near road and Retaing wall
27	0.000	0.00	0.00	Do
28	0.000	0.00	0.00	Near Chovva bypass bridge
29	0.000	0.00	0.00	Do
30	64.125	0.00	64.13	Do
31	50.325	0.00	50.33	Do
Total			393.38	
Deduct the volume of sand in prohibited area				

26	0.000	0.00	0.00	Near road and Retaing wall
27	0.000	0.00	0.00	Do
28	0.000	0.00	0.00	Near Chovva bypass bridge
29	0.000	0.00	0.00	Do
30	64.125	0.00	64.13	Do
31	50.325	0.00	50.33	Do
	Total deduction		114.45	
	Net volume of sand		279.00	
Kariyad				
PF. No.	Volume of sand in RB	Volume of sand in LB	Total Volume	Remarks
32	218.70	0.00	218.70	Near Chovva bypass bridge
33	66.53	0.00	66.53	Do
34	89.63	0.00	89.63	Do
35	59.48	0.00	59.48	
36	102.23	0.00	102.23	
37	49.73	0.00	49.73	
38	0.00	0.00	0.00	
39	0.00	0.00	0.00	
40	0.00	0.00	0.00	
41	25.43	0.00	25.43	
42	42.83	0.00	42.83	
43	75.30	0.00	75.30	
44	127.58	0.00	127.58	
45	0.00	0.00	0.00	
46	0.00	0.00	0.00	
47	60.38	0.00	60.38	
48	148.58	0.00	148.58	
49	145.80	0.00	145.80	
50	166.05	0.00	166.05	
51	92.55	0.00	92.55	
52	62.93	0.00	62.93	
53	101.10	0.00	101.10	
54	114.45	0.00	114.45	
55	128.85	0.00	128.85	
56	222.30	0.00	222.30	
57	0.00	0.00	0.00	
58	0.00	0.00	0.00	
59	146.85	0.00	146.85	
60	157.35	0.00	157.35	
61	426.00	0.00	426.00	Intersection of canal
62	8.25	0.00	8.25	Do

63	532.50	0.00	532.50	Do
64	1203.98	0.00	1203.98	
65	1261.58	0.00	1261.58	
66	1030.65	0.00	1030.65	
67	645.30	0.00	645.30	
68	596.33	0.00	596.33	
69	686.03	0.00	686.03	
70	996.53	0.00	996.53	
71	620.78	0.00	620.78	
72	250.35	0.00	250.35	
73	547.65	0.00	547.65	
74	598.20	0.00	598.20	
75	331.88	0.00	331.88	
76	341.55	0.00	341.55	
77	287.03	0.00	287.03	
78	190.88	0.00	190.88	Near Kunnummakara bridge
79	0.00	0.00	0.00	Do
80	337.50	0.00	337.50	Do
81	160.95	0.00	160.95	Do
82	297.38	0.00	297.38	Do
83	476.48	0.00	476.48	Do
84	120.98	0.00	120.98	Do
85	196.50	0.00	196.50	
86	251.63	0.00	251.63	
87	219.75	0.00	219.75	
88	219.68	0.00	219.68	
89	410.10	0.00	410.10	
90	499.88	0.00	499.88	
91	1050.53	0.00	1050.53	
92	3355.80	0.00	3355.80	
93	712.58	0.00	712.58	
94	1286.10	0.00	1286.10	Intersection of canal
95	301.73	0.00	301.73	Do
96	526.35	0.00	526.35	Do
97	425.85	0.00	425.85	
98	439.95	0.00	439.95	
99	625.05	0.00	625.05	
100	752.10	0.00	752.10	
101	2616.68	0.00	2616.68	
102	2230.95	0.00	2230.95	
103	2880.75	0.00	2880.75	
104	3678.23	0.00	3678.23	Near Monthal Bridge
105	3374.18	0.00	3374.18	Do
106	2810.40	0.00	2810.40	Do
Total			43218.00	

Deduct the volume of sand in prohibited area				
32	218.70	0.00	218.70	Near Chovva bypass bridge
33	66.53	0.00	66.53	Do
34	89.63	0.00	89.63	Do
61	426.00	0.00	426.00	Intersection of canal
62	8.25	0.00	8.25	Do
63	532.50	0.00	532.50	Do
78	190.88	0.00	190.88	Near Kunnummakara bridge
79	0.00	0.00	0.00	Do
80	337.50	0.00	337.50	Do
81	160.95	0.00	160.95	Do
82	297.38	0.00	297.38	Do
83	476.48	0.00	476.48	Do
84	120.98	0.00	120.98	Do
94	1286.10	0.00	1286.10	Intersection of canal
95	301.73	0.00	301.73	Do
96	526.35	0.00	526.35	Do
104	3678.23	0.00	3678.23	Near Monthal Bridge
105	3374.18	0.00	3374.18	Do
106	2810.40	0.00	2810.40	Do
	Total deduction		14902.73	
	Net volume of sand		28315.00	

Chokli				
PF. No.	Volume of sand in RB	Volume of sand in LB	Total Volume	Remarks
107	4041.00	0.00	4041.00	Near Monthal bridge
108	6223.88	0.00	6223.88	Do
109	7064.25	0.00	7064.25	Do
110	8269.50	0.00	8269.50	
111	7078.43	0.00	7078.43	
112	6011.18	0.00	6011.18	
113	1713.83	0.00	1713.83	
114	1875.60	0.00	1875.60	
115	1432.80	0.00	1432.80	
116	817.73	0.00	817.73	
117	1044.60	0.00	1044.60	
118	1215.60	0.00	1215.60	
119	1524.60	0.00	1524.60	

Total			48312.98	
Deduct the volume of sand in prohibited area				
107	4041.00	0.00	4041.00	Near Monthal bridge
108	6223.88	0.00	6223.88	Do
109	7064.25	0.00	7064.25	Do
	Total deduction		17329.13	
	Net volume of sand		31584.00	
New Mahe				
PF. No.	Volume of sand in RB	Volume of sand in LB	Total Volume	Remarks
120	893.70	0.00	893.70	Near Mahe railway bridge
121	1776.75	0.00	1776.75	Do
122	203.33	0.00	203.33	Do
123	1390.65	0.00	1390.65	Do
124	674.18	0.00	674.18	Do
125	250.05	0.00	250.05	Do
126	382.58	0.00	382.58	Do
127	342.53	0.00	342.53	
128	1803.90	0.00	1803.90	
129	2493.68	0.00	2493.68	
130	4316.48	0.00	4316.48	
131	2331.15	0.00	2331.15	Near Mahe road bridge
132	802.73	0.00	802.73	Do
133	0.00	0.00	0.00	Do
Total			17661.68	
Deduct the volume of sand in prohibited area				
120	893.70	0.00	893.70	Near Mahe railway bridge
121	1776.75	0.00	1776.75	Do
122	203.33	0.00	203.33	Do
123	1390.65	0.00	1390.65	Do
124	674.18	0.00	674.18	Do
125	250.05	0.00	250.05	Do
126	382.58	0.00	382.58	Do
131	2331.15	0.00	2331.15	Near Mahe road bridge
132	802.73	0.00	802.73	Do
133	0.00	0.00	0.00	Do
	Total deduction		8705.10	
	Net volume of sand		8957.00	

Mahe River Volume of sand for mining in Panchayat wise						
Sl.No.	Name of Local Body or Village	Stretch in Km.	Volume of sand deposit in m ³	Volume prohibited for mining	Net volume in m ³	No. of Lorry loads
1	Thripanangattur Panchayat (RB)	2.70 Km.	530.00	33.00	497.00	142.00
2	Peringalam Panchayat (RB)	1.80 Km.	393.00	114.00	279.00	80.00
3	Kariyad Panchayat (RB)	11.20 Km.	43218.00	14903.00	28315.00	8090.00
4	Chokli Panchayat (RB)	2.00 Km.	48313.00	17329.00	31584.00	9024.00
5	New Mahe (RB)	2.10 Km.	17662.00	8705.00	8957.00	2559.00
	Total	19.80 Km.	110116.00	41084.00	69632.00	19895.00
	Left Bank (LB) full Kozhikode District					
	Unit weight of river sand 2250 Kg/m ³					
	One lorry load is referred as 8 Tonnes					
	Sand Volume of on lorry load is 3.50 m ³					

5.5 Kuppam River:

- The Kuppam River is flowing from the Western Ghats to the Sea. The survey works started from the 1.00 Km before Chapparapadavu Bridge to Kuppam Bridge, total 18.09 Km. length.
- Width of the river is varying from 56.00 m to 212.00 m. and the maximum depth recorded is 7.41 m at PF-113, Mukkunn.
- The river is passing through 2 panchayats and one municipality (Chapparapadave panchayat and Pariyaram panchayat on left and right banks, the Thalipparambe Municipality is on left bank.)
- Total 3 bridges are crossing this river (Shangakiri railway bridge, Thottamkadavu road bridge and Perumpa bridge)
- Total 122 profiles (cross sections) has been taken at a distance of maximum 150 m according to the width of the river. The profiles are marked on the longitudinal section.
- The bench mark from the top of the Kuppam bridge has transferred to the permanent structures available on the bank of the river for further reference.

- All the permanent structures such as bridges, kadaves, temple, Panchayath well etc are marked on the longitudinal section.

Kuppam River Sand volume calculation sheet								
PF NO	Chainage	Avarage distance before (L1)	Avarage distance after (L2)	Zone of influence L= L1+L2 /2 m	Area of cross section (m2)	Volume of sand (m3) V	Volume of sand for RB Panchayat V/2 m3	Volume of sand for LB Panchayat V/2 m3
1	0	0	150	75	0.000	0.000	0.000	0.000
2	150	150	150	150	0.000	0.000	0.000	0.000
3	300	150	150	150	0.000	0.000	0.000	0.000
4	450	150	150	150	0.000	0.000	0.000	0.000
5	600	150	150	150	0.000	0.000	0.000	0.000
6	750	150	150	150	0.000	0.000	0.000	0.000
7	900	150	150	150	0.000	0.000	0.000	0.000
8	1050	150	150	150	0.000	0.000	0.000	0.000
9	1200	150	150	150	0.000	0.000	0.000	0.000
10	1350	150	150	150	0.000	0.000	0.000	0.000
11	1500	150	150	150	0.000	0.000	0.000	0.000
12	1650	150	150	150	0.000	0.000	0.000	0.000
13	1800	150	150	150	0.000	0.000	0.000	0.000
14	1950	150	150	150	0.000	0.000	0.000	0.000
15	2100	150	150	150	0.000	0.000	0.000	0.000
16	2250	150	150	150	0.000	0.000	0.000	0.000
17	2400	150	150	150	0.000	0.000	0.000	0.000
18	2550	150	150	150	0.000	0.000	0.000	0.000
19	2750	150	150	150	0.000	0.000	0.000	0.000
20	2850	150	150	150	0.000	0.000	0.000	0.000
21	3000	150	150	150	0.000	0.000	0.000	0.000
22	3150	150	150	150	0.000	0.000	0.000	0.000
23	3300	150	150	150	0.000	0.000	0.000	0.000
24	3450	150	150	150	0.000	0.000	0.000	0.000
25	3600	150	150	150	3.949	592.350	296.175	296.175
26	3750	150	150	150	0.607	91.050	45.525	45.525
27	3900	150	150	150	0.751	112.650	56.325	56.325
28	4050	150	150	150	0.777	116.550	58.275	58.275
29	4200	150	150	150	1.437	215.550	107.775	107.775
30	4350	150	150	150	0.000	0.000	0.000	0.000
31	4500	150	150	150	0.000	0.000	0.000	0.000
32	4650	150	150	150	0.000	0.000	0.000	0.000
33	4800	150	150	150	1.804	270.600	135.300	135.300
34	4950	150	150	150	2.515	377.250	188.625	188.625
35	5100	150	150	150	2.609	391.350	195.675	195.675
36	5250	150	150	150	3.003	450.450	225.225	225.225

37	5400	150	150	150	1.271	190.650	95.325	95.325
38	5550	150	150	150	2.829	424.350	212.175	212.175
39	5700	150	150	150	3.752	562.800	281.400	281.400
40	5850	150	150	150	3.106	465.900	232.950	232.950
41	6000	150	150	150	2.217	332.550	166.275	166.275
42	6150	150	150	150	0.376	56.400	28.200	28.200
43	6300	150	150	150	1.457	218.550	109.275	109.275
44	6450	150	150	150	1.538	230.700	115.350	115.350
45	6600	150	150	150	1.287	193.050	96.525	96.525
46	6750	150	150	150	3.159	473.850	236.925	236.925
47	6900	150	150	150	4.985	747.750	373.875	373.875
48	7050	150	150	150	5.005	750.750	375.375	375.375
49	7200	150	150	150	2.567	385.050	192.525	192.525
50	7350	150	150	150	1.186	177.900	88.950	88.950
51	7500	150	150	150	0.884	132.600	66.300	66.300
52	7650	150	150	150	2.199	329.850	164.925	164.925
53	7800	150	150	150	0.166	24.900	12.450	12.450
54	7950	150	150	150	0.000	0.000	0.000	0.000
55	8100	150	150	150	0.000	0.000	0.000	0.000
56	8250	150	150	150	0.000	0.000	0.000	0.000
57	8400	150	150	150	1.576	236.400	118.200	118.200
58	8550	150	150	150	1.350	202.500	101.250	101.250
59	8700	150	150	150	1.503	225.450	112.725	112.725
60	8850	150	150	150	1.542	231.300	115.650	115.650
61	9000	150	150	150	0.957	143.550	71.775	71.775
62	9150	150	150	150	0.792	118.800	59.400	59.400
63	9300	150	150	150	1.122	168.300	84.150	84.150
64	9450	150	150	150	1.461	219.150	109.575	109.575
65	9600	150	150	150	0.000	0.000	0.000	0.000
66	9750	150	150	150	1.007	151.050	75.525	75.525
67	9900	150	150	150	0.385	57.750	28.875	28.875
68	10050	150	150	150	0.398	59.700	29.850	29.850
69	10200	150	150	150	0.392	58.800	29.400	29.400
70	10350	150	150	150	1.863	279.450	139.725	139.725
71	10500	150	150	150	0.341	51.150	25.575	25.575
72	10650	150	150	150	0.000	0.000	0.000	0.000
73	10800	150	150	150	0.000	0.000	0.000	0.000
74	10950	150	150	150	0.000	0.000	0.000	0.000
75	11100	150	150	150	0.000	0.000	0.000	0.000
76	11250	150	150	150	0.000	0.000	0.000	0.000
77	11400	150	150	150	0.000	0.000	0.000	0.000
78	11550	150	150	150	0.000	0.000	0.000	0.000
79	11700	150	150	150	0.000	0.000	0.000	0.000
80	11850	150	150	150	0.000	0.000	0.000	0.000
81	12000	150	150	150	0.000	0.000	0.000	0.000
82	12150	150	150	150	0.315	47.250	23.625	23.625

83	12300	150	150	150	1.149	172.350	86.175	86.175
84	12450	150	150	150	0.000	0.000	0.000	0.000
85	12600	150	150	150	0.000	0.000	0.000	0.000
86	12750	150	150	150	0.000	0.000	0.000	0.000
87	12900	150	150	150	0.000	0.000	0.000	0.000
88	13050	150	150	150	0.000	0.000	0.000	0.000
89	13200	150	150	150	0.000	0.000	0.000	0.000
90	13350	150	150	150	0.000	0.000	0.000	0.000
91	13500	150	150	150	0.000	0.000	0.000	0.000
92	13650	150	150	150	0.000	0.000	0.000	0.000
93	13800	150	150	150	0.000	0.000	0.000	0.000
94	13950	150	150	150	0.000	0.000	0.000	0.000
95	14100	150	150	150	0.000	0.000	0.000	0.000
96	14250	150	150	150	0.000	0.000	0.000	0.000
97	14400	150	150	150	0.000	0.000	0.000	0.000
98	14550	150	150	150	0.000	0.000	0.000	0.000
99	14700	150	150	150	0.000	0.000	0.000	0.000
100	14850	150	150	150	2.108	316.200	158.100	158.100
101	15000	150	150	150	21.624	3243.600	1621.800	1621.800
102	15150	150	150	150	16.149	2422.350	1211.175	1211.175
103	15300	150	150	150	10.485	1572.750	786.375	786.375
104	15450	150	150	150	5.827	874.050	437.025	437.025
105	15600	150	150	150	9.225	1383.750	691.875	691.875
106	15750	150	150	150	15.047	2257.050	1128.525	1128.525
107	15900	150	150	150	9.397	1409.550	704.775	704.775
108	16050	150	150	150	3.519	527.850	263.925	263.925
109	16200	150	150	150	0.000	0.000	0.000	0.000
110	16350	150	150	150	0.000	0.000	0.000	0.000
111	16500	150	150	150	0.000	0.000	0.000	0.000
112	16650	150	150	150	0.000	0.000	0.000	0.000
113	16800	150	150	150	0.000	0.000	0.000	0.000
114	16950	150	150	150	0.000	0.000	0.000	0.000
115	17100	150	150	150	0.000	0.000	0.000	0.000
116	17250	150	150	150	0.000	0.000	0.000	0.000
117	17400	150	150	150	0.511	76.650	38.325	38.325
118	17550	150	150	150	1.210	181.500	90.750	90.750
119	17700	150	150	150	9.875	1481.250	740.625	740.625
120	17850	150	150	150	5.621	843.150	421.575	421.575
121	18000	150	150	150	1.411	211.650	105.825	105.825
122	18087.577	150	0	75	0.100	7.500	3.750	3.750
TOTAL						27547.200	13773.600	13773.600

Kuppam River Sand Volume Calculation Sheet in Panchayat wise				
Chapparapadave Panchayat				
PF. No.	Volume of sand in RB	Volume of sand in LB	Total Volume	Remarks
1	0.00	0.00	0.00	
2	0.00	0.00	0.00	
3	0.00	0.00	0.00	
4	0.00	0.00	0.00	
5	0.00	0.00	0.00	
6	0.00	0.00	0.00	Near Chaparapadave bridge
7	0.00	0.00	0.00	Do
8	0.00	0.00	0.00	Do
9	0.00	0.00	0.00	Do
10	0.00	0.00	0.00	Do
11	0.00	0.00	0.00	Do
12	0.00	0.00	0.00	
13	0.00	0.00	0.00	
14	0.00	0.00	0.00	
15	0.00	0.00	0.00	
16	0.00	0.00	0.00	
17	0.00	0.00	0.00	
18	0.00	0.00	0.00	
19	0.00	0.00	0.00	
20	0.00	0.00	0.00	Near Kooverithod palam
21	0.00	0.00	0.00	Do
22	0.00	0.00	0.00	Do
23	0.00	0.00	0.00	Do
24	0.00	0.00	0.00	Do
25	296.18	296.18	592.35	Do
26	45.53	45.53	91.05	
27	56.33	56.33	112.65	
28	58.28	58.28	116.55	
29	107.78	107.78	215.55	
30	0.00	0.00	0.00	
31	0.00	0.00	0.00	
32	0.00	0.00	0.00	
33	135.30	135.30	270.60	
34	188.63	188.63	377.25	
35	195.68	195.68	391.35	
36	225.23	225.23	450.45	
37	95.33	95.33	190.65	
38	212.18	212.18	424.35	
39	281.40	281.40	562.80	

40	232.95	232.95	465.90	
41	166.28	166.28	332.55	
42	28.20	28.20	56.40	
43	109.28	109.28	218.55	
44	115.35	115.35	230.70	
45	96.53	96.53	193.05	
46	236.93	236.93	473.85	
47	373.88	373.88	747.75	
48	375.38	375.38	750.75	
49	192.53	192.53	385.05	
50	88.95	88.95	177.90	
51	66.30	66.30	132.60	
52	164.93	164.93	329.85	
53	12.45	12.45	24.90	
54	0.00	0.00	0.00	
55	0.00	0.00	0.00	
	Total		8315.40	
Deduct the volume of sand in prohibited area				
6	0.00	0.00	0.00	Near Chaparapadave bridge
7	0.00	0.00	0.00	Do
8	0.00	0.00	0.00	Do
9	0.00	0.00	0.00	Do
10	0.00	0.00	0.00	Do
11	0.00	0.00	0.00	Do
20	0.00	0.00	0.00	Near Kooverithod palam
21	0.00	0.00	0.00	Do
22	0.00	0.00	0.00	Do
23	0.00	0.00	0.00	Do
24	0.00	0.00	0.00	Do
25	296.18	296.18	592.35	Do
	Total deduction		592.35	
	Net volume		7723.00	
Pariyaram Panchayat				
PF. No.	Volume of sand in RB	Volume of sand in LB	Total Volume	Remarks
56	0.00	0.00	0.00	
57	118.20	118.20	236.40	
58	101.25	101.25	202.50	
59	112.73	112.73	225.45	
60	115.65	115.65	231.30	

61	71.78	71.78	143.55	
62	59.40	59.40	118.80	
63	84.15	84.15	168.30	
64	109.58	109.58	219.15	
65	0.00	0.00	0.00	
66	75.53	75.53	151.05	
67	28.88	28.88	57.75	
68	29.85	29.85	59.70	
69	29.40	29.40	58.80	
70	139.73	139.73	279.45	
71	25.58	25.58	51.15	
72	0.00	0.00	0.00	
73	0.00	0.00	0.00	
74	0.00	0.00	0.00	
75	0.00	0.00	0.00	
76	0.00	0.00	0.00	Near Temple kadave
77	0.00	0.00	0.00	Do
78	0.00	0.00	0.00	Do
79	0.00	0.00	0.00	Do
80	0.00	0.00	0.00	
81	0.00	0.00	0.00	
82	23.63	23.63	47.25	
83	86.18	86.18	172.35	
84	0.00	0.00	0.00	
85	0.00	0.00	0.00	
86	0.00	0.00	0.00	
87	0.00	0.00	0.00	
88	0.00	0.00	0.00	
89	0.00	0.00	0.00	
90	0.00	0.00	0.00	
91	0.00	0.00	0.00	Near Bridge under construction
92	0.00	0.00	0.00	Do
93	0.00	0.00	0.00	Do
94	0.00	0.00	0.00	Do
95	0.00	0.00	0.00	Do
96	0.00	0.00	0.00	Do
97	0.00	0.00	0.00	
98	0.00	0.00	0.00	
99	0.00	0.00	0.00	
100	158.10	158.10	316.20	
101	1621.80	1621.80	3243.60	
102	1211.18	1211.18	2422.35	
103	786.38	786.38	1572.75	
104	437.03	437.03	874.05	
105	691.88	691.88	1383.75	
106	1128.53	1128.53	2257.05	

107	704.78	704.78	1409.55	
108	263.93	263.93	527.85	
109	0.00	0.00	0.00	
110	0.00	0.00	0.00	
111	0.00	0.00	0.00	
112	0.00	0.00	0.00	
113	0.00	0.00	0.00	
114	0.00	0.00	0.00	
115	0.00	0.00	0.00	
116	0.00	0.00	0.00	
117	38.33	0.00	38.33	
118	90.75	0.00	90.75	
119	740.63	0.00	740.63	Near Kuppam bridge
120	421.58	0.00	421.58	Do
121	105.83	0.00	105.83	Do
122	3.75	0.00	3.75	Do
			17830.95	
Deduct the volume of sand in prohibited area				
76	0.00	0.00	0.00	Near Temple kadave
77	0.00	0.00	0.00	Do
78	0.00	0.00	0.00	Do
79	0.00	0.00	0.00	Do
91	0.00	0.00	0.00	Near Bridge under construction
92	0.00	0.00	0.00	Do
93	0.00	0.00	0.00	Do
94	0.00	0.00	0.00	Do
95	0.00	0.00	0.00	Do
96	0.00	0.00	0.00	Do
119	740.63	0.00	740.63	Near Kuppam bridge
120	421.58	0.00	421.58	Do
121	105.83	0.00	105.83	Do
122	3.75	0.00	3.75	Do
	Total deduction		1271.78	
	Net volume		16559.00	
Thaliparambe Municipality				
PF. No.	Volume of sand in RB	Volume of sand in LB	Total Volume	Remarks
113	0.00	0.00	0.00	
114	0.00	0.00	0.00	
115	0.00	0.00	0.00	
116	0.00	0.00	0.00	

117	0.00	38.33	38.33	
118	0.00	90.75	90.75	
119	0.00	740.63	740.63	Near Kuppam bridge
120	0.00	421.58	421.58	Do
121	0.00	105.83	105.83	Do
122	0.00	3.75	3.75	Do
	Total		1397.10	
Deduct the volume of sand in prohibited area				
119	0.00	740.63	740.63	Near Kuppam bridge
120	0.00	421.58	421.58	Do
121	0.00	105.83	105.83	Do
122	0.00	3.75	3.75	Do
	Total deduction		1271.78	
	Net volume		125.00	

Kuppam River Volume of sand for mining in Panchayat wise						
Sl.No.	Name of Local Body or Village	Stretch in Km.	Volume of sand deposit in m ³	Volume prohibited for mining	Net volume in m ³	No. of Lorry loads
1	Chapparapadave Panchayat (LB & RB)	8.25 Km.	8315.00	592.00	7723.00	2206.00
2	Parriyaram Panchayat (LB & RB)	10.05 Km.	17831.00	1272.00	16559.00	4731.00
3	Thaliparambe Municipality (LB)	1.50 Km.	1397.00	1272.00	125.00	35.00
	Total	18.30 Km.	27543.00	3136.00	24407.00	6972.00

Unit weight of river sand 2250 Kg/m ³
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One lorry load is referred as 8 Tonnes
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Sand Volume of on lorry load is 3.50 m ³
