

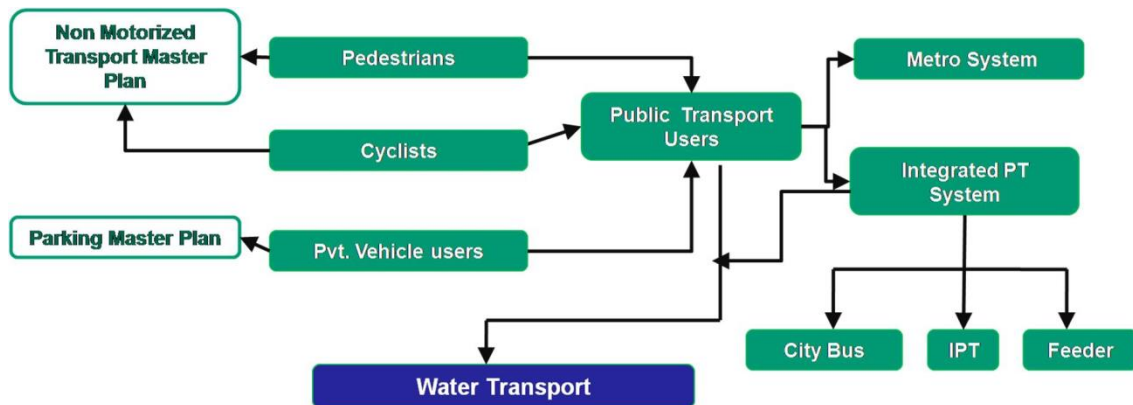
## PROJECT REPORT

### 1.0 GENERAL

Kochi Metro Rail Limited (KMRL) in line with the directives of the Ministry of Urban Development, Government of India has spearheaded the task of setting up an integrated transportation system for Kochi. Kochi Water Metro Project (KWMP) is envisaged for water connectivity, as per international standards and aims to integrate the system with other modes of transport including the metro system over a period of time.

### 2.0 KOCHI WATER METRO PROJECT

With the need for a sustainable water transport system, it is critical that the same is integrated with the other existing and proposed transportation systems in the city region to make it effective. As shown in Figure-1, Water Metro system, metro system (under implementation), integrated public transport system (road based) and non-motorised transport plan are part of a Unified Metropolitan Transportation Network.



**Figure-1: Integrated Metropolitan Transportation System for Kochi**

KWMP sector is an investment-sensitive sector. The total cost constitutes cost of the vessels, fuel costs, crew salaries and maintenance costs. In order to keep the ferry services, assured patronage from the general public is pre-requisite. With this in view, it is decided to introduce the identified 16 routes in phases over a period of 4 years between 2017-20, in two phases. 7 routes would be introduced in Phase I (2017-18) and additional 9 routes would be introduced in Phase II (2019-20). The Kochi City Region waterway comes under the National Waterways-3 as identified by Inland Waterways Authority of India (IWAI). The waterways and channel widths vary across the length and breadth of the city region. For the proposed routes of the water transportation system project, it is recommended to demarcate a dedicated

water transport corridor with minimum 20 m width along the identified routes, to the extent possible

### 3.0 PROJECT LOCATION

The project is located in Kochi and is targeted to expand connectivity between the mainland and the adjoining municipalities, island communities and Panchayat areas through waterways. The project location map is shown in Figure-2.

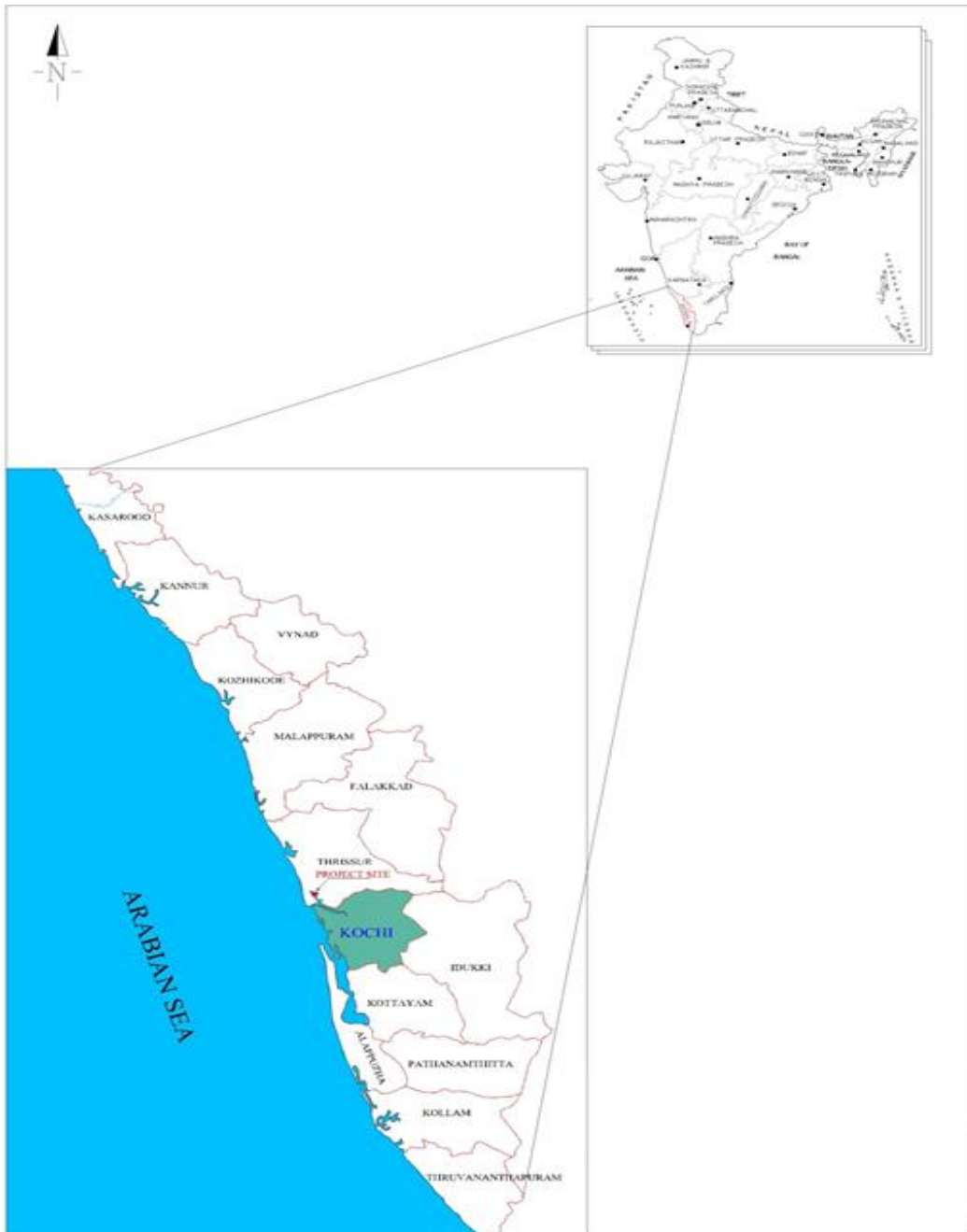


Figure-2: Project Location

#### 4.0 EXISTING FERRY SYSTEM IN KOCHI

This section discusses the various parameters of the currently operational water transport system such as their routes, deployment of boats and its integration with the other existing modes of transport.

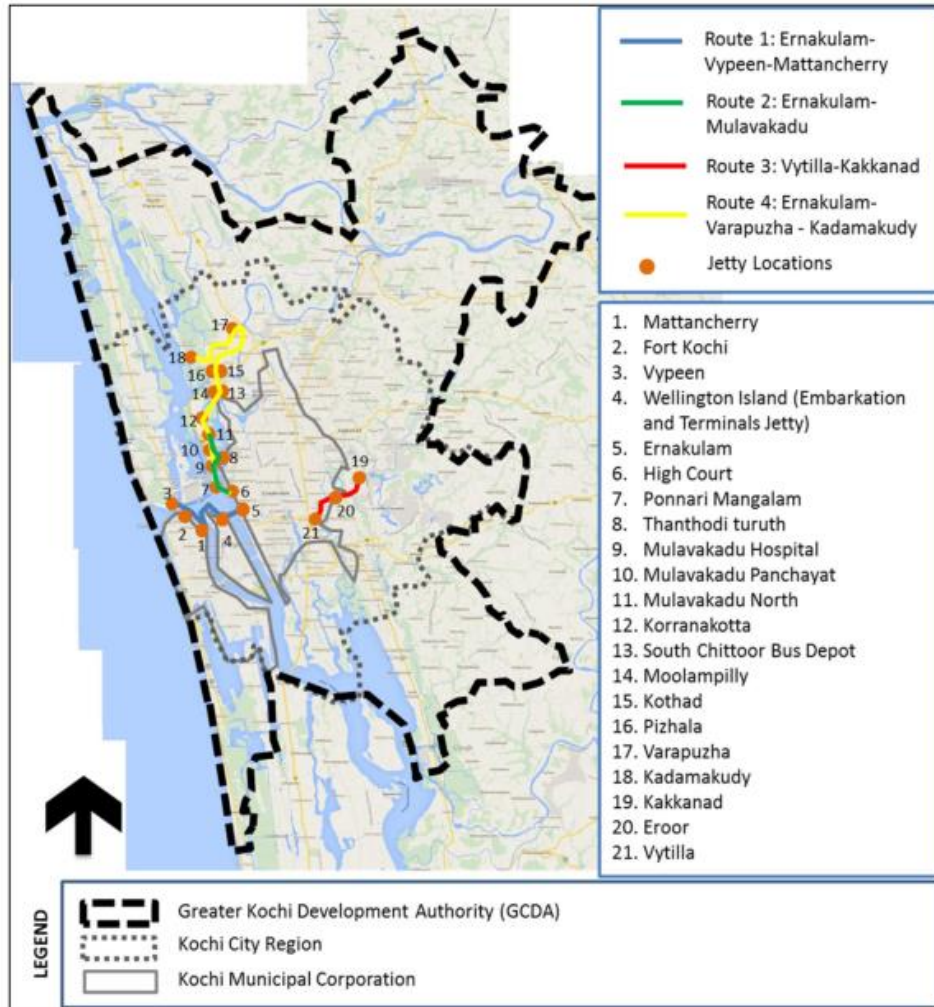
##### ***Ferry System Characteristics***

State Water Transport Department (SWTD), operates the water transport in Kochi. SWTD operates services from the following 10 jetties / ferry terminals;

- Ernakulam
- High Court
- Fort Kochi
- Mattancherry
- Embarkation (Willingdon Island)
- Vypeen
- Mulavukadu
- Vytilla
- Eloor
- Kakkanad

The boats/ferries operated by the SWTD, private operators, Tourism Department and KSINC act as a principal link between the mainland and the islands. Majority of these boats are old and in a dilapidated state, due to which the water transport system is losing out on competing with the other road based motorized modes in the city. SWTD operates currently only 9 boats in the area.

Private boats operate in the area, but these do not have a fixed schedule for operation. There were once 60 operational jetties connecting island communities with the mainland, however only a few of those jetties are operational today. According to State Water Transport Department, currently there are 4 operational routes connecting the 21 jetties which are operational. Figure-3 represents the operational routes and jetties in Kochi.



**Figure-3: Existing Operational Ferry Routes and Jetty Locations in Kochi**

As per data from the Kerala State Water Transport Department (KSWTD), the following four routes are operated between 21 operational jetties connecting the islands to the mainland.

1. Section 1 - Ernakulam–Mattancherry–Vypeen: There are two routes one, via Wellington Island and the other directly to Vypeen. The first route takes about 20 minutes, and operates between 6 am and 9 pm, with headway of 30 minutes. The second route takes about 15 minutes, and operates between 7 am and 9:30 pm, with headway of 30 minutes.
2. Section 2 - Ernakulam–Mulavakadu: Journey time of approximately 20 minutes, operating between 7am and 6pm, with headway of 30minutes.
3. Section 3 - Vytilla–Kakkanad: This route takes approximately 30 mins and operates between 7 am and 6 pm, with headway of 1 hour.
4. Section 4 - Ernakulam–Varapuzha–Kadamakudy: This journey takes up

approximately 1 hour to complete and has 6 services between 7 am and 7 pm.

### **Existing Jetty Infrastructure**

There is limited infrastructure available at the existing boat jetty locations. Based on ground survey with the stake holders, only Ernakulam Main Jetty, High Court Jetty, Fort Kochi and Vypeen Jetty were found to have relatively acceptable level of infrastructure. Of these, only Ernakulam and High Court Jetties are recently built with RCC structures. All other jetties, identified in the project have a simple concrete retaining wall as jetty with a dilapidated jetty shelter, which cannot house more than 6 people at a single time. The jetty areas are generally dark and not safe for public use in the evening. These jetty locations lack a proper transit supportive infrastructure, which has been cited as one of the reasons for decreasing use of boats as the access is not safe, convenient and appealing.

## **5.0 NEED OF THE INTERGRATED WATER TRANSPORT PROJECT**

Currently the State Water Transport Department is the main operator in the water transport system in Kochi besides the various private operators and localised jangar services. Ferry services are operational between Ernakulam mainland, Fort Kochi, Vypeen, Mattancherry, Embarkation, Bolghatty, Mulavukadu, High Court, Vytilla, Eloor and Kakkanad jetties. Other jetties such as Nettoor, Edakochi, Kumbhalam, Pizhala, Moolampilly, Thanthonithuruth etc are served by private ferry services and jangars. However, the system has been declining over the last few decades owing to depleting boat numbers, low quality of boats, lack of safety measures, lack of reliability and poor access infrastructure to the jetties. The system has seen minimal investment in the system and technology upgrade. If fast modern boats with regular time schedules are employed there shall be substantial increase in the passengers. Another untapped potential is the tourist traffic. The islands around Kochi are very scenic which can be developed as attractive tourist spots.

## **6.0 IMPLEMENTATION PLAN OF WATER TRANSPORT SYSTEM**

The proposed project recommends sixteen (16) identified routes connecting thirty eight (38) jetties across ten (10) island communities across a 76 km route network. The identified routes and jetties are as given in the table below and represented in the figure. Of the 38 jetties, eighteen (18) are proposed to be developed as major jetties or main boat hubs while the remaining twenty (20) jetties shall be developed as minor jetties for water transit services. Part of the identified 76 km and the areas

around the jetty locations shall require dredging in order to maintain a minimum desirable clearance.

The entire Inland Water Transport project is proposed to be realised over a period of four years between 2017 and 2020. Based on the demand, the identified 16 routes have been prioritised under Phase I and Phase II. The entire water transport system (with the identified 16 routes) is proposed to be fully operational by 2020. The identified routes for integrated transport system in Kochi is given in Table-1 and shown in Figure-4 and Figure-5 respectively. The activities in the various jetties proposed are given in Annexure-I.

**Table-1: Proposed Routes for Kochi Water Metro Project**

Route No.	Origin	Destination	Route Description (Tentative)
1	South Chittoor	Ernakulam	South Chittoor, Mulavukadu Panchayat, Poonarimangalam, Thanthoninthuruth
2	Edakochi	Thevara	Edakochi, Kumbhalam, Thevara
3	Ernakulam	Vypeen	Ernakulam, Embarkation Jetty, Fort Kochi, Vypeen
4	Ernakulam	Mattancherry	Ernakulam, Embarkation, Fort Kochi, Mattancherry
5	High Court	Mulavukadu	High Court, Bolgatty, Thanthoninthuruth, Poonarimangalam. Mulavukadu Panchayat, Mulavukadu Hospital, Korrunkota, Mulavukadu North
6	Vytilla	Kakkanad	Vytilla, Eroor, Kakkanad
7	Kumbhalam	Thevara	Kumbhalam, Nettoor, Thevara
8	Info Park	Edakochi	Info Park, Vytilla, Kakkanad, Thykoodam, Thevara, Kumbhalam, Edakochi
9	Mulavukadu	South Chittoor	Mulavukadu Panchayat, Moolampilly, Pizhala, Kothad, South Chittoor
10	Edakochi	Vypeen	Edakochi, Thoppumpady, Mattancherry, Fort Kochi Vypeen
11	South	Cheranalloor	South Chittoor, Moolampilly,

<b>Route No.</b>	<b>Origin</b>	<b>Destination</b>	<b>Route Description (Tentative)</b>
	Chittoor		Pizhala, Kothad, Chennur, Varapuzha, Eloor&Cheranallur
12	Elamkunn- apuzha	High Court	Elamkunnapuzha – Mulavukadu West, Bolgatty, High Court
13	Kadamakudy	Paliyamth- uruth	Kadamakkudy- PaliyamThuruth (Pizhala Island) - Korhad
14	Chennur	Thundath- umkadavu	Chennur North-Chariyam Thuruth North-ThundathumKadav.
15	Chariyamth- uruth	Chennur	ChariyamThuruth South- Pizhala Hospital - Chennur South
16	Kothad	Amrita Hospital	Kothad - Medicity Hospital-Amrita Hospital.



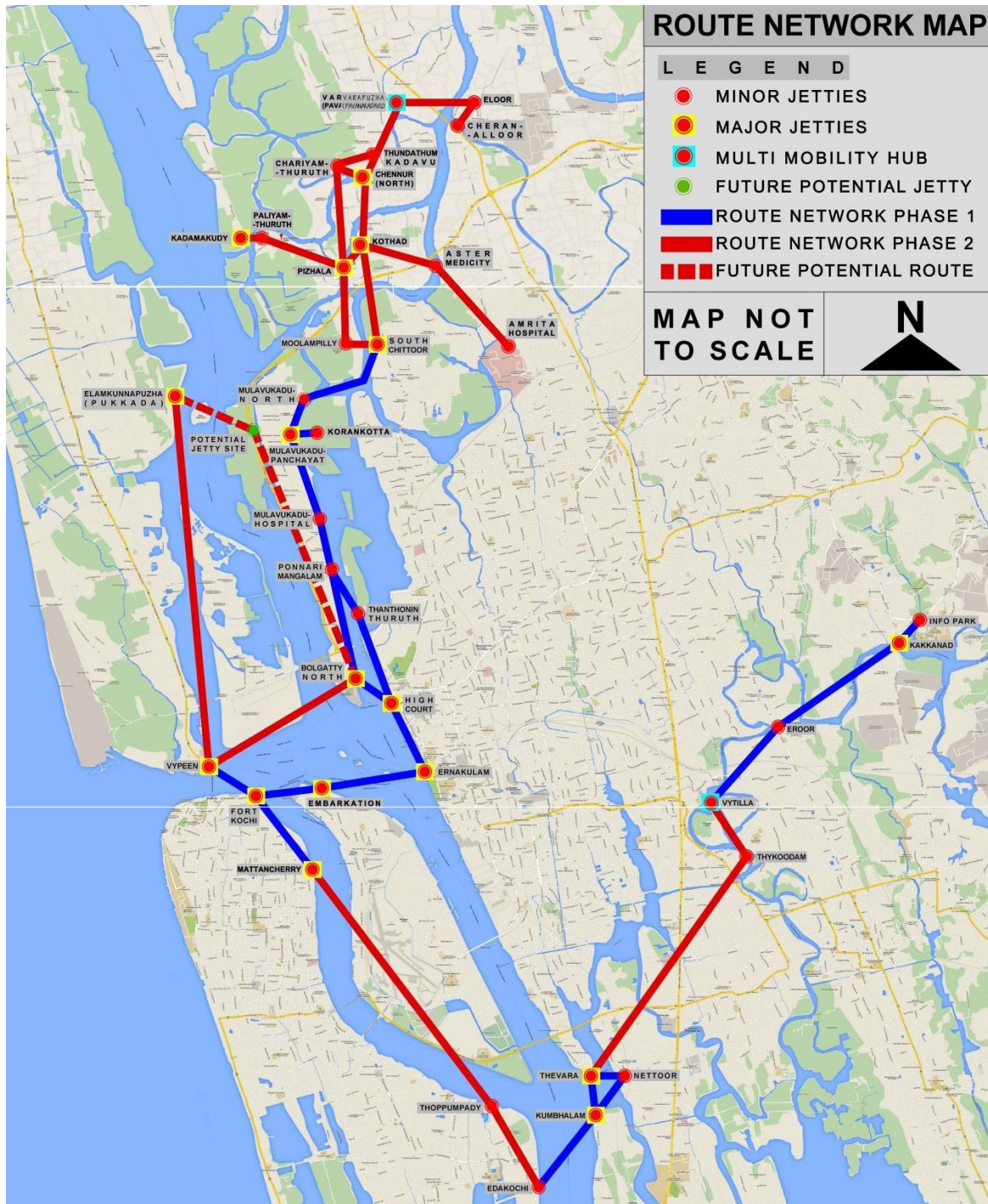
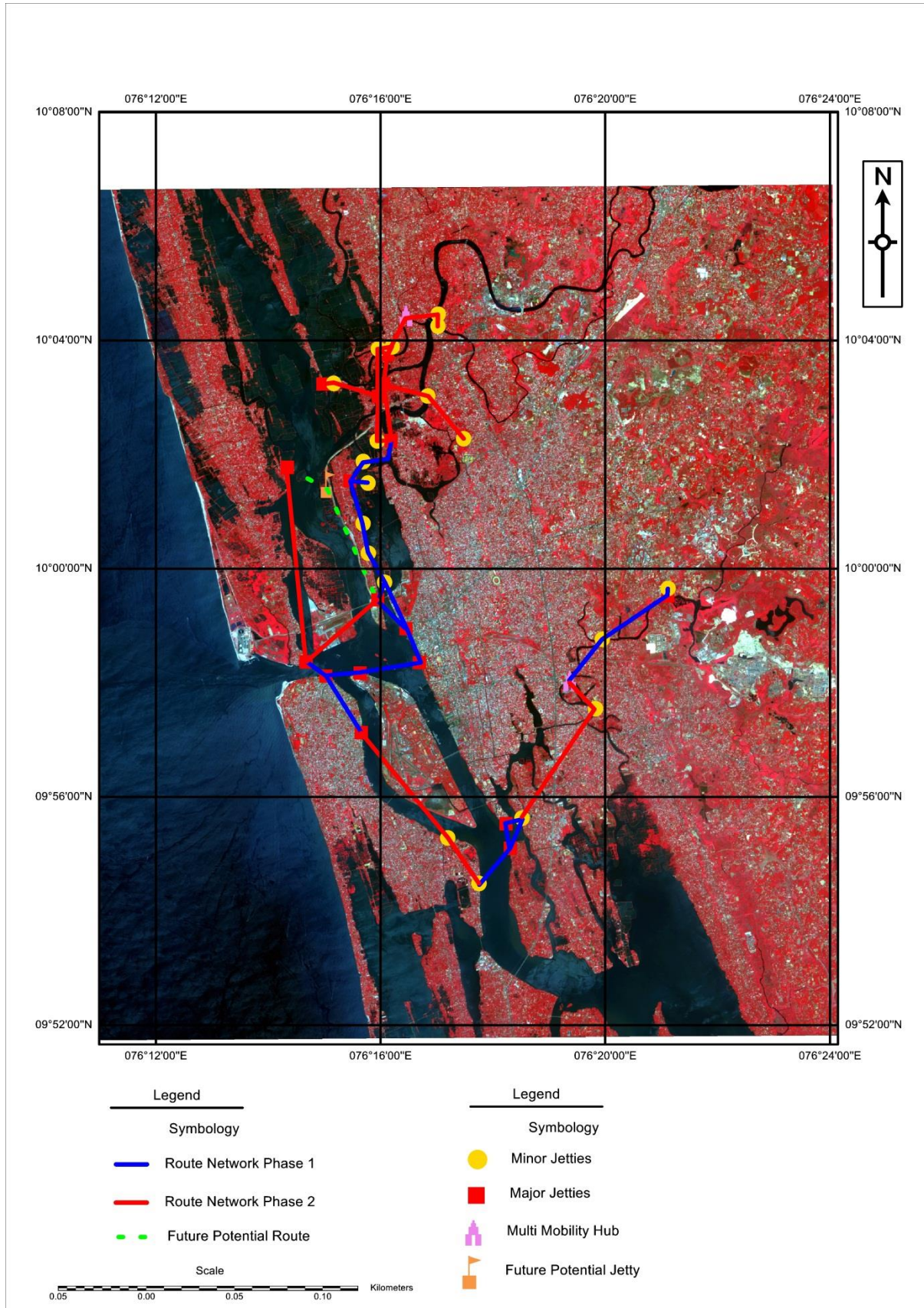


Figure-4: Proposed Routes for Kochi Water Metro Project





**Figure-5: Proposed Routes for Kochi Water Metro Project (Satellite Image)**

## **7.0 DREDGING OF WATERWAYS**

Almost all the boat channels identified for the Kochi Water Metro Project are current ferry routes and very little capital dredging is envisaged. The dredging shall be limited to maintenance dredging for removal of silt deposits. At present Inland Water Authority of India (IWAI) and Kerala Irrigation Department are handling the dredging maintaining to a depth of 1-2 ms. Proposed draft for the boats for KWMP is about 0.9 m and a channel depth of 1.5 ms would suffice for safe operation. Present dredging arrangements shall continue and KMRL also would take up dredging on a need basis to ensure uninterrupted ferry service.

## **8.0 INFRASTRUCTURE FACILITIES**

### **Jetty Stations or Piers**

The existing jetties are built of cement concrete and are in a dilapidated condition. The new and renovated jetties are proposed to be developed in a phased manner. The upgradation of piers is permissible under the CRZ regulation as applicable in Kochi.

### **Major and Minor Jetties or Piers**

It is tentatively proposed that 18 jetties would be developed as major jetties and the rest 20 as minor jetties. Of the 18 major jetties, 3 of the major jetties will be developed as part of the second phase, the three jetties being Elamkunnappuzha, Kadamakudy and Varapuzha. And the 7 minor jetties that shall be taken up as part of Phase II development are: Amrita Hospital, Chariyamthurutu, Cheranalloor, Eloor, Aster Medicity, Paliyamthuruth and Thundathukadavu.

### **Jetty Development**

The jetties are proposed to be developed as concrete piers and/or floating pontoons with automated mechanical docking of boats. The floating pontoons are proposed to accommodate a maximum of two boats at major jetties with a slot system with a spacing of 1.5 m. The major boat hubs are proposed to be developed as an integrated development on the lines of transit station development comprising of property development, improved non-motorised transport and feeder access to the boat jetty.

### **Boatyard / Depot**

The existing boatyard at Thevara is proposed to be upgraded and developed with all repair and maintenance infrastructure for periodic maintenance and upkeep of the

vessels. Since the maintenance of engines and spare parts shall be covered under the Warranties and Annual Maintenance Contracts, the periodic checks may be carried out at the Thevara Boatyard. The daily fitness checks of vessels shall be undertaken at the terminal docking points of the routes. In addition to this, a new boatyard is proposed at Pizhala.

### **Intelligent Transportation and Navigation System**

GPRS (4G) based Intelligent Navigation & Cruise control, GPS Tracking, Passenger Address and Information Systems, dedicated 2 way voice/data communication, on-board surveillance cameras, on-board multi SIM WiFi Hotspot is recommended for water transport project's ITS. A cellular communication (GPRS/LTE) based intelligent transportation and navigation system is recommended for implementation and integration of boat with other mode of transportation viz Metro Rail, Bus etc.

### **Global Positioning System (GPS)**

Major constituents of the GPS based tracking are

- i) GPS tracking device: The device fits into the boat and captures the GPS location information to a central server. GPS based navigation and cruise control shall be enabled and sent to the central control center.
- ii) GPS tracking server: The tracking server has three responsibilities: receiving data from the GPS tracking unit, securely storing it, and serving this information on demand to the user.
- iii) User Interface (UI): The UI determines how one will be able to access information, view vehicle data, and elicit important details from it. A mobile App, Web based interface is also recommended.

### **Passenger Information System (PIS)**

Passenger Information System (PIS) consists of Passengers Announcement System (PAS) and Passenger Information Display System (PIDS). The PAS and PIDS shall be coordinated automatically to provide real time passenger audio broadcast and visual information at each jetty/boat/Central Control center in a multi-lingual format. The PAS and PIDS shall respond to special interrupt messages and also enable any PAS/PIDS operator to send special announcement or emergency messages for passengers and staff from a central/local Control center. It shall automatically announce exact arrival information of train at boat jetties/ boat. Four major types of messages shall be provided by the PIDS/PAS as a minimum: Fixed digital recording,

Pre-formatted with data to be added, instantly recorded and Live Video/audio broadcast.

The PIDS shall be LED screen based display, which could display the time of day and other appropriate pre-determined, fixed, pre-formatted messages, route number, fares, arrival/departure, same for the next two boats from the jetty, destination/origin information and free-entry text messages regarding safety, boat delays and emergencies etc. The PIDS shall be provided with a suitable workstation with functionality of transmitting video files to the PIDS display screens for advertisement and commercial purposes.

The PIDS/PAS shall be capable of maintaining the required intelligibility at all times regardless of the changing environment including crowd density, temperature, humidity and noise level.

In addition, the PIS shall provide information on routes, schedules and fares on internet, Interactive Voice Response System (IVRS) and through SMS on mobile phones.

### **Master Clock**

The Master Clock shall have a GPS Antenna with mounting hardware, which shall be positioned in an unobstructed area to provide a clear line of sight to no less than four of the orbiting satellites. The GPS Receiver/Decoder Unit, located adjacent to the antenna, shall continuously collect the external time information for the Master Clock Subsystem. A master clock protocol converter to deliver time-of-day and date to display clocks shall be there.

### **CCTV inside boats and at jetties / Hubs**

CCTV system is required to be provided to ensure effective surveillance of an area as well as to create tamperproof video recording for post event analysis.

Video surveillance system shall be end to end IP Based with Full HDIP cameras.

The CCTV subsystem shall use IP surveillance to monitor and record video over an IP Network via the Local Area Network installed locally within each site and the FOTS installed line wide for inter-site communication.

Boat jetties, Hubs, Boats, parking, specifically identified theft prone areas and other property development complexes shall be covered by camera surveillance. Also IR illuminator at the pole/wall keeping in view the lighting conditions is also recommended.



### **Automatic Fare Collection System**

Automatic fare collection system – on-board Smart card /Ticketing Solutions will be provided by financial institution led consortium (Axis bank), which will be in line with the Kochi Metro Rail model. In addition, Automated Passenger Boarding and Alighting Count (Integrated Services Control Centre) is proposed to be in place.

### **Operation Control Centre**

A central control facility comprising of a LED based large video display is recommended for controlling the services. This shall act as a nerve centre of the entire system and associated services and shall provide the overall control and co-ordination of the system. It shall consist of all the necessary computing and communications hardware and software needed to fulfil this function.

### **CCTVs inside boats and at jetties / hubs**

For the purpose of safety and security, CCTV surveillance systems shall be installed in each of the boats and a tall appropriate locations in the minor as well major boat jetties. At the major boat jetties, these shall be appropriately installed so as to monitor the entire boat hub complex including the property development complex.

### **Non-Motorised Transport Plan**

Non-motorised transport includes walking and bicycling as modes of travel. Infrastructure with reference to the high percentage of these NMT trips in the city as well as the access trips to the jetties is inadequate and is therefore proposed to be upgraded with walkways and bicycle tracks etc. Covered walkways and footpaths are essentially to be developed to provide physical access to the jetties.

### **Disabled Friendly Access**

All access roads and intersections under this project are proposed to be designed keeping in mind the provision for easy and safe access of differently-abled users. Some of the provisions made are described as under;

#### **Tactile Paving – Guiding and warning tiles**

Tactile guidance blocks (Line-type) indicates a barrier free route for person with visual impairment. Care must be taken to ensure that there are no obstacles, along the route traversed by the guidance block. Also there should be clear headroom of atleast 2.1 m height above the tactile guidance block, free of protruding objects such as overhanging tree branches and signage, along the entire length of the walk.



### **Disabled Friendly Access – ramps**

It is essential that ramps at all jetties and access points be provided to enable access for all the physically disabled groups.

### **Public Bike Sharing / Rent-a-bicycle scheme**

As every transit trip is a multi-modal journey and everybody who rides transit is a pedestrian or cyclist on atleast one end of their trip. Currently share of cycle trips in Kochi is 1% of the total trips which is quite low. There are major gaps in bicycle accessibility and parking infrastructure. However, at jetty locations of Fort Kochi, Mattancherry and Kumbhalam significant bicycle usage as access mode was observed which indicates popularity of this mode.

### **Feeder Service Development**

38% of the access trips to the existing boat jetties are made by public transport and 53% by walk, with access trip distances upto as high as 5 km. These high access trip lengths are a deterrent to people from using water transport system. Furthermore, poor connectivity to the interiors of the islands through public transport is another reason for people shifting from water transport to bus based public transport.

In order to provide connectivity and access to the boat jetties by modes other than NMT, it is proposed that feeder services be initiated to the boat jetties by introduction of small occupancy vehicles such as the mini-buses, electric rickshaws etc.

### **Parking Provisions**

Over the last few decades, due to increase in affordability, coupled with lack of public transport system, the increase in vehicle ownership has been steep with an annual growth rate of 12%. The same is also reflected even in the existing access/egress trips to the jetty by private modes i.e.7%. It is therefore recommended that at major jetties/boat hubs, parking provisions be made for cars and two wheelers along with bicycles (privately owned) in the ratio 20:30:50 respectively. The cost of provision for parking has been included in the jetty modernisation cost.

### **Elevated Walkways for multi-modal integration**

It is proposed to identify critical intersections in the island areas, especially those in the influence area of the proposed jetties, where high pedestrian-vehicular conflict is observed. It is proposed to develop elevated walkways and foot-over-bridges at such locations so as to prioritise the pedestrian movement. Two such locations have been identified which require immediate intervention in terms of grade-separated

pedestrian facilities near major boat hubs proposed.

### **Signages**

Road signs are an important component of the traffic control system. Type, size, colour and lettering pattern of the signs are as per IRC-93-1985.

### **Street Safety Provisions**

The user survey at the boat jetties indicated only 27% of the users to be female and the overall apprehension of both genders to use the boat jetties for access to water transportation due to isolated location of jetties, poor upkeep and lack of security at the jetties. Lack of proper lighting and hygiene were other issues indicated by the users. To overcome these constraints, it is proposed to install CCTV surveillance cameras on the access road network to the tune of covering the influence area of the jetty.

### **Street Lights**

Lack of proper streetlights is a major deterrent to the potential and existing users of the water transport system. In order to improve safe access to the jetties, it is proposed to install solar powered LED lights to enable safe and active spaces around the jetties even during off-peak hours and during late hours in the day.

### **Landscaping and Street Furniture**

Street furniture is an important element of each street in urban area as they are the only link between all origins and destinations and transit facilities used by pedestrians and commuters. Various on-street activities such as street vending and street markets give an appearance of vibrancy to streets. This interaction of pedestrians, motor-vehicles and varied activities on the streets needs to be resolved in a way that benefits all. Pedestrian pathways would be designed with kiosks, benches, dustbins and street landscape elements like fountains, parks, parking and tree pits. The entire network will be studied for local need and land availability for street activities.

### **Area Development Initiatives**

Sustainable Water Transport Project has been proposed as a holistic project with the primary transport system components i.e. boat vessels and jetty stations/boat hubs coupled and complimented with allied infrastructure development which shall not only improve access to the jetties but also have a positive impact on the users' perception of the access areas around jetties with the installation of infrastructure for lighting, safety, disabled friendly access designs etc. In addition to the above, it is

also proposed to integrate land development on the islands, tourism, water front development, urban rejuvenation and other economic activities in and around jetty locations so as to provide an economic impetus to the overall livelihoods of the people residing on the islands.

### **Property development at major boat hubs**

Majority of the existing jetties which are fully functional and have high footfalls, already have an informal or at certain locations a formalised commercial retail function around the jetty. Major hub locations such as Vypeen, South Chittoor, Fort Kochi, Ernakulam, Mattancherry etc have extensive commercial development around the jetty locations.

### **Water Front Development**

Kochi City Region has abundant backwaters in the region which provide scenic views and are potential areas to be developed through beautification and place making by introduction of social recreational areas, walkways and trailing, bicycling trails and boating areas. Islands such as Kothad, Vypeen, Bolgatty, Thanthoni Thuruth, Kadamakuddy, Mulavakadu, Moolampilly, Elamkunapuzha and Pizhala have immense potential to undertake beautification of waterfront and development of activities which also help in the uplifting of the livelihood of the island communities, eg, fishmarkets, fleamarkets, cultural festivals at these developed areas.

### **Tourism**

Pokkali Farming is a unique cultivation practice undertaken in Ernakulam and Allapuzha districts of Kerala which involves cultivation of a saline tolerant rice variety in an organic way in the water-logged coastal regions. Pokkali Farming has off late developed a brand image for its way for cultivation and has generated interest in export of the products. The quality of the paddy attracts many tourists to know more about the practice. Pizhala is one of the pioneers and is most famous for carrying out this practice on a large scale.

## **9.0 LAND ACQUISITION**

In accordance with the land requirement by all the jetties, minimum land to the extent of jetty requirements is proposed to be developed for provision of the above mentioned facilities. In case of jetty locations within the Panchayat areas, the land is primarily owned by the Panchayat committees while in other cases, the ownership varies from GCDA, KSRTC, SWTD, Cochin Corporation, Port Trust, etc. In case

land is not available from these agencies, limited amount of land acquisition from private owners shall be resorted to.

### 10.0 CAPITAL COST

The project is estimated to cost 747.28 crores with core water transport infrastructure estimated at 435.37 crores. In order to encourage private sector participation in the project and reduce burden on the government, it is proposed that one third of the boats are acquired and owned by the private sector participants in the project and balance two-thirds of the boats and 100% of the jetty and other infrastructure costs be funded by the Government SPV, under a suitable business model as decided by the project SPV. The funding to be provided by private sector is thus estimated at 65.47crores. Thus the total capital outflow is expected to be 681crores. The details are given in Table-2.

**Table-2: Capital Cost Estimation (Unit: Crore)**

<b>Component Description</b>			
<b>A) Direct Infrastructure Costs</b>	<b>Phase-I</b>	<b>Phase-II</b>	<b>Total</b>
Jetty Infrastructure Cost	62.00	40.89	102.89
Provision for Boatyard	10.00	5.00	15.00
Dredging of Waterways	10.00	15.00	25.00
Commercial Complex	30.63	16.81	47.44
Investment on Inland Navigation System & OCC	9.70	5.60	15.30
<b>Total Civil Infrastructure Cost</b>	<b>122.33</b>	<b>83.30</b>	<b>205.63</b>
Cost of Boats	109.59	86.22	195.81
<b>Soft Costs</b>			
Setup/start-up/development costs (2%)	4.62	3.39	8.03
Contingency 5% on Sub Total	11.83	8.65	20.47
Interest During Construction	3.23	2.20	5.44
<b>Total</b>	<b>251.61</b>	<b>183.76</b>	<b>435.37</b>
<b>B) Ancillary Infrastructure</b>			
Development of Access roads/island roads/non-motorised transport	161		161
Development of Electric Feeders, Bicycle Sharing and Walkways with travelators	130.51		130.51
<b>Setup/start-up/development cost (2%) + Contingency (5%) on B</b>	<b>20.40</b>		<b>20.40</b>
<b>Sub-Total</b>	<b>311.91</b>		<b>311.91</b>
<b>Grand Total</b>			<b>747.28</b>
<b>Project Cost Excluding 1/3 quantity of boats</b>			<b>681</b>

## 11.0 BENEFITS

Implementation of the Kochi Water Metro Project would have the following advantages

1. Would facilitate better connectivity of the islands around Kochi mainland. This had been a long standing requirement of the islanders and could be only partially mitigated through the Gosree bridges and ICTT road.
2. Would drastically reduce the road traffic by diverting the passengers to water transport. In turn, it would assist in reducing the road congestion in the Kochi roads.
3. Would reduce the atmospheric pollution from land vehicles and carbon footprint of Kochi City
4. Would give an impetus to the tourism in and around Kochi. This in turn would lead to the development of all the islands connected by the Water Metro Project.



**Annexure-I  
Details of Proposed Jetties**

Sl. No.	Name of Pier/Location	Sy.No & Village Taluk & District	Reclamation requirement (Yes or No)	Dredging requirement (Yes or No)?	Whether alternate site identified (Yes or No)?	Protected sites in the vicinity of proposed plot/jetty?	Coordinates (Latitude & Longitude)		Remarks
<b>Major Jetties</b>									
1	<b>South Chittoor</b> Cheranallor GP	sy.243/4 Cheranalloor, Kanayannur , Ernakulam	No	No	No	No	10.038	76.269E	Presently Boat service is operating at this jetty
2	<b>Mulavukad Panchayath Jetty</b> Mulavukad Panchayath	sy.102/12,101/20,101/ 18,21 Mulavukad, Kanayannur, Ernakulam	No	No	No	No	10.024	76.257E	Presently Boat service is operating at this jetty
3	<b>Ernakulam KTDC</b> Kochi Corporation	Sy.843 Ernakulam, Kanayannur, Ernakulam	No	No	No	No	9.972	76.278E	Presently Boat service is operating at this jetty
4	<b>Info Park</b>	Sy. 609, Kakkanad Village, Kanayannur Taluk, Ernakulam	No	Yes	No	No	10.05	76.368E	Presently there is no boat service and jetty
5	<b>Kumbalam</b> Kumbalam Panchayath	Sy.1,2 Kumbalam , Kannayannur, Ernakulam	No	No	No	No	9.920	76.304E	Presently Boat service is operating through this jetty.
6	<b>Fort Kochi,</b> Jetty and fueling station (Junkar jetty Area) Kochi Corporation	Sy.25,26,36 Fortkochi, Kochi Taluk, Ernakulam	No	No	Yes	No	9.968	76.244E	Presently Boat service is operating at this jetty
7	<b>Mattancherry,</b> Kochi Corporation	Sy.1196,462,1594 Mattancherry village, Kochi Taluk, Ernakulam	No	Yes- Maintenance only	No	No	9.957	76.260E	Presently Boat services is operating through this jetty
8	<b>Embarkation (W/I),</b> Kochi Corporation	2578/2 Thoppumpady, Kochi Taluk, Ernakulam	No		No	No	9.970	76.261E	Presently Boat services is operating at this jetty
9	<b>Ernakulam (High Court),</b>	Sy.843 Ernakulam,	No	Yes, Maintenance	No	No	9.983	76.273E	

Sl. No.	Name of Pier/Location	Sy.No & Village Taluk & District	Reclamation requirement (Yes or No)	Dredging requirement (Yes or No)?	Whether alternate site identified (Yes or No)?	Protected sites in the vicinity of proposed plot/jetty?	Coordinates (Latitude & Longitude)		Remarks
	Kochi Corporation	Kanayannur, Ernakulam							
10	<b>Vyttila</b> Kochi Corporation	Sy.688,689, Poonithura Village,Kanayannur Taluk,Ernakulam	No	No	No	No	9.967	76.322E	Presently Boat services is operating at this jetty
11	<b>Vypeen,</b> Kochi Corporation	Sy.288/1,2 287/1,2,289 Fort Kochi Village, Kochi Taluk, Ernakulam	No	No	No	No	9.973	76.244E	Presently Boat service is operating at this jetty
12	<b>Kakkanad (IWAI),</b> Thrikkakkara Municipality	Sy.541,533,540 Kakkanad Village, Kanayannur Taluk, Ernakulam	No	No	No	No	9.992	76.351	Presently Boat services are operating near to this jetty. Proposed site is easily accessible to public and the proposed Metro Station is near the site for future integration.
13	<b>Thevara Yard</b> Kochi Corporation	Sy.1067,1069,1068, 1072,1184,1210 Ernakulam Village , Kanayannur Taluk , Ernakulam	No	Yes- Maintenance	No	No	9.946	76.290E	Presently KURTC is operating services from the terminal. KINCO/SWTD is functioning their work shop and boat repairing Yard in addition to the jetty.
14	<b>Pizhala</b> Kadamakkudy Panchayath	296/4,8,9 292/5,10 kadamakkudy Village, Kanayannur Taluk, Ernakulam	No	No	No	No	10.048	76.265E	Presently Boat service is operating at this jetty
15	<b>Kadamakkudy</b> Kadamakkudy Panchayath	124, kadamakkudy Village, Kanayannur Taluk, Ernakulam	No	No	No	No	10.053	76.250E	Presently Boat service is operating at this jetty.No vacant land in the jetty premises. To get required land, House plot is to be acquired or shift the jetty site and acquire wet land-Paddy field
16	<b>Kothad</b> Kadamakkudy	485 kadamakkudy Village, Kanayannur	No	No	No	No	10.058	76.271E	Presently boat service and Jankar Service are operating

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	Panchayath	Taluk, Ernakulam							at this jetty
17	<b>Chennur</b> Kadamakkudy Panchayath	398/12,13,399 kadamakkudy Village, Kanayannur Taluk, Ernakulam	No	No	No	No	10.059	76.271E	Presently boat service and Jankar Service are operating at this jetty
18	<b>Varapuzha (Market)</b> Varapuzha Panchayath	307/3 Varapuzha Village, Paravoor Taluk, Ernakulam	No	Yes, Maintenance	Yes	No	10.076	76.272E	Presently No service at this jetty. The jetty site is very near to the Varapuzha Market and town.
19	<b>Elakunnapuzha</b> Elakunnapuzha Panchayath	232/3,4,5,6,7 Elakunnapuzha Village, Kochi Taluk, Ernakulam	No	Yes, Maintenance	No	No	10.030	76.239E	Presently no boat service is operating at this jetty. Previously boat service was available from this jetty to Kadamakkudy and Ernakulam
	<b>Minor Jetties</b>								
20	<b>Ponnariman-galam,</b> Mulavukad Panchayath	230/11,304 Mulavukad Village, Kanayannur Taluk, Ernakulam	No	Yes, Maintenance	No	No	10.003	76.263E	Presently Boat services is operating at this jetty. No vacant private land is available in the jetty premises.
21	<b>Bolgatty,</b> Mulavukad Panchayath	Sy.299,304 Mulavukad Village Kanayannur Taluk Ernakulam	No	Yes, Maintenance	No	No	9.987	76.267E	Presently Boat services is operating at this jetty.
22	<b>Mulavukad Hospital</b> Mulavukad Panchayath	Sy.182/13,12 Mulavukad Village, Kanayannur Taluk, Ernakulam	No	No	No	No	10.011	76.261E	Presently Boat service is operating through this jetty.
23	<b>Mulavukad North,</b> Mulavukad Panchayath	Sy.71/1,6&1 Mulavukad Village,Kanayannur Taluk,Ernakulam	No	No	No	No	10.029	76.259E	Presently Boat service is operating at this jetty.
24	<b>Korumkotta</b> Cheranalloor Panchayath	624/5,7 Cheranalloor Village, Kanayannur Taluk, Ernakulam	No	No	Yes	No	10.030	76.265E	Alternate site identified apart from the DPR site. Presently boat service is operating at this jetty

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25	<b>Thanthonithuruth</b> , Kochi Corporation	Sy.304,402 Mulavukad Village, Kanayannur Taluk, Ernakulam	No	No	No	No	9.996	76.267E	Presently Boat service is operating at this jetty
26	<b>Edakochi</b> Kochi Corporation	1442,204,1579 Edakochi Village, Kochi Taluk, Ernakulam	No	Yes, Maintenance	No	No	9.893	76.296E	Existing jetty which was a major hub but fallen out of use
27	<b>Eroor</b> Thripunithura Municipality	1(bl.50),47(bl.20) Nadama Village, Kanayannur Taluk, Ernakulam	No	No	No	No	9.980	76.333E	Presently Boat services is operating at this jetty.
28	<b>Nettoor</b> Maradu Municipality	270/16,99/1, 1 Maradu Village	No	Yes, Maintenance	No	No	9.927	76.307E	Presently boat service is operated by private operator authorised by Maradu Municipality.
29	<b>Thykoodam</b> Kochi corporation	1205 Poonithura Village, Kanayannur Taluk, Ernakulam	No	No	No	No	9.956	76.326E	Presently no boat service is operating at this jetty however there is existing jetty which has fallen out of use
30	<b>Moolampilly</b> Kadamakkudy Panchayath	575,574 Kadamakkudy Village, Kanayannur Taluk, Ernakulam	No	No	No	No	10.038	76.268E	Presently boat service is operating at this jetty.
31	<b>Thoppumpady</b> Kochi Corporation	981,982 Thoppumpady Village, Kochi Taluk	No	Yes, Maintenance	No	No	9.936	76.264E	Presently no boat service is operating at this existing jetty.
32	<b>Thundathumkadavu</b> Varapuzha Panchayath	330/8 Varapuzha Village, Paravoor Taluk Ernakulam	No	Yes, Maintenance	No	No	10.064	76.267E	Presently no boat service is operating at this existing jetty.
33	<b>Eloor</b> Eloor Municipality	Sy.No.9 Eloor Village, Paravoor Taluk, Ernakulam	No	No	No	No	10.073	76.282E	Presently boat service is operating at this jetty.
34	<b>Cheranalloor</b> Cheranalloor Panchayath	Sy.1/1 ,3/1 Cheranalloor Village,Kanayannur Taluk,Ernakulam	No	No	No	No	10.072	76.282E	Presently Junkar service is operating at this jetty.

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35	<b>Paliyamthuruthu</b> Kadamakkudy Panchayath	Sy.226/2 Kadamakkudy Village Sy.226/1 Pvt land	No	No	No	No	10.053	76.251E	Presently boat service is operating at this jetty. Overhead Water tank is constructed in the Panchayat Land
36	<b>Chariyamthuruth</b> Kadamakkudy Panchayath	181/4,5,10,11,6 Kadamakkudy Village, Kanayannur	No	No	No	No	10.064	76.266E	Presently boat service is operating at this jetty.
37	<b>Aster Medcity</b> Cheranalloor Panchayath	232/1,9 Cheranalloor village, Kanayannur taluk, Ernakulam	No	Yes	No	No	10.046	76.272E	Presently no boat service is operating at this jetty. Before the construction of the KOTHAD bridge there was ferry service to Kothad from the proposed site.
38	<b>Amritha Hospital</b> Kochi Corporation	Sy.130 Edappilly North, Kanayannur Taluk, Ernakulam	No	Yes	No	No	10.033	76.288E	No passenger boat service is operating from this site.