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# WALKABILITY STUDY KOCHI 2017



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2017



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**Jacob Samuel**

Director- Programmes

## LIST OF ACRONYMS

ESAF – Evangelical Social Action Forum  
UMTA - Unified Metropolitan Transport Authority  
GCDA – Greater Cochin Development Authority  
PWD – Public Works Department  
KSRTC – Kerala State Road Transport Corporation  
NATPAC – National Transport and Planning Research Centre  
RBDCK - Roads and Bridges Development Corporation of Kerala  
MoUD - Ministry of Urban Development  
KSUDP - Kerala Sustainable Urban Development Project  
KSIWA - Kerala State Inland Water Authorities  
KSWTD - State Water Transport Department  
KMRL - Kochi Metro Limited  
KSPCB - Kerala State Pollution Control Board  
RTO – Regional Transport Office  
NUTP – National Urban Transport Policy  
JNNURM - Jawaharlal Nehru National Urban Renewal Mission  
NURM - National Urban Renewal Mission  
GWI - Global Walkability Index  
CBD – Central Business District  
IRC – Indian Road Congress  
RoW – Right of Way  
CPPR – Centre for Public Policy Research  
PWD – Persons with Disability

## Executive Summary

“Walkability study in Kochi was commissioned by ESAF with technical guidance and support from HealthBridge Foundation of Canada. The study involved qualitative and quantitative data analysis of the pedestrian facilities, safety, amenities and convenience of pedestrians. Walkability of the city was assessed using:

1. Field Walkability Survey in 10 major junctions
2. Pedestrian Perception Survey
3. Pedestrian Count
4. Observation Study
5. Agency and Policy Reviews

The city has high pedestrian volume irrespective of peak or non peak hours, weekend or weekdays. At a given time, more than 2000 people were on the streets walking to and fro to their destinations.

The assessment of policies and agencies responsible for ensuring pedestrian rights revealed that despite having many recommendations put forth by various institutions and government bodies lack of political will and coordination deter in ensuring the right of the pedestrians. Lack of political will defines the current sad scenario of walkability in the city.

Majority of the segments assessed have two or more lanes of traffic with 95% segments having high volume of vehicles;

<b>Issue</b>	<b>Findings (Field Walkability survey)</b>	<b>Findings (Perception survey)</b>	<b>Recommendations</b>
<b>Traffic volume</b>	High volume road- 95% Low volume – 5%	Fear to cross busy streets – 60%	Create safe level crossing at grade is important than going for subways, foot over bridge
<b>Land use and diversity</b>	Most of the segments had diverse use to an extent Shops – 93% Restaurants – 91% Offices – 76% Government offices – 53% Schools – 35% Houses – 27% Parks and playgrounds -22%	NA Mode of transport used for less than 2 Kms – Walk - 42% Public transport - 17% Motor bike – 17% Cycle – 10% Auto – 10% Car – 4%	Increase the mixed land use will help to have more diversity Giving priority on public spaces like parks and playground encourage more diversity to happen Given that 79% of people are using sustainable transport for small commutes, pedestrians should be prioritised over car
<b>Footpath availability</b>	Both side of the street - 62% One side of the street – 16% No footpath – 22%	Fear to walk at night – 60%	All high volume streets should have footpath on both the sides as mandated by IRC 103:2012
<b>Footpath composition and quality</b>	Slabs – 77% Tiles – 61% Concrete – 14% None of these segments are wheel chair accessible and friendly <u>Width of the footpath</u> - 2-4 Ft - 58% 4-6 Ft – 21% More than 6 Ft – 2% <u>Quality of the footpaths</u> - Poor – 54% Fair – 34% Good – 12%	Worst – 24% Bad - 50% OK – 23% Good -3% 68% wants wider and even footpath	6 Ft being the standard width, even and wide footpath should be made mandatory across the city Ensuring regular maintenance of footpaths and replacing the broken tiles as and when required by the respective agencies Ensuring hand rails, warning tiles at the edge of the footpath to warn the visually challenged to have a safe accessibility to the road and on to the footpath should be considered

<b>Footpath obstructions</b>	A lot of obstructions- 63% Some of obstructions- 28% A little of obstructions- 7%	51% of the respondents shared lack or poor quality of footpath deterred them from walking 64% wants obstructions to be removed	Obstruction free footpath that ensures free and smooth mobility of pedestrian has to assured
<b>Obstruction types</b>	Pillars and cables - 84% Cars and motor bikes - 72% Debris - 63% Exit/entry points - 63% Trees - 51% More than 4 times - people have to walk through the carriage way due to obstruction - 86%	Motor bikes – 47% Haphazard parking of Bus – 35%	Law enforcement of ensuring obstruction free footpath and prioritising the rights of pedestrians should be strictly followed  Penalizing the defaulters is advocated  Design of the footpath has to be ensured in such a way that pedestrian do not have to frequently walk on to the carriage way
<b>Footpath disorder - Type</b>	Garbage -84% Cans/ bottles – 40% Cigarettes/bidi – 35% Urine smell – 33% Broken glasses – 14%	Clean footpaths – 68%	The City Corporation should ensure that garbage is collected on daily basis and footpath is clear of any type of disorders  Dust bins and public toilets should be provided and ensuring regularly emptied/ maintained
<b>Safety Measures</b>	No facilities – 35% Signages – 46% Police enforcement – 46% Zebra crossing – 40% Special lights – 29% Raised walkways – 20%	Enforcement of laws – 47% Reduced and slow traffic – 56% Safer crossing points – 51%	Enforcement of policies and penalizing the defaulters to be ensured  Ensure to have pedestrian infrastructures and strictly enforcing traffic calming measures  Audible signals such as those fitted on pelican crossings should be used with all pedestrian signals for safety of visually impaired

<p><b>Amenities for pedestrians</b></p>	<p>No amenities - 47%  Vendors - 47%  Seating - 6%  Dust bins - 6%  Toilets - 4%  Very few tree shades - 47%  Many tree shades - 49%  Road oriented street lights - 76%  Pedestrian oriented street lights - 11%</p>	<p>Improved street lighting - 63%  Vendor management - 58%</p>	<p>Ensuring service amenities like seating , adequate tree shades, pedestrian oriented street lights</p> <p>Placing dust bins and toilets at conveniently located places is important to have a safe and clean walking environment</p> <p>When footpaths have a gradient unsafe for elderly people to walk, then hand rails should be provided</p> <p>Designated Hawker Zones must be allowed to locate in areas where pedestrians tend to wait or congregate i.e. street intersections and near bus stops or major civic destinations, pubic offices etc</p>
<p><b>Street crossing facilities</b></p>	<p>Signages – 53%  Traffic signal – 30%  No facilities – 40%</p>	<p>Zebra crossing – 64%  Police enforcement – 32%  Traffic warden – 9%</p>	<p>Needs of pedestrian to cross the streets has to be ensured</p> <p>Periodically repainting the zebra crossings as and when it is faded</p> <p>Tactile pavement should be provided at all locations on a pedestrian facility where there is a potential safety concern for visually impaired pedestrians (such as just before a ramp that leads to pedestrian crossing, around an obstruction, before the stairs to the subway</p> <p>Identifying and placing traffic wardens at all major traffic junctions and school zones should be prioritized and ensured</p>
<p><b>Aggressive driver behaviours</b></p>	<p>Aggressive driver behaviours were noticed on 80% of the roads</p>	<p>Drivers are careless with the pedestrians – 70%</p>	<p>Awareness on the importance of ‘pedestrian first’ policy, ‘give way to pedestrian’ should be conducted through various platforms especially through print, visual , audio and social media</p> <p>Street design options to traffic calming should be executed</p>

<b>Vehicle parking</b>	Cars /motorbikes parked illegally – 89% Trucks parked illegally – 46%	NA	Illegal on-street parking should be monitored and penalized Provision for paid parking at some points can be thought about to reduce the congestion in the city centre and should be effectively managed Staggered timings for entry of trucks should be strictly enforced and executed in the city centre
<b>Walking space available in school zone</b>	No proper walking zone – 93% of the road	NA	School zones should have footpaths on both the sides Planning for one ways during school opening and closing hours to reduce the traffic volume and congestion in the school zone

Table 1 Overview of issues addressed, research findings and the recommendations

***“If you design communities for automobiles, you get more automobiles. If you design them for people, you get walk able, livable communities.”***

Parris Glendening and Christine Todd Whitman

# CHAPTER-I

## INTRODUCTION

In India, walking is considered a major mode of commute from point A to destination. Roads once constructed to accommodate the pedestrians are overtaken by vehicles. Net result is that, pedestrians lost his lion share of being on road safely; in fact the current scenario has reached a stage where pedestrians are no safer on the streets. Urban sprawl has often left pedestrians stranded. Wide roads have been built without sidewalks or frequent crosswalks, and high-speed traffic makes those roadways particularly deadly. In many areas, intersections with crosswalks may be as much as a kilometer apart, leaving pedestrians with no safe way to cross the street. The growing urban sprawl has directly encouraged people to be highly dependent on vehicles which have created a dare situation for pedestrians. Globally about 1.25 million people die each year as a result of road traffic crashes. Road traffic injuries are the leading cause of death among people aged between 15 and 29 years<sup>1</sup>. The data shows that on an average day 1324 accidents occur on Indian roads leading to the death of 349 people. This means 55 accidents and 15 lives lost per hour. In other words, a life lost every four minutes<sup>2</sup>. In Kerala; it was found that there is a 20% increase in the road accidents and injuries compared to the year 2015<sup>3</sup>. Although rash and drunk driving are the leading cause to these fatalities and non fatal injuries, lack of pedestrian infrastructures and poor urban planning also puts pedestrians at risk.

Road traffic deaths among pedestrians, cyclists and motorcyclists are intolerably high. The second Global Report on Road safety shared that, globally, pedestrians constitute 22% of all road deaths, and in some countries this proportion is as high as two thirds. Millions more people are injured in traffic-related crashes while walking, some of whom become permanently disabled<sup>4</sup>.

### 1.1 Why on pedestrian safety:

Walking is a basic and common mode of transport in all societies around the world. Virtually every trip begins and ends with walking. Pedestrian collisions, like all road traffic crashes, should not be accepted as inevitable because they are, in fact, both predictable and preventable. Reduction or elimination of the risks faced by pedestrians is an important and achievable policy goal. The WHO, 2009 report which analysed causes of accidents and policies suggested that our roads are particularly unsafe for pedestrians, cyclists and motorcyclists who, without the protective cell of car around them are particularly vulnerable. Making walking and cycling safer is critical to reducing the number of road traffic deaths and is important for achieving the Decade of Action for Road Safety's aim to promote non motorized forms of transport.

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<sup>1</sup> <http://www.who.int/mediacentre/factsheets/fs358/en/>

<sup>2</sup> <http://www.firstpost.com/india/mumbai-pune-expressway-accident-is-a-reminder-of-the-state-of-road-safety-in-india-2826294.html>

<sup>3</sup>

<sup>4</sup> [http://apps.who.int/iris/bitstream/10665/79753/1/9789241505352\\_eng.pdf](http://apps.who.int/iris/bitstream/10665/79753/1/9789241505352_eng.pdf)

Walking has well established health and environmental benefits such as increasing physical activity that may lead to reduced cardiovascular and obesity-related diseases, and many countries have begun to implement policies to encourage walking as an important mode of transport. Pedestrian safety measures improve walking environments and contribute to urban renewal, local economic growth, social cohesion, improved air quality and reduction in the harmful effects of traffic noise.

## **1.2 Why Kochi:**

Kochi also known as “Queen of Arabian Sea” was the centre of Indian Spice trades for many centuries. The commercial capital of Kerala is home to Cochin Stock Exchange, Southern Naval Command of Indian Navy and state headquarters. The city of Kochi has well connected transport network by all means of mode. With a population of 601,574 as of 2011, the city of Kochi has Kerala's second highest population density parameter with 6340 people per Km<sup>2</sup>. As the population increases, their need to commute to different locations have increased manifold. With easily affordable loan schemes, vehicle loans have become attractive and encourage the people to own a personal vehicle. Accident rates in Kerala are reportedly on the rise. The available data shows that 17,017 accidents have taken place till May 2016. The city of Kochi continues to have a higher number of road accidents. Out of 2561 accident cases registered in 2015 in the city, 168 cases were fatal and around 1637 had non fatality injuries. Official records say that more than half of the road accident victims in Kerala are between the ages of 20-55<sup>5</sup>. Though a high number of accidents take place due to negligence on part of the driver and rash driving, one cannot ignore the plight of the roads. With the increase in number of vehicles on our roads, the infrastructure too needs to be improved. The city ready to roll out the first phase of metro will also encourages people to use sustainable transport provided adequate pedestrian amenities are ensured across the city. In this background, the walkability of the city should be a major concern for the city administration. ESAF will analyse the current scenario of walkability in the city and pitch in to fill the gap so that policy makers and implementation agencies can ensure the safety of pedestrian by and large.

## **1.3 Agencies responsible for transportation and urban planning in Kochi:**

City transport is run on various transport modes such as bus, sub-urban rail, ferry services. Presently, facilitation and management of traffic & transportation is done by multiple agencies/departments. This scenario itself shows that there needs to be coordination with multiple agencies to ensure seamless flow of traffic around the city. As the responsibility of each department varies at different points, there needs to be a coordinating agency that can ensure the process smoothly. Kochi is soon going to have Unified Metropolitan Transport Authority (UMTA).

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<sup>5</sup> <http://www.newindianexpress.com/cities/kochi/2017/mar/10/preventive-maintenance-will-slash-accident-rate-in-kerala-official-1579720.html>

<b>Organisation</b>	<b>Responsibilities</b>
<b>City Corporation, Kochi</b>	Responsible for development and maintenance of roads within corporation limits
<b>Greater Kochi Development Authority (GCDA)</b>	Guide the development in Greater Cochin Region, prepare the structural plan for Cochin and vision documents for the region, identifying projects in order to attract development in certain parts of the region, maintain and collect rent from its shopping complexes at various locations
<b>Public Works Department, Kerala (PWD)</b>	Design, implementation and maintenance of all public works undertaken by Government, providing required road infrastructure and road safety
<b>Kerala State Road Transport Corporation (KSRTC)</b>	Connects the city through public transport
<b>National Transportation and Planning Research Center (NATPAC), Trivandrum</b>	Research and consultancy works in the fields of traffic engineering and transportation planning, highway engineering, public transport system
<b>Roads and Bridges Development Corporation of Kerala (RBDCK) Ltd</b>	To construct, maintain, operate and manage highways, expressways, roads, bypasses, bridges, over-bridges etc., entrusted to and vested with the Company by the Government of Kerala
<b>Department of Town and Country Planning</b>	Preparation, processing, monitoring and review of Urban Development Plans, advising the Government on issues relating to urban and regional planning
<b>Ministry of Urban Development (MoUD)</b>	Formulation and administration of the rules and regulations and laws relating to the housing and urban development
<b>Kerala Sustainable Urban Development Project (under Local Self Government Department) (KSUDP)</b>	Improve and expand urban infrastructure and services (solid waste management, roads and transport etc.)
<b>City Police, Kochi</b>	Influences public transport policy, planning and on-street enforcement activities, ensure smooth flow of traffic
<b>Motor Vehicles Department</b>	To provide services as per the Motor Vehicles Acts and Rules to all the citizens equally and to create an accident- and hassle-free transport mechanism
<b>Kerala State Inland Water Authorities (KSIWA)</b>	Carry out surveys and investigations for the development, maintenance of the national waterways and the appurtenant land, setting up of infrastructural facilities for waterways, provide for the regulation of navigation and traffic

<b>State Water Transport Department, Kerala (KSWTD)</b>	Operates passenger services on majority of routes, takes care of ticketing and maintenance of its vessels
<b>Kochi Metro Limited (KMRL)</b>	Operates metro train services and connects people to different part of the city
<b>Indian Railways</b>	Responsible for operating rail transport
<b>Kerala State Pollution Control Board (KSPCB)</b>	Responsible for enforcing laws related to environmental protection
<b>Office of Commissioner of Police</b>	Responsible for law enforcement in the city
<b>Regional Transport Office, Kochi (RTO)</b>	Responsible for maintaining a database of drivers and a database of vehicles
<b>Department of Tourism, Kerala</b>	Prime regulatory agency that overviews and supervises entire tourism activities
<b>Cochin Port Trust</b>	Main catalyst for the economic development of the region, with a strong commitment to environmentally sound policies and safe practices
<b>Goshree Island Development Authority</b>	Guide the development in the Goshree group of Islands, helps to bridge the gap between the islands and the mainland, in terms of infrastructure

Table 2 - List of agencies and departments responsible for the urban planning of Kochi City

## 1.4 Policies:

### 1. Transport Policies for Kerala, 2011

Kerala's draft transport policy proposes a revamping of the public transportation system to increase its modal share from the existing 33 per cent to 80 per cent of trips. The policy proposes to reduce dependence on personal transport and increase the share of buses in intra-state and intra-city transport. Encouragement will also be given for investment in a metro rail or mono rail service and suburban rail system on main routes.

As the policy states, 'The Government will encourage introduction of new generation cleaner energy buses to reduce pollution level. The share of KSRTC buses in the total stage carriage services will be increased from the present 27 per cent to 50 per cent by 2025. Public transport will get preferential treatment in the tax structure compared to personalized transport'.

The policy further suggests improvement in both design and capacity of city roads. It also proposes introduction of four-wheel auto-rickshaws, shared taxis and intermediate public transport services in the form of minibuses and other vehicles. These proposals have important implications for transportation in Kerala. In order to achieve an increase in transit users, the government must prioritize spending on public transit over private automobiles. But such a goal also has important implications for improving walking.

All transit trips begin and end with a walking or cycling trip. Therefore, in addition to increasing spending on public transit, infrastructure investment must also focus on pedestrians and cyclists. After all, if people cannot travel comfortably, conveniently and safely by foot or bicycle to and from transit stops, then high ridership of transit will remain an unachievable goal.

## **2. Kerala Road Development Policy (Draft) 2009**

Kerala Road Development Policy is being formulated to enable the government to prioritize and execute programs and projects which are consistent with the road sector policy. This document outlines the road development targets to be achieved by the year 2021. The objectives of this policies are adopt better standards and specifications in design and construction of roads, ensure road safety and mitigate ribbon development, provide quicker access to essential services, thereby improving the quality of life in rural areas, improve the functional capability of roads (Speed, Safety), improve Inter modal Connectivity (Water – Air – Road), professionally manage highways assets and resources.

## **3. Parking Policies**

The Kerala Transport Policy proposes open multi-storied parking facilities constructed by the government at important centres. The policy also proposes that local bodies issue building permits only after ensuring adequate in-house parking spaces for the expected number of inhabitants' vehicles as well as building, off-street parking facilities for existing buildings at suitable locations, with the cost to be recovered from building owners. The National Urban Transport Policy (NUTP) directs the state governments to amend building by-laws in all million plus cities so that adequate parking space is available for all residents/users of such buildings. The policy recommends multi-level parking complexes to be made a mandatory requirement in city centres that have several high rise commercial complexes. Levying of high parking fees was also mooted by the NUTP.

If the government hopes to achieve its goal of 80% of all trips taken by public transit, they will need to introduce parking controls rather than mandate more parking spaces. In terms of meeting existing demand for parking, it is also important to note that one can greatly expand available parking simply by limiting the amount of time for which any individual car is parked. That is, rather than build parking lots, one can ensure higher turnover of existing parking spaces. If one car is parked in a space for eight hours, that space serves only one car. If, however, people only park for one hour or less, then the space can serve at least eight vehicles during the day. That is the only efficient approach to addressing parking supply and is made possible by charging sufficiently high fees per time that vehicles are parked.

#### **4. National Urban Transport Policy, 2006**

The National Urban Transport Policy recommends equitable allocation of road space with a focus on people, not vehicles. To achieve this, reserving lanes and corridors exclusively for public transport and non-motorized modes of travel were suggested. Under the heading "Priority to the use of public transport and NMT", the policy states that "The central government would promote investments in public transport as well as measures that make its use more attractive than in the past. Towards this end, the central government would encourage all State capitals as well as other cities with a population of more than one million to start planning for high capacity public transport systems."

Jawaharlal Nehru National Urban Renewal Mission (JNNURM) is an incentive to cities and states across the country to implement modern bus systems, in particular Bus Rapid Transit. The main aim behind this scheme is to encourage the Public Transportation System in cities and thus to reduce the use of private vehicles within city limits. At present such buses are introduced in Cochin and Trivandrum under JNNURM.

The National Urban Transport Policy, under the heading "Priority for Non Motorized transport", further states that "The Central Government would give priority to the construction of cycle tracks and pedestrian paths in all cities, under the National Urban Renewal Mission (NURM), to enhance safety and thereby enhance use of non-motorized modes."

#### **5. Hawker Policies**

A street vendor is broadly defined as a person who offers goods or services for sale to the public without having a permanent built up structure but with a temporary static structure or mobile stall (or head load). Street vendors may be stationary or occupying space on the footpath or other public or private areas, or may be mobile in the sense that they move from place to place carrying their wares on push carts or in cycles or baskets on their heads or may sell their wares in moving buses etc.

The Supreme Court ruling on street vendors states that, "If properly regulated according to the Exigency of the circumstances, the small traders on the sidewalks can considerably add to the comfort and convenience of the general public, by making available ordinary articles of everyday use for a comparatively lesser price. An ordinary person, not very affluent, while hurrying towards his home after a day's work can pick up these articles without going out of his way to find a regular market. The right to carry on trade or business mentioned in Article 19(1)g of the Constitution, on street footpath, if properly regulated cannot be denied on the ground that the streets are meant exclusively for passing or re-passing and no other use."

The National Policy for Street Vendors suggests demarcation of vending zones. According to the policy, the demarcating of hawking zones should be city/ town specific. It should be done in a participatory process by a town vending committee which would consist of municipal authority, traffic police, Associations (marketers, traders) etc. The policy suggests that all vendors need to be registered at a

nominal fee and they be issued an identity card. The town vending committee is entrusted to monitor the hawking activity. Street vendors are most vulnerable to forced eviction and denial of basic right to livelihood. The policy restricts the ability of authorities to carry out forceful eviction of street vendors and they should be served a notice of 30 days if the eviction is urgent.

An analysis of the above policies makes clear that both the State and the Central Government have policies relating to transportation planning, land use allocation, parking, NMT and public transport. For Instance, the NUTP gives priority for the construction of cycle tracks, pedestrian paths and encourages public transport, while the Kerala Transport Policy suggests the improvement of design and capacity of city roads, introduction of new generation buses and encouragement of public transport.

## **6. The Persons with Disabilities (Equal Opportunities, Protection of Rights and Full Participation) Act, 1995**

The Act lays down provisions to help ensure that people with disabilities can have easy access to the streets. The Act, among other things mentions that the appropriate governments and the local authorities shall, within the limits of their economic capacity and development, provide for:

- Installation of auditory signals at red lights in the public roads for the benefit of persons with visual handicap;
- Causing curb cuts and slopes to be made in footpath for the easy access of wheel chair users;
- Engraving on the surface of the zebra crossing for the blind or for persons with low vision;
- Engraving on the edges of railway platforms for the blinds or for persons with low vision

***“In a quality city, a person should be able to live their entire life without a car, and not feel deprived”***

Paul Bedford

## CHAPTER-II

# RESEARCH METHODOLOGY

### 2.1 Introduction

Walkability is an important parameter for the livability of the city; the walkability study of Kochi can create positive effect in the developmental initiatives of Kochi. The walkability study focus to capture data on nine parameters such as obstruction, disability infrastructure, availability of crossings, modal conflict points, availability of walking paths, grade crossing safety, motorist behavior, amenities and safety from crime.

### 2.2 Objectives

- 2.2.1. To provide a qualitative assessment of walking conditions in the city including safety, security and convenience of the pedestrian environment
- 2.2.1 To evaluate the perception of pedestrians regarding the current pedestrian facilities and their preferences as regards potential facility improvements
- 2.2.2 To create awareness and interest among the general public, planners and policymakers on pedestrian rights and issues and to facilitate policy changes

### 2.3 Personnel

- 2.3.1 The research team was headed by Ms. Manju George (Project Manager, Livable Cities India), Devas Boban and Jithin Xavier, Project Coordinators, Livable Cities India, Kochi program
- 2.3.2 Orientation for conducting the study was given for the project team. The data collection for the Walkability Study was done with the help of Master's students of the Department of Social Work of St. Albert's College, Kochi. Prior to the data collection, each question of the instruments was discussed thoroughly to make sure, that the team understood what all information must be collected with each question

### 2.4 Design

Both primary and secondary data were collected for the study. Primary data collection was done through observation and interviews; secondary data was collected by analyzing earlier reports and policies pertaining to the pedestrian environment in Kochi. An observation study was designed and implemented to generate a clearer picture of the actual problems faced by the pedestrians in Kochi city. In addition, to complement the observation study, a perception study was undertaken by the team, which included a survey of 400 people. The pedestrian volume at different points in the city was also analyzed.

- 2.4.1 Study Area – The Kochi Corporation limit is growing due to the urban agglomeration. The city centre has grown from the immediate circle to the periphery as well. Thus we collected data from a

larger circle that considered being the major commercial and destination people uses. Taking Kochi Corporation as the centre, the major junctions that captures the major chunk of people from the Goshree Islands at Boat Jetty and Menaka, leading to Marine Drive and High Court in North, to Kacheripady and Kaloor Junction in East, to Edappally Junction in North, to Palarivattom, Vytilla Junction, South Railway Junction and Thevara Junction in South, and North to Kochi Corporation Head Office. All the junctions selected in the study area carries people from different locations to major commercial, educational and shopping centers.

The ten major junctions chosen for the study are as follows: The segment detailed of these each junctions are added in the annexure for reference.

1.	Boat Jetty Junction	2.	Menaka Bus Stop & Marine Drive
3.	High Court Junction	4.	Kacheripady
5.	Kaloor	6.	Edappally
7.	Palarivattom	8.	Vytilla Junction
9.	Ernakulam Junction (South Railway Station)	10.	Thevara Junction

Table 3 - Major junctions selected for the study



Figure 1 - Google map of study area

## 2.5 Methodology

The methodology used in the study is based on the Global Walkability Index (GWI), which includes a field walkability survey and an institutional survey. The study also includes interviews with pedestrians regarding the walking environment in the city and analyzes the pedestrian volume at selected points. The field walkability survey and pedestrian perception survey were done by 40 students from St. Albert's College, Ernakulam under the supervision of Project Coordinators from ESAF. They were given classroom as well as field training by the project team. The institutional survey was conducted by the project team itself.

### 2.5.1 Field Walkability Survey (Infrastructure Audit)

A field walkability survey is a qualitative assessment of walking conditions including safety, security and convenience of the pedestrian environment. The survey was carried out in 55 road segments in Kochi in the month of July 2016. Segmentation of the roads was done by analyzing the intersections and junctions along each section of the road. For every segment a landmark was noted and a number was assigned. A questionnaire previously developed by HealthBridge and WBB Trust (Work for a Better Bangladesh) used in Walkability study of Thrissur was used after piloting in the Kochi scenario. The field walkability study was carried out from 27.06.16 – 30.06.16.

### 2.5.2 Pedestrian Perception Survey

A pedestrian perception survey was conducted in order to evaluate the pedestrians' perception of the current walking facilities available in the city. Their perceptions about future improvements were also studied. Pedestrian perception survey was conducted in 10 segments of the city during the peak and non-peak hours. This was done by counting the pedestrians who walk past the surveyor at a particular point in one hour. 400 pedestrians were randomly chosen for the study. The samples were distributed equally as children, youth, middle age and senior citizens by taking gender into the considerations. Perception survey was held on 14.01.17 from 9 am to 5 pm with the help of 40 volunteers from Department of Social Work, St. Alberts College Ernakulam.

### 2.5.3 Pedestrian Count

Pedestrian count was carried out from 26.07.17 to 14.11.2017 during week days and weekends. The peak and non peak hours were covered by 40 students in 10 segments.

### 2.5.4 Observation Study

An observation study was conducted at various segments to understand the difficulties faced by the pedestrians.

### 2.5.5 Policy and Institutional Survey

Existing policies related pedestrian rights were analysed. Interviews were carried out to understand the roles and responsibilities of agencies who will be the major stakeholders of

developing a good walkability index for the city. Details of this are added in the report for the reference

## **2.6 Finance**

Financial support for the study was provided by HealthBridge Foundation of Canada

## **2.7 Limitations of the survey**

The surveyors were given classroom as well as field training before all the surveys and were monitored at regular intervals so as to avoid mistakes during the survey. Nevertheless, one of the limitations of the field walkability survey is the subjectivity of the responses, as they greatly depend on the individual assessment of the surveyors. Since Kochi Metro work was going on in various segments, traffic congestions and plights of pedestrians would have highlighted from the normal days.

***“We can have a city that is very friendly to cars or we can have a city that is very friendly to people. We cannot have both”***

Enrique Penalosa

## CHAPTER-III

# RESEARCH RESULTS

### 3.1 Introduction

This chapter discusses about the various data captured through field walkability survey, pedestrian perception survey, pedestrian count, and observation study. The factors that analysed under various tools are as follows: land use diversity, availability and quality of footpaths, amenities for the differently able, safety of pedestrian, and parking facilities.

### 3.2 Pedestrian Count

Pedestrian count was carried out in the selected ten locations which are prominent in the city that connects people from different locations to the heart of the city. This included commercial and shopping areas, office, educational institutions, religious institutions and major transit points.

Table 4 depicts the pedestrian count of peak and non peak hours during the weekdays. All the junctions showed more over same count irrespective of whether it is carried out in peak or non peak hours. This being the case, having adequate pedestrian infrastructure in the areas that connects the city to different point of destination is very important. Having adequate pedestrian infrastructure will also help the smooth flow of traffic without hindering the pedestrians.

No.	Segment Id	Date observed	Peak and non- peak hours			Pedestrian volume
			8-10AM	12-2PM	4-6 PM	
1	Boat Jetty & Menaka	20-07-2016	2335	2685	2354	7374
2	Kacheripady	21-07-2016	2339	1956	1999	6294
3	Edappally	26-07-2016	3008	2672	4358	10038
4	Palarivattom	27-07-2016	2943	3353	3653	9949
5	Kaloor	28-07-2016	3882	2459	2784	9125
6	High Court	18-10-2016	3266	2260	3622	9148
7	Marine Drive	19-10-2016	1119	1317	1583	4019
8	Thevara	24-10-2016	3266	2655	3929	9850
9	Ernakulam South	08-11-2016	2349	2576	2955	7880
10	Vytila	09-11-2016	2149	2652	2682	7483

Table 4 - Pedestrian count on weekdays

Table 5 shares the details of pedestrian count during weekends. All major transit junctions show a considerable increase in pedestrian volume.

No.	Segment Id	Date observed	Peak and non- peak hours			Pedestrian volume
			8-10AM	12-2PM	4-6 PM	
1	Kacheripady	17-10-2016	2257	2212	2352	6821
2	Edappally	21-10-2016	2597	2045	4059	8701
3	Palarivattom	22-10-2016	3081	3463	3733	10277
4	Kaloor	28-10-2016	3549	3102	3733	10384
5	High Court	16-07-2016	2558	1927	3925	8410
6	Boat Jetty & Menaka	22-07-2016	2484	2144	1885	6513
7	Thevara	05-11-2016	2740	2349	3143	8232
8	Marine Drive	07-11-2016	1292	1202	1490	3984
9	Ernakulam South	11-11-2016	2203	2247	2852	7302
10	Vytilla	14-11-2016	2549	2712	2923	8184

Table 5 - Pedestrian count on weekends

Majority of the segments selected being part of the Central Business District (CBD) of Kochi, these data will also help to design the CBD area with pedestrian infrastructure planning that ensures smooth mobility, safety and pleasure.

### 3.3 Field Walkability Survey

#### 3.3.1 General condition of the segments

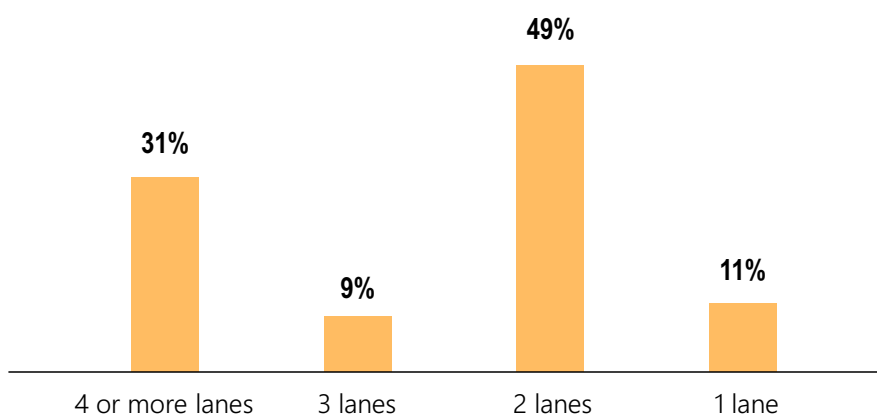


Figure 2 - Number of lanes

Almost half of the segment have two lanes where as a little over than one third has four or more lanes. Considering the pedestrian volume during the week days and weekends, the importance of having right pedestrian infrastructure at every segment to avoid any untoward instances should be of utmost priority for the city administration.

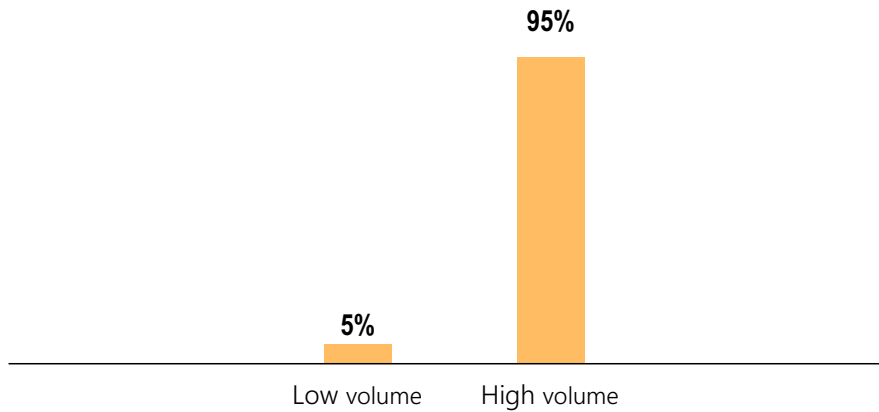


Figure 3 - Vehicle volumes in segments

Majority of the segments have high volume of vehicles.

### 3.1.1 Land use diversity

Mixed land use enables a range of land uses including residential, commercial, and industrial to be co-located in an integrated way that supports sustainable forms of transport such as public transport, walking and cycling, and increases neighbourhood amenity. Mixed land use developments can enhance the economic vitality and perceived security of an area by increasing the number of people on the street and in public spaces. Mixed or diverse land use is one of the “3Ds”—density, pedestrian friendly design, and diversity—that have been found to associate with walking. Land use diversity shortens the distance between destinations and encourages various modes such as walking, biking or public transit. Land use diversity measures the mixing of land uses to identify those characterized by homogeneous land uses, such as rural or suburban areas, or those characterized by mixed land uses, such as dense activity/urban centers.

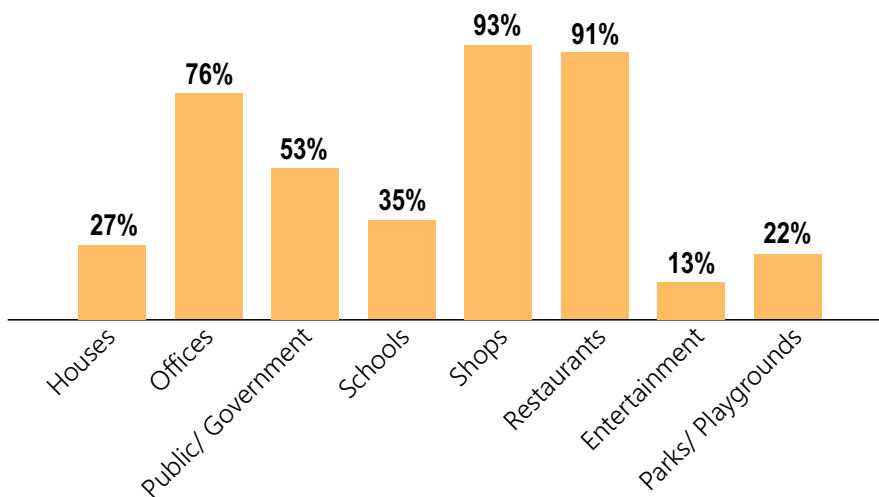


Figure 4 - Land use diversity in the segments

The majority of the segments selected have shops, restaurants, offices and public or government institutions. Since most of the segments selected were around the CBD area, only quarter of the segment had residential area and parks and playgrounds.

### 3.1.1 Availability and quality of footpaths

The footpath quality was measured using the following parameters; availability, buffer zone, condition of the footpath, obstructions on the paths, physical disorders and cleanliness in the segments. Overall quality of the footpaths in the city were found to be below average.

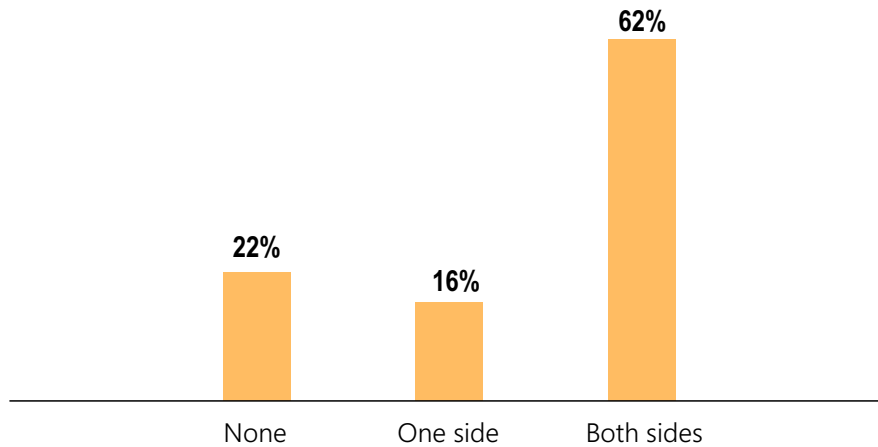


Figure 5 - Availability of footpaths

Majority of the segment have footpaths on both sides of the road. Considering the fact that almost all the segment are in the CBD area, the remaining 38% requires immediate attention for the city to be walking friendly. Well planned footpaths provide continuous space for walking. They also support other activities such as street vending and can make bus stops a resting place without compromising pedestrian mobility. The success of a footpath depends on the integration of multiple elements in a coherent design. The city of Kochi has recognized the importance of having great footpath and walkways. Kochi Marine drive has good walkway that encourages and strengthens the social fabric of a society. Places like these across the city are very important to improve walkability of the city.



Figure 6 - Marine drive walkway

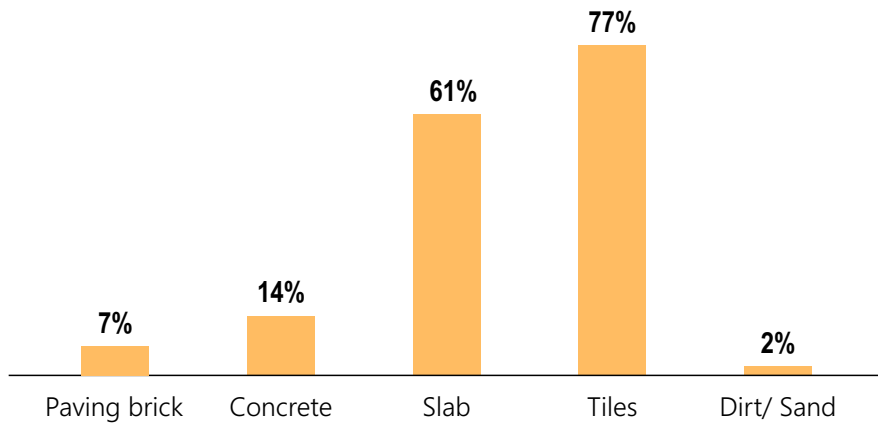


Figure 7 - Materials used for pavement

Majority of the footpath are made by tiles and slab. Any material used for sidewalks and walkways needs to be slip-resistant and easy to maintain. The regular maintenance of these footpath should be taken care otherwise as the obstructions arises, pedestrian have to step on to the road and then to the footpath make the walking an unpleasurable activity.

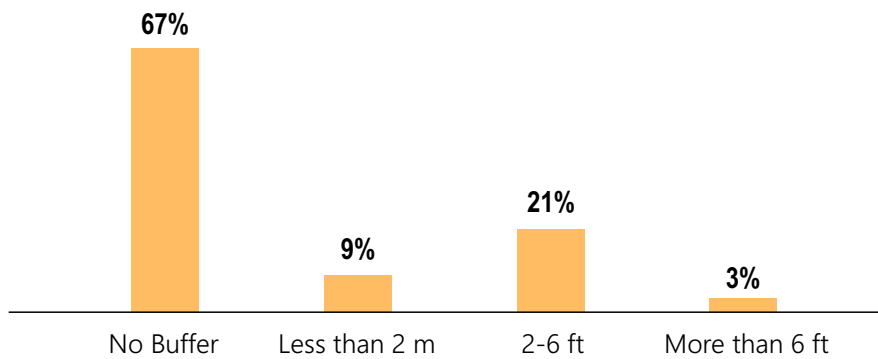


Figure 8 - Availability of buffer

Majority of the segments do not have any buffer (67%) which means that pedestrian is always at risk to be in collision with the vehicles. This highlights the importance of having proper pedestrian infrastructure with adequate buffer to protect the pedestrians.

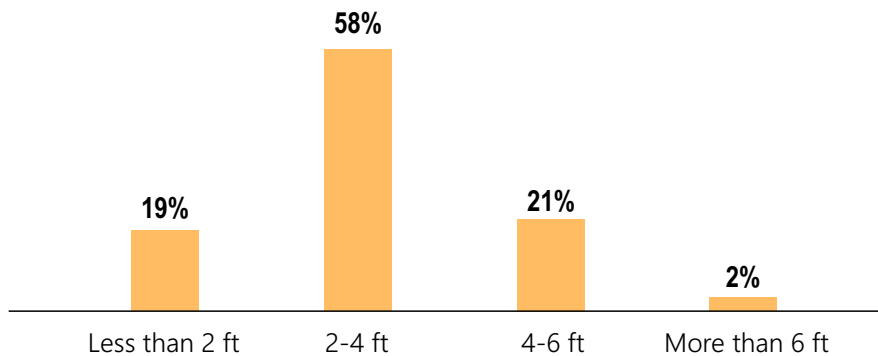


Figure 9 - Width of the footpath

Only around one fifth of the footpath is in adequate width as mandated by the Indian Road Congress: 103 - 2012. The width of the footpath is fundamental to the effective functioning of a pedestrian system. Without an optimum width, footpath will not help move enough pedestrian and discourage them from walking. The width of the guideline depends upon the expected pedestrian flows. The minimum width of a clear unobstructed pathway should be 1.8 meter (6Ft) in residential and mixed use areas. The width increases as the area moves to commercial and it can go up to 4 meters (13 Ft) depending upon the pedestrian flows and commercial areas.

In this context it is seen that the city lacks in caring for its pedestrian in terms of providing a pleasurable and safe walking experience.

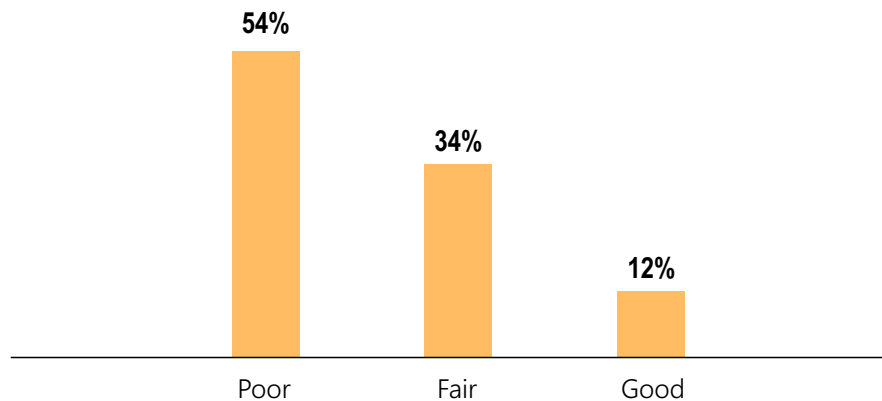


Figure 10 - Condition of the footpath

Despite having a pro active city administration towards pedestrian friendliness, a little more than half of the segments have footpath in poor quality.

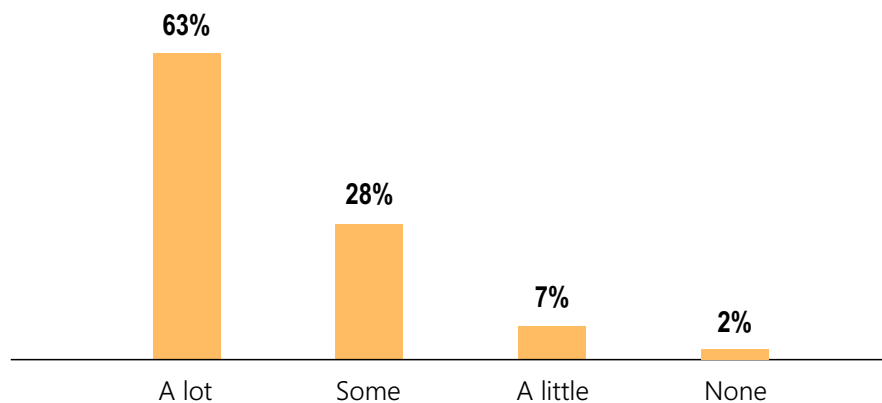


Figure 11 - Rate of obstructions in the footpath

The infrastructure audit found that most of the footpath in the segments had lot of obstructions amounting to 63% whereas almost one third had obstructions to some extent. Almost 91% of the footpaths are not pedestrian friendly.

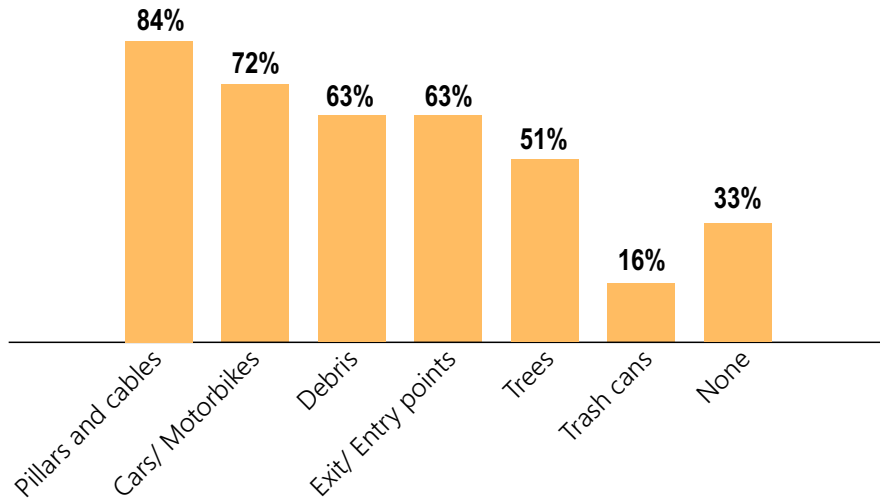


Figure 12 - Obstructions in the footpath

Obstructions are very common across the segments, mostly as pillars and cables, vehicles parked on the footpath, debris dumped and in some places with trees.



Figure 13 - Image showing various obstructions on the footpath in various segments

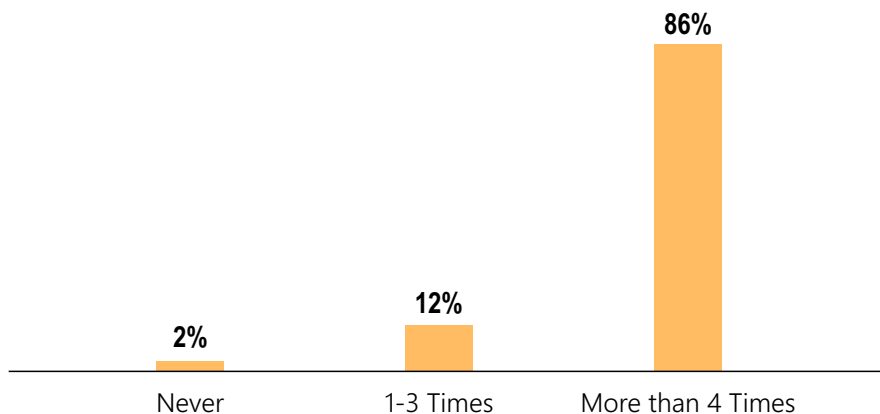


Figure 14 - Obstructions and leaving the footpath

It was shared that majority of the pedestrians had to leave the footpath more than four times on a single trip. These kinds of situations discourages people to use the footpath as most of the travel are purpose oriented and thus needs to be completed within a stipulated time period. More over getting down on the road and footbath back and forth is not just a risky task but not desirable either.

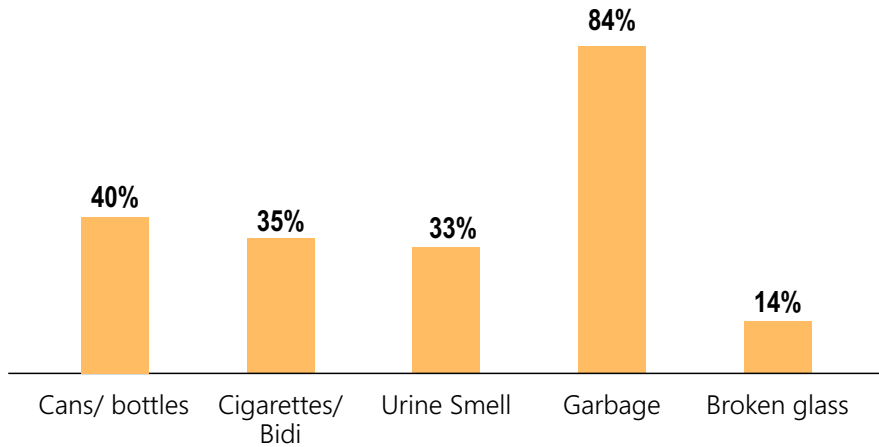


Figure 15 - Kind of physical disorders in the segments

Garbage being the main physical disorder reported by the majority of the pedestrians, a little above one third also specified urine smell, cans and bottles thrown around as other disturbing factors that makes walking a non pleasurable activity.

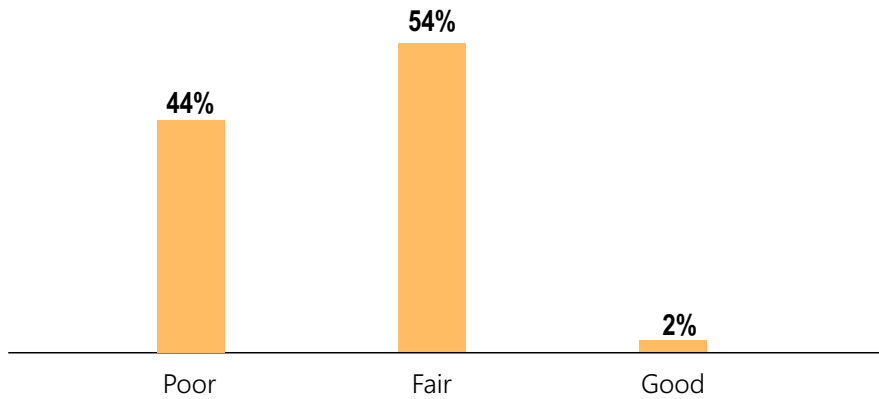


Figure 16 - Cleanliness in the segments

Though Kochi city is synonymous with garbage thrown around, most of the segments are clean enough. That does not mean that the city do not have to work on it. Around 44% segments needs attention to make the area clean and appealing for the pedestrians.

### 3.3.4 Facilities for the differently able

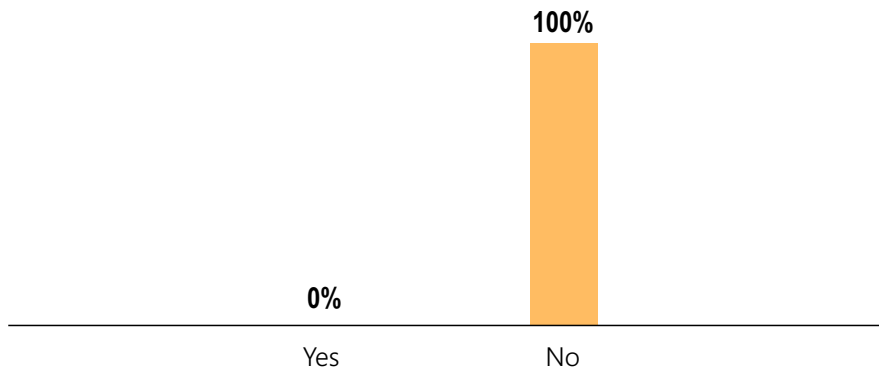


Figure 17 - Wheelchair accessibility

The city has never been visionary for People with Disability (PWD). Foot path need to be accessed by all segments of the population especially for PWD. The footpaths should be barrier free so that the wheel chair users can utilize the pedestrian facilities and are not forced to get on to the road.

### 3.3.5 Safety Measures

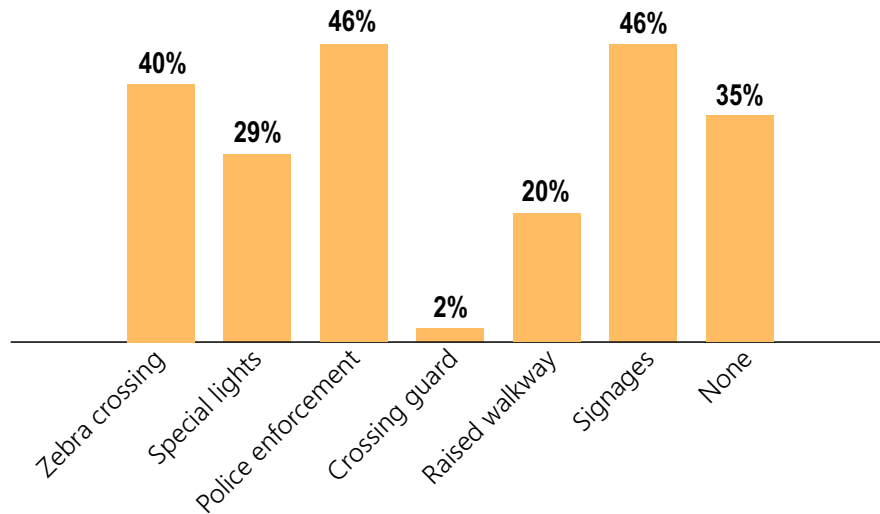


Figure 18 - Crossing aids for the pedestrians

Majority of the segments have zebra crossing, signages, and police enforcement. But almost one third of the segment does not have any crossing aids that help pedestrian to cross the street safely. Safety measures such as traffic calming amenities, raised walkway, buffers, sitting arrangements, adequate lighting, police enforcement etc are very important to encourage walking.

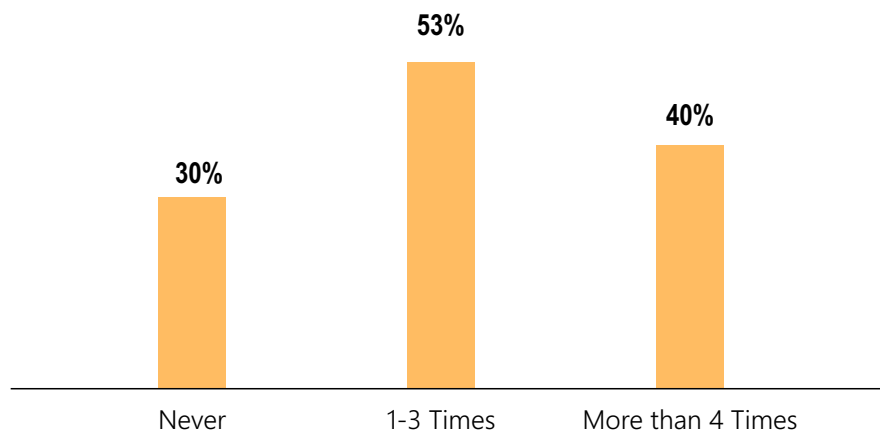


Figure 19 - Traffic calming measures to reduce the speed of the vehicles

Though many segments have traffic calming measures like traffic signals and signages it is disheartening to realize that the 40% of the CBD area do not have such measures.

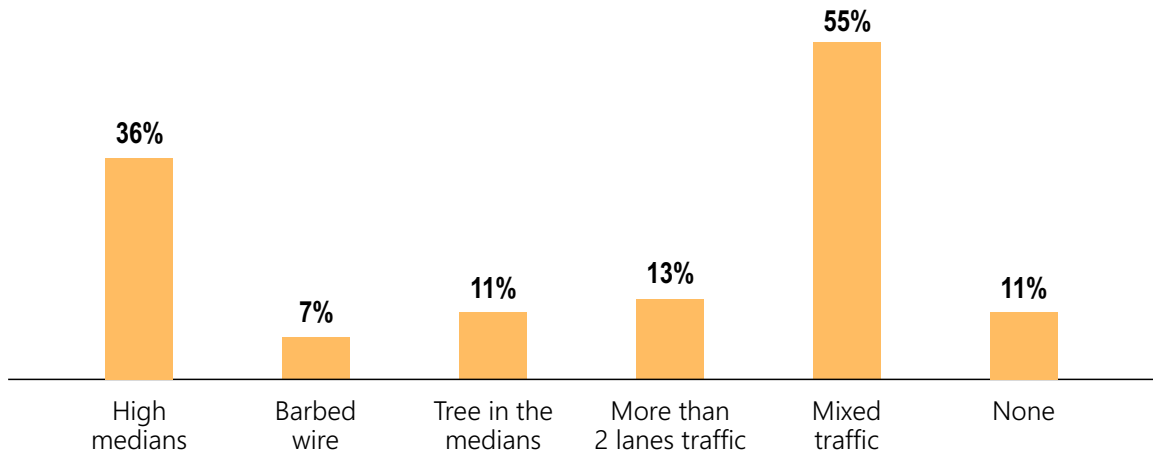


Figure 20 - Barriers that prevent pedestrians to cross the street

Pedestrians are always met with obstructions that deter him to have a safe crossing in the major segments. Among them the noted ones are high medians and mixed traffic.

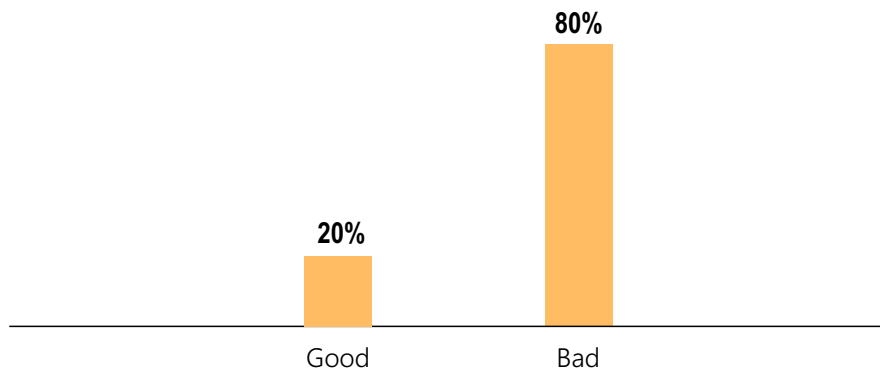


Figure 21 - Driver's attitude towards pedestrians

Most of the pedestrians felt that as a pedestrian they have to meet with the aggression of driver's who always wanted to swift pass through the street.

### 3.3.6 Availability of amenities

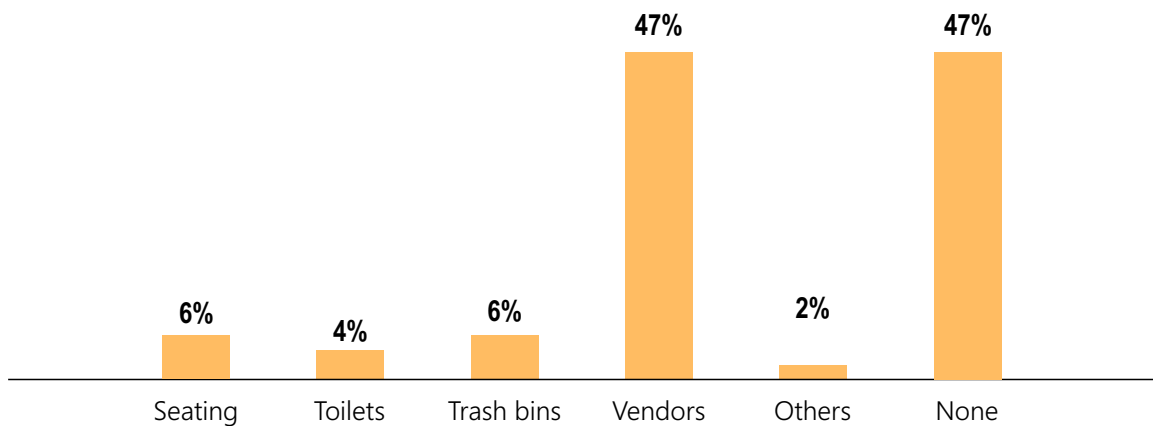


Figure 22 - Pedestrian infrastructures available

As pedestrian amenities, the team explored on seating facilities, rest rooms, dust bins, and vendors. Though almost half segment does not have any, rest of the places has vendors. Hawkers provide a wide variety of services and amenities to people, at convenient locations – with negligible investment and infrastructural costs, they form the eyes of the street to keep streets safe, they keep streets clean, busy, and vibrant, they provide a variety of cheaper food and retail options, they express our unique culture. Vendors generate self-employment for a large number of people. Hawkers must be given designated space within the road Right-of-Way (ROW), so that they don't occupy the minimum clear width required for pedestrians to walk.

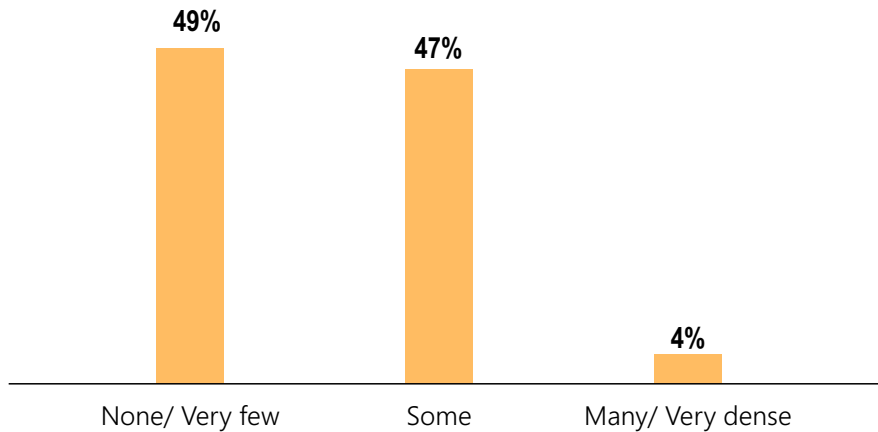


Figure 23 - Tree shades in the segments

Tree shades plays an important role in encouraging people to adopt non motorized transport. Almost half of the segments do not have adequate tree shades which need to think about when the city administration plans for improving the walkability of the city.

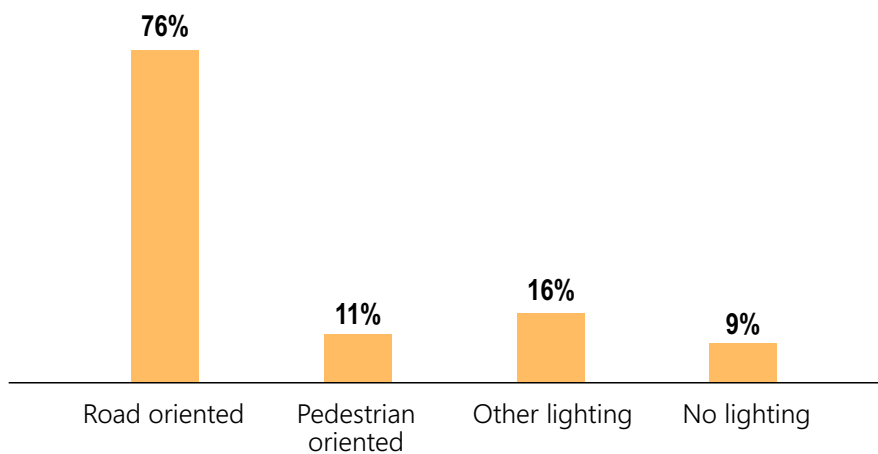


Figure 24 - Availability of street lights

Personal security is especially important to vulnerable groups such as elderly people and women (including girls and women with disabilities) and good lighting is particularly necessary for pedestrian crossings. Concentrated lighting is essential where congregation of pedestrian is expected. Lighting must be provided every 20 – 30 meter interval; pedestrian lighting should illuminate the pedestrian walkway.

Pedestrian lighting should be provided along the sidewalk, at street corners, at access at grade cross walk, and all subways and foot over bridges should be well lit. For illuminating pedestrian facilities, pedestrian specific lighting is preferred over the general high mast street lighting with poles that are of low-mast, 3 to 5 meters tall.

### 3.3.7 Others

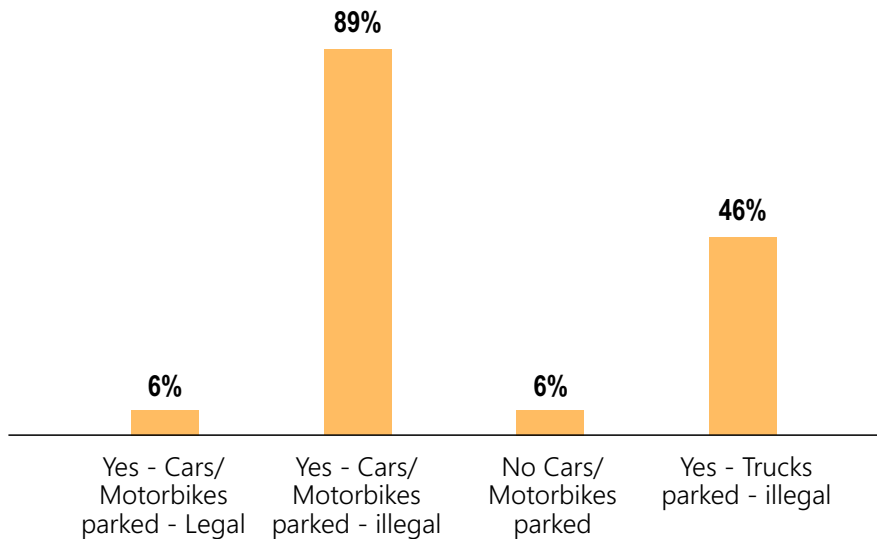


Figure 25 - Vehicles parked on the road

The study observed parking of vehicles both legal and illegal, in many streets. Legal parking refers to parking in specified areas and places which do not affect the mobility of pedestrians and other vehicles. Illegal parking refers to vehicles parked on footpaths, in specified no parking areas and on the side of the road blocking the traffic.

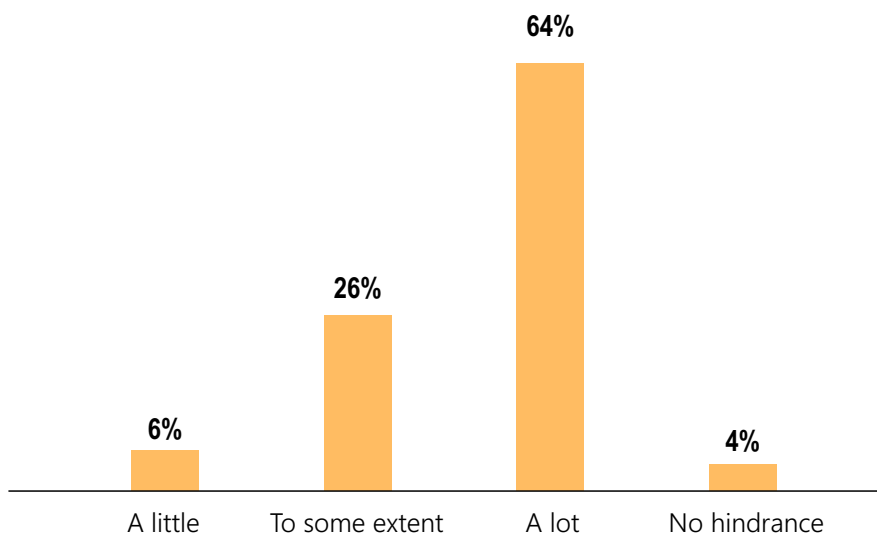


Figure 26 - Disturbances due to vehicles parked

Parked vehicles created a lot of disturbances to the smooth flow of pedestrian movement.

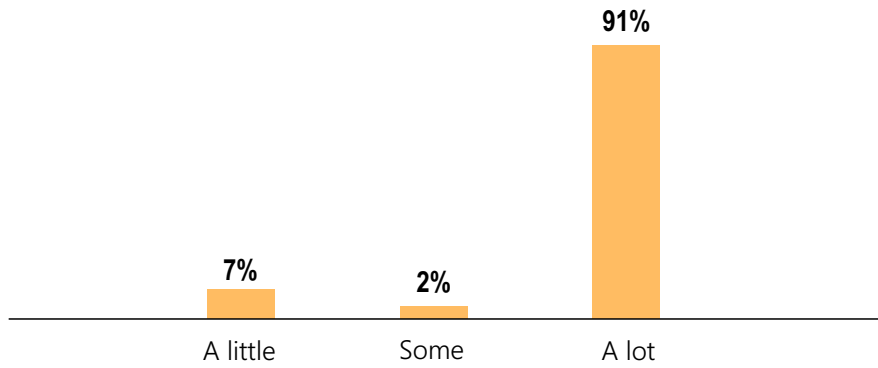


Figure 27 - Noise pollution experienced

Majority of the segments being in the CBD area had lot of noise pollution.

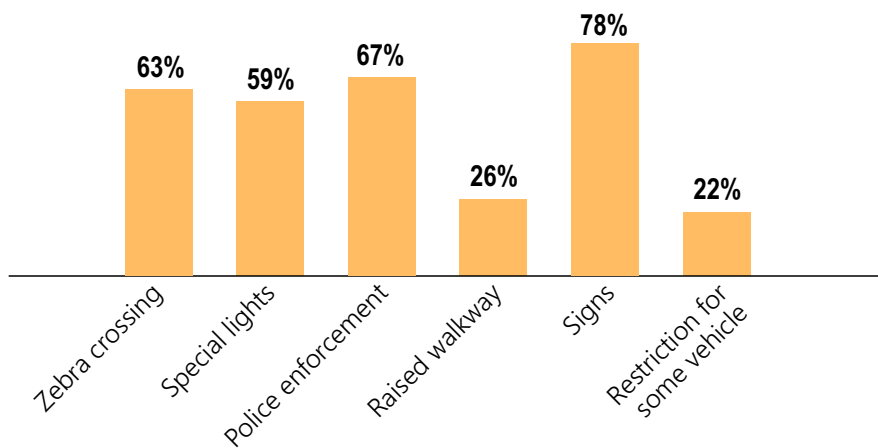


Figure 28 - Crossing aids available in school zone

The CBD area has 49% of schools of which 93% schools do not have convenient walk ways for children to walk and traffic around schools is reported to be an important concern to parents, school officials, and communities. Most of the segment had zebra crossing, police enforcement and signages which actually ensures safety of children.

### 3.4 Pedestrian Perception Survey

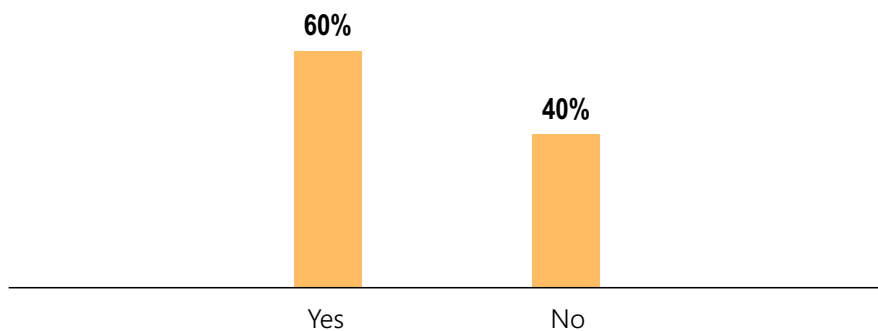


Figure 29 - Fear of crossing the road

Majority of the pedestrians feared crossing the streets.

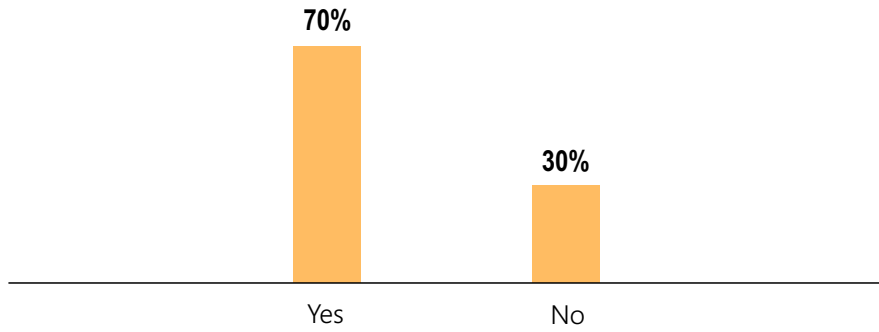


Figure 30 - Pedestrian's perception on driver's attitude towards them

Majority of the pedestrians felt that drivers were careless about pedestrians.

### 3.4.1 Mode of transportation used for short trips (less than 2 Kms)

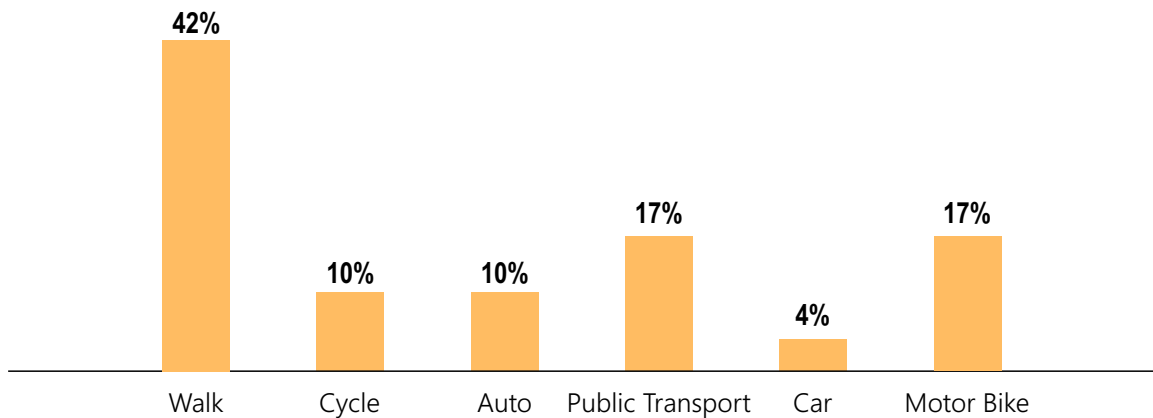


Figure 31 - Mode of transport chosen for short trips

Majority of the pedestrians use walking and public transport for short trips.

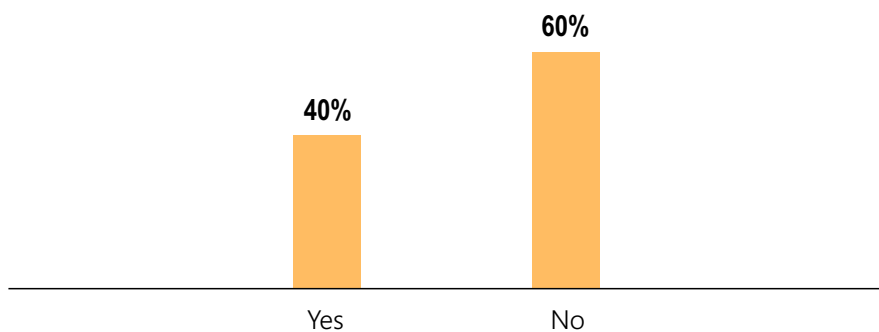


Figure 32 - Pedestrian's perception on safety while walking at night

Majority of the pedestrians feared of their safety while walking on the night. This result also correlates with the infrastructure audit of street lights where only one tenth of the segments had pedestrian oriented street lights.

### 3.4.2 Pedestrian facilities and perception

Two – wheelers and public transport created more havoc for pedestrians with their movement as well as crossing at grade. Half of the pedestrians rated the pedestrian facility in the city as bad which reflects the kind of responsibility city administration has towards the pedestrians. Majority of the pedestrian felt that hawkers could be handled better way than the existing one.

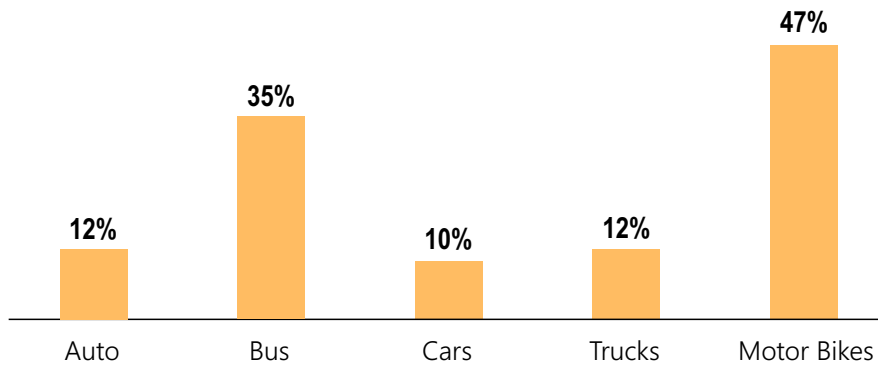


Figure 33 - Type of vehicles creates havoc for smooth pedestrian movement

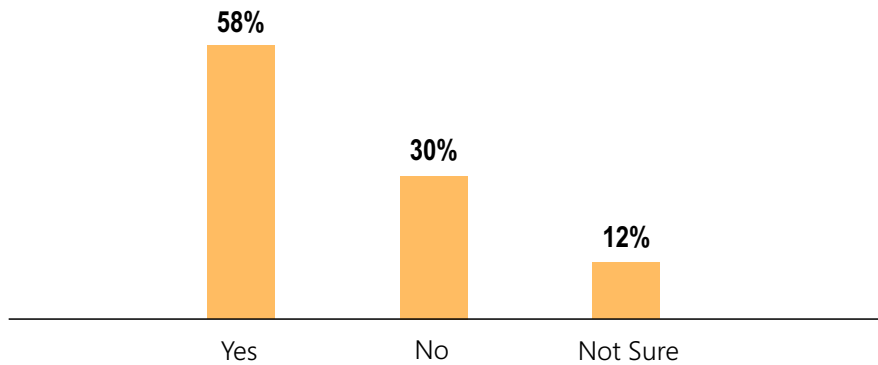


Figure 34 - Management of hawkers

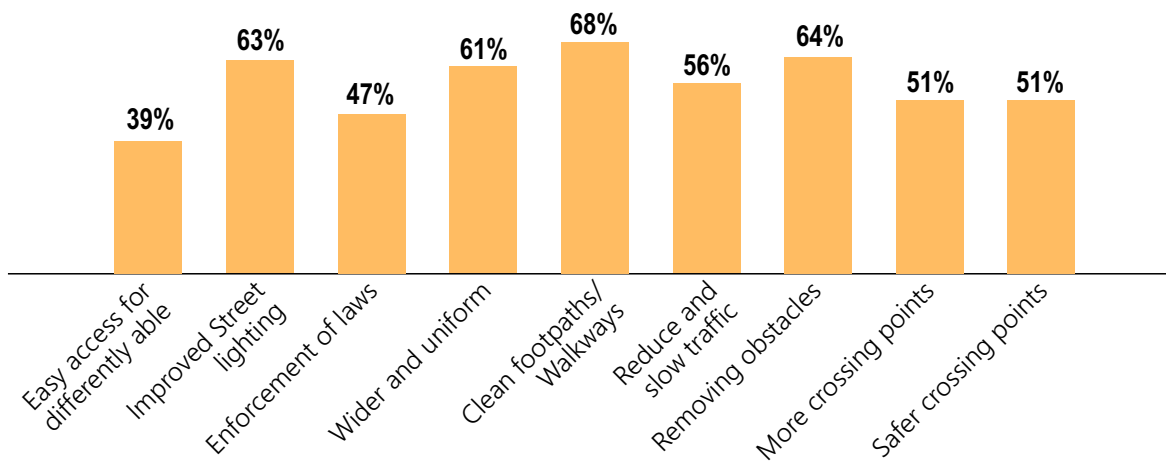


Figure 35 - Wish list of pedestrian's for better pedestrian amenities

The wish list of pedestrians shows that the city government has to concentrate in all the areas that ensure pedestrian safety and facilities. It is important to see that almost 40% people responded for universal accessibility.

Universal design is the design and composition of an environment so that it can be accessed, understood and used to the greatest extent possible by all people regardless of their age, size, ability or disability. The intent of universal design is to make the life simple for every one with all abilities. Ensuring the pedestrian safety with a universal design enables people with differently able to access the pedestrian facilities across the city.

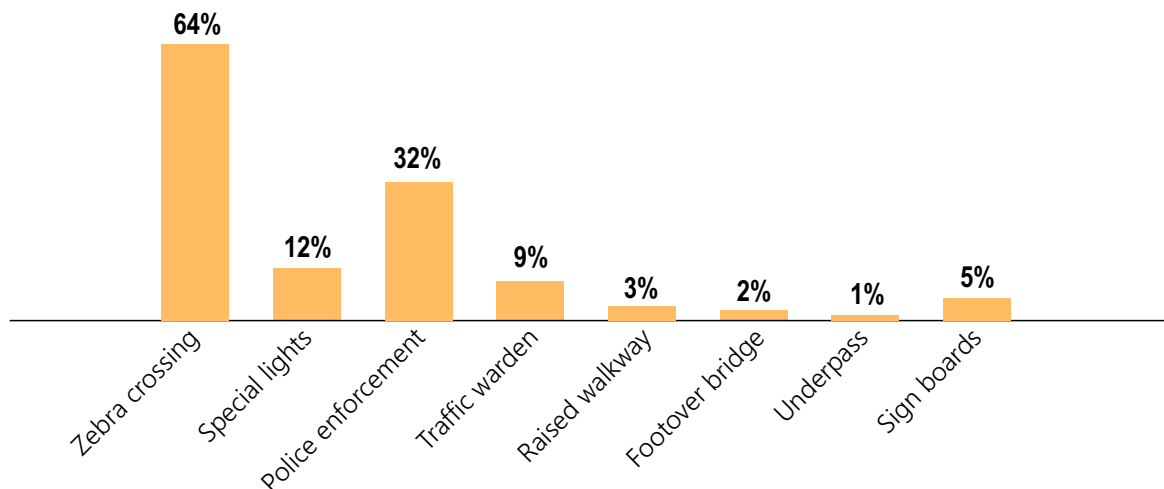


Figure 36 - Suggestions to facilitate traffic calming measures

Any pedestrian in the city look for safe and comfort mobility from the point of origin to the destinations. At any point of travel, every one becomes pedestrian at some point and they would expect to have their rights protected. Couple of wish list is zebra crossing and police enforcement for safe mobility along with adequate pedestrian oriented street lights.

### 3.5 Observation Study

Walkability has direct influence on the public health of the people in the city. Availability of pedestrian infrastructure determines the desire for walking. Adding it to it, seamless public transport services that ensure first and last mile connectivity defines the choice for the use of sustainable mode of transport for any trip. Pedestrian facilities are not just sidewalks but all those measures/designs intended to provide a convenient and comfortable atmosphere for people who opt walking. Walkability is important for building social capital and hence for a vibrant and healthy city.

#### **Pedestrian facilities include:**

- Footpaths and walkways
- Zebra crossings (cross walks)

Traffic control devices

Furnishings that create a pedestrian friendly atmosphere (such as benches, shade & landscaping)

Other technology and design features intended to encourage pedestrian activity (lighting, roundabouts)

This section looks into the existing facilities that supports pedestrian infrastructure in the city. The objective of this section is to bring the shortcomings of pedestrian environment to the notice of the decision makers and organisations responsible for pedestrian infrastructure development through photographs. The study tries to project the pitfalls in infrastructure developments rather than focussing on the unavailability of it.

Photo documentary tries to identify and project the shortcomings of:

1. Pedestrian crossings	2. Obstructions
3. Quality of footpaths	4. Pedestrian Signals
5. Design	6. Amenities/on street facilities

Table 6 - List of indicators looked at

### 3.5.1 Pedestrian crossings

A crossing/ crosswalk are usually provided at an intersection or at the midblock section of a roadway where pedestrians intend to cross. The crosswalk can be at-grade or with a grade separation (such as subways and foot over bridges). At all intersections, crosswalk should be at-grade.

At mid-block sections, at-grade crosswalk are recommended on all non-arterial streets, and, grade separated crosswalk is recommended on arterial streets and highways to reduce the exposure of pedestrians to vehicles travelling at high speeds. Although at grade is a preferred option, grade separation can be used where at grade solutions are found not feasible.



Figure 37 - Example for typical intersection crossing, midblock crosswalks to cross the streets with long distances between intersection crossings, raised cross walk



Figure 38 - Pedestrian struggling to cross the road, faded zebra crossing at High Court Junction

### 3.5.2 Obstructions

Obstruction on the footpath forces the pedestrian to use the main road which is a threat to the life of pedestrian. Obstruction free footpath is essential for encouraging and adoption of walking as a mode of transport. With any trip walking either in the first mile, last or either both being an essential part of the journey, it is essential to have an obstruction free footpath. When vehicle is parked on foot path then people often have no choice but to walk in the road where they are at much greater risk of being involved in a collision with a moving vehicle. Law enforcement agencies should take necessary steps to curb parking of vehicles on footpaths/walkways.



Figure 39 - Obstructions in the form of debris dumped, vehicles parked, light pole and trees, damaged slabs on the footpath

### 3.5.3 Quality of footpaths

Footpaths/ Sidewalks should be provided on both sides on all categories of street. Walk zone shall have a minimum clear width of 1.8 meters, which is the width required for two wheelchairs to comfortably cross each other (IRC:103-2012, 6.1.3) and must be entirely free of obstructions (IRC:103-2012, 6.1.10.2). In case of footpaths/ sidewalks with high pedestrian activity, such as commercial areas, the minimum walk zone width of 4 meters.

Footpaths should have flat walking surfaces, allowing for proper drainage and preventing puddles from forming (IRC:SP:50 and IRC:103-2012, 6.1.6). Guide tiles should be laid along the length of the footpath to assist persons with vision impairments (IRC: 103-2012, 6.1.4).

Comfort, continuity, and safety are the governing criteria for the design and construction of pedestrian facilities. For this reason, the footpaths are divided into three main zones: the frontage zone (also known as “dead width”), the pedestrian zone, and the furniture zone. Each of these zones plays an important role in a well-functioning footpath.



Figure 40 - Picture showing the division of Footpath/ Sidewalk into 3 zones



Figure 41 - Image showing various obstructions on the footpath that hampers the pleasure of walking in various segments

### 3.5.4 Pedestrian signals

Pedestrian signals are devices used at signalized intersections to notify pedestrians when it is safe to cross the street. Modern pedestrian signals incorporate countdown timers into their design that display the number of seconds remaining before the signal changes to red. Pedestrian initiated traffic lights may be installed at mid-block crossings to make traffic stop for pedestrians, cyclists and the physically handicapped. Audible crossing signals (pelican crossings) help everyone, as well as being essential for persons with vision impairments.



Figure 42 - Different kinds of signals that help pedestrian to cross safely

### 3.5.5 Design

As per Indian Road Congress standards the height of the kerb above the road should not exceed 150 mm (IRC: 103-2012, 6.1.4). Footpaths in residential areas require a minimum clear width of 1.8 m, which is enough space for two wheelchairs to pass each other. For commercial areas, the clear width should be at least 2.5 m (IRC: 103-2012, 6.1.5.2). Footpaths should have flat walking surfaces, allowing for proper drainage and preventing puddles from forming (IRC:SP: 50 and IRC:103-2012, 6.1.6). Guide tiles should be laid along the length of the footpath to assist persons with vision impairments (IRC: 103-2012, 6.1.4).

Hawkers or “micro-entrepreneurs” provide a wide variety of services and amenities to people, at convenient locations – with negligible investment and infrastructural costs. They keep streets busy, vibrant and safe, thus adding worth to local economy. They provide a variety of cheaper food and retail options. They infuse mixed-use and encourage walk-trips in a city planned predominantly based on private-vehicle use. They generate self-employment for a large number of people.



Figure 43 - Height and width of the footpath design for its usage

### 3.5.6 Amenities /on street facilities

Proper lighting is an important aspect for the perceived safety of pedestrian facility. Pedestrian lighting should be provided along the sidewalk, at street corners, at access to at-grade crosswalk, and, all subways

and foot over bridges should be well lit. For illuminating pedestrian facilities, pedestrian specific lighting is preferred over the general high mast street lighting. Pedestrian light poles are of low-mast, 3 to 5 meters tall. Pedestrian scale lighting ensures and illuminates the pedestrian walkways. Mid mast lighting (10-12 meter tall) are appropriate for wide streets with high pedestrian and commercial activities are involved.

Street Furniture is an important component of streets as it helps create resting or “pause” spaces along the daily paths of people and makes streets more enjoyable. Seating is an essential piece of Street Furniture which provides pedestrians and especially public transport users an opportunity to rest or pause, in the mist of their daily schedules. Seating provided must be easy to clean, located in areas that are well watched, busy, and well shaded by trees or artificial canopies - to protect people from the harsh weather.

Dustbins must be provided at each bus-stop and street intersection in order to discourage people from throwing trash on the road.



Figure 44 - Adequate pedestrian amenities (street lights, street furniture, and dust bin) in the city

Kochi city does have identified the importance of good pedestrian facilities. In fact Kochi Metro Rail Limited has shown replicable model “Street Scape Walkway” in Panampilly Nagar, a posh neighbourhood in the city is well appreciated and used by many residents from the nearby and far. As KMRL has plans to have more such initiatives in the city, we can confidently say the Kochi knows what are pedestrian rights and its importance.



Figure 45 - Pedestrian walkway at Panampilly Nagar- “Street Scape Walkway”

## CHAPTER-V

# IMPROVING WALKABILITY IN THE CITY OF KOCHI

The increase in the number of personal vehicle count has encroached pedestrian to have the Right of Way (ROW). Discussions on the urban mobility have always been around transport mobility which always gave attention on wider roads, and express highways. Attempting to provide the solution for unending traffic congestion by widening road has worsened the scenario and is not a solution for the growing number of vehicles. The growing interest on providing transport oriented infrastructure has endangered pedestrians on road; the data shows that there has been a 20% increase in the road accidents in the city. As a thumb rule, the cost to provide pedestrian infrastructure for 1 Kilometre is only one thirtieth of the cost involve for making a flyover of same distance. Further, the users of pedestrian infrastructure will be 10 times more than the number of car users. This shows the importance of making pedestrian infrastructure a priority in any of the developmental projects.

The pedestrian count during week days and weekends shows irrespective of peak or non peak hours number of pedestrians in the city at any segment is almost 2000 and above. This number calls the attention to consider "Right to Walk" as a fundamental right of any human being. According to a NATPAC study in Kochi 2013<sup>6</sup>, the walk-ability index for the city is 0.53, i.e., 'average'.

Pedestrian audit done by Centre for Public Policy Research (CPPR), 2008 had analysed the pedestrian infrastructure in Kochi which also has reflected same condition when it comes to the rights of pedestrian. As the city grew from 2008, there has not been any improvement in protecting the right of the pedestrians. The city has adequate number of policies and different agencies that can ensure the right of the pedestrians, but it lacks strong political will and vision.

There are few examples here and there in the city which were built taking care of pedestrian needs such as Marine Drive Walk Way, KMRL's Street Scape at Panampilly Nagar. These two examples cites on how a city street both in commercial and residential area can be designed in such a way that pedestrians are protected, city stands for its people's well being. This requires strong vision for the city and political will to allocate budget and execution.



Marine Drive Walk Way

Street Scape, Panampilly Nagar

Figure 46 - Images of examples from the city on pedestrian infrastructure

Promotion of sustainable transport should be made it as an agenda which should be facilitated with adequate infrastructure in terms of wide and even footpath, street furniture, crossing aids, traffic calming measures etc. City of Kochi is blessed with good fleet of public transport that connects the people with different part of the city. With Kochi Metro being functional, the major load of private and personal vehicles can be taken away from the street provided the administration ensures adequate measures to address the first and last mile connectivity.

When parking is free or inexpensive it offers little disincentive to driving. This “free” parking comes at a great social cost, however. Not only does free parking encourage private vehicles, but the significant amount of space required for car parking comes at the expense of parks, playgrounds, housing and the pedestrian realm. The only feasible solution to the parking problem is one based on reducing demand rather than increasing supply, through a range of measures that include charging by time and congestion, space occupied for all parking, and encouraging alternate modes of transport, including walking, that do not require terminal capacity (parking).

Kochi Master plans speaks for pedestrainisation and levying of congestion charges among the eight broad strategies recommended in the Master Plan drawn up for promoting non – motorised transport (NMT) along the select Kochi Metro corridors. The Master Plan also proposes for four metres wide zebra crossings and in places of intersections with pedestrian refuge, the zebra crossing should be connected directly to the refuge island.

Regularising hawking zones and demarcating hawkers without creating an obstruction for pedestrians are going to be a daunting task for the Corporation. With 2328 street vendors identified as qualified vendors, the City has plans to rehabilitate them to a permanent building which may not be a feasible solution neither for the vendors nor for the people who walk. Instead of forcing them to lose their livelihood the street design should be planned in such a way that all the prominent segments have enough place for the vendors. Otherwise, vendors will come back to the original location where they have been supported by earning a livelihood. This being a sensitive issue, the city corporation should handle it cautiously.

The wish list given by the pedestrians has only asked for safe pedestrian infrastructure and amenities which is also cited in the policies mentioned in the report. Identifying the loop holes and execution of the requirement requires political will and vision for the city.

***“Cities are for people. A city is where people come to work and raise their families and to spend their money and to walk in the evening. It is not a traffic corridor”***

-John Norquist

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<sup>6</sup>The detailed study report was not accessible and the study has calculated walkability index for city where as ESAF study has concentrated more on the qualitative assessment of pedestrian infrastructure and amenities

## CHAPTER-VI

# CONCLUSIONS AND RECOMMENDATIONS

The Walkability study conducted in the city of Kochi has thrown light to many of the infrastructure deficits in ensuring rights of the pedestrians. Though Kochi has some examples that can be replicated for the entire city, political will and adequate budget allocation is not in sync with the requirement of the city. Only 23% rated the pedestrian infrastructure as just sufficient to ensure the safety of the pedestrians, the Corporation has a major role to play.

The wish list of the pedestrians in order to have better pedestrian facilities and traffic calming measures advocate for wide and even footpaths, removal of obstructions, clean footpaths, easy access for Persons with Disability, improved pedestrian oriented street lighting, safe crossing points, zebra crossings and police enforcements.

The city has not thought about the rights of the PWD's which is a major concern. Ensuring the pedestrian safety with a universal design enables people with differently able to access the pedestrian facilities across the cities.

Implementing Street Vendor Policy and protecting the right of the Street Vendors ensure that they can ensure safety of pedestrians at any point of time. Street furniture add beauty and experience of the pedestrian be he is on his origin of travel or at the destination point. The authorities should consider planting new trees when developing the street policy, while taking care not to block pedestrian movement.

Replicating the examples of Street Scape or Marine Drive Walk Way will definitely make the city "Queen of Pedestrian Rights".

Specific recommendations:

- All high volume streets should have footpath on both the sides
- Even and wide footpath should be made mandatory across the city
- Ensuring regular maintenance of footpaths and replacing the broken tiles as and when required by the respective agencies
- Obstruction free footpath that ensures free and smooth mobility of pedestrian has to assured
- Law enforcement of ensuring obstruction free footpath and prioritising the rights of pedestrians should be strictly followed
- Provide safe level crossing at grade is within the city limits
- Repainting the zebra crossing as it fades periodically is recommended

- Tactile pavement should be provided at all locations on a pedestrian facility where there is a potential safety concern for visually impaired pedestrians
- Increase the mixed land use will help to have more diversity
- Giving priority on public spaces like parks and playground encourage more diversity to happen
- Design of the footpath has to be ensured in such a way that pedestrian do not have to frequently walk on to the carriage way
- The City Corporation should ensure that garbage is collected on a daily basis and footpath is clear of any type of disorders
- Placing dust bins and toilets at conveniently located places is important to have a safe and clean walking environment
- Audible signals such as those fitted on pelican crossings should be used with all pedestrian signals for safety of visually impaired
- Ensuring service amenities like seating , adequate tree shades, pedestrian oriented street lights
- When footpaths have a gradient unsafe for elderly people to walk, then hand rails should be provided
- Designated Hawker Zones must be allowed to locate in areas where pedestrians tend to wait or congregate
- Identifying and placing traffic wardens at all major traffic junctions and school zones should be prioritized and ensured
- Awareness on the importance of pedestrian first policy, give way of pedestrian should be conducted through various platforms especially through print, visual , audio and social media
- Illegal on-street parking should be monitored and penalized
- Provision for paid parking at some points can be thought about to reduce the congestion in the city centre and should be effectively managed
- Staggered timings for entry of trucks should be strictly enforced and executed in the city centre
- School zones should have footpaths on both the sides
- Planning for one ways or no entry zones during school opening and closing hours to reduce the traffic volume and congestion in the school zone

***“God made us walking animals - pedestrians. As a fish needs to swim, a bird to fly, a deer to run, we need to walk, not in order to survive, but to be happy”***

Enrique Penalosa

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## ANNEXURE - 1 : Segment Details

Segments identified & analyzed for the Walkability study of Kochi City, are listed below;

### 1. Edappally

Sl.No	Segment ID	From	To
1	A.1	St George School	Eddapally Bus Stop( Near Fashion Paints)
2	A.2	Eddapally Signal	MahalJumaMajsid
3	A.3	Eddapally Signal	St George Chapel (Bypass Road)
4	A.4	Eddapally Church	Changampuzha Park
5	A.5	Changampuzha Park	Modern bread
6	A.6	Modern bread	RenaiMedicity

### 2. Palarivattom

Sl.No	Segment ID	From	To
1	B.1	RenaiMedicity	Dhanalakshmi Bank
2	B.2	Dhanalakshmi Bank	SBI branch, Palarivattom Jn.
3	B.3	Palarivattom Jn.	BSNL Office, Palarivattom
4	B.4	BSNL Office, Palarivattom	Palarivattom Pipe Line( bypass)
5	B.5	Palarivattom Jn.	Dr. Koshy's Dental implant clinic
6	B.6	Dr. Koshy's Dental implant clinic	South Palarivattom (Thamanam)
7	B.7	Palarivattom Jn.	St Martin's Church

### 3. Kaloor

Sl.No	Segment ID	From	To
1	C.1	Bank of India	Kaloor Jn.( signal)
2	C.2	Kaloor Jn.( signal)	Financial corporation (Lissy Jn.)
3	C.3	Kaloor Jn.	IGNOU
4	C.4	IGNOU	Café Arabia Restaurant
5	C.5	Café Arabia Restaurant	St. Francis church
6	C.6	St. Francis church	Katrikadav Bridge

#### 4. Ernakulam Town

Sl.No	Segment ID	From	To
1	D.1	Town hall, Ekm	Kacherippadi Jn.
2	D.2	Kacherippadi Jn.	Banerji road Jn. (KSRTC)
3	D.3	Kacherippadi Jn.	Circle office, Kacherippadi
4	D.4	Kacherippadi Signal	St. Albert's College, Ekm
5	D.5	St. Albert's College, Ekm	Sariths theatre, Ekm

#### 5. High Court

Sl.No	Segment ID	From	To
1	E.1	Banerji Road, Ekm	Beverage Co., Ekm
2	E.2	Beverage Co., Ekm	High Court Jn.
3	E.3	High Court Jn. (Near vypin stand)	Army welfare apartment, High court
4	E.4	Army welfare apartment, High court	High court bridge (Fisheries)
5	E.5	High court Jn.	Dhana Lakshmi Bank (Near Bridge)
6	E.6	St. Mary's Basilica, Ekm	Market Road (near bridge)

#### 6. Menaka & Boat Jetty

Sl.No	Segment ID	From	To
1	C.1	Bank of India	Kaloor Jn.( signal)
2	C.2	Kaloor Jn.( signal)	Financial corporation (Lissy Jn.)
3	C.3	Kaloor Jn.	IGNOU
4	C.4	IGNOU	Café Arabia Restaurant
5	C.5	Café Arabia Restaurant	St. Francis church
6	C.6	St. Francis church	Katrikadav Bridge

#### 7. Ernakulam South

Sl.No	Segment ID	From	To
1	G.1	TDM Hall	Jose Junction, ekm
2	G.2	Jose Junction, ekm	Kottakalaryavydhyashalla, Pallimuku
3	G.3	Kottakalaryavydhyashalla, Pallimuku	Medical trust hospital, Pallimuku
4	G.4	Jose Junction, ekm	Hotel Grand (SRV school) South Ekm
5	G.5	Govt. Girls HSS, South Ekm.	Vallanambalam, pallimuku
6	G.6	Medical trust hospital	Kanoos theatre, Pallimuku

## 8. Thevara

Sl.No	Segment ID	From	To
1	H.1	Cochin shipyard	Vasan Eye care ( Atlantics)
2	H.2	Vasan Eye care ( Atlantics)	Thevera Jn.
3	H.3	Thevera Jn.	St. Thomas girls high school
4	H.4	St. jude's church	South Indian Bank, Thevera
5	H.5	South Indian bank, Thevera	Santhi Nagar

## 9. Vytilla

Sl.No	Segment ID	From	To
1	I.1	VyttilaJanathaJn, (ToCH school)	Welcare hospital
2	I.2	Welcare hospital	Vytilajn.
3	I.3	Vytilajn.	Royal Enfield showroom
4	I.4	Vytilajn.	Vytilla bridge

## 10. Marine Drive Walkway

Sl.No	Segment ID	From	To
1	J.1	Menkana main road	Walkway near Gate way Hotel
2	J.2	Menaka Bridge	Marine drive walkway
3	J.3	High court Junction road	Marine drive Walkway
4	J.4	Abad Residence	Marine drive Walkway

***“Urbanism works when it creates a journey as desirable as the destination”***

Paul Goldberger

## ANNEXURE - 2 : Pedestrian Count Form

Name: ..... Location: .....

Date: ..... Start Time: ..... End Time: ..... Weather: .....

Please fill in your name, count location, date, time period, and weather conditions (fair, rainy, very cold). Count all pedestrians crossing your screen line under the appropriate categories.

- Count for two hours in 15 minute increments.
- Pedestrians include people in wheelchairs or others using assistive devices, children in strollers, etc.
- Pedestrians are divided into four category and their count can be best placed under the relevant category provided below.

Hours	Pedestrians							
	Male				Female			
	Children and teenagers	Youth	Middle aged	Senior citizens	Children and teenagers	Youth	Middle aged	Senior citizens
00-:15								
15- :30								
30- :45								
45- 1:00								
1:00- 1:15								
1:15- 1:30								
1:30- 1:45								
1:45- 2:00								
Total								

## ANNEXURE - 3 : Field Walkability Survey

### Field Survey Form - Quality of Pedestrian Environments

By: Livable City Program (ESAF)

Volunteer Name: ..... Date: ..... Section ID: .....

Segment ID: ..... Start Time: ..... End Time: .....

---

1. Is road construction underway?

Yes  No

If yes, skip all questions and begin next segment on a new sheet.

If no, continue to Question 1.

2. Number of Lanes:

4 or more lanes  3 lanes  2 lanes  1 Lane  
 No Lanes

3. Two way traffic

Yes  No

4. Vehicle Speed

Not Posted  15 mph  20 mph  25 mph  
 30 mph  35 mph  40 mph  45 mph  
 45+ mph

5. Segment Type:

Low VolumeRoad  MediumVolumeRoad  High VolumeRoad  Path/NoRoad

\*\* if no road, skip the "Safety" section

6. Segment Intersections (check all that apply):

3 way intersection  4 way intersection  Other intersection  Segment ends but path continues  
 Segment ends  Segment has no intersections

## Land Use Diversity

7. Are residential and non-residential land-uses mixed in this segment?

- No mix                       Little mix                       Some mix                       A lot of mix

8. What uses do you see in this segment? (check all)

- Houses                       Office                       Public/ Government                       Schools  
 Shops                       Restaurant/ Cafe                       Entertainment                       Park/ Playground

## Footpath Availability

9. Presence of a footpath or walkway in segment?

- None                       One side                       Both sides

\*\* if no footpath or walkway skip to question 22

10. Is the footpath/walkway complete in this segment?

- Not complete                       Complete one side                       Complete both sides

## Footpath Quality

11. Is there a buffer between the road and path?

- No mix                       Little mix                       Some mix                       A lot of mix

12. What materials are used for footpath/walkway? (check all that apply)

- Paving Brick                       Concrete                       Bitumim                       Slab  
 Tiles                       Dirt/Sand                       Other

13. What is the width of the footpath/walkway?

- Less than 2ft                       2ft to 4ft                       4ft to 6ft                       More than 6 ft

14. What is the condition of the footpath/walkway?

- Poor (many heaves, broken sections)                       Fair (some heaves, broken sections)                       Good (very few heaves, broken sections)

15. Are there obstructions blocking the footpath/ walkway? (check all that apply)

- Cars/ Motorbike                       Trash cans                       Construction rubbish                       Car Exit/ entry cuts  
 Shop goods                       Pillers and cables                       Trees                       Vendors  
 Trucks                       None

16. What is the quantity of obstructions blocking the footpath/walkway?

- None                       A little                       Some                       A lot

17. Did you need to leave the footpath/walkway because of the obstructions?

- Never                       1-3 times                       4+                       Could not walk on path

18. Is there physical disorder visible in the segment (on footpath or road)?( check all that apply)

- Cans/bottles                       Cigarette/ bidi                       Urine Smell                       Garbage  
 Broken glass                       Graffiti                       None

19. What is the overall cleanliness of the segment?

- Poor (a lot of physical disorder)                       Fair (some physical disorder)                       Good (very few physical disorder)

Facilities for the Disabled .

20. Are there curvilinear or curb cuts on the footpath/ walkways of this segment?

- None                       Some intersections                       All intersections

21. Would a person in a wheelchair be able to travel along the footpath/walkway in this segment?

- Yes                       No

## Safety

22. Are there barriers that make it difficult or prevent pedestrians from crossing the street?

- High medians                       Barbed wire                       Trees/ plantings in medians                       More than 2 lanes traffic  
 Mixed Traffic                       None

23. Are there crossing aids for pedestrians to cross the street safely? (Check all that apply)

- Zebra Crossing                       Special Lights                       Police Enforcement                       Crossing Guard  
 Raised walkway                       Signs                       Underground/ Foot over bridge                       Cars obey laws/ yield  
 None

24. Are there traffic-calming and controlling devices to reduce volume or speed? (check all that apply)

- Roundabout                       Lane width restriction                       Traffic signals                       Speed humps  
 Signs (other)                       None

25. What is the posted speed limit? (if there is no posted limit, enter 999) .....

26. Do you see cars being driven in segment?

Yes  No

\*if no, skip to question 24

27. Are there aggressive drivers (i.e. speeding, not giving pedestrians the right of way)?

Yes  No

28. What are the major sign/sign boards seen in a segment/ check all ?

Speed limit  Pedestrian crossing  School Ahead  Horns Trohibited  
 Other  None

29. Is there any Railing barriers to prevent the pedestrian crossing the roads in stretches without zebra crossing?

Yes  No  Not Applicable

### Availability of Amenities

30. What types of service amenities exist in this segment? (check all that apply)

Seating  Toilet  Trash bins  Vendors  
 Other  None

31. Are there trees shading the walking area?

None/very few  Some  Many/ very dense

32. Are there lights? (check all that apply)

Road-oriented lighting  Pedestrian-scale lighting  Other lighting  No lighting

### Other

33. Are there vehicles parked on the road in this segment? (check all that apply)

Yes-car/motorbike legal parking  Yes -cars/ motorbike not legal  No cars/ motorbike parked  N/A - no road  
 Yes- trucks Legal  Yes -trucks not legal  No trucks parked

34. If yes , Is there any charge for parking ?

No charge  Yes  Less than 20 per hr/day  Above 20 per hr/day

35. Does the parking hinder the mobility of pedestrians / cyclist ?
- A little                       To some extent                       Alot                       No Hindrance
36. How much noise pollution is audible in this segment (e.g. traffic, construction, factories)?
- None                       A little                       Some                       A lot
37. How many people do you see in this segment?
- None                       1-6                       7-14                       15+
38. Are there children playing in this segment?
- Yes                       No
39. Are there people stopping to talk or greet one another?
- Yes                       No
40. What was the weather condition ?
- Hot Summer                       Raining

### **Safety in the School Premises**

41. Are there crossing aids for school children to cross the street safety ? (Check all that apply)
- Zebra Crossing                       Special Lights                       Police Enforcement                       Crossing Guard
- Raised walkway                       Signs                       Underground/  
Foot over bridge                       Cars obey laws/ yield
- None                       Restriction for some  
vehicle in school time
42. Are there enough walking space for children to walk comfortably across the road on peak times ?
- Yes                       No
43. Are there tracks for cycling in the school premises?
- Yes                       No

# ANNEXURE - 4 : Pedestrian Perception Survey

## Perception Survey Form - ESAF Livable City Project

Instructions: Complete the survey for every person you talk to. If they say they will not participate, check off "no" for questions 1 and then start a new survey for the next person.

1. We are conducting a survey of pedestrians to understand what would make the streets better for you.

Do you have a few moments to answer a survey?

- Yes                       No

If yes, proceed to question 2.

If no, "Thank you for your time." End of survey. Start new form.

2. Where are you living? Instruction: Write address as precisely as possible

.....

3. Where did you start your journey today? (instructions: do **not** prompt unless confused, select one answer)

- Work                       School                       Home                       Relatives  
 Friend                       Shopping                       Mosque/Temple                       Entertainment  
 Don't know                       Other (specify) .....

4. Where are you going on this journey? (instructions: do **not** prompt unless confused, select one answer.

If person says they are going to multiple places select their next destination)

- Work                       School                       Home                       Relatives  
 Friend                       Shopping                       Mosque/Temple                       Entertainment  
 Don't know                       Other (specify) .....

5. What is the address of your next destination? Write address as precisely as possible

.....

6. Do you fear to cross busy roads?

- Yes                       No

7. Do you think that most of the times drivers give less care for pedestrians and cyclists?

- Yes                       No                       don't know

8. What mode of transportation would you choose to travel to places that are below 2kms in distance?

- Walk                       Cycle                       Auto                       Bus/Public transport  
 Car                       Motorbike                       Other (specify).....

9. Do you feel safe to walk during night time?

- Yes                       No

10. Do you experience abuse from motorists while crossing the roads or in similar circumstances?

- Often                       Rarely                       Many times                       Never

11. According to you which type of vehicles cause more havoc to pedestrians?

- Auto                       Bus                       Trucks                       Cars  
 Motorbikes                       Other (specify) .....

12. Think about the trip that you are currently on. How much time will you spend travelling one way using the following modes: (Instructions: read out the first mode, let the person answer with no prompt, select the appropriate answer, then read the next mode, select the appropriate answer. Continue until the end).

Mode	None	<=5min	6-10	11-15	16-30	31-60	61-90	90+	Not Sure
a. Walk									
b. Cycle									
c. Bus/Train									
d. Rickshaw									
f. CNG/taxi									
h. Car/Personal Vehicle									
i. Motorbike									

13. What type of vehicle(s) does your family own? (do not prompt, check all that apply)

- Bicycle                       Car                       Motorbike                       Rickshaw  
 CNG                       None                       Not sure

14. Is there any place that you would like to walk (such as to work or to a relatives house) but you currently are unable? (Instructions: Check all that apply)

- Work                       School                       Park                       Small Store  
 Big Store                       Vendor                       Relatives/Friends                       Mosque/temple  
 Entertainment                       Does not apply/  
no place                       Other (specify).....

15. Why can't you walk to this place (places)? (Instructions: Do not prompt unless confused. Check all that apply)

- Too far                       No footpath                       Footpath quality                       Difficult to cross street  
 Afraid of crime                       Other (specify) .....

16. How would you rate the pedestrian facilities in Kochi? (Instructions: list the options, check one answer)

- Worst                       Bad                       OK                       Good  
 Best

17. If given the opportunity, what improvements would you like to have in pedestrian facilities?

The following are important possible improvements. Please pick the 5 that you think are most important. (instructions: you may need to show the person the list. Only choose the top 5. If refuse, cross out)

Improvement	Check if chosen ✓
a. Easy access for disabled people	
b. Improved street lighting	
c. Enforcement of laws	
d. Wider and level footpaths/walkways	
e. Clean footpaths/walkways (e.g. clear of disorders, rubbish, syringes, graffiti)	
f. Reduced and slow traffic on road	
g. Removing obstacles e.g. parking from footpath	
h. More crossing points	
i. Safer crossing points	
j. Other (specify):	

18. If you have to cross the road, what do you prefer? (Instructions: Do not prompt, unless confused.

Check one answer. If person has many, ask which one they would like the most)

- Zebra Crossing                       Special Lights                       Police Enforcement                       Crossing Guard  
 Raised walkway                       Foot over Bridge                       Underpass                       Sign  
 Not sure

19. In one week, how often do you feeling fear while walking because of the following?

(instructions: read out the first , let the person answer with no prompt, select the appropriate answer, then read the next mode, select the appropriate answer. Continue until the end.)

	None/Rarely	1-3 days	4-6 days	Every day	Many times a day	Not sure/ refused
a. Car/ motorbike/ personal vehicle						

b. Bus						
c. CNG/taxi						
d. Rickshaw						
e. Commercial Truck						
f. Road design						
g. Dogs						
h. Crossing street						
i. Uncovered manholes						
j. Drains						

20. How many times you been injured because of the poor quality of the footpath/walkway in the last 3 months?  
(instructions: do not prompt unless confused, select one answer)

- Never                       1-2 times                       3-4 times                       5+  
 Not sure/ refused

21. Have you seen or personally experienced the following crimes while walking in the last 3 months?  
(instruction: read out the first, let person answer, select appropriate answer then continue)

<b>Crime</b>	<b>Yes</b>	<b>No</b>	<b>Not sure</b>
a. Teasing			
b. Hijackers			
c. Political Conflict Group			
d. Conflict			
e. Addicted people/mad person			

22. Do you feel safer when there are other people walking on the street?

- Yes                       No                       Not Sure

**Socio - Economic Profile**

23. Would you like proper management for hawkers?

- Yes                       No                       Not Sure

24. Sex:

- Male                       Female

25. Age

15-30

30-50

>50

26. Occupation

.....

27. Household Income/month

<=3000

3001 - 6000

6001 - 9000

9002 - 12000

12001 - 15000

Enter Amount .....





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# WALKABILITY STUDY KOCHI

2017



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