IMPROVEMENTS IN THE PROVISION OF PEDESTRIAN INFRASTRUCTURE INTO THE ORGANIZATION AND USE OF ACCRA ROAD.

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A PLANNING DEVELOPMENT PROJECT REPORT SUBMITTED IN PARTIAL FULFILMENT FOR THE REQUIREMENTS OF THE DEGREE OF BACHELOR OF ARTS IN URBAN AND REGIONAL PLANNING

DEPARTMENT OF URBAN AND REGIONAL PLANNING

SCHOOL OF THE BUILT ENVIRONMENT

UNIVERSITY OF NAIROBI

JUNE 2014
DECLARATION

This Planning Development Project is my original work and has not been presented for a degree in any other university

Signed……………………………Date…………………………………

Kipkorir Ezekiel Kim

(Candidate)

This Planning Research Project has been submitted for examination with my approval as the University Supervisor

Signed………………………………Date…………………………………

James Murimi

(Supervisor)
DEDICATION

To my beloved parents, brothers and sisters for your undying support and care.
ACKNOWLEDGEMENT

First and foremost, I would like to acknowledge God, for awarding me the strength and perseverance throughout this project period.

I would like to extend my sincere gratitude to my supervisor, Mr. Murimi for the valuable guidance, patience and support he has given me in the writing of this development project report right from the beginning to its final completion.

I would also like to appreciate the input of project coordinator Mr. Maleche whose wonderful insights expounded my intellect in this project.

Lastly, am grateful to all my wonderful family members and friends for their unfailing support and encouragement during my entire schooling period. This academic journey has been a bumpy ride but your encouragement has seen me this far. I am appreciative to you all for your kind assistance.
ABSTRACT

Accra road section acts as an important city of Nairobi. Its importance is well known for its functions in the city especially that it connects the main CBD to the lower section popularly known as River road section of the central business district. However, due to its functionality, Accra road do experience a high rate of congestions both for the vehicular traffic and the human population. This is attributed by the fact that the road section has been converted to a matatu and bus termini. This hence encourages many vehicles and people trying to access the public service vehicles from this road section. The other reason is the presence of commercial activities along this road which attract many people into the road section, there are other causes of pedestrian space congestions like the blockage by the street sellers and display of commercial products along the road which reduces the walking space hence forces pedestrians to overflow into the carriage way for walking space. This affect the vehicular flows and poses risks to the pedestrians and the motorists. The status of the available walking spaces is wanting and insufficient for the large number of users of this road section especially at rush hours.

This development project envisions contributing towards this undertaking by providing a development improvement framework for Accra road development to efficiently redesign its usage and organization. A well urban road or street enhances livable streets; create a sense of urbanism with clean and calm environment and social environment and an economic environment that promotes growth and prosperity for the area in discussion and the country at large.

The data collection process involved the use of both primary and secondary sources. The primary data sources included data collected directly during field work that is, direct observation, administration of questionnaires among others. The secondary data employed the use of published and unpublished documents, library research and internet sources.

The development project examined two possible alternatives for the future development and improvement of the Accra road. After critical evaluation of these alternatives, the planed intervention was chosen as it effectively addresses resolution of the problems in the area. The planned improvement programme for the future of the road section will thus be based on this
intervention. This includes a site environmental management plan to effectively mitigate the possible negative impacts that may arise from the implementation process.
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<table>
<thead>
<tr>
<th>Acronym</th>
<th>Full Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>CBD</td>
<td>Central Business District</td>
</tr>
<tr>
<td>GOK</td>
<td>Government of Kenya</td>
</tr>
<tr>
<td>KRB</td>
<td>Kenya Roads Board</td>
</tr>
<tr>
<td>KURA</td>
<td>Kenya Urban Roads Authority</td>
</tr>
<tr>
<td>NEMA</td>
<td>National Environment Management Authority</td>
</tr>
<tr>
<td>NMT</td>
<td>Non-Motorized Transport</td>
</tr>
<tr>
<td>SACCOs</td>
<td>Savings and Credit Cooperative Organizations</td>
</tr>
</tbody>
</table>
CHAPTER ONE

INTRODUCTION

1.1 Overview
This chapter provides introductions that give the title, findings and recommendations of the planning research project; a summary of the development project title, objectives and methodology.

Planning research project title;

“PEDESTRIAN SPACES CONGESTIONS AND THE EFFECTS ON TRAFFIC FLOWS. A CASE OF ACCRA ROAD NAIROBI”

1.2 Summary of the Main Findings
After the analysis of the findings, the issues arising are summarized and their implications indicated as follows below.

1.2.1 Insufficient Pedestrian Spaces
The implication of insufficiency of pedestrian spaces, narrow pathways, rugged pathways and unrepaired pavements impair the pedestrian mobility along Accra road. Although there are many people walking along this road, the little spaces left for them is still competed for by other activities for instance the on-street sellers and matatu Sacco business who utilize the same space for their activities. The implications of these are seen when the pedestrians are forced to walk on any space available for instance the carriage way to reach their target destination. In this case, time used by the pedestrians from one point of the road to the other increases thus causes delays.

1.2.2 Lack of traffic control measures
Speed bumps, zebra crossing and traffic lights are missing along this road. This gives the pedestrians freedom to cross at any point of desire overlooking the risks that he/she may encounter when crossing the road. Also, it delays vehicular traffic because vehicles have to decelerate or even stop whenever pedestrians cross at almost all points in the road to reduce and
avoid accidents. The road having many intersections has no traffic lights to check on the flow of traffic and also few traffic police officers who try to manage the already congested road section.

1.2.3 Pedestrian encroachment in to the carriage way
Due to pressure on the narrow pedestrian spaces, people tend to walk on the carriage way and cross the road at any point as well. These limits the vehicular smooth flow and at the same time pose great danger to the pedestrians. The implications of these scenes leave the motorists with no choice but to decelerate to allow for pedestrian movement. This causes a scenario of mixed traffic along the road which is usually unfavourable for the pedestrians who are exposed to more risks in case of accidents. The general use of this road is still disorganized yet it is one of the roads within the CBD which should have been more decent with good aesthetic value and accommodative to all users without space conflicts.

1.2.4 Wrong Parking
Undesignated parking of vehicles along the road is the cause of congestion in the road. This hampers both pedestrians and other motorized vehicular movements and accessibility in general.

Parking at road junction breaks the continuity of the pedestrian movements along this road making them use the carriage way and this too limits the free flow of vehicles. This increases the time taken when using this road and also waste of resources when held up in traffic jam.

1.2.5 Commercial Activities
The encroachment of commercial activities for instance on-street sellers and commercial goods arranged or displayed along the shops fronts’ narrows down the space the pedestrians. The impacts of these are seen when pedestrians use the limited space hence congestion and also spill over to the carriage way. Others avoid using the road section which causes them use more time walking to their desired destination. In addition, these commercial activities are not provide with loading and unloading zones hence when undertaking this activity, the vehicles are parked on the road which prevents smooth vehicular flow while the goods on the other side blocks the pedestrian movements slowing down other activities along the road.

1.2.6 Other Non-motorized modes of transportation
Along Accra road, there are other road users for instance the people pulling and pushing the hand carts. These non-motorized modes use the carriage way in this road section. This too hampered
smooth flow of traffic along the road. The insufficiency of non-motorized spaces makes them to use any available space along the road just like the case of the pedestrians thus hinders smooth vehicular flows.

1.2.7 Utilization of the road Median
Accra road being a dual carriage road has a median. This median is being utilized mainly for parking purposes and the other uses for instance the electricity poles along the median. Advertisement activities also take place in the median. There are two at least two city county managed building structures used as ‘Iko Toilets’ plus other commercial activities like shoe shining along this road section. Some spaces are empty and unmaintained along the median of this road. These activities take place in the median without designated crossing places for pedestrians to use when accessing these structures posing great danger to them.

1.3 Summary of the main recommendation of the Research Project

1.3.1 Provision of sufficient pedestrian facilities and wider better walkways
From the research findings, it is noted that the Accra road needs the provision of sufficient pedestrian walkways wide enough to accommodate the large number of pedestrians using this section of the CBD. This will help sort the problem of pedestrians spilling to the carriage ways thus causing traffic congestion. Also provision of better pedestrian walkways will allow for better movements of pedestrians reducing incidences of human congestion. In addition to walkways, provision of other facilities for instance, benches and weather shades on the space available in the median.

1.3.2 Traffic control measures along the road
Zebra crossings, traffic lights are highly recommended to be installed along Accra road due to the presence of many road intersections along this road. Zebra crossings will enable pedestrians cross at designated points safely contrary to their evidenced crossing of the road at any point, risking their lives.

1.3.3 Road condition improvement
Poor road conditions contribute to the irregular use of roads. Improving the condition of Accra road section for instance re-carpeting the road is important so as it can allow for road marking
and provision of other road structures like signage which help in road usage. Marking especially for parking will allow for regular and organized parking along this road.

1.3.4 Control the commercial Goods displaying along the building fronts
As one of the factors affecting the pedestrian movement being the on-street sellers and commercial goods being displayed blocking the pedestrian walkways, it is recommended that the shop owners use the inner shopping areas to allow free flow of pedestrians. In the case of on-street sellers, they should be relocated to other market areas like the Muthurwa market or provided with selling stalls like the newly constructed City County of Nairobi stalls along University way near Globe roundabout.

1.4 Planning Development Project Title:
“IMPROVEMENT IN THE PROVISION OF PEDESTRIAN INFRASTRUCTURE INTO THE ORGANIZATION AND USE OF ACCRA ROAD”.

1.5 Reasons for the choice of the development project
The choice of the development project proposed is based on the main research findings, implications and their recommendations of the research project.

Accra road section is a highly congested road with mixed activities of pedestrians and vehicular flows along the road. This situation calls for a proper organization and planning of the road section to spatially make the available space accommodate the activities without further space conflicts. The improvement of pedestrian infrastructure will help in regulating pedestrian movements and their effects on the vehicular flows.

The improving the provision of pedestrian infrastructure in to road use organization along this road is justified on the basis that:

- There is limited space provision for pedestrians’ use whereby the walkways are along building fronts which are generally rugged, narrow, unrepaired, congested and competed for by other users for instance the on-street sellers, commercial activities displayed their goods, vehicular parking and even passengers’ luggage along the road. Providing pedestrian walkway will help avoid instances of people walking on the carriage way and others crossing the road section at any point.
Road use organization will help control effects of disorganized parking, commercial activities and traffic congestions along the road section.

Still on the organization on use of this road, the median should be designed in a way that it favors pedestrian use also along the road. This will create more space for the pedestrians.

1.6 Location and area coverage of the development project

The development project area covers an area of Accra Road, Nairobi Central Business District. This is a road section from the intersection at Moi Avenue to the road intersection at Cross road. It is a road stretch of about 350 meters.

Map 1: Location of Development Project

Source: google maps.

1.7 Objectives of the development project

1. To improve on the provision of the pedestrian walkways and provide for the road markings and other road signage along Accra road.
2. To re-organize the road use design for efficient traffic generation and movement patterns.
3. To prepare regulations limiting displaying of commercial goods on building fronts where pedestrians use as walkways.
4. To develop the project’s implementation, monitoring and evaluation frameworks as well as an institutional structure for the traffic management measures for control of vehicular and pedestrian flows along Accra road.

1.8 Assumptions

1. Implementation of the above project will help to decongest and reorganize the use of this road section and hence allow free movement of pedestrians and free vehicular flows along Accra road.
2. Accra road has a high number of pedestrians and with time, the number increases hence if not planned for, then there would be more space use chaos along this Accra road.
3. All the relevant stakeholders involved in this project will support the project as found necessary and appropriate.

1.9 Scope and Organization of project chapters

The project aims at establishing an approach that will improve on the provision of pedestrian infrastructure along Accra road. This action among others like reorganization of road use will help to equitably resolve the incidences of human-vehicular congestions and space conflicts. Having traffic management measures to regulate the traffic along the Accra road section is also useful to maintain the organization measures put in place and ensure aesthetic carrying out of activities along the Accra section. An institutional framework to oversee the implementation, monitoring and evaluation of the project is also provided to ensure that all the objectives of this project are realized.

The organization of project chapters is as follows:

Chapter 1: Introduction

This chapter brings out the summary of the findings and recommendations of the planning research project. It indicates the development project title, reason for the chosen development
project, location and area coverage of the project, objectives to be achieved and the scope of the project. Research methodology has also been brought out in this first chapter of the project.

**Chapter 2: Review of Policy Guidelines**

This chapter concerns the review of relevant policies, plans, planning policies, design guidelines and standards. In addition, there is also review of regulatory guidelines and handbook manuals requirements for the implementation of this development project. Analysis of past experiences and practices is also articulated in this chapter, conceptual framework and theoretical principles necessary for guiding this project implementation are brought out in this second chapter.

**Chapter 3: Situation Analysis**

This comprises of physical location of the study area and landscape or topographical and environmental characteristics of the area, background of the area, population characteristics, land use analysis and institutional, legal and financial issues of the project area.

**Chapter 4: Project Planning, Design and Implementation**

At this stage, planning design of projects, development of the spatial plan which includes the design of alternatives and drawing of spatial models of different scales. It also entails detailed design of the action plans and implementation strategies with reference to project objectives, strategies and programs identified. The chapter also has the implementation schedule and implementation agencies of the project.

**Chapter 5: Monitoring and Evaluation**

The chapter deals with monitoring and evaluation stages in the implementation of the project, guidelines of the implementation process and finally site/environmental management plan.

**1.10 Development Project Methodology**

The methodology examines the type of data needed, sources of these data and the subjects to be achieved for the study and development of this project. Also data collection methods and data analysis methods are mentioned in this section. This section also shows the methods of data presentation, limitations and the data need matrix.
1.10.1 Data Needs and Requirements
This entails all relevant data required pertaining the development of plan designs, implementation and monitoring and evaluation of this development project. The data needed depends mostly on the objectives put in place for the realization of this project and other related actions involved. In the part of data requirements, the information needed for instance project location area, population, activities’ characteristics, physical and environmental characteristics are examined in details.

1.10.2 Data Sources
Largely depending on the data needs and requirements, data sources were both from primary and secondary sources. They are mainly sources containing information on Nairobi’s transportation, roads, population and development plans and guidelines among others.

The primary data sources majorly were obtained by conducting direct interview with the key informant and field surveys. These are first-hand information concerning this development project.

The other data was sourced from various secondary materials. The major policies that were of critical consideration included the Kenya Vision 2030, the Integrated National Transport Policy (2009) and the Nairobi Metro 2030.


Data on planning standards was sourced from Physical Planning Handbook (2008), the Metric Handbook and the Building Code.

The population demographic information was majorly got from the Kenya National Housing and Population Census Report (2009) and other information obtained from the referenced sources for instance the internet sources.

1.10.3 Methods of Data Collection
Observation—direct observation helps in obtaining real time variables and helps in explain the events and organization of activities in the study area. All observable data or information about
the study area is recorded for instance road users’ behaviours’, modal splits and land use patterns. These observations are then mapped out, sketched or comprehensively described.

*Photography* – this involves capturing images in the study area. This helps in explaining the situations on the ground through images.

*Sketching* - used to represent the features as they are in the study area. This includes drawing cross-sections to show different sections of the study area.

*Mapping* - involves the locating or indicating of the major features in the study areas for instance transport networks and general representation of the area in focus.

The methods of collecting secondary data include literature review from any publication written on the subject concerning the project area, transportation and governance.

Government documents: these include the constitution, the acts of parliament, census documents, service records, policy papers, sessional papers and research papers owned by the government.

Books: these are obtained in the library and are useful in obtaining information concerning the historical developments of the city growth and changes that might have occurred in the study area. These in addition help in obtaining the legal documents guiding and controlling developments in the country and those concerning the counties’ regulations.

### 1.10.4 Methods of Data Analysis

The data collected are synthesized for the purposes of interpretation. Having both qualitative and quantitative data means that different methods were applied to process the data. For instance the qualitative data were analysed using the descriptive methods while the quantitative data were analysed using the appropriate software’s like Google Sketch up, AutoCAD for drawing representations among other methods.

### 1.10.5 Methods of Data Presentation

Generally, data used in this project were presented using the relevant methods for instance, through photographs, drawings, graphs and descriptions which takes the major section of the project and gives explanations to the whole development process.
<table>
<thead>
<tr>
<th>Objective</th>
<th>Data need</th>
<th>Data collection method</th>
<th>Data Analysis and presentation methods</th>
<th>Expected results</th>
</tr>
</thead>
</table>
| To improve on the provision of the pedestrian walkways and provide for the road markings and other road signage along Accra road. | - Existing road infrastructure conditions  
- Standards of road signs | - Field survey  
- Photographs  
- Existing maps | - Descriptive models  
- GIS maps | - Improved pedestrian infrastructure  
- Road with signage and markings |
| To re-organize the road use design for efficient traffic generation and movement patterns. | - Road users population size and characteristics  
- Vehicular travel patterns  
- Road network patterns | - Field survey  
- Road map network  
- Photographs | - Conceptual models  
- GIS maps  
- Descriptive maps. | - Organized use of Accra road with clear flowing traffic |
| To prepare regulations limiting displaying of commercial goods on building fronts where pedestrians use as walkways. | - Existing city county regulations  
- Existing extent of hindrances | - Review of CCN by-laws and regulations  
- Field survey | - Descriptive regulatory models and statements | - Pedestrian free walkways from commercial activities hindrances |
| To develop the project’s implementation, monitoring and evaluation frameworks as well as an institutional structure for the traffic management measures for control of vehicular and pedestrian flows along Accra road. | - Legal and policy of transport  
- Institutional framework for transportation planning  
- Stakeholders to be involved | - Review of policies  
- Identification of various potential stakeholders | - Qualitative selection of stakeholders involved as per policies  
- Tables with actors and their roles. | - Implemented project with institutions for monitoring, evaluating and further improving on the road usability and conditions |

Source: Author, 2014
CHAPTER TWO

REVIEW OF LEGAL AND POLICY GUIDELINES

2.1 Nairobi City County By-Laws

As a county government, Nairobi City County has its by-laws used in managing the city to ensure smooth running of day to day activities in the city. The following are some of the by-laws concerning the use of the urban road and parking spaces within the city centre.

Non-payment parking fee will lead to clamping and towing of the vehicle. Any vehicle clamped must pay clamping fees to the council. Failure to pay towing fees and other expenses incurred by the council within 60 days, may lead to disposal of the vehicle through the public notice auction.

Parking attendants shall at all times put on a uniform, carry and have with them a proper identification badge issued by the council. You need a council permit to run a commercial private parking place. Vehicles must be parked within the space indicated by lines or any other mark provided by the council.

The council will not be responsible for damage or loss incurred during clamping or removal of the offending vehicle.

Those concerning the use of matatu terminus are as follows:

1. Parking of any vehicle other than a matatu at a matatu terminus is an offense.
2. Matatu should only be parked at a matatu terminus and will only stop to pick or drop passengers at a designated bus stop. All matatus at terminus should be under direction of an enforcement official.
3. One should not drive more than 10km/hr. into the terminus. Importuning for passengers on the streets or terminus is an offense.
4. A matatu abandoned at the terminus without adhering to the by-laws may be removed by an enforcement officer. If fees and expenses incurred in the removal of the matatu are not paid within 60 days.
from day of removal, the council may dispose it to cover outstanding fees and expenses.

5. Six or more persons waiting to enter a matatu at a terminus or designated stopping place must form a queue. Hawking of goods at a matatu terminus without a permit of the council is illegal.

2.2 Development Ordinances and Zones
This is a simplified guide to those aspects of the development ordinances that every property developer in this City requires in setting up any form of development – be it residential, commercial, industrial, institutional or religious. With the continued high rate of urbanization, the City Council of Nairobi has a duty to use planning controls to ensure that development is allowed only where it is needed, while ensuring that the character and amenity of the area are not adversely affected.

2.3 Zoning Guide
For a concerted approach to achieve these planning objectives, this zone guide gives prospective developers general planning guidelines that would hasten awareness on development control, ease the procedures for making development applications and hence curtail inappropriate illegal developments. The table below is a section of the zoning guide for the Central Business District.

Table 2: Nairobi City Zoning Guide

<table>
<thead>
<tr>
<th>ZONE</th>
<th>AREAS COVERED</th>
<th>GC %</th>
<th>PR %</th>
<th>Dept Ref. Map</th>
<th>TYPE (S) OF DEVELOPMENT ALLOWED</th>
<th>MIN. AREA (Ha.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1A</td>
<td>Central Business District (CBD)</td>
<td></td>
<td></td>
<td></td>
<td>Commercial/Residential/Light Industry</td>
<td>0.05</td>
</tr>
<tr>
<td></td>
<td>• Core CBD</td>
<td>80</td>
<td>600</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Peri-CBD</td>
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<td>500</td>
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2.4 Kenya Vision 2030
The vision’s implementation is through five year medium-term rolling plans, starting with the first one which will cover the period 2008-2012. Thus, the performance of the government should in future be gauged on the basis of these medium term benchmarks. The Vision also aims
at creating a cohesive, equitable and just society based on democratic principles and issue-based politics grounded on our rich and diverse cultures and traditions.

It recognizes transport as a key component in creating a competitive business environment as well as a reliable means through which other economic and social objectives will be achieved. This therefore creates the need for an efficient transport system which minimizes travel times and distance. The strategy thus suggests a raft of policy intervention areas which include promotion of public transport, mobility and freedom of movement.

Investment focus is made on construction of new roads and improvement of the existing networks. This also includes highway capacity improvements, development of bypasses and development of a priority road network. There are also plans to consider the maximum maintainable road networks which include all the major roads, the main radial routes to outlying areas and the roads which connect these radial routes to the city centre. There is also a critical concern to ensure adequate provision for metropolitan wide non-motorized transport, mobility network.

2.5 Integrated National Transport Policy

This policy covers key challenges related to transport infrastructure planning, development and management, legal, institutional and regulatory framework for the sector, safety and security, funding, gender mainstreaming, utilization of Information and Communication Technology (ICT), and environmental considerations, among others. Its aim is to provide a policy that is conducive to the stimulation of rapid development and efficient management of a safe, widely accessible transport system that responds to modern technological advancement in a rapidly changing and globalized environment.

Some of the current transport sector challenges identified in the INTP are as follows:

- Poor quality of transport services
- Inappropriate modal split
- Lack of inter-modal integration
- Weak adherence to environmental requirements
- Lack of urban transport policy
- Institutional deficiencies
- Lack of funds for development and maintenance of roads.
Although various forms of NMIMTs are already in use in several parts of the country, little has been done to incorporate them into the road transport network or in the national transport system and indeed into the road transport policy so that they can effectively play a complementary role in the transportation of both passengers and freight. There is a need for their recognition, development, funding and technical support from various government bodies, local authorities, and the private sector. Lack of infrastructure for NMIMTs has led to a situation where the same road space is shared amongst pedestrians, motorized transport and NMIMTs thus compromising safety.

The development and maintenance of infrastructure for NMIMTs will be supported by all local authorities and road agencies. In the urban areas, each local authority or agency will provide and maintain adequate sidewalks and pavements for pedestrians, separate lanes, parking bays, bridges, footpaths, and other facilities for NMIMTs, including ramps for the physically challenged. All road agencies shall make provision for NMIMTs facilities in their planning and design programmes, irrespective of the use of those facilities by motorized vehicles.

NMT and IMT infrastructure, including footpaths, foot bridges, and ramps for the physically challenged will be developed and provided in designated roads irrespective of their use by motorized transport and shall be eligible for technical and financial support from the road agencies.

2.6 The Traffic Act (CAP 403)

This is an Act of Parliament to consolidate the law relating to traffic on the roads. This act indicates the laws that should be followed by the road users and emphasis has been given to the motorists. The act deals with registration of vehicles, licenses concerning motorists, traffic offences and their respective penalties and regulation of traffic. The section of regulation of traffic shows the power to regulate traffic and also the traffic sign which is very important aspect in the roads. The act entails the regulations for the provisions of the parking spaces and subsidiary legislations for instance Nairobi by-laws (2008).

2.7 Physical Planning Act, cap 286

An Act of Parliament to provide for the preparation and implementation of physical development plans and for connected purposes.
According to the physical planning Act, the following are regulations for the purpose of renewal or redevelopment plans.

(a) Providing a broad land use framework illustrating a co-ordinated policy of renewal and guiding both public and private redevelopment activities;

(b) Providing a road pattern and traffic networks designed to improve vehicular access and parking space and also facilitate segregation of vehicles and pedestrians;

(c) Providing a basis for determining development applications on extensions of leases, extension of users and change of users.

The form and content of renewal plans include a set of written statements and land use maps whose details are outlined below—

Content of Renewal Plans

(a) Land use pattern analysis:

The analysis must deal with policy statements and land use proposals to facilitate:

(i) Conservation of areas whose historic, architectural, or commercial values are relatively high;

(ii) Improvement of general up-grading of areas whose existing conditions are desirable; and

(iii) Comprehensive cumulative redevelopment of areas whose conditions are undesirable.

(b) Traffic systems:

This analysis should comprise policy statement and land use proposals for—

(i) Safe pedestrian movement;

(ii) Easy access to buildings;

(iii) Efficient circulation of traffic with business;

(iv) Convenient and ample public car parks;

(v) Efficient road links, among other things.

2.8 The Urban Areas and Cities Act, 2011

An act of Parliament to give effect to Article 184 of the Constitution; to provide for the, classification, governance and management of urban areas and cities; to provide for the criteria of establishing urban areas, to provide for the principle of governance and participation of residents and for connected purposes. The objects and purposes of this Act are to establish a
legislative framework for governance and management of urban areas and cities. It also outlines preparation of integrated city development plans.

2.9 Environmental Management and Coordination Act, 1999
An ACT of Parliament to provide for the establishment of an appropriate legal and institutional framework for the management of the environment and for the matters connected therewith and incidental thereto. In the act, the principles state that every person in Kenya is entitled to a clean and healthy environment and had the duty to safeguard and enhance the environment. This entitlement to a clean and healthy environment includes the access by any person in Kenya to the various public elements or segments of the environment for recreational, educational, health, spiritual and cultural purposes.

The National Environmental Authority established in this Act shall co-ordinate the various environmental management activities being undertaken by the lead agencies and promote the integration of environmental considerations into development policies, plans, programmes and projects with a view to ensuring the proper management and rational utilization of environmental resources on a sustainable yield basis for the improvement of the quality of human life in Kenya. The proponent of a project shall undertake or cause to be undertaken at his own expense and environmental impact assessment study and prepare a report thereof where the Authority, being satisfied, after studying the project report submitted, that the intended project may or is likely to have or will have a significant impact on the environment. This act supports the making of a site/environmental management plan in the development project.

2.10 Physical Planning Handbook

Primary Distributors

These are sometimes referred to as arterial, major or urban freeway roads. They form the primary road network for an urban area as whole. All external through traffic movement to, from and within the urban area are channelled to the primary distributors, which are intended for free flow of traffic.
District Distributors

These are also referred to as collector or minor roads. They distribute traffic within residential, industrial and central business districts of the urban area. They form the link between primary network and various neighbourhoods and localities.

Local Distributors or Feeder Roads

These roads distribute traffic within neighbourhoods and localities. They form a link between district distributors and access roads.

Access Roads

These roads give direct access to buildings and land within neighborhoods and localities. They include: Cul-de-Sac or Dead-end Streets: meant to eliminate through traffic in a cluster of houses. Therefore, to retain their inherent advantage they should be short, normally up to a maximum of 60 meters. Loop Street or Crescent: a variation of the Cul-de-Sac but eliminates the necessity of dead-end and therefore provide continuous circulation in the residential cluster and ensure easy accessibility to properties without road frontage. Service Lane: this is a road parallel to main access road to buildings provided for parked loading or off-loading of goods. Service lanes should be separated or screened from the main roads using buffer zones.

2.11 Urban road Reserves

Urban road reserves require more generous space provision because of additional street furniture and infrastructural facilities that have to be provided. In most instances, the road has to accommodate multiple functions that have to be independently provided in design.

Way leaves for trunk services such as water and sewerage, underground telephone cables and high voltage power lines, when provided along road reserves require additional provision.

Further, the role of the informal sector in job creation in urban areas has now been recognized. Most of the informal activities are footloose and heavily dependent on passing trade. They therefore require specific provision when located within road reserves.

Because of the above reasons, the following urban road reserve widths have been recommended:
Primary Distributors

Major communication routes 60m.

Important through routes 30-36m.

District Distributors

Spine roads and roads in commercial or industrial area 25m

Bus routes 25m.

Local distributor roads

With no direct vehicular access to Individual plots. 18m

Local Distributors

Major access road exceeding 150m in length 15m.

Access road not exceeding 150m in length (normal Residential Street) 12m

Access Roads

Cul-de-Sacs or short connecting road not exceeding 6m-9m

Service lanes 6m

Cyclist lanes 3m

Footpaths 2m.

Road Standards

(a) Carriageway Widths

The following are the recommended carriageway widths:
• Trunk and Major Roads          7.5m or more
• Commercial and Industrial streets     7.0m or more
• Spine Roads and Bus Routes          7.0m
• Access Roads (in residential areas)     5.5m
• Cul-de-Sac (not exceeding 60m)         5.0m

The standard provision for footpaths shall be 2m wide footway on each side of the carriageway, subject to the following relaxations: Occasional obstructions shall nowhere reduce the footway width below 1.2m. Pedestrians shall be physically separated from moving vehicles by a barrier such as an upstand kerb, open drain or wide verge.

2.12 Metric Handbook Planning and Design Data
The following are the definitions of terms according to the Metric Handbook.

Carriageway: the area of road surface dedicated to vehicles and Carriageway width is the distance between the kerbs forming the carriageway edges

Dual carriageway: a road with a central reservation, each separate carriageway carrying traffic in the reverse direction lane: a width of carriageway capable of carrying a single line of vehicles, usually delineated with white-painted dashed lines on the carriageway surface

Lane width: since the maximum vehicle width permitted is 2.5 m, and the minimum clearance between parallel vehicles is 0.5 m, the minimum lane width is 3 m. However, vehicles travelling at speed require greater clearance and large vehicles need greater widths on curves, so faster roads have wider lanes

Cycle track or cycle path: a completely separated right-of-way primarily for the use of bicycles

Cycle lane: a portion of a roadway which has been designated by striping, signing, and pavement markings for preferential or exclusive use by cyclists

Shared roadway: a right-of-way designated by signs or permanent markings as a bicycle route, but which is also shared with pedestrians and motorists

Footway: an area of road devoted solely for the use of pedestrians, including those in wheelchairs or with prams, and running alongside the vehicular carriageway. In Britain the
footway is also called the ‘pavement’, in the USA the ‘sidewalk’ and finally a Footpath is a facility for pedestrians not forming part of a road.

2.13 Critics of the Transport and Planning Legislations
Although there is existence of the transport legislations and also the planning legislations in Kenya, there is still laxity in implementing and adhering to these laws and policies to the latter. This can be observed from the current transport challenges faced in Kenya. These include:

1. Poor quality of transport services especially in urban areas
2. Inappropriate modal splits
3. Lack of inter-modal integration in the country
4. Lack of urban transport policies
5. Institutional deficiencies concerning transport sector in the country
6. Lack of enough funds for development and maintenance of roads in the country
7. Poor road conditions in the country
8. Narrow roads which cannot conform to the set standards thus cannot accommodate the increasing traffic especially in urban areas.

2.14 Case Studies

Under the theme “Creating space for sustainable transport”, private car access to the city centre was restricted with the closure of the main High Street. This closure, as part of the Oxford Integrated Transport Strategy (OTS), in addition to a number of other traffic management changes in the city centre, represents the most significant change to the transport system of Oxford for over 25 years.
Oxford is an historic university town, with a city centre characterized by a medieval street network and buildings. The city is bounded on three sides by the River Isis. The surrounding catchment area is predominantly rural, with approximately 78 500 trips made into the city per day (12-hour period). The city is a popular tourist destination.
During the 1980s the city was experiencing worsening environmental conditions, including increasing air pollution and noise levels, as a result of increasing car traffic levels. Pollution was having a negative impact on both the historic fabric of the city and the urban quality of life. Traffic congestion was a growing problem, affecting the speed and therefore attractiveness of
public transport services. Conditions for pedestrians and cyclists were negatively affected by the dominance of private motorized vehicles.

Predictions of increased traffic congestion as a result of the city centre closure did not materialize. Over the 12-month period, between June 1999 and June 2000, traffic flows on the inner cordon were down by an average of 20%. Traffic flows on the outer cordon over the same period remained largely unchanged with a small reduction of 1.3%. It appears that some of the traffic has evaporated. A fall in the number of cars parking in the city centre has been outweighed by an increase in park-and-ride use. Air quality has shown a marked improvement across the central city area. Change in modal split away from the private car provides clear evidence of the success of the OTS. In 1991 the person-trip ratio (excluding pedestrians) was 54% for private cars, 27% for buses and 11% for cyclists. By 2000, the modal split was 39% for cars, 44% for buses and 11% for cyclists.

**The strategy: Oxford Integrated Transport Strategy**

In 1993, the first stages of the ‘Oxford Integrated Transport Strategy’ (OTS) were implemented. The aims of the OTS were to:

- reduce the problems of congestion and environmental pollution due to traffic
- improve the general quality of life in the city centre
- make public transport, walking and cycling more attractive alternatives to private car use
- improve road safety
- promote economic vitality
- provide suitable access arrangements and improved accessibility for mobility impaired people.

A step-by-step approach to the implementation of a package of traffic management measures was seen as critical. As a result, the road closures required to improve environmental conditions in the central city area were only adopted after the implementation of a phased five-year plan which aimed at encouraging people to switch from the car to other more sustainable transport modes. These measures included: park-and-ride expansion and enhancement, cycling facility improvements, bus priority routes, and central area parking restrictions.

In order to proceed with the next phase of the OTS, in addition to an extensive consultation process, a public inquiry was necessary due to the scale of change proposed to the road network.
Approval was obtained, and work began on alterations to roads in the city centre in September 1998. On 1 June 1999, the road space reallocation was implemented, most notably the full Pedestrianization of the most important shopping streets (Corn market Street and the west part of Broad Street), and the removal of most traffic from High Street and St Aldates during the day. Additional traffic management changes included the introduction of bus priority routes and associated traffic calming, access and parking arrangements.

In the weeks running up to the opening date a publicity campaign was organized. Leaflets, advertisements on buses and poster boards around the city provided information about the impending changes, followed by a series of press releases in the final two weeks before the OTS launch. The publicity invited people to contact the city and county council with questions about the scheme. Opposition to the scheme was raised, most notably on the basis that traffic congestion on two key routes in the city would worsen, and from retailers concerned about delivery access and trade levels. Press coverage of the scheme raised these concerns.

Detailed monitoring of the situation was carried out. Central government approval of the OTS in 1993 was contingent upon an extension of the existing traffic-monitoring programme to include elements such as bus journey times and pedestrian flow counts in order to fully monitor the impact of the scheme. Funding support from the European Commission for the EMITS project (Environmental Monitoring of Integrated Transport Strategies) through the LIFE '95 programme made it possible to monitor additional aspects of the strategy, for example, the effects on air pollution and economic vitality.

**Modal split**

Annual classified surveys show that the daytime split by mode has significantly shifted away from the private car. In 2000, the person trip-ratio (excluding pedestrians) was 39 % for cars, 44 % for buses and 11 % for cyclists. This compares with 54 % for private cars and 27 % for buses in 1991 before the implementation of the OTS (cycling as a proportion had not changed).

**Air quality**

Air quality which is monitored at over 40 sites across the city has improved significantly. Within weeks of the road closures, a 25 % reduction in particulate matter was observed in Corn market Street (see diagram above), and carbon monoxide levels showed a 75 % improvement at St Aldates. The majority of sites throughout the city show reductions in nitrogen dioxide levels.
Retail activity
A sample of nine retailers in the central area showed a decline in trade during the period June 1999–June 2000, a trend that continued throughout the rest of 2000. However, nationally most retailers have been suffering difficulties, linked in particular with the high value of UK sterling which has affected the number of foreign tourists. However confidence in the city of Oxford remains high and the vacancy rate for retail units of 1% (2001) is very low.

Media reaction/public acceptance
Press coverage of the scheme was mixed. Traffic congestion and delays caused by the initial confusion and displacement of traffic were cited in declaring the OTS unsuccessful. However most of these problems were short-lived and media and public acceptance of the scheme has grown as the advantages of the traffic free environment, in addition to the other measures, have become apparent.

2.14.2 Achievements and Lessons Learnt
• The adoption of a step by step, integrated approach to the implementation of the OTS was seen as critical to the success of the significant road space reallocation element of the scheme.
• Comprehensive monitoring of a wide range of elements before and after the road closure provided arguments in support of the scheme.
• The length of road dedicated to pedestrian areas is relatively short, thereby successfully retaining pedestrian and retail activity.
• Effective marketing of the scheme, linked with a comprehensive communications strategy, enabled transport planners and politicians to emphasize both the need for change in travel behaviors—continuing the status quo was not sustainable—and the advantages that would result from the scheme in terms of improved environmental conditions, amenity and accessibility.
Plate 1: High Street, England

*High Street — before (left) and after (Right) the central area challenges*

2.14.3 Case study 2: Mama Ngina Street, Nairobi

In the City of Nairobi, the existing pavement and walkways can hardly contain the current human traffic. Not only is it common for people to dodge each other while walking on sidewalks, some people opt to walk on the road to avoid the crowded walkways. Nairobi’s walkways have been the same size for over sixty years, when the city population was less than a third of what it is now.

Plate 2: Mama Ngina Street, Nairobi

Source: Global Site Plans, 2014
This crowded environment is attractive to pickpockets and downtown muggers. Some pavements also serve as bus stops and haggling touts make it worse. Should the hawkers or street vendors be in town, there may be no space to walk at all. One functional disorder in the city is the dedication of more space to roadside parking than pedestrian walkways. With hundreds of pedestrians on the walkways, the combination of angled parking and narrow pavements appear to be a contradiction to the basic principles of democracy. The City has only two distinct walkways: Aga Khan Walk is Nairobi’s only fulltime pedestrian street while Mama Ngina Street was re-designed as a ‘traffic calming street’ with no roadside parking and a wider pedestrian walkway designed as a ‘traffic calming street’ with no roadside parking and a wider pedestrian walkway. The popularity of these streets tells one of their importance’s.

2.14.4 Achievements

1. Shaping of public space and creation of walkable links
2. Wider pavements for Better accessibility and sustainability
3. Better lighting thus improved security especially at night
4. Clear road signings and well-designed building facades
5. Space for street trees to enhance environmental aesthetics

2.14.5 Lessons learnt
Pedestrian schemes, however, should not create traffic problems on other roads; otherwise they end up shifting problems. A good walkable environment works better with efficient mass public transportation systems like bus rapid transit, urban rail and aerial cable transportation if it can be installed.

City authorities should start thinking of how walkable their cities are beneficial to their residents and the possibilities to turn parts of the Central Business District from car-choked areas to havens for those on foot.
Figure 1: Conceptual Framework

**Existing situation**

- Non-review of urban road design usage
- Inefficient pedestrian spaces
- Existence of uncontrolled activities especially transport related
- Human and traffic congestions
- Increasing number of activities versus limited space
- Several actors having the same functions

**Policies and legal documents**

**Policies**

Millennium Development Goals (MDGs), Kenya vision 2030, Integrated National Transport Policy (INTP)

**Legal documents**


**Others**

Regulatory guidelines, planning and design standards (Physical planning Handbook 2008, Neurfert and A.J metrics and CCN by-laws among others)

**Projected proposal**

Improvements in the Provision of Pedestrian Infrastructure into the Organization and use of Accra Road.

**Projected elements**

- Improved pedestrian spaces conditions
- Increased sizes of pedestrian walkways
- Provisions of traffic controlling systems
- Road markings
- Environmental conservations
- Controlled commercial activities along the streets

**Desired future**

- Broader and improved pedestrian walkways
- Regular revision of urban road usage design plans
- Efficient and adequate utilization of street spaces without traffic related conflicts of spaces
- Harmonization of involved institutions
CHAPTER THREE

SITUATION ANALYSIS

This chapter states the physical location of the project area and landscape or topographical and environmental characteristics of the area, background (history, planning and development) of the area, population characteristics, land use analysis and institutional, legal and financial issues of the project area.

3.1 Location context of the project area
The city is located at 1°17'S 36°49'E and is set almost in the middle between Kisumu and Mombasa cities. The business district is boxed within the four main roads; Uhuru Highway, Haile Selassie Avenue, Moi Avenue and University Way.

The project area is in the central business district of Nairobi city. It is situated along the Accra road section which is a road stretch connecting the Tom Mboya Street and Cross road.

Figure 2: Location of the Project

Source: Google maps, 2014
3.2 Background and History of the project area.

Nairobi is the capital city of Kenya. The city and its surrounding area also form the Nairobi County. Founded by the British in 1899 as a simple rail depot on the railway linking Mombasa to Uganda, the town quickly grew to become the capital of British East Africa in 1907, and eventually the capital of the newly independent Kenyan republic in 1963. By 1900, Nairobi had already become a large and flourishing settlement consisting mainly of railway buildings and separate areas for Europeans and Indians, the latter being mainly laborers employed in the construction of the railway. There was practically no African settlement (Aligula et al, 2005). During Kenya's colonial period, the city became a centre for the colony's coffee, tea and sisal industry. Nairobi city is also a county in itself. The first comprehensive plan of the city (the Nairobi Master Plan for a Colonial City) was commissioned in 1948, but was never adopted fully. The plan laid down guidelines for Nairobi’s future development, earmarked land for major uses and made important proposals for extensions to the road network. Using the concept of functionalism, the plan created a modern national city to cater for industrial expansion and the growing numbers of African wage earners working in the industries. The plan also used the garden-city concept to divide residential areas into neighborhood units. In the 1948 master plan for Nairobi, the Neighborhood Unit Concept was highly advocated for and it affected the Africans the most. Courtesy of this concept, the density expected in African locations was 30 persons per acre (80 persons per hectare). The neighborhood units were planned such that workers in the industrial area could walk through a distance of at most 2 miles to their work places. The present layout of both the Industrial area and the Road Network is attributed to the 1948 master plan (Mwaura, 2002).

In 1963, the new independent government expanded the city boundaries from 90 sq. km to 690 sq. km. The intention was to include adequate land for future expansion for residential and commercial development and to absorb the peri-urban settlements. (www.standardmedia.co.ke). Nairobi is the most populous city in East Africa, with a current estimated population of about 3 million. Nairobi is currently the 14th largest city in Africa, including the population of its suburbs.
3.3 Site Analysis.

3.3.1 Climatic conditions

Nairobi has a subtropical highland climate (Cfb). At 1,795 metres (5,889 ft.) above sea level, evenings may be cool, especially in the June/July season, when the temperature can drop to 10 °C (50 °F). The sunniest and warmest part of the year is from December to March, when temperatures average the mid-twenties during the day. The mean maximum temperature for this period is 24 °C (75 °F). The average daily temperatures of the project area range from 29oC in the dry seasons to 24oC during the rest of the year. The minimum daily temperature range is huge, from 10oC to 30oC in May and February respectively. The hottest months are from January to March. Design of the buildings in the area must thus be such that the room temperatures are neither too cold nor too hot for the comfort of the occupants.

There are two rainy seasons, but rainfall can be moderate. The cloudiest part of the year is just after the first rainy season, when, until September, conditions are usually overcast with drizzle. As Nairobi is situated close to the equator, the differences between the seasons are minimal. The seasons are referred to as the wet season and dry season. The timing of sunrise and sunset varies little throughout the year for the same reason (World Meteorological Organization). Maximum relative humidity occurs near dawn whereas the minimum relative humidity happens in the rainy seasons. The relative humidity however generally ranges from a daily maximum of 88% in May to daily minimum of 35% in April.

3.3.2 Geology

The soils of the Nairobi area are products of weathering of mainly volcanic rocks. Weathering has produced red soils that reach more than 50 feet (15m) in thickness (Saggerson, 1991). A number of subdivisions are recognized in the Nairobi area according to drainage, climatic regions and slopes, and other categories have been introduced for lithosols and regosols. Dominant in the study area are phonolites of middle Pliocene rocks. They are found 2-3 feet below the ground. Soils within the area are basically black cotton soils which are 2-3 feet deep in most parts. This geological structure can support tall building densities as they are along Accra road.
3.4 Population and demographic characteristics.

According to the 2009 Census, in the administrative area of Nairobi, 3,138,295 inhabitants lived within 696 km² (269 sq. mi). The proportion of the population living below the poverty line increased from 26% in 1992 to 50% in 1997. The dependency ratio is 71.3% for the poor, 48.1% for the non-poor and 52.75% in Nairobi as a whole. The total fertility rate is 3.5% for the poor, 2.6% for the non-poor and 2.8% for Nairobi as a whole (Ottichillo 2009). The daytime population in the city is higher than the resident population. This daytime population includes people from the surrounding areas who come to the city for job, commercial activities or other purposes but they do not live within Nairobi County.

3.4.1 Socio-economic characteristics

Socio-economically, Nairobi employs 25% of the country’s workforce and 43% of the country’s urban workers, and generates more than 45% of national GDP (UN-HABITAT 2006). However, socio-economic conditions are deteriorating quickly, especially in the last two and a half decades. The city’s functions have expanded to such an extent that it has become the primate city in the country. It is the political, social, cultural, and economic capital of Kenya. In addition to being the capital city of Kenya, it serves as the regional and international headquarter for several commercial and public institutions, including many multinational companies and United Nations agencies.

The city of Nairobi has experienced tremendous growth in the last four decades. Rapid population increase has been both a cause and effect of this growth. In less than one hundred years Nairobi has burgeoned from an uninhabited vegetated plateau into a metropolis with over 3 million inhabitants. This rapid growth of the city has not been accompanied by systematic planning and development of physical infrastructure and social amenities, and adequate attention has not been paid to the conservation of natural resources and the environment. As a consequence, the city is currently faced with numerous problems. Among these problems are poor urban infrastructure; inadequate social amenities; haphazard and uncontrolled growth; inadequate and inappropriate housing; unprecedented growth and mushrooming of slum dwellings or urban sprawl; poor transport system; poor water and sewerage system; environmental deterioration; and personal insecurity.
3.4.2 Cultural and political profile of the population
Owing to rural-to-urban migration after independence, in 1970, the European population dropped
to 4%, the Asian population to 14% and the African population increased to 83%.4 The African
populations is currently made up of a mix of Kenyan ethnic groups. Most immigrants in Nairobi
come from the Central, Nyanza and Eastern Provinces of Kenya.
Nairobi is a cosmopolitan city, with foreigners working in various international organisations
located in the city. It is composed of Europeans, Asians, Somalis and Nubians, who are citizens
of Kenya; citizens of various African countries; and Kenyans from all parts of the country.

3.5 Accra Road use Analysis.
The following summarizes the analysis of the usage of Accra road.

3.5.1 Parking
The Accra road stretch is a wide road stretch and it is dual carriage road. The road is mainly used
by the public service vehicles as their termini. These are majorly long distance public service
vehicles. The parking spaces are used as the boarding and alighting zones by these public service
vehicles. This is more contributed by the presence of their booking offices along the road. The
parking spaces are on both sides of the road and also along the median. This means that there are
on-street parking spaces of which they are largely used as boarding and alighting areas by the
matatu Sacco vehicles.

3.5.2 Vehicular Traffic Generation Pattern
The main source of vehicular traffic along Accra road is the presence or the use of the road as a
bus/matatu terminus. This attracts many vehicles hence in most of the day times the road
experiences traffic jams. Another vehicular generator is the centrality of the road connecting the
upper part of the CBD and River road sections. This causes many vehicles use this road for
easier access to other lower roads.
3.5.3 Pedestrian Generators and Movement Pattern
The main pedestrian generators in Accra road are the bus/matatu terminus. The presences of commercial activities along the road also attract pedestrians thus a more congested road especially during the day. The road is also used by the pedestrians to access the other parts of the town due to the presence of other roads linked to the Accra road.

In terms of the movement patterns, pedestrians move along the building facades and some along the carriage ways due to the congestions along the road. They also cross the road at any point thus affects the vehicular flows along the road.
3.5.4 Commercial Activities
Accra road being within the CBD has attracted many commercial activities. These activities on the buildings along the road and they include shops selling different commodities, hotels and restaurants and offices. Some commercial activities which are not necessarily on the buildings are on-street sellers who use the space that is supposed to be utilized by the pedestrians.

3.5.5 Electricity lines
Electricity is basically aligned along the main road that is Accra road. The electricity has been supplied to the various commercial buildings within the study area. The power poles are placed in the median of the road with even the power transformer at the intersection of Accra road and River road. This poses grave danger to the motorists and general road users in the case of an accident involving these power poles along the road. The road is well installed with street lighting and is in good condition.
Figure 3: Existing situation of Accra road

On-street parking and pedestrian walkways along building fronts/facades. Also there is presence of on-street sellers.

Source: Author, 2014
3.6 Institutional, legal and financial issues of the project area.

The project area has two key institutions that shall be involved in its execution. They include; The Nairobi City County especially the ministry of lands, housing and urban development which entails the department of city planning will be the lead agents. The NCC tasks will involve the acquisition of the road section in collaboration with Kenya Urban Roads Authority (KURA) and financing the project shall be through the Kenya Roads Board. The other institutions that will be involved include KURA, NEMA, Matatu Saccos/Union and the members of the public.

All duties will be executed under the mandate and in accordance with the provisions of the Constitution of Kenya (2010), the County Government Act (2012), the Urban Areas and Cities Act (2011), the Physical Planning Act (1996) EMCA, Integrated National Transport Policy among others.
CHAPTER FOUR

PROJECT PLANNING, DESIGN AND IMPLEMENTATION

4.1 Overview
As outlined in Chapter one of this report, the objectives of this project will be achieved through a series of designs. The designs have been developed through a series of steps as outlined in the sections of this chapter.

Table 3: Planning and Design of projects (expected outputs and outcomes of the project)

<table>
<thead>
<tr>
<th>Objective</th>
<th>Outputs</th>
<th>Expected Outcomes</th>
</tr>
</thead>
</table>
| To improve on the provision of the pedestrian walkways and provide for the road markings and other road signage along Accra road. | ➢ Acquisition of parking space adjacent to the buildings to be used by pedestrians.  
➢ Repairing of the existing walkways.  
➢ Provision of road signage along the road including installation of traffic lights, parking spaces marking and zebra crossings at the intersections. | ➢ Increased pedestrian walkways hence reduction of pedestrian congestions.  
➢ Improved pedestrian walking space conditions  
➢ Organized traffic movements  
➢ Well parked vehicles along the road on the marked spaces  
➢ Safer road crossing by the pedestrians along Accra road                                                                                           |
| To re-organize the road use design for efficient traffic generation and movement patterns. | ➢ Restriction of the remaining parking space to be used for parking only but not as bus or matatu termini  
➢ Distribution of existing termini among other small road like Tsavo road, Timboroa road, Dubois road, Munyu road, Duruma road and Taveta road to reduce vehicular congestion on Accra road | ➢ Reduced incidences of wrong parking  
➢ Less congested road  
➢ Improved vehicular traffic movements  
➢ Distributed traffic generation pattern  
➢ More organized Accra road in terms of pedestrian and vehicular uses.                                                                             |
To prepare regulations limiting displaying of commercial goods on building fronts where pedestrians use as walkways.

- Disallowing display of commercial products along the building facades or placement of other commercial product along the road where pedestrians use as walkways.
- Free from obstructions way for the pedestrians hence smooth movements.

To develop the project’s implementation, monitoring and evaluation frameworks as well as an institutional structure for the traffic management measures for control of vehicular and pedestrian flows along Accra road.

- Project’s Implementation Strategies and schedules
- Project’s Monitoring and Evaluation framework
- Institutional framework for project’s implementation.
- Adequate implementation, monitoring and evaluation of developments in the project area.

Source: Author 2014.

### 4.3 Development of the spatial plans

In order to develop alternative spatial designs, it is necessary to understand how activities occur in the project area. For instance, some of the challenges experienced in the project are include insufficient pedestrian spaces, lack of traffic control measures, pedestrian encroachment in to the carriage way, wrong parking. The projection of the current situation in reference to traffic demands is important in coming up with plans and alternatives that will help solve these problems in future. The figure below is an example of how to arrive at an alternative by checking the current situation of the pedestrian traffic using the population and personal trips and projecting it to the future so as to understand the conditions of the pedestrian infrastructure requirements.
Problem identification

This was done through a research project exercise. The researcher established that the key problems in the study area included; insufficient pedestrian spaces, wrong parking along the
road, lack of clear road markings and lack of traffic lights to control traffic along the road especially at the intersection and zebra crossing areas among other problems.

**Goals and objective setting**

After the identification of the problems within the study area the researcher formulated four policy recommendations to address the problems. The recommendations included the following:

1. Pedestrian walkways improvements in terms of provision planning
2. Regular revision/ update of city road infrastructure development plans
3. Harmonization of involved institutions

All the recommendations were evaluated in a bid to come up with the most appealing one that would respond largely to the problems stated. As a result, planning for the improvement in the provision of pedestrian infrastructure into the organization and use of Accra road was chosen for implementation due to its increased potential to address the main issues within the study area. This formed the ultimate goal of this project. To ensure its effective implementation, the following objectives were formulated.

1) To create awareness to the people in the project area on the need for improvement of pedestrian infrastructure along the road section.
2) To acquire the site for the improvement purposes.
3) To conduct a site inventory and analysis
4) To design the pedestrian infrastructure improvement plans for implementation
5) To provide the project’s development framework of implementation, monitoring and environmental management plan.

**Data collection and analysis**

This was done largely under objectives 1, 2 and 3 as stated above. It involved creating awareness to the members of the public within the project area especially the matatu Saccos using the road section as terminus, adjacent business commercial operators and the general public using the road. This is mainly done to get their own opinions whether they welcomed the idea of planning
the area and improving on the provision of pedestrian infrastructure. After acceptance by the plan consumers, information on site acquisition of the specific site for construction is sought. Later, after acquiring the site analysis was done on the suitability of the site to accommodate the project.

**Synthesis**

Synthesis is basically undertaken to understand the causes and effects of the problem identified to the environment and to the public. Site suitability is also done to establish the effects of the physical and climatic attributes of the area to the proposed developments.

**Alternative strategy formulation**

Three intervention measures were formulated. They included; nil intervention and cities for people models. Nil intervention occurs when a situation is given no planning attention in an effort to address the main issues facing a place. Cities for people occurs when movement of people creates a vibrant economic life on the streets and endorses sustainable urban development because it supports reductions in per-capita resource use and ensures walk-able distances to services and infrastructures and avoids the car dependence as the distances to any services are short.

**Implementation**

Implementation schedule to guide the implementation and the achievement of the ultimate goals of the project was formulated. The schedule illustrates in relation to the objectives the actions/activities to be done, the time required, the relevant actors and the indicators of success.

**Monitoring and evaluation**

This formed the last step in the development of the project. It involved the stating of the objectives of monitoring and evaluation the guidelines of implementation. In addition, the site/environmental management plan is also formulated at this stage.

**4.4 Site Planning and design process stages**

The project adopted the conventional planning and design process. The process encompassed the following stages:
# 4.4.1 Development Program

## THE DESIGN PROGRAM

### Goal statement

**Planning for improvement in the provision of pedestrian infrastructure into the organization and use of Accra road**

### Objectives

1. To create awareness to the people in the project area on the need for improving on the pedestrian infrastructure along the road.
2. To acquire the site for the project along the road.
3. To conduct a site inventory and analysis.
4. To design the pedestrian infrastructure into organization of Accra road use for implementation.
5. To provide pedestrian infrastructure development project framework of implementation and monitoring.

### Program physical elements

**Improvement of provision of pedestrian walkways (main component)**

It entails:

- Repair of the existing pedestrian walkways along building fronts
- Acquisition of the parking spaces along the building fronts and be converted to be used as pedestrian ways

For traffic management along Accra road, the following programs shall be undertaken

- Lanes marks and parking marks
- Zebra crossing marks along the road at the intersections
- Installation of traffic lights

### Other:

- Provision of garbage bins to avoid littering of the road section after the completion of the project.

Source: Author, 2014
4.5 Design of alternatives

4.5.1 Nil intervention

Nil intervention occurs when a situation is given no planning attention or intervention in an effort to address the main problem issues facing a place or people. In the case of Accra road for instance, if there is no intervention to the current situation then with time the whole road section will be chaotic due to the current congested situation. The pedestrian spaces are congested and for many of the pedestrians who try to avoid the congested situation, they end up walking on the carriage way thus affecting the traffic flows. For the case of vehicular congestion, the road section is used as bus/matatu termini for several Saccos and hence have many vehicles parked along the road overcrowding the road section and in other cases there are incidences of motorists parking on the wrong parts of the road. This situation can either block the pedestrians or other vehicles along the road.
Figure 5: Existing Situation

- Pedestrians walking on the carriage way
- Commercial products placed on the walkways
- Poor state of the pedestrian spaces or walkways available
- Wrong parking causing road chaos along Accra road

Source: Author, 2014
The adoption of this alternative will result to increased congested situation along Accra road as shown on the figure above and the section will be more chaotic in that there is no clear use organization along the road. As a result, the space available for use by pedestrians will all be put into use by the street vendors and car parking. Consequently, the pedestrians will be forced more to walk along the carriage way leading to conflicts with the motorized traffic which can cause accidents. Also, the congested situation will derail the aesthetic nature of the road sector. Although this alternative will cause problems along the road, it does not cost any amount if implemented.

4.5.2 Planned Intervention
Planned intervention is the situation whereby the problems facing the project area are identified and dealt with by planning for strategies that will help solve these problems. The interventions in this project area include; improvement of the pedestrian conditions state and provisions, installation of traffic lights, provision of zebra crossings along the road on its intersections with other roads, restriction of on-street selling activities along the road, road marking and placements of waste bins for environmental conservation purposes. The adoption of this alternative is resource costing and time taking but has many benefits to the area at the long run.

4.6 Evaluation of the alternatives
The evaluation took into consideration to an extent the alternatives addressed in the following challenges identified faced in the project area.

1. Congestion
2. Compatibility of the road use
3. Aesthetics
4. Time and costs of implementation
5. Use of the road by motorists and pedestrians without conflicting

4.7 Appraisal techniques
To identify the preferred alternative, three techniques were used. They include;

1. Cost benefit analysis/matrix
2. Financial investment appraisal
3. Goal achievement matrix
4.7.1 Goal achievement matrix
Goal achievement matrix involved the construction of a cross tabulation matrix that indicated the
achievement of certain goals considered critical for the success of the development project. The
achievement of a goal was given a score of 1 (one) whereas a value of 0 (zero) was a given for
failure to achieve a certain goal. The main assumption is that all goals carried the same weight in
terms of significance. The alternative with the highest score is assumed to be the most viable
one. These are represented in form of a table as shown below.

Table 4: Goal Achievement Matrix

<table>
<thead>
<tr>
<th>Alternative</th>
<th>score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Reduced congestion</td>
</tr>
<tr>
<td>Nil intervention</td>
<td>0</td>
</tr>
<tr>
<td>Planned model</td>
<td>1</td>
</tr>
</tbody>
</table>

Source: Author 2014

4.7.2 Cost benefit matrix
Cost benefit matrix involves a list of all the benefits/ strengths accrued by an alternative against
its disadvantages/ weaknesses. The alternative which emerges out with many benefits against its
weaknesses is therefore considered as the best.

After evaluation, and as shown in the next table 5, is evident that the decentralized model yielded
more benefits as compared to the other two. It also had the least weaknesses/ disadvantages as
compared to nil intervention and planned intervention. It was therefore concluded that the
planned intervention served as the most viable alternative.
### Table 5: Cost Benefit Matrix

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Benefits</th>
<th>Weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nil intervention</td>
<td>No cost incurred</td>
<td>- Continued conflicts between pedestrians and motorists on the use and organization of Accra road</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Increased congestions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Continuous degradation the road aesthetics</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Increased pressure on the existing spaces for motorists and pedestrians</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Poor working environments for the general public</td>
</tr>
<tr>
<td>Planned model</td>
<td>- A plan to guide the road use and organization</td>
<td>- It is expensive; require a lot of finance and time.</td>
</tr>
<tr>
<td></td>
<td>- It leads to improved aesthetics</td>
<td>- It will cause displacement of activities like on-street sellers along the road</td>
</tr>
<tr>
<td></td>
<td>- Improved quality of infrastructure</td>
<td>- Requires acquisition of parking space hence decrease in the parking spaces available</td>
</tr>
<tr>
<td></td>
<td>- Economical in terms of time for implementation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Institutions will also be harmonized by allocating them different functions</td>
<td></td>
</tr>
</tbody>
</table>

Source: Author 2014

### 4.7.3 Financial investment appraisal

Financial investment appraisal technique is used to evaluate another alternative by analysing its development implications in terms of capital and operation expenses involved.to all the alternatives accept the nil intervention, the following sources of capital costs were identified:

1. Space acquisition
2. Plan approvals
3. Site preparation
4. Construction process
4.8 Preferred Intervention
From the analyses done, it was noted that though it is the most expensive model to implement and operationalize, planned model has more scores in the cost benefit matrix and the goal achievement matrix. It is therefore the most qualifying alternative for implementation in the project area.
Figure 6: Proposed Development Plan Layout

Legend
- Red: Commercial
- Gray: Transportation (carriage way)
- Light blue: Pedestrian spaces
- Dark blue: Public utility
- Violet: Industrial (petrol station)
- Gray: Parking spaces

Scale 1:100
Figure 7: Cross-Section of the Proposed Accra road plan

Source: Author, 2014
This is the redesigned plan of Accra road with improved provision of pedestrian space/walkway.

Figure 8: Site model Perspective View

Source: Author, 2014
Figure 9: Proposed Zebra Crossing and Traffic Lights

Source: Author, 2014

Figure 10: Aerial view of the proposed Plan model

Source: Author, 2014
4.9 Implementation Strategies With Reference To Project Programmes and Projects

The public awareness and sensitization strategy will be implemented under the objective aiming to provide a site inventory and detailed spatial analysis of the site in relevance to the development project. Through this objective, people are going to be informed about the development of this project as well as the expected outcomes and benefits. This awareness will also provide a platform for creating the development site data register to be used for the purpose of the exercise. This strategy will be carried out through Seminars and workshops programmes on importance of the development project and waste management.

The other strategy is Acquisition of the parking space which is currently used for parking along building facades in Accra road which will be exercised together with the public awareness and sensitization strategy.

The third strategy is to improve on the provision of the pedestrian walkways and provide for the road markings and other road signage along Accra road and detailed spatial analysis of the site. The actions and programmes to be undertaken to achieve this strategy will involve increasing pedestrian space, providing zebra crossing, installation of traffic lights and provision of road markings. Lastly is the creating of a clean environment by improved solid waste management. This programme will be implemented by installing and placing of litter bins within the development site particularly along the developed road plan.
<table>
<thead>
<tr>
<th>Implementation stage</th>
<th>Expected outputs and outcomes</th>
<th>Indicators</th>
<th>Target</th>
<th>Means of monitoring and evaluation</th>
<th>Actors responsible</th>
<th>Resources needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plan approval</td>
<td>An approved Sectoral transport plan for the project area Guided development</td>
<td>Improvement in the provision of pedestrian walkways Level of improvement of traffic generation and movement patterns by the approved design</td>
<td>A road design for Accra road that will enhance proper traffic generation and movement patterns</td>
<td>Assessing the efficiency of traffic flow patterns presented in the project design</td>
<td>-City County of Nairobi</td>
<td>-Time - Human resource</td>
</tr>
<tr>
<td>Environmental Impact Assessments of different</td>
<td>-EIA reports with guidelines to mitigate adverse</td>
<td>The levels of achievement</td>
<td>Minimal damage on the environment by implementing bodies</td>
<td>Assessing the expected environmental status</td>
<td>-NEMA</td>
<td>Funds (consultation fees)</td>
</tr>
<tr>
<td>Developing Road &amp; designs and approval of the same</td>
<td>Approved proper road designs</td>
<td>-The level of adequacy of the designs -The level of efficiency of traffic flow enabled by the road designs</td>
<td>- Designs that conform to the spaces available and coverage proposed for the area and which will meet the demands of the people - Road design that will ensure proper traffic flow</td>
<td>-Assessing the level of the design’s conformity to national policy goals, planning standards and regulations of the project area</td>
<td>-Architect and Engineer consultants -Planners -Developers -Nairobi City County</td>
<td>-Funds (consultation fees and other fees for application for development permission) - Human resource -Time</td>
</tr>
<tr>
<td>Actual Constructions</td>
<td>-Adequately planned road developments -Efficient traffic generation and channelling patterns</td>
<td>Efficient traffic generation and distribution patterns</td>
<td>Development of buildings which will meet the demands of the people - Efficient road networks</td>
<td>Accordance with the provisions of the plan</td>
<td>KURA -Nairobi City County -Contractors</td>
<td>Human resource -Various road and construction materials and equipment</td>
</tr>
</tbody>
</table>

Source: Author, 2014
### Table 7: Implementation Schedule

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<tbody>
<tr>
<td>Seminars and workshops on importance of the development project to the public.</td>
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<tr>
<td>Relocation of activities to other road sections for organization purposes.</td>
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<td>Road Section acquisition.</td>
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<tr>
<td>Project design adjustment and approval</td>
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<tr>
<td>Environmental Impact Assessment</td>
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<tr>
<td>Construction works (pedestrian Space improvement and expansion), Road marking, zebra crossing marking and traffic lights installation in the development site.</td>
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<tr>
<td>Monitoring and evaluation</td>
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</table>

Q1 = First Quarter of the year; Q2 = Second Quarter of the year; Q3 = Third Quarter of the year; Q4 = Fourth Quarter of the year

Source: Author, 2014
4.10 Project phasing and costing
The project will follow a phasing implementation outline as shown in the table below.

<table>
<thead>
<tr>
<th>Phase</th>
<th>Activity</th>
</tr>
</thead>
</table>
| Phase 1 | Involves preparation of plans and designs for approval  
Preparation of environmental impact assessment report for the site |
| Phase 2 | Acquisition of parking space adjacent to the buildings to be used by pedestrians. This shall be done by the relevant authorities in a systematic manner to avoid conflicts |
| Phase 3 | This phase will involve laying out provisions of various infrastructure and resource mobilization to the site. |
| Phase 4 | Will involve the actual construction which comprises of repair walkways and improvement of the pedestrian conditions state and provisions, installation of traffic lights, provision of zebra crossings along the road on its intersections with other roads, road marking and placements of waste bins for environmental conservation purposes |
| Phase 5 | Will involve preparation of a regulation restricting on-street selling activities along the road |
| Phase 6 | Will involve the monitoring process and management of the road section. This will involve post evaluation of the effects caused by the whole intervention |

Source: Author 2014

Table 8: Project Activity and Costing

<table>
<thead>
<tr>
<th>Project activity</th>
<th>Cost (Ksh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Awareness creation and Workshops</td>
<td>1,500,000*</td>
</tr>
<tr>
<td>Road section acquisition</td>
<td>2,000,000*</td>
</tr>
<tr>
<td>Expansion and repair of pedestrian spaces sections</td>
<td>21,000,000*</td>
</tr>
<tr>
<td>Road marking including zebra crossings</td>
<td>6,000,000*</td>
</tr>
<tr>
<td>Installation of traffic lights</td>
<td>3,000,000*</td>
</tr>
<tr>
<td>Placement of litter bins</td>
<td>100,000*</td>
</tr>
<tr>
<td>Monitoring and Evaluation</td>
<td>3,000,000*</td>
</tr>
<tr>
<td>Total</td>
<td>36,600,000*</td>
</tr>
</tbody>
</table>

*This means that the figures indicated are not final and are subject to revision through consultation with civil engineers and quantity surveyors

Source: Author 2014
CHAPTER FIVE

MONITORING AND IMPLEMENTATION

5.1 Monitoring and Evaluation Stages in the Implementation of the Projects
This process begins immediately when the implementation exercise begins. It ensures that the project runs as planned and the targeted objectives are achieved within the designated time and resources availed are used accordingly. It involves the review of the progress and checking of scope creep changes during the implementation period, identification of areas of deviations and making adjustments before moving into the next step.

5.1.1 Evaluation Methods
The state and progress of the project will be evaluated in three different stages. These stages include; mid-term evaluation, terminal evaluation and post implementation evaluations.

Mid-term evaluations-Mid-term evaluations will involve monitoring the progress of the project at each stage. This is to ensure that the project is implemented in conformity with the desired plans and rectification of any change that arises along the process.

Terminal evaluations-These are evaluations conducted at the end of each stage during implementation of the project. It enables the stakeholders to check and reconsider if necessary the level of goal achievement by the project at the end of each stage. Before commencing the next phase, any undesirable outcomes are adjusted.

Post implementation evaluations-these are evaluations undertaken after the completion of the project. They seek to deepen understanding of the effects and implications of the project to the road users, City County of Nairobi, Commercial activities and the environmental aesthetics. The negative effects of the project are thus mitigated and other recommendations are drawn from the project.

5.1.2 Objectives of monitoring and evaluation
The main objective is to ensure that the plan is implemented as per the standards stated and making of necessary adjustments are made in conformity to the planning processes required.
Other Objectives include;

1. To ensure that all the programs of the project are implemented as planned.
2. To ensure efficient utilization of resources to avoid mismanagement of resources.
3. To ensure general public and stakeholder participation during the implementation of the project as per the constitutional requirements.

5.2 Guidelines for the implementation process
The implementation process will have the following guidelines:

The Nairobi City County Planning Department shall be responsible for and approval of the developments proposed for the project area.

Public participation shall be a continuous process in the implementation of the developments in this project area. This is because there are many stakeholders affected by this project hence their participation is necessary to avoid incidences of conflicts.

Pedestrian walkways shall be improved on both sides of the road.

Environmental protection shall be a consideration when undertaking the project and the project area shall be provided with garbage bins to reduce environmental pollution and hence have a city street free from pollutions.

No structure shall be constructed outside the limits of the project area unless it is deemed by the City County of Nairobi this is necessary so as to avoid the conditions of congested infrastructure and having a well-organized road section.

No activities like hawking, parking or touting shall be allowed in the areas designated as pedestrian walkways within the project area.

Traffic shall be well controlled during the entire period of implementation of this project to avoid incidences of accidents and delays either to the project or to the traffic.

The provision of the public health act, EMCA, as to the safety of persons and the environment will be adhered to by any form of development and the persons involved.

Coordination of activities of different institutions implementing any project in the area will be mandatory.

Stakeholder meetings should continuously be held throughout the process of implementation. The main function of these meetings would be to discuss the progress of the project and deliberating on the emerging issues.
### Table 9: Monitoring and evaluation schedule

<table>
<thead>
<tr>
<th>Type of indicator</th>
<th>Actor(s)</th>
<th>Impacts of the indicator</th>
<th>Other remarks</th>
</tr>
</thead>
<tbody>
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</tbody>
</table>

Source: Author, 2014

### Table 10: Site/Environmental Management Plan

<table>
<thead>
<tr>
<th>Environmental Impacts</th>
<th>Mitigations</th>
<th>Actors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earth materials excavations from the site during</td>
<td>Rightful disposal of materials as directed by the authorities concerned that is the CCN and NEMA</td>
<td>City Board for Nairobi</td>
</tr>
<tr>
<td>implementation process</td>
<td></td>
<td>Contractor</td>
</tr>
<tr>
<td></td>
<td></td>
<td>KURA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NEMA</td>
</tr>
<tr>
<td>Noise pollution during the implementation process</td>
<td>Staging the main works to be done during weekends when the city is not too busy and noisy process to be done in the evenings after working hours.</td>
<td>KURA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Contractors</td>
</tr>
<tr>
<td>Solid waste management</td>
<td>Installation of new and modern garbage bins along Accra road on both sides of the road.</td>
<td>City County of Nairobi</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Contractors</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NEMA</td>
</tr>
<tr>
<td>Air pollution from dust emission</td>
<td>Wetting all dusty areas when necessary Screen the project area</td>
<td></td>
</tr>
</tbody>
</table>

Source: Author, 2014
List of References


11. UNEP (2010). Share the road: investment in walking and cycling Road infrastructure. Nairobi, UNON.

