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A THESIS REPORT

ON

"DEVELOPMENT OF PARKING STRATEGIES IN KIGALI CITY"

Submitted by:

MUNYENTWALI Régis (REG.NO: PG2011567)

Under the Guidance of:

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Submitted in partial fulfillment of the requirements for the award of

MASTERS OF SCIENCE DEGREE IN

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This is to certify that the Thesis Work entitled* "DEVELOPMENT OF PARKING STRATEGIES IN KIGALI CITY"** ***is a record of the original bonafide work done by **MUNYENTWALI Régis (REG.NO: PG2011567) in partial fulfillment of the requirement for the award of Masters of Science Degree in Transportation engineering and Economics of Kigali Institute of Science and Technology, during the Academic Year 2011-2012.**

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Submitted for the Project Examination held at KIST on ……..

DECLARATION

I hereby declare that the thesis entitled **"DEVELOPMENT OF PARKING STRATEGIES IN KIGALI CITY"** submitted for the Degree of Master of Science is my original work and the thesis has not formed the basis for the award of any Degree, Diploma, Fellowship of similar other titles. It has not been submitted to any other University or Institution for the award of any Degree or Diploma.

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Certified that this thesis titled **"DEVELOPMENT OF PARKING STRATEGIES IN KIGALI CITY"** is the bonafide work of MUNYENTWALI Régis (REGO: PG2011567) who carried out the research under my supervision. Certified further that to the best of my knowledge the work reported herein does not form part of any other thesis or dissertation on the basis of which a degree or award was conferred on an earlier occasion for this or any other candidate.

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ABSTRACT

Parking management is an important component of contemporary travel demand management strategy. The lack of information about parkers' behavior in the Central Business District makes it difficult to develop effective parking strategies. The effectiveness of many parking strategies depends on influencing parking choice on willingness to pay parking fee or to use public transport. To understanding the factors affecting these choices is of considerable practical importance. The purpose of this study is is to understand parkers' behavior on willingness to pay parking fee (WTP) in the Central Business District of Kigali City, to develop number of parking strategies and hence to recommend the appropriate strategies for the City of Kigali.

This project research, analysis parking choice behavior based on a stated preference (SP) dataset collected in various locations in Kigali City Center, for on-street and off street parking. The willingness to Pay (WTP) method was used to evaluate parking behavior and willingness to pay parking fees. In order to ensure unbiased collection of data, a stratified random sampling technique was used on this research. Both responsive (Stated Preference) as well as informative data were collected with the help of questionnaire surveys. Additionally, a set of parking survey methods was used to study the parking duration (turnover), the parking usage through the analysis of the parking stress in the area and the parking accumulation and occupancy. Furthermore, the parking survey data were used to forecast the parking situation in the area of study in five years to come, from 2014 to 2018.

Therefore, after doing a thorough analysis about the problem, the researcher found out that the existing parking management condition was in an alarming situation and recommended that a quick action has to be taken by the concerned parties, especially for on-street parking, by referring to the findings of this research. Finally, the research also develops a number of strategies that can be used to solve a problem parking in the City of Kigali. The main strategy is to apply the 85% rule, where the higher rates should be charged on blocks with higher occupancies, and lower rates on blocks with lower occupancies.

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ABBREVIATIONS

HOV: High Occupation Vehicle

WTP: Willingness-To-Pay

TODs: Transit-oriented Developments

SP: Stated Preference

RP: Revealed Preference

VOT: Value of Time

RTDA: Rwanda Transport Development Agency

KIST: Kigali Institute of Science and Technology

AM : Ante Meridiem (Morning Time)

CBD : Central Business District

KCC : Kigali City Council

KIST : Kigali Institute of Science and Technology

MININFRA : Ministry of Infrastructure

RRA : Rwanda Revenue Authority

RwF : Rwandan Francs

BRT: Bus Rapid Transit

Min. Minutes

Chapter 1 : GENERAL INTRODUCTION

1.1. Back Ground

The city of Kigali is a rapidly growing city with an annual population growth rate of 5.40% according to the Kigali City conceptual Master plan (1). As the population grows, the vehicle ownership increases likewise.

it has been estimated that out of 8,760 hours of a year, the automobile averagely runs for only 400 hours, leaving as many as 8,360 hours when it is parked, which means that approximately 95% of the time, the automobile is parked (2). According to records of Rwanda Revenue Authority, number of vehicles was increased from 2,792 vehicles in 2005 to 5,370 vehicles in 2011. Basing on the above situation, City of Kigali needs to develop parking strategies.

Parking strategy is one of the most powerful means urban planners and policy makers can use to manage travel demand and traffic in city centers. In many countries, governments are increasingly using parking strategies as a means of reducing urban road traffic. Many researchers believe that parking measures are effective means of reducing congestion. Parking standards in Kigali are currently defined in terms of a minimum requirement for different land uses. Given the political willingness of parking policies and the lack of evidence of the effects of actual changes to parking policies in Kigali, there is need for research into the potential effects of such policies. The purpose of this research is to study the potential response of city center bound travelers to parking restriction policies through a response model based on stated preference data. This research will help understand the role of parking strategies in developing sustainable transportation programs.

Parking can be effectively managed through several types of policy interventions.

These include controls on the number of parking spaces, their spatial distribution, parking costs, parking time limits, residential parking permits, taxes, provision of employee parking, and levels of policy enforcement. The total amount of parking available in the city center can affect the amount of traffic entering the area, and the location and layout of these spaces can affect the movement of traffic within the center. On-street parking reduces the traffic capacity of roads in the center.

Parking management can be used to encourage people to shift from private cars to public transportation. Parking policy, however, can have other effects on travel patterns. It may encourage people to travel to other destinations, change the time of day of the trip, and

change or cancel their activities. In the long run, it may even cause businesses to move outside the existing business district, thereby dispersing activities and increasing dependency on the private vehicle. Such a response to a new parking policy may increase congestion and air pollution in the long term, and thus achieve the reverse effects of those intended in implementing the measure.

The objective of a parking-management program should be to increase the attractiveness of the CBD as much as possible by encouraging people to change their choice of travel mode and travel time without discouraging them from coming to the city center. A good parking strategy should restrain commuting by car without hindering shoppers and people doing personal business. The benefits and costs of parking management programs should be carefully studied before implementation. Benefits include reduced travel time and costs for some users, improved downtown amenity, and potentially improved economic activity, reduced air pollution, noise pollution, and a reduced need to expand highways.

To evaluate the potential benefits of parking measures and to learn how parking policy functions as a powerful transportation-planning tool, we need an improved understanding of people's responses to them. We need to understand how parking strategies affect the demand for and the supply of parking, and how parking demand and supply in turn affect the vitality and value of the CBD.

1.2. OBJECTIVES OF THE STUDY

1.2.1. GENERAL OBJECTIVE

This project research will be carried out to develop suitable parking strategies in Kigali City, specifically in Central Business District, the center of Kigali city. The research idea comes from an existing problem of insufficient and inappropriate parking that suffers City of Kigali in general.

Objective of this study, is to find solution of parking problems in the area of study and solution will be achieved by referring to good practices used in other cities.

Additionally, a set of parking survey methods will be used to study the parking duration (turnover), the parking usage through the analysis of the parking stress in the area and the parking accumulation and occupancy. Furthermore, the parking survey data will be used to forecast the parking situation in the area of study.

The study helps to understand the level and extent of parking phenomenon in Kigali City. As a result it enables to develop appropriate parking strategies with all necessary requirements. This will provide an everlasting solution to the problem of parking in Kigali City. Parking strategies has the potential of reducing enormous burden of parking and driving in Kigali City at the same time provides safety to pedestrians. This study is an attempt to increase the efficiency of parking service; improve journey time reliability for road users; to enhance the built and natural environment; to make City of Kigali a safer place and to raise revenue for the council to reinvest in transport services and measures

1.2.2. SPECIFIC OBJECTIVES

The specific objectives that encourage the researcher to carry out this study are:

- To improve journey time reliability for road users;
- To increase turnover of the most convenient spaces. This increases consumer convenience;
- facilitates deliveries, and reduces cruising for parking (searching for an unoccupied space)
- Reduces the number of spaces needed to meet demand, reducing total parking costs, and allowing more compact development.
- Encourages longer-term parkers to use less convenient spaces (such as off-street or urban fringe), and encourages travelers (particularly commuters) to use alternative modes when possible.
- To make City of Kigali a safer place for road users

1.3. PROBLEM STATEMENT

The main problem which arises in City of Kigali is related to the lack of appropriate parking facilities, insufficiency and proper strategies to solve the parking problems in the City of Kigali, especially in CBD (Central Business District).

Moreover, many of drivers spends much time looking for parking and it create congestion and accident some times.

1.4. RESEARCH QUESTION

After all these issues have been stated, what can be done to remedy these problems related to the lack of appropriate parking strategies?

1.5. JUSTIFICATION OF THE STUDY

The main purpose of this study is to develop parking strategies in Kigali City, especially in CBD (Central business District). It was observed that to drive and parking in Kigali becomes a big problem.
The researcher wanted to explore the Best strategies to organize parking in Kigali City.

1.6. SCOPE OF STUDY

The scope of this study is limited to Nyarugenge District at CBD area and it will be taken as a sample to represent the whole City, with an assumption that the extrapolated result will be true for whole study area.

1.7. SIGNIFICANCE OF THE STUDY

The study helps to understand the level and extent of parking phenomenon in Kigali City. As a result it enables to develop appropriate parking strategies with all necessary requirements. This will provide an everlasting solution to the problem of parking in Kigali City. Parking strategies has the potential of reducing enormous burden of parking and driving in Kigali City at the same time provides safety to pedestrians. This study is an attempt to increase the efficiency of parking service; improve journey time reliability for road users; to enhance the built and natural environment; to make City of Kigali a safer place and to raise revenue for the council to reinvest in transport services and measures

Chapter 2 : LITERATURE REVIEW

2.1. Introduction

Parking is a term that refers to the act of stopping a vehicle and leaving it unoccupied for more than a brief time and is a fundamental component of any vehicle trip . Parking is a nearly universal planning issue. Every municipality must have a place to store vehicles that enter their jurisdiction. There are few planning issues more visible, as cars are parked virtually everywhere. It is estimated that up to 40% of a typical city's land area is used for parking lots (3).

In fact, parking facilities as a part of an overall transportation system are one of the crucial issues of the modern world of today, and thus several researchers have devoted their time and knowledge to document the findings of their researches.

Therefore, this chapter underlines key information from various researches carried out in the field of transportation engineering, especially in the planning and design of parking facilities.

2.2. An Overview of Current Parking strategies Practice

2.2.1. Introduction

Although cities have required developers to provide a minimum number of off-street parking spaces for both residential and commercial uses since shortly after the advent of the motor vehicle, in the 1980s innovative planners started to introduce a new wave of parking requirements such as commercial parking maximums and limits on the amount of parking that developers are permitted to build in certain downtown areas.

Today, cities are considering implementing a wider range of alternative parking standards, such as elimination of parking minimums for both residential and commercial development and residential parking maximums. Such policies are designed to limit the influence of the vehicle and to create walkable and vibrant neighborhoods and commercial destinations by reducing the amount of land taken up by parking. This section will explore the historical development of parking requirements and will provide an overview of the state of the practice regarding current parking policy.

2.2.2. *Minimum Parking Requirements*

Today, free parking is available just about everywhere such as on the street, in strip malls, or at the condominium complexes of our friends. The widespread availability of free parking developed from a tradition of providing curbside tethers for horses and carriages (4) . As more people bought cars and the demand for curbside parking increased, cities began to

include in zoning ordinances requirements that developers provide the minimum number of off-street parking spaces necessary to accommodate the demand for parking created by development on a particular site. This practice is now known as a minimum parking requirement. By 1946, a survey of 76 cities found that 17% had implemented minimum parking requirements. A follow-up study of the same 76 cities five years later found that 71% of cities had adopted parking requirements, (5) making for a 54% jump in the number of cities with minimum parking requirements. Today, most cities establish minimum off-street parking requirements in zoning ordinances for all land uses, including commercial, office, and residential developments.

Beyond the traditional custom of providing free parking in the United States, there are several reasons why cities today require developers to provide off-street parking spaces. Two primary motivations are commercial viability and market demand. Developers and cities want to maximize the market demand for a particular type of housing or business, and thus the conventional belief is that a land use should provide off-street parking in a quantity that is sufficient to accommodate all of the vehicles that might want to access that particular land use (6). Neither developers nor funders want to discourage people from purchasing, renting, or shopping at a property because it is inaccessible. Also, city governments like to minimize the number of vehicles that "spill over" into on-street parking spaces in neighboring residential areas or illegal spaces (7). Cities typically establish minimum parking requirements in one of two ways: by following examples set by neighboring cities or by using a manual developed by the

Institute of Transportation Engineers, called Parking Generation. However, according to parking policy researcher Donald Shoup, both of these methods are flawed. By copying the parking plans enacted by other local agencies, cities run the risk of repeating the mistakes of others, and may inadvertently replicate arbitrary calculations (8). The parking rates outlined in Parking Generation are not generally applicable, as they are based on a few parking surveys that are conducted during peak hours in suburban locations. Although most cities lack the financial resources to conduct individual parking demand surveys for each land use, it is difficult to rationalize applying the ITE rates to all circumstances.

Since most cities follow the same rules of thumb to calculate parking requirements, many cities implement requirements that are similar. Typical minimum parking rates in

California cities are as follows: (9),

- Residential: one to two spaces per unit. (1:1 or 2:1)

- Office Space: three spaces per 1,000 square feet of office space.
- Retail: one to four spaces per 1,000 square feet of retail space.
- Restaurant: varies greatly by restaurant type and jurisdiction; but one space per 200 square feet is fairly typical.

2.2.3. *Maximum Parking Requirements*

Planners looking to prevent sprawl and auto-dependency in favor of creating more walkable and vibrant places are more frequently considering parking maximums in place of traditional parking minimums. As opposed to parking minimums, which require developers to provide a certain minimum number of parking spaces, which they can exceed, maximum parking requirements establish a limit on the amount of parking spaces that a developer can provide. Cities may establish parking maximums instead of parking minimums, or in concert with a parking minimum. Like parking minimums, maximum parking designations are included in zoning ordinances or neighborhood plans.

Parking maximums are a relatively new alternative parking policy strategy. The limit on the number of spaces allowed is typically determined in one of two ways. Some cities base parking maximums on the availability of alternative modes of transportation (as in Portland, Oregon; San Francisco, California; and Cambridge, Massachusetts, which all tie parking maximums to transit policies) (10).

Other cities conduct parking utilization studies locally to derive parking maximum allowances for their municipality, rather than relying on parking generation rates. The cities that have conducted utilization studies include Portland bend and Hood River in Oregon (11). Massachusetts is credited with being one of the first cities to set parking maximums, which it did in the 1980s. Cambridge's parking maximum today allows, for example, for a maximum of two parking spaces per 800 square feet of general office space, or for two spaces per five seats at a bar (12). In addition to removing parking minimums, Portland have also set parking maximums in parts of the downtown business district. The maximum allows, for example, .7 off-street parking spaces per 1,000 square feet of office space, and 1.35 spaces per residential unit (13) . Although realized benefits of residential parking maximums are not well documented, there is some evidence that parking maximums lead to marginal increases in transit ridership and decreases in vehicle congestion. Cities may choose to impose parking maximums to encourage transit ridership, maximize limited land resources, and improve urban aesthetics (14). Units without parking spaces are more affordable. So removing the cost

of a parking space from the price of a house (also known as “unbundling” parking) can make housing affordable for more people.

Despite the benefits, parking maximums as an alternative parking policy are often controversial. Developers are often opposed to parking maximums because, over the many years that minimum parking requirements have been the status quo in development, developers have created a rule of thumb for what will sell: residential units such as single family homes, condominiums, or apartments with a ratio of at least one parking space per unit 1:1 (15)

2.3. How availability of a parking space at the destination influences travel behaviour

Since there are not many studies that examine the influence of residential parking availability on peoples’ travel behavior, it is instructive to look at the body of literature that looks at whether parking availability at work or shopping locations influences travel behavior. The literature on this topic suggests that people drive more when there is a parking space available at the destination. One study of 10 office parks in Southern California that met minimum parking requirements found that peak utilization was only 56%, which suggests that the parking minimums are too high. This study also revealed that people who work at offices with free parking travel with 10% fewer people than those who work at offices without free parking, because less people are riding transit or carpooling (16). In Curitiba, Brazil, a city that is well known in transportation planning circles for its extensive Bus Rapid Transit (BRT) system, parking minimums were imposed evenly in the downtown and outskirt areas. A recent study of the areas around five BRT stations in Curitiba found that parking minimums led to free or cheap parking in the city, promoting single occupant vehicle use and running against the stated goals of the city’s adopted land use policies (17).

2.4. Influences of land use influences on travel behaviour

The useful group of studies looks at how land use influences travel behavior. A variety of land use factors other than parking can influence travel behavior, including residential density, land use mix, employment density, roadway design, bicycle facilities, site design, and retail (18) . Travel behavior indicators that can be studied include mode choice, vehicle miles traveled and vehicle ownership. Some studies in this category find that density can influence mode choice, and in recent years this proves particularly true for residents of TODs. However, another body of literature in this area has reached inconclusive results, and some argue that it’s impossible to isolate the factors that influence travel behavior. A landmark

study conducted in 1995 found that residential density and mixed uses generally influence people to use single occupant vehicles less frequently and to use transit or walk more.85 In professional practice, it is commonly accepted that people will use cars less often when there are other means of travel such as transit available, walkable destinations nearby, and local employment opportunities (19).

2.5. Parking demand management practice

Parking Management strategies are aimed at encouraging more efficient use of existing parking facilities, reduce parking demand and shift travel to HOV modes. Smart management of parking helps to ensure access to local businesses, and provides access for visitors to regional and neighborhood attractions without encroachment on valuable public spaces**.** The ministry of Infrastructure (MININFRA) recently developed a policy for car parking management (20). The above policy is based on a number of key principles of which some are stated as follows:

- To promote parking management as a demand management tool – to decrease use of private vehicles and thus reduce overall demand of parking, and shift travel to public transport, para-transport& non-motorized modes;
- To coordinate on- and off- street parking management and charging;
- To ensure that parking is a consumer commodity, not a legal right. No subsidized parking is to be provided in public spaces;
- To charge a price for parking reflecting full economic opportunity cost for the land, capital cost, operation &maintenance cost and temporal demand;
- To design parking facilities that are well integrated with surrounding buildings and walking environments;
- To promote "park and ride" programs that encourage transit oriented development;
- To ensure highest efficiency and financial viability for spaces already designated for parking;
- To prioritize short-term parkers over long-term parkers in areas designated for private parking in order to maximize turnover and enable economic vibrancy.

On the other hand, Parking facilities fall into three categories for their management:

1. Parking on private land over which the local authority has no control other than through the application of planning consents.

2. Parking which is controlled by the local authority for the benefit of short term parkers.
3. Parking which is controlled by the local authority for the benefit of the long term parkers.

2.6. Factors and guidelines for parking demand

Parking demand varies from place to place, based on a number of factors. These include: the price of parking (people use parking more when it is free or cheap); the provision of alternate modes of transportation; the amount and quality of pedestrian networks; and demographics (poorer households tend to own fewer cars). Certain uses may also require more parking than others.

Many municipalities base their parking requirements on guidelines from the Urban Land Institute (ULI) and the Institute of Transportation Engineers (ITE), or the ordinances of neighboring communities. These guidelines and general standards can be useful tools, but should not be the sole basis for parking requirements in a municipality. Instead, each community should determine its individual need for parking and tailor standards to specific uses and areas. The most common way to do this is through surveys, including counting cars. If car counting is impractical, municipalities can also use employee mode-share surveys to determine the average level of demand in a certain area and for a certain use. Determining parking demand is not an exact science. Because of this, many communities opt for supplying too much parking over supplying too little. Another option, however, is to manage the existing parking supply more efficiently, or to adopt strategies aimed at reducing parking demand. In this way, cities and towns can preserve the special qualities of their communities rather than requiring acres of asphalt to accommodate cars.

2.6.1. *Strategies to reduce parking demand*

These strategies encourage the use of other modes of transportation and better utilization of current parking facilities. Reduced supply also makes it easier to price parking and thus reduce demand. The following are some steps municipalities can include in their zoning ordinances to help reduce parking demand.

2.6.1.1. Set Maximum Parking Requirements

The set of maximum parking requirements can apply to individual developments or as a cap for an entire district. The use of such requirements must be carefully thought out, and just as with minimum requirements, municipalities should be careful not to simply copy other communities' regulations or national standards (unfortunately, lenders can be wary of

financing projects with less parking than usual, regardless of local standards or planners' goals).

Maximum parking requirements can be an effective tool to reduce parking demand, but they should be used in conjunction with other transportation demand management (TDM) strategies. Maximum parking requirements will work best in areas where transportation alternatives, such as transit and pedestrian facilities, are well-provided.

2.6.1.2. Parking fee as traffic management tool

Variable pricing, which increases during peak hours and in places with higher demand, encourages longer-term parkers to choose lower priced and more remote facilities, leaving higher priced central facilities available for high turnover traffic. These strategies cause drivers to switch to other modes and to use parking facilities more efficiently.

2.6.1.2.1. ***What is the right parking price****?*

There is no single, clear-cut answer to the question of the proper price for parking, but some answers are much more problematic than others. Hidden assumptions about parking often influence people's thinking about parking prices. When parking is seen as a government responsibility and as a type of infrastructure, the possibility of a market price may be ignored. Erroneous public good arguments may prompt calls for parking to be free to users. The effort to ensure adequate parking supply under the conventional approach often ignores prices altogether, implicitly assuming free parking. In fact, people's view of the "right price" often seems to be whatever motorists are accustomed. For on-street parking (21), have argued that the right price at any particular time and place is that which ensures enough vacancies for zero parking search, has minimizing external impacts on traffic. This would help in a market-based approach by providing a responsive price signal for actors in the local parking system. The pricing principle when parking is a standalone business is generally "what the market will bear." However, most parking is not run as a standalone business but in association with other activities, whose managers manage parking as a complement to their main business. For many, pricing is merely a tool to deter free riding. Customers may be offered free parking via grace periods and parking validation systems.

2.6.1.3. Eliminating Time limits

Once a policy of market rate pricing is adopted, with the goal of achieving an 85% occupancy rate on each block, even at the busiest hours, then time limits can actually be eliminated. With their elimination, much of the worry and "ticket anxiety" for downtown customers disappears. In Redwood City, where this policy was recently adopted (22), describes the thinking behind the City's decision.

Market-rate prices are the only known way to consistently create available parking spaces in popular areas. If we institute market-rate prices, and adequate spaces are made available, then what purpose do time limits serve? No other than to inconvenience customers. If there is a space or two available on all blocks, then who cares how long each individual car is there? The reality is that it doesn't matter.

2.6.1.4. Unbundle Parking

The concept of unbundling parking generally applies to residential developments, where the price of a unit often includes the cost of parking. Separating the two allows residents to decide whether or not they need a parking space. In areas with good transit and pedestrian facilities, this can encourage households to reduce the number of cars they own or to choose not to own a car at all. This reduces the cost of housing for families that may not own a car. Unbundling parking has multiple benefits: reducing automobile usage, increasing transit use, and allowing more land to be used for development or open space, thus increasing the amenities in a community.

2.6.1.5. Offer Commuter Benefits From Area Employers

Commuter benefits such as parking cash-out, travel allowances, and transit vouchers allow employees to use money that would otherwise be spent on parking to be spent on alternate means of transportation. Parking cash-out and travel allowances are both based on pricing parking. With parking cash-out, employees are given the cash equivalent of the price of their parking space if they agree to give it up. With travel allowances, all spaces are priced and employees are given a payment to cover commuting costs. They can use the money to pay for a parking space or for another mode. Transit fare vouchers can encourage employees to drive less. This program can also encourage transit usage aside from commuting, since transit passes purchased with Transit Checks are valid at all times.

2.6.1.6. Improve Pedestrian, Transit, and Bicycle Facilities

The improvement of pedestrian, transit, and bicycle facilities can encourage people to use these transportation modes rather than driving. Facilities can include bicycle lanes and bike parking; pedestrian amenities; and frequent and reliable transit service near or in major activity centers. These improvements make the use of these modes more attractive and create a lively streetscape which draws more people to an area.

2.6.2. *Strategies to accommodate parking* demand

These strategies encourage the use of privet cars and it increase parking demand, thus reduce parking supply.

The following are some steps municipalities can include in their zoning ordinances accommodate parking demand

2.6.2.1. Set Minimum Parking Requirements

The main appeal of minimum parking requirements is that they ensure an adequate supply. Many communities require construction of all spaces at the beginning of a development, since additional parking at a later date can be expensive to supply and the developer may no longer be involved in the project. However, minimum parking requirements often set supply far above demand. In order to avoid this, it is helpful to combine limited minimum requirements with other strategies, or in some cases to do away with minimum requirements altogether in favor of other approaches.

2.6.2.2. Provide On-Street Parking

On-street parking appeals to motorists because it is visible and convenient. It serves multiple destinations, uses less space than off-street parking, serves as a buffer between pedestrians and moving cars, and slows down traffic, creating a more pedestrian-friendly environment.

However, there is limited space for on-street parking and it competes with other uses of street space, such as traffic lanes, bike lanes, and sidewalks. Although on-street parking on its own is unlikely to provide enough parking for a commercial center or most residential neighborhoods, it can be used successfully in conjunction with other strategies.

2.6.2.3. Provide parking information to Users

The provision of information on the availability, location, and price of parking aids users in finding parking, and spreads parking demand among multiple facilities. This information can be provided through signs, brochures, and websites, and can be incorporated into general marketing material. Another solution is to provide real time information on the location of

available parking spaces. This is often done through the use of digital signs located along main thoroughfares that direct motorists to nearby parking facilities and display the number of available spaces.

2.6.2.4. Regulate Parking

Parking regulations can aid in the efficient use of street space and parking resources. Some aspects of parking that can be regulated include time, users, types of vehicles, and on-street parking. Regulation of time and users encourages the efficient use of facilities, reserving high-demand spaces for shorter term, high-turnover users, while promoting the use of more remote spaces by longer-term parkers. Regulation of types of vehicles and on-street parking improves traffic flow, by limiting the on-street parking of large vehicles and prohibiting on-street parking on major roads during peak travel times in order to provide extra traffic lanes.

2.6.2.5. The use of shared Parking

Parking requirements can be reduced by as much as 30% to 50% through the accommodation of parking in shared garages or lots. Shared parking, including on-street parking, is especially useful in "park once" environments, where customers park their car in one place and then walk between destinations (23). It works well when the hours of operation for various uses are complementary, the peak hours of use do not overlap, and when parking facilities are located within a reasonable distance of destinations. Often, facilities are built and managed by the city or municipality, but are funded by in-lieu fees paid by developers opting not to build as much on-site parking.

Written agreements between businesses can minimize the potential for conflict and ensure that parking is available for all businesses and customers.

2.6.2.6. Don't Build Spaces All At Once (Reserve Parking)

Municipalities can allow developers to build less than the minimum amount of parking at the outset, provided open space is reserved which, if needed, can be converted to parking at a later date. Upper Merion Township, Montgomery County, allows developers to construct 75% of the minimum number of spaces, with the understanding that the remaining 25% will be added if the Township's building official determines the existing parking to be inadequate. This strategy has the advantage of restricting the supply of parking, lessening the amount of impervious surface created by a development, and adding to the green space within the development (24) .

2.7. The 85% rule – what does it mean for the parking supply?

Practical Capacity is the occupancy rate at which on-street parking is well utilized though still reasonably available. On-street parking occupancy rates at or close to 100 percent are generally undesirable. When available on-street spaces are scarce, and off-street spaces are high-priced relative to on-street spaces, drivers circulate or "cruise" to find an available on-street space. Drivers are also tempted to park illegally. An on-street parking occupancy of 85 percent has been demonstrated by parking experts, most notably, as the benchmark for the practical capacity of on-street parking. At 85 percent occupancy, approximately one available space is expected per block, thus limiting the cruising phenomenon and generally assuring the availability of a space. Anyone involved in parking will inevitably run across the "85% Rule." Though this concept has been a common tool for decades, it drew wider attention when discussed (25) that on any single block, parking should be priced to ensure that 15% of the total spaces are available. Where less than 15% are available, the cost of parking should be raised until occupancy rates fall to 85%. Eighty-five percent is the level at which a city's competing objectives are well met: 85% of the spaces are in use, which means that a valuable and limited resource is being efficiently used; and 15% of the parking spaces are available at any time, so customers are assured that they will be able to quickly find a space close to their destination.

Thus, higher rates should be charged on blocks with higher occupancies, and lower rates on blocks with lower occupancies. This is called variable rate or performance-based pricing. According *to Shoup*, charging a "fair market price" for high-demand spaces increases turnover, thereby strengthening business, reducing congestion, improving air quality, and generating a revenue source for cities to reinvest in the area. The 85% Rule is an important guiding principle to include in any parking management plan for the reasons stated above. Unfortunately, some cities have implemented this strategy before having a clear reason to do so. Any city should be cautious with a simple application of the 85% Rule, but particularly smaller cities that have traditionally operated with free parking. Some cities have created "parking benefit districts" in which parking fee revenues go into a special fund that benefits businesses in the district. When local merchants see that parking revenues are spent on public improvements that benefit their businesses, they are more likely to support the parking fees.

2.8. Parker's behaviour in choosing location

The activities in a city are mainly concentrated in the Central Business District (CBD). These activities demand more parking spaces but increasing the number of parking spaces is

restricted by the limitation of land area. Parkers' behavior in choosing a parking location, such as on road parking, on surface and in multistory building, are distinct by trip purpose and other factors. It reveals that the effectiveness of the parking location usage can be improved if the parkers' behavior in choosing parking location is known. For planning purposes, knowledge about parkers' behavior can also support the allocation of parking demand according to the parking location.

The lack of information about parkers' behavior and preference in choosing a parking location in the Central Business District area, especially for commuting, business and shopping trips, makes it difficult to develop effective parking strategies. Understanding parking behavior is an effective way to analyze the effects of parking policy measures. The purpose of this research is to develop parking strategies and to understand parkers' behavior in choosing a parking location in the Central Business District of Kigali City.

2.9. Required information for parking studies

Studies must be conducted to collect the required information about the capacity and use of existing parking facilities. In addition, information about the demand for parking is needed. Parking studies may be restricted to a particular traffic producer or attractor, such as a store, or they may encompass an entire region, such as a central business district.

Before parking studies can be initiated, the study area must be defined. A cordon line is drawn to delineate the study area. It should include traffic generators and a periphery, including all points within an appropriate walking distance. The survey area should also include any area that might be impacted by the parking modifications. The boundary should be drawn to facilitate cordon counts by minimizing the number of entrance and exit points.

Once the study area has been defined, there are several different types of parking studies that may be required. These study types are listed below and discussed in detail in the remaining paragraphs.

- Inventory of Parking Facilities
- Accumulation Counts
- Duration and Turnover Surveys
- User Information Surveys
- Land Use Method of Determining Demand

2.9.1. Inventory of parking facilities

Information is collected on the current condition of parking facilities. This includes:

- The location, condition, type, and number of parking spaces.
- Parking rates if appropriate. These are often related to trip generation or other Land use considerations.
- Time limits, hours of availability and any other restrictions.
- Layout of spaces: geometry and other features such as crosswalks and city Services.
- Ownership of the off-street facilities.

2.9.2. *Accumulation counts for parking*

These are conducted to obtain data on the number of vehicles parked in a study area during a specific period of time. First, the number of vehicles already in that area are counted or estimated. Then the number of vehicles entering and exiting during that specified period are noted, and added or subtracted from the accumulated number of vehicles. Accumulation data are normally summarized by time period for the entire study area. The occupancy can be calculated by taking accumulation/total spaces. Peaking characteristics can be determined by graphing the accumulation data by time of day. The accumulation graph usually includes cumulative arrival and cumulative departure graphs as well.

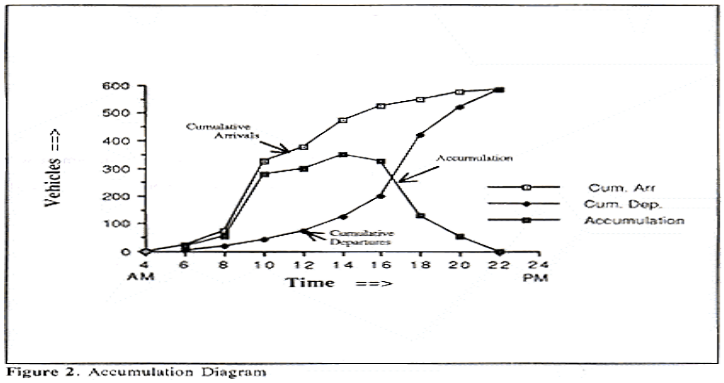

Figure 2. Accumulation Diagram

Figure 2-1: Accumulation Diagram (26)

2.9.3. *Parking duration and turnover surveys*

The accumulation study does not provide information on parking duration, turnover or parking violations. This information requires a license plate survey, which is often very expensive. Instead, modifications are often made to the field data collection protocols. Note that there is usually a trade-off between data collection costs and study accuracy. Spending more time and money may increase accuracy, but at what point does the incremental change in accuracy become too expensive?

In planning a license plate survey, assume that each patrolling observer can check about four spaces per minute. The first observer will be slower, because all the license plate numbers will have to be recorded, but subsequent observers will be able to work much faster. The form shown below can be used for a license plate survey.

Parking turnover is the rate of use of a facility. It is determined by dividing the number of available parking spaces into the number of vehicles parked in those spaces in a stated time period.

2.10. Traffic regulatory measures for parking

The regulatory measures range from waiting time restrictions in a street to the comprehensive control over an extended area, laying down where vehicles may or may not park, what should be the waiting time and what charges should be levied for parking.

A Detailed transportation and Infrastructure Master Plan report for Nyarugenge district (27) revealed that in quartier commercial, the parking situation is comparatively controlled whereby on-street curb side parking is the common method of parking. Though on-street parking is an extravagant use of the existing narrow street space, it cannot be entirely prohibited. A judicious application of appropriate regulatory measures helps to mitigate some of the ill-effects of on-street parking.

Among other measures, the Kigali Veterans' Cooperative Society (KVCS) is the company in charge of charging a fee for on-street parking, whereby a small car is charged 100 Rwf and a medium car 200RwF respectively, for as long as one (1) hour parking duration. Note that this price has not been calculated taking into account the opportunity cost of parking areas, therefore this should be done in the future.

The transportation and Infrastructure Master Plan report for Nyarugenge district goes on to state that "it is particularly common to observe uncontrolled loading and unloading in the Central Business areas (CBDs), especially in the area surrounding the newest Nyarugenge Market", which coincidently happens to be the area of my study.

The Kigali city council (KCC) has recently adopted regulatory measures for the CBD. As translated and quoted from the Mayor of Kigali's public announcement letter made on June 29, 2011/ Ref N° 1990/07.01.07/11 "Trucks with the capacity of more than 5 tons of goods will be allowed to City center for unloading only from 9pm and should leave the city center not later than 5am in the morning. No truck is allowed to park in city center during the day."

Furthermore, the parking method in some portions of quartier commercial has been shifted from 60° angle parking to parallel parking so as to widen the width of the carriageway.

In one way, this has been an advantage as far as increasing the capacity of the roads in the area is concerned. On the other hand, this has caused lack of parking spaces vis-à-vis the current demand (since the number of parking spaces reduces in parallel parking).

2.11. The use of parking surveys

2.11.1. Introduction

Parking is one of the serious problems that confront the urban planner and the traffic engineer. The CBD and its surroundings are usually the areas where a parking survey is needed. In order to propose a solution for the improvement of parking conditions, the surveys are required to gather data pertaining to the availability of parking space, the extent of its usage as well as the parking demand.

For instance, if it is proposed to implement a system of parking charges, it will be necessary to know how much to charge and what will be the effect of the pricing policy on parking. In fact, parking surveys are intended to supply all this kind of information.

2.11.2. *Types of parking surveys*

The type of parking survey to be conducted for formulating a comprehensive parking plan for an area can vary depending on scope. Furthermore, the data collected and the degree of sophistication employed depend upon the funds available.

The types of parking surveys usually conducted are listed and explained below:

i) Parking space inventory

ii) Parking usage survey by patrol

iii) Questionnaire type parking usage survey

iv) Cordon count

2.11.3. *Parking Space Inventory*

This parking survey method consists of collecting data on the amount, type and location of space actually or potentially available for parking in an area under study, which has to be delineated first. This survey is used in this research.

2.11.4. *Parking usage survey by patrol*

This method has the main purpose of obtaining data on the extent of usage of parking spaces. Parking usage survey by is used. It consists of making periodic observation by counting parked

vehicles on each patrol, at regular intervals through a certain period to cover the arrivals and departures of commuters and shoppers.

The survey can be conducted for on-street and off-street parking facilities.

2.11.5. *Questionnaire type parking usage Survey*

This survey involves interviews with the drivers who use the parking facilities.

According to Roth, the key information that can be collected is stated here below (28)

- Extent of parking facilities usage,
- Parking requirements at the price existing at the time of the survey,
- Parking demand at different prices,
- Journey purposes of car parkers, etc.

2.11.6. *Cordon count*

In this method, the area to be surveyed is demarcated by a cordon line which is crossed by the roads emanating from the area. Counting stations are established at these crossing points and a count is made for all the vehicles entering and leaving the area.

The obtained results are the basic settings for the efficient management of the parking system and the optimal design of parking facilities in urban centers.

2.12. Price elasticity of demand

Elasticity of demand is an important variation on the concept of demand. Demand can be classified as elastic, inelastic or unitary.

- An elastic demand is one in which the change in quantity demanded due to a change in price is large.
- An inelastic demand is one in which the change in quantity demanded due to a change in price is small.

The price elasticity of demand measures how these prices changes affected occupancy rates. Economists define price elasticity as the percent change in the occupancy rate (the quantity of parking demanded) divided by the percent change in the meter price. The wide range of price elasticity suggests that many variables other than price affect parking demand. Higher prices should reduce occupancy, and lower prices should increase occupancy. In many cases, however, occupancy either rose after prices rose or fell after prices fell. Higher prices do not cause higher occupancy, and lower prices do not cause lower occupancy, so other factors

must have overwhelmed the effects of prices on occupancy in the cases of positive price elasticity.

The wide range of elasticity at the block level also suggests that the circumstances on individual blocks vary so greatly that planners will never be able to estimate an accurate elasticity to predict the prices needed to achieve the target occupancy for every block.

2.13. The need of discrete choice models

Discrete choice models are the method used to analyze and predict a decision maker's choice of one alternative from a finite set of mutually exclusive and collectively exhaustive alternatives. Such models have numerous applications since many behavioral responses are discrete or qualitative in nature; that is, they correspond to choices of one or another of a set of alternatives.

The ultimate interest in discrete choice modeling, as in most econometric modeling, lies in being able to predict the decision making behavior of a group of individuals. A further interest is to determine the relative influence of different attributes of alternatives and characteristics of decision makers when they make choice decisions. For example, transportation analysts may be interested in predicting the fraction of commuters using each of several travel modes under a variety of service conditions, or marketing researchers may be interested in examining the fraction of car buyers selecting each of several makes and models with different prices and attributes. Further, they may be interested in predicting this fraction for different groups of individuals and identifying individuals who are most likely to favor one or another alternative. Similarly, they may be interested in understanding how different groups value different attributes of an alternative; for example are business air travelers more sensitive to total travel time or the frequency of flight departures for a chosen destination (29). There are two basic ways of modeling such aggregate (or group) behavior. One approach directly models the aggregate share of all or a segment of decision makers choosing each alternative as a function of the characteristics of the alternatives and socio-demographic attributes of the group. This approach is commonly referred to as the aggregate approach. The second approach is to recognize that aggregate behavior is the result of numerous individual decisions and to model individual choice responses as a function of the characteristics of the alternatives available to and socio-demographic attributes of each individual. This second approach is referred to as the disaggregate approach. The disaggregate approach has several important advantages over the aggregate approach to modeling the decision making behavior of a group of individuals. First, the disaggregate

approach explains why an individual makes a particular choice given her/his circumstances and is, therefore, better able to reflect changes in choice behavior due to changes in individual characteristics and attributes of alternatives. The aggregate approach, on the other hand, rests primarily on statistical associations among relevant variables at a level other than that of the decision maker; as a result, it is unable to provide accurate and reliable estimates of the change in choice behavior due changes in service or in the population. Second, the disaggregate approach, because of its causal nature, is likely to be more transferable to a different point in time and to a different geographic context, a critical requirement for prediction. Third, discrete choice models are being increasingly used to understand behavior so that the behavior may be changed in a proactive manner through carefully designed strategies that modify the attributes of alternatives which are important to individual decision makers. The disaggregate approach is more suited for proactive policy analysis since it is causal, less tied to the estimation data and more likely to include a range of relevant policy variables. Fourth, the disaggregate approach is more efficient than the aggregate approach in terms of model reliability per unit cost of data collection. Disaggregate data provide substantial variation in the behavior of interest and in the determinants of that behavior, enabling the efficient estimation of model parameters. On the other hand, aggregation leads to considerable loss in variability, thus requiring much more data to obtain the same level of model precision. Finally, disaggregate models, if properly specified, will obtain un-biased parameter estimates, while aggregate model estimates are known to produce biased (*i.e.* incorrect) parameter estimates (30).

Chapter 3 : STUDY METHODOLOGY AND TECHNIQUES

3.1. Introduction

In this chapter, we described the methodology used in this thesis research. The chapter of literature review, we discussed on different methods that are usually applicable in parking strategies, also some previous studies have been reviewed.

Various methods were used according to the information targeted in order to achieve the objectives of the study. This chapter will therefore elaborate issues like structure of data collection, area of the study, sampling methods and data processing.

The present research was carried out to develop parking strategies for motorized vehicles in Kigali city, taking CBD as the case study.

The researcher made use of both primary and secondary data. Primary data were collected through a set of parking survey methods.

Then, the collected data was supported by secondary data extracted from the available literature on the topic of study.

3.2. Methodology

3.2.1. Description of the area of study

As mentioned above, the area originally consisted of City of Kigali. But since it was huge, it could not be accomplished properly; CBD was selected and visited for the study. It was taken to represent the whole study area with an assumption that extrapolated results will be true for the whole study area. This study area is located in the heart of Kigali City, in Nyarugenge district, and covers three locations, the first was at UTC (Off-street parking), the second was the street number **KN2 ST** from the City Plaza building up to the Newest Nyarugenge Market building and the third was the street number **KN4 ^{AV}** from Bank of Kigali to the Rwanda radio's office. For on-street parking survey, the researcher walked along the area of study from the starting point to the end, by writing vehicle plate number every 30 minutes interval. And for off-street parking the researcher was writing the plates number of the vehicles interring and leaving the parking every 15 minutes. Here below is the map showing those locations.

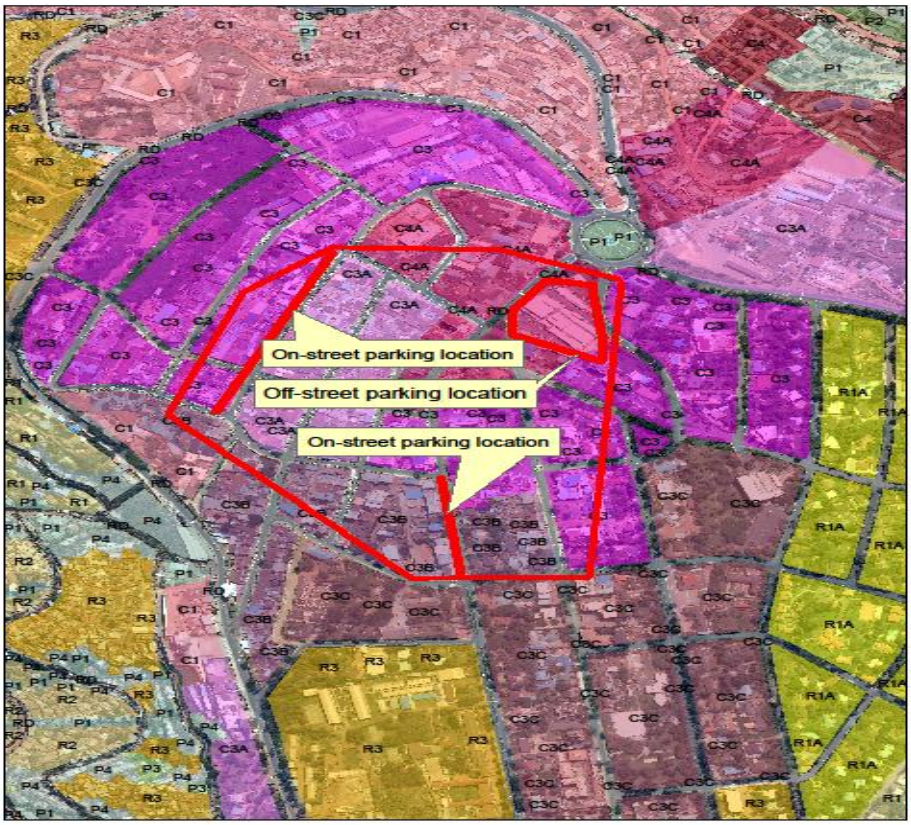

Figure 3-1: Study area

3.2.2. Use Data collected in the parking survey

3.2.2.1. Parking Space Inventory was one of the method used

In line with the requirements for this parking survey method, the researcher collected data on the amount, type and location of parking spaces in the delineated area of the study.

The recorded items included among others, the total lengths of curb, the number of parking spaces provided on the street, street width, driveways and other features that are likely to affect the use of the street for parking. These data were used for developing parking strategies.

3.2.2.2. Parking usage by patrol survey

This method consisted of counts of parked vehicles on-street every 30 minutes through a period of 16 hours, from 6am to 9pm, covering the morning and evening peak period, the arrival and departure of a vehicle, and the parking accumulation as well as the turn-over.

The survey took place on working day, so as to be representative of the other days as required by specifications (Kadiyali, 1997) (31) .

But, for off-street the method consisted of recoding the plate number of the vehicle interring in the parking and the ones leaving the parking, so that we were able to know the parking time of the vehicle in the parking. This recording was done every 15 minute

3.2.2.3. Questionnaire type parking usage Survey

This method involves interviewing the drivers who use the parking facilities available.

In fact, as recommended in the literature, the collected key information was specifically the trip purpose, time of arrival at the parking place, time of departure from the parking place, type of vehicle and type of parking space used. The form used is to be found in Appendix **of** this report.

In fact, the survey took place on week days (Monday and Friday); and in order to capture the current situation in the area, 150 drivers randomly seen to park in the area of study at the time of the survey were interviewed.

This sample size was selected using Kerlinger's statement that a sample of 30 or over is generally acceptable with no danger of biasness in representing the characteristics of the whole population. In addition, Holt also argues that as a general rule the minimum number should be 30 (32)**.**

Since the interviews involved human beings, due care was given to ethical considerations.

3.2.3. *Various consultations made in this research*

The researcher consulted different institutions dealing with transport issues across Rwanda, such Transport department of MININFRA, City of Kigali and KVSS were a great resource. Also, RRA though its motor vehicle division and clearing department provided the researcher with important information.

3.2.4. Willingness-To-Pay Method (WTP)

This research combines stated preference data with demographic, travel habit, and driving behavior information to examine the willingness to pay for the parking. Bivariate correlations and multivariate regression models are used to identify the factors that predict the hourly parking fee breakpoint at which current drivers will change travel behavior and no longer drive to the City Center. This research identifies trip purpose, average single trip distance,

travel time for one trip, walking time from parking to destination, walking distance from parking to destination, monthly income, daily parking fee, monthly parking fee . Willingness-To-Pay method approach was applied to assess willingness of individuals to pay parking fee. Therefore this method had different way or technics used to required parking fee to manage parking appropriately. Willingness-to-pay (WTP) values can be determined using contingent valuation and stated preference surveys or by analysis of revealed preference data (33) .

1. Contingent valuation method and Stated preference survey method involve surveys to determine the willingness of people to pay for products or attributes in hypothetical situations.
2. Revealed preference methods derive values from people's actual purchases and actual real-life decisions and choices.

The Willingness-To-Pay method is principally based on survey design to determine the amount of money that individuals would pay for parking.

3.2.4.1. Use Discrete choice Model

Discrete choice modeling is one of the methods that can be used for the analysis of the data relating to an individual's WTP for the parking fees (34). There are programs that assist with the analysis of discrete choice models; such as, Statistical Package for the Social Sciences (SPSS). In this research, SPSS is used to analysis discrete choice models.

It was stated that the result of the discrete choice models used by analysts describe preferences and choice in terms of probabilities of choosing each alternative. Moreover, as with deterministic choice theory, the individual is assumed to choose an alternative if its utility is greater than that of any other alternative (35). These probabilities reflect the population probabilities that people with a given set of characteristics and facing the same set of alternatives choose each of the alternatives.

The utility functions can be formulated as demonstrated in equation 3.1 as follow:

$$\boldsymbol{U = V + \varepsilon = \beta' x + \varepsilon} \qquad \textbf{Equation 3-1}$$

Where

U= the utility of willing to pay the amount for severity reduction.

V= the systematic (deterministic) component of utility of willing to pay the amount for severity reduction.

ε = the random (disturbance or error) component of utility of willing to pay the amount for severity reduction.

x = the vector of attributes that are related to the willingness to pay the amount for severity reduction.

β' = the vector of unknown parameters.

The approach of Ben-Akiva and Lerman viewed the utility of any alternative as a random variable in which, if any alternative i has been selected by person n from choice set C_n then the probability P_n is given by the equation 3.3 as follow:

$P_{in}=P\ (U_{in} \geq U_{jn}\ \forall j\ \in C_n, j \neq i)$ **Equation 3-2**

Where:

P_{in} = the probability that the individual n chooses alternative i

Uin = utility function of the individual n chooses alternative i

$\forall j$ = all the cases, J, in the choice set C_n: the choice set of the individual n

Applying the formula into binary choices which symbolize the choice sets C_n as i and j, then the probability of people choosing alternative i is demonstrated in equation 3.4 below:

$\boldsymbol{P_n(i/C_n) = \Pr(U_{in} \geq U_{jn})}$ **Equation 3-3**

And the probability of people choosing alternative j is highlighted in equation 3.5.

$\boldsymbol{Pn(j) = 1 - Pn(i)}$ **Equation 3-4**

Logistically distributed, the choice probability of alternative i for binary logit is presented as :

$\boldsymbol{P_n(i) = Pr(U_{in} \geq U_{jn})}$ **Equation 3-5**

3.2.5. Determination of price elasticity of demand

Elasticity is defined as the percentage change in the response variable with respect to a one percent change in an explanatory variable. In the context of logit models, the response variable is the choice probability of an alternative, such as P_i , and the explanatory variable is the attribute X_{ik} . Elasticity is different from derivatives in that elasticity is normalized by the

variable units. To clearly illustrate the concept of elasticity, let us consider that P_{1i} and $\mathbf{P}_{2i}$ are choice probabilities of an alternative i at attribute levels X_{1i} and X_{2i}, respectively (36). In this case, the elasticity is the proportional change in the probability divided by the proportional change in the attribute under consideration:

$$\boldsymbol{Elasticity} = \frac{\boldsymbol{Percentage\ change\ in\ probability}}{\boldsymbol{Percentage\ change\ in\ attribute}} = \frac{(\boldsymbol{P2-P1})/\boldsymbol{P2}}{(\boldsymbol{X2-X1})/\boldsymbol{X2}} = \frac{(\boldsymbol{\Delta P}\ /\boldsymbol{P1})}{(\boldsymbol{\Delta X}/\boldsymbol{X1})} \quad \textbf{Equation 3-6}$$

There is some ambiguity in the computation of this elasticity measure in terms of whether it should be normalized using the original probability-attribute combination (P_{1i} , X_{1i}) or the new probability-attribute combination (P_{2i} , X_{2i}). A compromise approach is to compute the elasticity relative to the mid-point of both sets of variables, yielding a measure called the arc elasticity. The expression for arc elasticity is:

$$\boldsymbol{Arc\ Elasticity} = \frac{\left(\frac{\boldsymbol{P2-P1}}{(\boldsymbol{P1-P2})/2}\right)}{\left(\frac{\boldsymbol{X2-X1}}{(\boldsymbol{X1+X2})/2}\right)} = \frac{\left(\frac{\boldsymbol{\Delta P}}{(\boldsymbol{P1-P2})/2}\right)}{\left(\frac{\boldsymbol{\Delta X}}{(\boldsymbol{X1+X2})/2}\right)} \quad \textbf{Equation 3-7}$$

In this research, researcher establishes data on the occupancy and prices for all parking spaces in the study area. The price elasticity of demand is used to measure how these prices changes affected occupancy rates. Economists define price elasticity as the percent change in the occupancy rate (the quantity of parking demanded) divided by the percent change in the meter price. For example, if a 10 percent price increase leads to a 5 percent fall in occupancy, the price elasticity of demand is –0.5 (–5% ÷ 10%).

We calculated the elasticity of demand revealed by all the price changes during study's first year. For each price change, we compared the old price and average occupancy to the new price and average occupancy during the following period.

The formula bellow is used to compute elasticity for this study report:

$$\boldsymbol{\eta} = \frac{(\mathbf{Q1-Q2})/(\mathbf{Q1+Q2})}{(\mathbf{P1-P2})/(\mathbf{P1+P2})} \qquad \textbf{Equation 3-8}$$

Where:

η represents the price elasticity of demand,

Q_1 represents the initial quantity demanded that exists when the price equals P_1 and

Q_2 represents the new quantity demanded that exists when the price changes to P_2

If the formula creates a number greater than 1, the demand is elastic. In other words, quantity changes faster than price. If the number is less than 1, demand is inelastic. In other words,

quantity changes slower than price. If the number is equal to 1, elasticity of demand is unitary. In other words, quantity changes at the same rate as price.

Chapter 4 : QUESTIONNAIRE DESIGN

4.1.Introduction

Question papers were given to respondent where questions should be answered and those answers were compared or added to those from interview. In these questionnaires the researcher needed to know the preference of driver, between paying parking fee or use other transport modes.

The purpose of Stated Preference (SP) Studies is to assess how respondents' choices vary in different hypothetical situations. SP is a survey technique concerned with measuring and understanding the preferences underlying people's stated choices, based on how they respond to hypothetical situations. In SP research respondents are presented with choices between hypothetical but realistic alternatives, with each alternative being described in terms of their characteristics or "attributes". By varying the values of these attributes in a carefully controlled way (using an experimental design with appropriate statistical properties), we can learn about how much importance people attach to each attribute on the basis of the choices

they make. It is also possible to estimate choice probabilities for given choice alternatives similar to those studied.

Surveys were conducted to gather information about how many people of a population have certain opinions or characteristics, or how often certain events occur together. Analytical surveys were designed to 'explain' something or to show causal relationships between one variable and another. Although there were some descriptive issues associated with parking fee being investigated. However, it is more oriented towards finding associations, explanations and predictions, but less towards representative-description and enumeration.

The design of the questionnaire was based on all the feasible explanatory variables, dependent variables and uncontrolled variables in the form of errors without involving any implicit controlled variable. It is not always practically feasible to include all statistically significant attributes in a questionnaire design, particularly some of the qualitative response models for stated preference (SP).

4.2. Questionnaires design

The questionnaires used in the research can broadly be classified into the following types:

a. Informative or Descriptive Questions

b. Questions for disaggregate models

4.2.1. Descriptive Questions

Questionnaires used in this research contained some informative questions related to parking fee, travel time and trip length, searching time etc. These questions are realistic in nature seeking to know different informative issues related to the parking and public transport price. In order to avoid any response bias, the questions were limited to just single question for one quarry without having any leading questions or any suggestive loaded words. In wording the questions efforts were made to avoid double-barreled questions, proverbs and double negatives, etc. The possibility of using both open-ended and pre-coded questions was investigated. In an open question, the respondent is given the freedom to decide the aspect, form, details and length of his answer. It is responsibility if the interviewers to record as much of it as they can. However, it is very difficult to code the open questions, which makes their analysis difficult. Basing on this it was decided not to use any open questions in this study.

4.2.2. State preference Questions

A number of discrete models like SP deal with non-factual, attitudinal or qualitative response types of questions. An attitude, choice, perception or belief is likely to be more complex and multi-faceted than an issue of fact. There is no external way of verifying the reliability of questions and answers. The responses are, generally more sensitive to bias by wording, by response sets, by leading, by prestige and by contextual effects (37). All the possible aspects of the respondent like his knowledge about the topics under investigation, ability to understand hypothetical or behavioral question, etc. were taken into account prior to designing the questionnaires for the qualitative response models.

4.2.2.1. Willingness to pay Questions

Under the concept of this study, the respondents were asked to state how much they are willing to pay for the parking before switching from use of privet car to another mode of transport. The respondents were asked individually.

4.2.2.2. The use of Stated Preference Questions

The purpose of designing stated preference questions is to collect data for efficient model estimation with as little bias as possible. The design of options and their presentation in SP questionnaires may be organized in three steps: a) the selection of the attribute levels and

combinations constituting each alternative, b) the design of the presentation of these alternatives, and (c) the specification of the response to be elicited from the respondents (37)

SP choice data are obtained by offering each respondent a set of hypothetical realistic alternatives. To optimize the efficiency of SP design, attention should be paid to the conditions under which choices will change. Where choice involves trade-off, efforts should be made to identify the point at which the respondents are just indifferent between two alternatives, i.e. the ‘boundary values’.

Chapter 5 : FINDINGS PRESENTATION AND DISCUSSION

5.1. Introduction

This chapter deals with the analysis and interpretation of the primary data that have been collected. Raw data must be analyzed so as to find trends and patterns that will result in information that can be easily understood The parking survey was conducted using two methods, namely the parking usage survey by questionnaire type as well as the parking usage survey by patrol. The parking survey provided information on the usage of the existing parking spaces, the parking duration (turnover) as well as the parking accumulation in quartier commercial. The data collected from the parking survey were also used to forecast the parking situation in quartier commercial for the next five years.

After conducting the parking surveys, SPSS was used to discuss and interpret the data, and then results are discussed in graphs and tables. Finally the results were compared according to two methods used, and then compared with international results also.

Therefore, this chapter discusses the findings of the present study and responds to the research question.

5.2. findings presentation and discussion

5.2.1. Findings of the parking usage survey by questionnaire type

Samples of 150 drivers seen to park in the area of study were asked about their trip purpose as well as the occupancy rate of their cars so as to capture the picture of the whole area.

As shown from the figure 5.2, it was found that 45% of the people drive to City Center for Commuting purposes whereas 35% drive for Business purposes and 20% for other purposes. This shows that there is a high demand for parking space to serve Commuting and business dealers.

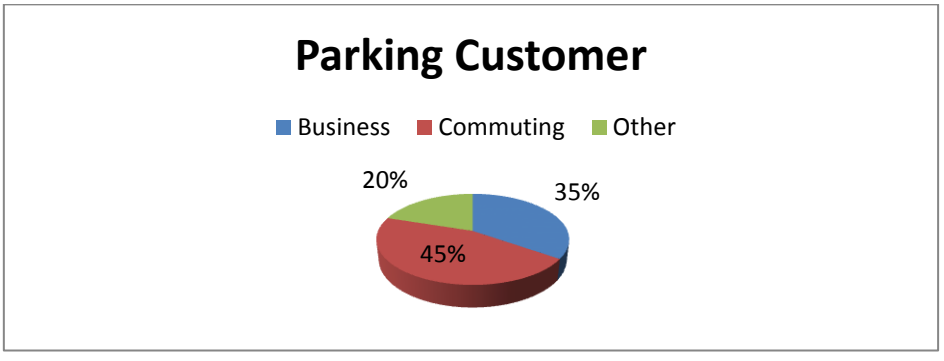

Figure 5-1: Chart showing the distribution of the trip purpose over the sample

From the figure 5.3 below, it was found that 41% of the people drive to City Center their single trip distance is 6km to 10km, 20% drive for 11km to 15km, 18% drive less than 5km. This shows that most of people drive (41%) drive an average single trip distance of 6km to 10km and the average single trip distance is 11.95km.

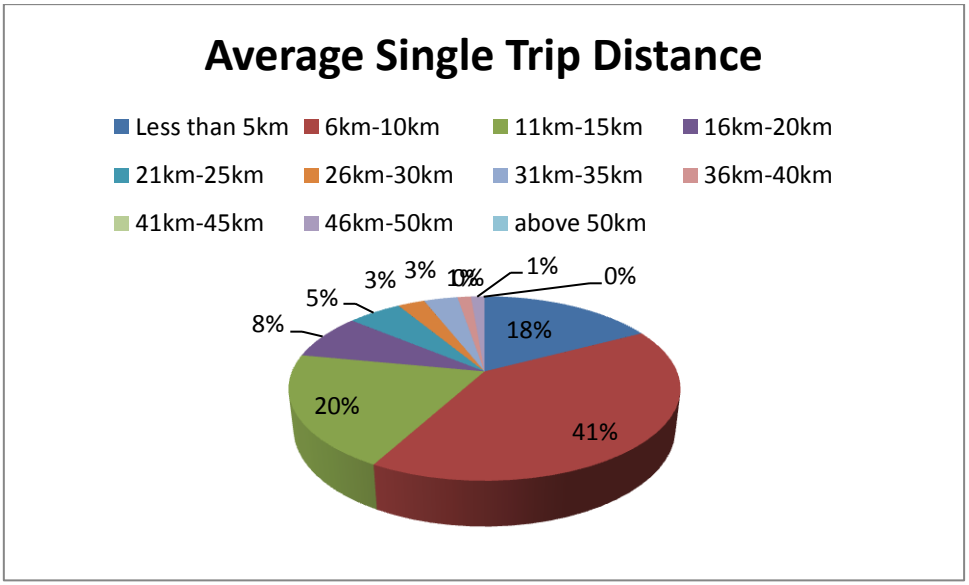

Figure 5-2: Chart showing the distribution of the average single trip distance over the sample

The figure 5.4 below, shows that 29% of the people drive to City Center, they use travel time of 26 minutes to 30 minutes, 23%, they use 31 minutes to 35 minutes, 13% they use 36 min to 40minutes, 13% they use 21 minutes to 25 minutes , 9% they use less than 20 min and 11% they use more than 40minutes . This shows that most of people (52%) their travel time for one trip is 26 minutes to 35 minutes. The average travel time for one trip is 29minites

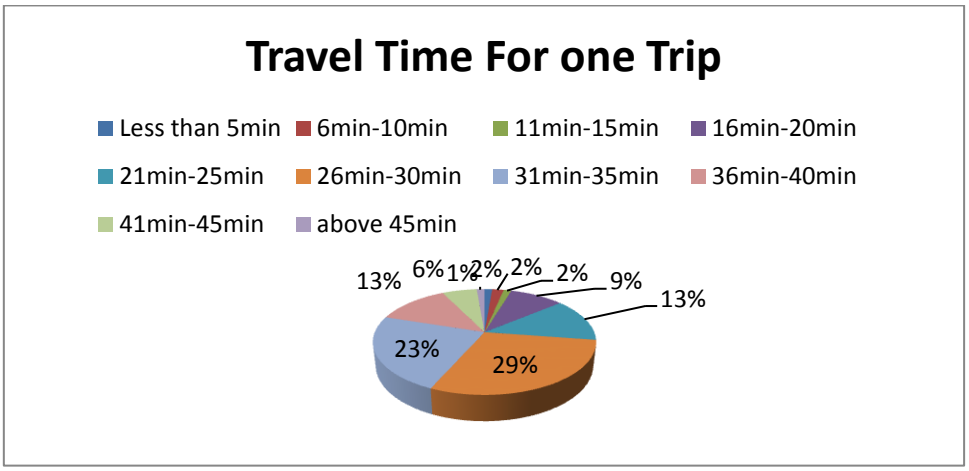

Figure 5-3: Chart showing the distribution of the travel time for one trip

Referring to figure 5.5 below, it was found that 52% of the people drive to City Center their walking time from parking to destination is less than 5min , 36% of driver they use 6min. to 10min. and 12% they use more than 10min. This shows that most of people driving to the city center (88%) they working time from parking to their destination is less than 10min. From this, it was found that the average walking time from the parking to destination 5,6min.

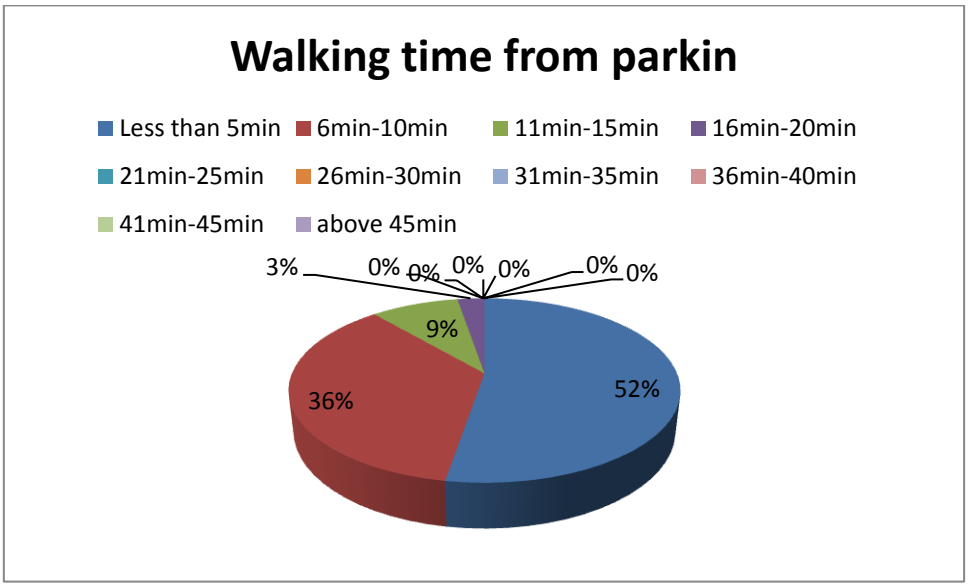

Figure 5-4: Chart showing the distribution of the walking time from parking to destination

The figure 5.6 below, shows that 29% of the people drive to City Center, they use travel time of 26 min to 30 min , 23% they use 31 min to 35 min., 13% they use 36 min to 40min , 13% they use 21 min. to 25 min , 9% they use less than 20 min and 11% they use more than 40min . This shows that most of people (52%) their travel time for one trip is 26 min to 35 min. Basing on this, it was found that the average walking distance from parking to destination is 140m.

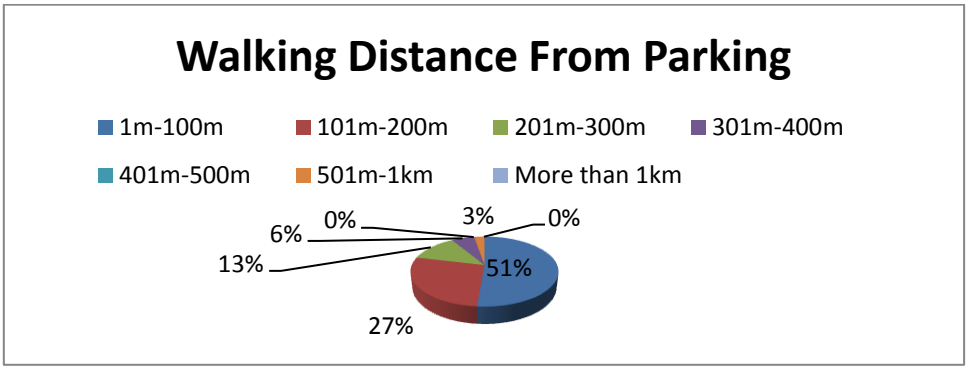

Figure 5-5 Chart showing the distribution of the walking distance from parking to Destination

From the figure 5.7 below, it is evident that 28% of the people drive to City Center, they spend 26min. to 30min. for searching parking, 21% they spend 21min. to 25min for searching parking, 17% spend 31min. to 35min., 16% spend 16min. to 20min. 6% they spend 11min. to 15min. 7% they spend more than 35min. and only 5% spend less than 10min. for searching parking. This shows that most of people (66%) they spend more than 20 min. as searching time. It was found that, the average searching time is 24min.

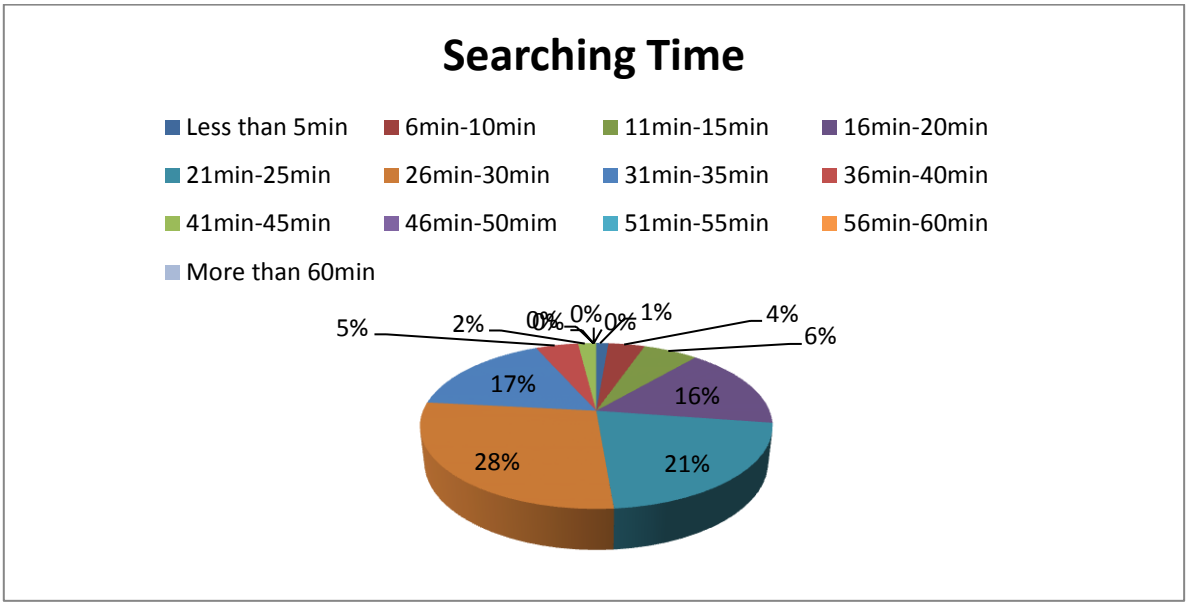

Figure 5-6: Chart showing the distribution of the searching time over the sample

From the figure 5.8 below, it was found that 23% of the people drive to City Center, their average monthly income is 700,001Rwf to 800,000Rwf, 19% their monthly income is 600,001 to 700,000Rwf, 14% of the people drive to the city center, their monthly income is 800,001Rwf to 900,000Rwf, 13% their monthly income is 900,001Rwf to 1,000,000Rwf, only 2% of the people drive to the city center, their monthly income is more than 1,000,000Rwf and 29% their monthly income is less than 600,000Rwf.

This shows that, the average monthly income is 678,000Rwf.

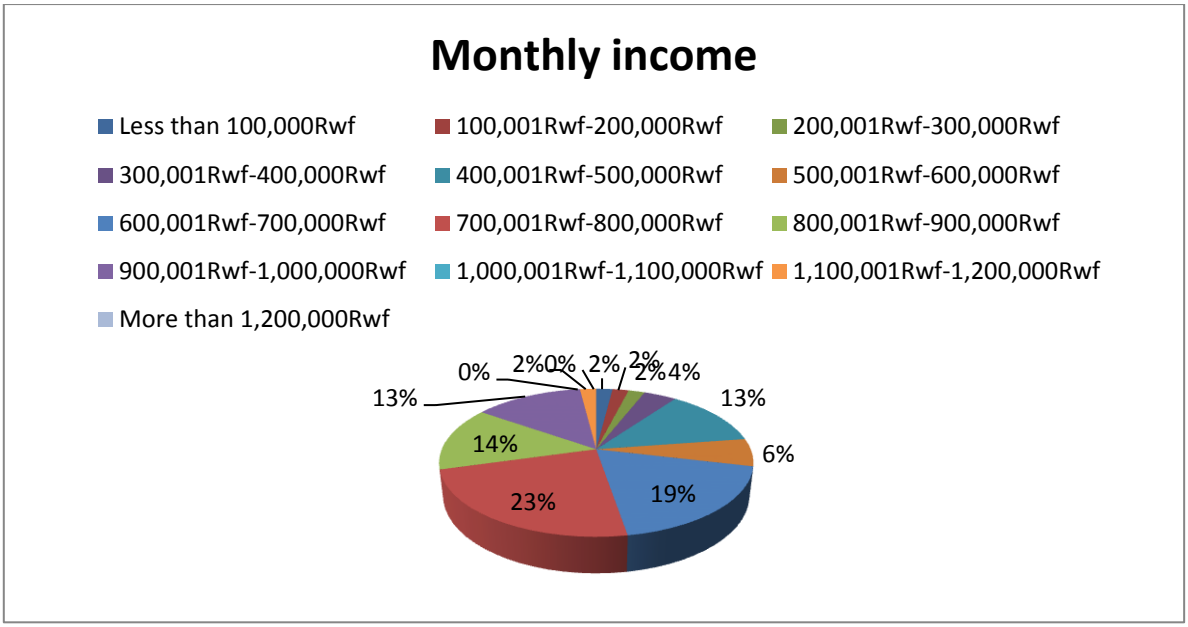

Figure 5-7: Chart showing the distribution of the searching time over the sample

As shown from the figure 5.9 below, it shows 52% of people drive to the City Center use monthly parking fee method, 37% they use hourly parking fee method and 11% they use daily parking fee method. This shows that 63% of the drivers they use this parking most of time and they use for long-time parking

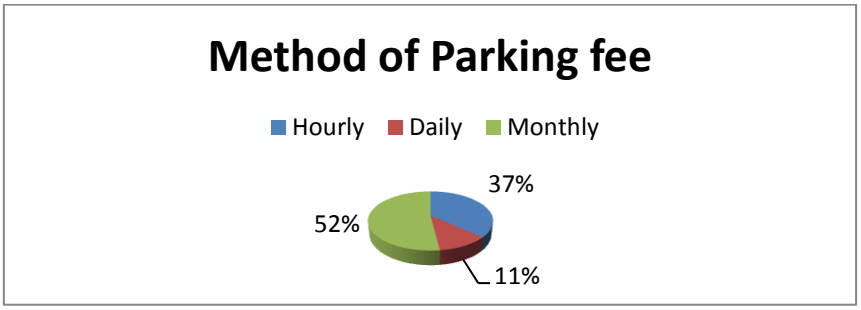

Figure 5-8: Chart showing the distribution of parking fee method over the sample

The figure 5.10 below, shows that 82% of the people drive to City Center, their daily parking fee is between 600Rwf to 1000Rwf and 18% of them their daily parking fee is between 1100Rwf to 1500Rwf. It was found that the average daily parking fee is 888Rwf, almost 900Rwf.

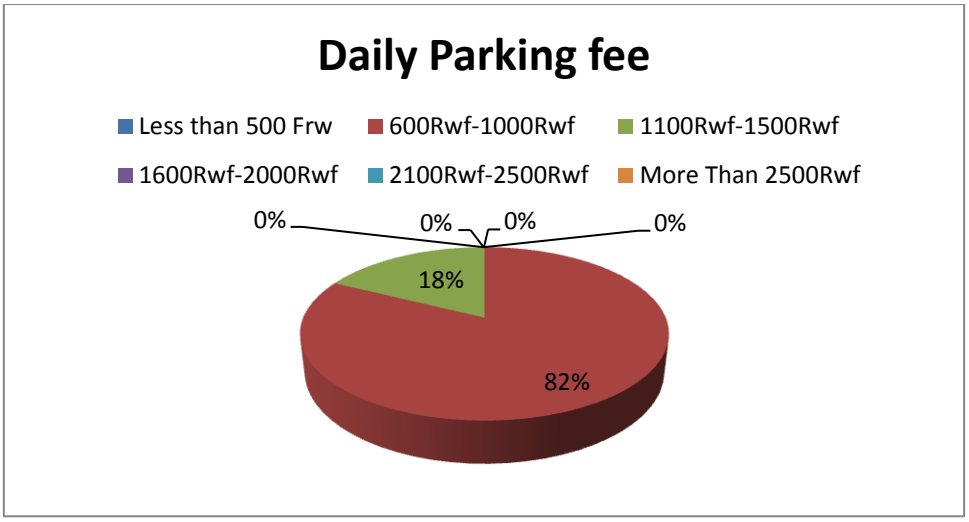

Figure 5-9 : **Chart showing the distribution of daily parking fee over the sample**

The figure 6.11 below, shows that 69% of the people drive to City Center, their monthly parking fee is between 6,000Rwf to 10,000Rwf, 23% of them their monthly parking fee is between 11,000Rwf to 15,000Rwf, 5% their monthly parking fee is between 16,000Rwf to 20,000Rw and 3% of them their monthly parking fee is between 21,000Rwf to 25,000Rwf. It was found that the average monthly parking fee is 10,051Rwf.

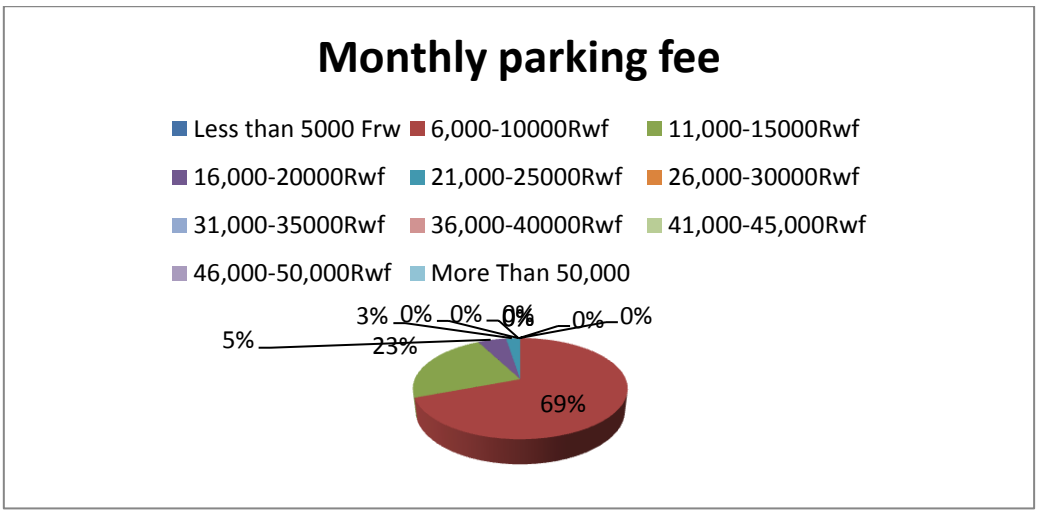

Figure 5-10 : **Chart showing the distribution of Monthly Parking fee over the sample**

From the figure 5.12 below, it was found that the willingness to pay parking per one hour, is as follow: 29% of the people drive to City Center, are willing to pay parking not more than 500Rwf per hour, 20% are willing to pay parking not more than 750Rwf per hour, 15% are willing to pay parking not more than 250Rwf per hour, 12% are willing to pay parking not more than 1,000Rwf per hour, 9% are willing to pay parking not more than 1,500Rwf per

hour, 5% are willing to pay parking not more than 2000Rwf per hour, 4% are willing to pay parking not more than 5,000Rwf per hour, 2% are willing to pay parking not more than 100Rwf per hour, 2% are willing to pay parking not more than 7,500Rwf per hour and 2% of them are willing to pay not more than 2,500Twf per hour. The average parking price per hour is 546Rwf.

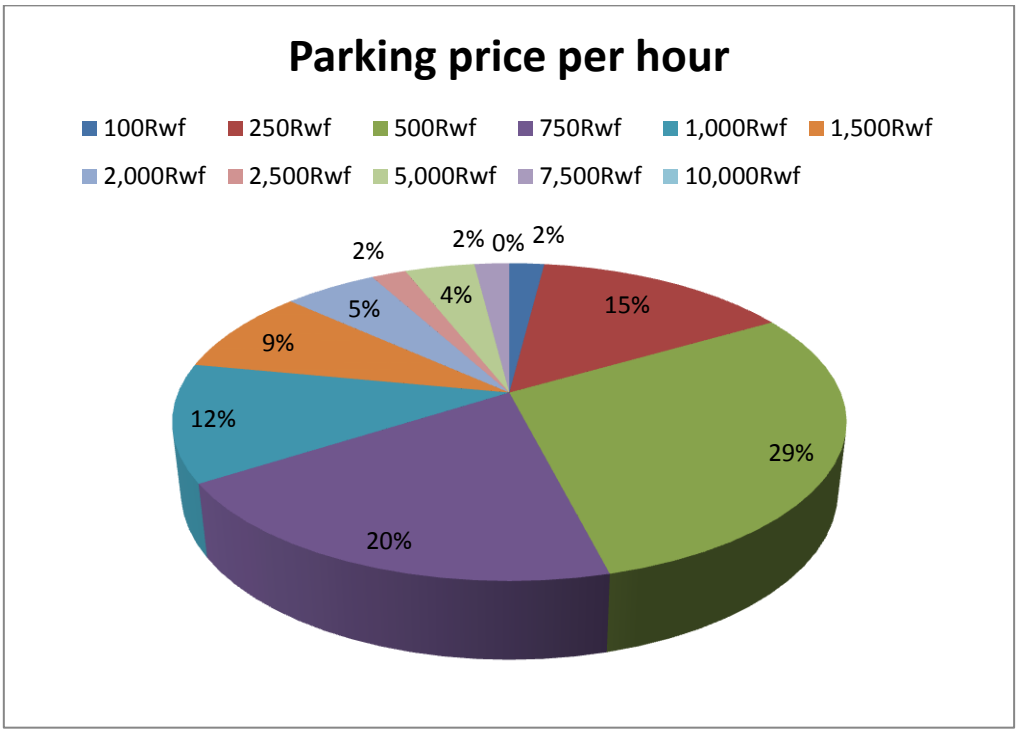

Figure 5-11: Chart showing the distribution of Monthly Parking fee over the sample

5.2.2. Findings for on-street parking usage survey by the patrol

First, an accumulation study was done whereby the number of vehicles already in the area of study is counted first, and then the number of vehicles entering and exiting during a specific time is estimated and added or subtracted from the accumulated number of vehicles.

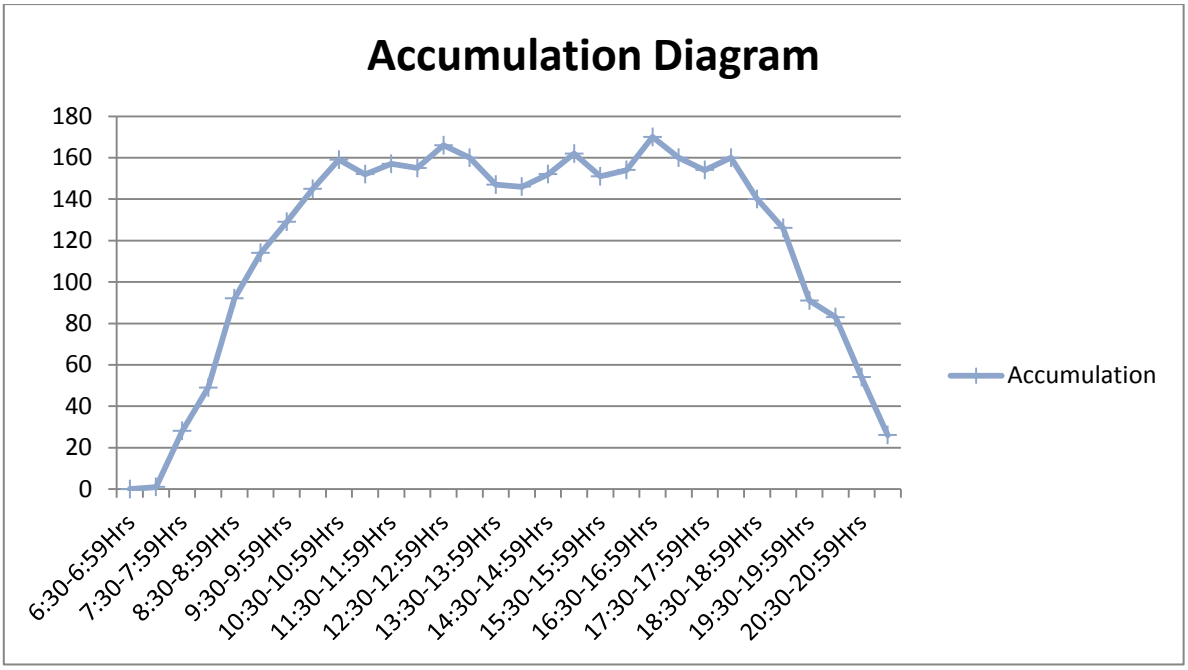

Figure 5-12 show Graph plotting the vehicle accumulation within the area of study

In this line, it was found that during the 14 hours, the number of parked vehicles is beyond the parking capacity. This is due to illegal parking after all the parking spaces are filled. This means that there is a need of keeping demand at least at 85% of parking capacity.

Second, a parking survey assessment was done in order to determine the serviceability of the existing as well as the predicted parking demand.

At first, the predicted number of the vehicles parked was calculated using the following formula:

$$B_y = A_{y-1} \times (1 + r)^{y-x}$$

Where:

- ✓ r=7.5% is the traffic growth rate(compounding)
- ✓ x = year for which we counted the number of vehicles parked (kept constant)
- ✓ A = Number of vehicles parked in the previous year x(counted)
- ✓ y= Year for which we want to predict the number of vehicles parked, varies from 2014 to 2018.
- ✓ B= Number of vehicles parked in year y (calculated)

The same formula was used to forecast the predicted number of vehicles that will be parked in 5 years to come.

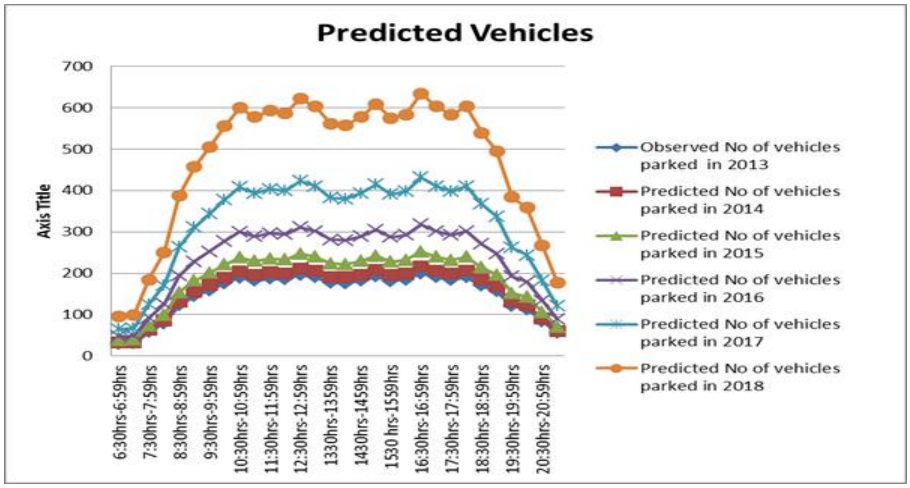

Figure 5-13 Shows Growth of the number of vehicles parked over five years

Secondly, the parking stress to the existing parking in five years was calculated using the following formula:

$$Parking\ stress\ in\ year\ X = \frac{Number\ of\ vehicles\ parked\ in\ that\ year\ X}{Parking\ space\ available}$$

On one hand, as shown in the table below, the parking stress in 2013 for the 100-space existing parking space was 85% before 8:29am and 122% to 200% between 8:30am-4:59pm; which means that from 8:30am, the parking is over-used.

This parking stress is predicted to be 88.77% between 6:30-6:59am and 634% between 12:30-12:59pm in 2017.

These figures shows that the existing 100-space parking is no longer functional there is a need of strategies to solve the problem.

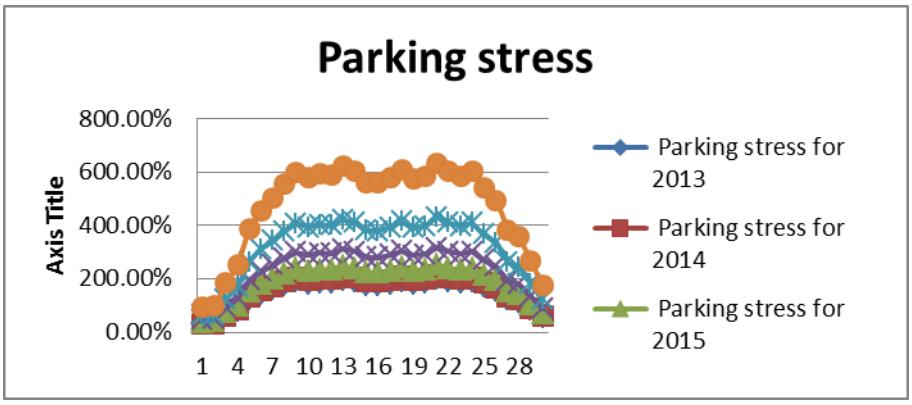

Figure 5-14 above Illustrate parking stress in the area of the study

Thirdly, the parking duration (turnover) was surveyed for the parking in the area of the study.

The results are presented in the table 5-1 and figure 5-15 below

Less than 30 min	30 - 60 min	60-90 min	90-120 min	120-150 min	150-180 min	180-210 min	210-240 min	240-270 min	270-300 min	300-330 min	330-360 min	More than 360 min.
23.26%	14.28%	8.65%	6.38%	4.69%	4.08%	3.57%	3.07%	3.00%	2.85%	2.37%	2.49%	21.33%

Table 5-1: Parking Duration for on-street parking

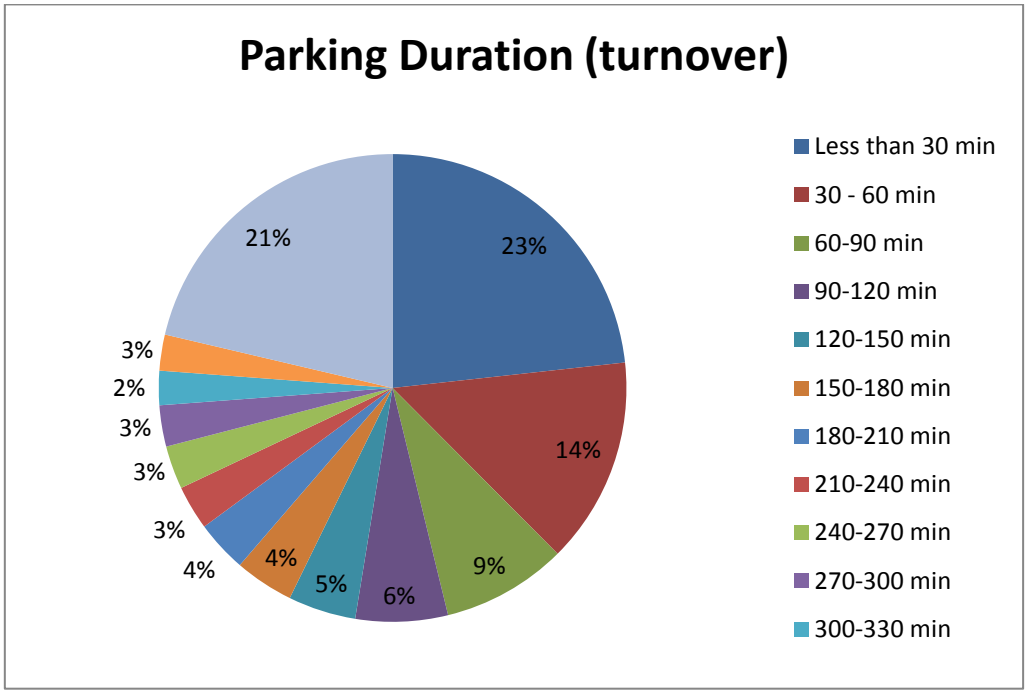

Figure 5-15 showing the parking duration (turnover) rate

The results indicate that 23% of all the surveyed vehicles parked for less than 30 min, and those that parked 31 to 60min. were 14%. In other words, the vehicles that parked for less than 1 hour are almost 37% of all the vehicles, which means that there is a high demand for short-term parking.

On the other hand, vehicles that parked for more than 5 hours were found to be 26% of the total vehicles, which means that there is a high demand for long-term parking as well.

In the survey, it was found out that most of the long-term parkers are business dealers who work in the area but live out of the city center.

Therefore, providing a park-and-ride in the outside of Kigali city center and increase parking fee would partially solve the problem of lack of parking by allowing more of the short-term parking and restricting long-term parking.

5.2.3. Findings for of-street parking usage survey by the patrol

First, an accumulation study was done whereby the number of vehicles already in the area of study is counted first, and then the number of vehicles entering and exiting during a specific time is estimated and added or subtracted from the accumulated number of vehicles.

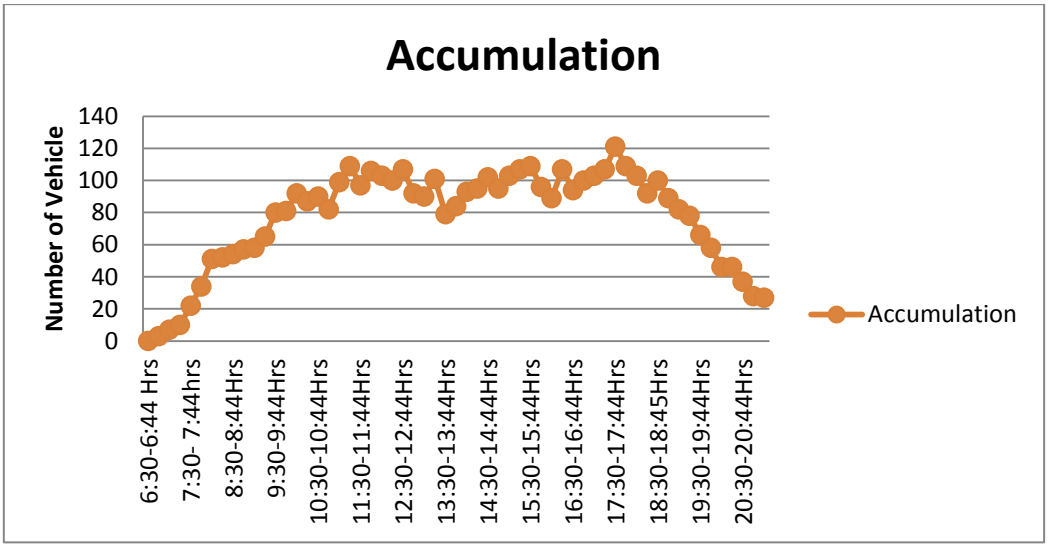

Figure 5-16 show the accumulation table

In this line, it was found that during the 14 hours, the number of parked vehicles is beyond the parking capacity. This is due to illegal parking after all the parking spaces are filled. This means that there is a need of keeping demand at least at 85% of parking capacity.

Figure 5-17 shows the illegal on-street parking

Second, a parking survey assessment was done in order to determine the serviceability of the existing as well as the predicted parking demand.

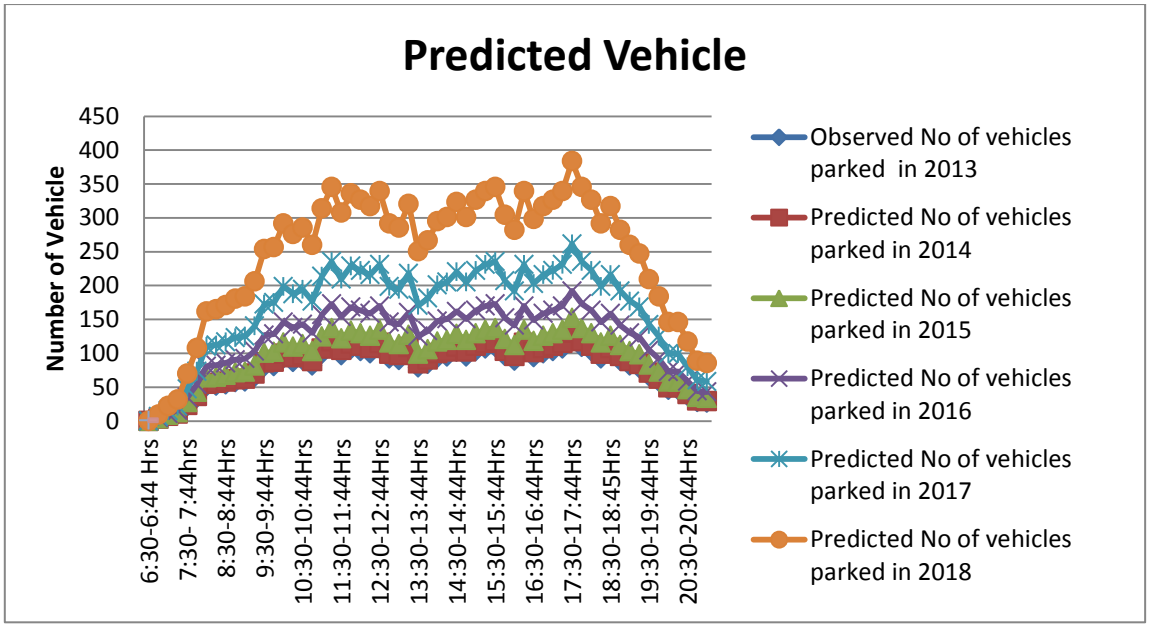

Figure 5-18 showing Growth of the number of vehicles parked over five years

Secondly, the parking stress to the existing parking in five years was calculated using the following formula:

$$Parking\ stress\ in\ year\ X = \frac{Number\ of\ vehicles\ parked\ in\ that\ year\ X}{Parking\ space\ available}$$

On one hand, as shown in the table below, the parking stress in 2013 for the 136 existing parking space was at 85% before 8:29am and 122% to 200% between 8:30am-4:59pm; which means that from 8:30am, the parking is over-used.

This parking stress is predicted to be below at 85% before 7:59am and it is increasing up 254% at 11;29 pm in 2018.

These figures shows that the existing 136-space parking will no longer functional there is a need of strategies to solve the problem.

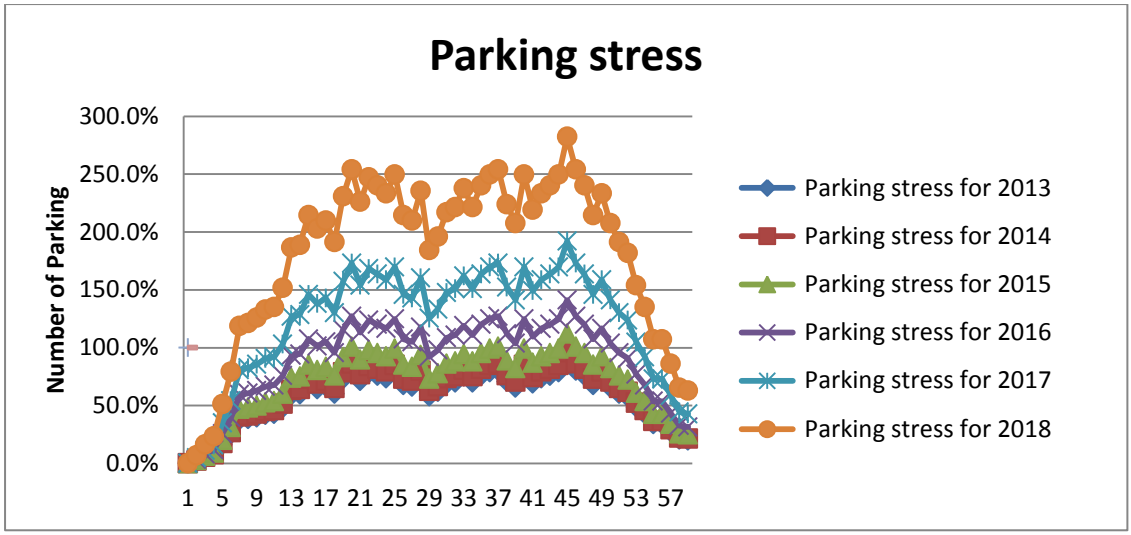

Figure 5-19 above Illustrate parking stress in the area of the study

Thirdly, the parking duration (turnover) was surveyed for the parking in the area of the study.

The results are presented in the table 5-2 and figure 5-19 below

Less than 15 min	15 - 30 min	30-45 min	45-60 min	60-75 min	75-90 min	90-105 min	105-120 min	120-135 min	135-150 min	150-165 min	165-180 min	180-195 min	195-210 min	210-225 min	225-240 min	More than 240 min
43.85%	8.13%	6.30%	3.85%	3.28%	2.14%	1.56%	1.61%	2.19%	1.04%	1.25%	1.30%	1.30%	0.99%	0.68%	0.99%	19.53%

Table 5-2: Parking Duration for off-street parking

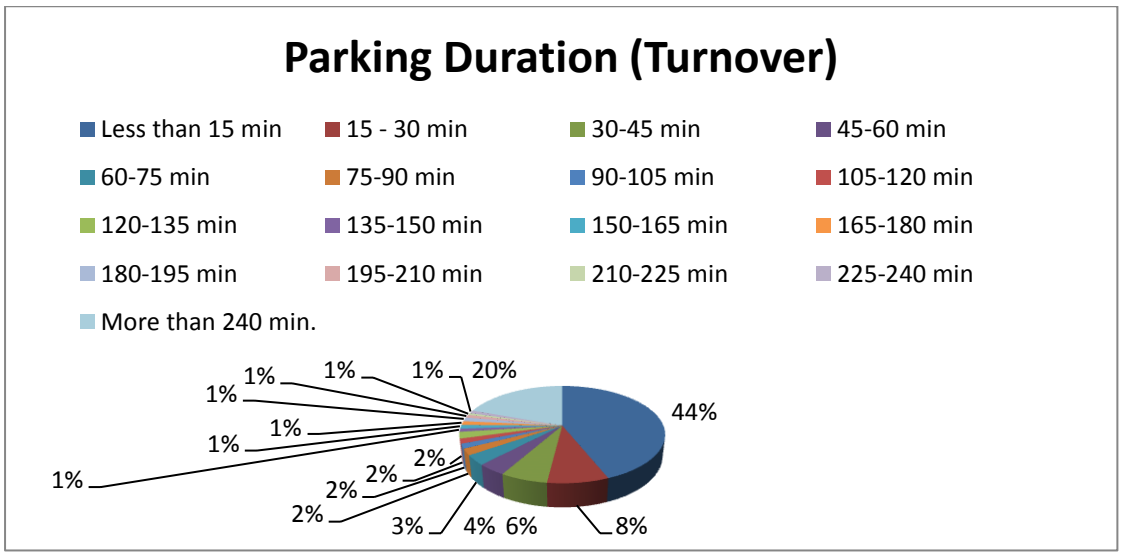

Figure 5-20 show the parking duration (turnover) rate

The results indicate that 44% of all the surveyed vehicles parked for less than 15 min, and 8% parked 15 to 30min. and those that parked 30min. to 1hour were 10%. In other words, the vehicles that parked for less than 1 hour are almost 62% of all the vehicles, which means that there is a high demand for short-term parking.

On the other hand, vehicles that parked for more than 4 hours were found to be 20% of the total vehicles, which means that there is a fair demand for long-term parking as well.

In the survey, it was found out that most of the long-term parkers are business dealers who work in the area but live out of the city center.

Therefore, providing a park-and-ride in the outside of Kigali city center and increase parking fee would partially solve the problem of lack of parking by allowing more of the short-term parking and restricting long-term parking.

5.3. Price elasticity of Demand in the location of commercial zone (on-street parking)

The price elasticity of demand measures how these prices changes affected occupancy rates. Economists define price elasticity as the percent change in the occupancy rate (the quantity of parking demanded) divided by the percent change in the meter price. For example, if a 10 percent price increase leads to a 5 percent fall in occupancy, the price elasticity of demand is –0.5 (–5% ÷ 10%).

For this study we calculated the elasticity of demand revealed by all the price changes during first year. For each price change, we compared the old price and average

occupancy to the new price and average occupancy during the following period.

The table below indicates how annual parking fees affects parking demand.

For example at Commercial zone in 2016, a 34% percent price increase leads to a 79 percent fall in occupancy, the price elasticity of demand is –1.65 In this year of 2016 to achieve the target parking occupancy of 85%, the parking price needed is 450Rwf per hour.

Year	parking capacity	grouth rate of demande	demand	Price to be charged	% change in price	elasticity in the year	% change in demand	keep parking capacity between 85% (85 Spaces)
2013	100	7.5%	170	100	0.00	-0.45	0	170
2014	100	7.5%	183	200	0.67	-0.99	-0.66	86
2015	100	7.5%	196	320	0.43	-1.65	-0.71	82
2016	100	7.5%	211	450	0.34	-2.35	-0.79	85

2017	100	7.5%	227	600	0.29	-3.14	-0.90	80
2018	100	7.5%	244	760	0.24	-3.98	-0.94	82

Table 5-3 above indicates how annual parking fees and its elasticity

The figure 5.21 below, shows the parking occupancy in the year of 2013 and it shows at what time the parking occupancy is beyond 85%. The parking occupancy is beyond 85% from 09:00 am to 08:00 pm. The parking is no longer functional; there is a need of strategies to solve the problem.

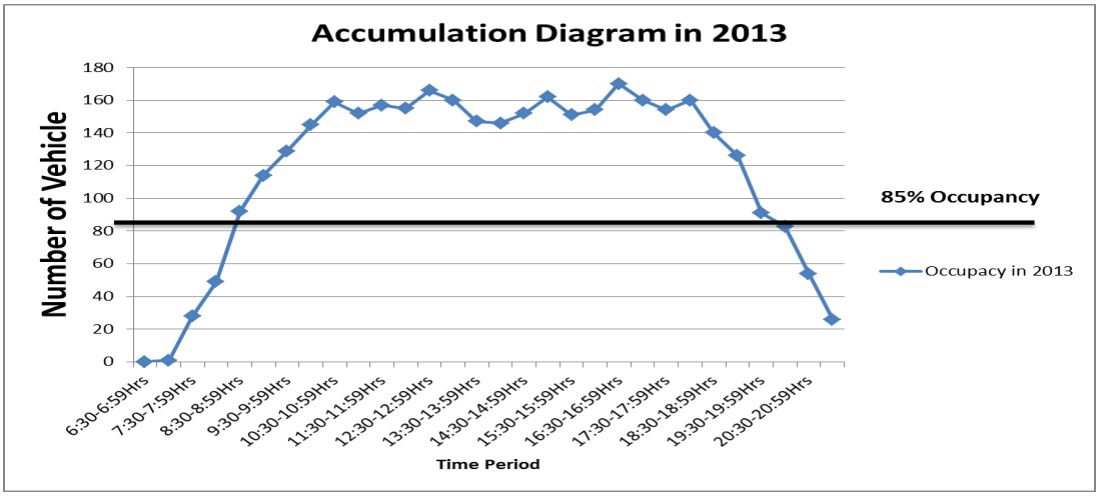

Figure 5-21 above Illustrate parking occupancy in area of the study in 2013 (Commercial zone)

The figure 5.22 below shows the parking occupancy in the year of 2014 and it shows at what time the parking occupancy is beyond 85%. The parking occupancy is beyond 85% from 08:30 am to 08:30 pm. It is evident that, parking will no longer be functional in 2014; there is a need of strategies to solve the problem. To solve the problem the parking fees will be increased from the current 100Rwf to 200Rwf per hour to achieve 85% occupancy. a 67 percent price increase leads to a 66 percent fall in occupancy, the price elasticity of demand is –0.99.

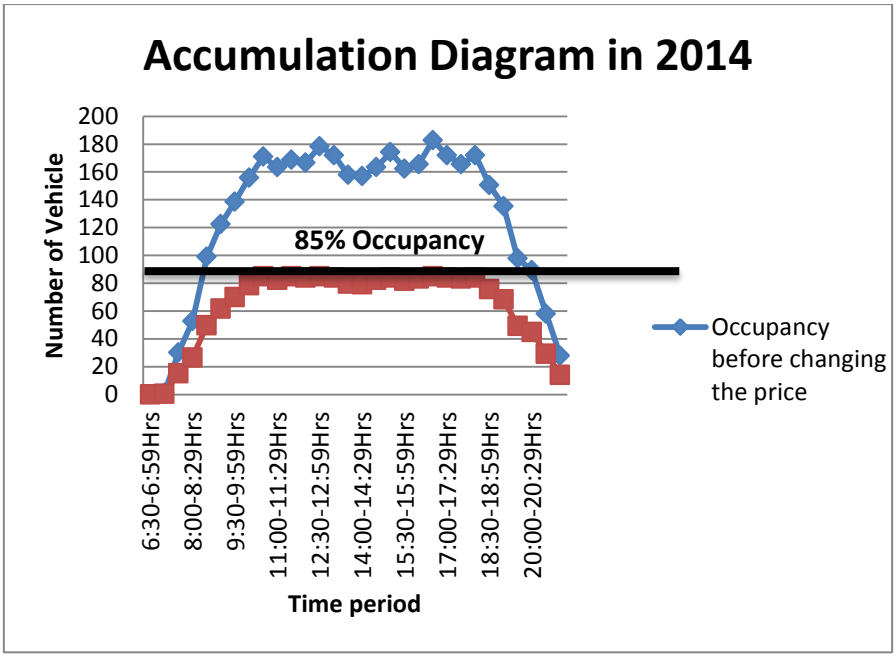

Figure 5-22 above Illustrate parking occupancy in area of the study in 2014 (Commercial zone)

The figure 5.23 below shows the parking occupancy in the year of 2015 and it shows at also what time the parking occupancy is beyond 85%. The parking occupancy is beyond 85% from 08:30 am to 09:00 pm. It is evident that, parking will no longer be functional in 2015; there is a need of strategies to solve the problem. To solve the problem the parking fees will be increased to 320Rwf per hour to achieve 85% occupancy. a 43 percent price increase leads to 71 percent fall in occupancy, the price elasticity of demand is –1.65.

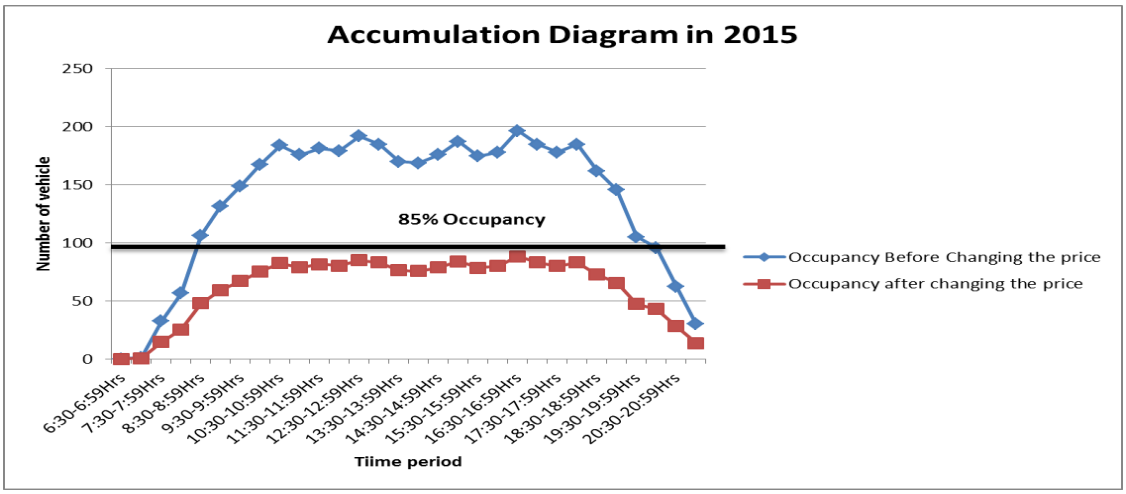

Figure 5-23 above Illustrate parking occupancy in area of the study in 2015 (commercial zone)

The figure 5.24 below shows the parking occupancy in the year of 2016 and it shows at also what time the parking occupancy is beyond 85%. The parking occupancy is beyond 85%

from 08:00 am to 09:00 pm. It is evident that, parking will no longer be functional in 2016; there is a need of strategies to solve the problem. To solve the problem the parking fees will be increased to 450Rwf per hour to achieve 85% occupancy. 34 percent price increase leads to 79 percent fall in occupancy, the price elasticity of demand is –2.35

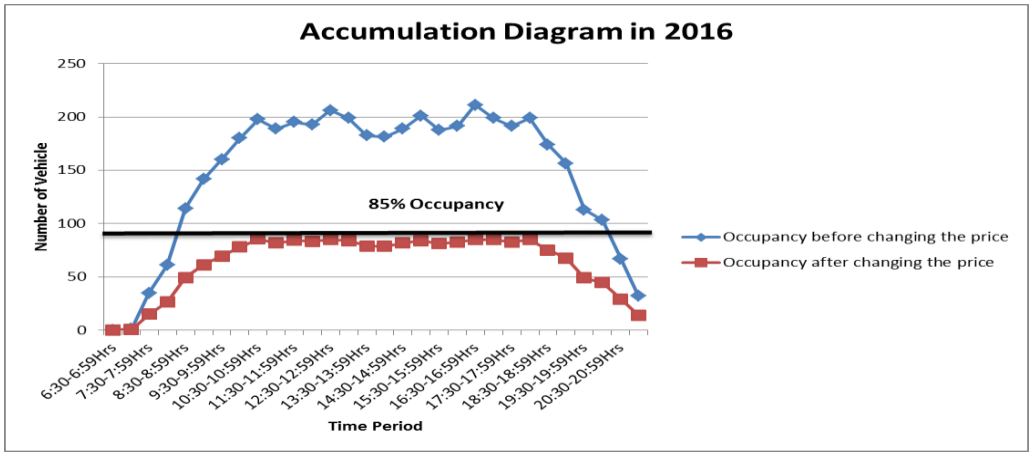

Figure 5-24 above Illustrate parking occupancy in area of the study in 2016 (commercial zone)

The figure 5.25 below shows the parking occupancy in the year of 2017 and it shows at also what time the parking occupancy is beyond 85%. The parking occupancy is beyond 85% from 07:30 am to 09:30 pm. It is evident that, parking will no longer be functional in 2017; there is a need of strategies to solve the problem. To solve the problem the parking fees will be increased to 600Rwf per hour to achieve 85% occupancy. 29 percent price increase leads to a 90 percent fall in occupancy, the price elasticity of demand is –3.14.

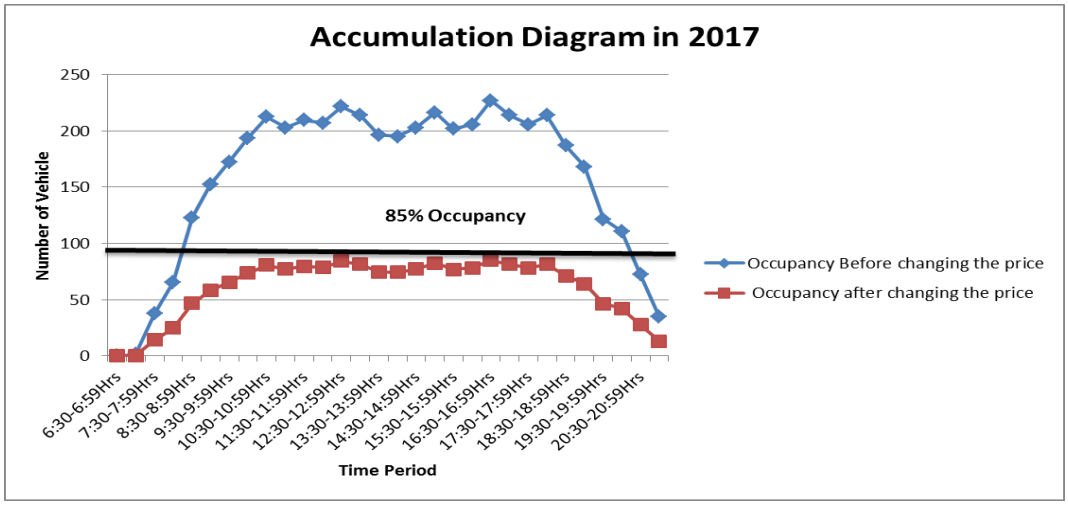

Figure 5-25 above Illustrate parking occupancy in area of the study in 2017 (commercial zone)

The figure 5.26 below shows the parking occupancy in the year of 2018 and it shows at also what time the parking occupancy is beyond 85%. The parking occupancy is beyond 85% from 07:00 am to 09:30 pm. It is evident that, parking will no longer be functional in 2018; there is a need of strategies to solve the problem. To solve the problem the parking fees will be increased to 760Rwf per hour to achieve 85% occupancy. 24 percent price increase leads to a 94 percent fall in occupancy, the price elasticity of demand is –3.98.

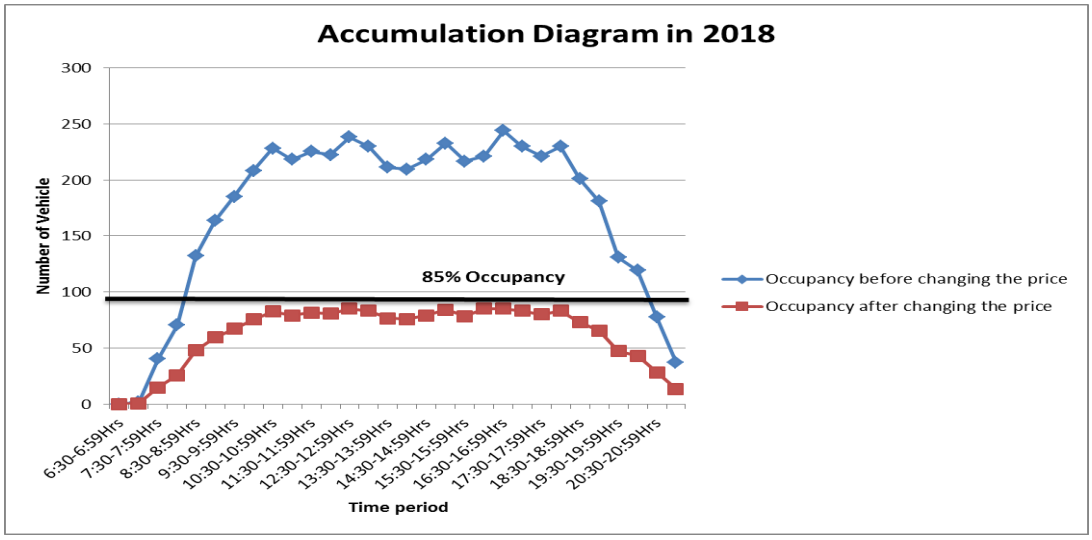

Figure 5-26 above Illustrate parking occupancy in area of the study in 2018 (commercial zone)

5.4. Price Elasticity of Demand for on-street of Bank of Kigali to Rwanda radio's office

The table below indicates how annual parking fees affects parking demand at this location.

For example in 2015, a 18 percent price increase leads to 56 percent fall in occupancy, the price elasticity of demand is –0.56. In the year of 2015 to achieve the target parking occupancy of 85%, the parking price needed is 120Rwf per hour.

Year	parking capacity	grouth rate of demande	demand	Price to be charged	% change in price	elasticity in the year	% change in demand	keep parking capacity between 85% (55)
2013	65	7.5%	50	100	0	-0.45	0	50
2014	65	7.5%	54	100	0	-0.45	0	50
2015	65	7.5%	58	120	0.18	-0.56	-0.10	52
2016	65	7.5%	62	150	0.22	-0.66	-0.15	53
2017	65	7.5%	67	190	0.24	-0.93	-0.22	52
2018	65	7.5%	72	240	0.23	-1.21	-0.28	52

Table 5-4 above indicates how annual parking fees and its elasticity

The figure 5.27 below shows the parking occupancy in the year of 2013. It was observed that the parking occupancy in this year is still functional; there is non-need of strategies to be taken.

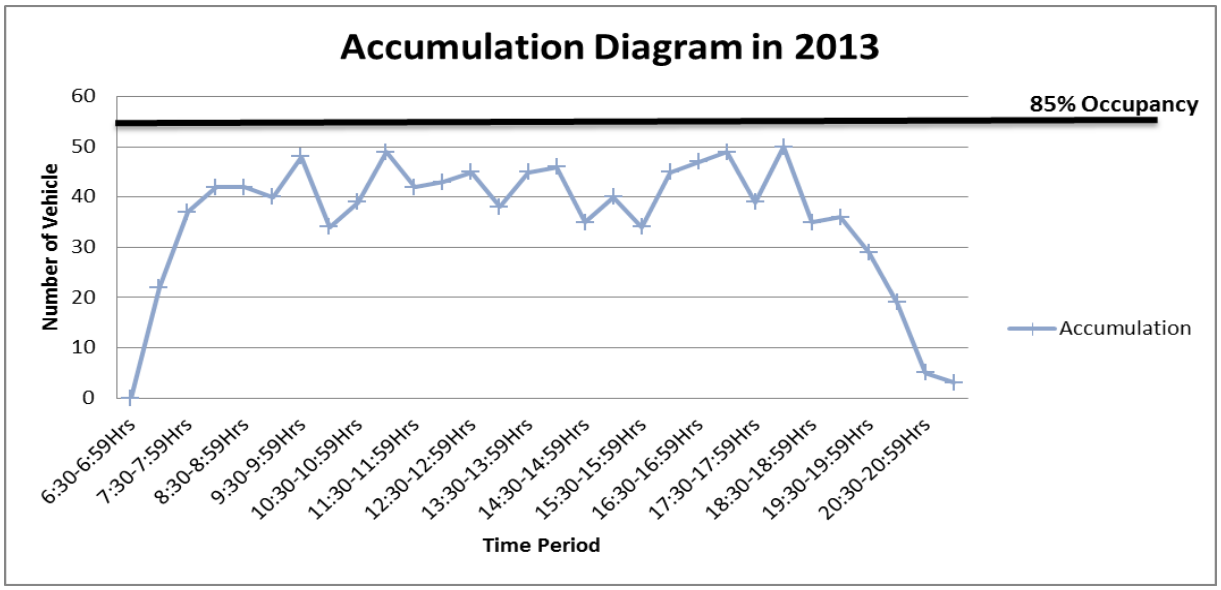

Figure 5-27 above Illustrate parking occupancy in area of the study in 2013 (portion Bank of Kigali to Rwanda radio's office)

The figure 5.28 below shows the parking occupancy in the year of 2014. The parking occupancy in this year is now at the target parking occupancy of 85% . In this year the parking is functional; there is non-need of strategies to be taken.

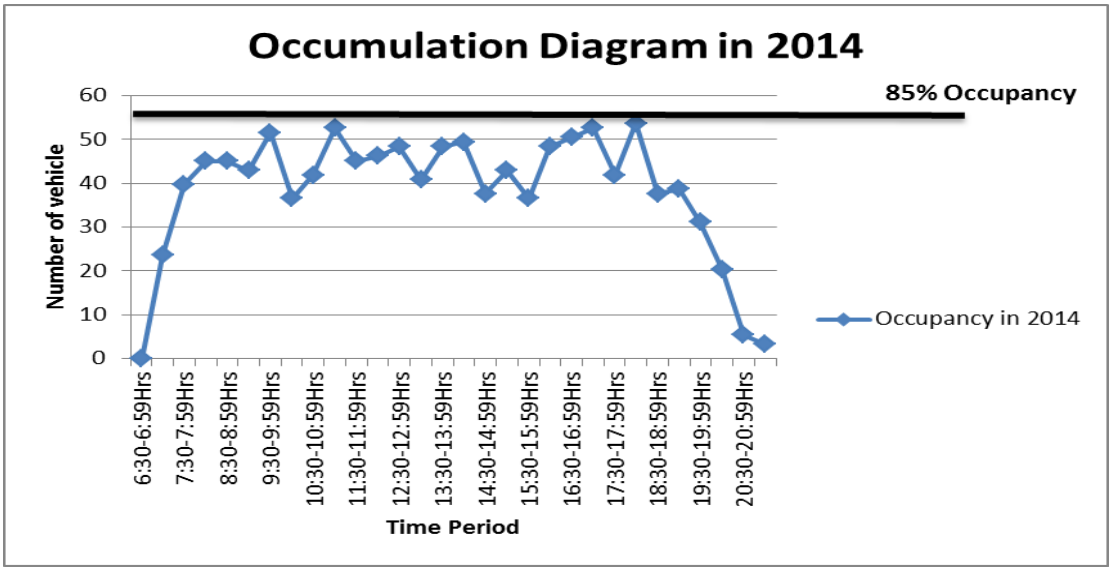

Figure 5-28 above Illustrate parking occupancy in area of the study in 2014 (portion Bank of Kigali to Rwanda radio's office)

The figure 5.29 below shows the parking occupancy in the year of 2015 and it shows also at what time the parking occupancy is beyond 85%. The parking occupancy is beyond 85% from 08:30pm to 09:00 pm. It is evident that, parking will no longer be functional in 2015; there is a need of strategies to solve the problem. One of them is to increase parking fees from 100Rwf to 120Rwf per hour to achieve 85% occupancy. 18 percent price increase leads to 10 percent fall in occupancy, the price elasticity of demand is –0.56.

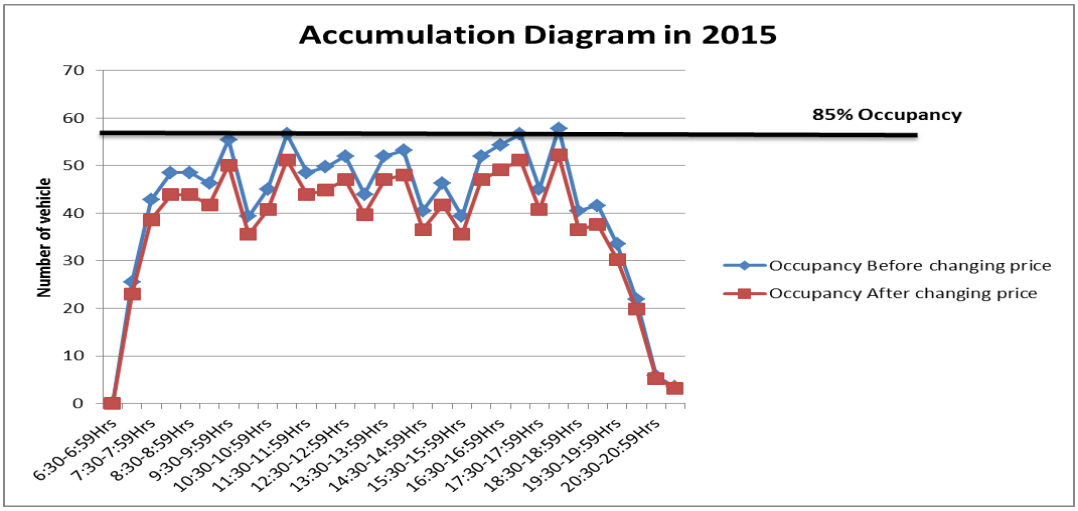

Figure 5-29 above Illustrate parking occupancy in area of the study in 2015 (portion Bank of Kigali to Rwanda radio's office)

The figure 5.30 below shows the parking occupancy in the year of 2016 and it shows also at what time the parking occupancy is beyond 85%. The parking occupancy is beyond 85% in the morning hours from 09:30am to 11:00 am and afternoon from 03:00pm to 07:00pm. It is evident that, parking will no longer functional in 2016; there is a need of strategies to solve the problem at some time period. One of the strategies is to increase parking fees from to 150Rwf per hour at certain period to achieve 85% occupancy. 22 percent price increase leads to 15 percent fall in occupancy, the price elasticity of demand is –0.66.

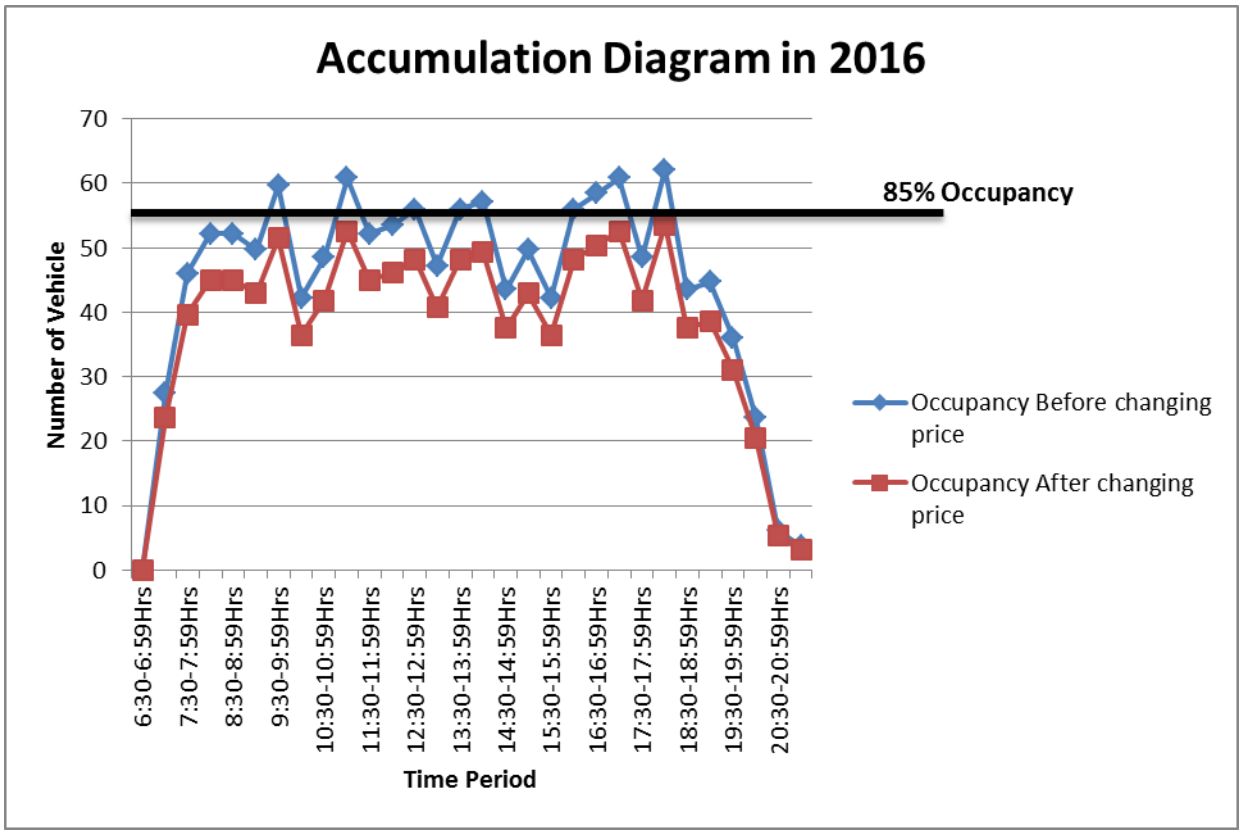

Figure 5-30 above Illustrate parking occupancy in area of the study in 2016 (portion Bank of Kigali to Rwanda radio's office)

The figure 5.31 below shows the parking occupancy in the year of 2017. The parking occupancy is beyond the target of 85% from 09:00am to 19:00pm. It is evident that, parking will not be functional in 2017; there is a need of strategies to solve the problem at peak hours. One of the strategies is to increase parking fees from to 190Rwf per hour at certain hours to achieve 85% occupancy. 24 percent price increase leads to 22 percent fall in occupancy, the price elasticity of demand is –0.93.

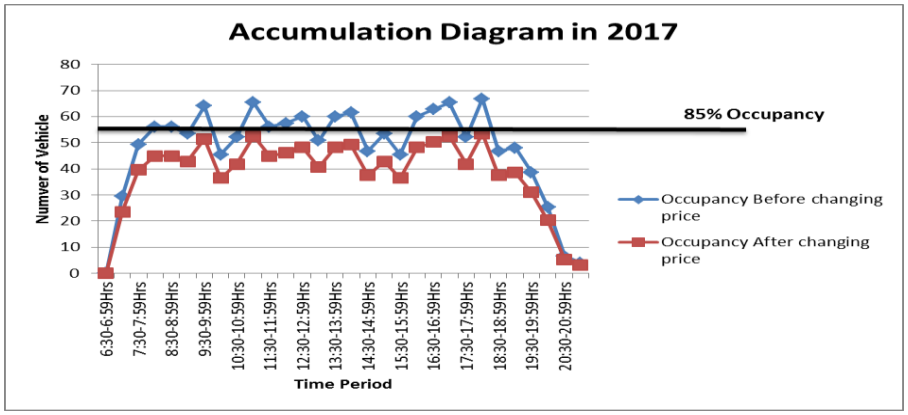

Figure 5-31 above Illustrate parking occupancy in area of the study in 2017 (portion Bank of Kigali to Rwanda radio's office)

The figure 5.32 below shows the parking occupancy in the year of 2018. It is evident that, parking will not be functional in 2018; there is a need of strategies to solve the problem at peak hours. One of the strategies is to increase parking fees from to 240Rwf per hour form 07:30am to 07:00pm at certain hours to achieve 85% occupancy. 23 percent price increase leads to 28 percent fall in occupancy; the price elasticity of demand is –1.21.

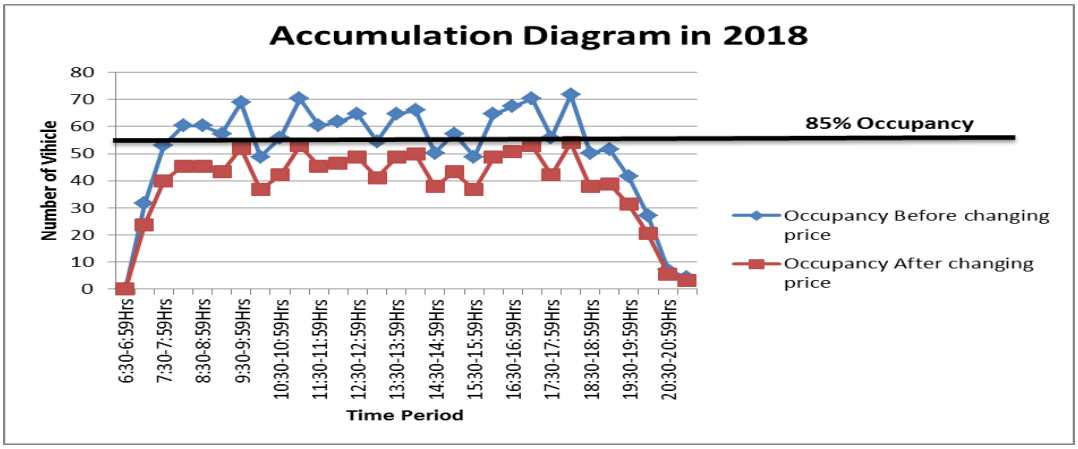

Figure 5-32 above Illustrate parking occupancy in area of the study in 2018 (portion Bank of Kigali to Rwanda radio's office)

5.5. Price Elasticity of Demand for off-street parking (UTC)

Application of the 85% Rule *on-street* should be complemented with *off-street parking and transportation options* to ensure that the overall access to local goods and services is enhanced.

The table below indicates how annual parking fees affects parking demand at this location.

For example in 2014, at 40 percent price increase leads to 29 percent fall in occupancy, the price elasticity of demand is –0.72. In this year to achieve the target parking occupancy of 85%, the parking price needed is 150Rwf per hour.

Year	parking capacity	grouth rate of demande	demand	Price to be charged	% change in price	elasticity in the year	% change in demand	keep parking capacity between 85% (116 space)
2013	136	7.5%	125	100	0	-0.45	0	125
2014	136	7.5%	134	150	0.40	-0.72	-0.29	94
2015	136	7.5%	144	200	0.29	-0.99	-0.28	101
2016	136	7.5%	155	250	0.22	-1.26	-0.28	109
2017	136	7.5%	167	310	0.21	-1.59	-0.34	110
2018	136	7.5%	179	380	0.20	-1.97	-0.40	111

Table 5-5 above indicates how annual parking fees and its elasticity

The figure 5.33 below shows the parking occupancy in the year of 2013. The parking occupancy in this year it is almost at 85% occupancy, from 11:15am to 08:45pm. The parking still functional; there is non-need of strategies to be taken, but it reach target of parking occupancy.

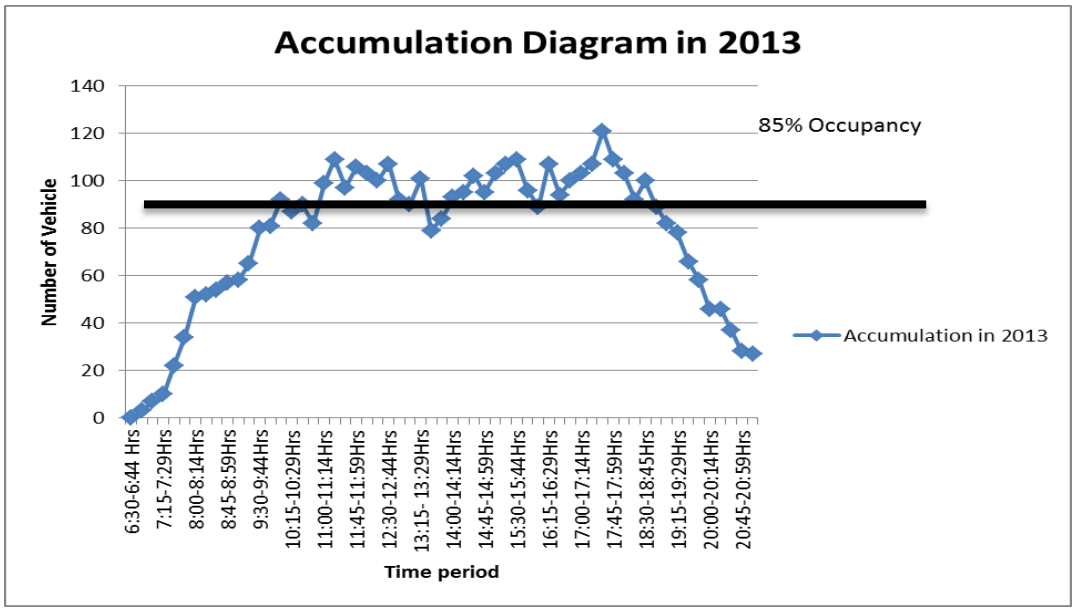

Figure 5-33 above Illustrate parking occupancy in area of the study in 2013 (UTC)

The figure 5.34 below shows the parking occupancy in the year of 2014 and it shows also at what time the parking occupancy is beyond 85%. The parking occupancy is beyond the target of 85% in the afternoon from 05:00pm to 06:00pm. It is evident that, parking will not functional in 2014, but in short period. There is a need of strategies to solve the problem at that period. One of the strategies is to increase parking fees from to 150Rwf per hour. 40 percent price increase leads to 29 percent fall in occupancy, the price elasticity of demand is –0.72.

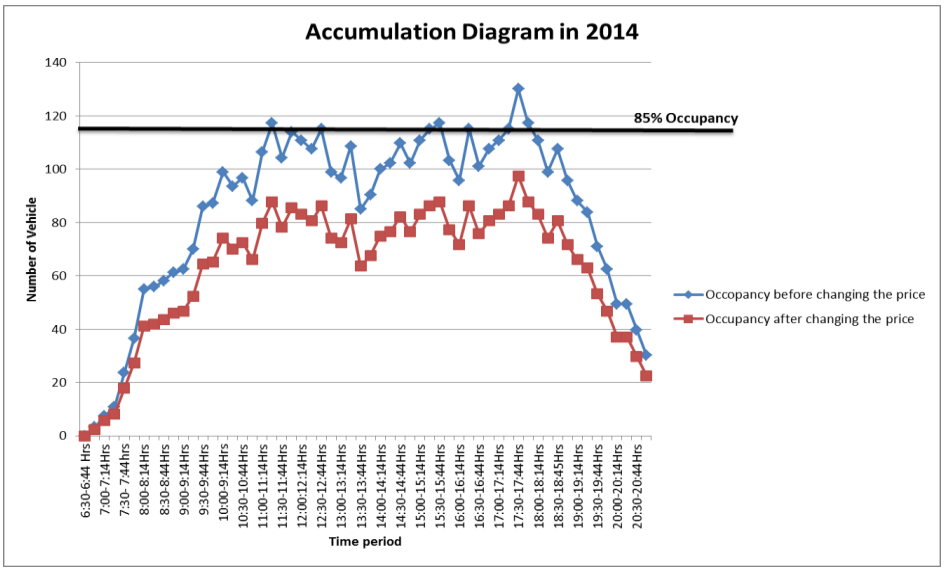

Figure 5-34 above Illustrate parking occupancy in area of the study in 2014 (UTC)

The figure 5.35 below shows the parking occupancy in the year of 2015 and it shows also at what time the parking occupancy is beyond 85%. The parking occupancy is beyond the target of 85% from 11:00am to 06:00pm. It is evident that, parking will not functional in 2015, but not for the whole day. There is a need of strategies to solve the problem at that period. One of them is to increase parking fees from to 200Rwf per hour. 29 percent price increase leads to 28 percent fall in occupancy, the price elasticity of demand is –0.99.

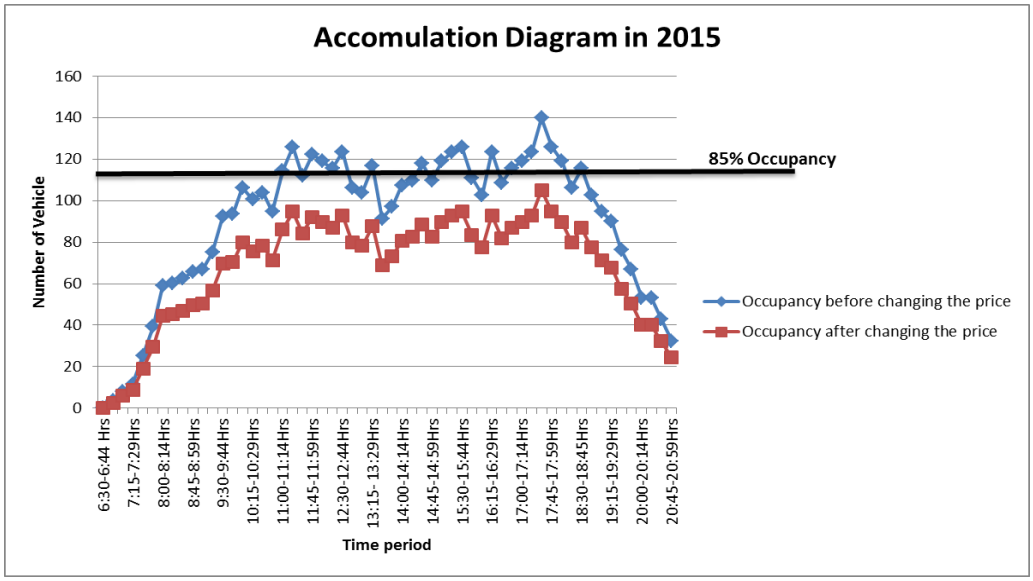

Figure 5-35 above Illustrate parking occupancy in area of the study in 2015 (UTC)

The figure 5.36 below shows the parking occupancy in the year of 2016 and it shows also at what time the parking occupancy is beyond 85%. The occupancy is beyond the target of 85% from 10:00am to 06:300pm. It is evident that, parking will not functional in 2016. There is a need of strategies to achieve 85% parking occupancy. One of them is to increase parking fees to 250Rwf per hour. 22 percent price increase leads to 28 percent fall in occupancy; the price elasticity of demand is –1.26.

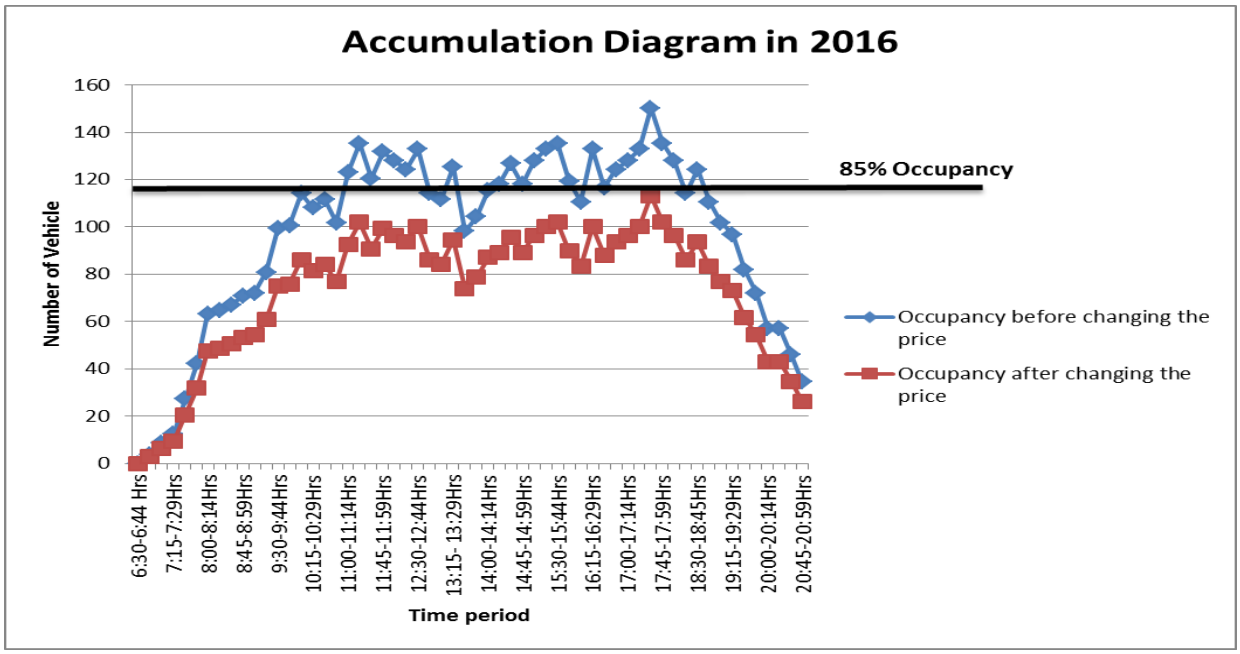

Figure 5-36 above Illustrate parking occupancy in area of the study in 2016 (UTC)

The figure 5.37 below shows the parking occupancy in the year of 2017. The occupancy is beyond the target of 85% from 09:30am to 06:30pm. It is evident that, parking will not functional in 2017. There is a need of action to be taken to achieve 85% parking occupancy. One of them is to increase parking fees to 310Rwf per hour. 21 percent price increase leads to 34 percent fall in occupancy; the price elasticity of demand is –1.59.

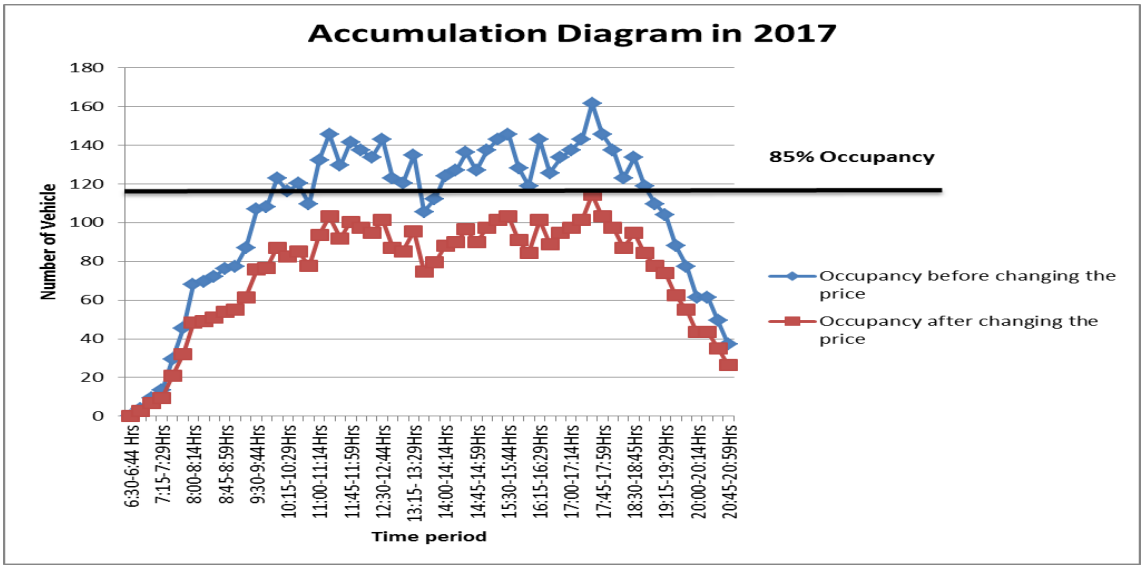

Figure 5-37 above Illustrate parking occupancy in area of the study in 2017 (UTC)

The figure 5.38 below shows the parking occupancy in the year of 2018. The occupancy is beyond the target of 85% from 09:0am to 07:0pm. It is evident that, parking will not functional in 2018. There is a need of action to be taken to achieve 85% parking occupancy. One of them is to increase parking fees to 380Rwf per hour. 20 percent price increase leads to 40 percent fall in occupancy; the price elasticity of demand is –1.97.

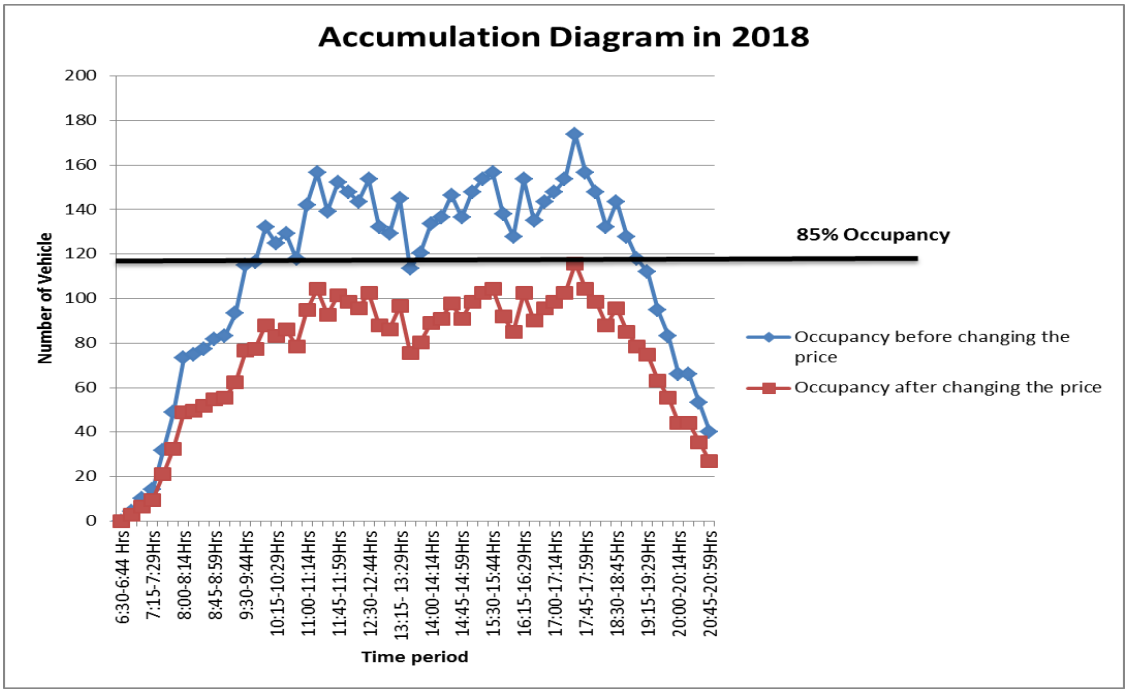

Figure 5-38: above Illustrate parking occupancy in area of the study in 2018 (UTC)

5.6. Model Analysis

Table 5.6 below shows the total number of cases which was analysed by SPSS, N=4800 cases. This number comes from 16 scenarios times two choices (1= yes and 0= No) times tone hundred and fifty which is the total number of distributed questionnaires.

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	4800	100.0
	Missing Cases	0	.0
	Total	4800	100.0
Unselected Cases		0	.0
Total		4800	100.0

Table 5-6 shows the Summary of analyzed cases

The choice options in the Table below shows that 50% decided to pay parking fee' other 50% decided to pay Use Alternative means of transport including public transport.

		Observed	Predicted		
			Choice		Percentage Correct
			0	1	
Step 0	Choice	0	0	2400	.0
		1	0	2400	100.0
	Overall Percentage				50.0

Table 5-7 The percentage number of the choices

From the table 5-8 Variable in the equation below:

B - This is the coefficient for the constant (also called the "intercept") in the null model.

S.E. - This is the standard error around the coefficient for the constant

Wald- This is the Wald chi-square test, which tests the null hypothesis that the constant equals 0. This hypothesis is accepted because the p-value (listed in the column called "Sig.") is greater than the critical p-value of .05 (or .01). Hence, we conclude that the constant is 0.

Df – This is the degree of freedom for the Wald chi-square test. There is only one degree of freedom because there is only one predictor in the model, namely the constant.

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	.000	.029	.000	1	1.000	1.000

Table 5-8 Variables in the Equation

Chapter 6 : CONCLUSION AND RECOMMENDATION

6.1. Conclusion

This study has aimed to develop parking strategies in Kigali City. As car ownership grows, so demand for parking will grow, and City of Kigali will have to deal with many of the issues that have been drawn in this study. It is possible to develop a car parking strategies that will manage the negative impacts of urban car use whilst also supporting business and the economy; but this is a careful balancing.

The general conclusion is, on-street parking in the area of study is not well managed. Therefore, development of parking strategies is needed to manage demand and the following points were noted:

- On-street parking occupancy is beyond 100% from 09:00 am to 08:00 pm. This means that the parking is serving above capacity. Therefore people are forced to park illegally.
- The accumulation study showed that the rate of vehicle arrivals, are almost greater than the rate of vehicle departures, which means that the parking facilities in the area are already running beyond capacity. This is due to illegal parking after all the parking spaces are filled.
- The research showed that the parking spaces would only serve in the in the morning, early hours only.
- This research shows that most of people (66%) they spend more than 20 min. searching time and the average searching time is 24min.
- The results indicate that drivers are willing to pay parking fee up almost 600Rwf per hour. Above this amount of money they are shifting to other modes
- It was observed that the lower the parking duration, the higher the turnover percentage. This means that there is a demand for short-term parkers (below one hour parking duration) of as high as 37%.

6.2. Recommended strategies

Based on the existing parking conditions within the Kigali City center, together with identified stakeholder issues and future needs associated with the parking system, this study recommends a series of comprehensive strategies to improve parking conditions in the City center for consideration by the City and other stakeholders. This program of strategies and

actions would be carried out over both the short, medium and longer terms through further planning and budgeting processes.

Parking must be managed to assure that priority land uses are supported with an effective and efficient system of access that caters to the needs of priority users. As the purpose and objective of parking management in City of Kigali should be to implement strategies that

Support the development of a vibrant, regional center for shopping, working, living, recreation and entertainment and the customers, visitors, employees and residents of those uses. The components of this study need to be simple and intuitive for the user, providing and Understandable system that is safe, secure, affordable and well integrated into the traffic system and other access modes. The main objective those strategies are to reduce parking demand, not to accommodate the overall parking demand.

Based on the findings of this study, we would recommend that relevant strategies should be pursued and formalized.

The research study raises issues and recommendations strategies as well.

Below are strategy recommendations to the City of Kigali to consider, formalize and pursue in the coming years. They are organized as follows:

1. **Implement the 85% Rule to facilitate/direct parking management strategies**

The 85% Rule is a measure of parking utilization that acts as an objective benchmark against which parking management decisions are based.

Once a supply of parking routinely exceeds 85 percent occupancy, the 85% Rule would recommend that parking management strategies be evaluated and implemented as necessary to bring peak hour occupancies to a level below 85 percent to assure intended uses are conveniently accommodated.

Having the 85% Rule in effect will assure that a process for evaluating and responding to future parking activity in the CBD is in place. Basing on finding of this study Kigali City is extremely recommended, to implement the 85% rule.

2. **Adopt rate ranges for on-street parking in City of Kigali.**

This would allow City Administration to adjust rates administratively within the ranges adopted and based on the 85% Rule.

City of Kigali is recommended to adopt rate ranges for hourly parking in City facilities and empower City administration to make adjustments to parking rates based on review of occupancies within a supply by the Parking Manager, routine occupancies that exceed 85% and input from a Parking advisory Committee. If occupancies are in excess of 85%, then City administration can adjust rates within a pre-adopted range by the City Council.

3. Consider parking management planning/strategies for areas of the Kigali City not covered by this research.

Efforts should be made to assess parking dynamics in areas of the Kigali City not covered by this research. The research was done on CBD, but other areas of Kigali city (e.g. Kisimenti, Kimironko, Nyabugogo) are experiencing development pressures as well.
These areas should be evaluated to assure access decision making is supported with Sound data as completely as that for the CBD.

4. Appoint parking advisory committee

The City of Kigali should formally appoint a Parking Advisory Committee made of a representative Cross section of the City center interests. The formal charge of the Committee would be to assist a Parking Manager in the implementation of the parking management; review parking issues over time; and advise the Mayor and City Council on strategy implementation based on the Guiding Principles for parking management and strategies adopted for each parking management zone.

5. Establish a Special Parking Revenue Fund for City of Kigali as a mechanism to direct and dedicate funds identified for future City parking and transportation improvements.

As the supply of parking becomes constrained over time, it will be important to direct funds into a specific account intended to support on-going transportation, mobility and access in the city center. Fund should be dedicated to: Enforcement , operations, marketing and communications, new supply where necessary, transportation Demand Management programs.

6. **Codify Guiding Principles for Parking Management as City Code.**

The Guiding Principles have to be developed to provide a framework for managing parking and decision making in the downtown over time. “Codifying” the Guiding Principles will

serve to inform future management decision making as well as development of future public facilities. Guiding Principles recommended are:

a. To decrease the use of private vehicles and thus reduce overall demand of parking, and shift travel to public transport, para-transport& non-motorized modes;
b. Encourage other transport modes.
c. Promote strategic development of off - street facilities.
d. Provide safe, secure and well -lit parking to allow a sense of security at all times on street and off - street.
e. Calibrate parking standards to support the City's goals for transit, biking, walking and ridesharing.
f. To ensure that parking is a consumer commodity, not a legal right. No subsidized parking is to be provided in public spaces;
g. To design parking facilities that are well integrated with surrounding buildings and walking environments;
h. To promote "park and ride" programs that encourage transit oriented development;
i. To Adjust time limit in high demand areas;
j. To prioritize short-term parkers over long-term parkers in areas designated for private parking in order to maximize turnover and enable economic vibrancy.

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APPENDICES

APPENDIX I

Questionnaire for research

Sample No.: Day of Travel: ……../……/…….. Sheet …… of ……

QUESTIONNAIRE FORM

Respondent ID:……..

Dear Respondent,

This survey is intended to capture your views on Central Business District (CBD) parking situation, and it was designed for research purposes only; filling it is voluntary. The present research is conducted to develop suitable parking strategies in Kigali City, specifically in Central Business District, the center of Kigali city. The research idea comes from an existing problem of insufficient and inappropriate parking that suffers City of Kigali in general. We would now like you to take part in this survey. This survey questionnaire has two parts, in part two we want you to suppose that you were asked to choose among various alternatives of transport, some with public transport and the other with privet car.
We have presented this information in a series of possible scenarios, each scenario would present one hypothetical but realistic choice for you. For each pair of scenarios we would like you to indicate which one you would choose.
Remember that the use of privet car, you there is Vehicle Operating Cost which is estimated as follow:

1. Vehicle Operating Cost of Car is 166 Rwf/Km (i.e. RWF 1,660 for 10 km)
2. Vehicle Operating Cost of jeep is 291 Rwf/Km (i.e. RWF 2,900 for 10 km)
3. Vehicle Operating Cost of Pick up is 172 Rwf/ Km (i.e. RWF 1,720 for 10 km)

Your privacy and secrecy will be secured by the researcher.

Definition of some words

1. Walking time: Walking time is the time you use by walking from home to where you take other means of transport or the time you use from the parking to the end of your destination.
2. Waiting time: Waiting time is the time you spend by waiting for PT (Bus) for you trip
3. Searching time: Searching time is the time you spend by searching the space for parking

4. In Vehicle time: In Vehicle time is the time you use from when you get in the car up to the parking.

A. PART 1

Please indicate the number which represents your opinion. Tick at the box given.

1. **What is your trip purpose?**
   - Business ☐
   - Commuting ☐
   - Other ☐
2. **What is your average Single trip Distance?**
   - Less than 5 Km ☐
   - Between 6-10 Km ☐
   - Between 11-15 Km ☐
   - Between 16-20 Km ☐
   - Between 21-25 km ☐
   - Between 26-30 Km ☐
   - Between 31-35 Km ☐
   - Between 36-40 Km ☐
   - Between 41-45 Km ☐
   - Between 46-50 Km ☐
   - Above 50Km ☐
3. **What is your travel time for one trip (IVT)**
   - Less than 5min. ☐
   - Between 6-10 min. ☐
   - Between 11-15 min. ☐
   - Between 16-20 min. ☐
   - Between 21-25 min. ☐
   - Between 26-30 min. ☐
   - Between 31-35min. ☐
   - Between 36-40min. ☐
   - Between 41-45min. ☐
   - More than 45 min. ☐
4. **What is your walking Time from the parking to your end destination?**
   - Less than 5min. ☐
   - Between 6-10 min. ☐
   - Between 11-15 min. ☐

- Between 16-20 min.
- Between 21-25 min.
- Between 26-30 min.
- Between 31-35 min.
- Between 36- 40 min.
- Between 41-45 min
- More than 45 min.

5. **What is your walking distance from the parking to your end destination?**
   - Between 1m and 100mm
   - Between 101 and 200m
   - Between 201m and 300m
   - Between 301m and 400m
   - Between 401m and 500m
   - Between 500 and 1km
   - More than 1km

6. **How many minutes you spend for searching parking**
   - Less than 5min.
   - Between 6-10 min.
   - Between 11-15 min.
   - Between 16-20 min.
   - Between 21-25 min.
   - Between 26-30 min.
   - Between 31-35 min.
   - Between 36-40 min.
   - Between 41-45 min.
   - Between 46-50 min.
   - Between 51-55 min.
   - Between 56-60 min.
   - More than 1hour

7. **How much is your monthly income**
   - Less than 100,000Rwf
   - 100,001Rwf – 200.000Rwf
   - 200,001Rwf – 300,000Rwf
   - 300,001Rwf – 400,000Rwf
   - 400,000Rwf – 500,000Rwf

- 500,001Rwf – 600,000Rwf
- 600,001Rwf – 700,000Rwf
- 700,001Rwf – 800,000Rwf
- 800,001Rwf – 900,000Rwf
- 900,001Rwf – 1,000,000Rwf
- 1,000,001Rwf – 1,500,000Rwf
- 1,500,001Rwf – 2,000,000Rwf
- 2,000,001 Rwf – 2,500,000Rwf
- 2,500,001Rwf – 5,000,000Rwf
- More than 5,000,000Rwf

8. **What is the method of the parking fee do you use**
   - Hourly parking fee
   - Daily parking fee
   - Monthly parking

a. If it is Daily parking fee is how much? Tick at the box below

- Less than 500 Rwf
- Between 600 -1000 Rwf
- Between 1100 - 1500Rwf
- Between 1600- 2000 Rwf
- Betwee 2100 – 2500 Rwf
- More than 2,500 Rwf

b. If it is Monthly parking fee is how much? Tick at the box below

- Less than 5,000 Rwf
- Between 6,000 -10,000 Rwf
- Between 11,000 – 15,000Rwf
- Between 16,000- 20,000 Rwf
- Betwee 21,000 – 25,000 Rwf
- Between 26,000 -30,000 Rwf
- Between 31,000 – 35,000 Rwf
- Between 36,000 – 40,000Rwf
- Between 41,000-45,000Rwf
- Between 46,000Rwf – 50,000Rwf
- More than 50,000 Rwf

B. PART 2

What is your choice preference in the following alternatives for a typical trip of about 10 km?

Choice 1:

Option	Walking and waiting time	Searching time	In Vehicle time	Parking fee/fare	Tick Choice
Use Alternative means of transport including PT	25	0	35	275	
Avail parking facility	0	15	30	400	

Choice 2:

Option	Walking and waiting time	Searching time	In Vehicle time	Parking fee/fare	Tick Choice
Use Alternative means of transport including PT	20	0	30	300	
Avail parking facility	0	10	25	600	

Choice 3:

Option	Walking and waiting time	Searching time	In Vehicle time	Parking fee/fare	Tick Choice
Use Alternative means of transport including PT	30	0	40	225	
Avail parking facility	0	20	35	300	

Choice 4:

Option	Walking and waiting time	Searching time	In Vehicle time	Parking fee/fare	Tick Choice
Use Alternative means of transport including PT	15	0	25	350	
Avail parking facility	0	5	20	1100	

Choice 5:

Option	Walking and waiting time	Searching time	In Vehicle time	Parking fee/fare	Tick Choice
Use Alternative means of transport including PT	35	0	45	175	
Avail parking facility	0	25	40	200	

Choice 6:

Option	Walking and waiting time	Searching time	In Vehicle time	Parking fee/fare	Tick Choice
Use Alternative means of transport including PT	15	*0*	*20*	375	
Avail parking facility	0	*5*	*15*	1,400	

Choice 7:

Option	Walking and waiting time	Searching time	In Vehicle time	Parking fee/fare	Tick Choice
Use Alternative means of transport including PT	40	0	50	100	
Avail parking facility	0	30	45	0	

Choice 8:

Option	Walking and waiting time	Searching time	In Vehicle time	Parking fee/fare	Tick Choice
Use Alternative means of transport including PT	15	*0*	*20*	375	
Avail parking facility	0	*5*	*15*	1400	

Choice 9:

Option	Walking and waiting time	Searching time	In Vehicle time	Parking fee/fare	Tick Choice

Use Alternative means of transport including PT	35	0	50	125	
Avail parking facility	0	25	40	200	

Choice 10:

Option	Walking and waiting time	Searching time	In Vehicle time	Parking fee/fare	Tick Choice
Use Alternative means of transport including PT	10	*0*	*30*	375	
Avail parking facility	0	*5*	*20*	1,100	

Choice 11:

Option	Walking and waiting time	Searching time	In Vehicle time	Parking fee/fare	Tick Choice
Use Alternative means of transport including PT	40	0	40	150	
Avail parking facility	0	10	45	500	

Choice 12:

Option	Walking and waiting time	Searching time	In Vehicle time	Parking fee/fare	Tick Choice
Use Alternative means of transport including PT	10	*0*	*20*	475	
Avail parking facility	0	*5*	*15*	1400	

Choice 13:

Option	Walking and waiting time	Searching time	In Vehicle time	Parking fee/fare	Tick Choice
Use Alternative means of transport including PT	40	0	15	250	
Avail parking facility	0	10	15	800	

Choice 14:

Option	Walking and waiting time	Searching time	In Vehicle time	Parking fee/fare	Tick Choice

Use Alternative means of transport including PT	20	*0*	*30*	300	
Avail parking facility	0	*5*	*20*	1100	

Choice 15:

Option	Walking and waiting time	Searching time	In Vehicle time	Parking fee/fare	Tick Choice
Use Alternative means of transport including PT	40	0	25	200	
Avail parking facility	0	5	45	700	

Choice 16:

Option	Walking and waiting time	Searching time	In Vehicle time	Parking fee/fare	Tick Choice
Use Alternative means of transport including PT	10	*0*	*20*	475	
Avail parking facility	0	*0*	*15*	1500	

Appendix II: Some Results from SPSS

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	.000	.029	.000	1	1.000	1.000

The Coefficient of Variables in Model for parking Costs

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	W_WT	-6.636	.287	536.093	1	.000	.001
	S_T_hr	-1.428	.461	9.603	1	.002	.240
	I_V_T_hr	-4.747	.249	363.362	1	.000	.009
	Cost	-.005	.000	1027.901	1	.000	.995
	Constant	6.699	.227	867.713	1	.000	811.938

a. Variable(s) entered on step 1: W_WT, S_T_hr, I_V_T_hr, Cost.

APPENDIX III

1. SPECIMEN FORM OF DATA RECORDING/PARKING USAGE BY PATROL SURVEY (Morning)

PARKING SURVEY:		OF-STREET PARKING										PARKING SURVEY:		OF-STREET PARKING										
NAME OF PARKING: UTC												NAME OF PARKING: UTC												
PARKING LOCATION: DOWN SIDE												PARKING LOCATION: DOWN SIDE												
POSITION	Entrance											POSITION	Entrance											
DATE:												DATE:												
TIME:												TIME:												
6:30	6:45	7:00	7:15	7:30	7:45	8:00	8:15	8:30	8:45	9:00	9:15	9:30	9:45	10:00	10:15	10:30	10:45	11:00	11:15	11:30	11:45	12:00	12:15	12:30

2. SPECIMEN FORM OF DATA RECORDING/PARKING USAGE BY PATROL SURVEY (Afternoon)

PARKING SURVEY: ON-STREET PARKING								PARKING SURVEY: ON STREET PARKING							
PORTION OF THE ROAD:								PORTION OF THE ROAD:							
PARKING SIDES: LEFT AND RIGHT								PARKING SIDES: LEFT AND RIGHT							
DATE:								DATE:							
TIME:								TIME:							
6:30		7:00		7:30		8:00		8:30		9:00		9:30		10:00	
L.	R.	L.	R.	L.	R.	L.	R.	L.	R.	L.	R.	L.	R.	L.	R.

APPENDIX IV: TABLE SHOWING PARKING ACCUMULATION IN THE AREA OF STUDY

Time Period	6:30-6:59 Hrs	7:00-7:29 Hrs	7:30-7:59Hrs	8:00-8:29 Hrs	8:30-8:59Hrs	9:00-9:29Hrs	9:30-9:59Hrs	10:00-10:29 Hrs	10:30-10:59 Hrs	11:00-11:29 Hrs	11:30-11:59 Hrs	12:00-12:29 Hrs	12:30-12:59 Hrs	13:00-13:29 Hrs	13:30-13:59Hrs	14:00-14:29 Hrs	14:30-14:59 Hrs	15:00-15:29 Hrs	15:30-15:59 Hrs	16:00-16:29 Hrs	16:30-16:59 Hrs	17:00-17:29 Hrs	17:30-17:59 Hrs	18:00-18:29 Hrs	18:30-18:59 Hrs	19:00-19:29 Hrs	19:30-19:59 Hrs	20:00-20:29 Hrs	20:30-20:59 Hrs	21:00-21:29 Hrs	
Vehicles parked	30	31	58	79	122	144	159	175	189	182	187	185	196	190	177	176	182	192	181	184	200	190	184	190	170	156	121	113	84	56	
Common vehicles	24	20	19	16	16	14	15	15	14	14	13	12	14	13	15	12	11	11	11	11	11	11	11	10	11	9	13	10	10		
	Depa	6	11	39	63	106	130	144	160	175	168	174	173	182	177	162	164	171	181	170	173	189	179	173	180	159	147	108	103	74	**4041**
	Arriv.	7	38	60	106	128	145	160	174	168	173	172	184	176	164	161	170	181	170	173	189	179	173	179	160	145	112	100	74	46	**4067**
Cum. Arrival	0	7	45	105	211	339	484	644	818	986	1159	1331	1515	1691	1855	2016	2186	2367	2537	2710	2899	3078	3251	3430	3590	3735	3847	3947	4021	4067	**58871**
Cum. Departure	0	6	17	56	119	225	355	499	659	834	1002	1176	1349	1531	1708	1870	2034	2205	2386	2556	2729	2918	3097	3270	3450	3609	3756	3864	3967	4041	**55288**
Accumulation	0	1	28	49	92	114	129	145	159	152	157	155	166	160	147	146	152	162	151	154	170	160	154	160	140	126	91	83	54	26	**3583**

APPENDIX V: TABLE SHOWING CALCULATIONS FOR PARKING STRESS IN EXISTING 200-SPACES PARKING FACILITIES (2012-2017)

Overall length 550m	**Traffic Growth Rate** 7.5%						**Available space** 100					
	2013	2014	2015	2016	2017	2018						
Time Period	**Observed No of vehicles parked in 2013**	**Predicted No of vehicles parked in 2014**	**Predicted No of vehicles parked in 2015**	**Predicted No of vehicles parked in 2016**	**Predicted No of vehicles parked in 2017**	**Predicted No of vehicles parked in 2018**	**Parking stress for 2013**	**Parking stress for 2014**	**Parking stress for 2015**	**Parking stress for 2016**	**Parking stress for 2017**	**Parking stress for 2018**
6:30hrs-6:59hrs	30	32	37	46	62	89	30.00%	32.25%	37.27%	46.30%	61.83%	88.77%
7:00hrs-7:29hrs	31	33	39	48	64	92	31.00%	33.33%	38.51%	47.84%	63.89%	91.73%
7:30hrs-7:59hrs	58	62	72	90	120	172	58.00%	62.35%	72.05%	89.51%	119.54%	171.61%
8:00hrs-8:29hrs	79	85	98	122	163	234	79.00%	84.93%	98.14%	121.92%	162.82%	233.75%
8:30hrs-8:59hrs	122	131	152	188	251	361	122.00%	131.15%	151.56%	188.28%	251.45%	360.98%
9:00hrs-9:29hrs	144	155	179	222	297	426	144.00%	154.80%	178.89%	222.24%	296.79%	426.08%
9:30hrs-9:59hrs	159	171	198	245	328	470	159.00%	170.93%	197.53%	245.38%	327.70%	470.46%
10:00hrs - 10:29hrs	175	188	217	270	361	518	175.00%	188.13%	217.40%	270.08%	360.68%	517.80%

10:30hrs - 10:59hrs	189	203	235	292	390	559	189.00%	203.18%	234.79%	291.68%	389.53%	559.23%
11:00hrs - 11:29hrs	182	196	226	281	375	539	182.00%	195.65%	226.10%	280.88%	375.11%	538.52%
11:30hrs - 11:59hrs	187	201	232	289	385	553	187.00%	201.03%	232.31%	288.60%	385.41%	553.31%
12:00hrs - 12:29hrs	185	199	230	286	381	547	185.00%	198.88%	229.82%	285.51%	381.29%	547.39%
12:30hrs - 12:59hrs	196	211	243	302	404	580	196.00%	210.70%	243.49%	302.49%	403.96%	579.94%
13:00hrs - 13:29hrs	190	204	236	293	392	562	190.00%	204.25%	236.04%	293.23%	391.60%	562.19%
1330hrs - 1359hrs	177	190	220	273	365	524	177.00%	190.28%	219.89%	273.16%	364.80%	523.72%
1400hrs - 1429hrs	176	189	219	272	363	521	176.00%	189.20%	218.64%	271.62%	362.74%	520.76%
1430hrs - 1459hrs	182	196	226	281	375	539	182.00%	195.65%	226.10%	280.88%	375.11%	538.52%
1500hrs - 1529hrs	192	206	239	296	396	568	192.00%	206.40%	238.52%	296.31%	395.72%	568.10%
1530 hrs- 1559hrs	181	195	225	279	373	536	181.00%	194.58%	224.86%	279.34%	373.05%	535.56%

1600hrs - 1629hrs	184	198	229	284	379	544	184.00%	197.80%	228.58%	283.97%	379.23%	544.43%
16:30hrs - 16:59hrs	200	215	248	309	412	592	200.00%	215.00%	248.46%	308.66%	412.21%	591.78%
17:00hrs - 17:29hrs	190	204	236	293	392	562	190.00%	204.25%	236.04%	293.23%	391.60%	562.19%
17:30hrs - 17:59hrs	184	198	229	284	379	544	184.00%	197.80%	228.58%	283.97%	379.23%	544.43%
18:00hrs - 18:29hrs	190	204	236	293	392	562	190.00%	204.25%	236.04%	293.23%	391.60%	562.19%
18:30hrs - 18:59hrs	170	183	211	262	350	503	170.00%	182.75%	211.19%	262.36%	350.38%	503.01%
19:00hrs - 19:29hrs	156	168	194	241	322	462	156.00%	167.70%	193.80%	240.76%	321.52%	461.58%
19:30hrs - 19:59hrs	121	130	150	187	249	358	121.00%	130.08%	150.32%	186.74%	249.38%	358.02%
20:00hrs - 20:29hrs	113	121	140	174	233	334	113.00%	121.48%	140.38%	174.39%	232.90%	334.35%
20:30hrs - 20:59hrs	84	90	104	130	173	249	84.00%	90.30%	104.35%	129.64%	173.13%	248.55%
21:00 hrs- 21:29hrs	56	60	70	86	115	166	56.00%	60.20%	69.57%	86.42%	115.42%	165.70%

APPENDIX VI: TABLE SHOWING CALCULATIONS FOR PARKING DURATION (TURNOVER)

Time period	Less than 30 min	30 - 60 min	60-90 min	90-120 min	120-150 min	150-180 min	180-210 min	210-240 min	240-270 min	270-300 min	300-330 min	330-360 min	360-390 min	390-420 min	420-450 min	450-480 min	480-510 min	510-540 min	540-570 min	570-600 min	600-630 min	630-660 min	660-690 min	690-710 min	710-740 min	740-770 min	770-800 min	800-830 min	830-860 min	860-890 min	
counting at 6:30	7	4	1	3	0	2	1	0	1	0	1	1	2	1	2	3	1	0	0	0	0	0	0	1	1	2	4	3	0	11	
counting at 7:00	1	5	2	2	1	1	1	1	0	1	0	2	1	0	1	1	0	0	0	0	5	5	0	1	4	3	2	0	12	0	
counting at 7:30	15	2	9	11	7	1	1	2	1	1	4	0	2	1	2	1	0	2	3	0	2	2	3	5	1	2	1	13	0	0	
counting at 8:00	17	10	3	2	2	3	0	5	3	3	0	4	4	2	1	0	0	1	4	1	3	4	7	4	3	1	14	0	0	0	
counting at 8:30	31	13	3	1	4	2	5	3	8	2	5	3	2	3	1	1	4	7	1	4	2	9	8	5	1	16	0	0	0	0	
counting at 9:00	47	10	8	12	2	5	2	7	2	4	4	4	2	1	2	1	5	4	5	2	9	9	7	4	17	0	0	0	0	0	
counting at 9:30	31	22	16	2	4	3	9	4	0	5	2	1	0	0	2	9	1	8	4	11	8	7	4	16	0	0	0	0	0	0	
counting at 10:00	28	23	8	7	7	10	7	3	5	0	3	4	1	4	8	3	8	4	10	8	5	5	23	0	0	0	0	0	0	0	
counting at 10:30	46	16	13	8	13	5	5	7	1	5	2	1	1	5	4	10	3	8	8	7	5	22	0	0	0	0	0	0	0	0	
counting at 11:00	36	22	13	21	4	2	5	1	4	3	1	7	13	3	9	8	5	8	7	5	22	0	0	0	0	0	0	0	0	0	
counting at 11:30	37	20	29	7	0	4	5	2	2	0	1	10	3	9	8	4	8	8	5	22	0	0	0	0	0	0	0	0	0	0	
counting at 12:00	32	42	10	2	5	8	3	0	3	3	8	3	8	7	10	5	7	7	20	0	0	0	0	0	0	0	0	0	0	0	

counting at 12:30	29	28	4	9	8	4	2	4	1	10	4	9	9	11	4	8	7	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
counting at 13:00	41	19	14	9	5	4	4	1	11	8	3	9	13	4	4	5	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
counting at 13:30	34	20	13	11	2	7	2	12	8	7	10	13	4	4	4	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
counting at 14:00	32	16	15	9	4	0	12	7	9	13	14	7	5	4	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
counting at 14:30	37	26	11	8	1	11	10	8	11	17	8	7	3	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
counting at 15:00	38	14	16	9	13	10	11	9	16	11	8	3	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
counting at 15:30	41	21	10	20	10	14	10	14	10	5	4	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
counting at 16:00	36	24	23	13	16	10	12	9	10	4	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
counting at 16:30	58	31	15	19	13	12	11	9	3	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
counting at 17:00	39	34	19	16	16	11	11	5	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
counting at 17:30	32	40	15	19	13	17	5	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
counting at 18:00	54	24	24	14	16	9	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
counting at 18:30	53	37	21	12	11	27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
counting at 19:00	39	31	20	12	32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
counting at 19:30	37	19	13	33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
counting at 20:00	40	23	41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
counting at 20:30	20	49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
counting at 21:00	61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total number of vehicle	1049	644	390	288	211	184	161	138	135	129	107	112	100	86	88	84	72	75	68	60	62	63	51	38	28	25	22	16	12	11				
Percentage	23.26%	14.28%	8.65%	6.38%	4.69%	4.08%	3.57%	3.07%	3.00%	2.85%	2.37%	2.49%	2.22%	1.91%	1.96%	1.86%	1.59%	1.67%	1.50%	1.33%	1.38%	1.40%	1.14%	0.85%	0.63%	0.56%	0.48%	0.36%	0.27%	0.24%				

APPENDIX VII: TABLE SHOWING PARKING ACCUMULATION IN THE AREA OF THE STUDY (OF-STREET PARKING)

Time Period	6:30-6:44 Hrs	6:45-6:59Hrs	7:00-7:14Hrs	7:15-7:29Hrs	7:30-7:44hrs	7:45-7:59Hrs	8:00-8:14Hrs	8:15-:8:29Hrs	8:30-8:44Hrs	8:45-8:59Hrs	9:00-9:14Hrs	9:15-9:29Hr	9:30-9:44Hrs	9:45-9:59Hr	10:00-9:14Hrs	10:15-10:29Hrs	10:30-10:44Hrs	10:45-10:59Hrs	11:00-11:14Hrs	11:15-11:29Hrs	11:30-11:44Hrs	11:45-11:59Hrs	12:00:12:14Hrs	12:15-12:29Hrs	12:30-12:44Hrs	12:45-12:59Hrs
Vehicles Arrive	2	4	5	5	12	20	24	15	14	12	14	15	22	17	25	18	25	11	34	33	35	25	23	24	33	20
	Depart.	2	1	1	2	0	8	7	14	12	9	13	8	7	16	14	23	22	19	17	23	47	16	26	27	26
	Arriv.	2	1	1	2	0	8	7	14	12	9	13	8	7	16	14	23	22	19	17	23	47	16	26	27	26
Cum. Arrival	2	6	11	16	28	48	72	87	101	113	127	142	164	181	206	224	249	260	294	327	362	387	410	434	467	487
Cum. Departure	2	3	4	6	6	14	21	35	47	56	69	77	84	100	114	137	159	178	195	218	265	281	307	334	360	395
Accumulation	0	3	7	10	22	34	51	52	54	57	58	65	80	81	92	87	90	82	99	109	97	106	103	100	107	92

Time Period		13:00-13:14Hrs	13:15-13:29Hrs	13:30-13:44Hrs	13:45-13:59Hrs	14:00-14:14Hrs	14:15-14:39Hrs	14:30-14:44Hrs	14:45-14:59Hrs	15:00-15:14Hrs	15:15-15:29Hrs	15:30-15:44Hrs	15:45-15:59Hrs	16:00-16:14Hrs	16:15-16:29Hrs	16:30-16:44Hrs	16:45-16:59Hrs	17:00-17:14Hrs	17:15-17:29Hrs	17:30-17:44Hrs	17:45-17:59Hrs	18:00-18:14Hrs	18:15-18:29Hrs	18:30-18:45Hrs	18:45-18:59Hrs	19:00-19:14Hrs	19:15-19:29Hrs	19:30-19:44Hrs	19:45-19:59Hrs	20:00-20:14Hrs	20:15-20:29Hrs	20:30-20:44Hrs	20:45-20:59Hrs	21:00-21:14Hrs
Vehicles Arrived		16	24	15	28	28	21	32	19	35	24	25	19	21	38	11	26	25	32	26	21	26	14	31	21	15	21	16	13	14	12	13	6	10
	Depart.	35	18	13	37	23	19	19	25	26	27	20	23	32	28	20	24	20	22	28	12	33	32	25	23	32	22	25	28	21	26	12	22	15
	Arriv.	35	18	13	37	23	19	19	25	26	27	20	23	32	28	20	24	20	22	28	12	33	32	25	23	32	22	25	28	21	26	12	22	15
Cum. Arrival		503	527	542	570	598	619	651	670	705	729	754	773	794	832	843	869	894	926	952	973	999	1013	1044	1065	1080	1101	1117	1130	1144	1156	1169	1175	1185
Cum. Departure		413	426	463	486	505	524	549	575	602	622	645	677	705	725	749	769	791	819	831	864	896	921	944	976	998	1023	1051	1072	1098	1110	1132	1147	1158
Accumulation		90	101	79	84	93	95	102	95	103	107	109	96	89	107	94	100	103	107	121	109	103	92	100	89	82	78	66	58	46	46	37	28	27

APPENDIX VIII: TABLE SHOWING CALCULATIONS FOR PARKING STRESS IN EXISTING 200-SPACES PARKING FACILITIES (2012-2017)

Overall length	Traffic Growth Rate						Availabl e space					
550m	0.07						136					
	2013	2014	2015	2016	2017	2018						
Time Period	Observed No of vehicles parked in 2013	Predicte d No of vehicles parked in 2014	Predicted No of vehicles parked in 2015	Predicted No of vehicles parked in 2016	Predicted No of vehicles parked in 2017	Predicted No of vehicles parked in 2018	Parking stress for 2013	Parking stress for 2014	Parking stress for 2015	Parking stress for 2016	Parking stress for 2017	Parking stress for 2018
6:30-6:44 Hrs	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
6:45-6:59Hrs	3	3	4	5	6	10	2.2%	2.4%	2.8%	3.5%	4.8%	7.0%
7:00-7:14Hrs	7	8	9	11	15	22	5.1%	5.6%	6.5%	8.2%	11.1%	16.3%
7:15-7:29Hrs	10	11	13	16	22	32	7.4%	7.9%	9.3%	11.7%	15.9%	23.3%
7:30-7:44hrs	22	24	28	35	47	70	16.2%	17.5%	20.4%	25.7%	34.9%	51.3%
7:45-7:59Hrs	34	37	43	54	73	108	25.0%	27.0%	31.5%	39.7%	54.0%	79.3%
8:00-8:14Hrs	51	55	64	81	110	162	37.5%	40.5%	47.2%	59.5%	81.0%	119.0%
8:15-:8:29Hrs	52	56	66	83	112	165	38.2%	41.3%	48.2%	60.7%	82.5%	121.3%
8:30-8:44Hrs	54	58	68	86	117	171	39.7%	42.9%	50.0%	63.0%	85.7%	126.0%

8:45-8:59Hrs	57	62	72	90	123	181	41.9%	45.3%	52.8%	66.5%	90.5%	133.0%
9:00-9:14Hrs	58	63	73	92	125	184	42.6%	46.1%	53.7%	67.7%	92.1%	135.3%
9:15-9:29Hr	65	70	82	103	140	206	47.8%	51.6%	60.2%	75.8%	103.2%	151.6%
9:30-9:44Hrs	80	86	101	127	173	254	58.8%	63.5%	74.1%	93.3%	127.0%	186.6%
9:45-9:59Hr	81	87	102	129	175	257	59.6%	64.3%	75.0%	94.5%	128.6%	188.9%
10:00-9:14Hrs	92	99	116	146	199	292	67.6%	73.1%	85.2%	107.3%	146.0%	214.6%
10:15-10:29Hrs	87	94	110	138	188	276	64.0%	69.1%	80.6%	101.5%	138.1%	202.9%
10:30-10:44Hrs	90	97	113	143	194	285	66.2%	71.5%	83.4%	105.0%	142.9%	209.9%
10:45-10:59Hrs	82	89	103	130	177	260	60.3%	65.1%	76.0%	95.7%	130.2%	191.3%
11:00-11:14Hrs	99	107	125	157	214	314	72.8%	78.6%	91.7%	115.5%	157.2%	230.9%
11:15-11:29Hrs	109	118	137	173	235	346	80.1%	86.6%	101.0%	127.2%	173.0%	254.2%
11:30-11:44Hrs	97	105	122	154	209	308	71.3%	77.0%	89.8%	113.2%	154.0%	226.3%
11:45-11:59Hrs	106	114	134	168	229	336	77.9%	84.2%	98.2%	123.7%	168.3%	247.2%
12:00:12:14Hrs	103	111	130	163	222	327	75.7%	81.8%	95.4%	120.2%	163.5%	240.2%
12:15-12:29Hrs	100	108	126	159	216	317	73.5%	79.4%	92.6%	116.7%	158.7%	233.2%
12:30-12:44Hrs	107	116	135	170	231	339	78.7%	85.0%	99.1%	124.8%	169.9%	249.6%

12:45-12:59Hrs	92	99	116	146	199	292	67.6%	73.1%	85.2%	107.3%	146.0%	214.6%
13:00-13:14Hrs	90	97	113	143	194	285	66.2%	71.5%	83.4%	105.0%	142.9%	209.9%
13:15-13:29Hrs	101	109	127	160	218	320	74.3%	80.2%	93.6%	117.8%	160.3%	235.6%
13:30-13:44Hrs	79	85	100	125	171	251	58.1%	62.7%	73.2%	92.2%	125.4%	184.3%
13:45-13:59Hrs	84	91	106	133	181	266	61.8%	66.7%	77.8%	98.0%	133.3%	195.9%
14:00-14:14Hrs	93	100	117	148	201	295	68.4%	73.9%	86.1%	108.5%	147.6%	216.9%
14:15-14:39Hrs	95	103	120	151	205	301	69.9%	75.4%	88.0%	110.8%	150.8%	221.6%
14:30-14:44Hrs	102	110	128	162	220	324	75.0%	81.0%	94.5%	119.0%	161.9%	237.9%
14:45-14:59Hrs	95	103	120	151	205	301	69.9%	75.4%	88.0%	110.8%	150.8%	221.6%
15:00-15:14Hrs	103	111	130	163	222	327	75.7%	81.8%	95.4%	120.2%	163.5%	240.2%
15:15-15:29Hrs	107	116	135	170	231	339	78.7%	85.0%	99.1%	124.8%	169.9%	249.6%
15:30-15:44Hrs	109	118	137	173	235	346	80.1%	86.6%	101.0%	127.2%	173.0%	254.2%
15:45-15:59Hrs	96	104	121	152	207	305	70.6%	76.2%	88.9%	112.0%	152.4%	223.9%
16:00-16:14Hrs	89	96	112	141	192	282	65.4%	70.7%	82.4%	103.8%	141.3%	207.6%
16:15-16:29Hrs	107	116	135	170	231	339	78.7%	85.0%	99.1%	124.8%	169.9%	249.6%
16:30-16:44Hrs	94	102	118	149	203	298	69.1%	74.6%	87.1%	109.7%	149.2%	219.3%

16:45-16:59Hrs	100	108	126	159	216	317	73.5%	79.4%	92.6%	116.7%	158.7%	233.2%
17:00-17:14Hrs	103	111	130	163	222	327	75.7%	81.8%	95.4%	120.2%	163.5%	240.2%
17:15-17:29Hrs	107	116	135	170	231	339	78.7%	85.0%	99.1%	124.8%	169.9%	249.6%
17:30-17:44Hrs	121	131	152	192	261	384	89.0%	96.1%	112.1%	141.2%	192.1%	282.2%
17:45-17:59Hrs	109	118	137	173	235	346	80.1%	86.6%	101.0%	127.2%	173.0%	254.2%
18:00-18:14Hrs	103	111	130	163	222	327	75.7%	81.8%	95.4%	120.2%	163.5%	240.2%
18:15-18:29Hrs	92	99	116	146	199	292	67.6%	73.1%	85.2%	107.3%	146.0%	214.6%
18:30-18:45Hrs	100	108	126	159	216	317	73.5%	79.4%	92.6%	116.7%	158.7%	233.2%
18:45-18:59Hrs	89	96	112	141	192	282	65.4%	70.7%	82.4%	103.8%	141.3%	207.6%
19:00-19:14Hrs	82	89	103	130	177	260	60.3%	65.1%	76.0%	95.7%	130.2%	191.3%
19:15-19:29Hrs	78	84	98	124	168	247	57.4%	61.9%	72.2%	91.0%	123.8%	181.9%
19:30-19:44Hrs	66	71	83	105	142	209	48.5%	52.4%	61.1%	77.0%	104.8%	153.9%
19:45-19:59Hrs	58	63	73	92	125	184	42.6%	46.1%	53.7%	67.7%	92.1%	135.3%
20:00-20:14Hrs	46	50	58	73	99	146	33.8%	36.5%	42.6%	53.7%	73.0%	107.3%
20:15-20:29Hrs	46	50	58	73	99	146	33.8%	36.5%	42.6%	53.7%	73.0%	107.3%
20:30-20:44Hrs	37	40	47	59	80	117	27.2%	29.4%	34.3%	43.2%	58.7%	86.3%

20:45-20:59Hrs	28	30	35	44	60	89	20.6%	22.2%	25.9%	32.7%	44.4%	65.3%
21:00-21:14Hrs	27	29	34	43	58	86	19.9%	21.4%	25.0%	31.5%	42.9%	63.0%

DATA RECORDED / PARKING USAGE BY PATROL SURVEY (ON-STREET PARKING ONLY)

PARKING SURVEY: **ON-STREET PARKING**

PORTION OF THE ROAD: KN2 ST

PARKING SIDES: LEFT AND RIGHT

DATE:

TIME:

PARKING SURVEY: ON STREET PARKING

PORTION OF THE ROAD: KN2 ST

PARKING SIDES: LEFT AND RIGHT

DATE:

TIME:

6:30		7:00		7:30		8:00		8:30		9:00		9:30		10:00	
L.	R.	L.	R.	L.	R.	L.	R.	L.	R.	L.	R.	L.	R.	L.	R.
RAB930W	RAA584Y	RAB930W	RAA584Y	RAB930W	RAB759Z	RAB272Y	RAB693T	RAC620L	RAA584Y	RAC620L	RAB759Z	RAB272Y	RAB759Z	RAA228P	RAC707I
RAA065F	RAB888P	RAA065F	RAB888P	RAA065F	RAA584Y	RAB662L	RAA584Y	RAB272Y	RAB759Z	RAB272Y	RAA584Y	RAB442X	RAA584W	RAB272Y	IT839RD
RAA611U	RAC196P	RAA611U	RAC196A	RAA611U	RAB888P	RAC862H	RAA024F	RAB662L	RAA024F	RAA223S	RAA024F	RAC620L	RAB560S	RAB624F	RAB656K
RAC457D	RAB093T	RAC457D	RAB093T	RAC457D	RAB972G	RAB930W	RAC946D	RAB887G	RAC196A	RAB887G	RAA293Y	RAB887G	RAA263Z	RAB191H	RAB739I
RAA069B	IT839RD	RAB235L	RAB557U	RAC647E	RAC196A	RAA065F	RAC196A	RAB335J	RAA004P	RAC869H	RAC196A	RAB976Y	RAA293X	UN152RA	RAB308B
RAA811Z	RAB557U	RAA069B	RAB344N	IT104RC	RAB093T	RAC457D	RAA004P	RAC869H	RAB093T	RAB930W	RAA004P	RAC424F	RAA232H	RAB976Y	RAC004I
RAA672U	RAB344N	RAA811Z	RAA621X	RAC125B	RAC190A	RAB131W	RAB093T	RAB930W	GR274D	RAA065F	RAC794A	RAC869H	RAC313H	RAC424F	RAA072T
RAC821H	RAA649I	RAA672U	RAA649I	RAA069B	RAB557U	RAC647E	RAB656K	RAA065F	RAC372K	RAC457D	RAB093T	RAB876K	RAA432I	RAC223J	RAB067W
RAC138F	RAB337T	RAC821H	RAB337T	RAA811Z	RAB344N	RAC887D	IT839RD	RAC457S	RAB656K	RAC580J	RAB067W	RAB930W	RAC196A	RAC869H	RAB093T
RAC833H	RAC572C	RAC138F	RAC572C	RAA672U	RAA621X	RAA069B	RAB740Y	RAB131W	IT839RD	RAC889A	RAA072T	RAB952U	RAA004P	RAB930W	RAB427C
RAB221Z	RAA997M	RAC833H	RAA977M	RAC821H	RAB439H	RAA811Z	RAC190A	RAA730Q	RAB495I	RAB131W	RAC359F	RAB294N	RAB122D	RAB952U	RAB122D
RAB443P	RAB693T	RAB221Z	RAB693T	RAC688C	RAA649I	RAB878T	RAB439H	RAC647E	RAB242P	RAB910U	RAC372K	RAB445S	RAB093T	RAB294N	RAA004P
RAB270R	IT327RB	RAB443P	IT327RB	RAC113A	RAB337T	RAA672U	RAB557U	RAA253I	RAA284X	RAA730Q	RAB656K	RAB453S	RAB097W	RAC391F	RAC196A
RAA315Q	RAC134B	RAB270R	RAC134B	RAB221Z	RAC572C	RAC821H	RAC831B	RAB560V	RAB740Y	RAB832Q	IT839RD	RAC794A	RAA072T	RAA760F	RAC620B
	RAA977M	RAA315Q	RAA236R	RAB443P	RAA977M	RAC688E	RAC433B	RAC887D	RAC190A	RAC647E	RAC707I	RAB516Y	RAC004I	RAC794A	RAB126I
	RAA344N		RAB759Z	RAC812J	RAB693T	RAC113A	RAA649I	RAA372M	RAC497F	RAA337Y	RAB997S	RAC580J	RAB252S	RAB516V	RAC313H
				RAB338X	RAC991G	RAB221Z	RAB337T	RAA930D	RAB286Z	RAA253I	RAB579I	RAA609M	RAB308B	RAC580J	RAC588K
				RAA860F	IT327RB	RAB443P	RAC572C	RAC579K	RAB557U	RAB560V	RAA284X	RAB131W	RAC372K	RAA609M	RAA293Y
				RAA996X	RAC134B	RAA412R	RAA977M	RAC566K	RAC831B	RAC545H	RAB740Y	RAB910U	RAB656K	RAB131W	RAA263Z
				RAB485P	RAB322Y	RAB583Y	RAC991G	RAB252K	RAC433B	RAA372M	RAC190A	RAA730Q	IT839RD	RAB910U	RAB960N

				RAB996X	RAA236R	RAC812J	RAA981W	RAC456F	RAA649I	RAA930D	RAC479F	RAB832Q	RAC707I	RAA730Q	RAA584Y
				RAA412R	RAC251K	RAB885Q	IT327RB	RAC882J	RAB337T	RAC256K	RAA509Z	RAC647E	RAC020G	RAB832Q	RAB759Z
				RAC688E	RAB591K	RAC666B	RAB537A	RAA811Z	RAC572C	RAC566I	RAB557U	RAA377Y	RAB591V	RAC647E	RAB003V
				RAC887D	RAA051V	RAB338X	RAC134B	RAB878J	RAA977M	RAB252K	RAC433B	RAA253I	RAB032N	RAA377Y	RAA062T
				RAC869H	RAA333Z	RAB767S	RAA052B	RAA672U	RAB693T	RAC456F	RAB649I	RAB560X	RAB997S	RAA253I	RAC029I
				RAB272Y	RAB332Y	RAC705J	RAC479F	RAC821H	RAC991G	RAC882J	RAB387Y	RAC545H	RAA096C	RAB560V	RAC020G
					RAB787Y	RAC981D	RAA284X	RAC688E	RAA981W	RAA811Z	RAB337T	RAA372M	RAB579I	RAC545H	RAB591V
					RAB495I	RAB158I	RAA954D	RAC113A	RAA378X	RAB878T	RAC572C	RAA930S	RAA284X	RAA372M	RAB032M
					RAA052B	RAA860F	RAB759Z	RAB221Z	RAB537A	RAA672U	RAA997M	RAA647R	RAB740Y	RAA930S	RAB997S
					RAB537A	RAA996X		RAB443P	RAB294I	RAC821H	RAB188Z	RAC256K	RAC190A	RAA647R	RAB255A
					RAA378X	RAB485P		RAA412R	RAB139F	RAC688E	RAB934H	RAC566I	RAB480D	RAC256K	RAA096S
					RAA981W	RAC235C		RAA512H	RAA126T	RAA379E	RAA981W	RAB252K	RAB696N	RAC536I	RAB579I
						RAB077R		RAC235C	RAC968A	RAB221Z	RAA378X	RAC456F	RAB557U	RAB252K	RAA284X
						RAA033A		RAB917W	RAB772Z	RAB443P	RAB537A	RAC882J	RAB011L	RAC456F	RAB740Y
						RAB767J		RAC383Y	RAB809G	RAA412R	RAB294A	RAA811Z	RAC433B	RAC882J	RAC190A
						RAB383Y		RAC812J	RAB787Y	RAA512H	RAB470Z	RAB878T	RAA649I	RAA811Z	RAB480D
						RAB917W		RAB666B	RAC245G	RAA351S	RAB444V	RAA672U	RAB337T	RAB878T	RAB696N
						RAC882J		RAB885Q	RAC251K	RAB728L	RAA126T	RAC821H	RAC572C	RAA672U	RAB557U
						RAC456F		RAB338X	RAB591K	RAA595E	RAA243Y	RAC688E	RAA977M	RAC821H	RAB011L
						RAB252K		RAB767S	RAC938I	RAA047N	RAC968A	RAC113A	RAB188Z	RAC688E	RAC433B
						RAC572K		RAC705J	RAA051V	RAB917W	RAA161N	RAB221Z	RAB520S	RAA555X	RAA649I
						RAA930D		RAC981D	RAC755H	RAB383Y	RAB809G	RAB443P	RAC024F	RAB221Z	RAB337T
						RAA372M		RAB144M	RAB322Y	RAC812J	RAB787Y	RAA412R	RAB934H	RAB443P	RAC572C
						RAB560V		RAB158I	RAA236R	RAB885Q	RAC245G	RAC774C	RAA578E	RAA412R	RAA977M
						RAA253I		RAA860F	RAB591X	RAB338V	RAC251K	RAC351G	RAA981W	RAC774C	RAB188Z
						RAA730Q		RAA996V	RAC245K	RAB767S	RAB818L	RAA047M	RAA378X	RAC351G	RAB520S
						RAB294N		RAB485P	RAC787Y	RAC705J	RAA012M	RAB728L	RAB537A	RAA047N	RAA638Y
						RAC869H		RAA381Q	RAB070U	RAC981D	RAC938I	RAA595E	RAB294I	RAB728L	RAB934H
						RAB737N		RAB077R	RDF032N	RAB144M	RAA051Y	RAB383N	RAB007R	RAA595E	RAA578E

						RAC620L		RAA033A	RAA509Z	RAA484D	RAC755H	RAC138F	RAB982Q	RAA754M	RAB916V
								RAC666B	RAC479F	RAB763V	RAB322Y	RAB917W	RAB470Z	RAB383N	RAA378X
								RAB383Y	RAB579I	RAA860F	RAA254N	RAB383Y	RAA100T	RAC138F	RAB537A
								RAA595E	RAB997S	RAA996V	RAC254G	RAC812J	RAA126T	RAB917W	RAB294I
								RAC904Z	RAA511M	RAB485P	RAC560K	RAB885Q	RAA243Y	RAC779G	RAB007R
								RAB878T	RAB067M	RAA629A	RAA126K	RAA484P	RAC968A	RAB383Y	RAB012K
								RAC566I	RAA293Y	RAB077R	RAC338E	RAB338X	RAA161N	RAC812J	RAB429L
								RAC256K	RAA759Z	RAA033A	RAB294I	RAB767S	RAA397X	RAB885Q	RAB470Z
								RAC545H		RAA484P	RAC024E	RAC705J	RAB809G	RAB338X	RAC638B
								RAA253J		RAA520J	RAA977M	RAC981S	RAB787Y	RAA484P	RAA243Y
								RAA377Y		RAC351G	RAA649I	RAB144M	RAB818L	RAB456H	RAA126T
								RAB832Q		RAC113A	RAB308B	RAC845F	RAC245G	RAB767S	RAC968A
								RAB910U		RAB878J	RAA096C	RAB763V	RAB810A	RAC705J	RAA161N
								RAC457D		RAA647R	RAB851L	RAA860F	RAC755H	RAC981D	RAB527B
								RAB950W		RAA377Y	RAB032M	RAA996V	RAB332Y	RAB144M	RAB809G
								RAA223S		RAB516V	RAB591V	RAB485P	RAB732C	RAC845F	RAC245G
										RAC794A	RAC020G	RAB270R	RAA450L	RAB763V	RAB787Y
										RAB453S	RAB252S	RAA629A	RAB322Y	RAB139B	RAC102C
										RAB445S	RAC004I	RAB077R	RAB755H	RAB854S	RAB818L
										RAB294M	GR636C	RAA033A	RAC809G	RAA996X	RAB810A
										RAB442X	RAA432I	RAA996X	RAC638B	RAB485P	RAC755H
											RAC313H	RAC981D	RAB024F	RAB270R	RAB279K
											RAA232H	RAC779G	RAA642T	RAA629A	RAB322Y
											RAA263Z	RAA047N	RAB557B	RAB077R	RAC732C
											RAB560S	RAA630D	RAA579I	RAA033A	RAA450L
												RAB560V	RAB255A	RAB772Z	RAB732C
												RAC202B	RAB032M	UAP550M	RAB561H
												RAA760F		RAA154M	RAC179L
												RAC263I		RAC774L	RAC185C

												RAC424L		RAA725H	RAA096C
												UN152RA		RAC566I	RAB693G
												RAB191H		RAA930P	RAB738B
												RAB624F		RAB516W	RAB775E
												RAA228P		RAC764A	RAB083T
														RAC391I	RAA672Q
														RAB275U	RAC116K
														RAB029K	
														RAC184H	
														RAB662L	
														RAB887G	
														RAB558U	

PARKING SURVEY: ON STREET PARKING

PORTION OF THE ROAD: **KN2 ST**

PARKING SIDES: LEFT AND RIGHT

DATE:

TIME:

10:30		11:00		11:30		12:00	
L.	R.	L.	R.	L.	R.	L.	R.
RAB558U	RAB690N	RAB558U	RAC119H	RAB272Y	RAC119H	RAB191A	RAC119H
RAB272Y	RAC116K	RAB450W	RAA584Y	RAA910X	RAA584Y	RAA910X	RAA584Y
RAB662L	RAA293Y	RAB272Y	RAB960N	RAB662L	RAC116K	RAC929J	RAB960N
RAC184H	RAA588K	RAB191H	RAC116K	RAA263Z	RAB960N	RAC362I	RAC116K
RAB029K	RAC313H	RAA910X	RAA293Y	RAB029K	RAA293Y	RAA482W	RAA293Y
RAC223J	RAC126I	RAB662L	RAB965M	RAB560S	RAB444M	RAB560S	RAB965M
RAC869H	RAA672Q	RAA263Z	RAC313H	RAA065F	RAB965M	RAA056F	RAB229D
RAB275U	RAC196A	RAB029K	RAB851W	RAC869H	RAB229D	RAC869H	RAC867C
RAB930W	RAA004P	RAC223J	RAC196A	RAB594U	RAA311P	RAB594U	RAB851W
RAB952U	RAB093T	RAC869H	RAA004P	RAB930W	RAC643D	RAB930W	RAC196A
RAB294N	RAB067W	RAB594V	RAC161I	RAC616C	RAB851W	GR365C	RAC722D
RAC391I	RAA072T	RAB930W	RAB093T	RAB952U	RAC196A	RAC339H	RAC039F
RAA760F	RAC004I	RAC616C	RAB067W	RAB294N	RAC722D	RAB294N	RAC620B
RAC794A	RAB775E	RAC229D	RAB766R	RAC391I	RAA745X	RAC391T	RAB093T
RAB516V	RAB738B	RAB294N	RAC004I	RAA760F	RAC620B	RAA760F	RAB067W
RAC580J	RAB693G	RAC391I	RAA400U	RAC659G	RAB093T	RAC659G	RAB556R
RAC055B	RAB656K	RAA760F	RAB693G	RAC516V	RAB067W	RAB516V	RAC852E
RAB131W	IT839RD	RAC659G	RAB656K	RAB993N	RAB556R	RAC580J	UN23329
RAB910U	RAC707I	RAB516V	IT839RD	RAC055B	RAC004I	RAC055B	RAA267T
RAA730Q	RAC020G	RAC580J	RAC707I	RAB131W	RAB875R	RAB131W	RAB693G
RAB832Q	RAB591V	RAC055B	RAC020G	RAB910V	RAA168U	RAB910U	RAB656K

PARKING SURVEY: ON STREET PARKING

PORTION OF THE ROAD: KN2 ST

PARKING SIDES: LEFT AND RIGHT

DATE:

TIME:

12:30		13:00		13:30		14:00	
L.	R.	L.	R.	L.	R.	L.	R.
RAB558U	RAC119H	RAB272Y	RAC119H	RAB558U	RAB344N	RAB558U	RAB344N
RAC988C	RAA584Y	RAB191H	RAA584Y	RAB444M	RAA584Y	RAB444M	RAA584Y
UAS266C	RAB960N	RAA910X	RAB960N	RAB272Y	RAB960N	RAB272Y	RAB960N
RAB272Y	RAC116K	RAC929J	RAC116K	RAB005R	RAA792A	RAB474V	RAB243F
RAB191H	RAA587M	RAA321J	RAA263Z	RAA910X	RAA263Z	RAA910X	RAA482W
RAC929J	RAC601J	RAA198J	RAA587M	RAC929J	RAA587N	RAC999J	RAC313H
RAA321J	RAB965M	RAA065F	RAC601J	RAA321J	RAC313H	RAB191H	RAC232L
RAA482W	RAB229D	RAB952U	RAB871W	RAA293Y	RAC232L	RAA293Y	RAB582T
RAB560S	RAC867C	RAB930W	RAB201U	RAA004P	RAB582T	RAB662L	RAC489B
RAA065F	RAB851W	RAB329R	RAB657G	RAC457D	RAA232H	RAA450L	RAB390Q
RAC869H	RAC196A	RAC784H	RAB851W	RAB930W	RAB851W	RAC457D	RAC196A
RAC074I	IT984RC	RAC844J	RAC196A	RAB394C	RAC196A	RAB930W	IT984RC
RAB930W	RAC039F	RAA727V	IT984RC	RAA065F	RAC511E	RAB394C	RAB102B
RAB329R	RAC620B	RAA894F	RAC757D	RAC844J	RAB278E	RAA065F	RAB278F
RAC339H	RAB093T	RAB659G	RAB278F	RAA727V	RAB093T	RAC844J	RAB093T
RAC886H	RAB067W	RAB516V	RAB093T	RAB687X	RAB067W	RAA669U	RAB067W
RAC391I	RAB826C	RAB753V	RAB067W	RAC659G	RAC580T	RAC659G	RAC580J
RAA760F	RAC852E	RAC055B	RAC117I	RAB516V	RAC852E	RAB516V	RAC852E
RAC659G	RAC467B	RAB910U	RAC852E	RAC055B	RAC467B	RAC055B	RAC467B
RAB516V	RAA621X	RAA730Q	RAC467B	RAC369G	RAA621X	RAC369G	RAA621X
RAC580J	RAB656K	RAC265G	RAA621X	RAB910U	RAB656K	RAB910U	RAB656K

RAC647E	RAB032M	RAB131W	RAB591V	RAA730Q	RAB693G	RAA730Q	IT839RD	RAC055B	IT879RD	RAC647I	RAB656K	RAA730Q	IT839RD	RAA730Q	IT839RD
RAA377Y	RAB997S	RAA730Q	RAB032M	RAC647E	RAB656K	RAB832Q	RAC707I	RAB131W	RAC707I	RAA253T	IT839RD	RAC697Q	RAC707I	RAB401K	RAC707I
RAA253I	RAB123E	RAC647E	RAB997S	RAA377Y	IT839RD	RAC647E	RAB609H	RAB910U	RAA967Y	RAB560V	RAC707I	RAA421V	RAB839I	RAC647E	RAB984S
RAB560V	RAA096C	RAB910U	RAB123E	RAA253I	RAC707I	RAA377Y	RAB591V	RAA730Q	RAB780R	RAC545H	RAA967Y	RAA253I	RAC020G	RAA253I	RAC887D
RAC545H	RAB579I	RAA832Q	RAB950C	RAB560V	RAC020G	RAA253I	RAB032M	RAC265G	RAB591V	RAA377Y	RAB839I	RAB560V	RAB032M	RAB560V	RAC020G
RAA372W	RAA725H	RAA377Y	RAB579I	RAB409K	RAB591V	RAB560V	RAB997S	RAC647E	RAB032M	RAB269G	RAC020G	RAC545H	RAB997S	RAC545H	RAB032M
RAA930D	RAB740Y	RAB560V	RAB420V	RAC545H	RAB032M	RAC545H	RAB229I	RAA317Y	RAB997S	RAC417H	RAB032M	RAC468K	RAB345E	RAC468K	RAB997S
RAA647R	RAC190A	RAA340V	RAB740Y	RAA340V	RAB997S	RAC113D	RAA926V	RAA253I	RAB229I	RAA647R	RAB997S	RAB922Z	RAB787W	RAB922Z	RAB345E
RAC256K	RAB480B	RAA941W	RAC190A	RAA941W	RAB169P	RAB144B	RAB579I	RAB560V	RAA926V	RAC256K	RAB787W	RAA647R	RAB579T	RAC714L	RAB787W
RAC566I	RAB696N	RAA930D	RAC680J	RAA930D	RAA926V	RAA930D	UAR992D	RAC545H	RAB579I	RAB664Z	RAB579I	RAC256K	UAR992D	RAA647R	RAB579I
RAB252K	RAB557U	RAA647R	RAB696M	RAC256K	RAB579I	RAA647R	RAB740Y	RAC113A	UAR992D	RAA534B	UAR992D	RAB664Z	RAB390Q	RAC256K	UAR992D
RAC456F	RAB011L	RAC256K	RAB557U	RAC566I	UAR992D	RAC256K	RAC190A	RAB144B	RAB282P	RAC456F	RAB390Q	RAA534B	RAC190A	RAA284X	RAA926V
RAC882J	RAC433B	RAC566I	RAB011L	RAB252K	RAB740Y	RAC566I	RAC680J	RAC417H	RAC190A	RAC882F	RAC190A	RAC456F	RAC680J	RAA534B	RAC190A
RAA811Z	RAA649I	RAC545H	RAC433B	RAC456F	RAC190A	RAC779C	RAB696M	RAA647R	RAC680J	RAA811Z	RAC680J	RAC882J	RAB696N	RAC456F	RAB696N
RAB878T	RAB337T	RAB252K	RAA649I	RAC882J	RAC680J	RAC456F	RAB557U	RAC256K	RAB696M	RAC817G	RAB696M	RAB188Z	RAB557U	RAC882J	RAB557U
RAA672U	RAC572C	RAC456F	RAB537M	RAA647R	RAB696N	RAC882I	RAB011L	RAC566I	RAB557U	RAB878T	RAB557U	RAC817G	RAB011L	RAB188Z	RAB011L
RAC821H	RAA977M	RAC882J	RAC572C	RAC817G	RAB557U	RAA811Z	RAC433B	RAC779C	RAB011L	RAA672U	RAB011L	RAB878T	RAC433B	RAC817G	RAC433B
RAA688E	RAB188Z	RAA811Z	RAA977M	RAB878T	RAB011L	RAC817G	RAA649I	RAC456I	RAC433B	RAC821H	RAC433B	RAA672U	RAB537M	RAB878T	RAB439H
RAA555X	RAB520S	RAB878T	H4773A	RAA672U	RAC433B	RAB878T	RAB537M	RAC882J	RAA284X	RAC439I	RAA284X	RAC821H	RAC572C	RAA672U	RAB165X
RAB221Z	RAB841D	RAA672U	RAB520S	RAC821H	RAA649I	RAC688E	RAC572C	RAA811Z	RAB537M	RAA555X	RAB537M	RAC187D	RAA977M	RAC821H	RAB537M
RAB443P	RAB934H	RAC821H	RAB841D	RAC688E	RAB537M	RAC821H	RAA977M	RAC817G	RAC572C	RAB221Z	RAC572C	RAA555X	RAC840I	RAC576J	RAC572C
RAA412R	RAC185C	RAC688E	RAC286L	RAA555X	RAC572C	RAA672U	UAS926Y	RAB878T	RAA977M	RAC513I	RAA977M	RAB221Z	RAB520S	RAA555X	RAA977M
RAC774C	RAA378X	RAA555X	RAB772Z	RAB221Z	RAA977M	RAA555X	RAB520S	RAA672U	RAB432G	RAA357M	RAB432G	RAC479F	RAC335L	RAB221Z	RAB443P
RAC351G	RAB537A	RAB221Z	RAC185C	RAB443P	RAB520S	RAB221Z	RAA719X	RAC821H	RAB520S	RAA378X	RAB520S	RAA378X	RAB337T	1909AA19	IT637RC
RAB728L	RAB294I	RAB443P	RAA378X	RAA412R	RAB841D	RAB443P	RAA615Z	RAC439I	RAA047N	RAC774C	RAB852Z	RAC774C	RAA252V	RAC479F	RAA457Z
RAA047N	RAB007L	RAA412R	RAB537A	RAB188Z	RAC479F	RAA412R	RAB671G	RAA555X	RAC116F	RAC351G	RAB117Z	RAC351G	RAB537A	RAA378X	RAC335L
RAA595E	GR048D	RAC774C	RAB294I	RAC774C	RAB443U	RAC774C	RAA158N	RAB221Z	RAB671G	RAA268N	RAB337T	RAA268M	RAB294I	RAC774C	RAB337T
RAA154M	RAB429L	RAC351G	RAB007R	RAC351G	RAC185C	RAC351G	RAA378X	RAC513I	RAA158N	RAB383N	RAB771U	RAB383M	RAB007R	RAC351G	RAA219P
RAB383N	RAC179L	RAB520Y	RAB591K	RAB520Y	RAA378X	RAB520Y	RAB537A	RAA412R	RAA378X	RAA595E	RAB109J	RAA595E	RAB084N	RAB614F	RAC335B

RAC138F	RAB304U	RAB383N	RAB429L	RAB383N	RAB537A	RAB383N	RAB294I	RAC774C	RAB537A	RAA756E	RAB537A	RAA756E	RAB057L	RAB383N	RAB537A
RAB917W	RAC638B	RAA595I	RAC179L	RAA595E	RAB294I	RAA395E	RAB007R	RAC351G	RAB294I	RAC638B	RAB294I	RAA615Z	RAC179L	RAA595E	RAB294I
RAC779G	RAA126T	RAA673K	RAB304U	RAB442I	RAA007R	RAB442I	RAB591K	RAB569Y	RAB007R	RAA615Z	RAB007R	RAB186Q	RAB470Z	RAA756E	RAC446H
RAB383Y	RAA243Y	RAA154M	RAC638B	RAA252V	RAB591K	RAA673K	RAB057L	RAA615Z	RAB591K	RAB186Q	RAB684N	RAB917W	RAC446H	RAA615Z	RAB684N
RAC812J	RAC968A	RAC779G	RAA126T	RAA673K	RAB057L	RAB186Q	RAC179C	RAB383N	RAB057L	RAB917W	RAB057L	RAA219P	RAA126T	RAB186Q	RAB057L
RAB885Q	RAB736M	RAB917W	RAA243Y	RAC779G	RAC179L	RAB917W	RAB470Z	RAB750E	RAC179L	RAA219P	RAC179L	RAB942Y	RAA243Y	RAB917W	RAC179L
RAA404P	RAB527B	RAB867Q	RAC968A	RAB917W	RAB678Q	RAB928V	RAC638B	RAB595E	RAB470Z	RAC968B	RAB470Z	RAA064J	RAC968A	RAB851W	RAB470Z
RAB338X	RAB869G	RAC812J	RAA052B	RAB186Q	RAC638B	RAC968B	RAA126T	RAA673K	RAC638B	RAB687X	RAA134L	RAB383Y	RAA052B	RAB569Y	RAB336V
RAB456H	RAC245G	RAC025L	RAB413X	RAC003C	RAA126T	RAB087X	RAA243Y	RAB917W	RAA126T	RAB383Y	RAA126T	RAB885Q	RAB222X	RAC588F	RAA126T
RAB767S	RAB787Y	RAB885Q	RAB527B	RAB687X	RAA243Y	RAC812J	RAC968A	RAC968B	RAA243Y	RAB885Q	RAA243Y	RAA484P	UAK062D	RAB383Y	RAA243Y
RAC705J	RAB684N	RAA484P	RAB809G	RAC812J	RAC968A	RAC885Q	RAA052B	RAB687X	RAC968A	RAA484P	RAC968A	RAB338X	RAB809G	RAB885Q	RAC968A
RAC981D	RAC102C	RAB338X	RAB787Y	RAB484P	RAA052B	RAA484R	RAC566L	RAC812J	RAA052B	RAB338X	RAA052B	RAB456H	RAC245G	RAA484P	RAA052B
RAB144M	RAB818L	RAB456H	RAC245G	RAB338X	RAC566L	RAB338X	RAB410D	RAB885Q	RAC666B	RAB456H	RAC666B	RAA857Z	RAC930J	RAB338X	RAB222X
RAC845F	RAC938I	RAB767S	RAA102Y	RAB456H	RAB527B	RAB456H	RAB809G	RAA484P	RAC460L	RAB375F	UAK062D	RAB500U	RAC868B	RAB456H	UAK062D
RAB763V	RAB810A	RAC705J	RAC938I	RAB073I	RAB809G	RAB073I	RAB787Y	RAB338X	RAB809G	RAB500U	RAB809G	RAB847G	RAB894V	RAC812J	RAB809G
RAC139B	RAC755H	RAC981D	RAB818L	RAB500U	RAB787Y	RAB500U	RAC245G	RAB456H	RAB787Y	RAB847G	RAB787Y	RAB470L	RAB767S	RAB765L	RAC245G
IT487RD	RAB279K	RAA395U	RAB810A	RAC981D	RAC245G	RAB847G	RAA102Y	RAB073F	RAC245G	RAB470L	RAC245G	RAA359U	RAC755H	RAB847G	RAB787Y
RAA996X	RAB322Y	RAA359U	RAC755H	RAA359U	RAA102Y	RAB470L	RAC705J	RAB500U	RAC930J	RAA359U	RAC930J	RAC845F	RAB279K	RAB470L	RAC930J
RAB485B	RAB732C	RAC845F	RAB279K	RAC845F	RAC938I	RAA359U	RAB818L	RAB847G	RAC705J	RAC845I	RAC868B	RAB763V	RAB160X	RAA359U	RAC868B
RAB270R	RAA450L	RAB763V	RAB322Y	RAB763V	RAB818L	RAC845F	RAB767S	RAB470L	RAB818J	RAB763V	RAB053U	RAC705J	RAB322Y	RAC845F	RAC938I
RAA629A	RAB816L	RAB433Q	RAB732C	RAB433Q	RAB810A	RAB763V	RAB810A	RAA359U	RAB767S	RAA523C	RAC755H	RAA523C	RAB732C	RAB763V	RAB767S
RAB077R	RAB809G	RAB914Q	RAA450C	RAB914Q	RAC755H	RAB433Q	RAA755H	RAC845F	RAC938J	RAA996X	RAB279K	RAA996X	RAB787Y	RAC705J	RAC755H
RAA384U	RAB304D	RAA996X	RAB273K	RAA996X	RAB279K	RAA523C	RAB279K	RAB763V	RAC755H	RAB485P	RAB322Y	RAB485P	RAB684N	RAA523C	RAB160X
RAB139B	RAB591K	RAB485B	RAA278F	RAB485P	RAB322Y	RAA996X	RAB322Y	RAB499W	RAB279K	RAB270R	RAB732C	RAB483S	RAB109J	RAA996X	RAB279K
RAB763B	RAB087R	RAB270R	RAA913R	RAB270R	RAB732C	RAA384U	RAC732C	RAA523C	RAB322Y	RAA629A	RAA450L	RAA629A	RAA846P	RAB485P	RAB322Y
RAB767J	RAB772Z	RAA629A	HA4773	RAA629A	RAA450L	RAA033A	RAA450L	RAA996X	RAB732C	RAA033A	RAB648N	RAA033A	RAC443P	RAB977Q	RAB732C
RAA484P	RAB537M	RAC420G	UAR992D	RAA033A	RAC938L	RAA629A	RAB732C	RAB485P	RAA450L	RAA384U	RAA252V	RAA384U	RAB165X	RAA629A	RAA055B
RAC812L	RAC680G	RAA384U	CA8502	RAA384U	RAA102L	RAB270R	RAC755H	RAB270R	RAC938I	RAC489B	RAB417I	RAC489B	RAB439H	RAA033A	RAB537D
RAC138I	RAB420V	RAC928I	RAA632M	RAA484P	RAC243G	RAB485P	RAB709G	RAA629A	RAB818L	RAB659S	RAB345E	RAB383N	RAC680N	RAA236R	RAC539J

RAB595E	RAB950C	RAB073F	RAA168U	RAC908B	RAB007R	RAA847G	RAC179L	RAA384U	RAC392H	RAB845F	RAA580L	1909AA19	RAB579I	RAB763J	RAA997M
RAC824G	RAA591V	RAB186Q	RAB556R	RAA073K	RAB479F	RAA484P	RAB294L	RAA033A	RAB294L	RAA359V	RAC707L	GP866A	RAC183B	RAB379M	RAC004I
RAC688E	RAB654K	RAB797W	RAC620B	RAA525E	UAS926Y	RAB885Q	RAB432G	RAC712K	RAB109J	RAB942Y	IT879RD	RAB782R	RAC580J	RAA154M	RAA126V
RAB778T	RAA400V	RAA252V	RAA745X	RAB222Z	RAB229I	RAB687X	RAB282P	RAB222V	RAB852Z	RAC479F	RAA232H	RAC714L	IT984RC	RAB641I	RAB979I
RAC802J	RAB096T	RAB442I	RAC722D	RAA811Z	RAC563D	RAA615Z	RAB390Q	RAB186Q	RAB390Q	RAA792A	RAB105P	RAC647F	RAA482W	RAB387Y	RAB381L
RAA630D	RAC161I	RAA595E	RAA311P	RAC779C	RAC852E	RAC444G	RAB826C	RAA756E	RAB787W	RAB188Z	RAC232L	UAP617G	RAB243F	RAB626I	RAC852C
RAA372M	RAA851W	RAA443P	RAB651E	RAC113A	RAC039F	RAA595E	IT984RC	RAA595E	RAB839I	RAC882J	RAC313H	RAA669U		RAC991D	RAB102D
RAA253F	RAB126T	RAA456F		RAB144B	RAC867C	RAB569Y	RAC601J	RAA378X	IT839RD	RAB922Z	RAA690M	RAA065J		RAC647F	RAA669U
RAB516W	RAB965M	RAB409K		RAB832Q	RAC119H	RAC897G		RAC430I	RAC117L	RAC468K	RAB344N	RAB394J		RAB131W	
RAC659G	RAB960N	RAA253I		RAA910U		RAC417H		RAC456F	RAB278F	RAA253I	RAA792A	RAA450L		RAC929J	
RAC616C	RAA584Y	RAC664E		RAC580I		RAC113A		RAA534B	RAC757D	RAA425V		RAB749J			
RAB594U	RAC119H	RAB832Q		RAC339H		RAC391I		RAA551N	RAB871W	RAC647E		RAB191H			
IT675RB	RAA228P	RAB993N		GR365C		RAA065I		20CD04R	RAA263Z	GR674C		RAB474N			
RAA910X	IT675RB	RAB229D		RAB594V		RAA910K		RAB560D	RAC960N	RAB910V					
RAB191H		RAA065F		RAA482W		RAB191H		RAA377Y	RAB105P	RAC369G					
RAB450W		RAB560S		RAC362I		RAB272Y		RAA055B		RAB516W					
RAA263Z		RAB624F		RAB560N		UAS266C		RAB753V		RAB394L					
				RAC255G		RAC988C		RAA727U		GP934A					
				RAC580J		RAB558U		RAC844J		RAA293Y					
				RAB516V				RAC784H		RAB022F					
								BUB7605A		RAB444M					
								RAB952U		RAB558U					
								RAA910X							

PARKING SURVEY: ON STREET PARKING

PORTION OF THE ROAD: KN2 ST

PARKING SIDES: LEFT AND RIGHT

DATE:

TIME:

14:30		15:00		15:30		16:00	
L.	R.	L.	R.	L.	R.	L.	R.
RAB558U	RAB344N	RAB558U	RAB775E	RAA910X	RAA584Y	RAA910X	RAA584Y
RAB444M	RAA584Y	RAA910X	RAA584Y	RAB272Y	RAA707R	RAB272Y	RAB960N
RAB272Y	RAB960N	RAB272Y	RAB960N	RAB934H	RAA146Q	RAB934H	RAA146Q
RAA228P	RAB438T	RAC127C	RAB438T	RAB549H	RAC263I	RAB549H	RAB555Q
RAA910X	RAA482T	RAC929J	RAA482W	RAB929J	RAA669Y	RAB929J	RAA482W
RAC929J	RAC313H	RAB965S	RAC313H	RAB965S	RAC196A	RAB960N	RAC313H
RAA293Y	RAC232L	RAB377K	RAC232L	RAB662L	IT986RC	RAA293Y	RAB582T
RAB662J	RAB582T	RAA293Y	RAB582T	RAA293Y	RAB041H	RAB229D	RAC565F
RAB687X	RAC489B	RAA229D	RAA913H	RAB229D	RAB278F	RAA760F	RAA669U
RAC457D	RAA669U	RAA760F	RAA669U	RAA760F	RAB093T	RAC457D	RAC196A
RAB920W	RAC196A	RAC457D	RAC192A	RAC457D	RAB067W	RAB771U	IT984RC
RAA065F	IT984RC	RAA004P	IT984RC	RAB771U	RAC523K	RAC794A	RAB811L
RAA223S	RAB102D	RAA065F	RAC281G	RAC764A	RAC852E	RAA065F	RAB278I
RAB953U	RAB278F	RAB932Q	RAB278I	RAA065F	RAC703J	RAB932Q	RAB093T
RAC659G	RAB093T	RAC089G	RAB093T	RAB932Q	RAA621X	RAB286Z	RAB067W
RAB516V	RAB067W	RAB569T	RAB067W	RAB286Z	RAB656K	RAC620B	GR022A
RAB131W	RAC580J	RAB516V	RAC580J	IT385RD	IT839RD	RAB516V	RAC852E
RAC055B	RAC852E	RAB131W	RAC852E	RAB516V	RAC707I	RAB131W	RAB272U
RAC369G	RAB381L	RAC055B	RAC423B	RAB131W	RAA930D	RAC055B	RAA621X
RAB910U	RAA621X	RAC369G	RAA621X	RAC055B	RAB848R	RAB520S	RAB656A
RAA730Q	RAB656K	RAB910U	RAB656K	RAB520S	RAC022G	RAB910U	IT839RD
RAC647E	IT839RD	RAA730Q	IT839RD	RAB910U	RAB032M	RAA730Q	RAC707I

PARKING SURVEY: ON STREET PARKING

PORTION OF THE ROAD: KN2 ST

PARKING SIDES: LEFT AND RIGHT

DATE:

TIME:

16:30		17:00		17:30		18:00	
L.	R.	L.	R.	L.	R.	L.	R.
RAA910X	RAB960N	RAB624F	RAA584Y	RAA910X	RAA263Z	RAA910X	RAC643H
RAB272Y	RAB482W	RAA910X	RAA557Q	RAB272Y	RAB960N	RAB972G	RAB960N
RAB009N	RAC313H	RAB272Y	RAA263Z	RAB480Z	RAC424F	RAA101A	RAC424F
RAC929J	RAC263I	RAB009N	RAB960N	RAB662L	RAC313H	RAB662L	RAC313H
RAC675G	RAC576H	RAB599N	RAA482W	RAA377Y	RAC164D	RAA377Y	RAA263Z
RAB975M	RAA669U	RAB544U	RAC313H	RAC029L	RAA293Y	RAB105P	RAA482W
RAA293Y	RAC196A	IT817RD	RAB089R	IT817RD	RAC233J	IT817RD	RAB282K
RAB229D	RAC004B	RAB229D	RAB844J	RAB934H	RAA669U	RAB934H	RAC196A
RAA760F	RAB266D	RAA760F	RAC712A	RAC457D	RAC196A	RAA760F	RAA004P
RAC457D	RAB278I	RAC457D	RAA667U	RAA760F	RAA004P	RAC457D	RAC502I
RAB771U	RAB093T	RAB771U	RAC196A	RAB771U	RAA695B	RAB771U	RAB278F
RAC844J	RAB067W	RAC844J	RAA004P	RAC319I	RAB278F	RAC742G	RAB093T
RAA065F	RAC523K	RAA065F	RAB266T	RAA065F	RAB093T	RAA065F	RAB067W
RAB932Q	RAC852E	RAB932Q	RAB278F	RAB932Q	RAB067W	RAB834G	RAB977Q
RAB286Z	RAA646K	RAB286Z	RAB093T	RAC580J	RAB523K	RAC580J	RAC852E
RAC620B	RAA621X	RAC620B	RAB067W	RAC620B	RAC852E	RAC620B	RAC967C
RAB516V	RAB656K	RAB516V	RAB523K	RAB516V	RAC967C	RAB033A	RAA621X
RAB113W	IT839RD	RAB113W	RAC852E	RAB113W	RAA621X	RAB131W	RAB656K
RAC055B	RAC707I	RAC055B	RAA646K	RAC055B	RAB656K	RAB997S	IT839RD
RAB520S	RAA930D	RAB520S	RAA621X	RAB520S	IT839RD	RAB520S	RAA130D
RAB910U	RAA727V	RAB910U	RAB656K	RAB910U	RAC707I	RAB910U	RAA113A
RAA730Q	RAC020G	RAB548Y	IT839RD	RAB548Y	RAA930D	RAB229I	RAC020G

RAB252S	RAC707I	RAA072T	RAC707I	RAA730Q	RAA325V	RAA072T	RAA930D	RAA072T	RAB032M	RAA072T	RAC707I	RAA072T	RAC113A	RAC647E	RAA236N
RAA253I	RAC530L	RAC647E	RAC887D	RAA072T	RAB056W	RAC647E	RAC887D	RAC647E	RAB084T	RAC647E	RAA930D	RAC647E	RAC020G	RAA609M	RAB869D
RAB560V	RAC887D	RAB193M	RAC020G	RAC647E	RAB878W	RAC580J	RAC020G	RAC580J	RAB444M	RAA609M	RAC113A	RAA609M	RAB032M	RAA253I	UAR992D
RAC545H	RAC020G	RAA253I	RAB032M	RAB193M	RAA683H	RAA253I	UAR992D	RAA253I	RAB978F	RAA253I	RAC020G	RAA253I	RAC038B	RAB560V	RAC539J
RAB922L	RAB032M	RAB560V	RAB797S	RAA253I	RAB787W	RAB560V	RAC190A	RAB560V	UAR992D	RAB560V	RAB032M	RAB560V	RAB065B	RAC817M	RAC190A
RAA909Y	RAB997S	RAC545H	RAB623C	RAB560V	RAB579I	RAB546Z	RAB315W	RAA548R	RAC539J	RAC601J	RAC038B	RAC601J	RAB344N	RAB811V	RAC904K
RAA647R	RAB623C	RAB575K	RAB787W	RAC545H	UAR992D	RAC952I	RAB696N	RAB504S	RAC190A	RAC840I	RAB103X	RAC902G	UAR992D	RAC545H	RAB696N
RAC256K	RAB787W	RAB922Z	RAB579I	RAC952I	RAB391Q	RAB922Z	RAB557U	RAA068R	RAB315W	RAB945X	RAB978I	RAB945X	RAC539J	RAC444B	RAB557U
RAA534B	RAB597I	B6837A	UAR992D	RAB922Z	RAC190A	B6837A	RAB011L	RAB922Z	RAB696N	RAB922Z	UAR992D	RAB922Z	RAC190A	RAB852Z	RAB011L
RAC456F	UAR992D	RAA596Y	RAA762X	B6837A	RAB315W	RAA004P	RAC433B	B6837A	RAB557U	RAC444B	RAC539J	RAC444B	RAC904K	RAA539Z	RAC125B
RAC882J	RAA926V	RAC256K	RAC190A	RAA596Y	RAB696N	RAC256K	RAB439H	RAB852Z	RAB011L	RAB852Z	RAC190A	RAB852Z	RAB696N	RAC833H	RAC661D
RAB188Z	RAC190A	RAB392Y	RAB641I	RAC256K	RAB557U	RAB392Y	RAB945R	RAC256K	RAC433B	RAC794A	RAC847H	RAC794A	RAB557U	RAB252K	RAB945R
RAC817G	RAC992C	RAA534B	RAB696N	RAB392Y	RAB011L	RAA534B	RAB537M	RAC902J	RAB439H	RAB791Z	RAB696N	RAB791Z	RAB011L	RAA936Z	RAB537M
RAB878T	RAB696N	RAC456F	RAB557U	RAA534B	RAC433B	RAC456F	RAC572C	RAC456J	RAB945L	RAB252K	RAB557U	RAB252K	RAC125B	RAC180E	RAC165A
RAA672U	RAB557U	RAC882J	RAB011L	RAC456F	RAB439H	RAC882J	RAA977M	RAA719K	RAB537M	RAC456F	RAB011L	RAA936Z	RAB945R	RAA188Z	RAA977M
RAC821H	RAB011L	RAB188Z	RAC433B	RAC882J	RAA580M	RAB188Z	RAB443P	RAB188Z	RAC572C	RAA719K	RAC433B	RAA719K	RAB537M	RAB853E	RAB443P
RAB387Y	RAC433B	RAB853E	RAB439H	RAB188Z	RAB537M	RAB853E	RAB410D	RAB853E	RAA977M	RAB188Z	RAB439H	RAB188Z	RAC165A	RAB878T	RAB322U
RAA555X	RAB439H	RAB878T	RAA537M	RAB853E	RAC572L	RAB878T	RAC277I	RAB878T	RAB443P	RAB853E	RAB945R	RAB853E	RAA977M	RAA672U	RAC254E
RAB221Z	RAB165X	RAA672U	RAC572C	RAB878T	RAA977M	RAA672U	RAB909D	RAA672U	RAB300N	RAB878T	RAB537M	RAB878T	RAB443P	RAC821H	RAA599C
1909AA19	RAB537M	RAC821H	RAA977M	RAA672U	RAB443P	RAC821H	RAB337T	RAC821H	RAB579I	RAA672U	RAC483B	RAA672U	RAC254E	RAB387Y	RAC994C
RAC479F	RAC572C	RAB387Y	RAB443P	RAC821H	IT637RC	RAB387Y	RAC940I	RAB387Y	RAB909D	RAC821H	RAA977M	RAC821H	RAC994C	RAA555X	RAB337T
RAA378X	RAA977M	RAA555X	IT637RC	RAB387Y	RAC277I	RAA555X	RAC295D	RAA555X	RAB337T	RAB387Y	RAB443P	RAB387Y	RAB337T	RAB221Z	RAA378X
RAC774C	RAB443P	RAB221Z	RAC277I	RAA555X	RAC539J	RAB221Z	RAB537A	RAB221Z	RAC940I	RAA555X	RAB300N	RAA555X	RAB069Q	9127AB19	RAB449D
RAC351G	IT637RC	RAC335H	RAC539J	RAB221Z	RAB337T	RAC704G	RAB294I	RAC704G	RAA211H	RAB221Z	RAB579I	RAB221Z	RAB449D	RAB182W	RAB537A
RAA673K	RAC539J	RAC601J	RAB337T	RAC335H	RAA219P	RAC166H	RAC239E	RAC166H	RAB537A	RAC704G	RAB909D	9127AB19	RAB537A	RAA604Z	RAB294I
RAB383M	RAB337T	RAA378X	RAA219P	RAC601J	RAC295D	RAA378X	RAA756E	RAA378X	RAB294I	RAA378X	RAB337D	RAB182W	RAB294I	RAC774C	RAB057L
RAA154M	RAA219P	RAC774C	RAC335P	RAA378X	RAB537A	RAC774C	RAC138F	RAC774C	RAB960U	RAC774C	RAC633I	RAA604Z	RAB057L	RAC521G	RAA268N
RAA756E	RAC335P	RAC351G	RAB537A	RAC774C	RAB294I	RAC351G	RAC179L	RAC351G	RAC239E	RAC351G	RAC239E	RAC774C	RAB589H	RAC276G	RAA051V
RAA615Z	RAB537A	RAA673K	RAB294I	RAC351G	RAB728L	RAA673K	RAB470Z	RAA673K	RAA756E	RAA673K	RAB537A	RAC351G	RAC446H	RAA673K	RAB470Y

RAB442I	RAB294I	RAB383M	RAC239E	RAA673K	RAC239E	RAB383M	RAB343P	RAB383M	RAC138F	RAB442I	RAB294I	RAC276G	RAA051V	RAB723L	RAC921J
RAB917W	RAC446H	RAA154M	RAB186Q	RAB383M	RAC138F	RAA219P	RAA243Y	RAA615Z	RAB270K	RAC725A	RAB057L	RAC810E	RAB470Z	RAB768L	RAB591K
RAB693T	RAB186Q	RAA756E	RAC138F	RAA154M	RAC179L	RAC725A	RAC968A	RAC725A	RAB470Z	RAA252V	RAB600X	RAA673K	RAA622G	RAB917W	RAA243Y
RAB569Y	RAB057L	RAA615Z	RAC179L	RAC725A	RAB470Z	RAA252V	RAA052B	RAC252V	RAC781K	RAB186Q	RAA051V	RAB007R	RAC502I	RAB873G	RAA052B
RAB772Z	RAC179L	RAA252V	RAB470Z	RAA474R	RAB007R	RAB186Q	RAA222X	RAB186Q	RAC848F	RAB917W	RAB470Z	RAA219P	RAB591K	RAB569Y	RAB222X
RAB383Y	RAB470Z	RAB217W	RAA461C	RAA252V	RAC927B	RAB917W	UAK062D	RAB917W	RAA243Y	RAC882J	RAA126T	RAB917W	RAA243Y	RAC666B	UAK062D
RAB885Q	RAA561C	RAB693T	RAC968A	RAB186Q	RAA243Y	RAB470W	RAB809G	RAB332X	RAC968A	RAB569Y	RAB591K	RAB873G	RAC968A	RAB383Y	RAB809G
RAA484P	RAA126T	RAB569Y	RAA243Y	RAB917W	RAC968A	RAB569Y	RAC245G	RAB569Y	RAA052B	RAC666B	RAA243Y	RAB569Y	RAA052B	RAB885Q	RAB787Y
GR304C	RAA243Y	RAB772Z	RAA052B	RAB693T	RAA052B	RAC666B	RAB787Y	RAC666B	RAB222X	RAB383Y	RAC968A	RAC666B	RAB222X	RAA484P	RAB679Z
RAB456H	RAC968A	RAB383Y	RAB222X	RAB569Y	RAB222X	RAB383X	RAC930J	RAB383X	UAK062D	RAB885Q	RAA052B	RAB383Y	UAK062D	RAA236R	RAA306Q
RAC812J	RAA052B	RAB885Q	UAK062D	RAB634P	UAK062D	RAB885Q	RAB671G	RAB885Q	RAB809G	RAA484P	RAB222X	RAB885Q	RAB809G	RAA244L	RAB624D
RAB765L	RAB222X	RAA484P	RAB809G	RAB383Y	RAB809G	RAA484P	RAC741B	RAA484P	RAC245G	RAA236R	RAB809G	RAA484P	RAB158B	RAC812J	RAB767S
RAB847G	UAK062K	RAB338X	RAC245G	RAB885Q	RAC245G	RAC812J	RAB767S	RAA244L	RAB787Y	RAA244L	RAC245G	RAA236R	RAB787Y	RAC705J	RAC755H
RAA102Y	RAB839G	RAB456H	RAC930J	RAA484P	RAB787Y	RAB683M	RAA450L	RAC812L	RAC930J	RAC812J	RAB787Y	RAA244L	RAB930J	RAA573X	RAC265J
RAA359U	RAC245G	RAC812J	RAB787Y	RAB338X	RAC930J	RAC938I	RAC755H	RAC705Y	RAB353Z	RAC705J	RAC930J	RAC812J	RAB338X	RAB797C	RAB322Y
RAC845F	RAB787Y	RAB765L	RAC868B	RAB456H	RAC868B	RAA102Y	RAB686X	RAB863Q	RAC741B	RAA573X	RAB611W	RAC705J	RAA767S	RAC845F	RAB732C
RAB763V	RAC930J	RAB847G	RAC938I	RAC812J	RAB660G	RAB684N	RAB322Y	RAA102Y	RAB767S	RAA102Y	RAA867Z	RAA573X	KBS729W	RAB763V	RAC264J
RAC705J	RAC868B	RAA102Y	RAB767S	RAB765L	RAB767S	RAC845F	RAB732C	RAB684N	RAA450L	RAB684N	RAB767S	RAA102Y	RAC755H	RAB592Z	RAC968A
RAA523C	RAC938I	RAA359U	RAA147V	RAB847G	RAA450L	RAB763V	RAA950V	RAC845F	RAA755H	RAC845F	KBS729W	RAA477M	RAA305W	RAA068D	RAB915J
RAA996X	RAB767S	RAC845F	IT996RC	RAA102Y	RAB792X	RAB801X	RAC760F	RAB763V	RAA686X	RAB763V	RAC755H	RAC845F	RAB830W	RAA996X	RAB470Z
RAB485P	RAC755H	RAB763V	RAB160X	RAB684N	RAB322Y	RAA523C	RAB222X	RAB268H	RAA075A	GR245D	RAB888D	RAB763V	RAC747I	RAB485P	RAB579L
RAB977Q	RAB160X	RAB242S	RAC591X	RAC845F	RAB732C	RAA996V	RAB325X	RAA523C	RAB732C	RAB753V	RAB372C	RAC922B	GR353C	RAA161V	RAB537H
RAA629A	RAB591K	RAA523C	RAB522Y	RAB763V	RAA950V	RAB485P	RAB579I	RAA996V	RAB322Y	RAA996V	RAB732C	RAB753V	RAC747J	RAA545V	UAK992D
RAA983M	RAB322Y	RAA996X	RAB732C	RAB801X	RAB889G	RAA083L	RAB300N	RAB485P	RAB783Z	RAB485P	RAB322Y	RAA996X	RAB322Y	RAA927T	RAB722C
RAA227N	RAB732C	RAB485P	RAC522Y	RAA523C	RAC546A	RAB818L	RAB977M	RAA883L	RAC760F	RAC938I	RAC760I	RAB485P	RAB767S	UN476RA	RAB032M
RAC991K	RAB673K	RAB977Q	RAB591X	RAA996X	RAA595E	RAA373M	RAB537N	RAB812L	RAB787Z	RAB818L	UAK062D	RAC938F	RAB624D	RAA427T	RAC209E
RAA933M	RAB809G	RAA629A	RAC138I	RAB485P	RAC572C	RAA427T	RAC556I	RAA373M	RAA767S	RAA945N	RAA222X	RAB818L	RAC930J	RAB796D	RAC113A
RAC843F	UAK062D	RAA530A	RAB728L	RAA629A	RAB945R	A8758A	RAC744D	RAA427T	RAB591X	RAA427T	RAC446H	RAA545V	RAB204M	RAA068P	RAA930D
RAB383N	RAA245Y	RAA427T	RAB242F	RAA373M	RAA394K	RAA996X	RAB056W	RAC967C	RAC270K	RAC967C	RAC176H	RAA427T	RAA268N	RAB847Q	RAC707I

RAB853E	RAC138F	RAC705J	IT637C	RAA427T	IT025RA	RAC523C	RAB084T	RAB818L	RAC470Z	RAC938F	RAB007R	UN476RA	IT744RD	RAA618K	RAA086W
RAB392Y	RAC335B	RAC523C	RAB537M	RAA083L	RAC020G	RAB938I	RAB032M	RAA083L	RAC779G	RAA996X	RAB728L	RAA781Y	RAA378X	RAA236Z	RAA852E
RAA596Y	RAC277I	RAB763W	RAB057L	RAC523C	RAB621X	RAA244L	RAB848R	RAB684M	RAB057L	RAC994C	RAB337T	RAB728C	RAC254I	RAB007R	RAB631Z
RAB922Z	RAB579I	RAB917W	RAB315W	RAB470W	IT984RC	RAB338X	RAB656K	RAC812J	RAC633I	RAC810E	RAC994C	RAB888D	RAB869D	RAC888G	UAK070W
UAP200M	RAB023C	RAB383N	RAC579K	RAA747R	RAA669U	RAB383Y	RAA646K	RAA236R	RAB899H	RAC145J	RAC438B	RAA539Z	RAA236N	RAB185S	RAA669U
RAB639M	RAB887D	RAC952I	RAB997S	RAB383N	RAC313H	RAB383N	RAC523A	RAA484D	RAB945R	RAB182V	RAC904K	RAB811V	RAB032A	RAC572C	RAC762K
RAA072T	RAA369R	RAB520S	RAB887D	RAC704G	RAA482W	RAA719K	RAB266T	RAB383Y	RAB103X	RAA595I	RAB344N	RAB131W	RAB977Q	RAB188Z	RAA584Y
RAC089G	RAB659K	IT385RD	RAA930D	RAA004P	RAC046A	RAC902I	RAC004B	RAC882J	RAC038B	RAB741Z	RAB065B	RAB033A	RAA482W	RAB571Y	RAA231F
RAB932Q	RAB775E	RAB286Z	RAB272U	RAC794A		RAB392J	RAC576H	RAA252V	RAC113A	RAB131W	RAA967C	RAB620B	RAC643I	RAB389I	RAA138F
RAA004P	RAA482W	RAC794A	RAB278F	RAA700Q		RAB201T	RAC263I	RAB383N	RAB266T	RAB620B	RAC523K	RAC590L	RAA584Y	RAB160P	
RAC717I		RAB771U	RAB811L	RAB960N		RAC844J		RAC456F	RAA004P	RAC319I	RAA669U	RAC742G		RAC817E	
RAB377K		RAB229D	RAC196A	RAC929J		RAB975M		RAB252K	RAC712A	RAC029L	RAC233J	RAB105P		RAA077Y	
		RAB662L	RAC565F	RAC053J		RAC929J		RAC353G	RAC844J	RAA377Y	RAA293Y	RAB480L		RAA671G	
		RAB549H	RAB693G			RAA670K		RAB995X	RAA482W	RAB662L	RAC424I	RAB972G		RAC008A	
		RAB934H	RAB555Q					RAC601J	RAA960N	RAB480Z				RAA833C	
			RAA146Q					RAC735H	RAA263Z	RAB910X				RAB016F	
			RAC086A					RAB131W	RAA557Q					RAB253E	
								IT817RD	RAA584Y					RAB447H	
								RAB594U	GR845C					RAB972Q	
								RAB599W							
								RAB624F							

PARKING SURVEY: ON STREET PARKING

PORTION OF THE ROAD: KN2 ST

PARKING SIDES: LEFT AND RIGHT

DATE:

TIME:

18:30		19:00		19:30		20:00	
L.	R.	L.	R.	L.	R.	L.	R.
RAA910X	RAA231F	RAB972G	RAA928E	RAA482W	RAA584Y	RAA482W	RAA584Y
RAB965P	RAA584Y	RAB447H	RAB960N	RAB972G	RAA928T	RAB972G	RAA928T
RAB662L	RAA669U	UAS775A	RAC424F	RAB447H	RAB960N	RAB272Y	RAB960N
RAA377Y	RAC424F	RAA377Y	RAC313H	RAB272Y	RAC424F	RAA377Y	RAC424F
IT817RD	RAC313H	RAB558Y	RAA232H	RAB662I	RAC313H	RAA760F	RAC313H
RAB934H	RAA263Z	RAB934H	RAA293Y	RAA377Y	RAB876M	RAB356Y	RAB891D
RAA760E	UAR070A	RAA760F	RAB282K	RAB623K	RAA293Y	RAB771U	RAA293Y
RAC457D	RAB282K	RAC457D	RAC196A	RAC394B	RAC196A	RAC742G	RAC869H
RAA771U	RAC196A	RAB771U	RAA606M	RAA760F	RAA609M	RAA065F	RAC196A
RAC742G	RAA004P	RAC742G	RAB749Y	RAB771U	RAB749Y	RAB311S	RAC198F
RAA065F	RAB502I	RAA065F	RAB278F	RAC742G	RAB067Y	RAC794A	RAB389G
RAB834G	RAB278F	RAA312G	RAB093T	RAA065F	RAB930W	RAB977S	RAB067Y
RAC620B	RAB093T	RAB616S	RAB067W	RAB311S	RAB656K	RAB910U	RAB930W
RAB616D	RAB067W	RAB997S	RAB930W	RAA941W	IT839RD	RAC580J	IT839RD
RAB131W	RAC129E	RAB910U	RAB261M	RAB997S	RAA910E	RAC676F	RAC182G
RAB997S	RAB356T	RAA611U	RAA621X	RAB910U	RAA930D	RAB267L	RAB409P
RAB910U	RAA621X	RAC647E	RAB656K	RAC676G	RAB709U	RAA253I	RAB409U
RAA611U	RAB656K	RAC004I	IT839RD	RAC004I	RAB380P	RAB558U	RAB032M
RAC647E	IT839RD	RAA253I	RAC533D	RAA253I	RAB032M	RAC451F	RAB722C
RAA253I	RAA930D	RAC579K	RAA930D	RAB558U	RAB722C	RAB191B	RAC501F
RAB560U	RAB709U	RAC451F	RAB809U	RAC794A	RAA236N	RAB852Z	RAB344N
RAC579K	RAB032M	RAA198J	RAB032M	RAC451F	UAR992D	RAC817G	RAB363X

PARKING SURVEY: ON STREET PARKING

PORTION OF THE ROAD: KN2 ST

PARKING SIDES: LEFT AND RIGHT

DATE:

TIME:

20:30		21:00		21:30	
L.	R.	L.	R.	L.	R.
RAA482W	RAA584Y	RAB447H	RAA584Y		
RAB272Y	RAA928T	RAA480I	RAB960N		
RAA377Y	RAB485C	RAB272Y	RAC313H		
RAB769Z	RAB960N	RAB585Y	RAA482W		
RAB585Y	RAC424F	RAA065F	RAA293Y		
RAA760I	RAC313H	RAC887D	RAC869H		
RAA065F	RAB891D	RAB558U	RAC508B		
RAB311S	RAA293Y	RAB833H	RAC196A		
RAB997S	RAC869H	RAB344N	RAC278B		
RAB910U	RAC196A	RAB188Z	RAB067W		
RAC676G	RAA198F	RAB185S	RAB930W		
RAC864C	RAB067Y	RAA672U	IT839RD		
RAB558U	RAB930W	RAC821H	RAB409P		
RAC451F	IT839RD	F3546A	RAB579I		
RAB387P	RAB032M	RAA199A	RAB206K		
RAC833H	RAB579I	RAC572C	RAB557U		
RAB344N	RAB206K	RAA621H	RAB696N		
RAA093J	RAB557U	RAC138F	RAA072T		
RAB188Z	RAB696N	RAB626X	RAA493U		
RAB185S	RAA072T	RAC833H	RAC125B		
RAB215A	RAA493U		RAB693T		
RAA672U	RAC125B		RAA211H		

RAB160P	RAB222C	RAB852Z	RAB722C	RAB852Z	RAC539J	RAC833H	RAB206K	RAC821H	RAB693T		RAC165A		
RAC451E	RAA236N	RAA236Y	RAA236N	RAC833H	RAC190A	RAA093J	RAB696N	RAA555X	RAC165A		RAA977M		
RAC545H	UAR992D	RAC833H	UAR992D	RAB252K	RAB629G	RAC142D	RAA072T	RAC572C	RAA977M		RAB443P		
RAB852Z	RAC539J	RAB252K	RAC539J	RAB740Y	RAB696N	RAB188Z	RAA493U	RAA621H	RAB443P		UAR992D		
RAA236V	RAC190A	RAB448D	RAC190A	RAC142D	RAA072T	RAB185S	RAC125B	RAA848X	UAR992D		RAC677G		
RAC833H	RAB696N	RAB188Z	RAB629G	RAB188Z	RAA493U	RAA672U	RAC647I	RAA632M	RAC677G		RAB337T		
RAB252K	RAB480D	RAB614G	RAB696N	RAB878J	RAC125B	RAC821H	RAC165A	RAA105M	RAB337T		RAB465H		
RAC180E	RAB011L	RAB878T	RAA072T	RAA672U	RAC944C	RAC008A	RAA977M	RAC138F	RAB465H		RAB294I		
RAB188Z	RAC125B	RAA672U	RAB011L	RAC821H	RAC165A	RAA555X	RAB443P	RAA756B	RAB294I		RAB007R		
RAA578E	RAC944C	RAC821H	RAC125B	RAC008A	RAA977M	RAA221Z	RAC677G	RAA728L	RAA219P		RAA219P		
RAB878T	RAB537M	RAB387Y	RAC944C	RAA555X	RAB443P	RAC572L	RAB337T	RAA852V	RAC515L		RAA052B		
RAA672U	RAC165A	RAA555X	RAB847Q	RAB221Z	RAC677G	RAA621H	RAC046D	RAB186Q	RAA052B		RAC264J		
RAC821H	RAA977M	RAB221Z	RAC165A	RAC572L	RAB337T	RAA848X	RAB465H	RAB728L	RAC986F		RAB558U		
RAB387V	RAB443P	RAC572C	RAA977M	RAA621H	RAA378X	RAA959M	RAA268N	RAC756B	RAC264J		RAC116K		
RAA555X	RAB322U	RAB209C	RAB443P	RAA848X	RAA268N	RAA105M	RAB294I	RAC913B	RAB007R				
RAB221Z	RAC254E	RAA848X	RAB322U	RAA959M	RAB294I	RAC138F	RAA219P	RAB779Z	RAC156A				
RAC572C	RAA102J	RAA959N	RAA102J	RAA105M	RAB057L	RAA673K	RAC968A		RAB409P				
RAB185S	RAC994C	RAA589Y	RAC994C	RAC138F	RAC968A	RAA728K	RAA052B		RAB151V				
RAC888G	RAB337T	RAC138F	RAB337T	RAA673K	RAA052B	RAA252V	RAB818L		RAB067W				
RAA959N	RAA378X	RAA673K	RAA378X	RAB728L	RAB809G	RAB186Q	RAC755H		RAC198F				
RAC276G	RAB449D	RAB442I	RAB449D	RAA252V	RAB787Y	RAA756E	RAC986F		RAA482W				
RAA673K	RAB537A	RAB426S	RAB294I	RAB186Q	RAB679Z	RAA666B	RAC264J		RAC849D				
RAB728L	RAB294F	RAB917W	RAB057L	RAB873G	GR227D	RAC912C	RAA710P		RAB311S				
RAA268N	RAB057L	RAB873G	RAB470Z	RAB518S	RAB353Q	RAC527I	UAR992D		RAC116K				
RAB442I	RAA051V	RAA412L	RAC977E	RAA666B	RAC755H	RAA573X	RAB693T						
RAB078M	RAB470Z	RAC666B	RAC968A	RAB383Y	RAC986F	RAB144M	RAB557U						
RAB917W	RAC977E	RAB383Y	RAA052B	RAC812J	RAC264J	RAA545V	RAB595A						
RAB873G	RAC883B	RAB885Q	UAK062D	RAA102Y	RAC647F	RAB912Q	RAA344N						
RAB569Y	RAB261M	RAC812J	RAB809G	RAA573X	RAB629Q	RAC666B	RAA730X						

RAC666B	RAC968A	RAA102J	RAB787Y	RAB470Z	RAA730D	RAB673K	RAA384K						
RAB383Y	RAA052B	RAA573X	RAB679Z	RAB997J	RAC182G	RAB221Z	RAB656E						
RAB885Q	RAB222X	RAB763V	RAA618K	RAA629A	RAC887D	RAB215A	RAB067W						
RAA484P	UAK062D	RAB305Y	RAB353Q	RAA545V	RAB067W	RAB344M							
RAA236R	RAB809G	RAB144M	RAB767S	RAA997J	RAC809H	RAC676G							
RAC021K	RAB787Y	RAB485P	RAC653F	RAC666B	RAA910X	RAB810U							
RAC812Y	RAB679Z	RAA629A	RAC755H	RAA518S		RAB997S							
RAA573X	RAA618K	RAA545V	RAC986F	RAB878T		RAB769Z							
RAC847Q	RAA302Q	RAC705J	RAC264J	RAB252Z									
RAC845F	RAB767S	RAB763X	RAB732C	RAB191B									
RAB763V	RAC755H	RAA691X	RAC145I	RAB356Y									
RAC938I	RAC986F	RAA102Y	RAB186Q	RAB208K									
RAA068P	RAC264J	RAB916W	RAA268N	RAB181H									
RAA996X	RAB269P	RAC239E	RAA808Y										
RAB485P	RAB732C	RAB787R	RAB788S										
RAA359U	RAA332Q	RAB555X	RAA493U										
RAA545V	RAA968A	RAC008A	RAB629Q										
RAC763V	RAB186Q	RAC142D	RAB380P										
RAA102Y	RAB007R	GR416B	RAB709U										
RAC812J	RAA072T	RAA236V	RAA910E										
RAA236K	RAB190A	RAC794A	RAB092C										
RAA756E	RAB722C	RAB558U	RAA928T										
RAA586Y	RAC533D	RAC676G	RAA584Y										
RAC209L	RAB930M	RAB611B	RAA910X										
RAB387Y	RAB749Y	RAB771L											
RAA821H	UAK070W	RAC457S											
RAB448D	RAA293Y	RAB623K											
RAC457H	RAA232H	RAB662C											
RAC451F	RAB960N	RAB772Y											

RAA853I	RAA928T	RAA482W											
RAC004I													
RAB579L													
RAB771U													
UAS775A													
RAB444M													
RAB447M													
RAB972G													
RAB935N													