ENHANCING THE IMAGE OF INTRA-CITY TRANSPORT (BUS) TERMINALS IN KUMASI, GHANA

by

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KNUST

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DECLARATION

I hereby declare that this submission is my own work towards the M.Arch and that, to the best of my knowledge, it contains no material previously published by another person nor material which has been accepted for the award of any other degree of the University, except where due acknowledgement has been made in text.

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ABSTRACT

In this era, the phenomenon of travel distinguishes itself as an unavoidable and inescapable component of our lives. Ghana depends on road transport to cart on the average 95% of freight and 98% of passengers annually. Majority of the population travel by mass transit therefore, there is the need to see to it that daily journeys become enjoyable and not a drudgery by the provision of good travel services.

This is a study conducted on the intra-city terminals in Kumasi, Ghana's second largest city and the capital of the Ashanti Region. The study was carried out because of the existing practice of people boarding commercial vehicles at unauthorised places within the city although areas have been designated for terminals. They do not use these terminals because they are repelled by the lack of facilities, poor management and poor safety measures in place.

The study examined the location and management problems at the Old Tafo Lorry Park in Kumasi. It also found out how the infrastructure and services provided there affected activities at the terminal. The study also looked at the type of public transport that the population preferred and what reasons accounted for their choices. The findings showed that majority of the people who patronise the Old Tafo terminal prefer to travel by minibuses (trotro) rather than taxis and Metro Mass Transit buses. The reasons for their choice are that they want to travel with the fastest, most convenient and most affordable means of movement at any given time.

The study proposed a model terminal that addressed the identified problems with solutions including the separation of activities within the terminal and the provision

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of basic infrastructure such as sheltered waiting areas and washrooms. These solutions are proposed with the aim of enhancing the image of the Old Tafo Lorry Park. The model can be adjusted to suit all intra-city terminals in the country.

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CHAPTER ONE: INTRODUCTION

1.1 BACKGROUND

With the growth of urbanisation in Ghana, mobility of people has been on the rise. People commute on a daily basis to and from work or leisure and as such require some form of communication or transport means to link these parts of their everyday lives. Transportation plays very crucial roles and functions in society as a means of information dissemination and the transfer of people, goods and services from place to place. It includes all modes of movement be it by air, rail, road or water.

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Ghana relies heavily on road transport. It is estimated that 95% of freight and 98% of passengers are carried on our roads yearly (MRT 2006a). Road and transportation infrastructure are essential catalysts to the development of the economy. It has been observed that a significant increase in mobility of people and higher levels of accessibility to goods and services accompany contemporary economic processes (Rodrigue et al., 2006). It is therefore a major challenge to develop transport systems as a means to satisfy the road needs of people. Transportation as an investment in socio-economic terms also helps in poverty alleviation and improves the living conditions of people.

Majority of daily commuters do not have personal vehicles. Available statistics estimate that only 35% of the road users use a private car, the other 65% travel on foot or make use of public transport (mass transit system) to meet their travelling requirements (MRT 2006b). Urbanik (2007) defines public transport as "transportation service that is available to the general public and carries passengers to common destinations for a fee". Public transport systems require spaces to operate

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from where people and freight are assembled and dispersed. These spaces are known as terminals and they help in the organisation and smooth functioning of the various types of public transport systems.

A transport terminal is a facility or location where freight and passengers are assembled and dispersed on a journey. It is any point of interchange involving some mode of transport (Rodrigue et al., 2006). The main functions that take place in all terminals are to converge and disperse; however, the mode of movement and the type of cargo handled there define the differences. My focus in this dissertation is on road transport and intra-city movement of people from bus terminals. These bus terminals in Ghana are known as lorry parks, lorry stations or simply 'stations'. A lorry park is a bus terminal involving different kinds of vehicles including taxicabs, minibuses (known locally as 'trotro') and Metro Mass Transit (MMT) buses.

According to the 2005 edition of the 'Meet the Press' series, the Ghanaian Minister of Transportation declared the intention of the government to prioritise the development of road infrastructure in order to promote investment, grow the economy to achieve a middle-income status and to actualise the position of Ghana as the gateway to the West African sub-region (MRT 2006d). Recent trends in road construction including the expansion and the creation of interchanges and flyovers that have characterised the last five years supports the fact that the Government of Ghana places priority on road infrastructure development.

Steps to create improved community transport terminals are also being taken. The relocation and expansion of the Achimota Terminal in Accra, the renovation of the

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Kejetia Terminal in Kumasi and the building of terminals for Metro Mass Transit buses in both Kumasi and Accra are all examples in this direction. All these are part of the efforts being made to improve our road transport systems to boost the economy of the nation (MRT 2006a).

1.2 PROBLEM STATEMENT

Road transport is Ghana's main means of movement accounting for about 45% of the nation's socio-economic growth (Agyemfra, 2003). However, Addo (2002) asserts that the haphazard location and management of most terminal and transit points weaken the road network structure. Kwakye et al. (1997) also identified poor terminal or lorry park organization and management as a restricting factor to the optimum use of available public transport. Most terminals spring up next to markets, trading centres or on privately owned land and as such are not properly developed and managed as illustrated in Figure 1.1.

Figure 1.1: A lorry station (terminal) next to a market in Kumasi

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This is the result of the fact that some settlements are developed without the necessary provision for social services like public transport terminals. In cases where such provision is made, developers violate Town and Country Planning regulations to the extent that terminals are later sited anywhere. Many of the sites are no longer suitable for terminals because of changing trends in road construction and increase in population.

These terminals also lack facilities such as waiting and boarding areas, sanitary facilities and extra space for future expansion. Where some of these facilities exist, they are not properly developed. As a result, they become congested and chaotic with time. It is an appalling situation during the rainy season and evening rush hours when there are long queues of passengers waiting for vehicles without any shelter or resting place (as shown in Figure 1.2).

Figure 1.2: Passengers struggling to board a vehicle during rush hours

Ground treatment is poor leaving terminals dusty during the dry season and muddy during the wet season (Figure 1.3). There is also the frequent occurrence of vehicular

- pedestrian conflicts making the stations unsafe for passengers especially the elderly and physically challenged.

Figure 1.3: Poor ground treatment – dusty in the dry season

Prospective users are repelled by the problems of location, lack of facilities, poor management and unsafe environments. They therefore prefer to board fast moving vehicles along the road (often referred to as 'hit-and-run' or in the local Twi dialect as *"waa-waa"*) and at other unauthorised places.

1.3 OBJECTIVES

The aim of this study is to explore and understand intra-city transport terminals and their impact on users. The research will specifically study the Old Tafo Lorry Park in Kumasi, examining its location and management problems. The study also intends to find out the level of congestion based on traffic generated on a daily basis at the terminal. The research would examine as well the infrastructure and services provided at the station and how adequate or otherwise they are. Safety of passengers and how security issues are handled at the station would also be examined.

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Finally, the study will propose solutions to the identified problems with the aim of enhancing the image of the Old Tafo Lorry Park and how best the solutions can be adjusted and applied to other intra-city terminals in Kumasi.

1.4 SCOPE OF WORK

The study will concentrate on the problem areas of intra-city bus terminals in the cities of Ghana with emphasis on Kumasi, the second largest city in the country. The Old Tafo Lorry Park on the outskirts of the city will be used as a research and study area. The study will attempt solutions to the problems identified at that terminal using that as a basis for recommendations.

1.5 METHODOLOGY

Data for the research is to be obtained from both primary and secondary sources. The primary sources to be used are interviews, questionnaires and personal observation. Literature from books, journals and magazines from libraries and the internet will be reviewed as a secondary data source for the study. The data will then be analysed to obtain required information for the study.

1.6 JUSTIFICATION

The study will lead to the development of design approaches to solving the problems of intra-city terminals, which have been hampered by poor planning and overwhelmed by increase of mobility of Ghanaian people.

1.7 CONTRIBUTION

The findings are a contribution to the existing research on road transport terminals in Ghana, which are rather limited and as such, the results may inform policy makers and stakeholders in the road transport sector about vital features to be incorporated in the design of such facilities. The model terminal proposed is a means of contributing to solutions for the problems of intra-city terminals.

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CHAPTER TWO: LITERATURE REVIEW

2.1 INTRODUCTION

A general review of documented publications on public transport by road and its infrastructure is outlined in this chapter. There are also case studies done on three existing road transport terminals from different parts of the world with emphasis on the issues raised in the objectives. The conclusions drawn from the case studies serve as a basis for assessing the terminal under study and making proposals for its enhancement.

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2.2 ROAD TRANSPORTATION

Road transport is the principal mode of transport in Ghana for both freight and passengers; be it public or private transport systems carting on the average 98% of people and 95% of goods (MRT 2006a). Other modes such as rail, air and water are also in use albeit at a lower scale. Ghana therefore has a large road network linking major cities and towns as well small villages in hinterlands. The planning, construction and maintenance of roads and road infrastructure is handled by the Ministry of Transportation through three main branch departments. These are the Ghana Highway Authority (GHA), the Department of Urban Roads (DUR) and the Department of Feeder Roads (DFR) (MRT 2006c).

Improving urban public transport systems and developing road infrastructure will result in increased mobility and access to employment, markets as well as job opportunities and this is important for both the populace and the image of the nation.

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2.2.1 History of Public Transport

The earliest public transport was water transport since people either walked or rode on animals on land. In the 17th century, road public transport systems began operating in Europe. They included horse-drawn carriages that were hired, hackney carriages and stagecoaches. By 1819, regular service routes for public transport were operational in Paris, France (Urbanik, 2007). The omnibus came into use in the 1820s in the European cities of Paris and London (Journal, Museum of Transport, Greater Manchester *[no date]*). A motorised form of the omnibus (autobus) replaced the manual one around 1905. The era of streetcars came a few years later but this did not last long. Buses began to replace streetcars in the United States because of a continuing series of technical improvements (Urbanik, 2007). Public transport in modern days is by road, rail, water and air. Other technologies including the magnetic levitation (maglev) for better and faster transportation means are being developed (Ausubel and Marchetti, 2001).

2.2.2 Public Transport in Ghana

Private car ownership was not very common in Ghana in times past. The history of public transport in Ghana dates back to 1927 when the first public bus company, the Omnibus Services Authority (OSA) was started. It was government owned and contributed a lot to the society until its decline in the 1980's. This caused the privately owned public transport industry to boom. The assets of OSA were put into divestiture in 1995. In 1961, the Government of Ghana introduced a bus company, the Government Transport, to link people in the country. The company's name changed to State Transport Corporation (STC) in 1966. The company was diversified in 2000 and finally privatised. It is now known as Intercity STC with Social Security

and National Insurance Trust (SSNIT) as its main shareholder (MMT 2006a). Present day public transport systems operating on intra-city basis are taxis (shared taxis), minibuses (trotro) and metro mass transit buses (MMT 2006b). Taxis have a seating capacity of four passengers and trotro range in size from 12 to 30 seats (Kwakye et al., 1997). These vehicles offer a range of services such as chartering, point-to-point (dropping) and fixed route sharing or joining. The vehicles are not metered but fares for normal journeys are fixed (Grieco et al., 1996).

2.3 THE ROAD TRANSPORT TERMINAL

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2.3.1 Introduction

Road transport systems require a mode in order to facilitate movement. Whatever mode is employed in movement, both passengers and freight would first have to be taken to a point called a terminal before the onward journey to their final destinations. These spaces have their own impact on a society and cannot be ignored especially when they spring up in unauthorised areas, without proper management and without facilities, thus compromising on the safety of users.

2.3.2 Location of Terminals and level of Traffic Congestion

Transport terminals are defined by their spatial as well as a functional character. By virtue of where they are found, their functions are specific going a long way to influence the environment in which they are located. The major factor influencing the location of a transport terminal is that it must serve a large concentration of population and/or industrial activities which forms the terminal's market area (Rodrigue et al. 2006). It also serves as a focal point for clusters of other specialized services including brisk trading.

In Ghana, some of these terminals are sited next to markets and trading centres where various economic activities including vibrant buying and selling occur, making them appear to be extensions of the market. Locating a terminal next to a market has both advantages and disadvantages. It is necessary because sellers require some form of transportation to bring their wares to the trading centers and markets to be sold. Buyers also need to cart whatever goods they have purchased from the market. This location can have disadvantages as trading eventually spill over from the markets into the terminals sometimes to the point of taking over the entire space meant for vehicular activities.

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Other terminals are found within residential areas located near streets or on privately owned land within communities giving the impression that no consideration was given to the development of public transport terminals. Oppong (2000) writes that these locations inhibit the development of permanent structures as well as expansion proposals for the terminals resulting in congestion. He further states that this congestion is because of the small land sizes for terminals, as a positive correlation exists between the size of a terminal and number of vehicles that are handled there (Oppong, 2000).

Traffic congestion (known colloquially as traffic jam) refers to the situation where long queues of vehicles result in slower speeds of vehicles and longer travel times (Strickland and Berman, 1995). In Ghana, the legal seating capacity of taxis is four passengers while trotro range in size from twelve (12) to thirty (30) seats (Kwakye et al., 1997). Multiplying these figures with the number of available vehicles and taking

into consideration other people who come to the terminals for other activities give an idea of the number of people who can be at a particular terminal at a given time.

The various activities that go on and thus draw people to a terminal include boarding and disembarking from the following types of vehicles – Metro Mass Transit (MMT) buses, minibuses (trotro), taxis and private cars, and carrying of goods and luggage either personally or with the assistance of porters to or from vehicles. Other activities performed are queuing to purchase tickets, if needed; waiting in sheltered areas and lounges if vehicles are not ready for departure or expected ones have not yet arrived and trading; i.e. buying and selling of food, snacks and newspapers. Vehicles in queue waiting passengers during off-peak hours and interaction between members of the community as they move around also take place at terminals. These activities cause terminals to become crowded with people and congested with vehicles.

Some notable negative effects congestion can have on the facility are delays in the movement of people and goods. This is the result of vehicles not being able to enter or exit the terminal, leaving passengers stranded. The few people who manage to get vehicles to board within the terminal go through a whole lot of delays and frustrations before they are able to embark on their journeys. Littering and filth creation is another result of overcrowding of terminals as are chaos and high crime rate such as pick pocketing. Congestion is therefore not a good phenomenon and as such should be discouraged. This is because it has adverse effects on terminals, the community and the entire nation.

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But these intra-city terminals can and must be a part of a settlement because they serve community needs. Locating them within the community will properly define each settlement especially when developers follow laid-down planning regulations and properly design the terminals to make them dignified places. Building types blending well with surroundings is necessary so that the entire facility becomes an efficient place where movement patterns are neither chaotic nor dramatic but rather smooth (PPS, 2006). A suggestion is made by Rodrigue et al., (2006) that the allocation, design and construction of transport infrastructure and services are subject to proper planning both by public and private agencies. It is further proposed that new transport terminals be located outside central areas of cities to avoid high land costs and congestion (Rodrigue et al., 2006).

2.3.3 Management of Terminals in Ghana

Locating and developing lorry parks within the Kumasi Metropolis are under the jurisdiction of the Department of Urban Roads of the Ministry of Transportation. However, the responsibility of managing affairs at the terminals has been delegated to some private companies. The management team comprise a managing director; head of finance, head of security and a management board of not less than five people (Appiagyei, 2007).

Commercial vehicles work under unions and associations to facilitate activities at the stations. The two main recognised unions are the Ghana Private Road Transport Union (GPRTU) and the Progressive Transport Owners Association (PROTOA). These two encompass a wide range of vehicles ranging from shared taxis to long distance commuter buses. Other transport unions are Co-operative Transport Union,

Unity Transport Union, Travellers Welfare Service Transport Union, All Tops Transport Union, Positive Transport Union, Commercial Drivers Transport Union (Vigilant), Redeemer Transport Union, King Jesus Transport Union, Express Drive Transport Union and Inter City Transport Union (Freiku, 2008).

Transport unions have a hierarchical organisational structure with a chairman as the head of the management team. He works together with the vice chairman, secretary, treasurer, stationmasters and 'bookmen'. The stationmasters deal directly with the drivers and conductors of commercial vehicles (Ali, 2007).

2.3.4 Facilities provided at terminals

Considerations are to be made when facilities especially infrastructure are being provided for terminals. This is because, aside the need for facilities and services to be able to cater for current traffic, future projections and trends are equally important. Facilities that are provided in terminals include lanes for arrival and departure, parking areas for the vehicles, areas for cargo-vehicle interchange – handling, storing and processing of the cargo. Other facilities are traffic control facilities, administration units, operations, maintenance, safety and security areas; parking areas for the personnel of the terminal, customers and visitors as well as vehicle servicing areas. The facilities at terminals are to aid in achieving the main function of a terminal which is to handle and cart freight and people. They can be sub-grouped under headings such as shelter, logistics and technology.

2.3.5 The safety and security in terminals

A major concern when managing terminals is about safety and security of the people and goods that are handled there on daily basis. Rodrigue et al., (2006) identified crowd control and safety issues as the priority matters bothering managers of railway terminals and airports due to the dense numbers of passengers there. They advanced a proposition that accesses to terminals be well monitored and controlled while movement of passengers is channelled along pathways that provide safe access to and from platforms and gates (Rodrigue et al., 2006).

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Safety and security of goods and passengers in road transport terminals is also of major importance. In places where dark alleyways and obscure corners abound, crime rate is higher and safety of users can be compromised.

After the September 11th, 2001 (9/11) terrorists' attacks in the US, new and improved systems of monitoring airports have been put in place. They include restricted accesses to airports and freight terminals, presence of more security personnel and fortifying cockpits of aeroplanes. Extensive screening of passengers both manually and with electronic gadgets as well as rigorous inspection of their luggage are some of the means employed at ensuring safety in airports (Nolan, 2007).

These same systems if incorporated into road transport terminals will go a long way in helping with the safety and security of the users. In addition to monitoring systems, planning arrangements done in such a way as to minimise obscure and dark areas are necessary to ensure safe and secure terminals.

Worker safety and theft are also of primary concern at terminals. There arises the need to put in stricter measures to ensure that terminal workers are safe and secure while on duty. However, these stricter safety measures have their negative consequences. Cost of installing high-tech security devices and paying of more security personnel are some problems managers of terminals have to deal with. In addition, when tighter security measures are employed, it becomes an inconvenience, which delays the movement of people and goods (Rodrigue et al., 2006).

2.4 CASE STUDIES

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These are studies carried out on different types of existing intra-city terminals in some selected parts of the world to explore and understand theses facilities and their impact on the socio-economic needs of the people they serve. The researcher sought to find out what exits there with respect to their locations, facilities provided, management practices and how safety issues have been handled to meet the needs of users effectively.

2.4.1 Staples Street Bus Station, Corpus Christi, Texas, USA.

The Staples Street City Hall bus transfer centre found in Texas State in the United States opened in February 1994. This transit terminal reaches beyond the boundaries of a typical bus stop and involves the larger goal of helping to reshape the Corpus Christi community in which it is located (PPS 2006). It was chosen to be studied to observe how its location, facilities provided and organisational structure effectively served the community in which it is situated.

2.4.1.1 Location of the terminal and level of traffic congestion

The station is found across the street from the City Hall of Corpus Christi, Texas community. It is therefore easily accessible to both people and vehicles. It has been described as becoming almost the town square or plaza because of the large number of people that congregate there on a daily basis. The conducive environment created attracts old friends and acquaintances as well as new ones. Others are also compelled to pass through the station by virtue of its location. Found in Figure 2.1 is a picture that shows the terminal in relation to the rest of the buildings in its immediate vicinity (PPS 2006).

Figure 2.1: Front view of the Staples Street Bus Station and its surroundings (Source: PPS 2006)

Although the Staples Street Bus Station serves 14 different bus routes with an estimated 5,000 transit users per day, the planning ensures minimal congestion levels. In the afternoons when the largest numbers of people are present, it is reported that the station has a festive feeling with people socializing and meeting friends (PPS 2006).

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2.4.1.2 Facilities provided at the terminal

The facilities found at the bus station include a waiting shelter with a unique architecture. The entrance to the shelter is celebrated with an image of a Spanish-style civic building. The terminal has a paved open space surrounded by trees in tiled planters serving as focal and vending points in the middle of the station. It also has light fixtures for night lighting and phone booths. The trees, artwork and architectural forms make it a pleasant place for use for both staff and patrons. Passengers are provided with enhanced services. The idea behind building of the facility is to attract more users through the creation of a pleasant environment. The terminal, however, has some shortcomings. Transit users complain about inadequate shelter during heavy rain and wind, and a lack of restrooms (PPS 2006).

2.4.1.3 The Safety and Security at the Terminal

The safety and security of users was addressed adequately with locating the terminal where large numbers of people use it. This makes it safer and more secure than typical bus stops. The provision of night lighting also ensures the safe use of the terminal even at night (PPS 2006).

2.4.1.4 Observation

1. By virtue of its central location, it is easy to access by both people and vehicles and serves a dual purpose (both as a terminal and as a place that allows for the congregating of many people).
2. The facilities provided serve their ultimate purpose of attracting patronage.
3. The terminal provides comfort and safety to its users.

If what is found here is applied to terminals within the Kumasi metropolis, it will go a long way in lifting their images making them worth patronising.

2.4.2 The Richmond Hill Centre Bus Terminal, Toronto, Ontario, Canada.

This bus terminal is usually described as a 'bare bones bus station' or a 'glorified bus stop' due to its open yet elegant building forms. It was built on the ramp that connects Yonge Street and Highway 7 interchange in Richmond Hill, Ontario, on September 4, 2005. It is immediately adjacent to the Langstaff Government of Ontario (GO) train station (Eustache, 2005). This terminal was included in the study because it is a good example of an intra-city bus terminal with open pavilions serving as waiting areas just as we have in Ghana. Another reason for studying the facility was to find out what went into the planning to make a terminal found in the most populous city in the highly urbanized Ontario province to function effectively without congestion.

2.4.2.1 Location of the terminal and level of traffic congestion

The Richmond Hill Terminal is located on the northeast side of Yonge Street and Highway 7 interchange in southern Richmond Hill, Toronto, Canada. This makes it easily accessible by both people and vehicles. The parking arrangement used allows for the easy manoeuvring of buses in and out of the boarding bays. This arrangement works hand-in-hand with a one-way traffic system so that there is no traffic build-up of vehicles at entry points and exits. Congestion is not a problem at this terminal because of the efficiency and swiftness of activities that go on there. The shelters are designed with widely spaced columns to facilitate easy circulation of people round the terminal (shown in Figure 2.2 below).

Figure 2.2: A view of Richmond Hill Centre Bus Terminal showing the passenger shelters (Source: Eustache, 2005)

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2.4.2.2 Facilities provided at the terminal

The terminal is equipped with bus bays that have overhead Light-Emitting Diode (LED) displays for information. Other facilities found at the terminal are automated ticket vending machines, a bicycle parking lot, waste and recycle bins, payphones and a maintenance yard. The waiting shelters have metal benches with armrests to make users comfortable. There is a balanced mix of greenery and paving for ground treatment. Maximum use is also made of natural lighting and natural ventilation with the provision of open structures that have high volumes with overhead windows (shown in Figure 2.3).

Figure 2.3: Overhead window that allows natural light into the waiting shelter through the roof (Source: Eustache, 2005)

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2.4.2.3 The Safety and Security at the terminal

There is adequate, legible signage as well as LED displays provided round the entire terminal. Glass cubicles are provided beneath the open pavilions to help protect passengers from the elements of weather (especially driving rain and wind) without obstructing their views around. A structure for locking bicycles is available to keep cycles safe when the owners patronise the terminal (Eustache, 2005).

2.4.2.4 Observation

1. The Richmond Hill Centre Bus Terminal is accessible because its location next to a train terminal is good.
2. It provides a nice, well-treated environment that is not congested.
3. The terminal has parking large enough to accommodate many vehicles.
4. There is good flow of vehicular traffic because of how the terminal is planned.
5. The facility has a good signage system, which facilitates movement of users.
6. It provides comfort for its users and makes them safe.
7. Maximum use is made of natural light and ventilation at the waiting shelters.

2.4.3 The Central Lorry Park, Kejetia, Kumasi, Ghana.

The Kejetia Central Lorry Park is Kumasi's major commercial vehicle terminal catering for both inter-city and intra-city journeys. It is located in the core area of the city and is known to be the largest open vehicle park in West Africa. For this reason, the facility was chosen to be studied. Found in Appendix 2 is an aerial map of the city of Kumasi that shows the location of Kejetia in relation to other suburbs of the city.

2.4.3.1 Location of the terminal and level of traffic congestion

The terminal is found in the heart of town, adjacent the main Central Market of Kumasi and the Central Business District of Adum. It lies in a valley area, bordered by roads namely Bantama Road on the west, Park Road on the north and Mampong Road on the east (illustrated in Figure 2.4).

Figure 2.4: Aerial map of the Central Lorry Park, Kejetia with boundary roads (Source: Department of Urban Roads, 2007)

This central location has both advantages and disadvantages. It is readily accessible to people on foot coming from all directions, so the human traffic density is very high from early morning until sunset. The human traffic consists not only of passengers who want to board vehicles, but many other people serving varying interests at the terminal. With advantage taken of all the roads for accesses into and out of the facility, vehicular traffic levels are high especially during the day. As a

result, there is a lot of noise and chaos at the terminal with the accesses blocked by long queues of vehicle. The terminal appears to be an extension of the market because of the commercial activities that go on there. Figure 2.5 is an aerial view of the terminal showing some vehicles parked around the waiting pavilions with others in a queue attempting to move out during the day.

Figure 2.5: Aerial view of the Kejetia Terminal

The lateral spread of the development also accounts for the congestion within the terminal. The entire site has been taken over by shops leaving little space for vehicle activities that should have been given priority. These shops, serving as pull-factors, bring in more people increasing the human traffic greatly and adversely affecting vehicle manoeuvring.

2.4.3.2 Management of the Terminal

The Central Lorry Park has an administration block occupied by Freko FD Ltd, a private company that runs the affairs of the terminal. The management board of the company consists of a managing director, head of finance, head of security and other administrative workers (Thompson, 2007). Commercial vehicles that operate from

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this terminal work under recognised unions and associations. All activities that go on at the terminal are organised with proper supervision.

2.4.3.3 Facilities provided at the terminal

Infrastructures provided at the terminal are waiting areas and loading bays; shops, food vending joints and washrooms. Adequate signage and night lighting is provided. There are waste bins at vantage points and a large car park for private vehicles. Further service provision has been made in the form of open and covered u-drains to aid in storm water management, roof gutters to help channel rainwater from roofs of the buildings to the ground as well as vertical pipes to carry run off from the roof of the pavilions into u-drains.

Provision was however not made for ticket sellers and goods at the bus boarding bays. Ticket sellers therefore sit and operate from the waiting areas, reducing the spaces to be used by passengers. Heavy goods are left at the mercy of the elements and vehicles due to lack of proper handling areas. Head porters (known locally as 'kayayei') are not considered in the planning although they play a significant role at the terminal by carting goods to and from the adjacent market. Thus, they loiter about; resting anywhere they find comfortable (depicted in Figure 2.6) including the seats meant for passengers.

Figure 2.6: Head porters resting on pavements meant for pedestrian use

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2.4.3.4 The Safety and Security at the terminal

Passenger safety and security is by the provision of raised curbs with bollards painted in reflective warning colours of red and white to separate pedestrian walkways from vehicle paths (Figure 2.7).

Figure 2.7: Bollards and kerbs to separate vehicles from people

There is also adequate signage, pedestrian crossing points and speed rumps at various parts of the terminal. As part of security measures, the terminal has a police post, security offices fitted with security cameras and a 70-man security force on patrol 24 hours a day (Thompson, 2007). At night, adequate lighting is in place with the

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provision of streetlights all over the place for the comfort and safety of the users of the facility. However, there are some notable short falls such as frequent vehicular-pedestrian conflicts when passengers cross over from point to point around the terminal.

2.4.3.5 Observation

1. The Central Lorry Park is accessible by virtue of its location in the centre of town.
2. Due to its location, the lateral spread of development and the trading activities that go on there, the terminal is highly congested and very noisy.
3. The facility has a good signage system that facilitates movement of users.
4. An attempt is made to provide comfort for its users with the facilities provided.
5. Passenger safety is well handled with adequate provision of security measures.
6. Open pavilions leave passengers at the mercy of the elements of weather.

2.4.4 Conclusions of Case Studies

The following conclusions are drawn from the case studies above.

- Circulation of people and the manoeuvring of vehicles are of prime importance in a bus terminal and have to be as easy as possible.
- Congestion causes undue delays during the movement of people and goods.
- Facilities provided should serve their purposes and intent efficiently.
- Simple structures that take maximum advantage of natural breezes and light are important for shelters.
- Interactions between people and vehicles are to be reduced to prevent conflicts and accidents.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 INTRODUCTION

This chapter gives an overview of how the research work was carried out. The chapter outlines the sources of data, modes of collection as well as how the data was analysed and used in order to help find solutions to the problems facing the intra-city lorry stations in Kumasi.

3.2 RESEARCH INFORMATION

Research is defined as the detailed study of something in order to discover new facts, especially in a university or scientific institution (Macmillan, 2002). Two main sources of research data gathering are primary and secondary sources. Both are used in this study. The primary sources used were interviews, questionnaires and personal observations. Literature reviews of publications, books, journals and magazines from libraries and the internet were used as a secondary source of information.

Some areas of research are Field research and Survey research. Field research is a naturalistic research. It involves using experiments in natural settings to form casual hypotheses that can be tested at higher constraint levels. Survey research, on the other hand, utilises several basic procedures to obtain information from people in their natural environments. The basic instrument used is the survey; a set of questions relevant to the area of study is presented to subjects (Graziano and Raulin, 1989). For the purpose of this study, the survey research was used.

3.2.1 Interviews and Questionnaires

A study of this nature required the collection and analysis of quantitative data. Quantitative data in turn required the collection of information from respondents that would be generally numerical in pattern and thus be most amenable to statistical analysis. Consequently, the researcher embarked upon a sample survey, in which data were obtained by interviewing some stakeholders at transport terminals.

This survey was carried out using self-administered questionnaires that had open-ended and close-ended questions (Appendix 1). The population involved in this survey (i.e. the stakeholders in the transport terminal) is heterogeneous – different people from different backgrounds with different purposes. Due to the busy nature of the terminals and the nature of the population, the stratified random sampling method was used in selecting the people to be interviewed and to be served with questionnaires. The sample size was 150 people drawn from the population.

The population was divided into three subgroups or strata. These are:

(1) Patrons to the terminal. This category includes the administrative body working at the terminal, drivers, conductors, passengers, vendors, porters, shop owners as well as hawkers (Group A).

(2) Managers of terminals in the city and statutory bodies managing Kumasi, that is, the Kumasi Metropolitan Authority (KMA), Town and Country Planning Department and the Department of Urban Roads, Ashanti Region (Group B).

(3) The management of the Ashanti Regional Secretariat of the Ghana Private Road Transport Union (GPRTU) as an agency operating vehicles that make use of transport terminals in the region (Group C).

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A total of 120 people were sampled from group A; the reason being that this group consists of the largest numbers of daily users of terminals. Seventy-five (75) of the 120 people (representing 62.5%) were interviewed in a one-on-one manner and 45 people (representing 37.5%) were served with questionnaires. This is because the drivers, conductors, hawkers and porters were busy going about their duties and majority of them were not literate enough and thus did not like the idea of filling questionnaires. They preferred to answer the questions in a one-on-one-dialogue manner. From group B, 20 people were used in the survey. The sample size for group C was 10 people. The sample space was not so wide for groups B and C hence the small number of people used in assessment.

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The interviews that took place at the Old Tafo Lorry Park in Kumasi were done over a period of about two months. Between December 2006 and February 2007, the terminal was visited daily to collect data for the research.

3.2.2 Personal Observation and Photographs

Extensive personal observations of the situation on ground at various terminals were undertaken as a data source for this project. The observation focused on the general layout of the structures in relation to other facilities around, the activities that go on at the terminal, circulation patterns of humans and vehicles, fabric, structure and aesthetics of any building, safety and security as well as ground treatment. Relevant pictures of the site and daily activities that go on there were taken and used as a source of information. Site maps and other cadastral information required for the project were taken from relevant sources.

3.2.3 Measurements

Physical measurements were done of the site recording all facilities. This helped to assess how comfortable people were in using the lorry parks. Traffic density (both human and vehicular) was also measured during the study months through traffic counts at regular intervals during peak and off-peak hours to determine congestion levels and their impact on the activities at the terminals. Traffic counts were taken between the hours of 6:00 a.m. and 10:00 a.m. for morning densities and between 4:00 p.m. and 8:00 p.m. for the evening peak densities. It was also done during the daytime off-peak hours between 11:00 a.m. and 2:00 p.m. The results were used in the analysis.

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3.2.4 Review of Related Literature

Existing literature on issues relating to and on the subject of bus terminals were reviewed for information to help throw more light on the study. This was carried in two broad areas; general review of documented publications such as books, journals and magazines from libraries and the internet as well as case studies of existing similar facilities around the world.

CHAPTER FOUR: FINDINGS AND DISCUSSION

4.1 INTRODUCTION

This chapter presents the existing situation at the Old Tafo Lorry Park in the city of Kumasi. The chapter also discusses the results of the interviews and questionnaires. The results are rather interesting in general and show reasons why the populace patronise the station or otherwise as well as reasons for preferring a particular kind of public transport.

4.2 THE EXISTING SITUATION AT THE OLD TAFO LORRY PARK.

4.2.1 Introduction

Old Tafo is a low-income suburb located on the periphery of the city of Kumasi, Ashanti Region. It falls along the proposed second ring road to be constructed round the city (see Appendix 2). The transport terminal is in the commercial hub of the Tafo town, adjacent the main community market that has been earmarked by the Kumasi Metropolitan Assembly (KMA) to be developed into a satellite market. The terminal thus has to adequately accommodate the needs of the new market. A pictorial representation of the existing situation is presented in Appendix 3.

4.2.2 The Old Tafo Lorry Park

The terminal is located within the heart of the Tafo-Pankrono sub metro adjacent to the community market. A major road, the Kumasi-Mampong road, on the eastern side and a minor road on the western side bound the facility. The total land area earmarked for the lorry park is approximately 36,500m^2 and the site is orientated at 30° to the north-south axis with the longer sides facing west. However, due to encroachment, the current terminal operates on a rectangular plot of 15,000m^2.

Vehicular access is mostly from the major road. There are no well-defined pedestrian accesses around or on the site. Figure 4.1 is a map of a section of the Old Tafo town showing the present terminal and surrounding facilities.

Figure 4.1: Map of a section of Old Tafo and the Lorry Park (Source: Tafo Town Council, 2007)

The community market on the southeast and some mixed-use development on the eastern and western sides surround the terminal as illustrated in Figure 4.2. The main activities that take place at the Old Tafo terminal are boarding and disembarking from vehicles; commercial activities of buying and selling goods and food, as well as

communication vendors (mobile-to-mobile operators). Vehicle service shops also operate from the terminal.

Figure 4.2: The Lorry Park and surrounding facilities (Source: Tafo Town Council, 2007)

In terms of infrastructure, this terminal has next to nothing. Currently, there are no designated waiting areas, not to mention sheltered facilities. The only structures are a urinal, some stalls and shops for selling as illustrated in Appendix 3.

The land is flat for most parts but slopes towards the northwest and along the east-west axis. At the minimum for every 20-metre run, the land drops a height of one (1) meter. The terminal's grounds are untreated therefore it is dusty in the dry season and muddy in the rainy season (refer to Appendix 3).

4.2.3 Problems at the Lorry Park

4.2.3.1 Location of the terminal and level of traffic congestion

The location of the terminal in the town centre next to a market ensures that people are always present there. Some people are forced to go through the terminal by virtue of its location and not because they are there to board vehicles. There are no well-defined pedestrian accesses to and from, as well as within the terminal.

The vehicular entry and exit points that have been tapped directly from the main road partly account for the vehicular congestion that occurs there. This happens when many vehicles arrive at the same time and each wants to quickly load and leave. Since the access points are along the main road, long queues of vehicles are recorded at the terminal during peak times when there is traffic jam on the main road.

4.2.3.2 Management of the Terminal

Unlike other terminals within the city that have private companies designated to run them, the affairs of the Old Tafo terminal are managed by the Tafo Town Council (TTC) administration. This is not so efficient since it is only during peak hours that task force members are present to show that the terminal has an authority over its matters. Also due to the distance between the location of the terminal and the Town Council offices, it always takes time before anything that happens is reported to officials for immediate response from the TTC.

4.2.3.3 Facilities provided at the terminal

The Old Tafo terminal's lack of infrastructure and facilities is a major problem that needs critical attention. This is because the comfort and safety of users are seriously

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compromised during use. Lack of waiting and boarding areas force passengers to queue in the open and right in the path of vehicles. The terminal's untreated grounds are littered with waste thrown out of vehicles.

2.4.3.4 The Safety and Security at the terminal

Members of the TTC Task Force are usually sent to the terminal during peak hours (mornings and evenings) to direct traffic and to see to the general comportment of users. Apart from them, no other safety measures are in place, leaving passengers and passers-by at the mercy of vehicles as they criss-cross each other. There is the occurrence of rampant vehicular-pedestrian as well as vehicular-vehicular conflicts that result in chaos with drivers tooting horns.

4.3 DATA ANALYSIS

4.3.1 Respondent Rate

In all, 81 people were interviewed in a one-on-one manner and 69 people served with questionnaires from the three sub-groups making a total of 150 people. One hundred and five (105) responses representing 70% of the population sampled were used in the analysis. This is because some respondents did not return the questionnaires; some did not fill them while others did not answer all the questions asked. Of the 105, 85 were commuters randomly selected from the Tafo Lorry Park.

4.3.2 Location of the terminal

When asked about their opinions of the location of the station, some patrons responded it was easy to access the facility and do not wish for it to be relocated. Out of 85 respondents, 51 answered that the location should be maintained with reasons

that it is easily accessible to them from their homes and their shops in the market. Thirty (30) respondents suggested that the terminal be relocated if it was to be developed into a satellite terminal as such a facility would bring in more people and vehicles. Four (4) commuters were indifferent to the location of the terminal. Table 4.1 below shows the distribution of the responses.

Table 4.1: Commuters response to location of the terminal

Location	No. of People	Percentage
Good – should be maintained	51	60
Not good – should be relocated	30	35.3
Location is not important	4	4.7
Total	85	100

4.3.3 Level of traffic generation

In determining the traffic densities of vehicles and people at the terminal, traffic counts were conducted between the hours of 6:00 a.m. and 10:00 a.m. (to determine morning rush hour densities) and between 4:00 p.m. and 8:00 p.m. for the evening peak densities. It was also done during the daytime off-peak hours between 11:00 a.m. and 2:00 p.m. Table 4.2 shows typical temporary densities recorded at the Old Tafo terminal.

Table 4.2: Average number of vehicles using the terminal daily

Type of vehicle	Morning (6:00 a.m. – 10:00 a.m.)	Afternoon (11:00 a.m. – 2:00 p.m.)	Evening (4:00 p.m. – 8:00 p.m.)
Minibuses (trotro)	45	28	65
Taxis	25	18	31
Private cars	10	10	7
Total	80	56	103

An average total of 80 vehicles use the lorry park between morning hours of 6:00 a.m. and 10:00 a.m. Out of this figure, 25 are taxis, 45 are minibuses and 10 are private vehicles. The private vehicles consist of all non-commercial saloon vehicles that use the terminal. The capacity of each vehicle (i.e. maximum 4 for saloon cars – taxis and private cars and an average of 20 for minibuses) is considered in estimating the number of people who use the terminal.

Number of Vehicle type * Capacity = Number of People

45 minibuses	X	20	=	900 people
25 shared taxis	X	4	=	100 people
10 private cars	X	4	=	40 people
Total number of people			=	1040 people

Adding other people who serve various interests at the terminal such as hawkers, food vendors, about 1,100 use the terminal in the mornings.

In the evenings (between 3:30 p.m. and 7:30 p.m.), 103 vehicles are recorded. 65 of this figure are minibuses while 31 are taxis and seven (7) are private vehicles.

Number of Vehicle type * Capacity = Number of People

65 minibuses	X	20	=	1300 people
31 shared taxis	X	4	=	124 people
7 private cars	X	4	=	28 people
Total number of people			=	1452 people

It is observed that an average of about 1500 people use of the terminal during evening peak periods.

4.3.4 Facilities provided at the terminal

All the people interviewed complained about lack of shelter especially during the rainy season when using the terminal is most inconvenient. Fifty-eight (58) out of the 85 respondents laid emphasis on the deplorable state of the inadequate facilities available. The facilities available were described as bad by 22 of the people interviewed while five (5) people described the facilities at the terminal as average. Table 4.3 display the responses patrons to the terminal gave about the facilities provided.

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Table 4.3: Commuters response to facilities provided at the terminal

Facilities provided	No. of People	Percentage
Very bad	58	68.3
Bad	22	25.8
Average	5	5.9
Good	0	0
Very good	0	0
Total	85	100

4.3.5 Preferred Means of Public Transport

From 85 commuters randomly selected and interviewed from the station, 68 of them (80%) use public transport as their daily means of travel. Of the remaining 17, it is either they do not travel every day or because they own private cars and prefer to travel in them that is the reason why they do not use public transport on a daily basis.

A list of the three kinds of public transport systems, namely taxi, minibus (trotro) and Metro Mass Transit (MMT) bus were presented to them to indicate their preference and reasons why. Of the respondents, 27 use taxis daily because that was the only means of public transport to the areas they were going. Given a choice, 55.5%

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(representing 15 people) of the 27 said they prefer minibuses since they considered taxis as expensive.

Forty-nine (49) commuters stated minibuses as their preferred choice of public transport with reasons that trotros were economical, faster, quickly gets full up and could stop at any bus stop for people to board or alight. Only nine (9) of the 85 said they preferred to board MMT buses because they felt safer travelling aboard bigger vehicles.

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Table 4.4: Commuters public transport preference

Type of vehicle	No. of People	Percentage
Taxis	27	31.8
Minibuses (trotro)	49	57.6
MMT buses	9	10.6
Total	85	100

64 out of 68 people who daily use public transport (94.1%) cite speed and saving of time as the main reasons for preferring the taxis and minibuses to the bigger, some what slower MMT buses. They do not want to waste time in the mornings when they have to get to work or school early.

4.4 OBSERVATIONS FROM THE STUDY

From the study carried out at the Old Tafo terminal, the following are observed:

1) The location of the terminal within the core area of the community had both positive and negative implications. While the patrons prefer the location because of how easily they can access it, the level of vehicular traffic generated on the major boundary road makes the location undesirable.

2) Demand for public transport is higher in the mornings and evenings (peak or rush hours). The average number of vehicles that use the terminal in the morning is 80 bringing about 1,100 people to the station. About 1,500 people from the average of 103 vehicles use the terminal during evening rush hours. These figures result in congestion at the terminal. In effect, there are regular vehicular-pedestrian conflicts and minor accidents that need to be curbed.

3) The inadequate infrastructure and facilities at the terminal makes using the facility difficult especially during the rainy season. During off-peak hours, drivers and conductors resort to sleeping in their vehicles, which is an unhealthy practice.

4) The lorry park should have a management body that operates on the terminal's premises instead of being run by the Town Council administration from their offices.

5) From the responses of 94.1% of the commuters interviewed (i.e. 64 out of 68 people who use public transport daily), the proposed terminal should make provision for more minibuses (trotro) than taxis and MMT buses, as this is the means of transport they can afford.

CHAPTER FIVE: THE PROPOSAL

5.1 INTRODUCTION

The findings from the research aided in the proposing of a model enhanced lorry park that will address the problems of location, facilities provided, management as well as safety and security issues. The philosophy and concept behind the model terminal evolved from the responses of commuters that point to the fact that saving of time is paramount in commuting.

5.2 THE DESIGN

5.2.1 Philosophy and Concept

According to Ausubel and Marchetti (2001), man has travel instincts. The first of these instincts is to stick to the budget of time dedicated to mobility, i.e. time saving. The second instinct of man is to use the best means of transport available when people depart from home. The third is to spend within the travel-money budget (Ausubel and Marchetti, 2001). From the responses of commuters in the study, it is true that they prefer to travel by the fastest, most convenient and most affordable means of transport available anytime.

These led to the developing of a design concept of saving time. With this concept in mind, a philosophy of the words "SPEED, COMFORT AND EFFICIENCY" is proposed. This philosophy is geared toward providing solutions to the problems identified in the study so that people can be moved effectively and as quickly as possible from place to place within the city. To be efficient, the functioning process of the entire facility should follow a logical sequence with clear-cut distinctions between activities that take place at the terminal. Therefore, the location of a

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terminal, its management and facilities provided there are to be done in an efficient way that will make commuters comfortable.

The logical set of activities at the terminal is to follow a linear sequence of processes that allow for some diversions along it in the form of commercial units and other activities. These 'necessary evils' distort the linear path even though they add features that help the terminal to function well (illustrated in Figure 5.1 below).

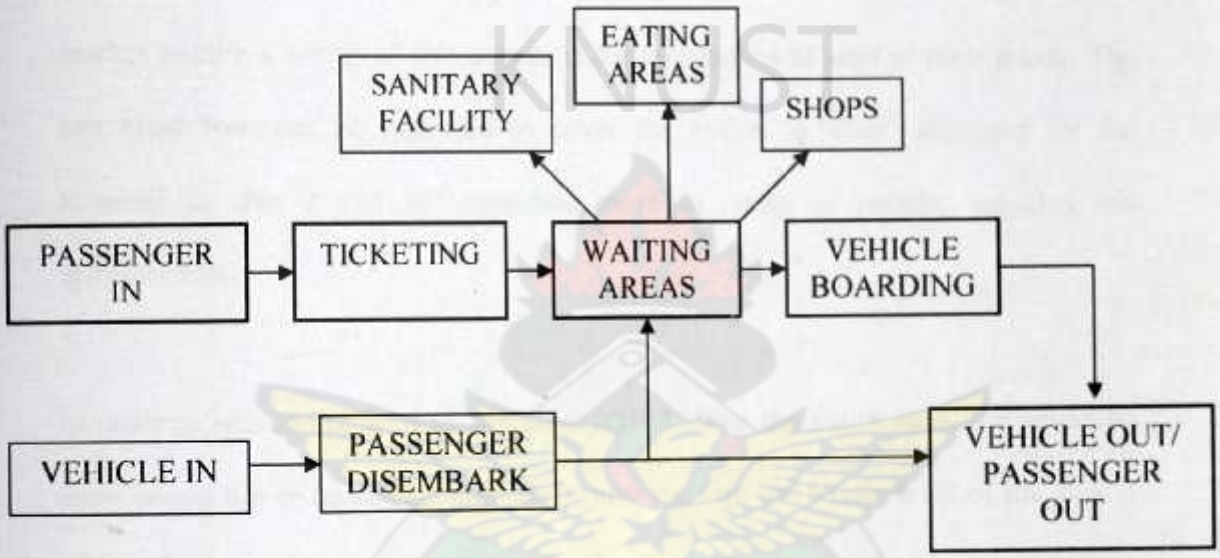

Figure 5.1: Logical sequence of processes that take place in a terminal

The design philosophy is to be achieved using three main themes of links, self-sustenance and universality of the design. The linear process involves passenger concourses in continuous linking forms that facilitate movement with little or no interruption and locating waiting areas to enhance easy and quick boarding of vehicles. The model terminal should be self-sustaining (i.e. a facility that can generate its own water supply and electricity) so that its functioning is not entirely

dependent on external conditions. The concept also seeks to employ a universal design (all-inclusive design) in order to accommodate the widest range of potential users including people with special needs such as the elderly and the physically challenged.

5.2.2 Location of the terminal and level of traffic congestion

The Old Tafo Lorry Park is to be maintained at its present location next to the community market. This will serve to put it to good use since patrons to and from the market require a means of transportation for themselves as well as their goods. The site must however, be extended to cover the entire 36,500m^2 allocated for the terminal so that it can accommodate more in terms of people, vehicles and infrastructure.

In order to reduce the level of vehicular traffic along the major road, the vehicular entry points are to be tapped from the minor road on the North West of the site. A service lane is to be provided along the Kumasi-Mampong road to intercept exiting commercial vehicles, allowing them to join this main road at an appropriate traffic light controlled junction. The importance of this service lane is to absorb the queue of vehicles while freeing the main road for good traffic flow (shown in Figure 5.2).

A saw-tooth parking arrangement is to be used to allow for the easy manoeuvring of commercial vehicles in and out of the boarding bays. For ease of movement of vehicles at the terminal, a one-way traffic system is proposed so that even during morning and evening rush hours, the terminal is not choked up. These solutions will allow for swift and efficient circulation around the terminal.

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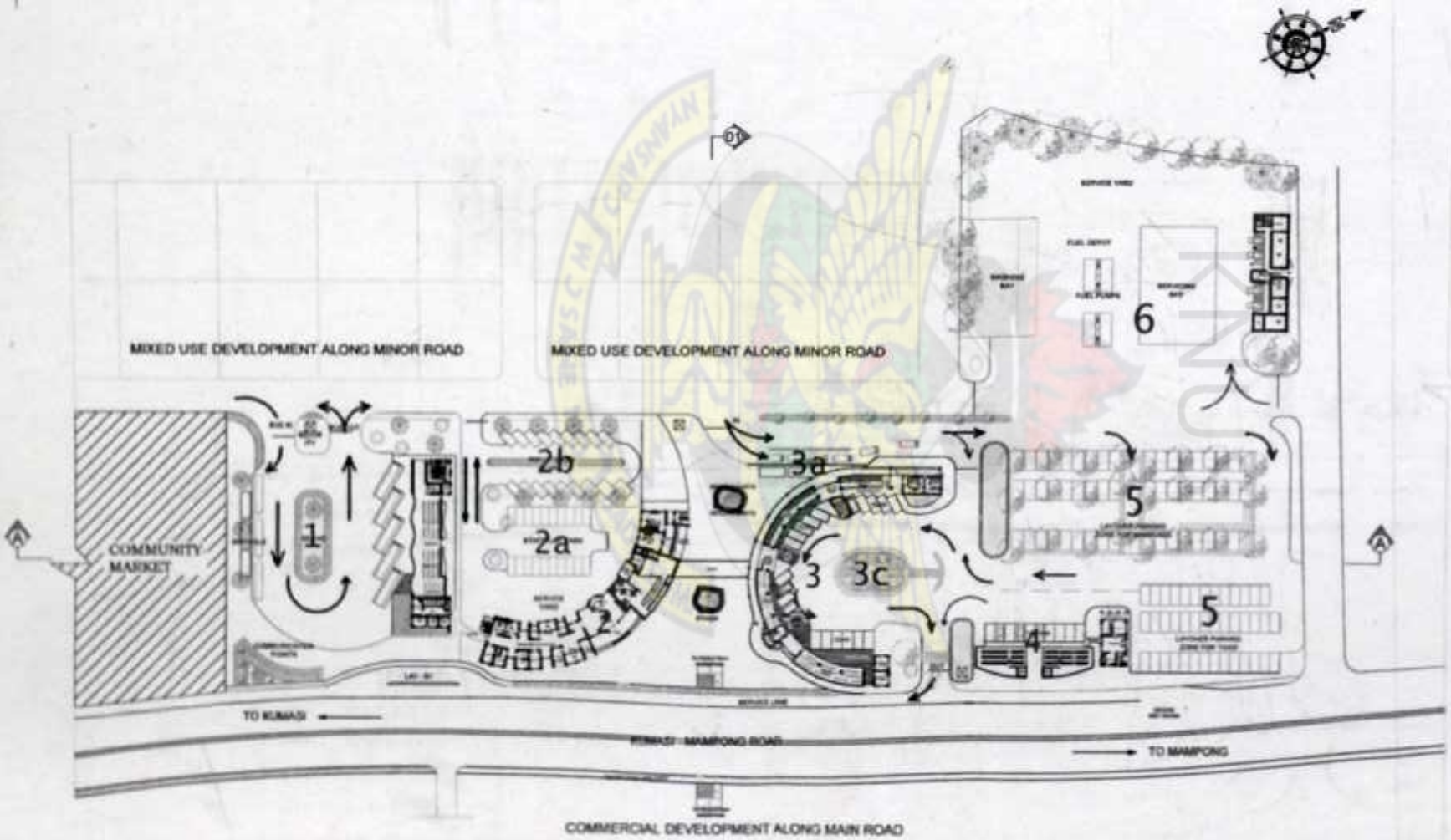
PLANS: SITE LAYOUT



LEGEND

1 METRO MASS UNIT
- SECURITY BOX
- ARRIVAL SHELTER
- WAITING AREA & DEPARTURE SHELTER

2 ADMINISTRATION BLOCK
- PARKING LOT
- ADMINISTRATION BUILDING
- PEDESTRIAN ZONE

3 MINIBUS UNIT
- ARRIVALS
- WAITING AREA & DEPARTURE SHELTER
- FOUNTAIN

4 TAXI RANK
- TAXI RANK
- DRIVERS' REST ROOM

5 LAYOVER PARKING AREAS
- MINIBUS LAYOVER PARKING LOT
- TAXI LAYOVER PARKING LOT

6 MAINTENANCE YARD
- ADMINISTRATION
- SERVICING BAY
- FUEL PUMPS
- WASHING BAY
- SERVICE YARD

PLANS: CIRCULATION AND LANDSCAPE

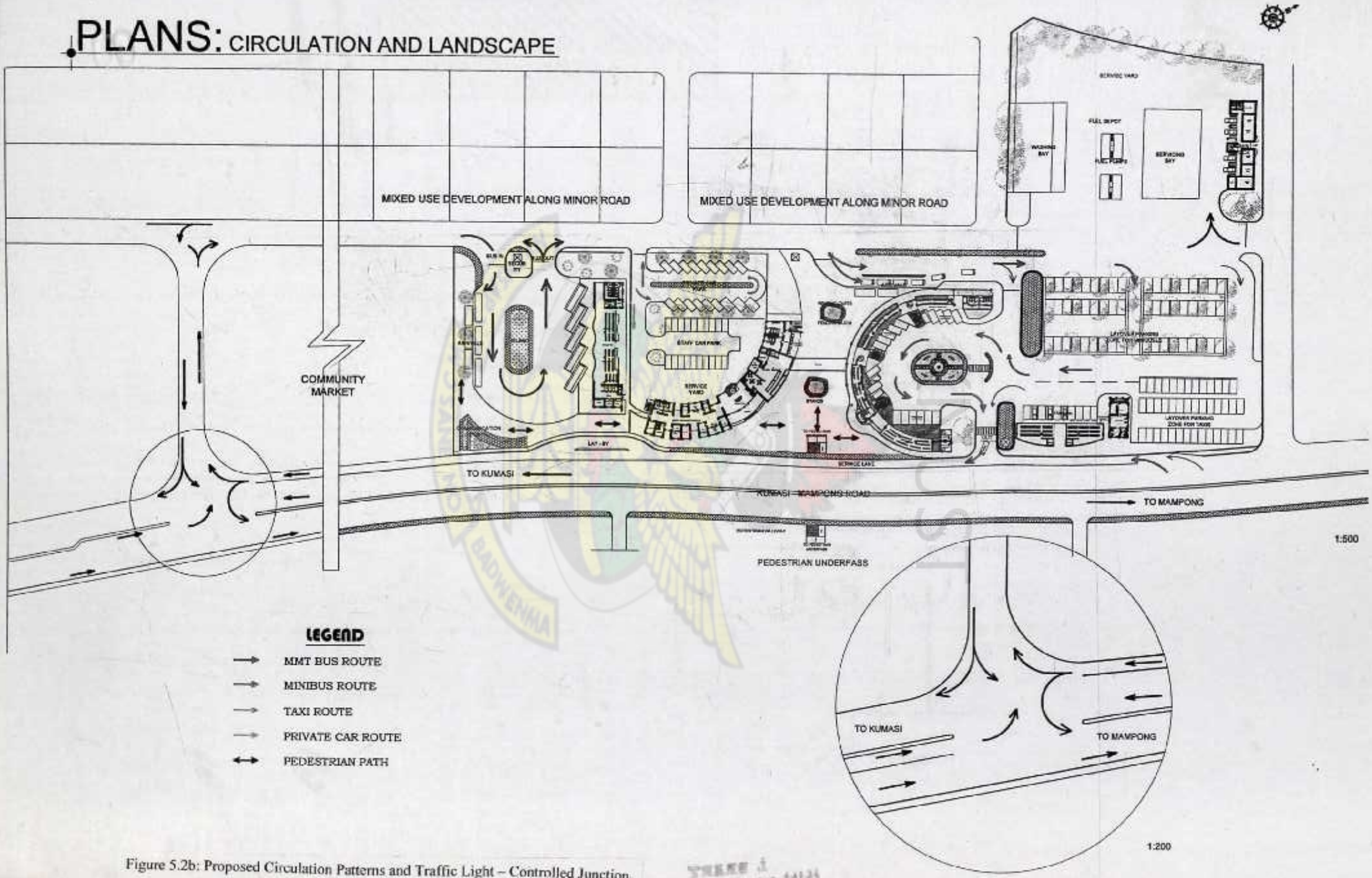


Figure 5.2b: Proposed Circulation Patterns and Traffic Light – Controlled Junction

Based on the data on the temporary average vehicular densities at the terminal, the proposed terminal is to accommodate 200 vehicles. Of this figure, 130 are to be commercial vehicles as follows: 70 minibuses, 50 taxis and 10 MMT buses. This breakdown is the result of the commuters' responses concerning their preferred means of public transport. The remaining 70 vehicles are to be private vehicles including staff vehicles that will use the terminal.

A means of controlling the number of vehicles that make use of the terminal to prevent congestion is to be provided at the security offices at the entry points. This is through the means of electronic sensors that will automatically count each vehicle as it enters and lock the gates when a programmed number of vehicles are within the terminal. As soon as a number of vehicles exit, the entry gates will be automatically unlocked to allow in more vehicles. A layover-parking zone for minibuses and taxis will be created to cater for the extra vehicles that await passengers during off-peak hours. This area will also serve as overnight parking zone for vehicles (both commercial and private) that park at the terminal for a fee (illustrated in Figure 5.2).

5.2.3 Management of the Terminal

The findings showed that the lack of a management body at the premises did not auger well for the activities at the terminal. Therefore, this terminal will be handed over to a private company to run its affairs in order to ensure law and order at the site. By doing so, the Tafo Town Council administration will also be freed of that responsibility and thus, can properly focus on other matters of the town. An administration block built on the premises will also house the management of the

various transport unions who will see to the general comportment of their members at the terminal.

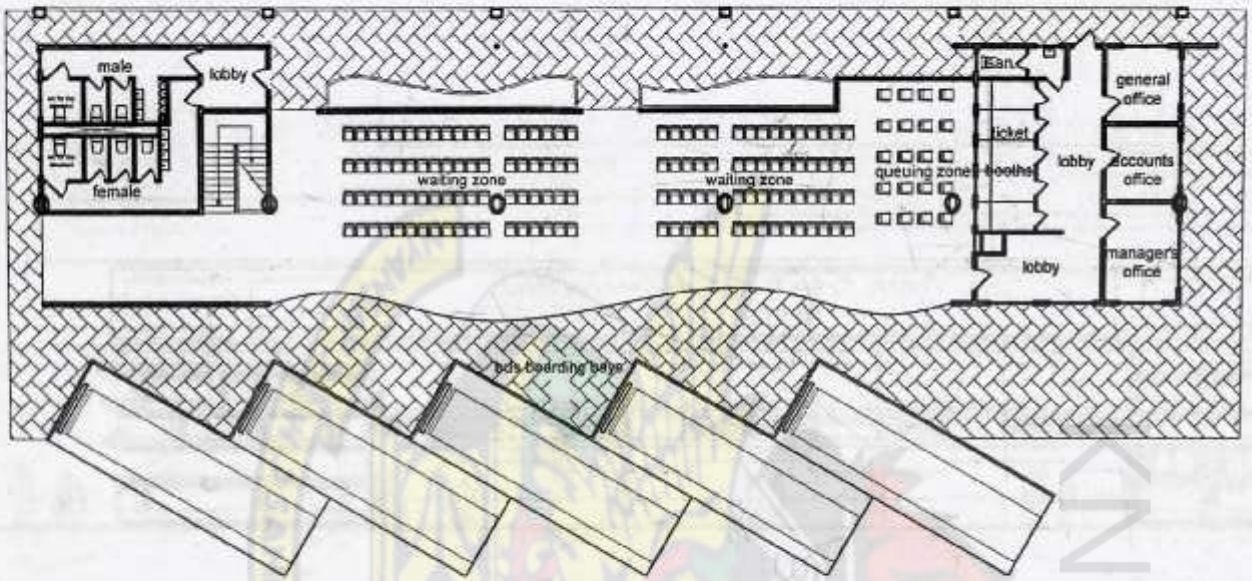
5.2.4 Facilities provided at the terminal

From the case studies done, the following infrastructures are found to be basic in the structure of terminal. They are ticket booths, arrival and offloading bays, and vehicle boarding bays. Others are sheltered waiting areas for passengers (both open and enclosed) and washrooms. Some passengers wait for sometime before having access to vehicles, especially in the evenings and because of this, facilities such as internet cafés, snack bars and restaurants will help them to put the time they spend waiting to better use. These facilities are shown in the designs in Figures 5.3, 5.4 and 5.5.

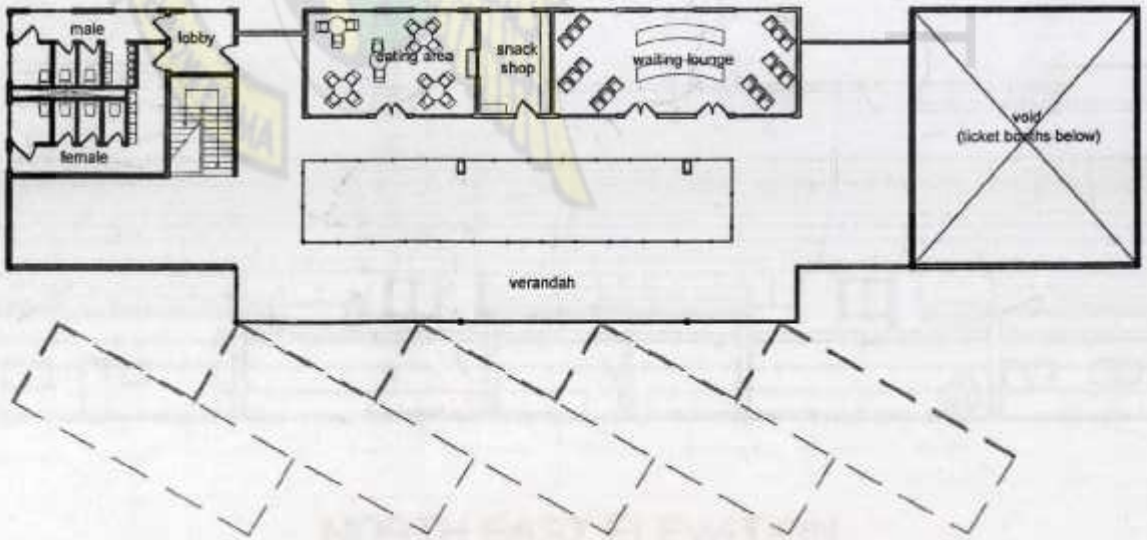
Street furniture provided under shade trees will be available for public use. Other facilities such as an administration block to house offices for the managers of the terminal (illustrated in Figure 5.6), seminar and meeting rooms, banking outlets, parking areas for non-commercial vehicles (including staff vehicles) and a few shops are also necessary if the overall functioning is to be without hitches.

Users of the terminal are not only passengers waiting to board or getting off vehicles. Drivers, conductors, hawkers, porters as well as technical and administrative staffs form a part of the usual daily users. The comfort of drivers and conductors are also important since they deal directly with the passengers. As such, they are to be provided with a common room complete with eating, resting and sanitary areas to help them socialize and to relax during the off-peak hours when the terminal is less busy (Figure 5.7).

PLANS: METRO MASS SHELTER



GROUND FLOOR PLAN



FIRST FLOOR PLAN

Figure 5.3a: The Proposed Metro Mass Transit Bus Shelter (Floor Plans)

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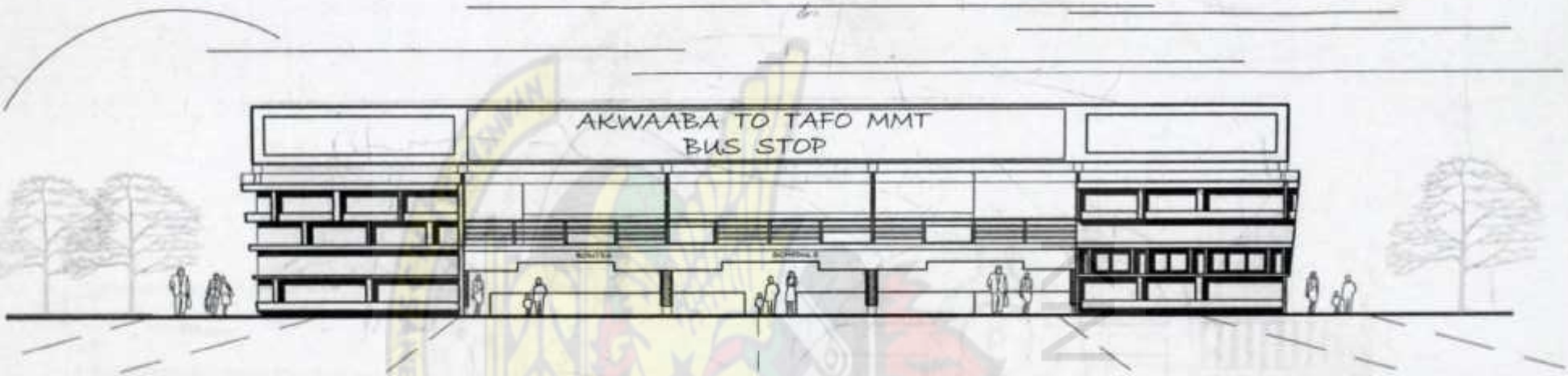
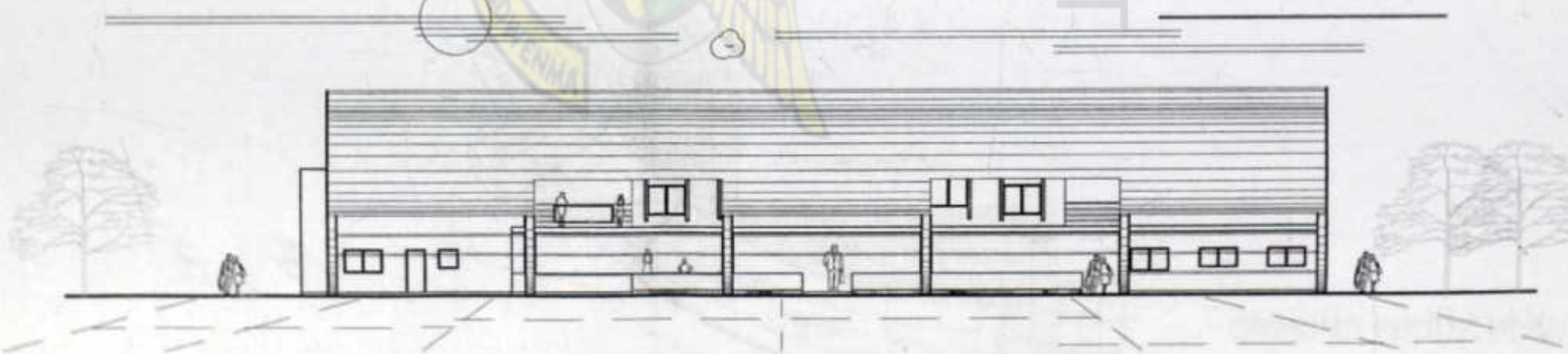
ELEVATIONS: METRO MASS SHELTER



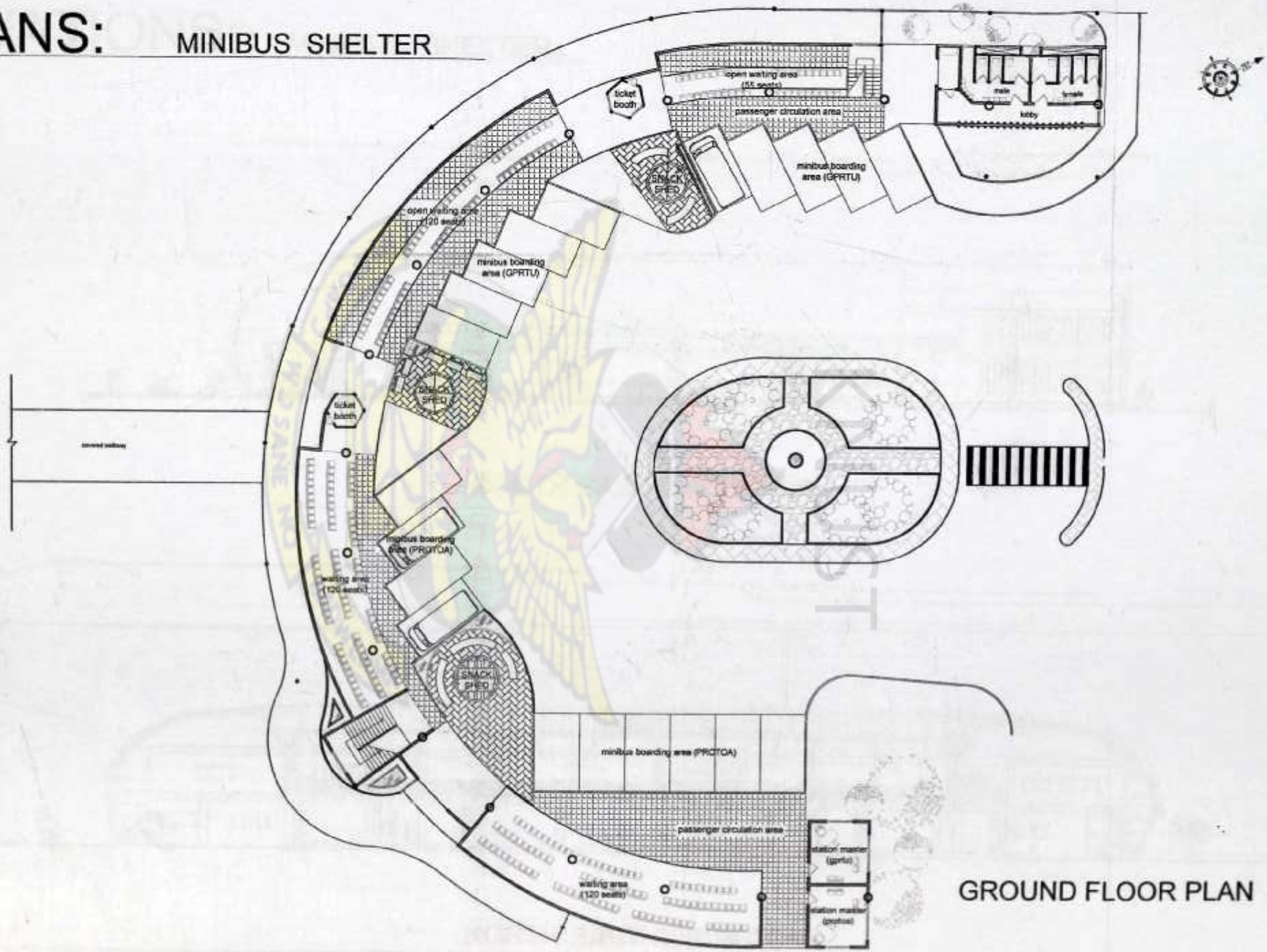
SOUTH WEST ELEVATION



NORTH EAST ELEVATION

Figure 5.3b: The Proposed Metro Mass Transit Bus Shelter (Elevations)

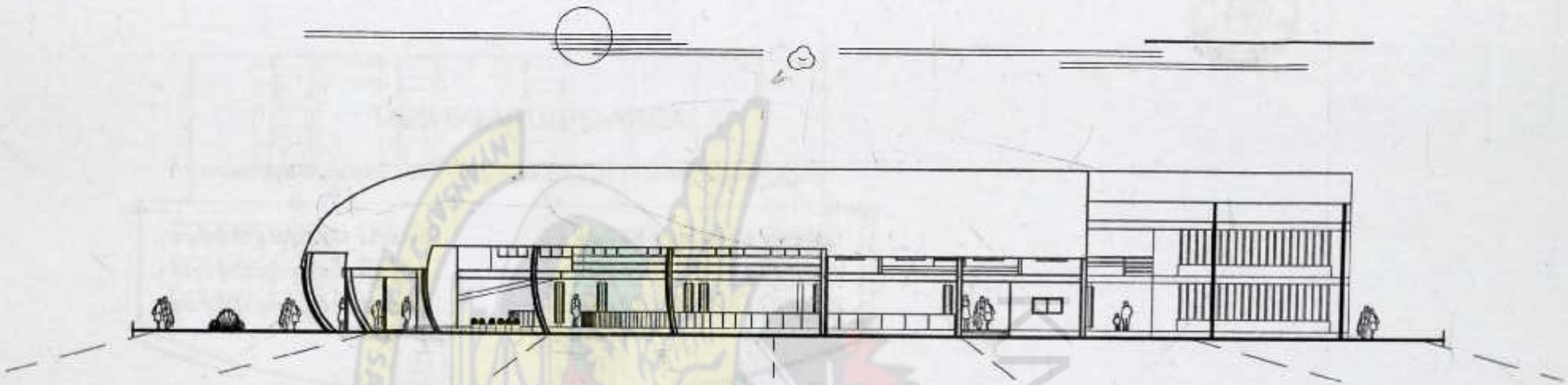
PLANS: MINIBUS SHELTER



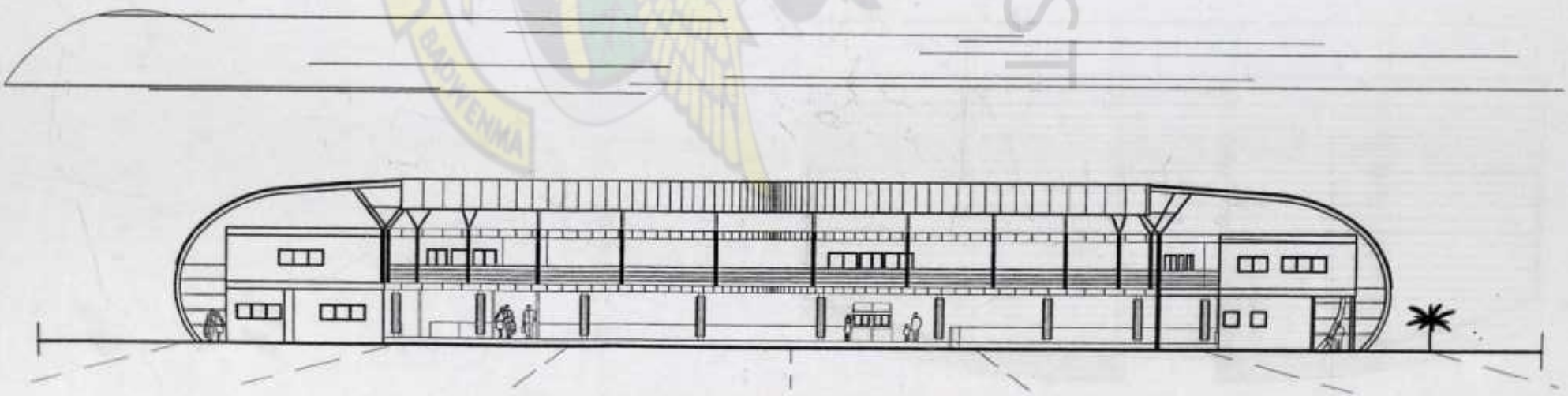
GROUND FLOOR PLAN

Figure 5.4a: The Proposed Minibus Shelter (Ground Floor Plan)

ELEVATIONS: MINIBUS SHELTER



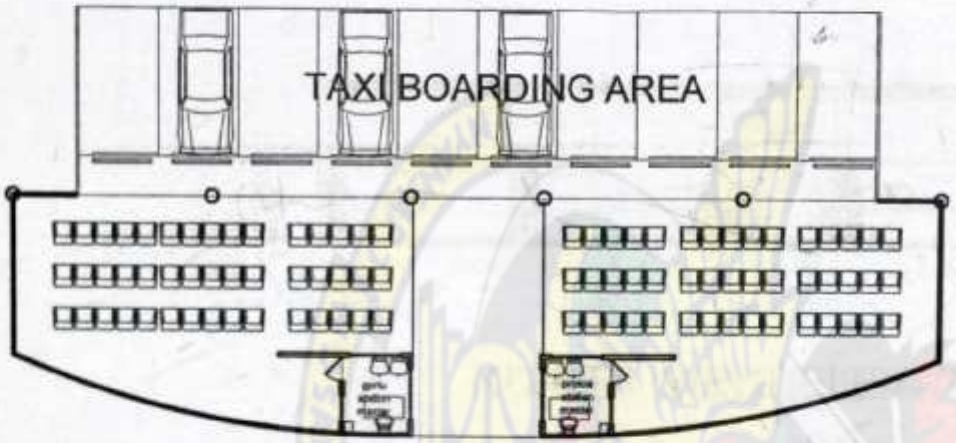
SOUTH EAST ELEVATION



NORTH EAST ELEVATION

Figure 5.4b: The Proposed Minibus Shelter (Elevations)

PLANS: TAXI RANK



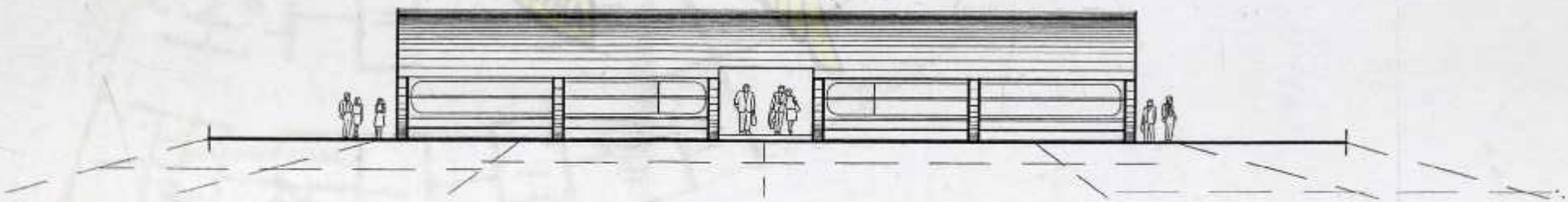
FLOOR PLAN

ROOF PLAN

Figure 5.5a: The Proposed Taxi Rank (Plans)

ELEVATIONS: TAXI RANK

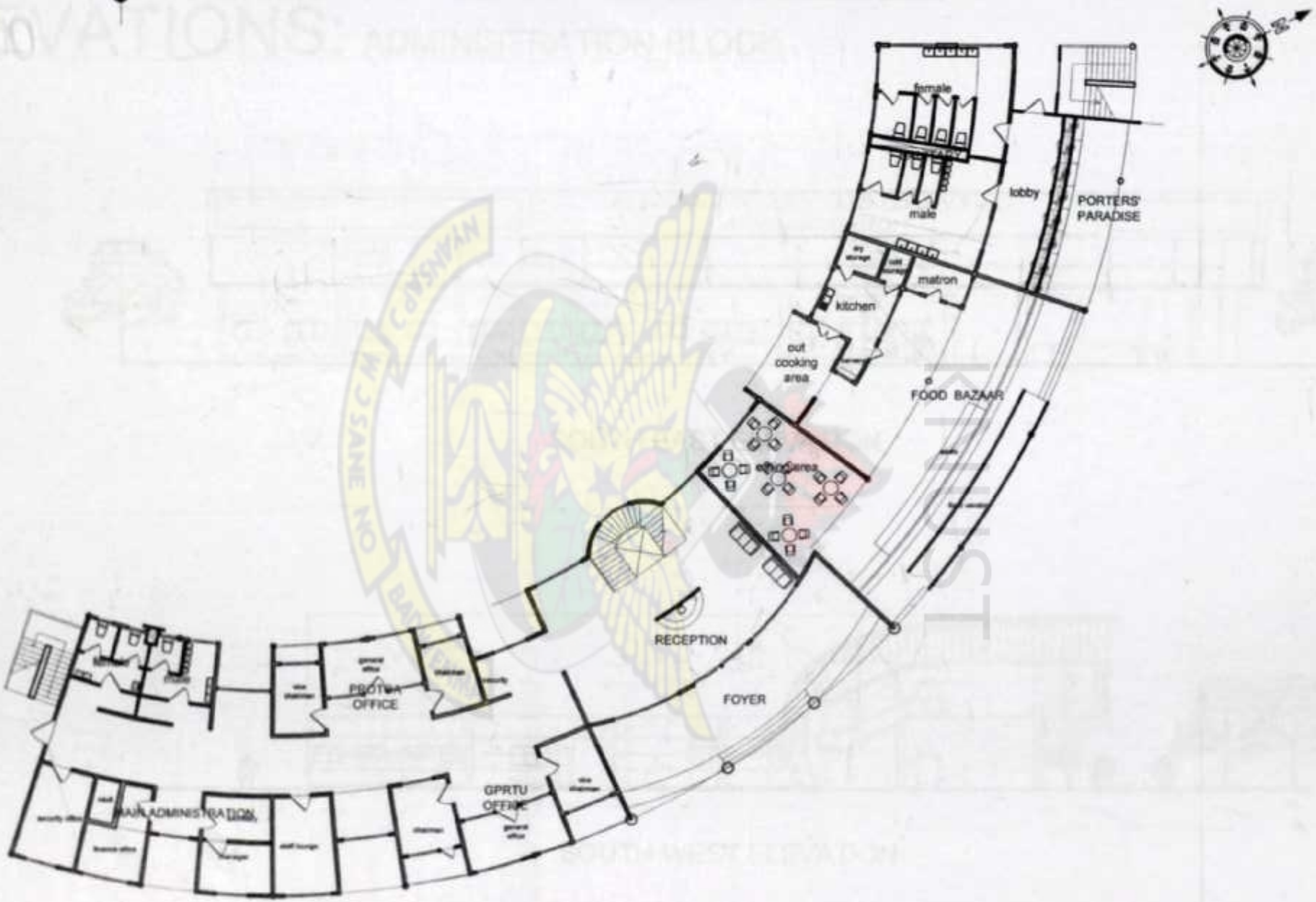
NORTH WEST ELEVATION



SOUTH EAST ELEVATION

Figure 5.5b: The Proposed Taxi Rank (Elevations)

PLANS: ADMINISTRATION BLOCK

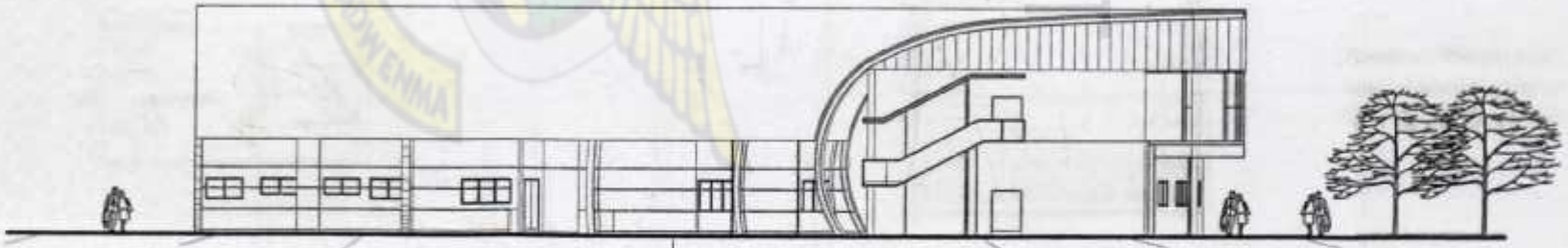


GROUND FLOOR PLAN

Figure 5.6a: The Proposed Administration Block (Ground Floor Plan)

ELEVATIONS: ADMINISTRATION BLOCK

SOUTH EAST ELEVATION



SOUTH WEST ELEVATION

Figure 5.6b: The Proposed Administration Block (Elevations)

PLANS: DRIVERS' WAITING UNIT

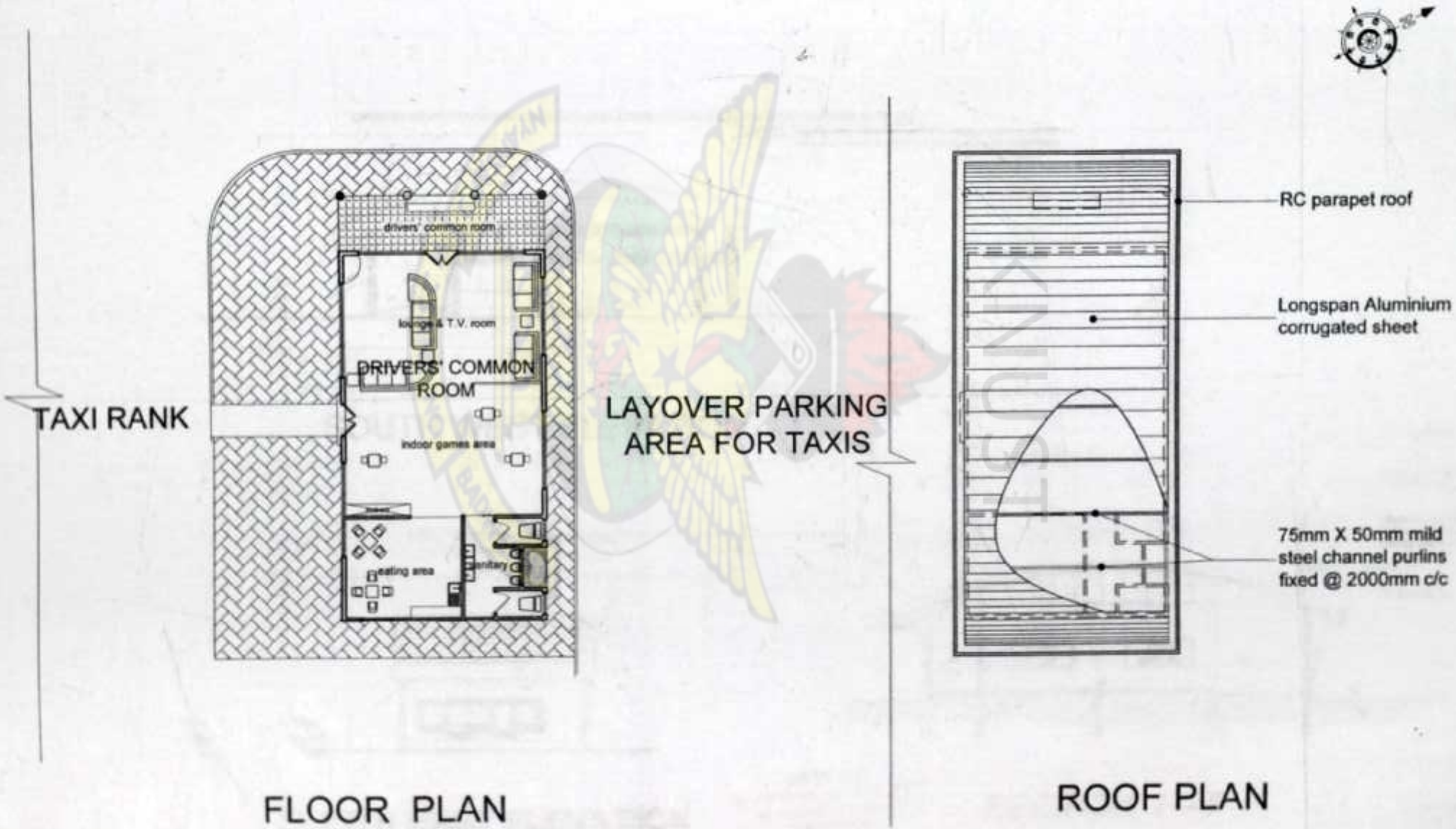


Figure 5.7a: The Proposed Drivers' Rest Room (Plans)

Basic services in the form of electricity and regular water supply will make using the terminal comfortable. Refuse disposal bins will be located at vantage points for public use. Ground treatment with soft and hard landscape elements are also necessary since the beauty of the whole terminal depends not only on the buildings but on the landscaping as well. Trees planted at vantage points will shade and help cool the microclimate of the terminal. Clearly defined pedestrian zones, road islands and well-paved vehicle parks add a touch to the overall appearance of the Old Tafo terminal to make it a comfortable and appealing facility to use. Figure 5.8 shows the proposed services and landscape layout of the terminal.

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5.2.5 The Safety and Security at the terminal

From the study, it is observed that no safety and security facilities are provided aside the security men who direct traffic at peak hours. As it is more prudent to use planning and design to address this issue than to rely heavily on security devices, the location of the terminal partly addresses the security issue. When people encounter and interact with each other, they serve as each other's keeper, evoking a sense of security in users. All areas of the terminal will be exposed without any dark alleys.

In order to reduce pedestrian-vehicular conflicts to the barest minimum, all activities that take place at the station will be segregated (shown in Figure 5.8). A pedestrian zone demarcated in the centre of the station will be for only human activities and will house a stairway leading to a pedestrian underpass meant for people to cross the busy Kumasi-Mampong road (illustrated in Figure 5.2). Road islands to define vehicular routes as well as pedestrian walkways will help to separate the activities of people from vehicles thereby reducing vehicular-pedestrian conflicts. Bollards painted in

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reflective, warning colours will be fixed on the kerbs so that visibility is not hindered at night or during foggy days.

Secondary security systems such as closed circuit cameras and televisions (CCTV) monitoring activities all over the facility and alarm systems will be employed. Fire hydrants are to be located at vantage points on the site for easy access by fire engines. Within the buildings, fire foam and extinguishers will be provided at easily accessible points such as on columns. Security men will also be at the entry and exit checkpoints to enforce law and order at the terminal.

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Maximum security at night is also important. This will be achieved by the provision of security lights around the car parks, taxi rank and bus bays. Amenity lights will be fixed on the lawns and on passenger concourses while streetlights are to be provided around the site periphery for full night lighting of the station.

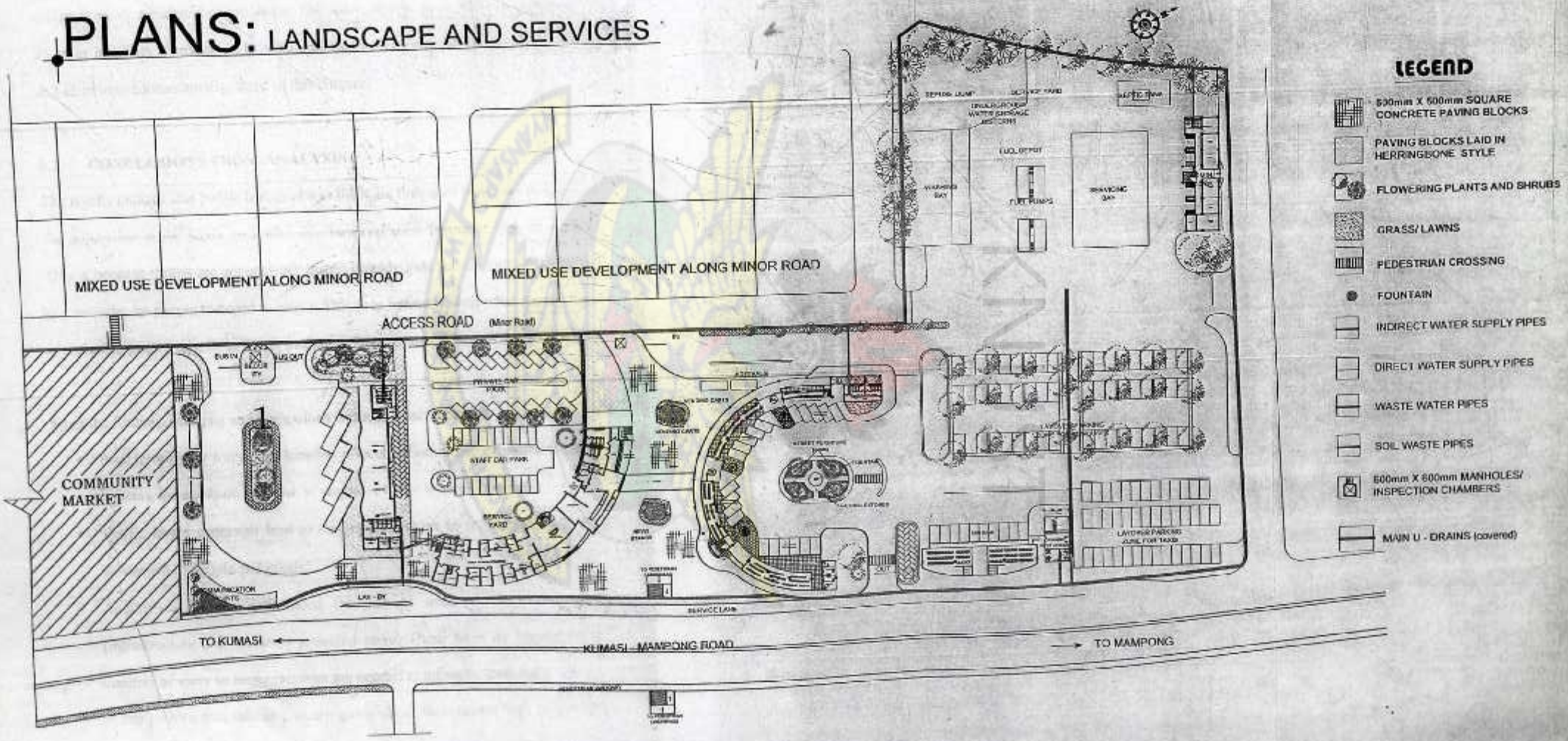

Figure 5.8: Proposed Service and Landscape Layout

CHAPTER SIX: CONCLUSIONS AND RECOMMENDATIONS

6.1 PREAMBLE

This study explored intra-city transport terminals and their impact on users in Kumasi, studying the case of the Old Tafo Lorry Park. It also proposed a model design to solve the identified problems. The solutions can be adjusted and applied to all other intra-city terminals in Kumasi and Ghana. The conclusions from the study and recommendations are discussed in this chapter.

6.2 CONCLUSIONS FROM ANALYSIS

The results indicate that public transport was the main means of travel for majority of the population at the study area with minibuses as their favourite type of vehicle. This is because trotros are economical, faster, quickly gets full up and could stop at any bus stop for people to board or alight. This is in harmony with what Ausubel and Marchetti suggest as the three travel instincts of man (Ausubel and Marchetti, 2001).

From the findings, analysis and discussions it can be concluded that

- Poor terminal or lorry park location affects optimum use of public transport systems, as people do not wish to patronise badly located terminals.
- Traffic levels generated lead to congestion, which in turn causes delays in movement of people and goods.
- Another factor that influenced the use of terminals is the facilities (infrastructure and services) provided there. These have an impact on the comfort of users so better facilities are needed at intra-city terminals.
- When patrons feel safe and secure going about their duties, they patronise a terminal.

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6.3 RECOMMENDATIONS

The following are recommended as part of efforts to enhance and uplift the image of the intra-city transport terminal to make it a comfortable facility for use by all:

1) The terminal should be located where it is easily accessible by both humans and vehicles. At the same time, the location should not be one that will encourage the generation of vehicular traffic on major roads. Accesses into and out of the facility should be tapped from roads with less vehicular movement (also known as minor roads). In instances where that cannot be the case, a service lane is to be provided to prevent direct entry and exit to major roads.

2) It is proposed that to adequately serve the needs of the people, all activities that go on within the terminal should be segregated to reduce regular pedestrian-vehicular interaction leading to conflicts. The various sections are to be linked with covered walkways so that users are able to move from one point to the other and to locate what they want easily without getting lost or confused.

3) Adequate sheltered waiting areas are to be provided fitted with the required furniture. Other necessary infrastructure and services such as drivers' rest rooms should be made available to ensure regular user comfort.

4) A layover-parking zone should always be provided so that during off-peak hours when there not many passengers, the empty vehicles park there while

their drivers and conductors relax. When this is provided, loading bays are made free with just a few vehicles parked there.

5) An electronic system of counting of vehicles should be provided at the security checks at entry points to know when the terminal is almost full. Automatic sensors will lock the gates until a number of vehicles exit from the terminal. This is to prevent congestion of vehicles within the terminal.

6) Safety and security issues are to be thought of in the initial planning and design stages. This will go a long way to enhance the end result of the facility.

6.4 CONCLUSION

Architecture is about solving problems. Usually the solution that takes into consideration the past, present and future trends is most welcome as it addresses all issues. As Gail Plummer once said, 'improvements, refinements and changes come easily when one has a pattern to follow', a knowledge and understanding of the existing situations at intra-city terminals will influence future proposals for the planning and designing of these facilities.

This study of the existing situation and subsequent proposal for the future has attempted to solve the problems that repel users of public transport from using intra-city terminals.

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APPENDIX 1

QUESTIONNAIRE

ENHANCING THE IMAGE OF INTRA-CITY TRANSPORT TERMINALS IN KUMASI, GHANA

Dear Patron,

This questionnaire is intended to obtain information from you about intra-city transport terminals (lorry parks or 'trotro' stations). The researcher is a student of the Department of Architecture, KNUST, Kumasi and she would like to find out your favourite means of public transport, what accounts for the choice and some problems you encounter in the use of public transport facilities.

The information is for academic study only and your responses will be kept in confidence. Thank you very much for your assistance in completing this questionnaire.

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1. What activities bring you to this station?
   (a) Work (includes vehicle workers, vendors, porters, management body)
   (b) Commuting

2. How often do you travel by public transport?
   (a) Daily
   (b) Weekly
   (c) Monthly
   (d) Rarely

3. Which of the following below is your main means for daily intra-city travels?
   (a) Taxi
   (b) Minibus (*Trotro*)
   (c) Metro Mass Transit (MMT) bus
   (d) Private vehicle

4. Rank the following in order of preference as means of public transport by writing 1st, 2nd, and 3rd, against your choice.
   (a) Taxi
   (b) Minibus (*Trotro*)
   (c) Metro Mass Transit (MMT) bus

5. Which of the following above will you not board if given a choice and why?
   (a) Taxi
   (b) Minibus (*Trotro*)
   (c) Metro Mass Transit (MMT) bus

   .....

   .....

.....
.....

6. How often do you use this terminal?
   (a) Every day (b) Every other day (c) Weekly
   (d) Monthly (e) Rarely

7. What do you think of the situation at this terminal with respect to facilities and services offered?
   (a) Very Bad (b) Bad
   (c) Average (d) Good
   (e) Very Good

8. What, in your opinion, are some facilities you would want at this place to make using the terminal more comfortable?
   .....
   .....
   .....
   .....
   .....

9. Do you like where this station is located? How easy is it for you to get here to board a vehicle?
   .....
   .....

10. If given a choice would you board a vehicle from here (this station) or you would prefer the moving ones that pick up passengers along the way ('hit and run' style)?
   .....
   .....
   .....

11. What improvement(s) would you like to see in the services offered by:
   (a) Taxi: .....
   .....
   (b) Minibus (Trotro): .....
   .....
   (c) MMT buses:.....
   .....

12. Are you comfortable and safe using this terminal? Why?
   .....
   .....

.....

.....

13. Personal Information

P1. Gender: a. Male b. Female

P2. Age:

P3. Occupation: .....

Thank You

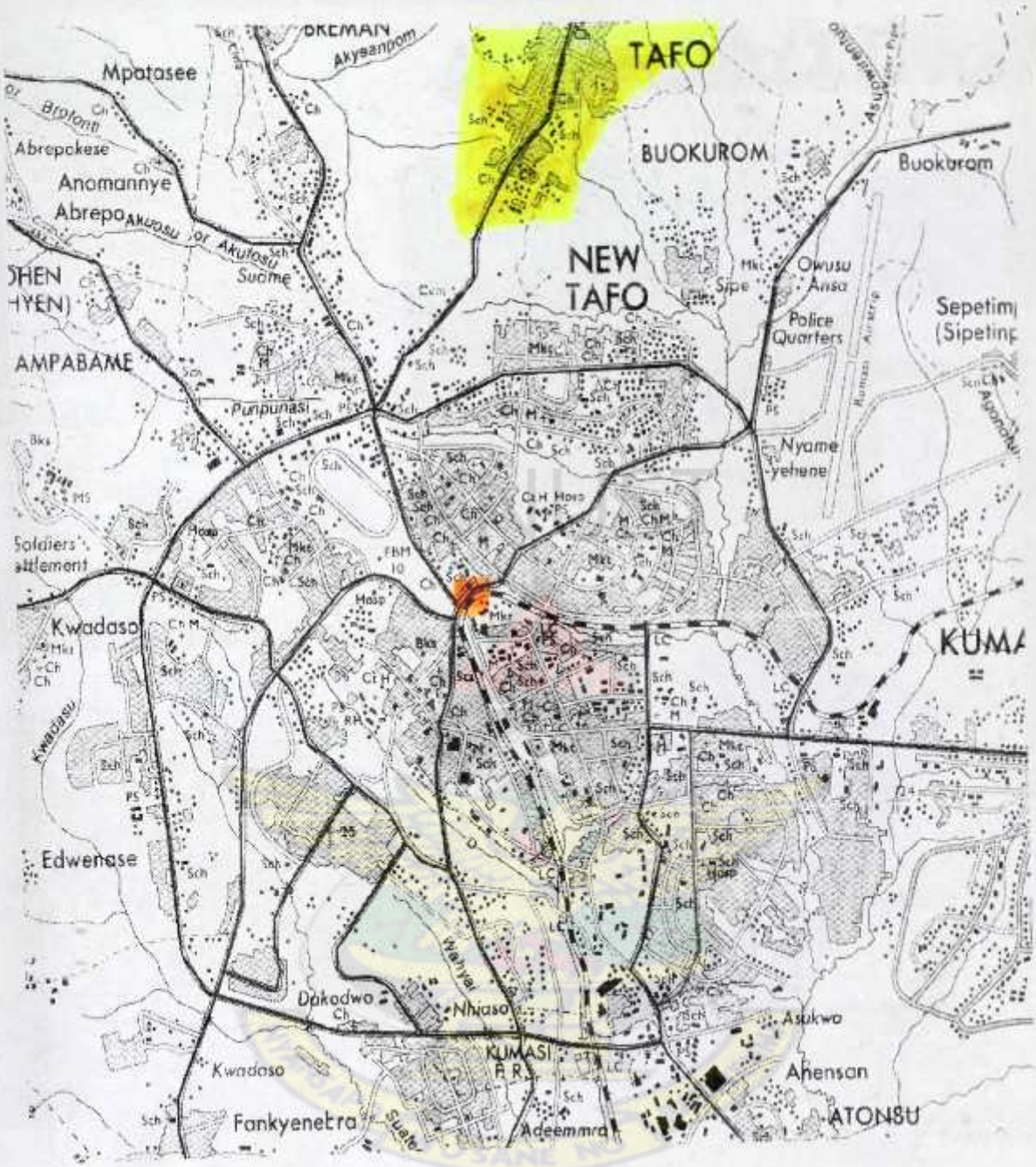
Gloria Osei-Poku
Department of Architecture
KNUST, Kumasi

INTERVIEWS

The following stakeholders were interviewed in a one-on-one manner for information for the study:

- Alhaji Issah Ali, Deputy Regional Chairman at the Ashanti Regional Secretariat of the GPRTU about organisation of unions at transport terminals.
- Mr. Kofi Nti Appiagyei, Development Engineer, Department of Urban Roads, Ashanti Region for information on lorry stations in the region.
- Mr. Gabriel Thompson, Head of ICT and Finance, Freko FD Company, Managers of the Kejetia Terminal for information on Kejetia Lorry Park.

APPENDIX 2



Map of Kumasi, showing the Study Area (Source: KMA, 2004)

LEGEND

KEJETIA

OLD TAFO

SITE INVENTORY - *STUDY ON EXISTING LORRY PARK*

ACTIVITIES AT THE LORRY PARK

SANITARY AREAS AND WASTE HANDLING AT THE LORRY PARK

FOOD VENDORS SELLING ALONG THE MAIN ROAD.

VULCANIZERS - A PART OF VEHICLE SERVICE SHOPS FOUND AT THE LORRY PARK

TAXIS PARKED IN A ROW AWAITING PASSENGERS

VARIOUS KINDS OF COMMERCIAL ACTIVITIES AT THE LORRY PARK.

A SECTION OF MINI BUSES (*TROTRO*) THAT OPERATE FROM THE LORRY PARK.

COMMERCIAL

EXISTING LORRY PARK

KUMASI - MAMPO

COMMERCIAL - RESIDENTIAL

COMMERCIAL -

OBSERVATIONS

- **QUEUING MODES OF PASSENGERS**
  NO WAITING AREAS PROVIDED.
  PASSENGERS QUEUE IN THE OPEN WHEN THEY HAVE TO WAIT FOR VEHICLES.
- **BOARDING AND DISEMBARKING**
  NO PROPERLY DEMARCATED LOADING AND ARRIVAL BAYS.
- **ACCESS**
  WELL DEFINED ENTRY AND EXIT POINTS MANNED BY SECURITY.
- **SERVICES**
  BASIC SERVICES IN THE FORM OF ELECTRICITY, PIPE BORNE WATER AND TELEPHONE LINES ARE AVAILABLE.
- **GENERAL OBSERVATIONS**
  GROUND HAS NOT BEEN TREATED. DUST AND DIRT COVER THE SITE. DURING RAINS, THERE IS A LOT OF MUD.

THE PRESENT LORRY PARK LACKS A LOT OF FACILITIES WHICH ARE NEEDED FOR IT TO FUNCTION EFFICIENTLY AND EFFECTIVELY.