

**PUBLIC TRANSPORT INTERCHANGES AS POSITIVE
URBAN LIVING ENVIRONMENTS**

Belinda Verster

**PUBLIC TRANSPORT INTERCHANGES AS POSITIVE
URBAN LIVING ENVIRONMENTS**

by

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**Thesis submitted in fulfillment of the requirement for the Magister
Technologiae: Town and Regional Planning**

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CAPE TECHNIKON

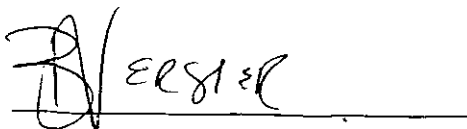
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Cape Technikon**

EXTERNAL SUPERVISOR: J. R. PRINSLOO

**CAPE TOWN
October 2004**

DECLARATION

I, Belinda Verster, hereby declare that the contents of this thesis represent my own work, and that it has not previously been submitted for academic examination towards any qualification at any tertiary institution. Furthermore, it represents my own opinions and not necessarily those of the Cape Technikon.

A handwritten signature in black ink, appearing to read 'B. Verster', is written over a horizontal line.

Belinda Verster

ABSTRACT

Urban environments are by their very nature vastly complex with regard to the way they operate and how they perform in terms of quality of life.

The influence of public transportation on the urban environment was highlighted by the erstwhile South African Minister of Transport, Mr Abdulah Mohamed Omar (Department of Transport 1999) when he said that in order to ensure sustainable urban environments, public transportation needs to be the preferred mode of motorised transportation in our cities.

In order for this target to be reached, as set by the Minister, it is clearly necessary that the public transportation system operates at its optimal level and that existing deficiencies be identified and addressed. One typical, under-achieving element in the public transportation systems of cities in the developing world is in fact the Public Transport Interchange (PTI).

The quality of PTIs and their surrounding urban environments has been seriously neglected and ignored in the past. Evidence strongly suggests that PTIs have the potential to provide fundamental preconditions for social and economic development locally and in some instances in the wider metropolitan context.

For this potential to be realised, a set of performance measures needs to be identified specifically for PTIs as an evaluating tool and to guide upgrades and new developments.

However, before such performance measures can be proposed, a full understanding of what a positive urban living environment could be in the context of PTIs, needs to be developed.

In summary, the objective of this research project is to address the existing shortcomings associated with Public Transport Interchanges by setting performance indicators for evaluating and developing PTIs in the developing world context, with specific emphasis on Cape Town, South Africa.

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 - My family!
-
- The financial assistance of the National Research Foundation, Southern Transportation Centre of Development (*National Department of Transport*) and the Cape Technikon is hereby acknowledged. Opinions expressed in this thesis and the conclusions arrived at, are those of the author and are not necessarily to be attributed to the National Research Foundation, Southern Transportation Centre of Development nor the Cape Technikon.

DEFINITIONS AND CONCEPTS

Closed questions

These questions provide response categories. They work better than open questions in situations where there are preferences for inexpensive structured information. Closed questions also work well when data is gathered by telephone, and they are a must for self-administered questionnaires, because most respondents simply will not write answers to open questions (Sudman&Blair, 1998: 267-268).

Intercept surveys

Intercept surveys allow face-to-face interviewing at a much lower cost than in-home surveys because travel costs are eliminated. In most intercept surveys, interviewers are sent into a specific study area (Sudman&Blair, 1998: 156-159).

Mixed method approach

This approach is one in which the researcher tends to base knowledge claims on pragmatic grounds (e.g. consequence-orientated, problem-centred, and pluralistic). It employs strategies of inquiry that involve collecting data either simultaneously or sequentially to best understand research problems. The data collection involves gathering both numeric information as well as text information so that the final database represents both quantitative and qualitative information (Creswell, 2003: 18-20).

Open questions

These are questions without response categories. Open questions are advisable when you do not know what answers to expect (Sudman&Blair, 1998: 267-268).

Pedestrian range

The maximum distance a person is willing to travel on foot for a specific service, facility or amenity.

Pilot study or field-testing

This is the process of pre-testing questionnaires on a small population. Every researcher should give the questionnaire to at least half a dozen people, to test whether there are any items that they may have difficulty in understanding or in comprehending exactly as to what the writer of the questionnaire is seeking to determine (Leedy, 1980: 100).

Pre-tests (or pilot tests) involve administering the questionnaire under field conditions to a sample of ten to fifty respondents. This testing usually comes after the questionnaire has gone through basic testing and been revised. The major purpose of the pre-test is to uncover any remaining problems in the questionnaire. The pre-test is also used to time the interview. Finally, the pre-test is used to identify questions that are not useful (Sudman&Blair, 1998: 300-301).

Population units

The first step in defining a population is defining the population units. Is the population made up of individuals, households, companies, factories, transactions, sales, etc? The definition of population units for any given research project depends on what product or service is being studied, what market segments are of interest, and what phenomena are of interest (Sudman&Blair, 1998: 334-335).

Public transport interchange

Place where modes of transport are integrated and where a change in direction is possible (City of Cape Town. Planning and Development Directorate, 1999).

“Any passenger facility where transport services are in sufficiently close proximity that transfer between them, or to another mode, is practicable and cost effective or could be made so” (The Institute of Logistics and Transport. United Kingdom, 2000).

Sample bias

Members of a sample may differ from the larger population to which the specific study may be applicable. Defining the correct population of interest can create an unbiased sample (Creswell, 2004: 333-335).

Sample population

This term refers to a selection of a sample from the total population, from which data must be extracted (Leedy, 1980: 118).

The sample should be carefully chosen that through it the researcher is able to see all the characteristics of the total population in the same way that he/she would see them were he/she actually to inspect the totality of the population (Leedy, 1980: 111).

Stratified random sampling

In this case, the population, instead of a homogeneous mass, is composed of layers (strata) of discretely different types of individual units (Leedy, 1980: 119).

Stratification means that specific characteristics of individuals are represented in the sample, and the sample reflects the true proportion of individuals with certain characteristics of the population (Creswell, 2004: 156).

When randomly selecting people from a population, these characteristics may or may not be present in the sample in the same proportions as in the population; stratification ensures their representation (Creswell, 2004: 157).

In stratified sampling, the population is separated into subgroups, called strata, and separate "simple random sampling" are drawn for each subgroup (Sudman&Blair, 1998: 348).

Urban living environment

An area with a large concentration of people and activities in a predominately man-made environment. This environment also refers to our social, cultural and economic surroundings, and our interaction with these surroundings. The natural environment is integrated with the built environment.

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PART A: POSITION STATEMENT

The essential approach chosen in this thesis is to verify the validity of spatial concepts, ideas and theories (posed in traditionally accepted literature, the non-spatial context, case studies and end-user surveys) pertaining to the quality of urban places. It needs to be noted, however that this study is confined to the urban qualities of public transport interchanges specifically, and not to the qualities of the city as a whole.

Public transport interchanges form a component of a metropolitan area's transport system. Transport systems go beyond providing opportunities of mobility in that their design and performance also directly influence patterns of growth and economic activities. The quality of a given transport system thus influences not only its primary function of transporting people and goods in an urban area, but also its capacity to initiate and sustain certain growth centres in the city. Part A investigates some pertinent aspects associated with public transport systems, and specifically public transport interchanges, and suggests certain methodologies for this research project.

CHAPTER 1

THE RESEARCH PROBLEM AND ITS SETTING

1.1 STATEMENT OF THE RESEARCH PROBLEM

Public Transport Interchanges (PTIs) do not adequately perform their full functions in the operation of liveable cities. By identifying relevant performance measures, it can be shown how PTIs can be improved so that they may contribute to a positive urban living environment.

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1.2 BACKGROUND TO THE RESEARCH PROBLEM

The importance and significance of PTIs should be seen against the background of efficient public transport systems. For this reason the following is submitted:

1.2.1 The Importance of Public Transport

Literature suggests that in order to ensure sustainable and equitable cities, public transport should be the preferred transportation mode. The Moving South Africa document (South Africa. Department of Transport, 1997b: 9) is quite specific with its expectation of an 80:20 ratio between public and private transport.

This position of favouring public transport, is taken by Vuchic (2000), who highlights two basic features of public transport, clearly signifying that it should be seen as a solution to urban transport problems rather than a contributor:

- "...As a public system, transit (public transport) is open and available to most of the population..." (Vuchic, 2000: 37).

This implies that it is accessible and equitable, unlike the private vehicle, which is highly exclusive and accessible to only the more affluent and thus a small percentage of the South African population.

- "Transit has far greater transporting capacity, lower area requirements, and fewer negative side effects per passenger trip than does the auto/highway system" (Vuchic, 2000: 37).

The negative effects of transporting large numbers of people, such as environmental pollution or the space taken up by parking areas and extensive road infrastructure, would be mitigated by using a high-capacity transport system instead of a high number of low capacity vehicles.

Vuchic (2000: 50-52) further emphasises the importance of public transport in terms of its role as an integrator, especially with “socially isolated population groups”.

People from disadvantaged backgrounds could thus, through efficient public transport, it is argued, enjoy the same socio-economic benefits that the private vehicle would offer its users.

Laconte, in his work, *Transportation Networks in Urban Europe*. (1992: 93-113) states the following reasons as to why public transport is important in urban areas:

- It saves valuable city space and also occupies it for a shorter time. unlike the private vehicle that needs to be parked in a space for a major part of the day.
- The cost to the individual is lower compared with private cars, and therefore there is greater affordability for a greater number of people.
- It can bring about major improvements to urban structure in that:
 - It can free space which would otherwise be used for roads and parking, and release it for other purposes.
 - Fast public transport helps to bring people to the city centres and reduces the number coming in by car. thus reducing traffic congestion.
 - It is far less damaging to the city environment per passenger carried in terms of space consumption. energy consumption, pollution, noise levels and safety.
 - Improving public transport makes cities more accessible which then enhances their capacity to develop, and reinforces their economic and social strengths.

The importance of public transport can be summarised by identifying four realms to which it can contribute:

Economic

Typically, large cities have the highest levels of productivity in the economy, and when transport policy reduces congestion, or results in this being minimised, the benefits to the local economy, national economy and personal incomes are considerable.

Social

Public transport provides an important step on the economic ladder for the urban poor, allowing them to access jobs. Social upliftment and a higher standard of living can become a reality for those with access to employment opportunities.

It also can afford access to the vulnerable groups (young, elderly, women), the mobility handicapped and other special-needs passengers (Cape Metropolitan Council, 1998: 11).

Development

Public transport can be seen as a "metropolitan structuring device" (Cape Metropolitan Council, 1998: 11) where increased accessibility can result in intensified development.

Environment

Air pollution is becoming the most pressing environmental problem in many cities, and the prime cause can be road traffic. Good public transport, by minimising congestion and by moving people in less polluting vehicles, can thus be an environmentally friendly transport option.

1.2.2 The Land Use and (Public) Transport Relationship

The dispersing of different land uses in a city necessitates movement. If the average distance exceeds the pedestrian range, the majority of people are dependent on public transport to reach opportunities.

Land uses thus have a direct influence on the movement demands and patterns of city inhabitants, whilst on the other hand; transport provides the necessary access certain land uses are dependent on.

Accessibility should be the key factor in ensuring sustainable cities and not mobility as was the case in the past. Mobility is “merely a means to an end – accessibility” (International Union of Public Transport. United Nations. 1996: 9).

An interesting question arises from the Moving South Africa document, as to the circumstances under which transport should lead and where it should follow spatial planning? (South Africa. Department of Transport. 1997b: 12). This issue is to a large extent resolved in the context of the specific study area. The interdependence, though, of land use and transport is undeniable, which means the only sustainable solution would be for the two to be developed in tandem: in cognisance of each other and in support of each other.

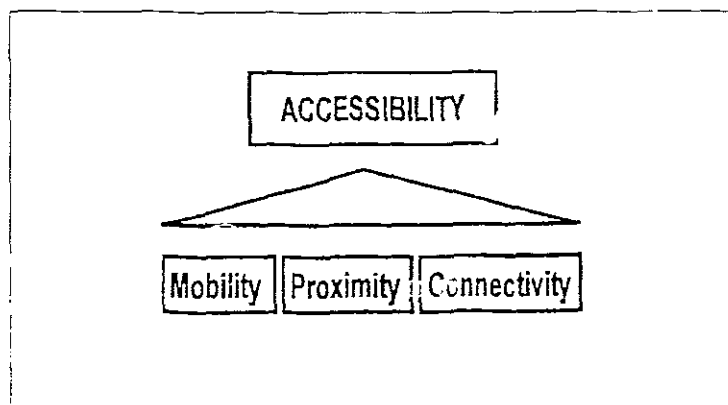


Figure 1.1 “Accessibility is a function of land use configuration (proximity), transport networks and services (connectivity) and systems performance, or quality of movement (mobility)” (Source: Haiden & Vieira, 1999).

1.2.3 The Situation Confronting Public Transport in South Africa

A number of threats to the current public transport system are identified in a publication by Kwazulu-Natal, Department of Transport (2002). These can also apply in the broader context of South Africa and can result in the total failure of the present system throughout the country, because of:

- Escalating subsidies
Public transport is not efficient in most South African cities because of low densities and segregation between places of opportunities and places of residence. This has resulted in a highly subsidised and unsustainable system.
- Declining service levels
An infrequent public transport service has resulted in the system losing appeal with users.
- Dilapidated infrastructure
Fixed and rolling stock is in a neglected state, which would need major investment to upgrade.
- Rapid motorisation
An increase in private-car usage is in direct competition with public transport usage. On account of the freedom the car affords its user, it's the favoured choice if the choice exists.
- Violence
Public transport in South Africa is known for unsafe travelling conditions. This is a definite deterrent to the use of the public transport system if other options exist.

- Entrenched apartheid land-use structures resulting in urban sprawl
The demand for movement over large distances in urban areas is extreme in South Africa as a consequence of the separation of residential areas on a racial basis as well as the separation of land uses. This has resulted in most South African cities being unsustainable.

Public transport is under pressure to render an economically viable service under these conditions.

The Kwazulu-Natal Department of Transport (2002) suggests the most important causes for the existing public transport inadequacies to be the apartheid legacy, the wasteful duplication of services and the destructive competition that exists amongst different public transport modes (especially bus and minibus taxi).

In addition to the above, the old-fashioned and conservative approaches to transport development such as an emphasis on car-orientated cities have resulted in the systems' inadequacies. Very few existing projects e.g. cross-subsidisation of the general system by a more luxurious public transport system or aggressive moves to identify and enforce the roles of different modes in the public transport system were ever developed further than the proposal stage. These approaches have played a major role in South Africa's outdated and inefficient public transport system.

1.2.4 The Significance of Public Transport Interchanges (PTIs)

Worldwide there is an increased need to interchange between modes of transport (Terzis *et al.* 2000). In South Africa this is due to the following factors:

- The increased dispersal of activities. Relocation of places of employment results in dispersed activities all over the city, which in return results in more complicated travel patterns. The resultant

travel patterns can as a consequence generate the need for more interchanging to take place.

- Customer-based public transport system. National Transport policies strongly suggest that public transport needs to fulfil roles beyond serving the commuter (i.e. work-home trips) and should also be customer-based and allow travel to an array of destinations catering for a variety of people and users including children, the aged, women, handicapped persons. This would imply universal access and a wider user-base than only commuters.

The PTI as a catalyst for nodal development

Many areas of cities are plagued by underdevelopment. A PTI can be seen as a means of overcoming this problem in that it is a point of concentration of opportunities (social, economic), which collectively provide the positive preconditions for developmental efforts.

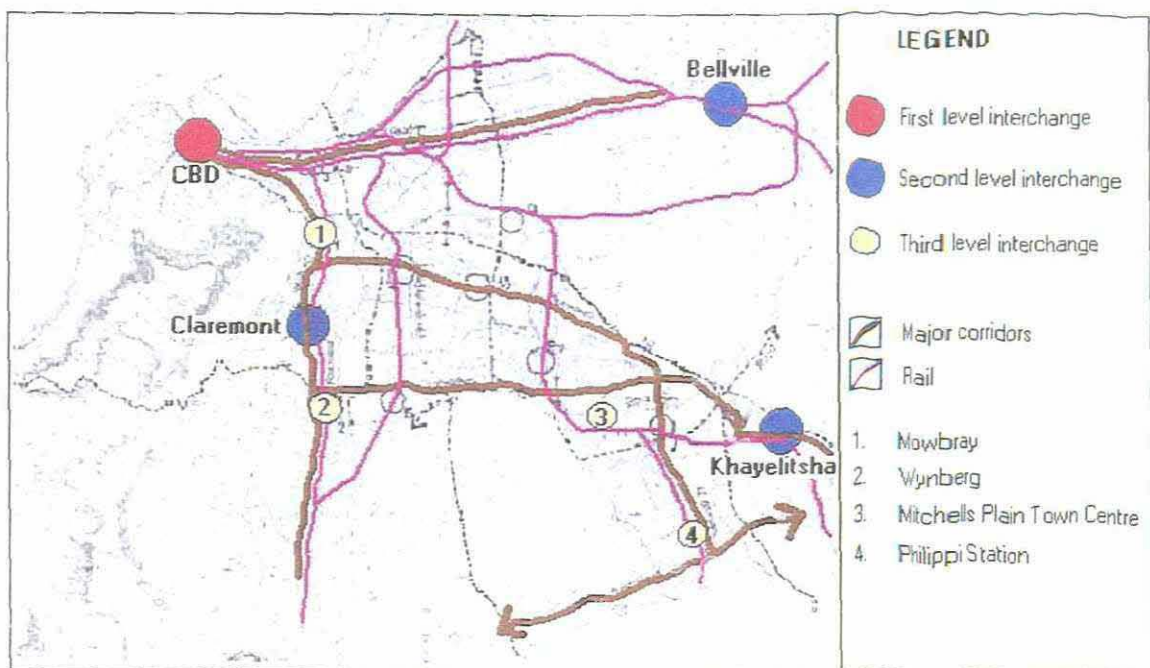


Figure 1.2 PTIs take up key locations in the city and link with rail and road corridors (Source: Adapted from City of Cape Town. Planning and Development Directorate, 1999).

The PTI as a gateway

The historical representation of the urban fabric as a “space of places” is making way for a shift to a “space of flows”, where the focus is on specialised clusters of activities which are interconnected (Castells, 1989).

The PTI can be seen as having all the preconditions for developing into such a cluster or part of a system of interconnected clusters. Restructuring in the urban fabric is needed to facilitate the “space of flows” idea. A PTI should thus be seen as a movement gateway and be utilised for such a function, which in turn could ensure optimal use of the opportunities in and around PTIs as well.

PTIs constitute both departure and arrival points, though it is the latter which implies the quality of a gateway to the local area in question. This results in their being the first place in terms of which visitors form an impression of the area. Yet, many PTIs constitute the most unpleasant and unsocial places in a city, contradicting the potential they have for celebrating arrival.

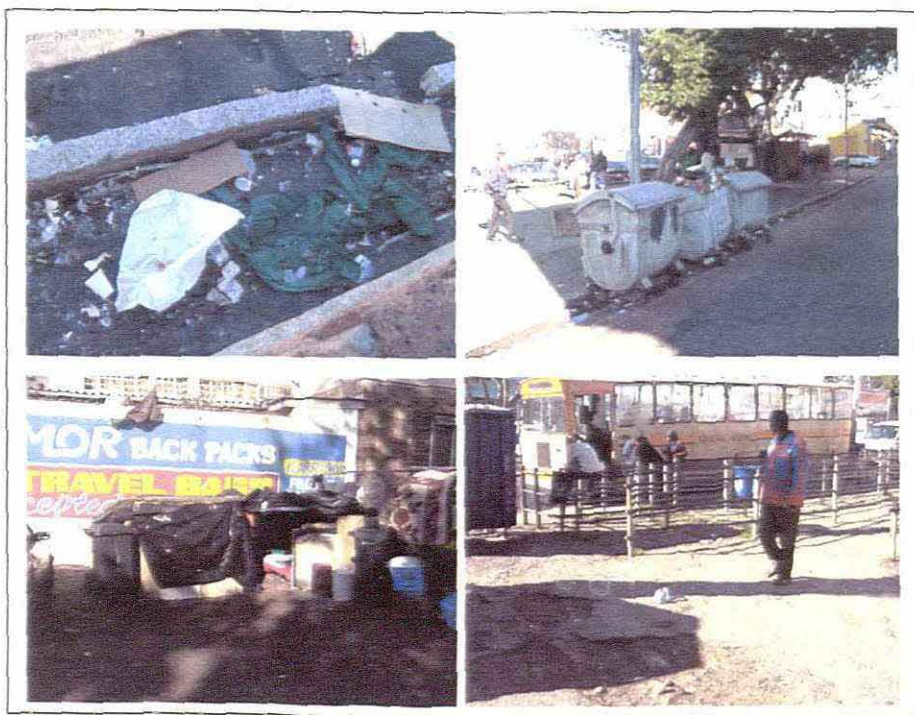


Figure 1.3 Many PTIs constitute the most unpleasant and unsocial places in the city.

1.2.5 The Research Problem

“Multi-Modal public transport interchanges are where trading, commercial activities, social interaction and transport interchange activities take place in a mutually supportive and cost-effective manner for the benefit of the local and wider community and environment” (City of Tygerberg. Cape Town, 2000: 6).

The above statement describes the optimal situation. In reality it would appear that most of the opportunities that a PTI can offer are often lost, mainly because these opportunities were never considered in the planning stages nor recognised as potentially contributing to a positive urban living environment.

This problem, it is contended, stems from the fact that no direct performance measures exist explicitly to identify good or bad practices in public transport interchange development. A lack of these performance-measuring tools has therefore resulted in the present situation where limited criteria are available to guide the planning, development, upgrade and appraisal of PTIs.

A thorough literature review and extensive consultation with those in the fields of Town and Regional Planning, Transportation Planning and Transportation Engineering clearly show that although much research has in fact been undertaken in regard to the engineering, functional and operational aspects of PTIs, the interaction and relationship between technical performance on the one hand, and so-called urban performance on the other, has received limited attention. This observation provides the fundamental point of departure for this thesis

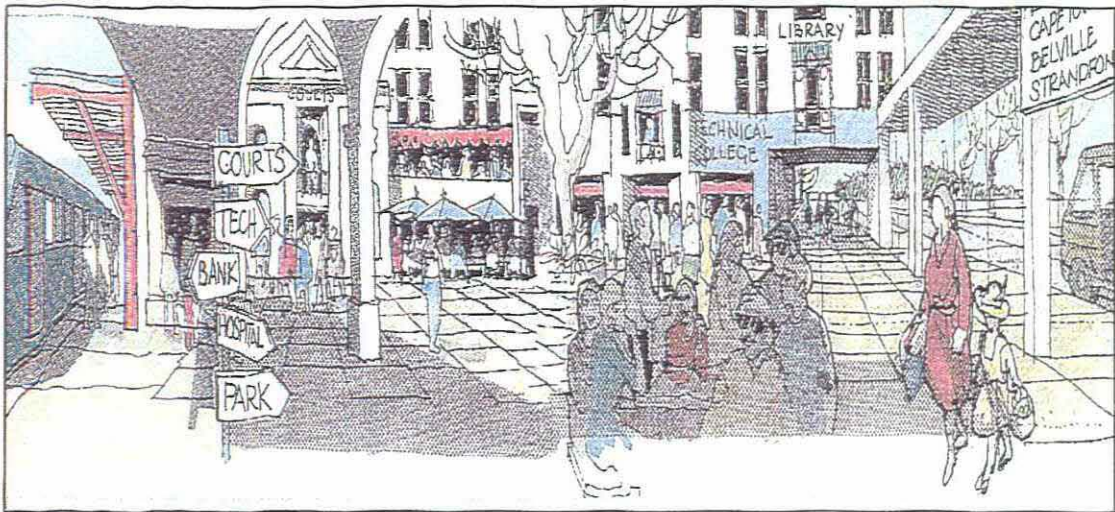


Figure 1.4 Transport, commercial and social activities taking place at the PTI
(Source: City of Cape Town. Planning and Development Directorate, 1999).

Two main research questions emerge at this point, the first being: **What constitutes a positive urban living environment in the context of public transport interchanges?**

The literature that was explored, highlights the following spheres through which PTIs can contribute positively to the urban environment:

1. Movement and access
2. Special place creation
3. Economic generation

These three spheres of activity which refer to functional, economic and social realms of city life, are suggested as fundamental to a positive urban living environment, and imply the nature and scope of the potential influence that PTIs can have not only on their immediate and surrounding environments, but on their functions within themselves.

According to the City of Tygerberg, Cape Town (2000: 17) "...the strategic potential and positive effects of PTIs on the urban living environment are evident but not yet fully realised." This statement further emphasises the need

for investigation into the understanding of how PTIs can contribute to urban living environments.

PTIs should thus be seen not merely as “points” of modal interchange but potential “zones” for commercial and social interaction (City of Tygerberg, Cape Town, 2000: 8-23), and as public places to improve equity and develop a unique sense of place (Lynch, 1981: 229-233). Though the available literature recognises the “potential” of PTIs, it fails to substantiate this with research data specific to the potential influences of PTIs and does not provide a set of tools for evaluating their performance, existing and future.

PTIs form an integrated part of a city’s transportation network (Nagurney, 2000). It follows therefore that their performance (or lack thereof) can have a direct influence on the quality or liveability of a city, particularly if their functioning goes beyond mere transportation efficiency.



Figure 1.5 PTIs form an integral part of a city’s transport network. They provide the interface between different modes of transport such as car, rail, bus, and pedestrian (Source: *International union of public transport, 1996*).

This then introduces the second research question: **What in fact are the comprehensive performance measures for public transport interchanges?**

Halvorson (2001: 57) refers to performance measures as “quality of life measures” which illustrate their role as measuring tools of the quality of the urban environment or as in the case of this study, which enable one to gauge the influence that the elements in a PTI can have on the quality of that PTI, as a component of the city.

Further, numerous policy documents and legislation, including inter alia the White Paper on National Transportation Policy (South Africa, Department of Transport, 1996), Moving Ahead (Cape Metropolitan Council, 1998), Local Government Municipal Systems Act (South Africa, 2000a) and the National Land Transport Transition Act (South Africa, 2000b), have forced authorities to rethink their approach to transportation. Many positive recommendations emanated from these documents and legislation, which included the use of performance measures for various settings. It would appear that authorities responsible for implementing some of the new strategies have not yet determined their meaning. After numerous consultations with role-players in the planning and development of public transportation, regarding the contextualising of performance measures for PTIs, it, however, seems evident that there is in fact no clear awareness or agreement concerning these performance measures.

It is argued here that this is a researchable problem, having regard to the following:

- The influences that PTIs can have on the quality of the urban living environment have virtually been ignored in past and current research on public transportation systems and mobility (Nexus and Navtech database search, 18/04/2002).

- PTIs are integral to public transport, the latter being crucial to the sustainability of urban areas.
- Consensus on performance measures to evaluate PTIs specifically has not as yet been reached nor have such measures in fact been clearly identified by anyone.
- One of the main expenditure items in Cape Town Uni-City's Transport Directorate is the upgrade of modal interchanges, and this research aims at giving direction on how this money can be spent to derive maximum benefits.
- There is a misconception that the core function of a PTI is solely to facilitate movement and anything beyond this core function is regarded as merely incidental.

1.3 RESEARCH QUESTIONS

Question 1: What is meant by a “positive urban living environment” in the context of public transport interchanges?

PTIs should perform a range of functions to ensure high quality, liveable cities. It is argued that these functions that PTIs can perform could dramatically and positively influence the urban environment from the precinct to metropolitan scale. These fundamental functions are:

- Movement and access
- Special place creation
- Economic generation

Question 2: What are the relevant performance measures to be used for the evaluation of public transport interchanges?

In order to determine the quality of urban environments, there clearly must be in existence a set of guiding principles or criteria on the basis of which such evaluation can take place.

In the literature and in practice, such principles and criteria have in fact been developed over time concerning the larger urban context. However, these concepts have not as yet been properly identified for PTIs as components of the larger city.

1.4 OBJECTIVES OF THE STUDY

The primary objective of this research is thus to *identify appropriate performance measures through a range of contextual informants to facilitate the proper planning and design of public transport interchanges in order to achieve their full spatial, economic and social potential in various urban contexts.* The contextual informants include the following: literature and theories, the non-spatial framework, case studies as precedents and the end-user perspective.

This research project is therefore important:

- To identify the role and influence of PTIs with regard to the quality of urban environments.
- To highlight the role of performance-based evaluation as an aid to improve the decision-making process in the planning of PTIs
- To provide guidance in the identification and selection of specific performance measures depending on the context and scale in which the PTI is set. thus relying not only on quantitative evaluation but also on qualitative evaluation.
- To supply further empirical and normative data and knowledge to those disciplines and decision-makers engaged in the planning or upgrade of PTIs.

- To a multi-disciplinary professional team, including: architects, urban designers, town and regional planners, transportation planners and transportation engineers.

1.5 DELINEATION OF THE STUDY

- Cities are examined, in this study, in both developed and developing countries, though it is acknowledged that what works for the former need not necessarily apply to the latter.
- The study's geographical focus is the Cape Metropolitan Area (CMA). The following PTIs in the aforementioned geographical area have been chosen for the surveys to determine the end-user perspective:

Cape Town

Bellville

Wynberg

Claremont

Mowbray

Parow

A detailed discussion with regard to the reasons why specifically these PTIs were chosen follows in chapter 6.

- The focus of investigation included PTIs where all three major public transportation modes (train, bus, minibus taxi) are present.

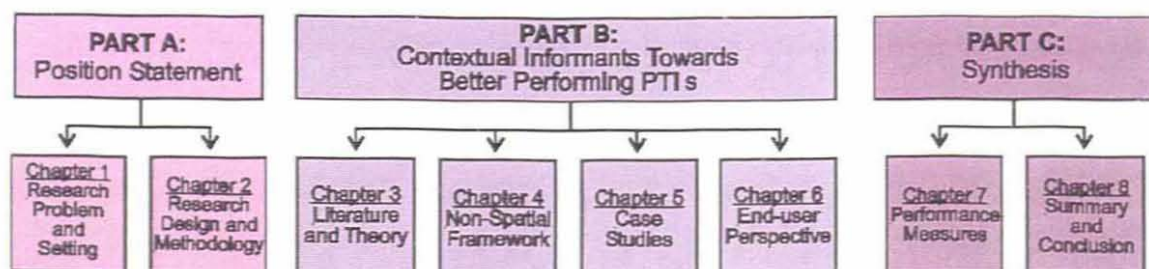
1.6 SIGNIFICANCE OF THE STUDY

- South Africa is a leading country in the continent of Africa for economic, technological and other reasons. It is therefore argued that South

African research and studies on urban movement systems is of crucial importance to other African developing countries and cities.

- Improving public transport systems that facilitate not only movement to opportunities but also economic development, social exchanges and communications is of obvious importance for South Africa in the context of addressing underdevelopment.
- The study should therefore assist properly informed planning and design of PTIs, including the multi-disciplinary approach in this regard.
- This research fills a gap in the existing knowledge base, both in terms of theory and practice, and seeks to address one of the most important issues as highlighted by numerous white papers and legislation namely: the identification and use of key performance measures to determine the quality of urban environments generated by PTIs.

1.7 STRUCTURE OF THE DOCUMENT



This document is divided into three parts. **Part A** summarises the position statement with chapter 1 concentrating on the research problem and its setting.

Chapter 2 presents the different styles of methodology followed for each section of the research project. **Part B** gives a detailed discussion on the investigation to determine the contextual informants that may lead to better performing public transport interchanges.

Chapter 3 investigates literature and theory on urban performance. The works of eight authors, which emerged as particularly relevant, are discussed.

Chapter 4 represents the non-spatial framework in which public transport operates. This includes all the relevant legislation, policies, and the administrative and social context.

Chapter 5 provides an overview of national and international case studies that provide empirical evidence for purposes of helpful precedents.

Chapter 6 depicts the methods used, results and findings of the end-user surveys that were conducted at six PTIs in the Cape Metropolitan Area.

The final section, **Part C**, proposes performance measures derived and from chapters 3,4 and 5, and confirmed by the findings in chapter 6. It further revisits the research questions and objectives put forward in chapter 1 and proposes possible answers. In conclusion, a number of future research projects and research related outcomes and contributions are presented.

CHAPTER 2

RESEARCH DESIGN AND METHODOLOGY

2.1 INTRODUCTION

As previously mentioned, this research project comprises three main parts; namely the Position Statement, the Contextual Informants towards better performing PTI and finally the Synthesis.

The second and third parts thus relate to the gathering, analysis and application of data and information. As a principle, the type of information required and the sources available dictate the method used. In this instance, this resulted in different methods being used for different information sets.

Typically, the research process is not one that follows a specific sequence, with many of the methods, applications and activities occurring simultaneously and parallel to each other, with “feedback loops” also arising at various phases.

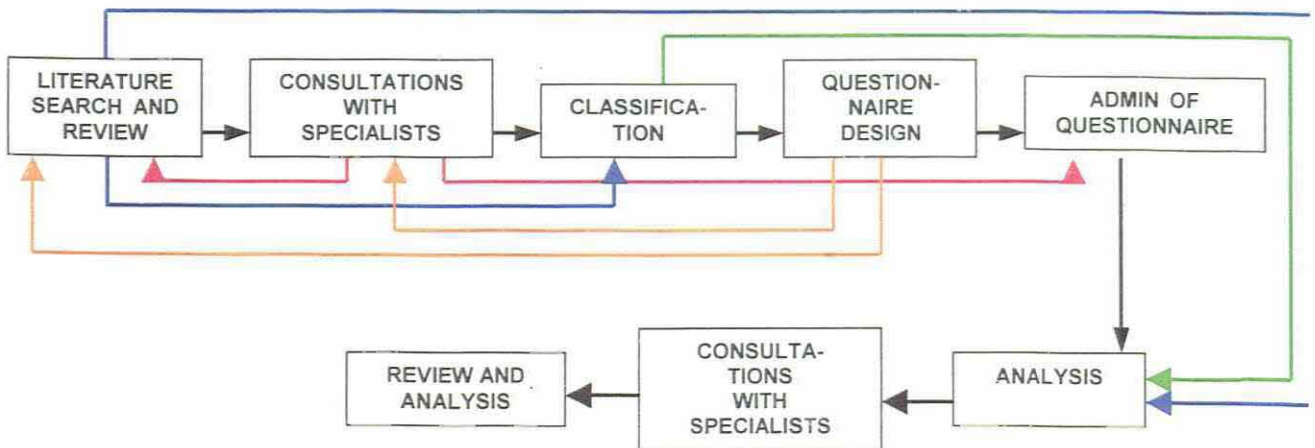
















Figure 2.1 The different research methods and/or activities and the sequence in which they inform each other.

Table 2.1 Flow-chart depicting research methods and/or activities in order to realize specific objectives.

Research Method and/or Activity	Issues relating to a Positive Urban Living Environment (PULE)	Issues relating to public transport and PTIs
1. Literature search and review. 	1. Literature related to PULE. 	1. Literature related to urban public transportation and public transport interchanges. 
2. Consultations with specialists. 	2. Confirmed relevance of identified literature. 	2. Explanation of the operational issues and assisted in identifying relevant case studies. 
3. Classification and site visits.	3. Identifying the sources for the contextual informants. 	3. Identification of the target PTIs by using a checklist. 
4. Questionnaire Design 	4. Includes open and closed questions. 	
5. Administration of questionnaire. 	5. Determining end-user perceptions regarding the quality of PTIs. 	
6. Analysis. 	6. Combination of lessons learned from case studies, non-spatial context, literature and theory and end-users. 	
7. Review and analysis	7. Formulating performance measures.	

2.2 CHAPTER 3: LITERATURE AND THEORY

An extensive literature review highlighted certain authors to be the most relevant and preferred ones in the field of determining high quality urban environments, especially in the public domain. Very little of this kind of information could be uncovered in the literature on transportation, hence the focus was placed on works relating to town and regional planning and urban design.

Personal interviews with town and regional planning and urban design practitioners suggested additional authors and confirmed the ones already chosen.

2.3 CHAPTER 4: THE NON-SPATIAL FRAMEWORK

The legislative context for public transport in South Africa, and specifically Cape Town, was investigated in this chapter by interpreting the relevance and usefulness of different pieces of legislation, policies and working documents.

Internet searches on numerous government websites, with the key word "public transport", highlighted the legislation and policy documents that could have been of relevance to this research study. An overview of all these documents led to the specific policies and legislation that were chosen for an in-depth discussion in chapter 4. The particular relevance in each instance to public transport as well as PTIs, were identified.

2.4 CHAPTER 5: CASE STUDIES AS PRECEDENTS

The importance and desirability of case studies as information sources are, in principle, beyond question. The practical and logistical problems that were encountered in obtaining case study information, however, put some doubt on the eventual relevance of the information that could be gathered.

The case studies that had the potential to become precedent studies were identified through a process of personal interviews with seasoned practitioners and specialists in the field of public transportation.

Originally, the main method of data collection comprised in-depth Internet searches. The Cape Technikon's Research Information Support Centre (RISC) assisted with this, especially in the "grey or deep internet" searches. Though this resulted in general information regarding a city's public transport system being gathered, very little data at levels of specificity about PTIs could be found with this method.

The private libraries of the abovementioned practitioners and specialists proved to be of more use. Unfortunately many of the documents scrutinised were outdated and their relevance remains questionable.

International contact with J Louw (Manager: Queensland Transport: Australia) and C.R. Rivasplata (Director: San Francisco Planning department. CA. USA) made at the Annual South African Transport Conference (2003) also provided a general overview regarding public transport systems in their respective countries. *but again no substantial information about PTI developments were forthcoming.*

A site visit to Warrick Junction, Durban, and scrutiny of certain specific and detailed documents did, however, reveal very relevant and useful information as a case study.

2.5 CHAPTER 6: THE END-USER PERSPECTIVE

Face-to-face personal interviews with structured questionnaires were used to gather data from four end-user groups at six different target PTIs in the Cape Metropolitan Area. These interviews occurred between June and August 2003.

Personal observations also were used to determine the relevance and selection of certain other PTIs for this research study. Site visits were undertaken at the following PTIs: Athlone, Bellville, Cape Town station-deck, Claremont, Langa, Mitchell's Plain, Mowbray, Parow, Philippi, Potsdam and Wynberg. A checklist (see Appendix 1) was devised that was utilised to gain the needed information at each PTI to determine its relevance for the purposes of this research study.

The design of the four different questionnaires (see Appendix 2) was mainly informed by literature on structured questionnaires and face-to-face survey methods. Personal interviews with PTI managers and key role players assisted in further refining the questionnaires.

A detailed exposition of the survey process is provided in Chapter 6.

2.6 CHAPTER 7: PROPOSED PERFORMANCE MEASURES

The relevant performance measures for PTIs were determined by revisiting chapters 3, 4 and 5.

2.7 GENERAL

A workshop was held in an early phase of the research process, which proved to be an important technique for testing the research direction and relating the value of its possible outcomes to specialists in other fields relevant to the project. This workshop was held in September 2002 and was attended by Yusry Frizlar (Arcus Gibb), Ashraf Adam (MCA Planners), Vic Theunissen (Cape Technikon) and the researcher. The researcher gave a presentation of her research outline at this meeting and an in-depth discussion followed on how this research fits into the different professions dealing with the built environment and which emphasis changes should be made in order to ensure the maximum contribution that this project could make.

Table 2.2 Key role players interviewed.

Name	Company/ Establishment	Position	Relevance
Clough, Nick	Intersite	Regional Planner	Property developers of PTIs.
Gordge, Richard	CSIR, Transportek	Public Transport analyst	International experience of public transport systems.
Haiden, Ronald	City of Cape Town	Manager: Projects Transport, Roads, Storm water	Highlighted the engineering and operational aspects of PTIs.
Kingma, Ronald	City of Cape Town	Head: Public Transport	Involved in public transport related issues for the City of Cape Town.
Kleinveld, Llewellyn	Modalink	Operations Manager	Involved in the management of PTIs.
Mazaza, Maddie	City of Cape Town	Project Manager: Mobility Strategy unit	Involved in the latest transport/town planning related strategy for the City of Cape Town.

PART B: CONTEXTUAL INFORMANTS TOWARDS BETTER PERFORMING PUBLIC TRANSPORT INTERCHANGES

This section seeks to explore and understand the characteristics of better performing PTIs. Evidence of the elements that might contribute to the "ideal" PTI has been gathered from the following sources: historical and contemporary literature and theory on urban performance, (chapter 3) the relevant administrative and legislative context. (chapter 4) national and international precedent studies (chapter 5) and public opinion through a series of personal surveys (chapter 6). It must be acknowledged here that though the essential theme of this study is the performance of PTIs, this cannot be examined in isolation of the larger picture of public transport. A further point that needs to be emphasised, is that the contextual informants identified in the following four chapters will not apply equally to every PTI because of differences in scale and in purpose.

CHAPTER 3 LITERATURE AND THEORY ON URBAN PERFORMANCE

3.1. INTRODUCTION

Good theory makes good practice. As was stated in part A, this thesis is aimed at the verification of theoretical concepts expressed in selected planning literature and publications that have come to be over an extended period of time.

An understanding of *theory* and its value is needed before relevant theoretical issues can be identified in the literature. It can be said that a *theory* is "...a rigorously organised framework of tested ideas. The ideas that make up a theory are ideas that have been tested in certain social situations and are therefore capable of providing interpretations of other similar situations" (Scott 1980: 41).

Thus, well-recognised and widely accepted theories can be used as guiding principles when interpreting urban phenomena.

Scott (1980) identifies two sets of ideas or bodies of knowledge, which represent the theoretical framework for urban planning. These are:

- “Knowledge about the way in which planning activities proceed, termed theory *of* planning, and
- “Knowledge about the processes operating in, and the structure of, urban areas, termed theory *in* planning” (Scott, 1980: 18).

In order to explain the difference between the two sets of theory, a definition for planning activity is needed. Scott referred to this as consisting “...of a conceptual and operational level attempts to intervene in the process of the present in order to create or ensure a normative future” (1980: 19)

Theory *of* planning or “the thinking behind planning” is concerned with how planning should proceed and supply knowledge and direction at the conceptual stage of planning.

Theory *in* planning, on the other hand, represents the “ways of thinking about urban areas”. This theory is derived from the body of knowledge that can be found in planning literature concerning the different aspects of urban areas.

Scott summarises the value of theory by stating that “...there is nothing more practical than a good and relevant theory” (1980: 27).

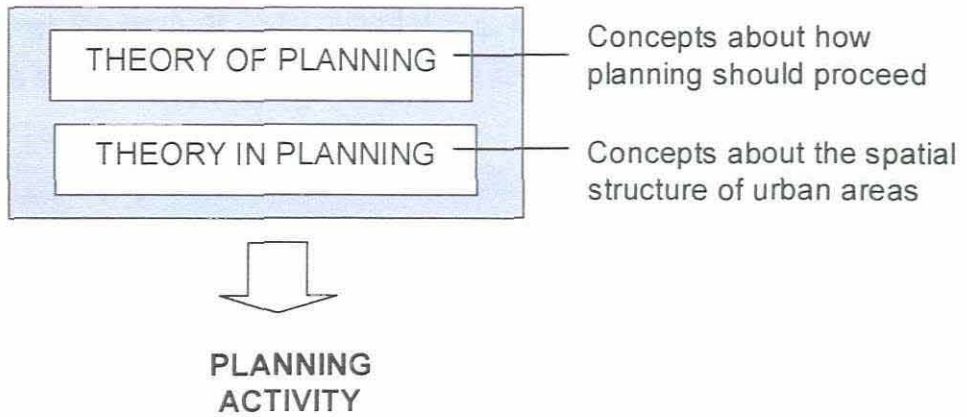


Figure 3.1 The conceptual relationship between Theory *of* planning and Theory *in* planning (Source: Adapted from Scott, 1980: 19).

3.2. THE THEORETICAL CONTEXT

With this introduction in mind, it could be stated that the theories explored in this thesis fall under the “theory in planning” category, which as was mentioned, represents the ways of thinking about urban areas

Despite the importance of travel in many people’s daily lives, the available literature specifically on PTIs and the theory governing their planning in relation to their associated urban environments, appears to be sparse.

Some approaches, though, are expressed in various works which give clear direction in the way urban areas as a whole should be planned and developed in order to ensure positive urban living environments (PULE). In this section, a selection of authors’ works is accordingly presented which reveals aspects of particular relevance and importance to the assessment and evaluation of PTIs. Although these were not written with the public transport environment specifically in mind, those parts that seem to be clearly applicable or arguably have a direct influence on PTIs are presented here.

This analysis takes the form of firstly summarising all the relevant points from the specific literature source and secondly stating the analogies that can be drawn for the purpose of PTIs.

It must be stressed that liveability, or the quality of the urban living environment, is in essence qualitative, and most of this environment's characteristics are thus not readily quantifiable. This may be problematic for this specific study in that one of the outcomes of this research is supposed to be a set of performance measures, which, by implication could be expected to be quantifiable. This apparent contradiction is, however, resolved in that the findings of this thesis are based both on elements that are quantifiable and those that are qualitative; the former lending themselves to actual measurements and statistics, and the latter pertaining to evaluation and interpretation. The degree of subjective interpretation would of course be governed by previous theoretical knowledge.

As a consequence, it is deemed appropriate in this chapter to distinguish between higher and lower order principles.

The higher order principles are universal, "higher tier" issues such as social and equity considerations. These are normative principles that clearly do not lend themselves to quantification and their impact or lack thereof is therefore not measurable in the normal sense. Nonetheless, people do have a strong appreciation of these qualities either being present or not in public spaces. It can thus be said that people inherently have a sense of awareness, both at a conscious and subconscious level, of these higher order qualities.

The second level of influence is constituted of the lower order principles. These are more practically achievable and measurable and may even constitute readily observable actions: for example, the quality of the pedestrian environment, the levels of safety and security, or specific maintenance activities at a PTI.

These basic criteria, as will be seen, inform a set of performance measures that are envisaged as the primary outcome of this research project.

The works of eight selected authors are henceforth discussed. In each case, *principles are extracted under the heading "lessons learned"*. Some repetition inevitably will occur under this heading as one proceeds from one work to the next.

3.2.1. Bertolini and Spit. 1998. *Cities on Rails: The Redevelopment of Railway Station Areas.*

The authors investigate the two predominant roles of station areas as nodes and places. Firstly, therefore, they are seen to constitute important *nodes* in the transport network. They act as points of access to not only the rail service but also to other modes of transport and to the local area served. Secondly, station areas serve as unique *places* in the city. Each embodies a concentration of infrastructure, a diverse collection of surrounding buildings, pedestrian spaces and open spaces, all of these providing positive pre-conditions for the presence and a range of activities of people. Its role as a place is further strengthened by its direct influence on the quality of its surrounds and vice versa. A station area thus performs a far more pervasive role than simply facilitating movement in a city (Bertolini & Spit, 1998: 9-42).

Although Bertolini and Spit argue that "...a place is a physical environment and a synonym for 'space'" (1998: 11), in the context of this study, there is in fact a need to differentiate between *place* and *space*. Space can be seen as a part of the city having a certain physical form, dimensions and land use such as a PTI, whereas a "place" refers to the way users interpret and respond to that space, and therefore to the sum total of its psychological qualities.

What then is the difference between a node and a place? According to the authors, a "node" is very specific in its role in any transport network and the city,

and has a specific and definable function, whereas a “place” refers to different elements of influence the node can have on its surroundings: hence the use of terms like public transport interchange *district* or public transport interchange *precinct*. This implies the wider influence or “placeness” a PTI can have on the urban environment, going far beyond the facilitation of movement. Conversely, this wider notion of place influences the operations of the node.

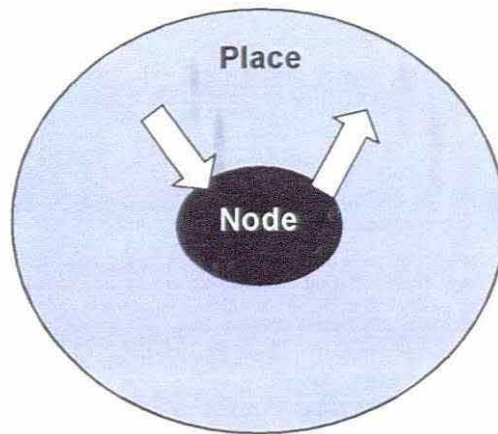


Figure 3.2 A node has a specific and a definable function and a place refers to different elements of influence the node can have on its surroundings. Arrows depict the influence that place and node have on each other (Source: Adapted from Bertolini & Spit, 1998).

A further difference between the function of a PTI as a node and its function as a place lies in defining these boundaries of influence. In order to investigate this, the following questions could be asked: where does the boundary lie between the so-called “PTI district” and the rest of the city and what makes this district different from the latter?

The fact is that a PTI as a “node” can, in most cases, have identifiable and very clear boundaries such as movement channels at the periphery or a change in land use. On the other hand, a PTI as a “place” is characterised by transitional areas, depending on the particular “psychological” quality, rather than clear-cut boundaries. The influence of a PTI may thus either extend far beyond its

immediate surrounds, or entities close to a PTI may show no relationship to it (Bertolini & Spit, 1998: 11-13), whether this sphere of influence is considered from the perspective of a “node” or a “place”.

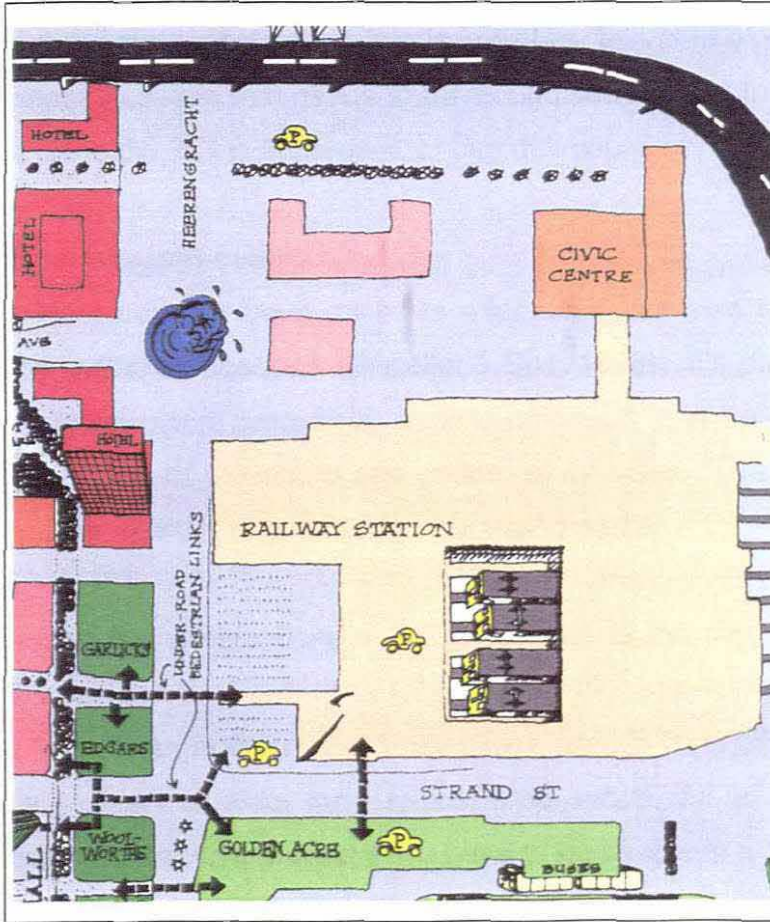


Figure 3.3 Clear boundaries, such as roads and a change in land use, identify the railway station as a node (Source: City of Cape Town. Town Planning Branch, City Engineer's Department, 1985: 24).

The interrelationship between “node” and “place” can be reinforcing, as highlighted by Bertolini and Spit. High levels of accessibility may provide the critical mass needed to sustain certain activities in the same way that high levels of intensity in activities provide the threshold for the development of transport networks.

Types of nodes and places

Socio-economic activities, over and above movement activities, tend to concentrate around transportation nodes (PTI) for very specific and obvious reasons. However, there are certain activities that are repelled by transportation nodes such as some residential and religious activities, by virtue of incompatibility. This is an important limitation that needs to be recognised in order to determine the type of node or place the PTI is at present, or can develop into.

The PTI's uniqueness and complexity

Each PTI is unique, not only because of its operations, but also because of the differences in its spatial composition (Bertolini & Spit, 1998). Its position and role in the city's public transport network is usually unique in that no other PTI has exactly that combination of conditions and pattern of activities. This aspect further complicates the identification of boundaries discussed earlier.

In further regard to the contributions a PTI can make to the city, Bertolini in an article called "Planning in the Borderless City" (2000, 461) states that station areas are one of the few places in the modern city where people from different walks of life can physically meet. In order for a space to be successful as a public place, one needs human contact; this means there have to be people in a 'space' for it to become a 'place'. He further claims that a diverse group of people sharing a space would generate some tension. This can clearly be seen in a PTI though more from a diverse functions or activities point of view – i.e. tension between bus and taxi drivers, vehicles and pedestrians, formal and informal traders. Yet it is accepted that even with these tensions being generated, enormous physical, social and economical opportunities occur within the locations taken up by PTIs.

LESSONS LEARNED

Higher order principles

- The most important higher order function of a PTI is the sum of its qualities as a “place” that goes beyond being a mere “space”. It should be recognised that as a place, a PTI has an undeniable influence on the quality of experiences within it as well as the quality of its surrounds (and vice versa), be it positive or negative.
- With the technological advances of the modern day, human contact need not always take on a physical form. For example, people can communicate with the help of cell-phones or the Internet. The important issue though, is that in order to have successful social spaces in the city, direct human contact is essential. PTIs facilitate such contact and thus comply with one of the preconditions for a positive social space.
- Some activities are deterred by PTIs such as certain residential categories and formal religious activities, though huge potential might exist for informal outreach and evangelism.
- A PTI can fulfil differing nodal functions such as a transport node, economic node and social node. These functions are very distinct and easily definable.

3.2.2 Behrens and Watson, 1996. *Making Urban Places: Principles and Guidelines for Layout Planning.*

The authors (Behrens & Watson, 1996, v-viii, 10-12, 66-95) refer to normative concerns, which should govern environmental quality when layout planning is undertaken. Although this book focuses on explicit layout principles, it suggests in the opening chapter those important universal concerns that can be applied to any urban setting.

'Quality' urban environments according to the authors mean "...urban environments that enrich the lives of the people who live in, and experience, them" (Behrens & Watson, 1996: 10). Six normative concerns are identified as general criteria that can assist in determining the quality of an urban environment. All are relevant to this study:

- **Place-making:** Creating a unique sense of place is a fundamental objective. This can be achieved in numerous ways such as responding to the natural context by for example emphasising views of significant natural features or respecting the cultural context where culturally significant symbols are part of public spaces.

Further, hard public spaces, of which a PTI is clearly an example, play an important role in this quality of place-making. Hard public spaces should facilitate social interaction and offer different life-experiences.

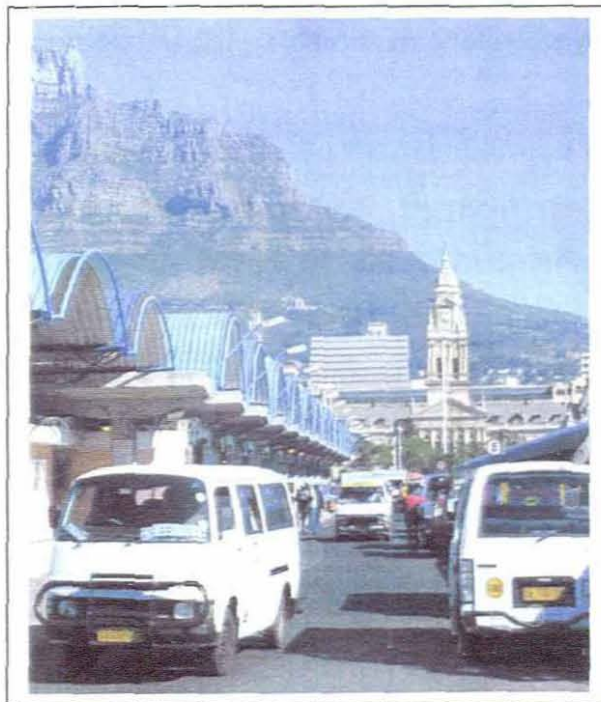


Figure 3.4 Important historic public buildings (Cape Town City Hall) and natural features (Table Mountain) contribute to sense of place to Cape Town station (Source: Cape Metropolitan Council, 2001: 18).

- **Scale:** Human scale is no less important than vehicular scale. Human scale refers to height and width dimensions in relation to the capacity of humans to utilise or appreciate specific physical forms in the city.

In order for the pedestrian environment to be convenient, safe and comfortable, clear pedestrian movement channels need to exist and road and public spaces should have a multi-functional use.

To ensure a feeling of safety, a sense of enclosure is an important quality of an urban space in that it defines that space as having a beginning and an end. Public surveillance is also made easy when a space is clearly defined, and with the presence of large numbers of people.

- **Access:** The ease with which people can access the PTI and the variety of opportunities that are accessible from the PTI through the use of public transport and walking determines the levels of accessibility.

Pedestrian movement should be the number one priority within the PTI precinct to ensure equitable access. By positioning facilities/activities at the most accessible points of the city, conditions are created for investment and appropriate development.

- **Opportunity:** The PTI offers strong opportunities for informal and formal trading as a stop-start precinct in a public transport trip. A PTI can be seen as a "retailing-generator", which can provide the necessary thresholds for informal and formal trading. This characteristic implies the development of economic activity in and around the PTI.
- **Efficiency:** By clustering compatible and mutually supportive public facilities such as mobile libraries and municipal offices at a PTI, the

number of trips needed is reduced and the time and money spent on travelling will decrease.

- Choice: Spaces should be created around the PTI with different intensity levels. Some areas should be bustling with activities while others should allow for conversation and relaxation to take place. Such opposing though complimentary areas result in rich and interesting environments that offer choice and addresses a range of end-user needs.

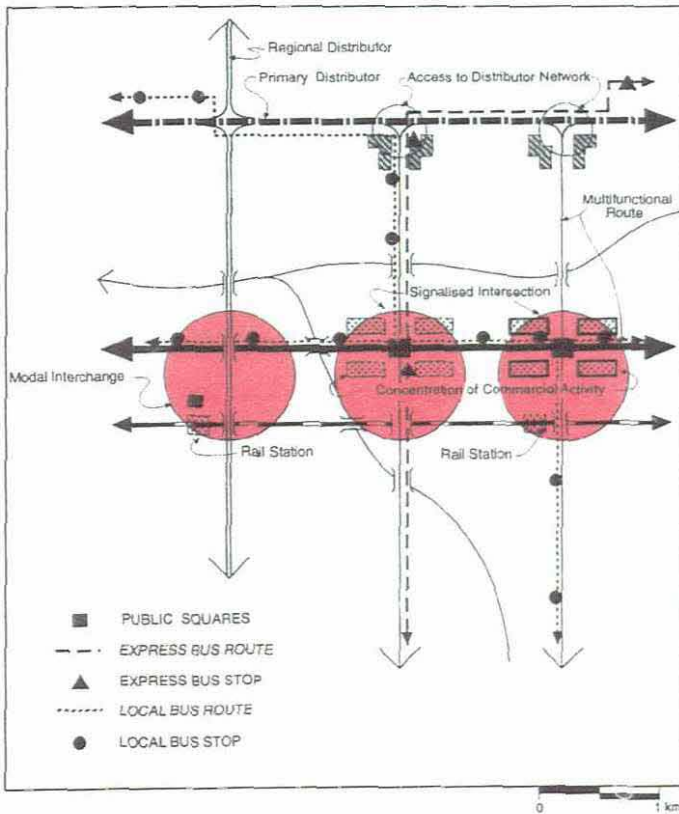


Figure 3.5 A concentration of people, activities and opportunities exists in close proximity to rail stations (Source: Adapted from Behrens & Watson, 1996: 89).

LESSONS LEARNED

Higher order principles

- The fact that there is concentrated movement in the PTI makes this environment ideal for formal and informal economic development.
- Each PTI has a strong quality of uniqueness, in part because of the fact that it is situated in a local area with its own unique character. This quality should manifest itself at the PTI seeing as it is the gateway to the area. In addition, the uniqueness of a PTI can emanate from the particular forms and features within it.
- Major investment potential exists around a PTI because of the accessibility of its location as well as the intense human contact within it.
- The traditional cultural elements of society should be recognised and celebrated in public spaces. This can be designed in the PTI context to impart uniqueness and convey something about the local area and its people.
- Public facilities should in many instances be situated at places with the highest levels of access, such as PTIs. This ensures that the greatest volume of people can reach such facilities, in the interests of equity.
- The PTI should be legible and welcoming. People need to be able to orientate themselves even in an unfamiliar place

Lower order principles

- Natural and planted vegetation can give protection from natural elements, and be an important aesthetic element in the PTI and also provide a soft edge to define areas with different functions.
- For a public space to feel safe and intimate and be understood by its users, defined spaces and a sense of enclosure are needed. Hard (i.e. public buildings) or soft edges (i.e. trees, hedges) can be used to create enclosure.

- Vistas are enhancing elements that can occur through the sensitive placing of buildings surrounding the PTI, through road alignments and the location of public spaces so that dominant natural elements such as mountain or sea relate visually to the PTI to acknowledge its larger natural context and reinforce the sense of orientation.
- Micro-climatic considerations incorporated in the design of the PTI ensures that both the benefits and negative impacts of sunlight, shades, shadows, temperature, rain and wind are addressed in the optimal positioning and detailed design of buildings, orientation of streets and location of informal activity areas.
- Human comfort in a public space is a further criterion for determining how well that space is performing. People should, for instance enjoy adequate and safe seating and the space should be well lit at all times to ensure a safe environment.
- Pedestrian walkways should represent the legibly shortest, direct routes to numerous destinations from the PTI into the surrounds. Pedestrian movement should also be prioritised within the PTI precinct with pedestrian crossings and well maintained walkways.
- In order to achieve maximum benefit in public spaces such as PTIs, many types of services (public toilets, public telephones, post collection points etc.) could advantageously be clustered around these spaces. This makes the services themselves highly accessible, as they would then be positioned where the most concentrated demand is.
- Main movement channels (mainly pedestrian) tend to generate a higher intensity in economic activities, whether in linear form or as a market place.

3.2.3. Bentley, Alcock, Murrain, McGlynn and Smith. 1985. *Responsive Environments: A Manual for Designers.*

The authors pose a profound question concerning the quality of urban environments: "How does design affect choice?" (Bentley *et al*, 1985: 9). Design, where different elements are positioned in relation to each other is one of those issues, in conjunction with access, that can either severely limit or result in unlimited choice. With this question by way of introduction, the authors refer to the following qualities that contribute to a "responsive" environment:

- Permeability
- Legibility
- Variety
- Robustness
- Visual Appropriateness
- Richness
- Personalisation

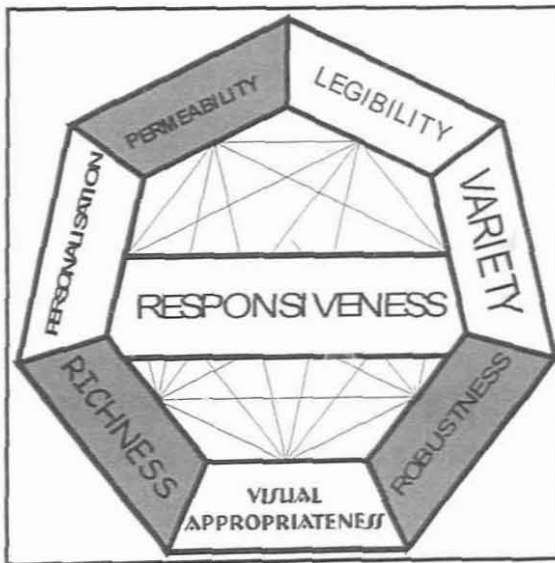


Figure 3.6 The key qualities for making places responsive (Source: Adapted from Bentley *et al*, 1985: 9).

- Quality of permeability

The concept of “permeability” can be divided into two parts. The first can be referred to as physical permeability. This quality determines where people can physically go and where not. The road layout plays an important role in physical permeability in that it determines the number and type of alternative routes available to users. In order for a space to offer choice, places, services and facilities need to be accessible. This refers back to the question that was asked at the beginning of this section, as to how design affects choice. If public and private vehicles as well as pedestrians are sharing road space in the PTI precinct, the levels of physical permeability for pedestrians will decrease. Vehicles will be a hindrance to free pedestrian movement.

The second part refers to visual permeability. As sight is our most pervading sense, it follows that people will be fully aware of which choices are available by having visual contact with alternatives. If people see where they can go and what they have access to, the space is perceived as permeable and user-friendly. Just as the availability of information is important in the PTI, so are visual restrictions problematic, such as the insensitive placement of tall buildings that may block the view to a landmark, which could have provided orientation outside the PTI precinct

- Quality of variety

This refers to the range of options available to the user. Places should offer a “choice of experiences”. A PTI attracts people from all over the city with different socio-economic backgrounds, which makes it the ideal space to integrate and cater for different demands and different types of uses or activities.



Figure 3.7 Choice offered by formal and informal traders contributes to the quality of variety.

It is important to note that variety is not achievable if a “mixed bag of activities” is merely placed on a site (Bentley *et al*, 1985: 30). Strong relations and interactions are needed between different activities. There should be logical reasons why activities are there and why they are placed in certain positions. For example, between different magnets (the station, a major shop or a main road) pedestrian flows are generated which create the supporting thresholds for smaller or informal shops to be viable. The magnets can be seen as the primary uses, supporting secondary uses in the PTI precinct.



Figure 3.8 A variety of transport modes are available which contributes to choice (Source: Rubenstein, 1992: 200).

- Quality of legibility

The ease with which one can understand your environment is an important pre-condition for the optimal appreciation of such an environment. In the public transport environment, the surrounds and position of PTIs are of considerable importance. The surrounding physical forms and structures should indicate the importance of the PTI in announcing the entrance to an important public space. Hence, the position, the size, the quality and importance of the surrounding buildings should give an indication of the importance of the activities happening in and around such a space.

- Quality of robustness

Environments that offer a large range of choices because they can be used for many different purposes are said to have this quality. The more uses a space can have, the more choice it affords to the users and thus the higher the quality of continuously attracting people, refer to as robustness. An important point the authors make with regard to robustness and public outdoor spaces is that they should not be “specialised spaces” (Bentley *et al*, 1985: 56). Each space should not have only one activity or use, but should have many uses that will attract more people to the space.

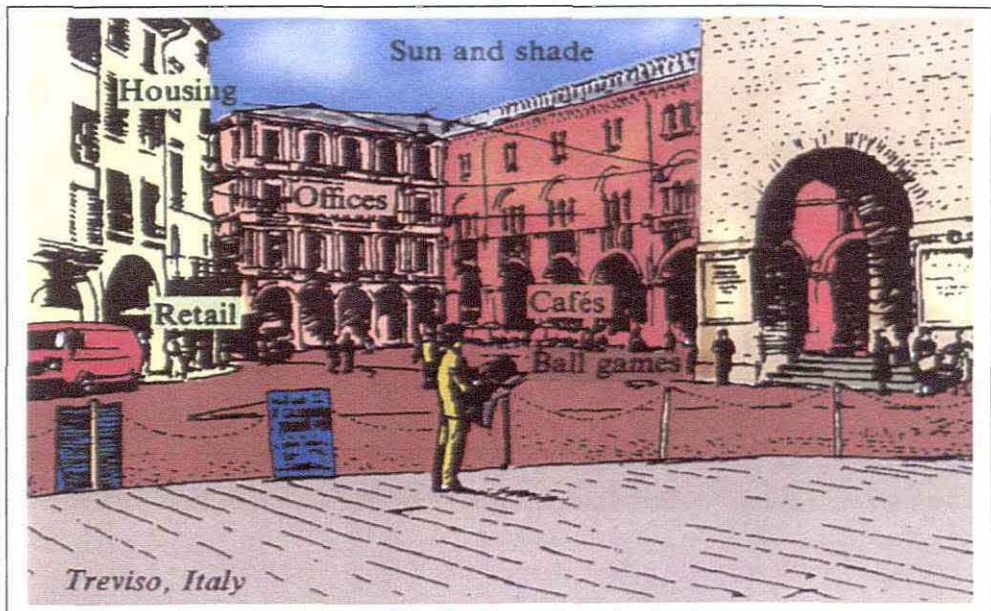


Figure 3.9 Multi-functional spaces catering for different users and activities (Source: Bentley *et al*, 1985: 56).

Bentley *et al* suggest that activities in surrounding buildings strongly influence the activities in a public space. The uses of buildings forming the edges of PTIs can thus to a large extent influence the robustness of character within the PTI precinct. These edges forming the public space provide the location where most activities in fact take place.

- Quality of visual appropriateness

If the stance is taken that people, consciously or unconsciously, interpret any space, appropriateness of perceived forms and structures is essential in the messages “read” by passers-by or new visitors. As in the case of robustness, buildings forming the edge of a public space play a major role in the space’s quality, although in this case, of visual appropriateness. The “facades” of these buildings should inform people of their function and use.



Figure 3.10 The outside of buildings should communicate its function (Source: Adapted from Bentley et al, 1985: 76).

In the case of PTIs (as in most public spaces) the visual appropriateness is of course to some degree a subjective matter, in that a variety of people with different value systems use and perceive them.

- Quality of richness

Bentley *et al* suggest that in order to realise the quality of richness, a space should be designed for all senses: “sense of motion (alternative routes for moving through a place), sense of smell, sense of hearing, sense of touch and sense of sight” (Bentley *et al.* 1985: 89). PTIs indeed invoke all these senses because of the range and intensity of activities in and around them.

- Quality of personalisation

Among the reasons why personalisation should occur in a public space is to create interest and to convey clarity of different uses in a complex environment. Devices such as the circular tube with red and white stripes outside a gentleman's hair salon are cases in point.

The authors do warn though that high levels of personalisation in public spaces can be detrimental to the quality of such a space and that it should for the most part be restricted to private buildings and spaces. This criterion is thus not particularly relevant to PTIs.

LESSONS LEARNED

Higher order principles

- All urban spaces are interpreted and appreciated for their qualities by people once that particular environment stimulates their full range of senses. The challenge for designers is to create such urban spaces, which might otherwise become “lost space” (Trancik, 1986)

Lower order principles

- In order to ensure permeability, links to the local area and to the city as a whole should be identified, strengthened or developed. A PTI, because of being strongly characterised by movement activities, should have most of the motorised links in place. It is important to make sure the pedestrian links, especially to the local area, also receive the attention needed.
- Specialised, large-scale zones of single use would undermine what a PTI precinct could be. There should instead be a variety in land use and activities as this attracts complex interactions through different users, for varied reasons and at varied times (Bentley *et al*, 1985: 27).
- Important public buildings such as station buildings should through appropriate architectural treatment have an imposing though “relevant” appearance.
- *Appropriate designing of building edges facilitates a wide range of activities that would enable a robust public space.*
- Public spaces consist inter alia of vehicular space, shared space and pedestrian space. As previously mentioned, pedestrians should receive preference and the shared space, because it represents the physical area of greatest conflict, presents a challenge for design.

3.2.4. Bernick and Cervero. 1997. *Transit Villages in the 21st Century.*

The authors refer to transit villages defined as a village extending a distance that can be covered in about 5 minutes on foot from a transit station. The hallmarks of a transit village are given as the following:

- Enhanced mobility and environmental quality
When jobs, shops, housing and other activities are located close to or around a transit village there is a higher probability of increased public transport utilisation. Further, more trips can conveniently be made by cycling or walking because of the close proximity of activities.

- Pedestrian friendliness

Some of the elements that can contribute to a pedestrian friendly environment in a transit village include a variety of activities, wide side-walks, tree-lined streets and path-ways, a properly landscaped public plaza or public-seating area, and a clear and continuous pathway network linking the transit village with nearby activities. Well-illuminated areas are an added desirable feature.



Figure 3.11 A pedestrian-orientated environment consisting of safe, congestion free walkways, street furniture and landscaping (Source: *City of Cape Town*, 1975: 44).

- Public safety

The authors stress this as the most important precondition for attracting people to a public space. They suggest that the best way in which to create a safe and secure transit village is by having a residential function

as a of a transit village. Through 24-hour surveillance by residents in the proximity of the transit village on weekends and weekdays, the typical “ghost-town” syndrome after 6pm can be overcome.

Any unoccupied buildings around the transit village or vast, underutilised parking areas should be upgraded to avoid the negative quality these bring to the transit village.

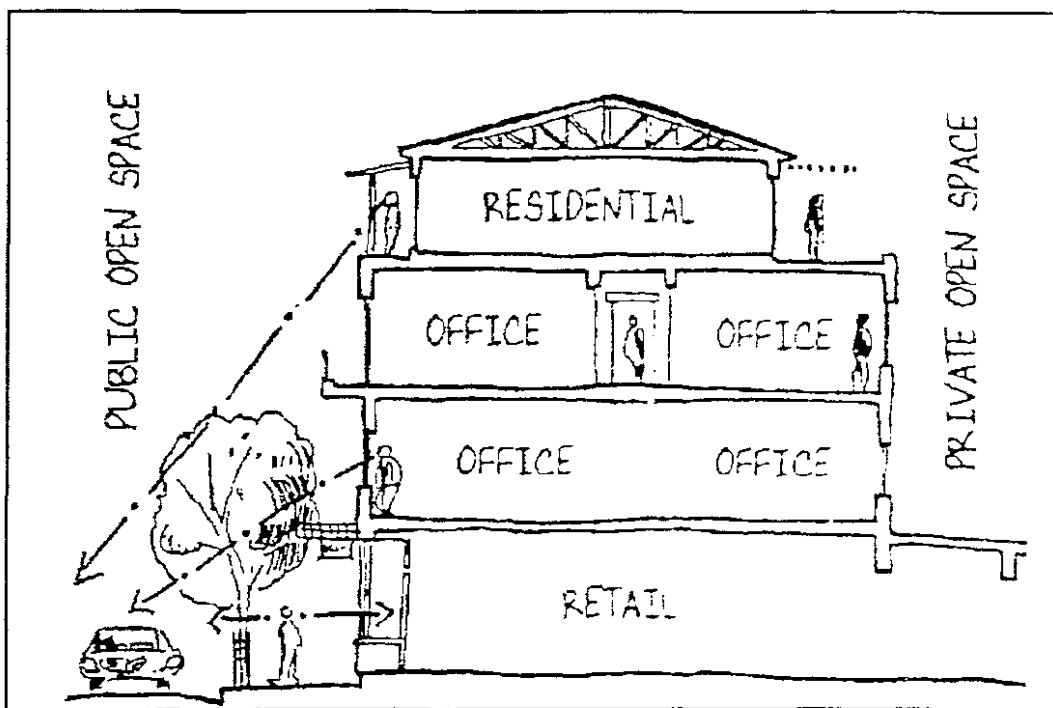


Figure 3.12 Examples of visual surveillance of the public realm (Source: Gautrans & City of Cape Town, 2001: 25).

- Neighbourhood revitalisation

Economic growth can be stimulated because of the existence of constant pedestrian traffic thresholds and the optimisation of existing surrounding building space. Conversely, opportunities for community rebuilding exist

around PTIs because they are places that bring people of different ages, incomes and walks of life into daily contact (social diversity).

- Public celebration

The PTI lends itself to house a space where public activities are generated in a highly accessible area. This community place can have a “chameleon like” character in that it can be used for different activities different times of the day and week.

The three dimensions or attributes that the authors suggest be in place in order for a transit village to be successful are: Density, Diversity and Design (Bernick & Cervero, 1997: 73). *Density refers to having sufficient residents and workers in walking distance from the PTI to generate high ridership.* Diversity is meant having a mixed land use and different options on moving around. Design refers to the physical features and layout of the site to accommodate walking, cycling and a variety of public transport modes. In order for the PTI environment to be user-friendly it inevitably needs to be pedestrian friendly, seeing as any public transport trip will involve some degree of walking. The pedestrian environment should thus gain preference.

Some PTI supportive design ideas highlighted by a study that was undertaken in the United States and Canada, are the following (Bernick & Cervero, 1997: 91-94):

- Continuous and direct physical linkages between major activities in and around the PTI are needed to ensure shortest distances. Thus it is very important especially for pedestrians that sidewalks are in a good condition and that they link up with safe pedestrian crossings to and from a continuous network.

- The quality of the pedestrian environment is affected by the nature of the building frontages onto the PTI. It is suggested that the ground floor level of the buildings be used for formal or informal retail activity or that interesting textures are used on buildings, building cantilevers are added for weather protection or attractive landscaping and positioning of street furniture occur, to enhance the walking experience.
- A hard public open space or pedestrian plaza can be an inviting element of the PTI in that it provides relief to the otherwise built-up surrounds. This should be a multi-functional space that can be used for numerous activities, depending on the needs of the community, times of day and week.
- In order for the PTI to be user-friendly, basic needs such as shelter, seating and route/time information need to be met.

If a PTI is going to fulfil its role as a public space, attention should be given to the type of activities that can happen in a public space. Gehl, in his book, *Giving the City a Human Face* (1992) (Gehl cited in Bernick & Cervero, 1997: 95-99) suggested three types of activities that can take place in a public space, namely necessary activities, optional activities and social activities. It is argued that all these should be accommodated in the ideal PTI to ensure a rich, vibrant and attractive public space.

These activities can be explained as follows: necessary activities are the ones that are inevitable and one has to do such as waiting for the train or walking to the PTI. These activities take place whenever the need arises and more or less regardless of the quality of the physical environment. There is thus no choice in the matter for the commuter.



Figure 3.13 Necessary activities: passengers waiting for a train.

Optional activities are activities one will do when the circumstances are right and one is tempted to do that. Examples are enjoying a cup of coffee at a coffee shop, buying something from a stall or sitting down and watching passers-by. These activities are chosen when the situation is pleasant and inviting.

Social activities involve meeting people. This can take the form of either individual or small group meetings or major festivals.

The authors conclude this book by arguing that transit villages can become “places that matter” in a city (Bernick & Cervero, 1997: 131-133) only if the following are in place:

- Higher residential densities in close proximity to station areas,
- Mixed land uses surrounding station areas, so that needs can be met largely with public transport and that no one needs to be dependent on private transport,

LESSONS LEARNED

Higher order principles

- Opportunities for community rebuilding exist around PTIs because of the social diversity of the people using it on a daily basis.

Lower order principles

- A continuous pedestrian pathway should link PTIs with nearby activities
- A PTI should be well lit, have landscaping elements and sufficient and appropriate seating to ensure a positive pedestrian environment.
- Having a residential component as part of the PTI can bring about a safe public environment.
- Public celebration can occur where there is high quality access at PTIs
- Building facade quality surrounding a PTI contributes immensely to a positive pedestrian experience as facades form the edges and are therefore an integral part of the space as experienced.
- A PTI should give opportunity for necessary, optional and social activities to take place in its precinct as a "place that matters".

3.2.5. Lynch. 1960. *Image of the City*.

Lynch presents three elements that contribute to the visual quality of a city environment. Although he proposes this at a city-wide scale, it is argued that the universal quality of these, make them applicable to any scale. These are, legibility, the different parts of the space need to be easily identifiable and grouped to form an overall pattern: structure and identity, in the words of Trancik "the recognisable, coherent pattern of urban blocks, buildings, and space" (Trancik, 1986: 120) and imageability, referring to how people experience the physical environment.

He further suggested five “elements of urban form” (Lynch, 1960: 46-83). These elements are vital in physical and psychological orientation and according to the author, the major requirements for a legible urban space:

Paths: These are all the different movement channels in a city. In a PTI it can be the roads, sidewalks (or pedestrian walkways), the rail line.

Edges: These are “linear breaks in continuity” (Lynch, 1960: 47) where there is a change of some sort. It might be a change in use or character. Examples of edges at a PTI might be the rail line or the facades of surrounding buildings.

Districts: They have “some common, identifying character” (Lynch, 1960: 47), which makes them different from their surrounds. At the metropolitan scale, the entire PTI can be viewed as an area with a common identity

Nodes: According to the definition of a node given by Lynch, a PTI fits it perfectly. He said: “...the strategic spots in a city into which an observer can enter, they may be primarily junctions, places of a break in transportation, a crossing or convergence of paths...” (Lynch, 1960: 47).

Landmarks: These are specific objects such as buildings, a tower, and a mountain i.e. an element that can be used to show direction and position. Apart from the orientation function of landmarks it also contributes to the uniqueness of a place. Landmarks can be relevant at different scales, for example, Table Mountain would be a citywide landmark and the courthouse close to Wynberg PTI would be a local landmark.

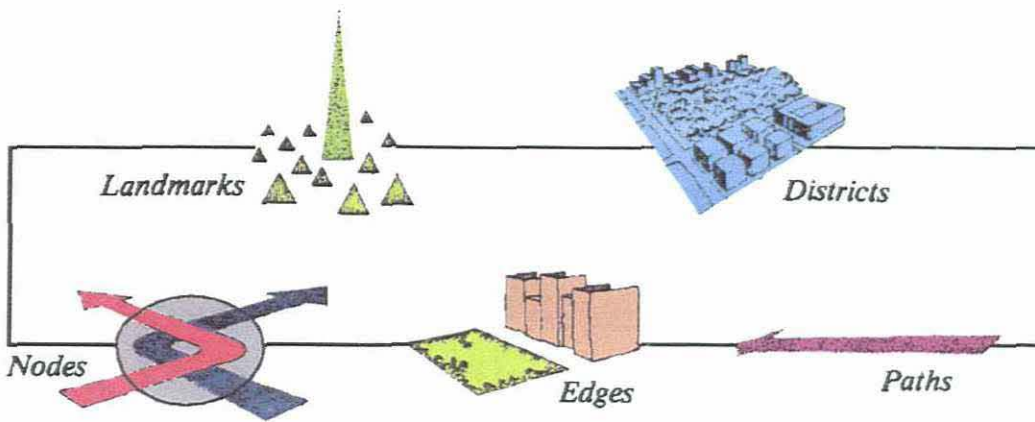


Figure 3.14 Kevin Lynch's spatial elements of a city (Source: Trancik, 1986: 121).

LESSONS LEARNED

Higher order principles

- Legibility or the clarity of a space is a determining factor in its overall quality.

Lower order principles

- Movement channels in the PTI should be well defined and clearly demarcated as to their specific use.
- Opportunities for a change in use at edges contribute to the PTI being a vibrant space.
- Easily identifiable areas contribute to the clarity of a space.
- Capacity for socio-economic opportunities exists in and around a PTI because of its nodal characteristic.
- Any landmarks in a place (whether it is physically in the place or visible from it) should be incorporated as to make orientation easier and contribute to the place's uniqueness.

3.2.6. Lynch. 1981. *A Theory of Good City Form*.

Lynch suggested that universal city qualities exist that are relevant to urban dwellers from all walks of life, with different backgrounds and socio-economic status. These qualities are referred to as performance dimensions. The author explains that not all performance dimensions would be of equal importance depending on the context, and that in some cases trade-offs need to be negotiated depending on a person's preferences or values (Lynch, 1981: 111-112)

The suggested performance dimensions are:

- Vitality

Vitality is defined as: "the degree to which the form of the city (settlement) supports the vital functions, the biological requirements and capabilities of human beings, above all, how it protects the survival of the species" (Lynch, 1981: 118).

Lynch specifically refers to the "...features of the environment, which are conducive to health...which make it a vital place" (Lynch, 1981: 121)

Vitality is attained by satisfying the following sub-criteria:

- Sustenance

Sustenance refers to the sufficient supply of the life-supporting elements such as food, energy, water, air and the efficient disposal of waste. These must be able to sustain at least human life.

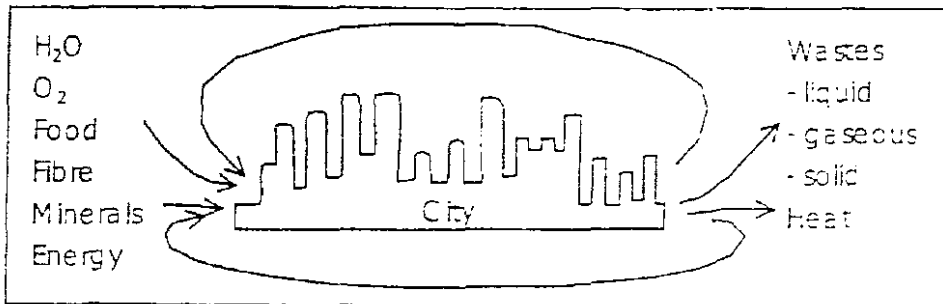


Figure 3.15 "The throughput must be adequate to sustain life" (Source Lynch 1981 121).

- **Safety**

The urban environment should be free from hazardous elements or at least the fear of experiencing these elements should be minor. It can be described as a physically safe area with clean air, hygienic and healthy food. It also means the treatment of those who have been subjected to any of these hazardous elements and it refers to systems that would assist in establishing these.

- **Consonance**

Consonance means that the physical environment should be conducive to the biological requirements of human beings. Natural rhythms such as walking should be supported by the spatial environment. Doors, steps, windows, building heights, street widths, etc. should be built to easily meet the needs of the human users. In other words it should fit to the human size (Lynch, 1981: 122-128).

If sustenance is achieved safety is established and maintained, and if consonance were attained, then the performance dimension of vitality would have been successfully met

- Sense

“This is the degree to which the settlement can be clearly defined and mentally differentiated and structured in time and space by residents and the degree to which that mental structure connects with their values and concepts – to match environment, our sensory and mental capabilities, and our cultural constructs” (Lynch, 1981: 118).

A personal feeling about a space and the interaction between person and place determines the quality of sense. This performance dimension is thus to a large extent open to various interpretations depending on the observer.

- Identity

Identity is the ability of an area to be different from other areas. Lynch refers to this as “a sense of place” (Lynch, 1981: 131). A place’s uniqueness or a special character can give it a sense of identity. Cape Town will be a good example of a city with a unique identity because of the configuration responding to Table Mountain and the sea.

- Structure

Structure of a small place “...is the sense of how parts fit together...” (Lynch, 1981: 134). At a larger scale it refers to the sense of orientation. Orientation is critical to ensure access to opportunities.

Elements that enable orientation include significant landmarks, such as buildings or statues, and other clues such as grid layouts, slopes, or textures.

- Congruence

This refers to how the form or appearance of a building (or space) is matched by its social, economic or cultural role. It also refers to how its location communicates its function (Lynch, 1981: 138).

- Transparency

This has reference to the ability of the city or urban places to be perceived by means of the five basic human senses. Here the "sense of life" comes into being (Lynch, 1981: 139).

For example can one touch, see and smell the goods that are for sale or can one see whether a parking area is full or not?

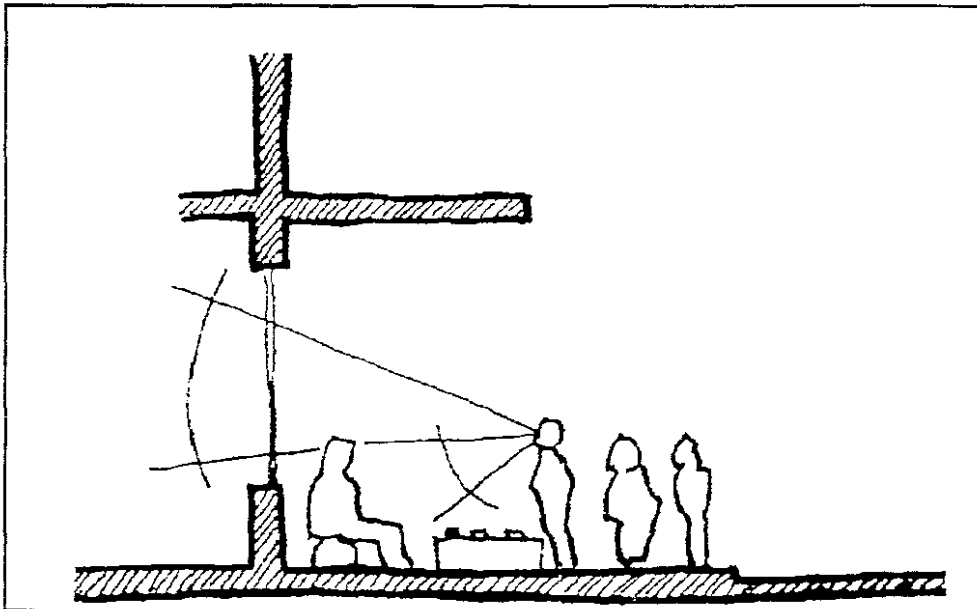


Figure 3.16 Transparent ground-floor building frontages extend the public realm
(Source: Gautrans & City of Cape Town 2001: 25).

- Legibility

This refers to the question whether there is a clear message from the environment and how it is communicated to the user. This principle sees the urban environment as a means of communication, displaying both implicit and explicit symbols. These symbols serve various functions. For example, they inform users regarding ownership, affiliation, goods and services, etc. "...the degree to which inhabitants of an environment or settlement can communicate accurately to each other via its symbolic physical feature" (Lynch, 1981: 139).

- Fit

The criteria of fit can be met by satisfying the following: adaptability (how the environment can cope with change); manipulability (how the environment can be changed within certain constraints such as time, costs, sense of continuity); and resilience (how easily a place can be restored).

- Access

"The ability to reach other people, activities, resources, services, information, or places including the quantity and diversity of elements that can be reached" (Lynch, 1981: 118).

- Diversity and Choice

The degree of choice a space offers, influences its levels of access. Alternative routes to be taken to the same destination, the diversity in transport modes available or range of shops in an area all denote levels of choice.

LESSONS LEARNED

Lower order principle

- Any distinctive or exceptional element of the PTI, for example an historic building or an extraordinary view should be incorporated to provide the space with a unique identity
- Proper waste disposal systems are of the utmost importance to ensure a healthy environment.
- People using the PTI should be safe. User's safety refers to two aspects, the one being a physically safe environment with limited hazards such as dangerous street crossings, stairways, dilapidated walkways, and the second being protection from criminal acts. Surveillance from surrounding buildings, visible policing or security and the presence of people at all times can ensure a safer PTI.
- The spatial environment should be conducive to the activity of walking and the related elements, such as buildings and streets should be built to human scale.
- Building relationships, road layouts and alignments, and landmarks should give structure to an area to ensure easy orientation.
- Building heights, forms and facades should communicate their primary function and thus give a clear indication of their social, economic or cultural role.
- Informal traders and shopkeepers enabled to clearly exhibit their goods ensure a vibrant and transparent environment.
- Directional or locational information needs to be communicated to users of a space in order for a space to be legible.
- Users should have a choice in the routes they can take or the transport modes they want to use. Shops in/or surrounding the PTI should be of varying nature and offer a range of goods.

3.2.7. Tibbalds. 1992. *Making People-Friendly Towns: Improving the Public Environment in Towns and Cities.*

The author refers to the public realm as all the places to which the public has unrestrained physical and visual access.

“The overriding criteria by which cities and towns should be judged are the nature of the public realm” (Tibbalds, 1992: 9). Public transport interchanges, like squares and public buildings, form an integral part of the public realm and can fit, as will be shown in the next few paragraphs, very well with the main arguments Tibbalds poses as contributing factors to a healthy and vibrant public realm

He suggests that the quality of ‘people-friendly’ environments could only be achieved through the following:

- Mixed uses and activities. By having a mixed-use environment, a rich, varied and safe character is created. In this regard, a PTI can be seen as a potential node of activity mainly because of its accessibility and threshold potential. This characteristic makes it the perfect location to house different activities and uses. Tibbalds suggests “greater diversity will help to create a more liveable city” (1992: 12)
- Human Scale: Although the main function of a PTI is to facilitate movement and related activities, it potentially performs a far more pervasive role in city life. A comfortable human scale environment is related to the pace at which pedestrians best perceive their surrounds. However, as a PTI focuses on movement, some tension inevitably arises between pedestrians and other modes of transport, the latter usually involving a higher tempo of movement.

Tibbalds suggests the following regarding the nature and quality of human scale:

- Clearly defined edges of a public space by buildings or streets.
 - A range of shopping experiences seeing as shopping comprises one of the key pedestrian-level uses.
 - The existence of a permeable space where pedestrian movement through and between buildings is facilitated by the positioning of such buildings.
 - Building forms or structures that offer protection from the elements and complex facades that contributes to the aesthetic value of the environment.
- **Pedestrian Freedom:** The quality of an urban environment is to a large extent determined by the freedom with which people can walk around in such an environment. There are two types of obstacles to pedestrian freedom. The first is made up of poles, bollards, litter-bins, advertising features, parked cars, planting features, broken paving, and suchlike, that can offer a hindrance on even designated pedestrian paths. The second is the all-too-familiar conflict between pedestrians and moving vehicles.

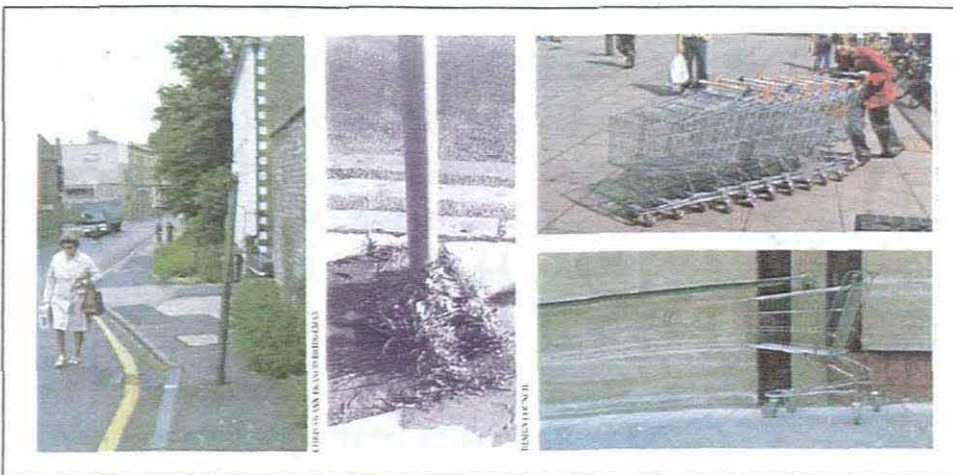


Figure 3.17 Obstacles that can constrain pedestrian freedom (Source: *Design Council and the Royal Town Planning Institute, 1979: 49*).

- Equitable access, which means access for all, is one of the basic elements needed for a positive urban living environment. PTIs, because of their function as movement facilitators and their strategic positions in the city, are perfectly positioned to fulfil the “access for all” function. Age, physical incapacity, poor social background or low income levels should not be deterring factors that exclude people from accessing the activities, resources, information and places of a city.
- An understandable urban environment, in which one feels well orientated, puts the user of such an environment at ease. Knowing where you’re going or where you can go, as well as understanding the alternatives available to you, goes a long way in ensuring a “user-friendly” environment. Tibbalds refers to the importance of the quality of legibility in understanding an urban environment. Legibility, if it exists at the PTI level, provides affirmative answers to the following
 - Do you know that you have entered the PTI area?
 - Do you know where to exit the area and in doing so which part of the city you are entering?
 - Is transport-related information readily available? Can you see which modes are available and what their routes are?
 - Are the different environments (i.e. pedestrian, vehicular, trading, resting/waiting) clearly demarcated by surface change, level change, and signage?
 - Are there any landmarks visible from the PTI: are there any elements at the interchange that can play the role of a landmark, or is the PTI a landmark itself?
- Lasting Environments: Most PTIs would probably have buildings (either the “old station building” or surrounding buildings) of high architectural quality and historical value. These buildings play an important visual role in determining the quality of the PTI environment. A most practical issue

in lasting environments is the degree of maintenance afforded to them. PTI environments are often poorly managed public places typified by quality degrading factors such as dilapidated and grimy and neglected surrounding buildings, litter, graffiti, poor maintenance of vegetation, and hard surfaces in poor condition.

LESSONS LEARNED

Higher order impacts

- A PTI should facilitate equitable access, which means it should be safe, physically accessible and affordable for especially the vulnerable groups of society (the aged, women, children, and disabled).
- A legible environment has many advantages for the users such as a feeling of safety, comfort and orientation as well as knowledge of all the services and facilities available.

Lower order impacts

- A PTI should be preserved as a timeless and robust environment by maintaining not only the surrounding buildings but also the hard spaces.
- In order for a PTI to contribute to a positive urban living environment, it needs to accommodate a diversity of uses in its precinct
- Pedestrians should be seen as the primary users of a PTI, which should thus be designed to human scale as opposed to the vehicular scale.

3.2.8. Trancik, 1986. *Finding Lost Space: Theories of Urban Design*.

Trancik refers to positive urban environments as "found space". One of his main arguments for a "found space" is a definable pedestrian environment where the flow of pedestrians takes preference over any other type of movement. In order to

design a pedestrian-orientated space, enclosure is an important precondition that needs to be met. "Peoples' image of and reaction to a space is largely determined by the way it is enclosed. People like rooms" (Trancik, 1986: 18). People therefore relate to rooms, which means a space needs to have "walls" and links to other spaces or activities. Surrounding buildings, which assist in defining the space by forming measurable boundaries, creates these "walls". The surrounding buildings should contribute to the activities of the space. Life inside the buildings should therefore be related to the outside life on the street.

One of the elements that Trancik refers to is the presence of hard public spaces in the city. Trancik identifies three important components of successful hard public spaces (Trancik, 1986: 60-63):

- The frame: This is three-dimensional and includes the edges of the space, the degree of enclosure, and characteristics of the spatial wall (e.g. building facades). The frame forms the outer boundaries that define the space.
- The pattern (or surface): This is two-dimensional and refers to textures, materials and composition of the ground surface.
- Objects in space or focal points: These are the elements that make a space memorable such as buildings, water features, sculptures and other accents, all which contribute to the uniqueness of the space, and in fact make it a "place".

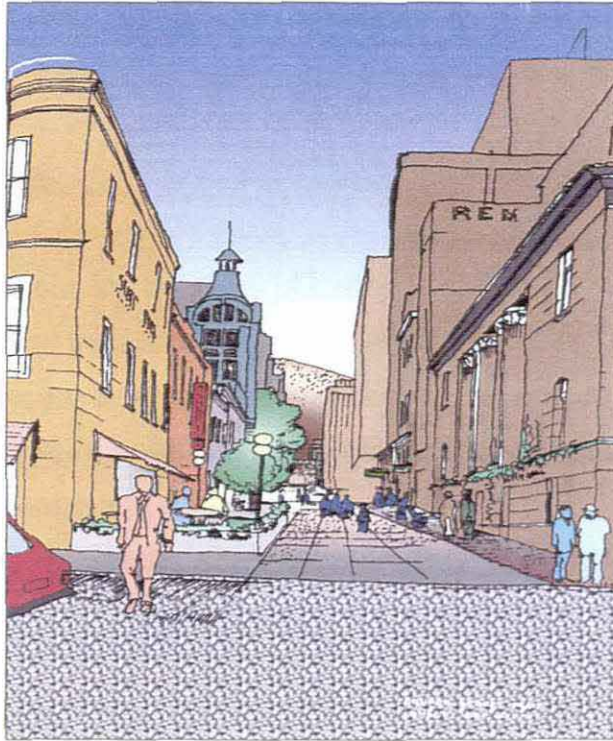


Figure 3.18 The buildings forming the frame, the paved walkway that provides the pattern and a clock tower that represents an object (Source: *City of Cape Town*, 1975: 36).

“A place is space which has a distinct character” (Norber-Schulz cited in Trancik, 1986: 114). Trancik argues that the determining factor in a place having a distinct character is people, and the way they interpret and use a space. This is especially applicable to a PTI in that it attracts thousands of people on a daily basis. The essence of this thesis in fact is that a PTI presents a most likely instance where a *lost space* can be converted into a *found space*.

LESSONS LEARNED

Higher order impacts

- Human dimensions should be considered when designing outdoor space and the heights of surrounding buildings.

- Public spaces need to have strong enclosure in order for them to be used optimally.

Lower order impacts

- The inside and outside activities of buildings should be related. Around PTIs it is common to find underutilised or even empty buildings
- Pedestrians need a space with enclosure to ensure a sense of safety. Individual buildings can be integrated with hard open spaces in the PTI precinct to enhance the sense of enclosure.
- The type and quality of surface cover and the presence of focal points contribute to creating a hard space as a unique and memorable place

3.2.9 Vuchic. 2000. *Transportation for Liveable Cities*.

Vuchic states that urban transportation systems (which include public transportation) have a direct influence on whether a city is liveable or not. For the purpose of this study, the following suggestive points are made:

- "Transportation has major social, environmental, and other positive and negative side effects" (Vuchic, 2000: xviii).
- "Although transportation has some elements of free-market operation, it is also a complex system involving social and environmental factors that must be planned as a whole" (Vuchic, 2000: xviii).
- "Travel opportunities and costs affect the quality of life of individuals and population groups; transportation systems therefore, must be planned not only for efficiency but for social and equity considerations as well" (Vuchic, 2000: xviii).
- "Transportation has a major impact not only on the physical form of cities but on their liveability – the quality of their natural and man-made environments" (Vuchic, 2000: xviii)

From the above it is clear that Vuchic (2000) recognises the impact of public transport going far beyond the movement of goods and people. It is an activity with a profound and direct impact on the quality of life, be it in the social, environmental or economical sense.

Vuchic (2000: 233-235) further identifies three major sets of characteristics of a liveable urban environment as being:

- “Human-oriented ”

This refers to designing spaces to a human scale as against a vehicular scale. Features, such as protection from the elements of weather, seating, *designated pedestrian walkways, landscaping or policing, need to be in place to make a space convenient, safe and pleasant for people.*

- “Economically viable and efficient”

This refers to having a variety of economic opportunities in the area and efficient service provision.

- “Socially sound”

A sense of togetherness and pride in individual areas and the city as a whole is what is needed for a liveable environment. Social, economic and ethnic barriers can be overcome by having high quality social spaces.

LESSONS LEARNED

Higher order impacts

- Public transport and PTIs have a social function: they facilitate the connection of people with people. The PTI is seen as a public space where everybody has equal rights and no differentiation is made with regard to social class, income group, race or gender.

Principles of Public Transport and Pedestrian Infrastructure

- Public transport and PTIs have a welfare function: They facilitate access to opportunities such as employment, schools, clinics or hospitals. Having access to these directly influences quality of life.
- Public transport and PTIs are major facilitators of equity: the number of destinations that can be reached, the cost of public transport in time, money and levels of convenience. The levels of safety and security at the PTI and on the public transport mode are additional factors determining the extent to which vulnerable groups of society (poor, aged, children, women, physically or mentally handicapped) are included in that which makes city living good.
- Walking needs to be seen as basic to the liveable space/neighbourhood/city. A pleasant, safe and convenient pedestrian environment is one of the principles that can ensure all the higher order principles mentioned above.

Lower order impacts

- In order to satisfy the diverse travel needs that exist because of the physical form of cities and the dispersed positioning of opportunities, an inter-modal public transport system is imperative. This is a system where public transport modes should be properly integrated so that each mode performs its role where it is most efficient.
- The inter-modal public transport system also needs to be integrated with other activities. This refers to the basic planning principle of land use and transport being mutually supportive to ensure a sustainable and high quality urban environment.

Many PTIs or their components are typically “lost” urban spaces that can be reclaimed and transformed into opportunities not only for development but also for lively and safe social interaction.

3.3 THE THREE SPHERES OF INFLUENCE OF PTIs

It emerges from the foregoing theoretical exposition that the higher and lower order principles lend themselves to a three-fold classification.

The following diagram shows the three classes or spheres of influence in terms of which a PTI can be said to operate, with special reference to facilitating the quality of city life:

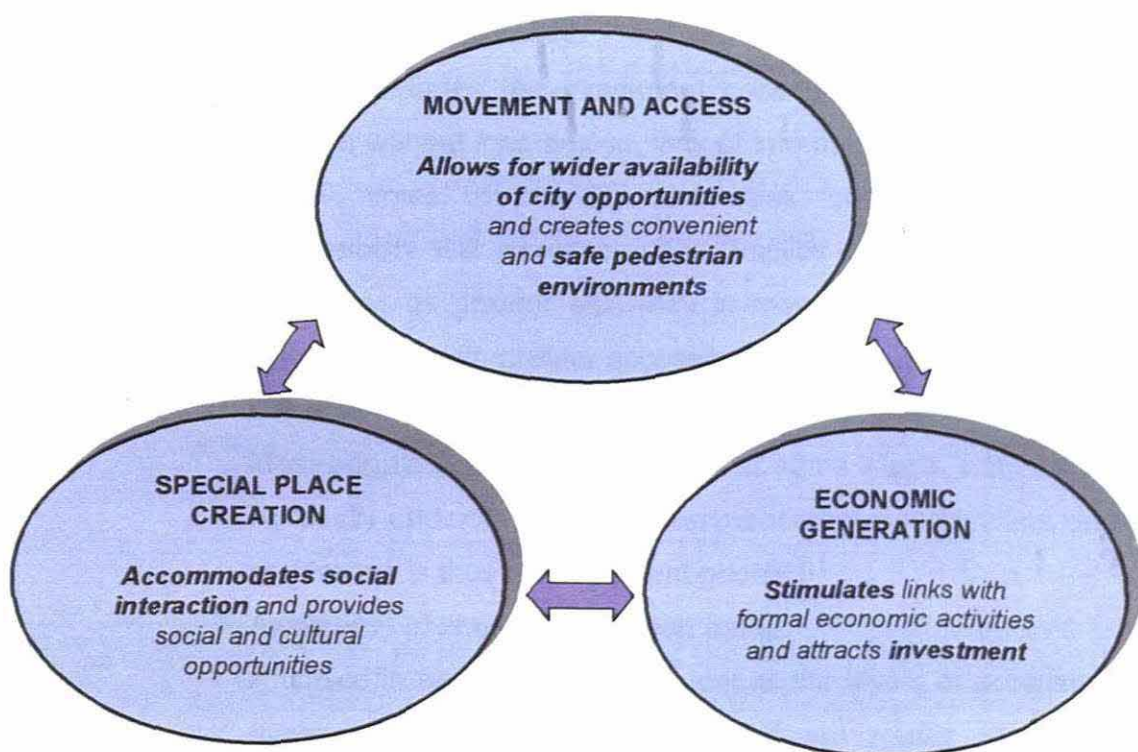


Figure 3.19 The three spheres of influence of PTIs

The specific meaning and relevance of each of these spheres will depend on the context of the individual PTI. Aspects such as its role at city scale, its socio-economic setting, its proximity to activity corridors and mixed-use areas, influence its potential realisation in terms of one or all of these spheres of influence.

The following are some of the planning principles that contribute to the specific sphere of influence of a PTI:

Movement and Access Sphere

- Integration of transport nodes at city level.
A clear understanding of the function and scale at which the PTI operates, will assist in minimising operational duplication and results in a more efficient public transport service.
- Maximised accessibility.
A PTI facilitates the movement between modes. If this can happen without long delays, lack of information or restrictions to certain times of the day and week, commuters' levels of accessibility will increase. This implies heightened levels of efficiency, as greater efficiency in movement and transport is synonymous with greater accessibility.
- Creation of a convenient and safe pedestrian environment.
Most people will be a pedestrian. at some stage. within a PTI. An easily understandable environment where pedestrians enjoy preference is thus a self-evident priority.
- Availability of choice of transport mode.
A choice in transport mode influences the levels of accessibility because different modes cover different routes at different speeds and at different rates.

Special Place Creation Sphere

- Provision of social and cultural opportunities.
A PTI is a place that attracts people of different ages with different socio-economic, cultural and religious backgrounds. The clear implication is that in many instances it is an untapped

social and cultural space with the potential of becoming a special place in the city.

- Provision of a range of facilities.

If many different facilities exist around a PTI, such as libraries, shops, post office services, child day-care, medical services, motor vehicle-related services, gymnasium or financial services (pension payout points), more people will be attracted to it for many different reasons pertaining to quality of life, other than movement.

Economic Generation Sphere

- Stimulation of the link between formal and informal economic activities.

Direct competition between formal and informal economic activities is usually not to the advantage of especially the formal shops, mainly because of the higher cost of overheads. This results in a dilapidated formal economic environment around a PTI. The positive spin-offs that are nonetheless possible for both formal and informal activity should be highlighted as reasons why a symbiotic relationship will be beneficial to the quality of the PTI environment as a whole.

- Poverty alleviation/job creation through informal trading.

The opportunity for informal trading exists at a PTI because of the necessary consumer thresholds being present. In order to maximise this potential, the informal sector needs to be guided and monitored.

- Attraction of investment to the area.

PTIs are often characterised by negative and unsafe environments. Investments and new developments will

contribute to changing this image to one of growth and prosperity.

The safety and security aspects are an overriding factor at each of the three spheres. None of the opportunities arising in the confines of a public transport interchange can be properly realised without it being a safe environment. For this research study, safety refers to accident-related incidents and security against crime related incidents (Kwazulu-Natal. Department of Transport, 2002: 9).

A further sphere of influence identified in this study is that of empowerment. As with safety and security, it pervades all three the main spheres of influence as described above. The ability to move around in a city, and having access to different opportunities, ensures a world of possibilities to better the quality of one's life at all age levels. Having access to the economic and social opportunities within a PTI precinct thus empowers people to become "complete" citizens, fully sharing what the city has to offer.

3.4 CONCLUSION

A point of departure for most research projects would be to determine what is embedded in literature and existing theories. The findings in this chapter thus form the foundation for the rest of the analysis, because now urban design and transport principles have been translated in terms of the public transport interchange context, in order to give a clearer indication of what constitutes a positive urban living environment for PTIs.

As mentioned previously, two classes or sections of literature had to be investigated. namely urban design as well as transportation. This posed many challenges mainly because it is not an easy task to translate the quantitative and engineering methods most often found in transportation literature to performance and qualitative approaches

The three spheres of influence identified in this chapter refer to the differing “roles or parts” of a PTI. These spheres of influence can be used for purposes of categorising the various higher and lower order issues and principles, and table 7.2 suggests such a categorisation.

It is envisaged that these key issues and principles can be developed, together with the issues highlighted by other informants suggested in chapters 4 and 5, into a comprehensive set of performance measures, at both the higher and lower order levels, specifically applicable to PTIs.

CHAPTER 4

THE NON-SPATIAL FRAMEWORK

4.1 INTRODUCTION

As has been stated at the outset, the focus of this thesis is to address urban qualities emanating from the spatially related components of PTIs, rather than transportation efficiency or the merits of the institutional and the legislative frameworks. Neither is the social context addressed, at least not directly, though the social consequences of the proposed spatial principles that do form the focus of this thesis, are identified. It is accepted, nonetheless, that in planning, spatial and non-spatial principles are often connected in terms of cause and effect.

The following provides an overview of and background to the current public transport framework in South Africa, and where applicable, specific to the city of Cape Town.

The purpose of this overview is to determine whether there are any existing criteria or principles in this non-spatial realm that can be discovered and applied to the successful development or upgrade of public transport interchanges.

This non-spatial realm is examined under five headings, namely the Institutional Framework, Legislative Framework, Policy Framework, Design Guidelines and the Social Context.

Having regard to the numerous legislation and policy frameworks and whatever administrative machinery appears to be in place, it can be stated at the outset that considerable confusion and uncertainty concerning responsibilities at the various levels of government contributes to a situation, in the Western Cape Province and

elsewhere, of questionable service delivery. Critical comments relating to this are again given at the end of this chapter.

4.2 THE INSTITUTIONAL FRAMEWORK

In this section the responsibilities of different departments and public transport agencies are outlined, whilst a general overview of the role players and their responsibilities are also provided.

4.2.1 National Department of Transport (NDoT)

The main functions of the Department include the formulation of national policies and strategic planning to ensure growth and development in the public transport sector as well as regulating competition and safety standards for the entire public transport sector (South Africa. National Department of Transport, 2003).

4.2.2 Provincial Department of Transport (PDoT)

The Constitution (South Africa, 1996) delegates legislative and executive powers in respect of public transport to provincial governments in their respective regions. Provincial governments are thus responsible for public transport at the provincial level.

4.2.3 Metropolitan / Local Government

The responsibility of municipal public transport falls under the particular local government, and in Cape Town's case, the Uni-city of Cape Town carries this responsibility. Although the Uni-city is in a transition phase regarding its political and administrative structures, the following represents the situation at the time of writing (May 2004):

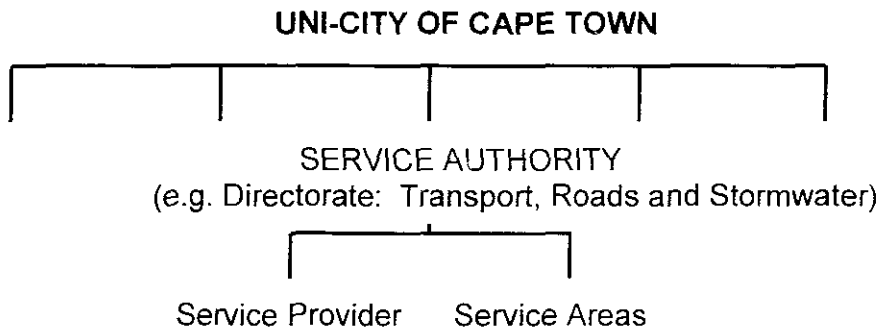


Figure 4.1 Administrative structure of the City of Cape Town.

4.2.4 Metropolitan Transport Advisory Boards

At present, metropolitan transport advisory boards are the governing bodies for urban areas that have been declared metropolitan transport areas (South Africa, 1977b). In the near future, transport authorities will replace these advisory boards.

4.2.5 Metropolitan Transport Area (MTA)

A MTA is declared and exists under section 3 of the Urban Transport Act No. 78 of 1977 (South Africa, 1977b).

A MTA may include only one municipal area, or more than one, or even parts of municipal areas, depending on the transport context and issues at hand.

Section 4 of the Urban Transport Act 1977 (South Africa, 1977b) designates certain municipalities as core cities of MTAs. These core cities are responsible for the administrative, planning and implementation functions related to transportation in the specific MTA.

4.2.6 Transport Authority

This refers to a single institutional structure, which can come about by grouping the different transport functions of a MTA together. A transport authority is only established if its role is to improve transport service delivery in the local sphere of government.

This is not a metropolitan-wide function in that a transport authority is responsible for a specific MTA at the municipal government level.

The functions and competencies of transport authorities with regard to public transport are stipulated in section 68 of the National Land Transport Transition Act No. 22 of 2000 (South Africa, 2000b) so as to:

- Promote security in public transport.
- Encourage and promote the optimal use of the available travel modes so as to enhance the effectiveness of the transport system and reduce travelling time and costs.
- Market, promote and assume responsibility for publicity associated with the public transport system.
- Provide information to users or potential users of public transport.
- In the case of unsubsidised public transport services, set minimum fares.

In certain public transport spheres, the possibility of forming a transport authority has met with some resistance mainly because it focuses on centralising and coordinating all aspects of transport in a specific MTA. This would have the obvious implications of certain relevant parties (local authorities, public transport agencies and operators) losing some or all powers, regarding transportation.

A further issue concerning the possible success or failure of a transport authority is that the National Land Transport Transition Act No. 22 of 2000 (South Africa, 2000b) deems it to be a voluntary institution and thus does not in fact vest it with the powers and protection appropriate for an authority of this nature to be taken seriously.

No transport authorities have been established as yet in the Western Cape (one does exist in the eThekweni Municipality in Durban, Kwazulu-Natal), and there is considerable confusion regarding its supposed functions and powers.

4.2.7 Member of the Executive Council (MEC) for Transport

This is the MEC of a province who is responsible for public transport in that specific province.

The functions of transport MECs are stipulated in Act No. 22 of 2000 (South Africa, 2000b) to range from preparing transport frameworks and policies to promoting public transport in the province.

4.2.8 Authorities and Agents responsible for PTIs

The responsible authority to plan, provide, manage and maintain the road-based transport side of PTIs is the Uni-city of Cape Towns' Transport, Roads and Stormwater Directorate. The rail-based transport system and its associated station area is the responsibility of National Government and specifically its agent, the South African Rail Commuter Corporation (SARCC).

Metrorail is contracted by SARCC to operate all commuter rail services and to maintain rail rolling stock and infrastructure (SARCC, 2004).

Intersite is a division of the SARCC and is responsible for the management of the rail-related properties that will include rail stations. On the road-based side of PTIs, Modalink is the Uni-city's management agent (Kingma, 2003).

To clarify responsibilities and jurisdiction further, the example of the Cape Town CBD public transport interchange is used:

- Management of the rail component of the PTI = *Intersite*
- Rail-related security and ticketing = *Metrorail*
- Cleaning, operational management and day-to-day running of the PTI = Interchange manager appointed by *Modalink*

One of the major challenges with the existing responsibility structure is a lack of communication and co-ordination regarding issues that span the entire PTI. At present the PTI is divided between a road-based and a rail-based environment. Such generic issues might for instance be that of security or inter-modal ticketing systems or even pedestrian movement channels.

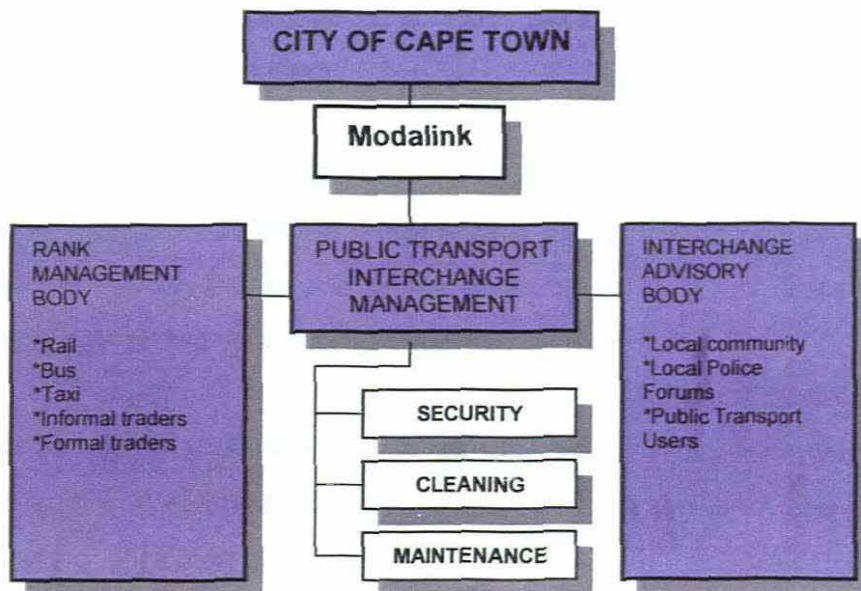


Figure 4.2 The management structure of PTIs (Source: Van Eeden, 2002: 84)

4.3 THE LEGISLATIVE FRAMEWORK

The following provides an overview of South African legislation and policies related to public transportation and PTIs. The aim of examining the legislative framework is to reveal the boundaries and frameworks in which the public transport system can and should operate.

The erstwhile Minister of Transport and Public Works, Mr Mac Maharaj, stressed the importance of the legislative context by saying that “The effectiveness of the role played by transport is very much dictated by the soundness of the transport policy and strategies underlying it” (South Africa. Department of Transport, 1996: 1).

In Cape Town, as in most South African cities, transport problems date back to the Apartheid era (1950 –1994) where segregation of the city into white and non-white areas and facilities was the policy approach of the time. This political ideology saw the non-white population being pushed to the periphery of the city where there were very few opportunities (jobs, schools, social, medical, engineering services, proper housing, public transport).

Having regard to the immense influence that the legislative decisions taken today could have on the quality of lives that people will lead in the future, it is imperative to determine the legislative and policy environment of public transport and PTIs, before any further analysis or proposals can be made.

Although the National Government is responsible for policy formulation, monitoring and strategic implementation regarding public transportation the Constitution of the Republic of South Africa (South Africa, 1996). as previously mentioned, identified certain legislative and executive powers in respect of public transport, as a provincial competency.

For this reason, emphasis is put in this study on provincial (Western Cape) and city (Cape Town Uni-city) legislation and policies.

4.3.1 National Legislation

Urban Transport Act No. 78 of 1977 (South Africa, 1977b)

The Vision: “To promote the planning and provision of adequate urban transport facilities...”

This Act provides for the establishment of metropolitan transport areas (MTAs) and that there should be a designated core city for each MTA.

It has no direct relevance to PTI developments, but the formation of MTAs will determine which local authority will be responsible for which PTI.

The Constitution of the Republic of South Africa, Act No. 108 of 1996 (South Africa, 1996)

The following policies provide guidance to public transport:

- Everyone has the right to freedom of movement (Section 21).
- Citizens have the right to choose their trade, occupation or profession freely (Section 22). To fulfil this right people need physical access to such opportunities via an affordable movement system such as public transport.
- Everyone has the right to an environment that is not harmful to his or her health or well-being (Section 24), thus shifting emphasis from the private car with its high pollution levels to public transport.

The Constitution is very specific with the type of society it wants for its citizens. Seeing as public transportation is one of the key elements to unlock such a society, it is understandable that so many sections of the Constitution are directly applicable to public transportation.

The White Paper on National Transport Policy (South Africa, Department of Transport, 1996)

The Moving South Africa Strategy developed from this White Paper, which suggested the restructuring of urban passenger transport networks, and passenger interchanges as the “hinge points” of the system. This awareness resulted in much more emphasis being put on the planning and management of PTIs.

National Land Transport Transition Act No. 22 of 2000 (South Africa, 2000b)

The Goal: “Creating appropriate institutional bodies, planning, regulated competition and the restructuring of modes, sustainable funding, and effective transport law enforcement” (South Africa, 2000b: 11). The Act further provides for the devolution of transport planning, services and infrastructure development to transport authorities. One of the results of this process of devolution will be to identify appropriate transport modes for different transport corridors (South Africa, 2000b: 17).

The main focus points of the Act are:

- To facilitate public transport as a priority.
- To enable the establishment of local level transport authorities.
- To set the requirements for integrated transport planning.
- To establish regulated competition.

The Act signifies a shift from infrastructure development to public transport orientated developments.

4.3.2 Provincial Legislation

The Provincial White Paper on Transport (Western Cape (South Africa) Legislature, 1997)

This Paper suggests that transportation should be seen as part of a broader development agenda that not only addresses transportation aims.

The following are the key policies on public transport as contained in this document:

- Alter modal split in favour of public transport.
- Use of public transport routes as key structuring devices.
- Preparation of an operational plan for public transport.
- Restructuring the road based public transport industry.
- Funding as a shared responsibility.
- A review of transport prices.

4.3.3 Local Government Legislation

Local Government Municipal Systems Act No. 32 of 2000 (South Africa, 2000a)

It provides the core principles, mechanisms and processes that are necessary to enable municipalities to move towards social and economic upliftment of local communities.

This Act does not, however, make specific mention of public transportation, but it was thought worth mentioning because of specifically that fact. All previous legislation mentioned or suggested public transport to be a “vehicle” for community upliftment, but this Act, which deals with what should happen at ground level, excludes this important issue.

4.4 POLICY FRAMEWORKS

4.4.1 The Metropolitan Spatial Development Framework: A Guide for Spatial Development in the Cape Metropolitan Functional Region (Cape Metropolitan Council. Department of Urban Planning, 1996)

This document attempts to set out the basic values that should inform all planning and development in the Cape Metropolitan Region (CMR).

The MSDF suggests that promising opportunities exist for the development of commercial nodes at stations due to the fact that the commuter rail-transport system plays a vital role in the levels of mobility of the general population, and there is therefore a constant flow of people through these areas.

The MSDF also states that modal interchanges situated at strategic locations should play an important role in the provision of access to social facilities and economic opportunities.

It unfortunately does not suggest specific steps or an action plan that can lead to such a situation.

4.4.2 Moving South Africa: Towards a Transport Strategy for South Africa for the year 2020 (South Africa. Department of Transport, 1997b)

Its main function is to realise the vision as set out by the White Paper on Land Transport Policy (South Africa. Department of Transport, 1996) by developing specific key actions and plans.

The Mandate is to: "...to develop a strategy to ensure that the transportation system of South Africa meets the needs of South Africa in the 21st century and therefore contributes to the country's growth and economic and social development" (South Africa. Department of Transport, 1997b: 2).

The Moving South Africa document has identified three key strategic areas for focus:

- Densify corridors and nodes to achieve economies of scale,
- Optimise modal economies and service mix, and
- Improve firm levels of performance.

This policy document is a strategic framework to improve passenger and freight transport over a 20-year period. What makes this unique is that this framework is for the first time based on consumer needs. Its focus is mainly on the improvement of infrastructure and the encouragement of private investment, particularly in the minibus taxi, bus and rail sectors.

The Moving South Africa strategy is a data-driven project with the primary unit of analysis being the customer and their needs, including the needs of the nation as a customer.

4.4.3 Moving Ahead: Cape Metropolitan Transport Plan (Cape Metropolitan Council, 1998)

This is a policy document that follows from the Moving South Africa document (South Africa. Department of Transport, 1997b).

The mission statement reads as follows: "...the preparation of transport policies and plans and the co-ordination of the provision and management of transport facilities which will enhance opportunities for access to activities at satisfactory levels of mobility, comfort, cost and safety, as a service to all the people of, and visitors to, the Cape Metropolitan transport area, through an ongoing transparent, accountable and consultative process" (Cape Metropolitan Council, 1998: 11).

This document suggests five main policy thrusts and areas for intervention in order to achieve sustainability. The ones applicable to public transport are:

- Vastly enriched public transport systems. Improve and extend the range and variety of public transport services as well as the suppliers of such services.
- Restraint on private car use, particularly during peak periods.
- Establishment of an appropriate metropolitan transport authority to resolve the organisational and functional disarray, which exists in the transport sector.
- More productive use of available transport resources, not only through a more appropriate land use disposition, but also through planning and engineering initiatives.

4.4.4 Municipal Spatial Development Framework (City of Cape Town. Planning and Development Directorate, 1999)

According to the Municipal Spatial Development Framework (Muni-SDF) “interchange points represent points of high accessibility” (1999: 24). They thus provide an ideal place to cluster social and economic services and an ideal place for government to reach people with support services. This potentially could result in better service delivery and more people benefiting from services.

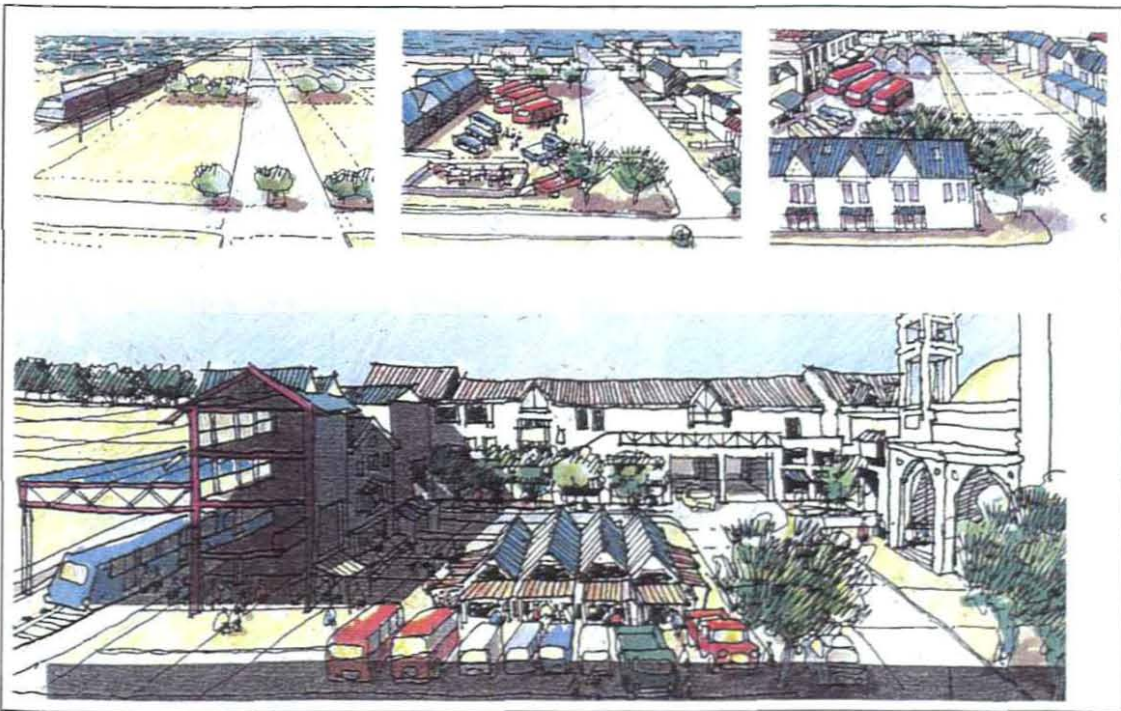


Figure 4.3 The process of development of centres around public transport interchanges as suggested by the Muni-MSDF (Source: City of Cape Town. Planning and Development Directorate, 1999).

4.4.5 The Road to Safety Strategy 2001-2005 (South Africa. Department of Transport, 2001)

This strategy was published in mid 2001 and highlights the following approach as applicable to public transport:

- The introduction of a national passenger's charter for public transport users, to be displayed in all public transport vehicles and to be implemented via compulsory company compliant lines and a national traffic call centre linked to traffic control rooms and the South African Police Service.
- The registration of all bus and minibus taxi operators, and the development and implementation of a code of practice and fleet safety management plan that can be monitored on-site for compliance, with the option of deregistration of non-compliant operators.

As far as can be determined, not one of these approaches have been reached and implemented to date.

4.4.6 The New Strategic Vision for the City of Cape Town (City of Cape Town, 2003)

The vision for the city is stated as: " A prosperous city, known for its ability to compete in the 21st century and its commitment to meeting the challenges facing South Africa, SADC and the African Continent" (City of Cape Town, 2003).

Eight indicators, in which the city's progress is to be measured, were identified. Again only the ones applicable to public transport are included:

- A sustainable city: a commitment to development that meets the needs of the present generation without compromising future generations.
- An accessible city: the city is growing, and requires an urbanisation strategy that focuses on sharing the benefits of urban life with everyone. Public transport should be improved so that Cape Town

can better serve residents and visitors and open up access to opportunity.

- A safe and caring city: valuing people underlies the notion of a safe and caring city.
- A prosperous city: the decisions made today affect the kind of Cape Town we will have in decades to come. Cape Town will be established as a city in touch with its competitive advantages, playing its part in growing the national economy.

4.4.7 Mobility Strategy (City of Cape Town. Directorate of Transport, Roads and Stormwater, 2004)

The Mobility Strategy is the latest document from the Uni-city of Cape Town and has as its priority the “transformation and restructuring of public transport in the City of Cape Town” (City of Cape Town. Directorate of Transport, Roads and Stormwater, 2004: 1).



Figure 4.4 The two components of this Strategy are social and transport restructuring (Source: City of Cape Town. Directorate of Transport. Roads and Stormwater, 2004: 5).

The most important thrust of this document is that the emphasis is to be placed on people and not so much the different modes of public transport or infrastructure as in the past. For this reason, walkways and cycle paths are suggested as important

elements of the city's movement network. Further, transport nodes and interchanges are seen as potential service villages, which is consistent with one of the approaches that this research project advocates.

The Mobility Strategy suggests the following key elements that have relevance to PTI developments:

- Safety and security issues: well-illuminated structures, visible presence of safety officers, and installation of latest surveillance technology.
- Seamless journeys with convenient transfers: all travel information has to be comprehensive and readily available, the transport service needs to be inter-modal, easy-to-read signage at PTIs, service agents to be available to assist passengers).

In summary, the stated objective of the relevant public sector bodies to promote public transport was found to be manifested in the relevant legislative and policy documents.

Some subtle shifts are noticeable such as that the focus is moving away from the transport mode and put on the individual unit, namely the person or end-user. This results in a vision for the City of people-first planning or people-centred development.

4.5 REVIEW OF RELEVANT GUIDELINES SPECIFIC TO PTI DESIGN

4.5.1 The Development of Effective Modal Interchanges for a Restructuring Passenger Transport System: Towards a Guideline Planning Approach (CSIR: Transportek, 1999).

The design guidelines as identified in this document can be summarised as follows:

- Movement of commuters through the PTI should be free from any restrictions and obstacles that can cause delays.
- Space and levels of service (thus capacity of the physical environment and levels of service at the PTI) should be adequately efficient to handle peak flows.
- Commuters should be able to orientate themselves with ease within the PTI.
- Comfort, security and safety of commuters should be ensured through design. This can be achieved by the following:
 - Encouraging multi-functional PTIs
 - Separation of different transport modes
 - Establishing clear pedestrian routes
 - Providing legible signage
 - Improve visibility and surveillance within the PTI
 - Provision of adequate lighting
 - The optimal use of adjacent land
 - Public amenities such as toilets need to be clearly visible and attractive
 - Subways should be limited in the PTI
- Facilities should be in place to evacuate commuters during an emergency.
- Maintenance of the PTI facilities.
- *Information provision should receive considerable consideration.*
- The PTI should be designed to be an attractive urban environment, which attracts people to public transport.

4.5.2 Guide: Identifying Good and Bad Practices in Passenger Transport Interchanges (Terzis, Last & Sullivan, 2000)

Pedestrian access levels, it is argued, determine levels of accessibility and linkages within the PTI as well as with the surrounding urban area. "Straight-line pedestrian access" should be strived for with no or limited obstacles.

The PTI should be seen as an opportune setting to house numerous facilities which include travel-related and general facilities as summarised in the following table.

Table 4.1 Possible facilities located at PTIs (Source: *Terzis et al, 2000*).

	FACILITY
Travel-related	Shelter Waiting areas Toilets Ticket sales Car parking Cycle parking Bus and minibus taxi rank
Other	Retail outlets Informal vendors Cash points Public telephones Cafes Shoe repairs/key cutting

PTIs "...are the principle shop window for the public transport system, and as such the image they convey will be a major influence on public perceptions of public transport" (Terzis *et al*, 2000: 97). The regular passenger might not be as sensitive to elements such as image, signage, or maintenance levels, but the potential or irregular traveller will be. It is argued that these passengers would be convinced to make use of public transport on a more regular basis.

This guideline document suggests the following aspects, which would contribute to the image and legibility of the PTI:

- The visibility of key facilities (ticket offices, information boards, and boarding areas for different modes) from the entrance points to the PTI.
- The visibility of staff, sufficient lighting, short and wide pedestrian walkways and clear lines of visibility for a safe and secure environment.
- High standards of maintenance.
- The availability of different information facilities: line diagrams and maps, timetables, electronic help-points and staff to handle enquiries.
- Clear signage (as a specialised part of information) using pictograms, colour and different sizes to indicate the position of all the public transport modes, pedestrian/cycle routes and facilities, car parking, toilets, information points, telephones, shops and other facilities.

4.5.3 Planning and Design Guidelines for Public Transport Interchanges in Gauteng: Draft Report (Gauteng Provincial Government. Department of Public Transport, Roads and Works, 2002)

This document suggests the following guidelines for the pedestrian and cyclist environment at PTIs:

- Safety issues such as having well maintained surfaces and traffic safety such as pedestrian crossings or traffic calming measures.
- Signage specific for pedestrians and cyclists
- The shortest and most direct routes should be chosen for pedestrians and cyclists to ensure a convenient environment.
- Weather protection and storage facilities specifically for pedestrians.

It further emphasizes the importance of separating different transport modes as far as possible and especially motorised and non-motorised modes of transport.

4.6 THE SOCIAL CONTEXT

Social opposition has become evident and built up around inadequate public transport provision throughout greater Cape Town. This has found expression in vandalism of especially trains, stations and bus stops.

Further, violence in public transport journeys in one or other form is an almost daily occurrence. The following recent reports in the local Cape Town newspapers illustrate the situation, whilst violent behaviour, such as muggings is hardly newsworthy any more:

“Court backs crime-weary train commuters”, The Star, 7 February 2003

“Passengers wounded in Cape taxi conflict”, Cape Times, 11 March 2003

“Metrorail off the rails”, Cape Argus, 17 March 2003

In response to all the violence and a spate of killings in recent years on Metrorail facilities, the Rail Commuters Action Group (RCAG) was formed. This group with the help of affected individuals is in the process of forcing the authorities and Metrorail to take responsibility for the safety of rail commuters. In a judgment that was handed down on the 6th February 2003, Metrorail was ordered to do what they are required to do by law, namely to provide a safe rail service for commuters.

However, even after that court ruling, no major changes (if any) are visible at ground level to make rail travel safer. In fact, the attitude of the government and responsible parties was to challenge the court’s ruling. This action does not in any way assure the citizens of the commitment from their government institutions to act in the commuters’ best interest. This is clearly a sign that better governance is

needed in the public transport environment, especially rail commuting in Cape Town, at present.

Bearing the above in mind, it is clear that modal choice becomes even more limited if violence paralyses one or more modes of public transport in a city. Commuters are in other words restricted in the type and number of opportunities that are accessible, and are forced into utilising private transport which not everyone can afford.

Modal choice has a direct influence on peoples' mobility. The public transportation options for Capetonians are thus quite limited. Trams have been dispensed with and rapid rail transport has not been introduced in the city as yet. The range of possibilities in movement (public transport) is thus limited to bus (which operates along fixed routes according to specific schedules and provides a line-haul service), trains (which operate on fixed rail corridors and provide a line-haul service) and minibus taxis (operating a range of services between urban settlements and provide a feeder service).

There are, however, some positive prospects for public transport in Cape Town. One of these is the inner-city bus plan. Although this will only operate within the boundaries of the Cape Town CBD it could to a large extent relieve the city from intra-city trips being made by private motorcars. In regard to the disadvantaged communities, it still does not solve the problem of accessing the city and its opportunities from the outer-lying suburbs.

The overall result is that public transportation in metropolitan Cape Town has failed to fulfil its proper role in development in that it does not in any substantial way contribute to the upliftment of the communities that are solely dependant on it for their daily survival (Chapman & Cristallides, 1983).

4.7 CONCLUSION

The following is a summary of the major problems experienced in the public transport realm, specifically in Cape Town. These problems were identified in the above contextual study in consultation with senior and knowledgeable transportation planners and the Guidelines for the preparation of an Integrated Transport Plan (South Africa. Department of Transport, 1997a).

- Unclear Legislation

The Land Transport Transition Act No. 22 of 2000 (South Africa, 2000b) suggests very specific shifts of which a major one is a change in focus from infrastructure development to public transport-orientated developments. Prior to this Act very little legislation existed to clearly spell out the direction that should be taken in public transport planning for the greater good of society.

There is no comprehensive legislation for PTI development although some legislation exists to give direction in nodal development.

The situation sketched here is suggestive of the pervading problem where even existing legislation can fail in producing that which was envisaged by the lawmakers. Some of the issues pertaining to this include (Millar, 1989):

- The relevant act or policy requires sufficient expertise and officials for the purposes of execution.
- Responsibilities of role-players are not clearly expressed.
- A lack of adequate political will to achieve the intended goals.

- A fatalistic and indifferent attitude on the part of the general public as to whether these goals have been achieved or not.

On a positive note, it seems as if the City of Cape Town has the necessary policies in place to utilise PTIs as catalysts for urban growth. The difficulty though is that the authorisation and funding lies with the Provincial and National Governments and seeing as PTIs in themselves are not seen as income generators, it is unlikely that a large-scale development and upgrade program will be initiated in the near future.

- **Fragmented Institutional Framework**

This results in a multitude of agencies having interest in the operations of the public transport system for one or other reason and then too few that can really be held accountable or responsible if things go wrong. Clarity is needed on the functions and responsibilities of different departments and agencies. Clear boundaries should be identified to eliminate the present overlap in the administrative, political, functional and planning spheres.

- **Competition between different Modes of Public Transport**

Instead of having a public transport system where each mode's function and role in the system is defined, one finds competition between especially buses and minibus taxi's for the same customers and routes. This has obvious ramifications in that the manoeuvrability of the minibus taxi enables it to penetrate more areas and cover more routes, which makes it more attractive to the commuters than the bus, which has a fixed schedule, and fixed routes. The problem arises in that the bus system, which is subsidised by the State, is now under-utilised because of the competition from minibus taxis. This implies direct wastage of subsidies because of the under-utilisation of the bus system.

- Lack of Safety on Public Transport

In Cape Town, rail is one of the most extensive public transport networks available, serving the largest part of the city. Unfortunately, rail is also the mode, which is under severe threat from all types of violent and criminal activities. This results in a system in which much has been invested yet underutilised for pure lack of safety.

Further, the minibus taxis are notorious for being one of the most accident-prone modes of public transport though commuters are forced to use them as an alternative to the Golden Arrow buses. The buses experience their own problems of which the most important from a safety point of view might be the fact that bus drivers and passengers are subject to daily intimidation from minibus taxi drivers because of the two modes competing for the same clients.

- Uncertainty in regard to the available services, time scheduling and routes

The public transport services in Cape Town are not known for punctuality and reliability. This is a problem that commuters are faced with on a daily basis, which has a direct bearing on the attractiveness of the available service.

COSATU is taking action in this regard, by instituting a law-suit against Metrorail for loss of income by commuters because of trains being late during the past six months (Coetzee, 2004). This will be the first court case of its kind in South Africa and may have profound ramifications for public transport service providers with regard to their responsibilities and accountability.

- Some inadequacies with regard to specifically Public Transport Interchanges have been identified as follows:

- . National legislation is unclear as to the responsibilities of the different role players.
- . Provincial legislation fails to properly acknowledge the potential that exists around PTIs.
- . Provincial legislation and policies are not executed in guiding the responsible authorities to develop PTIs with the surrounding urban context in mind and develop a strategy to ensure PTIs develop into the type of node that is needed in the specific area.
- . National, provincial and metropolitan policies are not really integrated so as to compliment and support each other with regard to, amongst others: their role in the metropolitan area, methods of categorising or classifying PTIs and potential growth scenarios for each of the different categories.

In conclusion, it is clear that the vision for public transport as set out in the preceding section will not be achieved if the groundwork is not done properly. Identifying responsibilities for the different agencies and role players are key, and of even greater importance are accountability and performance checks. The ramifications of this, however, fall beyond the ambit of this study.

Please refer to table 7.3 for a summary of the contextual informants from this chapter.

CHAPTER 5

CASE STUDIES AS PRECEDENTS

5.1 INTRODUCTION

Utilising case studies as a means of identifying contextual informants is the third approach towards an understanding of a better performing PTI. Two other approaches have already been described and explained in previous chapters viz:

- The literature and theories
- The non-spatial framework

The fourth approach, the end-user perspective, is explored in the following chapter.

Initially, it was envisaged that considerable practical and informative case study data would be available, but the literature review in fact quite early on highlighted a lack of detailed, site-specific information, which then resulted in uncertainty with regard to the probable significance of a chapter on comparative examples.

It was felt appropriate and important, nonetheless, for the research project to include this chapter, at least to make some observations, aside from pointing out the dearth of information even locally and more so in the case of foreign examples, specifically within the time frame of this study.

With the selection of case studies the following criteria were used:

- The practicalities of access to and availability of relevant information.

- Whether professionals had previously identified the specific case study as relevant. On account of time and financial constraints, neither national PTIs (except Warwick Junction in Durban and local Cape Town PTIs) nor international PTIs could be visited and inspected for first-hand observations. This made the researcher solely reliant on secondary information such as contained in library sources, non-library sources (documents from consultants) and the Internet, which as has been mentioned, was found to be somewhat limited.
- The types of selection criteria suggested by Terzis *et al*, viz. “site-specific case studies, addressing particular interchanges and their facilities, and topic case studies, addressing particular issues of interest in the development and evaluation of passenger interchanges” (2000: 48). The South African case studies can be classified as the latter.

The national and international examples that could be identified through this process were then examined, in order to derive some clearer notions as to what a PTI in the fullest sense can be, in terms of urban quality.

Specific elements of these case study cities' public transport system and/or public transport interchange development are seen, with the benefit of hindsight, to have some generic lessons for the greater Cape Town context. The example cities identified are:

- Paris, France
- London, United Kingdom
- Hong Kong, Peoples Republic of China
- Singapore, Malaysia

- Curitiba, Brazil
- Bogotá, Columbia
- Johannesburg and Durban, South Africa

The following table represents a comparative analysis of the chosen case study cities and the city of Cape Town. The purpose of this table is to illustrate some of the notable differences and similarities between these cities and Cape Town, despite the limitations of other data, particularly with regard to the relative usage of public versus private transport.

Table 5.1 Comparison between case study cities and Cape Town.

CITY	Paris	London	Hong Kong	Singapore	Bogotá	Curitiba	Durban	Johannesburg	Cape Town
Population in millions	6,9 ¹	7,0 ²	6,8 ⁹	4,2 ⁴	6,0 ¹⁴	2,3 ¹¹	3,1 ⁶	3,2 ⁶	3,2 ⁵
% Commuters by public transport	80 ¹	85 ²	80 ¹³	70 ¹³	85 ¹⁰	75 ¹¹	57 ¹³	47 ¹³	50 ⁵
Average commuter trip length in kilometres	3,4 ¹	3,7 ²	6,2 ³	-	15,5 ¹³	5,5 ¹³	20,0 ⁸	-	14,0 ⁵
Car ownership/1000 population	-	-	60 ³	120 ³	-	267 ¹³	160 ¹³	350 ¹²	170 ¹³

¹ European Union. 2003.

² Transport for London. S.a. Congestion Changing. [online] Available: <http://www.transportforlondon.gov.uk/tfl/> [12 May 2004]

³ National department of transport , 2002

⁴ Singapore Department of Statistics. 2004. Statistics Singapore: Key indicators. [online] Available: <http://www.singstat.gov.sg/index.html>

- ⁵ Feinman & Glickman, 2003
- ⁶ Daniels, T. (TracyD@statssa.gov.za). 2004. Population count for Cape Town, Johannesburg and Durban. E-mail to B Verster (belindav@ctech.ac.za). [25 May 2004]
- ⁷ City of Johannesburg, 2003
- ⁸ Metropolitan Durban. 1999. Transportation: State. [online] Available: <http://www.ceroi.net/report/Durban/drivers/transport/state.htm> [12 May 2004]
- ⁹ Census and statistics department, 2004.
- ¹⁰ Hidalgo, 2002
- ¹¹ Urban development. 1998. *Curitiba, Brazil: Towards Sustainable urban Development* [Online]. Available: <http://137.121.254.52/pub/1010i/01-e.htm> [21 June 2004]
- ¹² The World Gazetteer. 2004. *South Africa: cities and places*. [Online]. Available: <http://www.terradaily.com/2004/040604115608.c0dco42j.html> [21 June 2004]
- ¹³ Haiden, R.M. 2004. Informal presentation as a guest speaker at the Cape Technikon presenting 1995 data.
- ¹⁴ The World Gazetteer. 2004. *Bogota*. [Online]. Available: <http://www.gazetteerdec/c/c-co.htm#pl-109> [14 June 2004]
-

The World Bank (2000: 4-7) has identified three factors that seemingly influence and explain the mode of transport preferences of developed and developing countries. These are mentioned below with some clarifications derived from the information in table 5.1:

- Income levels, which are directly correlated with private vehicle ownership. This would imply that the poorer sections of the community would be dependant on public transport and PTIs. (*The table contradicts this statement in some respects because the highest car ownership is found in developing cities such as Curitiba.*)

- Size and density of a city, which has a direct influence on trip lengths and levels of congestion. It is argued that the denser the city population the shorter the trip lengths to amenities and facilities, mainly because the thresholds exist to support facilities in close proximity to most people. On the other hand, high densities could result in congestion because of the number of people that need to be moved around. Public transport again plays a vital role in alleviating congestion because of its high carrying capacity. This in turn results in the role played by PTIs being more important because more people will be dependant on using its facilities. *(London is a densely populated city with the lowest trip lengths which means commuters need to travel only short distances to access opportunities).*
- The political history of a country and how land use patterns were shaped. *(South African cities represent some of the longest average commuter trip lengths. This can be attributed to a history of separate development with the largest percentage of the urban population residing distant from socio-economic opportunities. This fact, coupled with the relatively low public transport usage, can mean either that a very high percentage of daily trips are made by private transport or that a large portion of the urban population is not mobile in terms of any form of motorised transport).*

Though there are other inferences based on Table 5.1, such as the instances of positive correlation between higher private car usage and higher car ownership, this is not always the case. For example, Singapore with 120 cars per 1000 population still shows a 70% public transport usage and Curitiba with an even higher 267 cars per 1000 population shows a 70% public transport usage. The fact that Singapore and Curitiba impose certain constraints such as levies on

private car usage, coupled with an efficient public transport system, a compact city and heightened social awareness of the negative effects of private transport on environmental sustainability, might be reasons for this “discrepancy”.

A final and definite inference regarding the magnitudes reflected in table 5.1 is the correspondingly challenging demands put on both private and public transport in any city of the world, irrespective of the extent to which some cities, notably in the developed world, have managed to put the infrastructure in place to rise to these challenges.

5.2 INTERNATIONAL CASE STUDIES

Although it is commonly agreed that no two cities are the same, not even in the same country, on account of their historical, political and physical differences, lessons can nonetheless be learned concerning PTIs and other components, from examples of good public transport practice. Public transport systems elsewhere which have been successful could therefore provide insight for professionals involved in public transport planning in our local context.

The following is a discussion of six international cities representing Europe, Asia and South America.

5.2.1 Paris, France

The city in general

Paris metropolitan region has a population of 10.9 million, divided between 2.9 million in Paris-city, 4 million in the inner ring of suburbs and 4 million in the outer ring of suburbs (European Union, 2003). Paris is seen as one of the most compact western cities and known to be pedestrian friendly (International Union of Public Transport, 1996).

The public transport system

The public transport system consists of 16 metro rail lines, 2 tramway routes, 317 bus routes and 4 regional express rail lines (European Union, 2003).

A unique and positive characteristic of the Paris public transport system is the interconnectivity between not only different modes of public transport but between regional and local systems. This interconnectivity enables a single ticketing system to be used for all the different public transport modes, which ensures very high levels of accessibility where patrons have a wide choice between the different systems. A further positive attribute is the tramway system that was built to connect different suburbs and by so doing increased the use of public transport for non-work trips (International Union of Public Transport, 1996).

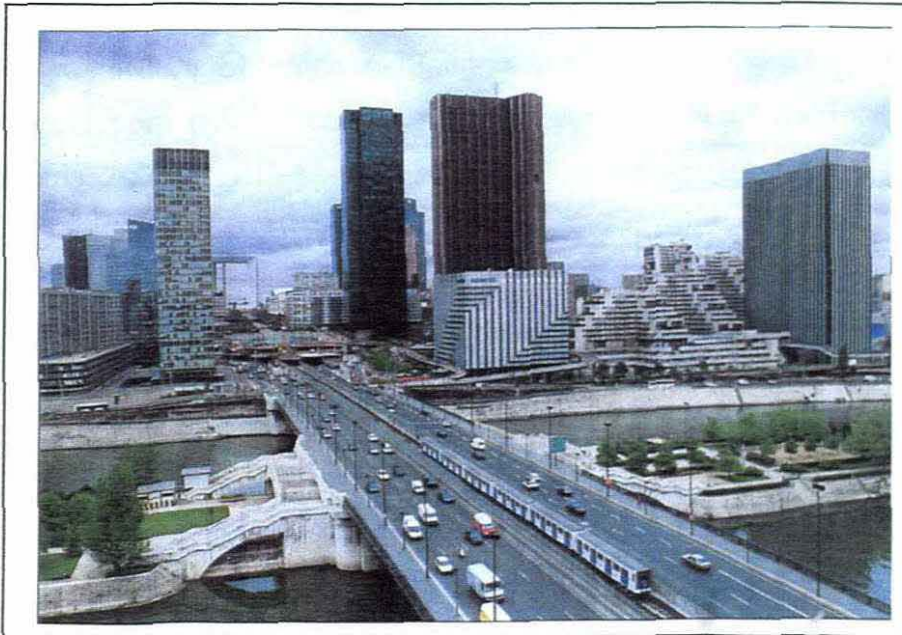


Figure 5.1 A Paris Metro-rail line. Note the space-efficiency of public transport compared with private transport (Source: *International Union of Public Transport*, 1996: 9).

The predominant public transport mode in the city is the metro rail system, which is extremely reliable and efficient with trains arriving every three to five minutes (European Union, 2003).

Public transport interchanges

PTIs, especially for the metro system are equipped with the latest “Intelligent Transport” technologies such as pre-paid smart cards that can be bought over the Internet or via cell phones. An inter-modal ticketing system exists which means that any of the available public transport modes can be used without purchasing a ticket for each (European Union, 2003).

5.2.2 London, United Kingdom

The city in general

London has a total population of 7 million and is one of the fastest growing populations in Western Europe. This can be attributed to a large extent to the influx of new residents (Morris, 2003). London’s population represents a culturally diverse mixture of Africans, Bangladeshis and Sri Lankans. The number of people from ethnic backgrounds represent 28,8% of the total city population (Morris, 2003).

The public transport system

The metropolitan area of London has one of the oldest public transport networks in the world. It is an extensive system consisting of bus, underground rail, light rail, tram, taxis and river bus.

Table 5.2 London travel trends for 1999 to 2003 (Source: Government Office for London, 2003).

	Bus	Tube	Train	Total Public	Car/Taxi	Walk/Cycle	TOTAL
Trips per day (mil)							
1999	3.6	2.6	1.7	7.9	11.2	5.7	24.8
2003	4.7	2.7	1.9	9.2	10.8	5.9	26
Percentage mode share							
1999	15	10	7	32	45	23	100
2003	18	10	7	36	42	23	100

The two most significant changes evident in this table are the 3% reduction in car traffic and the 4% increase in public transport usage. This can only be attributed to improved public transport and the city's private vehicle capacity being reached.

Public transport interchanges

One of the major challenges in Greater London (not unlike Cape Town) is the complex administrative system with numerous private and public organisations responsible for facilities and services. This has resulted in a decline in the quality of infrastructure and service provision because of the lack of joint commitment and sharing of responsibilities (Transport for London Integration Department, 2001).

In order to address this problem, London adopted guidelines in 2002 for inter-modal transport interchanges that aim to improve the overall journey-experience by reducing inconveniences, complexities and uncertainties at PTIs.

The following is a summary of the applicable guidelines from the Transport for London Integration Department document (2001):

- The PTI layout should reflect the different activities people carry out at the interchange namely to transfer between modes, to wait for the next service and/or to carry out other activities such as shopping. There should thus be “specialised activity areas” for the *different actions people engage in*.
- The availability and quality of information is crucial to ensure a positive experience at a PTI: real-time electronic information displays to inform passengers of the time schedules, a touch-screen information system where information can be tailored to specific requirements, a public address system or maps showing *different routes and modes operating on those routes*.
- As interchanges are public spaces, security is of the utmost importance. One of the major contributors to a secure environment is surveillance, which can be achieved by using transparent material, by positioning waiting facilities, staff offices and information points so that staff and passengers can see and be seen.
- A clean and well-maintained interchange improves the ambiance of the space and reassures passengers. This will include constant repairs and removal of evidence of vandalism.

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- A clean and well-maintained interchange improves the ambiance of the space and reassures passengers. This will include constant repairs and removal of evidence of vandalism.



Figure 5.2 A touch-screen passenger-access terminal where information can be tailored to specific requirements (Source: *Transport for London Integration Department, 2001: 27*).

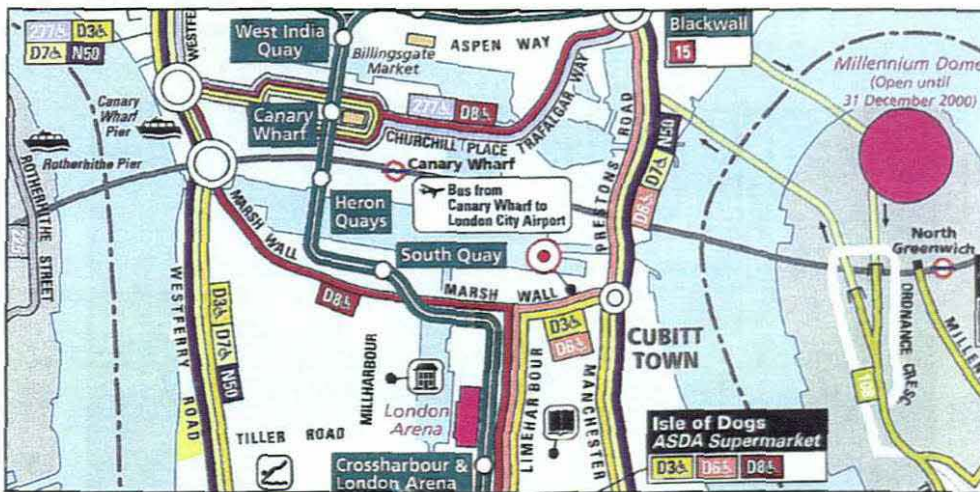


Figure 5.3 A map indicating public transport routes and facilities (Source: *Transport for London Integration Department, 2001: 29*).

- The shortest possible and safest route (preferable along desire lines) should be chosen as pedestrian paths. These paths should be free of obstructions to ensure the least delays and congestion. Pedestrians should be segregated from road vehicles and very

clear, signalled (where needed) pedestrian crossings should be provided.

- Waiting facilities should include weather protection, seating, public telephones, real-time information, public address system, toilets and clocks.



Figure 5.4 Availability and quality of information, waiting areas and ancillary activities that contribute to making a PTI a positive space (Source: *Transport for London Integration Department, 2001: 4-23*).



Figure 5.5 Good practice. Upgrades to this intermodal transport interchange were the result of a partnership between several public and private role players

sharing budgetary responsibilities (Source: *Transport for London Integration Department, 2001: 34*).



Figure 5.6 Integration of different public transport modes with an environment to support easy transfer between modes (Source: *Transport for London Integration Department, 2001: 35*).

5.2.3 Hong Kong, Peoples Republic of China

The city in general

Hong Kong is an intensely developed first world city, with one of the world's largest urban populations, living at a very high density. Hong Kong had, in 2002, a population of 6,708,389 (Census and Statistics Department, 2001).

The public transport system

Public transport is the preferred transport mode in Hong Kong and approximately 80% of all motorised trips in the city are made by means of public transport, which includes rail, bus, taxis and trams. Rail dominates the public transport scene and represents approximately 40% to 50% of the total public transport patronage (Hong Kong. Transport Department, 2001). The Mass Rail Transit

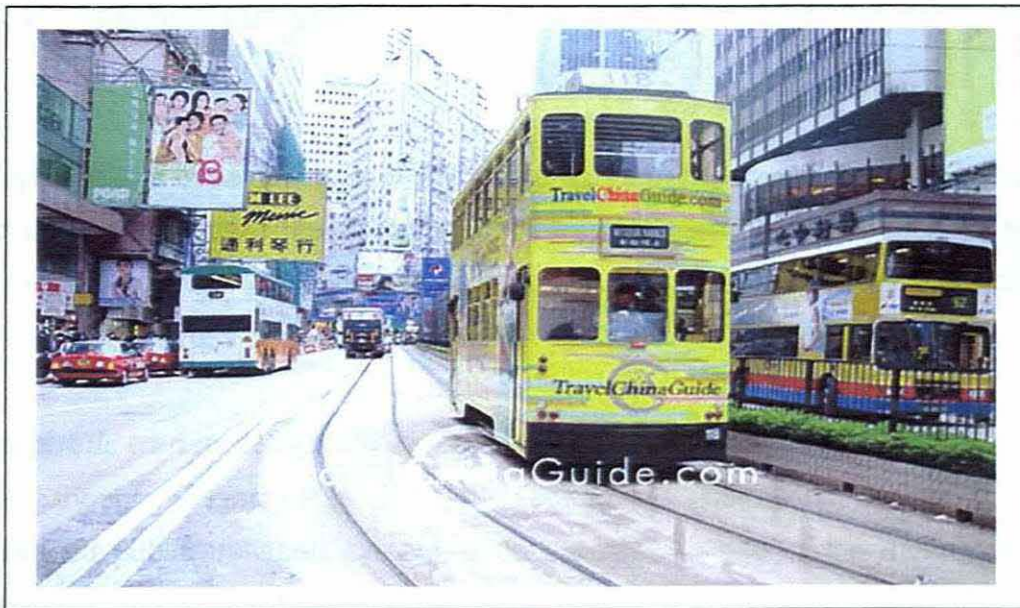


Figure 5.7 A railroad bus in Hong Kong (Source: *Travel China Guide*, 2004).

Public transport interchanges

In order to handle such huge numbers of commuters during peak times, only the latest technologies are used such as centralised control centres that electronically control the number of people that can move in and out of terminals, to the temperature and humidity levels in underground stations.

Real-time electronic information boards, not only in the station areas, but also on the vehicles themselves ensure that passengers are informed at all times and can base their trip decisions on up-to-date information (Feinman & Glickman, 2003).

5.2.4 Singapore, Malaysia

The city in general

Singapore is a developed world city with a very strong economy. It is seen as a global hub of knowledge-driven industries, which is the latest addition to its economic engine. This type of economy makes it very attractive for foreign investment because of its profitability (Turner, 2004: 1425 -1433).

The public transport system

Even though Singapore is a heavily congested metropolis, it has a most advanced public transport system, which is held as one of the most efficient, convenient and affordable in the world (Turner, 2004).

Singapore uses its public transport system in conjunction with alternative modes of transport such as on foot and by bicycle to develop a sustainable city. The city has adopted a land use policy that reduces the need to travel, to ensure that the above-mentioned modes are competitive alternatives to the unsustainable private car (International Union of Public Transport, 1996: 6-8).

Singapore further has aggressive policies in place to restrain ownership and usage of private cars, which has resulted in a decline in commuting by car (Hoyle & Knowles, 1992).

The city has an integrated public transport system made up of the following:

- An extensive bus network, consisting of air-conditioned buses running on express lanes.
- A rail system with a ridership of 1.1 million passengers per day.
- 17 863 taxi's (Singapore Department of Statistics, 2000: 8).

Public transport interchanges

The rail stations are rather far apart (1,6 km on average) according to Asian standards, thus not serving all residential concentrations along the route very conveniently. The MRT (Mass Rail Transit) is well integrated with bus services at station interchanges, which results in high levels of interchange between modes.



Figure 5.8 Singapore is an example of where preference is given to pedestrians and public transport in the city centre (Source: *International Union of Public Transport*, 1996: 10).



Figure 5.9 An underground rail station in Singapore (Source: *Feinman & Glickman*, 2003).

Public Transport interchanges, as can be seen in figure 5.9, are quite modern and luxurious. All terminal buildings are air-conditioned and have TV's and other forms of entertainment available for passengers. Other activities that are accommodated in the terminal buildings include specialised restaurants and jewellery boutiques, which indicate that the affluent sectors of society are using public transport as well.

5.2.5 Curitiba, Brazil

The city in general

Curitiba is the capital of the Brazilian state Parana and has a metropolitan population of 2,3 million. It is a developing world city with all the associated problems i.e. rapid population growth; struggling economy and widespread corruption (Madison, 2004).

The city is in the shape of a diamond, with the main city centre forming the central node. In the 1970's urban growth and development were encouraged along structural axes, therefore allowing the public transport system to grow along these routes and provide access to all parts of the city.

The public transport system

Curitiba's privately owned public transport system is recognised internationally as a successful model with 75% of the city's weekday commuting utilising this service. The extensive public transport system further covers 90% of the overall city.

The public transport system takes the form of a 'trunk and branch' system, consisting of structural corridors with land on either side being zoned for high-density commercial and residential use (Green, 1991). Public transport thus passes through the areas with the highest concentration of urban activity.

density commercial and residential use (Green, 1991). Public transport thus passes through the areas with the highest concentration of urban activity.

The city opted to focus on one mode of public transport, namely buses, because it was the most cost-effective means of transport. Hence a bus-only lane was introduced. Two exclusive lanes for buses run along the centre of main roads with cars being restricted to the outside lanes. Moreover, a simplified pre-paid method and bus lines with the same fare, irrespective of the distance travelled on that line, has also been implemented.

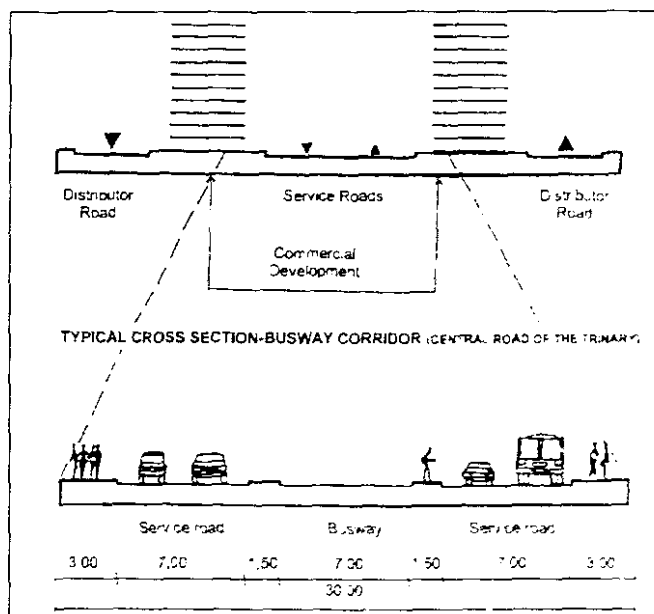


Figure 5.10 A Typical cross section of a development corridor in Curitiba (Source: Green, 1991: 52).

Public transport interchanges

Directional changes in any type of trip can only be made at terminals. This helps to formalise the system and cuts out any un-scheduled stops, which has an influence on the dependability of the public transport system.

bus floor. The tube stations further give a relatively safe and sheltered waiting environment.

Curitiba provides public transport interchanges in a manner that enables “staying in touch” with the inhabitants in what they call ‘citizen streets’. Satellite offices of the city administration are built around the interchange to facilitate this contact.



Figure 5.11 Curitiba has established an efficient network of buses with sheltered bus stops. For speeding up the service, ticketing takes place at the entrance to the bus stop (Source: *International Union of Public Transport*, 1996: 10).



Figure 5.12 Special platforms for quick docking at the tube station speeds up the bus system (Source: *International Union of Public Transport*, 1996: 11).

5.2.6 Bogotá, Columbia

The city in general

Bogotá is the capital of Colombia, a developing country with a relatively under-developed public transport system. The city has a cosmopolitan character and is continually expanding. It is the fastest growing metropolitan area, not only in Colombia but also in South America.

Within it, prosperity and poverty co-exist very clearly, making it one of the world's most chaotic, aggressive, yet fascinating metropolises.

The public transport system

Bogotá is yet another example of a city that has elected to enhance its bus service. The rapid bus system is called the TransMilenio (meaning "transport for the third millennium) which carries 700 000 commuters per weekday and operates eighteen hours a day (Hildago, 2002: 1-7).

The TransMilenio system virtually covers the entire city and runs on exclusive routes, which render it a faster mode of transport than the private car that has to face daily traffic congestion.



Figure 5.13 One of the major modes of public transport in Bogotá is the taxi-bus (Source: Hildago, 2002).



Figure 5.14 The exclusive bus lanes as used by the TransMilenio system (Source: Hildago, 2002).

Public transport interchanges

Three types of stations or interchanges form the nodes in the bus system. These are referred to as main, medium and simple stations. The main station is located at the beginning and end of roadways, the medium ones are situated at important intersections, and the simple stations are located every 500m along the routes.

The simple stations are provided with bicycle parking facilities and all stations have adequate walkways, plazas and sidewalks for pedestrian and bicycle access. Each station is also provided with maps and route information to facilitate easy use of the system.

A further element of the TransMilenio system is the close proximity of parking and maintenance areas for the buses near terminal stations (Institute for Transportation and Development Policy, 2003).



Figure 5.15 The stations are easily accessible via pedestrian walkways (Source: Leal & Bertini, 2004).

5.3 SOUTH AFRICAN CASE STUDIES

5.3.1 Johannesburg

The city in general

Johannesburg is easily the largest and most cosmopolitan city in South Africa with a population of 3,2 million (Census and Statistics Department, 2001). Johannesburg is a multi-cultural hotpot that to a large extent controls South Africa's economy and is seen as the commercial capital of the country (World Executive, 2004).

The public transport system

The public transport system consists of rail (19% of all public transport trips), scheduled bus (9% of all public transport trips) and minibus taxis (72% of all public transport trips) (City of Johannesburg, 2003).

Africa's economy and is seen as the commercial capital of the country (World Executive, 2004).

The public transport system

The public transport system consists of rail (19% of all public transport trips), scheduled bus (9% of all public transport trips) and minibus taxis (72% of all public transport trips) (City of Johannesburg, 2003).

The following table reveals the reasons for commuters being dissatisfied with the different public transport modes provided in the city. These reasons clearly differ to a large extent depending of the mode used, except for crime, which is a common problem area to all three modes.

Table 5.3 Causes of dissatisfaction with public transport services in the City of Johannesburg (Source: City of Johannesburg, 2003: 15).

Cause	Train users	Bus users	Taxi users
Cost	13%	36%	48%
Distance from home	46%	18%	24%
Travel time	35%	24%	20%
Crime at ranks/stations/termini	51%	32%	57%
Crime on bus/train	55%	11%	-
Taxi industry violence	-	-	49%
Safety from accidents	19%	16%	66%
Frequency peak	38%	30%	38%

Jeppe Station public transport interchange

Jeppe Station in the Jeppestown local district was upgraded in mid 2002. Some of the upgrade proposals that can be of use for this research study is presented here.

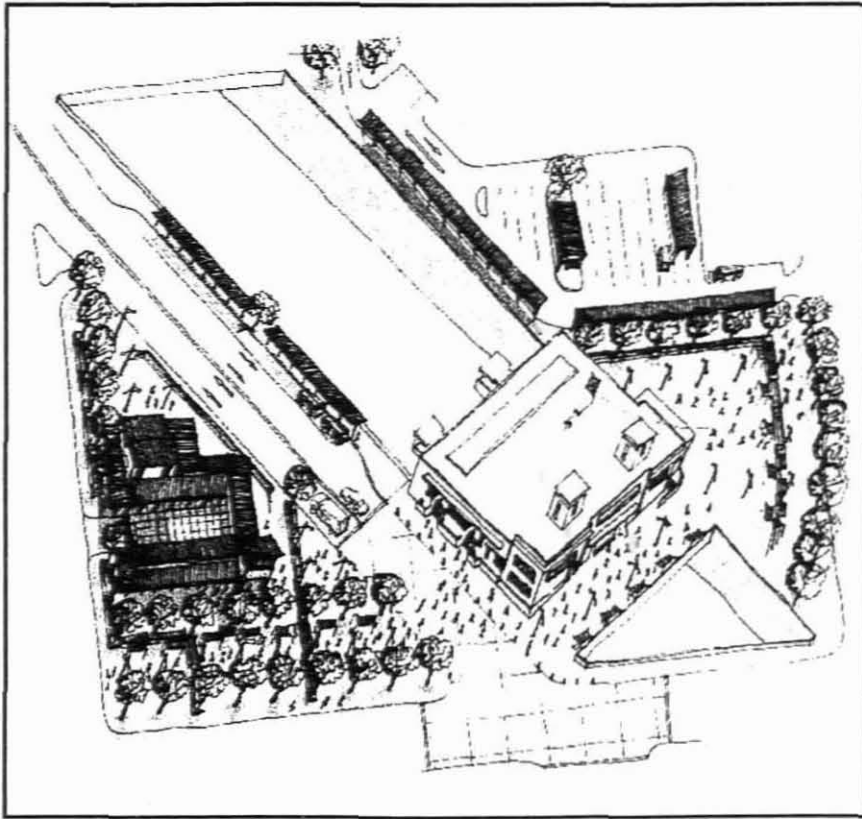


Figure 5.16 The design vision for Jeppe Station, Johannesburg (Source: Adapted from Johannesburg Development Agency, 2001: 2).

Some of the elements proposed are: an informal trader-market building accommodating 63 informal traders (situated on one of the peripheral streets to not only serve the station area, but also the surrounds), a public bath-house which includes showers and public ablution and two tree-lined piazzas housing informal traders in semi-permanent structures (Johannesburg Development Agency, 2001).

The main issues of concern that needed attention through the design of the new Jeppe Station were that of safety and aesthetics. An attractive environment, it is argued in the relevant documents, can contribute to safety. The safety aspect was addressed by ensuring a well-illuminated public environment. It was further

achieved by ensuring that all space has a specific function, which results in no space not being “owned” by some activity and thus not being occupied.

5.3.2 Durban

The city in general

Durban is one of South Africa's leading seaports and is a major importer of raw materials. It has a population of 3,1 million and has one of the largest Asian populations of any city in South Africa (Daniels, 2004).

The public transport system

Durban has a modal split of 57% public transport and 43% private in the morning peak (Aucamp, 2003).

Of the public transport trips, 50% is taken by minibus taxi, 30% by bus and 20% by train.

Table 5.4 Public transport usages per income group for the city of Durban (Source: Aucamp, 2003).

Public Transport Usage	5% of high income residents
	25% of medium income residents
	90% of low income residents
	56% of all commuter trips at peak times

Warwick Junction public transport interchange

Warwick Junction in central Durban is as much a public transport interchange as it is a shopping node. The shopping activities range from traditional healers selling their goods, to food being prepared and sold, as well as the normal informal trading in goods such as toys, sweets, fruit, handbags etc.

This public transport interchange is very well organised regarding its retailing function in that areas are demarcated for each type of good being sold. For example, food commodities such as cow heads and meat are only sold early in the morning and only on the periphery of the PTI whilst traditional medicines and the traditional healers are situated on the upper level away from the bustle of the normal PTI activities. Clothes are sold close to the long-distance bus-stops, because most people buying clothes are on their way to their families in the rural areas.

Most of the informal economic activities at the PTI are roofed, resulting in a weather-protected pedestrian environment.

5.4 CONCLUSION

Although at the outset of this chapter, the relevance and quality of possible lessons that could be learned from this exercise were queried, it has with the benefit of hindsight proven to be a valuable investigation in expanding general insights into the qualities of PTIs. This is evident in table 7.4, summarising the relevant contextual informants identified in the case studies.

Many of the attributes of the PTIs described in this chapter, it might be argued, are possibly more relevant to the developed world because of the costs and the technologies used, but seeing as there is a definite move in South Africa from transport authorities towards "Intelligent Transport Systems" (Anderson, 2004), which incorporate all the latest technological advances, it was nonetheless thought appropriate to include developed world examples.

CHAPTER 6

THE END-USER PERSPECTIVE

6.1 INTRODUCTION

This section of the research project is empirical in nature in that it consists of observations of reality based on fieldwork. As mentioned in the previous chapter, this constituted the fourth approach towards an understanding of a better performing PTI.

The primary purpose of the surveys was to determine the perceptions of PTI users regarding the public transport interchange environment and by doing this, the researcher would develop an understanding of the existing performance failures from their perspectives. These perspectives thus represent public opinion as opposed to planning professional views, which is of obvious importance in order to make more fully informed and legitimate recommendations.

6.2 SURVEY METHODOLOGY

The primary data concerning end-user perceptions was gathered by using the Mixed Methods Approach (Creswell, 2003: 208-227), which is a combination of qualitative and quantitative research approaches, where data collection from both forms of research is employed. This is a very useful and typical practice specifically in the social and human sciences.

The more notable characteristics of the qualitative and quantitative approaches (Creswell, 2003: 179-183), which were pertinent for this study's specific survey process, are discussed here briefly.

Qualitative Research:

- Takes place in the natural setting or “site” (thus the PTI) of the respondent.
- Enables the researcher to “experience” the context and have a higher level of understanding of the site.
- Allows the researcher to make informed personal interpretations of the data.
- Typically uses open-ended observations, descriptive text data (words) and image data (pictures, photographs) for data collection.

One of the methods used by the qualitative approach is descriptive surveys. Leedy (1980: 97) defines the descriptive survey method or normative survey method as a process through which the data is collected by the researcher using personal observations.

The qualitative approach and descriptive surveys were used in the beginning stages to determine the different end-user groups as well as the appropriate target public transport interchanges where the quantitative surveys were to be performed.

At a later stage in the data collection process, this approach was employed once again to analyse and interpret PTIs, namely Athlone, Mitchell’s Plain and Philippi that were excluded from the quantitative surveys.

Quantitative Research:

- Objective data results can be determined from this approach through empirical observations and measures.

- "...Provides a numeric description of trends, attitudes or opinions of a population by studying a sample of that population. From the sample results, the researcher generalises or makes claims about the population" (Creswell, 2003: 153).

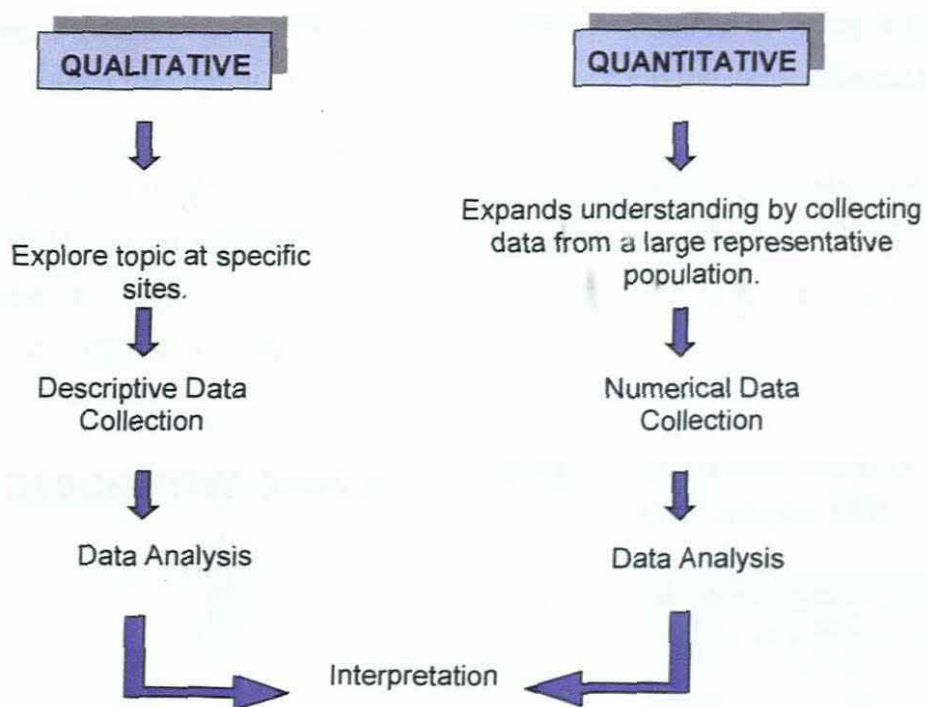


Figure 6.1 The sequential implementation, which means that qualitative and quantitative data are collected in phases (Source: Adopted from Creswell, 2003: 211-213).

The actual collection of quantitative and qualitative data from the different end-user groups was undertaken by using a structured questionnaire. The method of administering the questionnaire was the face-to-face personal interview.

The same method was used for the pilot as well as the sample surveys. Although other methods, such as on-site observations, telephonic surveys, post cards and focus groups were considered, the face-to-face personal interview suggested itself as the most effective and appropriate in terms of the desired

information viz. personal and direct feedback. Although recognised as one of the most time-consuming methods, it seemed clear that the critical importance of this information to the study warranted the time and money spent on this exercise.

A further reason for employing the face-to-face personal interview combined with a structured questionnaire was to maintain sample integrity by using a method that encourages the highest possible response rate from the sample population.

Thirdly, the fact that this method facilitates the generation of standardised data (Ntlebi, 1998), which meant that direct comparisons between the different target PTIs could be made which is useful in determining universal problem areas, made it the preferred survey method.

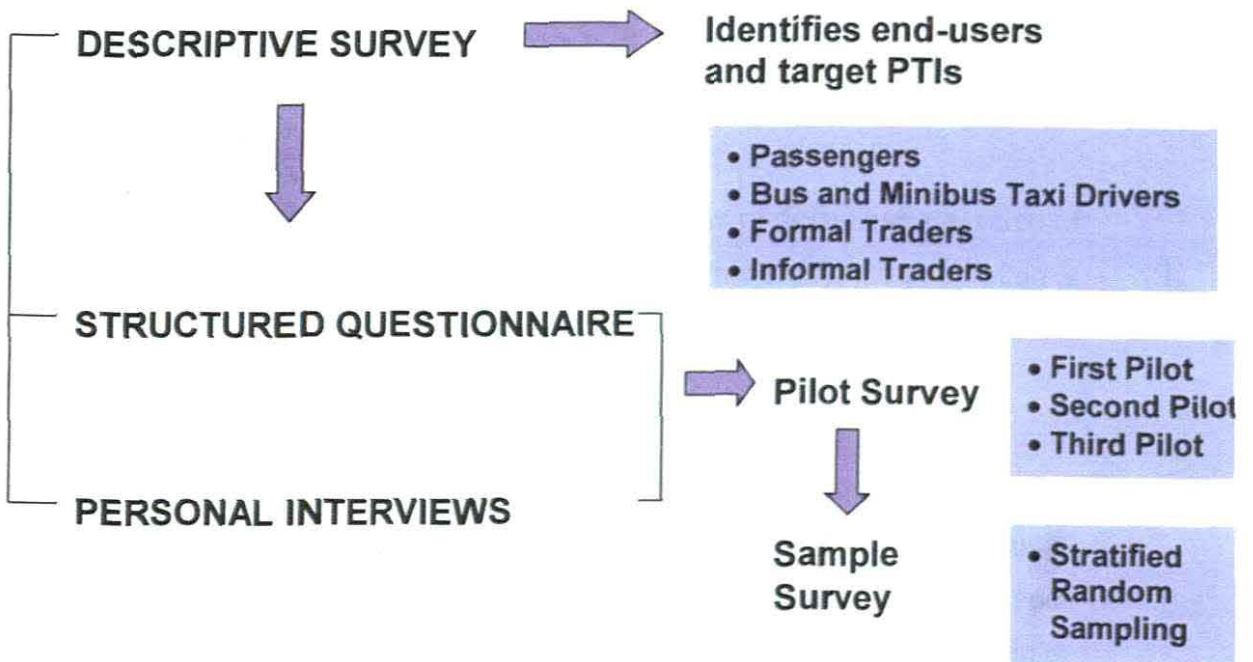


Figure 6.2 The survey methodology used to determine the end-user perspective.

6.2.1 The Population and Sample

In order to avoid bias, a representative sample population that included all race groups, both genders and all age groups, was aimed at with the survey for the passenger section of the end-user surveys. This representative population was based on commuter and passenger information gathered from various sources including the relevant local authorities, Modalink, Metrorail and the Golden Arrow Bus Company.

The population unit that was used was the individual end-user with the population boundaries being set by the physical boundaries of the PTI precinct (refer to 6.3.2 for a discussion on the process followed in determining the PTI precinct).

The sampling technique

In order to determine the sampling technique to be implemented, the following were considered:

Demographic Characteristics: "The population consists of definite strata, each of which is distinctly different..." (Leedy, 1980: 118). In this study, the population is made up of all the end-users of the specific PTI, and the "strata" would be the specific end-user groups, for example the passengers.

The appropriate sampling technique for such a population is accordingly deemed to be stratified random sampling (Welman & Kruger, 2001). This method is used when there are different types of individual units within a specific stratum, such as the passenger stratum being divided in the race, age and gender units. Stratified random sampling has the added advantage that each individual in the population has an equal probability of being selected which ensures an impartial sample (Creswell, 2003).

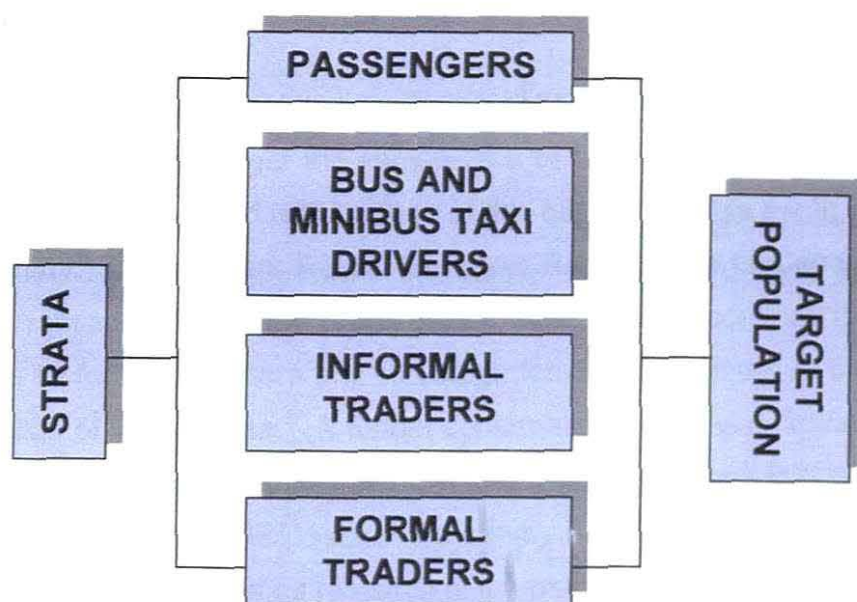


Figure 6.3 Four layers or strata of the surveyed population.

The stratified sampling technique was specifically used for the passenger surveys and not for the other end-user surveys. The passengers were divided into different race, age and gender groups.

Intercept surveys, where respondents are randomly selected, were used, because it was found that this method provides a less biased cross-section of end-users. This is important to ensure a relatively representative sample population.

In order to achieve a balanced representation of all the users of a PTI, the survey population was divided into four groups, as previously mentioned:

- Passengers (Inter-peak - between 09:00 and 15:00 on days that represented normal travel patterns, daily or occasional),
- Bus and minibus taxi drivers,
- Informal traders,
- Formal traders (shops within the PTI precinct)

The sample size

Determining an appropriate sample size is inevitably somewhat problematic in reference to the rule: “the larger the sample, the better”. Having regard to the logistical challenges associated with surveys of this nature, this rule might well be only discretionary. The Current Public Transport Record (City of Cape Town, Directorate: Transport, Roads and Storm Water, 2002: disk 2) confirms this with the following: Unfortunately there are no straightforward and objective answers to the calculation of sample size.” A further confirmation of this was found in the Nelson Mandela Aids Research Document, where a population of 5 000 000 was identified, but only 13 000 participated in the survey which represented a 0.26% sample. And this was accepted as research of international relevance.

On account of the survey being done through personal interviews, which can be extremely time-consuming, labour-intensive and expensive, the sample size needed to be practical and manageable, but still have a level of acceptability and be logically and statistically defensible. For these reasons, a number of interviews with professional researchers and statisticians (Dr B Haldenwang from the University of Stellenbosch, Ms CS Strümpfer from the Cape Technikon) were conducted to determine an acceptable sample size. Through this process, a 0.25% - 1% sample size for passengers was found to be representative for a normative study such as this.

Some practical considerations that restrict one from achieving a larger sample size are:

- Available funding for the research project
- Time constraints
- Willingness of people to participate or not
- Length of the questionnaire
- Number of people required to conduct the survey
- Unsophisticated respondents.

The actual number of respondents needed to achieve a sample of the above range (0.25% - 1%) was ultimately determined by using the Current Public Transport Record (City of Cape Town, Directorate: Transport, Roads and Storm Water, 2002). A number of problems, however, arise with these data sources, which are likely to have an influence on the validity of the sample population size.

Some of these problems are:

- The Current Public Transport Record's data differs dramatically from specific PTI documents such as the Cape Town Station Deck Progress Report (City of Cape Town, 2002) regarding daily passenger numbers.
- The inter-peak period differs between the different documents, which results in another inconsistency in that data is captured for different durations. This situation is understandable though, in that peak periods start and end at different times depending on the route and location i.e. peak-hour in Khayelitsha would start earlier than for instance peak-hour in Sea Point.
- Information regarding the total number of informal traders does not exist for any PTI. This is also understandable, because the time of the month and week will to a large extent determine the number of traders (legal or illegal). A Friday at the end of the month will see the highest number of traders on account of the obvious spending potential that exists. This problem was addressed by counting the number of informal traders at each PTI on the day of the survey and this information was then used as base data.

The final sample population consisted of 1 696 unspoiled questionnaires representing 1 055 passengers, 289 bus and minibus-taxi drivers, 149 formal traders and 203 informal traders.

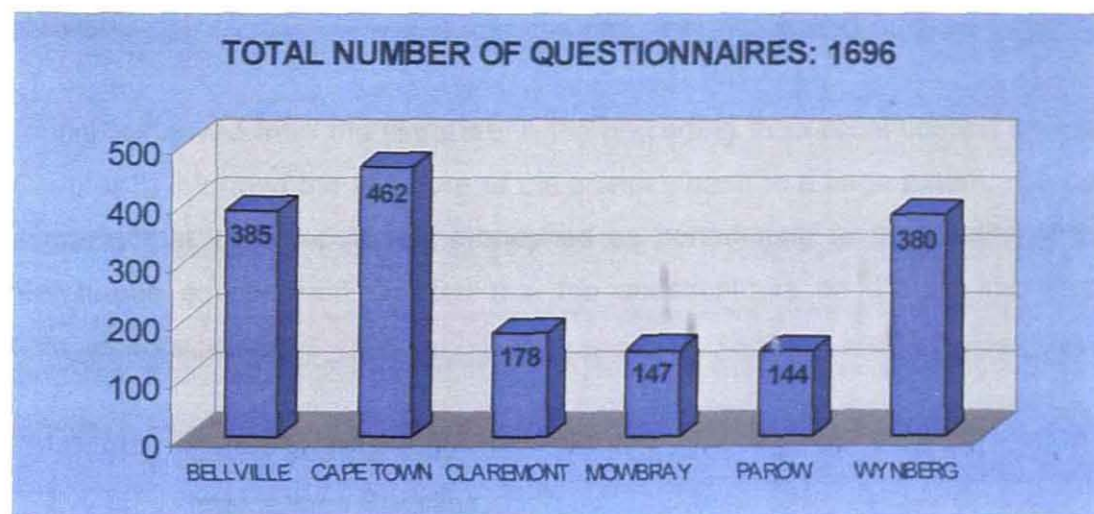


Figure 6.4 The total number of questionnaires completed at each PTI.

Table 6.1 The total number of questionnaires completed for each end-user group at each of the target PTIs.

PTI	Passengers	Bus and Minibus Taxi Drivers	Formal Traders	Informal Traders
Bellville	247	48	41	49
Cape Town	301	66	35	60
Claremont	100	42	14	22
Mowbray	100	20	14	13
Parow	81	24	16	23
Wynberg	226	89	29	36
TOTAL	1055	289	149	203

6.2.2 The Survey Instrumentation

As mentioned previously, the survey instruments used to collect data were the descriptive survey and the structured questionnaire with a face-to-face personal interview.

Concepts derived from the literature in the preceding theoretical context chapter (Chapter 3) informed the structure of the questionnaire to a large extent. Certain elements that were repeatedly mentioned as contributing to the quality of the interchange environment dictated that the questionnaire be divided into three main sections, namely:

- Safety and Security.
- Interchange Facilities.
- Pedestrian Environment.

A combination of open and closed questions was used, with the majority being closed questions. Open questions were used at the end of the questionnaire to give the respondents an opportunity to comment on any issues that might have been missed by the previous questions or to give a more detailed response.

Seeing as most of the respondents were not anticipated to be of high literacy levels, it was decided to make the questions as simple and understandable as possible. For this reason the closed question type was preferred.

Although it is generally accepted that a face-to-face personal interview does not have to be restricted by the number of response categories (Sudman & Blair, 1998), it was found with the pilot studies that three alternatives were the maximum the respondents could understand with ease and clarity. For this reason the YES – MAYBE / SOMETIMES – NO alternatives were presented in the questionnaire.

HOW DO PASSENGERS EXPERIENCE PUBLIC TRANSPORT INTERCHANGES?

An interchange includes the following: Train Station, Bus Terminus, Taxi Rank, Station Complex. Shops and buildings within a one street block radius.

GENDER	RACE	AGE	MODE	INTERCHANGE:
Male <input type="checkbox"/>	White <input type="checkbox"/>	0 - 25 years <input type="checkbox"/>	Train <input type="checkbox"/>	DATE Aug 2003
Female <input type="checkbox"/>	Black <input type="checkbox"/>	26 - 50 years <input type="checkbox"/>	Bus <input type="checkbox"/>	TIME:
	Coloured <input type="checkbox"/>	51 and older <input type="checkbox"/>	Taxi <input type="checkbox"/>	

	QUESTIONS	YES	OKAY / SOMETIMES	NO
1	What is the purpose of your trip (E.g. work, school, shopping, etc.)			
2	Safety and Security			
2.1	Do you feel safe when:			
	(a) Buying something from the informal traders?			
	(b) Buying from the shops adjacent to the interchange?			
	(c) Walking around?			
	(d) Crossing the road?			
2.2	Have you ever been robbed at the interchange?			
2.3	Are there: (a) Visible policing / security officers at the interchange?			
	(b) Are they effective?			

Figure 6.5 An extract of the questionnaire used for the survey interviews showing the different response categories.

As previously mentioned, the four end-user groups were identified as the following:

- Passengers (Inter-peak, daily or occasional).
- Bus and minibus taxi drivers.
- Informal traders.
- Formal traders (shopkeepers within the PTI precinct).

Each one of the above groups was presumed as having different perspectives and needs with regard to PTIs. This warranted different questionnaires being designed for each end-user group. Refer to Appendix 2 for complete examples of each questionnaire.

As a consequence of consultation with Dr B Haldenwang, Senior Researcher, Institute for Futures Research, University of Stellenbosch, certain basic demographic data such as gender, race and age was integrated into the

objectives of the questionnaire. The rationale for this was that it would be essential to develop proper insights regarding the respondents and the context in which passengers experience a PTI. For example, a female could have different perceptions from a male, or an elderly person could be confronted with difficulties that younger people do not.

A further data set provided especially in the passenger questionnaire, is trip purpose. It was thought that this data might be very useful, especially for the detailed analysis of the individual PTIs, to explain certain phenomena that might be found.

Training the interviewers

The ten interviewers employed for the survey (2 M.Tech, 4 B.Tech, 4 Third year Town and Regional planning students) were informed of the requirements in order for the surveys to contribute to the research project. The questionnaire and the reason for each question were discussed. Background information, which included socio-economic data and location and role in the city, was given regarding each of the target PTIs on the day of the specific survey

It was further found necessary to train interviewers on how to approach and to establish rapport with respondents. A short, general description of the research project and an assurance that the interview will not take much of their time seemed to put respondents at ease and encourage them to participate. Easy, non-threatening questions to start the questionnaire ensured good co-operation from the respondents.

Testing the questionnaire

The questionnaire was tested by firstly circulating the draft to as many people as possible for revision. These revisers included colleagues from different professions, town and regional planning consultants and transport engineering consultants, and undergraduate town and regional planning students. Some

important, potential problem areas were highlighted and rectified such as the then lack of demographic information.

The second method of testing the questionnaire was to undertake pilot studies or field-testing (Creswell, 2003). Three pilot studies were undertaken under field conditions to test the questionnaire and the interview style that was needed to obtain the best results. The first pilot study's aim was to test the clarity of the questions. The data that was gathered from this exercise was, however, discarded because of the fact that the questionnaire changed dramatically after this first pilot study when it became evident that the questions needed to be much simpler in language as well as understanding.

Table 6.2 The function of the different pilot studies and the methods used.

Pilot Study	What was tested?	Method
1	<ul style="list-style-type: none"> • Clarity of questions • Level of understanding 	On-board survey
2	<ul style="list-style-type: none"> • Revised passenger questionnaire • Time it took to fill in questionnaire 	On-board survey / Random interception
3	<ul style="list-style-type: none"> • Language clarity • Random intercept method 	Random interception

The interviewers had some difficulty in convincing people on their way to work to stop in the interchange precinct to answer questions. For this reason the first and second pilot study (that was focused on passengers and undertaken in the morning and afternoon peak) were performed while travelling with the respondents on the different public transport modes (on-board surveys). Again,

problems were encountered especially with elderly males who were reluctant to participate. Although this method of on-board surveys was not considered for the sample survey, mainly because of the logistics involved and for security reasons, it was thought to be a good way of testing the questionnaire seeing as no-one's trip was interrupted.

The third pilot study focused on the rest of the end-users and was performed at only one PTI, namely Claremont. The actual method of "randomly" intercepting respondents was tested. Language seemed to be the major obstacle especially amongst the informal traders because of the fact that the majority of them were not South African citizens. An interpreter was used, but again the questionnaire had to be adapted and simplified seeing as an interpreter was not always going to be readily available. The method seemed to be successful, with very few of the respondents approached, not being willing to participate.

6.3 THE TARGET PUBLIC TRANSPORT INTERCHANGES

6.3.1 Criteria for choosing the target PTIs

In order to decide at which PTIs to conduct the survey, the following were used as points of departure: "...there are unifying principles that apply to all interchanges regardless of their size or purpose and that is that passengers have certain basic expectations as to how an interchange should function regardless of its size, or the volume of passengers that use it" (Transport for London Integration Department, 2001: 11) and "...best sites [destination interchanges] at which to learn the central phenomena of interest [the end-users perspective]..." (Creswell, 2003: 182).

In view of the above, it was decided that "destination interchanges" in terms of work and not so much "origin interchanges" would represent the best target PTIs from which to learn "the central phenomena".

A destination interchange would mean an interchange where people arrive at as opposed to one where people leave from in the morning peak (Kingma, 2003). It was found that a higher concentration of activities exists around destination interchanges, which means that more can be learned from them for this specific study.

The chosen PTIs, namely Bellville, Cape Town, Claremont, Mowbray, Parow and Wynberg are deemed to best represent the Cape Metropolitan Area. The researcher admits the possible gap in the findings because of the exclusion of certain geographical areas (specifically the Metro South East) in the CMA.

The decision for this exclusion was taken after due consideration, where the safety and security of the researcher and involved students had to receive preference.

This problem was partially overcome by undertaking personal observations and analyses of additional PTIs located in these "excluded" areas. These PTIs are Athlone, Mitchell's Plain and Philippi.

A further prerequisite in choosing suitable interchanges would be for them to have all three modes of transport present at a comfortable walking distance from one another.

The essential mixture of land-uses was another determinant in choosing an appropriate interchange. The area around the interchange would preferably have to represent a mixture of residential, commercial as well as public facilities. The reason for this is to represent the interactions between PTI land uses and the city.

According to Jenks, Williams and Burton (2000) the importance of mixed land use in term of transportation is of paramount importance to ensure diversity and integration of the transport system with the urban structure.

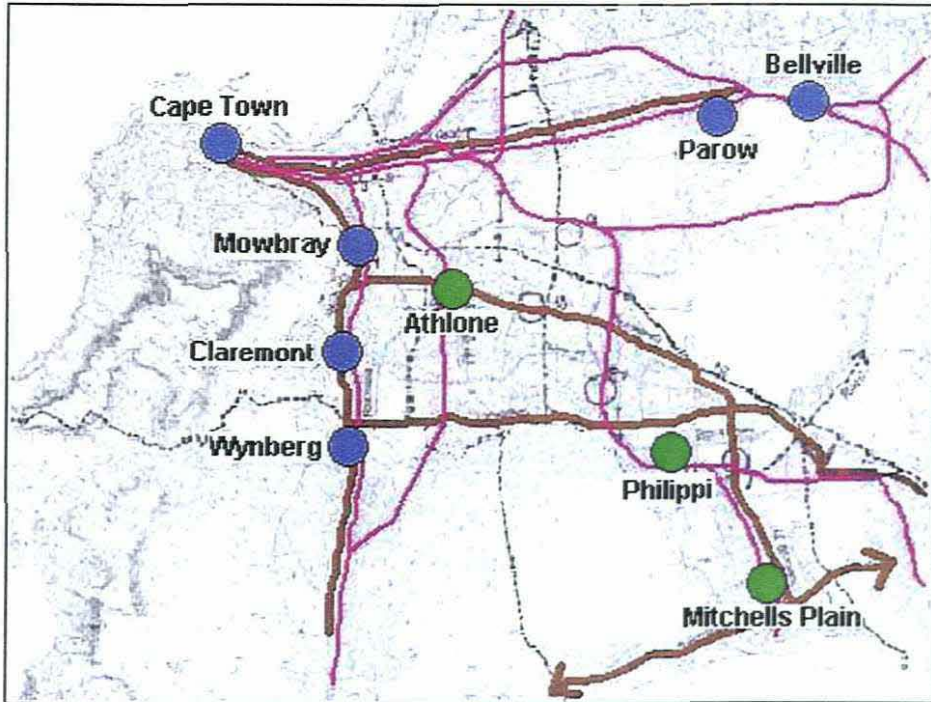


Figure 6.6 The purple PTIs represent the ones where the full survey was conducted and green represents the PTIs where descriptive surveys were undertaken.

For the following reasons, the under-mentioned PTIs were chosen as target interchanges for the surveys:

CAPE TOWN CBD:

- The largest PTI in the Cape Metropolitan Area and serves 197 125 passengers daily (City of Cape Town, 2002).
- Forms part of a metropolitan node and is situated at the convergence of the two main activity corridors in Cape Town.

- The railway station, the Golden Arrow bus terminus and the upper deck minibus taxi rank are well integrated with the Golden Acre shopping complex.
- A large number of formal as well as informal economic activities happening in and around this PTI, which has a strong interface with the city centre.

BELLVILLE:

- The second largest PTI in the Cape Metropolitan Area, serving 96 717 passengers on a daily basis (City of Cape Town, 2001b).
- A component of the northern Voortrekker road corridor.
- Improved in major upgrade in 2002 that resulted in it being one of the prominent PTIs of Cape Town.

CLAREMONT:

- Situated on the Main Road corridor.
- Serves 22 741 passengers (City of Cape Town, 2001).
- Claremont PTI serves a complex socio-economic mix ranging from high to middle to middle-low income groups.

MOWBRAY:

- The only recently upgraded PTI on the Main Road corridor.
- Serves 18 745 passengers daily.
- Is surrounded by an extensive land use mix with a single residential area in close proximity to the PTI.

PAROW:

- Situated on the Voortrekker road activity corridor, serving 29 027 passengers (City of Cape Town, Directorate: Transport, Roads and Stormwater, 2002).
- Includes an active, informal business component along a pedestrian walkway (Station Road), which links the interchange with Voortrekker Road.

WYNBERG:

- Situated on the important Simons town rail line and Main Road corridor, serving 70 529 passengers (City of Cape Town, Directorate: Transport, Roads and Stormwater, 2002).
- Unique in that it has a Mosque and a Magistrates Court located within its precinct. These two public institutions, situated on either side of the rail line, result in the PTI having a distinct character.

6.3.2 Determining the PTI precinct

A number of approaches are proposed in the available literature to suggest parameters to be used to identify the boundaries of a PTI precinct. Examples of this are presented here:

- Bertolini and Spit (1998: 12) suggested the walkable-radius as "...a circular area radiating from the railway station that is considered 'walkable' distance." Some authors represent the walkable radius in distance and others in time spent walking.

An advantage of this approach is that it is based or can be based on user's perspectives. This has the potential to be a true representation of reality.

This approach has numerous drawbacks though, as in most cases a circular area cannot be identified because of the linear nature of activity corridors or because of physical barriers, and most pertinently, because of the different types of users.

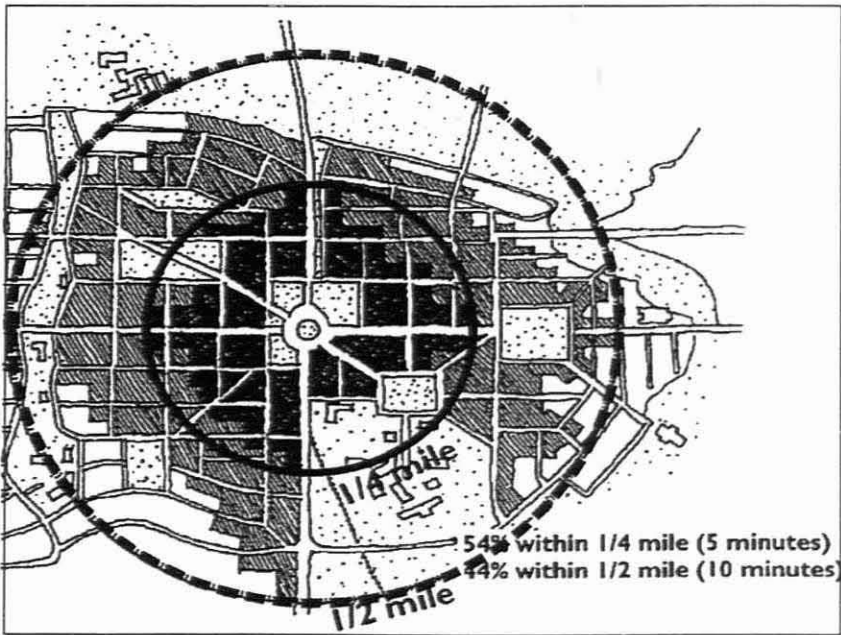


Figure 6.7 The walkable radius is depicted as a walking time of 5 and 10 minutes depending on the reason for the trip (Source: *Congress for the New Urbanism, 2004*).

- The Walkable Communities Inc. (2004) uses Functional Elements to determine precinct boundaries. The PTI precinct is here seen as the area that has a strong locational link with the PTI. Functional elements (for example a commercial axis, industrial area served by the PTI) which have a direct connection with the PTI are included as part of the precinct.

The main advantage of this approach is that the functional relationship between the PTI and surrounding elements is recognised.

- The Topographic Approach was followed by the City of Cape Town, Planning and Development Directorate (1999) in the Municipal Spatial Development Framework. This is based on demarcating a space, usually rectangular, with the PTI at the centre. It's achieved by a "commonsense" evaluation of which elements (such as land uses) should be included in the rectangle.

The main advantage is that every aspect in the local area is included and predetermined assumptions that can exclude certain elements, does not play a role in this approach.

- Bertolini and Spit (1998: 12) suggested a Development Perimeter to be used when a redevelopment initiative already defines such a specific physical perimeter.

The main advantage of this approach is that it can coincide with other existing boundaries i.e. administrative or functional, and that it takes cognisance of any existing development plan.

A disadvantage is that elements (such as pedestrian movement routes) under the PTI's influence, that are not part of the development plan, may be overlooked.

For this study, no single approach was followed, but rather a combination of the above. The reason for this is that the drawbacks of each of these approaches could be eliminated as far as possible. Further, the fact that the target PTIs each have a unique context and setting, needed to be appreciated in that no single approach would be able to satisfy all the individual PTIs. In summary, the

following issues as highlighted by the above investigation were borne in mind in the process of determining the PTI precincts:

- In some cases the precinct should clearly be seen as linear to accommodate specific activities and not always as circular, as suggested by most approaches.
- Functional elements that have a direct influence on the PTI activities should be included, such as the courthouse at the Wynberg PTI.
- The “common sense” approach, thus including what would commonly be considered as part of or influencing the PTI, was followed in most cases after a thorough site investigation of each PTI.

6.4 EXECUTING THE SURVEY

As previously mentioned, the surveys were performed during inter-peak times, thus between 09:00 and 15:00 and on days that represented normal travel patterns. These were found to be Tuesdays, Wednesdays and Thursdays excluding school holidays and public holidays. In the initial stages of the surveys, attempts were made to perform them on Fridays, but it was found that Fridays had a different travel pattern (earlier passenger peak) and that traders and shopkeepers operated differently on a Friday than the rest of the week, being the busiest day.

Ten senior town and regional planning students from the Cape Technikon conducted personal interviews by using a standardised questionnaire specifically designed for each end-user group (see appendix 2).

Respondents were generally very willing to participate with the exception of a few bus drivers who were under pressure to keep to their schedule and so did not have a great deal of time available.



Figure 6.8 Interviewers conducting the surveys.

6.5 CONSTRAINING FACTORS FOR THE SURVEY

The researcher acknowledges that this study cannot be seen as entirely representative for the following reasons:

- The survey excluded morning and afternoon peak passengers.
- The survey excluded certain geographical areas in Metropolitan Cape Town.
- The survey excluded "origin" PTIs.

One of the major problems was that of safety. Most of the surveys were undertaken with the local police's partial co-operation (a patrol car would drive past the PTI while the survey was underway), but no formal protection could be expected from them for obvious reasons.

Funding was secured from the Cape Technikon for employing a private security company, specifically for the then intended Mitchell's Plain and Philippi surveys, but after consultation with the PTI managers and the local police it was decided not to continue with these specific surveys because of the major safety risk at the time.

Another difficulty was the limited number of trained interviewers available for the surveys. As previously mentioned, the researcher, two M.Tech, four B.Tech and four third year students from the Cape Technikon's Town and Regional Planning Department conducted the surveys. The surveys were performed over a period of 3 months (June – August 2003). The Cape Town winter weather also was a negative factor in that a total of five surveys had to be postponed due to rain.

6.6 DATA ANALYSIS

The data preparation was conducted by four teams of students under constant and close supervision of the researcher.

The data needed to be prepared for analysis before the actual analysis could take place. Sudman and Blair's (1998) guidelines were used for this process. It should be noted that only the steps applicable to this specific study were used.

The first step in the preparation process was to physically inspect the data. This step revealed that some questionnaires were filled in only partially. These questionnaires were removed and "return surveys" were done in order to ensure the correct sample size.

The next step was coding the data so that similar data would be located in groups to simplify data capturing by computer. Each response to a specific question in the questionnaire had a value e.g. yes = 1, maybe/sometimes = 2, no = 3, no response = 4.

The third step in preparing data for analysis was the data entry. Data entry was performed directly from the original questionnaires. Computer entry was done by initially using the spreadsheet program Microsoft Excel, but it was found that a more advanced management tool to sort, organise and query information was needed, which resulted in the entire data entry process being executed in Microsoft Access. An additional statistical package was not needed because the relevant graphical analysis could be executed with Microsoft Access.

The fact that part of this exercise was qualitative in nature, resulted in some difficulty with analysing responses. The survey team held regular meetings to ensure that different data sets were captured and analysed in the same manner.

The final step of “cleaning” the data took the form of checking the data for the following: “...out-of-range observations...logical inconsistencies...unlikely observations...” (Sudman & Blair, 1998: 429-433). Most of the errors that were identified were due to human error and could be rectified easily because each questionnaire was linked to its data via a separate coding system.

6.7 THE RESULTS AND FINDINGS

The results of the end-user analysis for the six target public transport interchanges reveal a number of perspectives of which only the most important are summarised under each end-user group. Detailed information is available for each individual surveyed PTI.

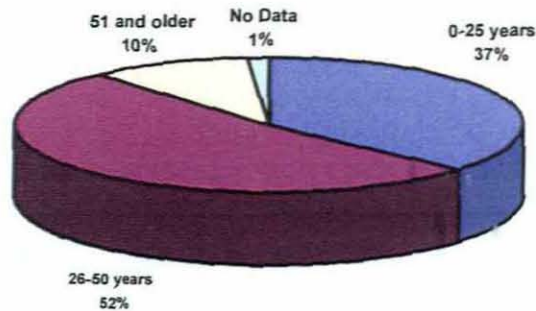
6.7.1. Passengers

The passenger end-user group is seen as the most important group with regard to the survey, for the simple reason that they perform different roles such as passengers, pedestrians and customers, which means they experience the full spectrum of the PTI activities. These differing roles result in their being the best

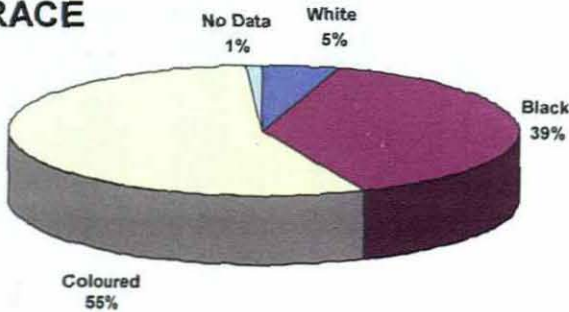
equipped to comment on any shortcomings and problem areas experienced within the PTI precinct.

The following pie-charts represent the demographic data sets captured for the respondents constituting the passenger end-user group:

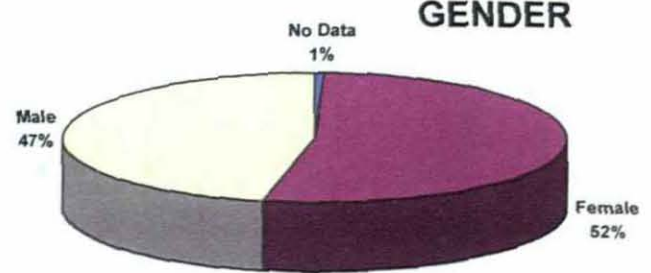
AGE



RACE



GENDER



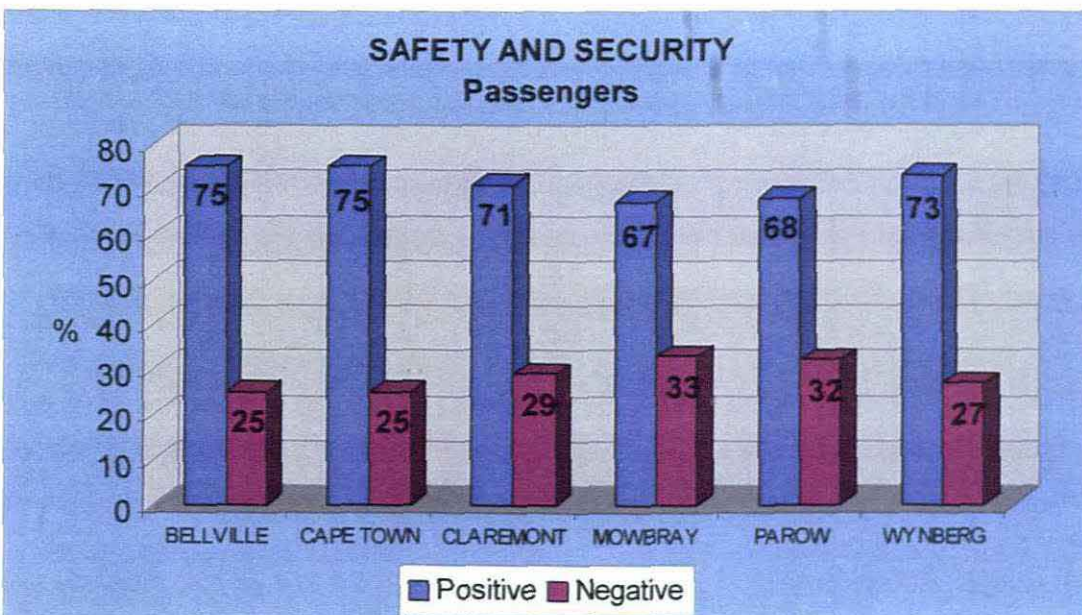
The age chart shows 52% of respondents between the ages of 26-50. This can be considered unusual because of the fact that the surveys were performed during inter-peak times, thus between 9:00 and 15:00 when one would expect people in this age bracket to be at their places of employment.

A deliberate effort was made to ensure a 50-50 male / female split, so that gender could not be responsible for any possible distorted results. As previously mentioned, it was surmised that different gender and age groups would experience the PTI environment differently, which is why it was so important to produce data with this in mind.

Fifty-five percent of respondents represented the coloured and thirty-nine percent represented the black race group.

Safety and Security

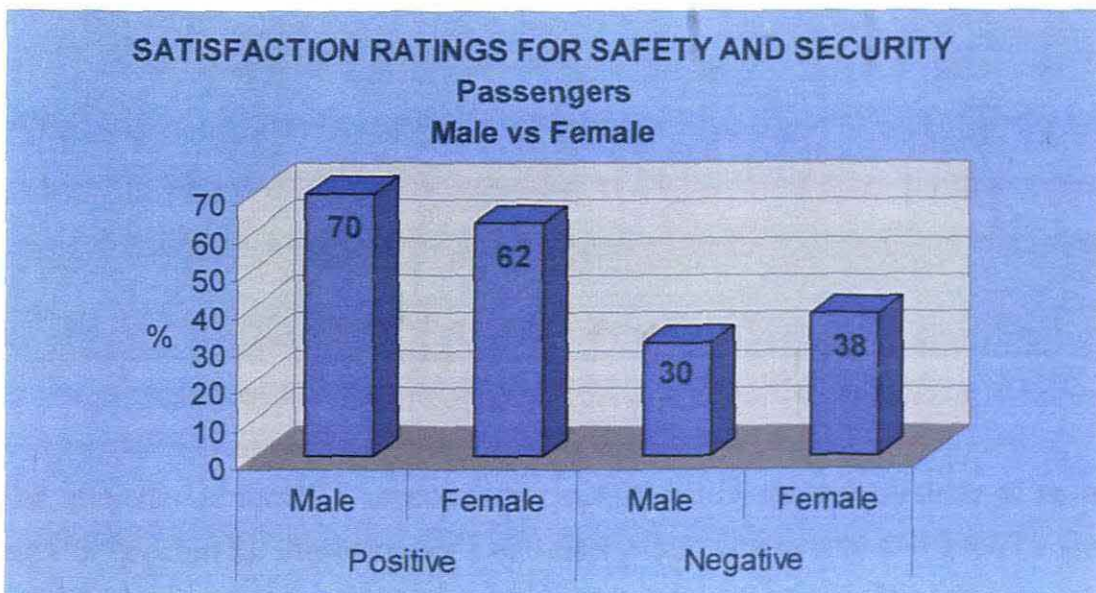
Typical questions for the safety and security section in the questionnaire were: “Do you feel safe when” and then listing a number of activities, or “Is there visible policing or are there security officers at the PTI”? See appendix 2 for the complete questionnaire.



Overall, the majority of respondents expressed a feeling of particular safety in the PTI environment. No significant differences were found between the individual PTIs with the safest ones suggested as being Cape Town station deck and Bellville. The finding that Cape Town station deck rates as one of the safest PTIs surveyed, is peculiar because this is where a shooting incident occurred, while conducting surveys.

Nevertheless, the respondents in the six PTIs that were surveyed showed a positive inclination with regard to safety and security on mid-week days and between peak hours.

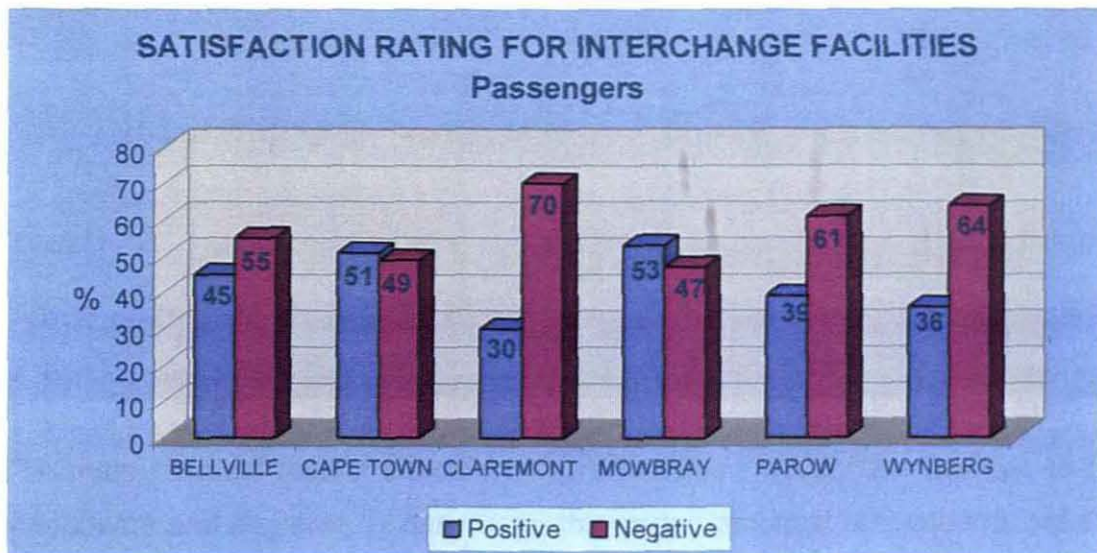
In order to analyse the safety and security issue further, a graph representing a division between the genders was produced. An overall positive response was recorded with only 38% of female respondents experiencing the PTI as an unsafe environment. This reveals a much lower percentage than what was generally anticipated.



Interchange Facilities

Questions for the interchange facilities section were arrived at determining satisfactory standards of components such as toilets, shelter, seating and lighting, information and ticket offices. For this reason, respondents were asked whether they knew which facilities were available and if such facilities were in a satisfactory condition.

A further topic addressed was that of the user-friendliness of interchange facilities for vulnerable groups. Interchange managers who needed this information to motivate suggested upgrades at their specific PTIs, specifically raised this question. A graph representing this information in a generalised form therefore is not presented here as the real meaning lies in the context of each individual PTI.

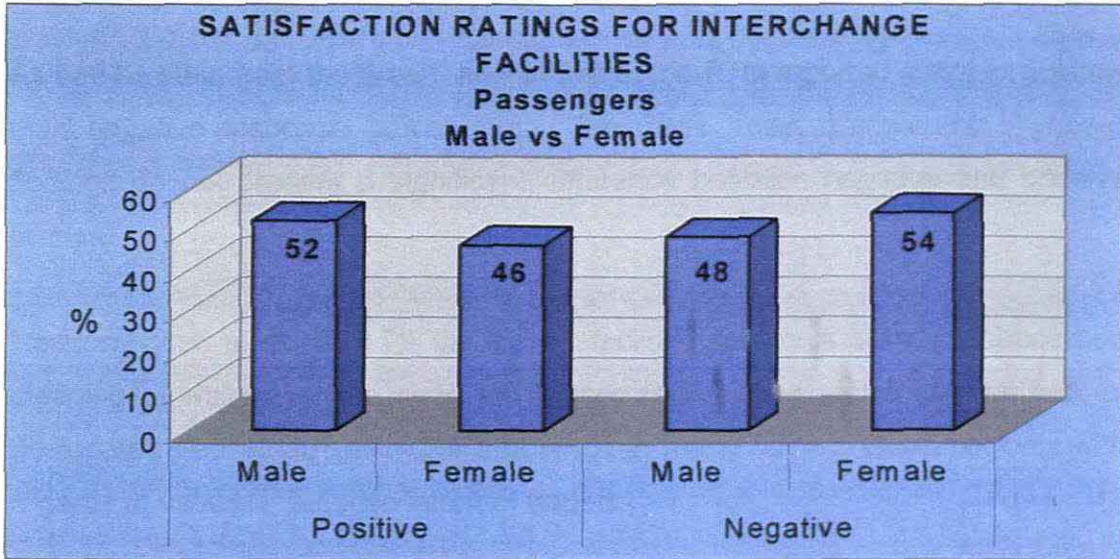


The interchange facilities section was emphasised by the survey findings as an area of concern for the passenger end-user group where only two interchanges were found to be performing positively and not with any appreciable margin: Cape Town at 51% and Mowbray at 53%.

Claremont seems to present a serious problem with regard to its interchange facilities, though development plans for the upgrade of the PTI are in the stage of finalisation which will presumably result in a more positive experience for users.

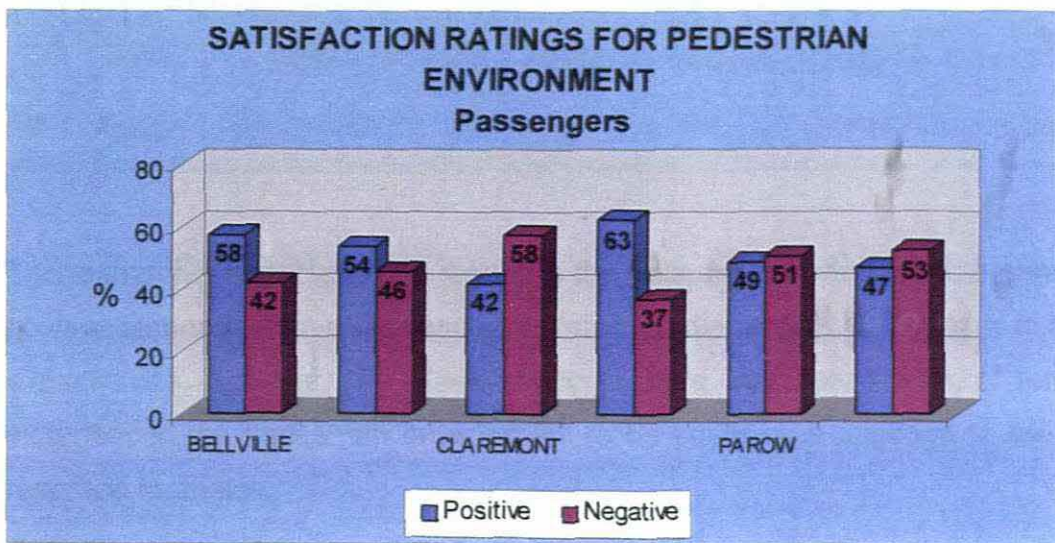
The findings of this section of the questionnaire coincide with the main concerns highlighted by passengers in a later graph (see page 156), seeing as three of the top five concerns identified by passengers were covered under the interchange

facilities, namely lack of shelter, quality of seating and the state of ablution facilities.



The male / female results indicate 54% of females consider the facilities to be inadequate and negative. Reasons for this varied amongst respondents but the reason cited most often were the poor state of ablution facilities. Just over half of the male respondents felt the PTI facilities were positive and adequate.

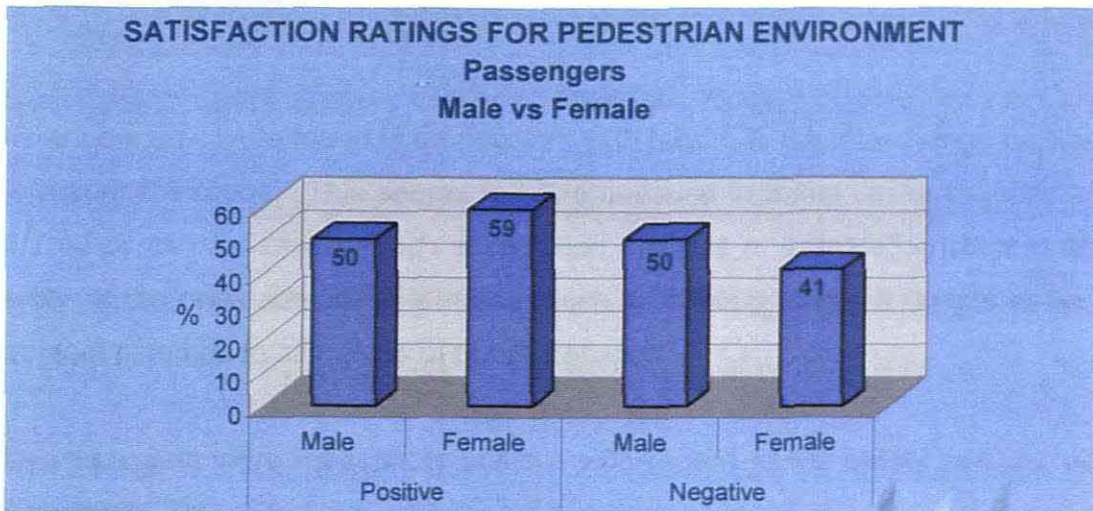
Pedestrian environment



This graph depicts the responses to questions regarding the pedestrian environment. Questions dealing with issues such as walking space, obstacles, conflict areas and quality of surfaces were asked.

As can be seen from the graph, almost half of the PTIs reported a higher positive than negative response percentage. The Cape Town, Parow and Wynberg findings do not present a significant difference between negative and positive ratings.

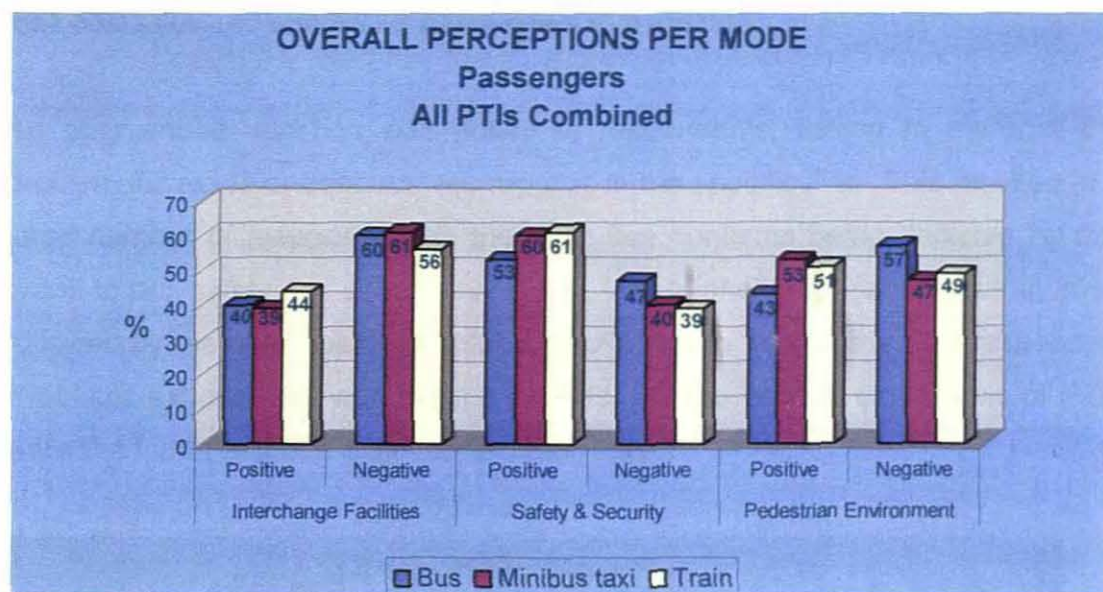
Reasons cited most often for the dissatisfaction, were lack of maintenance and cleaning of walkways, the need for shelter and seating and a general lack of designated pedestrian walkways that result in many conflict areas not only with regards to vehicles, but also informal traders.



The researcher expected, with regard to the pedestrian environment, a generally positive response from males and a negative female response. Contrary to these expectations, however, the survey findings were that nearly 60% of females experienced the pedestrian environment to be positive as opposed to the 50% recorded for males.

General

The following graph combines a number of themes to present the overall responses of passengers using the three modes of public transport:



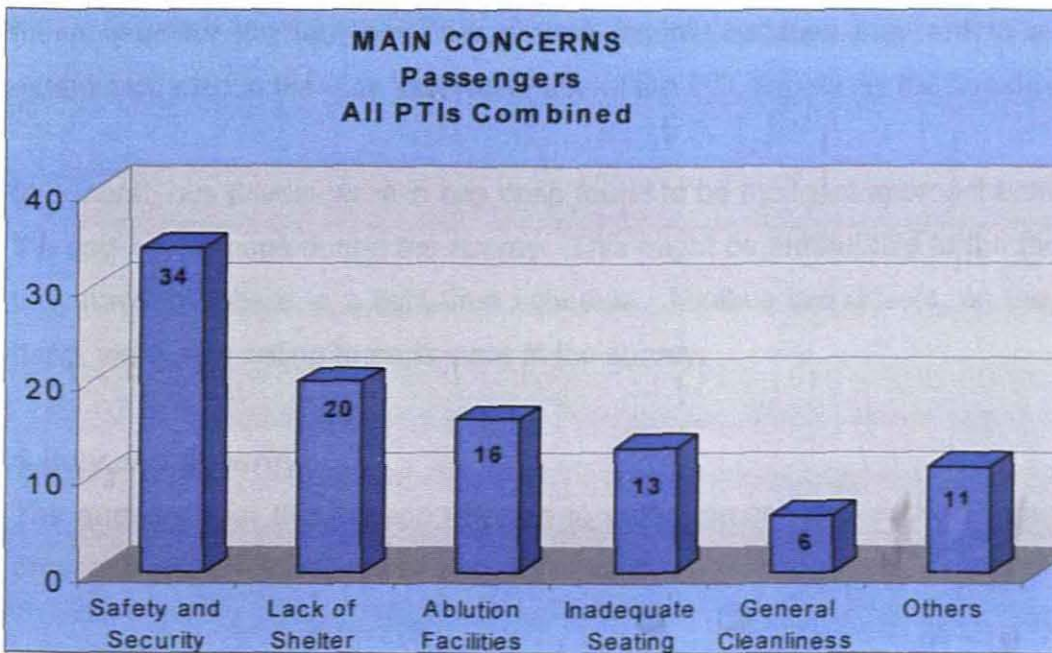
All respondents were found to be negative with regard to the interchange facilities no matter the mode. This seems feasible because in many cases facilities are shared by all passengers (such as ablution facilities or information offices) and even for the ones specific to a mode, such as waiting areas, it seems to be a problem common to all modes of public transport.

All passengers were reasonably positive with regard to the safety and security aspects at PTIs.

The majority of train passengers experienced the PTI as a safe environment with a 61% positive response, whilst bus passengers responded most negatively with only 53% feeling that PTIs are safe and secure.

With regard to the pedestrian environment, a 10% difference in satisfaction levels between bus and minibus taxi passengers were recorded. This might be attributable to the fact that minibus taxis are more flexible in their drop-off and pick-up areas, which may result in shorter walking distances and thus implying less obstacles and conflict for passengers to negotiate.

An open-ended question was posed to respondents, asking to highlight the problematic areas or concern with regards to the specific PTI. This resulted in a large number of responses with the main five concerns being depicted by this graph to be: safety and security with 34%, lack of shelter for passengers at 20%, followed by the poor quality of ablution facilities with 16% of the total responses. Problems experienced with seating at PTIs and the general cleanliness of PTIs were the fourth and fifth major concerns.



Whereas the data concerning "Satisfaction Ratings for Safety and Security" (refer to graph on page 152) revealed that passengers were in general positive with regard to safety and security at PTIs, in this open-ended question section, safety

and security was found to be the number one concern. This can be attributed to the fact that the open-ended question highlighted people's perceptions and not the actual, tangible situation as tested with the specific questions under the safety and security section of the questionnaire.

Some of the main comments included under the "Other" heading were the disturbances caused by informal traders (sidewalks being blocked, passengers being harassed by informal traders), the insufficient facilities for disabled passengers and the general lack of information within the PTI precinct.

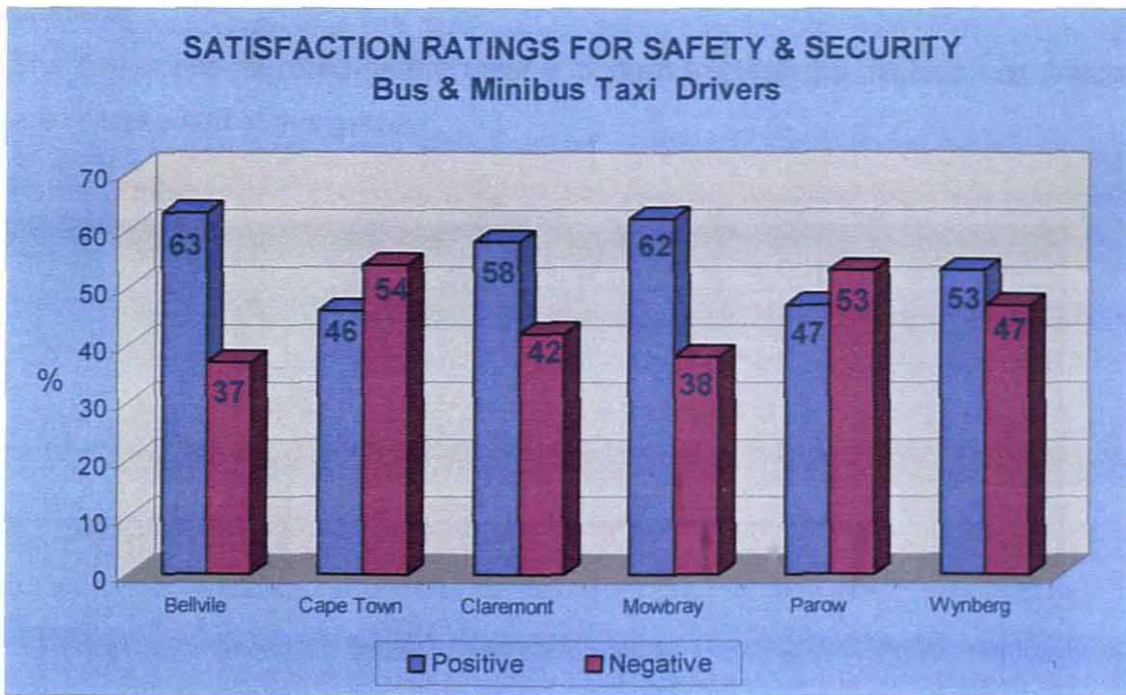
6.7.2 Bus and Minibus Taxi Drivers

Bus and minibus taxi drivers were interviewed to determine the manner in which they experience the PTI environment. Their questionnaire was the shortest of those used for the four end-user groups, mainly because they are to a large extent restricted in the way they make use of the PTI, especially the bus drivers.

In general, bus drivers were in any case found to be the least approachable of all the end-user groups during the survey. This might be attributable to the fact that they have to adhere to a tight time schedule. Minibus taxi drivers, on the other hand, were very willing to participate in the survey.

Safety and Security

The questions for this section referred to safety procedures at the PTI and the presence and effectiveness of security officers.

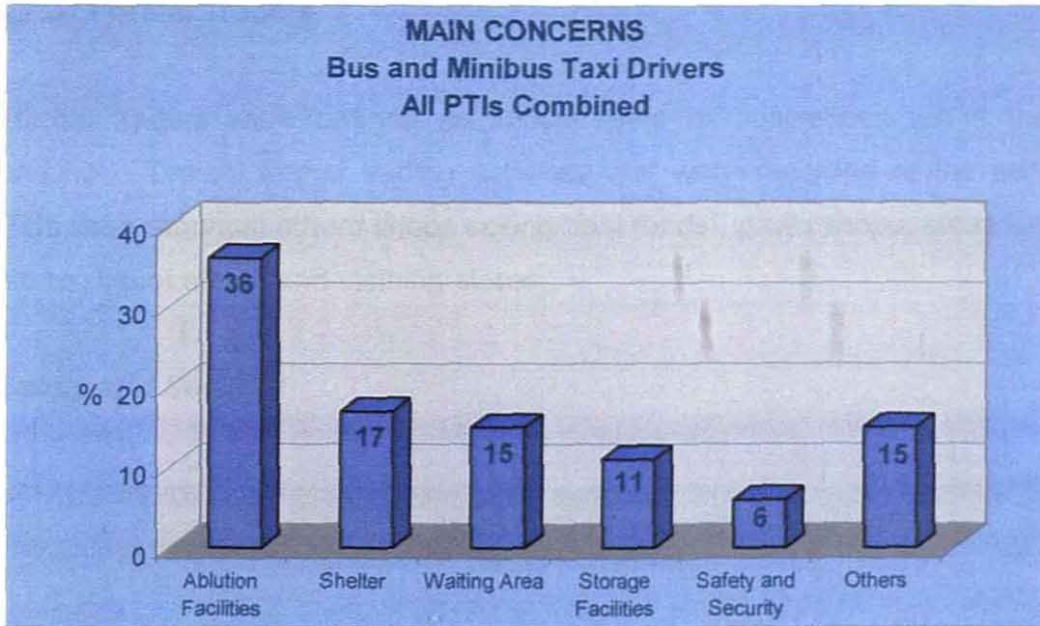


Respondents recorded a generally positive reaction with regard to safety and security within the PTI precinct, but not with a huge margin. The upgraded PTIs, namely Bellville and Mowbray, represented the safest environments for bus and minibus taxi drivers, according to the survey.

The foregoing problems experienced with regard to safety and security correlate closely with the following graph depicting the "Main Concerns" as bus and minibus taxi drivers highlighted it as one of the main problem areas.

General

The five concerns rated as the most important for bus and minibus taxi drivers are represented in this graph.



Thirty-six percent of respondents felt that the ablution facilities are not to standard. The pedestrian end-user group, as one of their major concerns, previously also highlighted this problem.

The other main concerns were the lack of sheltered termini for both bus and minibus taxi's, limited vehicle waiting or parking areas, the total lack of storage facilities (this was a major problem for minibus taxi drivers) and safety and security. The problem of safety and security went beyond the physical PTI environment in this case and included the unsafe situations that exist because of the competition between bus and minibus taxi operators and drivers.

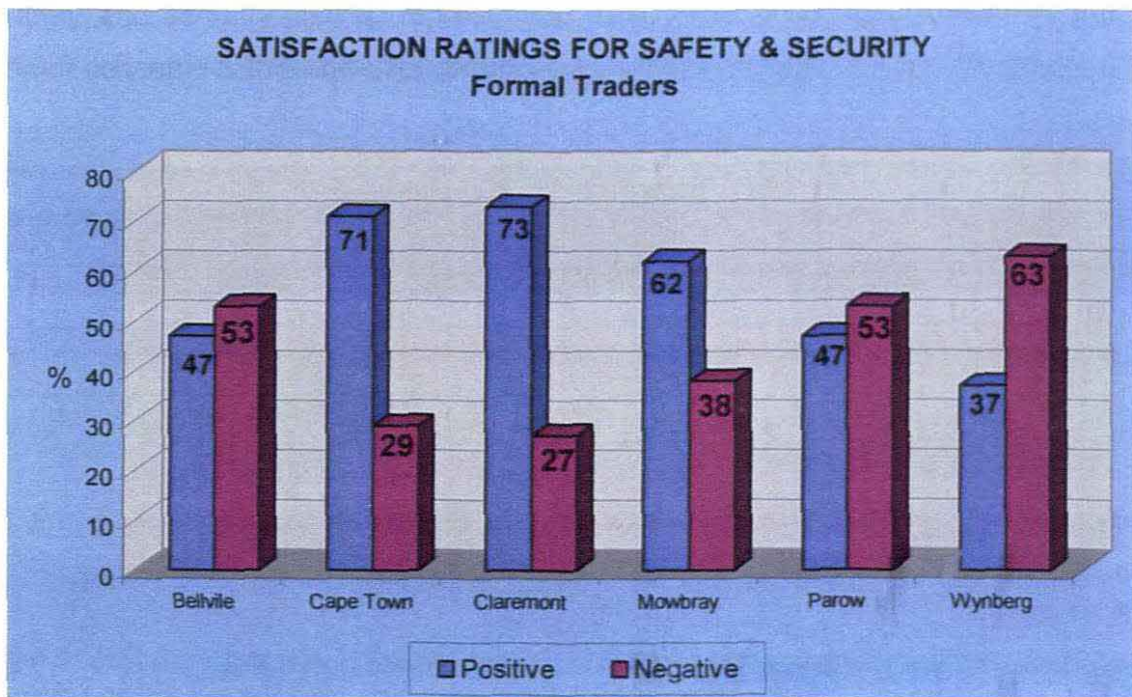
The 15% "other concerns" recorded include issues such as a lack of manoeuvring space especially during peak times and at the entrance and exit

points to the PTI. A need for more structured drop-off, waiting and pick-up facilities was raised as an important element that can improve the quality of the bus and minibus taxi service.

6.7.3 Formal Traders

Formal traders were defined as shopkeepers or businesses within the PTI precinct. Typical formal trading activities that were recorded at the surveyed PTIs were amongst others shops selling “fast foods”, pawn shops, small furniture stores, liquor stores and clothing stores.

Safety and Security

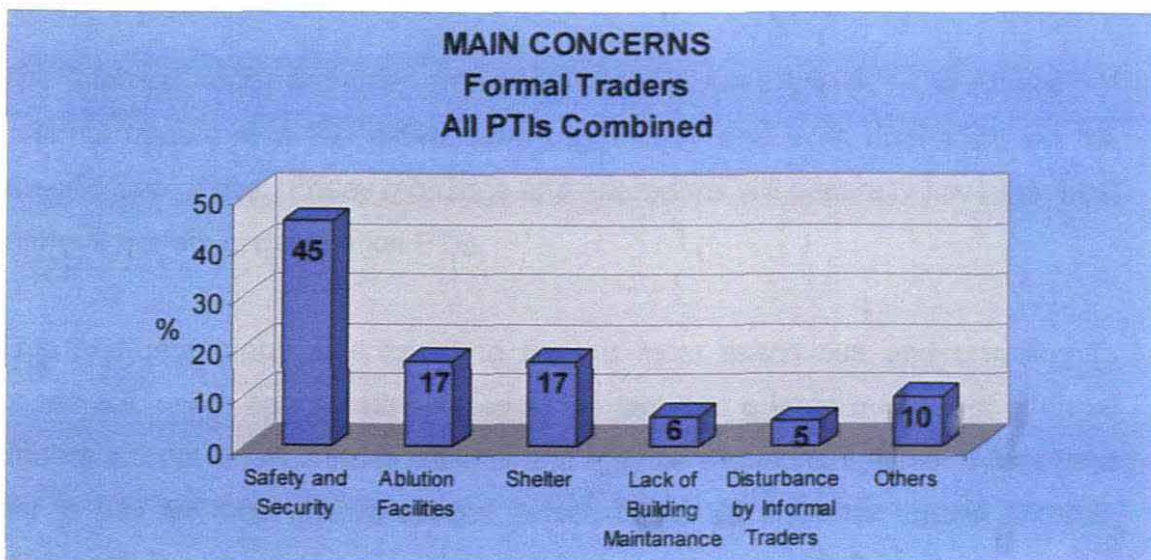


Questions for this section included the ones asked to the bus and minibus taxi drivers. Further, respondents were asked whether they felt safe during operating hours and if they have been robbed at their shop.

Significant differences in responses were recorded for this section with half of the PTIs surveyed being experienced as a safe environment and half as an unsafe environment. The very high positive responses recorded for Cape Town, Claremont and Mowbray might be attributed to the fact that these three PTIs have a clear distinction between the areas allocated for formal and informal trading activities. Shopkeepers are thus not “challenged” by informal traders for, for example, the space in front of their shops.

General

Safety and security issues, representing 45%, were once again raised as the major concern for this end-user group.



The lack of or poor condition of the PTI's ablution facilities and the lack of adequate shelter results in a huge problem for shopkeepers with passengers wanting to either use the surrounding shop's toilets or using the inside or front of

the shops for shelter. This causes an obvious disturbance to normal operations of the shops.

The lack of maintenance to buildings surrounding the PTI was a further concern highlighted. It was felt that the dilapidated state of most buildings deter people from shopping activities within the PTI precinct.

Respondents further highlighted the informal traders as a disturbance. The reason cited most often was the fact that they “clutter” the space in front of the shop windows and entrances.

The major other issues highlighted were cleanliness of sidewalks, especially in front of their stores and around the informal traders, with suggestions for stricter regulations and controlling of the informal traders.

6.7.4 Informal Traders

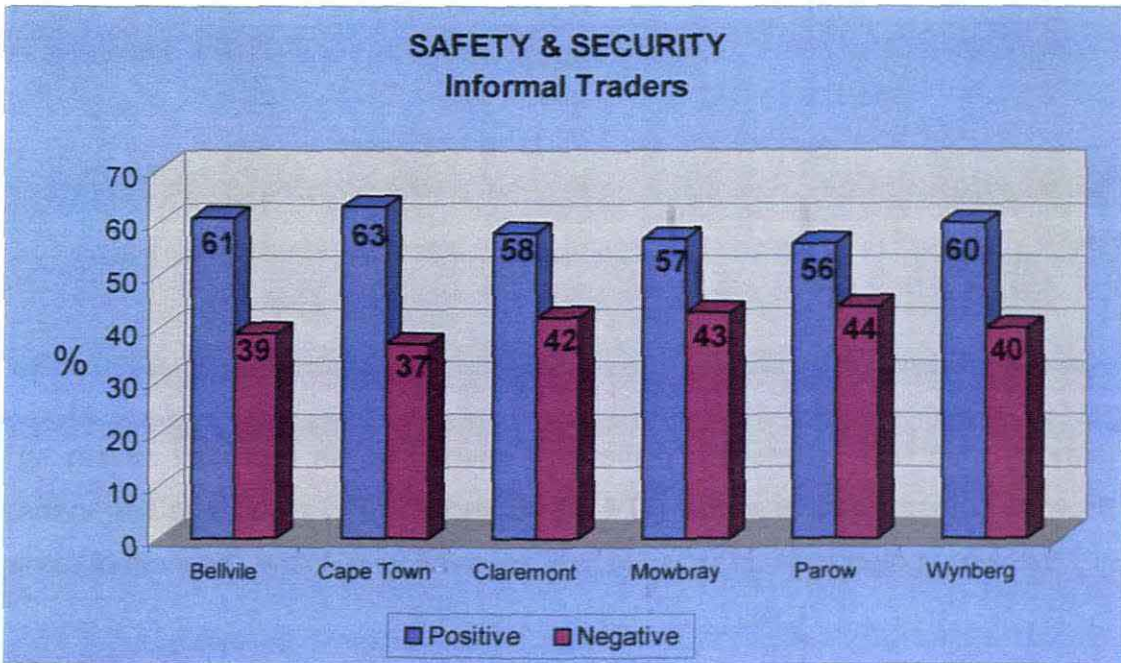
The informal trader end-user group is a most diverse group. The number of informal traders at a PTI differs from day to day and even depending on the specific time of day. Friday mornings and afternoons will generally have the most informal traders at destination PTIs.

This end-user group was found to be the most suspicious and unwilling to cooperate, which can be attributable to the fact that a large number of informal traders are not South African citizens and may be illegal immigrants. Many tend not to pay for their trading spaces, which might be a further reason for their reluctance to communicate.

The following represents the views and perceptions of the informal traders with regard to safety and security, interchange facilities and main concerns at PTIs:

Safety and Security

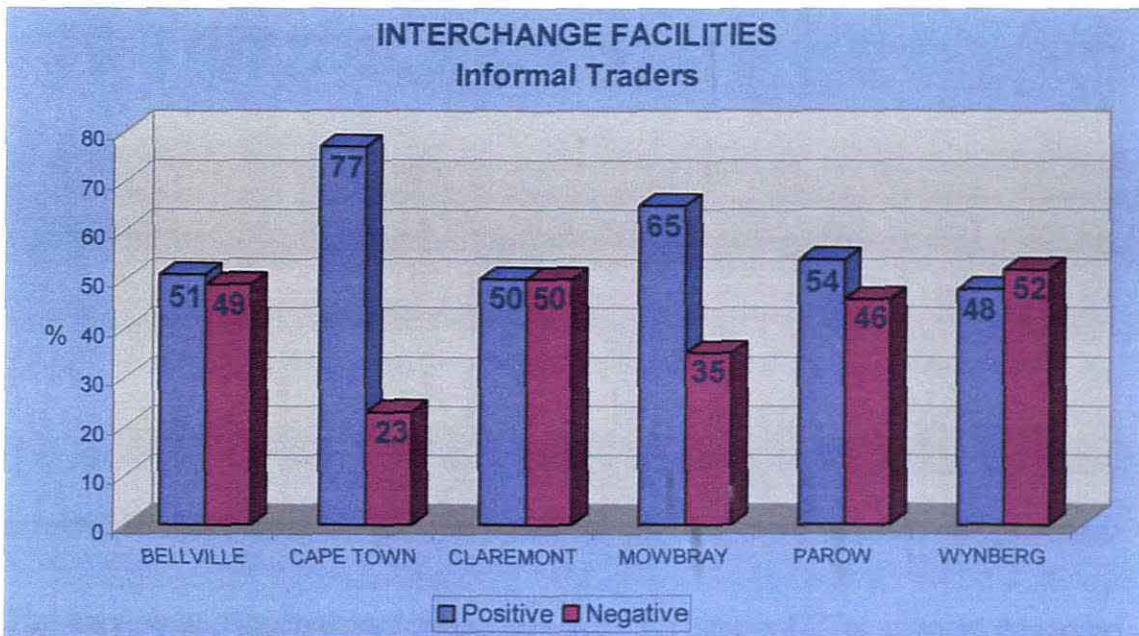
Similar questions to the other end-user groups with regard to safety and security were posed to the informal traders, which resulted in a significant positive response as depicted in the graph below.



No major differences in responses between the six PTIs are revealed, which suggest in general that informal traders feel relatively safe whilst selling their goods within the PTI precinct.

Interchange Facilities

Questions with regard to the state of the ablution facilities, the general cleanliness of the PTI and trading and storage space were presented to respondents in order to determine their views with regard to the available or non-available facilities.



The results indicated an overwhelming positive response (77%) from informal traders at Cape Town. This is one of the PTIs where informal trading is much more “formalised”, which may have resulted in better facilities being provided.

General

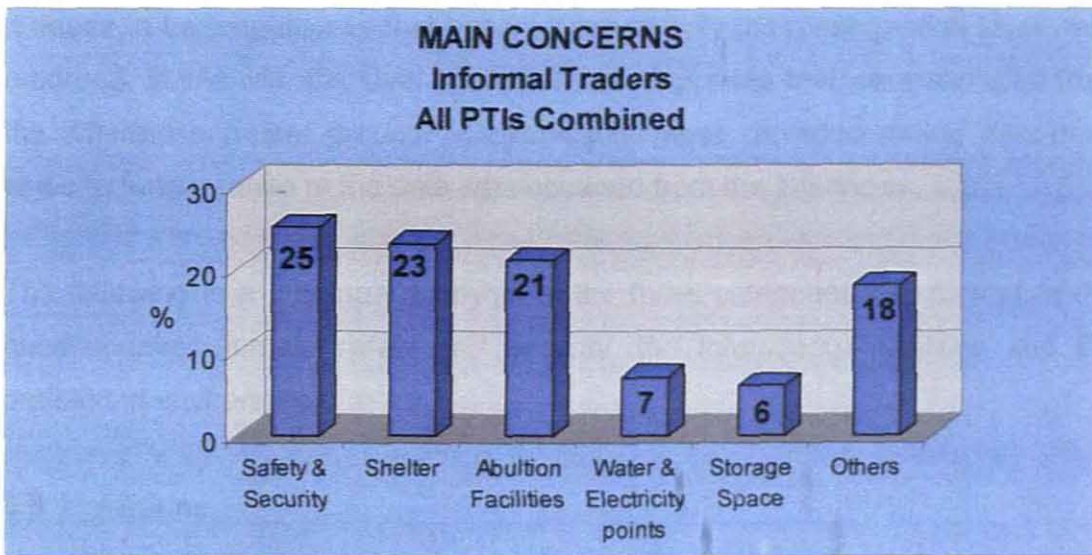
The previous chapters on literature and theories, as well as case studies, suggests a formal market place as a viable alternative to the existing “casual” positioning of informal traders. The informal traders’ opinions in this regard were tested with a question in the questionnaire asking them whether they would want to be moved into a formal market place. The following graph illustrates the responses to that question.



The varying and inconsistent responses from the different PTIs suggest this to be a controversial topic. The context of each PTI might to a large extent determine the specific responses. For example, at Mowbray and Parow (the two smallest PTIs surveyed) informal traders may possibly be totally dependant on commuter and passenger movement routes to intercept potential customers who are likely to only buy from the informal traders because they are “on their way”.

With regard to the main concerns highlighted by informal traders, “safety and security” was rated as the primary concern, as in the case of the formal traders. Although, when asked specific questions with regard to safety and security issues, the general response was positive, the perception clearly exists with informal traders that PTIs are unsafe environments.

Lack of shelter, water and electricity points and storage space were also found to be major concerns for informal traders. These issues can directly influence the quantity of goods that can be sold on a daily basis and thus the profits that can be made.



Eighteen percent of the total responses did not fall into the five main concern categories. Some of these “other” concerns were that the PTI should be cleaned more regularly, inflated rent payable for stalls, and uniform stall sizes.

6.8 DESCRIPTIVE SURVEYS

As previously mentioned (6.3.1 Criteria for choosing the target PTIs) certain geographical areas were excluded from the survey. In order to bridge this gap, the descriptive survey method with the on-site, direct observation technique was used as a means of collecting data at three PTIs, namely Athlone, Mitchell’s Plain and Philippi.

Leedy (1980: 97-99) refers to the descriptive survey method as a method of research that simply looks with intense accuracy at the phenomena of the moment and then describes precisely what the researcher sees.

The parameter used to guide these direct observations, was the passenger questionnaire, being all-inclusive of the different PTI environments and relevant issues.

It needs to be emphasised that observations at only the most general level were recorded, in line with the level and quality of responses that were captured from the different end-user groups. Observations were recorded during inter-peak times to further relate to the data sets obtained from the interviews.

The following is a summary analysis of the three categories as covered in the questionnaire, namely safety and security, the interchange facilities and the pedestrian environment.

6.8.1 Athlone

The areas included in the observational exercise were the taxi termini at the rail station, the parking and pedestrian areas as well as the formal and informal economic activities within a street block radius.

Safety and Security

It was observed as being a relatively safe environment, bearing in mind its being a typical origin PTI with very few activities and people present during early inter-peak times.

Interchange Facilities

Public ablution facilities are well located with good surveillance, but are usually locked and thus not freely accessible.

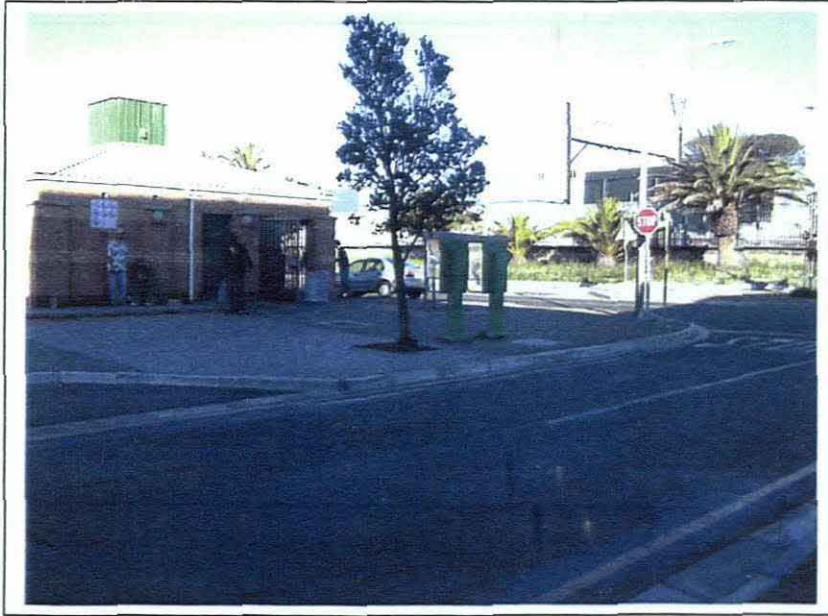


Figure 6.9 Athlone PTI: Public toilets are highly visible.

This is a generally clean and well-maintained PTI. A major disadvantage though, is the lack of adequate shelter and seating for commuters. Only one area with limited seating and overhead shelters was observed. These shelters appeared to be quite inadequate for protecting commuters from the natural elements.

Apart from the station name, no other information was visible.

Pedestrian Environment

Some aspects showed signs of upgrading such as paved pedestrian walkways and a few landscaping elements. There are some traffic calming measures in place such as speed humps and demarcated pedestrian crossings that should contribute to limiting potential conflict with vehicles.



Figure 6.10 A raised pedestrian crossing and bollards define the pedestrian environment.

Economic Activities

An economic magnet, namely the Food World store within the PTI precinct, is evidence of investors realising the opportunities associated with public transport interchanges. This store probably attracts people to the PTI for reasons other than travelling.

Numerous informal traders are positioned on the side-streets with demarcated bays and roofed structures. Their positioning on the sidewalks could be a hindrance to free pedestrian movement, especially during peak times with its high volumes.

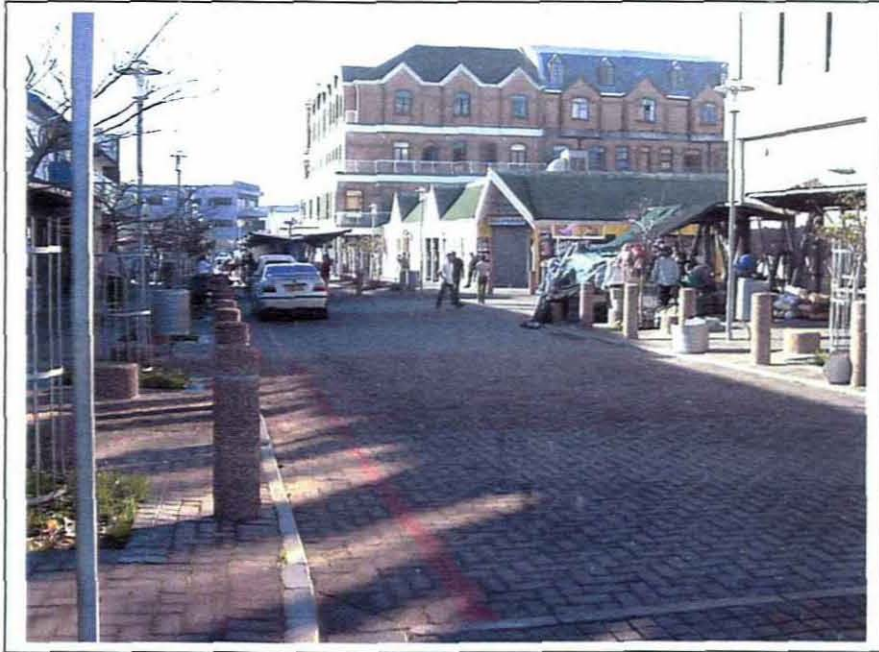


Figure 6.11 The road and sidewalk have the same surfacing. This implies that the road is a shared space for vehicles and pedestrians.

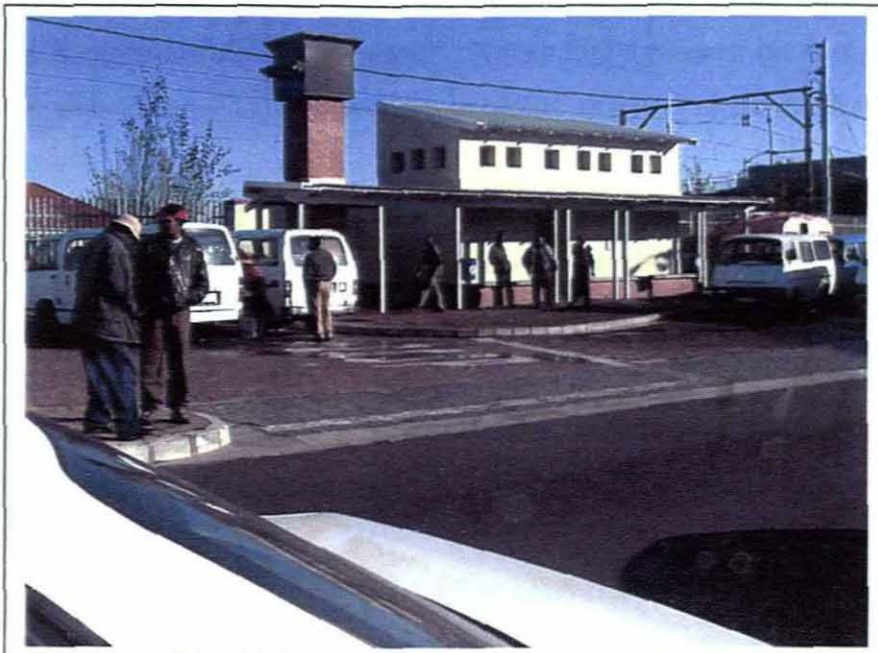


Figure 6.12 An associated activity such as washing of vehicles is provided for within the Athlone PTI precinct.

General

No buses enter the PTI, because of the fact that the bus pick-up and drop-off is situated on Klipfontein road, which results in movement conflict within the PTI being limited to motorcars, minibus taxis and pedestrians. Washing facilities for minibus taxis are available and used regularly

6.8.2 Mitchell's Plain

Mitchell's Plain station PTI is surrounded by low to middle income residential development and is serviced by all three modes of public transport, namely train, bus and minibus taxi, in very close proximity to one another.

Safety and security

This PTI is evidently a hub of activities throughout the day (the PTI was visited on three occasions at different inter-peak times), which results in sufficient people around to make it quite a safe environment. No security officers on foot were noticeable while visiting the PTI, but security vehicles seemed to patrol the area intermittently.

Interchange Facilities

The bus rank is roofed but no shelter exists at present for the minibus taxi rank. No seating was observed anywhere in the PTI precinct which indicates this to be a user-unfriendly environment especially for vulnerable groups such as the aged.

The concealed position of the public toilets further contributes to the negative quality of this PTI.

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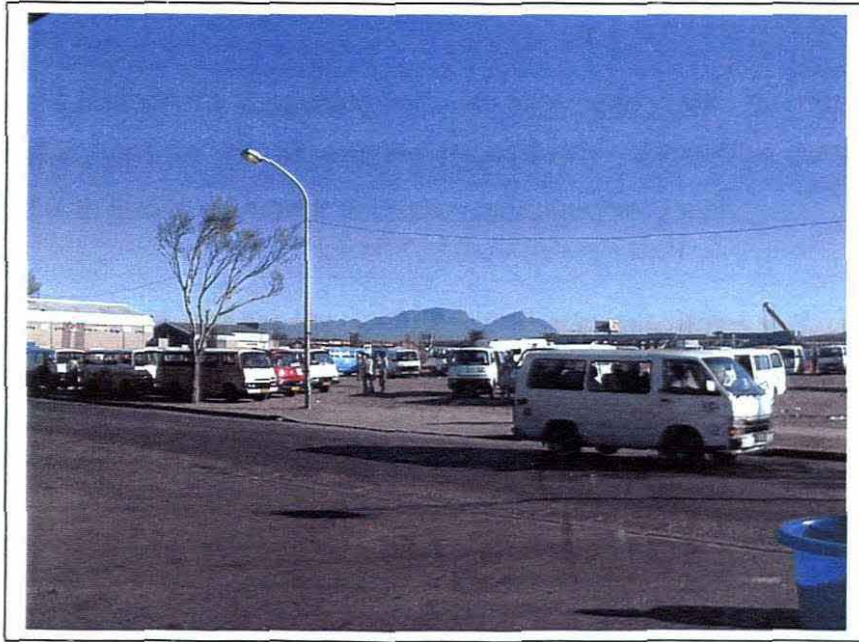


Figure 6.13 The extensive minibus taxi rank seems informal with no ancillary facilities being provided for at present.

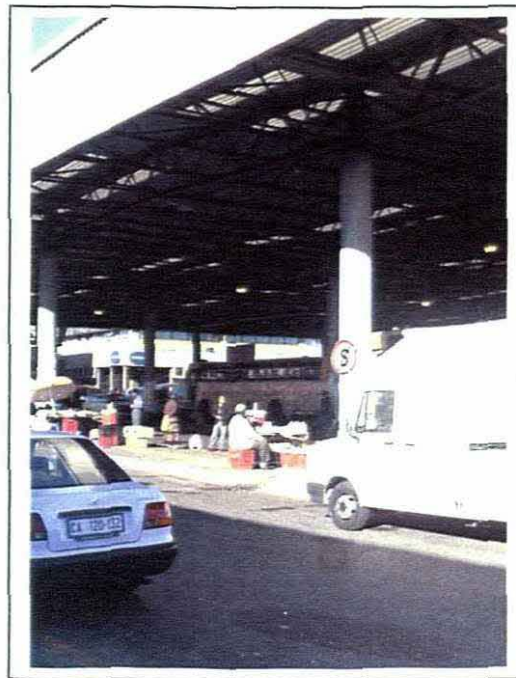


Figure 6.14 The bus pick-up and drop-off area is roofed and has informal traders on the periphery of the structure.

Pedestrian Environment

Pedestrians are in constant conflict with vehicles and have no demarcated pedestrian walkways that can offer some right-of-way. Sidewalks do exist, but are congested with informal traders and not maintained very well.

Narrow, one-way roads around the bus terminus are congested due to illegally parked private and delivery vehicles. As a consequence, visibility is limited for pedestrians, which compromises their safety.

Economic Activities

This is a major economic cluster with many informal traders and a huge shopping mall around the rail station and on the periphery of the PTI.

The PTI is in close proximity (within 5 minutes walking distance) to medical facilities, a college and businesses and thus well integrated with the local area.

General

This PTI is under construction at present with improvements to the minibus taxi rank in progress.

A large number of parking bays for private vehicles are provided in and around the PTI precinct, which increases the PTI's accessibility.

6.8.3 Philippi

This PTI is surrounded by informal housing and includes a car and minibus taxi rank, the rail station and informal trading activities. Buses do not enter the PTI and operate on the peripheral roads surrounding the settlement.

Safety and Security

Many people were found loitering around in this PTI, which imparted an unsafe feeling, although a security office with numerous officers were observed.

Interchange Facilities

Vandalism has degraded the visual quality of this PTI with broken seating, damaged railings and information boards. Graffiti on building walls and oil spills on the paving further spoiled the quality of this environment.



Figure 6.15 Vandalised information boards.

Pedestrian Environment

The pedestrian areas are indicated by a different type and colour paving than the road surfaces. Pedestrian movement channels are relatively free from any

obstacles, except for the occasional broken paving patches and tree planters. Informal traders are restricted to the periphery of the PTI, to further unclutter the pedestrian walkways.

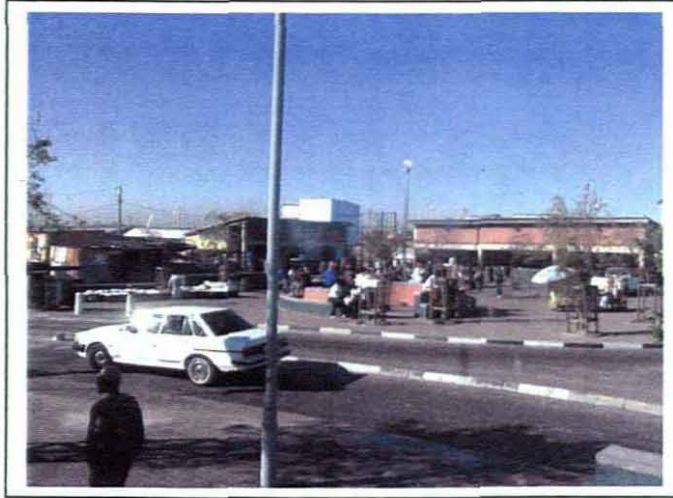


Figure 6.16 The difference in paving between vehicle and pedestrian surfaces contribute to minimising conflict areas.

Economic Activities

No formal economic activities were observed within the PTI precinct, but a large number of informal activities exist in and around the PTI. These informal activities include selling of goods and fresh produce, services such as car repairs and car washes (using water from the PTI ablution facilities), hair salons and cell phone and electronic repairs.

General

This PTI was seemingly upgraded with a view to creating a positive space and would have been successful were it not for the lack of maintenance and inefficient enforcement of informal trading operations.

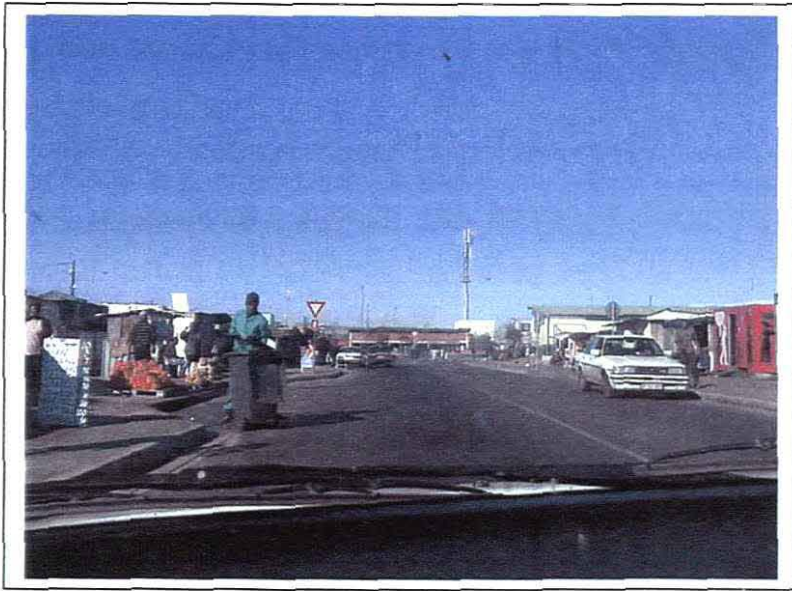


Figure 6.17 The PTI (in the background) is surrounded by informal housing with numerous activities such as selling of fresh produce and car repairs spilling over into the PTI precinct.

6.9 CONCLUSION

In Part B of the research project, the main objective was to determine which contextual informants could be derived from relevant sources.

A thorough investigation and interpretation of these sources was documented in chapters 3, 4 and 5, and what can be learned from them with regard to a better performing PTI, is summarised and presented in the following chapter.

The end-user perspective, described in this chapter, provided the final source in the search for contextual informants, and this produced some unexpected challenges.

All possible pre-cautions were taken to ensure the statistical soundness and validity of the survey data and findings; hence the emphasis and thorough investigation of all possible methods.

The objective of this end-user survey was to determine whether the users of PTIs could verify what were identified in chapters 3,4 and 5, as important informants towards better performing PTIs.

It was found that respondents, through not being as knowledgeable and consciously aware of certain performance measures such as legibility or place quality, could not realistically be expected to comment on these “higher order” issues. They could in fact only give basic responses.

With this in mind, the following correlations can be drawn:

As was expected, “safety and security” was highlighted in the literature and case studies as a major concern. This was confirmed by the results of the end-user survey with three end-user groups rating it as the top concern and one group as one of its top five concerns. Thus the perception that the sample population has with regard to how safe and secure an urban environment is, will directly influence its subjective assessment of the quality of such an environment.

Although legibility of the PTI for pedestrians was raised in the literature and case studies as a major factor, this could not be confirmed by the end-user surveys, mainly because a proper understanding of such concepts could not be expected from unsophisticated respondents.

An aspect that was confirmed by the surveys though, was the importance attached to shelter and ablution facilities. This is certainly highlighted in the literature and case studies as a precondition for positive public spaces.

A final concern shared by end-users, was the lack of maintenance and cleanliness of the PTI environment. Again literature and case studies confirmed this as a priority in a better performing PTI.

What might seem to be a surprising factor was that the lack of information was not rated very pertinent in the end-user survey, although this was seen as an important performance measure in the preceding chapters. This could possibly be attributed to the fact that many of the respondents happened to be regular commuters familiar with the surroundings.

A final comment with regard to the end-user survey is that the detailed findings (see appendix 3 for graphs representing Bellville PTI survey findings) concerning the particular PTIs have subsequently been referred to the individual PTI managers in the belief that the information would be of assistance in identifying priorities for remedial action.

PART C: SYNTHESIS

Part C represents a culmination of the total research project with performance measures proposed in chapter 7. These, it is argued, can drastically change the quality of existing PTIs from unsafe, unattractive and under-utilised urban environments to safe, accessible and multi-functional public spaces.

Chapter 8 is an overview of the research project, with summarised comments for each of the chapters in parts A and B. Further, future fields of research are suggested that can follow from this project and finally, the positive consequences and outcomes from this research endeavour, are presented.

CHAPTER 7

PROPOSED PERFORMANCE MEASURES

7.1 INTRODUCTION

This chapter seeks to summarise the preconditions uncovered in part B that are necessary in order for public transport interchanges to become positive urban living environments. The terms used to describe these preconditions were debated extensively, mainly because of the scope and differing nature of the elements that were uncovered. For this reason, terms such as issues and principles, performance measures, performance criteria, contextual informants and simply preconditions, were explored throughout the research project.

“Performance measures” seems at this stage of the research to be the most encompassing and relevant term and is henceforth used to refer to those elements that can contribute to better performing PTIs.

The performance measures presented in the following tables were gathered from three sources namely:

- The relevant administrative, legislative, policy and development guideline documentation,
- Historical and contemporary literature on urban and transport performance and
- National and international precedent studies.

Although the personal surveys to determine the end-user perspective (chapter 6) formed part of the section to determine performance measures, the resultant findings could not realistically be combined with the findings of chapters 3,4 and 5 mainly because of the lesser quality of the information gathered, as explained in the conclusion of chapter 6.

An attempt was made to present the findings in various formats including a matrix, though it was decided to present this in the form reflected in tables 7.2, 7.3 and 7.4 so as to also reflect the reference sources

Some duplication of the more universal performance measures, identified in the literature, inevitably occurs on the basis of their applying virtually to all instances, and these are presented in table 7.1. Note that these should not be seen as more important or relevant to PTIs and this is thus not an attempt to prioritise or to give preference to any of the performance measures.

Table 7.1 Universal performance measures identified by all three sources.

Movement and Access	<ul style="list-style-type: none"> • Safest, most direct routes and with the least obstacles, should be chosen as pedestrian paths. • The pedestrian environment should be well maintained and should include traffic calming measures, adequate lighting, seating, surfacing and weather protection.
Special Place Creation	<ul style="list-style-type: none"> • Social facilities and activities to facilitate community interaction should be incorporated in the PTI.
Economic Generation	<ul style="list-style-type: none"> • Formal and informal economic activities should be incorporated in the PTI to form an economic node. • Economic activities should be formally positioned along pedestrian paths.
Safety and Security	<ul style="list-style-type: none"> • Surveillance through internal positioning of PTI activities, surrounding buildings and land uses and the latest technology should be a priority to ensure safety and security. • Separate pedestrians and vehicles as far as possible. • PTIs should be multi-functional to ensure presence of people at different times of the day.
General	<ul style="list-style-type: none"> • Information should be readily available, and relevant. • Maintenance of all PTI elements directly influences the quality of the PTI and should be a priority. • PTIs should reflect the different activities people engage in such as transfer between modes, waiting, shopping and socialising.

7.2 CONTEXTUAL INFORMANTS ESSENTIAL FOR PUBLIC TRANSPORT INTERCHANGES TO BECOME POSITIVE URBAN LIVING ENVIRONMENTS

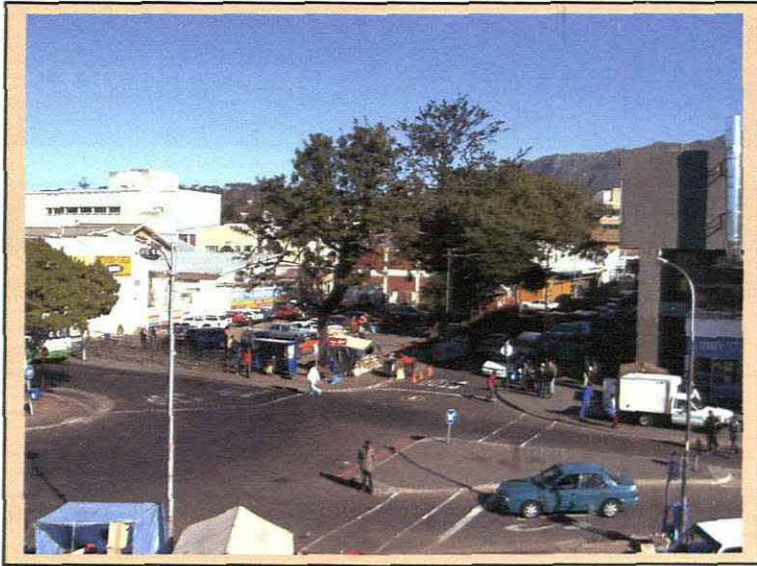
Table 7.2 represents the contextual informants deduced from the relevant literature and theory as investigated and presented in chapter 3. Table 7.3 is a representation of chapter 4, the non-spatial contextual informants and finally the findings of chapter 5, the case studies, are presented in table 7.4.

In summary, it seems that the kind of environment all the above sources are suggesting would have the following main characteristics:

- A safe, pedestrian-orientated and convenient environment where structural clarity (positioning of buildings, parking areas, informal traders and movement channels) can contribute to surveillance and the quality of legibility.
- A dynamic and inviting environment with high visual qualities and a special place sense. Any unique qualities such as views or history of the local area should be incorporated in the PTIs design. Emphasising the entrance and exist points can contribute to realising these characteristics.
- A cluster of diverse business and public functions, such as clinics, libraries, big business, shops, municipal offices and informal trading. This result in a complex urban entity, which offers a range of choices to users, which ensures people gravitate towards PTIs for reasons other than movement (Dewar *et al*, 1989: 9-11).

It has already been stated that properly designed PTIs should make a major contribution to the urban living environment of the city as a whole. The point should therefore once again be made in this conclusion that planners, urban designers and related professions need to constantly appraise or revisit the quality "urbanity" (Dewar *et al*, 1989), in whatever component of the city.

The following drawings illustrate possible improvements to Claremont PTI, as examples where, full economic and social potential can be realised towards a positive urban living environment.



- Integration between formal & informal businesses.
- Informal traders along pedestrian routes.
- Clear, visible space with limited obstructions.
- Signage and landscaping at PTI entrances.
- Pedestrian orientated environment with seating, overhead protection, sidewalks.



Figure 7.1 Proposed interventions to ensure a PTI becomes a positive urban living environment.

TABLE 7.2 CONTEXTUAL INFORMANTS FROM LITERATURE AND THEORY ON URBAN PERFORMANCE (CHAPTER 3).

SPHERES OF INFLUENCE	CONTEXTUAL INFORMANTS and/or	POSSIBLE PERFORMANCE MEASURES	
1. MOVEMENT AND ACCESS			
1.1 Motorised Environment	<ul style="list-style-type: none"> Alternative routes and transport modes should be available to users. Strong vehicular links are needed to ensure a permeable environment. Each mode of transport should have a specific and clear role in the transport system. 		
1.2 Non-Motorised (NM) Environment	<ul style="list-style-type: none"> The shortest and most direct routes should be provided as pedestrian paths to nearby facilities. All elements in the pedestrian environment should be at a human scale. Walkways and pedestrian crossings should be well maintained. A high quality pedestrian environment should include adequate lighting, seating, overhead protection, well-maintained surface cover and landscaping. 		
2. SPECIAL PLACE CREATION			
	<ul style="list-style-type: none"> PTIs should have some elements or characteristics to ensure its place quality. Provide public areas which facilitate different levels of human contact. The PTI functions as a social node. Public facilities should be located close to PTIs because of the latter's high accessibility. A welcoming and legible environment can contribute to social activities. Natural vegetation can be used for aesthetics, as protection from the natural elements and as a soft edge. Building architecture should reflect importance and its social, economic or cultural function. Surrounding building facades should be of a high quality. PTIs should facilitate community interaction. Variety of economic activities ensures a robust place. Informal traders and shopkeepers who exhibit their goods ensure a complex and rich environment. 		
3. ECONOMIC GENERATION			
	<ul style="list-style-type: none"> PTIs should function as an economic node in the city. The PTI is ideal for formal as well as informal development and investment opportunities because of its accessibility. Pedestrian channels initiate high intensity economic activities. 		

4. SAFETY AND SECURITY			
	<ul style="list-style-type: none"> • A sense of enclosure creates a safe and intimate public space. • A residential component can provide surveillance at the PTI, especially at inter-peak times. • A legible environment contributes to levels of safety. • Protection from the elements, safe structures and a well-lit space is needed for safety and security. • The PTI should have a legible structure and should be an extension of a legible city structure. 		
5. INFORMATION			
	<ul style="list-style-type: none"> • Safety procedures should be well advertised to PTI users. • The availability of information contribute to a PTI's legibility. 		
6. EMPOWERMENT			
	<ul style="list-style-type: none"> • PTIs can be seen as a social equaliser. • Vulnerable groups should have safe and affordable access. 		
7. GENERAL			
	<ul style="list-style-type: none"> • A variety in land uses attracts more people. • PTIs should provide for the full range of necessary, optional and social activities. • Levels of maintenance of a social space influence its quality. • Districts which are identifiable and functional contributes to the PTIs legibility. • Religious, some residential and recreational activities are incompatible with PTIs. • Surrounding buildings will affect the micro-climatic conditions and will influence the way in which the PTI is utilised. 		

4. SAFETY AND SECURITY			
	<ul style="list-style-type: none"> • A sense of enclosure creates a safe and intimate public space. • A residential component can provide surveillance at the PTI, especially at inter-peak times. • A legible environment contributes to levels of safety. • Protection from the elements, safe structures and a well-lit space is needed for safety and security. • The PTI should have a legible structure and should be an extension of a legible city structure. 		
5. INFORMATION			
	<ul style="list-style-type: none"> • Safety procedures should be well advertised to PTI users. • The availability of information contribute to a PTI's legibility. 		
6. EMPOWERMENT			
	<ul style="list-style-type: none"> • PTIs can be seen as a social equaliser. • Vulnerable groups should have safe and affordable access. 		
7. GENERAL			
	<ul style="list-style-type: none"> • A variety in land uses attracts more people. • PTIs should provide for the full range of necessary, optional and social activities. • Levels of maintenance of a social space influence its quality. • Districts which are identifiable and functional contributes to the PTIs legibility. • Religious, some residential and recreational activities are incompatible with PTIs. • Surrounding buildings will affect the micro-climatic conditions and will influence the way in which the PTI is utilised. 		

Table 7.3 CONTEXTUAL INFORMANTS FROM THE NON-SPATIAL ENVIRONMENT (CHAPTER 4).

SPHERES OF INFLUENCE	CONTEXTUAL INFORMANTS and/or POSSIBLE DESIGN CRITERIA	
1. MOVEMENT AND ACCESS		
1.1 Motorised Environment	<ul style="list-style-type: none"> • Ensure safe parking for private cars in very close proximity to the PTI. 	
1.2 Non-Motorised (NM) Environment	<ul style="list-style-type: none"> • Emphasis should be placed on walkways and cycle paths as important movement channels within the PTI precinct. • The quality of the NM environment is influenced to a large extent by the levels of weather protection. 	
	<ul style="list-style-type: none"> • Pedestrians should be able to move freely with limited restrictions and obstacles: <ul style="list-style-type: none"> • Limit conflict with vehicles by separating motorised and NM movement. • Make use of pedestrian crossings and traffic calming measures where motorised and NM modes share movement space. • Special signage for pedestrians and cyclists will inform and direct them and communicate to motorists that preference is given to NM modes. • The shortest and most direct routes should be identified within the PTI precinct and to the surrounding areas, to be walkways and cycle paths. • Ensure that walking surfaces are well-maintained and free of unnecessary obstacles. 	
	<ul style="list-style-type: none"> • Safe storage facilities (for shopping bags, cycle helmets etc.) can contribute to the comfort of NM movers. 	
2. SPECIAL PLACE CREATION		
	<ul style="list-style-type: none"> • PTIs should represent a cluster of social and economic facilities and should be seen as a potential Service Village, possibly housing retail outlets, informal vendors, café's and public services. 	
	<ul style="list-style-type: none"> • The unit to plan for at a PTI is the person. It is thus important that the environment should be at human scale. 	
	<ul style="list-style-type: none"> • In order for the PTI to be an attractive urban environment, it is essential that it is well maintained. 	
	<ul style="list-style-type: none"> • The availability of information and the ease with which a person (especially on foot) can orientate him/her self, contributes to the users understanding of the PTI environment. 	
	<ul style="list-style-type: none"> • Important facilities such as ticket office, information booth or boards and boarding areas should be visible from the entrance points to the PTI to ensure a legible environment. 	
3. ECONOMIC GENERATION		
	<ul style="list-style-type: none"> • Formal and informal commercial opportunities exist because of the constant flow of people at PTIs. 	
	<ul style="list-style-type: none"> • As PTIs are highly accessible, they have the potential to develop into economic nodes. 	
4. SAFETY AND SECURITY		
	<ul style="list-style-type: none"> • All structures in the PTI should be well-illuminated. 	
	<ul style="list-style-type: none"> • Safety officers should be visible. 	
	<ul style="list-style-type: none"> • As far as possible use the latest surveillance technology available and improve visibility by limiting obstacles in sightlines. 	

	<ul style="list-style-type: none"> • Emergency evacuation should be physically possible and relevant emergency actions should be clearly communicated to users.
	<ul style="list-style-type: none"> • A multi-functional PTI will be a safer environment, because people are attracted to it for various reasons at various times of the day and/or night.
	<ul style="list-style-type: none"> • Separation of various transport modes can contribute to safety at the PTI especially by having clear pedestrian routes.
	<ul style="list-style-type: none"> • Limit the number of subways in and around the PTI.
	<ul style="list-style-type: none"> • Public amenities such as toilets should be visible and well-maintained.
	<ul style="list-style-type: none"> • Land adjacent to PTIs should be used optimally, because of the safety risk vacant or unused land holds especially for pedestrians.
5. INFORMATION	
	<ul style="list-style-type: none"> • Staff should be available to assist passengers with real-time information.
	<ul style="list-style-type: none"> • Travel information should be comprehensive and readily available and can be available in different formats such as line diagrams, maps, timetables, electronic help points.
	<ul style="list-style-type: none"> • Signage should be easily understandable and comprehensive. Using pictograms and different colors can overcome language barriers.
6. EMPOWERMENT	
	<ul style="list-style-type: none"> • PTIs can provide a possible link between government and the people. People can be informed of important governmental issues, thus opportunity for communication as well as a place where governmental support services can be delivered.
7. GENERAL	
	<ul style="list-style-type: none"> • The PTI should be able to handle the number of passengers during peak periods both with regard to service levels and the physical environment such as adequate parking space, wide enough walkways.

Table 7.4 CONTEXTUAL INFORMANTS FROM CASE STUDIES (CHAPTER 5).

SPHERES OF INFLUENCE	CONTEXTUAL INFROMANTS and/or POSSIBLE DESIGN CRITERIA	
1. MOVEMENT AND ACCESS		
1.1 Motorised Environment		
1.2 Non-Motorised (NM) Environment	<ul style="list-style-type: none"> • The shortest and safest routes should be chosen as pedestrian paths. • Pedestrian paths should preferable follow existing desire lines. • Pedestrian and vehicular movement channels should be separate and clear signage should indicate this. • Pathways should be free of obstacles and obstructions to ensure the least inconvenience and congestion. • A high quality pedestrian environment and the close proximity of different modes will simplify transfer between modes. • Linkages between the PTI and its surrounding environment can be enforced by retaining existing pedestrian movement channels. 	
2. SPECIAL PLACE CREATION		
	<ul style="list-style-type: none"> • The ambiance of a space is improved if it is kept clean and well-maintained. • The quality of waiting facilities will directly influence people's experience of the PTI. The following should be element of the waiting areas: <ul style="list-style-type: none"> • Proper and comfortable seating • Public phones • Weather protection • Real-time information • Public toilets • Clocks 	
3. ECONOMIC GENERATION		
	<ul style="list-style-type: none"> • Informal traders, if positioned and managed correctly, can be a major asset to the PTI. • Informal traders/market buildings should be positioned on the periphery of the PTI to capture surrounding customers who do not make use of the PTI as such. • Make the PTI more legible by formalising informal traders. 	
4. SAFETY AND SECURITY		
	<ul style="list-style-type: none"> • Reduce inconvenience and uncertainty at PTIs to achieve a safer environment. • Pedestrians and vehicles should be segregated. • Surveillance can contribute to a safer public environment. The sensitive positioning of waiting areas, management offices, and information points can contribute to people seeing other people and being seen. 	

	<ul style="list-style-type: none"> • The latest technology should be used, where cost-effective, to control numbers of people at entrance and exit points.
	<ul style="list-style-type: none"> • Level platforms for embarking and disembarking and tube station elevators enable disabled people, the elderly and parents with children to make extensive use of public transport.
5. INFORMATION	
	<ul style="list-style-type: none"> • The availability and quality of information directly influence user's experience of the PTI.
	<ul style="list-style-type: none"> • Information can be made available by means of: <ul style="list-style-type: none"> • Real-time electronic displays • Public address system • Up-to-date maps showing routes and modes operating these routes
6. EMPOWERMENT	
	<ul style="list-style-type: none"> • PTIs can be used to reach citizens by having satellite offices of the city administration at the PTI. Public administrative functions and services can thus be brought to the people.
	<ul style="list-style-type: none"> • The PTI should be planned and designed to accommodate the disabled, elderly and parents with children.
7. GENERAL	
	<ul style="list-style-type: none"> • PTIs should reflect the different activities people engage in such as transfer between modes, waiting and other activities for instance shopping.
	<ul style="list-style-type: none"> • If users of a PTI have a specific need, such as a public bath-house, incorporate it in the design of the PTI.
	<ul style="list-style-type: none"> • Partnerships and cooperation between private and public sector role players are important from an administrative point of view.

7.3 CONCLUSION

The identified performance measures, it is suggested, can be applied at two separate levels, depending on whether the relevant PTI is an existing one or a newly planned one.

They could in other words firstly be used as an evaluating tool for existing PTIs in the beginning stages of upgrade projects. CSIR: Transportek suggested, "...if public transport interchanges are to play an invaluable role in encouraging the use of public transport, the need to provide well designed interchange facilities is paramount" (1999: 36), and the only way to determine whether PTIs are well designed would be to make use of performance measures such as the ones identified and suggested in this chapter.

The performance measures can further be used at the outset of a new PTI development project to assist in prioritising those fundamental elements that should be seen as principle to ensure that the PTI performs to its optimal potential as an urban space facilitating movement, social and economic activities.

It is thus argued that the different contextual informants or performance measures presented here can contribute to a significant extent to realise the full potential of PTIs, existing or new.

CHAPTER 8

SUMMARY AND CONCLUSION

8.1 INTRODUCTION

This final chapter is intended to revisit parts A and B of this thesis with special emphasis on Chapter 1, which introduced the research problems and its setting.

The second part of this chapter deals with suggestions for future research projects and gives an overview of the research activities and outputs emanating in the course of this study.

8.1.1 Part A Synopsis

Comments with regard to Public Transport and the Role of PTIs

It has been stated repeatedly that the functions of PTIs go beyond mere transport operations. Secondly, properly performing PTIs are essential components of successful public transport systems and indeed of optimally performing cities in terms of providing vibrant living environments, which goes beyond mere functionality.

There are serious problems confronting public transport systems in South Africa, which, though not being the thrust of this thesis, could to a significant extent be addressed in the proper planning of PTIs. In this regard every PTI should fulfil the function of a gateway in three senses: firstly it constitutes an entry point to the public transport system, secondly it provides access to the wider city and all that it has to offer, and thirdly offers a point of entry to the particular local area to visitors from elsewhere in the city.

Comments with regard to the Research Questions and Objectives

The question of what constitutes a positive urban living environment has now been explored in terms of general theories relating to planning and urban design. With the benefit of hindsight, it is contended that the first research question (what a positive urban living environment in the context of PTIs constitutes) has been rigorously addressed in the theories explored in chapter three.

The comprehensive performance measures have been determined with reference to four sources namely historical and contemporary literature and theory on urban performance, the relevant administrative and legislative context, national and international precedent studies and to a lesser extent* (for reasons mentioned), public opinion through a series of personal surveys. This then answers the second research question, namely what the relevant performance measures are.

The contention has now progressed to a sense of conviction on the basis of this evidence, that the identified performance measures would distinctly raise the probability that PTIs will achieve their full spatial, economic and social potential. The primary objective of the research project, as stated under "Objectives of the Study", has thus been realised.

It also seems apparent that the methodology chosen was relevant in that findings were arrived at with a more than satisfactory degree of confidence, though further detailed investigation and analysis is suggested for the end-user perspective.

8.1.2 Part B Synopsis

Chapter 3 highlights two classes of theories of importance to this study, namely theories from urban design and theories from urban transportation. These theories have been found to be readily translatable to the PTI context, which clearly suggests their relevance to PTIs. The lessons learned from the theoretical context were, as was expected, invaluable in giving clear guidance to the study that followed.

Chapter 4, the non-spatial framework, sets out to uncover what, from an institutional, legislative and policy perspective is in place and what is seemingly absent. The institutional constraints to an efficient public transport system in which PTIs can operate, is highlighted in the introduction and concluding comments to this chapter.

Chapter 5, Case Studies as Precedents, confirms that the performance measures identified under the three spheres of influence are universal and therefore equally applicable to the international as the South African context.

The end-user survey, described in Chapter 6, presents a further attempt to, as far as possible, identify some of the tangible performance measures that are important.

Finally and most importantly, Part B confirms the relevance and importance of the three spheres of influence as suggested in chapter 1 and that PTIs have the potential to develop and be improved to become positive urban living environments.

8.2 FUTURE RESEARCH TOPICS

As should be the case with any research project of this nature and extent, many new questions arose, and the following future research topics seem to suggest themselves. Some of them would possibly require less extensive study in being confined to more specific issues.

- An in-depth understanding of PTIs within their surrounding urban environments which might include factors such as the transport modes that serve a particular PTI and how the modes link with each other and with the surrounding transport routes, identifying the travel patterns of passengers and commuters, their volumes and their profile

- Investigate the relevance of indicator-based evaluation for PTIs by using the suggested performance measures. These categories into which the performance measures are disaggregated can then be developed as refinements and then possibly tested for their relevance and usefulness.

Traditionally, transport-related performance measures or indicators are divided into the following:

Customer service performance indicators such as travel times, travel cost, mode of travel by trip purpose and,

Operational system performance providing information on transport infrastructure, extent of bus, rail and taxi services and their utilisation (City of Johannesburg, 2003: 14-15).

The above measures do not fall in the ambit of this research project, in addressing deficiencies with regard to evaluating PTIs as all-encompassing public spaces. This is clearly a topic for separate study.

- Examine transport-related public spaces, such as PTIs, parking areas, road-space, pedestrian movement channels, in terms of their potential role and function in the local and wider urban context.

8.3 RESEARCH RELATED OUTPUTS AND ACTIVITIES

Funding for the following research activities and outputs was secured from the National Research Foundation, The Southern Transport Centre of Development (National Department of Transport) and the Cape Technikon.

8.3.1 Courses Attended

- Research Methodology (Prof Crombe. UCT, 2002),

- Urban Transit Modes (Prof V Vuchic from the University of Pennsylvania, USA and Prof CJ Bester, at the University of Stellenbosch, 2003).
- NRF proposal writing workshop (2003).

8.3.2 Conference and Poster Papers

- **Planning Students Congress**, University of Natal, Durban (September 2002). The researcher and three B.Tech students deliver two papers and one poster paper.
- **The Annual Technology Conference**, Cape Technikon, Cape Town (October 2002, 2003, 2004). Researcher delivered a paper at each of these events. Co-authored two further papers at the 2003 and one at the 2004 conferences.
- **Southern Transport Centre of Development Symposium**, Peninsula Technikon (2002) and University of Stellenbosch (2003). The researcher delivered a paper at each of these events.
- **The South African Transport Conference**, CSIR Conference Centre, Pretoria (July 2003, 2004). This is a refereed conference and the researcher delivered the following papers: "Multi-modal public transport interchanges as contributors to a positive urban living environment" and "Normative surveys to determine end-user perceptions of public transport interchanges". The researcher co-authored two further papers at the 2004 conference.
- **Research Expo**, Cape Technikon, Cape Town (2003). Designed two poster papers and further co-authored two poster papers for this event.
- **Sustainable Planning and Development**, Bologna, Italy (September 2005). Paper title: "Can public transport interchanges be positive urban environments in the Developing World?" Abstract has been accepted.

8.3.3 Contributions to Departmental Research Endeavours

- Introduction of formal research procedures and methodology course at fourth-year level.
- Research capacity was developed within the department by awarding eight third-year student bursaries, five fourth-year student assistant positions and two masters' bursaries.
- Introduction of departmental research awards to acknowledge the research activities students were involved in and to motivate students to continue with postgraduate studies (2003, 2004).

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APPENDIX 1

Preliminary Observations Checklist

PTI	Significance	Safe/Unsafe environment	Three PT modes within PTI precinct	Mixed land use Informal traders=I, Residential=R1, R2, O1, O2, Offices=O1, Other=O2	Income levels	General observations
Athlone	Sub-metro	Unsafe	No	Yes I, R1, R2, O1, O2	Low to middle	Very congested, conflict between pedestrians and vehicles.
Bellville	Metro	Safe	Yes	Yes I, R1, R2, O1, O2	Low to middle	Large number of private vehicle parking available.
Cape Town	Metro	Safe except minibus-taxi rank	Yes	Yes I, C, O, O2	Not applicable	PT modes do not share the same operating space, differing levels of informal trading intensity by the three PT modes.
Claremont	Sub-metro	Safe	Yes	Yes I, R1, R2, O1, O2	Low, middle and high	Metropolitan shopping node, limited manoeuvrability negatively influences the functioning of the PTI.
Langa	Local	Unsafe	No	Low intensity	Low to middle	Concentration of long distance busses and minibus-taxis.
Mitchell's Plain	Metro	Unsafe	No	Yes I, R1, R2, O1, O2	Low	Public facilities clustered around PTI.
Mowbray	Sub-metro	Safe	Yes	Low intensity	Low to middle	Situated on the Main road Mature Activity Corridor
Parow	Sub-metro	Safe	Yes	Yes I, R1, R2, O1, O2	Low to middle	Light industries and varying residential densities around PTI. Many vagrants on the Connaught Rd side.
Philippi	Local	Unsafe	No	Yes I, R1	Low	Informal residential as part of the PTI precinct.
Potsdam	Local	Safe	No	No	Low	Purely public transport function.
Wynberg	Metro	Safe on the Mosques side, unsafe on Magistrates Court side.	Yes	Yes I, R1, R2, O1, O2	Low to middle	Mosque and Magistrates court as part of PTI precinct

APPENDIX 2

End-user Questionnaires

HOW DO PASSENGERS EXPERIENCE PUBLIC TRANSPORT INTERCHANGES?

An interchange includes the following: Train Station, Bus Terminus, Mini-bus Taxi Rank, Station Complex, Shops and buildings within a one street block radius.

GENDER	RACE	AGE	MODE
Male <input type="checkbox"/>	White <input type="checkbox"/>	0 - 25 years <input type="checkbox"/>	Train <input type="checkbox"/>
Female <input type="checkbox"/>	Black <input type="checkbox"/>	26 - 50 years <input type="checkbox"/>	Bus <input type="checkbox"/>
	Coloured <input type="checkbox"/>	51 and older <input type="checkbox"/>	Taxi <input type="checkbox"/>

INTERCHANGE:

DATE:

TIME:

	QUESTIONS	YES	OKAY / SOMETIMES	NO
--	-----------	-----	------------------	----

1	What is the purpose of your trip (E.g. work, school, shopping, etc.)			
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2	Safety and Security			
2.1	Do you feel safe when:			
	(a) Buying something from the informal traders?			
	(b) Buying from the shops adjacent to the interchange?			
	(c) Walking around?			
	(d) Crossing the road?			
2.2	Have you ever been robbed at the interchange?			
2.3	Are there: (a) Visible policing / security officers at the interchange?			
	(b) Are they effective?			

3	Interchange Facilities			
3.1	Do you know which facilities are available at the interchange? E.g. Toilets, police, ticket offices, information booth.			
3.2	Is the interchange user-friendly for vulnerable groups of people? E.g. Aged, Women, Children, Disabled.			
3.3	Are the following satisfactory in the interchange?			
	(a) Ablution blocks / Toilets			
	(b) Lighting			
	(c) Seating			
	(d) Shelters			
	(e) General Cleanliness			

4	Pedestrian Environment			
4.1	Do you feel that there is enough walking space? E.g. Is the pavement wide enough to walk on.			
4.2	Do the Informal Traders restrict your movements?			
4.3	When walking do you frequently come across any of the following: Puddles, potholes, slippery surfaces etc.?			

5	General			
5.1	Do you use the interchange for:			
	(a) Commuting only			
	(b) Waiting for trains, taxi's or buses			
	(c) Buying goods from Formal Shops at the PTI			
	(d) Buying goods from Informal Traders at the PTI			
5.2	Is there anything that you would like to change at the interchange?			

Comments

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APPENDIX 3

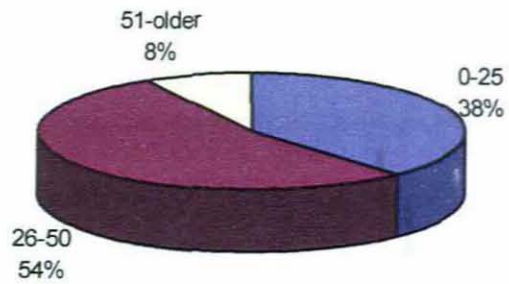
Detailed End-user Survey Results

BELLVILLE PTI

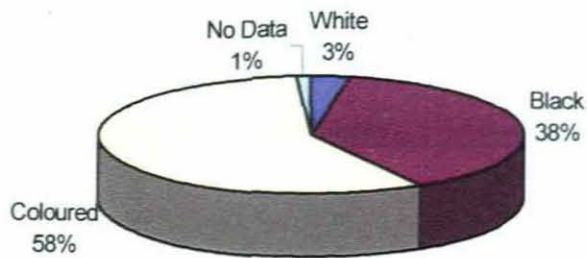
1. PASSENGERS

1.1 Demographic Information

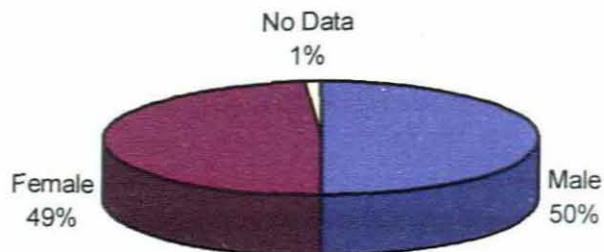
Bellville Overall Age Split

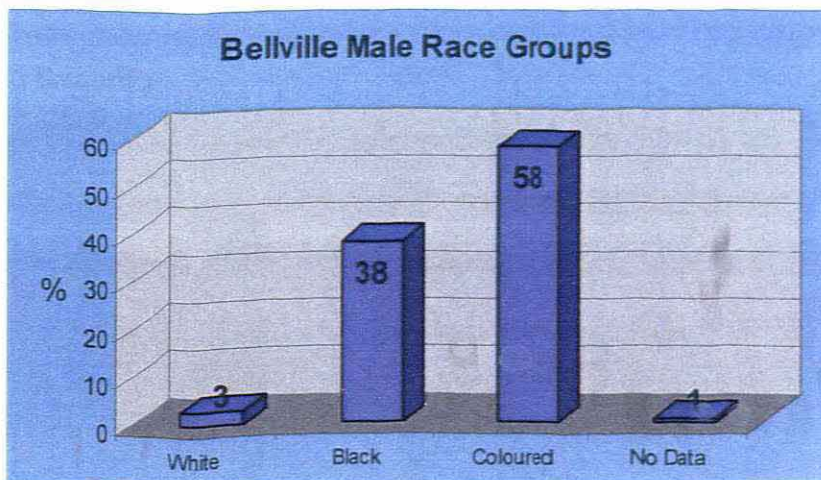
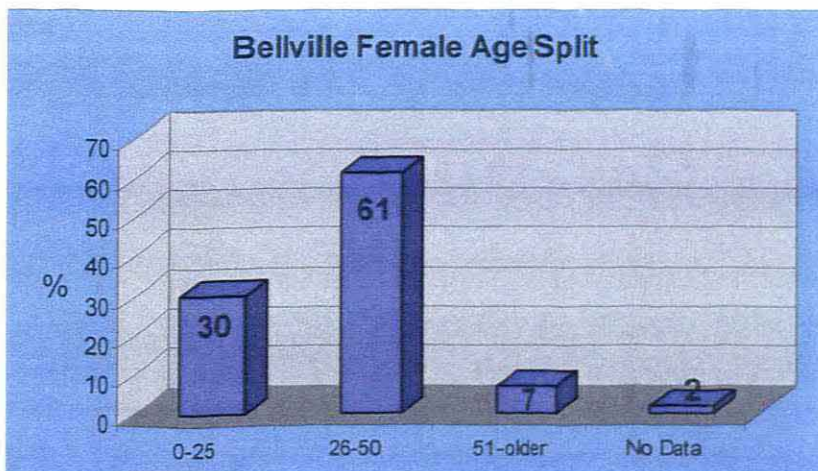
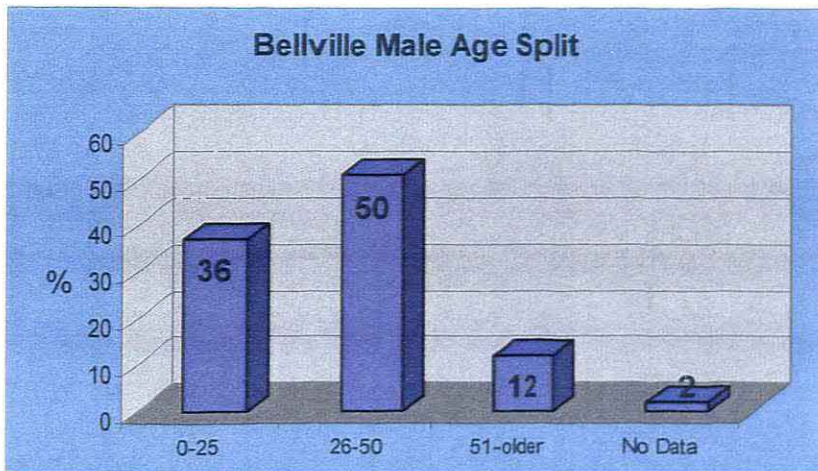


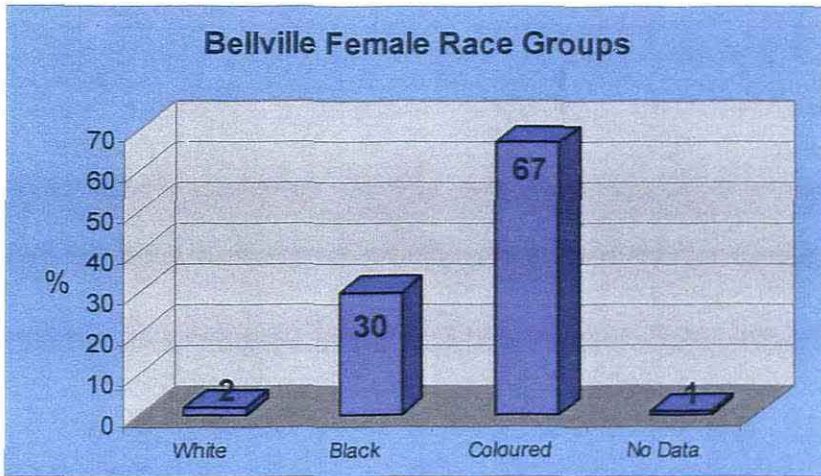
Bellville Overall Race Split



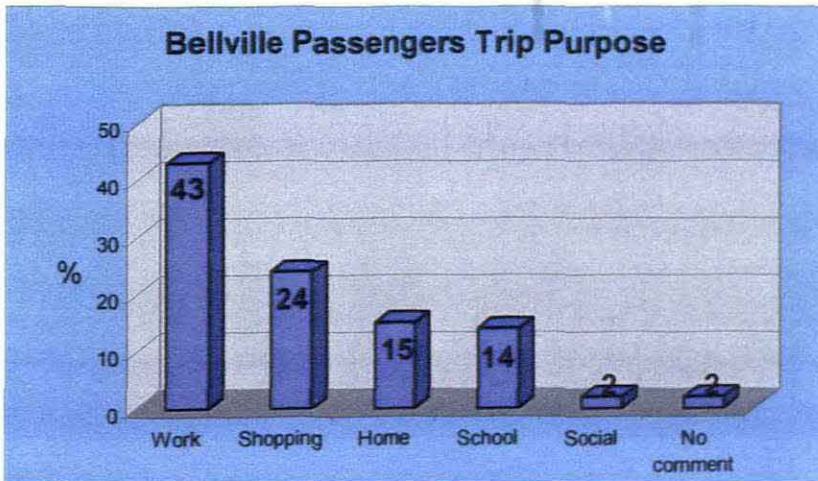
Bellville Overall Gender Split



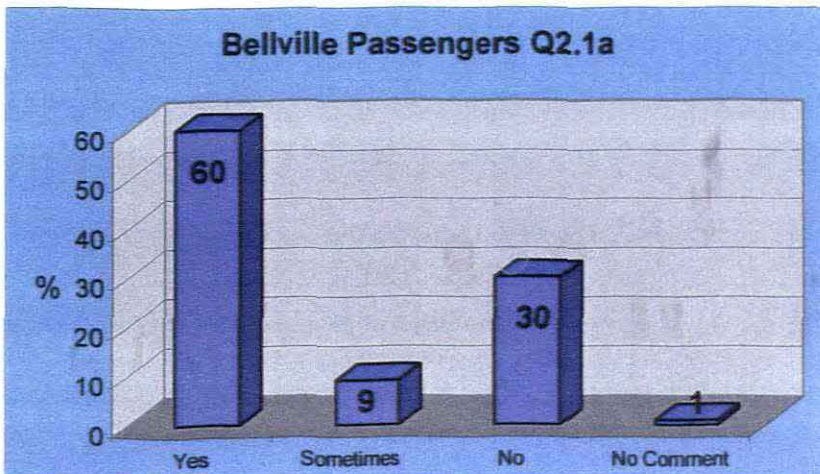


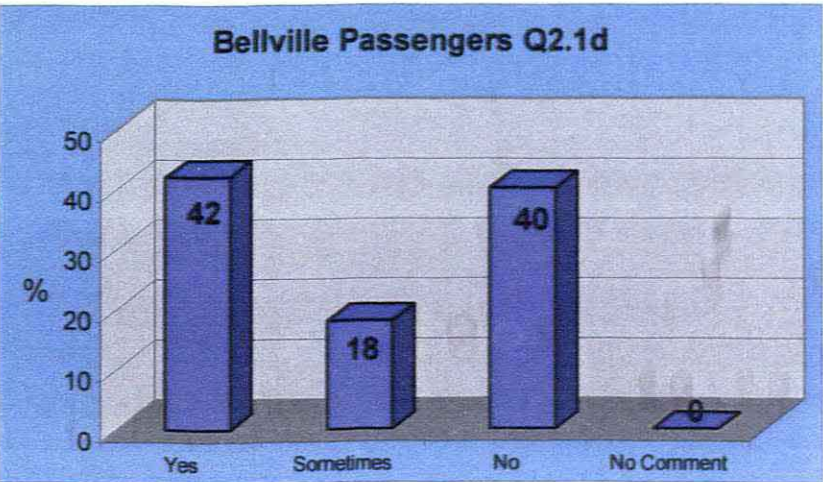
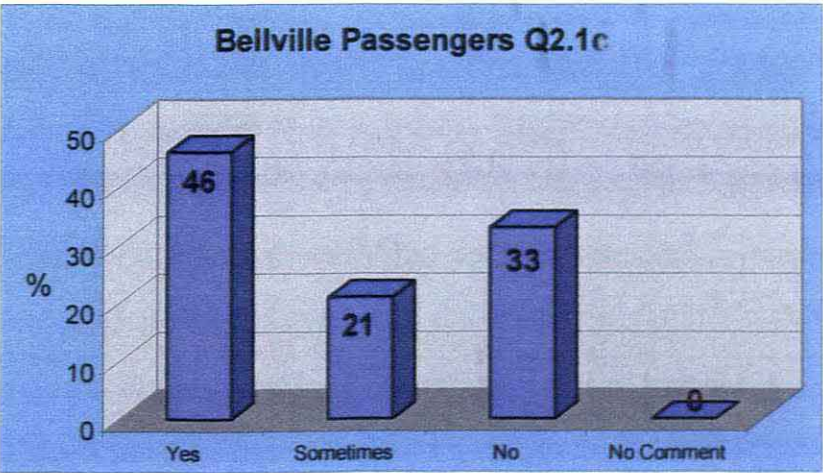
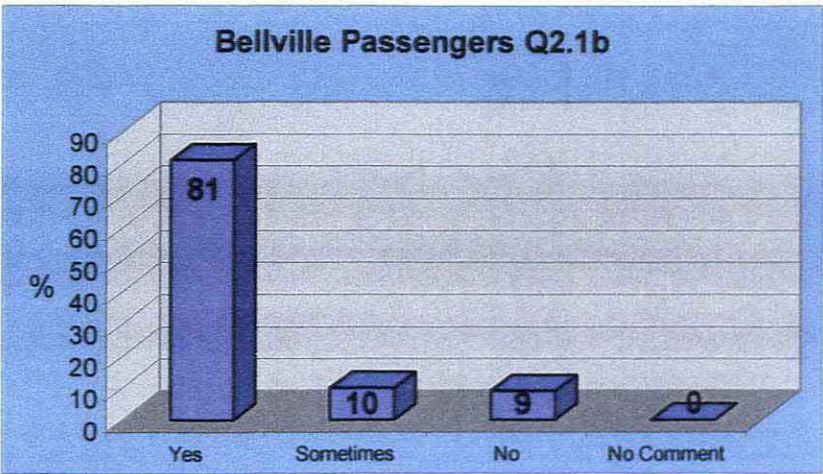


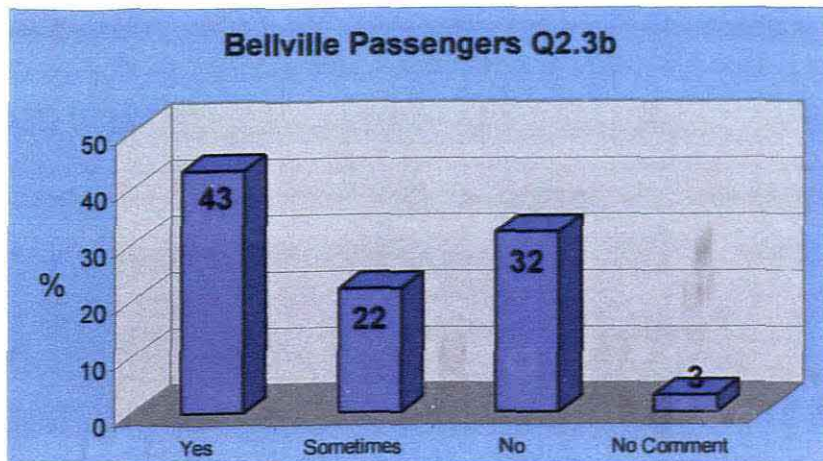
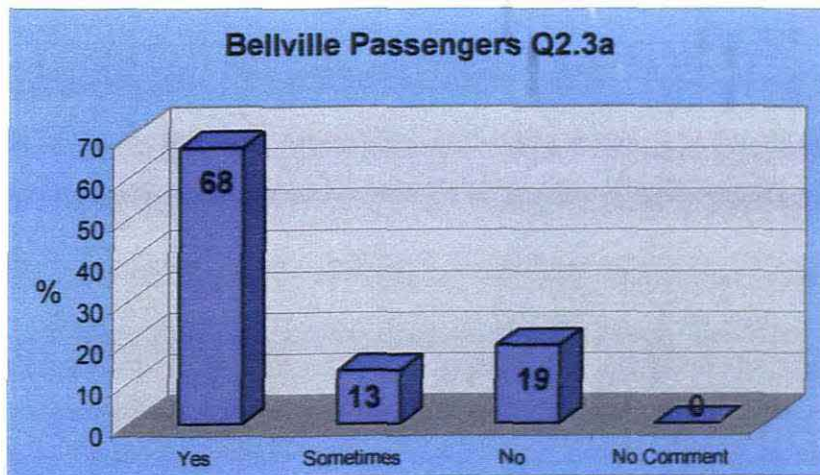
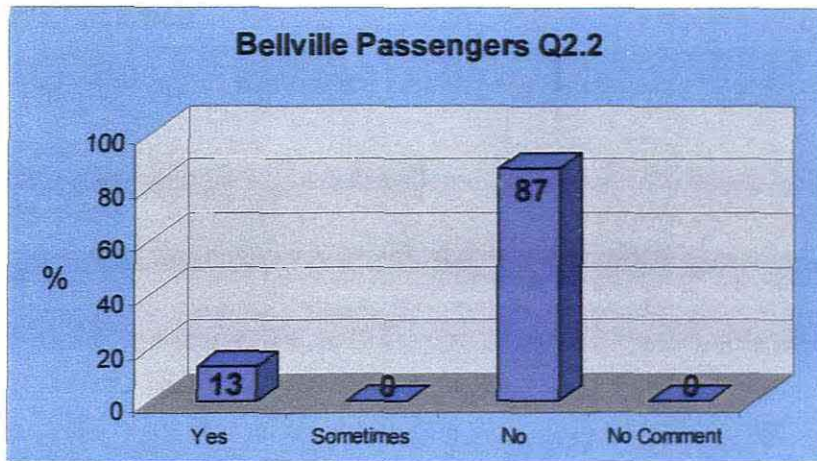
1.2 Trip Purpose



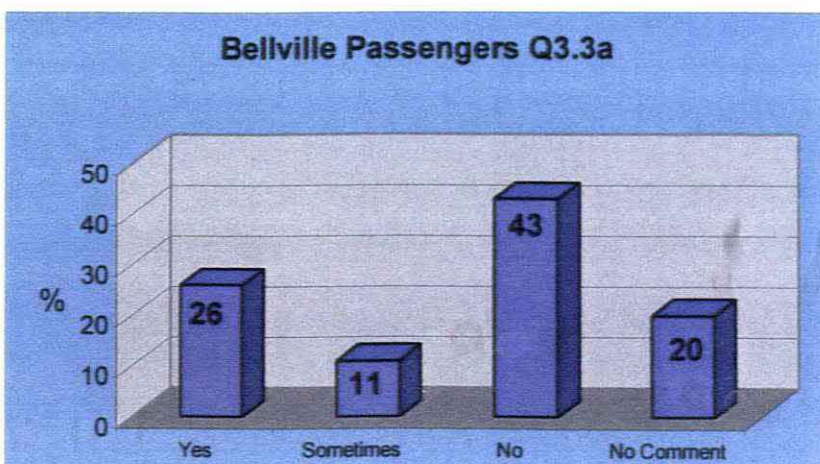
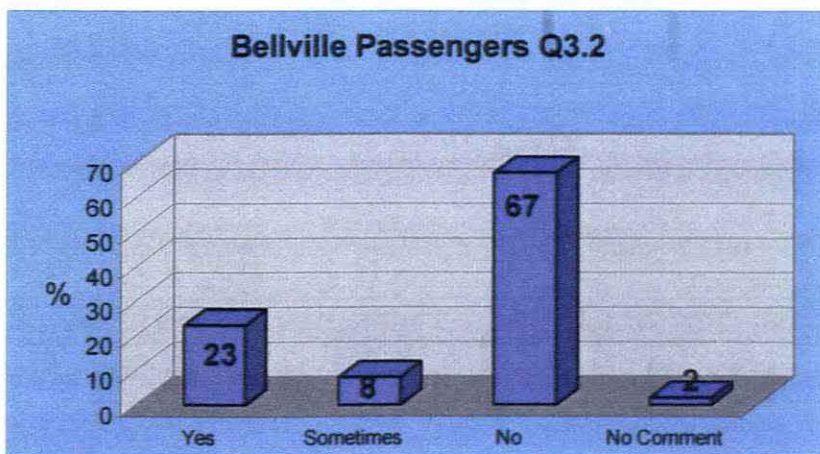
1.3 Safety and Security

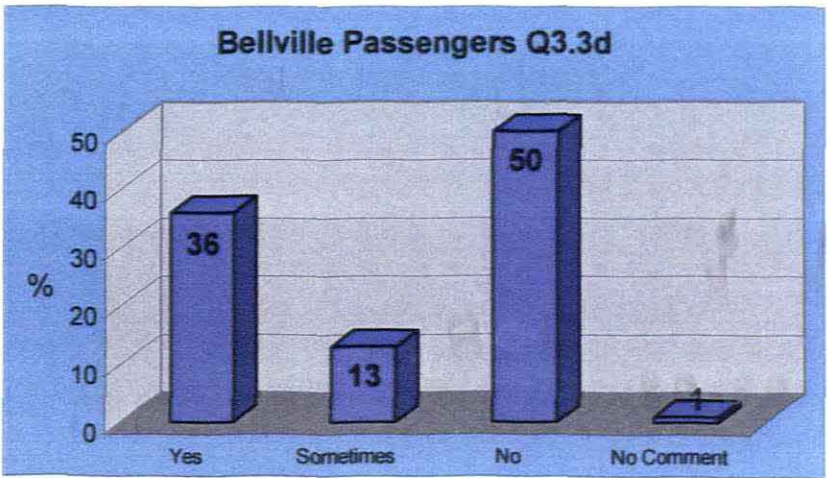
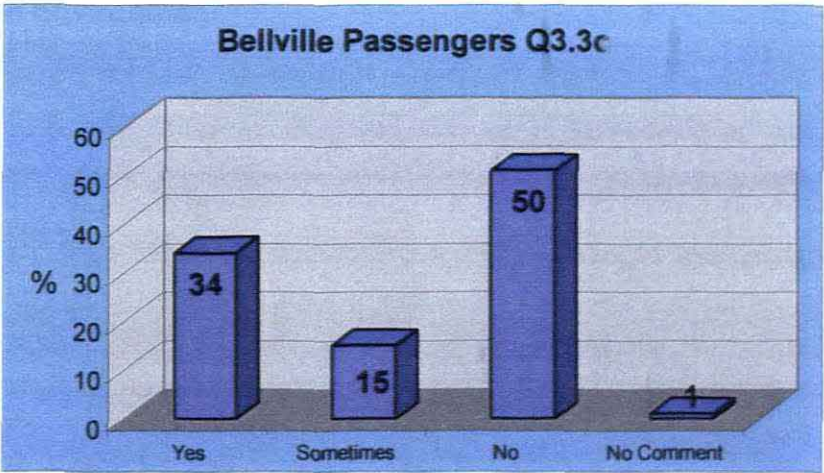
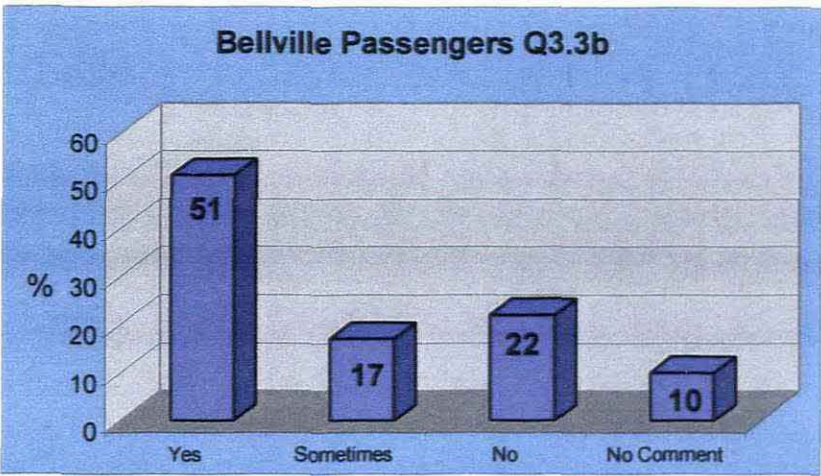


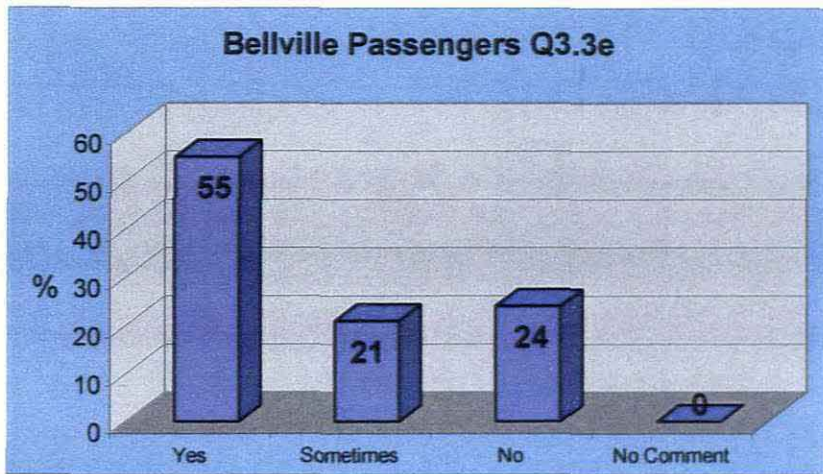




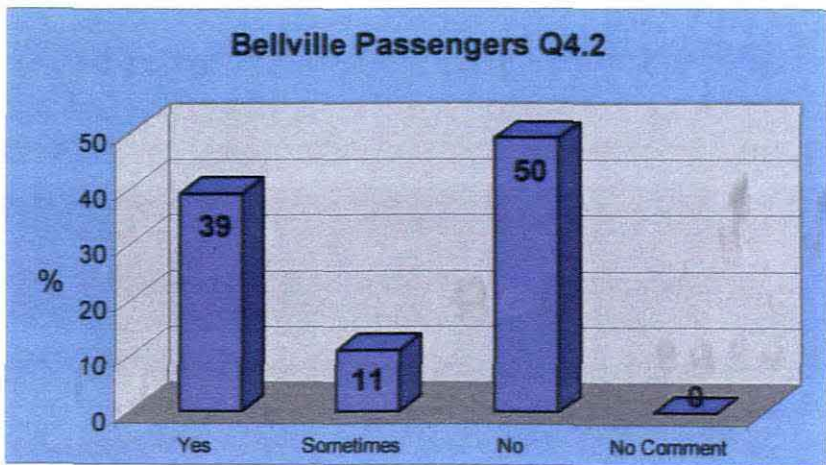
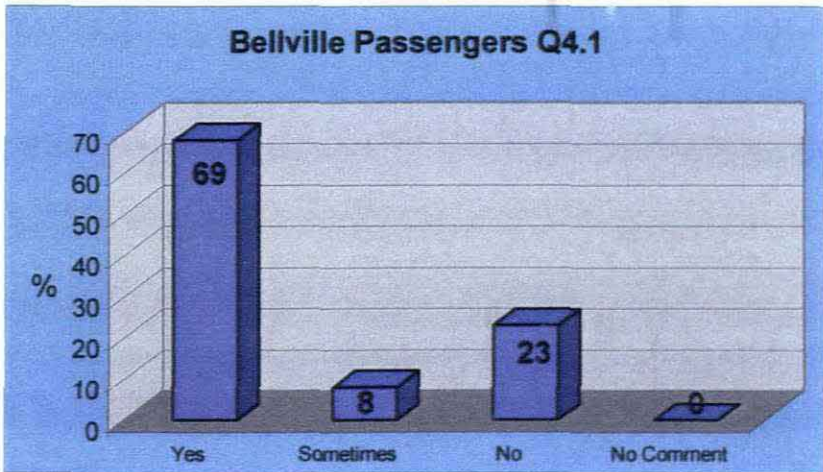
1.4 Interchange Facilities

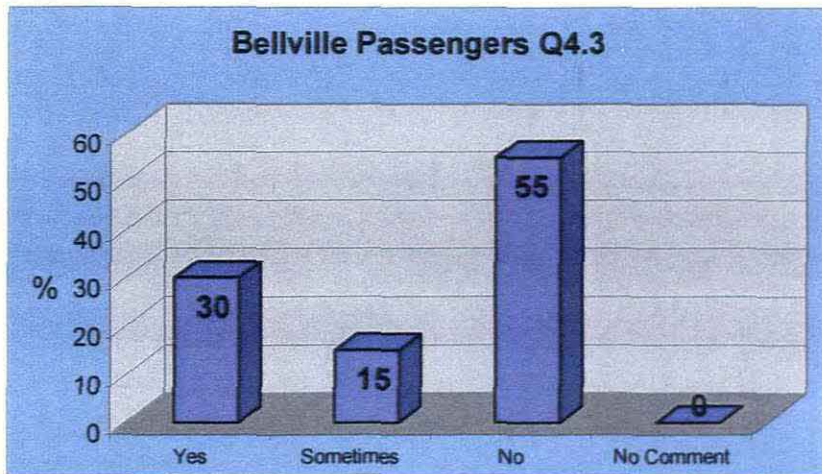




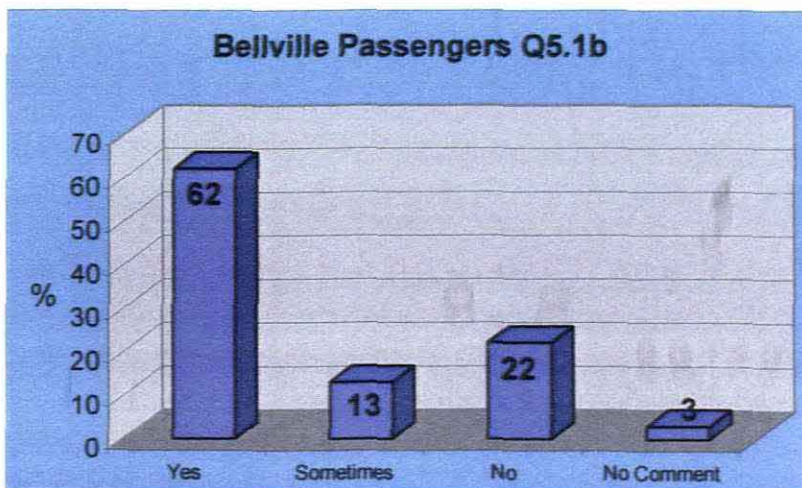
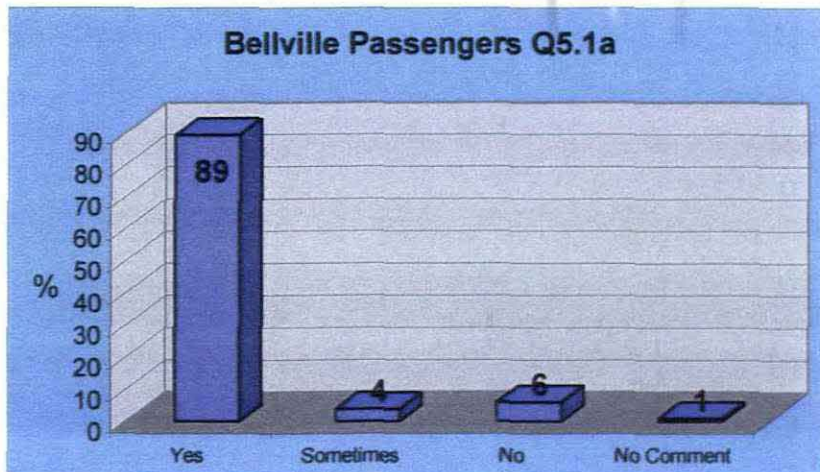


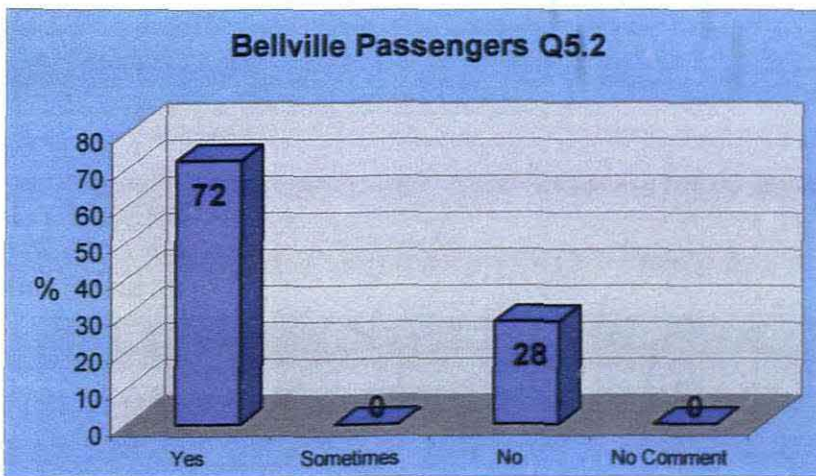
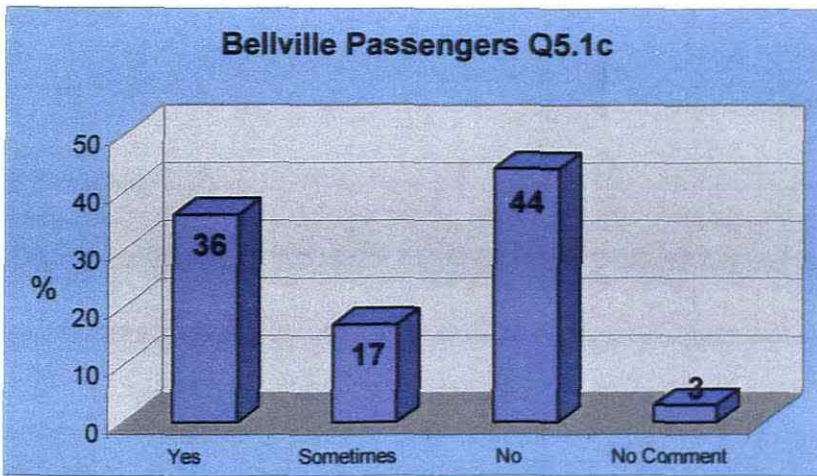
1.5 Pedestrian Environment



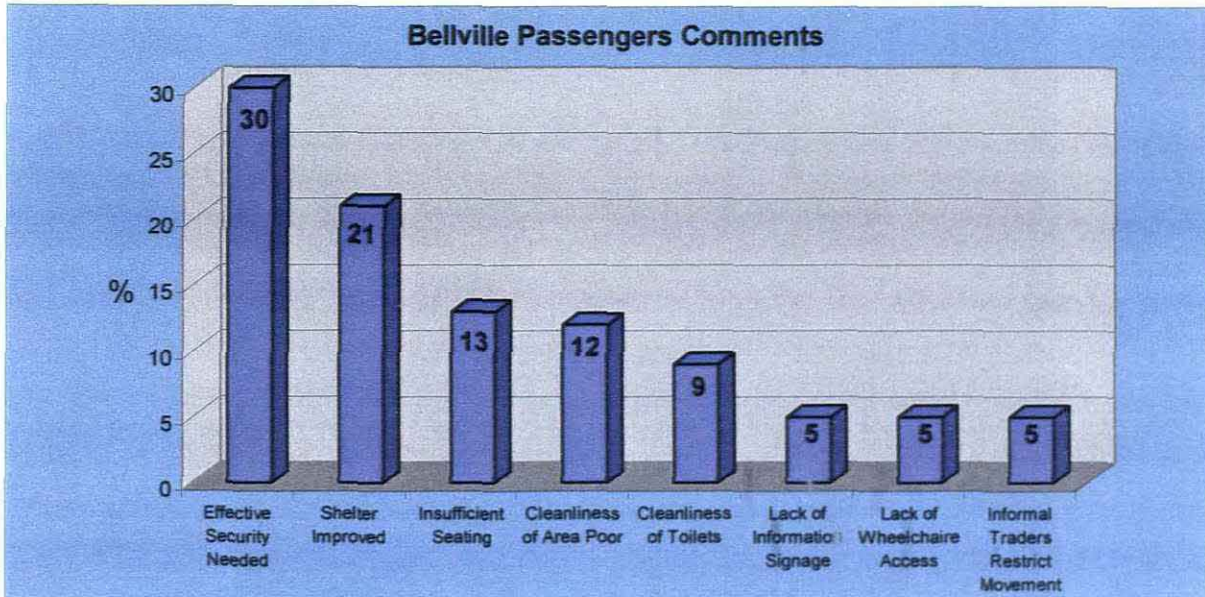


1.6 General



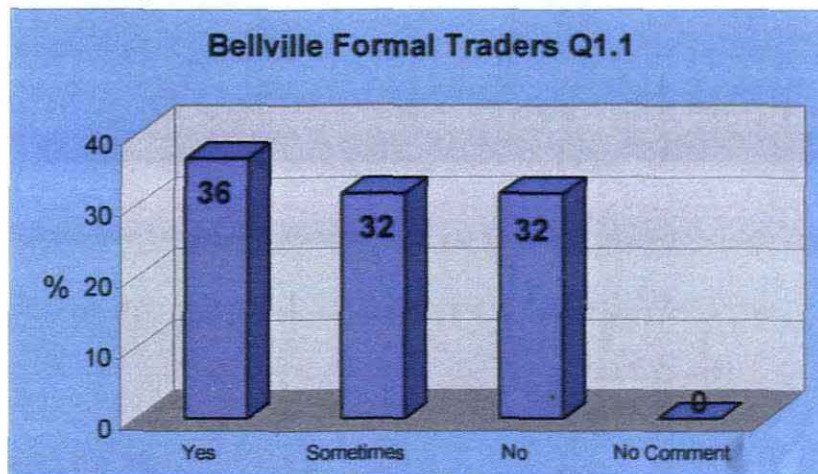


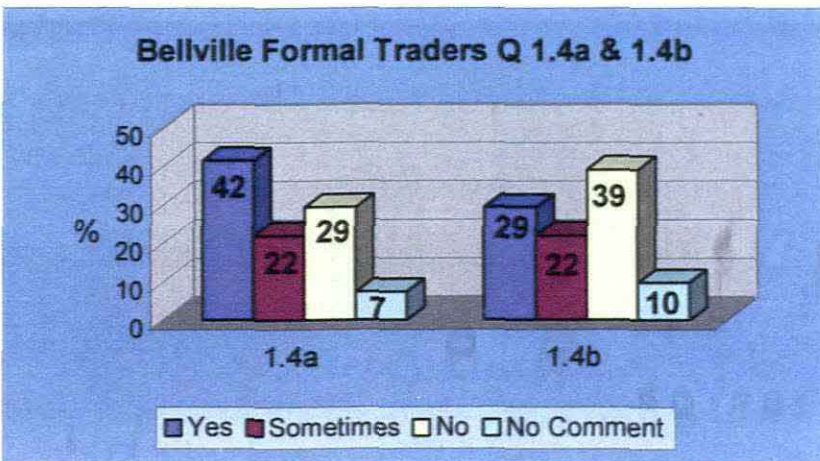
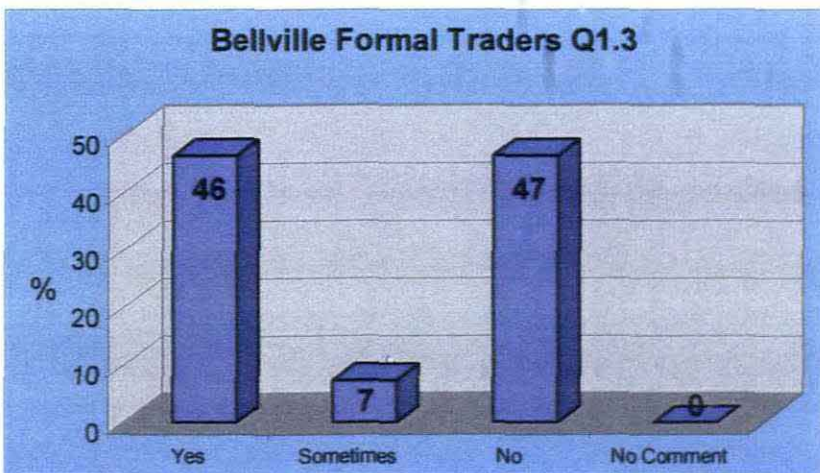
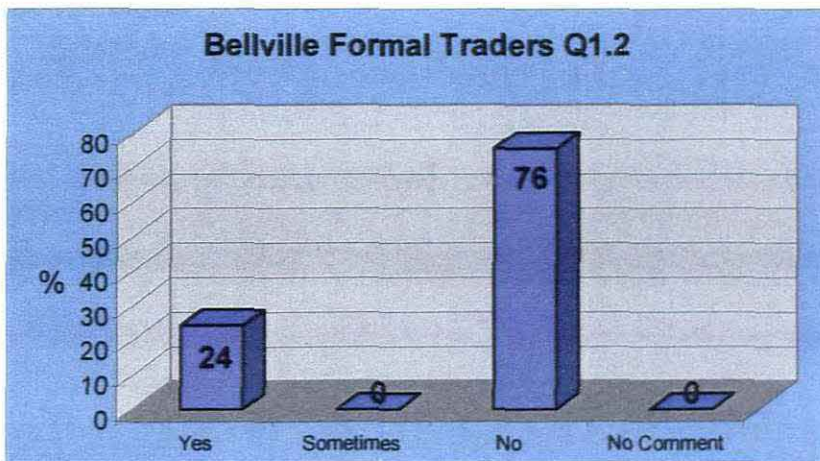
1.7 Main Concerns



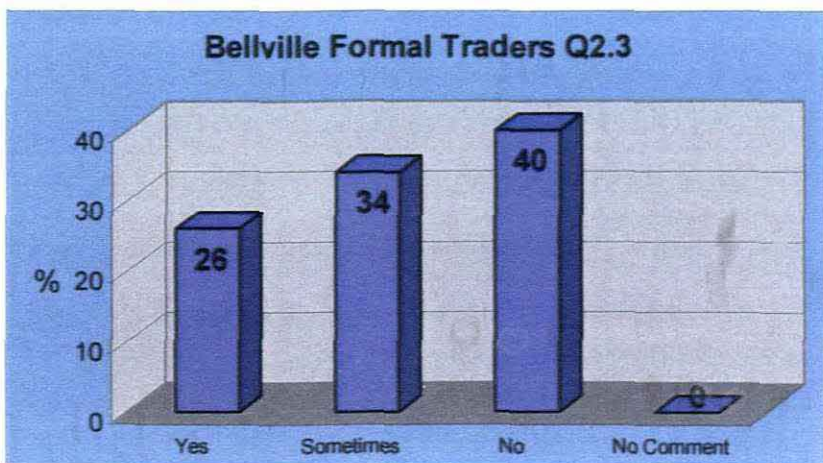
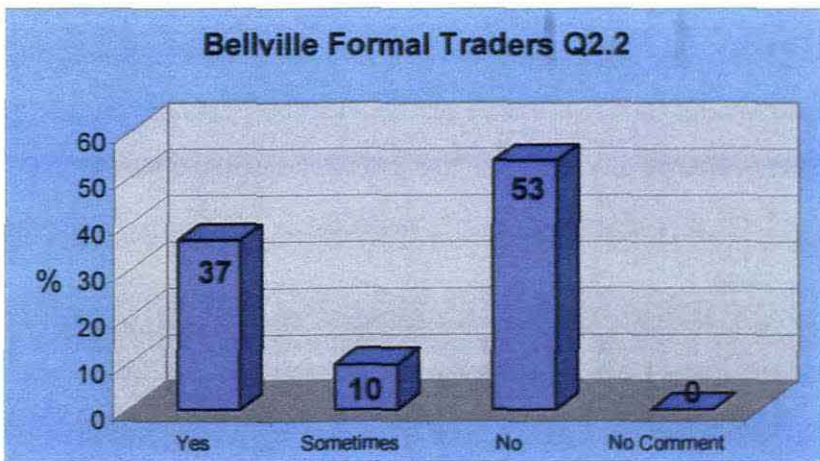
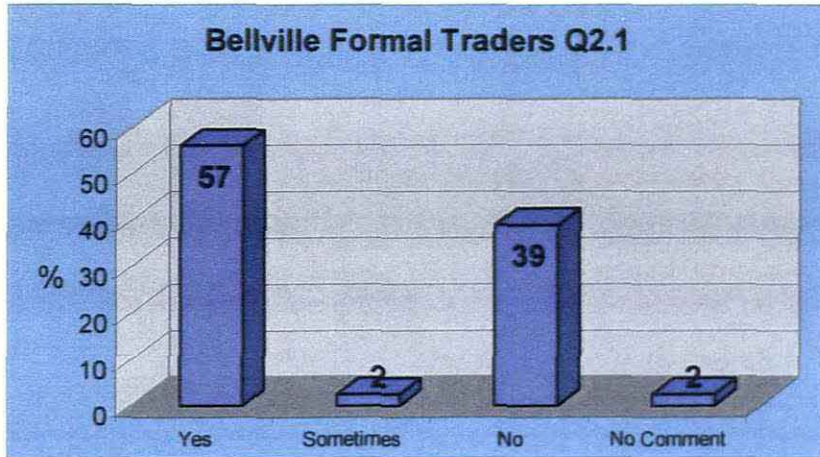
2. FORMAL TRADERS

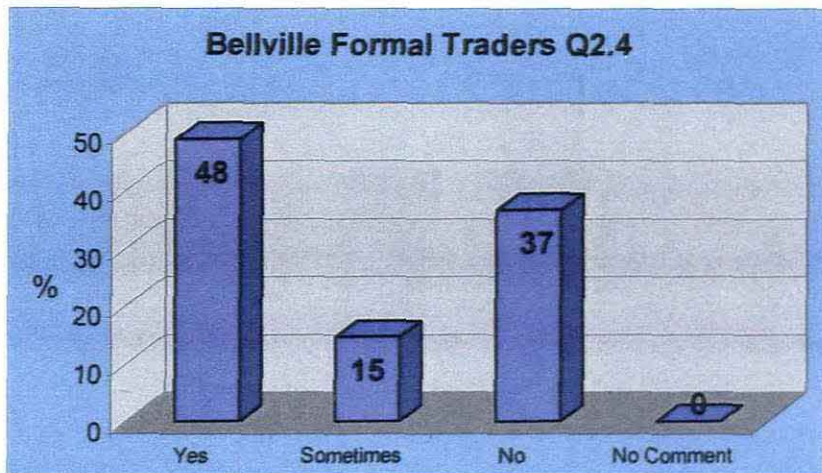
2.1 Safety and Security



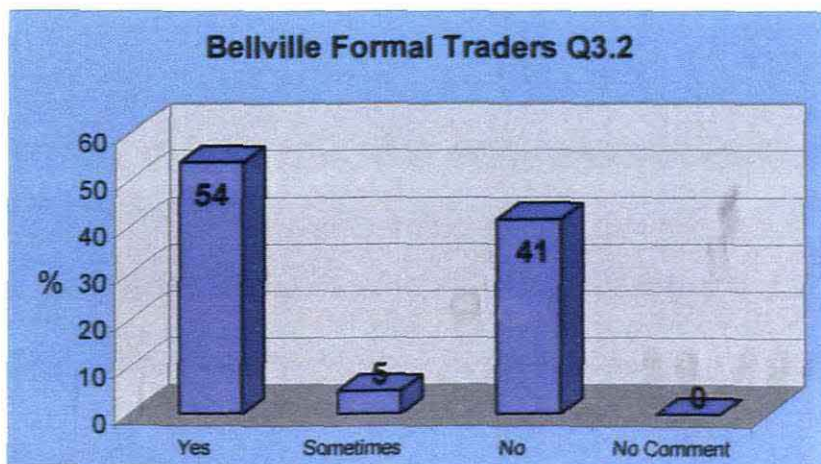
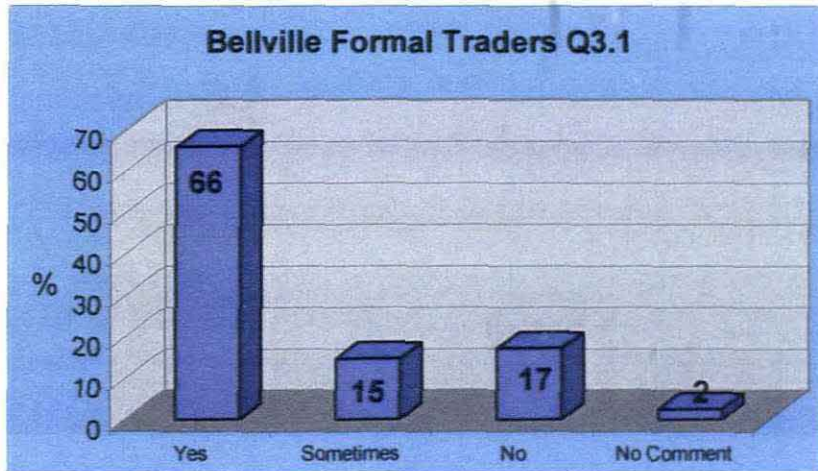


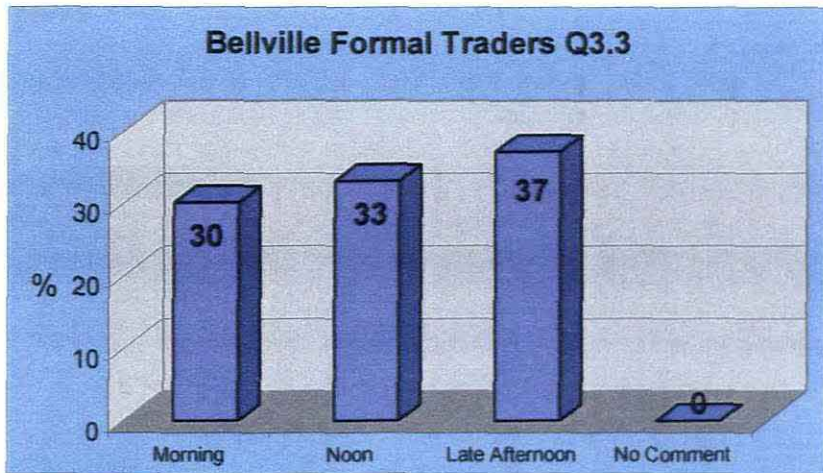
2.2 Interchange Facilities



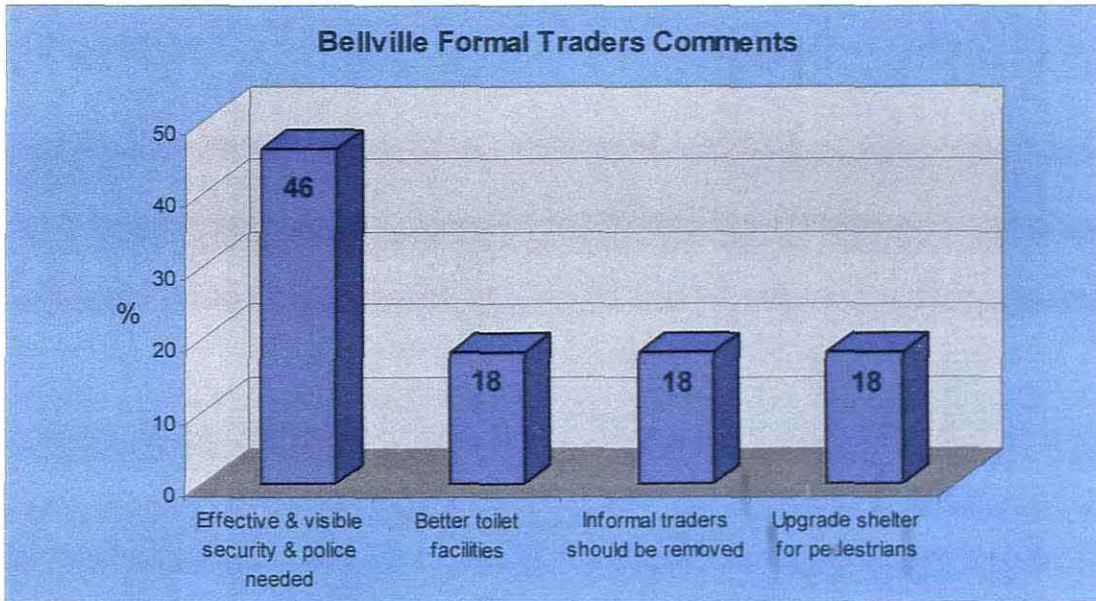


2.3 General



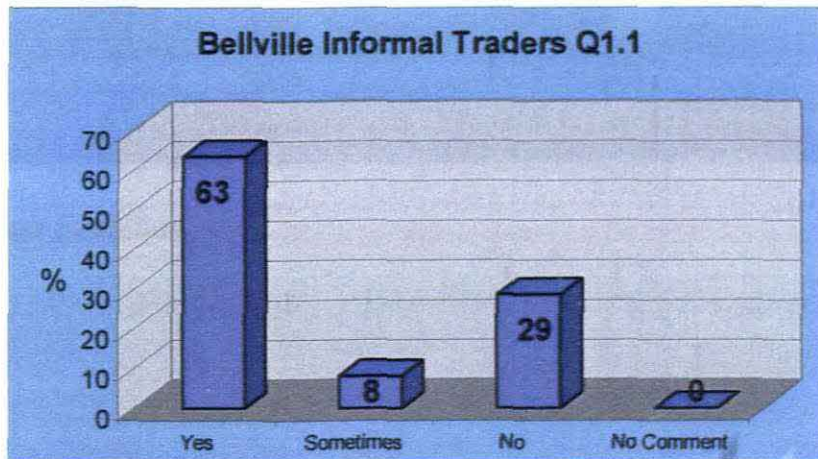


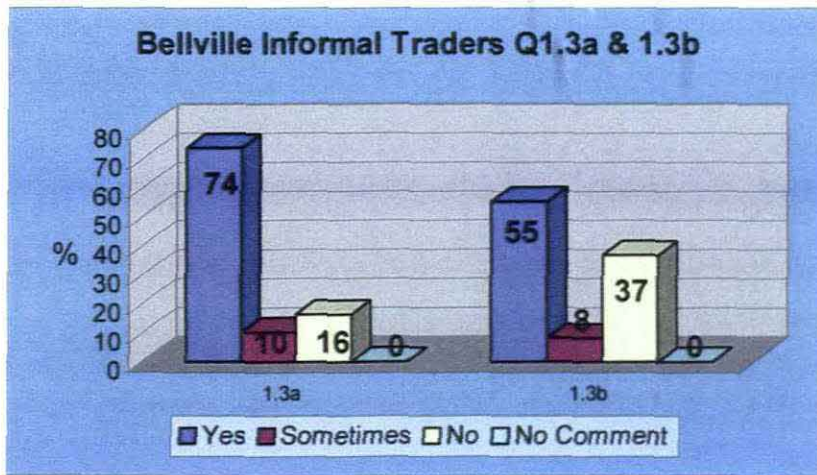
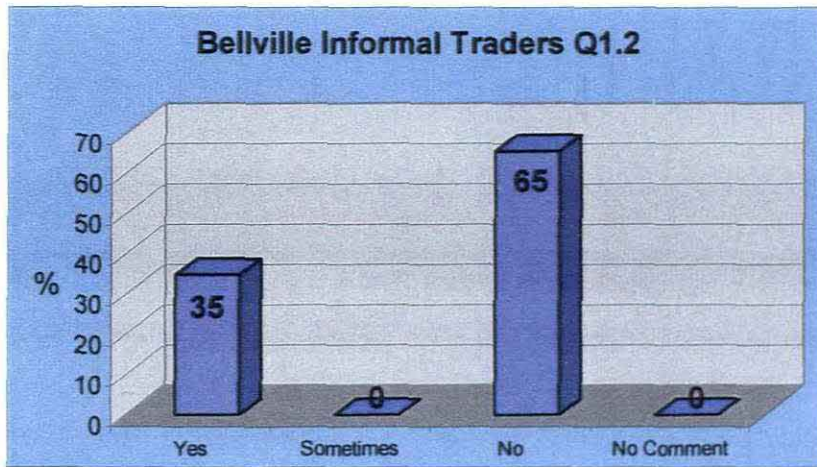
2.4 Main Concerns



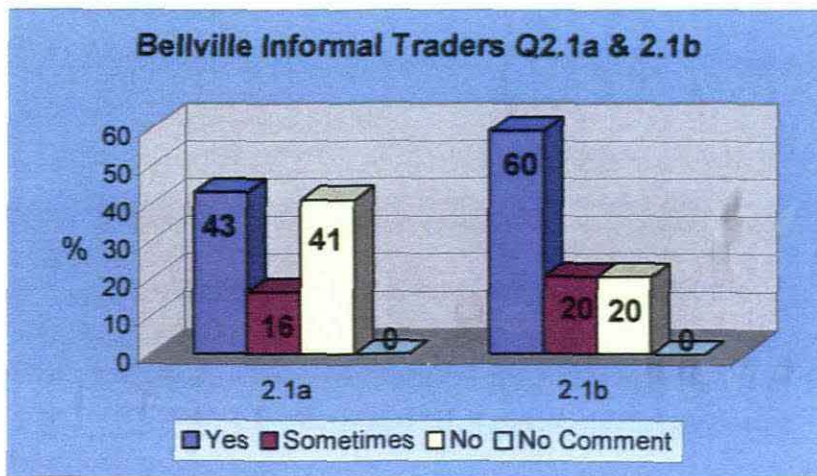
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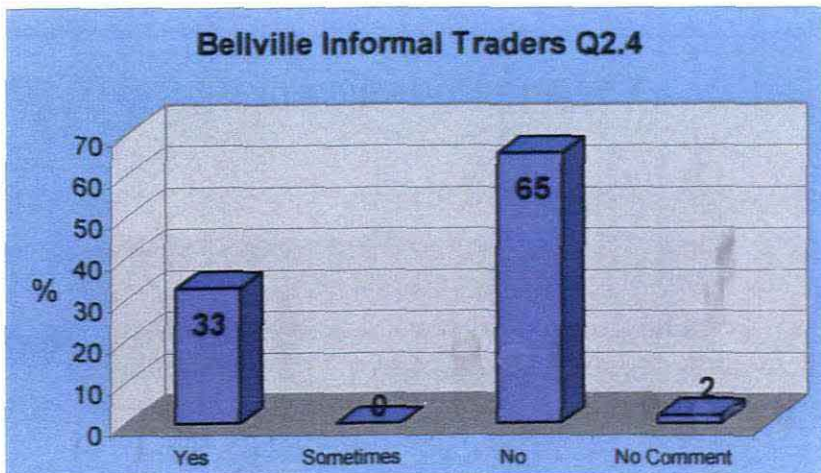
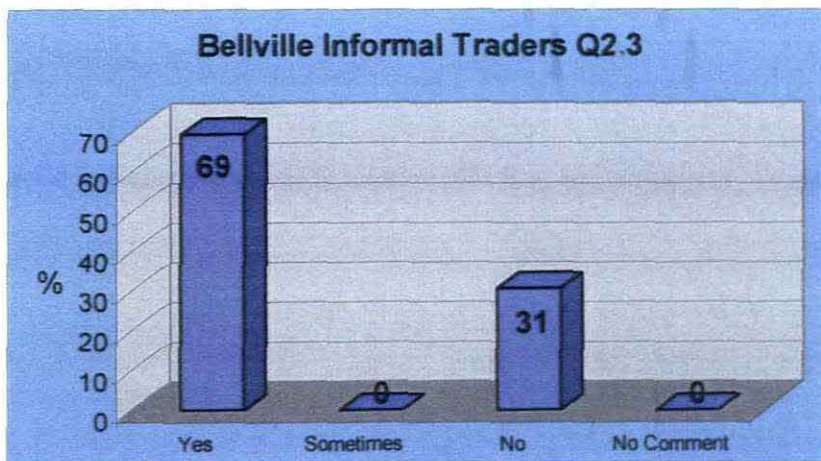
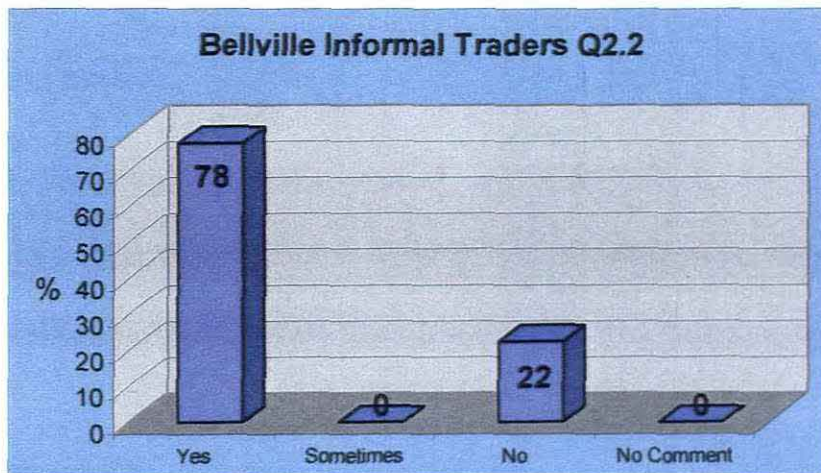
3.1 Safety and Security

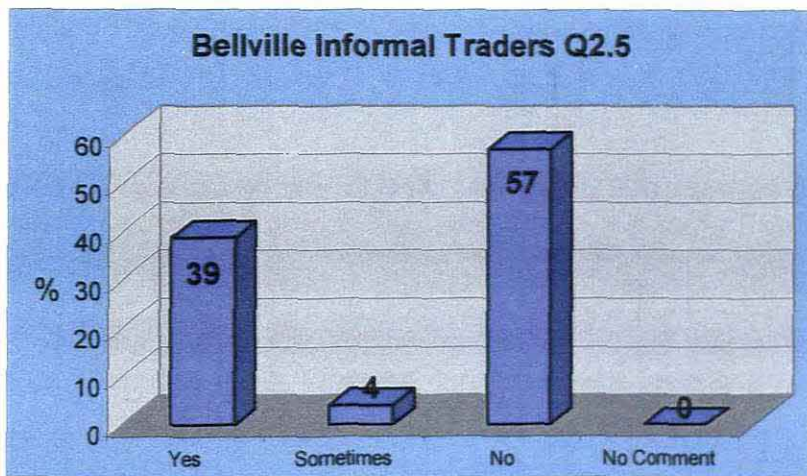




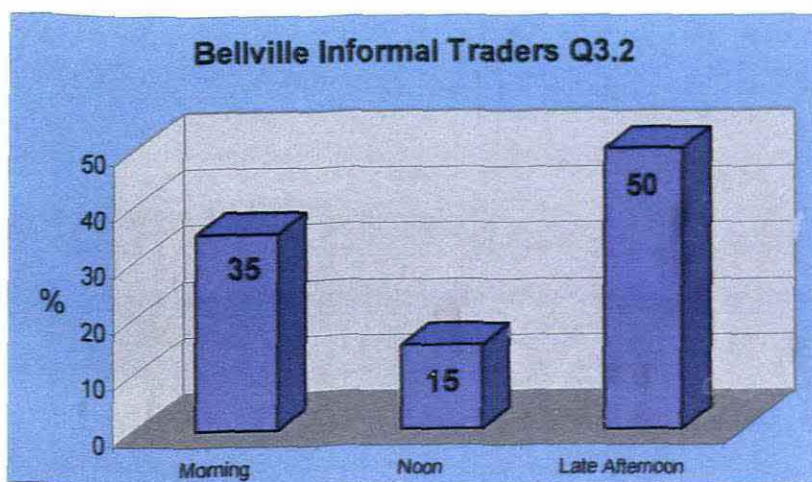
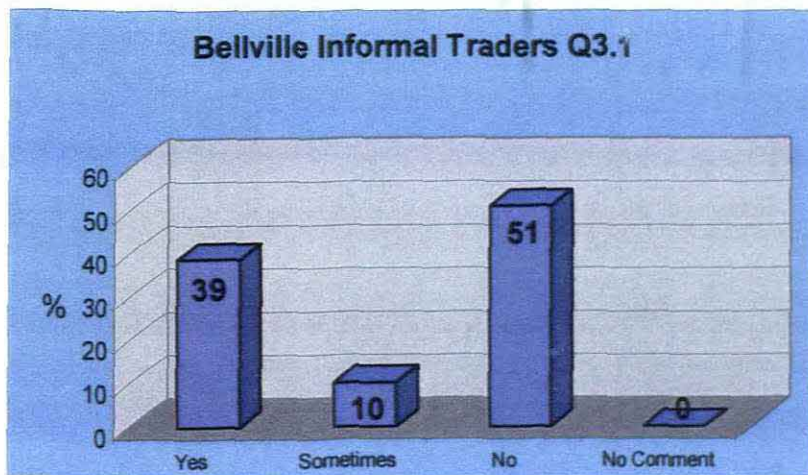
3.2 Interchange Facilities

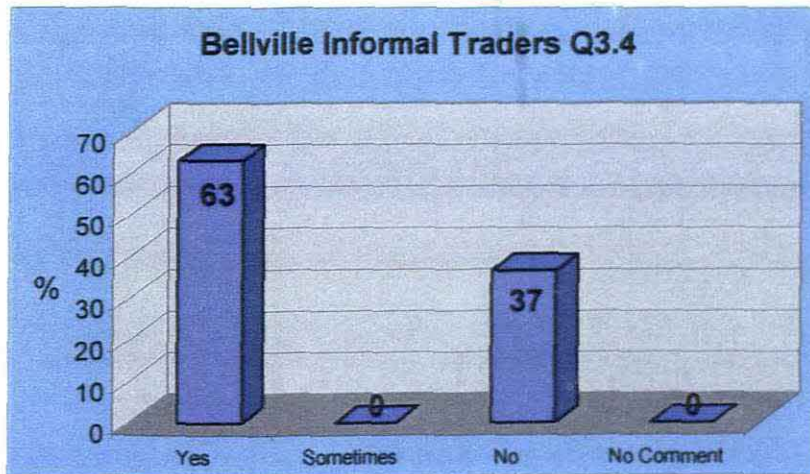
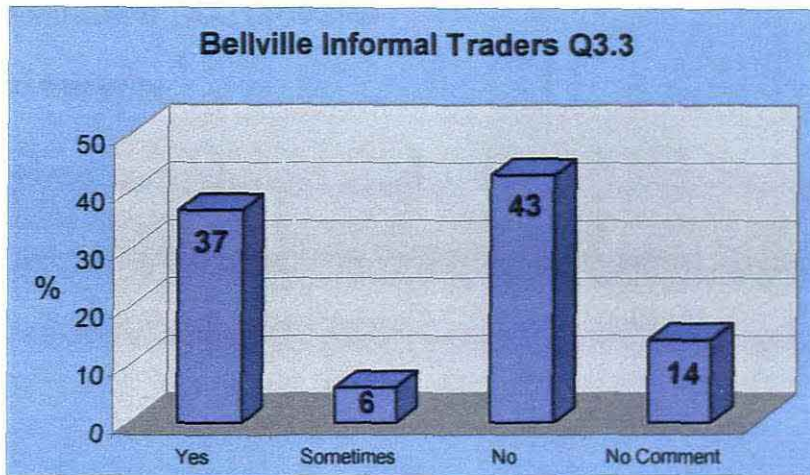




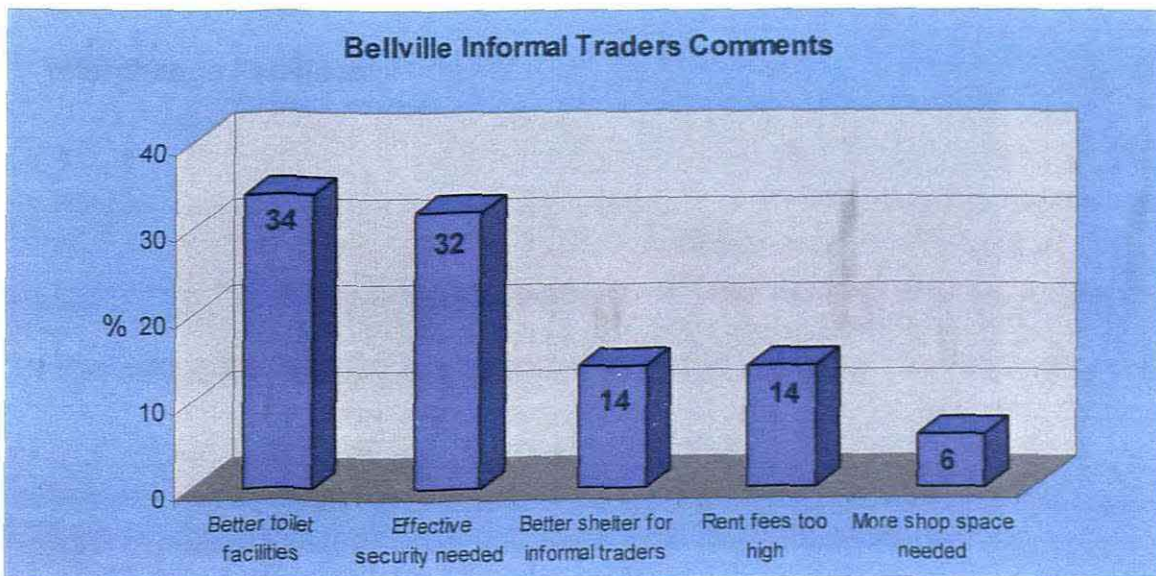


3.3 General



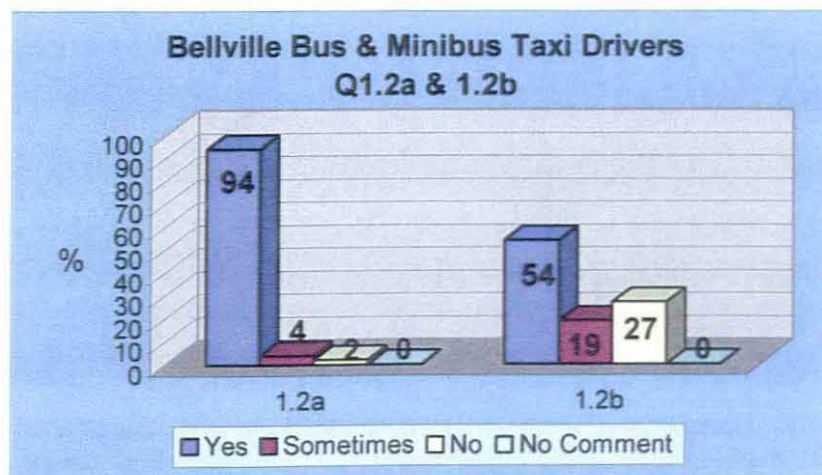
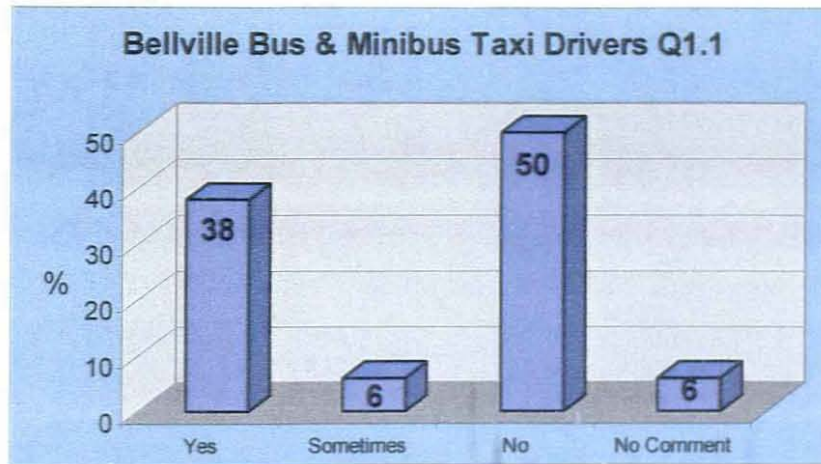


3.4 Main Concerns

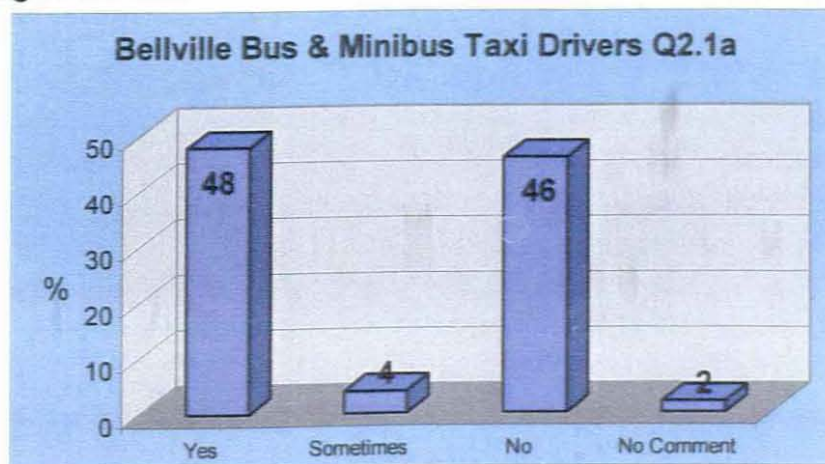


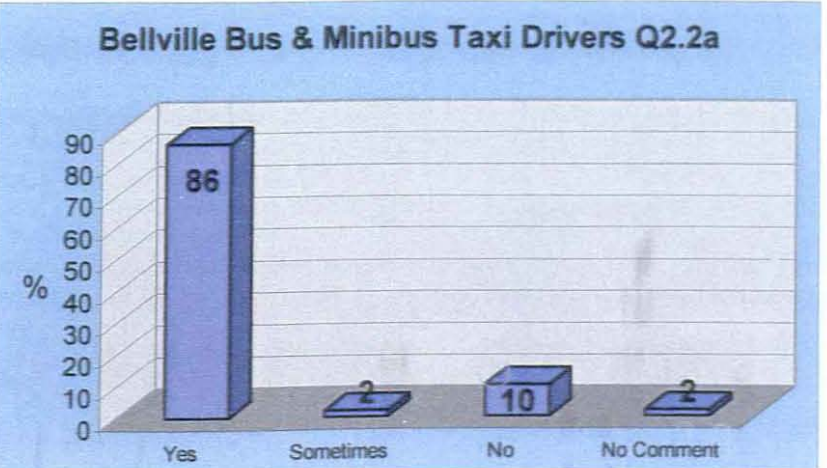
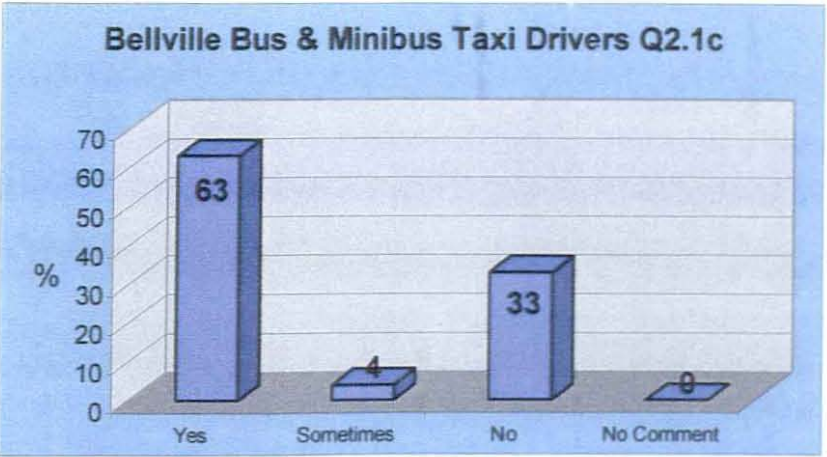
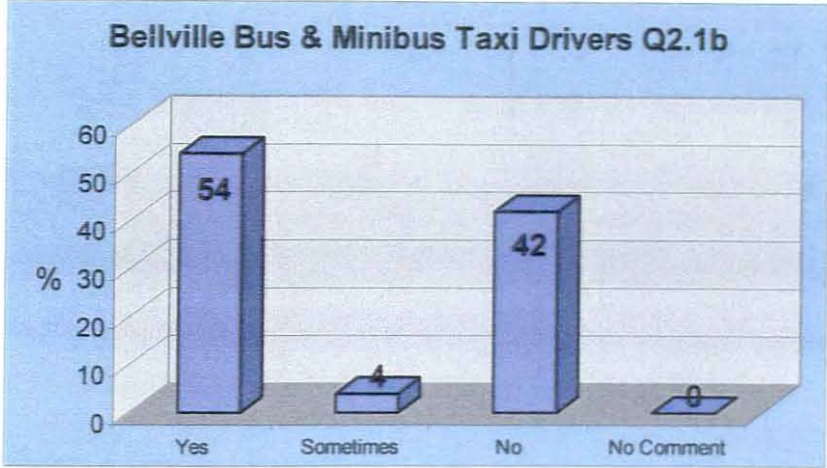
4. BUS AND MINIBUS TAXI DRIVERS

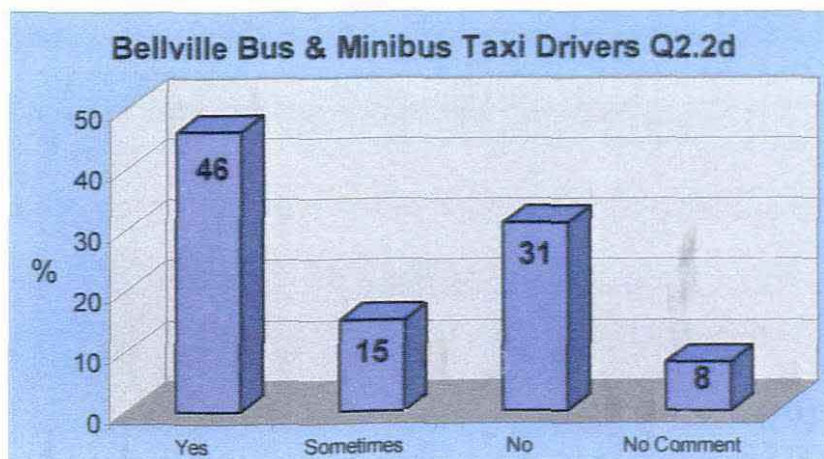
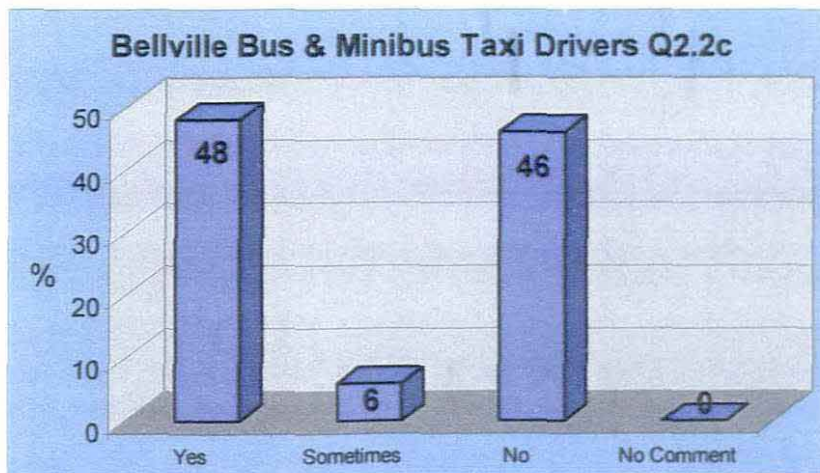
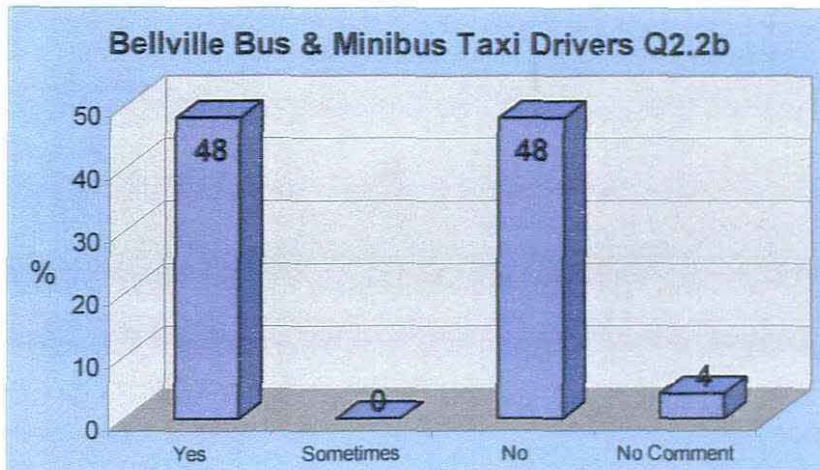
4.1 Safety and Security

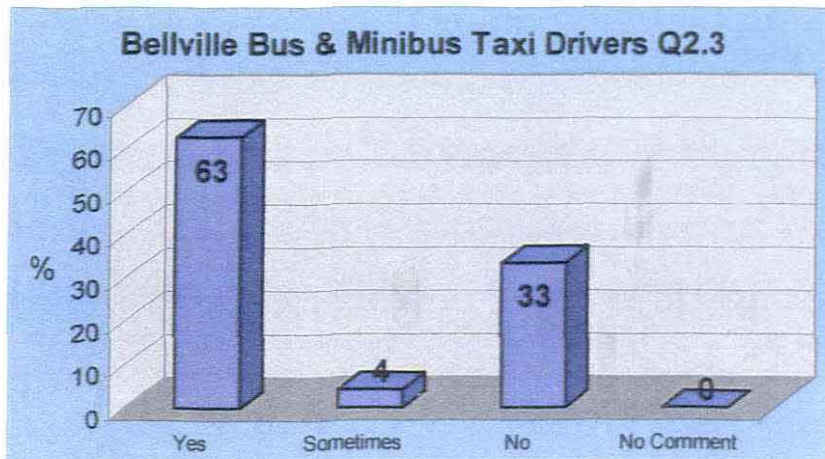
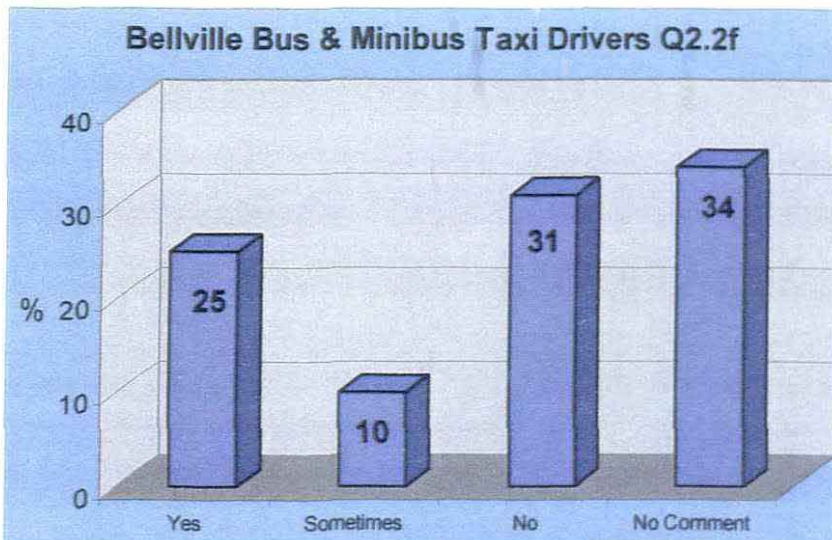
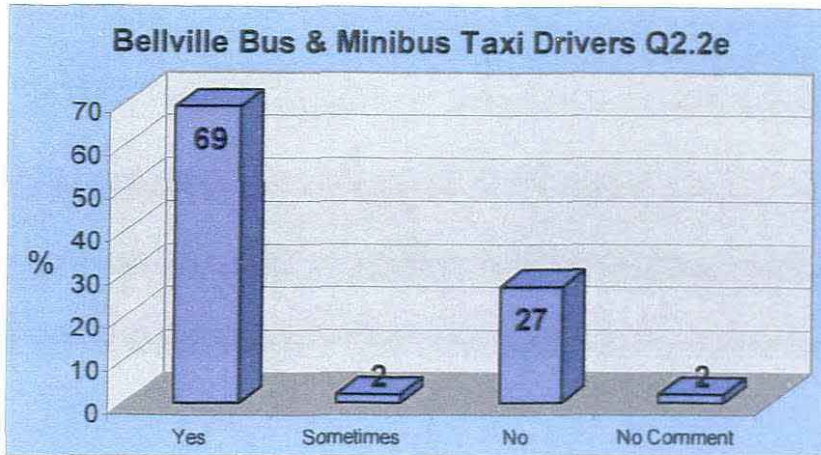


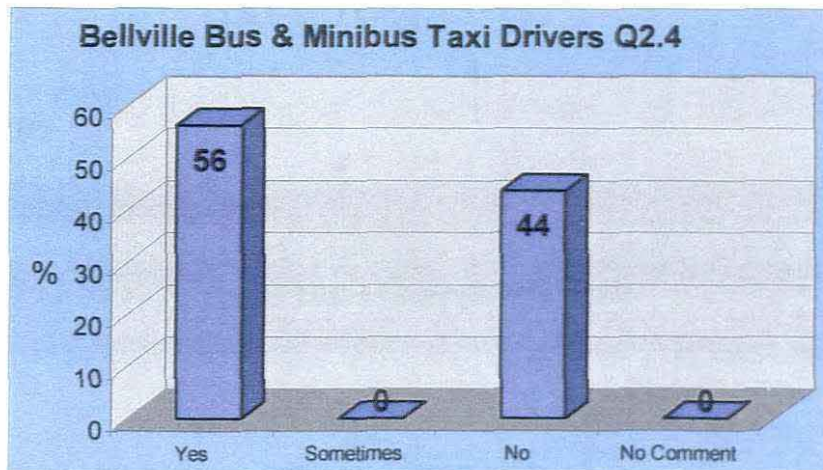
4.2 Interchange Facilities



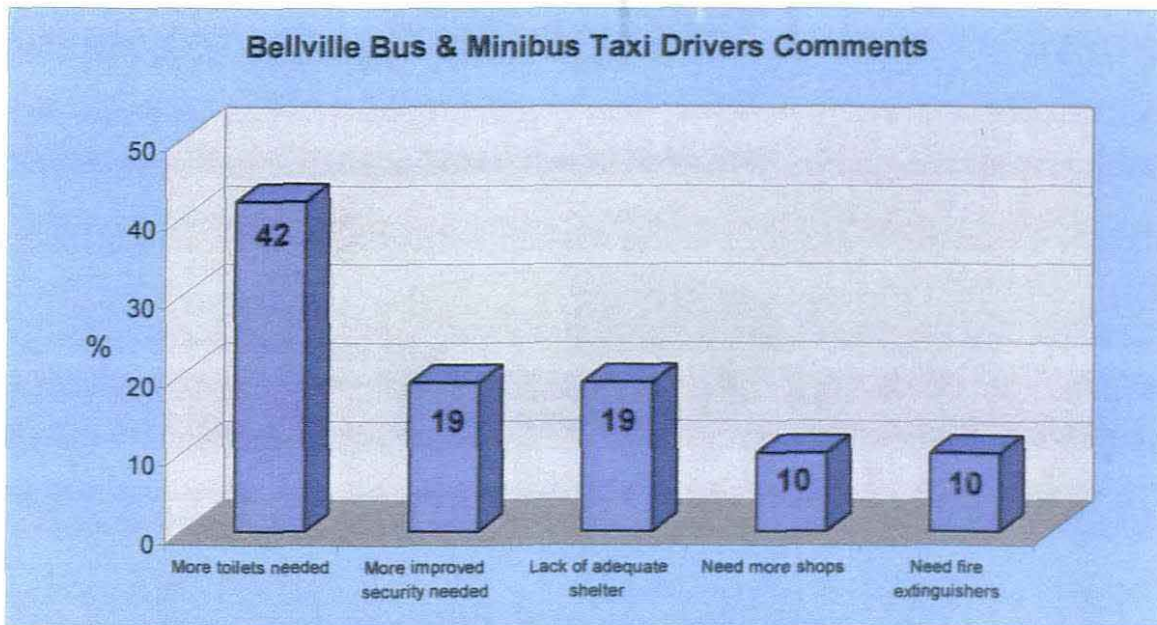








4.3 Main Concerns

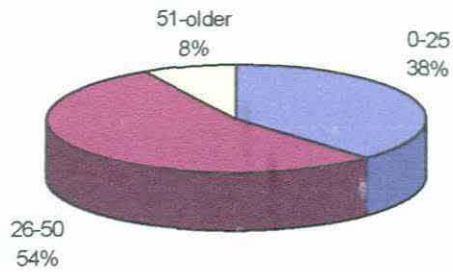


CAPE TOWN PTI

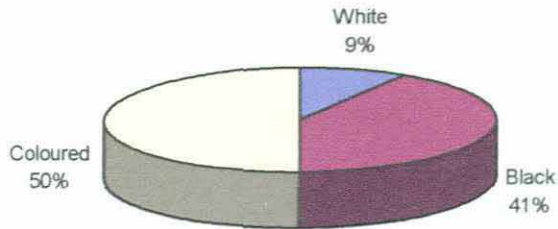
1. PASSENGERS

1.1 Demographic Information

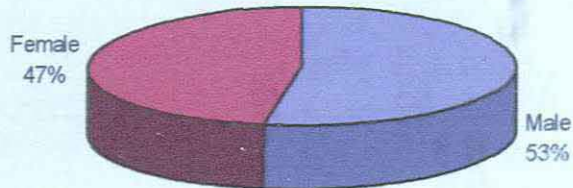
Cape Town Overall Age Split

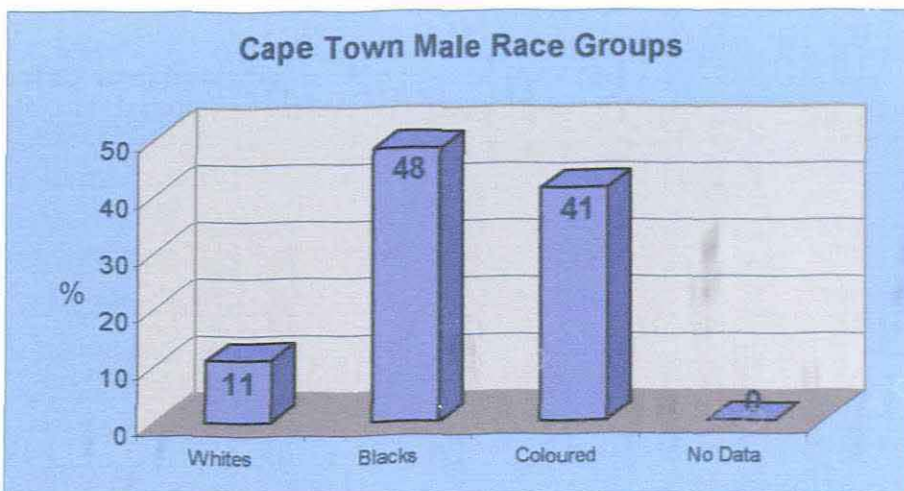
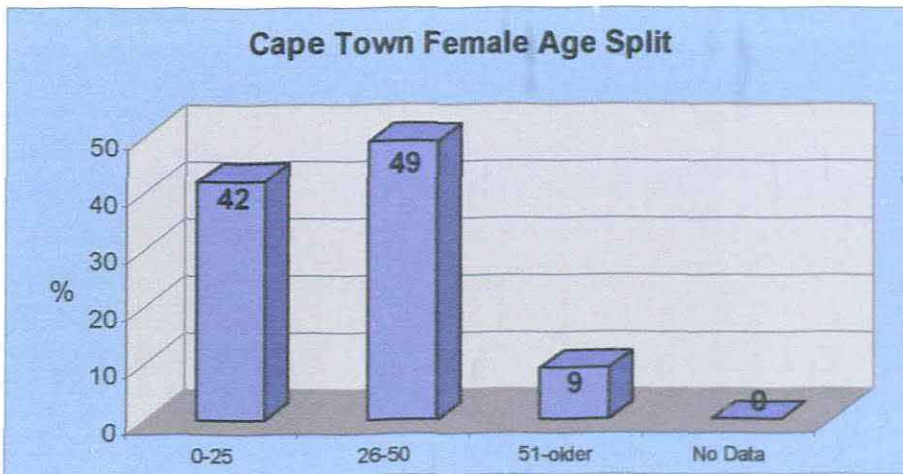
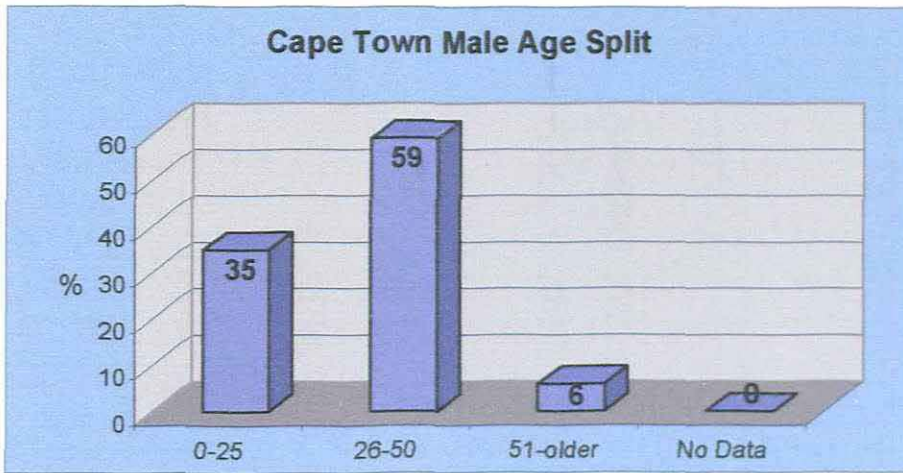


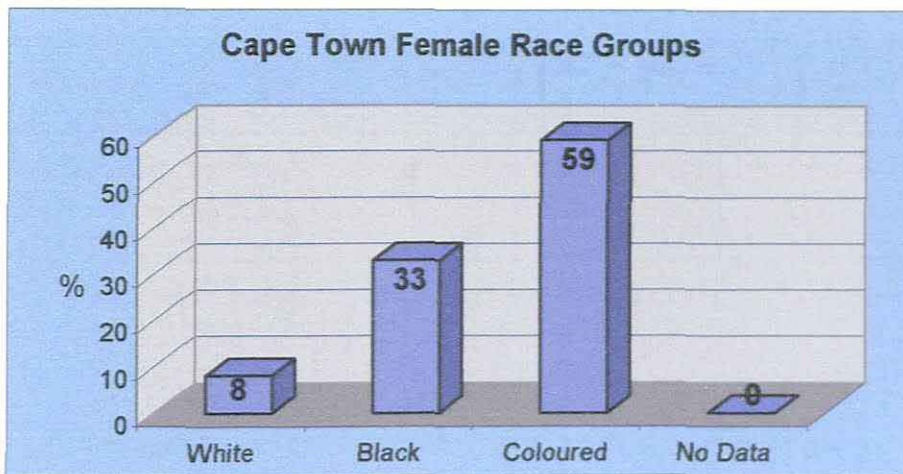
Cape Town Overall Race Split



Cape Town Overall Gender Split



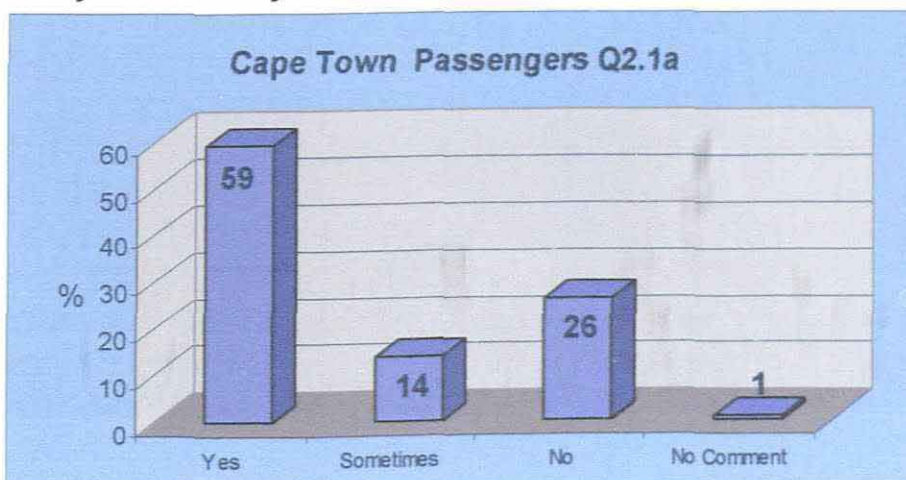


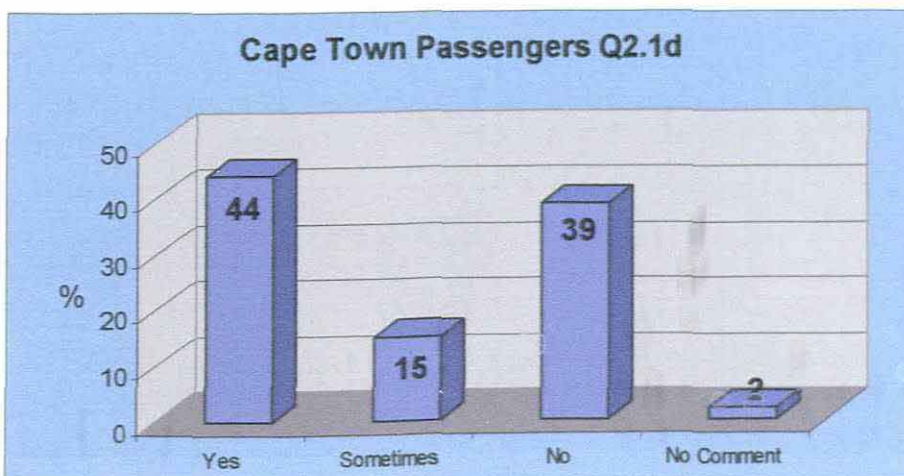
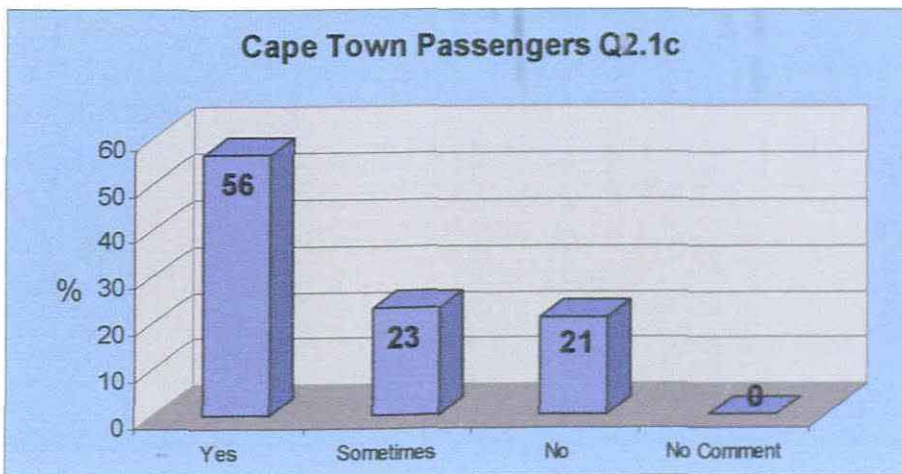
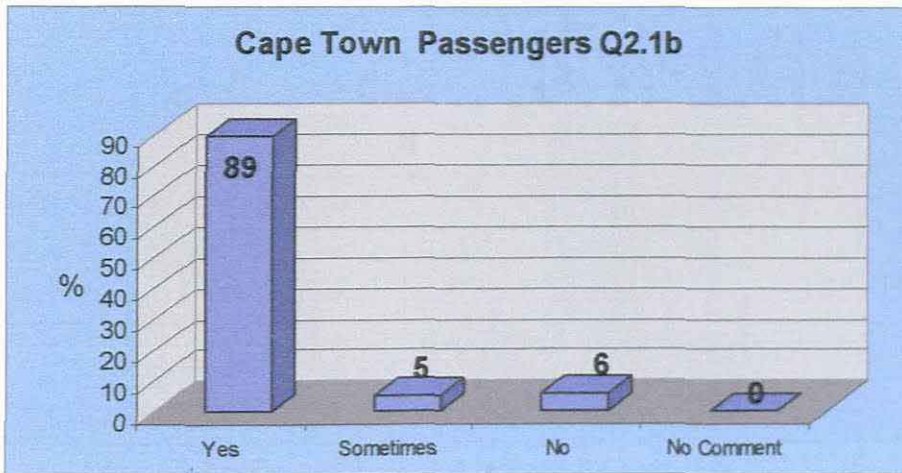


1.2 Trip Purpose

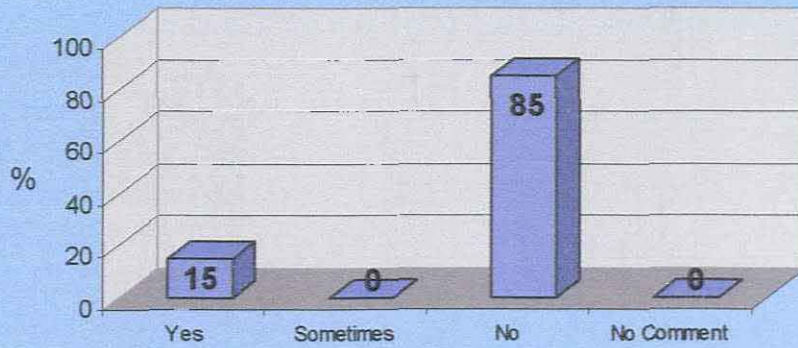


1.3 Safety and Security

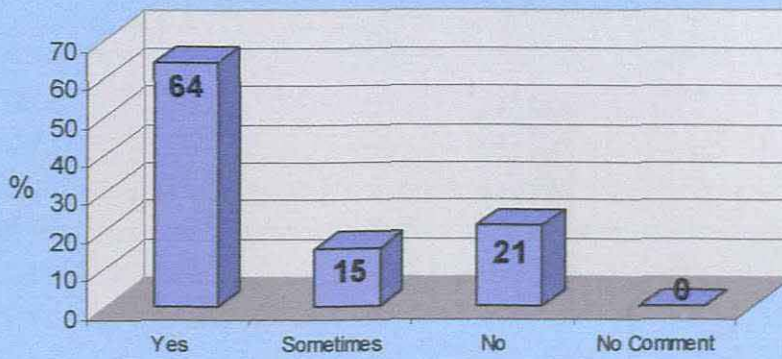




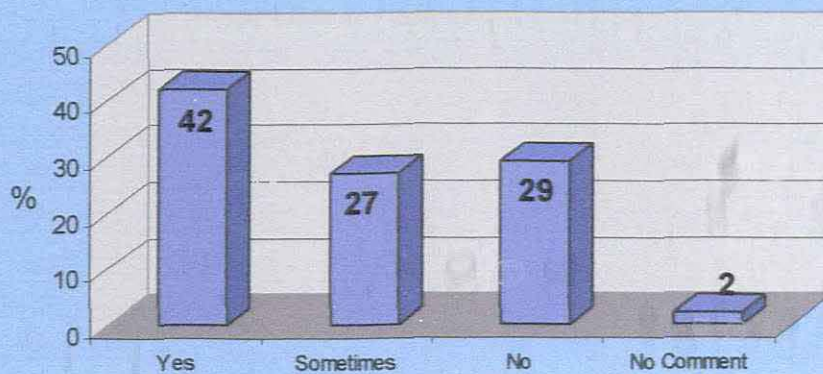
Cape Town Passengers Q2.2



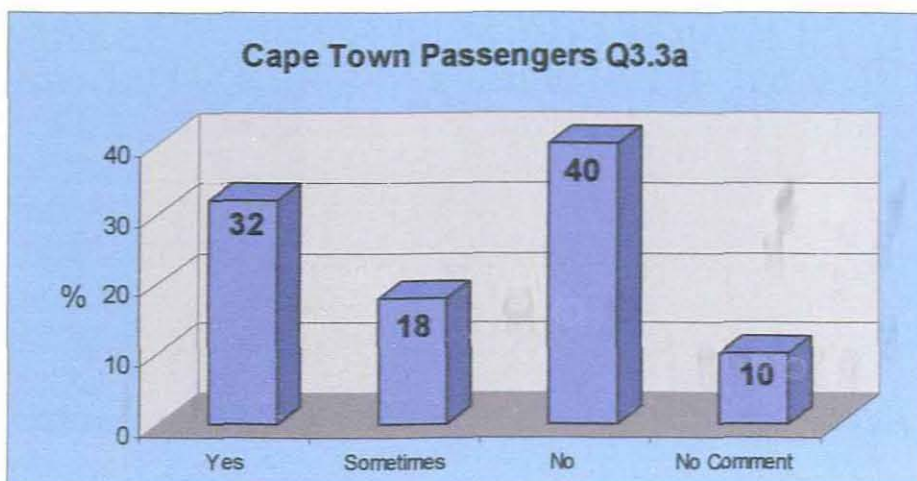
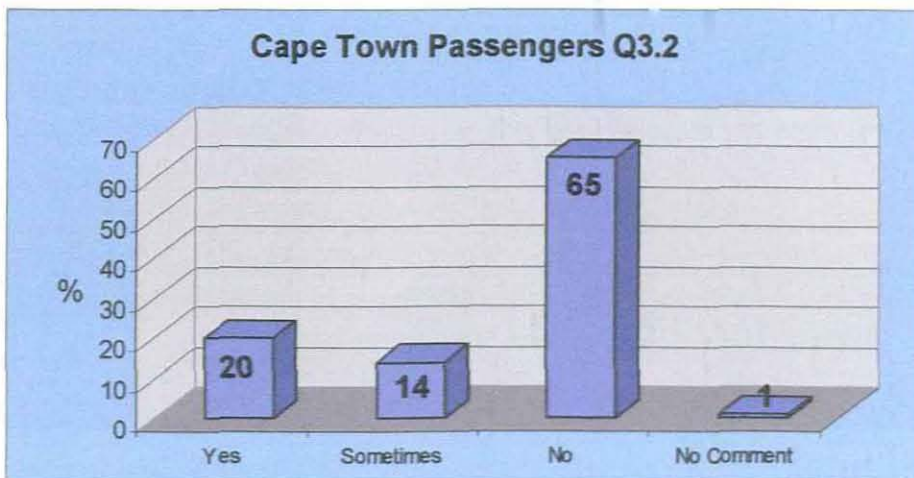
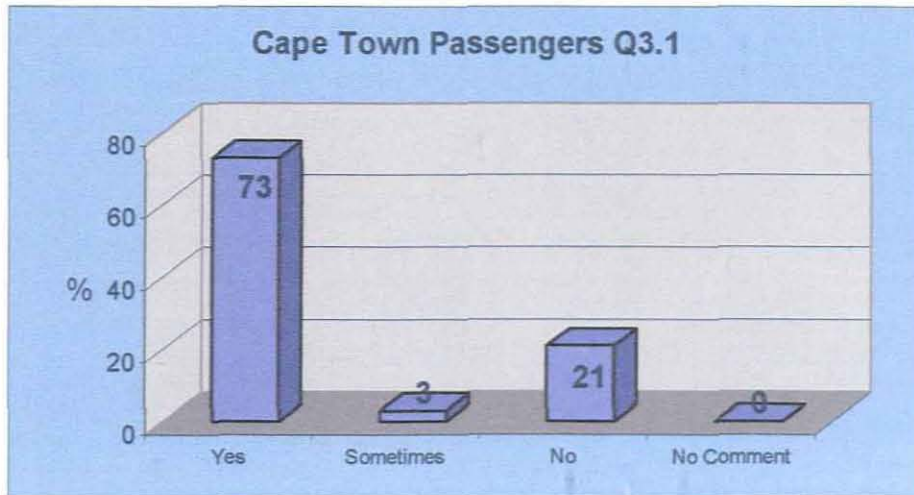
Cape Town Passengers Q2.3a

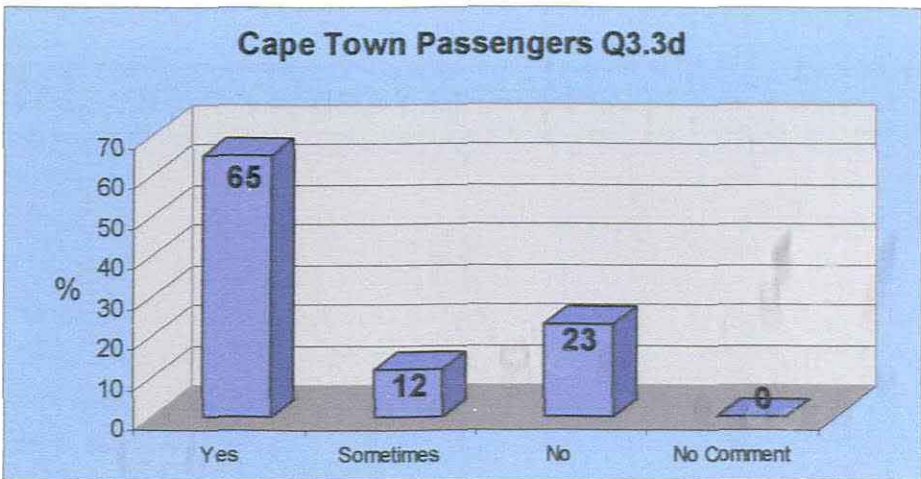
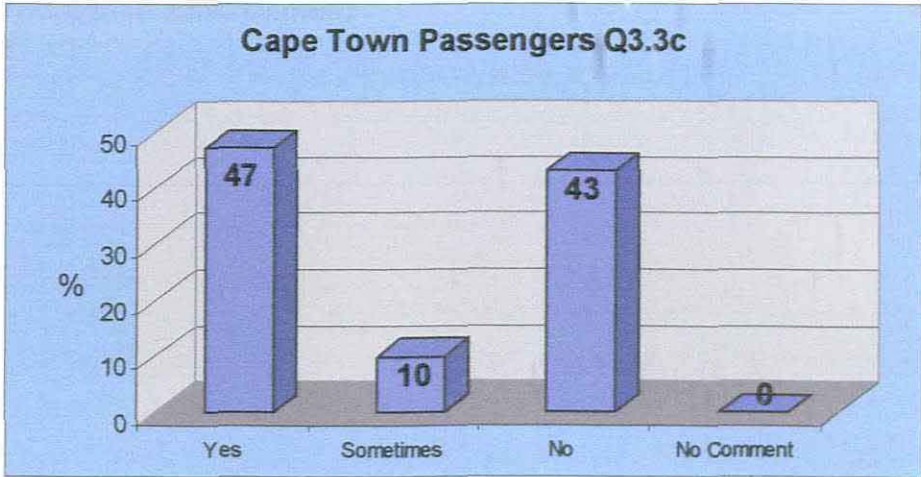
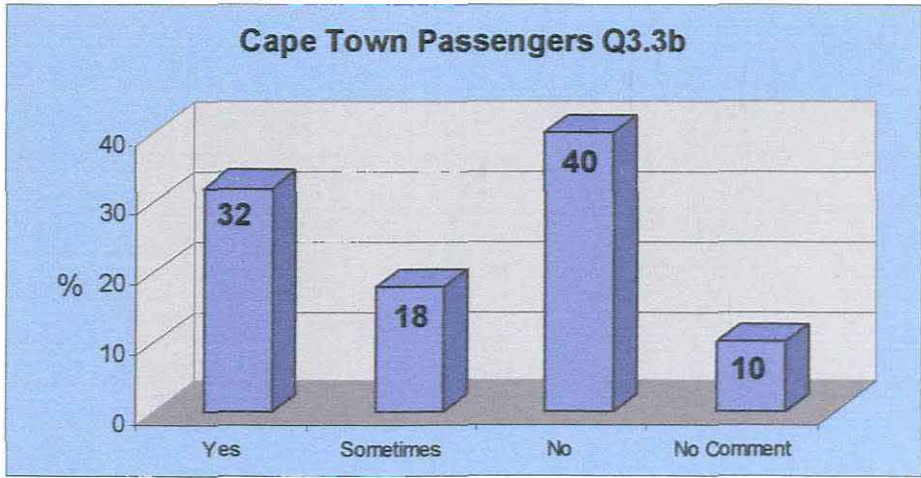


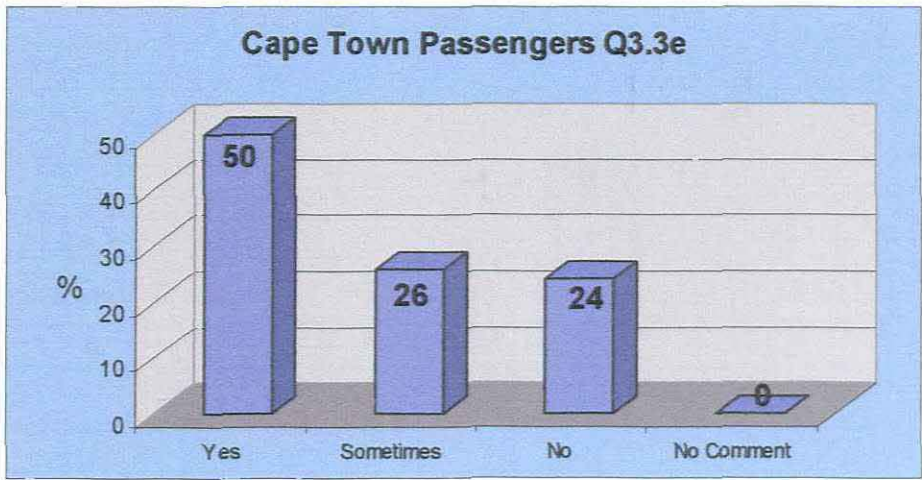
Cape Town Passengers Q2.3b



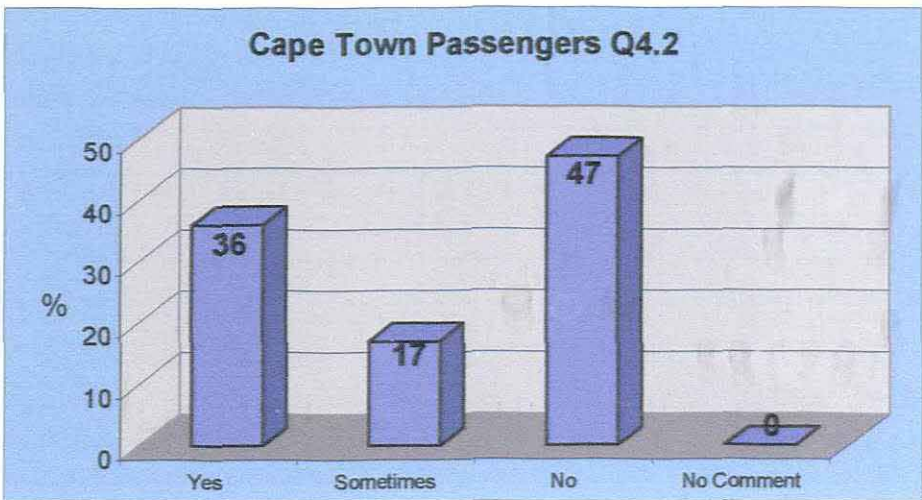
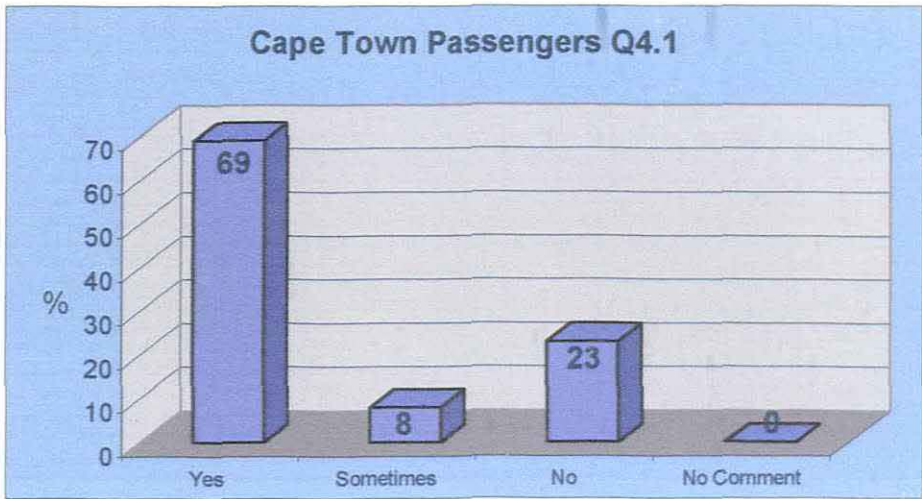
1.4 Interchange Facilities

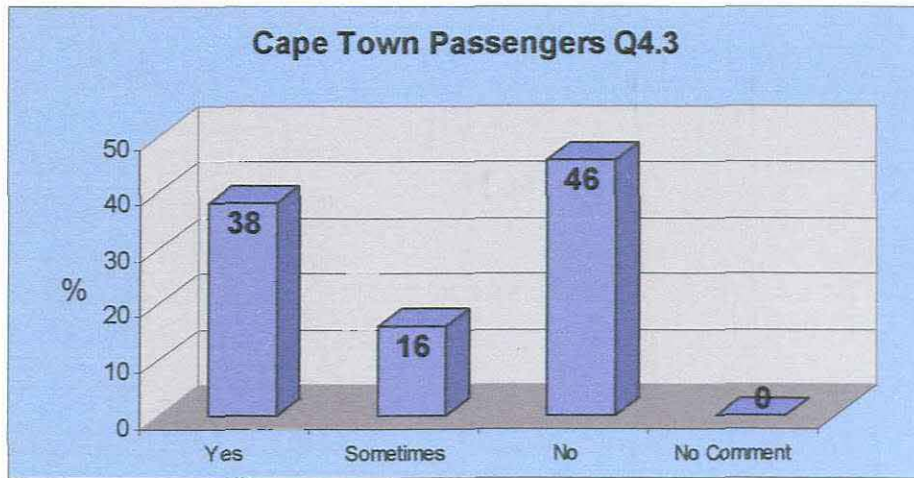




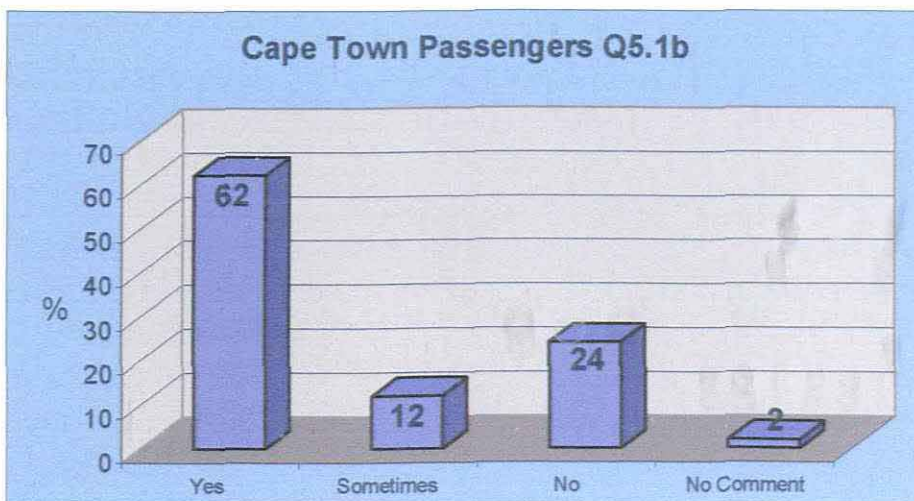
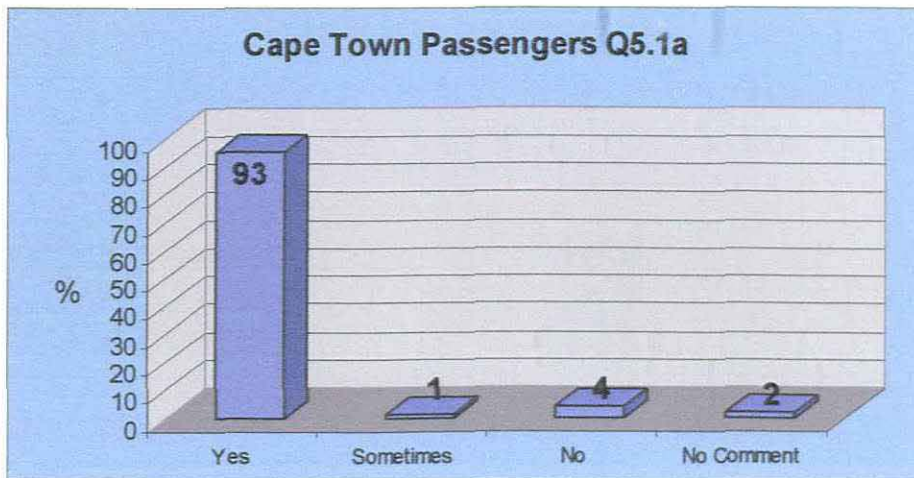


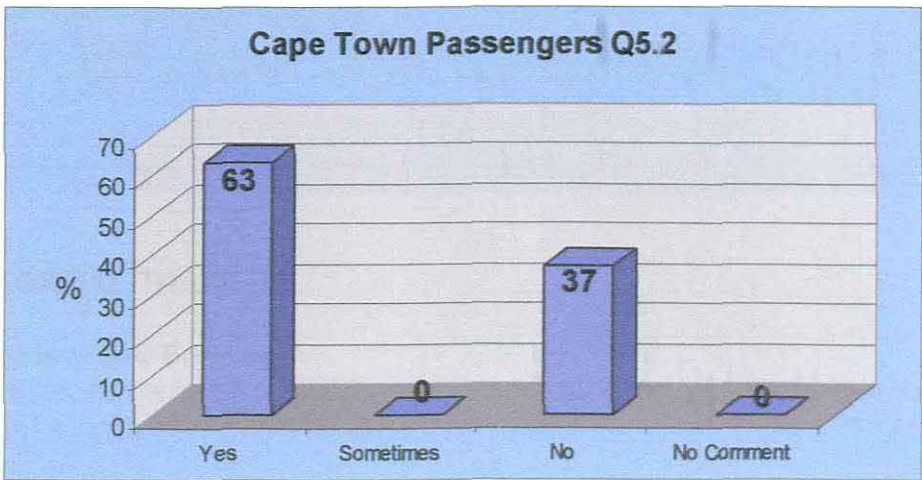
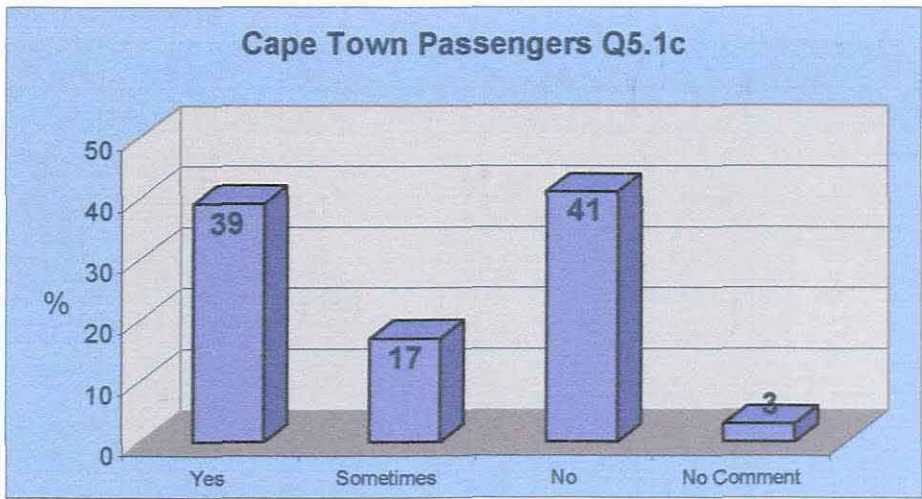
1.5 Pedestrian Environment



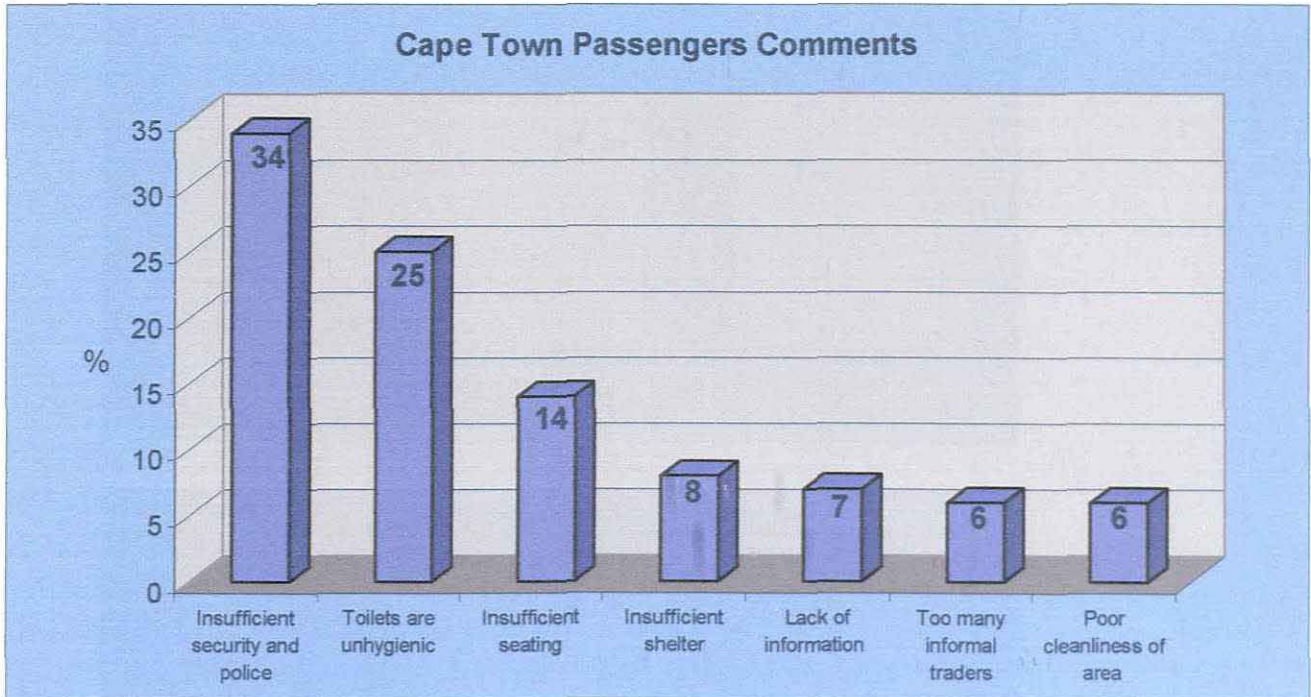


1.6 General



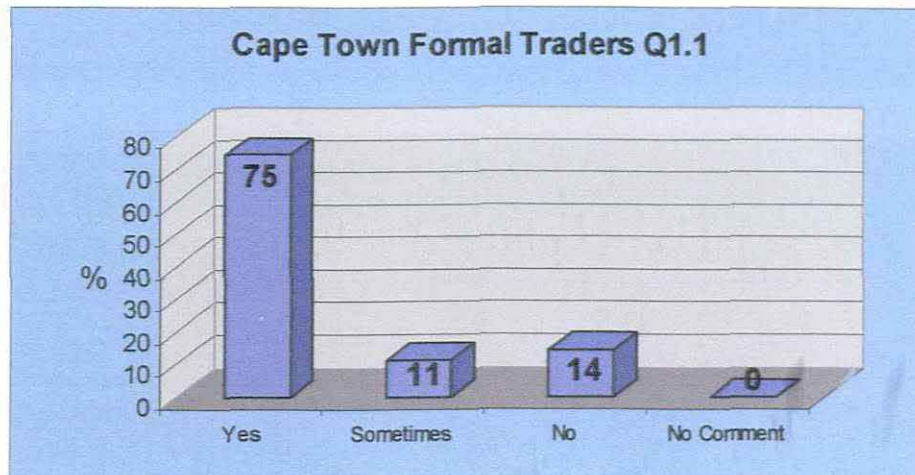


1.7 Main Concerns

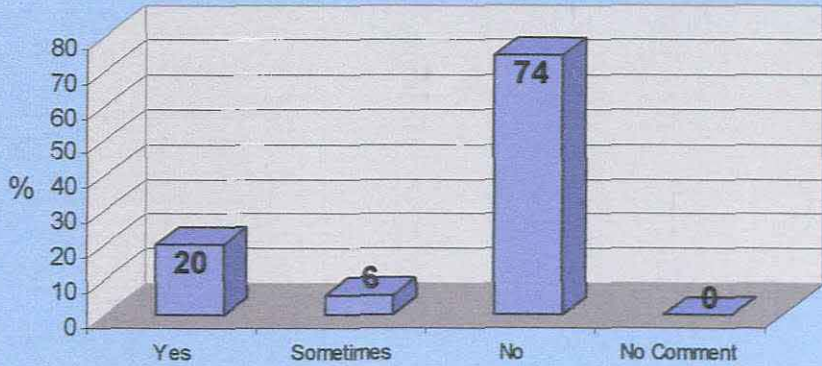


2. FORMAL TRADERS

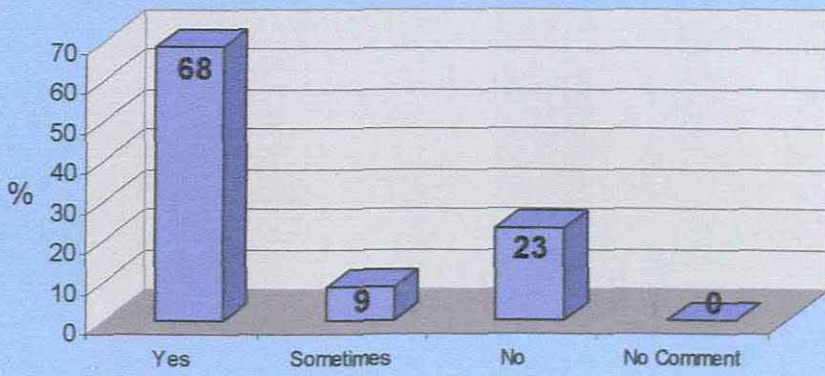
2.1 Safety and Security



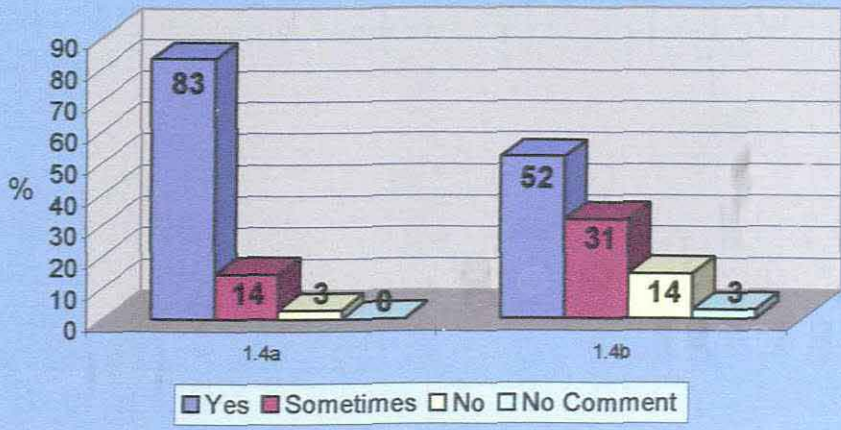
Cape Town Formal Traders Q1.2



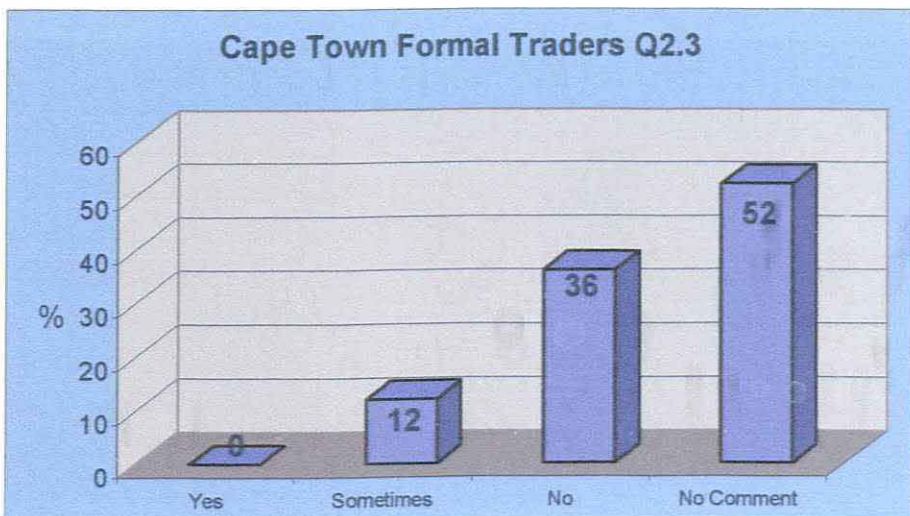
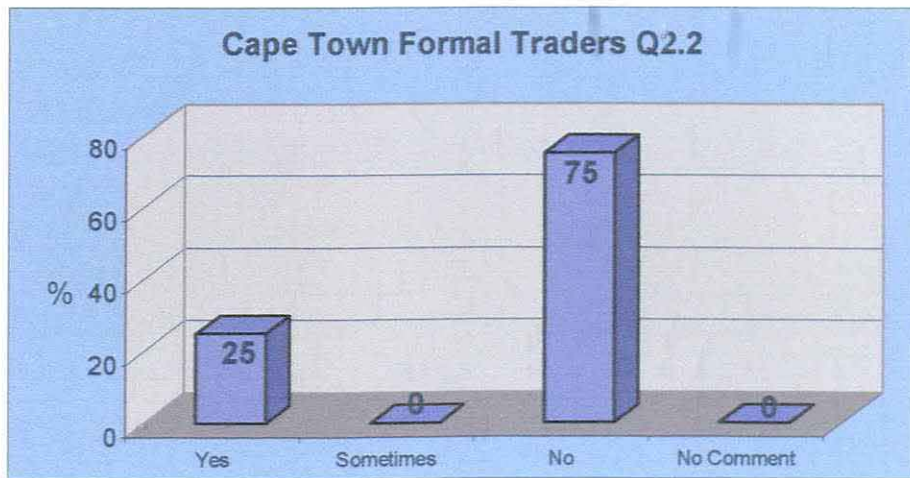
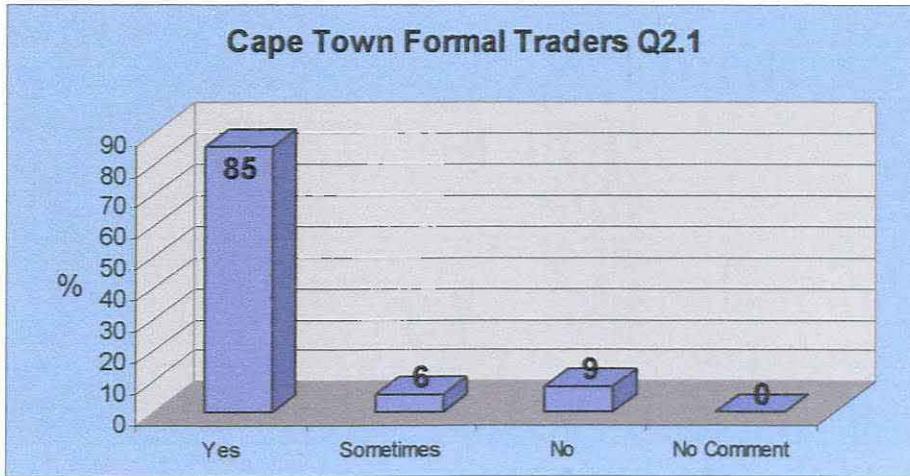
Cape Town Formal Traders Q1.3

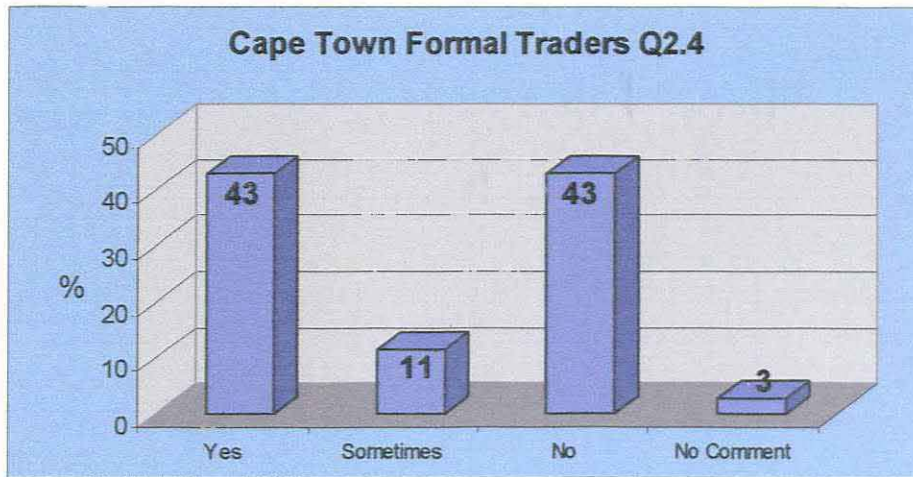


Cape Town Formal Traders Q1.4a & 1.4b

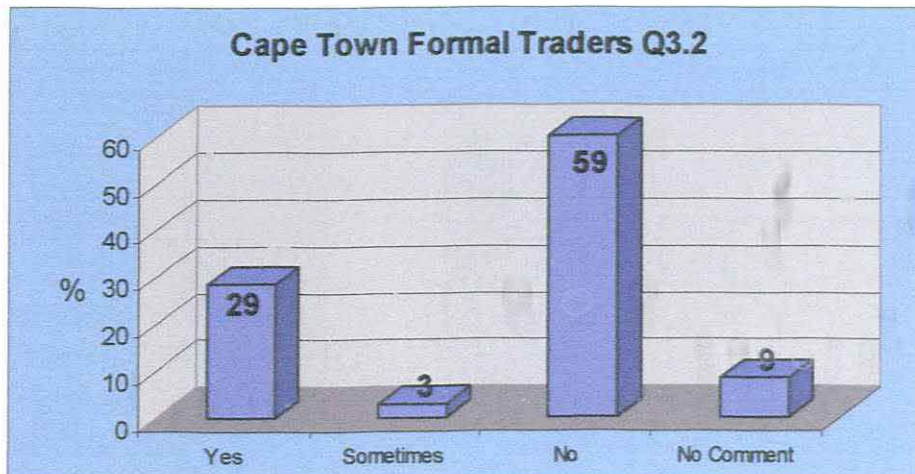
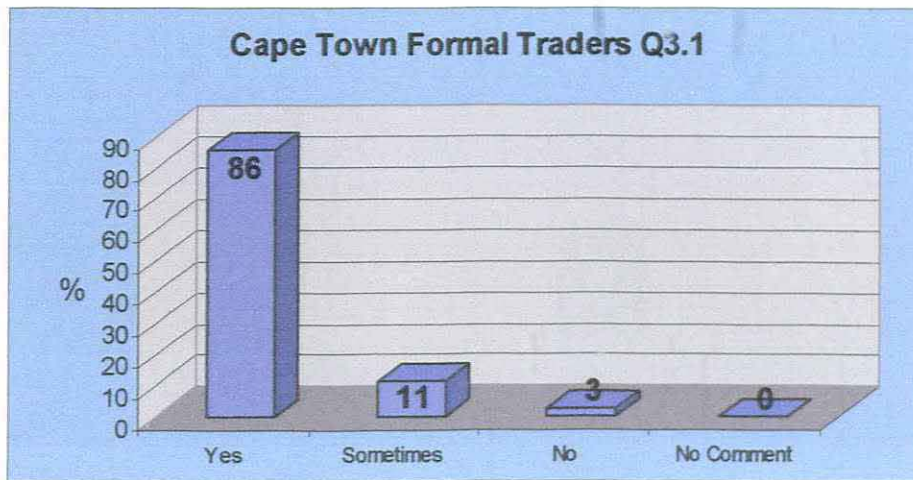


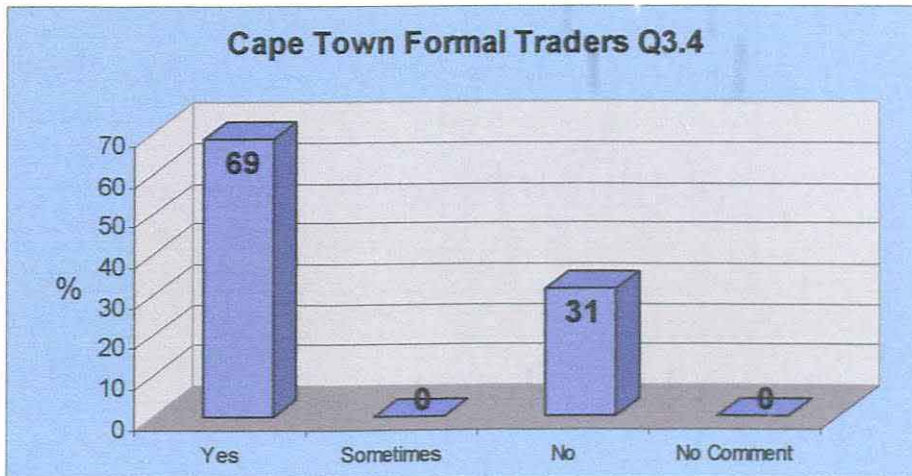
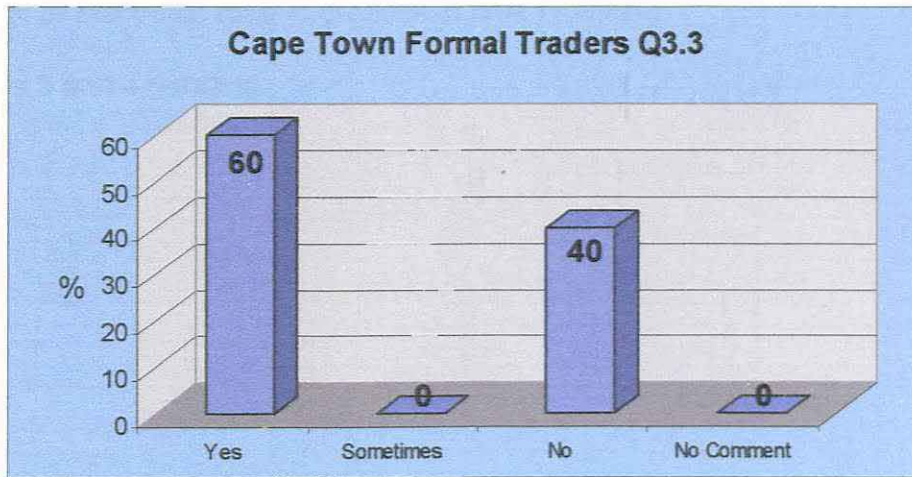
2.2 Interchange Facilities



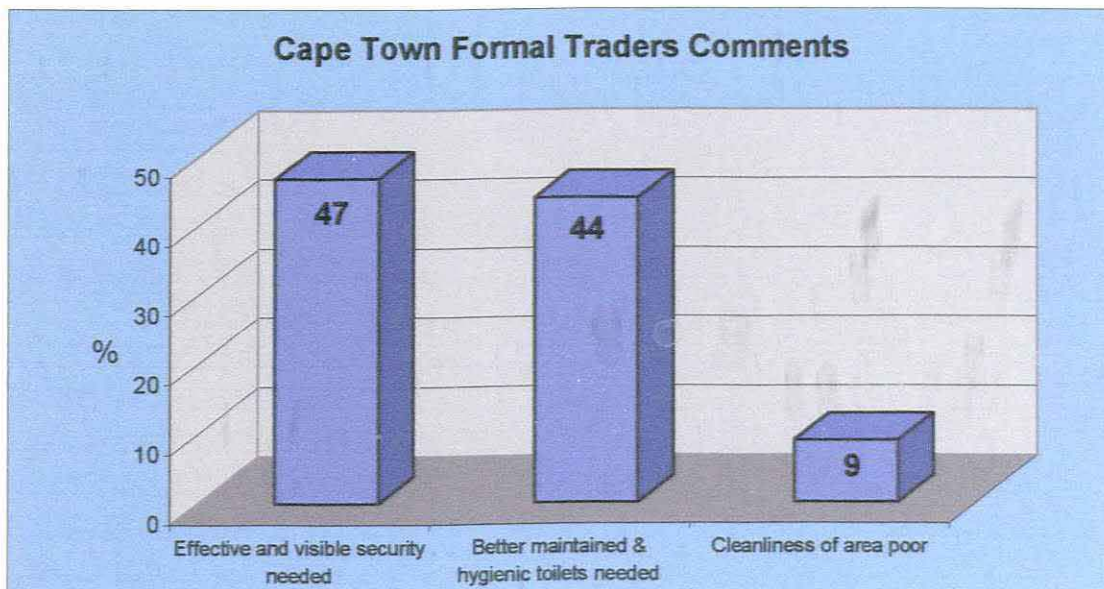


2.3 General





2.4 Main Concerns



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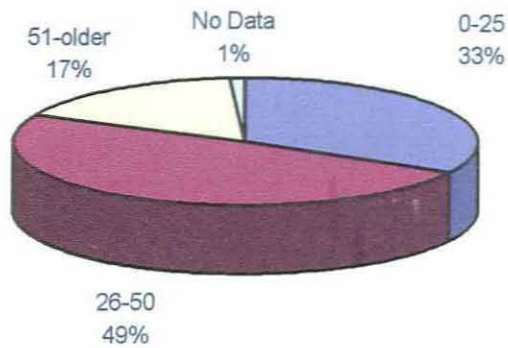
Sections 3 and 4 pending.

CLAREMONT PTI

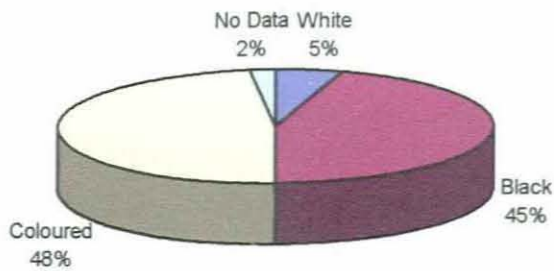
1. PASSENGERS

1.1 Demographics

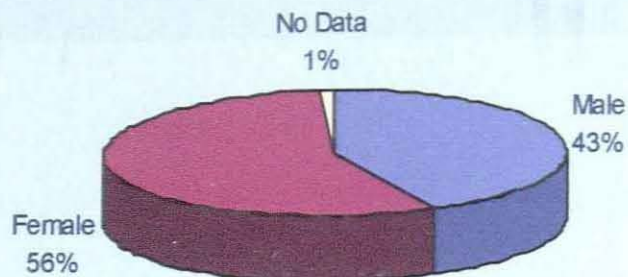
Claremont Overall Age Split

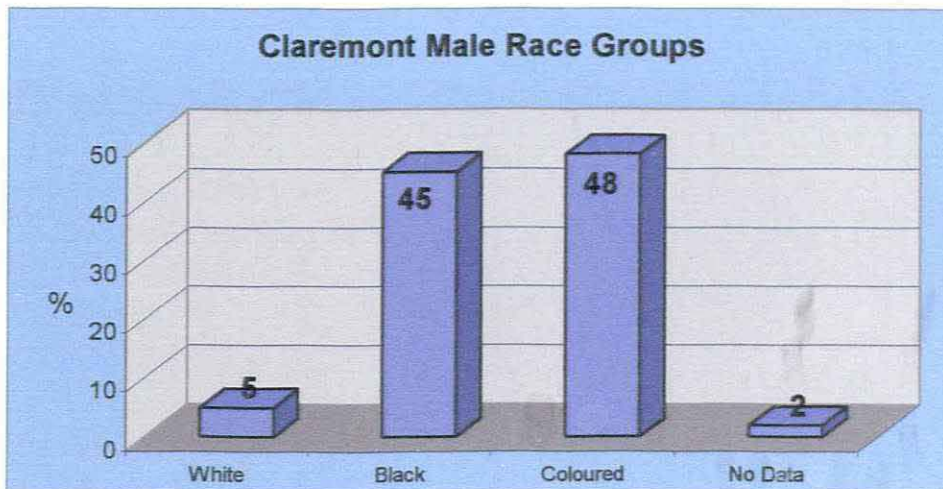
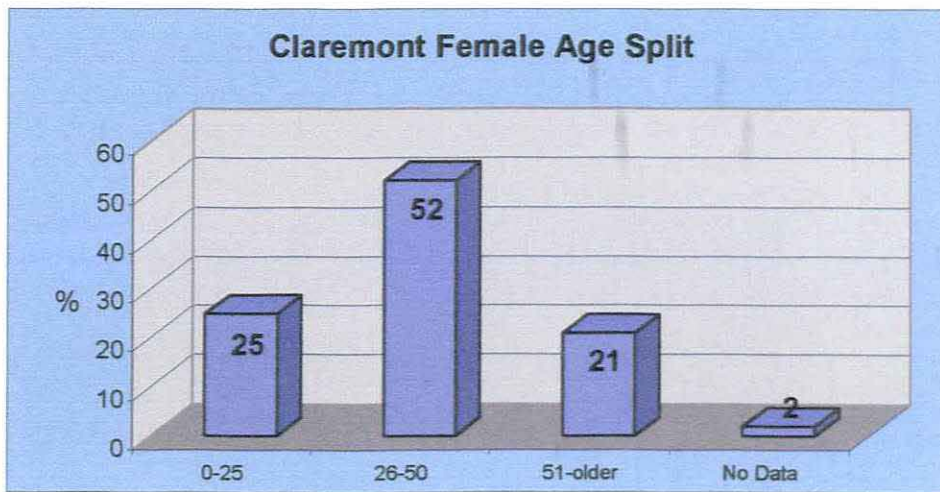
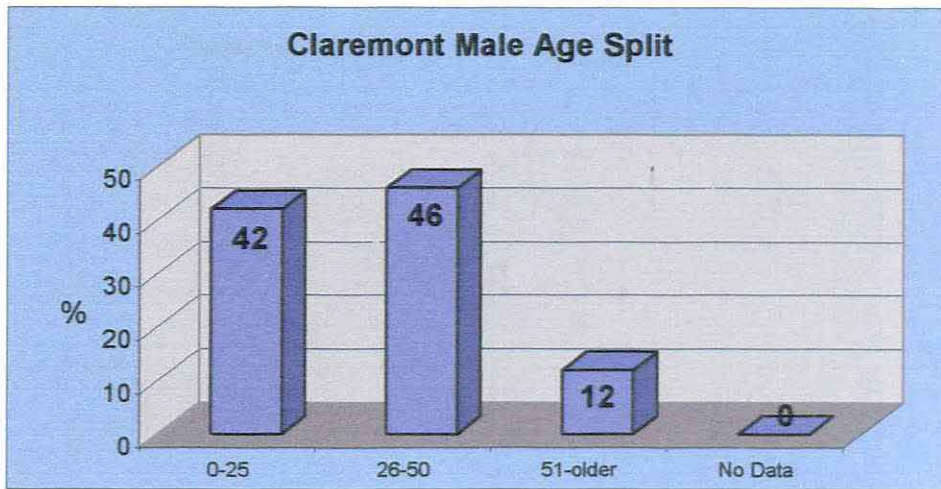


Claremont Overall Race Split

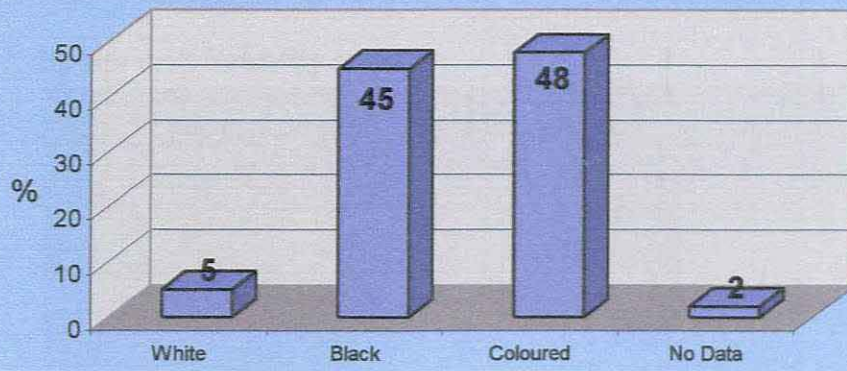


Claremont Overall Gender Split



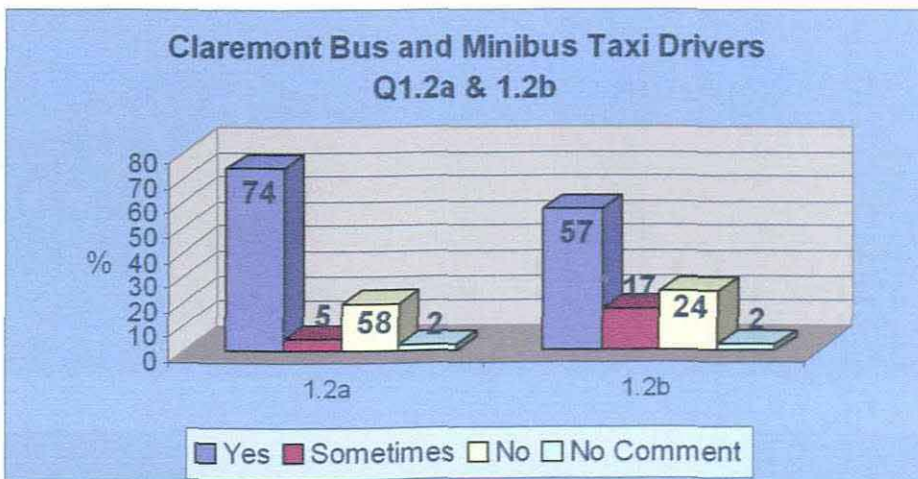
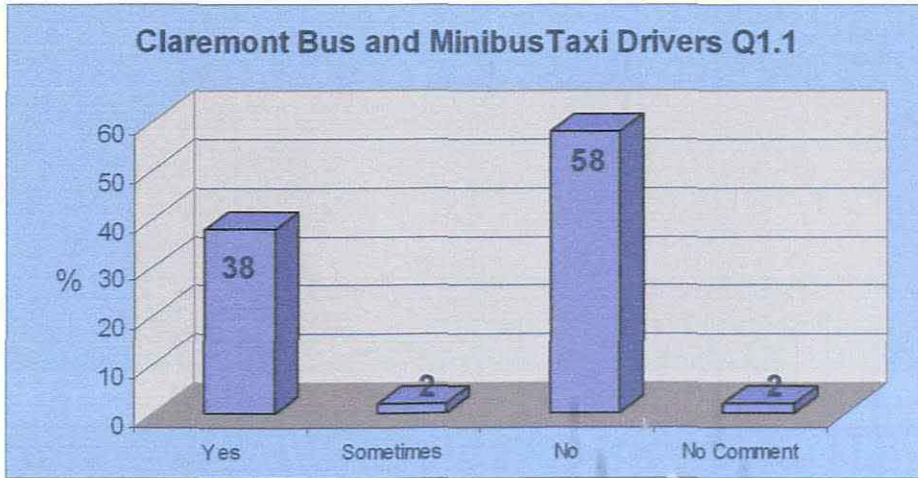


Claremont Female Race Groups

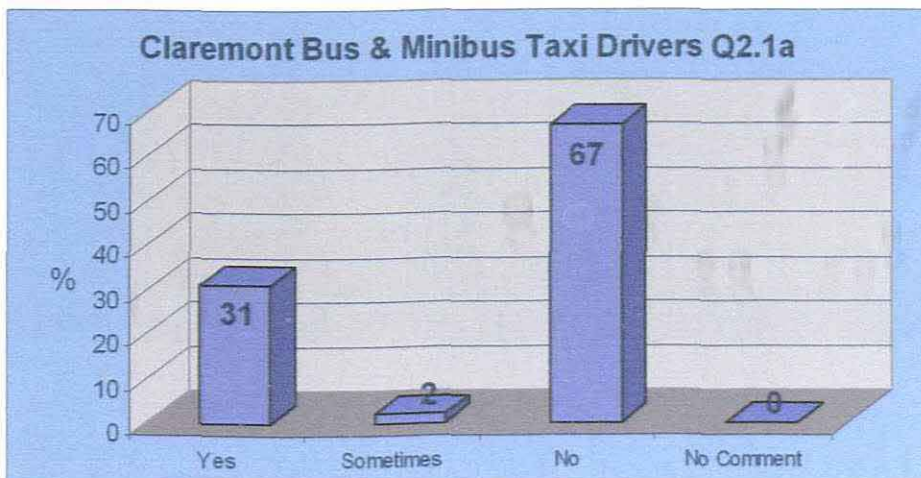


4. BUS AND MINIBUS TAXI DRIVERS

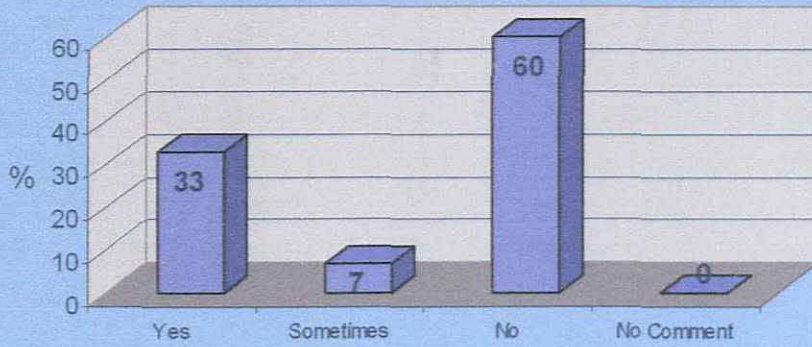
4.1. Safety and Security



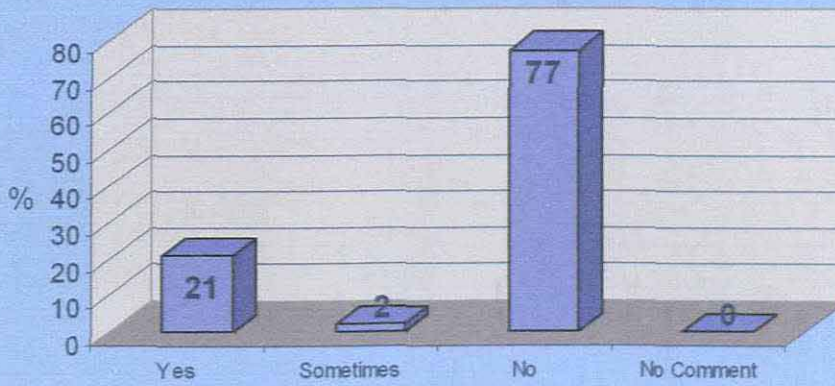
4.2. Interchange Facilities



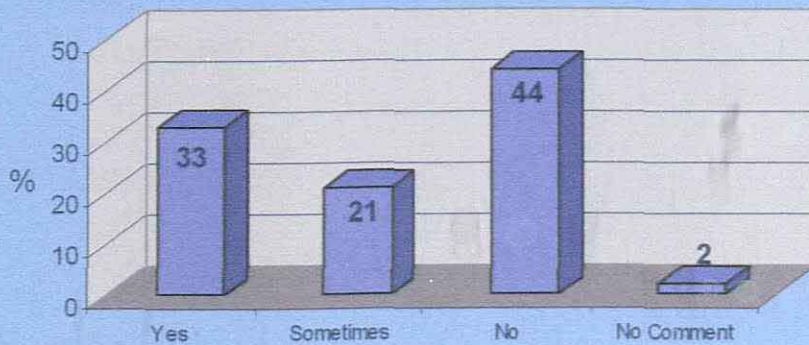
Claremont Bus & Minibus Taxi Drivers Q2.1b



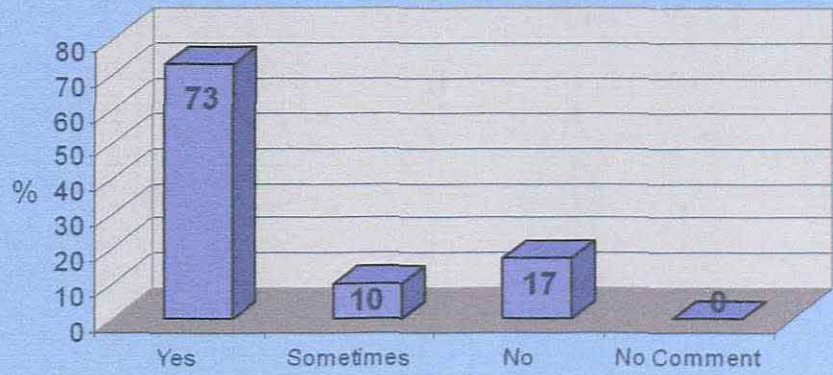
Claremont Bus and Minibus Taxi Drivers Q2.1c



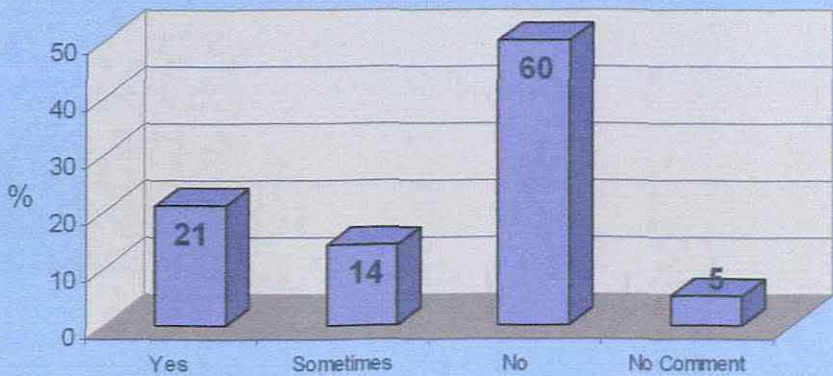
Claremont Bus & Minibus Taxi Drivers Q2.2a



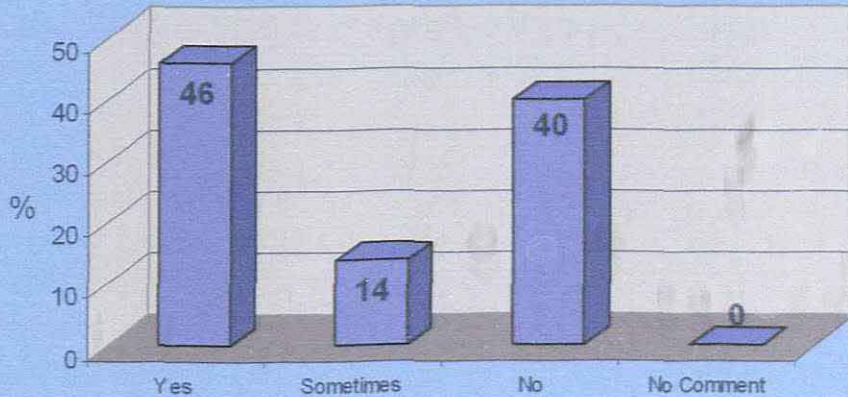
Claremont Bus and Minibus Taxi Drivers Q2.2b



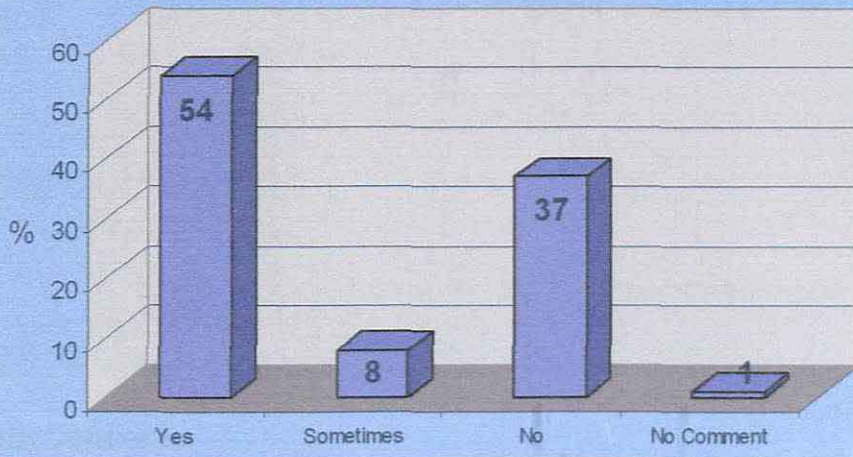
Claremont Bus and Minibus Taxi Drivers Q2.2c



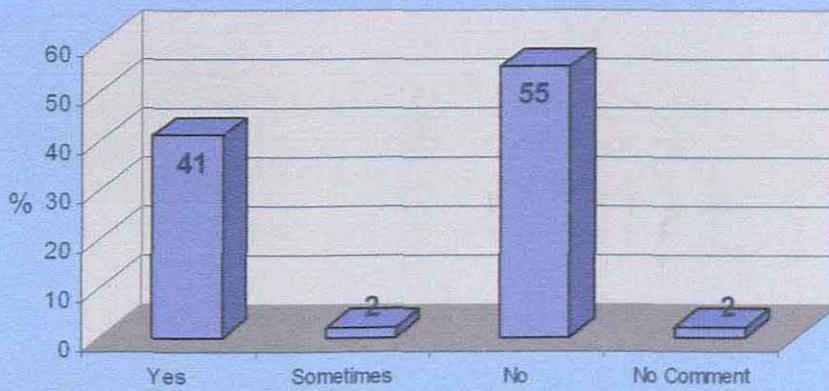
Claremont Bus and Minibus Taxi Drivers Q2.2d



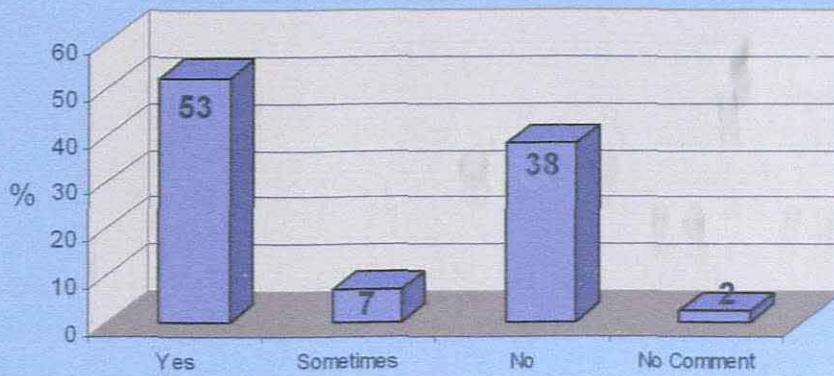
Claremont Bus and Minibus Taxi Drivers Q2.2e

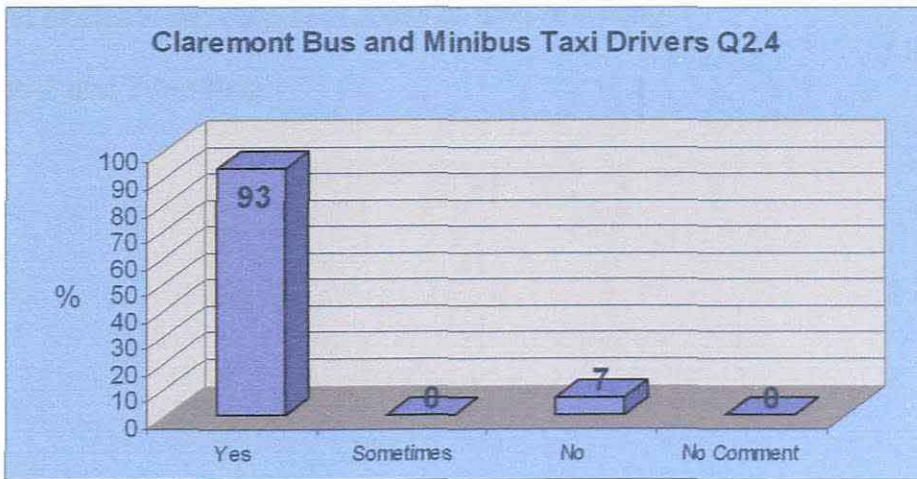


Claremont Bus and Minibus Taxi Drivers Q2.2f

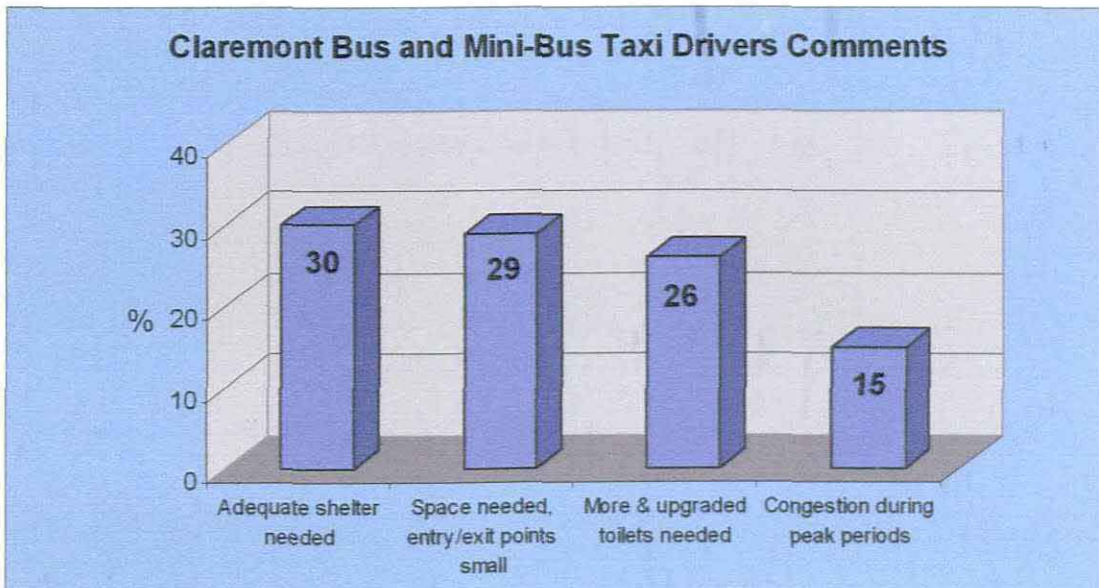


Claremont Bus and Minibus Taxi Drivers Q2.3





4.3 Main Concerns



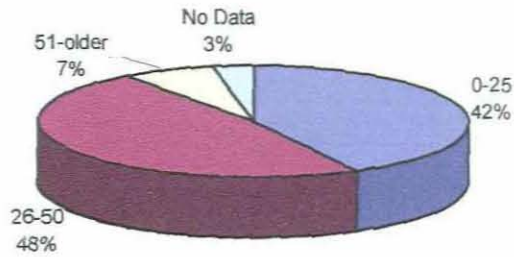
Retrieval of electronic data in process at time of writing.

Sections 2 and 3 pending.

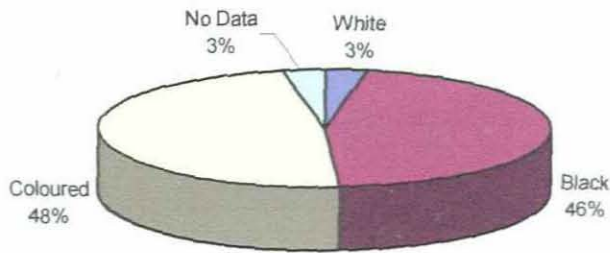
1. PASSENGERS

1.1 Demographic Information

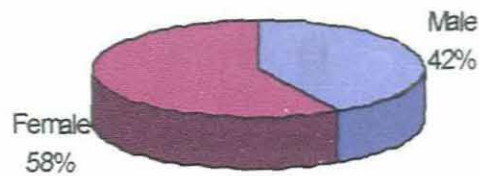
Mowbray Overall Age Split

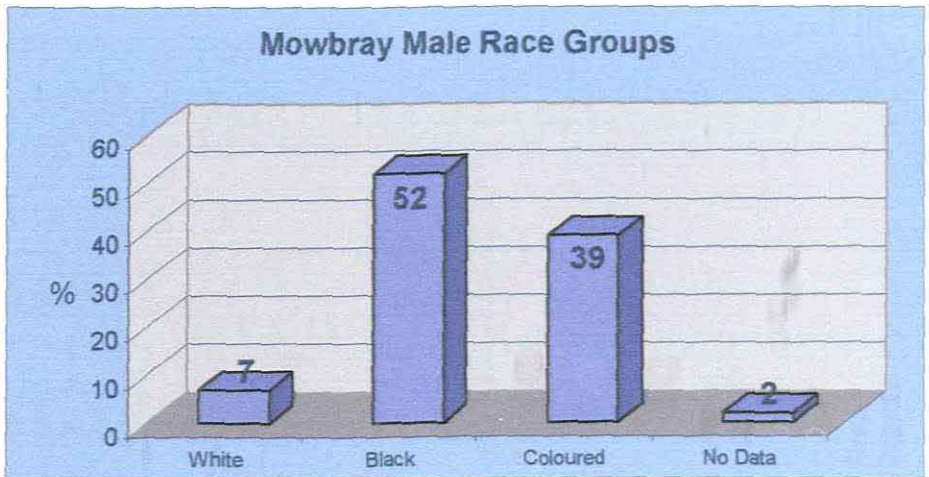
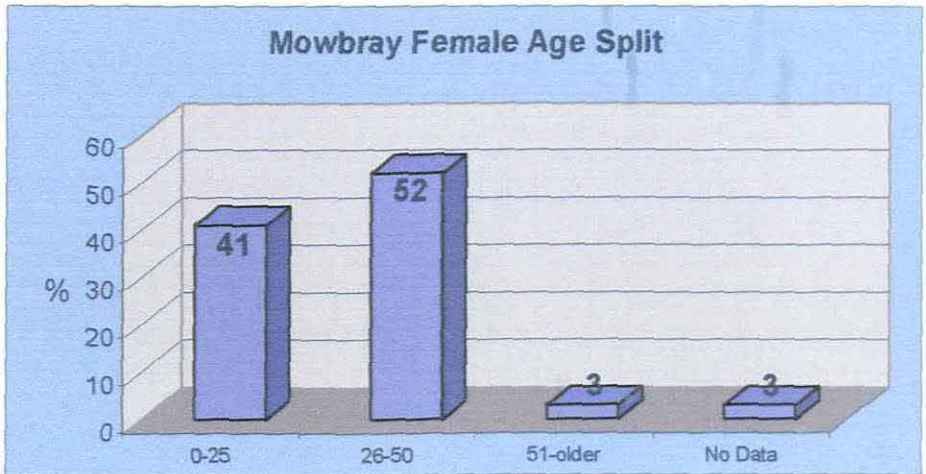
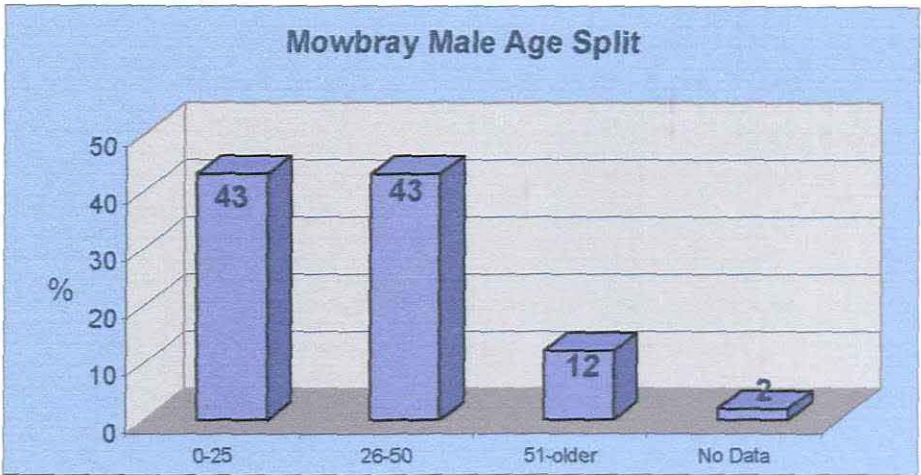


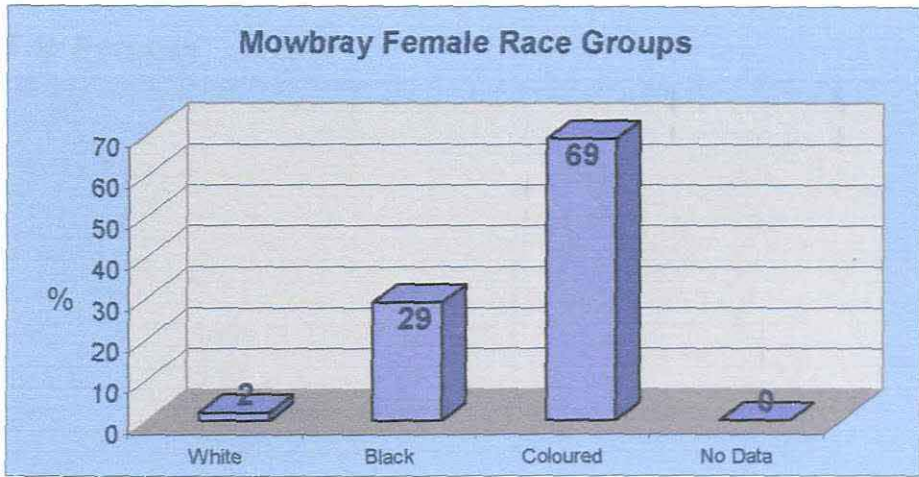
Mowbray Overall Race Split



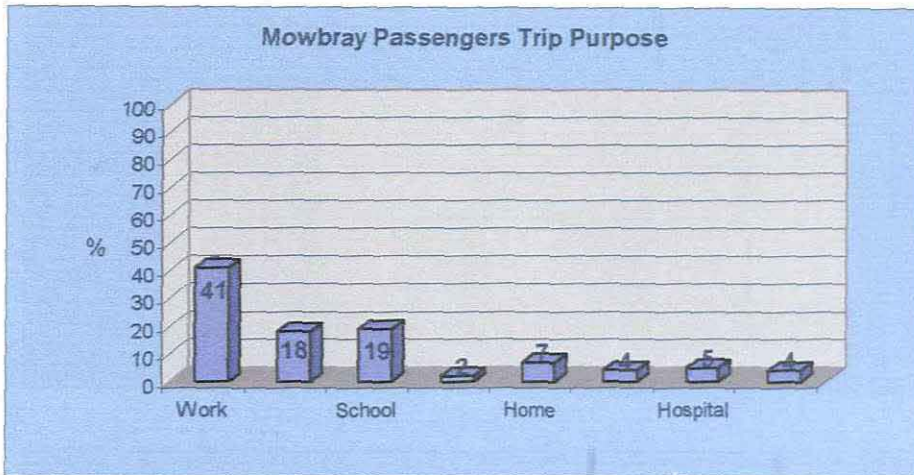
Mowbray Overall Gender Split



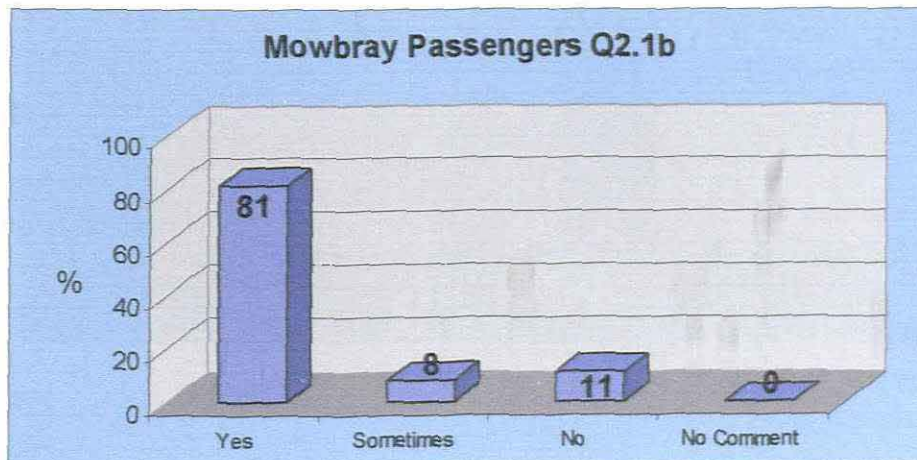
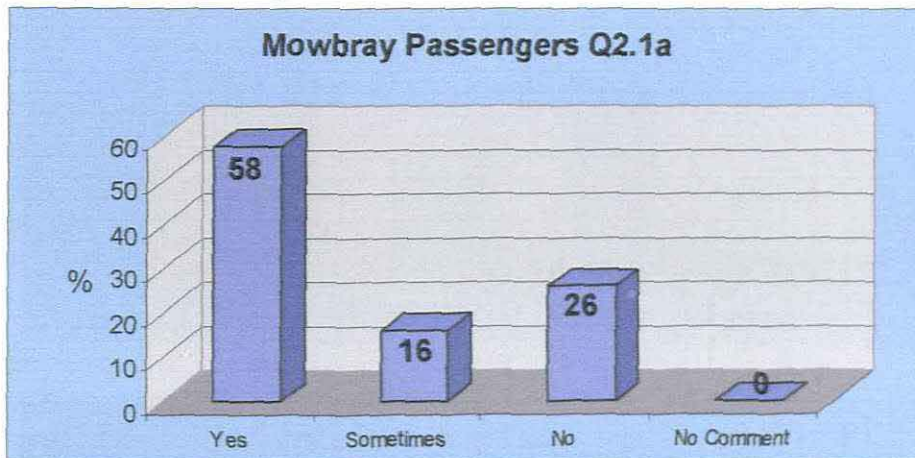


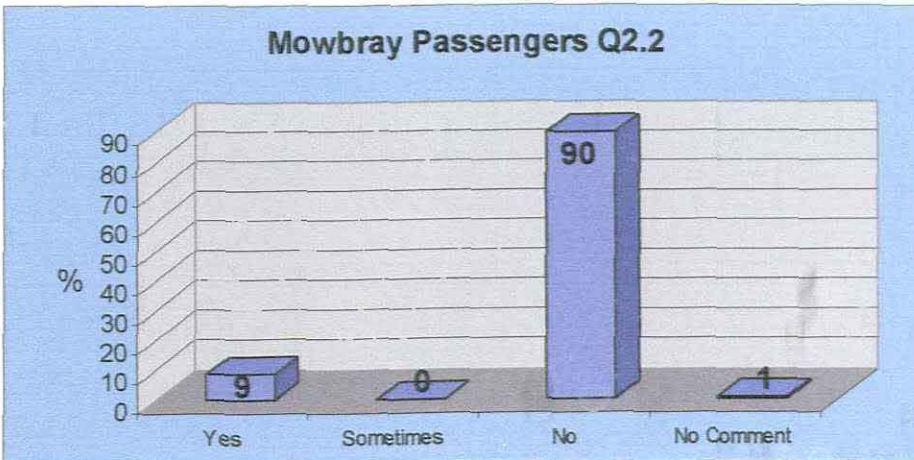
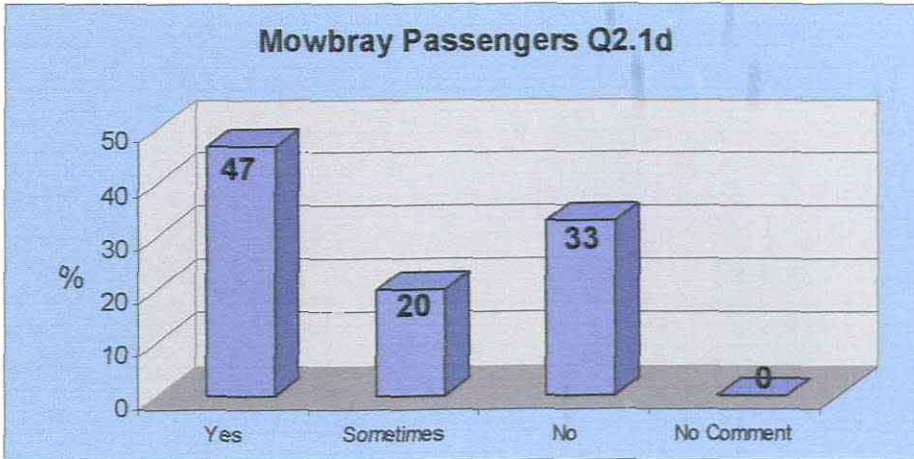
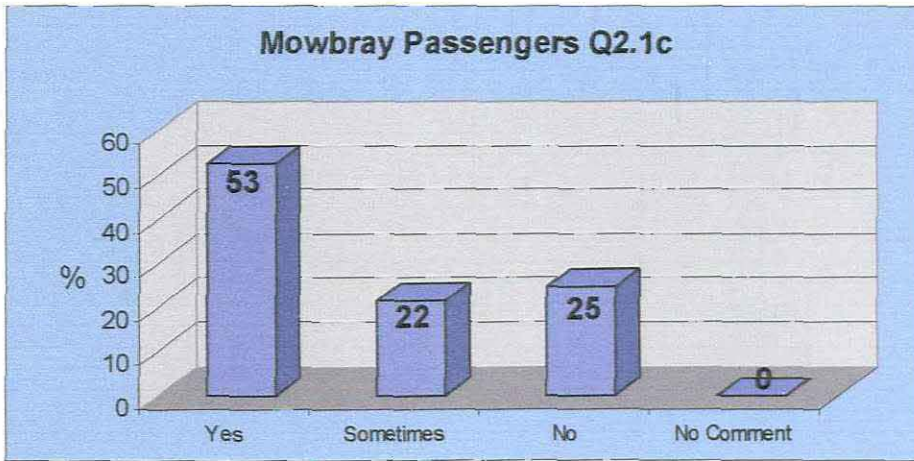


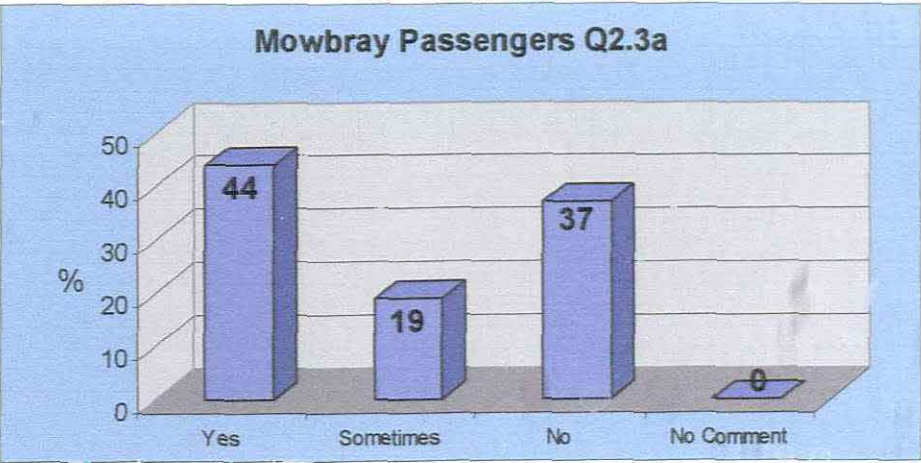
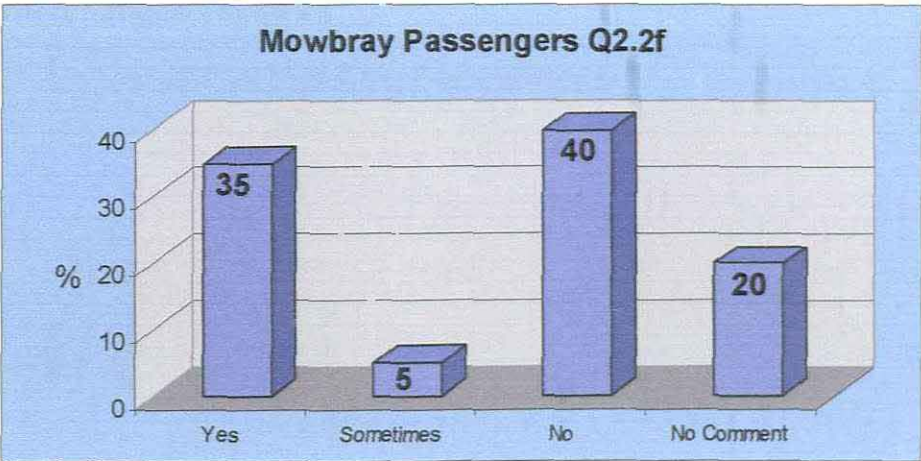
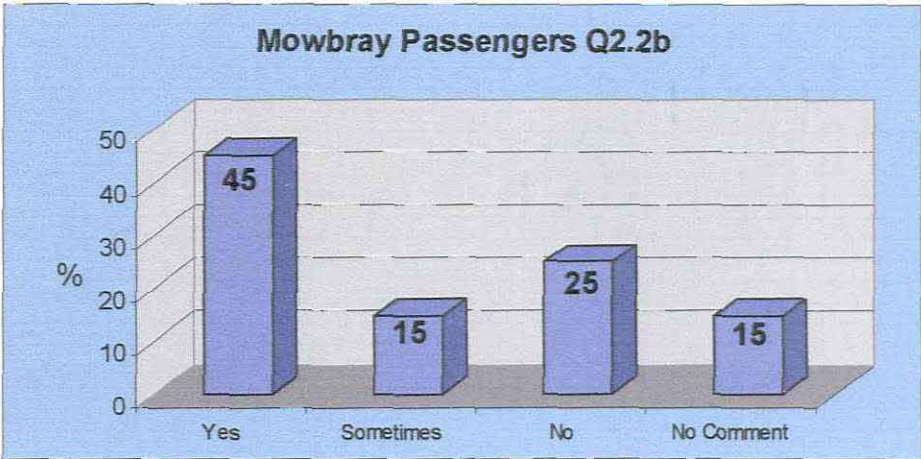
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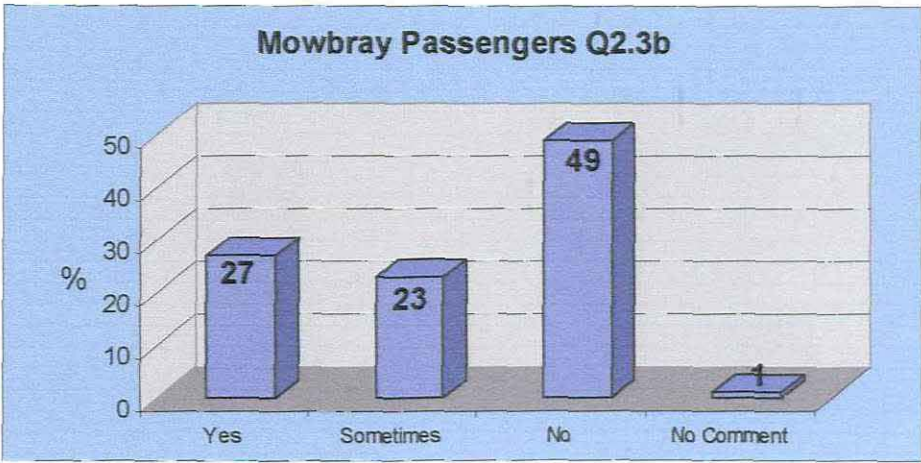


1.3 Safety and Security

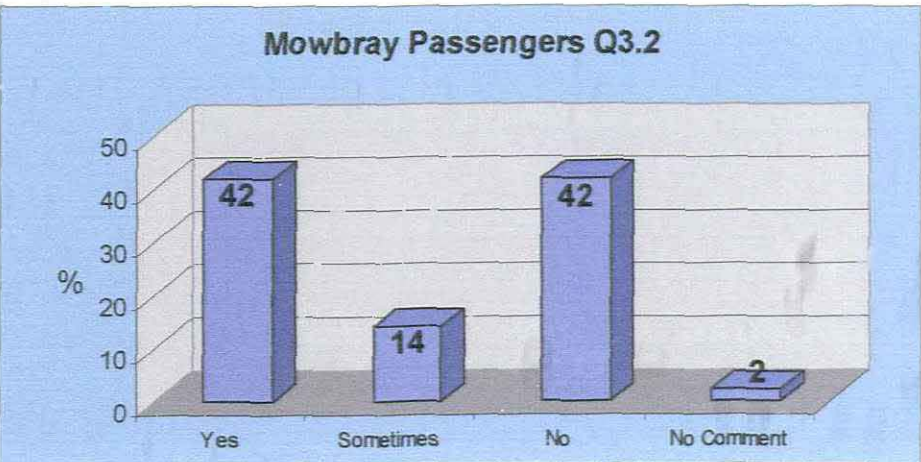
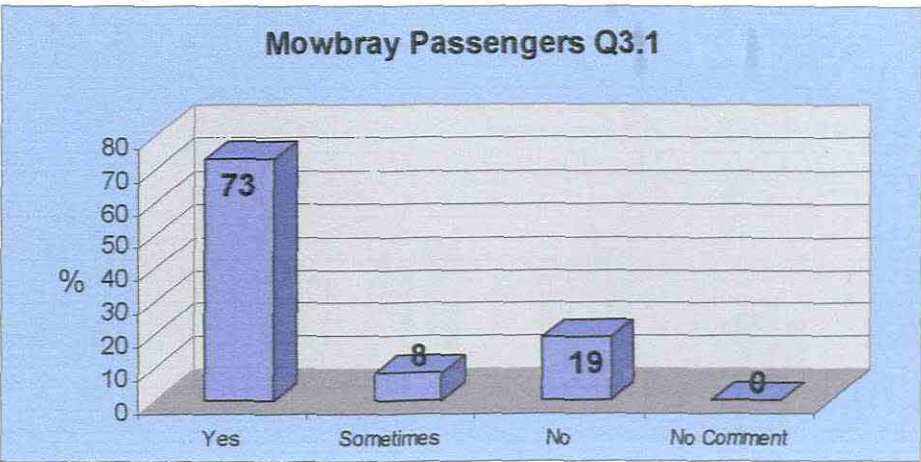


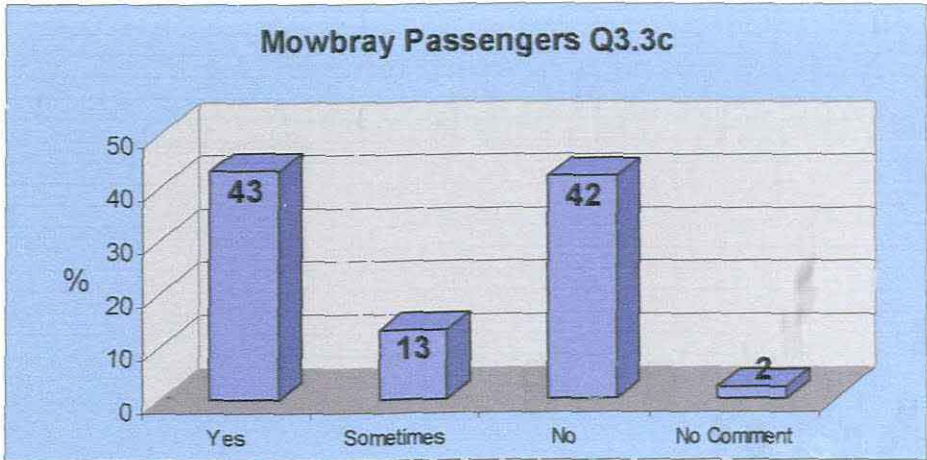
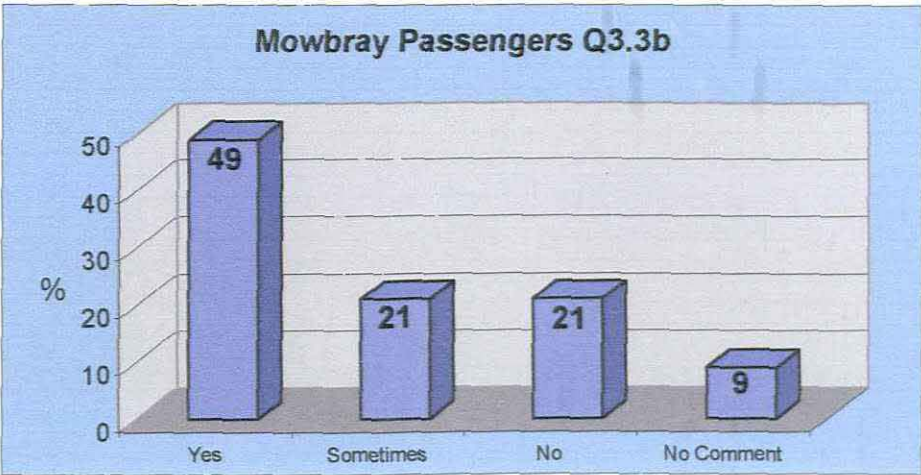
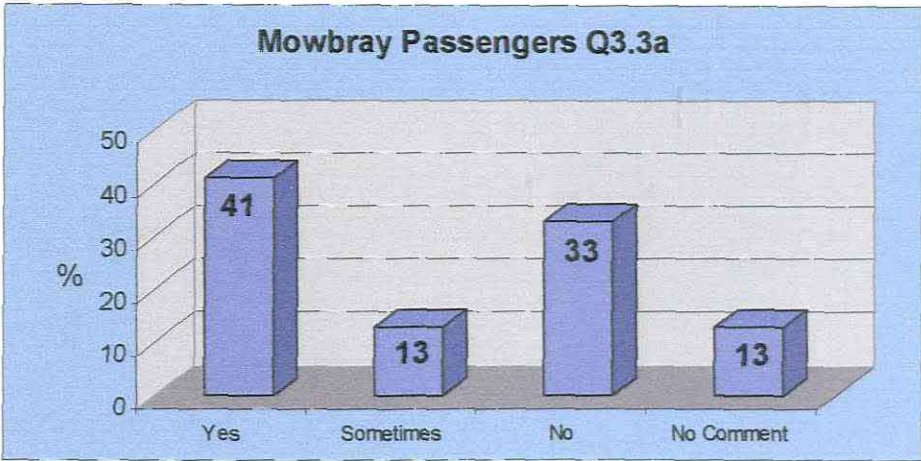


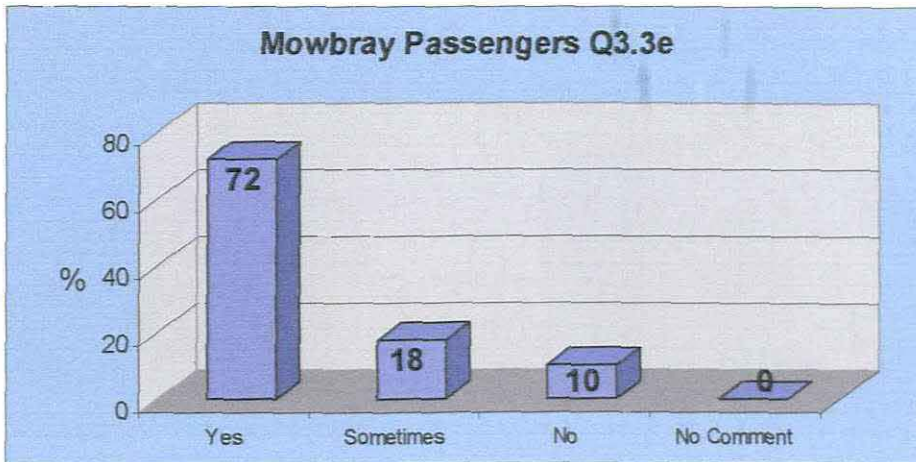
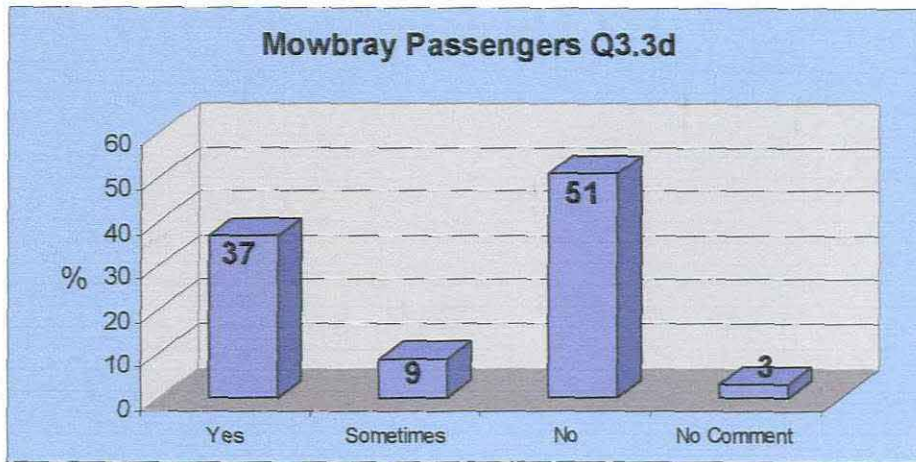




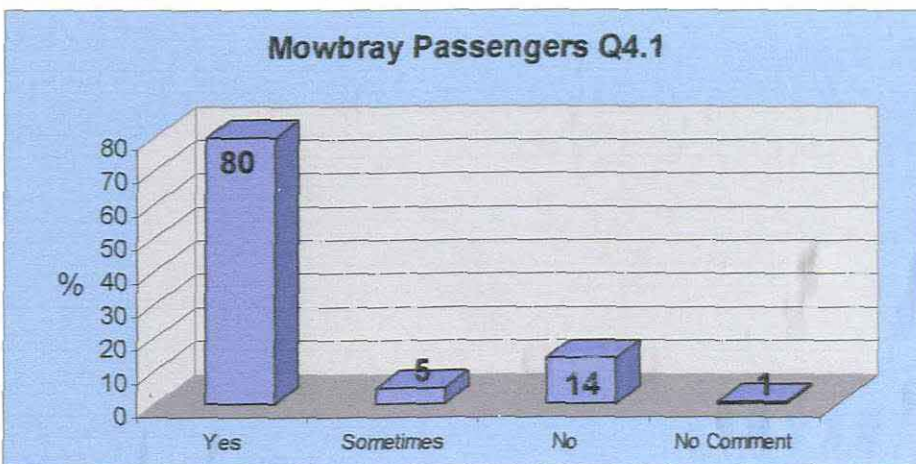
1.4 Interchanges Facilities

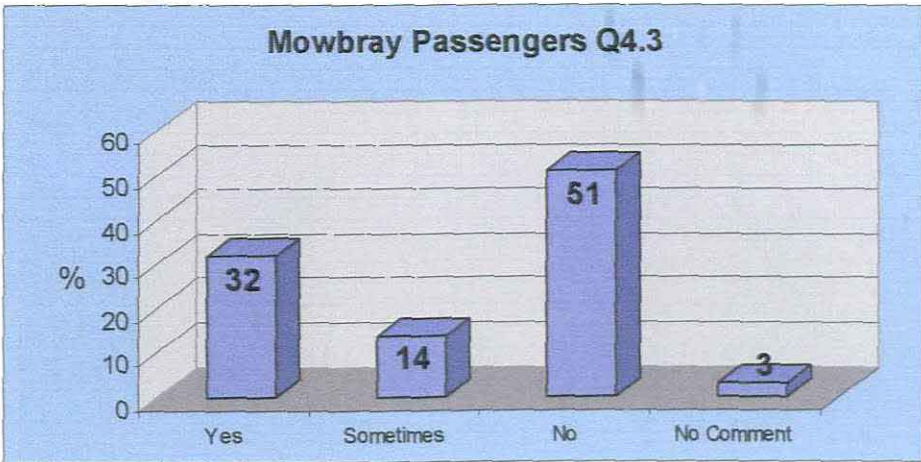
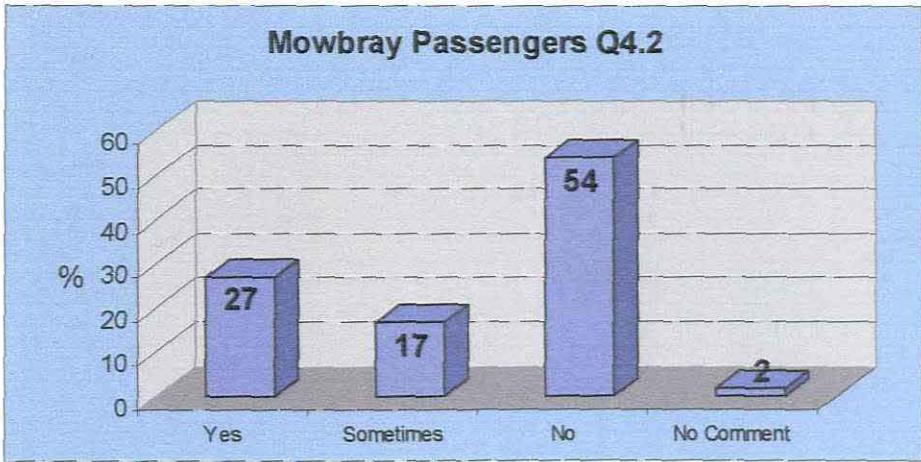




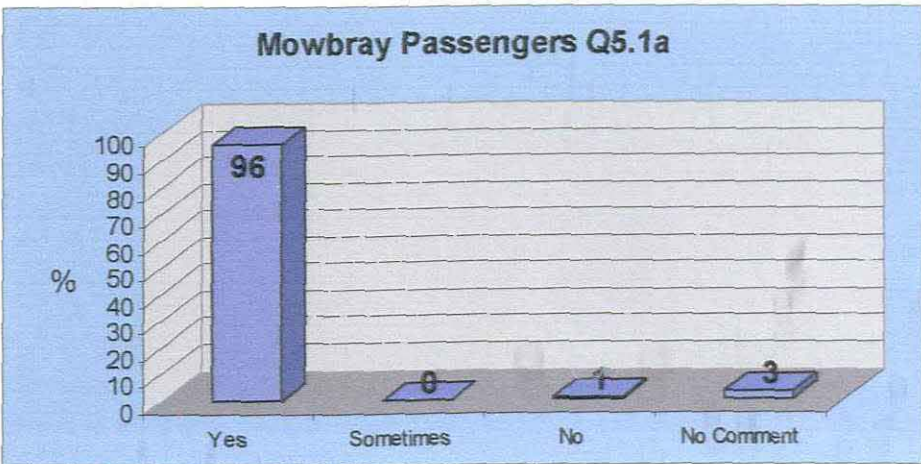


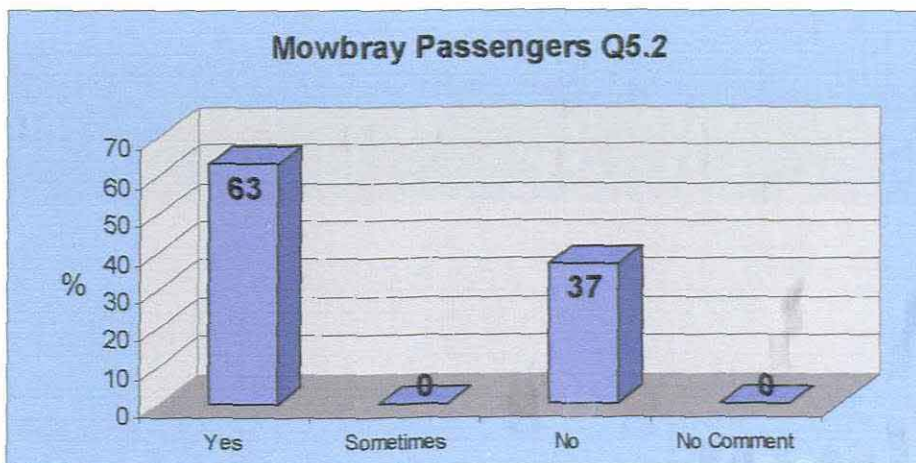
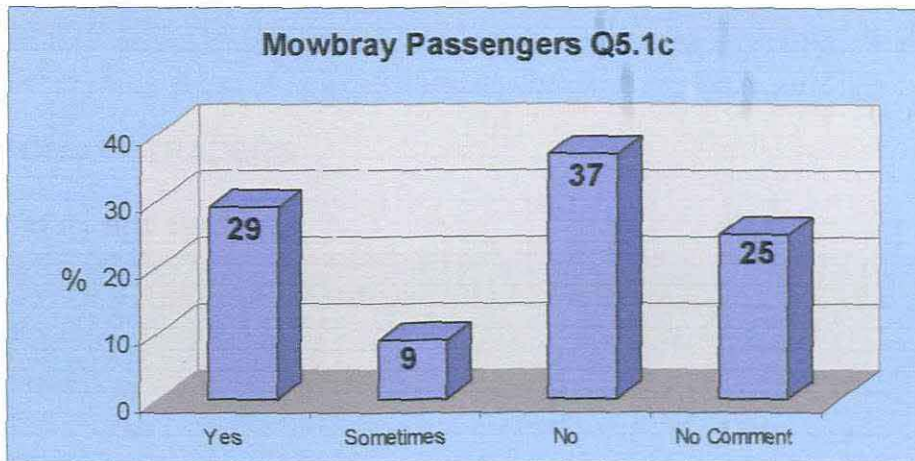
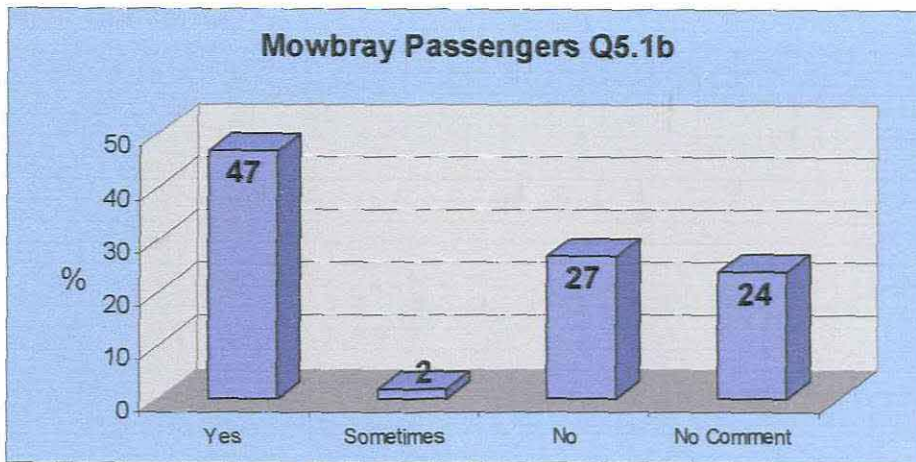
1.5 Pedestrian Environment



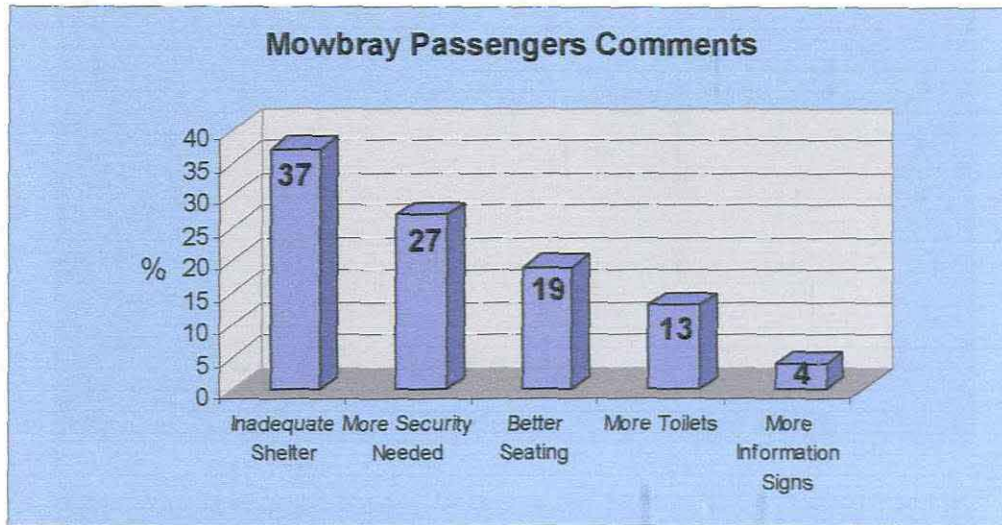


1.6 General



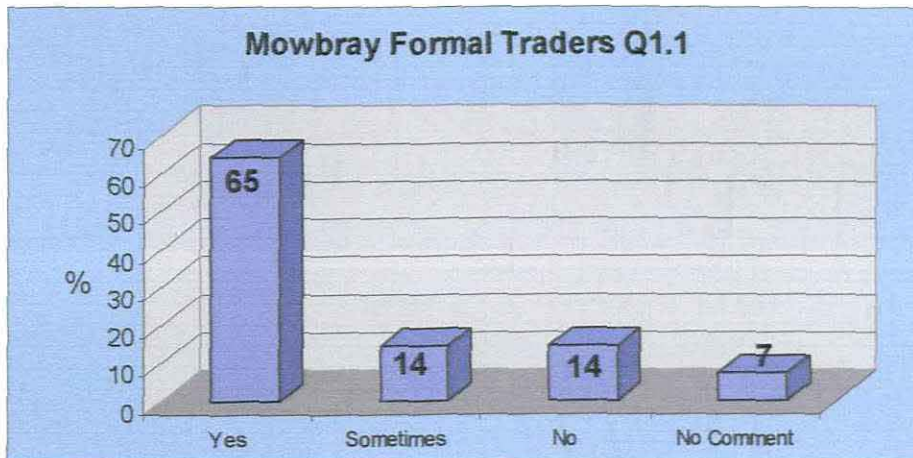


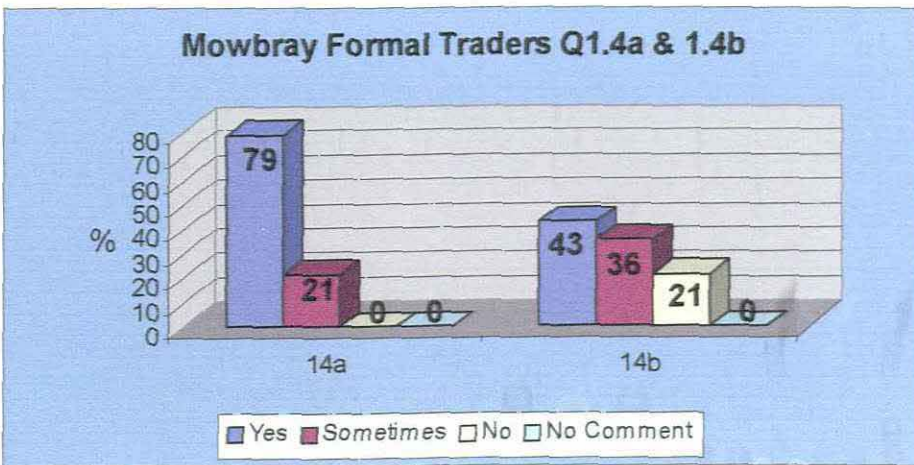
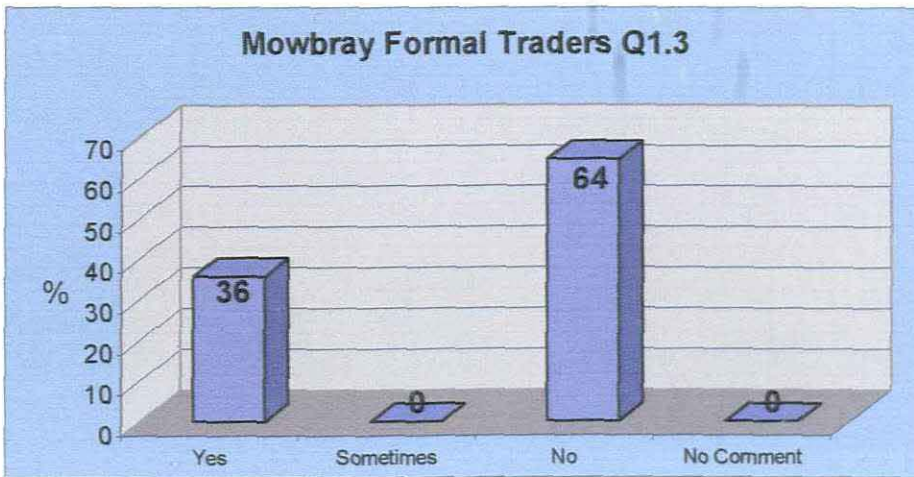
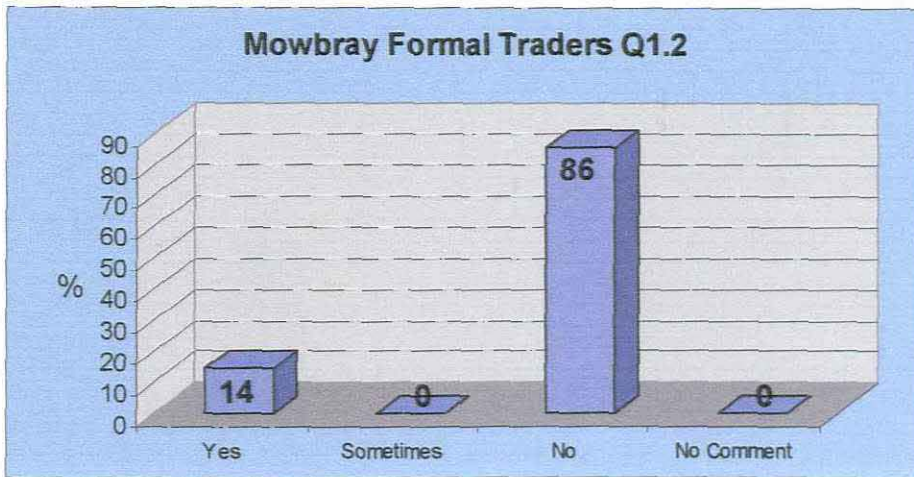
1.7 Main Concerns



2. FORMAL TRADERS

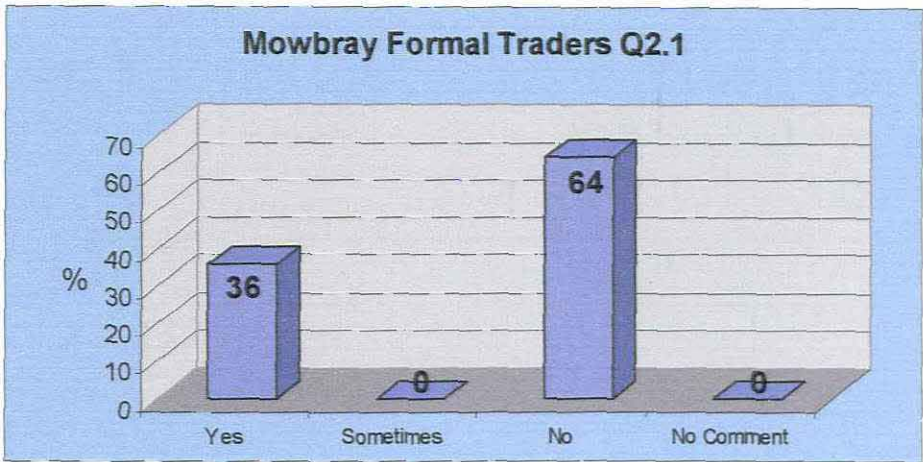
2.1 Safety and Security



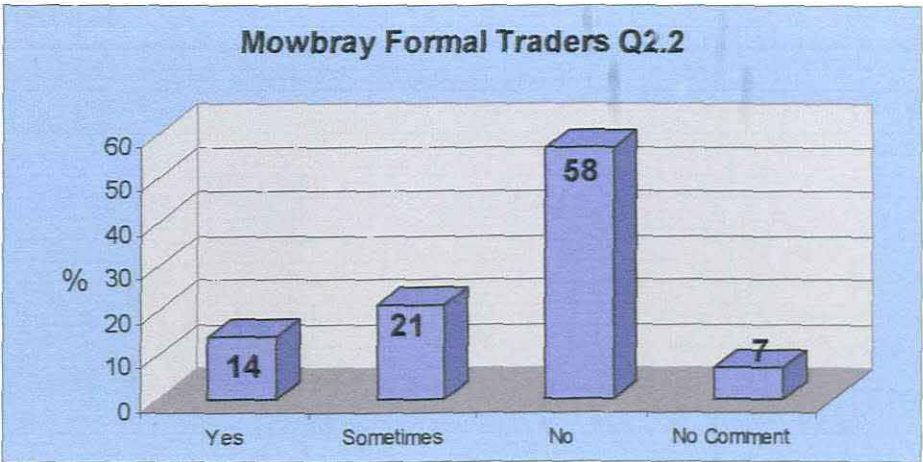


2.2 Interchanges Facilities

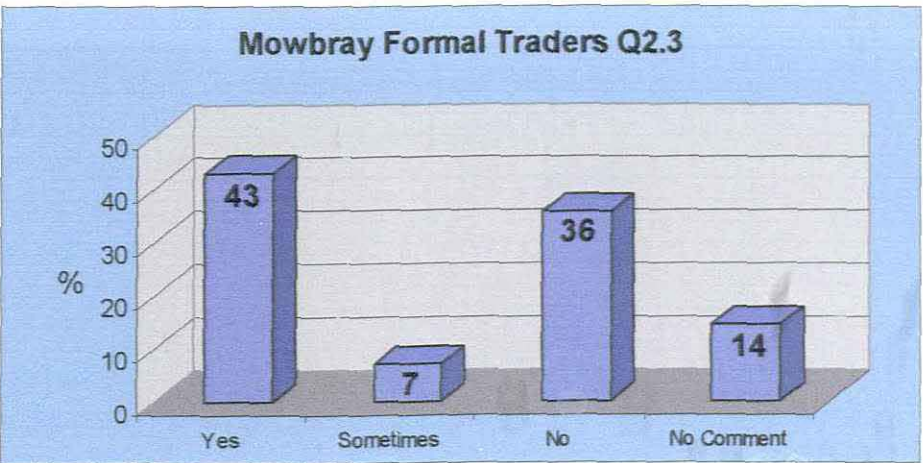
Mowbray Formal Traders Q2.1

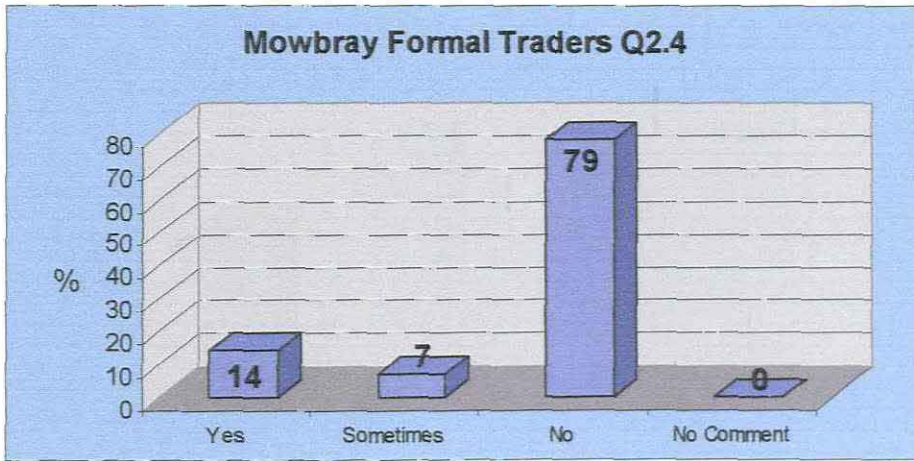


Mowbray Formal Traders Q2.2

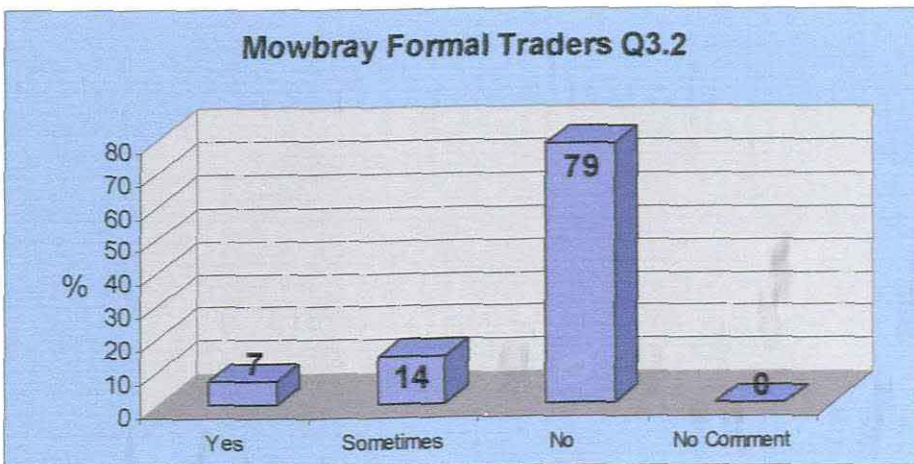
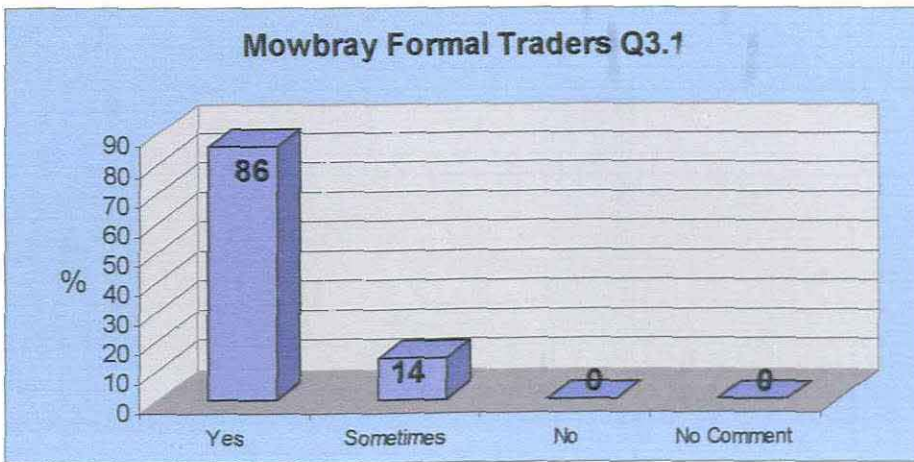


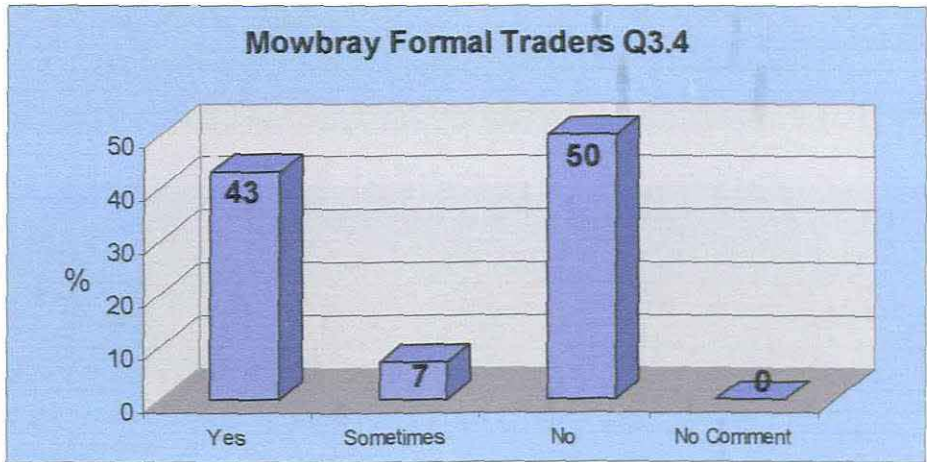
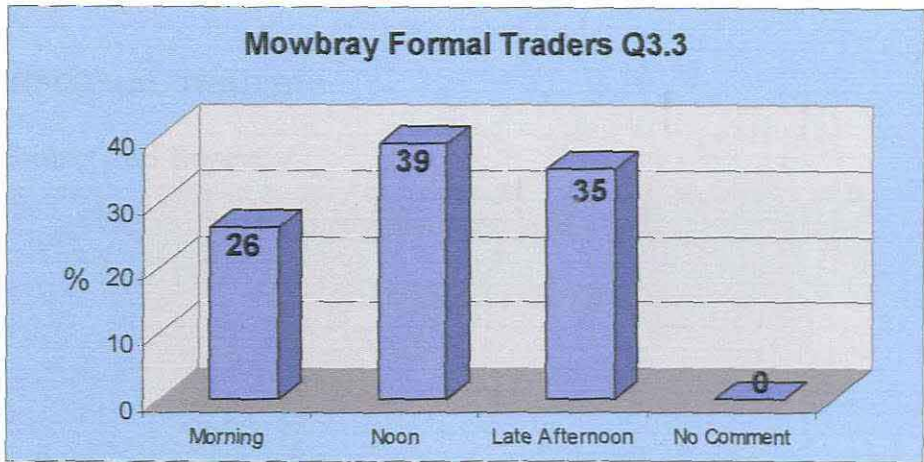
Mowbray Formal Traders Q2.3



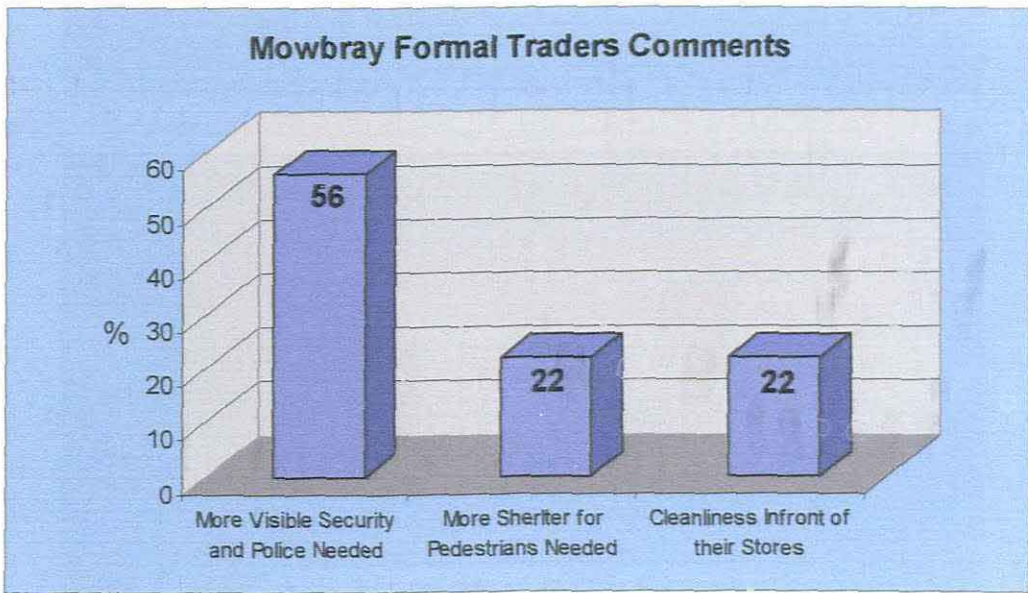


2.3 General



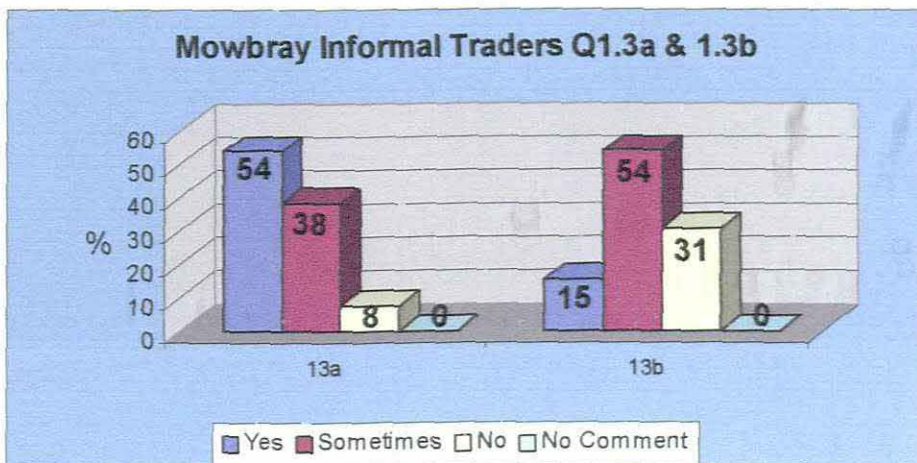
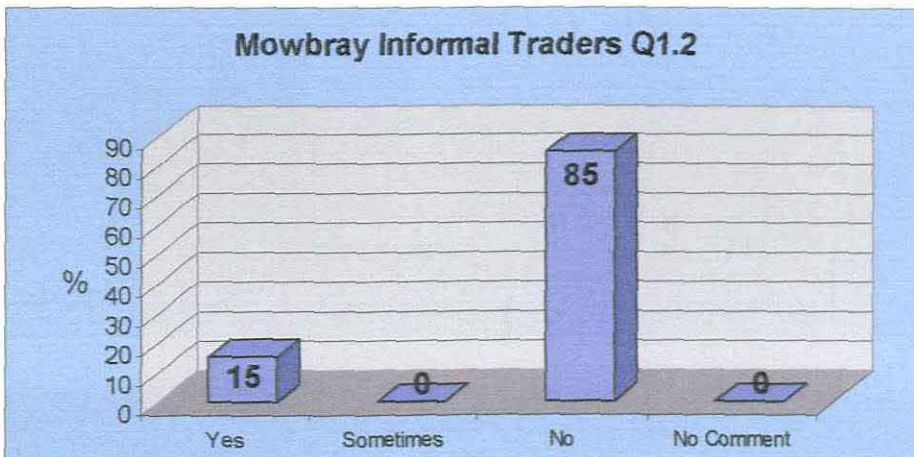
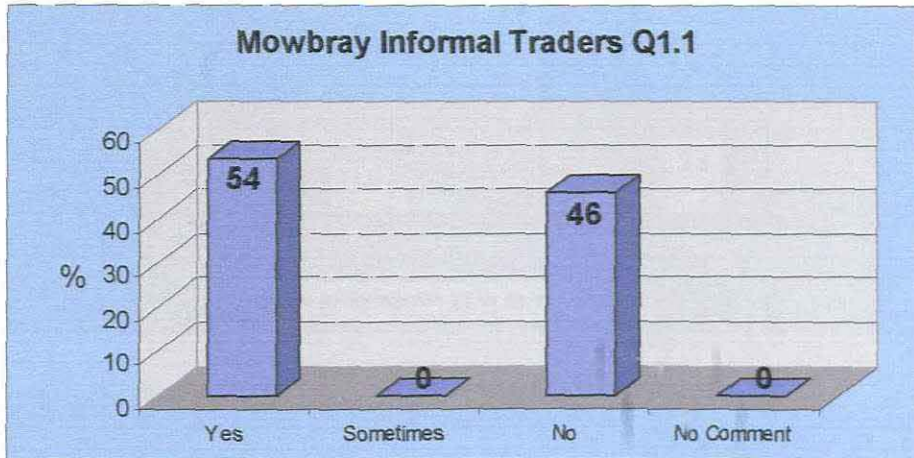


2.4 Main Concerns

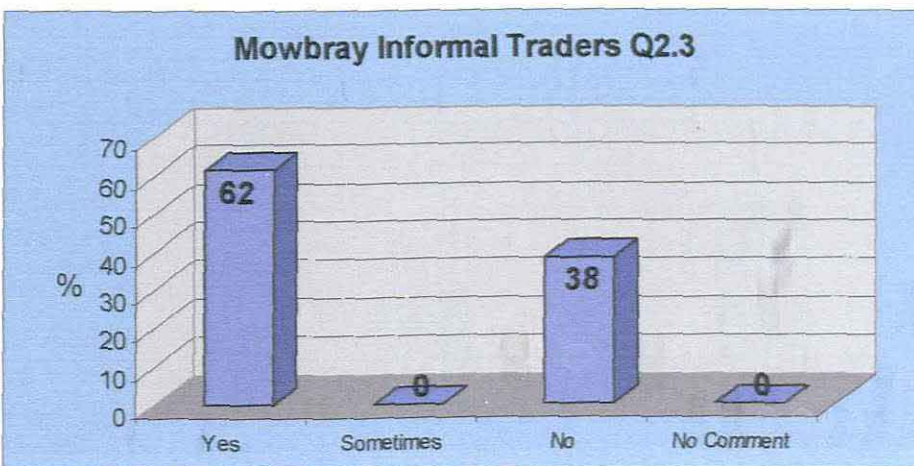
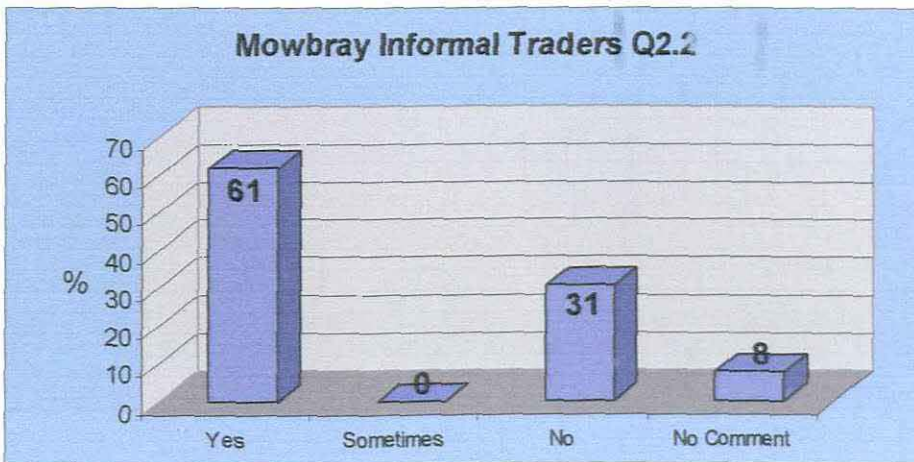
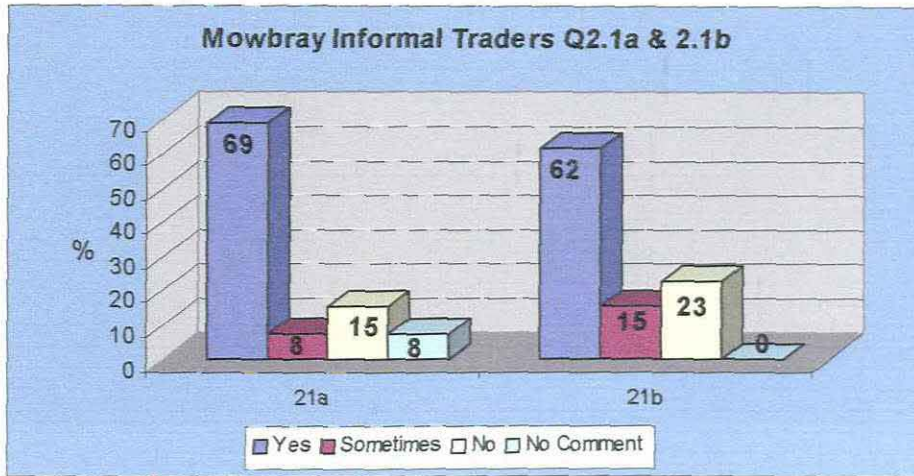


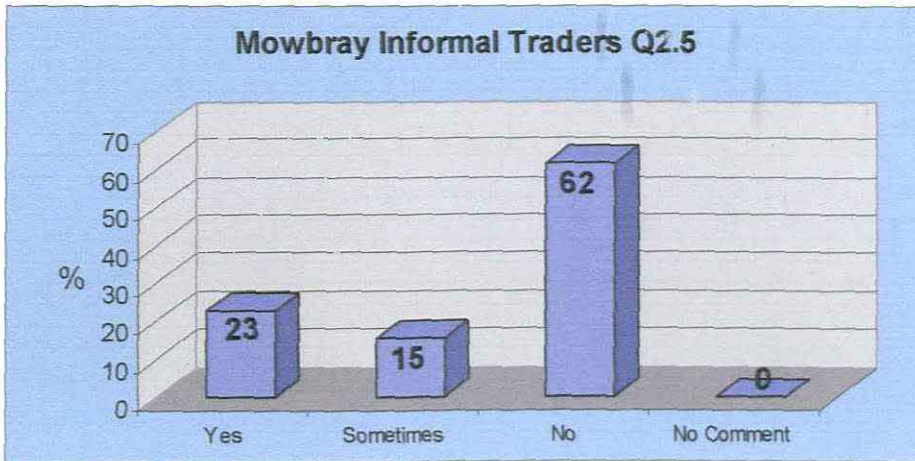
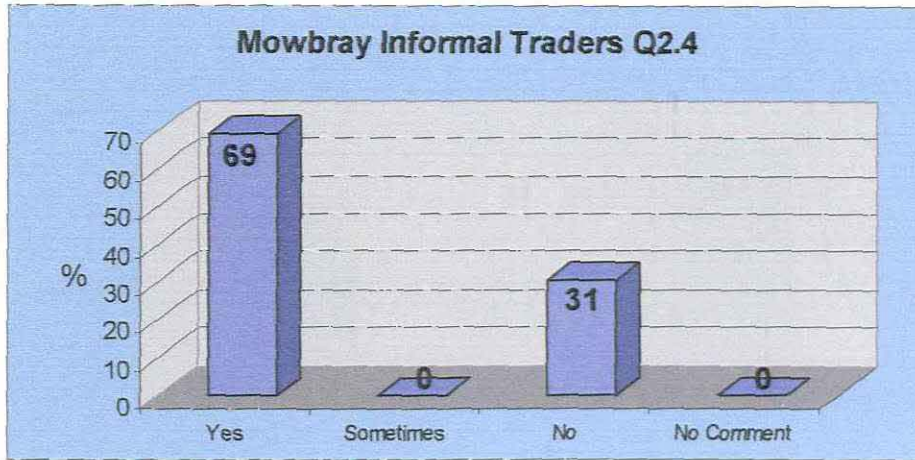
3. INFORMAL TRADERS

3.1 Safety and Security

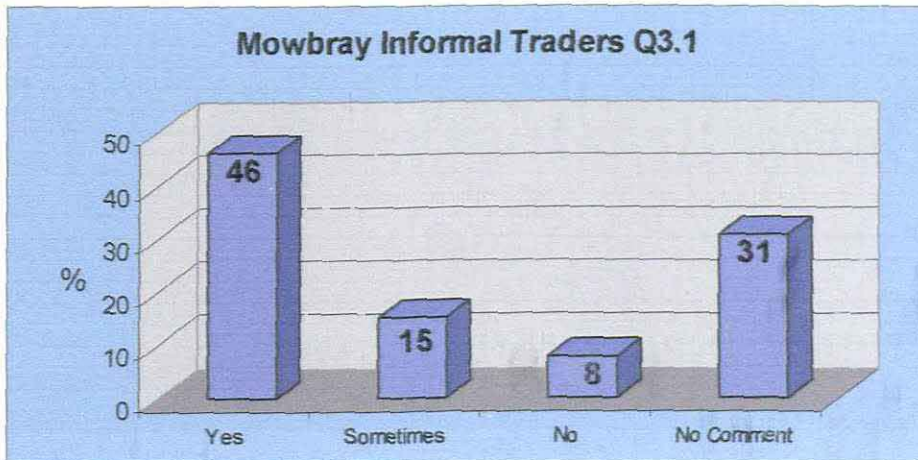


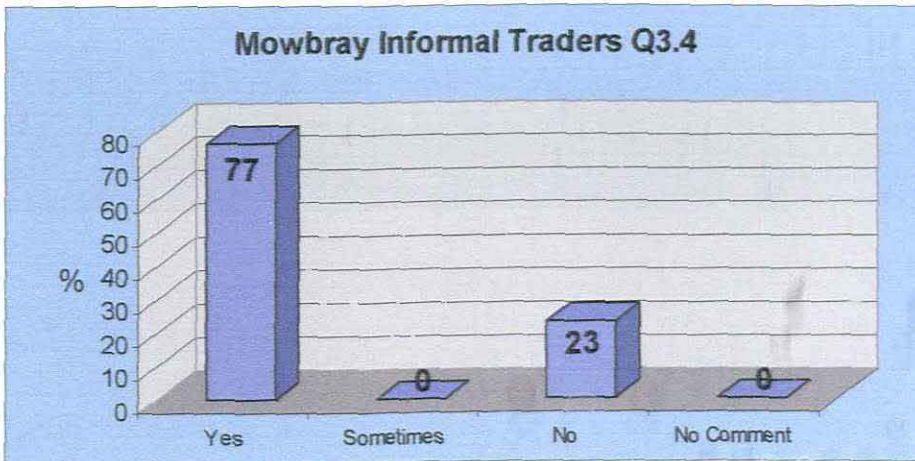
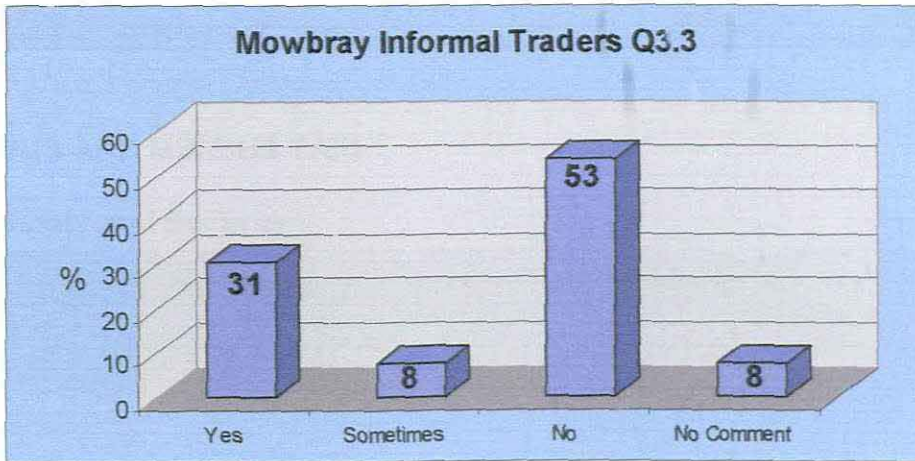
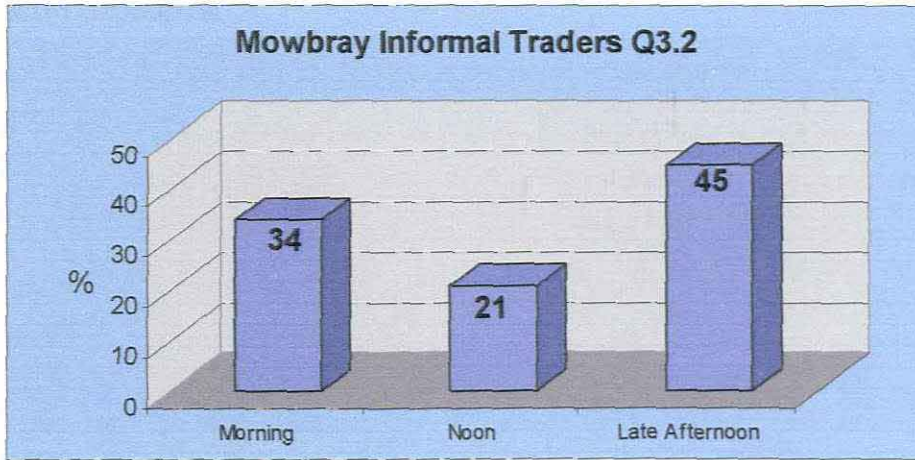
3.2 Interchange Facilities



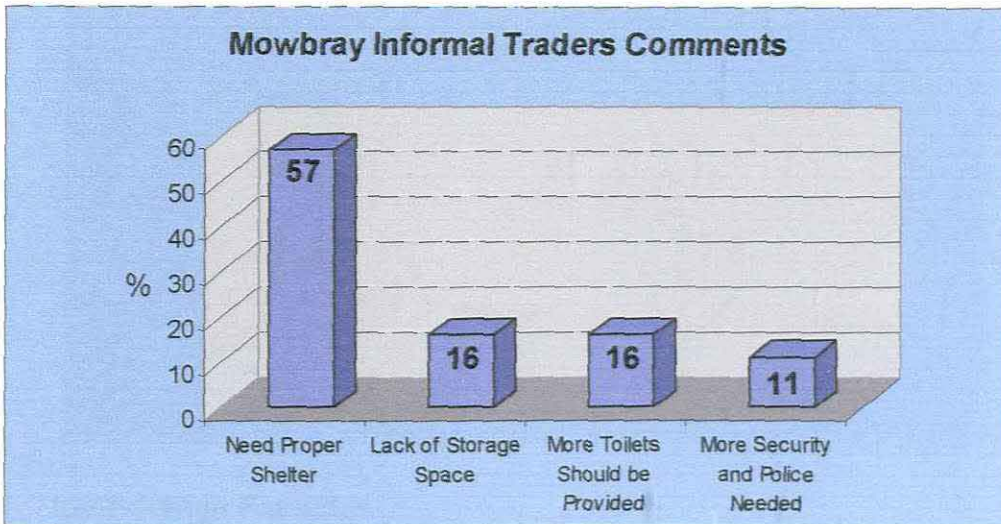


3.3 General



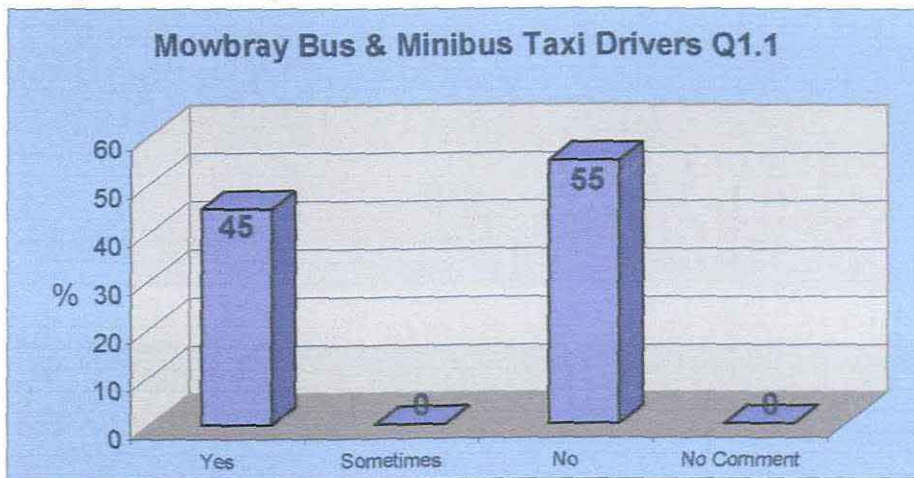


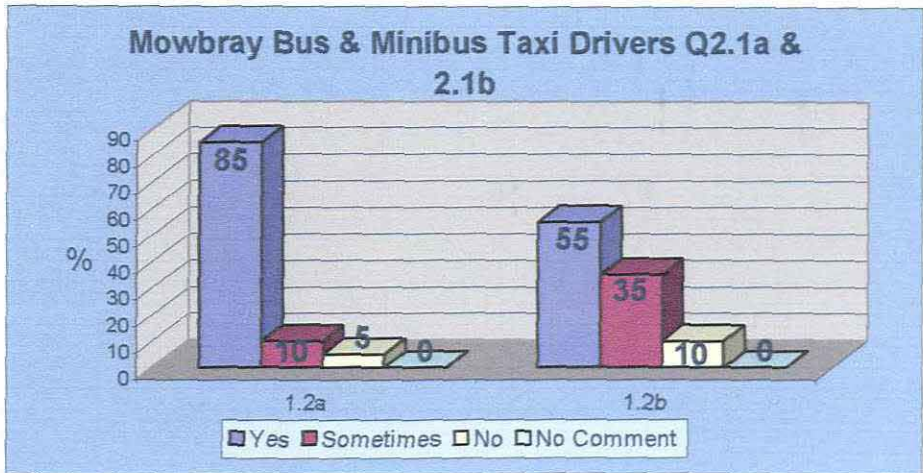
3.4 Main Concerns



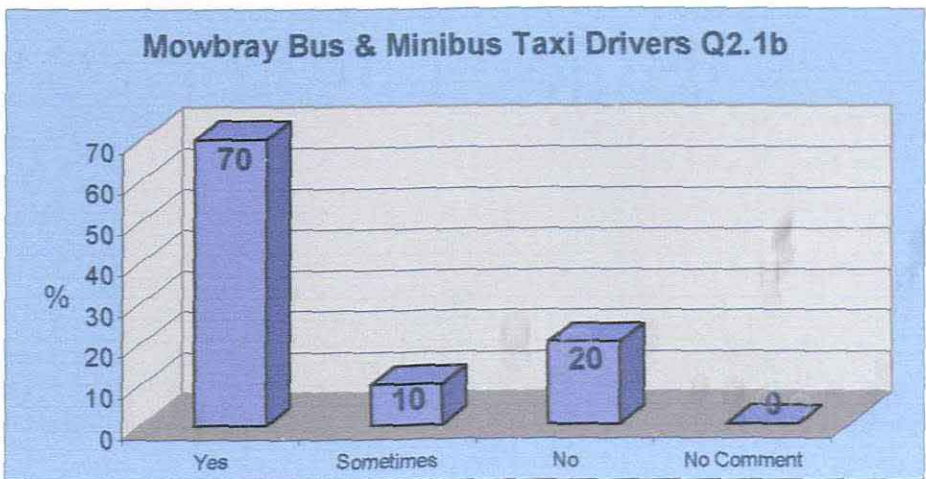
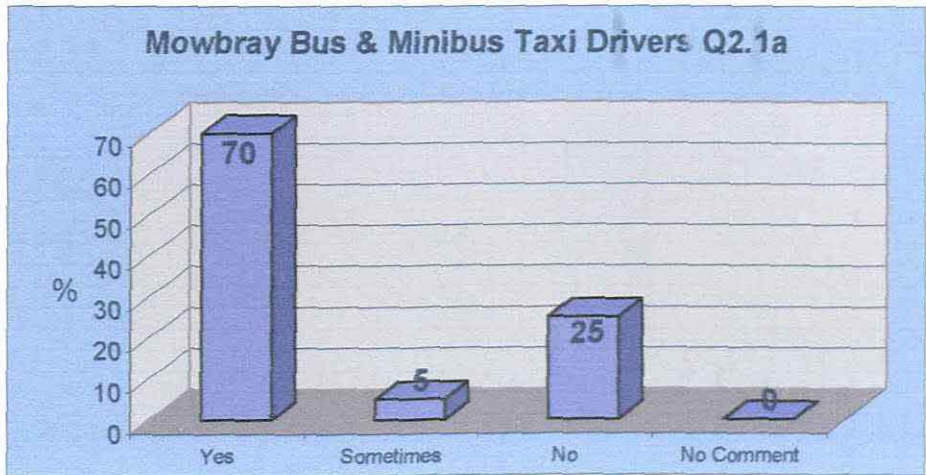
4. BUS AND MINIBUS TAXI

4.1 Safety and Security

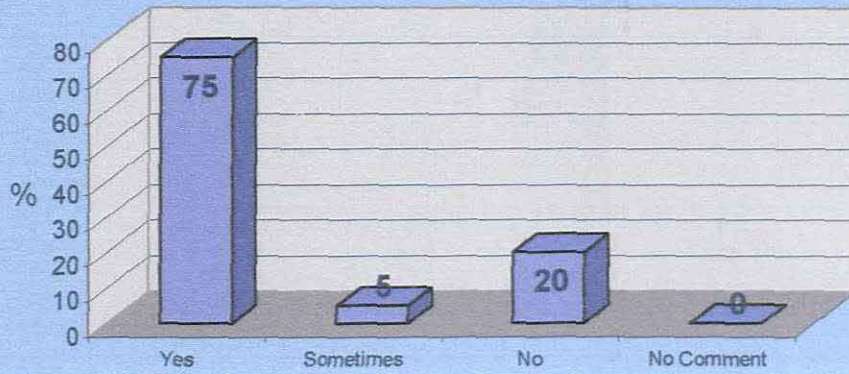




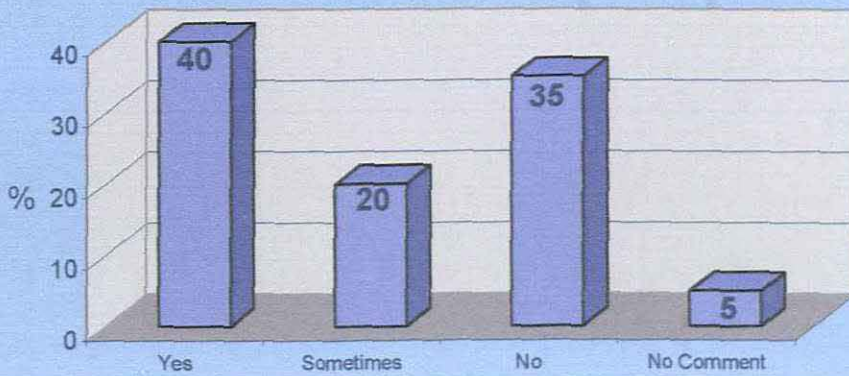
4.2 Interchange Facilities



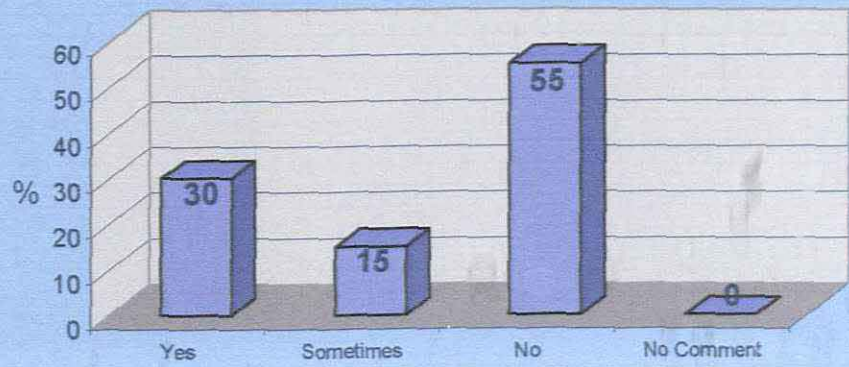
Mowbray Bus & Minibus Taxi Drivers Q2.1c

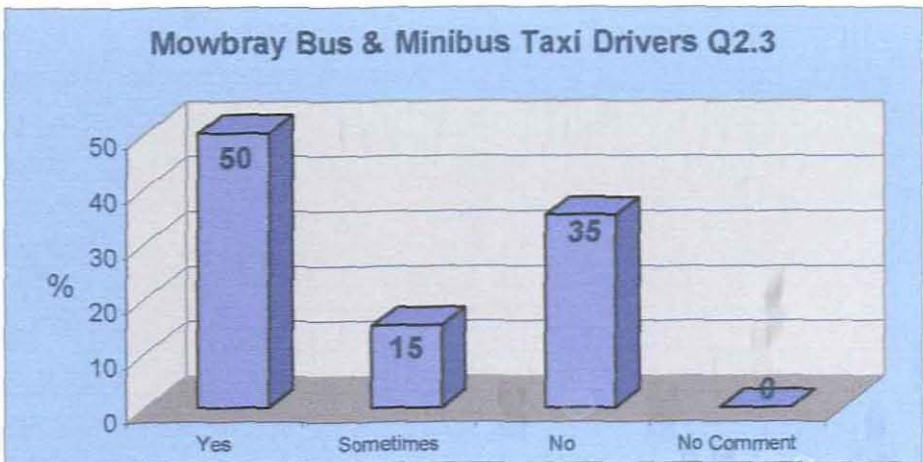
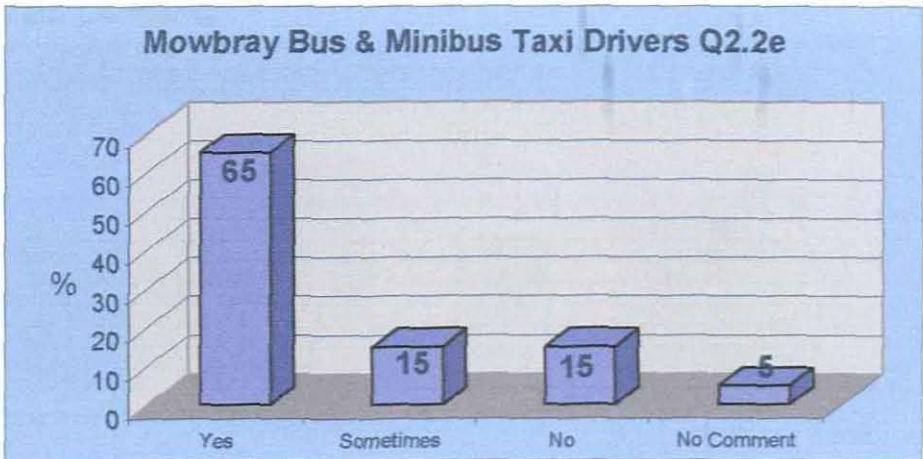
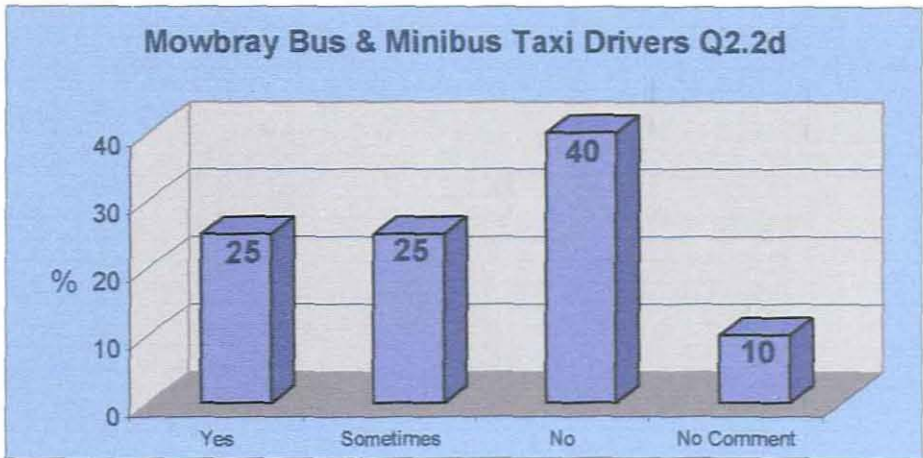


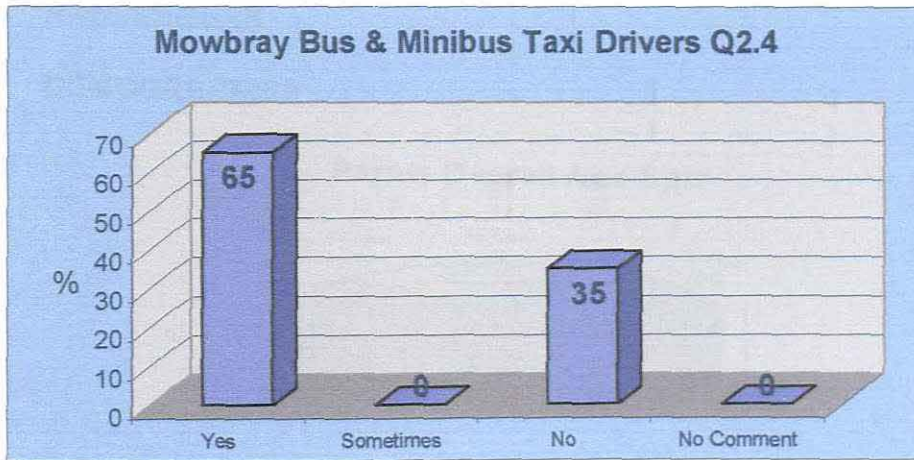
Mowbray Bus & Minibus Taxi Drivers Q2.2a



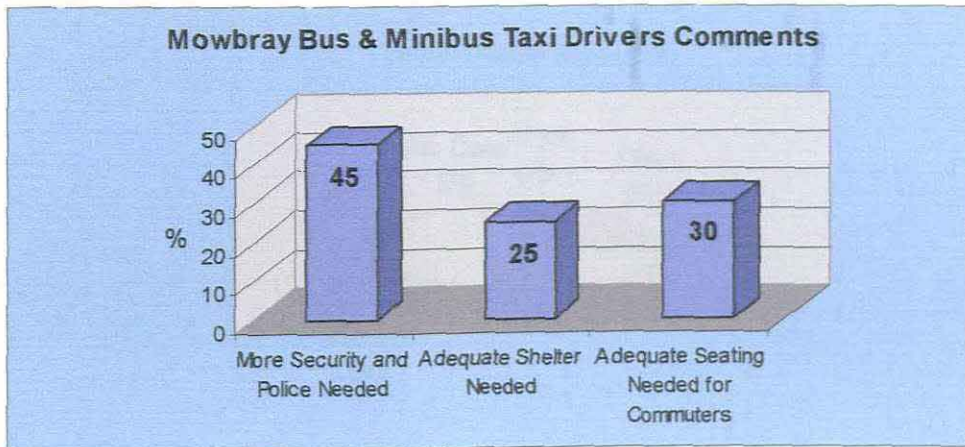
Mowbray Bus & Minibus Taxi Drivers Q2.2c







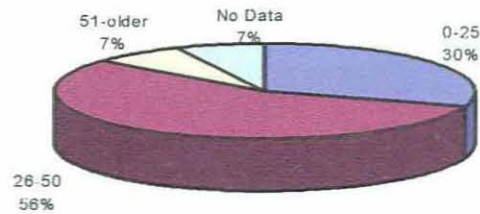
4.3 Main Concerns



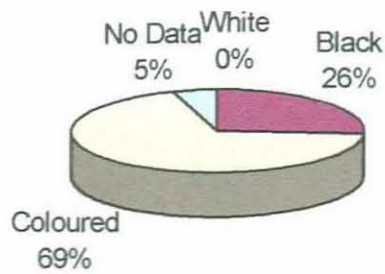
1. PASSENGERS

1.1 DEMOGRAPHICS

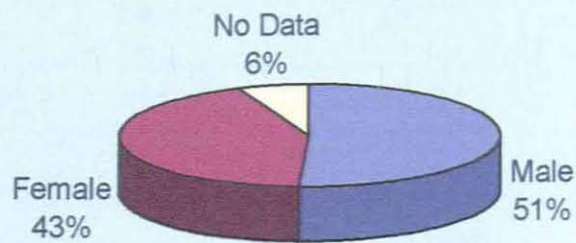
Parow Overall Age Split

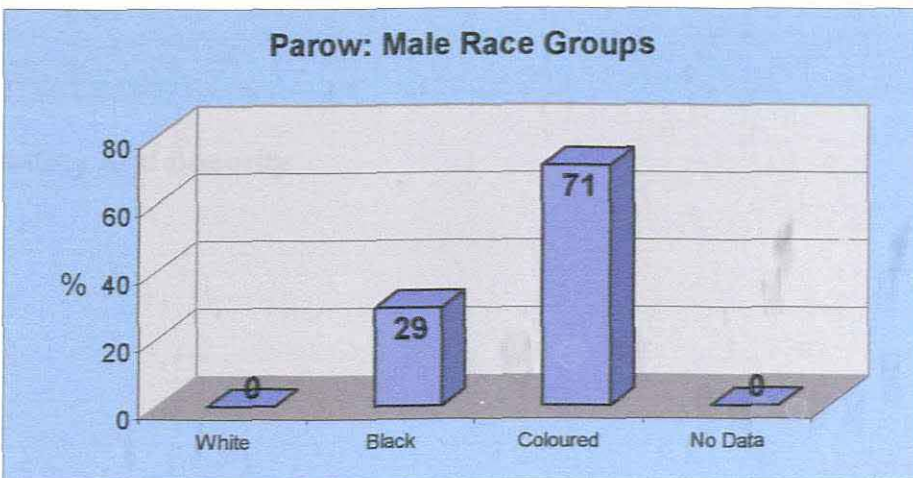
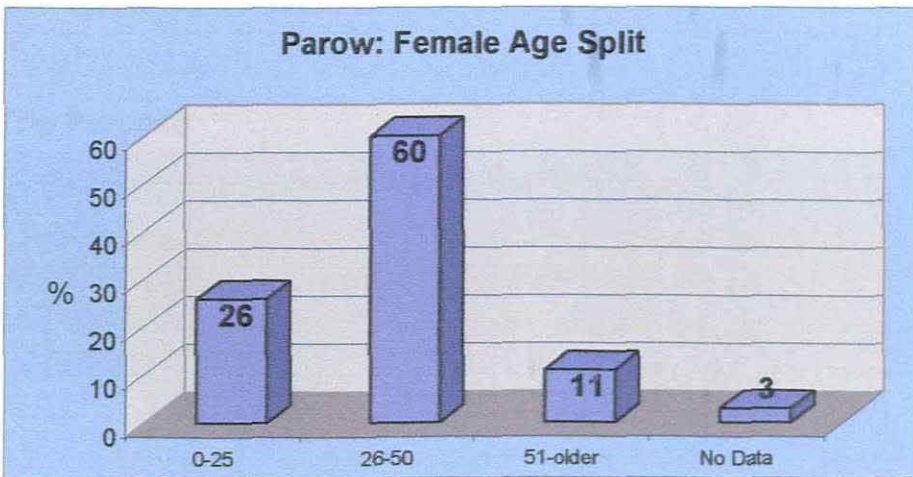
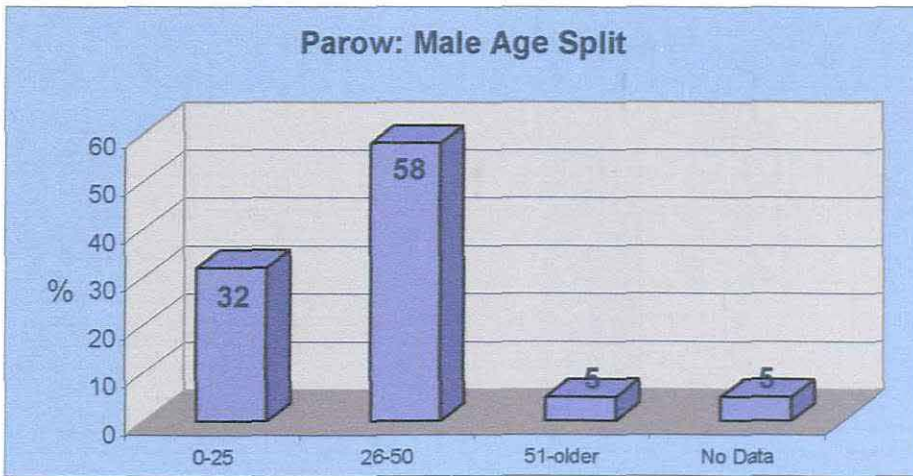


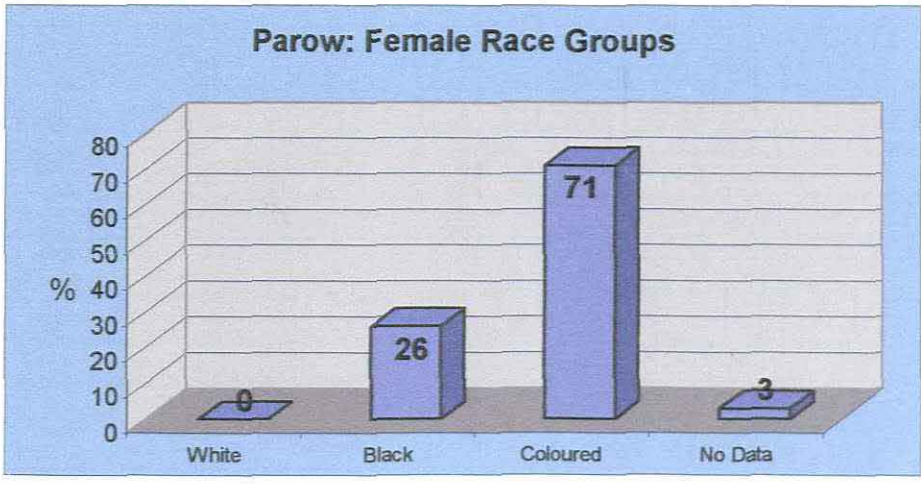
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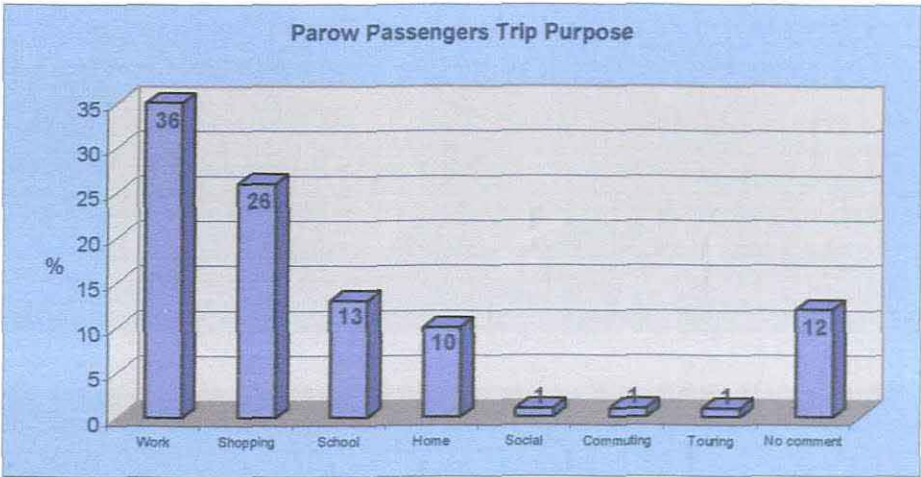
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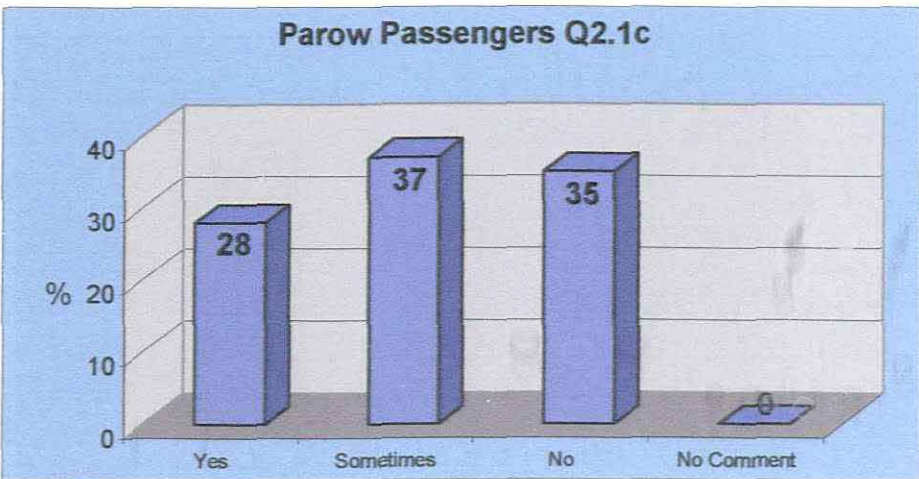
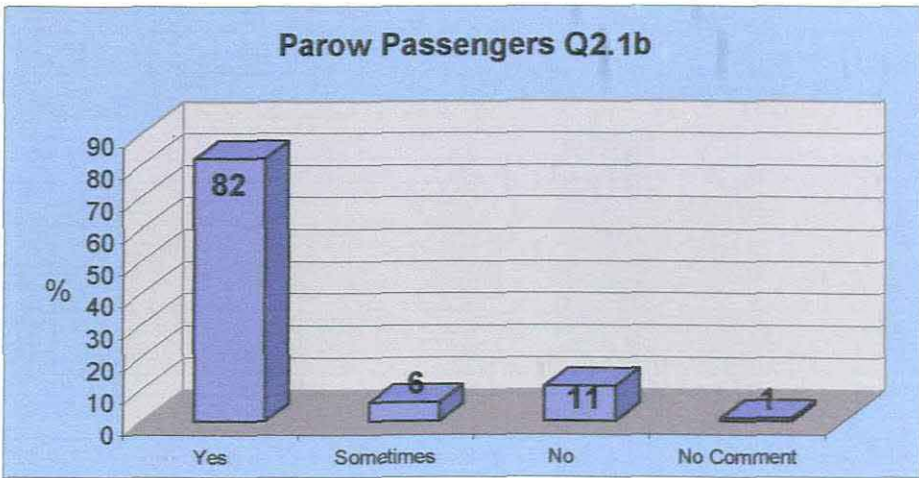
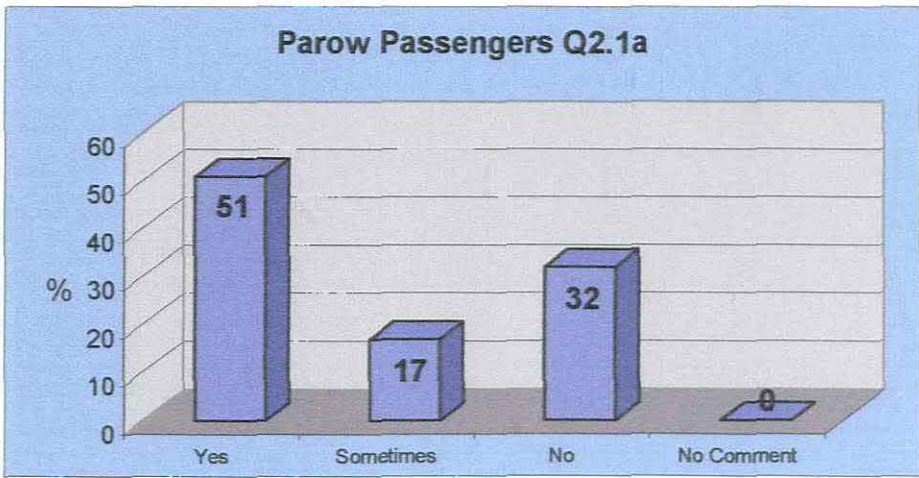


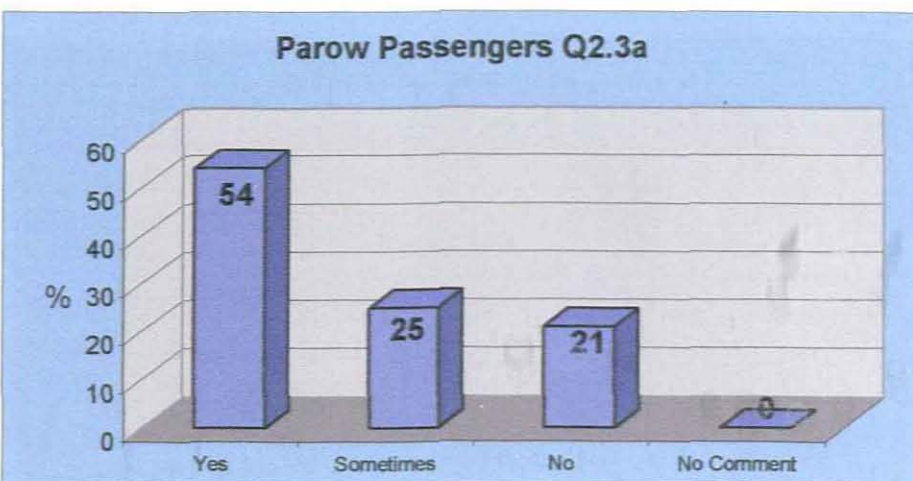
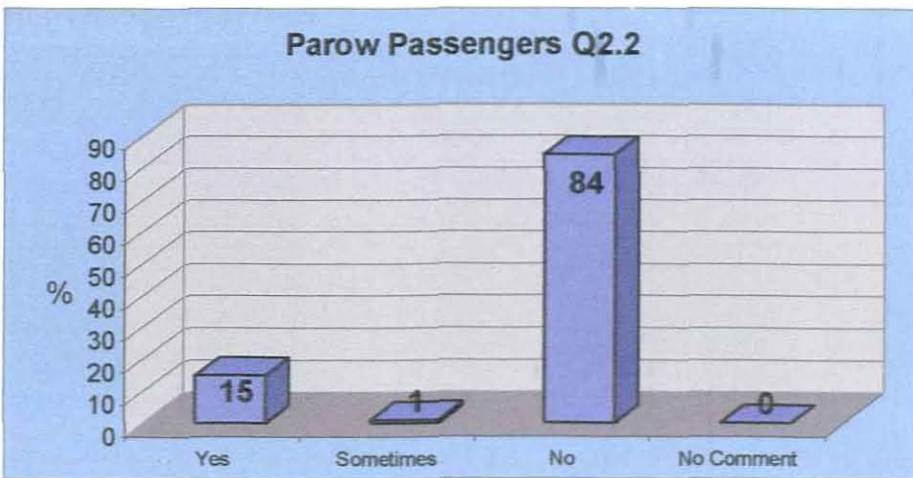
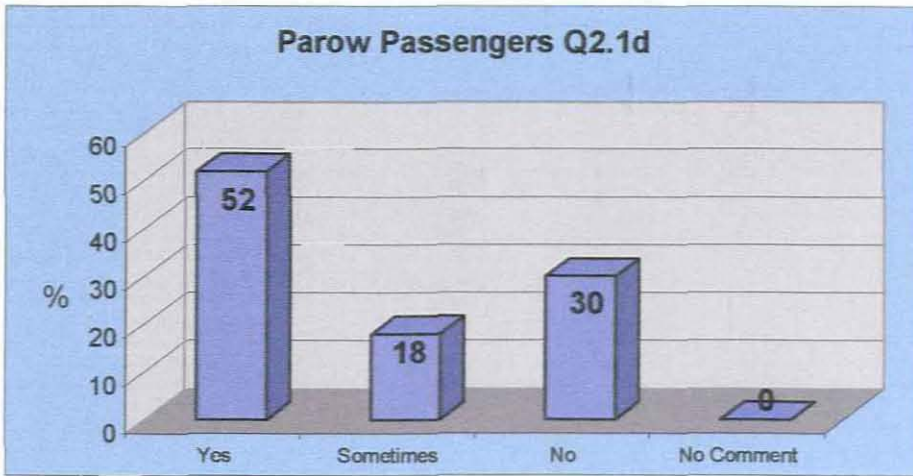


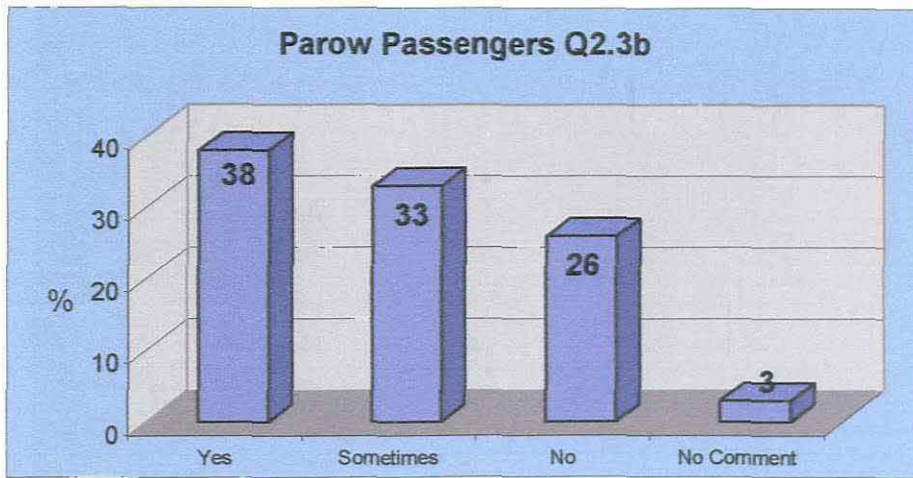
1.2 Trip Purpose



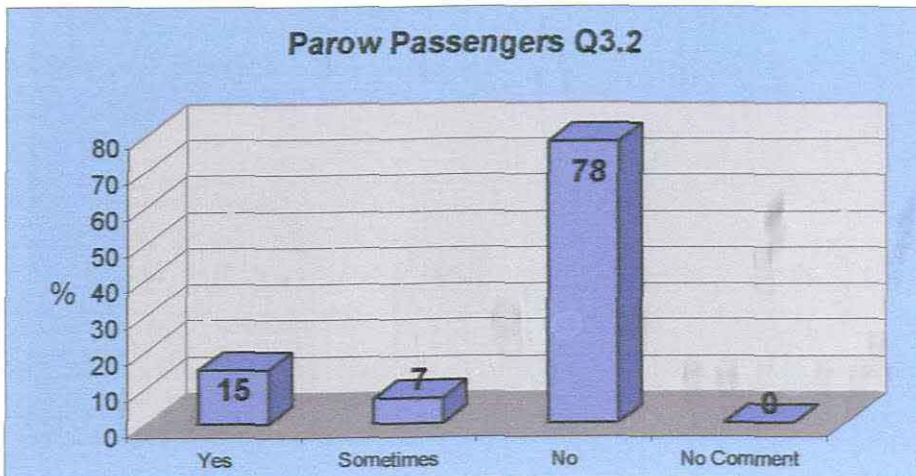
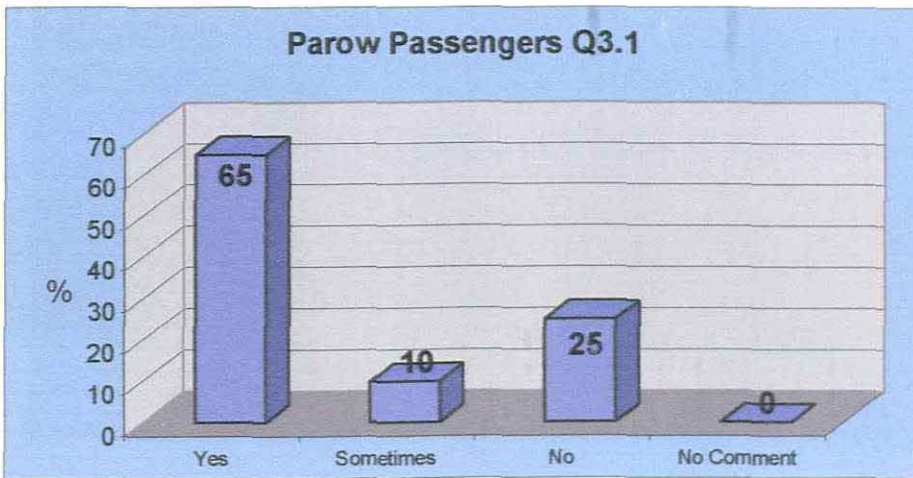
1.3 Safety And Security

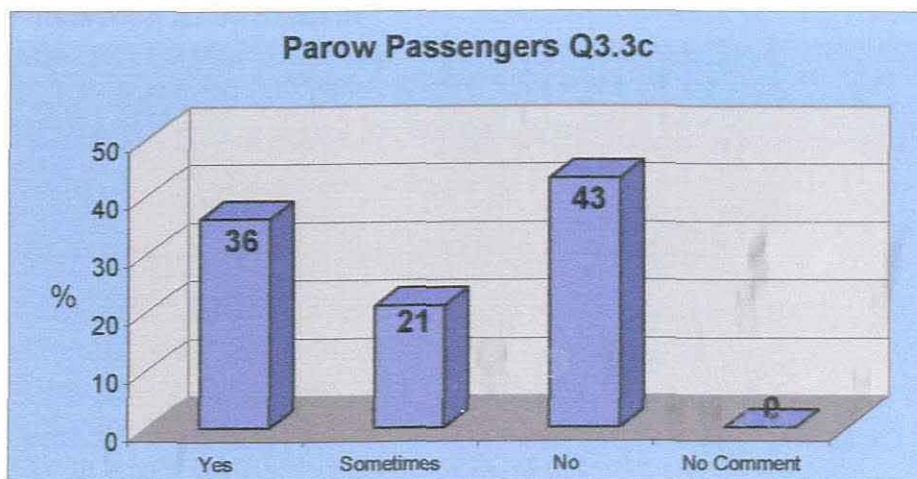
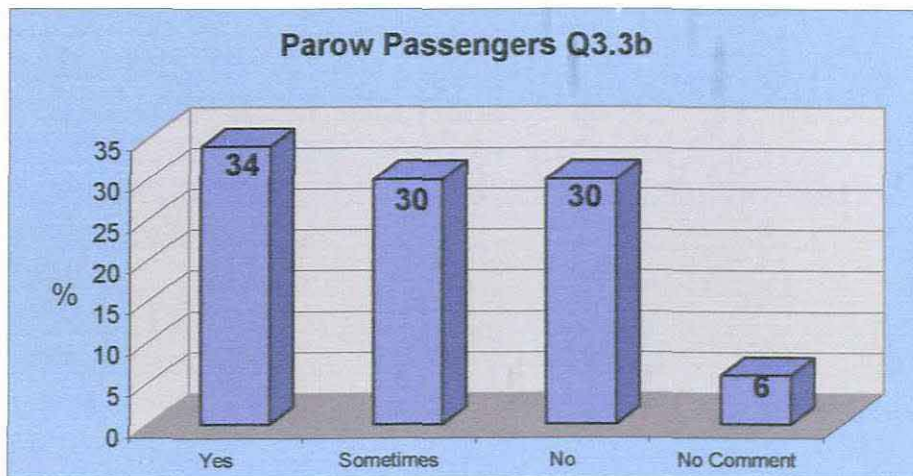
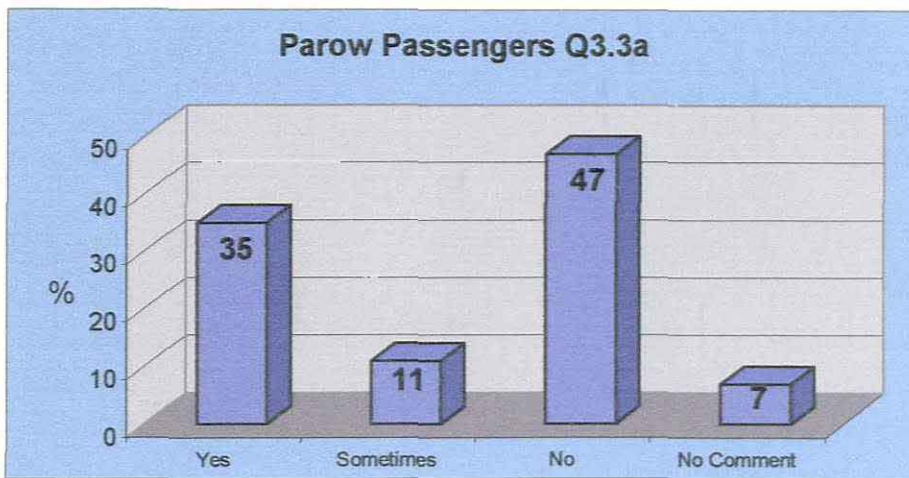


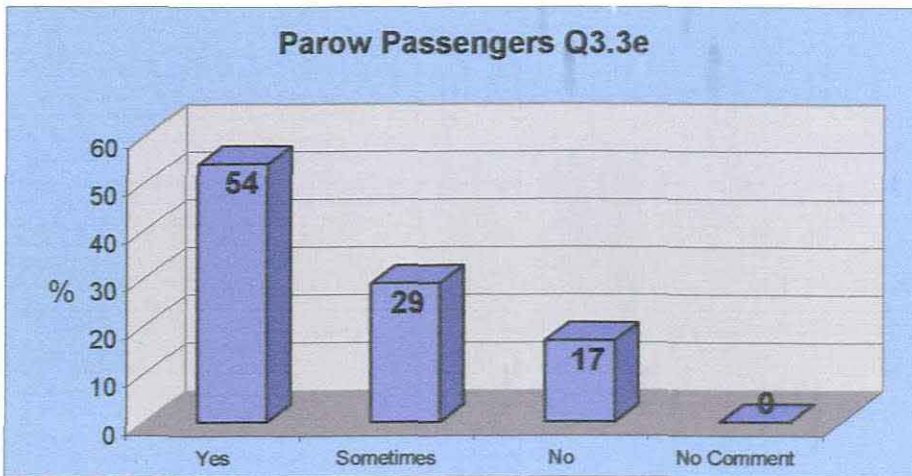
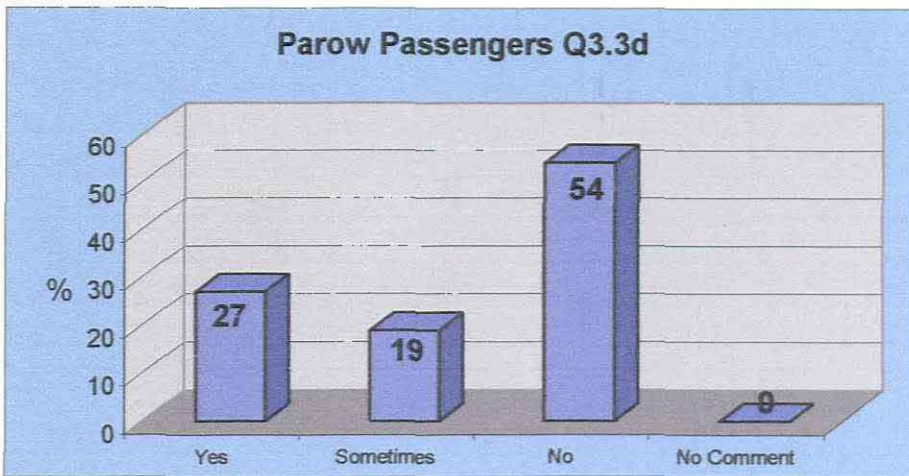




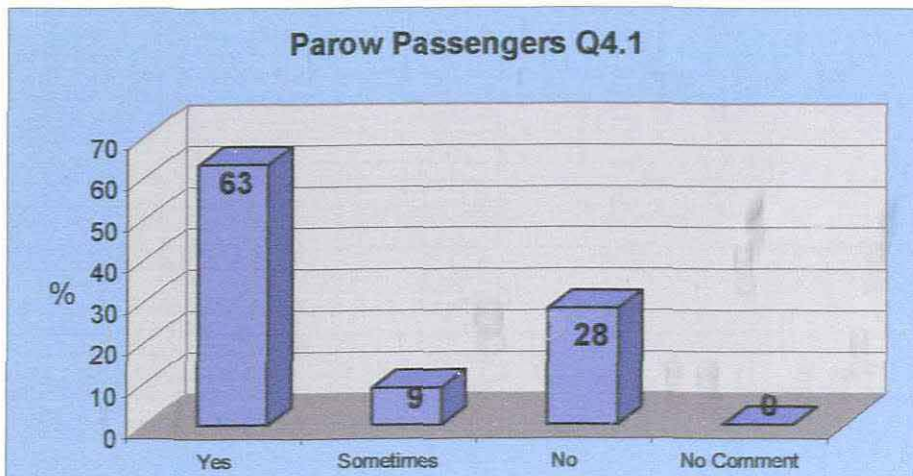
1.4 Interchange Facilities

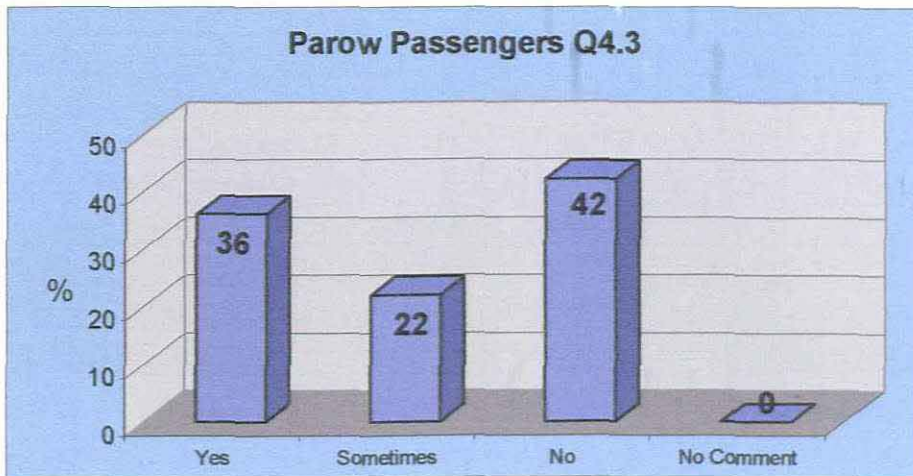
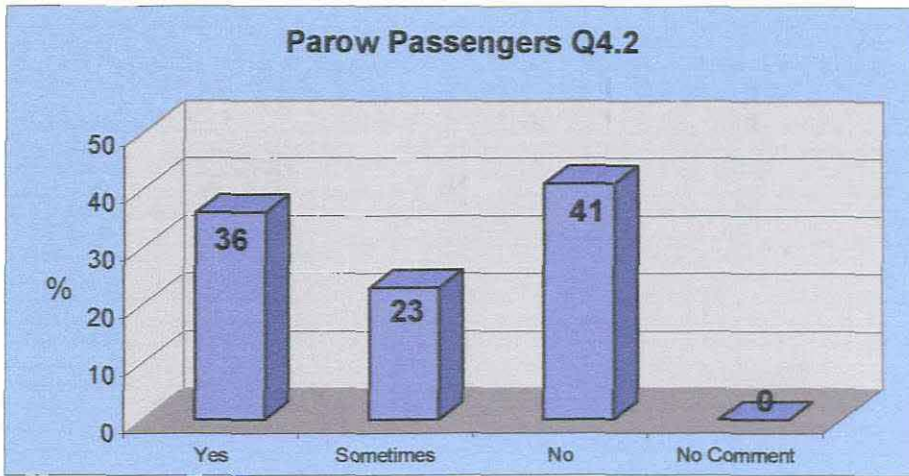




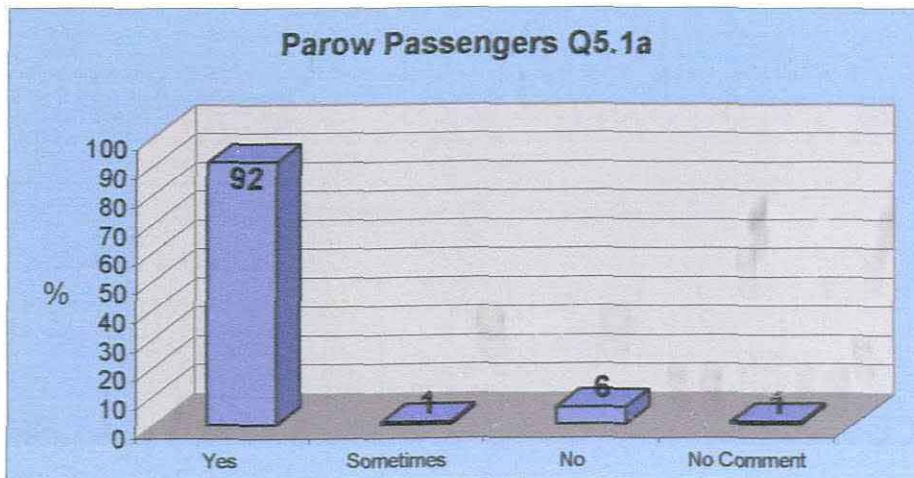


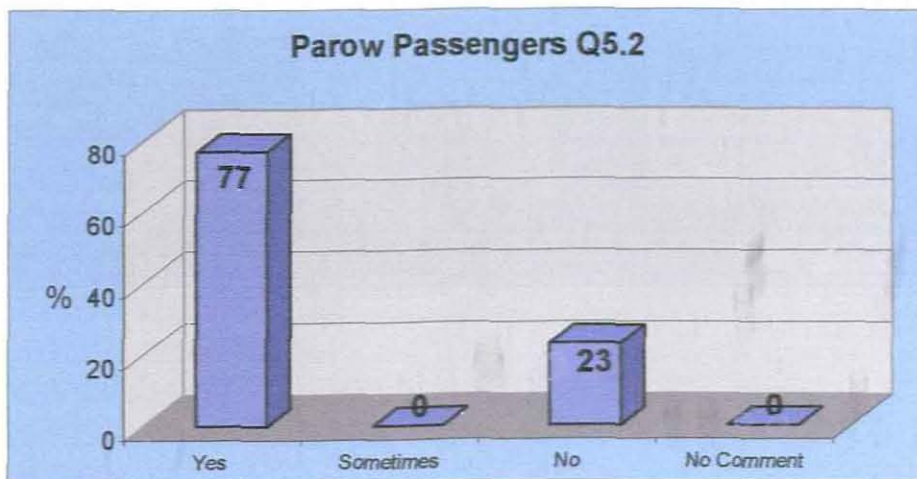
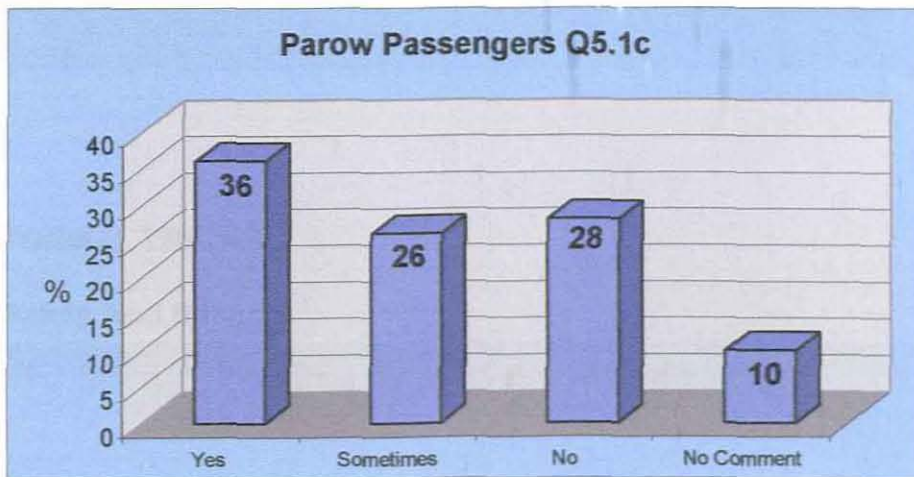
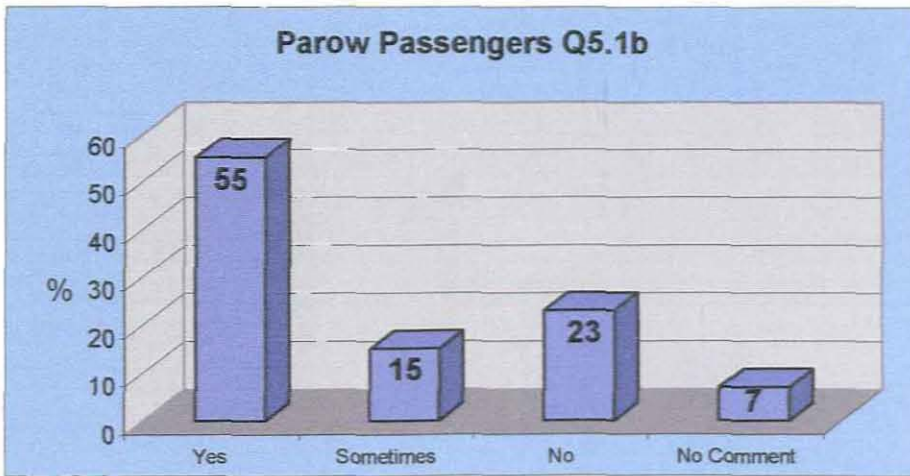
1.5 Pedestrian Environment



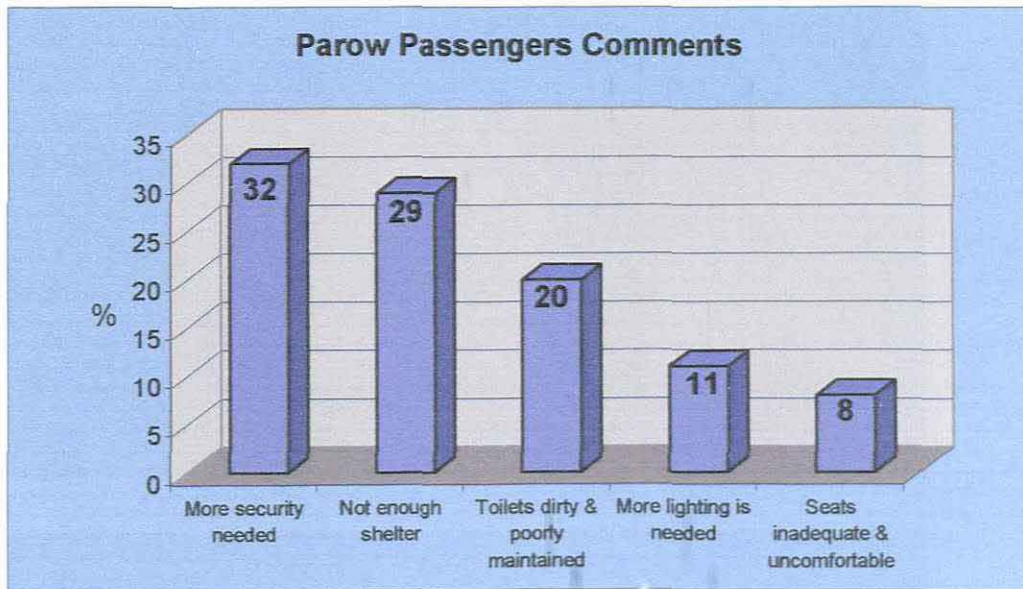


1.6 General



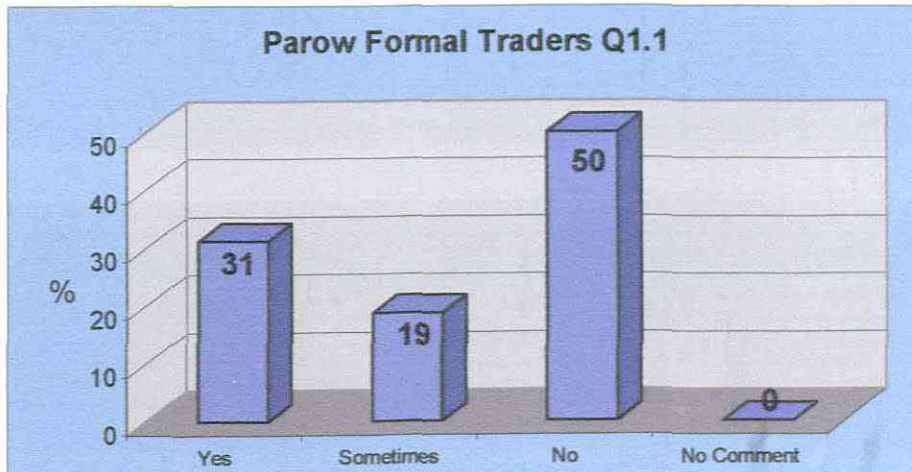


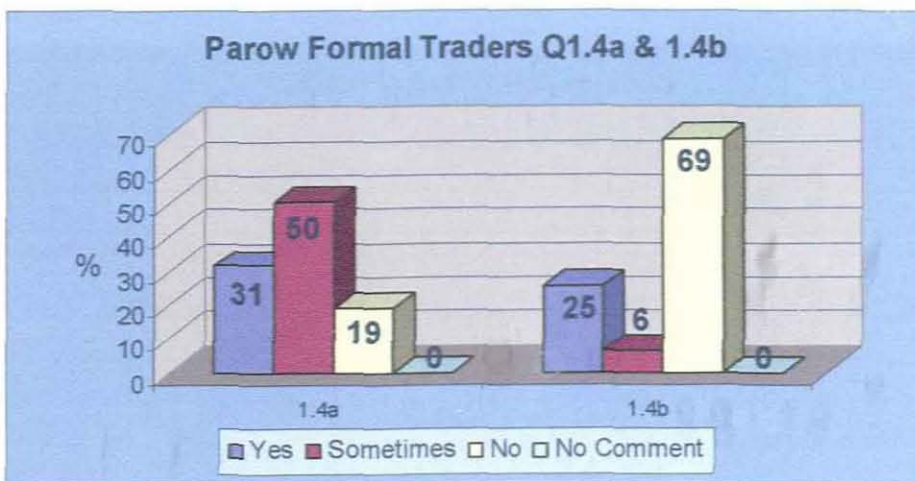
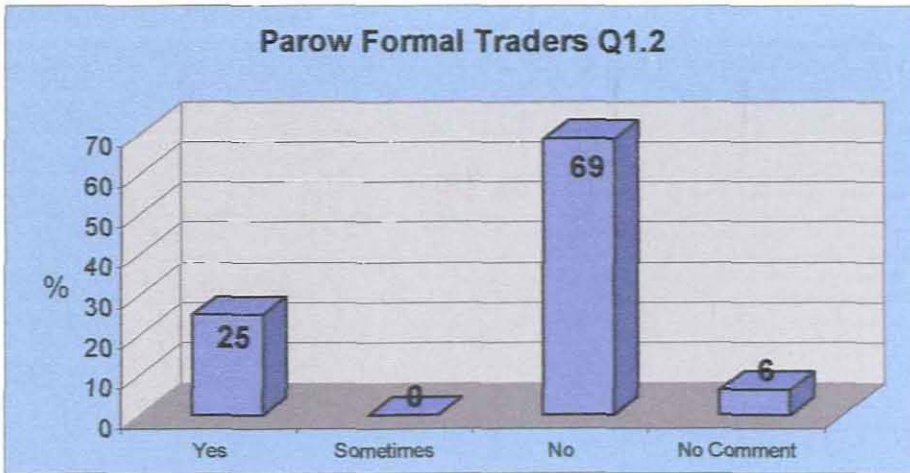
1.7 Main Concerns



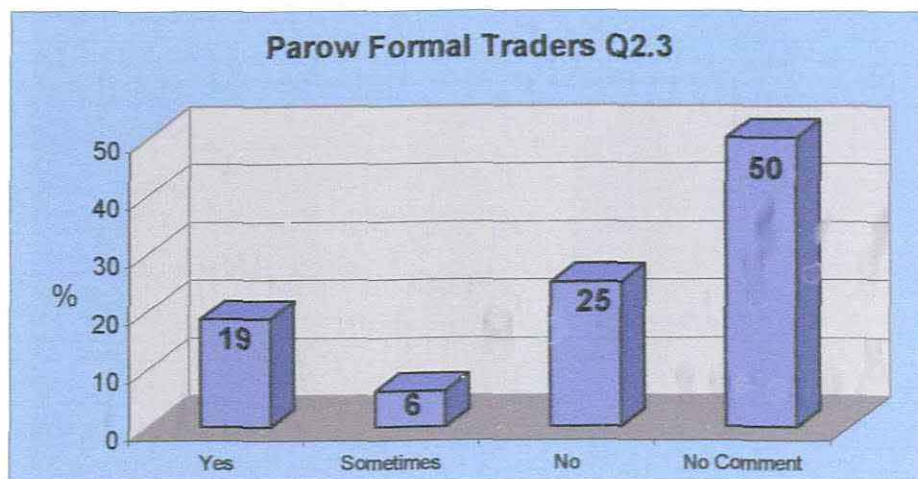
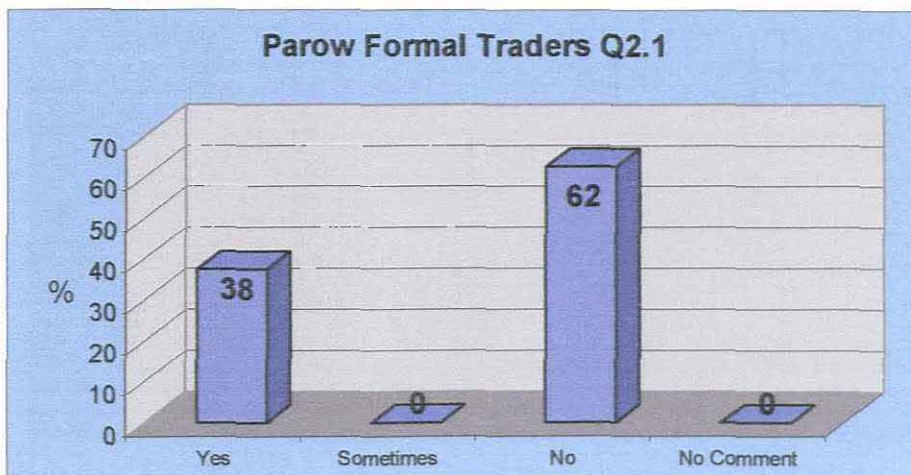
2. FORMAL TRADERS

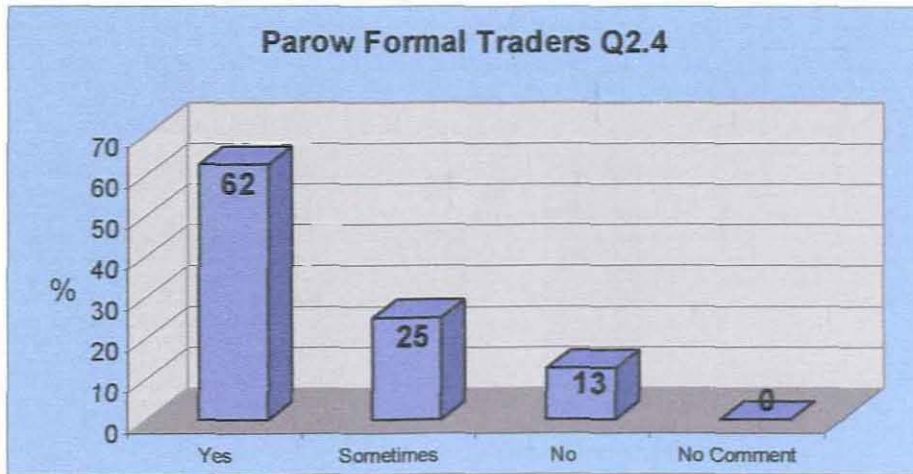
2.1 Safety And Security



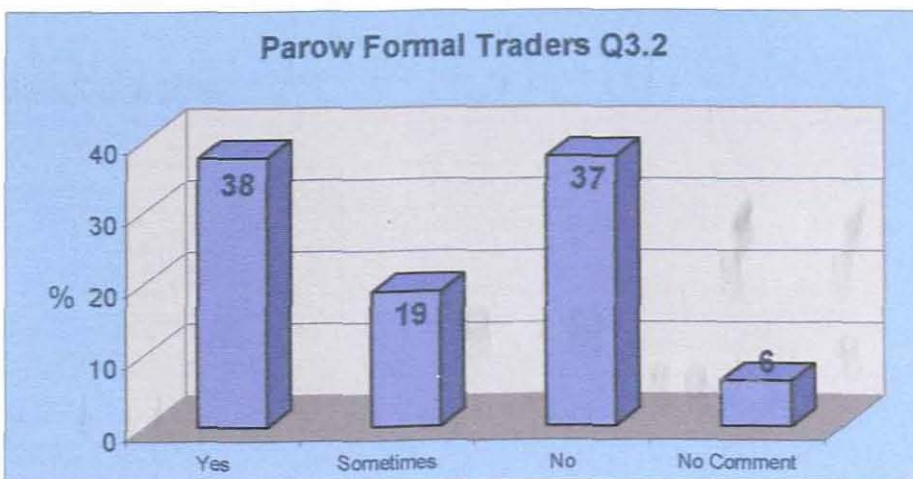
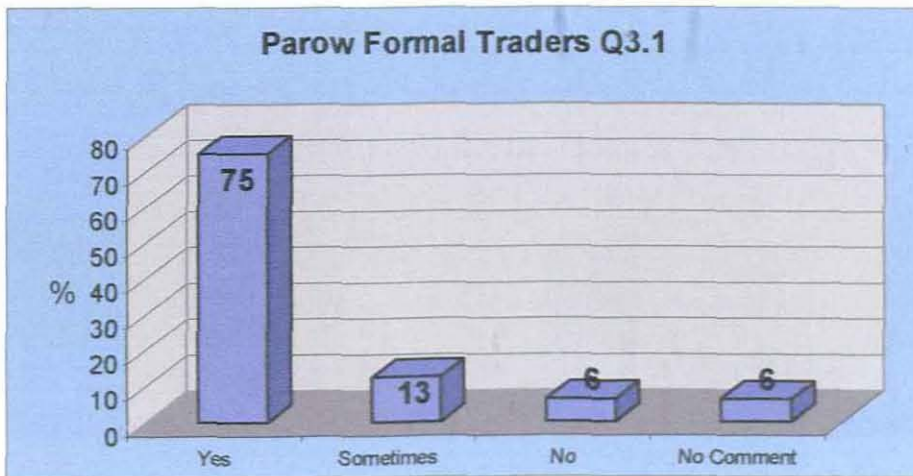


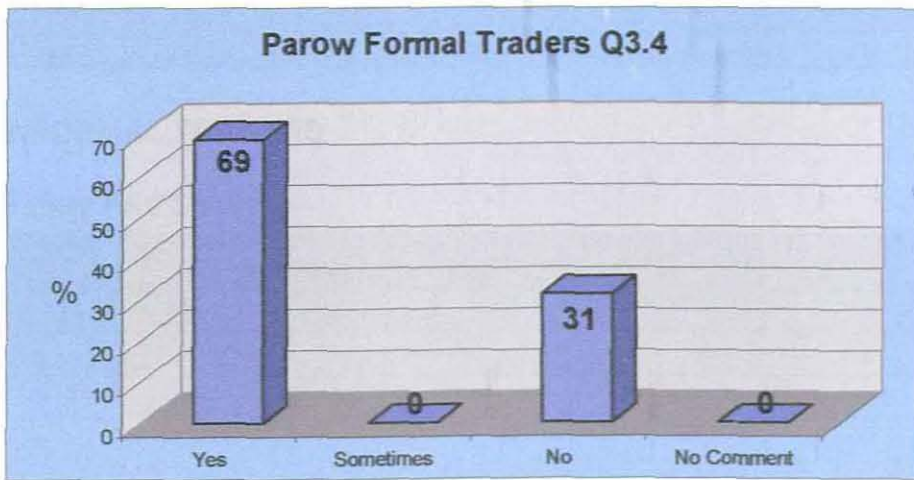
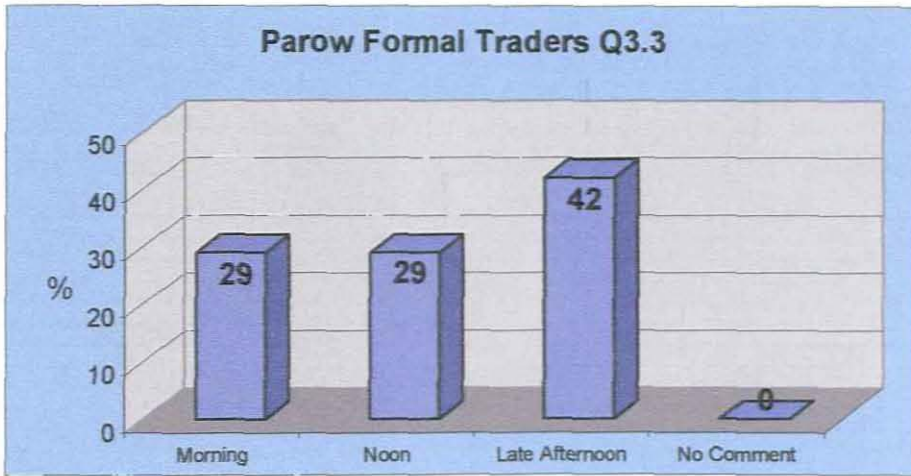
2.2 Interchange Facilities



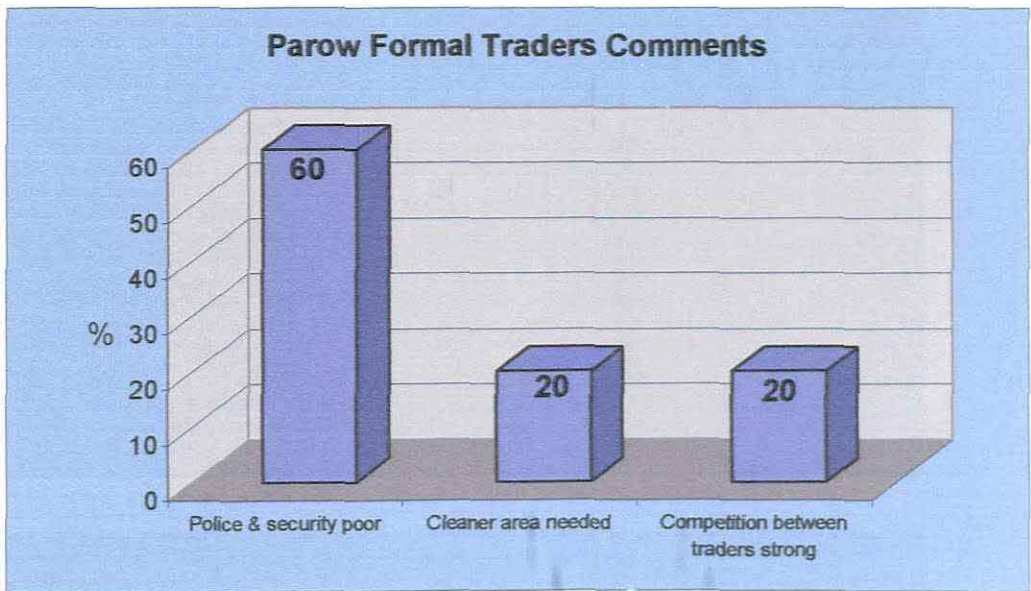


2.3 General



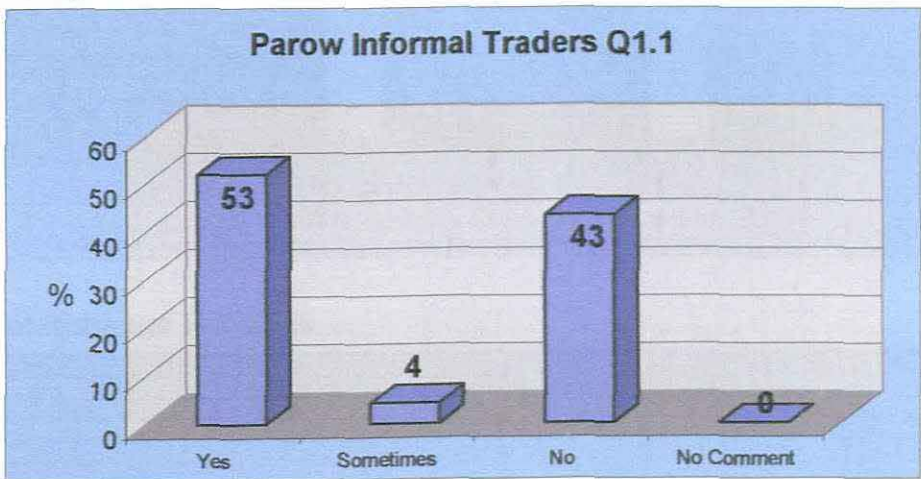


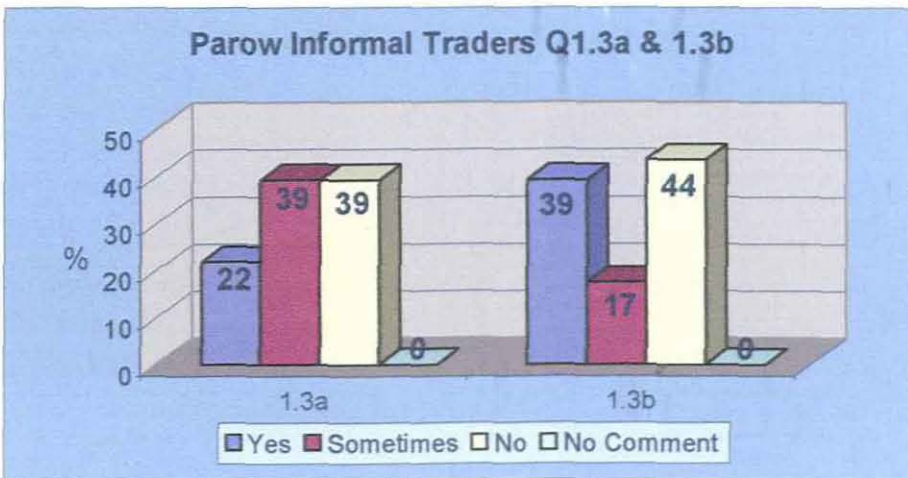
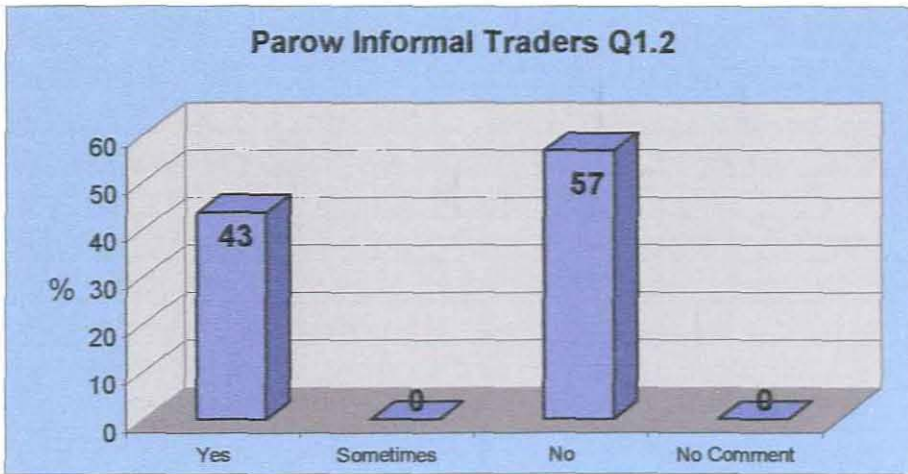
2.4 Main Concerns



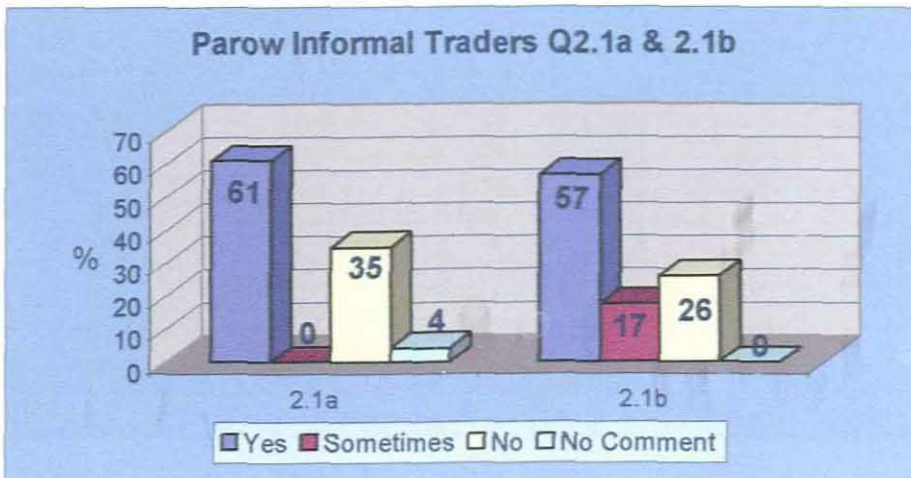
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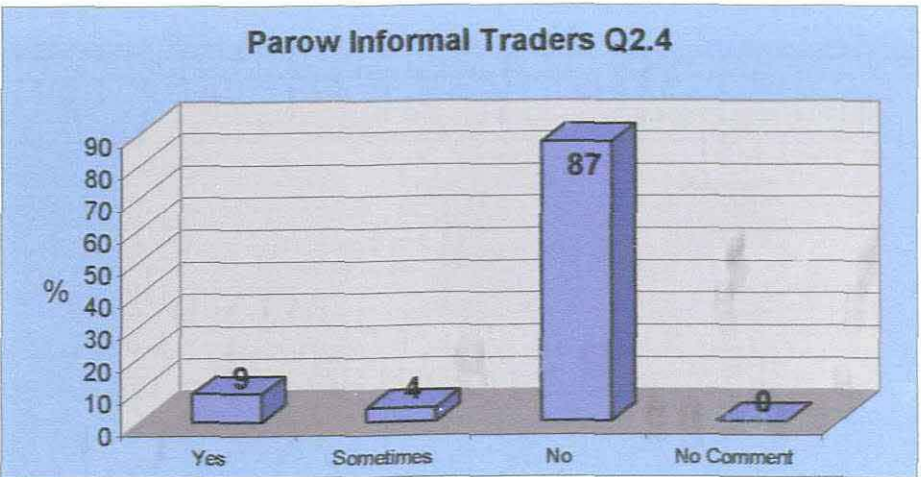
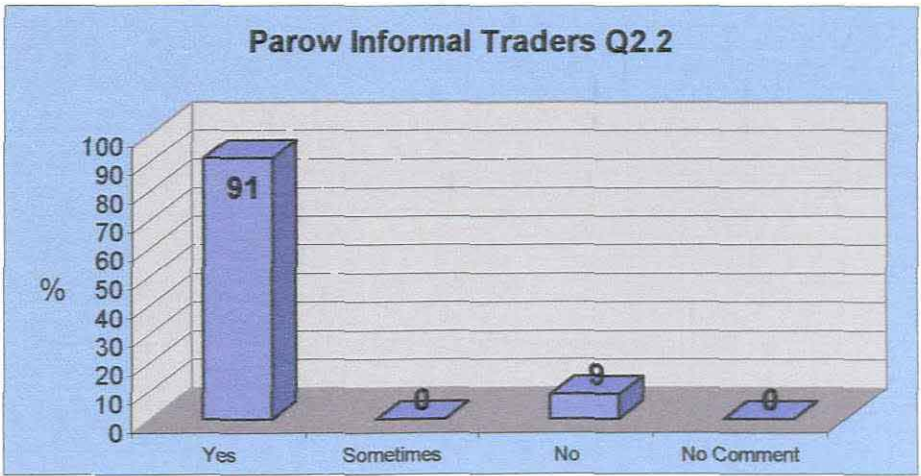
3.1 Safety And Security

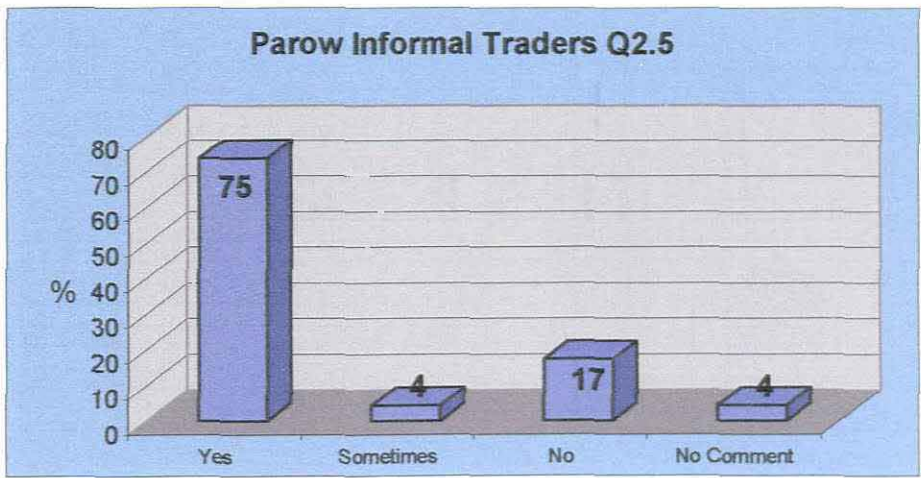




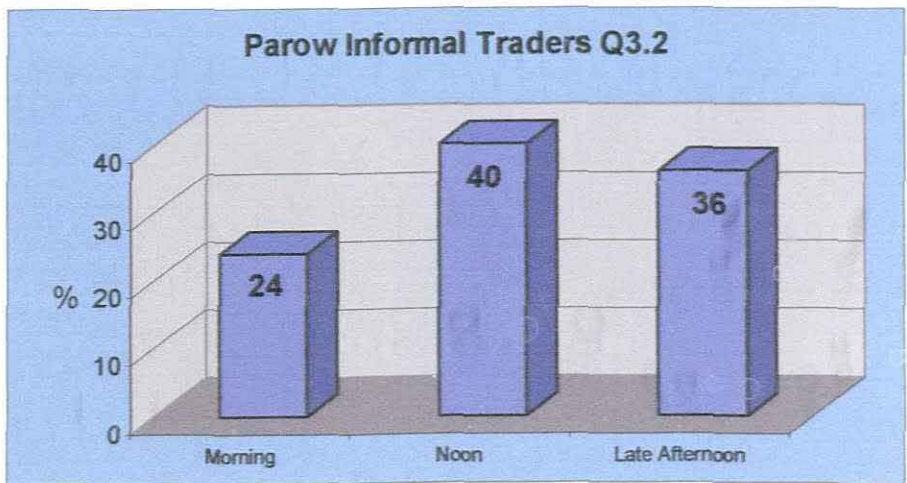
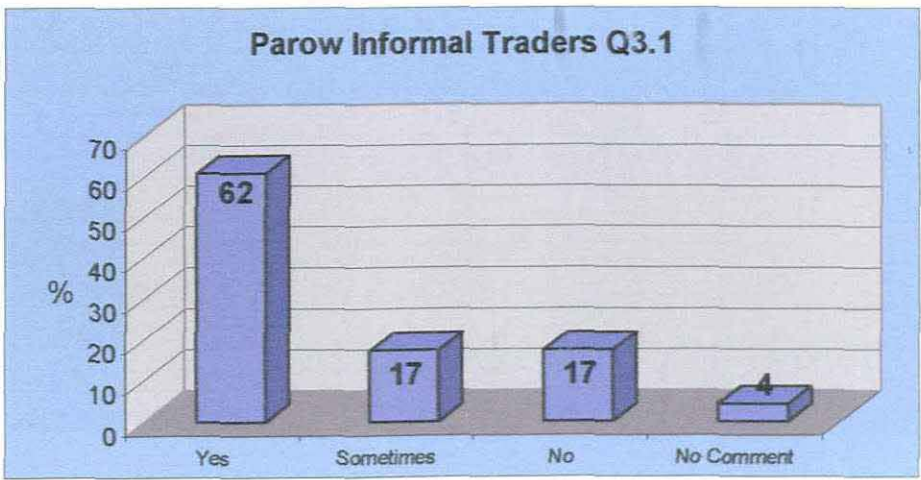
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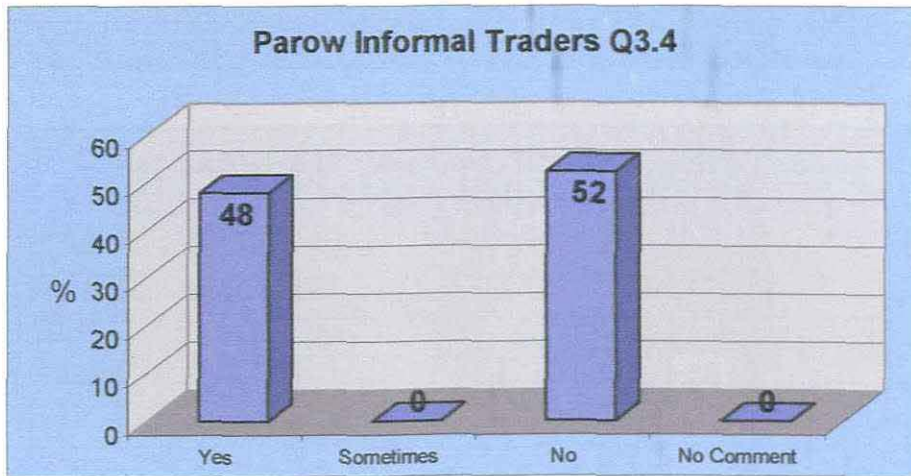
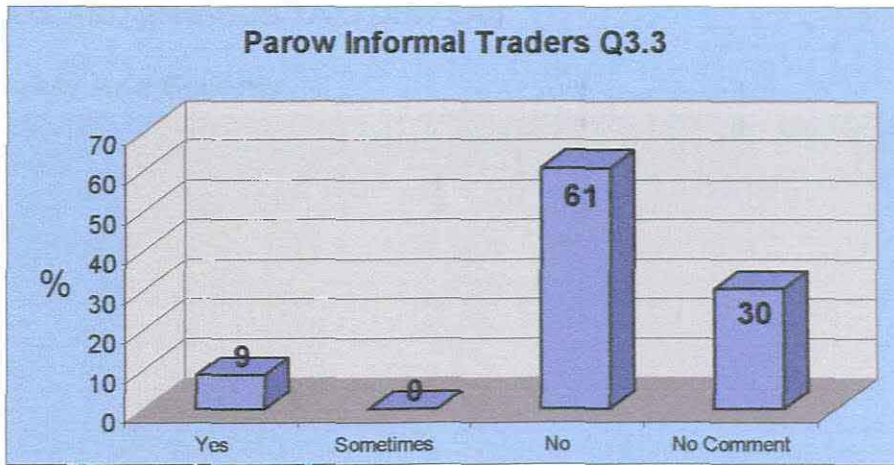




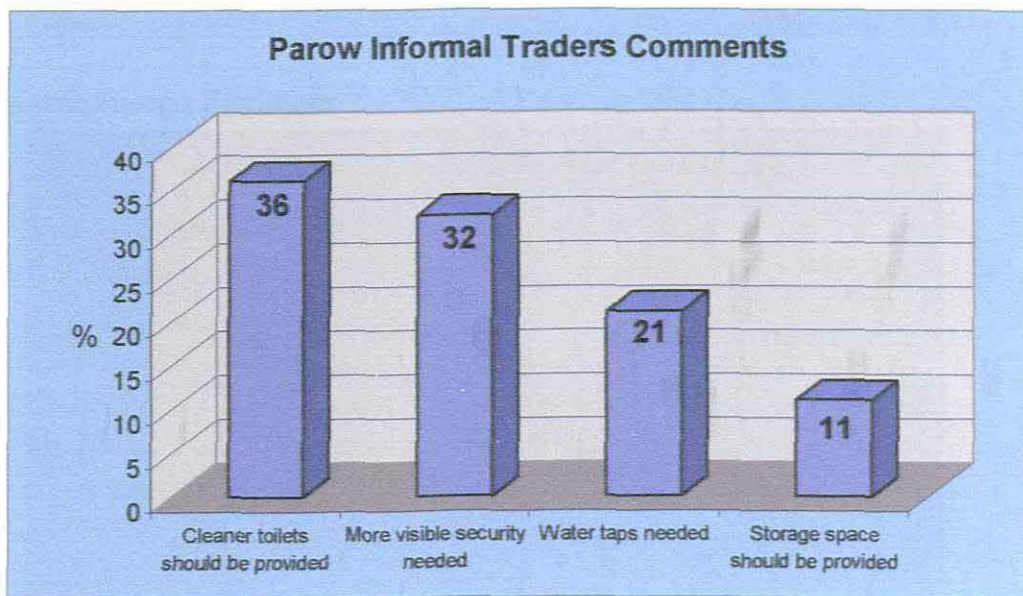


3.3 General



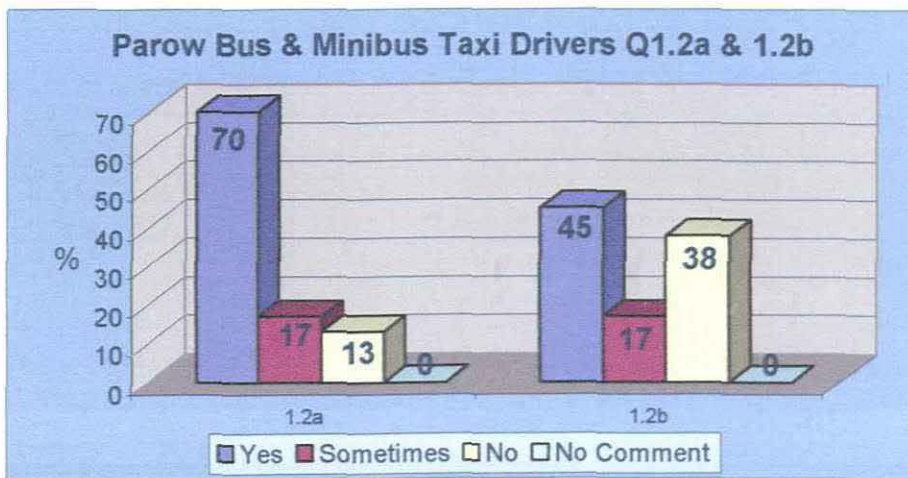
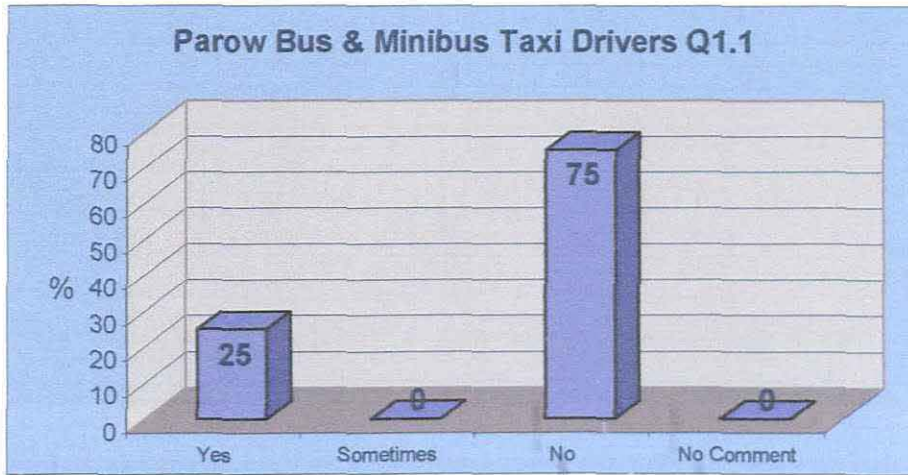


3.4 Main Concerns

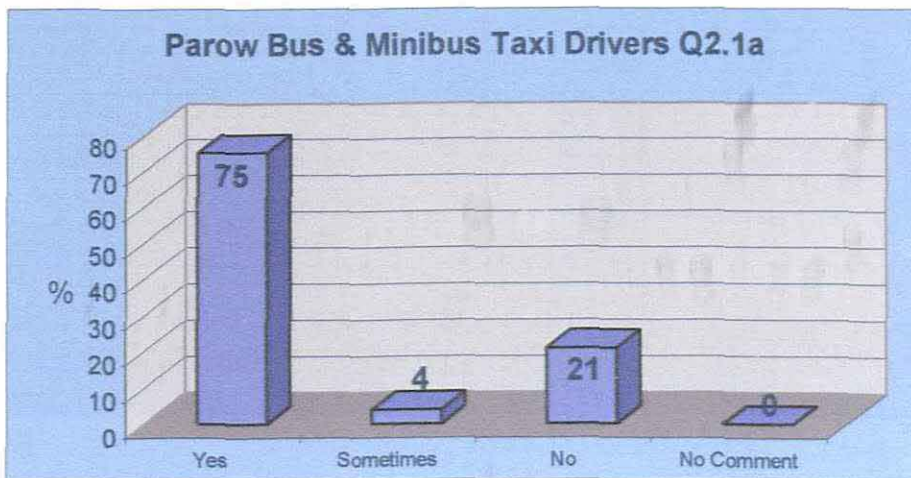


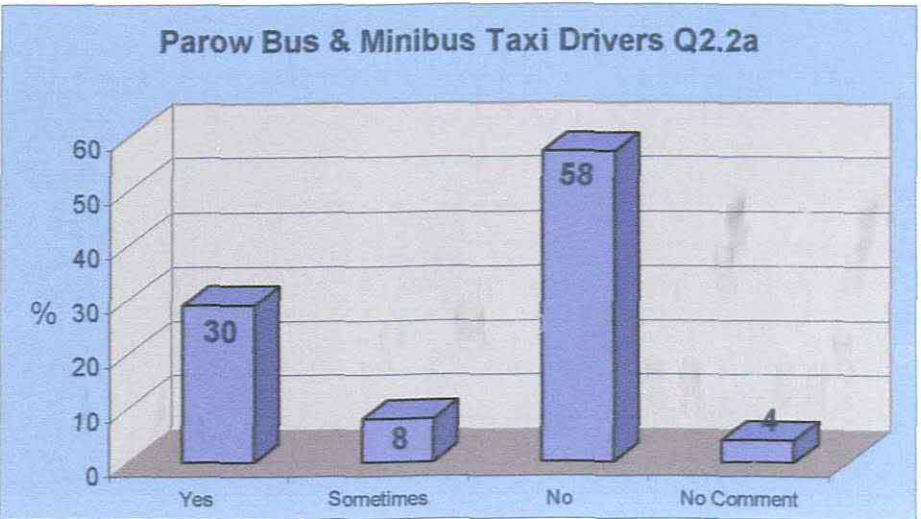
4. BUS AND MINI-BUS TAXI DRIVERS

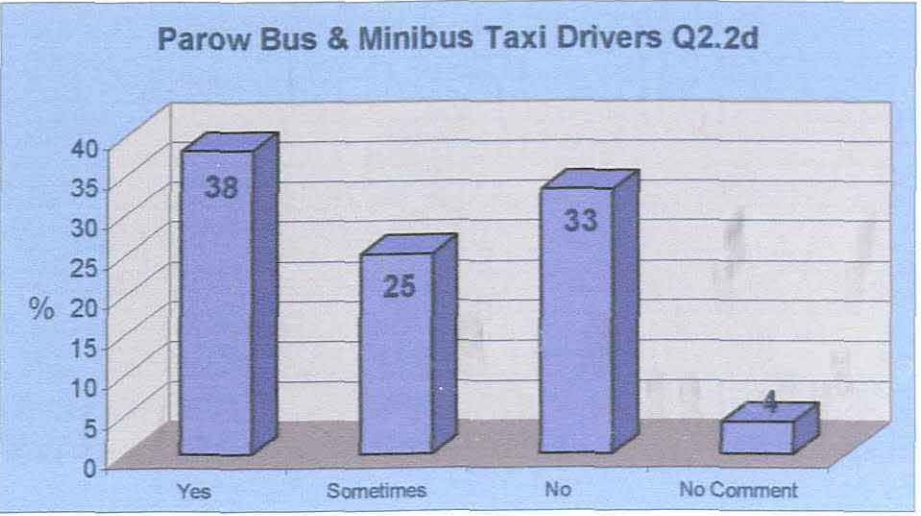
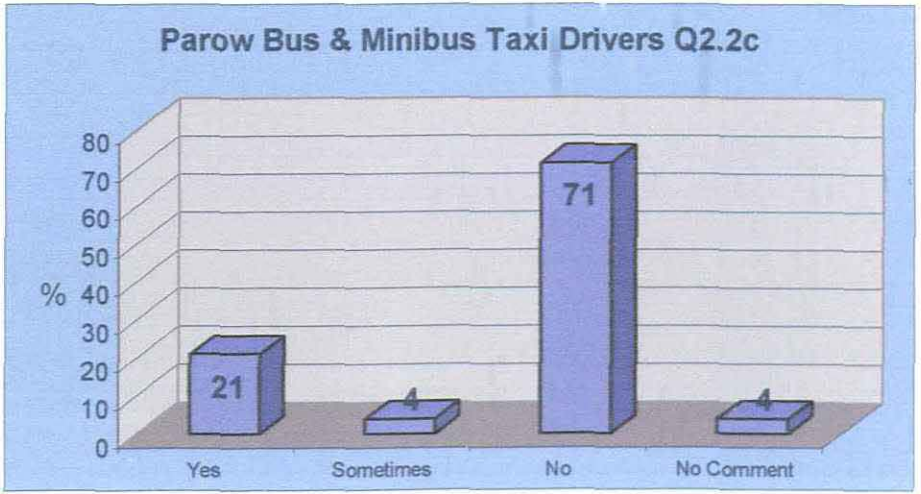
4.1 Safety And Security

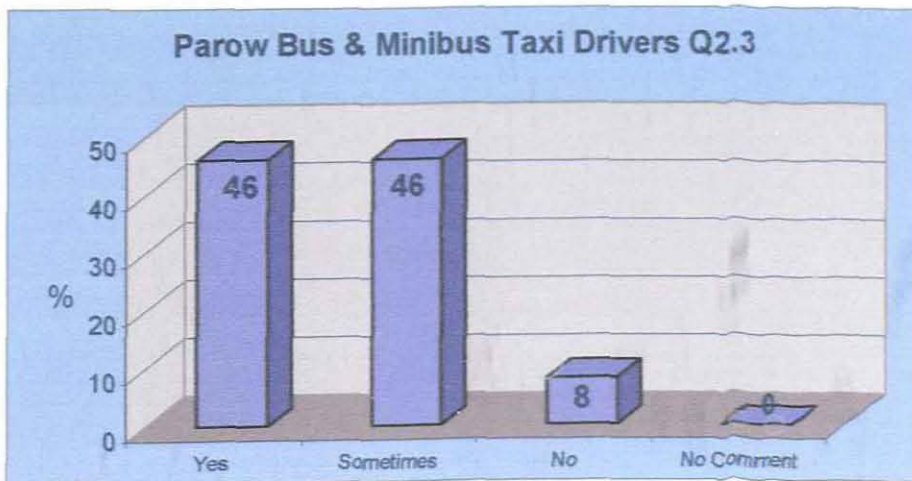
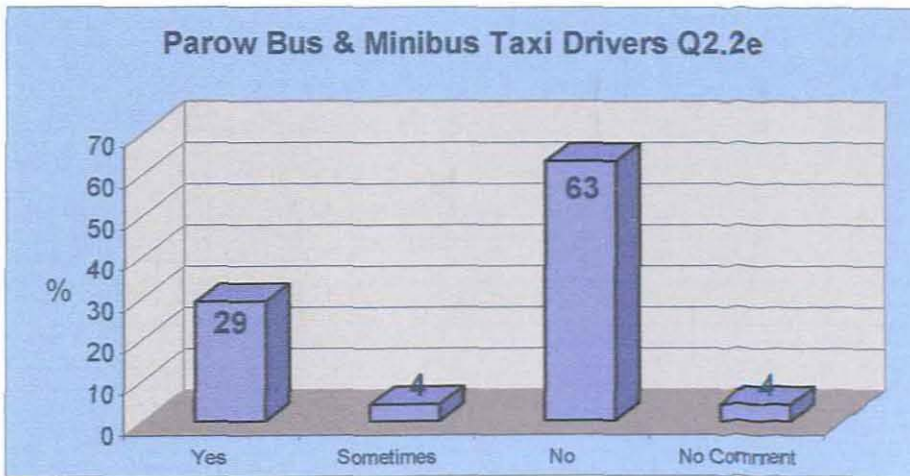


4.2 Interchange Facilities



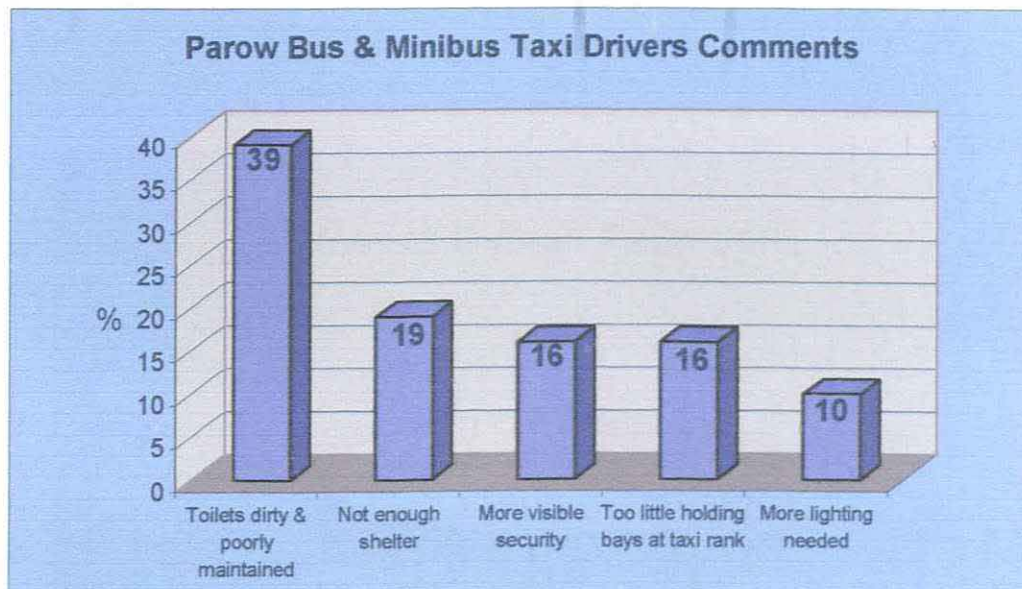








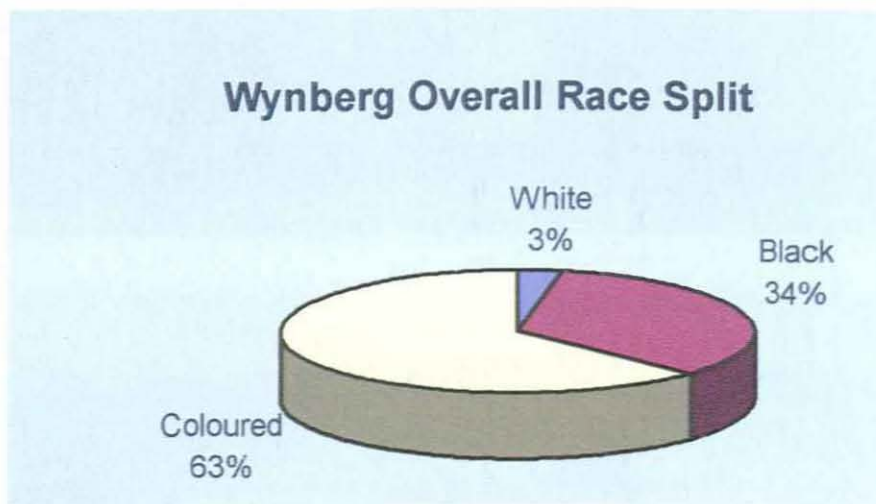
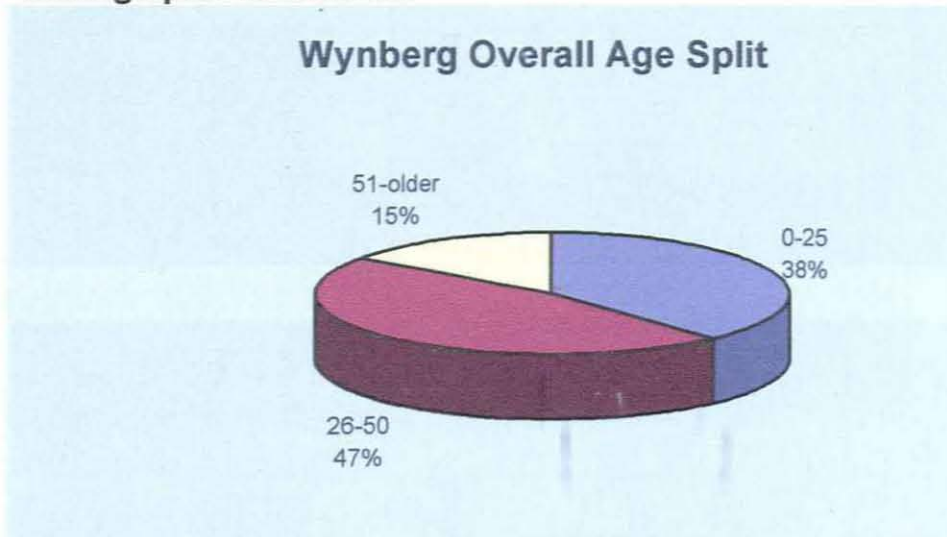
4.3 Main Concerns

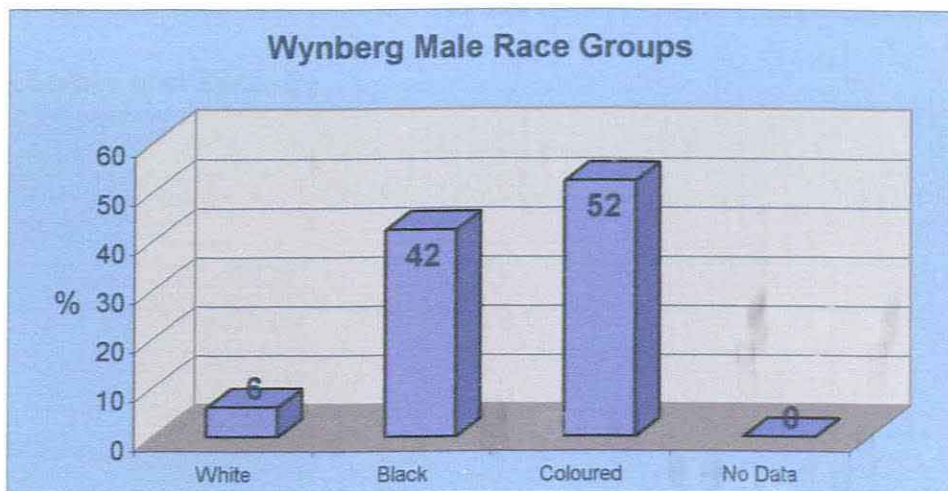
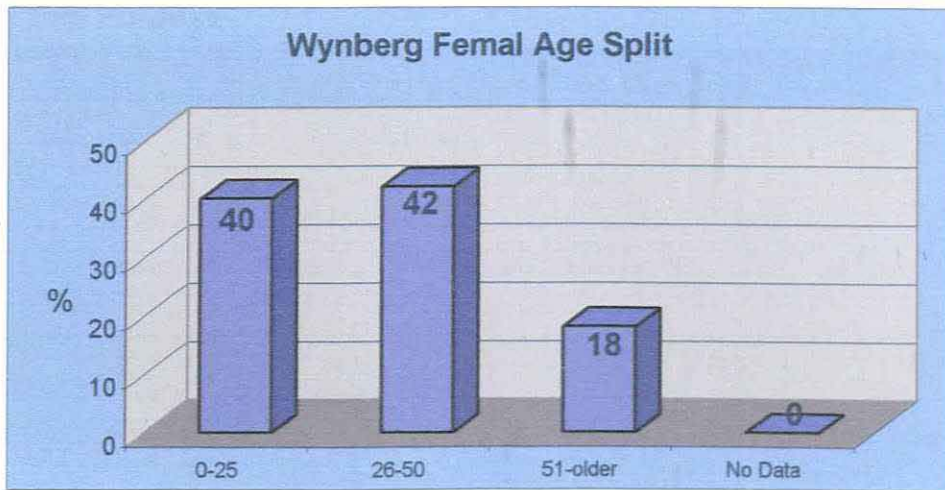
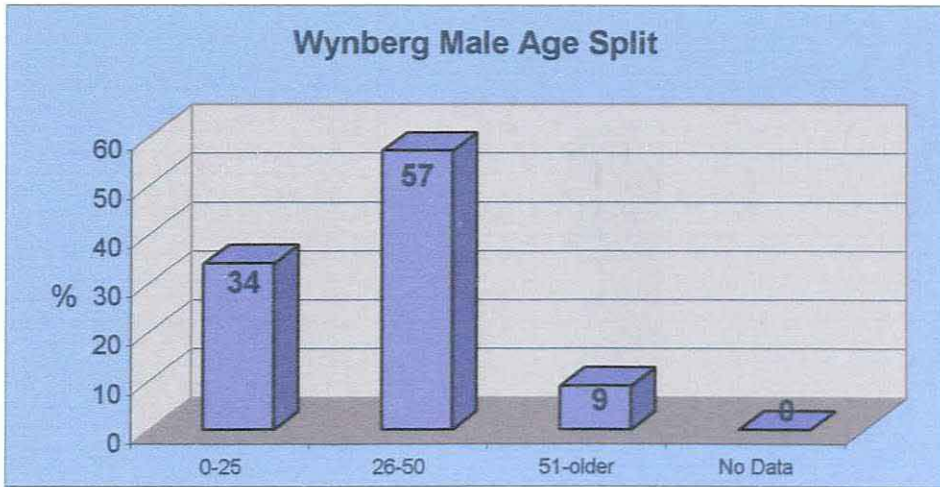


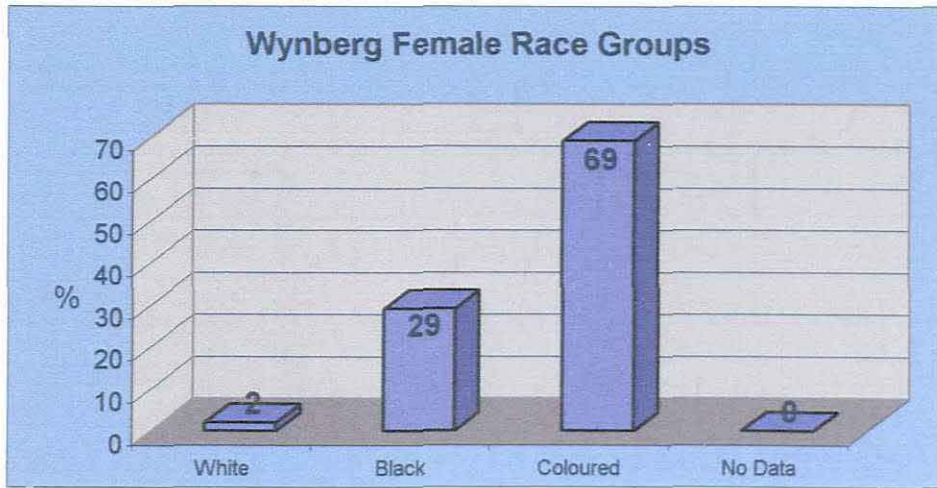
WYNBERG PTI

1. PASSENGERS

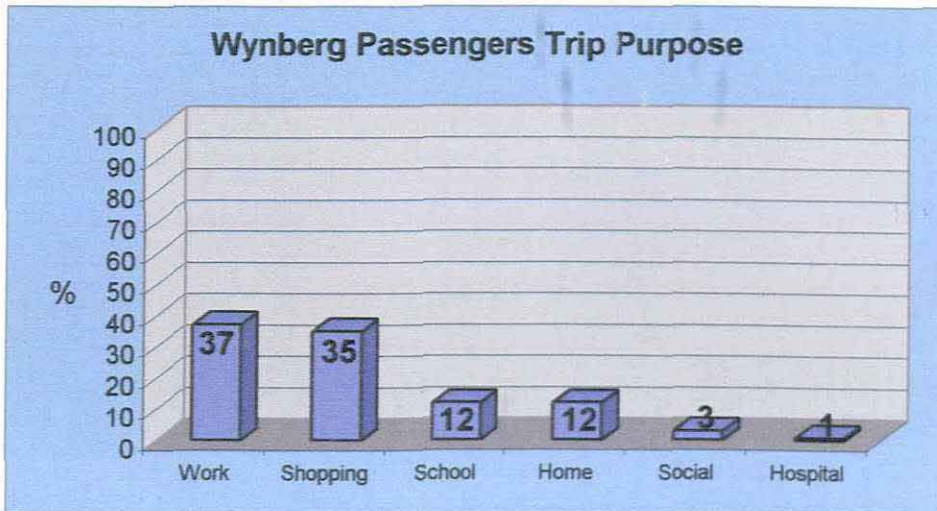
1.1 Demographic Information



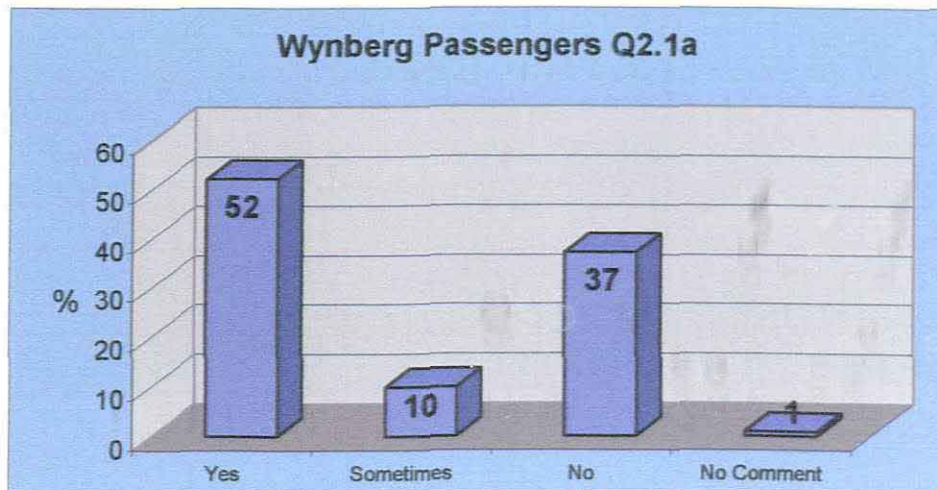


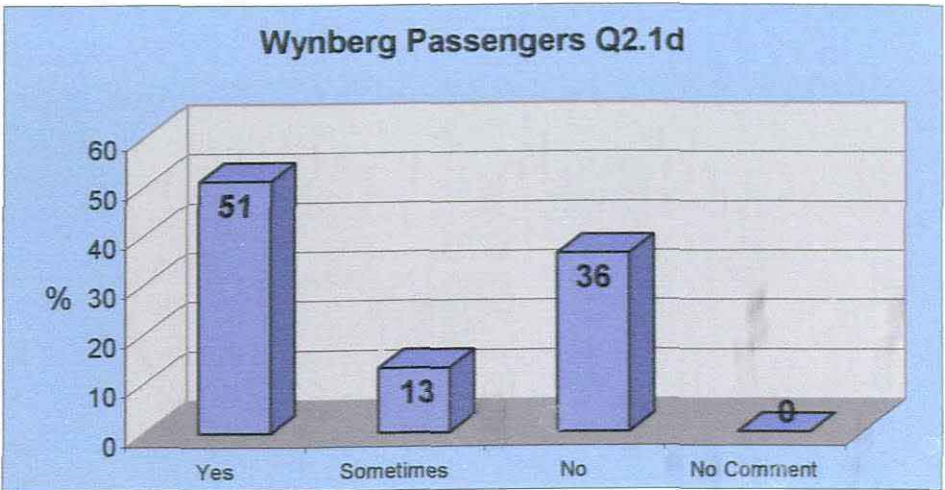
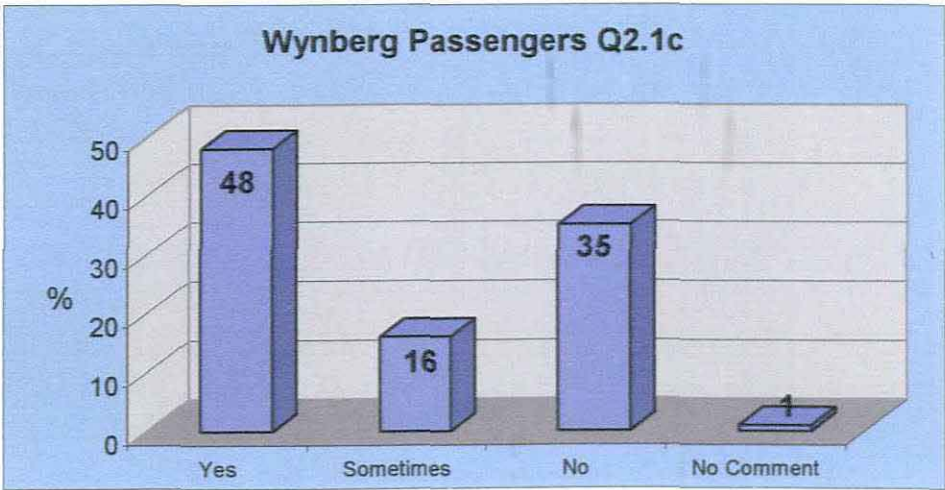
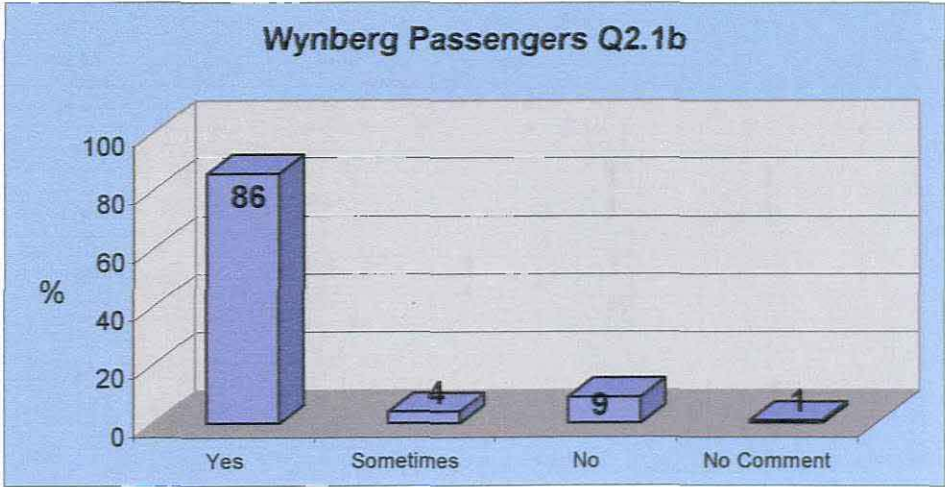


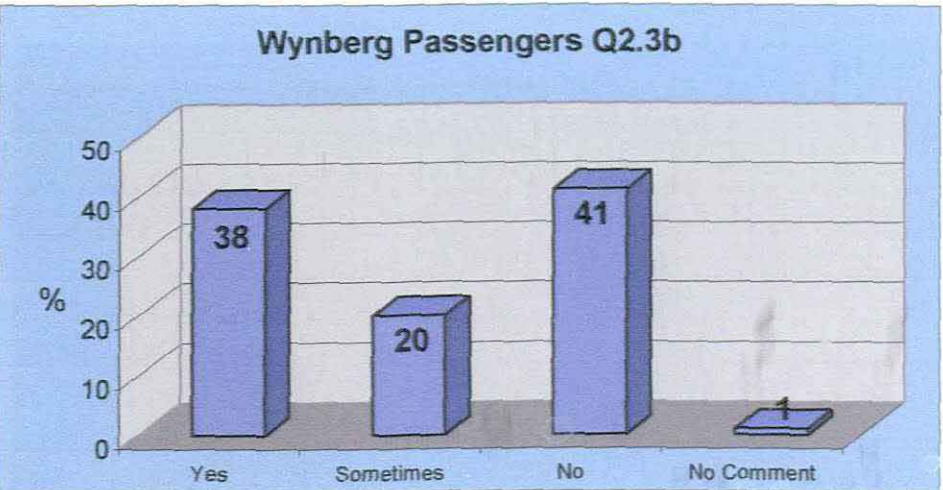
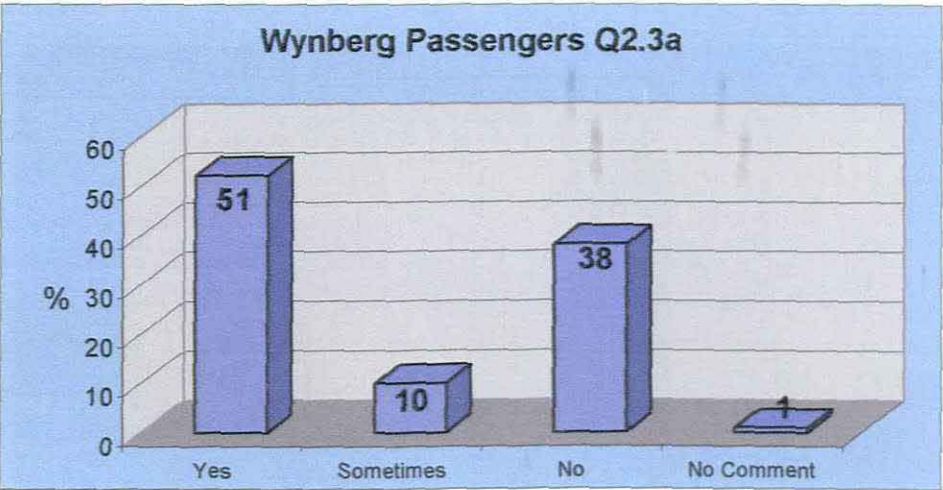
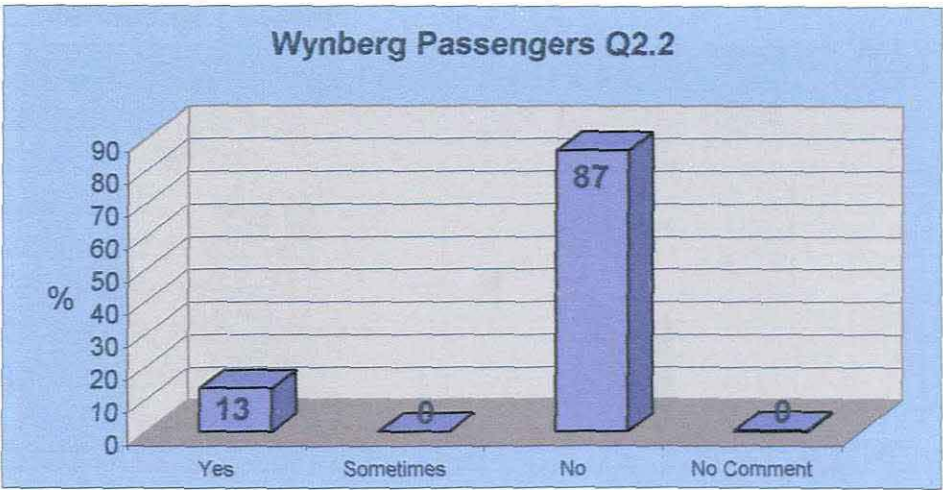
1.2 Trip Purpose



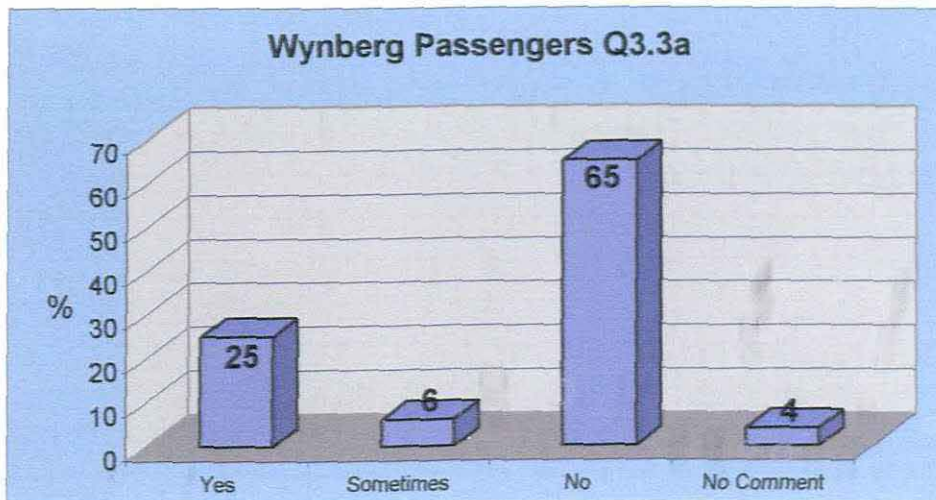
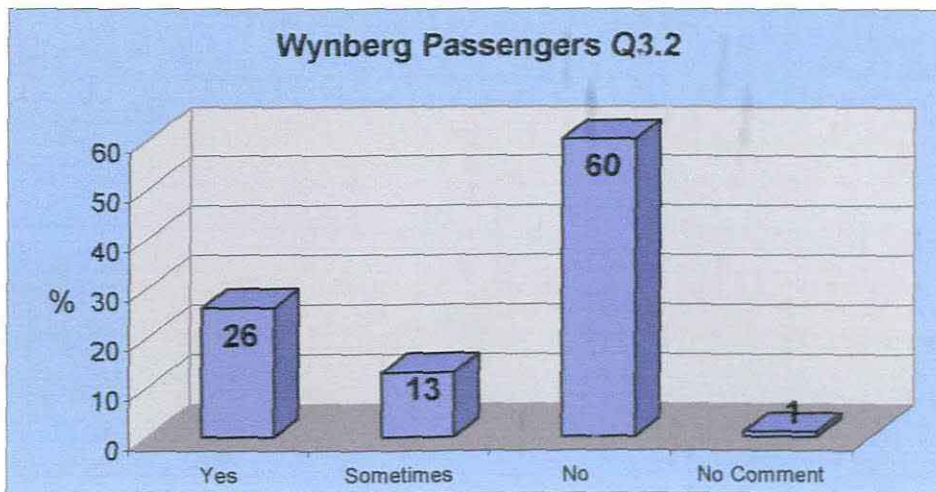
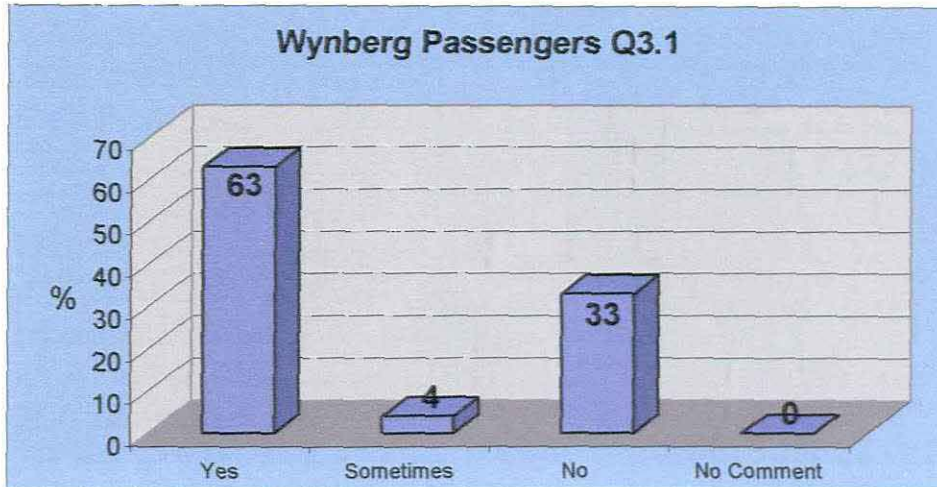
1.3 Safety and Security

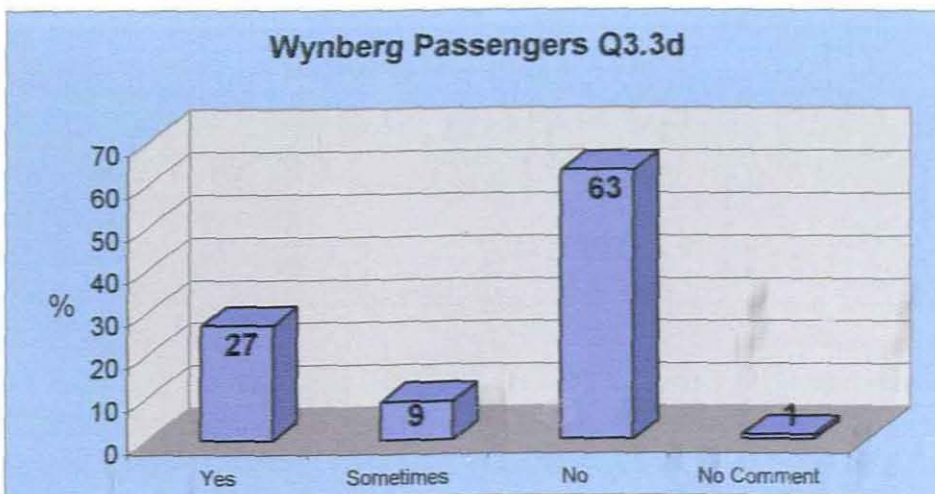
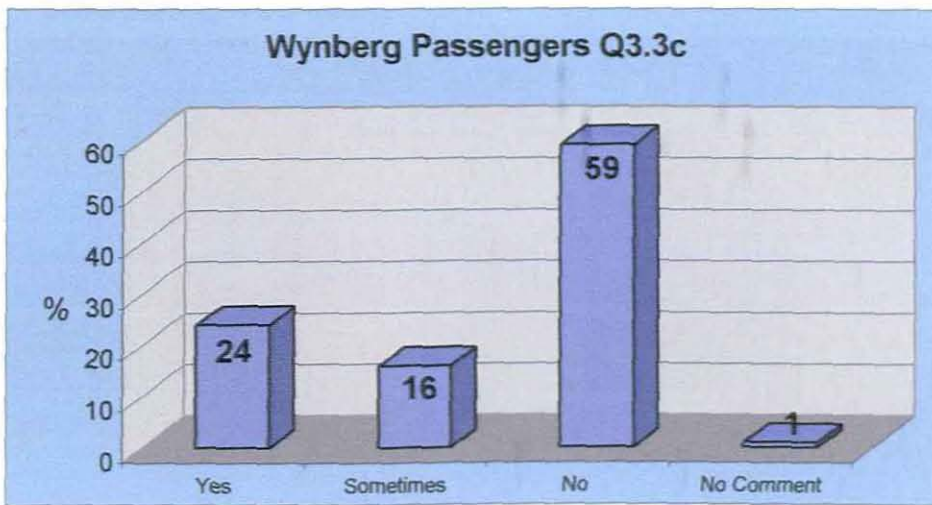
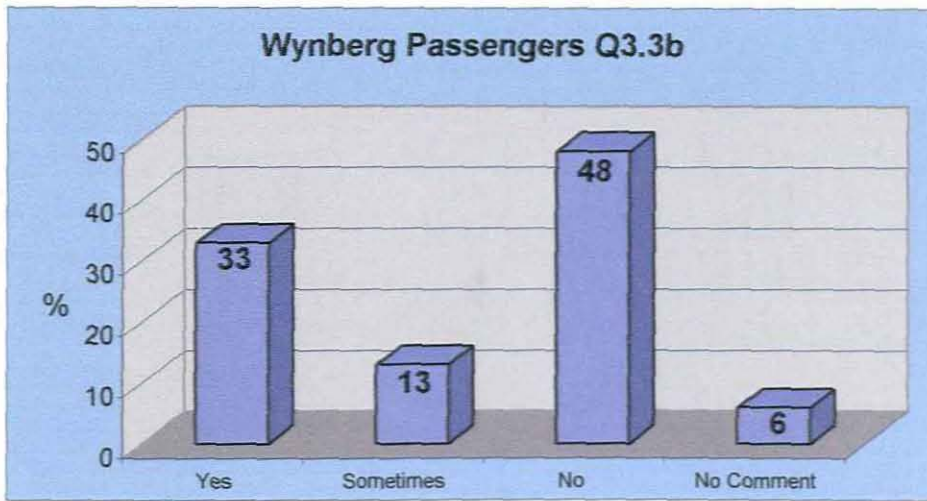


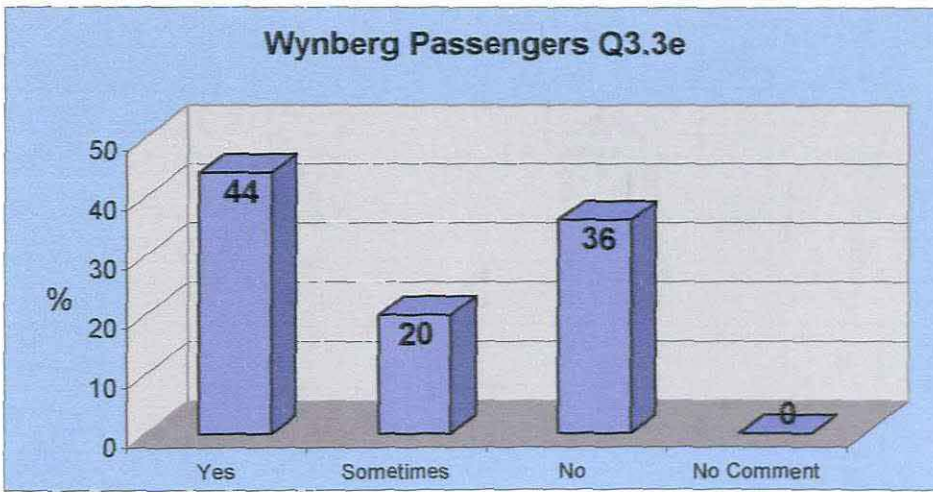




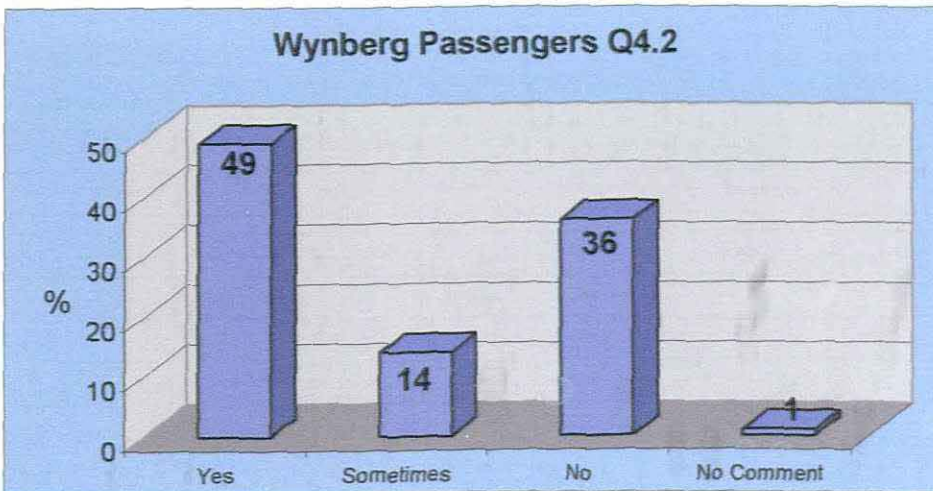
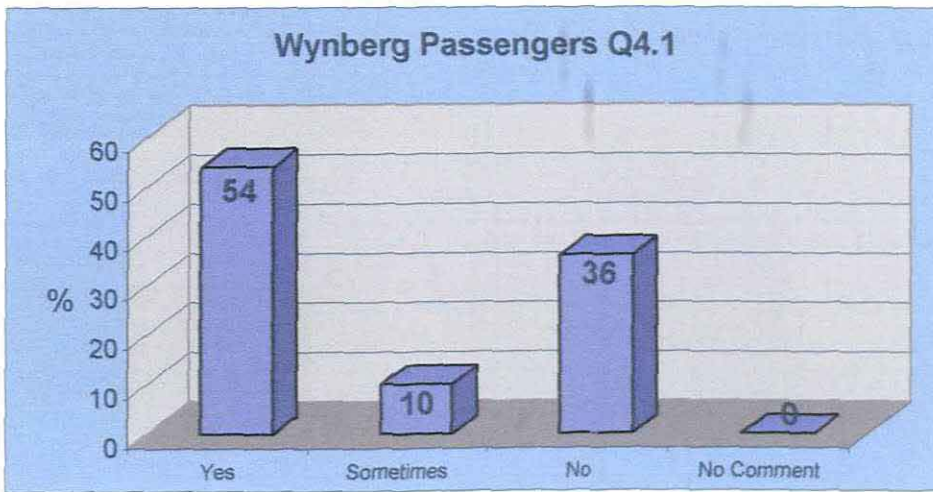
1.4 Interchange Facilities

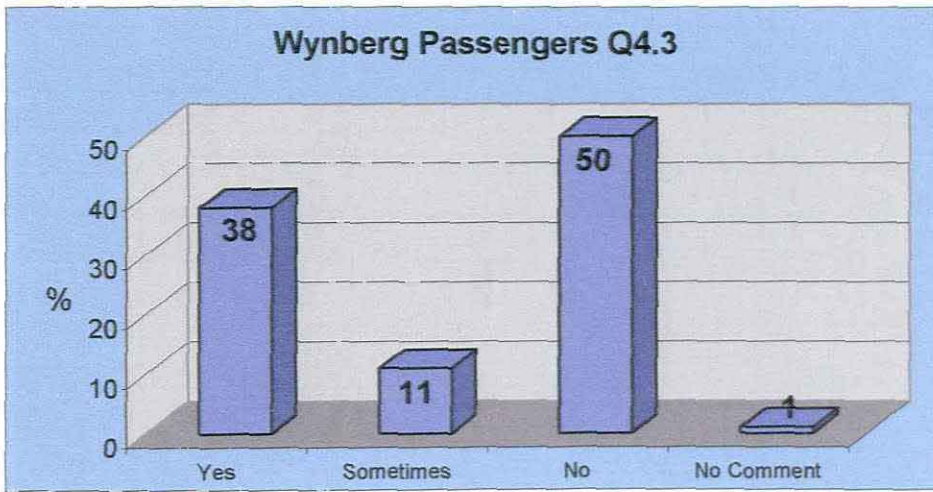




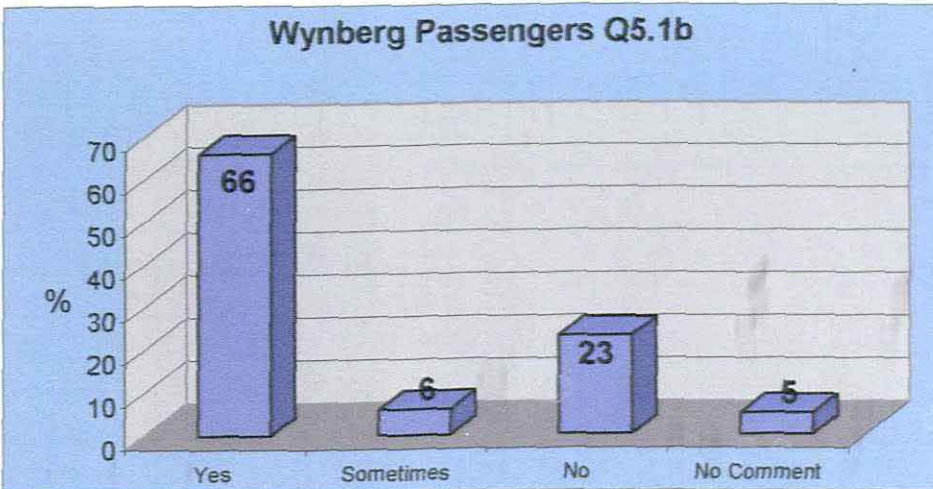
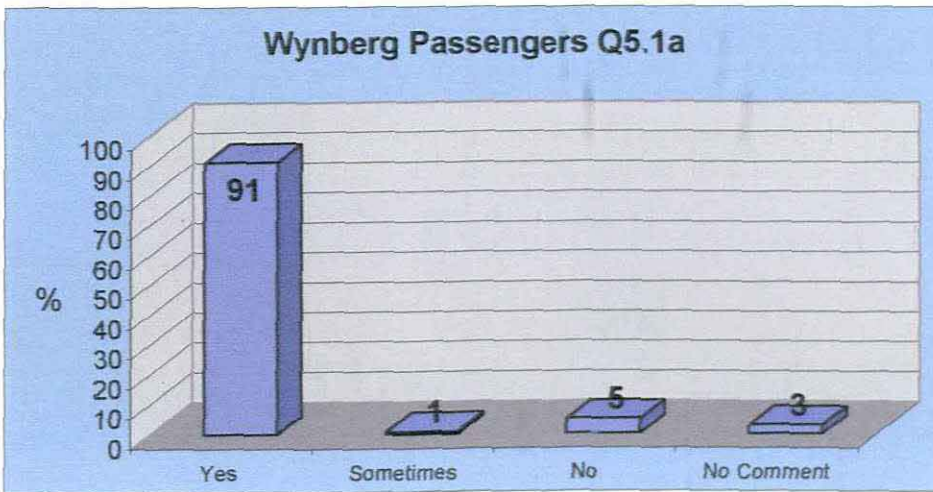


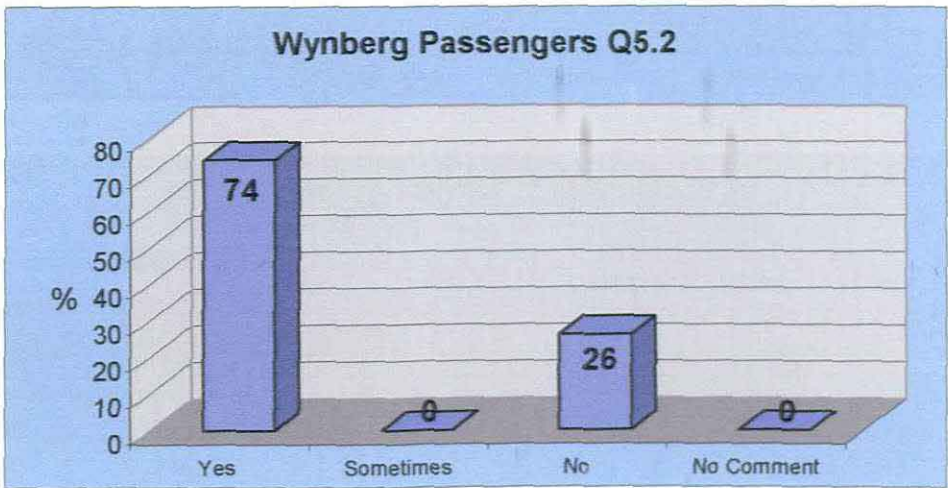
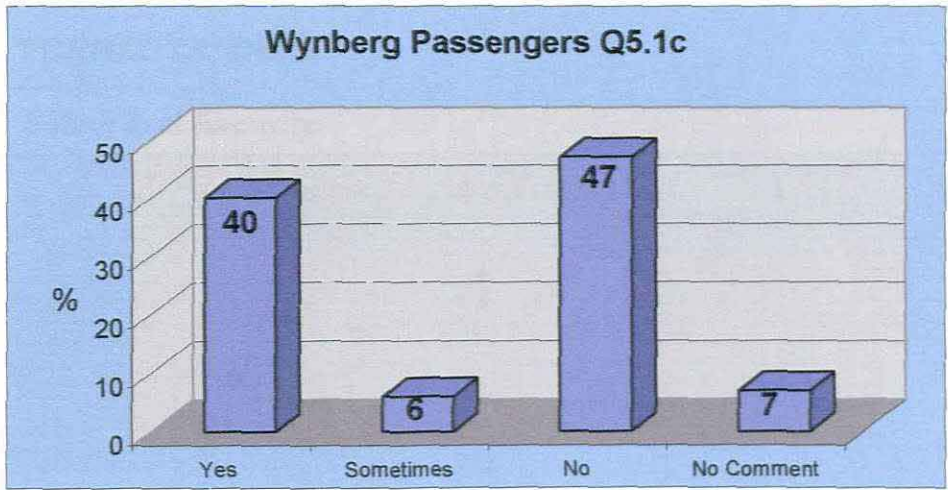
1.5 Pedestrian Environment



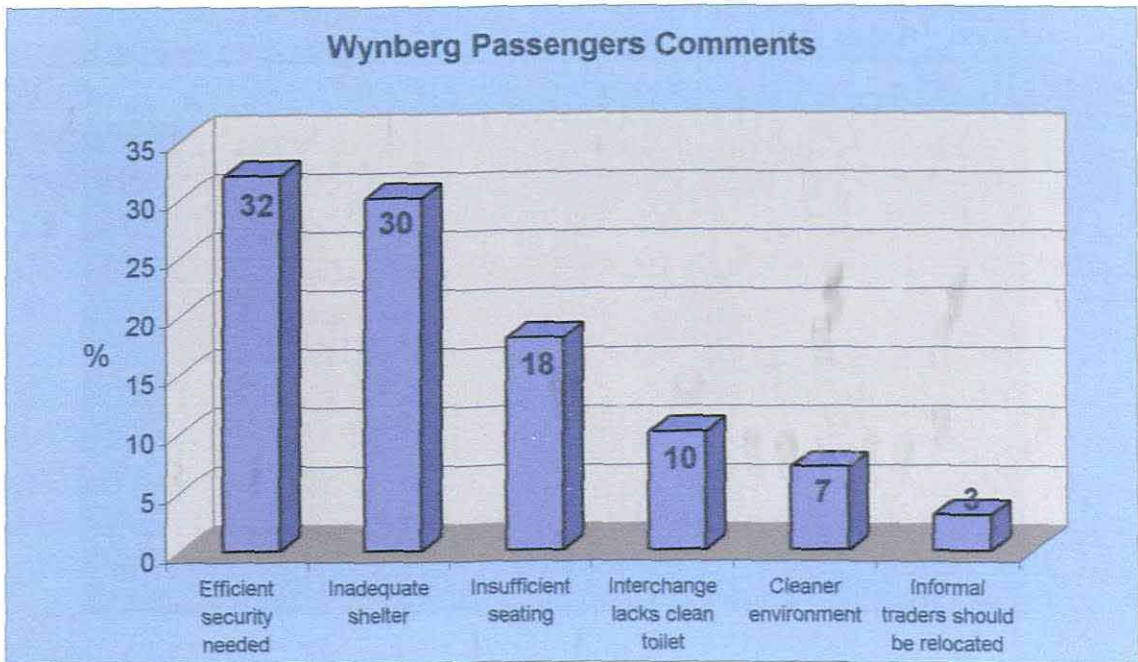


1.6 General



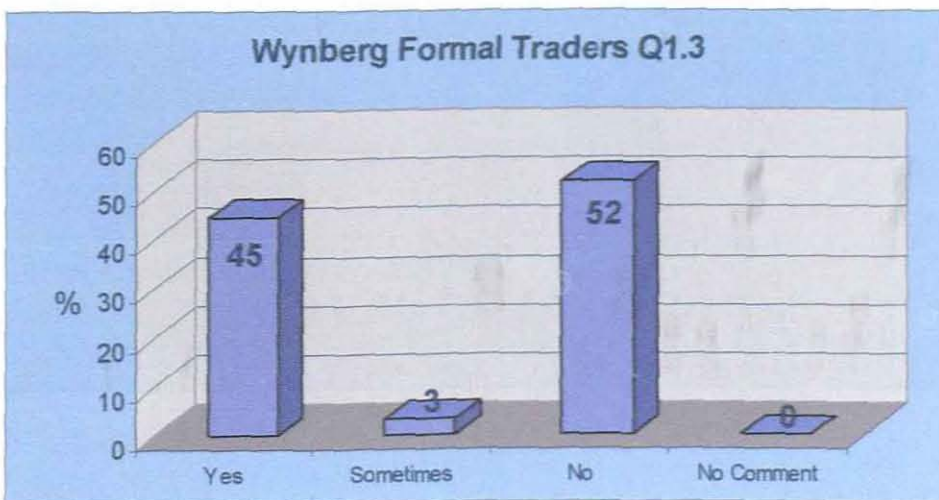
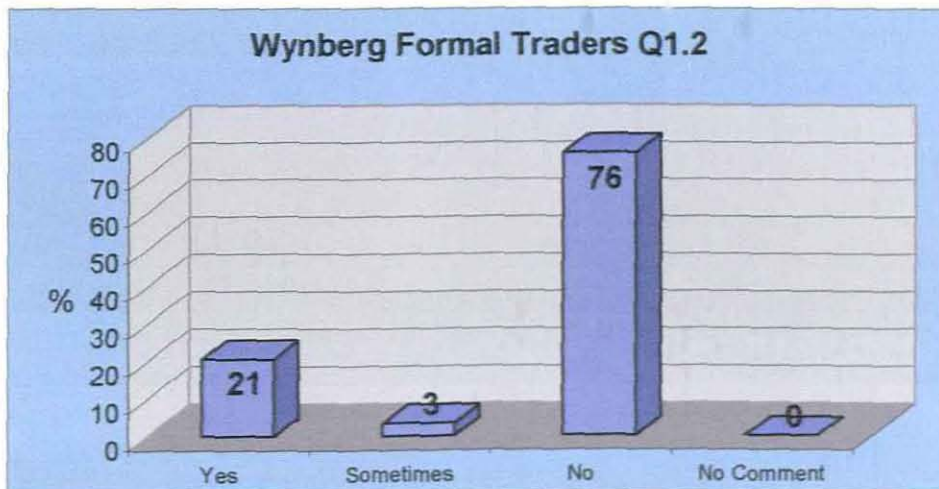
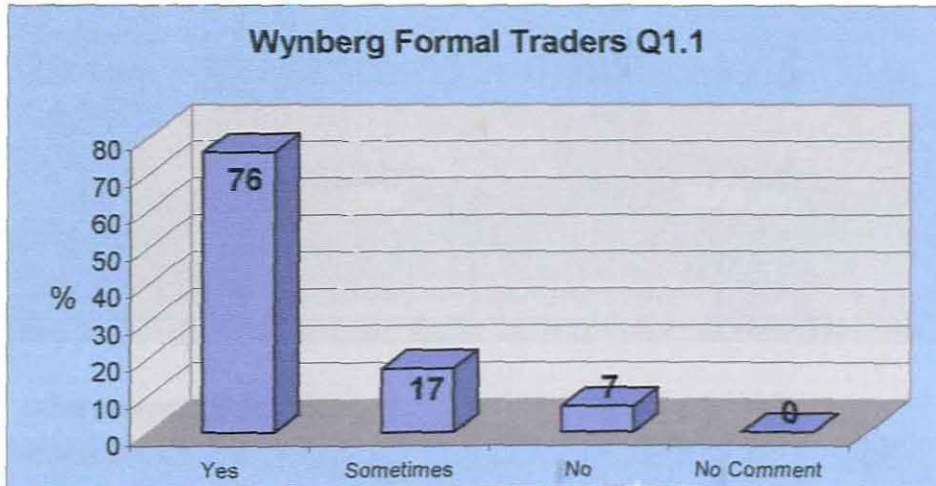


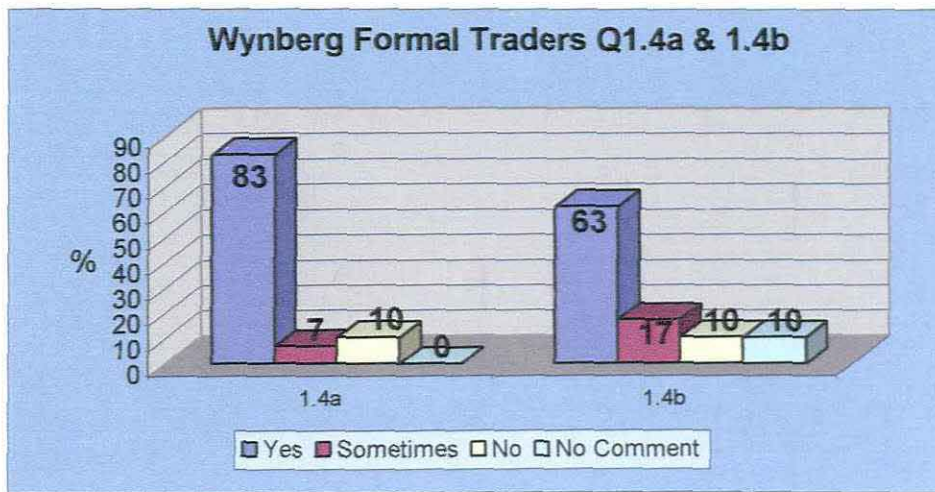
1.7 Main Concerns



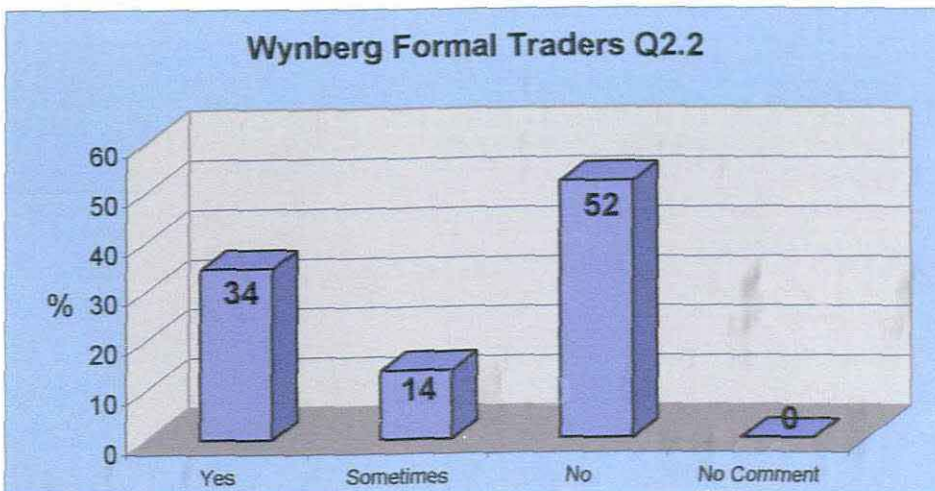
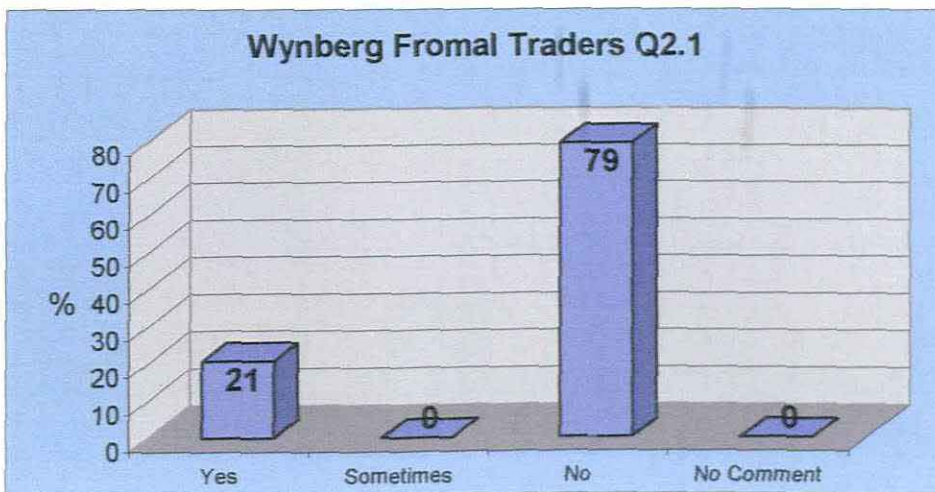
2. FORMAL TRADERS

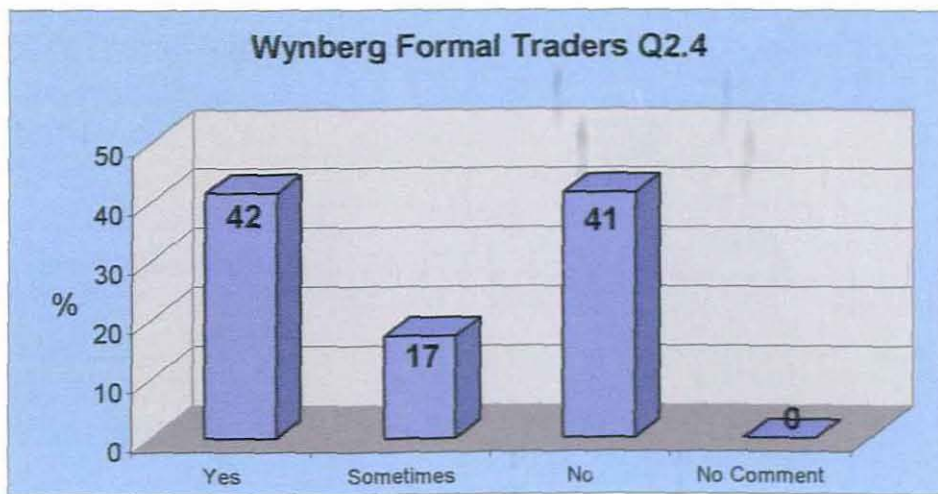
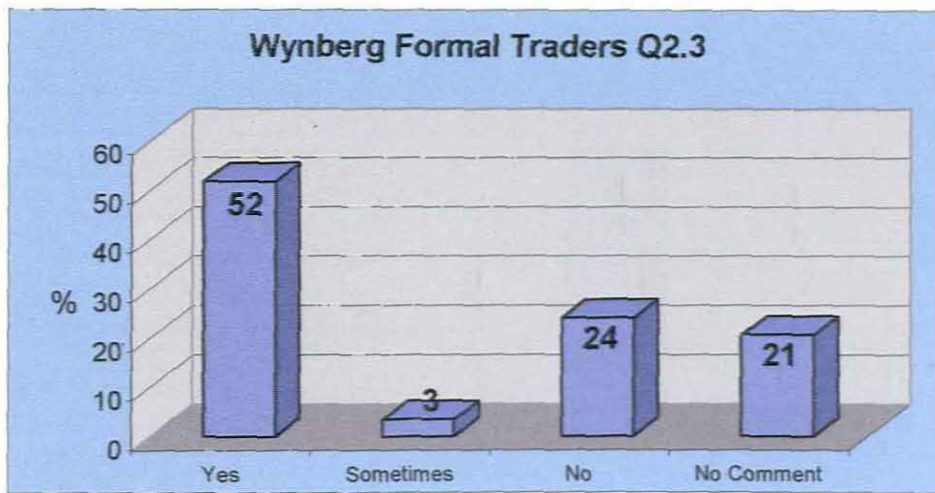
2.1 Safety and Security



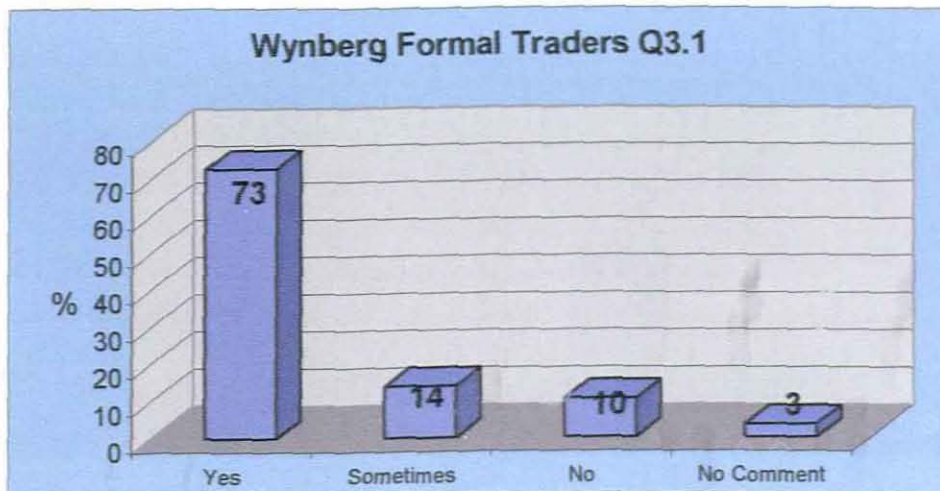


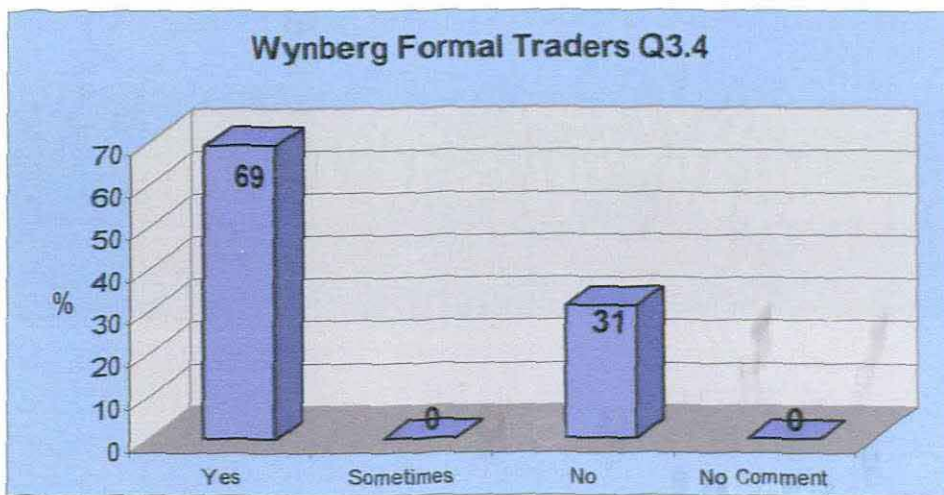
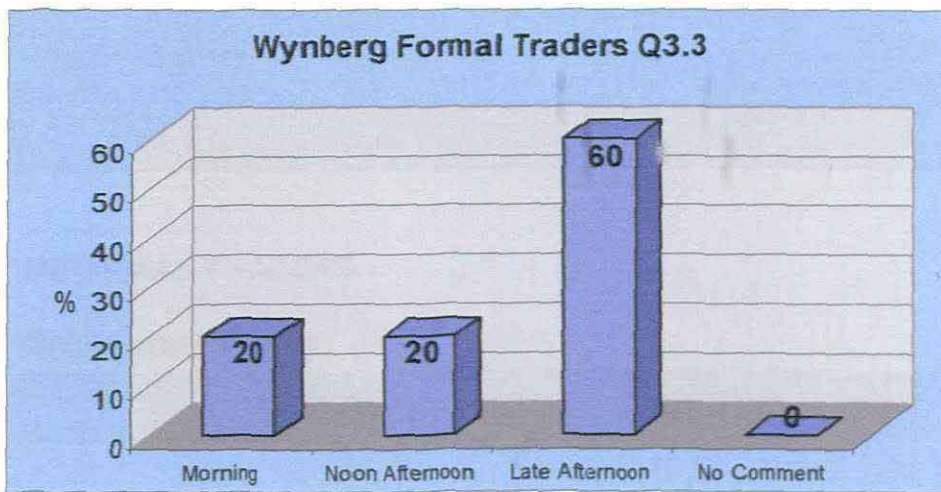
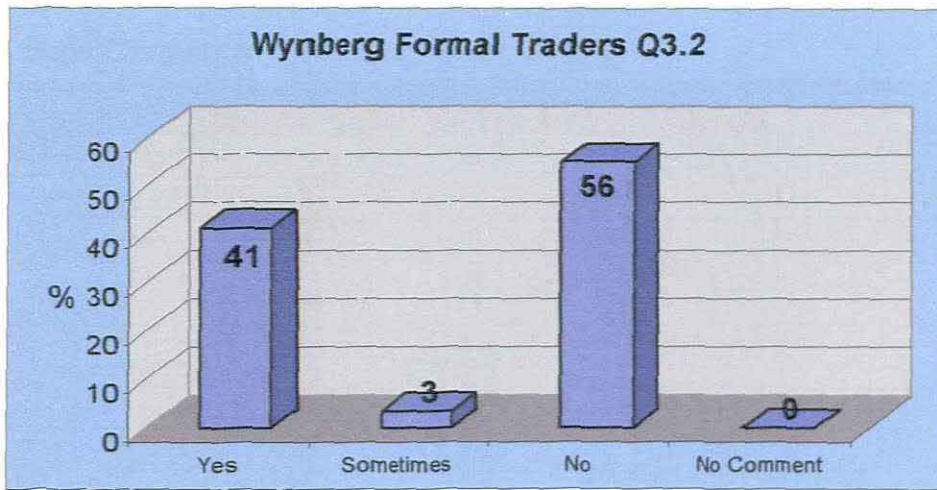
2.2 Interchange Facilities



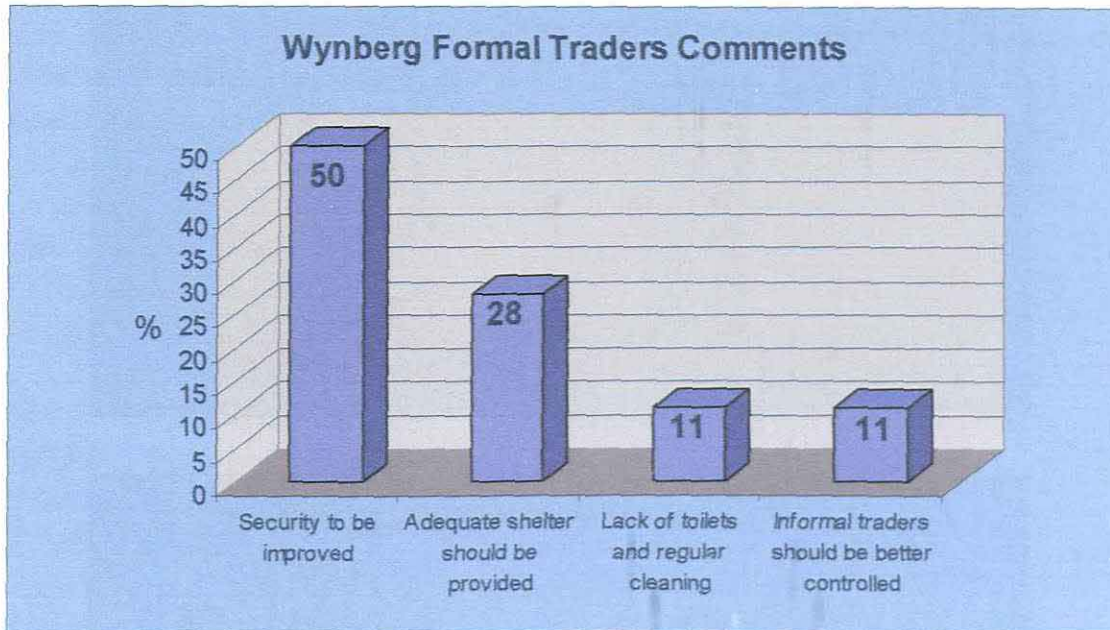


2.3 General



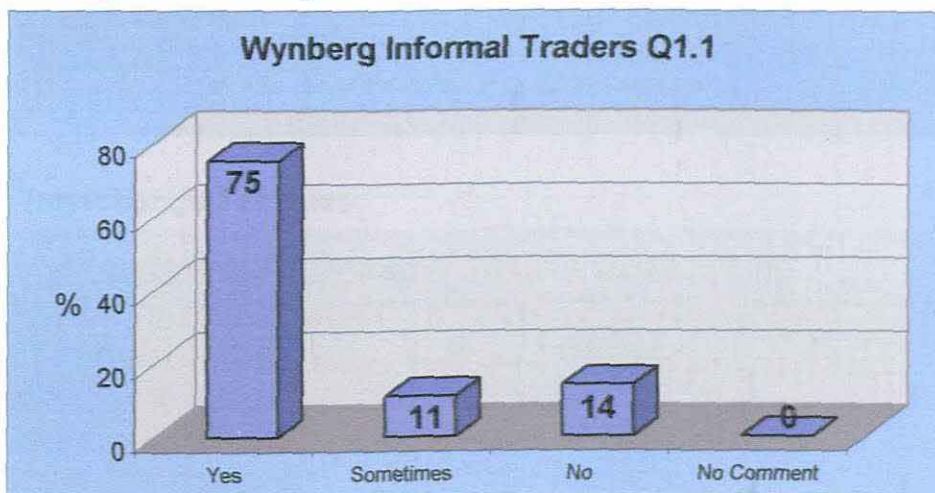


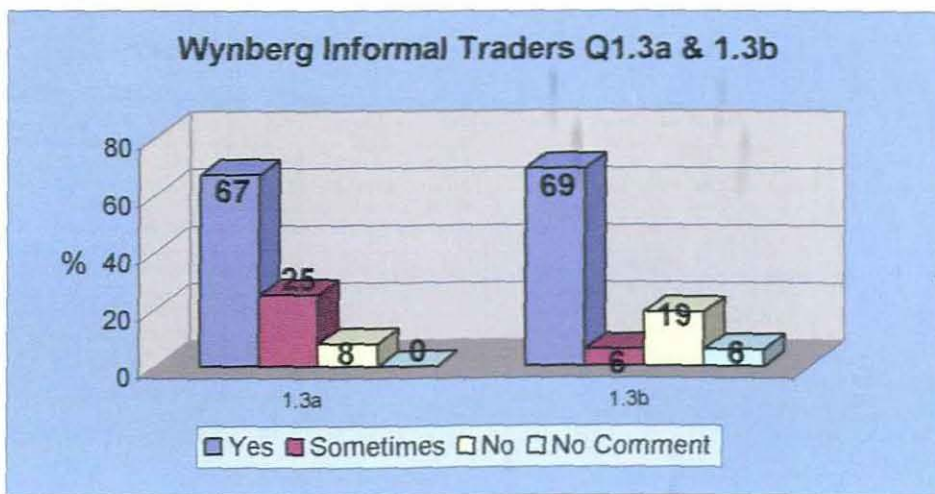
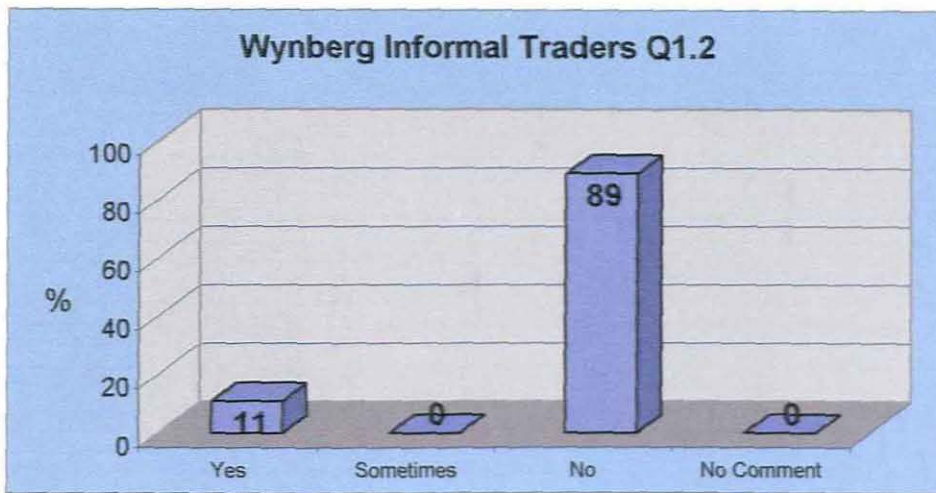
2.4 Main Concerns



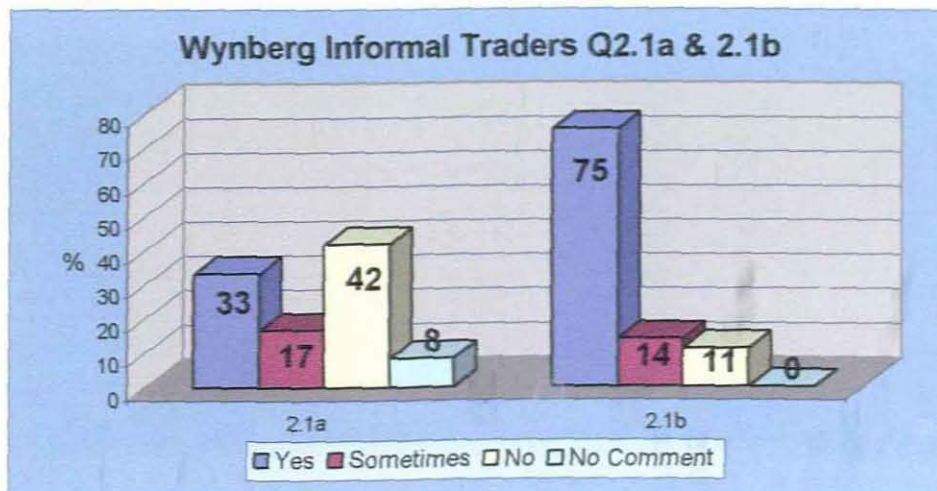
3. INFORMAL TRADERS

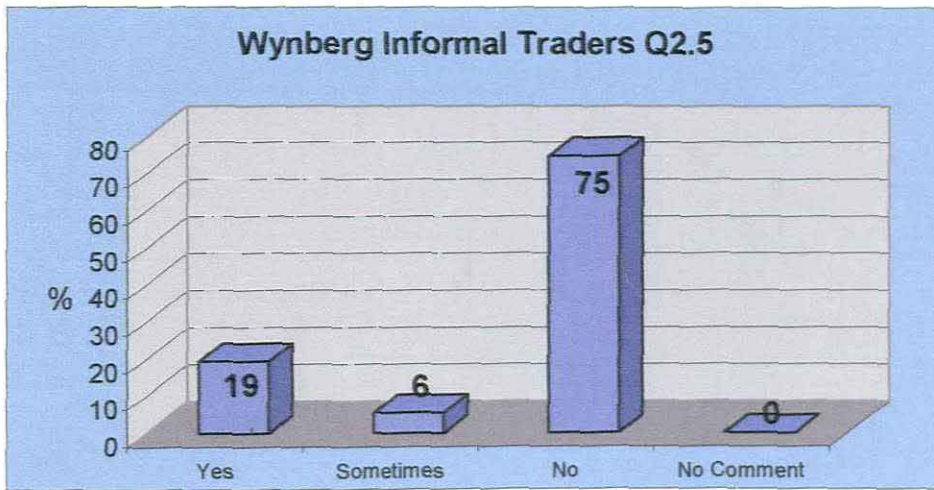
3.1 Safety and Security



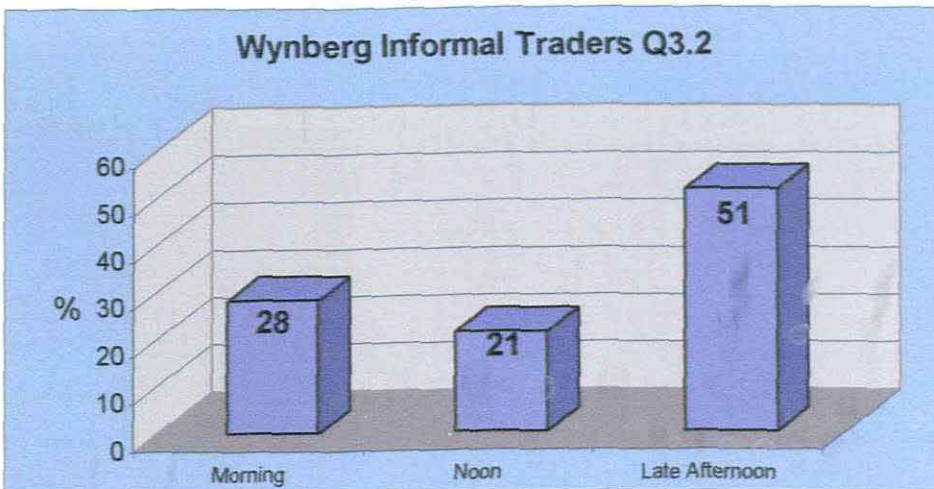
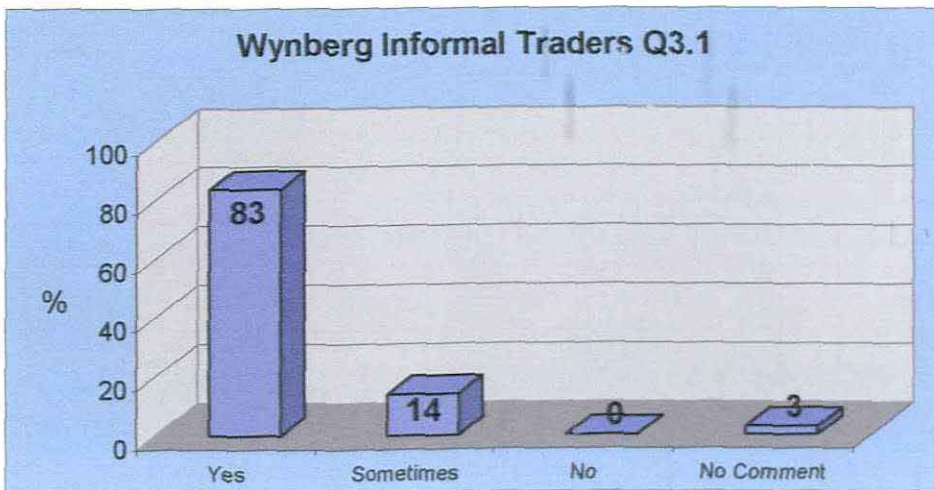


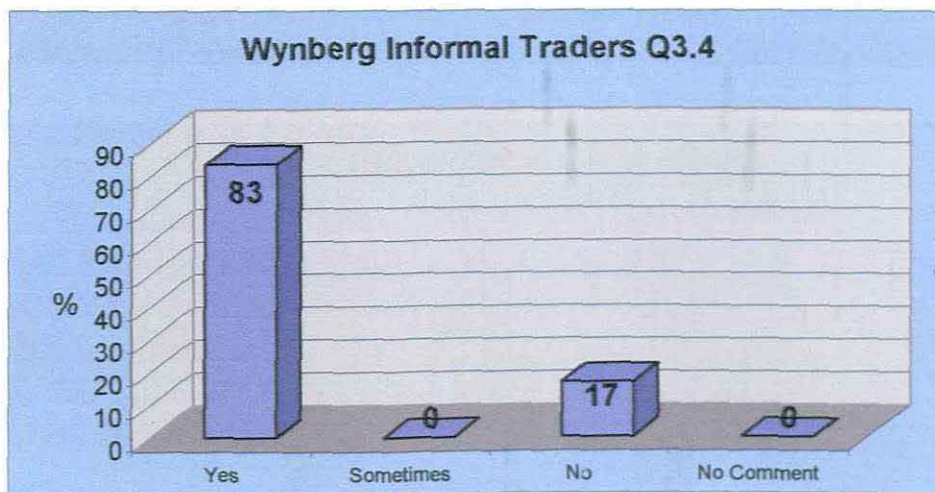
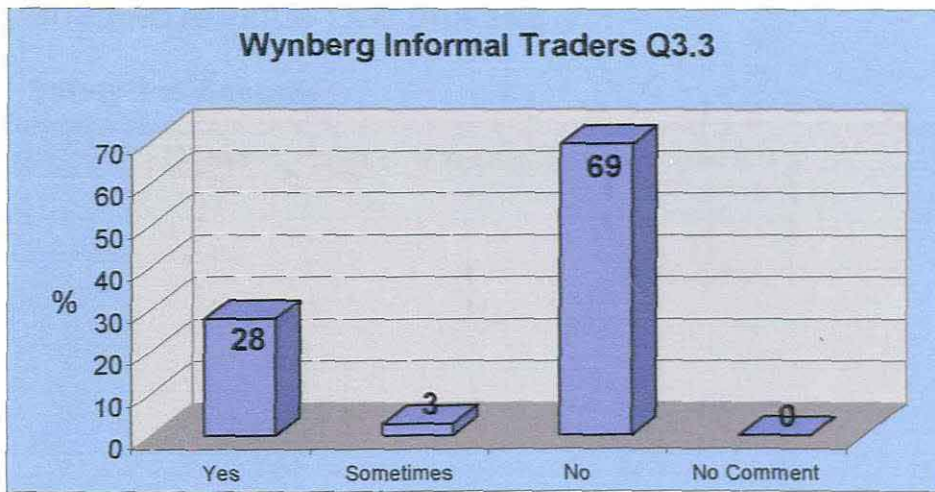
3.2 Interchange Facilities



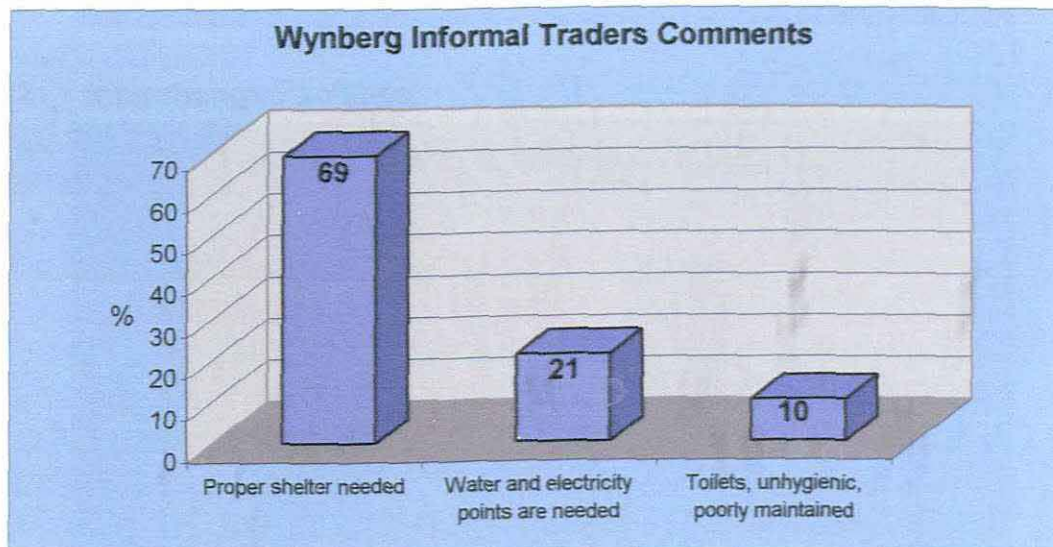


3.3 General



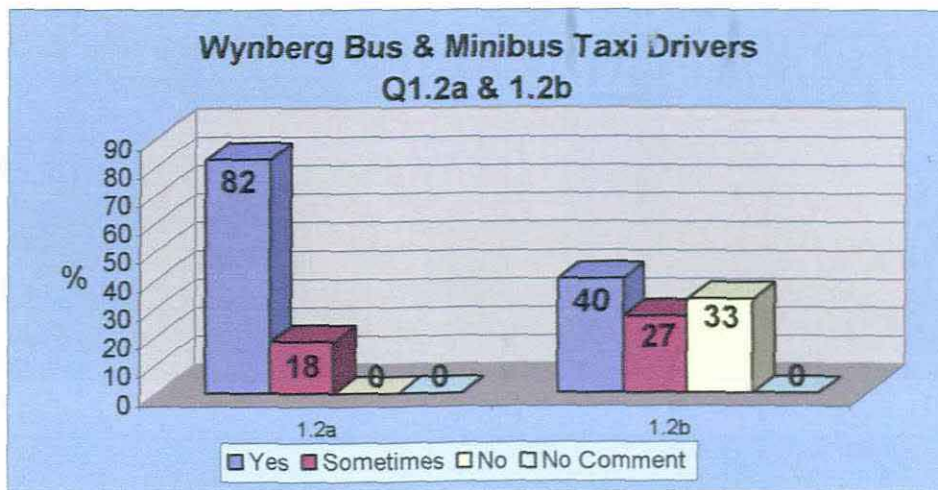
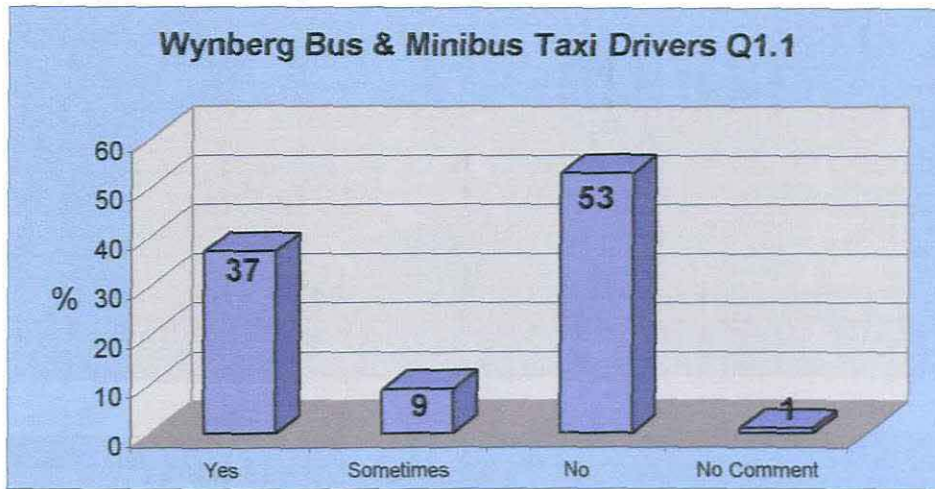


3.4 Main Concerns



4. BUS AND MINIBUS TAXI DRIVERS

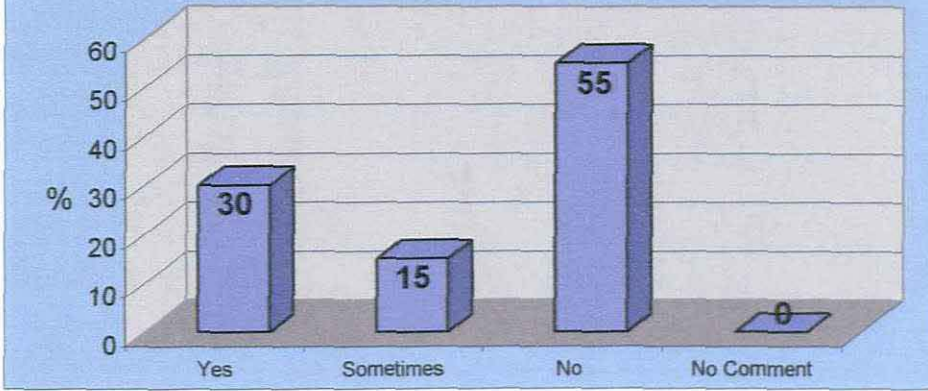
4.1 Safety and Security



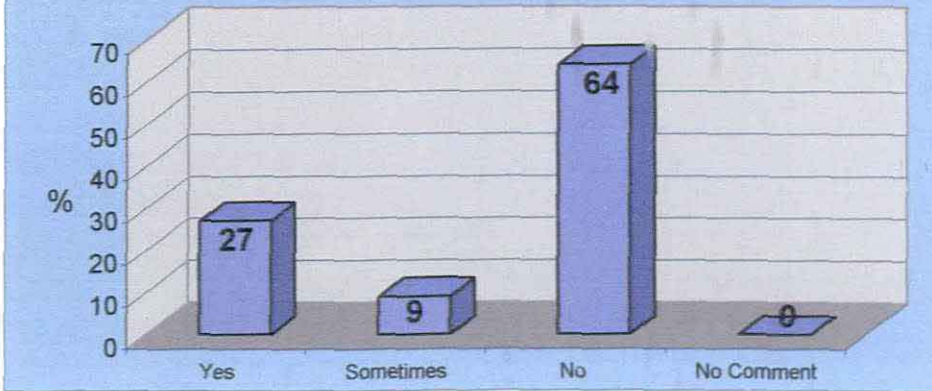
4.2 Interchange Facilities



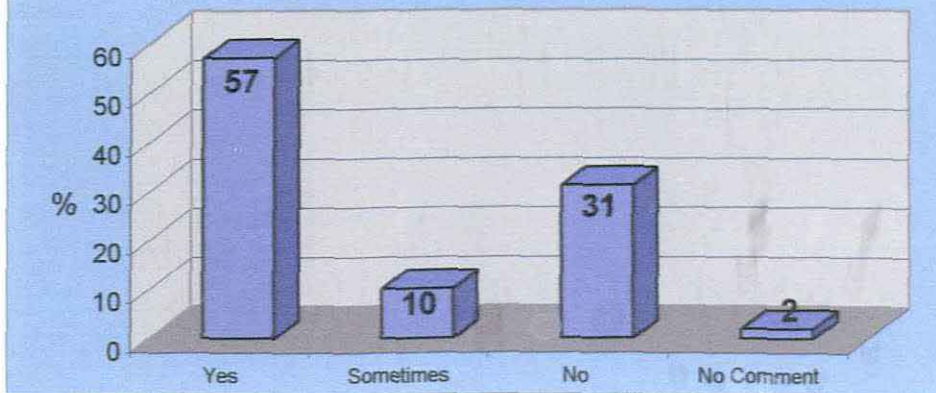
Wynberg Bus & Minibus Taxi Drivers Q2.1b



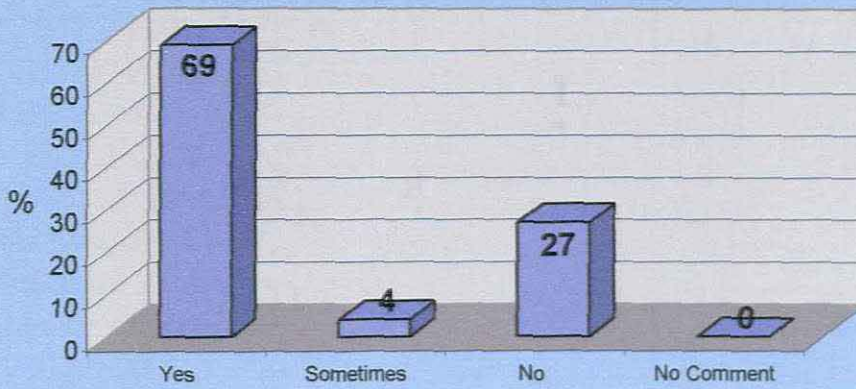
Wynberg Bus & Minibus Taxi Drivers Q2.1c



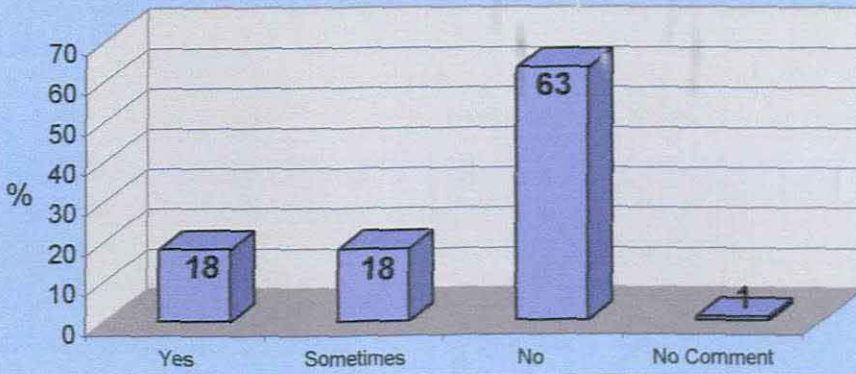
Wynberg Bus & Minibus Taxi Drivers Q2.2a



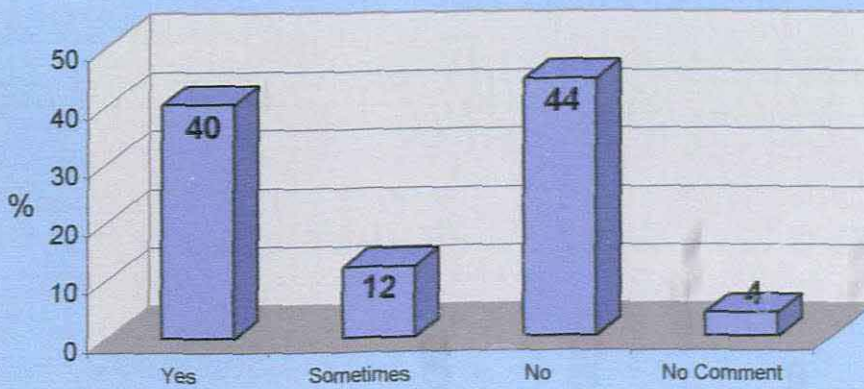
Wynberg Bus & Minibus Taxi Drivers Q2.2b



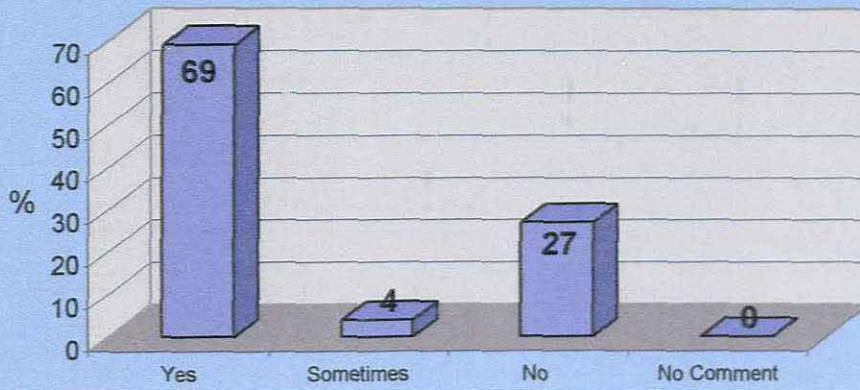
Wynberg Bus & Minibus Taxi Drivers Q2.2c



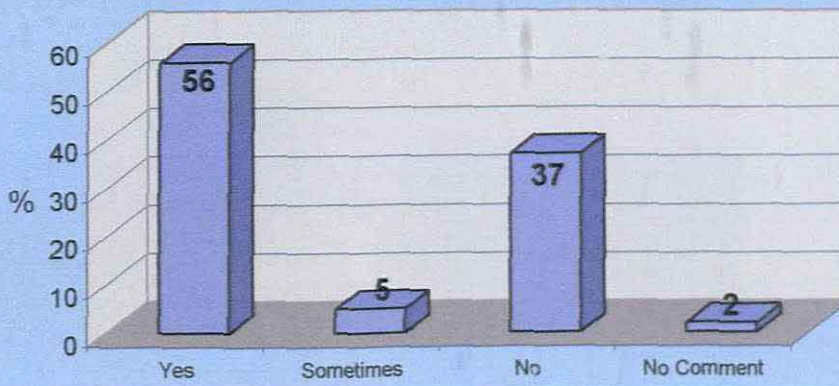
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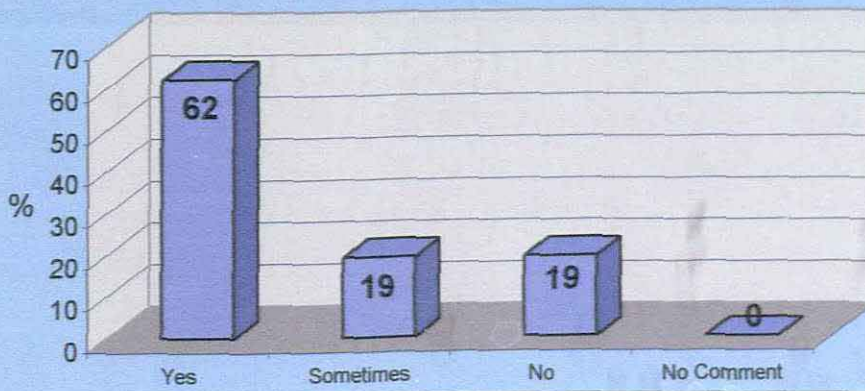
Wynberg Bus & Minibus Taxi Drivers Q2.2e

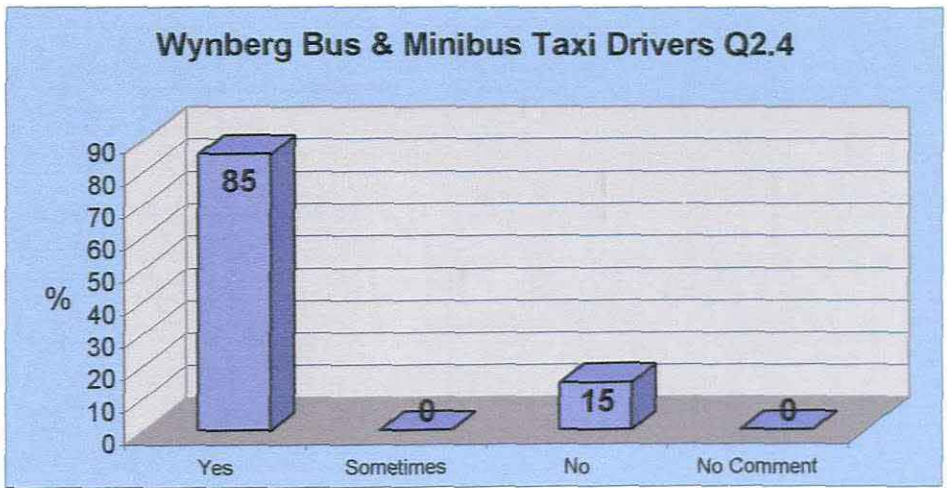


Wynberg Bus & Minibus Taxi Drivers Q2.2f



Wynberg Bus & Minibus Taxi Drivers Q2.3





4.3 Main Concerns

