

# MyCiTi BUS RAPID TRANSIT IT IS NOT JUST ABOUT THE BUS

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## ABSTRACT

The City of Cape Town's (CCT's) MyCiTi bus service is a component of a larger Integrated Rapid Transit (IRT) System that brings together all modes of transport including rail, bus, taxis and non-motorised transport (NMT) in a coordinated fashion. The CCT is aiming to significantly expand the service from the present provision of 18 routes (as of December 2013) to a total of 37 routes to complete Phase 1 of the planned four phase roll-out.

The continued success of the service is, however, not just about buses, but is dependent on a number of parts that contribute equally to the success of the system. This paper gives some insight into how all these parts contribute to ensuring that the buses are kept on the road and the passenger journey is kept as enjoyable and stress-free as possible. It also discussed some of the operational challenges faced by the team to ensure that the most efficient usage of the buses is achieved.

### 1 BACKGROUND

The City of Cape Town (CCT) has entered an exciting era of public transport. Not only has it successfully launched a Transport Authority, known as Transport for Cape Town (TCT), but its flagship project, the Cape Town MyCiTi Integrated Rapid Transit (IRT) System, is growing from strength to strength.

The MyCiTi bus service is a component of the larger IRT System which brings together all modes of transport including rail, bus, taxis and non-motorised transport (NMT) in a coordinated fashion. It was launched as a pilot project in May 2010 for the 2010 FIFA World Cup to provide services such as the Civic Centre to Stadium shuttle service, the Airport to City express service and the Inner City Gardens to Waterfront service for World Cup spectators and visitors. The system has grown since then, and supported by its ever increasing infrastructure footprint, provides a safe, efficient, affordable and reliable public transport services for the residents of Cape Town.

The CCT is aiming to significantly expand the services from the present provision of 18 feeder and trunk routes (as of December 2013) by introducing an additional 12 feeder and trunk routes by July 2014 to complete Phase 1a. Phase 1b will follow with the introduction of an additional 7 routes bring the total for Phase 1 to 37 routes. A trunk route is classified as an arterial route on dedicated bus lanes whereas a feeder route is a more penetrative route that operates in mixed traffic in mainly suburban areas.

The continued success of the service is however not just about buses, but is dependent on a number of parts that contribute equally to the success of the system. This paper gives some insight into how all these parts contribute to ensuring that the buses are kept on the road and the passenger journey is kept as enjoyable and stress-free as possible. It also discusses some of the operational challenges faced by the team to ensure that the most efficient usage of the buses is achieved.

## 2 THE SUM OF THE PARTS

Transporting a passenger from A to B involves a system of well co-ordinated and integrated parts. Each of these parts play an important role in ensuring that passengers are able get to their destination with the objective of ensuring they enjoy the ride as well. A typical passenger experience will involve:

- The Transport Information Centre (TIC) and communications teams who provide passengers with up-to-date information on bus schedules, route maps and interruptions to the service via telephone, web site and social media etc;
- the directional and information signage at all stops, shelters and stations;
- the infrastructure with its dedicated roadways and stations to ensure a quick and congestion-free journey to work and school;
- the Automatic Fare Collection (AFC) system to ensure ease of payment and access;
- the Operators who drive the buses and operate the stations;
- the low emission buses with wheelchair and bicycle access; and
- the Law Enforcement Officers who uphold their safety.

Some of these key parts are described in more detail below.

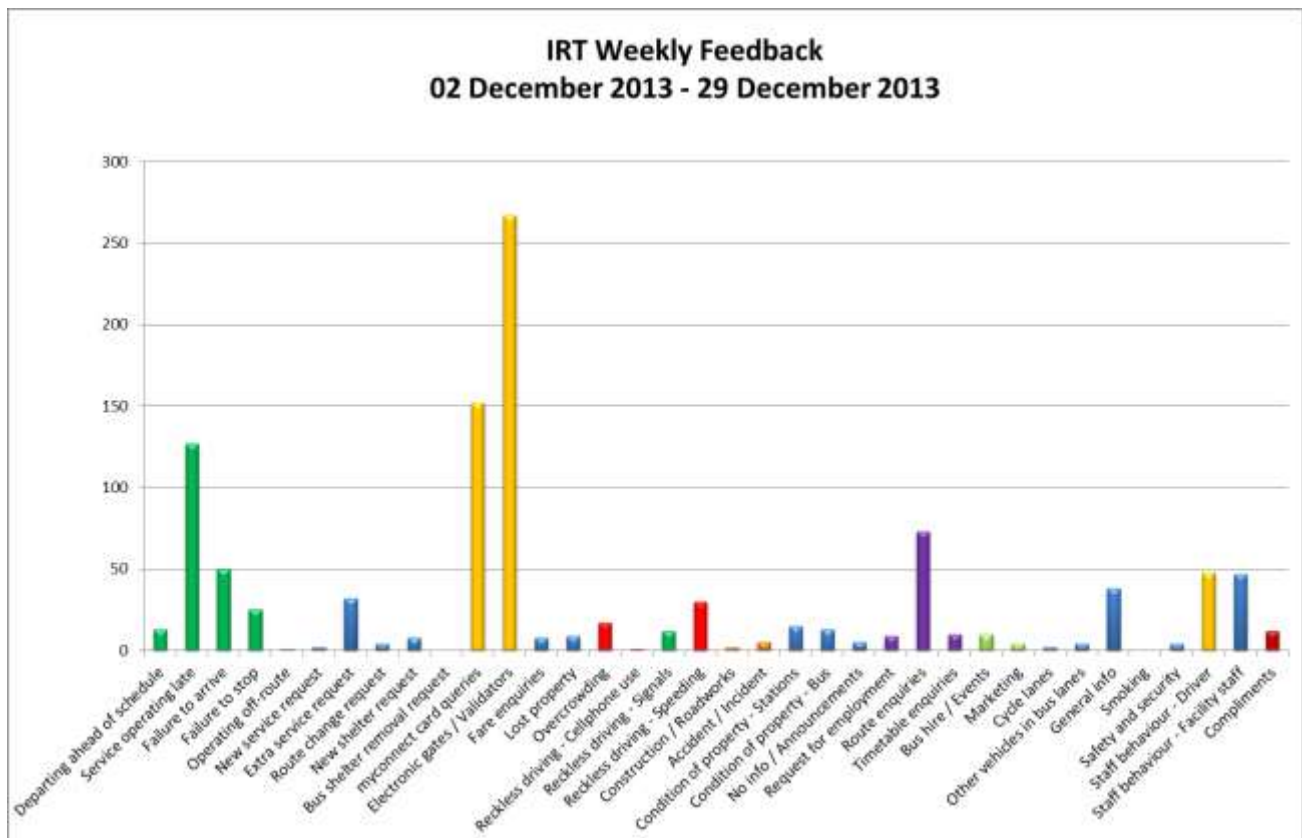
### 1.1 Transport Information Centre and Communications

The TIC acts as the central point of contact for all public queries. With one toll free number 0800 65 64 63, passengers can access a wide range of information about MyCiTi and log complaints or queries. These include questions relating to how the **myconnect** (AFC) card works, bus departure / arrival times, future routes, lost property and fare enquiries.

The system also relies on continuous feedback from the general public to ensure that the highest standards are maintained. The TIC refers any serious or special issues directly to City operational team to ensure that a personal touch is provided and to provide feedback directly to the operations team.

**Graph 1** gives an indication of the number of calls and type of feedback received from the public in a typical month. It clearly indicates the enthusiasm of the public by the number of enquiries regarding when routes are coming to their area, but also a high level of uncertainty using the new my connect card and electronic access gates.

**Graph 1: TIC Statistics**



The communications team has developed a brand everyone can relate to. The MyCiTi mascot “Marvin” is the product of a competition among passengers. He can be found mingling with the crowd at special events and has become an interactive showpiece for representing the brand.



**Figure 1: Queries Sticker**



**Figure 2: Marvin with Card**

The Mobi Website site is accessible from all forms of mobile phone and provides the passenger with ‘live’ real time information on bus departure times per route for every stop. All times reflected include any delays experienced on the route, which are also indicated on the electronic Passenger Information Displays (PIDs) in all of the stations.

A dedicated and fully interactive website, [www.myciti.org.za](http://www.myciti.org.za) has been launched, which provides a wide range of information including a trip planner, route maps, time tables and information on fares etc.

## 1.2 Signage

For passengers that do not have access to the internet or smart phones, passenger information signs at all stops and stations are an integral part of the system to keep passengers informed. The signage comprises static information signs, way-finding signs, electronic PIDs in stations and electronic destination displays (EDDs) on buses. A dedicated team of graphic designers and operational signage staff ensure that the information is continuously updated.



Figure 3: Bus Shelter

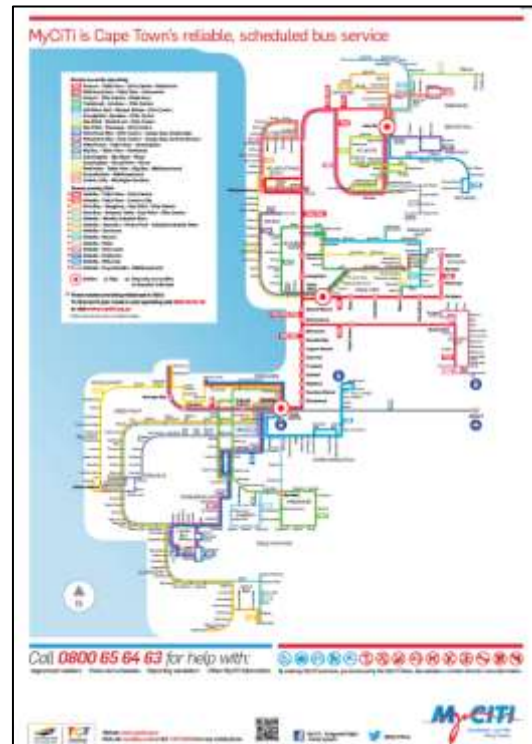


Figure 4: Route Map

## 1.3 Infrastructure

The bulk of the investment in this service is in the infrastructure, which differentiates the MyCiti system from other modes of transport by improving system efficiency. Some of these time savers include:

- The “red” road, a dedicated concrete bus lane enabling the buses to travel independently of mixed traffic, especially significant in peak periods;
- the stops and closed stations with high-level level boarding through multiple doors enabling faster boarding and alighting times;
- inductive loops at traffic light intersections enabling pre-selection signal control to give the bus priority;
- kassel kerbs that control the bus wheel movement when docking, allowing for more accurate station alignment;
- cameras linked to the centrally located Transport Management Centre (TMC) enabling queues to be analysed inside the stations and bus requirements managed accordingly;
- pre-paid gate access with the AFC system using the Euro Mistro Visa (EMV) cards reducing delays to bus departure times as bus drivers don't have to deal with money or tickets.

## 1.4 The Automatic Fare Collection system

The EMV or **my** connect card is a world class payment system that not only acts as a debit card, but enables quick “tapping on” and “tapping off” while using the buses and stations.

When the system commenced, a flat fare was charged depending on what service the passenger used. On the 3rd August 2013, the distance based fare structure was launched, which allows for more accurate fares linked to distance travelled, the charging of peak and off-peak fares and the option of buying cheaper bulk packages.

MyCiTi Mover fares						
0-5 km	5-10 km	10-20 km	20-30 km	30-60 km	> 60 km	
R5.20	R6.10	R7.40	R9.80	R10.90	R16.20	
0-5 km	5-10 km	10-20 km	20-30 km	30-60 km	> 60 km	
R4.40	R5.00	R6.10	R8.00	R9.00	R14.10	

MyCiTi Standard fares						
0-5 km	5-10 km	10-20 km	20-30 km	30-60 km	> 60 km	
R6.80	R7.90	R9.60	R12.70	R14.30	R21.10	
0-5 km	5-10 km	10-20 km	20-30 km	30-60 km	> 60 km	
R5.70	R6.50	R7.90	R10.50	R11.70	R18.30	

**Figure 5: Distance Based Fares**

**Myconnect** cards can be purchased and value added at MyCiTi stations or at selected retailers in the vicinity of the service. To date, in excess of 150 000 cards have been sold.



**Figure 6: Access Gates**



**Figure 7: Bus Validator**

## 1.5 Vehicle Operating Companies and Station Management Services

The City has partnered with taxi associations and bus companies who presently operate in the planned MyCiTi areas. These associations have formed companies who now operate the buses. Three companies presently operate the service, Table Bay Rapid Transit (TBRT), Kidrogen and TransPeninsula Investments.

These companies have risen to the challenge of managing these new bus companies, providing the drivers, technical and management staff necessary to keep the buses on the road.



## 1.6 The Fleet

The MyCiTi fleet presently consists of three vehicle types. The vehicle types are used according to the route or area in which they are operating which is influenced by the passenger demand, the terrain and the station/stop configuration.

At present the operational fleet comprises 8x18m, 44x12m and 97x9m buses. As the future routes and services roll out for Phase 1, an additional 24x18m, 42x12m and 124x9m vehicles are due to enter the service, taking the total fleet size to 339 buses for Phase 1. All these buses are wheelchair and bicycle friendly.

- 18 m articulated buses  
These high-floor buses operate mainly on the dedicated busways and can accommodate up to 130 passengers.



**Figure 8: 18m bus**

- 12 m rigid buses  
These high-floor buses also operate mainly on the dedicated busways and can accommodate up to 85 passengers.



**Figure 9: 12m bus**

- 9 m buses

These low-floor buses designed to travel efficiently in mixed traffic and on the steep and narrow roads found in many areas of Cape Town. These medium-sized buses can accommodate up to 50 passengers and have a demarcated area for a wheelchair. Level boarding is achieved via a retractable ramp.



Figure 10: 9m bus

### 3 MyCiTi STATISTICS

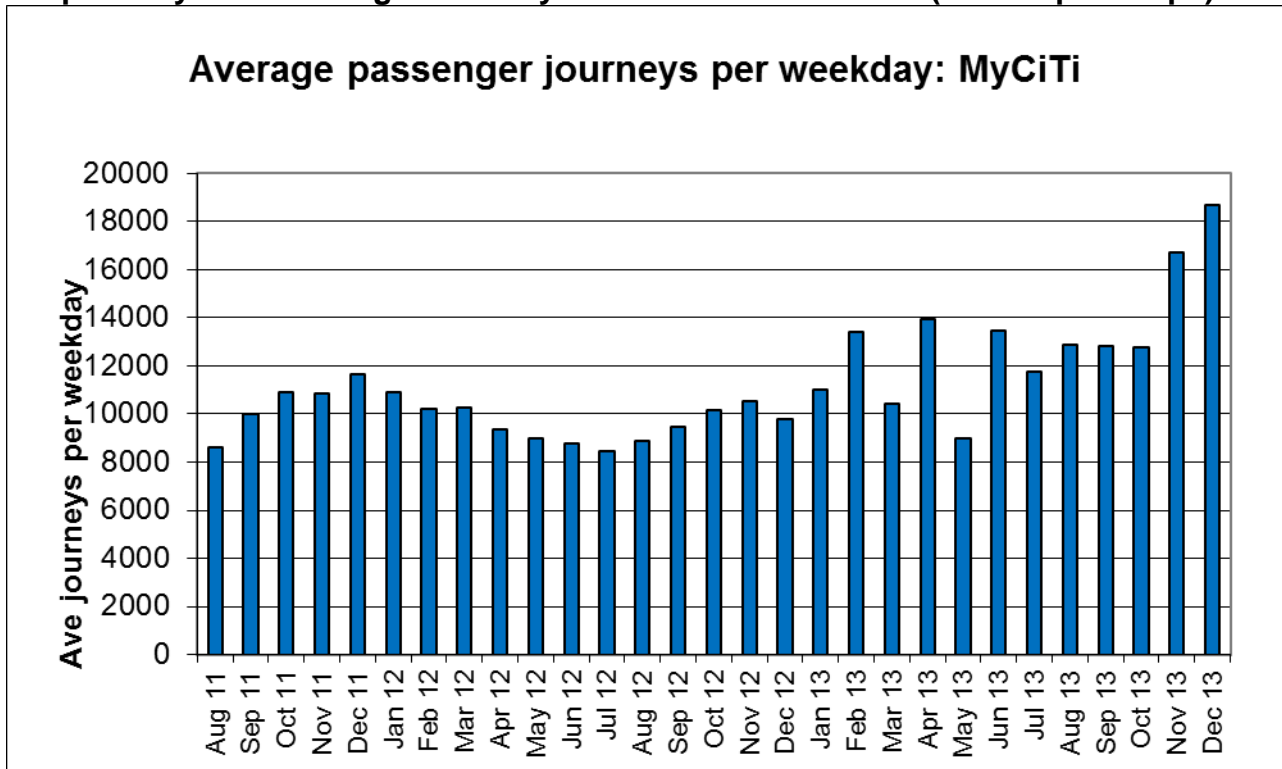
#### 1.7 Number of Passenger Journeys

Since the launch in May 2010, approximately 8.5 million passenger journeys have been made on the MyCiTi rapid transit system. In addition to daily commuter travel, it includes transport services provided during the 2010 FIFA World Cup and subsequent events held at the Cape Town Stadium.

The average number of weekday passenger journeys per month is shown in **Graph 2**. The decrease in the number of passengers in May 2013 was due to the national bus strike and the increase in November and December 2013 was due to the launch of new routes.

A general seasonal trend is emerging as potential passengers choose to use their cars over the Cape Town winter months. It is also interesting to note that the number of passenger journeys does not decrease over the December holiday season, indicating a high use of the system by recreational users.

**Graph 2: MyCiTi Passenger Journeys Based on Ticket Sales (excl Airport Trips)**



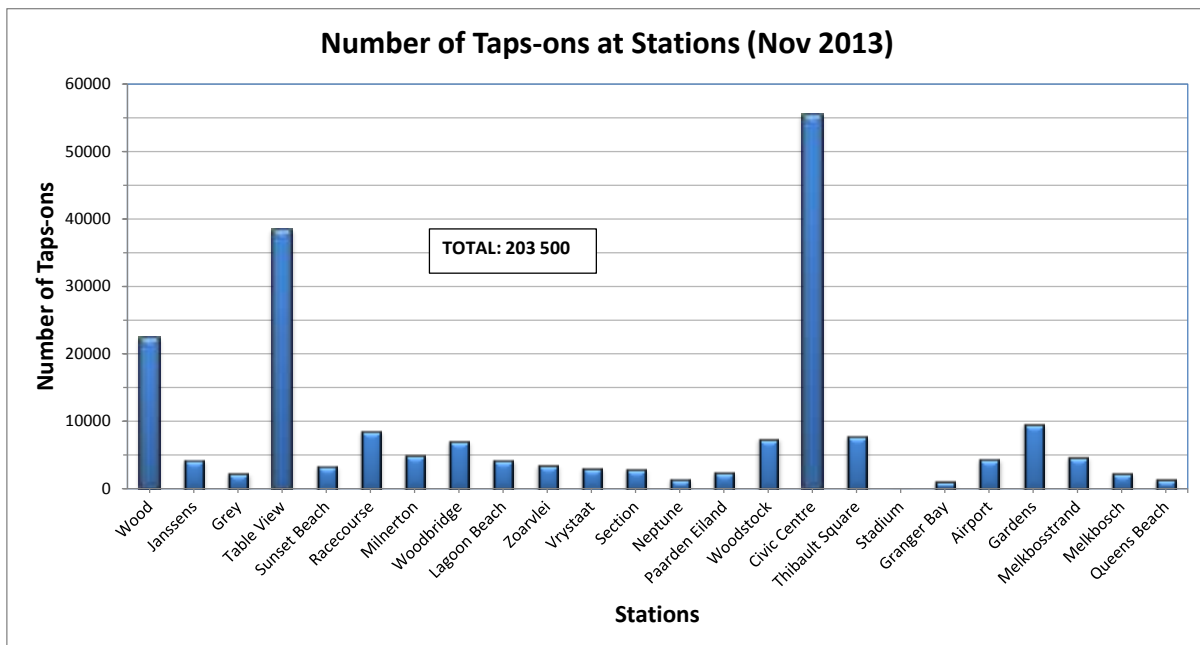
**1.8 Route Utilisation**

The total number of boarding passengers per trunk station and per feeder route (at stops) for the month of November 2013 is indicated in **Graphs 3 and 4**. These graphs show the number of people that enter the system by tapping on, excluding free transfers between routes.

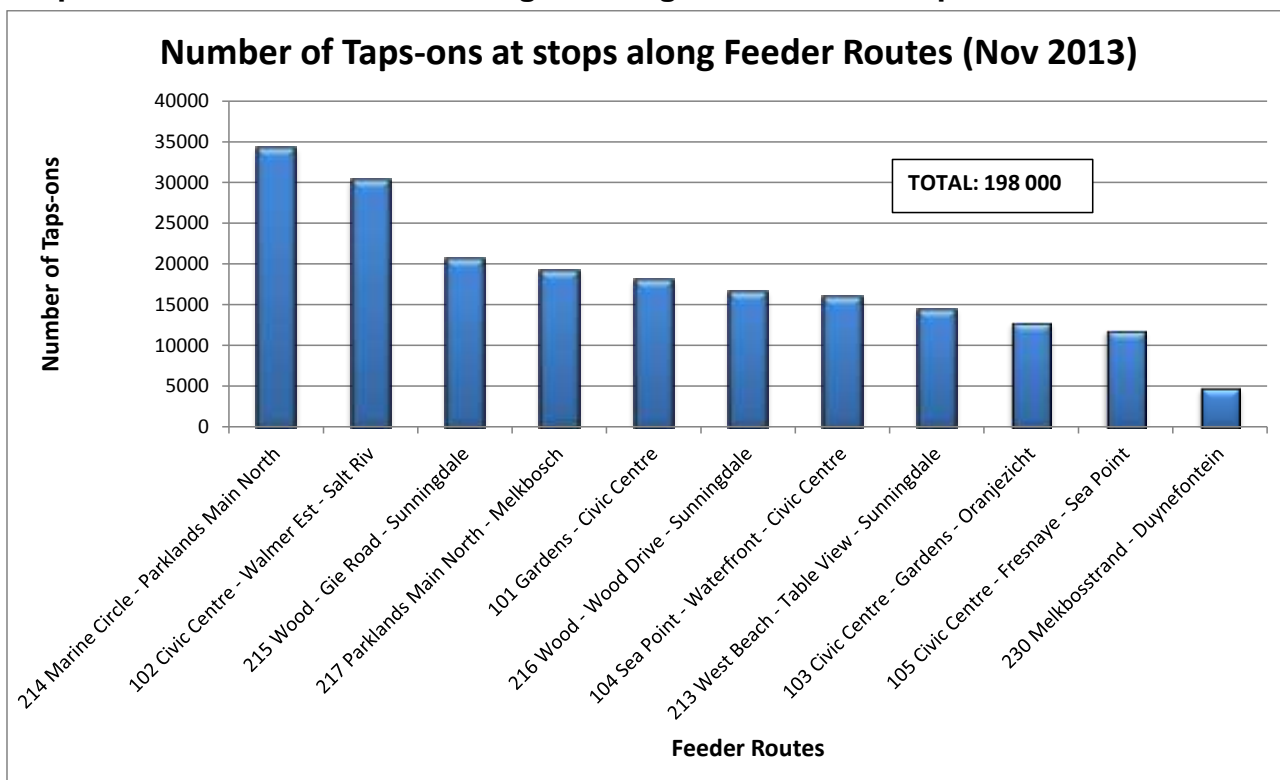
The combined total tap-ons at stations and feeder stops indicate that a total of approximately 400 000 passenger journeys were made in the month of November.



**Graph 3: Total Number of Boarding Passengers at Trunk Stations**

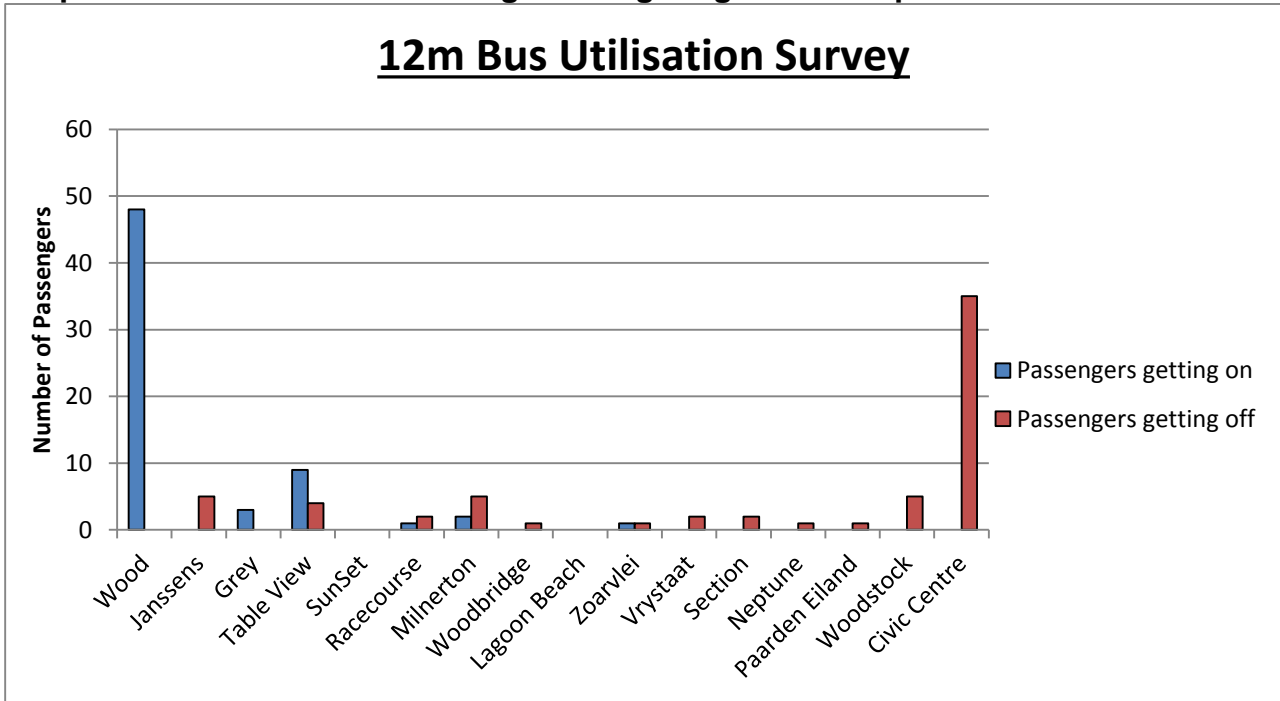


**Graph 4: Total Number of Boarding Passengers at Feeder Stops**

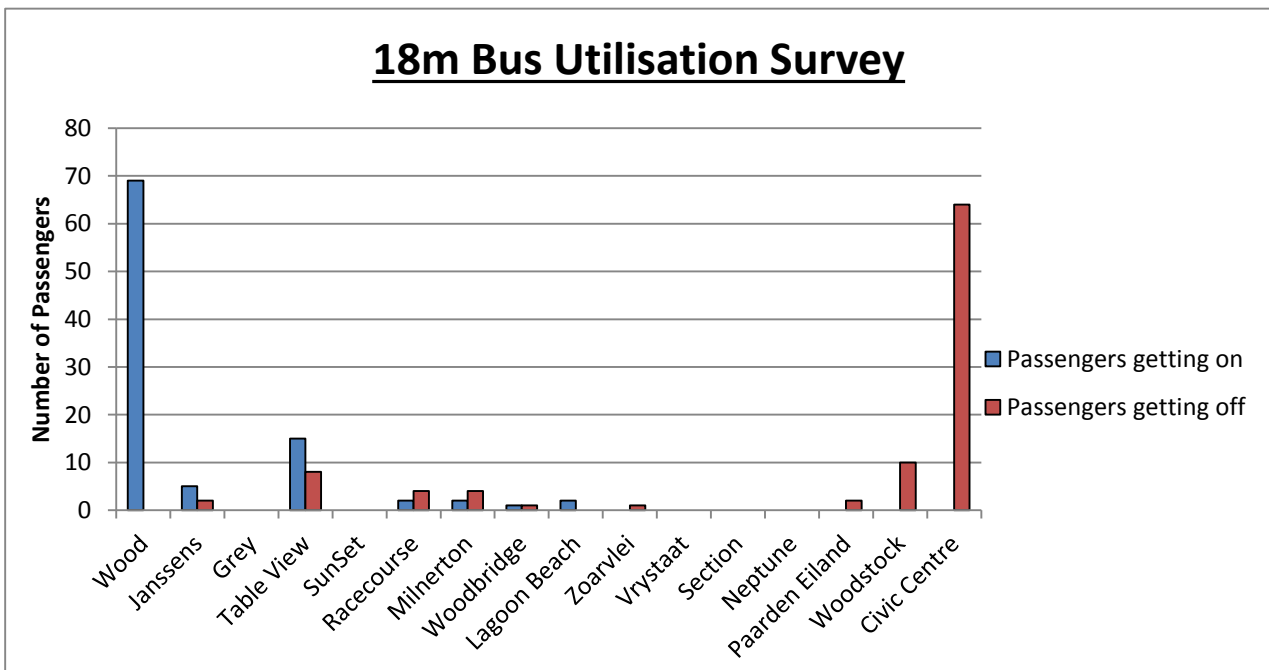


A more in-depth analysis of passengers boarding and alighting on individual bus trips (including free transfers) along the T01 trunk route is shown in **Graphs 5 and 6**. These graphs indicate that a typical AM peak trip inbound towards the CBD is very much a point-to-point service with relatively few passengers embarking and disembarking along the route. Due to the high bus occupancies during the peaks, there is often reluctance by passengers to board full buses at intermediate stations.

**Graph 5: Number of Pax Boarding and Alighting in the AM peak on a 12m bus**



**Graph 6: Number of Pax Boarding and Alighting in the AM peak on an 18m bus**



## 1.9 Bus Occupancies

One of the biggest operational challenges that faces the MyCiTi team, is to encourage higher passenger occupancies in the buses amongst the largely “choice users” of the service. It is important to balance the passenger’s expectations of comfort with the economic reality of ensuring maximum utilisation of the existing assets.

The recommended maximum standing density in South African is 4.5 standees per m<sup>2</sup> of available standing area, which compares favourably to the European and USA standards of 4 standees/m<sup>2</sup> and 5 standees/m<sup>2</sup> respectively. The *Transit Capacity and Quality of Service Manual* (2<sup>nd</sup> Edition, TRB), however, suggests that crush loading occurs at approximately 150% of seated capacity.

The MyCiTi Volvo buses are currently specified for a maximum standing density of approximately 4.2 standees/m<sup>2</sup>, but the present actual peak standing densities achieved tends to be a lot lower. **Table 1** summarises the maximum passenger capacity (based on 4.2 standees/m<sup>2</sup>) compared to the TRB standard and a maximum “practical capacity” benchmark of 85% of maximum legal capacity (used internally by the CCT).

**Table 1: Summary of Legal Bus Capacities**

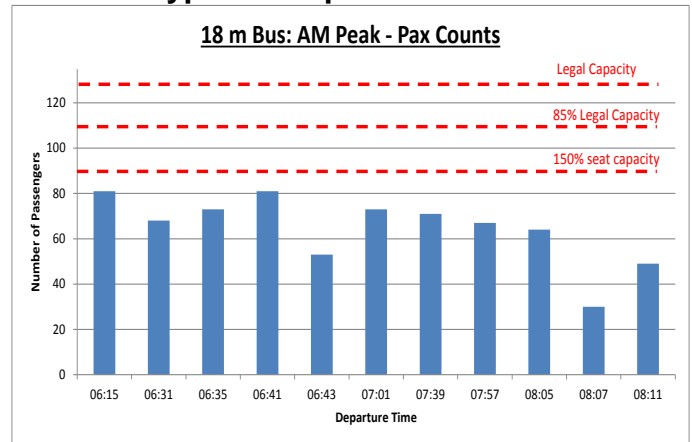
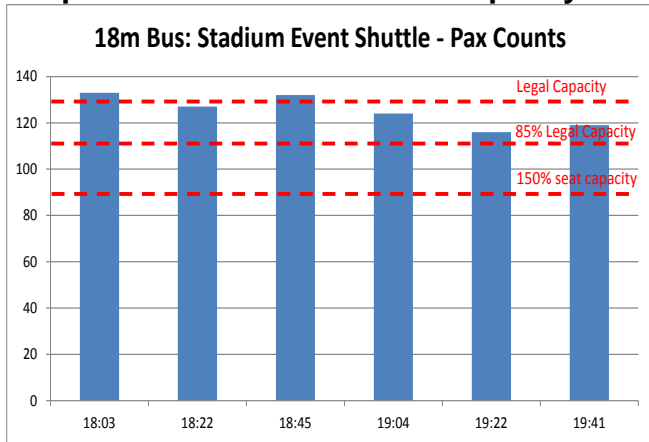
MyCiTi Bus Passenger Capacity						
Bus Type	Maximum Legal Passenger Capacity				150% of seats	85% of total
	Seated*	Standing	Wheelchair**	Total		
A - 18m Artic	59	72	(2)	131	87	111
B - 12m Airport Shuttle	37	43	(1)	80	54	67
C - 12m Bus	45	41	(1)	86	66	72
D - 9m Bus	26	25	(1)	51	38	43

**NOTES:**

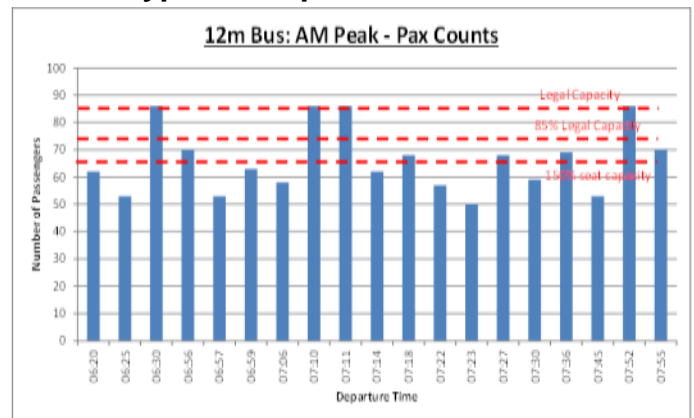
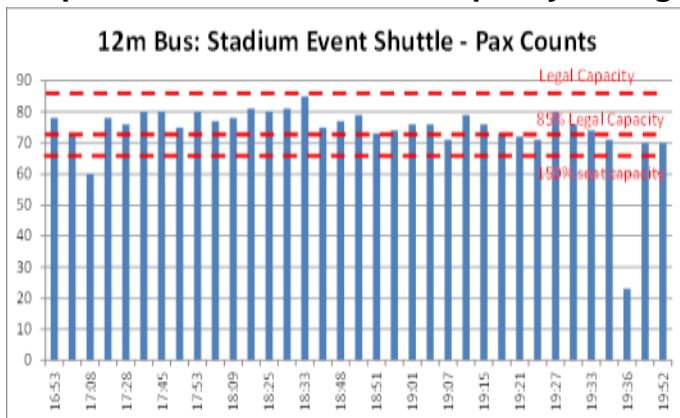
- \* Seated number includes the driver
- \*\* Wheelchair spaces are included in the seated number

**Graphs 7 and 8** show the typical surveyed occupancy of an 18m articulated bus over a short distance of 2.4km for an event at Cape Town Stadium and over a longer distance of 18km during a typical AM peak trip under high demand conditions. **Graphs 9 and 10** show the same information for a 12m bus. The results below are not isolated and have proven to be fairly consistent over at least two years of regular surveys.

**Graphs 7 and 8: 18 m Bus Occupancy during Event vs Typical AM peak**



**Graphs 9 & 10: 12 m Bus Occupancy during Event vs Typical AM peak**



Based on the above results, one can make some interesting assumptions as follows:

- Buses operate at about 90% of legal capacity over short distances and high demand scenarios.
- Buses operate at lower occupancies over longer distances and high demand scenarios. This is due to the reluctance of passengers to stand over longer distances.
- The average occupancy of 18m articulated buses is much lower than 12m rigid buses over the longer distance, making the 18m bus significantly more inefficient to operate over this distance. The reason for this appears to be the passenger's preference to stand bunched near the doors, blocking access by other passengers. There also appears to be an aversion to standing in the articulated section of the bus or at the back due to ride discomfort.

In order to keep the standing densities as high as possible in peaks, the current operational approach is to first fill the seated capacity of the peak buses and then allow those who are willing to stand for the journey to jump the queue. This improves the sustainability of the service whilst ensuring that passengers are not deterred from using the system.

However, over even longer distances of approximately 30km on the Atlantis Route, it is likely that no standing passengers will be permitted for safety reasons, further reducing the efficiency of the buses.

#### **4 CONCLUSION**

In conclusion, while the operational success of such a complex and important operation is dependent on all the parts functioning together in an efficient manner, the whole of the parts relies on a few hard-learned principles:

- Operations is about relationships and being able to work as a team under "just in time" circumstances.
- Constantly keep communication channels open both internally, to the operators and their employees, to operational staff and to the public.
- Being able to empower people to do their jobs – operational processes require quick decisions.
- Having people capable of doing the job and defining their roles and responsibilities within an ordered reporting structure.
- Have efficient systems in place to enable constant monitoring for constant improvement.
- Unwavering political support is essential.