DRAFT

[Version: 5 October 2015]

Implementing BRT in eThekwini: challenges, lessons and opportunities

NOTE: THIS IS A DRAFT, THE FINAL VERSION OF THE PAPER WILL BE PROVIDED SHORTLY. PLEASE DO NOT DISSEMINATE THIS VERSION

Sue Bannister
Carlos Esteves

Table of Contents

INTRODUCTION

"South African transport history is composed of various instances of adoption of latest transport technology before sudden and complete replacement by more modern innovations." (Wood, 2015 p4)

In the early 2000's the eThekwini Municipality developed a transport strategy termed the "Public Transport Fundamental Public Transport Restructuring" (FPTR) which made use of the extensive rail network in the city and augmented it with bus and taxi services largely as scheduled feeder services transferring to rail at key points. When coupled with the fact that eThekwini became the first Transport authority in terms of the NLTTA, city's vision in the early 2000's was to create, in time, an integrated transport system allowing for a seamless, multi-modal, single ticketing system of public transport across eThekwini.

This strategy was, at various points presented to DoT as the city's public transport strategy of choice. However, in the build-up to the 2010 FIFA World Cup, DoT paid no attention to the strategy and DoT officials continually blocked attempts by eThekwini to ensure that preparations for the World Cup should be used as an opportunity to put into place the building blocks of that integrated strategy. After 18 months of fruitless engagements and writing memoranda, a meeting between the then DG of DoT and the City Manager of eThekwini was held. At this meeting, the DG of DoT excluded her officials and apologised and conceded that she had been misled by her officials[1]. The reason for this was her officials differing opinion on the choice of technology – namely the integration of all modes and particularly the use of rail versus the sole approach of using large capacity buses synonymous with bus rapid transit (BRT). Given that it was too late to change plans, the city eventually had to adopt the DoT preferred approach, and developed a BRT system, despite having grave concerns about the ongoing costs of this system.

Numerous approaches have been used to address the segregated and sprawling spatial patterns facing South African cities. This has included attempts to decentralise job creating industry into outer lying areas, constructing new highways, increasing the number of road lanes, public sponsored bus services, commuter train systems and densification of inner cities to create living opportunities closer to places of employment. All approaches have had their advantages and disadvantages, proponents and detractors. Many have at some time been the focus of a monomania of sorts.

This paper outlines the circular process which eThekwini has undertaken in implementing a public transport strategy in the city and demonstrates the dangers and inefficiencies in the conditional grant and pre-defined technology choices made by the DoT. It also discusses how, despite the

[1] Interview with the former City Manager of eThekwini

shortcomings of the system and its technology, the city is aiming to increase its economic viability and sustainability.

Background

The legacy of Apartheid has meant that most of the poor living in South Africa's big cities live some distance from the central areas and areas of economic opportunities. eThekwini's approach to addressing this problem has been to firstly increase residential opportunities in areas which currently provide economic and employment opportunities, secondly to improve connectivity between current residential and employment areas, and finally to increase both housing and economic opportunities in decentralised, but well located nodes in a TOD approach.

ROMANCING THE RAPID BUS

In late 2006 the DoT, in the build up to the World Cup, called for proposals from host cities to provide them with proposals for funding for transport systems for the 2010 FIFA World Cup (WC) which would become legacy systems going forward. Various workshops were held including a cross-sectoral transport workshop focussing on the need to reduce transport costs across all modes.

In eThekwini, plans to restructure the city's transport system began in the early 2000's, and looked at creating an integrated transport solution for the corridors that carried the highest number of passengers. The work had concentrated on the key north-south corridor that links the Bridge City/Inanda area in the north with Umlazi in the south via the Durban CBD. The proposal was termed the "Fundamental Public Transport Restructuring" (FPTR) which envisaged a hub-and-spoke concept transport model where mini bus taxi's (MBT) and buses would integrate with rail and other proposed road based corridors.

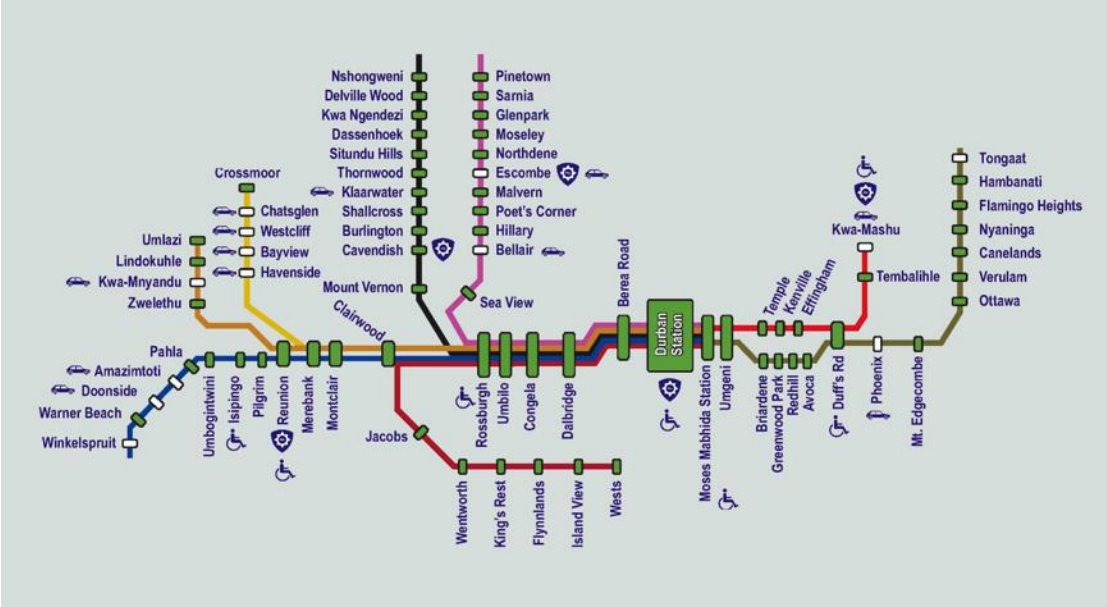


Figure 1. eThekwini has an extensive existing commuter rail system

The approach was to rationalize and to align with the appropriate mode for the passenger numbers and distances that were required for each leg of the commute trip.

The resultant model had road based trips moving passengers from the ends of their trips to and from a rail corridor thereby using rail as the mode of choice for the longest portion of the trip. Where rail was not available a road based solution in the form of buses was proposed.

This approach largely used existing infrastructure, modes and fleet. This would have been the first step of the full restructuring of the city's public transport in that it included the formation of appropriate single operator service providers to remove inefficiencies due to mode and route competition. It would also move the fleet to a distance and capacity appropriate vehicle size ie in some instances from MBT to bus.

The re-structuring would have seen services truncated at key points with passenger transfer onto higher capacity vehicles such as train or articulated buses to provide consolidated passenger movement to their destination.

The proposed infrastructure interventions were limited, focussed on rail upgrades and largely targeting the fleet and ticketing requirements for the system.

The World Cup afforded eThekwini an opportunity to test hub and spoke concepts using hub terminals to move spectators from low capacity vehicles to higher capacity vehicles as was envisaged for the FPTR. This included inner city options such as light rail. In order to test out such options, eThekwini launched the first inner-city public transport system which had a dedicated Inner City People Mover, allowing for a hop on- hop off bus system which operated for 18 hours each day. Negotiated contracts with the taxi and bus

operators to service the World Cup spectator transport also allowed relationships and distance based contracts to be negotiated, thereby exposing the industry to that form of operation. The City sent teams of bus and taxi owners abroad to look at Colombian models and arranged for the local taxi associations to take over the bus-based Inner City People mover, to ensure their buy in to an integrated transport system.

However, leading up to the World Cup, the National Department of Transport (NDOT) directed Metros to introduce the Bus Rapid Transit as the main means of public transport, as had been developed in South American cities such as in Bogota, Columbia. Although the BRT system addressed many of the public transport issues within eThekwini it meant significantly greater capital and operational funding requirements than the FPTR system would. The city therefore maintained and its FPTR approach and did not adopt a BRT system.

Two years after submitting its FPTR proposal to DoT, it became apparent to eThekwini that the city would not be funded by the DoT for a World Cup transport system, primarily because it had not adopted a BRT approach. The basis for NDoT's funding allocation focussed around specific principles which effectively required a BRT response. These were based on the assumption that BRT would reduce general service operating costs to the point that a "zero subsidy" was to be targeted.

As indicated above, NDoT officials failed to consider properly the eThekwini model. This meant that eThekwini had no option but to accept the BRT approach.

THE ORIGINS OF BRT MANIA

It is important to look at how and why the predisposition towards a BRT system came into South African transport policy. Although, not a new concept for South Africa, In 2006, Lloyd Wright, an international specialist in BRT introduced the zero subsidy BRT concept at the Southern African Transport Conference.[2] Wright was hosted by the NDoT to host workshops on BRT in Johannesburg, Cape Town, Tshwane and eThekwini. [3]

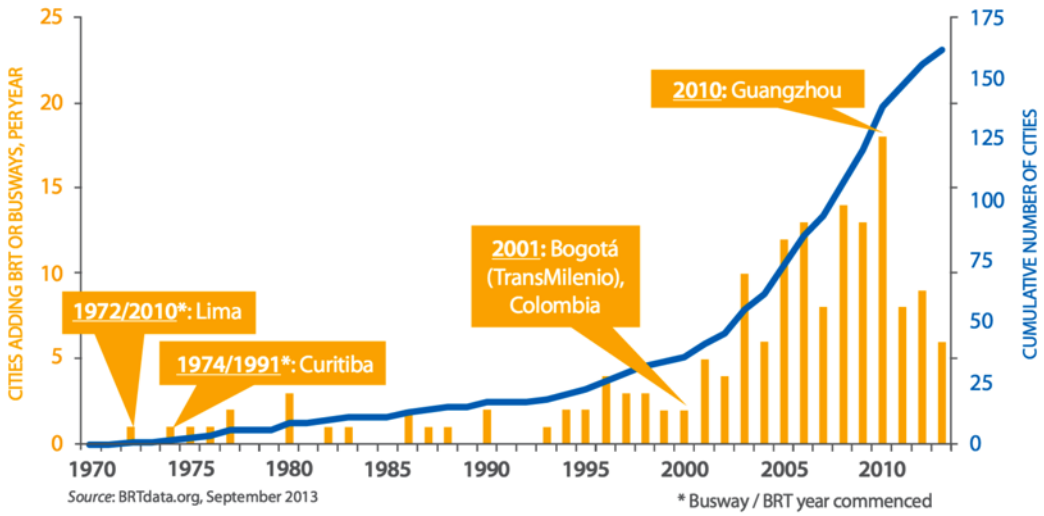
Many of the lessons in BRT centred around its success in South America, and Colombia (Bogota) and Brazil (Curitiba) in particular. [4] In 2006 and 2007 many municipalities went on fact finding missions to these countries and based on their findings and many undertook to develop BRT systems. The Transmillio system in Bogota was very attractive and appeared to offer a complete solution in that it's direct operating subsidy was effectively zero and the ridership was on the increase through the first five years of operation. In the first five years, it had not only restructured the public transport system and changed expectations in the city but had contributed significantly to the rebuilding and freeing of that society in providing affordable, reliable and

[2] Wood, 2015
[3] Wood, 2015
[4] Wood, 2015

safe public transport. South African policy makers believed that the same could be achieved in South Africa and discounted the differences between our city structures, densities and social variations and those in Colombia.

BRT systems, it seemed had become the panacea for all that was wrong with our cities - a treatment sold on exaggerated claims and with often unclear demonstrable value. The following figure is from Wood (2015).

Figure ES-1 Growth of BRT Systems and Busways Around the World



NDOT's POLICY EVOLUTION

The Public Transport Strategy of 2007 was implemented through the framework of the Public Transport Action Plan. The underlying principles in the Action Plan were to accelerate existing transport plans, through maximising the use of existing transport infrastructure and accelerating the implementation if the government's economic and sustainable development policies.

Within this, phase 1 outlines integrated rapid public transport network (IRPTN) projects in 12 cities and 6 districts.

The IRPTN strategy includes the following features:

- 85% of all residents within 1km of a Rapid PT Network by 2020
- Upgraded modal fleet, facilities, stops and stations
- Extended hours of operation (16-24hrs)
- Peak frequencies (5-10min) – Off peak frequencies (10-30min)
- Full special needs and wheel chair access

- Safe and secure operations monitored by Control Centre
- Electronic fare integration when making transfers
- Integrated feeder services including walking / cycling and taxi networks
- Integration with metered taxi services and long distance intercity services
- Car competitive PT option – enable strict peak period car use management

These principles are very onerous and it was pointed out to NDoT that given our apartheid spatial patterns and existing modes of transport, could simply not be achieved by 2020.

BUS RAPID TRANSIT

Bus Rapid Transit is a highly specialised bus system, which aims to provide a high quality, rapid, mass transport system. It is characterised by a number of features, although not all are necessarily present in all BRT systems:

- **Grade separation**: providing separate and dedicated BRT lanes.
- **Bigger buses** – to carry more passengers A standard bus can carry around 80 people, but the dedicated BRT lanes allow buses with capacities of up to 200 persons per bus
- **Quality of service**: high quality buses, high levels of maintenance, ease of boarding, quality stations with passenger facilities including toilets and good security both on the bus and at the stations.
- **Frequency of service**: Passenger wait times of less than 10 minutes during peak periods.
- **Ticketing**: Electronic fare collection
- **Modal integration**, including integrated ticketing, allowing passengers to easily transfer between modes, integration with pedestrian, cycling and other transport routes.

In reality, many systems do not demonstrate all of the above features, but rather a lesser combination of features.

The benefits of a BRT system are many. Firstly they mean a reduction in the number of vehicles on the road. One BRT bus can replace almost 3 buses or 10 taxi's and therefore can significantly reduce the number of vehicles in the road during peak hours. And if operating at full capacity have lower operating and capital costs.

Because of the dedicated right of way lanes (ROW), BRT buses are not caught up in the peak hour congestions, so can offer commuters a faster trip. This, and the increased efficiency in numbers mean reduced green house effects and less congestion for other drivers. Fewer vehicles, dedicated lanes and greater training for drivers reduce accidents and fatalities.

In addition, because BRT stations allow for faster passenger loading BRT buses can move more people in a given time period than a greater number of smaller vehicles.

BRT systems, similar to other efficient, effective, reliable and cost effective transport systems also have the potential to transform our cities. This phenomenon now commonly known as transit oriented development (TOD) involves increased levels of development around transit hubs and stations. Increased density around these transport nodes means that nearby residents can access transport easily with less distance between their home and transport. Businesses clustered around the nodes can attract a greater number of employees, who can get to work at less cost, in less time and with greater reliability. For municipalities this increase in density means higher land value and increased rates – although it does require – if it is to be successful – greater management and levels of service. And if land use and zoning systems allow it, these nodes can become mixed use developments which improve living and working conditions in areas that may have previously not enjoyed such development.

The sustainability of a BRT system is closely dependent on its ability to carry a sufficient volume of passengers to justify the bigger buses and dedicated right of way. Passenger numbers are closely related to residential densities which in South African cities are not anywhere near as high as those in South American cities.

BRT is useful in moving large numbers of passengers between two points, where it effectively replicates a train. Yet, like a train, its movement patterns are very inflexible as it is stuck in the dedicated right of way lanes. This forces passengers to have to change more often unless their destination begins and ends at the two points.

South African passengers are also not willing to stand for their journey, meaning that when all the BRT seats get used up they would rather wait for the next vehicle rather than stand. This means that the buses often don't reach their target capacity.

Importantly, before a costly BRT system is implemented, a full understanding of its upfront and ongoing costs is required. This needs to be based on realistic assumptions about issues such as potential densities and passenger values and the trade off's they will make, between for instance waiting time, a seated journey and the distance they are prepared to access a ROW system such as rail or BRT.

Nicolai, 2008[5] notes: "*Unfortunately, many - if not most - of those [*BRT*] studies have been used deliberately to provide arguments for pre-determined opinions and intentions instead of providing rational figures for neutral*

[5] INFLUENCES OF OPERATIONAL ISSUES ON THE OPERATIONAL COST OF BRT BUSES AND BRT SYSTEMS
Joaquín C Nicolai and Dietmar M Weiss
Daimler Research Centre Berlin, Daimler AG / Research and Development Society and Technology Research Group, Alt-Moabit 96a, 0559 Berlin, Germany

analysis. Many interest-groups have tried to compare apples with oranges in order to promote or to oppose some project in the public discussion." (p559)

In addition, because many South African cities implemented BRT systems on a partial basis for World Cup purposes, the broader network's were not planned nor fully costed, meaning that BRT systems were implemented without a full understanding of the costs of a the comprehensive system across the whole city.

IS BRT the SOLUTION TO SA'S BIG CITY TRANSPORT PROBLEMS?

"*Our message to other cities is to really focus on ensuring that your fare structure, fares and fare collection methods must be aligned to your public transport promise and strategy and not try follow international best practice or fancy systems*." (Seftel and Peterson (2014) p 805)

Seftel and Peterson[6], (2014), note that the Rea Vaya BRT system in Johannesburg aimed to transport 40 000 passengers per day, however at the time of writing the paper in November 2013, only 19 000 passenger trips were recorded.[7] More recently, Seftel noted that most Johannesburg corridors had only about 10 000 commuters who could use the BRT system.[8] In comparison the mini bus taxi industry in Johannesburg transports over 1 million passengers per day and the Gautrain 48 000 passengers.[9]

Whilst bigger buses allow for the transportation of high volumes of passengers between particular points, and dedicated lanes avoid traffic congestion and allow buses to travel fast, it appears that the BRT was an expensive solution to problems that were not necessarily priority issues for most South African cities and commuters.

What then, are the main problems facing our cities and commuters to which public transport must respond?

The 2013 National Transport Survey provides a useful insight into commuting patterns in eThekwini. Just over half of the city's work commuters use public transport (54%). The majority (41%) of commuters use MBT transport, followed

[6] from the transport department of the City of Johannesburg, in a 2014 paper presented at the 33rd Southern African Transport Conference (SATC 2014),

[7] ACHIEVING SUSTAINABILITY IN BRT IMPLEMENTATION IN THE CITY OF JOHANNESBURG, L SEFTEL and B PETERSON, Proceedings of the 33rd Southern African Transport Conference (SATC 2014) 7 – 10 July 2014
Proceedings ISBN Number: 978-1-920017-61-3
Pretoria, South Africa

[8] Business Day, "Low passenger numbers bedevil Rea Vaya" by Andiswa Maqutu, 02 October 2015, 06:35, accessed at http://www.bdlive.co.za/business/transport/2015/10/02/low-passenger-numbers-bedevil-rea-vaya

[9] Transport department of the City of Johannesburg, in a 2014 paper presented at the 33rd Southern African Transport Conference (SATC 2014),

by 36% in private vehicles. (as either passengers or drivers). Only 7% use the bus and 5% the train and 11% walk all the way to work.

Given that average train travel costs are almost half of those for MBT's, it is important to understand why passengers don't use rail. Of the factors prioritised as influencing their mode of travel in eThekwini, 32% of households prioritised travel time compared to 22.9% of households who prioritised travel costs.[10]

Most commuters in eThekwini (53%) live beyond a 15m walk of a **train** station, and 35% of transport survey respondents felt that they could not easily access the train. Yet, the primary reason for not using the train cited by most respondents related to the level of service (39%). Here, problems included overcrowding (70%), concerns about personal safety on the walk to the station (58.5%), the punctuality of the service (55.5%) and travel time (54.9). However, when on the train, safety was a lesser concern (only raised by 25.2%) and facilities on the train and station were only a concern to 37% of people. Train fares were the least of commuters problems

Similarly, most commuters don't use **bus** services, because even though they are relatively accessible, the service levels are poor. (37% attribute non usage to poor service levels, whilst 26% say that buses are inaccessible).
Those that do use buses note that the primary problem is overcrowding (50,6%) followed by security at the bus stops (47.3%); poor facilities at bus stops 46%.[11]

The 2004 Current Public Transport Record, which was a comprehensive record across the entire eThekwini Municipality and is the most recent record of public transport provision within the municipality[12], notes that the city has approximately 130 MBT associations servicing some 1700 single direction unscheduled routes. There were approximately 60 bus operators or bus owners associations which held licenses to service 1600 routes.

The licensed routes for MBT and Bus services reached 90% and 80% over the total population respectively ie those within a 15min walking distance of each respective service.

THE ETHEKWINI SOLUTION TO NDOT'S REQUIREMENTS

As directed by NDoT, eThekwini revised its public transport strategy to provide an integrated rapid public transport network that would ensure that 85% of the city's population would have access to scheduled public transport services. The resulting Go!Durban strategy involved the planning and design of a public transport network system that incorporated and integrated all modes of transport – including non motorised transport.

[10] National Household Travel Survey Provincial – KwaZulu-Natal Profile, Report 03-20-06(2014)
[11] National Transport Survey
[12] There is no current updated CPTR for the city. A proposed update was stalled in 2014.

As a continuation of the FPTR, Go!Durban retained rail as a key mode as the main transport mode along the corridors it served and where the passenger numbers supported rail as the desired mode. This was the case for the north-south rail corridor linking Bridge City in the north to Umlazi in the south. In this there were corridors where there was direct competition between some of the proposed road based routes that arose from the demand modelling and the service and capacity that rail could provide. This was permitted on the basis that the implementation plan would ensure that the demand is sufficient to meet the operational passenger requirements for both services and negate the competition for passengers that might occur. The problem with this assumption however is seen in the Rea Vaya experience where passengers have shifted from rail to BRT rather than from mini bus taxi's to BRT.

eThekwini's plan resulted in a wall to wall strategy with a network of 9 public transport corridors. This is comprised of an integrated package of rail and rapid bus trunk routes with dedicated right of ways, feeder and complimentary services infrastructure.

Nine routes were planned throughout the city, of which three bus and one rail system are developed in phase 1. Construction is currently underway on the first phase, which is due to launch in 2016.

Figure 1 Construction of Right of Way Routes in Pinetown

In addition to being a transport programme, Go!Durban affords the city with an opportunity to facilitate and direct the re-structuring of land use and development to improve the overall travel efficiency for commuters within the metro. It also improves connectivity and develops a more compact and connected city to reverse some of the effects of the apartheid spatial planning.

The costs of the Go!Durban system are however significant. An analysis of the operational costs has shown that the financial deficit between the fare income and the operating costs will be an under recovery of 3 to 4 times the income. Based on the experience in other South African cities, during the transition period until the system has matured is expected to be closer to an under recovery of 6 times the income.

Given however, that the decision in the type of system to implement have been made and the city is now some way down the line in its implementation, the focus now needs to be on how the gains from and viability of the system can be increased.

Increasing the viability of the Go!Durban system will primarily need to look at how ridership can be increased. Key to this is increasing density at transport nodes and by ensuring land use mix at nodes and along corridors.[13]

[13] Naude

Naude notes that there are a number of policy trade off's which need to be made between spatial restructuring; optimizing economic growth; recouping capital costs versus improving operational sustainability; generating income for the fiscus and creating more equitable accessibility patterns. (P 370) Many of these are in direct conflict with one another and require difficult decisions to be made and Naude concludes that it is simply not possible to get the value from all of these, but instead an "optimal mix of desired outcomes" is needed.

ADDRESSING THE DENSITY ISSUE

One of the main issues impacting on the viability of South Africa's BRT systems is the relative low density of our cities.

STATS ON OUR DENSITIES COMPARED TO OTHERS (to be provided)

The issue, too, is not just average densities, but the fact that SA cities have densities specifically distorted as a result of apartheid spatial patterns.
Cooke and Behrens, 2014 have analysed the relationship between public transport and land use characteristics and propose that three land use characteristics, urban density, land use mix and polycentrism have the greatest impact on the quality, viability and efficiency of public transport.

Urban density has a direct impact on the ridership of public transport. Choice of mode of travel is dependent on ease of access and where nodes can be densified, a greater number of passengers can, more easily access the node. Density is however not independent of location – and Cooke and Behrens note that density per se is not a good determinant of urban transport success, noting that uniform density throughout a city may even have a negative impact on transport – exacerbating congestion and increasing negative externalities. Density Articulation is instead the strategic location of areas of higher density. Density articulation reduces the need for feeder services and has a higher impact on public transport than gross density. The authors note that small improvements in density articulation can have great improvements in transport viability. "To achieve a high public transport modal split and sustainable BRT service requires high densities, high articulation, small catchment areas and minimal feeder services. It is suggested that a detailed land use development plan is created for each major public transport corridor, with unique targets for density and density articulation. These plans would need to be integrated with those of the Integrated Rapid Public Transport Network plan and implemented proactively." (p398)[14]

eThekwini had, during the 2000s, moved its RDP strategy away from simply building on the cheapest land available, towards identifying areas which were close to the high priority Public Transport corridors. A number of different RDP options were also introduced including semi-detached units,

[14] ARTICULATED DENSITY: A STUDY OF ITS POTENTIAL EFFECTS ON THE FINANCIAL SUSTAINABILITY OF SOUTH AFRICAN BRT CORRIDORS
S Cooke and R Behrens, Proceedings of the 34th Southern African Transport Conference (SATC 2015)

single-storey walk-ups, etc. The private sector was also expected to provide at least 10% of their housing projects dedicated to the "Gap Housing" market.

CAPTURING ADDITIONAL VALUE

In 2010, the SACN, released a research report on creating and capturing value around transport nodes, noting that municipalities must be proactive and creative in the way they direct and facilitate development around transport nodes. The research showed that whilst infrastructure was an important component, issues such as land availability and appropriate development rights were as vitally important. They also noted that trade-off's needed to be made between value creation and capture. [15]

Naude, 2015[16], in reviewing the potential for BRT systems to change land use and accessibility systems in South African cities, notes that in order to gain the benefit of transport investments, 'pre-existing real estate fundamentals' needed to be in place. These include a buoyant property market and highly sought after locations. Where these factors were not present, development benefits were less likely to be realized.

eThekwini's nodes were chosen bearing this in mind. Whilst it is difficult for cities to introduce land banking options on any scale, eThekwini started such options and has investigated ways in which state-owned land could be used for these transport and housing options.

To increase densities as well as increase the mix in land use along the C3 route, 18 opportunity areas have been identified, all with close proximity to the stations. The 18 opportunities consist of 12 greenfield sites and 6 brownfield sites, which in total are 45 ha in size. Within these, it is estimated that there is potential for an additional 2220 in new housing units on greenfield sites and 1170 units housing on brownfield sites. This represents an additional 3390 housing units. If fully taken up, and assuming an average ratable value of R200 000 per unit, this will provide an additional R678 million investment within the area.

In addition, a further 78 700m2 of commercial / light industrial opportunities could be realised. This does not guarantee that the private sector will necessarily take up these opportunities, but indications thus far have been very positive with a number of current and potential property owners showing great interest in taking up development opportunities.

[15] Creating and capturing value around transport nodes SACN 2010

[16] EXPLORING POTENTIAL OF PUBLIC TRANSPORT SYSTEMS TO FACILITATE DEVELOPMENT IN THE SA CONTEXT, S Naudé, SBN Number: 978-1-920017-63-7 363, Proceedings of the 34th Southern African Transport Conference (SATC 2015)

PART 3: IMPLICATIONS, LESSONS, CHALLENGES

Implications

The move from the current public transport to the proposed system has multiple and compounding challenges which drive Capital and Operating costs upwards. Whilst providing significant benefits to passengers and the broader city, these come with significant costs and present numerous management challenges. Some of these are outlined below.

- Moving from unregulated to regulated through contracts requires the formation of legally constituted operating companies; merging of competitors into partnerships and will require higher compensation levels.

- Moving from unscheduled to scheduled services throughout the system will require a significantly higher fleet size, staffing and driver numbers to cope with peak requirements.

- Shifting from a profit driven to passenger focused approach requires hours of operation to increase to provide service in 'unprofitable' times of the day, vehicle conditions have to be improved and conditions of service for drivers to be increased

- Increasing safety and security will require increased staffing requirements and concomitant operating costs.

- Increasing accessibility to a fully universal access compliant across the full system will increase infrastructure and fleet costs as well as operating costs.

- Increasing oversight of the system will require greater staff compliment required to monitor and oversee quality of service

However, in return, passengers will get the benefits of a well managed system, faster travel times, reliability and predictability. Travelling will be safer and accident rates in general will drop. The entire city will benefit from lower congestion rates.

In general though, it has become clear that the existing system, with a sole focus on BRT is not working and will not work. Rather, one needs a far more flexible model allowing for an integration of all modes together with an integration with human settlements.

The benefits of a 'grand scheme' approach

Having designed the full wall-to-wall "ultimate" system allowed the city to get a realistic sense of the enormous financial challenge that the implementation of the system will require. It has also allowed for an advanced understanding of corridor locations, permitting land use planning and land reservation to take place ahead of the system implementation. It also creates a better environment for collaboration with developers and other state authorities and allows for better planning to ensure that Go!Durban infrastructure can be accommodated in the future.

Successes

Although the Go!Durban system is still under development, it has already yielded some results in densifying and creating new housing typologies around the transport nodes. Developers in the Pinetown CBD and New Germany CBD have expressed interest in converting currently under-used parking facilities into entry level accommodation units. There has also been an intensification of commercial and office facilities in proximity to Go!Durban stations in New Germany.

The process to reduce parking requirements in proximity to the IRPTN trunk corridors has already been initiated and the wall-to-wall plan has allowed advance reduction of parking requirements to facilitate more intense land use developments and higher densities ahead of the IRPTN infrastructure being provided.

The city has also begun to target certain properties for rezoning to facilitate development opportunities in proximity to stations.

Challenges

Densities: A significant challenge is related to the fact that the travel demand analysis has revealed that the spatial density of residential areas is insufficient to realistically expect that a zero or near zero public transport system is possible based on the current proposed levels of service.

Service levels: Although setting the standards for the BRT system high, has its merits and will benefit commuters, it will have great difficulty competing the with unregulated MBT and bus system. The implication is that commuters are likely to value the existing system more as the trade offs such as safety, security, reliability availability, etc are often perceived abstractly by people and not quantifiable in their expectation.

Trade off choices: Based on current behavioural plans and surveys, the value attributed to levels of service such a minimal walking and sitting throughout the trip is valued beyond the risk of safety and security and the certainty and reliability of travel.

Enforcement weaknesses: The inability for enforcement agencies to regulate the existing regulations and bylaws allow unregulated public transport providers to keep their costs low, through for example, sub-standard vehicles, and speeding. This further exacerbates the inability for a formal system to compete with an informal system.

Lessons

There have been some important lessons learned during the Go!Durban process:

1. Rather than embark on an entirely new BRT system, it is felt that a better approach would have been to transform the public transport strategy in stages, through empowering and restructuring existing public transport operators while developing and improving efficiencies of existing systems and improving existing infrastructure.

2. The relatively low densities in our cities undermine the viability of all public transport systems. There is a need to look carefully at how we can create increased housing densification in well located areas. This must include designing and planning for a restructured land use landscape.

3. There are direct contradictions between providing low income housing in outer lying areas in order to deliver housing at the cheapest rate, and then having to spend significant amounts on transport systems to assist housing beneficiaries to access commercial nodes and employment locations. In this regard the full (and longer term) public and private costs of continuing to do this must be quantified.

4. There is a need to dedicate significant human and financial resources to a public transport restructuring system from the beginning due to its complexity and necessary high level of engagement.

5. The funding framework for transport is on one hand too loose and yet too influenced by NDOT. Cities cannot structure the implementing of infrastructure and service levels to suit local conditions in terms of a phased infrastructure implementation strategy. There would be a significant advantage to developing an outcomes based implementation funding framework to which cities could apply with certainty in subsequent application submissions.

6. Decision makers were too easily influenced by the idea of the South American BRT solution. Not enough questions were asked and not enough realistic cost benefit appraisal was done. Decisions made will have significant long term implications and whilst key decisions were

made by national government departments, the long term costs will need to be borne by the cities.

7. There is a need to fast track regulation changes to support greater flexibility in land use regulations and greater flexibility in housing subsidies to encourage brownfields regeneration by private sector. There are a range of impediments to municipalities being able to influence development through partnership arrangements.

8. Similarly, the current legislative and compliance driven system prevents innovation - which by its very nature is risky. Often small amounts of "wasteful or fruitless expenditure" will yield valuable and future cost saving results.

9. There is a need to actively challenge the current private-car mentality in both administrative and political leadership approaches.

10. There was a definite benefit for eThekwini in having investigated alternative strategies as it has afforded the ability to adjust between strategies when required.

11. The wall to wall design up front has afforded an opportunity to ensure that economic strategies and sustainability interventions can be set in place ahead of the infrastructure and service being implemented in that specific area.