EVALUATION OF PARKING PROVISIONS WITHIN THE ETHEKWINI REGION

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ABSTRACT

The provision of parking is an integral component of the transportation system in metropolitan areas. Parking for developments within these areas should be sufficient to prevent congestion and illegal parking.

Parking demand ratios are enforced by town planning schemes and public transport systems. National, Provincial and Local public transport initiatives were reviewed. The eThekwini Integrated Rapid Public Transport Network (IRPTN), Bus Rapid Transit System (BRT) and Passenger Rail Route upgrades have a significant impact on these parking ratios.

This paper reports on parking surveys done at randomly selected shopping centres in the eThekwini region. A comparison of the actual parking demand versus the recommended town planning ratios and costs are done.

The findings confirm the diversity in parking requirements and the need to introduce supplementary provisions in the town planning scheme and further to recognise areas where discretion needs to be applied.

1. INTRODUCTION

The provision of parking is an integral component of the total transportation system in metropolitan areas. As long as society makes use of the motor vehicles, parking areas will be needed for vehicle storage purposes, not only in the CBD but also at a variety of other land uses such as shopping centres, educational institutions and offices. With the ever increasing cost of land and construction of parking facilities and, the influence of on-street and off-street parking on traffic flow on the streets, it is necessary for all controlling authorities to lay down and ensure compliance with adequate, realistic and effective parking requirements and standards.

Current parking standards principally for shopping centres in the town planning schemes are proving onerous in many instances because of changing shopping patterns and the introduction of other uses. Retail entertainment centres are becoming more popular. Centres of all sizes increasingly contain larger proportions of restaurants, services, cinema and specialised entertainment venues. Moreover relatively new types of shopping centres are evolving such as power centres, theme centres and fashion/specialty centres. Further, local and neighbourhood centres that

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have a mix of land uses are being developed in residential suburbs, thereby reducing the need to travel to larger centres. These centres are generally established along public transport routes.

National parking standards were published by the Department of Transport in 1985 and some planners consider these to be somewhat dated or not sufficiently comprehensive in respect of, in particular, the emergence of new retail hybrids. Further, these parking standards were introduced prior to extended hours of shopping and Sunday shopping being introduced.

The primary aim of this research paper is to review in detail, off-street parking demand for shopping centres and taking cognisance of:

- Socio economic characteristics
- Area of development
- Current and realistic parking standards

2. BACKGROUND

2.1 The White Paper for Transport in South Africa (DoT, 1996) [8]

The vision for South African transport is of a system which will:

"Provide safe, reliable, effective, efficient, and fully integrated transport operations and infrastructure which will best meet the needs of freight and passenger customers at improving levels of service and cost in a fashion which supports government strategies for economic and social development whilst being environmentally and economically sustainable".

The following strategic objectives are listed in the White Paper for Transport and have a direct or indirect influence on parking policy:

- To promote the use of public transport over private car travel, with the goal of achieving a ratio of 80:20 between public transport and private car usage;
- The effective functioning of cities and industrial areas must be enhanced through integrated planning of land use, transport infrastructure, transport operations and bulk services;
- Development priority will be giving to infilling, densification, mixed land use and the promotion of development corridors and nodes;
- Containment of urban sprawl and sub-urbanisation beyond the urban limits will be addressed through provincial spatial development plans;
- Unrestricted car usage and subsidised car parking will be contained through the application of policy instruments which could include strict parking policies, access restriction for private cars, higher licence fees, road pricing or area licencing. Restraint on private car usage will however not be implemented independently of improvement in the quality of public transport.

2.2 The eThekwini Integrated Rapid Public Transport Network IRPTN [9]

Go Durban! is the name of the integrated rapid public transport network (IRPTN) that aims to provide a flexible, safe, cost effective, seamless transport experience for the people of the eThekwini region.

Go Durban! promises to promote transport that is universally accessible to all of Durban's citizens. World-class cities know that infrastructure investment is critical to the sustainability of a region, and the standard of living for its citizens. Go Durban! is identified as one of the key pillars integral to the stimulation of economic growth in the region. Initially, citizens will see the development of high quality public transport linkages between Bridge City, Durban Central, Pinetown, Umlazi and Umhlanga. The aim is to provide seamless transfers across transport modes, by creating ease of access at stations and precincts, and by using electronic ticketing and providing passenger safety and security. The design of the IRPTN stations and station precincts will create a focal point for communities, as well as for new, and more sustainable economic development.

Go Durban! will see nine transport corridors linked by various modes of transport (bus, rail and taxi) across the eThekwini region by 2027. The provision of transport is intrinsic to the creation of a vibrant, liveable and sustainable city in line with the City's vision which is that by 2030, eThekwini Municipality will be Africa's most caring and liveable city.

***Go Durban!* aims to deliver:**

- Upgraded fleet, facilities, stops and stations
- Extended hours of operation (16-24hrs)
- Peak frequencies (5-10min) – Off peak frequencies (10-30min)
- Full Universal Access (special needs and wheelchair access)
- Safe and secure operations monitored by a 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 options and alternatives – to enable strict peak period car use management.

Through *Go Durban!* the City aims to ensure that 85% of all residents will have access to safe, affordable and quality scheduled public transport. It aims to provide opportunities for densification, mixed-use and transit-oriented development to reduce the need for travel, and promote the emergence of a world-class city and to inspire a wave of architectural renewal, which will result in urban rejuvenation and revitalization of run-down areas.

Both the National Government and Local Authority initiatives are aligned when it comes to providing an effective public transport system. This will further discourage the use of private vehicles and have a direct impact on the parking ratios. The Local Authority parking guidelines should make provision for public transport and facilities.

3. CURRENT PARKING STANDARDS

A selection of parking standards contained in the relevant town planning schemes and guidelines is summarised in the Table 1 below.

Table 1: Parking Standards of Various Authorities for the Selected Land Uses

Land Use	Shopping Centres
eThekwini Municipality *	Neighbourhood (< 5000m2) – 7 bays/100m2 PFA Community(5000m2–15000m2) – 6 bays/100m2 PFA Regional (> 15000 m2) – 5 bay/100m2 PFA
Department of Transport **	Neighbourhood (< 5000m2) – 7 bays/100m2 PFA Community(5000m2–15000m2) – 6 bays/100m2 PFA Regional (> 15000 m2) – 5 bay/100m2 PFA Hypermarket – 7 bays/100m2 PFA
City of uMhlathuze ***	1 bay/15m2 PFA
City of Johannesburg****	6 bays/100m2 PFA
Nelson Mandela Bay Municipality*****	6 bays/100m2 GLA

Source

* eThekwini Municipality – Parking and Loading Standards October 2010
**Department of Transport – Parking Standards March 1980
***City uMhlathuze – Draft Scheme October 2013
****City of Johannesburg – Consolidated Johannesburg Town Planning Scheme 2011
*****Nelson Mandela Bay Municipality – Draft Integrated Zoning Scheme June 2008

Definitions:

- **Gross leasable Area (GLA)** is the amount of floor space available to be rented in a commercial property.
- **Proposed Floor Area (PFA)** means the sum of a building at each floor level, and includes wall thickness

3.1 Retail

Shopping centres can be provided in four different categories in the Durban area being minor shopping, special shopping, general shopping and general business. Shopping centres are categorized according to GLA into local, neighbourhood, community and regional centres. The different categories are illustrated on the Table 2 below.

Table 2: Hierarchy of Shopping Centres

Description	GLA (m^2)
Local Centre	400 – 2 000
Neighbourhood Centre	2 000 – 15 000
Community Centre	15 000 – 30 0000
Regional Centre	30 000+

Source: South African Trip Generation Rates 2nd edition RR92/228

4. PARKING DEMAND

4.1 Factors Influencing Parking Demand

The demand for parking in respect of any land use is a function of trip generating propensity and length of stay. Vehicle trip generation is influenced by the level of car ownership in the catchment area and the availability of public transport. Parking duration is influenced by the size and type of development and trip purpose.

4.1.1 Car Ownership

The level of car availability in an area has a profound influence on traffic generated and on parking demand at shopping centres in the area. Car ownership, which can be determined from vehicle registry records by area post code, tends to be used as a proxy for car availability. Generally, in low income areas the range is 20 to 150 cars/ 1000 people, medium income areas range from 150 to 400 cars/1000 people, and higher income areas, range from 400 to over 500 cars/ 1000 people.

4.1.2 Shopping Centres

Because of their number and size, shopping centres generate the largest aggregate off-street demand for parking and their relatively high parking turnover rates result in this land use requiring the greatest attention to layout and circulation.

The type and size of a centre will have an effect on parking demand and duration. For example, a warehouse type centre generates fewer customers per $100m^2$ and consequently may require as little as 1.5 bays/$100m^2$. Centres which have no major food anchors also have a lower requirement in the region of 2 to 2.5 bays/$100m^2$. Shops with high customer density such as major supermarkets generate higher parking demand in the region of 4 to 5 bays/$100m^2$.

The parking standards may be relaxed for centres in lower income areas with lower car ownership, where a high proportion of customers travel by public transport or on foot.

Table 10 shows trip generation adjustment factors for shopping centres as stipulated in Committee of Transport Officials (COTO) TMH 17 Volume 1 South African Trip Data Manual Table 3.2.

Table 3: Trip Generation Adjustment Factor (extract from Table 3.2)

Land Use		Size Units	Percentage reduction for developments in areas with			
			Mixed-Use Development	Low Vehicle Ownership	Very low Ownership	Transit nodes or Corridors
800	Retail					
820	Shopping Centre	100 sqm GLA	10%	30%	60%	15%

Trip generation rates and parking ratios for shopping centres have a direct relationship. Local Authorities should exercise discretion when it comes to parking ratios and their decisions should be based on the following factors:

- Locality (Low, medium or high income area)
- Car ownership
- Catchment area – from market or feasibility study
- Availability of public transport
- LSM Level (Living Standard Measure was developed by the South African Advertising and Research Foundation. It is a means of segmenting the South African market that cuts across race, gender, age or any other variables used to categorise people. LSM groups people according to their living standards.)

4.1.3 The accessibility of Shopping Centres

Quick and convenient access to a Shopping Centre is of vital importance for optimising traffic flow. Shopping centres with several entrances and electronic parking boards (displaying number of parking bays available) provide efficient flow of vehicles into and out of the centres.

People are attracted to a centres not only for shopping convenience, ease of access and security but also for parking convenience. Neighbourhood shopping centres are easily accessible centres for patrons to pop in for small items and hence the parking convenience is an added attraction.

4.2 Parking Surveys

Parking surveys were conducted at various shopping centres within the eThekwini region. Vehicles were recorded entering and exiting the establishments during the peak hours. Shopping centres were selected on a random basis and the surveys were conducted on the 1st May 2015 (Public Holiday) between 12h00 to 19h00. It is also noted that payment dates for salaries (which influences spending behaviour) varies from institution to institution and range between the 15th and the 30th of the month.

4.2.1 Shopping Centres Surveys

Shopping centres were selected randomly in different areas of the eThekwini Region. The PFA of the centres were determined from the eThekwini Municipality GIS and confirmed with a site visit.

Table 4: Parking Requirements for Shopping Centres Surveyed

Site (Shopping Centre)	Area (m2)	Parking Ratio	Total no. of Parking Bays Required
Waterloo Spar	5 577 m^2	6 bays/ 100 m^2	335
The Crescent	7 968 m^2	6 bays/ 100 m^2	478
Westville	10 350 m^2	6 bays/ 100 m^2	621
Pick n Pay Phoenix	14 750 m^2	6 bays/ 100 m^2	885
Bluff Shopping Centre	14 900 m^2	6 bays/ 100 m^2	894

Traffic surveys were conducted on a month-end Friday (1st May 2015) between 12h00 to 19h00 as this coincides with the commuter peak hour and would have the highest parking demand.

Table 5: Parking Survey Results: Waterloo Spar

Waterloo Spar					
Time	**Vehicles In**	**Vehicles Out**	**Parking Used**	**Cumulative**	**Average Parking**
Parking already in use				168	165
12:00 - 13:00	54	61	-7	161	172
13:00 - 14:00	65	43	22	183	182
14:00 - 15:00	41	44	-3	180	175
15:00 - 16:00	68	57	-11	169	174
16:00 - 17:00	80	71	9	178	175
17:00 - 18:00	63	70	-7	171	166
18:00 - 19:00	55	65	-10	**161**	
Highest Average					**182**
Maximum observed Average Parking Ratio					**3.3 bays/100m²**

Table 6: Parking Survey Results: The Crescent

The Crescent					
Time	**Vehicles In**	**Vehicles Out**	**Parking Used**	**Cumulative**	**Average Parking**
Parking already in use				239	330
12:00 - 13:00	411	230	181	420	416
13:00 - 14:00	436	445	-9	411	415
14:00 - 15:00	371	363	8	419	441
15:00 - 16:00	264	221	43	462	461
16:00 - 17:00	237	240	-3	459	465
17:00 - 18:00	116	104	12	471	469
18:00 - 19:00	58	62	-4	**467**	
Highest Average					**469**
Maximum observed Average Parking Ratio					**5.9 bays/100m²**

Table 7: Parking Survey Results: Westville Mall

Westville Mall					
Time	**Vehicles In**	**Vehicles Out**	**Parking Used**	**Cumulative**	**Average Parking**
Parking already in use				311	278
12:00 - 13:00	336	402	-66	245	261
13:00 - 14:00	305	273	32	277	471
14:00 - 15:00	302	385	-83	194	454
15:00 - 16:00	269	203	66	260	293
16:00 - 17:00	284	218	66	326	327
17:00 - 18:00	262	259	3	329	290
18:00 - 19:00	183	261	-78	**251**	
Highest Average					**471**
Maximum observed Average Parking Ratio					**4.6 bays/100m²**

Table 8: Parking Survey Results: Phoenix Pick n Pay

Phoenix Pick n Pay					
Time	**Vehicles In**	**Vehicles Out**	**Parking Used**	**Cumulative**	**Average Parking**
Parking already in use				443	448
12:00 - 13:00	272	263	9	452	447
13:00 - 14:00	263	274	-11	441	438
14:00 - 15:00	265	272	-7	434	399
15:00 - 16:00	213	284	-71	363	355
16:00 - 17:00	199	216	-17	346	322
17:00 - 18:00	145	193	-48	298	273
18:00 - 19:00	72	123	-51	**247**	
Highest Average					**448**
Maximum observed Average Parking Ratio					**3.0 bays/100m²**

Table 9: Parking Survey Results: Bluff Shopping Centre

Bluff Shopping Centre					
Time	**Vehicles In**	**Vehicles Out**	**Parking Used**	**Cumulative**	**Average Parking**
Parking already in use				447	431
12:00 - 13:00	433	465	-32	415	386
13:00 - 14:00	438	496	-58	357	341
14:00 - 15:00	427	460	-33	324	308
15:00 - 16:00	292	324	-32	292	247
16:00 - 17:00	260	351	-91	201	197
17:00 - 18:00	259	268	-9	192	163
18:00 - 19:00	126	185	-59	**133**	
Highest Average					**431**
Maximum observed Average Parking Ratio					**2.9 bays/100m²**

The Waterloo Spar, Phoenix Pick n Pay and the Bluff Shopping Centre fall within a low to middle income areas therefore the average parking demand is far less than the total parking bays required by the local Authority. The parking demand is between 40% to 50% (2.9 to 3.5 bays) less than the requirements (6 bays) of the local authority. The Crescent and Westville mall shopping centres is within a medium to high income area hence the parking ratio is almost on par with the total parking bays required.

The parking ratios don't take into account the type of centre (e.g. Neighbourhood Centre, Regional Centre, Specialty Centre, and Power Centre etc.), the area and use of public transport.

4.3 Local Shopping Centres by Area

Service Stations with Convenience Stores have developed rapidly over the years and some have partnered with established stores like Woolworths and Pick n Pay. Convenience Stores not only offering daily fresh produce but also fast food outlets. Further, the number of shopping centres in an area will also have a profound effect on the parking ratio.

A survey of shopping centres and petrol filling stations with convenience stores was conducted in the residential suburbs listed in Table 9 below.

Table 10: Survey of Shopping Complexes and Petrol Filling Stations

Area	Reference Point	Number of Shopping Centres	Petrol Filling Stations with Convenience Stores
Phoenix	Parthenon Street	15	7
Kwa Mashu	Malendela Road	3	1
Westville	Jan Hofmeyer Road	5	4
Chatsworth	R K Khan Circle	21	7
Umlazi	V Section	4	2

The number of shopping centres and petrol filling stations were surveyed within a 2km radius. The survey shows that there is variety of choices when it comes to shopping in an area. The traffic is therefore distributed between these centres. The number of shopping centres in an area will have an effect on the parking ratio's as the number of consumers going to one shopping centre is lessened by the variety of choices o centres

4.4 20th and 30th Highest Hour Standard [10]

The (20th and) 30th highest hour is a widely adopted method for setting parking standards in USA. The concept of using a 30th highest hour is a benchmark standard emanating from road design, the underlying philosophy being that roads (and parking) systems need to be designed to cater for normal traffic growth and hence the 30th highest hours are discounted.

This concept may typically have relevance in South Africa where, for example, a retail development has an oversupply of parking, (albeit in accordance with the town planning scheme), and extensions are planned. In this instance a developer may put

forward a proposal to relax the parking requirements on the basis that the existing parking provision will be sufficient to satisfy the expected demand.

It is suggested, however, that a Local Authority should as appropriate require a 30th highest hour analysis or a comprehensive parking study. This will give an indication of the peak demand periods, average duration that the parking is been used and whether sufficient parking is available.

5. COST OF PARKING

The order of magnitude cost of parking bays based on recent projects (2015) are as follows:

- At grade – R52 000/bay
- Above Ground – R 88 300/bay
- Below Ground – R 107 000/bay

Note that these cost include all accessible roadways, aisle, ramps and turning areas as well as land and infrastructure costs. If a centre requires 20 additional at grade parking bays to comply with parking regulations, this could cost in the region of a million rand which may never be used.

6. CONCLUSION

The current parking standards do not support National and Local initiatives of public transport. In fact the current rates do the opposite in that it encourages private motor vehicle usage. Apart from the Go Durban initiatives, the eThekwini Municipality has also introduced special public transport lanes.

The current parking standards should not be unilaterally applied but rather, cognisance should be taken to the following influencing factors:

- Locality (Low, medium or high income area)
- Car ownership
- Catchment area – from market or feasibility study
- Availability of public transport
- LSM level (Living Standards Measure)

The above surveyed evidence shows that the current parking ratios for shopping centres could be reduced by between 20 to 40%. The shopping centres that were surveyed are located in low to high income areas as illustrated on the table below.

Shopping Centre	Income Group
Waterloo Spar	Low Income Area
The Crescent	High Income Area
Westville	Medium to High Income Area
Pick n Pay Phoenix	Low to Medium Income Area
Bluff Shopping Centre	Low to Medium Income Area

For shopping centres located in low to medium income areas: like Waterloo Spar; Phoenix Pick n Pay and Bluff Shopping Centre, the parking ratio could be reduced by an estimated 40%. Pedestrian movement and public transport is more significant in low income areas therefore discretion should be applied to these areas.

In high income areas, like Umhlanga and Westville, the parking ratio is on par with the actual parking utilisation. These areas have medium to high vehicle ownership and public transport is not predominately used. Therefore consumers are mainly utilising their private vehicles to visit shopping centres.

The findings of this paper confirms the diversity in parking requirements, the need to introduce supplementary provisions in the town planning scheme and further recognise areas where discretion can be applied.

7. REFERENCE

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