DEVELOPING THE ETHEKWINI OPERATING LICENCES STRATEGY: HOW USEFUL IS THE CPTR INFORMATION?

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ABSTRACT

eThekwini has completed its first comprehensive Current Public Transport Record (CPTR) and Operating Licences Strategy (OLS).

The paper will give a brief description of the information collected in the CPTR, and how it was used to prepare the OLS. More specifically, the usefulness of the CPTR information will be evaluated in terms of:

- licence application reviews
- alternative mode analyses by corridor
- potential for use of recap vehicles
- infrastructure requirements
- taxi industry issues
- public transport planning

The paper will also discuss the limitations of the CPTR information in preparing the OLS, and evaluate whether the CPTR was worth the cost and effort for the eThekwini Transport Authority.

1. INTRODUCTION

The intent of this paper is to use the CPTR and OLS experience in eThekwini to comment on the usefulness and intent of the transport legislation for the CPTR and OLS.

This paper will therefore initially describe the process followed in eThekwini and some of the issues that had to be taken into account. It will show some of the general limitations of the CPTR and OLS as outlined in legislation, and then draw some conclusions.

2. THE CURRENT PUBLIC TRANSPORT RECORD

2.1 Background

The eThekwini municipal area is centred on Durban. As it covers an area of some 2300 km^2, it was split into 8 areas for survey and route compilation purposes. The first area was surveyed in 2003 and covered Westmead, Pinetown and Clermont as a pilot study to finalise procedures, forms and formatting.

The work was undertaken by specialist consultants, the four survey contracting firms operating in the Durban area and three teams provided by the minibus taxi industry.

Specialised data capture and reporting software had been written by specialist consultants and this was refined during the CPTR and OLS process.

The CPTR covered peak direction service utilisation in the two weekday peak periods 05h00 to 08h00 and 15h30 to 18h30, the surveys being undertaken during school terms and finishing in August 2004. Data capture and cleaning were completed in October 2004.

2.2 Key Challenges With Data Collection and Capturing

Information on bus routes, fares and fare stages, departure times and terminal points was obtained by the consultant in discussions with operators (54 operators or owners associations) and from their printed material where available. Similar information for taxis (except for scheduled departure times) was obtained from taxi association chairmen for the first two areas but there were so many differences between descriptions from this source and operational routes during surveys that a more pragmatic procedure was followed for subsequent areas. The survey contractors obtained the necessary route information from rank managers and marshals and supplied this to the consultant. Even then the survey routes were often different. Thus additional routes had to be added to the database following the survey and other routes did not appear to operate on the survey day. (These problems also occurred with bus services but to a lesser extent).

Terminal points were mapped progressively and handed to the Department for capture of co-ordinates. These were relayed to the software consultant for creation and updating of the terminals layer used in route plotting. The final tally was 632 bus and taxi terminal points, varying from a major off-street rank to a minor on-street end point with no infrastructure.

Schedules of uni-directional routes were prepared, by area and operator, then numbered with a two letter operator prefix. The schedules contained the origin and destination with GPS ID numbers, plus via points where more than one route ran between the same end points. There are 1629 bus routes and 1730 taxi routes in the database.

Route mapping was an exacting process requiring many A1 map sets per mode per area, totalling some 400 sheets in all. Selected links were marked so that the route generator could build the route correctly without taking short cuts. With an average of perhaps 20 selected links per route, some 60 000 links needed to be captured by matching the map on the screen with the route plots and clicking on relevant links in the correct order.

Route validation was a major exercise for numerous reasons, such as erroneous link selection, the capture module needing progressive correction and refinement, erroneous capture of terminal co-ordinates, and various errors in the GIS network needing correction.

Survey data capture and cleaning proceeded in parallel with the surveys. Capture and cleaning was a major task requiring long hours and dedication from the capturing and supervisory staff of the survey consultant. The surveys are the subject of a separate paper.

Many of the problems incurred during the data collection/capture process were addressed during the preparation of this first full CPTR. Consequently, many of these should be avoidable in the preparation of subsequent versions of the CPTR.

3. THE OPERATING LICENCE STRATEGY

3.1 The Brief

A specialist consultant was employed to prepare the OLS, in the period November 2004 to January 2005. The brief included the following tasks:

(1) Review and finalisation of the proposed evaluation criteria in the Interim OLS.
(2) Preparation of an overview of utilisation of services and infrastructure. This should clearly identify over and under-utilised services and infrastructure.
(3) Consideration of any "system" issues such as potential to consolidate services into corridors etc.
(4) Identification of areas for the implementation of the proposed recap vehicles, in particular the 35-seater.
(5) Development of clear and detailed recommendations on:-

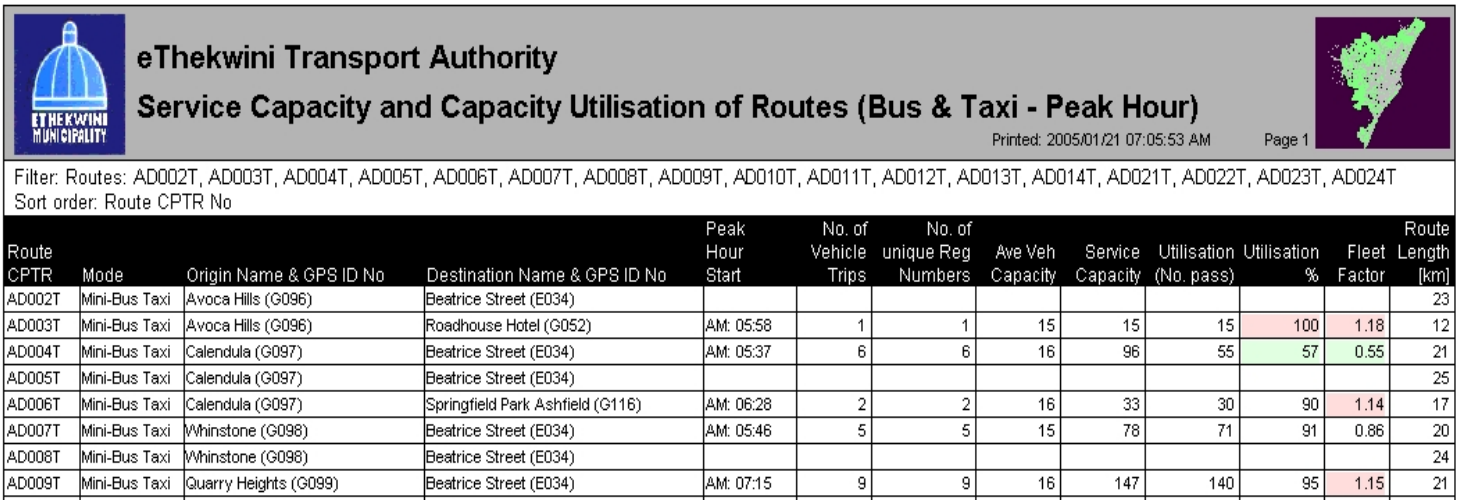
a. The preferred mode or mode mix for the particular corridor.
b. Locations of oversupply where no new licences should be approved.
c. Locations of undersupply where new licences could possibly be approved.
d. Locations where an incorrect mode is being used and how to effect a change in the mode.
e. Quantification of the number of licences per route or corridor that could be added to or need to be removed.

3.2 Methodology

The approach adopted was to interrogate the database using the reporting module, and to combine/group information on facilities and routes appropriately so that comment and recommendations could be made on area-to-area movements and on individual routes. Fifty-four public transport residential areas and 23 significant employment areas were demarcated. These were converted to an analysis layer with ArcView so that route origins and destinations could be grouped computationally, and so that plots of the GIS network, routes and analysis areas could be made.

An overview of the public transport system was prepared in terms of a series of A4 information sheets, each one relating to an origin area and destination areas for which travel information was sourced in the database.

At the top of the sheet a table contains information, for the corridor to each destination area, on the mode (bus or taxi), number of routes, number of vehicle trips, service capacity, peak hour passengers and utilisation rate. Comments are included for the routes making up the corridor and their efficiency in terms of their fleet factor (theoretical fleet size needed/actual fleet size). The fleet factor was based on the route distance, an assumed average speed and layover time (both controllable), the number of vehicle trips and the number of unique registration numbers, average vehicle capacity and number of passengers. Of the two small maps, the upper one shows the network, the relevant analysis areas and the routes, the lower one the network, the relevant areas and band-width arrows representing passenger volumes. The OLS contains 65 of these analysis sheets, which were prepared from the utilisation tables output from the reporting module (one line per route), and the area to area totals were converted to Excel spreadsheets. The complete overview sheets were set up in Excel files. An example of a portion of a reporting module utilisation table appears in Figure 1.



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Service Capacity and Capacity Utilisation of Routes (Bus & Taxi - Peak Hour)

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Filter: Routes: AD002T, AD003T, AD004T, AD005T, AD006T, AD007T, AD008T, AD009T, AD010T, AD011T, AD012T, AD013T, AD014T, AD021T, AD022T, AD023T, AD024T
Sort order: Route CPTR No

Route CPTR	Mode	Origin Name & GPS ID No	Destination Name & GPS ID No	Peak Hour Start	No. of Vehicle Trips	No. of unique Reg Numbers	Ave Veh Capacity	Service Capacity	Utilisation (No. pass)	Utilisation %	Fleet Factor	Route Length [km]
AD002T	Mini-Bus Taxi	Avoca Hills (G096)	Beatrice Street (E034)									23
AD003T	Mini-Bus Taxi	Avoca Hills (G096)	Roadhouse Hotel (G052)	AM: 05:58	1	1	15	15	15	100	1.18	12
AD004T	Mini-Bus Taxi	Calendula (G097)	Beatrice Street (E034)	AM: 05:37	6	6	16	96	55	57	0.55	21
AD005T	Mini-Bus Taxi	Calendula (G097)	Beatrice Street (E034)									25
AD006T	Mini-Bus Taxi	Calendula (G097)	Springfield Park Ashfield (G116)	AM: 06:28	2	2	16	33	30	90	1.14	17
AD007T	Mini-Bus Taxi	Whinstone (G098)	Beatrice Street (E034)	AM: 05:46	5	5	15	78	71	91	0.86	20
AD008T	Mini-Bus Taxi	Whinstone (G098)	Beatrice Street (E034)									24
AD009T	Mini-Bus Taxi	Quarry Heights (G099)	Beatrice Street (E034)	AM: 07:15	9	9	16	147	140	95	1.15	21

Figure 1: Utilisation Table

Individual routes were analysed on the basis of trip frequency, vehicle capacity, passengers/hour, utilisation rate, fleet factor and average waiting time. A set of standard comments and recommendations was formulated and the reporting module was amended to provide for the addition of a comment and recommendation on the route detail sheet by punching in a number. The standard notes are shown in Table 1 and an example of a route detail sheet is in Figure 2.

In framing the comments and recommendations, service criteria adopted were firstly that headway up to 20 minutes was reasonable, implying average waiting time up to 10 or 15 minutes. Secondly, under-utilisation was taken to be less than 40% for buses and 50% for taxis, full utilisation as over 80% for buses and 100% for taxis, the differences being due to buses carrying standees. In respect of fleet factor, the assumed average speed was 30km/hr and layover time 10 minutes.

The long-term strategy adopted several years ago was used in making recommendations for routes in the coastal corridor, where rail is the dominant mode. Eventually, competing bus and taxi routes should be converted to shorter feeder services to rail stations, but the rail system will need some improvement and single ticketing will need to be introduced. For example, on busy taxi routes it would be inappropriate to suggest the use of midi or standard buses if such routes were to be discontinued in the restructuring process.

Table 1: Comments and Recommendations

OPERATING LICENCE STRATEGY			
STANDARD COMMENTS FOR INDIVIDUAL ROUTES		**RECOMMENDATIONS RELATED TO COMMENTS**	
0	No peak service found on survey day.	50	Insufficient data for recommendation.
1	Satisfactory bus operation. No action needed.	51	No further licences at present.
2	Adequate bus capacity and utilisation, but better frequency needed. 35 Seater would be appropriate.	52	Possible midibus route. No further licences for standard buses at present.
3	Bus utilisation 100% or more but poor frequency. 35 Seaters would be appropriate.	53	Possible midibus route to match demand. Alternatively 1 or 2 new licences after verification of patronage.
4	Inter-city or long distance coach or taxi services. Low frequency not an issue. No action needed.	54	No further licences at present unless unequivocally justified by applicant or until survey data is available.
5	Low frequency, low volume (<100/hr) bus route. 18 Seaters would be appropriate.	55	Possible route for 18 seater vehicles. Alternatively no further licences at present for standard buses.
6	Reasonable to good bus frequency and utilisation 100% or more. Candidate for more trips per hour, but boarding volumes at origin usually much lower than driver interview volumes. Further verification of utilisation would be prudent before approval of further licences or trips.	56	1 or 2 new licences after verification of patronage.
7	Under-utilised taxi route (<50%).	57	No new licences at present.
8	Fully utilised taxi route (100% or more), low frequency (3 or less/hr) long wait >15 min. Candidate for more service if fleet factor >0.9.	581	(FF>0.9) - Up to 3 new licences may be issued
		582	(FF<0.9) - No new licences at present, unless shown that fleet is used efficiently.
9	Fully utilised taxi route (100% or more), moderate to high frequency (4 or more/hr), moderate (5 to 15 min) wait.	59	No new licences to be issued at present.
10	Fully utilised taxi route (100% or more), moderate to high frequency 4 or more/hr), short wait (<5 min).	60	No new licences to be issued at present.
11	Fully utilised taxi route (100% or more), moderate to high frequency (4 or more/hr), long wait > 15 min. Could be due to rank throughput limitations (no action on service) or to insufficient service. Action to be dependent on examination of rank operation.	611	(FF > 0.9) If rank is inadequate, reorganise or enlarge the rank, use bigger vehicles or relocate route start point. If insufficient service, up to 3 new licences may be issued, or more after demand surveys carried out.
		612	(FF < 0.9) If rank is inadequate, reorganise or enlarge the rank, use bigger vehicles or relocate route start point. If insufficient service, the association should be encouraged to use the fleet more efficiently.
12	Taxi passenger volume from 300 to 500/hr. Candidate for 35 Seater vehicles. (The range may differ for reverse route in other peak).	62	Possible candidate for midibus size vehicles, if rank can accommodate them and if not in competition with north-south rail corridor. Otherwise no new licences.
13	Taxi passenger volume >500/hr. Candidate for normal buses. (The range may be less for reverse direction in other peak).	63	Possible standard bus route if not in competition with north-south rail corridor. If rank unsuitable for buses, relocate route start/end point. Otherwise no new licences.
15	Adequate or well utilised taxi route (50% to 99%), passenger volume 15 to 300/hr. No action needed.	65	No new licences to be issued at present.
16	Specific vias or Durban destination not distinguished in survey. Route probably shares in patronage noted for other vias or Durban destinations.	66	Check performance of equivalent route with survey data and apply recommendation for that route.

100 added to comment number:
Add: Competes with north-south rail service (may need feeder service)

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Route Detail Sheet

Route: FW016T

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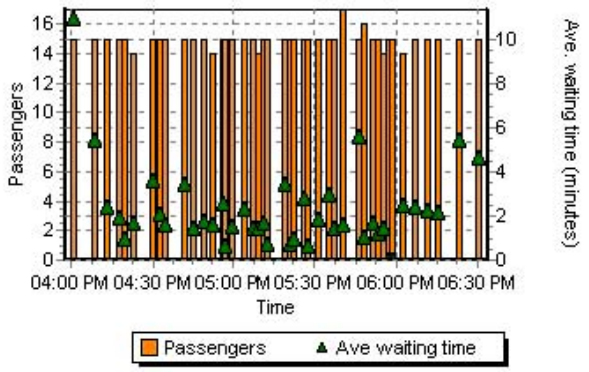
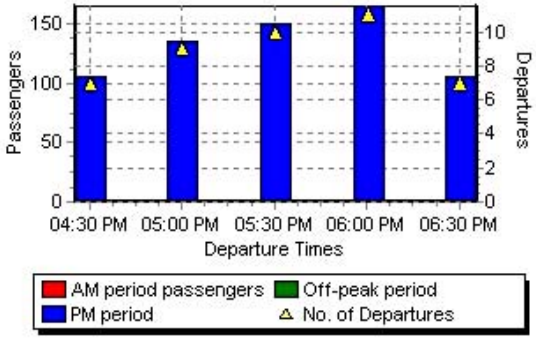
Route Description

CPTR Route No	FW016T
Route Name	Isipingo Taxi 3 to Folweni A
Origin Name & GPS ID No	Isipingo Taxi 3 (C043)
Destin. Name & GPS ID No	Folweni A (C001)
Via Points	
Route Length	15.2km
Mode	Mini-Bus Taxi
Operator/Association	Folweni T.A.
Operator Route No	
Service Type	Commuter
Route Type	Normal Route
Inside Metro	Yes
Definite	Yes

Waiting Times



Route Utilisation



Based on totals for 30 minutes ending at the indicated time.

Service Capacity and Utilisation

	AM Peak	Off Peak	PM Peak
Peak Hour Start			16:56
Number of Veh Trips			22
No of Unique Reg No's			21
Ave Veh Capacity			15
Service Capacity (No of pass)			330
Utilisation (No of pass)			330
Utilisation %			100%
Fleet Factor			1.05
Spare Capacity			0

Timetable Departure Times

Comments

12: Taxi passenger volume from 300 to 500/hr. Candidate for 35 seater vehicles. (The range may differ for reverse route in other peak).

Recommendations

62: Possible candidate for midibus size vehicles, if rank can accommodate them and if not in competition with north-south rail corridor. Otherwise no new licences.

Figure 2: Route Detail Sheet

4. VALUE AND LIMITATIONS OF CPTR INFORMATION

4.1 Introduction

The transport legislation defines clearly the type of information that needs to be collected for the CPTR, the tables that need to be produced, and how the information should be analysed to make recommendations on operating licences.

However, the nature of the minibus taxi “informal” public transport service is that it does not always easily fit into such a prescribed format or neatly predefined “boxes” and categories.

The following section will comment on the limitations of the CPTR and OLS documents as intended by national legislation from the eThekwini experience.

4.2 Limitations of CPTR Data in preparing the OLS

4.2.1 Informal nature of many of the Minibus taxi services

The required tables for the CPTR prescribe, for example, a fixed start and end point and a waiting time for each route.

However, in many residential areas in eThekwini, it was discovered that no fixed start points exist. Minibus taxi rove throughout the area, picking up passengers as they wait on the side on the road. Once they have a full load they will take the shortest route to their destination without going via a rank (formal or informal). A specific minibus taxi may only determine its destination later based on the majority of passengers, and then off-load the other passengers at a point for them to be picked up by another minibus taxi.

The result is that it is virtually impossible to accurately survey this type of operation. It is not possible to determine passenger waiting times, for example, a major consideration in evaluating a route. The only way to survey such an operation is through screenline surveys, and unless one goes the very unpopular and disruptive route of stopping every minibus taxi at the screenline, precise destinations and routing can not be determined.

Consequently, these routes will have a question mark on their accuracy and will have no waiting time data. This is a major limitation for the OLS analyses and recommendations.

Secondly, minibus taxis often stop virtually at any point along their route to drop off passengers. Doing on board surveys for minibus taxi is not practical, due to the number of taxis and their limited capacity for passengers.

Consequently, exact utilisation of the service cannot be determined accurately.

Thirdly, the nature of current minibus taxi operations is that from day to day the vehicles will change which route they operate in a particular association, and also some associations allocate a different number of vehicles to a particular route depending on the demand on that day. This makes determining the supply information difficult. This is further complicated by the fact that certain routes may need to be re-surveyed on another day, and hence the exact number of unique vehicles for an association is difficult to determine.

Consequently, even determining accurate supply data for some routes is problematic.

4.2.2 Cost of the CPTR and value for money considerations

Ideally, the OLS needs to take into account issues such as financial viability of operations. This is not an easy task, and making it too simplistic produces superficial results easily challenged. In order to assess financial viability, the following additional information is needed:

- Complete data set on pick up and drop offs along the entire route to determine "seat turnover" and revenue.
- Complete data for a full week, as valley and weekend services can be decisive in determining financial viability
- Some idea of the competing services patronage and financial viability and the impact of more vehicles on them.
- The full costs of the current mode. This is very difficult to obtain due to the informal nature of the minibus taxi industry with no records being kept. At best, one has to use general cost models, and their relevance to a particular operation is open to dispute.

Also, as mentioned above, to establish utilisation accurately, on and off counts at all stops are required. This would require on board surveys for bus and taxis services, which are extremely expensive and practically almost impossible for minibus taxis.

In eThekwini, the cost of collecting such information was financially prohibitive and practically almost impossible for the entire area.

In terms of value for money, then, the costs of doing a thorough CPTR to meet all the OLS requirements are prohibitive and the practicality of it is also an issue.

4.2.3 The sheer magnitude of the data collection, validation and capturing

A data collection exercise is not an exact science. The best planned surveys experience on site deviations and differences. It is typically known also that traffic volumes can vary from day to day.

This, combined with the magnitude of the task of collecting data on every single service in a large Metropolitan area, will always lead to inaccuracies in the final CPTR tables and OLS analysis. In eThekwini, it took approximately 1 year to collect all the information. Data validation and capturing was a huge task, and it is simply not possible to produce 100% correct data.

This means that typically any CPTR and OLS will have a level of confidence attached to it. It would be anyone's guess as to what this level of confidence is!

4.3 Value of the CPTR in preparing a Useful OLS

Despite the above-mentioned limitations, the CPTR is a valuable resource. Although there may be gaps in the data and some degree of uncertainty as to the actual figures, the OLS is very useful in framing recommendations to the Licensing Board on licence applications. It will speed up the process and ensure consistency in assessment. The data is certainly accurate enough to make good recommendations on the most appropriate mode per corridor or route. Making recommendations to the Board without it would be disastrous.

Also, having some facts of service provision and utilisation provides ammunition in dealing with disputes and violence in the taxi industry.

The passenger volumes can assist in the recalibration of travel forecasting models, although origin-destination surveys would be required for the model.

There is no doubt that, despite some of the limitations, the eThekwini CPTR is a valuable resource which can be augmented and improved with the passage of time.

The principal determinant of appropriate mode should be passenger volume, but required frequency to give a reasonable service is also important. The OLS has enabled the most appropriate mode to be determined on an individual route basis. On a corridor basis it will depend on the implementation of the Fundamental Restructuring of Public Transport, a project undertaken in 2000, as well as on a trade-off between the convenience of direct services and the economies of feeder and line-haul services with transfers, where single ticketing for multi-mode journeys will be required. The OLS has also shown that 35 seater recap vehicles will be appropriate on numerous routes currently operated by bus or taxi.

5. SUMMARY AND CONCLUSIONS

This paper has dealt with some of the limitations of the legislation in its requirements and intent of the CPTR and OLS. Due to the informal nature of many minibus taxi operations, certain data cannot be surveyed accurately (or at all).

However, the CPTR and OLS are still considered useful processes to give a good indication of the current services that will enable generally sound and consistent recommendations to be given to the Board.

In eThekwini there was useable peak period data for over 2000 routes on origin, destination, via points, vehicle trips with departure time, unique registration numbers, vehicle capacity, service capacity, passengers, utilisation rate, fleet factor, route length, fares and for the majority of these routes, waiting time. In addition there was information on over 600 route start and end points, geocoded, including the ranks and terminals with infrastructure. For the latter there was information on the number of bays, utilisation by loading point, operators using the facility and available amenities. Available software provided the tables specified in the Department of Transport guidelines.

There are several limitations in the data which require some circumspection in its use. They cover such topics, inter alia, as routes with no data, some surveyed routes with no waiting time data, some peak hour figures which may appear inconsistent, and waiting times which appear too long or too short in relation to other variables.

The whole exercise was expensive (over five million rands) but on balance well worth it. However, it will not be worth the cost and effort of repeating the work more often than at five year intervals. What will be important is to have a system in place to keep service provision records up-to-date. This will require careful logging of changes to both bus and taxi licences and a system to rapidly retrieve such information.