

The Johannesburg Metropolitan Transport Area includes the following local authorities:-

- Alberton
- Bedfordview
- Edenvale
- Germiston
- Alexandra
- Randburg
- Sandton
- Roodepoort and Dobsonville
- Johannesburg, Meadowlands and Diepkloof

The vehicle registration in JOMET is given in Table 4.3.

TABLE 4.3 : VEHICLE REGISTRATION : JOHANNESBURG METROPOLITAN TRANSPORT AREA

Classification	Driessen Projections				Actual or Projected			Driessen 1970/80 growth p a	JOMET 1977/80 average growth p a	JOMET 1979/80 growth
	JOMET 1970	JOMET 1980	JOMET 2000		JOMET 1977	JOMET 1980	JOMET * 2000			
Motor car	529 000	961 000	2 513 000		425 450	488 424	638 450	8,2%	2,17%	3,13%
Mini Bus	In above	In above	In above		7 239	12 844	40 839	-	25,81%	3,28%
Motor Cycles	In above	In above	In above		26 816	30 966	51 716	-	5,18%	3,86%
Commercial Vehicles	79 000	168 000	593 000		114 355	105 092	127 476	11,3%	-2,93%	2,13%
Buses	In above	In above	In above		4 104	3 633	4 028	-	-3,83%	1,09%
Other	Not con- sidered	Not con- sidered	Not con- sidered		1 749	1 569	669	-	-3,43%	-2,70%
TOTAL	608 000	1 129 000	3 106 000		612 713	642 528	863 178	8,6%	1,62%	2,97%

* Three year trend extrapolated, excepting commercial vehicles and buses which are one year trend extrapolated.

The Driessen total projections are in fact for Johannesburg and the Witwatersrand and consequently cannot be compared with the JOMET statistics directly. The percentage growth figures can however, be meaningfully compared.

Consistent with the PEMET experience Driessen appears to have considerably overestimated vehicle growth for the JOMET area. The apparent dramatic increase in mini-bus population between 1977/80 must be read with circumspection as it covered the period when the legal definition of a bus changed. Growth of 3,28%, as experienced from 1979/80 is nearer what can be expected.

Significantly the growth of the commercial vehicle population in JOMET is not as great as predicted by Driessen. This can be partly accounted for in that much of the registration of these vehicles occurs outside of the JOMET area, in, for example ORMET towns.

Contrary to the PEMET experience, the increase in registration in individual local authorities (Johannesburg 8,1%; Roodepoort 5,5%; Alberton 11,5%; Germiston 1,0%; Randburg/Sandton -1,0%) indicates that those areas with large Black population are experiencing substantial increases in registration. This implies that Black car ownership is increasing. Unfortunately insufficient data exists to determine precisely by how much.

During 1980 the average daily vehicle travel on major routes amounted to 13 805 000 vehicle kilometres per day. This represents an increase of 10,6 relative to the 12 454 000 vehicle kilometres per day during 1979. The figures for person kilometres of travel for 1980 show a 8,4% increase relative to 1979. This indicates an overall drop in average vehicle occupancy of from 1,56 to 1,52 over the period.

Such a drop is substantial and gives rise to concern. Sufficient data does not - unfortunately - exist to identify the attributable cause of this phenomena although officials of the City Engineers Department, Johannesburg attribute it to decreasing occupancy of Black owned commuting vehicles. JOMET's statistics pertain to private travel only. To arrive at public travel it is necessary to look at other sources of information which will be discussed later in this section.

During 1980, average daily person travel by private transport amounted to 21 049 543 kilometres, which represents an increase of 8,4% compared with the figure of 19 427 236 kilometres of travel per day during 1979.

This compares with Driessen's figure of 23 123 000 in 1970, an apparent decrease. Driessen's growth aims for road travel were 7,3% pa for White, 7,1% pa for Blacks; his unadjusted projection's for road travel were 7,5% pa for Whites, 8,3% for Blacks. It must be remembered that the Driessen Committee did not aim for a total reduction in travel but rather for a shift from private to public modes.

Data for the following discussion has been obtained from the Management Information System for Bus Undertakings operated by the Department of Transport. The data is not exhaustive for the entire area but is extracted from those undertakings, the bulk of them, which do submit information.

Indications are that bus ridership has increased at approximately 3% per annum since 1978, reversing the continued downward trend experienced since 1945. It is too early to predict if this will be maintained or not.

Driessen's estimate for both bus and rail travel in 1970 was 6 150 000 person kilometres each, aiming for 7 528 000 and 94 174 000 person kilometres respectively in 1980 and 2000. These represent annual increases of 2,24% and 5,31% respectively for each mode.

If the increase in bus ridership since 1978 can be maintained for any length of time (say ten years), Driessen's growth may be achieved.

A similar positive trend has been observed in rail travel with annual increases of 7,5% for White and 6,1% for Black travel being observed since 1978. Again, if maintained, these increases may achieve Driessen's growth.

The overall effect appears to be an increase of private travel at a rate above that predicted by Driessen, as well as more rapid rates of increase in bus and rail travel over the last two years. Vehicle ownership has not grown as fast as travel has, but vehicle occupancy has decreased. The obvious deduction from this is that trip lengths have increased over the period. This would indicate a population movement to residences further away from the CBD as well as possible increased decentralisation of job opportunities.

4.1.5 Summary discussion on JOMET

The indication is that the following trends have been experienced in the JOMET area over the period since metropolitan planning was introduced (1977/80):-

- total travel has increased by approximately 6% p a;
- private travel has increased by a like amount;

- public bus travel has increased at half this rate;
- public rail travel has also increased at 6% p a;
- goods vehicle registrations have declined, but goods vehicle travel across the intermediate cordon has increased by 7,5% p a;
- there has been an unquantifiable but noticeable increase in Black private car ownership, (indications are towards 90% of total growth being in Black vehicle registrations) and a corresponding growth in mini-buses;
- trips are becoming longer and the area of attraction of JOMET is expanding. This is an indication of decentralisation occurring such that it is the prime reason for the increase in travel, rather than growth in demand from traditional attractions.

As in the case of PEMET it is apparent that these changes are the result of circumstances and forces outside of the control of the planning authorities e.g. general economic climate and free market mechanisms.

Several cordons are regularly counted in the JOMET area. Of these the most revealing are the CBD cordon counts surrounding the eleven identifiable CBD's of Johannesburg, Alberton, Elsburg, Germiston, Randburg, Sandton, Edenvale, Bedfordview and Roodepoort; the metropolitan area cordon; and the intermediate cordon. While the first two of these cordons only give total vehicle counts, the last provides an interesting comparison between vehicle types, although not sufficiently disaggregated to give a confirmation of the modal changes discussed earlier.

The CBD cordon reveals that the following change has occurred in the Johannesburg CBD by total vehicle movements between 1977 and 1979, and lists the 1980 data for the remaining identifiable CBD's.

<u>CBD</u>	<u>1977</u> <u>(vehicles)</u>	<u>1980</u> <u>(vehicles)</u>	<u>% Change</u> <u>p a</u>	<u>1980</u> <u>Vehicle</u> <u>occupancy</u>
Johannesburg	365 960	441 923	6,92%	1,52
Alberton	-	91 861	-	1,69
Elsburg	-	26 256	-	1,63
Germiston	-	104 770	-	1,50
Randburg	-	33 822	-	1,51
Sandton	-	31 567	-	1,31
Edenvale	-	72 047	-	1,45
Bedfordview	-	29 513	-	1,53
Roodepoort	-	64 808	-	1,50

The metropolitan area cordon count reveals that the total number of vehicles crossing the cordon has increased by 6,25% pa, from 321 000 in 1977 to 381 000 in 1980. With an average vehicle occupancy at that point of 1,61, this represents a total of 608 000 person movements across the cordon in a day. In other word, the JOMET area attracts 304 000 per day from outside of its boundaries. This is equivalent to 14,5% of the total JOMET population, and adds weight to the contention that apparently longer trips being made.

The intermediate cordon reveals that total vehicle movements within the JOMET area have increased by 5,88% p a over the past four years, while the passenger car portion of this has decreased from 75,3 to 72,8%.

4.1.6 General summary comment

As a concluding comment, the reader is reminded that the theme of this dissertation is the 'Effects of central government participation on urban transportation'. It is submitted that the PEMET and JOMET figures on their own provide sufficient evidence that the effects of any authority's involvement in trying to influence that travel behaviour is minimal. This is confirmed by data available from other areas.

The authorities' role is to assess demand and project it in the light of realistic experience (through a system much as those initiated by the Department of Transport for transport planning and for Management Information Systems for bus undertakings) and provide the infrastructure to meet that demand.

In their efforts it should always be borne in mind that travel demand follows levels of economic prosperity and that the ultimate measure of success is in having the right facilities available when needed. Any coercive form of influence, be it in the issuing of permits, or the restrictive circumscribing of places of residence and work, or any other, will not succeed and will merely compound problems through stifling latent demand until it is necessary to meet this through techniques of crisis management. This approach is always expensive and should not be acceptable in a society as advanced, and as volatile, as our own.

4.2 Investment in Urban Transport Infrastructure

Due to the variety of sources from which this information must be obtained, this dissertation can not hope to go into great depth in this field. A comparison will be made between figures readily available in the Driessen Report and White Paper, and the five published urban transport plans. These, it is felt will provide a comparison of different levels of investment sufficient for this report. The interested reader is referred to the comprehensive work undertaken by the National Institute for Transport and Road Research for a more in-depth treatment of the topic, particularly the work done by Dr PNW Freeman.

4.2.1 General discussion of the Driessen Report's recommendations

The Driessen Report gave emphasis to road related financial figures, so any investigation of necessity begins here. According to the Committee the following were the actual and projected road expenditures for the seven major urban areas:-

Item	Driessen projected (R millions)		
	1970/1	1980	2000
Construction:-			
Express ways	16,3	32,7	107,5
Major arterials	20,9	41,9	137,9
Other roads	15,8	20,3	31,5
TOTAL (assumed 6,0% p a to 1980; then 5,5%)	53	94,9	276,9
Maintenance	9,9	15,7	37,4
Interest	12,4	24,8	70,2
TOTAL (assumed 6,0% p a to 1980; then 5,5%)	75,3	135,4	284,5

The Urban Transport Fund would provide R3 578,5 million of this amount in total, starting at the theoretical amount of R36,0 million in 1970/71 and growing to R314,3 million per annum in 2000.

The theoretical contribution for 1980 road construction and maintenance should thus have been R66,4 million.

These road figures amounted to 73% of the total deemed necessary for the Urban Transport Fund, or from a different point of view, 27% was considered necessary for other forms of urban transportation, excluding underground rail.

The total urban expenditure deemed necessary for urban transportation by the Driessen Committee is synthesized in the following table.

Item	% Subsidy	UTF Contribution 1970/71 (R million)	Total deemed necessary	
			1970/71	1980 *
Bus capital	50	4,0	8,0	16,0
Traffic control	50	1,0	2,0	4,0
Construction	60	36,0	60,0	120,0
Bus operation	20	5,0	25,0	50,0
Rail operation	-	3,5	3,5	7,0
Administration	-	0,5	0,5	1,0
TOTAL		50,0	99,0	198,0

* Assumes the 10% inflation rate implied by Driessen. R198,0 million in total compares well with the R110,6 million it was envisaged would be spent on roads in 1980 in total, and the estimated R66,4 million UTF road subsidy, applied at a rate of 60%.

In summary, in 1980, the Urban Transport Fund should have made available R100,0 million, of which approximately R70,0 million should have been available to provide a 60% subsidy on road works.

R8,0 million should have been available for bus capital purchases; R2,0 million for traffic control equipment; R10,0 million for bus operating subsidies; R7,0 million for railway losses and say R3,0 million for administration and studies, including research.

4.2.2 The actual case

In fact the annual Parliamentary appropriation to the UTF in 1980/81 amounted to R20,0 million, or 20% of the demand identified in the Driessen Report for that year.

This amount is split up into:-

Bus capital	: Nil
Traffic Control	: Nil
Construction	: R12,3 million
Bus operation	: R 1,1 million
Rail operation	: Nil
Administration	: R 4,6 million
Studies, Research and Demonstration projects	: <u>R 2,0</u> million
TOTAL	: <u>R20,0</u> million

Three questions need to be asked:-

- why is only 20% of the amount identified in Driessen being provided?
- what effect has this had on the level of investment in the urban areas?
- what effect has this had on demand for investment?

4.2.3 The reason for low UTF appropriations

The White Paper made it quite clear that central government policy was that 15% of the envisaged UTF moneys would come from:-

- an additional levy of up to 12 per cent on central city properties;
- additional revenue from parking fees, of which a fixed percentage should be earmarked;
- a tax on parking space;
- charges for loading zones.

The remaining 85% would, according to the White Paper, have to be found from other sources, but the Government did not take a decision on the matter for reasons that hinged around the relatively small expenditure necessary to launch the initiative leading to a false sense of time being available; and the view that the permit and levy system favoured by the Driessen Committee would prove the ultimate panacea if implemented.

This is where the breakdown occurred. Time was neither available nor free; the cities were not willing to implement any of the proposals to raise the 15% and nor, more importantly, was any city or administrator prepared to introduce a permit and levy system, even if only on an experimental basis.

The Central Government misjudged the cities willingness to co-operate with higher dictates, and the cities misread the Government's intentions.

Treasury, and Parliament, could be coerced only into granting the following amounts towards implementing the White Paper's recommendations:-

1976/77 : R 0,8 million

1977/78 : R 2,0 million

1978/79 : R 8,0 million

1979/80 : R18,0 million

1980/81 : R20,0 million

TOTAL : R48,8 million

Preliminary indications are that the 1981/82 appropriation will not be any higher than in 1980/81, despite strong representations of deputations from several provincial administrations and core cities, to a variety of ministers.

In short the Government has felt that it has met its White Paper obligations in initiating a scheme which cities can utilise towards becoming self financing.

The cities on the other hand have not heard that message, or refuse to accept it, and continue with the same demands which initiated the Driessen Committee in the first place, viz the cities cannot afford to finance their own infrastructure, either practically or politically, and the exchequer must provide relief.

The communication gap, caused by different political stances and views on the matter, has caused unlimited annoyance and grief.

Who is right is a matter for the population itself to decide through the democratic process.

The developments occurring right now in the suggestions coming from the Croeser Working Group of the Treasury, which followed from the Browne Committee, in that the amount will be found within individual areas from an employers wage bill tax, is perhaps a messy but workable compromise between central government's view point that areas will be self financing and self

governing, and the cities viewpoint that city residents are not going to be further burdened with local taxation, but must retain self government.

The author must remind the reader of his personal ideal of existing licence fees plus a portion of GST being ploughed back into an area, but this is not a topic that this thesis need address itself to.

4.2.4 The effect on level of investment

It is a fact that with the passing of the Urban Transport Act the cities misinterpreted this as an opening to unlimited financial largesse. This misconception was prolonged by the Department of Transport and the NTC encouraging Core Cities to submit plans identifying actual demand, in the mistaken idea that great demands on Treasury would open the flood gates of the Exchequer - and incidently increase the role of the Department.

The only envisaged financial restriction on urban transportation investment in those halycon early days was through the matching funds put up by local authorities - an envisaged 40%. This led to strategies prepared in JOMET, PEMET and elsewhere calling generally for investments of the order of R800 million (1979 rands) in total to the end of the century, for each metropolitan area.

The demand was tailored to the money envisaged as being available. Interestingly R800 million times five areas, and allowing for inflation, comes to R9 000 million, which is close enough to Driessens's total figure to accept that the ballpark is the same.

The short term effect of this communication gap is shown graphically in the following estimates from JOMET's Interim Transport Plans.¹⁷

	1979/80	1980/81	1981/82	1982/83	1983/84	1984/85	Period <u>Total</u>
Initial	24 078	29 168	31 515	31 775	31 027	-	147 563
Second	-	33 763	37 659	41 768	41 161	36 665	191 016
Third	-	-	39 719	34 306	32 052	31 731	121 556

(estimated total cost in thousands of rands)

The sad effect is to see a relatively uniform planned expenditure over five years in the Initial plan, changing to a forward loaded pattern in the Second plan as unfinanced jobs are pushed one year away, but still in the expectation of receiving assistance, to the resignation that money will not be available and a realistic downgrading in the Third plan.

The effect is even more traumatically highlighted in PEMET's record of public transport and related facilities expenditure¹⁸ as follows:-

1976 : R1 420 000
 1977 : R1 129 000
 1978 : R2 332 000
 1979 : R 987 000
 1980 : R 487 000

The encouragement lent to public transport in the initial of enthusiasm saw investment in these facilities reach record heights in 1978, but, in anticipation of Central Government assistance, which did not materialise, fall off in latter years.

The short to medium term (1 year to 5 year) effect is thus traumatic. Through a lack of clarity of each party's views, and a basic lack of communication, the level of investment in transport infrastructure, and especially in the historically less favoured areas of public transport and heavily Black used routes has undertaken a three to four year hiccup in its generally constant move forward.

The cost of this hiccup in direct monetary terms in JOMET alone is of the order of R21,0 million in lost investment over three years. The long term congestive effects of this break in the planning process are not possible to measure at this stage.

4.2.5 The demand for investment

The following comparative table is of interest:-

Item	Demand project by Driessen 1980	Demand identified in 5 plans 1980
Bus capital	16,0	12,0
Traffic control	4,0	2,0
Construction	120,0	82,0
Bus Operation	50,0	45,0
Rail Operation	7,0	200,0 *
Administration, Studies and Research	1,0	5,0
Demonstration projects	-	3,0
TOTAL	198,0	349,0

* this is misleading as it is the rail losses in urban areas in 1980. Driessen did not envisage meeting the full amount, although it is what the Railways now feel their due.

If the increased demands from the Railways are not considered, Driessen's projections are reasonably comparable apart from the lower construction investment demand.

4.2.6 Concluding remarks

The point to be made at the conclusion of this section is that irrespective of political stances, and irrespective of the level of investment made into urban transport infrastructure, the latent demand will continue to call for a uniform rate of real investment to meet demand. A practical statement of the SA Road Federation is that a society pays for good roads, whether it has them or not. This can well be extended to transport infrastructure as a whole.

The effect of Central Government's role in this disruption in the planning process, and how it should avoid a recurrence is discussed in Chapters 5 & 6.

4.3 Assessment of priorities

17

JOMET's Initial Interim Transport Plan, which was both the first attempt at metropolitan transport project programming and the first urban transport plan to be approved, merely compiled a list of the projects considered to be of metropolitan significance from constituent municipalities capital programmes. The view at that time was that assistance from the Urban Transport Fund would be adequate to meet all demands and the only constraint on finance would come from local authorities matching funds.

The limited funds that eventually became available forced the NTC in its approval of the plan to request the Core City to identify how these projects met the long term requirements of the area and to prioritise projects using objective criteria, preferably through cost benefit analysis or other economic tests.

These two conditions have become standard in all urban transport plan approvals.

With regard to the former condition it was relatively easy for those areas (viz JOMET, PREMET and Durban) which had long term proposals and defined arterial networks to more fully motivate the need for projects. In the case of Cape Town and PEMET topographical constraints dictated future development and projects could accordingly be practically motivated.

The interesting aspect of co-ordination came in ranking priorities for a metropolitan area rather than for a single local authority.

It was generally agreed that cost benefit or other economic assessment was unsuited to the nature of the problem (i.e. distribution of limited resources amongst projects, all of pressing urgency, but none mutually exclusive) and several different approaches were adapted. These are discussed below.

4.3.1 JOMET

Messrs TI Carlisle and JA Webster (Forward Planners : Jhb CED) produced JOMET's 'Methodology for Major Road Project Priority Allocation'.

This is a relatively simple method whereby different highway projects, on an overall programme, may be allocated in priority thus eliminating as far as possible subjective assessment.

To assess schemes readily, taking into account the majority of aspects which both promote and comprise highway improvements, a sufficiency rating schedule is completed giving an overall rating for each scheme. This then allows it to be ranked with other schemes from all over the Metropolitan area although they may differ in their concept.

The process entails grading of improvements by using a system of marking each itemised element of existing conditions and proposed design. Each element is allocated a weighting factor

in accordance with its merit compared with other elements. Draft ranking sheets are attached to the documents for the two cases of an improvement to an existing highway and a completely new highway. The procedure is to ring the corresponding number in accordance with each item marked. The summation of all items then gives a 'score' for the project based on a highway needs principle.

After assessing all schemes in the programme, a final table can be prepared of relative project priority. The schemes can then be carried out in descending order until the budget allocation is reached. However, at this stage no financial assessment has been taken into account except indirectly where it is reflected in the weightings given in the rankings.

A full cost/benefit analysis on each scheme would be complex and time consuming and in view of the approximate construction costs that may only be available, to determine financial benefits in any great detail would be unnecessary. It is considered nevertheless, that some form of cost/benefit exercise should be imposed in order to confirm that projects undertaken represent a real financial return to the community. A simplified analysis is therefore carried out, taking into account travel costs only on the schemes that, from the ranking table, come within the annual budget.

The operational stages of a project priority exercise are therefore:-

1. Rank schemes in order of priority on a highway needs basis and proposed design.
2. Draw up a short list of schemes in relation to finance available.

3. Carry out cost/benefit analysis on short list of schemes.
4. If cost/benefit calculations indicate a financial return above a stated level, then scheme moves into firm programme.
5. If scheme has poor cost/benefit return then it should be re-appraised to see if proposal being considered is of too high a standard.

It should be noted that the cost/benefit analysis does not reveal absolute financial benefit but compares benefits in relation to the competing schemes.

An obvious failing of this approach is that, while it successfully ranks highway projects it does not provide for public transport projects. This is understandable as the system is based on one developed by the Federal Highway Administration.

A further weakness in JOMET's approach is that, in order to maintain cohesion of the area it is ensured that each constituent local authority gets at least some of the financial cake each year. This immediately disrupts the objectively determined priorities.

4.3.2 PREMETS

PREMET does not have the problem of other areas in that it only consists in Pretoria and Verwoerdburg.¹⁹ Each authority has its own Councils accepted program. Priorities for the area are accordingly easily determined through negotiation. Cost benefit analysis should however, be undertaken for each project.

4.3.3 DURBAN

Durban addressed the problem most comprehensively.²⁰ They used two separate ranking systems. The first was for the short term of the ensuing year.

It was considered desirable to allocate priorities only to those projects incurring expenditure in 1980/81. It would be wasted effort to carry this out for subsequent years because there will inevitably be some changes to the plan in later annual submissions.

- Projects approved in the Initial Interim Transport Plan which were under way in 1979/80 were given first priority, and new projects starting in 1980/81 were given second priority.
- The second level of the hierarchy related to major transport categories.

Traffic control projects were given the highest priority because they benefit both public and private transport, and enable the best return to be made on road investment.

Bus transport projects were given second priority since they benefit the greatest number of road users, help stem the decline in use of public transport and help to reduce the need for new road construction.

- The third priority was assigned to road construction projects.

Within the three categories of project rated as above, a further rating system was devised.

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Within the three categories of project rated as above, a further rating system was devised.

For traffic control projects, first priority was given to existing projects already underway, second priority to projects giving an area-wide benefit rather than an isolated one, and third priority to any other projects.

The bus transport category of projects was rated as follows:-

1. Non-White services
 - (a) Ranks and terminals
 - (b) Demonstration projects
 - (c) Feeder bus services
2. White services
 - (a) Passenger facilities
 - (b) Demonstration projects
 - (c) Equipment
3. Bus depots
 - (a) Black areas
 - (b) Others

It was considered vital that Non-White service improvements be given first priority in this category, in view of the results of Durban's public participation exercise and the basis of the principles stated above.

In respect of road projects, those approved in the Initial Interim Transport Plan and which started in 1979/80 were given first priority, despite the fact that some could not be motivated on the basis of the traffic assignments used to rate all the other road projects.

Priorities of other road projects were done with due regard to 1985 peak hour assigned volume and the volume: capacity ratio of 1985 trips on the 1980 network, so that there would not be a bias in favour of low volume roads with high V/C ratios.

Their second approach was to employ a cost benefit for the longer term.

The estimation of community benefits arising from changes to the transportation system consists of establishing costs to the community incurred by use of the new system and subtracting these from the costs incurred on the original system. The cost difference represents benefit.

Costs are made up primarily of two classes of items: construction and maintenance costs on the one hand, system operating costs on the other. The Deltran suite of computer programs is particularly appropriate for calculating operating costs.

For ease of comparison of costs for different areas, dates and transport systems, such costs are converted to their nett present value (NPV) through the application of a discount rate. This procedure is based on the premise that it is of more value to have something now than in a number of years time. Conversely, a benefit which will accrue in the future is not worth as much today as the same benefit accruing today. A discount rate of 10% per annum is most commonly adopted and this had been recommended by the Department of Transport. A rate of 10% reduces a cost or benefit arising in seven years time, for example, to approximately half for purposes of NPV. Thus, long-term benefits are devalued in comparison with immediate and short-term benefits.

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Taking the base year of 1980 as the starting point, the road projects to be completed by 1985 were evaluated as a package with a 20 year life, in that the total network benefits arising from that package were calculated, construction and all figures for a 20 year period up to 2005 discounted to 1980 (1981 in the case of benefits). The analysis was undertaken in terms of constant prices, using 1980 estimated values. Differential inflation was taken into account, that, is, where particular elements were expected to inflate at significantly different rates from the consumer price index. This may occur in respect of fuel, for example, but insufficient reliable information was available to warrant the incorporation of differential inflation into any aspect of the analysis. Since transport cost elements are likely to rise faster than the consumer price index, the benefits of the construction programme will have been understated to some degree in this respect.

The calculation of operating costs could be undertaken on a zone to zone basis, using mean interzonal speeds and distances. This makes differences in the network which have a significant effect on operating costs, and much sensitivity is lost. The Deltran traffic assignment suite is able to accumulate valid operating costs link by link, using the individual link volumes lengths and speeds, for the whole system. Operating costs were calculated separately for cars, commercial vehicles and buses, and for each race in respect of cars and buses, so that the differing values of vehicle occupancy, occupants' time and vehicle running costs could be taken into account. This gave a sensitive total operating cost when combined with volume and speed on every individual link.

Operating costs over a 20 year period on the 'do-nothing' 1980 network were derived by loading that network with forecast 1985 and 2000 trips. This gave a time series change in operating cost. The effect of implementing the 1980 - 1985 road programme was measured by loading the 1985 network with the 1985

and 2000 trips. Subtracting these operating costs from those incurred on the 1980 network gave system gross benefits for 1985 and 2000 derived from the 1980 - 1985 road programme. Benefits for intermediate years and years up to 2005, assuming a 20 year project life, were calculated proportionately. Nettbenefits were calculated by deducting annual capital charges, and discounting all values to 1980 in respect of costs and 1981 in respect of benefits. The time lag of one year throughout the period was to recognise that costs are always incurred before benefits start to accrue, assuming an average one year construction period. Benefits were consequently devalued by one year in relation to costs throughout the assured life of the projects.

The above analyses showed the effect of the five year programme if all future links were to be built. As this is an unrealistic assumption, a further evaluation was done on the basis of a postulated 2000 network, and this was loaded with 2000 trips. The resulting operating cost, deducted from the cost of the 2000 trips on the 1985 network, gave the benefit of the 2000 network including the 1980 - 1985 programme in the year 2000. Gross benefits between 1985 and 2005 were calculated proportionately. Approximate 1985 - 2000 construction costs were calculated and converted to annual capital charges. These were then deducted from gross benefit to derive nett benefit, and discounted to 1980 and 1981. Maintenance costs of the road in the programme should be included, ideally, but this was not done for three reasons:-

- (a) maintenance of new projects would be minimal in the first few years;
- (b) maintenance cost is small compared with construction cost;
- (c) when discounted to 1980, maintenance costs should be insignificant, assuming continued high inflation rates.

The capital cost of projects was converted to an annual cost on the basis of assumed loan repayment practices. It was assumed that the average interest rate for the first five years would be 7% per annum. Including loan redemption, this results in a factor of 0,10358 to be applied to the capital cost, assuming a twenty year repayment period for each year's expenditure. After the first five years, it was assumed that the interest rate would increase to 10% per annum and the repayment period for each year's expenditure would be fourteen years. This results in a factor of 0,13575 to be applied to the yearly construction cost.

The costs of National and Provincial road projects were not included in the analysis because they were not part of the Metropolitan Transport Board's programme. They are independently financed and not subject to MTAB control. In case it is argued that the benefits from such projects should also be excluded, there are two important considerations to justify their inclusion.

- (a) The complete networks for 1985 and 2000 were required for assignment purposes to achieve a realistic traffic loading of all links. If Provincial road projects had been omitted, the loading, hence operating cost, of the rest of the network would have been falsified.
- (b) Many National and Provincial projects lie towards the periphery of study area, e.g. the N3 and N2 national freeways. It is logical to assume, therefore, that their primary purpose will be to serve external trips, i.e. those with one or both ends outside the study area. In fact, the 1985 gross benefit of the external trip matrix is negative, which can only arise from significantly higher operating speeds in 1985 than 1980 where the roads were uncongested in 1980. This suggests that from a cost/benefit point of view such projects could be deferred. Be that as it may, the effect is

one of dilution on the gross benefits realised from the MTAB road programme in the operating summaries.

The calculation of nett benefits was performed in respect of fuel consumption; in terms of both volume and value of fuel saved this has a higher value to the consumer than the annual capital charges.

This leads on to the question of taxes and whether these should be deducted from benefits, particularly since tax comprises a substantial proportion of fuel costs. If a national transport study was being undertaken, taxes would represent a transfer cost which should be deducted by Government, as the collector of tax and manager of the study. However, a metropolitan area study, undertaken by the authorities within that area, should take account of all transport payments made by the travellers in its area, including transport related taxes, because the residents of the area will save the tax as well as other costs arising from transportation improvements. Tax elements have not been excluded from the analysis for the above reason.

Again unfortunately, while Durban's first (short term) approach incorporates public transport projects, their second does not.

4.3.4 PEMET

PEMET is in a similar situation to PREMET (section 4.3.3 above) and adopted the same approach of negotiation amongst constituent local authorities.¹⁸ Work is being undertaken towards developing a goal achievement matrix approach for determining project priorities. This is an exciting development but remains in its infancy at this stage.

4.3.5 CAPE TOWN

Cape Town has used a simplified and practical Ontario method.²¹

The Cape Town City Engineer argues that the shortcomings of the Highway System give rise to severe but localised traffic congestion during peak periods on certain routes, particularly at intersections and interchanges. It would be desirable but financially impractical to eliminate all points of congestion, therefore priority should be given to the elimination of those points which cause most delay to the largest number of people, and which reveal a higher than normal accident rate. In later Transport Plans it is hoped to undertake benefit/cost or Cost Effective studies. For the present, however, a simple highway priority ranking system is used consisting of the ratio of the 1985 traffic predicted peak volume to the existing traffic capacity expressed as a percentage averaged over the whole route. Where there is no existing facility, a two lane two-way carriageway is assumed.

Where the index is 100% then the estimated peak loading will equal traffic capacity of the facility over the full peak hour. The capacities used were:-

1 800 vph per lane for freeways

1 200 vph per signal controlled lane for major arterials

800 vph per signal controlled lane for collector/distributor arterials.

The rating so obtained is a relative one and would not be affected by using more general lane capacities. The ratings are averaged over the entire route and used to establish a theoretical priority rating for highways.

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4.3. Discussion

The point made is that while each area used its own method, these were all increasingly objective methods and are aiming towards economic assessments in the longer term. This is the first time that objective criteria have been used to prioritise all projects in the urban areas. Unfortunately provision must still be made for bringing public transport systems unbiasedly into the rankings. All systems have this failing at present. As indicated PEMET intends working towards the compilation of a goal achievement matrix, which may prove the eventual satisfactory solution.

The point of this section is that through Central Government insistence on objective criteria and measurement systems being used, rationality is gradually being brought into urban area capital transport programs. The relevance of this is discussed more fully in Chapter 5.

4.4 Land Usage

It was realised well before the advent of the Driessen initiative that land use had a considerable effect on transportation demand and that, when considering this aspect, South Africa's land use pattern left a lot to be desired.

The Driessen Report, however, formalised this recognition and endeavoured to introduce some form of control. Specifically the areas in which land-use influences transportation factors are:-

- generation
- attraction
- parking

goods loading and off-loading
pedestrian movement

It is accepted that there are many more, for example as discussed in the Department of Transport's document:-

'Residential Densities to Support Public Transport in the White Areas of South Africa'²²

The five listed were, however, those identified and pursued through the White Paper and Urban Transport Act.

Earliest thought was that an Act of Parliament should be passed to freeze all bulk factors, thus effectively freezing existing 'zoning' traffic generation and attraction capabilities. This concept was extended to the idea that central government should also control all aspects of parking and goods movement.

Fortunately wiser council prevailed and this, coupled with the Administrators' total rejection of any infringement on their rights to approve land use, led to the present working with regard to these aspects in the Urban Transport Act. In effect these amount to statements of policy on these aspects and for the relevant Town Planning Schemes form part and parcel of an approved Transport Plan. Changes in bulk are then to be finally approved by the Administrator in consultation with the NTC, while parking and loading policies will be determined by the respective metropolitan areas themselves, but approved annually by the NTC.

A practical system has now been established to enable the bulk factor changes to be negotiated upon, and the Department has made its views known through the publication of the following reports:-

- 'The effects of the change in land use on traffic volumes';²³
- 'Parking standards';²⁴
- 'Residential Densities to support public transport in the²²
White areas of South Africa';

A report on 'Goods loading and off-loading' is currently in the course of preparation.

It is apparent that these documents are receiving the attention and support of all concerned, particularly the planning authorities and other government departments.

4.4.1 What is the effect?

In the past five years there has been little change in the development of the CBD's of the five areas. Taking the case of the Port Elizabeth CBD for example.

There are five major identifiable business districts within the metropolitan area, of which the Central Business District of Port Elizabeth is the largest. These have recently been supplemented by the opening of three hypermarkets, two of which are situated on the old Fairview race course and the other in the western suburbs at Hunters Retreat.

The means of controlling density in these business districts is through having a maximum Floor Space Index (F S I). This is defined as the ratio between the gross floor area of the building, together with any necessary outbuildings, and the area of land upon which it is constructed. In a number of Town Planning Schemes, the F S I is referred to as a Bulk Factor, but the definition is identical.

The topography of Port Elizabeth, with its very narrow coastal plain, in places only 400 m wide, has greatly influenced growth in this area. Consequently development is very much elongated about Main Street, which forms a spine, and is commonly split into two sections for planning purposes, i.e., the 'Hard Core' and 'North End'. The latter has traditionally been centred around the car sales industry, but it is now rapidly becoming a major shopping centre catering mainly for the Coloured and Black communities.

A large section of the centre of the 'Hard Core' of the Central Business District is not controlled by an F S I, but by means of a height restriction. The development in the area from Russell Road in the north to White Road in the South and Chapel and Strand Streets in the west and east respectively is controlled by a 31,75 m height restriction, the objective of which is to maintain an uninterrupted view of Algoa Bay from the Donkin Reserve. Consequently, varying floor space indices apply, depending on the location within the Central Business District. In order to comply with Article 6 (2) of the Urban Transport Act Number 78 of 1977, F S I's have been calculated and are included in PEMET's transport plan. The Central Business District (North End) has a uniform F S I of 3.

During the past year two buildings were demolished in the 'Hard Core' area, namely Adderley Building and West-South House. In addition the U B S Building was completed. The nett result of the above changes is an overall increase of the developed 'Hard Core' from 49,6% to 49,8% of the maximum permissible development. There was no change in the development of the C B D 'North End' during the past year.

It would be naive to suggest that this static state has been brought about by controls initiated by the Urban Transport Act.

It is suggested that, as is the case with total travel demand, which was discussed in an earlier section, this lack of development in the CBD merely follows the dictates of economic prosperity. A similar situation is experienced in the other declared metropolitan transport areas.

Considering the other end of the transport chain, the residential areas, it is common knowledge that JOMET has an approved land use strategy. This provides for low density residential development in Sandton.

In spite of this declared policy what has been the recent experience in Sandton?

The halcyon days of one of South Africa's poshest residential area seem to be on the way out. Townhouses have cut a swathe through the gentlemen's estates of yesteryear - and set the trend which will change the once exclusive parkland image of Sandton.

For every new house built next year a townhouse will be erected.

It has recently been learnt that the new higher-density image of this once plush area is set on a irreversible path. The wave of townhouses is unlikely to be halted - but the old Sandton image is dying hard with a political row brewing over the future look of the town. A scathing attack was launched on the then chairman of the town's management committee and the present council. It accused them of destroying Sandton's 'inheritance' of lush parkland and turning the wide open spaces into blocks of faceless townhouses - a sorry 'legacy' for future generations, it was suggested.

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