EVALUATING THE IMPACT OF ENVIRONMENTAL IMPROVEMENTS

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Daar is 'n behoefte aan metodes om beoogde relatiewe kleinskaal publieke sektor omgewingsverbeteringskemas te evalueer. Tradisionele evalueringstegnieke van projekte is nie geskik vir hierdie doel nie want inter alia *is hulle tydrowend en duur om toe te pas op klein- en mediumgrootte projekte. Hierdie artikel beskryf en evalueer 'n eksperimentele stedelike ontwerp projek onderneem deur die Johannesburg Stadsraad se Beplanningsdepartement in 'n hoë digtheid residensiële gebied. Die projek is drie jaar na implementering geëvalueer deur 'n tegniek gebaseer op 'n "Value Engineering" benadering. Die gevolgtrekking is dat die projek wel die moeite werd was. Die tegniek is geskik om hierdie tipe skema te evalueer in die beplanningstadium sowel as na implementering.*

There is a need for methods to evaluate relatively small-scale potential public sector environmental improvement schemes. The traditional plan evaluation techniques are not suitable for this role because, inter alia *they are too laborious and costly to be used for small and medium sized projects. This paper describes and evaluates an experimental urban design project undertaken by the Johannesburg City Council Planning Department in a high density residential area. The project was evaluated three years after implementation using a technique based on a value engineering approach. The paper concludes that the project was worthwhile and that the technique is appropriate for evaluating this kind of scheme, both at the planning stage and after implementation.*

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The authors wish to acknowledge the co-operation of the technical departments of the Johannesburg City Council.

The Johannesburg City Council's Planning Department has, for many years, been committed to identifying and intervening in urban areas where pressure for change is occurring. Inevitably this pressure has threatened existing environmental standards and repercussions have been felt by the community and the local economy. In order to protect the existing order while simultaneously allowing for positive change certain, not always conventional, planning actions have been taken. These actions have necessitated the spending of public funds and therefore their implementation has had to be justified in terms of the anticipated consequences of the actions. Further, as in any public authority, the Johannesburg Planning Department always has more urban design projects than resources available to implement them.

Often the projects are widely different in their aims and selecting between such projects is difficult. In 1973, Peters (1973:11) said: ". . . it is evident that a large part of public spending is voted on the basis of hunch, guesswork, horse trading or barely concealed electoral calculations". There is, unfortunately, nothing in the literature to suggest that things are much different today. In fact, the question of evaluation of planning projects has after extensive coverage in the 1960s and 1970s been neglected in the literature in the past decade, despite the fact that it has not been satisfactorily resolved.

In the past a number of techniques have been suggested to evaluate planning projects in a rational way. Probably the best-known and the most widely used of these techniques are social cost-benefit analysis, planning balance sheet analysis, the check-list of criteria approach and the goals achievement matrix. This paper argues that the acknowledged techniques are inappropriate for evaluating the kinds of urban design schemes with which a municipal planning department is mainly concerned. They have not been rejected because they are inherently inferior, in fact, the approach discussed in this paper borrows substantially from them. It is, however, contended that they are inappropriate for three main reasons.

- Firstly, most existing techniques try to identify "costs and benefits" which implies considerable subjectivity in the evaluation as these terms only have meaning when considered from a particular point of view. The approaches also all aim at achieving a way of aggregating and summing the data found in the evaluation so as to reach a conclusion about which is the "best" scheme so that the evaluators can make recommendations. The method described here is aimed at avoiding this dubious approach. It is believed that it is the job of the planner and his team to describe the anticipated (or de facto) impact of proposals on as many criteria as practical and to present their findings in a clear way without attaching value judgements to the

likely consequences of the schemes: it is the prerogative of the decision-taker to draw his own conclusions from the data and to take his decision on each project according to whatever criteria he wishes.

- Secondly, as Lichfield (1975:xvii) indicates in his comparison of the various evaluation techniques, the techniques were developed to deal with evaluation in the plan-making process and not for assessing the performance of a plan during or after implementation.
- Thirdly, the accepted techniques were developed to deal with the evaluation of very large-scale projects such as a third airport for London, regional transportation schemes and major changes in land use. For projects of this nature it is clearly warranted to spend much time and money on evaluating possible economic, social and political consequences of alternative proposals for the same scheme as well as to try to ascertain the merits of the scheme as a whole compared to other entirely different public projects since the costs of proceeding with major schemes of this nature are high. However, this paper is not concerned with the broader decisions of how the State allocates money to major schemes, or even with how a Council allocates money to an Urban Planning Branch: its interest is to be able to describe and evaluate schemes prepared by a Branch in such a way that the decision-takers can see what the consequences of proceeding with particular schemes are likely to be and, after implementation, can see what the consequences were. These comprehensive techniques are too costly, complex, and time-consuming to be warranted for relatively small schemes such as those which originate within a single municipal department.

This paper describes an alternative technique, based on a value engineering approach. The technique is illustrated in this paper by a detailed description of an urban design project in Johannesburg. The aim here is to identify and define the costs and the impacts of such a project in such a way that these factors can be used to generate a model against which other schemes, both completed and proposed, can be evaluated. The evaluation technique described is not limited to any one kind of project and has in practice also been successfully used under different circumstances.

THE HILLBROW PILOT STUDY

Hillbrow is one of the major high rise apartment complexes in South Africa. It is also one of the most accessible

FIGURE 1 *A view of Hillbrow*

With between 300 and 500 persons per hectare Hillbrow is one of the most densely populated residential areas in South Africa.

parts of Johannesburg from a public transport point of view. It is close to central Johannesburg and has a number of important through routes which present a conflict between traffic movement and the needs of residential areas.

A study of the Hillbrow area was undertaken early in 1980 because it was perceived to be deteriorating and it was feared that it could degenerate into a slum if remedial action was not taken.

A sociological study was conducted to quantify certain problems inherent in the area as well as to identify specific issues as perceived by the residents themselves. Arising from this study the following problems were highlighted: safety, pollution and lack of a sense of identity.

In response to the specific needs of the community the following goals were proposed:

(i) to increase personal security and to reduce the incidence of undesirable behaviour as far as possible;
(ii) to provide adequate parking and to reduce indiscriminate vehicular movement through the area;
(iii) to improve the quality of the public environment thereby providing a greater sense of identity and a relief from urban pressures.

To achieve these goals a traffic circulation plan aimed at discouraging extraneous traffic and concentrating through traffic on major arterial routes, was drawn up. This allowed for the creation of conditions more conducive to residential privacy in the "freed streets" and the identification of "residential precincts". Although a number of projects were identified implementation of the strategy was initially restricted to one area. The area selected for the pilot study was chosen because of its inherent good quality, well-treed environment and the opportunities it presented for the implementation of the 'residential precinct' concept.

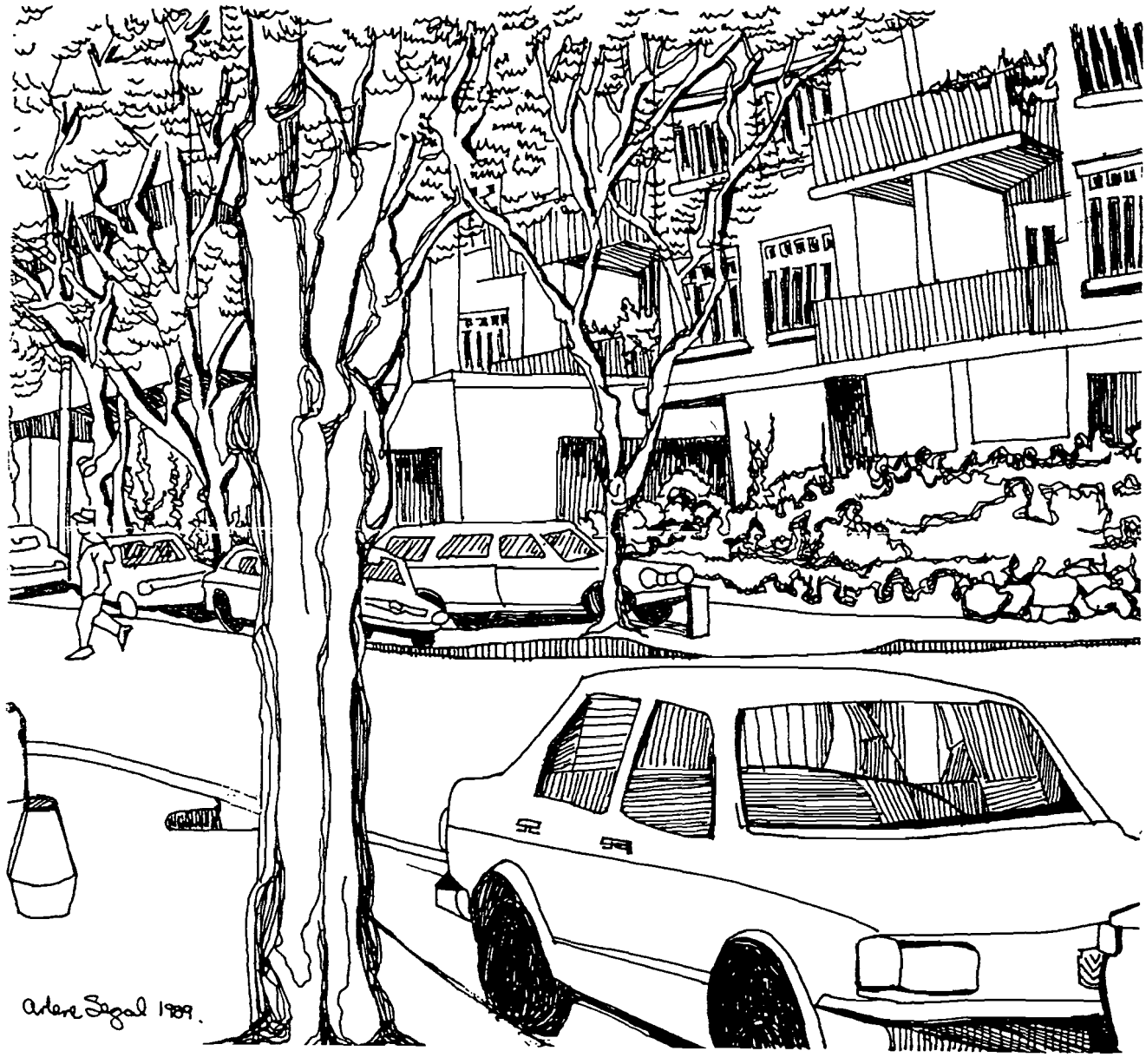

FIGURE 2 *Hillbrow Pilot Study Area: Before*

Problems that were highlighted: lack of security, inadequate parking, pollution, indiscriminate vehicular movement through the area and lack of a sense of identity.

The pilot study area is on the north west boundary of Hillbrow and is 3,759ha in extent. It is bounded by Clarendon Place to the west, Claim Street to the east, Bruce Street to the south and Jager Street to the north. In 1984 it had 1 850 residents living in apartment blocks and residential hotels. The only non-residential building in the area was a synagogue.

The concept plan for upgrading the environment within this precinct was aimed at the following:

- redefining the relationship between the public and private areas by introducing planting, lighting, and seating, and creating a semi-public space outside each residential block;
- limiting undesirable activities and traffic which did not belong in the area through the introduction of two loop roads to slow traffic down and inhibit their use as through routes;
- providing additional parking and easy access for residents;
- strengthening the image of the precinct by emphasising its boundaries and highlighting its entrances and exits through narrowing down the roads at these points and demarcating the points of access by the planting of trees. This reinforces the sense of entering a semi-private precinct;
- providing two focal points.

THE VALUE ENGINEERING APPROACH

In the evaluation of a scheme it is necessary to identify the critical factors to be considered and their effects. The first stage of this approach is therefore to identify and quantify as many of the inputs and effects as can be readily defined. It is important to keep the data concerning the project as objective as possible: Designating inputs and effects as "costs" or "benefits" is specifically avoided, even though most of them could be so designated. These terms imply that proposals be considered from a particular viewpoint and hence the person undertaking the study would be required to make value judgements. It is

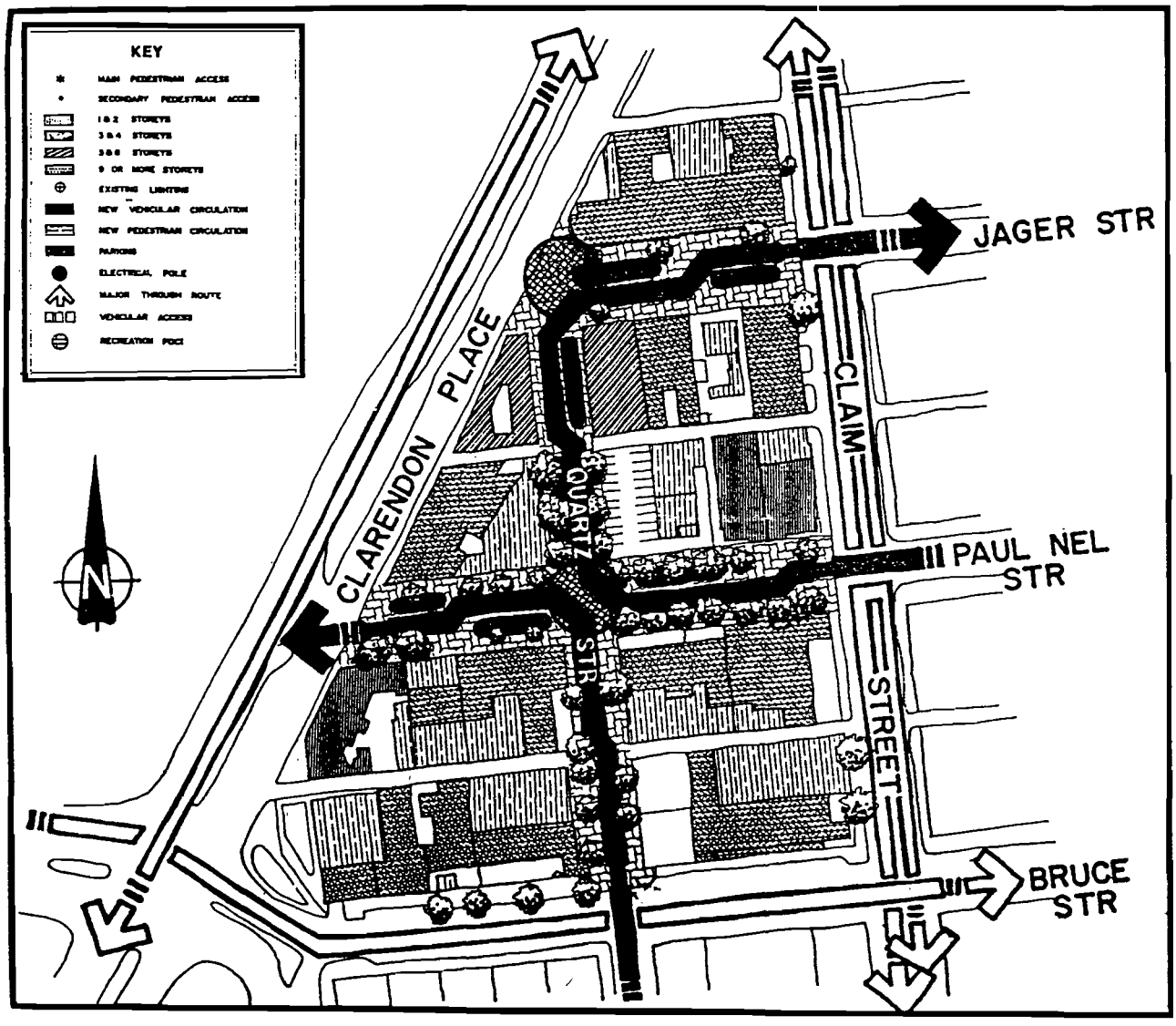

FIGURE 3 *Hillbrow Pilot Study Area: Concept Plan*

Inhibit vehicular through movement by two loop roads, provide additional parking, highlight entrances and exits by road narrowing and planting, widen sidewalks to encourage pedestrian dominance and perception of a semi-private precinct.

believed that it is the prerogative and the duty of the people designated to take the ultimate decisions as to whether or not the project should go ahead to supply their own value judgements. It is also important to restrict the parameters adopted for evaluation and data to be collected to include only relevant and direct factors as the scale of projects for which this technique was devised does not warrant extensive and in consequence expensive analysis.

Once the data has been collected each aspect is looked at with reference to a norm appropriate to the aspect itself. The approach is a "value engineering" one where the data is rated on a scale from 0 to 10. If a project is being evaluated at the planning stage there should be three sets of ratings – the rating before intervention, the anticipated rating after an appropriate time period with no intervention and the anticipated rating after the planned intervention. The construction of appropriate scales will vary from time to time and from place to place but should be consistent for any group of projects being compared. An "Impact Chart" is then constructed on which these ratings can be drawn graphically so that the results for each project can be seen at a glance. Finally the data is evaluated.

This approach could be compared to the 'planning balance sheet' approach first proposed by Nathaniel Lichfield in 1956 (Lichfield 1956). The major difference is, however, that he advocated analysing all costs and benefits in a very elaborate way whereas the emphasis in this approach is on simplicity: it allows for educated guesses and for clear distinctions to be made between hard data and guesswork.

The criteria used and effects vary according to the type of scheme being considered. Issues vital to one scheme may be irrelevant in another so the data collected will differ from project to project. In the case of the Hillbrow Pilot Study Project planning, environmental and social criteria were considered in addition to the financial/economic criteria. The selection of the criteria considered in the Hillbrow example was loosely based on the "priority evaluation formula" devised by the authorities in Minneapolis, Minnesota as described by the American Society of Planning Officials (1977:9).

The idea of the formula is that each project is evaluated and scored in a range 0 – 50 on 14 separate points. The scores are then added and the project with the highest total score is accorded the highest priority. The points considered by Minneapolis are: goals and objectives, standards and criteria; service limits; environmental quality; quality of life; special need; health, safety and general welfare; service distribution; economic development; public benefit; cost effectiveness; commitment; coordination; and neighbourhood involvement.

The data given in the example which follows is all factual and is based on the situation as assessed three years after the implementation of the project.

THE IMPACT OF THE HILLBROW PILOT STUDY

Considerations of confidentiality and space preclude detailing all of the calculations for each of the aspects considered. The information given below describes the scales used to draw up the "Urban Design Impact Chart" shown on Figure 5 and how the Hillbrow study area rated in relation to these scales at the planning stage and three years after implementation.

The project was evaluated in terms of 13 criteria in addition to capital cost. For each criterion a scale from 0 to 10 was constructed with the value of 5 being assigned to the average situation for Johannesburg as a whole or for the wider Hillbrow area, whichever seemed most appropriate.

Planning Criteria

Planning criteria were evaluated under three main headings viz. relation to planning goals; relation to current standards; and service standards.

Relation to planning goals – The Johannesburg City Council Planning Department has clear planning goals and the area was evaluated before intervention as falling short of these goals in several important respects yet it was about average for Johannesburg and thus the planning stage score was assessed at 5. Obviously, after implementation the area was considerably improved in this respect. After implementation this criterion was scored at 8 where a score of 10 would imply perfect harmony with municipal planning goals.

Relation to current construction standards – As in the case of planning goals, the Johannesburg Municipality

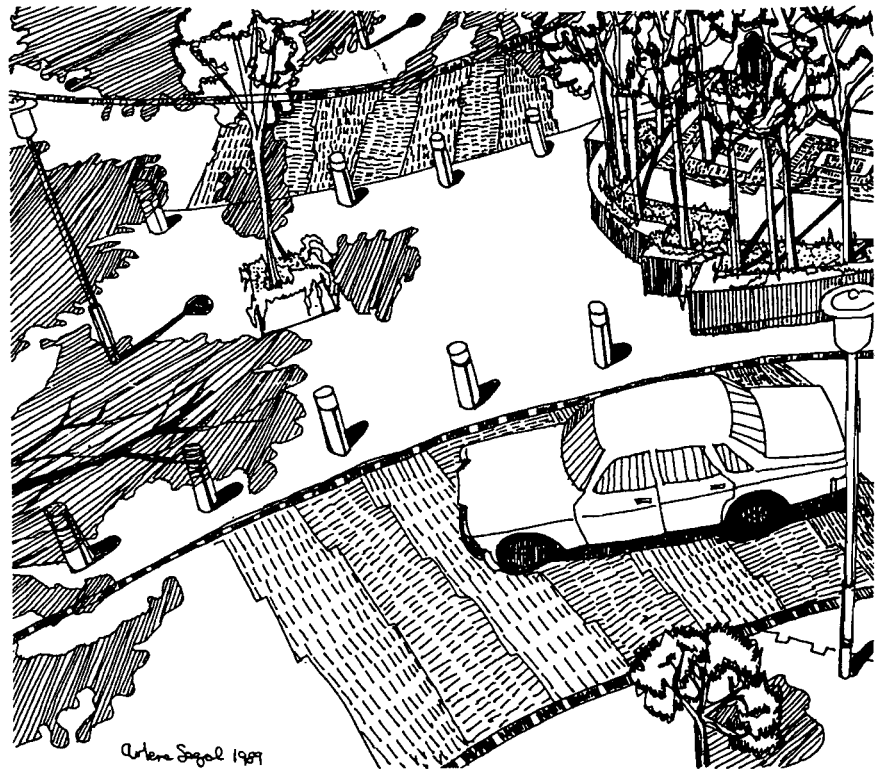

FIGURE 4 *Hillbrow Pilot Study Area: After*

Improved environmental quality with better planting, lighting, and seating, and a greater sense of identity and relief from urban pressures.

has standards to which new developments are constructed. These change over time and older areas such as Hillbrow invariably fall short of current standards which is why continuous upgrading of older urban areas takes place. The aspects considered under this heading included: road and pavement surfacing materials, street plantings and street furniture. The study area was again found to be about average at the planning stage. The value 10 was assigned to the highest standards found in any part of the town and after implementation the pilot study was scored at 8.

Service standards - This heading refers to frequency of refuse removal and street cleaning, illumination levels, type of sewerage disposal etc. Each aspect of these services was looked at. As in the case of construction standards, the value 10 was assigned to the highest standard of servicing in the city. The study area rated above average with a score of 7 at the planning stage and 9 after implementation. (Note that if relevant the results could be individually shown for each aspect of servicing but as service standards were not a problem in the study area the individual results have been aggregated.)

Environmental Criteria

Five environmental criteria were evaluated: overall environmental quality; crime; vagrancy; traffic; and litter.

Overall environmental quality – A subjective assessment was made by planning officials. As one of the criteria on which the pilot study area was selected was that it had a good quality environment it is not surprising that the planning stage evaluation was 6. After implementation overall environmental quality was further improved to a value of 8 on a scale where the value of 10 was assigned to one of the highest income residential areas.

Crime – Precise data on crime is not available because crime statistics are only kept by the police for Hillbrow as a whole. For Hillbrow as a whole the crime rate was and is average relative to other residential neighbourhoods on a per capita basis. Thus the planning stage evaluation was a score of 5. In the opinion of the head of the local police station there was a marked reduction in crime in the study area after upgrading because the residents were "jealous of their place" and thus maintained surveillance of their "territory". Where 10 represents half the average crime rate for a Johannesburg residential suburb the study area was rated 8 after implementation.

Vagrancy – Hillbrow as a whole experiences a problem of vagrancy and the Pilot Study Area is no exception. It is the opinion of residents and property owners that the upgrading increased the area's attractiveness to vagrants. When residents' have expressed any dissatisfaction with the scheme the increased presence of vagrants was almost always the reason. The problem was particularly noticeable immediately after implementation and the Council was obliged to remove some benches that were being used as beds by vagrants. Increased numbers of vagrants seem to have been attracted to the area by a soup kitchen which was started at the synagogue subsequent to the implementation of the project but it seems probable that the upgrading did encourage them to remain rather than moving back to their previous haunts. The planning stage score was again the average 5 but the post implementation score dropped to 3 even after the removal of the benches. A score of 0 would imply that vagrants were conspicuously present in the area day and night.

Traffic – The upgrading scheme made considerable changes to the road network. A one way system with narrower roads and loops at the main intersections was designed to slow down vehicles and inhibit through driving. There was a marked reduction in vehicle collisions after implementation. In 1985 there were 16 collisions in the area and in 1987 there was only 1. At the planning stage the area was assessed at 3 which reflected an accident rate well above average for Johannesburg residential areas. After implementation the score was 9 where 10 is the ideal of no accidents.

Litter – At the planning stage litter was not a particular problem. Again a value of 5 was assigned. After implementation residents complained about increased litter (which they associated with the vagrants in the area) but, according to the Cleansing Branch of the Council, there was a decrease in the generation of litter since implementation. Their view was that the litter became more conspicuous because of the generally improved appearance of the area. This problem was subsequently solved by increasing the frequency of street cleaning. There was no additional cost involved in the more frequent cleaning because the man-hours spent on street cleaning did not increase. A rating of 10 would imply litter is rarely seen on the streets and on this scale the post-implementation score was 8.

Note that many other environmental criteria could have been evaluated if they were relevant. Two important criteria, noise and air pollution, not evaluated in the Hillbrow study are mentioned below.

Noise – In this particular case an evaluation of noise levels was not considered important because noise was not identified as a problem at the planning stage and the improvement project did not specifically have any noise-related goals. Consequently, no decibel readings were taken before implementation. However, there was probably an improvement in noise levels as a consequence of a smaller volume of through traffic.

Air pollution – As with noise, this aspect was not considered in this study though it almost certainly would have been found to be lower because of the lower volume of traffic through the area. Objective measurement standards could have easily been obtained if necessary.

Social Criteria

Only two criteria: residential migration and acceptability of proposals were evaluted.

Residential migration – This criteria is a measure of the "success" of an area. A score of 10 would imply that there are no vacant dwellings and some buildings have waiting lists. At the planning stage the area had above average occupancy rates and relatively low tenant turnover. It was scored at 8. Following implementation the situation deteriorated but the deterioration could not be attributed to the scheme as two important external factors had important impacts. Firstly, the prolonged recession and associated net emigration from the country reduced the demand from whites for Hillbrow-type flats accommodation and, second-

ly, the influx of blacks into the area increased the demand for the smaller and cheaper units by blacks. The letting agent for one of the buildings still occupied exclusively by white tenants claimed that although vacancies in his building were higher three years after implementation than at the planning stage they were lower than in other buildings he administers in other parts of Hillbrow and that the building was able to attract and keep "a better class of tenants" since the upgrading. The property owners accepting black tenants reported increased occupancy but this was in no way related to the environmental upgrading. After implementation the area was scored at 7.

Acceptability of scheme – At the planning stage there was mild discontent from residents with the state of their area and this aspect was scored at 4. (For this criteria the rating at the planning stage refers to the acceptability of the status quo not the acceptability of the improvement proposals.)

The scale ranges from 0 being vociferous local objections to 10 being widespread public support with 5 being neutrality. From conversations with residents three years after implementation there is no doubt that the scheme as a whole is enthusiastically supported. Even people with specific grumbles preferred the upgraded situation to the situation before intervention. At the time the scheme was proposed the population was as enthusiastic. The scheme was rated 9 after implementation.

A criterion frequently of importance in planning projects is whether or not they achieve goals related to helping special groups such as the elderly or unemployed. It was not a specific aim of this scheme to help any particular group of under-privileged people so this aspect was not measured. However, the residents of Hillbrow include a higher than average proportion of retired people so if this aspect had been measured it would probably also have yielded a positive result.

Financial/Economic Criteria

In addition to capital costs and annual upkeep costs, rateable values and the amount of private investment attracted to the area were considered.

Capital costs – Capital costs of projects need to be looked at in absolute as well as relative terms. Ideally one would want to compare capital expenditure on projects of this kind with per capita expenditure on similar projects. However, this project was the first in Johannesburg to be analysed in this way so comparative data was not available and the capital expenditure had to be looked at in other ways. The total capital cost of the Hillbrow Pilot Study Project was R400 000. This was equivalent to R216 per head of the population resident in the area at the time of implementation. The total capital expenditure by the Johannesburg City Planning Department in the 1984/5 fiscal year was R7,93 million. The project thus cost 5,1% of the year's budget. The people affected by the project comprised about 1,4% of Johannesburg's population at the time. This information shows that the capital expenditure on the Hillbrow project was relatively modest and benefitted a significant proportion of the city's population. It is probable that, because of the high population density of the area involved, it would compare favourably with similar projects in other areas. This is the one criterion that does not have separate values for planning stage and post implementation but it can still be plotted on the chart. A scale with the average given a rating of 5 and 0 and 10 being respectively the most and least expensive projects undertaken by the department would be desirable. In the absence of this data a scale where 0 was double or more and 10 half or less than the average capital spending per head on similar projects was thus used. On this scale the rating given to the Hillbrow Pilot Study project is 5. This figure is intended to reflect the opinion that capital costs are modest and, if anything, lower per capita than for similar schemes in other areas as discussed above. It should not be read as an actual calculated value.

Annual costs – A number of annual costs changed as a consequence of the project. For example, electricity consumption was increased because the number of street lights and their light intensity were increased. Similarly, additional street planting involved more time in maintaining the plants, more plant replacement costs and higher water usage during dry seasons. The introduction of more durable finishes to the roads and pavements and the diversion of traffic to other areas led to a reduction in the annual cost of maintaining these surfaces. Other costs did not change. For example, the cost of street cleaning was unchanged as discussed above. Unfortunately, because these costs were not all analysed at the planning stage and because the Departments concerned include the Pilot Study Area with the rest of Hillbrow in their financial data, it has not been possible to accurately quantify all of the changes in running costs. However, the authors estimate that the net result of all the changes is that the annual cost of providing municipal services to the area is now about 20% higher than it would have been if the project had not been implemented. Estimated costs after implementation are rated in relation to the estimated costs, assuming no intervention (which is the average cost per resident for similar services in Hillbrow as a whole) and the scale values used are as above i.e. 0 is double or more and 10 is half or less than the cost of similar services in an unimproved area of Hillbrow. Whereas at the planning stage annual costs were average for the areas and thus rated at 5, after implementation they were rated at 4.

Rateable values – At the planning stage the rateable values were average for the Hillbrow area and thus given a value of 5. The land values in the area were not re-assessed by the Municipality subsequent to the project's implementation but improvement values were re-assessed. It was found that six of the eleven buildings fronting on to the upgraded streets had increased in value and the five others had declined in value. The rateable value of the 11 buildings together increased by 25,4% between 1984 and 1988. The rateable value of 56 properties in the blocks surrounding the Pilot Study Area but not directly affected by the scheme decreased by 3% in the same period. This aspect is rated on a scale where 0 and 10 represent values decreasing or increasing respectively by 10 per cent per annum relative to the average for the suburb as a whole. On this scale the situation after implementation was rated at 8½.

Private investment – At the planning stage there was very little investment in the study area so this aspect was rated

3 on a scale ranging from 0 representing no new investment or disinvestment (i.e. abandonment of buildings) to 10 representing all property owners adding value. It was found that five of the property owners in the area had improved their properties since the implementation of the scheme. One of the improvements involved investment of more than R1m. Another property owner wanted to improve his buildings but was not able to obtain bond finance. These investments obviously influenced the rateable values discussed above but because this is a specific indicator of planning success it was considered separately as well. The developer responsible for the largest investment claimed that the particular building was chosen from several in Hillbrow owned by the same people because it was felt that the environmental upgrading undertaken by the Council would give the particular building a better chance of success. This data was interpreted to give the situation after implementation a rating of 7. (A similar situation has been experienced in Durban's Beach and City Improvement Programme. The private sector responded to the, still incomplete, Council initiatives on the beachfront by carrying out new developments and improvements to twice the value of the Council's investment by 1988. (Durban 1987-88)

THE URBAN DESIGN IMPACT CHART

Figure 5 is an "Urban Design Impact Chart" for the Hillbrow Pilot Study project. The chart lists the criteria against which the scheme has been evaluated and, against each criterion, three plots representing: the situation at planning stage; the estimated situation three years later if the project had not been undertaken; and the situation that was found three years after implementation.

The differences between the plots against a particular criterion indicate a change in the circumstances. This change is negative if the later plot is below the planning stage plot and positive if it is above it. The mid point on the chart (5) is intended to represent the "average" situation for any aspect.

Figure 5 shows that the area was at or below average on most criteria before project implementation and thus was in line for some upgrading. The estimated situation after three years with no intervention was expected to be worse in most respects. (Comparison with other parts of Hillbrow where there was no intervention indicate that this was a realistic expectation.) It is clear that this scheme had impacts on many levels and that most of these impacts were favourable. The only apparent negative impact of the scheme was that it increased the area's attractiveness to vagrants. In relation to both the situation before intervention and the anticipated situation without intervention the improvement appears to have been significant.

It can also be seen from Figure 5 that the costs with respect to these improvements were somewhat higher annual costs for providing municipal services and that the capital cost of this scheme was below average.

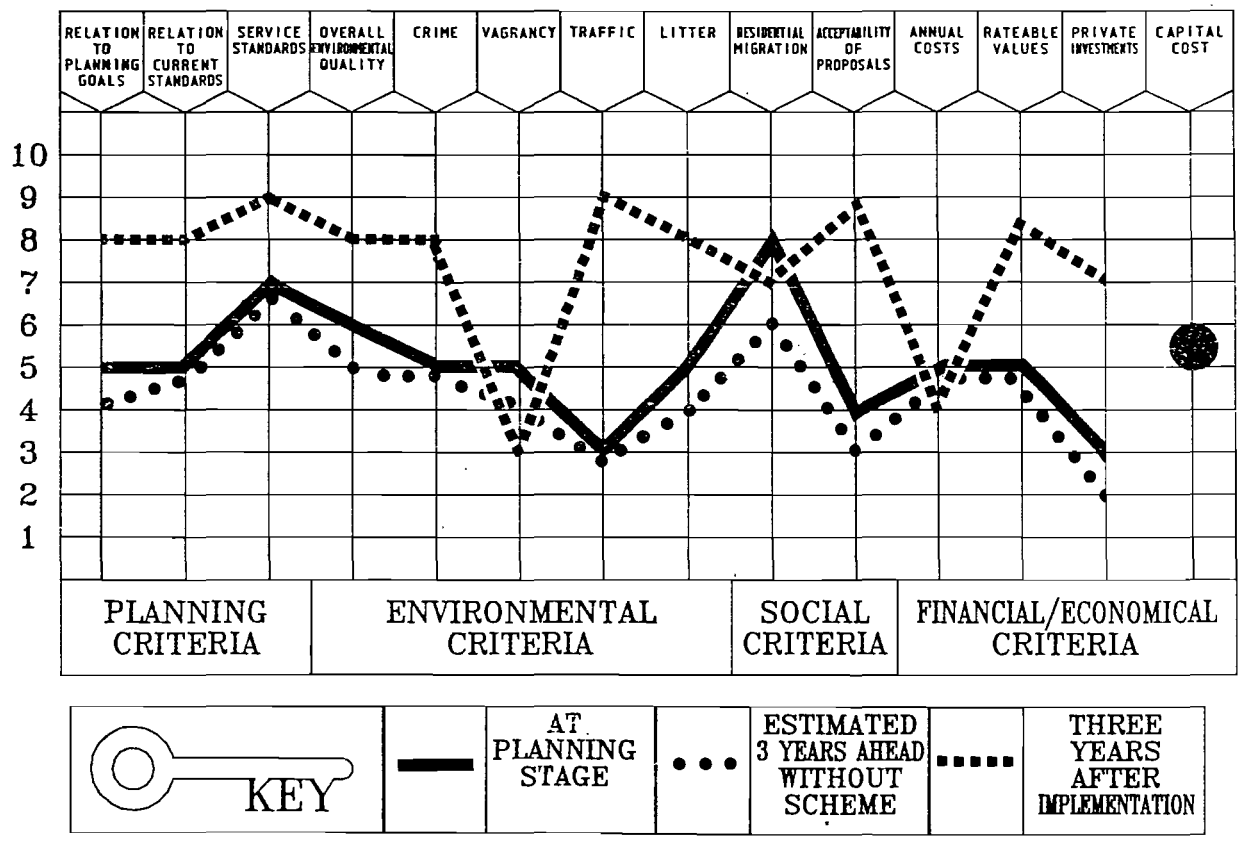

FIGURE 5 *Hillbrow Pilot Study Area: Urban Design Impact Chart*

The area was at or below average on most criteria before project implementation and was expected to deteriorate. After implementation there was a very marked improvement.

The Wider Impact

For anything to be considered to have had an impact on the community at large it must have positively affected the overall welfare of the community – not just shifted advantages from one place or section of the community to another. It has been contended that town planning merely redistributes benefits (Lean & Goodall, 1966:252-3).

However, the authors do not agree that this is always the case. It is believed that, in upgrading an area by improving the environment the local authority was instrumental in arresting the otherwise inevitable deterioration of the area and thereby saving at least some of the buildings in the area from eventual demolition. As mentioned above, identified private investment aimed at improving existing buildings in the upgraded area exceeded the amount invested by the Municipality by at least a factor of five in the three years after the project was initiated. When it is borne in mind that prior to implementation Hillbrow as a whole was widely acknowledged to be deteriorating and some owners of individual flats were abandoning their properties this seems to indicate an important benefit.

This method of analysis has not attempted to consider issues beyond the immediate case study but there is considerable evidence in the literature to warrant the belief that the benefits of selected intervention through the upgrading of older urban areas extend beyond the specific case to the community at large. As former British Environment Minister, Michael Heseltine, pointed out: "The less we do to reverse the decline of urban stress the faster the frontiers of that stress will spread." (Heseltine, 1986). Undoubtedly the Hillbrow Pilot Study Project has contributed to "reversing the decline of urban stress" and it is possible, therefore, that this project will have wider beneficial effects even though these may not be directly traceable.

According to Broadbent (1977:235) a public investment is worth supporting on economic grounds if some people gain and no-one loses or if the gainers can compensate the losers. In this scheme there seem to have been 1 850 residents who experienced gains in environmental quality and no apparent losers. Even if there is doubt about the project's economic merit, social benefits should not be ignored as Swanson (1987:106) notes: "Political realists argue that decisions in the public sector . . . are made on the basis of political rationality . . . Economic efficiency is only one value . . . which must be taken into account through the political process." From the response of those interviewed it is clear that politically this scheme was popular, not only with the area's residents and political representatives but also with residents of other areas who asked the Council to implement similar schemes in their own areas.

CONCLUSION

The value engineering approach used to evaluate the Hillbrow project was a simple, low cost, exercise which provided a wealth of information in a way in which the impact of intervention could be evaluated and graphically presented. The technique is readily adaptable to assess different criteria relevant to particular projects and it enables easy comparisons to be made between different projects. When used at the planning stage of projects it can be a useful tool in presenting information to decision-takers and it provides clear, measurable, targets against which to evaluate projects after implementation.

This technique allows decision-takers to weigh-up the value of the benefits promised by a scheme against the costs of implementing and maintaining them. "Impact charts" can show at a glance if there is expected to be a marked increase in running costs after implementation or if the capital cost per resident (or per unit of area or whatever other measure the decision-takers assume in the evaluation) is out of line with other projects already implemented or under consideration. Only the decision-takers can and must decide if they can afford the project and if they think it offers sufficient value to them in terms of their own goals. This technique clarifies issues in terms of the values attributed and facilitates objective evaluation of proposals.

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