

FROM RED TO GREEN, GREEN TO AMBER, AND BACK TO RED: A CRITIQUE OF SOUTH AFRICAN LAYOUT PLANNING

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A document providing layout planning and engineering service guidelines, which has become known as the "red book", was recently prepared by the CSIR and issued by the Department of National Housing. The guidelines in the "red book" relating to layout planning are based upon: (1) erroneous assumptions around levels of car ownership, fiscal resources, the anticipation of road functions and the functional linkages of households, (2) a narrow set of concerns around motor car access, pedestrian safety and the creation of spatially defined communities, and (3) inappropriate layout planning concepts in the form of neighbourhood cells, functional road hierarchies and closed road geometries. The current South African context necessitates a reformulation of these guidelines. As the metaphorical title of the paper suggests, the "red book" has not changed considerably from its preceding "blue" and "green"

books, and concerns relating to traffic remain paramount. There is a need for layout planning guidelines which prioritise place making, public transport and pedestrian access, the integration of urban environments, the facilitation of economic opportunity, and a more collective and systemic approach to facility and service provision.

'n Dokument wat riglyne vir uitlegbeplanning en ingenieursdienste verskaf, genaamd die "rooi boek", is onlangs deur die WNNR opgestel en deur die Departement van Nasionale Behuising uitgegee. Die uitlegbeplanningriglyne in die "rooi boek" is op: (1) verkeerde veronderstellings oor motoreienaarskap, fisikaal bronne, padgebruik en die funksionele verbindings van huisgesinne, (2) enge besorgdhede aangaande motortoegang,

voetgangerveiligheid en die skepping van geografies gedefinieerde gemeenskappe, asook (3) misplaasde uitlegbeplanning idees in die vorm van gemeenskapselle, funksionele padhierarchy en geslote padgeometrie, gebaseer. Die huidige Suid-Afrikaanse konteks maak dit noodsaaklik om hierdie riglyne te herformuleer. Soos die titel van hierdie artikel impliseer, het die "rooi boek" nie baie van sy twee voorgangers, die sogenaamde "blou" en "groen" boeke, verskil nie, en aangeleenthede rondom padverkeer bly te hoog op die agenda. Wat dringend benodig word, is riglyne vir uitlegbeplanning wat prioriteit gee aan die skepping van menslike publieke omgewings, publieke vervoer en voetgangertoegang, die skepping van ekonomiese geleenthede, en 'n meer kollektiewe en sistematiese benadering tot die lewering van fasiliteite en dienste.

1 INTRODUCTION

In 1994, a document entitled "Guidelines for the Provision of Engineering Services and Amenities in Residential Township Development" was released by the Division of Building Technology of the CSIR, on behalf of the Department of National Housing and the National Housing Board (DNH 1994). The so-called "red book" combines the guidelines of the previous "blue" and "green books" into a single document (DCD 1983, DDA 1988). The red book guidelines are concerned with stormwater management, road design, water supply, sanitation, solid waste management, and with the focus of this paper, layout planning¹. As a document issued by the Department of National Housing and endorsed by the White Paper

on housing, the red book represents official government opinion on layout and infrastructure planning, and as such will have a significant impact on the nature and quality of environments that develop in South African urban areas (RSA 1994:63).

This paper provides a critique of the layout planning guidelines presented in the red book. It is understood that the red book is intended to be a dynamic document, to be amended as local contexts and technologies change (Schlotfeldt 1995). It is argued in this paper that the current South African urban planning context necessitates a rethinking of the layout concepts that are promoted in the red book. The paper begins by offering a set of normative concerns appropriate to guiding layout planning in the South

African context, it follows by outlining the origins of, and assumptions underlying, prevailing layout planning concepts, it then provides a critique of these concepts on the basis of the normative concerns presented, and finally it promotes an alternative conceptual approach to layout planning in the South African context². The approach promoted is drawn from a document prepared by the Urban Problems Research Unit for the Community and Urban Services Support Project (CUSSP), entitled "Layout Planning Handbook: Principles and Guidelines for the Preparation of Layout Plans in the Developing Urban Areas of South Africa" (Behrens and Watson 1995). The permission of CUSSP to use the information and concepts presented in this document is acknowledged.

2 NORMATIVE CONCERNS

Normative concerns in layout planning have tended to change as technological innovation, rates of urbanisation, economic growth, and environmental destruction have altered the context within which urban development occurs. It is argued that within the current South African context, where levels of poverty, unemployment and spatial inequality have reached alarming proportions, the development and management of urban settlements generally, should be guided by three overarching concerns: the satisfaction of human needs, establishing a sustainable relationship between urban settlements and their surrounding natural environment, and the most efficient use of resources.

Within these overarching concerns it is argued that, more specifically, layout planning should be guided by the following concerns: (1) place making - a concern for creating urban environments that reflect a sense of place, express the unique nature of their natural and cultural setting, and invoke a *sense of belonging*, (2) scale - a concern for designing the heights, widths, distances, surfacings and operations of the various elements of a layout plan, from the perspective of the convenience, safety and comfort of the person on foot, (3) access - a concern for matching the circulation needs of end-user communities, and ensuring that levels of access are maximised for the greatest number of people, (4) opportunity - a concern for maximising the economic opportunities that are inherent in large agglomerations of people, by creating the necessary spatial pre-conditions for viable small commercial enterprises and informal street trading, (5) efficiency - a concern for planning the utilisation of land and the provision of services, facilities and amenities in an efficient and systemic manner, and (6) choice - a concern for maximising the choices available to end-user communities regarding housing consolidation, service provision, urban surroundings, movement modes and so on, in order to meet a diverse range of household needs.

In short, layout planning should be guided by a concern to create places³ that are enriching, sustainable and

convenient, providing opportunities and choices to inhabitants, in a way that makes efficient use of limited resources. The concern should not be to simply optimize the provision of infrastructure sectorally, but to ensure that together these infrastructural elements operate in a developmental and systemic way - this frequently necessitates trade-offs and sometimes even technical inefficiencies. It is often less the nature of infrastructure provided, than how the infrastructure provided is arranged in space, that initiates the development of enriching urban places. It is in this regard that layout planning concepts, which form the focus of the remainder of this paper, are critically important.

3 CURRENT LAYOUT PLANNING CONCEPTS

The layout planning concepts that, with a limited number of exceptions, currently inform layout planning practice in South Africa, are examined in terms of their conceptual approach, origins and underlying assumptions.

3.1 South African Guidelines

The conceptual approach to layout planning expressed in the red book, is discussed in terms of how it addresses what have, over the last hundred years of modern town planning, conventionally been regarded as the basic tasks of layout planning: creating environmental quality, facilitating circulation, and facilitating facility, amenity and utility service provision. These tasks provide a useful framework for description and analysis.

3.1.1 Environmental Quality

With regard to the task of creating quality urban environments, the current layout planning guidelines are concerned mainly with the aesthetics of the streetscape. The guidelines attempt to promote street aesthetics by creating visual interest through curvilinear road alignments, promoting the creation of quiet residential areas without extraneous traffic, and recommending that the road layout, dwelling units, public spaces, landscaping and engineering services, are designed as

an integrated concept.

3.1.2 Circulation

With regard to the task of facilitating circulation, the current layout planning guidelines are concerned mainly with enabling uninterrupted flows of vehicular traffic on arterial roads, and for minimising accidents involving pedestrians and motorists - especially on residential access roads. The guidelines promote the functional efficiency of arterial routes and minimise the opportunity for conflict in the following ways. Firstly, by establishing a strict road hierarchy which classifies roads according to function and traffic distribution. Long distance, high speed traffic for instance, is confined to higher order roads, while shorter distance, low speed traffic to lower order roads. The hierarchy includes: class 1 trunk roads, class 2 primary distributors, class 3 district distributors, class 4 local distributors, class 5a access collectors, and class 5b-5f access roads. Secondly, by reducing the number of intersections, promoting *three-legged junctions* with fewer conflict points than four-legged junctions, and preventing higher order roads from intersecting with lower order roads. Roads intersect only with roads on a level above or below them in the hierarchy. Thirdly, by limiting extraneous traffic in residential areas. The circulation network combines aspects of open and closed road geometries⁴. Higher road classes form open systems, while lower road classes form closed systems, which prevent extraneous traffic, particularly heavy vehicles, from entering residential areas.

3.1.3 Facility and Amenity Provision

With regard to the task of facilitating facility and amenity provision, the current layout planning guidelines are concerned mainly with convenient access to public facilities by local households, and the use of residential access roads as open space. The guidelines promote access to local facilities by locating public facilities like schools within the centre of "community" or "neighbourhood" cells. These facilities are intended to serve only the residents of the particular

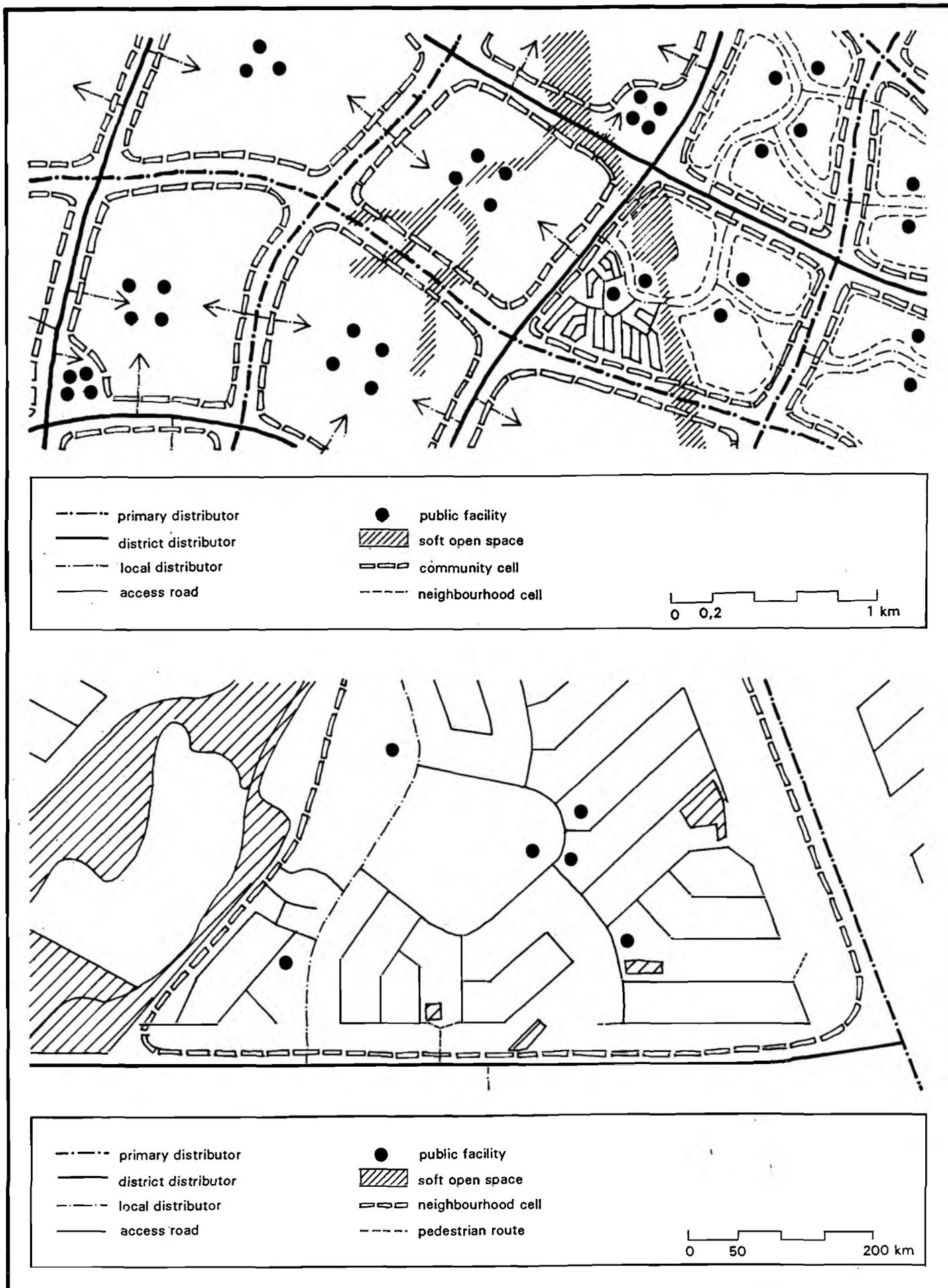


FIGURE 1: Conceptual diagram illustrating the spatial implications of the red book's layout planning guidelines at the sub-metropolitan and local scales. Source: After figures 3.6, 3.7, 5.1 and 6.3 (DNH 1994)

cell. More intensive traffic-generating facilities and commercial services are located at the entrances of community cells, and adjacent to higher order distributors.

3.1.4 Utility Provision

With regard to the task of facilitating utility service provision, the current layout planning guidelines are concerned mainly with the economical provision of roads, stormwater drainage, water, sanitation and solid waste collection services, the functional efficiency of these services, and the protection of public health and safety.

The red book provides a non-prescriptive matrix of service levels, from which appropriate combinations of service technologies can be selected according to site conditions and the ability of end-user communities to pay. Guidelines are therefore provided for a range of service standards, from very low to very high. The guidelines seek to maximise service utility to the individual household. The emphasis in service provision therefore tends towards individualised service connections to residential erven. Other than roads, stormwater drainage and public lighting which are communal by definition, collective provision (in the form of public water standpipes and solid waste collection points) is recommended only as an option in the face of severely restricted resources.

The guidelines promote the derivation of appropriate road reserve widths according to context specific factors, like the nature of reticulation (e.g. mid-block vs. street) or on-street parking requirements, rather than the application of prescriptive width standards.

3.2 Origins of Concepts

The approach to layout planning described above incorporates three main concepts: (1) neighbourhood cells (DNH 1994:3-14), (2) functional road hierarchies (DNH 1994:3-11, 13), and (3) closed road geometries (DNH 1994:3-14, 19). The development of these concepts has, either implicitly or explicitly, been influenced by planning concepts developed

in European and North American cities. The notion of spatially defined communities, or neighbourhood cells, for instance, has been influenced by the “neighbourhood unit” and “planned unit development” concepts, while the notions of a functional road hierarchy and a closed road geometry have been informed by the “environmental area” and “Radburn super-block” concepts. Of these concepts, perhaps the two most influential have been the neighbourhood unit and the environmental area.

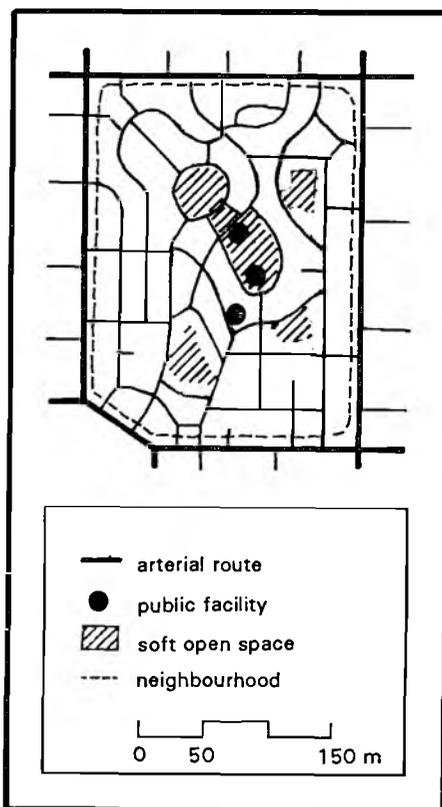


FIGURE 2: Conceptual diagram illustrating the “neighbourhood unit”.

Source: After Perry (1939:58)

3.2.1 Neighbourhood Unit

The neighbourhood unit concept, which to a large extent emanated from Ebenezer Howard’s (1902) “garden city” idea, was developed in the United States in the 1920’s by Clarence Perry (1939). The concept emerged in response to the rapid urbanisation that occurred in American cities

at the turn of the century, and the perception that in this process, the traditional community life of the newly urbanised population was being eroded due to the socially alienating nature of large metropolitan centres. The unit sought to recreate the neighbourliness and community cohesiveness of the small rural town. It was characterised by low residential densities, large expanses of open space, and localised public facilities. The ideal size of a unit was considered to be approximately 10 000 people - based on the population required to support an elementary school.

The primary concerns which motivated the development of the concept were the creation of clearly identifiable, independent social units, and to a lesser extent, the minimisation of conflicts between school children and through-traffic.

The neighbourhood unit has a fairly open road geometry⁵, characterised by a curvilinear street pattern, and enclosing arterial routes. The road layout is designed to protect neighbourhood schools, roads and parks from heavy traffic, by confining through-traffic to the arterial routes on the periphery of the unit. Through-traffic is discouraged from entering the unit by increasing the width (and capacity) of the bordering arterial routes, decreasing the width of internal roads, and adopting curvilinear road alignments.

Public facilities are located within the neighbourhood unit, grouped around a central public open space or common. The playing fields of the elementary school are distributed throughout the unit in order to combine open spaces with housing areas. The inwardly orientated facilities and amenities of the unit are intended to serve only local residents. Unlike public facilities and amenities, shops and services are located at traffic intersections adjacent to other units, and are supported by the residents of more than one neighbourhood unit.

The neighbourhood unit influenced the conceptual approach to facility location in South African layout planning, in the form of “neighbourhood cells”. The introverted nature of the unit in fact provided a useful spatial logic for past separate amenities legislation.

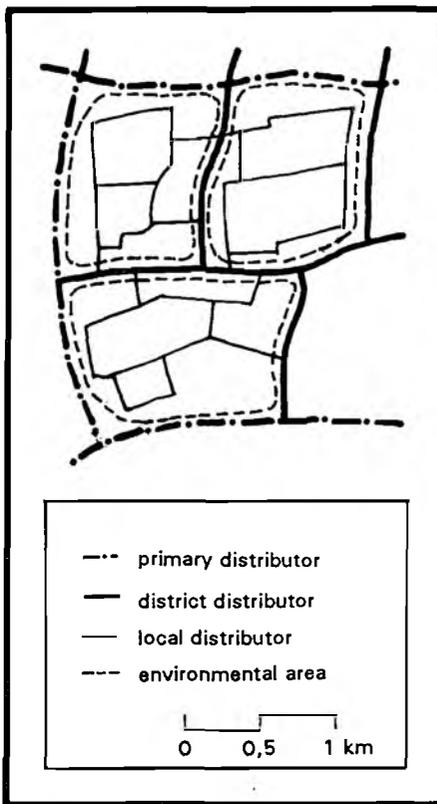


FIGURE 3: Conceptual diagram illustrating the "environmental area".

Source: After Buchanan *et al.* (1963:44).

3.2.2 Environmental Area

The environmental area concept, which emerged out of Alker Tripp's (1938) "precinct planning" idea, was developed in the United Kingdom by a working group on traffic chaired by Colin Buchanan in 1963 (Buchanan *et al.* 1963). The "Buchanan report" responded to the growing traffic problem, evidenced in London during the 1950's, by dividing cities into cellular environmental areas. People were to live in environmental areas relatively free from the hazards of vehicular traffic - within these areas concerns for street aesthetics, noise and air pollution were to predominate over the flow of traffic.

The primary concerns which motivated the development of the environmental area concept included a decline in the utility of motor cars due to congestion, and a deterioration in the safety and quality of urban environments. Of these concerns, the latter was regarded

as most important. Both the problems of increased congestion and decreased pedestrian safety were seen to be the result of rapid increases in private vehicle usage, and the form and arrangement of road networks. The report argued that older, open road networks were too narrow and had too many intersections to accommodate the modern motor vehicle. The increasing number of road accidents in London motivated proposals for sweeping physical changes to road network design in order to reduce the number of opportunities for conflict between vehicles and pedestrians. The report did not seek to reduce vehicular traffic, but rather to organise it more efficiently and safely.

The environmental area concept has a closed road geometry, in which roads are categorised into a clear hierarchy: primary, district and local distributors. The environmental areas are surrounded by a network of freeways which enable rapid, uninterrupted flows of vehicular traffic between cellular environments. The area has limited access points, which restrict the entry of extraneous traffic. Limited access to major roads is achieved through "backup design", where the first row of erven back onto the major road without having access to it.

The environmental area influenced the conceptual approach to road geometry and hierarchy in South African layout planning, in the form of closed road networks with numerous crescents and culs-de-sac, and a functional hierarchy of trunk, distributor, collector and access roads. In the same way as the neighbourhood unit concept coincided with separate amenities legislation, the cellular environmental area concept provided a useful spatial logic for past group area policies of spatial segregation.

3.3 Underlying Assumptions

The neighbourhood cell, functional road hierarchy and closed road geometry concepts in South African layout planning, which developed out of the neighbourhood unit and environmental area ideas, are based upon a number of implicit underlying assumptions relating to the functional linkages of households, fiscal resources, the anti-

cipation of road functions, and levels of car ownership.

The neighbourhood cell concept is based upon two key assumptions. The first is that it is possible, through the organisation of movement routes and public facilities, to create spatially defined social units. More specifically that there is a constant demand for facilities and services over time within any one particular cell, and that the functional linkages between households and public facilities respond to a hierarchy of "districts", "communities", "neighbourhoods", and "development blocks" - in other words, that it is possible to match the movements of households to and from facilities of varying orders, with an urban environment comprised of a series of cells of varying orders. The second assumption is that there are sufficient fiscal resources to provide each residential cell with the range of public facilities it was planned to contain.

The functional road hierarchy concept is based upon the assumption that it is possible to anticipate, and within reasonable limits plan for, the functions of every road within the road network, and that these functions will remain relatively constant over time.

The closed road geometry concept is based upon the assumption that virtually every household will eventually own at least one motor car, and that as a result, traffic volumes will increase and private vehicles will gain an ever increasing share of modal split.

4 CRITIQUE OF CURRENT LAYOUT PLANNING CONCEPTS

The following criticisms of the layout planning concepts expressed in the red book, are identified on the basis of the normative concerns presented earlier in this paper.

A general criticism of current layout concepts is that a guiding vision of appropriate urban form has all but disappeared. Initially, guidelines and development control systems promoted suburban settlement - a world in which dwellings are detached, population densities are low, open space is maximised in the form of large private

gardens, and levels of mobility are high. Over recent decades, as it has become increasingly clear that suburbia is neither financially attainable nor environmentally sustainable, the suburban vision has essentially shrunk. Erven are smaller and the size of dwelling units have been reduced, or have disappeared altogether. Due to overcrowding and backyard shacking, population densities are often high, little quality open space, neither private nor public, is provided, and very few households can afford the cost of private mobility.

Concerns for urban form and the quality of urban environments have largely been substituted by concerns relating to administrative ease, civil engineering issues, capital costs and public participation procedures. The results have become known as "toilet" and "matchbox" towns - sterile and standardised low-income townships which are inaccessible for the person on foot, frequently entrench an inefficient city structure, and provide few opportunities for self-generated income.

Instead of tranquil suburbia, the guidelines are now geared to the delivery of small serviced starter houses or serviced sites which create a very different environment, yet the guiding suburban model has not been replaced. Urban development is occurring without a clear vision of appropriate urban form.

4.1 Critique of Assumptions

One does not have to look particularly far empirically, to observe that the assumptions that underlie the neighbourhood cell, functional road hierarchy and closed road geometry concepts have failed to materialise in South African cities.

The assumption that it is possible to create spatially defined social units oversimplifies the complex social relationships that exist within a city, as well as the multifarious functional linkages between individual households and the range of public facilities and commercial services they frequent. Family doctors, dentists or favourite grocery stores for instance, are often located in very different parts of a

city. In particular, children in the post-apartheid era do not always attend the pre-primary, primary or secondary school in their local area - in Cape Town, Khayelitsha children attending a secondary school in Mowbray some twenty kilometres away are perhaps an extreme example of this.

The assumption that there are sufficient fiscal resources to provide each neighbourhood cell with the range of public facilities it was planned to contain, overestimates the ability of the State to raise sufficient revenue to finance the provision of public facilities to match need, and its ability to effectively deliver these facilities equitably. The backlog of education and health facilities in many predominantly black urban areas is evidence of this. In Cape Town for instance, the ratios of public schools to population in 1991 were approximately 1:8 900 and 1:2 300 for black and white population groups respectively (Smit and Hennessy 1995).

The assumption that it is possible to anticipate and plan for the functions of

every road, oversimplifies the diverse range of road users, and their respective needs, that exist, and fails to acknowledge the dynamic technological, demographical and political nature of urban systems. In Cape Town for instance, the use of particular stretches of roadway for hailing and alighting from mini-buses, the use of roads adjacent to rail stations as mini-bus ranks, and the common occurrence of street traders at signalised freeway intersections, are some obvious examples of this.

The assumption that most households will eventually own a car fails to acknowledge the low combined monthly incomes of most urban households. Lower income urban environments experience relatively low car traffic - traffic consists mainly of pedestrians, mini-buses, and buses. In Cape Town for instance, approximately 52% of commuters are dependant on either public transport or walking to get to work (Table 1), and in low-income areas approximately one household in every five owns a car (Table 2).

Table 1: Journey-to-work modal split in metropolitan Cape Town by population group

	% MODAL SPLIT		NO OF MOVNTS
	1980	1990	1990
WHITE			
Public Transport	25%	15%	37 950
Walking	5%	5%	12 650
Motor Car	70%	80%	202 400
"COLOURED"/BLACK			
Public Transport	64%	54%	349 920
Walking	12%	9%	58 320
Motor Car	24%	37%	239 760
ALL POP. GROUPS			
Public Transport	48%	44%	396 440
Walking	10%	8%	72 080
Motor Car	42%	48%	432 480

Source: The journey-to-work modal split estimates have been derived through the Echenique Land Use/Transportation modelling process, using 1980 census data - Metropolitan Transport Planning Branch, Cape Town City Council, in personal communications (1995) with Paul Mann of Liebenberg and Stander Consulting Engineers.

Note: Journey-to-work movement estimates assume that "earner per household" provides an indication of the number of journey-to-work movements per household, per day. These estimates are approximate. Over the last five years major changes have occurred - there has been an increase in mini-buses, and a related decline in public transport use due to *inter alia* assaults on buses and decreased safety. It should also be noted however that many trips are not journey-to-work movements. Housewives, school children, pensioners and the unemployed for instance, often do not have access to private cars and are reliant on public transport services, bicycling and walking in order to move - perhaps suggesting that estimates of overall modal split on the basis of journey-to-work movements, overemphasize motor cars.

Table 2: Levels of car ownership in metropolitan Cape Town

CARS/HOUSEHOLD	
Segment 1	1,56
Segment 2	0,91
Segment 3	0,59
Segment 4	0,19
Segment 5	0,21

Source: Metropolitan Transport Planning Branch, Cape Town City Council, in personal communications (1994) with Paul Mann of Liebenberg and Stander Consulting Engineers.

Note: Segments 1 to 5 indicate the range of income groups in metropolitan Cape Town. Segment 1 corresponds to high-income groups, while segment 5 corresponds to low-income groups.

4.2 Critique of Guidelines

Not all the guidelines in the red book are regarded as inappropriate. Guidelines that encourage the contextual derivation of road reserve widths, the use of access roads as public open space, the arrangement of soft open spaces into interconnected webs, the interaction of urban professionals, and the involvement of end-user communities in layout and infrastructure planning decisions for instance, are supported. Nevertheless, as indicated in the critique of the assumptions that underlie prevailing layout concepts, there are major shortcomings. In terms of the normative concerns presented earlier - place making, scale, access, opportunity, efficiency and choice - the following criticisms of the red book's layout planning guidelines are identified.

With regard to place making, the creation of a sense of place in new urban developments is not adequately addressed - a fairly uniform suburban environment is promoted. As a result, a concern for making places, as opposed to simply serviced land, has been, with a limited number of exceptions, almost entirely lacking in South African layout planning over recent decades. The red book guidelines provide little indication of how a layout plan should respond to a specific natural and cultural landscape, and of the role hard public spaces like markets and squares play in urban living.

With regard to scale, the guidelines fail to address the need for definition, surveillance and protection in hard public space provision (i.e. market places, squares and streets). The public environment promoted is essentially "overscaled", in that a vehicular scale dominates over a human scale - widths, distances and surfacings are treated primarily from the perspective of the mobility of vehicles.

With regard to access, four main criticisms are identified: Firstly, guidelines regarding road hierarchy and geometric layout are concerned primarily with facilitating private vehicle mobility, local pedestrian and cycle access to internalised public facilities, and enhancing road safety. Consequently pedestrian movement beyond local schools, churches and shops (i.e. to employment centres and higher order commercial services and facilities) is disadvantaged, and the operation of local public transport services is difficult. The car-orientated approach to layout planning results in road networks in lower income areas very similar to networks in higher income areas, despite very different levels of private car ownership. Secondly, the guidelines promote a road network that is inflexible, and unable to adapt to changes in the function of roads and the nature of abutting land use activities. This inflexibility stems from closed road geometries, and a limited conception of vehicular movement - which is essentially restricted to concentrating large volumes of traffic onto distributor routes. Other forms of movement, like stop-start traffic associated with activity streets, which facilitate an intensive mix of commercial, light industrial and residential activities, are not accommodated in the hierarchical network. Thirdly, the internalised or introverted location of lower order public facilities, to serve only single neighbourhood cells, makes the sharing of facilities between cells difficult when, because of demographic changes or facility backlogs, the needs of one neighbourhood population cannot be met within a single neighbourhood cell. This often results in a considerable decline in pedestrian safety, as people are forced to cross major arterial routes in order to reach public facilities in adjoining neighbourhood cells. Fourthly, the location of higher

order public facilities at accessible points within the distributor network, facilitates easy vehicular access only, at the expense of public transport and pedestrian access. Consequently higher order facilities are least accessible to the poorest income groups who do not own motor cars.

With regard to opportunity, two main criticisms are identified: Firstly, the physical separation of road classes and the restriction of extraneous vehicular traffic to higher order classes, does not create favourable conditions for small commercial enterprises or informal street trading. The concentration of through-traffic onto uninterrupted, limited access distributors prevents local traders from gaining access to non-local consumers. The guidelines in fact give very little consideration to the implications of layout planning for the creation of economic opportunities. Secondly, the functions of utility services are narrowly defined - generally around satisfying residential consumption needs only. The more collective functions of services, regarding street trading, small scale manufacturing, social interaction and recreation tend to be ignored. Consequently the minimum level of services associated with hard public spaces, necessary to support vibrant public life and embryonic local economies, are overlooked. Public squares and markets with standpipes, solid waste bins, public telephones, public toilets, metered electricity dispensers are not provided.

With regard to efficiency, the guidelines fail to adequately illustrate to town planners and urban designers which geometric road layouts and subdivision patterns most effectively facilitate the efficient reticulation of engineering services, and what the functional and spatial relationships between different services are.

With regard to choice, the guidelines fail to recognise the importance of choice and variety in enriching the experiences of those individuals that live within, or pass through, particular urban environments.

In short, the current layout planning guidelines are based upon erroneous assumptions, a narrow set of concerns regarding primarily motor car access, pedestrian safety and the creation of

spatially defined communities, and a limited interpretation of the elements of essential layout infrastructure.

5 TOWARDS MORE APPROPRIATE CONCEPTS

The basic theoretical assumption underlying the approach to layout planning promoted in this paper, is that public investment into facility, amenity and utility infrastructure provides a framework around which private investment into residential, commercial and industrial activities responds. In essence, that it is possible, through the geometric arrangement of movement routes, the design of public spaces, and the location of public facilities, amenities and services, to create the spatial conditions necessary to influence the course of development in a local area - that spatial arrangements matter.

The purpose of a layout plan is therefore understood to provide a spatial framework within which a series of initially public, and then private, investments can be accommodated over time, in a mutually reinforcing and developmental manner - it is initiating and flexible, rather than prescriptive. The appropriate form of plan therefore indicates an essential, as opposed to a comprehensive, set of spatial interventions.

5.1 Layout Planning Process

Modern town planning has experienced major shifts in thinking about process, or method. "Process" essentially describes the steps to be taken in the formulation of a plan, and is fundamentally influenced by the philosophical approach adopted to procedural theory⁶, and the way this influences the planner's professional ethic and perceived role in society.

Over recent decades, layout planning practice in South Africa has tended to be dominated by procedural planning (or systems) theory, in which analysis and problem identification gives rise to a series of alternative outline layout plans, which are then evaluated often on the basis of technically based ranking criteria or public consultation, and one chosen for detailed planning and

implementation. This process is essentially linear, and abrogates the planner's responsibility of taking explicitly value-driven decisions.

It is argued here that the layout planning process should be normative and cyclical, not "technical" and linear - as in any planning process, there is both value judgement and repetition involved in the bringing together of contextual and conceptual investigations, end-user participation, and the formulation and testing of ideas at various scales.

It follows that the starting point of the layout planning process is appropriately, a set of concerns around the quality of urban environments and the levels of performance they should achieve. The stages of the plan formation process therefore centre around the task of converting these normative concerns into a set of contextual layout proposals.

This process has five main tasks, each of which is revisited during the planning process⁷: The first task involves an analysis of the physical, socio-economic, financial and regulatory context. The second task involves the conversion of normative concerns into guiding layout planning principles, expressed as a set of written statements, and the identification of their implications for spatial relationships, expressed as a set of acontextual concept diagrams. The third task involves the quantification of needs into a programme of required facility, amenity and infrastructure investments. The fourth task involves bringing together context analysis, guiding layout planning concepts and programme, to form concept plans at a range of scales. The fifth task involves attaching widths, lengths and areas to the lines drawn on concept plans, to form more detailed layout plans. Public participation occurs, at certain strategic points, throughout the process.

5.2 Layout Planning Principles

The following layout planning principles are intended to inform the second task in the plan formation process - converting concerns (for place making, scale, access, opportunity, effi-

ciency and choice), into guiding principles and associated concept diagrams⁸.

5.2.1 Place Making

With regard to place making, the following principles are advanced:

- Focus on a hierarchical system of hard public spaces (e.g. squares, markets) as the main structuring element of urban areas, in order to establish loci for social interaction and community events, and create places that shape enduring impressions of the settlement;
- Respond to the cultural context of a site by understanding traditional ways of making the local cultural landscape (e.g. patterns of planting, road alignments, locations of symbolic or sacred buildings and spaces), and incorporating these into layout plans, in order to ensure that existing forms of the cultural landscape are maintained;
- Respond to the natural context of a site by identifying the implications of natural characteristics (e.g. topography, vegetation, climate) for layout planning, in order to accentuate uniqueness, and bring the presence of the natural landscape visually into the settlement; and
- Improve, where necessary, the protective and visual qualities of the natural landscape (e.g. shade, wind protection, topographical interest), in order to enhance the comfort of urban places, and provide structure to processes of settlement formation.

5.2.2 Scale

With regard to scale, the following principles are advanced:

- Define hard open spaces (e.g. squares, road reserves) through the juxtaposition of public buildings, public furniture and tree-planting, in order to create outdoor "rooms" which provide a sense of enclosure, greater safety through public surveillance, and protection from

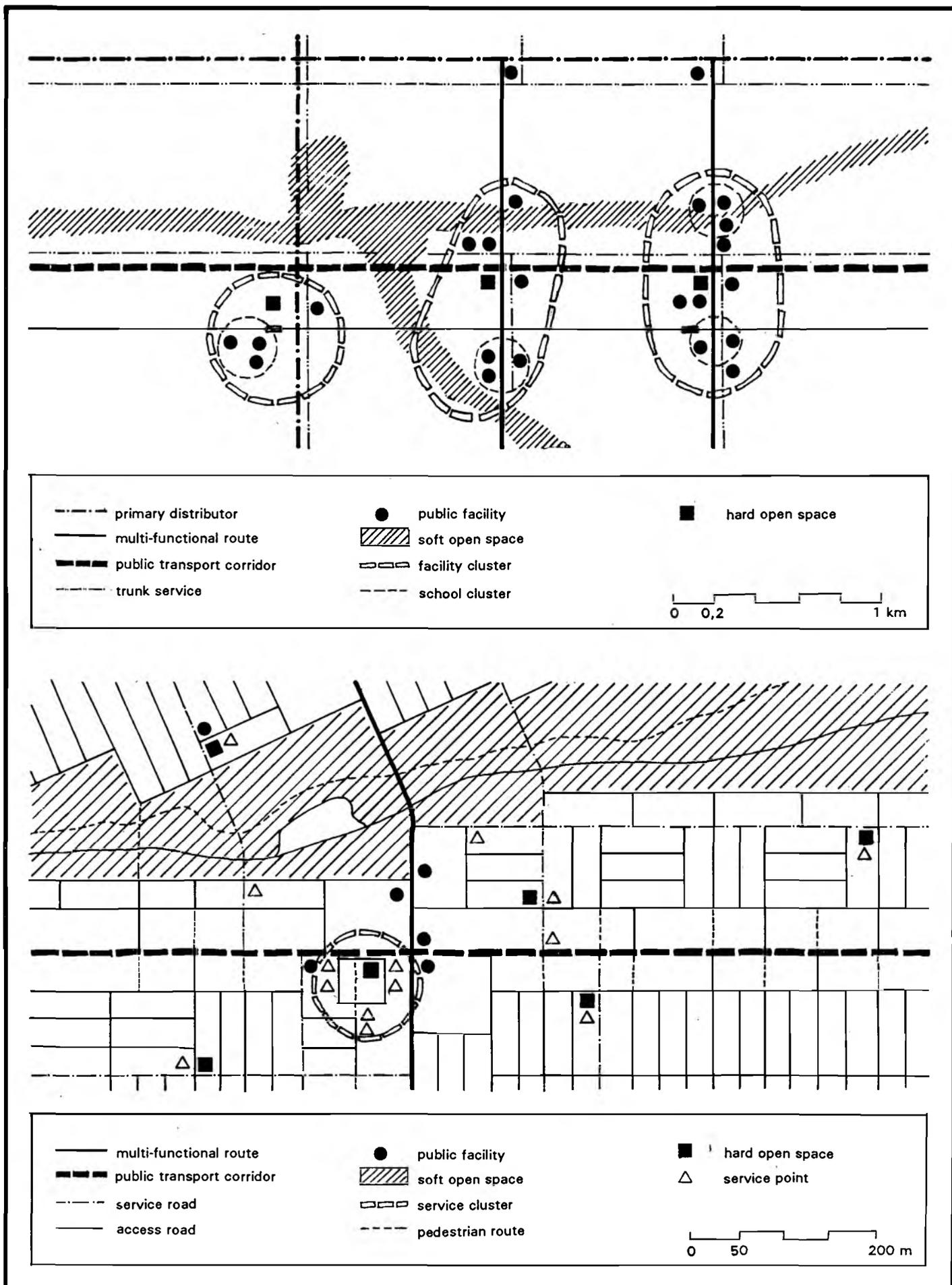


FIGURE 4: Conceptual diagram illustrating the spatial implications of the recommended layout planning principles at the sub-metropolitan and local scales

the natural elements;

- Link soft open spaces (e.g. public parks, playing fields), in order to form networks of recreational space which provide opportunities for the creation of continuous walkways, and greater levels of urban biodiversity; and
- Provide middle and lower order road networks with a continuous functional gradation of road types, in order to reconcile the needs of numerous road functions (e.g. social, economic, aesthetic) and road users (e.g. pedestrians, street traders, motorists), and accommodate different modes and types of traffic movement (e.g. through, stop-start, access-seeking).

5.2.3 Access

With regard to access, the following principles are advanced:

- Integrate the local road network with the surrounding movement system and land use pattern, in order to improve levels of inter-connection, extend important routes through the area, and provide opportunities for increased coverage and penetration of public transport operations;
- Prioritise pedestrian movement by providing direct, safe and convenient routes between different land use activities and public transport stops, in order to increase levels of intra-district access for the most vulnerable, and very often poorest, group of road users;
- Facilitate efficient and effective public transport services by making provision for prerequisite road geometries and thresholds (i.e. residential density) within layout plans, in order to improve inter-district accessibility for lower income households, and reduce the need for congesting and polluting motor car travel;
- Design open and flexible middle and lower order road geometries which offer numerous possible through connections, in order to enable complex systems of move-

ment to emerge (e.g. the mix of through, local and pedestrian movement associated with vibrant “activity streets”), facilitate unrestricted pedestrian movement, provide public transport vehicles with direct and unconvoluted service routes, and be most able to respond to changes in sub-metropolitan movement patterns, land-use distribution and modal split; and

- Expose the public facility system by locating the majority of facilities along main public transport routes, in order to make them as accessible as possible, enable complex patterns of use between different neighbourhoods, and create the conditions necessary to encourage private commercial and industrial investments.

5.2.4 Opportunity

With regard to creating opportunity, the following principles are advanced:

- Concentrate local through-movement onto continuous connecting “activity” routes through the routing of public transport services and the location of movement generators (e.g. public facilities, modal interchanges), in order to create the passing consumer thresholds necessary to support viable small and large-scale commercial activities;
- Provide hard public spaces at points of greatest access (e.g. modal interchanges, intersections), in order to create the spatial conditions necessary for formal commercial investment and informal trading opportunities;
- Cluster collective service points⁹ around hard public spaces, in order to create favourable small-scale manufacturing and trading conditions (by providing the necessary utility services and attracting potential consumers to specific points in space), and in cases where these services perform residential functions¹⁰ as well, enable a single trip to satisfy numerous household needs; and

- Incorporate public markets (i.e. agglomerated services and stalls) at points of greater access, as an element of essential public infrastructure, in order to assist small-scale manufacturers and traders by providing central trading locations and creating agglomerations of small traders capable of competing effectively with larger commercial establishments.

5.2.5 Efficiency

With regard to efficiency, the following principles are advanced:

- Cluster public facilities according to their hierarchical and lateral functional relationships (e.g. medical referrals, book circulation), in order to facilitate the sharing of resources (e.g. halls, playing fields, teaching equipment) between facilities, and enable a number of household needs to be satisfied in a single trip;
- Integrate public open space networks with utility services like major stormwater management systems (e.g. retention and retarding ponds) and solid waste disposal sites, in order to enable these spaces to perform numerous functions (e.g. public open spaces acting as overflow facilities in the event of severe storms, and stormwater storage facilities providing landscaping features);
- Facilitate efficient service provision and land utilisation by optimising the layout for the particular combination of service options provided (e.g. avoiding steep or flat road gradients, reducing road length per erf), in order to enhance the affordability of a development through reductions in the unit cost of land acquisition and service provision;
- Align trunk services (e.g. sewer mains, electricity sub-stations, water ring mains) to more intensive movement routes which link public facility clusters and non-residential land uses, in order to ensure that full service connections are made to public facilities, commercial services and small-scale

manufacturers, from the beginning of the infrastructure provision process; and

- Address the collective functions of services¹¹, in order to provide the basic infrastructure around which vibrant urban settlements and embryonic local economies may develop, and where all service needs cannot be met within the individual dwelling, allocate limited resources to benefit entire communities, rather than limited numbers of households.

5.2.6 Choice

With regard to choice, the following principles are advanced:

- Provide contrasting public spaces of greater and less intensity, in

order to create spaces of relief and relaxation in bustling areas, create spaces of exchange and interaction in quieter areas, and initiate pulses of urban activity that generate vibrancy and interest in urban settlements;

- Facilitate a range of housing forms and housing processes (e.g. aided self-help unit consolidation, walk-up units, subletting backyard dwellings, operating home businesses) by varying the size of erven and the level of service provision per erf within a layout plan, in order to accommodate the diverse range of housing needs that exist within end-user communities; and
- Meet the spatial requirements (e.g. road reserve widths) of future infrastructure upgrade, in order to

ensure that, where every erf is not provided with a high or full level of services, it is possible to upgrade the initial level of service provision at a later date.

6 CONCLUSION

Current layout planning guidelines are based upon erroneous assumptions, a narrow set of concerns, and inappropriate layout planning concepts devised in "first world" cities. The current South African context necessitates a reformulation of these guidelines. There is a need for layout planning guidelines which emphasize place making, public transport and pedestrian access, the integration of urban environments, the facilitation of economic opportunity, and a more collective and systemic approach to facility and service provision.

NOTES

- 1 The term "layout planning" is used in this paper to refer to the creation of quality urban environments through the geometric design of road networks, public spaces, block alignments, and erf dimensions, and the identification of appropriate locations for public facility investment. See chapters 1, 2, 3 and 5 for those sections of the "red book" that deal directly with aspects of "layout planning".
- 2 The opinions of the author as expressed in this paper have been influenced by those of Professor Dave Dewar and Vanessa Watson of the School of Architecture and Planning at the University of Cape Town, and Paul Mann of Liebenberg and Stander Consulting Engineers.
- 3 The importance of creating "places" does not relate simply to the creation of picturesque landscapes or pretty streets, but to the establishment of a sense of belonging. Different places offer very different life experiences, and these experiences influence peoples' perceptions, values and self-identity.
- 4 There are two generic types of road geometry: open and closed. A closed (or limited-access) road geometry consists of a functional hierarchy of roads, within which higher order roads do not intersect with lower order roads. This road system establishes clearly defined movement routes between any two points, and offers few or no alternatives. An open road geometry on the other hand, consists of a system of roads of differing widths and importance intersecting freely with one another. This road system offers a choice of numerous alternative routes between any two points within the network.
- 5 The neighbourhood unit later became the basic spatial concept behind the AASHTO road hierarchy classification (AASHO 1973, AASTHO 1984). As car ownership increased in the United States, so the neighbourhood unit concept was modified to incorporate a closed, as opposed to Perry's (1939) fairly open, road geometry - see AASHO (1973:159) for a graphic illustration of this.
- 6 "Procedural theory" refers to theories relating to the process of formulating planning interventions, and to the relationship between planners and society (e.g. systems theory, radical theory, hermeneutics). It is distinct from "substantive theory", which either explains spatial systems (e.g. neo-classical or Marxist interpretations of the urban land market), or indicates how spatial development is initiated (e.g. growth pole theory).
- 7 Depending on the nature of the planning problem, different tasks require greater or less emphasis. For example, where the occupants of a site are already settled (i.e. *in situ* upgrade), a significant emphasis in analysis will be on understanding their needs and priorities. Alternatively, where settlement of a site is to be very rapid (i.e. managed land settlement - see van der Linden 1994), analysis and plan formulation may have to occur in a very short period of time and will thus have to be strategic and targeted. Every planning problem is likely to be unique, and will require judgement as to how the layout planning process should be conducted.
- 8 The layout planning principles are drawn from the CUSSP handbook referred to in the introduction of this paper (Behrens and Watson 1995). Refer to this document for an elaboration of these principles.
- 9 Collective services are those services consumed off-site, to satisfy either domestic household service needs or community service needs. Community service needs relate to movement, drainage, public safety, outdoor manufacturing, market trading and social interaction. In the case of domestic household needs, the service is transported to the site for consumption within the dwelling or on the site. In the case of community needs the service is used within the public environment. Collective services include: water supply in the form of public standpipes, sanitation in the form of public toilets, roads, stormwater drainage, energy supply in the form of metered electricity dispensers in public markets, public lighting, solid waste removal in the form of rubbish collection points, and communications in the form of public telephones and post collection points.
- 10 Residential services are those services consumed on-site, to satisfy domestic household service needs. The service is used either in the individual dwelling, or on the site. Residential services include: water supply in the form of house or yard taps, sanitation in the form of in-house or out-house toilets, energy supply in the form of electricity or gas, solid waste removal in the form of kerbside rubbish collection, and communications in the form of private telephones and postal delivery.

- 11 Minimum essential services typically include: water standpipes, waterborne sewerage, gravel access roads and bitumen surfaced bus routes, unlined stormwater channels, communal solid waste collection points, high-mast security lighting, and occasionally prepayment electricity dispensers. The provision of public telephones, post collection points and electricity connections usually occurs later, once sites have been occupied and a demand for these services has been established. This typical assessment of essential services defines service functions narrowly - generally around satisfying residential consumption needs. The more collective functions of services, regarding street trading, small scale manufacturing, social interaction and recreation, tend to be ignored. Consequently public standpipes, solid waste bins, public telephones, public toilets and metered electricity dispensers associated with hard public spaces and public markets, are seldom, if ever, provided.

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