THE PLANNING OF SASOLBURG AND SECUNDA — ACHIEVEMENTS AND PROSPECTS

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In all the thought and effort that has gone into Sasol's town development and in the periods of stress and the moments of elation experienced during the 32 years of ongoing endeavour, there has been the common concern for the ultimate objectives — the creation of an urban environment worth living in, economical, safe and pleasant.

The bare necessity of providing housing as a prerequisite to the running of the Sasol I factory touched upon the basic elements from which towns were made. It called for critical assessment of traditional methods and presented opportunities to try out new approaches. The technical task turned into a spiritual adventure of a rare and fascinating kind. The Sasol Management took an active part in the venture and interest permeated through their organisation. The Local Authority on its later establishment responded in the same spirit. And so did many of the inhabitants as they saw their environment emerge from the dust of the construction site.

During the years of implimentation and development the interests in the human issues was maintained and eventually in 1975 it was transmitted to the team entrusted with the design, construction and administration of the new town of Secunda.

Sasolburg went through several phases of growth. The pioneering stage of the fifties was followed by a period of ongoing growth, starting where the success of the huge industrial venture was assured and the plant was expanded in 1960. The Local Authority entered upon active township development towards the end of the seventies with the acquisition of the speculative townships together with vacant land on the northern slopes towards the Vaal River. A phase of expansion was thus initiated.

NOTE: This report expresses solely the writer's views and nothing herein may be construed as emanating from The South African Coal, Oil and Gas Corporation Limited.

1. SASOLBURG: THE PIONEERING STAGE

1.1 The Beginnings

Sasolburg had a most modest start that February morning in 1951 when the mealie fields of the northern Free-state were scanned from an unusual angle: to assess the siting possibilities for a large plant and a little new town. To the men called upon to set up a oil-from-coal conversion plant at a scale not attempted anywere else, the primary concern was the pithead, the plant site and the waste disposal area all of which needed large expanses of land.

The budget was tight. The venture fraught with uncertainties — a long way from the powerful petrochemical complex we know today.

For those thus engaged, the building of a new town was an uncalled for nuisance. Yet it was indispensable that the people who were to administer and operate the undertaling were housed in an environment in which they could lead contented lives.

Thus the planner's brief was crisp. The estimated works complement of 1000 whites represented a population of about 8000; allowing a contingency for future affiliated industries and adding a safety margin, the population for which the town was to be designed was to be 10 000 and not one soul more. Corresponding provision was to be made for the black population within the framework of Government policy.

The initial stage of the planning and development of Sasolburg was described in the issue of S.A. Architectural Record for March 1958. As this publication has been out of print for some time, its contents are summarized in this chapter.

1.2 Planning Objectives

Although the provision of living accommodation for the personnel of the plant was looked upon essentially as a housing estate, its location was sufficiently isolated and its size large enough to offer an opportunity for creating a comprehensive urban organism balanced in itself.

Four aspects of planning appeared to be of over-riding importance:

(i) The first priority was to break the destructive force of the motor vehicle without restraining its usefulness. This could be done by establishing a system of main roads conducive to the free movement of vehicles without any detrimental effect on the use of the surrounding land.

(ii) Supplementary to the road system, a network of pedestrian cum cycle paths would ensure safe movement within the residential areas, particularly to schools and local shops, and link different areas at predetermined traffic points that could be controlled.

(iii) New forms of residential development were needed to replace the amorphous sprawl of the suburban areas of our towns with an organic pattern of self-contained units comprising within their limits all that was necessary for daily

living, such as kindergarten, primary school, local shops and recreation, protected permanently from external disturbance.

(iv) Concerted attention was to be given to the creation of a coherent urban scene primarily in the town centre and preferably wherever possible throughout the town as a whole — with emphasis on planting as an indispensable element to be introduced from the beginning.

1.3 Physical Conditions

1.3.1 Location

The selection of the site on the northern edge of the Orange Free State was dictated by the vast deposits of low grade coal close to the Vaal River, the scource of the large quantities of water required in the oil-from-coal conversion process. The principle consumer area of the Witwatersrand lay to the north within a radius of 90 km. Together with Vereeniging and Vanderbijlpark, the new town would in due course become part of a metropolitan complex. The coordination of the growth of such an urban pattern entailed the safeguarding of the identity of the constituant parts and the protection of the Vaal River vital for water supply and recreation. These issues together with transportation were recognised as a matter of grave concern for the future.

1.3.2 The Site

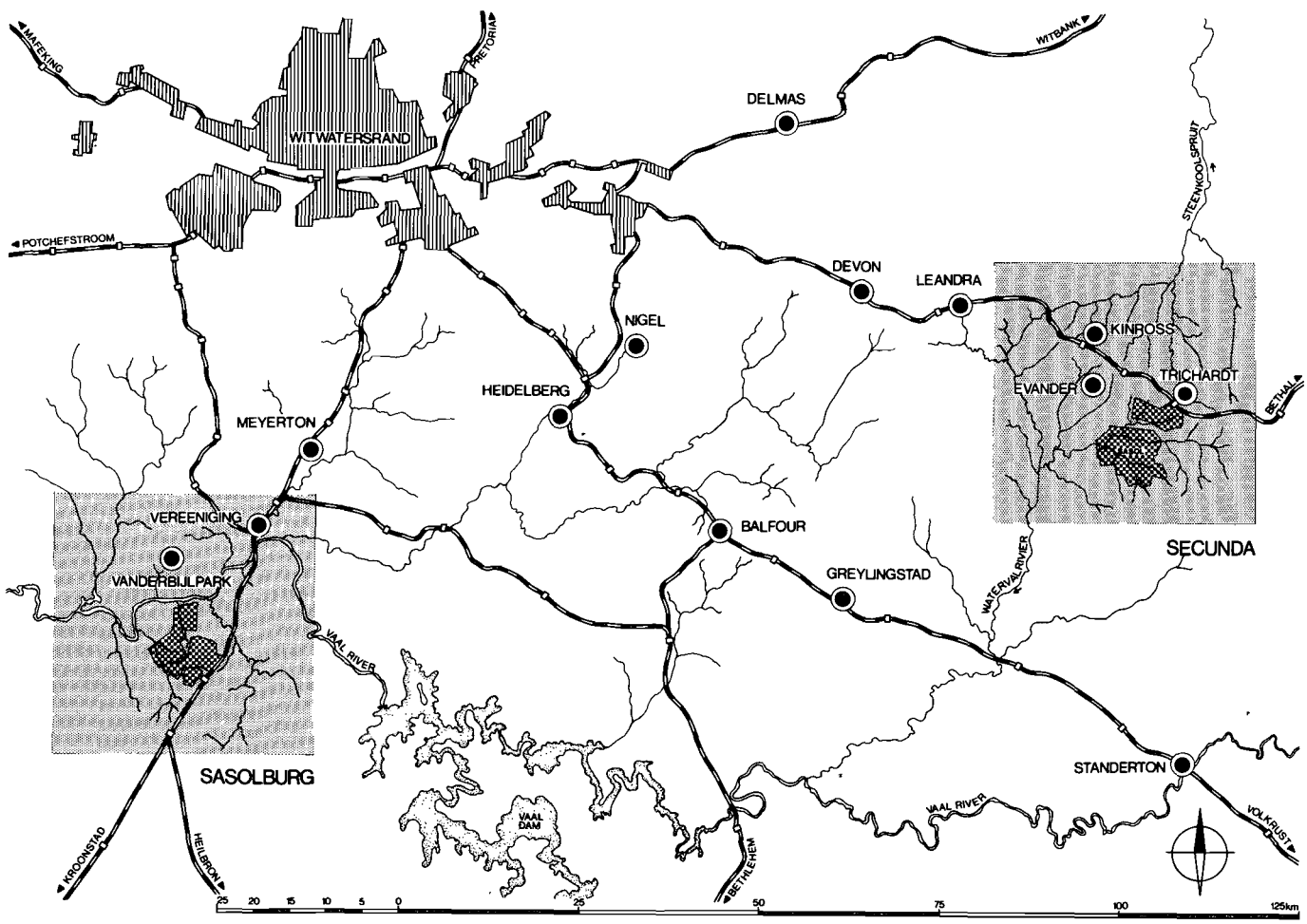
The site acquired for the factory and the town comprised 21 square kilometres of farm land, situated on the western flank of a dome-shaped hill rising steadily southward from the Vaal for a distance of 7 km to a height of 70 m above the river. Two thirds of the land formed a compact block and the remainder extended as a corridor to the river. The coal deposits stretched southward from the planning area with the pithead just inside the boundary. Coalbrook Station on the main line to Bloemfontein was situated to south-east of the planning area, 4 km from its centre.

1.3.3 Climate

The prevailing winds were northwesterly with cold south-easterlies in winter and the highveld thunderstorms in summer. Annual rainfall averaged 660 mm, almost all during the summer months, October to April.

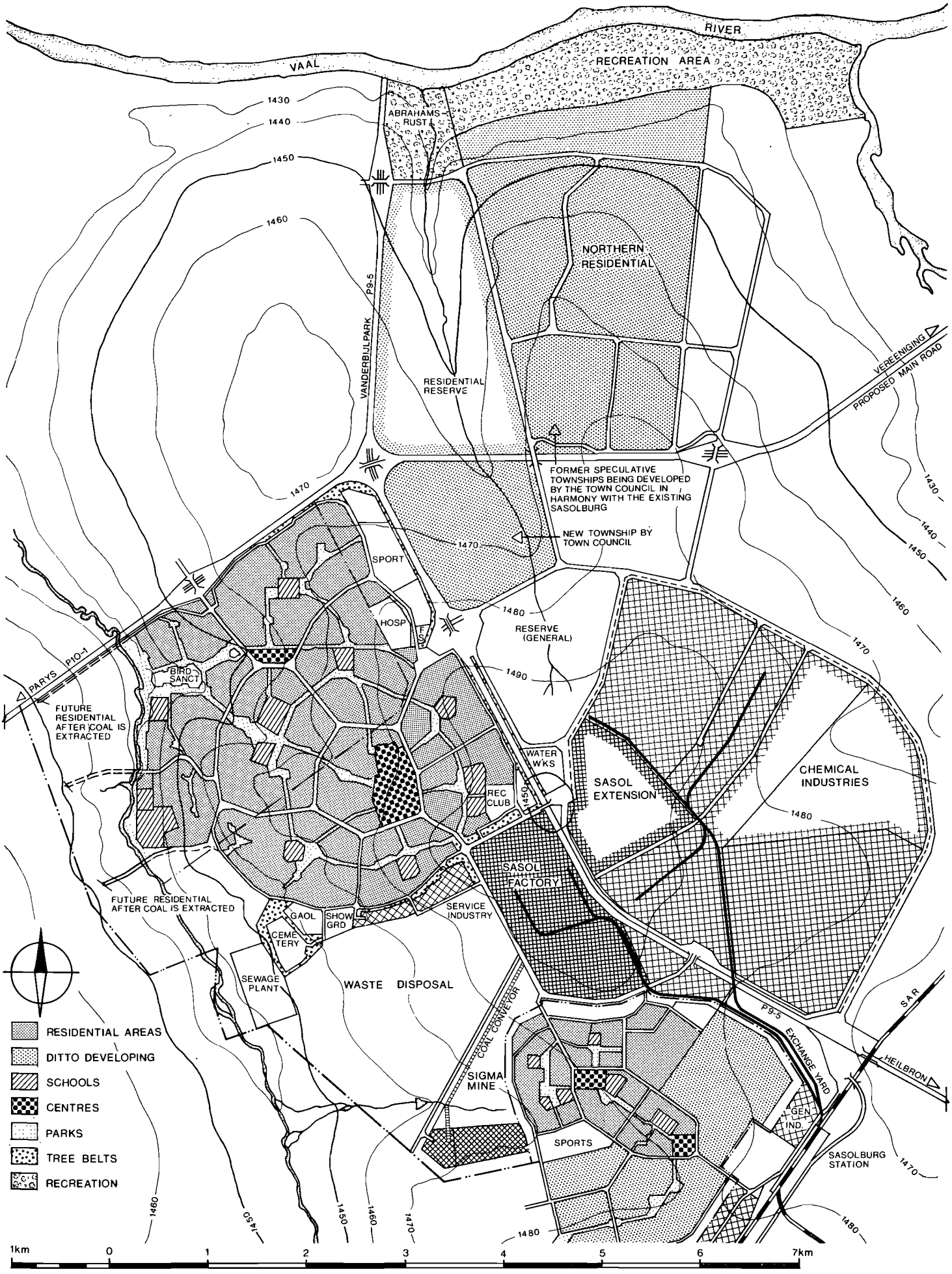
1.4 General Disposition

The requirements of the oil-from-coal factory governed the basic disposition of the main use areas of the town. Considerations of economy of transport for both raw materials and finished products would have indicated that the plant should be sited in the southern sector of the planning area between pithead and railway station, which position would also have been completely in the lee of the residential areas as regards the prevailing wind.



SASOLBURG AND SECUNDA LOCALITY PLAN

1 : 1 000 000



SASOLBURG GENERAL LAYOUT 1 : 50 000

Investigations of the sub-soil, however, disclosed in this area expansive clay of considerable depth. Consequently the plant site had to be moved further north near the apex of the dome where a stable stratum was available at shallow depth. This position also presented comparatively gentle gradients which facilitated the levelling and terracing of the widespread site measuring about 850 m in width by 1200 m in length, covering approximately 100 hectares.

South of the factory an area of similar extent was reserved for future industrial development devoted to the processing of chemical products gained in the conversion of coal. These two areas, together with extensive waste disposal grounds, constituted the industrial zone which occupied the centre portion of the town area. To the north thereof extended the White residential area, to the south the Black township. Due to the very limited extent of land set aside for the new town, the residential area had to be brought up close to the industrial zone, closer than would have been desirable from the psychological point of view as well as for the prevention of nuisance from smoke and smell. The latter, fortunately, did prove much less disturbing than had been feared at the design stage. Tree belts were used to mark the break between work and leisure.

A railway feeder line, operated with the Corporation's own diesel engines, linked factory and industrial area with the exchange yard near the station.

1.5 Main Roads

Motor access to the town was provided by a new provincial road which fringed the planning area but was kept completely separate from it. Since this road might conceivably form a major link in the regional road network of the future, it was designed in accordance with National Road standards allowing for dual-carriageways divided by a median strip. Three intersections spaced about 2 km apart gave access to the main road system of the town. This was designed for the sole purpose of conveying vehicular traffic between the various sectors of the town. Access to the main roads was limited to the street intersections and these were spaced as far as considerations of convenience permitted. All adjoining building land was separated from the main roads by fences or hedges; not even a pedestrian gate was accepted. Access to the adjoining stands was provided from the local streets within the development areas. In this manner the mixing of vehicular and pedestrian traffic was largely eliminated and motor vehicles enjoyed free flow in smooth conduits unimpeded by standing vehicles. The median strips of the main roads were kept sufficiently wide to permit vehicles turning to the right to stop clear of the traffic lanes. Being specifically designed for moving traffic, the carriageways were adequate with only two lanes in each direction whereas usually a third lane for parking would be unavoidable. Should at any time bicycle traffic assume greater proportions, provision could be made for diverting this traffic on to cycle tracks to be built at kerb-top level in a construction very much lighter than that of the carriageways.

1.6 Residential Area

1.6.1 The Plan

The land available for the white residential area did not permit housing much more than 10 000 persons at the traditional gross density of about 25 persons per hectare. A drastic increase in density was not favoured and the Corporation was not prepared at that stage to purchase more land. The capacity of the land had no reserve to accommodate any future increases, particularly with regard to the unknown demands of the subsidiary industries. Expansibility was, therefore, a fundamental requirement of the plan. This was interpreted in the sence that the layout had to be shaped to permit the town to grow beyond the stipulated size and at each stage it would be a coherent selfcontained entity.

The layout assumed the form of a crescent focused on the town centre and it was arranged that ultimately it could be closed into a full circle. In the initial stage, the residential area was made up of five units. Lying within the meshes of the network of main roads, these were termed "precincts" to express their defined shape. By 1960 four of these were established and built up to about three quarters of their capacity. Unit No. 5 adjoining the town centre was pegged. Fringing the southern edge of the layout were the service industries, the outspan (a relic from oxwagon days still demanded under the Roads Ordinance), a show ground, the prison with its vegetable gardens and the cemetry. The hospital was sited on the northern periphery.

1.6.2 Contents of the Residential Units

The residential units comprise everything necessary for daily family life.

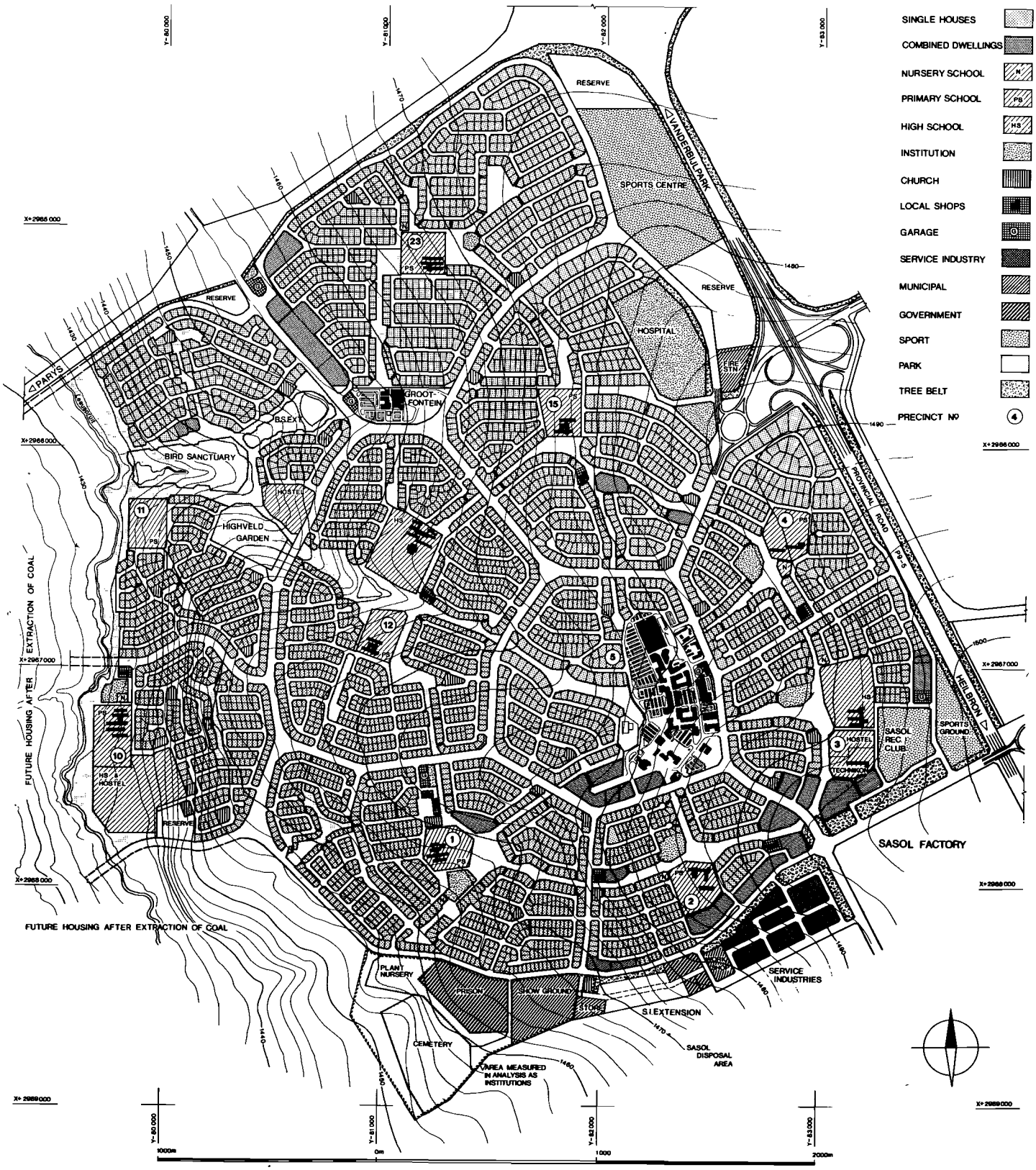
Dwellings

In accordance with South African tradition, detatched dwellings naturally predominated. They were to house three quarters of the population, on stands varying in size from 710 m^2 to 2 000 m^2 except for a few that were larger. The average size worked out just over 1 000 m^2. Considering the economical aspect, the Townships Board was agreeable to a relaxation of the minimum requirements of 830 m^2 then ruling and permitted one-fifth of all stands to be reduced to 710 m^2 which size was still adequate for a cottage to be correctly sited in relation to neighbours and aspect. Despite the deliberate intermixing of stands in groups of different sizes, social stratification became more marked than had been expected.

The remaining quarter of the population was housed in flats and combined dwellings (terrace houses and maisonettes) for which comparatively large sites had been provided with the intention that this type of housing be designed in groups related to their own garden space and playgrounds. Development of these sites was governed by a floor space ratio that permitted building densities twice that of the average single dwelling in the case of row houses and three times for flats. In order to maintain the close relationship that these buildings should have with their garden

space, the heights were limited to two storeys for combined dwellings and generally to three storeys for flats. Only in the vicinity of the town centre were seven-storeyed slender blocks of flats visualised.

There was dire need for the development of new forms of accommodation intermediate between the extremes that had become traditional in this country: on the one hand the single house that was causing our towns to stretch over enormous areas and, on the other, the high density block of flats wherein people were cooped up on high shelves completely divorced from the ground. A combination of the labour-saving layout of a flat with the amenities of direct garden access of a house promised to be a more suitable solution for the needs of the average family than the detached dwelling with its unusable side spaces and a wasteful backyard. Given a



SASOLBURG RESIDENTIAL AREA | 1 : 25 000

sympathetic approach and care in designing, it should not be impossible to devise new forms that would satisfy the South African mode of life.

Open Spaces

Three-quarters of the usual allowance of 4 ha per 1 000 persons for open spaces were allocated to the precincts. The open spaces were not dotted about in isolated parks but were arranged in a continuous system of landscaped green strips which traversed the residential areas generally in a circumferential manner with radials reaching to the town centre. Nowhere less than 30 m wide and frequently broadening out into bays for childrens' playgrounds and informal games, the park strips were to be the everyday play and romping ground close at hand after work and school. At the same time they afforded pedestrian access to school, shop and local recreation club, as also between the precincts and to the town centre. They constituted a system of walkways completely isolated from the dangers of vehicular traffic. Intersections with main streets were kept to the absolute minimum with pedestrian subways recommended at these points. Although the construction of these grade-separated crossings was deferred into the future, the usual traffic controls could be applied in the meantime.

Not least, the park strips interrupted the spread of the residential areas and by a breath of Nature, dispelled the feeling of claustrophobia that large stretches of detached dwellings engendered. Like streams, they were meandering through the whole residential area and in their sweep united the different sections.

The park strips were to be covered with coarse veld grass and planted with trees in varying patterns: avenues opening on to canopies of grove-like clusters; massive groups and tall specimen trees giving shade and accent at selected points; here and there a few shrubs and a bed of flowers, but on the whole, it was to be bold landscaping in contrast to the smaller scale of the gardens and the street trees. Continuous parks planted in this manner were economical to establish and maintain. A young town needed parks that were useful and well within its means.

Schools

The primary schools were placed at the centre of each precinct within a walking distance not exceeding 800 m from the most distant dwelling. No main roads were to be traversed on the way to these schools. Every third precinct was to include a secondary school. For children over the age of 12 years traffic considerations were not as important as for the younger ones. Even so subways or other effective controls were essential at the few points where pedestrian ways crossed main roads.

Club Site

For organised recreation at the local level a club site was provided in each precinct. About ½ ha in extent, these sites could accommodate a few tennis courts, a bowling green and a hall together with minor sporting facilities. Like the park strips they were to vest in the Local Authority. It was not intended that the club premises be leased to specific sporting clubs but rather that the town council or a committee of citizens should develop and operate the club in an informal manner to the benefit of all. Hobby clubs, cultural groups and youth organisations should find a home there as well as those interested in active sports.

Shops

Local shopping needs were met by small groups of about half a dozen shops intended to comprise a grocer, a greengrocer, a chemist, possibly a butcher or a hairdresser and of course the all important cafe which also served as tobacconist, confectioner and newsagent. The fairly large sites had building lines set 12 m back from the street boundaries and the developers were obliged to provide parking on their own land. The local shops were sited generally on the secondary radial streets between two precincts and had easy access from the park strips. They were not placed at the centre of the precincts for good reasons. The vehicular traffic that the shops attracted, both delivery vans and customers' cars, would be a disturbing element in the quiet residential streets. And also, the householders had to be given a reasonable choice in shopping and not be made dependent on what might easily develop into a local monopoly.

1.6.3 Layout of Residential Units

Layout Pattern

Urban layout patterns were changing slowly as was well known from our ubiquitous grid system. Even where, prompted by a keener awareness of the topography, the rigid rectangularity was replaced by curves, the street pattern retained its uniformity, leaving quiet development streets open to through traffic in search of short cuts. Within the span of a single generation the motor vehicle had outmoded the age-old methods of laying out streets. And no alternative was ready at hand. New approaches could be found only by experience; this meant by logical reasoning followed up in patient observation of the results. Each new layout, rationally applied, was in itself an experiment. Developing through a sequence of such experiments new techniques would gradually evolve.

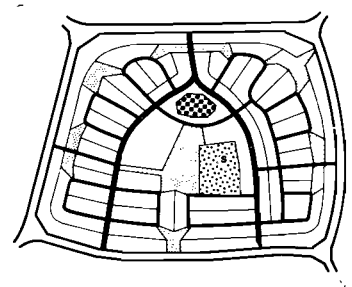
It was essential, therefore, that work done elsewhere in the world should be carefully re-examined before a layout pattern was adopted for Sasolburg. Two examples, though vastly different in approach, taught a lesson applicable to South African conditions. The one was the English pattern whose genealogy could possible be traced from the village green through the Inns of Court to Welwyn Garden City and the New Towns; and the other, the Radburn pattern, had been created in an enthusiastic attempt to tame the dangerous motor car and put it in its appropriate place in American community life.

In the English pattern a feeder street traversed the residential unit to give access to development streets which in the shape of loops, culs-de-sac and courts formed the setting for the spatial grouping of buildings in a restful atmosphere. The number of access points to the residential unit could be kept to a minimum so as not to interfere unnecessarily with the traffic

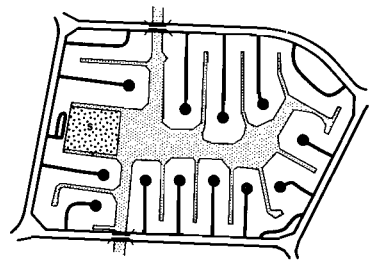
in the circumferential main roads. The feeder street was also the bus route, and since in Britian between the wars and in the first decade after the war, buses played a much greater part than private cars, there had been a need to run it through the middle of the residential units. From this in turn followed that the school and the principal park, situated at the centre were seperated by a traffic road from the greater part of the residential area. As long as the incidence of traffic was low no serious conditions did arise, but as soon as the private car became the indispensable medium of locomotion as it had in this country, the separation developed into a serious problem. This was the case particularly where a local shopping centre at times attracted denser traffic than that observed on the main roads.

In the Radburn patterns all through-traffic was excluded. Cul-de-sac streets provided vehicular access to the dwellings which on their opposite side faced on to a footpath leading into the central park area. Once one passed through the garden gate on the way to school, playing field or neighbouring friends, no motor car threatened safety or disturbed peace any longer. This pattern suggested an uncompromising solution to a problem that was a serious one also in South Africa where the ratio of motor vehicles to population was close to that of the United States. But practical application in this country would be another matter. The footpaths would at once be decried as sanitary lanes in the condemnation of which householders, policemen and municipal officials spoke with one voice. A network of footpaths also presupposed a very orderly community lest the maintenance bills reached exhorbitant levels. But there was one aspect inherent in this pattern that needed careful consideration. The strict separation of pedestrians and motor cars brought with it a multiplicity of intersections along the main roads where vehicles turning into the residential cul-de-sac impeded and endangered the straight flow of traffic.

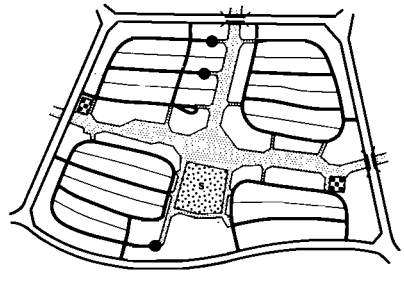
In the Sasolburg pattern the layout of the precincts was conditioned by the basic planning aims stated earlier. The most important of these, the separation of through traffic from use areas, demanded that the links with the local street system be limited to the absolute minimum. From this it followed that the local streets of each sector of a residential unit had to be inter-leading. It was unavoidable that little children on their way from home to school had to cross some of these streets, but the larger part of their walks was in the park strips which were reached through short pedestrian lanes placed at convenient points. The dangers inherent in crossing even quiet residential streets were considerably reduced by keeping the residential sectors small and possibly by a reduction of the permissible speed limit.



English Pattern



Radburn Pattern



Sasolburg Pattern

LAYOUT OF RESIDENTIAL UNITS COMPARED

Housing

Wherever possible the residential streets were so orientated that the majority of the building plots permitted houses to face north. Where eastern and western aspects were unavoidable the sites were enlarged in width to allow greater freedom in the placing of buildings.

Detached dwellings were obstinate elements to combine into an urban scene. By tradition they were self-asserting and often discordant in materials and colours. An attempt was made at Sasolburg to relieve with correlated groups of houses the well-known suburban jumble. In the township layout all reasonable opportunities were utilised to suggest grouped development by arranging building plots in crescents, culs-de-sac and other forms of short sequences. When the Corporation was ready to embark on their building programme, a recommendation was made that development be undertaken in groups and that the architects commissioned for the work be instructed to express the groups in correlated site planning and by using either a limited number of materials with varying layouts or, where uniform plans had to be used, by blending the colours into a modulated scheme. Here and there these intentions were realised but more could have been done. The management houses designed by one architect formed a delightful group which served as an inspiring example of how a great principle in art — variations on a common theme — offered far reaching possibilities in suburban development.

Services

Besides providing safety and convenience, the layout pattern of Sasolburg proved economical with regard to the reticulation of services. The water mains and, to a large extent, the main cables were laid as rings in the green strips which also offered easy routes for the disposal of stormwater. Practically no services were laid under main streets and consequently no digging up of the surfaces of busy roads would ever be necessary. The aggregate street area including all main streets was found to be 22,3 percent of the total residential area. This represented a saving of about a tenth in comparison with the generally accepted ratio of 25 percent.

The planning of the new town was carried out and approved before engineers were commissioned for the services. It was, therefore a moment of relief to learn that the intention to serve the three first precincts and the town centre with one single main sewer had proved feasible in the detail study and that gravity would keep the system running even where the layout had been stretched over flattish ground.

1.6.4 Size of Residential Unit

The size of a residential unit was to be determined by the relationship of the primary school to the population. The aim was that all children of primary school age be able to go to the school of their own precinct and thus be saved from having to cross any main roads. It was necessary, therefore, to have a good indication of the number of children to be catered for in proportion to the capacity of the school.

On instruction of the Townships Board a primary school site had to be provided for every 400 houses. The same figure had been stipulated also in the report on estate planning issued in 1949 by the South African Council for Scientific and Industrial Research. Considering that the two standards coincided and remembering the importance of the correct correlation of schools and population having been stressed in earlier discussions with the Board, it was assumed that primary schools would be designed to accumulate the number of scholars expected to accrue from 400 houses, according to past experience.

When the first two primary schools were built for 600 pupils each, it became evident in the light of information from other sources that the capacity of the school would vastly exceed requirements. When the matter was taken up with the Townships Board, it was learnt that the Department of Education was working on an index of 1,5 primary scholars from every house.

The prospects were that at least one but probably two of the four precincts would remain without a primary school and all the children living there would be forced to cross main roads on their daily walk to a school in another precinct. Nothing could be done to save the situation in the first four precincts but the impass that had arisen, threatened to bring to naught the safety precautions proposed in the planning concept.

Despite staunch efforts by teachers and traffic officers in promoting road safety, effective action against the steadily rising accident figures could be taken only by eliminating altogether the conflict between pedestrians and vehicles. To do this was the task of the planner. As experience had shown, however, he would not be able to succeed until the facts of the matter had been clarified and accepted. The relevant investigation is described hereafter in Section 2.3.

1.7 Town Centre

1.7.1 Design

In the design of the town centre two main aims were pursued. The endeavour to obviate the nerve-racking and dangerous intermixing of shoppers and motor cars led to a continuous system of walkways penetrating the centre in the form of pedestrian malls and sidewalks and linking to the footpaths entering the radial green strips of the residential precincts.

Secondly, the buildings were intended to be fused into concerted groups, modulated by the interplay of mass and space. Compact urbanity was to contrast with suburban openness.

The town centre was designed for a population of 20 000, twice that of the initial stage of the growth of the town. The timing of development played an important part in the design. Within the ultimate layout a core was needed that would serve the full range of functions and when completed with paving, trees and street furnishings was capable of assuming an urban character. The remainder of the town centre site was to be left untouched until the demands of the growing town would cause the core to expand.

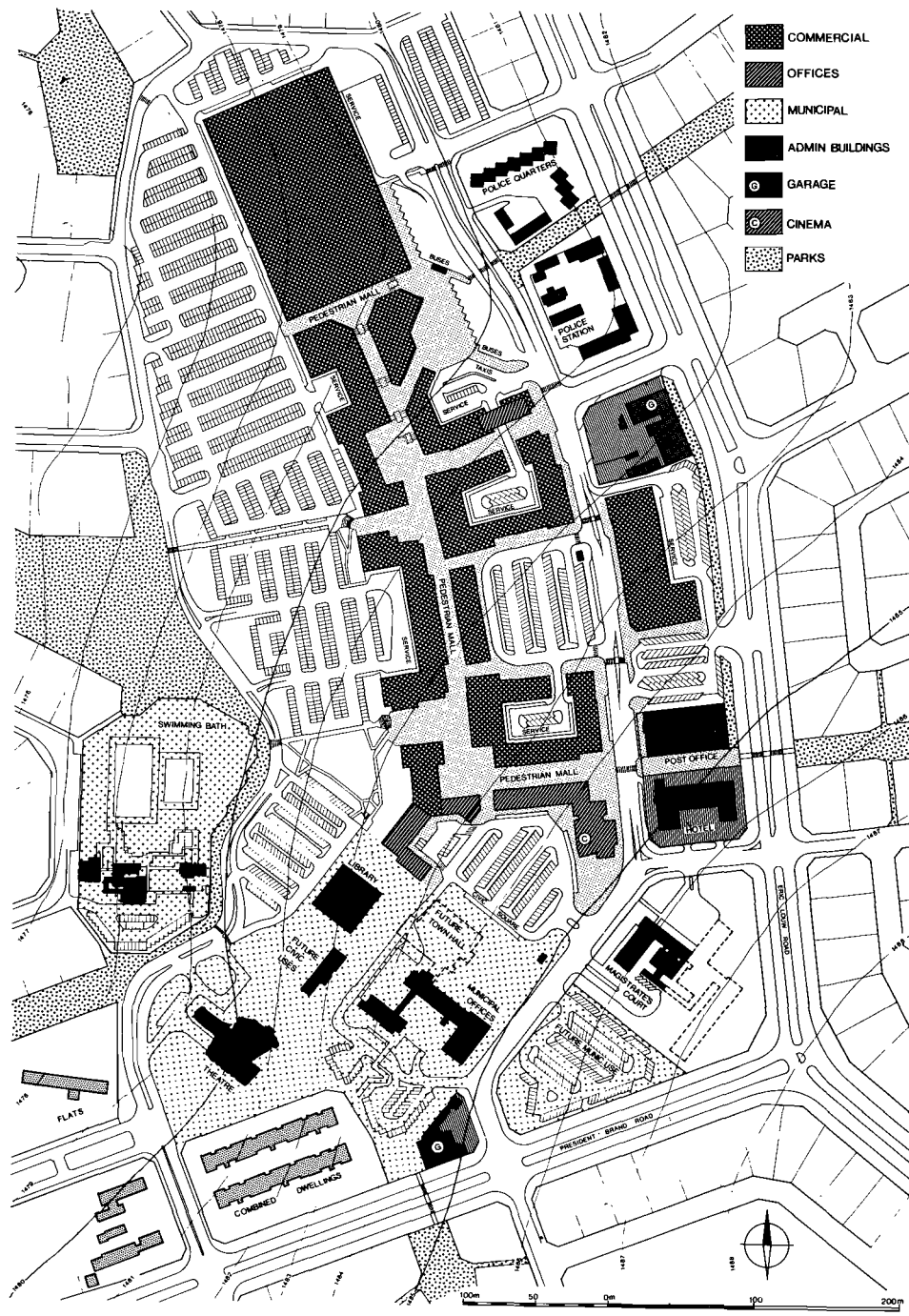
In the design process of the town centre the estimate of requirements was followed by the siting of the buildings. With setbacks and variations in height these were moulded into coherent groups which had a three-dimensional appearance in themselves and at the same time defined the spaces designed for vehicular and pedestrian movement. The cutting up of the land into building sites was the final stage which together with the framing of the conditions of title represented the translation of the design into a legal framework.

1.7.2 The Plan

The town centre was fringed by the principal roads but seperated from them with narrow green strips. Four entrances led into the single street that joined the several sections of the oblong layout. On the opposite side, the town centre overlooked a gentle moulding in the westward slope of the hillside, which was to be occupied later by Precinct 5.

The layout had no "back" that would have been suitable for the parking of the 500 motor vehicles expected to require accommodation at one time. Large masses of parked motor cars were regarded as an uninspiring sight and expanses of empty tarmac even worse. The required parking, therefore, was split up into small areas which in the form of squares helped to articulate the groups of buildings.

Shops needed a compact layout with continuous rows of windows to generate an animated atmosphere pleasant to shoppers and beneficial to shopkeepers. Unloading of supplies was removed from streets and sidewalks into courtyards round which the shops were grouped. General business premises — offices, banks, agencies, places of entertainment and hotels — adjoined the shopping complex. Motor garages were placed at the entrances to the town centre. For the



SASOLBURG TOWN CENTRE 1 : 5 000

town hall and other public buildings individual sites were made large enough to allow for a dignified setting and for future expansion. No residential accommodation was provided in the business area but within easy walking distance a more congenial setting for flat development was created next to the civic complex. Workshops and warehouses were relegated to the service industries and were accommodated in a separate township on the southern edge of the residential area, conveniently accessible from the town centre.

1.7.3 Implementation

All buildings in the town centre were to be designed by architects. Out of the realization that with regulations governing canopies, copings and choice of materials, nothing would be achieved but dull uniformity, reliance was placed on design skill. Dialogue between planner and architects was initiated through a condition in the deed of sale of each site. Where necessary consultations were also arranged between architects of adjoining buildings. Before commencing his work, every architect was fully informed of the characteristics of his site in relation to the planning concept of the centre as a whole. The design for a proposed building was discussed at the sketch stage when modifications could still be made with little loss of time and effort. The method worked well, resulting with hardly any exception in fruitful dialogue at times culminating in spirited exchanges of views. Each instance was a reaffirmation that planning and building were one.

1.8 Black Residential Area

The Black Residential Area was laid out within the framework of a general development plan eventually to accommodate 30 000 persons. Two residential units were designed and partly developed in accordance with the official standard of accommodation prepared jointly by the former Native Affairs Department, the National Housing Office and the Building Research Institute. Past experience had indicated that the requirements of the urban black population were essentially the same as those of the White inhabitants. For this reason a similar urban pattern was adopted. In fact the greenswards combining all parks, sports fields and other recreational facilities were even more essential. Not only was there a larger number of people to use the walkways, but there was urgent need for organizing the sprawl of closely spaced cottages into smaller sections capable of creating a sense of locality. The bands of landscaped open spaces were to reach up close to the homes and so set the stage for the development of community life.

2. SASOLBURG: ASSESSMENT 1960

Sasol's success in overcoming the teething troubles of the unique installation opened the way for enlarging the plant and for exploring in subsidiary industries the chemical potential inherent in the basic coal-from-oil conversion process. In eight years of development the young town had emerged as a coherent environment. Although the trees were still small and most of the buildings were standing uneasy in an open landscape, there was enough physical substance and practical experience to judge the effect of the initial planning provisions in preparation for an ongoing expansion into a distant future. Dangers threatening the very essence of the planning concept were faced in serious negotiations with the authorities and resolved eventually.

2.1 Planning for Contingencies

The original town land had recently been extended by new acquisitions north-west of the White residential development and by the incorporation of an area of 260 ha to the east destined for the establishment of Sasol related industries. The four residential precincts, well on the way to completion, were ready for their crescent shaped formation to be extended into a full circle round the core composed of the town centre and Precinct 5. This healthy position of being ready on a broad front demonstrated vividly how necessary it had been for the planner to interpret the client's instructions not only by the letter of immediate intentions but also in terms of the inherent nature of the development about to be initiated. A large undertaking like that of Sasol, if successful, was bound to grow and demand development beyond what could have been imagined at the outset.

On the other hand, it might well be fraught with unforseen difficulties and in consequence the original planning target of the town would never be reached or it could be delayed for some considerable time. This contingency had also been taken into consideration by confining the initial residential development to three precincts (Nos. 2, 3, & 4) and by concentrating in the town centre all that was necessary for a selfcontained village in one locality: a few shops and offices, the post office and the hotel with its pub forming a concerted environment. Planning in units assured compact development at every stage of growth and saved the surrounding country side from being dotted with urban fragments.

Fortunately the positive contingency prevailed and the preparedness for expansion could be brought into play.

2.2 Main road Plannning

The main road system, as far as it was completed in connection with the first four residential precincts, the Sasol factory and the Black township, had come up to expectation in all aspects: traffic flow, economy and safety. It made for ease of orientation and the inhabitants enjoyed their peace unmolested by through traffic. Above all, the Town Engineer and the Chief Traffic Inspector praised the triple intersections for being self regulating, so much so that nowhere in the town the need for a traffic light had arisen.

In the hindsight of today, it is gratifying to note that the same attitude has been shared by two succeeding town engineers and to this day there is not a single traffic light in Sasolburg. The determination to pursue this policy as long as possible is still alive.

Being a new feature, applied in South Africa for the first time, the concept of access controlled urban main roads was bound to meet opposition. In

1956 the Townships Board vetoed the further use of the system on the grounds that back yards were exposed to public view. In lengthy correspondence the issue was discussed with the Board. The frustrating part was the total disregard of the evident merits of the system by the authorities and their onesided insistence on concealing the untidy habits of a small section of the population. The planner pointed out that service streets along main roads were prohibitive in land use and construction cost and they would not prevent children, dogs and careless people from rushing across the traffic lanes. On the other hand there was a host of regulations to deal with fowlhouses, noxious weeds, dismantled cars and miscellaneous litter. If legal leverage was applied consistently and, possibly, here and there a word of friendly advice added, in course of time, this kind of disorder was bound to disappear.

The impass threatened the new rational planning approach in its entirety. It was resolved only with the official intervention of Sasol. In gratifying sequence after the confused lapse of judgement, the positive relationship with the Townships Board was restored to the same good spirit of dialogue which had prevailed in the early days when new planning issues were discussed and evaluated.

2.3 Allocation of Primary Schools

The index of 1,5 primary scholars per house, as insisted upon by the Department of Education, implied by simple analysis that all families living in the stipulated 400 houses would each have to be blessed with about 8 children to be able to fill a school designed for 600 children. Evidently it was necessary to find a realistic basis for implementing the planning intention of accommodating every child in the school of its own precinct. An investigation was undertaken in 1955 utilizing all relevant records available from the Bureau of Census and Statistics relative to the sensus taken in 1946 and 1951 for four towns similar in nature to Sasolburg: Springs, Krugersdorp, Randfontein and Vereeniging. For comparison Johannesburg, Bloemfontein and Kroonstad were also analysed and in 1951 figures became available for the new town of Vanderbijlpark.

The analysis showed that for the towns in question the ratio of children of primary school age to dwellings varied from 0,66 to 0,82. Being spread over a surprisingly short range these figures gave a good indication of actual conditions but it could be argued that the high birth rates of the postwar years had not been fully reflected. For this reason the analysis was extended to determine the theoretical upper limit of the ratio, on the assumption that the high birth rates of the two census years would be maintained. The result lay in a close scatter round 1,00. In the detailed report submitted to the Townships Board and the Department of Education the figure of 1,0 was proposed as a very safe upper limit for the design of permanent residential units and it was suggested that temporary peaks that might occur in the first decade of a new town should be dealt with by means of temporary structures. In a full discussion that followed the submission of the report not one iota of evidence was given as to how the official ratio had been computed. The authorities then closed the subject and ruled that their figure of 1,5 was to remain unaltered.

Another impass had been reached. Its consequences were serious, since the safety of young children was involved. Frustration caused by the incredibly stolid attitude taken by the authorities was, however, no reason for giving up a vital feature of the planning concept. Fortunately the impending extension of the residential area offered hope for a painless solution, as will be explained later.

In the planning of the new town the principle of dual-medium education, that was current in the Orange Free State at the time, had been relied upon to enable the children of both language groups to attend the school of their own precinct. In practice, however, considerations of school management in conjunction with political trends, were leading towards a stronger separation of the media of tuition into different schools. In the special situation of Sasolburg where 85% of the White population were Afrikaans speaking, it would still be possible to implement the planning concept. The overwhelming majority of children could be accommodated in the school of the precinct in which they lived. Only one in every seven had to go beyond.

For the purpose of applying the planning principle under more usual conditions, it would be necessary to combine two or three residential precincts and allocate the primary schools in proportion to the prevailing language distribution.

3. SASOLBURG: ONGOING DEVELOPMENT

3.1 Industrial Area

3.1.1 A New Dimension

The designation at the end of 1959 of 260 ha of farm land to be used for industries related to Sasol was not only a major addition to the town but it also put a new dimension into the planning scheme of Sasolburg. In the original studies of 1951, there had been no cause for providing an industrial area east of the Provincial road, which was then being established. In siting the three entrance points to the town, however. the remote eventuality of future urban expansion in that direction had been given consideration. Two of the entrances to Sasolburg, the central one and the one to the south were suitably placed in relation to the layout potential of the new industrial zone. The area set aside originally for subsidiary industries south of the Sasol factory was incorporated in the extension scheme of the factory.

3.1.2 Provincial Road

In the preliminary studies for the industrial area, the relocation of the Provincial road further east was concidered but an alternative eastern route was soon abandoned on the grounds that it would;

(i) cut across good residential land on the northern slopes towards the Vaal River;

(ii) remove the access points away from the town, the railway station and the road connection to Parys;

(iii) probably restrain future industrial expansion.

In fact it was appreciated that in its present position the Provincial road was well placed to give direct access to both the town and the industrial area. The two bridges which would be needed in due course to link town and industry were not the deciding factor as their cost would be negligible in comparison with the expenditure entailed in a new bypass road which in turn would also have to be provided with bridges for rural roads to enter the urban area.

To fulfil their functions effectively, main roads have to get to the heart of activities through cleavages in the urban pattern. By-passes are appropriate only where no safe routes through an existing layout can be found.

3.1.3 Industrial Township

In the planning of the industrial layout there were two possible approaches:

(i) railway distribution along the western edge served off the feeder line to the Sasol plant and road access from an eastern ring road;
(ii) the inversed arrangement of rail on the eastern boundary and road to the west.

The second alternative was much superior in that it offered future expansion possibilities and needed less road construction in the initial stage.

In the layout of the township the first few sites were determined to meet specific requirements but for the bulk of the area a correlated road-rail pattern was evolved with a view to providing for a wide range of sites of different sizes to be subdivided later. This deviation from the normal procedure of determining all erven of an industrial township at the outset was adopted to retain flexibility in meeting the divergent and possibly large scale needs of chemical enterprises.

3.1.4 Industrial Expansion

Soon after the establishment of the industrial area by Sasol, a separate site of similar extent was added to the south-east, for the Midlands Factory of AECI Limited. In 1965, reservation was made in the industrial area for the extension of the Sasol plant and this was compensated with additional land which was further enlarged in 1867 to accommodate the National Refinery.

At each stage of the progressive expansion it was possible to maintain a simple coherent layout pattern, contained with within a circular road.

3.1.5 Services

The eastern portion of the layout is reached on a ring road which gives access to cul-de-sac streets and connects to a future through street to link both halves with a bridge over the railway feeder line. The ring street would also be capable of serving any further industrial expansion to the north-east.

Concurrent with streets and railway reserves, a system of pipe reserves was established to connect the Sasol plant with the other enterprises and these amongst themselves for the conveyance of chemical products.

Along the Provincial road P9-5, the need for a gas main to transport Sasol gas under high pressure to Vanderbijlpark and the Witwatersrand provided an opportunity for the establishment of a tree belt, 32 m wide with a 13 m clearance in the middle sectionalized for diverse additional services besides gas (oil pipe, GPO cable and future product pipes together with municipal services). There would also be room for a rapid transit route in future, either on ground or suspended without unduly decimating the tree belt which has become a major feature in the landscape, reflecting the changing seasons in the foliage of the different species of trees.

3.1.6 Grade Separated Entrances

The increasing traffic volume generated by the industrial development and the consequent growth of the town motivated as early as 1967 the construction of bridges in conjunction with grade-separated entrances to Sasolburg from the Provincial road P9-5 and on the two roads linking both halves of the urban layout. In addition to the two existing entrances, one at the railway main line and the other near the centre, a third entrance is being constructed to serve the northern residential areas and the recreation zone on the Vaal.

The provision of grade-separated entrances became economically feasible because in the layout of the town the entry points and linkages had been reduced to the essential minimum.

3.2 White Residential Area

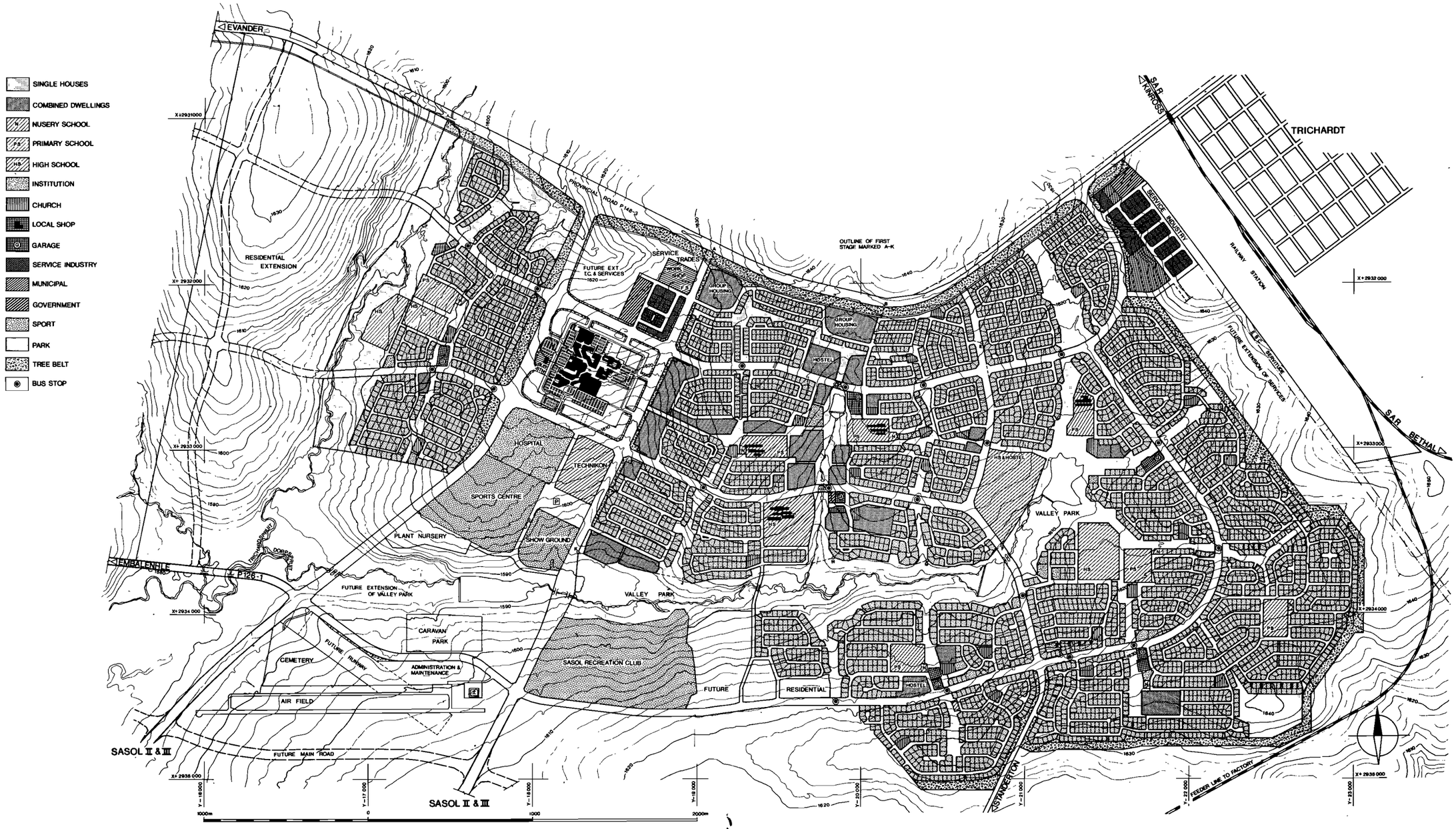
3.2.1 Gradual Growth

Residential accommodation was provided stepwise in proportion to the enlargement of the Sasol plant and the establishment of related processes by other organizations. Whilst Precinct 5 was being developed following the construction of the second main sewer, the first part of a new precinct (designated No. 12) was planned in 1962 in the road fork between precincts 1 and 5. The 300 houses then required did not constitute a complete residential unit. A primary school site was provided as part of the layout but there was no need to enter upon a discussion on the vexed question of how many houses were to be allocated to it.

Over the next three years, Precinct 12 was built up in five successive townships. The new residential development, lying comfortably in the broad dishing of the central valley, comprised ultimately 984 houses and 15 flats, laid out round the primary school and a high school. No further word was spoken about the correlation of houses to primary school but in practice it worked out right, as the reference hereunder will show.

Precinct 15 was established, concurrent with Precinct 12, in three stages from 1960 to 1965. On account of larger erf sizes, the number of dwellings was limited to 637 (583 houses with 54 row-houses and flats), with a primary school at the centre.

Precinct 23 occupied the last remaining space available, after the land to the west, extending down to the Leeuspruit, had been declared mining area. It was completed in four stages from 1965 to 1974, with a total of 898 dwellings (716 houses and 182 row-houses). Besides a primary school



SECUNDA RESIDENTIAL AREA

1 : 25 000

site, a fair sized site was set aside for the eventual establishment of a commercial sub-centre to serve possible larger development in future.

3.2.2 Size of New Precincts

In determining the size of Precinct 12, the index of 0,8 pupil per house was adopted as a considered conclusion from the school analysis carried out in 1955. On this basis it was estimated that 670 Afrikaans speaking pupils would have to be accommodated within the precinct. With the tendency of economics pushing up capacities, the school would be well able to meet this demand. This was the first occasion that a proper correlation was achieved between the inhabitants and the primary school in their midst.

The index 0,8 was confirmed in later studies in which the educational needs of the growing town were monitored. The Town Engineer's yearbook has through the years shown a gradual decrease: during the sixties the index dropped from 0,82 to 0,77, in the seventies to 0,71 and in March 1982 it stood at 0,68. Such a change was to be expected as the initially young population matured into normal age grouping.

3.2.3. Urban Pattern

As the crescent shape of the first four precincts expanded into a rosette, the ring road round the core formed of the town centre and Precinct 5 was given a north-west connection to the Parys road, and a western extension was intended to swing south-west across the Leeuspruit valley towards the potential long range hinterland of the town. In this manner the ring road was to assume the dual function of an inner distributor and a pair of radials connecting the town to its surroundings.

Prospecting results indicating valuable beds of coal immediately west of the town, led to the decision to stop all urban development west of Precinct 12. Already in the design of the first parts of the township the intended western radial had to be swung into a circumferential route to connect up to the Parys road.

The main network benefited considerably from the enlarged size of the new precincts. Savings in road construction combined with ease of orientation.

3.2.4 A New School Issue

In the first stage of development Precincts 1 and 3 had been left without primary schools. The development of Precinct 5 which had no school of its own and the partial use of the school in Precinct 4 for tuition in the English medium resulted in a shortage of primary school facilities in the established sector of the town. Precinct 1 which qualified by a small margin for a school of its own was extended with a layout of 265 houses. This was economical planning in every aspect and justified the provision of a primary school in this precinct.

A school was in fact built but it was of a special kind in accordance with the Education Department's decision to use the site for a regional school for children who had difficulties in following normal classes. Utter chaos followed this decision. The majority of children living in Precinct 1 had to go to the school in Precinct 12 which was in the process of being fully occupied by the children living there. Consequently the northern part of Precinct 12 had to decant into Precinct 15 which in turn had to pass its own children to Precinct 23.

The planner's endeavour to build safety for the children into the plan of this town could not have been nullified more thoroughly than by the action of the authorities. Yet there was a saving grace that mitigated the effect to some extent. The walkways in the park strips had only few crossings with the main roads and these could be safeguarded by scholar patrols or pointsmen.

Had the need for a special school been stated in good time an appropriate site could have been created for it.

3.2.5. Western Extension

The discovery of a fault in the geological strata curtailed the mining programme and the area west of the town reverted to surface development in 1968. Additional land was acquired and the new Precincts 10 and 11 were to occupy both slopes of the valley but development was recently halted at the stream where advanced mining methods were found to be feasible in the given situation. Whereas the traditional pillar method had made mining at shallow depth mutually exclusive to urban development, the new techniques used in total extraction allowed the surface to be used after the overburden had settled and consolidated within a few years. The two precincts may eventually be completed.

3.2.6 Sub-centre Grootfontein

Concurrent with the start of the western extension, steps were taken to establish a sub-centre which was to serve the outer parts of the residential area with goods intermediate to the everyday commodities of the local shops and the broader selection available in the town centre. The sub-centre also relieved the growing pressure on the town centre until the extension plans of the latter could be put into practice.

3.2.7 Analysis of Use Areas

The detailed analysis of the residential area prepared in 1980 is presented in Table 1. Subsequent development to date has not materially changed the picture.

3.3 Town Centre

3.3.1 Growing Up

The development of the town centre reflected the gradual growth and maturing of the town in which people of many walks of life and diverse interests had come to settle and lead their lives. In the initial stage some shops and offices had grouped themselves in the southern sector together with the post office and the hotel with its pub. The magistrate's court had risen on its own ground a little distance away. By 1960 the retail capacity had increased to 4 800m^2, representing already an index of 0,71 m^2 per inhabitant. In the steady growth that followed, retail properties were released step by step in proportion to the growth of the population. Sasol's good judgement in restraining hasty development was demonstrated in a

TABLE 1 SASOLBURG: ANALYSIS OF USE AREAS. DECEMBER 1980

SUMMARY	DEVELOPMENT STAGE 1																WESTERN EXTENSION									
	PRECINCT 1		PRECINCT 2		PRECINCT 3		PRECINCT 4		PRECINCT 5		PRECINCT 12		PRECINCT 15		PRECINCT 23		PRECINCT 10		PRECINCT 11		SUMMARY AT END OF 1977					
																					ALL PRECINCTS		OUTSIDE PRECTS		TOTAL AREA	
DETACHED DWELLINGS	ha	%	ha	%	ha	%	ha	%	ha	%	ha	%	ha	%	ha	%	ha	%	ha	%	ha	%	ha	%	ha	%
DETACHED DWELLINGS	70,66	62,5	28,89	48,3	28,56	44,9	43,91	67,3	38,11	63,3	77,65	58,4	77,63	67,8	89,12	64,8	22,92	34,0	55,47	46,7	532,92	57,0				42,4
COMBINED DWELLINGS	2,08	1,8	8,32	13,9	6,69	9,7	-	-	4,68	7,8	-	-	1,83	1,6	7,58	5,5	-	-	0,74	0,6	31,92	3,4				2,5
RESIDENTIAL	72,74	64,3	37,21	62,2	35,25	54,6	43,91	67,3	42,79	71,1	77,65	58,4	79,46	69,4	96,70	70,3	22,92	34,0	56,21	47,3	564,84	60,4				44,9
COLLEGE	-	-	-	-	2,26	3,5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2,26	0,3				0,2
SEC. SCHOOLS & HOSTELS	-	-	-	-	8,90	13,8	-	-	-	-	8,14	6,1	-	-	-	-	11,79	17,5	3,84	3,2	32,67	3,5				2,6
PRIMARY SCHOOLS	3,85	3,4	4,31	7,2	-	-	4,28	6,5	-	-	3,85	2,9	3,86	3,4	3,86	2,8	4,90	7,3	4,02	3,4	32,93	3,5				2,6
NURSERY SCHOOLS	0,16	0,1	0,19	0,3	0,20	0,3	0,37	0,6	-	-	-	-	-	-	0,16	0,1	-	-	-	-	1,08	0,1				0,1
EDUCATIONAL	4,01	3,5	4,50	7,5	11,36	17,6	4,65	7,1	-	-	11,99	9,0	3,86	3,4	4,02	2,9	16,69	24,8	7,86	6,6	68,94	7,4				5,5
PARKS	9,43	8,3	6,03	10,0	6,18	9,6	4,02	6,2	6,53	10,8	17,37	13,0	9,86	8,6	11,22	8,2	1,71	2,6	14,95	12,6	87,30	9,4				6,9
SPORTS GROUNDS	1,40	1,2	1,30	2,2	1,27	2,0	1,56	2,4	-	-	-	-	-	-	0,52	0,4	-	-	-	-	6,05	0,7				0,5
OPEN SPACE	10,83	9,5	7,33	12,2	7,45	11,6	5,58	8,6	6,53	10,8	17,37	13,0	9,86	8,6	11,74	8,6	1,71	2,6	14,95	12,6	93,35	10,1				7,4
LOCAL SHOPS	0,40	0,4	0,78	1,3	-	-	0,39	0,6	-	-	0,39	0,3	0,35	0,3	-	-	-	-	-	-	2,31	0,3				0,2
CHURCHES	1,11	1,0	0,31	0,5	0,60	0,9	0,35	0,5	0,56	0,9	0,37	0,3	1,02	0,9	0,63	0,5	1,78	2,6	1,37	1,2	8,10	0,8				0,6
PRECINCT STREETS	23,49	20,8	9,38	15,7	9,38	14,5	10,01	15,4	10,21	17,0	24,96	18,8	19,46	17,0	23,98	17,4	9,85	14,7	18,79	15,8	159,51	17,1				12,7
WALKWAYS	0,55	0,5	0,35	0,6	0,50	0,8	0,34	0,5	0,12	0,2	0,25	0,2	0,44	0,4	0,42	0,3	0,10	0,1	0,05	0,1	3,12	0,3				0,2
LOCAL TRAFFIC	24,04	21,3	9,73	16,3	9,88	15,3	10,35	15,9	10,33	17,2	25,21	19,0	19,90	17,4	24,40	17,7	9,95	14,8	18,84	15,9	162,63	17,4				12,9
TOTAL 1A: PROCLAIMED TOWNSHIPS	113,13	100	59,86	100	64,54	100	65,23	100	60,21	100	132,98	100	114,45	100	137,49	100	53,05	78,8	99,23	83,6	900,17	96,4				71,5
TOWNSHIP RESERVES	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8,78	13,0	8,91	7,5	17,69	1,9				1,4
PARK RESERVES	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5,52	8,2	10,63	8,9	16,15	1,7				1,3
TOTAL 1B: PRECINCTS	113,13	100	59,86	100	64,54	100	65,23	100	60,21	100	132,98	100	114,45	100	137,49	100	67,35	100	118,77	100	934,01	100			934,01	74,2
INSTITUTIONS																							61,85	19,1		4,9
TOWN CENTRE																							26,50	8,2		2,1
SUB CENTRE																							6,68	2,0		0,5
SERVICE INDUSTRY																							34,80	10,7		2,8
SPORTS GROUNDS																							41,47	12,8		3,3
TREE BELTS																							15,78	4,9		1,3
GEN. OPEN SPACE																							57,25	17,7		4,6
NATURE AREAS°																							21,29	6,6		1,7
LAND RESERVES																							24,16	7,4		1,9
MAIN ROADS																							91,73	28,3		7,3
TOTAL 2																							324,26	100	324,26	25,8
GRAND TOTAL																									1258,27	100

CORRELATIONS												
1. DET. DWGS: N°	834	325	280	316	321	984	583	716	◇ 265+(70)	◇ 491+(60)	◇ 5115+(130)	ALL DWELLINGS
1.1 AVERAGE PLOT SIZE	847m²	889m²	1035m²	1389m²	1187m²	789m²	1132m²	1245m²	865m²	1130m²	1043m²	SINGLE HOUSES
1.2 TOWNSHIP LAND+/DW	1132m²	1585m²	1683m²	2064m²	1730m²	1269m²	1932m²	1814m²	1509m²	1928m²	1628m²	5245 85%
1.3 RATIO 1.2 TO 1.1	1,57	1,78	1,62	1,48	1,45	1,60	1,45	1,45	1,74	1,71	1,56	COMBINED DWGS
1.4 DWGS/ha TSH LAND+	7,51	6,31	5,94	4,84	5,78	7,88	5,18	5,51	6,63	5,19	5,77	925 15%
2. COMB. DWGS: N°	-	264	141	11	210	15	54	115			810	TOTAL
2.1 EXIST. ROW HOUSES	-	123	-	-	74	-	50	115				6170 100%
2.2 EXIST. FLATS	-	141	141	11	136	15	4	-				
2.3 SITE AREA/ROW HSE	-	366-477:AV 448m²	-	-	-	-	361-376:AV 366m²	371-697:AV 518m²				
2.4 ROW HSES/ha SITE AREA	-	27-21:AV 22	-	-	-	-	28-26:AV 27	27-14:AV 19				
2.5 POTENTIAL ROW HOUSES	54	-	-	-	-	-	-	42	-	19	115	

REFERENCES

+ TOWNSHIP LAND = AREA OF PROCLAIMED TOWNSHIPS LESS HIGH SCHOOL, HOSTEL AND COMBINED DWELLING SITES.
° NATURE AREAS ARE : BIRD SANCTUARY, DITTO EXTENSION AND HIGHVELD GARDEN.
◇ FIGURES IN BRACKETS REPRESENT POTENTIAL HOUSES IN RESIDENTIAL RESERVES.

NOTES

1. "DETACHED DWELLINGS" COVERS SINGLE HOUSES ONLY. "COMBINED DWELLINGS" COMPRISES MAISONETTES, ROW HOUSES AND FLATS
2. THE AREA OF TOWN CENTRE, SUB CENTRE AND SERVICE INDUSTRIES INCLUDE LOCAL STREETS, PARKING & TREEBELTS.

graph which showed close correlation between the population curve and the diagram of retail space.

The commercial growth was punctuated with additions of social and cultural significance. Sasol donated a small library in 1961 to mark the level 7 000 the White population had reached. The village Board of management, established by Province in 1954 with 7 appointed members, took an active interest in creating an appropriate setting for the buildings erected by Government and private enterprise. Patterned paving was laid to pedestrian areas in conjunction with planting and a start was made with the layout of the town garden. On the civic centre side, the new municipal building was ready in 1969 to accommodate the elected town council. The swimming bath was a most welcome addition stimulating great interest in water sport. The cultural life of the town supported through the years by diverse interest groups received great impetus by the completion of the multipurpose theatre in 1975. The twentyfifth anniversary of the establishment of local government was aptly marked in 1979 with a wonderful new library building of which the Sasolburgers can be justly proud.

3.3.2 Retailing Capacity

In 1972 all sites in the town centre designated for shops and offices were fully developed, except for one property kept vacant to facilitate future extension. This was an appropriate moment to record the actual use of the premises and to analyse the composition of the business activities with a view to guiding future development. The survey in which different types of shops and offices were recorded on the basis of measured drawings is summarized in Table 2. In order to assess the activities of the centre in the context of the business pattern of the town, the local shops in the residential areas and the Grootfontein sub-centre were included in the investigation. In December 1972 the White population was estimated at 20 600.

TABLE 2 SASOLBURG: SUMMARY OF BUSINESS PREMISES. DECEMBER 1972

FLOOR AREA ANALYSIS

LOCALITY	RETAIL			FINANCE & AGENCIES			OFFICE & MEDICAL			ENTER= TAINMT		VACNT		GRAND TOTAL		
	N°	m² %	m²/P	N°	m² %	m²/P	N°	m² %	m²/P	N°	m²	N°	m²	N°	m² %	m²/P
TOWN CENTRE	72	21503 65,1	1,04	21	5094 98,8	0,25	38	4597 97,7	0,22	1	599		482 81,3	132	32275 37,2	1,57
GROOTFONTEIN SUB CENTRE	18	5079 15,4	0,25	1	64 1,2	-	1	109 2,3	- 0,01	-	-	-	-	20	5252 11,9	0,25
LOCAL SHOPS	39	6439 19,5	1,31	-	-	-	-	-	-	-	-	-	111 18,7	39	6550 14,9	0,32
TOTAL	129	33021 100%	1,60	22	5158 100%	0,25	39	4709 100%	0,23	1	599		593 100%	191	44097 100%	2,14

TENANTS PERSONNEL % VEHICLES

	N°	N°/100m²	N°	N°/100m²	N°	N°/100m²	N°	N°/100m²	N°	N°/100m²
WHITE BLACK	568 333	1,7 1,0	235 27	4,6 0,5	134 18	2,8 0,4			937 378	2,1 0,9
PERSONS	901	2,7	262	5,1	152	3,2			1315	3,0
VEHICLES	259	0,8	137	2,7	82	1,8			480	1,1

NOTES :

ESTIMATED WHITE POPULATION IN DECEMBER 1972 : 20 600

THIS SURVEY DOES NOT INCLUDE GARAGES AND BUSINESS PREMISES IN SERVICE INDUSTRIAL AREA

RETAILING INCLUDES PERSONAL SERVICE (OPTICIAN, TAYLOR, HAIRDRESSER, JEWELLER ETC)

FINANCE INSTITUTIONS COMPRISE BANKS, BUILDING SOCIETIES, INSURANCE COMPANIES

OFFICES INCLUDE MEDICAL SUITES

The survey quantified the empirical observation that the supply of food had been decentralized into the suburban shops. These had been developed beyond the size and type of trading originally intended. Several groups of local shops were built before retailing was established in the centre and the temptation to jump the gun overruled the planner's advice. Site development of the local shops was controlled by deep building lines to ensure parking on site, but the extent of the building was left to free enterprise and common sense.

This generous belief in human reasonableness has, through experience, been replaced by the conviction that suburban trading had to be strictly circumscribed. Conversely, the developers found out that muti shops and cycle repairs were not exactly the type of tenants originally visualized. Some others have done well boosting local convenience shops into motor car orientated food outlets. Sound lessons have been learnt about the interplay of free enterprise and guidance.

3.3.3 Town Centre Extension

Preliminary schemes for gradual development were prepared between 1968 and 1974 and these were condenced into a two stage programme when the Town Council acquired the land and set development in motion in 1977.

Stage 1 consisting of 7 shop sites with an aggregate area of 3 300 m^2 was to be sited in the town gardens. This was a sad turn, because it decimated a cherished feature of the original layout into two small remnants of open space. The loss, however, was compensated by the soundness of the proposal in the interest of optimal use of land valuable to everyone. The town gardens had not fulfilled the intended purpose. The "Bowl" informally shaped for open air performances had never heard the sound of a violin or the cadence of a recital. The inhabitants had not made the garden their own. The consoling experience was that over lunch the shop assistants and their friends gathered on the lawn (in the absence of benches to discourage loitering). Occasionally the planner spent a lunch break there observing the people and the progress of the trees. The proposal to site the first stage of the town centre extension in the town gardens was motivated by the overriding planning consideration that the new development be closely linked to the existing establishment to prevent any possible split into a prosperous new portion and the old part aging unhappily.

Stage 2, now in the achitectural design stage, incorporates sites for speciality shops, totalling 5 900 m^2 and a hypermarket of 14 000 m^2. All parts, old and new, are fused together along a spinal pedestrian mall. The limited open space on the east side, used for convenience parking and bus station is amply compensated by an extended parking area giving easy access to all parts of the town centre from the west. In the layout pattern provision is made for further growth in future.

3.4 Black Township

On its formation in 1954, the Village Board of Management took over the administration of the Black township under guidance of the Government. In a change of official policy emphasis was laid on the construction of hostels for single workers and family housing was no longer expanded. The prescribed accommodation was in the form of standard units comprising two dormitories for eight persons each with a kitchen-dining room between them. The units were to be set with gaps in repetitive straight rows: as on a chequer board. There was a challenge to turn the monotonuous standard into a more viable layout composed of courtyards enclosed with blocks of two or three units.

In this manner wasteful side spaces were transformed into communal areas available for social gathering and recreation. In a closely adjusted layout the stipulated density was achieved and in addition enough space was freed for a soccer field.

One such scheme was approved and built but for subsequent development an official plan was to be followed whereby continuous rows of dormitory units were arranged like the spokes in half a wagon wheel, converging to the hub from where the entire establishment could be rigidly monitored and policed. The planner's endeavour had come to an end in a situation where the rock bottom of human relations had been reached.

It took more than half a generation of slow changes in attitudes to make it possible in recent years for AE&CI Limited to build for their own workers single quarters and family houses which demonstrate that with understanding and design skill very pleasant practical environments can be created. Sasol is now following with a residential unit in a concerted layout of 300 houses for their employees. These developments hold the hope that with further growth in similar vane the Black township may change from the drab necessity it was reduced to into the pleasant urban environment visualized in the initial planning concept.

3.5 Town Development

3.5.1 Implementation of the Plan

The plan set the stage on which the buildings, street furnishings, the recreation places and trees eventually combined to form the urban scene. Throughout the preparation of the town plan the third dimension had been kept in mind. Localities suggesting special handling had revealed themselves, odd corners had called for attention, certain stretches needed protection, specific points invited accents or vistas. In the finished plan, however, such possibilities for enhancing the urban scene could not be presented. New methods were needed to carry the planning process beyond the traditional norm whereby the planner was to leave the scene for good after writing the conditions and rendering the plan in conventional colours. Thereafter the implementation of the visual scene was left to unrelated endeavours on individual building sites.

A start was made by establishing dialogue between architects and planner. As mentioned, this showed positive results. The public spaces under the control of the Local Authority contained a most important potential for creating an attractive environment in the town centre. At the end of the

fifties when the Village Board of Management had tamed the manifold problems of running a new town, tentative discussions were held to outline the possibilities inherent in the layout. Mutual understanding grew with the task and soon positive teamwork prevailed between town engineer, chief traffic officer and planner, stimulated by good response from the Town Council. Besides site layouts for public buildings, close attention was given to the protection of pedestrians by means of guard rails, built barriers, rugged planting and by constructing a subway and a foot bridge at the approaches to the town offices. Correlation of paving and planting was a recurring subject and much groundwork was done in the parks. Traffic flow and parking was monitored and improvements made where necessary. In the course of time a tradition was established in which design approach and teamwork were happily combined.

3.5.2. Planting

There were few situations where trees and other types of plants did not make indispensable contributions to the experiene of life in towns. In word and sketch, it was demonstrated that planting, besides being a display of the horticulturist's skills, had to perform many practical and aesthetic functions in the built environment. Trees in their fascinating varieties had so much to contribute from treebelts for protection and definition of space to shade giving clusters and avenues or in foils to buildings or as specimens for accent. Shrubs and ground covers were so much needed to relieve hard paving and fronts of buildings and were so much gentler in guiding pedestrian movement than constructed barriers.

Though different in their approaches, the horticulturist and the planner had a vital interest in the use of plants in the urban environment. It was essential that they should pool their skills and work together to achieve effective results in an economical way. Particularly in the selecting of planting material, the horticulturist's concern with climate, soil and husbandry should be oriented by the urban design approach of the planner. The urgent need for such teamwork was, however, hardly reflected in practice.

In cities and towns it was evident that horticulturists, with few exceptions, were shunning such cooperation preferring to regard themselves called upon to decorate the physical environment created by others with applied plant arrangements of their own choosing. Preference was being given to annuals, at great expense to the taxpayer, in expectation of getting spontaneous applause from members of the public during the few precious weeks of flowering. In reality, however, planting in most urban environments should be evergreen, rugged, strong to stand up to the man-made elements. Being self-reliant such planting would need little attention and form dark frames to bring out the colour accents of annuals.

Even with good will and a fair knowledge of plant material on the part of the planner, little cooperation could be expected until the horticulturist had been made aware of the urban design implications of his work.

3.5.3 Parks

The 14 000 trees planted by Sasol in the early fifties were beginning to make their mark in the urban scene whilst the newly appointed Village Board of Management was attending to other matters. In 1960 tree planting was resumed and carried through steadily to a total of 50 000 in 1982.

In the parks a start was also made in the early sixties with the construction of entrances which were dsitinguished by brown stone walling with related planting and had the function of directing pedestrians on to the marked main road crossings and also to keep motor cars out.

There followed children's playgrounds in which the standard equipment of swings, seesaws and roundabouts was amplified with climbing structures to initiate imaginative group games. Timber posts, brick boxes and concrete elements were tried out in different schemes to form supports for slides, firemen's poles and balancing bars. All these elements stimulated movement in three dimensions. Cycle tracks over undulated ground added to the experience. In one case a safe cable slide (foefie slide) was suspended between two timber towers on mounds with a sag in the cable to break the force of the movement. The playgrounds were designed to allow the children of different age groups to exercise their imagination, skill and courage in stages.

In the mid-sixties, somewhat belatedly, a start was made with the construction of walkways in the park strips. This brought the parks closer to the people and the high school pupils on their bicycles made full use of the safe all-weather routes.

Parks are never quite finished. At Sasolburg the park strips are still in need of sustained attention to develop their potential to the full. Many more trees have to strengthen the existing planting patterns in the form of avenues along footpaths, groves in widenings, and accents in convenient spots. Walkways have to be extended. Schrubs in groups are to enhance entrances and guard walkway junctions from short cuts leaving shabby bare patches on the ground. Children's playgrounds are needed in several precincts and their setting should be enhanced with low hedges and beds of sturdy planting.

This is an ongoing challenge calling for imagination combined with good management to stretch funds and manpower to best advantage.

4. SASOLBURG: EXPANSION

In the late seventies the Town Council of Sasolburg entered into active township development through the acquisition of two speculative townships, including attendant vacant land. Vaal Park, the larger one of the two, had been established in 1948, ahead of the Sasol project, in anticipation of the petrochemical works mooted by Anglo Vaal. A colourful prospectus invited the public to "come in on the ground floor" of a brand new city which offered healthy suburban living on the banks of the Vaal in combination with the "assured development of the coming industrial centre of the Orange Free State". The glowing

prospects were illustrated by word and sketch in a picture which in retrospect appears as an urban nightmare. Fortunately this venture lay dormant for many years for lack of services which evidently had been overlooked by the authorities in granting approval.

The other township appeared on the scene in 1969 in the form of a long wedge rising from the Vaal along the eastern boundary of the Sasol property right up to Sasolburg. Its expanse threatened to impede future concerted development in a broader sense and the layout brought undesirable and dangerous features right up to the boundary of Sasolburg. Urgent negotiations with the Townships Board and the developer brought about a redesign of the layout in smaller portions and in harmony with the planning principles of Sasolburg.

The two townships were then related to a simple main road system, to connect them to industries and town, whilst safeguarding the orderly development of the broad northern slopes down to the river. Potential development extended in width from P9-5, the western boundary, to the natural limit of the Taaibosspruit to the east.

In preparation of impending development in the Vaal Basin, two new townships are being established by the Town Council, to the south of the existing development and on Welgelegen bought from Sasol. The two new townships will make the northern residential areas contiguous with the town. In the Vaal Park layout, the residential plots owned by the Council are being adapted to present day needs by means of consolidation and subsequent redesign for smaller units arranged in crescents and culs-de-sac or other forms of peaceful environments. Planning action is being initiated in the northern part of Vaal Park to fuse a disjointed layout of shop sites into a village centre with commercial and communal facilities arranged round a pedestrian core. The nature reserve between the river bank and the flood line will be preserved and partially developed for recreation by the Town Council who some years ago established the attractive recreation park on Abrahamsrust.

The town centre of Sasolburg growing in strength through major additions now being prepared will remain unchanged in its present position. Seen in relation to the northern residential development the location appears excentric. Looking at the entire urban picture, the inclusion of the Black inhabitants with their increasing demands and their enchanced purchasing power balances the urban pattern. The eventual completion of the western precincts will equalize further the overall spread.

Remembering the several instances of fearful concern for the orderly development of the northern areas, the Town Council's participation in township development entails a welcome assurance that the traditional planning logic will prevail. It is good to know that the spirit of Sasolburg is alive and well and remains active at home.

5. SECUNDA: THE NEW TASK

5.1 Starting off

On 5th December, 1974, the Sasol II project was announced. The planner's brief was again brief:

(i) a new town of 11 000 tot 13 000 inhabitants was to be established to serve the new factory in the eastern Transvaal;
(ii) the locality would not be known until the prospecting programme was completed in about two months;
(iii) time was of prime essence and necessitated the appointment of a firm of planning consultants to work together with the planner;
(iv) the spirit of Sasolburg was to be infused into the new town.

Within a few days, a schedule of work was prepared listing all aspects to be considered, information to be collected and contracts to be established, and a provisional time chart was plotted for the performance of the work up to the issue of tender documents for civil engineering contracts and house construction at the end of 1975.

An organizational framework was set up, managerial functions were allocated for negotiations on the procurement of basic services, functions and procedures of liaison committees were correlated, aerial mapping and subsoil investigation put on stand-by. A socio-economic survey of the south-eastern Transvaal was commissioned. Years of experience in techniques and administration guided by the team spirit that had made Sasolburg, gave the new town a flying start.

Planning authorities were contacted to clarify standards to be adopted. A short study tour to Great Britian was initiated. On 21 January 1975, the firm of Mallows, Louw, Hoffe and Partners, architects and planners, were appointed as planning consultants. An organization in which both professions were integrated was essential for the implementation of the planning philosophy of Sasolburg in the new town.

The study tour from 8 to 22 February 1975 was most useful to update earlier acquaintance with British new towns and to test the planners' own thinking. The detour via the new satellites of Paris put new slants on city building. The observations and interviews were subsequently compiled in two volumes including maps drawn to identical scales.

5.2 Interpretation of Brief

The salient issues of the Sasolburg experiece were summarized as follows:

5.2.1 Road Planning

The channelling of vehicular traffic into an access-controlled main road system had freed the residential areas of disturbance from through traffic. It had also improved road safety considerably as a result of reducing conflict points to a minimal number of street intersections. Orientation was facilitated through the structure introduced into the urban fabric by the main roads.

5.2.2 Pedestrian Movement

The walkways leading to the schools, playgrounds and shops and linking the residential areas with each other and the town centre were making

movement on foot safer and more pleasant in landscaped surroundings. Not only children benefited from this facility but so did all age groups. The use of the walkways for pedal cycles proved very popular with high school scholars and with workers on their way to the factory. The safety aspect was being emphasized by the inhabitants as a vital feature of the quality of life at Sasolburg.

5.2.3 Residential Pattern

The park strips into which the walkways were laid articulated the residential areas, dividing them into smaller parts where variations in the development pattern combined with changes in topography and planting brought about distinct localities. Phased development of these parts made it possible to create integrated environments of streets, buildings and planting at an early stage.

5.2.4 Strong Centre

The action of a strong centre comprising all the needs of society — (shopping, cultural and social activities and administration) had given Sasolburg a lively permanent focus — a face with many facets — capable of coping with changing requirements of the growing population and with new dimensions in the urban layout. As experience had clearly shown, decentralization should be confined to every day convenience shopping in the suburbs in addition to sport facilities and service industries.

5.2.5 Evaluation

The four foregoing planning principles had proved their worth and would naturally be applied again to the new town. Besides these factors making for continuity in planning approach, the quarter century that had passed since Sasolburg was laid out had brought about some far-reaching changes.

In the face of the steady increase in motor car ownership of all population groups, the oil crises knocked a painful dent into the optimism of continued growth of the South African economy. Climbing inflation rates were beginning to cloud the hedonistic scene of the Consumer Society. Above all a growing concern about the energy resources of our globe forecast restraint on the most remarkable feature of our time: the freedom of individual movement in motorized tin boxes. Whichever way the looming future was interpreted, there was an obligation on planners to prepare for the effective use of public transport in conjunction with economy in land use to contain wasteful sprawl in urban growth. Efficiency of transport and density of development were correlated.

In contrast to track-bound modes of transportation, buses were flexible in routing and timing — two great advantages in a town of the size contemplated. Sasolburg assumed its layout pattern from the endeavour to tame the private motor vehicle. The new town was due to get its stamp from the provision for public transport, in readiness for the new century.

5.2.6 Public Transport

Analysis of the different routes adopted at Sasolburg for staff buses operated by several companies led to the conclusion that the most effective route for public transport would be through the circumferential park strips. From there all residential development on both sides would be served equally well. Whilst, buses and trams had been allowed to enter pedestrian areas in numerous town centres, the appearance of a bus in a park would have a disturbing effect. People relaxing there and, particularly, children playing ball games would be interfered with and endangered by such intrusion. There was also a very practical consideration which ruled buses out of parks altogether: park entrances remaining open for the entry of buses would be a temptation to motorist inclined to drive wherever it was physically possible. No notice board or policing and education would keep the park safe from a motley invasion of vehicles. The other equally compelling reason against bus routes in parks would be the cost involved in constructing separate roadways.

After a good look at different methods of introducing public transport into the urban fabric of the British new towns, the conclusion was reached that bus routes had to coincide with motor roads. This approach was sound with regard to construction costs but it demanded that concerned attention be given to minimizing the conflict between pedestrians and vehicles at bus stops by means of grade separated crossings or other means of traffic control.

5.2.7 Allocation of the Primary Schools

Apart from all the other frustrations experienced at Sasolburg, there was inherent in the concept of residential precincts the difficulty of correlating houses and primary school under ever-changing conditions of language groups and age pattern of the population. To gain greater flexibility it would be desirable to open up the layout pattern of the residential areas without of course losing the homely scale experienced at Sasolburg.

5.2.8 Modified Approach

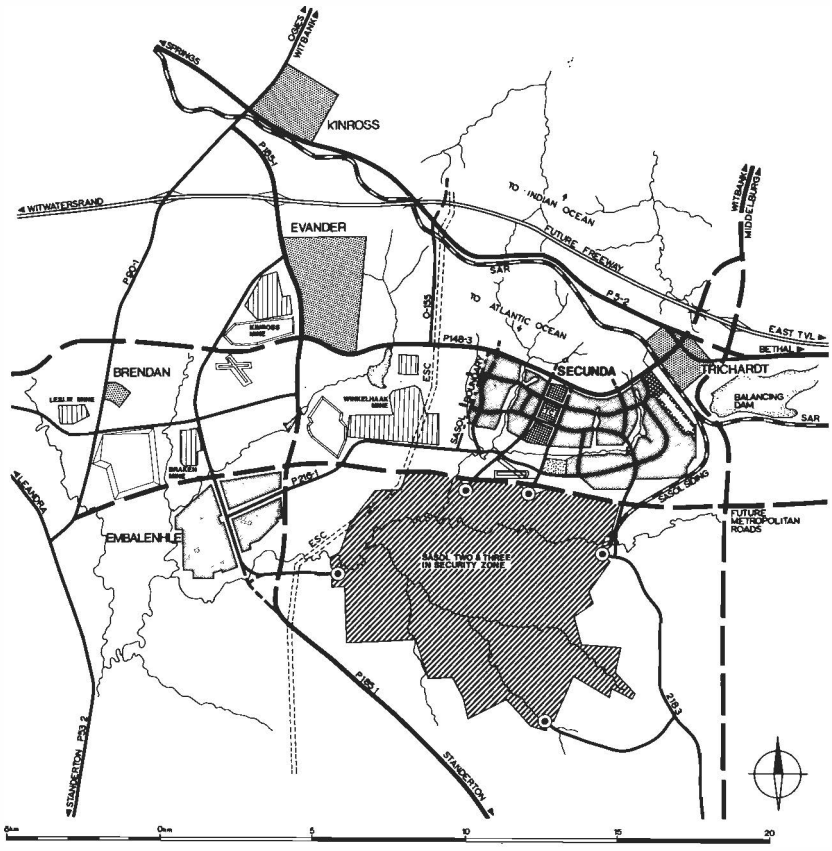
The adaption of two of the planning principles to changed circumstances gave the design approach to the new town a special challenge and compelling interest. The urban pattern would be characterized by the dual purpose roads, adapted to private and public transportation, which were to serve bands of urban development up to 500 m wide on both sides, according to accepted walking distances from houses to bus stops.

6. SECUNDA: REGIONAL SETTING

6.1 Selection of Factory Site

On 12 March, 1975, the site chosen for the Sasol II factory was pointed out by the Technical Director and the planners were invited to find a suitable locality for the town.

The factory was to be sited on a piece of land underlain by poor coal deposits, decimated by dolorite intrusions and earlier natural combustion. The large site, to assume eventually an extent of 3,5 km by 2,5 km = 8,75 square kilometres, stretched along the southern slopes of the Bankspruit valley, at a distance of 7 km south-west of Trichardt and 8 km south-east of Evander. The location had been determined by the large deposits of



SECUNDA GUIDE PLAN

suitable coal in combination with the availability of large quantities of water and power. Good access by road and rail together with direct connection to the oil pumping mains from the coast to the Reef represented a strong determinant. The soil of the surrounding farm lands was to be of modest agricultural and grazing value. All these requirements had to be met within reasonable proximity of the consumer market of the PWV region (Pretoria-Witwatersrand-Vaal Triangle) and within link-up distance of Sasolburg for piped products and commuting.

6.2 The Site for the Town

The parameters for the town site were the following:

(i) injunction by the Department of Planning to relate the new town to existing development to avoid urban scatter;

(ii) optimal proximity to the factory: clear of possible air pollution but close enough for daily commuting and timely arrival of key personnel during critical phases;

(iii) position in lee of prevailing winds;

(iv) favourable relation to infrastructure (road access, railway stations, water, power, effluent);

(v) minimal neutralization of coal deposits;

(vi) suitable topography characterized by moderate slopes and a coherent configuration favouring optimal orientation of buildings and the emergence of a sense of locality;

(vii) generous hinterland to absorb eventual growth beyond what could be foreseen at the start.

Preliminary subsoil investigations were carried out to obtain indications of the relative merits of the sites under consideration. Throughout the area shallow soils were overlying sandstone and dolerite of varying degrees of compaction. Greasy black clay was dominant in the flood plains of the valleys.

Three possible sites were examined. The one recommended for adoption was situated south of the Provincial road P148-3, the first half of which was being constructed at the time to link Evander and Trichardt. The site met all the criteria mentioned except that future growth beyond the estimated population would be needed for the new town to integrate with Evander. On the other side, however, it was contiguous with Trichardt situated on the opposite side of the railway line. The topography was characterized by gentle slopes that formed a valley opening westward from a bowl-shaped eastern end. A burnt-out patch in the coal seams occur ed just at a good spot for the town centre to be located in a prominent position on high ground.

The entire site was outside the pollution zone, 4 km wide measured from the source on the factory site, in accordance with the critical limit set by the Health Department.

The northern slopes of the valley would lend themselves naturally for urban development of the size envisaged and the other parts of the coherent landscape remained readily available for ongoing development later. To the north of this site, across the Provincial road, there stretched a broad hinterland which would become available in the long term after the coal was mined by total extraction methods.

6.3 Climate

The site lay on the southern flank just below the ridge of the hills dividing the catchment areas of the Atlantic and Indian Oceans. In this raised position astride the 1600 m contour line, the countryside was exposed to the south-western thunder storms and to the biting south-easter in winter but it was also fanned by the cooling breeze prevailing in summer. In addition to these characteristics typical for the Witwatersrand, there was an occasional wind intrusion from due east.

Adequate rainfall, on average 650 to 700 mm per year, could be expected during the summer months.

6.4 Preparatory Planning

At the beginning of May 1975 the recommended site was approved officially in the context of a preliminary development plan. The outline of the land required for factory and town was plotted on a map and the options for the respective farm positions negotiated. Aerial surveys and soil in-

vestigations were producing preliminary results.

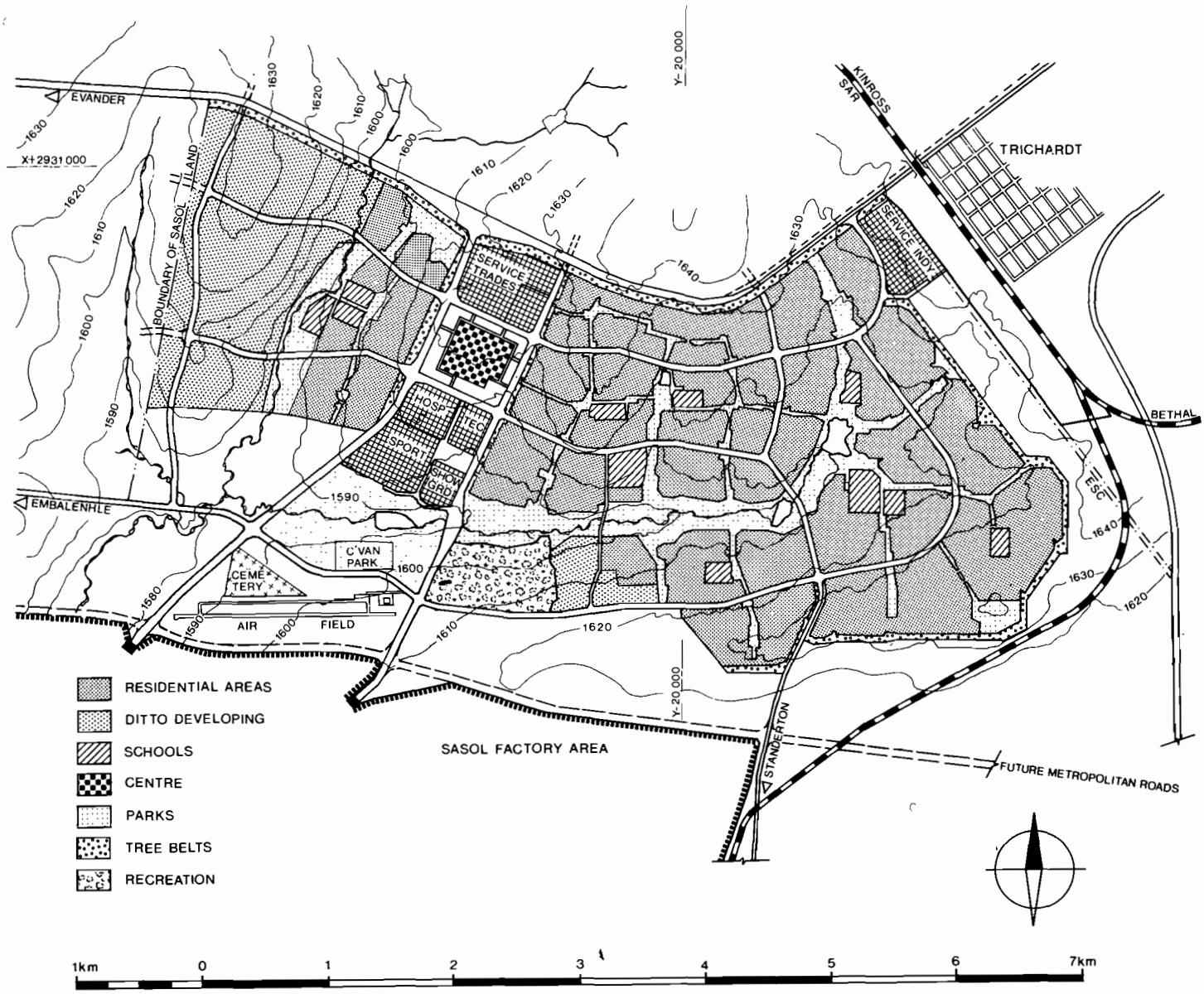
The large plant was finally oriented to the topography and, together with the layout diagram for the town, related to a basic road network which was marked out in cooperation with the traffic consultant, Dr. P.W.B. Kruger. A system of graded main roads was to serve in several stages of development the entire region extending from Kinross in the west to Trichardt in the east with Evander and Secunda situated on opposite sides of the spinal road. In a sequence of studies, punctuated with discussions to clear problems with the authorities as they arose, the stage was reached on 27 May 1975 for presenting to the Board of Sasol the setting and general disposition of the new town. The next step was the presentation on 10 June 1975 to the Guide Plan Committee on which all Government bodies were represented. On that day, Sasol was authorized to proceed, the options were implemented and the location of the new town was announced. Sasol bought all land at agricultural prices cum improvements, unaffected by speculation.

7. SECUNDA: FIRST STAGE FOR SASOL II

7.1 General Disposition

The town centre, sited in its predetermined position on the burnt out coal seam, had ample space on both sides for the development of residential areas. For reasons of economy in the reticulation of services the whole of the accommodation required for Sasol II was planned to the east, leaving the western portion in abeyance until future extensions were required. A main road passing the town centre on its west side was provided to give access to the town and the factory from the Provincial road P148-3. A corresponding road on the east side of the centre was to link the town with the factory but not to connect to the Provincial road. In future it could extend into the northern areas via a bridge or a subway.

Two urban main roads were to convey the vehicular movement of the entire



SECUNDA GENERAL LAYOUT 1 : 50 000

new town in its first stage. They were to bring in the traffic from the main access road and carry it to all parts of the layout. Laid generally parallel along the contour lines, they were so spaced that each road served bands of development 350 to 500 m wide on both sides. These were the roads intended for the dual purpose of conveying private traffic and carrying public transport. The spacing was determined in accordance with generally accepted walking distances to bus stops. By a fortunate coincidence the space between P148-3 and the flood line in the valley allowed for a balanced layout wherein neither the economy was squeezed by close spacing of the roads nor the walking comfort was stretched by wider spacing. At both ends the roads could be elongated carrying the simple pattern into the future layout. A north-south link road was provided at the eastern end of the initial stage.

7.2 Residential Area

The residential area of the initial stage was enhanced by a large valley running from north to south in the middle of the layout. It was developed as the major park strip with the old farm dam left in it. On both sides it was flanked with sites for higher residential densities (group housing, two-storeyed row houses and flats up to three storeys high.) The two local shop sites were placed where the walkway in the park strips crossed the main road by means of underpasses.

At quarter points in the 2 km length of the township, there were two minor greenswards running north-south. At all intersections of main roads with park strips, bus stops were foreseen, spaced on average 600 m, so that passengers could continue on foot in the parks immediately upon alighting. Subways were proposed at all such crossings but their construction was deferred, except in the middle position where the force of stormwater lent strength to the planner's arguments.

A park strip extending east-west at the centre between the two main roads was to link the several parts of the layout with each other and with the primary schools. A westward extension was to lead to the town centre and in its course a footbridge was visualized over the main road laid in a natural depression. The broad valley to the south was seen rich in opportunities for sport and engagement of nature. It was to be laid out with divers facilities ranging from trim parks, picnic places and play areas, to restful stretches and natural kranzes, ponds and sponge areas planted with indigenous species and some used as teaching gardens.

Planning procedure went fast. From the layout sketches on 28 June 1975 the preparations of plans proceeded to approval in principle by the Transvaal Provincial Administration on 16th September 1975. The first sod was turned for simultaneous construction of roads, services and houses on 1 March 1976. The first family moved into its home in July 1976 — 14 months after the site for the new town had been approved.

The use area analysis of the first stage of the residential area is shown in Table 3.

TABLE 3 SECUNDA: SUMMARY OF USE AREAS. RESIDENTIAL AREA FIRST STAGE

TYPE OF USE	ERVEN N°	AREA m²	TOTAL AREA%
DETACHED DWELLINGS	1460	141,14	40,25
COMBINED DWELLINGS	23	53,50	15,25
RESIDENTIAL (c)	1483	194,64	55,50
SECONDARY SCHOOLS	1	8,82	2,52
PRIMARY SCHOOLS	2	7,00	2,00
NURSERY SCHOOLS	2	0,47	0,13
EDUCATIONAL	5	16,29	4,65
PARKS	29	38,56	10,99
TREEBELTS	9	11,70	3,34
OPEN SPACES	38	50,26	14,33
SHOPS & GARAGES	4	2,24	0,64
CHURCHES	12	4,34	1,24
INSTITUTIONS (b)	1	1,17	0,33
MAIN ROADS		25,18	7,18
LOCAL STREETS		56,58	16,13
TRAFFIC		81,76	23,31
TOTAL AREA (a)	1543	350,70	100

NOTES :

(a) THE OUTLINE OF THE FIRST STAGE OF SECUNDA IS MARKED ON THE LAYOUT DRAWING WITH THE LETTERS A TO K

(b) "INSTITUTIONS" REPRESENTS COMMUNITY CENTRE

(c) "DETACHED DWELLINGS" COMPRISE SINGLE HOUSES ONLY

"COMBINED DWELLINGS" ARE COMPOSED AS FOLLOWS :

GROUP HOUSES	7 ERVEN,	22,45ha,	374*
ROW HOUSES	9 ERVEN,	19,31ha,	483*
FLATS	6 ERVEN,	8,23ha,	412*
HOSTEL	1 ERVEN,	3,51ha -	
TOTAL	23 ERVEN,	53,50ha,	1269*

DETACHED DWELLINGS	1640
ALL DWELLINGS	2729

*ESTIMATED DWELLINGS

7.3 TOWN CENTRE

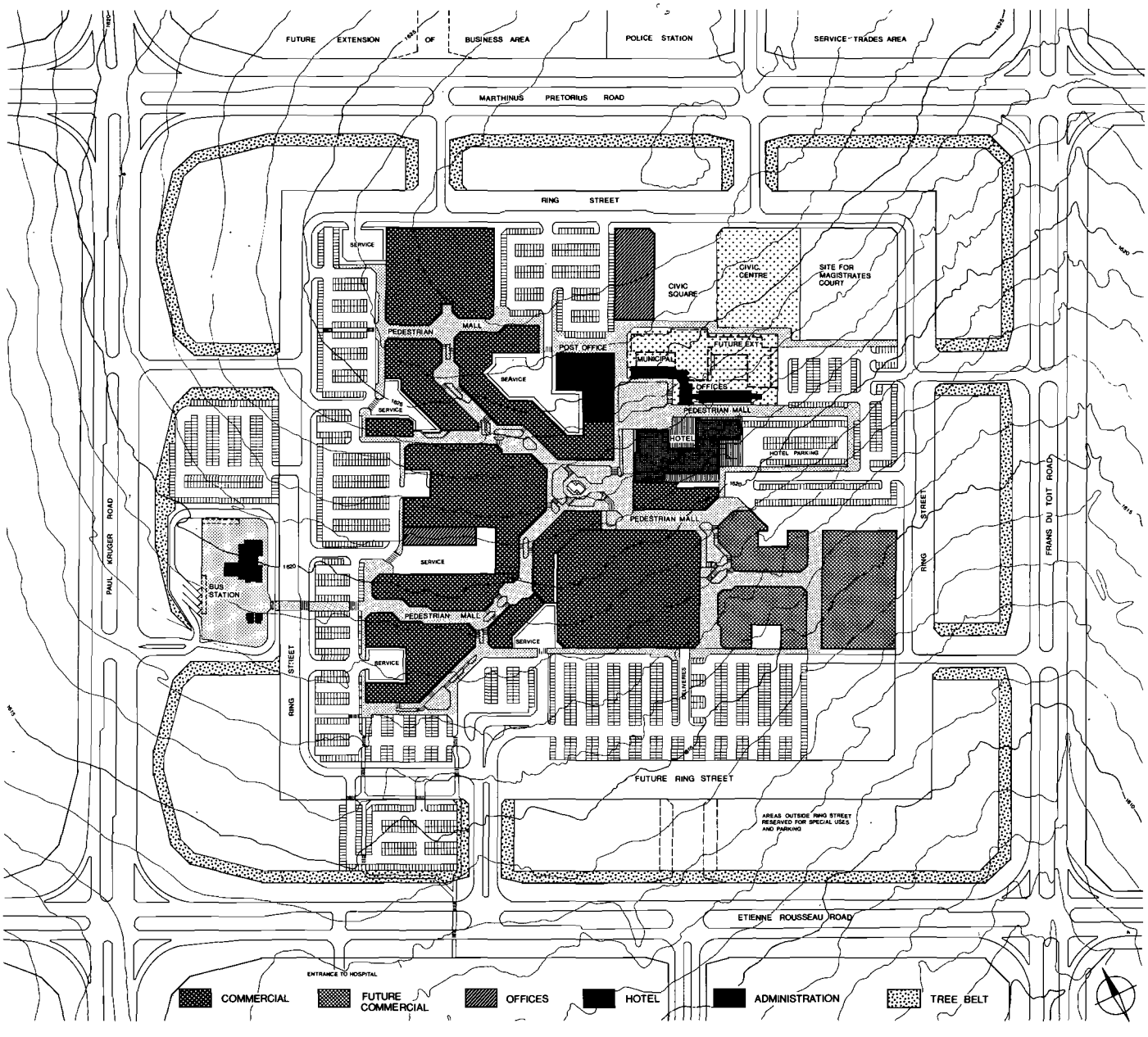
7.3.1 Layout

All functions of the centre — retailing, administrative, social and cultural — were provided for in the core, 20 ha in extent, inside the 30 m ring street which was designed to serve all parts of the layout and give access to the parking areas immediately adjoining the different uses. The ring street would be reached from seven potential entrance points on the main roads which defined the site of the town centre, measuring 700 m x 600 m = 42 ha. The space between the ring street and the site boundaries was created to meet all sorts of contingencies ranging from additional parking to transportation needs and diverse future uses including the possibility of a commercial-recreational building bridging over the street.

The bus station was established in the western section with direct connection to the main road. The outer 10 m width of the reserve space was designated for landscaping in diverse planting patterns, expressing the different parts of the well modulated topography and to set off the centre from the hard asphalt bands of the main roads.

7.3.2 Design

The design of the core was occasion for intense, spirited cooperation with Mallows, Louw, Hoffe and Partners, colloquially referred to as MLH. In a bundle of rough sketches the process was recorded as it clarified and condenced the layout pattern. Bill Birrer, presenting a neat set of diagrams made a convincing case for starting the growth process of the core right in the middle instead of favouring the eastern portion in correlation with the residential development. The graphic dialogue with Zel Macek built up to that memorable flash shortly before one midnight when the two central squares fell into place together to



SECUNDA TOWN CENTRE

1 : 5 000

form the hub of the pedestrian mall system — the essence of the entire layout. The design sequence was one of those great spells when planning and architecture became one.

7.3.3 Building and Spaces

As at Sasolburg, the estimated requirements for commercial, administrative and civic purposes were visualized in building units of appropriate sizes and these were set into congenial groups, enclosing malls and squares. Shoppers, business men and those just enjoying themselves were seen moving through these spaces, experiencing the changing shapes of passages, widenings and courts with new vistas opening at every turn. The terrain was not easy with slopes averaging 1 in 25. Steps and ramps had to be used frequently. The changes of levels were kept well below one metre and five to seven comfortable treads were to give people a feeling of being swept up. All parts of the town centre could be reached with wheeled aids. The frontages of the buildings facing pedestrian spaces were to be provided with canopies projecting generally 2,4 m over the walkways to protect the people from sun and rain. Trees and planting beds were to soften the built environment. Deliveries were relegated to service yards clear of pedestrian movement.

The shop buildings were kept at two storeys, in proportion to the malls, generally 10 m wide. Another reason for this limitation was the need for adequate space to create frontages for show windows and breadth in the surrounding space for the layout of service yards and parking areas. The magnets of department stores and supermarkets stayed at the ground floor. Hotel and offices were going higher depending on type of use and situation.

Guided by a market research report in which the growing potential of Secunda as a regional centre was stressed, the layout was to comprise an ultimate gross leasable area for retailing of 80 000 m^2. This envelope would allow the town centre to meet contingencies well beyond present expectations without bursting its compact layout. In addition, provision for further retailing and general commercial growth was made in the area to the north which could be linked with a shopping mall beneath or over the main road.

7.4 Central Area

7.4.1 Central Services

Designing a new town for public transport implied that all services to which the inhabitants had to have access could be reached conveniently by communal conveyance. Diverse types of uses — some of them demanding large stretches of land — had to be acommodated at the centre. To this end the town centre was extended both to north and to south, to form a central zone large enough to accommodate everything the town needed for its effective functioning. The only exceptions were the service industrial area which, on account of its special nature, was placed at the periphery of the town and the cemetry which depended on suitable soil (not easy to find at Secunda) and demanded a deep hinterland for continuing growth.

7.4.2 Centre North

This area, nearly equal in extent to that of the town centre, was planned to accommodate service trades together with the police station with depot and the municipal work base comprising workshops, stores, transport depot and fire station. The service trades area was laid out for small workshops and warehouses which for the convenience of the public needed a central location but would disrupt the compact pattern of the retail zone. In scale of operation, the activities to be accommodated on the area were distinctly different from the service industries where heavier, bulkier specialist work attracted the general public to a much lesser degree.

A large portion of the centre north area was to be kept in reserve for the long term future expansion of both the service trades and the retail core.

7.4.3 Centre South

On the large expanse of land descending toward the valley park, provision was made in the first instance for a hospital site and a technikon. Later additions would include a sports centre and show grounds together with ample parking. This type of development would be of an open nature amenable to landscaping to form a transition to the recreation area in the valley.

8. SECUNDA: SECOND STAGE FOR SASOL III

8.1 General Disposition

The decision late in 1978 to build the Sasol III factory to an identical extent next to Sasol II released an avalanche of simultaneous work. The new construction was to be undertaken immediately with existing teams and equipment as a continuing process extending from Sasol II. The staff for the new plant was being recruited and would need accommodation of various types in the near future. The structure of the new residential expansion had been sketched out in conjunction with the design of the first stage. Work on township layouts was taken in hand as soon as preliminary information on subsoil conditions was received and the flood lines in the shallow bowl of the site had been established.

8.2 Residential Expansion

Within the skews and curves of the main roads, it was possible to maintain the general pattern of local streets running predominantly east-west to attain optimal orientation for the single house sites. Combined dwellings were not favoured neither by tenants and prospective owners nor by management. The school sites, previously discussed with the Education Department, were confirmed on the basis of 0,8 primary scholar per house.

Three sites were created for local shops, measuring on average 5000m^2 in extent, with a FAR 0,25 to allow for adequate parking and some planting. Together with the two shop sites in the layout of the first stage, the total retailing provision in the residential areas would amount to 6300m^2, representing an index of 0,24m^2 per inhabitant.

The extent of the land available for residential development was severely

decimated by the Health Department's instruction to double the pollution zone in consequence upon the establishment of the Sasol III factory. The critical radius, increased accordingly from 4 km to 5,6 km, eliminated the south/western portion of the residential area for the time being. The matter would be reviewed when conclusions on the actual effects could be drawn from the monitoring records of the two plants in full operation.

8.3 Western Extension

As the large expanses of temporary housing are being phased out with the termination of the construction work, the residential area to the west of the town centre is being developed for permanent employees of Sasol. As the extension takes shape, progressively the town centre will assume it's intended central position.

8.4 Effects of the Town

The doubling of the population has stimulated the growth of the town centre which is moving towards completion of its central and western sections. With new buildings opening for trading, the mix of merchandise broadens in the lengthened malls. The adjoining parking areas are paved and planted. In addition to the lively atmosphere which has animated the pedestrian malls and squares from the start, for the first time the outward appearance of the town centre is beginning to take shape in a coherent silhouette.

The south-eastern section remains dormant ready for another bold expansion move in future. In the residential areas, large numbers of comfortable houses have been built, of generous size and well appointed. Thousands of trees have been planted by Sasol and the Local Authority and many gardens give their houses a pleasant setting. Yet large parts of the town still have the appearance of a construction camp. This can be remedied only through generous planting in streets, parks, treebelts and private gardens. Involvement, time and patience is needed to catch up with the natural environment on the extremely fast construction programme. A determined effort is being made in emulating the green setting of Sasolburg even in an environment which is not very friendly to plant growth.

In the Black township Sasol is taking an active part in cooperation with the Administration Board in providing optimal planned accommodation for their employees. At Kinross, Sasol with the assistance of the Town Council, has been active for some years in establishing an entire township for their staff.

9. IN CONCLUSION

9.1 Standards of Performance

To close this report on the planning approach to Sasol's two new towns, it may be appropriate to note the criteria that have guided the process.

1. Any endeavour to create urban environments worth living in must be comprehensive: all the different elements of which the ultimate urban scene will be composed must be given due consideration at the outset.
2. This is the task of the planner who is thrown entirely upon his own devices — imagination, experience, judgement — and has to clarify his intentions in dialogue with himself. Ruthless self-criticism is his safety-net in testing all his ideas in the context of urban complexity to ensure that they are functional, practicable and economical as well as acceptable socially.
3. Once a coherent picture has emerged and has been trimmed to the essentials, the proposal has to be documented in concise form and fully motivated to show the client and interested parties what they may expect. Constructive criticism brought forth in the ensuing dialogue is bound to enrich the final review of the scheme.
4. The planner must give sense of direction to the whole process of development and by persistent initiative ensure continuity of quality control in the process. The planner's attitude must motivate the entire team.
5. Current rules, guide books and procedures have to be examined for their relevance to the project in hand. Nothing must be accepted that is not amenable to rational assessment.
6. Dialogue with the authorities must be conducted on the basis that officials face the same complex realities and the same economic stringencies as the planner does. One-sided rulings and official taboos are highly dangerous, as they may nullify rational planning and consequently affect the common weal.

9.2 Appreciation

A challenging experience has on two separate occasions proceeded through the entire spectrum of planning from regional analysis to main road planning, land use allocation and township layout followed by guidance of the three-dimensional realization, terminating in the design of children's playgrounds.

In a spirit of understanding and enterprise the S.A. Coal Oil and Gas Corporation Limited made it possible to apply a rational approach to the layout of the two new towns. For this unique experience I am deeply grateful. In particular I wish to thank those who through their personal involvement made the venture possible:

— Dr. P.E. Rousseau, Managing Director and Chairman of the Board, for his trust in sensible looking, yet untried methods,

— Dr. D.P. de Villiers, who as Secretary, Managing Director and Chairman of the Board, has given enormous impetus to the planning schemes through his abiding critical interest in all facets of the urban development.

— Mr. Aage Brink, Construction Manager, for his confidence and fruitful cooperation in the crucial beginnings,

— Dr. J.A. Stegmann, Managing Director, for maintaining stimulating dialogue on all aspects of planning,

— Mr. A.M. Muller, General Manager, Sasol Townships Limited, who with his deep involvement and his skill of getting things done has given a very special significance to the many memorable years of mutual trust and working together,

— Mr. F.J. Nel, General Manager, Sasol (Transvaal) Townships Limited, for the teamwork he engendered during difficult times of rapid development under adverse conditions,

— Mr. E.J. de Wit, Manager Civil Works, for effective cooperation in a quiet key under pressing circumstances.

Thanks go to all at Sasol I, II and III, directors, management and staff members who have taken enthusiastic part in the planning venture.

The increasing understanding and cooperation with the Town Council and staff of Sasolburg has been a most precious experience and holds the assurance that the spirit in which things have been done will carry on well into the future.

Equally so the close teamwork with the Health Committee and staff of Secunda has been marked with an agreeable personable touch and augurs well for the unfinished task ahead.

Finally, the grand teamwork of all the consultants, the engineers on site and the collegues at Mallows, Louw, Hoffe and Partners has made the planning work a memorable experience and is gratefully appreciated.

To Professor Dr. E.W.N. Mallows I am much indebted for his invaluable advice and criticism in the formative stages of the Sasolburg scheme and for his untiring support and friendship during the critical phases of the Secunda project.

In conclusion, the age-old notion that the calibre of the client is reflected in the final project could not have been exemplified more fully than in Sasol's two new towns.