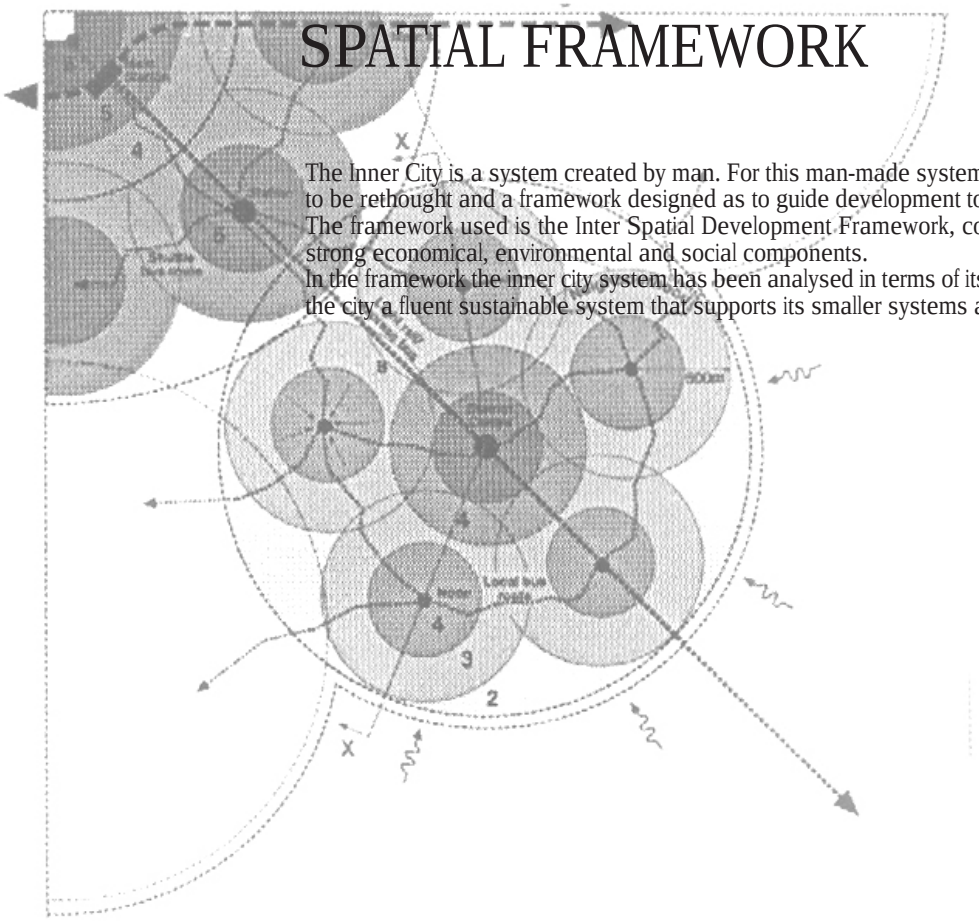
C h a p t e r 6

SPATIAL FRAMEWORK



The Inner City is a system created by man. For this man-made system to function and grow/evolve into a sustainable human-friendly environment, the system has to be rethought and a framework designed as to guide development to fit the larger system in the future.
The framework used is the Inter Spatial Development Framework, compiled by the Capital Consortium. The reason for choosing this framework is based on its strong economical, environmental and social components.
In the framework the inner city system has been analysed in terms of its strengths, weaknesses opportunities and threats resulting in the framework aimed at making the city a fluent sustainable system that supports its smaller systems and the life that it contains.

Fig 67: Image Of Urban Sytem [Thompson, C. W. 2002.P63]

CONTEXT

Pretoria CBD is generally known as the productive part of the Greater Pretoria Metropolitan economy, containing functions of administration, markets, offices, retail, services and residential components that gives the CBD a vibrant multi-functional character.

Recent transition:
-Decentralisation and the growth of the "Edge City"
-Movement of Certain Government Departments to Johannesburg

Nodal Activities:
-Office, retail: CBD=Primary Activity Node
Brooklyn, Hatfield and Menlyn=Secondary Activity Node

-Scientific: CSIR, Botanical gardens, Persequor and Proefplaas

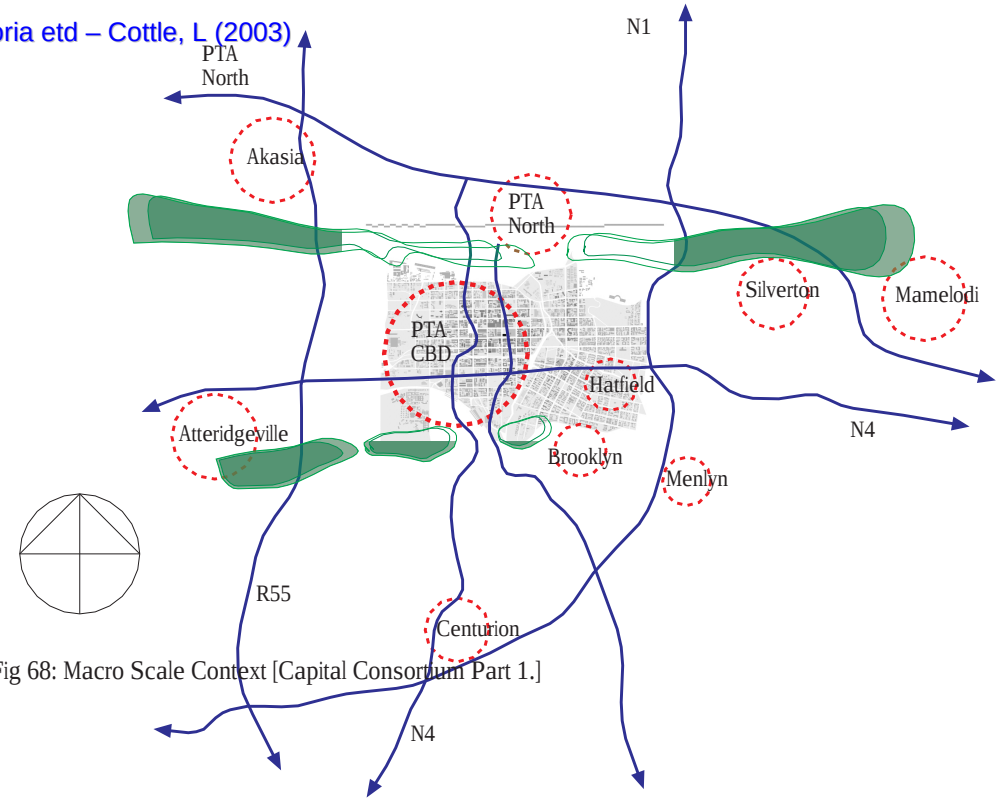


Fig 68: Macro Scale Context [Capital Consortium Part 1.]

CBD North
Contains low density mixed land use, with a strong formal and informal retail component, which relates to heavy vehicular and pedestrian traffic. Taxi traffic and activity dominates this area, with the taxi rank being a major feature. This is an area of uncertainty with regards to road proposals, resulting in large areas of council-owned land.

Central CBD and Church Square
Contains the traditional CBD land uses of retail, offices and services and currently contains mixed activity areas. There is a major vehicular and pedestrian movement in areas of retail (formal and informal) and offices. It is predominantly high density and contains strong Government and Municipal functions.

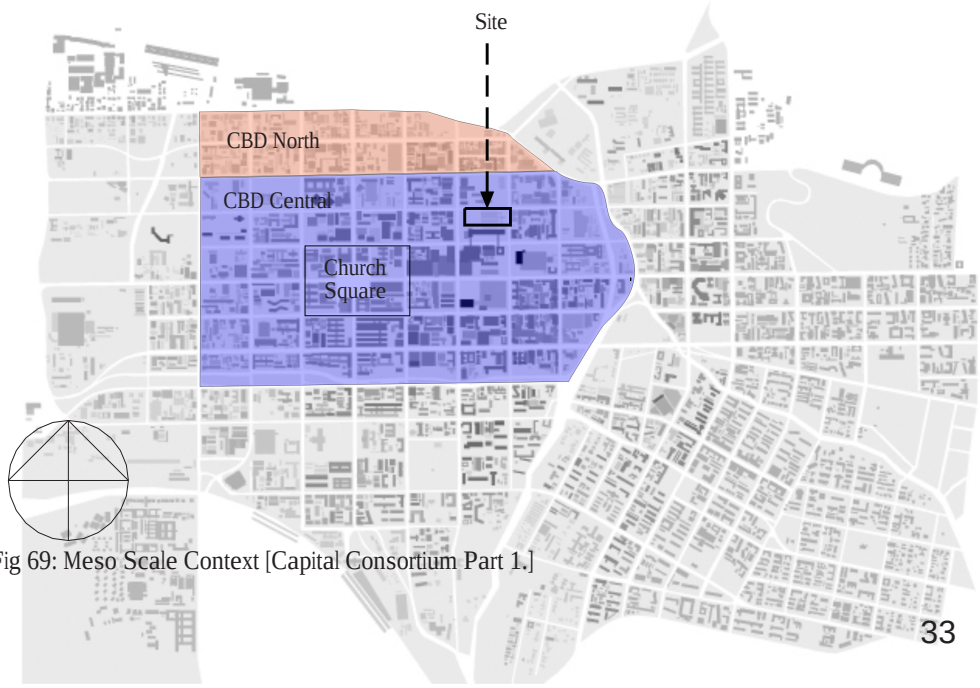


Fig 69: Meso Scale Context [Capital Consortium Part 1.]

TOWARDS AN INTEGRATED SPATIAL DEVELOPMENT FRAMEWORK

Introduction:
A Strength-Weakness-Opportunity-Threat analysis was done to create the basis for the preperation of the ISDF. The most important critical issues emanating from the analysis were identified.

Critical issues:

Physical issues

- Majority of inner city users reside in areas far away from the Inner City
- 'Traditional' CBD land uses have decentralised from the Inner City
- Shortage of usable open space
- Open spaces are generally inaccessible and mono-functional while their potential are under-utilised
- Natural features, rivers and ridges, were historically mismanaged and are currently still inaccessible and neglected
- Parks and open spaces function in isolation
- The urban landscape is in urgent need of upgrading
- Development of informal retail sector places demand on the Inner City for additional facilities
- There is a lack of balance and integration between pedestrian movement, public transport and public space, and the location of facilities related to these elements
- Poor linkages exists between elements of the Inner City
- The aging state of the Inner City exerts pressure on infrastructure and services
- Image of the city lacks articulation
- Infrastructure for private transport dominates in terms of supply of roads and parking, in relation to the availability of public transport facilities and infrastructure
- Public transport suffers from many weaknesses, which contribute to low utilisation. Most notably is the long walking distances.
- Public transport is characterised by the poor quality of services, facilities and vehicles.
- There are insufficient public facilities and amenities, including recreational areas.
- The lack of corporate identity (image).
- Bulk reticulation services are in many areas ageing rapidly.

Economical issues

- Decentralised economic activities.
- A transition in market needs and users of the Inner City
- Financial and budgetary constraints place a burden on the development of the Inner City.
- The 'core' of the Inner City is currently too weak to compete effectively, and requires physical and economic compaction and restructuring.
- The Inner City lacks direction by a Metropolitan Economic Development Strategy or Policy.
- The land use and economic activities surrounding the Inner City are changing

Social issues

- Crime and grime
- The socio-demographic profile of users and residents are changing, resulting in the changing requirement for social facilities and services.
- The socio-economic profile of users and residents is changing, creating different job requirements and reassessment of certain of certain economic sectors.

Institutional issues

- No effective managerial or institutional measures are currently in place to combat decentralisation.
- There is a lack of incentives that will ensure proper management and investment.
- There is an absence of a system whereby all conservation-worthy structures, elements and areas can be categorised in terms of historic significance and conservation worthiness. There is also a lack of necessary mechanisms that will enable the council to enforce legislation.
- There is currently a lack public-private partnerships within the Inner City inhibiting the development of collaborative management and investment schemes.
- Council owned land is not used effectively.
  There is little political will power and support for the Inner City.

Strategic goals

The ten most critical issues were identified and translated into strategic goals:

1. A unique image (branding)
2. A people's place
3. A Capital and world class city
4. Appropriate and well defined urban structure
5. Enhancement of natural features
6. Optimum mobility to all inhabitants
7. Appropriate diversity of land use
8. Sustainable economic development
9. Sub-areas with unique identities and characters (precincts)
10. Efficient management and political will power.

1 THE INTEGRATED SPATIAL DEVELOPMENT FRAMEWORK

1.1 SPATIAL DEVELOPMENT CONCEPT

The basic development concept entails a functionally effective inner city of which the main components – land use, natural environment, open space, and transportation – are carefully planned and fully integrated. The concept developed in this regard is one where the CBD core area is densified and surrounded by a mixed-use land support area that is bordered by strong residential periphery.

ISDF spatial development affecting the area that surrounds the proposed site:

1.1.1 Market

To create a marketable image for Pretoria Inner City will be done through branding. The rich national culture and historical heritage, as well as the abundant African ecology will be exploited in these branding themes for the Inner City. The recommended themes are easy to exploit and they can assist to sell the Pretoria Inner City, from a tourism point of view, as the Gateway to Africa.

1.1.2 A people's place

The basic development concept has as its primary aim the creation of a sustainable economic environment for people, a people's place.

- Vibrant human activity for 24/7
- More public transport and larger accommodation for pedestrians
- Creating active open space
- Creating spatial opportunities for festival retail, recreation, entertainment and user-friendly services.

1.1.3 A Capital and World Class City

The movement of Parliament to Pretoria and the location of Pretoria in relation to the rest of Africa present a unique opportunity to develop Pretoria into the Capital of Africa. As such it will be established as a world-class city containing both first and third world elements, which cater for the needs of all its inhabitants and users, and introduces an exciting aesthetic for the proposed development. Spatially, the development concept entails high standards for functionality, legibility, security, public transport, and the enhancement of outstanding features.
Outstanding features include both natural features, i.e. the Apies River, man-made features or components of the urban build form i.e. buildings, streets, boulevards, piazzas, and squares, as well as activity based features, i.e. the National Zoological Gardens which is located near the proposed site.

1.1.4 Sustainable economic development

The development concept is strengthened by the formulation and implementation of an Economic Development Plan. This plan makes provision for

- Strategies and actions related to home business and residential development.
- SMME development
- Public support programs,
- Centralisation of government and corporate functions
- Business and tourism development.

The Economic Development Plan is spatially supported by creating:

- Development corridors between tourism facilities.
- High density residential and retail nodes,
- And specialised development precincts in the Inner City as well as with economic activities beyond the boundaries of the Inner City.

1.1.5 Appropriate, diversity of land use

This core area is served primarily by pedestrian facilities and public transport - vehicular traffic has a low priority, while more emphasis is given to pedestrian requirements. These streets will provide high accessibility and low capacity for vehicular traffic.
Surrounding the core area is an area of lower density mixed land uses, which is aimed at providing support to both the core area and the outer residential areas. It therefore contains elements of both areas. The opportunities for light industrial, manufacturing, and SMME's are primarily contained in sections of this area.

1.1.6 Enhancement of natural features

The open space system located near the site is characterised by the Apies River and the National Zoological Gardens.
The core or heart of the open space system is the Apies River that runs through the central Inner City. The Apies River is a unique green spine that will act as a vibrant link between activity nodes.

The National Zoological Gardens at the northern end of the Apies River will overspill to the east along the Apies River, with a new entrance from this direction. A vibrant and pulsating open-air arts and crafts market and theme park in the true spirit of Africa will be created along the Apies River at this new entrance. The proposed development is located between the above-mentioned areas.

1.1.7 Appropriate, attractive and well-defined urban structure

The integrated nature of this development concept affords the opportunity to create appropriate, attractive, and well-defined urban structure.
This is done by means of:

- Full integration of land use.
- Open space.
- Transportation
- Availability of residential and employment opportunities in close proximity.
- Diverse and appropriate combination and mix of land uses, public transport, environmentally sustainable development.
- Appropriate interfaces between districts and precincts.

Finally, it is done by recognising the important role played by non-spatial issues in the development of a successful spatial concept.

1.1.8 Optimum accessibility and mobility to all inhabitants

The focus in transportation will radically shift to the accessibility and mobility of people as opposed to vehicles. The current urban situation will change with the introduction of effective and efficient public transportation.
Street closures as well as narrower cross-sections of streets and reduced on-street parking will enable multi-functionality of streets and pedestrianisation.

Further changes to mobility and accessibility:

- Pedestrian and cycle networks
- Enhance the visual experience and create visual access to activity
- Create a buffer zone between pedestrians and vehicles.
  Create traffic calming elements.

1.2 POTENTIAL AND OPPORTUNITIES IN THE INNER CITY

1.2.1 Sub-functional area: CBD North

- Resolve uncertainty regarding roads proposals along Bloed Street and Boom Street;
- Create a functional linkage through the area, by means of land use and transportation linkages, in order to link the CBD with the Zoo.
- Introduce land use, which supports the CBD 'core area', as well as the Zoo and gateway to the CBD along Paul Kruger Street.
- Cater for pedestrian users emanating from the taxi ranks and Belle Ombre Station - Street level retail and pedestrian facilities

1.2.2 Sub-functional area: CBD Central

- Maintain the "traditional CBD users" - retail, offices and provision of services.
- Provide facilities and services to cater for pedestrians.
- Preserve the historical elements in the area.
- Implement policies, which will maintain the stability of the area.
- Implement a transportation system supportive of the land uses in the area (for example, public transport, functional access routes for private transport etc).
- Give recognition to the Green elements in the area and create linkages with other Green elements, for example the Zoo and the Union Buildings.

1.3 FORMATIVE COMPONENTS OF THE ISDF

The following Integrated Spatial Development Framework is a guiding plan, relative to my site, for the dynamic Inner City. It is based on the afore-mentioned development concepts and is supported and informed in greater detail by illustrations of formative elements of the Inner City, namely:

- Land Use
- Open Space- Transport- Urban Design
- Urban conservation
- Public Facilities

The main components of the ISDF, pertinent to my development area, are highlighted as follows:

- Strong and compact high-density CBD core surrounded by supporting mixed land uses with residential uses on the periphery:
- An increase in the residential component.
- A road hierarchy, which acknowledges the requirements of both vehicles and people, with special attention to public transport.
- The introduction of an efficient and integrated public transport system;
- A strong emphasis on the multi-functionality of streets and the needs of pedestrians.
- The identification and use of precincts, i.e. new functional areas.
- Spatial opportunities for entertainment, recreation, and hands-on education.
- Spatial branding, and the creation of identity by using the historical and cultural heritage and the African ecology as themes.

The following sections will highlight each of the related formative components of the ISDF

1.3.1 Land use

1.3.1.1 Land use proposals and plans

The land-use proposals are guided by the above-mentioned Development Concepts. In addition, they are influenced by the economy, transportation, environmental, infrastructure, historical, institutional and social aspects of the Inner City.

Traditional CBD Area:

Introduce residential land use as a component of new mixed uses into the Inner City, especially in the old CBD, to cater for the new users and potential new residents of the Inner City.

1.3.1.1.1 Retail

Retail is considered to be one of the most important activities for economic sustainability of the Inner City. In addition, due to its economic importance and significance in catering for the needs of users and residents of the Inner City, retail is also considered a major component of mixed land throughout the Inner City.

1.3.1.1.2 CBD Core

The CBD Core is the compact heart of the Inner City. It is restricted to an area of 12 blocks in which the land uses of offices, retail and residential are situated. Its compactness is aimed at achieving economies of scale, thereby increasing the economic strength of the CBD. The compact CBD Core is surrounded by land use providing a range of support services to the core area. These services range from additional retail, residential and office facilities, to markets, SMME's, commercial uses and social services including educational and health care facilities and recreational and open space opportunities.

1.3.1.1.3 Mixed land use retail and markets, residential and offices

The area identified for this mix of land use currently contains a mix of formal and informal retail opportunities and a small residential component. The area displays vibrancy with a large pedestrian and public transportation component. Due to its proximity to a range of diverse land uses including the Zoo in the north, Belle Ombre Station in the west, the proposed Struben Street Boulevard and the CBD in the south, this area should contain land use, which supports all of these elements. In addition, the proposed major east-west transportation route will also influence the nature of this area in the future.

Markets are indicated in this area to respond to the tourist demand related to the Zoo. As such, they must cater more for tourists than for commuters and residents of the Inner City. In addition to markets, a retail component should remain in this area, to cater for residents, commuters and visitors.

The indication of offices in this area responds to the overflow of office needs from the CBD support area and to the proximity of the Struben Street Government Boulevard.

1.3.1.1.4 Transport related uses

Certain areas currently contain immovable uses related to transportation activities. As such, the following nearby areas have been demarcated for transportation-related uses:

- Belle Ombre Station and surrounding environment.
- Area between Boom and Bloed Streets.

1.3.1.1.5 Mixed land use: Retail and SMME'S

The areas indicated for this mix of land use are currently vibrant and busy and characterised by large-scale formal and informal retail. The areas are also situated in close proximity to the active Belle Ombre station and proposed taxi ranks, which offers access to the Inner City for great number of skilled and unskilled labourers. As such, the vibrancy of this area should be encouraged. Surrounded by residential and retail use while being located in close proximity to the CBD core. The provision of retail opportunities, incorporating formal and informal retail, will provide for residents and users of the Inner City and for the commuters utilising Belle Ombre Station and the taxi rank.

1.3.1.1.6 Institutional

Institutional uses include educational facilities, large government-related facilities and health care facilities Institutional uses encompass the related existing areas:

- Educational and health care facilities within Sunnyside and Arcadia.
- The Union Buildings: and
- Hospital Hill.

The purpose of these areas, dedicated to institutional uses is mainly one of providing services and facilities to the users and residents of the area. The provision of educational and health care facilities is vital for the upliftment of the residential community, and on a broader scale, for the provision of services to the metropolitan and regional population.

1.3.2 Open space

1.3.2.1 Open space concept

The potential of open spaces in the Inner City should be optimised to cater for human, social and recreational needs. Through the appropriate development and revitalisation of open spaces, the Inner City can be transformed into a socially healthy and environmentally sustainable, people friendly place with international landmarks. In order to achieve the above, the concept for development of open space in the Inner City involves the following principles:

- Firstly, the natural open spaces bordering the Inner City, to the north and the south, act as open space anchors. These facilities must be optimised to their full potential so as to function as regional, national and international recreation and tourism nodes.
- Secondly, the core or heart of the Inner City Green Plan is to create unique and active 'green' spines that will act as vibrant links between anchors, almost like a recreational spine.
- Thirdly, a network of secondary open space routes, mostly east west orientated, linking the existing and new secondary open spaces and nodes will support the central Green Spine by creating an integrated and accessible Open Space System for the total Inner City.

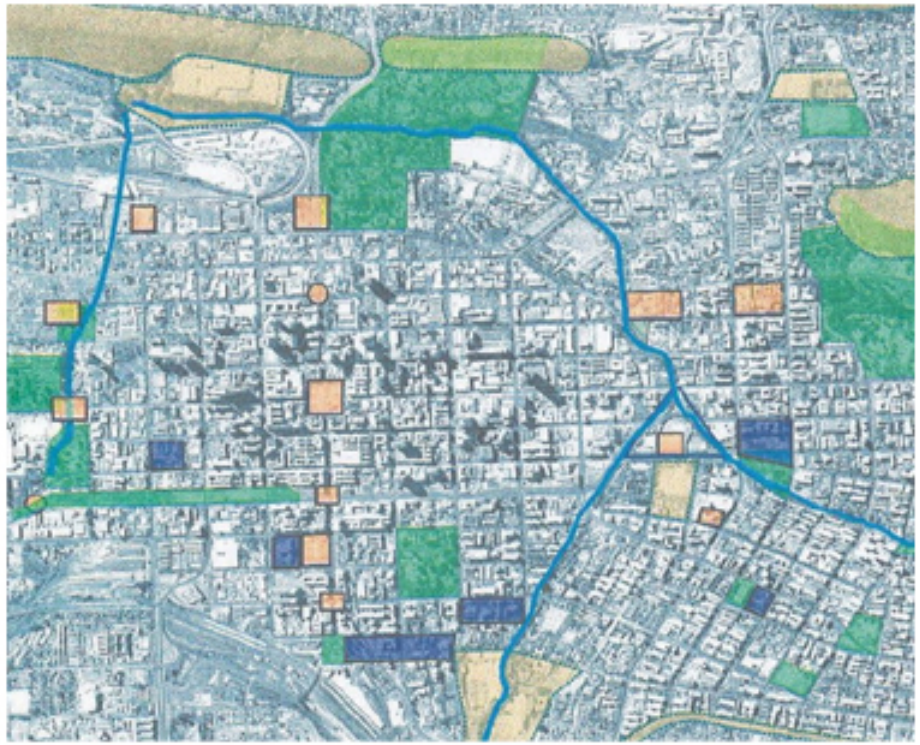
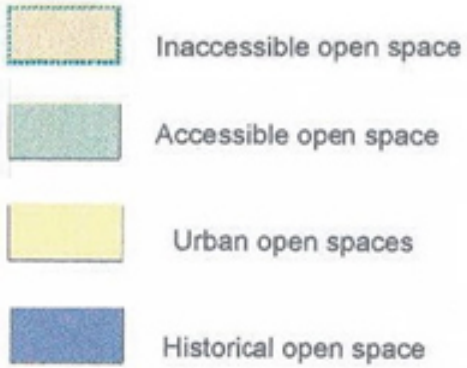


Fig 70: Open Space in the Inner City [Capital Consortium Part 2. P7]



1.3.2.2 Open space proposals and plans

The proposed Inner City Open Space Plan, or Green Plan, will function as a system and hierarchy of open spaces. Open spaces are not isolated individual areas but form part of a continuous system, treated as a network across the Inner City that is integrated with other land uses as well as with the surrounding City Wide Open Space System. The system includes a wide range of scale and type of open spaces from local to regional and national level, containing natural and urban areas for passive and active recreation.

The Inner City Open Space System, relevant to my development contains the following structural elements on a spatial level:

- Activity Spines or Green Corridors.
- Natural features and conservation areas.
- Existing open spaces.
- Open Space Linkages and Continuity.
- New Open Spaces and Nodes.
- Urban Boulevards.
- Accessibility, and Urban Trails.

1.3.2.2.1 Open space linkages and continuity.

Through the linear connection of one park to other parks, value is added to each open space, particularly when this is by means of walking or cycling trails. These linkages will make the combined open space system more valuable than the sum of all the individual open spaces.

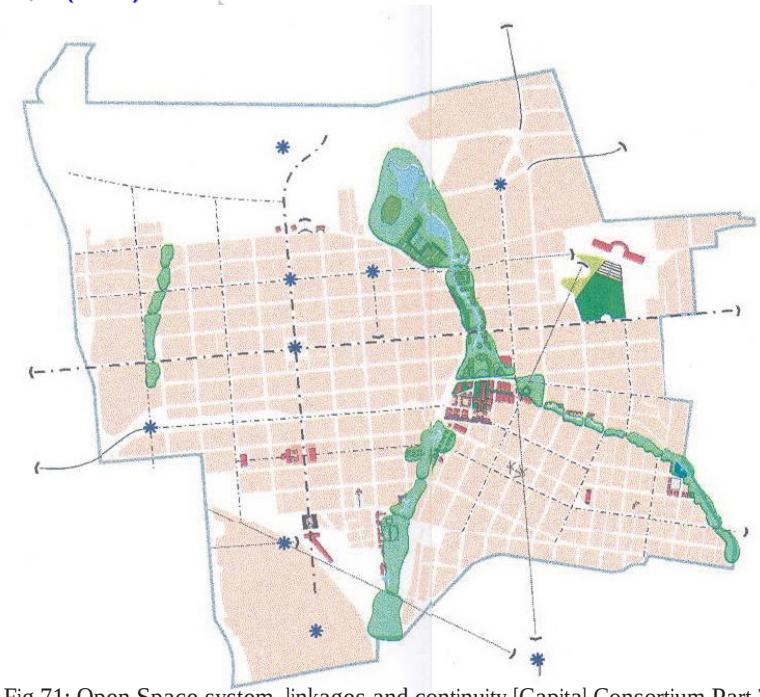


Fig 71: Open Space system, linkages and continuity [Capital Consortium Part 2. P7]

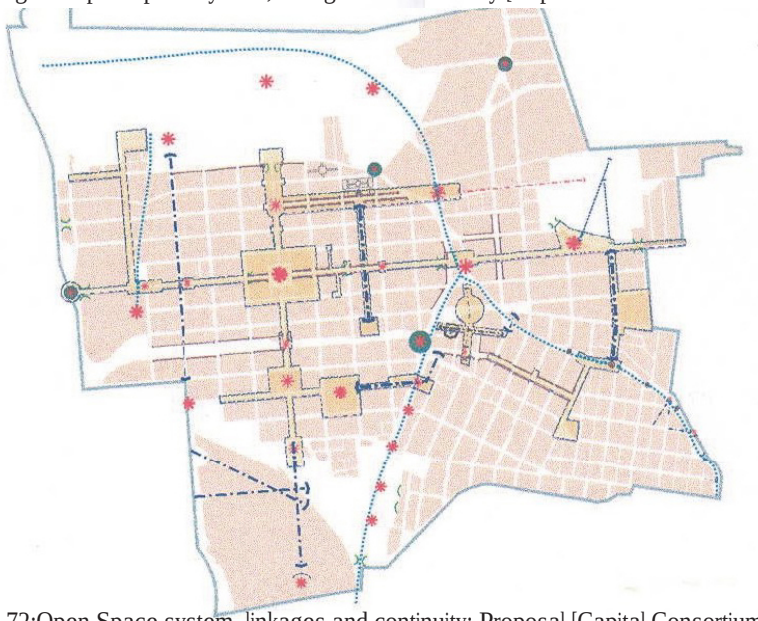


Fig 72:Open Space system, linkages and continuity: Proposal [Capital Consortium Part 2. P7]

1.3.3 Transportation

Two categories:
- Public transport
- Private transport

1.3.3.1 Public transport concept:

· A safe, secure and people friendly public transport environment with convenient vehicles.
· Internal linkage to residential, employment, commercial and recreational nodes should be provided.

1.3.3.1.2 Private transport concept:

·Ensure efficient and effective linkages with other development core doors and nodes.
·The provision of a well-defined functional justification of roadways in the Inner City to enable the transformation of the urban built form and structure of the Inner City into a people's place.

1.3.3.3 Functional classification of Inner City roads

The classification of Inner City roads into four different categories, namely Right Of Way Categories (ROW) 1, 2, 3 and 4 (only ROW 2 and ROW 3 are pertinant)

The proposed definition (roads crossing my development site) of these ROW categories are as follows:

- ROW 2: High capacity with a balanced mobility and accessibility function and limited on-street parking — medium distance or distribution function for public transport.

- ROW 3:Limtted capacity with emphasis on accessibility and short Distance or local trips with maximum on-street parking — access function for public transport.

Proes street: ROW 2
Prinsloo street: ROW 2
Van Der Walt street: ROW2
Vermeulen street: ROW3

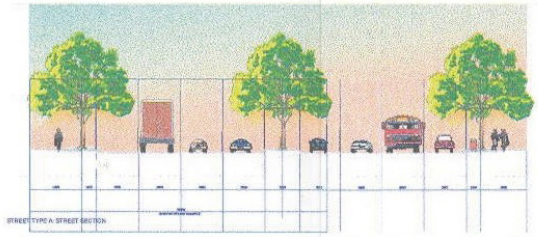
1.3.3.4 Parking

The existing overall parking supply for the Inner City is sufficient to serve the existing land use and should be accepted as the absolute maximum parking supply. However, insufficient off-street public parking has been pointed out as one of the reasons why businesses are relocating out of Inner City. The overall parking supply should, however, be decreased gradually over time with the implementation of public transport.

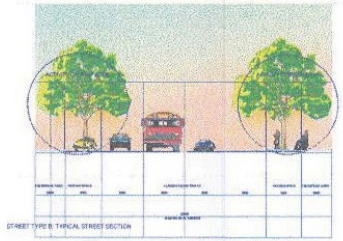
1.3.3.5 Pedestrian movements

The identification and classification of an appropriate hierarchy of roads in the Inner City, fully integrated with public transport services and facilities, are input parameters and conditions for the creation of appropriately and well-defined urban space and structure.

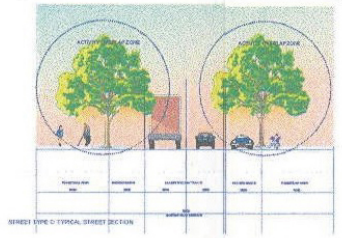
Sections of Van der Walt Street as well as strategic pedestrian crossings must be redeveloped to explore their multi-functionality in terms of pedestrians and vehicles



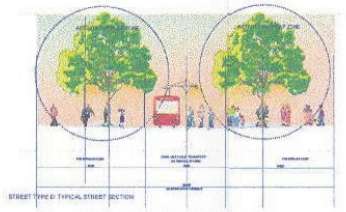
Example of typical major arterial road with 4 lanes either side



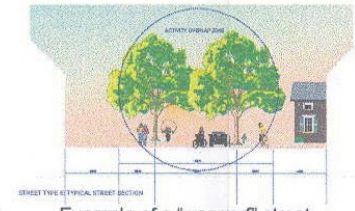
Example of one-way street



Example of two-way street



Example of activity street



Example of a "woonerf" street

Fig 73: Generic Street Sections
[Capital Consortium Part 2. P60]

1.3.4 Urban Design

1.3.4.1 Urban design concept

The urban design concept, involves the following broad principles:

- Re-establishment or creation of a relationship between the Inner City, the natural environment and open space system.
- Development of the network of public spaces and facilities in relation to these public spaces.
- Introduction of structuring elements that increase the legibility of the urban form and enhance the Capital City image.

1.3.4.2 Urban design proposals and plans

1.3.4.2.1 Physical component: improvement of linkages and legibility

Green chain linkages:
Development of green spaces as coherent linear natural spaces, supportive of a mix of land use and activity, is proposed.

"High Streets" and linkages between precincts:
The main streets or routes within each precinct or sub-functional area should be developed in terms of the primary characteristics of that area.

Visual linkages:
Visual linkages relating to the controlling of views and vista's to significant natural and man-made landmarks, specifically related to the Capital City Image, will contribute to strengthening of the Inner City's identity.

1.3.4.2.2 Philosophical component: Creation of a sense of place and identity

The following strategies are proposed in terms of creating a sense of place and identity:

The Capital City Image:

The city should reflect its identity as the capital in its public open space, amenities, facilities and built form. The richness of the South African flora and fauna and its diversity of cultures should be further reflected in the open spaces, thresholds, monuments and shrines:

Creation of an hierarchy of urban open spaces: The establishment and linkage of an hierarchy of urban open spaces, in the form of pedestrian, cycle and vehicle networks is proposed along the flyers and ridges. Pocket parks or small urban green spaces are furthermore proposed on both public and private property, and
Definition of urban spaces: The linkages and network of urban open space, as articulated above, are all linked and by so doing facilitate citywide spatial continuity and contextual linkage. Spaces are defined by using thresholds, clear edges, landmarks and sight lines.

Fig 74: Accessible and Inaccessible Open Space [Capital Consortium Part 2. P9]

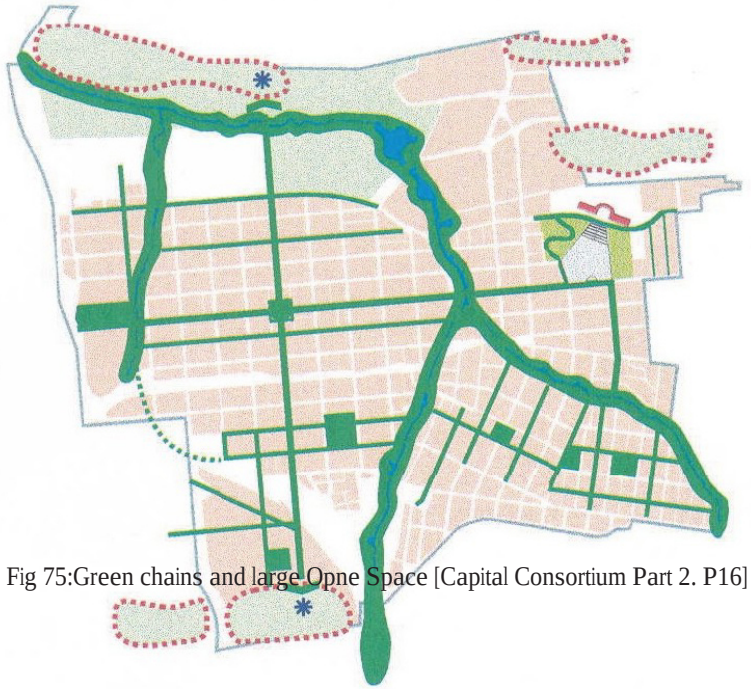


Fig 75:Green chains and large Opne Space [Capital Consortium Part 2. P16]

1.3.5 Urban conservation

1.3.5.1 Urban conservation concept

The concept guiding the formulation of a conservation plan for the Inner City is based on the following principles:

- Management of change
- Encouragement versus coercing: It makes good economic sense and is in the long-term interest of the Inner City to encourage, rather than to coerce developers into conservation practices. An appropriate conservation policy needs to take this into account.

1.3.6 Public facilities

1.3.6.1 Public facilities concept

In order to manage existing and to provide for new public facilities within a continuous changing urban environment, the concept for catering for public facilities in the Inner City is based on the following:

- Positions for future public facilities and utilities is required to be spelled out
- A unifying language" (that is, minimum design standards) for all public facilities and utilities is required.
- A management plan for all public facilities and utilities is required.

The following design criteria are identified for all public facilities and utilities

- Security — to create a safe and secure environment for all users;
- Durability and low maintenance — required for all public facilities and utilities to be erected; and
- Aesthetic considerations — ergonomically and user-friendly design to create a unifying and coherent corporate image.

2.1 Spatial guidelines

2.1.1 CBD Core Precinct

- Improve the quality of the environment, through efforts including:
  -Introducing design measures in terms of the natural and built environment.
  -Encouragement of high quality offices, retail and residential land use.
  -Initiating investment and development focussing on the core area.
  -Landscaping of streets, linkages main arterials and vacant, private and public land;
- Provide sufficient parking in appropriate locations at competitive rates to cater for the focused development within the core area:
- Maximise the accessibility to the area through the hierarchical road network, pedestrian-friendly routes and sidewalks, and affordable, appropriate and convenient public transportation:
- With the exception of off-loading and limited loading, no other activities should take place in this area.
- Specially treat parts of ROW 2 and ROW 3 streets, where pedestrian traffic is heavy, in order to make this precinct pedestrian-friendly.
- Give the CBD strong definition through focussing development within the 12-block radius.
- Establish a series of small urban green spaces or pocket parks within the area.
- Conserve and promote historical features.
- All future public facilities and utilities should reflect the historic nature of this precinct, in terms of their appearance and design.
- Focus the location of Parliament within this area, as the CBD Core is the economic heart of the Inner City.

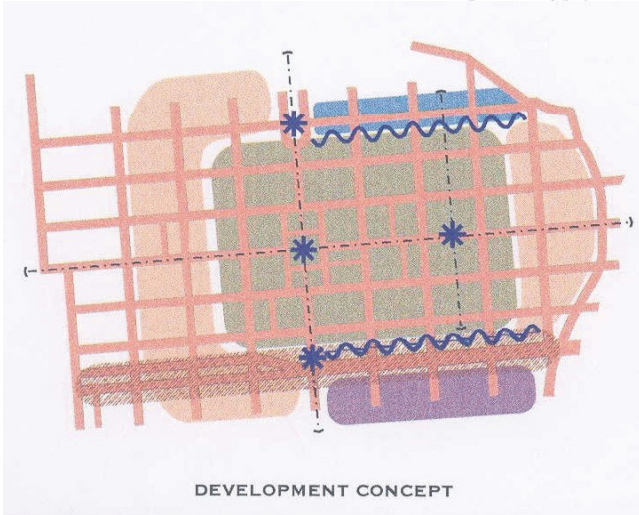


Fig 76: [Capital Consortium Part 2. P20]

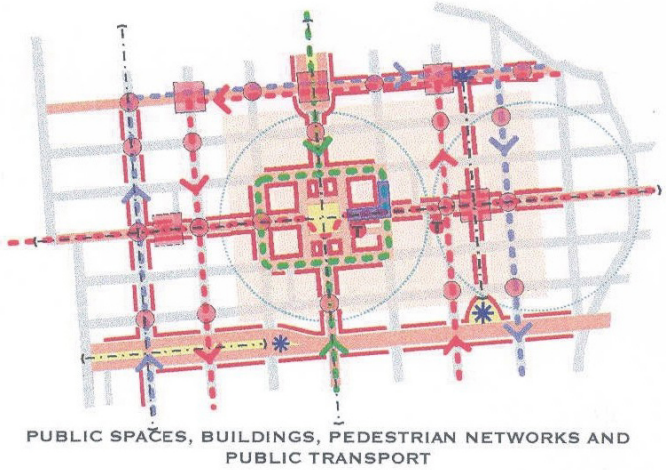


Fig 77: [Capital Consortium Part 2. P20]

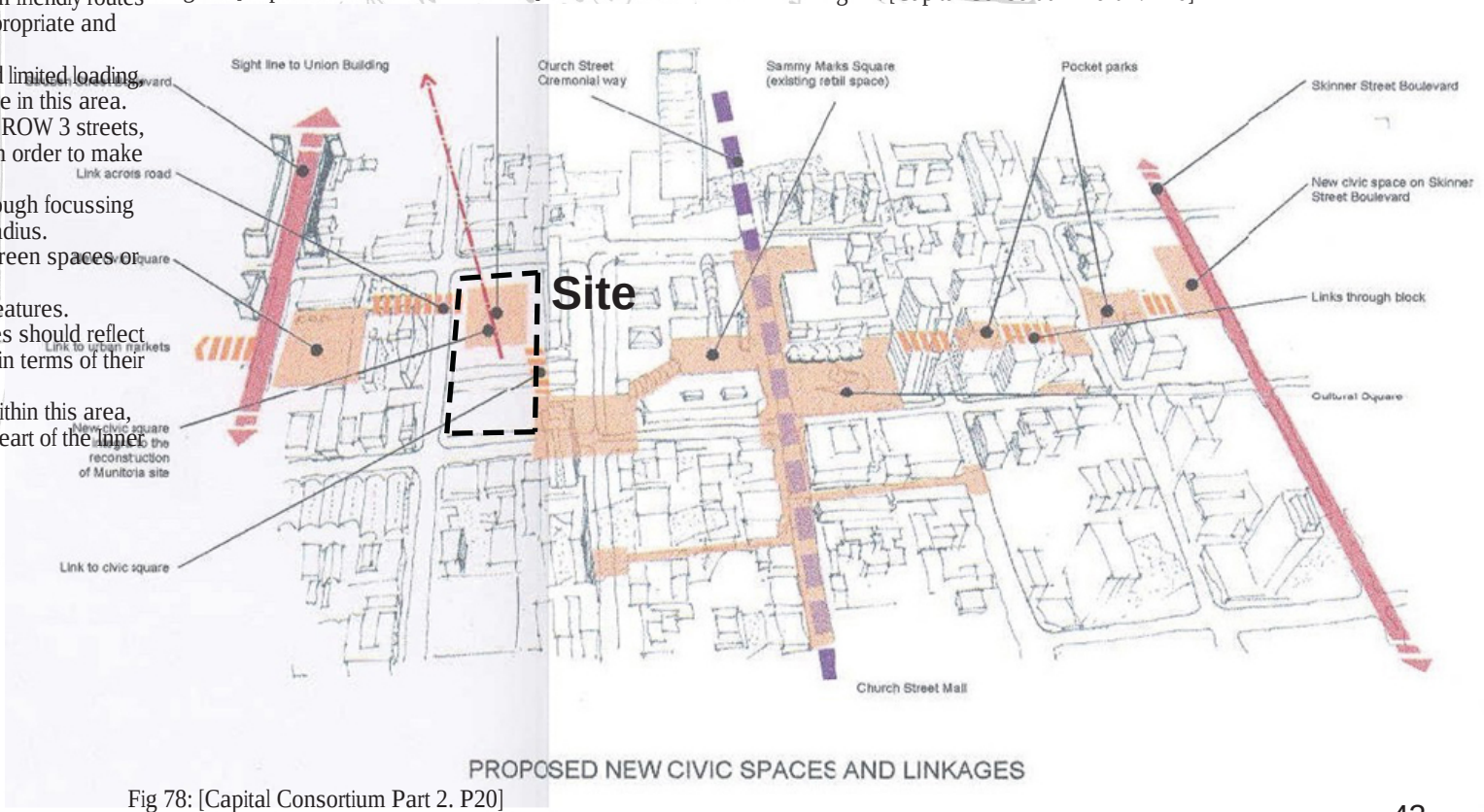


Fig 78: [Capital Consortium Part 2. P20]

2.1.1.2 CBD Support Precinct:

- Encourage land use which will support the CBD Core Area — that is to say that this area should accommodate the spillover of land use focused within the core as well as additional uses which will support the development and economic sustainability of the core.
- Plan for internal and external vehicular movement through the hierarchical definition of the grid road-network.
- Provide sufficient-parking in appropriate locations to cater for the core area and for the support area itself. Where parking in the core is restricted or limited, provide parking in the CBD Support Precinct.
- Provide appropriate pedestrian and vehicular linkage through to the CBD.

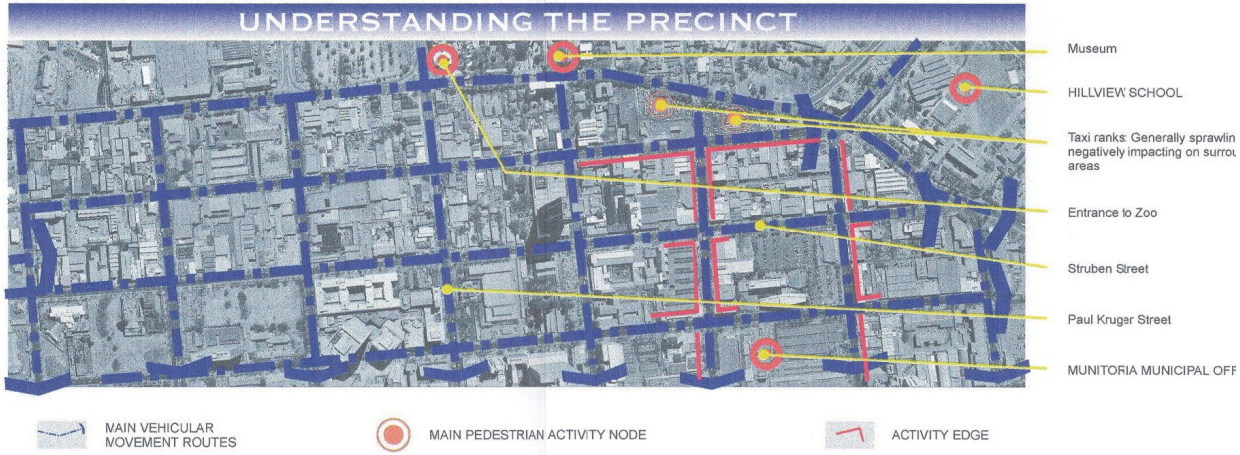


Fig 79: [Capital Consortium Part 2. P23]

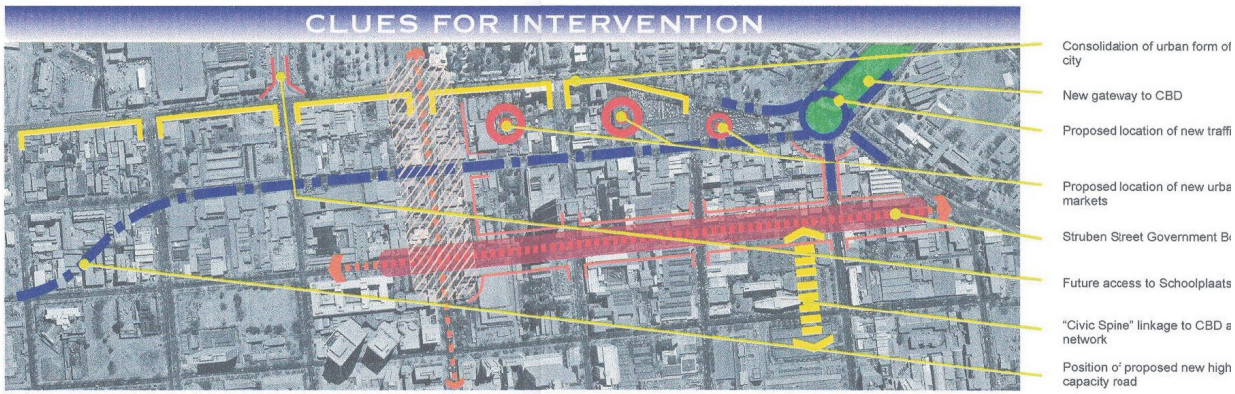


Fig 80: [Capital Consortium Part 2. P23]

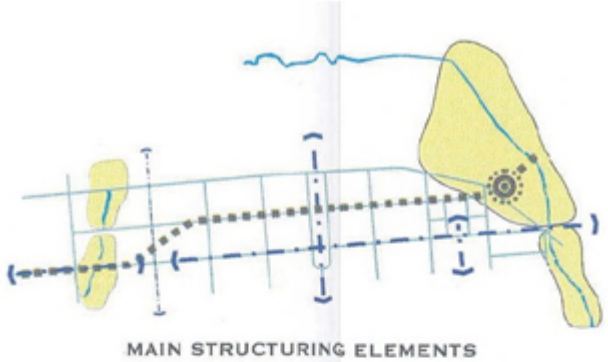


Fig 81: [Capital Consortium Part 2. P22]

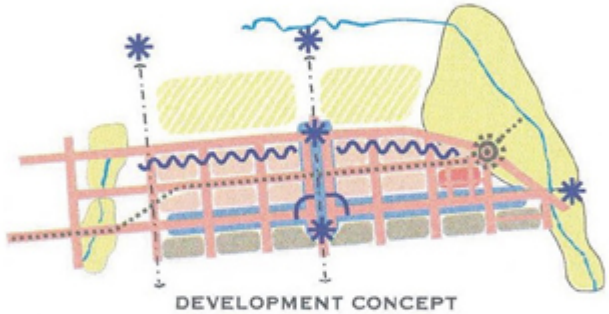


Fig 82: [Capital Consortium Part 2. P22]

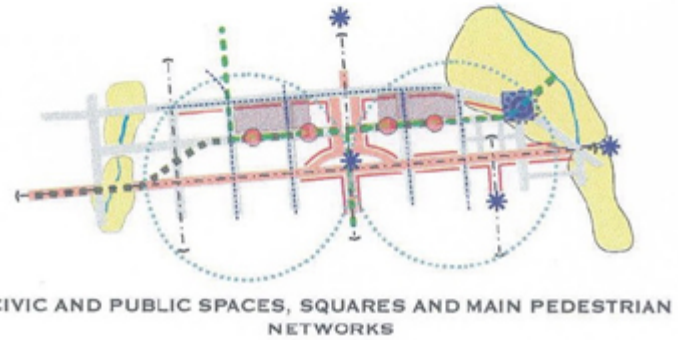


Fig 83: [Capital Consortium Part 2. P22]

C h a p t e r 7

PRECEDENTS 1-5

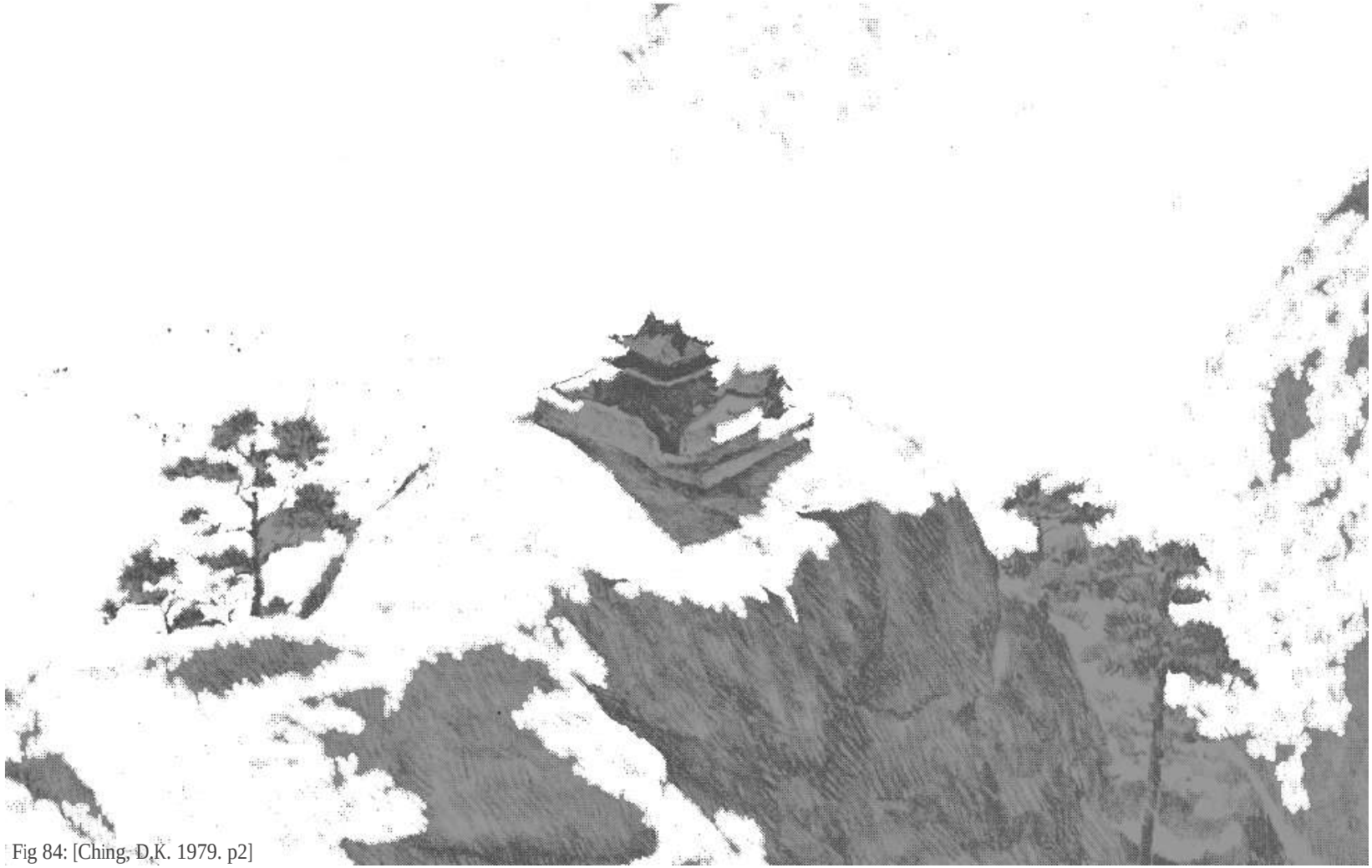


Fig 84: [Ching, D.K. 1979. p2]

PRECEDENT 1

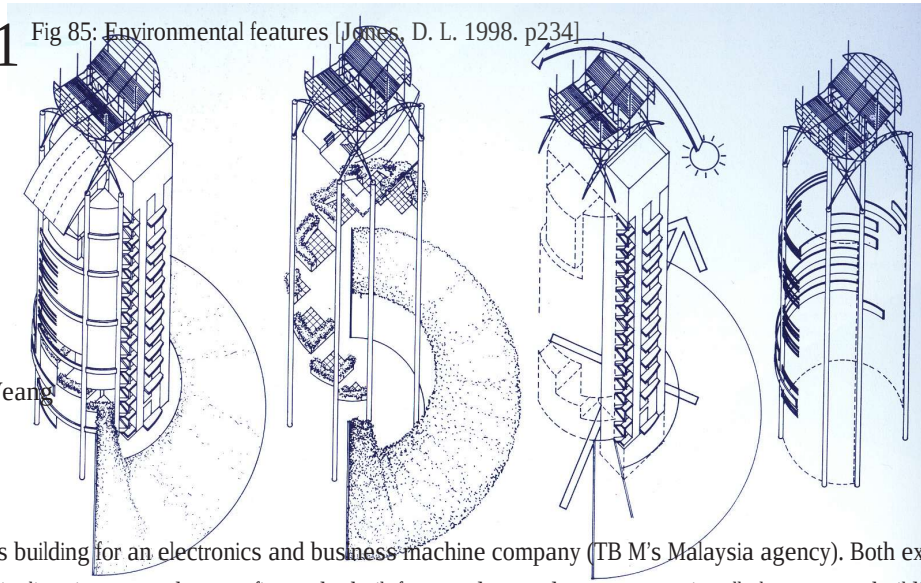


Fig 85: Environmental features [Jones, D. L. 1998. p234]

Menara Mesiniaga
Selangor, Malaysia
Architect: T.R. Hamzah and Ken Yeang

Menara Mesiniaga is a headquarters building for an electronics and business machine company (TB M's Malaysia agency). Both external and internal design features use a bioclimatic approach to configure the built form and to produce an operationally low-energy building.

The most striking design feature is the planting, which is introduced into the façade and the 'skycourts', starting from a three storey high-planted mound and spiralling up the face of the building. Triple-height recessed terraces towards the upper part of the building are also planted. These atriums allow a cool flow of air to be channelled through the building's transitional spaces, while the planting provides shade and an oxygen-rich atmosphere. Curtain-wall glazing is used only on the north and south façades so as to moderate solar gain. All the window areas facing the hot east and west faces have external aluminium fins and louvres to provide sun shading. Glazing details allow the light green glass to act as a ventilation filter, protecting the interior without totally insulating it. Terraces are provided for all the office floors, and have sliding full-height glass doors to control the extent of natural ventilation (when required). Lift lobbies, stairwells and toilets are naturally ventilated and sunlit. The lift lobbies do not need pressurisation for fire protection.

The rooftop sun terrace is covered with a sunroof of trussed steel and aluminium; this both shades and filters light on to the swimming pool and the curved gymnasium roof (it also provides space for the possible future fixing of solar cells). Internally, enclosed rooms are placed as a central core rather than being situated at the periphery. This ensures good natural lighting and views out for the peripherally located world stations. The building's circular plan means that there are no dark corners. A range of automated systems is employed to reduce energy consumption by equipment and the air-conditioning plant.

This is perhaps the best known of a series of towers that Ken Yeang has designed in the Far East. In each he attempts a sensitivity towards the environment and the use of energy, despite a building form and local climate that do not encourage this approach.

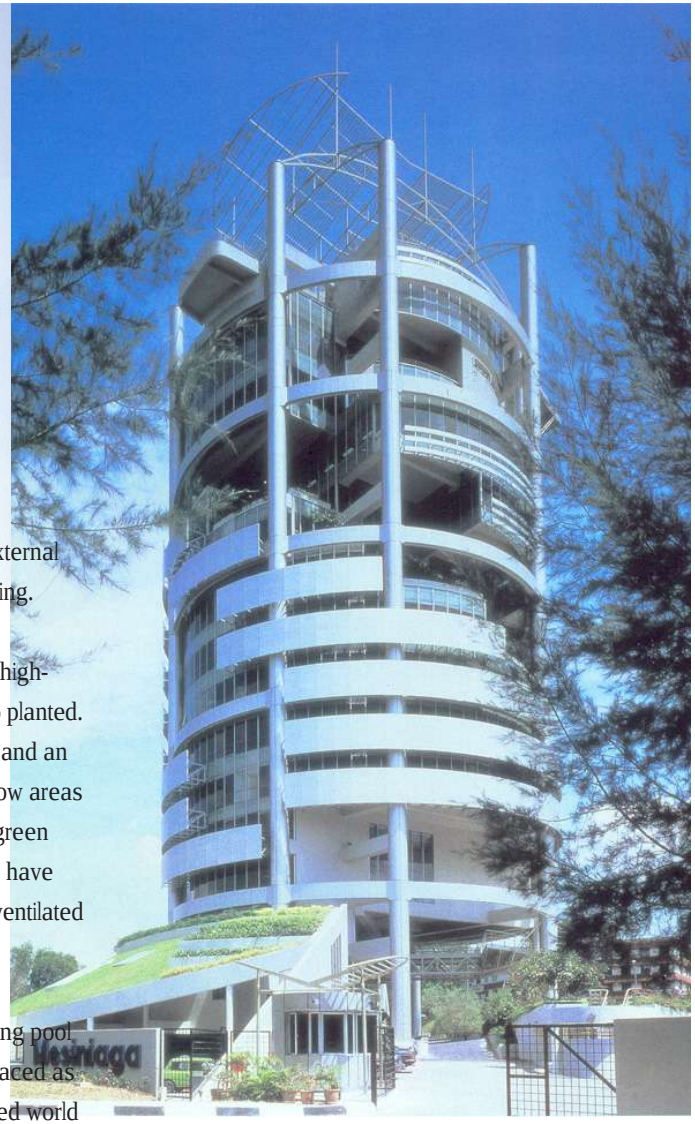


Fig 86: View of tower [Jones, D. L. 1998. p235]

[Jones, D. L. 1998. Architecture and the Environment, Bioclimatic Building Design. Laurence King]

PRECEDENT 2

The following three projects are all design proposals by the Richard Rogers Partnership

The masterplan proposed by the partnership for the Parisian new town of Val d'Oise. A group of existing settlements and planned new development around Le Bourget Airport to the north of the French capital, set out to achieve a major reduction in energy consumption. It was a study with significant lessons for the shape of the modern city, and the partnership drew on it for its plans for Shanghai. The practice believed that it was vital to tackle the issue of energy at the level of infrastructure design, as well as that of individual buildings. They calculated that it would be possible to build the new Val d'Oise in such a way as to achieve energy savings of sixty per cent compared with a conventional modern development, provided that its form was determined by climatic considerations, rather than the requirements of the automobile.

What they call a responsible energy strategy depends on four key elements: better thermal insulation standards would be the most important single element, followed by the maximum use of natural ventilation. The balance of the savings would be made, by making use of solar gain for water heating, and the installation of more efficient systems and management technology. But the strategy did not stop there. By incorporating natural ventilation and day lighting in factories, the industry's use of energy could be halved. And the plan would have seen a huge reduction in the amount of energy being used for transport in Val d'Oise through the greater use of public transport, adopting integrated planning policies and more efficient rolling stock and motive power for a light rail rapid transit loop that would link the town with its neighbours.

Rogers' consultants calculated that if you took an infrastructure planned with efficient energy use in mind, and added to that the impact of using a combined heat and power system and renewable energy sources as well, then the net energy use could come down to just twelve per cent of that of a traditional town. It would mean a town geared not to the needs of the car, but one with a layout that responds to climate, sun, wind direction, views and topography. It would maximise the use of daylight, minimise the use of electricity for lighting and encourage a community-wide energy self-sufficient strategy. Regarding the detailed design of individual buildings, one of the key projects in which the partnership evolved its approach to energy-efficient architecture was its submission in the invited competition for the Inland Revenue's new Nottingham building, a huge office complex under the shadow of Nottingham Castle.

[Sudjic, D. 1994. The Architecture of Richard Rogers. Harry N. Abrams, Inc., Publishers.]

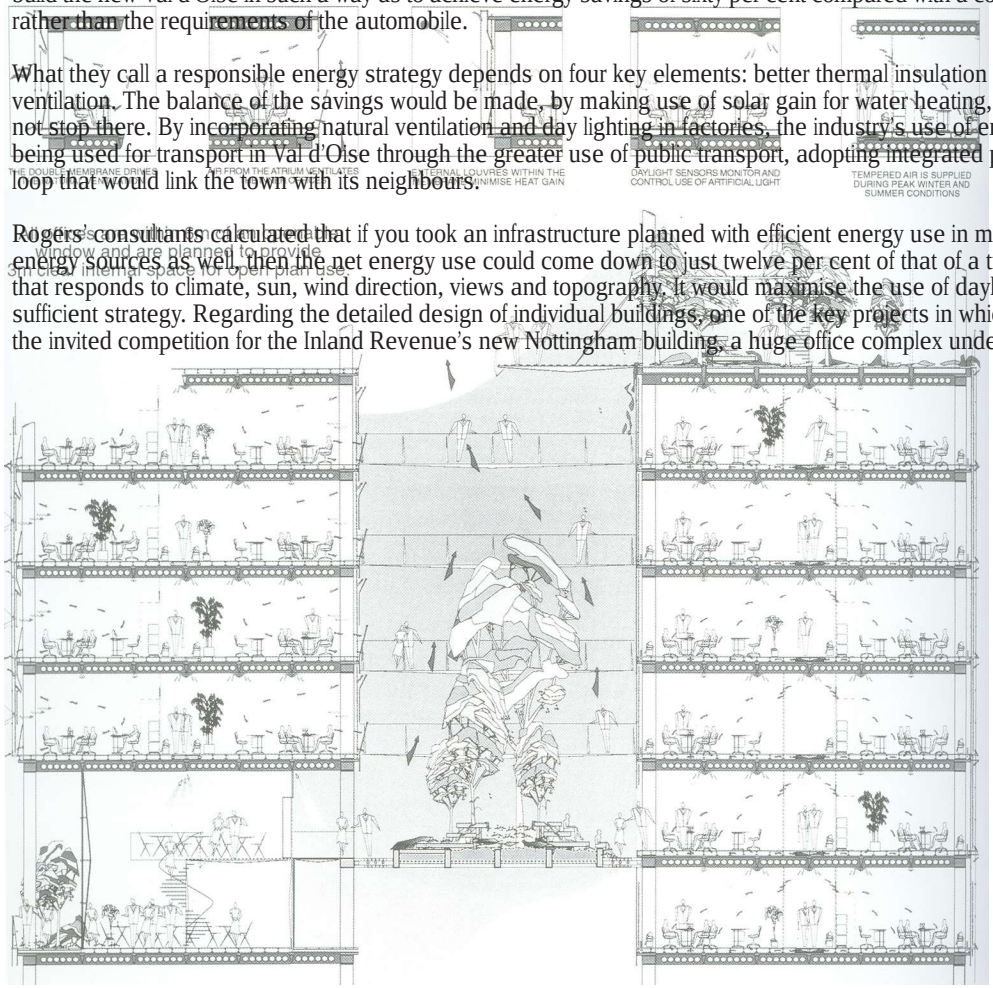


Fig 87: Building section [Sudjic, D. 1994.]

The brief from the Inland Revenue asked for 'offices fit for their purpose, and which provide value for money, and which are in sympathy with the environmental context, and enhance it. In the partnership's view, that meant respecting views of Nottingham Castle, and reinforcing the landscape of the immediate environment, but it also meant an environmentally friendly building, a flexible workplace, which could absorb growth and change, and a workplace with a sense of community. To this end, the building is orientated in such a way as to act as a buffer from the noise and the pollution from the railway line on the edge of the site, and to provide the largest possible landscaped open space facing on to the canal that forms one boundary. Its form provides shelter from prevailing winds, and protects its interior from unwelcome heat gain from the sun.
The view from the castle looking down over the Inland Revenue site was seen as particularly important. The sloping roof, with its part glass, part solid panels, was treated as the fifth elevation, set in densely landscaped grounds and free of the usual paraphernalia of mechanical servicing plants, ducting, cooling towers and all conventional office roof finishes. The absence of the unsightly trappings of a conventional air-conditioning installation would have been achieved by relying instead on passive environmental control, a mix-mode heating and cooling system which limits its major mechanical interventions to summer and winter peaks. In this way, while the building systems have the capacity to react mechanically when needed, normal operation is limited to the manipulation of existing external air to ensure the comfort of the workforce.

All the facades, except the southern side, which is a sealed double skin designed to deflect the noise and cut out pollution from the railway line, have opening windows. It is true that the temperature variations in such a building are greater than those in conventionally air-conditioned buildings, but as Rogers points out, this makes you more aware of the seasonal fluctuations, which is a benefit rather than a handicap. Low-energy building servicing systems rely on orientation to reduce unwanted heat gain and loss, and on tapping into free sources of energy and light. These sources of energy would have been utilised in varying densities to control internal thermal comfort in the Inland Revenue building.

[Sudjic, D. 1994. The Architecture of Richard Rogers. Harry N. Abrams, Inc., Publishers.]

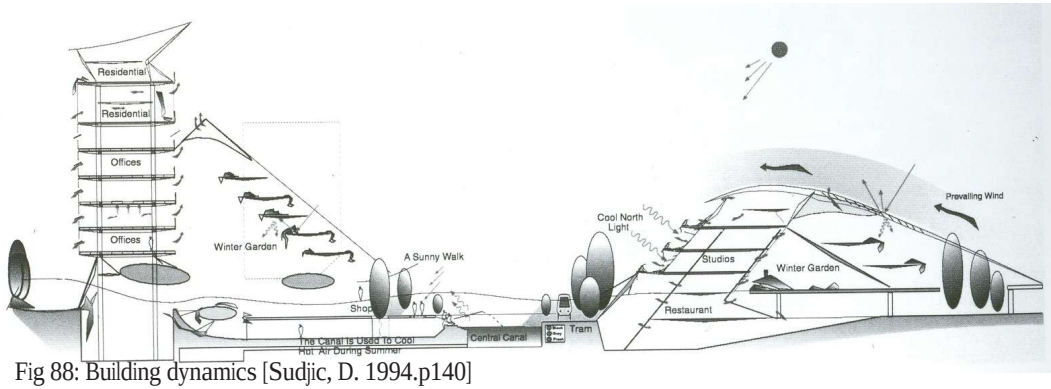


Fig 88: Building dynamics [Sudjic, D. 1994.p140]

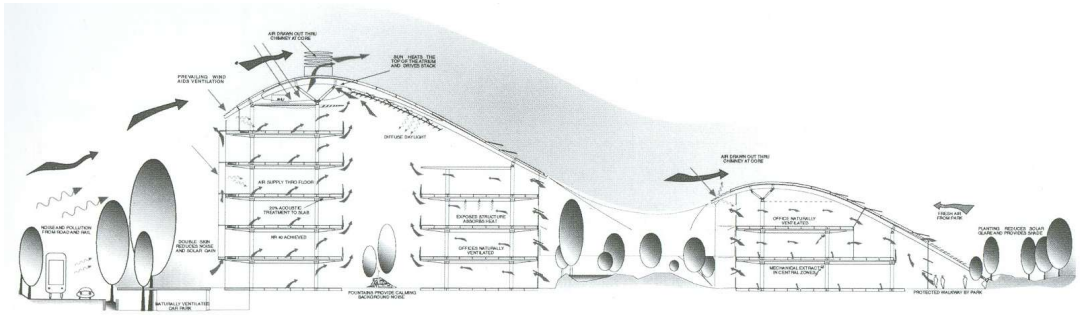


Fig 89: Building dynamics [Sudjic, D. 1994.p141]

Each floor would have contained a combined raised computer floor and plenum. During most of the year, most areas of the building rely on fresh air from open windows, but the southern offices, with the sealed skin, would draw on the plenum system for fresh air. During summer peak temperatures, some mechanical cooling would have been required, using heat exchange, with canal and ground water rather than by mechanical refrigeration plant. During the winter, all areas would have a conditioned fresh air supply, heated by solar energy, and heat recovery. Finned tube heating would maintain comfort in the perimeter offices, and the system would be capable of being adapted to provide personal control and being automatically overridden in periods of high solar gain.

With its use of extensive landscaped interior atria, there would have been scope to use the ground water in the atrium pool to provide cooling during the summer peaks, while the cross-section of the building lent itself to the use of heat to drive stair air upwards, to create a stack effect for ventilation. During the summer nights, external air would have cooled the structural floor slabs to reduce the cooling load the following day, a process that would take place in reverse during the winter extremes.

[Sudjic, D. 1994. The Architecture of Richard Rogers. Harry N. Abrams, Inc., Publishers.]

PRECEDENT 3

Library and Cultural Centre
Herten, Germany

Architect
LOG ID, Dieter Schempp

This public building comprises two interconnected elements: a four-storey public library, and a cultural centre in the form of a glazed rotunda rising through four storeys. Library and cultural centre share the same entrance foyer on the building's northwest side. Balconies open from the library into the cultural centre rotunda and can be used by the audience when performances are held there. On the west side of the rotunda is a café facing a small circular public space, with glass walls that can be opened up in summer.

This project, situated in the built-up centre of a small Ruhr town, called for new solutions from its architects. The innovative architectural practice behind it specializes in exploiting the potential of passive solar energy and green vegetation.

To make optimal use of sunlight a large zigzag glass roof spans the entire building. Beneath it are solar collectors for heating domestic hot water and air. The heated air is used to warm the library and glass rotunda. This can then be supplemented by district heating (waste heat from a power station) when exterior temperatures are too low. The concrete mass of the walls and ceilings of the library absorbs heat and keeps the interior at an even temperature. The roof of the cultural centre can be opened on hot days, creating a thermal chimney to cool the space below.

Subtropical plants are planted on the balconies and in the rotunda to boost oxygen levels, as well as to provide some acoustic absorption and shade on sunny days.

CLIMATIC ZONE
Temperate

BUILDING ENERGY FEATURES

Orientation of main façades
Natural ventilation
Natural nighttime ventilation provision
Thermal transmission of building envelope
Utilization of building mass thermal storage as part of energy strategy
Shading by plants

ENVIRONMENTAL/HEALTH FEATURES
Use of natural materials
Natural organic sewage treatment

[Jones, D. L. 1998. Architecture and the Environment, Bioclimatic Building Design. Laurence King.]

Fig 90: Interior [Jones, D. L. 1998. p87]

Fig 91: View of exterior [Jones, D. L. 1998. p85]

Fig 92: Plan view [Jones, D. L. 1998. p86]

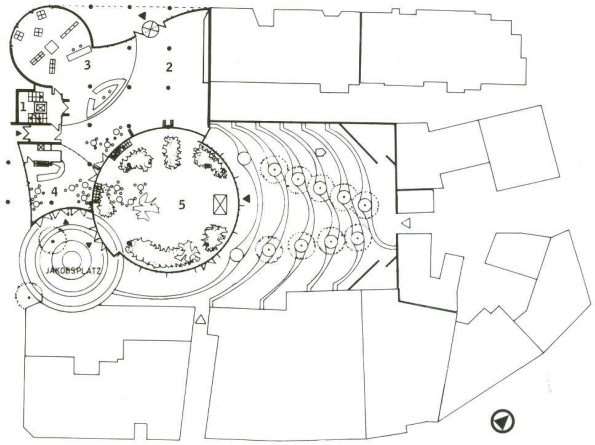
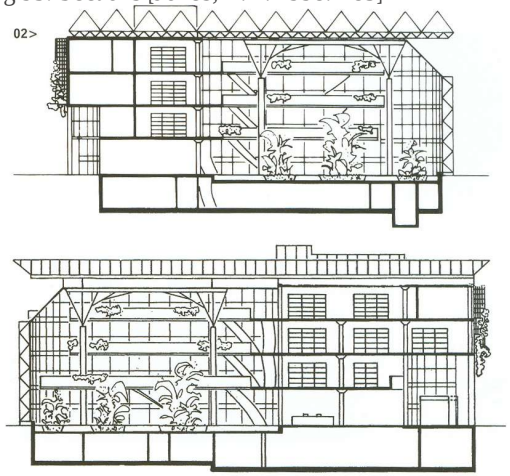


Fig 93: Sections [Jones, D. L. 1998. P85]



PRECEDENT 4

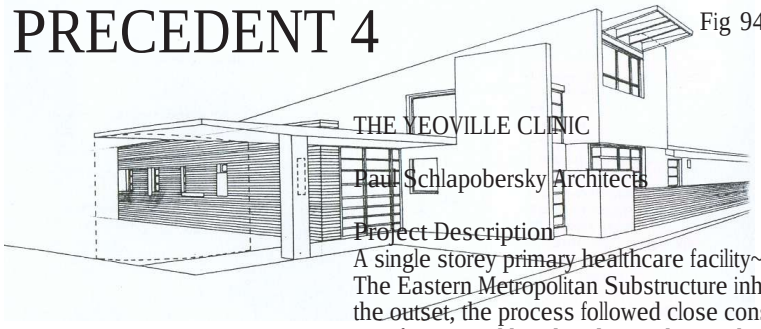


Fig 94: Isometric [Schlapobersky, 1998.p27]

THE YEOVILLE CLINIC

Paul Schlapobersky Architects

Project Description

A single storey primary healthcare facility~ 595m2, sited on two tennis courts, at the intersection of Kenmere and Hopkins Roads, Yeoville, Johannesburg.

The Eastern Metropolitan Substructure inherited the partially completed project during the devolution of power in municipal government that took place in 1996. From the outset, the process followed close consultation with the recipient community, through the efforts of the Yeoville Community Forum. Yeoville is one of the most significant neighbourhoods in Johannesburg, both historically and through its continued presence at the cutting-edge of urbanisation in this country. Yeoville also has a sound urban fabric, containing many buildings of architectural merit. The timing of the project, the attitude of the client, and the nature of the recipient community, offered a unique opportunity, which demanded a responsive public building.

Public buildings of the apartheid era all too often strove to achieve a different durability: physical impenetrability unapproachability coupled with a domination of the landscape and the communities they "served'. For the Yeoville Clinic, we wanted to create a building such as the neighbouring swimming baths, where primary concerns such as site positioning, volume and use of natural light would take precedence over technical experimentation. We also tried to respect the architectural tradition and urban fabric of the neighbourhood and to make manifest a humane approach to community healthcare.

Construction & Materials

In keeping with the above ambition, we used mostly standard materials and detailing, avoiding complex junctions or expensive products. The monopitch roofs on the clinic are continuous length steel sheeting, without any skylight openings. Windows are mostly standard steel catalogue. The rooftrusses are a combination of plate and bolted assembly, and were selected for their ability to span the 11 m width of the main waiting area and reception.

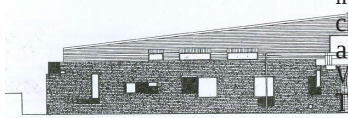


Fig 95

Volume & Light

The relatively high ceiling in the main waiting area, with the introduction of clerestory windows into the upper wall surface, brings ventilation and north light into the heart of the building. The extremely large main waiting area could not be subjected to a ruthless adherence to minimum permitted ceiling heights if it was to be a space that would be anything other than oppressive.

Privacy

One of the client's requirements was that the building be substantially introverted, allowing visitors a high degree of privacy. The client's fear was that, given the sensitive nature of some health issues, patients would avoid a building that would not permit a degree of cloistering. The embedded nature of the main waiting area and the provision of a walled public courtyard are in response to this requirement.

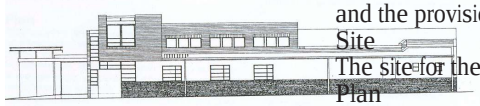


Fig 96

Site

The site for the new clinic was two existing tennis courts at the east edge of the Yeoville Square Park, along Kenmere Road.

Plan

The shape of the plan arose out of several requirements, the most important of which was that there be as few corridors as possible, since these become congested and create difficulties for staff members. The consulting and emergency rooms are all arranged to open directly onto the main waiting area, which was to be as large as possible. The reception area acts as a security point, adjacent to the main entry, and is visible to the main public areas. The addition of a public courtyard as per the client's accommodation requirements allowed us to bring light and a view into the heart of what is otherwise a very deep, square building. The dogleg shape of the main entry arose out of a requirement that babies, weighed naked at the reception counter, not be exposed to direct draughts. The southwest portion of the building (multipurpose room and toilets) can be accessed separately from the outside, allowing the public to use this portion of the building for community meetings when the clinic is closed, with a security gate separating the two portions. The multipurpose room can be narrowed in future to allow for a passage to link through to a maternity wing extension, which would be sited on remaining open land to the west.

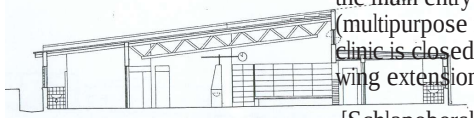


Fig 97

[Schlapobersky, P. October 1998.The Yeoville Clinic. South African Architect.]

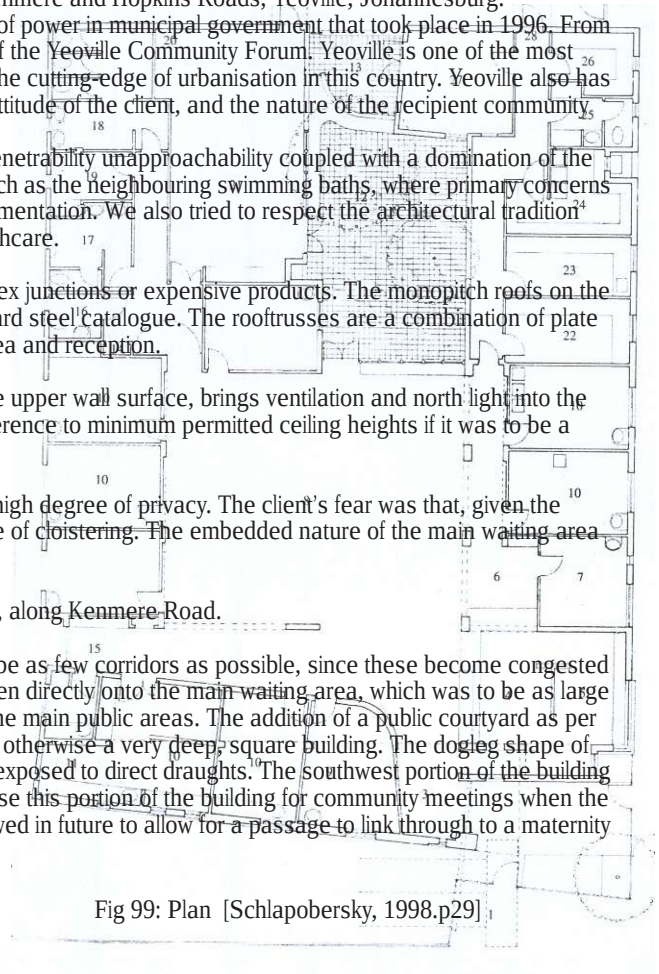


Fig 99: Plan [Schlapobersky, 1998.p29]

Fig 95-97: Elevations [Schlapobersky, 1998.p26]

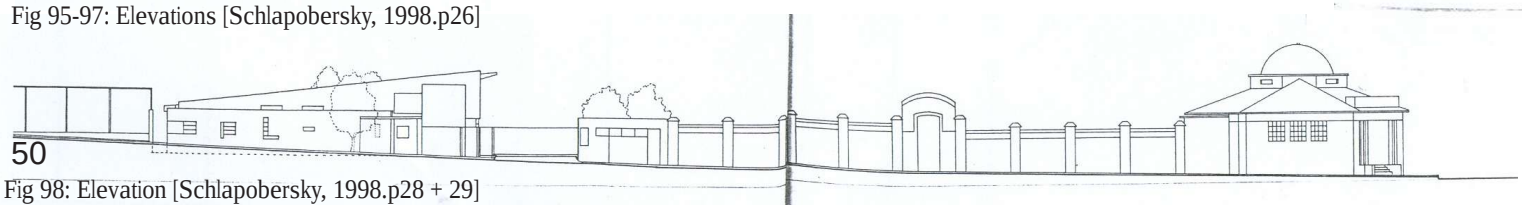


Fig 98: Elevation [Schlapobersky, 1998.p28 + 29]

PRECEDENT 5

Le Jardin Atlantique

Francois Brun, Michel Pena

Location: Paris, France.
Date of construction: 1994.
Architects: François Brun, Michel Pens.

Le Jardin Atlantique is located literally on top of the train stations of Montparnasse and Pasteur, adding a surface area of 3.5 ha (8.5 acres) to Paris, won back from the railroad. Totally removed from the traffic flows and surrounded by recently constructed buildings, there is nothing to link it to traditional Parisian city gardens.
The project had to solve particularly complex problems, both technical and environmental, such as the depth of the soil and the load limits, a 700 space parking lot located over the railroad but under the garden, the presence of a hundred openings for lighting the spaces underneath, the ventilation shafts, and the shadows cast by the surrounding tall buildings.
The distribution of the park on the ground was organized around a large central square surrounded by a strolling area that separates it from the other zones. The garden is built on strips of land around this central lawn area, on the edges of which, on one side, are areas planted with trees, featuring a linked series of smaller themed spaces and, on the other, sports installations.

[Cerver, F. A. 2000. The World Of Contemporary Architecture. Konemann.]

Fig 100: Views of site [Cerver, F. A. 2000.p168]

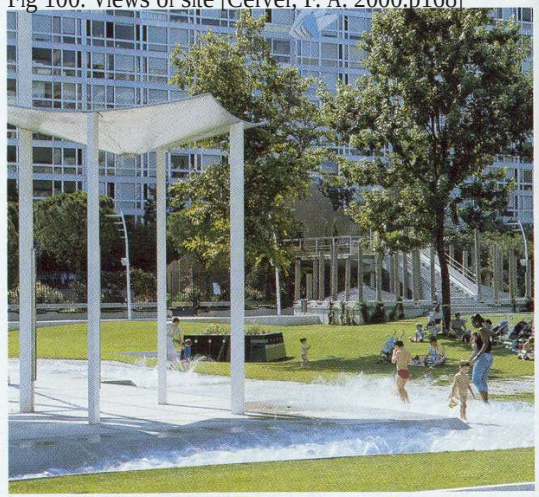


Fig 101: Views of site [Cerver, F. A. 2000.p168]

Fig 102: Views of site [Cerver, F. A. 2000.p169]

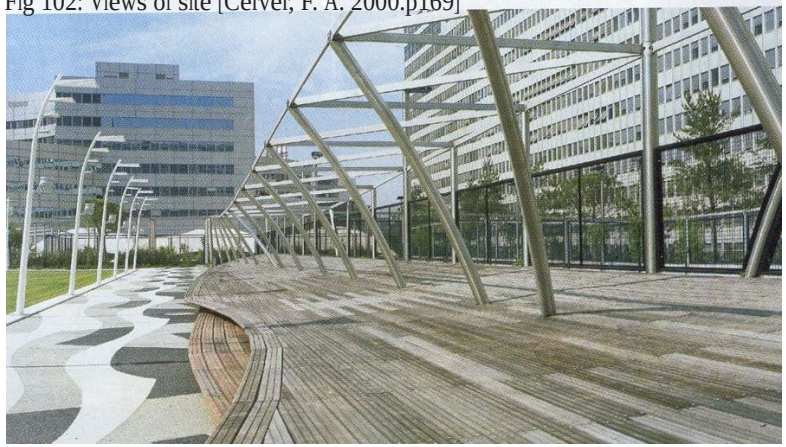


Fig 104: Views of site [Cerver, F. A. 2000.p169]

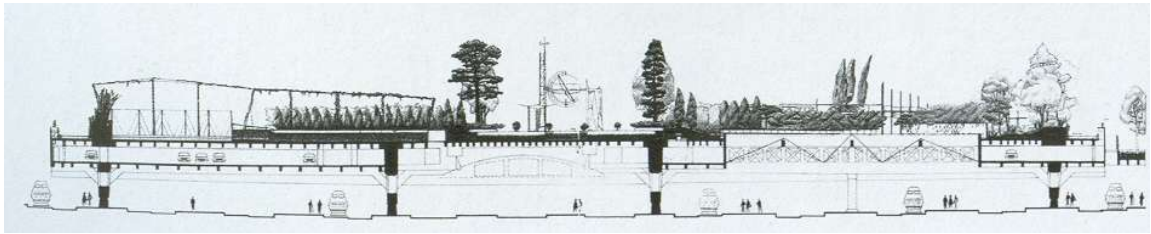


Fig 103: Section [Cerver, F. A. 2000.p168]

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