

THE URBAN HABITAT

An application in urban design of a critical review of two planning strategies

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**...to all the parties involved...
thank you for your continual help,
critique, input and support**



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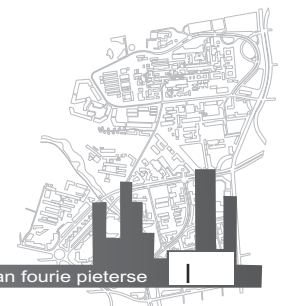
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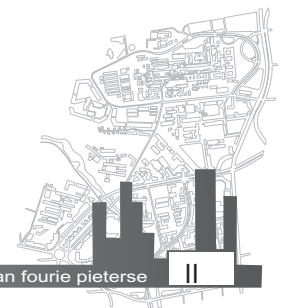
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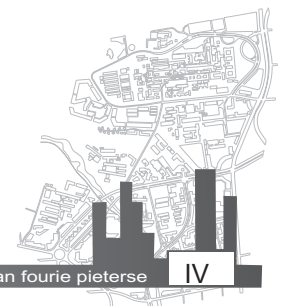


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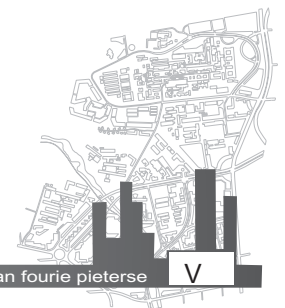
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CHAPTER I. PRELIMINARIES.

1.1. INTRODUCTION

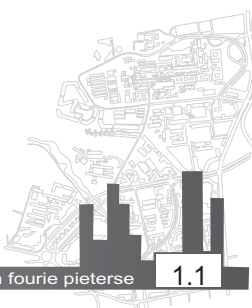
There are many subjects in the profession of Landscape Architecture that lends itself to further study. One subject is that of ecological design in urban settings. Many designers attempt to address this design concept but these attempts still draw negative critic in terms of creating functioning habitat. This study searches for answers that will result in projects with effective biodiversity master planning while it also fulfil in the needs of functional natural habitat, sustainable systems and the optimum urban human habitat.

This dissertation covers some areas in the methodology and process of landscape architectural design with emphasis on incorporating Function-Based Habitat Design into existing landscape design processes. Most design professionals familiar with both currently see Function-based Habitat Design and conventional landscape architectural design processes as two separate processes. This creates problems for the functionality and success of both endeavours. The dissertation comprises of two parts, an academic approach and a creative design exercise.

1.2. AIM OF STUDY

The academic approach will evaluate the above mentioned processes critically before combining it into a single practical process that manifests in and is tested by the creative development of the Hospital Hill Urban Design Framework. This framework will be developed further to a detailed design, expressing the finer elements of the new design process. This new process may result in a synergy, where the new process is much greater than the sum of the two parts. The aim study can thus be defined as a study that will

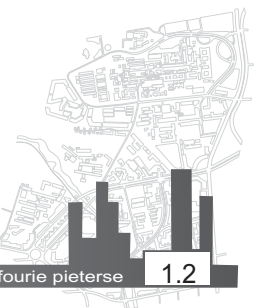
- investigate current design processes;
- evaluate the approach of each process; and
- demonstrate the new developed process.



1.3. METHODOLOGY

Some designers believe that one can retrofit Function-based Habitat Design to any environment. However, there is room for betterment towards a holistic design process, where all factors and systems concerned in the separate processes are compiled in a single process.

Research will cover the existing, conventional processes prescribed by landscape architects like Motloch, McHarg and Simonds as well as the Functional Habitat Design process. Both processes will undergo a critical review where it is weighed against set criteria, assessing the success of the individual processes in terms of human and ecological or wildlife standards. A discussion of this critical review will result in a single design process proposal. This new process will be applied to a site in order to determine its success or failure.



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Chapter II. Project Brief.



CHAPTER II. PROJECT BRIEF.

2.1. CLIENT PROFILE

The client, City of Tshwane Metropolitan Municipality, Department of Environment and Planning, is concerned about the current state of the city ecology. As guardians of the urban environment, they are concerned about the decay of both the human and animal habitat. This department has the jurisdiction to initiate urban redevelopment to rectify this problem. However, they cannot do it alone. To be successful, this endeavour should be a collective effort by the city planners and the different landowners/tenants on the site.

The environmental study and the master plan design will be funded by the Department of Environment and Planning. This design will cover both the private and public owned land. Detailed design will be completed for the public areas, funded by the department. The different private lot owners will have access to the master plan design, giving them the opportunity to realise the potential of bettering their own environment. The individual owners will fund their own detail design for their properties that conforms to the grander idea of the master plan.

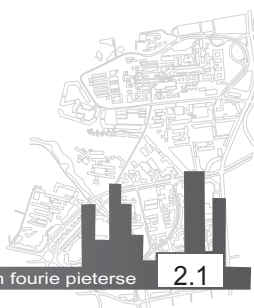
The following project implementation options exist:

- Community driven projects:
- Council driven projects:
- Privately driven projects.

The interested and affected parties include:

- City of Tshwane Metropolitan Municipality:

- Department of Culture and Recreation
Tel: 012 527 8124
- Pretoria Zoo
Address: 25 Boom Street
Tel: 012 328 3265
- Pretoria Academic Hospital
Address: Voortrekker Road
Tel: 012 328 2578
- Orthopaedic Hospital
Address: 5th Avenue, Les Marais, Gezina.
Tel: 012 335 2794
- Old Moedersbond Hospital
Address: Beatrix Street, Arcadia
Tel: 012 328 3654
- Femina Clinic
Address: Belvedere Street 460, Arcadia.
Tel: 012 328 3838
- Dental Clinic
Address: Dr. Savage Road, Arcadia
Tel: 012 328 4568
- Princehof School for the Blind
Address: POBox 2817, Pretoria
Tel: 012 328 4170
- Residents
- Business Owners
- Action groups concerned about city amenities



2.2 THE BRIEF

The concept of life is fully meaningful only in the context of the entire biosphere (Davies, 1987, p95). Hospital Hill is an area characterised by urban decay. The public realm is in an urgent need of revival and redevelopment. Many opportunities to enhance the wildlife qualities will arise from this project, partly because of its location and partly because of the particular land uses associated with the site. Hospital Hill is located on the boundary of the Pretoria Zoological Gardens, while the Apies River flows through the site. The site includes hillside and valley, build-up land and open space, creating many habitat opportunities.

Health institutions dominate the land-use. This type of land-use is associated with an artificial and sterile environment. The role of animals, wildlife and the outdoors in promoting mental health and reducing the healing time of patients is still being studied. This project creates the potential to exploit this concept. It is worthwhile to enhance the public realm while grabbing every chance of normalising the depressing atmosphere of most health institutions. Improved biodiversity will also add to the human enjoyment factor of the different users.

This project should fit into existing urban frameworks, complimenting the existing urban form while exploring contemporary ideas in enhancing the urban wildlife character.. The designer might look into proven wildlife management techniques to solve the problem of habitat creation. These techniques should melt into landscape architectural principles creating a robust

process for the design of cities saturated with urban wildlife.

2.3. THE SITE

Hospital Hill, an area in the City of Tshwane (Figure. 1), will serve as the site for the dissertation. Set in an existing urban context, the process will be test thoroughly. The design will encompass all the analysis and stages of the new design process together with influences associated with an urban re-development. It is in this context where Function-based Habitat Design, and thus ecological design, becomes a most difficult objective due to the intensive use of the public realm in the urban context. If the dissertation results in a process that proof to be successful on this site, the same approach can be extrapolated to less complicated areas like projects in more rural natural settings.

Why haven't we been doing this, Function-based Habitat Design, for the last 40 years? Real Simple: Convention & Reductionisms Control (Breedlove et al, 2003). Function-based Habitat Design is currently seen as a privilege for the elite, for the clients that can pay for the expensive process and the rich who can afford living in a secure estate where Function-based Habitat Design has been implemented. With the urban, public setting of this project, the dissertation will reveal many possibilities that will enable the general public to benefit from all the aspects of habitat creation. It will set a prototype design where city planners can criticise and evaluate the effectiveness and potential of Function-based Habitat Design in the urban context.



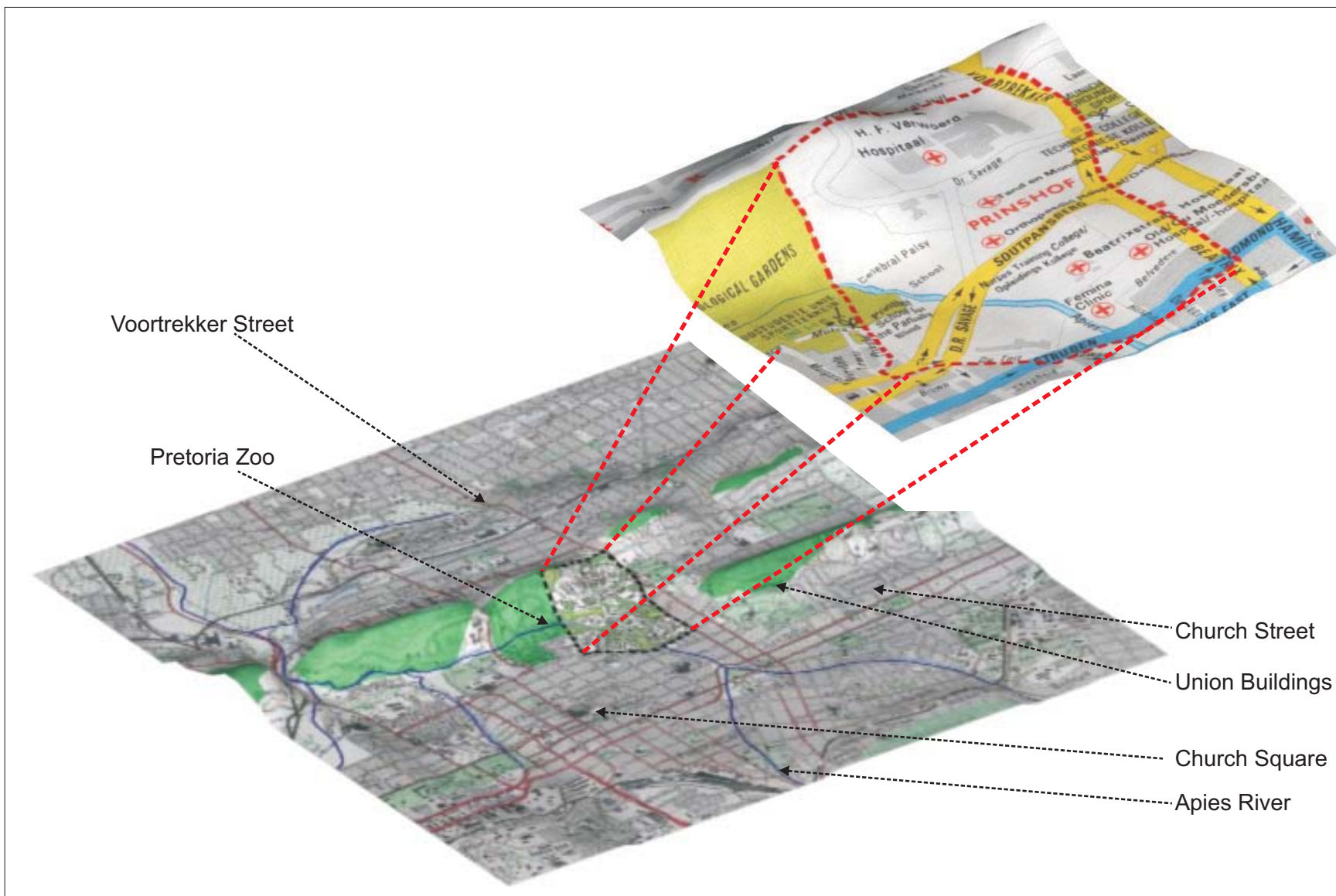


Figure 1. Site location. (Map Studio, 1996).



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Chapter III. Design Process Development - NuHabit@ Design Process



THE HOSPITAL HILL URBAN DEVELOPMENT FRAMEWORK: THE URBAN HABITAT
APIES CORRIDOR MASTER PLAN: HOSPITAL HILL SECTION
HOVE'S DRIFT DETAIL DESIGN

by jan fourie pieterse



3. INVENTORY AND ANALYSIS

3.1. Regional Inventory

3.1.1. Climate

The site falls into an area with a warm temperate climate. Mean temperatures varies between 18,6°C and 31,7 °C for summer and 5,3°C and 20.3°C for winter. The mean relative humidity starts between 30% and 45% in July, climbing to 60% or 75% in January. The annual rainfall varies between 650mm and 750mm falling mostly during late spring up to mid summer (Table 2 & Map 1.1). The strongest winds are experienced during October and November averaging a speed of 3,66m/s. direction and speed varies through the year as follows:

Mean Wind Direction & Velocity:

Jan, 8:00; East, 1,3m/s

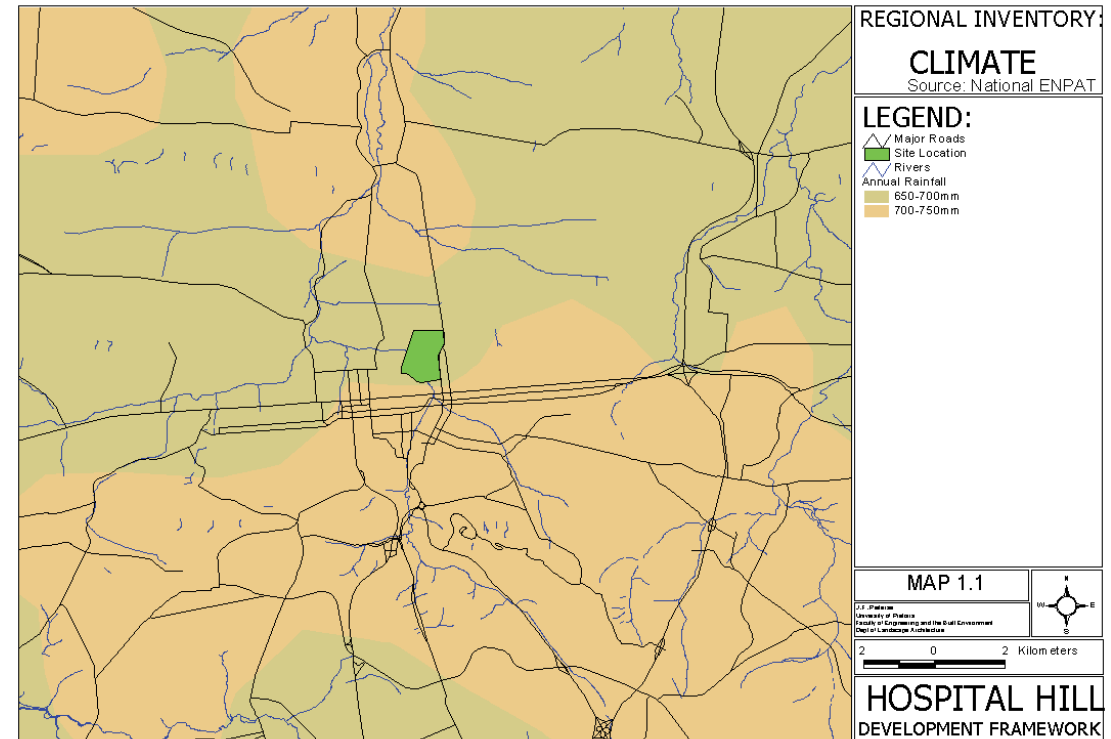
13:00; NNE, 1,0m/s

17:00; East, 0,4m/s

July, 8:00; SE, 0.6m/s

13:00; NW/NNW, 1,0m/s

17:00; WNW/NW, 0.8m/s



ANNUAL PRECIPITATION VOLUMES FOR DIFFERENT SIZE SITES														
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC		
PERCENTAGE, %	13.5	14.5	8.5	5.0	6.5	0.5	0.3	0.3	1.5	11.0	22.5	15.0		
DEPTH / MONTH, mm	101.3	108.8	63.8	37.5	48.8	3.8	2.3	2.3	11.3	82.5	168.8	112.5		
SITE	AREA, m ²	VOLUME OF PRECIPITATION, l											TOTAL, l	
1	1000	101,250	108,750	63,750	37,500	48,750	3,750	2,250	2,250	11,250	82,500	168,750	112,500	743,250
2	2000	202,500	217,500	127,500	75,000	97,500	7,500	4,500	4,500	22,500	165,000	337,500	225,000	1,486,500
3	4000	405,000	435,000	255,000	150,000	195,000	15,000	9,000	9,000	45,000	330,000	675,000	450,000	2,973,000
4	6000	607,500	652,500	382,500	225,000	292,500	22,500	13,500	13,500	67,500	495,000	1,012,500	675,000	4,459,500
6	8000	810,000	870,000	510,000	300,000	390,000	30,000	18,000	18,000	90,000	660,000	1,350,000	900,000	5,946,000
6	10000	1,012,500	1,087,500	637,500	375,000	487,500	37,500	22,500	22,500	112,500	825,000	1,687,500	1,125,000	7,432,500
7	12000	1,215,000	1,305,000	765,000	450,000	585,000	45,000	27,000	27,000	135,000	990,000	2,025,000	1,350,000	8,919,000
8	15000	1,518,750	1,631,250	956,250	562,500	731,250	56,250	33,750	33,750	168,750	1,237,500	2,531,250	1,687,500	11,148,750

Table 2. (Data From National Weather Bureau)



3.1..2. Topography and landform

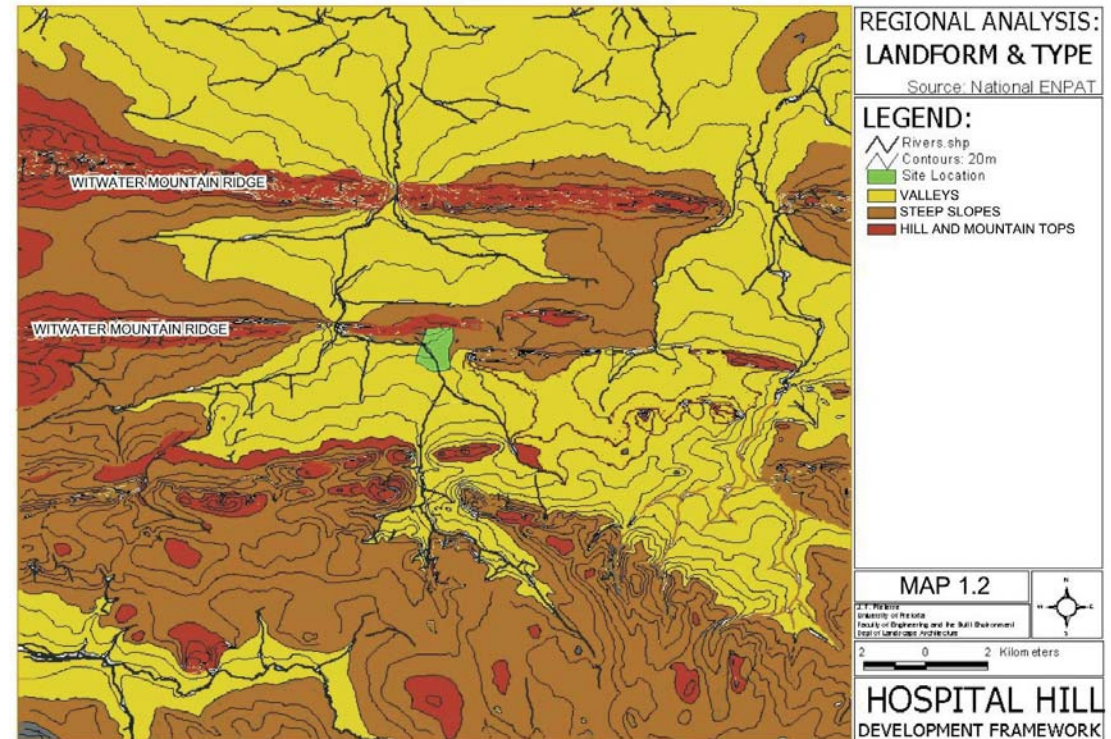
The Pretoria region is characterised by ridges, the Magalies Mountain Range and Witwater Mountain Range, running parallel to one another and a few smaller hills, Salovokop, Klapperkop, Meintjieskop. These hills and ridges create areas with differing topographical characteristics. The mountain ranges were eroded away by the Apies River creating valleys between and a poort through it. The ridges form the edges of the Bushveld Complex that lies to the north. The effect of this complex creates steeper southern slopes and more gentle northern slopes (Map 1.2).

3.1.3. Biome and vegetation type

Tshwane falls within two South African biomes, the Grassveld biome and the Savannah biome. The site falls within the transition zone between the two biomes resulting in areas that are intermingled with species from both biomes only depending on the site characteristics like slope, water availability and soil type (Low and Rebelo, 1998, p19 & p39) (Map 1.3 & Map1.4).

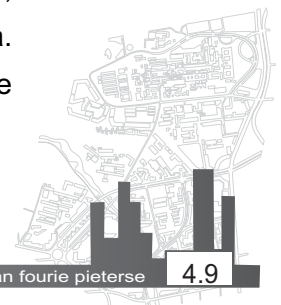
3.1.3.1. The Grassland Biome

It occurs mainly mostly to the south of Tshwane but it has regional significance and thus an influence of the site. A single layer of grasses dominates this biome. Trees are absent, except in a few localised habitats like along rivers and ridges. The grasses of this area are mainly sour grass for they withdraw their nutrients from the leaves during winter and become unpalatable. Frost, fire and grazing maintain the grass dominance and prevent trees from establishing (Low and Rebelo, 1998, p38).



The vegetation type from this biome with the most influence on the site is the Rocky Highveld Grassland also known as the Bankenveld. It forms a transition vegetation type between typical grasslands of the high plateau, and the bushveld of the lower plateau. It includes the southern slopes of the Magaliesberg and the dolomite plains of the northern parts of SA. The Bankenveld covers rocky mountains, hills, ridges and plains of quartzite, conglomerate, shale, dolomite and sometimes andesitic lava. Economic uses include grazing by cattle and game, but the grasses are mainly sour (Low and Rebelo, 1998, p39).

Grasses: Giant Speargrass *Trachypogon spicatus*
 Broadleaf Bluestem *Diheteropogon amplexans*



Red Autumngrass *Schizachyrium sanguineum*
Andropogon schirensis
Panicum natalense
Digitaria monodactyla

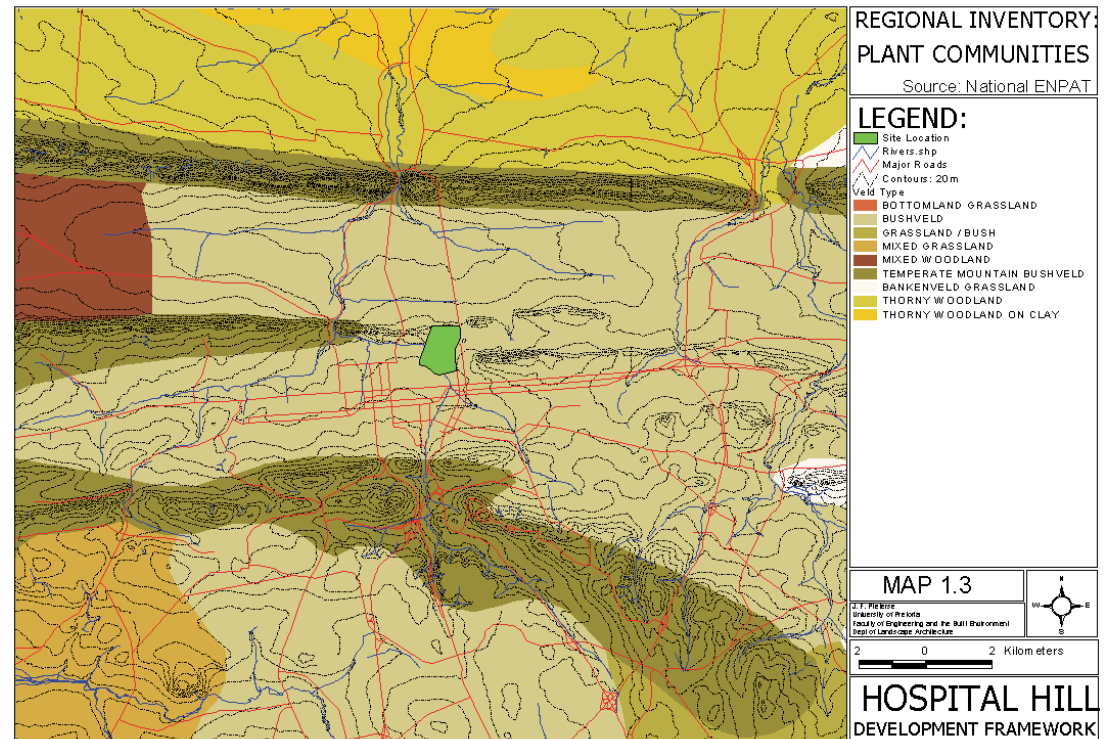
Trees: Common Hook Thorn *Acacia caffra*

Mountain karee *Rhus leptodictya*
 White pear *Dombeya rotundifolia*
 Transvaal protea *Protea caffra*
 White Stink Wood *Celtis african*

3.1.3.2. The Savannah Biome

The northern part of Tshwane falls in this Biome generally known as Bushveld. It is characterised by grassy ground layer and a woody upper stratum. Most of this vegetation types are used for grazing by cattle or game. Most of the species, grasses and trees are fire resistant (Low and Rebelo, 1998, p19).

The vegetation type representing this biome on this site is the Mixed Bushveld. It represents a great variety of plant communities, with many variations and transitions. Vegetation varies from a dense, short bushveld to a rather open tree savannah. The soil is mostly coarse, sandy and shallow, overlying granite, quartzite, sandstone shale. This Bushveld represents a great variety of plants, with many variations and transitions. Vegetation varies from dense, short bushveld to a rather open tree savannah. The area comprises mostly undulating plains. Grazing is sweet (Low and Rebelo, 1998, p19).



Grasses: Finger grass *Digitaria eriantha*
 Wool grass *Antheophora pubescens*
Aristida spe.
Eragrostis spe

Trees: Red Bushwillow *Combretum apiculatum*
 Common Hook Thorn *Acacia caffra*
 Sicklebush *Dichrostachys cinerea*
 Marula *Sclerocarea birrea*

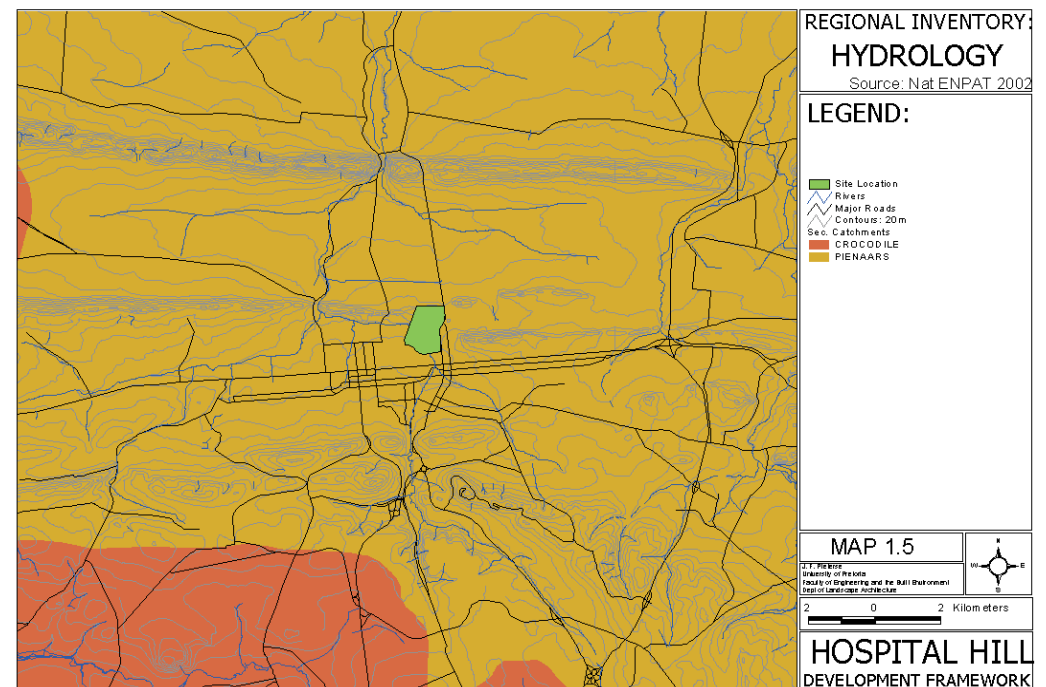
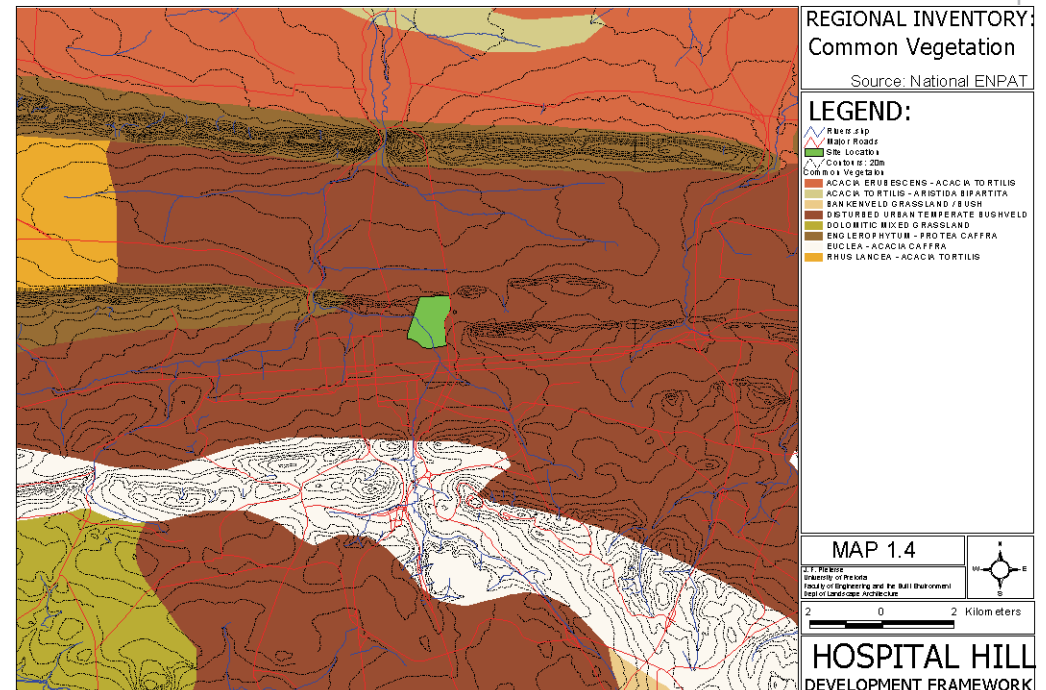
3.1.4. Wildlife

The rural area away from the city is known for its reserves, private game farms and conservation areas, such as Ben Alberts, Mabula, Vaalkop Dam, Rust der Winter Dam, Roodeplaat Dam, Loskop Dam, Rietvlei Dam, Groenkloof, Nylsvley and Rustenburg, Pietersburg, Percy Fyfe and Ben Lavin Nature Reserves. There also exist a few conservational areas within the city protecting mainly the ridges and some areas along the rivers. These areas form vital source populations for the wildlife and biodiversity in the area.

3.1.5. Hydrology and catchments

The Apies River is the most important hydrological feature of the area. Two springs in this reserve, delivering up to 30 million litres of water per day; are sources for the Apies River. Bulk of this water is distributed into the water network of the city (Holm, 1999, p4) (Map 1.5). Ten streams or tributaries flow into the main river,

- Eeufees Spruit
- Bergklapper Loop
- Kerameikos Loop
- Timeball Creek
- Walker Spruit
- Steenoven Spruit
- Skinner Spruit
- Modder Spruit
- De Moot Spruit
- Wonderboom Spruit



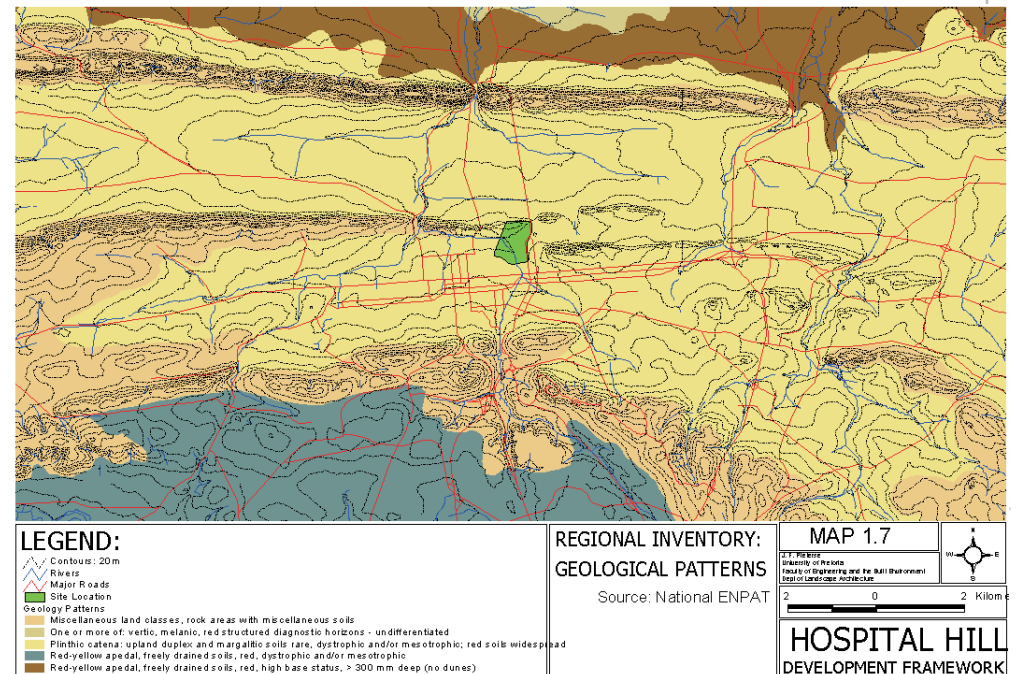
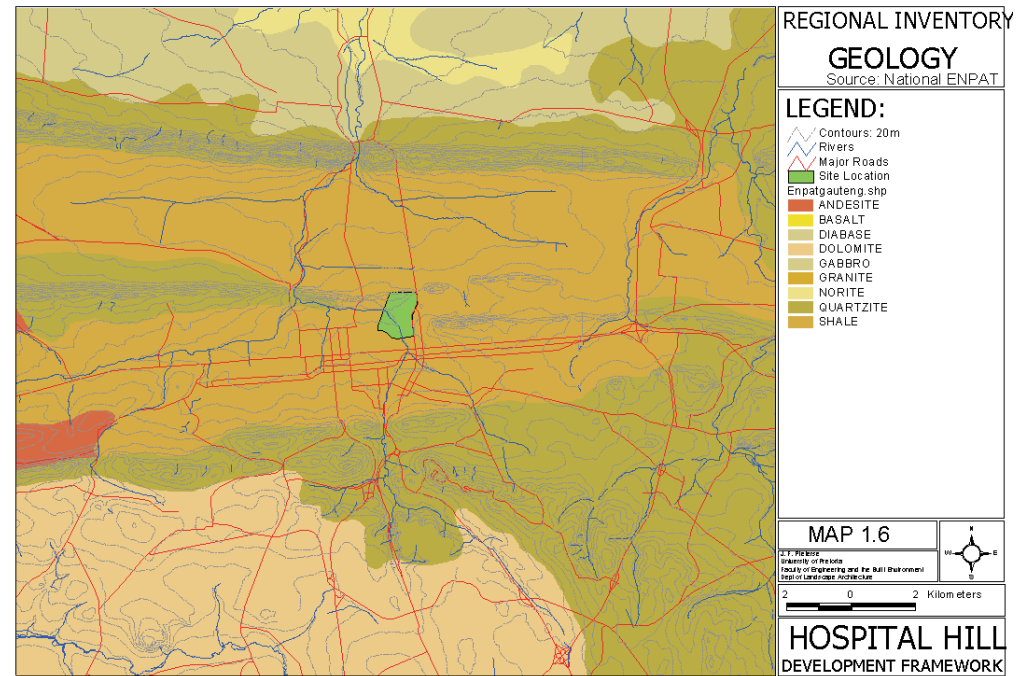
City development significantly influenced the natural hydrological characteristics of the region. Based on water quality as guideline for recreational use; the river is generally usable in the upstream parts where areas with a decrease in water quality are limited. The hydrological pattern changed due to water extraction at Fountains Valley and the canalisation of the stream over large distances through the city. Periodic downstream problems are experienced with embankment erosion and instabilities during floods. Placement of fill material and dense encroachment of exotic vegetation cause abnormalities on land, especially during flood conditions. Downstream, however, the stream experiences many ecological pressures. The ecology is under stress due to pollution, littering, invasion of exotic plant species and physical disturbances (dumping, embankment and riverbed disruption). On a larger scale, the river forms part of the Pienaars, and ultimately of the Crocodile River catchments.

3.1.6. Geology

The soil on in the region is mostly coarse, sandy and shallow, with underlying granite, quartzite, sandstone or shale (Map 1.6 & Map 1.7).

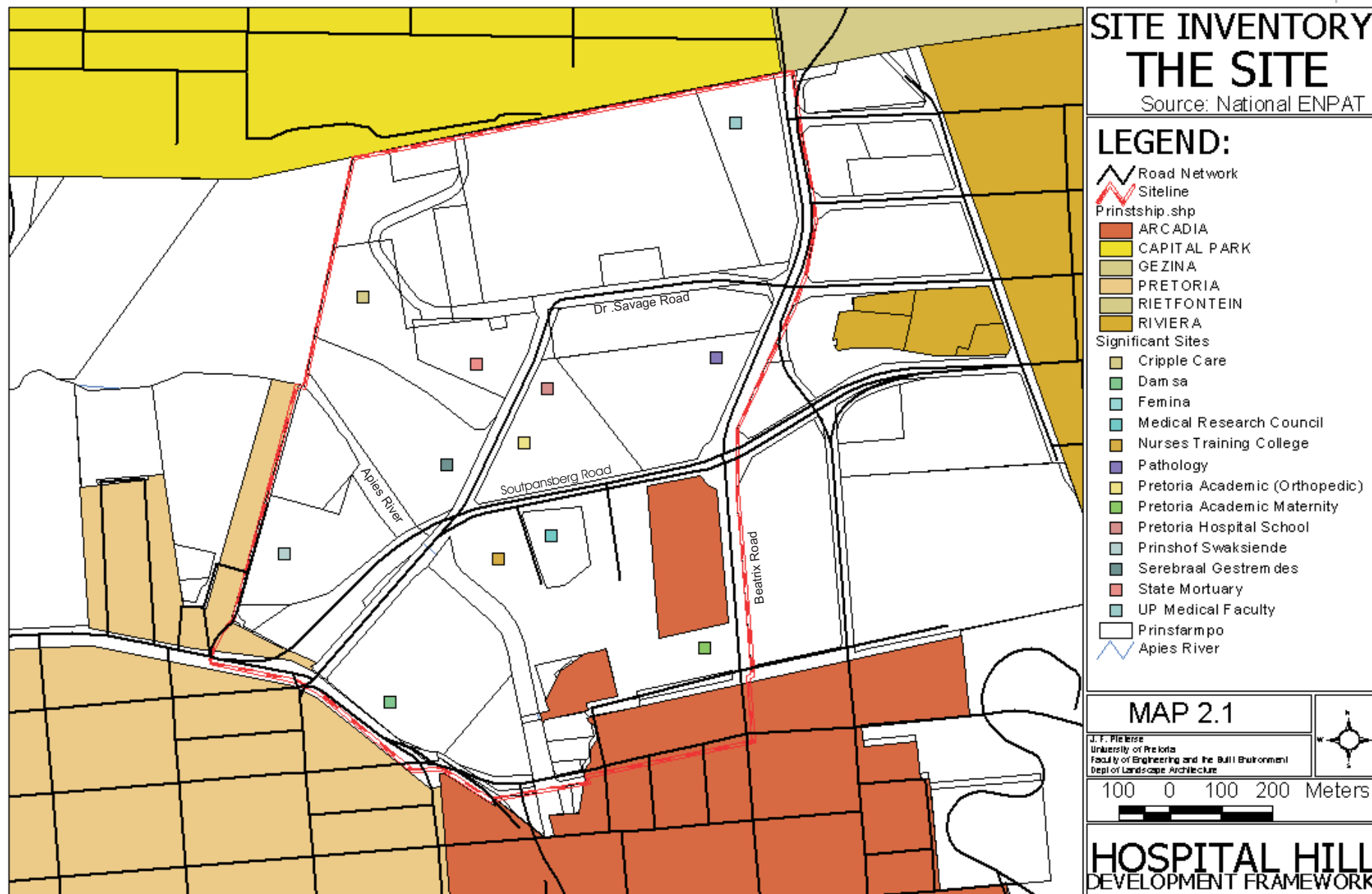
3.1.7. Institutional and Community Services

The area, being a metropolis, is well serviced with community and institutional services in comparison with other rural areas in the country. There is a relatively even distribution of schools, churches, police and fire station, hospitals and libraries in the region. However, the quality of these services in the lower income areas is not up to standard. The rich can afford private hospitals and schools, while the poor struggle to get the needed quality of services at state funded hospitals and clinics. Crime is an ever present danger in the region, and the need of intensified policing and security services can not be stressed



3.2. Site Inventory

The site is situated on the fringe of the CBD. It is subject to a wide variety of influences. This Part covers the site specific character and influences (Map 2.1)



3.2.1. Micro climates

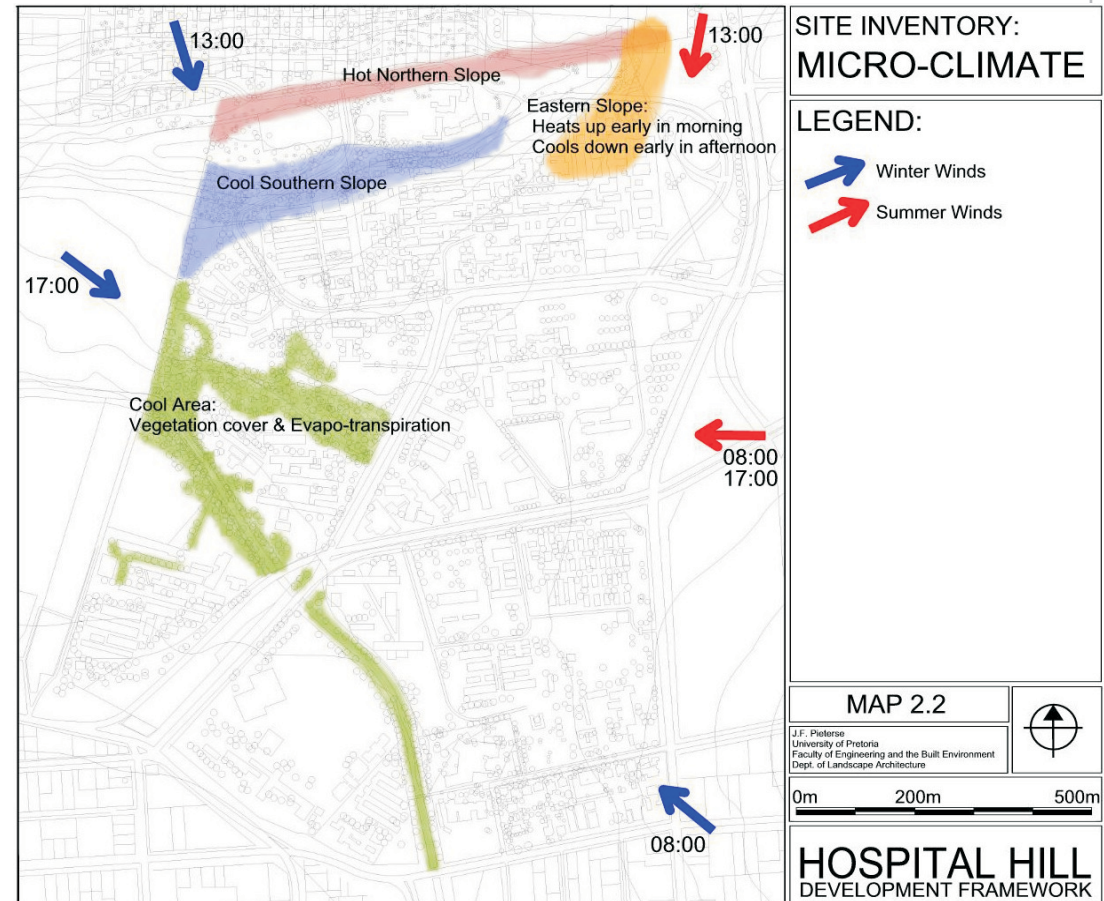
The site lies on the southern slope of the Witwater Mountain Ridge. The southern slope is cooler and wetter than the northern slope. The Pretoria Hospital part of the site also slopes to the east creating a surface that is warmer during morning hours while it cools down earlier than the surroundings in the afternoon (Map 2.2).

The embankments of the Apies River tend to be cooler than the rest of the site due to the evapo-transpiration effect of the surface water as well as the cooler air that settles down in the valleys.

Most of the artificial surfaces in the city have a very low volumetric heat capacity. These materials include asphalt roads, concrete surfaces and roofs. Together with the reflective effect of paints and glass the artificial materials tend to make the city warmer than the surrounding natural areas.

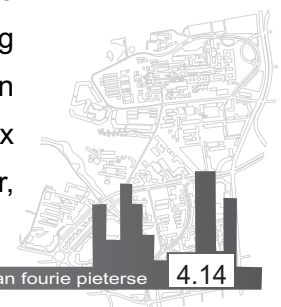
3.2.2. Natural features

The city is situated on the border of the central business district of the city. It is thus understandable that only a few natural features exist in this developed environment. The most prominent of these features are the Apies River and the Witwater Ridge. The Apies River flow through most of the site as a concrete canal with indigenous trees planted on the embankments, before the canal changes to a natural canal with embankments invaded by exotic vegetation. There exist a few other areas on the site that is covered in dense vegetation, indigenous and exotic (Map 2.3).



3.2.3. Water quality

The Apies River flows in a canal through most of the site. It has a relatively stable embankment and the canal surface is in a good condition giving it a clear appearance. No fish or aquatic life is present in the river. The water quality is low due to a sewer leaking into the river from an unknown source as well as other pollution and dumping. The level of the water table are only four to six metres under the natural soil level at areas near the river, increasing to deeper levels at areas of higher ground.



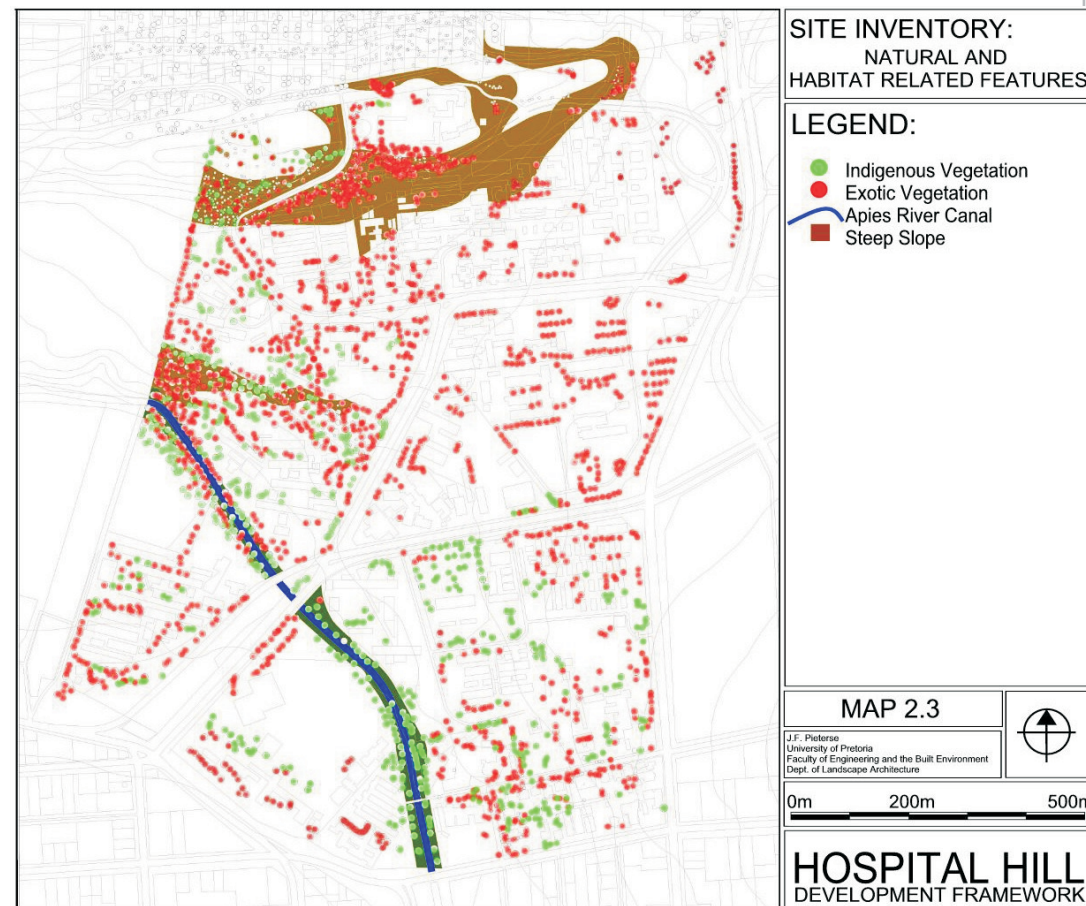
3.2.4. Flood and storm water records

Underground storm water pipes drain into the river, increasing the peak flow and intensity of storm water runoff regimes. Authorities are concerned about the restrictions applicable to development next to rivers and streams. The Metro-wide Integrated Development Plan of 1997 restricts development between a 50m corridor on both sides next to the fifty year flood line adjacent to streams and rivers. This creates an uncertainty when read with the national Water Act of 1998 stating that no development is allowed below the 100-year flood lone. The restrictions followed in this project will comply with the restrictions set by the Water Act.

According to the Rational Method of peak flow estimation, the canal should accommodate a peak flow of 209m³/s to withstand a 50-year flood, a flood that have a 2% chance of occurring at any time. This flood is contained in the canal, with the walls exceeding the flood line by approximately one meter.

3.2.5. Drainage

The direction of drainage is a function of the slope. This means that water drains mostly to the east and to the south of the site. The site is serviced with a storm water network including storm water pipes buried in the road reserves and the Apies River canal. The estimated value of the Apies River canal, on the site, as a storm water asset is approximately R18 million, meaning that it will cost around R18 million to replace it with underground pipes through the site (Holm et al, 1999, p8) (Map 2.8).



3.2.6. Slope analysis

The site is divided into different categories according to its slope (Map 2.6). These categories are:

- 0% - 3% (easy construction, little erosion)
- 3% - 8% (residential, medium structures, little erosion)
- 8% - 15% (expensive construction, difficult access, erosion)
- >15% (development constraint, high erosion)

3.2.7. Fauna and floral species

The BioAtlas (ENPAT 2002, DEAT) compiled a report regarding wildlife as well as the habitats the different species occupy on the site.

Bird Species Code : BIRDS506

Anthropoides paradiseus (Blue Crane)

Grassland, vleis and dry grass - hillsides. Shallow waters in pans Cultivated and fallow lands. Waterberg, Potgietersrus.

Gypohierax angolensis (Palmnut Vulture)

Associated with stands of palm trees. Limpopo Valley.

Gyps coprotheres (Cape Vulture)

Tall cliffs for breeding Kransberg, Blouberg, Manoutsa

Hirundo atrocaerulea (Blue Swallow)

Alt:1200-1500m,High rainfall - grassy, hillsides Paeroa-Haenertsburg

Lioptilus nigricapillus (Bush Blackcap)

Leucosidia and Buddlea thickets in valleys and ravines and edges of montane forest.

Mirafra chuana (Shortclawed Lark)

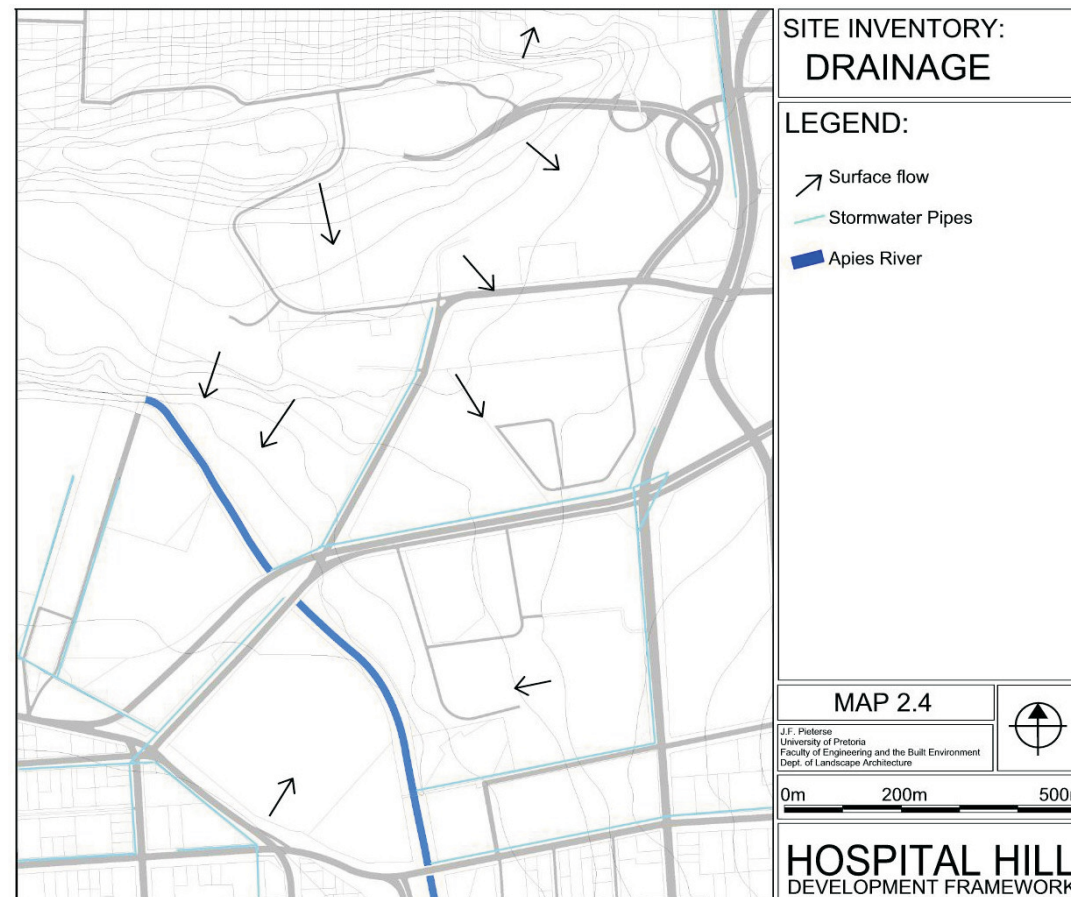
Flat Plains with acacia savannah or scrub. Pietersburg Plateau.

Neafrapus boehmi (Bohm's Spinetail)

Riparian forest and adjacent woodland, Limpopo and Levuvhu Rivers, breeds in Baobabs.

Oenanthe bifasciata (Buffstreaked Chat)

Hilly or mountainous country, frequently rocky hillslopes in

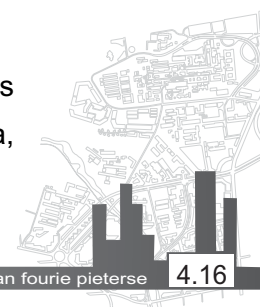


open grassland or areas with a sparse tree cover. Escarpment- Wolkberg, Mountains north of Potgietersrus, central and western Waterberg - Kransberg.

Pachyoccyx audeberti (Thickbilled Cuckoo)

Savannah and tall tree woodland - forested tree galleries along larger Lowveld rivers. Limpopo - Breslau, Mica area, Hans Merensky Nature Reserve.

Platysteira peltata (Wattle-eyed Flycatcher)



Platysteira peltata (Wattle-eyed Flycatcher)

Riparian gallery forest along Lowveld rivers, favouring areas with a closed canopy and open midstratum with tangles of creepers and lianas. Levuvhu, Limpopo rivers, Messina.

Schoenicola brevirostris (Broadtailed Warbler)

All dense grass, Cymbopogon, Heteropogon, Themeda, Imperata. Escarpment - South of Wolkberg

Scotopelia peli (Pel's Fishing Owl)

Large rivers and associated pans overhung with a gallery of tall riparian trees. Limpopo Basin, Levuvhu-Limpopo River.

Serinus citrinpectus (Lemonbreasted Canary)

Limpopo Valley from Messina to Pafuri.

Telacanthura ussheri (Mottled Spinetail)

Riparian gallery forests and breeding in baobabs. Limpopo and Levuvhu rivers.

Telophorus nigrifrons (Blackfronted Bush Shrike)

Primary montane forest also riparian forest - Levuvhu river. Restricted to Escarpment, Wood-bush, Duiwelskloof, Soutpansberg

Turtur afer (Bluespotted Dove)

Eastern Soutpansberg

Tyto capensis (Grass Owl)

Restricted to wet areas - marshes and vleis, permanent to seasonal vleis. Central Bushveld, Pietersburg, Escarpment - Wolkberg.

Vanellus albiceps (Whitecrowned Plover)



Restricted to larger perennial eastflowing rivers in northern Bushveld and Lowveld. Breeds on exposed sandbars and sandbanks. Restricted to Limpopo, Levuvhu, Letaba and Olifants Rivers.

Vanellus lugubris (Lesser Blackwinged Plover)

Savannah, open woodland with very short grass cover usually heavily grazed or recently burnt. Restricted to eastern Lowveld and Limpopo River Valley.

Zosterops senegalensis (Yellow White-eye)

Northern edge of N.P., Limpopo, Levuvhu and Mutale Rivers, Greefswald.

Coracias spatulata (Rackettailed Roller)

Deciduous woodland, either mopane or broad-leaved.
Limpopo River.

Geronticus calvus (Bald Ibis)

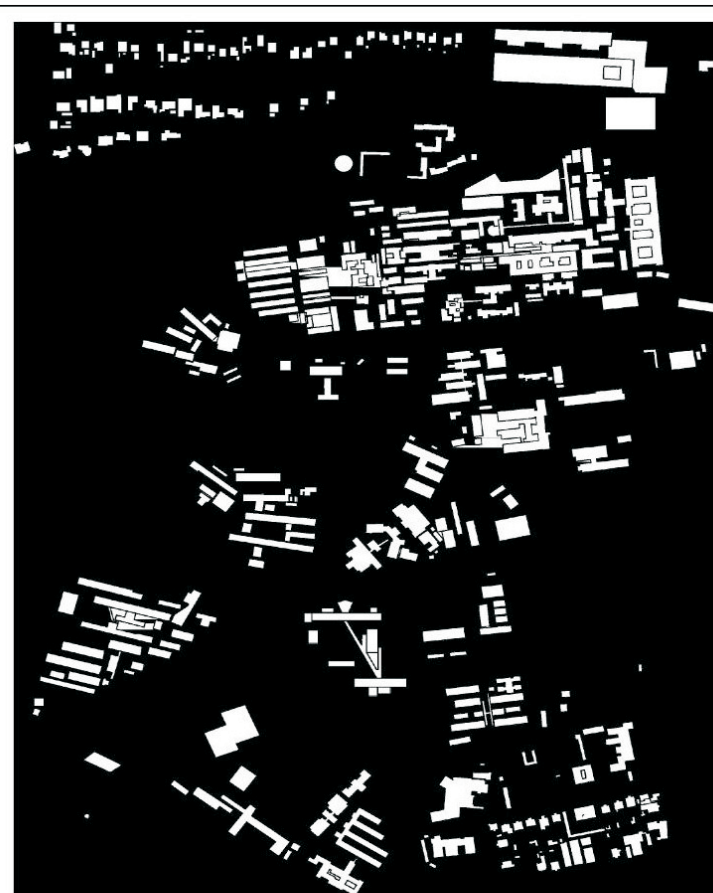
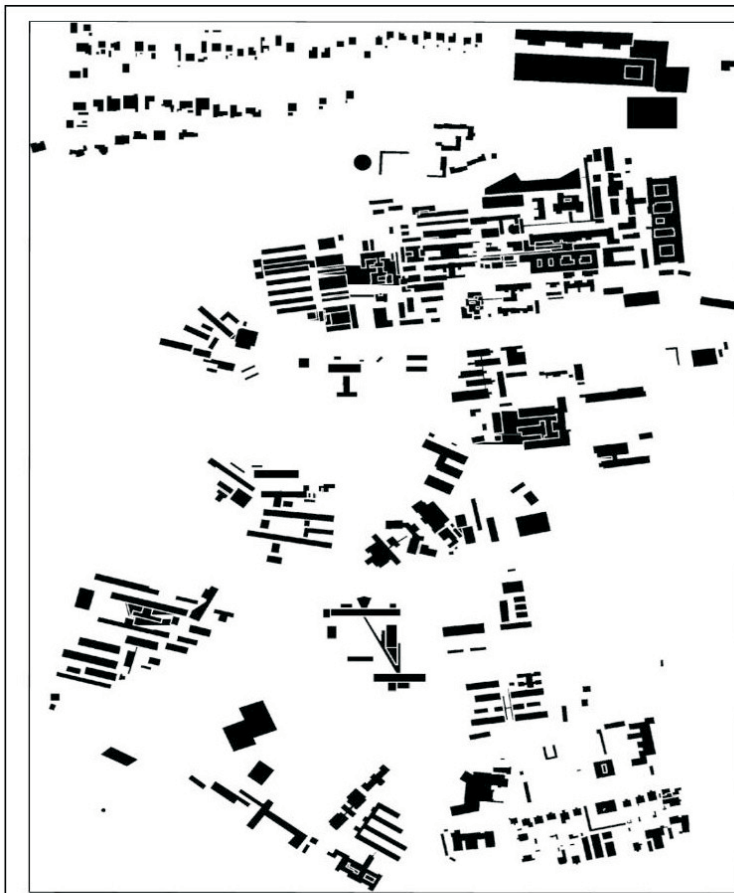
High rainfall sour & alpine grasslands. Breeds on cliffs,
Northwest of Pietersburg.

Glareola nordmanni (Blackwinged Pratincole)

Grassland, pastures, cultivated lands, vleis and pan edges.

Centropus bengalensis (Black Coucal)

Grassy seasonal vleis - Limpopo Flood plain.



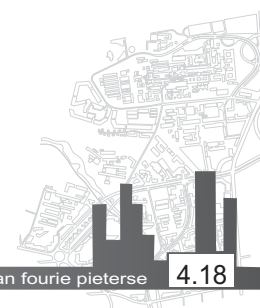
INVENTORY & ANALYSIS:
FIGURE-GROUND & GROUND FIGURE

MAP 2.6

J.F. Pieterse
University of Pretoria
Faculty of Engineering and the Built Environment
Dept. of Landscape Architecture



HOSPITAL HILL
DEVELOPMENT FRAMEWORK



Butterfly Species Code : BUTTER241

Aloeides dentatis
Open areas.

Mammal Species Code : MAMM204

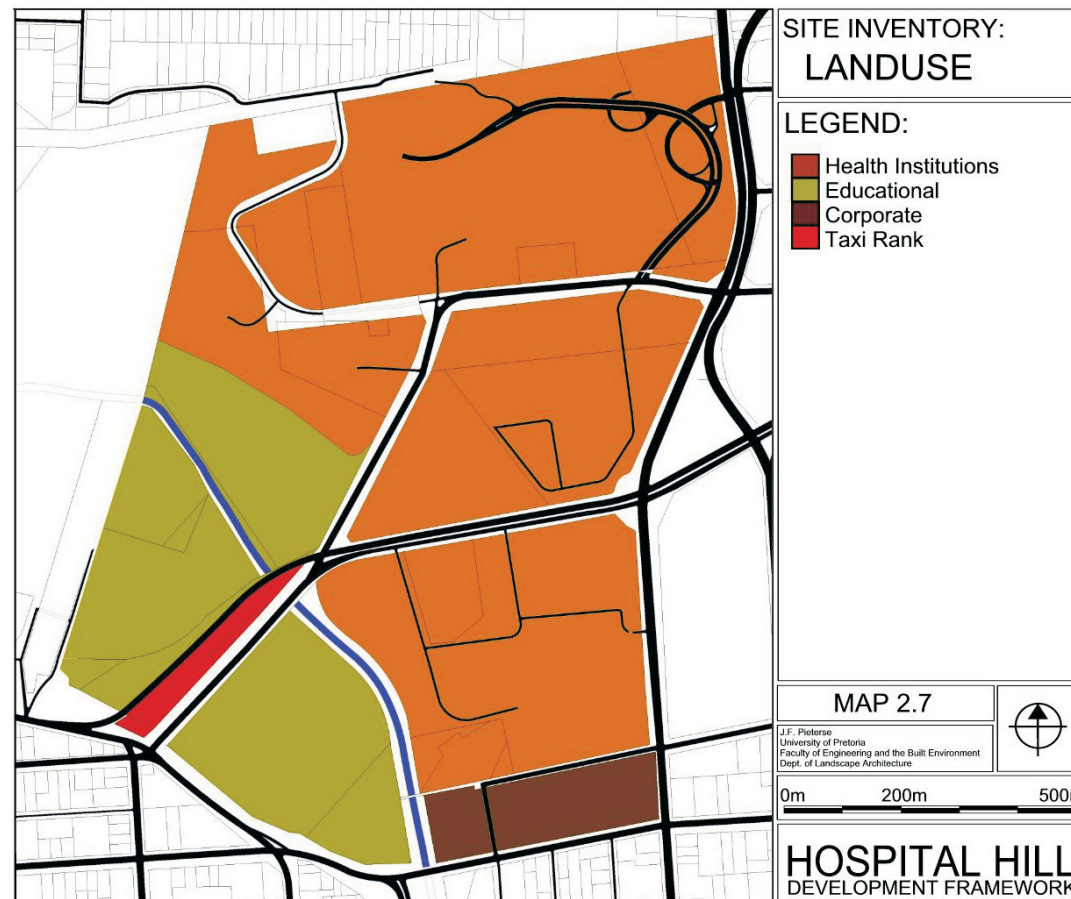
Lycaon pictus (Wild dog)
Open plains, open savannah woodland, arid country; avoids forest, thick underbrush and tall grass. Bovid prey availability and absence of lions important limiting factors.

Poecilogale albinucha (African weasel)
Savannah species associated with moist grassland or woodland where rainfall exceeds 600mm per year; flourishing rodent populations important as prey.

Rhynchogale melleri (Meller's mongoose)
Apparently restricted to woodlands, especially moist areas with dense grass cover. Also often associated with drainage lines and rock outcrops.

Orycteropus afer (Aardvark)
Wide habitat tolerance; open woodland, arid scrubland and grassland, mopane woodland; absent from forest and deserts. Disturbed grassland and sandy floodplains of major rivers are ideal habitat; avoids rocky areas; seasonal water sufficient.

It should be added that the site and its wildlife are subjected to the urban realm and thus are influenced by domestic animals like cats and dogs. Stray cats can be a big problem for birds and small



mammals. These stresses, together with the unnatural character of the city allows only for animals that are capable to adapt to the stresses. Many exotic animals and birds fit perfectly into these habitats like the Indian mina, sparrows, domestic doves, rats and mice.

3.2.8. Habitat related terrain features

Hospital Hill is poor in natural habitat. The inventory of the natural features done earlier contains all the information regarding



regarding existing habitat on the site. A further study into this aspect is thus not necessary.

3.2.9. Structures

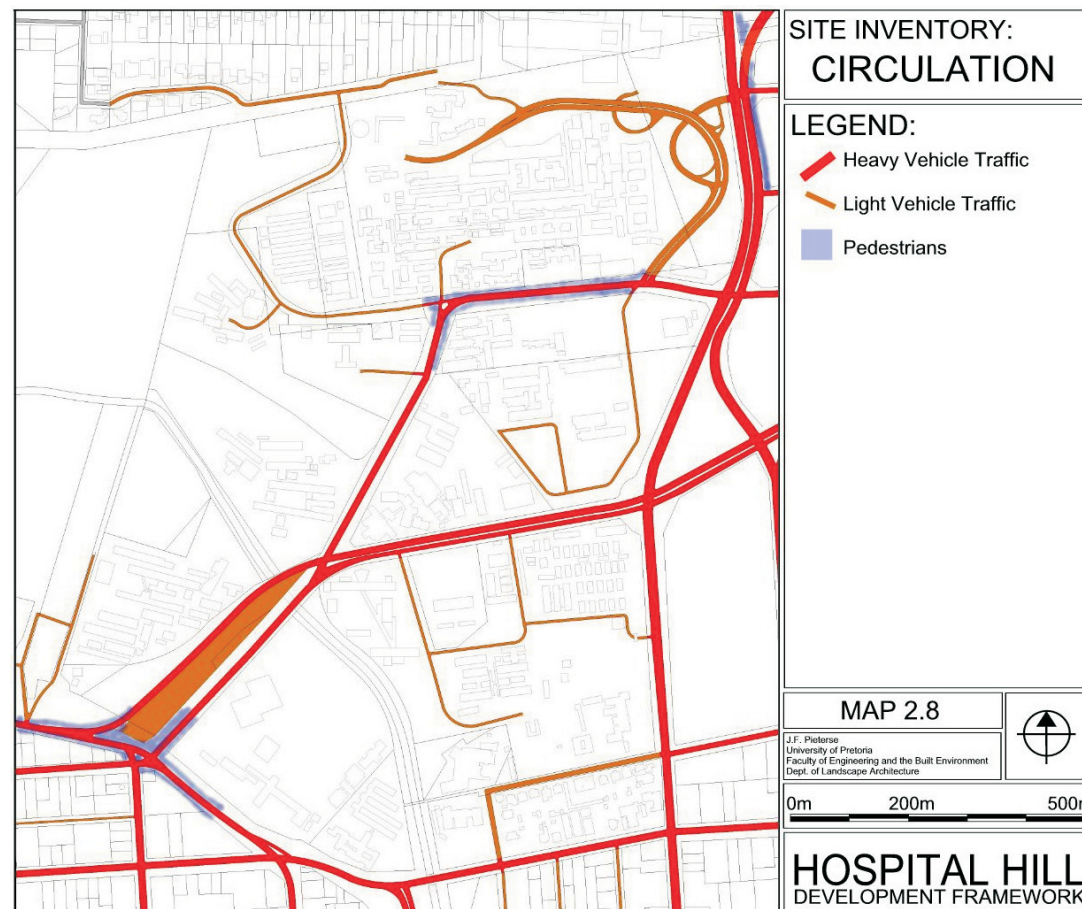
The urban form fails to define urban space and strong urban character. Structures are scattered over large institutional terrains, not standing up to their duty in expressing the urban realm. The figure-ground and ground-figure analysis reflects an incoherent positioning of building and structures. Structures obscure the view to the river and hide it from public view. No Built-to lines or building lines were used to create a spatial character on the site. No vistas, views or visual connections are enhanced and little has been done to exploit the possibilities of aesthetics in creating an enjoyable human environment (Map 2.7).

3.2.10. Surfaces

All the roads are laid in asphalt, sidewalks are cast in concrete and the remainder of the surfaces consists mostly of grass and bare soil.

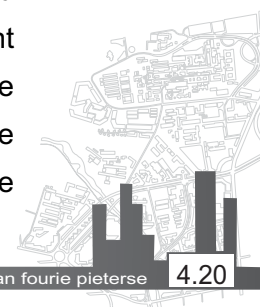
3.2.11. Land use

The land use is dominated by institutional facilities. This includes health care and educational facilities as well as a site for a telecommunication company, The educational facilities are focussed on the disabled and on educating people in the medical profession. Two schools are situated on the site, both for the disabled. Technicon of Pretoria, Department of Arts are also situated on the site. A part of the site is used for offices (Map2.8).



3.2.12. Hazards

The river area is unsafe, with no lighting and adjacent land use are not promoting activities on the river banks. This is partly due to the neglect of the river and the adjacent developments and businesses turning their backs on it. This unsafe environment becomes an even bigger hazard during floods when large volumes of water rushes down the canal. Erosion occurs where the river changes from a concrete to a natural canal creating the hazard of unstable substrate and embankments.



The traffic flowing at high speeds down Dr. Savage Street and Beatrix Street creates a hazard for pedestrian and cyclists. The intensity of road usage around the taxi rank and public transport drop-offs add to the road safety hazards for all users of the road.

3.2.13. Logical points of site access

The Hospital Hill site is divided into two parts by one major street, the Dr. Savage Road and Soutpansberg Street combination. Other smaller streets assist in the further distribution of vehicles, pedestrians and cyclists. Due to the nature of the whole site and its urban form, it is necessary to define all the entrances to the different properties and parts thereof. Different areas vary in levels of public accessibility. The streets are open to the public while the entrance to hospitals are monitored and the schools are restricted to all except the pupils, parents and staff.

3.2.14. Traffic flow (Pedestrian, bicycle, car, bus, train, public or private)

The taxi rank at the end of Dr. Savage creates an important intermodal node near the city centre. It creates the opportunity for informal trade to take place that leads to heavy pedestrian traffic. This is the part of the site with the heaviest traffic.

The entrance of the Pretoria hospital is associated with heavy traffic, private vehicular as well as pedestrian. The need for safer pedestrian circulation is evident at both the above mentioned areas. Pedestrians and cyclist are seen as secondary users of the

road designed for vehicular traffic.

3.2.15. Cultural, historical and recreational amenities

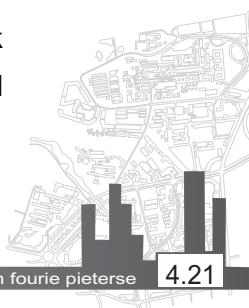
The site is poor in any cultural amenities as it is dominated by health institutions, however, the Technicon of Pretoria, Department of Art, is situated on the southern end of the site. It can be developed into a cultural centre with site and regional significance.

The site contains little elements with cultural-historical significance. The few with some significance are:

- The Apies River canal
- Hove's drift crossing (Dr. Savage)
- Ou Moedersbond building
- Some buildings at the Pretoria Academic Hospital
- Medical Research building

However, the priority of conserving these amenities is not high in relation to other cultural-historical site in the city.

Recreational amenities are limited. The Pretoria Zoo, on the western border of the site, is visited by locals and tourists on national as well as international level. The opportunity exists to extend this recreational amenity to incorporate the rest of the Apies River canal. The need for an integrated open space network is evident. The street furniture as part of the public-environmental interface is in a neglected state and needs some redevelopment.



3.2.16. Social gathering spaces

Some areas along the river is utilised by informal churches on Sundays. These gatherings develop underneath trees with enough shade to accommodate the group of between twenty and sixty people. The taxi rank at the end of Dr. Savage also serves as a social gathering space where informal trading takes place. These spaces developed informally and have the opportunity to be developed more effectively.

3.2.17. Visual Analysis & Impact Assessment:

Views are restricted due to the urban character of the site. The higher lying parts of the hill, where the student residents, Olympus, is situated give the opportunity of lookout points, and beautiful views over much of the city and residential areas to the north and east. Struben Street creates a vista up to the Union Buildings. This vista should be enhanced. Photographs of the site help to explain its character .

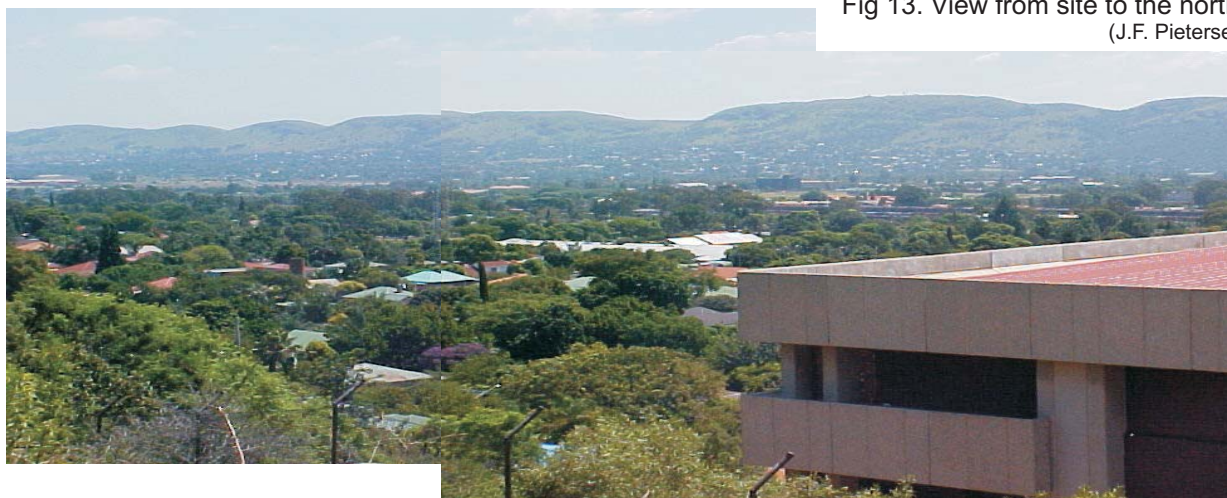


Fig 13. View from site to the north
(J.F. Pieterse)



Hove's Drift
(J.F. Pieterse)

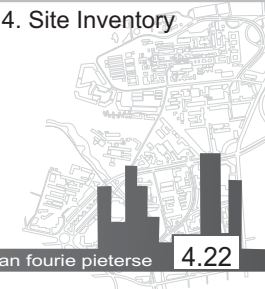


Apies River Canal
(J.F. Pieterse)



Medical Students Hostel
(J.F. Pieterse)

Figure 14. Site Inventory



THE URBAN HABITAT

Chapter IV. Hospital Hill Urban Development Framework.



THE HOSPITAL HILL URBAN DEVELOPMENT FRAMEWORK: THE URBAN HABITAT
APIES CORRIDOR MASTER PLAN: HOSPITAL HILL SECTION
HOVE'S DRIFT DETAIL DESIGN

by jan fourie pieterse



CHAPTER IV. HOSPITAL HILL URBAN DEVELOPMENT PROJECT: THE URBAN HABITAT

This chapter deals with all the information gathering stages of the design process as well as the process of developing the Hospital Hill Urban Development Framework. It follows the NuHabit@ Design Process that developed out of the critical evaluation of the two processes: conventional Landscape Architectural and the Function-based Habitat Design Process.

1. PROGRAMMING**1.1. Vision**

The vision for the Hospital Hill Development Framework is summarised as follows:

To facilitate the development of an urban landscape that defines the public realm as vibrant and responsive to the needs of its users, both, human and ecological. It should provide an improved environment to all, regardless of age, occupation, economical status or cultural background. The site will become:

- An integrated system of ecological and cultural opportunities, that is, a system that interacts meaningfully with its environment;
- a place that inspires social interaction, is safe and user friendly, and fulfils the needs of the community;
- an economically viable and sustainable asset to the city that enhances its environment to create business and tourist opportunities, managed and protected by enforced legislation, in partnership with all the communities.

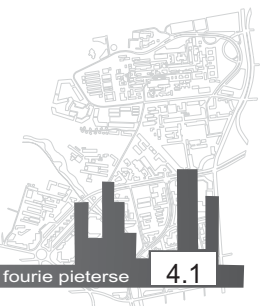
1.2. Objectives

General objectives for Hospital Hill site include the following:

- Optimizing habitat potential.
- Balance between urban opportunities.
- Intensity of use.
- Freedom and complexity.
- Equity.
- Continuity of urban fabric.
- Clarity.
- Income generation.
- Provide for pedestrians and cyclists.
- Normalising the surreal environment of the health facilities.
- Provision of appropriate public facilities promoting their multi-functional use.
- Extroverted Public Spaces.
- Instilling a Pride of Place.

1.3. Objectives from existing Urban Development Frameworks

Site objectives must include existing framework visions. These framework visions and objectives binds together all future development and all designers should commit to it in order to fit into the metropolitan structure.



1.3.1. The Pretoria Inner City Integrated Spatial Development Framework (ISDF)

This urban design framework defines the inner city in terms of varying spheres or scales of influence: regional, city and local or precinct scale. It is concerned with the mosaic of unique nodes and precincts reflecting various cultures and identities. The ISDF aims to enhance the spatial quality and identity of these nodes while combining them into a functional whole the Pretoria CBD.

1.3.1.1. The current situation

Natural features, rivers and bridges were mismanaged in the past and are currently inaccessible and neglected. Parks and open spaces in the inner city are scattered and function in isolation. The Apies River is an underutilised natural feature in the inner city. The potential for the creation of activity spines and open space corridors along the Apies River are stifled by the building of canals and is dominated by flood control measures. Strategic goals for the particular site according to the ISDF include:

- unique image (branding);
- a people's place;
- capital and world class city;
- appropriate, attractive and well-defined structure;
- enhancement of natural features;
- optimum mobility to all inhabitants;
- appropriate diversity and land use;
- sustainable economic development; and
- sub-areas with unique identities and characters.

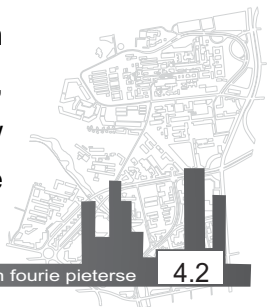
1.3.1.2. Features that will affect the area

The Struben Street Government Boulevard to the west, the hospital to the north and the union buildings to the east will have an impact on future development in the area. The location of institutional uses in response to these and development of retail and residential uses along the Apies River, will aid in the accessibility of the river. The Apies River is a unique hydrological asset and need to be protected together with a large amount of street trees. Since the inner city has evolved within a framework of natural features, a unique opportunity exists for the integration of the natural environment into the social and urban environments for mutual benefit of all.

Spatial opportunities for festival retail (open markets), recreation (sport and leisure opportunities), entertainment (concerts and exhibitions), and open-air education (hands-on science and eco-enviro-education) can be developed as niche activities of the inner city to attract visitors. Tourists must be able to go on self-guided city and heritage walks.

1.3.1.3. About Hospital Hill Precinct

The precinct contains Institutional Land Uses and provides vital social services and facilities. The proposed interventions should focus on creating identity within the street spaces. Develop each of the major intersections as spatial thresholds to the CBD core, but that relates to the identity and functions of the precincts. Allow associated services to locate in the finer grained areas on the periphery. Protect existing pockets of residential use.



1.3.2. Apies River Development Framework

(Holm et al, 1999)

The Urban Design Concept from the Apies River Development Framework is based on the following principles:

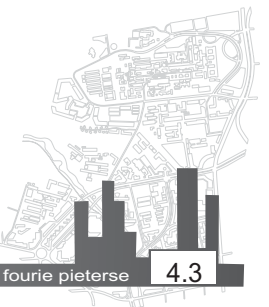
- Establish an integrated pedestrian and cycle network all along and over the Apies River.
- Minimise the negative impact of proposed roads on the Apies River and enhance their function to provide access to the river and activities surrounding it.
- Create major nodes at the special crossings (ceremonial axis and historical axis) of the Apies River by celebrating them in a unique way.
- Create a major node at the crossing of the Apies River with the taxi facility to pull energy generated along Boom Street, Bloed Street and at the taxi facility in towards the Apies River, linking it with the movement along the river.
- Create minor nodes with an accent on all bridges to make the Apies River visually accessible for passing traffic and physically accessible for all pedestrians and cyclists.
- Establish an area that can act as transition between the "Urban Character" of Hospital Precinct and the "Cultivated Character" of Zoo Precinct.

The following major components can be identified to form part of the Urban Design Concept:

- State Boulevard crossing as ceremonial node;
- Hove's Drift as intermodal node;
- Institutional Zone as character transition; and
- The Apies River as accessible safe and attractive open space.

Proposals for land uses include the following broad categories:

- In the urban section of the precinct, a strong mixed-use character is proposed. Any uses could be established on upper storeys. A residential component should preferably also be included. A condition is, however, that the ground floor uses should generate activities in the open space.
- Next to the State Boulevard, the establishment of offices (mainly institutional but also commercial) is proposed. An entertainment facility should preferably be established on the ground floor in the building(s) directly adjacent to the Apies River.
- The transition zone should be utilised to enhance the institutional function of the precinct, which should flow over towards the Zoo Precinct.
- Three public parks are proposed in this precinct. Two of them could accommodate recreational/entertainment facilities. These facilities should be available for usage by the general public.
- Organised informal activities should further be



promoted in the open space and could include, for instance, flea markets, horse-and-carriage riding, water related activities.

These are the most prominent proposals made by the Apies River Development Framework. It also contains information and proposals about urban conservation, movement and transport, public amenities as well as design proposals for nodes and junctions.

1.3.3. Struben Street Government Boulevard Urban Design Framework

The aim of the framework is to guide the transformation of Struben Street into a boulevard. This boulevard is to become a major symbolic element of the city as a significant consolidation of government and functions is envisaged to take place along it. The ISDF identified Struben Street as one of a series of strategic projects as catalytic interventions to assist in regenerating the Inner City. Strategies recommended in the ISDF consists of a public investment by the local authority in the public realm, investment by state in the form of state infrastructure, and a response through private initiative controlled through a series of incentives, guidelines and development controls.

1.3.3.1 Objectives

The Development Concept aims to maximise opportunities exhibited by Struben Street to compliment the Inner City and integrate Struben Street into the context of the Inner City. The area where the Apies River crosses Struben Street should be

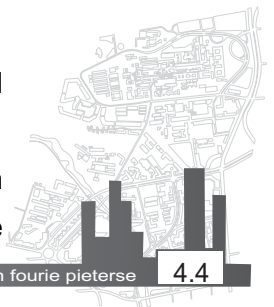
celebrated, and will mark the transition between the central area and Arcadia. In Arcadia, where Struben Street becomes Edmond Street, the area should be characterised by open space, celebrating the vista to the Union Buildings. The broad concept for development is outlined in the following;

The land use is guided by the proposals of the ISDF, and is therefore mixed along Struben Street. The area to the east of the central core, between Andries Street and the Apies River, should contain elements of land uses such as offices and retail and specialty markets. In addition, this area should introduce an element of residential support services, such as schools. Edmond Street, between the Apies River and the Union Buildings should contain predominantly institutional, residential and retail uses. The character should be in keeping with that of Arcadia, and should be appropriately landscaped to celebrate the vista to the Union Buildings. The proposed development should incorporate features to maximise open space and to make Struben Street an area of major activity, complimenting the CBD and the Inner City.

Landscape and Open Space System is divided into two parts;

“Transition Zone”: Van Der Walt Street to the Apies River

- Celebrate and recognise the Apies River Activity Spine
- Provide accessibility and integration between Boulevard and Apies River Open Space system.
- Appropriate treatment of future road planning extension of Nelson Mandela Drive and the integration with the



- Open Space System.
- Use of water as urban feature and focus element.
- Conserve and enhance existing Jacaranda trees.
- Provide parking, pedestrian facilities and sidewalks.

Apies River to the Union Buildings

- Enhancing the focus and view towards the Union Buildings.
- Conserve and enhance existing Pine trees.
- Create a green wedge towards the Union Buildings by means of landscape servitude and landscaped sidewalks.
- Provide parking, pedestrian facilities and landscaped sidewalks.

The most important feature along the length of the boulevard is the need to establish continuity in the built form. A continuous setback of 3.5m on both sides of the street in the form of servitude is proposed. A street wall of 6 floors is proposed and a colonnaded base and shelter for pedestrians. A double row of trees is also proposed along both sides of the street. Buildings along the Boulevard must be designed to permit a continuous front uninterrupted by parking floors. Due to the scale of the typical city block, mid-block pedestrian links are proposed. The Boulevard must provide both visual and physical linkages to the open space system.

The following specific elements were isolated to assist in the transformation of the proposed Boulevard:

- Public Spaces

The proposed civic spaces must be well connected to the future pedestrian network as proposed in the ISDF, but make a contribution towards the civic identity of the entire boulevard.

- Open Space system Interface
- Built Edge and Form

Specific guidelines for the built edge and form along the boulevard will establish continuity in as far as the character of the proposed Boulevard is concerned.

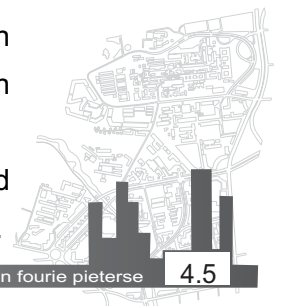
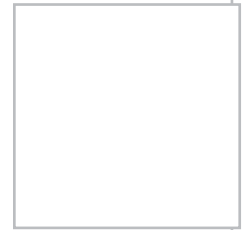
- Public Facilities/Conservation

It is proposed that a unique set of street furniture be developed to unify the identity along the proposed boulevard. The use and application of conservation worthy structures must follow the requirements and criteria established in the ISDF, and be applied along the length of the boulevard.

1.3.3.2 State Boulevard

Phase two of the state boulevard framework takes the following points of departure:

- Struben Street should be widened. An additional 3.5m on either side resulting in broader sidewalks and a more significant image.
- Implementation of road proposals, including the Nelson Mandela extension, and the re-alignment of the N4 with Bloed street in order to create a bypass.
- Articulation of the street as it crosses the Apies and Steenhovenspruit and for it to form part of the open space.

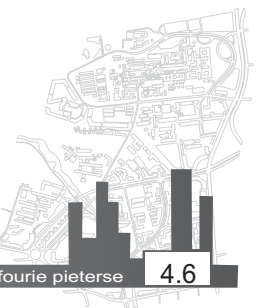


- Establishment of a visual connection to the union buildings by means of an intervention along Edmond street from Du Toit street to Beatrix street.
- Conservation of historic structures.
- Mid-block linkages to facilitate pedestrian movement.
- Articulation of thresholds and gateways unique to the street.
- Incrementational development of the street.
- Development guidelines to control the edge of the street.

1.3.3.3. Proposals

The framework suggests an urban park along Edmond Street, between Du Toit and Beatrix streets to create a visual link with the Union Buildings, currently somewhat obscured by the topography of the road. This will also be established by means of a linear water feature.

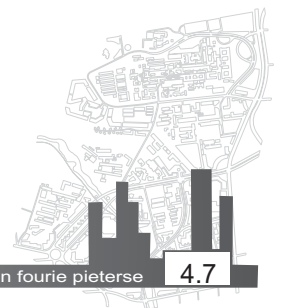
The Nelson Mandela extension is to be completed as to provide a bypass in the northern side of the city (along Bloed Street). This will ensure that Struben Street will accommodate less traffic and reinforce the feeling of a boulevard; this may also mean an intervention in the middle of the road. A focal point should be developed around the intersection of Struben and Du Toit streets.



2. LEGISLATION

It is imperative that the Hospital Hill Urban Development Framework encourages legitimate development. All developments and projects should fall into the following legislative articles and clauses (Holm, 1999, p2):

- Constitution of the Republic of South Africa, (Act 108 of 1996). Provides relevant sections on the environment and human rights relating to the environment.
- Water Services Development Act, 1997. Main focus is the realisation of the basic right of access to water supply for all. Every water service authority should accordingly prepare a water services development plan. The role of the Apies River, as water source, should be spelled out and linked to such a plan.
- Development Facilitation Act, 1995. Defines general principles for developments.
- Housing Act, 1997. Defines principles applicable to housing development in general.
- National Land Transport Bill, 1998 (Section 21). Provides a set of principles for development and defines the integration of transport and land development as well as transport plans required in terms of the Bill.
- National Water Act (Act No 36 of 1998) Focus on the protection, use, development, conservation, control and management of water resources in an equitable and sustainable way. Applicable sections deal, amongst others, with flow reduction activities, expropriation of properties and safety. Clause 144 of the Act deals with flood lines on township establishment plans. According to this section, 100 year flood lines should be indicated on plans. The Act is, however, not very clear on this issue.
- Provincial Regulations under Ordinance No 15 of 1986 (Clause 18). Deals with flood lines on township plans.
- Metropolitan IDP of April 1998. Restricts development in a 50-meter corridor next to the 50 year flood line.
- City Council by-laws in Notice No 8 of 1991 in the Provincial Gazette of 21 January 1991. Restrict erected buildings within the 50-year flood line.
- Conservation of Agricultural Resources Act (Act 43 of 1983). Focuses to provide control over the utilisation of the natural agricultural resources.
- Environment Conservation Act (Act 73 of 1989) provides for the protection and controlled utilisation of the environment.
- Health Act (Act 63 of 1977). It addresses regulations relating to water for human use and food processing.
- Physical Planning Act (Act 125 of 1991). States that regulations can be made relating to the disposal of any refuse or waste matter.
- Roads Traffic Act (Act 29 of 1985) (Section 101). Deals with refuse along roads.
- Sectional Title Act (Act 95 of 1986) (Section 7). Deals with waste on a common property.
- National Building Regulations and Standards. Address the approval of building plans.
- The National Environmental Management Act (Act 107 of 1998).



3. INVENTORY AND ANALYSIS

3.1. Regional Inventory

3.1.1. Climate

The site falls into an area with a warm temperate climate. Mean temperatures varies between 18,6°C and 31,7 °C for summer and 5,3°C and 20.3°C for winter. The mean relative humidity starts between 30% and 45% in July, climbing to 60% or 75% in January. The annual rainfall varies between 650mm and 750mm falling mostly during late spring up to mid summer (Table 2 & Map 1.1). The strongest winds are experienced during October and November averaging a speed of 3,66m/s. direction and speed varies through the year as follows:

Mean Wind Direction & Velocity:

Jan, 8:00; East, 1,3m/s

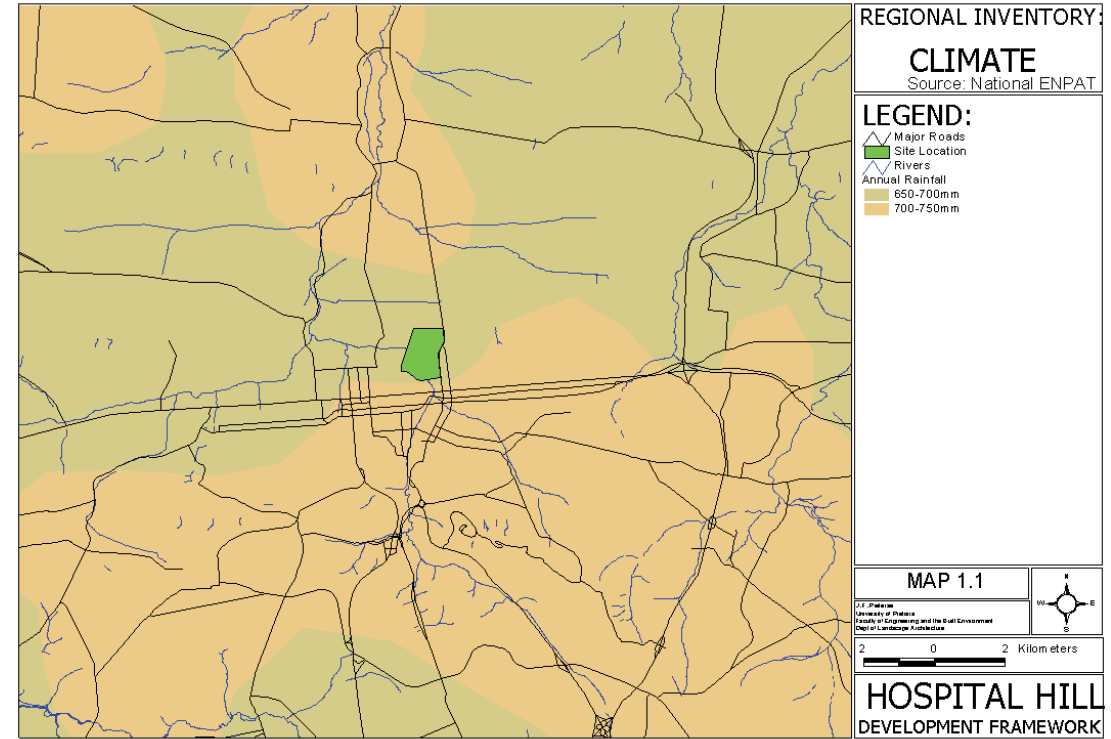
13:00; NNE, 1,0m/s

17:00; East, 0,4m/s

July, 8:00; SE, 0.6m/s

13:00; NW/NNW, 1,0m/s

17:00; WNW/NW, 0.8m/s



ANNUAL PRECIPITATION VOLUMES FOR DIFFERENT SIZE SITES														
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC		
PERCENTAGE, %	13.5	14.5	8.5	5.0	6.5	0.5	0.3	0.3	1.5	11.0	22.5	15.0		
DEPTH / MONTH, mm	101.3	108.8	63.8	37.5	48.8	3.8	2.3	2.3	11.3	82.5	168.8	112.5		
SITE	AREA, m ²	VOLUME OF PRECIPITATION, l											TOTAL, l	
1	1000	101,250	108,750	63,750	37,500	48,750	3,750	2,250	2,250	11,250	82,500	168,750	112,500	743,250
2	2000	202,500	217,500	127,500	75,000	97,500	7,500	4,500	4,500	22,500	165,000	337,500	225,000	1,486,500
3	4000	405,000	435,000	255,000	150,000	195,000	15,000	9,000	9,000	45,000	330,000	675,000	450,000	2,973,000
4	6000	607,500	652,500	382,500	225,000	292,500	22,500	13,500	13,500	67,500	495,000	1,012,500	675,000	4,459,500
6	8000	810,000	870,000	510,000	300,000	390,000	30,000	18,000	18,000	90,000	660,000	1,350,000	900,000	5,946,000
6	10000	1,012,500	1,087,500	637,500	375,000	487,500	37,500	22,500	22,500	112,500	825,000	1,687,500	1,125,000	7,432,500
7	12000	1,215,000	1,305,000	765,000	450,000	585,000	45,000	27,000	27,000	135,000	990,000	2,025,000	1,350,000	8,919,000
8	15000	1,518,750	1,631,250	956,250	562,500	731,250	56,250	33,750	33,750	168,750	1,237,500	2,531,250	1,687,500	11,148,750

Table 2. (Data From National Weather Bureau)



3.1..2. Topography and landform

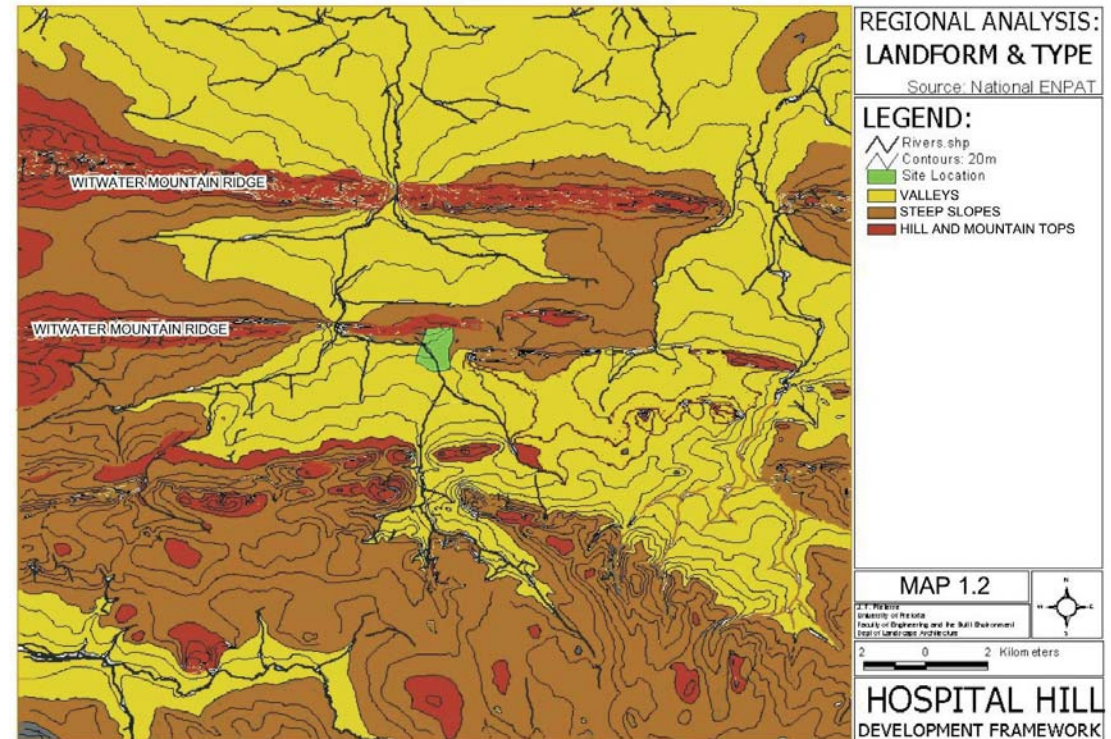
The Pretoria region is characterised by ridges, the Magalies Mountain Range and Witwater Mountain Range, running parallel to one another and a few smaller hills, Salovokop, Klapperkop, Meintjieskop. These hills and ridges create areas with differing topographical characteristics. The mountain ranges were eroded away by the Apies River creating valleys between and a poort through it. The ridges form the edges of the Bushveld Complex that lies to the north. The effect of this complex creates steeper southern slopes and more gentle northern slopes (Map 1.2).

3.1.3. Biome and vegetation type

Tshwane falls within two South African biomes, the Grassveld biome and the Savannah biome. The site falls within the transition zone between the two biomes resulting in areas that are intermingled with species from both biomes only depending on the site characteristics like slope, water availability and soil type (Low and Rebelo, 1998, p19 & p39) (Map 1.3 & Map1.4).

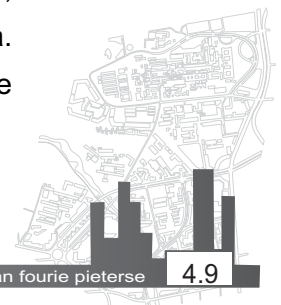
3.1.3.1. The Grassland Biome

It occurs mainly mostly to the south of Tshwane but it has regional significance and thus an influence of the site. A single layer of grasses dominates this biome. Trees are absent, except in a few localised habitats like along rivers and ridges. The grasses of this area are mainly sour grass for they withdraw their nutrients from the leaves during winter and become unpalatable. Frost, fire and grazing maintain the grass dominance and prevent trees from establishing (Low and Rebelo, 1998, p38).



The vegetation type from this biome with the most influence on the site is the Rocky Highveld Grassland also known as the Bankenveld. It forms a transition vegetation type between typical grasslands of the high plateau, and the bushveld of the lower plateau. It includes the southern slopes of the Magaliesberg and the dolomite plains of the northern parts of SA. The Bankenveld covers rocky mountains, hills, ridges and plains of quartzite, conglomerate, shale, dolomite and sometimes andesitic lava. Economic uses include grazing by cattle and game, but the grasses are mainly sour (Low and Rebelo, 1998, p39).

Grasses: Giant Speargrass *Trachypogon spicatus*
 Broadleaf Bluestem *Diheteropogon amplexans*



Red Autumngrass *Schizachyrium sanguineum*
Andropogon schirensis
Panicum natalense
Digitaria monodactyla

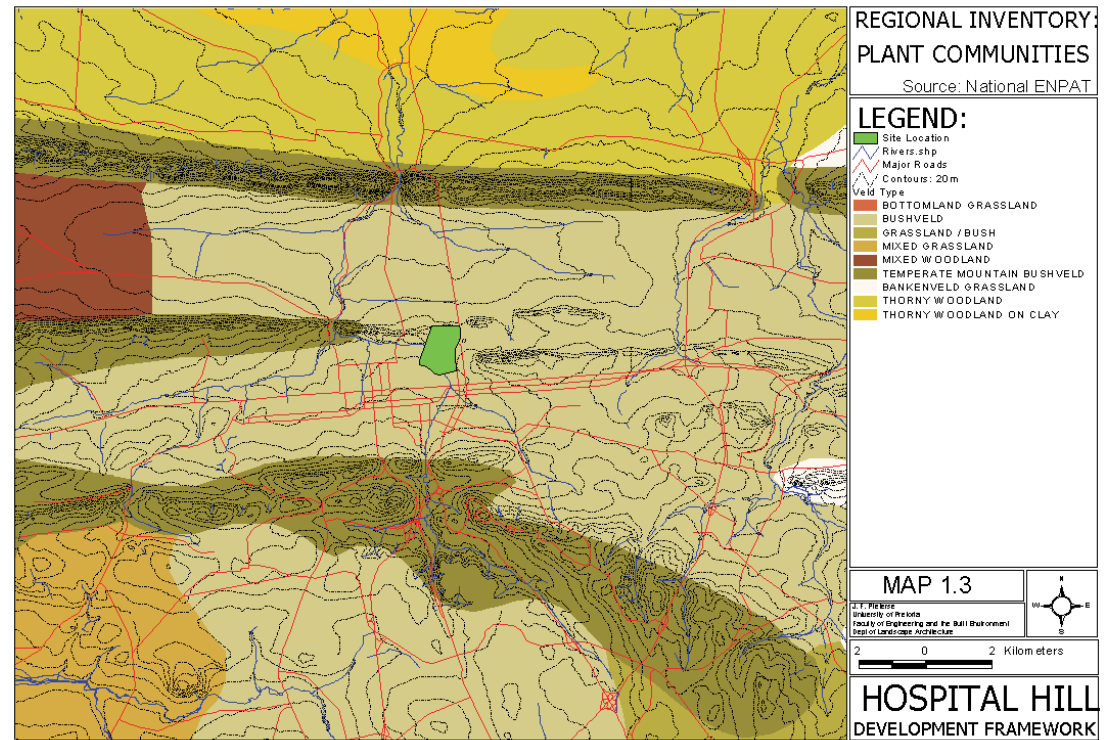
Trees: Common Hook Thorn *Acacia caffra*

Mountain karee *Rhus leptodictya*
 White pear *Dombeya rotundifolia*
 Transvaal protea *Protea caffra*
 White Stink Wood *Celtis african*

3.1.3.2. The Savannah Biome

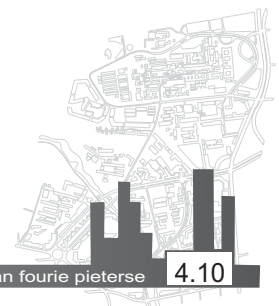
The northern part of Tshwane falls in this Biome generally known as Bushveld. It is characterised by grassy ground layer and a woody upper stratum. Most of this vegetation types are used for grazing by cattle or game. Most of the species, grasses and trees are fire resistant (Low and Rebelo, 1998, p19).

The vegetation type representing this biome on this site is the Mixed Bushveld. It represents a great variety of plant communities, with many variations and transitions. Vegetation varies from a dense, short bushveld to a rather open tree savannah. The soil is mostly coarse, sandy and shallow, overlying granite, quartzite, sandstone shale. This Bushveld represents a great variety of plants, with many variations and transitions. Vegetation varies from dense, short bushveld to a rather open tree savannah. The area comprises mostly undulating plains. Grazing is sweet (Low and Rebelo, 1998, p19).



Grasses: Finger grass *Digitaria eriantha*
 Wool grass *Antheophora pubescens*
Aristida spe.
Eragrostis spe

Trees: Red Bushwillow *Combretum apiculatum*
 Common Hook Thorn *Acacia caffra*
 Sicklebush *Dichrostachys cinerea*
 Marula *Sclerocarea birrea*



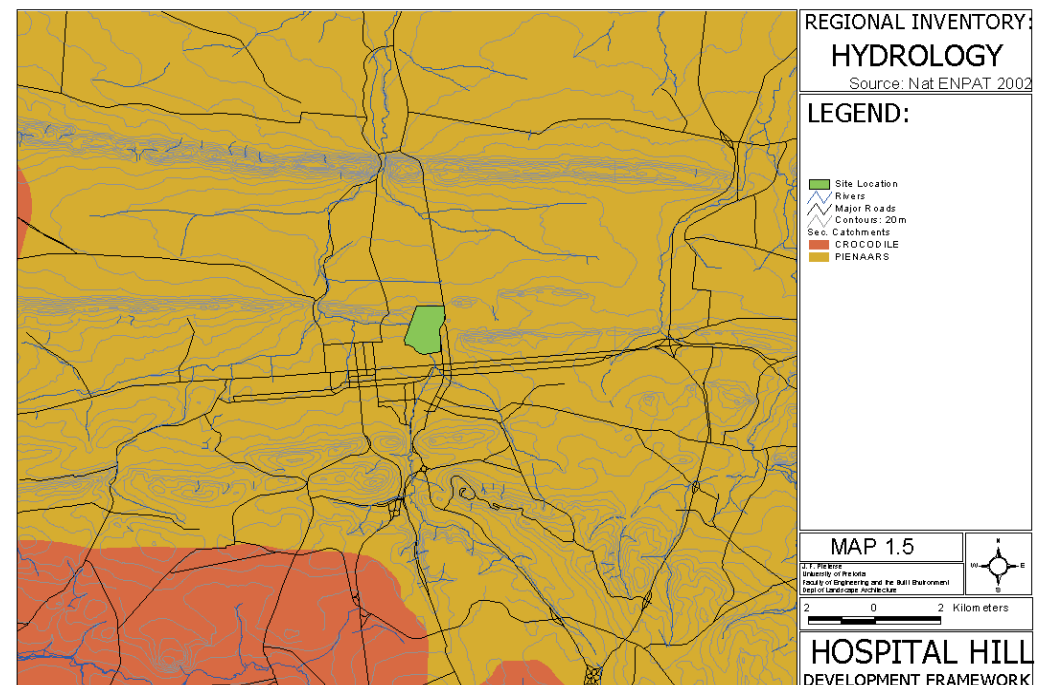
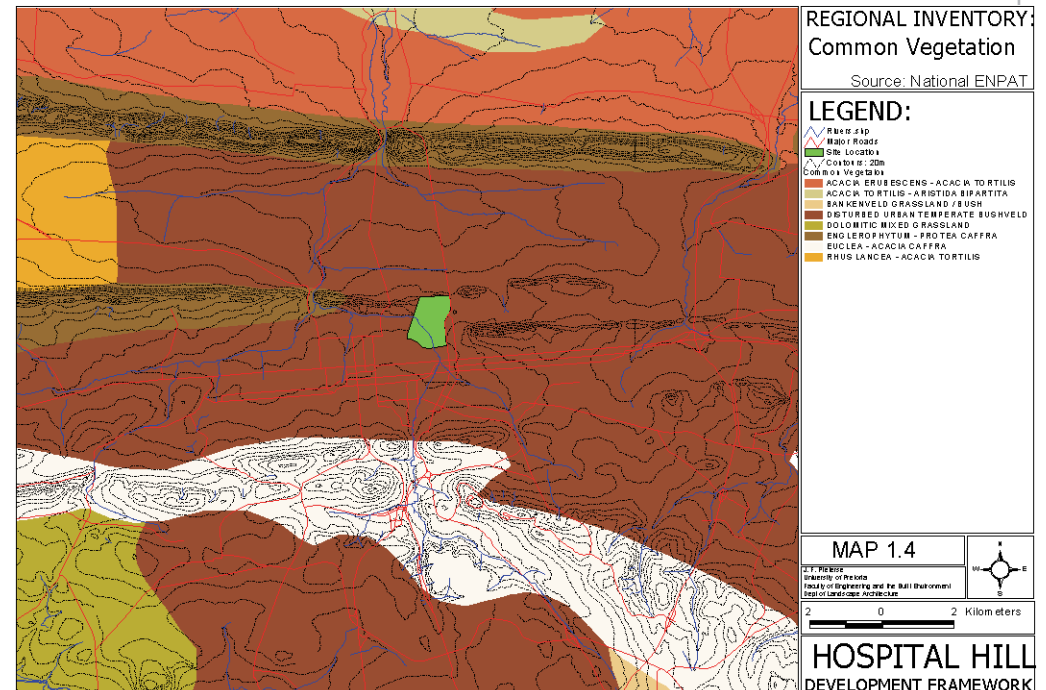
3.1.4. Wildlife

The rural area away from the city is known for its reserves, private game farms and conservation areas, such as Ben Alberts, Mabula, Vaalkop Dam, Rust der Winter Dam, Roodeplaat Dam, Loskop Dam, Rietvlei Dam, Groenkloof, Nylsvley and Rustenburg, Pietersburg, Percy Fyfe and Ben Lavin Nature Reserves. There also exist a few conservational areas within the city protecting mainly the ridges and some areas along the rivers. These areas form vital source populations for the wildlife and biodiversity in the area.

3.1.5. Hydrology and catchments

The Apies River is the most important hydrological feature of the area. Two springs in this reserve, delivering up to 30 million litres of water per day; are sources for the Apies River. Bulk of this water is distributed into the water network of the city (Holm, 1999, p4) (Map 1.5). Ten streams or tributaries flow into the main river,

- Eeufees Spruit
- Bergklapper Loop
- Kerameikos Loop
- Timeball Creek
- Walker Spruit
- Steenoven Spruit
- Skinner Spruit
- Modder Spruit
- De Moot Spruit
- Wonderboom Spruit



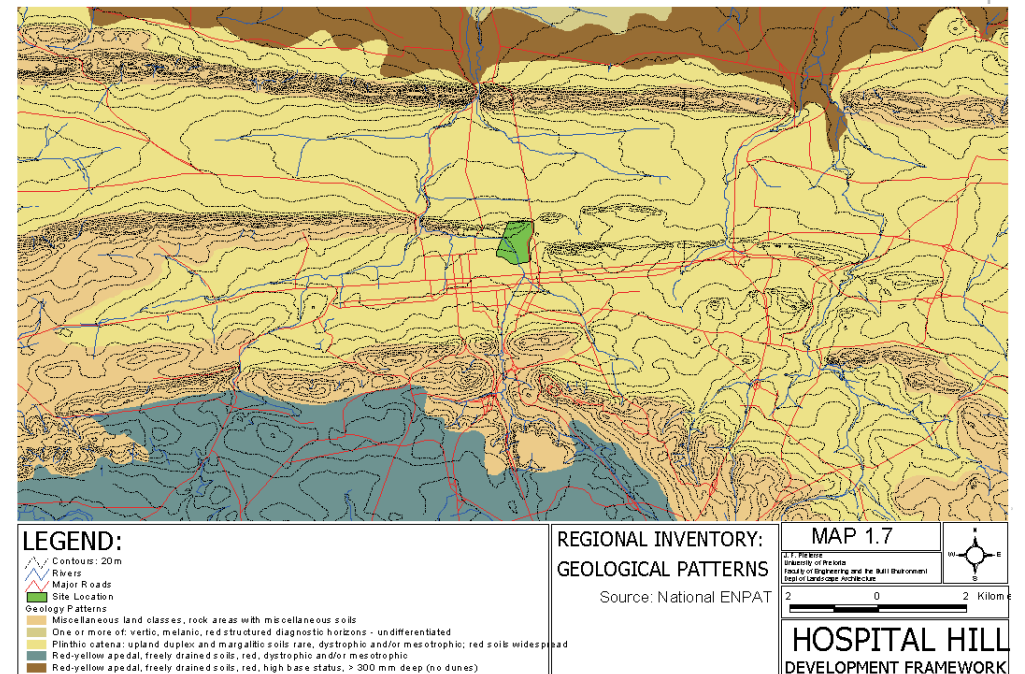
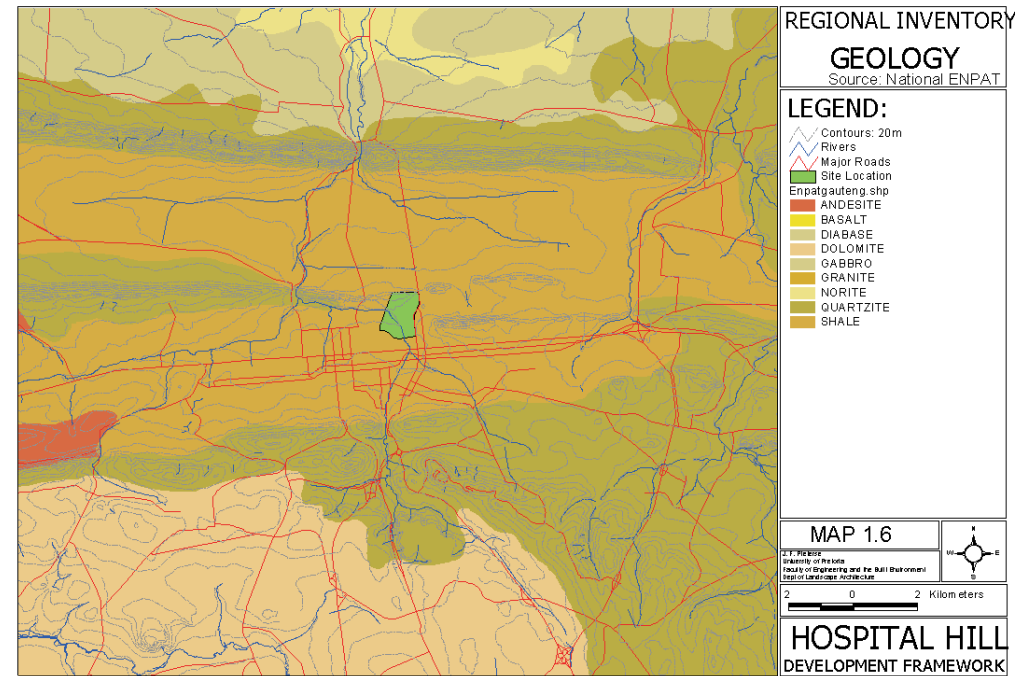
City development significantly influenced the natural hydrological characteristics of the region. Based on water quality as guideline for recreational use; the river is generally usable in the upstream parts where areas with a decrease in water quality are limited. The hydrological pattern changed due to water extraction at Fountains Valley and the canalisation of the stream over large distances through the city. Periodic downstream problems are experienced with embankment erosion and instabilities during floods. Placement of fill material and dense encroachment of exotic vegetation cause abnormalities on land, especially during flood conditions. Downstream, however, the stream experiences many ecological pressures. The ecology is under stress due to pollution, littering, invasion of exotic plant species and physical disturbances (dumping, embankment and riverbed disruption). On a larger scale, the river forms part of the Pienaars, and ultimately of the Crocodile River catchments.

3.1.6. Geology

The soil on in the region is mostly coarse, sandy and shallow, with underlying granite, quartzite, sandstone or shale (Map 1.6 & Map 1.7).

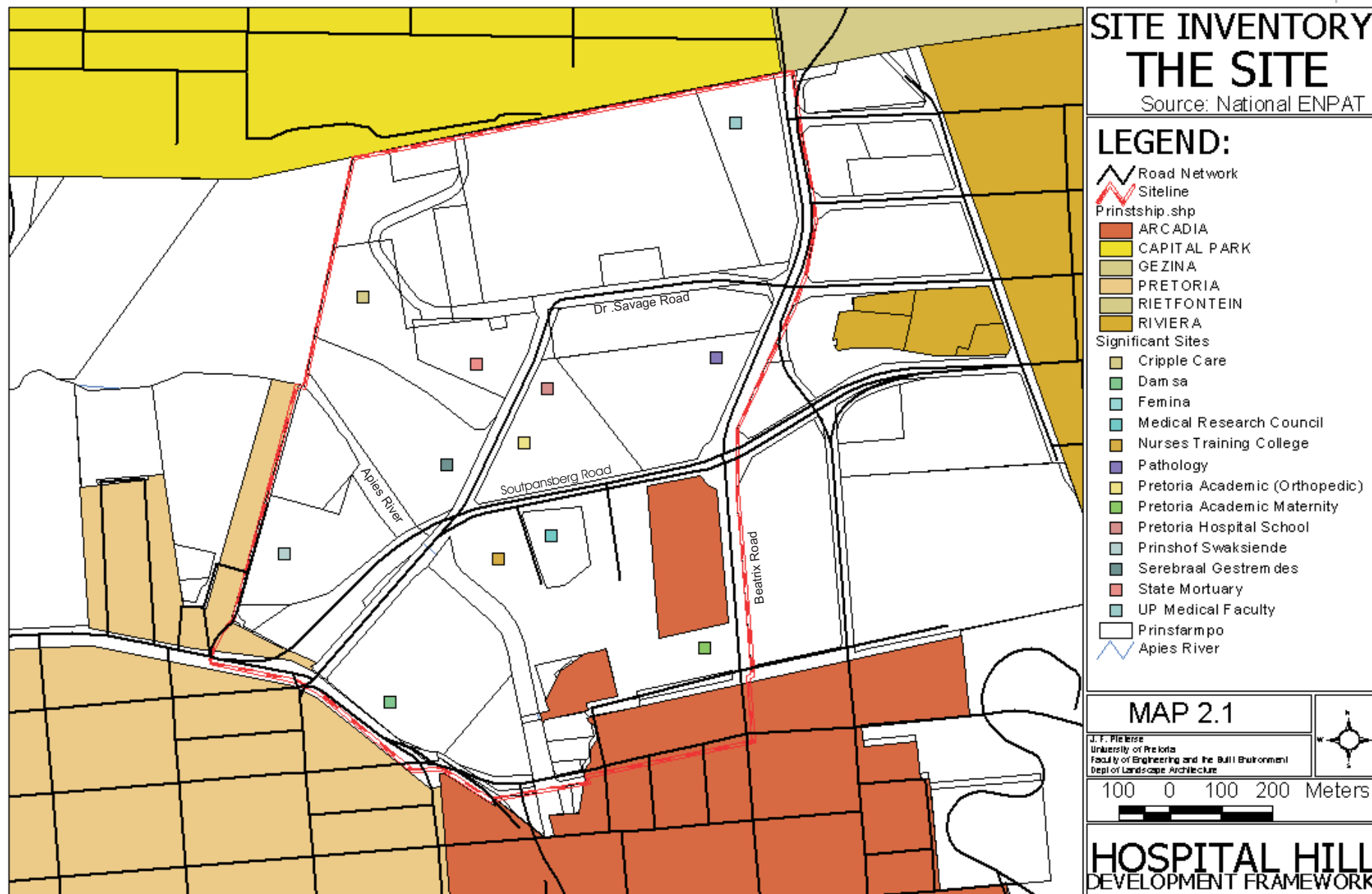
3.1.7. Institutional and Community Services

The area, being a metropolis, is well serviced with community and institutional services in comparison with other rural areas in the country. There is a relatively even distribution of schools, churches, police and fire station, hospitals and libraries in the region. However, the quality of these services in the lower income areas is not up to standard. The rich can afford private hospitals and schools, while the poor struggle to get the needed quality of services at state funded hospitals and clinics. Crime is an ever present danger in the region, and the need of intensified policing and security services can not be stressed



3.2. Site Inventory

The site is situated on the fringe of the CBD. It is subject to a wide variety of influences. This Part covers the site specific character and influences (Map 2.1)



3.2.1. Micro climates

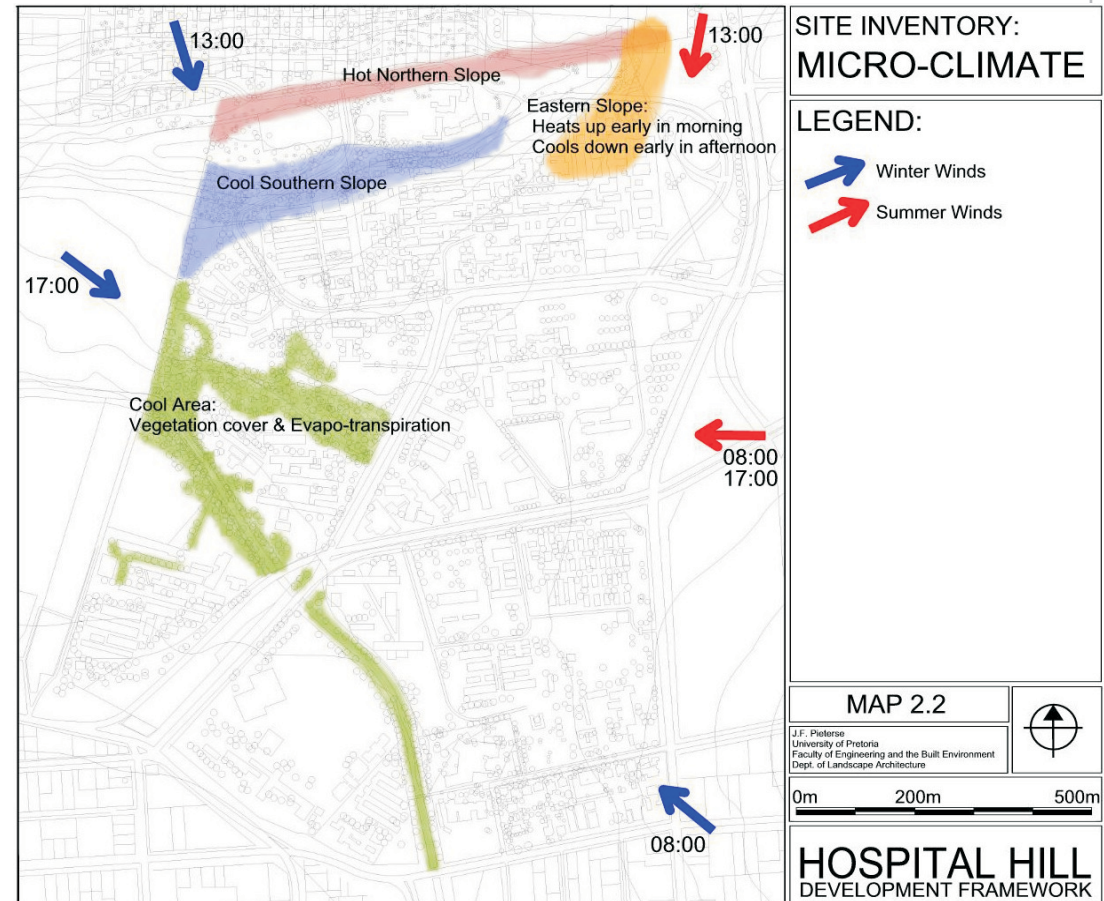
The site lies on the southern slope of the Witwater Mountain Ridge. The southern slope is cooler and wetter than the northern slope. The Pretoria Hospital part of the site also slopes to the east creating a surface that is warmer during morning hours while it cools down earlier than the surroundings in the afternoon (Map 2.2).

The embankments of the Apies River tend to be cooler than the rest of the site due to the evapo-transpiration effect of the surface water as well as the cooler air that settles down in the valleys.

Most of the artificial surfaces in the city have a very low volumetric heat capacity. These materials include asphalt roads, concrete surfaces and roofs. Together with the reflective effect of paints and glass the artificial materials tend to make the city warmer than the surrounding natural areas.

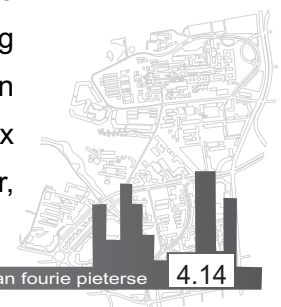
3.2.2. Natural features

The city is situated on the border of the central business district of the city. It is thus understandable that only a few natural features exist in this developed environment. The most prominent of these features are the Apies River and the Witwater Ridge. The Apies River flow through most of the site as a concrete canal with indigenous trees planted on the embankments, before the canal changes to a natural canal with embankments invaded by exotic vegetation. There exist a few other areas on the site that is covered in dense vegetation, indigenous and exotic (Map 2.3).



3.2.3. Water quality

The Apies River flows in a canal through most of the site. It has a relatively stable embankment and the canal surface is in a good condition giving it a clear appearance. No fish or aquatic life is present in the river. The water quality is low due to a sewer leaking into the river from an unknown source as well as other pollution and dumping. The level of the water table are only four to six metres under the natural soil level at areas near the river, increasing to deeper levels at areas of higher ground.



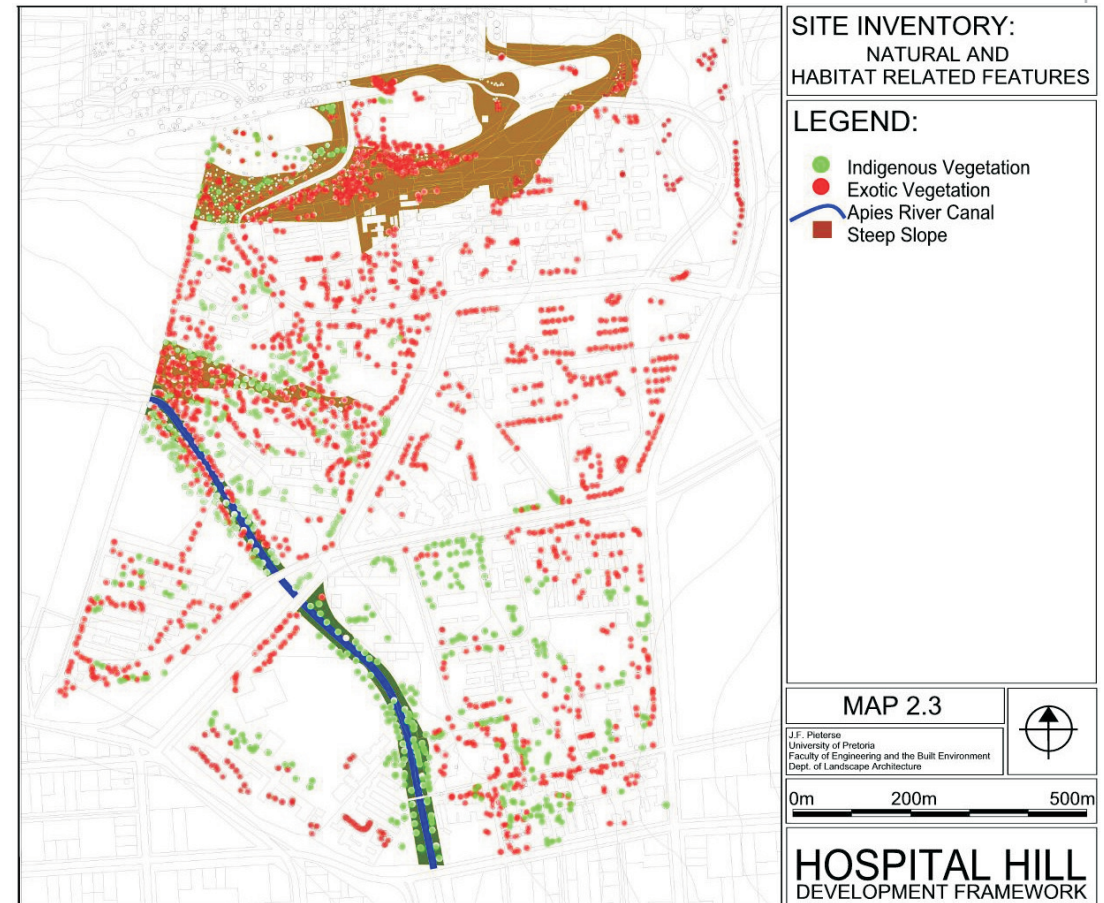
3.2.4. Flood and storm water records

Underground storm water pipes drain into the river, increasing the peak flow and intensity of storm water runoff regimes. Authorities are concerned about the restrictions applicable to development next to rivers and streams. The Metro-wide Integrated Development Plan of 1997 restricts development between a 50m corridor on both sides next to the fifty year flood line adjacent to streams and rivers. This creates an uncertainty when read with the national Water Act of 1998 stating that no development is allowed below the 100-year flood lone. The restrictions followed in this project will comply with the restrictions set by the Water Act.

According to the Rational Method of peak flow estimation, the canal should accommodate a peak flow of 209m³/s to withstand a 50-year flood, a flood that have a 2% chance of occurring at any time. This flood is contained in the canal, with the walls exceeding the flood line by approximately one meter.

3.2.5. Drainage

The direction of drainage is a function of the slope. This means that water drains mostly to the east and to the south of the site. The site is serviced with a storm water network including storm water pipes buried in the road reserves and the Apies River canal. The estimated value of the Apies River canal, on the site, as a storm water asset is approximately R18 million, meaning that it will cost around R18 million to replace it with underground pipes through the site (Holm et al, 1999, p8) (Map 2.8).



3.2.6. Slope analysis

The site is divided into different categories according to its slope (Map 2.6). These categories are:

- 0% - 3% (easy construction, little erosion)
- 3% - 8% (residential, medium structures, little erosion)
- 8% - 15% (expensive construction, difficult access, erosion)
- >15% (development constraint, high erosion)

3.2.7. Fauna and floral species

The BioAtlas (ENPAT 2002, DEAT) compiled a report regarding wildlife as well as the habitats the different species occupy on the site.

Bird Species Code : BIRDS506

Anthropoides paradiseus (Blue Crane)

Grassland, vleis and dry grass - hillsides. Shallow waters in pans Cultivated and fallow lands. Waterberg, Potgietersrus.

Gypohierax angolensis (Palmnut Vulture)

Associated with stands of palm trees. Limpopo Valley.

Gyps coprotheres (Cape Vulture)

Tall cliffs for breeding Kransberg, Blouberg, Manoutsa

Hirundo atrocaerulea (Blue Swallow)

Alt:1200-1500m,High rainfall - grassy, hillsides Paeroa-Haenertsburg

Lioptilus nigricapillus (Bush Blackcap)

Leucosidia and Buddlea thickets in valleys and ravines and edges of montane forest.

Mirafra chuana (Shortclawed Lark)

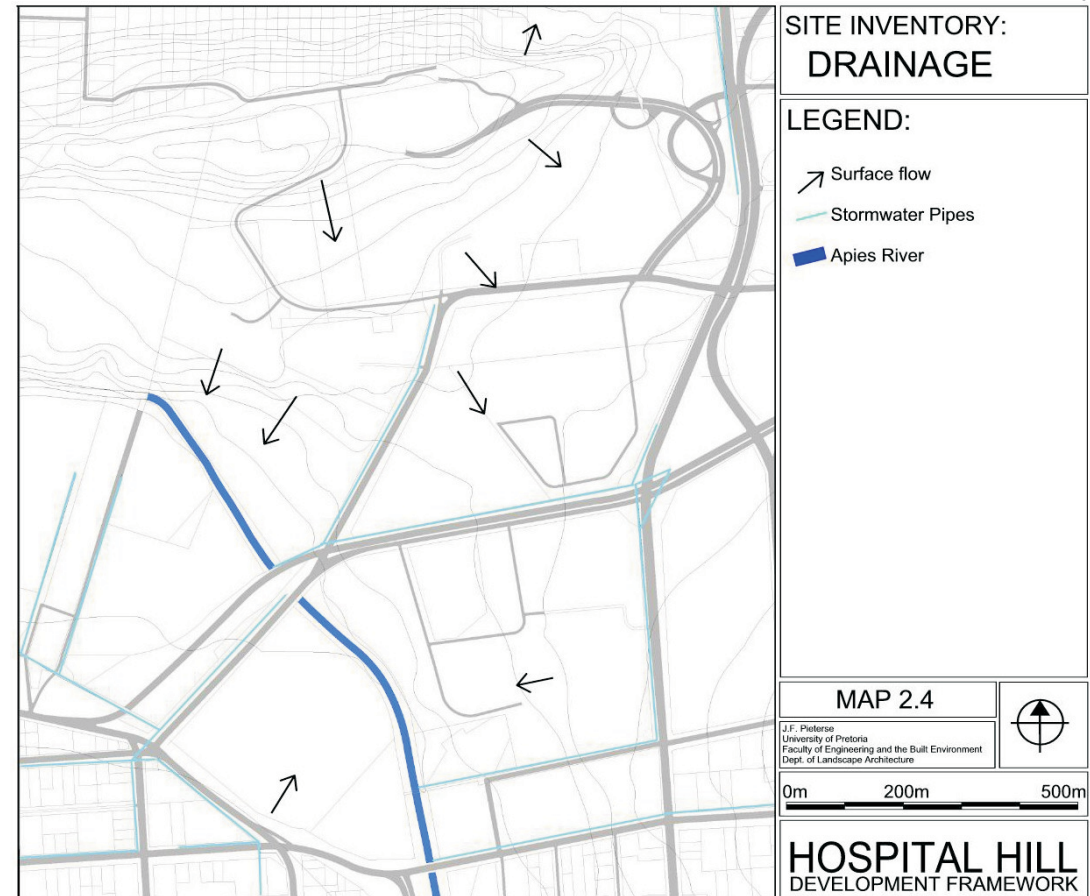
Flat Plains with acacia savannah or scrub. Pietersburg Plateau.

Neafrapus boehmi (Bohm's Spinetail)

Riparian forest and adjacent woodland, Limpopo and Levuvhu Rivers, breeds in Baobabs.

Oenanthe bifasciata (Buffstreaked Chat)

Hilly or mountainous country, frequently rocky hillslopes in

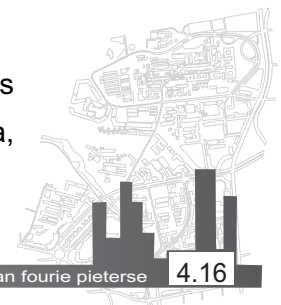


open grassland or areas with a sparse tree cover. Escarpment- Wolkberg, Mountains north of Potgietersrus, central and western Waterberg - Kransberg.

Pachyoccyx audeberti (Thickbilled Cuckoo)

Savannah and tall tree woodland - forested tree galleries along larger Lowveld rivers. Limpopo - Breslau, Mica area, Hans Merensky Nature Reserve.

Platysteira peltata (Wattle-eyed Flycatcher)



Platysteira peltata (Wattle-eyed Flycatcher)

Riparian gallery forest along Lowveld rivers, favouring areas with a closed canopy and open midstratum with tangles of creepers and lianas. Levuvhu, Limpopo rivers, Messina.

Schoenicola brevirostris (Broadtailed Warbler)

All dense grass, Cymbopogon, Heteropogon, Themeda, Imperata. Escarpment - South of Wolkberg

Scotopelia peli (Pel's Fishing Owl)

Large rivers and associated pans overhung with a gallery of tall riparian trees. Limpopo Basin, Levuvhu-Limpopo River.

Serinus citrinpectus (Lemonbreasted Canary)

Limpopo Valley from Messina to Pafuri.

Telacanthura ussheri (Mottled Spinetail)

Riparian gallery forests and breeding in baobabs. Limpopo and Levuvhu rivers.

Telophorus nigrifrons (Blackfronted Bush Shrike)

Primary montane forest also riparian forest - Levuvhu river. Restricted to Escarpment, Wood-bush, Duiwelskloof, Soutpansberg

Turtur afer (Bluespotted Dove)

Eastern Soutpansberg

Tyto capensis (Grass Owl)

Restricted to wet areas - marshes and vleis, permanent to seasonal vleis. Central Bushveld, Pietersburg, Escarpment - Wolkberg.

Vanellus albiceps (Whitecrowned Plover)



Restricted to larger perennial eastflowing rivers in northern Bushveld and Lowveld. Breeds on exposed sandbars and sandbanks. Restricted to Limpopo, Levuvhu, Letaba and Olifants Rivers.

Vanellus lugubris (Lesser Blackwinged Plover)

Savannah, open woodland with very short grass cover usually heavily grazed or recently burnt. Restricted to eastern Lowveld and Limpopo River Valley.

Zosterops senegalensis (Yellow White-eye)

Northern edge of N.P., Limpopo, Levuvhu and Mutale Rivers, Greefswald.

Coracias spatulata (Rackettailed Roller)

Deciduous woodland, either mopane or broad-leaved. Limpopo River.

Geronticus calvus (Bald Ibis)

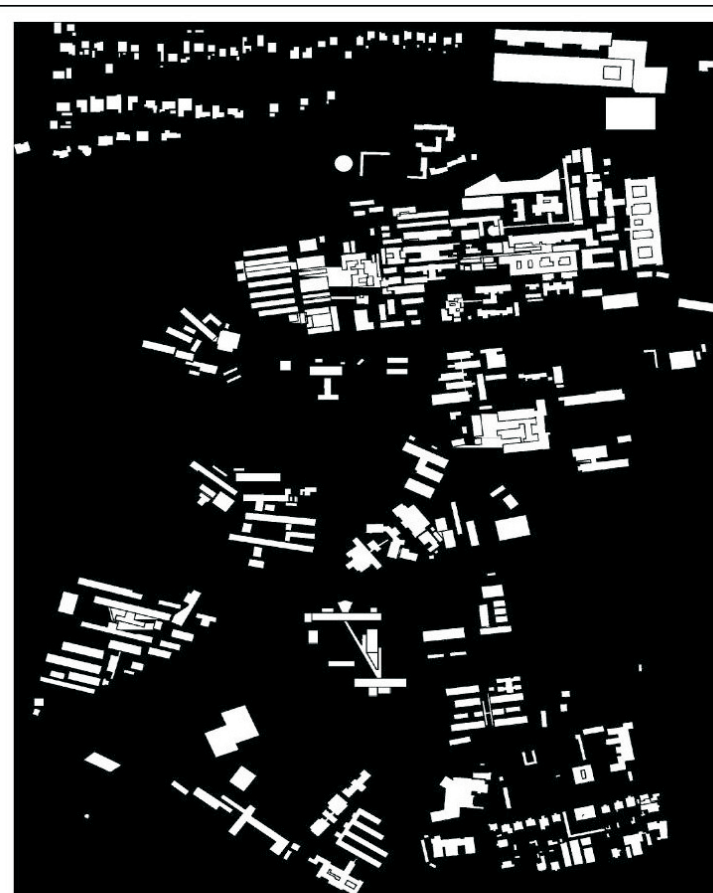
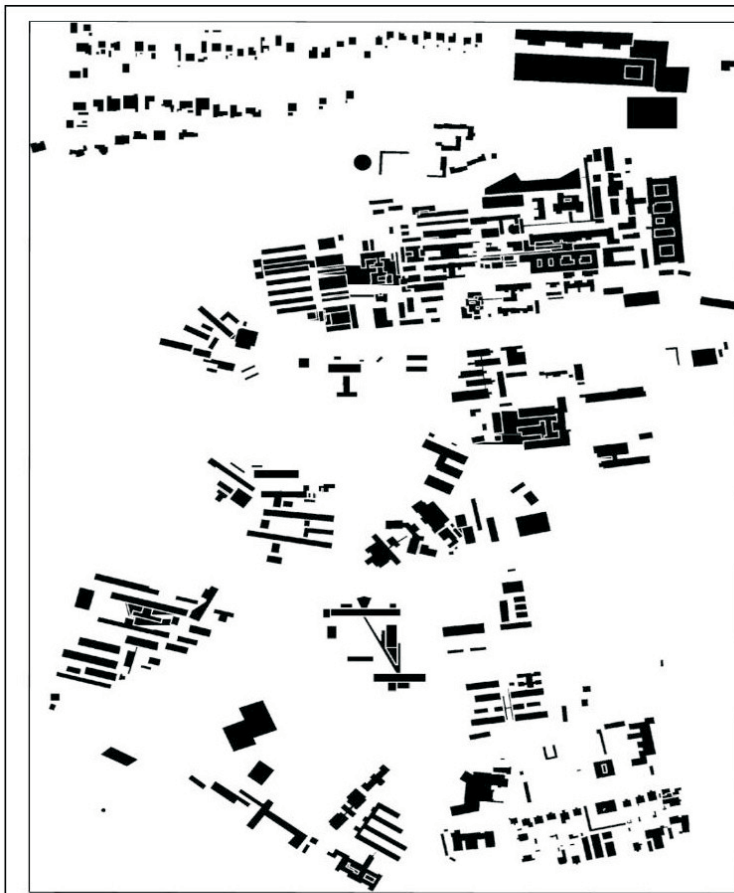
High rainfall sour & alpine grasslands. Breeds on cliffs, Northwest of Pietersburg.

Glareola nordmanni (Blackwinged Pratincole)

Grassland, pastures, cultivated lands, vleis and pan edges.

Centropus bengalensis (Black Coucal)

Grassy seasonal vleis - Limpopo Flood plain.



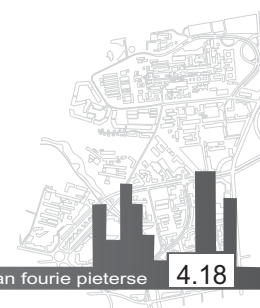
INVENTORY & ANALYSIS:
FIGURE-GROUND & GROUND FIGURE

MAP 2.6

J.F. Pieterse
University of Pretoria
Faculty of Engineering and the Built Environment
Dept. of Landscape Architecture



HOSPITAL HILL
DEVELOPMENT FRAMEWORK



Butterfly Species Code : BUTTER241

Aloeides dentatis
Open areas.

Mammal Species Code : MAMM204

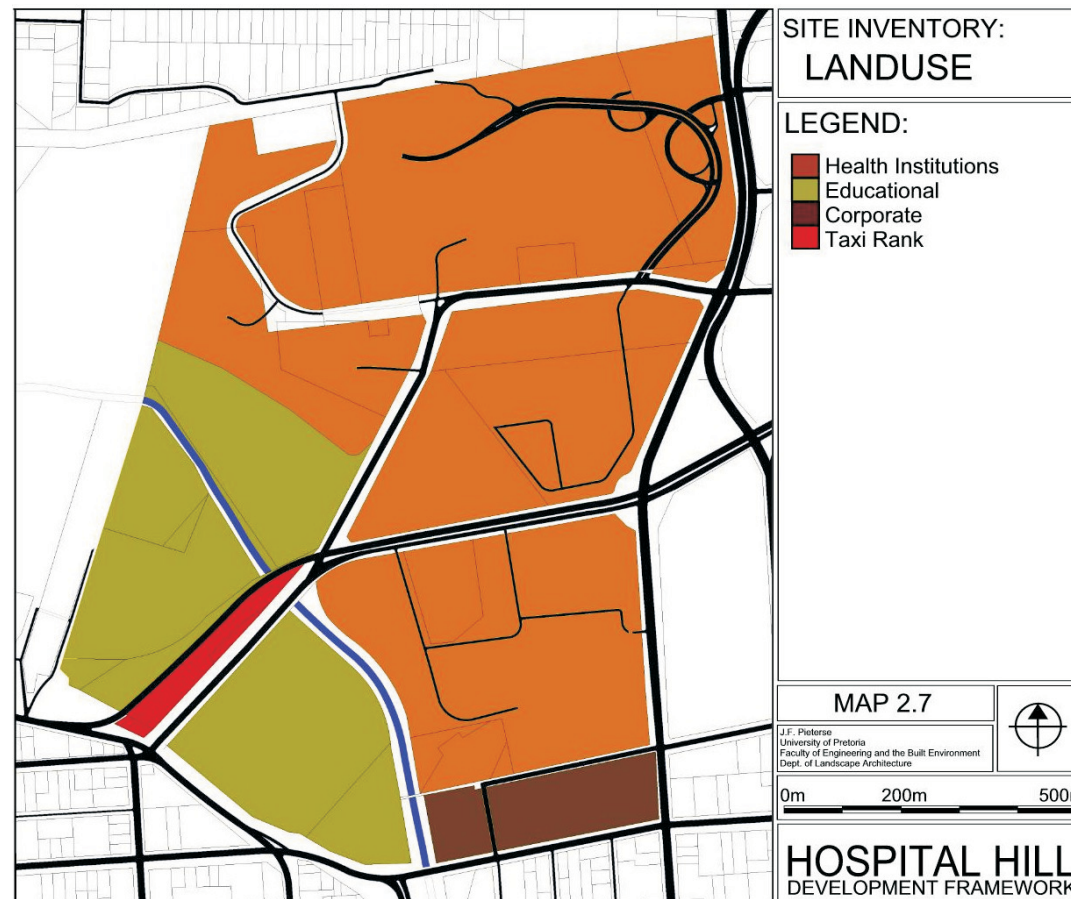
Lycaon pictus (Wild dog)
Open plains, open savannah woodland, arid country; avoids forest, thick underbrush and tall grass. Bovid prey availability and absence of lions important limiting factors.

Poecilogale albinucha (African weasel)
Savannah species associated with moist grassland or woodland where rainfall exceeds 600mm per year; flourishing rodent populations important as prey.

Rhynchogale melleri (Meller's mongoose)
Apparently restricted to woodlands, especially moist areas with dense grass cover. Also often associated with drainage lines and rock outcrops.

Orycteropus afer (Aardvark)
Wide habitat tolerance; open woodland, arid scrubland and grassland, mopane woodland; absent from forest and deserts. Disturbed grassland and sandy floodplains of major rivers are ideal habitat; avoids rocky areas; seasonal water sufficient.

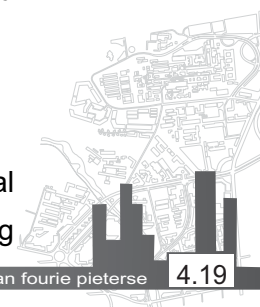
It should be added that the site and its wildlife are subjected to the urban realm and thus are influenced by domestic animals like cats and dogs. Stray cats can be a big problem for birds and small



mammals. These stresses, together with the unnatural character of the city allows only for animals that are capable to adapt to the stresses. Many exotic animals and birds fit perfectly into these habitats like the Indian mina, sparrows, domestic doves, rats and mice.

3.2.8. Habitat related terrain features

Hospital Hill is poor in natural habitat. The inventory of the natural features done earlier contains all the information regarding



regarding existing habitat on the site. A further study into this aspect is thus not necessary.

3.2.9. Structures

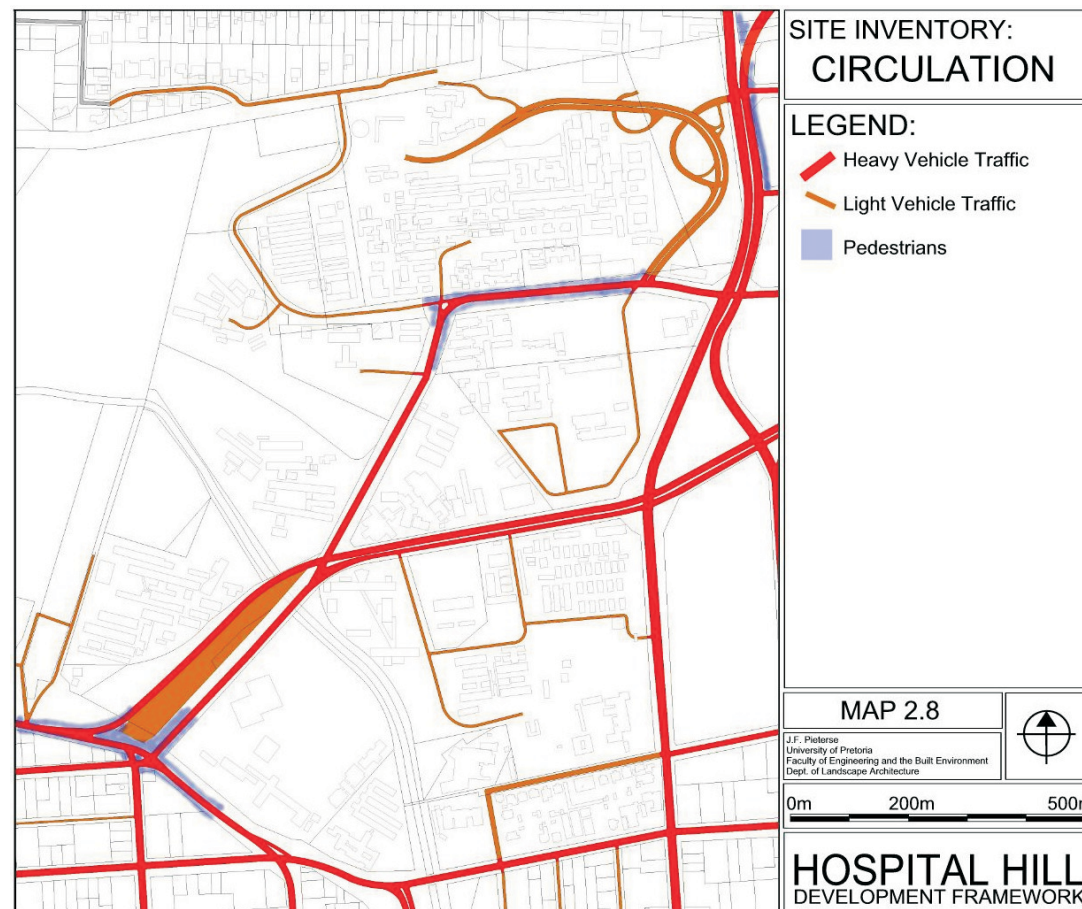
The urban form fails to define urban space and strong urban character. Structures are scattered over large institutional terrains, not standing up to their duty in expressing the urban realm. The figure-ground and ground-figure analysis reflects an incoherent positioning of building and structures. Structures obscure the view to the river and hide it from public view. No Built-to lines or building lines were used to create a spatial character on the site. No vistas, views or visual connections are enhanced and little has been done to exploit the possibilities of aesthetics in creating an enjoyable human environment (Map 2.7).

3.2.10. Surfaces

All the roads are laid in asphalt, sidewalks are cast in concrete and the remainder of the surfaces consists mostly of grass and bare soil.

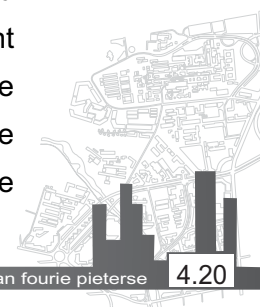
3.2.11. Land use

The land use is dominated by institutional facilities. This includes health care and educational facilities as well as a site for a telecommunication company, The educational facilities are focussed on the disabled and on educating people in the medical profession. Two schools are situated on the site, both for the disabled. Technicon of Pretoria, Department of Arts are also situated on the site. A part of the site is used for offices (Map2.8).



3.2.12. Hazards

The river area is unsafe, with no lighting and adjacent land use are not promoting activities on the river banks. This is partly due to the neglect of the river and the adjacent developments and businesses turning their backs on it. This unsafe environment becomes an even bigger hazard during floods when large volumes of water rushes down the canal. Erosion occurs where the river changes from a concrete to a natural canal creating the hazard of unstable substrate and embankments.



The traffic flowing at high speeds down Dr. Savage Street and Beatrix Street creates a hazard for pedestrian and cyclists. The intensity of road usage around the taxi rank and public transport drop-offs add to the road safety hazards for all users of the road.

3.2.13. Logical points of site access

The Hospital Hill site is divided into two parts by one major street, the Dr. Savage Road and Soutpansberg Street combination. Other smaller streets assist in the further distribution of vehicles, pedestrians and cyclists. Due to the nature of the whole site and its urban form, it is necessary to define all the entrances to the different properties and parts thereof. Different areas vary in levels of public accessibility. The streets are open to the public while the entrance to hospitals are monitored and the schools are restricted to all except the pupils, parents and staff.

3.2.14. Traffic flow (Pedestrian, bicycle, car, bus, train, public or private)

The taxi rank at the end of Dr. Savage creates an important intermodal node near the city centre. It creates the opportunity for informal trade to take place that leads to heavy pedestrian traffic. This is the part of the site with the heaviest traffic.

The entrance of the Pretoria hospital is associated with heavy traffic, private vehicular as well as pedestrian. The need for safer pedestrian circulation is evident at both the above mentioned areas. Pedestrians and cyclist are seen as secondary users of the

road designed for vehicular traffic.

3.2.15. Cultural, historical and recreational amenities

The site is poor in any cultural amenities as it is dominated by health institutions, however, the Technicon of Pretoria, Department of Art, is situated on the southern end of the site. It can be developed into a cultural centre with site and regional significance.

The site contains little elements with cultural-historical significance. The few with some significance are:

- The Apies River canal
- Hove's drift crossing (Dr. Savage)
- Ou Moedersbond building
- Some buildings at the Pretoria Academic Hospital
- Medical Research building

However, the priority of conserving these amenities is not high in relation to other cultural-historical site in the city.

Recreational amenities are limited. The Pretoria Zoo, on the western border of the site, is visited by locals and tourists on national as well as international level. The opportunity exists to extend this recreational amenity to incorporate the rest of the Apies River canal. The need for an integrated open space network is evident. The street furniture as part of the public-environmental interface is in a neglected state and needs some redevelopment.



3.2.16. Social gathering spaces

Some areas along the river is utilised by informal churches on Sundays. These gatherings develop underneath trees with enough shade to accommodate the group of between twenty and sixty people. The taxi rank at the end of Dr. Savage also serves as a social gathering space where informal trading takes place. These spaces developed informally and have the opportunity to be developed more effectively.

3.2.17. Visual Analysis & Impact Assessment:

Views are restricted due to the urban character of the site. The higher lying parts of the hill, where the student residents, Olympus, is situated give the opportunity of lookout points, and beautiful views over much of the city and residential areas to the north and east. Struben Street creates a vista up to the Union Buildings. This vista should be enhanced. Photographs of the site help to explain its character .

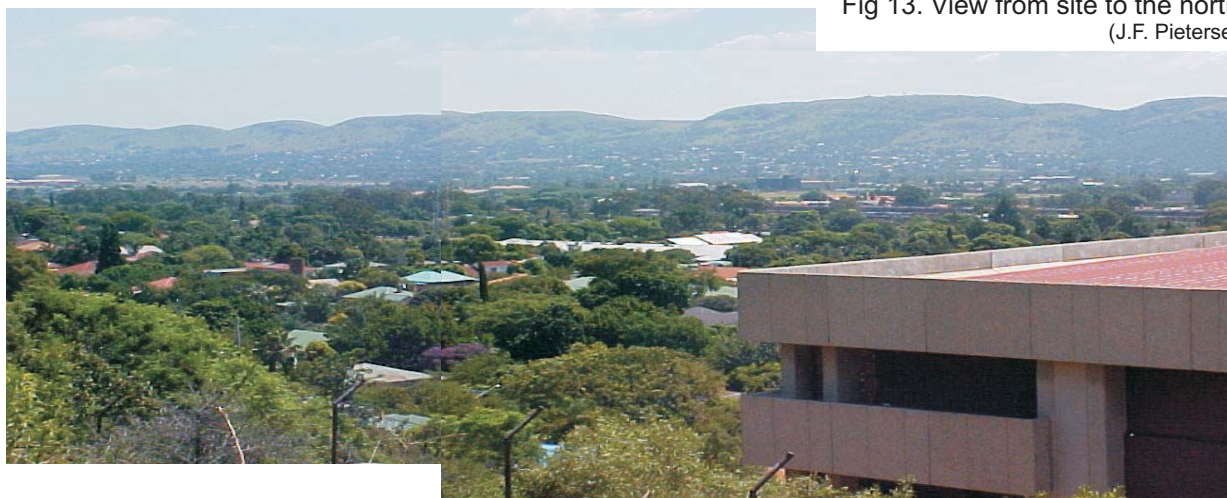


Fig 13. View from site to the north
(J.F. Pieterse)



Hove's Drift
(J.F. Pieterse)

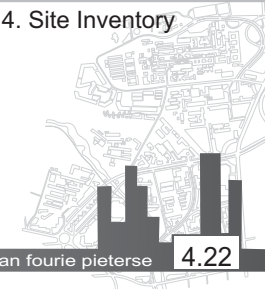


Apies River Canal
(J.F. Pieterse)



Medical Students Hostel
(J.F. Pieterse)

Figure 14. Site Inventory

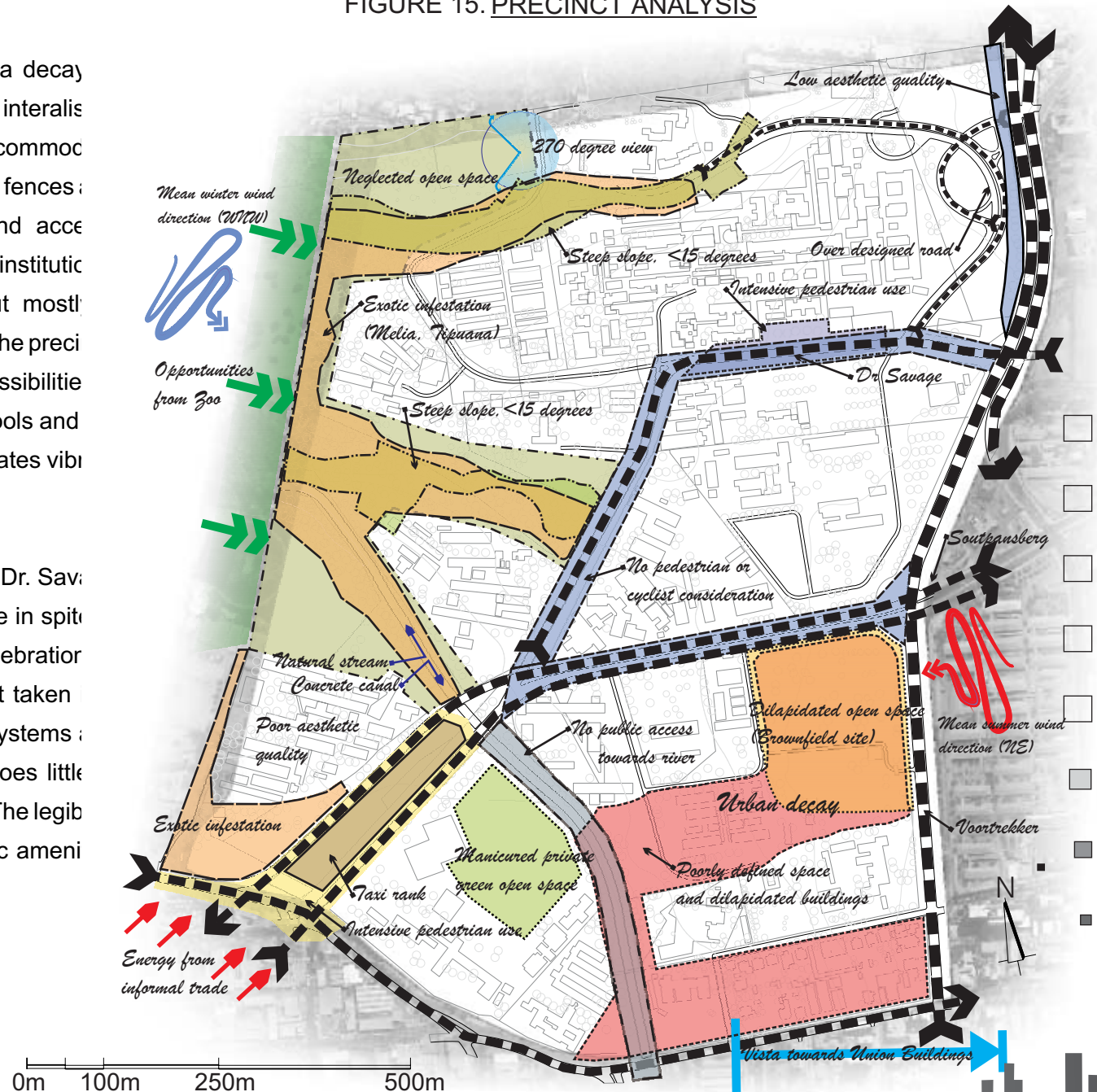


4. PRECINCT ANALYSIS

The Hospital Hill Precinct is characterised by a decay urban form and soft urban fabric. Functions are interalised resulting in a cold street scape that doesn't accommodate the pedestrian. The streets are lined with security fences; sites are only accessible through security and access controlled gates. Land use is dominated by institutional facilities including health and educational, but mostly a combination of both. Two schools are situated in the precinct. Both are schools for the disabled, creating the possibilities of landscapes with educational value to these schools and general users. There is little land use that stimulates vibrant city life.

The area to the south of the Pretoria Hospital in Dr. Savage Road is characterised by intense pedestrian use in spite of the poor public interface. There exists no celebratory street corners or gateways. User comfort is not taken into consideration in the design of the open space systems; the street scape, while the building structure does little to define public spaces and movement corridors. The legibility and permeability of the areas is poor and public amenities and street furniture is virtually non-existent.

FIGURE 15. PRECINCT ANALYSIS



The area doesn't feel safe to the general user with a large number of hiding places available to thieves. Lighting during night time is limited to the streets, not to the areas used by pedestrians. Open spaces are used by the homeless and many city dwellers see these spaces as dump sites for all kinds of waste.

Soutpansberg, Beatrix, Voortrekker and Dr. Savage Streets are of great importance to establish regional connectivity, but it lacks access to Nelson Mandela Road. Due to the vehicular focus, the needs of other users of the area are ignored. Smaller streets within the precinct are needed to stimulate internal circulation and to enhance permeability. The Apies River Corridor have possibilities to act as a multi-mode movement corridor.

There exists opportunities to incorporate the Pretoria Zoo into the creation of a tourist node and the connection of the zoo into the city scale multi-mode transport network. These connections can be established by making use of a monorail system that connects to walking routes as well as the public and tourist transport systems. The Apies River is important in a regional open space network and this should be developed. There exist great opportunities to create a network of urban habitat that incorporates the Apies River, Pretoria Zoo, existing parks as well as the street scapes and back lot areas in the precinct.

Biodiversity and the management of natural systems in the precinct is currently a low priority. Most of the public space is infested by exotic invaders including *Tipuana* and *Melia* species. The animal life is limited to that of stray dogs and cats, the Indian myna sparrow and doves.

The Apies River flows in a concrete canal through the site resulting in low aquatic life and a river with low recreational value. The water table is very shallow in this areas close to the river, making it necessary for landowners to pump water from there basements during the summer and most of the winter. This water flows into the stormwater system, ignoring the possibilities of reuse.

Some areas of the site have a very steep slope creating views over large parts of the city. These steep slopes are limiting the build ability on these sites. Pretoria is characterised by the parallel ridges running through the city creating a diversity of micro climatic conditions that should be acknowledge in the layout of the city.

The taxi rank on the south-western end of the precinct is associated with informal trade and street vending. This area is also used intensively by pedestrians, but lacks the associated public amenities and facilities required to make a significant and vibrant urban area.

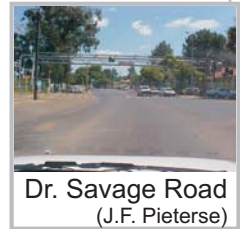


Figure 16. Site photo's.

5. URBAN DESIGN THEORY

5.1. Introduction to the problem

Urban design seeks to develop a policy framework for the design of the natural and built urban form. It coordinates private actions to produce the best possible public environments, providing contextual cues... ..and focusing on the interrelationships between major public and private urban elements, to enhance the settlements legibility and cultural fit. It must therefore respond ... This is just the start of the definition of urban design as approached by Roger Boden (Boden, 1989). It is clear that this is no simple discipline. As starting point in the approach the urban design problem of Hospital Hill, a study of the variety of works and theories on the subject of urban design is appropriate, like the works by Dewar and Uytendogaardt. With this information and the knowledge of the current issues concerning the site and its surroundings, one can decide on what theories and ideas to apply. The following aims to clarify the interpretation of the theories and how to apply it to the site.

5.2. South African Cities: A Manifesto for Change, by D. Dewar and R. S. Uytendogaardt.

5.2.1. Philosophy

Planning consciousness needs to be firmly rooted on two pillars. The first humanist and the second relates to the natural conditions which provides the setting upon which, and the basic resources with which, human life is played out (Dewar & Uytendogaardt, 1991. p13). This forms their philosophical point of departure, a basis for explaining their approach to urban

design.

The first pillar mentioned, carries the idea that the art of urban planning is concerned with the creation of human settlements. The client of planning is people and since the urban environment outlives any one generation of users, the designer does not represent any sectional interest or view of any group. The designer should enforce qualities that are timeless. Settlements of quality enrich the living conditions of all people, both rich and poor.

The second pillar supports three central concepts. The first is that of dynamic balance between man's activities and the resource base on which this take place. The second is regionalism and the third is resource sensitivity. Dewar and Uytendogaardt hold that the primary source of learning and understanding these concepts, are precedents, but it also calls for intuition, imagination and insight.

5.2.2. Approach

The authors state in their book that a cohesive approach to urban development is related to the methodology that underpins any design decision: need, programme, idea and context (Dewar & Uytendogaardt, 1991. p15). All these stages are creative. The design process is not linear, but cyclical, understanding gained in one stage feed back to, into, and lead to adjustments in the others.

'Need' refers to human needs and requirements: appropriate



Fig 17. Venice, Italy. The coming together of elements of structure over the entire city creates a complex, equitable system. (Dewar, 1991)

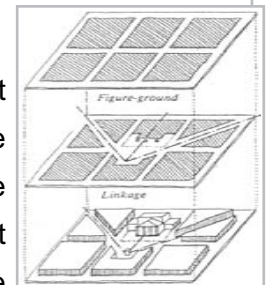
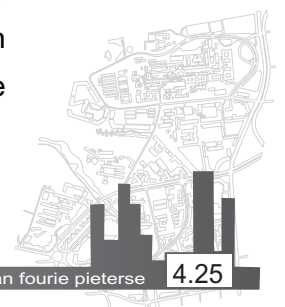


Fig 18. Diagram of urban design theories. (Trancik, 1986)



urban actions relate to the real needs and priorities of the urban dwellers. 'Programme' develops out of need and relates to the performance expectation of the development. 'Idea' at this level is abstract: they do not take concrete form, but they are the beginning of design. 'Context' evolves the ideas into specific form.

The approach that Dewar and Uytendogaardt advocate does not demand that everything should be controlled and planned. *What is required are several strong physical actions which will establish the spatial structure and form of the city and therefore inform the future decisions that will be made by a multitude of actors. The purpose of structure is to clarify the process of urban development, but one should not avoid all contradictions and conflict for it generates complexities that are the essence of vibrant cities (Dewar & Uytendogaardt, 1991, section vi).*

The primary elements of structure described in this work, relate to, but are better defined in the work by the same authors, *Creating Vibrant Urban Places to Live: A Primer*. In the making of settlement, structure is the device used to bring order to the design problem (Dewar & Uytendogaardt, 1983, p15). 'Structure' refers to the creation of public realm: that realm which is shared by all inhabitants as opposed to the private realm. There are three qualities that are central to positively-performing structure: order, scale and generosity (fig. 17). The elements that make up structure are:

- Space (defined by its multi-functional use, scale, clarity, enclosure, and comfort)

- Place
- Connection
- Institutions

These elements can not be separated operationally for there is overlap between them: a space becomes a place that accommodate movement and buildings and so on.

5.3. Finding Lost Space, by R. Trancik.

Three approaches to urban design theory can be identified on the basis of research into the evolution of modern spaces and the analysis of historic space (Trancik, 1986):

- Figure-ground theory (the study of relative land coverage of buildings as solid mass to open voids in an attempt to manipulate these relationships to clarify the structure of urban spaces by establishing a hierarchy of spaces)
- Linkage theory (the organisation of lines that connect the parts of the city and the design of a spatial datum from these lines that relate to buildings and spaces)
- Place theory (the understanding of cultural and human characteristics of physical space)

These theories differ from each other, but taken together can provide us with potential strategies for integrated urban design. The integrated approach must combine the qualities (fig. 18) expressed in each theory and this integration is achieved by (Trancik, 1986):

- integrated uses
- incrementalism

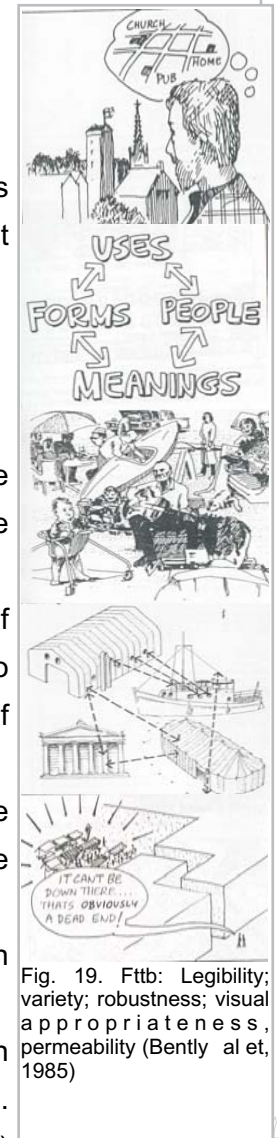


Fig. 19. Fttb: Legibility; variety; robustness; visual appropriateness, permeability (Bentley al et, 1985)

- design to give pedestrian precedent
- promoting closer proximity between housing and employment.

this integrated approach is not static but incorporate change and innovation to give added meaning for the contemporary users.

5.4. Responsive Environments, by Bentley et al.

A contribution to urban design theory was made in a now well-known design text, *Responsive Environments*. Bentley suggests a range of principles for the design of developments, and the qualities to be aspired towards in every settlement. The key principles are legibility, variety, robustness, visual appropriateness, richness, personalization and permeability (fig. 19). Each of these principles implies increasing diversity and choice, and this is a key message. Is the quality of civilized life conditional on the variety of experiences and freedom available to all? As a manual for designers, the book contains many valuable insights into the qualities of 'good places', particularly the non-aesthetic qualities overlooked by most earlier theorists; but it also makes many cultural and ideological assumptions which may not be sustainable in the blanket universal fashion implied by the proposed formulae.

5.5. Creating Neighborhoods & Places in the Built Environment, by D. Chapman.

Towns and cities are much more than bricks and stone. The physical form is only a stage set upon which a multitude of

human dramas continually unfold. The variety of activities which a place supports, 24 hours a day, seven days a week, is an indicator of its vitality. Activities may be conflicting or mutually supporting. They may be accessible or exclusive. Chapman's views explore the characteristics of places which make them lively and responsive to their users' needs. It considers some of the ways in which public policies and private activities have encouraged vitality and the ways in which we can all be responsible for the places we use. Chapman explains the ways to promote variety and vitality by means of the three A's: Attraction, Accessibility and Amenity, (fig. 20).

5.6. CONCLUSION

The application of theories and approaches, just like the use of precedents, are essential in the attempt to create vibrant and workable cities. The work of Dewar and Uytendogaardt, together with the works of the other theorists mentioned above becomes a powerful tool in the hand of any urban designer if he/she spends the time to analyse them to the point that the essence of it is understood.

Only by understanding the problem in past and current development patterns of South African cities, can it be remedied. Dewar & Uytendogaardt painted the problem for us and then went further in supplying the solution. We should aim to these principles to design concerning the urban environment.

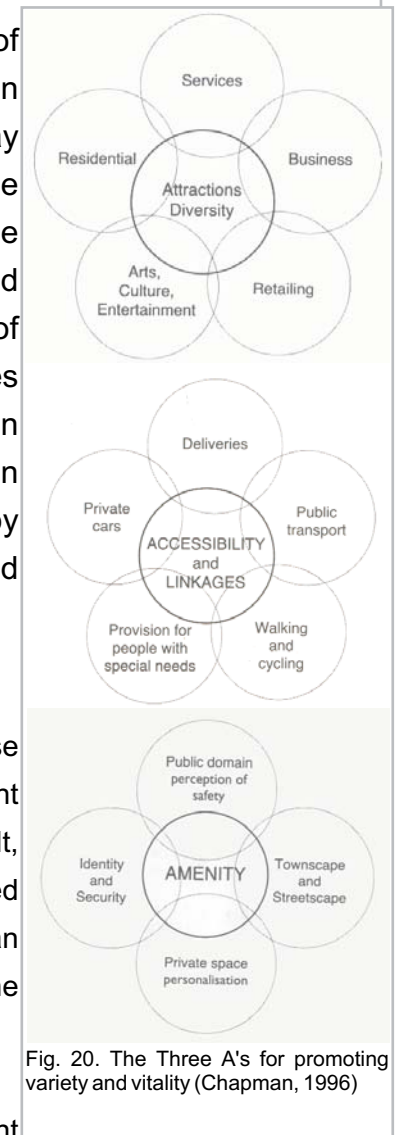


Fig. 20. The Three A's for promoting variety and vitality (Chapman, 1996)

6. DESIGN PRINCIPLES FOR A VIBRANT CITY

6.1 Permeability

Places should be accessible to people in order to offer them choices. This quality of an environment to offer people access through it, is a key measure of its permeability.

The proposed framework offers a system of public spaces that offers the user a number of alternative routes through the precinct. All these alternatives should be visible, thus visual permeability becomes an important consideration in establishing the precinct.

Physical and visual permeability depend on the way that the public space network divides the city into blocks. The large existing blocks of the precinct is broken up into smaller blocks enhancing the permeability and shortening the walking distances between places. The framework makes use of existing linkages with the addition of extra streets and pedestrian walkways, like the Apies River Corridor and other mid-block linkages. It breaks down the scale of existing developments and attempts not to segregate pedestrian and vehicle routes

The framework enforces the idea of perimeter block development. It relates to the idea of externalizing the interface between the public and private interface and internalizing the semi private uses of the institutional facilities like the schools. This means that all buildings need two facades: one onto the public space, and one onto the private spaces.

Visual permeability is also enhanced to a larger scale by the State Boulevard and other visual linkages and vistas between places of importance.

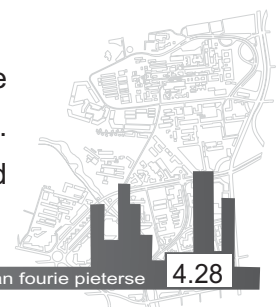
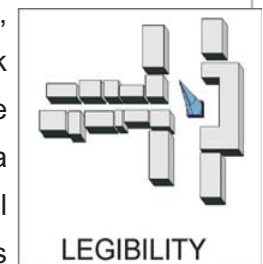
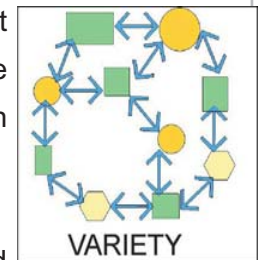
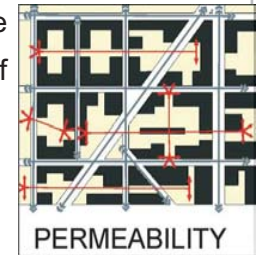
6.2 Variety

Accessible and variety goes hand in hand, as peoples won't visit different spaces unless they are offered a variety of choices. The aim of variety is to offer people the widest range of choices in terms of activities with the lowest need for mobility.

Hospital Hill Precinct is dominated by health facilities and institution and the opportunity exists to add variety of uses, building forms, people, meanings, densities etc. The framework encourages the development of tourists attraction and the establishment of all the major facilities needed in a neighbourhood. These facilities should be easily accessible to all users of the precinct and neighbouring communities. This results in the development of a neighbourhood centre, cultural node, tourist node, mix use streets and a wider range of land uses in the precinct.

6.3 Legibility

Legibility has to do with the layout of the precinct. Can people grasp the layout and understand what the precinct is all about. This legibility is applicable on two levels, the physical form and the activity patterns.



The framework aims to relate important places/spaces with the look of an important place/space like State Boulevard, gateways into the CBD, important street intersections and the celebration of river crossings. Activity and movement spines, like the Apies River Corridor and State Boulevard as well as other nodes, edges, paths and landmarks play major roles in understanding Hospital Hill as a whole.

6.4 Robustness

Places should be able to accommodate a wide range of uses. This quality is referred to as robustness. The framework encourages the design of robust spaces. One of the first areas where it becomes applicable, is on the street frontages and thus the way the building edges is designed. Building elements can help to define the public and private interface while itself becomes semi-private, for example balconies, elevated, terraced sitting areas for pubs and restaurants and display areas for shops. The privacy of the indoor activity can be achieved by horizontal distance, level change or a combination of both.

The effectiveness of edges as a support for people-watching and robustness, is increased with the provision of seating and other public amenities. Edge potential is also increased if parts can be protected from the weather or by the design of arcades.

Busy mix-use streets must accommodate a window-shopping lane, circulation lane, amenity lane as well as design elements

that ensure no one circulation mode dominates or limits the other. Pedestrian spaces should fit the human scale and the micro-climate should be designed to provide the human comfort.

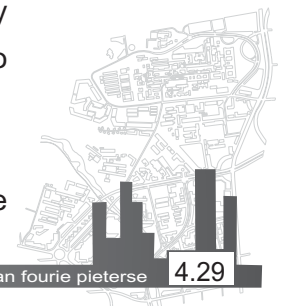
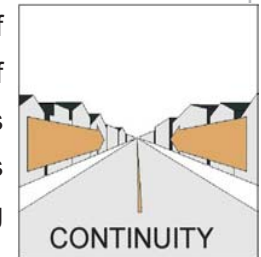
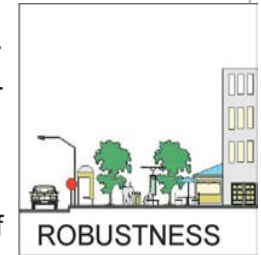
Public open space should be able to accommodate a variety of events including festivals, flea markets, circulation, play and exhibitions. The Apies River Corridor accommodates this level of use, while it supports high biodiversity and the chance of environmental education. The streets also supports many kinds of circulation modes and activities. Robustness ensures maximum use by a wide variety of users for different times during the day and thus assisting in the economy of these spaces.

6.5 Continuity

Continuity as a design principle is of vital importance in urban design.

The continuity of the built forms establishes a sense of place and enforces the urban structure and form. The continuity is guided by the establishment of building regulations like restrictions to building heights and commitment to build-to lines. New parcels of development should be integrated with existing development to obtain an agglomeration of economies. At places, the continuity should be consciously broken to ensure convenient access to green space.

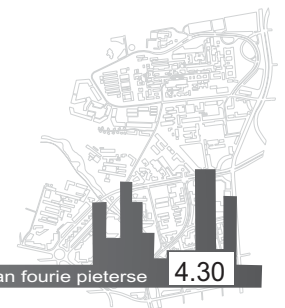
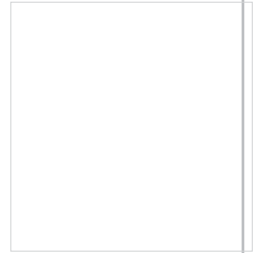
Other principles related to continuity of the built form, are



continuity of public space systems, green open space systems and the continuity of movement.

Public open space should make up a continuous network of space. Achieving a sense of enclosure and definition is important in this regard. Every building, either by the building itself, its walls, or planting, should contribute to defining the public space it abuts.

The movement of people, finance, goods and services is the energy network of settlements. The energy potential contained in the network is released through stopping, not through movement. Different movement modes have different patterns of stopping. Pedestrians and cars can stop anywhere along a route, bus stops are spaced 500m to 800m intervals. The monorail stops at every street intersection and sometimes at mid block nodes. This different distance networks create a complex system overlay that assists in the continuity of movement through the precinct.



7. DESIGN PRINCIPLES FOR A SUSTAINABLE CITY

In order to stimulate the development of a sustainable city, one has to incorporate design principles that supports sustainability. The design principles incorporated in the Hospital Hill Urban Design Framework is discussed.

7.1 Connectivity

Firstly, the framework proposes the extension of Nelson Mandela road to meet with Soutpansberg Road. This will enhance the regional connectivity with the existing local distributors while connecting to the major access roads and collectors. Further on, the precinct is well connected to other neighborhoods and districts.

7.2 Public Transport

The public transport system is in need of upgrading. Taxi and bus stops are to be established at 500m to 800m intervals throughout the precinct. A monorail systems is proposed along the Apies River to connect the Pretoria Zoo with the rest of the Pretoria open space system and tourist attractions like the proposed Freedom Park on Salvokop. A tourist bus stop is proposed at the existing taxi rank in order to be accessibly to the inter-modal node at Hove's Drift. The existing taxi rank should be further developed nearer to the CBD where it is already happening informally. The public transport management system and reliability should be enhanced to become more attractive to possible users.

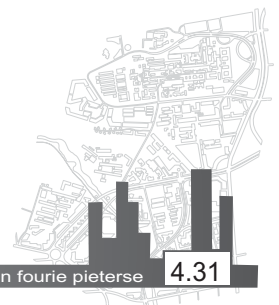
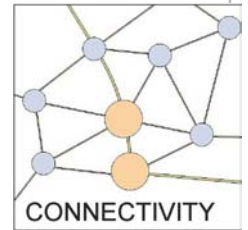
7.3 Access to Facilities

There exist a need for community in the precinct. These facilities should be accessible to all the users of the precinct, including people working in the area, residents, visitors to the hospital , tourists and by passers. It should thus be located at a central point where it is within walking distance from all possible users while it can tap into the energy sources from transport routes moving through the area. This framework proposes that the general facilities are developed at the intersection of Soutpansberg and Voortrekker Road on an existing brown field site. Facilities should include: childcare, banking services, communication facilities, restaurants, pubs, coffee shops, fast food outlets, clothing shops, bookshop, stationary shop, hardware shop, grocery, butchery, bakery.

7.4 Mixed Use

This framework encourages the zoning of land to mix-use. This type of land use is characterized by buildings that accommodates different types of use typically with commercial use on the ground floor, restaurants and offices on the second and third floor and residential and / or penthouses on the top floor.

This type of zoning allows for 24 hour use of buildings as well as the associated public open space in front of the buildings. This intense use help with the security of the area as it is constantly under user surveillance. This zoning enable cities to develop in a



way that fits the pedestrian. All the necessities needed for a high quality urban life is within walking distance: workplace, residence, recreation, educational facilities as well the commercial facilities to back it all up. By having all this facilities within walking distance, one is much less dependant on private or public transport. The stress under which these transport systems operate are thus released.

The framework proposes that the node at the Soutpansberg, Voortrekker Road as well as the southeastern part of the site be rezoned to that of mix-use. As the rest of the site is dominated by institutional use, it creates problems in terms of rezoning the rest of the site. It is thus imperative to keep to the rezoning proposals mentioned above.

7.5 Mixed Mode Streets

Mixed Mode Streets encourages use by all the different traffic modes. No single mode has dominance over the streets. Traffic speeds are controlled through design. All pedestrian crossings are safe for the pedestrian, while cyclist are taken into account and a cycle lane is introduced. These streets are vibrant and is characterised by markets and social life as all the users are welcomed into using it. These streets should also accommodate both transport types, private and public with adequate parking and sufficient passenger drop-off or pick-up points. These streets have the energy to support street vending and other street markets.

7.6 Public Amenities

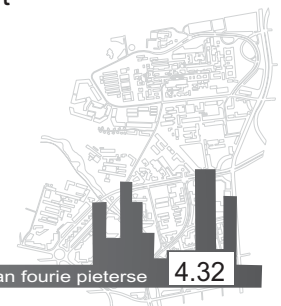
Public amenities include street furniture, information booths, street and pedestrian lighting, water features, drinking fountains, signage, etc. This should be of the same theme and assist in creating a unified character and image to the district. All these elements should be vandal proof and of a high quality in order to minimize maintenance.

Public areas should allow interaction between people and allow them to appreciate views without creating conflict between users. Lighting features should not disperse light energy into the air, as this is not sustainable.

7.7 User Comfort

The climate in the urban environment can be manipulated and altered through design. The climate of Pretoria is generally comfortable to the users, but during some seasons, it can become to hot or to cold. The micro-climates of the precinct should be managed to fit the user comfort levels by means of sustainable ways like evapo-transperation and natural ventilation.

Studies of cite specific micro-climates are encouraged by the Framework in order for the designer to design for human comfort levels.



7.8 Tourism

Tourism is arguably the most sustainable economical endeavor possible. Pretoria, as the capital city, has a significant number of tourist attractions, both local and international.

The Framework proposes that a tourist node be developed in the area of the existing taxi-rank. This node will house tourism information centers, travel agencies as well as tourist transport/departure facilities. This node is close to the Apies River Corridor and the inter-modal node to supply the tourist with city-wide transport that takes them to all the tourist attractions. It is also conveniently close to the Pretoria Zoo and the developing taxi-rank with its informal trade energy and vibrance. Many local entrepreneurs will benefit from tourism influx.

7.9 Safety

Safety is one of the cross-cutting issues of the Urban Design Framework. It is encouraged on all scales; regional, precinct, block and site. Many design application assists in developing safe environments. Creating 24hour-use spaces while enhancing visibility and permeability are concepts encouraged by the Framework.

Public spaces, hard and soft, should be well light by night while obscurity are addressed in the design. It should also be patrolled by security agencies or visible policing should be present. Users should be able to make choices in terms of routes taken to

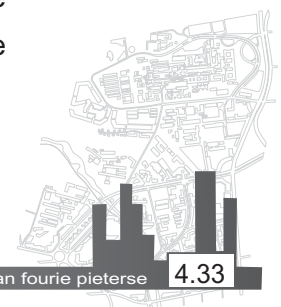
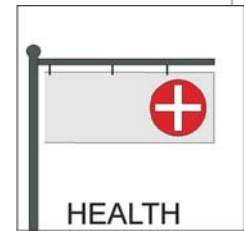
different places, limiting predictability and thus vulnerability to thieves. Hiding places should be minimized. A police station/sub-station should be present in the area.

7.10 Health

Health considerations forms a vital part of development in modern SA: not only to prevent cases of public liability, but also to educate the public in a country with poor and AIDS stricken people. User should have access to basic health services and information on illnesses. This precinct is dominated by health institution catering for bigger health issues, but it needs a clinic that fulfills in the basic needs of the community . Open space gathering areas must serve as 'classrooms' for the community where they can learn about health issues through exhibitions and public talks.

7.11 Sanitation

Sanitation is a basic service running hand in hand with the health issues. Public toilets and general access to potable water should be provided at all the major public gathering points. The area has a view tourist attractions that should be serviced with public toilets. This issue plays a major role in the way visitors experiences the city. Management and regular cleaning of these facilities thus becomes important. Pay-toilets should be considered for tourist areas to ensure adequate maintenance.



7.12 Disabled Access

Access for disabled persons should be available at all buildings entrances and level changes like street crossings and steps along the Apies River Boulevard.

These access principle should also apply to public transport pick-up and drop-off point. Parking for the disabled should be made available as per building regulations, conveniently close to facilities and building entrances. Street crossings should accommodate the slower crossing of disabled and older people thus making it safer for all users.

The mono-rail proposed to run along the Apies River Boulevard should be accessible to the disabled and serve as a way to transport the old or disabled from large scale public transport nodes through the rest of the city.

7.13 Water

Water should be used sparingly and sustainably. Rainwater harvesting and the recycling of water is encouraged. Water pumped from basements should be reused, as well as the grey water from buildings. Plants used should be hardy and use little water, this can be accomplished by using indigenous plants that are fit for the local environment.

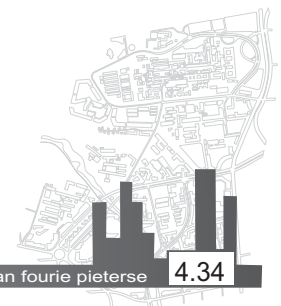
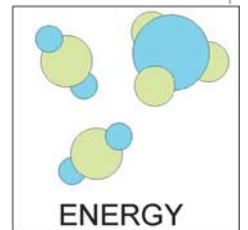
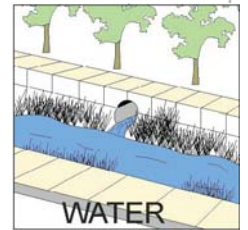
The Apies River is currently seen as a storm water channel with no sign of life. This channel should become a natural river again,

with water with a reasonable quality that can support some sort of aquatic life. The management of water quality in the catchment area should thus be addressed.

7.14 Energy

Energy flow is a major concern in an attempt to develop a sustainable city. This framework addresses the issues concerned with transport efficiency, micro-climate manipulation and sustainable measures to densify the city. All these principles aims at lowering the energy flow in the city and thus adding to its sustainability.

Another issue is the use of materials. The embodied energy contained within building materials should play a major role in material selection. The behavior of selected materials under exposure to temperature extremes also has an effect on the cities energy performance This is due to the different insulation values and heat absorption values of the material. It is encourage that these material characteristics be taken into account during the design stage.

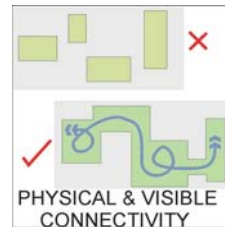


8. OTHER FRAMEWORK CONSIDERATIONS

Public Open Space should be designed according to set principles to ensure it is used and understood by its users

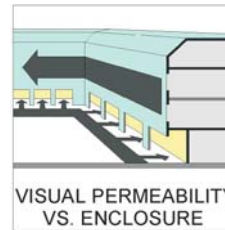
8.1.1. Physical and visible connectivity

Establish physical, visible and perceptual connectivity between cluster and linear open space as well as strong linkages between various hard open space.



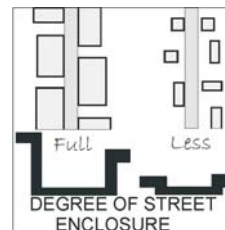
8.1.2. Visual permeability vs. Enclosure

Visual permeability through an interface enrich the public domain and will affect the way public space is used. It becomes controlling.



8.1.3. Degree of street enclosure

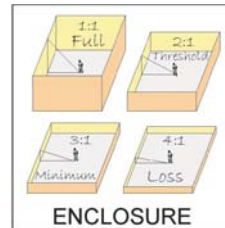
The general pattern of buildings should help to define the street. The relation between street width and the height of alining building defines the street space.



8.1.4. Enclosure of plaza's

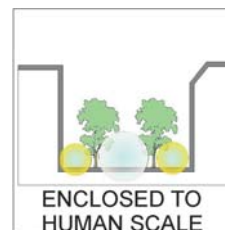
The relationship between radius and height determines enclosure:

- Full degree 1:1
- Threshold for enclosure is 1:2
- Minimum enclosure is 1:3
- Loss of enclosure > 1:3



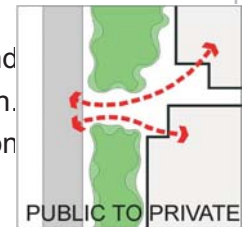
8.1.5. Human scale

Proportions should not be vehicle dominated. Use trees as enclosing elements and to create a sense of human scale. Define the boundary of the space by means of a unified wall or a series of pavilions linked with landscaping



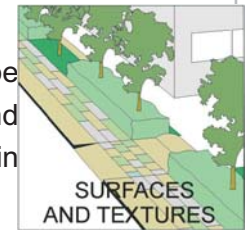
8.1.6. Public-private interface

Enhance the visibility and legibility of the relationship and the transition between private and public domain. Threshold should act as shared environments or transition place between public and private place.



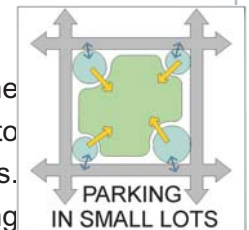
8.1.7. Surfaces and textures

Conflict between pedestrians and vehicles should be reduced through location and design of vehicular and pedestrian access to a parking facility or road. Changes in surface helps to define this transition,



8.1.8. Parking: small lots

Organise parking in small lots around the perimeter of the core of activities and movement. Parking lots should lead to the core and should provide pedestrian access to all streets. The parking lot should be integrated into the surrounding area through linking it to the natural movement routes and accommodating short-cuts



8.1.9. Parking: off street

Parking should preferably be located away from the street, at the back of buildings. It should not dominate the street front. Rather locate parking in small lots closer to destinations, especially in higher density developments and at local shops.



8.1.10. Markets

The gateway to a market place should convey a friendly invitation. The market should have an acceptable sense of place that should be defined by means of a primary space, supported by secondary spaces.



9. BIODIVERSITY: FUNCTION-BASED HABITAT DESIGN

Biodiversity in cities is generally at a very low quality. This problem can be addressed through a wildlife management system called Function-based Habitat Design (FHD). The principles of FHD is encouraged by wildlife biologist B. W. Breedlove (Breedlove et al, 2003). It is now explained in elementary terms.

Function-based Habitat Design process overview

Habitat is not and cannot be habitat unless it functions. The functions of habitat are simple. All animals must feed, breed, nest and rest. These habitat functions must be available in the quality and quantity required when and where they are needed. Having and enjoying birds and other animals requires that one design for their needs with the same care and consideration one takes when meeting the needs of a specific site or community (Breedlove et al, 1999)

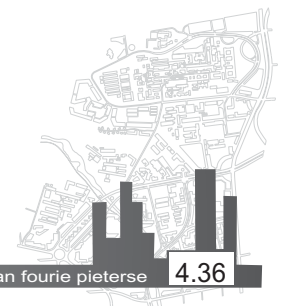
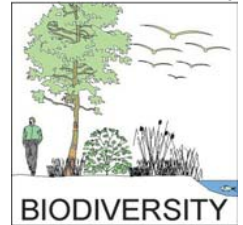
When producing a Function-based Habitat Design for an altered environment, FHD makes use of a particular “slice” of a natural community, a guild, as the focus of design (Breedlove et al, 2003). A guild makes it easier to manage design and implementation and to insure that habitat functions are associated with several different portions of the community. A guild can be describes as a group of animals making use of the same resources to sustain themselves (Breedlove et al, 2003). The concept of design for specific guilds can be explained as follows.

The Lesser Bush Baby Tree Canopy Feeder Habitat Guild has

three parts. The animal, the *Lesser Bush Baby*, is carefully selected as a guild representative. *Tree Canopy* identifies a vegetation cover the tree canopy. It is easily seen and easy to separate from other structures. The associated habitat function is *feeding* in this example. However, it could be any one of the four habitat functions. This three-part link among (1) an animal representing a guild, (2) the mapped structural unit of the natural system associated with the guild and (3) the habitat function contained in the structural or mapping unit comprises the design base of Functional Habitat Design.

- *Associated Species are beneficiaries of the guild implementation, meaning that extra animals are catered for without knowing it (Breedlove et al, 2003). These species occur due to a few reasons:*
- *They may obtain a portion of their life requisites from the vegetation cover types comprising the guild.*
- *They may be species from other guilds in which portions of habitat areas overlap the habitat pattern of the guild under direct consideration.*
- *They may be species that were not part of any design consideration but are part of what could be considered entire new unintended guilds that are using the guild bases created by the other designs (Breedlove et al, 2003).*

The precinct benefits from these additional guilds and species while meeting the needs for ease of design and management. This is another strength of the guilding process: benefits that are significant but which do not require direct design effort.



A Conformed Design is one in which the design requirements of both human habitat and the habitat of other species have been conformed, both spatially and functionally, to meet the needs of both groups with minimal interference of either group on the other (Breedlove et al, 2003). The framework aims toward a conformed design.

The *Habitat Guild Templates* (Breedlove et al, 2003) of the chosen guilds will be discussed with the associated *Vegetation Palettes* (Breedlove et al, 2003) made available to assist the design of functional natural habitat on all the different sites in the precinct.

9.1.1. Habitat Guild Selections

The following Habitat Guilds were selected for the Hospital Hill Function-based Habitat Design:

1. Lesser Bush Baby Tree Canopy Feeder Habitat Guild
- 2.a. Tawny Flanked Prinia Patchy Wetland Nester Habitat Guild
- 2.b. Tawny Flanked Prinia Upland Feeder Habitat Guild
3. Freshwater Crab Water Edge Feeder Habitat Guild
4. Common Hottentot Butterfly Larvae Grassland Feeder Habitat Guild
5. Banded Mongoose Acacia Shade Feeder Habitat Guild

These particular habitat guilds were selected with the help and knowledge of a wildlife biologist, Mr. Ben Breedlove. It is necessary to draw from information gathered from inventory and

analyses as well as an expert's opinion in specialised decisions like these. The biologist has a good understanding of the life requisites and habits of the local occurring species as well as their ability to adapt to the urban environment.

9.1.2. Habitat Guild Requisites Templates.

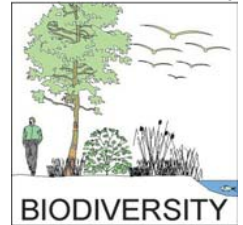
The templates are created with knowledge gained from literature and the expertise of a wildlife biologist. It should be done in detail to ensure that thorough understandings of the animals needs are obtained. It should include vegetation, soil hydrological and climatic condition and characteristics.

9.1.3. Terrain Features and Habitat Guild Decision Units Map.

With the current state and character of the site, the site can be seen as a clean slate in terms of habitat and the Decision Units Map. Habitat will created where there is currently very little functional habitat. The designer will start from scratch with very little existing habitat guiding his decision. The Terrain Features Map will guide the designer towards some decisions making.

9.1.4. Vegetation Planting palettes.

The final vegetation pallet consists of all the plants in the Habitat Guild Requisites Templates and the vegetation occurring naturally in the area. All are value ranked for their general value of supporting functional habitat and their landscaping value (Appendix A). This planting palette should be used where the aim of planting is not to meet a specific guild's needs: the conventional landscaped areas.



9.2. Tree Canopy Feeder Habitat Guild:

Lesser Bush Baby (Breedlove et al, 2003)

Bush Babies serve several purposes. They are an excellent choice for a *Guild Crest Species* (Breedlove et al, 2003) for the denser taller bush and tree covered areas on the site. Bush Babies are readily attracted to humans and their activities and the reason for selecting them as the Guild Crest Species, they feed in tree canopies where a large variety of other species feed, breed, nest or rest.

The Lesser Bush Baby is social. It occurs in small groups and sleeps together. Making a sleeping box for them meets their nesting and resting requirements and can provide entertainment and pleasure to you and your guests. They also respond well and easily to being fed and, if not disturbed, will habituate readily to both being fed and watched by humans at quite close range. None of this detracts from their utility and value as a design guide for creating habitat for a much wider range of species.

9.2.1. Lesser Bush Baby Tree Canopy Feeder Guild Habitat Template

Spatial Requirements

The Lesser Bush Baby requires a minimum habitat area of about 4 ha and a home range of about 7 ha. Ranges of males and females can overlap more than group ranges

Life Requisites (Feeding, Breeding, Nesting, Resting)

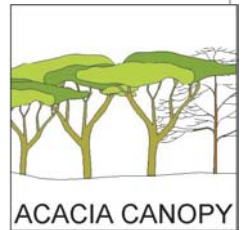
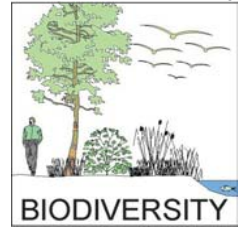
The Lesser Bush Baby is a tree or bush canopy dweller and can leap openings of up to 10 m. It nests in thick vines more than 12 m above ground level. It travels in social groups of 4 to 6 individuals but splits into smaller groups to forage. They move along established routes through tree canopies and could have more than 12 resting areas in their home range.

Their food consists of 50 percent vegetable materials and 50 percent insects and invertebrates and includes an occasional reptile or bird. The Lesser Bush Baby requires Acacia gum for reproductive success. Acacia gum is also an important food source when softer fruits and other foods are not available. Breeding occurs in the canopy and the young are born in nests. They are nocturnal and begin moving at sunset from their daylight resting places.

Guild Composition

The Lesser Bush Baby Tree Canopy Feeder Guild is expected to include about 20 to 30 rodent species and 5 to 6 larger mammal species. About 10 bird species are associated with the guild as are a few snakes and many invertebrate species.

Pollinators are seldom considered when thinking about guilds; however, they are required for reproduction of about one of three plant food species eaten by humans. The Lesser Bush Baby Tree Canopy Feeder Guild is expected to attract and support fruit bats and a variety of insect pollinators.



9.3. a) Patchy Wetland Nester Habitat Guild:**Tawny Flanked Prinia** (Breedlove et al, 2003)**b) Upland Feeder Habitat Guild:****Tawny Flanked Prinia** (Breedlove et al, 2003)

This guild is selected as an intuitive choice with a particularly good influence on site habitat design. The Tawny Flanked Prinia nests in wetlands that are emergent and patchy. This affords excellent viewing opportunities for humans while providing open water patches that will be used by both wetland and open water species. This combination works well for the intended mix of human uses and habitat for many other species.

It also uses upland areas to meet certain of its life requisites and is adapted to use of suburban areas. The 15 ha territory of the bird and its mix of requirements offer both excellent opportunities to manage for the guild and to attract the full range of species likely to be associated with the guild.

9.3.1. Tawny Flanked Prinia Patchy Wetland Nester/Upland Feeder Habitat Guild Template

Spatial Requirements

The Tawny Flanked Prinia has a territory of about 15 ha for a pair. An associated species in the guild, the Black Chested Prinia has a density of about one bird per 0.7 ha.

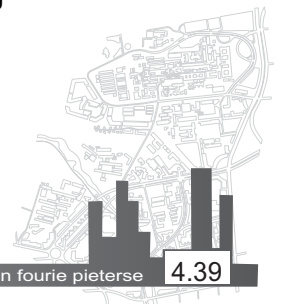
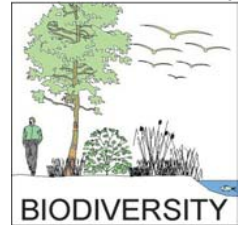
Life Requisites (Feeding, Breeding, Nesting, Resting)

The Tawny Flanked Prinia forages in lower vegetation and occupies the ecotone or edge between grasslands and tall bush. It is commonly found in rank patches of grassland on the edges of roads and water. The Prinia tends to breed October through April.

Guild Composition

This guild will contain an exceptionally large number of species even though the area for the nesting functional component of Tawny Flanked Prinia habitat is relatively small. The animal species “spill-over” effect from the Tawny Flanked Prinia nesting guild encompasses the animal species customarily occurring in the open water interspersed among emergent wetland vegetation patches as well as those species occurring in both maintained and unmaintained uplands. Therefore, many of the animals likely to occur on the site will occur within the encompassed total habitat area for this guild.

Human involvement in maintaining both the nonreedy patchiness of the wetland as well as the upland vegetation patterns will be needed to reach the potential for numbers of species and number of individuals occurring in this guild. This is true for the wetland and water portions of the guild as well as for those species using the upland.



9.4. Water Edge Feeder Habitat Guild: Fresh Water Crab (Breedlove et al, 2003)

9.4.1. Fresh Water Crab Water Edge Feeder Habitat Guild Template

Spatial Requirements

There are apparent oddities in the spatial requirements for this guild. The crab probably requires a small area to meet its needs. The otter that depends on this guild require many kilometres of bank edge for daily needs. These other species are the real reason for wanting the crab as the guild crest species. They are the design focus for producing and maintaining a set of conditions that would be needed by other species.

Otter, either the Cape Clawless Otter or the Spotted Neck Otter travel over several kilometres of waters edge per night. Up to 16 km per night is mentioned as a linear home range size for males with the home range for females being somewhat smaller. Typically they move within 20 metres or less of the water edge.

Our onsite habitat design goals for this guild then become twofold. First, increase carrying capacity for the otter and other species, particularly birds that will use the created waters. Second, maintain the habitat quality required to produce quality food for the crab population forces control over human factors that affect water quality. Keeping the waters so clean that the grassy vegetation does not accumulate an algal coat requires

that the system be monitored for nutrient input and that exceptionally clean conditions be maintained.

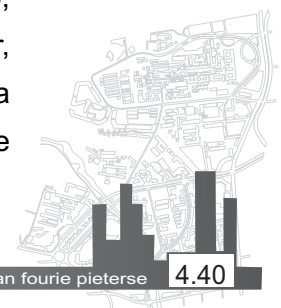
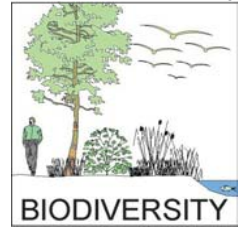
Life Requisites (Feeding, Breeding, Nesting, Resting)

The fresh water crab requires either piled rocky debris or holes in the bank as a refuge and as a place for enduring periods of low water or dry conditions in the streambed. These conditions must occur where the needed cavity space does not fill with sediment. Therefore, either areas free from sediment or areas with good flushing are necessary.

The holes extend deep enough to serve as water reservoirs in certain cases. These are excavated by the crabs and are often well flushed by moving water. Animals of this type are typically detritivores meaning that they eat vegetation that is partially decomposed. They are often also scavengers that will feed on carcasses of virtually any sort that are in the water. Assuring that conditions for production of decaying vegetation material are maintained is probably the key criterion for their success other than provision of adequate water and substrate for protection.

Guild Composition

This guild will have as the primary members the fresh water crab, the Cape Clawless Otter and the spotted neck otter. However, many of the water birds that will occur in the Tawny Flanked Prinia guild will also be found in this guild. Flowing water with adequate riffles will attract the Cape White-eye that is a frequent bather.



9.5. Bushveld Feeder Habitat Guild:

Banded Mongoose (Breedlove et al, 2003)

9.5.1. Banded Mongoose Bush Veld Feeder Habitat Guild Template

Spatial Requirements

The Banded Mongoose has a linear home range of 3 to 4 ha.

Life Requisites (Feeding, Breeding, Nesting, Resting)

The preferred vegetation cover types for Yellow Mongoose habitat include open country and savannah. It tends not to occur in dense forest, thick bush or desert. It occurs in open areas in grassland and vleis and is found around waterholes.

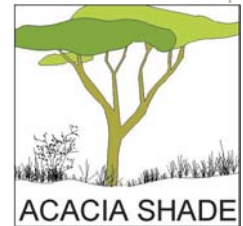
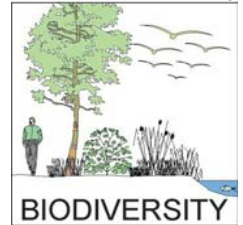
It occurs singly and in groups of up to 4 individuals. The young are born in chambers in burrows. No bedding material is used in the chamber. Temporary burrows are used as refuges throughout their range.

Food consists of insects, especially harvester termites, but also includes caterpillars, grasshoppers, small rodents and small birds.

Guild Composition

The Banded Mongoose occupies typical grassland savanna. It tends to exclude denser vegetation types. Therefore, the

associated species are those of the open savanna and savanna that tends toward grassland. This veldtype will remain a component of the site and with reasonable management should continue to attract the variety of birds and animals with which it is associated.



9.6. Grassveld Feeder Guild:

Common Hottentot Butterfly Larvae (Breedlove et al, 2003)

This is species whose critical life function is closely associated with high quality grassland. The Brown Hottentot uses rooigras (*Themeda triandra*) and *Ehrharta erecta*, among others, as larval food plants. Both species are indicators of veld in good condition. This guild relates to pollination of roadside and other landscaped vegetation with high aesthetic appeal as well generation and management of high value grassland.

Many other butterfly species will use the site and will use different vegetation cover types to meet their needs. This species when used as a guild crest species allows us to focus on forest edges where the adults meet their needs and the open sunlit grassy areas where the larval needs are met.

9.6.1. Common Hottentot Butterfly Larvae Grassveld Feeder Habitat Guild Template

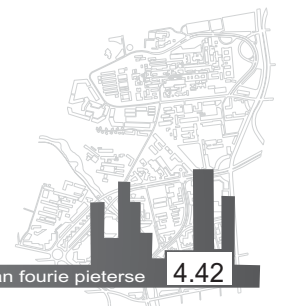
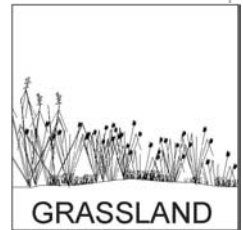
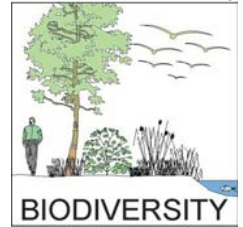
Spatial Requirements

The site is certainly large enough and has sufficiently diverse vegetation cover types, both natural and landscaped, that butterfly habitat will be ample and can be improved with time. Emphasis is given here on the larval stage spatial requirements because people tend to focus on the adults when it is at least as

important to provide opportunities for the larvae to have their needs met.

Life Requisites (Feeding, Breeding, Nesting, Resting)

Many butterflies have territories that are defended. Defense strategies include behaviors known as “patrolling,” “hilltopping,” and “perching,” to name the most common approaches. It would be difficult to catalogue them and the effort is beyond the scope of this design. Complexity and diversity are highly desirable when or after basic requirements for occurrence and perpetuation have been met.



9.7. Habitat Supplements (Breedlove et al, 2003)

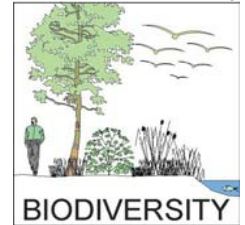
Habitat Supplements are constructed features, needed to provide a necessary components of habitat such as cavities, nest boxes, and roosts that are added to the implemented design for functional completeness (Breedlove et al, 2003). They are based on criteria in the Habitat Template. These supplements add functionality to a Function-based Habitat Design by either providing missing life requisites or to increase the availability of features that are most needed to increase habitat quality.

These Habitat Supplements is becoming a necessity in urban areas as normal development, management practices and other activities of humans remove or close cavities. They also remove mature tree or bush systems and replace them with young systems with trunk diameters that are too small to contain useful cavities (Breedlove et al, 2003). Therefore, cavities need to be added during site development to add functional value to the site. Habitat Supplements may include the following:

- Large Box
- Small Boxes
- Bat Box
- Owl Box
- Ground Cavity Large
- Ground Cavity Small
- Piles (Brush, Logs, Tiles, Pipes)
- Otter Holt
- Perch Large (Fish Eagle)

- Perch Small (Kingfishers)
- Nest Platform Inverted Culvert
- Raft Nesting, Resting

These supplements must be constructed and supplied in a sensible manner as to fit the needs and requirements of the creature it is meant to serve. It should also be done in consideration of the human factor. The urban influences on animals can not be ignored and must be taken into account when adding supplements to the design. Peoples have the inherent nature to steal or damage and thus people must not be given the opportunity to harm the animals that are making use of these supplements



Bushbaby nest

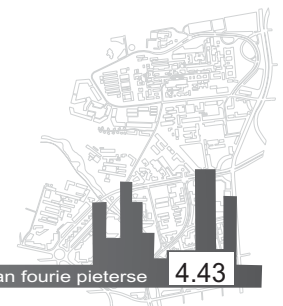


Raptor nest

9.8. Available space for Habitat

The vegetation needed to support the different guilds must be supplied in the right densities and quantities as to fulfill in the requirements set by the template. Space available for this vegetation starts with areas where the people expect to see habitat on a precinct scale:

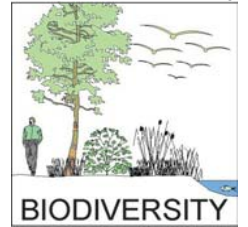
- Parks (regional, neighbourhood and local)
- Open space
- Street corridors
- River corridors
- Back-lot corridors
- Boulevards



On block / site specific scale, habitat can be developed through:

- Street scapes
- Front and backyards
- Conventional landscaped areas (evocative design)
- Green roofs / roof gardens
- Planters and water features
- Habitat supplements.

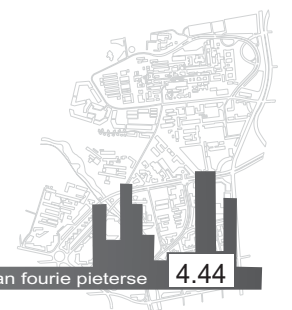
The opportunities provided by all these spaces should be maximised in order to create a functional and robust design of habitat.



Duck nest



Heron perch



10. THE URBAN HABITAT

10.1. A Design By Guilds

A Guild is a group of animals, or humans in this case, that make use of similar resources to fulfill in their daily life requisites.

The requisites of the six animal guilds selected for this project is simplified into a single framework: The Natural Habitat Framework. These requirements are superimposed onto the 'existing' site to create the ideal habitat for the different guild crest species as given by the Function-based Habitat Design Process. This framework sees the precinct as a site with natural habitat and topography alone. In this exercise, the urban fabric is taken away by the imagination as if it were bulldozed to a clean slate. The only existing elements taken into account are the ones with a functional value in supporting habitat, like the existing river, the ridge and its rocky outcrops.

Humans are seen as a guild as well, with the typical urban dweller as the Guild Crest Species. This Guild is much more complex as an animal guild and much more difficult to resolve because of all the differences in cultures, economical status, preferences and many others. The Urban / Human Habitat Framework aims to express the life requisites of the typical city dweller. It is based on contemporary urban design theories and principles, while problems and opportunities gathered through site analysis are exploited.

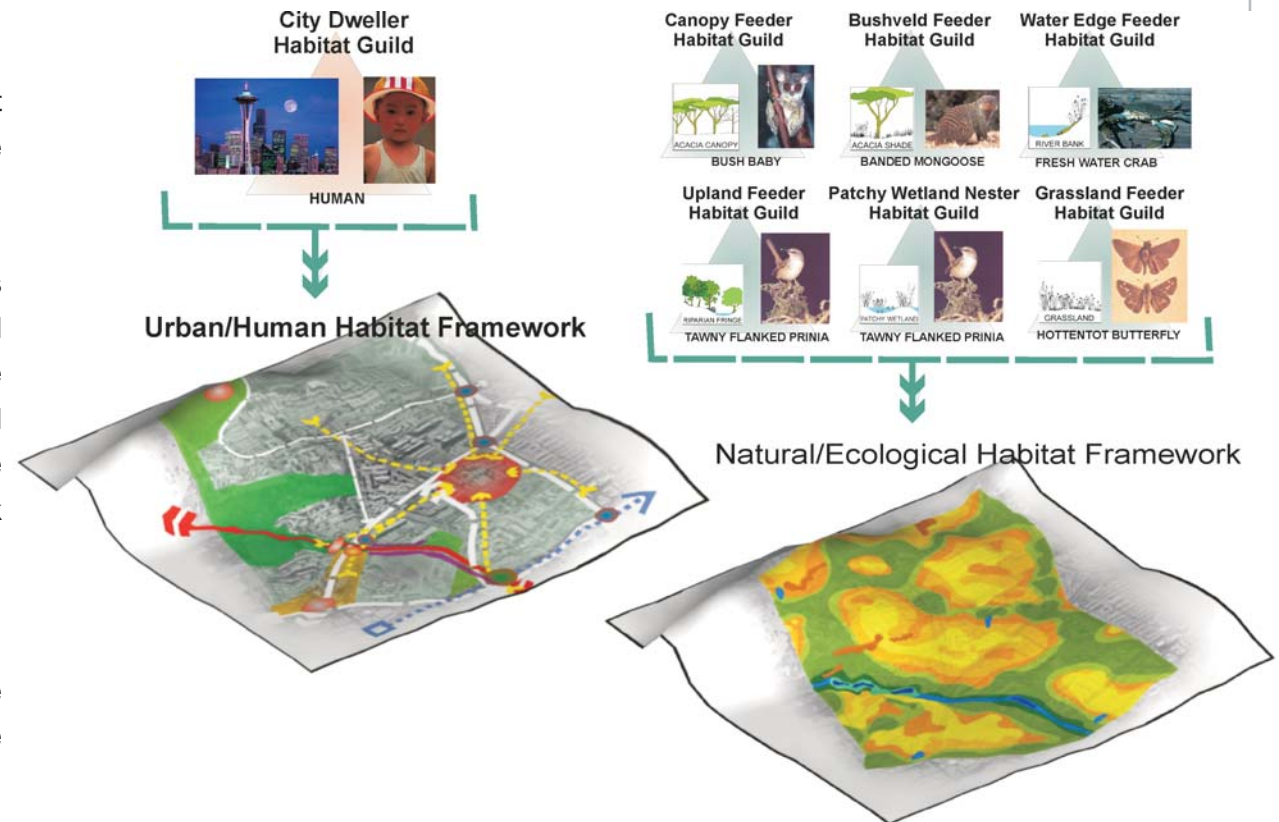
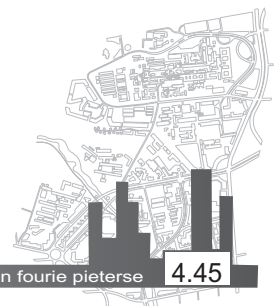


Figure 21. A design by guilds.

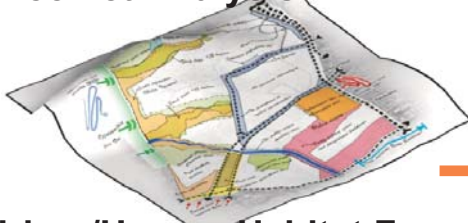


The Hospital Hill Urban Development Framework consists of complex layers and systems that operates dependently and independently of one another. These systems / layers include circulation, land use, open space network, drainage, urban form , etc.

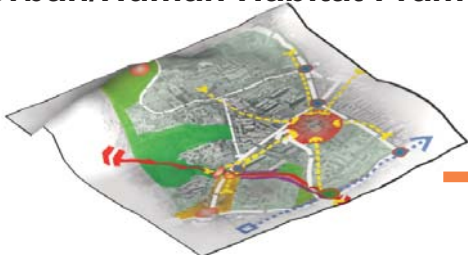
Existing Urban Fabric



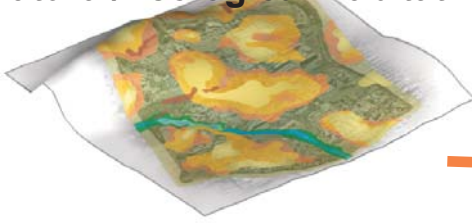
Precinct Analysis



Urban/Human Habitat Framework



Natural/Ecological Habitat Framework



**Hospital Hill
Urban Development Framework**



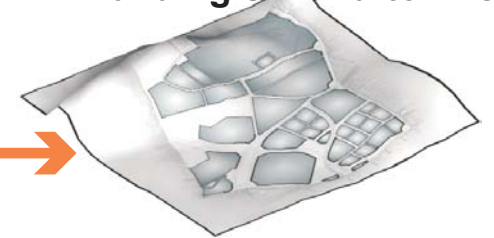
Land Use



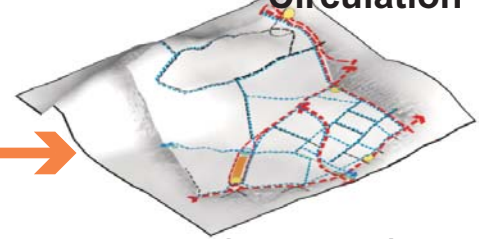
Green Space Network



Building & Build-to-lines



Circulation



Urban Structure/Fabric

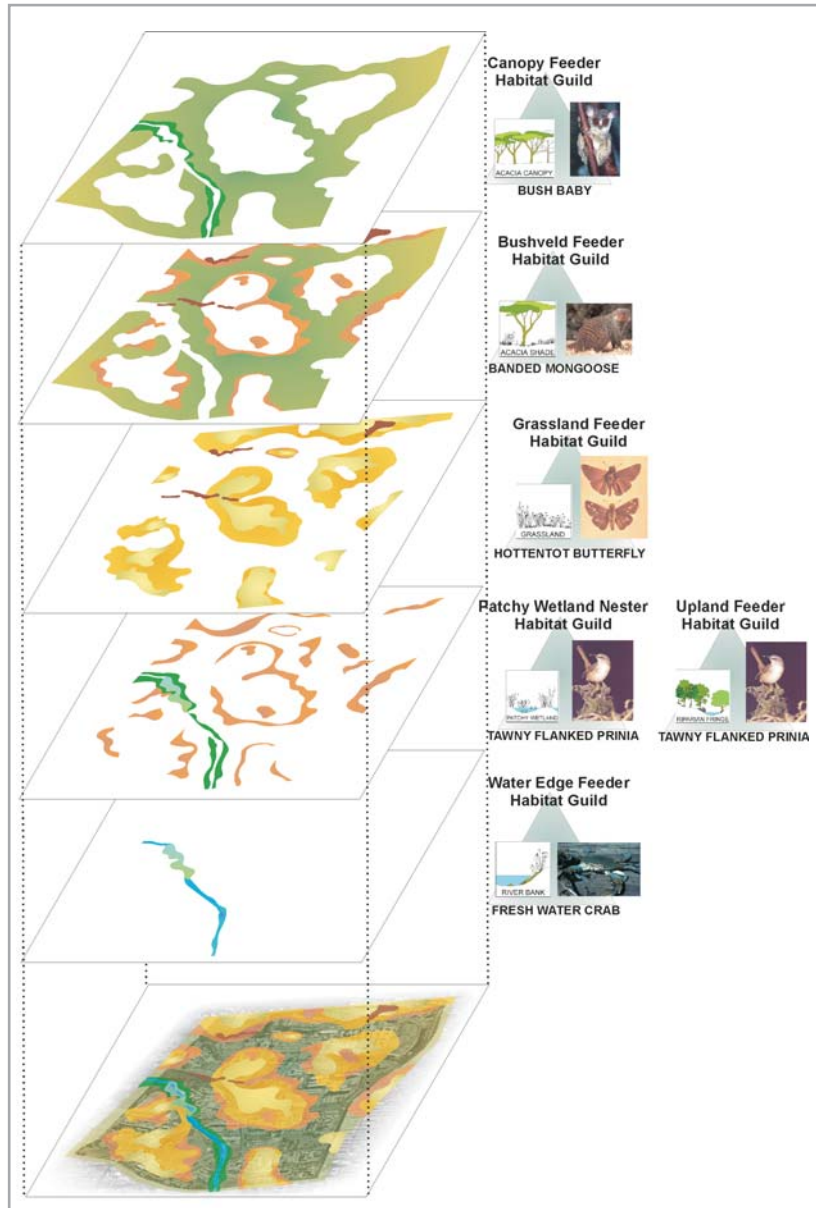


Figure 22. Composing the UDF.

10.2. The Natural Habitat Framework



The Site



Making up of the Natural Habitat Framework

NATURAL HABITAT FRAMEWORK

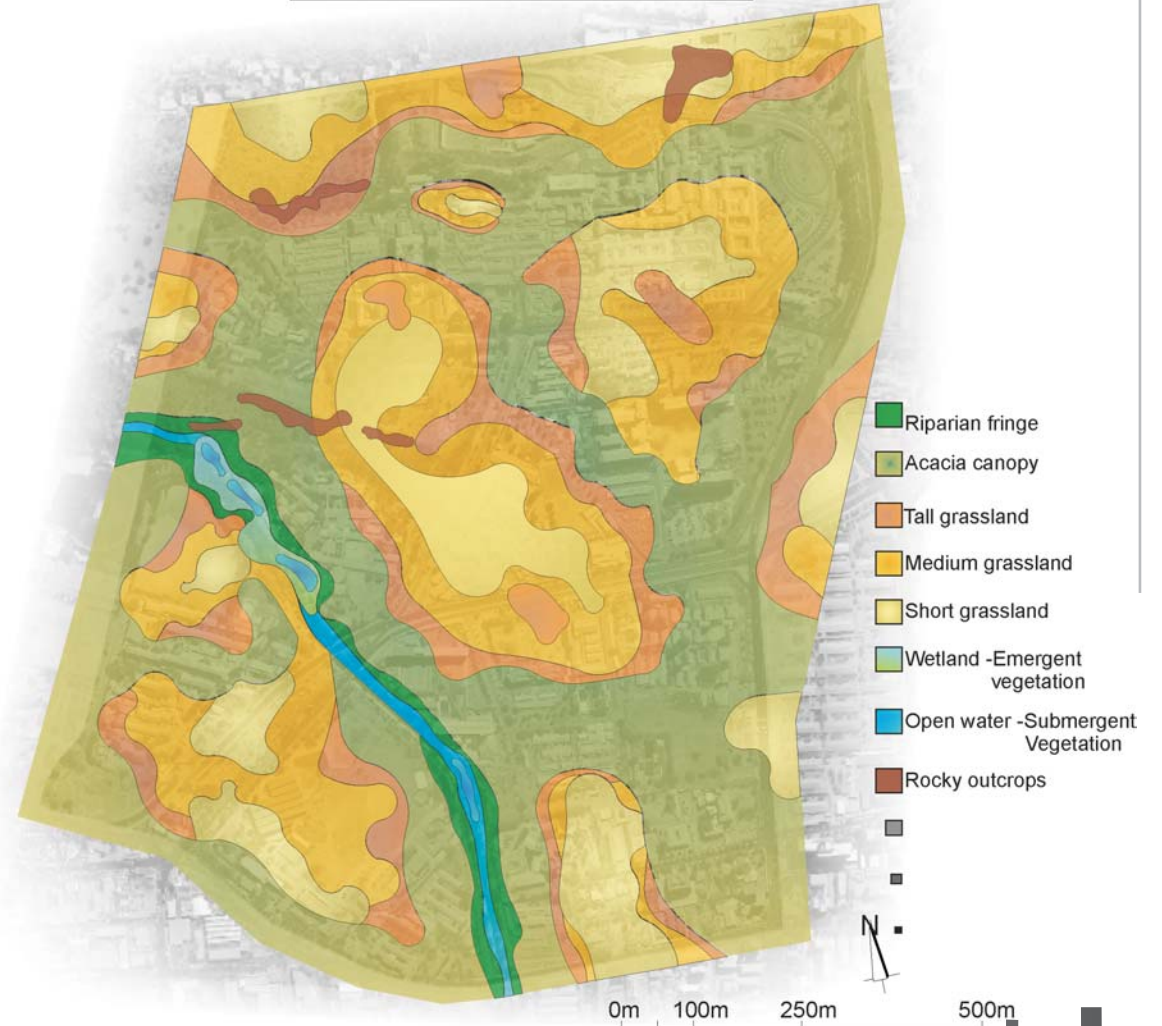


Figure 23. The Natural Habitat Framework.

10.3. The Human Habitat Framework

This proposal is the realisation of all the principles and guidelines discussed earlier in the framework. Green open space is seen here, as merely an escape to nature for the normal city dwellers. Nature and its own needs is discussed later on. It aims at creating a vibrant precinct that meets the needs of its human users.

The precinct should help to improve the image of the city to meet the qualities of a capital. It generates energy that will flow over to the rest of the city of Tshwane.

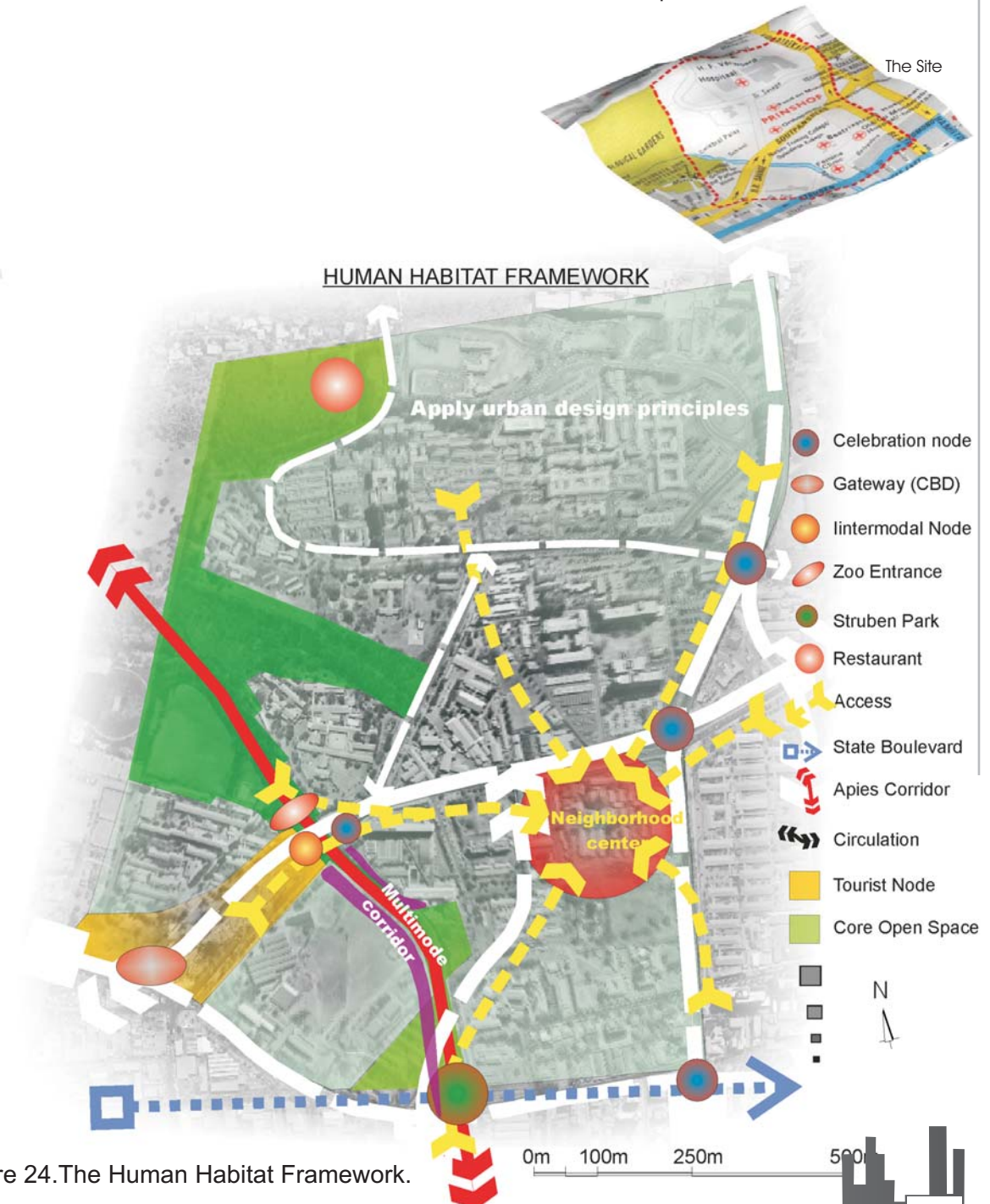


Figure 24. The Human Habitat Framework.

10.4. The Hospital Hill Urban Development Framework

The final Hospital Hill UDF is the result of the combination of all the thoughts and ideas gathered from the Precinct Analysis, the Human Habitat Framework and the Natural Habitat Framework, all superimposed onto the existing urban fabric. The one idea doesn't dominate the other. It rather influences in a positive, not restrictive, way.

It is imperative to understand that human habitat and natural habitat can not be separated in real life. Humans are part of nature, but simultaneously rules over it. For the purpose of the framework, the two were separated in the initial stages in order to clarify the many variables that exist in decision making on a project of this scale. The final result, in detail design, should be a conformed design. Requirements of human habitat and the habitat of other species have been conformed spatially and functionally. The needs of both groups are met with minimal interference of either group on the other.

The Hospital Hill UDF is complex and can be dissected into its different parts in order to understand it better. These parts or layers consists of:

- The land use proposal
- Open space network
- Built-form guidelines and restrictions
- Circulation pattern
- Propose urban structure
- Figure-ground pattern



HOSPITAL HILL UDF: THE URBAN HABITAT



Figure 25. Hospital Hill UDF.

10.5. Land Use Proposal

The land use proposal is still dominated by health institutions, but the opportunity was taken to add diversity and richness to the precinct. Mix use zoning plays a role in the attempt to add this diversity. The central mix use zoning will develop into a neighbourhood centre that caters for all the users while the south eastern part of the site is also rezoned to accommodate mix use.

The tourist/transport node is added to accommodate tourist access into the precinct while making the precinct more attractive for travel agencies. This will draw tourists to the city from where they could visit the attractions along the tourist routes.

The site currently serving as the Pretoria Technicon Arts Campus is proposed to accommodate cultural and educational themes that caters for students as well as the general public. It can be subdivided to accommodate different institutions and private owners.

State Boulevard is bordered by land use associated with state institutions. This is necessary to conform to the idea of Tshwane as the Capital and the boulevard leading to the future House of Parliament.

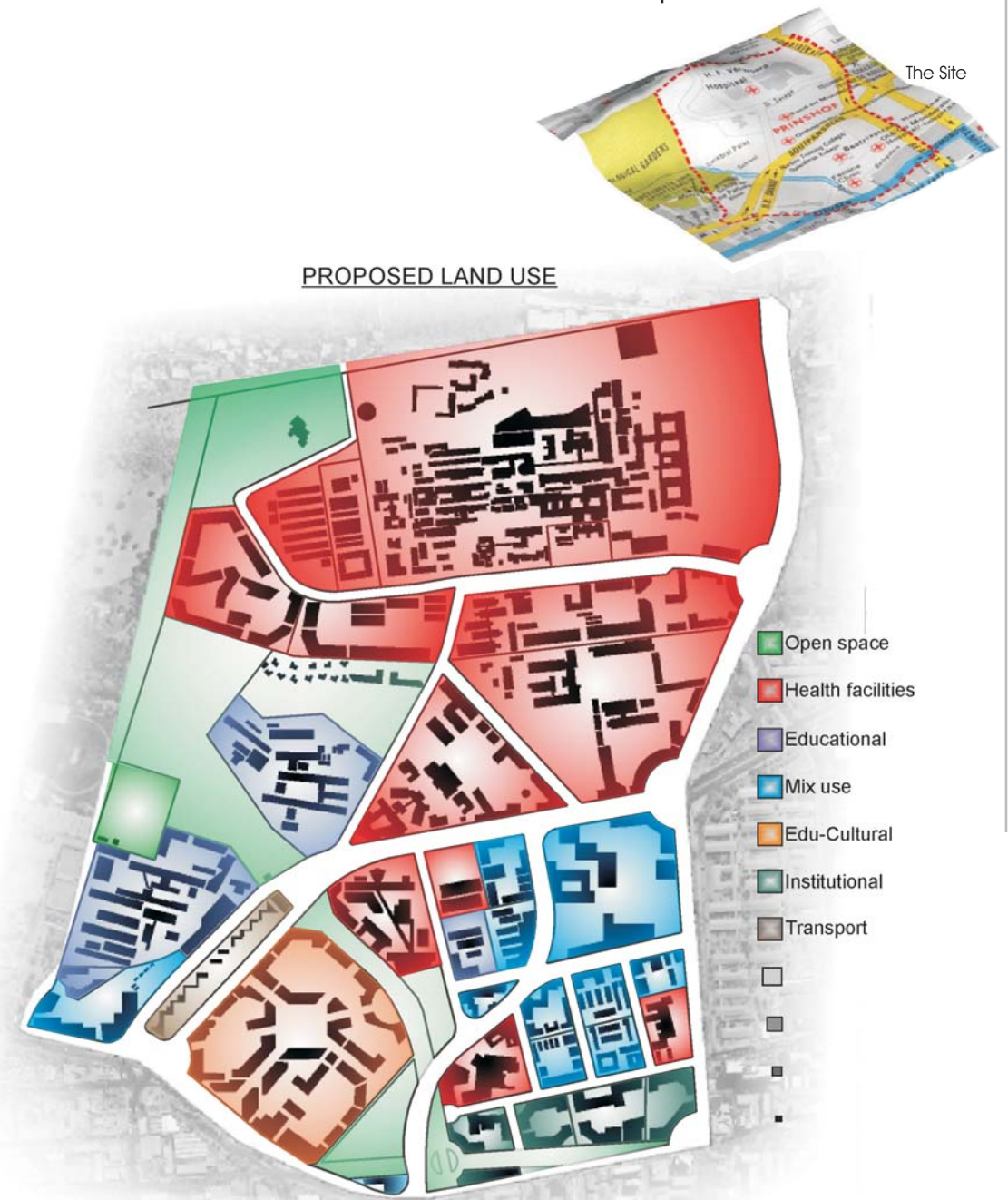


Figure 26. Proposed Land Use.

10.6. Open Green Space Proposal and Natural Habitat Framework

The Open Space Network proposed caters for the needs of the humans as well as the needs of the animal guilds identified in the FHD proposals. The network supports all the habitat functions as described by the Function-based Habitat Design. It makes use of public land in the first step of creating habitat and then allows for private land owners to “plug into” the Habitat Network.

By using this layout, one insures that the success of the FHD does not depend on the participation of every landowner. Still, it will add to the robustness and quality of the habitat on precinct scale if all the users “plug” into the system. The second and third step of habitat creation through design depend on the private land owners to commit and apply the FHD principles in their own semi-private and private open spaces.

This Open Space Network does not ‘bring nature into the city’. It creates the opportunity for the city to sustain nature.



Figure 27. Proposed Green Space Network.

10.7. Urban Form Proposal

The development of the urban form is guided through regulations and restrictions. These includes buildable areas that defines the space available for developers to build on. This includes building lines and servitudes.

Build-to lines defines boundary lines where vertical definition of space is needed. This regulation helps to define the urban open space systems and the measure of enclosure associated with it. The edges of buildings should fall on this build-to lines. These build-to lines must be conformed to in a ratio of 70/30 meaning that 70% of the facade must fall on the Built-to line while 30% of the facade can be set back to a depth of minimum 5m.

Buildings along streets and the Apies River Corridor should not be lower than four stories. The street facade should include an arcade with sheltered walkways 3m to 5m wide. The major streets should have a road reserve of 24m that includes a 3m to 7m walkway on every side. These roads are Soutpansberg, Voortrekker, Beatrix, Dr. Savage and Struben Street. The smaller collector streets should have a road reserve of 18m.

A 7m to 10m public circulation zone is proposed on both sides of the Apies River channel. It should accommodate all the public amenities associated with a boulevard.

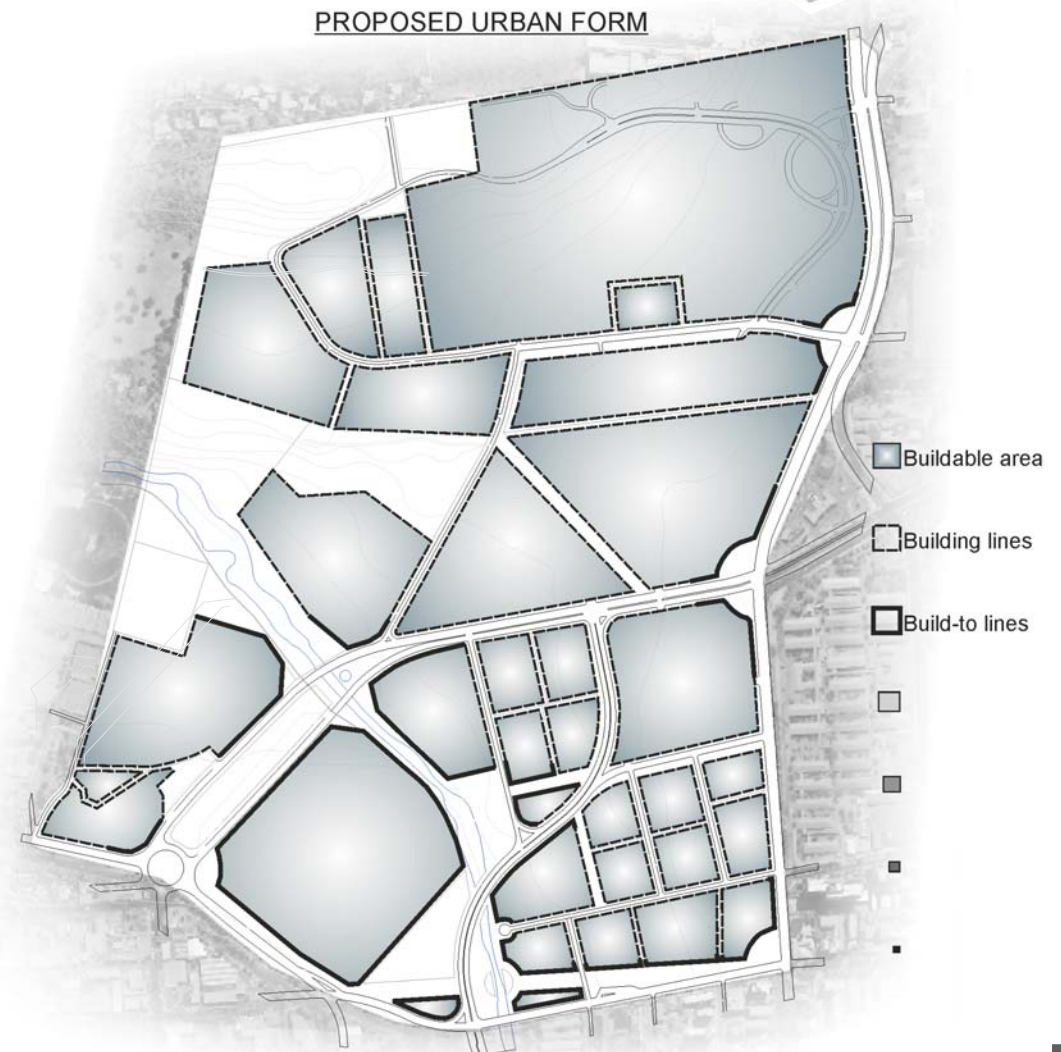


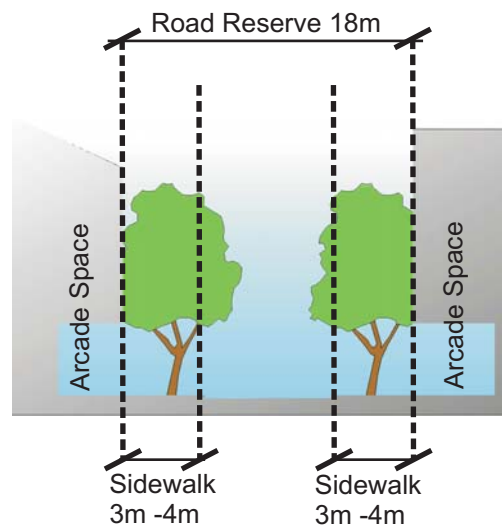
Figure 28. Proposed Urban Form.

10.7.1. Enclosure Regulations

Small Streets:

(Local collector streets)

The road reserve of 18 meters accommodates the right of way, parking areas as well as the sidewalks and tree zone. The trees should not be nearer than 3 meters to the facade of the building. A facade on the boundary line (build-to line) should accommodate a pedestrian arcade. The facades should have a height restriction of at least 4 floor levels.

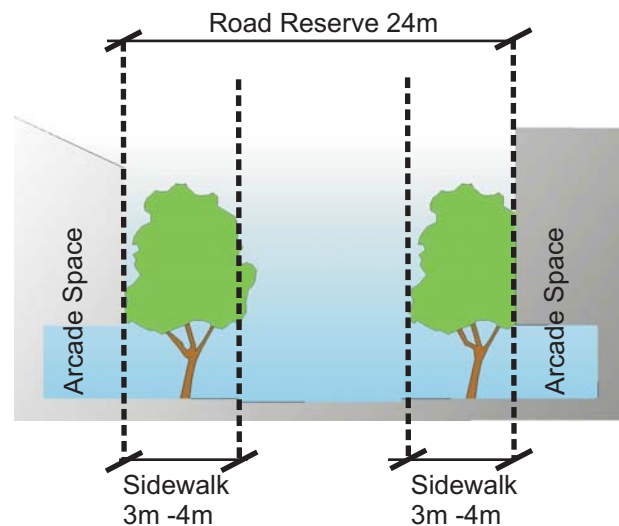


Large Streets:

(Regional Connectors and distributors, like Nelson Mandela and Voortrekker Road)

The road reserve of 24 meters accommodates the right of way, parking areas as well as the sidewalks and tree zone. The street may have a median separating two way traffic

The trees should not be nearer than 3 meters to the facade of the building. A facade on the boundary line (build-to line) should accommodate a pedestrian arcade. The facades should have a height restriction of at least 4 floor levels.



Apies River Corridor:

Buildings should face towards the river.

A pedestrian, jogging and cyclist movement way should be accommodated within the 7meter to 10 meter zone parallel to the channel edge. Habitat movement corridors should also be located within this area.

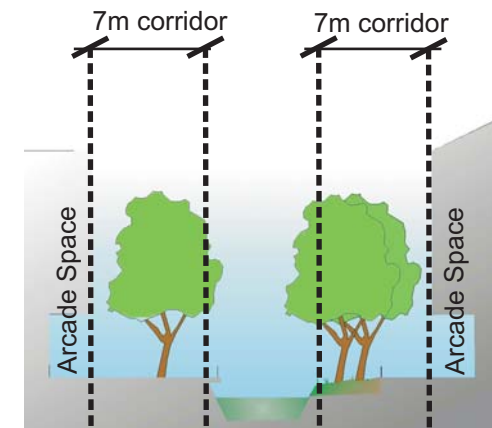


Figure 29. Proposed Enclosure Regulations.

10.8. Proposed Movement & Circulation

The circulation plan for the precinct allows for the movement of all modes to all destinations. The different modes, pedestrian, cyclist, private vehicle, public transport and the monorail develops a complex and robust circulation system that allows access in an equitable way.

10.4 . Nelson Mandela Road Extension

The proposal for the extension of Nelson Mandela Road to meet up with Soutpansberg Road already exists. It is part of the original plans drawn up for the City Council of Tshwane by the Consulting Engineers, Van Wyk & Louw. The whole plan for the Nelson Mandela Corridor has not been constructed yet. Currently, the Road stops at the intersection with Struben Street, but it is a awkward intersection that doesn't add positively to the city image. The extension should be constructed as part of the Hospital Hill Urban Development Framework.

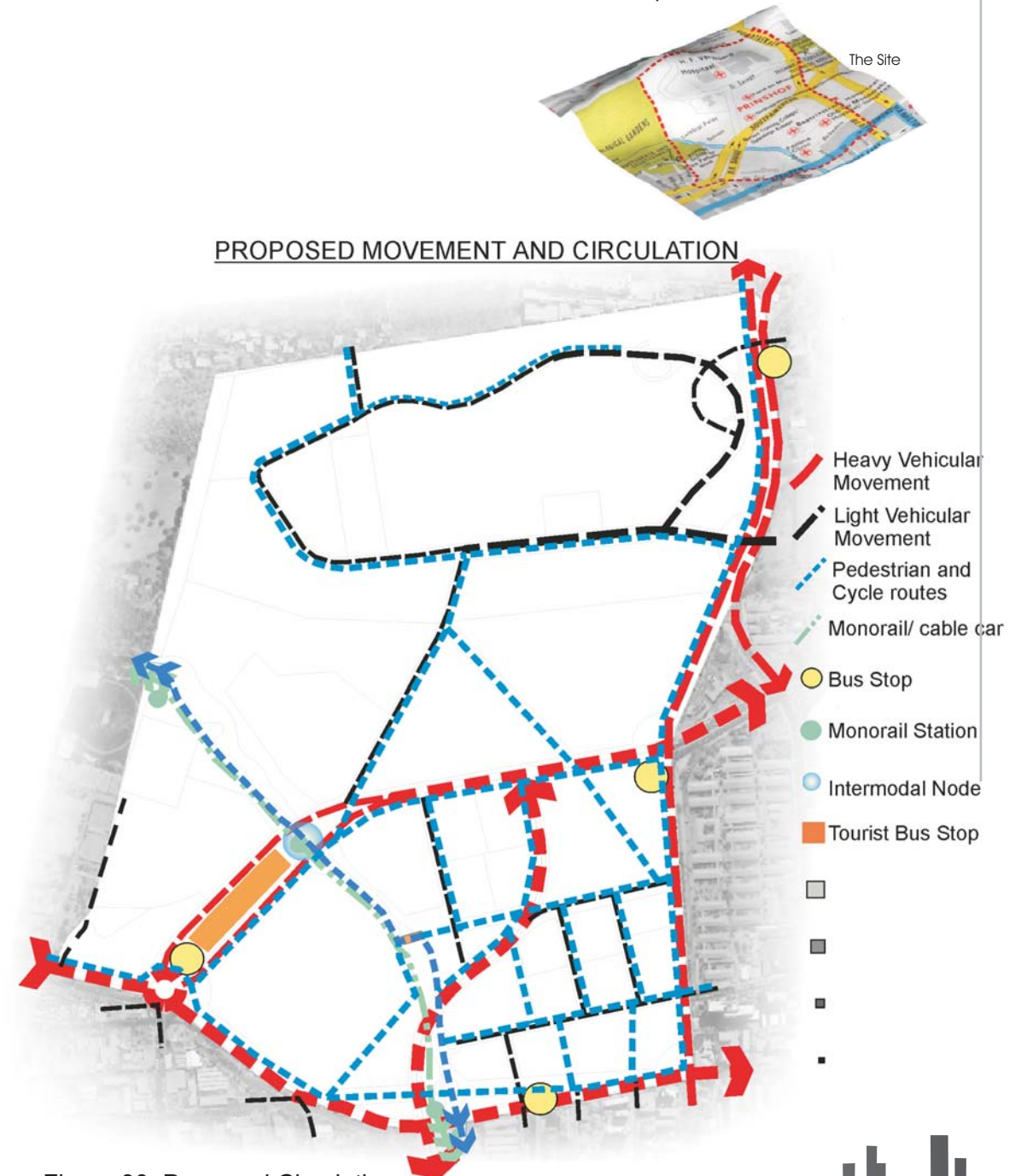


Figure 30. Proposed Circulation..

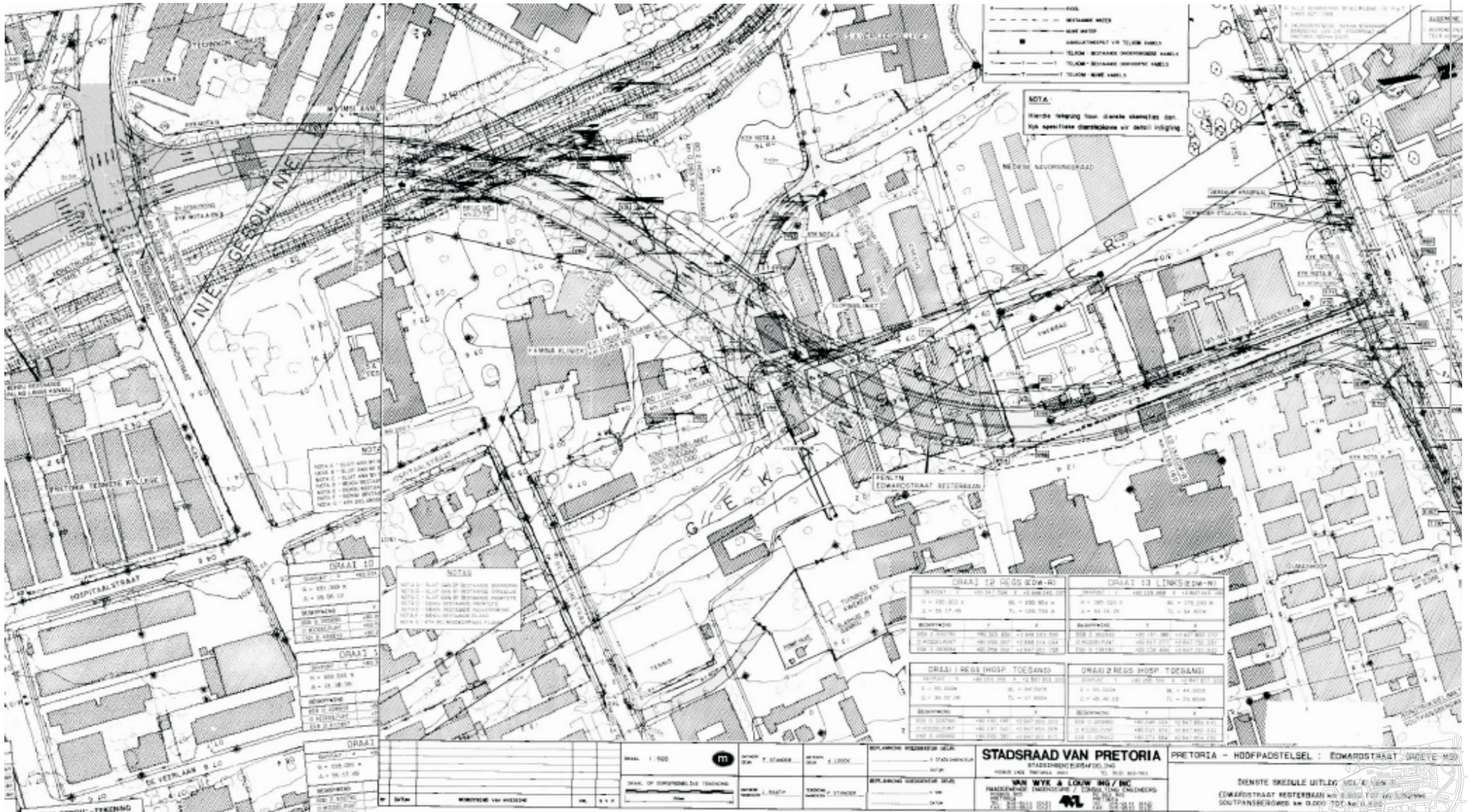


Figure 31. Nelson Mandela Road Extension.

10.9. Urban Fabric and Form Proposal

The Framework takes existing buildings and structures in account when proposing new ideas. It doesn't encourage the bulldozing of the old in an attempt to better the environment. It puts systems and regulations in place that allows the creativity and entrepreneurship of the users to create a sense of place.



PROPOSED URBAN FABRIC



Figure 32. Proposed Urban Fabric.

10.10 Figure-ground Proposal

The Proposed Figure-Ground display the new urban pattern that developed through the implementation of a few principles. The urban environment is characterised by a dense building pattern.



EXISTING FIGURE-GROUND

PROPOSED FIGURE-GROUND



Figure 33. Existing And Proposed Figure-Ground.

10.11. Apies River Edge Options

The edge of the Apies River Channel has a lot of different character opportunities. But in restoring the image of the river as a life-giving aquatic artery, it is essential to restore some kind of nature back to the channel. The idea of Function-based Habitat Design, however, requires that a substantial part of the channel resembles that of a natural river, even if the resemblance is merely in function. The designer has a few options in this regard.

Option 1:

The river is bordered with a narrow strip of aquatic emergent vegetation. This vegetation serves as passage for animals while it gives the impression of a natural river. There exists public access up to the narrow strip. Trees are planted in the public domain, away from the river.

Option 2:

This gives the impression of a river in a natural environment. Vegetation is planted up to the edge of the river and the only clue of public access is the narrow pathway meandering through the vegetation. Natural systems are dominant in this option. The river channel can be natural or constructed, both ways it will look natural from the public eye.

Option 3:

The public domain is elevated from the river bank. This option

allows no public access to the river edge while allowing natural systems to dominate in the strip between the river and the elevated public domain. Trees are planted in the strip as well as in the public domain. The elevation difference allows for the movement of animals while it prevents them from entering the public scene like sidewalks and roads.

Option 4:

This option is a combination between Option 2 and Option 3. It removes the general public from the river and vegetation while allowing an elevated view over the river. The public is allowed access to the natural area but use of the pathway is discouraged as it is narrow and doesn't support fast movement.

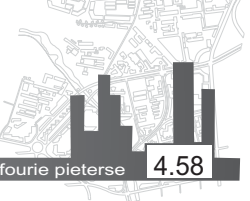
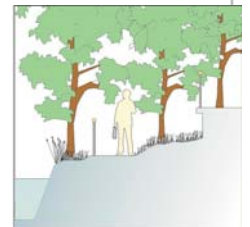
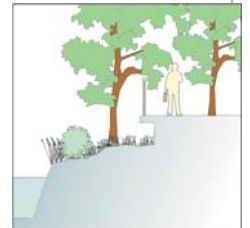
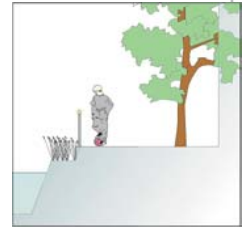
Option 5:

This option makes use of the river as the backdrop to public gathering. The river is bordered by heavy use public space while still conforming to the idea of allowing natural systems to function.

On a more detailed level, the edge design can differ :

- Low wall
- Safety railing
- Seating
- Vegetated separator

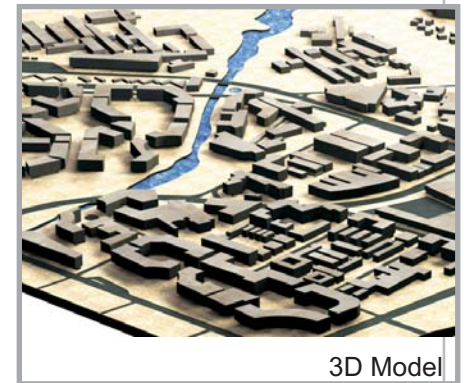
All of them have different positive and negative aspects under different uses. The designer should consider all of them before a decision is made.



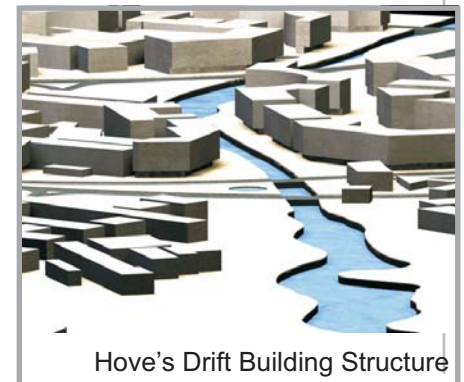
10.12. 3D Model Presentation



Figure 34. 3D Model of Hospital Hill Precinct proposed urban structure



3D Model



Hove's Drift Building Structure



Hove's Drift with trees

THE URBAN HABITAT

Chapter V. The Apies River Corridor Master Plan.



THE HOSPITAL HILL URBAN DEVELOPMENT FRAMEWORK: THE URBAN HABITAT
APIES CORRIDOR MASTER PLAN: HOSPITAL HILL SECTION
HOVE'S DRIFT DETAIL DESIGN

by jan fourie pieterse



CHAPTER V. APIES CORRIDOR MASTER PLAN: HOSPITAL HILL SECTION

The Master Plan Section of the Project covers the Apies River Corridor that transects the site . It allows for the demonstration and testing of the NuHabit@ Design Process in all the facets of urban design as this area play host to most of the elements encountered during urban design.

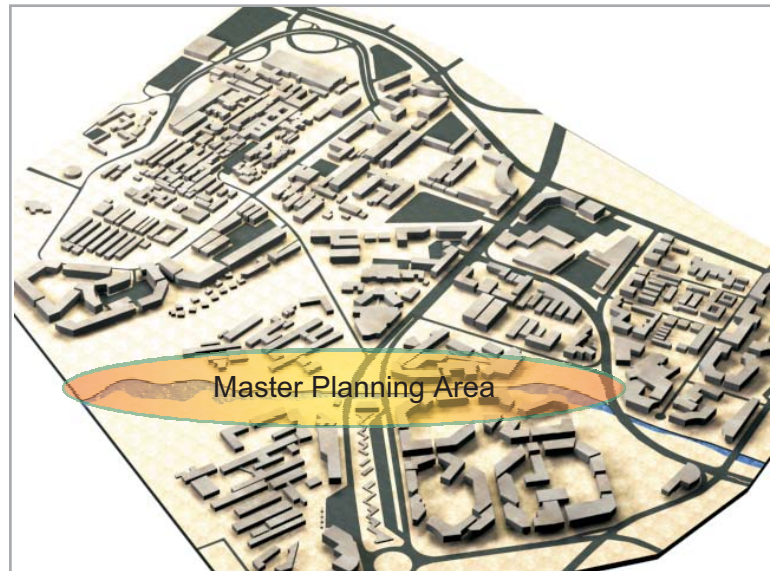


Figure 35. Apies River Corridor Master Planning

1. CONCEPT

Tshwane brings together the concepts of urban and rural characters. The Master Plan aims to enforce these ideas, but also add the contrasts of urban, symmetrical form meeting up with natural and organic form. It can be interpreted visually in the art of Kagiso Patric Mautloa, where rhythm and symmetry are place with organical and asymmetrical. Together it creates a synergy adding value to both characteristics.



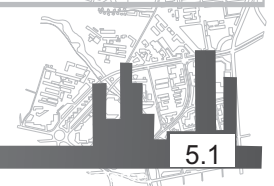
Figure 36. *Methamorphosis Wall*, by K.G. Mautloa



Fig. 37. Hove's Drift bridge



Fig. 38. Apies River Canal



2. MICRO-CLOMATIC PREDICTIONS

Micro-climates for the Master Plan area is predicted through a process that studies the sun/shade patterns and the prevailing wind directions through different times of the day and seasons. This times co-inside with the times that outside spaces are used most intensively.

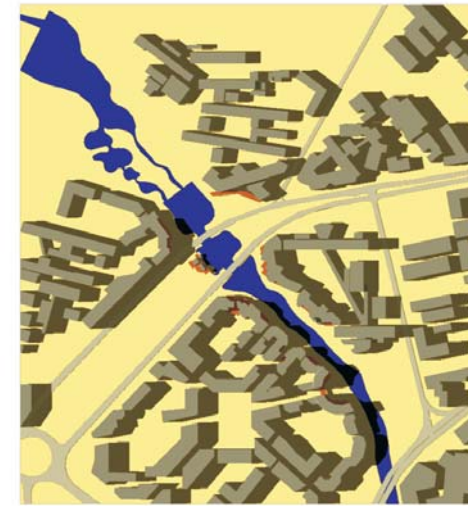
2.1. Sun/Shade Patterns - Figure 39



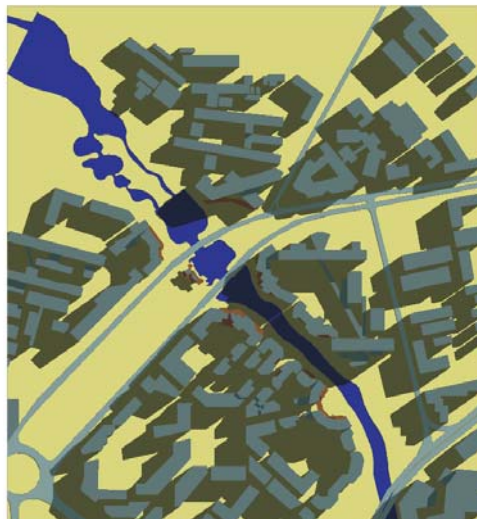
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21 Dec 17:00



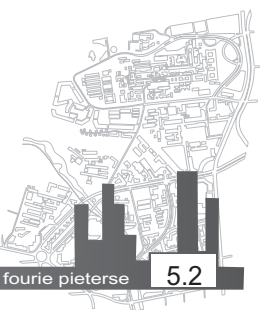
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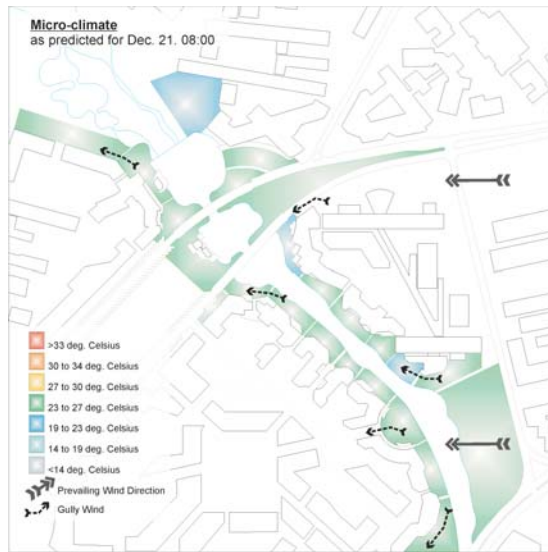
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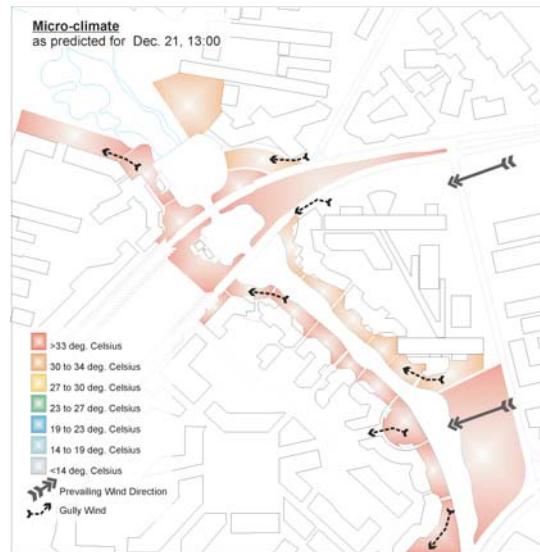
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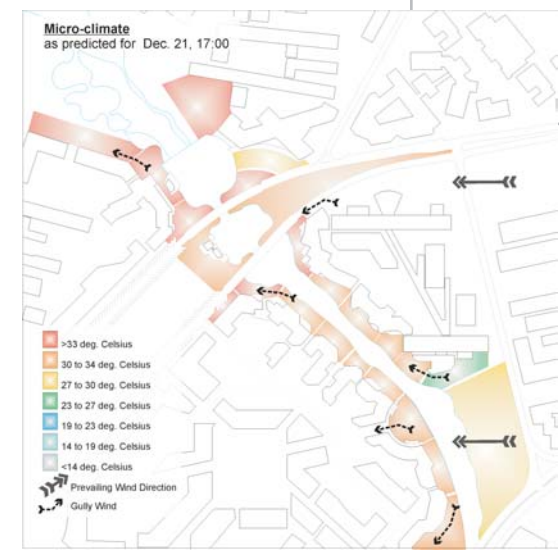
2.2. Predicted Micro-climates for mid-summer and mid-winter - Figure 40.



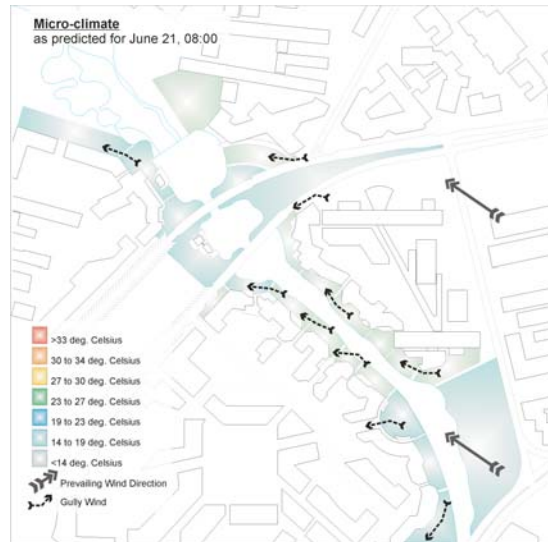
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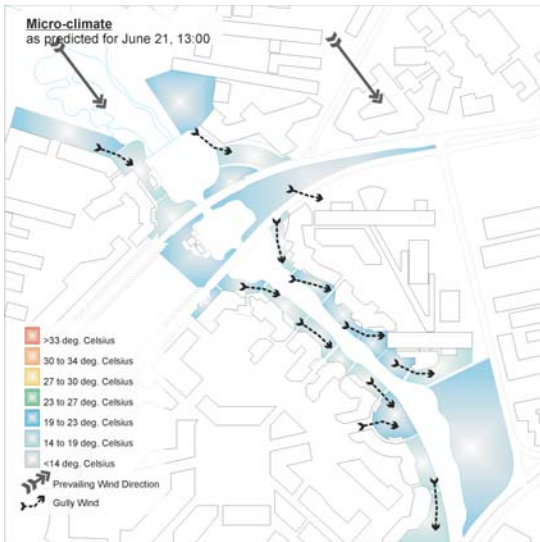
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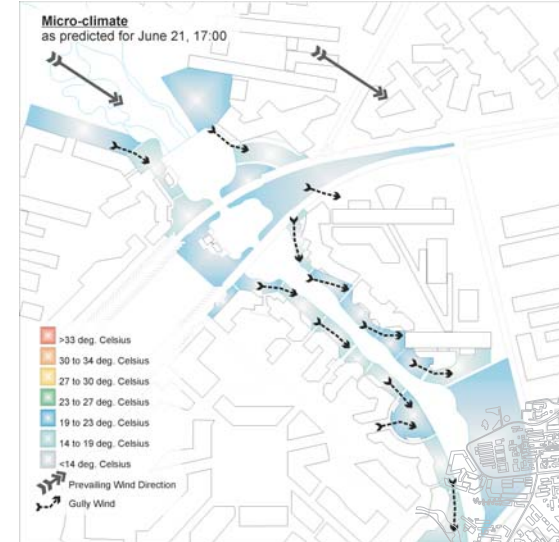
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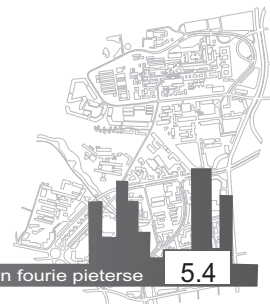
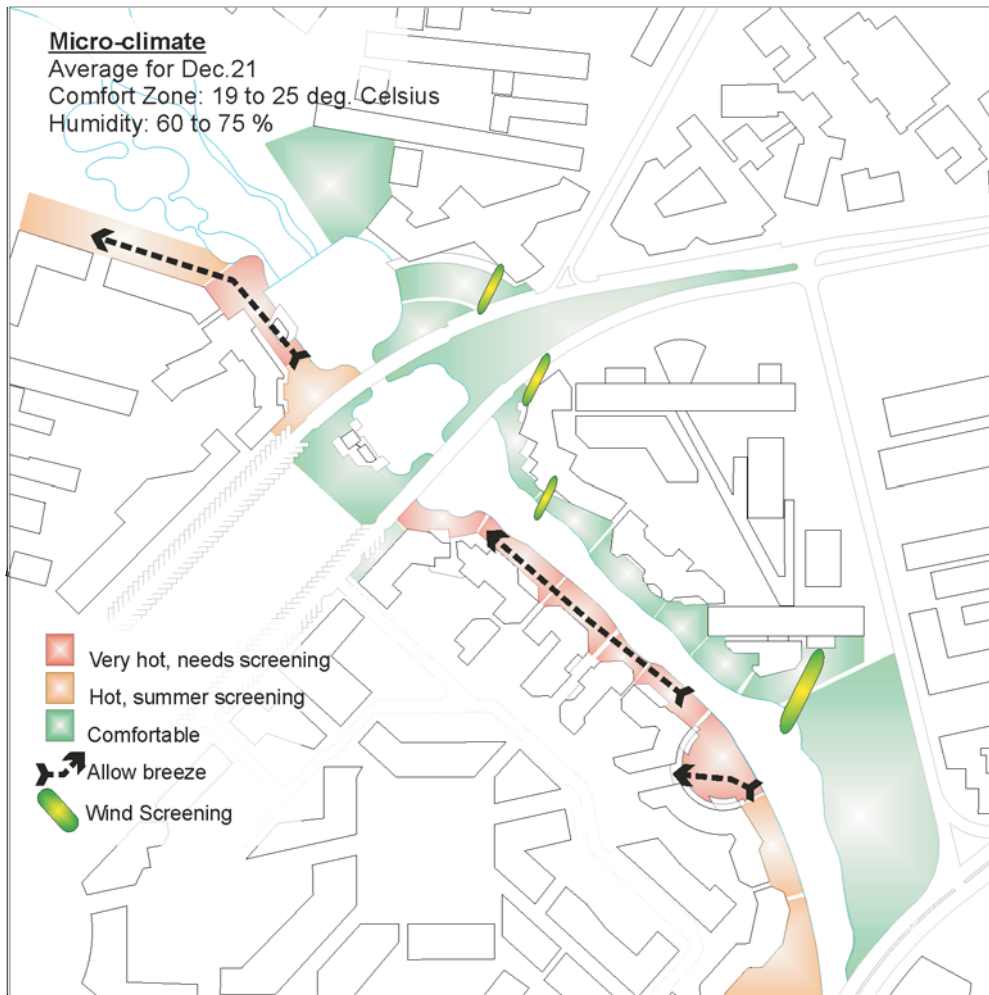


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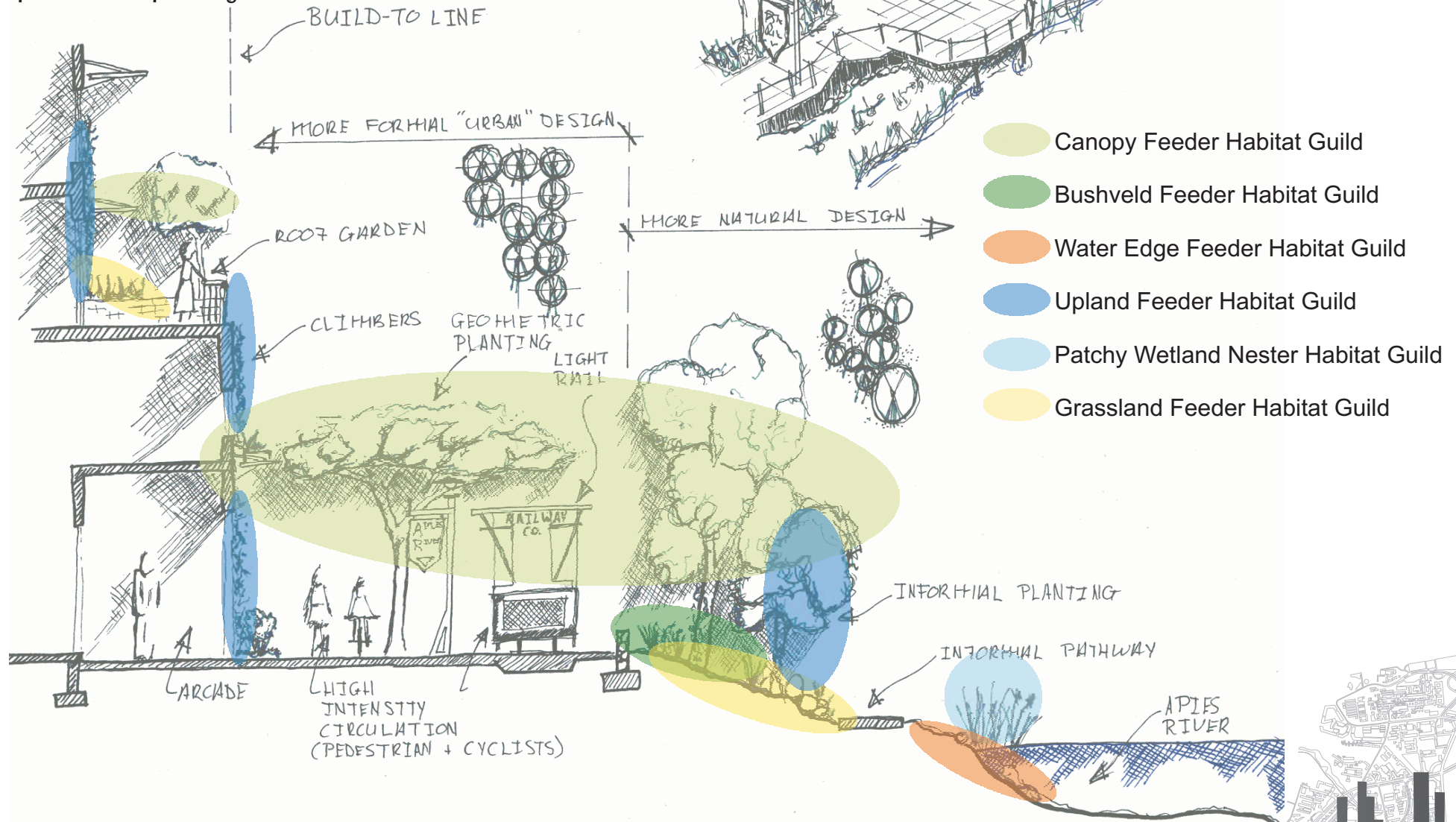
2.3. Predicted Average Micro-climates for mid-summer and mid-winter - Figure 41.



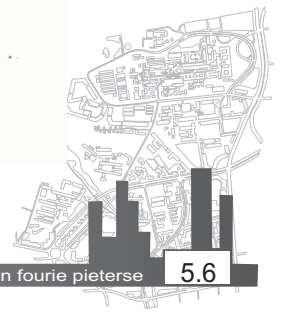
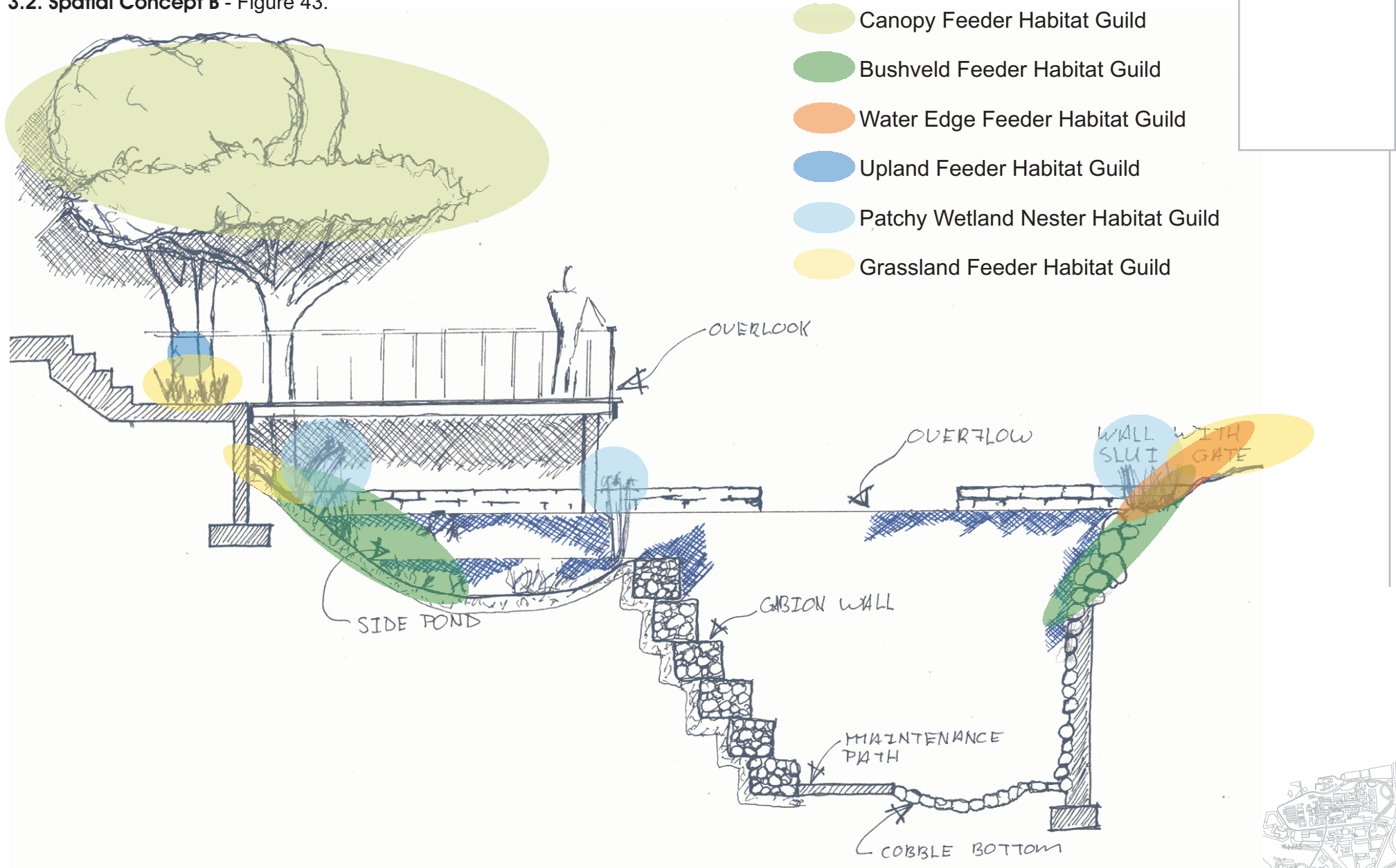
3. SPATIAL CONCEPT

This section shows the spatial definition along the Apies River Boulevard incorporating the different Habitat Units derived from the Guild Habitat Templates.

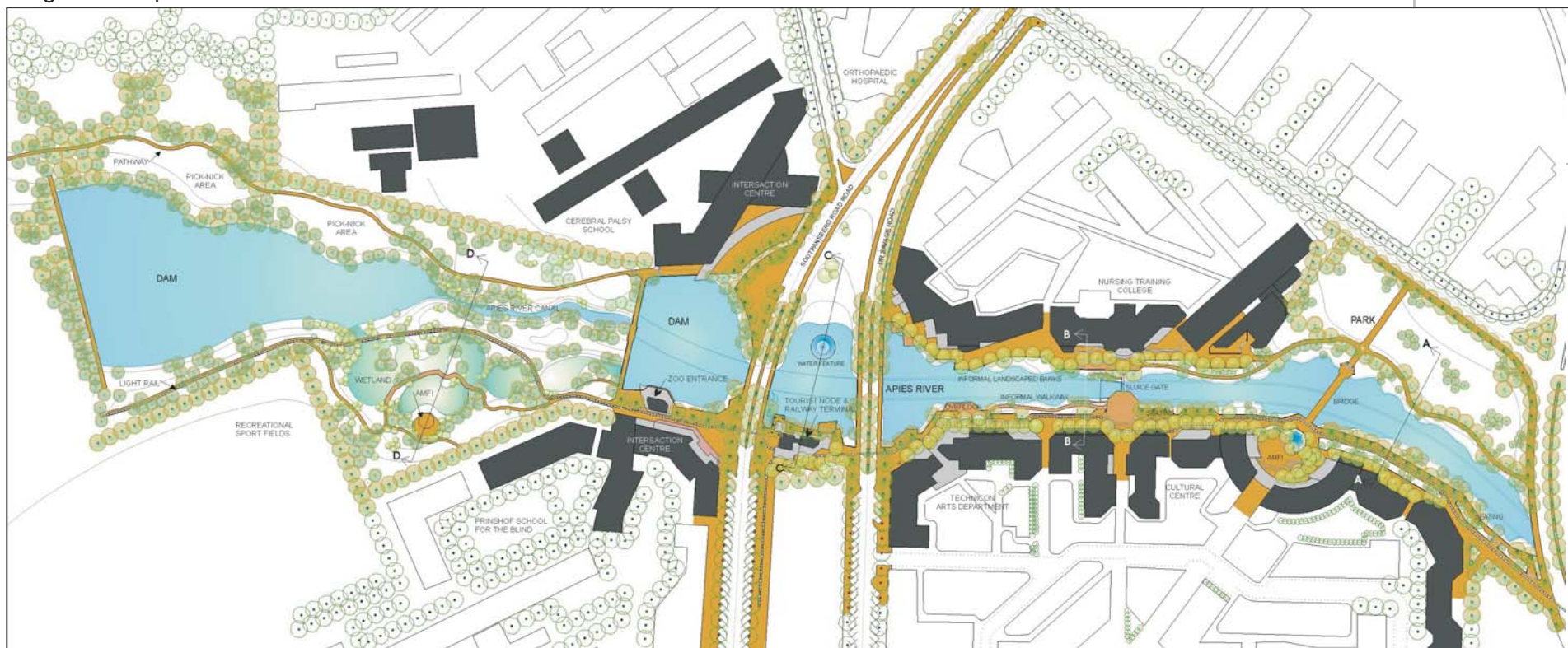
3.1 Spatial Concept A- Figure 42.



3.2. Spatial Concept B - Figure 43.



- Figure 44. Apies River Corridor Master Plan



The Master Plan covers two areas, Section A, with a strong urban character and that extends along the Apies River into the city, and Section B, which has a more natural character and form part of the Pretoria Zoo Site. Hove's Drift lies between these two parts and serves as a transition point between the two characteristics.

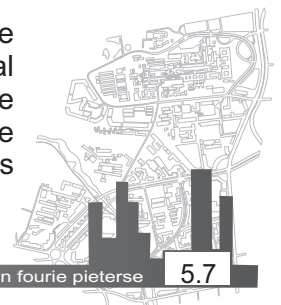
This drift becomes a gateway into the city. It serves as a intermodal transport node that accommodates private vehicles, public transport vehicles, tourist busses, pedestrians, cyclists and a light railway system. It also host a tourist information centre that informs tourists about different sites to visit while it supports the different modes to get them there.

Section A Master Plan guides the design of the public realm along the Apies River. The Apies River is bordered by Arts & Craft shops, cafes, restaurants and galleries. The existing concrete

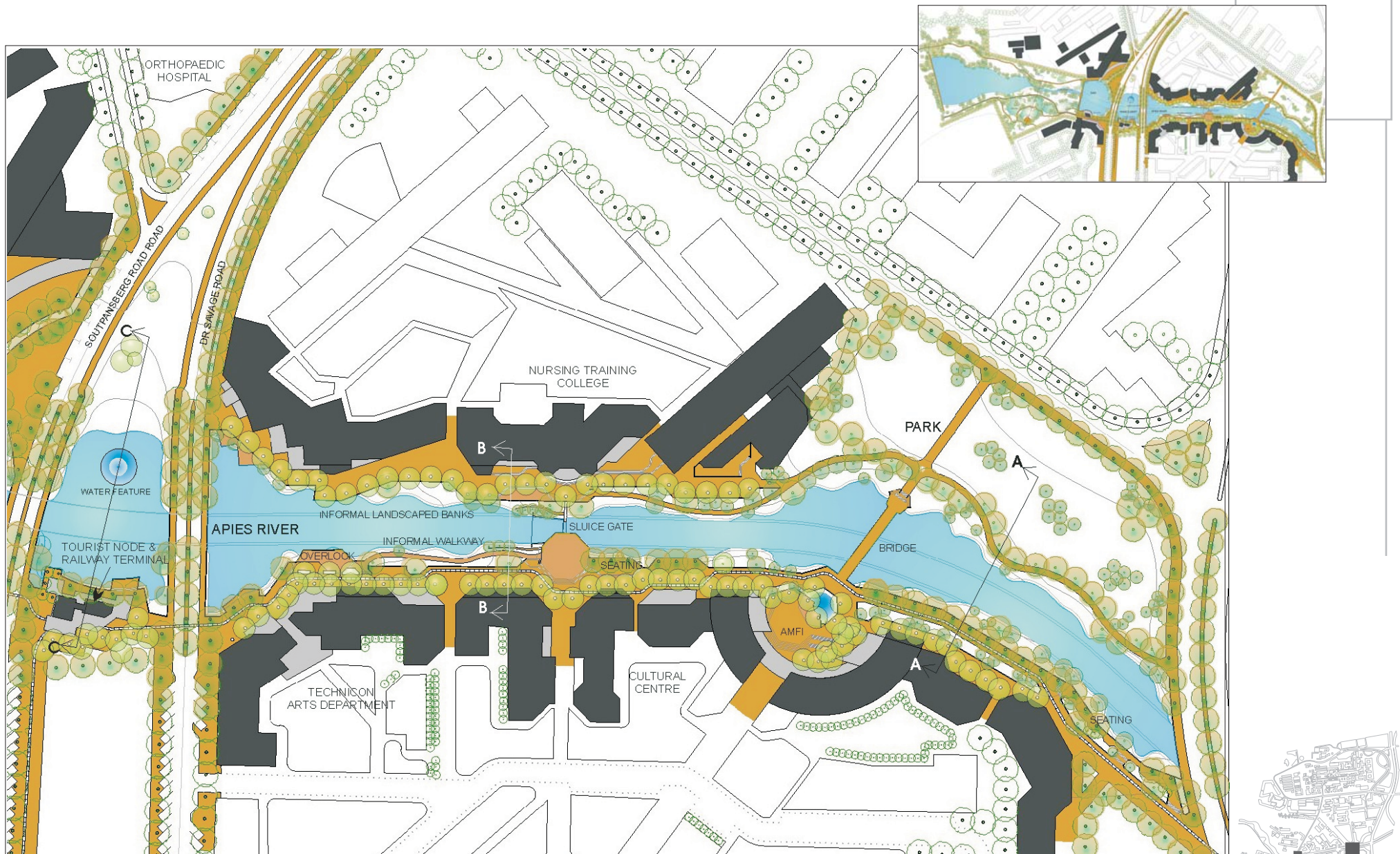
canal is changed into a system that appears to be a natural stream, but is able to accommodate flood waters and sustain the biota that occurs within the river. This is achieved through a series of dams and ponds, regulated by electronic sluce gates.

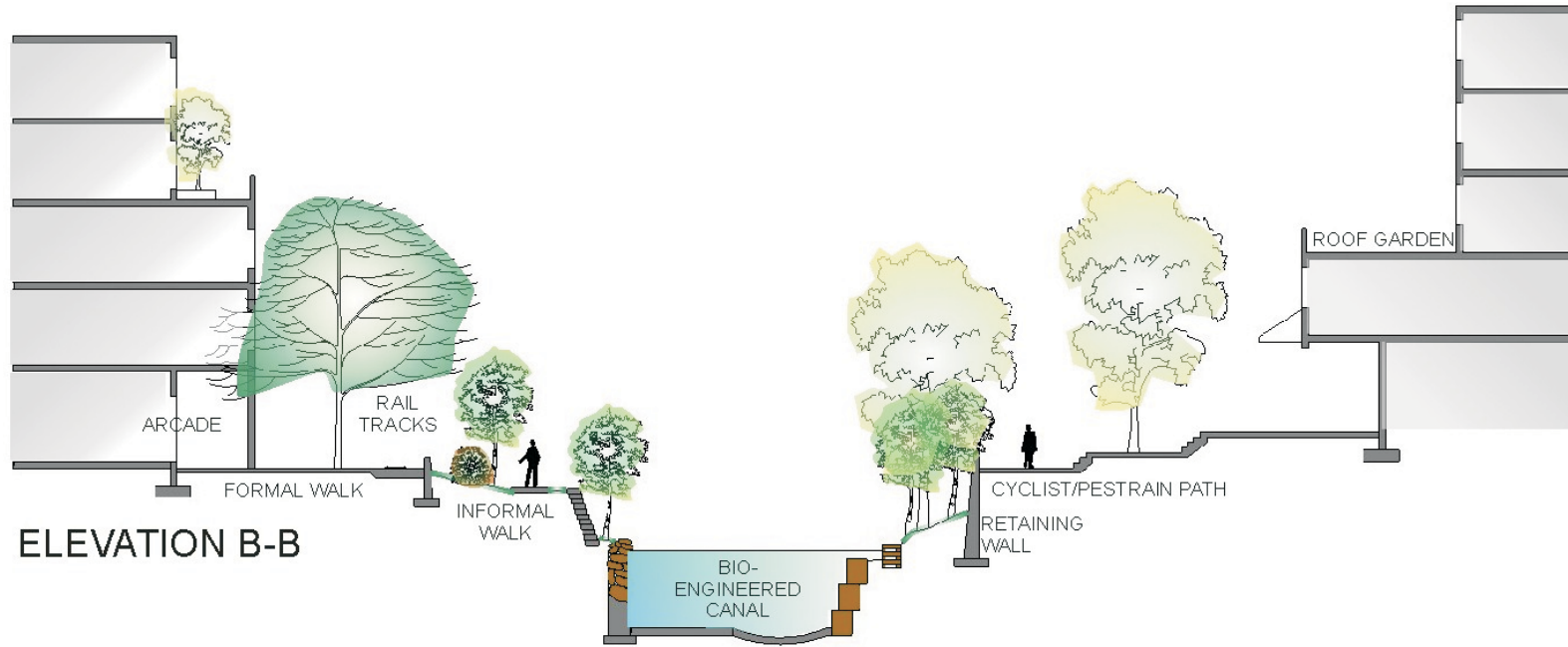
It is imperative for this Master Plan to create habitat and sustain life, both human and ecological while generating money for the private and public sector.

Section B falls within the Pretoria Zoo boundaries, but allows the two schools for the disabled access to nature and ecological education. A wetland system purifies the base flow water volume from the Apies River, But a Stormwater canal allows large volumes of water to hurry past. The whole section of the river is accessible for pedestrians, cyclists and the light railway system.

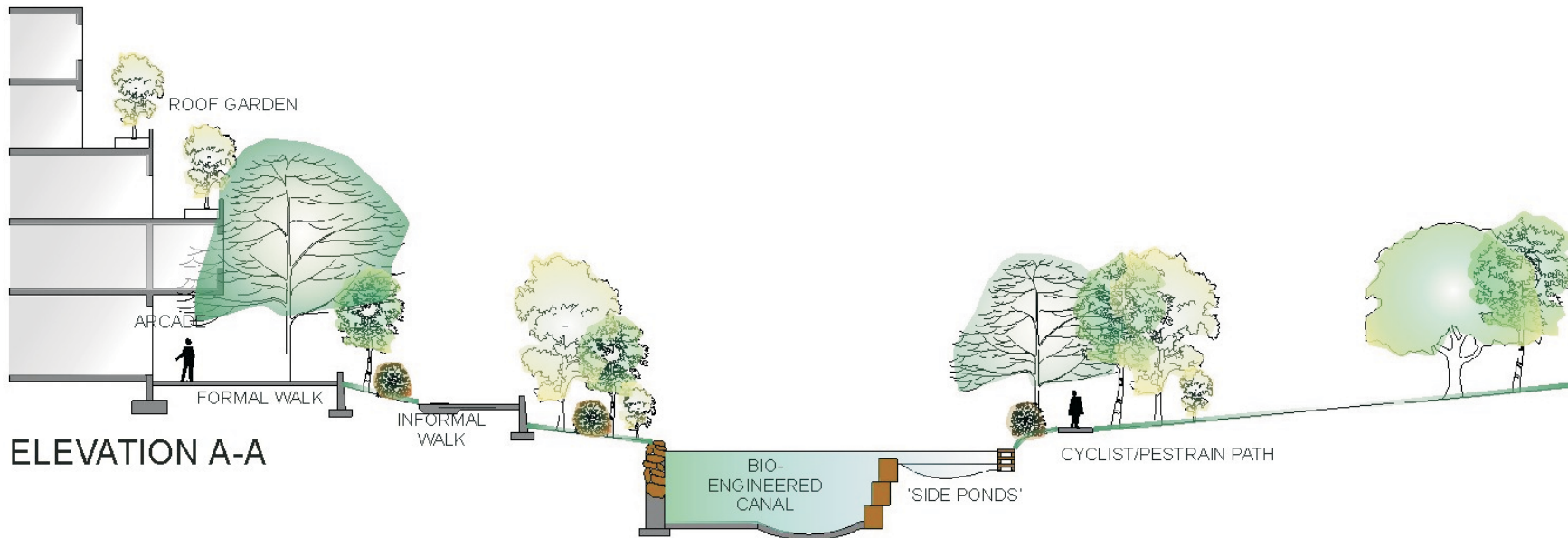


5.1. Master Planning, Section A - Figure 45.

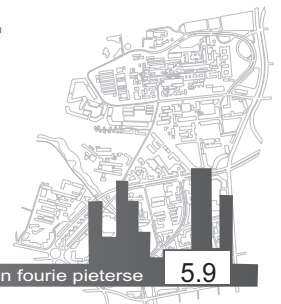




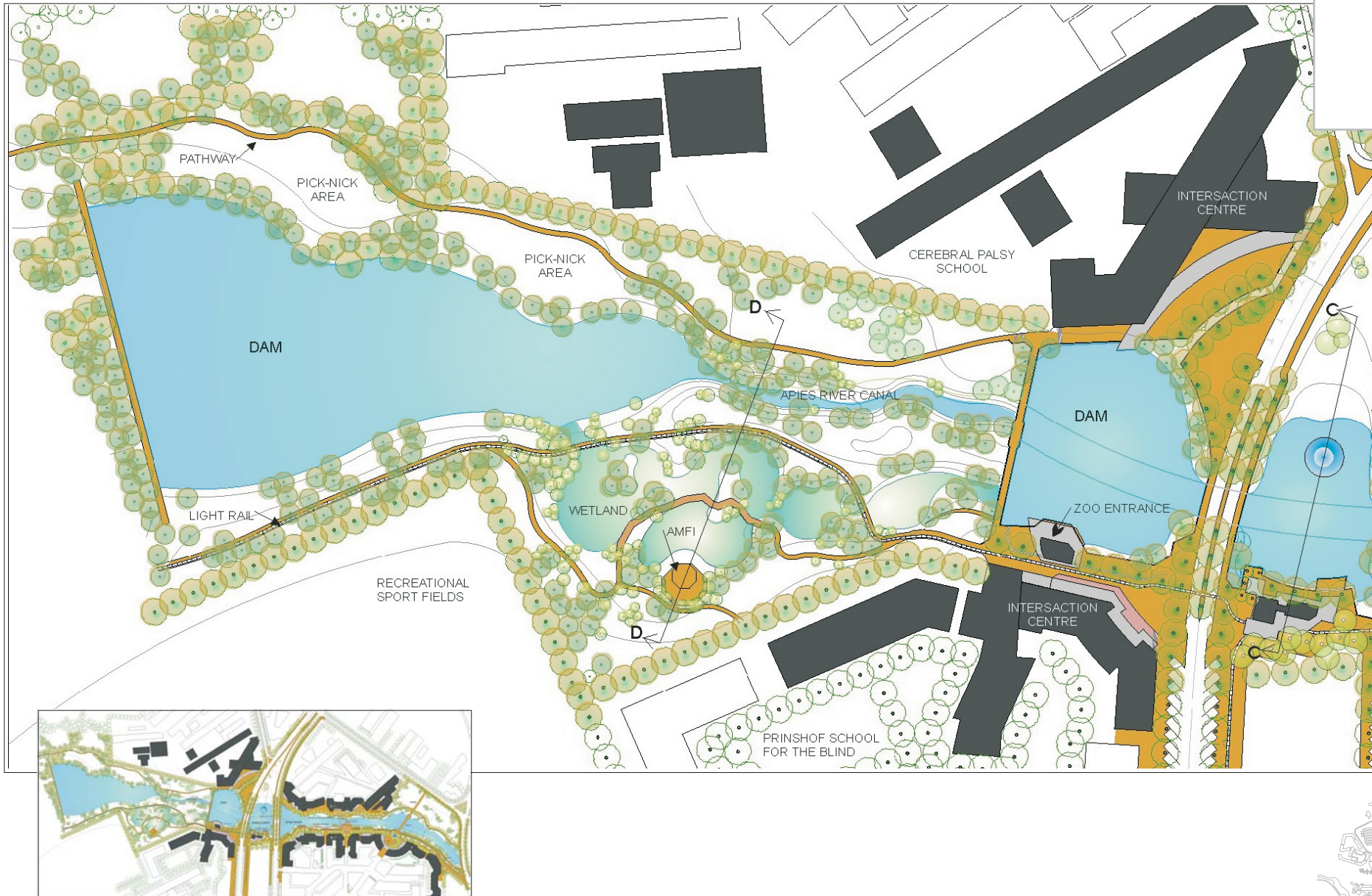
ELEVATION B-B

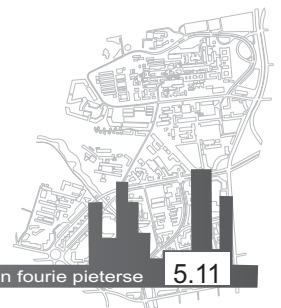
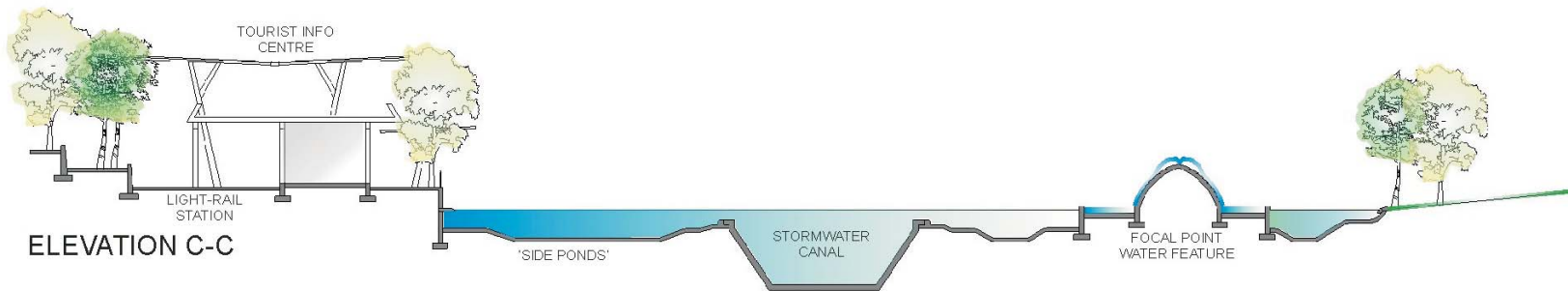
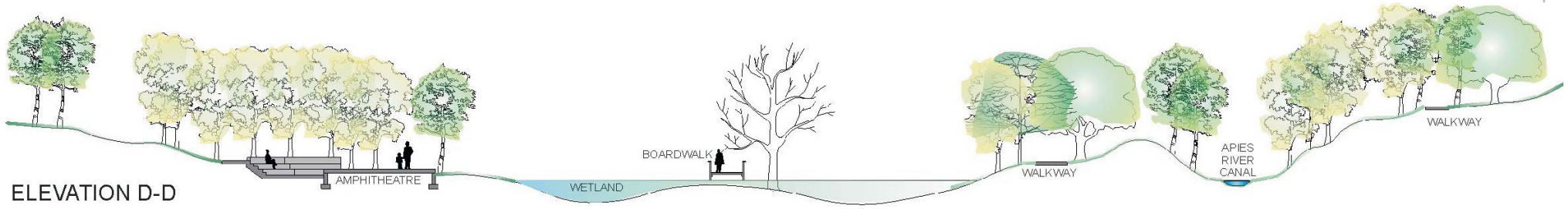


ELEVATION A-A



4.2. Master Planning ,Section B - Figure 47.





THE URBAN HABITAT

Chapter VI. Hove's Drift Centre Detail Design.



THE HOSPITAL HILL URBAN DEVELOPMENT FRAMEWORK: THE URBAN HABITAT
APIES CORRIDOR MASTER PLAN: HOSPITAL HILL SECTION
HOVE'S DRIFT DETAIL DESIGN

by jan fourie pieterse



CHAPTER VI. HOVE'S DRIFT CENTRE - DETAIL DESIGN

The Detail Design covers the area known as Hove's Drift. It is characterised as a intermodal node and the intersection of different systems: the Apies River, Soutpansberg Road, the light railway system, tourist routes, Apies River Boulevard, etc. The design takes into account all the urban systems while it explores the opportunities to create habitat for as much creatures as possible.

The Hove's Drift becomes an important node in the scope of the Hospital Hill Precinct. It becomes an interface between tourist and the City of Tswane. The node consists of a restaurant and café, as well as an information centre for tourists. It becomes the front door of the flea market and serves as a waiting area for buss, taxi, and the light railway passengers.

Hove's Drift also becomes the interface between the natural systems associated with the Apies River Corridor and the urban structure. It creates the opportunity to demonstrate how habitat functions in the natural and in the urban realm and how natural and human habitat can co-exist. Habitat is created in and on the built structures as well as in the open space. Vegetation selections conform to the Guild Requisites Templates and are plants that will fit into the urban setting. A total of 50 plants are selected that includes large and small trees, shrubs, grasses, climbers, forbs, bulbs, aquatic plants and ground covers (Appendix A). This plant selection adds to the biodiversity to the site and robustness to the habitat design.

Certain elements designed into the buildings and structures add to the habitat value and include:

- green roofs,
- roof ponds,
- elevated planters,
- wall coverings and trellises.

Other architectural elements creating habitat include:

- aerial nesting platforms
- owl nesting platforms
- bat boxes
- wall nesting cavities
- wall nesting platforms and
- ground-level cavities.

Non architectural habitat supplements are installed in trees, on islands and beneath ground level and include:

- large nesting boxes
- medium nesting boxes
- small nesting boxes
- fish hides
- duck nesting platforms
- heron poles
- toad / hedgehog cavities

Surfaces, textures and materials aims to enhance the sense of a dual between urban and natural systems that ultimately add a richness to the design. Architectural elements strengthens the idea and characteristics of both systems, while it creates habitat for humans and urban wildlife.

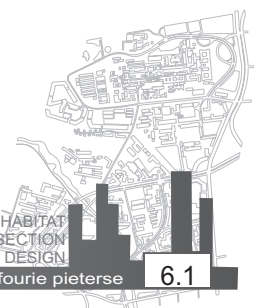
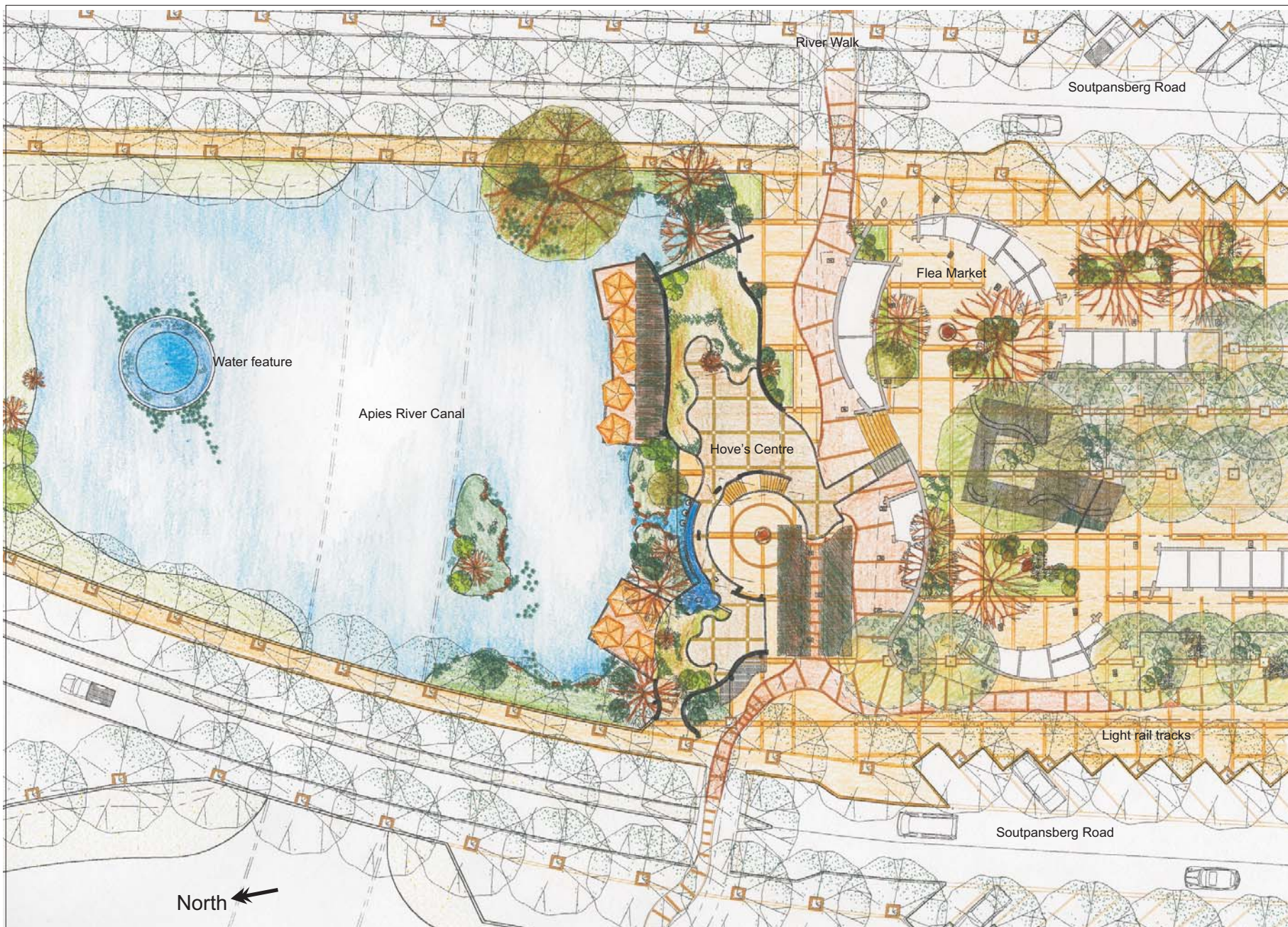


Figure 49. Hove's Drift Detail Design Plan.



THE HOSPITAL HILL URBAN DEVELOPMENT FRAMEWORK: THE URBAN HABITAT
APIES CORRIDOR MASTER PLAN: HOSPITAL HILL SECTION
HOVE'S DRIFT DETAIL DESIGN

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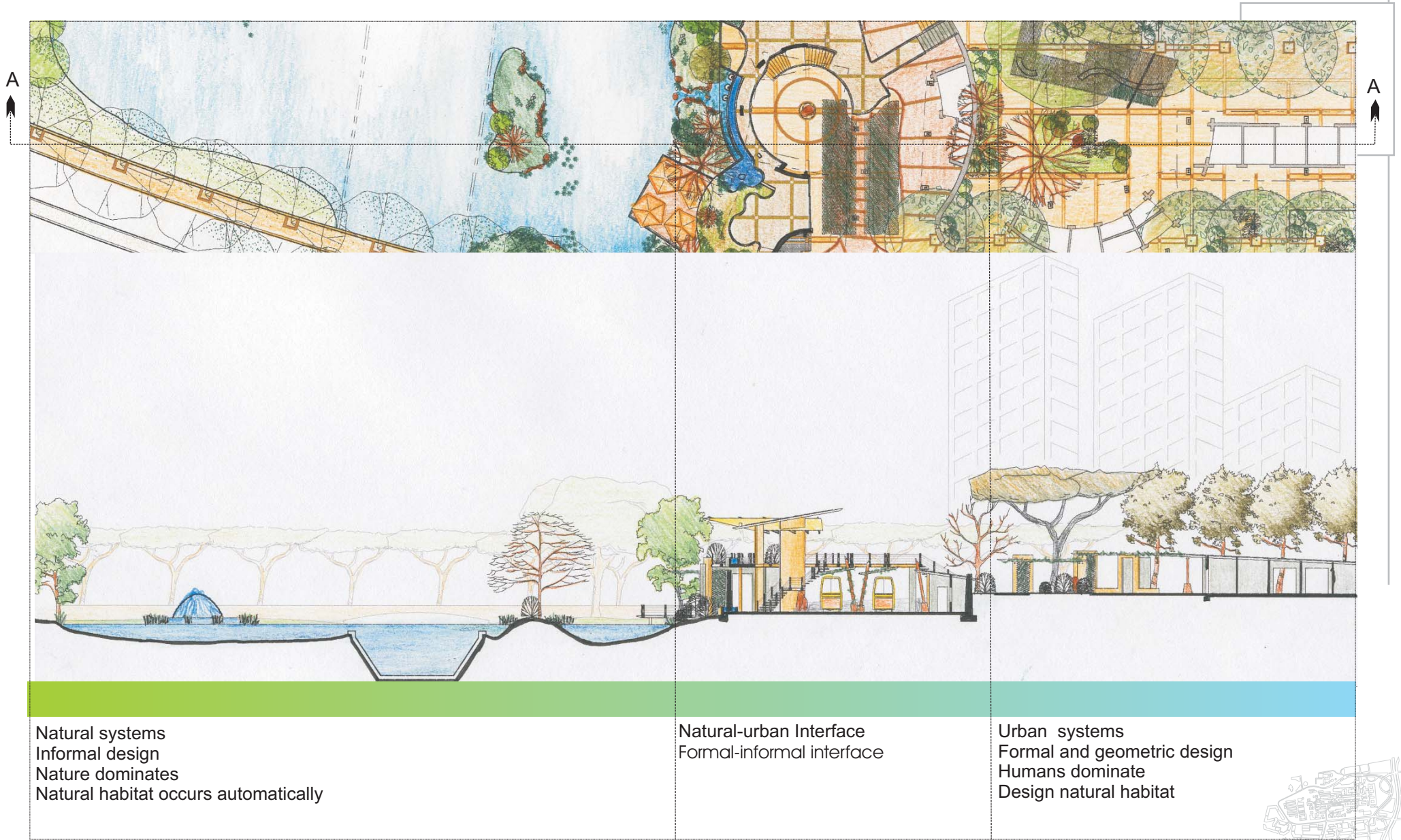


Figure 50. Section A-A through Hove's Drift Centre.

Figure 51. Hove's Drift Centre ground floor plan





Figure 52. Section AA - Enlarged



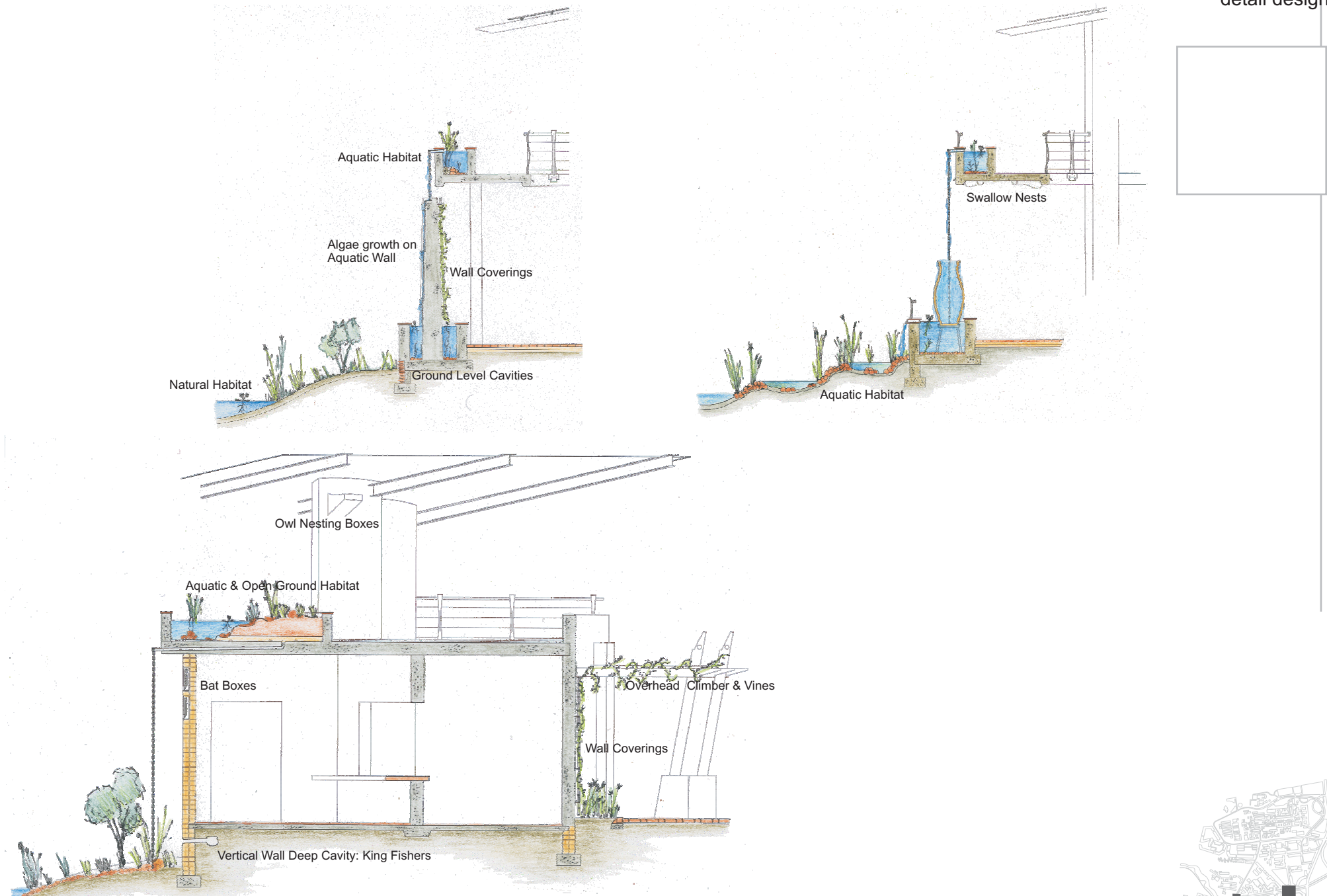


Figure 53. Detail Sections.

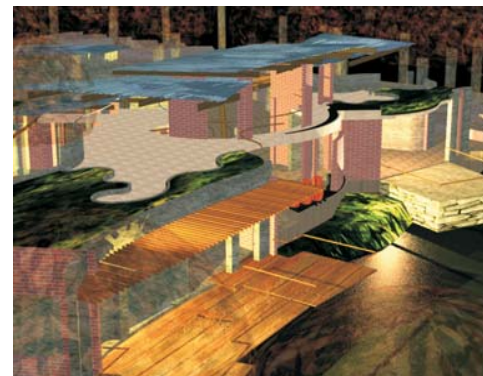
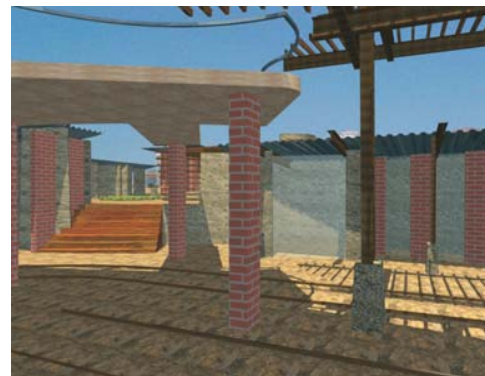
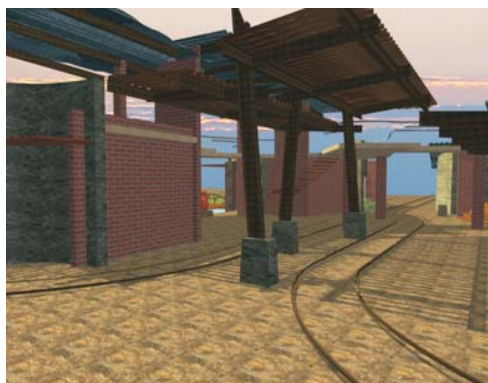


Figure 54. 3D CAD Model of Hove's Drift Centre.

THE URBAN HABITAT

Chapter VII. Design Discourse: The Big Idea.



THE HOSPITAL HILL URBAN DEVELOPMENT FRAMEWORK: THE URBAN HABITAT
APIES CORRIDOR MASTER PLAN: HOSPITAL HILL SECTION
HOVE'S DRIFT DETAIL DESIGN

by jan fourie pieterse



CHAPTER VII. DESIGN DISCOURSE: THE BIG IDEA

7.1. Life and the Biosphere

The concept of life is fully meaningful only in the context of the entire biosphere (Davies, 1987, p95). In this quote, Paul Davies touches on the idea that all living organisms are dependant on one another in order to survive. No living thing can exist in isolation. *All organisms are strongly coupled to their inanimate environment and require a continual throughput of matter and energy as well as the ability to export entropy* (Davies, 1987, p95). This environment, or habitat, must sustain the organisms coupled with it, or the organisms will die off or migrate to a more suitable environment.

The flow of energy between organisms mentioned by Davies becomes evident in the interaction between humans as well as the interaction between humans and nature. This interaction plays a major role in the quality of life experienced by these humans. The nature of this interaction (energy flow) or the lack thereof can be positive or negative and can ultimately attribute or detract from the quality of life. The nature of human life is thus defined by the nature in it.

7.2. Design Methodology Model

The urban environment is habitat. It is a habitat coupled with the city dweller and some animals like cats, rodents, minas and pigeons. This habitat is generally void of high quality



Figure 55 . The context of the entire biosphere.

functional habitat that sustains a healthy population of indigenous fauna and flora. The urban habitat caters for the human the ease of movement, circulation, entertainment, career opportunities, economical growth and high density housing. All this happens without consideration to urban wildlife habitat, but there is some coincidental success resulting in the presence of the problem animals.

The *NuHabit@ Design Process* approaches urban design from an angle where it caters for all the living organisms associated with a healthy ecosystem and functioning habitat, including humans. It encourages the use of principles of the *Function-based Habitat Design Process*

where the design relies on guild-building as basic pillars to support habitat creation. A guild is a group of organisms making use of the similar resources. The life requisites of fauna and flora enjoy a higher priority in order to create a city that can sustain them. It doesn't bring nature into the city. It creates a city that can sustain nature. The city habitat is changed from a sink- to a source population that delivers wildlife that can penetrate further into un-habituated parts of the city. The resulting design benefits nature, while it is economically viable and enrich the life of the urban dweller.

Numerous benefits and advantages are associated with the application of the *NuHabit@ Design Process*:

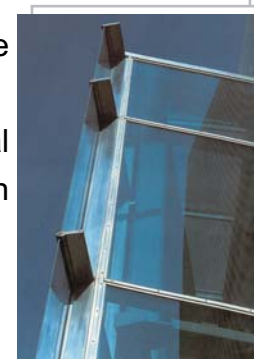
- Ecological advantages include the reduction of the impact of the design on the site and thus reducing its ecological footprint on earth.
- The level of biodiversity sustained by the site is raised while governed by the types of fauna and flora associated with the biome in which it occurs.
- Aesthetically, the visual appeal of functioning habitat offers endless possibilities. The planting layout is designed to evoke different emotions and views.
- The overall quality of life is enhanced by the creation of high quality habitat and the presence of the associated wildlife. The enjoyment of watching and listening to wildlife creatures are coupled with a calming psychological effect.

- A sense of community is established through the sense of place created by the all present wildlife.
- Economically, the benefits include a raise in real estate value while tourists and inquisitives are drawn to the attraction and the spin-off thereof.

7.3. Design Implementation

The City of Tswane, Capital of South Africa, is characterised by the different systems and influences operating within its boundaries. Man-made systems are superimposed onto nature, urban and natural structures influences one another and different cultures create diversity in atmospheres and space characteristics. The city becomes the interface for many contrasts to meet. Rural and urban structures, indigenous and multi-ethnic images as well as organic and symmetrical forms are but a few contrasts clashing at this interface. This clash creates energy and endless design possibilities for the urban designer. The diversity becomes the design context that becomes a design concept.

True to the concept, the design expresses a variety of dualistic ideas. Some is expressed robustly and others more subtle while it is enriched by the multi-cultural nature of the country. The design components speak a language symbolising the different systems and characteristics



Glass & Steel
(P.J. Mathews, 2003)



Rough concrete
(P.J. Mathews, 2003)

Fig 56. Materials.



working together in creating a strong sense of place fitting into the Tswane-environment.

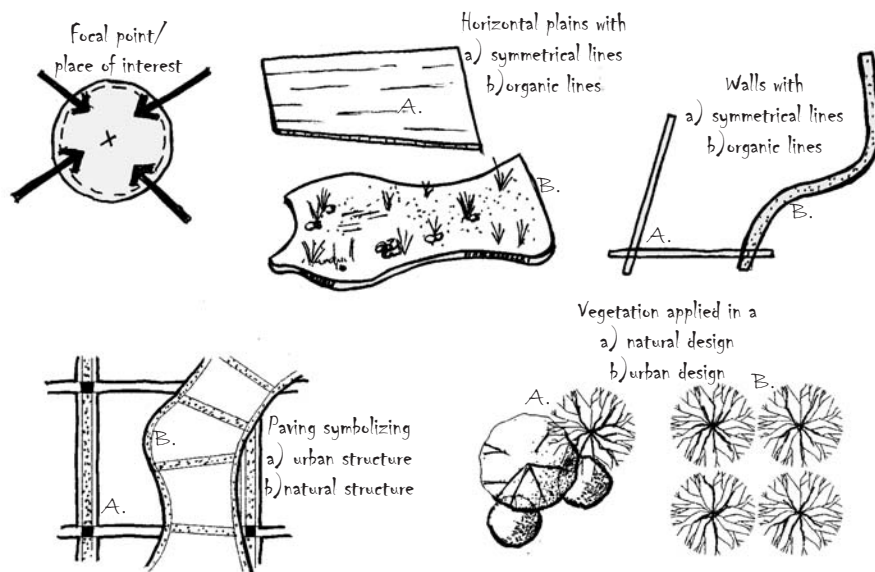


Figure 57. The Design Language

8.4. Design Language

Circles symbolises places of interest and importance or focal points. It is enhanced three dimensionally in the horizontal paving pattern and the vertical walls. Organic forms symbolises the structure and systems of natural and the indigenous order. These curving lines are used in the vertical enclosure elements like the walls and the horizontal plain of the roof garden. Curving pathways symbolises the natural flow of the Apies River and enforces the design language of the River Walk Boulevard running along the Apies.

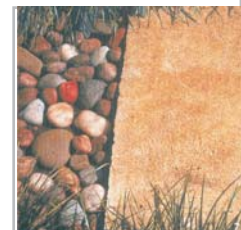
Clean, symmetrical lines symbolises the forms and order of the cosmopolitan city. It is used in the vertical and horizontal enclosures as well as in the paving, connecting the site to the rigid block lines of the urban grid.

Vegetation layout reinforces the interface created between the natural riverside systems and the man made urban form. The dramatically different roles played by vegetation in these two environments are displayed in the design layout. The urban vegetation is used in grids and lines, where the natural systems produce vegetation growing in a random fashion.

Materials are used that mimics the concept. Smooth contemporary materials like glass, steel and aluminium strengthens the cosmopolitan feel of the urban realm while it contrasts with the rough textured materials used in the organic lines and form. Together, these very different materials create diversity in the finest detail and complete the picture created through the design.



Smooth textures
(P.J. Mathews, 2003)



Natural textures
(P.J. Mathews, 2003)

Fig 58. Textures.

THE URBAN HABITAT

Conclusion



THE HOSPITAL HILL URBAN DEVELOPMENT FRAMEWORK: THE URBAN HABITAT
APIES CORRIDOR MASTER PLAN: HOSPITAL HILL SECTION
HOVE'S DRIFT DETAIL DESIGN

by jan fourie pieterse



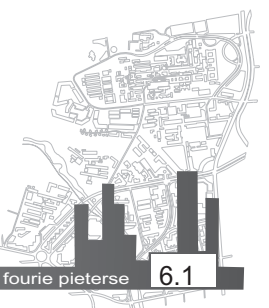
CONCLUSION

The Hospital Hill Urban Development Framework: The Urban Habitat, approach the urban dilemma in an unprecedented way. Previously, the city was seen as a habitat for homo sapiens, the dominant species. Little consideration was given to the role of ecology in the urban realm and what role it should play in the designing of cities.

But recently, a few designers started using buzzwords like sustainability, urban ecology and urban wildlife. People started asking question on how nature should be reintroduced into cities. This is the wrong question. The question should lead: how can cities sustain nature?

This framework encourages the use of the principles of Function-based Habitat Design. It is a design approach that ensures that habitat be created and managed to function at an optimum or even above optimum level. The city becomes able to sustain the natural systems that occurred before the human influence.

The theory is not yet tested in a complex urban realm like the Hospital Hill Precinct, but it is worth an attempt. The result may just be a Conformed Design, where design requirements of both human habitat and the habitat of other species have been conformed both spatially and functionally to meet the needs of both groups with minimal interference of either group on the other. This framework aims toward a conformed design.



THE URBAN HABITAT

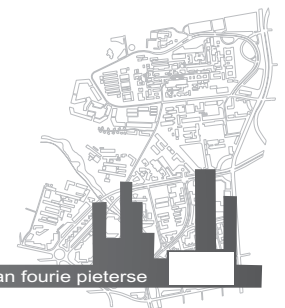
List of Referred Works



LIST OF REFERRED WORKS

list of referred works

- BENTLY ET AL. 1985. Responsive Environments. The Architectural Press, London.
- BODEN, R. 1989. The urban designer as interpretant A case study from a developing country. PhD. NA9000 Th37210. University of Washington.
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THE URBAN HABITAT

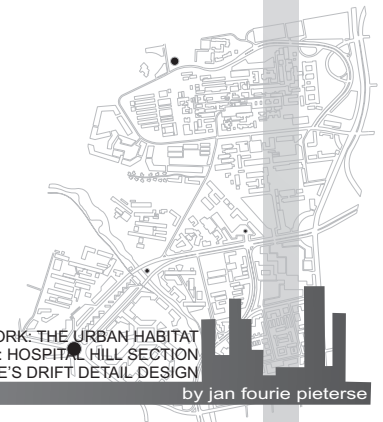
Appendixes.

APPENDIX A. VEGETATION PALETTES

This APPENDIX contains the plant list for the Hove's Drift Detail Design

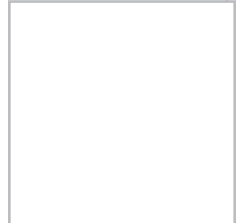
It also contains the Guild Based Vegetation Palettes. All the plants are value-ranked according to their ability to support the feeding, breeding, nesting and resting requirements of the specific guild. It also contains the Combined Vegetation Palette that is a combination of the value-ranked palettes and supplies a tool for choosing vegetation with a high value in supporting general habitat functions.

Habitat Support Values are ranked from 1 to 5, with 5 representing the highest level of support and 1 the lowest. In terms of aesthetics, 5 represents high aesthetic value for landscaping purposes and 1 a low aesthetic quality. Plants with a low value in terms of water regimes can sustain drought while plants ranked 5, need a lot of water.



APPENDIX A. VEGETATION PALETTES

PLANTLIST: HOVE'S DRIFT DETAIL DESIGN									
Common Name	Scientific Name	structure	height	diameter	decid/evergr	water	shape	habitat/20	
1 Hook-thorn	<i>Acacia caffra</i>	Tree	9	9	deciduous	mod	contorted	13	
2 Camel thorn	<i>Acacia erioloba</i>	Tree	10	13	deciduous	low	flat, spreading	19	
3 Sweet thorn	<i>Acacia karroo</i>	Tree	8	8	deciduous	mod	rounded	18	
4 Paperbark thorn	<i>Acacia sieberana</i>	Tree	12	16	deciduous	mod	flat, spreading	17	
5 Umbrella thorn	<i>Acacia tortilis</i>	Tree	10	12	deciduous	low	flat, spreading	19	
6 Fever tree	<i>Acacia xanthophloea</i>	Tree	12	14	deciduous	high	narrow, open	13	
7 River bushwillow	<i>Combretum erythrophyllum</i>	Tree	10	13	deciduous	high	rounded, dense	19	
8 Broom cluster fig	<i>Ficus sur</i>	Tree	12	13	evergreen	high	rounded, dense	18	
9 Common cluster fig	<i>Ficus sycomorus</i>	Tree	18	20	semi-decid	high	rounded, dense	13	
10 Wild date palm	<i>Phoenix reclinata</i>	Tree	4	4	evergreen	low	palm-like	18	
11 Marula	<i>Sclerocarya birrea</i>	Tree	10	15	deciduous	mod	rounded	18	
12 Krantz aloe	<i>Aloe arborescens</i>	Shrub	2	1	evergreen	low	small rounded	8	
13 Mountain aloe	<i>Aloe marlothii</i>	Shrub	2 to 5	1	evergreen	low	small rounded	11	
14 Large num-num	<i>Carissa macrocarpa</i>	Shrub	3	2	evergreen	mod	rounded	12	
15 Bluebush	<i>Diospyros lycioides</i>	Shrub	4	4	semi	mod	rounded	10	
16 Velvet ratish	<i>Grewia flava</i>	Shrub	2.5	2.5	deciduous	mod	rounded	12	
17 Wild dagga	<i>Leonotis leonorus</i>	Shrub	2	1.5	evergreen	mod	rounded	12	
18 River bells	<i>Mackaya bella</i>	Shrub	3	2	evergreen	mod	rounded	19	
19 LM grass	<i>Dactyloctenium australe</i>	Grass	variable	0.2	evergreen	mod	spreading	6	
20 Finger grass	<i>Digitaria eriantha</i>	Grass	0.4	1.4	perennial	mod	clump	18	
21 Heart-seed love grass	<i>Eragrostis capensis</i>	Grass	0.4	0.65	perennial	mod	clump	17	
22 Weeping love grass	<i>Eragrostis curvula</i>	Grass	0.4	1	perennial	mod	clump	17	
23 Tough love grass	<i>Eragrostis plana</i>	Grass	0.4	0.8	perennial	mod	clump	17	
24 Common thatching grass	<i>Hyparrhenia hirta</i>	Grass	0.5	1.7	perennial	mod	clump	18	
25 Yellow thatching grass	<i>Hyperthenea dissoluta</i>	Grass	0.5	2.5	perennial	mod	clump	18	
26 Guinea grass	<i>Panicum maximum</i>	Grass	0.6	1.7	perennial	mod	clump	19	
27 Red grass	<i>Themeda triandra</i>	Grass	0.4	1	perennial	mod	clump	20	
28 Wateruitjie	<i>Aponogeton junceus</i>	Water	0.1	0.95	evergreen	high	floating	16	
29 Dwarf papyrus	<i>Cyperus proflifer</i>	Water	0.3	0.15	evergreen	high	clump	15	
30 None	<i>Cyperus textilis</i>	Water	1.5	1	evergreen	high	clump	16	
31 Common rush	<i>Juncus effusus</i>	Water	0.7	0.3	evergreen	high	clump	16	
32 Sedge	<i>Mariscus congestus</i>	Water	0.1	0.5	evergreen	high	sedge	11	
33 Waterlily	<i>Nymphaea nouchali</i>	Water	0.1	0.8	evergreen	high	floating	18	
34 Common reed	<i>Phragmites australis</i>	Water	0.5	3	deciduous	high	clump	19	
35 Bulrush	<i>Typha capensis</i>	Water	2	0.6	evergreen	high	clump	20	
36 Dwarf agapanthus	<i>Agapanthus africanus</i>	Bulb	0.35	0.35	evergreen	mod	clump	6	
37 Common agapanthus	<i>Agapanthus praecox</i>	Bulb	0.5	0.6	evergreen	mod	clump	6	
38 Scented grass bulbine	<i>Bulbine capitata</i>	Bulb	0.45	0.35	deciduous	mod	clump	14	
39 Stalked bulbine	<i>Bulbine frutescens</i>	Bulb	0.3	0.4	deciduous	low	clump	14	
40 River lily	<i>Crinum macowanii</i>	Bulb	0.4	0.8	deciduous	mod	clump	16	
41 White arum lily	<i>Zantedeschia aethiopica</i>	Bulb	1.5	1.5	deciduous	high	clump	14	
42 Arum lily	<i>Zantedeschia rehmannii</i>	Bulb	1.5	1.5	deciduous	high	clump	14	
43 Travellers Joy	<i>Clematis brachiata</i>	Climber	4	2	deciduous	mod	spreading	12	
44 Flame creeper	<i>Combretum microphyllum</i>	Climber	3 to 5	1	deciduous	mod	spreading	14	
45 Black-eyed Susan	<i>Thunbergia alata</i>	Climber	3	1	semi	mod	dense	13	
46 Maagbitterwortel	<i>Dicoma anomala</i>	G-Cover	0.2	0.5	evergreen	mod	spreading	11	
47 Carpet geranium	<i>Geranium incanum</i>	G-Cover	0.3	0.3	evergreen	mod	spreading	12	
48 Sorrel	<i>Oxalis depressa</i>	G-Cover	0.1	variable	deciduous	mod	spreading	9	
49 Red clover	<i>Trifolium pratense</i>	G-Cover	0.1	0.3	deciduous	mod	spreading	8	



GUILD BASED VEGETATION PLANTING PALETTE							
Lesser Bush Baby Tree Canopy Feeder Habitat Guild							
Common Name	Scientific Name	F	B	N	R	Structure	
1	Wonderboom fig	<i>Ficus salicifolia</i>	5	5	5	5	1Tree
2	Broom cluster fig	<i>Ficus sur</i>	5	5	5	5	1Tree
3	Common cluster fig	<i>Ficus sycamorus</i>	5	5	5	5	1Tree
4	Wild peach	<i>Kiggelaria africana</i>	5	4	5	5	1Tree
5	Weeping boer-bean	<i>Schotia brachypetala</i>	5	4	5	5	1Tree
6	Buffalo-thorn	<i>Ziziphus mucronata</i>	5	4	5	5	1Tree
7	Wild custard-apple	<i>Annona senegalensis</i>	5	4	4	4	1Tree
8	Common coral tree	<i>Erythrina lysistemon</i>	5	4	4	5	1Tree
9	African mangosteen	<i>Garcinia livingstonei</i>	5	4	4	5	1Tree
10	Wild fuchsia	<i>Halleria elliptica</i>	5	4	4	5	1Tree
11	Tree-fuchsia	<i>Halleria lucida</i>	5	4	4	5	1Tree
12	Jacket-plum	<i>Pappea capensis</i>	5	4	4	4	1Tree
13	Marula	<i>Sclerocarya birrea</i>	5	4	4	5	1Tree
14	Water berry	<i>Syzygium cordatum</i>	5	4	4	4	1Tree
15	White pear	<i>Apodytes dimidiata</i>	5	3	3	4	1Tree
16	Broad-leaved panicum	<i>Panicum deustum</i>	5	3	3	3	3Grass
17	Guinea grass	<i>Panicum maximum</i>	5	3	3	3	3Grass
18	Mountain medlar	<i>Tapiphyllum parvifolium</i>	5	3	3	4	1Tree
19	Wild medlar	<i>Vangueria infausta</i>	5	3	3	4	1Tree
20	Horned thorn	<i>Acacia grandicornuta</i>	5	2	4	2	1Tree
21	Sweet thorn	<i>Acacia karroo</i>	5	2	3	2	1Tree
22	Ankle thorn	<i>Acacia robusta</i>	5	2	3	3	1Tree
23	Red-leaved fig	<i>Ficus ingens</i>	5	2	3	4	1Tree
24	Common hook-thorn	<i>Acacia caffra</i>	5	2	2	2	1Tree
25	Camel thorn	<i>Acacia erioloba</i>	5	2	2	2	1Tree
26	Large num-num	<i>Carissa macrocarpa</i>	5	2	2	3	2Shrub
27	False turkey-berry	<i>Plectroniella armata</i>	5	1	1	2	1Tree
28	White stinkwood	<i>Celtis africana</i>	4	5	5	5	1Tree
29	River bushwillow	<i>Combretum erythrophyllum</i>	4	5	5	5	1Tree
30	River bells	<i>Mackaya bella</i>	4	5	5	5	2Shrub
31	Cheesewood	<i>Pittosporum viridiflorum</i>	4	5	5	5	1Tree
32	Pigeonwood	<i>Trema orientalis</i>	4	5	5	5	1Tree
33	Forest mahogany	<i>Trichilia dregeana</i>	4	5	5	5	1Tree
34	Red ivory	<i>Berchemia zeyheri</i>	4	4	4	5	1Tree
35	Wild date palm	<i>Phoenix reclinata</i>	4	4	4	5	1Tree
36	Real yellowwood	<i>Podocarpus latifolius</i>	4	4	4	5	1Tree
37	Dogwood	<i>Rhamnus prinoides</i>	4	4	4	4	1Tree
38	Small knobwood	<i>Zanthoxylum capense</i>	4	4	4	5	1Tree
39	Wild olive	<i>Olea europaea subsp. africana</i>	4	3	4	5	1Tree
40	Red currant	<i>Rhus chinindensis</i>	4	3	4	5	1Tree
41	Fever tree	<i>Acacia xanthophloea</i>	4	3	3	4	1Tree
42	White gardenia	<i>Gardenia thunbergia</i>	4	3	3	4	1Tree
43	Savanna gardenia	<i>Gardenia volkensii</i>	4	3	3	4	1Tree
44	Common spike-thorn	<i>Gymnosporia buxifolia</i>	4	3	3	3	1Tree
45	Common bride's bush	<i>Pavetta gardeniifolia</i>	4	3	3	4	1Tree
46	Weeping bride's bush	<i>Pavetta lanceolata</i>	4	3	3	4	2Shrub
47	Soap-nettle	<i>Pouzolzia mixta</i>	4	3	3	3	2Shrub
48	Black bird-berry	<i>Psychotria capensis</i>	4	3	3	4	2Shrub
49	Cape beech	<i>Rapanea melanophloeos</i>	4	3	3	3	1Tree
50	Nana-berry	<i>Rhus dentata</i>	4	3	3	3	1Tree
51	Karree	<i>Rhus lancea</i>	4	3	3	4	1Tree
52	Mountain karree	<i>Rhus leptodictya</i>	4	3	3	4	1Tree
53	Glossy currant	<i>Rhus lucida</i>	4	3	3	4	1Tree
54	Common wild currant	<i>Rhus pyroides</i>	4	3	3	4	1Tree
55	Blue currant	<i>Rhus zeyheri</i>	4	3	3	4	1Tree
56	Cape gardenia	<i>Rothmania capensis</i>	4	3	3	4	1Tree
57	Bell gardenia	<i>Rothmania globosa</i>	4	3	3	4	1Tree
58	Wild camphor bush	<i>Tarconanthus camphoratus</i>	4	3	3	4	2Shrub
59	Paperbark thorn	<i>Acacia sieberana</i>	4	2	4	3	1Tree
60	Tree wisteria	<i>Bolusanthus speciosus</i>	4	2	3	4	1Tree
61	Bluebush	<i>Diospyros lycioides</i>	4	2	3	3	2Shrub
62	Puzzle bush	<i>Ehretia rigida</i>	4	2	3	3	2Shrub
63	Cape ash	<i>Ekebergia capensis</i>	4	2	3	4	1Tree
64	Giant paspalum	<i>Paspalum urvillei</i>	4	2	3	3	3Grass
65	Small num-num	<i>Carissa bispinosa</i>	4	2	2	2	2Shrub
66	Mountain cabbage tree	<i>Cussonia paniculata</i>	4	2	2	3	1Tree

GUILD BASED VEGETATION PLANTING PALETTE							
Banded Mongoose Acacia Shade Feeder Habitat Guild							
Common Name	Scientific Name	F	B	N	R	Structure	
1	Umbrella thorn	Acacia tortilis	5	5	4	5	1Tree
2	Common hook-thorn	Acacia caffra	5	4	5	5	1Tree
3	Camel thorn	Acacia erioloba	5	4	5	5	1Tree
4	Red thorn	Acacia gerrardii	5	4	5	5	1Tree
5	Scented thorn	Acacia nilotica	5	4	4	5	1Tree
6	Horned thorn	Acacia grandicornuta	5	3	5	5	1Tree
7	Sweet thorn	Acacia karroo	5	3	5	5	1Tree
8	Bottlebrush grass	Erneapogon scoparius	5	3	4	4	3Grass
9	Broad-leaved panicum	Panicum deustum	5	3	4	4	3Grass
10	Guinea grass	Panicum maximum	5	3	4	4	3Grass
11	Red grass	Themeda triandra	5	3	4	5	3Grass
12	Thimble grass	Fingerhuthia africana	5	3	2	4	3Grass
13	Splendid acacia	Acacia robusta	4	4	4	5	1Tree
14	Paperbark thorn	Acacia sieberana	4	3	5	5	1Tree
15	Inyanga flat-top	Acacia abyssinica	4	3	4	5	1Tree
16	Fever tree	Acacia xanthophloea	4	3	4	5	1Tree
17	Finger grass	Digitaria eriantha	4	3	4	4	3Grass
18	Bushveld signal grass	Urochloa mosambicensis	4	3	4	4	3Grass
19	Perennial signal grass	Urochloa oligotricha	4	3	4	4	3Grass
20	Blue buffalo grass	Cenchrus ciliaris	4	3	3	5	3Grass
21	Rhodes grass	Chloris gayana	4	3	3	4	3Grass
22	Couch grass	Cynodon dactylon	4	3	3	5	3Grass
23	Silver finger grass	Digitaria argyrograptia	4	3	3	4	3Grass
24	One-finger grass	Digitaria monodactyla	4	3	3	4	3Grass
25	Golden bristle grass	Setaria sphacelata var. sericea	4	3	3	4	3Grass
26	Common crowfoot	Dactyloctenium aegyptium	4	3	2	4	3Grass
27	Ana tree	Faidherbia albida	4	3	2	3	1Tree
28	Sawtooth love grass	Eragrostis superba	4	2	3	4	3Grass
29	Cork bush	Mundulea sericea	4	2	3	3	1Tree
30	Cat's tail	Perotis patens	4	2	3	3	3Grass
31	Herringbone grass	Pogonarthria squarrosa	4	2	3	4	3Grass
32	Buffalo-thorn	Ziziphus mucronata	4	2	3	3	1Tree
33	Vlei bristle grass	Setaria incrassata	4	2	2	3	3Grass
34	Black-seed bristle grass	Setaria nigrirostris	4	2	2	4	3Grass
35	Bushveld dropseed	Sporobolus iocidos	4	2	2	3	3Grass
36	Trailing Phlox	Sutera pauciflora	4	1	3	3	5Vine
37	Natal red top	Melinis repens	3	3	4	4	3Grass
38	Rolling grass	Aristida bipartita	3	3	2	3	3Grass
39	Spreading three-awn	Aristida congesta subsp. barbicollis	3	3	2	3	3Grass
40	Tassel three-awn	Aristida congesta subsp. congesta	3	3	2	3	3Grass
41	Iron grass	Aristida diffusa subsp. burkei	3	3	2	3	3Grass
42	Transvaal milkplum	Englerophytum magalismontanum	3	3	2	2	1Tree
43	Highveld white vygie	Delosperma herbeum	3	3	1	3	4GCover
44	Kleinswartstorm	Thesium costatum	3	2	4	4	2Shrub
45	Besembossie	Thesium utile	3	2	4	3	2Shrub
46	Wool grass	Anthephora pubescens	3	2	3	4	3Grass
47	False love grass	Bewisia biflora	3	2	3	3	3Grass
48	Broad-leaved bluestem	Diheteropogon amplexans	3	2	3	3	3Grass
49	Puzzle bush	Ehretia rigida	3	2	3	3	2Shrub
50	Heart-seed love grass	Eragrostis capensis	3	2	3	3	3Grass
51	Weeping love grass	Eragrostis curvula	3	2	3	4	3Grass
52	Wether love grass	Eragrostis nindensis	3	2	3	3	3Grass
53	Broad-leaved curly leaf	Eragrostis rigidior	3	2	3	4	3Grass
54	Rooi-opslag	Hermania depressa	3	2	3	3	3Grass
55	Gombossie	Hermannia boraginiflora	3	2	3	3	3Grass
56	Spear grass	Heteropogon contortus	3	2	3	3	3Grass
57	Wild rice grass	Leersia hexandra	3	2	3	3	3Grass
58	Hoary basil	Ocimum canum	3	2	3	3	4GCover

GUILD BASED VEGETATION PLANTING PALETTE						
Freshwater Crab Water Edge Feeder Habitat Guild						
Common Name	Scientific Name	F	B	N	R	Structure
1 Bulrush	<i>Typha capensis</i>	5	5	5	5	6Water
2 Waterlily	<i>Nymphaea nouchali</i>	5	4	4	5	6Water
3 None	<i>Nymphaoides indica</i>	5	4	4	5	6Water
4 Wateruintjie	<i>Aponogeton junceus</i>	5	3	4	4	6Water
5 Spotted knotweed	<i>Persicaria lapathifolia</i>	5	3	4	5	6Water
6 Water parsnip	<i>Betula erecta</i>	5	3	4	5	6Water
7 River grass	<i>Arundinella nepalensis</i>	4	3	3	4	3Grass
8 Cottonwool grass	<i>Imperta cylindrica</i>	4	3	3	4	3Grass
9 Common reed	<i>Phragmites australis</i>	4	2	2	3	6Water
10 Wild verbena	<i>Verbena bonariensis</i>	4	2	2	4	6Water
11 Sedge	<i>Mariscus congestus</i>	3	2	3	3	6Water
12 Oldwood	<i>Leucosidea sericea</i>	3	2	2	2	6Water
13 Mint	<i>Mentha aquatica</i>	3	2	2	3	7Herb
14 Sorrel	<i>Oxalis depressa</i>	3	2	2	2	4GCover
15 Common dock	<i>Rumex lanceolatus</i>	3	2	2	3	7Herb
16 Couch grass	<i>Cynodon dactylon</i>	2	2	3	3	3Grass
17 Red clover	<i>Trifolium pratense</i>	2	2	2	2	4GCover
18 Water elder	<i>Nuxia oppositifolia</i>	2	1	1	2	6Water

GUILD BASED VEGETATION PLANTING PALETTE							
Tawny Flanked Prinia Patchy Upland Feeder Nester Habitat Guild							
Common Name	Scientific Name	F	B	N	R	Structure	
1	River bushwillow	<i>Combretum erythrophyllum</i>	4	3	2	5	1Tree
2	Common hook-thorn	<i>Acacia caffra</i>	4	3	2	4	1Tree
3	Fever tree	<i>Acacia xanthophloea</i>	4	3	2	4	1Tree
4	Broom cluster fig	<i>Ficus sur</i>	4	3	2	4	1Tree
5	Common cluster fig	<i>Ficus sycamorus</i>	4	3	2	4	1Tree
6	Horned thorn	<i>Acacia grandicornuta</i>	4	2	2	4	1Tree
7	Camel thorn	<i>Acacia erioloba</i>	4	3	1	4	1Tree
8	Common coral tree	<i>Erythrina lysistemon</i>	4	3	1	4	1Tree
9	Paperbark thorn	<i>Acacia sieberana</i>	4	2	1	4	1Tree
10	White stinkwood	<i>Celtis africana</i>	4	3	2	3	1Tree
11	Mountain aloe	<i>Aloe marlothii</i>	4	2	2	3	2Shrub
12	Scented thorn	<i>Acacia nilotica</i>	4	2	1	3	1Tree
13	Ankle thorn	<i>Acacia robusta</i>	4	2	1	3	1Tree
14	African mangosteen	<i>Garcinia livingstonei</i>	4	2	1	2	1Tree
15	Krantz aloe	<i>Aloe arborescens</i>	4	1	1	2	2Shrub
16	Water berry	<i>Syzygium cordatum</i>	3	3	3	5	1Tree
17	Sweet thorn	<i>Acacia karroo</i>	3	2	2	4	1Tree
18	Weeping boer-bean	<i>Schotia brachypetala</i>	3	2	1	4	1Tree
19	Jacket-plum	<i>Pappea capensis</i>	3	1	1	4	1Tree
20	Buffalo-thorn	<i>Ziziphus mucronata</i>	3	1	1	4	1Tree
21	Common spike-thorn	<i>Gymnosporia buxifolia</i>	3	2	2	3	1Tree
22	River bells	<i>Mackaya bella</i>	3	2	2	3	2Shrub
23	Forest mahogany	<i>Trichilia dregeana</i>	3	1	2	3	1Tree
24	Umbrella thorn	<i>Acacia tortilis</i>	3	3	1	3	1Tree
25	Wild custard-apple	<i>Annona senegalensis</i>	3	2	1	3	1Tree
26	Large-fruited bushwillow	<i>Combretum zeyheri</i>	3	2	1	3	1Tree
27	Cape ash	<i>Ekebergia capensis</i>	3	2	1	3	1Tree
28	Ana tree	<i>Faidherbia albida</i>	3	2	1	3	1Tree
29	Wild peach	<i>Kiggelaria africana</i>	3	2	1	3	1Tree
30	Transvaal red milkwood	<i>Mimusops zeyheri</i>	3	2	1	3	1Tree
31	Wild teak	<i>Pterocarpus angolensis</i>	3	1	1	3	1Tree
32	Round-leaved teak	<i>Pterocarpus rotundifolius</i>	3	1	1	3	1Tree
33	Marula	<i>Sclerocarya birrea</i>	3	1	1	3	1Tree
34	Wild rice grass	<i>Leersia hexandra</i>	3	1	3	2	3Grass
35	Red thorn	<i>Acacia gerrardii</i>	3	2	1	2	1Tree
36	White pear	<i>Apodytes dimidiata</i>	3	2	1	2	1Tree
37	Pride-of-De Kaap	<i>Bauhinia galpinii</i>	3	2	1	2	2Shrub
38	None	<i>Bauhinia natalensis</i>	3	2	1	2	2Shrub
39	Red ivory	<i>Berchemia zeyheri</i>	3	2	1	2	1Tree
40	Wild seringa	<i>Burkea africana</i>	3	2	1	2	1Tree
41	Red bushwillow	<i>Combretum apiculatum</i>	3	2	1	2	1Tree
42	Forest bushwillow	<i>Combretum kraussii</i>	3	2	1	2	1Tree
43	Blue guarri	<i>Eucla crispa</i>	3	2	1	2	1Tree
44	Natal guarri	<i>Eucla natalensis</i>	3	2	1	2	1Tree
45	Guarri	<i>Eucla spp</i>	3	2	1	2	1Tree
46	Common guarri	<i>Eucla undulata</i>	3	2	1	2	1Tree
47	Transvaal honey-bell bush	<i>Freylinia tropica</i>	3	2	1	2	1Shrub
48	White raisin	<i>Grewia bicolor</i>	3	2	1	2	1Shrub
49	Velvet raisin	<i>Grewia flava</i>	3	2	1	2	1Shrub
50	Sandpaper raisin	<i>Grewia flavescens</i>	3	2	1	2	1Shrub
51	Silver raisin	<i>Grewia monticola</i>	3	2	1	2	1Shrub
52	Cross-berry	<i>Grewia occidentalis</i>	3	2	1	2	1Tree
53	Lavender tree	<i>Heteropyxis natalensis</i>	3	2	1	2	1Tree
54	Tree aloe	<i>Aloe barberiae</i>	3	1	1	2	1Tree
55	Russet bushwillow	<i>Combretum hereroense</i>	3	1	1	2	1Tree
56	Leadwood	<i>Combretum imberbe</i>	3	1	1	2	1Tree
57	Velvet bushwillow	<i>Combretum molle</i>	3	1	1	2	1Tree
58	Bokhoring	<i>Cryptolepis oblongifolia</i>	3	1	1	2	1Shrub
59	Red-leaved fig	<i>Ficus ingens</i>	3	1	1	2	1Tree
60	Wonderboom fig	<i>Ficus salicifolia</i>	3	1	1	2	1Tree
61	White-berry bush	<i>Flueggea virosa</i>	3	1	1	2	1Shrub
62	Common bush-cherry	<i>Maerua caffra</i>	3	1	1	2	1Shrub
63	None	<i>Chlorophytum bowkeri</i>	3	2	3	1	4GCover
64	Dwarf agapanthus	<i>Agapanthus africanus</i>	3	1	1	1	5Bulb
65	Common agapanthus	<i>Agapanthus praecox</i>	3	1	1	1	5Bulb
66	Common reed	<i>Phragmites australis</i>	2	5	5	5	6Water
67	Bulrush	<i>Typha capensis</i>	2	4	5	5	6Water
68	Red vlei grass	<i>Ischaemum fasciculatum</i>	2	3	5	5	3Grass

GUILD BASED VEGETATION PLANTING PALETTE						
Tawny Flanked Prinia Patchy Wetland Nester Habitat Guild						
Common Name	Scientific Name	F	B	N	R	Structure
1	River bushwillow	4	5	5	5	1Tree
2	Common reed	4	5	5	5	1Tree
3	Bulrush	4	5	5	5	1Tree
4	River grass	5	4	5	5	3Grass
5	Finger grass	4	4	5	5	3Grass
6	One-finger grass	4	4	5	5	3Grass
7	Common thatching grass	4	4	5	5	3Grass
8	Yellow thatching grass	4	4	5	5	3Grass
9	Cottonwool grass	4	4	5	5	3Grass
10	Red grass	4	4	5	5	3Grass
11	Tough love grass	4	3	5	5	3Grass
12	Old man's beard	3	3	5	5	3Grass
13	Broom cluster fig	5	4	4	5	1Tree
14	Common cluster fig	5	4	4	5	1Tree
15	Common paspalum	5	4	4	5	3Grass
16	Giant paspalum	5	4	4	5	3Grass
17	Wild date palm	5	4	4	5	1Tree
18	Vlei bristle grass	5	4	4	5	3Grass
19	Thatch reed	4	4	4	4	3Grass
20	Gum grass	4	4	4	5	3Grass
21	Wild rice grass	4	4	4	5	3Grass
22	Oldwood	4	4	4	4	1Tree
23	Weeping love grass	3	4	4	5	5Grass
24	Guinea grass	3	4	4	5	5Grass
25	Ratstail dropseed	3	4	4	5	5Grass
26	Catstail dropseed	3	4	4	5	5Grass
27	None	4	3	4	5	6Water
28	None	4	3	4	5	6Water
29	None	4	3	4	5	6Water
30	None	4	3	4	5	6Water
31	Heart-seed love grass	4	3	4	4	3Grass
32	Sedge	3	3	4	5	6Water
33	Bushveld dropseed	3	3	4	5	3Grass
34	Fibrous dropseed	3	3	4	5	3Grass
35	Feathered chloris	2	3	4	5	3Grass
36	Wire grass	2	3	4	4	3Grass
37	Broad-leaved curly leaf	3	2	4	4	3Grass
38	Common bristle grass	5	4	3	4	3Grass
39	Black-seed bristle grass	5	3	3	3	3Grass
40	Golden bristle grass	5	3	3	4	3Grass
41	White stinkwood	4	3	3	5	1Tree
42	Couch grass	4	3	3	4	3Grass
43	Red vlei grass	4	3	3	4	3Grass
44	White arum lily	4	3	3	4	5Bulb
45	Arum lily	4	3	3	4	5Bulb
46	Cape thatching reed	3	3	3	4	6Water
47	Fern	3	3	3	3	2Shrub
48	Water parsnip	3	3	3	4	7Herb
49	Bur bristle grass	2	3	3	3	3Grass
50	Wild verbena	5	2	3	4	2Shrub
51	Wateruintjie	3	2	3	3	6Water
52	Sawtooth love grass	3	2	3	3	3Grass
53	Blue marguerite	3	2	3	4	4GCover
54	None	3	2	3	4	4GCover
55	None	3	2	3	4	4GCover
56	None	3	2	3	4	4GCover
57	None	3	2	3	3	4GCover
58	Waxberry	3	2	3	4	1Tree
59	Common hook-thorn	2	1	3	3	1Tree
60	Vuurpyl	4	3	2	4	2Shrub

GUILD BASED VEGETATION PLANTING PALETTE						
Common Hottentot Larvae Grassland Feeder Habitat Guild						
Common Name	Scientific Name	F	B	N	R	Structure
1	Finger grass	5	5	5	5	3Grass
2	Golden bristle grass	5	5	5	5	3Grass
3	Common bristle grass	5	5	5	5	3Grass
4	Red grass	5	5	5	5	3Grass
5	Silver finger grass	5	4	5	5	3Grass
6	Russet grass	4	4	5	5	3Grass
7	Guinea grass	5	4	5	5	3Grass
8	Common paspalum	5	4	5	5	3Grass
9	Vlei bristle grass	5	4	5	5	3Grass
10	Mountain bristle grass	5	4	5	5	3Grass
11	Black-seed bristle grass	5	4	5	5	3Grass
12	Ratstail dropseed	4	4	5	5	3Grass
13	Quinine grass	4	4	5	5	3Grass
14	False love grass	5	4	4	5	3Grass
15	Pinhole grass	3	4	4	4	3Grass
16	Velvet signal grass	5	4	4	5	3Grass
17	Common signal grass	5	4	4	5	3Grass
18	Black-footed signal grass	5	4	4	5	3Grass
19	Common crowfoot	5	4	4	4	3Grass
20	One-finger grass	5	4	4	5	3Grass
21	Broad-leaved bluestem	5	4	4	5	3Grass
22	Wire grass	3	4	4	4	3Grass
23	Bottlebrush grass	4	4	4	5	3Grass
24	Heart-seed love grass	5	4	4	4	3Grass
25	Weeping love grass	4	4	4	5	3Grass
26	Gum grass	3	4	4	4	3Grass
27	Wether love grass	4	4	4	4	3Grass
28	Dew grass	5	4	4	5	3Grass
29	Tough love grass	4	4	4	5	3Grass
30	Narrow heart love grass	4	4	4	5	3Grass
31	Broad-leaved curly leaf	3	4	4	5	3Grass
32	Sawtooth love grass	5	4	4	4	3Grass
33	Fan grass	4	4	4	4	3Grass
34	Thimble grass	5	4	4	5	3Grass
35	Spear grass	4	4	4	5	3Grass
36	Wild rice grass	4	4	4	4	3Grass
37	Natal red top	3	4	4	5	3Grass
38	Pincushion grass	4	4	4	5	3Grass
39	Broad-leaved panicum	5	4	4	5	3Grass
40	Giant paspalum	4	4	4	4	3Grass
41	Herringbone grass	3	4	4	4	3Grass
42	Common wild sorghum	5	4	4	5	3Grass
43	Black-seed wild sorghum	5	4	4	5	3Grass
44	Giant spear grass	4	4	4	5	3Grass
45	Trident grass	5	4	4	5	3Grass
46	Hairy trident grass	4	4	4	5	3Grass
47	Bushveld signal grass	4	4	4	5	3Grass
48	Perennial signal grass	4	4	4	5	3Grass
49	Wool grass	5	4	3	4	3Grass
50	Couch grass	5	4	3	5	3Grass
51	Large carrot-seed grass	3	4	2	3	3Grass
52	Common thatching grass	4	3	5	5	3Grass
53	Yellow thatching grass	4	3	5	5	3Grass
54	Old man's beard	4	3	4	4	3Grass
55	Rolling grass	3	3	4	5	3Grass
56	Blue buffalo grass	5	3	4	4	3Grass
57	Rhodes grass	5	3	4	5	3Grass
58	Feathered chloris	4	3	4	4	3Grass
59	Broad-leaved turpentine	4	3	4	5	3Grass
60	Bushveld dropseed	4	3	4	4	3Grass
61	Calstail dropseed	4	3	4	4	3Grass
62	Fibrous dropseed	4	3	4	5	3Grass
63	Spreading three-awn	3	3	3	4	3Grass
64	Tassel three-awn	3	3	3	4	3Grass
65	Maagbitterwortel	2	3	3	3	4GCover
66	Carpet geranium	3	3	3	3	4GCover
67	Small oat grass	2	3	3	4	3Grass

COMBINED VEGETATION PALETTE

COMBINED VEGETATION PALETTE		Attributes (Habitat Function & Landscaping Value)								
Common name	Scientific name	Habitat				Landscaping			Water regime	
		F	B	N	R	Aesthetic	Structural	Colour		
(Source: Breedlove et al, 2003)										
1	White stinkwood	<i>Celtis africana</i>	5	5	4	5	5	1T	3Y	2
2	Buffalo-thorn	<i>Ziziphus mucronata</i>	5	4	4	4	4	1T	7G	2
3	Kei-apple	<i>Dovyalis caffra</i>	5	4	4	2	3	2T	4O	2
4	Doppruim	<i>Pappea capensis</i>	5	4	3	5	5	1T	5R	3
5	Broomcluster fig	<i>Ficus sur</i>	5	3	3	4	4	1T	9P	3
6	Common wild currant	<i>Rhus pyroides</i>	5	3	3	4	4	2T	6I	2
7	Large num-num	<i>Carissa macrocarpa</i>	5	4	3	2	4	3S	1W	2
8	Black bird-berry	<i>Psychotria capensis</i>	5	3	3	3	4	4S	4O	3
9	Sourplum	<i>Ximenia caffra</i>	5	2	3	3	3	2T	4O	2
10	Bluebush	<i>Diospyros lycoides</i>	5	3	3	3	3	3S	6I	2
11	Dogwood	<i>Rhamnus prinoides</i>	5	2	2	2	5	2T	7G	3
12	Tree-fuchsia	<i>Halleria lucida</i>	5	2	2	3	4	3S	4O	3
13	Sand taabos	<i>Rhus nebulosa</i>	5	2	2	2	4	3S	6I	3
14	Dune crow-berry	<i>Rhus crenata</i>	5	2	2	3	4	4S	6I	3
15	Oak-leaf berry	<i>Rhus incisa</i>	5	2	2	3	4	4S	6I	3
16	Cross-berry	<i>Grewia occidentalis</i>	5	3	2	3	3	1T	9P	3
17	Wild fuchsia	<i>Halleria elliptica</i>	5	2	2	3	3	3S	4O	3
18	Velvet raisin	<i>Grewia flava</i>	5	3	2	3	3	3S	3Y	2
19	Small num-num	<i>Carissa "Green Carpet"</i>	5	1	1	1	5	5G	1W	3
20	Common coral tree	<i>Erythrina lysistemon</i>	4	3	4	4	4	1T	5R	2
21	Wild peach	<i>Kiggelaria africana</i>	4	3	3	4	5	1T	6I	3
22	Weeping boer-bean	<i>Schotia brachypetala</i>	4	3	3	4	5	1T	5R	2
23	Wild date palm	<i>Phoenix reclinata</i>	4	3	3	2	5	2T	6I	4
24	Wild olive	<i>Olea eur. subsp. africana</i>	4	3	3	4	4	1T	6I	1
25	Mountain karee	<i>Rhus leptodictya</i>	4	3	3	4	4	1T	6I	2
26	Karee	<i>Rhus lancea</i>	4	3	3	4	4	1T	6I	2
27	Holly cassinopsis	<i>Cassinopsis ilicifolia</i>	4	3	3	3	4	2T	4O	3
28	Cheesewood	<i>Pittosporum viridiflorum</i>	4	3	3	4	3	2T	3Y	3
29	Red Ivory	<i>Berchemia zeyheri</i>	4	3	3	4	3	1T	3Y	3
30	Puzzle bush	<i>Ehretia rigida</i>	4	4	3	2	2	3S	6I	1
31	Wild apricot	<i>Dovyalis zeyheri</i>	4	2	3	3	2	2T	7G	2
32	Mountain cabbage tree	<i>Cussonia paniculata</i>	4	3	2	4	5	1T	6I	2
33	White ironwood	<i>Vepris lanceolata</i>	4	3	2	4	4	1T	6I	3
34	Pigeon wood	<i>Trema orientalis</i>	4	2	2	2	4	3S	7G	3
35	Baboon grape	<i>Rhoicissus digitata</i>	4	2	2	2	3	6V	6I	3
36	Blue guarri	<i>Euclia crispata</i>	4	2	2	3	3	1T	3Y	2
37	Guarri	<i>Euclia undulata</i>	4	2	2	3	3	1T	1W	2
38	Wild medlar	<i>Vangueria infausta</i>	4	2	2	3	2	2T	6I	3
39	Sour fig	<i>Carpobrotus edulis</i>	4	1	1	1	3	5G	9P	2
40	Mountain aloe	<i>Aloe marlothii</i>	4	2	1	2	3	2S	4YO	2
41	Velvet grass	<i>Brachiaria serrata</i>	4	1	1	2	3	5G	4O	2
42	Couch grass	<i>Cynodon dactylon</i>	4	1	1	1	3	5G	7G	2
43	Veld aloe	<i>Aloe greatheadii</i>	4	2	1	2	2	2S	4O	2
44	Common pendoring	<i>Maytenus heterophylla</i>	3	2	4	3	3	1T	1W	2
45	Koko tree	<i>Maytenus undata</i>	3	2	4	3	3	1T	1W	2
46	Tree aloe	<i>Aloe barberae</i>	3	2	3	4	5	1T	4O	2
47	Cape gardenia	<i>Rothmania capensis</i>	3	3	3	3	4	1T	1W	3
48	Bell gardenia	<i>Rothmania globosa</i>	3	3	3	3	4	1T	1W	3
49	Wild silver oak	<i>Brachylaena discolor</i>	3	3	3	4	4	2T	1W	2
50	White gardenia	<i>Gardenia thunbergia</i>	3	3	3	4	4	2T	1W	2
51	Pompon tree	<i>Dais cotonifolia</i>	3	3	3	4	4	2T	9P	3
52	Bride's bush	<i>Favetta gardeniiflora</i>	3	3	3	4	4	3S	1W	3
53	False olive	<i>Buddleja saligna</i>	3	3	3	3	3	2T	1W	2
54	Natal dombeya	<i>Dombeya cymosa</i>	3	3	3	4	3	3S	1W	3
55	Silver dombeya	<i>Dombeya pulchra</i>	3	3	3	4	3	3S	9P	3
56	Tree wisteria	<i>Bolusanthus speciosa</i>	3	3	2	3	5	2T	2B	2
57	Transvaal honey bell bush	<i>Freylinia tropica</i>	3	2	2	2	5	4S	2B	3
58	Cape beech	<i>Rapanea melanophloes</i>	3	2	2	3	4	1T	6I	3
59	Weeping sage	<i>Buddleja auriculata</i>	3	2	2	2	4	2T	1W	2
60	Red alder	<i>Cunonia capensis</i>	3	2	2	2	4	2T	1W	3
61	Corkbush	<i>Mundulea sericea</i>	3	2	2	3	4	2T	2B	2
62	Krantz aloe	<i>Aloe arborescens</i>	3	1	2	1	4	3S	4O	2
63	Pink sage	<i>Orthosiphon labiatus</i>	3	2	2	3	4	4S	9P	3
64	Pistol bush	<i>Ruttya ovata</i>	3	2	2	3	4	4S	1W	3
65	Small knobwood	<i>Zanthoxylum capense</i>	3	2	2	2	3	2T	1W	3
66	Ribbon bush	<i>Hypoestes aristata</i>	3	2	2	2	3	4S	2B	3
67	Mickey Mouse bush	<i>Ochna serrulata</i>	3	2	2	3	3	4S	3Y	3
68	Bird's brandy	<i>Lantana rugosa</i>	3	2	2	2	3	4S	9P	3
69	Red bushwillow	<i>Combretum apiculatum</i>	3	2	2	3	3	1T	3Y	3

COMBINED VEGETATION PALETTE

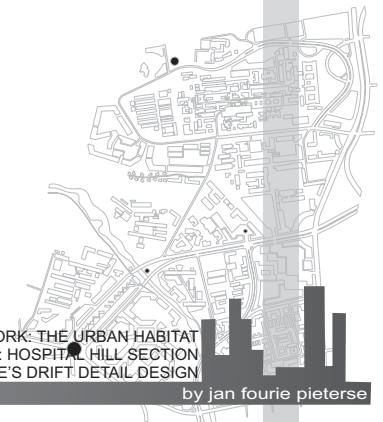
70	Milkweed	<i>Asclepias spp</i>	3	3	2	2	1	4S	1W	2
71	September bush	<i>Polygala myrtifolia</i>	3	1	1	1	5	4S	5R	4
72	Fern	<i>Asparagus densiflorus</i>	3	1	1	1	5	5G	6I	3
73	Cape Rattle-pod	<i>Crotalaria capensis</i>	3	1	1	1	4	3S	3Y	2
74	Konfetti bos	<i>Coleonema pulchellum</i>	3	2	1	1	4	4S	9P	3
75	Bulbine	<i>Bulbine narcissifolia</i>	3	1	1	1	4	8B	3Y	2
76	Natal watsonia	<i>Watsonia densiflorus</i>	3	1	1	1	4	8B	4O	3
77	Pilans watsonia	<i>Watsonia pilansii</i>	3	1	1	1	4	8B	4O	3
78	Dwarf agapanthus	<i>Agapanthus africanus</i>	3	1	1	1	4	8B	2B	2
79	Honey eyrops	<i>Euryops virgineus</i>	3	1	1	1	3	3S	3Y	2
80	Wild dagga	<i>Leonotis leonurus</i>	3	1	1	2	3	3S	4O	2
81	Golden daisy bush	<i>Euryops pectinatus</i>	3	1	1	1	3	4S	3Y	2
82	Bushmen's grape	<i>Rhoicissus tridentata</i>	3	1	1	1	3	6V	6I	3
83	Red-hot poker	<i>Kniphofia praecox</i>	3	1	1	1	3	9B	4O	3
84	Fern	<i>Asparagus setaceus</i>	3	1	1	1	3	5G	1W	3
85	Pinhole grass	<i>Bothriochloa insculpta</i>	3	1	1	1	3	5G	4O	2
86	Wild foxglove	<i>Ceratotheca triloba</i>	3	1	1	2	3	2S	9P	3
87	Fern	<i>Asparagus setaceus</i>	3	2	1	1	2	5G	1W	2
88	Velvet bushwillow	<i>Combretum molle</i>	2	2	3	5	4	1T	1W	2
89	Cape leadwort	<i>Plumbago auriculata</i>	2	2	2	2	5	3S	2B	2
90	Forest bride's bush	<i>Pavetta lanceolata</i>	2	2	2	2	4	2T	1B	3
91	Natal Sterizea	<i>Strelizea nicolai</i>	2	1	1	2	5	3S	1W	3
92	Crane flower	<i>Strelizea reginae</i>	2	1	1	1	5	4S	4O	3
93	Cape honeysuckle	<i>Tecomaria capensis</i>	2	1	1	1	5	4S	3Y/4O	3
94	Cascade asparagus	<i>Asparagus ramosissimus</i>	2	1	1	1	5	5G	6I	3
95	Starry wild jasmine	<i>Jasminum multipartitum</i>	4	1	1	1	5	6V	1W	3
96	Basuto kraal aloe	<i>Aloe tenuior</i>	2	1	1	1	4	4S	4O	2
97	Carpet geranium	<i>Geranium incanum</i>	2	1	1	1	4	2B	5G	3
98	Stalked bulbine	<i>Bulbine frutescens</i>	2	1	1	1	4	8B	3Y	2
99	Falling stars	<i>Crocosmia montbretia</i>	2	1	1	1	4	8B	4O	3
100	Wild rosemary	<i>Eriocephalus africanus</i>	2	1	1	1	3	4S	1W	2
101	Monkey's tail	<i>Xerophyta retinervis</i>	2	1	1	1	3	4S	9P	2
102	Red vygie	<i>Lampranthus coccineus</i>	2	1	1	1	3	5G	5R	2
103	Vygie	<i>Lampranthus glaucus</i>	2	1	1	1	3	5G	3Y	2
104	Common agapanthus	<i>Agapanthus praecox</i>	2	1	1	1	3	8B	2B	3
105	Fern	<i>Asparagus retrofractus</i>	2	1	1	1	2	5G	1W	2
106	Afrika aartappel	<i>Hypoxis obusta</i>	2	1	1	1	2	8B	3Y	2
107	Kaffertulp	<i>Hypoxis rigidula</i>	2	1	1	1	2	8B	3Y	2
108	Trailing Phlox	<i>Sutera pauciflora</i>	2	1	1	1	2	6V	1W	3
109	Cape gold	<i>Helichrysum splendidum</i>	2	1	1	1	1	2S	3Y	3
110	Honey everlasting	<i>Helichrysum patulum</i>	2	1	1	1	1	2S	1W	3
111	Everlasting	<i>Helichrysum rugulosum</i>	2	1	1	1	1	2S	3Y	3
112	Bulrush	<i>Typha capensis</i>	1	4	5	3	3	9W	7G	4
113	Vleitiesriet	<i>Phragmites australis</i>	1	4	4	3	3	9W	7G	4
114	Common hook-thorn	<i>Acacia caffra</i>	1	3	3	3	4	1T	1W	2
115	Sweet thorn	<i>Acacia karoo</i>	1	3	3	3	4	1T	3Y	2
116	Umbrella thorn	<i>Acacia tortilis</i>	1	3	3	3	4	1T	1W	2
117	Ankle thorn	<i>Acacia robusta</i>	1	3	3	3	3	1T	1W	2
118	Karoo Rhigozum	<i>Rhigozum obovatum</i>	1	2	3	2	3	4S	3Y	1
119	Forest bushwillow	<i>Combretum krausii</i>	1	2	2	3	5	1T	5R	2
120	River bushwillow	<i>Combretum erythrophyllum</i>	1	3	2	3	4	1T	4O	3
121	Natal bauhinia	<i>Bauhinia natalensis</i>	1	2	2	1	4	4S	2B	3
122	Purple sand olive	<i>Dodonea purpurea</i>	1	2	2	1	3	2T	5R	2
123	Pride-of-De Kaap	<i>Bauhinia galpinii</i>	1	2	2	1	3	3S	4O	2

THE URBAN HABITAT

Appendixes.

APPENDIX B. BASELINE DOCUMENT

This APPENDIX contains the Baseline Document that guides the whole project in terms of the Tripple-Bottom-Line Objectives: environmental, ecological and social.



THE HOSPITAL HILL URBAN DEVELOPMENT FRAMEWORK: THE URBAN HABITAT
APIES CORRIDOR MASTER PLAN: HOSPITAL HILL SECTION
HOVE'S DRIFT DETAIL DESIGN

by jan fourie pieterse



**BASELINE DOCUMENT:
HOSPITAL HILL PRECINCT DEVELOPMENT FRAMEWORK
& HOVE'S DRIFT DETAIL DESIGN**

A Report on Ethical and Sustainable Practice in Landscape Architecture (RESPLA)

JF PIETERSE

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 - 5.1. Social Issues**
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 - 5.1.3. Participation & Control
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 - 5.1.5. Work Environment and Labour Practices
 - 5.2. Economic Issues**
 - 5.2.1. Local Economy
 - 5.2.2. Efficiency of Use
 - 5.2.3. Ongoing Costs
 - 5.2.4. Capital Costs
 - 5.2.5. Tourism
 - 5.3. Environmental Issues**
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1. INTRODUCTION

Non-renewable resources are being depleted and there is increasing environmental damage as a result of human activities. It is important to address these issues of sustainability in order for it to become the way we live and work. Landscapes can play an important role in supporting sustainability. This is done through careful planning in which design decisions, material specifications and so on are carefully evaluated in terms of their long term impact on the economic, social and environmental sustainability of a society and the natural environment.

The Report on Ethical and Sustainable Practice in Landscape Architecture (RESPLA) has been designed to help evaluate the sustainability of projects through assessing the performance of a development in relation to a number of economic, social and environmental criteria. These criteria also include principles of ethical practice ensuring equitable conduct. The tool has been designed to be particularly appropriate for use in developing countries and therefore includes aspects such as the impact of the development on

the local economy, as economic issues are often a priority.

The tool can be used in design stages of a new project or for the rehabilitation of a landscape. It is designed to encourage the development of more sustainable landscapes by enabling different options to be evaluated rapidly and compared. The tool also enables a project to be rated in terms of the principles of sustainability and ethics applied. This enables developments to be compared to each other and to benchmarks.

This report serves as:

- a standard that guides ethical and professional duties, to promote best practice: by all relevant professions.
- a decision support tool for: building design teams including Landscape Architects, Architects, Quantity Surveyors, Structural Engineers and Mechanical and Electrical Engineers.
- part of a brief to the design team: by property owners and developers planning new developments.
- a way of ensuring that policies on sustainability and ethics are

implemented and integrated into the construction environment: by government and other organizations.

The RESPLA provides a way of making a basic assessment of the sustainability of a project.

2. REPORT CONTENT

2.1. Vision and strategy

The proposed project on Hospital Hill that will be evaluated aims to create a sustainable liveable city that will benefit all its stakeholders. The report sets baseline objectives to strive for in order to achieve this goal. These objectives takes on an approach which deals with social, economical and environmental issues while addressing ethical standards in all three of the bottom line sections.

2.2. Project Profile

The Project Name: Hospital Hill Precinct Development Framework
Hove's Drift Detail Design

The major product of the project focuses on the redevelopment of a part of the Pretoria CBD in order to rekindle vibrant city life. The creation of successful, functional habitat, human and natural, is central to this product. A framework will be developed that will guide the redevelopment of the precinct while the detail design will demonstrate how all the principles and concepts can be implemented within these guidelines. Implementing this framework

will add value to the city, both tangible and intangible value, benefiting all the stakeholders:

- The local community
- All customers visiting the area
- The metro-council and other private shareholders and provider of capital
- Suppliers of materials or services
- Trade Unions
- Workforce: direct and indirect
- Environmental institutions and NGO's

2.3. Scope and profile of report

The Report is compiled by: Mr. J. F. Pieterse

Contact number: 082 729 4148

Reporting period: Analysis and design stage

2003-02-10 to 2003-06-05

No previous report

The criteria and definitions used conforms to that defined by the Global Reporting Initiative (GRI), the structure of this tool is adapted

from the Sustainable Building Assessment Tool (SBAT) developed by J. Gibbert, while the Code of Ethics and the list for Normal Services and Duties Rendered by the Professional Landscape Architect were compiled by the South African Council for Landscape Architects.

**SOUTH AFRICAN COUNCIL FOR THE LANDSCAPE
ARCHITECTURAL PROFESSION CODE OF ETHICS**

Preface

Definition: Landscape architecture is hereby described as the science, technique and art of ecological, functional and aesthetic planning and design of exterior and open spaces for human use and enjoyment and for environmental conservation and rehabilitation.

Code of Ethics

1. Registered Professionals shall carry out their professional activities, as far as possible, in accordance with emerging principles of sustainable development and the highest standards of environmental protection and in compliance with relevant legislation, including but not restricted to the Landscape Architectural Professions Act, National Environmental Management Act, Environment Conservation Act, National Environmental Management Act and the Mineral and Energy Act.
2. Registered Professionals shall at all times place the integrity of the Profession and the principles of the South African Council for the Landscape Architectural Profession, above

any commitment to sectional or private interests.

3. Registered Professionals shall promote the incorporation of environmental and landscape design considerations from the earliest stages of project design or policy development.
4. Registered Professionals shall not conduct professional activities in a manner involving dishonesty, fraud, deceit, misrepresentation or bias.
5. Registered Professionals shall not advertise or present their services in a self-laudatory manner or in a manner that is derogatory to the dignity of the profession or in a manner that may bring discredit to the profession.
6. Registered Professionals shall, to the best of their ability, keep informed of advances in Landscape Architectural and Environmental Assessment practice, and must integrate such knowledge into their professional activities.
7. Registered Professionals shall inform a prospective client or employer of any professional or personal interests which may impair the objectivity of his/her work.
8. Registered Professionals shall not seek employment, grants or gain, or attempt to injure the reputation or opportunities for

employment of another Landscape Architect by false, biased or undocumented claims or accusations, by any other malicious action, or by offers of gifts or favours.

9. Registered Professionals shall, to the best of their ability, use the best available information.
10. Registered Professionals must only undertake particular work in a position of responsible charge where they have the relevant expertise and experience to undertake that work competently.
11. Registered Professionals shall not misrepresent or allow or permit misrepresentation of their own or their associates' academic or professional qualifications nor exaggerate their degree of responsibility for any work of a professional nature.
12. Registered Professionals shall comply with the objectives and the rules of the South African Council for the Landscape Architectural Profession, and all clauses of the Landscape Architectural Professions Act.

See Appendix B.1 for the Normal Services and Duties Rendered by the Professional Landscape Architect.

4. HOSPITAL HILL PRECINCT BASELINE OBJECTIVES

The following objectives are applicable on the precinct scale. It guides the Hospital Hill Precinct Framework. If these goals are reached, the project will be true to what the developers aimed to achieve. The tables in Appendix B are used to evaluate all the aspects discussed in the report periodically during construction and after final completion.

4.1. Social Issues

4.1.1. Inclusive Environments

4.1.1.1. *Urban form*

The precinct design enforces qualities that are timeless and will not represent any sectional interest or view of any group. Urban structure is defined by the creative use of space, place, connection, the role played by institutions and the overlap between them: a space becomes a place that accommodates movement, buildings and so on. Key design principles incorporated in the precinct framework includes the following:

- Permeability (Bentley et al, 1985) : the user has a number of options in terms of alternative ways through the environment (physical permeability) and spaces are connected with vistas and lines of sight (visual permeability).
- Variety (Bentley et al, 1985): the environment offers a choice of experiences, both in terms of uses and spatial structure.
- Legibility (Bentley et al, 1985): the network of links and uses in the city takes on 3D form that brings along perceptual structure and understanding of the place. The user can read the qualities and spatial character of the place (it plays with the ideas of nodes, edges, districts and landmarks).
- Robustness (Bentley et al, 1985): public places can be used for different purposes and serves multiple functions.
- Continuity (Bentley et al, 1985): the built structure creates a continuous edge and interface between public and private while it defines space and creates sense of place.
- Increased mixed use (Bentley et al, 1985): mix-use buildings and spaces serves functions of residential, corporate, retail and recreational functions that ensure 24 hour use of the area.

- Redevelopment of brown field sites: dilapidated buildings other sites that have already being built on are preferred for new development over green field sites.
- Improving regional connectivity (Bentley et al, 1985):connection with neighbouring district is enhanced to support public transport and easier access to all opportunities.

4.1.1.2. Transport

- Public transport is provided throughout the precinct in order to assist the need of transport.
- Public transport should be accessible to the disabled.
- An intermodal node is created to enhance the public transport network in connecting private vehicle, buss, taxi, monorail, pedestrian and cyclist routes.
- The road layout assist quick transport through the city while it creates the opportunity for node activities to take place like markets and neighbourhood centres.

4.1.1.3. Access to facilities

Conventional living and working patterns requires regular access to a range of services. These services can be accessed easily in environmentally friendly ways supporting sustainability by increasing

efficiency and reducing environmental impact. These services are within 400m, easily walkable distance for the average person, from any point in the precinct.

- Childcare: Provide safe play areas that can be overlooked from nearby public spaces.
- Banking services (i.e. ATM)
- Grocery, butchery, bakery
- Communication: Postal, telephone or email facilities
- Restaurants, pubs, coffee shops, fast food outlets
- Health: Hospital, clinic, general practitioners, dentists, optometrists
- Clothing shops
- Bookshop, stationary shop
- Hardware shop
- Vending and street markets

4.1.2. User Comfort

The quality of environments in urban settings has shown to have a direct impact on health, happiness and productivity of people.

Healthier, happier, more effective people contribute to sustainability by being more efficient and therefore reducing resource consumption and waste. However the quality of the urban context needs to be achieved with minimal cost.

4.1.2.1. Lighting in the landscape

- All public spaces, living environments and transport routes, vehicle and pedestrian are well lit during the night time while glare is minimised.

4.1.2.2. Human comfort

- Materials used are chosen to minimize unnatural solar reflection and have a low volumetric heat capacity.
- Heat loss is enhanced by restoring the effect of solar radiation and convection in order to minimise the effect of heat island.
- Micro climates formed by building inform design in order to design comfortable outside spaces.
- Provide seating areas in the sunny areas and shady areas.
- Structure are arranged to direct air movements to a comfortable level.

4.1.2.3. Noise

- Noise levels in public environments are limited to acceptable levels by means of screens and the general layout.

4.1.2.4. Views

- Enhance good views and vistas to important focal points.
- Use vistas to support the idea of Pretoria being the Capital City of SA

4.1.2.5. Access to all public facilities

- Easy access is provided to all public facilities.

4.1.3. Participation & Control

Public participation in decisions about public environment helps to ensure that the users care for and manage these environments. Control over aspects of their local environment enables personal satisfaction and comfort. Both of these support sustainability by promoting proper management of environments and increasing productivity.

4.1.3.1. Environmental control

- Create spaces that offer the user choices in terms of the environmental conditions.

4.1.3.2 User adaptation

- Provision is made for the personalisation of spaces where desired. This may include provision for use like restaurants and coffee shops along the river etc.

4.1.3.3. Amenity

- Street furniture is designed to fit into character of the district while the range itself plays a role in creating a sense of place. It will include street lights, pedestrian lights, benches, dustbins, bicycle stand, notice boards, water fountains and bus stop shelters.
- Information Booths should assist tourists as well as the local.
- Social spaces: Design for easy informal / formal social interaction. Seating provided along regularly used routes. Create spaces in different scales to cater for small groups and larger groups.

4.1.3.4. Hard Open Space

Hard open space has a major social function in the Hospital Precinct:

- Activities such as play, sport and recreation.
- Cultural entertainment.
- Visitor's destination for lingering and resting.

- Meeting and socialising space as it is situated between the public and private space and is surrounded by different uses.
- Backdrop for markets, vending and festivals.
- Access to facilities such as public services, libraries and clinics.
- Transport mode for pedestrians and cyclist as well as waiting area at intermodal nodes.
- Venue for political ceremonies and parades.

All these functions are located in hard open space taking the form of mixed-mode streets, pedestrian orientated streets, squares/plazas, markets, parking areas and public transport stops and stations.

4.1.3.5. Soft Open Space

Soft open space plays an important role in the psychological and physical needs of the urban people in the Hospital Precinct. Soft open space incorporated in the framework includes:

- Parkways
- Parks, regional and neighbourhood
- Sports fields
- Play spaces

- River corridor

4.1.3.6. *Community involvement:*

- Spaces or services should be shared or made available to local community. This includes access to halls that can be used for community forums.

4.1.4. Education, Health and Safety

Landscapes need to cater for the well being, development and safety of the people that use them. Environments that promote health can help reduce the incidence of diseases such as AIDS. Safe environments and first aid can help limit the incidence of accidents and where these occur, reduce the effect. Learning and access to information is increasingly seen as a requirement of a competitive work force. All of these factors contribute to sustainability by helping ensure that people remain healthy and economically active, thus reducing the 'costs' (to society, the environment and the economy) of unemployment and ill health.

4.1.4.1. *Education*

- Access and support for learning should be provided. This can be in the form of Internet access, structured courses, or the

provision of learning material such as books, journals and newspapers. The presence of health institutions in the precinct lends itself to this type of support and education.

- It should be exploited.

4.1.4.2. *Security and safety*

- Measures should be taken to ensure that the streets, public environment and routes to and from building, are safe, and feel safe. Measures taken could include well lit routes, routes and spaces overlooked by occupied areas, clear visual links between spaces.
- Patrols and visual policing should be present in the precinct.
- All structures in development comply with all safety requirements.
- Policy/regular checks in place to ensure that these are complied with.

4.1.4.3. *Health*

- First aid station to be provided in a central location as well as in every building.
- Include policies to ensure that this can be used effectively. Information readily available on health, education, and career

development issues. This could be in the form of a well-serviced notice boards located in a central position.

4.1.4.4. Sanitation

- Public toilets should be provided and should be managed well as this precinct will be visited by tourists and commuters.

4.2. Economic Issues

The economic dimension of sustainability concerns a projects impact on the economic circumstances of its stakeholders and on economic systems at the local, national and global levels.

4.2.1. Local Economy

The construction and management of developments can have a major impact on the economy of an area. The economy of an area can be stimulated and sustained by developments that make use and develop local skills and resources.

4.2.1.1. Attract businesses to the precinct

- Businesses are encouraged to locate in the precinct by creating high quality facilities for them to rent/buy in an appropriate location.

4.2.1.2. Encourage local small business development

- Small businesses like street markets and vending is encouraged in order to improve the living standard of local underprivileged persons.

4.2.1.3. Attract tourists, clients and buyers to the precinct

- A redeveloped and upgraded public realm will attract people and thus money to the precinct. This money will benefit the local economy.

4.2.2. Efficiency of Use

Buildings and developments cost money and make use of resources whether they are used or not. Effective and efficient use of buildings supports sustainability by reducing waste and the need for additional buildings.

4.2.2.1. Occupancy

- Building and all working/living spaces should be occupied for an average minimum of 30 hours per week. Zoning for mix-use will achieve this.

4.2.2.2. Diversity of function

- A diversity of uses will be created to allow for economic

generation and multiple functions.

4.2.2.3. *Space use*

- Spaces should be used effectively and efficiently. Robust layout and design accommodates maximum space use. Public spaces should be as robust as possible in order to allow for this intensity of use while keeping its character. The area along the river should be open for exhibitions, festivals etc.

4.2.2.4. *Ongoing Costs*

- Design should minimise the ongoing costs associated with provision of water and energy as well as disposal of sewerage and solid waste. Consumption and costs should be monitored regularly and reported to management. Create a policy and management to reduce consumption.

4.2.3. *Tourism*

Tourism plays a vital role in the local economy as well as the national economy of SA. Pretoria is the capital city of this country and lures a lot of tourists, especially foreign tourists to its streets and markets. This form, as one of the most sustainable ways of generating

income, should be exploited to the benefit of all.

4.2.3.1. *Tourist accessibility*

- Tourist bus stops and an information centre is located within the precinct near an intermodal node giving tourist access to the opportunities of the precinct as well as the rest of Pretoria.

4.2.3.2. *Attractions*

- Tourist attractions are located within the precinct. These include the State Boulevard, Apies River Corridor, Pretoria Zoo, etc.

4.2.3.3. *Safety*

- The framework aims to generate a safe environment that will be beneficial to tourism in the area.

4.3. Environmental Issues

4.3.1. *Biodiversity*

Buildings have a footprint and a size that take up space that could otherwise be occupied by natural ecosystems which contribute to sustainability by helping create and maintain an environment that supports life. (By, for instance controlling the carbon dioxide and

oxygen balance and maintaining temperatures within a limited range). Developments can support sustainability by, limiting development to sites that have already been disturbed, and working with nature by including aspects of natural ecosystems within the development. Habitat can be created in the urban realm through implementation of Function-based Habitat Design (Breedlove et al, 2003) as a wildlife management tool to re-establish wildlife in the city.

4.3.1.1. Habitat and Biodiversity through Function-based Habitat Design at regional and precinct level

The precinct has to provide habitats for animals. This is done through the principles of Function-based Habitat Design (Breedlove

et al, 2003). Habitat will be created on framework scale in accordance with the habitat requisites of the chosen Guild Crest Animal Species. These Species includes the Lesser Bushbaby, Banded Mongoose, Tawny Flanked Prinia, Fresh Water Crab and the Common Hottentot Butterfly.

- The habitat types associated with species mentioned above are Acacia canopy, Acacia shade vegetation, riparian fringe, upland/grassland, patchy wetland emergent, fresh water river bed and river bank. These habitats will be accommodated in the urban framework by means of regional parks, neighbourhood parks, street corridors, river corridors and public parking areas. This includes a coordinated landscaping strategy that takes into account planting, water, habitat structure, nesting and resting cavities, etc.

- Biodiversity will be maximised by creating robust habitat that will fulfil in the needs of selected Guild Crest Species as well as all the species associated with the selected guilds.
- Management strategies will be implemented to

Nr	Guild Crest Species	Structural Unit	Function	Min Area (ha)	Home Range (ha)
1	Lesser Bush Baby	Tree Canopy	Feeder	4	7
2	Tawny Flanked Prinia	Patchy Wetland	Nester	1 to 4	15
3	Tawny Flanked Prinia	Upland	Feeder	1 to 4	15
4	Freshwater Crab	Water Edge	Feeder	Water	-
5	Common Hottentot Butterfly Larvae	Grassland	Feeder	1	2
6	Banded Mongoose	Acacia Shade	Feeder	3 to 4	3 to 4

continuously monitor and adjust the created habitat to ensure that it functions at optimum or above optimum level.

4.3.1.2. *Vegetation*

- Plant selection will be motivated by the vegetation palette from the guild requisites template.
- These plants will also fit into the climatic conditions of Pretoria and thus supports sustainability.
- Plants should be chosen to fit the aesthetic character of the site

4.3.1.3. *Brownfield site*

- Development will happen on sites that have already been built on in order not to disturb existing fauna and flora.

4.3.2. *Water*

Water is required for many activities. However the large-scale provision of conventional water supply has many environmental implications. Reducing water consumption supports sustainability by reducing the environmental impact required to deliver water, and dispose of this after use in a conventional system.

4.3.2.1. *Rainwater*

- Rainwater will be harvested and used on site, allowing infiltration on site and thus feeding the ground water.

4.3.2.2. *Water use*

- The use of water efficient devices is encouraged.
- Construction will be done in the winter months when precipitation is low in order to minimize soil loss, erosion and silt clogging up the waterways.

4.3.3. *Energy*

Conventional energy production is responsible for making a large contribution to environmental damage and non-renewable resource depletion. Using less energy or using renewable energy in the development can make a substantial contribution to sustainability.

- The precinct is well served by public transport to accommodate low energy transport.
- Pedestrian and cyclist movement networks are promoted.
- Large green spaces covered with trees enhance the micro climate to fit the human comfort level in a sustainable manner.

5. HOSPITAL PRECINCT DETAIL BASELINE OBJECTIVES

The following objectives focus on the detail design of Hove's Drift (the crossing of Dr. Savage Street with the Apies River). The Hospital Hill Precinct Baseline Objectives still applies to the detail design, but this section discuss more detailed objectives that are to detailed to apply to a project on a framework scale.

5.1. Social Issues

5.1.1. User Comfort

5.1.1.1. *Lighting in the landscape*

- The building entrances, walkways, sidewalks, streets and the river canal should be well lit during night time, especially the pedestrian crossing at the bridge.
- Glare and discomfort from the light source should be minimised.

5.1.1.2. *Human comfort*

- The micro climate of the site will be altered to fit the human comfort levels by means of sun/shade patterns, evaporative

cooling techniques and directing natural air movement.

- Materials used will help to manipulate the climate in order to make it more comfortable.
- Create spaces that offer the user choices in terms of the environmental conditions.
- Provide seating in the sunny and shady areas.

5.1.1.3. *Noise*

- Traffic noise from the street will minimised by using absorbing material, planting and other screens.

5.1.1.4. *Views*

- The view along the Apies River will be enhanced.
- Hove's Drift will become a focal point accentuating the entrance into Pretoria CBD.

5.1.1.5. *Access*

- Hove's Drift accommodates a intermodal node that will enhance the accessibility to all parts of the precinct.
- All routes on the site are to be of a smooth and even surface (i.e. easily navigable by wheelchair).

5.1.2. Participation & Control

5.1.2.1. Environmental control

- Provision made for personalisation of spaces if desired. This may include provision for pin boards, choice of colours, places for plants and personal storage.

5.1.2.2. Public amenity

- A range of street furniture elements would add to the public amenity. This includes street lights, pedestrian lights, benches, dustbins, bicycle stand, notice boards, water fountains and bus stop shelters.
- Information booths would add to the comfort of tourists and new visitors to the area.
- Social spaces: Design for easy informal / formal social interaction. Seating provided along regularly used routes. Create spaces in different scales to cater for small groups and larger groups.
- High diversity and density of wildlife in the urban realm would add to the public amenity.

5.1.2.3. Hard Landscaping

- Stairs and ramps would be provided.
- All edges would be clearly distinguishable through the use of colour and texture, especially at level changes.
- Hard landscaping will facilitate circulation and many other uses on the site.
- Scale and proportion would fit the concepts of enclosure, continuity, rhythm etc.
- Detail design would discourage vehicle speeding.
- Material selection and design would enhance legibility and sense of place.
- Contrasting open space would be created with greater or less activity.
- Appropriate interfaces between public and private would be created.
- A variety of surfaces would be provided to increase maximum choice of use.

5.1.3. Education, Health and Safety

5.1.3.1. Education

- The environment would act as a tool for enviro-education. Being situated near schools for disabled learners, the project would grab the opportunity and exploit it, creating learning opportunities for these people.
- This environment would act as an example of how the human and natural habitat can be successfully integrated in the urban realm.

5.1.3.2. Security and safety

- The sign would enhance the safety of the area: eyes on the street idea.
- Design specifications will comply with that of safety regulations.
- Patrols would add to the safety of the area, also for the tourists.
- Other measures would include well lit routes, routes and spaces overlooked by occupied areas, clear visual links between spaces.

5.1.3.3. Health

- First aid station will be provided at the intermodal node.
- The site would be near a clinic and a major hospital.
- All water that users come in contact with would be clean and risk free.
- Public will have access to clean toilets and drinking water.

5.1.4. Work Environment and Labour Practices

During the construction phase of the development it is important to encourage healthy work environments and good labour practices.

5.1.4.1. Quality of Management

- Management should facilitate employer orientation to conform to the vision of the organisation.
- Evidence of employee engagement in decision making processes.
- Promote job satisfaction at all levels.

5.1.4.2. Health and Safety

- Make provision for a reporting body that handle incidences and complaints of unsafe practices on the job.

- Supply workers with protective equipment where applicable (i.e. hardhats and safety glasses).

5.1.4.3. Wages and Benefits

- Comply with national legal minimum wages.
- Have an understanding of the local cost of living and compensate workers accordingly.
- Provide workers with health and pension benefits.

5.1.4.4. Human Rights

- There should be no discrimination.
- Percentage of woman and previously disadvantaged people in prominent positions.
- Comply with Child and Forced Labour laws.
- Freedom of association should be enforced.
- Where applicable indigenous rights must be enforced.

5.1.4.5. Training and Education

- Provide for training in the budget over and above annual costs.
- Facilitate training of extra staff to accommodate problems associated with the HIV/Aids epidemic and the age at which

workers stop working.

5.2. Economic Issues

The economic dimension of sustainability concerns a projects impact on the economic circumstances of its stakeholders and on economic systems at the local, national and global levels.

5.2.1. Local Economy

The construction and management of developments can have a major impact on the economy of an area. The economy of an area can be stimulated and sustained by developments that make use and develop local skills and resources.

5.2.1.1. Local contractors and local expertise

- 80% of the construction would be carried out by contractors based within 40km of the development.
- Design would incorporate expertise of local artists and craftsmen.

5.2.1.2. Local construction material supply

- 80% of construction materials: cement, sand, bricks etc must be produced within 200km of site.

- Project would utilise plants from local growers and nurseries.

5.2.1.3. *Local component manufacturer*

- 80% of construction components i.e. street furniture range would be produced locally (within 200km).

5.2.1.4. *Outsource opportunities*

- Opportunities would be created and provision provided for small emerging businesses. This includes outsourcing catering, cleaning services and security as well as making space and equipment available for businesses to use for retail, education etc.

5.2.1.5. *Repairs and maintenance*

- All repairs and maintenance required by the development (including servicing of mechanical plant) can be carried out by contractors within 200km of site.

5.2.2. Efficiency of Use

5.2.2.1. *Diversity of function*

- A diversity of uses would be created that allow for economic generation and multiple functions.
- The area would be able to accommodate the individual person

as well as large groups without losing its sense of place.

5.2.2.2. *Space use*

- Different spaces would be used for learning, playing, recreation, sitting, resting and walking. These spaces should be robust to accommodate maximum space use.

5.2.3. Ongoing Costs

5.2.3.1. *Maintenance*

- Specification and material selections would aim for low maintenance and/ or low cost maintenance.
- Low or no maintenance components would be used (i.e. windows, doors, plant material etc).
- Maintenance would be carried out cost effectively (i.e. replaceable items such as light bulbs can be easily reached and replaced) while vandalism is minimised.

5.2.3.2. *Cleaning*

- Measures would be taken to limit requirement for cleaning. Hard wearing solid flooring would be specified.
- Designs would be easily accessible for cleaning and maintenance equipment e.g. lawnmowers.

5.2.3.3. Security / care taking

- Measures are taken to limit the requirement and costs of security. This would include mixed-use development (area is always occupied), buildings and spaces overlooked by occupied neighbouring buildings.
- Management systems must be put in place during the construction process concerning the control of safety and theft of material.

5.2.4. Capital Costs

Landscapes are valuable assets to the community. Cost effective developments ensure sustainability for all.

5.2.4.1. Consultant fees

- Consultant fees would not be calculated on total project cost basis only. Incentives would be provided to consultants to reduce capital cost and ongoing costs.

5.2.4.2. Build-ability

- Project would be designed to be built easily and cost effectively.
- Replication of elements and components would be made

easy.

5.2.4.3. Construction

- The construction approach would be designed to reduce initial capital cost of development.
- Construction would be phased.
- Finishes would be added later, after all the structures are constructed.

5.2.5. Tourism

5.2.5.1. Attractions

A variety of attractions would be available to the tourists:

- Access to the zoo.
- Restaurants and refreshments along the Apies River.
- Urban wildlife.
- Exhibitions and performances.
- Ride along the monorail route.
- Bicycle tours through the precinct and the city.
- Arts and crafts markets.
- State Boulevard.

5.2.5.2. Safety

- A main concern for tourist to SA is the crime rate. This would be addressed through sensible design and management.

5.3. Environmental Issues

5.3.1. Biodiversity

5.3.1.1. Habitat and Biodiversity

- The project would maximise biodiversity through design.
- The site would provide habitat to a wide range of animals through site specific Function-based Habitat Design (Breedlove et al, 2003).
- Function-based Habitat Design will add to the larger scale habitat requirements implemented on precinct scale by ways of the following:
 - creating back lot habitat
 - front yard habitat
 - streetscape habitat
 - green roofs
 - habitat supplements

- evocative design elements (i.e. all other landscaping elements)

- Habitat creation includes a coordinated landscaping strategy that takes into account planting, water, cavities etc.
- Management policies would enhance and better the habitats created.

5.3.1.2. Vegetation

- All vegetation introduced would be from Function-based Habitat Design Vegetation Palette that contains all the plants required to create a robust habitat fit for the local fauna.
- No invaders or aggressive plant material would be used.
- Plant selection would fit the local biomes and plant communities.

5.3.2. Water

5.3.2.1. Rainwater

- Rainwater is harvested, stored and used on site.
- Detention and retention facilities incorporated in runoff systems.
- Run off reduced by using pervious or absorbent surfaces.

- Hard landscaping minimised, pervious surfaces specified for car parking and paths.

5.3.2.2. *Water use*

- Water efficient devices would be used
- Grey water recycling will allow water for irrigation and some other purposes.
- Water pumped from basements will be used in irrigation etc. and not pumped down the storm water systems.

5.3.2.3. *Planting*

Planting has low water requirement (indigenous species).

5.3.3. Energy

Conventional energy production is responsible for making a large contribution to environmental damage and non-renewable resource depletion. Using less energy or using renewable energy in the development can make a substantial contribution to sustainability.

5.3.3.1. *Heating and Cooling System*

- Passive heating and cooling systems would be used that are environmentally friendly.
- Passive ventilation system.

- Choice of surface material to improve microclimatic conditions to the user.

5.3.3.2. *Renewable Energy*

- Use electricity generated from renewable sources i.e. wind, sun, biomass.

5.3.4. Recycling and Reuse

Raw materials and new components used in structures consume resources and energy in their manufacture and processes. Reducing the use of new materials and components in buildings and in the activities accommodated and reducing waste by recycling and reuse supports sustainability by reducing the energy consumption and resource consumption.

5.3.4.1. *Toxic waste*

- Arrangements would be made for the safe disposal / recycling of toxic/harmful substances i.e. batteries, printer toners, vehicle oil.

5.3.4.2. *Inorganic waste*

- Arrangements would be made for the sorting, storage and pick up of recyclable waste.

5.3.4.3. *Organic waste*

- Organic waste would be recycled on site to make compost.

5.3.4.4. *Construction waste*

- Construction waste would be minimised by careful management of construction practices. Design limits wastage by designing to comply with modular dimensions of materials etc.
- Separate reusable construction waste from other waste that can be used in the design.

5.3.5. Materials and Components

Developments usually require large quantities of materials and components. This may require large amounts of energy to produce. Their development may also require process that are harmful to the environment and consume non-renewable resources.

5.3.5.1. *Embodied energy*

- 80% of the construction materials and components would be made from materials and components with low embodied energy. Low embodied energy materials include locally (within country) made and sourced timber, concrete, concrete block

timber windows and doors etc.

5.3.5.2. *Material / component sources*

- 90% of materials and resources would be from renewable resources

5.3.5.3. *Recycled / reused materials and components*

- 10% of building materials and components would be reused or supplied by recycled sources.

5.3.5.5. *Construction processes*

- Building and construction process would be designed to minimally impact the environment.
- Requirement for large-scale vegetation clearing and earth movement minimised.
- Construction started in the end of the raining season to minimise soil loss and erosion.

6. EVALUATION

Commitment to these objectives will ensure the development of a project that scores high on sustainability while ethical practice was encouraged. The project should be evaluated after completion in order to verify which objectives were achieved and which not.

This evaluation is done by means of tables. First, all the objectives are ranked in terms of priority to establish the importance of each issue. This is done by referring to the analysis and by talking to the client and all the stakeholders before completion of the project. After completion of the project, the Evaluation Table is filled in order to establish where the project fell short in reaching the set objectives. The results of the Evaluation Table is compared to the prioritisation list to see if the main objectives have been reach, and thus to determine if the project was a success in term of sustainability and ethics. (The tables needed for evaluation is compiled in Appendix B.2)

APPENDIX B.1:

Normal Services and Duties rendered by the Professional Landscape Architect

SOUTH AFRICAN COUNCIL FOR THE LANDSCAPE ARCHITECTURAL PROFESSION

NORMAL SERVICES AND DUTIES

1.1 INITIAL STEPS

- 1.1.1 The Landscape Architects advise the Client with regard to the various services provided by the Landscape Architects. Having obtained the Client's preliminary affirmation of requirements the Landscape Architects must define possible guidelines for performance and action and advise the Client on the necessity of the services and appointment of other Consultants.
- 1.1.2 The Client must provide the Landscape Architects with all necessary information, documentation and plans which indicate related particulars.
- 1.1.3 After acceptance of appointment, the Landscape Architects must immediately do a complete investigation on the wider extent of The Project by
 - 1.1.3.1 Analysing all available data
 - 1.1.3.2 Visiting the site
 - 1.1.3.3 Consultation with the Client's Architects, Town Planners and Engineers or other Consultants who designed or are busy designing existing or planned buildings and other structures and services on the site concerned.
 - 1.1.3.4 Indicating which additional information must be provided by the Client.
 - 1.1.3.5 Arranging any special tests or investigations as may be necessary on site or in a laboratory after obtaining the written approval of the Client.

1.2 SCOPING STUDIES, ENVIRONMENTAL IMPACT ASSESSMENTS, ENVIRONMENTAL MANAGEMENT PLANS AND ENVIRONMENTAL AUDITING

Work done under this category entails all work necessary to comply with current legislation, such as the National Environmental Management Act, 107 of 1998

(NEMA) in order to obtain the necessary permits to carry out an activity.

Work executed under this section usually includes the following categories:

Scoping Reports

- 1.2.1 Environmental Impact Assessments
- 1.2.2 Specialist components of Environmental Impact Assessments such as Aesthetic/Visual Impact Assessment.
- 1.2.3 Environmental Management Plans.
- 1.2.4 Environmental Management and Planning Reports.
- 1.2.5 Environmental Auditing.
- 1.2.6 ISO 14001 development and implementation.
- 1.2.7 Strategic Impact Assessments.

1.3 ECOLOGICAL ANALYSIS, PLANNING AND REHABILITATION

Work done under this category entails surveys of the site in respect of geology, topography, microclimate, hydrology, soils, vegetation, etc. and is normally done in conjunction with specialist consultants. The interpretation of above-mentioned data is employed to determine the intrinsic suitability of the site for various uses. This category of Landscape Planning is usually done with a view to regional planning and the ecological planning of large sites with a view to optimal utilization and for the purpose of feasibility studies.

Work executed under this category usually includes the following services.

1.3.1 Collecting of Data

Visits to the site by the Landscape Architects accompanied by Specialist Consultants for the purpose of compiling data maps, which will be made available to the

Client. These data maps usually consist of inter alia, Geology, Climate, Hydrology, Geomorphology, Soil Map Units and Plant Species. Irrespective of the maps which are prepared with regard to ecological factors, data maps can also be prepared with regard to aesthetical considerations, social, cultural and economical factors.

1.3.2 Assimilation of Data

The Landscape Architects will interpret the collected data by either using computer or manual methods and may find it necessary to prepare interpreted data maps.

1.3.3 Formulation of Site Utilization Plans

The Landscape Architects will, on the basis of the preceding data, indicate the optimum utilization of the particular site which usually includes the following; development (housing, industrial, etc.), agriculture, recreation (active and passive), conservation areas and transport corridors. The Client may also request the Landscape Architects to find a suitable site for development.

The preceding documents will be accompanied by a written report in which The Project is described and in which recommendations for the implementation of the proposals for utilization will be made.

1.4 LANDSCAPE MASTER PLAN OR LONGTERM DEVELOPMENT PLAN

If the Client has already obtained a site for the purpose of development, the Landscape Architects will analyse all the natural and man-made characteristics of the site as well as determine the needs of the Client with regard to utilization of the site. This information will then be used for the preparation of a Landscape Master plan and/or Sketch plan as agreed.

The Client and the Landscape Architects will mutually determine the necessity of a Master plan. The Master plan will be compiled in order to exercise control over a project, which will be developed over a long period of time.

The Master plan will contain information with regard to zoning for use, traffic and pedestrian circulation on the site, placing of future buildings, schematic plant and soil shapes in the landscape, and will indicate suitable areas for facilities such as active and passive recreation, conservation and other functional as well as non-functional uses.

Where major earthmoving is planned, an amended contour plan must be compiled as part of the Master plan. The Master plan can also be subdivided into development priority areas, which will enable the Client to take decisions in this regard. The Master plan will also be accompanied by a written report setting out the considerations for planning with regard to development priorities.

1.5 SKETCH PLANS AND COST ESTIMATES

The Client will describe the extent of the necessary development in phases. The Landscape Architects' performances as stated in clause 1.5.1 to 1.5.7 below must only give effect to the immediate requirements of the Client formulated in writing in agreement with the provisions of the Master plan where such Master plan exists.

- 1.5.1 Studies to determine the practical feasibility of The Project must be done by the Landscape Architects on the basis of all available information and must be done in accordance with the Master plan.
- 1.5.2 After the Landscape Architects have properly studied the requirements of The Project and have informed the Client of its feasibility, the Landscape Architects must prepare PRELIMINARY SKETCH PLANS AND PRELIMINARY COST ESTIMATES of the phases as described in clause 1.5.1 above, as well as preliminary time schedules for the programming of documentation and construction.
- 1.5.3 If the Landscape Architects' preliminary proposals are not acceptable to the Client, the Landscape Architects must at their own expense change their proposals to the satisfaction of the Client, in as much as no change is made to the Client's planning philosophy and given requirements.
- 1.5.4 The landscape Architects must comply with the regulations of any local authority that has jurisdiction in the area in which the terrain is situated and must submit all necessary information to such authority for approval. The Landscape Architects must notify and inform the Client of matters concerning The Project which come to their attention and which can be of direct interest to the Client, including possible infringement on the rights of persons.
- 1.5.5 After written approval of Preliminary Sketch plans by the Client, the Landscape Architects must prepare a set of FINAL SKETCHPLANS and revised cost estimates which will serve as a fixed basis for all further work documentation.

- 1.5.6 Sketch plans and cost estimates must entirely cover all aspects involved in Landscape Planning, namely soil profiles, storm water drainage, irrigation, illumination of the terrain, pedestrian and traffic circulation, parking, recreation facilities and a schematic indication of planting.
- 1.5.7 Cost estimates at the Sketch plan phase must be prepared in consultation with the Consultants.

1.6 WORK DOCUMENTATION AND INVITING TENDERS

- 1.6.1 After written approval of final sketch plans and cost estimates of a specific phase, the Landscape Architects must, when receiving the instruction to do so prepare and compile within a reasonable period as agreed, work and detail drawings, specifications, and bills of quantities as well as contract documents in order to execute the work as contained in the final sketch plans. The work connected to a specific phase may, after written approval of the Client, be subdivided by the Landscape Architects into various subdivisions. The extent of each subdivision will normally be determined by the contractual ability of landscape contractors or as agreed with the Client.

Complete documentation, which falls within the scope of the normal services of the Landscape Architects, must be done for each phase or subdivision thereof, namely inter alia.

- 1.6.1.1 SOIL PROFILE PLANS: which are based on the original or modified contour plans and which indicate the general soil profile as well as the slopes of the soil around buildings or other structures or sports fields, etc, and also the positions of roads, soil retaining walls, stairs or ramps, water pools, ponds, etc.
- 1.6.1.2 SITE PLANS: which accurately indicate all structures or sports fields, foot-paths, traffic roads, parking spaces, planted areas, general instructions, etc. with dimensions.
- 1.6.1.3 PLANTING PLANS: which indicate the positions, type, species and variety of all plants which must be planted, and all existing plants which must not be removed and all existing plants which must be removed.
- 1.6.1.4 DETAIL DRAWINGS: on which the construction of smaller individual items must be indicated, for example plant containers, paving, stairs, seats, dustbins, ponds, recreational apparatus for children, etc.

- 1.6.1.5 SPECIFICATIONS: in which a thorough description of all materials to be used, is defined as well as specific methods of construction and/or installation. The specifications will be prepared in such a way that the work of the various trades or different contractors will be stated separately, for example excavations and soil formations, concrete work and masonry, paving work, recreation equipment, installation of services and planting.
- 1.6.1.6 BILLS OF QUANTITIES: in which all work to be done and all material and equipment to be provided, be itemized under the various categories of work and will indicate the unit of measure and the quantities.
- 1.6.1.7 CONTRACT DOCUMENTS: in which reference will be made to all the documentation of Clauses 1.6.1.1 to 1.6.1.6 hereof and containing sufficient and binding clauses to establish a complete, legal contract or plurality of contracts between Client and Contractors and to ensure timeous and proper completion of the work.
- 1.6.2 The Landscape Architects must at all stages co-ordinate all work of the Consultants with regard to the landscape contract work. Consultants will be responsible for the detail design of all individual items which exist on the site, where the technical and specialized nature of these items is of such extent that the design thereof does not fall within the scope of the Landscape Architects' normal services, in which case the Consultants in consultation with the Landscape Architects and to the satisfaction of the Client will compile complete work drawings, specifications and bills of quantities and tender and contract documents, will appoint specialist contractors and supervise the execution of their work. Final approval of all stages of Consultants' work rests with the Client.
- 1.6.3 After total completion of all work documentation for every individual phase of the project or for subdivisions of phases, as described in clause 1.5 and 1.6 hereof, a complete set of contract documents as well as a final cost estimate and adapted time schedule in the form of a detailed network programme, must be submitted to the Client. The cost estimate and time-schedule must be compiled in consultation with the Consultants and must also include all parts of their work. If the final cost estimate deviates with more than more or less 10% of the revised cost estimate, the Landscape Architects must submit a complete statement of reasons for such deviation.
- 1.6.4 After all documentation as described in clause 1.6.3 have been approved in writing by the Client, the Landscape Architects must obtain tenders for the Landscape Work as described in clause 1.6 and must make a motivated recommendation to the Client regarding the appointment of a specific Tenderer. No tender may be accepted without the written approval of the Client. The methods of obtaining tenders will be as set out in clause 1.12 hereof.
- 1.6.5 If the lowest tender exceeds the final cost estimate with more than 15%, the Client may instruct the Landscape Architects to make changes in the extent and/or quality of the work so that the sum of the contract or estimated sum of the contract approximately agrees with the final cost estimate. All changes to documentation, which

may arise from such an instruction, will be done at the cost of the Landscape Architects except where higher tender prices are ascribable to unforeseen increases beyond the control of the Landscape Architects.

1.7 SUPERVISION ON EXECUTION OF WORK

- 1.7.1 Before signing the contract the Landscape Architects must ensure that the Contractor has complied with the requirements of the conditions of the Contract such as, inter alia, the acquisition of guarantees and insurance of the work.
- 1.7.2 After signing the contract the site must be handed over to the contractor. The Landscape Architects must further provide all necessary information to the Contractor to enable him to immediately commence with the execution of the work.
- 1.7.3 The Landscape Architects must supervise the work during the execution thereof in such a way and at such times, which will ensure that The Project will be completed in time and in agreement with the contract documents.
- 1.7.4 In addition to the supervision as stated in clause 1.7.3 above, bi-weekly meetings on the site must be held without extra compensation to the Landscape Architects, under chairmanship of the Landscape Architects. A representative of the Client will attend these meetings on the site. The Landscape Architects will keep minutes of the discussions and decisions taken during the terrain meeting, which will be read at every ensuing meeting for approval.
- If full-time or more regular supervision is necessary, the Landscape Architects will, after having obtained approval from the Client, be responsible for such supervision and will be compensated on a time basis for the additional work.
- Only the Landscape Architects may issue instructions to the Contractor. It is the Landscape Architects' duty to issue all necessary instructions, be it amended or not, which are necessary for the proper execution of The Project, in a written form and without delay to the Contractor in order to avoid delay of The Project or the particular contract.
- 1.7.5 Certificates for monthly payments to Landscape Contractors must be prepared and issued by the Landscape Architects. Other general administrative services regarding the contracts must also be rendered by the Landscape Architects. The Quantity Surveyor will be responsible for the general cost control of contracts and for the issue of recommendations with regard to certificates for monthly payments to contractors who are under control of other consultants. The latter recommendations must be certified for payment by the Landscape Architects.

- 1.7.6 The Landscape Architects must receive the completed parts of The Project on behalf of the Client in the presence of an authorized representative of the Client. The Landscape Architects must, upon due consideration of the contract date, see to it that no part of The Project is handed over unless it is thoroughly completed for inauguration, subject to the provisions of the contract between Client and Contractor.
- 1.7.7 The Landscape Architects must provide the Contractor with complete lists of retention work within three months after completion and take over of any part of The Project or after any other longer period of time as specifically determined by the nature of the particular part of The Project and as may be agreed upon in the contract between the Client and Contractor.
- 1.7.8 Copies of drawings of service installations and landscape work. 'AS BUILT' as well as planting plans as executed, must be provided to the Client in duplicate together with general instructions with regard to the maintenance of all individual items.

1.8 RECORDS

The Landscape Architects must keep the necessary records available and up to date, together with all the concerning correspondence and communications with regard to The Project, which will be submitted to the Client when, required to do so. Records of the Landscape Architects' personnel expenditure on the basis of time compensation, as well as expenditures and travel expenses described in the Method of Compensation document, must be kept according to a generally accepted accounting system and will be available for perusal by the Client.

1.9 SUBMISSIONS

The Landscape Architects must, without extra compensation, attend the Client's meetings in order to submit or explain any drawings or documents or provide information or advice on The Project or any other matter arising from it.

1.10 CONTINUOUS LANDSCAPE ARCHITECT SERVICES

The Client may, after completion of The Project, decide to appoint the Landscape Architects for a further period of time to, if necessary, advise the Client with regard to changes to the work already executed and to control the maintenance of The Project. The Landscape Architects will be compensated for such additional work on a time basis.

1.11 LIMITATIONS WITH REGARD TO AMENDED INSTRUCTIONS

The Landscape Architects and the Client must in the Deed of Agreement agree on a limitation with regard to the estimated amended instruction which is referred to in Clauses 1.7.5.1 to 1.7.5.3 hereof.

1.12 METHOD OF OBTAINING TENDERS

The Landscape Architects and the Client must in the Deed of Agreement agree on a method of obtaining Tenders for the execution of the work. Tenders may be obtained according to the following methods:

1.12.1 Open Tenders

Where the proposed landscape contract is advertised in the press languages and documents are made available to interested parties.

1.12.2 Open Tenders for Bona Fide Landscape Contractors

Where the proposed landscape contract is advertised in the press but in which case documents are only made available to bona fide landscape contractors who are members of the recognized organisation.

1.12.3 Tender by Invitation

Where at least three landscape contractors are invited to tender for a landscape contract.

1.12.4 Negotiated Contract

Where the Landscape Architects will negotiate with a specific Landscape Contractor on behalf of the Client.

1.12.5 Other

The Landscape Architects will in all cases ensure that the conditions and methods of obtaining tenders will comply to the Client's tender rules and conditions.

APPENDIX B.2: EVALUATION TABLES

Table 1: Objective Prioritisation

	Criteria:	No 1	Low 2	Medium 3	High 4	Essential 5
SO	Social Issues					
SO1	Inclusive Environments					
SO2	User Comfort					
SO3	Participation and Control					
SO4	Community Involvement					
SO5	Education, Health, Safety					
EC	Economic Issues					
EC1	Local Economy					
EC2	Efficiency of Use					
EC3	Tourism					
EN	Environmental Issues					
EN1	Biodiversity					
EN2	Water					
EN3	Energy					

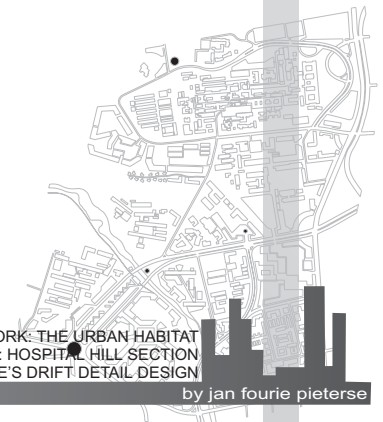
Table 2: Project Evaluation: Hospital Hill Precinct Development Framework.

PROJECT EVALUATION: Hospital Hill Precinct Framework			
	Criteria:	Achieved: Y / N	Comment:
S0.1	Inclusive Environments		
S0.1.1	Urban Form		
S0.1.2	Transport		
S0.1.3	Access to facilities		
S0.2	User Comfort		
S0.2.1	Lighting in the Landscape		
S0.2.2	Human Comfort		
S0.2.3	Noise		
S0.2.4	Views		
S0.2.5	Access to Public Facilities		
S0.3	Participation & Control		
S0.3.1	Environmental Control		
S0.3.2	User Adaptation		
S0.3.3	Amenity		
S0.3.4	Hard Open Space		
S0.3.5	Soft Open Space		
S0.4	Community Involvement		
S0.4.1	Community Involvement		
S0.5	Education, Health & Safety		
S0.5.1	Education		
S0.5.2	Safety & security		
S0.5.3	Health		
S0.5.4	Sanitation		
EC.1	Local Economy		
EC.1.1	Attract Business		
EC.1.2	Small Businesses		
EC.1.3	Tourist Attraction		
EC.2	Efficiency of Use		
EC.2.1	Occupancy		
EC.2.2	Diversity of Function		
EC.2.3	Space Use		
EC.2.4	Ongoing cost		
EC.3	Tourism		
EC.3.1	Tourist Accessibility		
EC.3.2	Attractions		
EC.3.3	Safety		
EN.1	Biodiversity		
EN.1.1	Habitat		
EN.1.2	Vegetation		
EN.1.3	Brownfield Sites		
EN.2	Water		
EN.2.1	Rainwater		
EN.2.2	Water Use		
EN.3	Energy		
EN.3.1	Energy		

THE URBAN HABITAT

Appendixes.

APPENDIX C. STAKE HOLDER & RISK ANALYSIS.

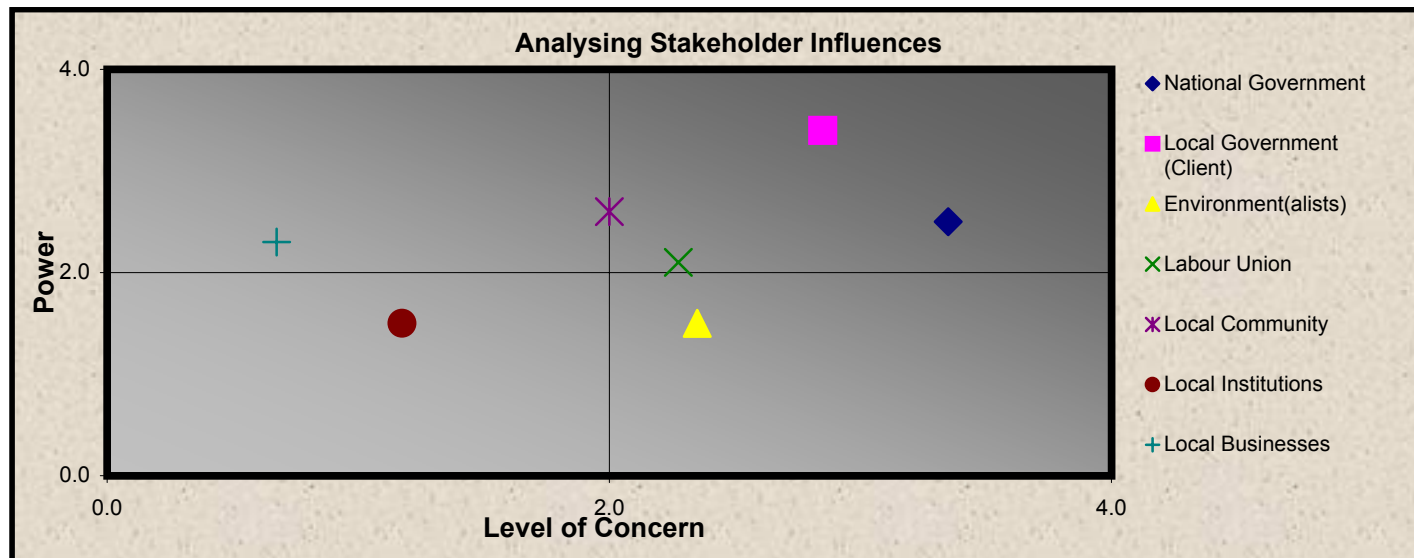


THE HOSPITAL HILL URBAN DEVELOPMENT FRAMEWORK: THE URBAN HABITAT
APIES CORRIDOR MASTER PLAN: HOSPITAL HILL SECTION
HOVE'S DRIFT DETAIL DESIGN

by jan fourie pieterse



Analysing Stakeholder Influence							Notes
Stakeholder Group	Power		Y-Axis Score	Level of Concern		X-Axis Score	
	Influence on Others	Direct Control of Resources		Technical	Social		
	0.35	0.65		0.2	0.8		
National Government	4.0	3.0	3.4	0.5	3.0	2.5	Key Stakeholder - Manage as such
Local Government (Client)	3.5	2.5	2.9	3.0	3.5	3.4	Key Stakeholder - Manage as such
Environment(alists)	3.0	2.0	2.4	3.5	1.0	1.5	Contingency Plan
Labour Union	0.0	3.5	2.3	0.5	2.5	2.1	Contingency Plan
Local Community	2.0	2.0	2.0	1.0	3.0	2.6	Contingency Plan
Local Institutions	1.5	1.0	1.2	1.5	1.5	1.5	Take Note
Local Businesses	1.0	0.5	0.7	1.5	2.5	2.3	Take Note



Risk Management Flowchart

Consequence Measure	C	Probability Measure	P	Risk Category	RF
Catastrophic	5	Likely	5	High	15 to 25
Major	4	Moderate	4	Medium	8 to 14
Moderate	3	Unlikely	3	Low	2 to 7
Minor	2	Rare	2		
Insignificant	1				

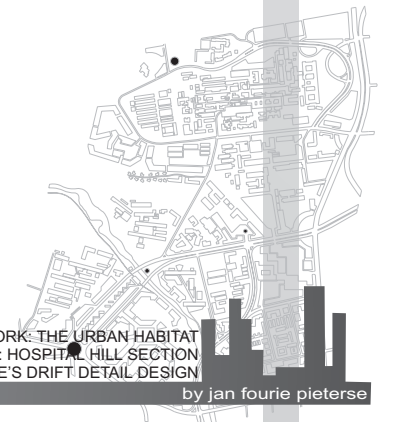
Rank	Risk Description	Risk Assessment	Control Assessment	Risk Factor	Assurance Priority	Mitigation Measures
		C	P	RF	(Category)	
		1 to 5	1 to 5			
Pre-Construction Phase						
1	Financial Investment	4.5	4	18	High	Ensure integration of PM, financial Systems, QS
2	Vision and Concept	4	4.5	18	High	Provide external oversight
8	Inadequate Risk Analysis	4	3	12	Medium	Provide external oversight
12	Currency Changes	3.5	3	10.5	Medium	Consult economists
14	Intellectual Investment	3	3	9	Medium	Provide external oversight
15	Party Cooperation	3	3	9	Medium	Provide external oversight
18	Legislation	2.5	1.5	3.75	Low	Legal consultation
Construction Phase						
3	Cost Management	4	4	16	High	Ensure integration of PM, financial Systems, QS
4	Schedule Management	4	4	16	High	Implement adherence and tracking system
7	Unanticipated. Govern. Intervention	3.5	3.5	12.25	Medium	Legal consultation, party participation
9	Resources	3	4	12	Medium	Resource management
10	Security	2.5	4.5	11.25	Medium	Manage
13	Natural Hazards	3.5	3	10.5	Medium	Insurance
16	Currency Changes	3	3	9	Medium	Consult economists
19	Safety	1.5	2.5	3.75	Low	Proper safety measures
Operational Phase						
5	Loss of Market Potential	4	3.5	14	Medium	Proper market study and conceptual development
6	Tourism Stability	4	3.5	14	Medium	Marketing & Management
11	Management	4.5	2.5	11.25	Medium	External oversight
17	Security & Safety	3	3	9	Medium	Proper safety measures

Executive Manager : JF Pieterse
 Risk Officer : JI Jo
 Date : 11/11/2003

THE URBAN HABITAT

Appendixes.

APPENDIX D. CASH FLOW & PROJECT MANAGEMENT.



THE HOSPITAL HILL URBAN DEVELOPMENT FRAMEWORK: THE URBAN HABITAT
APIES CORRIDOR MASTER PLAN: HOSPITAL HILL SECTION
HOVE'S DRIFT DETAIL DESIGN

by jan fourie pieterse



Hospital Hill Urban Development Framework
Hove's Drift Centre

06/11/2003

JF Pieterse

Schedule of Accommodation						
Description	Item	Number	Area/space	Tot. Area (sq m)	Rate/sq. m.	Cost
Restaurant	Kitchen	1	35	35	R 2,800.00	R 98,000.00
	Dining Area	1	150	150	R 2,500.00	R 375,000.00
	Deck	1	75	75	R 650.00	R 48,750.00
Café	Kitchen	1	20	20	R 2,500.00	R 50,000.00
	Sitting Area	1	75	75	R 1,800.00	R 135,000.00
Terminal	Waiting Area	1	100	100	R 250.00	R 25,000.00
	Stop Area	2	30	60	R 1,000.00	R 60,000.00
	Ticket Sales	1	10	10	R 2,000.00	R 20,000.00
Info Centre	Exhibition Area	1	30	30	R 2,000.00	R 60,000.00
	Shop	1	30	30	R 2,500.00	R 75,000.00
1st Floor	Public Area	1	175	175	R 1,500.00	R 262,500.00
	Roof Garden	1	100	100	R 1,700.00	R 170,000.00
	Roof Pond	1	9	9	R 1,500.00	R 13,500.00
	Roof Structure	3	70	210	R 1,000.00	R 210,000.00
Amenities	Hard Landscaping	1	700	700	R 210.00	R 147,000.00
	Soft Landscaping	1	350	350	R 150.00	R 52,500.00
	Water feature	1	20	20	R 1,500.00	R 30,000.00
	Irrigation	1	300	300	R 20.00	R 6,000.00
	Lighting	1	1000	1000	R 15.00	R 15,000.00
	Street furniture	lump sum				R 50,000.00
Total :				3449		R 1,903,250.00

**Hospital Hill Urban Development Framework
Hove's Drift Centre**

06/11/2003

JF Pieterse

Project Budgeting and Cash Flow

Hove's Drift Centre

Project Analysis

Area of Building (sq. m.)	585
Estimated Cost for Building	R 1,602,750.00
Area of Landscaping (sq. m.)	1,070
Estimated Cost for Landscaping	R 300,500.00
Estimated Project Cost	R 1,903,250.00
Professional Fees (9.2% of Project Cost)	R 175,099.00
Estimated Disbursement Cost (30%)	R 52,529.70

Subdivision of fees for variuos stages of work completed

Project Cost R 1,903,250.00

Stage	Stage description	Percentage	Fee/Stage	Cost/M. Hr.	M. Hrs. Avble	M. Hrs. Used	% Used	M.Hrs. Rmng	No Prsns	Hrs. Duration	Wks Duration
1	Master Planning	5%	R 8,754.95	R 104.00	84	84	100%	0.00	2	42	1.05
2	Sketch Plans	35%	R 61,284.65	R 104.00	589	589	100%	0.00	3	196	4.91
3	Documantation	30%	R 52,529.70	R 104.00	505	505	100%	0.00	2	253	6.31
4	Supervision	30%	R 52,529.70	R 104.00	505	505	100%	0.00	2	253	6.31
Total:		100%	R 175,099.00		1,684	1,684		0.00		744	18.6

Hospital Hill Urban Development Framework
Hove's Drift Centre

06/11/2003

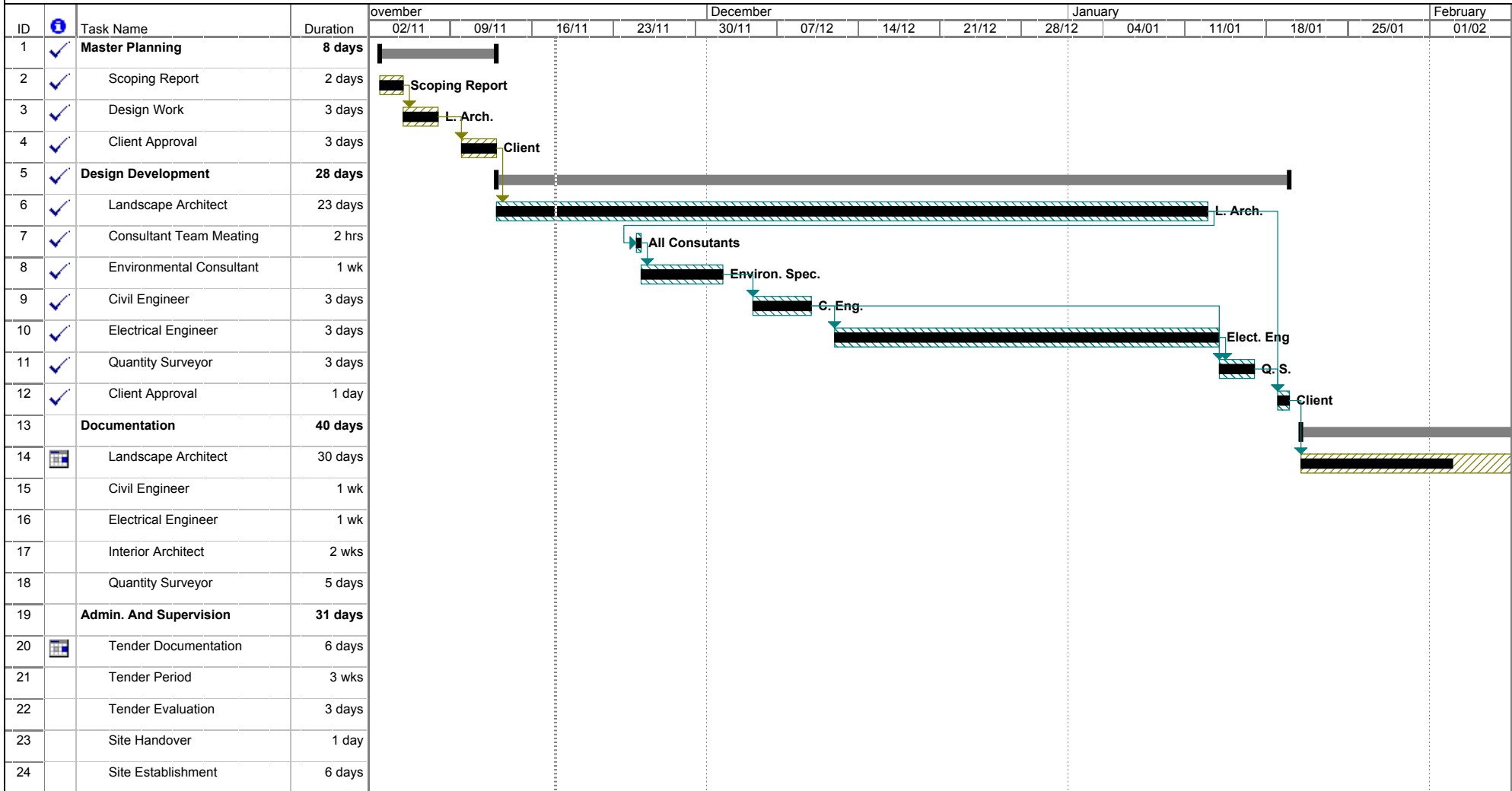
JF Pieterse

Office Cash Flow

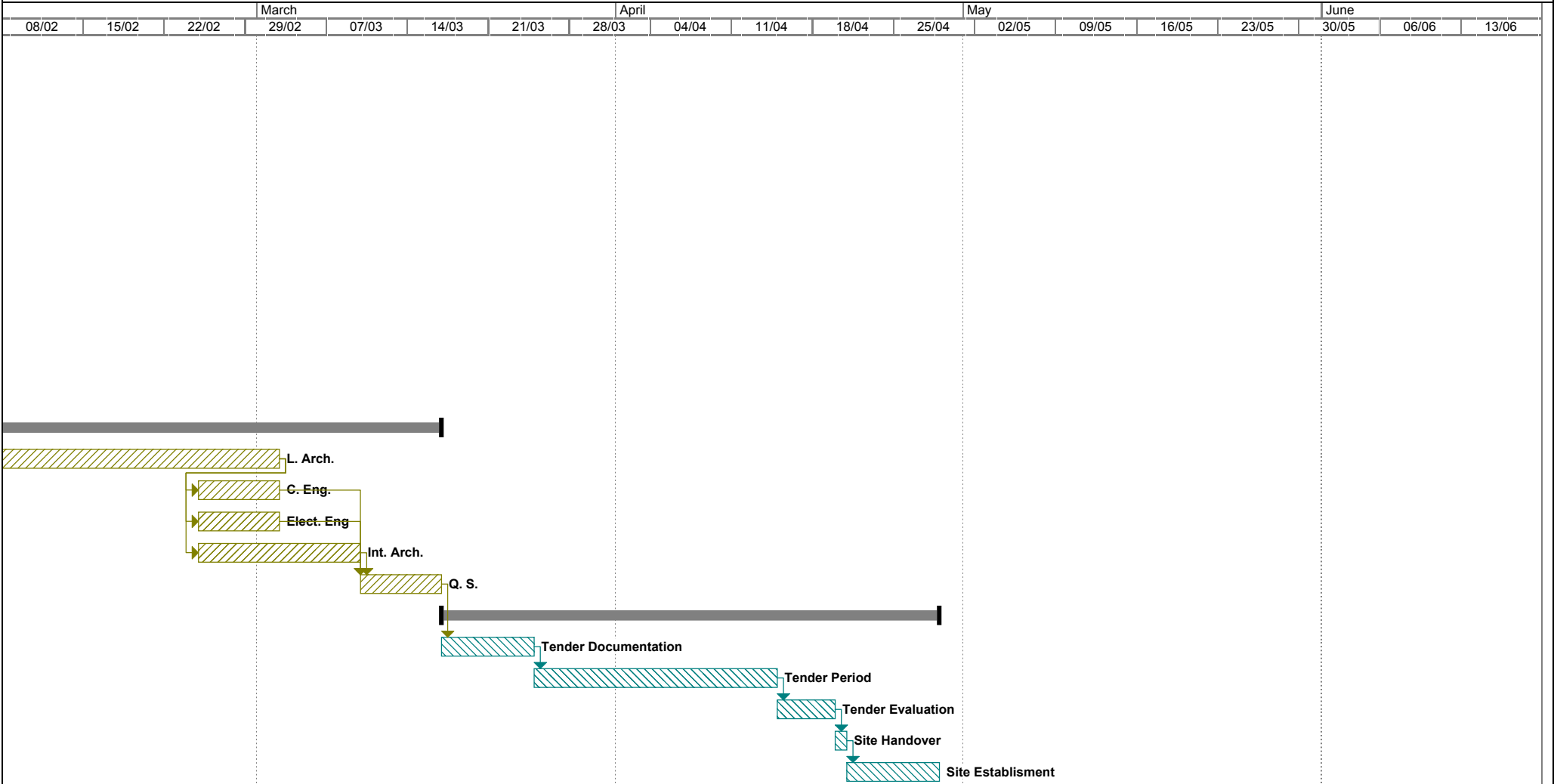
November 2003 to April 2004

Project Description	Project Cost	Fees and disbursements (to date)			November		December		January		February	
		Budget	Receive	Remain	Fee	Dist.	Fee	Dist.	Fee	Dist.	Fee	Dist.
Hove's Drift Centre	R 1,903,250.00	Fees	R 175,099.00	R 0.00	R 175,099.00	R 8,754.95		R 30,642.33		R 30,642.33		R 26,264.85
		Disb.	R 52,529.70	R 0.00	R 52,529.70		R 2,626.49		R 9,192.70		R 9,192.70	R 7,879.46
Project 2	R 2,005,000.00	Fees	R 170,425.00	R 30,250.00	R 140,175.00	R 0.00		R 0.00		R 0.00		R 12,050.00
		Disb.	R 95,629.68	R 15,020.00	R 80,609.68		R 0.00		R 0.00		R 0.00	R 3,615.00
Project 3	R 4,500,220.00	Fees	R 382,518.70	R 150,020.00	R 232,498.70	R 5,470.00		R 5,470.00		R 5,470.00		R 14,250.00
		Disb.	R 95,629.68	R 42,300.00	R 53,329.68		R 1,641.00		R 1,641.00		R 1,641.00	R 4,275.00
Total Fees	R 270,409.00					R 14,224.95		R 36,112.33		R 36,112.33		R 52,564.85
Total Disbursements	R 81,122.70						R 4,267.49		R 10,833.70		R 10,833.70	R 15,769.46
Overheads	R 162,245.40					R 27,040.90		R 27,040.90		R 27,040.90		R 27,040.90
Balance	R 108,163.60					R -12,815.95		R 9,071.43		R 9,071.43		R 25,523.95

				TOTAL (Nov - April)	REMAINING (May onwards)	
March		April			Check	Fee
Fee	Dist.	Fee	Dist.			
R 26,264.85		R 52,529.70		R 175,099.00	R 0.00	
	R 7,879.46		R 15,758.91	R 52,529.70		R 0.00
R 12,050.00		R 12,050.00		R 36,150.00	R 104,025.00	
	R 3,615.00		R 3,615.00	R 10,845.00		R 69,764.68
R 14,250.00		R 14,250.00		R 59,160.00	R 173,338.70	
	R 4,275.00		R 4,275.00	R 17,748.00		R 35,581.68
R 52,564.85		R 78,829.70			R 277,363.70	R 105,346.35
	R 15,769.46		R 23,648.91			
R 27,040.90		R 27,040.90				
R 25,523.95		R 51,788.80				



Project: Hove's Drift Centre Date: Tue 18/11/03	Task		Milestone		*Rolled Up Task		*Rolled Up Progress	
	Split		Summary		*Rolled Up Split		External Tasks	
	Progress		Project Summary		*Rolled Up Milestone		External Milestone	



Project: Hove's Drift Centre
 Date: Tue 18/11/03

Task		Milestone		*Rolled Up Task		*Rolled Up Progress	
Split		Summary		*Rolled Up Split		External Tasks	
Progress		Project Summary		*Rolled Up Milestone		External Milestone	