URBAN NATURE CONSERVATION
UNFOLDING THE LANDSCAPE

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CHAPTER I.

introduction
01 Introduction

1.1 Urban Nature Conservation

We each experience only a part of the earth, our own backyard plus trips, tours, vacations, movies, traveler’s tales. If my tree is dying, I notice. But the earth dying, slowly, is not as obvious, not something I can see at a glance through my window. So there is a gap between what is immediately visible and what is actually happening. Buildings replace the land. “The bulk of buildings stop air, sunlight and views. The memories what we built up around that particular place, either individually or as a culture, also disappear.” (Betsky 2005) In their place are structures that are new, if only for a moment, which aspire perfect form, function and appearance. To protect and re-create these memories we unfold open space in an urban place.

memory making place........

fig 1.1: green island
1.2 Urban Culture

The main reason for culture is to protect us from nature. Today our culture is disjunctured and fragmented, so the question arises what is real and what is not. This is because of the society of control in which we live today. (The Visual Culture Reader, 1998) As the late and great historian of American landscape J.B. Jackson states, “the only true vernacular is the sod hut or other structure that has no façade, no clear form and thus no way of presenting itself as part of a dominant culture. What are real are the multi cultural urban environments that we call Cities.”

Urban growth is a weapon of mass destruction. A great part of the urban population in developing countries suffers, among other very serious shortages, decreasing access to pleasant environments. With the continuous growth of cities in our country, there is an increase in the proportion of people living in environments that are both unhealthy and detached from green spaces.

Aldo Leopold’s argument that humans are part of a global biological community dependent on healthy land is as strong today as it was fifty years ago. Traditionally, owners of land have been allowed to perpetrate almost any act on the land that they owned. Today laws do exist that restrict some treatment of land. There is now some realization in our urban culture that the creation and conservation of urban green environments has a greater importance than just esthetical.

1.3 Urban Landscapes

Lately, any place whether natural or artificial, is considered landscape. Landscapes can be designed, to the point of becoming something artificial. Where neither natural surroundings nor the possibility of recreating them exist they are created through abstraction, symbolism and references.

In recent years, we have become more aware of the reality of the land. Guilt now pervades much of our culture (fig1.2). Perhaps it comes from a sense of what we have lost; a romantic desire to recapture the landscape.

fig 1.2: the greening of space left over after development
In many places, landscapes of great richness and beauty are replaced by cities where public spaces are few, badly designed, insalubrious, and of poor visual and environmental quality (fig 1.4). Although landscape is taken to mean a natural space, all or almost all the landscape we touch has already been changed. Farmland (fig 1.3) has been cleared, divided up, and planted. Irrigated fields, orchards or cornfields are not virgin land. Non-urban environments are considered landscape but this does not mean they are untouched by human hands.

The environment that characterizes cities is public space. In many cities in developing countries, it is the public space where the sometimes dramatic economical and social conditions become obvious. The symptoms are many:

- the simple lack of public amenity because of municipal financial weakness or other socio economic reasons,
- the misuse of public space by highly polluting motor vehicles, thus expelling pedestrians, or
- public space as a place for unregulated or illegal activities that form part of the informal economy.

(Planelles, 1999)

“Public space is the stage upon which the drama of communal life unfolds.” (Carr et al)
1.4 Energy

Energy, in all its different urban forms can be seen as a boundary constructor. The urban environment consists of roads with fast moving traffic. These roads filled with cars makes visual energy that constructs the boundaries of an urban place. Movement of people through and around the urban fabric, exploring places of historical, cultural, economical, political, and social importance, all form part of the energy lines through a city. It is these lines of energy that gives a place its internal strength.

On the other end of the scale you get Nature as energy. Nature as always, will always be the strongest form of energy and can shape and reshape any physical environment.

It’s the combination of these energies and many more which help you define the constraints for designing in the landscape. Energies can guide you in making the right decisions and achieving the best form and function for a creation in the landscape.

1.5 Conservation

Conservation is a state of harmony between men and land. “Despite nearly a century of propaganda, conservation still proceeds at a snail's pace; progress still consists largely of letterhead pieties and conventional public speaking. On the back forty we still slip two steps backward for each forward stride.” (Leopald, 1948) Since Leopald wrote these words about 70 years ago, we have made a lot of progress in conservation, but not in all fields. There is still a great lack in urban open space conservation while all the energy is concentrated in rural landscapes where nature is doing relatively fine on its own.

The usual answer to this dilemma is; more conservation education. No one will debate this, but is it certain that the volume of education needs stepping up? Or is something lacking in the content as well?

It is difficult to give a fair summary of its content in brief form, but, as I understand it, the content is substantially this: obey the law, vote right, join some organizations, and practice what conservation is profitable on your own land. In our attempt to make conservation easy, we have made it insignificant. (Leopald, 1948)

We must move away from this fixed idea that conservation is mainly about sustainability and preserving our recourses. There is lots more that need conservation, for example; aesthetical conservation, urban culture conservation, landform conservation, etc.

1.6 Conclusion

Today 57% (or 23 million) of all South Africans live in towns and cities. By the year 2010, 73% of our population will be urban - 43, 7 million people! (Botany online)

Urban open land is not merely soil; it is a fountain of energy flowing through the urban framework, a circuit of energy, in all its different urban forms can be seen as a boundary constructor.
soils, plants, and animals. Public space clearly and painfully reflects the physical deficiencies linked to low levels of ‘development’. (Planelles, 1999) These deficiencies are not only physical but also physiological and emotional. The urban environment must provide environments that are adequate for the development of its inhabitants.

The city is not only inserted within an environment, within a landscape, but in addition it creates its own inner environment and landscapes where the city life takes place. (Planelles, 1999)

In recent years, there has been a radical change in the way that landscapes are designed and understood. What in the past was considered part of the job performed by architects or civil engineering has come to be considered an independent discipline that makes use of architecture, urban design, biology, and contemporary art. This is a true step forward in understanding the complexity of the outdoor environment.

The landscape is constantly transforming and renewed and concepts such as sustainable development, globalization, mass tourism, and communication directly affect its design. Both the latest political events as well as the recent technological advances have an influence on the way we understand and design contemporary landscapes and its role in the public spaces of our cities.

With this empowered position that we have, we must explore and restore the land, and design an unfolding landscape to create memory making places and healthy environments.
Diagram showing the dynamics of the Urban Landscape. Culture, energy, conservation, and integration are the main four aspects that will be concentrated on in this thesis. Together they form the Urban Landscape.
CHAPTER II.
2.1 Project vision

Where the river cuts through the mountain.....the Apies

It is one of the regions most viable recourse as a working, natural and recreational landscape. A greenway/blueway plan initiates a real process for maintaining the vital connections to the river for present and future generations. It is an opportunity for protecting the river’s functions and processes, for protecting wildlife, for increasing value to the area, and ensuring that green space be preserved for future users as well.

This last stretch of the Apies river is worthy of a plan that defines future landscape treatments by responding to the character of the river and incorporating the spatial development plan of the area. This dissertation is intended to guide future land use in the Apies River bottom, to preserve and enhance quality of life around the river. The future of the Wonderboom/Apies River area depends upon the timely establishment of preservation policies and green space connections, both of which can be achieved through the establishment of the Apies River greenway.

2.2 Client profile

The client, City of Tshwane Municipality, Department of Environment and Planning, is concerned about the current state of the city’s open spaces. They are concerned about the degradation of both the human and natural environments. The urban and natural environment north of the Magaliesberg has been degrading fast over recent years. The Department of Environment and Planning has noticed this and declared this area as the ZONE of CHOICE. What this means is that a lot of funding will be allocated to this area in the coming years.

The interested and effected parties include:
- City of Tshwane Municipality
- The Department of Culture and Recreation
- Wonderboom Nature Reserve
- Business owners
- Farm owners (private)
- Residents
- Department of Water Affairs

2.3 The Site location

The site is situated on the northern side of the Magaliesberg. It is framed by the mountain (southern side) and three big roads, R513 Lavender Rd (western side), the R566 (northern side) and the R513 Lavender Rd (southern side).

Two railway stations border on the western side, the Wonderboom Station and the Pretoria North Station.

The site is divided up into private, government / public land. (More in-depth information on the site in chapter 3 – context analyses)
Fig 2.2 shows the chosen site in relation to Tshwane. This site incorporates the last stretch of the Apies River that falls in an urban environment. A large area of the site is covered by agricultural land and this gives the site the green appearance that is visible in fig 2.1. The site is cut in half by the river that runs in the middle of the site. There is no river crossings accept for the two bridges that closes of the site at its ends. In this area the Apies River has very large floodplains and this is one of the reasons why this area is still undeveloped to this day.

The river is not in a natural state and the plant and animal habitat around the river is in a bad condition. The river and its surrounding environment don’t read as one landscape. All the developments turn their back on the river and prevent public access to the river. There is a lot of historical and natural feature that must be preserved when development starts in this area.

2.4 Problems and objectives

Traditionally, owners of land have been allowed to perpetrate almost any act to the land that they owned and this had in most cases, a negative impact on natural environment. Today laws do exist that restrict people to certain land uses and treatment of that land. However, those laws exist only on paper and in most cases are not enforced by the relevant governing entity.

This site is a classic example of a misused, and badly planed urban environment. The most important part of this site is the river, which can’t be accessed by the public.

This thesis will seek to restore the land and design an unfolding landscape and creating a memory making experience. The energy of the river, the people moving through and around the site, and conserving urban nature will be the main guiding force behind this project.
Bringing out the green belt that surrounds the river through all the seasons. To provide the buffer between the river and the mix use that frames this green corridor. And lastly giving the land back to itself to change and shape itself as its been doing for so long.

Integrating frameworks – a good understanding of the urban framework and the open space framework is needed. It is important for these two frameworks to become one development framework and to guide the form of future development.

2.6 Project limitations

The study area is limited to Pretoria and mainly focused on Pretoria North. The reason for this is that this area is seen as ‘The Zone of Choice’. The Zone of Choice is an area identified by the City of Tshwane where they want to allocate a lot of money and new development, to strengthen the city to the north. There are also a lot of underused work opportunities in this area. The project will take into consideration the new development that is already starting in the specific area and the new main roads that will cut through the site.

The biggest limitation on the project is the river that runs through it and the agricultural land that is of high value. These limitation will help guide the form and function of new development on the site.

2.5 Research components

The research can be broken down into the following:

Urban culture – a look at the many cultures nestled in this area, and a look at the new unified urban culture of the 21st century. What in fact the people of this area need.

Energy – there are many guiding energies that form and shape this site, some natural and some man-made. The aim is to find the bridge that connects these energies.

Conservation – this is the combined conservation of the natural and urban open space environment. It is important to see these two aspects in equal value and be treated as one.
3 context analyses

3.1 A Vision for the Apies River

Where the river cuts through the mountain........the Apies

It is one of the region’s most viable resources as a working, natural and recreational landscape. A greenway/blueway master plan initiates a real process for maintaining the vital connections to the river for present and future generations. It is an opportunity to protect the river's functions and processes. This will increase the economic and aesthetical value of this area, and ensure that the green space be preserved for future users.

This last stretch of the Apies river is worthy of a plan that defines future landscape treatments by responding to the character of the river and incorporating the spatial development plan of the area. This dissertation is intended to guide future land use in the Apies River bottom to preserve and enhance quality of life around the river. The future of the Wonderboom/Apies River area depends upon the timely establishment of preservation policies and green space connections, both of which can be achieved through the establishment of the Apies River greenway.

This chapter will cover the contextual analyses of the site and surrounding area.
Institutional context

3.1 Integrated Development Plans (IDP)

In 1997 Integrated Development Plans (IDP) were compiled for the whole of Pretoria and for each of the 9 planning zones. The Apies River intersects Zones 1, 2, 8 and 9, with the following of relevance in these plans:

IDP Zone 1 describes the potential of Bon Accord Dam as a recreational asset and states the importance of eco-tourism activities, nature trails and the preservation of green belts. A strategic development area is identified as an extension of Wonder Waters shopping node, with guidelines to conserve the Apies River in the proposed development defined as a high priority. A techn/o office/hotel park is identified as a possibility along the Apies River, with an intermodal transfer node being proposed at the intersection of Rachel De Beer Street and Paul Kruger Street extension.

IDP Zone 2 identifies flooding of the Apies River and underutilization of open spaces or unprotected natural areas as problems. Legal protection of the River and utilization of its potential as an eco-tourism asset is proposed. A recreational area at the Wonderboomboort is suggested. Cycle routes, hiking trails and a possible lake are mentioned. (Holm, P5)

3.2 National Water Acts

The National Water Act (Act 36 of 1998) states as follows: "For the purpose of ensuring that all persons who might be affected have access to information regarding potential flood hazards, no person may establish a township unless the layout plan shows ... lines indicating the maximum level likely to be reached by flood waters on average once in every 100 years."

The following is not clear in the Act:
- Whether the Act is applicable only to new township applications. Apparently, existing townships will not be subject to floodline revisions.
- Whether the 100 year floodline is only for information purposes or as a building restriction.
- What type of development will be allowed below the 100 year floodline, if any.
- No reference is made of floodlines for undeveloped land.

In the Metro-wide IDP of 1997, development is restricted between a 50 meter corridor on both sides next to the 50 year floodline adjacent to streams and rivers. This was defined in anticipation of the requirements of the National Water Act. The restriction is proposed to be revised in the light of the above mentioned uncertainties. (Holm, P5)
3.4 Greenway Master plan

The Apies River Greenway Master Plan is intended as the open space component of a larger urban development plan (Rainbow Junction). It will guide future land use along the Apies River in this specific area by encouraging agriculture preservation, water quality improvement, wildlife habitat protection and the creation of a recreation amenity for all residents and visitors to this area.

The vision for this plan incorporates two distinct elements, connection and preservation.

Connection
- Surrounding communities
- Landscape to river
- Nature to City
- People to nature
- Nature to nature

Preservation
- Quality of live
- Plant and animal habitat
- River function and processes
- Agricultural lands
- Historic sites
fig 3.3: preservation
3.5 Apies River Urban Analyses

The site and context analyses will be on the Wonderboom poort and the Northern Apies River edge as indicated by fig.3.4. Each aspect of the analyses will take a quick look at the greater Apies River before listing the main problems or features that can have an effect on the urban open space framework.

The information used in this analysis was obtained from the Apies River Design Framework. (This document was collaboration between Holm Jordaan & Partners Architects and Urban Designers, Pretoria City Council and Action Apies River Working Committee) Fig3.5 shows this site in its immediate environment.
In fig 3.6 it is clear how the site flattens out to the north. This part of the river can be very dangerous in storm conditions. The reason for this is the Apies River is pushed through the Wonderboom poort (fig 3.5) together with other smaller steams and storm water. The river takes up an enormous amount of storm water from the CBD and surrounding areas. This area serves as the floodplain for the river in big storms. It is thus important to protect existing and future developments from the dangers of the river.

The issue of the floodplains will be addressed in the next chapter under master plan development.
3.5.1 Urban Form

3.5.1.1 Perceptual qualities

The almost 20 kilometer long Apies River is not legible as a linear line or string of activities. It is experienced through flash images at crossings or through gaps in the urban fabric. The river passes through the city without public knowledge and with no focal points for serial observation. Placemaking elements are lacking, with no unique sense of place.

3.5.1.2 Open Space Network

The Apies River links important natural elements such as nature areas, streams and ridges on a citywide scale. Accessibility on a smaller scale is almost impossible and where it is possible, it is either unsafe or visually unpleasant. In some instances hard and ugly edges exist, with backyard walls facing onto the river and forming the edges of the space. In other areas, there is almost no enclosure of space. Surfaces are not always viable for usage, with almost no attractive elements in the space. The river does not foster urban life. A pedestrian culture does not exist and almost no activities occur along the river during the day or the night. Poor lighting at night contributes to the “deadness” of the river.

3.5.1.3 Morphology

There are a few large open spaces along the river (e.g. Agricultural land, Unused open areas), but they are not accessible from the river and often not developed to be usable public spaces. On a detailed scale, small or intimate open spaces at street corners occur, but it should be formalised to form an integral part of a hierarchy of public spaces. Building typologies do not contribute to a feeling of identity and enclosure.
3.5.1.4 WONDERBOOM POORT - URBAN FORM

Perceptual qualities
- No legibility due to high order roads lifted from level of river
- Unique image enhanced by waterfall
- Poort gateway to city with natural sense of place, waterfall focal point

Open space network
- Not directly accessible
- Edges defined by ridges
- Mainly road surface
- Infrastructure elements obvious elements in space

Morphology
- Roads dominate
- No river interface

3.5.1.5 NORTHERN APIES RIVER EDGE - URBAN FORM

Perceptual qualities
- Legible as part of cultivated area, highly visible at bridge crossings
- Natural image supported by agricultural activities
- Cut in mountain defines gateway to city

Open space network
- Not directly accessible due to private property, no direct roads
- Mountain defines southern edge of space
- Agricultural to natural surfaces
- Overhead power lines dominating elements in space
- Mainly agricultural activities, mining and illegal development to east

Morphology
- Wide flood plain defined by roads on both sides
- The few residential structures along contributes to weak river interface
3.5.2 Land Use

3.5.2.1 Land Ownership

- The bulk of land adjacent to the Apies River is privately owned.
- Parcels of land are owned by the national or provincial government and are managed by the Department of Public Works.

3.5.2.2 Existing zoning

Existing zoning is reflected to a large extent in existing land uses, with illegal uses being a minimum.

3.5.2.3 Existing land uses

More than 70% of the land adjacent to the entire river (measured in distance fronting directly onto the river) consists of the following four land use categories:

- Farming activities (21%);
- Single and low rise residential (18%);
- Government and institutional uses (17%); and
- Regional open space (16.5%).

(Holm, P7)

The part north of the Magaliesberg has mainly agricultural activities along the river.
3.5.2.4 WONDERBOOM POORT - LAND USE

East
- Green open space used for picnics, informal churches with natural ridges of Magaliesberg Mountain Range (protected by law) further to the east

West
- Major road and railway line bordered by natural ridges of Magaliesberg Mountain Range

3.5.2.5 NORTHERN APIES RIVER EDGE - LAND USE

Southern portion
- Wonderwaters recreation and retail node to the east (currently being demolished for new lifestyle centre)
- Agriculture to the west

Northern portion
- Mainly agricultural uses with a small residential component to the east
- Agriculture to the west
3.5.3 Urban Nature Conservation

3.5.3.1 Natural physical characteristics

City development significantly influenced the natural physical characteristics over many years. The hydrological pattern changed due to water extraction at Fountains Valley and the canalisation of the stream over large distances through the city.

Downstream, periodic 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. 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.

3.5.3.2 Biological / ecological aspects

The stream experiences many ecological pressures. The ecology is under stress due to pollution, invasion of exotic plant species and physical disturbances (dumping, embankment and riverbed disruption).

3.5.3.3 River water

Two springs in Fountains Valley, delivering up to 30 million liters of water per day, are sources for the Apies River. The bulk of this water is distributed into the water network of the city.

Based on water quality guidelines for recreational use, the river is in general usable. Areas with a decrease in water quality are limited. As mentioned the Apies River has ten tributaries also providing water.

3.5.3.4 Environmental assets

Major natural assets include Groenkloof Nature Reserve, Wonderboom Nature Reserve, Bon Accord Dam, the three ridges (Time Ball Hill at UNISA, Witwaters Mountain Range at Daspoort, Magalies Mountain Range at Wonderboom poort) and tributaries of the Apies River.

3.5.3.5 Historical assets

Historical River - There are many places of historical importance all along the river. The most important ones are the following:
- The Wonderboom (Ficus salicifolia).
- The artificial waterfall in the poort, installed in 1960.
- House Booyse
- The graveyard of the Erasmus, Prinsloo and Booyse family. (Currently being moved to a safer location, due to vandalism) (fig 3.10)
- House Erasmus
- House Zeeland
- Old watering channels

Some of these are still in use and can become a tourist attraction or be upgraded to form part of a new design framework.

fig 3.10: Article about moving the Graveyard (Meyer, 2006)
3.5.3.6 WONDERBOOM POORT – URBAN NATURE CONSERVATION

Natural characteristics
- Part of proclaimed Nature Reserve
- Minor signs of erosion, river bed stabilised itself after major constructions of transportation routes
- De Moot Spruit joins the Apies River

Biological / ecological aspects
- Dominated by indigenous vegetation
- Not many bird species
- Fish and other aquatic life implied, not obvious

River water
- Visible pollution by solid waste littering

Environmental / historic assets
- Wonderboom Nature Reserve (proclaimed in 1954) indigenous trees, natural bushveld, waterfall, caves with archaeological deposits, fort
- Wonderboom large fig tree (known since mid 19th century)
- Silverton Shale Formation in mountain west side of Poort (rhythmic bedding, lenticular bedding)
- Archaeological Site in mountain west side of Poort (Middle Stone Age site)
- Apies River Poort - open space, access to Pretoria

3.5.3.7 NORTHERN APIES RIVER EDGE – URBAN NATURE CONSERVATION

Natural characteristics
- Characteristics of a natural river system
- Erosion and embankment disturbances main issue due to building waste and loss of natural vegetation

Biological / ecological aspects
- Indigenous vegetation exists, but unnecessary removal and vegetation disturbance
- Aquatic bird life observed
- Fish and other aquatic life visible and implied

River water
- Solid waste material deposits through stormwater

Environmental / historic assets
- Thomas Pleasure Resort in Pretoria North
- Doors Erasmus farm in Wonderboom area includes historical farmstead and cemeteries east of M1
- Stagecoach Buildings at Wonderboom Agricultural Holdings east of President Steyn Street
- Wonderboom Cemetery north of Wonderboom Nature Reserve
- Pagel Farm in Pretoria North next to R513
3.5.4 Movement and Transport

3.5.4.1 Roads

The road system in the vicinity of the Apies River was not planned and designed to provide access to the river itself. The system aims to allow vehicles to either cross the river or to move easily along it. No dedicated parking areas are provided and there are no entrances that give direct access to the river. Road infrastructure can be upgraded relatively easy to perform a river access function, with spare capacity during peak hours the only potential problem. The city's road hierarchy lends itself well to a structured approach to access and parking provision. Bridges are constructed to various designs and don't accentuate the crossings of the Apies River.

3.5.4.2 Public transport

Bus and taxi facilities are inadequate due to the lack of dedicated road infrastructure. Future planning by the Council allows for upgrading of these facilities. With timeous inputs, plans could be amended to cater for requirements of proposed developments along the river. The rail system provides limited access to the Apies River, with stations being few and far apart. With proper planning this can be improved to some extent.

3.5.4.3 Cycle roads

No formal cycle roads along the Apies River are a major shortcoming in the current access system. Cyclists can only use existing roads and streets.

3.5.4.4 Pedestrian movement

Pedestrian movement along the Apies River is restricted to a few precincts. Facilities are in general inadequate, with ample potential for upgrading at a cost that should not be prohibitive.

3.5.4.5 Intermodal nodes

Rail, bus, taxi and car transfer points are few and far apart. They are not aimed at serving the Apies River at all. Planning inputs could alter the situation and should be pursued without delay. The only intermodal nodes are the taxi ranks towards the northern part of the CBD.
3.5.4.6 WONDERBOOM POORT - MOVEMENT AND TRANSPORTATION

Accessibility
Visibility high, accessibility low, no direct access
- Cars         - bad
- Taxis        - bad
- Buses        - bad
- Rail         - bad
- Cycles       - bad
- Pedestrians  - average

Capacity
Virtually full capacity peak hours
- Cars         - bad
- Taxis        - bad
- Buses        - bad
- Rail         - bad
- Cycles       - bad
- Pedestrians  - average

Potential
Little potential for expansion or providing access due to geography
- Cars         - bad
- Taxis        - bad
- Buses        - bad
- Rail         - bad
- Cycles       - good
- Pedestrians  - good

3.5.4.7 NORTHERN APIES RIVER EDGE - MOVEMENT AND TRANSPORTATION

Accessibility
Strong transport axes but access to river can only be gained over private land
- Cars         - bad
- Taxis        - bad
- Buses        - bad
- Rail         - average
- Cycles       - bad
- Pedestrians  - bad

fig 3.13: Dominated by cars and trains, no safe pedestrian or cycle movement (Tshwane)
3.5.5 INFRASTRUCTURE & SERVICES

Being canalised and fixed with a concrete lining over large sections, the river bank became an urban spine along which installation of municipal services became convenient.

3.5.5.1 Stormwater

To drain stormwater more effectively, large sections of the Apies River were canalised and lined with a concrete lining or gabion protection. This restrained the effect of flooding and reduced the possibility of loss of life and damage to property. Through the following precincts, the profile of the Apies River is still that of a natural river course:

- Fountains Valley;
- UNISA Poort;
- Pretoria Zoo;
- Marabastad (lower part);
- Wonderboomboort (lower part);
- Annlin;
- Onderstepoort; and
- Bon Accord.

Floodlines vary between 10 meter in Marabastad (upstream) and 350 meter at Bon Accord Dam. Dumping has a serious impact on floodlines in Onderstepoort and Annlin.

3.5.5.2 Water

An average of 26 mega litres are pumped daily from the Fountains pump station into the Pretoria water supply system. Major pipelines up to 900 mm diameter from the Rietvlei Dam and Fountains occur along both banks of the river in Fountains and UNISA Poort. In the urban sections of the river, minor underground domestic pipes run along street reserves.

3.5.5.3 Electricity

In urban precincts many electrical cables are close to the river where the river banks are lined with concrete. Lower down the river a 132 kV Pretoria-Rooiwal overhead power line criss-crosses the river up to the southern side of Bon Accord Dam.

3.5.5.4 Sewerage

The banks of the Apies River are part of a major service spine for main sewer lines. They vary in size from 600 mm diameter at Fountains to 1800 mm diameter near Bon Accord Dam. Urban precincts are provided with sewer lines in the road reserves. At Daspoort Water Care Works an average of 35 mega litres effluent waste water are daily let into the river, with water quality being monitored on a weekly basis.

fig 3.14: Infrastructure and services in bad condition and not aesthetically pleasing
3.5.5.5 WONDERBOOM POORT - INFRASTRUCTURE & SERVICES

Stormwater
- Earth channel with gabion protection
- 50-year floodline: 70 m
- Surface drainage

Water supply
- Domestic water supply in road reserves
- Reservoir
- Major pipe crossing just north of poort: 200Ø, 450Ø and 600Ø

Electricity
- Overhead 132 kV powerline on left bank

Sewerage
- 1800Ø on right bank
- 900Ø on left bank

(Holm, P30)

3.5.5.6 NORTHERN APIES RIVER EDGE - INFRASTRUCTURE & SERVICES

Stormwater
- Natural course
- 50-year floodline: 250 m
- Surface drainage and underground pipes

Water supply
- 110Ø on left bank
- Domestic water supply in road reserves

Electricity
- Overhead 132 kV powerline on left bank

Sewerage
- 1800Ø on left bank
- 300Ø on right bank

(Holm, P32)
3.5.6 PUBLIC AMENITIES

3.5.6.1 Social Infrastructure

A large number of institutions and other social infrastructure are established relatively close to the river in the inner city. Various museums, libraries, educational institutions, health and care facilities, sport and recreational facilities are close to the river in the inner city. The Hospital Precinct has the largest amount of facilities but they, in general, "ignore" the river, turning their backs on the open space. Precincts outside the city have limited social facilities within 10 minutes walking distance of the river.

3.5.6.2 Public furniture

A general lack of public amenities and public furniture are an obvious problem. Lighting, benches, litter bins and drinking fountains are either neglected or totally lacking. Only in the Caledonian Precinct is new street furniture provided as part of the upgrading of the road network. There is, however an unintegrated implementation and design of only one side of the river.

3.5.6.3 Maintenance and care for public and communal spaces

The total Apies River area is very much neglected and unmaintained. Maintenance is the responsibility of different Council Departments, with channeled reaches falling under the responsibility of the Department of Transportation Engineering and Roads and natural water course reaches falling under the Department of Culture and Recreation. Only reaches on Council's property are maintained, with the maintenance of the river through private property being the responsibility of private owners. It is advisable to combine the relatively low cost of maintenance with high scientific, educational, aesthetic and recreational value. Through creative ecology, maintenance cost could be reduced to less than those of formal parks. All unbuilt land is not regarded as accessible open space and is not properly managed.

fig 3.15: No public furniture along informal pedestrian movement

fig 3.16: No safe river crossings for pedestrians, vehicle crossings used for pedestrian movement
3.5.6.4 WONDERBOOM POORT - PUBLIC AMENITIES
Social infrastructure
  - No facilities
Public furniture
  - None
Maintenance and care
  - Relatively good

3.5.6.5 NORTHERN APIES RIVER EDGE - PUBLIC AMENITIES
Social infrastructure
  - No facilities
Public furniture
  - None
Maintenance and care
  - Damage to river banks

fig 3.17: An existing public meeting place
3.6 Main Concerns

- The river is not legible within the urban structure and not part of an integrated open space system.
- The river area is neglected, with the back of adjacent developments turned towards the river.
- The river area is unsafe, with no lighting and adjacent land uses not promoting activities on the river banks.
- Most of the time little water is running along the canal, with no constant flow.
- There are ecological and urban decay along different parts of the river.
- There is bulk infrastructure along large parts of the canal banks.
- Development pressure is not appropriately managed and guided.
- The river is unsafe during storms and floods.
- There are no public amenities, or any pedestrian or cycle routes along the river.
- The river canal is difficult to maintain and clean (no vehicular access is possible and it is difficult for a person to get into and out of the concrete canal).
- Illegal dumping occurs in the floodline.
- Erosion exists in large parts.
3.7 Conclusion
The next step will be to create a master plan and development framework for this area, and linking it to the surrounding urban fabric. The master plan must create a balance between economic and ecological opportunities and constraints. It is important to incorporate all existing features, natural and historical, into this new master plan development. The development should encourage developers to invest in this area and by doing so adding to the economic and visual value of this part of Tshwane.
CHAPTER IV.
4.1 Developing the master plan

The master plan will aim to set out a framework that will guide future development in this area. The master plan must indicate all the different forms of land use along the river and what areas should be protected and treated as conservation areas. To form this master plan all existing natural and unnatural features of this area must be analysed.

4.2 Upgrading the Apies River

Before anything can be done on the side of the Apies River, the river itself must become a safer and cleaner system. The two main problems making the river an unsafe place is a large amount of sediment and wide flood lines along the northern part of the river.

4.2.1 Sediment

The problem of sediment can be overcome by controlling the sediment upstream. There is always a certain amount of sediment in a river, but when there is any urban development happening around the river it increases the stormwater runoff and more stormwater means more sediment into the river. Sediment gets trapped on the banks of the river and creates massive sediment banks and can increase the flood lines of the river.

The sediment problem can easily be solved by placing sediment traps at specific points, creating retention ponds along the river to give the sediment time to settles at the bottom of the pond and then be excavated and used as topsoil. Managing stormwater upstream at the CBD will help with this problem downstream.

4.2.2 Wide flood lines

The second problem being wide floodlines requires a careful investigation so that we don’t disturb the semi natural state of the river.

The floodplain topography is flat and about 500m wide in general. The river in its current state can only accommodate 1:5 and 1:10 year floods. The meandering section of the river between Wonderboom nature reserve and the Retirement village was historically a problem area for flooding. River meandering is caused by a constant amount of energy distributed between fixed upstream and downstream points, i.e. Wonderboom Poort (solid rock) and Bon Accord dam (inlet). Elevations of control points are fixed, therefore river can only move horizontally. Meandering over years was plotted from historical records and ‘erosion boundary’ within which river moves laterally was established.
Five options were considered in this study and attempt to narrow the flood lines:

- Water retention structure for flood attenuation at the Wonderboom Poort: An insufficient amount of space is available for the required storage volume of approx. $2 \times 10^6 \text{m}^3$ (represent area of about 40ha with average depth of 5m). In fig.4.2 you can see that this was the situation in the early 20th century. At present there are buildings and roads dominating the area in the Poort limiting the amount of space available for retention of water.

- Excavation of flood channel whilst at the same time retaining existing low flow channel and fill on riverbanks: Environmentally unacceptable - complete removal of existing riparian habitat except for flow channel and total re-establishment thereof. Fill in banks restricted by existing development (buildings and services). Refer to fig.4.3

- Concrete-lined canal: Hydraulically preferred alternative but environmentally unacceptable - complete removal of ecosystem and large amount of excavated material to dispose. Refer to fig.4.4

- Flood bypass channel (auxiliary river channel) on western bank: Environmental unacceptable - interfere with river morphology. Cost of land expropriation, excavations and disposal of excavated material not economically viable. Refer to fig.4.5

- Berms outside river riparian zone: Environmentally most acceptable solution. However, several practical considerations e.g. continuity of berms, land issues, protection of illegal structures, sources of material for construction of berms and financing. Refer to fig.4.6

(Apies River Rehabilitation document)

The lines on the following figures represent the following:

- Blue lines = 1 in 20 year flood lines
- Red lines = 1 in 50 year flood lines
- Purple lines = 1 in 100 year flood lines
- White line = river bank summary
- Yellow lines = implementation option
- Orange lines = cut and fill area
fig 4.3: cut and fill
(Rehabilitation document)
Fig 4.4: Concrete lined canal
(Rehabilitation document)
fig 4.5: auxiliary flood bypass
(Rehabilitation document)

auxiliary flood bypass channel option
fig 4.6: berming
(Rehabilitation document)
The best option for narrowing the flood lines is to use the berming option. Sediment can be harvested from the sediment traps and used to form these berms on the banks of the river. The sediment has a high nutrient level and will help establishing vegetation on the banks in a short period of time. Fig. 4.7 indicates the position of these berms. The berms are positioned 80m away from the river itself.

4.3 Treatment Zones

The character of the river ranges from natural to urban. Each Zone type has a different type of treatment and the river interacts differently to each land use type. Four character categories have been identified:

- Treatment Zone 1: Natural refers to an area where the natural ecology is dominant.

- Treatment Zone 2: Cultivated refers to an area where nature is put to use with activities taking place in symbioses with nature.

- Treatment Zone 3: Suburban refers to an area where nature is organised and discernible as a green strip running through a low to medium density built-up area.

- Treatment Zone 4: Urban refers to an area where the urban ecology is dominant, with nature being purely decorative and the river being a water feature within an intense urban environment where a concentration of activities and buildings occur.

In order to set up a proper working master plan, all of the above mentioned treatment zones should play a role in the development of the master plan. The treatment of all these zones should preserve agricultural land, open space and the character of the river. This can be done by locating appropriate recreation access and linking open space and parks to the river front. Providing safety for
greenway users is of ut most importance. This is the reason why it is not used as a recreational entity; it is recognized as an unsafe environment.

4.4 Master plan Development

4.4.1 Capturing Existing Form

One of the most important precedents is the existing urban fabric that frames the site. The street and city layout is very old but it can be a valuable indication of what work and what doesn’t work. By capturing the existing urban form, it is clear that all past development ignored the river and its potential. All the existing development face away from the river and the river front became ‘backyards’. There are some residential areas that do face the river but they still have a strong buffer between them and the river for safety purposes.

fig.4.8 the houses are situated away from the river for security from flooding (Tshwane)
4.4.2 Familiarizing with the Site

4.4.2.1 Movement
Movement in nature is crucial and unavoidable. On this specific site, nature’s movement is best experienced with the river changing over passing years. Through human movement we experience landscapes, not in a fixed condition, as a picturesque view. Rather, we move through the landscape in a cross-sectional horizontal motion, experienced in the vertical. The path of movement through and around the site becomes an important aspect of the design.

The site is framed by large roads and in the near future will be cut in three by two new roads connecting the east and the west of the site. This is not necessarily a bad development; it may give life to the centre of the site. There are two stations on the western border of the site which bring working people from the north into Pretoria. In this instance the movement creates strong energy (see 1.4 Energy) around the site which creates the boundary.

The river currently divides the site into two halves with agriculture on the western side and residential and commercial on the southern side.

4.4.2.2 Topography
This is the measure, the orientation, our finding the horizon and manipulating the surface to be occupied. It is important to establish a place in a balance of existing shapes of land so that the interventions on ground level not impact the topography negatively.

The topography of this site is not constant. The presence of the river makes it a changing environment that can be changed in a very short span of time; for example with the construction of new roads or the flooding of the river. (see 1.5 landform conservation)
4.4.3 Harvesting Form
In the process of forming a concept for the master plan, the form of the urban fabric around the site enforce the form of the new fabric on the site itself. The immediate environment serves as a precedent for the new development. The main form generators for the masterplan are:
- The River
- The main roads
- The surrounding urban fabric
- The historic watering channels
- Precedent studies

The three main precedents for the masterplan are:
- A site layout plan done by Holm Jordaan Architects (fig.4.12)
- Bear River greenway masterplan
- The site and surrounding environment

The first consideration was to respond to the site boundaries (the roads) and incorporating the water by means of links between the river and the site boundaries. The intention is to create new topography along the river, following the study done on the floodplains. This will largely impact the interaction between the river and any new development along the river. The strong and clear form of the river indicated the new location of the boulevard connecting the two new roads that is currently in development.

The green open space that sits in the eighty meter buffer zone will become a linear park with pedestrian walkways. The second green corridor will be along the existing watering channel and will run all the way to the northern part of the site and end up in the existing dam.
4.4.4 Agriculture
Preserving agricultural land is very important due to the fact that this is some of the last agricultural land near the CBD of Tshwane. The agricultural land has a form of aesthetics to it. (see fig.1.3) There is a different colour each season with crops ageing and getting ripe to be harvested. This visual asset should be harvested by means of development that embraces the views to the river over the agricultural land.

4.4.5 First design solution (see fig. 4.14)
In the first design solution some of the key features of the site were lost. The urban form did not respond to the agricultural land or the existing historic features of the site. It was also necessary to maximize the quantity of agricultural land to make an urban agricultural program more self sustainable. Furthermore it is important to have a clear centre of development which will function as a heart for this development.

The grid street form that was adopted from surrounding urban fabric is to overpowering and does not respond positively to the existing landform. A better solution will be a to cut back on the amount of streets and having one main boulevard with high density development bordering the boulevard.

fig.4.13: Aesthetics of agricultural land
4.4.6 Final design solution

The centre of the new development is situated over the main station (Pretoria North station) and can be the starting point for development in this area. All development should preferably occur between the eighty meter river buffers and the exiting watering channel. This will control urban sprawling and protect the urban open spaces.

There is not only a great need for public open space but also for places where public activities can take place. One of the best meeting places where all cultures mix and interact is in entertainment and more specific sports. This masterplan accommodates just that, with a mix use sporting facility that borders the centre of the development. This centre is situated right alongside the new transport interchange, so to make it easy for people to come from different directions with different forms of transport to one place and have social interaction.

The existing farm market buildings alongside the dam will become the base for the urban agricultural land surrounding the new development. The income of the agricultural produce will go to the maintenance and development of this stretch of the Apies River and public open spaces.

The green river corridor should eventually form part of the Wonderboom nature reserve and fall under the protection and maintenance of the reserve. The reserve and the corridor will be connected by means of new meandering pathways running from the reserve to the transportation interchange at the development centre.

The land use will be zoned in such a manner that it encourages residential development on the eastern bank of the river and commercial and retail development on the western side. It is still important that this piece of land is seen as a green cell and not loose its ‘urban nature’ appearance.

fig.4.15: final master plan
4.5 Master plan – Conclusion

For the master plan to work, it needs a starting point. This starting point must be a specific development within the master plan that will give life to the rest of the master plan. By analyzing the existing infrastructure in and around the site it came to a conclusion that this starting point should be the new plaza across the existing Pretoria North station. By doing so you give life back to the station and you pull people into this area of new development. All services are running along the site and with public transport situated right across the street, it makes this the perfect starting point to ignite new developments.
CHAPTER V.
5.1 Squares & Plazas
The Main Square or plaza is the most recognisable civic form of public space. If you think of the main squares of our towns and cities, they are usually situated in front of municipal buildings, along main roads or at business hubs and mark city centres. Nick Corbett in his book Revival of the Square notes the important and complex role of these spaces still fulfil: "The city square can provide visual relief and the recreational open space within a densely developed area, and can also serve to promote standards in public behaviour. If people are to be aware of the complexity and variety of the society they are part of, and if they are to appreciate notions of civic identity and respect for others, there must be a place where they can occasionally see and experience a diverse cross section of that society..... By simply standing in a lively public square, where different age groups and different members of society are gathered together, there is a share experience that evokes a positive sense of participation." The creation of new squares and plazas now come with this complex agenda: creating a space that is active and busy and one that the public will want to linger in and enjoy in a variety of ways.

5.2 Designing the Plaza
Like a successful building, a plaza requires a program of use and a strong concept. Therefore, careful thought should be given to a plaza's principal functions and to its relationship with the adjacent public realm (i.e. streets, pedestrian routes, and other open spaces), activities and architecture. While some plazas may act primarily as pedestrian nodes, others function best as important viewpoints or enhance the setting for a building.
5.2.1 Visibility and Views
Good street-to-plaza visibility announces the plaza's internal attractions. It signifies that it is a public space, it permits users to watch street activity and it makes the space safer.

Good visibility can be achieved by arranging any walls and planting to not screen or block off the plaza from the street and locating the plaza at or as close as possible to street level, preferably no more than 1.0 m above or below street level. The plaza should also take advantage of distant views to the mountains, rivers and other landmarks wherever possible.

In Dania Park (fig.5.2) you find a good example of visibility in and out of the park. The park is situated alongside the ocean and lively streets. The park is completely visible from the streets and when you’re in the park you have excellent views over the ocean and surrounding streetscape. There are numerous spaces that function as observation points, this makes the park safe for its users and easy to find people you’re looking for.

5.2.2 Linkages
The plaza should be linked to other surrounding open spaces, as well as interior spaces such as lobbies, to create a dynamic pedestrian network. Such links will make the plaza more useful and provide a more dynamic, coherent urban environment.

Linkages can be achieved or reinforced using the following devices:
- passages;
- bridges;
- steps/ramps;
- paving patterns;
- planting;
- and other structures.
A good example of a Plaza with proper linkages to its surrounding spaces and buildings is the Piccadilly Gardens in Manchester, UK (fig5.4). The Plaza was designed using the movement patterns of its users, as well as the street and surrounding infrastructure.

5.2.3 Safety
The plaza will be unsuccessful if it is not well used because of a perception of unsafeness. The design of the plaza should provide safety. Regard should be given to principles of designing for safety such as defensible space, clear sightlines, good lighting and provision of alternate “escape” paths.

The differences in usage, ownership and responsibilities among commercial, commercial/residential and residential plazas should be recognized, so that the different approaches to their design relative to urban safety is addressed at the initial planning stages. For example, zones of responsibility should be established and delineated in the design of these plaza types, taking into account their respective use patterns.

Visibility makes up a huge part of safety in a plaza. If you look at Passeig Garcia Faria, a shorefront landscape, it is clear how good open visibility makes the landscape safer. Openness and good visibility does not only make the landscape physically safer, it also makes the user more comfortable when walking around at day time and at night.

The plaza should provide good visual surveillance opportunities both from within the space and along the edges. People need to feel secure and will usually avoid dark hidden corners and vacant places. (see fig 5.5)

The plaza should be designed to maximize opportunities for casual monitoring from its perimeter and adjoining developments. Surveillance and overview from adjacent sidewalks, windows and decks are necessary components that contribute to the safety of the plaza.

5.2.4 Accessibility
The plaza should provide easy and direct access particularly for the elderly, disabled and young children. Ramp slopes should not exceed 10 to 12 percent and handrails should be incorporated. Selection of surface materials should result in easy access for the elderly and disabled, and also discourage incompatible plaza activities such as skateboarders in relaxing areas and motor vehicles taking shortcuts thro the plaza. Placement of planters, nonmoveable seating and handrails should further encourage easy wheelchair and pedestrian access and ease movement thro and around the plaza.

5.2.5 Lighting and Public Features
Good night time generalized lighting is important to enhance safety of the plaza, particularly if it functions as a shortcut or as a through route for pedestrians. Appropriate lighting can extend the usage time of the plaza and may encourage night life around the square.

A big problem in South Africa is loitering and with appropriately located and designed lighting it can be discouraged.
In autumn and winter, darkness occurs in early afternoon, coinciding with rush hours. This is generally a time of maximum plaza pedestrian flow, generated from office and retail buildings so lighting should be on timers to account for seasonal changes and promote the safety and ease movement of pedestrian’s throu the plaza after dark.

Lighting doesn’t just add to the safety and ease of use for users in the plaza. Lighting can easily change the image of the park at night and use of the park at night. Coloured lights can indicate places of interest and enhance the existing features in the plaza.

5.3 User Comfort

The sole reason for the existence of a plaza is to serve the needs of its users. Therefore user comfort is of the utmost importance. There are a couple of elements that has influence on user comfort.

5.3.1 Sunlight

In South Africa, exposure to direct sunlight in the summer can be very hot and uncomfortable. Open spaces can become a major attraction for pedestrians that seek shelter against the very hot summer conditions. It is therefore very important to provide forms of shelter against the warmth and other natural elements.

Sun paths, sun altitudes and shadow patterns in the plaza should be examined for all seasons, to ensure that there is sufficient shade in the summer and sun spots in the winter. Sunlight is particularly valued at lunch time in commercial business areas when workers escape to take in sum fresh air and sunlight. It’s thus important to consider the land use around the plaza to situate specific plaza features in the right areas. The Sunlight can be controlled by locating specific areas where seating is accessible in sunlight and in shade.

The Plaza can easily become uncomfortably hot due to the large amount of hard surfaces. The comfort level can be increased by channelling wind throu the plaza, the greening of areas with vegetation and making use of some form of evaporative cooling.
5.3.2 Wind
Drafts from surrounding buildings and large structures can cause user discomfort and should be prevented or reduced through specific design measures. Protection against strong winds is mostly important where retail buildings live out into the plaza.

Wind reduction can be achieved by the following measures:
- avoid large, open, unprotected areas;
- avoid wind funnels: narrow openings between buildings where the wind will pick up speed can and blow into the plaza;
- utilize planting, low walls and canopies for wind deflection and situate them so that they protect areas where is mostly needed.

5.3.3 Noise
High levels of traffic, industrial and other ambient noises detract from the enjoyment of a plaza. Noise can be partially mitigated by deterring attention from the noise source through the introduction of such elements as fountains or waterfalls. It is best if the elements are situated between the user and the source of noise.

5.3.4 Hard and Soft Balance
Landscape design today must recognize a new reality in environmental awareness. For example, wherever possible, permeable surfaces should be considered. Use of drought resistant plants may lessen dependency on automatic irrigation. Selection of plant materials should be done with a mind to reduce use of chemical laden maintenance. Perhaps plantings can be more productive by providing a habitat for birds, insects and other animals.

A changing landscape keeps the user interested, seasonal change can be achieved by selecting a variety of flowering or colourful shrubs and perennials instead of largely relying on annuals which are put to waste several times during the year. A tree becomes the roof of the plaza and therefore the choice of tree specie becomes utterly important. In some areas an evergreen tree provides a buffer to screen unwanted views and a deciduous tree gives shade in the hot summer and lets throe warming sun in the winter.

In most plazas the entire plaza is covered in a paved surface. It is important to note that if the plaza becomes too big that there is a need for soft or vegetated areas. If the plaza is shaped in the right way then these areas can help drain storm water in case of a large rain storm. By having large manicured lawn areas and shading trees inside the plaza you soften the plaza and provide space for picnics and children to play.
5.4 Plaza Essentials

5.4.1 Seating

Good seating is important to plaza users. Without it, fewer people will stop to use a space. There are some major points to remember when planning and placing seating:

- Plentiful Seating, maximize opportunities for sitting with different forms of structures for example; walls, steps, planters, water feature edges, and lawns.

- Locating the seats throughout the plaza must include seating towards the street, orientated to a view, near building entrances, alongside walkways, next to attractions/amenities, in shade, and in the sun.

- The use of a variety of seating types is very important. There should be seating in groups, for couples and alone. Fixed seats are preferred above moveable seats due to the fact that moveable seats have higher maintenance and are targets for vandalism. There should also be seating for children and disabled people.

- Seating is there for the comfort of the plaza user and therefore should be comfortable. The form and material used is very important. Generally wood is preferred to stone, concrete or metal however stone and concrete are more durable and can be shaped into almost any form.

fig.5.10: A Plaza seat can have any form and be made of many materials. The seat can also have more than one function.
5.4.2 Activity Generators
Successful plazas are generally characterized by several activity generators. Examples of such activity generators include food and retail outlets, as well as entertainment, which attract users and encourage socializing, relaxation and festivities. Good plaza management can include groups of people to activate the space, such as street theatre musicians, street markets and art. Providing the infrastructure for some of these events can help maintain the order and neatness of the plaza. Such infrastructure can be electrical outlets, water supply, lighting and shade structures.

5.4.3 Amenities
A plaza which is furnished with a variety of amenity features encourages general public usage and creates a sense of liveliness and excitement. Art work should provide a focal point for the plaza or become an integral component of the overall design of the plaza. Bike racks, drinking fountains and waste receptacles are practical, essential amenities.

Some others are:
- game tables;
- kiosks for information and posters;
- open air cafes;
- children's play equipment (where appropriate).

These amenities should be well maintained to not decrease the overall perception of the plaza. Choosing the right durable materials can minimise the maintenance on these amenities.
5.4.4 Weather Protection
The plaza will be used mostly in good weather conditions. If this good conditions change rapidly then there must be some form of shelter against rain and other forms of bad weather. Such protection should be provided at waiting points and along major pedestrian routes.

Protection can be achieved with the following devices:
- Canopies;
- Awnings;
- Shelters;

5.4.5 Natural Elements
Natural elements which reflect seasonal change should be provided, such as water and trees, shrubs and groundcovers in a variety of colours and textures. Vegetation should never create substantial enclosures from the street for safety reasons.

Plantings should reinforce the basic structure of the plaza, positively shape open space areas, and be functional in defining and unifying streets, paths and open spaces. The natural elements should provide distinct visual identity to key open space elements such as gateways to the plaza, views to amenities and create an atmosphere where the users will want to pass through.

Plants used in the plaza should be of the highest quality and in sufficient quantity and of sufficient scale to make an impact. Plantings should be selected and located so that their functional and aesthetic qualities can be maximized. Incorporation of irrigation and adequate drainage will help to assure their survival and best possible appearance over time.

5.4.6 Spatial Variety
Unless there is a specific symbolic or functional desire to accommodate large scale activities, large open spaces should be spatially defined into smaller, more easily identifiable and relatable areas. These smaller areas facilitate orientation and territory definition. People commonly gather at articulated edges in or around a plaza. A distinct sense of place can be achieved, in part, by defining edges and establishing a sense of enclosure through the use of canopies, trees, arcades and trellises.

The spaces inside the plaza should not be designed to accommodate only one use. The success of these spaces will be measured on how many functions the same space can accommodate.

5.4.7 Detailing and Materials
For this plaza to be successful it has to be built of high quality durable materials, which reflect throughout the entire design. The detailing must be consistent or compatible with the surrounding development's architectural language. The plaza design must acknowledge the practical considerations of drainage, non-slip paving, disabled access, easy maintenance and all the above mentioned qualities. Only then will the plaza have a good chance of being successful and surviving time.

5.5 Conclusion
The aim is to create an environment that could function on its own, while still being linked to the greater urban fabric. The plaza must support all the surrounding urban fabric by incorporating the right functions into the plaza. There must be integration and overlapping in these of all the above mentioned elements. These integrative social services and public amenities can accommodate a range of demands. The range of opportunities and choices within the plaza are enhanced by creating a place that embraces the user and user’s needs. It is thus important to create a place that is environmentally conscious and usable by all types of people.
CHAPTER VI.
6.1 Apies River Plaza – Detail Design

The detail design covers the plaza area across the Pretoria North Train Station. In the master plan this area is set out to become a major transport node. The design takes into account the entire urban infrastructure set out by the master plan.

The plaza becomes an important node in the master plan development. This is a very good point to kick-start the new development in this area. It becomes the heart that pumps energy into this node.

The plaza also becomes the interface between the natural systems associated with the Apies River Corridor and the urban structure.
6.1.2 Apies River Plaza Detail design plan

fig. 6.2: Apies River Plaza
fig.6.3: Apies River Plaza
6.2 Design Breakdown

6.2.3 The Transportation Zone

This area is the entrance to the square from the western side. On the one side Lavender Road (R513) forms a strong barrier that can not easily be crossed by pedestrians. A pedestrian bridge should be build that connects Pretoria North Station and the new taxi stop to improve the safety of the pedestrians. The bridge ends in a ramp that gives you two options. The one ramp leads you into the square and the other to the front of the taxi stop.

The taxi area will be typical to the other taxi ranks around Pretoria. What makes this taxi rank different is that this one will give the taxis the opportunity to change lanes in-between the entrance and the exit.

Roof structures can be added in time, but taxis should be discouraged from parking in this area overnight.
Durable materials should be used for this area to survive the high quantity of pedestrian and vehicular movement. Only the paving at the entrance and exit that divide the lanes should have a non mountable kerb to guide traffic into and out of the taxi stop.

The stone support towers can function as staircases that lead down to the individual taxi lanes.
6.2.4 The Arrival Square

The arrival square serves as a buffer between the plaza and the Taxi stop. The arrival square is a good area for informal market due to the fact that many people will pass through this area in a day. The market structure at the back of the arrival square will prevent the informal market from spreading into the rest of the plaza. The market structure also provides shelter against the sun and other bad weather conditions. This area is also covered with trees to add shelter for vendors and keep out some of the noise and visual pollution.

The market structure also incorporates ablution blocks for the vendors and a large store room where some vendors can keep their goods safe overnight.
fig. 6.14: View of Tree Canopy and Market Structure

fig. 6.15: Entrance to Plaza

fig. 6.16: Pre-cast concrete tree grids in arrival square

Fig. 6.17: Section & Plan of Market Structure
6.2.5 The Earth Mounds
The function of the earth mounds is firstly to provide bigger open space within the plaza that has a soft vegetated surface for children to play. Secondly it helps with drainage of water in case of big storms.

On the front side (west side) the embankment are clad in stone with long concrete seats that look over the water square. There’s a walkway that cuts through the middle of the earth mounds. It is situated in this position to prevent pedestrian traffic over the lawn area and it leads plaza visitors to the water square.

fig.6.18: Front view of Earth Mounds
fig.6.19: Earth Mounds
fig.6.20: Section through Earth Mounds

LEGEND

1. Manicured lawn
2. Prepare sub base to 96% MOD AASHTO
3. 0.1mm DPM (UPVC) on sub base
4. In situ concrete bench / step
5. Neatly Packed rock, first layer of rock on step to be fixed in concrete
6. Existing and new earth to be compacted in layers of max 500mm, site rubble can also be used
7. Stone infill to continue stone look from bottom to top

fig.6.21: View to the large trees in front of Earth Mounds

fig.6.22: Rock cladding on Earth Mound

fig.6.23: Example of an Earth Mound (Asensio)
6.2.6 The Water Square
The water square symbolizes the arrival of the water channels to the square. The water feature will be programmed to shoot water into the air in different patterns and volumes. The large area of water activity will have an evaporative cooling effect in the plaza.

Spouts are situated far apart to provide dry movement through the water square. A seating area are situated around the water square Plaza visitors can enjoy the evaporative cooling the spouts or just sit and relax while watching the children play in the water. The water square can be switched of to serve as a dry hard open space for gatherings or functions.

If the system is switched off completely, all the water will run in sub-surface channels to one large reservoir. While the system is running the water will continuously run through this reservoir to be filtered before returning to the Water Square. All spouts will be installed behind a grid to prevent people from tampering with the spouts.

fig.6.24: View of Water Square
fig.6.25: Water Square
fig. 6.26: Spouts at night (Asensio)

fig. 6.27: Possible Tar & tile surface (Asensio)

fig. 6.28: Section through Water Square

fig. 6.29: Interactive spouts (Asensio)

LEGEND
1. Custom-made metal grating
2. Tile and asphalt finish to match pattern on plan, tiling to be done before asphalt is burned / bonded to waterproofing
3. 3m Min. stainless steel jet nozzle with LED lighting. Metal grid over cutout.
4. Torch-on Waterproofing layer on concrete slab
5. In-situ concrete slab laid to 1:20 fall from centre of feature towards perimeter trough
6. Delivery pipe
7. Existing soil to be compacted
8. In-situ concrete catchment trough
6.2.7 Restaurant & Café square
This area is situated in front of two large office buildings. There are restaurants and cafés situated on the ground floor of each building and this area will serve as their outdoor dining area. This area is surrounded by long seating walls with gaps at specific points. This gives the space a boundary and encloses any activities within this space.

The area is covered by trees to form a large green canopy that will protect the users from the sun. The trees should preferably be deciduous to give the space a seasonal change and let through sum sun for the cold winter months.
fig.6.32: Restaurant & Café square framed by seating walls

fig.6.33: Section through Restaurant & Café square

fig.6.34: Green canopy over seating area

fig.6.35: Example of seating walls
6.2.8 The Plaza Park
This large green park like open space in the plaza prevents the plaza from being one big mass of hard surfaces. It has all the functions of a park, like large shading trees big lawn areas for children to play. This large green area is also situated at the entrance of the sporting facility to help accommodate large crowds and gatherings of people.

The other functions of the park so to help drain storm water away in case of a large storm. The park should be equipped with sufficient subsurface drains to prevent the plaza from flooding.
The function of the open space between the Plaza Park and sporting facility is to accommodate large crowds of people that will attend games at the Sport facility. This area can also be used as a market for arts and crafts.

fig.6.38: Park activities

fig.6.39: Walkways through park

fig.6.40: Open space between park and sport facility

fig.6.41: Tree canopy in park
6.2.9 Main walkway – road underpass

The main walkway has to cross four lanes of traffic in order to get to the retail area neighbour the plaza. Due to the high quantity of vehicular movement on this road, it is impossible to let the people cross the road by means of traffic lights. The walkway will pass underneath the four lanes to improve the safety of the pedestrians and keep the traffic from stopping every few minutes.

The underpass will have a large opening to accommodate for large quantities of people. The large opening will also help keep safety and visibility through the underpass to a maximum. The walkway that leads to underpass has a slope of 1:12 to accommodate wheelchairs and disabled people.

The walkway that leads to underpass has a slope of 1:
fig. 6.44: Wall treatment in underpass

fig. 6.45: Anti slip studs in pavement

fig. 6.46: Section trough underpass

fig. 6.47: Large opening in underpass

Vehicles and pedestrian movement above underpass
Conclusion

In this last stretch of the Apies River we have the opportunity to create an urban environment that interacts and embraces the river. Along the entire stretch of the Apies River the urban fabric turns its back to the river and by doing so the river becomes an unsafe and inaccessible place. The master plan that was developed shows how to approach this problem and will guide future development in order to prevent mismanagement.

There is a great need to uplift the image of Northern precincts. The Apies River Plaza is just one location where new development can be kick-started. It will work best if there are a couple of these locations where the government and/or private sector invest capital to spark new exciting river front development.

The result of new development alongside the Apies River can have a huge impact on the river itself and the rest of the system downstream. It is thus important for each new part of the development to take the river and its character in consideration. New development must always protect and enhance natural features for wildlife habitat, water quality and scenic amenity. They must provide recreational access to the corridor through appropriately located and developed facilities. It is important to identify and secure preservation for lands crucial for habitat and recreation linkages and always promote awareness and preservation of historic, cultural, and ecological resources along the corridor through education and interpretation.
List of references


 PRETORIA INNER CITY PARTNERSHIP. *The Inner City Integrated Spatial Development Framework.*