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1.0 Contextual analysis

1.1 Tshwane

Tshwane is located in Gauteng province and includes Pretoria which is the governmental capital of the country. It is essential to create Tshwane as “the African capital city of excellence”

(Tshwane inner city development and regeneration strategy 2005:5) (TICP).

The city is seen by many as being a gateway into South Africa and into Africa.

The economic core of the province is shaped by the availability of freeways. Severe funding restraints for road construction and maintenance would have a negative consequence on the growing economy. Public transport is becoming a viable solution to alleviate some of the growing demands for transportation.

Tshwane is immense and extensively scattered, the municipalities focus is on developing transportation nodes and corridors to strategically connect the city with outlying locations. This is comparable to what has been implemented in Johannesburg.

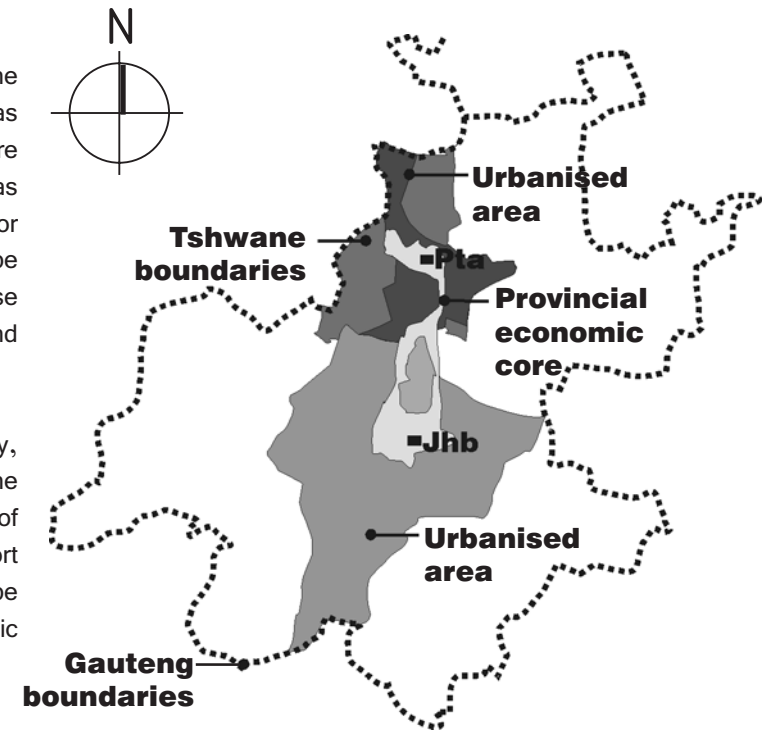
Baralink Development Framework (BDF) takes approximately 70% of commuters from Baragwanath, Soweto to Johannesburg's Bree Street Metro mall.

(Digest of South Architecture 2006/2007

The BDF identified two transportation nodes, developed them and by using the existing road system, the BDF strategically linked the distant peripheral township with the city.

Through the analysis of current trends, the Gauteng Transport Study (GTS2000), has identified how and where from, people are travelling in Tshwane. The GTS2000 has established major transportation nodes for development. Important corridors should be developed on specific routes linking these nodes which are designated roadways and facilities to public transportation.

The Strategic Transportation Plan, or Strategy, has identified transfers as being one of the challenges to public transport. The shortage of integration from different public transport services is causing the system to be ineffective (City of Tshwane, Strategic Public Transport Plan:51).



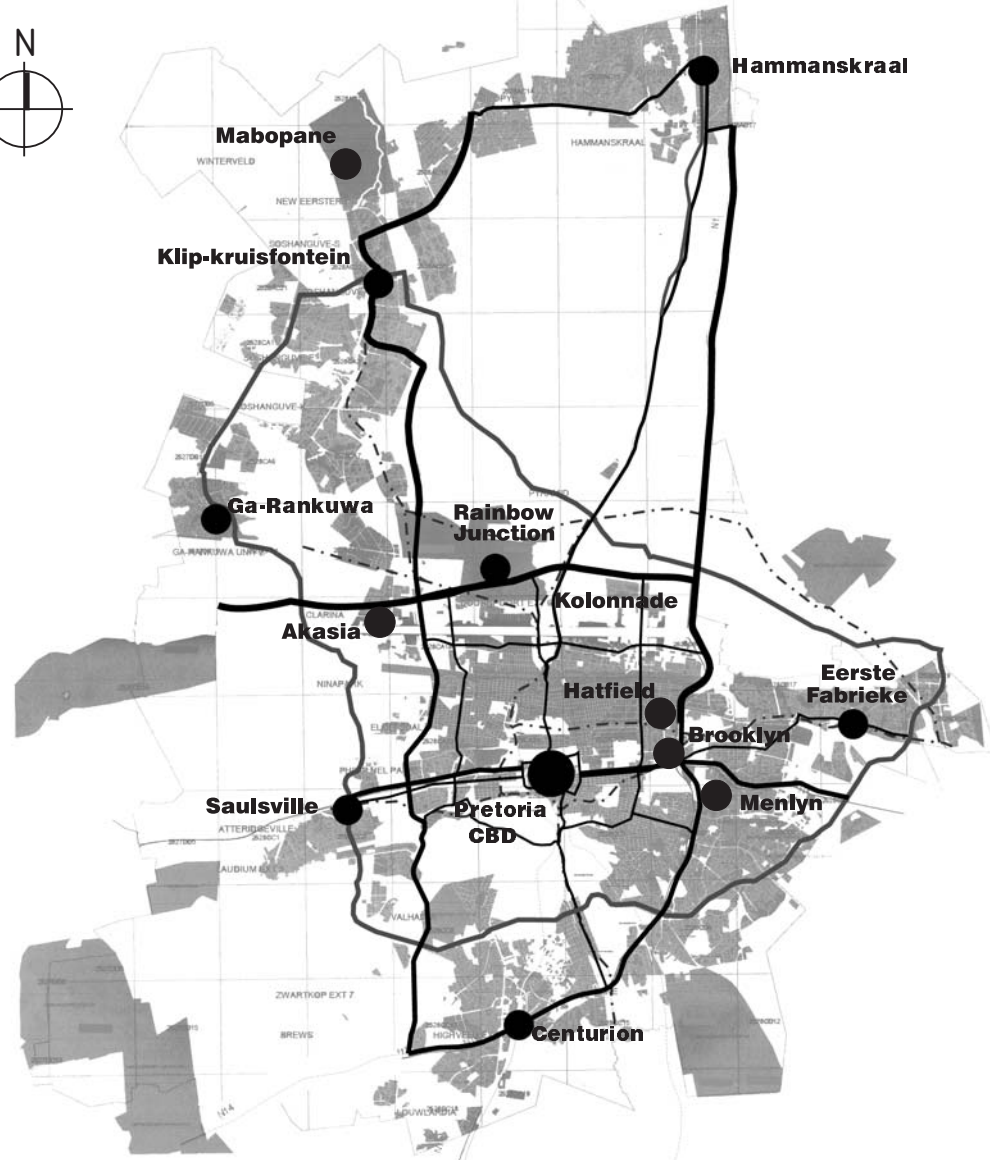
1_01 Gauteng economic corridor

1. Over 80% of provincial roads have passed their design life. Road management system shows that over 100km of roads need to be reconstructed each year and only 22km of this is being replaced.
(City of Tshwane, Strategic Public Transport Plan:35)

Transfers are not seen to be a positive influence on public transport due to the fact that changing from mode to mode involves time and effort. Only if the change is beneficial, either by costing less, greater speed and convenience, then transferring is acceptable to the commuter.

One of the requirements for a successful public transportation network is that it is as complete as possible and reduces the number of transfers. In order to do so the network must achieve maximum coverage. More interaction is required by stakeholders before the public transport network can be initiated.

As the proposal stands now, it will utilise approximately 24% (2000km) of the total 8700km municipal road network. (City of Tshwane, Strategic Public Transport Plan:41)



1_02: Highlighted road system of Tshwane and possible transport nodes.

1.2 Public transport network criteria

The Strategy has proposed the following network criteria, which will serve as the basic design parameters for this dissertation (Vide table 1_01).

Summary of table 1_01:

- The terminal will cater for more than 6000 passengers therefore the determined classification is primary or principal arterial.
- Dedicated roads , priority roadway or normal two way roads are required
- It must be in close proximity to either a bus terminal or a train station
- Ablutions must be available
- Drop off zones and public parking is required
- Robust walking surfaces and walking distances not exceeding 1000m in rural areas and not exceeding 500m in urban districts.
- Stops at 800m spacing and ten minute interval between pick ups, during peak hours.
- Terminal to have very low gas emissions or high levels of ventilation.

Properties	Strategic importance	Network function	Primary	secondary	tertiary	local
Volume	Passenger volumes in peak hours	> 6000	●			
		3000 to 6000		●		
		500 to 3000			●	
		<500				●
Infrastructure required	Road Facility	Dedicated Roads	●			
		Priority Roadway	●	●		
		Normal 2-way Road	●	●	●	
		Normal 1-way Road		●	●	●
	Passengers boarding	Bus Terminal/station	●			
		Bus Shelter and bay		●	●	
		Bus Bay			●	
		Bus Stop				●
	Ablution facilities	Available	●	●		
		Not available			●	●
	Collection and distribution	Park and Ride/ Kiss and ride	●	●		
		PT feeder	●	●		
Paved walkways		●	●	●		
No formal sidewalks					●	
Level of service required by passengers	Max. Walking Distance	1 500m	●			
		1 000m		●	●	
		500m				●
	Typical spacing of stops	800m	●			
		600m		●		
		450m		●	●	
		300m				●
	Frequency of service: Peak Period	Every 10 minutes	●			
		Every 20 minutes		●		
		Every 30 minutes			●	
Every 60 minutes					●	
Emissions	Emission Gasses	Very low	●			
		Low		●	●	
		Average			●	●

Table 1_01 Criteria for transportation network

1. Primary-Principal arterial
Secondary-Local Arterial
Tertiary-Collector roads
Local-Access Streets

1.3 Pretoria

Pretoria is the centre of activity for Tshwane. It, as many other cities around South Africa, has had its users changed from medium-high income groups to lower income groups. This has resulted in little to no capital being invested back into the city. Recently large government commissions have been authorised, they include the construction of a new National library, the refurbishment of the Civitas building and the proposed construction of a new Department of Education headquarters.

Pretoria has been based on grid-like planning that has been designed principally on vehicular movement. This grid runs north to south and east to west. Generally roads are one way with 3 or more lanes.

Access into Pretoria is mainly through freeways that connect to a ring road surrounding the core of the CBD. The ring road consists of Boom and Bloed street in the north, D.F. Malan Drive in the west, Skinner Street in the south and Nelson Mandela Drive in the East (*vide* Figure 1_03). This ring road can be considered to be an edge due to the high-speed volumes of traffic using it.

Both public and private Commuters travelling into the city, (*vide* Table 1_02), expect to park or be dropped off close to their final destination.

Private cars will choose to wait for parking, right in front of their destination, causing higher congestion in Pretoria's streets. However public transport commuters do not have that choice, they get dropped off where the bus or taxi stops. Therefore major public transportation nodes remain on the peripheral of the inner city. These nodes act as distribution and collection systems for the rest of Tshwane, serving the public commuter's requirements.

The CBD is located in a valley between the Witwatersberg and Salvokop mountain ranges, running east to west. This causes a major pollution problem in winter months by stopping the seasonal prevailing winds from the south.

Mode	%	People
Minibus Taxi	15,1	30 200
Bus	9,5	19 000
Train	6,5	13 000
Car	33,0	66 000
Walk	33,0	66 000
Other (Bicycle, motorbike,)	2,8	5 600

Table 1_02 Number of people in morning peak traffic



1_03 Inner city movement network

1. Access into Tswane:

- South-Two freeways: N1 from Johannesburg; R21 from O.R. Tambo International Airport.
- East-N4 freeway from Witbank.
- West-N4 freeway from Brits.
- Northern-Three provincial routes: north west through D.F. Malan Drive; centrally through Paul Kruger Street; Soutpansberg Road to the north east.

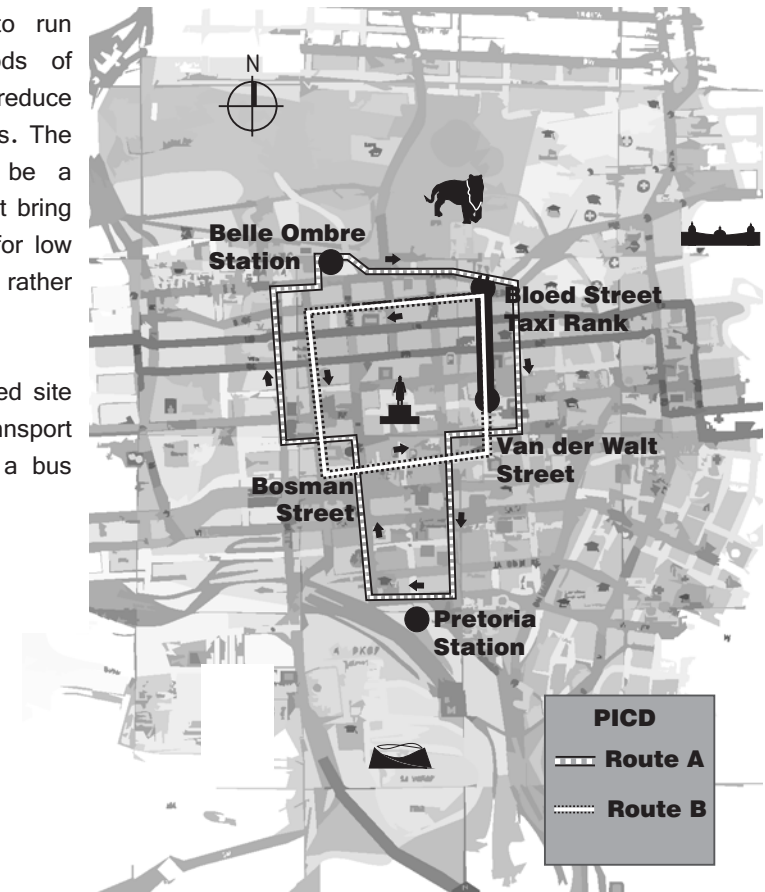
1.4 Proposed Inner City Bus Distribution System (PICD)

In 1996 an investigation revealed that several commuters have to walk more than two kilometres to get to their destination within the city. A few said that they were prepared to pay for a better distribution service. A proposal for a bus distribution system was therefore introduced by the Pretoria Municipality.

The investigation identified three main public transportation nodes: Pretoria railway station, Belle Ombre railway station and Bloed Street Taxi Ranks. The Proposed Inner City Bus Distribution System (PICD) will have two routes, connecting all three of these nodes and delivering commuters closer to their destination within the city.

The distribution system is planned to run every 5 minutes during peak periods of 05:30–08:30 and 15:30–18:30, and reduce to 15 minute intervals in off peak periods. The PICD admitted that there may not be a revenue from this service, as it does not bring a real benefit and is more of a luxury for low income commuters, say they would rather walk then pay for it (vide Annexure A).

The PICD could use part of the proposed site and accomplish one of the public transport network needs which is to connect to a bus terminal.



1_04 Main nodes of transport and commuter movement network.

	Route A	Route B	Total
Route length (km)	7,2	4,0	11,2
No buses required (pk)	6	4	10
Bus costs (cap - annual)	R 2 250 000	R 1 500 000	R 3 750 000
Bus costs (fuel, tyres, maint.)	R 1 350 000	R 1 000 000	R 2 350 000
Total bus costs (per annum)	R 3 600 000	R 2 500 000	R 6 100 000
Drivers required (2 drivers/bus)	12	8	20
Staff Costs (annual)	R 1 600 000	R 1 000 000	R 2 600 000
Total Cost (bus & staff)	R 5 200 000	R 3 500 000	R 8 700 000

Table 1_03: Overall budget for the PICD.

1.5 Activity Spines

The three main public transportation nodes generate a considerable amount of commuter /pedestrian movement that cause vibrant activity spines that move throughout the city (Site investigation 2007.03.22).

These activity spines are lined with butchers, music shops and take-away restaurants. Traders cram into every available niche of pavement, hardly leaving enough room for the flood of pedestrians who are on their way to and from the different terminals.

The most popular of these spines is Van der Walt Street. It links the commercial CBD to the Bloed street taxi rank. Here, informal trading carries on till the evening hours contradicting belief that the city dies as the sun sets.

This spine gives a heightened sense of place that is located on poorly maintained pavements, with garbage and debris blocking kerb inlets. Pavements are narrow and vehicle traffic flow is heavy making it an unsafe and an unfriendly pedestrian environment (*vide* Figure 1_05).

Not all the corridors to the existing terminals are as successful. For example, Belle Ombre station has a retail mall surrounding an old rundown taxi rank. The movement circulates in the mall, commuters leave the station and

the activity spine disappears, leaving a deteriorated walkway. Depots and warehouses that form a large parts of the topography around the station are responsible for the inactivity of the spine. The reason for this is that these buildings do not to interact with the public street space.

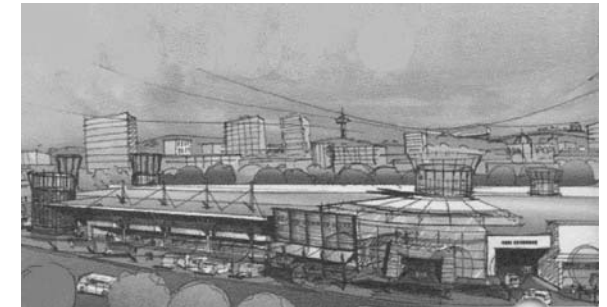
“People that have grown up in cities and buildings orient themselves to the major features of their structures. Of particular importance are continuous elements rivers, paths, street facades and specific prominent landmarks.” (Lang :1987).

Cognitive Mapping can achieve coherent commuter movement through the city. These activity spines create paths through which people recognise that they are moving towards a terminal.

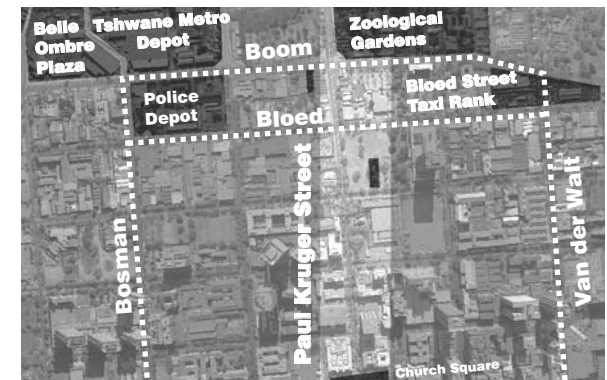
This dissertation will focus on the inactive sections of the cities fragmented spines, and through an appropriate response to the street, layout will be able to harness its potential and direct commuters to and from their destinations more efficiently.



1_05 Street shot of van der Walt



1_06 Proposed perspective of Bloed Street Mall



1_07 Aerial of North CBD

1.6 Pretoria, northern precinct

“ During World War II the zoning of this residential area was changed to accommodate light industrial activities. Several cottages north of the Panagos building were converted to manufacture helmets. Mr Panagos identified this change to be the start of the degeneration of the area.” (Wilson:2007)

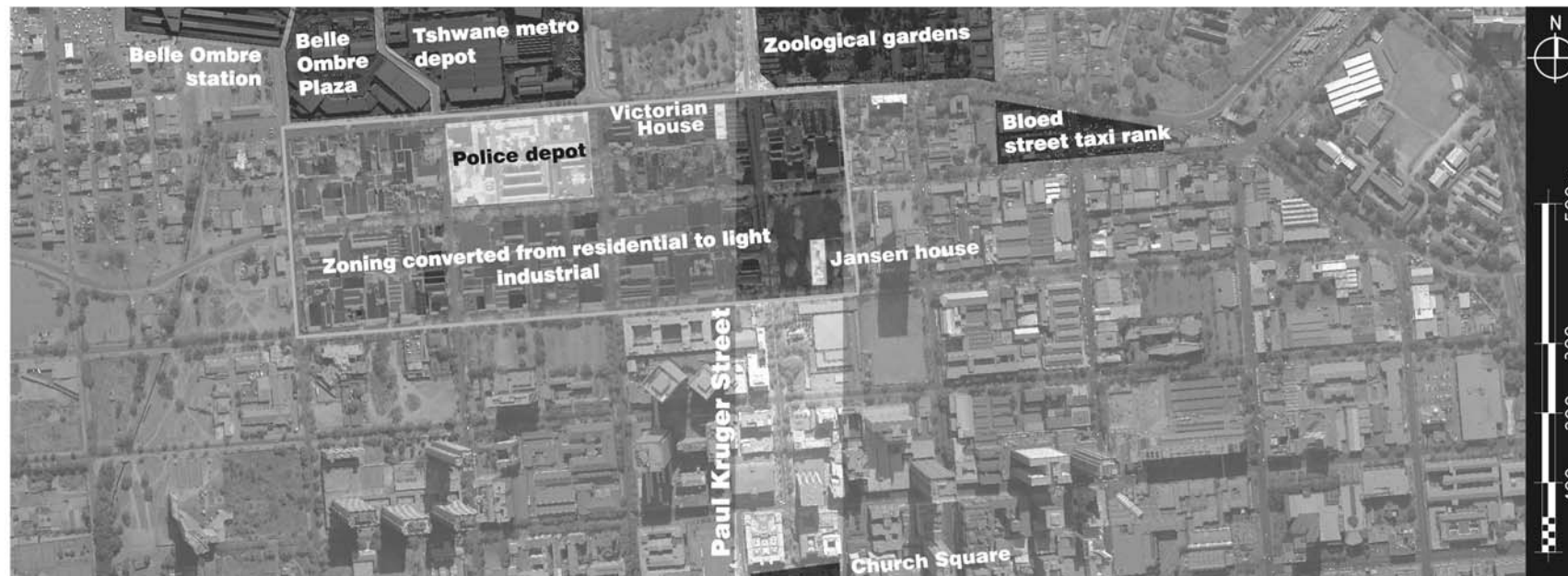
The Northern precinct of Pretoria is a fragmented area, little of the formal residential area remains. The dwellings have been mostly replaced by single storey light industrial buildings.

The area has relatively little activity in comparison to the rest of the city, with the exception of the crowd of commuters going to and from Belle Ombre Station and Bleod Street Taxi Rank.

The precinct is one of the gateways to the city. Paul Kruger Street enters the precinct from the north and carries on through the city till it finds Pretoria Station. This heightens the precinct’s status, as it becomes the first announcement that people are entering the CBD.

The precinct has a ring road that it shares with Pretoria’s ring road system. It consists of Vermeulen and Proes in the south; Prinsloo and van der Walt in the East; Bosman and Schubart in the west and Bloed and Boom in the north. The sharing of Bloed and Boom Streets ring road system, allows the precinct to have a high level of accessibility for vehicles.

The image of Pretoria depends on the first impression that this precinct portrays and therefore has to be a priority to initiate an urban renewal.



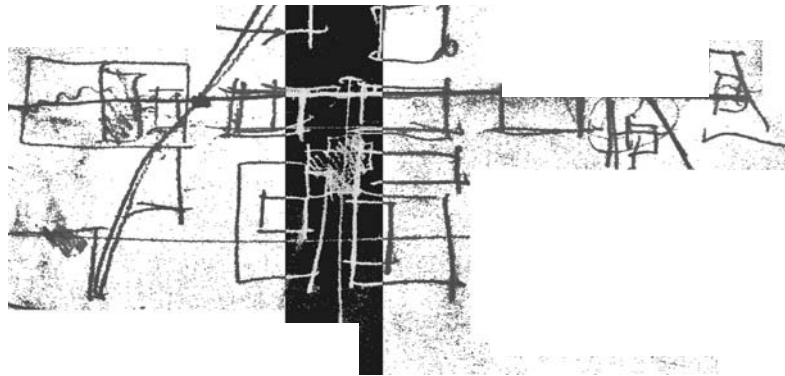
1_08 Modern day Pretoria, north of Church square

1.7 Proposed urban design frame work

This year, 2007, the M(Prof) Architectural students were assigned an area in Pretoria's northern districts. Members of the class split into groups, depending on their site location they developed a number of urban frameworks, this dissertation being part of two of the urban frameworks: one semi-pedestrianisation of Paul Kruger Street and the other introducing a pedestrian walk called Grand parade, which links Marabastad, in the west with the Bloed Street Taxi Rank in the east.

Paul Kruger Street Framework

The street currently consists of double lanes running north to south.



1_09 Conceptual sketch for Paul Kruger Street
Urban Design Framework

Paul Kruger Street is seen to be the Grid initiator of Pretoria, the street is not heavily utilised by vehicles because Church Square diverts traffic around it thus hampering the flow.

The Zoological Gardens and Zoo café are the only attractions to the north of Paul Kruger Street and they do not attract many users during the week. However on the weekends, the area is packed with families visiting the zoo. Many car dealerships and vacant lots line the street on either side, buildings that are left standing are in urgent need of repair. All this add to the perception that the area is unsafe and for that reason, pedestrians do not use the street.

The urban framework is split into two phases: Phase One is to fill the vacant lots with socially beneficial projects that will improve the spatial integration that will create nodes, the nodes linking the area to the city and attract people into the Precinct (Lynch 1960:69).

Phase two would involve reducing the street from the 4 lanes to two lanes and a tram line to the centre. the wider pavements will offer tenants and traders the space to cater for the potential increase in number of pedestrians.



1_10 Current section through Paul Kruger Street.



1_11 Phase 1 section through Paul Kruger Street.



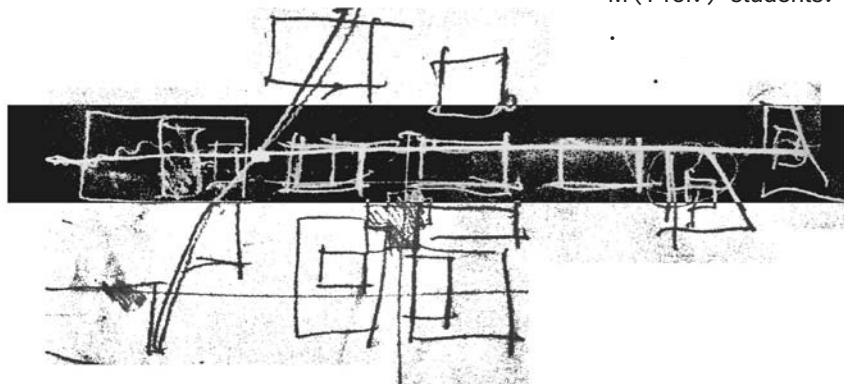
1_12 Phase 2 section through Paul Kruger Street.

Grand Parade Framework

The northern district of Pretoria seems to have a lack of continuity from east to west. There is already a in contrast to axis going north to south that was made along Paul Kruger Street. The streets in the area play an important role in the vehicular movement around the city. Thus the streets cannot afford to become smaller by accommodating a large pavement as would be required for pedestrian movement.

This proposal introduces a pedestrian walk that flows through the centre of the blocks, between Boom Street and Bloed street, beginning in the west in Marabastad and ending by the new Bloed street taxi mall in the east.

The proposal intends to promote urban renewal which will begin from its core leading out, pedestrian moving to create another activity spine, similar to the Church¹ Street mall.



1_13 Conceptual sketch for Grand Parade Urban Design Framework

The proposal is split in two phases:

Phase one: Municipality would begin to purchase properties or negotiate with landowners, convincing them that it will be financially rewarding to them to offer social benefit such as opening the rear of their sites for pedestrians. After all is agreed or acquired, register a right-of-way servitude throughout all the blocks. Dilapidated buildings will have to be demolished and vacant lots will turn into a 10 metre wide paved walkway, fitted with furniture and landscaped throughout.

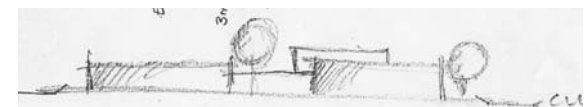
Phase two : Low to medium density residential buildings, built by the government's housing initiatives, will replace some dilapidated buildings and vacant lots. The private sector will then invest in shops, cafes and hotels along the walk linking various specialised buildings designed by the M(Prof.) students.

Guidelines and criterias for the development of Grand parade discussed and agreed upon, summerised as follows:

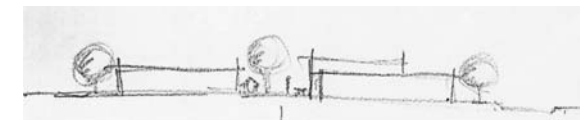
Unified street furniture, paving design and landscaping is to be used through out the parade. Colour code different blocks to help with orientation.

No boundary walls are to be built encouraging facades interaction with the street.

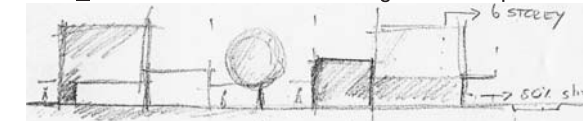
Each building is to contribute positively to urban public open spaces and define a strong edge. Maximum of five storeys, mixed use, buildings with retail at the street level with office on the first floor and residential or office above that, buildings are to have Vernacular architectural language.



1_14 Current section through Grand parade.



1_15 Phase 1 section through Grand parade.



1_16 Phase 2 section through Grand parade.

1.Church street mall was an existing vehicular road, in the centre of town that was pedestrianised and has formed a hub of commercial activity.

1.8 The Site

The proposed site is diagonally opposite Boom Street from the Belle Ombre Plaza, which is a shopping centre that links Belle Ombre Railway Station to Schubart Street. This site was chosen due to its connectivity with the ring road system of the precinct as well as Pretoria's ring road system. The site is located within 1000m walking distance from the railway station and is found to be on the main pedestrian movement patterns of the city (Site observations 22 March 2007).

The majority of the site is currently a Municipal police depot which consists of open parking, used for storage of broken vehicles. The rest of the site is used for retail shops. (Vide Figure 1_18)

The Police depot does not interact with the streets, causing large vacant sections of pavements devoid of any retail component and therefore few pedestrians use it. The depot prevents any chances of an activity spine forming, surrounded by a repulsive six foot wall with barbed wire fixed to the top. There is little to no traders found on the three street edges of the depot. This could also be attributed to the harassment that police officers plague traders with. (vide Annexure C)

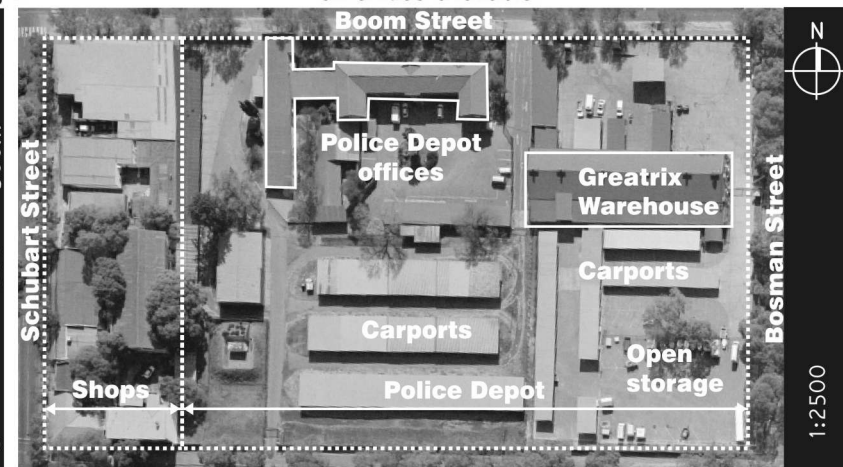
For this reason no traders are to be found along Boom Street due to the entrances to the depot. However, activity does occur on the opposite side of Bloed Street where shop keepers and traders line the streets, with commuter battling through.

Few buildings are sound, however the two main building of the police depot were visually identified as having heritage value. The Black Migrant Registrations Office, currently being used as the Police depots offices and the Greatrex Warehouse, which is still used as a storage warehouse, are both in a good condition.

The retail shops are accompanied by informal traders that line the street edge of the pavement. Both the shops and the traders are dependant on the movement of commuters, to and from Belle Ombre Station. This section of activity is in a poor state, the pavement is a simple, two metre wide strip of uneven concrete flanked by bare red earth. Litter is piled near the streets and there are no amenities available.



1_17 Site locality plan



1_18 Site aerial photograph

1.9 Site movement

The road system around the site consists of Boom Street, eastbound, on the north boundary; Bloed Street, westbound, on the south boundary; Schubart Street, south bound, on the west; and Bosman north bound, on the east (vide figure 1_19).

The site is located on the corner of the precinct's ring road and is in-between the northern section of the Pretoria ring road, consisting of Boom and Bloed Street. The traffic flow is heavy on these two roads and pedestrians are at risk when crossing them.

Pedestrian movement is generated by Belle Ombre Railway Station, it moves down Schubart in high volumes, heading towards Vermeulen or Church Streets in the south. At the corner of Schubart and Bloed, some pedestrians turn onto Bloed Street and head east, towards Bosman Street, others carry on south. The movement splits again at the corner of Bosman and Bloed, half move towards the south and half carry on toward Bloed Street taxirank in the east.

Low amount of pedestrian movement is to be found along Boom Street and almost none on Bosman Street, north of Bloed Street. The only street furniture available are street lights and dustbins. The pavements are in a poor condition.



1_19 Pedestrian movement.

1.10 Visual context



1_20



1_21



1_22



1_23



1_24



1_25



1_26



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1_28



1_29

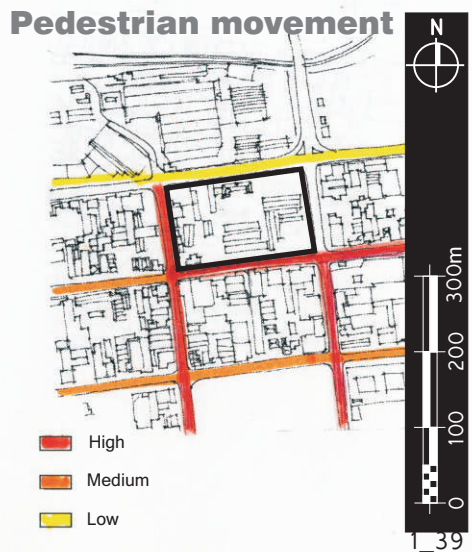
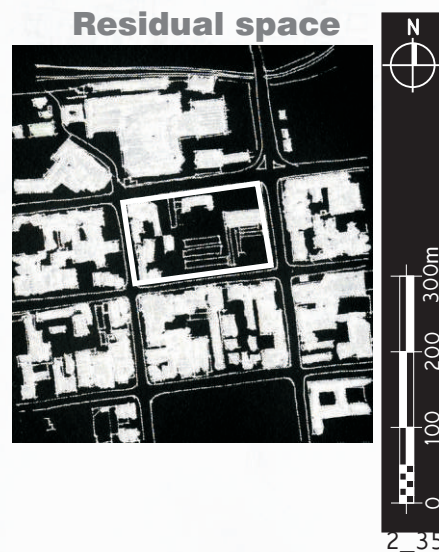
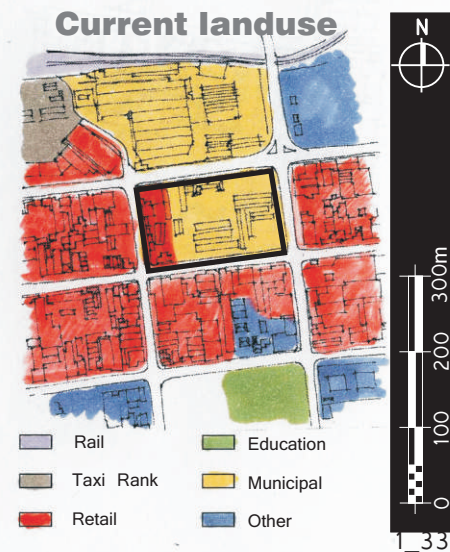
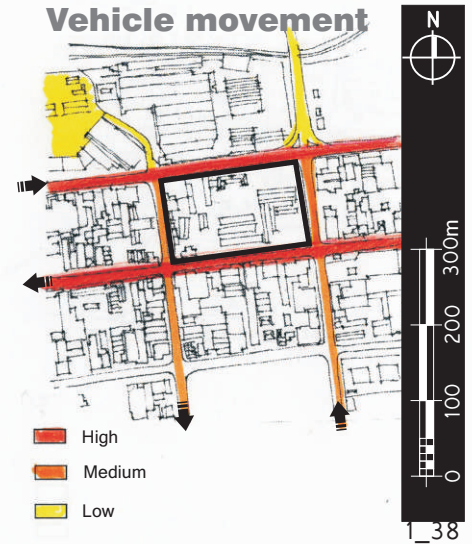
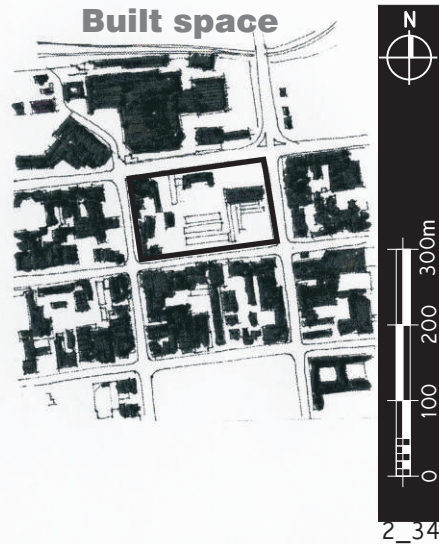
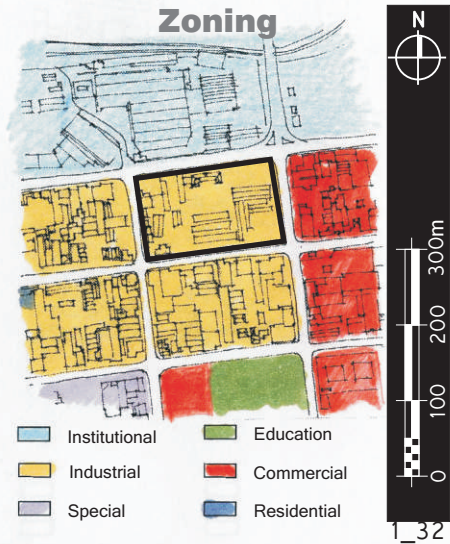


1_30



1_31

1.11 Visual contextual analysis



1.12 Site climate

The sites climatic conditions are considered in the design in order to achieve environmental comfort for the users.

Climate analysis has also been used to identify potential energy saving techniques such as natural ventilation, solar water heaters or water harvesting.

Temperature

Lowest min.: -5,5 °C ; Average 12,1 °C
Highest max.: 36,3 °C ; Average 24,8 °C

Humidity

Minimum: 57% @ 08h00 – 29% @ 14h00 [September]
Maximum: 75% @ 08h00 – 48% @ 14h00 [March]

Rainfall

An average of 674mm rainfall per year, most of the rainfall during the summer.

(vide Table 1_04)

Severe hailstorms have occurred.

Potential water harvesting per square metre:
80% of rainfall equals approximately 520mm can be utilised per annum.
(Crawley:2005:33)

Sun

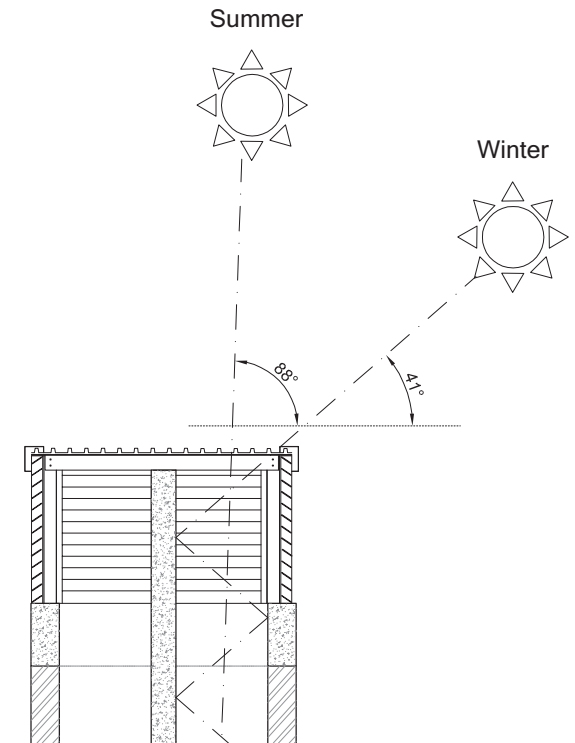
Average 89 giga Watt solar radiation/year
Summer sun angle: 88 ° North latitude.
Winter sun angle: 44 ° North latitude.

Cloud cover

Average 33% of 365 days
Varying from 13% in July to 54% in December

Wind

Prevailing winds are calm, blowing from a East direction, Occasional winter cold snaps bring winds from the south.
Turbulent wind patterns accompany summer thunderstorms. (Meyer Pienaar Tayob 1999: 49; Schulze 1986)



1_40 Sun angles effect on skylight.

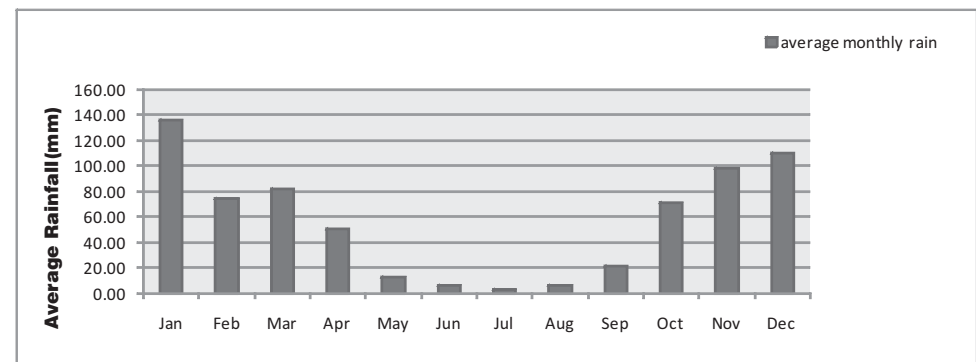


Table 1_04 Average annual rainfall