

CHAPTER 1

CONTEXT ANALYSIS



1. INTRODUCTION AND BACKGROUND

As social leaders, tertiary institutions have the responsibility to demonstrate visible efforts that contribute to their communities. A country such as South Africa that has constantly followed global trends throughout history, where tertiary education had been reserved for the privileged minority, and architecture was utilised as a physical and physiological tool for demonstrating and enforcing the segregation of the masses from one another- it becomes important to exhibit great efforts to reverse the physical and far more damaging psychological barriers that have been created within society. In light of this, it has become important for tertiary institutions, as some of the most relevant leaders in the world community, to be pioneers of breaking down all unconstructive barriers, rather to use innovative adaptive solutions and contribute an alternative architecture and urban fabric of inclusiveness, creating more efficiently functional cities. By doing so would ensure that universities exploit the opportunity of not only creating an identity for their location synonymous with their positive aspirations, but also an identity for itself synonymous with the successful development and positive activities of an area- thus reinventing urban environments that work more efficiently and in a more integrated manner.

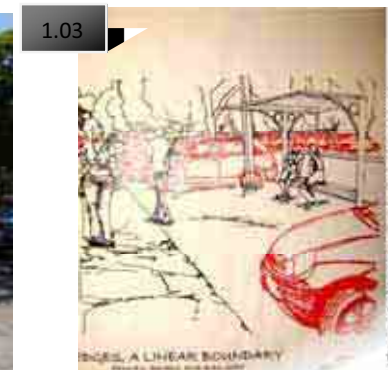
The fundamental objectives the design should fulfill are as follows:

- Creating an environment that is all encompassing of its surroundings and all its users.
- The design of a building that innovates within its constraints of low-tech building technology, local materials, and construction methods.
- Illustrate the translation of the concepts in the design so that users, though not expectedly, would perceive them.

Site selection

The site chosen for this dissertation is located on a corner edge of the University of Pretoria, Hatfield, Main Campus's boundary and forms part of the institution's property- positioned within its fences, in the Hatfield district, Pretoria. At 69m x 96m wide, it currently consists of a student parking lot, as well as an unused driveway and turning circle. The site is situated along the primary commercial activity path on Burnett Street, centrally situated at less than 10 minutes walk from the existing railway stations, the future Gautrain development (Hatfield station) and delineates the boundary edge of the Hatfield district business hub.

The client for the project may be described as being a partnership of a number of role players in the Provincial City of Tshwane Council and the University of Pretoria.



Typical view down Festival Street: Edges around the site are used primarily as thorough fares and informal street parking. Nothing indicates to a passerby that they are walking past the University of Pretoria. The university is undefined surrounded by a palisade fence housing the parking lot; a second fence divides the parking lot from the university within.

Client brief

The resultant urban brief entails the design of a development that not only demonstrates the university's core function- the creation and teaching of information and knowledge- but also includes the general public. The development is to house flexible research spaces, allowing the occupation of different research faculties with varying needs. The BE @UP (Business Enterprise at the University of Pretoria), currently situated on campus, is to be relocated to the new development to ensure that their commercial services are more accessible to a wider clientele.

The development aims to reduce the disparity between the part (university) and its whole (Hatfield district). Instead of the public identifying/perceiving each 'part' independently, they should rather perceive each as part of a whole.

The functional brief has been defined as follows: The University of Pretoria was last listed in the top 500 by Shanghai Jiao Tong in 2006, for its contribution to the engineering and science research fields. The university has, however, identified a lack of general resources to equip the various research departments with the ability to further excel and broaden these research scopes. The project is to develop a place of academic research that collaborates institutes within the university with other research institutions, such as the CSIR and Innovation Hub.

The development must establish a strong dialogue with its surroundings in order to assist in achieving acceptance and belonging of the institute. The project's broad brief is to spatially and functionally integrate the university with its surroundings, thus ensuring a more holistic interpretation of the district, as the home of the University of Pretoria.

The development should be perceived (branded) as a fixed point for a collective identity for the Hatfield district. Architecture with a strong social identity is required, defining the university as being part of the urban territory. In achieving this, the development should clearly reveal its function and organisation. The brief requires complete separation of public and institutional circulation patterns: identifying the building's constituent parts, resulting in a transparency that encourages a sense of accessibility and orientation, and communicated sensory-physically, psychologically and visually.

A result from the brief is the notion that in so far as the primary client is the university, the general public and future users of the development and feeders of the general Hatfield district must be considered clients or rather relevant stakeholders in insuring the success of the project.

The User

Defined as a person liable, in the lifetime of the built fabric (building and created infrastructure), to use the creation for his/her personal betterment.

The users are also service personnel, researchers and staff occupied in the daily running of the buildings and related activities.

Clients are those who require the professional services of the institution. Clients will probably be variable government departments and private industries, including developed enterprises and SMME'S.

Local residents are students and middle class young professionals. These residents would be defined as the after hour's users of the restaurant and entertainment sectors contained in the building complex.

The real world problem

The University of Pretoria, Hatfield, Main Campus is unrepresented within and is isolated from its urban framework (Hatfield district). This has limited the flexible growth of the area, attesting to general trends of traditionally designed institutions that have not embraced new urbanism ideas of connectivity between anchor parts and their surrounding environment for the benefit of the whole.

Some basic problems are encountered when analysing:

- Pedestrian movement patterns and their restrictions,
- Development patterns of the district; their potential and their restrictions,
- The boundary that is the university, ultimately revealing the primary restriction of the district's development.

Objectives

The objectives for the inter-institutional and Disciplinary Research Facility include the following:

Functionally

- To aid the goals of the Tshwane Hatfield district development framework- a tourist geared environment.

Architecturally

- To create an identity for the university along Burnett Street.

Spatially

- To reposition UP as a perceived gateway into the Hatfield district, driven by the critically located research hub facility interface between the general public and the university.
- To demolish physical and psychological barriers between the local and international demand markets, as well as the existing energies of Burnett Street, with the university, thereby encouraging the university to take upon itself the responsibility to stimulate development within the immediate surrounding urban environment.

These issues are:

- The psychological barrier created by the lack of user friendly and inclusive activities at the intersection of Burnett and Festival Street.
- The segregated and anonymous relation of the university to the active street edge of Burnett Street.
- The university's lack of interrelation and identification with the Hatfield district, which has become synonymous with Burnett Street.

Research Questions

- What are the requirements needed to house one of the world leading, international research, accredited facility universities?
- How can the development form an integrated whole within the full range of components of the urban arena and solve issues of the urban environment of the Hatfield district?
- How can the development retain its security requirements, yet fulfill the set objective of urbanising the university's edge?
- How do the needs of the pedestrian take preference without sacrificing vehicular users' growing requirements with the eminent Gautrain's arrival?
- What affects will the development have on the university's context, internally (UP) and externally (neighborhood and city)
- How does the project give all stakeholders- students, passerby's, lecturers, researchers and all other users- a sense of identifying, belonging and ownership of the campus?

Assumptions

- A great number of students will make use of the Gautrain to get to and from the university.
- Surrounding buildings on site of the university can be incorporated into the 'research triangle'.
- The co-operation of adjacent residential complex owners to take down their fences and use alternative security methods, which will be suggested and illustrated in the framework.

Delimitation

Barriers to be analysed will be limited to university road up to Burnett Street, and not the entire university perimeter.

1.04



(Gautrain Rapid Rail Link, September 2002-03)

2. CONTEXT STUDY

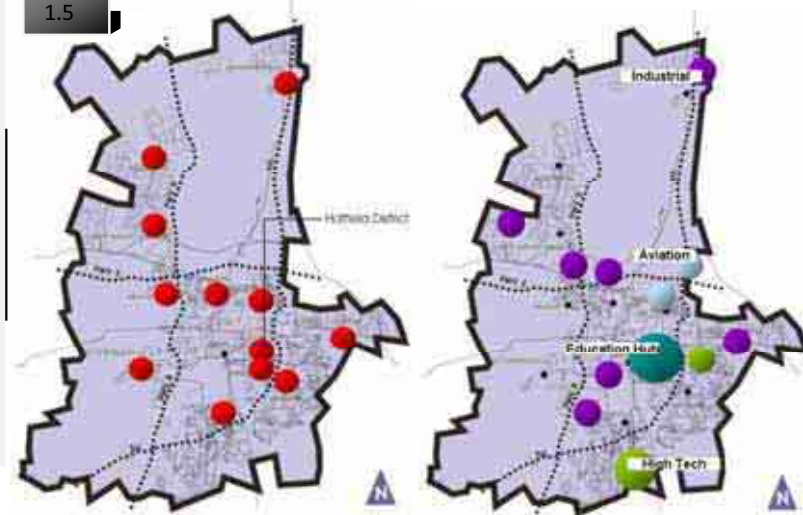
The following analyses are the departure points for creating an understanding that will influence the project's design development.

a) Macro context study

The area is divided into north and south Hatfield districts, separated by the existing South African Rail Commuters Corporation (SARCC) railway, leading to the future Gautrain development.

The Hatfield district has been identified as a metropolitan node of a specialised activity area in the Tshwane Spatial Development Strategy. This project would fulfill the strategies vision of developing such zones, having these become easily accessible and visible from mobility routes, thereby becoming more closely related to the development corridors. These areas will be heavily invested in by the city.

1.5



City of Tshwane Spatial Development Strategy 2010 & beyond- April 2007

1.06



(Tshwane Metropolitan Development Framework- Hatfield)

District Boundaries

The location of Hatfield in the urban context of Pretoria is graphically illustrated in fig 1.06. The northern boundary of the district is defined by Church Street, which divides the residential areas of Colbyn and the Presidency to the north, from the offices and residential area to the south.

The western boundary is delineated by Hill Street and University Road, which lies between the University of Pretoria and Loftus on the railway line.

The southern boundary comprises of Lynnwood Road. This includes Hillcrest, which encompasses a portion of the University of Pretoria. Lynnwood Road divides the main university campus from the south campus, which falls under the Brooklyn district.

The eastern boundary is made up of Duncan Road and End Street, bordering the university sport grounds (LC de Villiers) and the residential area of Hatfield Village.

1.07



(Tshwane Metropolitan Development Framework- Hatfield)

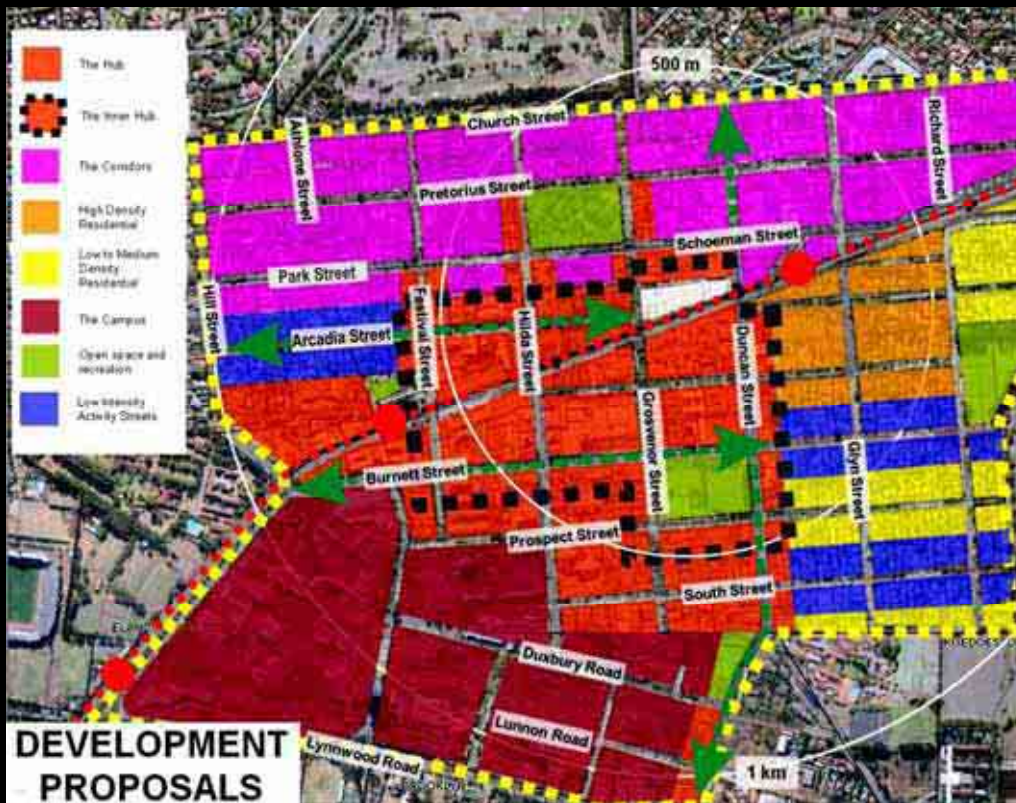
Densities

Hatfield is a low density area. This is particularly the case for Duncan Road, as it is largely occupied by showrooms, the public swimming pool, gas stations and office blocks.

The highest residential densities are found to be within Hatfield east (Hatfield Village student accommodation) and south of Prospect Street, which comprises mostly of university residential accommodation. The university students are thus the largest continuous contributor to the area, followed by the commuter consumers and employees to the core business area.

The new inner city development situated on Burnett Street, a block away from the proposed project, houses mixed use functions, including residential accommodation, offices and retail space. This and the Gauteng Hatfield station development will undoubtedly generate an increase in day and night densities within the district.

1.08



(Tshwane Metropolitan Development Framework- Hatfield)

Driving Forces to the District

The development of a Gautrain station within the Hatfield district will increase accessibility to the district. Thus, the station will also increase pedestrian and vehicular densities within the area.

Three parks are situated in the Hatfield district, namely Richard Street Park, Belgrave Square and Springbokpark. (Laubscher, 1992: 19)

The commercial activity paths run along Arcadia Street and Duncan Street, with the highest concentration of commercial activities on Burnett Street- which does not extend east beyond Duncan Road, or west beyond University Road.

The diverse land use- such as sport and recreation facilities, parks, educational facilities, churches, a police station, and commercial activities- as well as the strong and stable buying power of students, the projected increase in densities and tourists within the area, recreational facilities, and a safe environment ensured through passive surveillance and the visible and active police force located within the district, makes Hatfield a powerful activity core within Tshwane, with an even greater growth potential.

The proposed institute lies within the inner hub identified by the City of Tshwane Metropolitan municipality Hatfield framework. It must, therefore, play a developmental role in championing the city frameworks' objectives for this area.

1.09



(Tshwane Metropolitan Development Framework- Hatfield)

Burnett Street is indicated as one of the two future road networks to link the Hatfield District to the Innovation Hub. South Street, the other of the two proposed, is cut off short by the University's boundaries.

The Tshwane Metropolitan Development Framework for the Hatfield district indicates future plans for the area. (Fig. 1.09)

- Future link with the Innovation Hub
- Proposed BRT routes
- Existing primary movement routes/ linkages

These vehicular routes are limited, due to the location of the university's boundary fences.

Transport Networks

East-west primary networks:

The one-way eastward bound Schoeman Street.

The one-way westward bound Pretorius Street.

These Streets provide direct access to and from the CBD from the N4 in the east, including access to Hatfield.

Church Street (two-way transit route). This is the only direct route from the Silverton district and Mamelodi, the most developed township within Tshwane, to the CBD.

Burnett Street encompasses the majority of the area's current commercial activities and services.

The Lynnwood Road network functions to link Pretoria East to Sunnyside and the CBD.

North- south primary networks:

Duncan Road links the Brooklyn core to the Hatfield core and serves the areas north of Hatfield, via Gordon Street. Duncan Street is the only primary north-south vehicular network as a result of the university's position not allowing vehicular transit through its property.

Grosvenor Street is to run through the eminent Gautrain development. This will make it the most relevant secondary north-south vehicular transit route in the future.

Current municipal bus routes:

-Park Street -Duncan Street
-Lynnwood Road -Burnett Street

There is a great demand on the east-west major road networks in the morning peak times, resulting in traffic congestion on Pretorius, Church Street, Lynnwood and Duxbury Road, and on the north- south networks that lead into and out of the district, namely Gordon and Duncan.

Pedestrian Networks

Retail areas south of the SARCC railway line from Burnett Street and the office areas along Arcadia, north of the SARCC railway lines, have been denoted as the Core Hub by the TMDF. This is the activity node of pedestrian activity. The University of Pretoria, Hatfield campus also has various strong pedestrian paths to be looked at.

Concrete sidewalks are found on one side of the primary and secondary roads in Hatfield with the exception of Burnett Street with sidewalks on both sides of the road. Bicycles share the road with motor vehicles and sidewalks with pedestrians. No designated paths have been made available exclusively for bicycles.

The Affected Environment

A broad study of the affected environment over the whole area of the Gautrain project was carried out by the 'Gautrain Rapid Rail Link', September 2002:0-1

Topography-

The University of Pretoria, Hatfield campus is approximately 1340m above sea level.

Climate-

Tshwane has a warm and moderate climate. The mean daily sunshine factor is approximately 0.7 hours/day. Temperature averages ranges from 11,8°C in June to 23°C in January (mean annual air temperature)

Rainfall-

The driest month is July with an average monthly total rainfall of 3mm. The wettest month is January with an average monthly rainfall of 136mm.

Wind-

In Pretoria predominant summer winds are mostly north-easterly and south-easterly, winter winds being north-easterly and south-westerly with an average speed of 2m/s.

Vegetation-

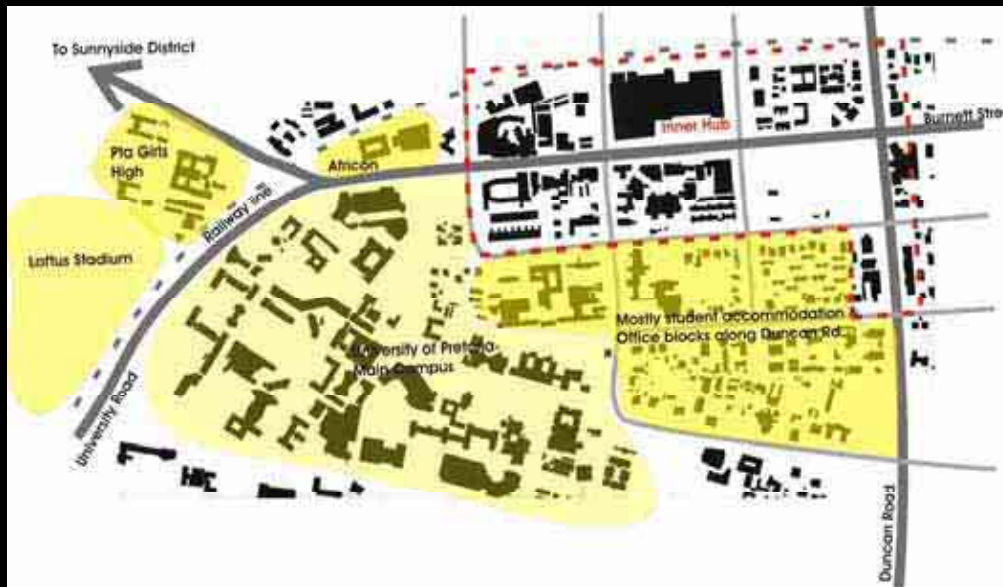
The road sides are planted with Jacaranda trees.

Air Quality-

The general air quality is assumed to be poor, as a result of the extent of the highly developed urbanised area. Pollutants emitted by vehicles include nitric oxide (No), carbon monoxide (Co), nitrogen dioxide (SO₂) particulate matter and lead.

Secondary pollutants from vehicle emissions include nitrogen dioxide, photochemical oxidants (ozone) nitric or sulphuric acids and nitrate and sulphate aerosols (Gauteng Department of Transport, Roads and Works, October 2002: 4- 1 – 4 -10).

1.10



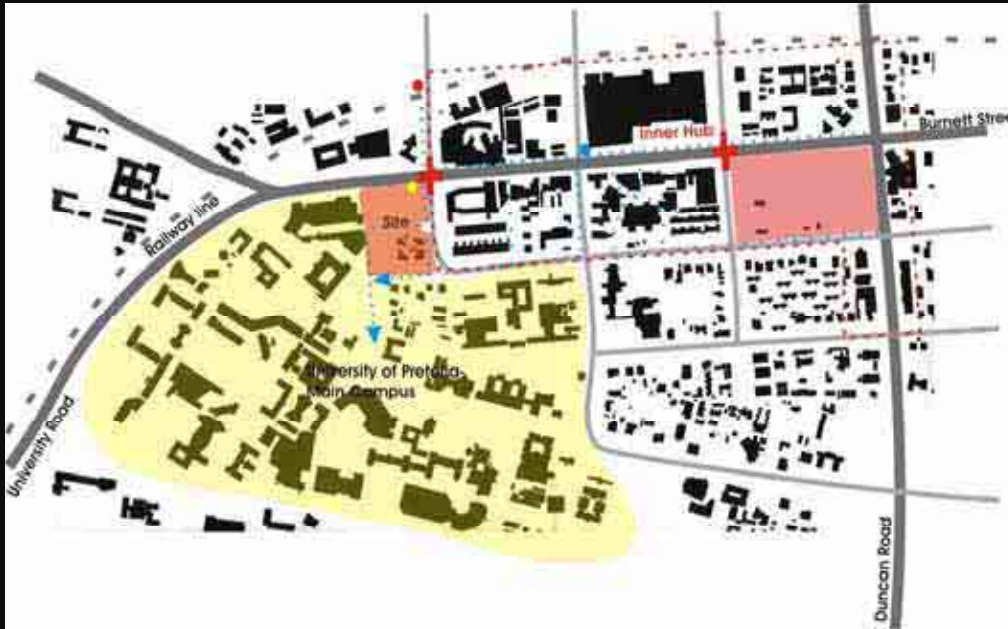
The university poses a developmental restriction to the Hatfield district. The physical barriers (fences) and psychological barriers (lack of inclusive function) along the university's edge means the university has absolutely no interface with its surroundings, resulting in an isolation of the tertiary educational facility as a whole.

Loftus Stadium, Pretoria Girls High school, the Africon building and the railway line create a similar problem in the urban context. Loftus and the Pretoria Girls High school act as definitive barriers between Sunnyside, an active district comprising of mainly students and young professionals and families, and Hatfield. The two districts are a mere 10min walk away from each other.

b) Micro context study

The train station and the university are positioned adjacent each other on either side of University Road. The unsafe and insipid atmosphere down the road is a direct result of these two areas rejection of one another. Each is barricaded behind palisade fences, with no articulation of their functions along the street edge, or generated activities to promote pedestrian occupation for the efficient operation of passive surveillance, thereby creating a sterile, stagnant and dangerous environment. A similar problem occurs on Lynnwood Road and Burnett Street. The common denominator concerning the restriction of the district's development is the isolation of these diverse functions that occur within it, reinforced by the fact that they define the hub's west and southern boundaries. When analysing the activated areas within and around the district, one finds that there are disconnected nodes. These 'nodes' are disengaged from one another by activities that accommodate singular activities, are fenced off, become dead zones at particular times on the day or week, and/or are connected by insufficient light or planted road networks.

1.11



- Bus/ taxi Stop
- Train Station
- Informal taxi stop
- Restrictive access gates
- ⋯ Current Pedestrian/ Vehicular site access movement patterns
- + Broken path of activity

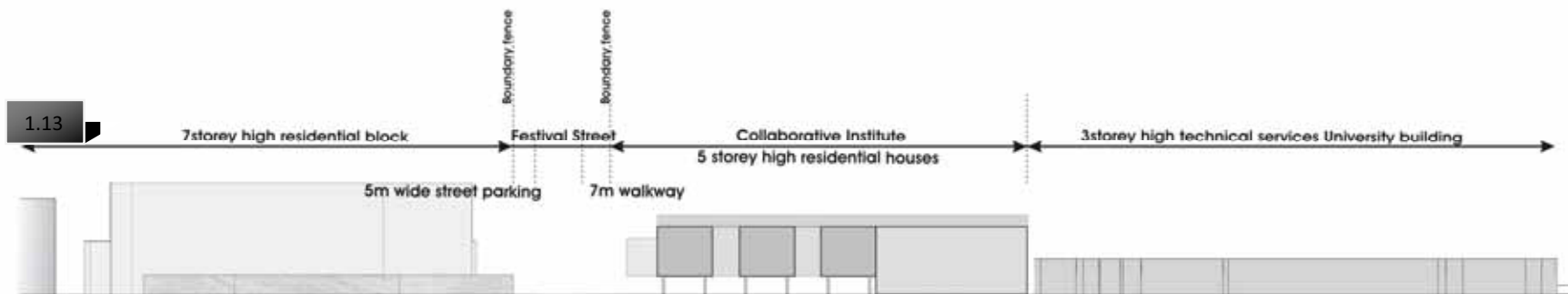
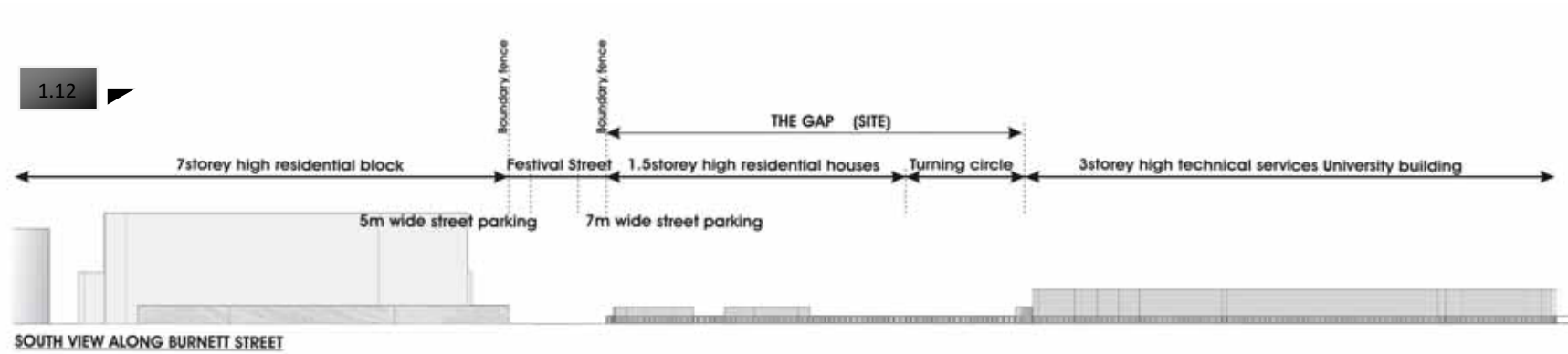
itself as the gateway to the heart of Hatfield. Burnett Street has the potential to stretch beyond the borders of Hatfield, becoming a commercial boulevard/strip that connects to similar activity areas within neighbouring zones, such as the Sunnyside and Arcadia districts.

Quality of environment

The quality of the public realm along Burnett Street is of a safe and secure environment, with sufficient street lighting and robust shading trees. The street is a public transport network, with the existing train station up the road and future Gautrain Hatfield Station 500m away. Most public transport users end up on or passing through Burnett Street, making it the busiest pedestrian street in Hatfield.

The impeded continuity of activity along this road is marked by the gaps (indicated in fig 1.11) along the line of buildings overlooking the street. One such gap is the chosen site, strategically located as the unexploited interface between the university and the heart of the Hatfield district, along Burnett Street.

The proposed development must incorporate similar activities occurring on Burnett Street, assisting to create a safer environment for pedestrians to walk along Burnett Street to University road, thus tapping into and associating the existing energy resource of the existing, but currently divorced activity spine. This also opens the opportunity for the university to position



In general, heights of buildings should be greatest at the centers and cores of areas and diminish gradually away from those areas. In this case, a disruption in the skyline has occurred with an abrupt and unannounced change to building scale and an end to social activity. The important feature is that heights of buildings should relate to the rest of the neighbourhood and building proportions should relate to the size of the human body.

3. PRECEDENT STUDY

One other utilised investigative tool includes an analysis of successful precedents, where human behavior patterns are studied in similar existing spatial developments (for example, Hatfield Square) along Burnett Street to generate an activated spatial threshold and envelopes, and then apply the findings to the project to enhance the existence of those patterns, thresholds and envelopes.

- a) Altering perceptions - transparency versus barriers:
Gauteng Tourism municipal building and Johannesburg Women's Prison Building.

(Fig. 2.01; 2.02; 2.03) The municipal building houses mainly the Gauteng tourism offices above. It forms the threshold between the semi-private court it encapsulates and fronts Jeppe Str. in Newtown, overlooking the parking which forms part of the Mary Fitzgerald square when there are no events.



The articulation of the disintegrating envelope of the government building by GAP architects, illustrates the notion of changing perceptions and thus attitudes towards the form. From a distance a solid, opaque and heavy form seems to be supported above a light structure. On approach the form becomes visibly penetrable, presenting its secondary layer and articulating the floor levels by exposing the extruded slabs, balcony openings and fenestration behind the screening mesh skin. A viewer begins to visually interact with the structure and becomes more aware of the true nature of the building, easing the feeling associated with approaching the unknown.

However, with Kate Otten's design of the women's jail in Johannesburg (Fig. 2.03), the opposite is true. This is as a result of the material, larger openings in and colour chosen for the shading screens utilised. From a distance, the light piercing through the screen openings dematerialises the enveloping layer, picking up the rusted brown tones and openings beneath. At a closer distance, the black and more solid nature of the screens become apparent, expressed as barriers to the skin beneath.



b) Accessibility and Orientation: National Assembly for Wales

The proposed development brief requires that the building accommodate two sets of users, which in many cases need to be kept apart physically. Similarly, the NAW is designed to provide complete separation of public and judicial circulation patterns. The building is essentially a transparent glass box, through which one can identify the building's constituent parts, encouraging a sense of accessibility and orientation.

Key elements of the design are the creation of a public space and integration with the existing urban landscape. The administrative offices are reached by bridges spanning the atrium and the clarity of the plan ensures that different routes across the atrium are maintained for both public and magistrates, emphasising function while ensuring sufficient levels of security.

c) Passive Environmental Control Systems

With a building as large as that proposed, and certain functions to function day and night, it is important to ensure that mechanical operations are minimised, especially lighting, ventilation and cooling. This is not only for economic reasons, but it is also the responsibility of the university as one of the social leaders to illustrate methods that are more sustainable.

Emphasis has been placed on passive environmental control systems at the NAW: the 'flask'-like volumes of the courtrooms allow daylight deep into the internal spaces and, through their height, ensure temperature control through stratification. The great glazed box wrapping around the chambers, with its sun-screening and ventilation systems incorporated within the roof, functions as a 'breathing' container. In addition, the podium and

offices are built in heavyweight concrete construction - resulting in an effective passive heat control system.



d) Programme: Princeton Advanced Research Institution

This will inform the operations and management processes, as well as the accommodation schedule, and justify the need for a similar institution at UP.

The programme in Interdisciplinary Studies at the Princeton Advanced Research Institute explores different ways of viewing the world, spanning a range of disciplines from physics, astrophysics, geology and paleontology to artificial intelligence, cognitive psychology and philosophy. The programme in Interdisciplinary Studies is focused on a variety of initiatives, most of which span two or more disciplines. For this reason, it is important that the development house's flexible spaces are capable of fulfilling various research needs either simultaneously and/or at changing intervals when a new team takes occupation of the building.

Interdisciplinary collaborations allow the different research disciplines to branch out from their comfort zones, and for information dissemination and research to become more accessible, including to the general public.

The institute must accommodate areas for informal presentation, intended for a general audience, where topics of a major open problem within the speaker's field are briefly described, together with suggestions for possible future progress with respect to that problem. These presentations are followed by discussions, after which everyone is free to mingle in more general discussions.

e) Spatial interpretation and application: Hatfield Square

In assisting the design's spatial organisation, drawing from the successful aspects of people accommodation and the hierarchy of functional spaces, the positioning of high demand day and night activities on the ground floor is maximized so as to keep the space alive with energy throughout most of the day and, therefore, safe as well. High demand day activities are those functions that everyone generally needs and will be used on a daily basis, such as the post office, food takeaway outlets, doctor's offices, pharmacies and grocery stores. High demand night activities may vary depending on the available market, in an area where such a substantial number of student reside, leisure activities such as pubs and game arcades would not be inappropriate.

The analysis also draws from the unsuccessful aspects of Hatfield Square. This also informs what to be careful of in this development. This includes the unaddressed need for shading within the open space, so that the centre is not merely used as a thorough-fare. All activities occur along the inner and outer edges of the buildings that form the Square.

