



UNIVERSITEIT VAN PRETORIA  
UNIVERSITY OF PRETORIA  
YUNIBESITHI YA PRETORIA



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## URBAN DESIGN

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## 3.1 Urban Design

“Urban design is the process of shaping the physical setting for life in cities, towns and villages. It is the art of making places. It involves the design of buildings, groups of buildings, spaces and landscapes, and establishing the processes that make successful development possible ([http://www.udg.org.uk/?document\\_id=468](http://www.udg.org.uk/?document_id=468) ,29/09/2008).”

“ The attempt to give form, in terms of both beauty and function, to entire areas or to whole cities. The focus is on the massing and organization of buildings and on the spaces between them, rather than on the design of individual structures (<http://students.ou.edu/H/Antonia.G.Hoberecht-1/IntroToUrbanDesign.html> ,29/09/2008).”

The University of Pretoria lies within the greater Tshwane Metropolitan council, at a smaller scale it is part of the Hatfield local precinct. However the University functions as an isolated entity due to its enclosed nature. The study of urban design theories and performance criteria that are to be implemented in conjunction with the `Campus Development Vision` to create a better campus environment for all. This study will focus on the urban analysis and design at a campus scale and then again within a smaller precinct level within the campus structure. Urban design takes place at multiple levels and scales from; Identifying large scale ordering structures as well as proposing new elements that define the urban fabric, in which smaller scale place making and public space design takes place.



## 3.2 Campus Urban Design

### VISION STATEMENT

“TRANSFORMING THE UNIVERSITY OF PRETORIA FROM AN ISOLATED FRAGMENTED KNOWLEDGE PRODUCTION INSTITUTION, TO A **UNIVERSITY CITY**, A CITY OF **INNOVATION**.”

Transforming the University and the Hatfield precinct into a **UNIVERSITY CITY**, an integrated networked city of innovation and social cohesion, where public sector interfaces with the private sector, interfaces with the academic sector. Removing physical, social and virtual boundaries that are constraining both the University’s and Hatfield precincts growth, creating a social amalgam that celebrates and empowers the uniqueness, vitality, potential and culture of South Africa’s premiere Academic community.

The transformation is a two phased proposal with a single vision as driving force; it consists of the transformation of the University into a “University City” and concurrently the transformation of Hatfield into a diverse, vibrant and regenerative social hub that enables the conception of a University City.

### University Village

The University of the Future is the University of Pretoria is a city of knowledge. The UP as a village is the first step in achieving the vision of the university as a city. A village that is the “brain” of the “University City” a village where the urban fabric is design at a human scale, where the buildings become nodes of social and academic interaction, and the exterior spaces act as outdoor rooms for academic discourse and social play; A village that has its own tangible and definable character, identity and vitality, a village that has clarity of circulation that is dominated by pedestrians; A village that is designed for the night time, which has a vibrant and cultural night life. The university village will function as community, working as an inter-related whole a symbiotic relationship of allied units. The transformation of the university into a village will prepare it to continue functioning as a holistic entity when integrated with the “University City” precinct.

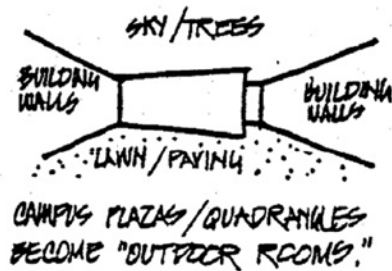


Figure 3.1: Campus outdoor rooms

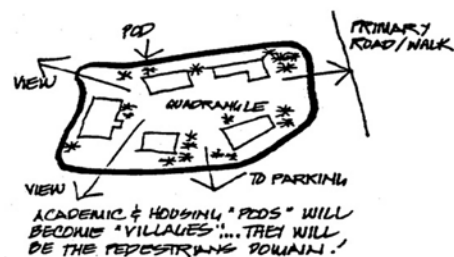


Figure 3.2: Campus architectural character



Figure 3.3: Nighttime campus lighting

Figure 3.4: Campus as a village



## Social Hub

Hatfield precinct is to be developed to create destination place. A place of continual social, cultural and civic regeneration; a place that defines its self as the vibrant, multifunctional “body” of the “University City”, Hatfield is to be the gateway of the “University City” precinct. Hatfield’s continual transformation will be driven by the creation of interdependent nodes including, transport, mixed use, culture, commerce and political, allowing a dynamic interface for social expression. Hatfield must become a place for the people, for businessmen, academics, students, professionals, politicians, workers; Hatfield must be a place for all.

## The University City

To achieve the University of Pretoria’s strategic objective of becoming a world class research institute, the Hatfield “social hub” and the “university village” need to merge from two vibrant successful independent isolated entities to a coherent spatially integrated community, without boundaries and borders. The future is now and that brings with it the world of Virtual spaces, virtual lectures, virtual libraries and virtual paths, thus there is an intense need to allow the community to enter upon campus grounds to fully utilise all facilities that will become obsolete in the virtual age. The unification of these two distinct identities must not allow the dissolution of either’s unique identity but rather reinforce each other key strengths and opportunities to allow a true city of knowledge to be born, a “UNIVERSITY CITY”.

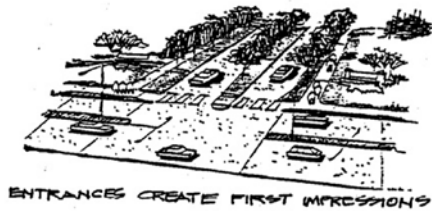


Figure 3.5: Campus main entrances



Figure 3.6: Campus must be a safe environment

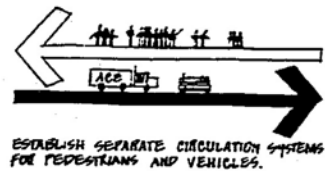


Figure 3.7: Campus circulation to separate cars and pedestrians



### 3.3 Theory and Performance Criteria

Developing an urban design strategy for the University of Pretoria required the use of various urban design theories and performance criteria. The theoretical approach that was used is that of Kevin Lynch, his 5 elements of urban design. The theory centers on the image of the city and creating understandable and readable environments. This theory was used and applied at the larger precinct scale of the university to identify the elements that define the larger urban fabric.

Kevin Lynch (Lynch: 1982, 46-48) classifies the five physical elements which contribute to the environmental image. In order for a clear city image to be established, these elements are to be strengthened. The manner in which they are patterned together produces a rich urban environment. Each element can contribute to identify and enhance one another.

The five elements consist of:

**Paths** - Paths are the channels along which the observer customarily, occasionally, or potentially moves. They can consist of streets, paths, railroads or walkways and can be defined as major or minor. (An example is the Tukkies laan pedestrian entrance from Lynnwood road)



Figure 3.8: Paths

**Nodes** - Definitive points, the strategic spots in a city into which an observer can enter, and which are the intensive foci to and from which people travel with high intensity of use and energy. (An example is the University's main entrance)



Figure 3.9: Node

**Edges** - Edges are boundaries like shores, railroad cuts, edges of development, walls, etc. There are major prominent edges such as the shorelines, or a series of mountains. There are also minor edges such as a street that separates two neighborhoods. An edge could be a collection of physical elements that form a district. (An example is Lynnwood road that runs parallel to the University's grounds)



Figure 3.10: Edges

Districts - Districts are the medium to large sections of the city, conceived of as having an area, which the observer mentally enters into, and which is recognizable as having some common or identifying characteristics. (An example is the University's grounds)

Landmarks - Landmarks are another type of point-reference, however they are external. They are simply physical elements. The key physical characteristic of a landmark is its singularity, some aspect that is unique and memorable in its context. (An example is the Human Sciences tower on the campus)



Figure 3.11: Districts

Figure 3.12: Landmarks



Secondly we looked at the implementation and use of some of the objectives of urban design as set out by the; By Design, Urban Design in the planning system: Towards Better Practice as published by the United Kingdom planning department. These objectives focus on the design and the form aspects of the built environment that can be used for successful place making.

“Successful streets, spaces, villages, towns and cities tend to have characteristics in common. These factors have been analysed to produce principles or objectives of good urban design. They help to remind us what should be sought to create a successful place. There is considerable overlap between the objectives and they are mutually re-enforcing.”

The Objectives of good place making is defined in By Design as:

- A. **Character** - A place with its own identity
- B. **Continuity and enclosure** - A place where public and private spaces are clearly distinguished.
- C. **Quality of the public realm** - A place with attractive and successful outdoor areas
- D. **Ease of movement** - A place that is easy to get to and move through
- E. **Legibility** - A place that has a clear image and is easy to understand

F. **Adaptability** - A place that can change easily

G. **Diversity** - A place with variety and choice

Secondary to the urban design objectives as stated in `By Design` the following aspects of the built environment play an immense role in the development of successful places:

1. **Urban structure** - The essential diagram of a place
2. **Urban grain** - The nature and extent of the subdivision of the area into smaller development parcels
3. **Density and mix** - The amount of development and the range of uses this influences
4. **Height and massing** - The scale of a building
5. **Building type** - The shape, size and use of a building
6. **Facade and interface** - The relationship of the building to the street





7. Details and materials - The appearance of the building

8. Streetscape and landscape - The design of route and spaces, their micro climate, ecology and biodiversity



Figure 3.13: Overview of campus districts

Figure 3.14: Campus image and opportunities analysis





### 3.4 Campus Urban Analysis

To enable the design of an appropriate campus precinct development framework, we as a group had to conduct a thorough urban landscape analysis on the proposed redevelopment zone. To develop performance criteria we used the previously mentioned urban design objects and built environment aspects of form, using these we developed a set of questionnaires and a rating system. The questions are based on the aforementioned criteria and rated on a three level scale Good to Average and Bad. (Appendix A). With these tools in hand we evaluated each area within our proposed precinct development.

This evaluation system enabled us to get a clear picture of what the urban design performance of the area was and where initial and major interventions where required. Further to finding the danger zones it also highlighted the key performance areas to build from.



Figure 3.15: Campus development potential analysis



Figure 3.16: Analysis area



Figure 3.17: Campus urban performance analysis averages

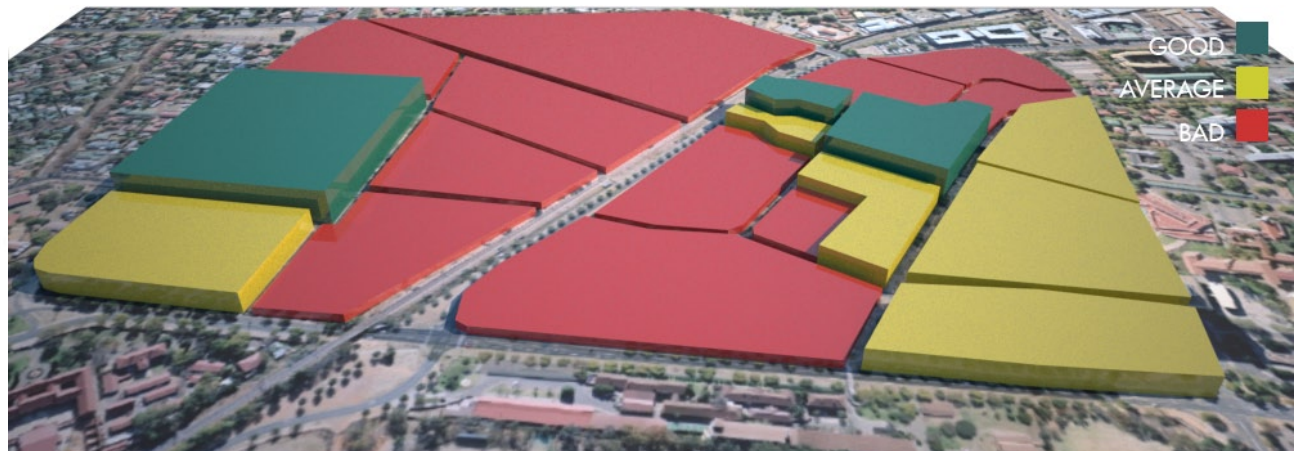




Figure 3.18: Character analysis



Figure 3.19: Details and Materials analysis



Figure 3.20: Continuity and Enclosure analysis



Figure 3.21: Diversity analysis

Figure 3.22: Density and Mix analysis

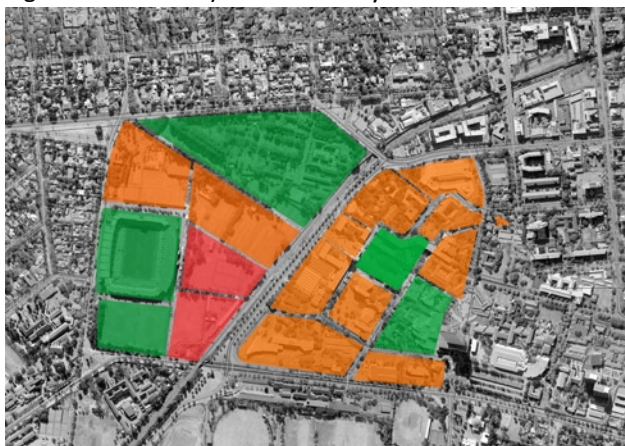


Figure 3.23: Ease of Movement analysis



## 3.5 Interventions

### Phase 1 Initial Intervention:

“...the relationship between different buildings; the relationship between buildings and streets, squares, parks and waterways and other spaces which make up the public domain; the nature and quality of the public domain itself; the relationship of one part of a village, town or city, with other parts; and the patterns of movements and activity which are thereby established: in short, the complex relationships between all the elements of built and un-built space (CABE, 2006).”

The Initial interventions (Phase 1) comprise the implementation of various urban design strategies and protocols. The guiding objectives behind these principles are as set out in the `Vision Statement` for the University`s proposed future development strategy.

The interventions at the urban level on the campus include the implementation of pedestrian network development guidelines, proposal and guidelines for densification and development as well as the reuse of under utilized threshold green spaces.

#### Pedestrian streets

“Streets are the arteries of our communities – a community’s success can depend on how well it is connected to local services and the wider world. However, it is all too easy to forget that streets are not just there to get people from A to B. In reality they are the tissue that connects and keeps alive the urban body of the campus. They form vital components of residential areas and greatly affect the overall quality of life for local people (Department of Transport, 2007).”

As stated in the UK`s department of transport manual for street design, streets are more than just routes from a to b, and nowhere is this more true than on a campus.

We have proposed three scales of intervention at a street level, each of them suited to a different pedestrian environment. One at a main artery scale,

to accommodate pedestrians comfortably with high speed traffic, secondly at campus ring road scale to accommodate both intercampus vehicle and pedestrian traffic with prominence being given to pedestrians and thirdly at a pedestrian only scale.

#### Densification

The University of Pretoria’s main campus is riddled with low density low efficiency land use in the form of parking areas and unused threshold green spaces. These areas have been identified as areas that are under utilized and have good development potential without impacting on the community environment that is being developed on campus. The Proposed development of these areas is highlighted in phase two of this framework.

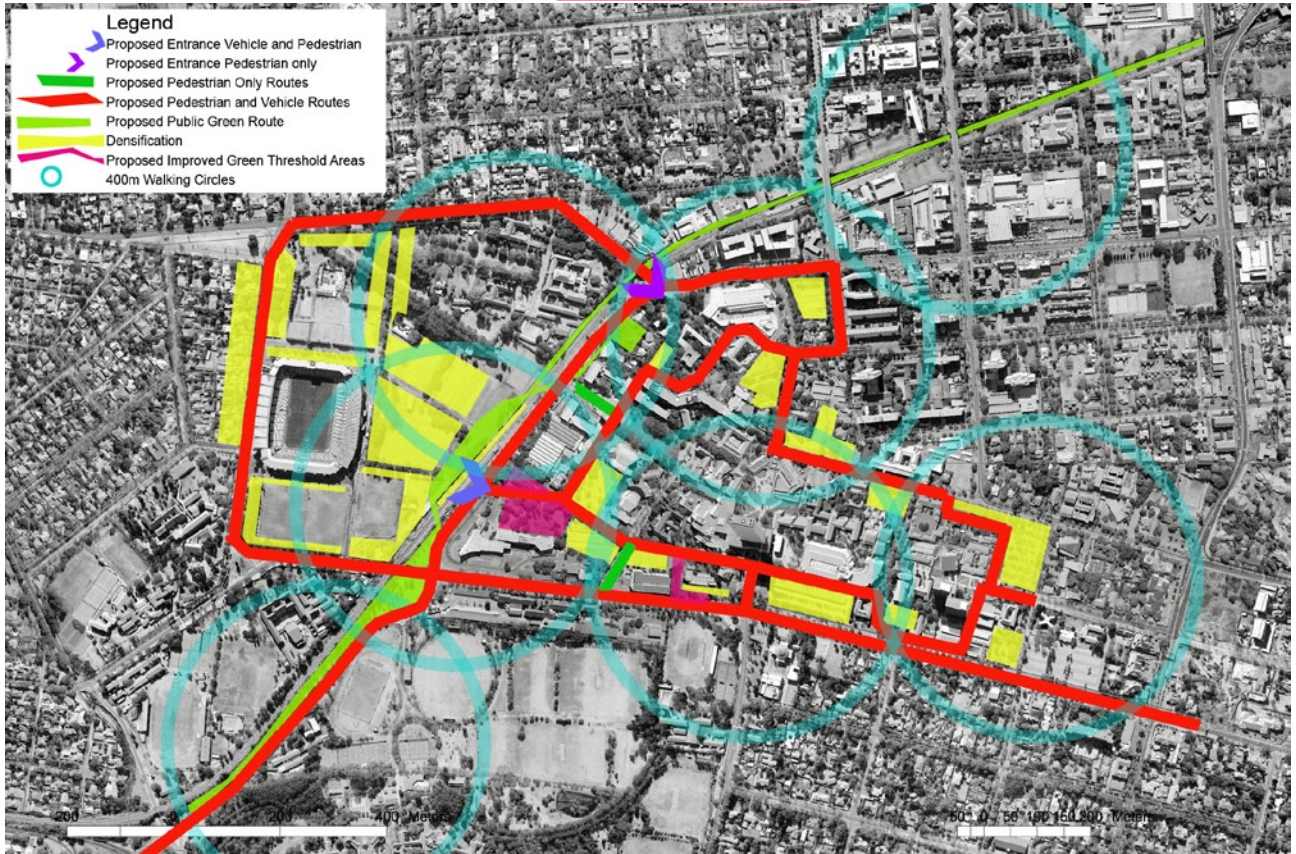


Figure 3.24: Initial Interventions map

Figure 3.25: Urban fabric deviation process

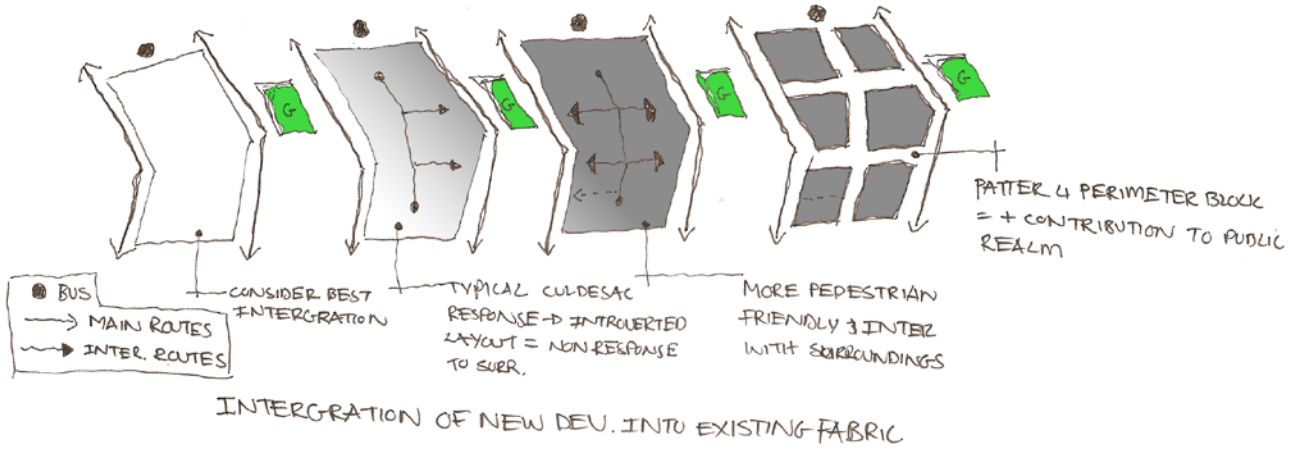
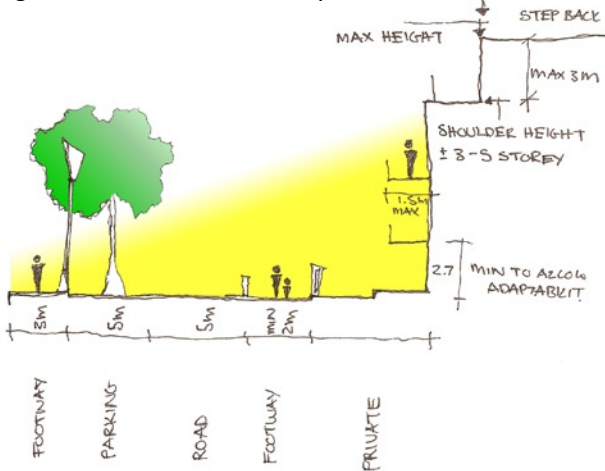




Figure 3.26: Pedestrian friendly sidewalk set out



PEDESTRIAN SPACE NEEDS

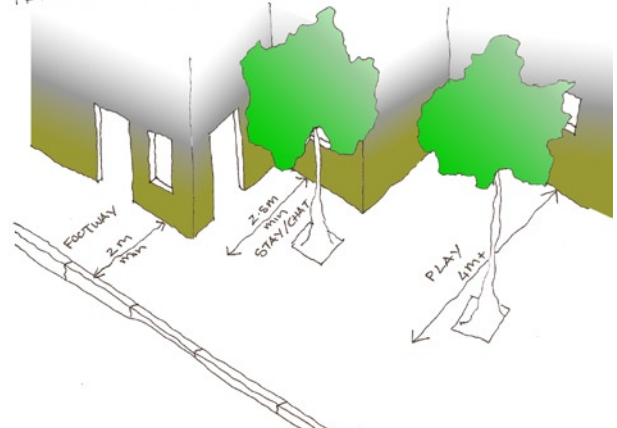


Figure 3.27: Pedestrian spatial requirements

Figure 3.28: Pedestrian sidewalk boundary scale

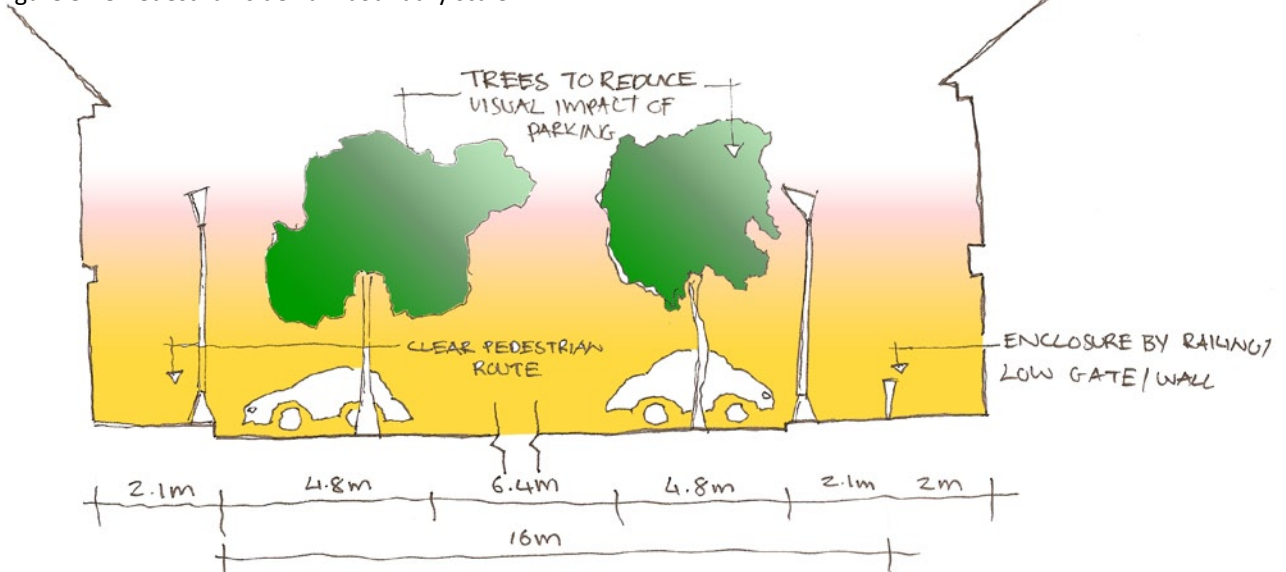
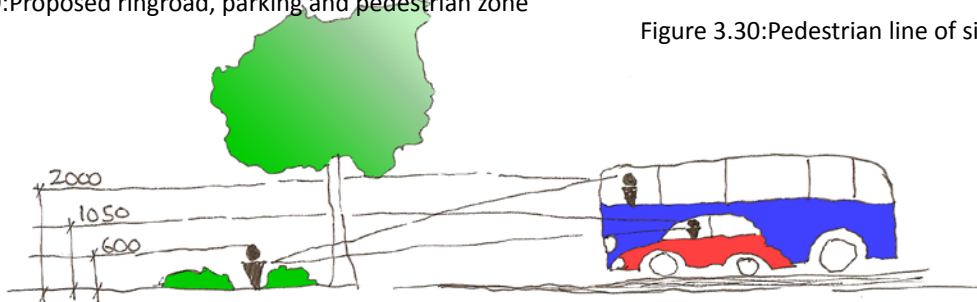


Figure 3.29: Proposed ringroad, parking and pedestrian zone

Figure 3.30: Pedestrian line of sight requirements



CLEAR HORIZONTAL SIGHT LINES SHOULD TAKE INTO ACCOUNT BOTH WHAT THE DRIVER CAN SEE AND WHAT PEDESTRIANS (CHILDREN) CAN SEE. EYE HEIGHT = 1.05m - 2m, OBJECT HEIGHT = 0.6 - 2m



Figure 3.31: Basic street width to height ratios

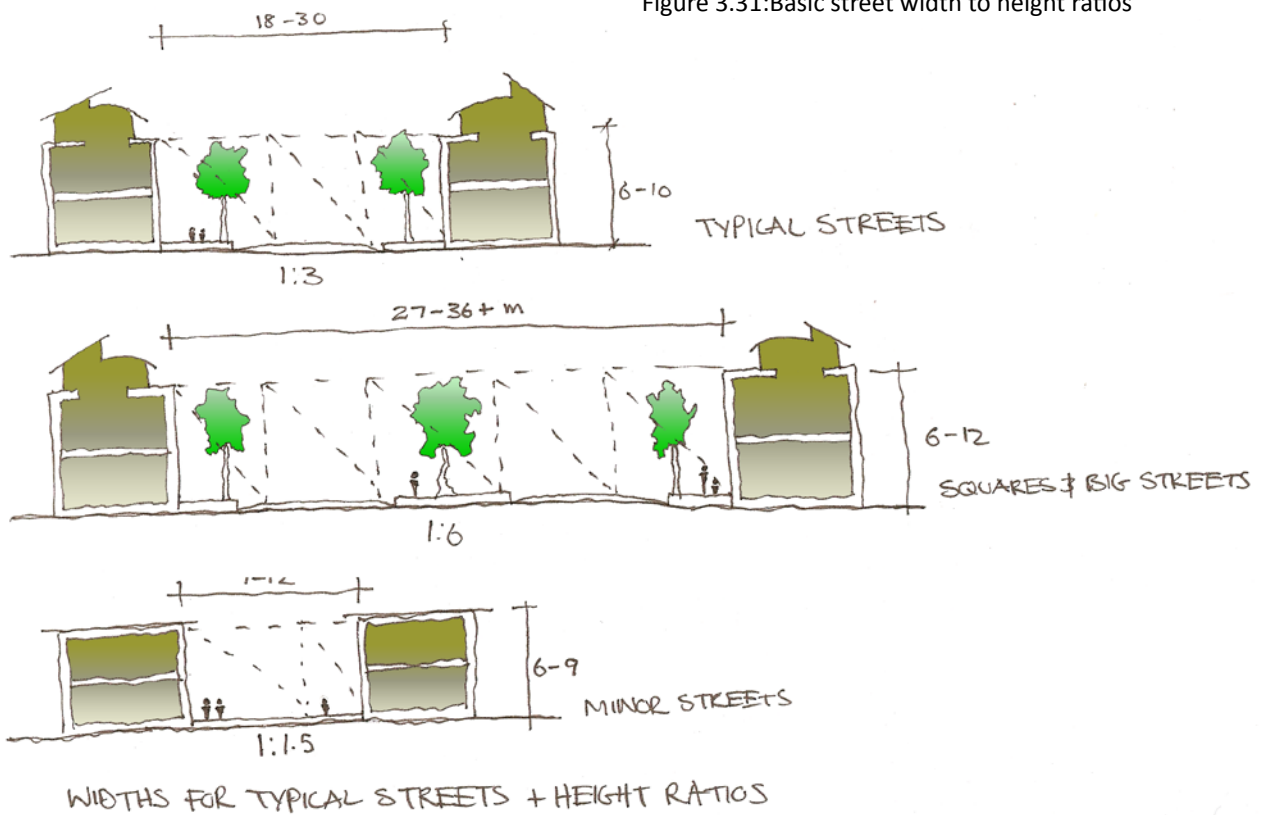
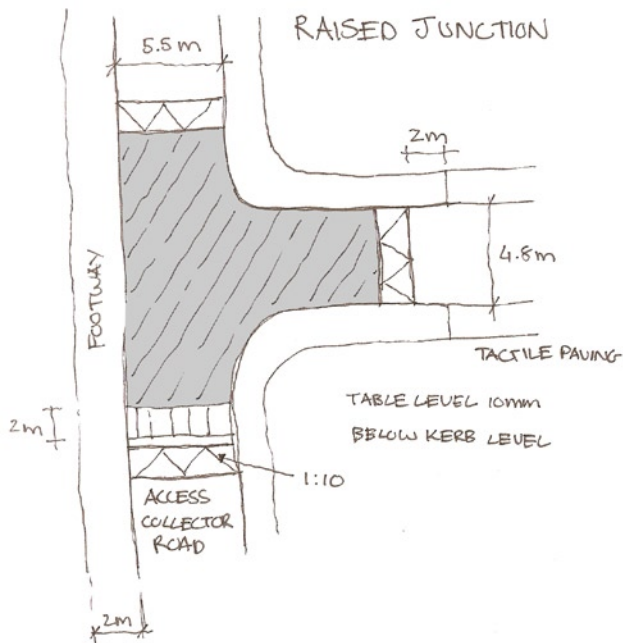


Figure 3.32: Ringroad intersection proposed raised junction



## Phase 2 Strategic Interventions:

### A

The proposed parking structure is to accommodate current and future campus parking requirements; it is to act as a base structure for future development on the site. The future development should conform to the requirements as set out in the research precinct and urban development frameworks. The parking structure will consist of one basement level and two semi – lower ground levels, it will serve as parking for students, faculty and visitors to the campus as well as the general public during sporting events. The structure should be designed as such to allow flexible planning parameters (structure, services and access) for the future proposed covering development.

### B

A research facility that provides new up to date research amenities to the University of Pretoria's top three research fields (Agriculture, Engineering and Natural Sciences). It will service current research requirements as well as be able to adapt to future research demands and technological requirements. The building is situated at the integration boundary between the existing arts precinct on campus and the proposed new research precinct, it thus needs to facilitate the integration and encourage interaction between these diverse precincts.

### C

#### Loftus Metrorail Station

The station is a flagship station, serving the Loftus Versfeld Stadium, the University and surrounding areas. The station has a shopping component and becomes a destination place instead of just a transition space.

#### Loftus Precinct:

New mixed use development with parking on ground floor level, open courtyard leading up to Loftus Versfeld Stadium (Pre- and Post game get together.)

The aim of the precinct is to create a continuous edge along/beside the sporting activities on Loftus after the divide of the enormous city block into smaller more humane city blocks with pedestrian friendly street interfaces.

### D

Sustainability requires a new pathway and our industry must evolve to be a contributor to finding the right answer, rather than delivering the trusted solutions that have served us well in an industry of unconstrained resources.

Aspiration of initiating a dialogue about our professional responsibility. The dialogue must engage with matters beyond engineering and find relevance in the disparate academic research, to drive the pragmatic decision making required by industry.

This thesis is not intended to be the final word, but rather a contribution to the body of knowledge that can be used to focus dialogue in this important area.

Our current methods of evaluating design fall a long way short of meeting the needs of a sustainable future. We have an obligation to embrace the search for ways of quantifying the impacts of our design decisions.

The proposed facility explore, interacts and communicate the profession of architecture through the medium of green technology and at the same time offer entertainment value. Creating a platform for discussion among built-environment professionals to-be, contributing to inform the public and future clientele. Addressing the issues within an educational facility, ensuring skill empowerment within the profession.

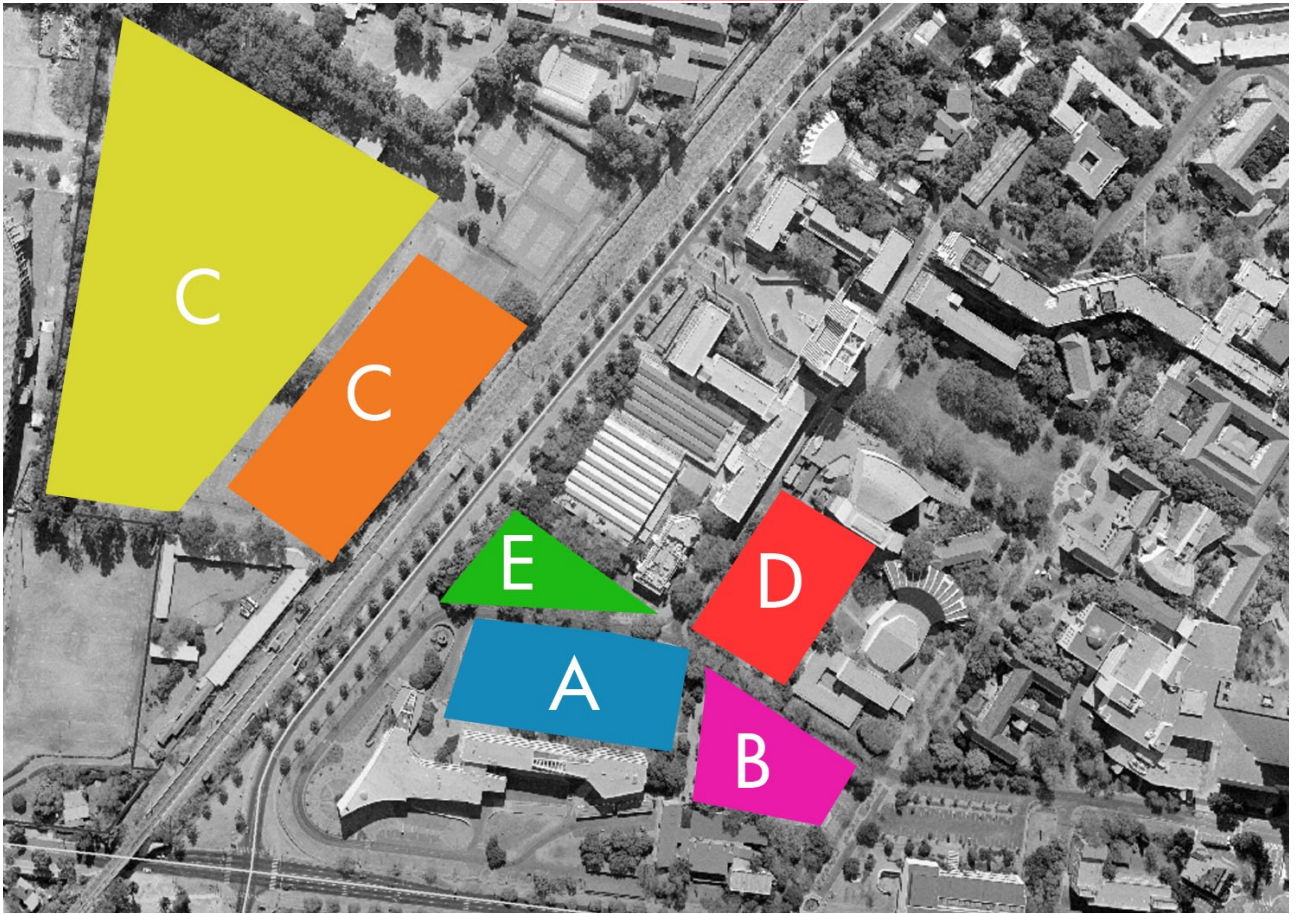


Figure 3.33: Strategic interventions diagram





### Phase 3 Key Interventions:

The establishment of a research precinct on the Universities grounds is based on numerous positive objectives. The improvement of access and connection to enhance scientific and academic collaboration and interaction is the key driver to a successful precinct development. The new precinct will serve to develop and sustain a collegial research community where interaction and interdisciplinary research within the community is implied. The new precinct will help to streamline the research processes by, allowing for resource, facility allocation and sharing. The proposed research precinct is located in an area of the campus that has established research facilities in the Microelectronics research building, the Engineering research facility and heavy machinery laboratory, however it is located in an area of the campus that affords the precinct a large area of under utilized space for future developments. Lastly the research precinct is located adjacent to the established arts precinct on campus; the framework is to encourage design that facilitates interaction between these two diverse fields of study, opening up new avenues of study and collaboration.





PROPOSED SPORTS PRECINCT



EXISTING ARTS PRECINCT



PROPOSED EDUCATION PRECINCT



EXISTING NATURAL SCIENCES PRECINCT



PROPOSED RESEARCH PRECINCT

Figure 3.34:Key interventions diagram