

“ THIRD NATURE ”

Re-evaluating the boundary of Zoological Gardens

Submitted in partial fulfilment of the requirements for the degree of Magister in Architecture (Professional) in the Faculty of Engineering, Built Environment and Information Technology, University of Pretoria.

In accordance with Regulations 4(e) of the General Regulations (G.57) for dissertations and theses, I declare that his dissertation, which I hereby submit for the degree Master of Architecture (Professional) at the University of Pretoria, is my own work and has not previously been submitted by me for a degree at this or any other tertiary institution.

I further state that no part of this dissertation has already been, or is currently being, submitted for any such degree diploma or other qualification.

I further declare that this thesis is substantially my own work. Where reference is made to the works of others, the extent to which that work has been used is indicated and fully acknowledged in the text and list of references.

“ THIRD NATURE ”

Re-evaluating the boundary of Zoological Gardens

RYNETTE VILJOEN.
University of Pretoria.
2012.

The National Zoological Gardens of South Africa.

325 Boom Street. Pretoria. South Africa.

S25°44.349' E28°11.329'.

Heritage and Cultural Landscape.

Study leader. Derick de Bruyn.
Studio Masters. Arthur Barker (Dr).
Jacques Laubscher (Dr.).

“You will never love something unless you experience it. The only way to make people understand, is for them to have an intimate experience” (Mullan, 1999: 103).

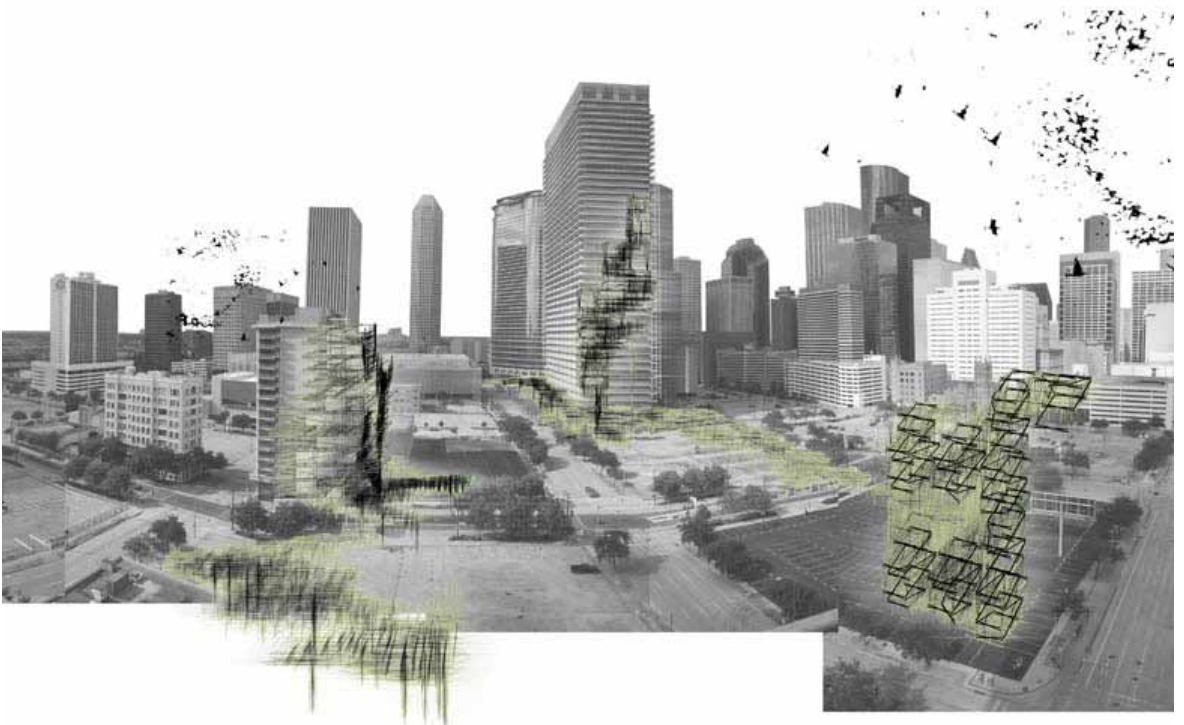


Figure i. 1 Visual exploration of the threshold between city and Nature (Scaffolding city, 2012).

The topic of this dissertation is the result of a life-long
fascination with the non-humans surrounding us.

Hierdie verhandeling ondersoek die verhouding tussen die mens, dier en argitektuur onder die teoretiese argument van die liminale.

Hierdie ondersoek word volstrek binne die verband van die mensdom se eeu-oue bekoring met die diereryk, en die vergestaltung hiervan in 'n tipologiese argitektuur as diere-tuine. Die Nasionale Dieretuin in die Sentrale Besigheidsdistrik van Pretoria beloop die voorgestelde fisiese konteks van hierdie verhandeling.

Die moontlike maniere waarop die verhouding tussen mens en dier manifesteer as ruimtelike boukuns of argitektuur word verken in die konteks van Dieretuine. Die streng grenstoestande wat binne hierdie argitektuur heers word aangespreek. Die bestaande betonpalisade-heining persoonlifieer een van hierdie ongenaakbare drumpels, as skeiding-sobjek tussen mens en dier, die stad en die dieretuin asook tussen die toeskouer en die betragde.

Die voorgestelde program ondersoek die liminale ruimte wat geskep word na aanleiding van spesifieke drumpels en die moontlikheid van daardie liminale ruimte of die derde ruimte as bewoonbare drumpel.

Die fisiese grens word geprogrameer as 'n openbare stedelike ontwikkeling wat negatiewe grenstoestande aanspreek deur publieke oop ruimtes aan geriewe te fasiliteer. Die ingang tot die dieretuin en 'n gratis observasie roete word voorgestel.

Hierdie verhandeling bevraagteken en daag konvensionele argitektoniese tipologiee uit deur die voorgestelde ontwerp, 'n "derde natuur" wat liminale ruimtes beset. Die nuwe kondisie streef na die integrasie tussen die rigiede grense tussen die bestaande definisies van die ruimtes "binne" en "buite" die dieretuin. Die funksie van die voorgestelde struktuur beloop infrastruktuur vir die menslike verbruiker asook 'n stedelike habitat vir plante en diere.

Die voorgestelde ontwikkeling manifesteer as 'n tipologiese argitektuur wat drumpels skep wat die verhouding tussen die mens en sy begrip van "Natuur" heroorweeg.

abstract

This dissertation explores the relationship between man, animal and architecture within the theoretical discourse of the liminal.

This exploration comes to pass within the context of humanity's on-going captivation with animals and the manifestation of this in typological architecture as Zoological Gardens. The National Zoological Gardens of Pretoria situated in within the Central Business District forms the proposed context of this dissertation.

Potential manners in which the relationship between man and animal manifest as spatial construct or architecture are investigated, within the context of the Zoological Gardens. The strict boundary conditions that exist within this context are consequently criticised. The existing concrete palisade fence epitomises these strict boundaries; between man and animal, city and Zoological garden and observer and observed.

The intervention considers the liminal space which is created due to these boundaries, and the possibilities of this liminal space, or third space, as a habitable threshold.

The threshold is programmed as an urban intervention that addresses the boundary condition by facilitating public open space, public amenities, Zoo interface and a Gratis Observatory Route.

The dissertation challenges conventional architectural typologies and proposes an intervention, a "third nature" that occupies this liminal space. The new condition attempts to blur the rigid boundaries between the existing conditions of 'inside' and 'outside' the Zoo. The intervention takes on the program of functioning as a public dwelling for man, in the form of public open space, while simultaneously offering an urban habitat for animals.

The proposed intervention manifests as a typological architecture that creates thresholds over which to renegotiate the relation between man and his understanding of "Nature".

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introduction

Part 1

In brief

Part 1 focuses on the conceptual and concrete problem statement within the context of South Africa.

This part introduces the proposed site, client and users and clearly states the focus, aims and delimitations of this dissertation.

[Man]*

A member of the *Homo sapiens* specie. Man refers to the everyday individual, which in groups forms society. Societies construct belief systems or paradigms.

Paradigms gives rise to certain cultural adaptations and can viewed as the physical construct of a paradigm.

How we live, what we do, what we eat.

[Architecture]*

Architecture originated from man's need of shelter, which evolved into the idea of dwelling. Primitive architecture only served man's basic needs.

Architecture has evolved from merely a shelter to a spatial construct defined by the paradigm of the time.

[Animal]*

A living organism belonging to the kingdom *Animalia* that feeds on organic matter. Animals typically have specialized sense organs and nervous system and able to respond rapidly to stimuli.

Changes within the relationship between man and animal have signified shifts in society's social paradigm and understanding of "nature" (Vining et al., 2008: 1).

This exploration comes to pass within the context of humanity's enduring fascination with animals and the manifestation of this in typological architecture as Zoological Gardens. The National Zoological Gardens of South Africa situated on the corner of Paul Kruger- and Boom Street within the Central Business District of Pretoria forms the context of this dissertation.

A relationship exists between an individual's level of concern for the environment and the sense of connectedness which the individual feels with nature. It can be established that society's relationship with nature has a direct influence on their cultural adaptations and paradigms (Vining et al., 2008: 1).

[Zoological Garden]*

also referred to as Zoological Park or Menagerie.

An establishment that maintains a collection of living animals, typically in a park or gardens, for study, conservation, or display to the public.

* The following definitions are presented by the author in support of the argument of this dissertation.

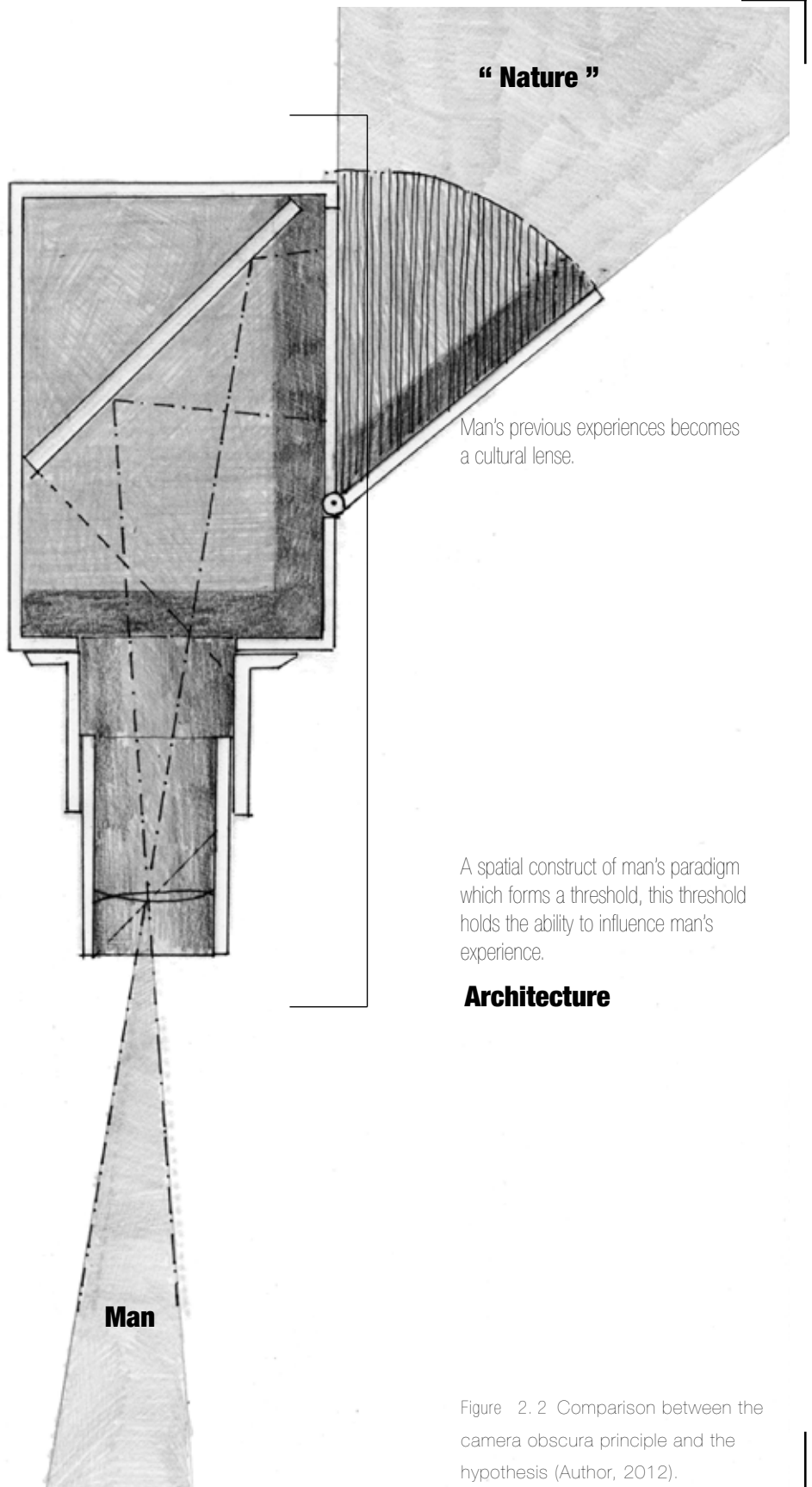


Figure 2.2 Comparison between the camera obscura principle and the hypothesis (Author, 2012).

1.2

Hypothesis

The manner in which animals are presented within Zoological Gardens provides a certain experience to the user.

Experiences alter man's beliefs and possibly his paradigm. The author argues that architecture, a spatial construct, in the form of an enclosure fundamentally determines this experience of the user.

As a result, architecture holds the ability to influence the experience of the user.

This dissertation calls on architecture to become a threshold over which to renegotiate the relation between man and his understanding of "Nature".

This new threshold will manifest as the "Third Nature", which will act as a tool that could possibly alter the relationship between man and animal.

**The architectural intervention aims to simultaneously provide
for man and animal, creating a space where interaction can
take place to the benefit of both,
a “Third Nature”.**

This investigation of this dissertation will take on the following form:

Part 1 Introduction

Outlines the context of the dissertation, the supposition it aims to explore and the limitation it faces.

Part 2 Background

An insight into the realms of Zoological Gardens will be provided. A connection between man's paradigm and the manner in which man represents or encloses animals within zoological gardens is established.

Part 3 Context

The grounding of the intervention within the urban context is formed. Analysis will take place on a macro- and micro scale to establish the wider milieu in which the intervention will have to position itself.

Part 4 Theoretical discourse

Investigates liminal space or thresholds as connections between man, animal and architecture. This theoretical investigation will lead to a theoretical concept.

Part 5 Design synthesis

The synthesised concept is explored and all design generators are incorporated to make the concept concrete, to make architecture.

Part 6 Technical investigation

Clarifies how the concept is manifested in the technical solution of the architectural response.

Part 7 Conclusion

The intervention, an architectural response, on the various conditions and informants will be presented.

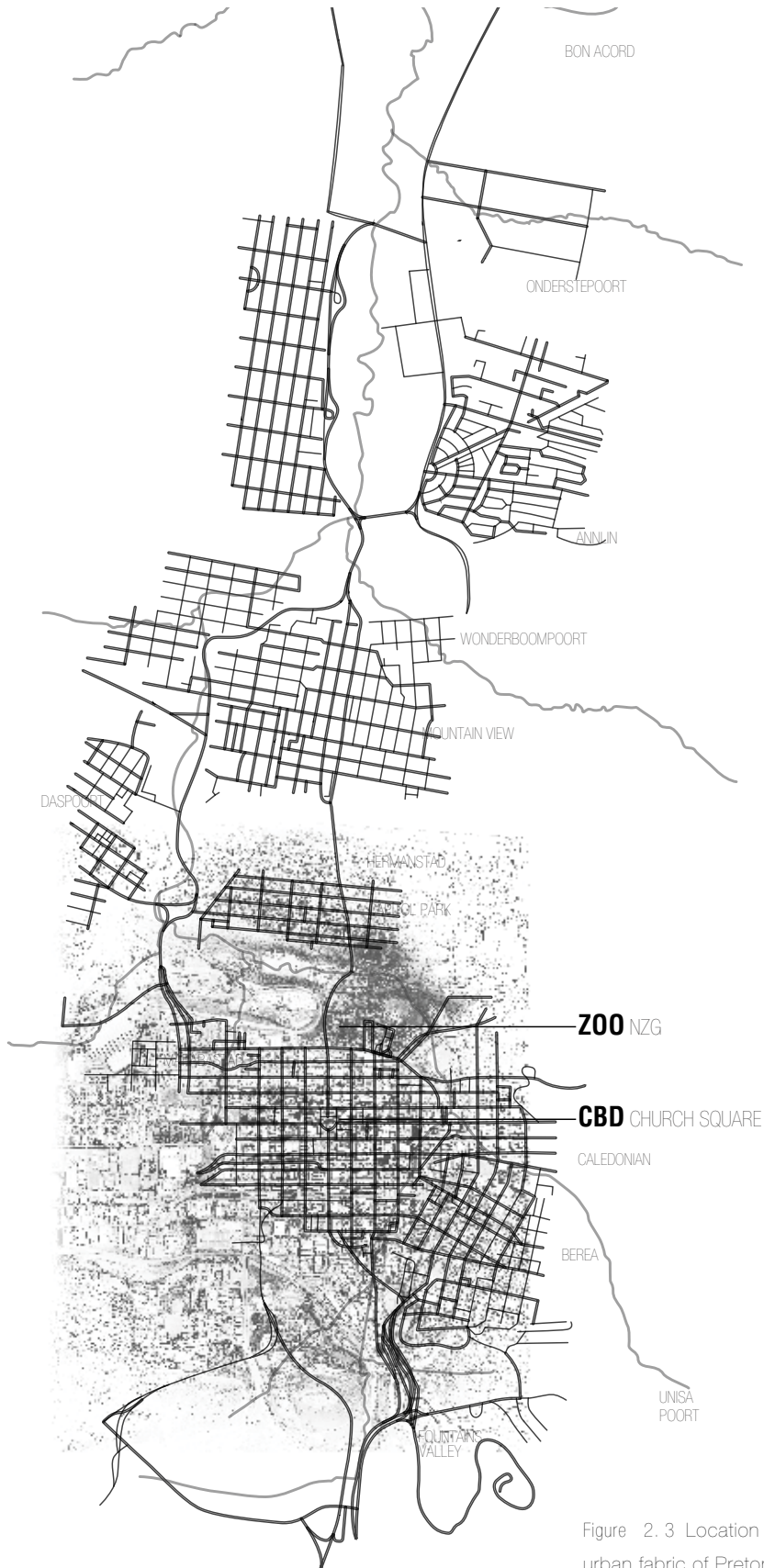


Figure 2.3 Location of Zoo within the urban fabric of Pretoria (Author, 2012).

The study area is located in the Central Business District (CBD) of Pretoria within the Metropolitan City of Tshwane.

The National Zoological Gardens of South Africa (henceforth, referred as Zoo) situated within the Northern precinct of the CBD forms the proposed context of this dissertation.

**Lion enclosures
indication northern
boundary of NZG**

**The Union
Buildings**

**Reserve bank
of South Africa**

**Absa
Building**



**Department
of Health**

**Telkom
Towers**

**Paul Kruger Street,
the northern boundary
to the city**

Figure 2.4 Panoramic view towards the south from the Daspoort ridge, indicating the boundary between the Zoo and the city of Pretoria (Author, 2012).

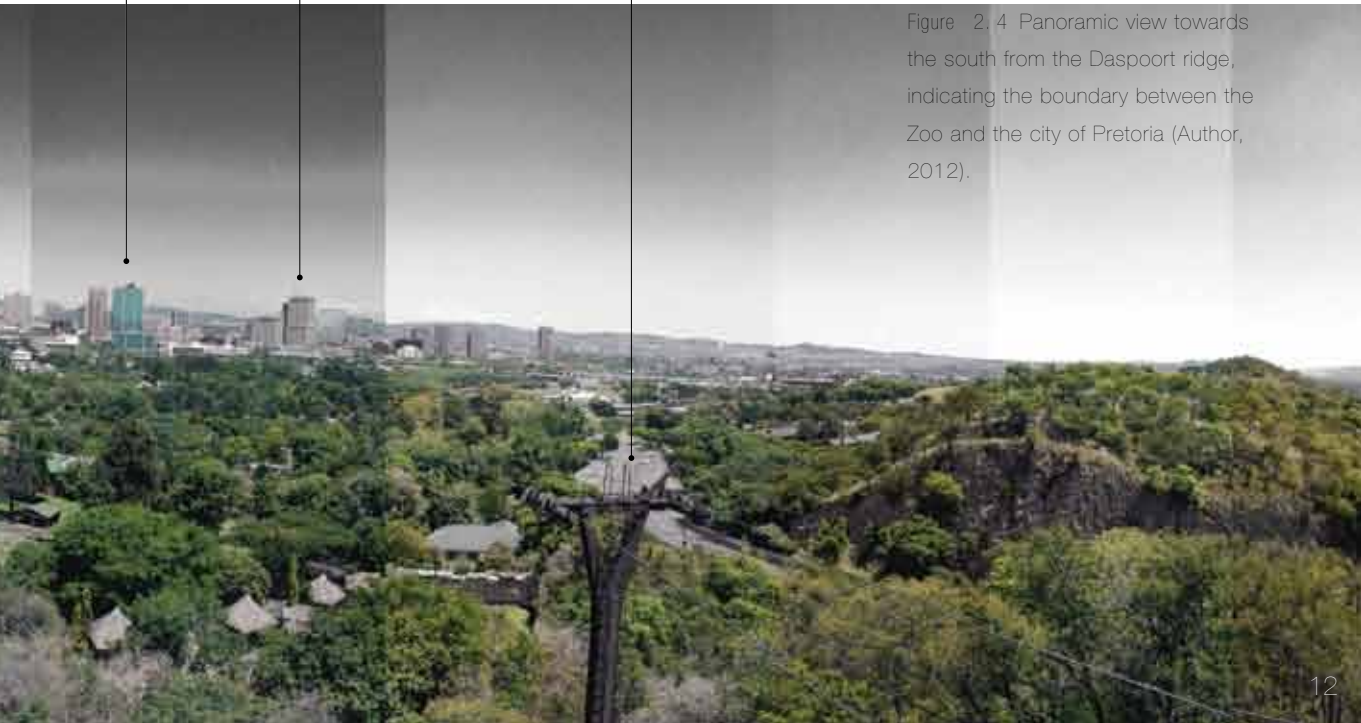




Figure 2.5 Zoo interface, corner of Paul Kruger - and Boom Street, January (Author, 2012).

Figure 2.6 Zoo interface, corner of Paul Kruger - and Boom Street, September (Author, 2012).



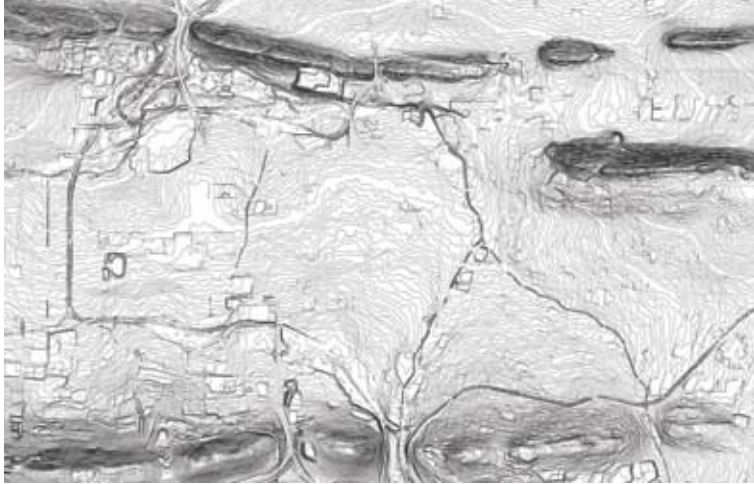
The Zoo becomes a physical exemplar of the ill-defined threshold between man and animal. This threshold occurs on different scales, each creating a unique condition that in turn poses its own set of problems.

Currently the threshold between the city of Pretoria and Zoo is impermeable and almost inhumane to the pedestrians passing by. The Zoo offers nothing of itself to the city. The passer-by is confronted by a monotonous boundary condition, a concrete palisade fence. The current condition offers the passer-by few glimpses into the Zoo, surely none that would encourage further exploration.

When eventually reaching the interface, the entrance of the Zoo, as it is tucked away behind the buildings within the urban fabric, one is met by a harsh parking area and the illegibility of a forecourt. It speaks of the entrance to a park populated with enclosed animals.

As one enters the Zoo, this notion is affirmed by the many animal enclosures which still remind of previous paradigms where the threshold between the observer and the observed was pertinently undisguised.

Even though the Zoo occupies a land parcel of 85 hectares within the CBD of Pretoria it does not actively engage with the city and remains isolated and without integration.



the landscape [**“Nature”**]



the spatial construct of man's paradigm [**“Architecture”**]



man's reality [**“Second Nature”**]

Figure 2.7 Illustrating the abstract spatially within the city (Author, 2012).

1.6

Aims

This dissertation aims to question the manner in which the relationship between man and animal is represented by means of architecture or spatial construct within contemporary Zoological Gardens, consequently criticising the strict boundary conditions that exist within this context.

The intervention aims to redefine the relationship between the Zoo and the city of Pretoria, by addressing the edge conditions within the urban fabric. The exploration of this threshold as entity of interaction between man and “nature” forms the main concern of this dissertation.

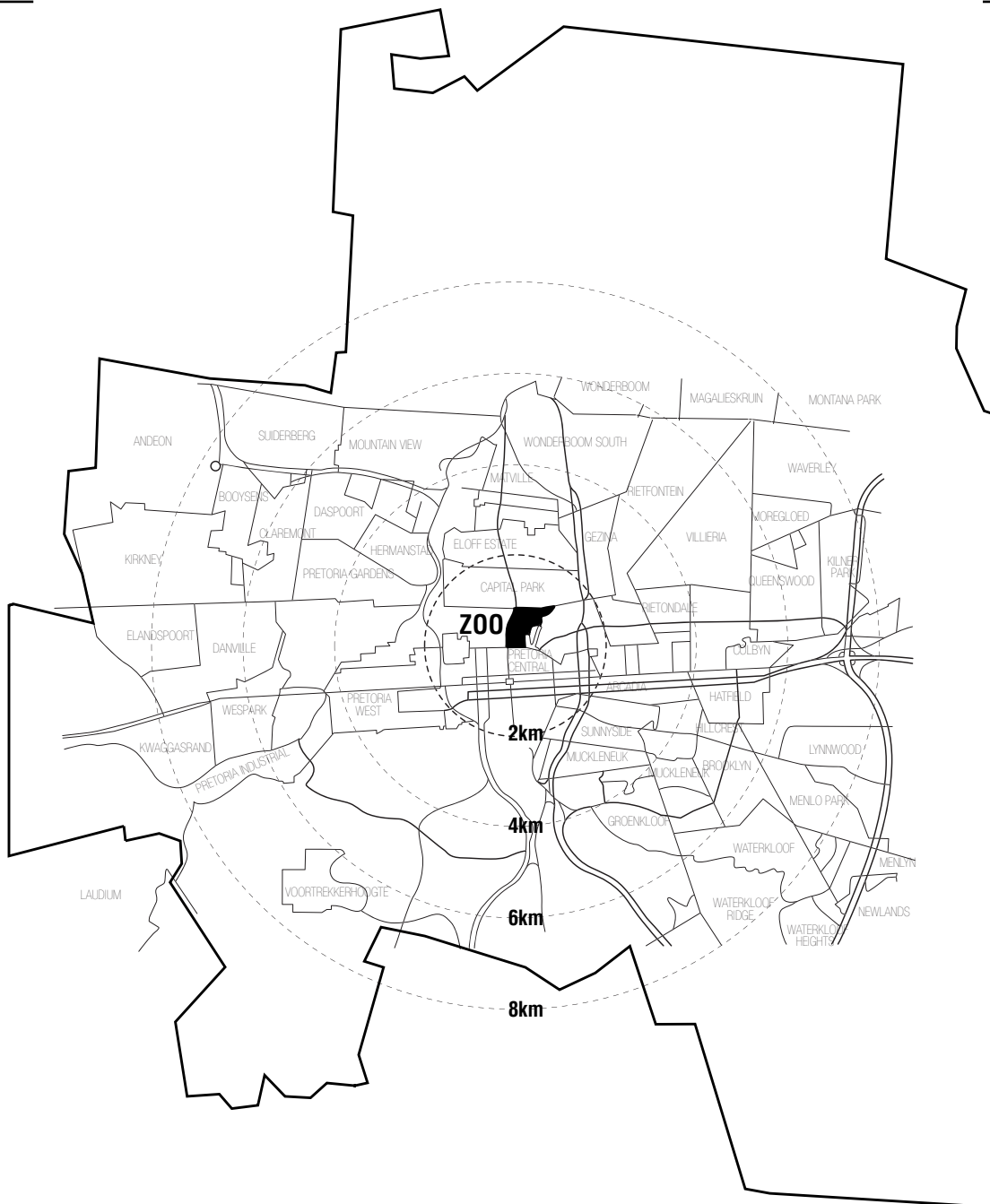
The intent is to challenge conventional boundary typologies within the context of the Zoo and possibly establish a typological intervention that simultaneously provides for the needs of the city as well as for the Zoo. The intervention must contribute to civic life within the city whilst inspiring compassion for other animals and revealing ways to live in better harmony with nature, motivating society to rethink their actions.

1.7

Delimitations

The dissertation aims to develop a new typological intervention that can address the boundary condition of the Zoo.

Due to the size of the Zoo, the intervention will focus on a portion of the boundary condition and aim to establish guidelines that could aid in future development of the entire boundary.



TSHWANE

Total visitors in 2011 [507 506]

Adults	[251 096]	49 %
Children	[133 079]	26 %
Groups	[123 331]	25 %

Figure 2.8 Indicating the demographic and visitor profile of Zoo within the Tshwane metropolitan (Author, 2012).

National Zoological Gardens of South Africa (NZG)

The Zoo provides the ideal setting for the reinvention and transformation of Zoological Gardens within the context of South Africa. It is the only Zoological Garden currently with national status and is currently rated amongst one of the top ten Zoological Gardens worldwide (Haywood, 2008: 6).

The Zoo had previously pioneered a historic shift in Southern Africa from buildings that housed animals for display to one from which humans observe animals (Dry & Joubert Argitek-
te, 1991: sec. 1.5).

A better boundary condition between the CBD and the city, one that provides certain interaction gratis to the public realm may spark a curiosity in further exploration of the precinct. This will cause a direct increase in the number of visitors to the Zoo and the organization's financial gain.



[“Third Nature”]

[Synanthropic species]

[Provided Habitat]

[Public Dwelling]

[Civil Society of Pretoria]

Figure 2.9 The relationship between the different users (Author, 2012).

[Civil Society of Pretoria]

“A civil society is a public space between the state, the market and the ordinary household, in which people can debate and tackle action” (Thompson, 2001).

Within the urban demographic of Pretoria, for many citizens their first interaction with animals will take place within the context of a Zoological garden. Individuals are presented with few opportunities to visit alternative areas of interaction. These initial experiences form the basis of an individuals’ perception of nature and wildlife.

Users will benefit from the reintegration of a previously isolated National Zoological Gardens being redefined as an entity that forms part of and actively contributes to the city. This reintegration of the zoo can lead to a renewed awareness of the relationship between man and nature.

[Synanthropic species]

“From the Greek *syn-*, “together with” + *anthro*, “man”, is a term applied to species of wild animals and plants of various kinds that live near, and benefit from, an association with humans and the artificial habitats that humans create”

(Johnson et al., 2005: 212).

Urban areas within cities rarely attempt to provide for these species. Many of these native species are left to search for an acceptable habitat within a city designed for man, usually to the annoyance of man. Man does not realise that these species contribution to the ecosystem is vital for his survival.

background

Part 2

In brief

Part 2 defines Zoological Gardens as cultural landscapes. Through an elementary history of the realms of Zoological Gardens, a connection between man's paradigm and the manner in which man presents and encloses animals is established.

This founding is grounded within the context of South Africa by examining how the National Zoological Gardens of South Africa came about.

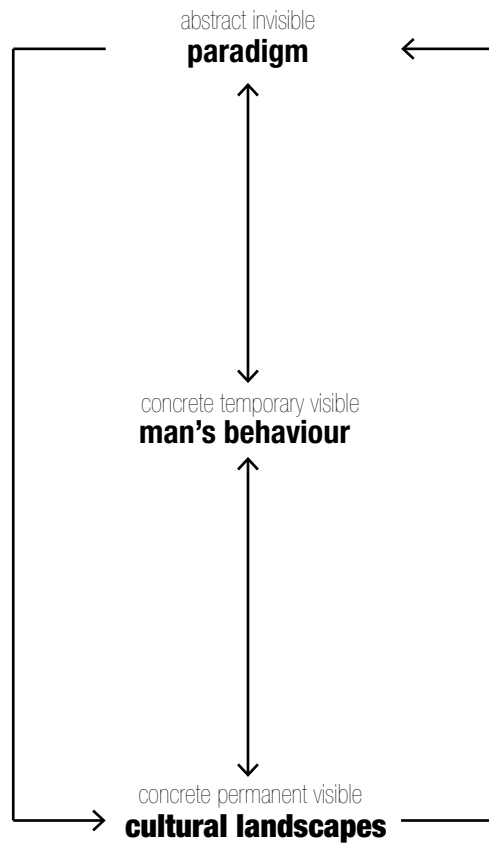


Figure 2.10 Explains the relationship between man, paradigm and cultural landscapes (Author, 2012).

2.1 Zoological Gardens as a Cultural Landscape

The typology of a Zoological Garden is a cultural construct of man's worldview towards animals and more generally towards nature. Zoological Gardens are the ordering of architecture and enclosures to satisfy the needs of both man and animal.

However, a Zoological Garden is a cultural establishment that does no longer reflect this true definition of nature but rather an exemplar of "Second Nature" ¹.

Zoological Gardens provide a landscape where human visitors can engage with a "Nature" that has been culturally manufactured by and for humans. Animals within this cultural construct have been and continue to be displayed in a manner that satisfies society's expectations of animals and human-animal relationships. Consequently, Zoological Gardens are dual spaces of cultural and natural construct (Whatmore, 2002: 22-35).

This representation of the "natural", "Second Nature" is inserted within the urban milieu of man, an urban landscape, the city.

Zoological Gardens form created landscapes inscribed with social and cultural messages conveyed through the presentation of animals (Wolch, 2002: 721-722). These messages are inscribed through how the user experiences the interaction between him and the animals. The manner in which Zoological Gardens manifest within society has changed over time.

"Cultural landscapes are both the cause and the effect of cultural values, cultural institutions, and human behaviour, which interact with the natural environment"

(Sauer, 1963: 315).

¹ Refer to Part 4: Theoretical discourse on page 98 for definition of "Second Nature".

Local Context

International Context

2900 BC First animal collections by Egyptians and Chinese

1501 BC Plants Animal birds in temple garden in Syria

1100 BC Chinese Keiser Win Wang Menagerie of 1500
Ackers

323 BC Alexander the Great – Alexandria

1100 England - Henry the first established small Zoolog-
ical Garden in Woodstock

1519 Menagerie discovered in Mexico by Spanish
Conquerors

1613 Royal Menagerie established at the Louvre

W.A. Simon van der Stel established a Zoo in the **1699**
Garden of the D.E.I.Company in Cape Town

Menagerie At Green Point established **1809**

The typology and architecture of Zoological Gardens have undergone three distinct realms, which epitomise the understanding and worldview of humans toward animals and hold a close relationship to the paradigm of society of the era.

This investigation will focus on the relationship between man, “Second Nature” and architecture over time. The study will focus on the flux in paradigm and the spatial consequence within an international and local context.

Ancient times – 1700 AD:

The passion for collecting - the Menageries

Animal collections from this era were called Menageries and were characterised by exhibitions of diverse specimens from distant lands. The main purpose of these enclosed collections was purely to glorify and provide private amusement to the ruling classes.

Typologically menageries were rows of enclosures exhibiting single specimen animals. This spatial construct reinforces the cultural paradigm of the time, the belief that man is superior over the natural world. This notion of authority stems from the society of the era infatuation to identify and catalogue nature (Wolch, 2002: 721-722).

Enclosures were designed in such a manner that the animals were far below the visitor which implied enhanced notions of human dominance over these now controlled and conquered representatives of nature (Hancocks, 2001: 57).

Human control and manipulation was evident where animals were lured to areas of plain sight by means of food. This setting provided the user with an entertaining experience. Species, habitat or behavioural information were seldom provided.

Thus, animal collections primarily fulfilled the role of entertainment within society.

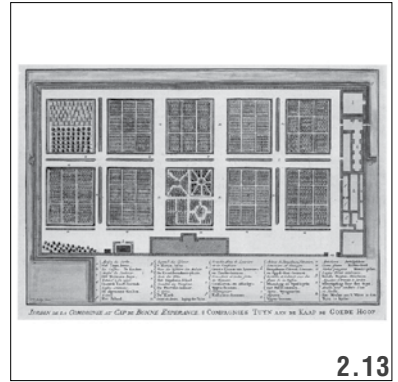
The enclosure typology and embedded cultural message stayed unaltered until the 1750's, when advancing scientific knowledge caused a shift.



2.11



2.12



2.13



2.14



2.15



2.16

local

- Figure 2.11 Photograph of Simon van der Stel's Menagerie in Cape Town (The Company's Gardens - History , 2012).
- Figure 2.12 Early plan of the D.E.I. Menagerie (The Company's Gardens - History , 2012).
- Figure 2.13 Plan of the Cape Town Menagerie (The Company's Gardens - History , 2012).
- Figure 2.14 Early Menagerie in South Africa (Engraving Gallway's Menagerie, 2012).
- Figure 2.15 Early Menagerie staff in South Africa (Cronje, 2008).
- Figure 2.16 Menagerie at Green point (Isles, 2012).



international

Figure 2.17 Wombwell's Royal Menagerie (Fairs are fun, 2000).

Figure 2.18 Venus Menagerie (Mikeh, 2010).

Figure 2.19 Artwork titled "Visitor Attacked by a Lion in a Menagerie" (Beltrand and Clair-Guyot, 2012).

Figure 2.20 Mosaic of Israel Menagerie (43 Sunday broadcast, 2011).

Figure 2.21 Menagerie poster (Still quite obsessed, 2011).

Figure 2.22 Menageries Versailles: (The Royal Menagerie at Versailles, 2011).

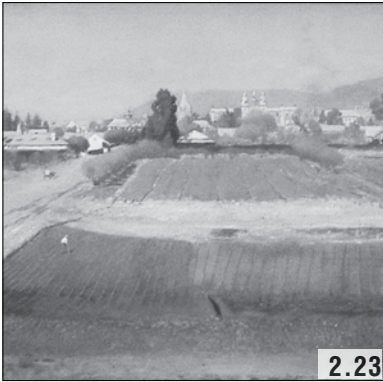
	1828	London Zoo established as a scientific entity.
	1829	The Raven's Cage [London Zoo], by Decimus Burton.
	1837	Burton Giraffe House [London Zoo], by Decimus Burton
	1847	London Zoo opens to the public.
	1864	The only photographs of living quagga taken at London Zoo.
	1865	Jumbo, the renowned elephant was transferred to the London Zoo from Jardin des Plantes in Paris.
Republican Government bought the farm 'Rus in Urbe' with the intend to establish a zoo.	1895	
Cecil J. Rodes established Groote Schuur Zoo, Cape Town	1891	
The founding of the National Zoological garden. Dr. Gunning, director of the 'State museum' in Market Street, Pretoria transferred a collection of animals to the farm 'Rus in Urbe'.	1899	
Lion House [NZG]	1902	
Johannesburg Zoo established	1903	
Additional land obtained North of the Apies River.	1909	
Pretoria City Council donated the Sammy Marks Fountain.	1910	
Bear House and Lion House erected [NZG]	1911	
NZG became independent from the State Museum	1913	1913 Mappin Terraces [London Zoo] by Sir Peter Chalmers Mitchell and John James Joass
Bloemfontein Zoo established.	1915	
Monkey House [NZG]	1915	
NZG acquired national status.	1916	
Giraffe House [NZG]	1917	
Kruger National Park established.	1926	
The NZG had a fun fair atmosphere, animals performed tricks and provided rides to visitors.	1930	1927 Reptile House [London Zoo] by Joan Beauchamp Proctor and Sir Edward Guy Dawber.
	1933	1933 The Round House [London Zoo] by Tecton.
	1934	1934 Penguin Pool [London Zoo] by Tecton.
Lion and Tiger Hillside Enclosure [NZG]	1938	
These enclosures marked a change in the realm of the NZG, a new attempt to exhibit animals in their natural environments.		
New main entrance built [NZG]	1942	
	1964	1964 Snowdon Aviary [London Zoo] by Tony Armstrong-Jones (Lord Snowdon), Cedric Price and Frank Newby.
	1965	1965 Casson Pavilion [London] by Sir Hugh Casson, Neville Conder and Partners.

During this era, the term 'zoo' was established. Zoological Gardens were perceived as living natural museums, primarily focused on educating the public by exhibiting ecological relationships between habitat and species (Mullan, 1999: 15-25). It was in this epoch of rapid scientific and technological advances that urban- and park planning emerged as a profession. For the first time the typology of the Zoological Garden emerged as planned entities and not left to chance expansion.

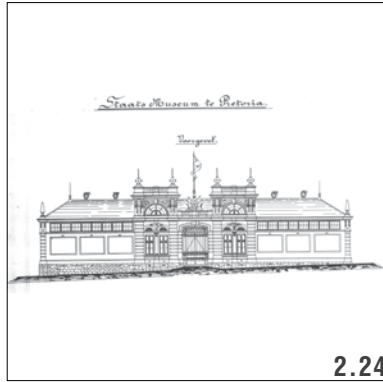
The Zoological Garden typology consisted of open enclosures with clear sight lines arranged according to ecological zones. The improved understanding of the relationships between species and habitats led to more landscaped enclosures. These landscaped enclosures were aimed to replicate the habitat of the specific specie (Hallman, 2006: 259). Enclosure design also changed where man was not elevated above animal. In opposition, a strong separating element between human and animal was still visible in the enclosure design.

To the end of this paradigm a new enclosure typology began to emerge. Enclosures appeared that allowed the visitor to enter the enclosure, referred to as 'immersion exhibits' (Hallman, 2006: 261). This typology of enclosure-architecture caused a revolution in the zoo experience, being worlds apart from the typical passive experience of viewing animals removed or separated from human visitors by means of bars, fences, moats and/or distance.

Immersion exhibits or enclosures caused a paradigm shift in the relationship between man and nature. Man viewed himself as part of the natural world and possibly the animal kingdom (Polakowski, 1987: 149). These vegetated immersion exhibits relied on interaction leading to interpretation as a mechanism of education.



2.23



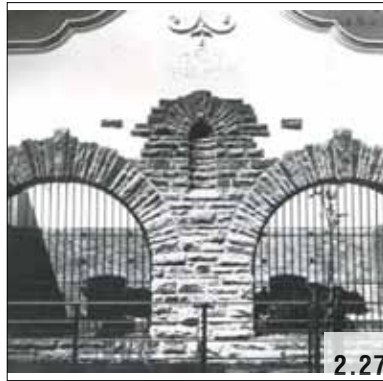
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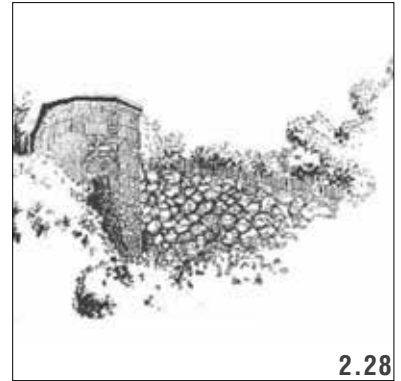
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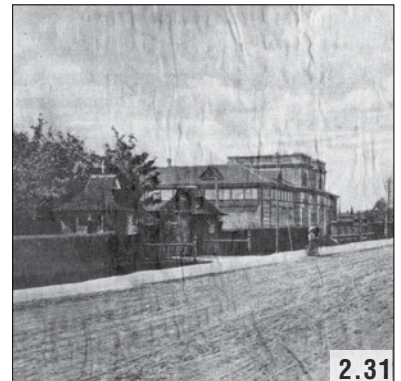
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2.30



2.31

local

Figure 2.23 Painting of the farms Rus in Urbe and Sans Souci by F.D. Oerder in 1902 (Swanepoel, 2012).

Figure 2.24 Drawing of State Museum (Department of Public Works, 1898).

Figure 2.25 Lion House (NZG) built in 1910 (Dry & Joubert Argitekte, 1991: 4.2).

Figure 2.26 Sammy Marks Fountain (Author, 2012).

Figure 2.27 Bear House (NZG) built in 1911 (Van den Berg, 2000: 32).

Figure 2.28 Lookout Towers over Tiger and Lion enclosures on the Daspoort Ridge (Dry & Joubert Argitekte, 1991: 4.2)

Figure 2.29 Tiger Enclosure from above (Author, 2012).

Figure 2.30 Tiger Enclosure from below (Author, 2012).

Figure 2.31 New Main Entrance built in 1942 (Pretoria News, 1988).



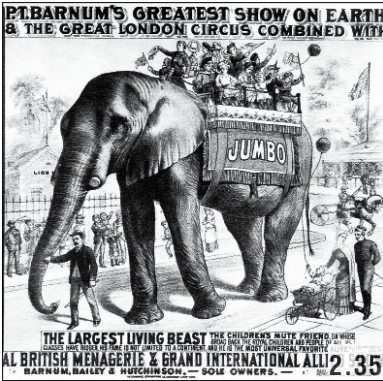
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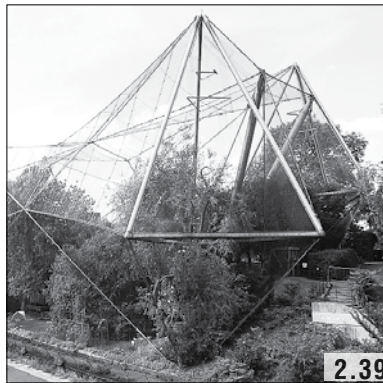
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international

Figure 2.32 Plan of London Zoo in 1829 (Zoological Society of London, 2000).

Figure 2.33 Burton Giraffe House [London Zoo] built in 1837 (London Zoo 2002, 2010).

Figure 2.34 One of the only photographs taken of living quagga, at London Zoo (Zoological Society of London, 2012).

Figure 2.35 Jumbo the renowned elephant (Kellog, 2011).

Figure 2.36 Mappin Terraces [London Zoo] built in 1913 (Zoological Gardens Postcards, 2012).

Figure 2.37 The Round House [London Zoo] designed by Tecton in 1933 (London Zoo 2002, 2010).

Figure 2.38 Penguin Pool [London Zoo] designed by Tecton in 1934 (Anker, 2006).

Figure 2.39 Snowdon Aviary [London Zoo] built in 1964 (Cedric Price, 2012).

Figure 2.40 Casson Pavilion [London Zoo] built in 1965 (Casson Pavilion, 2007).

Director, Dr Frank Brand heralded new era for the zoo. Brand led the way in modernizing the NZG by asserting the training and playing with wild animals as taboo.	1960	
Aquarium and Reptile park was built on the site of Dr. Gunning's house.	1970	
Establishment of the Lichtenburg Game Breeding Centre.	1972	
Parrot cages built.	1975	
883 Zoos established worldwide.	1978	1976 New Lion Terraces [London Zoo] by John Toovey , Colin Wears and Roger Balkwill.
Main Entrance revamped	1980	
Establishment of the Potgietersrus Breeding Centre and De Wildt Cheetah project.	1981	
Frank Brand Building Complex completed.	1982	
Mr. Labuschagne, the 5th director, support the idea of bio-exhibits. Where mixed species were exhibited in their natural social groupings.	1985	
Mr. Labuschagne established a policy that man's relation to the zoo is a very important factor. Friends of the zoo society and the adoption scheme was founded.	1991	
Walkthrough Aviary erected.	1996	
Entrances to the Zoo and aquarium were merge.	1997	1990 African Aviary [London Zoo] by John Toovey , by John S Bonnington Partnership, with Whitby and Bird, engineers.
		1999 B.U.G.S [London Zoo] by John Toovey , by Wharmby Kozdon Associates.
		2005 London Zoo ran an exhibit entitled the Human Zoo, which places eight humans on display in the Mappin Terraces. The idea behind the exhibit was to demonstrate the basic nature of man as an animal and examine the impact we have on the animal kingdom.
		2005 Gorilla Kingdom [London Zoo] by Proctor and Matthew.
		2011 Penguin Beach [London Zoo]
Bio-bank established at the NZG, consisting of over 1000 wildlife species.	2012	

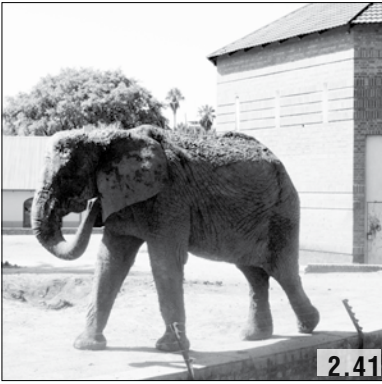
The final realm in the evolution of zoo landscapes reflects new and contesting thoughts of the role of Zoological Gardens within the urban context.

The notion of Zoological Gardens acting as ‘conservation institutions’ has emerged. Biological diversity and sustainability form the central themes of these institutions. This realm is still enduring in present time.

Numerous Zoological Gardens have attempted to justify the continued existence of captive animals by classifying the institution as ‘arks’ (Baratay, 2002: 199). Arks are institutions that are actively involved in the conservation of species and natural habitats while educating the public in such a manner that creates an awareness of man responsibility towards nature. However, Zoological Gardens still have to compete with various other recreational attractions in order to meet economic imperatives.

Conflicts exist between the historic role of Zoological Gardens, as sites of passive entertainment and recreational activities, and the redefined role to facilitate scientific and environmental education.

Due to these past perceptions of the role of Zoological Gardens, many modern Zoological Gardens have become a point of judgement by society. This places the role of Zoological Gardens in constant struggle between the conflicting poles of education and entertainment (Tarpley, 2008: 1-18).



local

Figure 2.41 Elephant exhibit, historic and current night facilities visible (Author, 2012).

Figure 2.42 Aquarium (Author, 2012).

Figure 2.43 Reptile Park (Author, 2012).

Figure 2.44 Frank Brand Complex: Entrance Building (Author, 2012).

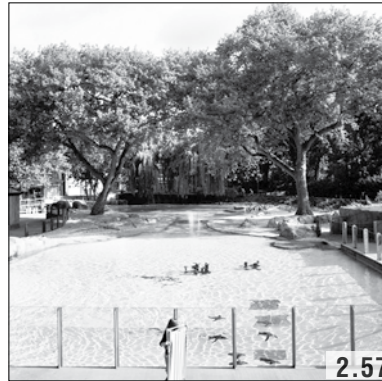
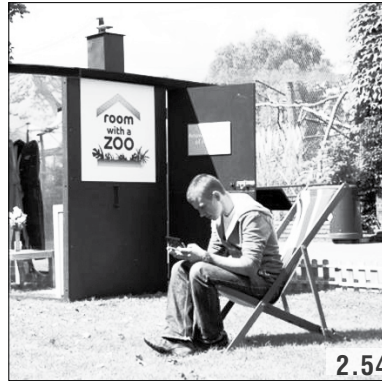
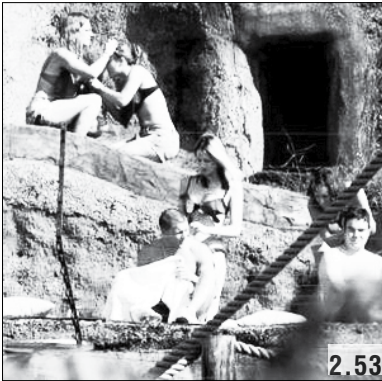
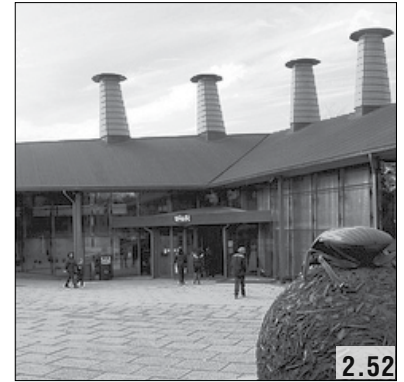
Figure 2.45 Frank Brand Complex: Administrative Building (Author, 2012).

Figure 2.46 Walkthrough Aviary (Author, 2012).

Figure 2.47 Current gorilla exhibit (Author, 2012).

Figure 2.48 Current leopard exhibit (Author, 2012).

Figure 2.49 Current giraffe exhibit (Author, 2012).



international

Figure 2.50 Lion Terraces [London Zoo] built in 1976 (Architecture Archive, 2012).

Figure 2.51 The Eastern Aviary has replaced the African Aviary [London Zoo] (Eastern Aviary, 2011).

Figure 2.52 B.U.G.S [London Zoo] built in 1999 (B.U.G.S, 2012).

Figure 2.53 Human Zoo exhibit in Mappin Terraces (Human Zoo, 2012).

Figure 2.54 Room with a Zoo experiment (Humans on display, 2009).

Figure 2.55 Gorilla Kingdom [London Zoo] completed in 2007 (Gorilla Kingdom, 2012).

Figure 2.56 Gorilla Kingdom [London Zoo] completed in 2007 (Gorilla Kingdom, 2012).

Figure 2.57 Penguin beach seen from above (Penguin Beach, 2012).

Figure 2.58 Penguin beach seen from below (Penguin Beach, 2012).

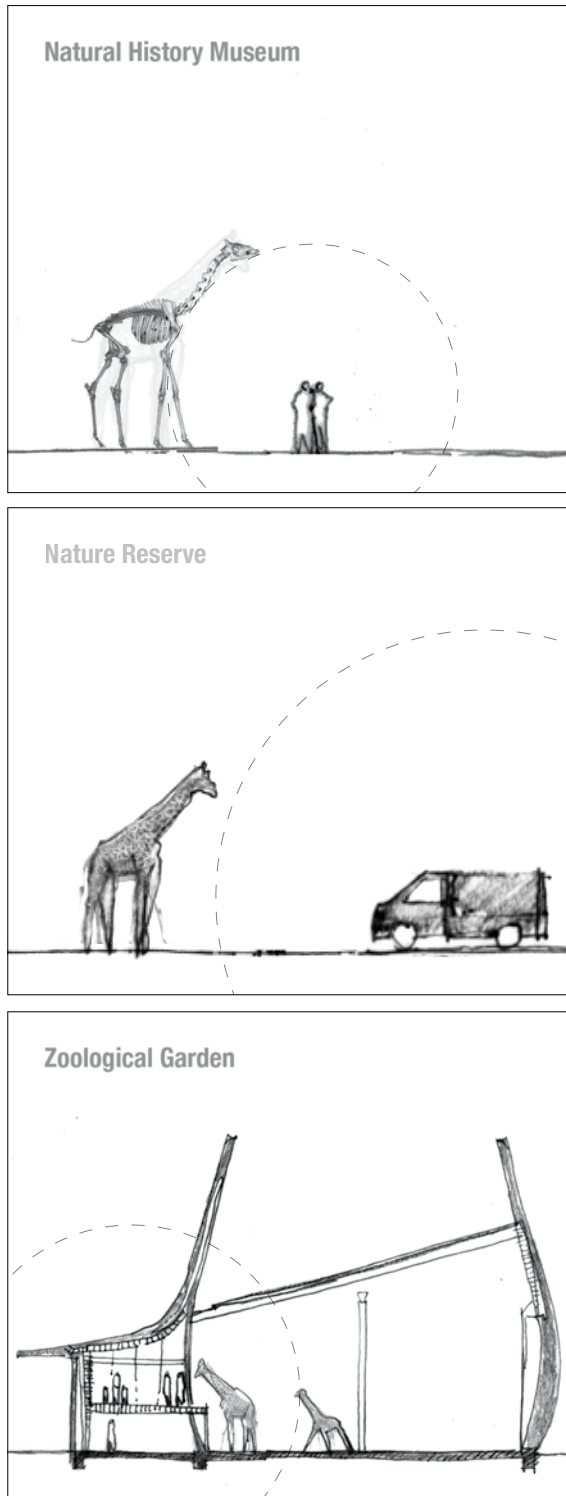


Figure 2.59 Manifestation of man's relationship with animals (Author, 2012).

**“Man’s relationship with animals provides
man with useful mirror of society”**

(Manicom, 2011: 17).

The Zoological Garden typology has changed to reflect progressive cultural values. Zoological Gardens have always been and remain to be cultural landscapes, spatial constructs of “Second Nature”, to engender a particular way of looking, both literally and figuratively, at animals (Mullan, 1999: 24).

Therefore, a Zoological Garden can be defined as a dual space of cultural and natural construct. Man constructs this “Second Nature” in an attempt to satisfy his yearning for nature.

This reverence and longing for natural settings have been coined as “biophilia” by an entomologist, Edward O. Wilson (1993). Beatley (2011) defines biophilia as “the extent to which humans are hard wired to need connection with nature and other forms of life”.

Man and “Nature” are two constants. Society and the paradigm it adopts at a state in time, finds itself in constant flux.

Architecture becomes the spatial construct between “Man”, “Nature” and man’s beliefs, a paradigm.

This need for interaction with animals has spatially manifested itself in three ways within the urban context of South Africa.

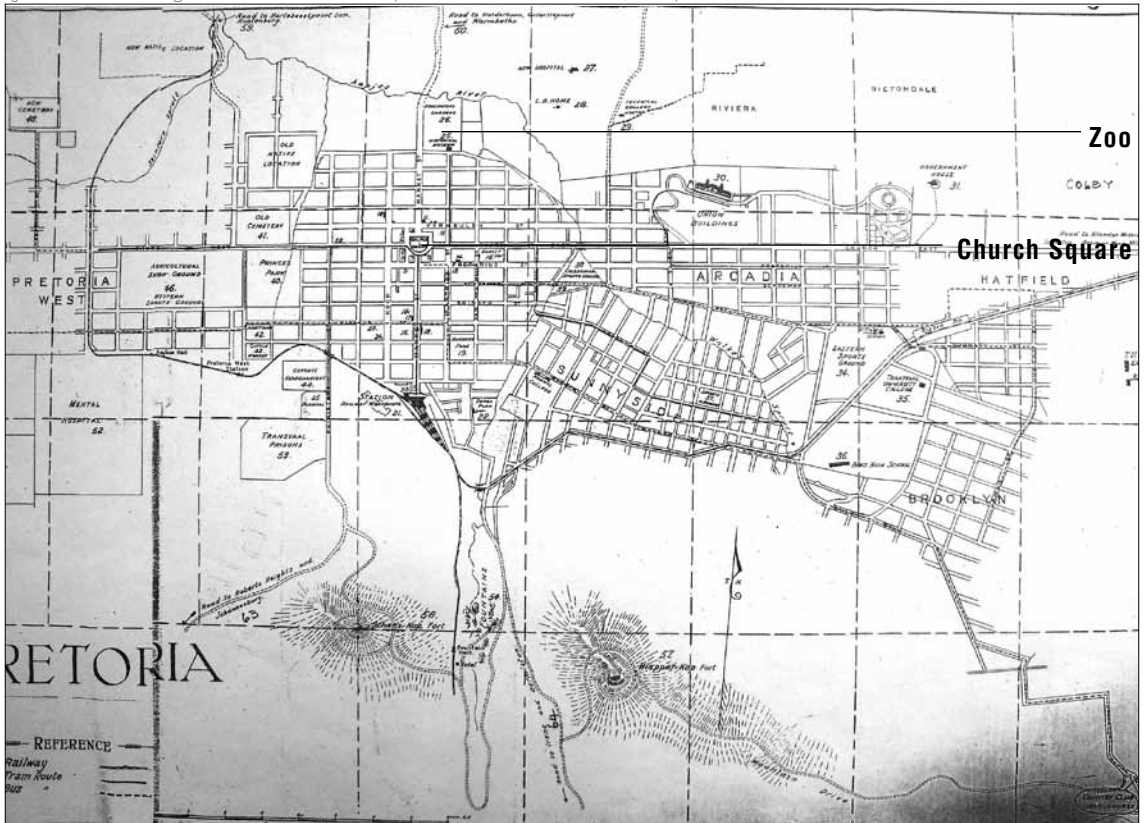
Firstly, the legal obtaining of the species itself and exhibited. Secondly, the condition of habitat and species within a physical or imaginary fence. And thirdly, the removal of species from their habitat to place them in captivity under controlled environments. These constructs are known as Natural History Museums, Nature Reserves and Zoological Gardens.

In all of these spatial constructs man is always central.



Figure 2.60 Rus in Urbe 1892 (Van der Waal Collection, n.d.).

Figure 2.61 Zoological Gardens in 1928 (Van der Waal Collection, n.d.).



“There is probably no zoological garden anywhere in the world that came into existence in the same unorthodox manner as the National Zoological Gardens” (Bigalke, 1958).

It is unclear when the director of the State Museum of the Zuid-Afrikaanse Republiek, Dr. Jan Willem Boudewyn Gunning (1899-1913) became interested in establishing a Zoological Garden in Pretoria (Van den Berg, 2000: 28). The collection started from various animals that were given to the museum for taxidermy which Gunning kept alive on the old “Market Square” (now known as Church Square).

After many complaints from the adjacent residents, Gunning petitioned the state that the animals were to be used to establish a Zoological Garden. On the 21 October 1899 the animals were relocated to the farm “Rus in Urbe”, which means Garden within the City. The farm previously belonged to Charl J. F. Cilliers, the South African poet, and was used as a barracks for soldiers. With the start of the Anglo-Boer War (1899) the farm was left vacant. To this day it remains the location of the Zoo.

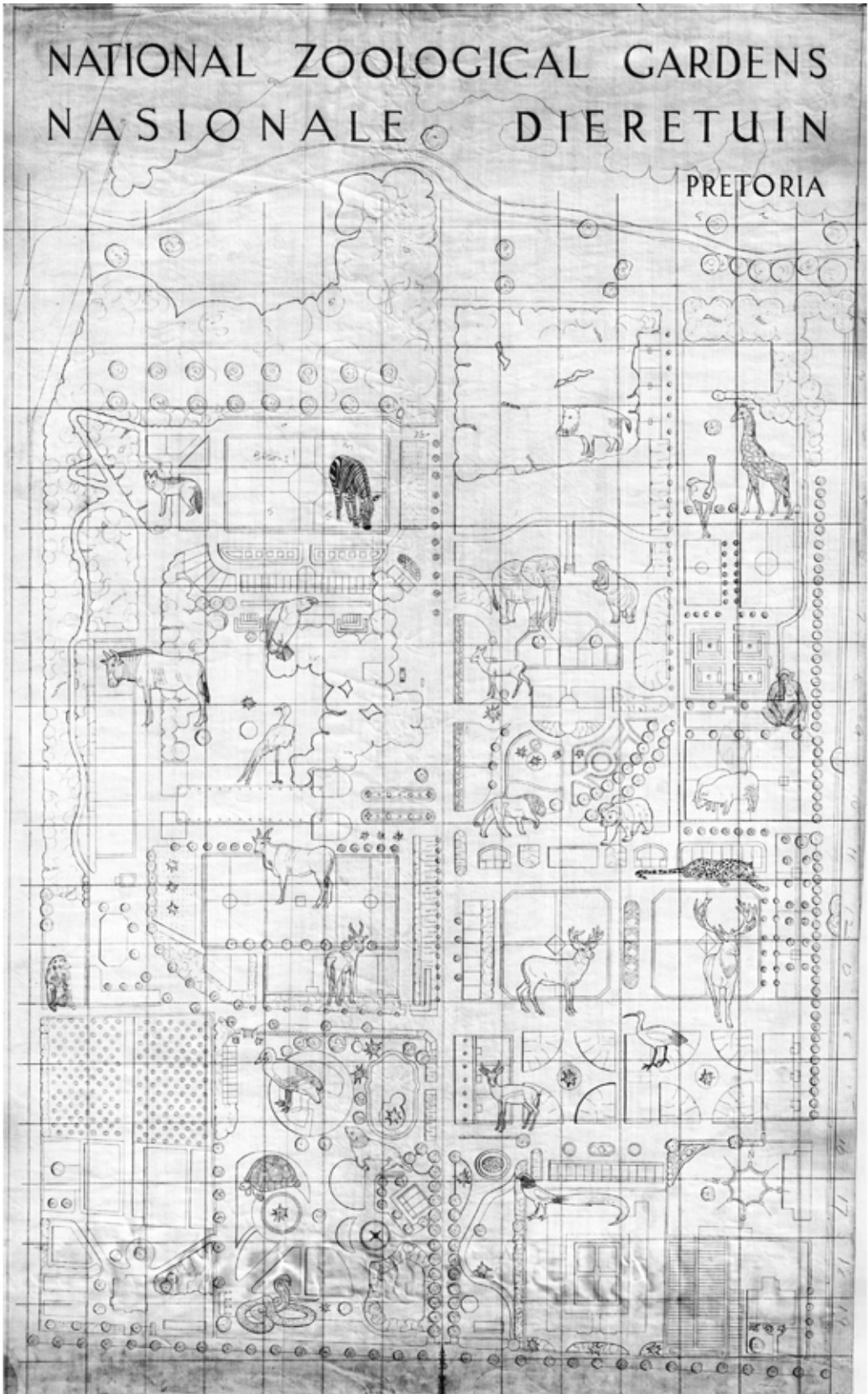


Figure 2.62 Plan of Developed Zoological Gardens (NZG, 1902).

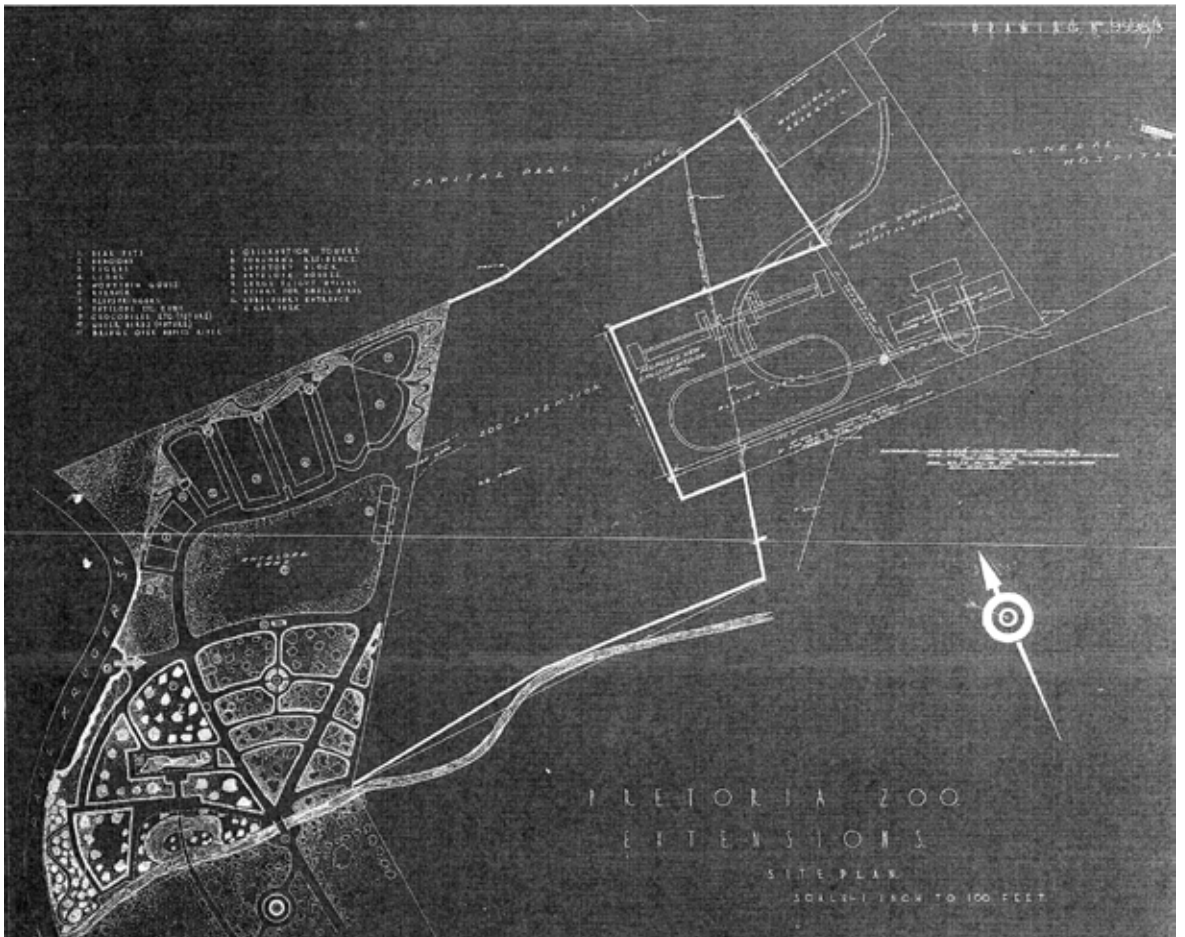
Gunning went to great extents to create a “recreational heaven for the city’s inhabitants” (Van den Berg, 2000: 32). The gardens were beautifully landscaped in which dramatic buildings such as the Lion House (1902) was built. The main entrance was erected in 1903. At this time, the Zoo consisted of a few farmhouses and enclosures housing small animals.

Gunning enthusiastically expanded with the following: a camp for Buffalo and Zebras (1907), Elephant and Rhino house (1910), Bear house (1911) and the Raptor cages (1912) (Dry & Joubert Argitekte, 1991: 4.2). The Zoo fast became a popular place to visit especially on Sundays when bands would play throughout the year (Bigalke, 1958: 21).



Figure 2.63 Dr. Jan Willem Boudewyn Gunning (Bigalke, 1958: 28).

Figure 2.64 Pretoria Zoo extensions: the Lion and Tiger Enclosures north of the Apies river (Department of Public works, n.d.).



Gunning was soon confronted by the pressing matter of the time, the keeping of animals in small and barren enclosures. In 1907 Gunning was exposed to Carl Hagenberg, a German entrepreneur, who revolutionised enclosure design by introducing artificial landscapes that acts as a backdrop to the enclosure. This artificial landscape was designed to resemble nature. Bars were replaced by concealed manners of control. Thus enclosures started to be seen as less as cages and more as exhibits (Dry & Joubert Argitekete, 1991: 4.2).

This approach recognized the importance of the position of the observer to the observed. The dominance of the architecture was greatly reduced to a simple holding structure. This approach required much more space than previous enclosure, to allow for adequate landscaping, hence the term Zoological Park or Garden. Even though the enclosures where more natural than before, it was often detached from the natural habitat of the specific species.

Gunning soon realised that the Daspoort ridge, north of the Apies River provided the topography to allow for this approach. Years later this vision led to the northern lion and tiger enclosures, which are still in use today. In 1902 the council of the Pretoria Municipality reserved 30 acres of this area to the State Museum and Zoological Gardens (Van den Berg, 2000: 34).

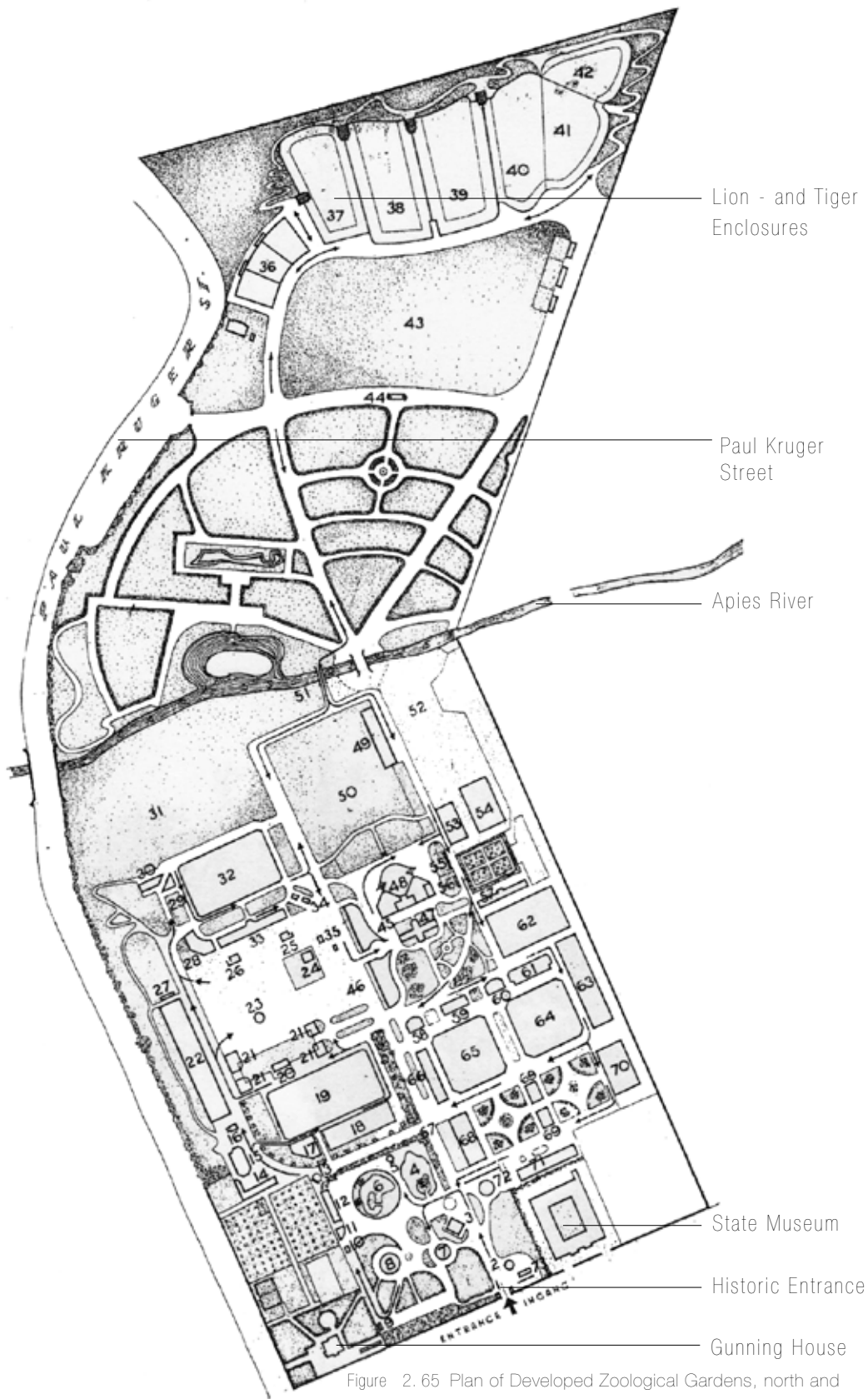


Figure 2.65 Plan of Developed Zoological Gardens, north and south of the Apies river (Department of Public works, n.d.).



Figure 2.66 A scene in the Zoological Gardens in 1910 (Van Schaik, J.,L., 1936).

After becoming a Union in 1913, the Zoological Gardens become independent of the then Transvaal museum, which until then functioned collectively (Dry & Joubert Argitekte, 1991: 4.2).

Dr. Alwin Karl Haagner succeeded Dr. Gunning after his passing, in 1913.

In 1916 the Zoo received national status. At this point of time, the Zoo had limited funds for acquiring additional animals and also served as a stop-over for animals travelling from Africa to the rest of the world.

Dr. Rudolph Bigalke became the third director of the National Zoological Gardens in 1927. Bigalke managed to acquire additional funding from the Department of Public works to erect the enclosures on the hillside, as envisioned by Gunning. The tiger and lion enclosures open on the 6th December 1938. Bigalke also made a significant contribution by founding the first Department of Nature conservation in Transvaal in 1945 (Dry & Joubert Argitekte, 1991: 4.2.2).

During the 1930's - 1940's the zoo had an amusement atmosphere. Many of the animals were exhibited on poles and performed tricks to the delight of the public.



Figure 2. 67 Aerial photograph of 1936 (Van der Waal Collection, n.d.).



Pretoria Station

Church Square

Paul Kruger Street

Late Victorian residential structures

Aspasia Building

Dr. Gunning residence

Historic entrance on axis
State Museum

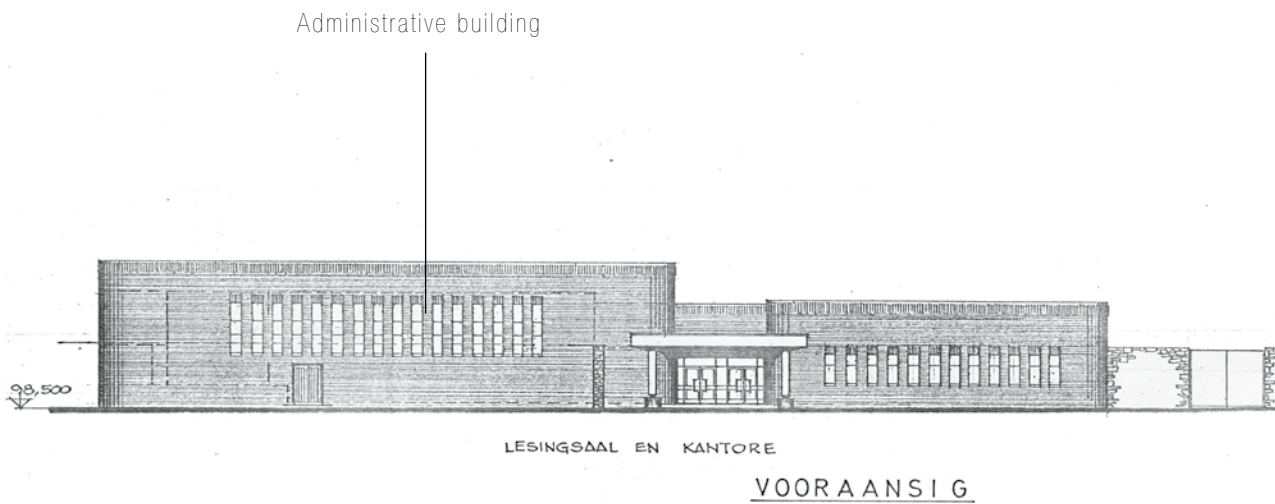


Figure 2. 68 Drawings of the Complex that was completed in 1982 in honour of Dr. Brand (Department of Public Works , 1979).

In 1960 Dr. Frank Brand became the fourth director, he applied himself to modernise the Zoo. Brand did away with the practise of using the animals as a form of entertainment.

Brand introduced night facilities into all the enclosures in such a manner that the public could only view the animals from a maximum three sides, offering the animals a safe retreat to at least one side of the enclosure. Most enclosures where also upgraded to suite the natural requirements of each animal.

Brand also recognised the importance of breeding endangered species and established various breeding projects still in practise today (Dry & Joubert Argitekete, 1991: 4.2.2).

Mr. Willie Labuschagne has been director since 1985. Labuschagne has made a better connection between the Zoo and the public his main priority. He believes that only through this connection can the Zoo reach its full potential as an educational and research entity. Great progress has been made in this connection by the formation of organizations such as “Friends of the Zoo” and the Adoption scheme (Dry & Joubert Argitekete, 1991: 4.2.3).

Today the Zoo is the biggest natural attraction within the inner city of Pretoria and the largest Zoological Garden in Africa. The Zoo has been recognised as one of the top ten Zoological Gardens in the world (Haywood, 2008: 6).

It is currently the only South African Zoological Garden with national status and occupies 85 hectares of land. The Zoo annually attracts more than 600 000 visitors with its collection of 6500 species (National Zoological Gardens of South Africa, 2012). Other facilities include a reptile park, South-Africa’s largest inland aquarium and an extensive exotic tree collection.

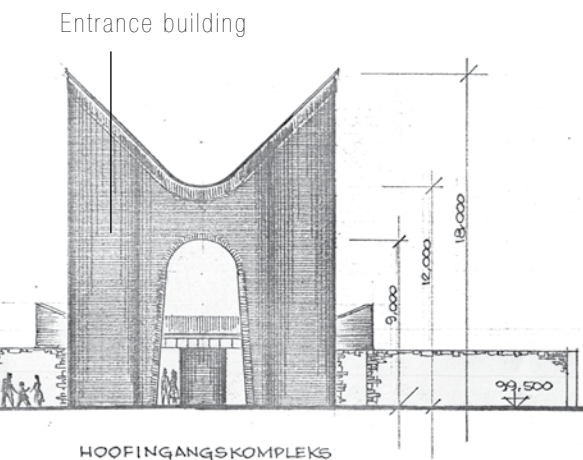
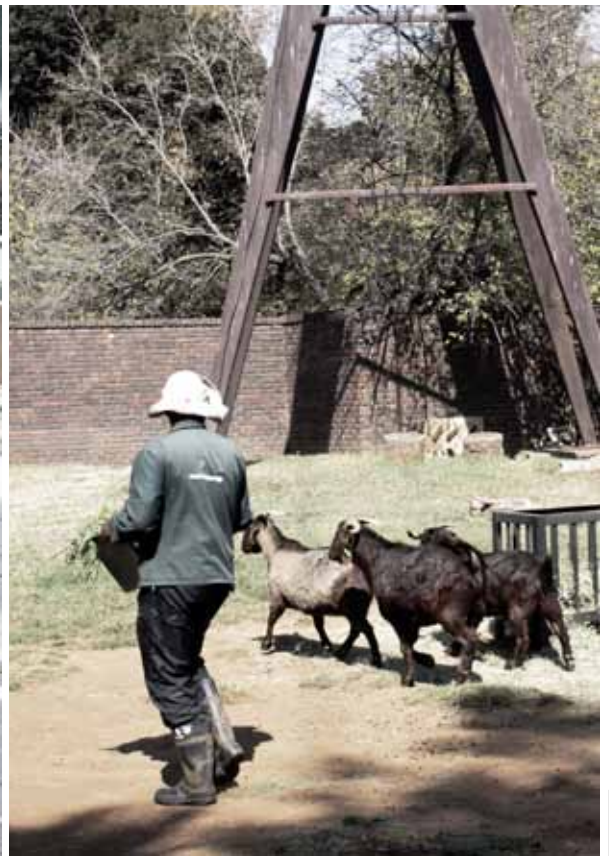
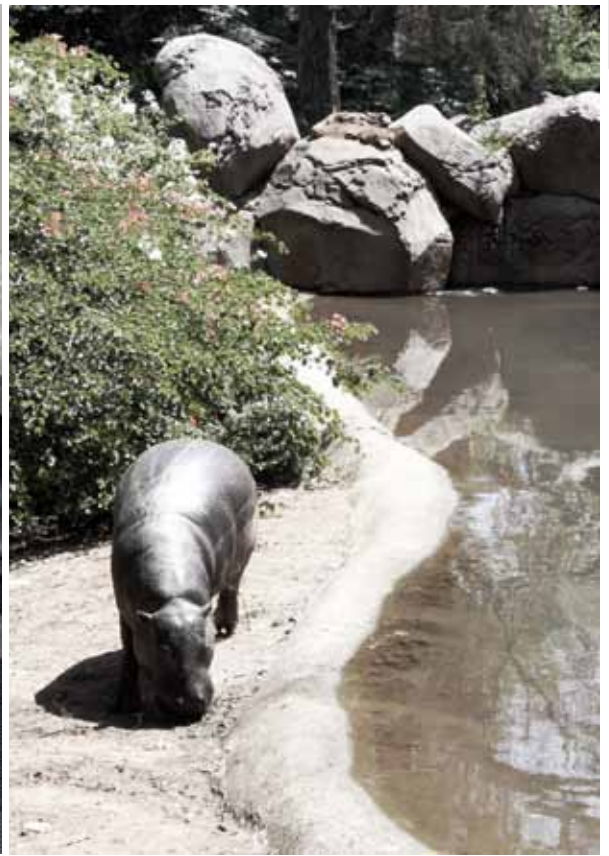


Figure 2. 69 Next page, Photographic study of the Zoo today (Author, 2012).





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context

Part 3

In brief

Part 3 is a detailed analysis of the different scales of context in which the dissertation takes place.



Figure 3.70. Photographic study of Pretoria as city and its relationship within "Second Nature" (Author, 2012).



The proposed site investigated in this dissertation is situated in South-African province of Gauteng. Tshwane, a municipal ward of this province has as its central business district (CBD), the city of Pretoria. Context is generated through the arrangement of culture and nature (Jordaan, 1989: 26).

The cultural response to environments and unique circumstances determine the sense of place. Places where these aspects are in unity, usually become authentic and timeless. The physical and spatial manifestation of a city is a product of planning. When this planning is overlaid with culture a city is created with a certain identity. City plan models strive to certain ideals to provide to its citizens or users. These ideals determine how a city is experienced by civil society.

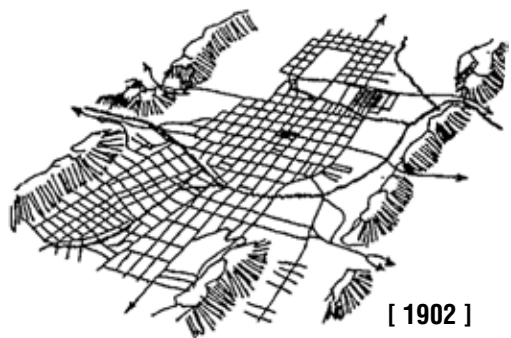
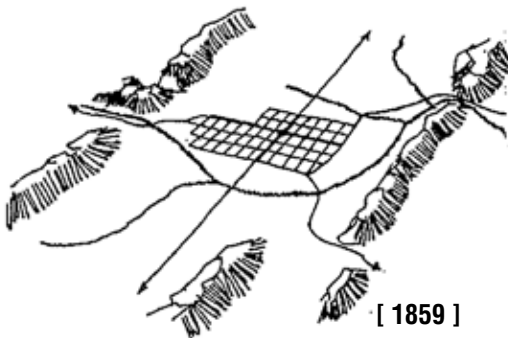
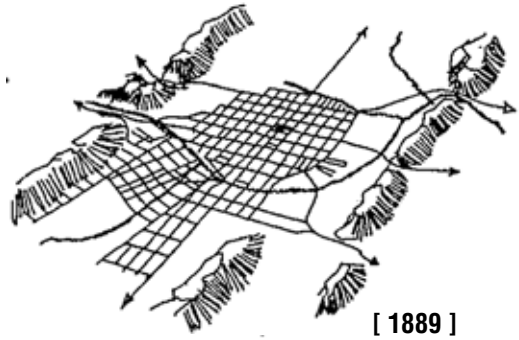
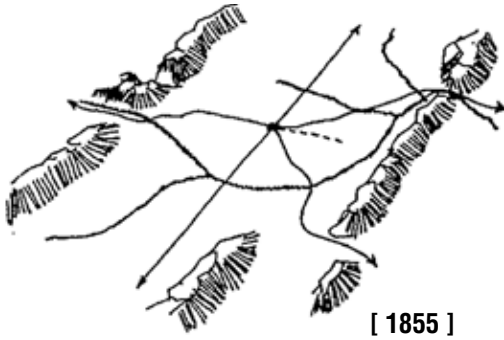
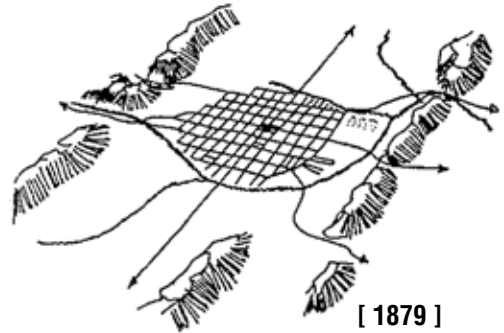
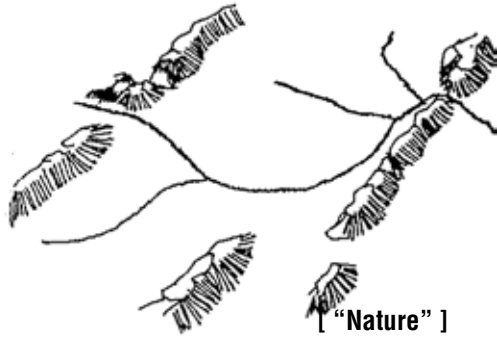
Pretoria was established as the seat of the Zuid-Afrikaanse Republiek (ZAR) in 1855 and continues to be the administrative capitol of South-Africa. The city model of Pretoria makes several references to natural phenomena and can almost be seen as a city grown from its circumstances; be it nature or culture.

Norburg-Schultz (1980: 45) described Pretoria as settlement that is sympathetic to the landscape.



“Pretoria is carefully organized to allow nature to maintain its presence. I am still amazed when I drive from the south into the city and how it is completely hidden between the rolling green hills and then suddenly appears”

(Barker, 2012).



**National Zoological
Gardens of South Africa,
Pretoria.**

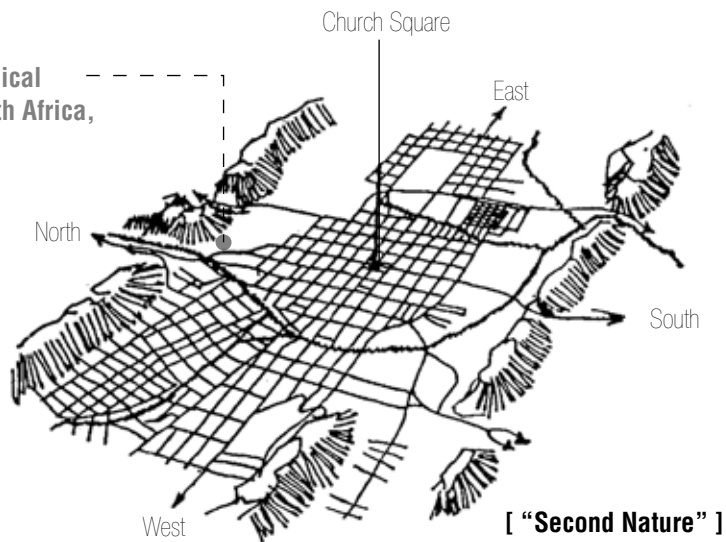


Figure 3.71 Pretoria's growth as a city over time (Jordaan, 1989: 26-29) and (Author, 2012).

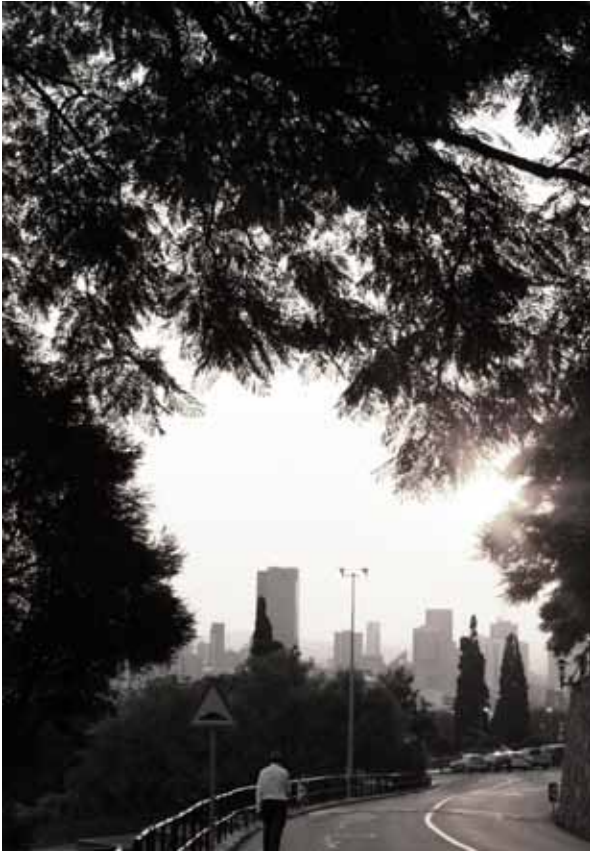
Pretoria is situated in the valley between the Magaliesberg -, Daspoort - and Schurweberg mountains and which were seen as the stable manly entities of the city. The natural ridges offered the settlement protection. With the Apies River, Steenhoven - and Walkerspruit providing water to the area it was considered an ideal location for the establishment of a settlement. Rivers and streams were perceived as female, nurturing mother entities. The growth of Pretoria is profoundly influenced by these geographical markers, causing a concentration of growth in an east-west direction (Jordaan, 1989: 27).

Jordaan (1989: 28) also states that the good city has a constant complex structure that allows for continued change while the basis survives. Within the valley the city is shaped by a rigid orthogonal street grid that still dominates the urban fabric to this day.

An intersection point of the grid is formed by the “cardo” (north-south axis) and “decumanus” (east-west axis), today known as Paul Kruger Street and Church Street. This point occurs at Church Square, previously known as Market Square. Church Square was intended as symbolic centre of the city. Today this symbolism has manifested spatially. This grid model aids the legibility as well as functioning of the city. The extension of the cross leads to the surrounding gateways and river crossings, literally connecting the city to the landscape.

The intersection divides the city into four quadrants. The intersection and city planning was informed by the cosmic path of the sun. The point of sun rise was seen as the place of birth and consequently the place of sunset as the place of death. This determined the positioning of the city cemetery, the Heldeakker. The direction of the water flow of the Apies River also follows this succession from east to west (Jordaan, 1989: 26-29).

Unfortunately, continued development within the CBD of Pretoria does not respect these model ideas. Roads are primarily designed for vehicle usage and public spaces are introverted. If this paradigm continues Pretoria will eventually lose its structure, image and identity.





nuber of women, children
and elderly
social networks
volunteerism
evening use
street life

welcoming
interactive
friendly
pride
neighborly
cooperative
stewardship
diverse

sociability

access & linkages

accessible
convenient
walkable
legible
connected
proximity
continuity

traffic data
mode splits
transit usage
pedestrian activity
parking usage patterns

place

local business ownership
land-use patterns
property values
rent levels
retail sales

fun
active
vital
special
real
useful
indigenous
celebratory
sustainable

activities & users

comfort & image

safe
clean green
sittable
spiritual
charming
attractive
historic

crime statistics
sanitation rating
building conditions
environmental data

key attributes

intangibles
measurements

Figure 3.73 Aspects of a good public open space (Author, 2012).

3.2. Synthesis of existing Urban Frameworks

In an attempt for the intervention to integrate into existing development strategies, the following frameworks were explored, the main focus of the framework is stated and its strengths to be incorporated to establish a framework proposal.

Tshwane Open Space Framework (TOSF)

Publisher: City Of Tshwane

Year: 2005

The TOSF (City of Tshwane: Environmental Planning Section, 2005: 1-2) establishes the intrinsic value of open space and develops guidelines regarding the development of an open space network that would serve the city and its people in a sustainable manner.

Open space includes green spaces consisting of vegetated land within a urban condition as well as civic spaces such as squares, market places and hard landscaped areas. The framework argues that open spaces within our cities are elements used for ecological, socio-economic and place making purposes (City of Tshwane: Environmental Planning Section, 2005: 6).

The TOSF (2005: 59) refers to the international group, *Project for Public Spaces*, to highlight the essential aspects of good open spaces, see fig. 3.3.

Project for Public Spaces places great emphasis on the following elements (City of Tshwane: Environmental Planning Section, 2005: 60-62);

- Adequate places to sit allowing people choice.
- Combining of activities to form gathering points that users enjoy.
- Good definition of entrances making the entrances welcoming and visually accessible.
- Walkways that responds to natural circulation patterns.
- Provision for the pedestrian within spaces that are dominated by vehicles.
- The elimination of blank walls or dead edges within the urban fabric.
- Convenient placement of transportation stops.

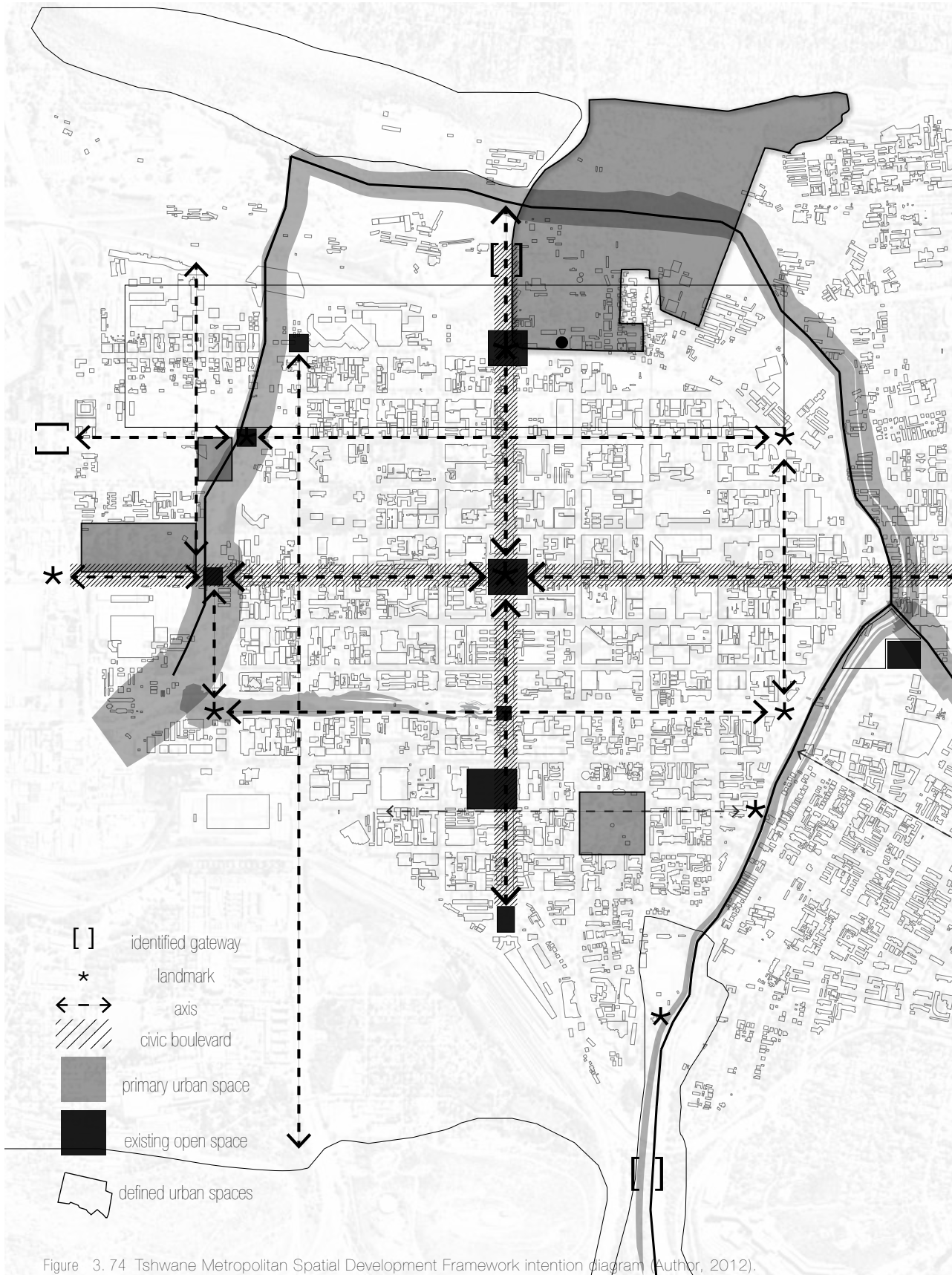
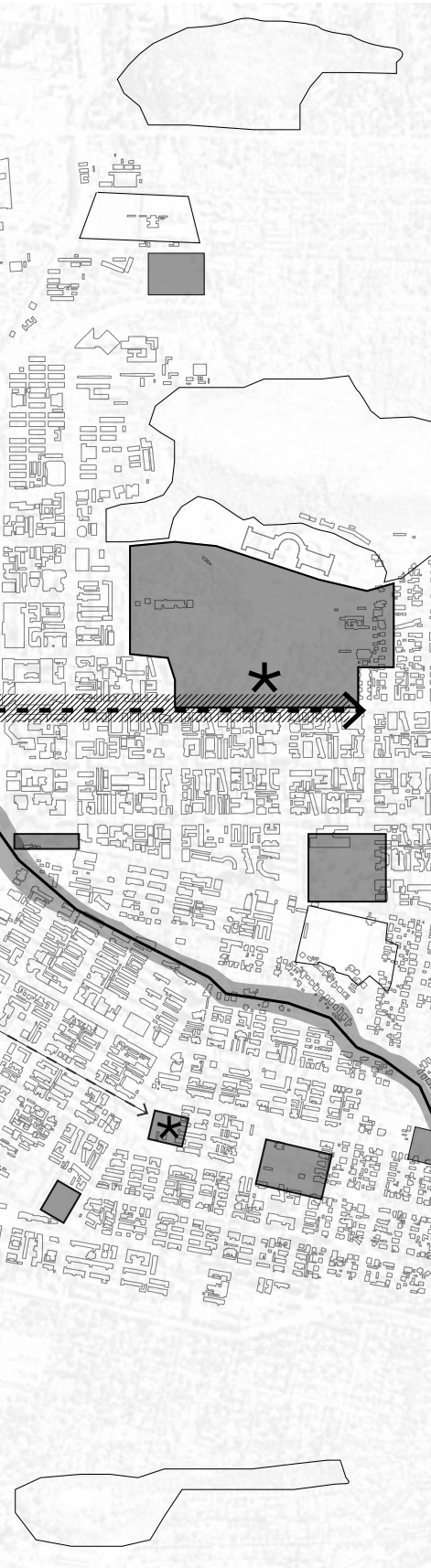


Figure 3.74 Tshwane Metropolitan Spatial Development Framework intention diagram (Author, 2012).



The Tshwane Metropolitan Spatial Development Framework (2012) highlights that Tshwane has many features which support its image and role as capital city. The features mentioned here are applicable to the specific area of study. Many of these features are established but still need definition and reinforcement.

Pretoria Inner City Integrated Spatial Development framework (ISDF)

Publisher: Capital Consortium

Year: 1999

The main focus of the ISDF (1999) framework is to protect and enhance the quality of areas that support public life. These areas are defined as a series of spaces, streets and places that users of the city pass through, as part of their everyday experience of the city.

At a regional scale the main focus is identity, capital image and linkages to the greater metropolitan area.

At city-wide scale the framework works towards improved legibility of the city, inter-precinct linkage and edge interface. At precinct level the emphases lie on articulation of nodes, routes and activity spines while respecting the existing identity of the precinct.

The ISDF (1999) divides the inner city into sixteen precincts. The existing framework of the Northern precinct of the CBD of Pretoria has attempted to address similar problems of fragmentation, illegibility lack of identity and the absence of a public interface. The ISDF proposes a series of interventions in Boom Street. These interventions are placed in such a manner, that it aids in stitching the urban fabric together through means of nodes.

The main intention of this Northern framework is to upgrade the existing environment of Marabastad while maintaining the historical character. The importance of establishing a formal northern entrance to the city at the intersection of Paul Kruger - and Boom Street as well as creating a new entrance for the National Zoological gardens is stressed.

By integrating the principles of the TOSF (2005) and the ISDF (1999), a site specific urban framework is created.

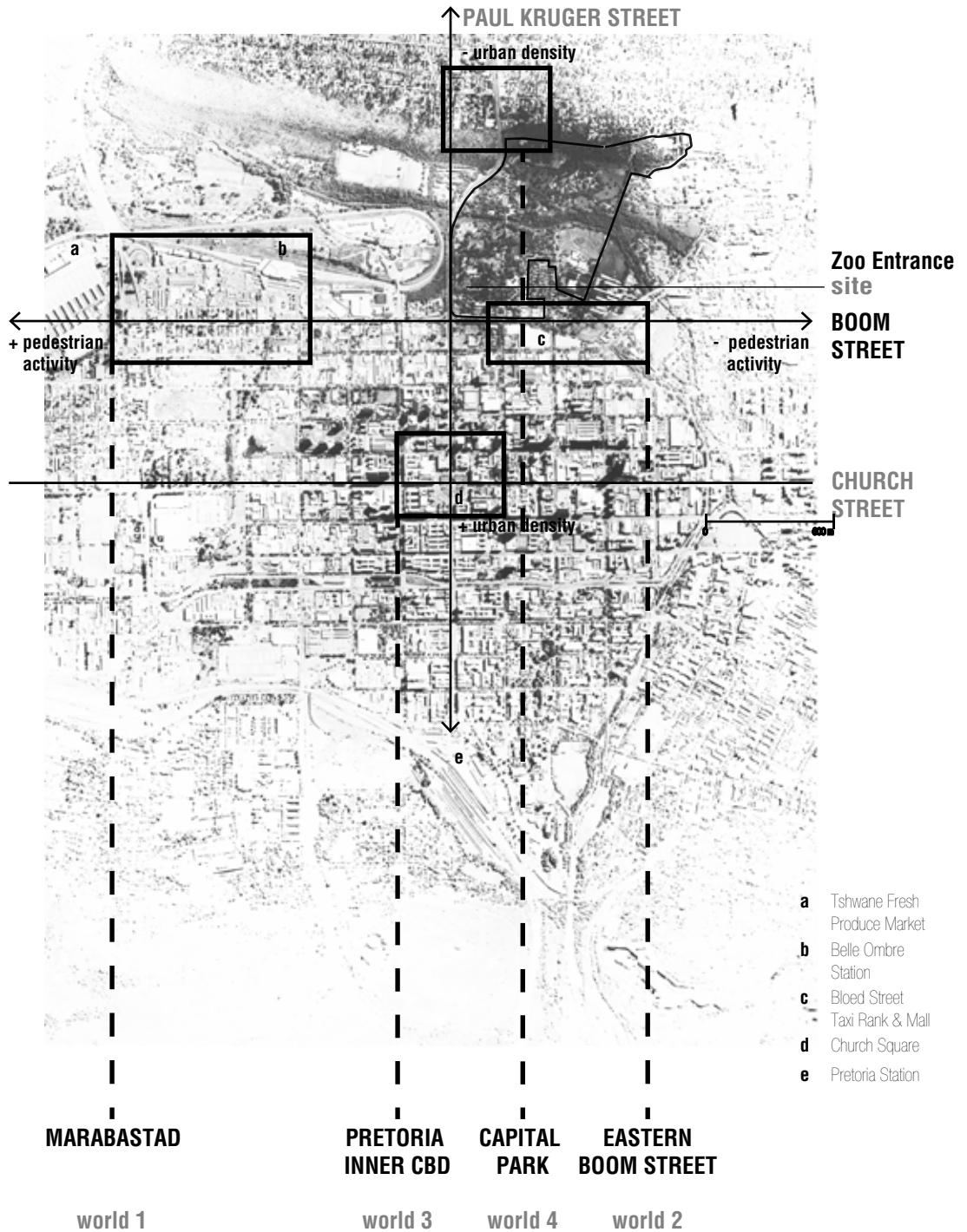


Figure 3.75 Graphic understanding of the site within its' context (Author, 2012).

The precinct under investigation, situated within the Northern portion of the CBD, is defined by D.F Malan Drive to the west, Boom Street to the north, Prinsloo Street to the east and Proes Street to the south.



MARABASTAD
world 1



EASTERN BOOM STREET
world 2



**CAPITOL PARK
world 3**



**CHURCH SQUARE
world 4**

Figure 3.76 Graphic compilation of the context (Author, 2012).

Western start
of Marabastad

Water treatment
facility

Steenhoven
Spruit

Bell Ombre
Rail Station

Apies River

Daspoort
Ridge

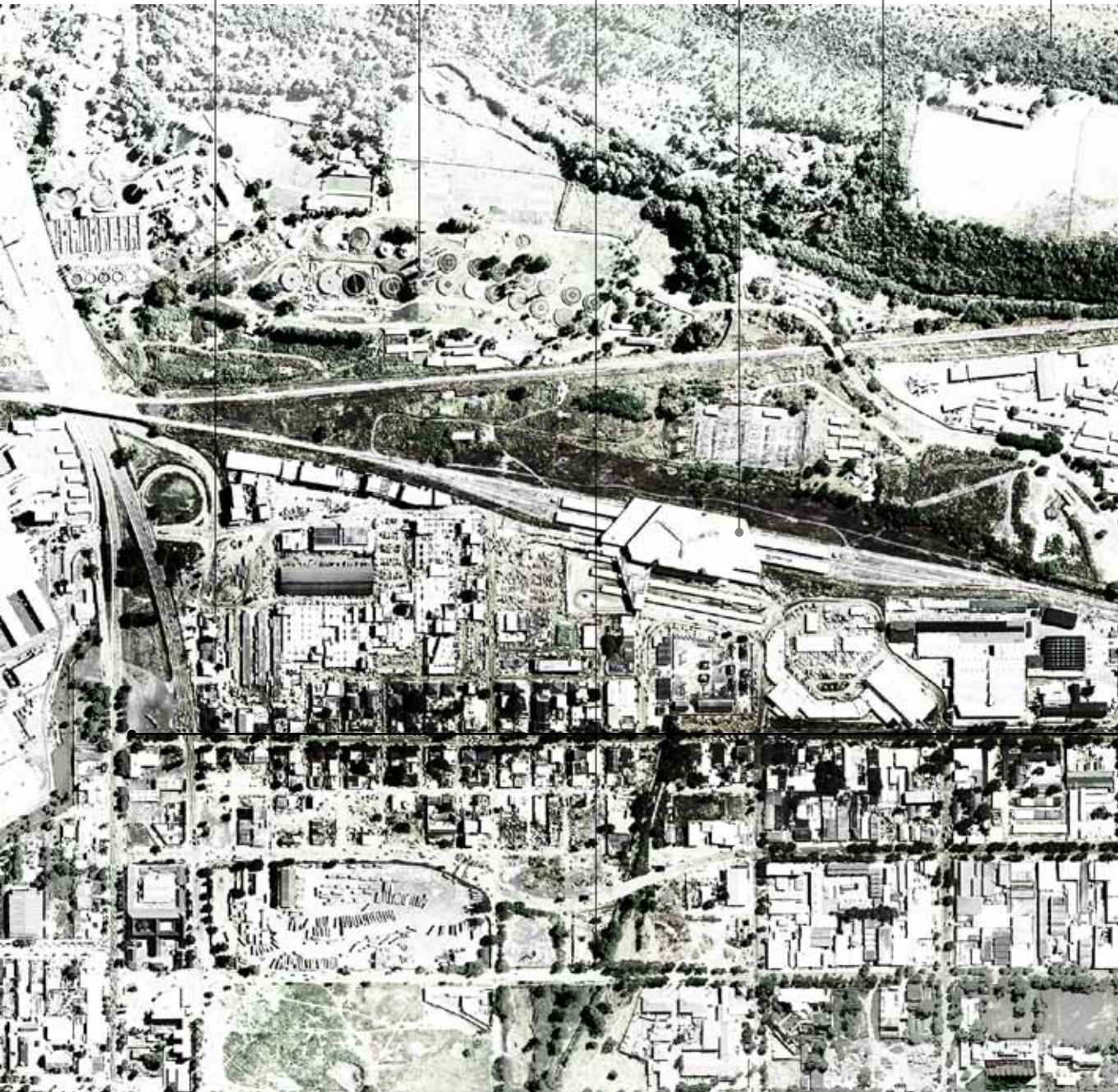


Figure 3.77 Contextual analysis within Northern precinct of the CBD (Author, 2012).

[SITE]

Langenhoven
High school

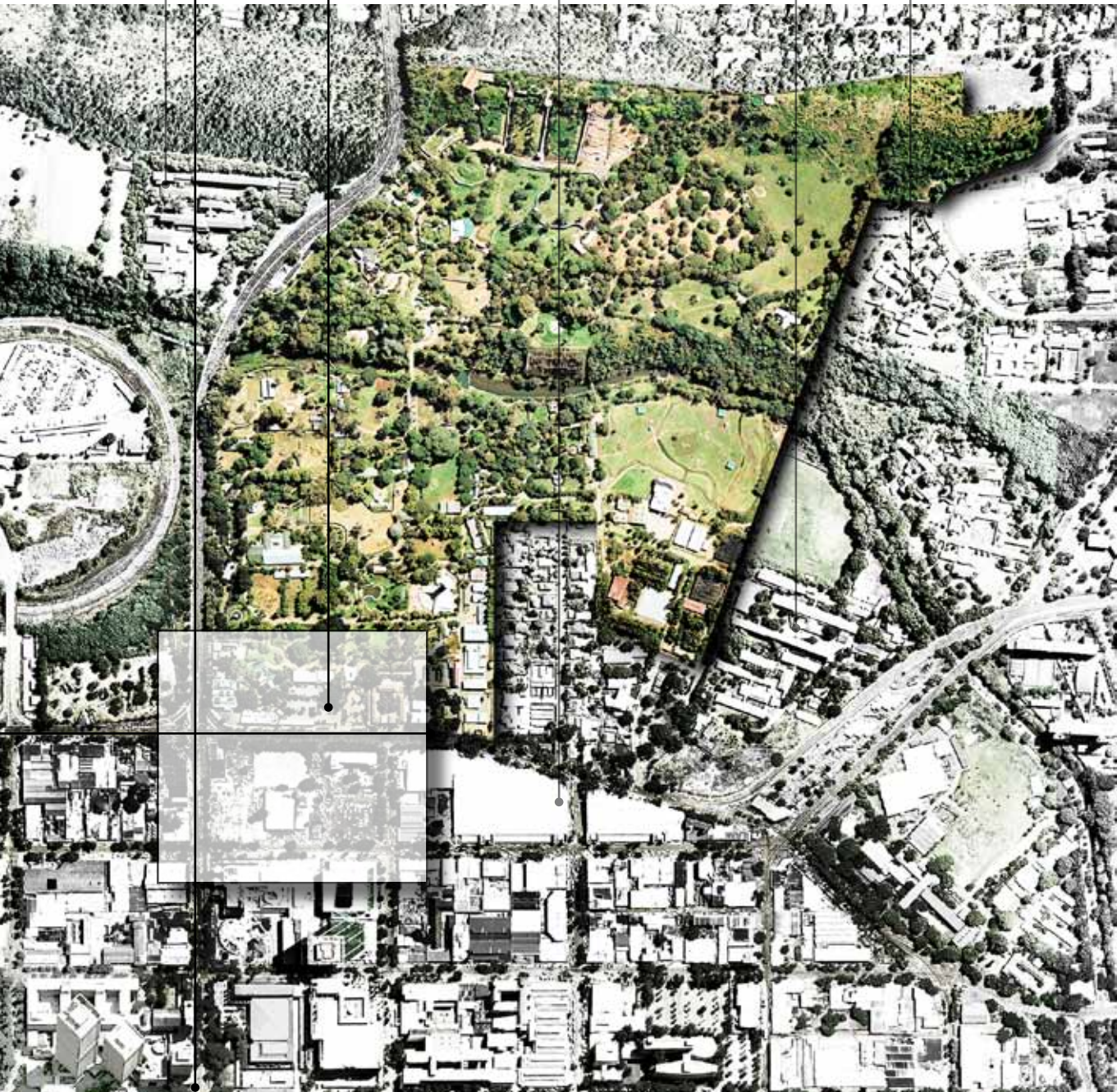
**Paul Kruger
Street**

**National Zoological
Gardens of South
Africa**

Bloed Street Taxi Rank
and Mall

Prinshof
School

School for
Celebral
Palsied



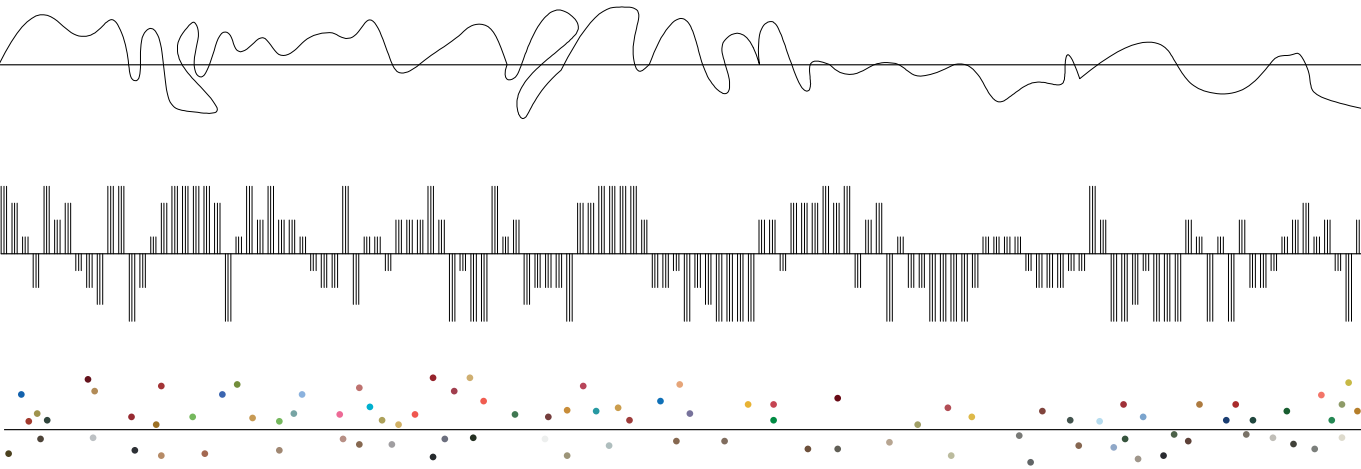
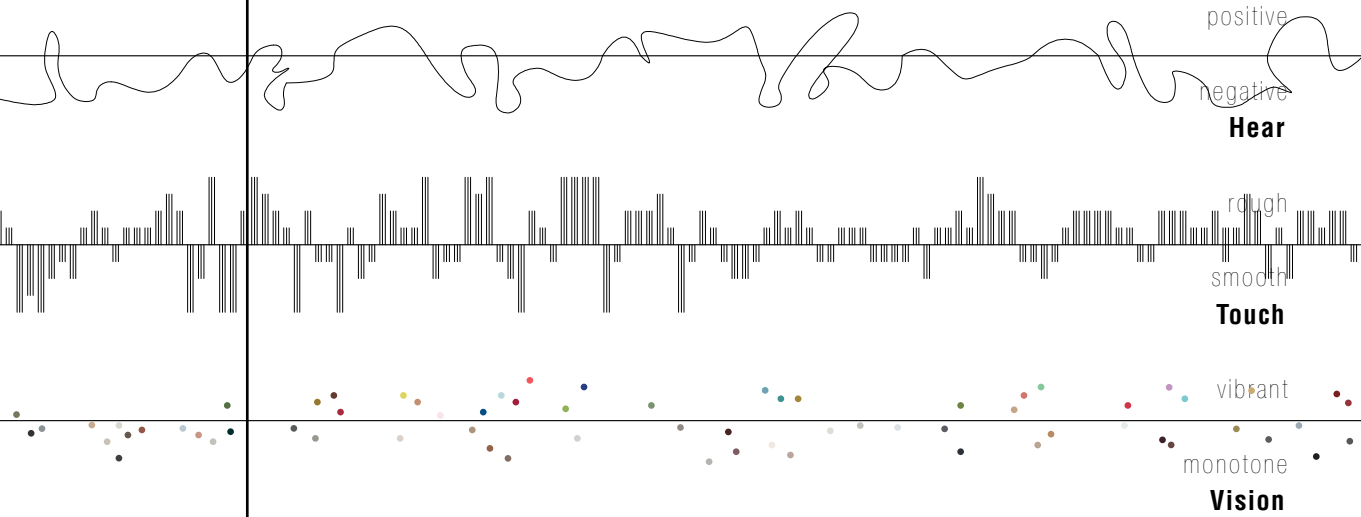
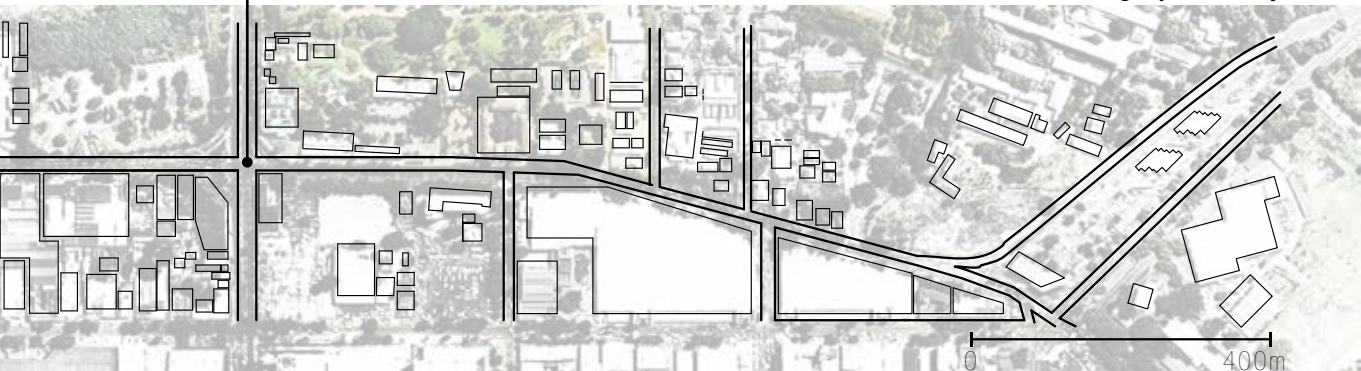


Figure 3.78 Analysis of Boom Street (Author, 2012).

The Paul Kruger – (North South) and Boom Street (East West) Intersection



Photographic study



Boom Street and Surroundings

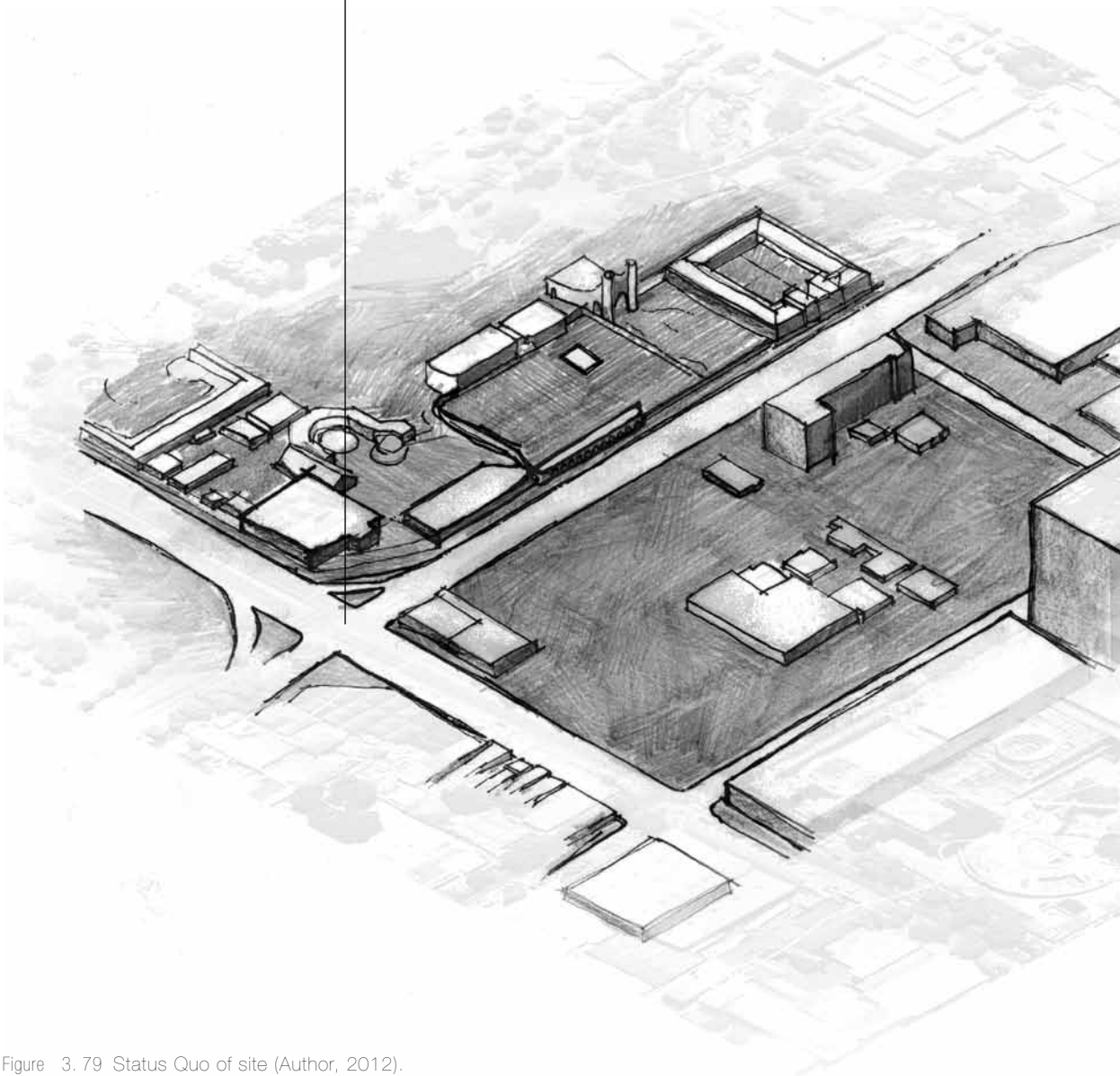
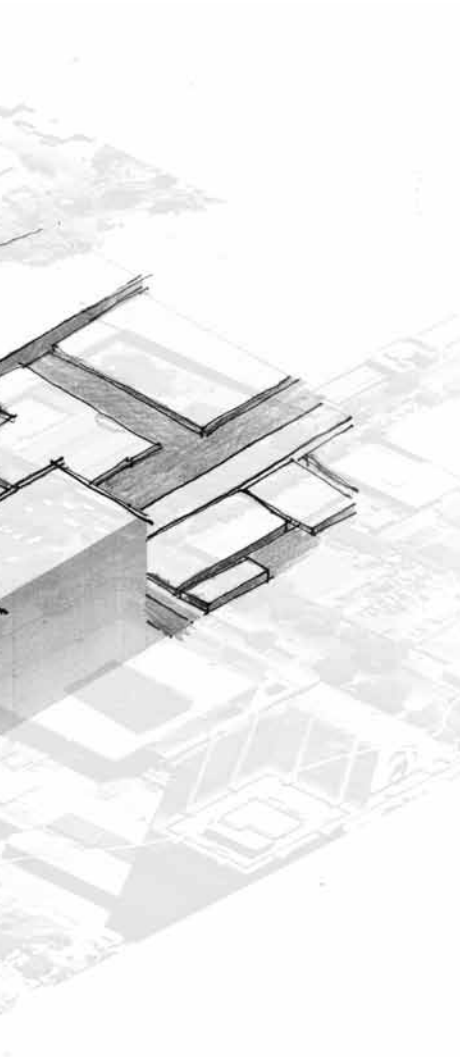


Figure 3.79 Status Quo of site (Author, 2012).

The Precinct Framework study area is defined by Boom Street to the north, Bloed Street to south, Paul Kruger Street to the west and Andries Street to the East.

The intersection of Paul Kruger – and Boom Streets signifies the northern gateway to the city, a point of connection between the inner CBD and northern Tshwane. This gateway is also in close proximity of public transport nodes, such as the Bloed Street Taxi Rank and Belle Ombre Railway Station.



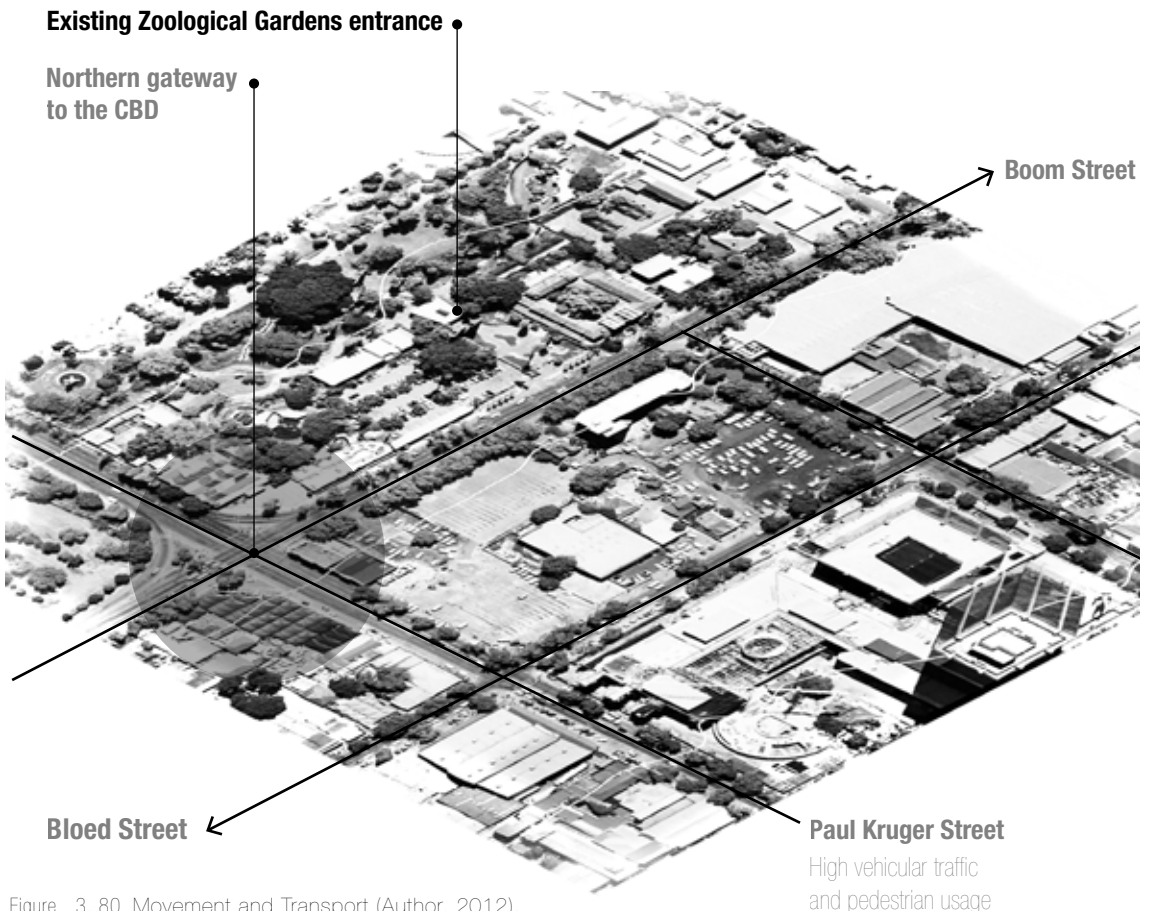


Figure 3.80 Movement and Transport (Author, 2012).

3.4. Precinct Framework: Analysis and Response

The main objective of this framework is to define the area's character through analysis. Consequently it will determine the possibilities to enhance the area's unique character and establish a sense of identity while addressing various other problems in the area.

Movement and Transport Problem statement

One of the main problems that have been identified is the high vehicular traffic and congestion within the area. There are various public transport nodes in close vicinity to each other causing high pedestrian activity. Some of the formalised taxi ranks, such as the Bloed Street Taxi Rank do not function well.

Safe public parking is provided by the Zoo, but on such a small scale that it is often full during peak times, and overflows to an informal parking area across Boom Street. Due to the lack of provision for the pedestrian in the form of walkways and active building edges, it creates an environment where the street user is left feeling unprotected.

Proposal

The framework proposes to decrease vehicular traffic within the precinct by the implementation of the following proposed interventions and strategies:

_Strengthening the presence of the Gautrain Bus Route by formalising the existing bus stop and waiting area. A new Bus Rapid Transit (BRT) system is also proposed and will make use of this stop.

_A new civic open arcade along the north-south axis towards the entrance of the Zoo between Bloed - and Boom Streets. This arcade will be positioned along a historic 'gap' in the urban fabric, which is an extension of the historical entrance axis of the Zoo. This arcade will be flanked by a permeable light commercial edge. It will cross Boom Street as primary traffic component and be punctuated by a new pedestrian traffic light.

_Proposed new timed drop-off/ pick-up zone. This area will cater for tour buses and taxis and will be located along the northern edge of Bloed Street. Safe pedestrian access to the Zoo is provided by means of proposed new civic open arcade.

_ Conversion of 50% of the Bloed Street Mall underground taxi rank to paid parking. This area will cater for secure park-

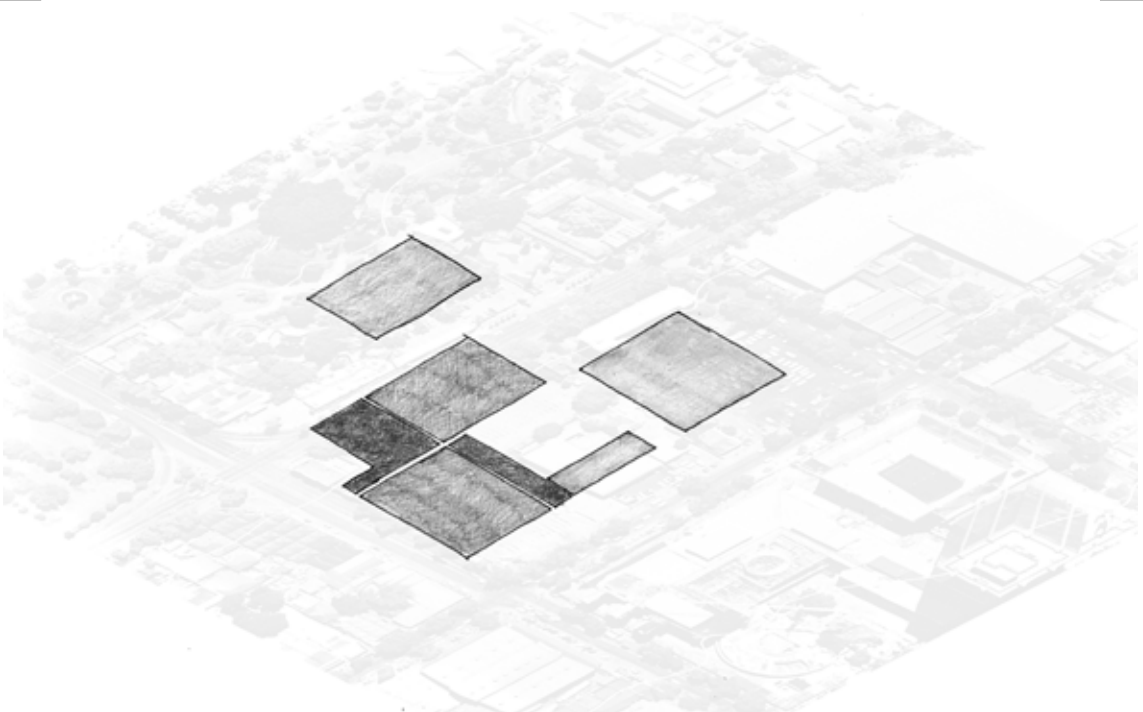


Figure 3.81 Waste scapes identified (Author, 2012).

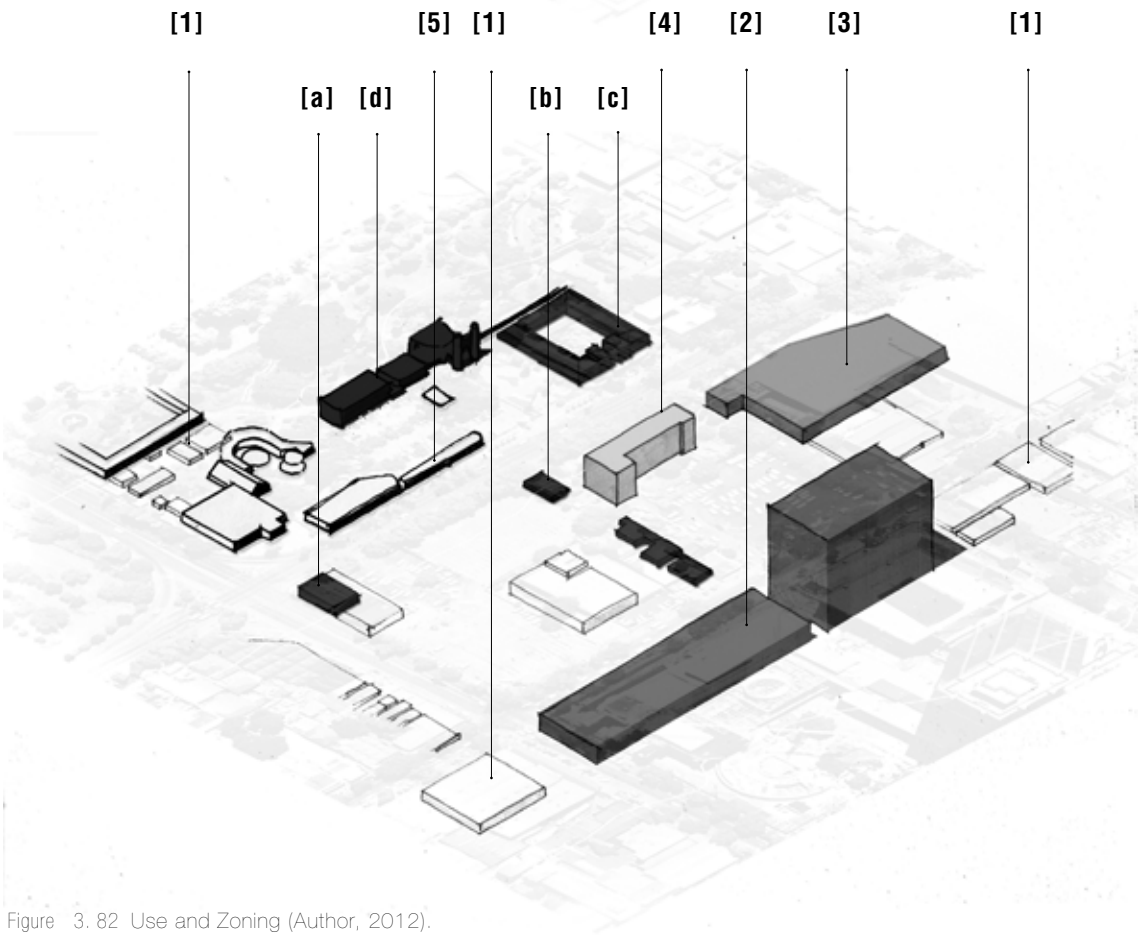


Figure 3.82 Use and Zoning (Author, 2012).

ing of civic private vehicles. _Removal of the slipway from Paul Kruger Street eastbound into Boom Street. This intervention will discourage major vehicular traffic and direct it to Struben Street as main urban arterial. New formal pedestrian crossings will be implemented on all four corners of the Paul Kruger – and Boom Street intersection.

_Implementation of a minimum six metre wide pedestrian sidewalk-guideline.

Use and Zoning Problem statement

A current usage analysis was done determining that the area is predominantly light industrial with very few mixed or residential use functions.

[1] Soft Fabric

Portions of the urban fabric that does not actively contribute to the development of the precinct and consists of semi-permanent to light steel construction. These structures are of low density and mainly used for light industrial programmes. This single use contributes to the urban decay of the area.

[2] Governmental use

Two Governmental buildings are situated within the study area, namely the Department of Health as well as the department of Education. These buildings has a very weak public and street interface. The single use programme promotes the fall of activity during certain times of the day.

[3] Retail and Public Transport

Bloed Street Taxi Rank and Mall is a large scale development however it is currently not functioning to its full potential due to lack of well defined street interfaces.

[4] Residential

Platana apartment block is the only residential zoning within the area and functions very well. It is fully occupied and provides passive surveillance.

[5] Structures of Zoological Garden

The structures mostly functions as a fence towards the street and offers the pedestrian only blank facades. This typology should be reconsidered.

Proposal

The area as entrance to the CBD has to increase its density to act as a transitional scale from the residential of the north to the high density of the CBD to the South. Care should be taken in this densification of the area as not to lose the slightly fragmented feel of the block as a whole. This fragmentation allows for more public front. To ensure this a civic open arcade is proposed from Boom Street to Bloed Street along the series of historic houses on the position of the historic axis running from the Zoological Gardens.



Figure 3. 83. Aspasia Building (Author, 2012).



Figure 3. 84. A series of historic residential structures (Author, 2012).



Figure 3. 85. The State Museum (Author, 2012).



Figure 3. 86. The Frank Brand Building Complex (Author, 2012).

[1] Aspasia Building

also known as the Zoo Café, address 28 Paul Kruger Street, is erected in 1927 and designed by architect Hector Reginald. It is thus protected by the PHRAG – Provincial Heritage Resources Agency at a grade 2 level, as it is older than 60 years. This building is significant as it becomes an exemplar of the Bazaar-era in South Africa and also hints of the Art Deco movement can be seen (Le Roux, 1991: 34). The building is current still in use with a small café on the ground floor and previously residential space being used as offices on the first floor.

[2] A series of historic residential structures

of the late Victorian era are found within the study area. These structures are dilapidated and without intervention will continue to decay.

[3] The State Museum

also known as the ZAR Museum situated next to the main entrance of the Zoological Gardens was erected in 1906. The museum was designed by architect F. Fritteli. The museum is significant as it is one of the first in South Africa as well as for its role in the cultural development of South Africa (Grobler, 1994: 17). The museum also is an important historic landmark within the city (Le Roux, 1991: 29). Sadly the museum, with its symmetrical faced with elaborate detailing, is currently unused and deteriorating fast. Public works plans to re-establish the museum together with the Zoological Gardens as a place of education. The structure is currently protected by SAHRA (South African Resources Agency) as it is older than 60 years, as well as the National Resources Act no. 25 of 1999 (Section 5, 36, 47).

[4] The Frank Brand Building Complex

was erected in 1983 in honour of Dr. Brand, a former director of the Zoo. Today it remains to function as the main entrance to the National Zoological Gardens of South Africa. It is significant as at the time it was built it was considered one of the most modern entrances to a zoo in the world (Swart, 1986).

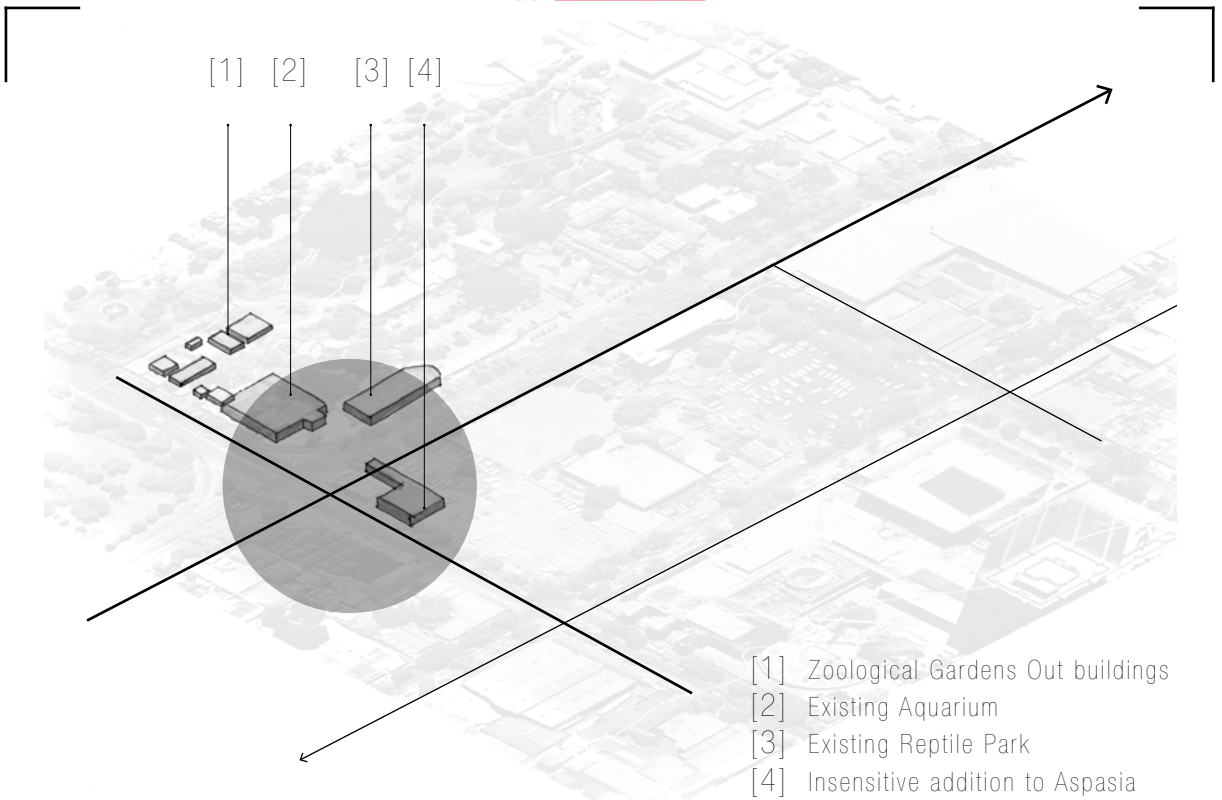


Figure 3.87 Identified to be demolished (Author, 2012).

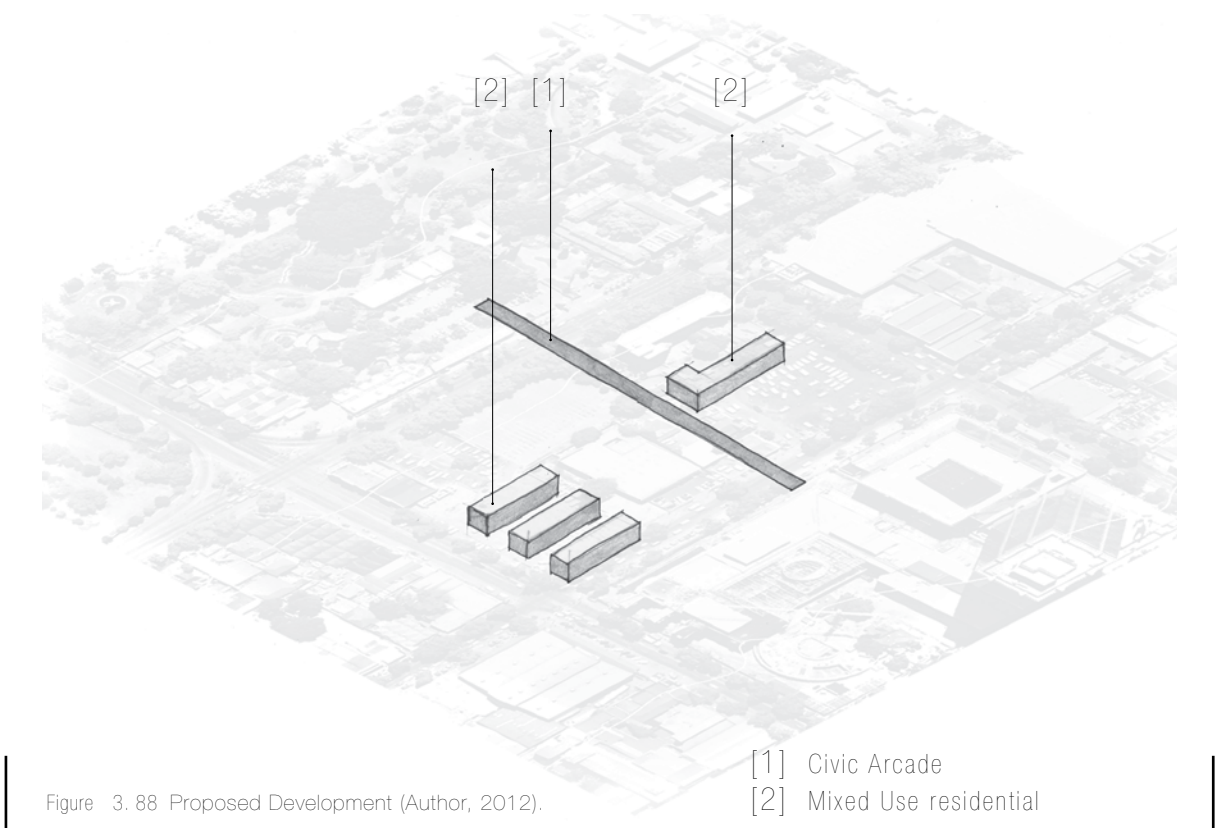


Figure 3.88 Proposed Development (Author, 2012).

The Paul Kruger – and Boom Street intersection should potentially act as a gateway to the city. This prospect is currently unheeded due to illegibility and weak public interfaces in the precinct. This intersection has also become a point that signifies division and fragmentation.

The south-north direction indicates the transition from larger more rigid urban fabric of the inner city to a smaller more informal urban fabric of the city fringe.

Paul Kruger Street divides the vibrant, multi-cultural Marabastad area in the east from the monotonous area to the west.

The eastern area is characterised by light industrial programmes that do not support an active street life. These programmes also limit the activities to certain times. Within the study area there are limited residential usage, consequently the precinct has no permanent residents. This lack of residents contributes to the feeling of constant passing through with little sense of identity or community. The lack of passive surveillance contributes to the urban decay.

The problems of the eastern section of Boom Street are amplified by the Bloed Street Mall. The intervention does not engage with the public on the street, thus the pedestrian is left with bland facades. The Bloed Street Mall intervention was established to facilitate the taxi industry of the area as well as informal to formal commercial activities. In principle such an intervention would have led to precinct regeneration.

However, due to a lack of street interface design along Boom Street, the Bloed Street Mall boosted urban decay along this edge that is visible in the way homeless people use it as a place sleep. The Bloed Street Taxi Rank also does not realise its primary objective; to act as a taxi rank. The transport system is placed at a lower level within the structure. It is thus separated from the street where the main users dynamic is. Thus it remains under used as it does not support the process of exchange between taxi and user on street level. This causes two main problems. It places additional pressure on the informal spaces that taxis use to function as a transport system. The designated structure is unused and creates a hole in the urban fabric.



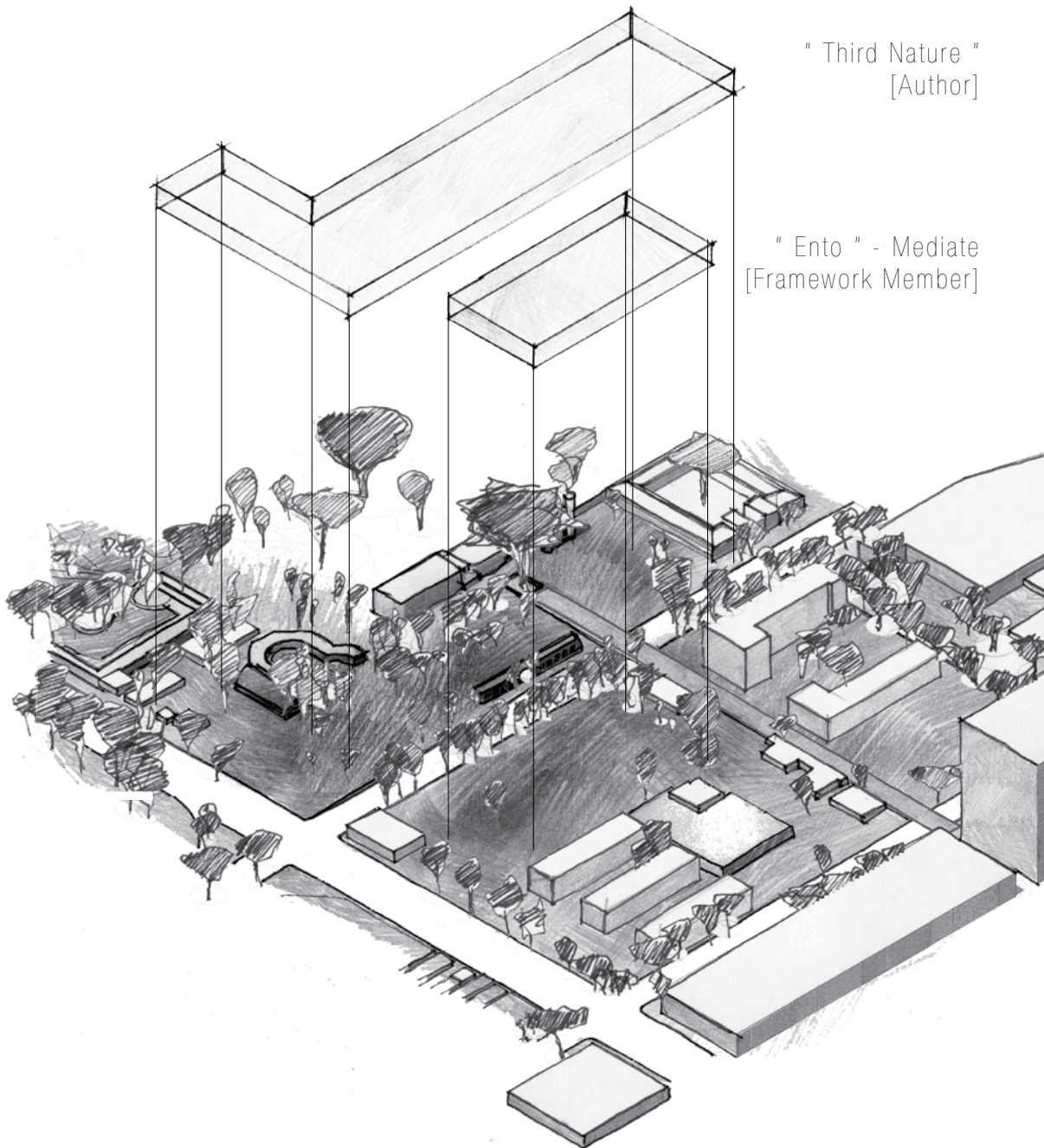
Figure 3. 89 Photographic study of Zoo and its context (Author, 2012).





Figure 3.90 Photographic study of Zoo and its context (Author, 2012).





" Third Nature " [Author]

" Ento " - Mediate [Framework Member]

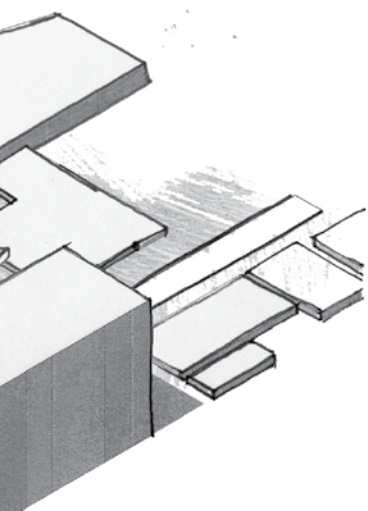
Figure 3.91 Identification of Interventions within the proposed Framework (Author, 2012).

For true precinct regeneration the east of Boom Street needs to be provided with vital opportunities in such a manner that the pedestrian experience and activity is increased on street level.

The interventions proposed are to address the issues of fragmentation, illegibility and lack of public interface.

The proposed civic open arcade becomes a means of allowing the filtering of pedestrians through the city block while tying together programmes and public open space in the precinct.

Care should be taken in this densification of the area as not to lose the permeable feel of the block as a whole. This fragmentation allows for more public front. To ensure this a civic open arcade is proposed from Boom Street to Bloed Street along the series of historic houses on the position of the historic axis running from the Zoological Gardens.



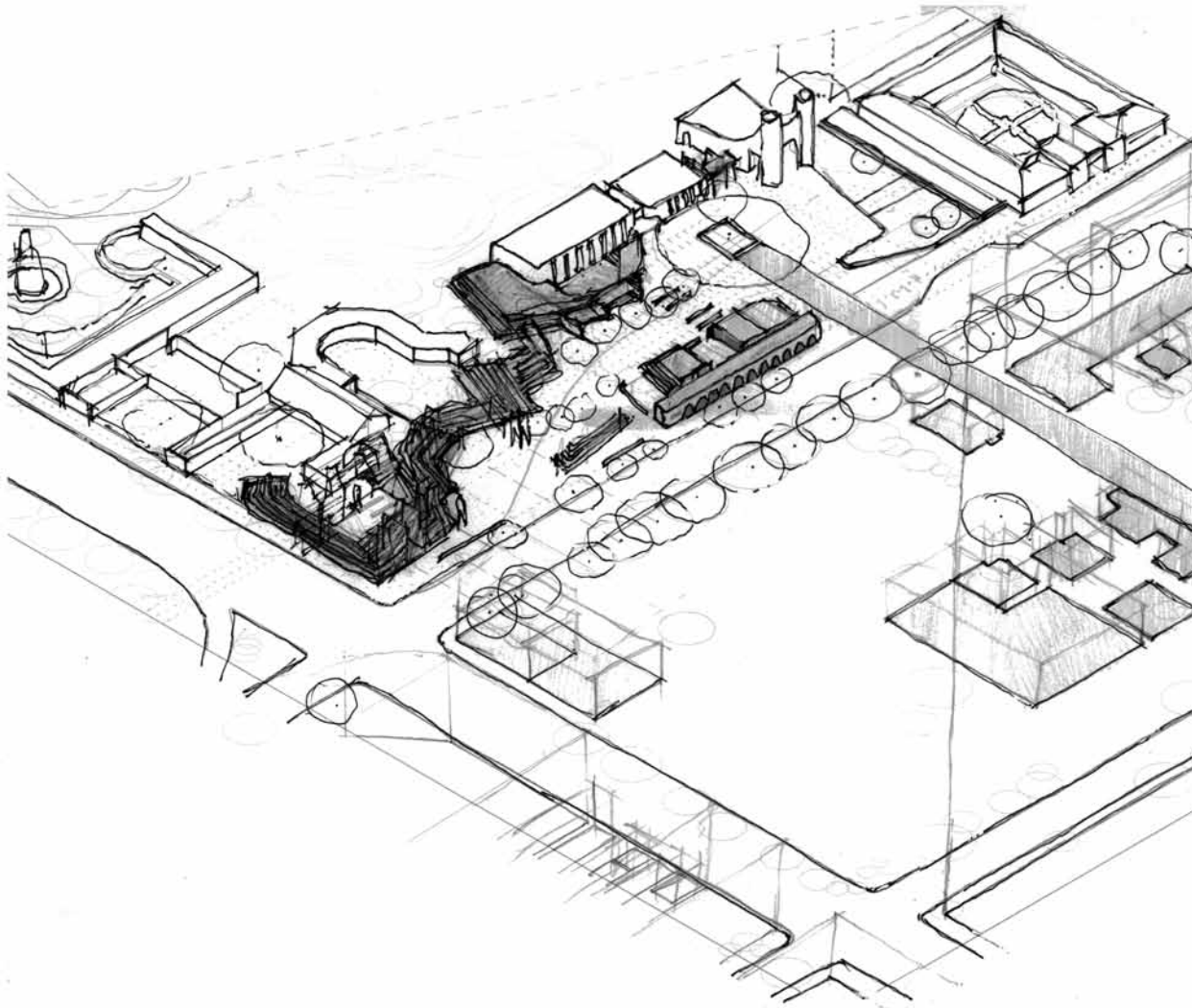
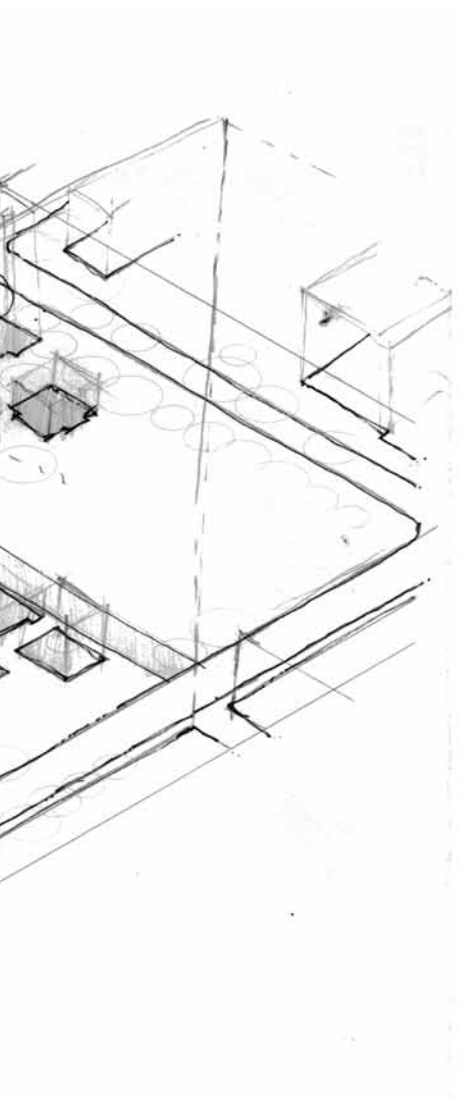


Figure 3.92 Conceptual design within the proposed Framework (Author, 2012).



theoretical discourse

Part 4

In brief

Part 4 introduces the theoretical premise in which the dissertation is grounded.

“I feel I exist on the boundaries

somewhere between science and art

art and architecture

public and private

east and west

I am always trying to find a balance between theses opposing forces,

finding the where opposites meet.

water out of stone

glass that flows like water

the fluidity of a rock

stopping time

existing not on either side

but on the line that divides

and that line takes up the dimensionality

it takes on the sense of place and shape”

Maya Lin (2006).



**“We enjoy the fruits of the plains
and of the mountains, the rivers
and the lakes are ours, we sow
corn, we plant trees, we fertilize
the soil by irrigation, we confine
the rivers and straighten or divert
their courses. In fine, by means of
our hands we essay to create as
it were a second world within the
world of nature”**

(Cicero, 1933: 151-152).

Figure 4.93 A visual exploration of the relationship between "Nature" and "Second Nature" (Author, 2012).

preface

[“ Nature ”]*

The phenomena of the physical world collectively, encompassing all living and non-living entities occurring on earth. The term refers to plants, animals, natural landscape, and other features and products of the earth.

Nature is an entity that man cannot make or manufacture (Oxford advanced dictionary, 2005: 976).

* Author's definition in support of the argument of this dissertation.

Nature is not what it used to be. That is what society may think, when they look at how man and his ways have affected nature (Walsh, 2012)

Attempting to define 'nature' or 'natural' could only occur in the context of man's relationship with nature, never nature itself (Van Mensvoort, 2005: 94-100). The definition has always been as much about what man sees, as it is about what he thinks. Attempting to bring nature into view is equally ambivalent.

Man can no longer view his environment, 'natural or otherwise', without some form of perceptual bias formed by preceding experiences. In conclusion, "Man's cultural lenses cannot be not tainted" (Van Mensvoort, 2005: 95). What is 'nature' and what is not, has and will always be a matter of contention.

[“ Second Nature ”]*

Man reveals his presence in the world by spatial construct - dwellings, buildings and cities.

These spatial constructions are set either directly or indirectly into nature, thus altering nature fundamentally, giving birth to a superficial nature or “second nature” (Crowe, 1995: 4).

* Author's definition in support of the argument of this dissertation.

Nevertheless, nature is seen as man's first environment, the historic source of knowledge and environment in which man formed his perception of reality.

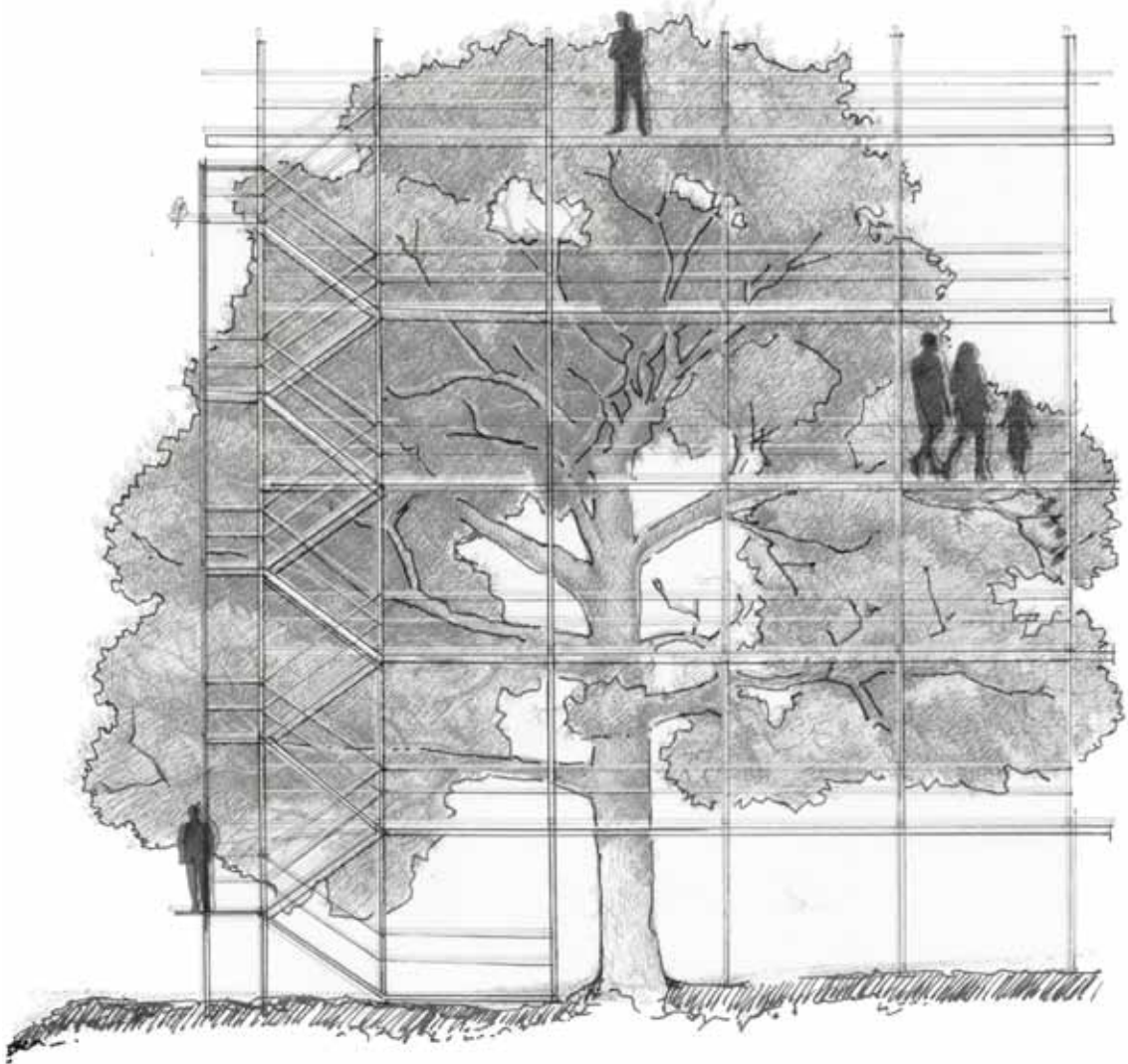


Figure 4.94 A illustration of conceptual understanding of "Third Nature" (Author, 2012).

By the extension of man's imagination and paradigm, "second nature" is created from what man has observed first-hand in nature (Crowe, 1995: 5). This "second nature" personifies a cultural construct of what man wants nature to be. This "second nature" forms man's reality.

This calls for a possible reconsideration of what man categorises as "nature" and what man views as "culture" in the light of man's ability to manipulate both (Schwarz, 2005).

[" Third Nature "]*

The "Third Nature" establishes a new architectural typology.

This typology incorporates the needs of both man and all other living organisms and natural systems equally, on every scale and phase of the development.

* Author's definition in support of the argument of this dissertation.

Architecture of the "Third Nature" provides dwellings of diverse function or program to the human user whilst recreating artificial habitats for other living organisms.

The character of such developments relies on investigations into of complex natural and programmatic systems and the implementation thereof in harmony to each other. The simultaneous inhabitation of these diverse users is exploited to be mutually beneficial to both the non-human and human user.

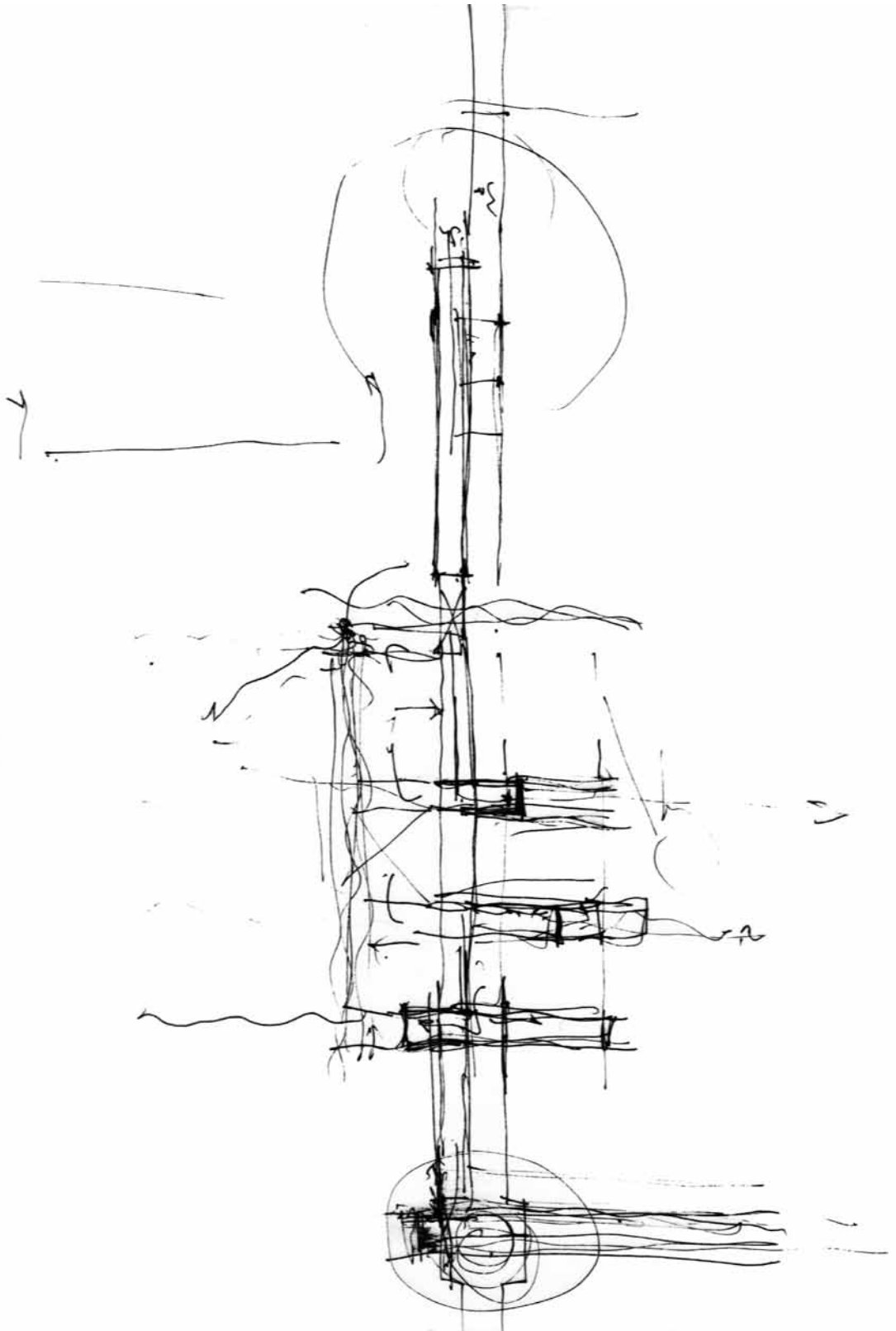


Figure 4.95 Exploration of the interface between the Zoo and the City (Author, 2012).

The theoretical discourse argues for architecture to assume the role of threshold over which to renegotiate and reconcile the threshold between man and nature. The contextualizing of architecture constructs “Second Nature”, man’s connection to “Nature”.

This notion assimilates impressions of the current site conditions, and possible opportunities for an intervention. Negative thresholds regarding the current spatial character of the Zoo, in particular the fence along Paul Kruger Street and the interface along Boom Street require significant consideration.

Both these interfaces bear responsibility (on urban and intimate scales) toward the city and hold opportunity to achieve better edge dialogue with the surrounding urban conditions. Through the review of pertinent theory, new programmatic responses are illuminated.

4.1. Liminal Space – The “Third Space”

[Liminal space]*

From the Latin word *limen*, meaning ‘a threshold’ (Oxford advanced dictionary, 2005: 858)

* Author’s definition in support of the argument of this dissertation.

Liminal space can be seen as the spatial or architectural construct of this threshold or in-between. In the context of this dissertation, liminal space refers to a transitional space, not one place or another but rather a third space in-between.

This is a space where identities can be redefined.

This concept presents a discontinuity of one entity, which heightens the spatial awareness of the occupant.

Fred Koetter (1980: 69) defines the liminal as “the realm of conscious and unconscious speculation and questioning – the ‘zone’ where things concrete and ideas are intermingled, taken apart and reassembled – where memory, values, and intentions collide”. It is a space that is essentially ambiguous and is, by definition, a transitional space or space between contradicting poles.

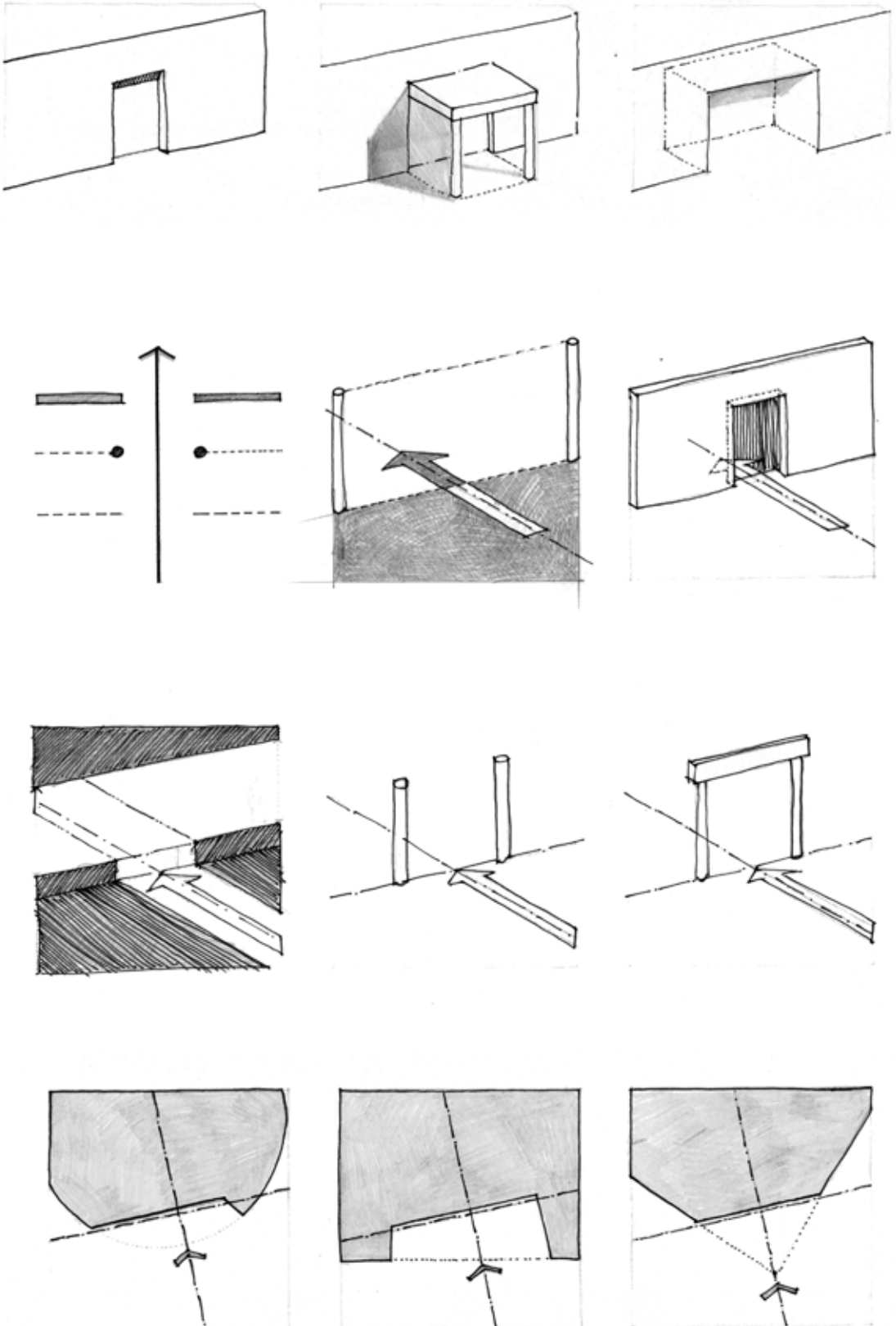
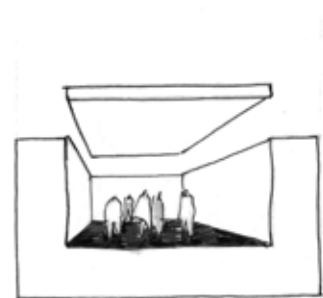
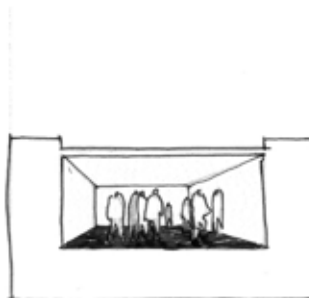
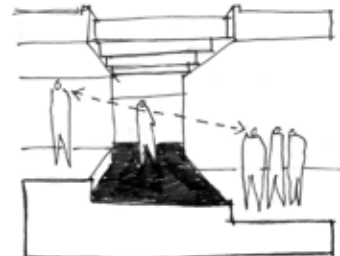
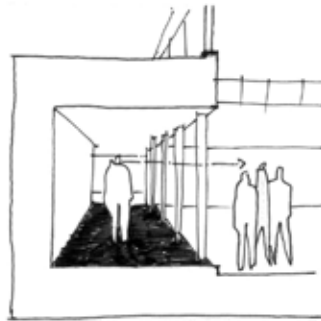
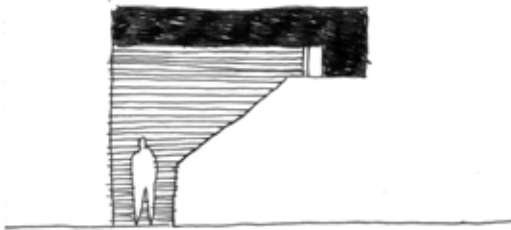


Figure 4.96 Exploration of the spatial implications of a threshold (Ching, 1996), edited by (Author, 2012).



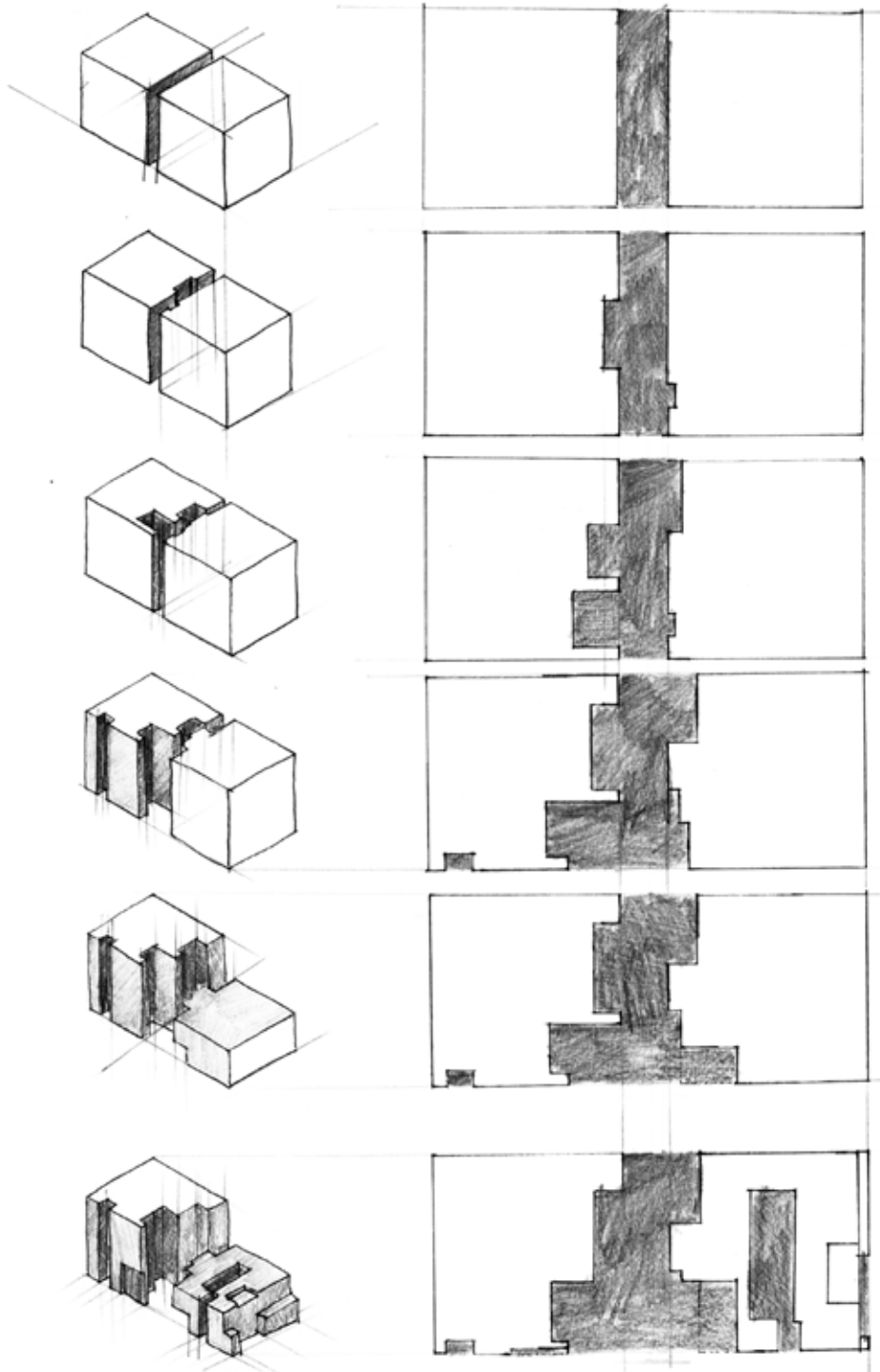


Figure 4.97 Diagrammatic exploration of the threshold (Author, 2012).

“Architecture is theory, art and practice. Each can be studied separately and wholly, or broadly across all three strata” (Pallasmaa, 2010).

Architecture exists as subliminal object in-between and because of paradoxical poles. These spaces by all means only exist between and because of these poles. According to Venturi (1966) the designer does not need to sacrifice one idea to further the other. Thus, for instance, one does not need to choose between light and dark to define space but rather exploit the play between contraries, referred to as the 'both and' condition.

The merging of contrasting fields inevitably creates tension. This tension allows the in-between to exist. Kurokawa (1991: 46) explains Suzuki Daisetz's philosophy of character of opposites as the elementary principle by which the contradictory opposites are revealed as existing in relation to each other.

The acknowledgement of the one will inevitably lead to the neglect of the other. Consequently, it can be argued that providing for the in-between leads to the acknowledgement and integration of both.

Thresholds form the links between the in-between and the paradoxical. This threshold can also be explored as a dualistic interface (Berrizbeita, 2003: 82).

Thresholds are the brink where transformations begin, where exchanges between unlinked and contradicting concepts take place, where identities are determined and declared.

Unlike an idea of inclusion as a meeting point where identities are blurred to create a compromised whole, a threshold as a process interweaves the preservation of the differences while creating something new from their coexistence.

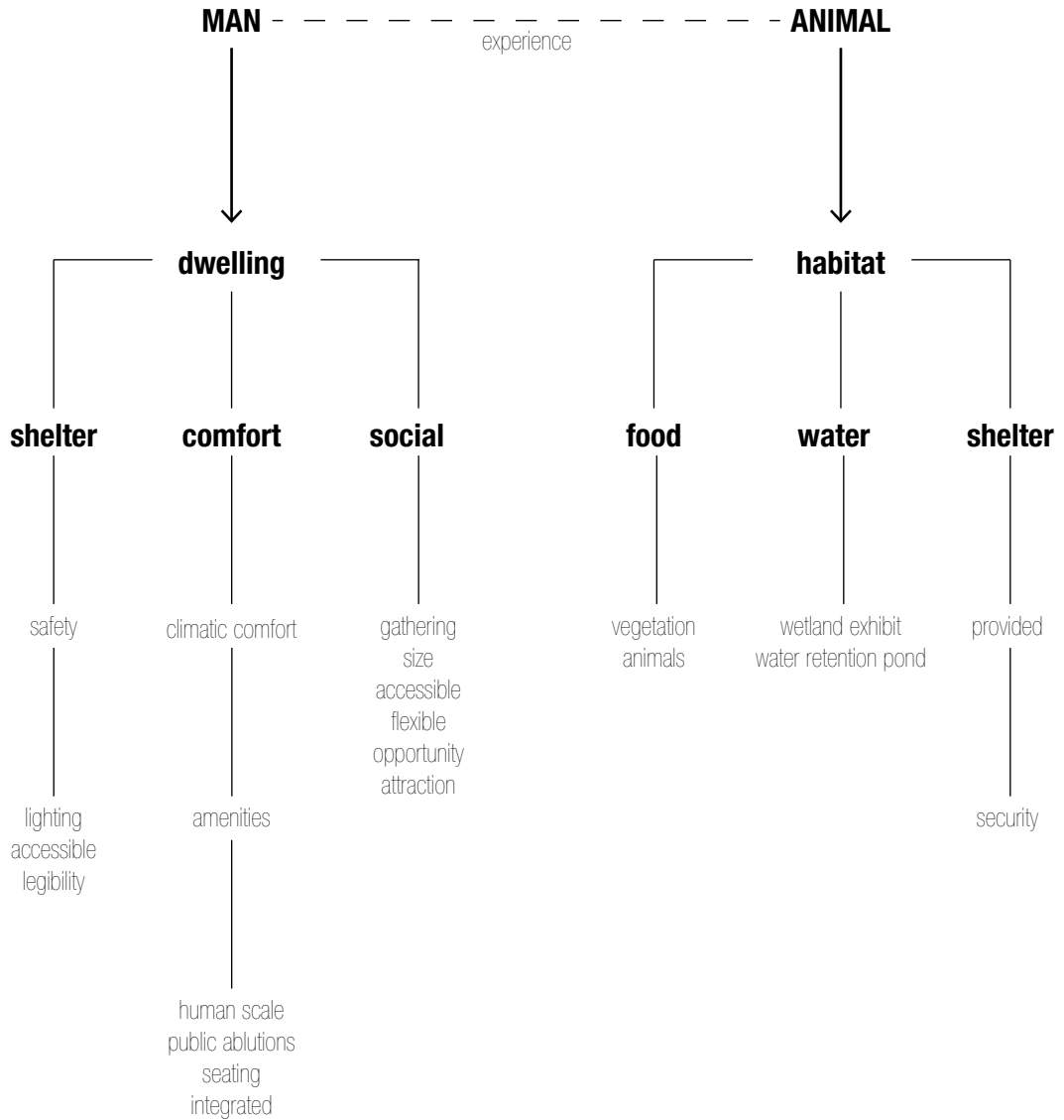
This forms the theoretical baseline for decision-making through the rest of this dissertation. Further theories are explored in the following parts along with the development of design.

design synthesis

Part 5

In brief

Part 5 highlights the design generators and substantiates the decision-making within the theoretical discourse and context of the dissertation



“ Third Nature ”

Figure 5.1 Bird Hide Westgate Park (Designwall, 2012), edited by (Author, 2012).

“The way we perceive animals illuminates our own values, concerns and aspirations” (Belozerskaya, 2006).

The boundaries that man construct to protect or manage species are due to the difference in classification between man and animal. John Berger (2009) identifies Descartes, the French philosopher, as crucial in defining the relationship between man and animal.

In separating the body from the soul, Descartes immediately limited the laws of physics and mechanics to the body. Since most religions advocate that animals have no souls, animals were reduced to the definition of a machine. This differentiation between man and animal is still evident in the current paradigm.

Dobzhansky (1985: 19) states “...the boundaries of species whereby men sort them are made my man”.

The ability of species to manipulate their surroundings, and the degree to which this manipulation occurs bears ample relevance to the manner in which man regards animal. This threshold between man and animal can be investigated spatially.

Man uses a building as a **dwelling** space. He uses this dwelling to shelter himself from the elements. However, all buildings are not architecture. Only when a dwelling space is formed in such a manner that it becomes more than shelter and actively contributes to the life of the user does it become architecture (Pallasmaa, 2005).

Habitat provides an environment for species in which they can survive. When this habitat is plentiful species will inhabit it for longer periods of time and use it to feed, exist and reproduce in (Oxford University, 2012).

The intervention proposes architecture that simultaneously provides dwelling for man, in the form of public open space, as well as habitat for species, a “Third Nature”. This architecture creates a condition where various boundaries start to be blurred.

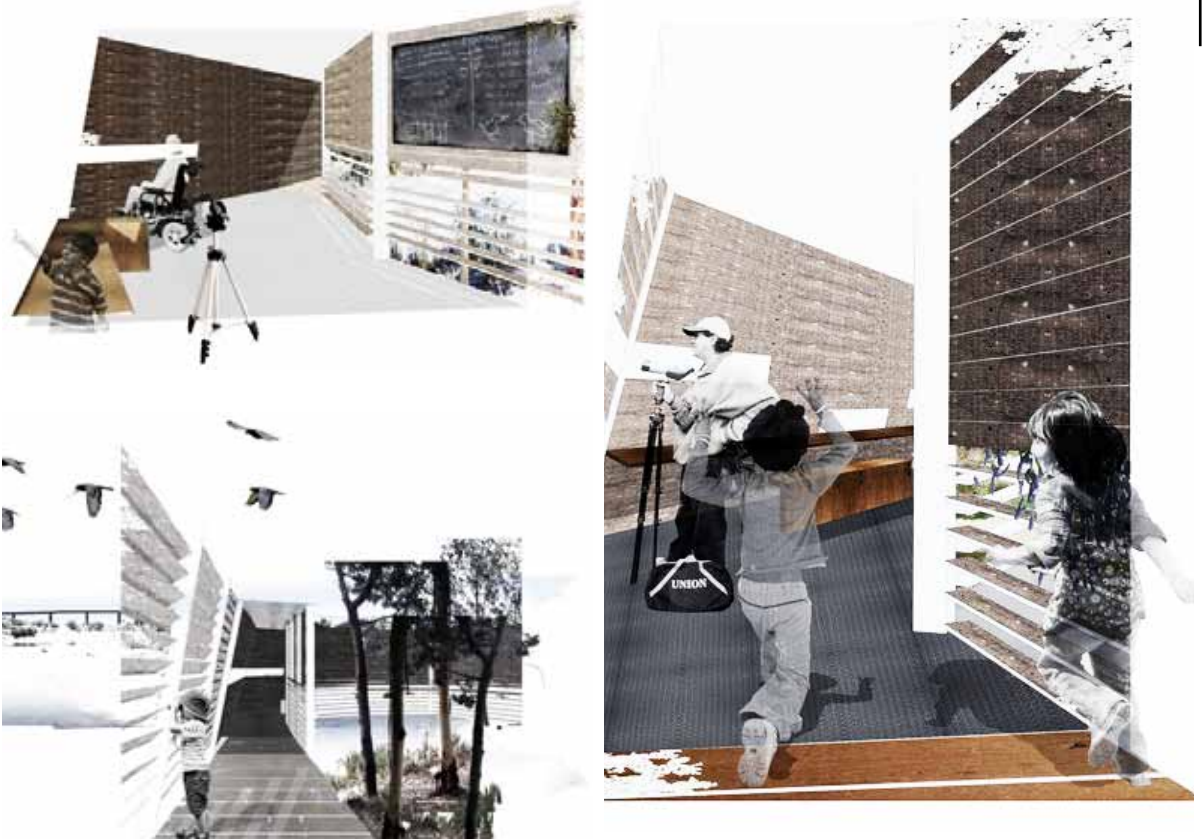


Figure 5.2 Bird Hide Westgate Park (Designwall, 2012), edited by (Author, 2012).

There is no longer such a rigid threshold between Zoo and city. Species will start to inhabit the urban spaces as there is provided for this to take place. The intervention institutes an “unzoo”; an animal inhabit as structure where it can be observed by man. However the intervention is designed in such a manner that it reveals and conceals the Zoo to the gratis user that the line between observer and the observed becomes very ambiguous and in the end is open to the interpretation of the user.

While the Zoo responds to its surroundings it gives back to the city, creating public spaces along its boundary.

This becomes a situation of give and take where both parties benefit.

Precedent

Bird Hide Westgate Park

Architect: MAKE Architecture

Status: Un-built

The park is situated in Industrial Melbourne. It is a former waste land that has been transformed into a prosperous ecological and recreational wetland environment. A bird hide is proposed on the freshwater lake to address the lack of purpose-built bird watching facilities.

Forming a new section of the established pathway system, this bird hide is born as a balustrade, grows to a screen as the bank angles away beneath the user, and encloses as it extends over the water. An impression of enclosure is created, only once inside the hide is the potential of observing is realised. The gradual transition from open to enclosed space is elaborated by the subtle increase in the angle of the louvres as the user approaches. Issues of disturbance are addressed subtle as the hide maintains open sight lines on the user side, while providing concealment on the bird's side (Designwall, 2012).

Relevance

The precedent was selected for its programmatic function as provider for interaction between man and animal within an urban condition. It aided the investigation of elements in architecture that are manipulated to fulfil more than one function. The manner in which elements are used to either reveal or conceal was studied.

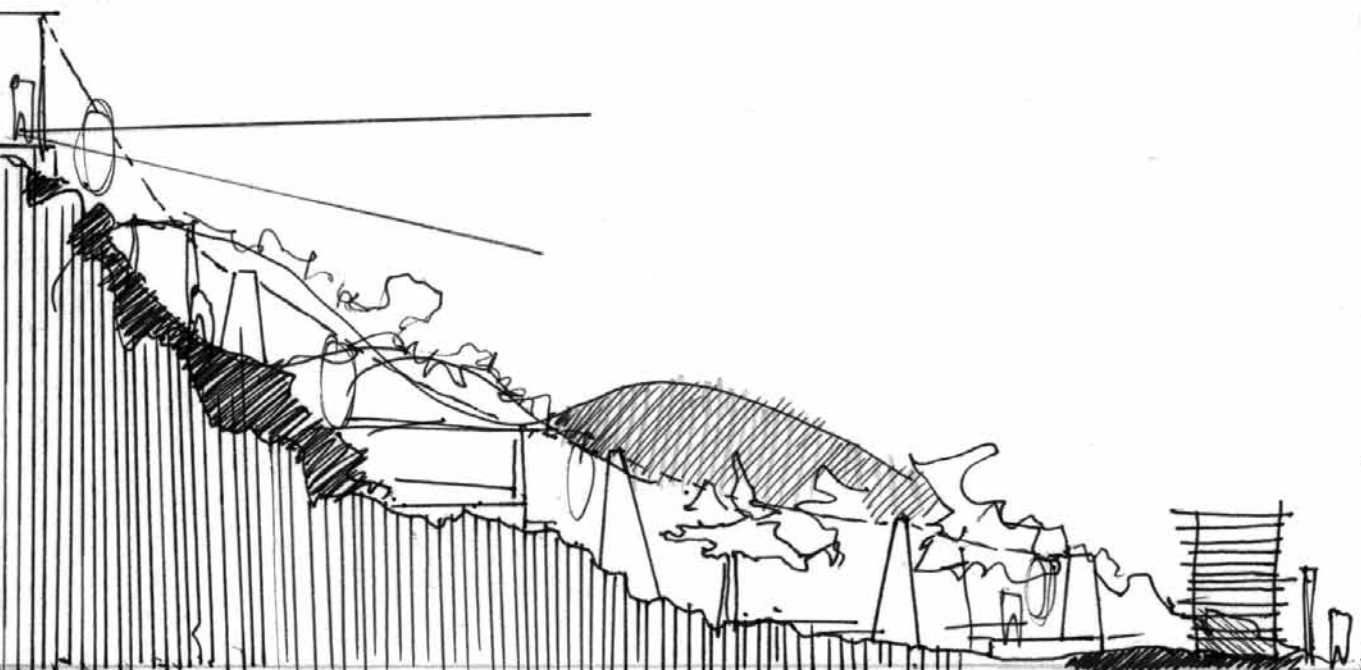


Figure 5.3 Conceptual drawing of the site within its urban condition (Author, 2012).

5.2. Spatial Manifestation of Theoretical Thresholds

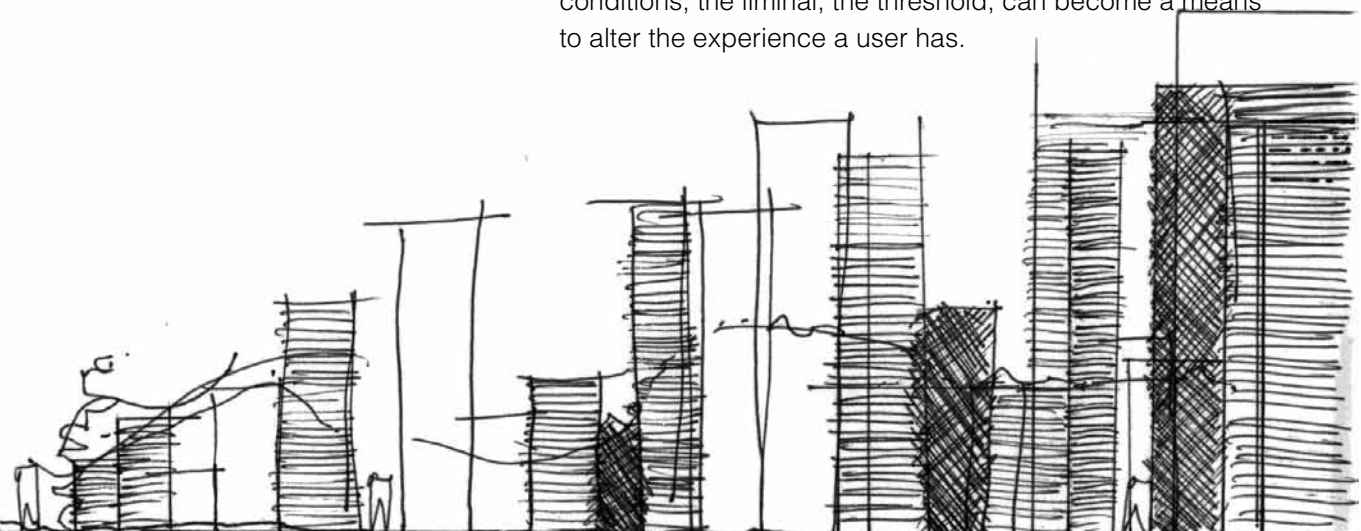
The main objective of the dissertation is to investigate existing boundaries and project that forward by challenging the typology of a boundary.

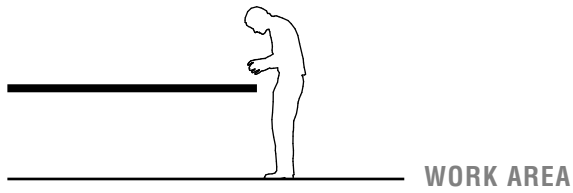
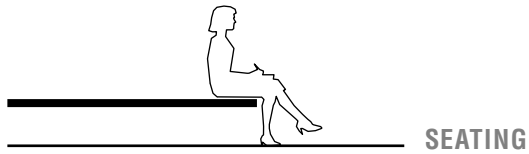
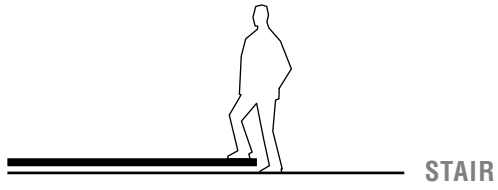
Grounding the theoretical discourse within the context leads to the exploration of three different threshold conditions.

1. On an urban scale the site is caught between different worlds. It has to respond to its surrounding context while still maintaining an identity of its own. The intervention has a responsibility at this scale to mediate the vibrant, informal Marabastad to the west with the mono-functional commercial to the east while acting as transition between the high urban density of the CBD to the south and the low density residential area to the north. In a north-south direction the intervention should announce one's entrance into the CBD.

2. On a site scale the intervention needs to mediate the threshold between the Zoo and its surroundings. An analysis of this boundary consists of two conditions, namely the boundary and the interface. The boundary is a monotonous prefabricated concrete fence. A fence is a structure intended to separate two entities from each other. Thus, creating a "them-and-us" scenario. An inside and an outside.

3. On an intimate scale the threshold between observer and the observed is investigated. The manipulation of these conditions, the liminal, the threshold, can become a means to alter the experience a user has.





REVEAL AND CONCEAL

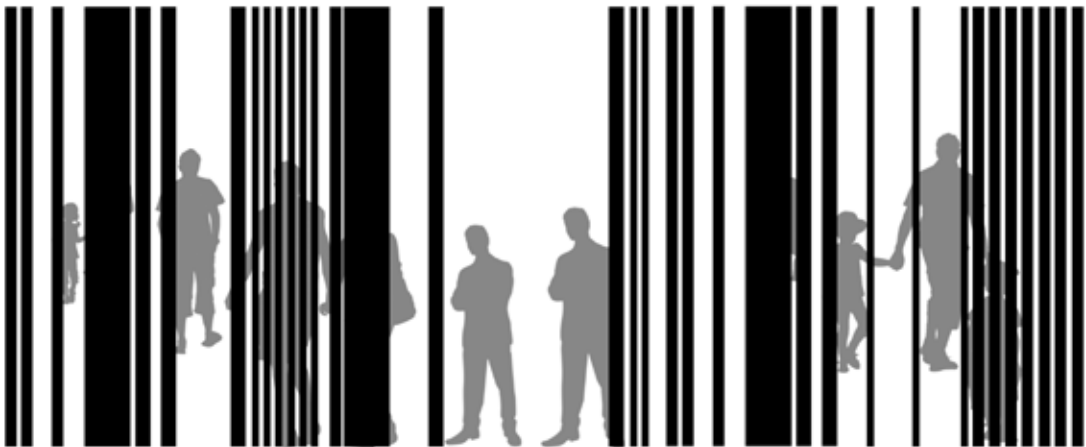


Figure 5.4 Conceptual understanding of planes and the users perception of function (Author, 2012).

5.3. Proposed Manipulation of Thresholds

The ground is manipulated to form a new boundary condition that allows for interaction between the city and the Zoo. The boundary condition changes to vary the interaction between moments of 'glimpse' and 'reveal'. The boundary continues to function as a fence in the sense that it restricts free movement over the boundary, thus serving in its primary purpose without obstructing interaction, be it visual or physical.

This manipulation of the boundary allows for the intervention to vary its responsibility to the city, thus contributing to public open space and the Zoo, adding to its identity and the experience it offers the user.

This variation between thresholds creates the blurring of boundaries and the redefinition of the boundary condition.

5.4. Spatial Manifestation of New Thresholds

Architecture can be explored as a series of planes.

Point marks position in space. It has no mass at all. A point can be an insignificant speck or a heavy anchor. A mass of points become a texture (Ching, 1996: 4).

Line is a series of points. A line is the connection between two points, it has length. A line can indicate direction or connection (Ching, 1996: 9).

Plane constitutes a flat surface that has a certain height and width. Planes define space. Architecture can be defined as the determination of space (Ching, 1996: 18).

The conceptual idea of the manipulation of the ground manifests itself as a series of raised planes. Landscape is expressed as active surface, structuring the conditions for new relationships and interactions.

Man perceives his use of planes according to the relationship thereof to his own body. Through means of these planes and man's relationship to each of them a series of spaces can be created (Pallasmaa, 2005: 7).

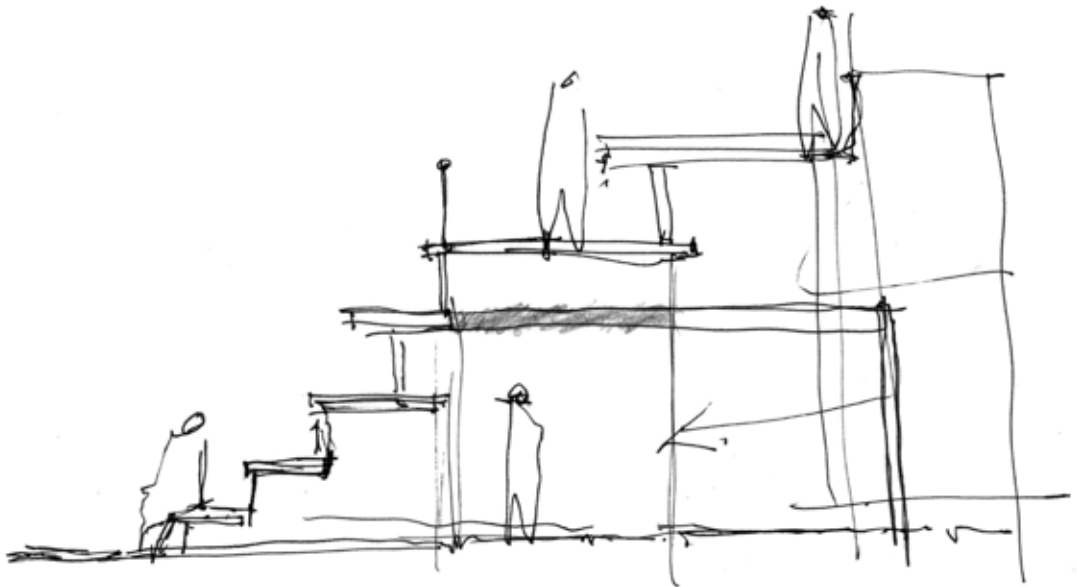
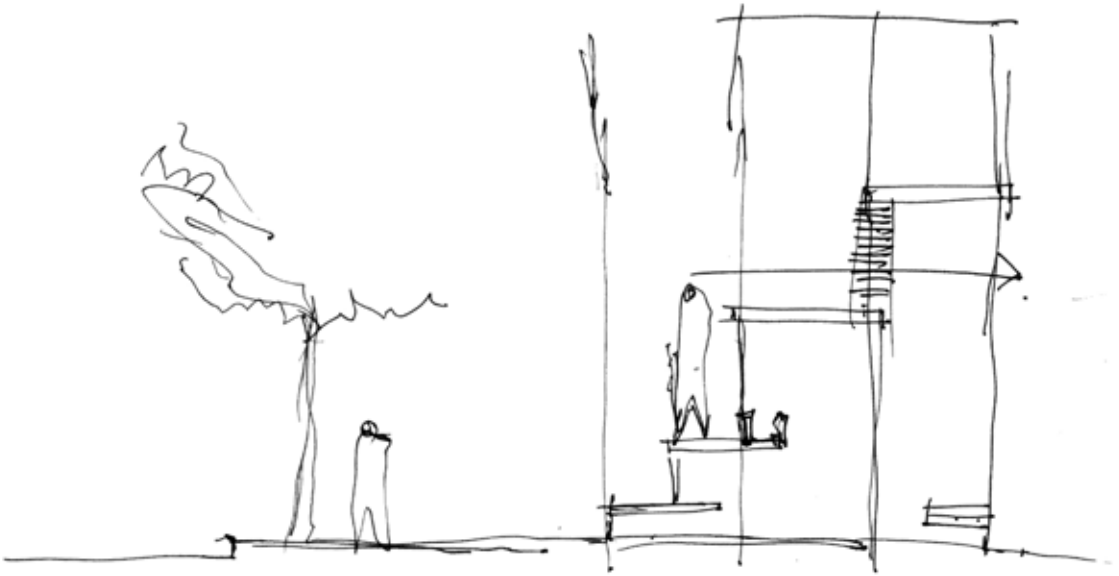
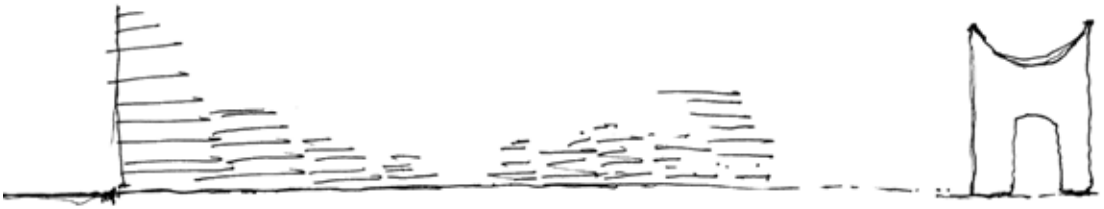


Figure 5.5 Exploration of the series of vertical planes, stairs, as a dual space (Author, 2012).

The boundary creates a sequence of thresholds for the user to explore. The planes should facilitate the boundary to become a mediating space between man and animal.

This mediation causes the boundary to become a narration of time; this will be executed by means of material, planting selection and species attraction.

Man will be made aware of this relationship between himself, animal and time. The weathering of the materials. The changes the planting undergoes temporally; according to season. The behaviour and life-span of species. This constant reminder of time, which in essence is movement, gives form to the series of planes.

These series of raised planes, that form the intervention, is not designed for users to ascend or descend, but rather for them to linger and just be.

A stair provides the opportunity to act as an entity with a dual interface. To one side acting as a means of exploration as one move up and is able to view more, while providing a sheltered space beneath it.

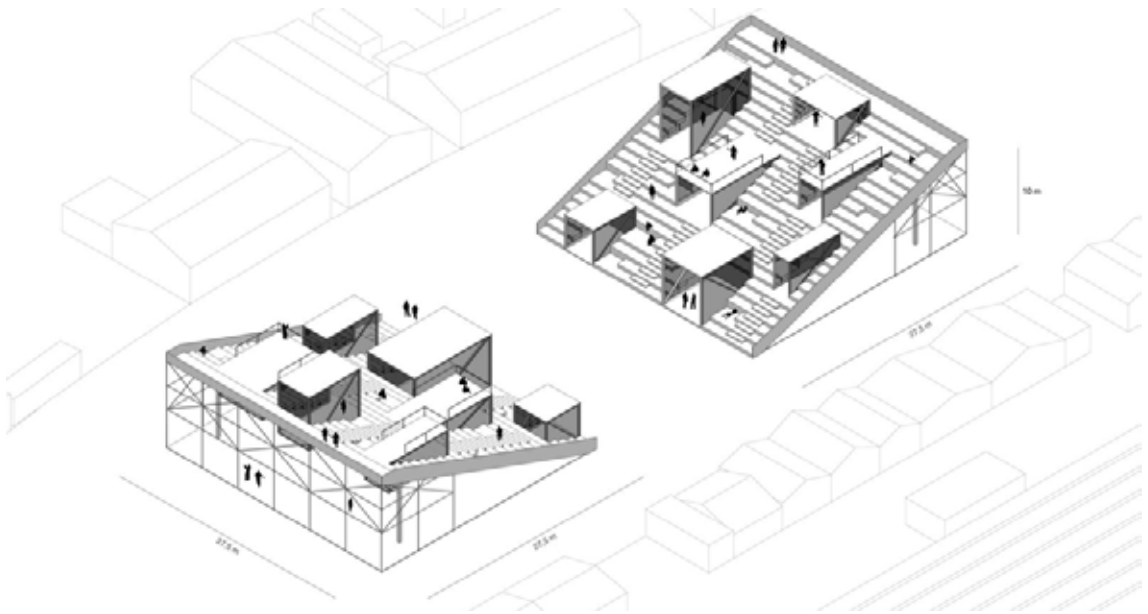


Figure 5.6 'Why Don't We Do It On The Stairs?' project (Vinnitskaya, 2011), edited by (Author, 2012).

‘Why Don’t We Do It On The Stairs?’

Architect: Re-Make / Re-Model

Winning proposal for the Danish architectural design competition ‘Build What Here?’

Status: Built

The intervention poses an open and flexible concept providing a variety of spaces to accommodate all sorts of activities throughout every hour of every day but is primarily designed for the Roskilde Music Festival. The strategy is multifaceted. Firstly the intervention provides seating, constructed from re-used plywood with scaffolding as structural support. This structure offers dual space as well as the different orientations allow the user to choose whether to sit in the sun or in shadow all throughout the day. A sheltered seating area is created under the stairs. At night this space turns into a dance stage (Vinnitskaya, 2011).

Relevance

The precedent was used as a method to envision a stair structure as a dual space.

design development

Part 6

In brief

Part 6 explains the development of the site in two parts.

Firstly, the fence along Paul Kruger Street is conceptually explored as a new topology.

Secondly, the Zoo entrance interface along Boom Street is developed to masterplan scale².

² Refer to Part 1.6 “Delimitations”, page 16.

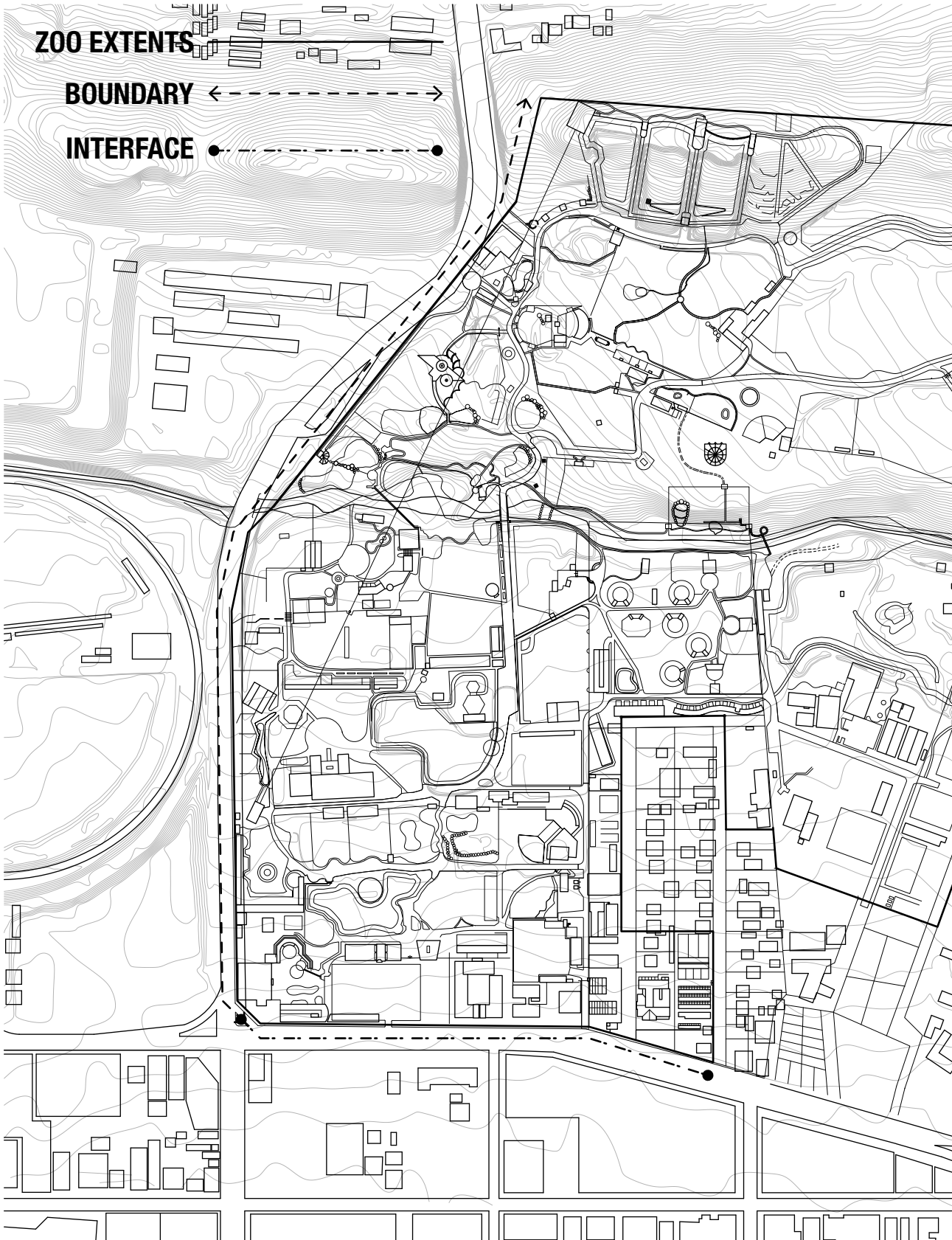


Figure 6.1 Plan indicating different parts of the site (Author, 2012).



**“A proper building grows naturally, logically,
and poetically out of all its conditions”.**

Louis Sullivan (Frederick, 2007: 17).

Figure 6.2 Photographic study of Zoo boundary (Author, 2012).







STATUS QUO EDGE CONDITION



CONCEPTUAL EDGE CONDITION

Figure 6.3 Exploring the Boundary (Author, 2012).

The dissertation identifies the spatial possibility of the boundary between the Zoo and its surrounding to be more than a fence but rather a threshold.

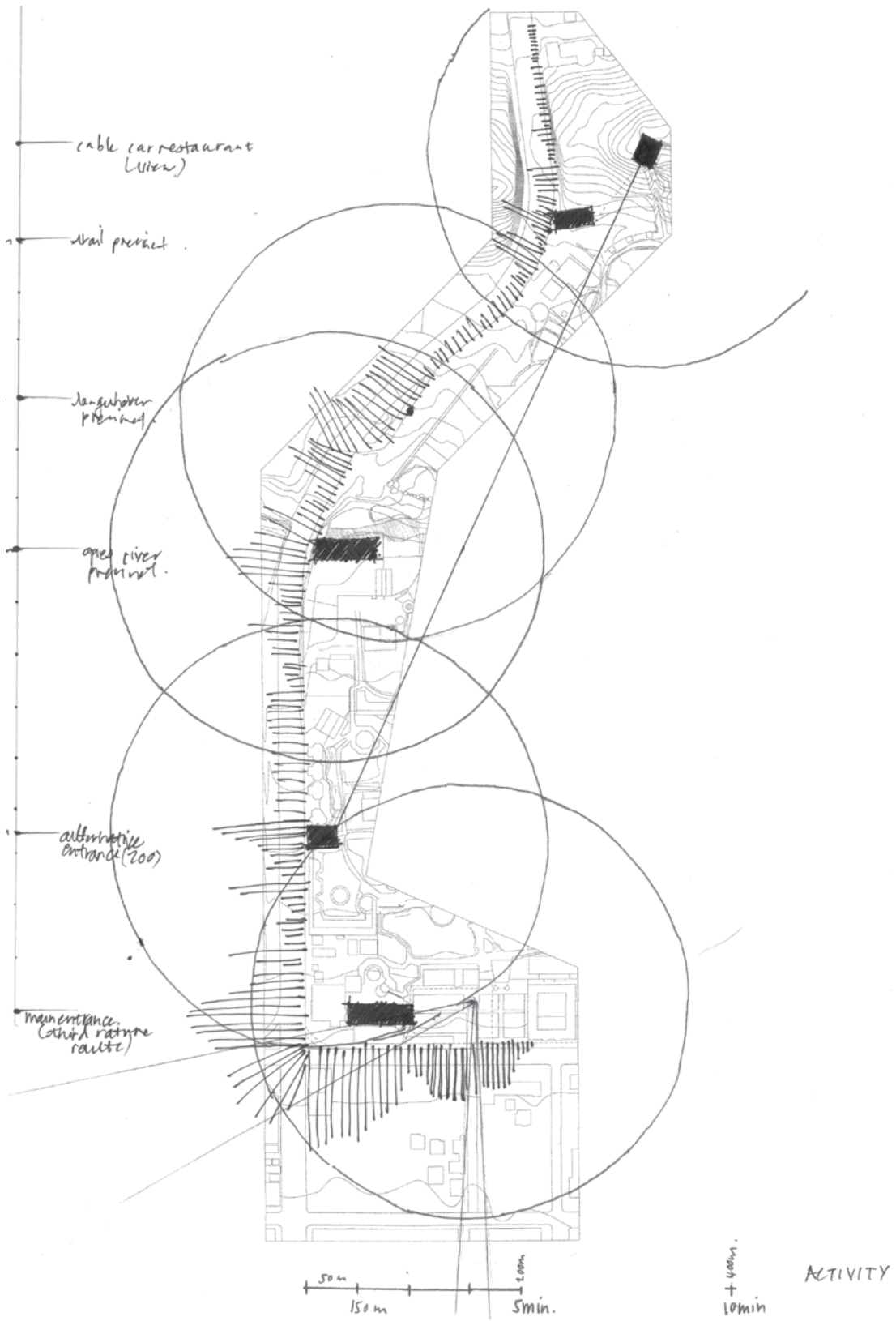


Figure 6. 4 Exploring the nodes of activity on the boundary (Author, 2012).

Pretoria proclaimed a town 16 November 1855

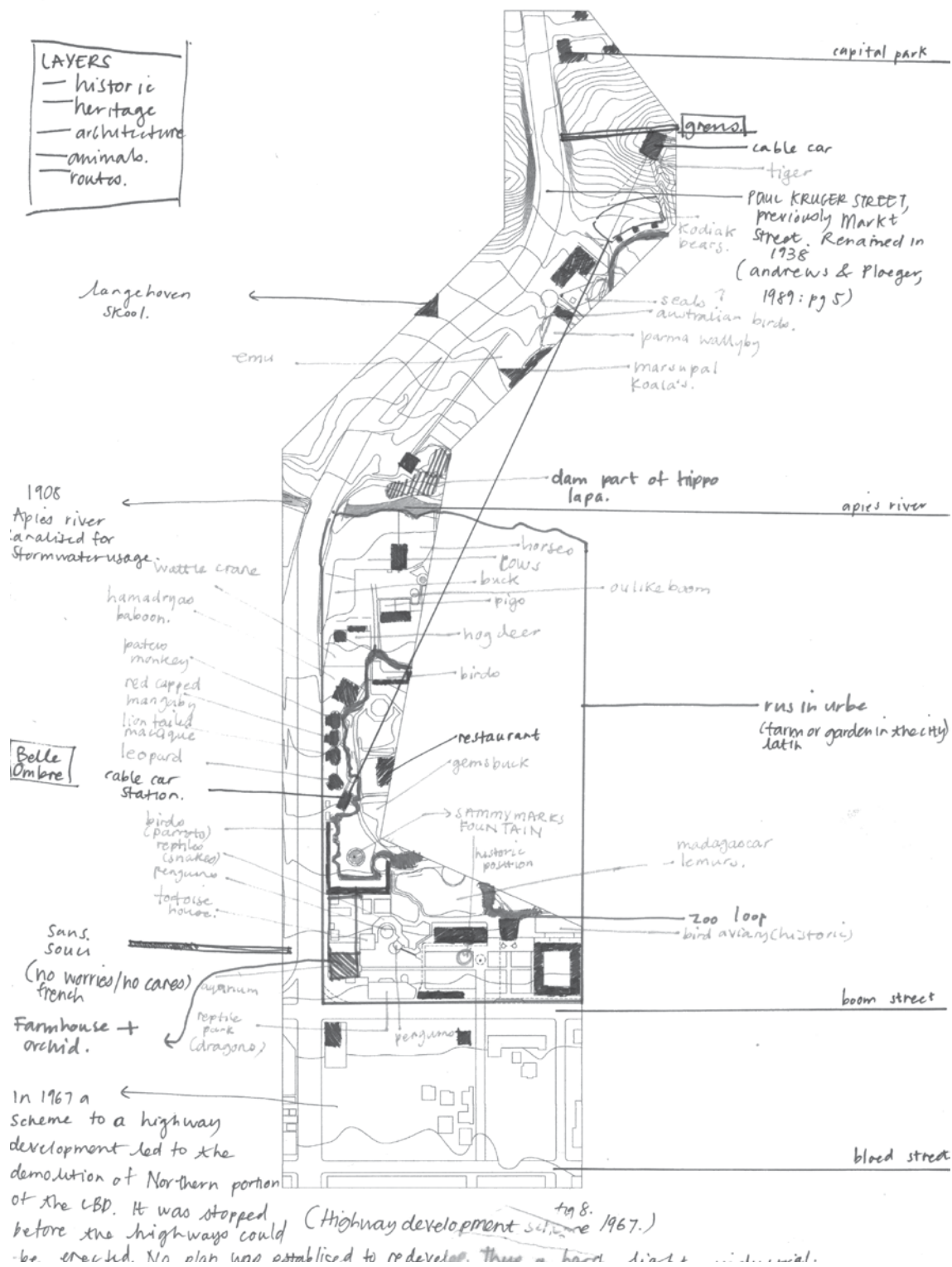


Figure 6. 5 Exploring the edge condition on the boundary (Author, 2012).

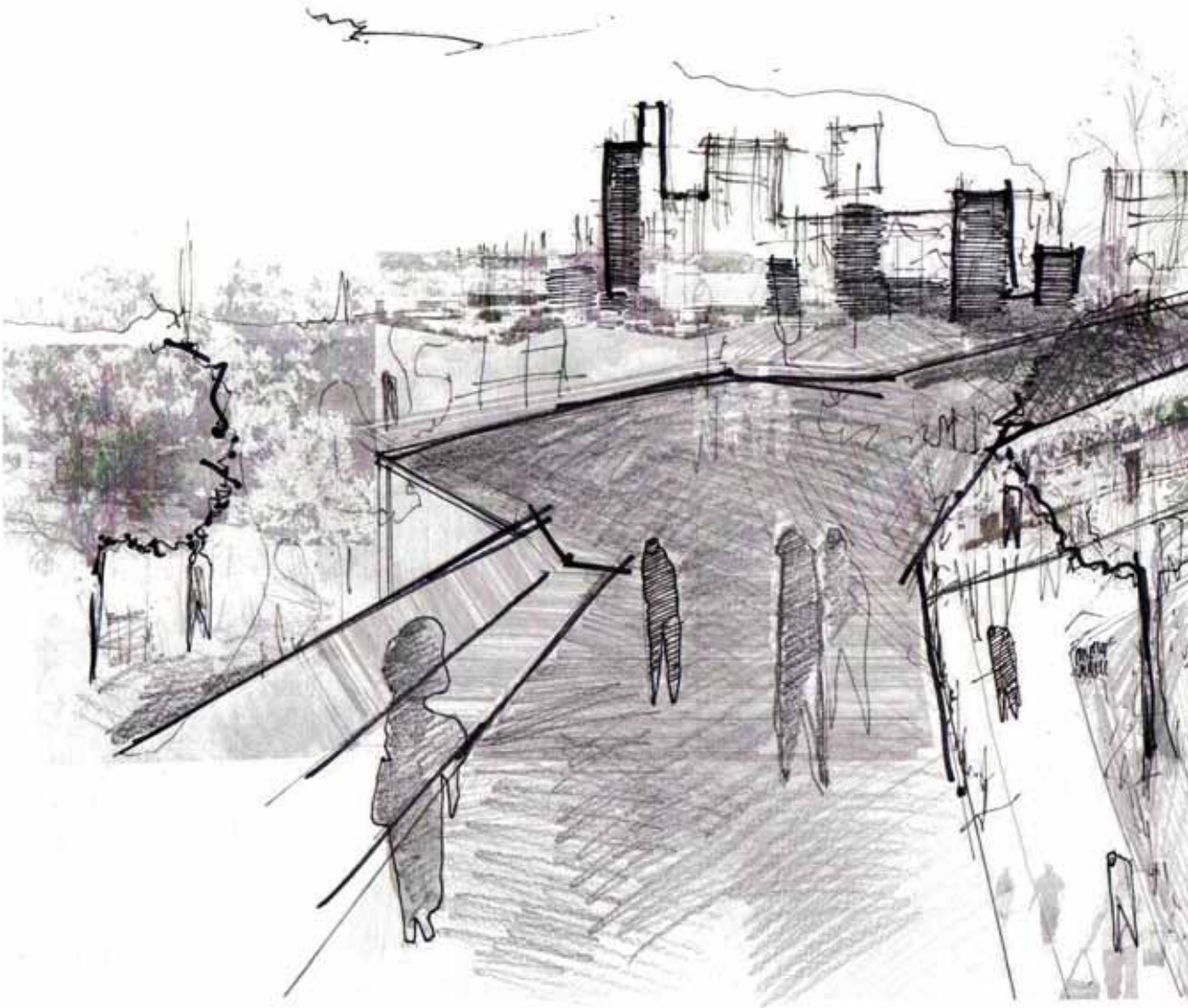
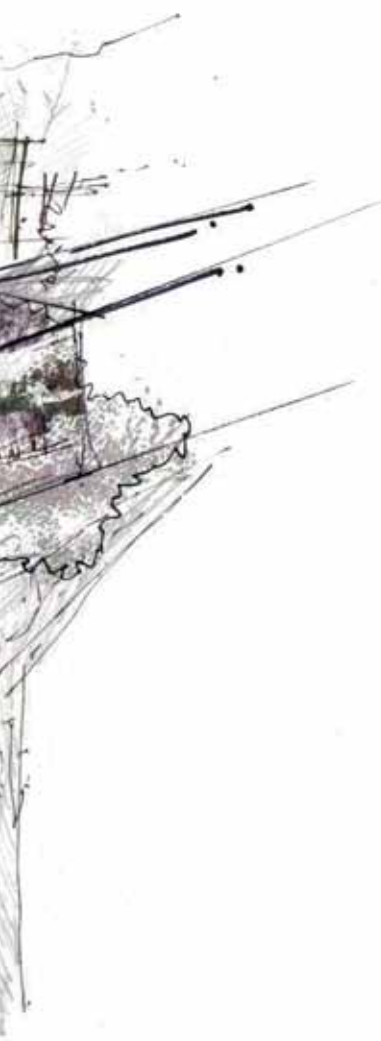


Figure 6.6 Conceptual drawing of the Gratis Observatory Route (Author, 2012).

This physical boundary becomes an interactive skin between the Zoo and the pedestrian activity. . The skin consists of different interlinked spaces. The thresholds between these spaces become vital, to establish a hierarchy among the functions. These spaces manifests as a route. This route intentionally becomes the horizontal exploration of the existing vertical fence. The habitable fence-like structure, establishes a route that will offer “gratis” interaction between the user and animals as well as a created habitat for animals; synanthropic species. The architecture attempts to redefine the typology of a fence as boundary condition.

During this exploration, refer to Figure 6.7, two types human users where identified. The first type of user, the coincidental user, refers to the everyday pedestrian passing by on street level. The second type of user, the intentional user, refers to an individual that made an active decision to visit the Zoological precinct as he is intrigued by the animals. These users are currently present.

The dissertation proposes that the Gratis Observatory Route, which replaces the existing fence, can grow from these principles. Providing the coincidental user with functions on ground level that will aid pedestrian activity. However, the intentional user will mainly be catered for on a level raised from street level. This gives the route the opportunity to offer vistas into the Zoo. However points of connection between these levels will occur along the edge, providing the individual the opportunity to move between user types.



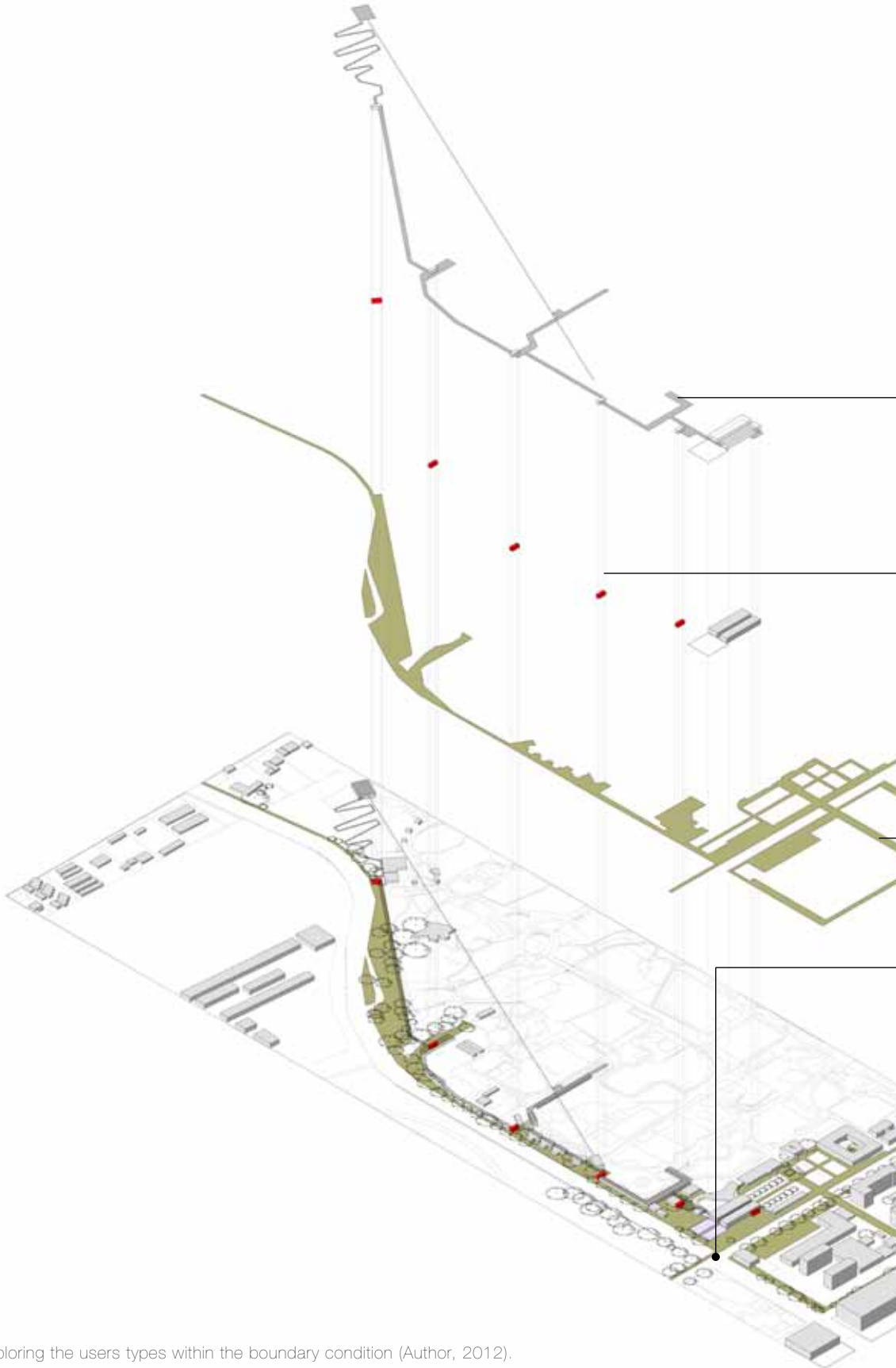


Figure 6.7 Exploring the users types within the boundary condition (Author, 2012).

user type 2 - intentional
- the intrigued individual

facilitators
- forming the connection

user type 1 - coincidental
- the everyday pedestrian

Paul Kruger - and
Boom Street Intersection



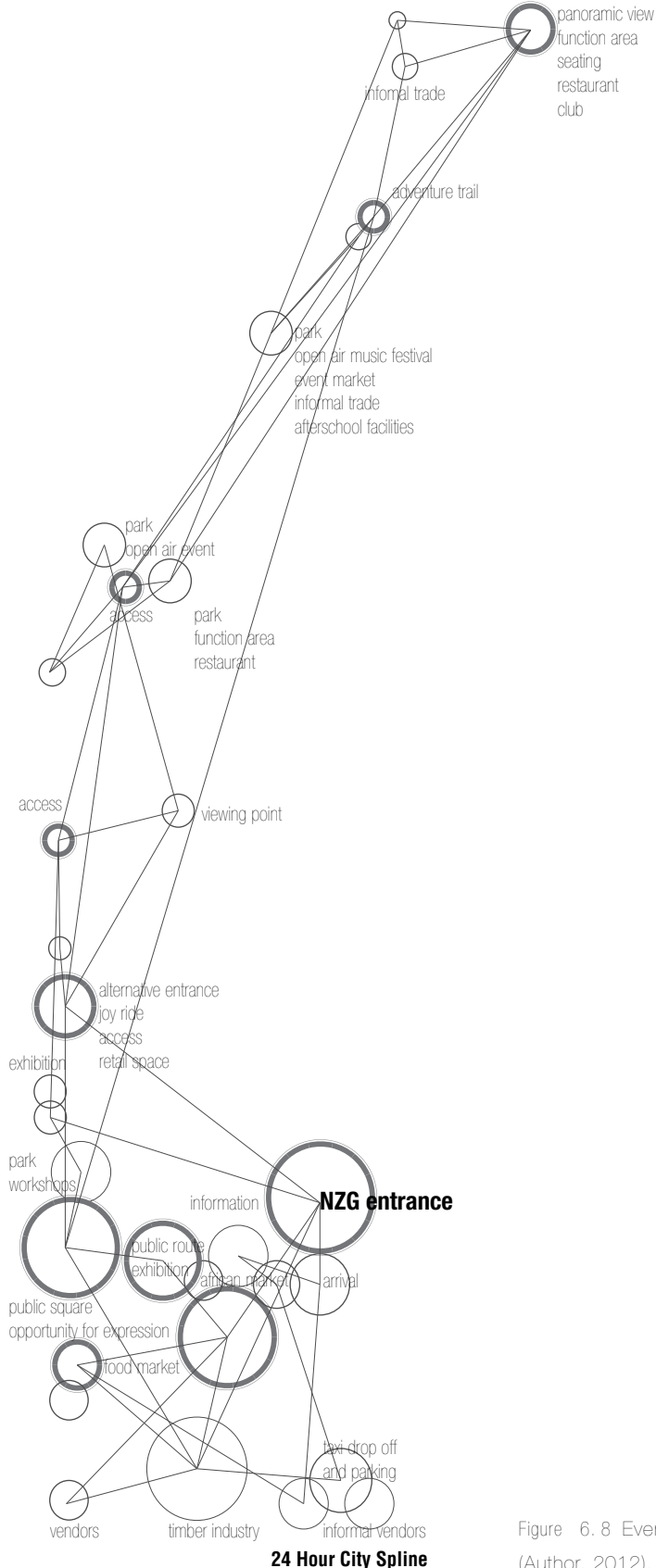
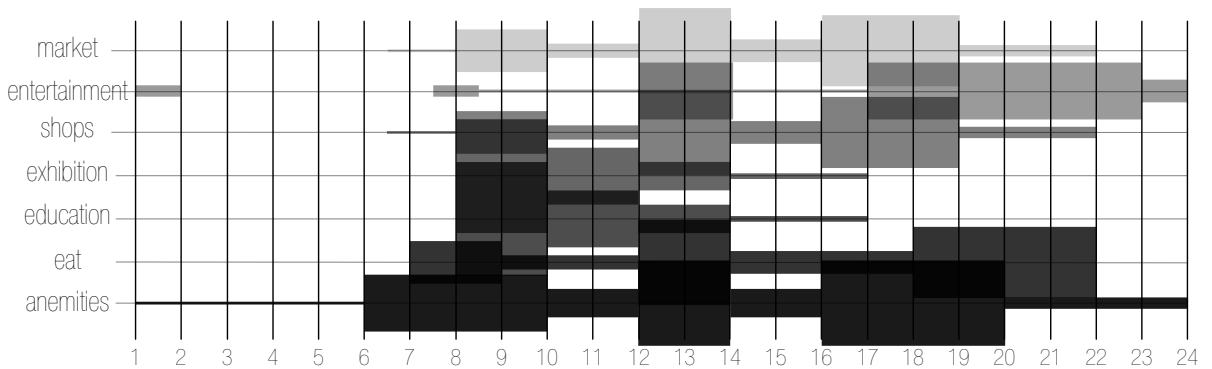


Figure 6.8 Events on the boundary
(Author, 2012).

The various urban conditions along the boundary was investigated, these conditions form spontaneous nodes that leans towards certain programmatic possibilities. These diverse nodes give rise to the chance of a 24 hour active spline.



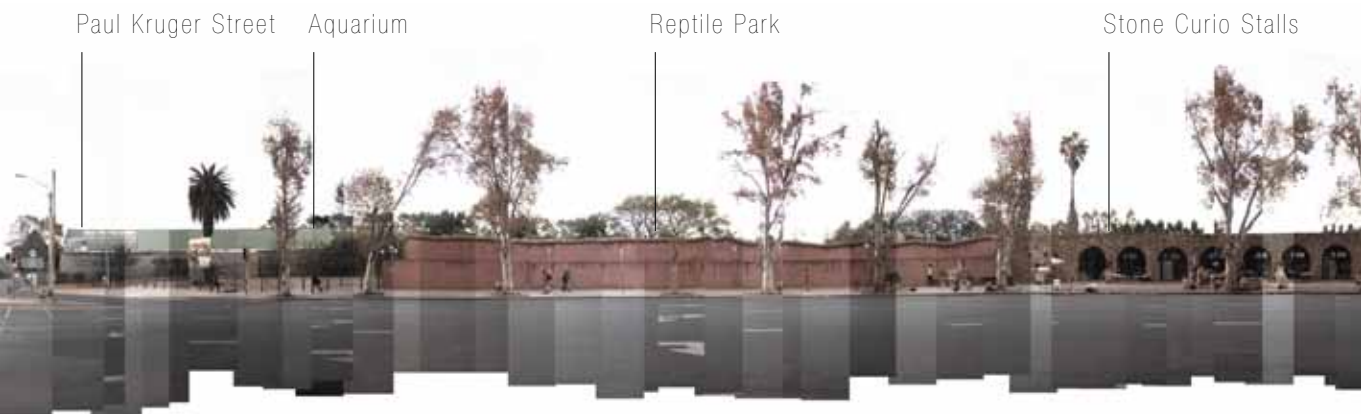


Figure 6.9 Existing interface along Boom Street (Author, 2012).

The conceptual intention is developed to an intervention. Focus is placed on the intersection of Paul Kruger – and Boom Street.

This corner represents an important place, a landmark in the city as the northern gateway to Pretoria CBD. This urban significance will be expressed as an urban gathering point, encouraging a strong public interface and pedestrian activity on street-level.

Layers explored through time in space within the context of function and programme is discussed.

The Paul Kruger – and Boom Street Corner

The existing aquarium does not provide public interface, and allows little opportunity for alteration, by means of program and construction. This structure will be demolished and the programme will be relocated.

The existing reptile park can be defined as a negative element as an entity. The building was designed and built as a fence, turning its back on the street. It completely lacks public interface and acts as a visual- and symbolic dividing factor between the city and the Zoo. The aesthetics of the building are foreign to its surroundings and negatively impacts on the architectural character of the Zoo. This structure will be demolished and the programme relocated.



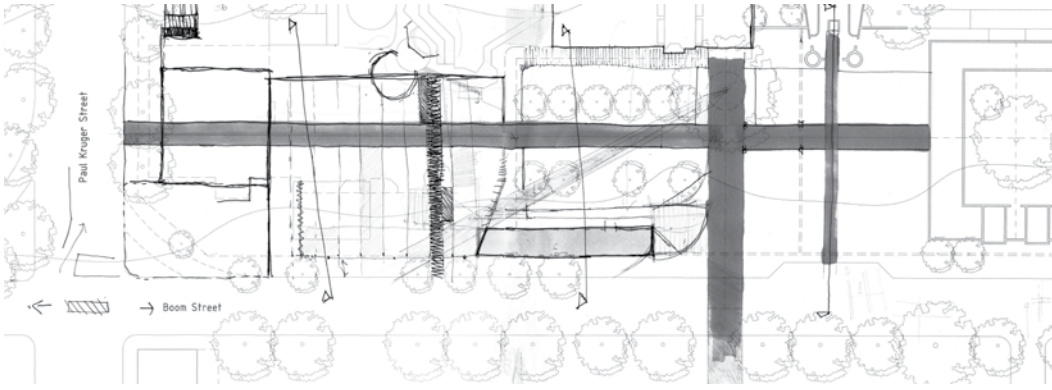


Figure 6.10 Conceptual plan addressing connectivity and linkages on the site (Author, 2012).

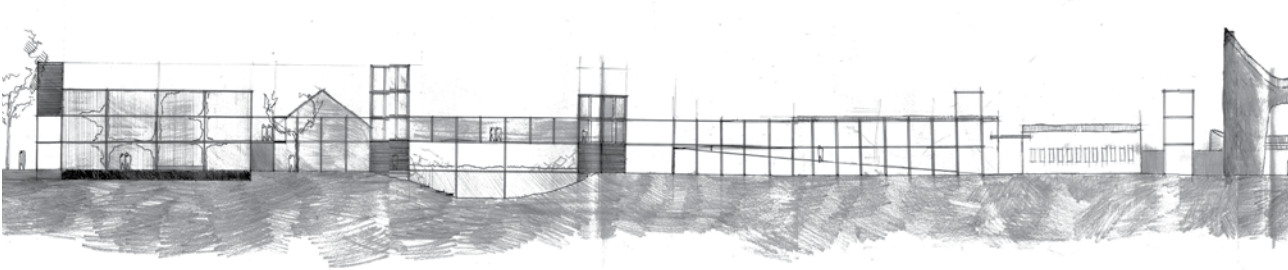


Figure 6.11 Conceptual interface intervention (Author, 2012).

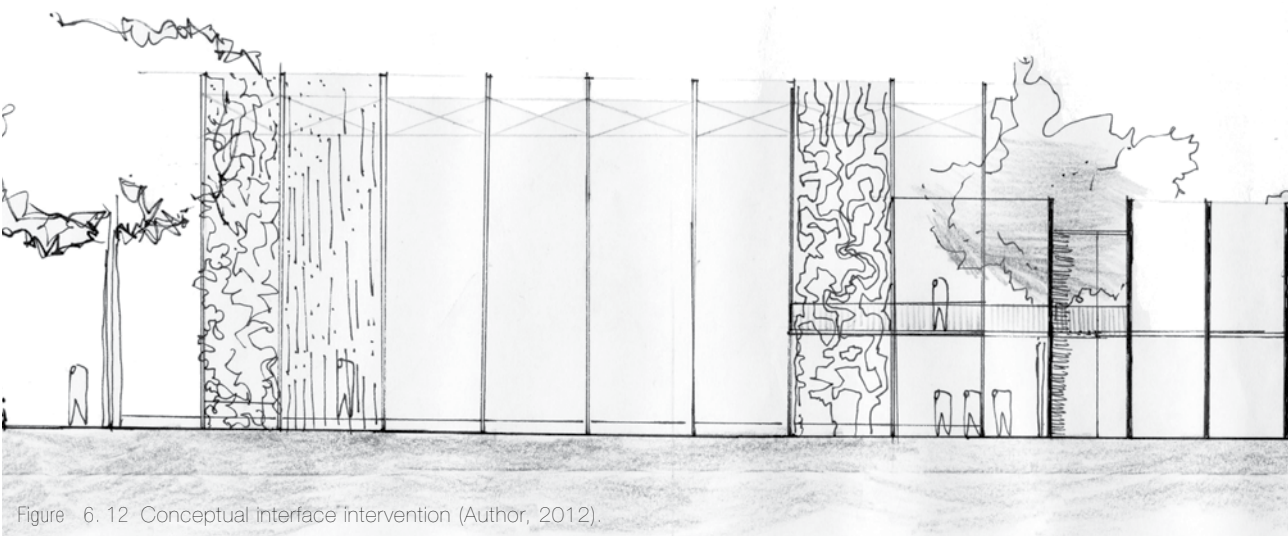


Figure 6.12 Conceptual interface intervention (Author, 2012).

Comprising the Frank Brand Administrative - and Entrance Buildings, are retained through their original use in the design intervention. These buildings are set back from the street quite significantly providing the opportunity for much needed public open space within the area.

Even though the Entrance building cannot adequately accommodate large numbers of patrons due to it being used as a two-way entity this building has a strong presence on site. To improve this congestion the Central Information cubicle within the entrance building will be removed to re-appropriate this building functioning as an entrance only. A new exit structure is proposed adjacent to the entrance building.

Reptile Exhibit

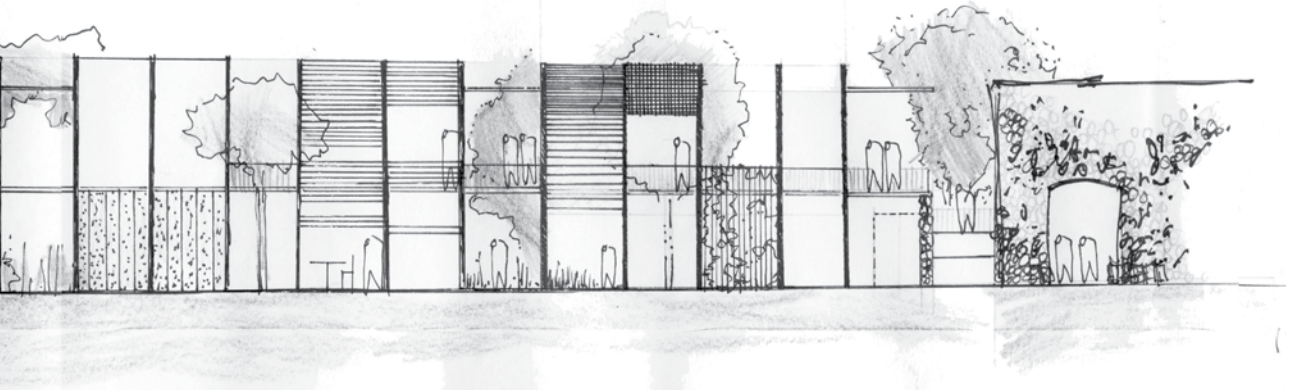
The snake and reptile exhibit holds opportunity for later upgrade, but is not addressed in this intervention. Due to the fact that it is a currently well-functioning building in terms of program and circulation it will be retained as-is for the time being.

Existing Curio Stalls

The exact date of completion of these stone-walled buildings is not clear. The structure adds aesthetic value and character to the street front of the Zoo whilst supporting informal trade. Additional workshops will be established to the north of the structure.

Tortoise Enclosure

The tortoise enclosure is retained in function and position. The low stone walls and lightweight gum-pole roof structure also compliment the stone construction character which is associated with other areas of the Zoo.



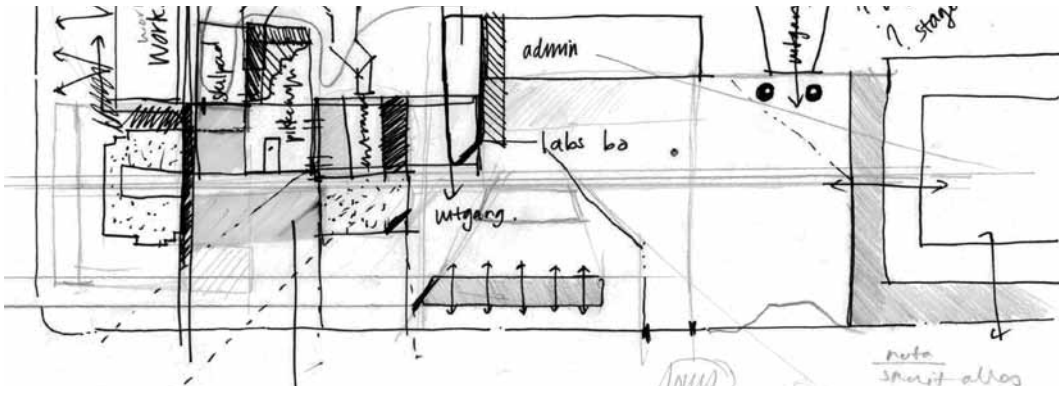


Figure 6.13 Conceptual plan (Author, 2012).

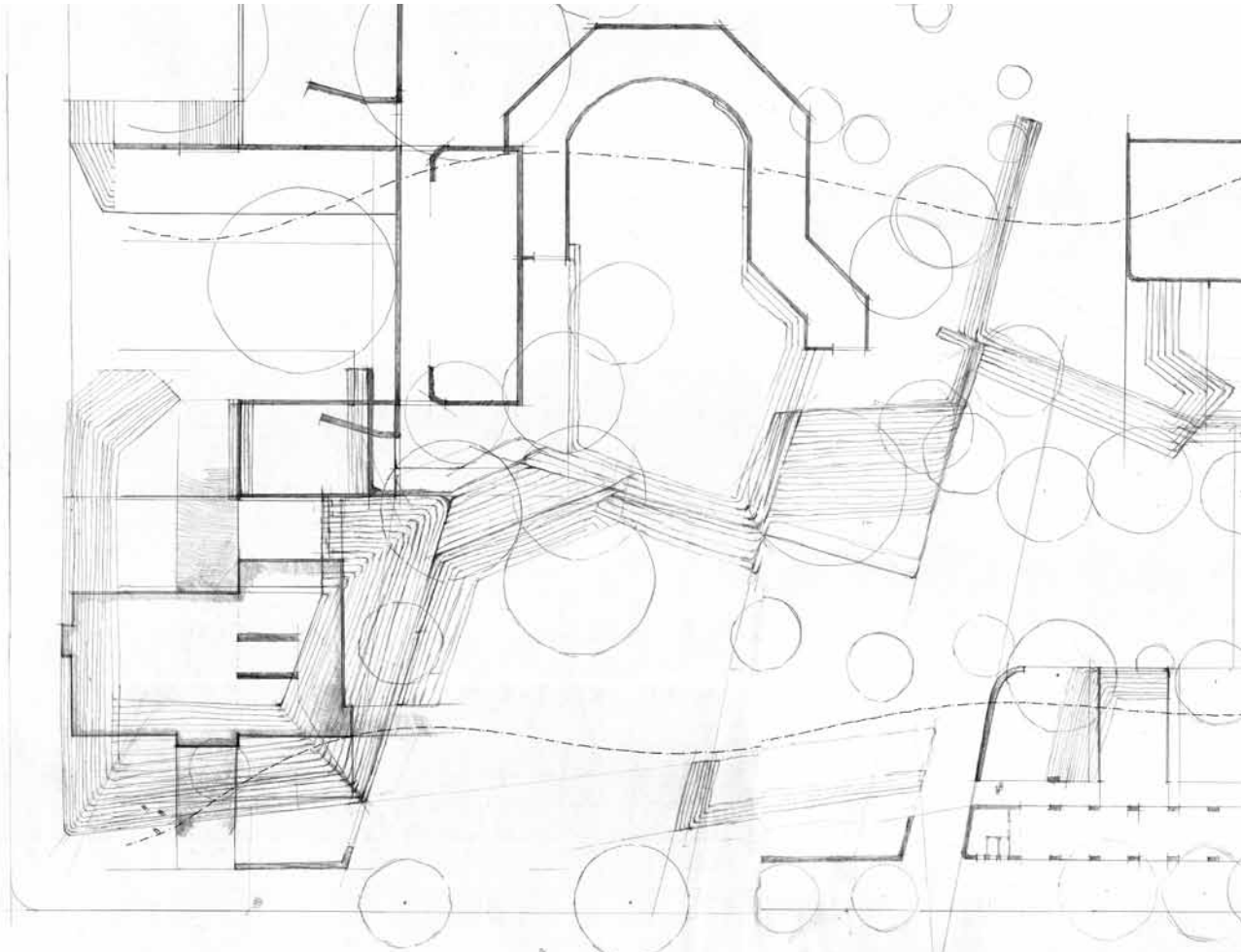
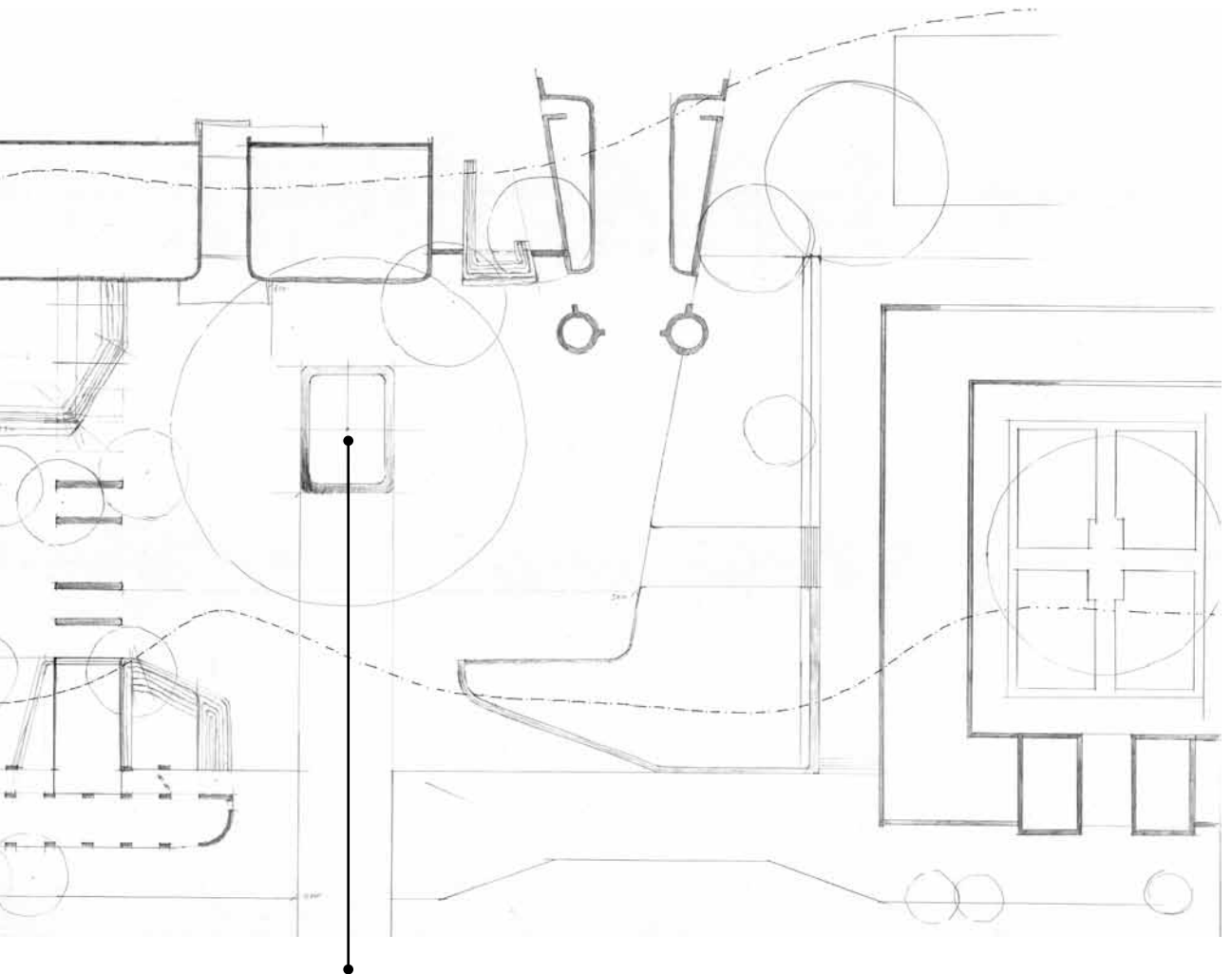


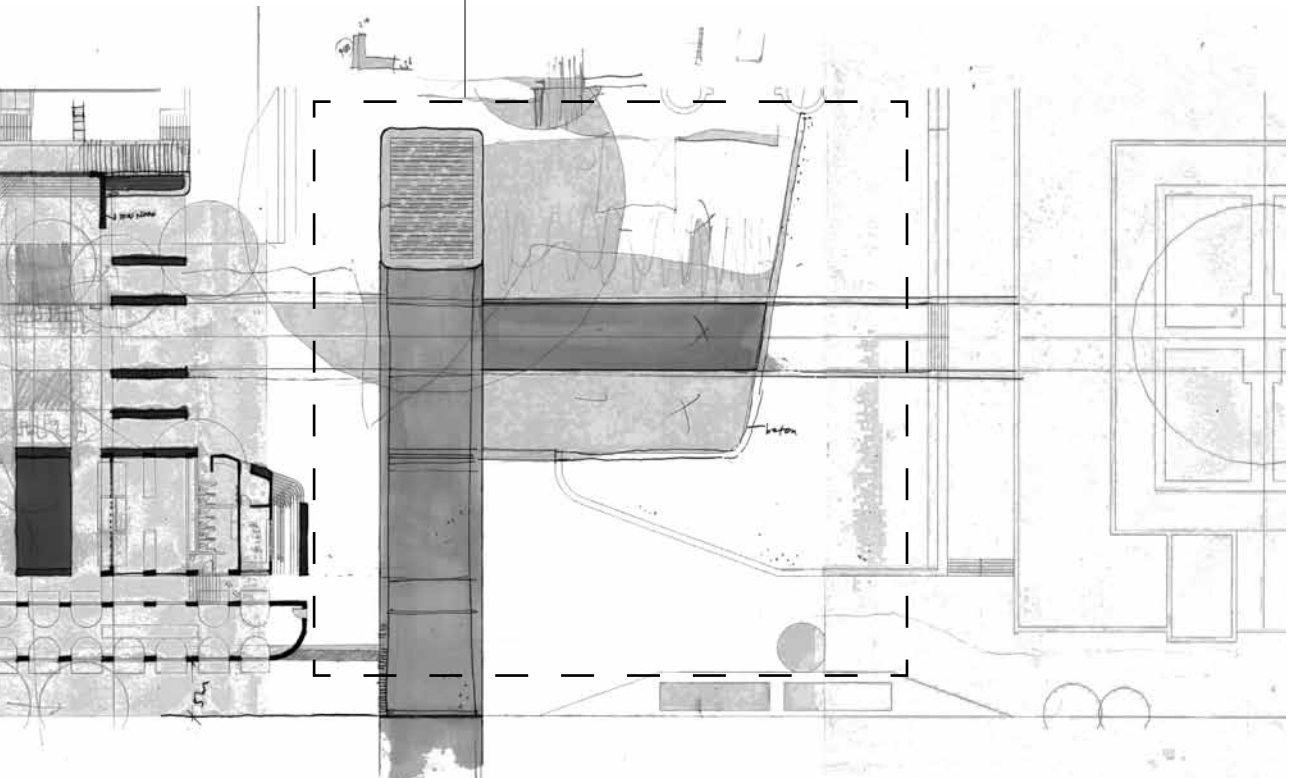
Figure 6.14 Conceptual plan addressing movement and identity on site (Author, 2012).

A pedestrian open-air arcade is proposed in the framework. This arcade will extend across Boom Street designating in the Outdoor "Foyer" against the Ficus tree.



This outdoor "foyer" space will serve as a point of arrival, gathering and departure for all users.

It is essentially a large urban room, housing high-energy pedestrian traffic, and providing access to the Zoo entrance, Gratis Observation Route, Frank Brand administrative building and proposed public spaces



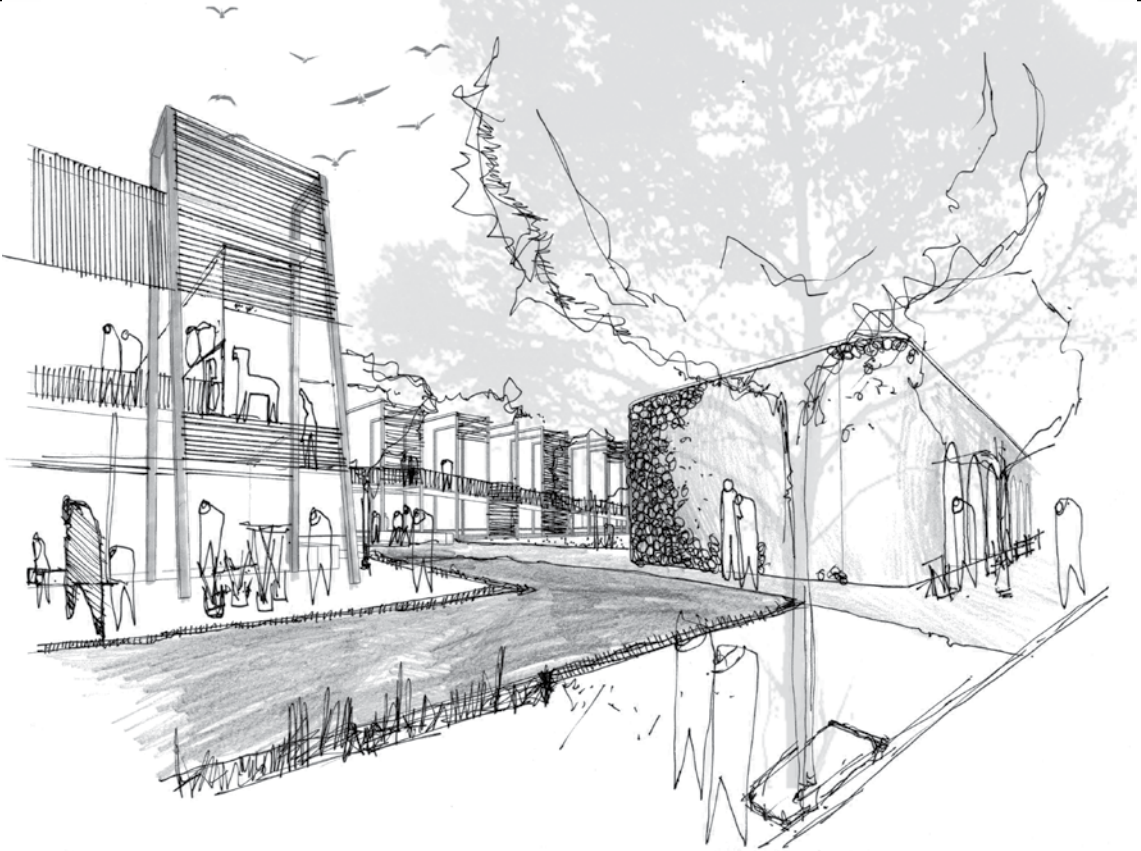


Figure 6.18 Conceptual perspective of street interface of intervention (Author, 2012).

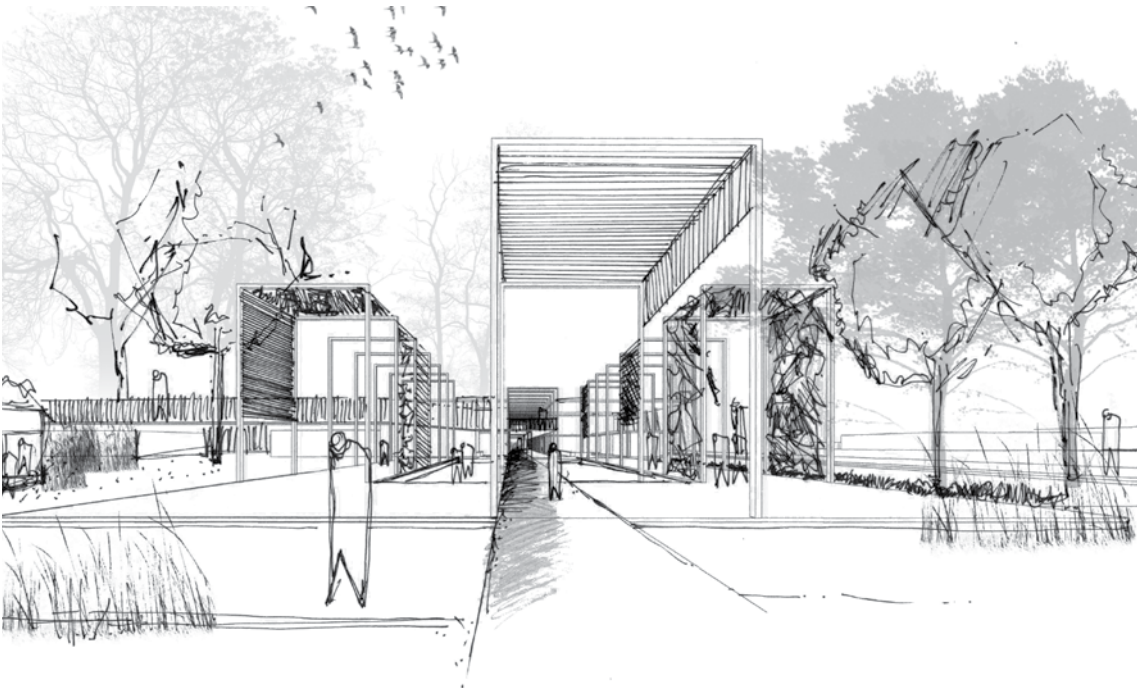


Figure 6.19 Conceptual perspective of Dr. Gunning Park (Author, 2012).

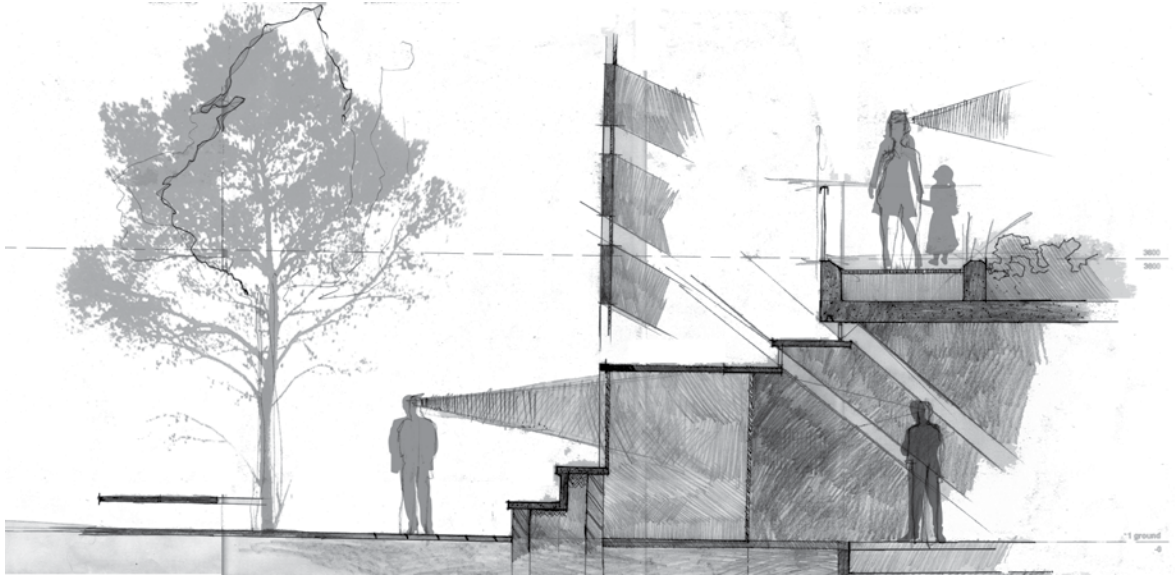


Figure 6.20 Conceptual section through Aquarium and viewing deck (Author, 2012).

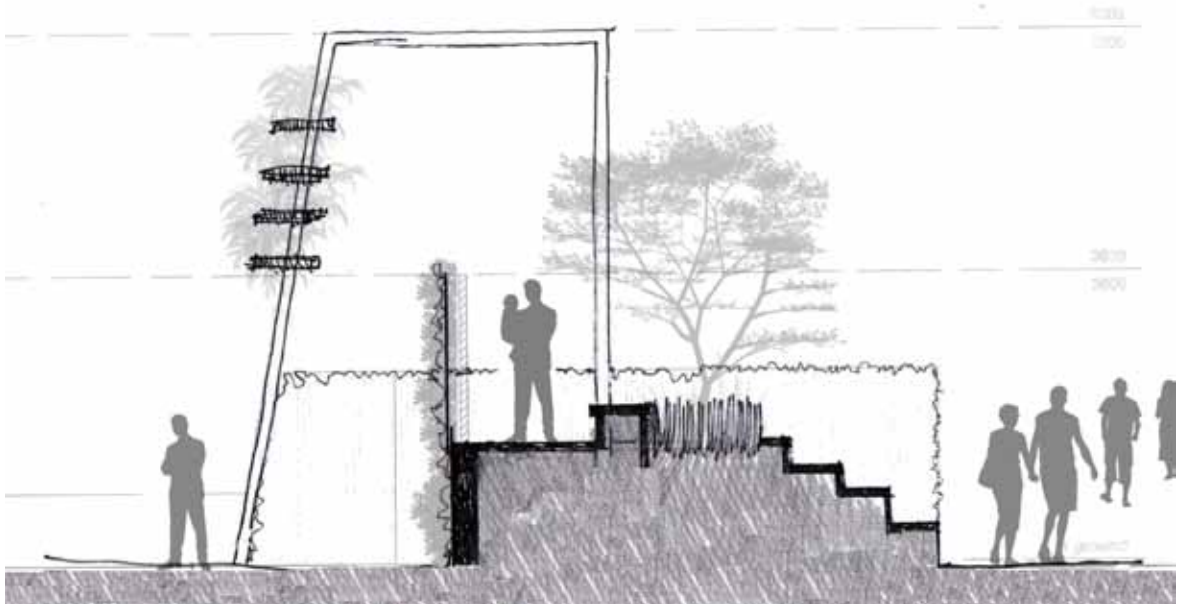


Figure 6.21 Conceptual section the boundary condition the intervention creates (Author, 2012).

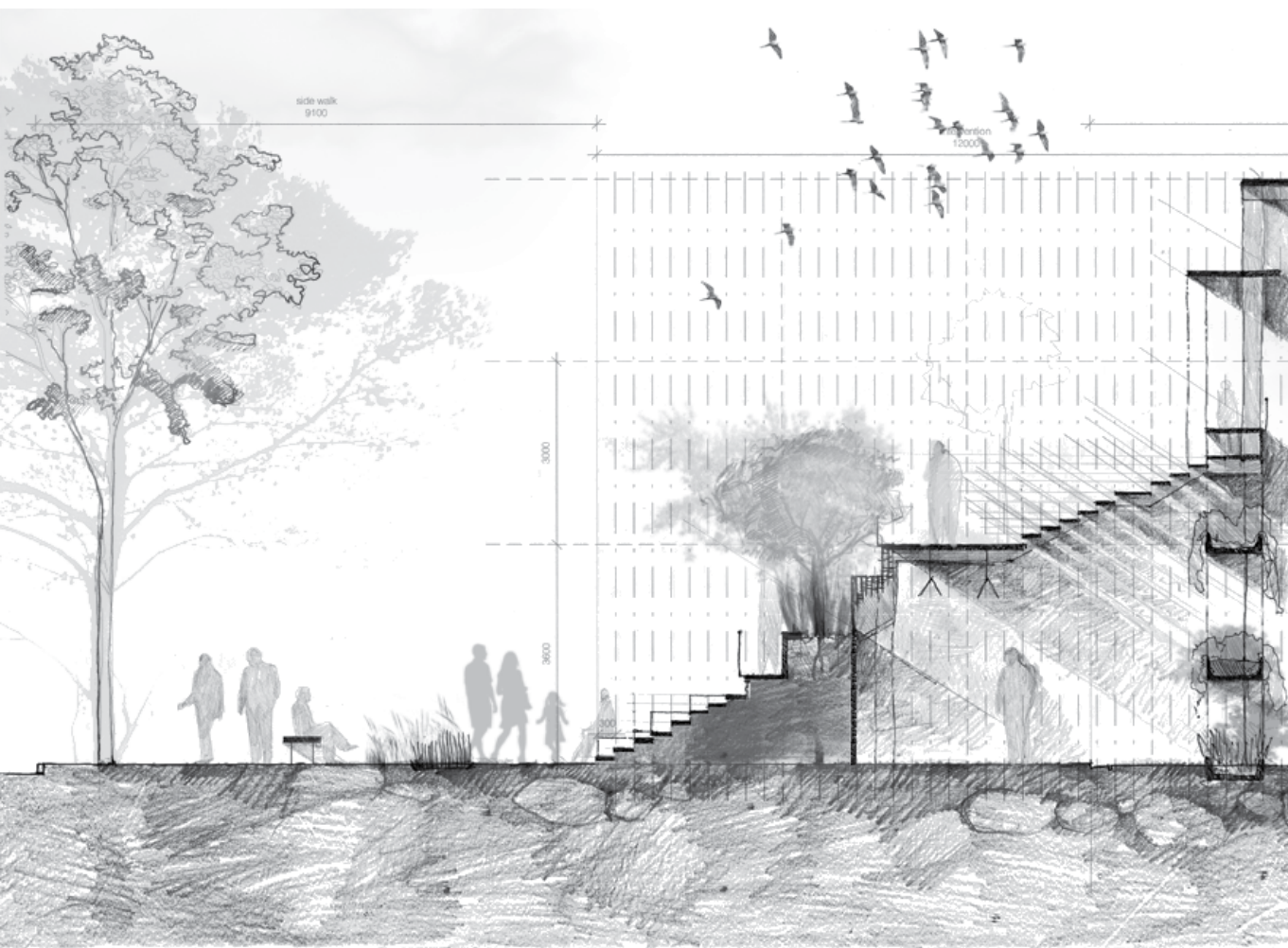


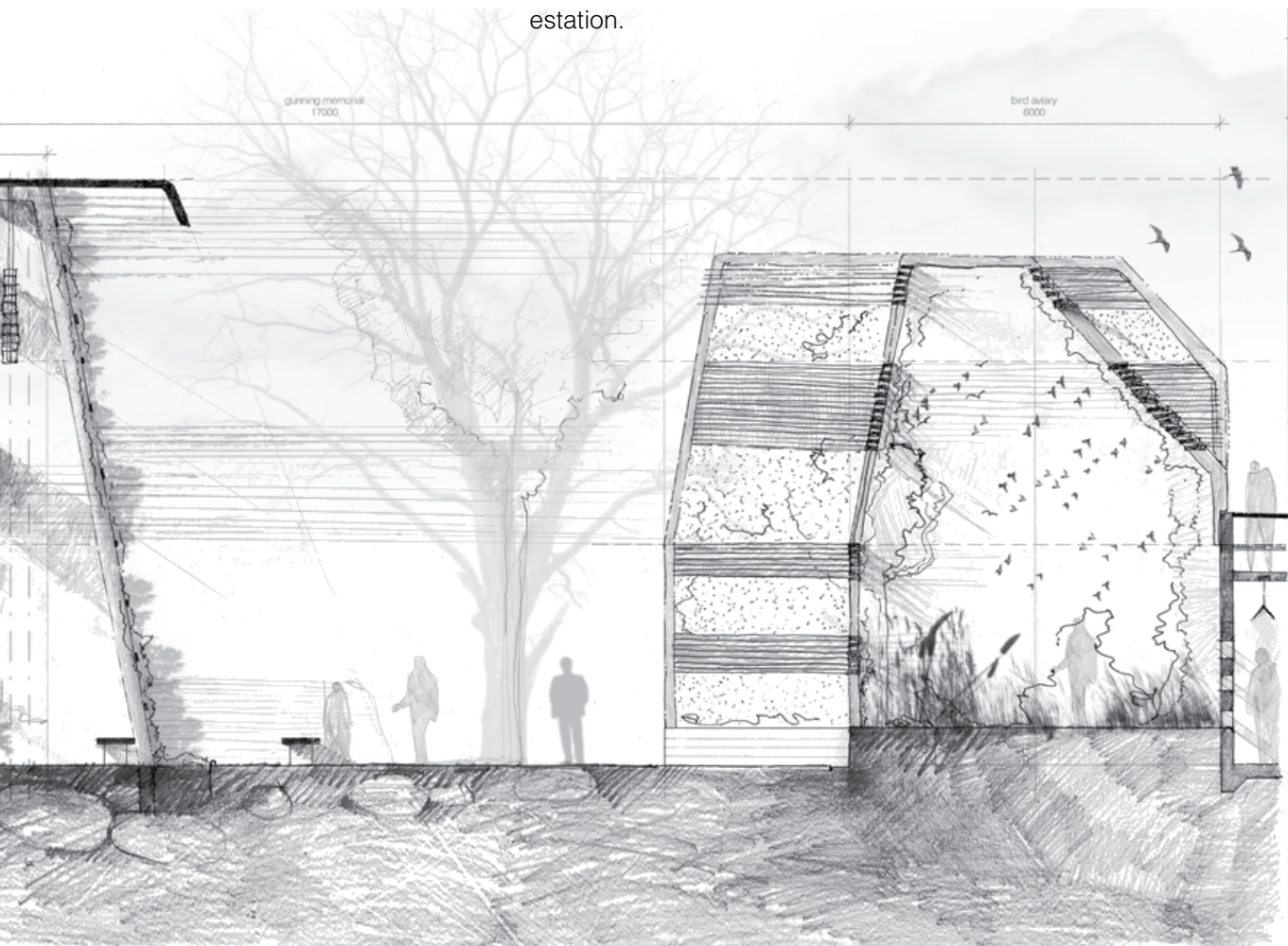
Figure 6. 22 Conceptual section through Dr. Gunning Park and Aviary (Author, 2012).

The park finds its origin in the position of the historic “Rus in Urbe” farmhouse. The residence of Dr. Jan Willem Boudewyn Gunning. The park honors Gunning for his ambitious vision for the development of a world class Zoological Garden within Pretoria.

The park develops from the historic position of the aforementioned farmhouse and fragments east- and northwards.

This structure will envelop and flank the proposed new public open space. This structure will epitomize the premise of architecture of the “Third Nature”, accommodating elements that will act as possible habitats for local fauna and flora.

Within the Dr. Gunning Park, a new exhibit will house *Shepardia gunningi*, or the east coast akalat. This small forest robin which was named for Dr Gunning is now classified as “Near Threatened” due to loss of habitat caused by deforestation.



technical investigation

Part 7

In brief

Part 7 focuses on the technical resolution of the theoretical and programmatic requirements with the context of the National Zoological Gardens of South Africa.

The etymology of the word 'architecture' can be defined by Greek origin as "arkhi" meaning master and "tekton" meaning builder or carpenter. The poetic connotation of the term first appears in Sappho, where the "tekton", the carpenter, assumes the role of the poet (Frampton, 1995: 3). This meaning undergoes further evolution, from something specific and physical, such as carpentry, to a more generic notion of making, involving the idea of "poesis" (Frampton, 1995: 4).

Adolf Heinrich Borbein remarked in his 1982 philological study; architecture and more specifically "tectonics becomes the art of joining's" (Frampton, 1995: 4). 'Art' here is to be understood as encompassing "tekne", and therefore indicates tectonic grouping not only of building parts but also objects, indeed artworks in a narrower sense.

However, architecture can and should be so much more.

Frampton (1995) strengthens this argument by the position that "architecture is also construction; a relationship exists between architecture and the circumstances of its being: the intrinsic worth of building materials and the various ways that they can be combined to become elements of architecture. This compilation of elements create man's milieu. The relationship is never a clear one." Frampton (1995) does not present this relationship as a revelation but rather its expressive potential as a lost practice. This 'expressive potential' can be defined as by the word tectonics. Through tectonics architecture becomes a language.

It can be established that construction forms the interface or threshold between architecture and the user.

Buildings that captivate are free of "isms", free of the superficial, "good taste" and superfluous additives (Blaser, 2001: 15). This does not necessary mean bland buildings. Through tectonics, architects can re-establish authentic architecture.

When buildings contribute to the public realm, they encourage people to meet and converse: engage with the passerby. Buildings must stimulate rather than repress human potential. This vital engagement between the public and private should inspire architectural identity. Building tectonics ought to be an extension of the intent and concept.

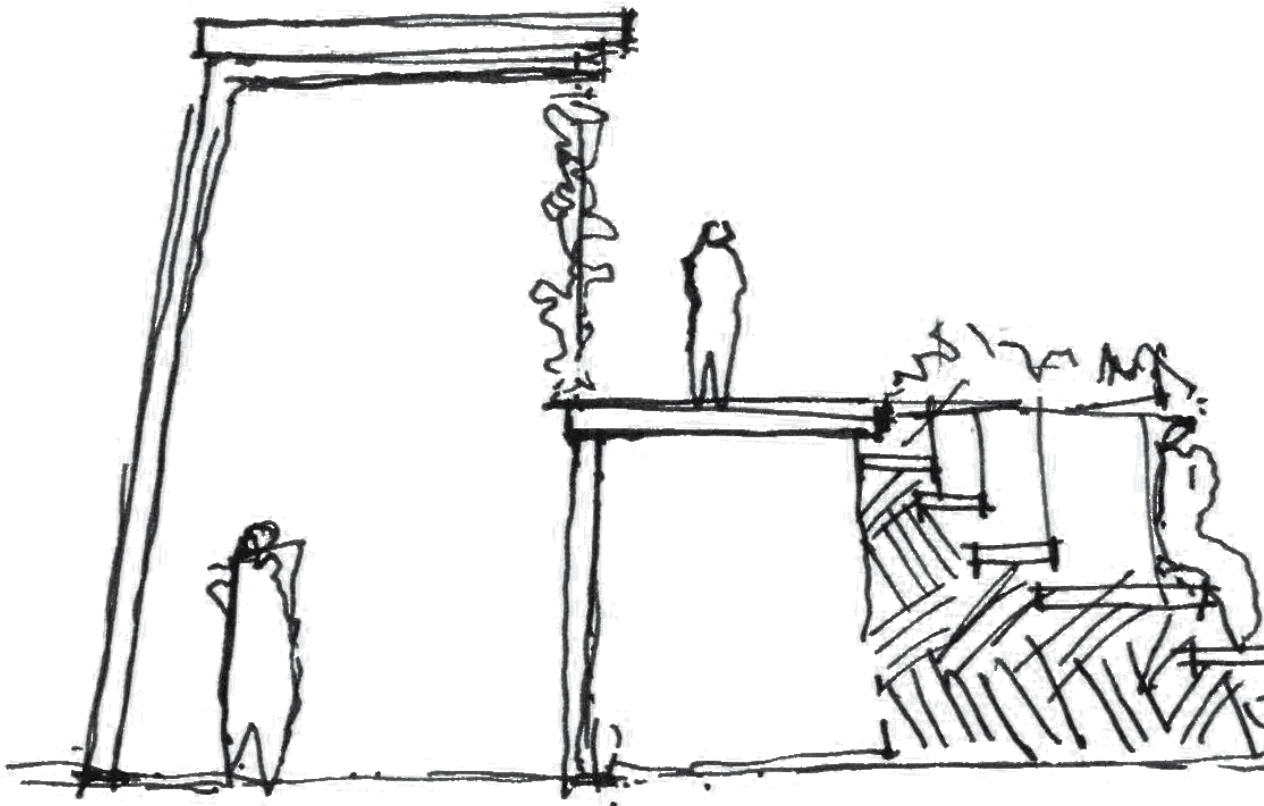


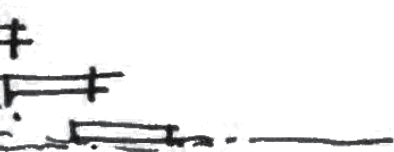
Figure 7.1 Tectonic intention (Author, 2012).

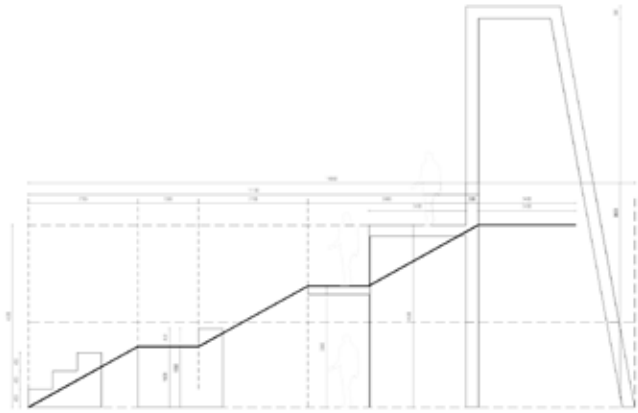
The tectonic intent develops from the threshold that exists between landscape and architecture.

Nature, habitually grounded in landscape and man dwelling in architecture. The technical investigates how the intervention can mediate these entities while contributing to an improved boundary condition.

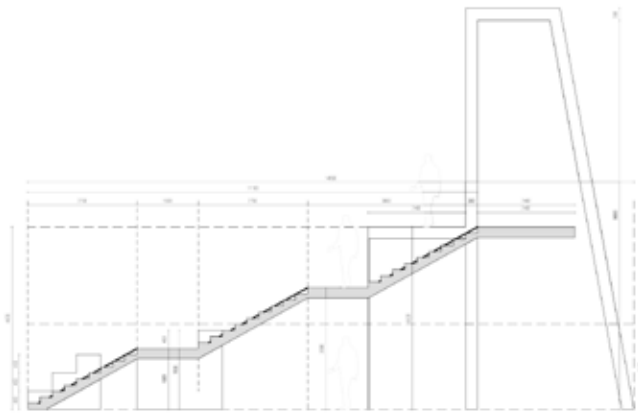
“A landscape is occupied, inhabited, or explored according to the opportunities it offers. By contrast architecture is too often understood narrowly as object and accessed in terms of its appearance. All too often its occupation is limited by predetermined ideas and rules of function, building type, and image.

Landscape as a powerful metaphor allowing a less inhibited relationship to spatial environments. Dissolving the distinction between building and landscape encourages a richer interaction and supportive relationship between the two. Architectural intervention that is specific to its landscape will result in a more complete environment” (Design Philosophy, 2012).

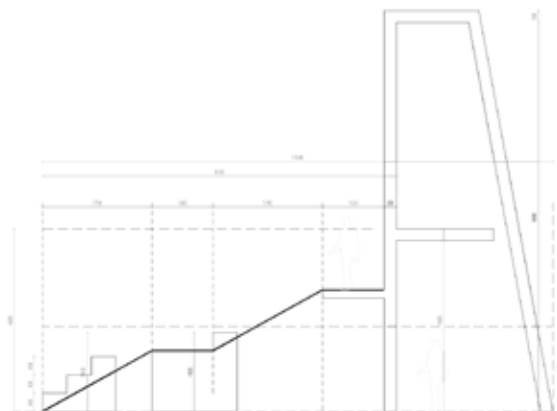




extended section



accessible



flexible

Figure 7.2 Manipulation of the ground (Author, 2012).



The manipulation of the urban surface aims to contribute to the Zoo while providing interactive space to the city.

The existing pre-cast concrete palisade fence elements are manipulated in the simplest manner; by being rotated at a ninety degree angle. This rotation signifies the physical adaptations of the function of these elements: once parts of a 'wall' they now become a 'floor' of the Gratis Observatory Route.

The manipulation of these elements also embodies the spirit of the re-evaluation of the Zoo boundary, from an element of segregation to an integrated, multi-functional threshold. Through the intervention the usage of these elements will enhance spatial legibility whilst providing a walkable surface.

Climatic Control

The structure is manipulated to adhere to thermal comfort for both man and animal. The structure provides access and vistas while simultaneously providing shade and conditions for vegetation growth.

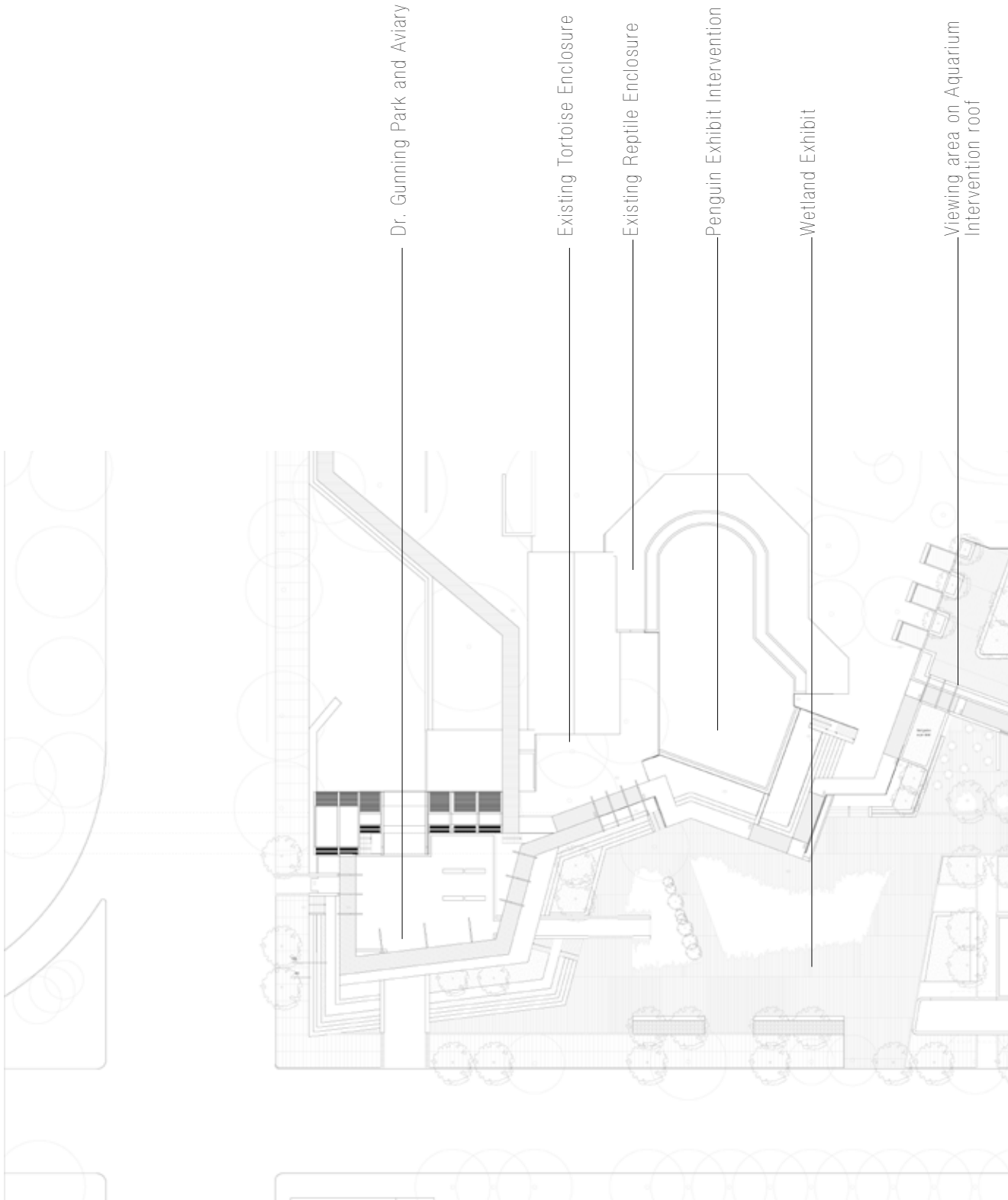


Figure 7.3 Site Plan 01.09 (Author, 2012).

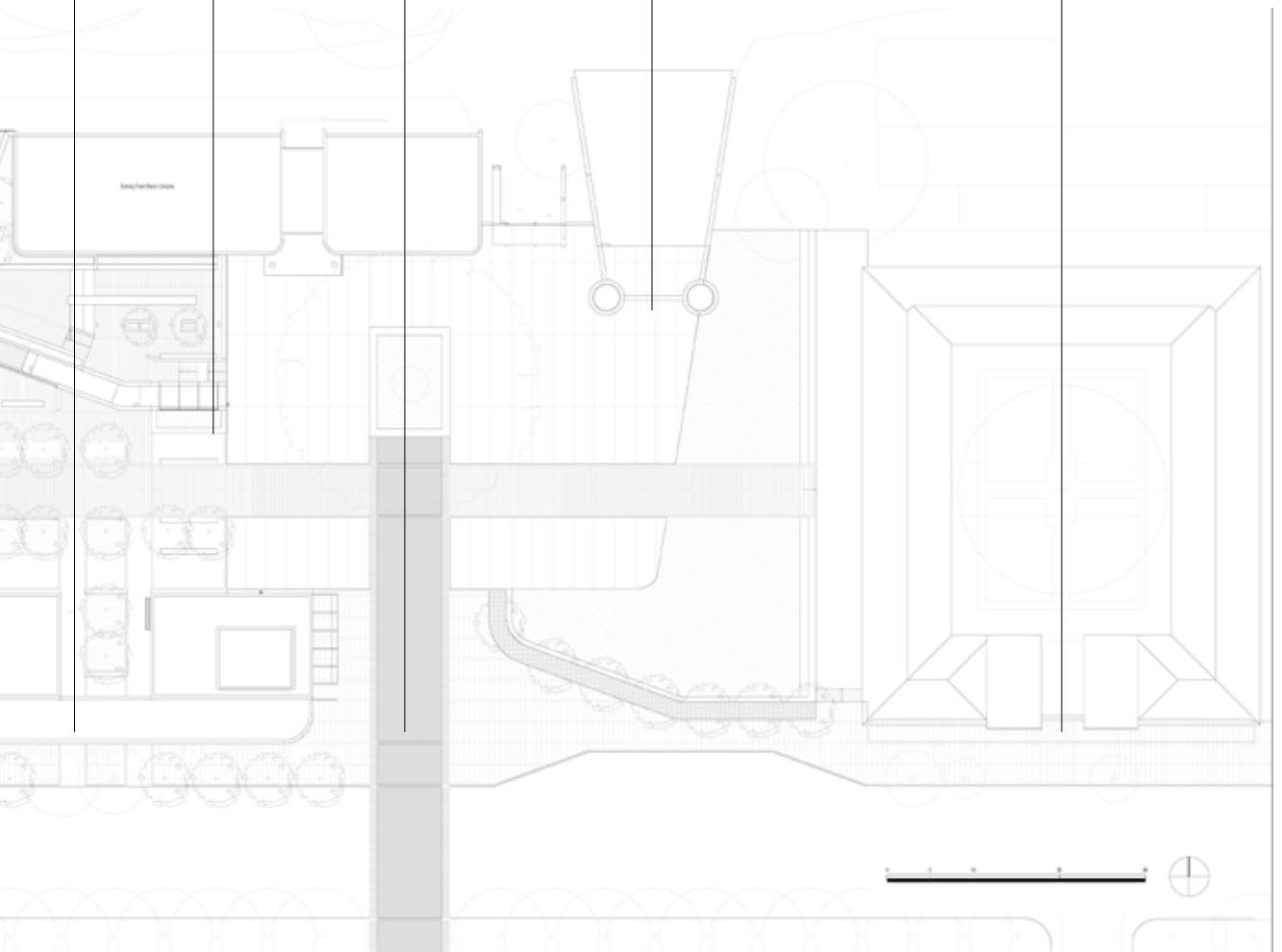
Workshops as extension of existing Curio Stalls

Start of Gratis Observatory Route

Civic Arcade on position of historic axis

Existing Entrance

State Museum



“Reduce potable water use for landscape irrigation by 50 percent from established baseline.”

“Protect and restore riparian, wetland, and shoreline buffers.”

“Manage storm water on site.”

The water management strategy for this intervention is based on the guidelines and performance benchmarks of Section 3 of The Sustainable Sites Initiative, henceforth referred to as the SSI (American Society of Landscape Architects, 2009).

The SSI sets the following guidelines to inform site design in terms of protecting and restoring processes and systems associated with a site's hydrology;

The wetland-ecology exhibit in the public open space along the Boom Street interface will act as a primary detention pond, from where runoff from rain- and storm events will be stored in a sub-surface retention facility. This water will be used to replenish the wet exhibit through cyclical water cleansing and pumping, and also to irrigate new vegetation.

Even though the wetland-ecology exhibit does not physically relate to systems that were present on site, it aims to increase public awareness of the critical and fragile value of such ecologies.

Decrease run-off velocity by surface treatment:

Roofs

_ Semi-extensive and extensive green roof systems are incorporated on new and existing roof structures. These systems act as temporary detention of storm water.

Paving: The paving design around the wetland exhibit comprises 60% lawn in between concrete pavers. This will assist in decreasing run-off velocity and encouraging infiltration to replenish sub-surface water stores.

Lawns

_ Lawned areas are slightly sunken compared to adjacent surfaces, where run-off from selected surfaces adjacent is sloped towards lawn areas. The lawns act as detention facilities during storm events, where the volumes of capacity have been calculated in the event of a 1:50 year occurrence interval.

Permeable paving

_ Keeping with the architectural language and character of the stone-walled vendor stalls, paved areas in front of

“Design rainwater/storm water features to provide a landscape amenity.”

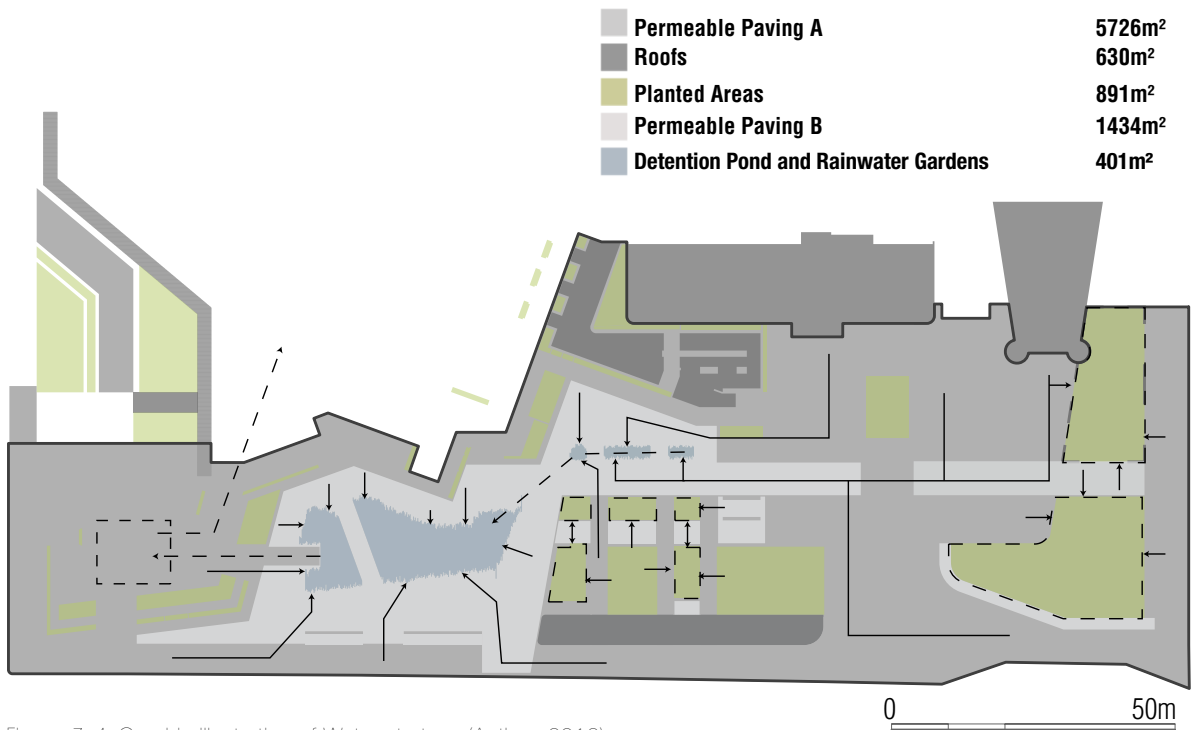


Figure 7.4 Graphic illustration of Water strategy (Author, 2012).

benches at waiting areas will consist of in-situ excavated stone laid on a gravel bed, flat side up. These areas will decrease velocity of run-off through uneven surface and promote infiltration of water into the soil beneath. This surface treatment will also be used instead of tree rings to accommodate planting of trees in paved areas.

Capture, store and re-use storm water

Storm water will be captured from selected surfaces by the rainwater gardens and central wetland exhibit, which will clean and temporarily store the run-off.

From here water will flow via gravitational forces to a sub-surface retention facility. This water will be used to irrigate vegetation and sustain the wetland exhibit.

Grey water re-used

Grey water from public restrooms will be stored and used to flush WC's.

The wetland-ecology exhibit in the public open space along the Boom Street interface will not only act as a tool for water management, but also promote public awareness of the critical and fragile value of such ecologies. This planted feature will provide an urban habitat for birds and animal also in support of biodiversity

FLOOD EVENT MANAGEMENT

Detention Stormwater on site
 Detention Volume for a 1:50 Storm event
 Peak p)Precipitation of 71mm/h
 Resulting in Runoff 287.4m³/h

Wetland Exhibit holds 480m³ at any given time. This volume must be maintained to conserve species in this habitat.
 Water will be circulated through the exhibit to prevent stagnant water from rotting.
 Evaporation from water surface have been accounted for.

20 YEAR	Area (m ²)	Runoff Coefficient	Peak rainfall (m/h)	Storm Discharge m ³ /h
Lawned Areas	2091.00	0.25	0.054	28.23
Planting Beds	891.00	0.17	0.054	8.18
Permeable Paved Areas (L)	2726.00	0.35	0.054	51.52
Permeable Paved Areas (M)	1434.00	0.28	0.054	21.68
Roofs	630.00	0.90	0.054	30.62
Water	401.00	1.00	0.054	21.65
				161.88

50 YEAR	Area (m ²)	Runoff Coefficient	Peak rainfall (m/h)	Storm Discharge m ³ /h
Lawned Areas	2091.00	0.25	0.071	37.12
Planting Beds	891.00	0.17	0.071	10.75
Impermeable Paved Areas	2726.00	0.70	0.071	135.48
Permeable Paved Areas	1434.00	0.30	0.071	30.54
Roofs	630.00	0.90	0.071	40.26
Water	401.00	1.00	0.071	28.47
				282.62

RAINWATER CAPTURE AND ATTENATION

Lawns	Ave. Rainfall (m)	Runoff Coefficient	Area (m ²)	Runoff (m ³)
January	0.102	0.25	2091.00	53.32
February	0.111	0.25	2091.00	58.03
March	0.081	0.25	2091.00	42.34
April	0.042	0.25	2091.00	21.96
May	0.016	0.25	2091.00	8.36
June	0.007	0.25	2091.00	3.66
July	0.004	0.25	2091.00	2.09
August	0.003	0.25	2091.00	1.57
September	0.02	0.25	2091.00	10.46
October	0.069	0.25	2091.00	36.07
November	0.106	0.25	2091.00	55.41
December	0.106	0.25	2091.00	55.41
				348.67

Planted Beds	Ave. Rainfall (m)	Runoff Coefficient	Area (m ²)	Runoff (m ³)
January	0.102	0.17	891.00	15.45
February	0.111	0.17	891.00	16.81
March	0.081	0.17	891.00	12.27
April	0.042	0.17	891.00	6.36
May	0.016	0.17	891.00	2.42
June	0.007	0.17	891.00	1.06
July	0.004	0.17	891.00	0.61
August	0.003	0.17	891.00	0.45
September	0.02	0.17	891.00	3.03
October	0.069	0.17	891.00	10.45
November	0.106	0.17	891.00	16.06
December	0.106	0.17	891.00	16.06
				101.03

Permeable Paved Areas (Less Pervious)	Ave. Rainfall (m)	Runoff Coefficient	Area (m ²)	Runoff (m ³)
January	0.102	0.35	2726.00	97.32
February	0.111	0.35	2726.00	105.91
March	0.081	0.35	2726.00	77.28
April	0.042	0.35	2726.00	40.07
May	0.016	0.35	2726.00	15.27
June	0.007	0.35	2726.00	6.68
July	0.004	0.35	2726.00	3.82
August	0.003	0.35	2726.00	2.86
September	0.02	0.35	2726.00	19.08
October	0.069	0.35	2726.00	65.83
November	0.106	0.35	2726.00	101.13
December	0.106	0.35	2726.00	101.13
				636.38

Permeable Paved Areas (More Pervious)	Ave. Rainfall (m)	Runoff Coefficient	Area (m ²)	Runoff (m ³)
January	0.102	0.28	1434.00	40.96
February	0.111	0.28	1434.00	44.57
March	0.081	0.28	1434.00	32.52
April	0.042	0.28	1434.00	16.86
May	0.016	0.28	1434.00	6.42
June	0.007	0.28	1434.00	2.81
July	0.004	0.28	1434.00	1.61
August	0.003	0.28	1434.00	1.20
September	0.02	0.28	1434.00	8.03
October	0.069	0.28	1434.00	27.70
November	0.106	0.28	1434.00	42.56
December	0.106	0.28	1434.00	42.56
				267.81

Roofs	Ave. Rainfall (m)	Runoff Coefficient	Area (m ²)	Runoff (m ³)
January	0.102	0.90	630.00	57.83
February	0.111	0.90	630.00	62.94
March	0.081	0.90	630.00	45.93
April	0.042	0.90	630.00	23.81
May	0.016	0.90	630.00	9.07
June	0.007	0.90	630.00	3.97
July	0.004	0.90	630.00	2.27
August	0.003	0.90	630.00	1.70
September	0.02	0.90	630.00	11.34
October	0.069	0.90	630.00	39.12
November	0.106	0.90	630.00	60.10
December	0.106	0.90	630.00	60.10
				378.19

Irrigation Demand	
Lawns	1923.72
Planting Beds and Planters	567.32
Evaporation from Water Surfaces	1.70
	2492.74

Lawn	Planting Area	Monthly	Irrigation Demand m ³
January	2091	0.05	104.55
February	2091	0.05	104.55
March	2091	0.09	188.19
April	2091	0.09	188.19
May	2091	0.09	188.19
June	2091	0.09	188.19
July	2091	0.09	188.19
August	2091	0.09	188.19
September	2091	0.09	188.19
October	2091	0.09	188.19
November	2091	0.05	104.55
December	2091	0.05	104.55
Annual Irrigation Demand			1923.72

Planting beds and Planters	Planting Area	Monthly	Irrigation Demand m ³
January	1091	0.03	32.73
February	1091	0.03	32.73
March	1091	0.05	54.55
April	1091	0.05	54.55
May	1091	0.05	54.55
June	1091	0.05	54.55
July	1091	0.05	54.55
August	1091	0.05	54.55
September	1091	0.05	54.55
October	1091	0.05	54.55
November	1091	0.03	32.73
December	1091	0.03	32.73
Annual Irrigation Demand			567.32

Evaporation from Wetland Exhibit Pond	Surface are (m ²)	Evaporation (mm/m ²)	Evaporation (m ³)
January	401	179.8	0.18
February	401	151.1	0.15
March	401	147.8	0.15
April	401	111.1	0.11
May	401	94.8	0.09
June	401	79.2	0.08
July	401	89	0.09
August	401	132	0.13
September	401	167	0.17
October	401	186.6	0.19
November	401	167.6	0.17
December	401	195.9	0.20
Annual Evaporation			1.7019

Global climate regulation

Maintaining balance of atmospheric gases at historic levels, creating breathable air, and sequestering greenhouse gases.

Air and water cleansing

Removing and reducing pollutants in air and water. Water supply and regulation. Storing and providing water within watersheds and aquifers.

Pollination

Providing pollinator species for reproduction of crops or other plants.

Waste decomposition and treatment

Breaking down waste and cycling nutrients.

Human health and well-being benefits

Enhancing physical, mental, and social well-being as a result of interaction with nature.

Local climate regulation

Regulating local temperature, precipitation, and humidity through shading, evapotranspiration, and windbreaks.

Erosion and sediment control

Retaining soil within an ecosystem, preventing damage from erosion and siltation. Hazard mitigation. Reducing vulnerability to damage from flooding, storm surge, wildfire, and drought.

Habitat functions

Providing refuge and reproduction habitat to plants and animals, thereby contributing to conservation of biological and genetic diversity and evolutionary processes.

Human health and well-being benefits

Enhancing physical, mental, and social well-being as a result of interaction with nature.

Food and renewable non-food products


Producing food, fuel, energy, medicine, or other products for human use.

(American Society of Landscape Architects, 2009).


Ecosystem services are goods and services of direct or indirect benefit to humans that are produced by ecosystem processes involving the interaction of living elements, such as vegetation and soil organisms, and non-living elements, such as bedrock, water, and air.


Researchers have come up with a number of lists of these benefits, each with slightly different wording, some lists slightly longer than others. The members of the Sustainable Sites Initiative's committees and staff have reviewed and consolidated the research into the list below of ecosystem services that a sustainable site can strive to protect or regenerate through sustainable land development and management practices.


A complete planting palette was investigated to maximize the number of species to be attracted.


 EVERGREEN (/PERENNIAL)


 FRUIT EDIBLE FOR HUMANS


 AQUATIC SPECIES


 DECIDUOUS (/ANNUAL)


 ATTRACTS BIRDS


 ATTRACTS INSECTS

 ATTRACTS SMALL MAMMALS

 SHRUB





































 ATTRACTIVE FLOWERS

 MEDICINAL VALUE

 ATTRACTS AQUATIC ANIMALS

 ATTRACTS BATS

Trees Suitable for Street Planting and Paved Areas

T1	<i>Acacia caffra</i>	Common hook thorn							
T2	<i>Acacia karroo</i>	Sweet thorn							
T3	<i>Celtis africana</i>	White stinkwood							
T4	<i>Combretum molle</i>	Velvet bushwillow							
T5	<i>Ekebergia capensis</i>	Cape ash							
T6	<i>Searsia leptodictya</i>	Mountinkaree							
T7	<i>Searsia pyroides</i>	Fire-thorn karee							
T8	<i>Searsia zeyheri</i>	Blue currant							



T1



T2



T3



T4



T5



T6





































































T7



T8

Medium Trees and Shrubs

S1	<i>Cussonia paniculata</i>	Mountain cabbage tree							
S2	<i>Dombeya rotundifolia</i>	Common wild pear							
S3	<i>Ehretia rigida</i>	Puzzle bush							
S4	<i>Englerophytum magalismontanum</i>	Stem fruit							
S5	<i>Euclea crispa</i>	Natal Guarri							
S6	<i>Ficus ingens</i>	Red-leaved fig							

S7	<i>Gymnosporia heterophylla</i>	Common spyke thorn					+	
S8	<i>Gymnosporia tenuispina</i>	Bell spike thorn					+	
S9	<i>Mundulia sericea</i>	Kork bush					+	
S10	<i>Nuxia congesta</i>	Common wild elder						
S11	<i>Ochna pretoriensis</i>	Magalies plane					+	
S12	<i>Ochna pulchra</i>	Peeling plane					+	
S13	<i>Rothmannia capensis</i>	Cape gardenia			+			
S14	<i>Strychnos pungens</i>	Spine-leaved monkey orange						
S15	<i>Ziziphus mucronata</i>	Buffalo thorn				+		



S1



S2



S3



S4



S5



S6



S7



S8



S9



S10



S11



S12



S13















































S14



S15

Grasses and Groundcovers

G1	<i>Cynodon dactylon</i>	Bermuda grass						
G2	<i>Helichrysum kraussii</i>	Curry bush					+	
G3	<i>Aloe chabaudii</i>	Chabaud's aloe					+	
G4	<i>Aloe cooperi</i>	grass aloe					+	
G5	<i>Aloe greatheadii</i> var. <i>davyana</i>	Small aloe					+	
G6	<i>Aloe transvaalensis</i>	Transvaal small aloe					+	
G7	<i>Aptenia cordifolia</i>	Sun rose			+			
G8	<i>Bulbine</i> spp.	Bulbinella			+			

G9	<i>Carpobrotus acinaciformis</i>	Ice plant							
G10	<i>Cotyledon orbiculata</i>	Pig's ear							
G11	<i>Portulacaria aurea</i>	Creeping pork bush							
G12	<i>Sanseveria pearsonia</i>	Spiky mother-in-law's tongue							



G1



G2



G3



G4



G5



G6



G7



G8



G9



G10










































































G11



G12

Climbing and Trailing Plants

C1	<i>Aloe ciliaris</i>	Climbing aloe							
C2	<i>Ancylobotrys capensis</i>	Rock milk apricot							
C3	<i>Asparagus spp.</i>	Climbing asparagus							
C4	<i>Bauhinia galpinii</i>	Pride of De Kaap							
C5	<i>Bowiea volubilis</i>	Climbing onion							
C6	<i>Cissus quadrangularis</i>	Veld grape							
C7	<i>Clematis brachiata</i>	Traveller's joy							
C8	<i>Combretum microphyllum</i>	Flame creeper							
C9	<i>Cucumis africanus</i>	Wild cucumber							
C10	<i>Jasminum multipartitum</i>	Starry wild jasmine							
C11	<i>Lagenaria sphaerica</i>	Wild calabash							
C12	<i>Senecio tamoides</i>	Canary creeper							
C13	<i>Thunbergia alata</i>	Black-eyed Susan							

S14	<i>Strychnos pungens</i>	Spine-leaved monkey orange						
S15	<i>Ziziphus mucronata</i>	Buffalo thorn						



S1



S2



S3



S4



S5



S6



S7



S8



S9



S10



S11



S12



S13




















































S14



S15

Grasses and Groundcovers

G1	<i>Cynodon dactylon</i>	Bermuda grass						
G2	<i>Helichrysum kraussii</i>	Curry bush						
G3	<i>Aloe chabaudii</i>	Chabaud's aloe						
G4	<i>Aloe cooperi</i>	grass aloe						
G5	<i>Aloe greatheadii</i> var. <i>davyana</i>	Small aloe						
G6	<i>Aloe transvaalensis</i>	Transvaal small aloe						
G7	<i>Aptenia cordifolia</i>	Sun rose						
G8	<i>Bulbine</i> spp.	Bulbinella						
G9	<i>Carpobrotus acinaciformis</i>	Ice plant						
G10	<i>Cotyledon orbiculata</i>	Pig's ear						
G11	<i>Portulacaria aurea</i>	Creeping pork bush						
G12	<i>Sanseveria pearsonia</i>	Spiky mother-in-law's tongue						



G1



G2



G3



G4



G5



G6



G7



G8



G9



G10



G11



G12

Climbing and Trailing Plants

C1	<i>Aloe ciliaris</i>	Climbing aloe								
C2	<i>Ancylobotrys capensis</i>	Rock milk apricot								
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C4	<i>Bauhinia galpinii</i>	Pride of De Kaap								
C5	<i>Bowiea volubilis</i>	Climbing onion								
C6	<i>Cissus quadrangularis</i>	Veld grape								
C7	<i>Clematis brachiata</i>	Traveller's joy								
C8	<i>Combretum microphyllum</i>	Flame creeper								
C9	<i>Cucumis africanus</i>	Wild cucumber								
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C12	<i>Senecio tamoides</i>	Canary creeper								
C13	<i>Thunbergia alata</i>	Black-eyed Susan								



C1



C2



C3



C4



C5



C6



C7



C8



C9



C10



C6



C7



C8



C9



C10



C11







































C12



C13

Aquatic species

A1	<i>Cyperus textilis</i>	Basket grass						
A2	<i>Juncus kraussii</i>	Jointed rush						
A3	<i>Rumex crispus</i>	Curly dock						
A4	<i>Tetragonia decumbens</i>	Sea spinach						
A5	<i>Typha capensis</i>	Common rush						
A6	<i>Zantedeschia aethiopica</i>	Arum lily						



A1



A2



A3



A4



A5



A6



existing



intervention

Materials were selected that would blend in with the existing palette as well extend to properties of weathering and seasonality.

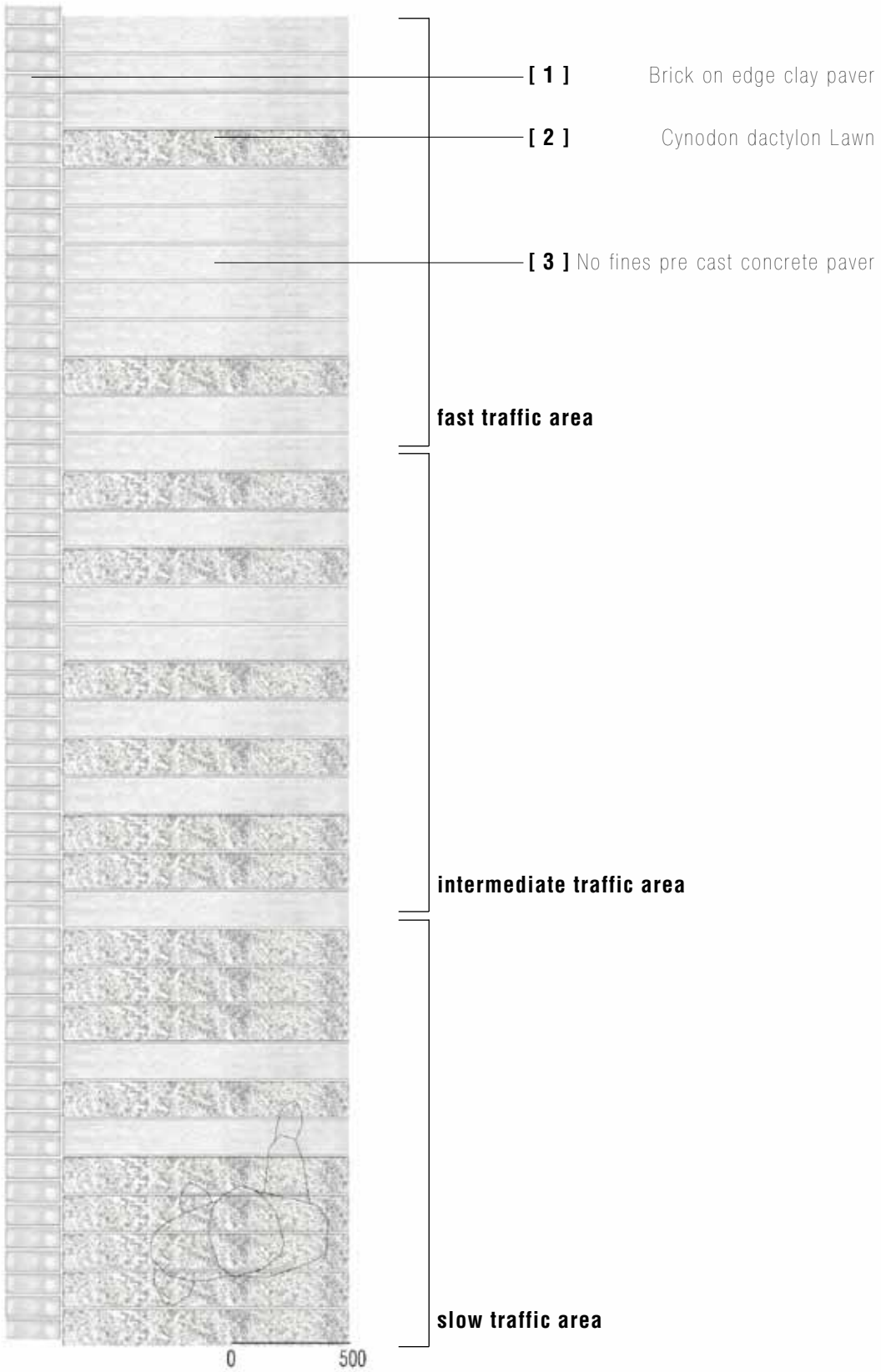


Figure 7.5 Detailed plan of ground treatment (Author, 2012).

Materials are selected to primarily aid pedestrian movement while creating enjoyable spaces. No fines pre cast concrete pavers are used in combination with lawn. The combination is used to cater for all traffic conditions.

This system also aids reducing the heat island effect as much as possible. The permeability of the ground treatment allows the replenishing of ground water systems.

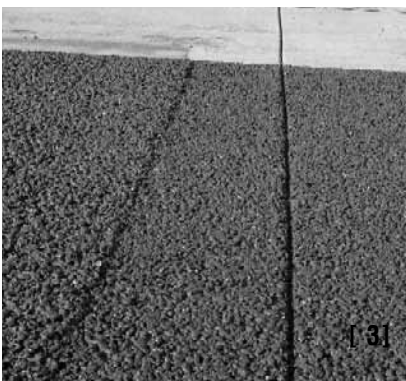
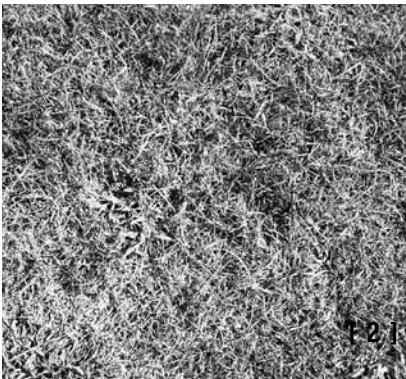
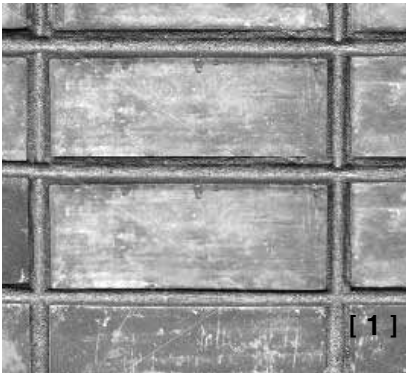


Figure 7.6 Materials (Author, 2012).

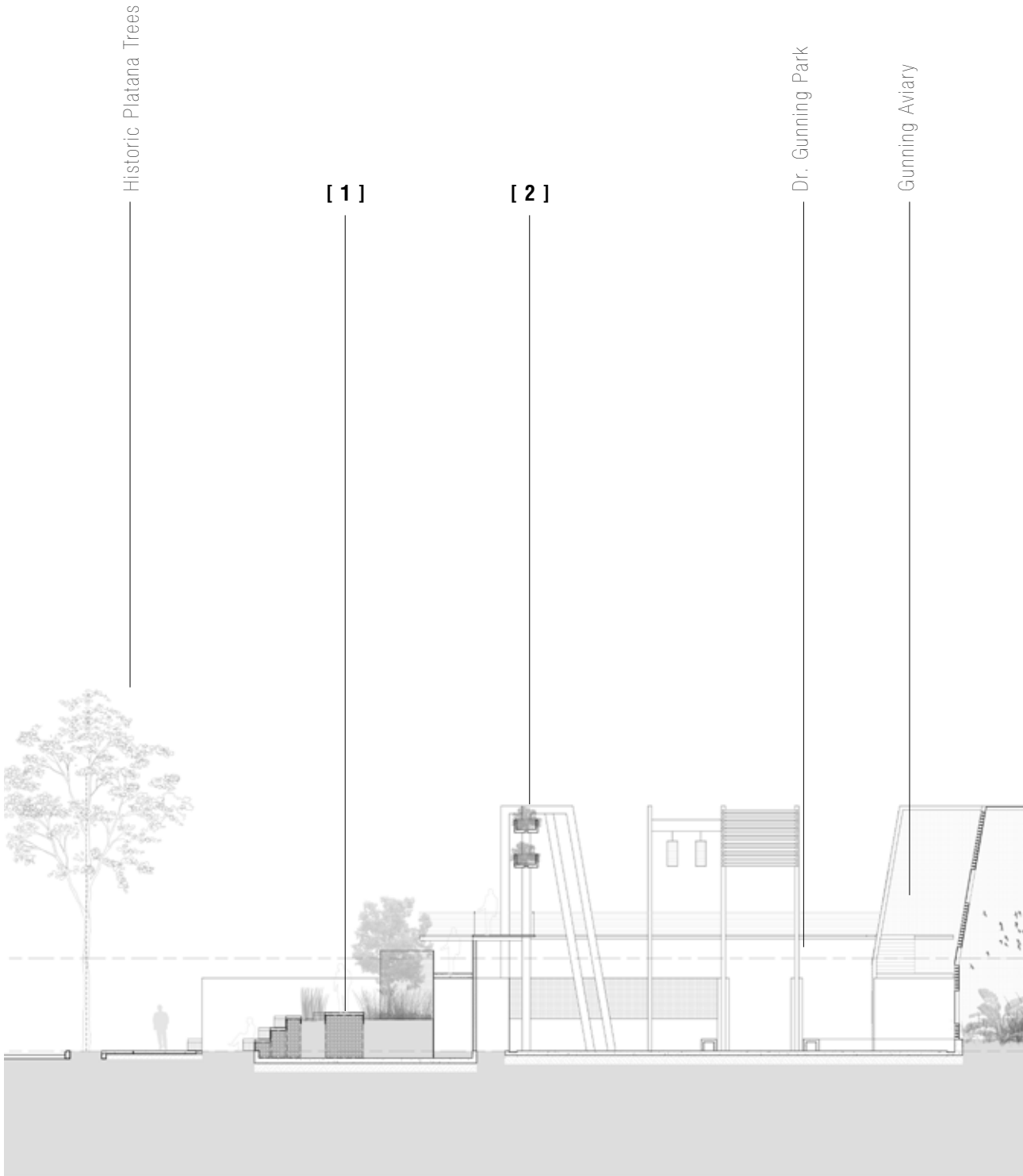


Figure 7.7 Section aa 01.09 (Author, 2012).

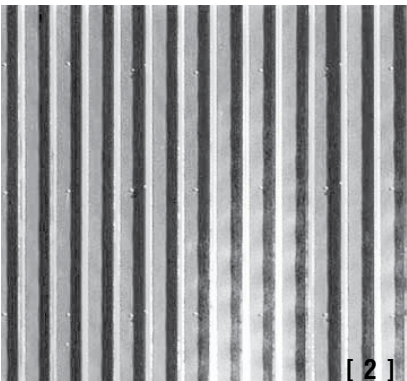
[1] Reinforced earth retaining wall



The structure extends from the landscape by means of a reinforced earth retaining wall. This system consists of a series of steel cage structures filled with rock, crushed concrete with soil infill.

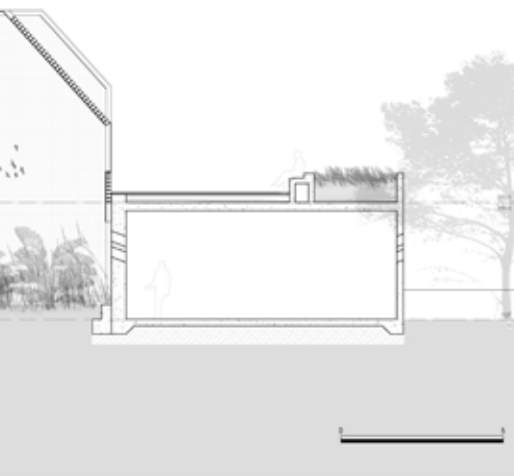
The steel cages are stacked and fixed in horizontal layers with uniaxial geogrids. This is an economical construction method that provides additional areas for vegetation to grow. The steel cages are finished with a no fines pre cast concrete coping that provides seating to the user.

[2] Weathering Steel



This material is selected for its low maintenance despite the high initial cost. The intention of the intervention requires a material that changes over time, just as the planting palette will differ with season. The rust runoff be channeled in such a way that it stains the concrete at certain points and forms part of the constantly changing intervention.

The combination of this structure will attempt to satisfy both the needs of man and animal. This system provides ample opportunity for the provision of public open space. Through the incorporation of vegetation and synanthropic habitats species will start to occupy the intervention.



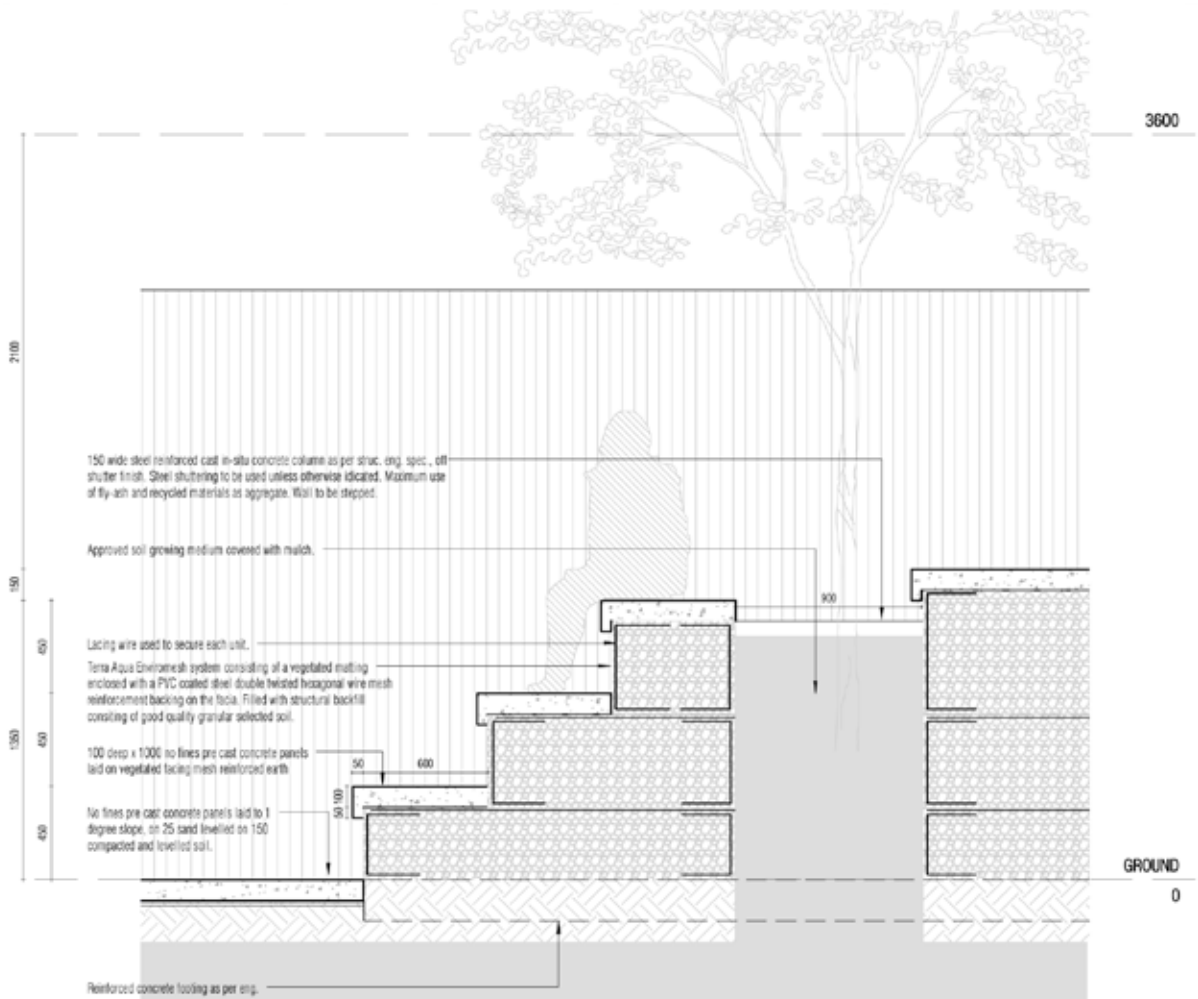


Figure 7. 8 Typical detail of Reinforced earth and concrete seating (Author, 2012).

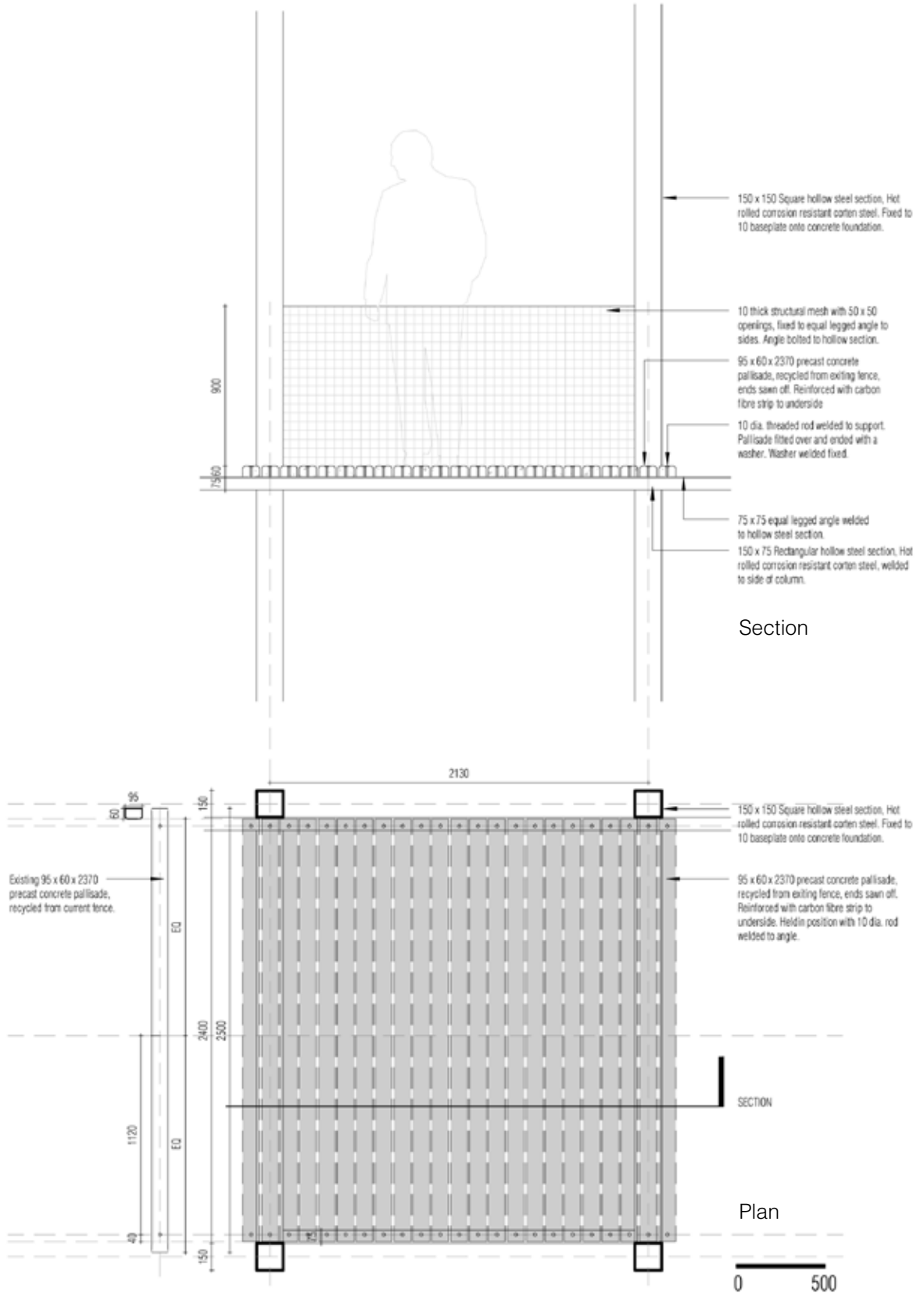


Figure 7.9 Detail of pre cast concrete palisade use for Gratis Observatory Route 01.09 (Author, 2012).

Consist of the adaptive reuse of the existing pre cast concrete fence. The palisade will be used as an infill on a corten steel frame structure. The material speaks of the past but is incorporated to reach the intervention intention.



Structural mesh is used to act as connection between the ground plane and the raised level. Throughout the intervention the mesh takes on different functions, as trellis for climbing vegetation or balustrade for the user accessibility.

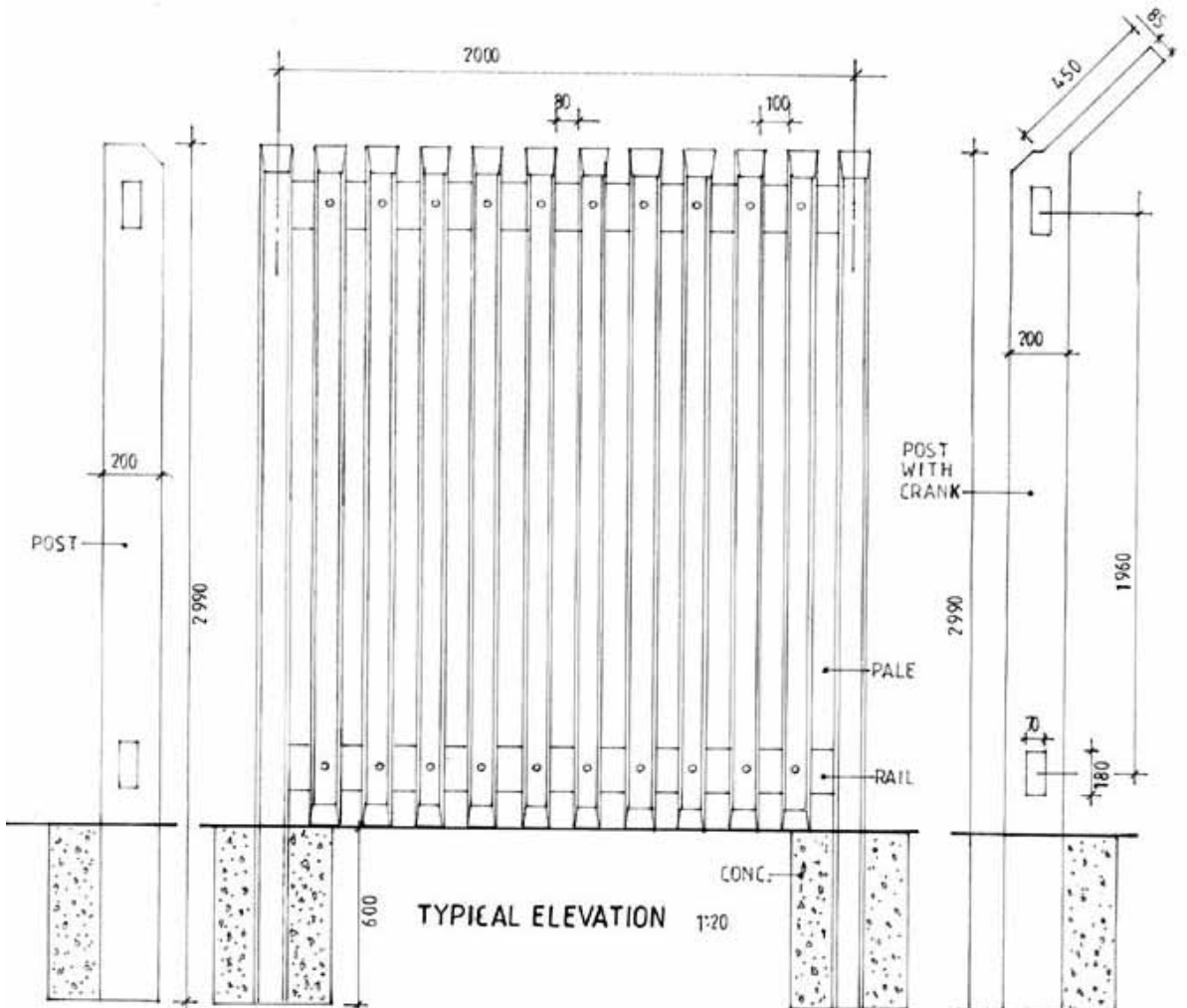


Figure 7.10 Detail of typical pre cast concrete palisade (Concrete Palisade, 2012).

conclusion

Part 8

In brief

Part 8 is a synthesis of the intervention in drawings as presented during the final examination.

All drawings are not to scale.

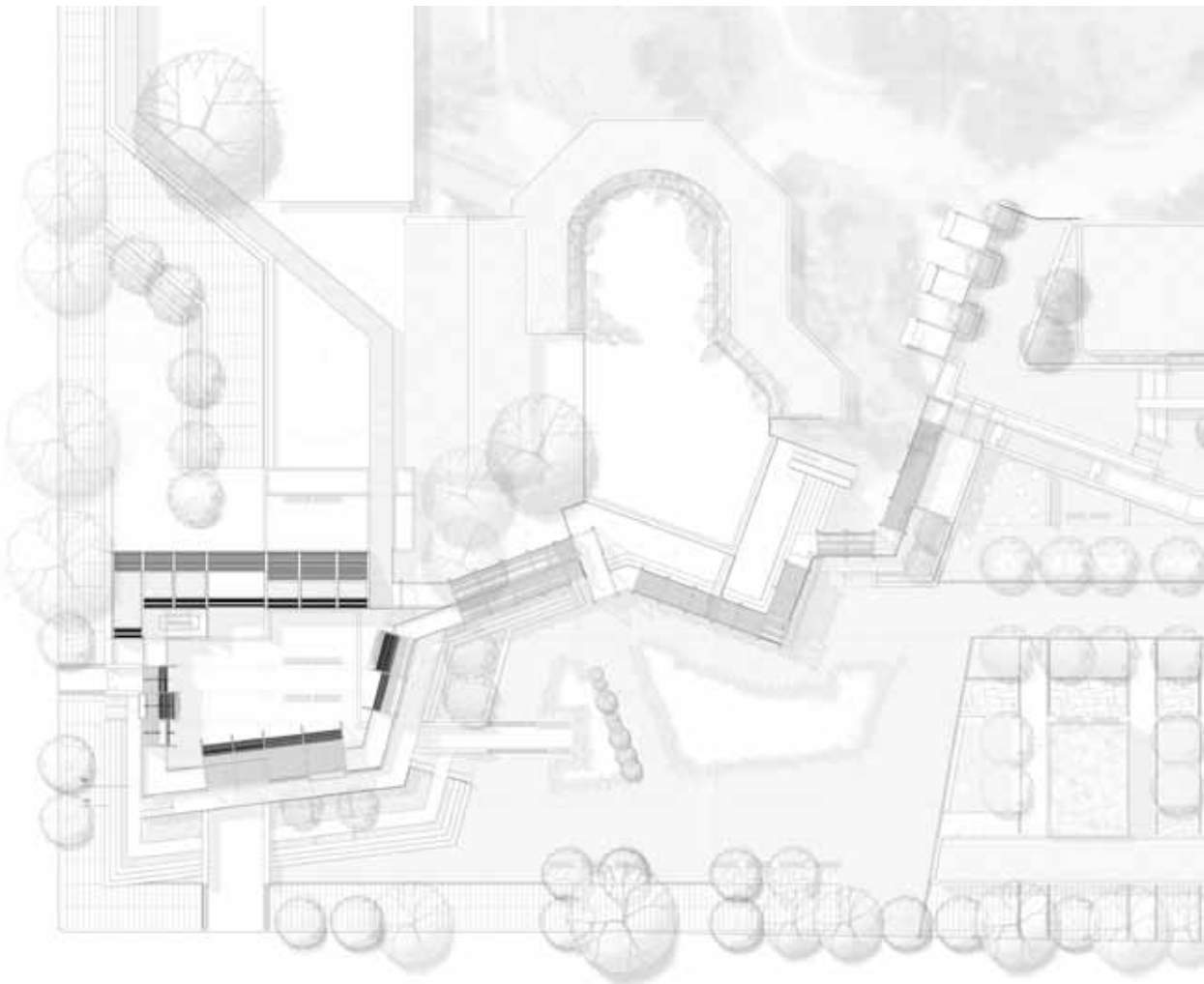


Figure 8.1 Siteplan (Author, 2012).

The dissertation investigation illustrates that the re-evaluation of a physical boundary, a fence, can lead to the establishment of a new architectural threshold typology.

This architectural intervention aimed to satisfy diverse needs, to both man and animal, while remaining authentic to its immediate and urban context.

The intervention re-establishes the threshold between the Zoological Gardens of Pretoria and the city.

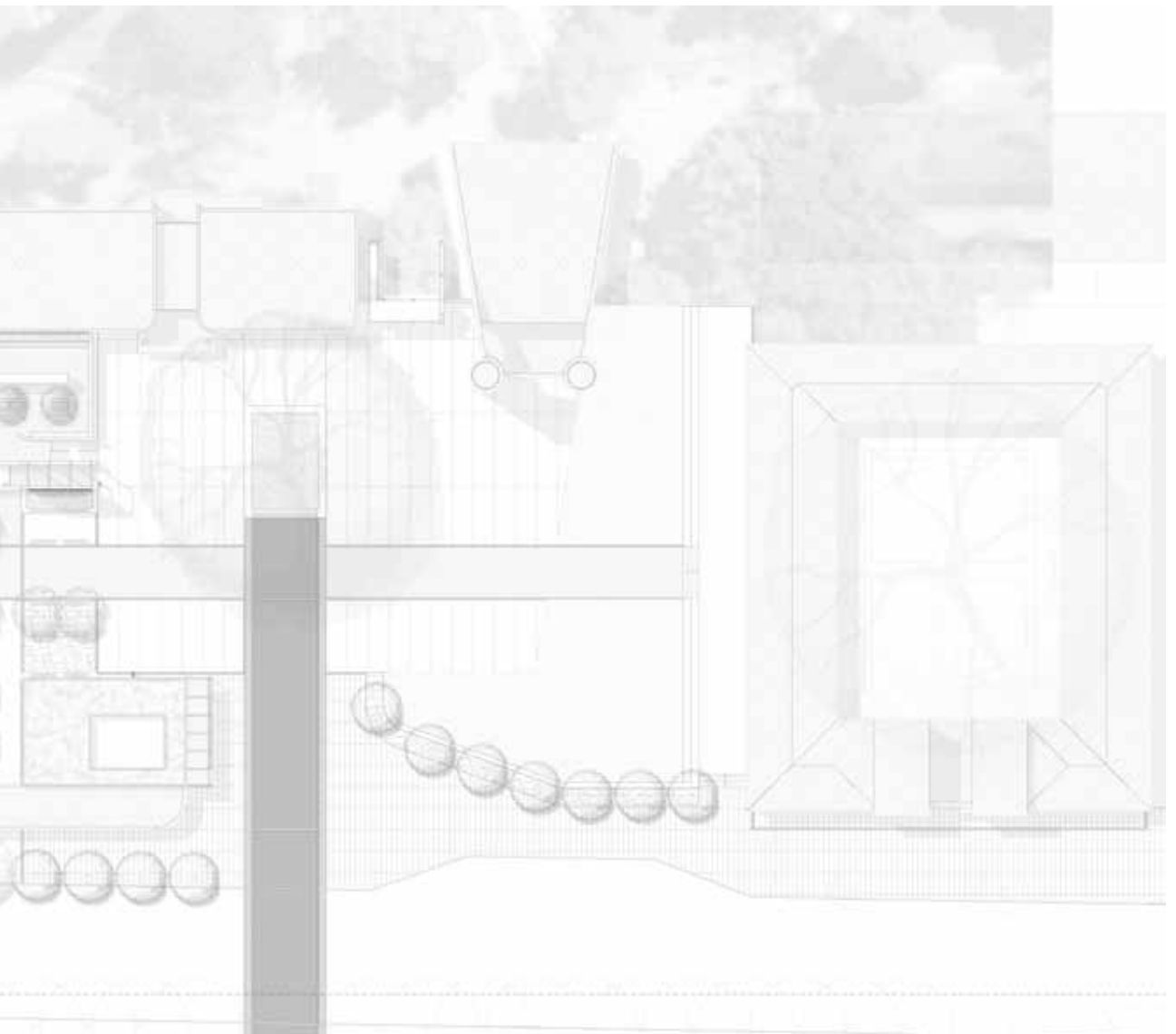
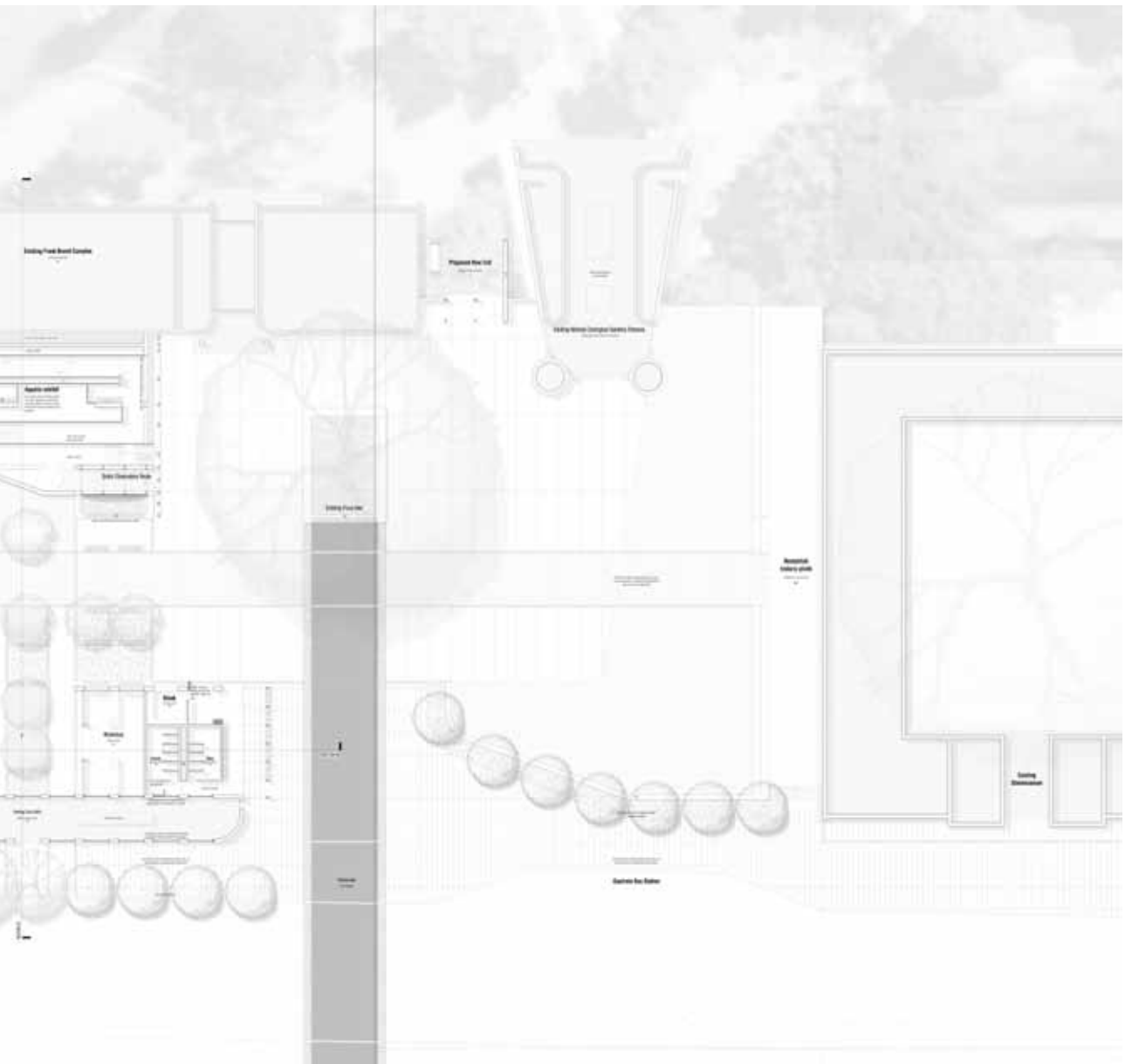




Figure 8.2 Ground (Author, 2012).



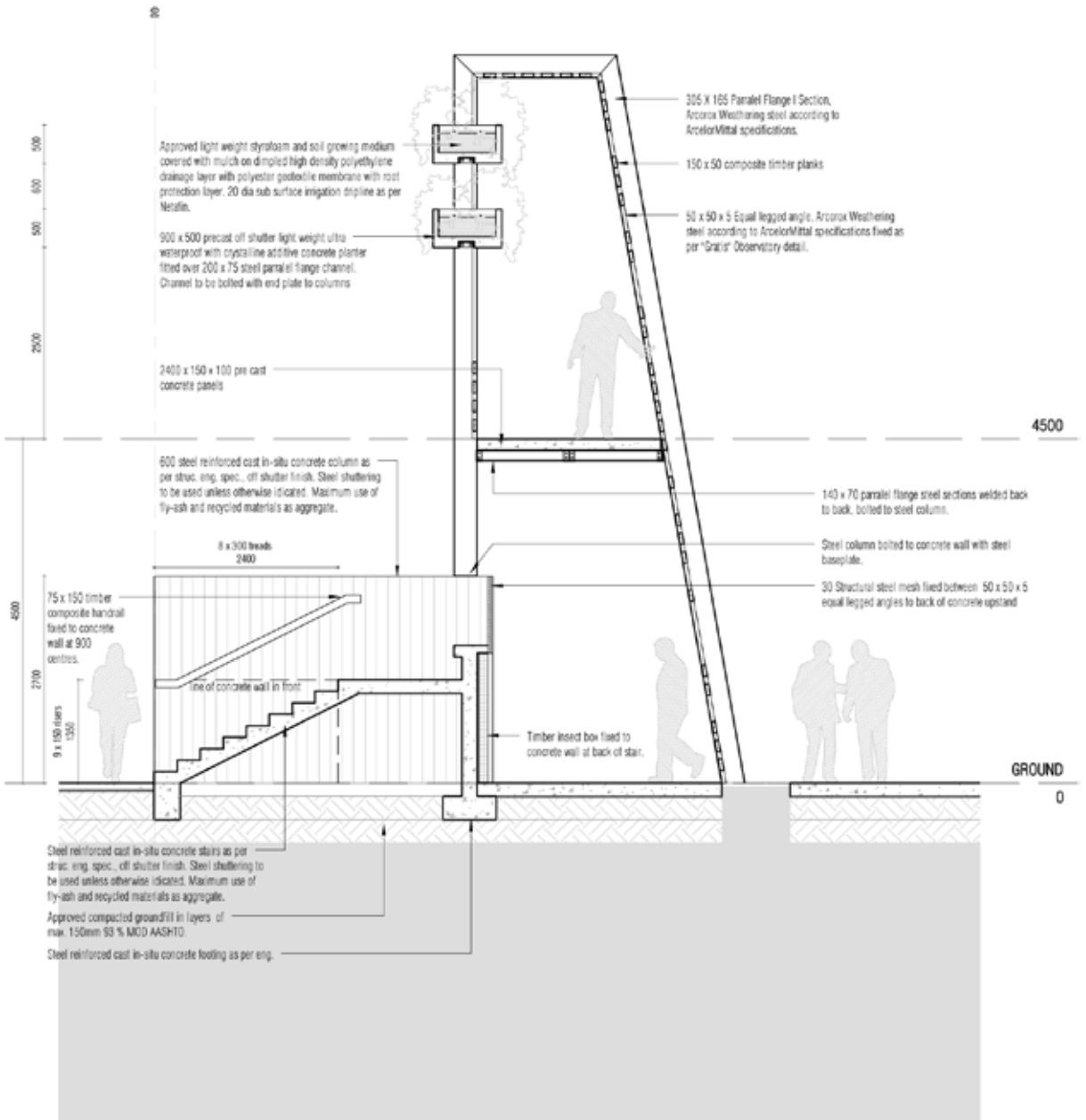


Figure 8.4 Detailed Section aa-1 (Author, 2012).



Figure 8.5 Section bb (Author, 2012).

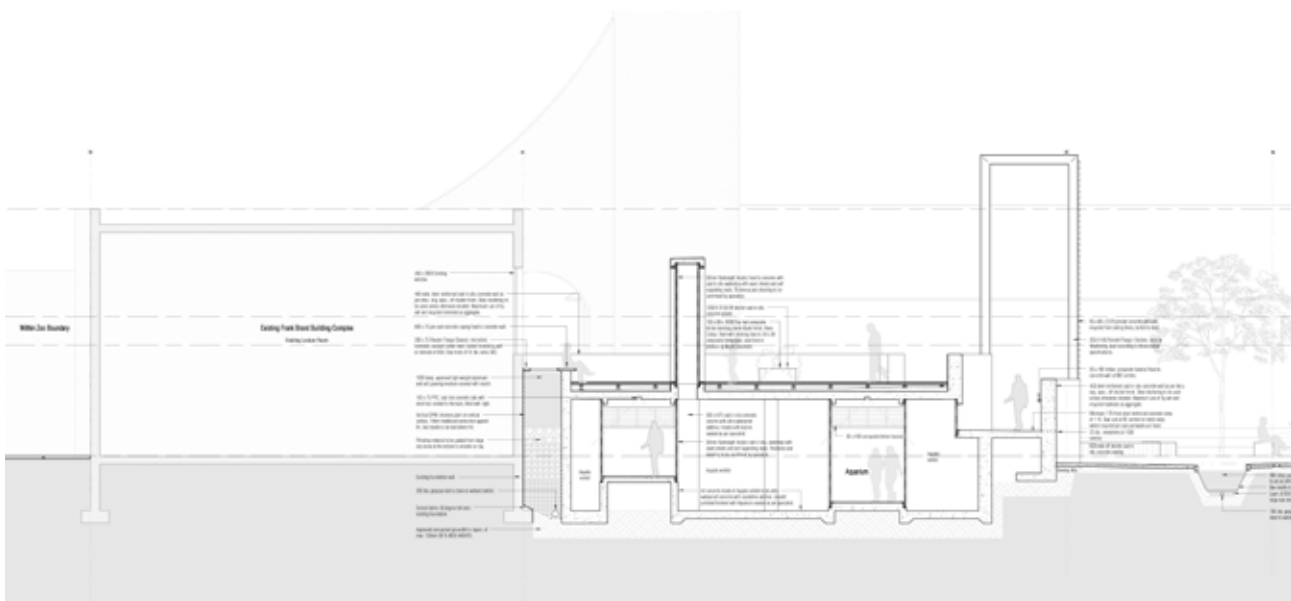
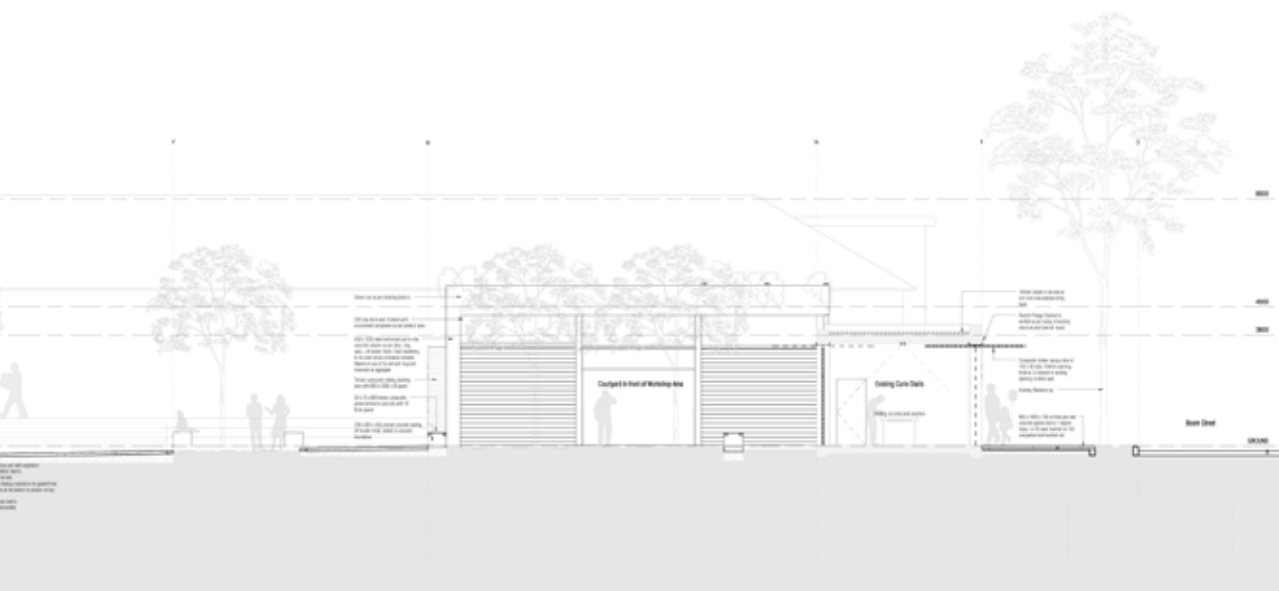
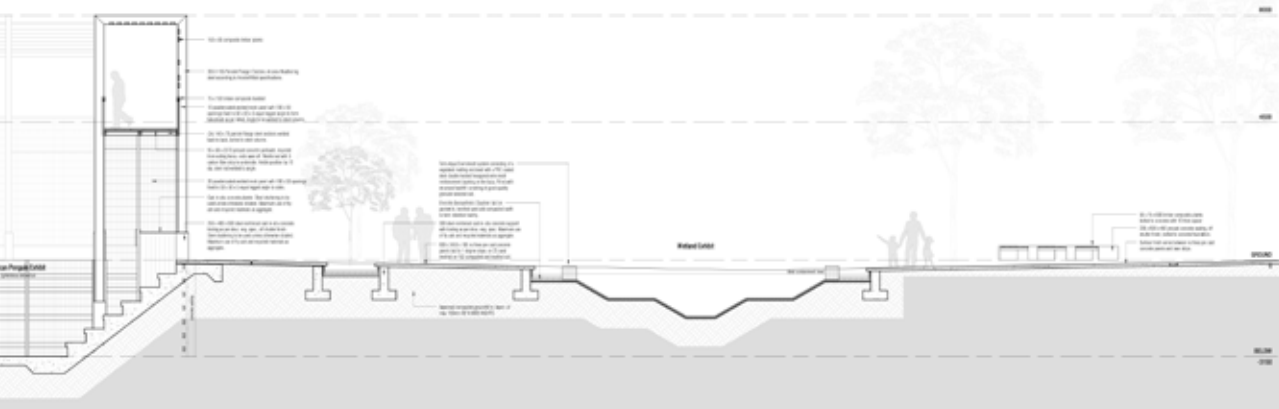
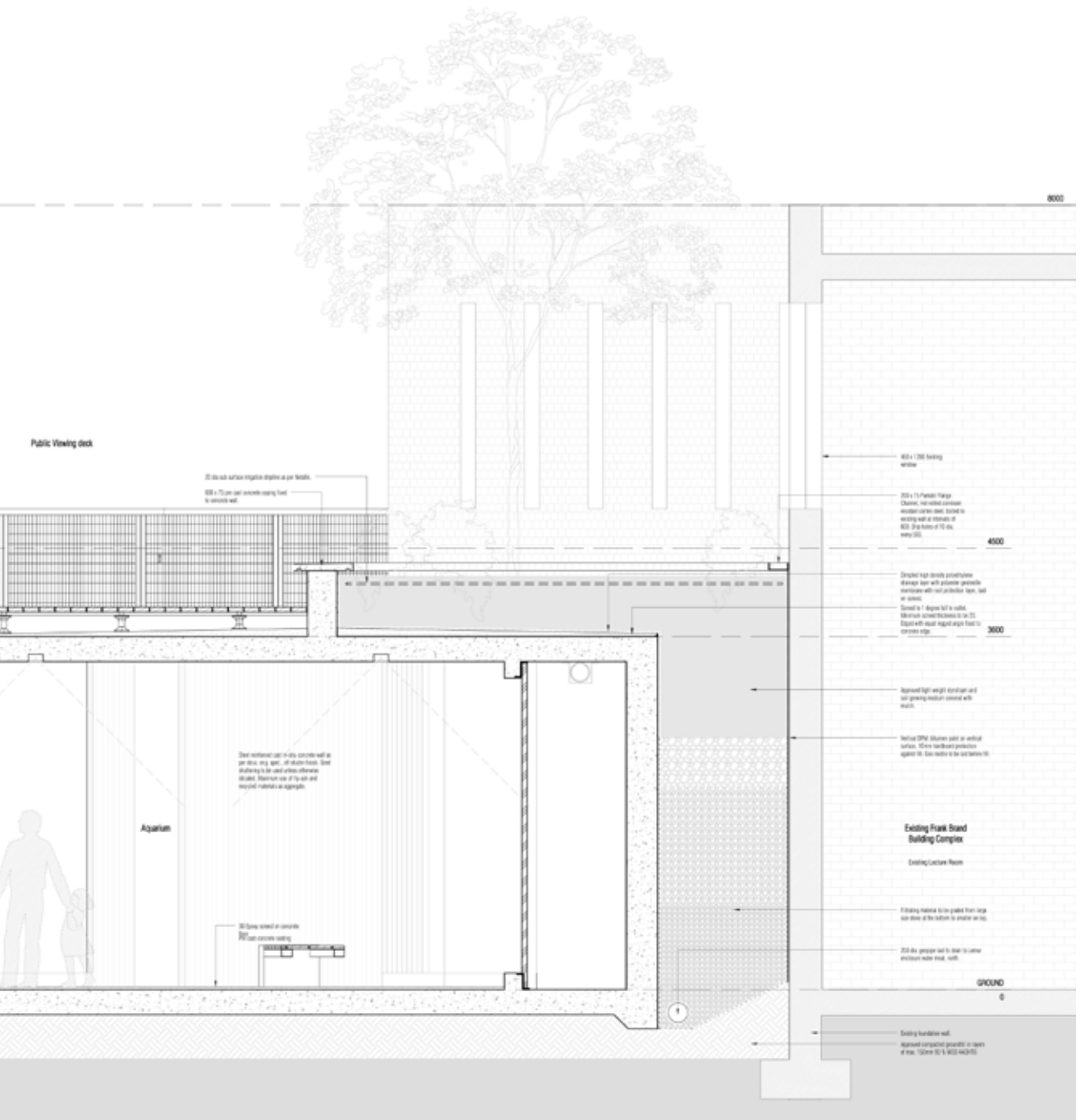


Figure 8.6 Section cc (Author, 2012).





Public Viewing deck

300 x 75 mm steel reinforcement bars per metre.
600 x 75 mm concrete coping fixed to concrete wall.

Aquarium

Steel reinforcement cast in situ concrete wall at per metre, max. span of 4.00m. Reinforcement shall be as per design and shall be approved by the relevant authority. Maximum use of fly ash and recycled materials in aggregate.

300 mm steel reinforcement bars per metre.
300 mm concrete coping.

600 x 1200 facing bricks

300 x 75 Plastic Edge Channel, hot rolled carbon steel, galvanneal, with a maximum spacing of 10 mm.

4500

Concrete top slabs, precast hollow floor slabs with polymer concrete aggregate with hot/cold water pipe, wall or column.
Concrete 1: 2: 4 (kg/m³) to 150 mm.
Reinforced concrete slabs to 150 mm.
Slabs with steel reinforcement bars to concrete edge.

3000

Approved light weight concrete and soil growing medium covered with mesh.

Refract (SP4) Blumes panel or similar surface, 10mm hot/cold water pipe against 100mm concrete to be cast below it.

Existing Frank Brand Building Complex

Existing Lecture Room

75mm mineral fibre panel from steel case on base of the lecture room wall.

300 dia. precast set in steel to corner, minimum width 100mm.

GROUND
0

Existing foundation wall.
Approved compact granular fill layer of max. 100mm 50% 400 400/100.

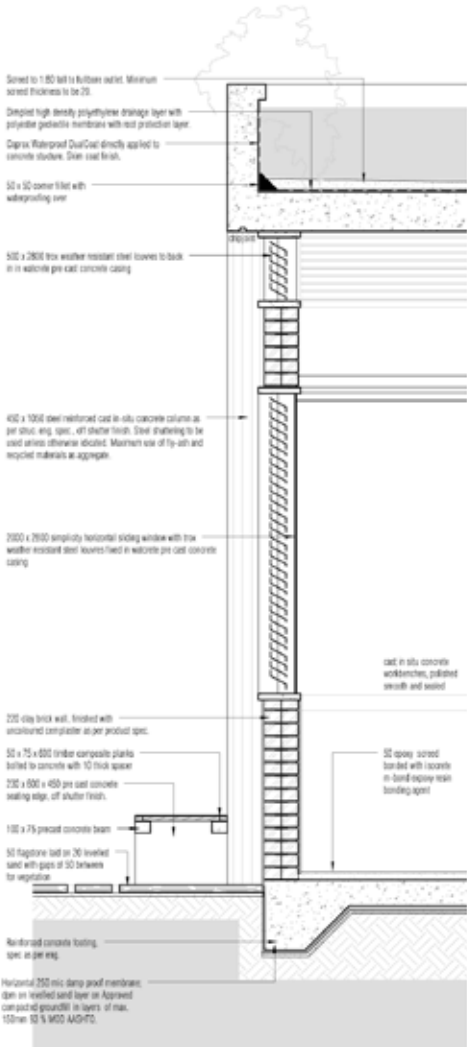


Figure 8.9 Section ee (Author, 2012).

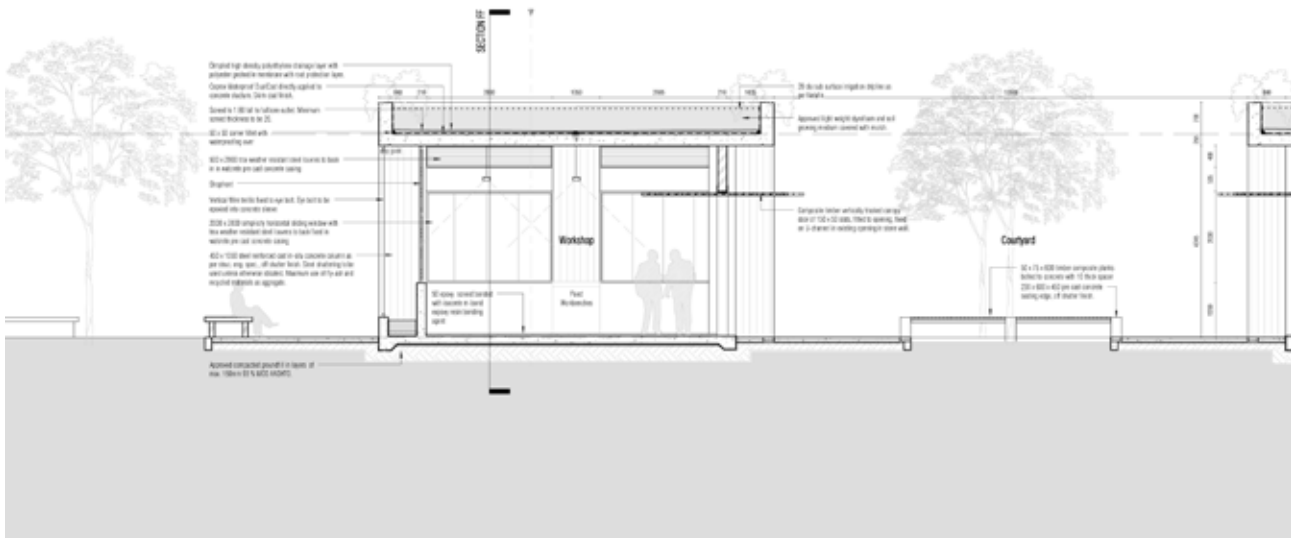


Figure 8.8 Section ff (Author, 2012).

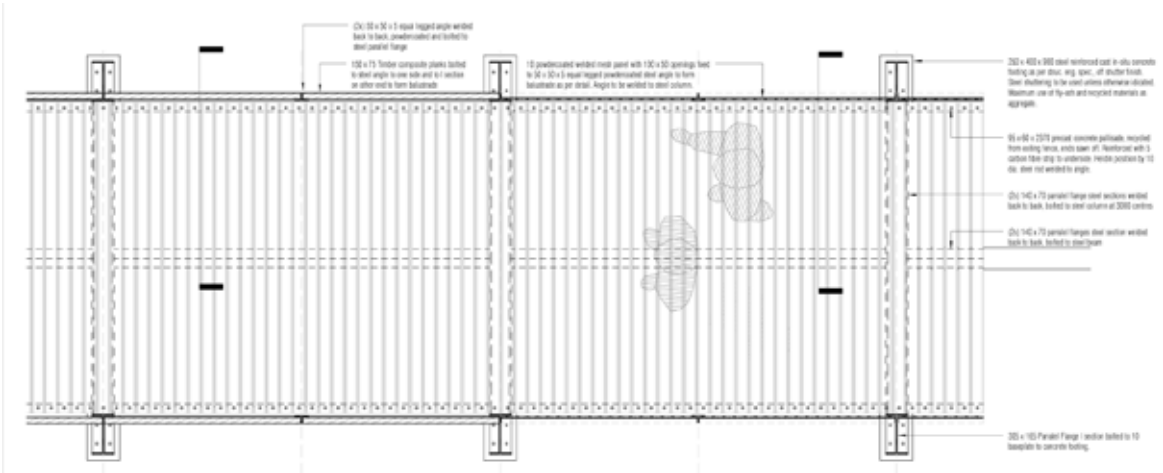


Figure 8.10 Typical "Gratis" Observatory Route Plan (Author, 2012).

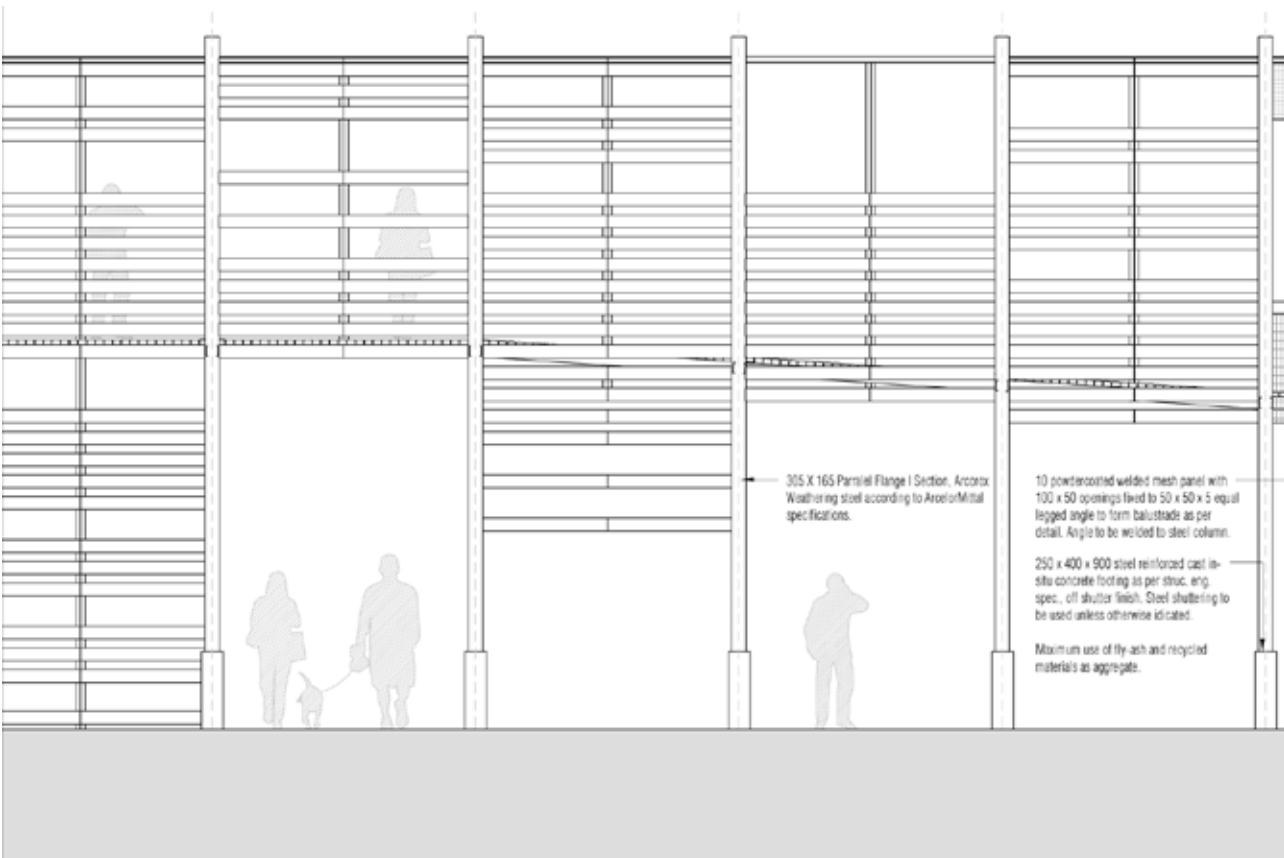
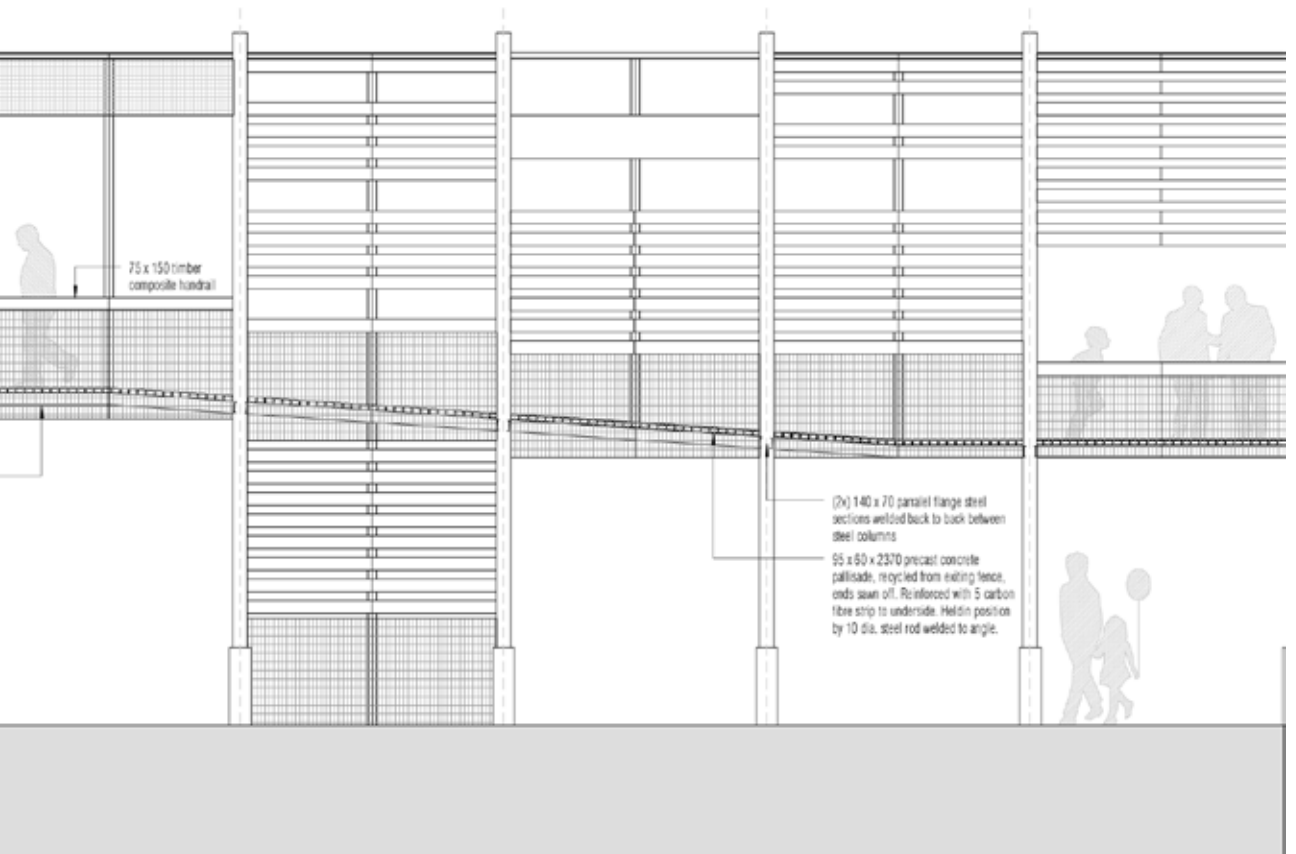


Figure 8.11 Typical "Gratis" Observatory Elevation (Author, 2012).



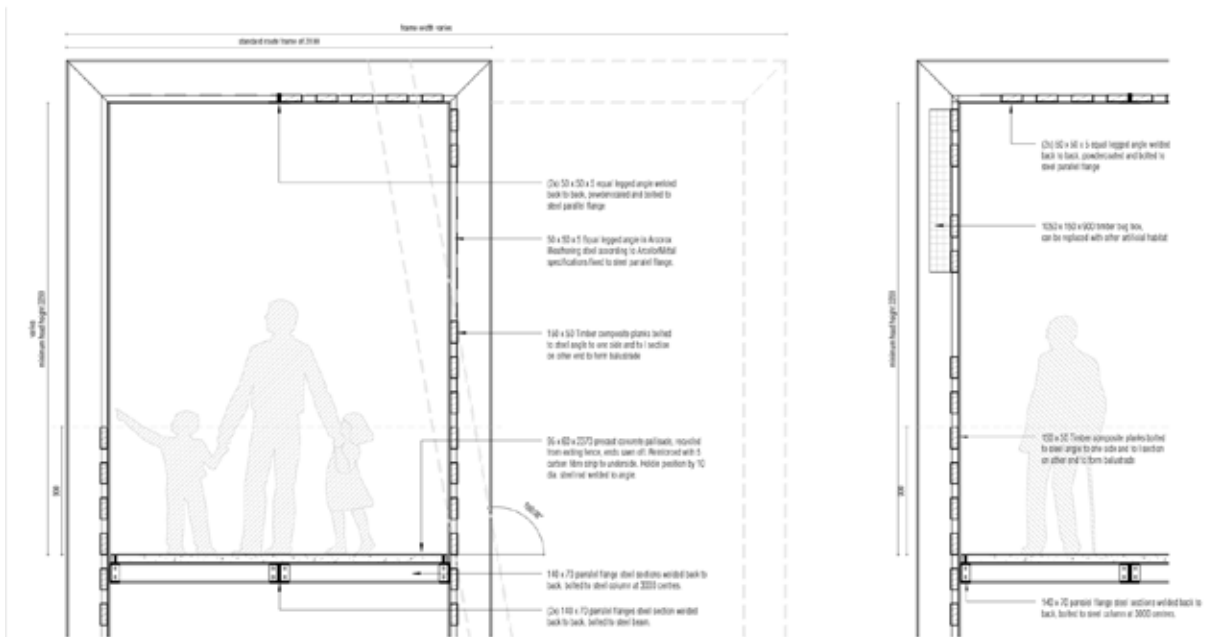
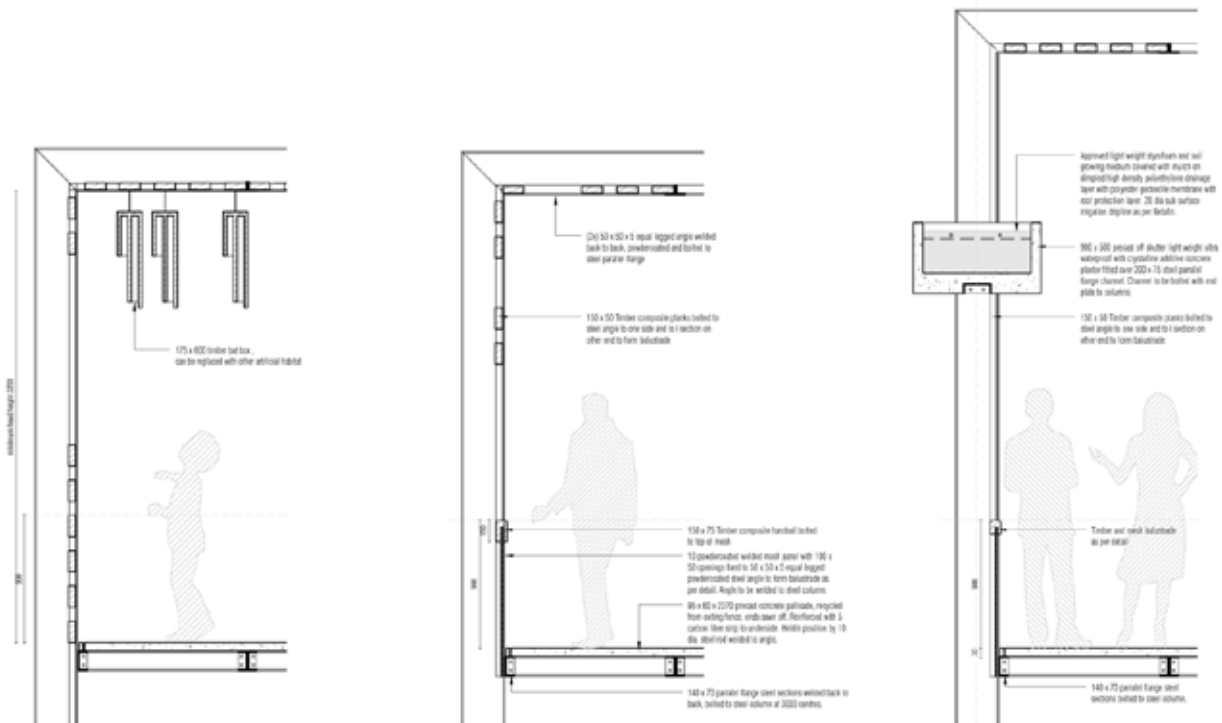


Figure 8. 12 Variations of "Gratis" Observatory Route Type Sections (Author, 2012).



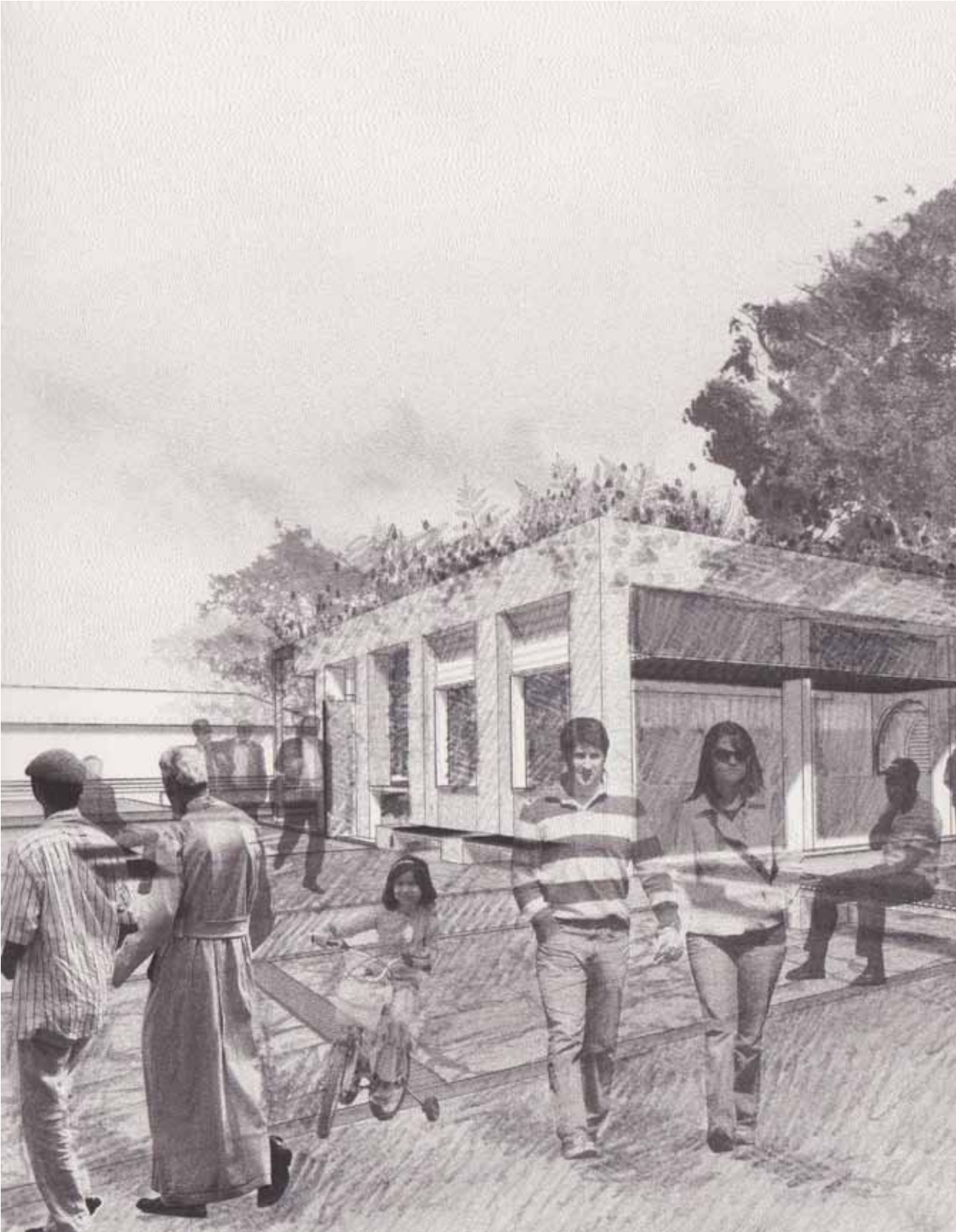
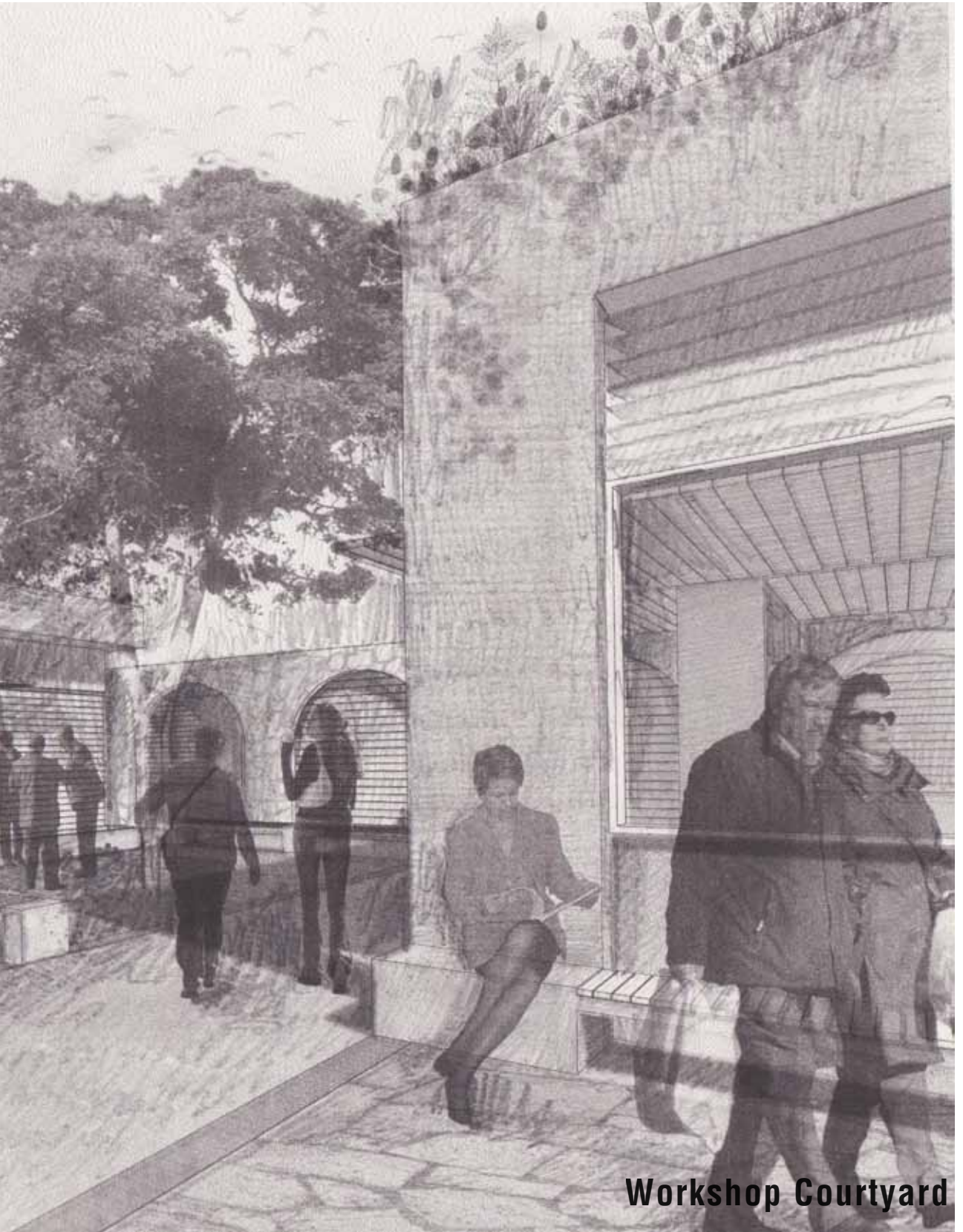


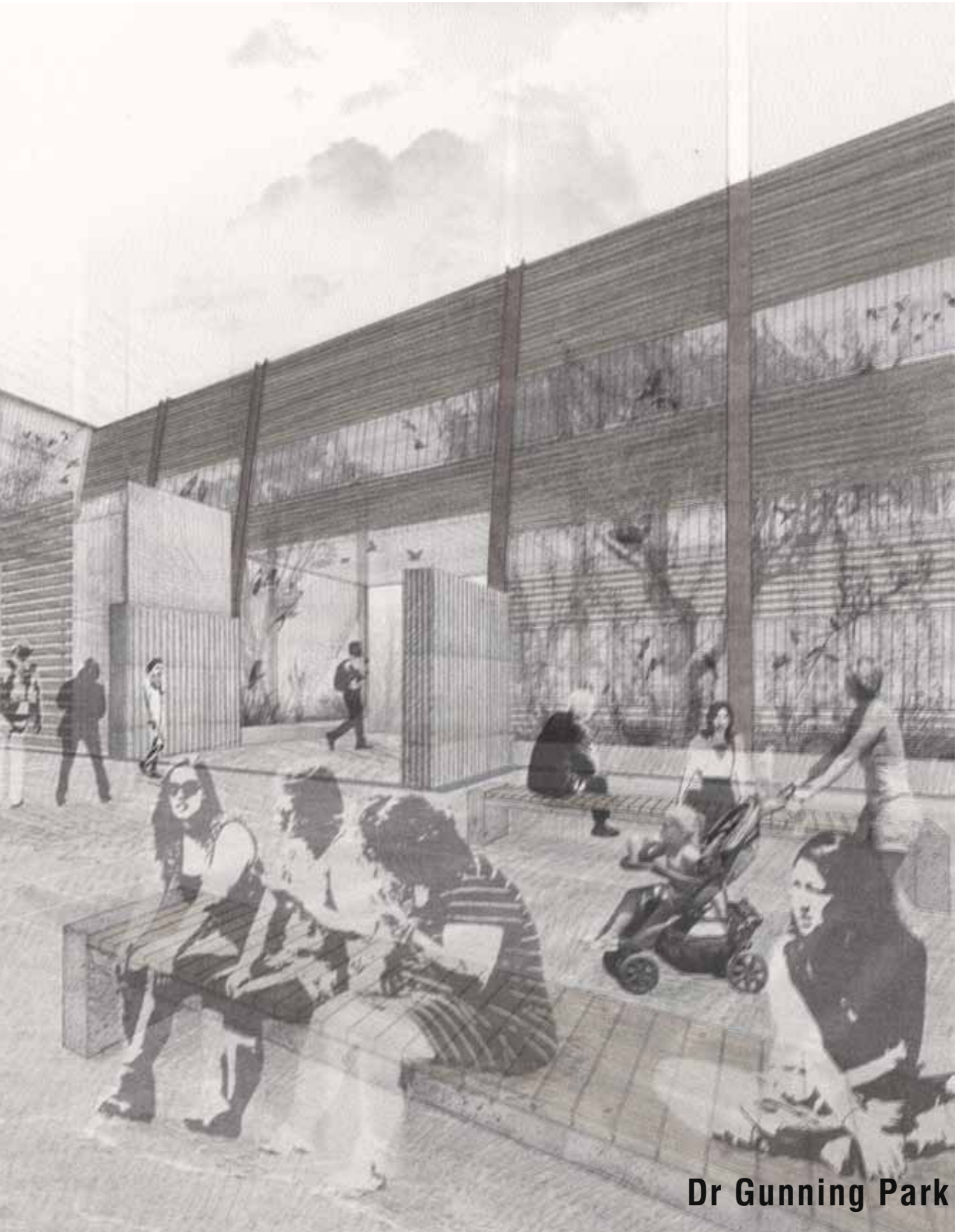
Figure 8.13 Perspective of Workshop area (Author, 2012).



Workshop Courtyard



Figure 8.14 Perspective of Dr Gunning Park (Author, 2012).



Dr Gunning Park



Figure 8.15 Perspective of new exit (Author, 2012).



Access to the Zoological Gardens



Figure 8.16 Perspective of Viewing deck (Author, 2012).



Viewing Deck



Figure 8.17 Perspective of "Gratis" Viewing area (Author, 2012).

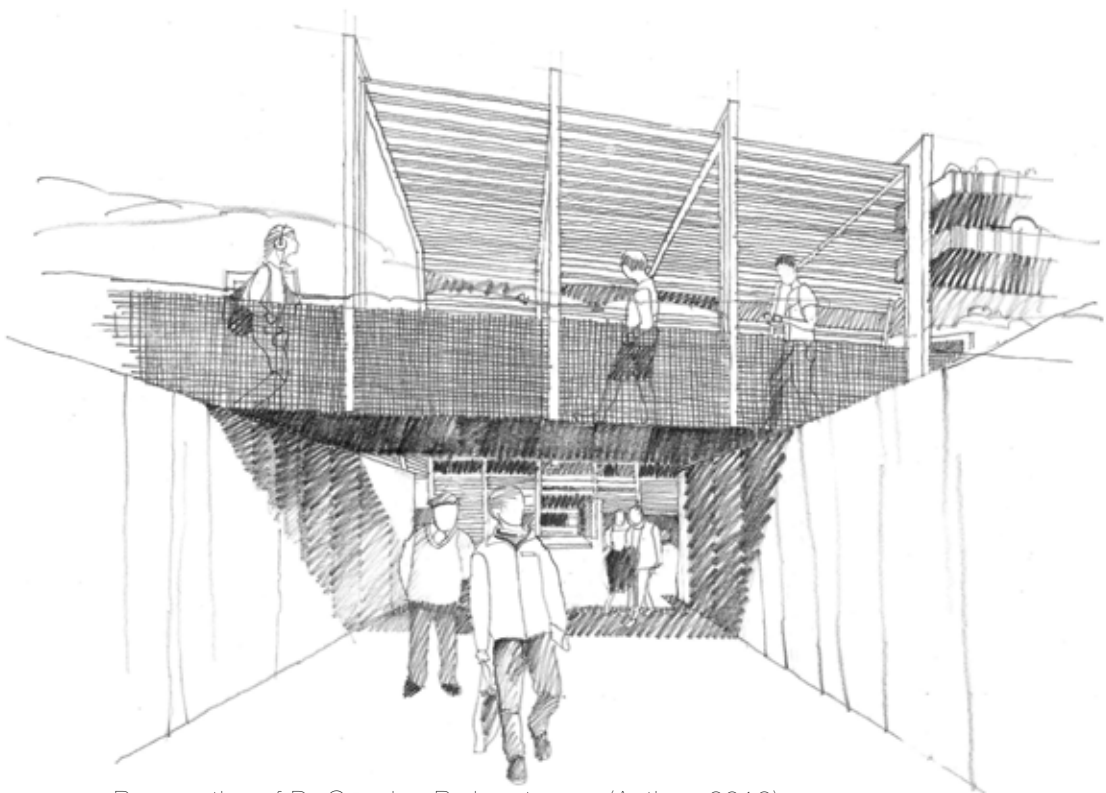


Figure 8.18 Perspective of Dr Gunning Park entrance (Author, 2012).



Figure 8.19 Perspective of "Gratis" Observatory Route (Author, 2012).



Figure 8.20 Photographs of Final model (Author, 2012).





Figure 8. 21 Final presentation (Author, 2012).

acknowledgements

Though only my name appears on the cover of this dissertation, many people have contributed to the completion. I am grateful to the people who have made this dissertation possible.

Dr Arthur Barker, thank you for being a remarkable teacher, giving me the freedom to explore on my own, and at the same time the guidance to recover when I wavered. You taught me how to question thoughts and express ideas.

Derrick, thank you for believing.

To my friends, family and Francois thank you for helping me stay sane.