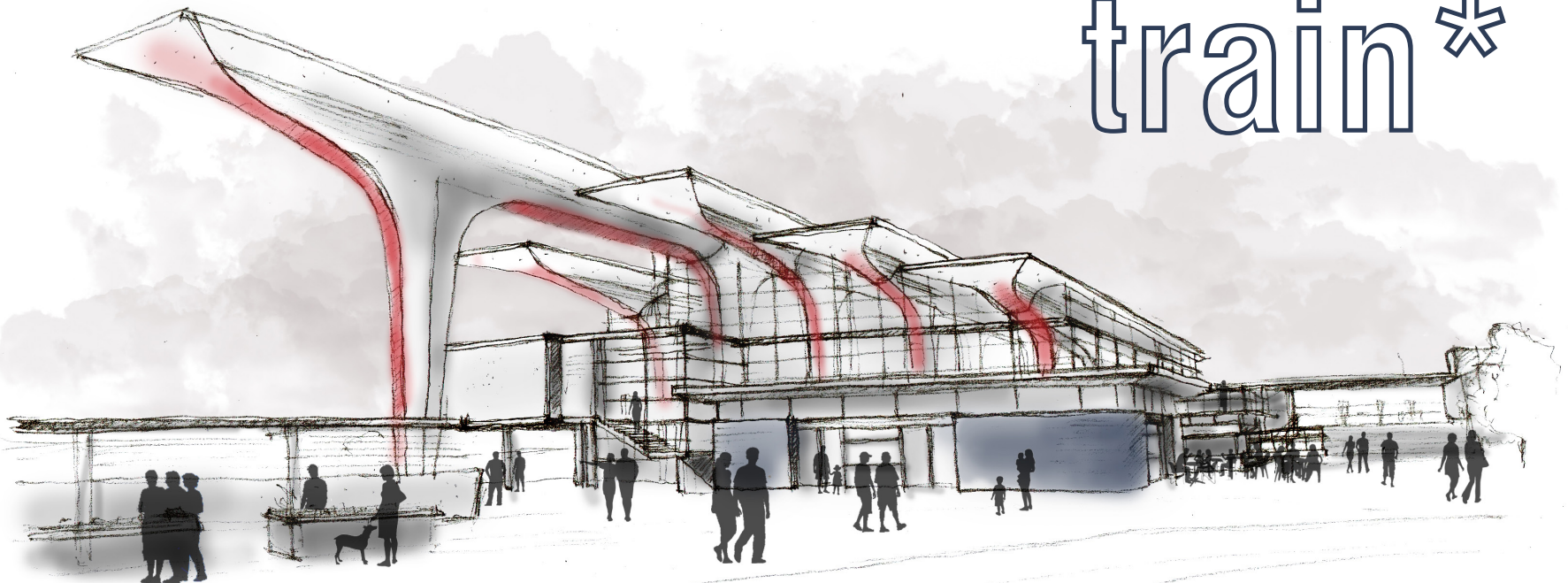


train*



From Spaces of Potential to Places of Interaction

Submitted in partial fulfilment of the requirements for
the degree Master of Architecture (Professional)

Department of Architecture

Faculty of Engineering, Built Environment and

Information Technology

University of Pretoria 2012

By Erika Kleinhans

Course coordinator: Dr Jacques Laubscher &

Dr Arthur Barker

Study leader & Mentor: Mr Gary White

All the thanks to my Heavenly Father,
Friends and Family for all their
support and encouragement.
You helped to make my dream come true!
May this be a start to a great career...

Fil 4:13



[site]

25°23'22.97"S
28°16'44.96"E

Project Summary

Programme: Sports Development Centre

Clients: Gauteng Department of Sport, Arts, Culture and Recreation, Nike and Altus Sport

End-Users: The community members of Hammanskraal and Temba.

Site Description: Hammanskraal
Leeuwkraal Dam

Site Location: The site is located in the green corridor next to the Leeuwkraal Dam. Topographically, the site divides the community into two parts. The site is currently used as a thoroughfare and is perceived as a dangerous area because of the prevalence of crime.

GPS Coordinates:

25°23'22.97"S, 28°16'44.96"E

Architectural Theoretical Premise:

The dissertation investigates how sports activities and facilities can be introduced into the public realm to promote public participation, interaction and awareness (whether direct or indirect) to foster a supportive sport culture.

Architectural Approach:

An architectural surface-based approach is used to create a threshold space between the public realm and sports facilities that incorporates and responds to the surrounding environment.

Research field:

Urbanism and human settlements



In accordance with Regulation 4(e) of the General Regulations (G.57) for dissertations and theses, I declare that this thesis, 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 my thesis 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.

The dissertation is 18163 words long (excluding the scanned items).



Erika Kleinhans

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Fig 1_ View of the site, Author 2012

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Fig 2_ People in a public space, Gehl 2002

Preface

Architecture should respond to a wide variety of elements and bring them together to form a harmonious whole. The design should be sensitive to the surrounding environment, as well as protect, acknowledge and draw inspiration from it to provide a space where people can interact with each other in a meaningful manner.

The beauty of architecture is in its detailed approach to the culmination of the elements and design considerations presented in a truthful and honest way.



Fig 3_ Hammanskraal railway line, Author 2012

This dissertation investigates the role of Architecture in promoting participation, interaction and awareness of the public in sporting activities, specifically with regard to the underprivileged community of Hammanskraal.

The problems with the existing sports facilities are the following:

- * the location of the facilities; and
- * the fact that even though they are public facilities, they do not necessarily act as public spaces. They are fenced off and cover a vast area of land without providing proper shade for the players and spectators.

The proposed intervention addresses these problems through the introduction of sports facilities into the public realm. This is achieved through locating of these facilities next to a new railway station and pedestrian

and vehicle route that crosses over the railway line (Fig 3).

The proposal intends to create a threshold space for members of the community in which to interact through sport, trade, social and cultural activities. The programme will provide sports training fields, a multi-functional hall, a gymnasium, a station and retail facilities.

The architectural response is informed by the following :

- * the amalgamation of sports facilities with the public space;
- * programmatic requirements; and
- * responses to contextual conditions.

Abstract

Chapter 1

Introduction

This chapter provides the background to and context of the dissertation and introduces the reader to the aims, design problems and research methodology followed throughout the design process.

'For too long the identification, development and nurturing of young sports athletes was a privilege that was afforded to a select few during the previous dispensation. Our present government realizes the importance of sports as a key factor in ensuring nation building and social cohesion. We know that to produce excellent sports athletes takes years of training and guidance and that talented athletes should be identified from an early age.'

(FSSACR, 2011)



Fig 1|1_ Children playing soccer, Author 2012

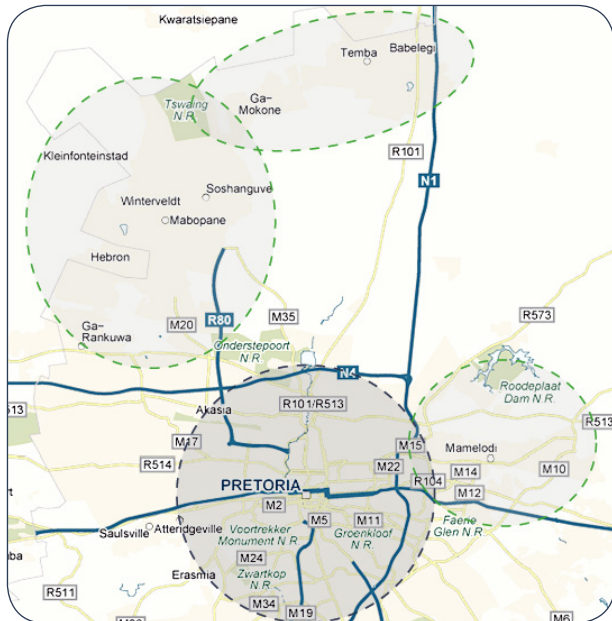


Fig 1|2_ Underprivileged rural communities around Pretoria CBD, Author 2011

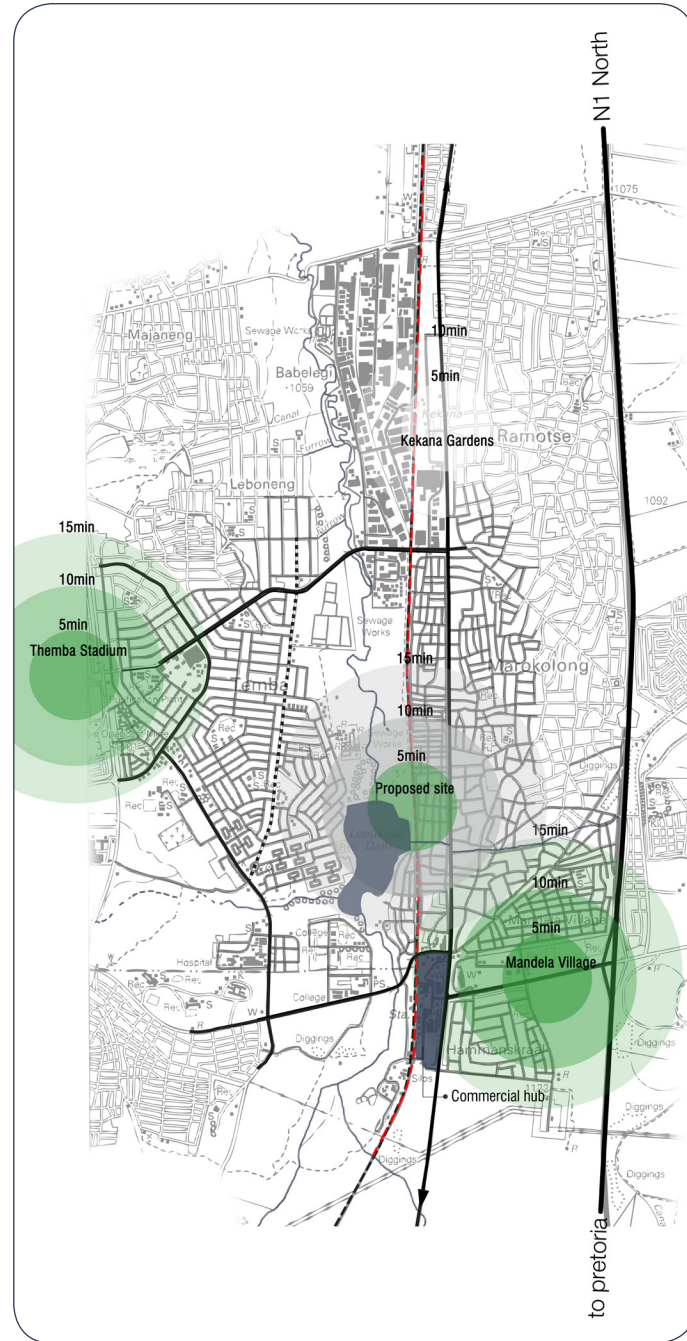


Fig 1|3_ Sport facilities in relation to the proposed site with an indication of walking circles, Author 2012

Introduction

According to the Minister of Sport and Recreation, Mr Fikile Mbalula, there is a need for the development of sport in South Africa, especially in rural areas where people have limited access to facilities and supporting infrastructure (Smith, 2011). Athletes need support and other infrastructure to be able to develop optimally. Thus because of the above mentioned situation, many talented athletes never have the opportunity to develop their abilities (Fig. 1|2). Even when a community has access to sports facilities, sport cannot reach its full potential without the participation of the community.

Existing sports facilities are mostly secluded and placed on the periphery of communities. This means that these facilities are outside of the public realm and are removed from the daily activities of the community. For example in Hammanskraal the sports facilities are not located in

the vicinity of the commercial and transport hub. This results in the community members having to travel extra distances to make use of the sports facilities, and the opportunity for interaction and awareness of the sport activities is lost (Fig 1|3).

Even though sport architecture generally provides sport infrastructure, it does not necessarily provide public spaces for people in which to interact on different levels. The focus of the facilities is placed on the needs of the athlete. The other participants of a sporting event (such as the spectators, referees and food vendors) make the event memorable and influence the experience of participating in sport, but they are often not taken into account. The layout of the facilities does not allow for the individual that passes by (the incidental participant), to also become involved in the sporting activities.

This dissertation investigates the role of architecture in the promotion of participation, interaction and awareness of the public in sporting activities, specifically in the underprivileged community of Hammanskraal.

The current predominant approach to South African sport architecture will be critically investigated in order to ascertain its level of engagement with the public and the success thereof.



'The track was fast and easy to run on and it just all felt so cool. It was great to be so close to the fans on the streets and I hope there will be more of this to come'

Usain Bolt (Bupa Great City Games, 2011)

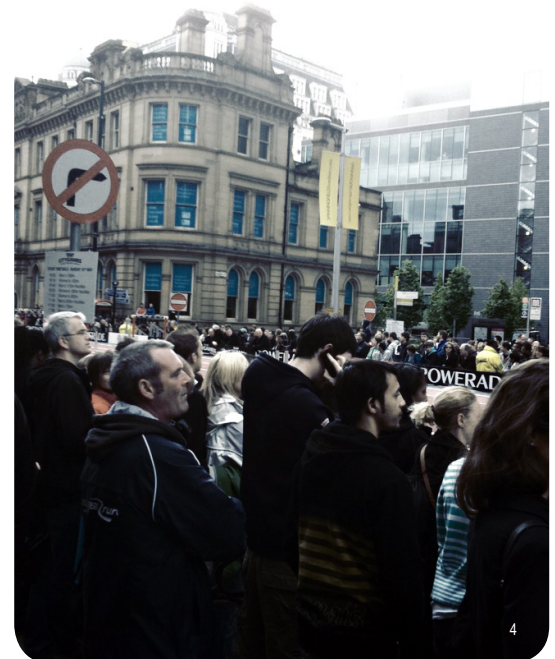


Fig 1|4_ The Great Manchester 150, Livesey 2009

The dissertation addresses the problems that arise from the existing sport infrastructure provided in townships in Southern Africa, which will be further discussed in Chapter 2. A new infrastructure model is proposed that brings sports facilities and public amenities into closer proximity to one another. The proposed infrastructure model also creates different view points with regard to daily activities and sporting events. This approach could promote participation in, interaction with, and awareness of sports activities among the different users of the community. The proposed approach could also foster a supportive sports environment that will motivate and encourage participants to develop their sporting abilities further.

The proposal builds on the initiative of the 'The Great Manchester 150' event (Fig. 1|4) that takes place yearly at the Bupa Great City Games. This event takes place on a specially constructed four lane track in one of the main streets of Manchester, England (England Athletics, 2010). Nova, the organisers of the event, stated in England Athletics newsletter (2010) that the initiative was brought about to make athletics more accessible to the public and to showcase talent on the streets of the city.

The proposal intends to create a threshold space for the members of the community in which to interact through sport, trade, social and cultural activities. The programme will provide sports training fields, a multi-functional hall, a gymnasium, a station and retail facilities.

01|1_ problem statement

01|1.1_ Sub-Problems

The following sub-problems need to be investigated in order to understand the context and impact of the design problem:

- * the current sport development structures;
- * the approaches to sport architecture within townships;
- * the role of the various participants participating in sports and public activities; and
- * the manner in which the spatial experiences of the participants can be enhanced through architecture.

This investigation will be done through a literature study of the existing literature regarding public spaces and organisations, as well as precedent studies of township architecture. A better understanding of the users' needs,

the layout of the community and the current urban situation (infrastructure and other factors) will inform the design proposal of the centre.

01|1.2_ Hypothesis

It can be hypothesised that public participation in, interaction with and awareness of sport could be achieved through sports fields being brought closer to the public realm. This process could be done in such a way that the public realm defines the edges of the sports field.

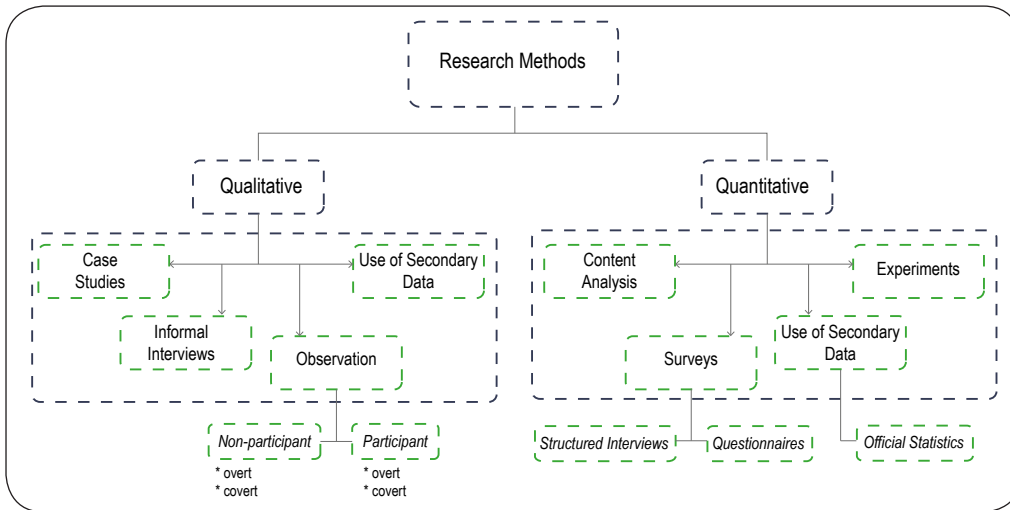


Fig 1|5_ Research Methods, ProfEssays

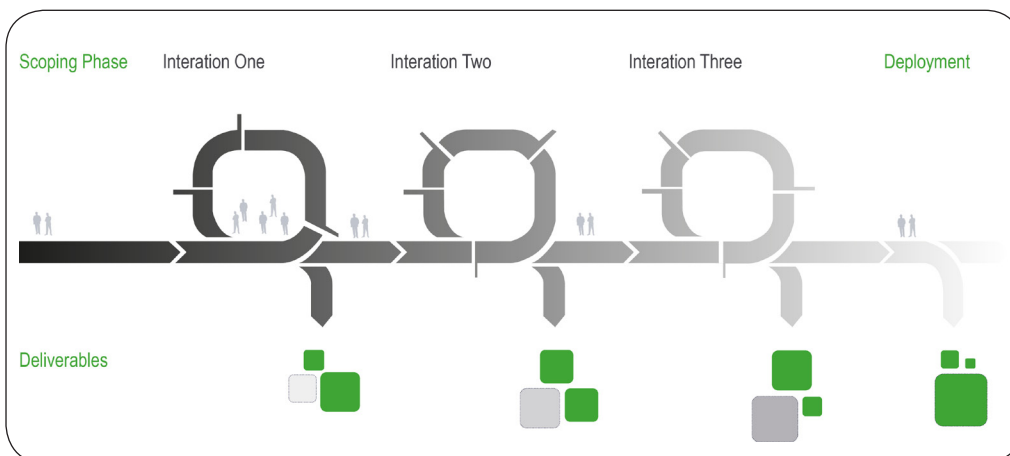


Fig 1|6_ Iterative design process, Digital Eskimo

01|2.1_ Research Methodology

A qualitative research method will be employed which, as proposed by Mayoux (2005), “does not primarily aim for the precise measurement of pre-determined hypotheses, but rather develops a holistic understanding of complex realities and processes. Which will result in the cumulative emergence of questions and hypotheses as the investigation progresses” (Fig 1|5).

The significance of the site and its surroundings will be determined through a contextual analysis of the macro- (the entire precinct), meso- (neighbourhood) and micro-level (site). These findings will be supported and supplemented by information gathered through informal interviews (narratives), participant observation, case studies and visual media (such as photography and video footage).

01|2.2_ Design Methods

“Design is one approach of inquiry and action among many used by humans to engage with the world.”

Erik Stolterman (Krogh, 2011).

A combination of research through design and research on design (precedent studies) will be used during the study. The approaches will interact with and inform each other in order to strengthen the theoretical and design decisions.

A thematic investigation, ideation and iteration process will be used (Fig. 1|6). The theory will inform the practice of the proposal and the practice will inform the theory. The process will be driven by practical application.

01|2_ methodology

01|2.3_ Contextual information

The contextual information that will be acquired through mapping, interviews, observation and previous studies of the area will assist in understanding the environment in which the community operates. This information will also assist in formulating the programme and layout of the proposed intervention.

The analysis of the contextual information will include the following:

- * the existing sports grounds, schools and public areas;
- * transport routes and nodes (both public and private);
- * pedestrian movement within walking distance from the site;
- * significant views from and to the site;

- * green spaces and natural resources;
- * the accessibility of the site;
- * the social zoning of the community;
- * the identity and genius loci of the surrounding communities and the site;
- * energy zones (activities);
- * how the site is defined by edges and surfaces (or boundaries);
- * materials used in the vicinity of the site; and
- * the networks of daily activity.

01|2.4_ Delimitations

Instead of a traditional or formal sports facility dedicated to one sport only, the design proposal aims to provide a multi-functional centre. A multi-functional centre will promote the different sports, trade and life skills needed to facilitate public participation.

The programme will not specifically provide dedicated sports fields, but will rather integrate and upgrade the existing open spaces within the community.

It is envisaged that the centre will form the heart of existing initiatives and will help to improve sport opportunities, as well as develop community involvement.



Fig 1|7_ Members involved in the project

01|2.5_ Assumptions

The proposed infrastructure will build on the Tshwane Open Space Framework (City of Tshwane, 2005) and the Local Spatial Development Framework for the Far North Eastern Area (City of Tshwane, 2008).

Although funds will be generated for the development, excessive costs should be avoided during the construction and operation period. Passive design principles should be employed to reduce the load on energy resourced.

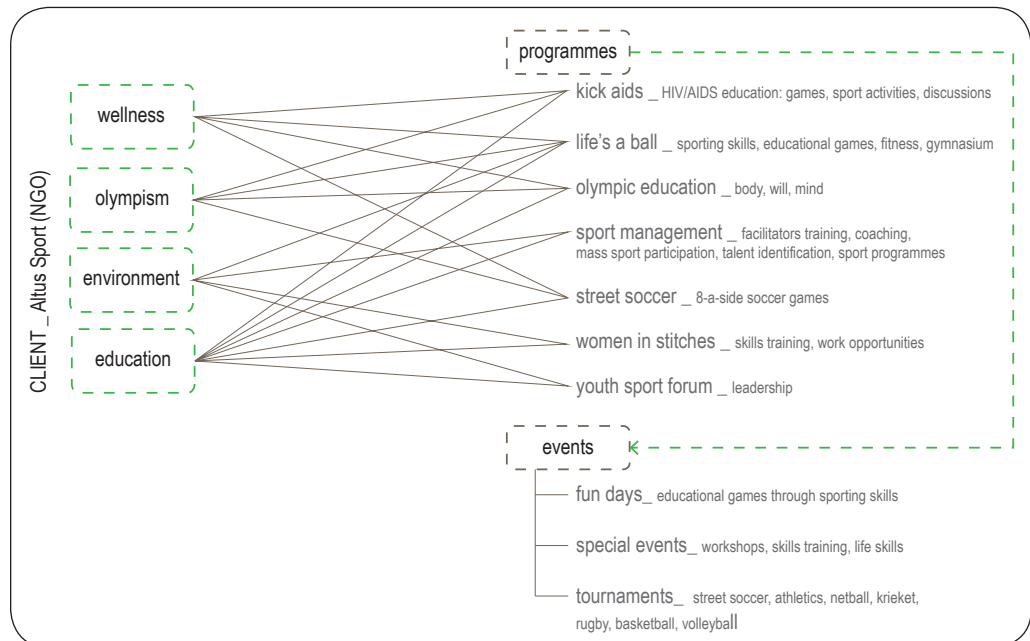


Fig 1|8_ Client profile, Author 2012

01|3_ client profile

01|3.1_Client Profile

The client is a Public-Private Partnership between the Gauteng Department of Sport, Arts, Culture and Recreation, the City of Tshwane and Nike as sponsor. (Fig 1|7).

01|3.2_Tenants

The proposed tenant is Altus Sport, a non-governmental organisation (NGO) and member of the Sport for Social Change Network (SSCN). Altus Sport aims at promoting sport growth and strengthening leadership skills in communities through workshops and events.

Since its inception in 1995, Altus Sport's members have been actively involved in several underprivileged communities, including Hammanskraal, where they have been initiating numerous sports events and workshops for the last ten years.

Through their sport educational programme, Altus Sport promotes sports participation that is integrated

and connected to real life situations and values. This sport participation is represented by environmental issues, wellness and Olympism (which is a philosophy of life, exalting and combining, in a balanced whole, the qualities of body, will and mind (Altus Sport, 2012)).

Altus Sport's programmes focus on the following (Altus Sport, 2012) (Fig. 1|8):

* **Primary schools:** includes the development of various sporting and life skills, such as environmental awareness, wellness and Olympism.

* **High schools:** includes the encouragement of high school children, especially girls, to participate in sport. Further training also includes the provision of information concerning HIV/Aids, human trafficking, teen pregnancy

and other issues.

* **Youth Sport Forum:** includes the enabling of young people through skills training to become tomorrow's leaders.

* **Read and Write Project:** includes the assistance of grade ones and twos by Youth Sport Leaders and Life's a Ball participants.

Altus Sport will manage the centre initially, but they will empower the community to take ownership once the centre is properly established.

01|3.3_End-users

The end-users will be the community members of Hammanskraal and Temba.

Chapter 2

The Nature of the Problem

This chapter investigates the nature of the problem with regard to the existing sport development structures and the approach to sport architecture in Southern Africa. The chapter also provides an overview of the relevant literature that supports the theoretical argument of dynamic public spaces and their effect on the surrounding community.

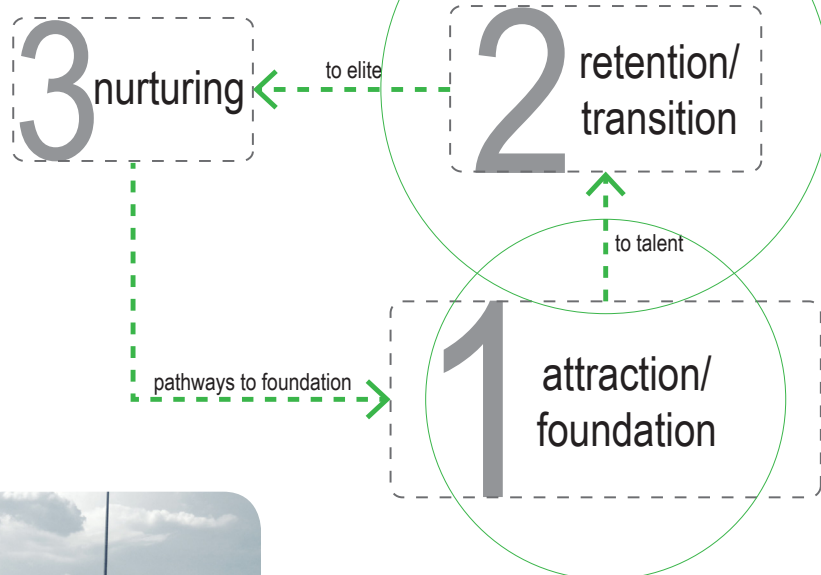


Fig 2|1_ Sport Development Processes, Sotiriadou 2005:191



I am compete in the 100m sprint
at the South African Youth Championships.
I train at the Technicon in Pretoria.
Koketso Manamela, 17 years old



Fig 2|2_
Sport Initiatives in Hammanskraal,
Author 2012

Fig 2|3_
Mandela Village Sport Centre,
Author 2012

Fig 2|4_
Talented athlete in Hammanskraal,
Author 2012

In order to address the shortcomings of sport development structures in South Africa, the current state of sports facilities and infrastructure needs to be investigated. This investigation will lead to a better understanding of how the proposed intervention can overcome the shortcomings and allow for a space that promotes participation, interaction and awareness among the public and sport users.

Sotiriadou (2005:190), in his study of sport development processes, concludes that there are three distinctive processes, namely attraction, retention and nurturing (as demonstrated in Fig 2|1). These processes are interrelated through three different sport development pathways, namely talent, the elite, and a foundation (Sotiriadou (2005:190)). These pathways link the processes in a continuous fashion and illustrate the

02|1_ sport development structure

movement of participants. These pathways also illustrate the impact that each process may have on other facets of sport development.

The attraction process focuses on talent identification and the provision of the necessary facilities for the community to be able to participate in sport (Sotiriadou (2005:191)). The retention or transition phase focuses on motivation and the provision of the necessary support system for athletes to further their talent (Sotiriadou (2005:205)). The last process – nurturing – focuses on established athletes by providing them with specialised structures to ensure that they will keep performing at their best (Sotiriadou (2005:215)). An athlete's knowledge then contributes to the foundation level through coaching and skills transfer.

In Hammanskraal, the community does have access to

sports facilities. Although these facilities are situated on the edges of the community several sport initiatives and events are held throughout the year. The main focus of these sports activities is to keep children off the streets and out of trouble after school and thus provide the basic infrastructure for the attraction or foundation level.

Talent identification within the community does happen to some extent, but is not a primary focus because of the lack of a retention or transition phase in Hammanskraal. Talented athletes have to travel by bus to the Pretoria central business district (CBD) located 40km from Hammanskraal to receive proper coaching and support systems to become professional athletes. Athletes may become discouraged because of this gap in the system and may eventually give up their dreams of furthering their sporting careers.

Once an athlete is identified and moved to the retention or transition process, it is of great importance that the athlete is motivated and supported. Motivation and support by management, the coach and especially friends and family is vital. Hammanskraal currently lacks this type of supportive culture during games and training sessions and therefore there is a need for public participation. The public could be exposed indirectly to the sports activities to foster a more supportive culture. This process could be encouraged by placing sports infrastructure within the public realm and by situating it in the middle of the community.

In terms of sports infrastructure, the proposed intervention will primarily focus on providing the desired facilities and programmes for talent identification and the retention or transition phase.

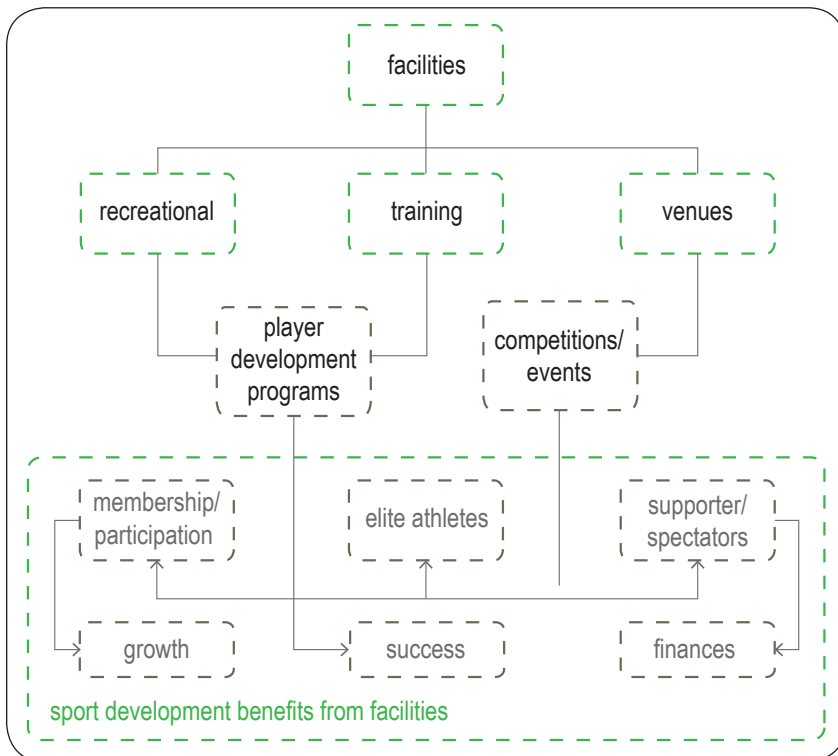


Fig 2|5_ Sport Development Benefits from Facilities , Sotiriadou 2005:154

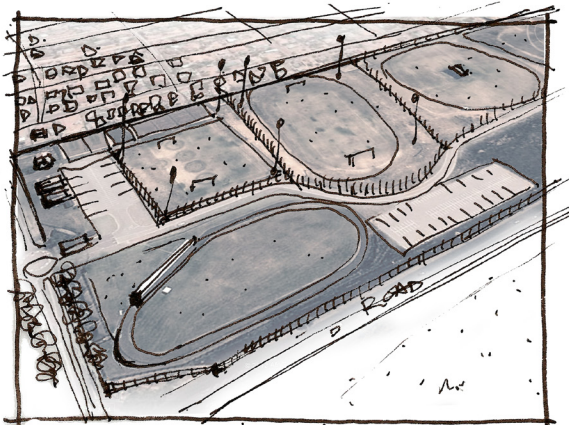
Current problems pertaining to sport facilities need to be addressed before a proper sport development structure with sufficient support from the community can be established.

The type of sport facilities provided and their location needs to be addressed to ensure use and ownership by the community.

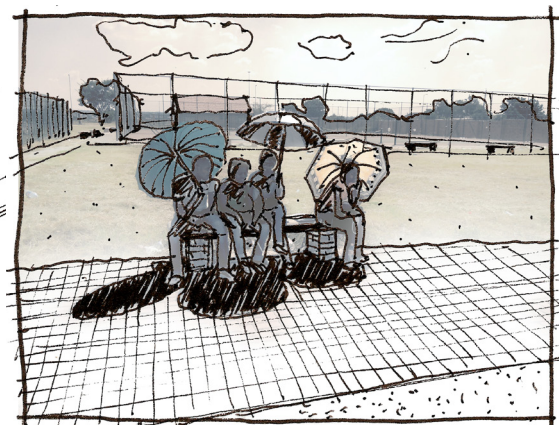
There are three different types of sport facilities (Fig 2|5) – recreational, training and venue facilities. The Mandela Village Sport Centre in Hammanskraal is an example of a training facility, while Temba Stadium is an example of a sports venue (Fig. 2|7).

Both these facilities are located on the periphery of their communities, outside the public realm, which makes them difficult to access. Characteristics and critique in

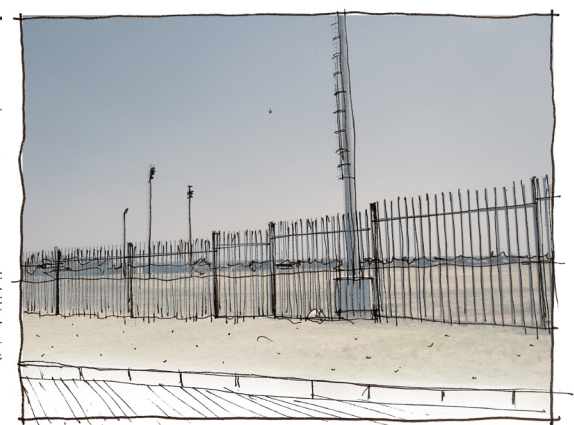
02|2_ approach to sport architecture



Vast open fields - harsh environment, unpersonal



No proper spectator stands or shading



All fields are fenced off

Fig 2|6_ Characteristics of the Mandela Village Sport Centre, Author 2012.

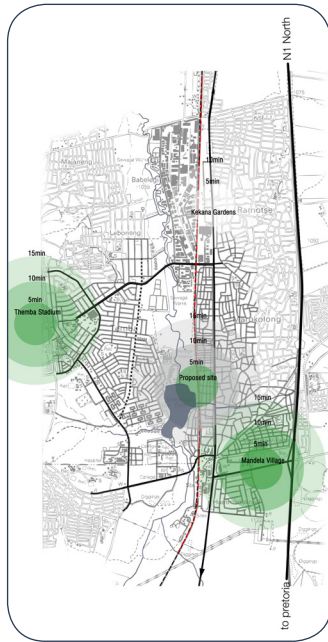
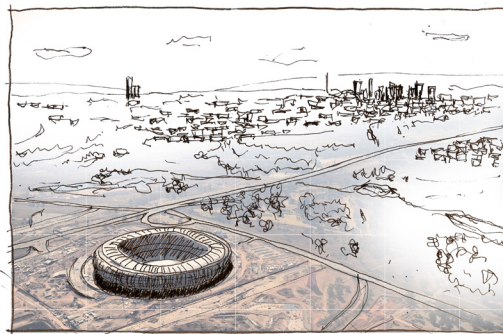
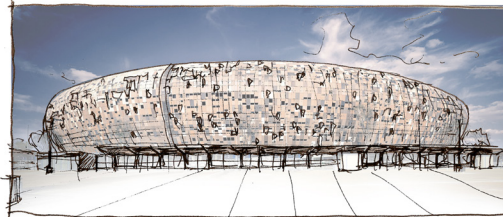


Fig 2|7_ Sport facilities in relation to the proposed site, Author 2012



Situated on the edges of the city - away from everyday activity



Contained - event happens inside secluded from the community



Excessive parking

Fig 2|8_ Characteristics of Venues, Author 2012



Fig 2|9_ Temba Stadium, Author 2012

terms of the sport architecture of these facilities will be given in detail in the following section.

02|2.1_ Recreation and Training Facilities (Mandela Village Sport Centre_ Fig 2|6)

Recreation and training facilities are characterised by vast sites with several pitches located next to one another. A substantial amount of parking is provided that is used once a year during a big event. No provision is made for shade or ablution blocks for spectators close to the fields. All the fields are fenced off and even when the gates are open, there is some kind of controlled access or booking system. The facility provides sports fields for the community to use, but does not actually give its members the opportunity to participate in the events and make these events their own.

The council has provided offices and small shops that are fenced off in an attempt to compensate for the lack of community involvement. If one considers the extensive management and resources needed to keep the fields maintained and to provide lighting (and other services), then the facility can be seen as an unsustainable design that exists in a harsh, impersonal environment.

Even though these sports facilities are intended for public use, they do not necessarily become public facilities.

02|2.2_ Venues (Temba Stadium_ Fig 2|8 &9)

Contrary to the above mentioned, stadiums are provided that incorporate grand stands and seating all around one field and are essentially focussed on the internal event (for example, Temba Stadium and the FNB Stadium in Soweto). By nature, the structure of these stadiums excludes the public from what is happening inside. In addition the stadiums are usually surrounded by access control measures and vast expanses of parking for occasional events, that push the boundary of interaction between the sport and public activities even further apart .

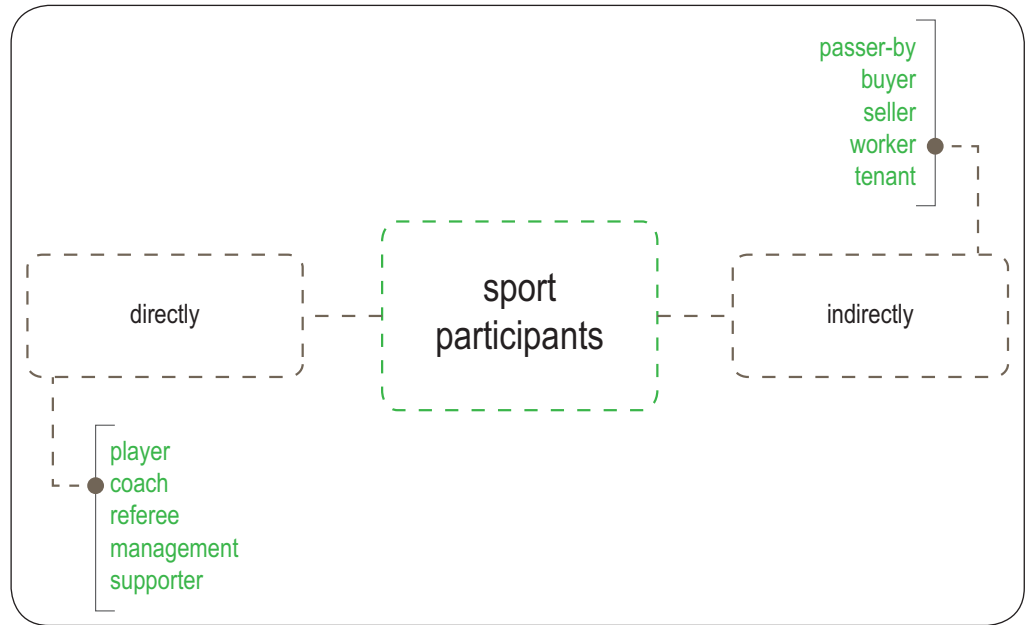


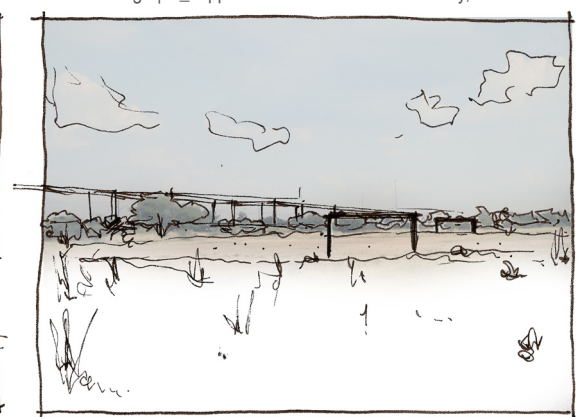
Fig 2|10
Participants participating in sporting activities,
Author 2012



Street Soccer



Soccer on scraped communal pitch



Open harsh landscape

Fig 2|11_ Opportunities within the community, Author 2012

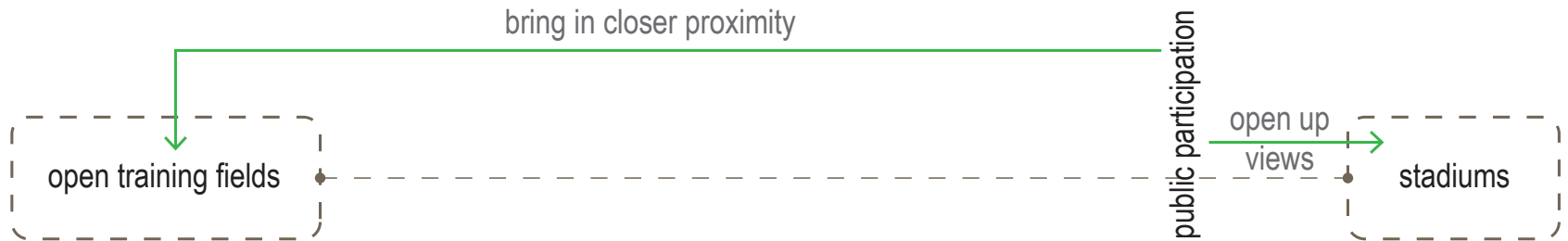


Fig 2|12_ Sport Architecture Concept, Author 2012

02|2.3_ Opportunities

There are several initiatives in the community that move away from sports stadiums and training centres. These initiatives integrate the public realm and indirectly promote participation, interaction and awareness in a more effective manner. These activities include street soccer and games on communal grounds within the community (Fig 2|11).

These informal, communal grounds do not have any supporting infrastructure, such as ablution facilities, water points or even proper shade, apart from a few trees.

Yet, despite the lack of proper infrastructure, these activities create a vibrant energy in the community. This energetic ambience between players and

spectators can be drawn on in order to provide a sport development facility within the community that promotes public participation (Fig. 2|12).

The proposed intervention will also consider the interaction and experience of all the participants that visit or use the building. The participants could be directly involved in the sports activities and events, or they could be indirectly involved through passing by and pursuing their daily activities close by to the facilities (Fig. 2|10).

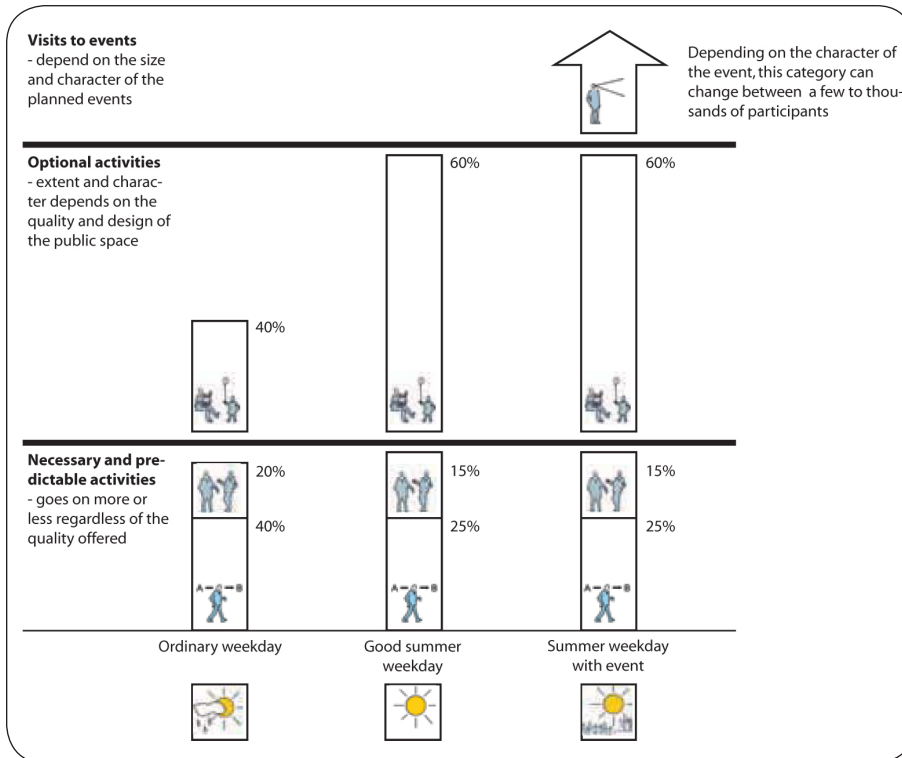


Fig 2|13_ Percentages of users in public spaces determined by the type of activities and weather, Gehl 2002

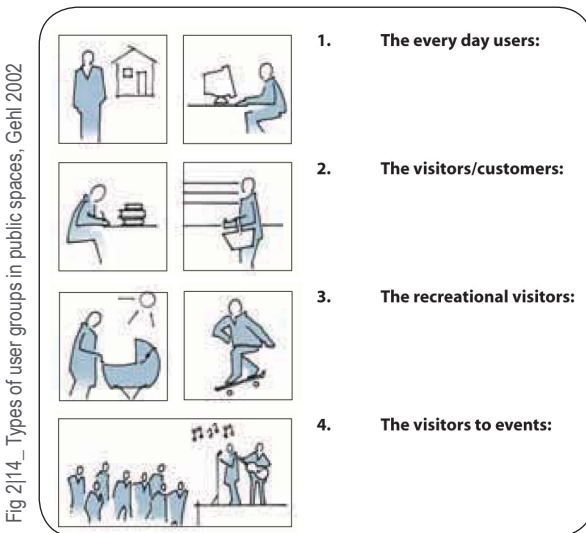


Fig 2|14_ Types of user groups in public spaces, Gehl 2002

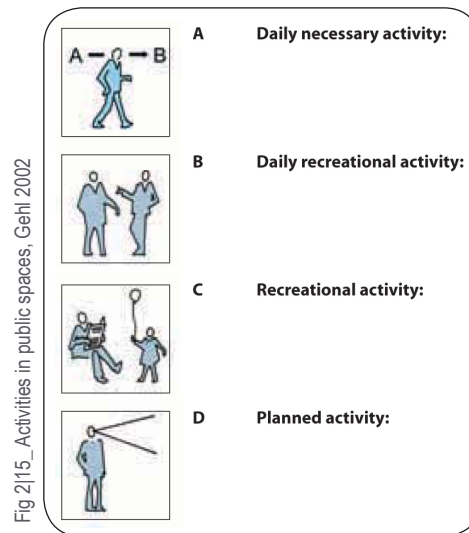


Fig 2|15_ Activities in public spaces, Gehl 2002



02|3.1_

Public Spaces and
Public Life

Jan Gehl (2002)

One should first consider what happens in public spaces and how people use public spaces in order to determine how sports activities can be introduced into the public realm.

Jan Gehl (2002), a Professor at the School of Architecture at the Royal Danish Academy of Fine Arts in Copenhagen, states that there are three different categories of activities in public spaces, namely necessary, optional and social activities.

Necessary activities are those that have to be done regardless of the quality of the surrounding environment, for example going to school or waiting for a bus. Yet, according to Gehl (2002:9), if good conditions are provided for the many necessary activities, it will retain and strengthen these activities over time.

Optional activities are associated with recreation and are, to a great extent, determined by climatic conditions and the quality of the surroundings (Gehl, 2002:9). These activities draw people to public spaces. Gehl (2002:9) states,

02|3_ literature review

“A Good City is characterized by a multitude of optional activities. People come to town, find the places attractive and stay for a long time”.

Social activities occur whenever people move about in the same spaces (Gehl, 2002:9). Watching, listening and experiencing other people allows for passive and active participation. The number of optional activities will determine the intensity of the social activities.

“The city then becomes a lively and wonderful city. A people city” (Gehl, 2002:9).

Optional and social activities are important with regard to the quality a city. Provision should be made for necessary activities, but circumstances should also allow for tempting and good quality spaces where people would want to spend their time.

According to Gehl (2002:10), pedestrian traffic and pedestrian activities provide the key to establishing lively and safe public spaces.

People arrive at public spaces by different means – by foot, by car, by bus, by train, or by bicycle. However, people eventually become pedestrians who leave their mode of transport behind, enter public spaces and experience the surroundings at eye level.

If provision is made for conditions that are conducive to walking, along with opportunities to ‘linger’, pause and experience one’s surroundings, vibrant urban spaces can be created.

It should also be kept in mind that apart from these spaces there are different types of public space users that relate to the various sport participants. These public

space users can be broadly classified as the following groups (Fig 2|14 and Fig 2|15):

- * Everyday users: people who live and work in the area or walk through it.
- * Visitors or /customers: people who visit the area.
- * Recreational visitors: people who visit the area because the public space is pleasant or use it for recreation, pleasure, exercise and play.
- * Visitors to events: people who visit the public space because of special events.

Gehl (2002:11) states that when planning public spaces, the most important group of people are those people who visit the area because the public spaces are “delightful”. Public spaces should therefore be highly

DESIGNING / DETAILING THE PUBLIC SPACES
A KEY WORD LIST

P R O T E C T I O N	1. Protection against Traffic & Accidents <ul style="list-style-type: none"> - traffic accidents - fear of traffic - other accidents 	2. Protection against crime & violence (safety) <ul style="list-style-type: none"> - lived in / used - streetlife - streetwatchers - overlapping functions - in space & time 	3. Protection against unpleasant climatic extremes <ul style="list-style-type: none"> - wind / draft - rain / snow - cold / heat - sun / glare 	
	C O M F O R T	4. Possibilities for WALKING <ul style="list-style-type: none"> - room for walking comfortably - un-tedious layout of streets - interesting facades - good surfaces - no obstacles - good accessibility to key points 	5. Possibilities for STANDING / STAYING <ul style="list-style-type: none"> - staying zones - 'Edge effect' - defined spots for staying - supports for staying 	6. Possibilities for SITTING <ul style="list-style-type: none"> - zones for sitting - maximized advantages primary sitting positions secondary sitting poss. - benches for resting
		7. Possibilities to SEE <ul style="list-style-type: none"> - seeing-distances - unhindered views - interesting views - lighting (when dark) 	8. Possibilities for HEARING / TALKING <ul style="list-style-type: none"> - low noise level - bench arrangements »talkscapes« 	9. Possibilities for PLAY / UNFOLDING / ACTIVITIES <ul style="list-style-type: none"> - invitation to physical activities, play & entertainment - day & night and summer & winter
E N J O Y M E N T	10. Scale <ul style="list-style-type: none"> - dimensioning of buildings & spaces in observance of the important human dimensions related to senses, movements, size & behaviour 	11. Possibilities for enjoying positive aspects of climate <ul style="list-style-type: none"> - sun / shade - warmth / coolness - breeze / ventilation 	12. Aesthetic quality / positive sense-experiences <ul style="list-style-type: none"> - good design & good detailing - views / vistas - trees, plants, water 	

Fig 2|16_ Public Spaces - Quality Demands, Gehl 2002

attractive and provide pleasant conditions for the users (Fig 2|13).

Within the above-mentioned user group, the focus can be on children, teenagers, adults or the elderly, and public spaces can be designed to meet the different needs of different groups.

Gehl (2002:11) also provides a list of criteria to be used as a guide in the design of public spaces (Fig 2|16). This guideline will be implemented and adjusted in the proposed design for Hammanskraal in order to create a vibrant public space.

The proposed intervention will create a public space where all the various elements could be addressed and introduced at a pedestrian level. The creation of such a public space will be done to improve the lack of proper public spaces that include a diversity of activities in Hammanskraal.

The environment should :

- * be pleasant to walk around in and pause for a while;
- * embrace and encourage social and cultural exchanges;
- * allow for talking, watching and experiencing; and
- * be lively, diverse and safe to move around in.



02|3.2_

Towards an Architectural Theory of Space and Organisations: Cognitive, Affective and Conative Relations in Workplaces

Kerstin Sailer and Alan Penn (2010)

The activities and users of public spaces are influenced and determined by the social networks and spatial organisation of the society.

Kerstin Sailer is a researcher in the field of workplace environments, building morphology and the sociology of architecture. Alan Penn is a Professor of Architectural and Urban Computing at the Bartlett School of Graduate Studies at the University College in London and is closely involved in the development and application of 'space syntax' methods and theories. Sailer and Penn (2010:1) investigate the organisational theory of human relationships, which can be governed not only by spatial rules (such as proximity or visibility), but also transpatial rules, which include conceptual closeness between people (such as common preferences, attitudes or behaviours)

How human societies can actually be seen as spatial phenomena is outlined by Hillier and Hanson (1984: 26):

"A society does more than simply exist in space. It also takes on a definite spatial form and it does so in two senses. First, it arranges people in space in that it locates them in relation to each other, with a greater or lesser degree of aggregation and separation, engendering patterns of movement and encounter that may be dense or sparse within or between different groupings. Second, it arranges space itself by means of buildings, boundaries, paths, markers, zones, and so on, so that the physical milieu of that society acquires a definite and recognisable spatial order."

Sailer and Penn (2010:7) correspond with Hillier and Hanson in stating that it is primarily the spatial configurations created by buildings that act to shape

society. Spatial configuration, as can be seen in the above quotations, is a social product created by people and organisations that make decisions on exactly what to construct and where to construct it. Sailer and Penn (2010:7) further argue that each decision is based on the knowledge of the currently existing built context.

Research done by Hillier, Pen and other (1993) regarding the 'Space Syntax' theory of natural movement found that the quality of social life within a space depends on the position of this space within the fabric of a city or a building. The research also found that more integrated spaces are livelier and are frequented by more people, while more segregated spaces show lower frequentation rates (Hillier et al, 1993). The existing sports facilities in Hammanskraal, which are situated on the edges of the community, is classified as segregated spaces.

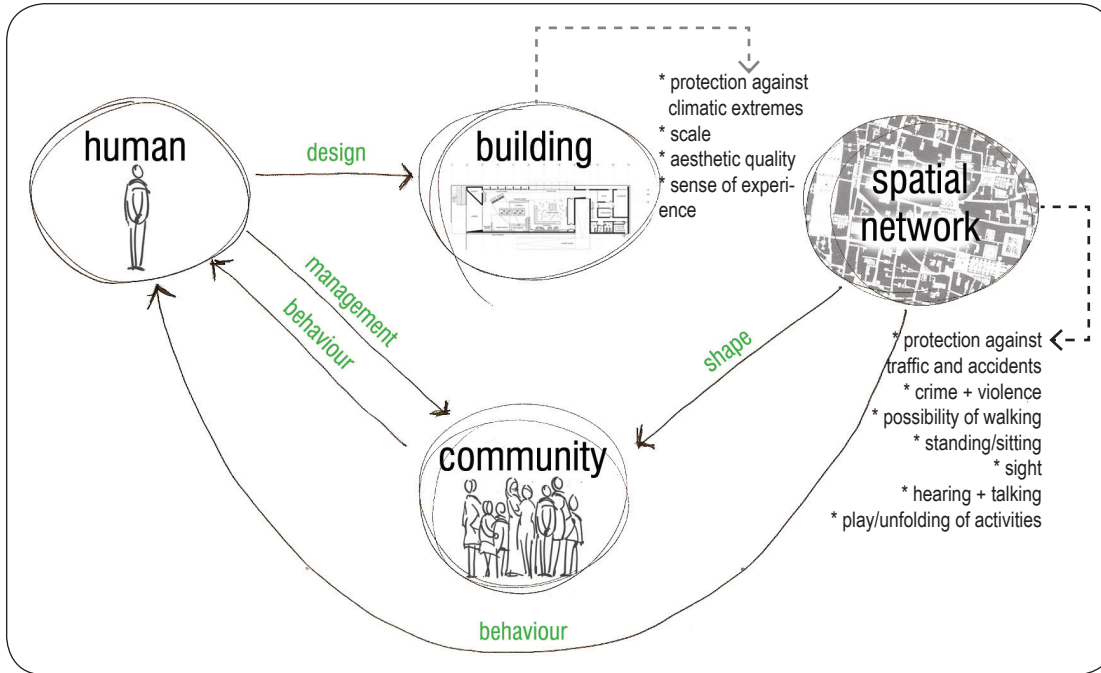


Fig 2|17_ A model of cyclic influence of social structure, social agency, spatial structure and spatial agency, Sailer & Penn 2010

Sailer and Penn (2010:8) further proposes the application of the three-fold psychological approach of cognition, affection and conation to bridge the gap between socio-organisational patterns and spatial patterns. This approach, can be used to explain the real-life phenomena of culture, identity, knowledge sharing and satisfaction in organisations.

Cognition refers to the process of generating information or knowledge (Sailer and Penn (2010:8)) and could relate on a spatial level to organisational functions in space, for example status. Affection refers to the emotional interpretation of perception, information or knowledge and it relates to place attachment, identification with spaces, or the feeling of a sense of place (Sailer and Penn (2010:8)). Conation relates information, as well as feelings, to intentional behaviour and links to purposeful

movement behaviour and the power of attractors in spaces (Sailer and Penn (2010:8)), for example water points in the Kudube Unit 9 neighbourhood which the community members use on a daily basis to collect water for the households.

Multiple relationships between spatial networks and social structures are established through this investigation. As illustrated in Fig 2|17, human beings shape buildings through design practice, but human beings also shape their community through management practice. However, the spatial network of buildings also shapes the community. Thus, both the buildings and the community affect the behaviour of human beings. Human beings in turn ultimately change the way they shape buildings and communities, which starts the cycle of influence again.

These social networks and the spatial organisation in the Hammanskraal society would inform the effect of the existing and proposed public spaces on the society.



02|3.3_

The Social Impact of Sport

Ramon Spaaij (2011)

When an architectural intervention successfully promotes public participation, interaction and awareness, a sport development programme can have a positive influence on the community (or society) and the spatial layout of the environment. This social impact can also have a positive effect on the individual athlete and provide opportunities to contribute to nation building in the South African context.

Ramon Spaaij is a Senior Research Fellow at the School of Social Sciences at La Trobe University, Melbourne, Australia, as well as at the Amsterdam Institute for Social Science Research at the University of Amsterdam. Spaaij's book, *The Social Impact of Sport*, contains ten essays that serve as a starting point for examining the ways in which sport contributes to, or inhibits, particular social outcomes. In the chapter, 'The social construction and impact of champions', Joseph Maguire (Spaaij, 2011:153) argues that

"Sport is both a separate world, and a suspension of everyday life, yet is also highly symbolic of the society in which it exists. In the context of sport we can both

experience a form of exciting significance that we rarely, if ever, encounter in our daily lives, and also conduct a symbolic dialogue with fellow participants and spectators that reveals things about ourselves and others. We are laid bare in sport in a way which we cover up in everyday life. Sport is a modern morality play that reveals fundamental truths about us as individuals, our societies and our relations with others. Sport, then, moves us emotionally and matters to us socially."

It is thus important to understand that sport can have an effect on society, whether the effect may be positive or negative. Sport can be used for 'civilising' a society through its disciplinary nature or it can reproduce or reinforce social inequalities (Spaaij (2011:158)). However, according to Spaaij (2011:158), these effects are coincidental and depend on the cultural meaning of

sport, as well as its context (Fig 2|18).

Therefore, when the specific symbolic and cultural meanings of sport within an identified community are understood. Calculated design decisions can then be made which have the ability to transform or contest these meanings through the proposed architecture.

Spaaij (2011:158) also states that sports activities are often intimately connected to other services, such as education and health.

Taking these factors into consideration, the proposed intervention can transform the current sport environment that is based on competition and individual performance into one that focuses on respect, tolerance and inclusiveness by providing an environment that will empower the community and be inclusive by nature.

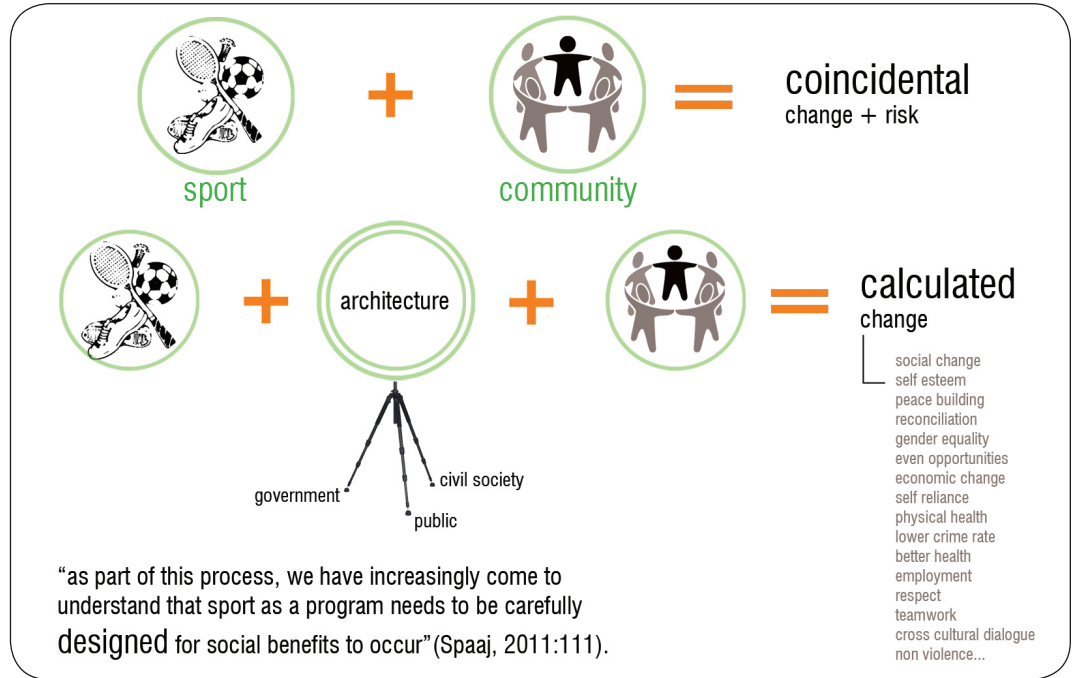


Fig 2|18_ The social impact of sport, Author 2012

Chapter 3

Contextual Analysis

This chapter gives a description of the surrounding environment within which the proposed site is located. The relevant facts regarding the location, history, current conditions and characteristics of the site are highlighted to ensure that an appropriate contextual response for the intervention is given.

03|1_ location

The rural area of Hammanskraal, situated in the far northern district of the City of Tshwane in Gauteng, was chosen for investigation.

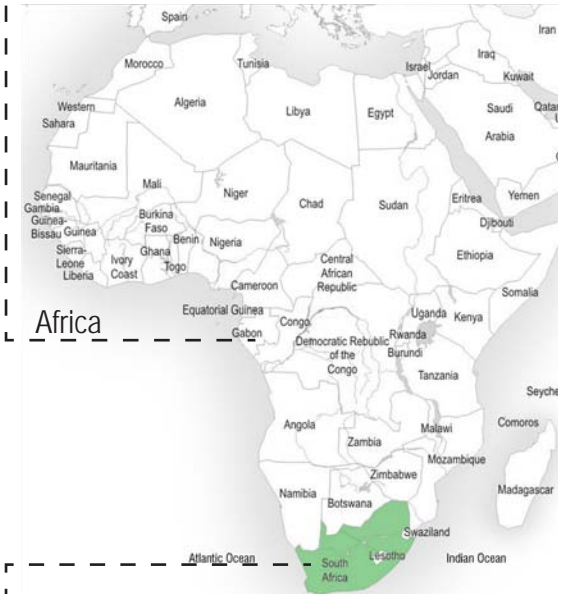
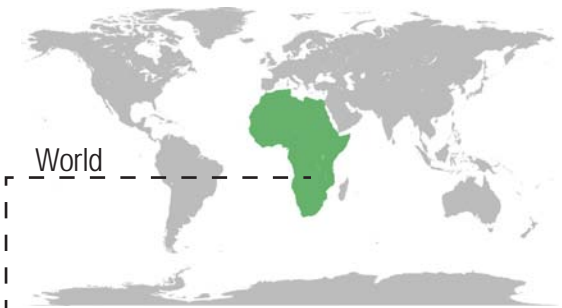
Hammanskraal is located 40km north-north-east of Pretoria and was one of the first previously disadvantaged black communities established outside of Pretoria under the apartheid regime. The area formed part of the old Bophuthatswana 'homeland' and played a crucial part during the black renaissance in the fight against apartheid (Pila, 2011).

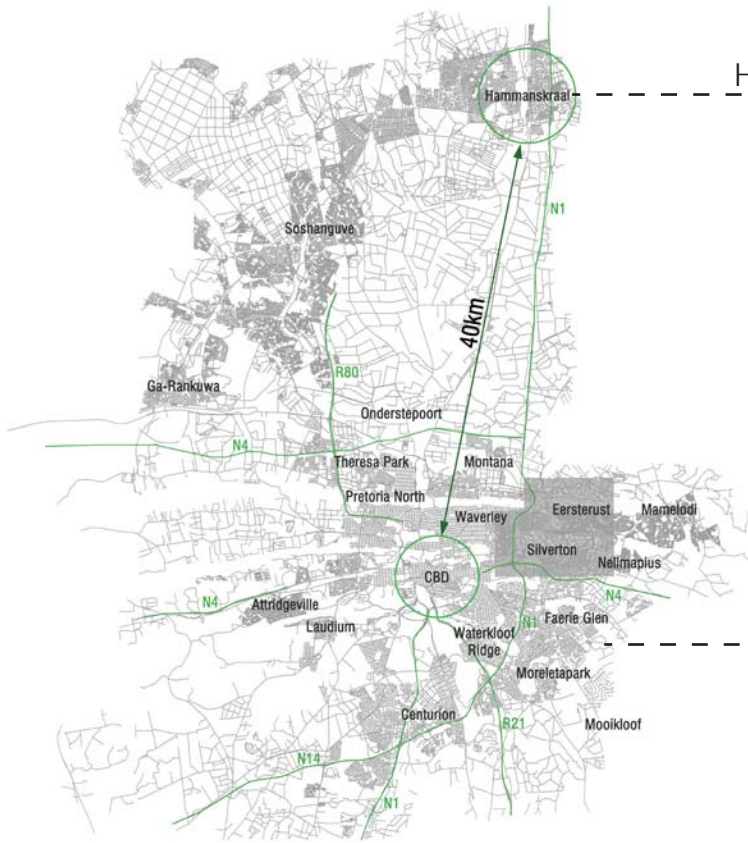
From a spatial perspective, this area has historically functioned in isolation from the rest of the City of Tshwane Metropolitan Area (City of Tshwane, 2004:2). The challenge is to re-integrate this area with a series of linkages or nodes on the main road heading towards the Tshwane CBD.

The precinct borders on an agricultural area and has a rural character with "natural beauty" (City of Tshwane, 2004:5).

The proposed site is located in the green corridor area of Hammanskraal, next to the Leeuwkraal Dam. Topographically, it is situated between the two neighbourhoods of Temba and Kudube. The main vehicle route (R101) and railway line run along the strip, which allow for easy access to the site. However, there is currently no pedestrian or vehicle crossing over the railway line. Which provides the opportunity for the establishment of a central transport node between the commercial hub of Hammanskraal and the Babelegi Industrial Area in the vicinity of the proposed site.

The Apies River runs along the western edge of the site. This natural element, which allows for a softened edge, could also form part of the intervention.

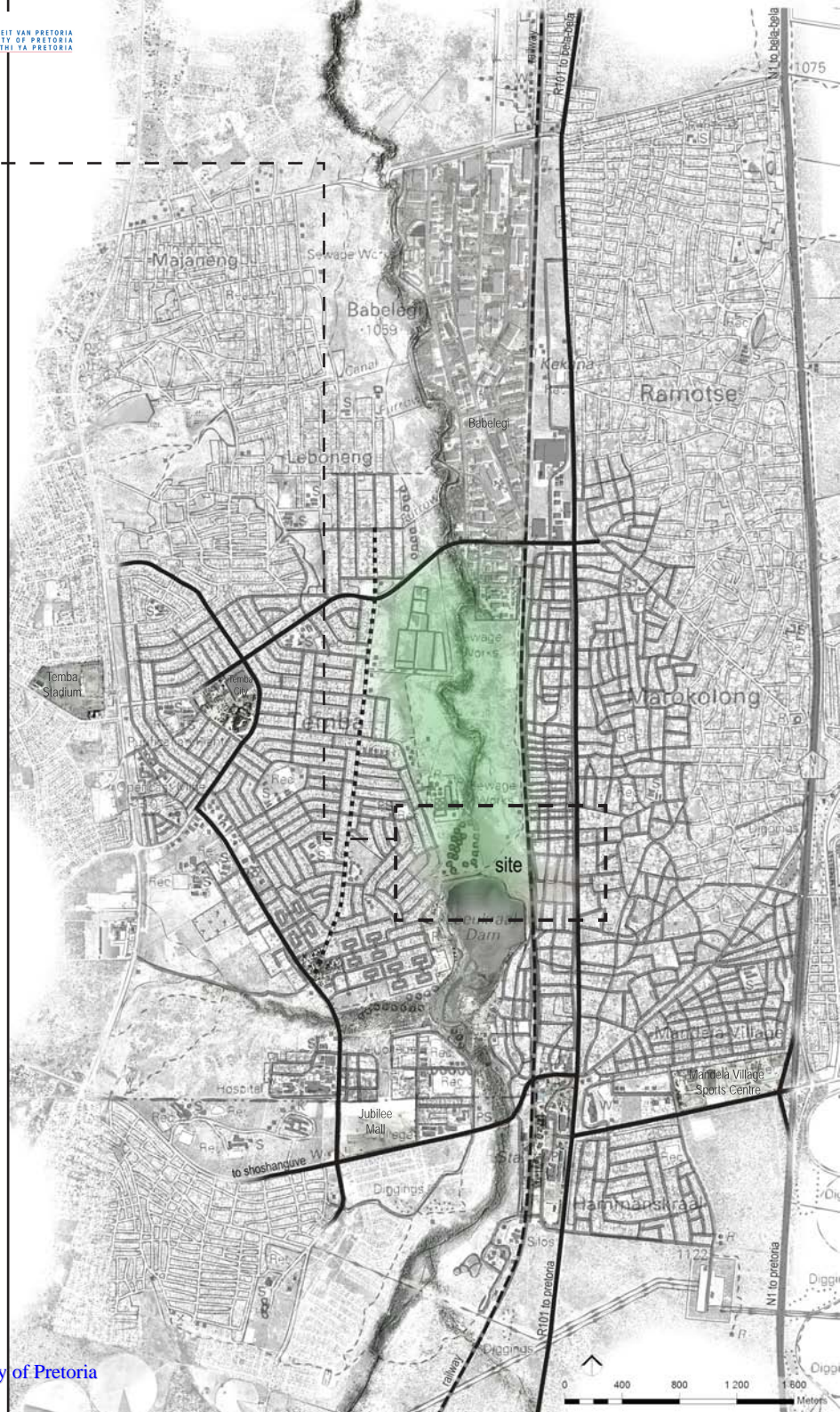




Hammanskraal

City of Tshwane

Gauteng



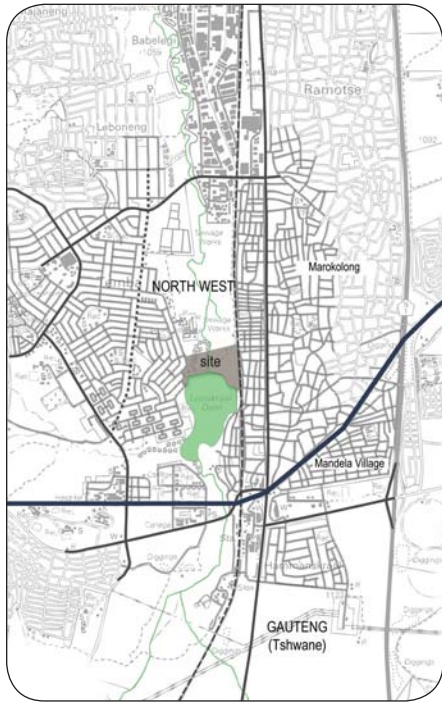


Fig 3|1_ Provincial borders. Author 2012.

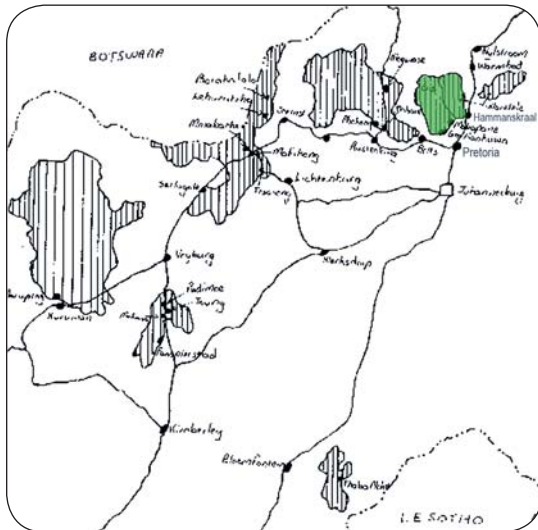


Fig 3|2_ The Former Bophuthatswana Territories, Tebbutt Commission Report 1998.

First farms owned by white farmers although land was designated to Africans as bantu locattions.	1860
	1880
	1890
Native affairs commission calculates the population as 27,874 (Native tribes of Transvaal).	1904
	1920
Fully pledged small town with police station, general store, train station and native affairs.	
	1942
Temba started on the Bezuidenhoutsfarm. People forcefully removed Orlando, Lady Selborne and Klipspruit.	
	1946
More people forcefully removed to the area.	1947
	1960
Only town developed in Tswanaland with 250 housing units	
	1961
Apartheid government decided to create 'homelands' for African people to keep them away from the white people.	
	1970
Republic of South Africa declares Bophuthatswana a self governing 'homeland'.	
	1972
First annual congress of Black People's Convention	
	1974
Black Renaissance Convention	
	1977
Independance from the Republic of South Africa.	
	1979
Amandebele-Ba-Lebolo forcefully removed from Majaneng.	
	1983
Forum held in Hammanskraal calling for the establishment of a socialist state.	
	1987
Matthews "The Flash" Temane; one of the best runners South Africa has ever seen set a new world record for the half marathon (1:00:11).	
	1994
Fall of the 'homelands' and incorporation into the radically inclusive South Africa.	
	1995
Mandela Village demarcated as part of Hammanskraal. Hammaskraal Sport Council established.	
	1999
Statue of Nelson Mandela erected. Hammaskraal Roller-Skating Club established.	
	2001
Township incorporated into the City of Tshwane Metropolitan Municipality.	
	2009
	2012

03|2_ the story of hammanskraal

The history of Hammanskraal tells the story of how it originated and developed through time. Josias Thabo Pila (2011), a journalist for the Kopitori website, recorded important facts and milestones. The following is an adaptation of Pila's (2011) online article:

Hammanskraal is one of the oldest townships that was declared a 'black area' during the Apartheid era, which still exists as a predominantly black area. It has its roots in the supply and cattle trading business of Hamman. Hamman was a farmer who, while transporting goods to the area, established a kraal made from thorn tree branches to protect his cattle from lions.

The kraal was helpful to the passing farmers who travelled through the area en-route to the then Northern Transvaal with their cattle. The kraal became known as Hamman's Kraal, which then resulted in the present

name – Hammanskraal.

Hammanskraal developed into a residential and trading area. By the year 1920, it had become a small town with its own police station, general store, train station and even had the offices of a government department tasked with administering African people's affairs, in other words 'Native Affairs'.

Hammanskraal, which was physically located within Northern Transvaal, was also a remote village of Bophuthatswana, known as Bophuthatswana-Gare during the homeland's existence (Fig 3|2).

After the 1994 general elections, which resulted in the fall of the homelands, Hammanskraal was incorporated into the newly-formed racially-inclusive South Africa. Hammanskraal, however, faced a number of problems

regarding its demarcation into the provinces. The Demarcations Board had classified some parts of Hammanskraal as part of the North-West Province – a decision that residents did not agree with as they wanted their area to fall under the Pretoria-Witwatersrand-Vereeniging (PWV) province, which was later renamed Gauteng (Fig 3|1).

In 1995, the Hammanskraal community was engaged in another dispute with the Demarcations Board. The Demarcations Board had designated Mandela Village as part of Hammanskraal. The Hammanskraal residents, ignored this change and argued that Mandela Village would decrease the status of their area as they considered Hammanskraal to be the "Sandton" of Tshwane (Fig 3|1).

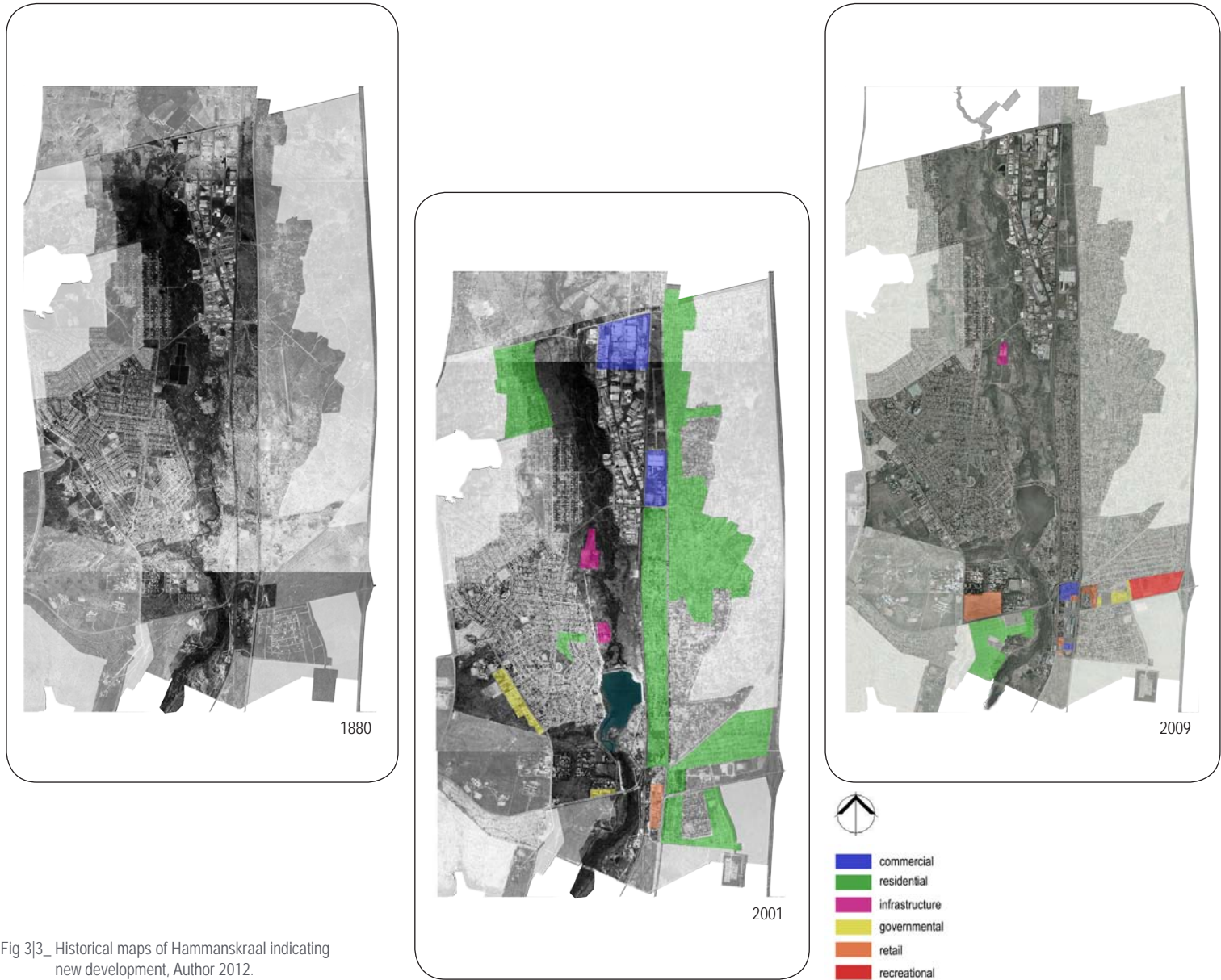


Fig 3|3_ Historical maps of Hammanskraal indicating new development, Author 2012.

The sporting history of Hammanskraal is also relevant. In 1987, Matthews 'The Flash' Temane (Fig 3|4), who was born and raised in Hammanskraal, became one of the best runners South Africa had ever seen when he set a new world record for the half marathon, with a time of one hour and 11 minutes. However, because of apartheid, South Africa had been banned from international events at the time (Modern Athlete, 2009) and Temane could not participate at a world class level. Despite the difficulties during apartheid, Hammanskraal was instrumental in the struggle against apartheid and the advancement of the Black Consciousness movement (Fig 3|5).

According to Absalom Molobe (2008:17), a previous Master of Architecture student who grew up in Hammanskraal in the 1980s in Marokolong (Fig 3|1), the only means of entertainment for the children between five and ten was playing on the streets. Molobe (2008:17) states that the location of this play was determined by the size of the group of children and the larger the group, the livelier the street would have been. Sometimes the children would play at a friend's home.

The older generation of Hammanskraal loved their front yard or garden and planted colourful flowers, which the children were not allowed to destroy as the garden was a mark of identity (Mosabeni (2008:17)).

Molobe(2008:17) further states that the children played a variety of games ranging from marbles (diali)



Fig 3|4_ Dingaen Thobela, Tshakile Nzimande and Matthews Temane with Minister of Law and Order Adriaan Vlok, City Press 1991.

to football (diski). Fun was the driver of the games, regardless if there was a lawn to play on or not. There were some formal recreational facilities, but these facilities were normally fenced off and part of the community school. Therefore the children used bricks and tins filled with sand as goal posts instead of formal facilities.

Political changes and changes in the government between 1990 and 2000 had a huge effect on the local communities. In the sporting arena black people were able to play games that were previously exclusively for white people, for example cricket. Unfortunately, limited resources and infrastructure resulted in many teenagers being discouraged from participating in sport.

When children finished school, their opportunities to prosper were limited as the only place where they



Fig 3|5_ The launch of the BPC at St Peter's Seminary, Hammanskraal, Mzileni 1973.

could find a job with limited skills was in the Babelegi Industrial Area, which is currently dilapidated.

No recreational spaces were available in Hammanskraal so, people spent their salaries on transport to travel to Pretoria CBD or places such as the Fountains Valley. In 1995, the Hammanskraal Sport Council was established with the help of the University of Pretoria, which offered hope for the development of sport in the area.

During the last ten years, the City of Tshwane did provide the community with a Sport Complex on the periphery of Mandela Village. This complex is, however fenced off. Several graded communal pitches were also provided throughout the neighbourhoods. Yet, these pitches lack infrastructure and identity. This situation still results in children playing in the streets, despite the fact that facilities have been provided.



Fig 3|6_ Main roads, Author 2012.

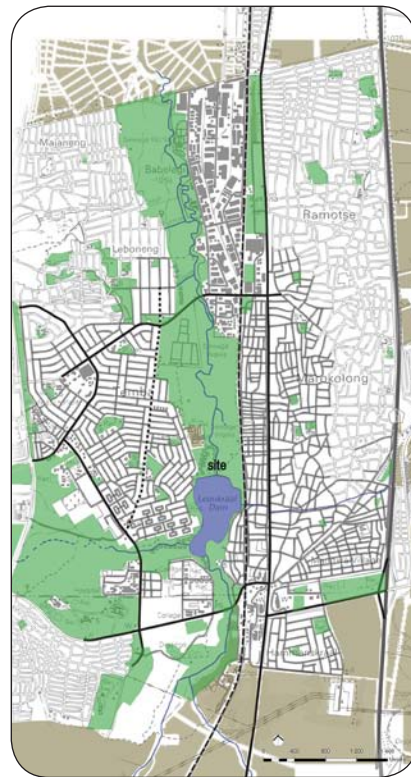


Fig 3|7_ Green spaces, water bodies & agriculture, Author 2012.



Fig 3|8_ Goats in the street, Author 2012.

Information was gathered about the environment, culture and social activities within the community through the use of mapping on both macro- and meso-levels, along with an investigation and literature studies. A better understanding of users' needs, the layout of the community and the current urban situation (such as the current state of the infrastructure) will direct the design of the proposed sport centre.

03|3.1_ Macro-Analysis of the Hammanskraal - Temba precinct

3.1.1_ Main Roads (Fig 3|6)

Apart from the R101 and the N1 that run through and along the community, there is only one road leading from the N1 to the R101. There are three main access routes from the R101 into the community of Temba. These access routes are situated a few kilometres away from each other, which

makes pedestrian movement difficult and results in the dependency on taxi and bus services.

Therefore there is a need, as well as an opportunity, to establish smaller nodes and pedestrian connections between the communities. There is also a need to cross over the R101 and railway that cut the community off from the green spaces.



03|3_ hammanskraal today

3.1.2_ Green Spaces and Water Bodies (Fig 3|7)

A green strip runs through the community which physically divides the community into two parts. There are limited green spaces and parks within the Marokolong neighbourhood and only a few parks in the Temba community. Although the green strip is quite large, it is mostly unused except for a sewerage works on the western side. The green strip is perceived as a dangerous area by the community.

The Apies River and Leeuwkraal Dam, known as 'Tema Beach' by the community, are situated within this green strip and are used for recreation and social activities. The dam also serves as a reservoir and forms part of the local infrastructure. Ironically, the community to the right of the dam does not have direct access to water in their homes.

The community is also surrounded by agricultural ground, which gives the area its rural character. There are a few agricultural initiatives along the edges of the green corridor and some people have small vegetable gardens in their back yards.

It is common to see cattle, sheep, goats and chickens in the streets, especially in the tribal areas (Fig 3|8).

The green strip shows much potential for agricultural development and environmental education about how to live in an environmentally friendly manner.

3.1.3_ Wards and Cultures (Fig 3|9)

The community of Hammanskraal is composed of various cultures – Tswana, Ndebele and Tsonga are the

most dominant (Fig 3|10). These cultures have become quite mixed and thus many traditional customs have been lost.

Although there has been a mixing of the cultures, a part of the community is still under tribal rule as the area was previously part of the Bophuthatswana homeland. The rest of the area falls under the municipal government. This division results in some areas that are still organic and rural, while others are structured into organised neighbourhoods.

Provincial borders also run through the community, resulting in two provinces (North -West and Gauteng) managing one area. The result is non-coherent development, different legislation and lack of identity due to various cultures and lifestyles.

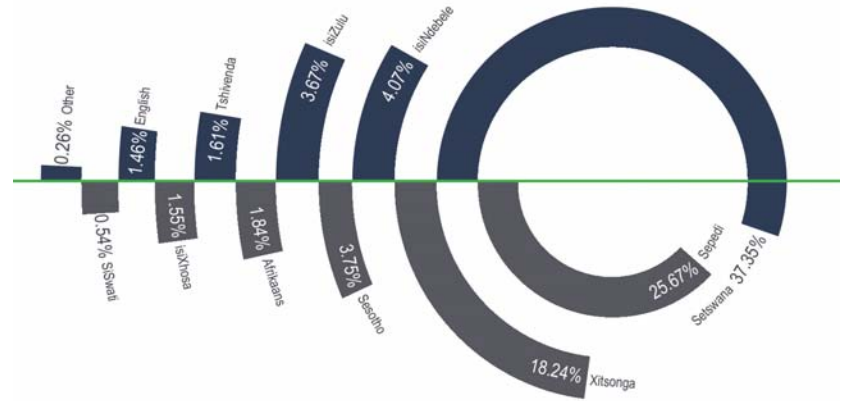


Fig 3|10_Hammanskraal cultures, Firth 2001.

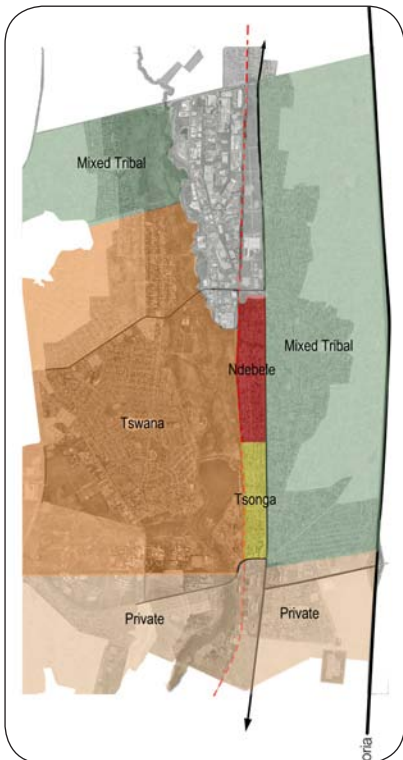


Fig 3|9_ Wards and Cultures, Author 2012.

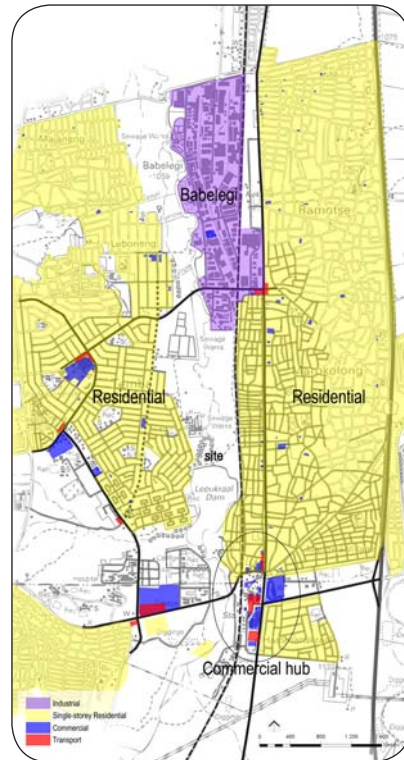


Fig 3|11_ Zoning, Author 2012.

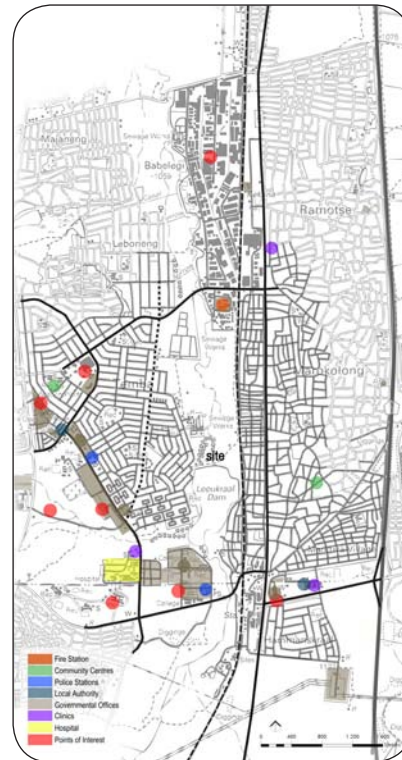


Fig 3|12_ Community facilities, Author 2012.

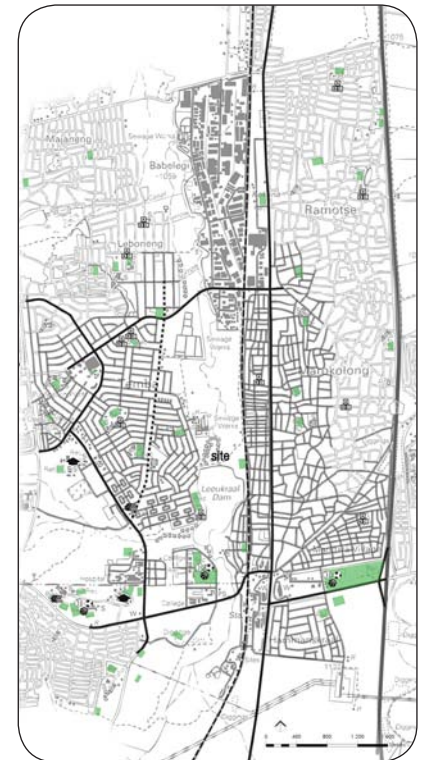


Fig 3|13_ Schools and sports grounds, Author 2012.

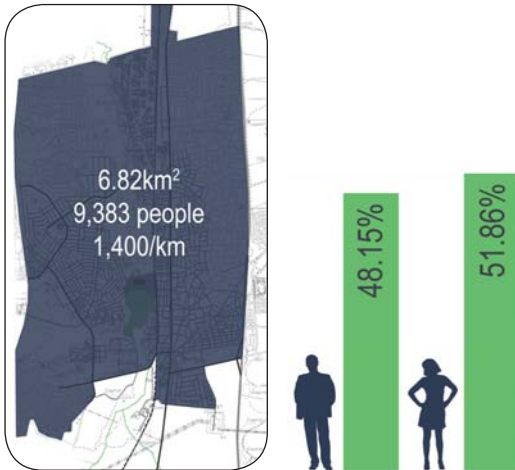
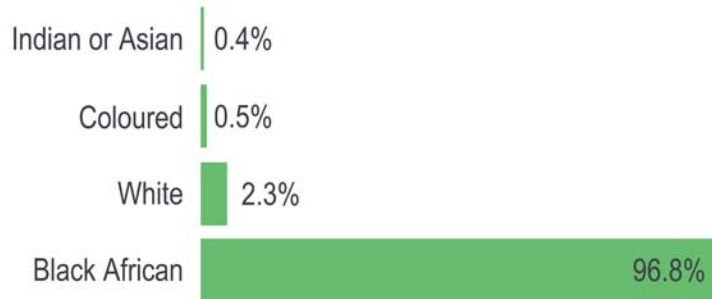


Fig 3|14_ Hammanskraal population, Firth 2001.



3.1.4_ Zoning (Fig 3|11)

The Hammanskraal precinct mostly consists of single-storey residential buildings, with the Babelegi Industrial area to the north and the commercial hub to the south.

The industrial area was established during the apartheid era, which resulted in many work opportunities. Although work opportunities were created many of the businesses closed down because of the expensive toll roads and long distances to the Pretoria CBD . These factors resulted in the area becoming dilapidated.

The commercial hub consists of several formal and informal businesses, taxi ranks and a railway station. The commercial hub forms the main link to the Pretoria CBD .

Commercial and municipal facilities are also situated along the main road leading to Temba City, but both commercial areas are quite far to travel for the community in the vicinity of the proposed site.

3.1.5_ Community Facilities (Fig 3|12)

There are several community facilities in the area – clinics, a hospital, a post office, skills training centres, police stations and community centres – but these are mainly municipal services.

The facilities are mostly situated along the main roads, instead of within the community where people could access them more easily.

3.1.6_ Schools and Sport Grounds (Fig 3|13)

There are several schools within the community. Unfortunately, there are more primary schools than secondary schools. The secondary schools are mainly situated within the Temba neighbourhood to the west. The location of these secondary schools results in children having to travel quite far to attend school or they have to travel by bus to the Pretoria CBD to attend school there. The schools also do not necessarily have their own sports facilities and have to make use of communal sports grounds within the vicinity of the schools.

The communal sports grounds only consist of graded pitches without any additional sports infrastructure. They are mainly used by the youth for games and football training.

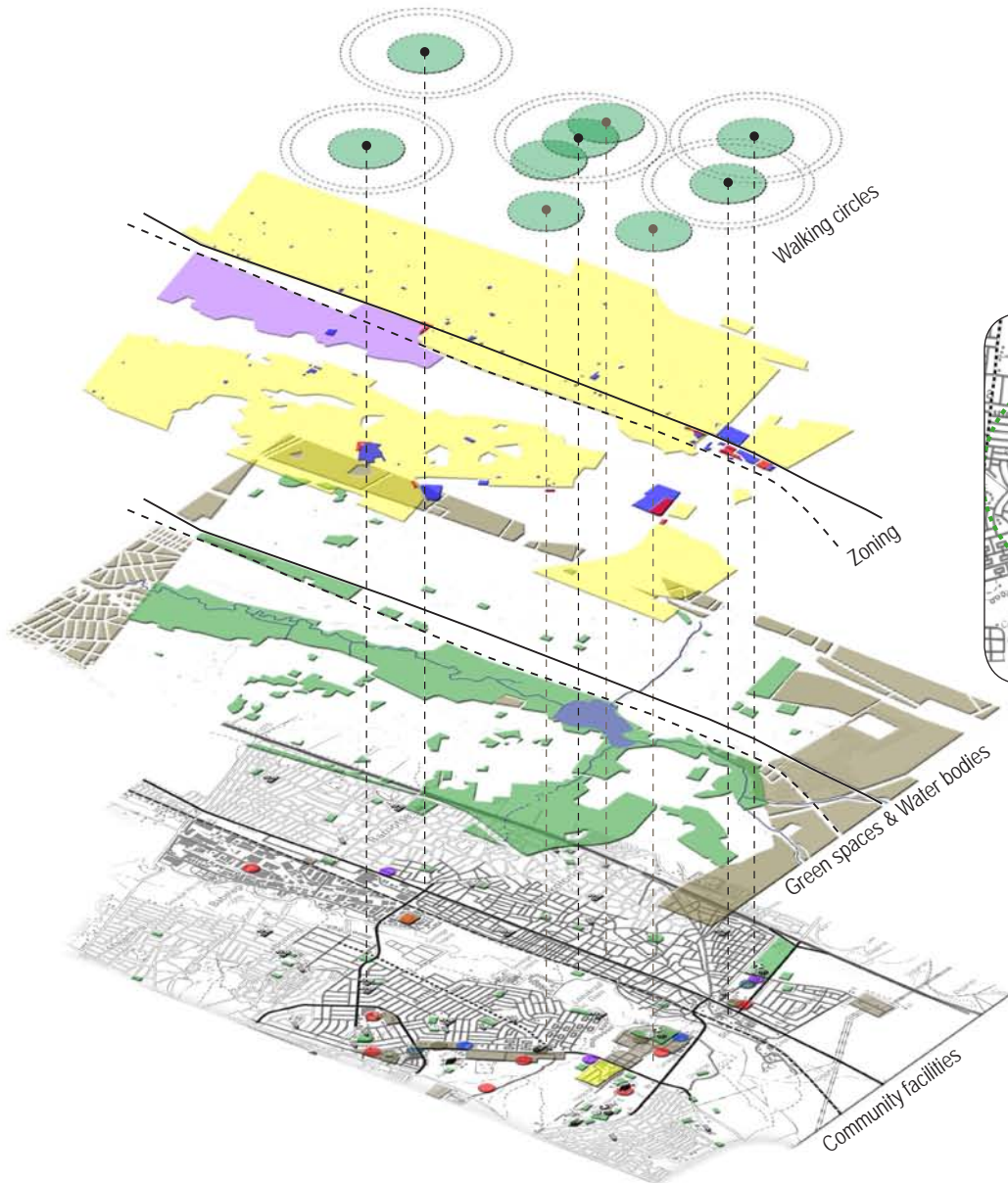


Fig 3|15_ Combined layers, Author 2012.

The Hammanskraal area has only two proper sports facilities (Mandela Village Sport Centre and Temba Stadium) and both are situated on the edges of the community. Big sports tournaments are held here a few times a year, but these facilities are not used to their full potential.



03|3.2_ Meso-Analysis of the Green Corridor

The proposed site is located in the green corridor just north of the Leeuwkraal Dam. The site is currently a graded pitch where children play soccer in the afternoons and on weekends.

An existing pedestrian route exists along the site with a suspension bridge crossing the river, which was constructed by the Fire Department of Hammanskraal in 2010. There is no formal vehicle crossing for the site. Therefore the site is isolated and cut-off by the railway line to the east and the river to the west. The only vehicle access is from the south, which is used by the municipality only.

The area is characterised by a typical bushveld landscape covered with savannah grass and scattered with thorn trees, mostly of the Acacia (Sweet Thorn) and Combretum (Shrub) species. Water bodies with a municipal water pump, a substation and 'shacks' are in close proximity to the area.

The river is used for fishing and religious ceremonies, but is currently partially covered with Bulrushes (*Typha latifolia*) and the invasive Water Hyacinth (*Eichhornia crassipes*) because of the overflow of the dam.



municipal route
* link to residential area
* water pump
* agriculture



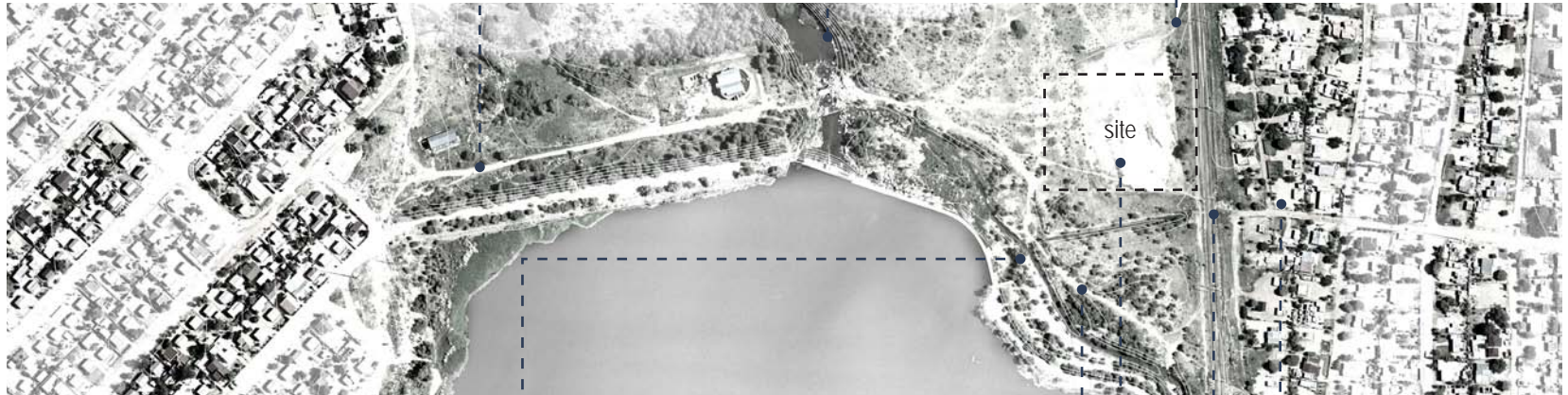
apies river

- * suspended pedestrian bridge
- * fishing
- * religious ceremonies
- * flooded bridge
- * propose new vehicle crossing



railway line

- * barrier
- * rhythm
- * grassland



pedestrian routes

- * short-cut routes
- * natural landscape
- * linkage to neighbourhood



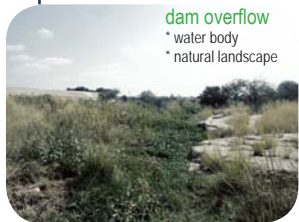
graded pitch [site]

- * no shade
- * dirt
- * no supporting infrastructure
- * vast
- * disconnected



level-crossing

- * no vehicle crossing
- * no safe pedestrian crossing



dam overflow

- * water body
- * natural landscape



informal residential area

- * informal housing (shacks)
- * green strip next to railway line
- * no direct access to water
- * no community centre
- * access to main vehicle route



03|4_ observations

Even though Hammanskraal is characterised by its auto-centric landscape combined with a rural character, the people still have a deep sense of community and strong relationships exist among them. The landscape and character of the area result in harsh and undesirable conditions.

Poverty is also a problem in this marginalised community with low income and few work opportunities. However the community members still take pride in their surroundings and create the best possible environment with the few resources they have. The community members treat each other with respect and even help their neighbours, family or friends who have a low income through, for example, stokvels (the informal gathering of savings amongst a group of people, which is handed out to each person, one after the other).

There is a hybrid system of international franchises and local entrepreneurial endeavours around the train station and taxi rank in Hammanskraal. However, because of the decentralised location, many people have to walk far distances or make use of the local taxi service to reach their destination.

Through interviews and observations, it was established that there is a vibrant sports culture among the youth. A variety of sports clubs exist in the area that focus on various sport modes, namely soccer, netball, table tennis, tennis, women's soccer, handball, volleyball, cricket, roller skating, rugby, aerobics, gymnastics, athletics, street football, boxing, karate and basketball. Activities even include arts and culture.

Some of the sports clubs are well established (such as the cricket and roller skating clubs), while others cater

for smaller groups of people. There is also established grassroots development structures for the youth.

Sport is used to divert children away from crime. Children who are talented and want to progress further in their sport become demotivated because of a lack of resources such as coaches, management, transport and support. There is a need for talent scouting and further development (retention or transition phase that focuses on motivation and provision of the necessary support systems) for those who have dreams of becoming athletes.

The urban landscape of Hammanskraal is rich with potential for development, restoration and regeneration.

Chapter 4

Urban Development

This chapter describes the urban framework on a macro- and meso- scale. The framework responds to the current conditions and introduces elements that will support the proposed intervention as well as improve the infrastructure of Hammanskraal along the main transport routes.

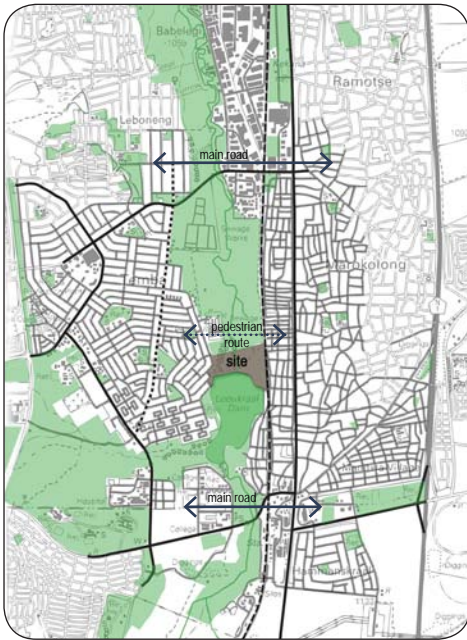


Fig 4|1_ Main vehicular roads, Author 2012



Fig 4|2_ Existing nodes, Author 2012

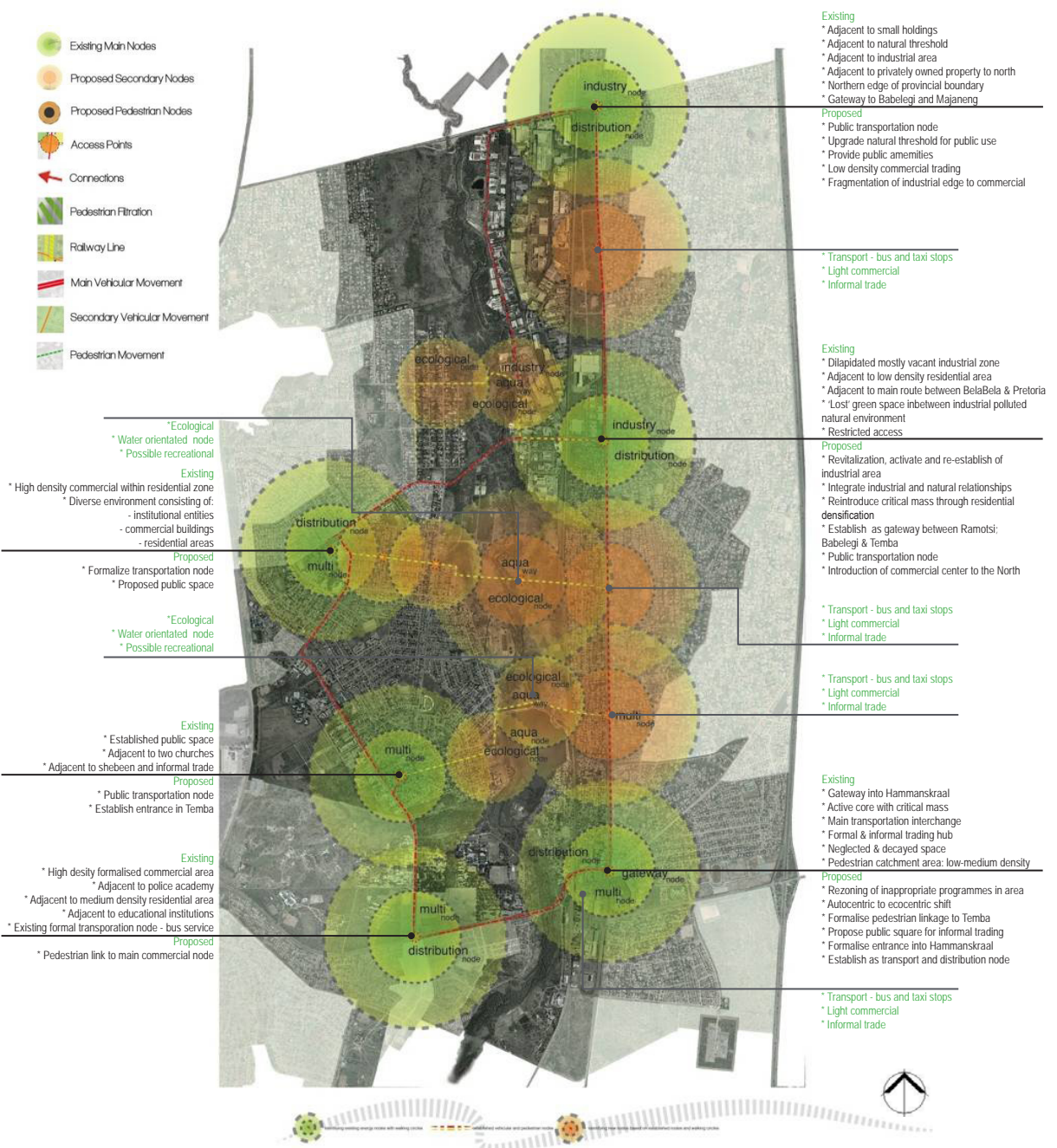


Fig 4|3_ Hammanskraal Macro Framework: existing and proposed nodes, Author 2012

04|1_ macro framework

04|1.1_ Current Conditions

As there is only one pedestrian bridge crossing the river next to the Leeuwkraal Dam, and no official railway crossing, high crime rates make the shortest route for pedestrians undesirable to use. Therefore people have to travel a much longer route along the two major roads, that cross the green corridor, to the commercial node of Hammanskraal.

There are three well-established commercial nodes at Hammanskraal, Temba City and Jubilee Mall. These commercial nodes are also associated with the main transport nodes. There are two industrial nodes to the north that lead into the Babelegi Industrial Area, which is currently mostly derelict (Fig 4|2).

04|1.2_ Proposed Framework

The approach to the urban design proposal for Hammanskraal is the following (Fig 4|3):

- * making the precinct pedestrian friendly on a larger scale because many people do not have their own cars and have to make use of public transport to reach their destinations;
- * activating additional transport nodes through the vehicular spine along the R101;
- * reactivating the derelict industrial and commercial nodes to create work opportunities, including the railway stations located at these points;
- * integrating the area with the ecological corridor and activating the ecologically viable space along the Apies

River which is currently underutilised;

* emphasising and establishing the individuality and uniqueness of place; and

* creating a tightly knit urban fabric.

The precinct framework introduces additional transport and commercial nodes along the main vehicular spine through Hammanskraal.

These nodes allow for new and active routes through the green corridor, which connect the communities and reduce walking distances to activity nodes. The routes contain smaller surveillance, activity, commercial and transport nodes.

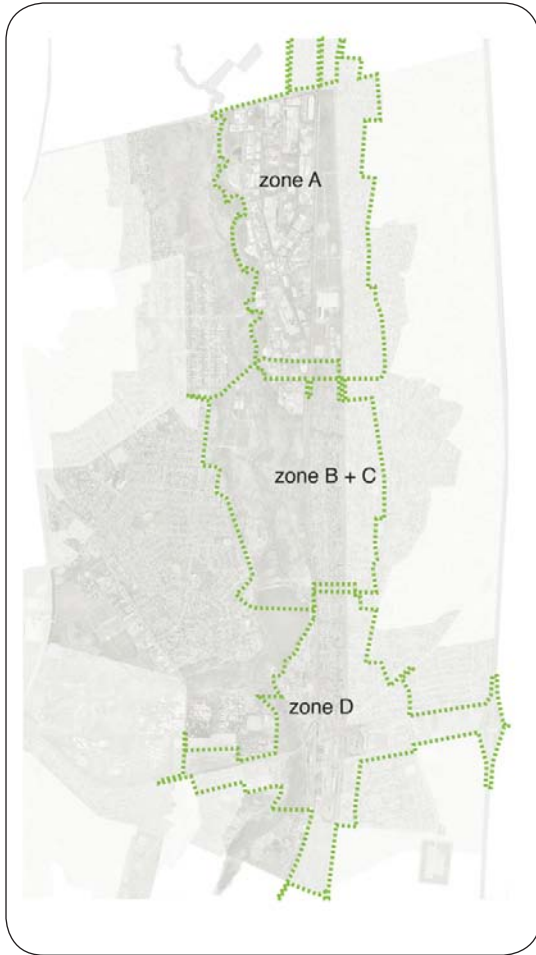


Fig 4|4_ Identified zones in Hammanskraal, Author 2012

The area of investigation was divided into four different zones, each with a different focus (Fig 4|4). Zone A focuses on industrial integration. Zones B and C focus on the integration of the green corridor into the area and connection between the communities. Zone D focuses on the commercial node of Hammanskraal.

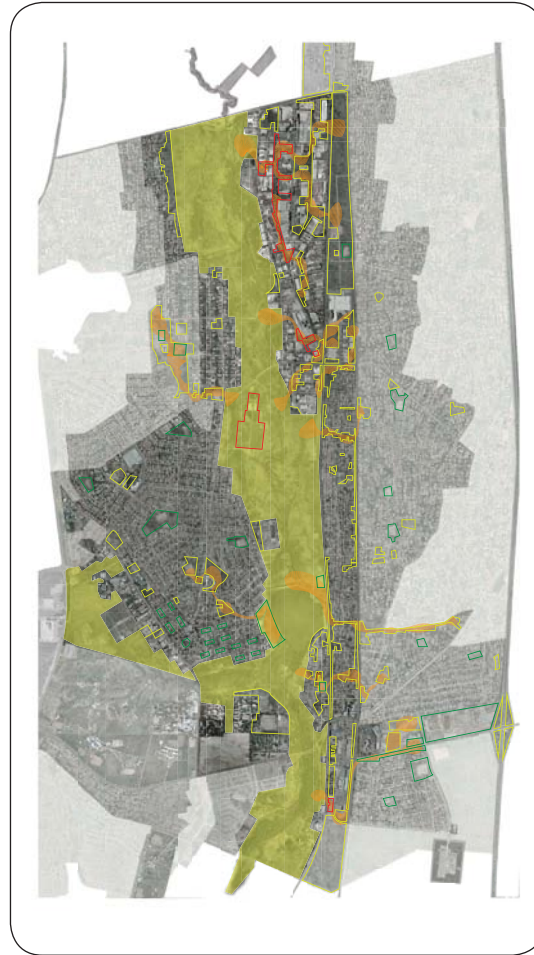


Fig 4|5_Green spaces and activity linkages, Author 2012

The Street Soccer initiative was started in 2010 in the community by NGO, Altus Sport to encourage participation in sport (Fig 4|7) (Sporting Chance, 2011). The concept of the initiative is used to introduce activity nodes at the existing communal sports grounds that link with the public realm. These nodes are divided into three different types (educational, communal and natural gateways) depending on their location within the community and the various users (Fig 4|9).

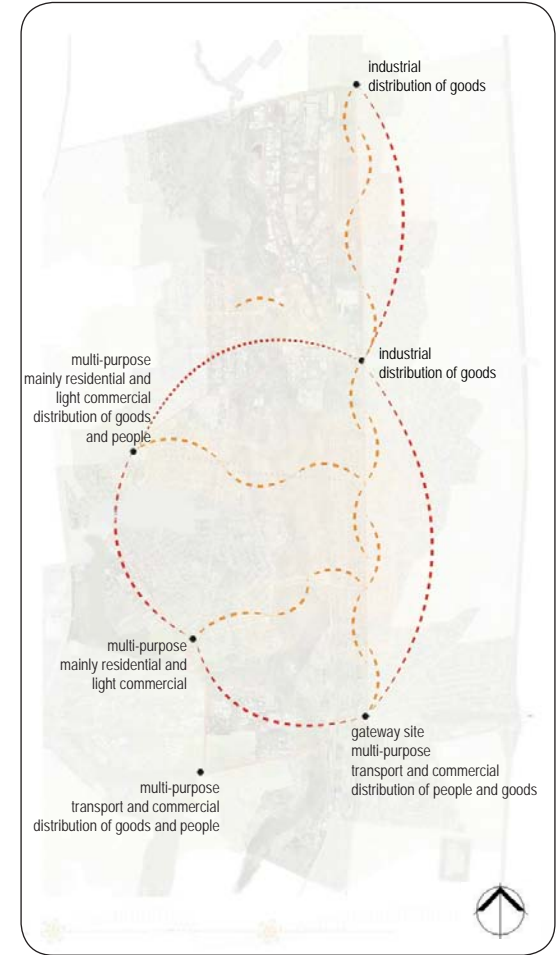


Fig 4|6_Connections, Author 2012

The story of Matthews Temane (Fig 4|8) inspired the proposal of a running, cycling or activity route throughout the community to link the activity nodes together and expose the user to different facets of the hybrid community.

Street Soccer _ Nodes



David Abrahams, Director of South African Homeless Street Soccer, explains that street soccer has emerged as a form of football that is linked to its social origin (Demetrius, 2009). Out of the need to develop a form of football that can engage socially disadvantaged young people.

The game does not have a referee or any rules – the players themselves resolve any conflict as they go along. Street soccer is an important part of getting young people involved in things that will lead to their betterment and an improvement of their lives.

“The street is the perfect venue for kids to come together and do something positive and healthy,” says Bing, MD of Sporting Chance. “Many of them have no place to go where they can socialize in a safe and healthy environment. Why not turn the streets we have for too long perceived as being dangerous, into a stage where life lessons can be taught, friendships forged and communities entertained?”

Sporting Chance, 2011

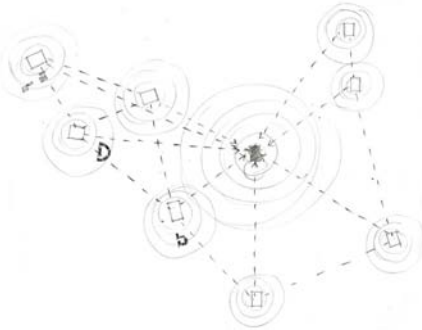


Fig 4|7_ Activity nodes around communal sport grounds, Author 2012



Matthews Temane _ Route

A legend of the 1980s and 1990s, Matthews ‘The Flash’ Temane, was one of the fastest runners our country has ever seen. He received Springbok Colours 12 times and, in 1987, he held the prestigious honour of being the fastest man in the world over the half marathon with a time of one hour and eleven minutes (ModernAthlete, 2009).

In an interview with Modern Athlete (2009) Matthews states that as a young boy he ran 10km to school and back every day. Running was not his first love. He lived to play soccer until a group of runners from school challenged the soccer players to a race around the field. Little did they know then that they would come up against a future world champion runner posing as a soccer player. Matthews outran them all and his soccer team managed to win. “That day, I realised I could run fast. I was 17 years old. My mom encouraged me to take up running and our school headmaster offered to coach me,” said Matthews.

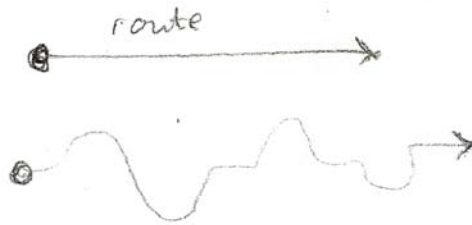


Fig 4|8_ Activity routes through the community, Author 2012

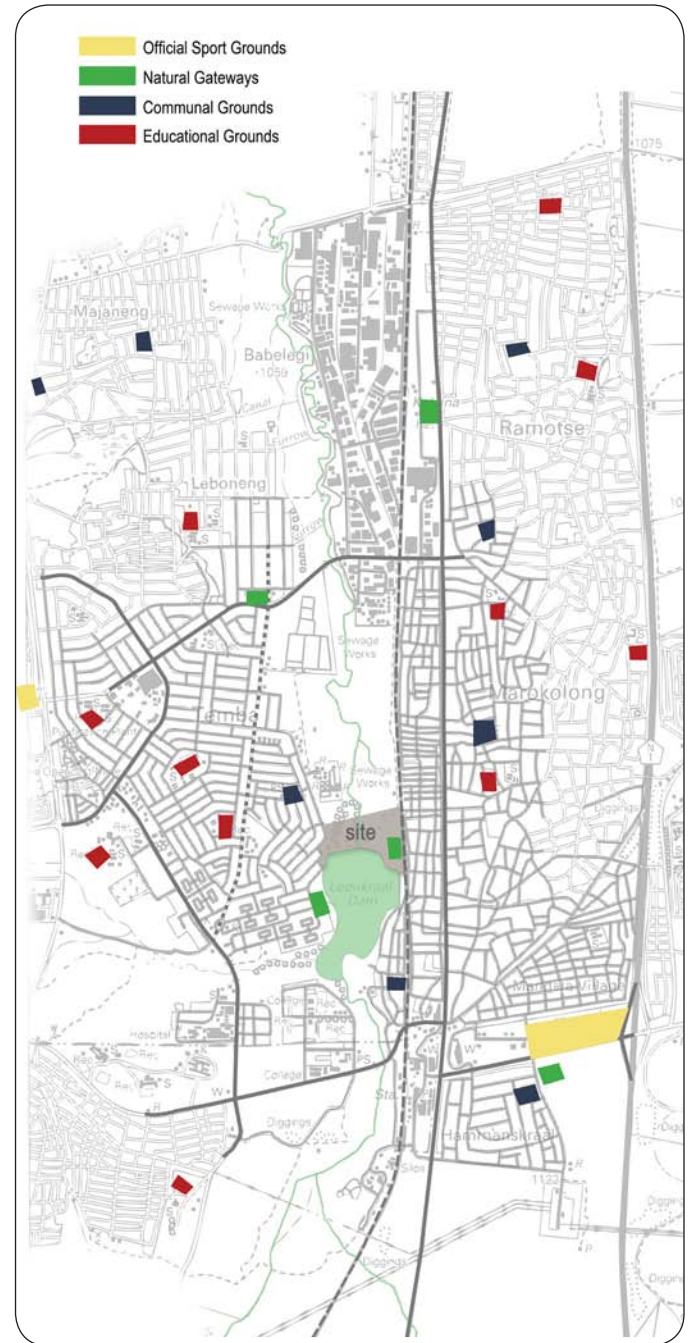


Fig 4|9_ Proposed sport node classification, Author 2012

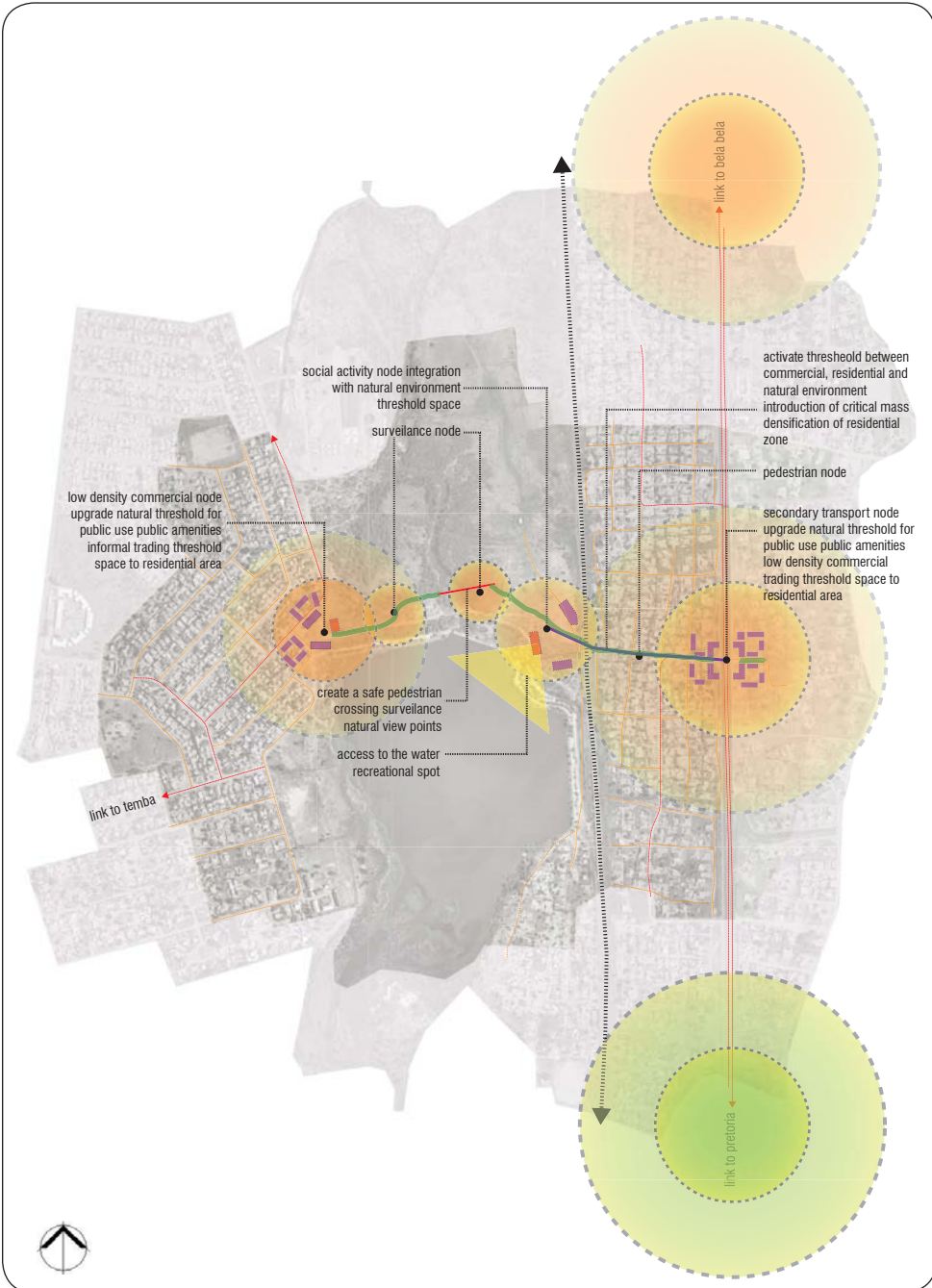


Fig 4|10_ Zone C proposal, Author 2012.

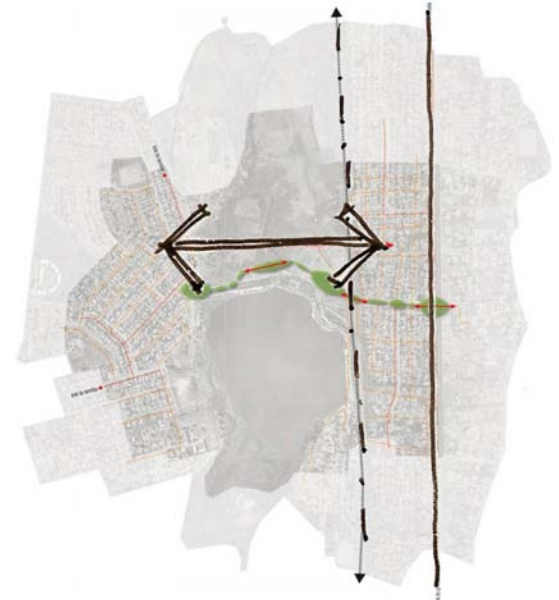


Fig 4|11_ Connections, Author 2012.

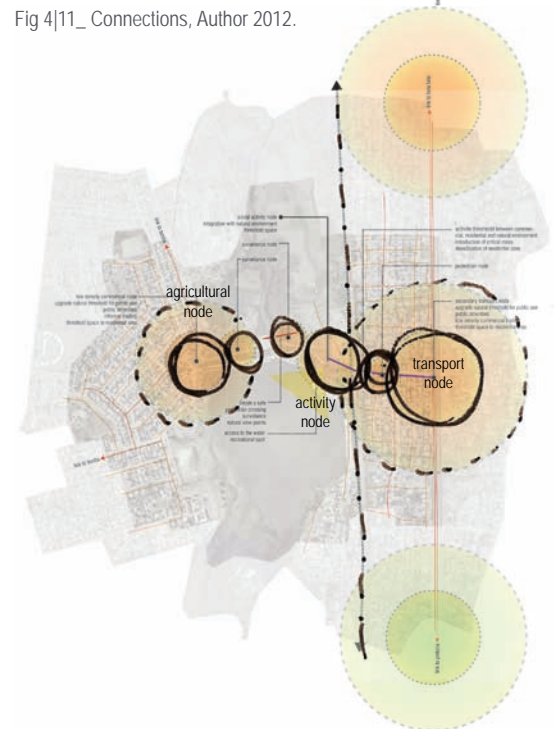


Fig 4|12_ Proposal, Author 2012.



Fig 4|13_ Zoning, Author 2012.

04|2_meso framework

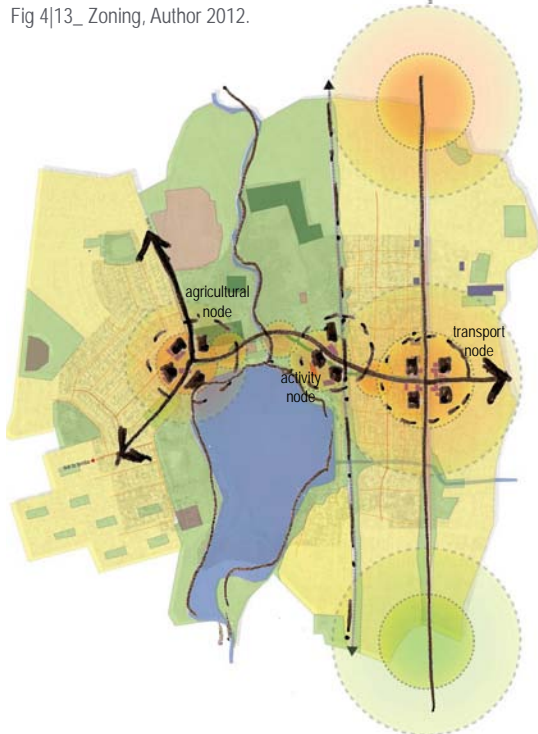


Fig 4|14_ Nodes and Massing, Author 2012.

The meso-framework proposes a new pedestrian and vehicle route across the green corridor. This route would reduce travel distances to and from the main commercial and transport nodes. The nodes would also bridge the barriers created by the river and railway line, connect the communities and incorporate the green corridor into the neighbourhoods (Fig 4|10&11).

The route is divided into several smaller nodes to ensure surveillance and safety along its length (Fig 4|12&14). This smaller nodes provides the opportunity to create an agricultural and educational hub on the western edge - a threshold space for the Temba neighbourhood - and a transport node intersecting with the R101 on the eastern edge. The proposed site will introduce an activity centre and new railway station that will form the central node of the route.

The station will become the intermediate stop between the industrial and commercial hubs of Hammanskraal. It is foreseen that the existing Hammanskraal station will accommodate 20 200 passengers during the AM peak hour by the year 2015 (Gauteng Department of Human Settlement, 2010:11). Therefore it is assumed that the proposed station should be able to accommodate about 30% of the passengers, thus 6060 passengers during peak hour.

The activity node would allow for better integration of the area with the surrounding environment and would open up natural views and connections to the dam.

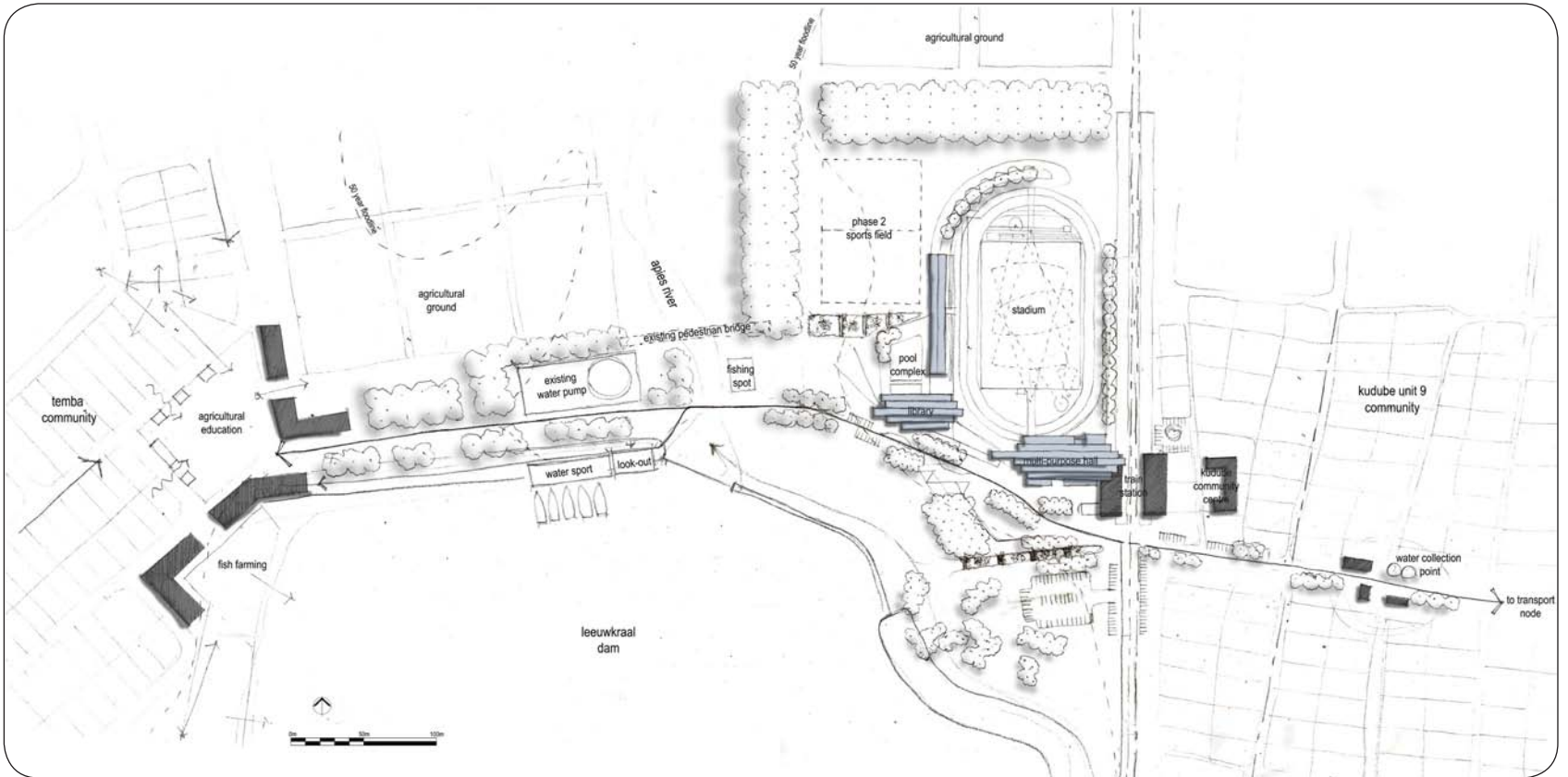


Fig 4|17_Meso-framework final proposal, Author 2012

Chapter 5

Architectural Language

This chapter investigates the existing architecture in Hammanskraal and other townships throughout Southern Africa in order to establish an appropriate architectural language for the proposed design. The chapter further describes precedents that refer to the typology and aesthetic of active public spaces.



Fig 5|1_ Informal trade, Author 2012.



Fig 5|2_ Formal trade, Author 2012.



Fig 5|3_ Residential, Author 2012.



Fig 5|4_ Industrial, Author 2012.

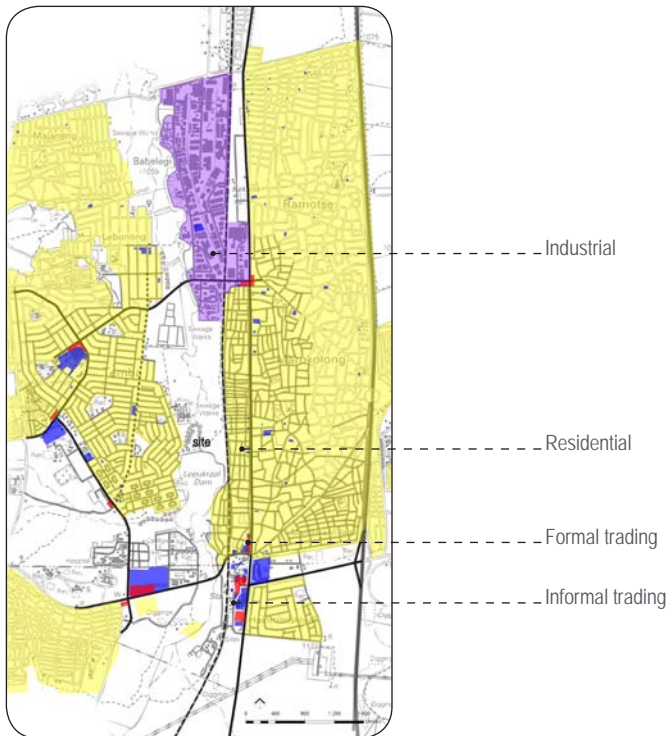


Fig 5|5_ Zoning, Author 2012.

"A civilization can best be understood by its architecture because of the way buildings show the interests of society, its organizational skills, affluence or poverty, the kind of climate and the attitude towards technology and the arts. In towns and cities the general structure of society can be understood through the medium of architecture, so it becomes the most pervasive mirror of man's presence."

(Baker 1989:xix)

05|1_ hammanskraal

The buildings in Hammanskraal can be broadly classified as the following: informal and formal trade buildings, residential buildings and industrial buildings. The architectural language of these buildings is mostly determined by the zoning areas in which they are located (Fig 5|5). The buildings have quite a distinctive aesthetic and relate with each other with regard to material use.

There exists a hybrid system of international franchises (formal trading) and local entrepreneurial efforts (informal trading), especially around the station in Hammanskraal. Formal trade is characterised by more permanent structures constructed of plastered concrete blocks or masonry bricks painted with several colours and adorned with multiple advertisements (Fig 5|2).

Informal trade takes place in latched-on, temporary structures that protect the traders and their goods from the sun (Fig. 5|1).

In the tribal residential area to the east, the houses mainly consist of 'shacks' (relatively small houses constructed out of corrugated iron sheets and other lightweight materials). As the houses are so small, the outdoor spaces become very important because they function as 'living rooms' for the particular residents (Fig 5|3). The houses are therefore positioned in the back of the erf to allow for enough space. The residents take pride in their gardens and outdoor spaces which are always swept clean or planted with a variety of plants.

The western residential area is managed by the local municipality and is much more developed than the tribal area. The houses are larger and are mostly built of brick, but the erf sizes are quite small in comparison to the tribal area and are demarcated by steel and brick fencing. Provision was made for green spaces in between the buildings to make the environment more inviting to the residents.

The industrial area (Fig 5|4) is characterised by big steel structures which are mostly dilapidated, but still express a decade of mass manufacturing. The multiple municipal service buildings relate to this architectural language through well-defined brick buildings and turquoise and yellow steel structures, which are mostly located within the green corridor.



Fig 5|6_ Example of ranking system

Fig 5|7_ Context of many township architecture, Gillman 2012

05|2_ township architecture in south africa

The 2012 Master of Architecture students investigated 23 completed projects in townships throughout South Africa, varying from community centres, schools and sports centres to museums.

These townships are identified as a suburb or city chiefly occupied by black people, formerly selected for black occupation by apartheid laws. They are mostly characterised by overpopulated small residential buildings built from salvaged materials, with limited public spaces within the neighbourhoods (Fig 5|7).

The various projects were ordered according to the year of construction (Fig 5|8) and programme type (Fig 5|9) to establish trends and approaches to architectural language.

During the apartheid era, only a few buildings were

developed in the townships that fulfilled basic needs for transport and municipal services. However, over the last few years, several schools, sport centres and multi-purpose community centres were developed.

Through the years, various architectural languages were explored, from contextual to monumental. The most successful projects are those that relate to the surrounding context, respond to the needs of the community and give an identity to the community.

The projects were first ranked according to their aesthetic value (Fig 5|10), which was determined by a 'cool wall' where all the Masters students could confer a ranking from 'seriously uncool' to 'sub-zero'.

The projects that fell into the 'seriously uncool' category did not respond effectively to the surrounding context

nor did they relate to the human scale, which made them uninviting.

The 'uncool' category refers to projects that fulfilled the needs of the community, but did not necessarily provide a distinctive architectural language for the buildings.

In the 'cool' category, the buildings started to challenge the architectural language of the township. They responded to the needs of the community and the surrounding context, as well as provided an identity for the community.

In the 'sub -zero' category, the buildings pushed the boundaries even more by providing a responsive contextual architecture that fulfilled needs, created an identity and served the aspirations of the community.

Timeline



Fig 5|8_ Timeline, Author 2012.

Programme



Fig 5|9_ Programmes, Author 2012.



2007

2008

2010

2011

2012



schools

sport centres



Soweto Theatre
Aillets (2012)
Soweto (Gauteng)



PROGRAMME: A theatre that provides equitable access to arts and culture facilities for the residents of Soweto.

CONSTRUCTION

Labour: Local	<div style="width: 100%; height: 5px; background-color: #008000;"></div>	Specialized
Structure: Permanent	<div style="width: 100%; height: 5px; background-color: #008000;"></div>	Temporary
Material: Regional	<div style="width: 100%; height: 5px; background-color: #008000;"></div>	Specialized

TPOLOGY

Vernacular	<div style="width: 100%; height: 5px; background-color: #008000;"></div>	International
Formalist	<div style="width: 100%; height: 5px; background-color: #008000;"></div>	Utilitarian
Scale: Domestic	<div style="width: 100%; height: 5px; background-color: #008000;"></div>	Civic
Form: Open ended	<div style="width: 100%; height: 5px; background-color: #008000;"></div>	Rigid



Nyanga Bath House + Khayelitsha Service Centres
Piet Louw Architects (2004)
Khayelitsha (Western Cape)



PROGRAMME: Governmental Service centre, playground and bath house with allocated public space. The language of rigid geometry and constructed public space has become in this context, a metaphor for the government's struggle both to deliver services in the townships and to collect rates and taxes.

CONSTRUCTION

Labour: Local	<div style="width: 100%; height: 5px; background-color: #008000;"></div>	Specialized
Structure: Permanent	<div style="width: 100%; height: 5px; background-color: #008000;"></div>	Temporary
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Form: Open ended	<div style="width: 100%; height: 5px; background-color: #008000;"></div>	Rigid



Harare Library
Charlotte Chamberlain & Nicola Irving (2011)
Khayelitsha (Cape Town)



PROGRAMME: The library forms part of a broader intervention in Khayelitsha. It is not surrounded by fencing, and is adorned with public art internally and externally.

CONSTRUCTION

Labour: Local	<div style="width: 100%; height: 5px; background-color: #008000;"></div>	Specialized
Structure: Permanent	<div style="width: 100%; height: 5px; background-color: #008000;"></div>	Temporary
Material: Regional	<div style="width: 100%; height: 5px; background-color: #008000;"></div>	Specialized

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Scale: Domestic	<div style="width: 100%; height: 5px; background-color: #008000;"></div>	Civic
Form: Open ended	<div style="width: 100%; height: 5px; background-color: #008000;"></div>	Rigid



Weibank Multipurpose Centre
CS Studio (2008)
Kalks River, Cape Town (Western Cape)



PROGRAMME: The programme consists of a main multipurpose space, offices and multipurpose office and youth area. The main elements are separate and juxtaposed to each other giving it a civic scale.

CONSTRUCTION

Labour: Local	<div style="width: 100%; height: 5px; background-color: #008000;"></div>	Specialized
Structure: Permanent	<div style="width: 100%; height: 5px; background-color: #008000;"></div>	Temporary
Material: Regional	<div style="width: 100%; height: 5px; background-color: #008000;"></div>	Specialized

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Scale: Domestic	<div style="width: 100%; height: 5px; background-color: #008000;"></div>	Civic
Form: Open ended	<div style="width: 100%; height: 5px; background-color: #008000;"></div>	Rigid



Nelson Mandela youth and Heritage Center
Stauch Vorster Architects (2007)
Qunu (Eastern Cape)



PROGRAMME: The design is a complex of modest, carefully placed buildings which quietly occupy their place between villages among the rolling Eastern Cape hills.

CONSTRUCTION

Labour: Local	<div style="width: 100%; height: 5px; background-color: #008000;"></div>	Specialized
Structure: Permanent	<div style="width: 100%; height: 5px; background-color: #008000;"></div>	Temporary
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Scale: Domestic	<div style="width: 100%; height: 5px; background-color: #008000;"></div>	Civic
Form: Open ended	<div style="width: 100%; height: 5px; background-color: #008000;"></div>	Rigid

seriously uncool

Walter Sisulu Square
studioMAS (2005)
Klipfont (Gauteng)



PROGRAMME: The design visualises a particular symbolic square but incorporates a larger urban plan for the area as part of the rejuvenation of Soweto.

CONSTRUCTION

Labour: Local	<div style="width: 100%; height: 5px; background-color: #008000;"></div>	Specialized
Structure: Permanent	<div style="width: 100%; height: 5px; background-color: #008000;"></div>	Temporary
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Vernacular	<div style="width: 100%; height: 5px; background-color: #008000;"></div>	International
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Scale: Domestic	<div style="width: 100%; height: 5px; background-color: #008000;"></div>	Civic
Form: Open ended	<div style="width: 100%; height: 5px; background-color: #008000;"></div>	Rigid

Phillipi Public Transport Interchange
Du Toit and Perrin in association (2002)
Cape Town (Western Cape)



PROGRAMME: The design aims to establish an integrated public environment that can potentially release further public and private investment over time. It support various programmes giving it an urban nature.

CONSTRUCTION

Labour: Local	<div style="width: 100%; height: 5px; background-color: #008000;"></div>	Specialized
Structure: Permanent	<div style="width: 100%; height: 5px; background-color: #008000;"></div>	Temporary
Material: Regional	<div style="width: 100%; height: 5px; background-color: #008000;"></div>	Specialized

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Form: Open ended	<div style="width: 100%; height: 5px; background-color: #008000;"></div>	Rigid

Dawid Klaaste Multipurpose Centre
CS Studio Architects (2005)
Bergsig, Laingsburg (Western Cape)



PROGRAMME: A vigorously sculptural building consisting of an exuberant congregation of steel, metal-clad angular forms, a concrete vaulted and arched sculpture. The programme consist out of a multipurpose hall, offices, workshops, restaurant and auditorium.

CONSTRUCTION

Labour: Local	<div style="width: 100%; height: 5px; background-color: #008000;"></div>	Specialized
Structure: Permanent	<div style="width: 100%; height: 5px; background-color: #008000;"></div>	Temporary
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Form: Open ended	<div style="width: 100%; height: 5px; background-color: #008000;"></div>	Rigid

uncool

Vissershok School
Tsa Design Studio (2012)
Du Noon, Vissershok (Western Cape)



PROGRAMME: At just 12 square meters, the colourful classroom provides learning space for 25-34 year olds in Du Noon, and it turns into a library for the entire Vissershok Primary School in the afternoons. The program are defined by a learning area, gathering area, play area and growing area.

CONSTRUCTION

Labour: Local	<div style="width: 100%; height: 5px; background-color: #008000;"></div>	Specialized
Structure: Permanent	<div style="width: 100%; height: 5px; background-color: #008000;"></div>	Temporary
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Form: Open ended	<div style="width: 100%; height: 5px; background-color: #008000;"></div>	Rigid

Inkwenkwezi School
Henrich Wofft and Sonja Spamer Architects
Du Noon, Cape Town (Western Cape)



PROGRAMME: The school stretches along the settlement, and its height is exploited to distinguish itself from the residential buildings.

CONSTRUCTION

Labour: Local	<div style="width: 100%; height: 5px; background-color: #008000;"></div>	Specialized
Structure: Permanent	<div style="width: 100%; height: 5px; background-color: #008000;"></div>	Temporary
Material: Regional	<div style="width: 100%; height: 5px; background-color: #008000;"></div>	Specialized

TPOLOGY

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Scale: Domestic	<div style="width: 100%; height: 5px; background-color: #008000;"></div>	Civic
Form: Open ended	<div style="width: 100%; height: 5px; background-color: #008000;"></div>	Rigid

Aesthetic

Fig 5|10_ Aesthetic, Author 2012.



Guguletu Sports Centre
Noero Wolff (1994)
Guguletu (Cape Town)



PROGRAMME: Multipurpose sport hall.

CONSTRUCTION				
Labour: Local	██████████	██████████	██████████	Specialized
Structure: Permanent	██████████	██████████	██████████	Temporary
Material: Regional	██████████	██████████	██████████	Specialized

TYPOLGY				
Vernacular	██████████	██████████	██████████	International
Formalist	██████████	██████████	██████████	Utilitarian
Scale: Domestic	██████████	██████████	██████████	Civic
Form: Open ended	██████████	██████████	██████████	Rigid



Oppie Koppie Community Creche
RWTH Aachen Department of Building Theory and Design +
Bernadette Heilmann (2011)
Pina Alfred Hanriet (Western Cape)



PROGRAMME: Creche accommodating 80 learners, but also represents a solution that has contributed significant architectural value in terms of spatial, formal and implementation innovation.

CONSTRUCTION				
Labour: Local	██████████	██████████	██████████	Specialized
Structure: Permanent	██████████	██████████	██████████	Temporary
Material: Regional	██████████	██████████	██████████	Specialized

TYPOLGY				
Vernacular	██████████	██████████	██████████	International
Formalist	██████████	██████████	██████████	Utilitarian
Scale: Domestic	██████████	██████████	██████████	Civic
Form: Open ended	██████████	██████████	██████████	Rigid



SAPS Retreat Railway Police Station
Makela Design Laboratory(2006)
Retreat (Western Cape)



PROGRAMME: A police station.

CONSTRUCTION				
Labour: Local	██████████	██████████	██████████	Specialized
Structure: Permanent	██████████	██████████	██████████	Temporary
Material: Regional	██████████	██████████	██████████	Specialized

TYPOLGY				
Vernacular	██████████	██████████	██████████	International
Formalist	██████████	██████████	██████████	Utilitarian
Scale: Domestic	██████████	██████████	██████████	Civic
Form: Open ended	██████████	██████████	██████████	Rigid



Red Location Museum of Struggle
Noero Wolff Architects, John Blair Architects(2007)
Red Location, P.E (Eastern Cape)



PROGRAMME: A museum- Received award of merit by the South African Institute of Architects and Royal Institute of British Architects for best building of the Year outside Britain.

CONSTRUCTION				
Labour: Local	██████████	██████████	██████████	Specialized
Structure: Permanent	██████████	██████████	██████████	Temporary
Material: Regional	██████████	██████████	██████████	Specialized

TYPOLGY				
Vernacular	██████████	██████████	██████████	International
Formalist	██████████	██████████	██████████	Utilitarian
Scale: Domestic	██████████	██████████	██████████	Civic
Form: Open ended	██████████	██████████	██████████	Rigid



Steinkopf Community Centre
Roelof Uitenhage(1978)
Steinkopf (Northern Cape)



PROGRAMME: Community centre with a main hall as central point attached to an extended spine. Louis Kahn design influence.

CONSTRUCTION				
Labour: Local	██████████	██████████	██████████	Specialized
Structure: Permanent	██████████	██████████	██████████	Temporary
Material: Regional	██████████	██████████	██████████	Specialized

TYPOLGY				
Vernacular	██████████	██████████	██████████	International
Formalist	██████████	██████████	██████████	Utilitarian
Scale: Domestic	██████████	██████████	██████████	Civic
Form: Open ended	██████████	██████████	██████████	Rigid

Usasazo Secondary School
Noero Wolff (2004)
Khayelitsha (Cape Town)

PROGRAMME: The original brief for a school with classrooms, a library, computer room, hall and admin section was later expanded by the architect to include entrepreneurial training.

CONSTRUCTION				
Labour: Local	██████████	██████████	██████████	Specialized
Structure: Permanent	██████████	██████████	██████████	Temporary
Material: Regional	██████████	██████████	██████████	Specialized

TYPOLGY				
Vernacular	██████████	██████████	██████████	International
Formalist	██████████	██████████	██████████	Utilitarian
Scale: Domestic	██████████	██████████	██████████	Civic
Form: Open ended	██████████	██████████	██████████	Rigid

Ithuba Skills College / Iphiko Primary School
Faculty of Architecture of Ujilejisa / BAS/haibat architects of the university of Lin (Australia) (2010)
Ithuba Campus, Magalala Heights (Gauteng)

PROGRAMME: Iphiko is designed like a little village with its own public and private spaces, a teen square and paths. The school has 2 classrooms, a kitchen, a workshop, bathrooms and a sheltered playground suitable for small children. Ithuba houses toilets, a protected play classroom and library room. The main focus was on using local materials in an environmentally friendly design.

CONSTRUCTION				
Labour: Local	██████████	██████████	██████████	Specialized
Structure: Permanent	██████████	██████████	██████████	Temporary
Material: Regional	██████████	██████████	██████████	Specialized

TYPOLGY				
Vernacular	██████████	██████████	██████████	International
Formalist	██████████	██████████	██████████	Utilitarian
Scale: Domestic	██████████	██████████	██████████	Civic
Form: Open ended	██████████	██████████	██████████	Rigid

Baragwanath Transport Interchange
Ludwig Hansen Architects and Urban Designers (2008)
Soweto, Johannesburg (Gauteng)

PROGRAMME: The interchange provides space and supporting facilities for informal traders as well as 800 holding bays for various taxi associations. The design acknowledges the importance of transport and traders within the Soweto context.

CONSTRUCTION				
Labour: Local	██████████	██████████	██████████	Specialized
Structure: Permanent	██████████	██████████	██████████	Temporary
Material: Regional	██████████	██████████	██████████	Specialized

TYPOLGY				
Vernacular	██████████	██████████	██████████	International
Formalist	██████████	██████████	██████████	Utilitarian
Scale: Domestic	██████████	██████████	██████████	Civic
Form: Open ended	██████████	██████████	██████████	Rigid

Nelson Mandela Interpretation Centre
Peter Rich Architects (2006)
Alexandra (Gauteng)

PROGRAMME: A center that commemorates the the townships unique past while promoting tourism and encouraging entrepreneurial activities.

CONSTRUCTION				
Labour: Local	██████████	██████████	██████████	Specialized
Structure: Permanent	██████████	██████████	██████████	Temporary
Material: Regional	██████████	██████████	██████████	Specialized

TYPOLGY				
Vernacular	██████████	██████████	██████████	International
Formalist	██████████	██████████	██████████	Utilitarian
Scale: Domestic	██████████	██████████	██████████	Civic
Form: Open ended	██████████	██████████	██████████	Rigid

Thusung Service Centre
Makela Design Laboratory (2008)
Khayelitsha (Western Cape)

PROGRAMME: The design challenges the perception that a building in a poor area should warrant low capital investment and lack quality. The centre incorporates an internal sports court, offices, gallery space and proposed urban park.

CONSTRUCTION				
Labour: Local	██████████	██████████	██████████	Specialized
Structure: Permanent	██████████	██████████	██████████	Temporary
Material: Regional	██████████	██████████	██████████	Specialized

TYPOLGY				
Vernacular	██████████	██████████	██████████	International
Formalist	██████████	██████████	██████████	Utilitarian
Scale: Domestic	██████████	██████████	██████████	Civic
Form: Open ended	██████████	██████████	██████████	Rigid

Ubuntu Centre
Field Architecture (2011)
Port Elizabeth

PROGRAMME: The centre provides pediatric HIV testing and treatment, counselling, education and community empowerment. The focus is on de-stigmatization and normalization of HIV-testing.

CONSTRUCTION				
Labour: Local	██████████	██████████	██████████	Specialized
Structure: Permanent	██████████	██████████	██████████	Temporary
Material: Regional	██████████	██████████	██████████	Specialized

TYPOLGY				
Vernacular	██████████	██████████	██████████	International
Formalist	██████████	██████████	██████████	Utilitarian
Scale: Domestic	██████████	██████████	██████████	Civic
Form: Open ended	██████████	██████████	██████████	Rigid



The projects were then ranked according to their construction and typology (Fig 5|6) to determine their success according to the various categories. This information was further used to establish where proposed thesis projects would fit into the architectural backdrop of the township as a whole.

Under the category 'construction' the projects were investigated according to their use of labour (ranged from local to specialised labour), the structure (ranged from permanent to temporary), and the sourcing of materials (ranged from regional to specialised). For 'typology', the criteria used to rank the buildings were vernacular to international, formalist to utilitarian, scale (domestic to civic) (Fig 5|11) and form (open ended to rigid).

The best-ranked projects were those that made extensive use of local labour and materials. The success of both the permanent and temporary categories depended on the programme and building costs. Some buildings were first built as temporary structures and then became permanent.

All these categories largely depended on the requirements of the programmes, but also still needed to consider the type of community that would make use of the buildings, their future needs and whether they could relate to the buildings.

domestic

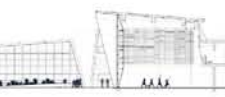
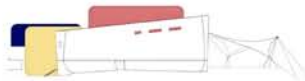
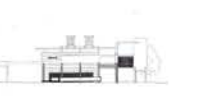
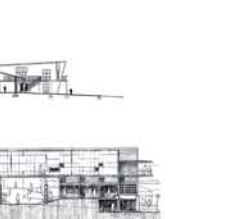
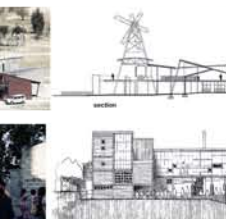
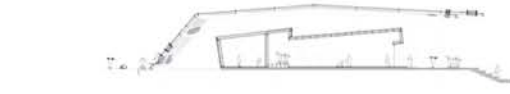


Fig 5|11_ Scale, Author 2012.

civic



Homeless World Cup Legacy Center, 2010
Lompreta Nolte Arquitetos, Nanda Eskes Arquitetura and
Architecture For Humanity
Conjunto Liberdade, Santa Cruz, Rio de Janeiro, Brazil



Sport City in Xativa, 2011
ACXT
Xátiva, Valencia, Spain



Silverstone Wing - Pitlane & Paddock, 2011
Populou
Northamptonshire, UK



F House, 2011
Katsufumi Kubota Architect
Yamaguchi, Japan



Facilities for Children and Youth Sport Activities, 2010
Cerrejon architects + Magen Arquitectos + Luis Moreno Architect
La Camisera, Oliver Neighbourhood of Zaragoza



Fig 5|17_ View from Leeuwkraal Dam wall, Author 2012

05|3_ establishing an architectural language

It was concluded that the proposed project should encourage and motivate the community. The project should give the users something to aspire and relate. The architecture and programme should also instil pride in the community members and provide the opportunity for them to take ownership of their community.

If one considers the horizontal nature of a sports field and the proposed site, it is envisaged that the building will accentuate the horizontal surface through the use of the roof and floor to define the various spaces. The various levels will also determine the viewpoints of the user, which will allow for different experiences throughout the building.

In terms of construction, the building should be more permanent in nature. The structure should be flexible enough to allow for the addition or detachment of

materials to define spaces that fulfil future needs. The materials should be sourced within a 50km radius of the site to ensure sustainability and to encourage a more vernacular approach. This approach will be strengthened through a combination of local and specialised labour in order to allow for skills transfer and work opportunities within the community.

The typology of the building will be utilitarian in nature, but will still aim to become a landmark building in the community. The typology will relate to the domestic scale of the buildings to the east, and will consider human scale throughout the building because of its relation to sport and the human body.



Fig 5|18_ Active public spaces

05|4.1_ Active public spaces

Through small-scale urban landscape installations in the vicinity of the building, as well as on the pedestrian route, the environment can become playful and enhance quality of the public space and the interaction between the people.

As an example of an active public space, the 'Walk the Line' installation (Fig 5|18.5 and Fig 5|18.6) by Hassell was a result of the STREET WORKS initiative of the Australian Institute of Landscape Architects (AILA) NSW (Hassell, 2011). The Australian Institute of Landscape Architects, invited entrants to re-imagine spaces in the Sydney as dynamic, innovative and sustainable temporary public places that bring people together in unique ways (Hassell, 2011).

The path is a line painted on the ground that become a game in selected areas. Street corners become hopscotch pitches, bat tennis courts and marbles fields, while stairs become waterfalls and road crossings become arcade games – all of which is a unique transformation of the public realm (Hassell, 2011). The temporary line links other STREET WORKS interventions and public transport nodes across the Sydney CBD to tempt the eye and lead both body and mind through the city, which encourages interaction with the surroundings and people in new and unusual ways (Hassell, 2012).

Other successful projects include Hassell's 'Nicholson Street Mall' (Fig 5|18.3) located in the centre of Footscray that represent the primary civic space for the local community. Hassell (2008) states that it serves as the commercial and social hub and represents the identity and aspirations not only of Footscray, but also of the entire municipality.

The Ormiston Activity Centre (Fig 5|18.2) is another

example of such a project. At this centre, berms (man-made mounds of earth) were used to create a skate board park with seating areas (Devitt, 2011). The open-air gymnasium at Mãe Luiza (Fig 5|18.1), envisioned by Herzog and de Meuron, is another applicable project. This project provides public amenities and responds to the local environment (Rosenfield, 2011). The open-air sporting court and public plaza in the shanty town of Altos de Cazucá in Colombia (Fig 5|18.4) features a tree-like canopy structure comprised of prefabricated dodecahedrons, which is yet another example of such a project (Gamboa, 2012).

Materials Used

These projects were constructed using minimal labour and resources, which resulted in sustainable solutions. The Hassell projects specifically were painted with

biodegradable paint made from organic polymers and natural pigments. The paint lasts for up to three months and is easily removed using a biodegradable ammonia and soap solution.

Application

Applications of such projects include the following:

- * Interventions can be placed at important points on the route to define spaces for bus or taxi pick ups or entrances to certain spaces within the building.
- * Interventions can also take the form of a mural which can be created by the local community in order to enhance ownership of the building.
- * Interventions can also define jogging routes through the community and give direction to such routes.

05|4_ precedents



Fig 5|19_UWC Sport complex and stadium, Author 2012



05|4.2_ University of the Western Cape (UWC) Sports Complex and Stadium

Architects: Uytendogaardt and Rozendal

Location: University of the Western Cape,
Bellville, Cape Town

Date of construction: 1986

The complex was chosen as precedent because of the efficient integration of the stadium and field area with a sports facility that fulfils the needs of the athlete. As well as for the construction and use of materials.

The stadium is positioned at the edge of the campus and mediates between the landscape of the Stellenbosch mountains to the east, and the built fabric of the University to the west (Gerwel, 1987:24)

The wall becomes the mediator. The architects (Gerwel, 1987:24) describe it as a powerful initial statement in the landscape, that opens up to the mountains, lightly holding the roof; while on the other side, the wall becomes the attachment for the beginning of the court enclosing system.

The stadium allows for 2500 spectators to enjoy an event and is currently home to UWC athletics, rugby, soccer and numerous other sporting events and local gatherings (Walkermare, 2006).

The design of the stadium successfully distinguishes between public, private and service areas. It allows views to and from these areas while completely controlling the movement patterns of the users. An upper level terrace becomes the major public social space and establish several important relationships; awareness of and contact with the field events (Gerwel, 1987:24).

The required spaces for the sports centre are placed under the pavilion – which is an optimal use of the space and incorporates courtyards to allow views of and integration with the surrounding landscape.

The layout allows for the multi-functional use and the adjustment of spaces, as required for specific events.

A combination of diagonal, organic and triangular lines is used to define different spaces, levels and services.

Materials Used

Steel and concrete technology is used for the main structure with facebrick as a planar or veneer material (Gerwel, 1987:24) – which is common to many UWC buildings. The roof consists of reinforced concrete cantilevered beams at 5,5m centres connected by curved, arch-shaped metal roof sheeting.

KEY TO LOWER LEVEL PLAN

1. Entrance loggia and turnstiles
2. Main entrance court and parking
3. Public: ramp up to terrace level of stadium
4. Public: ramp down to lower level
5. Service: ramp up from front of stadium
6. Escape: ramp up from front of stadium
7. Access to grass banks
8. Public: access to paved court and terrace level
9. Public toilets
10. Planted court: players entrance
11. Reception
12. Office
13. First Aid and dispensary
14. Clubroom
15. Gymnasium
16. Catering
17. Service
18. Players changerooms
19. Referees changerooms
20. Stores
21. Access to field
22. Clubroom gardens

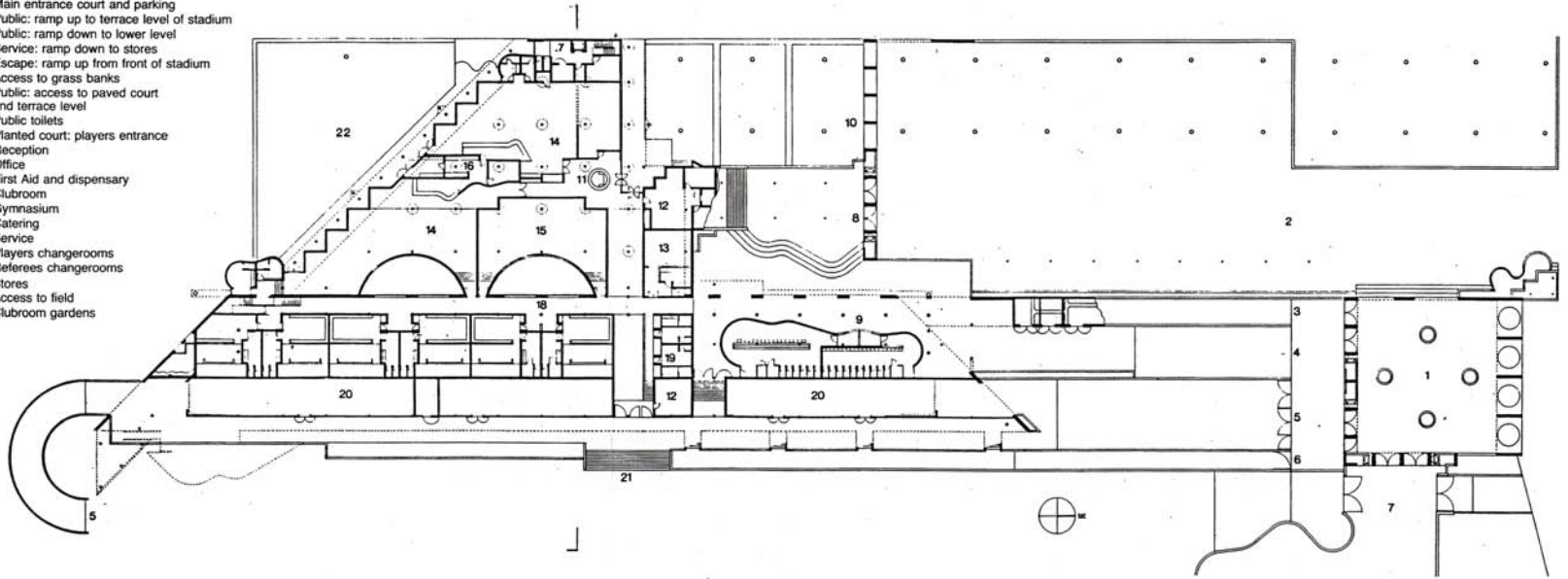


Fig 5|20_Lower Level Plan, Gerwel 1987:26

KEY TO LOWER LEVEL PLAN

1. Entrance loggia
2. Public ramp up to seating
3. Stairs up to terrace
4. Commentators box above
5. Electronic timing box
6. Control level
7. Commentators box
8. View platform
9. Public terrace
10. Catering and refreshments

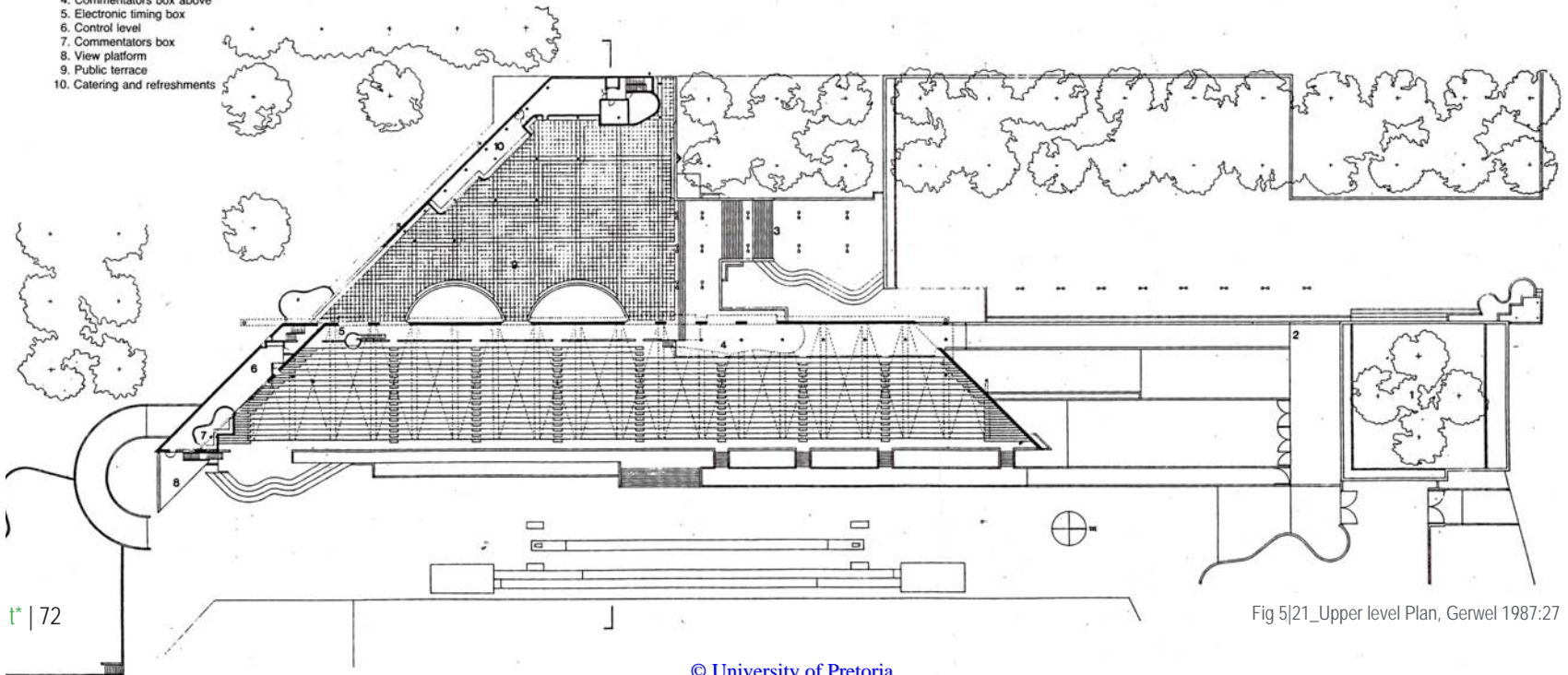
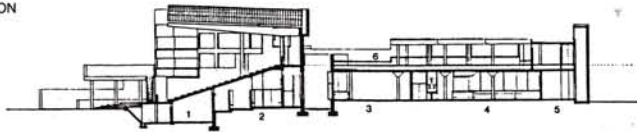


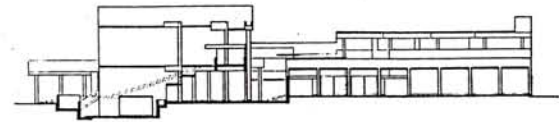
Fig 5|21_Upper level Plan, Gerwel 1987:27

KEY TO CROSS SECTION

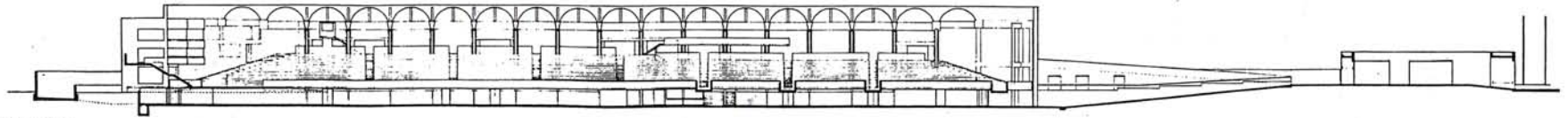
1. Stores
2. Players changerooms
3. Gymnasium
4. Clubroom
5. Service
6. Public terrace



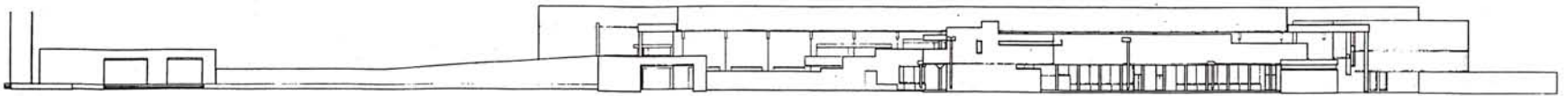
Cross section



North elevation



East elevation



West elevation

Fig 5|22_Sections and Elevations, Gerwel 1987:26&27

Application

The applications of this architecture include the following:

- * the use of ramps and levels to define public and private areas;
- * the integration of sports activities with a public interface;
- * the manner in which the spaces flow into each other; and
- * the distinction and application of brick and concrete.

KEY TO SITE PLAN

1. Proposed new east entrance to campus
2. Parking forest
3. Entrance loggia
4. Main entrance court
5. Main field
6. Secondary fields
7. Railway line

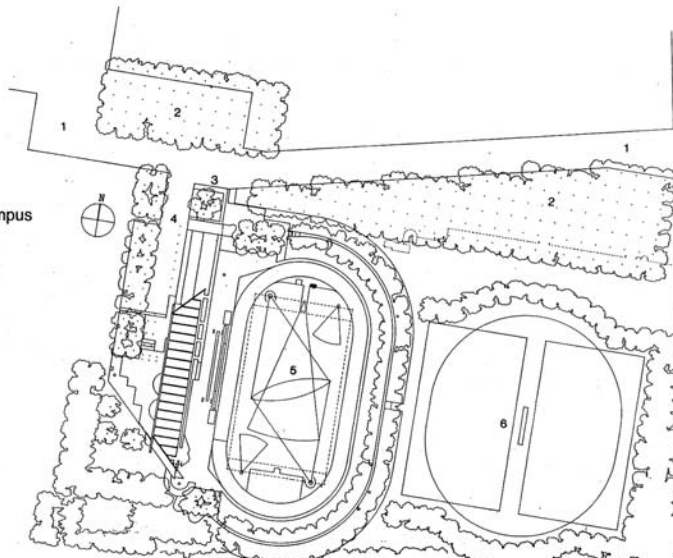


Fig 5|23_ Site Plan, Gerwel 1987:24

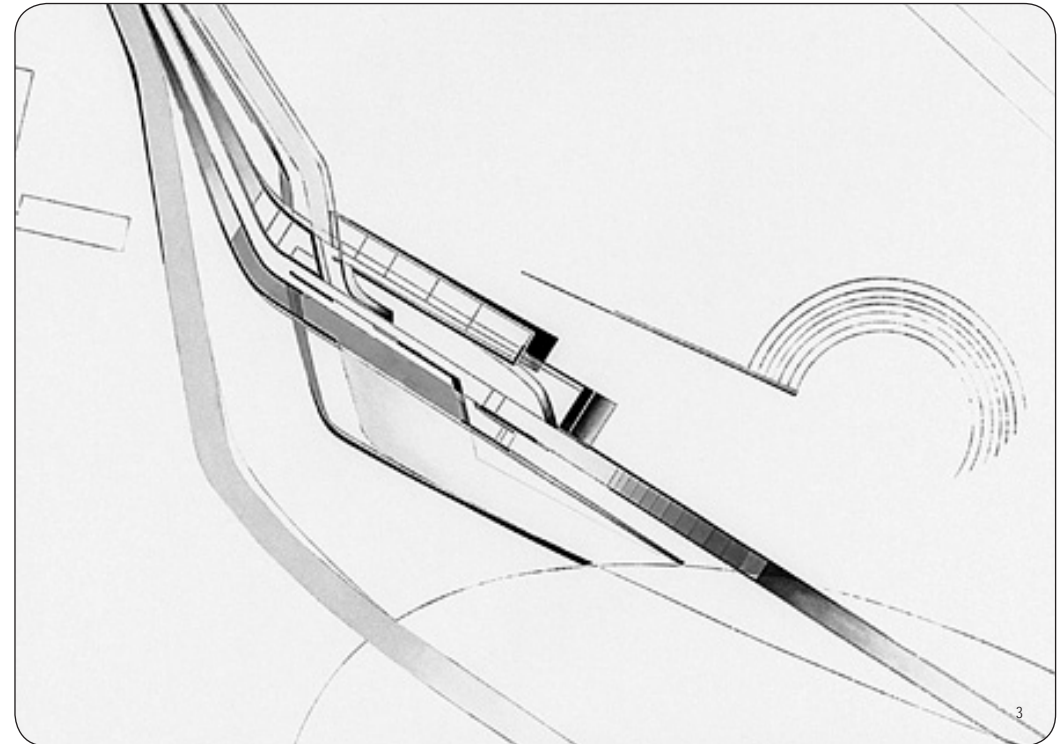
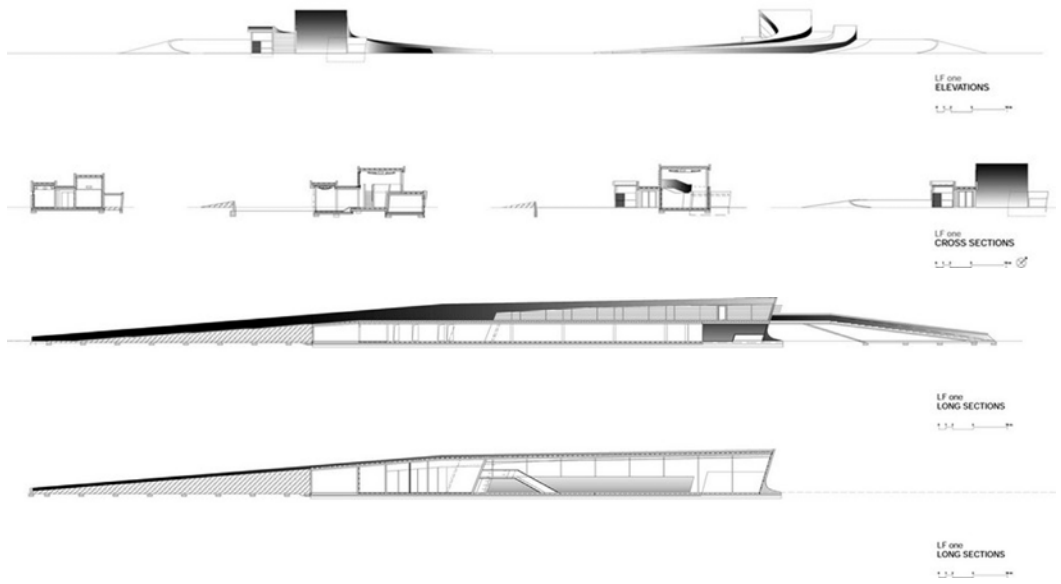


Fig 5|24_ Landesgartenschau Pavilion, Zaha Hadid Architects 1999.



05|4.3_ Trination Environmental Centre Landesgartenschau Pavilion

Architect: Zaha Hadid

Location: Weil am Rhein, Germany

Date of construction: 1999

The building was designed and built for a garden festival (Landscape Formation One) in the City of Weil am Rhein, Germany. Instead of acting as a separate object, the building dissolves into the surrounding landscape through the use of entangled walkways that form interwoven spaces. These spaces contain an exhibition hall, café and environmental centre (Singhal, 2012).

The main spaces, the exhibition hall and café, is situated along the naturally emerging paths, the position of the walkway allow natural sunlight in and provide contrasting views from the exterior (Singhal, 2012). Secondary rooms are merged into the base of the buildings. The environmental centre that is also located on the lower level take advantage of the insulating quality of the earth. The building also

features a south-facing terrace, solar energy sources and a sunken beam which also serves as a mezzanine (Singhal, 2012).

Environmental approaches were considered to achieve a constant temperature inside the building; which include the partial submersion of the building into the ground; the incorporation of an air-cooling system under the pathways; and the shading of windows with louvers. Archidose (1999) states that the building sensitively and carefully moulds the terrain to create an evolved "green" architecture — a grounded expressionism.

The building set a good example of how the proposed sport centre could be integrated with the surrounding environment through the use of walkways and integrated programmes.

Materials Used

The building consists of concrete, glass and wood panels that slide past and through each other. The materials give the building a contrasting and robust feel in the surrounding landscape.

Application

Possible applications of this type of architecture include the following:

- * relationships and integration with the surrounding site;
- * the incorporation of services into the structure;
- * subtle environmental elements; and
- * interwoven spaces.





05|4.4_ Sport City in Xátiva

Architects: ACXT

Location: Xátiva, Valencia, Spain

Date of event: 2011

Sport City is located on the outskirts of Xátiva, Spain and covers an area of more than 13 hectares. The project consists of two new football fields (one for an 11-a-side team and the other for a 7-a-side team), two indoor football pitches, two multi-purpose covered courts, tennis courts, beach volleyball courts, paddle courts (indoor and outdoor), basketball and mini-basketball courts, a French boules area, skating areas, swimming pools, areas for pitch and putt, a Basque ball game court (frontón), three playgrounds, an athletics track (with eight lanes) and a 2km jogging path (Gaete, 2012).

Gaete (2012) states that the unifying element of a great red curved roof is used to shelter the sports that need to be covered, embrace those who are outdoors and integrate the centre with the surrounding environment. The horizontal plane is well defined, with the roof constructed independently and the ceiling of the structures below not touching roof plane.



The structures reduce the scale of the building, while the placement of the programmes within the structures is used to define movement and secured areas. Visual access to the surrounding courts and play areas are allowed throughout the building. Colour and light are used extensively to create a vibrant environment where community members can participate in sport.

The building forms the central part of the sports centre and is surrounded by recreational areas, leisure spaces, and attractive landscaped gardens that follow the lines of the building.

The fact that the building becomes the central point and unifying element of the sport city serve as precedent for the layout, construction and integration of the proposed building.

Materials Used

The roof is constructed out of steel sheeting with a steel supporting structure, while the structures below consist of composite corrugated sheeting panels, glass and plastered brick

Application

Applications of this type of architecture include the following:

- * the roof as a defining element;
- * the structure as a separate entity below the roof;
- * the building defining the edge of the field;
- * the use of colour and light; and
- * the integration of the surrounding landscape.

Chapter 6

Design Development

This chapter explains the design concept and how the design developed in terms of the horizontal surface; the response to the surrounding environment; the programme requirements; safety; general dynamics; and climatic conditions.

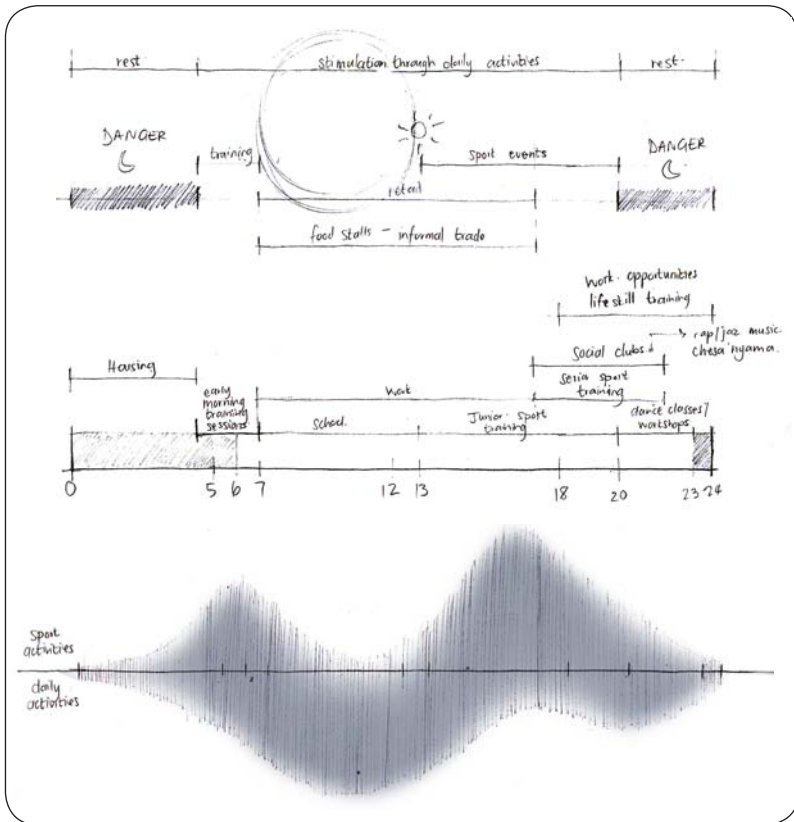


Fig 6|1_ Time lapses, Author 2012.

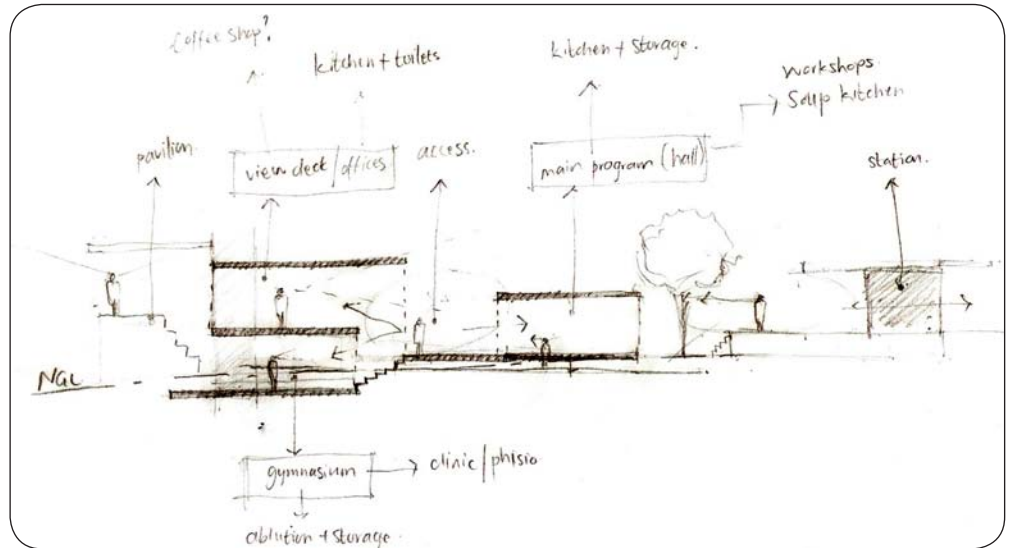


Fig 6|2_ Main and supporting programmes, Author 2012.

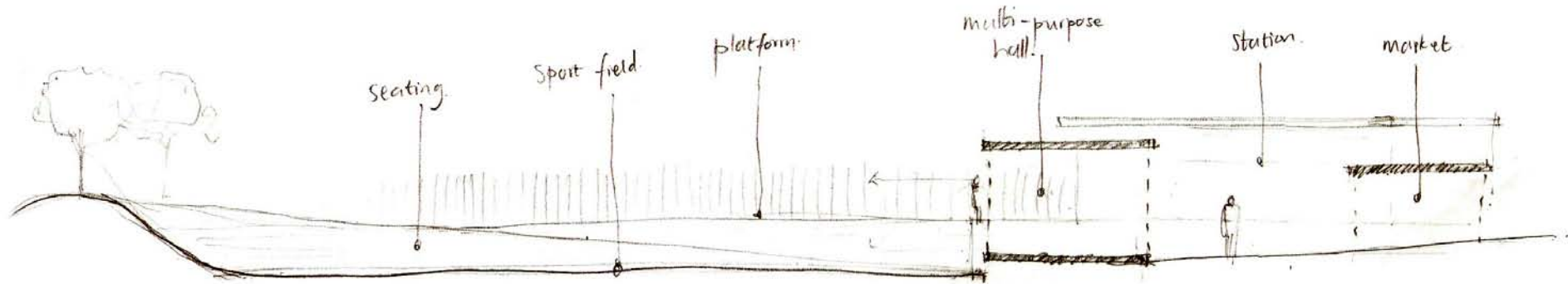


Fig 6|3_ Conceptual section through site, Author 2012.

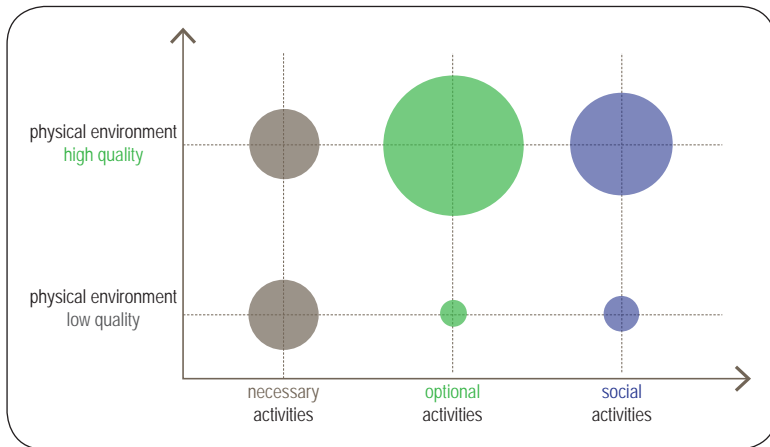


Fig 6|4_ Influence of the physical environment on the public activities, Gehl 2002

06|1_ programme

The proposed sports facilities building accommodates three main programmes: a multi-purpose hall, a gymnasium and NGO offices.

These main programmes are supported by secondary functions which allow for more public interaction and cross-programming (Fig 6|2 and Fig 6|3).

The secondary functions are the following:

- * a hall with a soup kitchen and workshops;
- * a gymnasium with a clinic, physiotherapist and swimming pools; and
- * offices with a library and viewing deck.

The station represents the main programme of the public interface, with a market, public toilets, a park and a community hall as supporting programmes.

The placement of the programmes are also determined by time lapses (Fig 6|1), which allowing for activity throughout the day, week and weekends to ensure passive surveillance and interaction.

The station is the constant movement generator with people travelling to and from it throughout the day. Peak times occur during the mornings and afternoons when commuters travel to work or home.

The daily work activities in the vicinity of the proposed public space mainly occur between 08h00 and 17h00, during lunch and when the schools come out (12h00 to 14h00). These times represent when the public space is used at an optimal level. During the evenings there is also a slight peak of activity, with people attending evening classes and/or workshops and/or social clubs.

The sports activities reach a slight peak of activity in the early mornings between 05h00 and 07h00, with training sessions before work and school. However, the biggest peak time is between 16h00 and 20h00 in the evenings when most of the school sports events happen. Adults also participate in club sports between these times.

The daily and sporting activities supplement each other throughout the day, which allow for constant movement and activity within the public space.

The size and volume of the proposed spaces are determined by the programmes and requirements set out in *Architects' data* (Neufert, Baiche & Walliman, 2000) and the *New Metric Handbook* (Tutt & Adler, 1979). The proposed spaces also need to relate to a human scale.

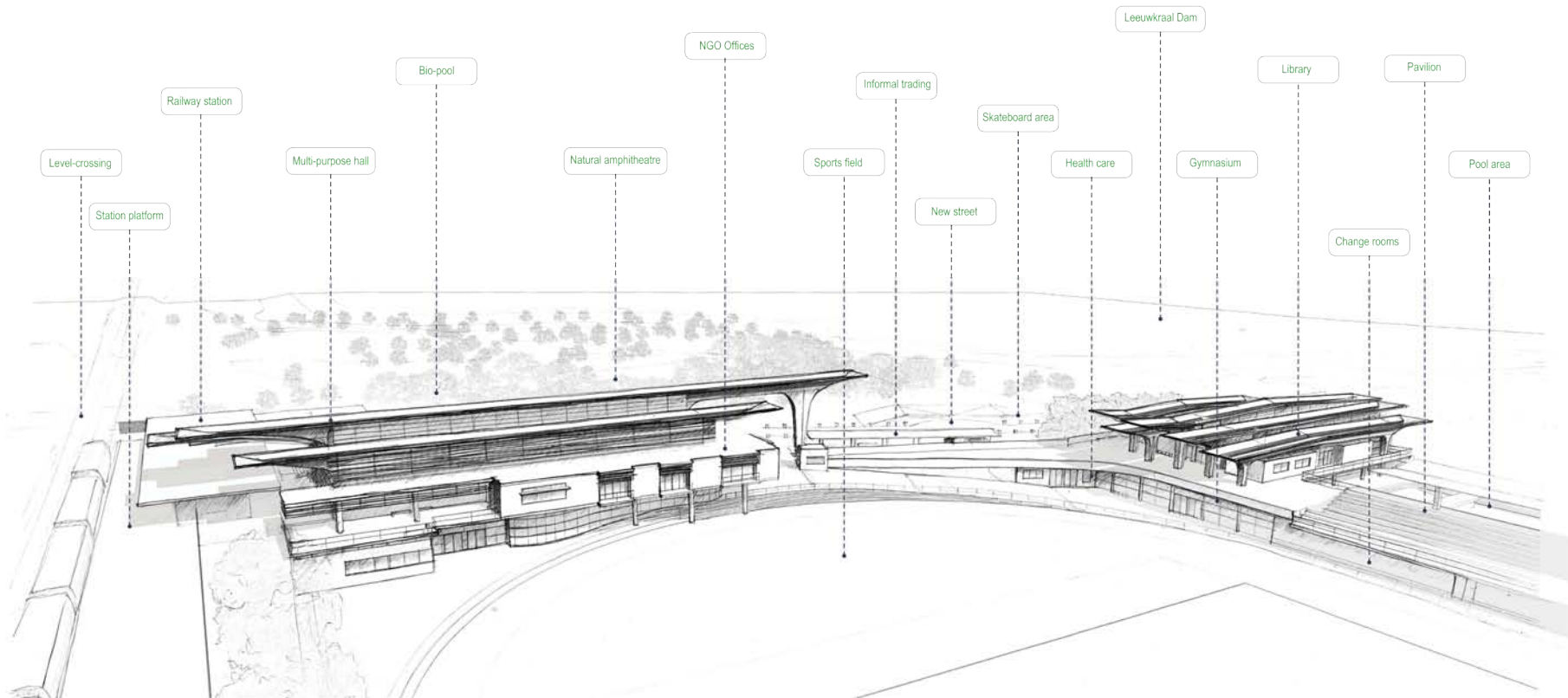


Fig 6|5_ Location view, Author 2012

Programme	Area requirement	Description
Stadium	2425m ²	Two full size grass pitches (ideal for hockey, soccer and rugby)- grass
		A six-lane 400m tartan running track - all weather surfacing
		A mini-stadium with seating for 2000 spectators, equipped with press box for major events
		Grass terraces with seating for a further 2000 spectators
		Changing and shower facilities for 4 teams (2 male and 2 female)
		Retail component serving the stadium and station along the vehicle route (sublet to tenants)
Fitness Centre	3347m ²	Sport medical centre with treatment and consulting rooms providing physiotherapy, sports injury massage, and access to a clinic
		Pool Complex:
		12 lane 25m swimming pool with depth varying between 1200mm and 2000mm to accommodate underwater hockey, swimming and water aerobics.
		Learner pool with depth of 1200m to accommodate guided water jogging, swim school, water-aerobics and under water breathing classes.
		Braai facilities along the perimeter of the swimming pools
		Gymnasium (540m ²) with treadmills, stationary cycles, lifting platforms, free & fixed weights, circuit training and warm-up area, as well as one demonstration and aerobics hall.
		NGO offices and consultation area
Multi-purpose hall	1600m ²	576m ² PUR flooring suitable for netball, volleyball, basketball, badminton, table tennis and workshops.
		Hall can also be used for workshops
		Seating around perimeter for 320 spectators
		Kitchen area to serve as kiosk during events or soup kitchen that serves to the arrival area during public events
		Changing and shower facilities for 2 teams (unisex)
		Care taker and cleaner room
		First aid facility
Library	524m ²	Two group discussion rooms
		Computer browsing area
		Printing station
		Adult, children and research shelves
		Study area
		Reading nook for books and journals
		Audio/visual
		Viewing deck over the swimming pools and stadium
Station	1430m ²	Two small platform stations on either side of the railway line (715m ² respectively)
		300 x 9m train platforms on either side with waiting areas
		Underground pedestrian tunnel linking the two
		Public toilets in the vicinity of the open waiting area
		Viewing platform to the sports hall and stadium

Fig 6|6_ Programme requirements, Author 2012

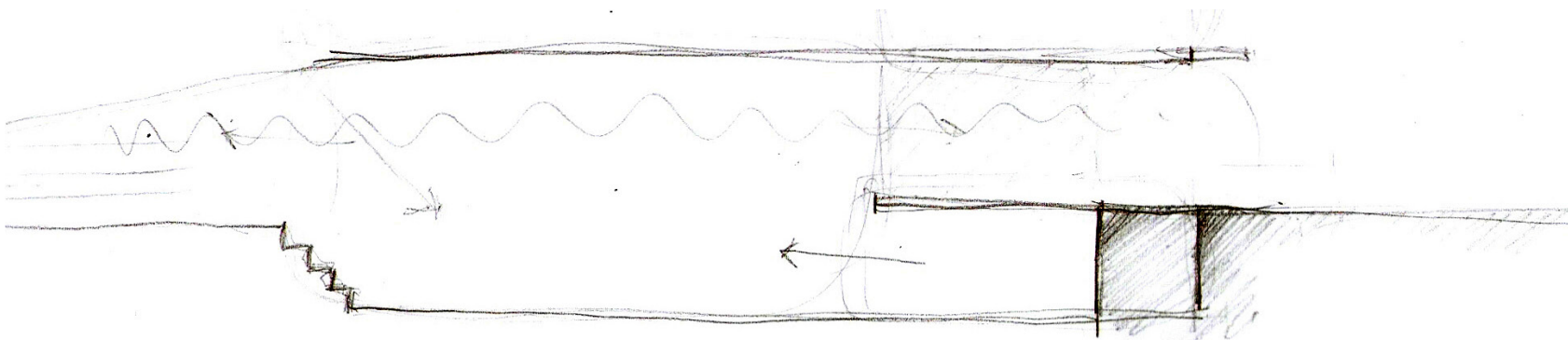


Fig 6|7_ Horizontal surface, Author 2012

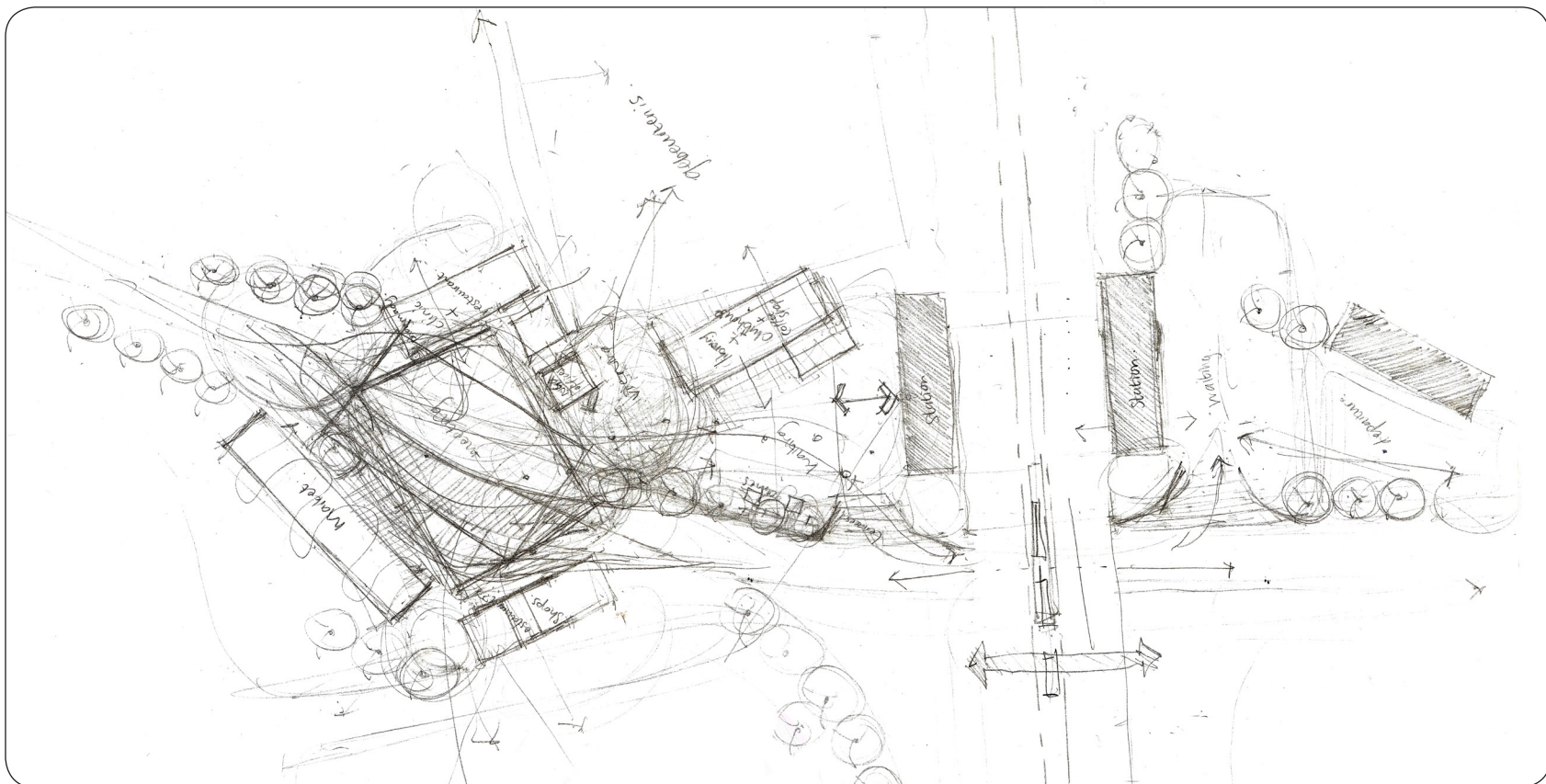


Fig 6|8_ Conceptual site development, Author 2012

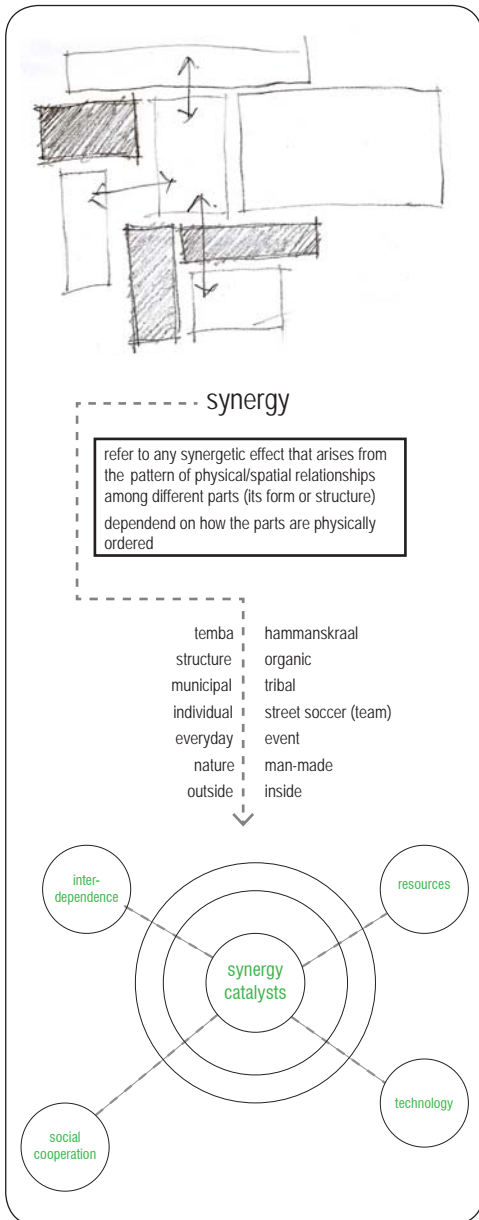


Fig 6|9_ Synergetic effect, Author 2012

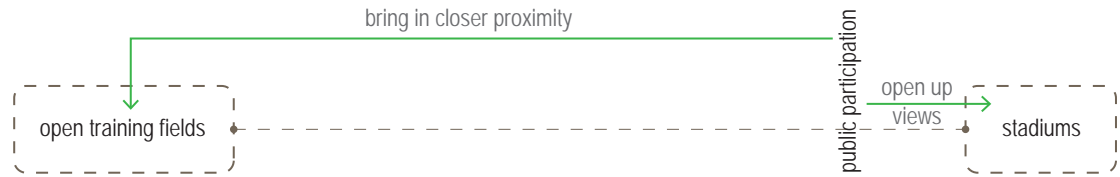


Fig 6|10_ Sport Architecture Concept, Author 2012

06|2_ concept

A synergetic effect is created through bringing sporting activities closer to the public realm and allowing visual exposure of the various sports and public activities (Fig 6|10). This synergetic effect could result in a more vibrant urban space and a spatial relationship that promotes interaction and awareness among the community members (Fig 6|8).

A threshold space is created between the community, sport and the public realm. Threshold spaces are also created between the natural and man-made, structures and the organic, the everyday and events, and ultimately, between the inside and outside (Fig 6|9). The success of these spaces will be determined by the inter-dependence of the programmes, the resources available to create the necessary environment, the technology applied to the building, and ultimately, the

social cooperation of the community members. The community members should be able to relate to the building and take ownership thereof.

A significant aspect of threshold or mediator spaces is the horizontal surface that is used as design generator. The horizontal surface can define space (Fig 6|1), yet still allow movement through the space that is crucial in the creation of these threshold spaces.

Fig 6|11_ Horizontal elements defining space, Ching 1979:99

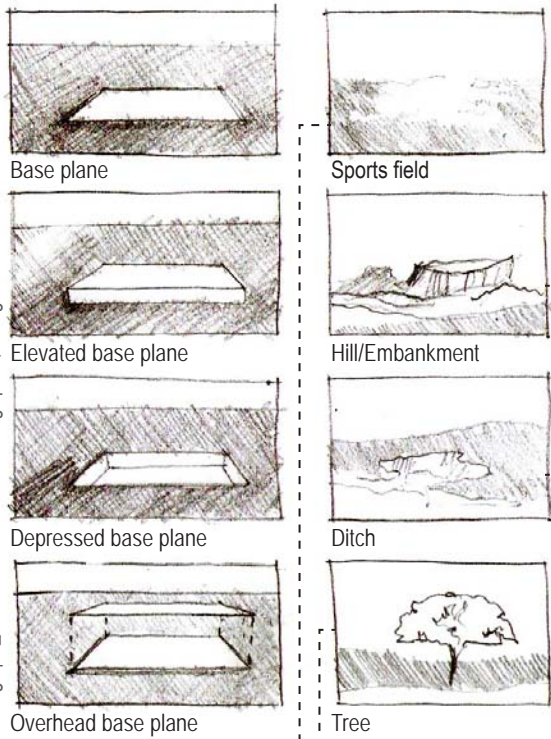
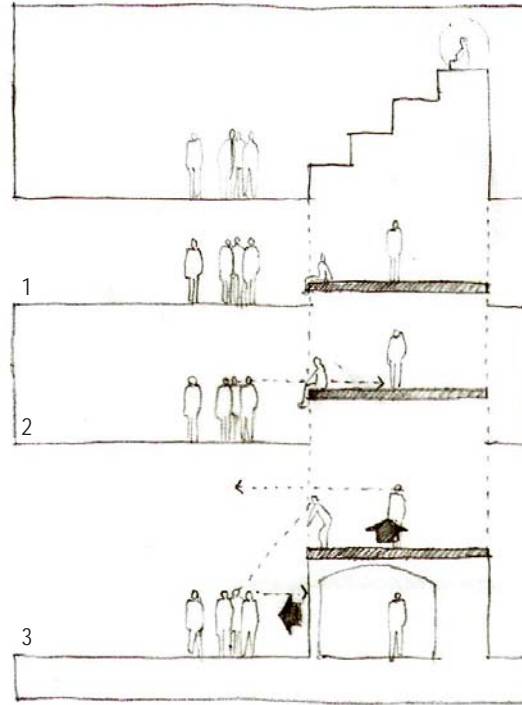


Fig 6|12_ Elevated base plane, Ching 1979:103



- 1_ Edge is well-defined; visual and spatial continuity maintained; physical access is easily accommodated.
- 2_ Visual continuity; spatial continuity interrupted; physical access requires the use of stairs or ramps
- 3_ Visual and spatial continuity interrupted; the field of elevated plane is isolated; elevated plane is transformed into a sheltering element for the space below



Fig 6|13_ View of surrounding context from the pedestrian bridge, Author 2012

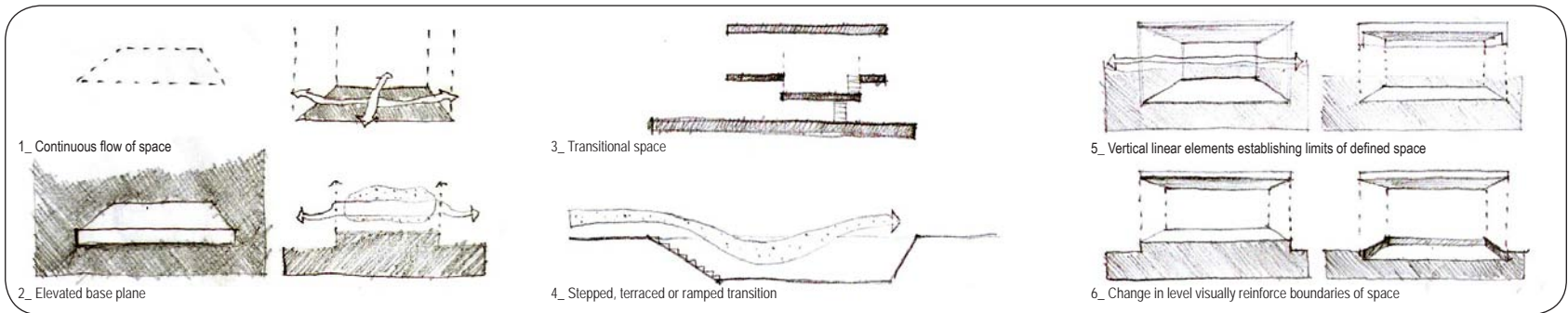


Fig 6|14_ Manipulation of the horizontal plane, Ching 1979

06|3_ horizontal surface

On the exploration of the possibilities of the horizontal plane through the studies of F. D. K. Ching in *Architecture: Form, Space and Order* (1979), it was found that various configurations of horizontal and vertical elements can generate and define specific types of spaces. The significance of the spaces are determined by the programme, the relationship with other spaces, the context and the overall concept of the building which are expressed through the application of relationship of the horizontal and vertical elements.

The proposed site in Hammanskraal (Fig 6|11 and Fig 6|13) consists of various horizontal planes which can be classified as a base plane (sports field), an elevated base plane (hill or embankment), a depressed base plane (ditch) and an overhead plane (trees). The design can respond to these planes and simultaneously

determine the degree to which space and visual continuity is maintained. This response depends on the scale of the level change between an elevated space and its surroundings (Fig 6|12).

Through the manipulation of the horizontal plane, certain spaces can be defined (Fig 6|14): (adapted from Ching, 1979)

- * With a change in colour, tone or texture the boundaries of a spatial zone can be determined, while allowing a continuous flow of space across it. The stronger the edge definition, the more distinct the field.
- * When a level change is introduced, a specific domain within a larger spatial context is created. This defines the boundaries of the field to a much greater extent and, depending on the height of the level change, may

interrupt the flow of space across the horizontal surface.

- * An area can also be sunken to reduce the scale of a room and define a more intimate space, or serve as a transitional space between two floors of a building.
- * Continuity of movement between sunken spaces and areas that rise around them can be achieved with steps, terraces or ramps.
- * Vertical linear elements that are used to support an overhead plane, such as columns or posts, will aid in visually establishing the limits of a space without disrupting its flow. These elements should be as slim as possible to accentuate the horizontal plane.
- * A similar effect of defining space can be achieved through turning down the edges of the overhead plane or introducing a level change beneath it.



Fig 6|15_ Proposal 1

Positive_

- * field defining the central space
- * supporting programmes
- * linkages with surrounding environment and inside and outside

Negative_

- * programmes too far apart
- * separate structures for each activity

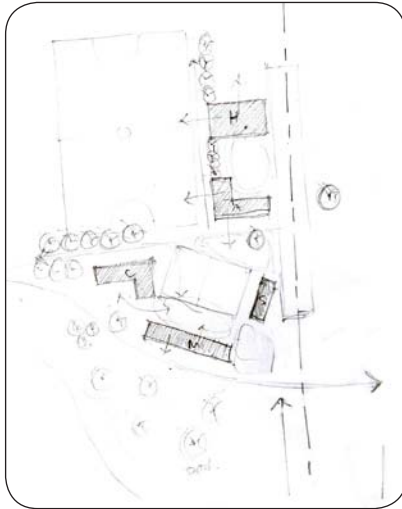


Fig 6|16_ Proposal 2

Positive_

- * introduction of a movement space from the platform to the route
- * safer play area in the middle
- * continuous view of big sports field

Negative_

- * programmes still not integrated enough
- * spaces not interlinked and too big

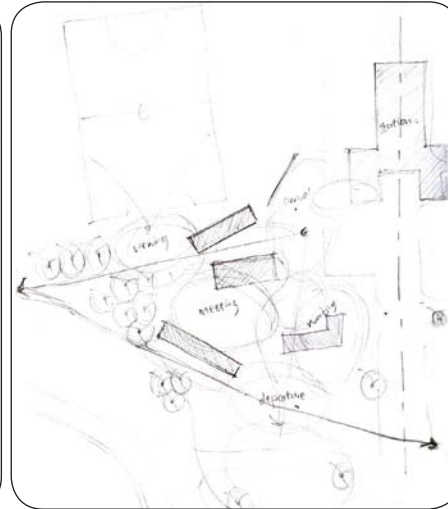


Fig 6|17_ Proposal 3

Positive_

- * introduction of different types of spaces
- * introduction of a station instead of only a train platform

Negative_

- * creation of two separate routes - reduces the density of users
- * areas not well defined and in no particular sequence
- * not effectively crossing the railway barrier

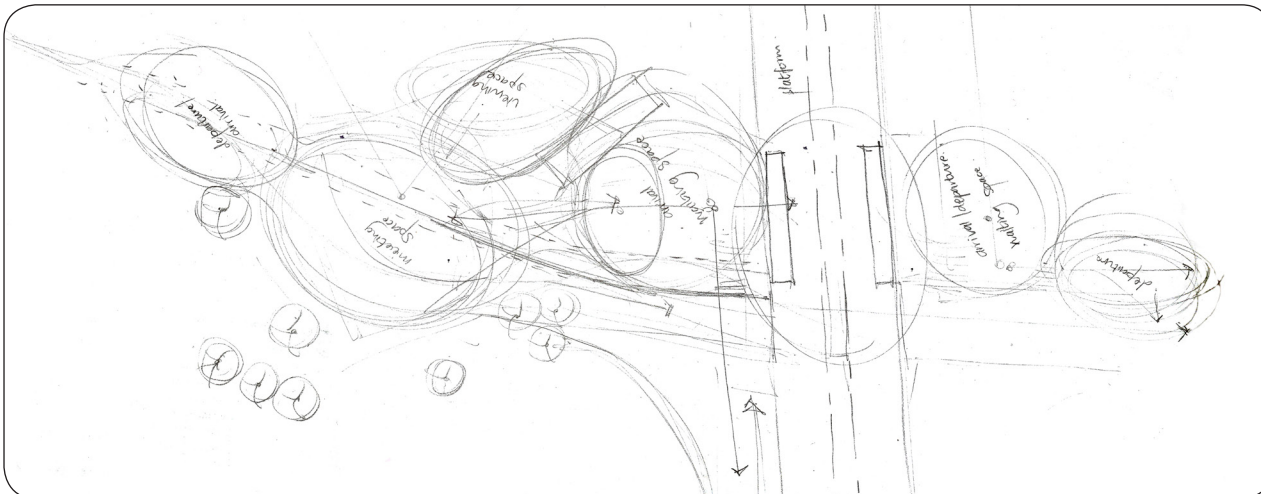
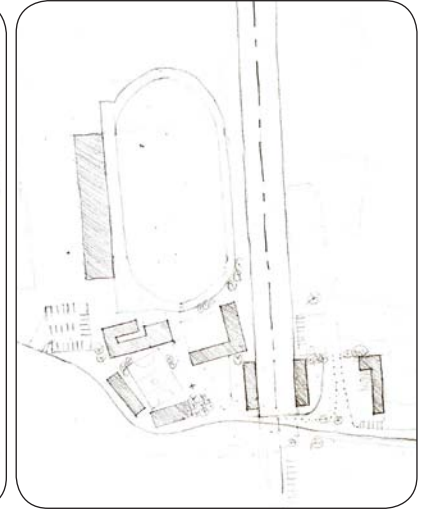


Fig 6|18_ Proposal 4

Positive_

- * better sequence and organisation of spaces
- * continuous movement
- * collaboration of pedestrian and vehicle routes
- * crossing over barrier

Negative_

- * need to condense spaces
- * bring sports field even closer to the station

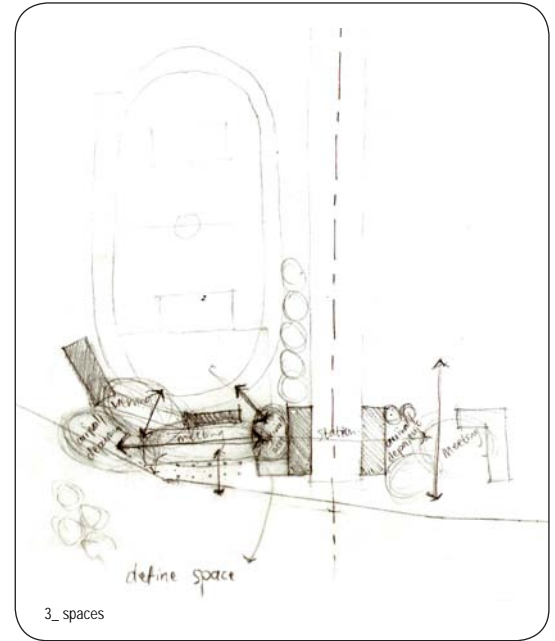
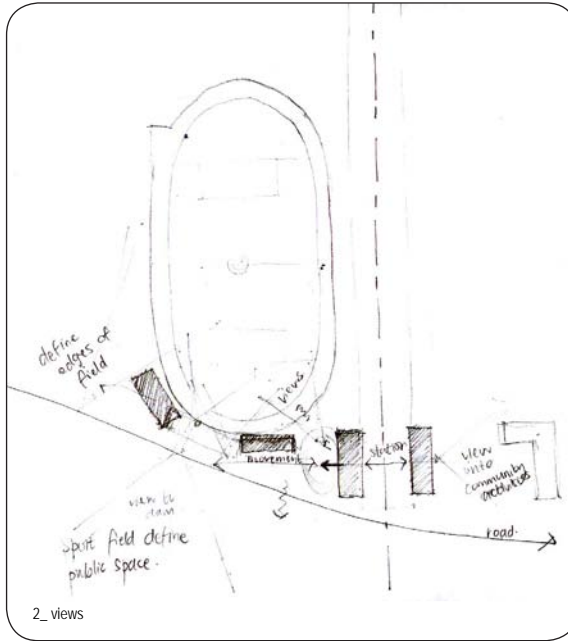
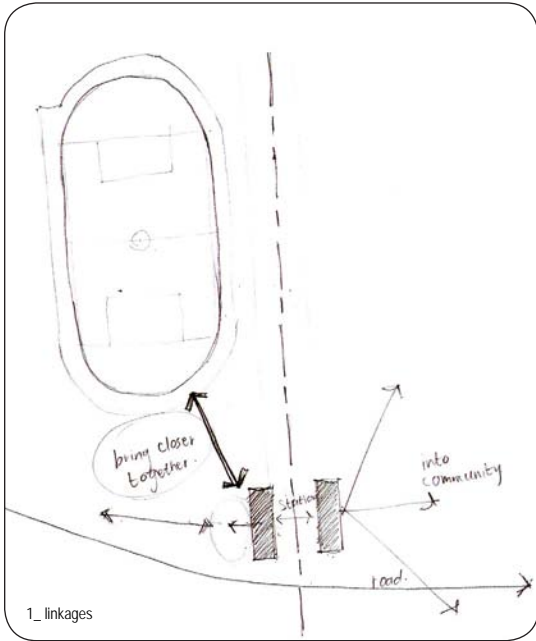


Fig 6|20_ Design generators

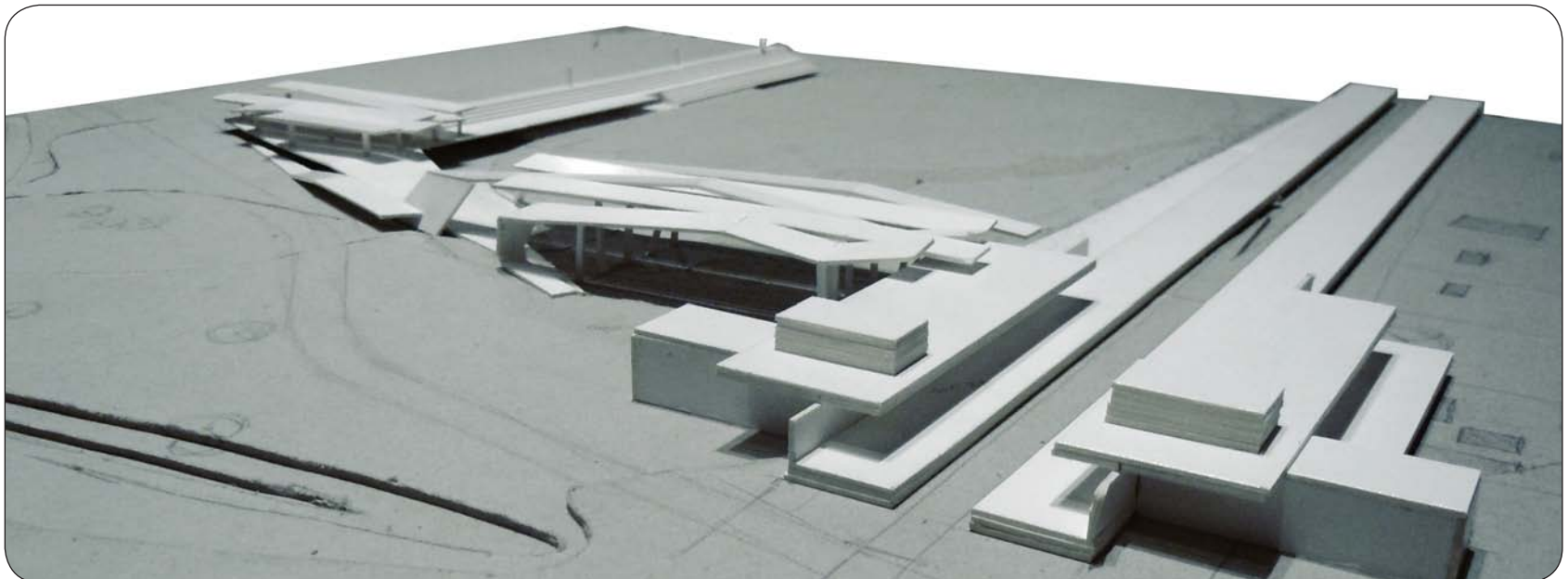
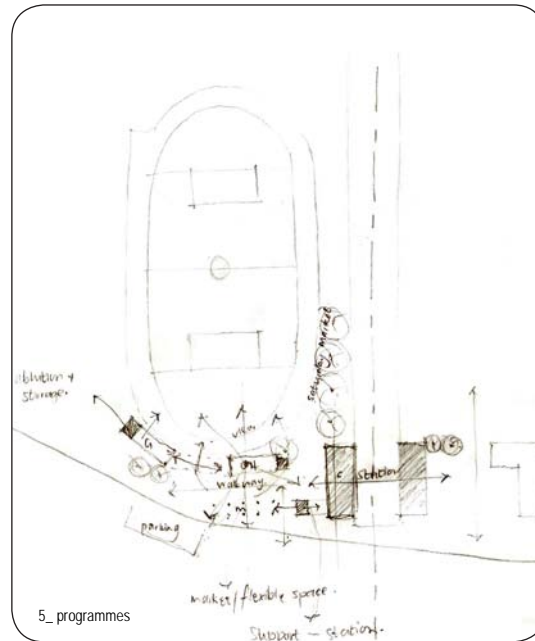
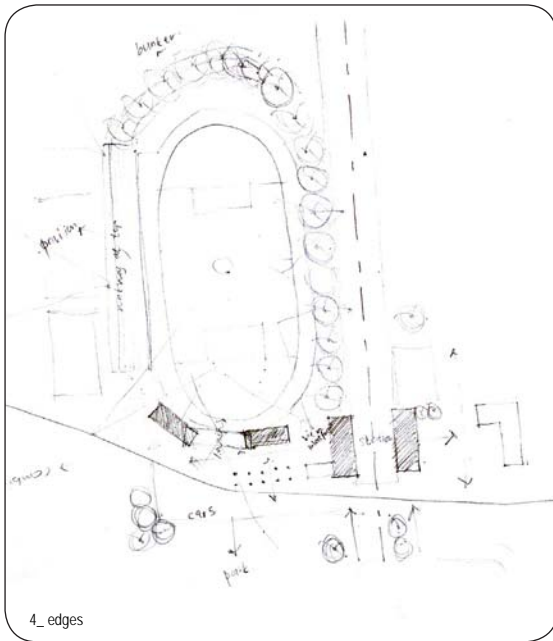


Fig 6|21_ Final design layout



06|4.3_ Spaces

It was also considered how the everyday-user would move to and from the station and sports activities. The defining spaces of arrival, departure, meeting and viewing were also considered. These spaces do not necessarily have fixed positions and they overlap in several instances, but they are used as guidelines to describe the kind of activity that would mostly occur there.

06|4.4_ Edges

In order to define the various spaces, the edge conditions had to be considered. Edge elements include level changes, wall conditions of the proposed building, covered areas, landscaping, berming and surface textures. In certain areas these would be hard edges, while in other areas they would become blurred and would blend in with the surrounding activities and landscape.

06|4.5_ Programme

The positions of the specific programmes were considered. These positions allowed for more typologically fixed programmes at the end points, with the station representing the public element on the one end and the gymnasium and NGO offices representing sport on the other end. The more flexible programmes fit in between these two extremes, such as the market and the multi-purpose sports hall. These programmes define the public and sports activities, yet allow for interaction and access between the activities. The users of the programmes can either be directly or in-directly involved.

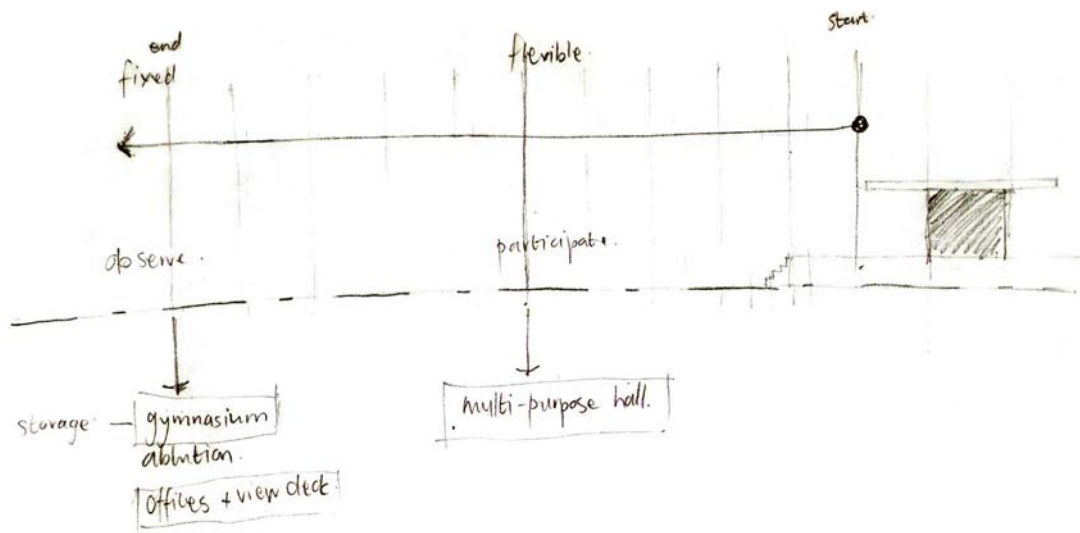


Fig 6|22_ Programmes

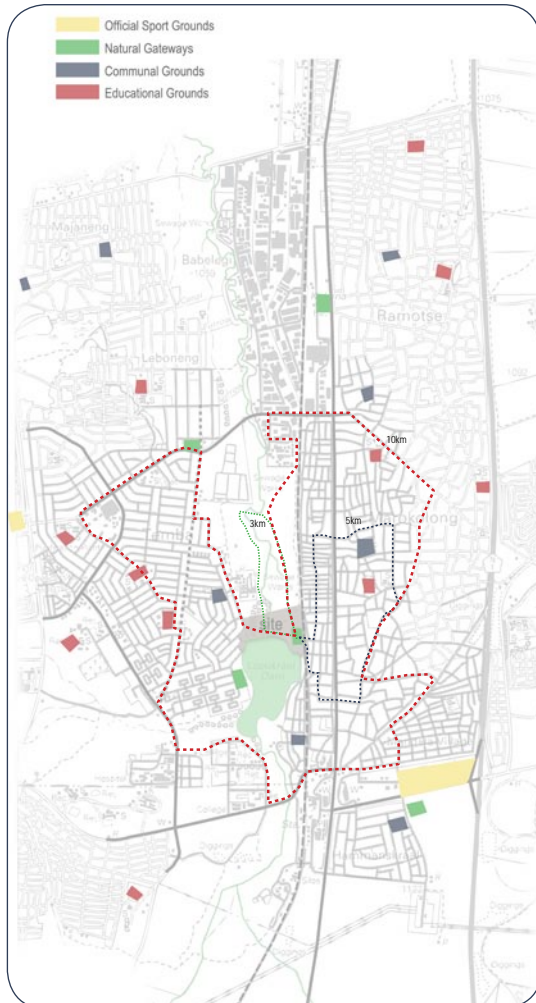


Fig 6|23_Jogging route through the neighbourhood, Author 2012

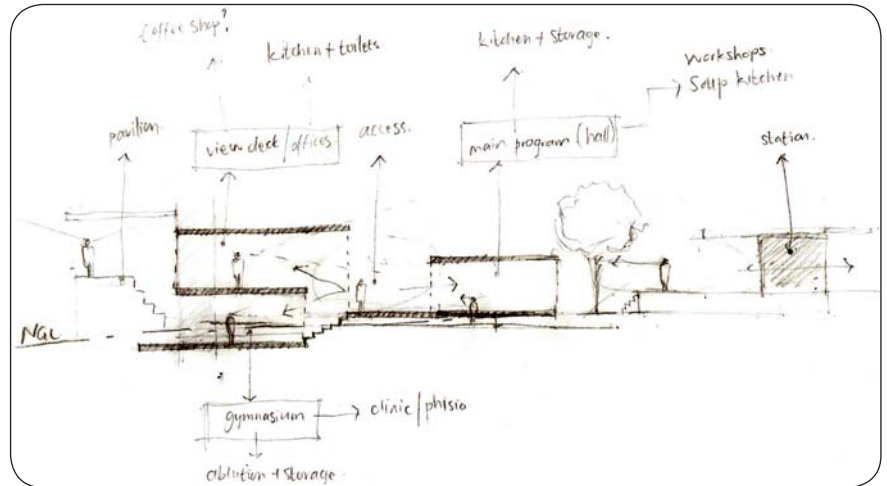


Fig 6|24_Section: Security provided by level changes and fence, Author 2012

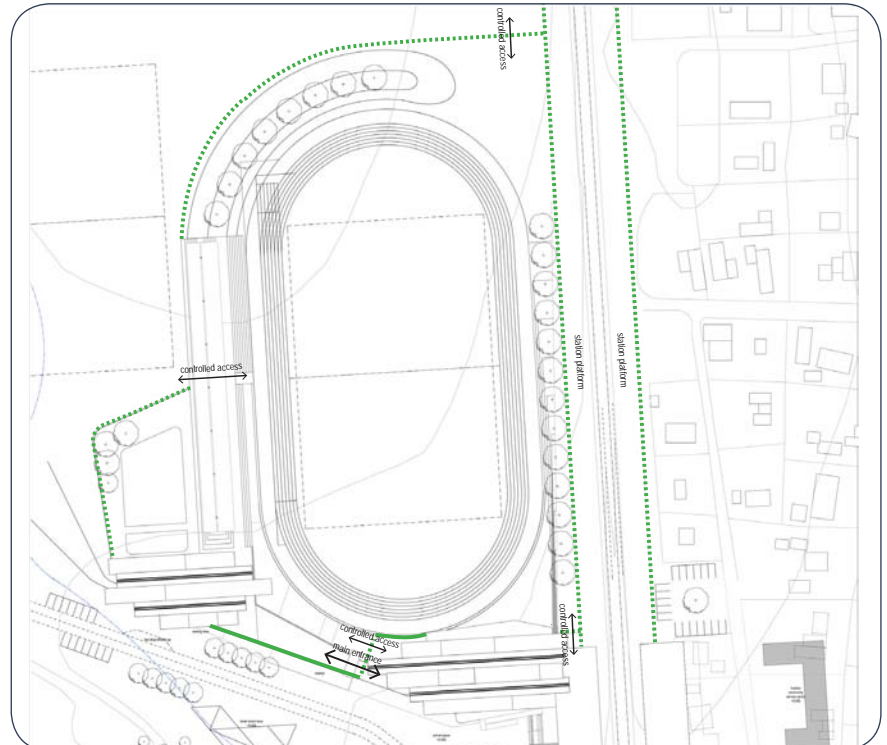


Fig 6|25_Security fence perimeter, Author 2012



Fig 6|26_ ClearVue fencing, Fenceoff 2012.



Fig 6|27_ Landscaping



06|5_ centre safety & general dynamics

It is important to ensure the personal safety of people travelling along the route and who use the station and sports facilities. Even though the sport and public activities flow into each other, the edges need to be defined to provide security.

This definition is achieved by the use of level changes, berms, ClearVue fencing along the perimeter of the field and a central access point to the sports facilities (Fig 6|24). The security barrier disappears into the surroundings and is manufactured from high-density tensile mesh with apertures that are too narrow for finger and footholds (Fig 6|25 & 6|26).

Cross-programming allows for passive surveillance throughout the day with sport and public activities taking place adjacent to each other. Night-time security is enhanced along the route with proper street lighting and

the provision of surveillance nodes at regular intervals.

The stadium lights also become a landmark and create a sense of safety and direction.

The design of the building allows control and security with private circulation on the lower levels and public circulation on the upper levels.

Apart from the tartan running track, few jogging trails are introduced along the green strip and through the community with the starting point originating in the public space (Fig 6|23).

Landscapes within the vicinity of the building are designed to promote pedestrian movement, interaction and participation. Games will be painted on the pavements with lines for hopscotch, hand-ball, follow the line and even maraba-raba. Provision is also made for a skateboard park and an amphitheatre (Fig 6|27).

This design is interspersed with seating areas where people can enjoy a meal, wait for the bus, or simply enjoy the surroundings.

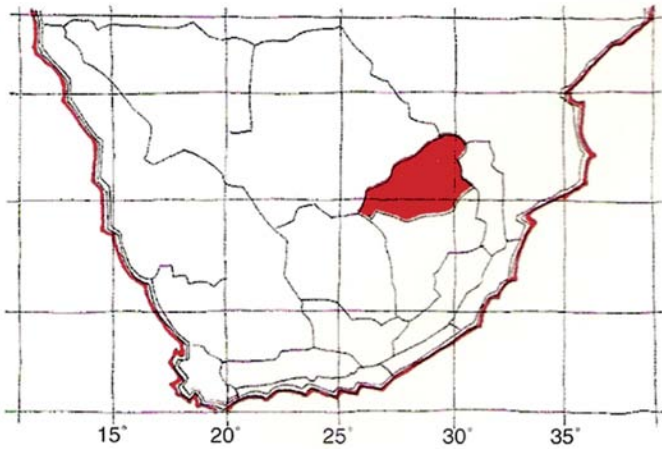


Fig 6|28_ Gauteng in relation to South Africa, Holm 1996.

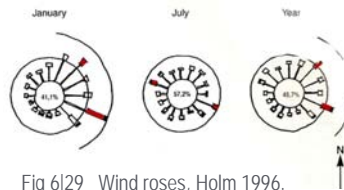


Fig 6|29_ Wind roses, Holm 1996.

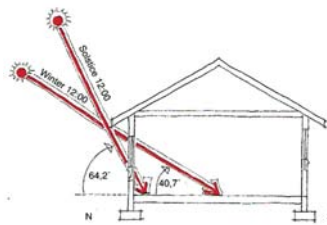
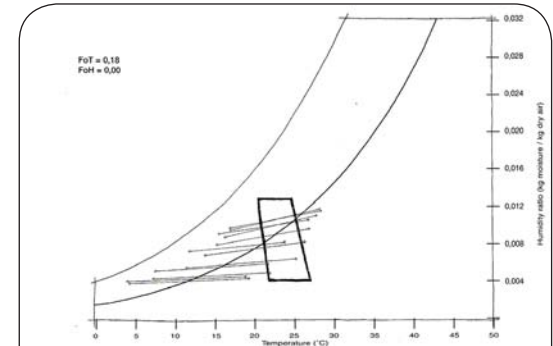
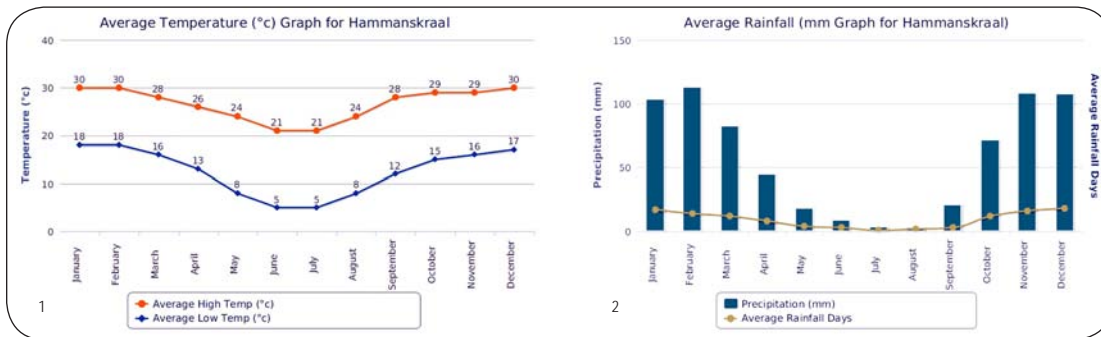


Fig 6|30_ Sun angles, Holm 1996.

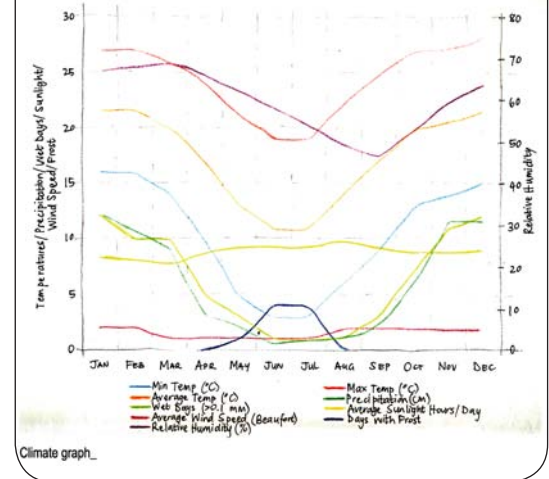


Psychrometric chart showing the comfort zone's position relative to the climate lines.



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Relative Humidity	65	67	70	67	64	62	58	46	50	55	62	67	61
Hours of sun	8	8	8	9	9	9	9	10	9	9	8	8	9
Precipitation sum	128	97	91	46	21	8	7	7	21	71	111	113	60
Precipitation days	14	13	13	10	4	4	1	1	7	14	18	18	10

Fig 6|31_ Climatic information of Hammanskraal, Zoover 2012.



Climate graph.

Fig 6|32_ Psychrometric chart and climate graph, Holm & Viljoen 1996.

06|6_ climatic response

Hamanskraal is located in a moderate climate zone, with distinct summer rain and dry winter seasons with a large daily temperature swing and strong solar radiation (Fig 6|28 to Fig 6|31). The relative humidity is moderate during the summer months because of frequent afternoon thunder-showers.

In *Manual for Energy Conscious Design*, Dieter Holm (1996:30) stipulates several factors to consider in the design of a building to ensure an indoor temperature that would allow for optimal comfort, stimulation, health and productivity (Fig 6|32):

- * Winter and summer requirements differ. Winter demands include a compact plan form, a well-insulated envelope and solar gain.
- * Openings for solar gain should be orientated towards

the winter sun and screened in summer when solar control is necessary to prevent overheating.

* Solar control devices near openings should preferably have a low thermal capacity so that they cool down rapidly at night.

* Thermal mass is also advisable, especially in inland areas where the daily temperature swing is more than 13°C. It can be provided by the mass of floors and internal partitions.

Through the application of these passive systems, the amount of resources for the building and the overall cost to operate it will be reduced. This reduction in cost could be further enhanced through the collection of water from the roofs that could be stored, filtered and used for irrigation, toilets and pools.

The proposed surface conditions also need to be considered carefully because these should provide a proper walking and driving surface, yet they should also allow for rainwater to penetrate the ground below to reduce the amount of run-off from the site.

With relatively high rainfall levels during the summer, the flood line of the dam plays an important role in establishing the positioning of the building, sports fields and swimming pools.

It is also crucial to provide sufficient shelter from the sun for the pedestrians along the route and in the public space, as well as for the spectators of events because of the lack of shade on the site.

Chapter 7

Technical Development

This chapter describes the technical investigation and resolution of the proposed design. Particular regard is given to the approach to the structural tectonic, the structural systems employed, the choice of materials, building systems and the phases of construction.

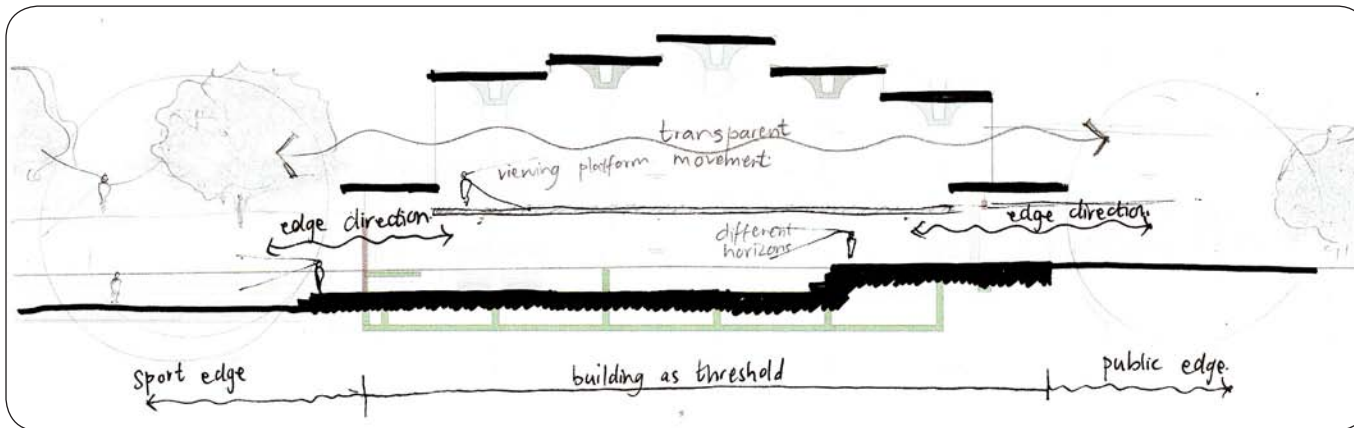
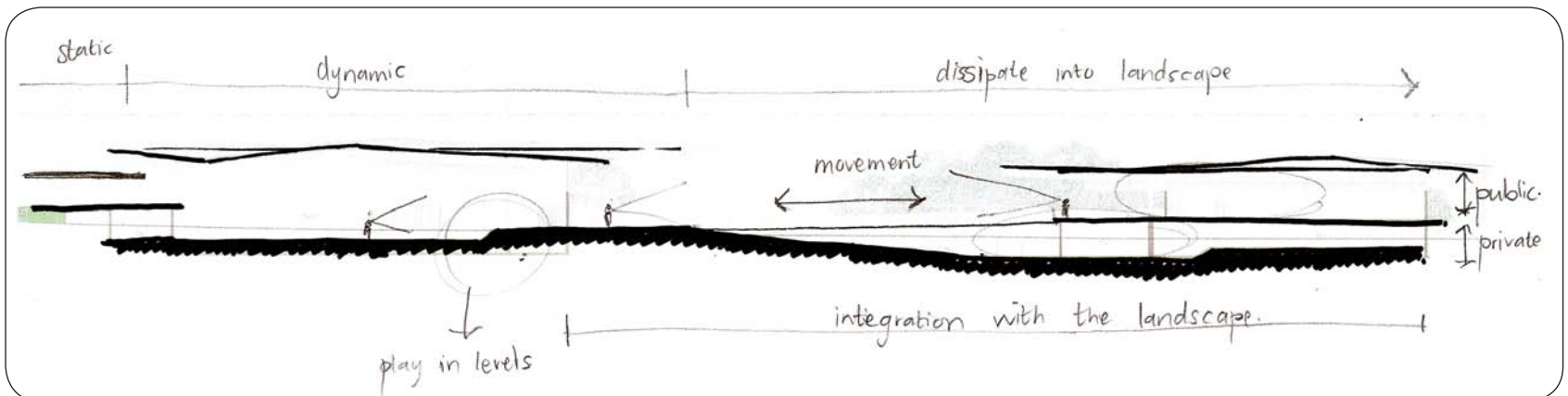


Fig 7|1_ Diagrams illustrating the conceptual approach to the building's tectonic, Author 2012



07|1_ structural tectonic

The following quotation from Oscar Niemeyer (Simonds, 1961:182) demonstrates an approach to defining the structural tectonic of a building :

"In designing a building, the architect is always led to imagine the work as it is intended to look when finished, placing himself mentally in the position of a visitor who is examining it carefully and critically.

Thus it is that he feels the future impressions that his design may make, the surprises that certain new and original solutions may reserve, the architectonic subtleties that the most sensitive will seek out and comprehend.

And in the course of his effort of imagination, the architect reviews the architectonic elements that he considers essential, endeavouring to ascertain whether his reasoning is sound, whether the material he proposes to use is suitable, whether the colors are harmonious, and whether the forms created are handsome and true.

For this purpose he take up an imaginary position in places where drawings are liable to be inexpressive, and strives to feel the volumes he is designing, in all their grandeur and proportion."

The structural tectonic of the building originated out of the accentuation of the horizontal plane and the need for a transparent edge that would allow a visual connection between the public and the sporting activities. This approach results in the building becoming the threshold between the public and sports edge, which also allows horizontal movement through and along the building.

The design concept manifests itself in three overlapping components: roof structure, ground surface and walls (as in-fill between the roof and ground). The ground surface becomes an interplay of levels with ramps connecting the one space to the next and allowing different view points as well as spatial experiences for the user.

These changes in level also define the private circulation on the lower level and the public circulation on the upper level, with the combined programme of the hall and sports field on the mid-level.

The roof structure defines the activities that take place in the specific spaces with a static structural roof at the station, a dynamic roof above the multi-purpose hall and a combination of static and dynamic roofs above the library and gymnasium that dissipate into the landscape.



Fig 7|2_ Substructure and excavations, Author 2012

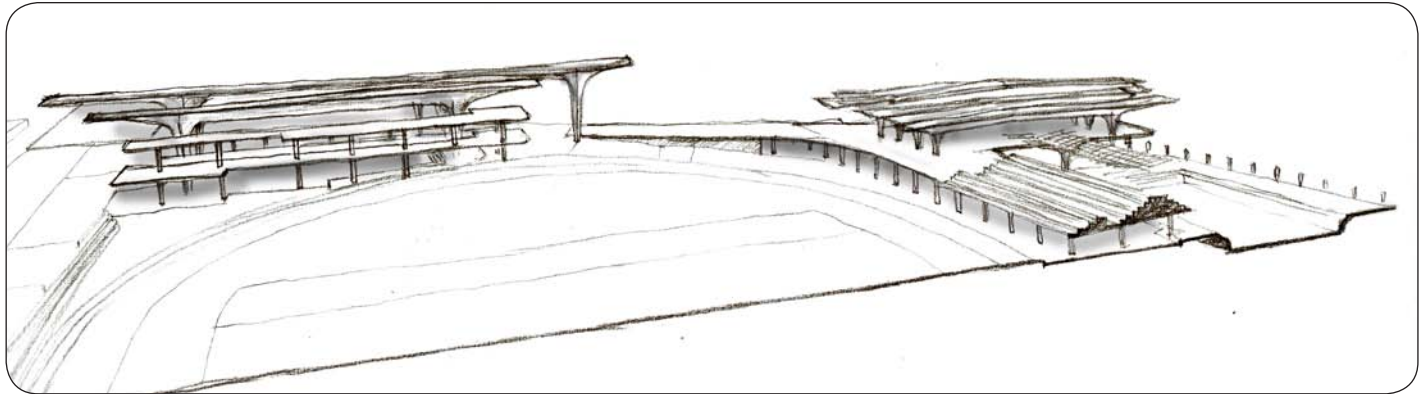


Fig 7|3_ Primary and secondary support, Author 2012

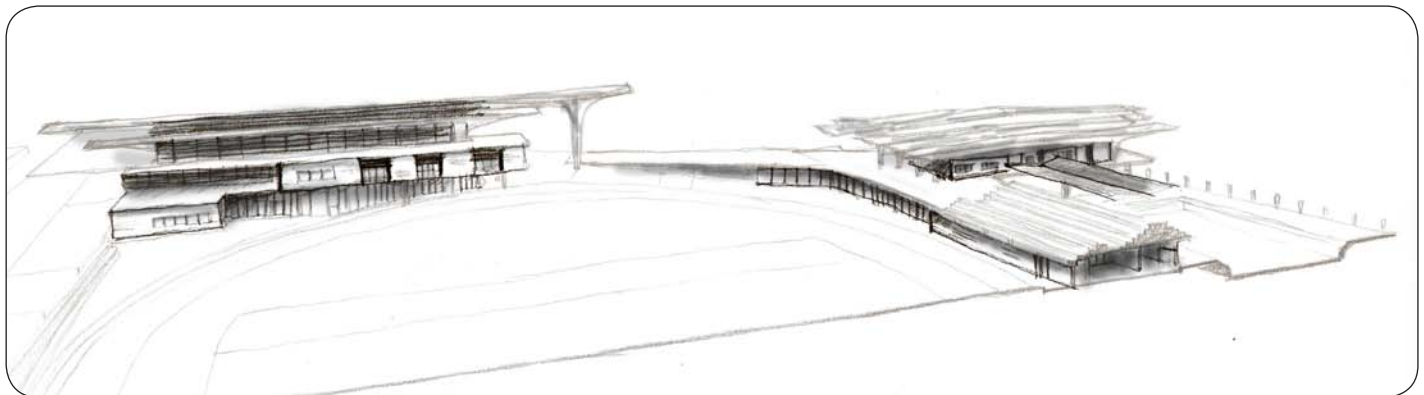


Fig 7|4_ In-fill structures, Author 2012

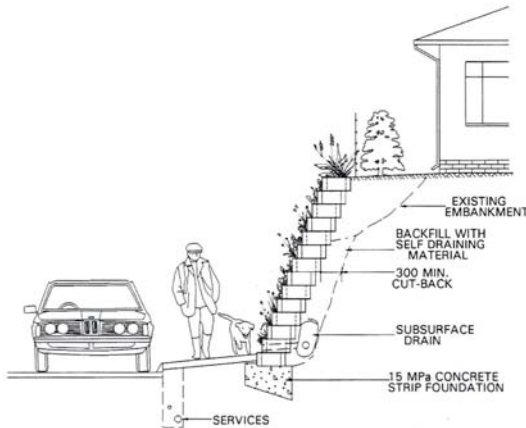


Fig 7|5_ Concrete retaining blocks,

07|2_ structural systems

The structural system of the proposed intervention is explained in three different categories that constitute the building syntax. These categories are the substructure, super structure and layered skins.

07|2.1_ Substructure and excavations (Fig 7|2)

The substructure of the building not only supports the lateral imposed loads of the superstructure, but also defines the private area where the sport related activities occur and where participating athletes would move through during events and training sessions.

The ground floor plane is established through the introduction of a ramp that falls along the site, with a surface level of 1.5m below the ground floor plane.

The excavation allows for a 3.5m meter high volume space that create a spacious area suitable for a fitness centre, change rooms, plant- and storage- rooms below the stadium.

A basement collection tank is constructed below the

reinforced concrete floor level of the fitness centre and multi-purpose hall, which is suitable for the storage of rainwater collected from the roof. This cavity creates a well insulated ground plane.

The reinforced concrete ramps are laid on compacted landfill that is collected from the excavations. The edge of the ramp is defined by hand packed precast concrete retaining blocks.

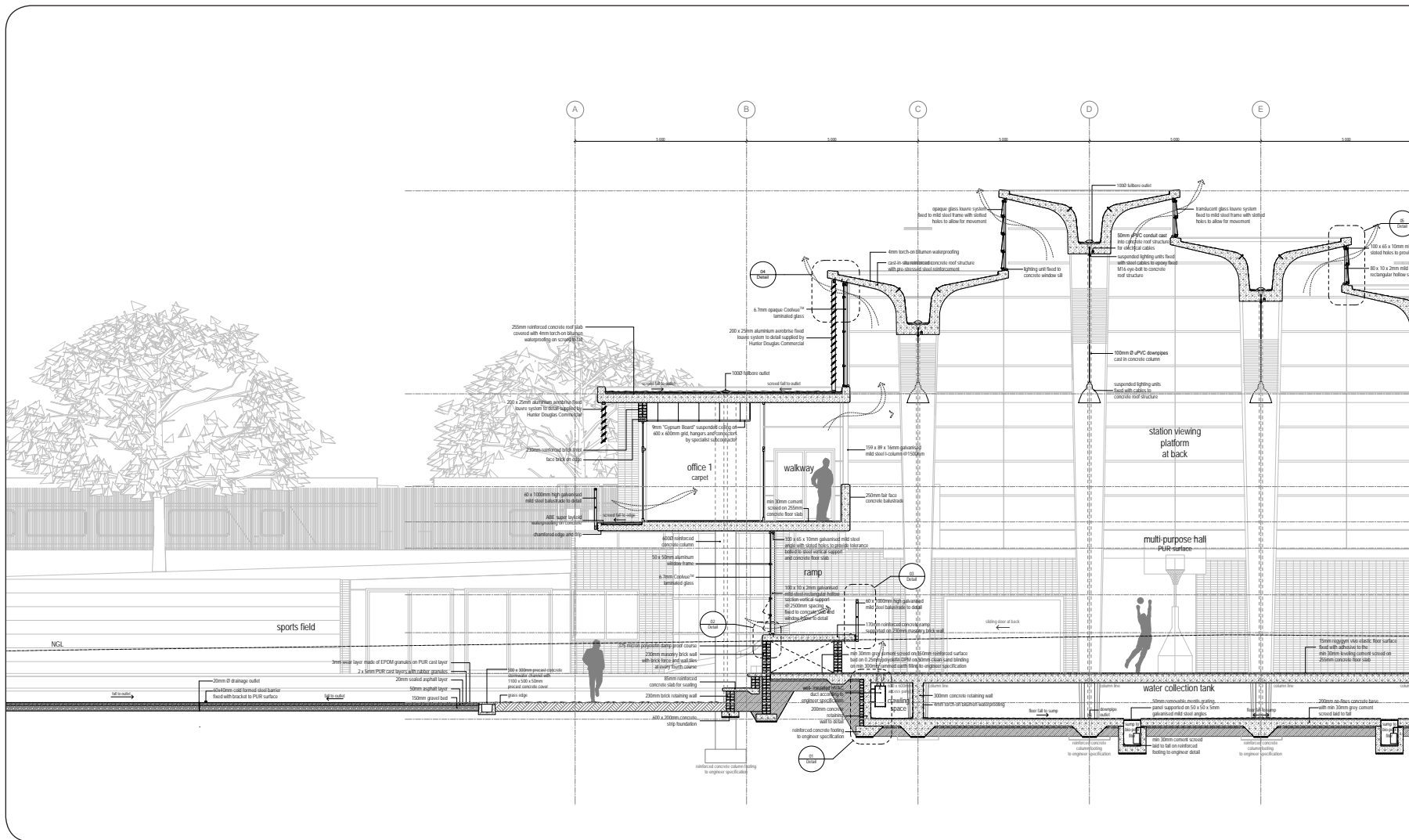
The surface plane of the sports field is constructed by a cut-and-fill method to ensure a relatively level plane suitable for games, with a slight slope to ensure drainage.

07|2.2_ Primary and Secondary Support (Fig 7|3)

The structural system consists of primary and secondary support frames which form the fixing platforms for the non-structural cladding systems, wall systems and roofing structure.

The primary structure consists of 500mm diameter round concrete columns and beams, which are placed on a 5000mm x 7500mm structural grid that support 255mm concrete floor slabs. Concrete is used because of economic reasons, as well as its structural abilities.

The roof structure requires larger and more elegant concrete columns that are shaped to become part of the roofing element. A number of 100mm PVC downpipes are casted into the columns, which lead to underground storage tanks that are used to maintain the public and



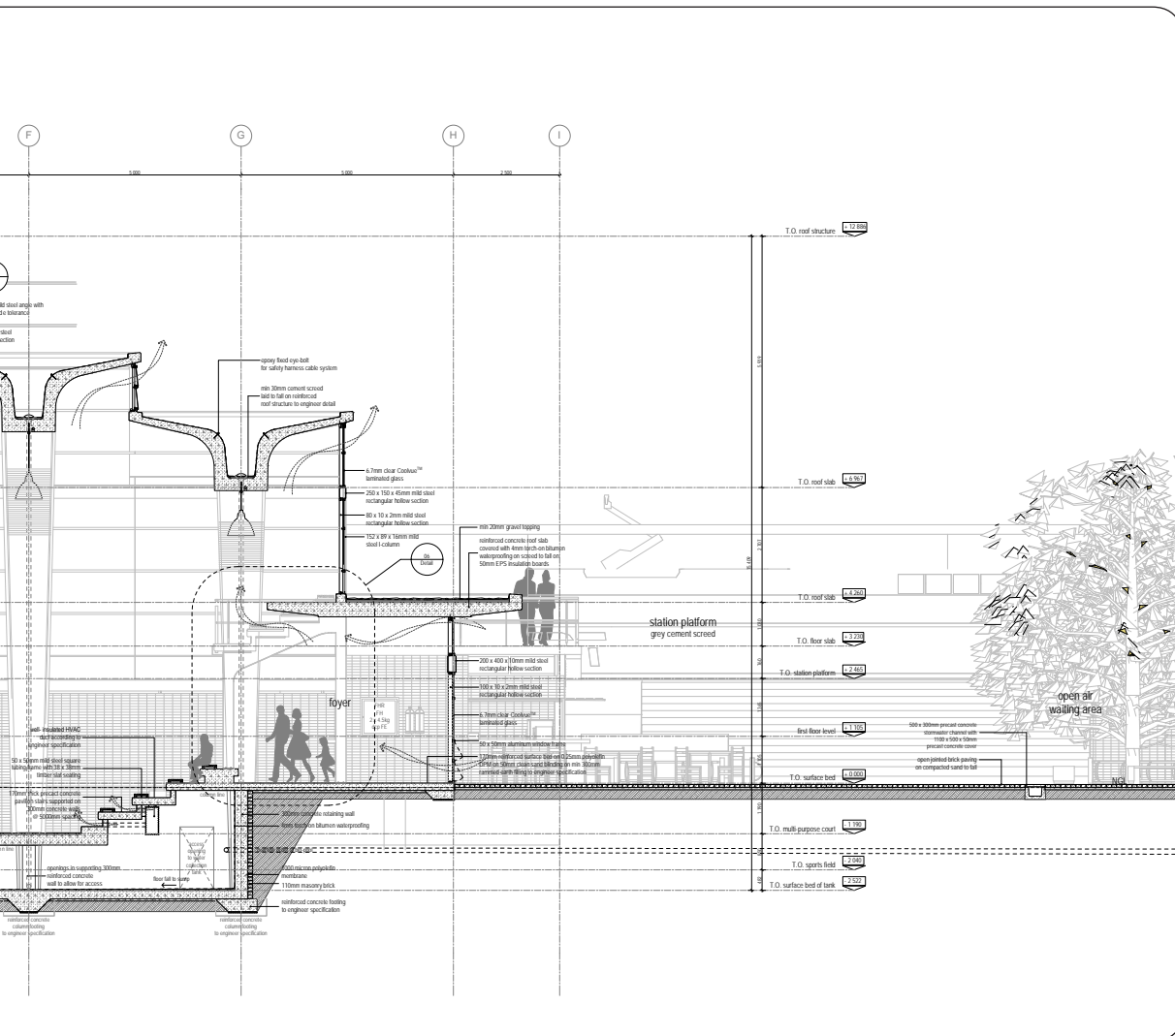


Fig 7|6_ Section through the multi-purpose hall, Author 2012

sport precinct. The electrical conduits for the lighting system are also cast into the columns, with access points provided at the required levels.

Reinforced concrete is used for the construction of the roof because it allows for an elegant roof that accentuates the horizontal plane and spans large distances while using minimal vertical support elements. Furthermore, the structure becomes a focal point in the landscape and creates an identity for the surrounding community and environment. The thermal mass of the concrete contributes to the comfort levels within the particular spaces and reduces the heat load.

The secondary support frame consists of 254 x 254 x 73mm H-columns and 254 x 146 x 31mm I-beams steel profiles that support the infill structure of the service boxes of the multi-purpose hall.

07|2.4_ In-fill (Fig 7|4)

The support structures are filled in with glass panels that allow for transparency and 230mm facebrick walls that define the service areas. The solid brick walls rarely touch the slab overhead because of the inferiority of the vertical plane in comparison to the horizontal plane. This opening provides the opportunity for clerestory windows and light shelves that allow indirect light into the spaces and assist in cross ventilation. Louvres systems that keep the sun out during summer and allow sun to penetrate the space during winter add another layer to the facade.



Fig 7|7_ Existing materials on site, Author 2012 Fig 7|8_ New materials, Author 2012

THE PSYCHOLOGY OF COLOR

COLOR PLAYS A MAJOR ROLE IN OUR VISUAL PERCEPTION AS IT INFLUENCES OUR REACTIONS ABOUT WORLD AROUND US. A FUNDAMENTAL GRASP OF COLOR PERCEPTION AND PSYCHOLOGY IN GRAPHIC AND WEB DESIGN IS THEREFORE CRITICAL IN ORDER TO CREATE PALETTES THAT EVOKE THE APPROPRIATE AUDIENCE REACTIONS.

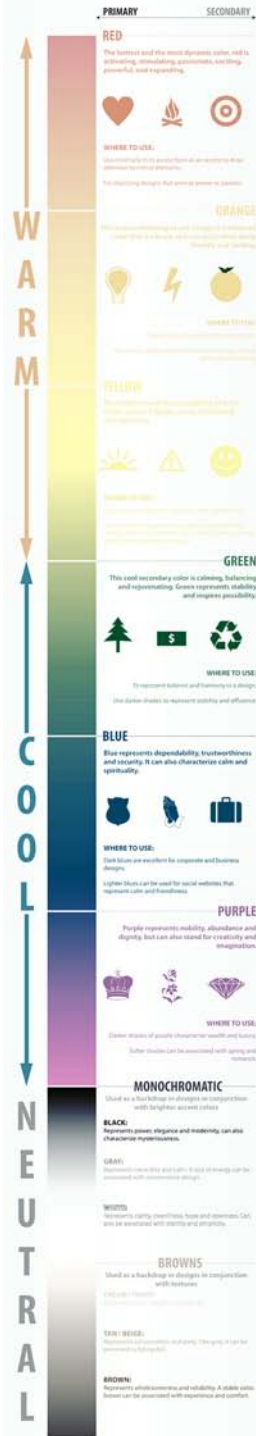


Fig 719_ Psychological effect of colours, DeWit, C. 2011.



Fig 7|10_ Possible colour palettes, Milan 2011.

07|3_ building materiality

The materials on site, which the design needs to respond to, are various elements of the natural landscape, the bridge and the railway line. These elements include grass, ground, trees, railway tracks, concrete sleepers and counter weights, timber lattices, steel cables and mesh (Fig 6|20).

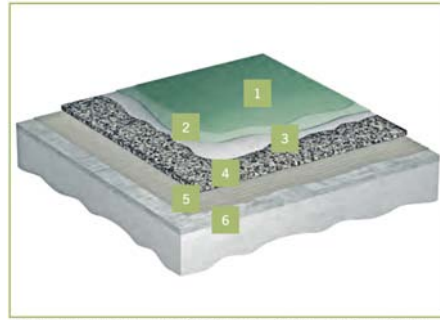
The materials used in the design would influence the texture and ambience of the building. Accent colours for orientation, direction and the indication of important areas would be used. These colours are determined by the psychological effect of the colours (Fig 6|22) and the type of activity happening in a specific space, as well as the relationship of the space with the surrounding environment (Fig. 6|21).

The materials used should be robust as the risk of vandalism through spray painting, theft or breakage is high. The materials should also weather well and require low maintenance because of the public nature of the building.

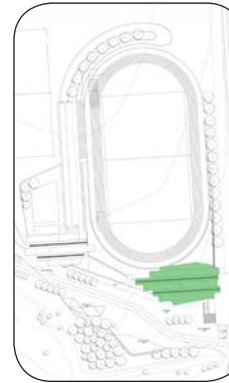
The proposed design is foreseen to create an identity for the site, as well as for the community members that will use it. The materials should be locally sourced (within a 50km radius from the site) as far as is possible and certain parts of the building could be built using local labour to enhance the community identity of the site. The community should be able to respond and relate to the architectural language of the building.



Fig 7|11_ Regugym® vivo, BSW, 2012:176



1 PUR coloured layer • 2 PUR wear layer • 3 Pores sealed with PUR •
4 Regupol® elastic layer • 5 Adhesive layer • 6 Screed
The product photo featured here also shows an optional stabilising fabric layer.



07|3.1_ Multi-purpose sports hall

Floor Surface_

A manipulated ground plane allows for the definition of a play area as well as seating and movement within the hall. This differentiation is further accentuated by the use of the materials. The foyer and movement spaces occur on the upper level. The upper level

becomes an extension of the exterior public space with the integration of the materials from a paving texture to an epoxy screed.

The seating becomes the transformation space and is covered with timber slats to allow for a warmer surface to sit on. The court, located on the lower level, is constructed with Regugym® vivo – a material that combines sport functionality with high standards of sustainability, environmental protection, health and safety.

The Regugym® vivo is constructed with a 14mm elastic layer that consists of materials that will not deplete resources, and a PUR (Polyurethane) wear layer. These layers make it possible to hold cultural and commercial events in the hall, apart from the sports events, with no need for an additional protective layer that is often necessary on sensitive sports flooring surfaces (BSW , 2012:176). The materials fulfil all the requirements of both amateur and professional sports, with the elastic layer that reduce high force impacts.

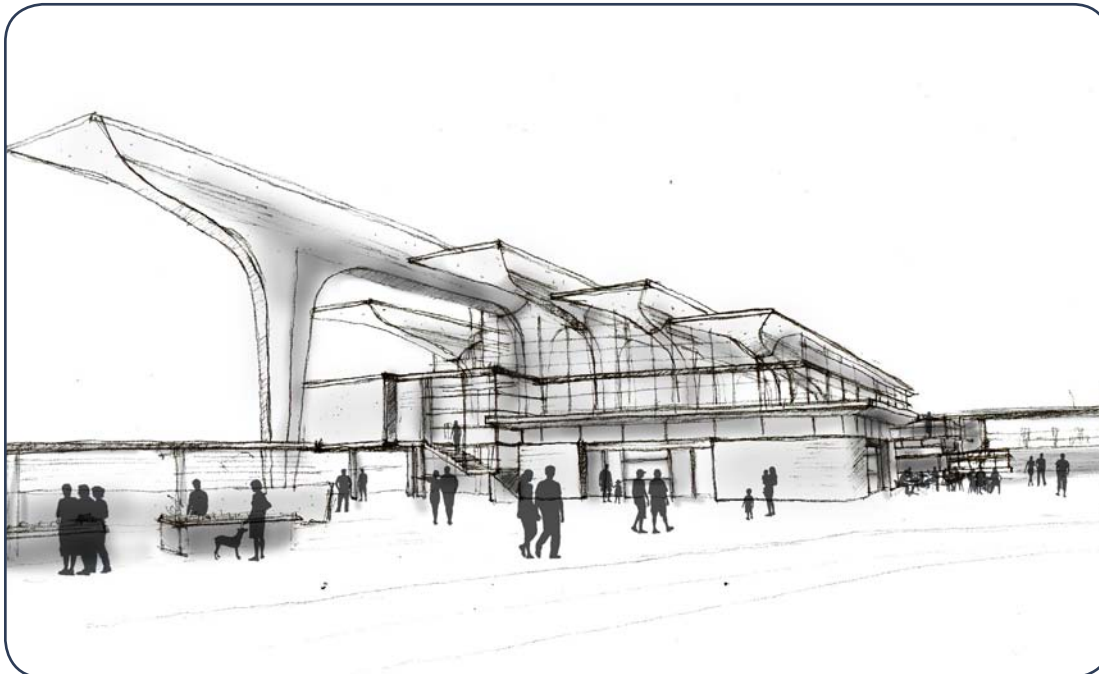


Fig 7|12_ View of multi-purpose hall, Author 2012

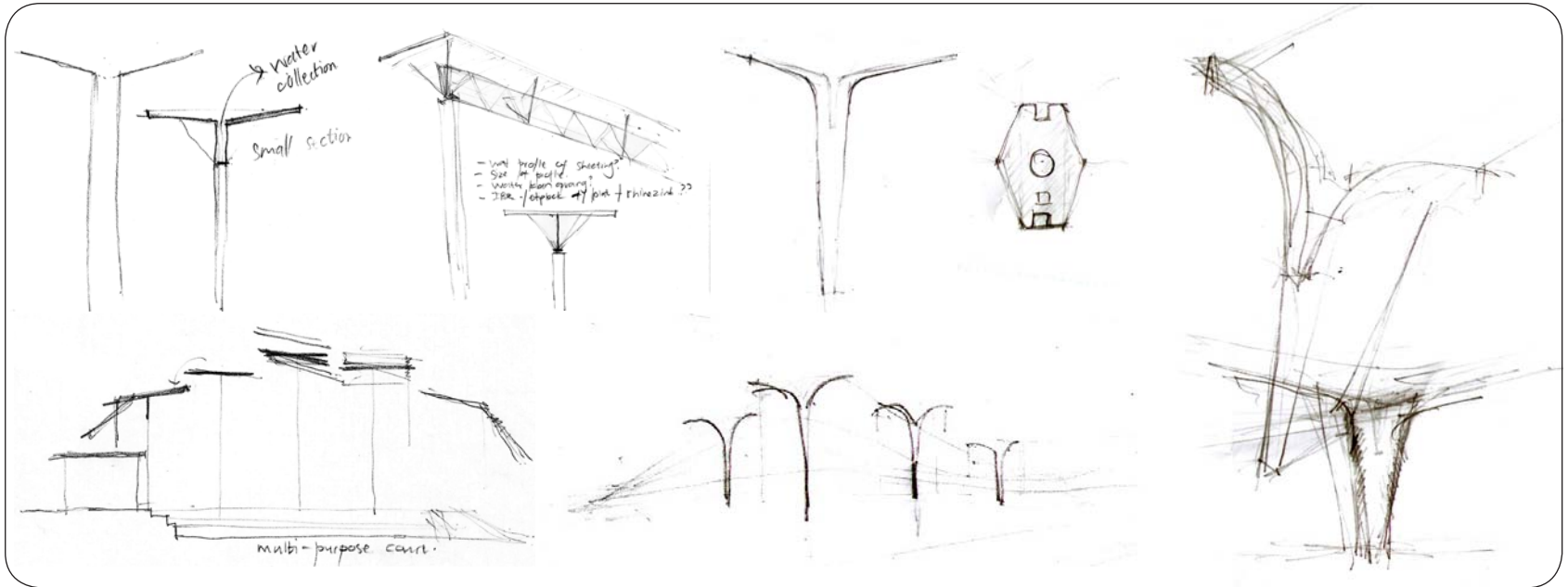


Fig 7|13_ Roof development, Author 2012

Roof_

The roof is developed from a steel structure into a series of concrete panels with a 5000mm width. These panels span 35m over the length of the field. The panels are also set at different heights, which can be read on plan through the length and width of the supporting columns. The columns are used as downpipes for the water and service ducts for the lighting fixtures that are fixed to the edge of and suspended from the concrete slabs.

The profile of the roof panels incorporates a gutter for water collection and the reflection of light into the hall. This profile provides a 1500mm depth that allows the structure to span quite a distance. The panels and columns create ribs that define the play area.

A concrete walkway on the level of the station platform is introduced around the field to reduce the scale of the building and to allow visibility of the sports games from inside and outside the building.

Durability, economy, energy efficiency, fire resistance, low maintenance and low costs, recycling, strength, mouldability and thermal mass all add to the sustainability and the choice of concrete (Cement and Concrete Institute, 2011:11).

Glazing_

The floor and roof plane is filled with 6.76mm CoolVue® laminated clear coated safety glass fitted in a steel frame. CoolVue® meets the demands of natural daylight and building transparency, without the heat gain associated with ordinary clear glass.

CoolVue® is manufactured by laminating a wavelength-selective heat-rejecting coating between two layers of PVB (polyvinyl butyral) and glass. CoolVue® also reduces sound transmission, increases safety and security and filters up to 99.5% of damaging short-wave UV radiation (Glass South Africa, 2012).

Brick_

The glass is interspersed with plastered 230mm masonry brick walls that define the main entrances, add thermal mass, block unwanted solar gain and serve as the base plane for signage.

Red bricks are used to enclose the service areas of the building, which also roots the building in the context, as these bricks are a regular occurrence in the Pretoria region.

Facebrick is used for the exterior walls because of its low maintenance on a long term basis, while plastered stock bricks are used for the interior walls, which could be painted with accent colours at focal points.

Louvres_

Aluminum Aerofoil (fin) louvre systems are used to shade the northern and western glass windows against the sun, yet enhance natural daylighting, reduce glare and regulate thermal gain to improve productivity and enhance indoor comfort (Nysan Solar Control Systems, 2007:8).

The sun louvres add to the aesthetic of the building and reduce the cooling loads while maintaining external vision.

07|3.2_ Gymnasium

Floor Surface_

The fitness centre is located on the lower ground floor and opens up onto the swimming pool area that is covered with pavement. The fitness centre and change rooms are made up of Everroll® impact 12mm flooring that has a high density to make it tough and durable. The surface is safe for running and jumping on with a high anti slip classification and a sufficient gliding capability to allow for stopping movements and is also suitable in wet areas (BSW, 2012:128).

The surface absorbs the impact of falling objects, such as dumb-bells, without incurring any damage. The surface also bears the load of the fitness equipment placed on the flooring and prevents the equipment from

slipping. The material is glued to the screed over the entire area with no underlying voids (BSW, 2012:128). The surface offers good impact and sound insulating properties. It is extremely hard-wearing, tough, easy to handle, and long-lasting.

Ceiling_

The ceiling is suspended from the 255mm concrete floor slab of the first floor, which provides enough head room for the installation of services, lighting and HVAC (Heating, Ventilation, and Air Conditioning) ducting in the cavity.

The ceiling consists of 24mm Gypsum Plasterboard fixed to galvanised steel T-sections and spaced on a 1200mm x 600mm grid.

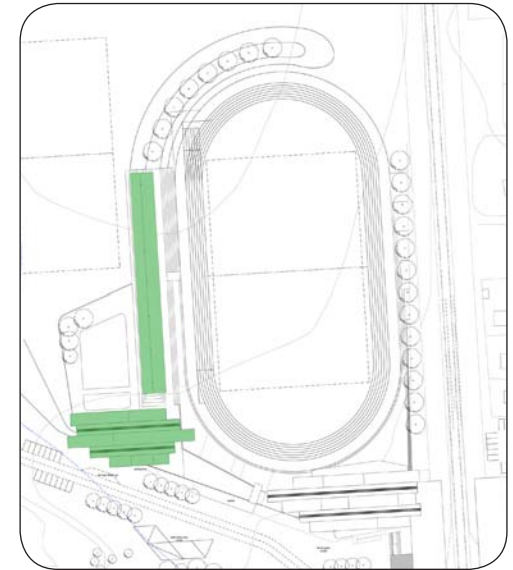


Fig 7|14_ Library and pavilion with fitness centre below,
Author 2012

In-fill_

The walls consist of a combination of brick walls (plastered on the inside and face brick on the outside) and glass panels to allow views of the swimming pool and field on either side of the fitness centre.

07|3.3_ Library

Floor surface_

Timber flooring is used for the library floors. Aesthetically, the material adds to the warmth and comfort of the interior space. The library requires a warm and comfortable space to enable the users to read and study while enjoying the views of the surrounding environment and activities.

The floor's surface consists of timber planks laid on the

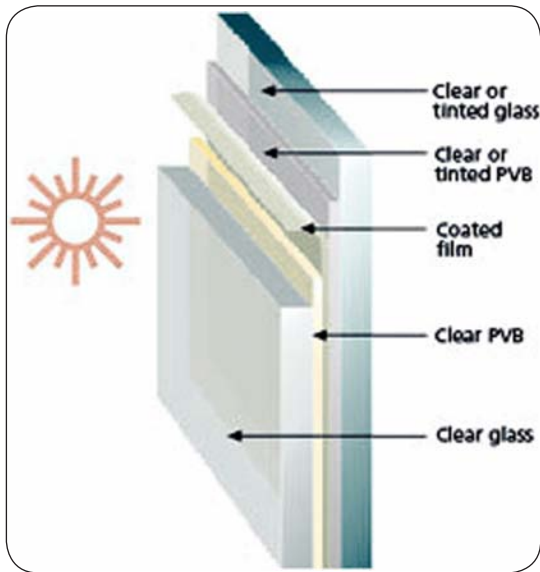


Fig 7|14_ Coolvue glass, Glass South Africa, 2012

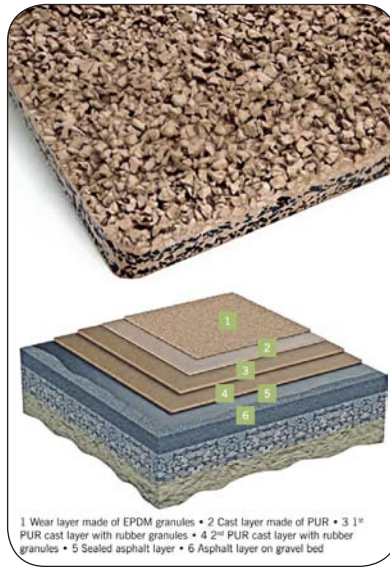


Fig 7|15_ Regupol® compact tartan, BSW, 2012:19

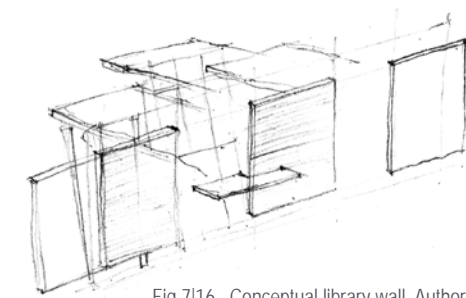


Fig 7|16_ Conceptual library wall, Author 2012

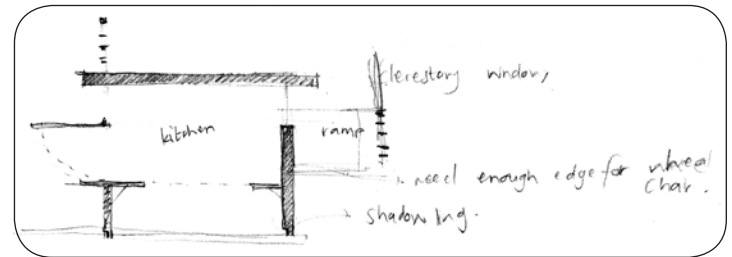


Fig 7|17_ Conceptual section through the kitchen of the hall, Author 2012

screed with a level change for the children's reading area. This level change reduces the scale of the space and creates a more intimate space. The level change is covered with carpet to enable the children to sit on the floor while reading.

Roof_

The roof is based on the same principle as the multi-purpose hall to continue the architectural language. The roof also ensures good lighting and a thermal mass that reduces the load on the HVAC system.

In-fill_

The in-fill consists of masonry brick and glass, but ensures that no direct sunlight penetrates the room, which allows for a full glass facade on the southern facade. The wall is broken up into cavities for book

cases, reading areas and discussion rooms that allow framed views of the surrounding area.

07|3.4_ Pavilion

The pavilion becomes an extension of the library platform, with a continuous walkway in the middle and seating that faces the sports field and swimming pools on either side.

The seating consists of precast concrete slabs that rest on supporting beams. The slabs are filled in by clerestorey windows for the bathrooms and masonry walls on the lower levels.

The roof of the pavilion is constructed from steel columns and beams with 15000mm spacing with steel purlins and galvanised roof sheeting fixed to the beams.

07|3.5_ Track

The six lane running track is constructed of Regupol® compact tartan. The material consists of polyurethane that is cast in situ with specially rated EPDM (Ethylene Propylene Diene Monomer) rubber granules to optimise shock absorption. The track shows immense resilience, even with intensive use for both competitions and training sessions (BSW, 2012:19).

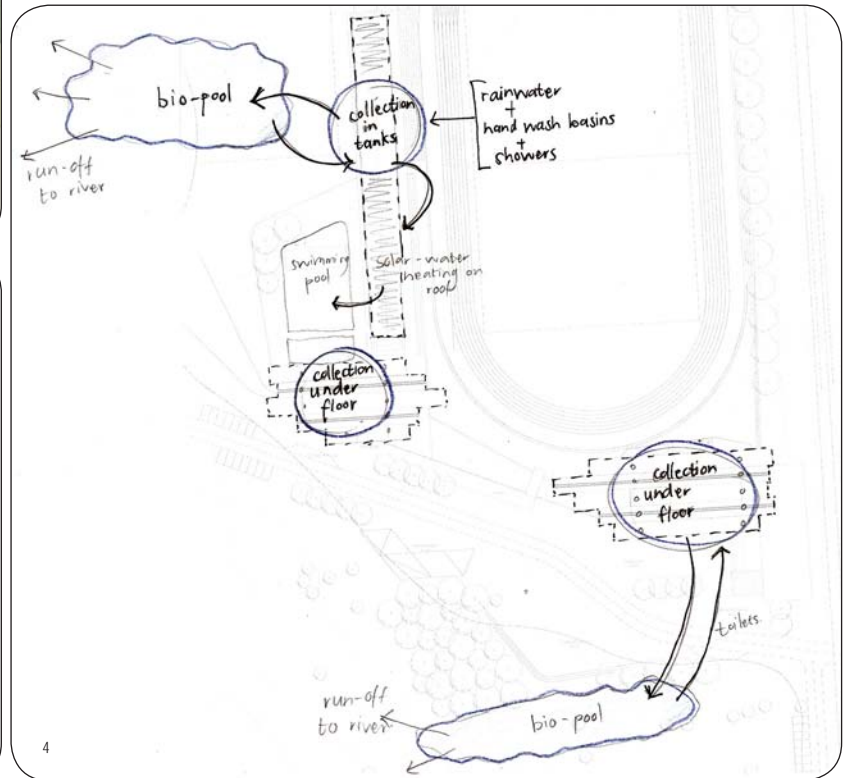
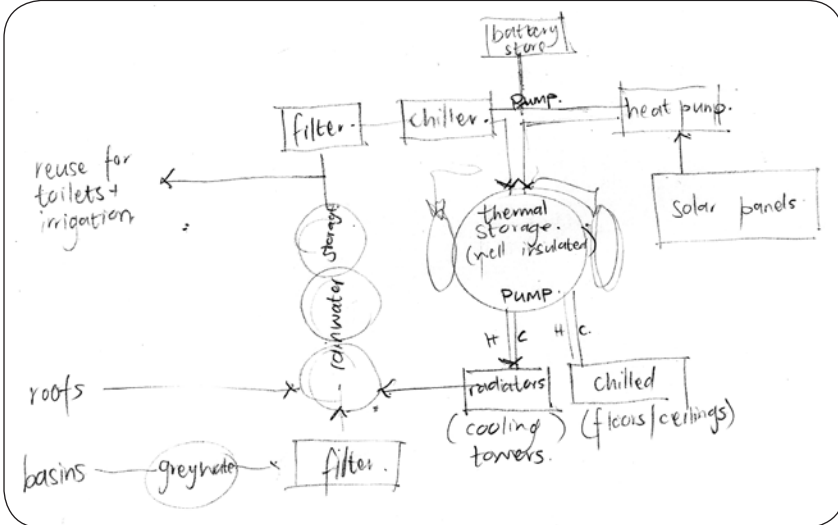
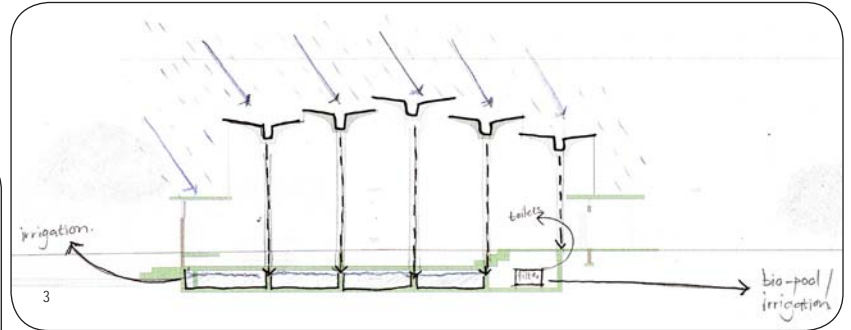
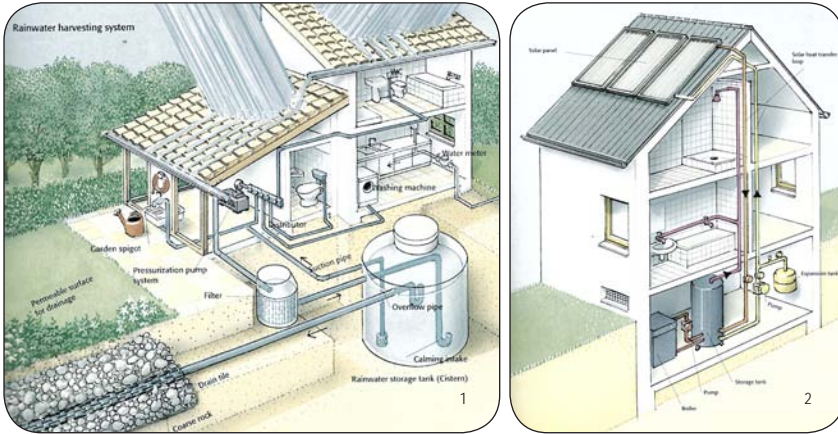


Fig 7|18_ Conceptual heating and cooling system, Author 2012

Fig 7|19_ Water management cycle, Author 2012

07|4_ building components & systems

Passive systems to reduce electricity use that were considered include water harvesting, natural lighting, ventilation and thermal mass.

07|4.1_ Water Management

Water is captured from the roofs and directed to 100mm diameter uPVC downpipes that are cast into the columns. The water then flows into the basement storage tanks, along with the greywater from the basins and showers. The water is filtered before entering the tanks and creates an insulating layer for the ground floor.

The water is sent through a bio-pool to naturally filter it and it is then re-used for the toilets, irrigation of the sports field, landscaping and for the swimming pools. The overflow water runs into the river.

The water from the bio-pools on the north side is pumped through solar water heaters fitted on the pavilion roof. The heated water then flows into the swimming pools or the thermal storage tanks for use in the showers and basins.

07|4.2_ Natural Lighting

Indirect lighting is optimised in the multi-purpose hall and library to avoid glare from direct solar rays. Therefore, most of the light is drawn from the southern facade and reflective light is introduced from the north.

The northern and western facades are covered with a screen to ensure that no direct sunlight enters the spaces in the summer. The screens on the northern facade allow light through in the winter to warm up the spaces.

Clerestory windows and light shelves in the fitness centre also serve the purpose of reflecting the light deeper into the space.

In the change rooms below the station platform, natural light is introduced through a ski-lights in the ceiling which forms the station platform.

07|4.3_ Natural Ventilation

Cross-ventilation is used to naturally ventilate the spaces. Fresh air enter the space on the lower levels and hot-air is extracted through the grills and louvres in the roof. This system can be boosted through the introduction of fans that blow the air through radiators filled with cold or hot water at the inlet.

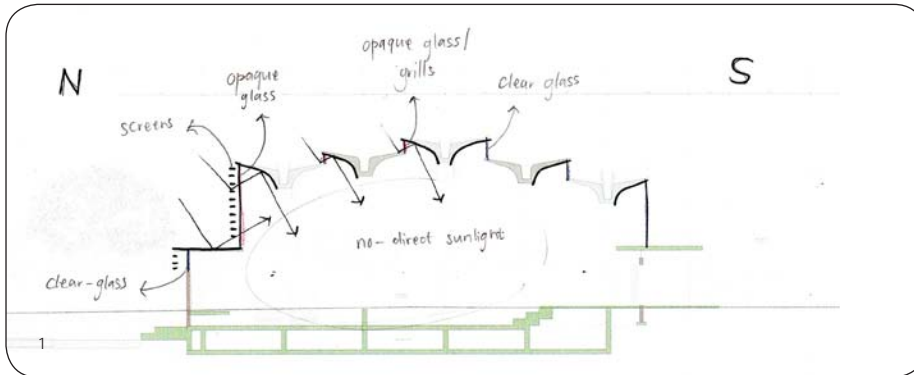


Fig 7|20_ Natural lighting, Author 2012

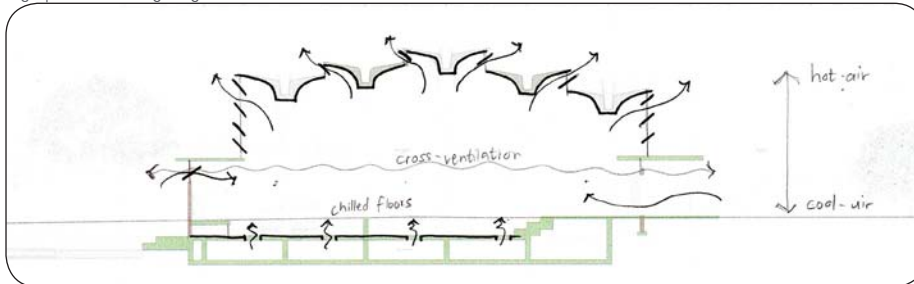
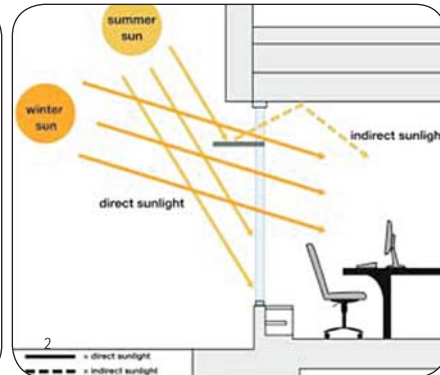


Fig 7|21_ Natural ventilation, Author 2012

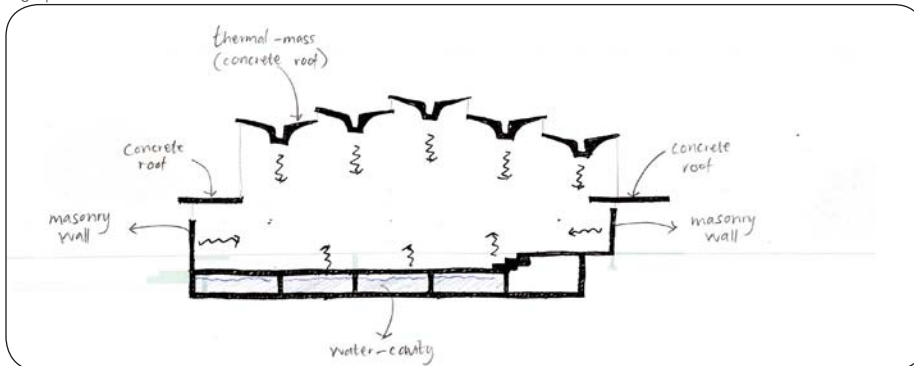


Fig 7|22_ Thermal mass, Author 2012

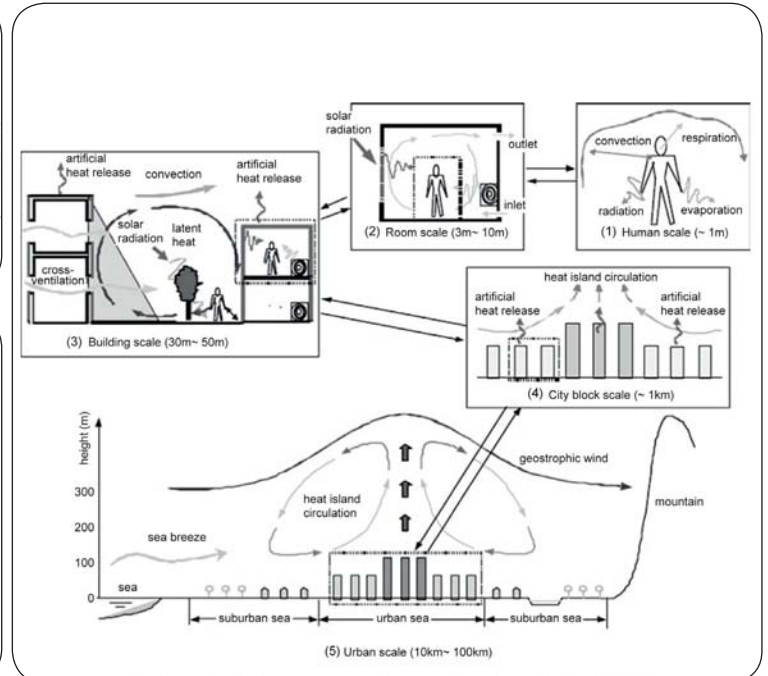


Fig 7|23_ Various scales of phenomena concerning with urban climate, Murakami 2004

07|4.4_ Thermal Mass

The concrete structure and masonry walls provide the opportunity to make use of the thermal mass principle to create latent heat or coolth. This principle is used to heat the space in the evening and keep the building cool during the day.

Together with night-time ventilation, the structure can contribute to limiting the use of an HVAC system, which will then only be used during peak hours.

Thermal mass ensures a more stable indoor temperature, which is preferable for the library space.

Active systems need to be employed to ensure appropriate comfort levels with regard to fresh air and humidity levels because of the high activity levels in the multi purpose hall and fitness centre.

07|4.5_ Heating and Cooling

After consulting a mechanical engineer, it was decided that an HVAC system equipped with a chiller and fan unit will be employed for the multi-purpose hall, library, fitness centre and swimming pool change rooms.

In the multi-purpose hall displacement ventilation is employed. The chiller, located outside of the building, blows fresh air over water to cool down the temperature. The fans blow the cool air through the ducts fitted in the floor surface of the hall. As the air heats up because of the ambient temperature of the surrounding environment and body heat, the hot air will rise and be extracted through the louvres in the roof.

The fitness centre will incorporate a ducting system that is fixed to the ceiling. The air will be blown and extracted

the air through ducts.

The library will make use of the same ducting system as the fitness centre, but will provide inlets on the lower levels and extract air through the louvres in the roof.



Fig 7|24_ Phase 1 _ Station, Author 2012.



Fig 7|25_ Phase 2 _ Multi-purpose hall, Author 2012.



Fig 7|26_ Phase 3 _ Track and sports field, Author 2012.



Fig 7|27_ Phase 4 _ Pavilion and fitness centre, Author 2012.

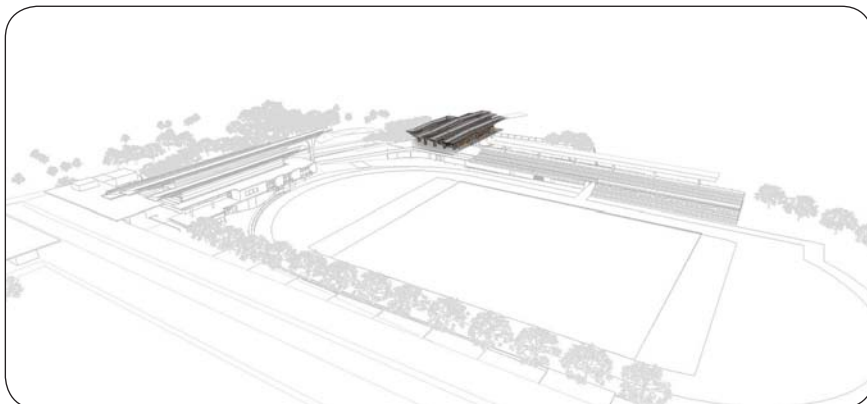


Fig 7|28_ Phase 5 _ Library, Author 2012.



Fig 7|29_ Phase 6 _ Additional sports fields, Author 2012.

Fig 7|30_ Phase 7_ Connection with other sports fields through jogging/walking routes, Author 2012.

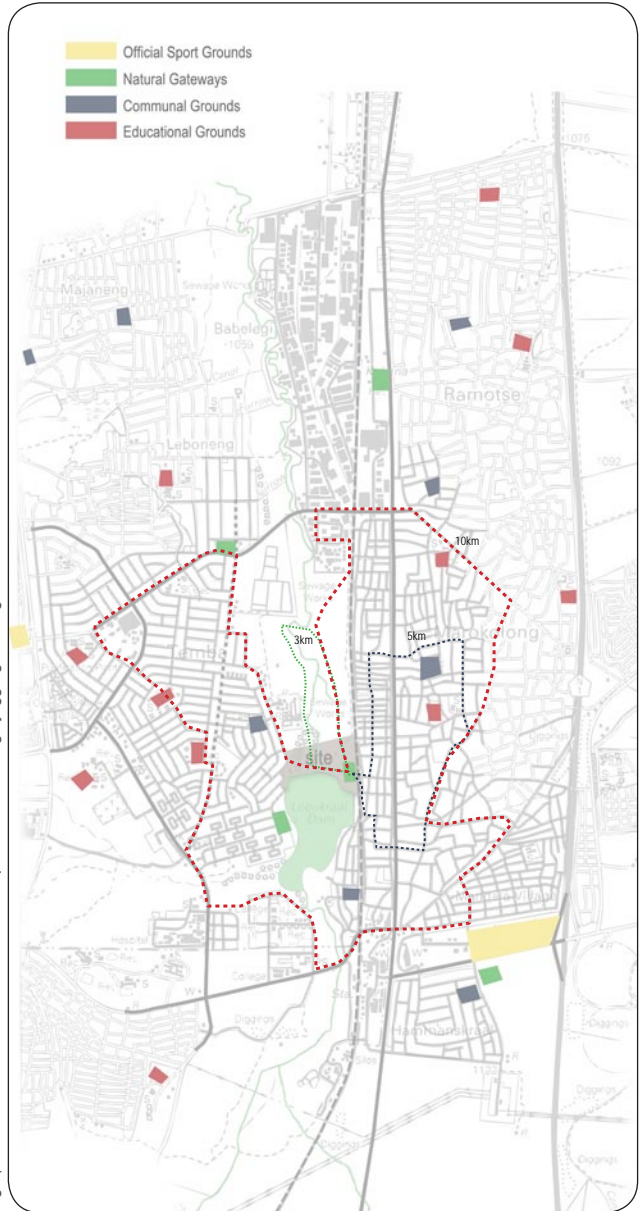


Fig 7|31_ Phase 7_ Development of smaller nodes at sports fields within the community depending on the surrounding public activities, Author 2012.

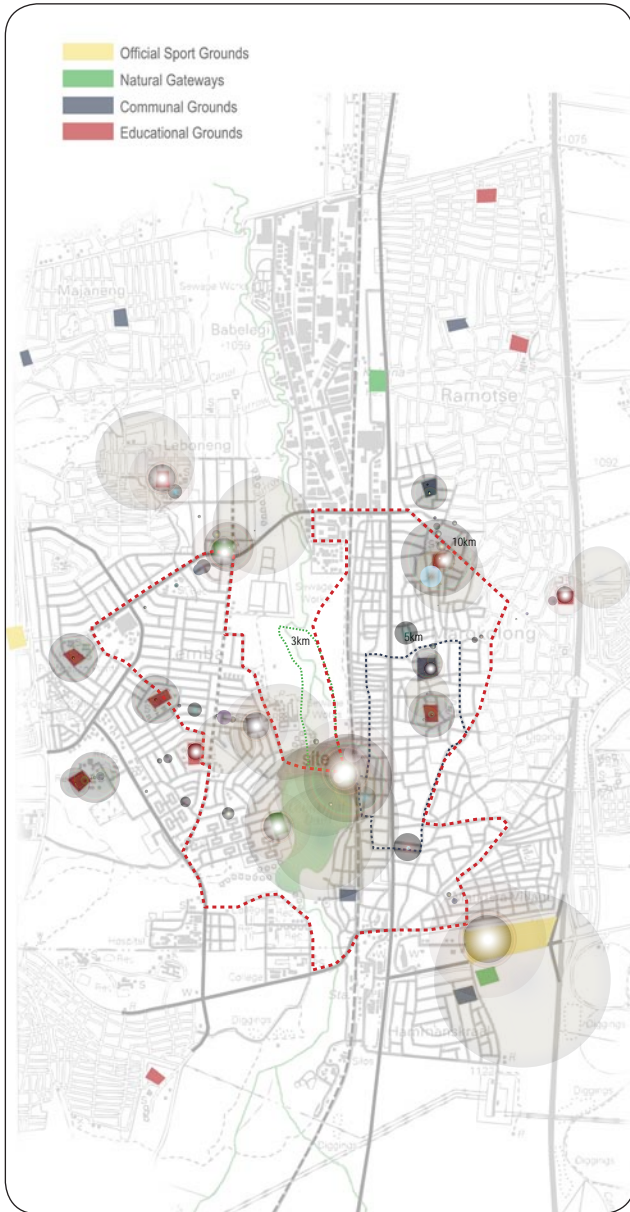
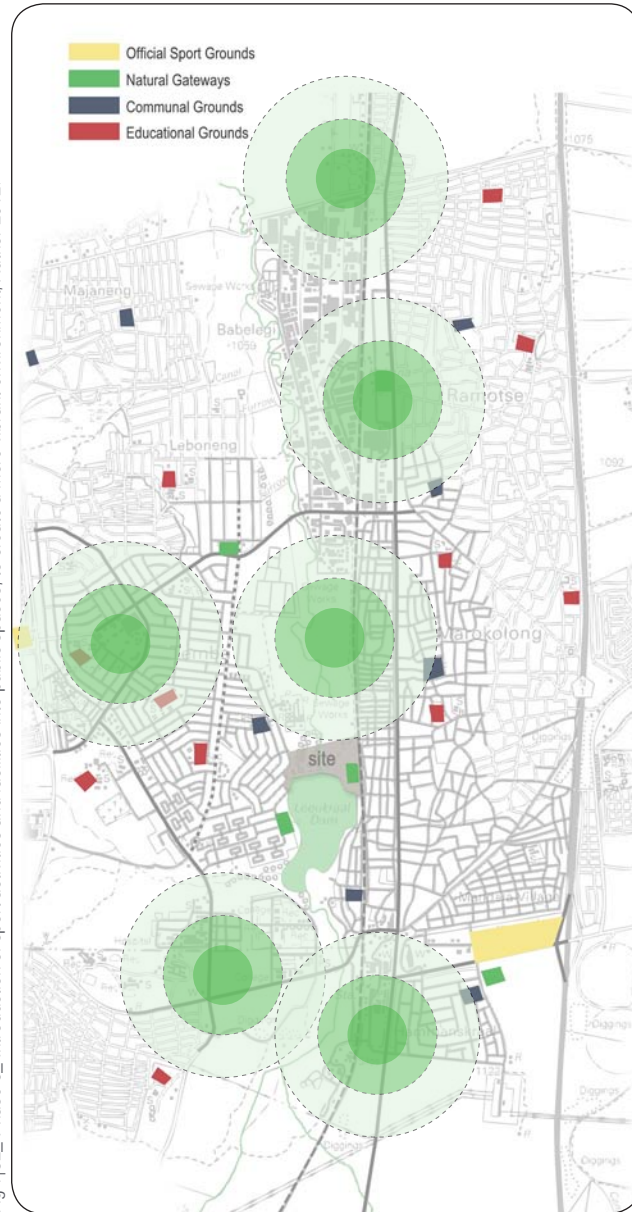


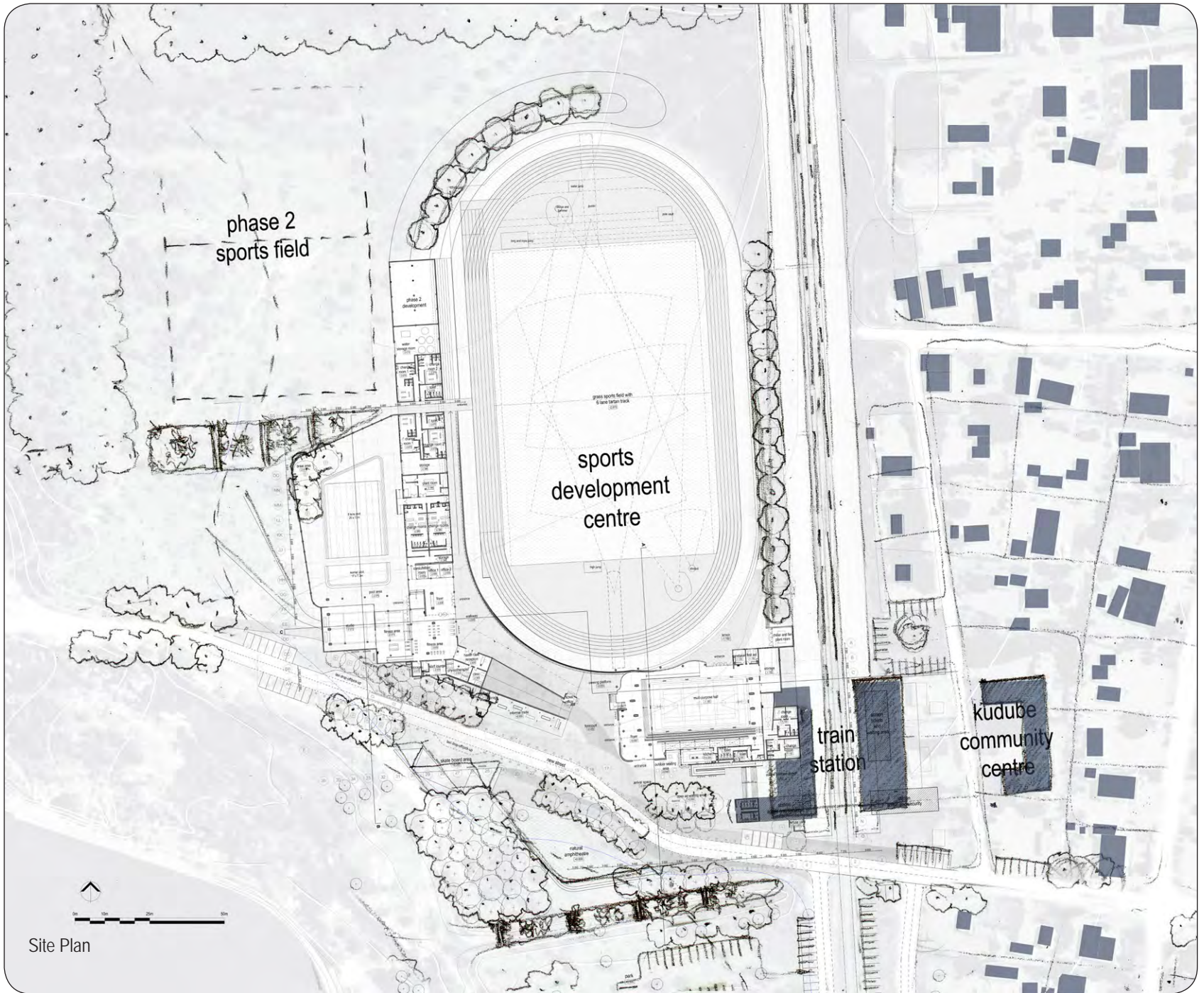
Fig 7|32_ Phase 8_ Introduction of sport activities and facilities into public spaces, to create a more vibrant environment, Author 2012.



Chapter 8

Technical Resolution

This chapter includes the final technical drawings and presentations as on the day of examination.

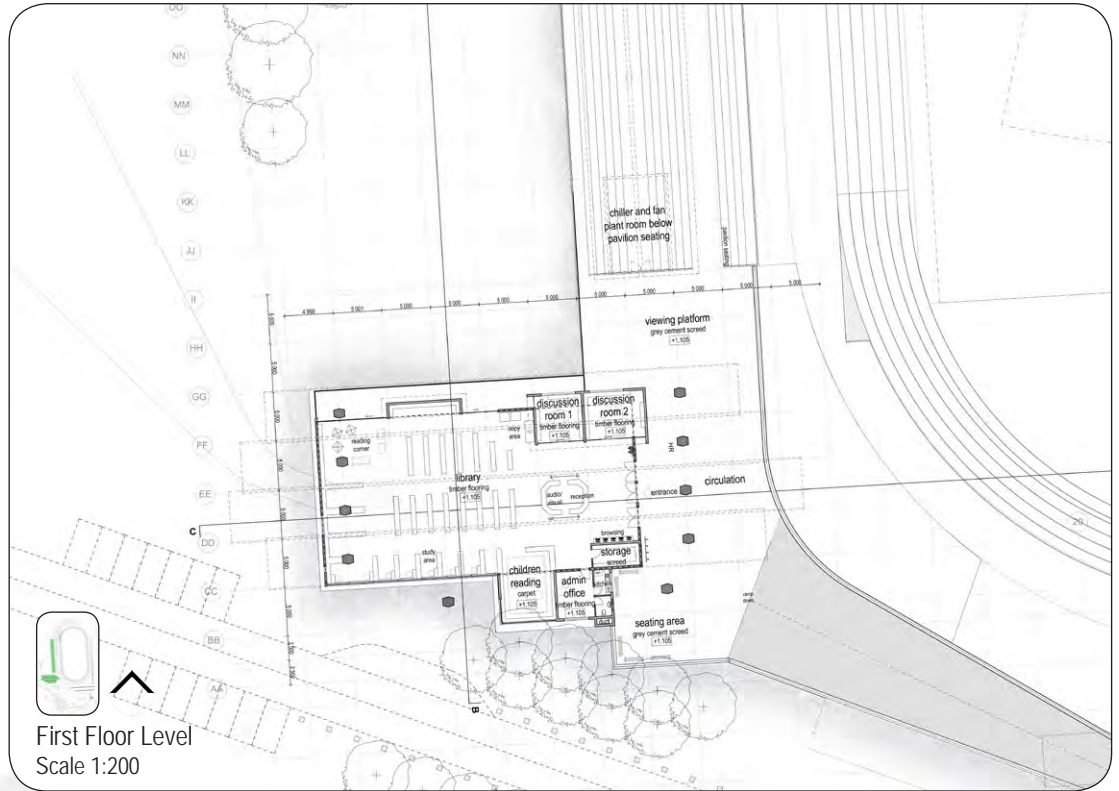


Site Plan

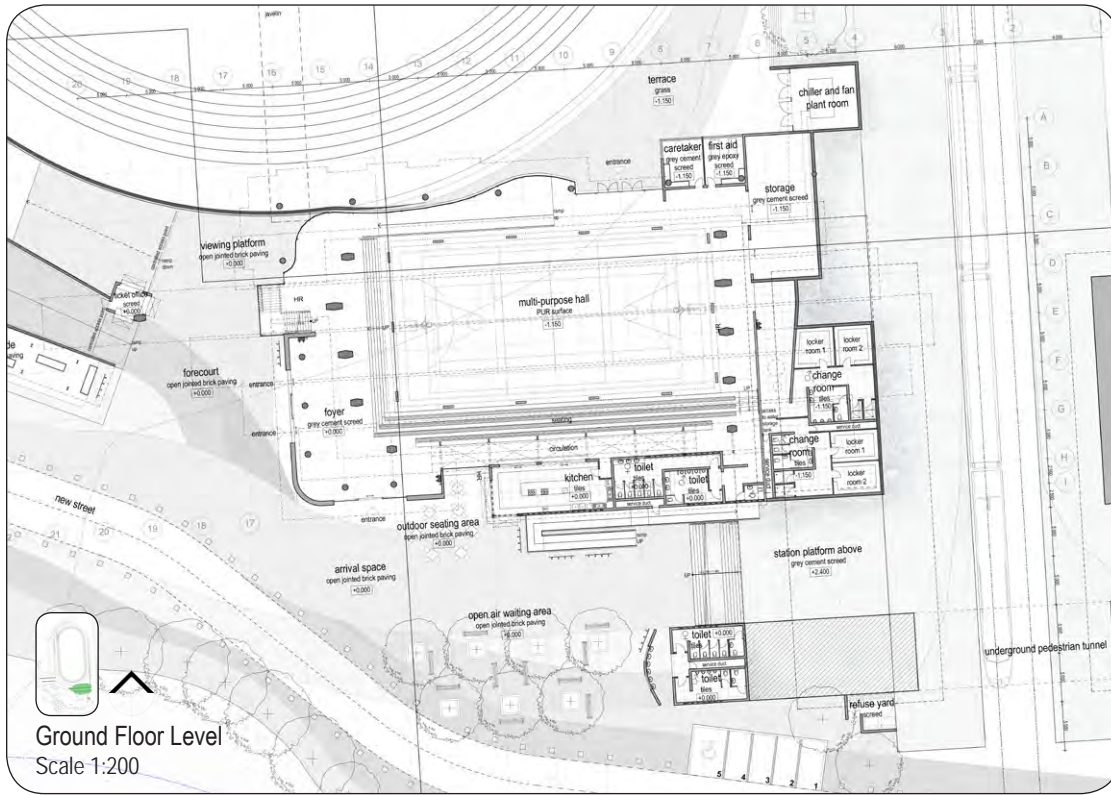
08|1_ design proposal



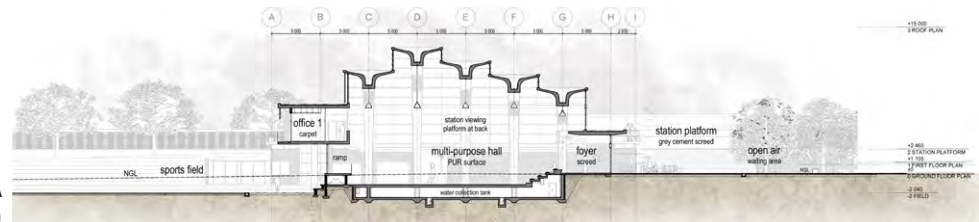
View along walkway towards station

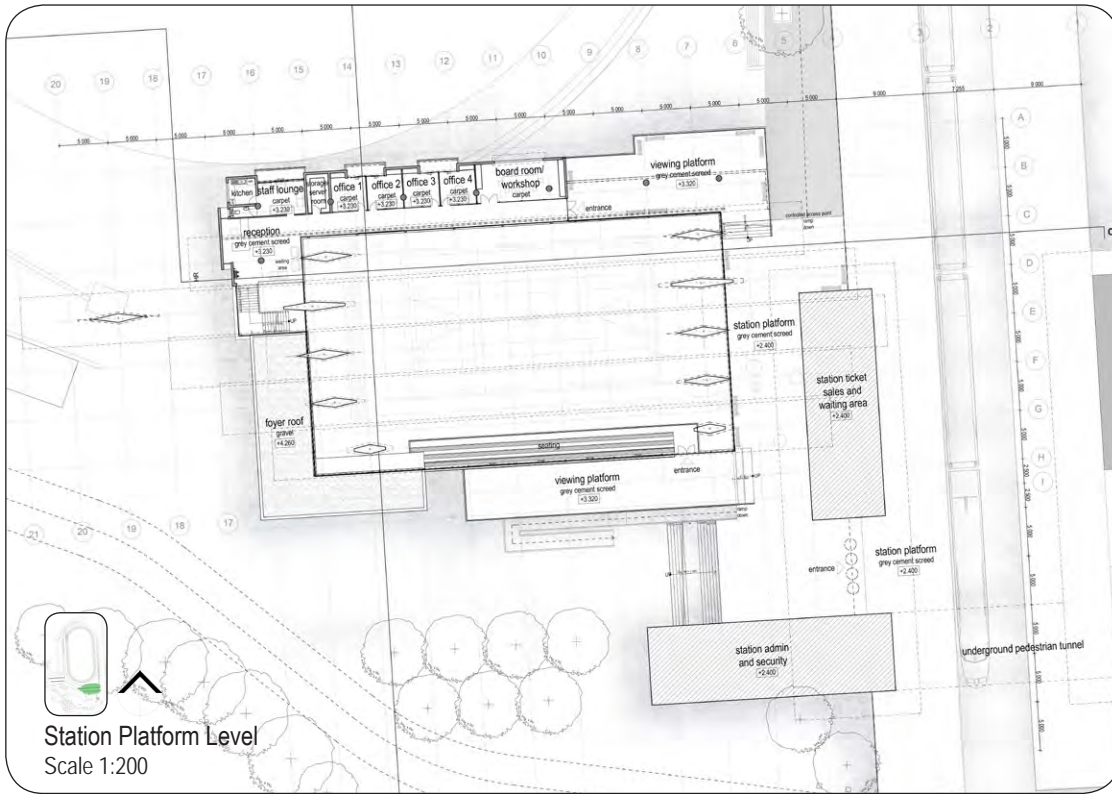






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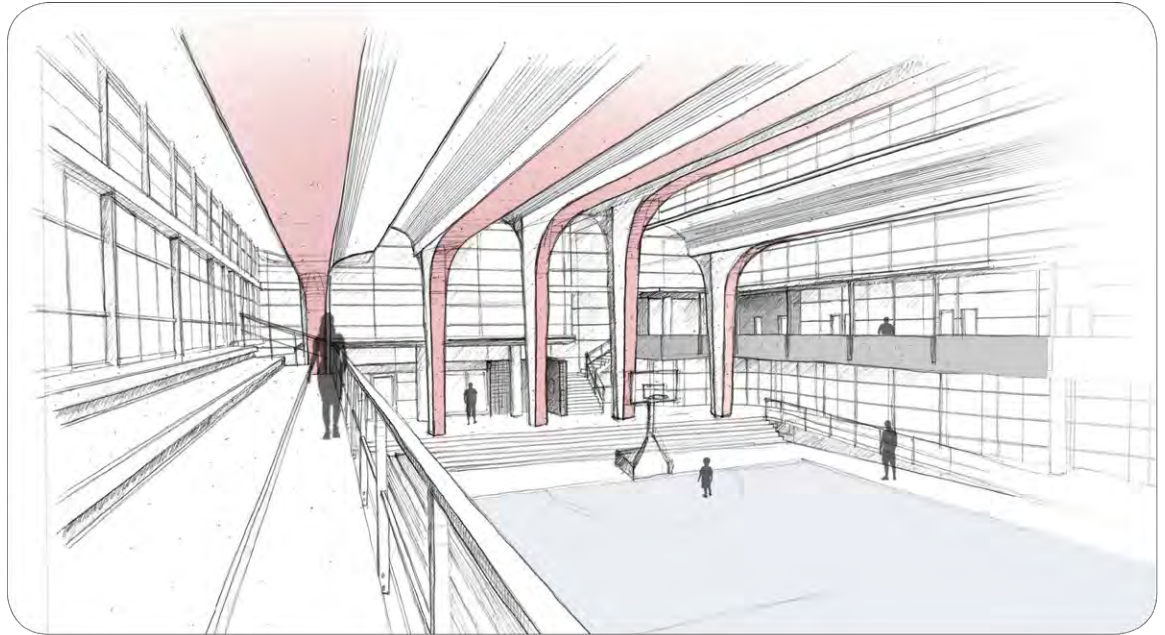




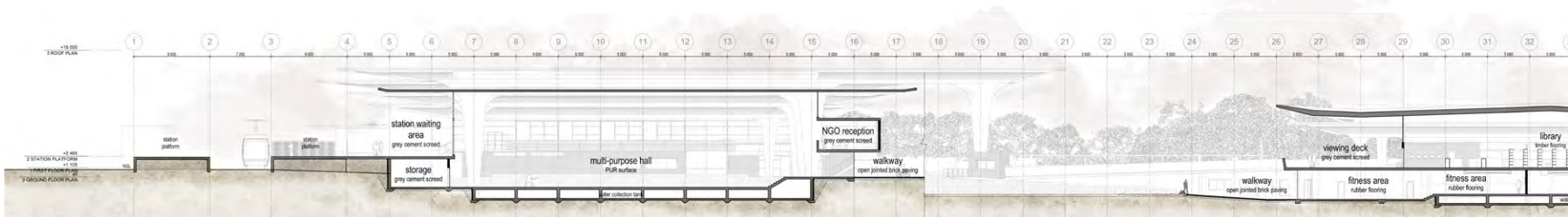
Station Platform Level
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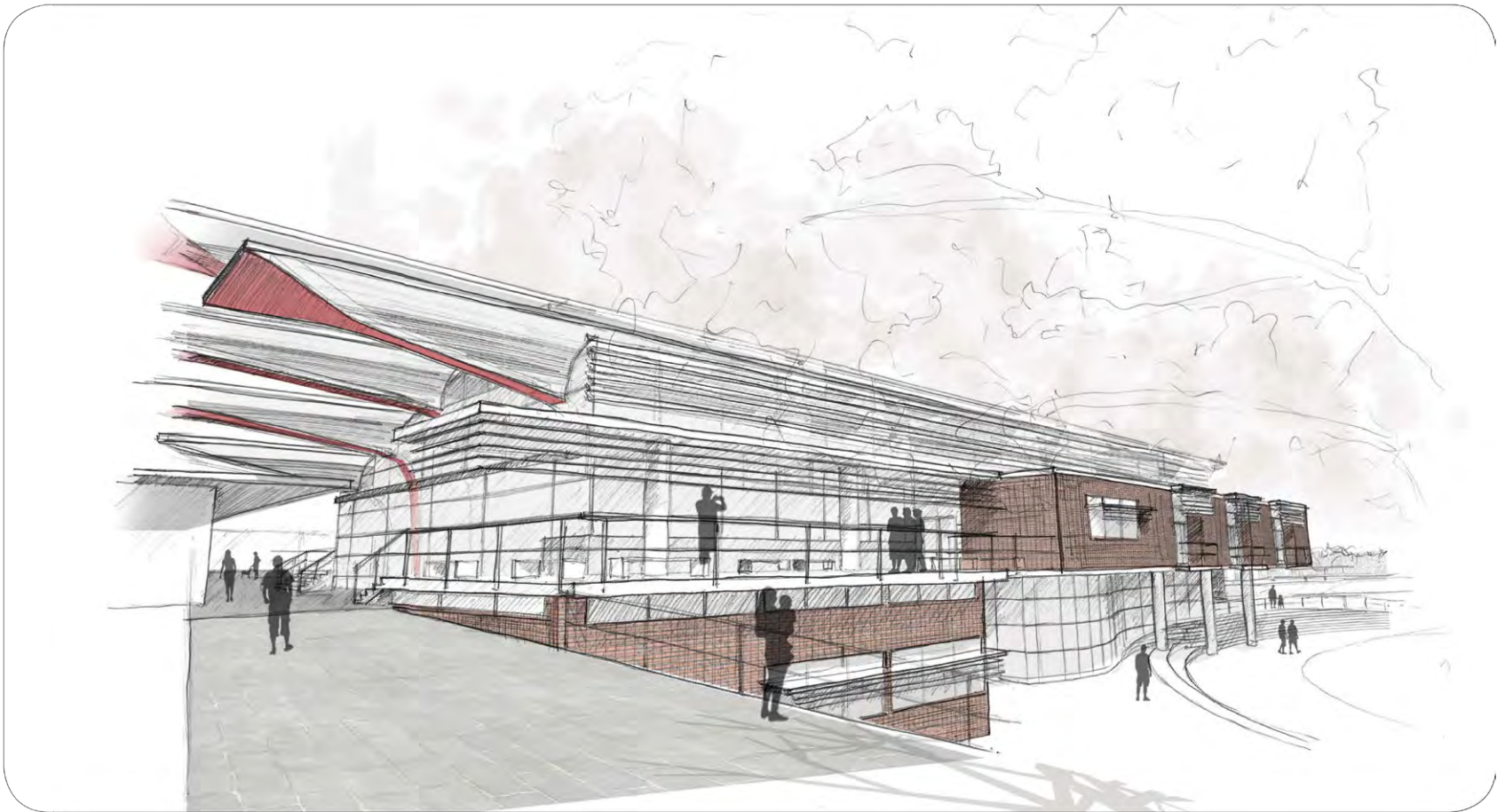
Section B-B
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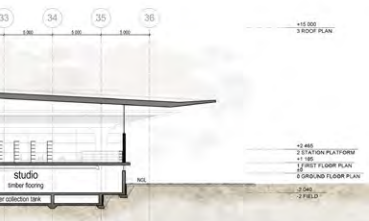


Inside of multi-purpose hall

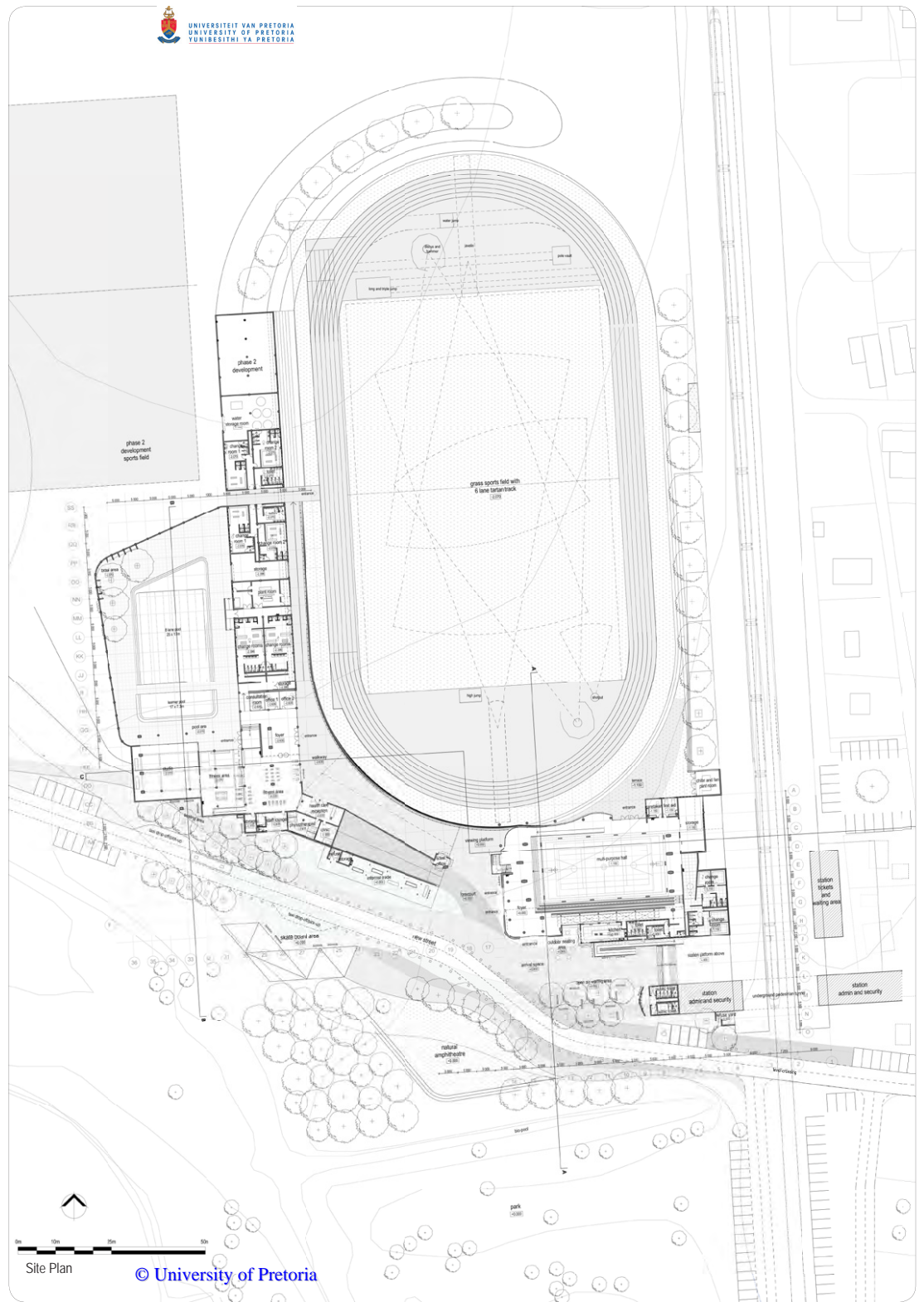




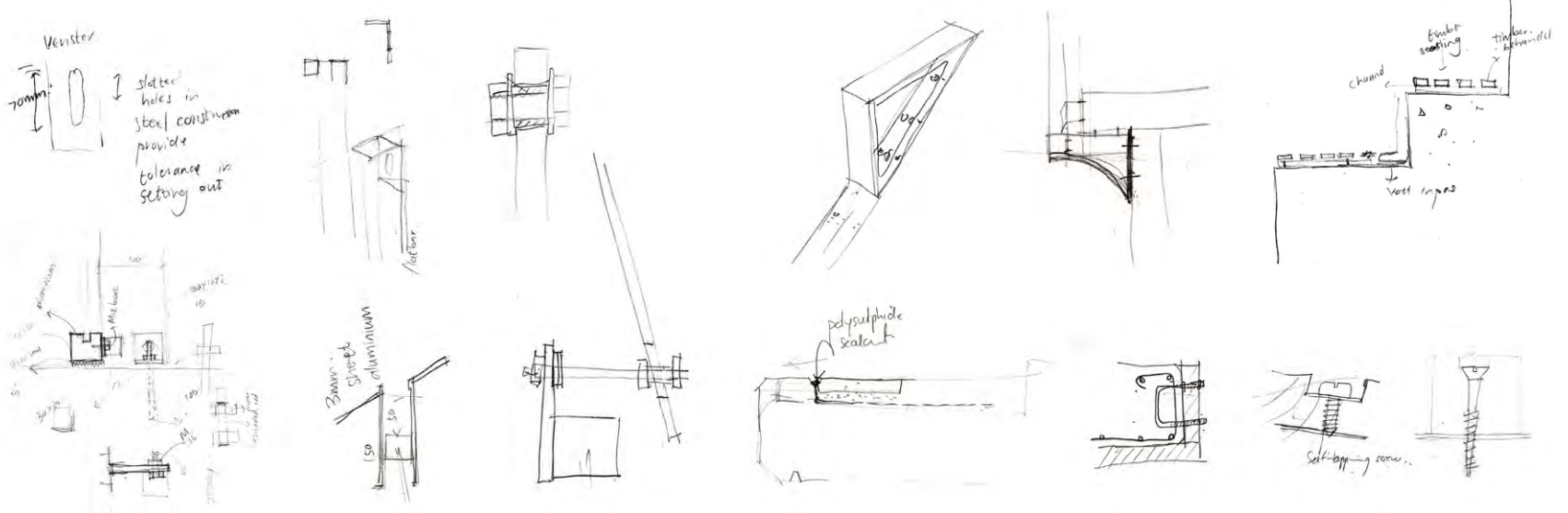
Walkway along station platform



Section C-C
Scale 1:200



08|2_ technical drawings

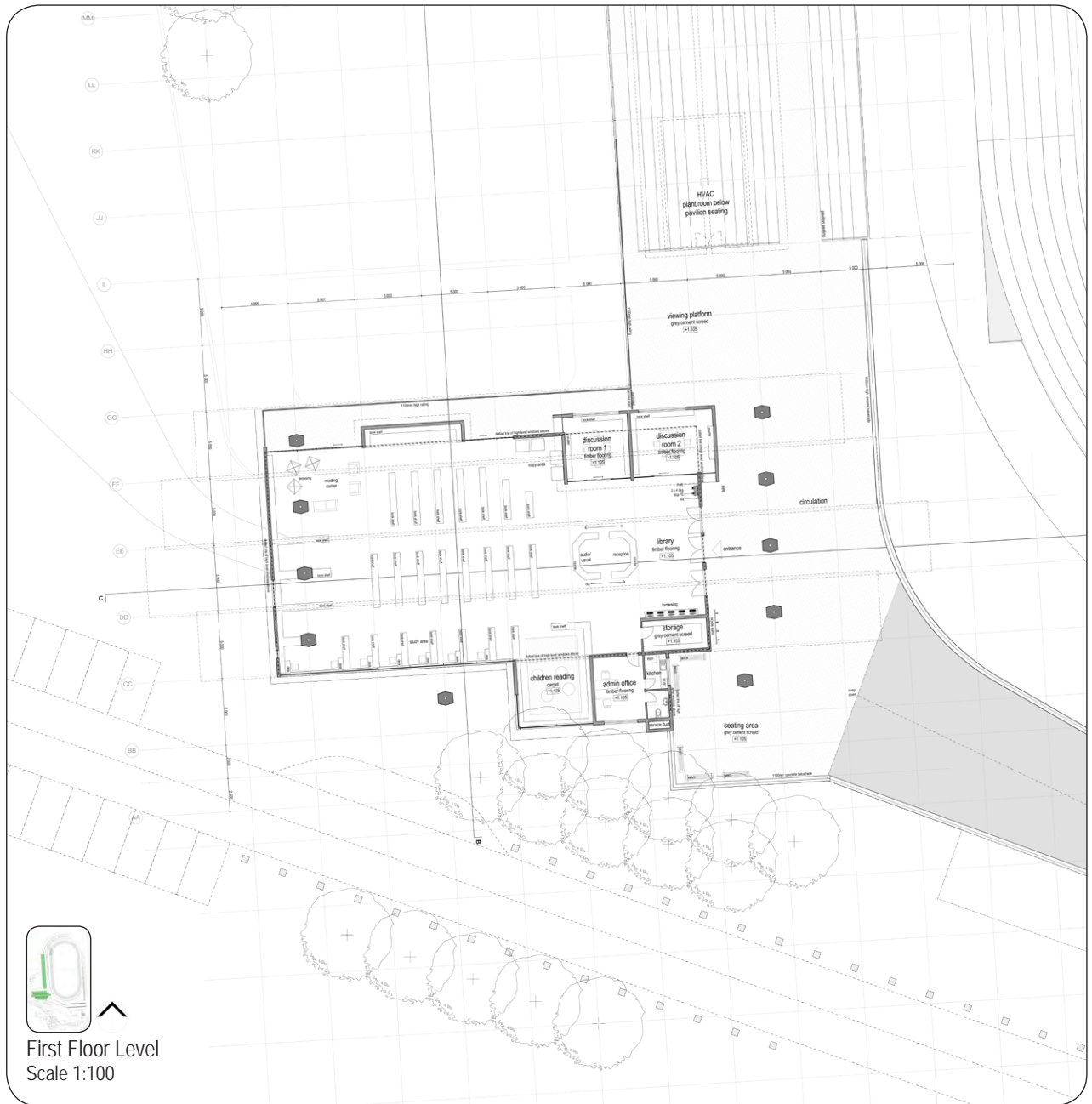


phase 2
development
sports field

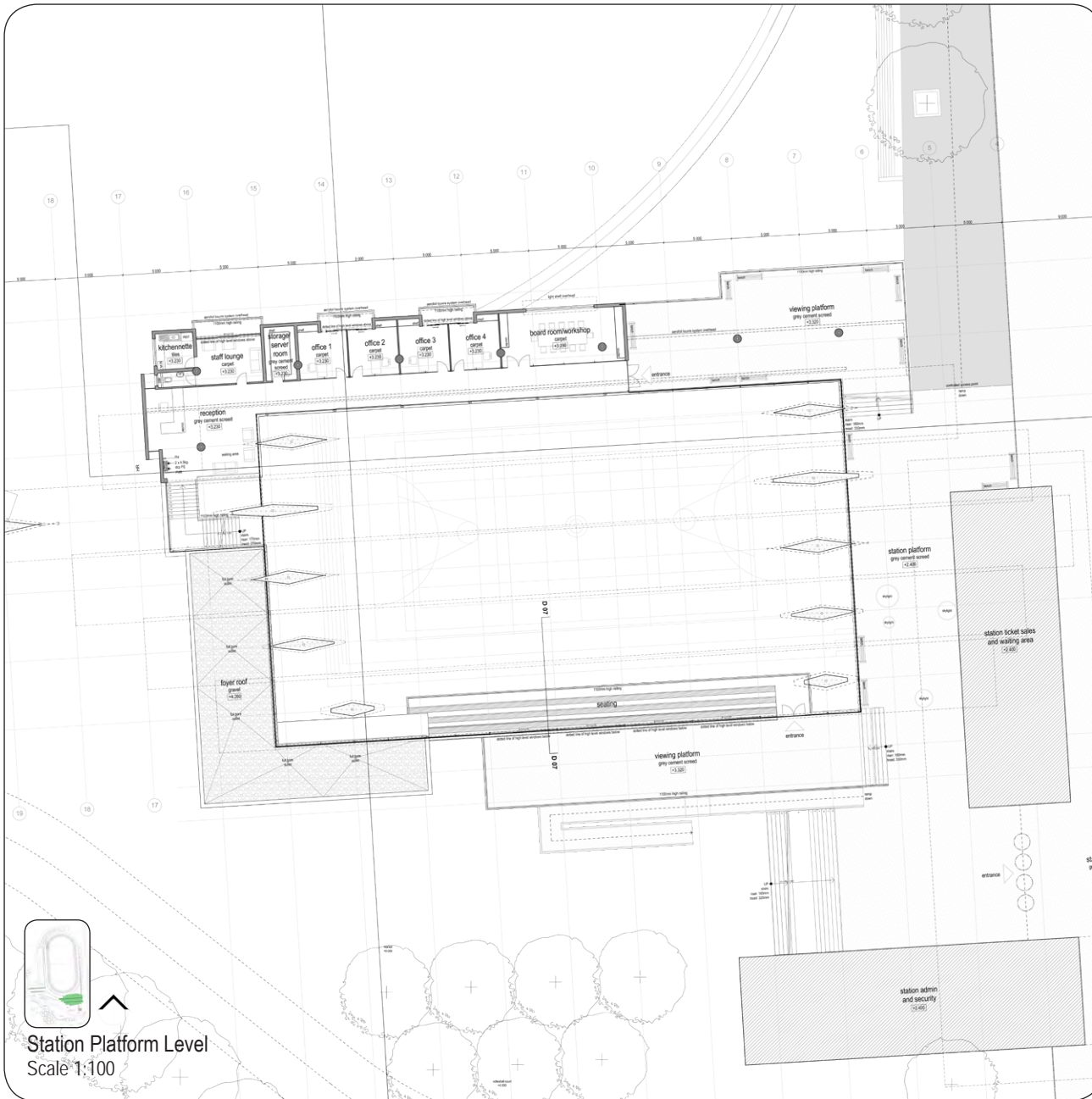




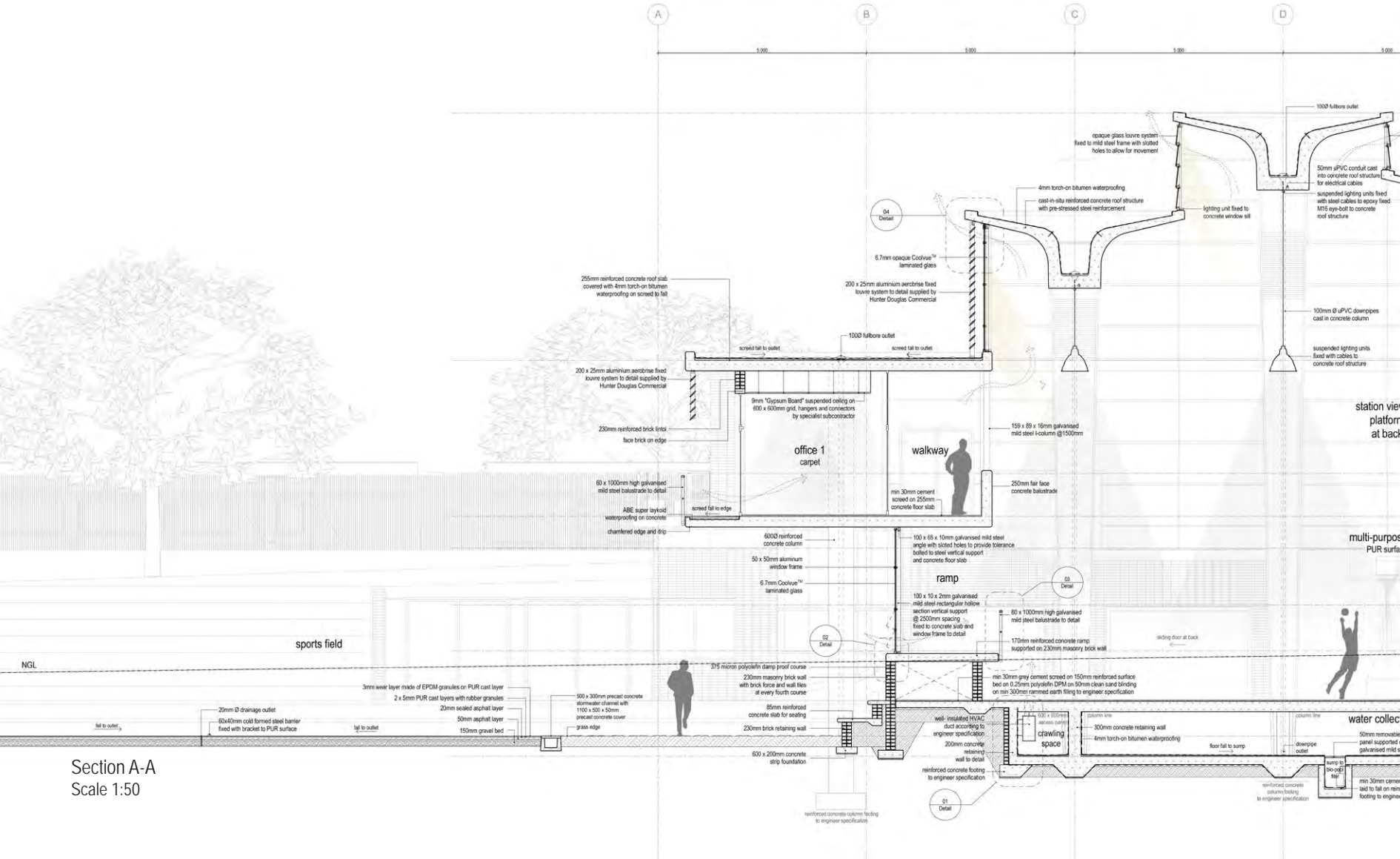
Ground Floor Level
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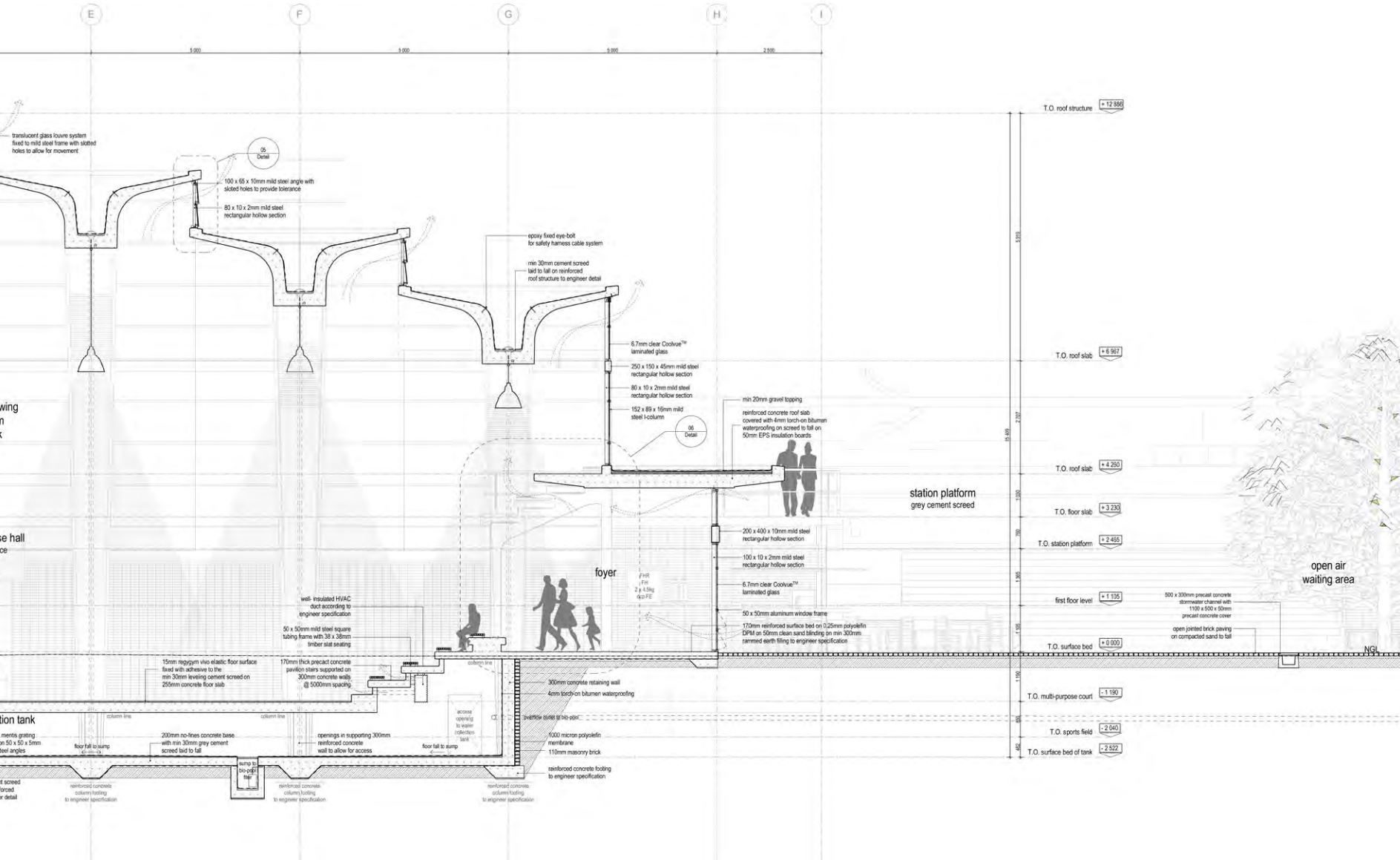


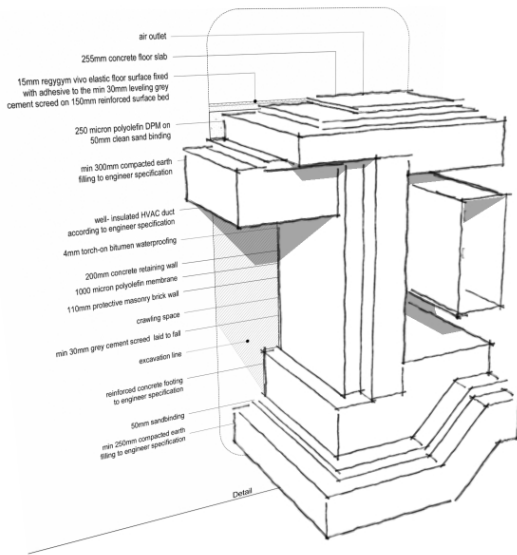
First Floor Level
Scale 1:100



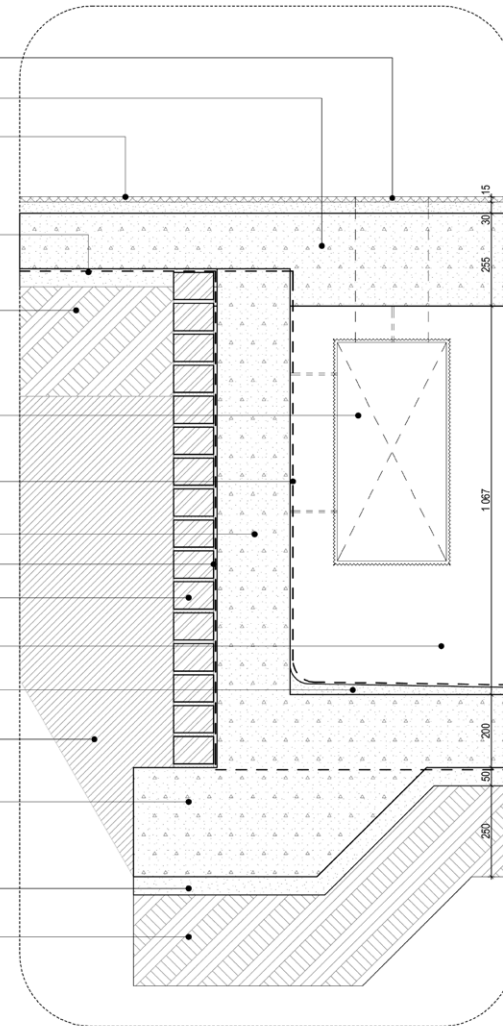
Station Platform Level
Scale 1:100



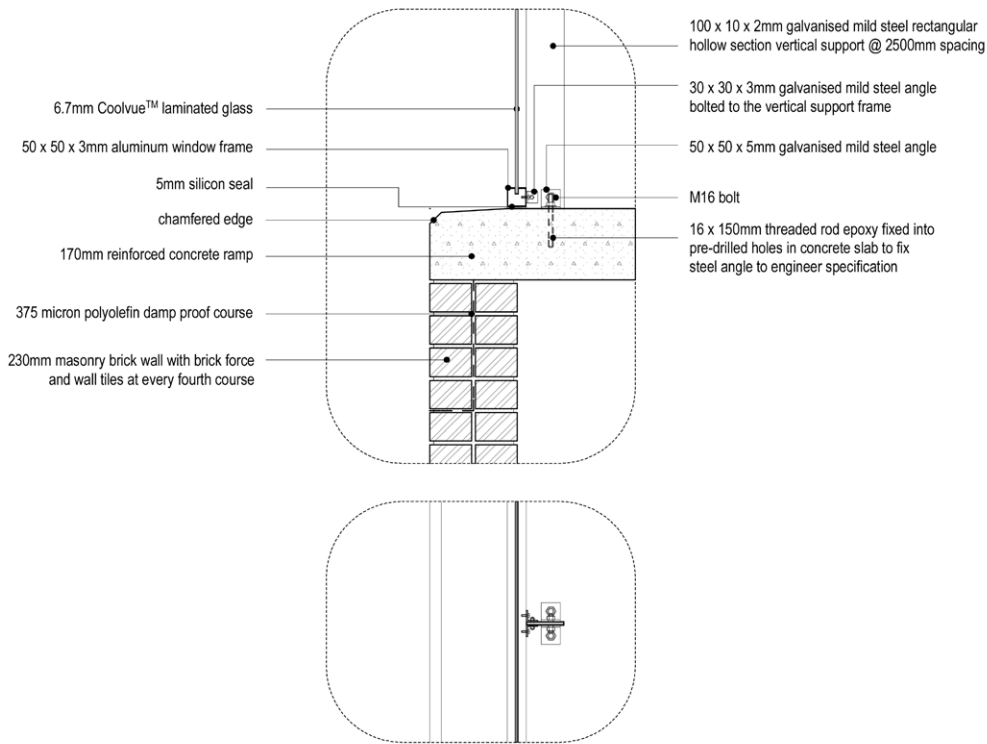




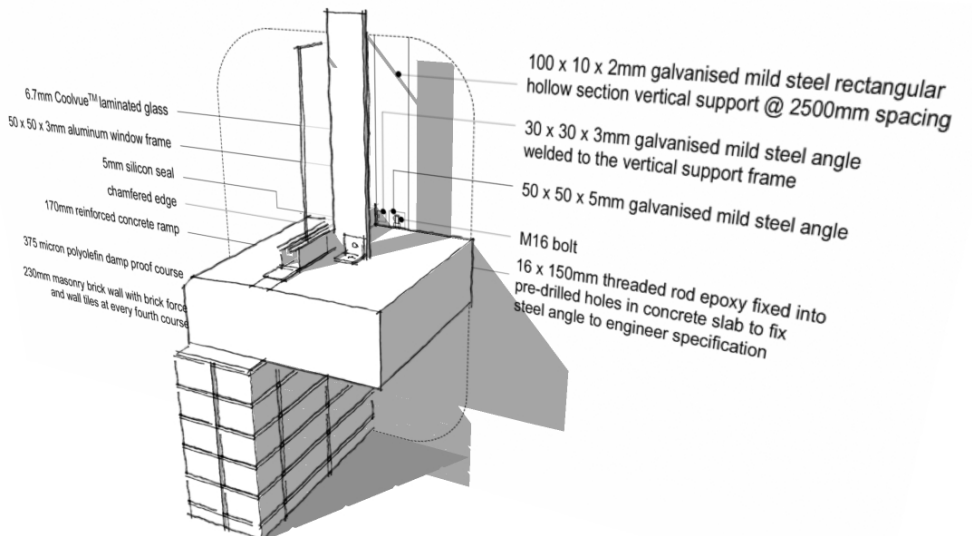
- air outlet
- 255mm concrete floor slab
- 15mm reggym vivo elastic floor surface fixed with adhesive to the min 30mm leveling grey cement screed on 150mm reinforced surface bed
- 250 micron polyolefin DPM on 50mm clean sand binding
- min 300mm compacted earth filling to engineer specification
- well-insulated HVAC duct according to engineer specification
- 4mm torch-on bitumen waterproofing
- 200mm concrete retaining wall
- 1000 micron polyolefin membrane
- 110mm protective masonry brick wall
- crawling space
- min 30mm grey cement screed laid to fall
- excavation line
- reinforced concrete footing to engineer specification
- 50mm sand blinding
- min 250mm compacted earth filling to engineer specification

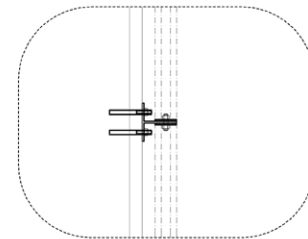
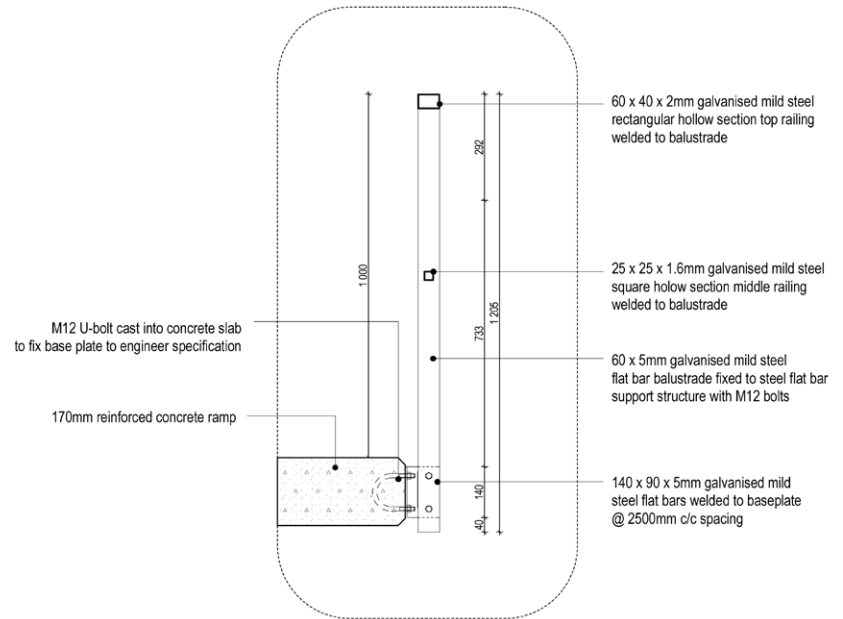
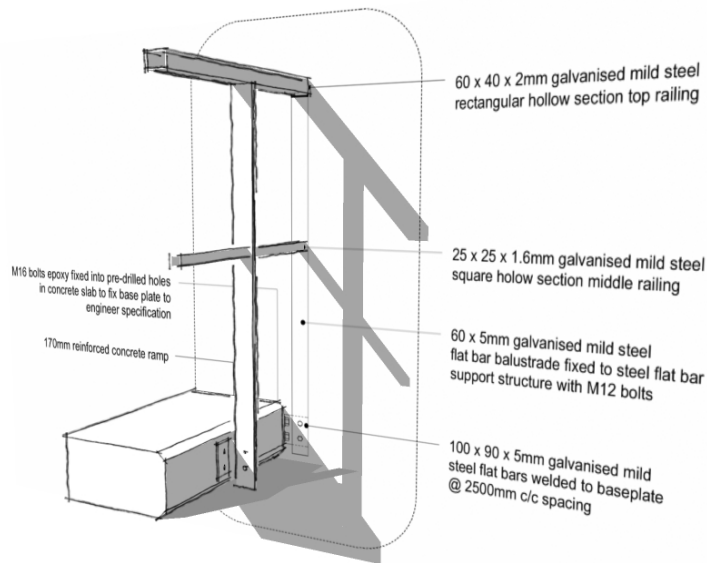


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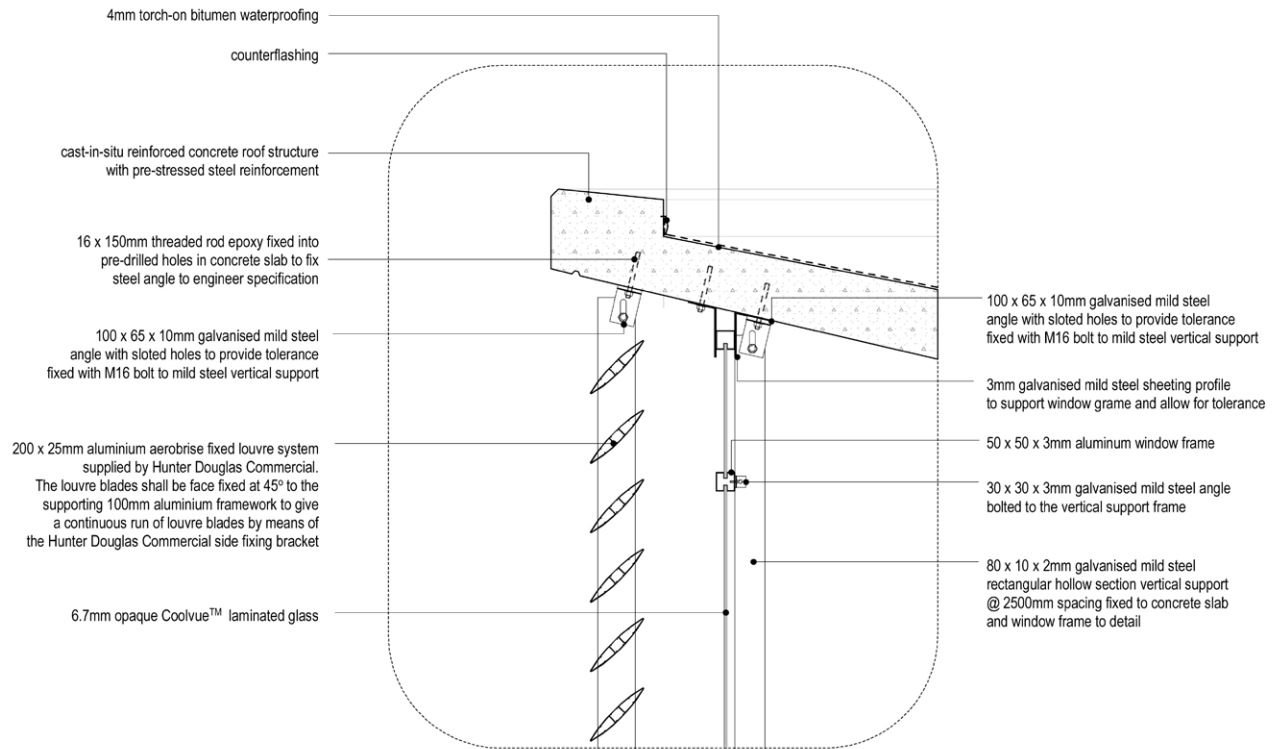


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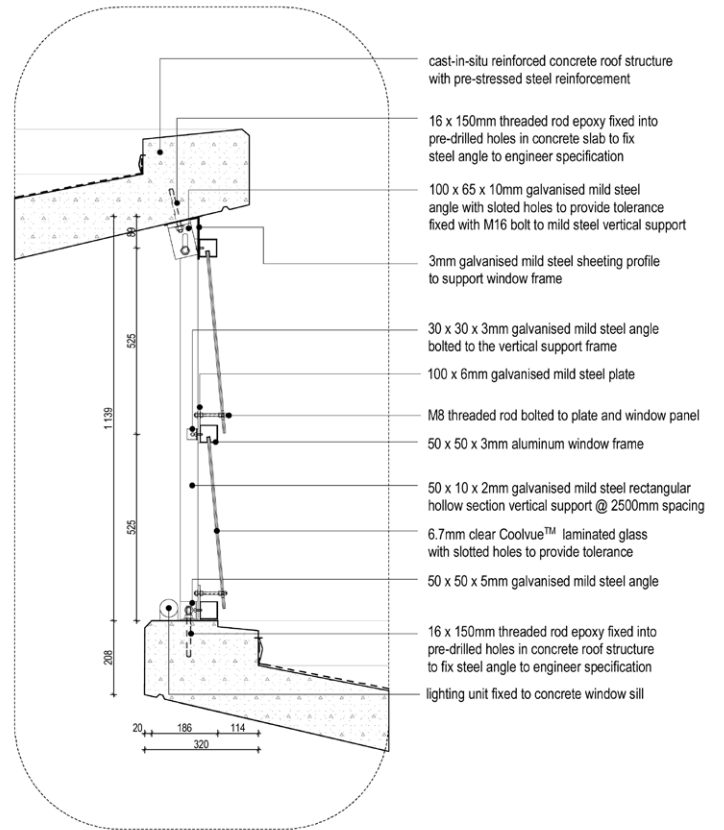
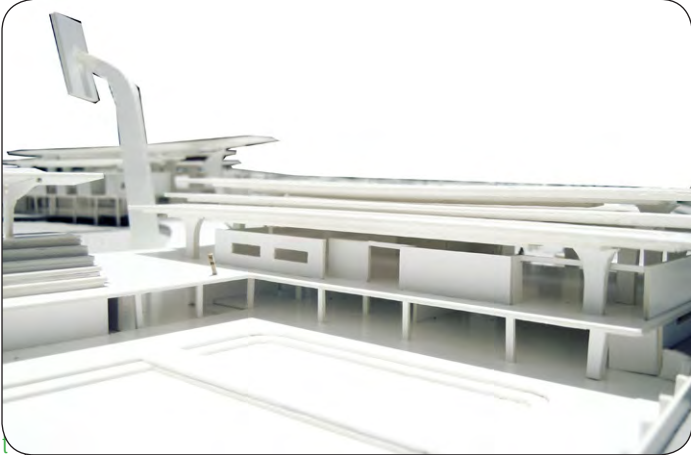
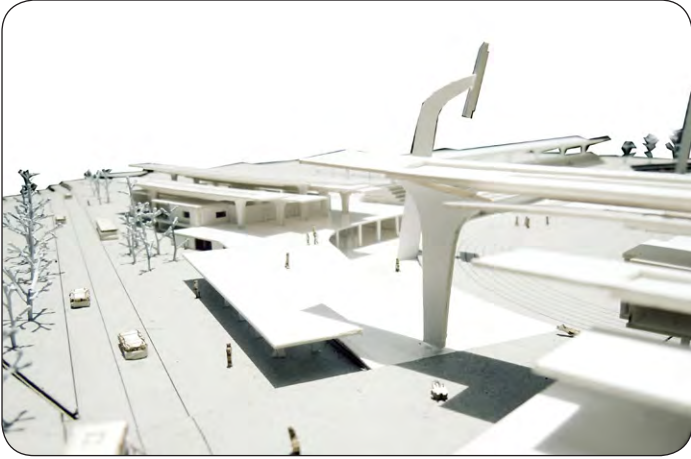




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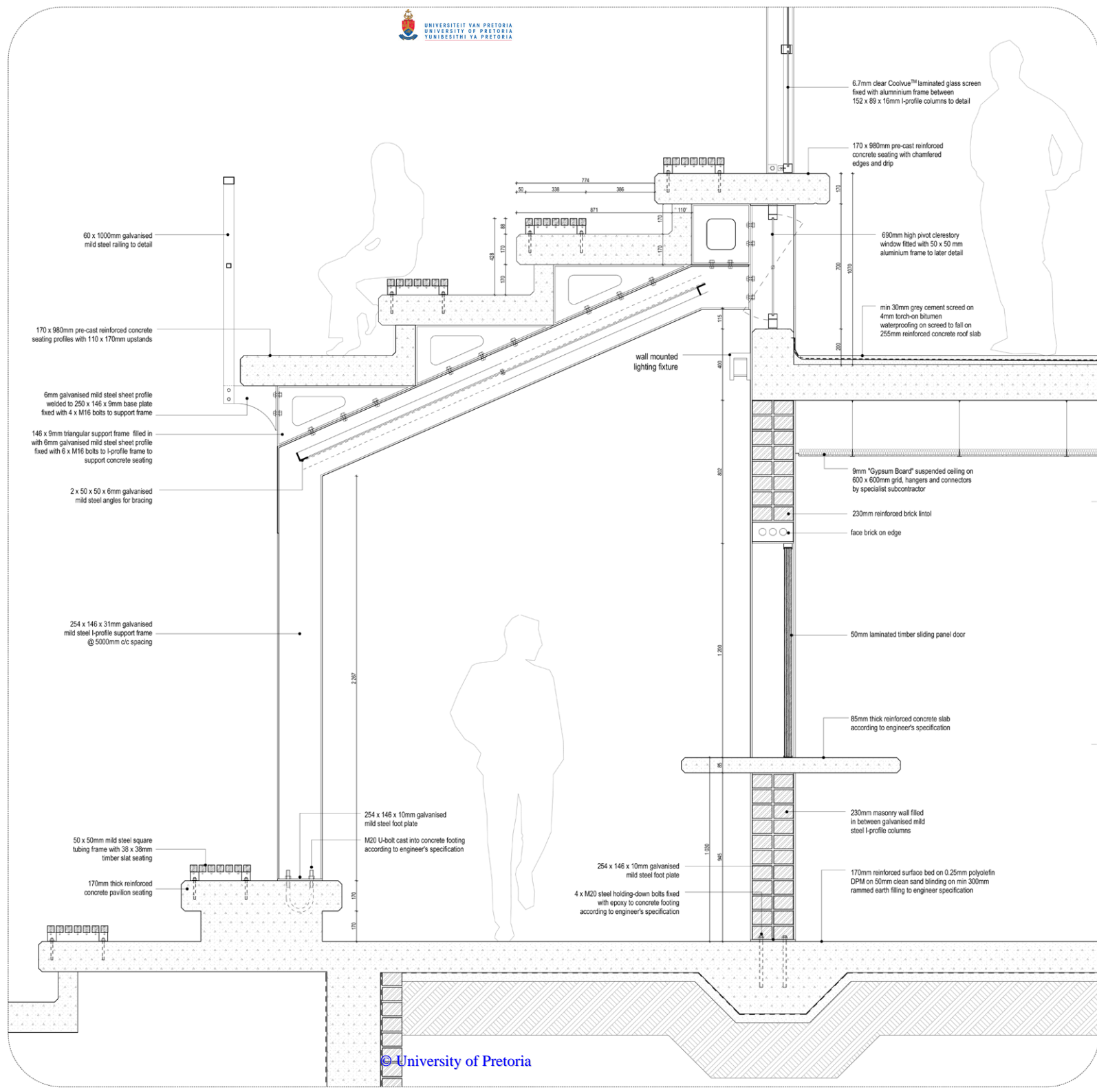


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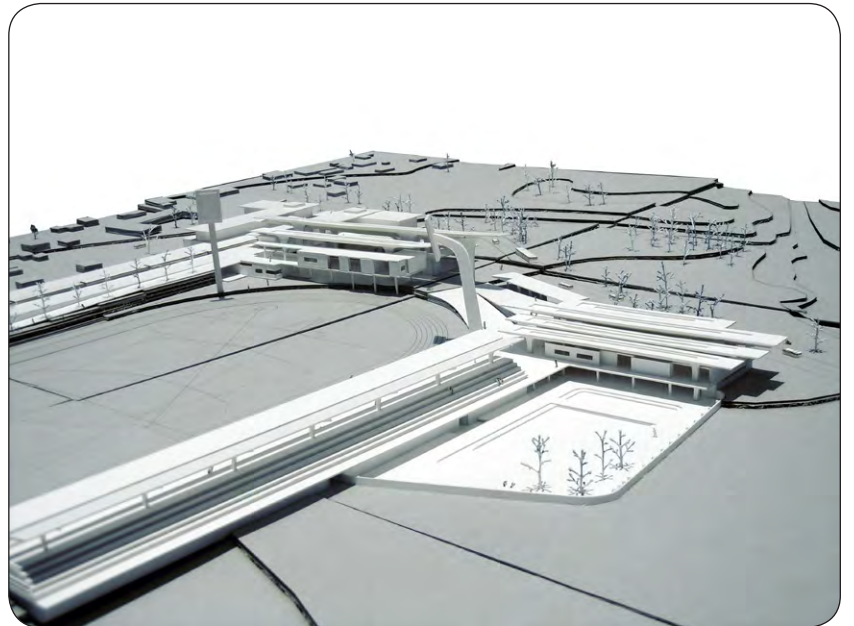
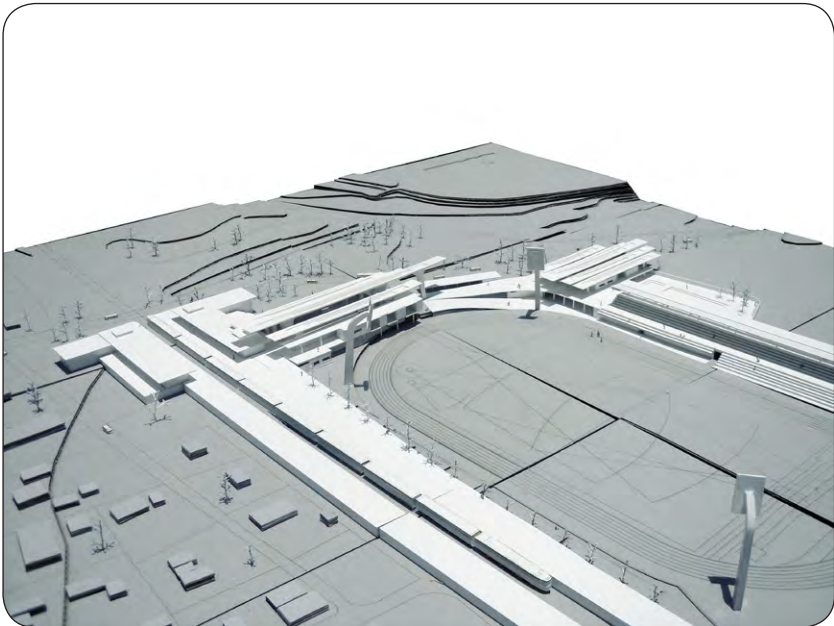
Detail 05
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Detail 06
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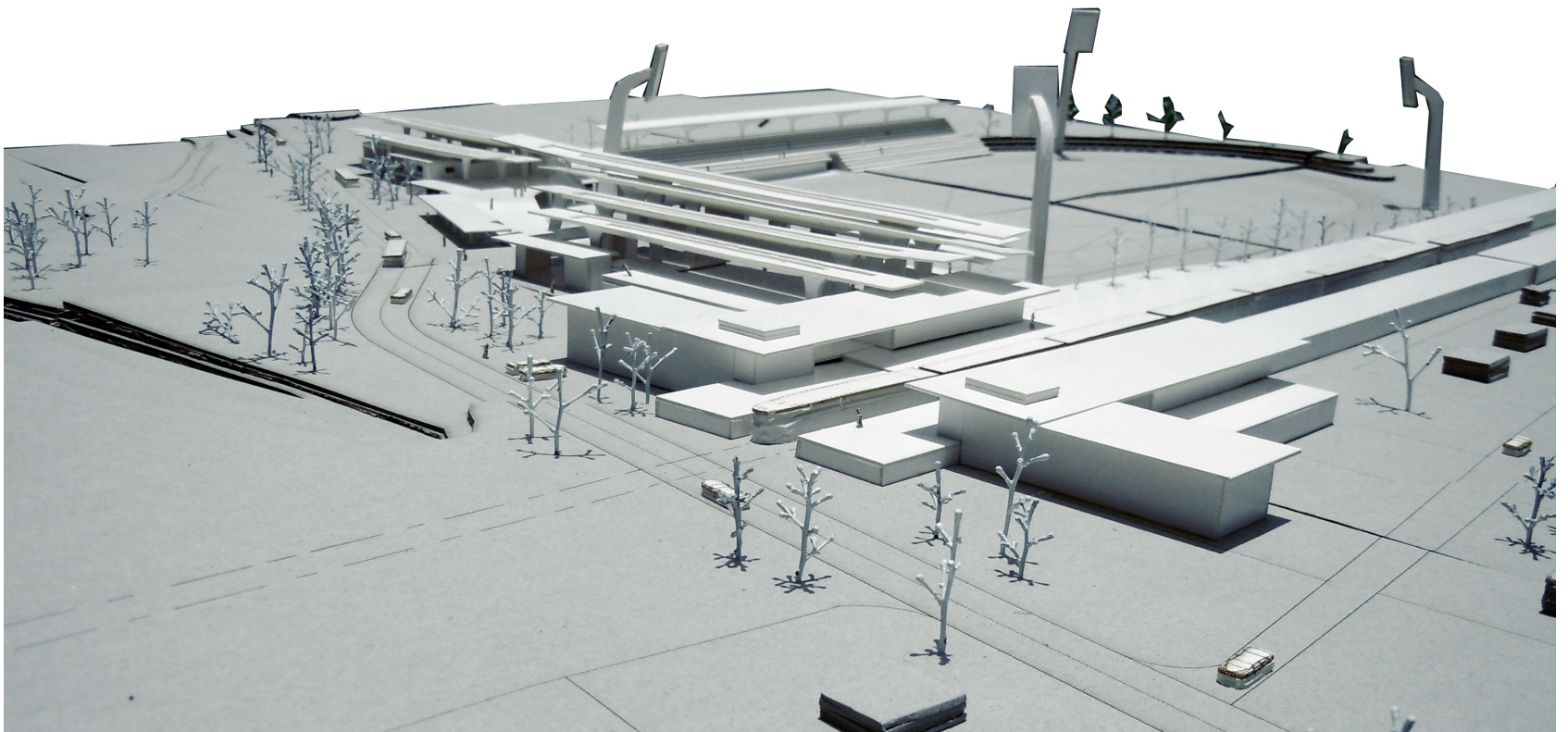


08|3_model



Chapter 9

Conclusion



08|1_ conclusion

The aim of this dissertation is to address the need for sport development in South Africa, especially in rural and underprivileged communities. The role of architecture in promoting the participation, interaction and awareness of the public with regard to sporting activities is investigated. This design approach is achieved through the introduction of sports facilities into the public realm – the sports facility is situated next to a new railway station and a pedestrian and vehicle route.

The proposal addresses issues regarding the sport development structure and current approach to sport architecture. The investigation seek to provide a facility that ensures safety, protection against the harsh environment, allows for movement and creates an identity for the intervention and the community.

The structural tectonic of the building accentuates the horizontal plane and creates a transparent edge that allows a visual connection between the activities. This connection results in the building becoming the threshold between the public and sports edge, which also allows horizontal movement through and along the building.

Level changes is used to define the movement between public and private and to integrate the building into the landscape. In order to promote a positive living environment, the structure made provision for cross ventilation, temperature control and natural lighting. To limit the obstruction of views, vertical elements is kept to a minimum and glass panels are used to create a permeable structure.

The centre allows members of the community (especially the youth) within Hammanskraal and Temba to participate in sporting activities, whether directly or in-directly. Through the use of cross-programming, a hybrid environment is created, where the public programmes support the sports programmes and vice versa throughout the week, as well as on weekends when events occur.

The centre creates a series of different spatial experiences and visual horizons for the user and promotes sport through daily activities.

Altus Sport. 2011. *Altus Sport Programmes*. [Online]. Available: <<http://altussport.co.za/node/12>> [Accessed 24/04/2012].

Amber, P. 2011. 'Facilities for Children and Youth Activities "La Camisera"/Cerrejon Arquitectos + Magén Arquitectos'. *ArchDaily*, 17 October 2011. [Online]. Available: <<http://www.archdaily.com/176095>> [Accessed 23/08/2012].

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