Tialise Taljaard

REDEMPTION

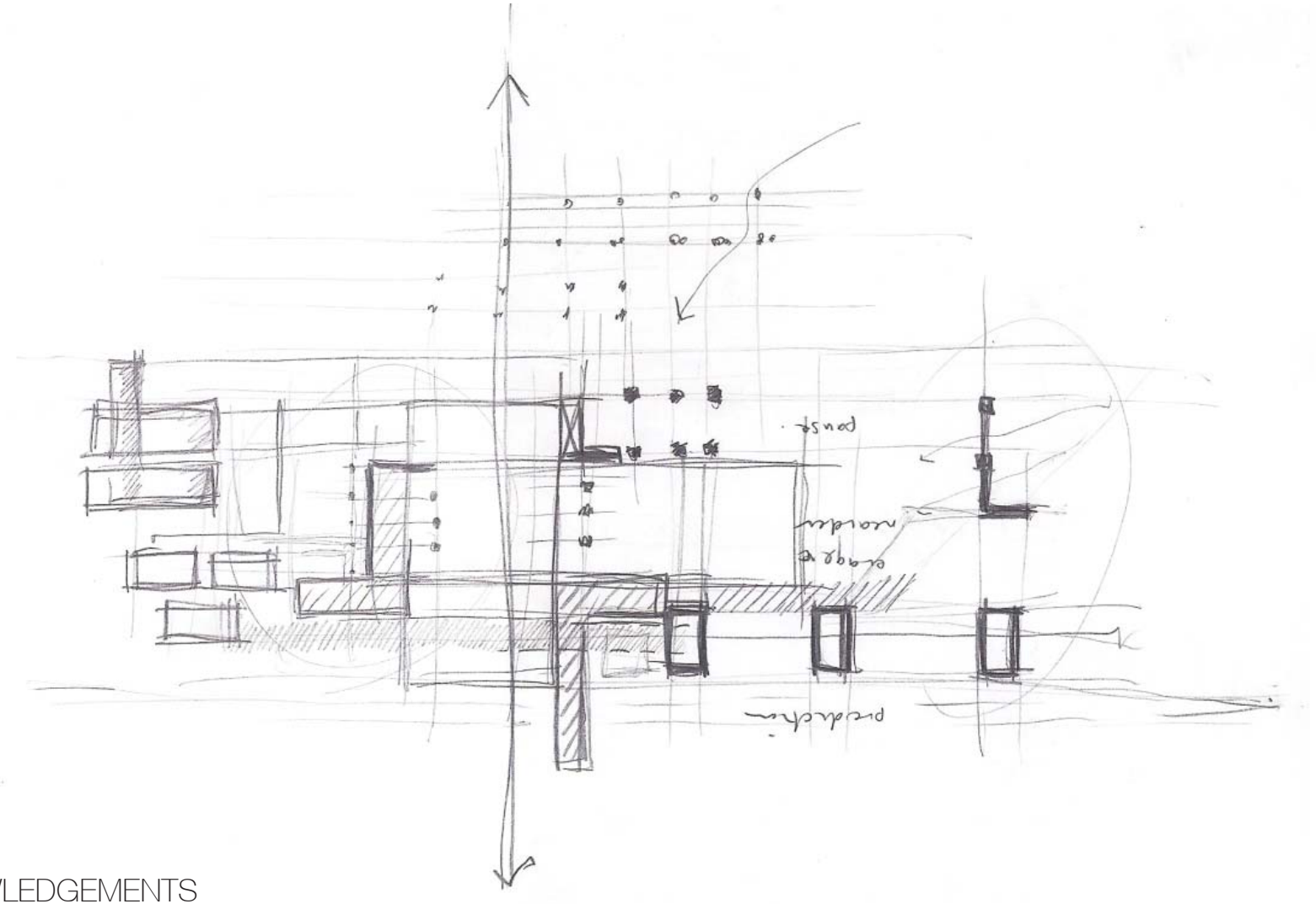
ARRESTING THE DAILY EXODUS FROM MAMELODI THROUGH PLACE MAKING AND PRODUCTION

Submitted in fulfilment of part of the requirements for the degree
Magister of Architecture (Professional)
Department of Architecture
Faculty of Engineering, Built Environment and Information Technology
University of Pretoria
South Africa

Year co-ordinator Arthur Barker
Study leader Carin Combrinck

The affiliated research field
Human Settlements and Urbanism

PRETORIA 2013



ACKNOWLEDGEMENTS

For inspiration, support and love
my sisters Hanri and Danielle, my friends.... my family.

and for pulling me through, Riki and making it real, Sandeep and Tarryn

Fig i-1
Parti diagram of the plan

To my parents Johan and Sandra

Declaration

In accordance with regulation 4[e] of the General Regulations [G.57] for Dissertations and Theses, I Declare that this Dissertation which I hereby submit for the Degree Magister of Architecture [Professional] at the University of Pretoria is my own work and has not previously been by me for a degree at this or any other tertiary institution.
I further state that no part of my Dissertation has already been, or is currently being, submitted for any such degree, diploma or other qualification.
I further declare that this dissertation is substantially my own work. Where reference is made to the works of others, the extent to which the work has been used is indicated and fully acknowledged in the text and list of references.

Tialise Taljaard
2013

PROJECT SUMMARY

Programme:	Eerste Fabrieken Train Station, glass recycling depot and production facility for recycled glass as generator of activity
Site description:	Eerste Fabrieken Train Station, Mamelodi, Tshwane, Gauteng
Site location:	Hatherley 331-JR R7
Address:	Eerste Fabrieken Train Station, Eerste Fabrieken Street, Mamelodi, Tshwane, Gauteng
GPS Coordinates:	Latitude 25°43'17" S Longitude 28°21'31" E
Research Field:	Human Settlements and Urbanism
Keywords:	Pendulum migration, Dormant spaces, Place making, Productive activity, Public participation through glass collection and recycling, Social cohesion.

The main function of the building

1. Creating accessible public spaces in dormant landscapes
2. Using a glass recycling depot and production of recycled glass as generator of activity

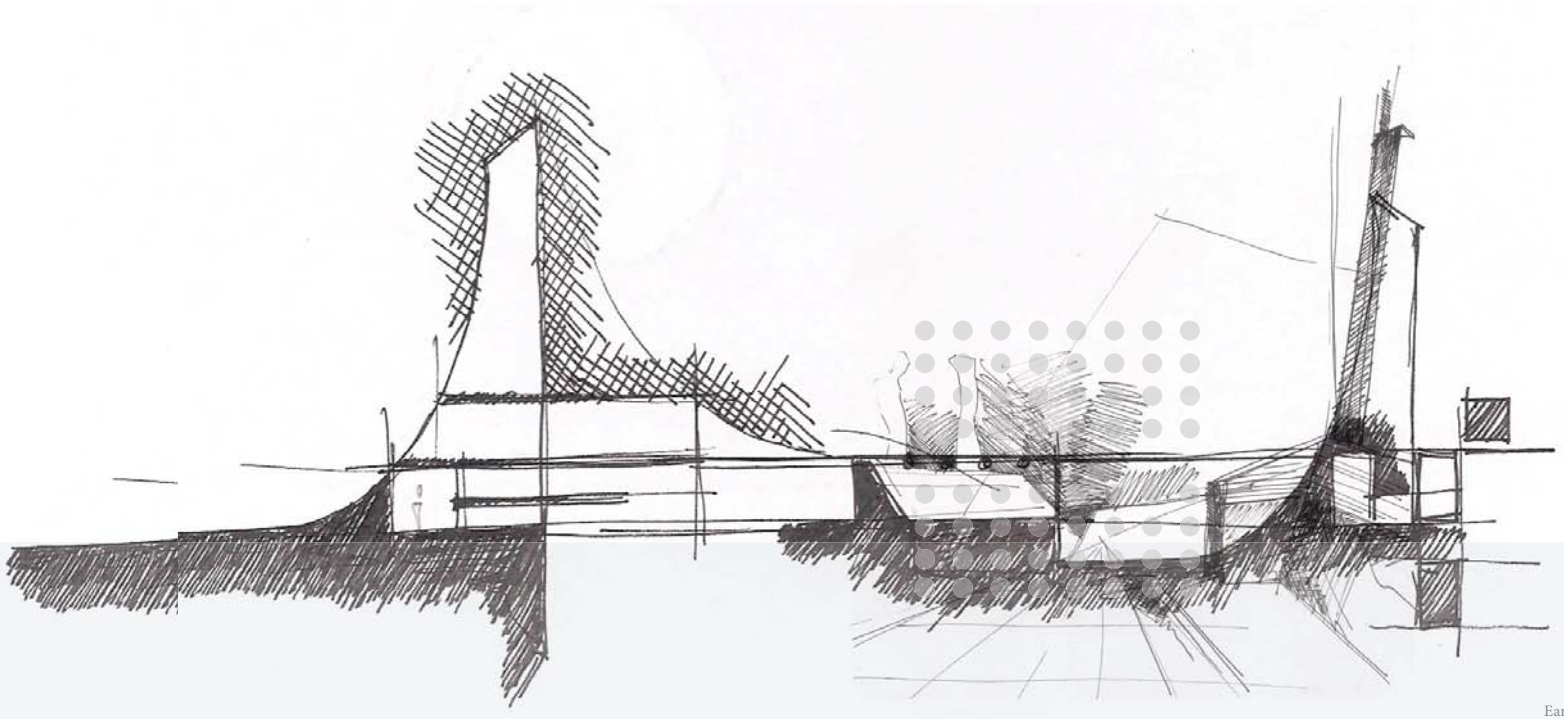


Fig i-2
Early concept

'We should understand that beauty is not a mysterious veil thrown over a building but a logical result of having everything in the right place'
(Bryggman cited in Pallasmaa 2008).

REDEMPTION

Arresting the daily Exodus from Mamelodi through place making and production

Eerste Fabrieken Railway Station and Taxi Rank

ABSTRACT

+ Urban Vision

Mamelodi has reached its geographical and topographical limits through urban sprawl. The prospects of expanding and developing the city outwards, therefore, is physically impossible. However, the settlement can be accessed from within if the already existing activity nodes are densified, transformed and developed. By accessing the existing activity nodes and generating functional spaces within Mamelodi, energy could be arrested in these nodes. In other words, by developing productive threshold nodes in these spaces of departure, such as the Eerste Fabrieken train station, pendulum migration patterns can be transformed to anchor energy that would normally be lost to labour migration.

+ Framework Issue and Intention

Creating opportunities and infrastructure from within Mamelodi should ensure the development of a functional city, where interdependency exists between the city and surrounding areas.

+ General Issue and Intention

Mamelodi is currently a settlement of dormancy due to the great number of skilled labourers that leave the settlement daily (GAPP, 2011). The aim is to create interdependent productive places in the currently dormant space of Mamelodi and close the feedback loops in consumption, production and waste simultaneously. By creating points of access through architectural intervention, nodes could become stepping stones for production and livelihood.
The objective of the programme is to create a place where the economic capacity of waste – both cultural and material – can be realized and (therefore) production boosted. The intention is to create a place that is accessible, where people can gather and actively participate in production. This intervention will serve to deal with waste; in so doing it will guarantee safe, clean and accessible spaces for a functional social domain. The programme aims to facilitate the happening of life in a site of production – in a public domain.

+ Programme

The main goal of the intervention is to create functional public spaces with production processes as generators of activity. By using the architectural intervention as generator of activity in the space, opportunities for employment should arise, contributing to the creation of energy. The design of this public space should serve to anchor the sprout of energy in Mamelodi, so that these spaces become nodes of livelihood.

To achieve community engagement, a recycling factory for glass is proposed. This programme makes use of the glass resources that are existent all over Mamelodi. In addition to the participation on site, there also exists the opportunity of pick-up points along the spines of activity. This programme of glass recycling allows for the participation of the whole of Mamelodi and surrounding areas. The processing of waste glass into functional products adds to the engaging aspects of the intervention, as people will be able to partake in the processes and purchase the new products in the social spaces.

+ Concept

The proposal is based on architecture of redemption and change within an existing fabric. The current conditions allow for the possibility of transformation and transition on an urban scale, as well as on an architectural scale. A change in urban structure will be necessary to motivate migrant workers to stay and utilise local opportunities, instead of leaving the settlement on a daily basis. The nodes of departure should therefore become thresholds that anchor energy, instead of releasing it to other cities. These nodes of livelihood could redeem and transform dormant spaces into functional places.

+ Architectural Intention

It is important that the approach to the architectural proposal is, in the first place, one of familiarity and accessibility, because the existing station will still function as transport node. In the second place, the proposed programme depends on public participation. To ensure participation within these spaces, a context-sensitive architecture that speaks of the surrounding Mamelodi structures and spaces is proposed for the intervention. The horizontal lines of the building form spaces that define thresholds between the different functions on site. The thresholds between social spaces, movement lines and productive spaces are accentuated by the overhead roof structures that define different scales and the hierarchy of spaces. Spaces are formed by geometries that define thresholds. The building literally acts as a threshold and solvent that merges light industry, people and transport. Movement across the site is complex because of these various programmes that need to be managed. Therefore, circulation paths are controlled by the stereotomics of the building on ground floor, while the light steel structure overhead defines the transition into different spaces.

CURRENT SITUATION

PENDULUM MIGRATION

Pendulum migration is an arbitrary name for the regular journeys of a population from home to work on a daily basis.

DORMANT SPACES

These spaces are in a state of minimal activity with cessation of growth, either as a reaction to adverse conditions, or as part of the normal rhythm and activity of a space. The state of rest of space and the perception that it is inactive, often leads to spaces becoming dormant over time.

APPROACH and INTENTIONS

PLACE MAKING

Place making is the art of creating public places that uplift and help us connect with one another. This approach is both a process and a philosophy. Place making is also often seen as “making a Public Space a Living Space”.

The concepts behind place making originated in the 1960s, when writers like Jane Jacobs and William H. Whyte offered ground-breaking ideas about designing cities that catered to the needs of people, that is, cities that don’t just accommodate cars and shopping centres.

At its most basic, place making is making liveable places by thinking through:

- the design of places,
- the experiences created, and
- the meaning they have in our lives.

PRODUCTION and PROCESS

Production (or process) is the processes and methods used to transform tangible inputs, such as raw materials, semi-finished goods and sub-assemblies; and intangible inputs like ideas, information and knowledge into goods or services.

Table of Contents

INTRODUCTION 1

THE DAILY EXODUS FROM MAMELODI

The necessity to commute considerable distances to work is a motion that has become a ritual of everyday life for many working class people. This daily labour migration is referred to as pendulum migration and is by no means a foreign concept to the context of South Africa. For many decades, people have been travelling from their homes in informal settlements to urban city areas, to seek employment and better opportunities for themselves and their families (Mansell, 1985:97); (Whiteside, 1997:15).

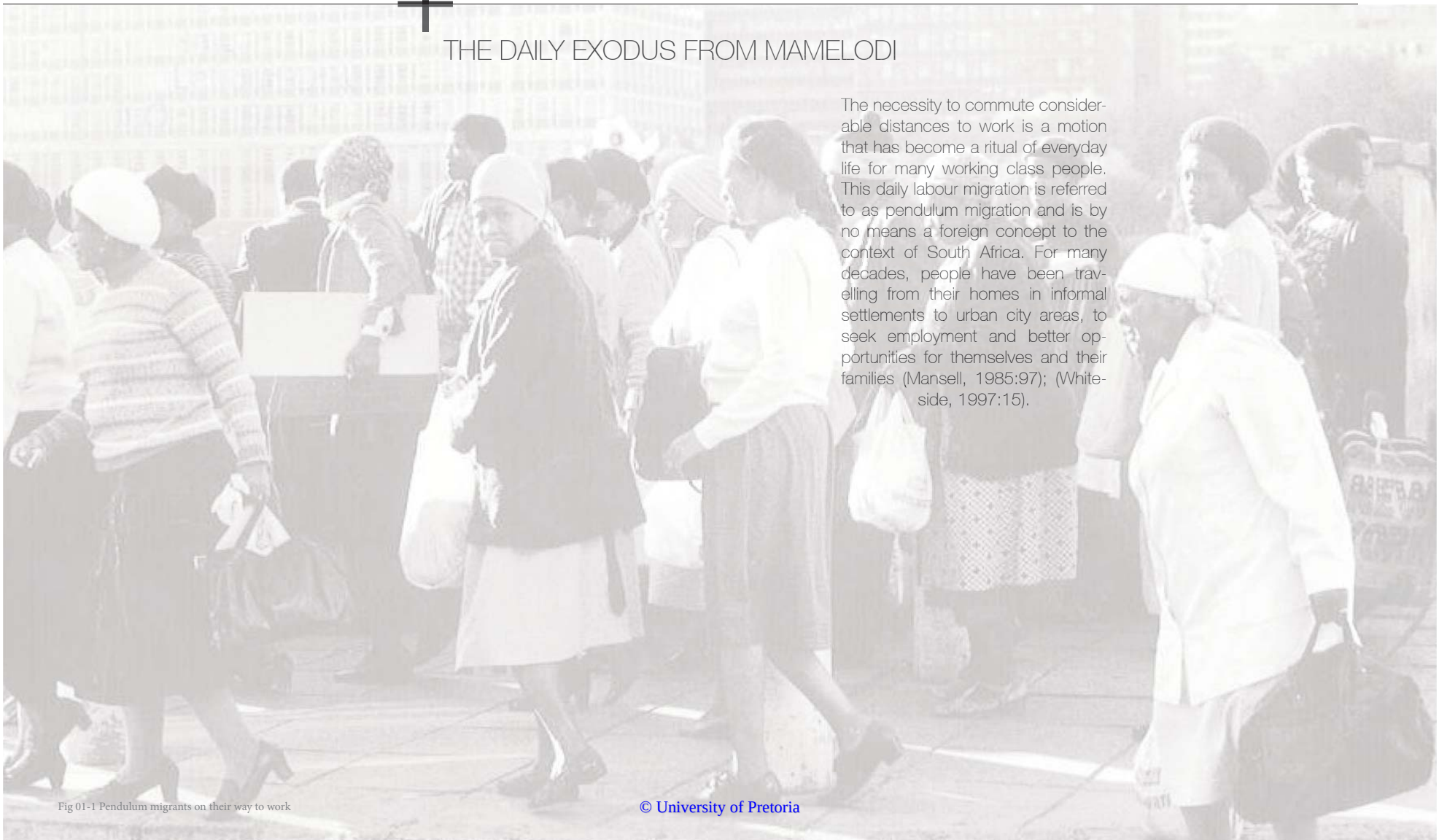


Fig 01-1 Pendulum migrants on their way to work

Fig 01-2
Train station platforms in Mamelodi

INTRODUCTION

The aim of this dissertation investigates the idea of creating an engaging public place by introducing productive activity in a dormant area of Mamelodi where the effects of pendulum migration and waste accumulation have caused public spaces to become inaccessible and functional only as spaces of departure. The site selection will involve looking for a space with a highly layered construct that captures the essence of what Mamelodi has become overtime. This proposed programme will aid in the investigation of testing whether a dormant space has the potential to inspire transformation and change in the social and public realm of this informal settlement.

Through the theoretical premise of Place Making, the investigation will focus on whether social spaces, activity generators, existing contexts and past events could be layered to create a functional public place. The hierarchy and transition of spaces from one to another could allow one to understand the process of change on site, as well as the process of change in terms of waste material that is reused and transformed into something useful. This thesis document explores the idea of a building as a threshold and solvent of different spaces that would normally be split from each other.

Fig 01-3
Pendulum migrants

BACKGROUND to PENDULUM MIGRATION

Pendulum migration is a negative side-effect of urbanisation, space division and in some cases historic administration. This phenomenon arises when areas of employment are generally located in the centres of urban areas where productive and industrial activities are concentrated around one another. City centres are believed to be ideal for these activities, as the availability of people and energy is naturally available in dense areas (Mansell, 1985). However, due to the rapid development of these urban zones, housing dilemmas became prominent.

This problem was often solved, especially in South Africa, by the extension of urban surfaces and the creation of rural settlements outside the city centre, thus causing the extreme marginalisation of residential areas from their employment in the city centres. Historically, and still today, people live far from where they work, and as in the past, opportunities closer to home today are more often than not non-existent. Consequently, one finds that there is a massive influx of people from the periphery to the centre of the city during the morning hours – only to be reversed again when people travel back home after work (Mansell, 1985).

There are many problems that are related to these pendulum labour migrations in a country like South Africa. One such problem unfolding in informal settlements is the drain of energy and activity from these areas. Energy is dispersed to other spaces, because of the inaccessibility of public spaces and inadequate infrastructure for production and work opportunities. This loss of livelihood and activity in a settlement to the inner city during the day causes such a settlement to become dormant. A dormant state can change – there is a suggestion of potential change – yet, this remains only a potential for all those people who cannot access the opportunities that come with focusing energy in a place to create economic activity and work opportunities. This loss of energy will be discussed together with intentions to redeem these idle landscapes to become functional public spaces.

GENERAL ISSUE

PENDULUM MIGRATION in SOUTH AFRICA

RITUALS OF EVERYDAY LIFE

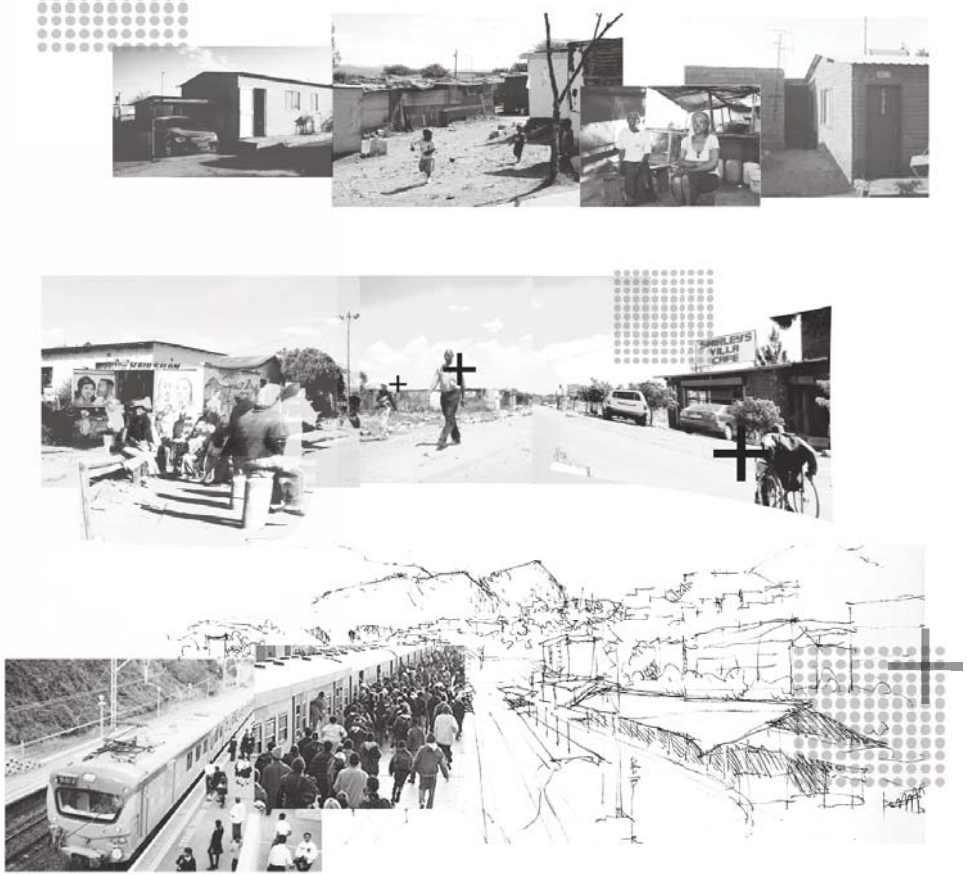


Fig 01-4
The everyday life of a pendulum migrant in Mamelodi

The origin of labour migration in South Africa dates back to 1866. During this time, diamonds were discovered in the Northern Cape – a discovery that transformed South Africa from a predominantly agricultural economy into a modern capitalist economy. The exploitation of diamonds and development of industries in urban areas led to an inflow of new immigrants from rural areas seeking their fortunes (Whiteside, 1988).

Apart from lacking infrastructure to house the massive influx of people to a concentrated region, urban areas were also controlled by prescriptive government legislation. Legislation during the 1920s and 1930s laid the foundations for what became known as influx control. In 1945, the Native Urban Areas Consolidation Act in conjunction with the 1942 Bantu Laws Amendment Act became the basis of the labour control system. The legislation prevented people of colour from remaining in certain (prescribed) areas for longer than seventy-two hours. The effect of this legislation was the exclusion of black South Africans from living in these urban environments (Whiteside, 1988). This segregation was achieved fully when areas outside the cities were designated for blacks to live in – the implication being that workers had to travel daily to get to and from their jobs.

In 1987, the government published a White Paper on urbanisation, which led to a revision of the influx control system. In essence, the report accepted that urbanisation was an ongoing process, and that there needed to be a degree of freedom of movement. Influx control no longer served any constitutional purposes and in June 1986, the Abolition of (the) Influx Control Act was passed (Whiteside, 1988). Here it should be noted that labour migration in South Africa is (still) unique, due to the historical administration, which forced people to the periphery of the city, only allowing labourers access to the city during the day (Whiteside, 1988).
The effect of labour migration is that there is little or no infrastructure to support production and working opportunities in many of the informal settlements and other formal RDP developments. Daily commuting to and from informal settlements has become a reality for many people living on the outskirts of the urban area, as they search for meaningful employment opportunities that are not available in their own settlements. Even if they were able to find work at home, these commuters often prefer to travel daily as they still earn more in cities. Due to the fact that pendulum migration has become such a common custom, the triadic effects are often ignored and forgotten. Triadic effects include the migration of the individual traveller, the recipient urban city and thirdly the real effect which is clearly evident in the informal settlements that get left behind every day (Whiteside, 1997).

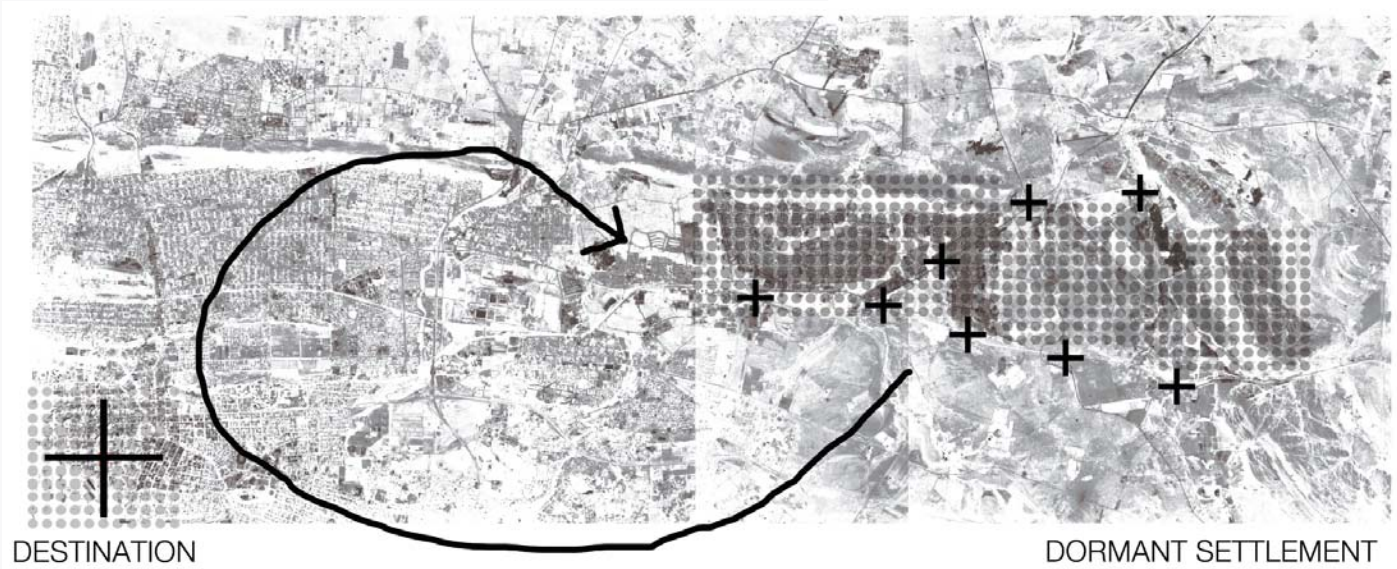
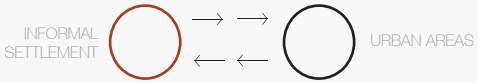


Fig 01-5
Wilson's Push and Pull model

Wilson has devised a model which merits further discussion and assists in understanding the forces at play on the migrant in a contemporary system (Wilson, 1972).



The first force is the pull of the urban areas. This may be a demand for labour, that is, an economic pull. The second is the informal settlement push: this may be due to increased poverty caused by population growth, or target employment brought about by the need to purchase an item or pay taxes. The third phase is the informal settlement pull: people who work in urban areas return to their home or roots for security reasons and to be with family. The fourth and final force, which was typical of the mid-apartheid era, entailed an urban push exerted by employers who did not want to pay for infrastructure in urban areas. Employers deliberately paid higher wages if employees' families had houses in informal settlements. This model provides a useful framework for analysis (Wilson, 1972).

Informal settlements on the periphery of the city have always had a large number of poor people that rely on opportunities from the city for migrant labour (Leibbrandt, 2011). As a result of the political change during the 1990s, large public organisations generated spatial restructuring of South African industry and the 'independent' homelands. Using research evidence from the 1990s, this paper shows that these changes led to increased participation by rural communities in regional and local labour markets. There was increased wage labour and weekly commuting. A number of these employees were skilled labourers. The number of people from informal areas that worked in cities started to increase, while the infrastructure, skilled labour and job opportunities in these informal settlements decreased due to the labour migration (Leibbrandt, 2011).

Keeping in mind that sprawl impacts negatively on the functioning of informal settlements as infrastructure is not sufficient for the number of people who are dependent on them, the prediction is that the need for development in informal settlements should happen from within the existing fabric (Wilson, 1972). It is necessary to start thinking about ways in which one would be able to increase informal settlement pull and centralise activity or industry in these settlements so that large numbers of people do not have to seek employment elsewhere, leaving behind dormant space.

URBAN ISSUE

After investigating the effect that daily pendulum migration has on informal settlements in South Africa and the City of Tshwane Metropolitan Municipality, the Mamelodi township was identified as an appropriate example of where this motion can be observed. Mamelodi township developed from the concept of influx controlled labour that was enforced by the previous administrative government. There are two apparent causes for the general, urban and architectural issues that can be observed in Mamelodi, namely the historic context, and the rapid population growth.

Fig 01-6
Timeline of the Mamelodi settlement

A WALK THROUGH HISTORY

1840
White settler-farmers (Voortrekkers) established the farm Vlakfontein 329 JR.

1945
On 30 October 1945 the then City Council of Pretoria bought Portions 2 and 3 of the farm Vlakfontein from the African and European Investment Company Ltd for the purpose of establishing a black township.

1947
"Construction of the township of Vlakfontein started in 1947 and was implemented from west to east. The town-planning scheme was designed under a Smuts oriented City Council of Pretoria planning department, which reflected current trends in town planning from abroad. The initial town plan design was altered under a Nationalist City Council of Pretoria over the next few years."

1948
Old aerial photographs of 1948 shows that a community of small-scale farmers occupied the eastern part of the farm Vlakfontein at that time.

1950
Relocation from Lady Selbourne and Eastwood to Mamelodi

1953
The township of Vlakfontein proclaimed as Vlakfontein Native Location. Vlakfontein initially started out with a mere 14 houses built for black people, who were relocated there under the Group Areas Act. The first residents worked at bottle-making (Eerste Fabrieke) and brick factories.

1962
The township Vlakfontein renamed to Mamelodi. The name "Mamelodi" means "mother of melodies" and was derived from the name given to President Paul Kruger (the first president of the Transvaal) by black people due to his unusual ability to whistle and imitate birds.

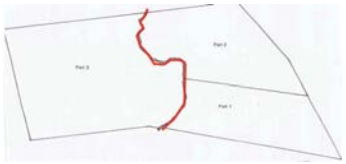
Putco bus starts operating in Mamelodi

1974
The private taxi transport system started operating

1977
Community Councils Act No 125 of 1977 This Act provided for the establishment of community councils, and for civil and criminal judicial powers to be conferred in certain black townships. This gave more power to the councils than the Advisory Boards or UBC's.

The historic context of Mamelodi refers to the apartheid administration, which enforced the pendulum migration through influx control, and in the process caused extreme division between home and employment. Currently, a state that involves rapid growth of the population and restricted physical space and infrastructure puts pressure on the existing fabric, perpetuating this division. The restricted physical space and infrastructure is underdeveloped, and therefore inaccessible. It is a state that contributes to people seeking job opportunities elsewhere. Both the historic context and physical space play their part in the continuous cycle of decay, because of a lack of developed infrastructure and Mamelodi's geographical position, that is, on the outskirts of the city centre. This results in the mass exodus of people from Mamelodi, who seek job opportunities in Pretoria city centre. The daily mass departures from Mamelodi cause a drain of energy from the settlement, which, in turn results in a state of dormancy.

With a population in excess of 50 000, the Mamelodi township could have been considered to be a city from as early as 1962 ('Native (Black) Urban Areas Act No 21 of 1923'). The original plan for the settlement set it within certain geographical and topographical constraints. These constraints have now been reached through sprawl. Although Mamelodi can be considered a city based on population, it lacks the necessary infrastructure that is characteristic of an independent, well-functioning city.



As a result, thousands of people living in Mamelodi travel to the city of Pretoria in search of meaningful employment every day. Mamelodi has become a place of dormancy, a place of consumption without production. This exodus has resulted in the collapse of thousands of livelihoods in agriculture, production, and related occupations (GAPP, 2011).

Generations of pendulum labourers have sought work in the cities and industries far from home. Movement of skilled workers from informal settlements to cities has been a reality in the past and continues to take place today. According to Ronald Skeldon, a professor of population statistics at the University of Sussex (Skeldon, 2003), a major drawback of rural-urban pendulum migration is that the people who go away to earn more money elsewhere, leave behind many disadvantaged labourers in the rural communities. This may mean that rural workers remain poor, whereas their peers who seek opportunities away from the settlement earn and spend their salaries and energy somewhere else. Skeldon states that the exodus from rural areas to urban areas is a dilemma caused by urbanisation, which, in turn causes rural areas to become inactive and underdeveloped (Skeldon, 2003). Points of departure, like train stations and bus stops are especially susceptible to becoming inactive, and are often left dormant during the day. These departure points and thresholds act as obstructions in the energy networks of the settlements, as their functionality is limited, rather than functional. They are not public spaces that accommodate people and meet their daily needs. The challenge is to localise opportunities in these informal settlements and create points of public access to turn around the dormant state Mamelodi is left in each day. These public access points have been identified as already existing activity nodes along the activity spines of Mamelodi, where large numbers of people move through spaces that lack the necessary infrastructure to support livelihood activity (Skeldon, 2003).

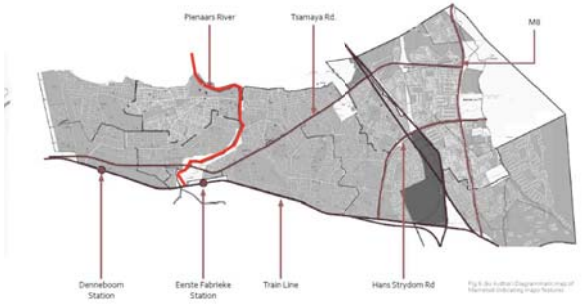


Fig 01-7
The Expansion of Mamelodi settlement

However, from the above mentioned contributing factors, it is evident that existing nodes in Mamelodi are dysfunctional and act as obstacles en route to Pretoria rather than thresholds the community can access through social engagement and production of precious goods. Access to these nodes in the settlement is important, for these nodes may lead to further development and transformation, contributing to Mamelodi's functional potential, to render it independent from external industries that draw energy out of the area on a daily basis.

One can thus conclude that Mamelodi has reached its limits in terms of available space through the rapid urban sprawl. Prospects of expanding and developing the city outwards is thus physically impossible. By accessing the existing activity nodes and generating functional spaces within Mamelodi, energy could be arrested in these nodes and development of the settlement could take place from within. This could be possible if the pendulum migration patterns are transformed by developing productive threshold nodes in these spaces of departure. Developing these nodes into accessible functional spaces could allow energy that would normally be lost to labour migration, to be anchored in the settlement.

Fig 01-8
Glass accumulation in Mamelodi

ARCHITECTURAL ISSUE

The field and literature research of Mamelodi identified places of departure as possible access points. It was based on the number of people passing through and the existing visible activity. In general, these access points take the form of train stations, bus stops and taxi ranks, which act as thresholds that filter people from Mamelodi to Pretoria, leaving behind idle pieces of land. It can be regarded idle, as it acts only as a gateway to other places, instead of being a functional active node in its own right. When these spaces of departure and people become idle, the terrain becomes a terrain of waste – it becomes a place of wasted potential, where the advancement of life prospects are wasted, and it becomes a place of wasted space, where space could have been used productively. (Wacquant, 2008). It is therefore proposed that these nodes of departure are developed into functional spaces that could act as anchors of energy in Mamelodi; thereby disrupting the chain of pendulum migration to other places.

Apart from wasted potential and wasted space, there is the accumulation of literal waste in these idle inactive landscapes, due to the high density of continuously moving feet that occur at intervals. Large amounts of waste were identified at points of departure and access nodes during field studies in Mamelodi. Waste management in the settlement of Mamelodi is evidently not effective enough, as rubbish is visible at various high activity areas. This could be due to the fact that waste is only collected by the municipality once a week (van Schalkwyk, 2013). This pick-up pattern is apparently not regular enough for the amount of waste that is generated on a weekly basis. Furthermore, the presence of waste in these areas where the only activity is associated with people leaving and arriving in public transport, contributes to making these places less desirable and less accessible.

The peripheries of cities have always been associated with waste and wasteland. Refuse areas have frequently been located at the outskirts of cities and the metaphor of 'wasteland' has been used to depict landscapes that are not used due to the amount of waste present. This phenomenon, however, is also clearly visible within spaces, such as departure points in peripheral settlements such as Mamelodi (Qviström 2008). Large amounts of waste prohibit people from using these spaces to their full potential, leaving them wasted, both in terms of use, and appearance.

There are attempts from organisations such as the Mamelodi Environmental Education Centre to improve the way waste is disposed of and managed in the settlement. The Mamelodi Environmental Educational Centre, in conjunction with the schools in the area runs the officially active recycling processes. The Mamelodi Environmental Education Centre and companies such as Mondi paper and Collect-a-can host these public participation events (van Schalkwyk, 2013). These recycling companies have a number of recycling bins distributed across Mamelodi's activity spines and lines of activities (van Schalkwyk, 2013). It is therefore evident that recycling in Mamelodi is active only in certain sectors of the settlement where external inputs are required to run such operations.

Why is glass not being collected?

Apart from the recycling efforts supported by the Mamelodi Environmental Education Centre, the Tshwane City Council has a waste management system that removes waste once a week. As discussed previously, this is not adequate given the copious amounts of overflow outside and next to the bins during the week. Most types of waste, such as cardboard, metal, organic waste and plastic are either reused by members of the community or incinerated. Glass, however, is difficult to deal with in informal settlements.
As glass cannot be incinerated or used in its original form, people do not know how to get rid of waste glass.

Important questions regarding glass as waste inevitably lead to an important point in this thesis, namely, the role of waste in creating dead space. These questions include:

Where does glass end up?
- in various heaps of glass bottles all over the settlement

Why does glass end up like this?
- the collection and removal of glass waste is inadequate

What is the consequence of this state of affairs?
- the accumulation of stagnant waste contributes to dead, dormant spaces

The current nodes of departure are inaccessible due to the lack of infrastructure and waste accumulation. If these nodes are developed and transformed into public spaces supported by architecture, these new public spaces could better accommodate public participation events, and improve functionality for use by people moving through the current nodes. If one sets out to access and develop these activity nodes by collecting and disposing of glass waste, these new spaces could become engaging public places, which house collection points for waste, production lines that process unwanted, unsafe and inactive waste, and distribution points for production, such as crafts inspired by waste. Functional public spaces could become accessible public places where members of the community contribute to, and engage with the production of functional, usable material from waste. Through architectural infrastructure and development, a place could be created which would encourage livelihood activities in Mamelodi, including glass collection, everyday market activities and glass processing.

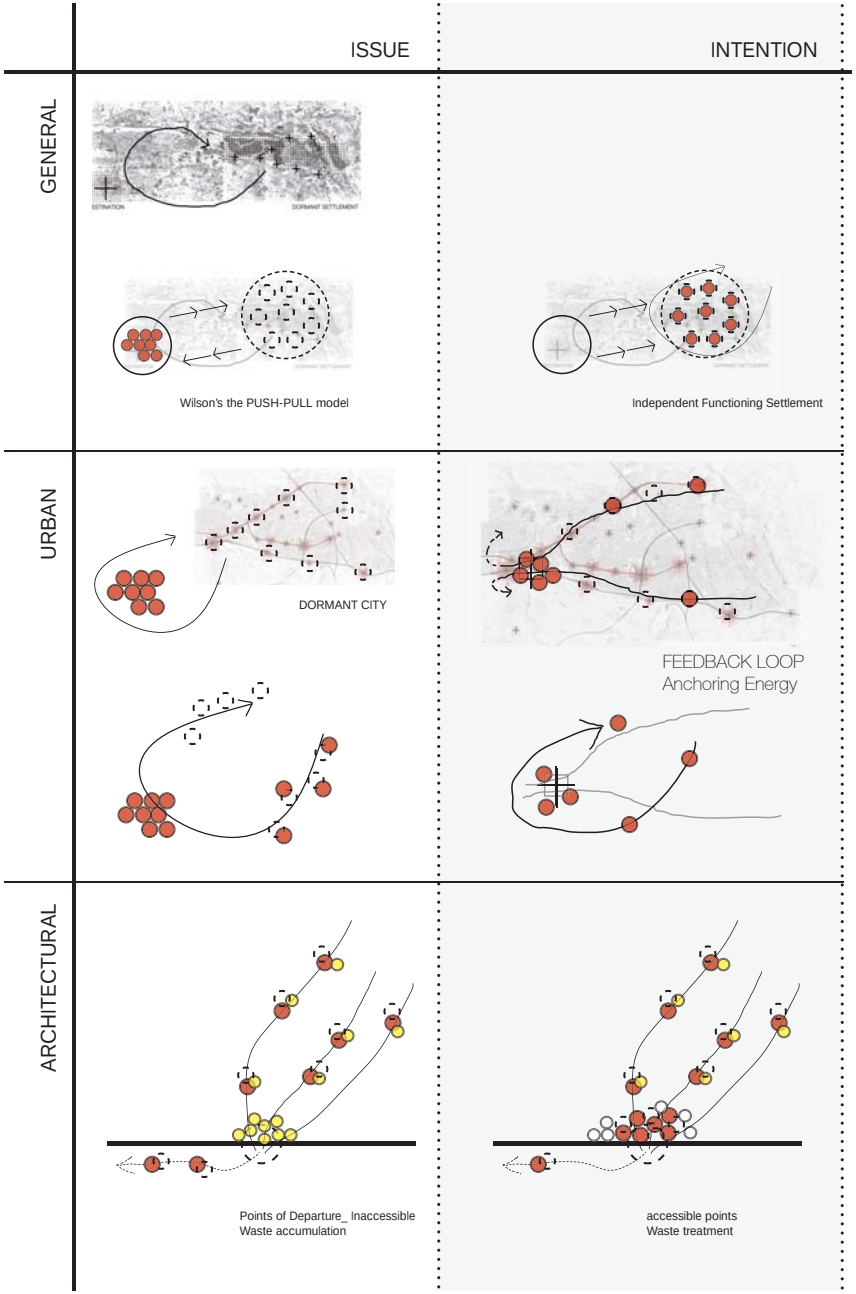


Fig 01-9 Explanation of issue and intention

Problem Statement formulated through the research conducted

Identification of ISSUE

a. Loss of energy in Mamelodi is directly related to the mass exodus of skilled people during the day because of the lack of infrastructure and opportunities within.

- The exodus of people from informal settlements to the city is associated with a search for meaningful employment
- The exodus of people from Mamelodi results in dormancy of the settlement, and inaccessible spaces

b. Apart from using the transport offered, thresholds of departure to the city are inaccessible due to waste accumulation. This absence of a functional place, and lack of infrastructure and space in the settlement contribute to the creation of a wasteland where waste accumulates and productive energy is lost.

Research Questions

These issues led to the formulation of the following research questions

- What is the role of an architectural design intervention that could facilitate access nodes of development within Mamelodi? How does architecture contribute to the place making and structuring of functional public places in currently dormant spaces that act as obstacles in the network of the existing fabric?

- What type of programme could address the waste issue and act as an activity generator that will facilitate accessibility to a functioning public space from within Mamelodi?

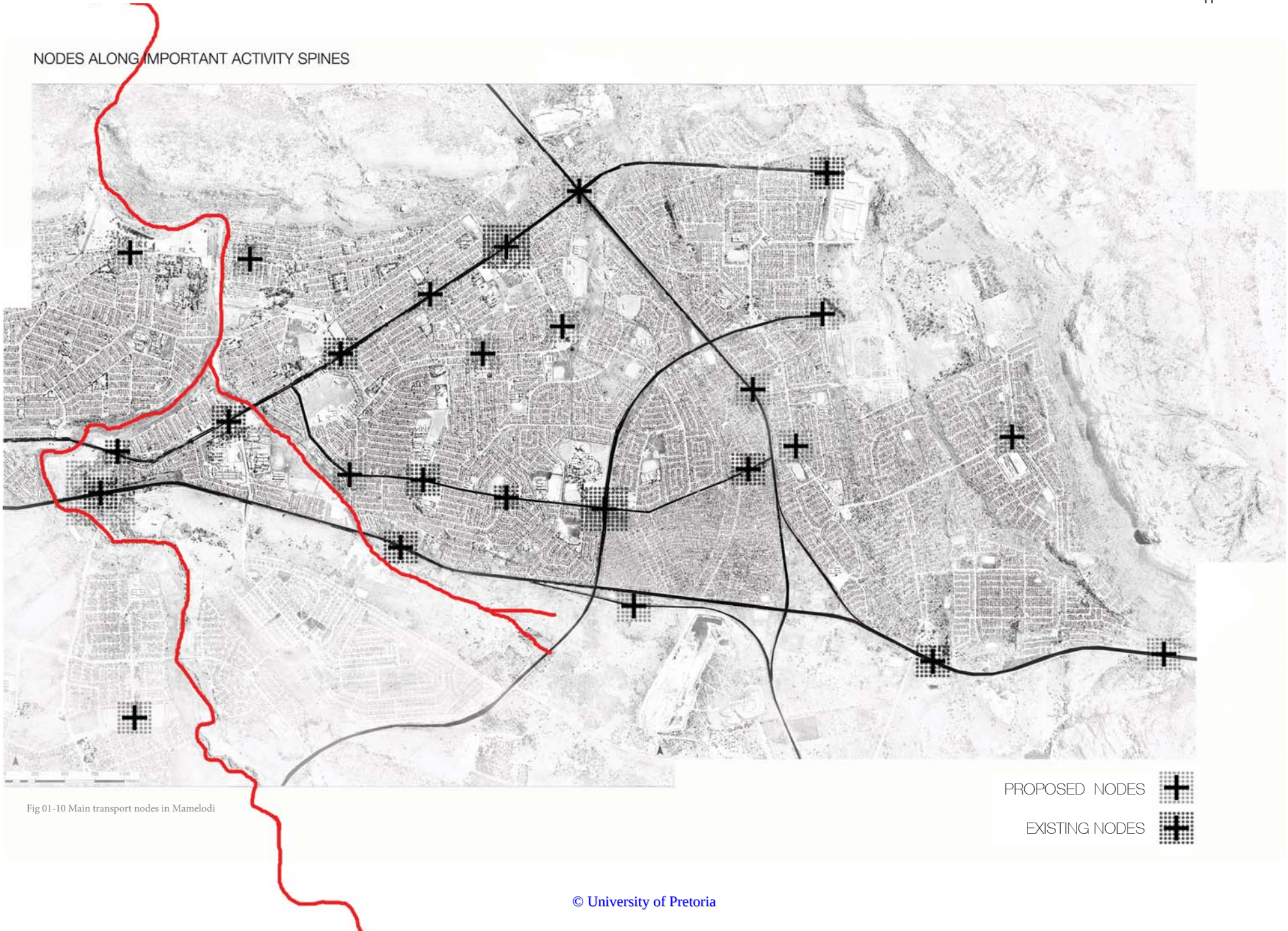


Fig 01-10 Main transport nodes in Mamelodi

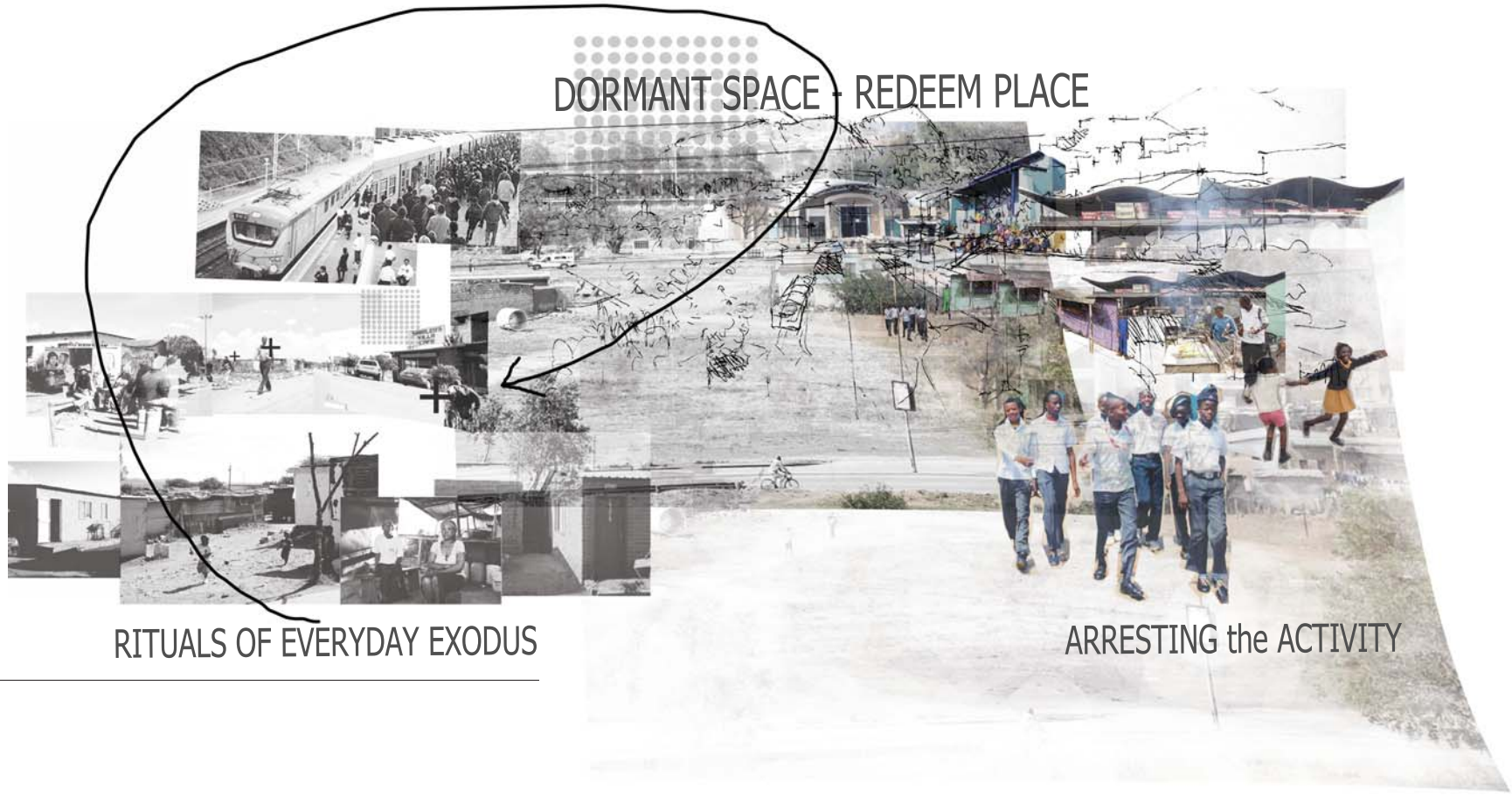


Fig 01-11 Project Vision

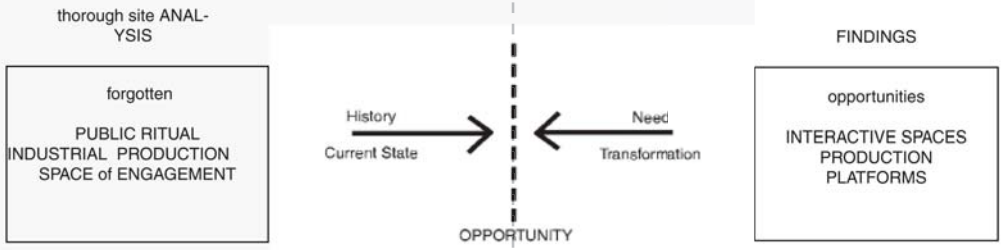
PROJECT INTENTION

The vision of special redemption for the greater Mamelodi is dependent on phases of change and transformation in the culture of pendulum migration to cities for opportunities. Transformation is possible through the development of access points within the community. These can be achieved by activating production in the public domain. Nodes could therefore become places of gathering, rather than remain idle landscapes. Investigations into Mamelodi have shown that given the context, any development in the informal settlement needs to take place from within the existing fabric, as there is so little infrastructure supporting active public spaces in this settlement.

Points of access along the activity spines could lead to a decrease of pressure on the urban fabric because of the influx of accessible energy and business to the area. The stagnant waste that contributes to the unused spaces in the settlement could create an opportunity for engagement when waste is processed and managed. This node could foster development in design and access to urban activities and fabric that are concerned with the reuse and processing of waste material (Gussow, 1971:27).

The proposed architectural intervention could create a public platform and access point through the processing of waste into re-usable products. This proposed public space would be developed in the nodes of departure identified earlier. Active participation from the community will be essential in establishing a functional social place in spaces previously lost to the community of Mamelodi due to dormancy and waste accumulation.
Spaces similar to the proposed intervention already exist in the context of South Africa. South African architect Piet Louw has designed various community projects that frame useful public spaces with a backdrop building which supports the space. One of the most well-known examples is the Khayelitsha Service Centre and Pay point. This building is a perfect example of architecture that responds to public issues and needs, and addresses the role of architecture in a city or informal community. The architecture aims to create a meaningful city space that adds value to the existing context by providing a certain service, which, in this case is the Service Centre and Pay Point. By creating a space that is framed by architecture, the possibility of using this building as an instrument of public place making is explored. Public space making is about defining public and private spaces through the process of interaction.

In the case of the Eerste Fabrieken Train Station, the availability of existing resources, such as waste glass could assist in identifying additional programmes to improve the functional public space. If materials such as glass are readily available, a programme incorporating these resources and acting as activity generator for the public space can be included. Such an initiative could also help solve the problem of dealing with waste glass that makes spaces inaccessible.
In summary, the intervention could contribute to the development of Mamelodi as an interdependent functional city by taking advantage of existing access points and transport thresholds that currently link the city.



OVERALL INTENTION

The general intention is to create opportunities and infrastructure within Mamelodi to ensure interdependent development between Mamelodi and the surrounding metropolitan area.

Urban Intention

Creating interdependent places of production within Mamelodi and closing the feedback loops in consumption, production and waste simultaneously constitutes the urban intention. Although this is the first priority, the intervention would still require the potential of external inputs and outputs to remain strong and efficient. By creating points of access through the architectural intervention, nodes could become stepping stones for production and livelihood (Capra, 2002:234).

Architectural Intention

The programmatic intention is to create a place of production where the economic capacity of waste - both cultural and material - can be realized; the created space could also provide a place for people to gather. This intervention will serve to guarantee safe, clean and accessible spaces for a functional social domain by managing waste responsibly.

- the programme would tie in with current networks and echo theories of emerging nodes of activity, ac cess and engagement
- it could join parts of the fabric by creating networks of engagement and points of access

The programme would serve to facilitate the happening of life in a site of production – in a public domain.

The language of architecture offered by architect Christopher Alexander is likely to accommodate the idea that users of a building could participate in the process activities of the building. In these spaces where users are able to contribute to a production process, there are co-authors or co-creators of the spaces that become significant through participation (Jones 2011).

The building itself should speak of modest yet interesting lines that rise above a mixture of formal and informal houses in the area of Eerste Fabrieken, Mamelodi. The architecture, along with existing structures and smaller objects, should illustrate the important role it would play in all aspects of public life. Collection points for glass drop-offs are meant to be visible and approachable; they should be the starting point of the transitional journey through the rest of the public space - merging with the production of glass processing. Spaces that frame the public space need to have an appropriate scale to allow the public easy approach and access. The construction methods and materials are to be sourced locally and should be familiar to the people that are going to move through these spaces. As this is a public space, materials should be robust. Thresholds are defined by light-filled spaces that comprise a layered portico, which acts as a gathering and rec reational space. The existing station acts as a link between the social courtyard and the industrial spaces to the west. The industrial space is currently made inaccessible by a layer of offices that service the station and the industrial area.

"The buildings are driven by the realisation that where there is no significant informing context, it becomes necessary to create one, to plant seeds that can become the beginnings of the public places, through the placement of the architectural elements."
(T. Deckler; A. Graupner; H. Rasmuss. 2008:77)

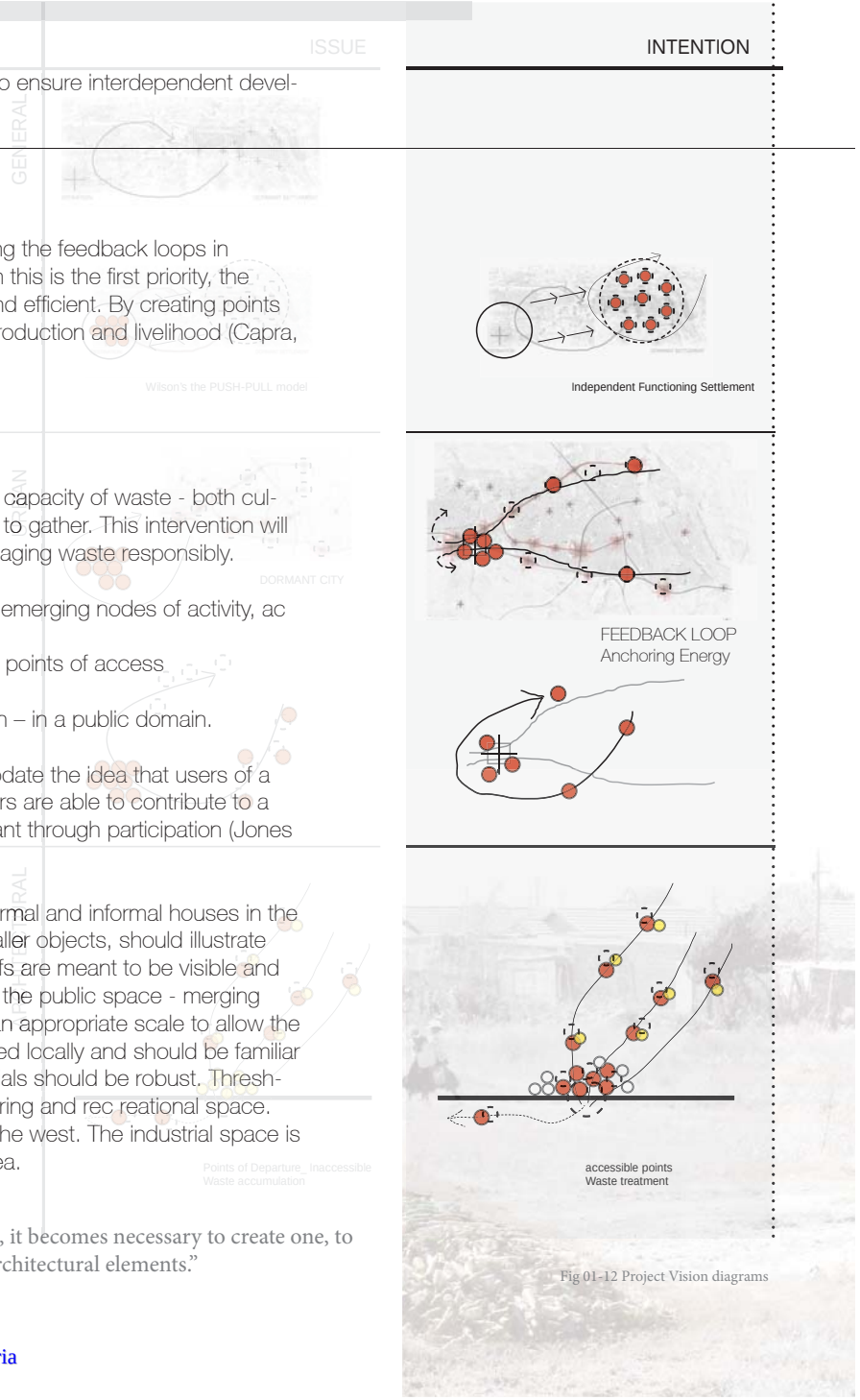


Fig 01-12 Project Vision diagrams

RESEARCH METHODOLOGY

Type of research strategies applied in this thesis:

- Historical Research
- Archival Analysis
- Experimental Analysis

Data Collection

OBSERVATION and PHYSICAL SURVEYS

1.Site visits to Mamelodi
- Photographs
- Artefacts and interviews
- Field notes
- Interviews
- Journal Sketches

SITE SELECTION

Before identifying a specific site, it was necessary to identify certain existing opportunities and networks that are present in Mamelodi. The development of these existing nodes through the creation and activation of these access points from within the area, present potential solutions that could awaken the current dormant state of the settlement.

These opportunities were identified by investigating existing nodal points and their characteristics, which would enable the comparison of nodes and translate their functionality and development potential. Identified nodes with the potential of further infrastructure and public space (for engagement) development, will be the focus points of the site selection choices. These nodes were identified as spaces where there is potential to open up access to functional public spaces from within the existing fabric. The notion of providing access to existing nodes is important, for it may lead to the development of functional spaces and opportunities to engage the community in productive activity that will eventually improve the settlement's interdependence. If potential in these access nodes are unlocked, a currently dormant settlement could develop into an interdependent facet of a functional city.

Context analysis and field research has found that the activation and expansion of access points would be necessary on a smaller scale node and axial development. As explained by Capra, an urban landscape like Mamelodi is a living network of people and places. A living network functions quite differently from a static place. It is a network of processes that actually continuously build the parts. The parts of the cell in this network do not come from a place outside the cell; they are created by the cell itself. And when Capra refers to parts, he refers to all the structures and infrastructure already existing (Capra, 2002). This smaller scale type of development is already visible in the informal trade nodes of Mamelodi's streets and is successful because it does not directly oppose the functioning networks that are already in place. The activation of these nodes would allow for the development of the existing fabric and create opportunities for sites to become productive spaces. More importantly, these dormant spaces could become public domains of social engagement and interaction. Thus, in a sense, these nodes would become nodes of livelihood where everyday ritual is possible in the public realm (Hamdi, 2011).

The proposed site needed to be a place where livelihood and production could co-exist. The link between this public domain and livelihood could be better understood if one starts to compare the newly proposed intervention to that of the ancient Greek agoras. The agora was the centre of commercial, political and public life in cities like Athens. It was a large open area surrounded by buildings with various functions. The agora was utilised for political, religious and military activity, as well as commerce. In this case therefore, the proposed site needed to be an active site with a constant flow of people that would contribute to the drop-off of waste glass. The site also needed to be historically productive, with space available to accommodate social interaction and light industrial activity.

List of Design informants

- Theory
  Creates an understanding of the problem and possible solutions that are applicable in the situation
- Site and Urban Morphology: how things changed, what is currently on site
- Access to public space generated by production and multi-functionality
- Ownership and participation through social cohesion

THEORETICAL DISCOURSE 2

PENDULUM MIGRATION: PAUSE, REFLECT and EFFECT

The dissertation will investigate the role architectural design interventions could have in generating development in access nodes that are currently non-functional, in other words, stagnant spaces in the settlement of Mamelodi that only serve as nodes of departure.

It will investigate whether adding structure and infrastructure to a dormant space would aid in creating

1. a functional public place, (which would generate)

2. opportunities for community members.

Fig 02-1 Networks, nodes and people

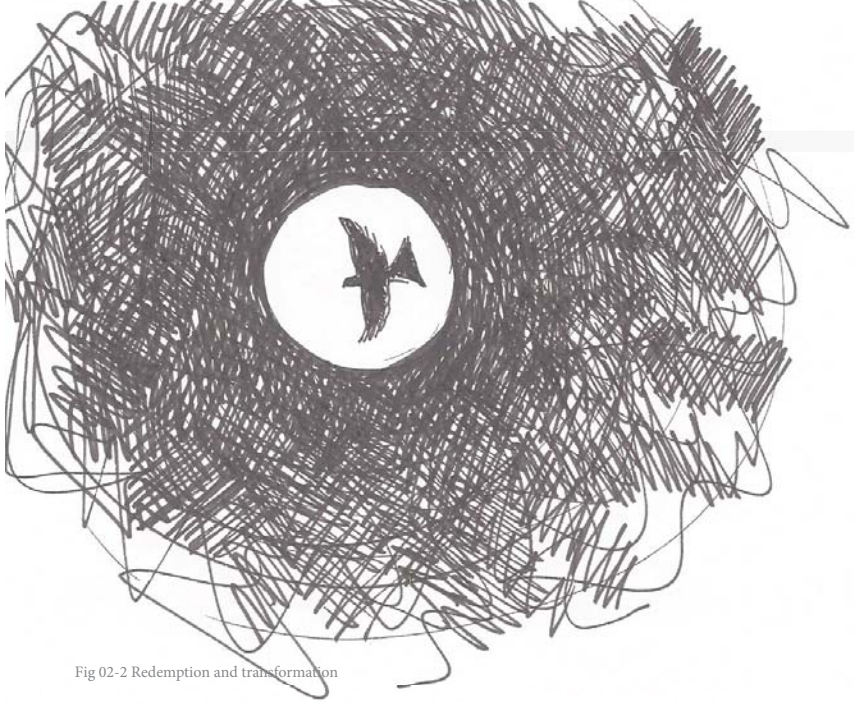


Fig 02-2 Redemption and transformation

PLACE and PLACEMAKING

In this section one of the main aims is to identify the various ways in which spaces are experienced, forgotten about and possibly revived.

It will be helpful to keep the introductory chapter in mind when reading this section. The introduction explained:

- The concept of pendulum migration;
- The reason for/cause of pendulum migration; and
- The tension created by pendulum migration.

The following section will highlight theories concerning the value of architectural interventions in developing settlements that are negatively affected by pendulum migration.

The relationship between space and place are investigated in order to demonstrate the concepts of experience and ideas around place making. In addition to the spatial relationship, a critical position on the research ideas will be formulated around the relationship between people and the spaces they move through. The data collection and analysis will assist in the construction of an argument which will lead to the exposition of this dissertation.

Two matters that are highlighted in the theory section include:

- Deductions made by researchers concerning the value of architectural interventions in the development of informal settlements.
- Presumptions investigated concerning linking light industrial production to the public realm.

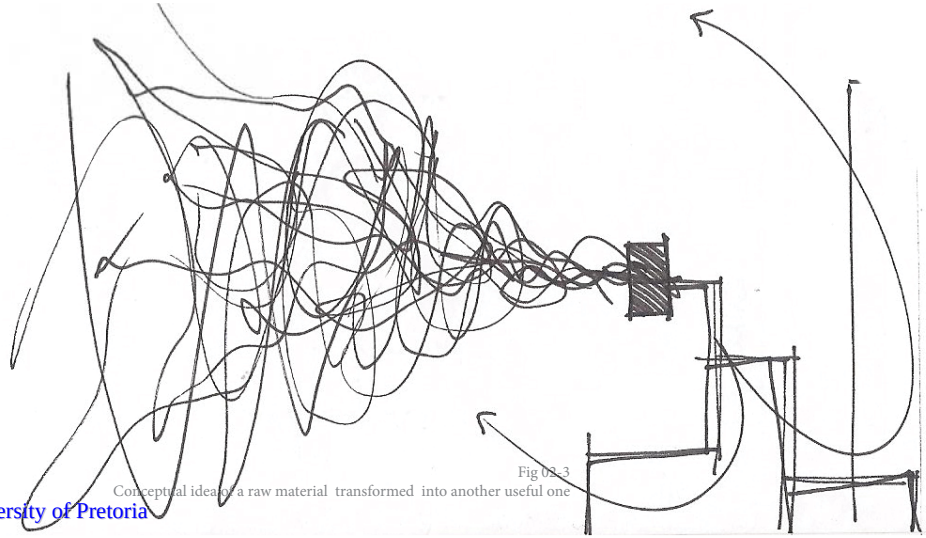


Fig 02-3
Conceptual idea of a raw material transformed into another useful one

Matore (1962: 22-23) writes:" We do not grasp space only by our senses.... we live in it, we project our personality into it, we are tied to it by emotional bonds; space is not just perceived..... it is lived."

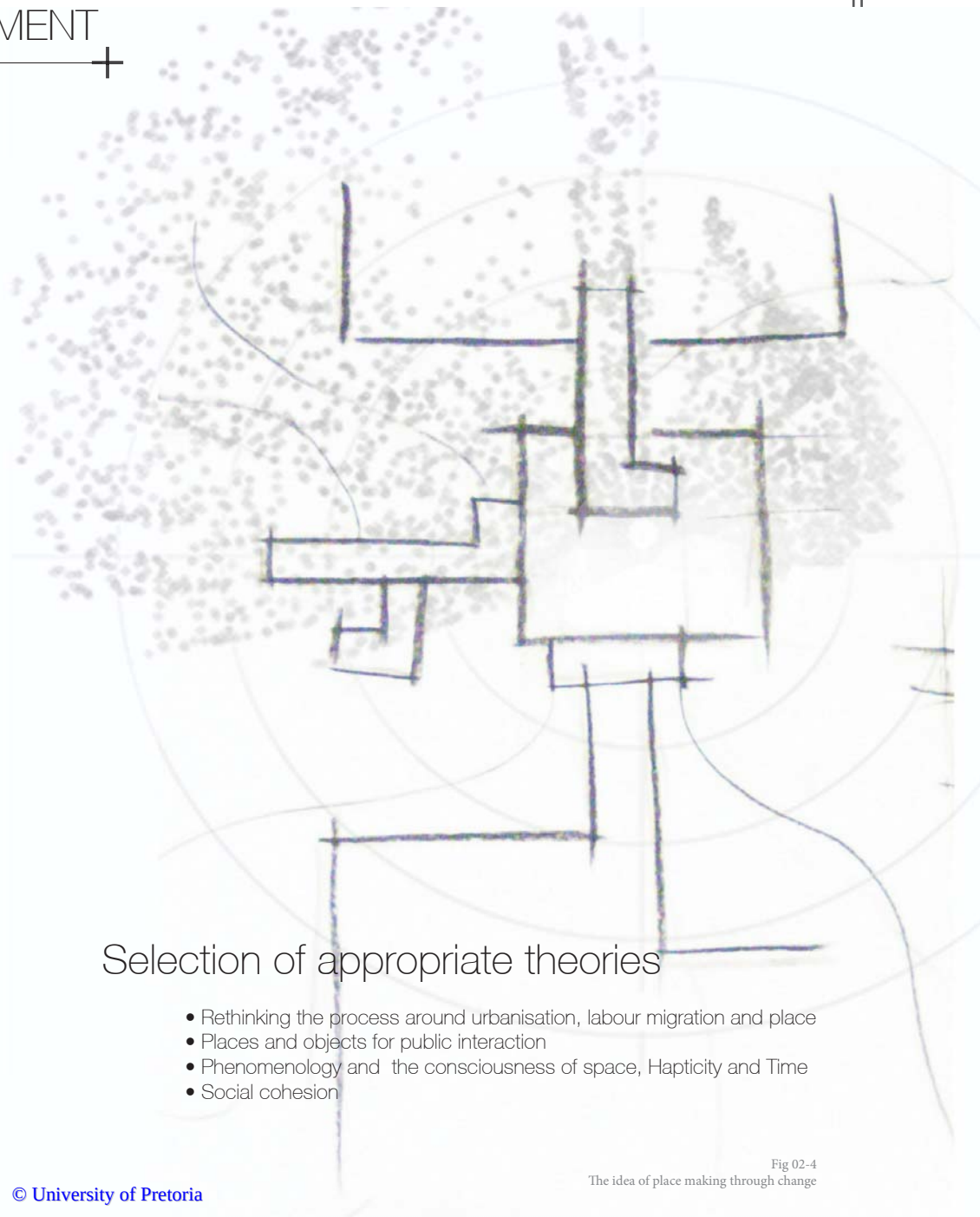
THEORETICAL ARGUEMENT

Although we live and orientate ourselves in a world made up of diverse spaces, we still seem to struggle to understand significant places and our experience of them. When such places begin to form the basis of people's existence, security and identity, we have to maintain these significant places as a priority so they do not become lost and redundant to people (Relph, 1976).

This section will examine the definition of place, the relationship of people and places, and the qualities places have to offer people. The different ways in which our experiences and consciousness of the spaces around us create places are also investigated; these are proposed as intervention for the Eerste Fabrieken Precinct in Mamelodi. The proposed intervention is intended to become a significant, functional space which is easier to understand and experience.

A place like the Eerste Fabrieken train station in Mamelodi is a monofunctional space which only serves as a threshold and gateway out of the settlement. Because of the constant flow of people through the train station, the place loses its significance in terms of experience and multifunction. It is therefore necessary to investigate the option of adding functional activities to a site like a train station. With this in mind, it is proposed that public interactive spaces are developed around the station to encourage public participation and improve people's quality of life. Furthermore, it is speculated that public spaces need a generator of activity to aid in the regeneration of space(s).

The generator should involve the direct participation of the community (Relph, 1976:128). Such participation could be the starting point in the process of production. Functional public spaces could be framed by an architectural intervention to mediate activity and anchor energy in spaces left dormant due to pendulum migration and historic progress. Development in these spaces could facilitate the creation of infrastructure to aid existing networks and deal with available resources (Capra, 2002:234). Spaces that are transformed and redeemed into functional public domains could serve to discourage people from travelling to the city centre everyday in search of better opportunities and spaces. Jacob Blak states that it is in our common interest to create settlements and cities where the key objective is to improve quality of life. This proposed intervention, including the building of appropriate structures is an opportunity to make the settlement an attractive place to live and work in (Blak, 2013).



Selection of appropriate theories

- Rethinking the process around urbanisation, labour migration and place
- Places and objects for public interaction
- Phenomenology and the consciousness of space, Hapticity and Time
- Social cohesion

Fig 02-4
The idea of place making through change

At the AZA (Architecture ZA) conference in Cape Town in 2012, the ideas of places and objects for public interaction were discussed. The theme focussed on "re-scripting architecture" and the potential we have to make small contributions that will eventually build upon each other to create significant changes. To understand what is needed in these social spaces, the phenomenological study of the intricate relationships that are created when human beings interact with inanimate forms and productive landscapes is discussed briefly. To understand this better, one can think of a sculpture that embodies its own sense of being; when a human interacts with it, life is transferred to the sculpture.

"The catalyst that converts any physical location into place is the process of experiencing deeply. A place is a piece of the whole environment that has been claimed by feelings"
Gussow (1971: 27)

Designing a place for people in a specific space

The lack of understanding people's need for space can be an obstacle for designers to create a better urban place, a place where social life can be stimulated. David Brower in Gussow's book states that loss of attachment, activity and decline in the ability to make a place authentic, represents a lack of experience. He suggests that the redevelopment of such attachment and ability to experience space is essential if we want to create environments that do not have to be ignored (Brower, 1971:15). Jacob Blak mentions that it is of utmost importance that we create public spaces for people to meet and socialise in. He believes that public spaces that are good for people are places where people are safe; where people can walk, stand, sit and feel comfortable (Blak, 2013).

Jan Gehl, a Danish architect, has written about the activities and feeling of public spaces in his publication, Life Between Buildings (Gehl, 1987; Therakomen, 2011). He divides outdoor activities in public spaces into three categories, namely necessary activities, optional activities, and social activities. According to Jan Gehl, a social activity takes place every time two people are together in the same space. To see and hear one another is in itself a form of contact and social interaction. The actual meeting where one is merely present, constitutes the seed for more comprehensive forms of social activity. This connection is important in relation to the physical planning of a place. Although the physical framework does not have a direct influence on the quality, content, and intensity of social contacts, architects and planners can affect the possibilities for meeting, seeing, and hearing people (Therakomen, 2011).

Together with this, the possibilities of redeeming and preserving people's sense of place do not only lie in the maintenance of the old space. Although human activity is becoming more dispersed in settlements like Mamelodi, one could counteract placelessness by restructuring the occupied spaces with catalysts and access points. The success, significance and authenticity of a place lie in its modification, which is based on the requirements of the space it occupies (Vycinas, 1961). It is therefore important to understand the requirements of a specific site like Eerste Fabrieken. The key is to fight apathy. Instead of trying to rewrite architecture, we need to listen more, speak less about abstract futures, and talk through our actions. We need to find solutions that stand firm in reality – a rooted presence

Social Cohesion

Architecture as a vector of social cohesion will be investigated in this section of the theory. Good practices will be discussed, including those that demonstrate the impact of public architecture processes and projects on cohesion.

The relationship between community and place is indeed a very powerful one in which each strengthens the characteristics of the other's values and involvement. Communal activities bring together the families of a place. These communal activities could take place in public spaces, buildings, streets or even spaces that provide water. People who live in a settlement like Mamelodi share a place regardless of the separation inherent in a place characterised by diversity. People are their place and place is its people. Within this context places are 'public'. These types of places are created naturally and are known through common experiences and involvement. A place is a centre of action and intention, it is "a focus where we experience the meaningful events of our existence together" (Norberg-Schultz, 1971:19). It is important therefore that spaces for social cohesion are made available in a settlement like Mamelodi. Such spaces should be easily accessible; frequent use of spaces like these will make them successful in terms of people's experiences. One way to ensure frequent use is to develop an area in a space that already accommodates large numbers of people moving through.

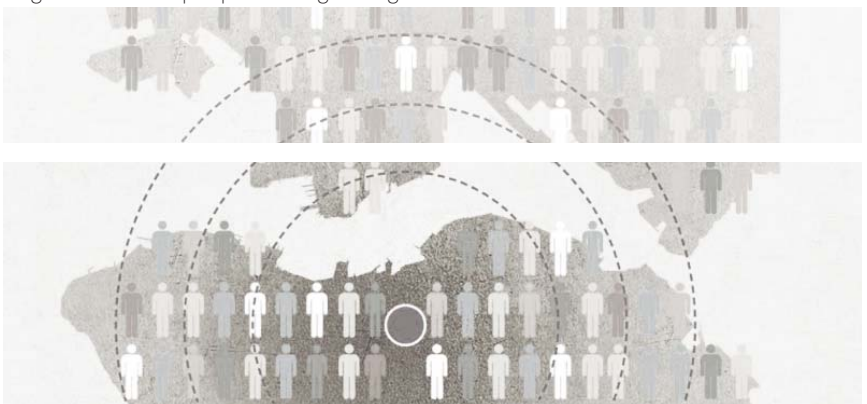


Fig 02-5
Graphic explaining social cohesion

Rethinking the process around urbanization, labour migration and place

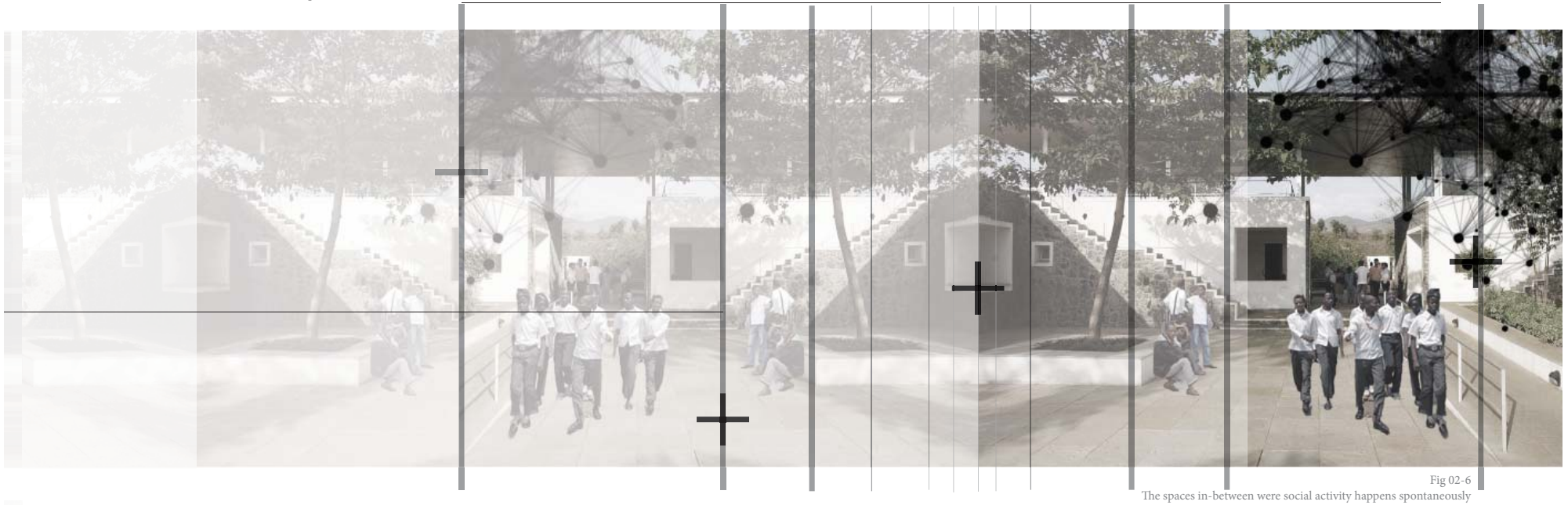


Fig 02-6
The spaces in-between were social activity happens spontaneously

David Brower writes that "the place we have roots in and the flavour of their light and sound feel right when things are right in those places, but it is perhaps possible to provide conditions that will allow roots and care for places to develop."

This line of thought concerning the creation of spaces and thresholds was adopted by the Indian architect and town planner Rahul Mehrotra in 2011 and centres around revaluating problems created by the rapid expansion of informal cities and labour migration. Briefly, this theory gives meaning as well as recognition to informal settlements and communities by creating spaces that cross social boundaries. In practice, this is achieved by softening thresholds to create in-between spaces, thus supporting unexpected social interaction in spaces where interaction may otherwise have remained absent.

This approach suggests possible solutions to problems of (social) engagement. It is a collective approach, inspired by needs on the outside, such as social engagement, as opposed to introspective activities experienced at home and at work (Mehrotra, 2011).

Most of Mehortra's work is focused on the consequence of the rapid urbanisation in India – something which is evident in Mamelodi as well. He argues that since the building environment directly affects the citizens' lives, space needs to be created to cater for spontaneous social interaction between these active social spaces. RMA Architects (of which Mehrotra is the founder) aim to rethink the global idea of living space and living in spaces. According to Mehrotra, rapidly growing cities extend themselves, while the liveable spaces are rapidly decreasing. An example of where this theory was applied is the "Magic Bus" project in Panvel, Mumbai, India. This project was completed in 2007 and hosts the campus of the Mumbai-based NGO, Magic Bus. In order to create a place with a sense of familiarity, the palette of the buildings includes materials that are typically used for buildings in slums and squatter settlements, where most of the participating children live. The building has also become an example of new ways in which ordinary materials can be used in construction. This building was intended to become a point of reference to the surrounding area.

It is important to consider this line of thought in the project proposal for the Eerste Fabrieken intervention in Mamelodi. The same kind of threshold space which could generate social activity around the station is needed to transform the lost space into something people can use.

Places have histories and memories attached to them concerning events and previous happenings. An approach to deal with memory of place is explored in Pallasmaa's Hapacity and Time (2008). He explains that our buildings have lost their opacity and depth, sensory invitation and discovery, mystery and shadow. This is relevant in understanding the history of the site of Eerste Fabrieken concerning production and falling infrastructure. Surfaces have a richly complex language of their own that evolves and changes over time.

Time is naturally a part of our understanding of places, for these experiences are often bound up with flux or continuity of change. Places themselves are expressions of past experiences and actions and of expectations for the future. The essence of place, however, neither lies in timelessness, nor in its permanence over time; the essence is simply its contribution to the experience of place as it is now.

An architectural response and its outcome is merely the result of a specific context. This relates to the social structures, local climate, weather and current activities associated with the context. This dissertation explores the architecture of new space; a derivative of existing spaces. This means that the existing context is altered and given a new character.

The purpose of the new space created through the architectural intervention, is to become the thresholds between Mamelodi, the station of departure, and a line of production happening in the background. This in-between architecture defines the public space and a new place of interaction (Venturi, 1967: 89). The architectural space facilitates circulation and public activity, and becomes a threshold between the public space and the spaces of process and production. This presents a new quality to the previously desolate lost space and forgotten industry.

Apart from the physical spaces the intervention defines, it also becomes a zone of transition between the past, the current and the future, not only in the sense of site and time, but also in function and requirements. It becomes important that the structure displays the thought of function; function then becomes representative also in the form of the intervention. It allows the architectural theory to become material – and so space is defined. For this reason, it is important for space to require this type of architecture so that the theory becomes the kind of space with the potential for interaction and experience (Norberg-Schulz, 1979: 18).

Ultimately, the intervention aims to create a place with different layers, tiered according to the functions it is required to perform. According to this vision, the public space exists in the foreground, while the activity generator functions and runs along the borders of the public spaces. A set of layers and phases defines the hierarchy of spaces, highlighting the importance of functional public space.

> ''The existential purpose of building or architecture is therefore to make a site become a place that is to uncover the meanings potentially present in the given environment.'' (Norberg-Schulz, 1979: 18).

Key words

Redemption
Change
Transition
Patterns and networks
Points of access and a collection point for waste
- built up of energy and engagement
Reconnecting to forgotten histories

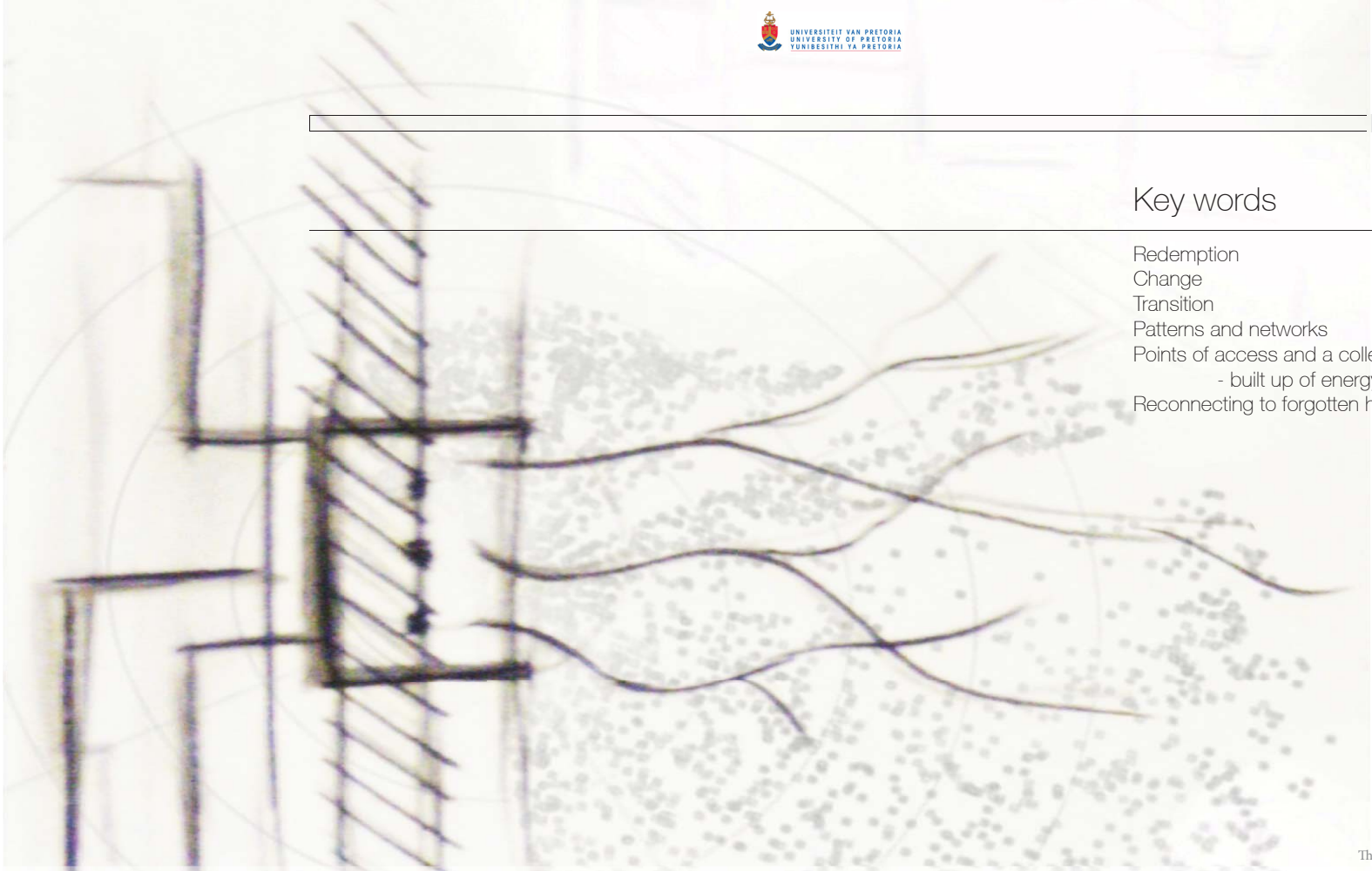


Fig 02-7
The idea of place making through change

Response to Issue

The dissertation is an attempt to manifest the theory concerning the effects of pendulum labour migration and investigate options that could reverse the negative effects this has on an informal settlement.

In general, the proposed intervention would contribute to the development of Mamelodi as an interdependent, functional city by taking advantage of existing activity nodes. By making these nodes socially accessible and not just idle transport departure points that currently link the city centre and assist in leading the energy out of Mamelodi, these nodes could become active, functional spaces. These active, functional spaces refer to places where production processes are used as generators of activity in public places. The available resources Mamelodi has to offer would also be a factor in determining the intervention. Availability refers to the natural convergence of people, little or no infrastructure, history of public functioning spaces in Mamelodi, natural informal trade as indicator of activity, and material on site. This will be discussed under the accumulation of waste in spaces that have the potential to be accessible (Bunschoteni, 2001; Mansell, 1985).

Furthermore, the exploration of creating feedback loops of materials (production, consumption, and waste) back into Mamelodi, making use of daily migrants and available waste resources would be attempts to establish grounds for the production of comfortable and appealing public places. By involving the community in engaging with the programme, the integration of production into an accessible public space can be achieved (Hamdi, 2004).

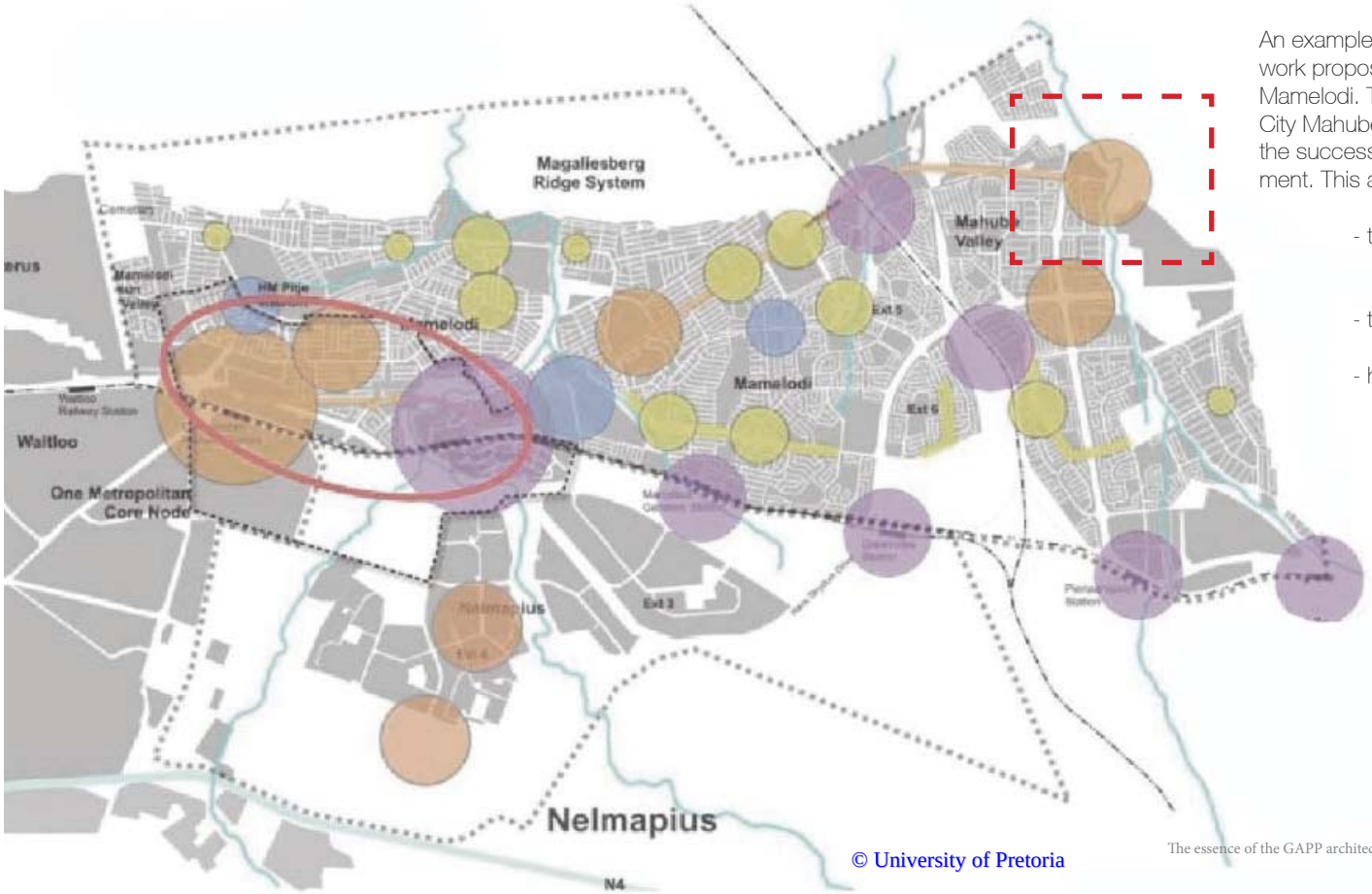
Practical literature review and research of suggested Frameworks

GAPP architects and urban designers framework:

The GAPP framework proposal for Mamelodi and Nelmapius identifies nodes along the same activity spines identified in the field research of the settlement. These key spines of activity were identified as Tsamaya Road and the railway line.

The placing of nodes along the spines are based on the amount of activity that takes place at a point and as presented by the framework many nodes are identified as possible points of access. A true understanding of a node in these literature reviews could be restricted and general. There are limitations in these reviews as their identification of where the nodes should be is based purely on the number of people moving through. There is a lack of understanding what these nodes should become in relation to the existing immediate surroundings and in terms of historic significance (GAPP, 2011).

The question arises as to how one would translate the identified nodes into spaces of access and architecture. In other words, how does one translate urban principles into architecture?



An example of nodal development according to a framework proposal was identified in the north-eastern part of Mamelodi. The example is the development of the Max City Mahube mall. This example allows one to question the success of a certain approach to nodal development. This approach allowed me to question:

- the appropriateness of where it is placed, as it is removed from the centre
- the way it encourages sprawl
- how it became such an isolated development

Fig 02-8
The essence of the GAPP architects and urban planners framework for nodal development in Mamelodi

Clarification of the Project Intent

Architecture as threshold and catalyst for experience and interaction

Is this type of nodal development on the edge of the settlement a functional point of access in the community? As observed from the field research, this type of development is not as successful as it could be otherwise. The effect of this mall on the surrounding area is one of great concern. It was built on the edge of the settlement in the east of Mamelodi where most of the structures comprise informal houses. A rapid sprawl of informal settlements started popping up around the mall. The negative effect on the existing fabric of the settlement centre is clear, as lots of the energy and activity has drained away from the settlement to the periphery. The development on the rim of the settlement has increased sprawl. It has forced people to travel distances they cannot afford, both in terms of time and money. It is often difficult to link the issues and process mentioned in urban theories to the day-to-day problems (Hamdi, 2004). Existing networks are often overseen and forgotten in the planning of development.

From investigating the context of Mamelodi, it is proposed that any development in the informal settlement needs to happen from within the existing fabric, as there is infrastructure, albeit little, which supports active public spaces in this settlement (where geographical limits have been reached). This type of development is already visible in Mamelodi on a small scale and is successful because it does not directly oppose the functioning networks that are already in place. As seen from the practical examples all around Mamelodi, these types of nodes and axial developments should be either lighter industrial developments along the railway, or finer grain developments along the streets – this is referred to as the microenterprise sector. The activation of these nodes would allow for site production that forms part of the public domain. Thus, in a sense, these nodes would become nodes of livelihood where everyday ritual is possible in the public realm (Capra, 2002).

It is notable that this nodal development is driven by the needs of the people and is known as the informal microenterprise sector. Within the African context, this type of sector is considered to be the most important employer. Studies have shown that it could provide 70-80 per cent of the urban work force. Therefore, any development should respond in a sensitive manner to this sector, and allow it to develop and sustain itself for the long term (Haan, 2006).

The architecture of redemption and change within an existing fabric is what is required. The current conditions allow for transformation and transition on an urban scale as well as on an architectural scale (Hamdi, 2004). A change in urban structure is necessary for migrant labourers who leave the settlement to interact with their environment. These nodes of departure need to become thresholds that anchor energy instead of releasing it to other cities. These nodes need to be spaces that pause movement and encourage interaction with the efforts of cleaning up wasted space. Events and actions are only significant in the context of certain places, and are coloured and influenced by the character of those spaces even as they contribute to that character (Relph, 1976:158).

Hamdi (2004) discusses the importance of supporting existing networks in a settlement. He refers to the networks of sub-centre that were set up in a city. These new sub-centres of waste collection and sorting helped in launching impressive networks that improved the lives and working conditions of waste pickers and at the same time contributed in cleaning up the city in an environmentally friendly manner. This relationship that exists between the already existing waste pickers and networks, and the new interventions of sub-centres has affected the community positively and contributed to a better quality of life (Hamdi, 2004). Waste is a collective produce, something that links people across economic, political, and social divides. What is needed in an intervention like this is a radical exposure to public waste management and a public interface for proper participation. People become aware of places they move through by developing a consciousness of space, activity and situation. It is therefore proposed that the existing train station becomes a place people are able to move through freely and where people can contribute by cleaning up, thus helping to transform lost unused spaces.

The proposed intervention needs to create a sense of familiarity in terms of aesthetic and a connection to the existing network and context. To this end, the selection of materials should be comprised of ordinary materials, typically used to put up buildings in the settlement of Mamelodi. The space will be used as a staging ground or experiment to readdress some of these architectural issues, including the use of ordinary materials, taking into account people's views, and ways of utilising these materials to their full potential.

Fig 02-9
Informal microenterprise sector

CONTEXT ANALYSIS 3

MAMELODI

After investigating the effect that daily pendulum migration has on informal settlements in South Africa and the City of Tshwane Metropolitan Municipality, the Mamelodi township was identified as an appropriate example where this motion can be observed. This township developed from the concept of influx controlled labour that was enforced by the previous administrative government. There are two apparent causal factors to the general, urban and architectural issues that can be observed in Mamelodi; the historic context and secondly the rapid population growth.

Fig 03-1 Mamelodi and the greater Tshwane

Mamelodi is a settlement situated on the eastern edge of the Tshwane district. Originally, it used to be a farm called Vlakfontein that was later subdivided into 3 divisions in 1870. In 1883, Eerste Fabrieken was opened to the south of Vlakfontein, which created many job opportunities, thus causing an influx of people into the area. In 1945, the Pretoria City Council bought part 2 and 3 of Vlakfontein farm and designed a native housing scheme. The initial purpose of the housing scheme was to formalise the infrastructure yet try to minimise the loss of socio-cultural authenticity. This infrastructure provided a potential framework for the settlement to grow. Numbers in the area started to increase drastically and grew from 6000, in 1954, to 50 000, in 1960. With a population in excess of 50 000, the Mamelodi Township could be considered to be a city as early as 1962. Its current condition is very directly influenced by the political context in which it was first conceived. (Potgieter, 2002)

It is only in 1962 that the settlement was renamed Mamelodi. The name “Mamelodi” means “mother of melodies” and was derived from the name given to President Paul Kruger (the first president of the Transvaal) by the native African population due to his unusual ability to whistle and imitate birds.

Since then, Mamelodi has expanded to such a degree that it has reached its borders on the south, east and north. The borders are physical constraints namely the Magaliesberg ridges that prohibit further growth from the east and north, while the railway limits the southern parts. Even with the physical constraints, population still seems to be growing in numbers, which consequently adds pressure to the urban fabric of Mamelodi. This then leads to the exploration of physical, cultural, social and historic attributes the context has to offer.

General Urban Intention

Mamelodi is currently a settlement of dormancy due to the great number of skilled labourers that leave the settlement daily (GAPP, 2011). The aim is to create interdependent productive places in the currently dormant space of Mamelodi and close the feedback loops in consumption, production and waste simultaneously. By creating points of access through the architectural intervention, nodes could become stepping stones for production and livelihood.

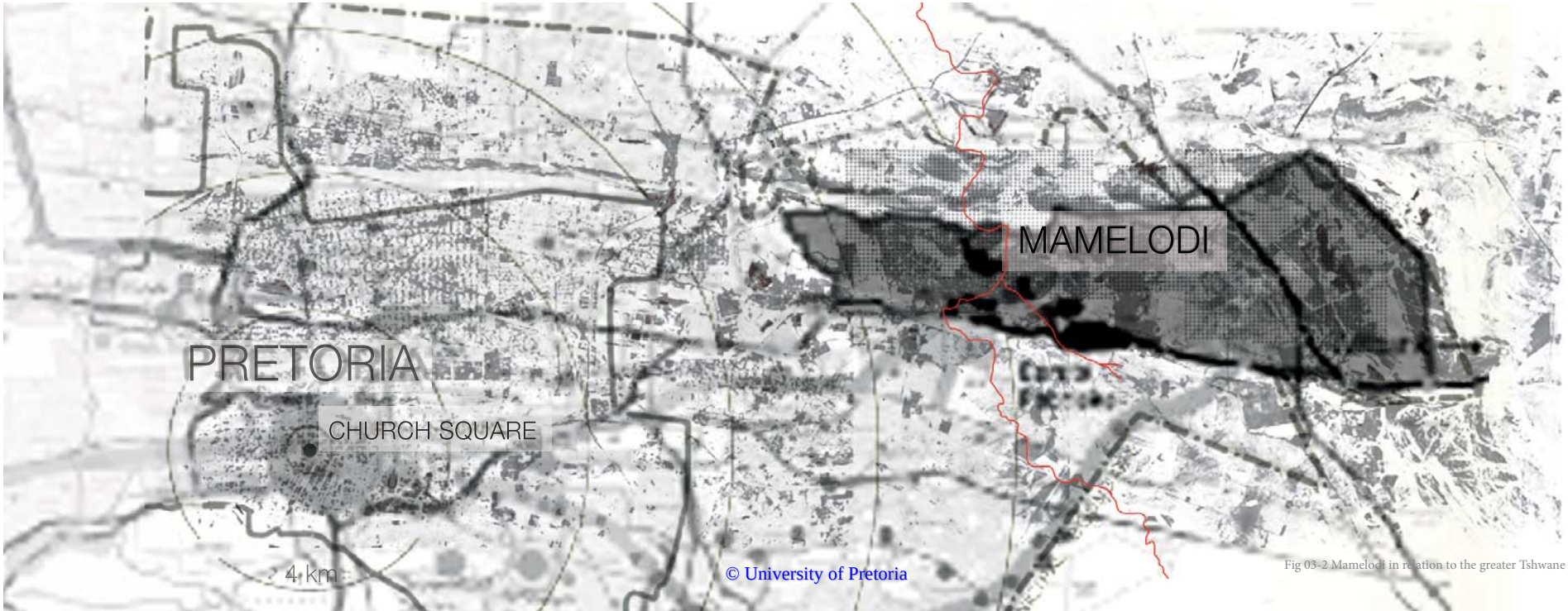


Fig 03-2 Mamelodi in relation to the greater Tshwane

MAMELODI Urban Analysis

Historical Relevance

Mamelodi was originally designed as a housing scheme with infrastructure that would support activity in the settlement. This infrastructure provided a potential framework for the settlement to grow. One of the major infrastructures that supported the township was the Eerste Fabrieken factory that was established in 1883. The creation of job opportunities caused an influx of people to Mamelodi. Since then the settlement has grown rapidly. This rapid growth has resulted in pressures on urban fabric as infrastructure in the settlement is both under immense pressure and too little for the number of people (Potgieter, 2002). Industry in the area has also died down to isolated pockets of productive activity.

Fig 03-3 The history of Mamelodi as a housing scheme

Regions in the Area

Today Mamelodi is a town of mixed development, some rural dwellers and a variety of urban spaces that are richly layered with people from all around South Africa and other African countries. Existing and vibrant social spaces are scattered all around the settlement. Tarred roads and gravel roads make up the main major roads and together with the railway tracks make up the key connection spines of the settlement. This briefly explains the context of Mamelodi and refers back to the theory Norberg-Schultz discusses when he says that dwelling means belonging to a concrete place. From this concrete place, future architectural interventions can take place. (Norberg-Schultz, 1979)

Mamelodi is separated by the Pienaars River which divides the settlement into an Eastern and Western side. The Western side is where Mamelodi was originally established. Mamelodi started to grow at a rapid pace, and sprawl is evident to the east of the settlement. The Railway track acts as the southern border of Mamelodi. Just sout of the railway line is the Nelmapius housing extension. Waltloo industrial park borders Mamelodi to the south west.

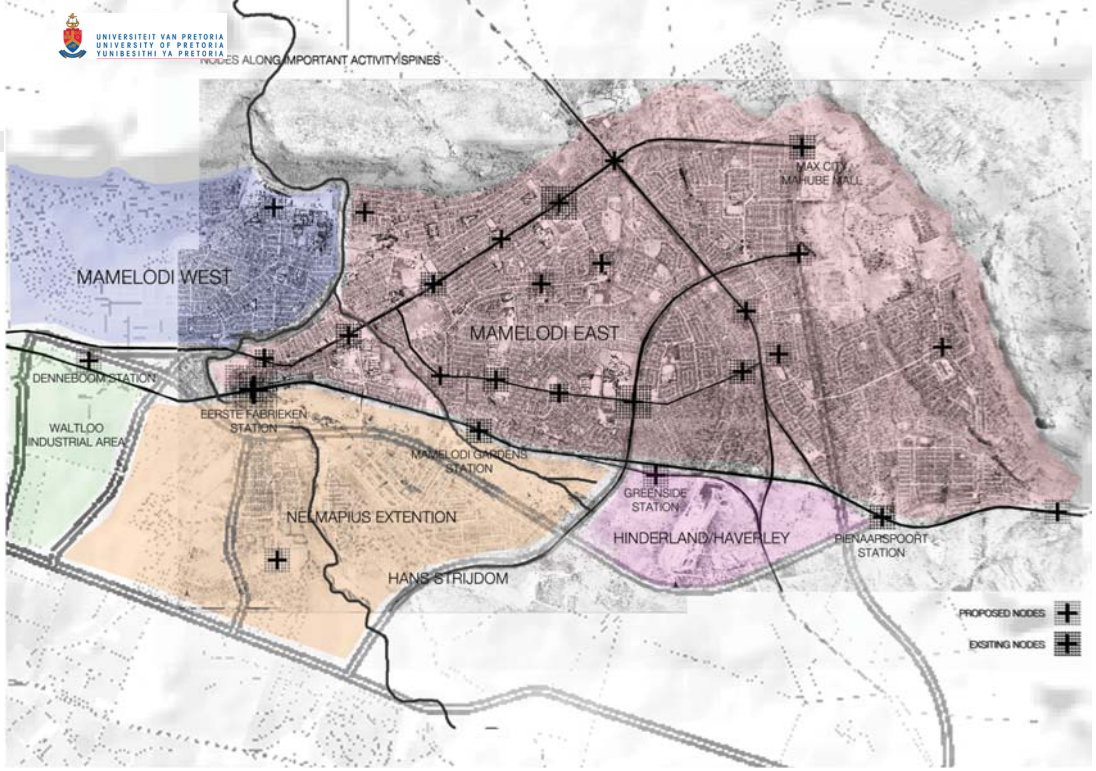


Fig 03-4 Regions in the area of Mamelodi

Major Transport networks

These major access routes include Hans Strydom Drive, Tsamaya Road, the railway line, the N4 and Waltloo Road.

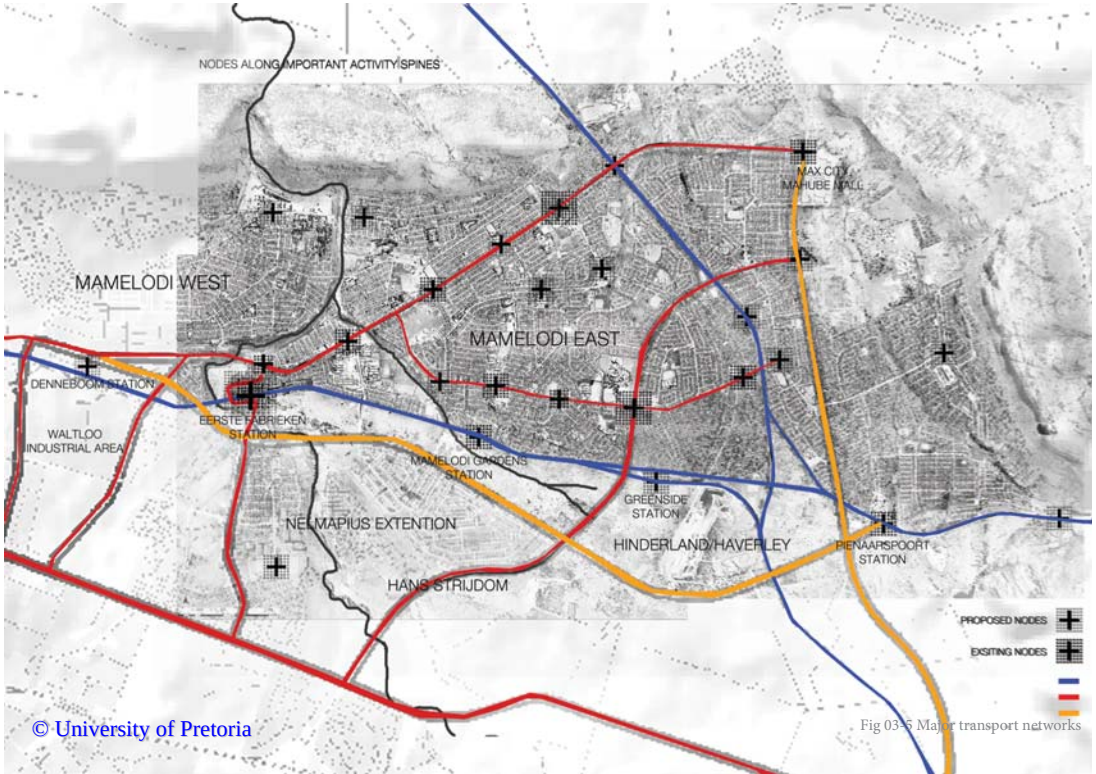


Fig 03-5 Major transport networks

1. Nelmapius Informal Taxi rank
2. Eerste Fabrieken Train station
3. Mamelodi Gardens Train Station
4. Greenview Train Station
5. Pienaarspoort Train Station
6. Vista University Informal Taxi rank
7. Tsamaya Road Informal Taxi rank
8. Max City Mahube Taxi rank
9. Panpoort Train Station

Fig 03-6 Major transport nodes and activity spine

Major transport nodes and activity spines

The image will show the Main access routes directly relevant to Mamelodi east, namely Tsamaya Road and the railway line. Activity nodes along these spines are illustrated, an mostly represent train stations, bus stops, taxi ranks and informal trading activity.

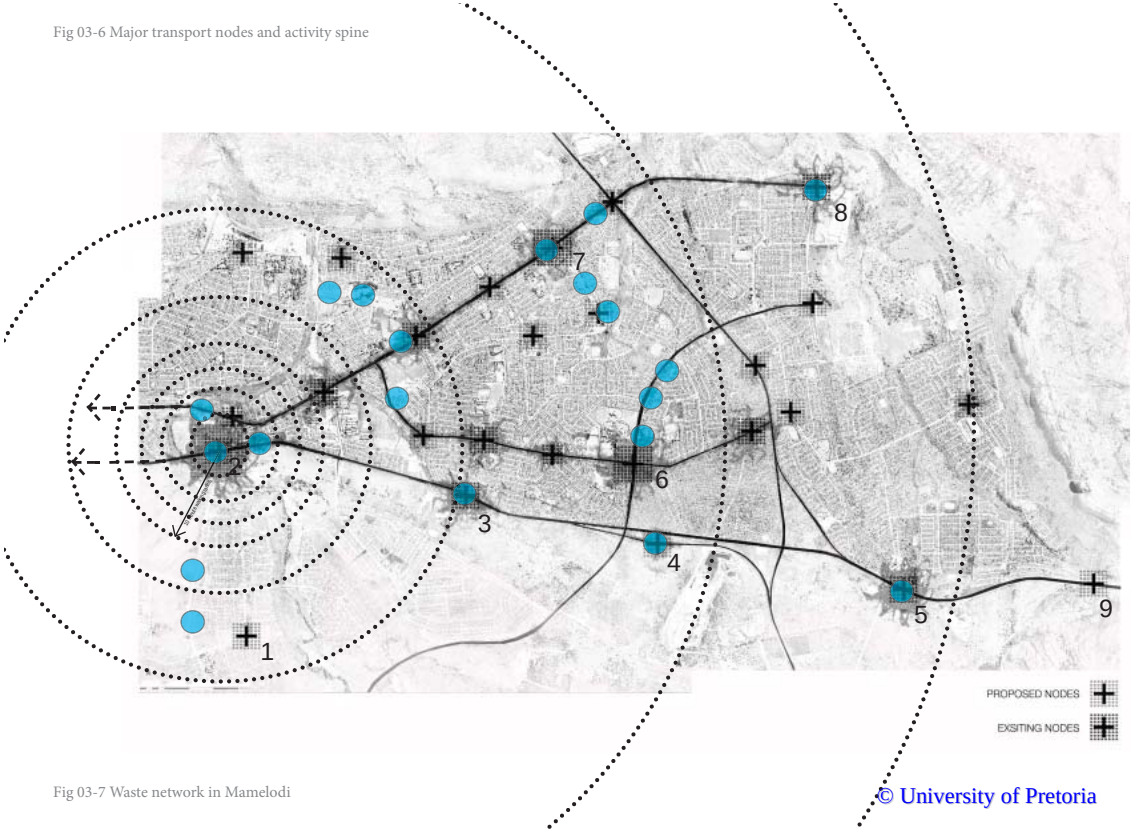


Fig 03-7 Waste network in Mamelodi

Waste network of Mamelodi

Current networks of waste and collection of waste is demonstrated in a plan. Points were waste is accumulated are represented by nodes and the links between these nodes are also illustrated.

Determining a site in relation to the greater Mamelodi Context

Wasted Spaces versus Waste in Spaces

The site was determined through the investigation of already existing nodes in the settlement. It is through the paper trail of consumption left by the high flow of energy that possible platforms for intervention can be identified.

The mapping attempts to reveal existing opportunities in the city fabric which could be expanded and infused into design interventions. Mapping begins on the urban scale where existing proposals for urban plans are presented. These frameworks present alternative routes and important nodes based on street level experience. The use of garbage to trace consumption energy produces unique results and introduces an underlying theoretical concern of using waste or leftover material in order to generate localised value. This process is mimicked in the "Ritual of Everyday Life" section of the mapping where you find the "left over people" who remain in the city during the day when the migrants have left; also need an intervention that could assist in creating alternative opportunities in Mamelodi (Mehrotra, 2005).

The node identified as appropriate site, needs to comply with the presence of three requirements namely

1. informal trading
2. transport infrastructure
3. possibilities of idle spaces

and should echo the dormant state which Mamelodi is in. The requirements for a site include informal trading, because it is from within the community that we want to create platforms of further opportunities. Informal trading is a symptom of high energy flow and potential access points. Second requirement is access to transport infrastructure, for this will increase the energy flow, due to practical, direct connections between the different nodes within Mamelodi and not to external industries. The presence of the transport node also ensures a constant flow of people through the site. The third requirement, involves a space that needs an intervention but also can be intervened. Some of the existing nodes are in dire need of resuscitation, because they have become stagnant, dying spaces affecting and effecting the surrounding environment, therefore the accessibility. Affecting, for it is an emotionally degrading and oppressive force, in that it leaves people unable to access platforms and to participate actively in their community. Effecting, because it leaves nature, physically spoiled and limited.

The programme will rely on the great numbers of people that move through these nodes that have little or no social and physical infrastructure; platforms or access points to respond to and engage with.

Identifying the suitable node for project proposal

The Loci for the Intervention in Mamelodi where industry and livelihood could happen
Identifying points of natural human convergence and accumulation of waste

- Enough feet should move through this space
- Trade should naturally be happening in the area
- There should be little support structure

EERSTE FABRIEKEN

Fig 03-8 Sketch of the Eerste Fabrieken train station precinct

The site identified is the Eerste Fabrieken precinct that dates back to 1883. The first settlers and in the area of Mamelodi were probably farmers and herdsmen. Later some of these settlers found employment with Sammy Marks at 'De Eerste Fabrieken in de Zuid-Afrikaansche Republiek Beperkt', the first factory in the Transvaal. It follows that the workers here were probably the first industrial workers in the Transvaal. The factory was registered in 1882 but in about 1902 turned from its original purpose of distilling and producing alcohol to become a bottle-making factory. The bottle glass was made from the sand of the Pienaars River and the bottles sold to the newly-formed South African Breweries, among others. The bottle factory employed local people, closing down around 1920. From accounts memories of this factory clearly survive in Mamelodi. Place names are among the things that orientate and link men most intimately with their territory. The naming of spaces is indeed part of a fundamental structuring of existential space. It appears essential and always has meaning in terms of a human task or lived experience (Relph, 1976).

The site Eerste Fabrieken in Mamelodi used to be a thriving area for production and trade. Industry in this area has decreased and the site around the station has become a wasteland, stagnant yet alive with possibilities. This site Eerste Fabrieken, as in the case with Mamelodi, has become a dormant site. Both Mamelodi and Eerste Fabrieken are in a dormant state where growth and activities have been missing and stagnant for a while, but potential for development promising.

Often geographical spaces reflect man's basic awareness of the world, his experiences and intentional links with his environment. It becomes a significant space of a particular culture that is humanised, often by the naming of places, by its qualities for men and by remarking it to serve better the needs of mankind. These spaces are not experienced in isolation and give direction to experience through visual, auditory and olfactory sensation, present circumstances and purposes, past experiences and associations and aesthetic standards by which we judge buildings and landscapes. Mamelodi as a geographical reality is seen in the street and public spaces created around the streets. The street becomes the centre and realm of everyday life (Dardel, 1952, p.37). The Eerste Fabrieken Train Station is one such place where activity is high, but not anchored. It acts as a threshold as people of Mamelodi leave on the train to Pretoria looking for improved opportunities, thus imagining a better chance just other side the threshold. The train station is a major contributor to the exodus of people from Mamelodi. This causes the space that is left behind during the day, stagnant and dead.

Buildings surrounding the site are also as mono functional as the city appears to be.

Fig 03-9 Photograph of the Eerste Fabrieken train station precinct

Synopsis of Eerste Fabrieken Site

1. Mamelodi originated where Eerste Fabrieken is today. Eerste Farieken used to be situated on the Vlakfontein farm.
   - Sammy Marks's Factory and Industry established in 1883
   - Job opportunities caused a major influx of people to the area
   - Rapid increase of population started
2. Eerste Fabrieken has also become dormant and forgotten which portrays the essence of what Mamelodi has become. The site is in an idle state with op portunity waiting to be developed. It is an area of disconnect, with a scattered amount of activity present on site
3. Transport systems and infrastructure are available. There is a natural flow of feet across the site.
4. Because of the large amount of people that move over the site every day, waste accumulates naturally on site.
5. Major Access routes and network, like the Tsamaya road, Love Drive and the railway merge at this point. This can be understood as a funnel of feet and energy to the site.
6. The original factories of 1883 included activities of glass making. Thus the historical significance of industry contributes to the significance of forgotten indus try on site.

Fig 03-10 Photograph of the Eerste Fabrieken train station precinct from Tsamaya Drive

Fig 03-11 Historic qualities of industry

Historical Qualities of Industry

From a historical point of view, the site has strong links to former industrial activity. There are only a few remains of the original Eerste Fabrieken factory which include an underground vault tunnels in which alcoholic beverages were distilled, some foundation of the original consolidated glass works and some houses dating back to the founding of the distillery in 1883. These enterprises were established by Sammy Marks and Alois Hugo Nellmapius (Melsons 2008:18).

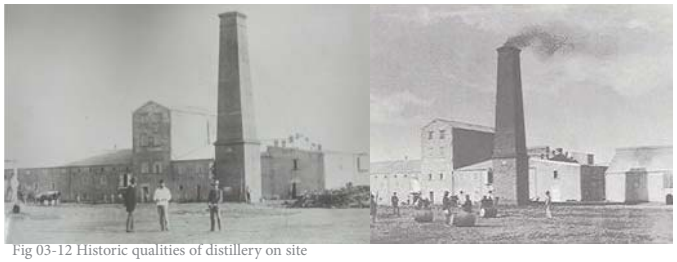


Fig 03-12 Historic qualities of distillery on site

Fig 03-13 Current land use

Current Land use and zoning

Eerste Fabrieken is situated in an arid climate zone that experience cold winters and warm summers. The site obtains an average high rain fall of 1600mm per year and low wind of 0-10 knots while during the majority of the year Mamelodi has open skies, which allows for 7 hours of sunlight per day. The Eerste Fabrieken site is currently occupied by Railway activities, a taxi rank and informal trading. Residential areas are present to the east, industrial activity to the north and transport infrastructure to the south.

Public Transport: Railway and Taxis

The railway line forms the site boundary to the south with the Eerste Fabrieken train station located on the site.

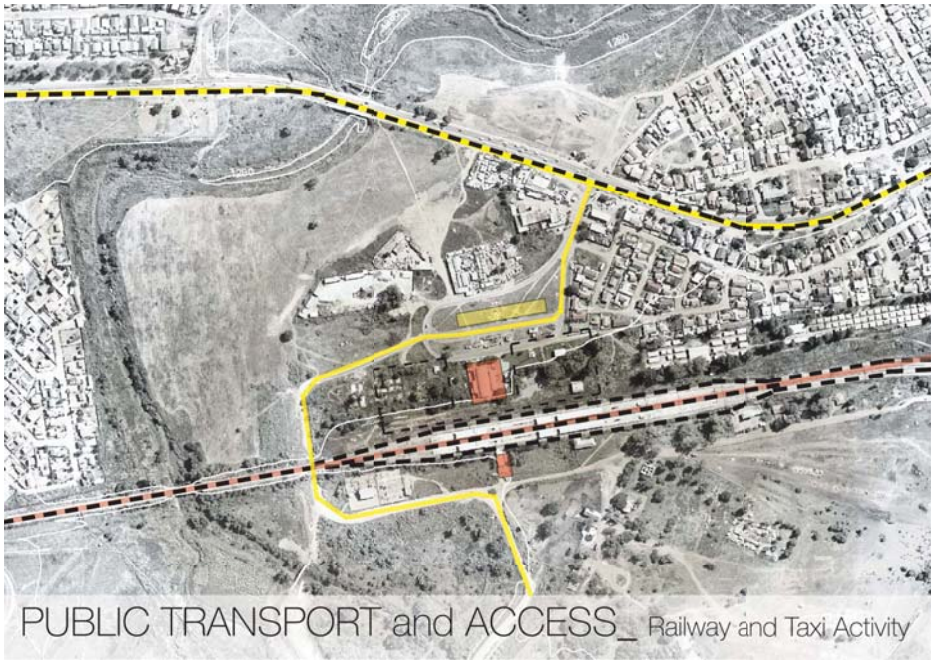


Fig 03-14 Public transport and access

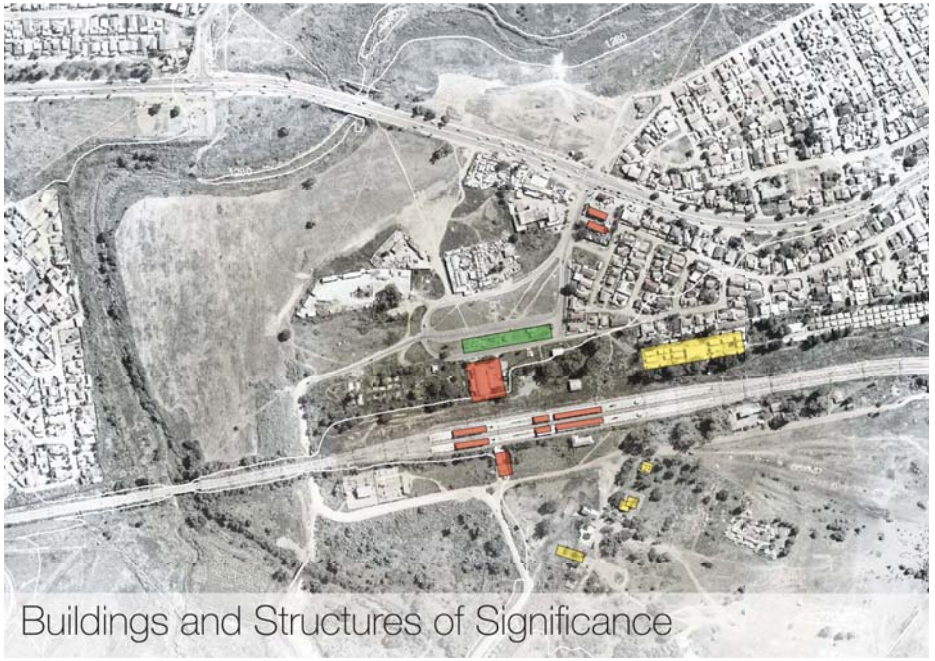


Fig 03-15 Buildings and structures of significance

Fig 03-16 Pedestrian activity

Pedestrian activity

The highest concentration of pedestrian activity is from the east where most of the residential zoning is situated.

Fig 03-17 Pedestrian activity on site

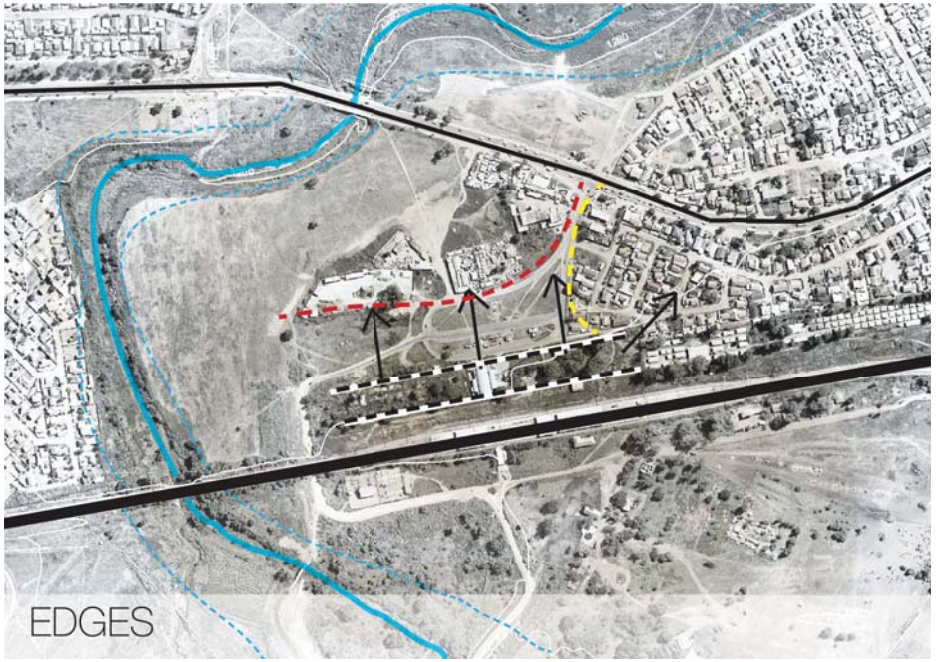


Fig 03-18 Edges

Edges

The railway line forms the site boundary to the south. The western and northern boundaries are defined by the Pienaars River, while the eastern boundary is defined by the current housing zone.

Energy and waste

Energy patterns across the site are mapped. Exact positions of waste are also illustrated.
These indicate were people move on a regular basis and naturally congregate in the area.

Fig 03-19 Waste network and accumulation

Strengths and opportunities

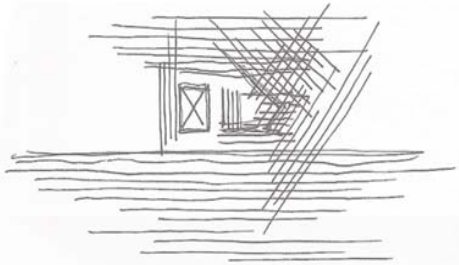
The site forms part of the new special development framework of GAPP. The fact that the site is well serviced with infrastructure, namely the Eerste Fabrieken train station, and that it is in close proximity to other large vehicular routes, makes it ideal for nodal development.

Fig 03-20 Strengths and opportunities

Waste accumulation on site

Fig 03-21 Glass accumulation in Mamelodi





Eerste Fabrieken Train Station and Train Platforms



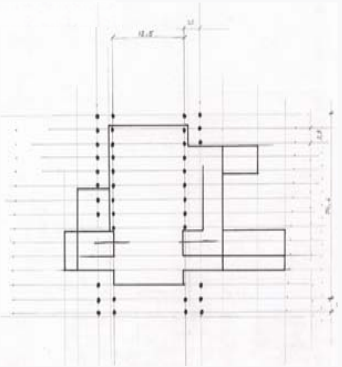
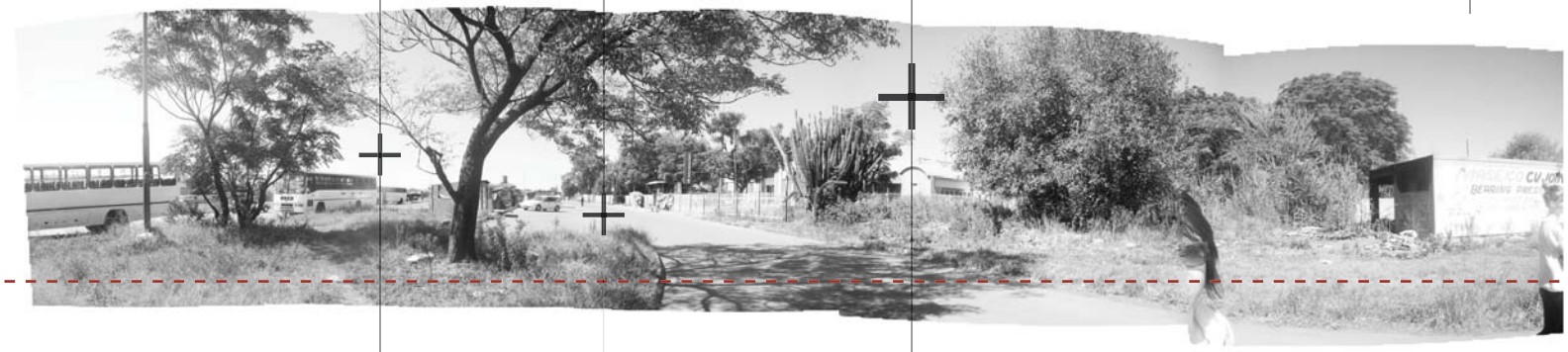



Fig 03-22 Photographs of Eerste Fabrieken train station



Panorama view of the Station and Taxi rank from the East

Panorama view of Station from the north



Panorama view of the taxi rank and station from the west

Fig 03-23,24,25 Photographs of Eerste Fabrieken train station and surroundings

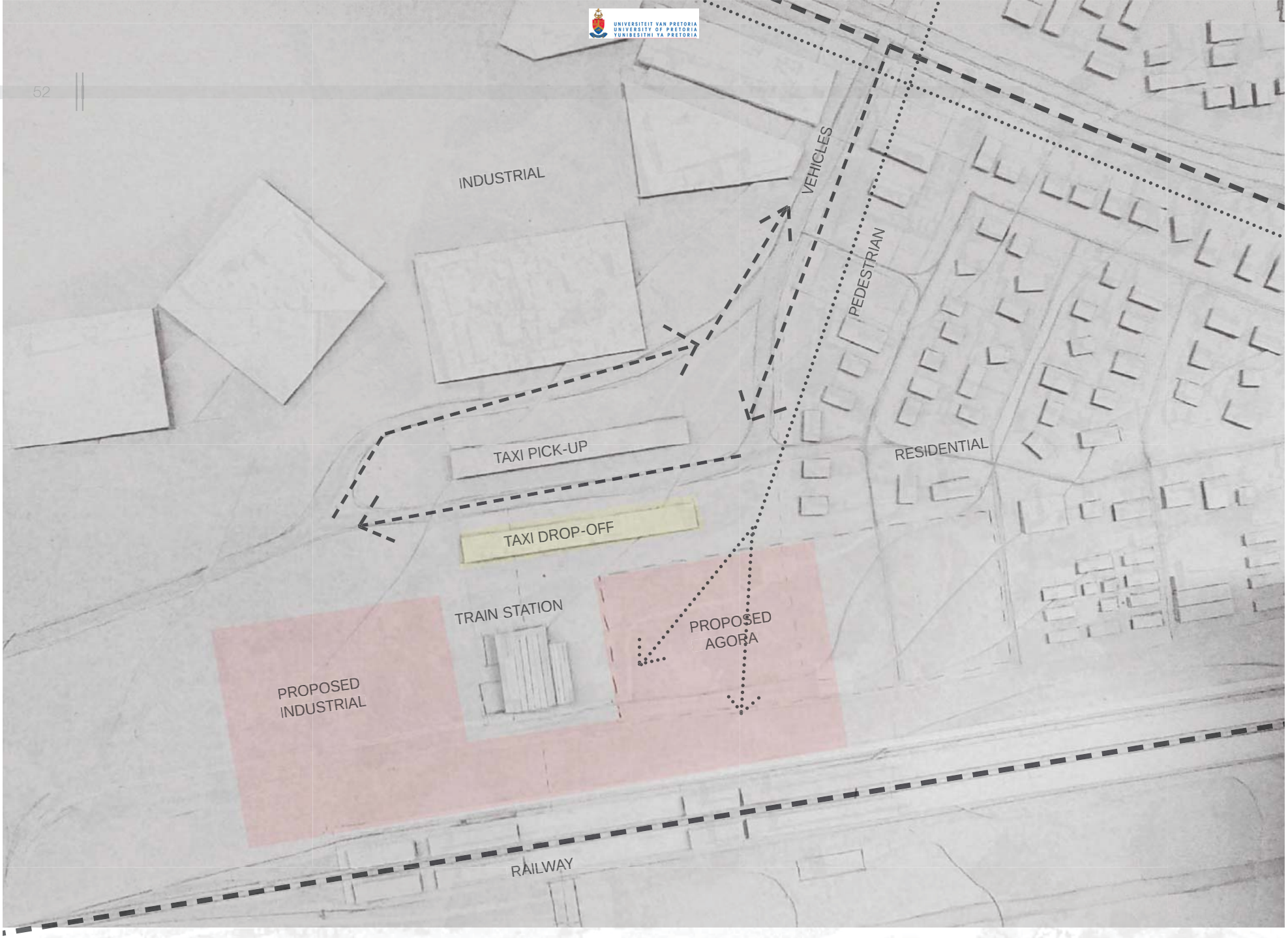
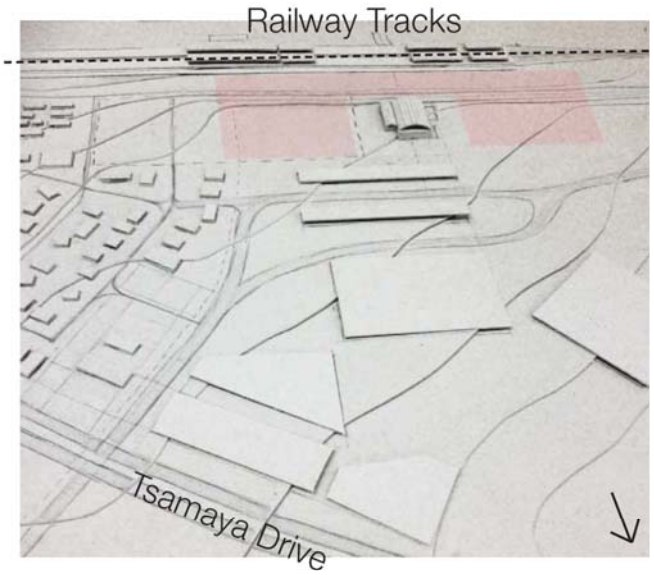


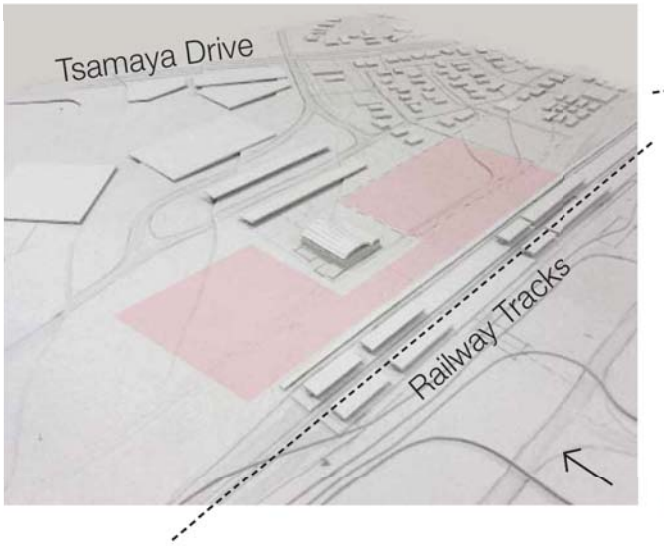
Fig 03-26 Vision and intention for the Eerste Fabrieken train station precinct

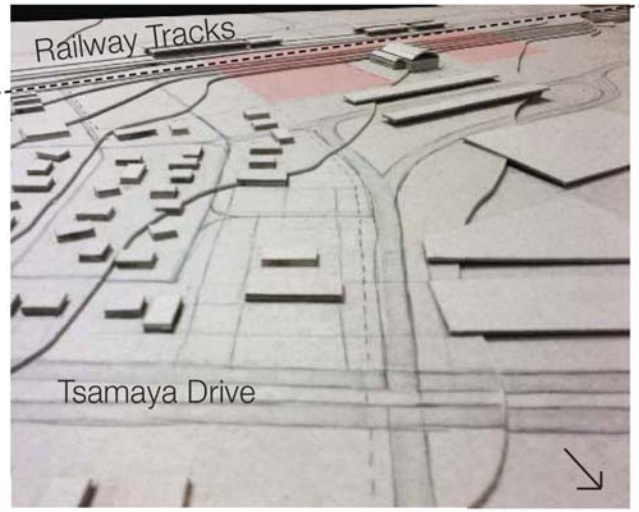
Urban vision

This image demonstrates the proposed organisation of the site according to the current use and future plans. Additions made to the site, is the establishing of a permanent taxi rank on the place a temporary structure is currently and the zoning of open public type space which would be able to filter people from the residential areas and transport routes into the station. This public space would also act as a node that would anchor energy in Mamelodi. By creating accessible public spaces by adding infrastructure, opportunities are bound to arise on site that would caters for the needs of people (Hamdi, 2004). The main aim of the site vision would be to define the site according to the activities envisioned. These spaces would mediate people and activities on the site.

This urban vision offers a summary of Arendt's ideas about the space in-between as a site of public interaction and production. The Athenian agora is a classic expression of such a space in-between offered the potential for change and transformation. For Arendt, the public and private realms and their corresponding activities are not historically static in their relation to each other and they may change in relative importance throughout history. Instead of experiencing the freedom associated with action and speech in the public realm, humans are generally reduced to mere adjuncts to the cycle of production and consumption. Space like a polis for instance, is in turn required to enable this cycle's smooth functioning and progressive acceleration. The social realm is a community centred around the cyclical process of production and consumption, in which human experience becomes based on individuality and speech dominated by productive participation (Arendt 1958: pp 209). Thus the vision for this site would be a development equal to that of an Athenian agora, where public life and production are situated in the same space.







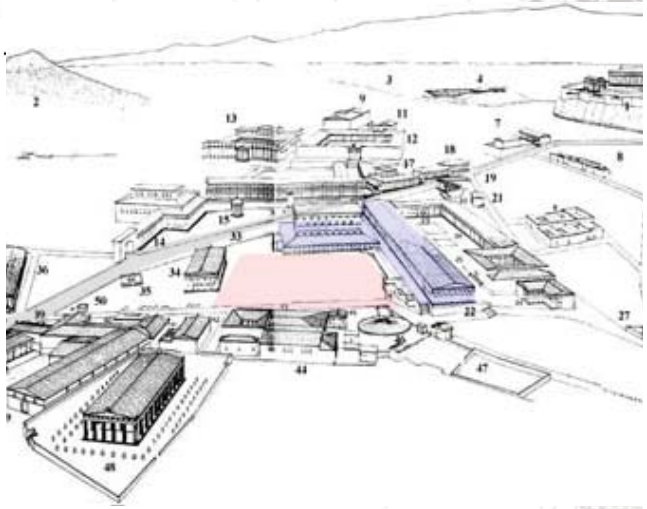


Fig 03-27, 28, 29 Vision and intention for the Eerste Fabrieken train station precinct

Fig 03-30 The idea of agora surrounded by stoa building

Site possibilities

- This idle piece of land has the potential to develop into a functional public space were public life and production could happen in the same realm. This is possible because of the high energy present on site already; it is just not secured on site yet.

-Links the site has with various zones in the area is ideal for introducing a functional public space which would cater for the needs of the community.

- Link with railway allows transport of materials to and from site.

-Link with station ensures that pedestrians will move across the site naturally.

- The architectural intervention on the site could echo the memory of the once thriving Eerste Farbrieken industrial development that has fragmented over the years.

- The intervention could act as an architecture of recovery and uplift a previously dormant area by introducing activity onto the site.

-Recycling could act as this activity generator on site and could physically contribute to the maintenance of a wasted space. The collection of waste glass from the public would ensure a constant contribution to the practice of glass processing. This drive to engage in the collection of glass would encourage the community to clean up the waste glass that lies around public spaces, resulting in a cleaner area.

- This light industrial production could create opportunities of engagement and employment for migratory labourers that would normally leave the settlement in search of bet ter opportunities elsewhere.

This site could become a functional public area driven by the production of reused waste. The monumentality of a possible intervention in existing dormant spaces could also address the deterioration of post-industrial sites. As the industrial site of Eerste Fabrieken has lost its industrial quality, the effect of pendulum migration on settlements is evident in spaces that have been forgotten and left behind during the day. Thus the demand for commercial, public and industrial spaces in urban and urban-periphery neighbourhoods has increased over the past few years. Secondly, this issue seems to increase due to the sprawl in informal settlements. These "deserted" industrial areas have the potential to become the "new urban centres" envisioned in Nine Points on Monumentality. This dormant space and lack of functional infrastructure signals a future, a possible environmental redemption (Sert; Léger; Giedion, 1943).

Fig 03-31 The site [illegible] place for intervention

The site is envisioned to have a productive component which would drive activity on the site. This type of development is seen on various scales and in different eras. The Saline Royale (Royal Saltworks) in Arc-et-Senans, eastern France is one example of a productive space which was exclusive to the owners and the labourers of the factory. The work is an important example of an early Enlightenment project in which the architect based his design on a philosophy that favoured arranging buildings according to a rational geometry and a hierarchical relation between the parts of the project. In the 18th century salt was an essential and valuable commodity. At the time, salt was widely used for the preservation of foods. Ledoux designed the semicircular complex to reflect a hierarchical organization of work and considered a salt factory to be the most important component of the city. The complete plan included the building of an ideal city forming a perfect circle, like that of the sun (Kostof 1991).

The factory was situated in the centre of the city, yet was inaccessible to the public. Thus the centre of the city became unapproachable and exclusive, which meant a lack of activity in the city itself. The feeling that the Royal Salt works has a secret connection with the outer space is still present nowadays. The strength and the balance which come out of this architectural composition determine a feeling in between trouble and understanding the logic of the placement (Gruson 2008). In contrast to this, it is proposed that the intervention in Eerste Fabrieken, Mamelodi, would become a productive landscape open to public participation. The building itself would act as a threshold between productive activity and public space that would allow visual access to the process for the public. This approach allows members of the public to observe the material changes of glass from a raw waste product to a new product that would have a new use and meaning.

This process and approach is also a metaphoric play on the transformation of Mamelodi as becoming a city by the transformation and redemption of public space in the settlement.

Fig 03-32 The Saltworks by Le Doux

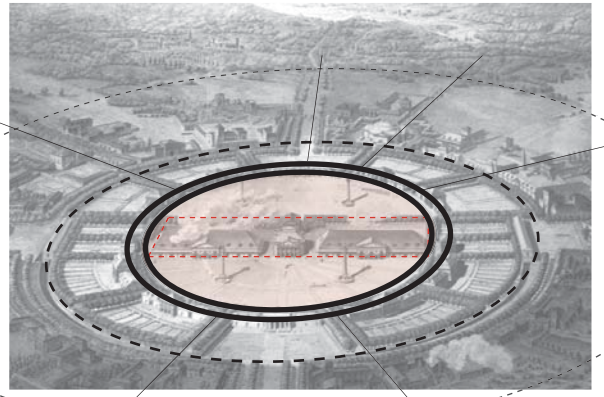


Fig 03-33 The Saltworks by Le Doux

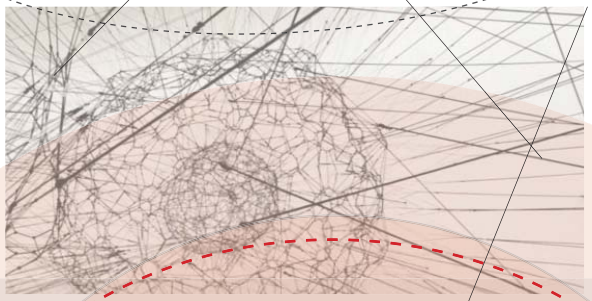


Fig 03-34 A network congregating at one point

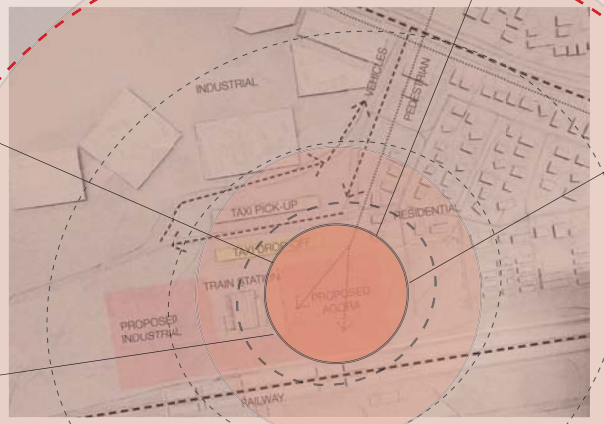


Fig 03-35 The Vision for the Eerste Fabrieken site

PROGRAMME PROPOSAL 4

REDEEMINING PUBLIC SPACE by introducing PRODUCTION as ACTIVITY GENERATOR

Building a sense of identity: City making, public structure and celebration spaces

In the public sphere, pioneering architects are creating buildings that reflect the culture, memory and spirit of place. According to Deckler in the publication "Contemporary South African Architecture in a Landscape of Transition", 2008, one of the most exciting developments since 1994 has been the exploration for a South African iden tity in the design of pub lic spaces and places. There seems to be a new approach in the public sector, where municipalities, provinces and national departments support build ings that speak to the people they are serving.

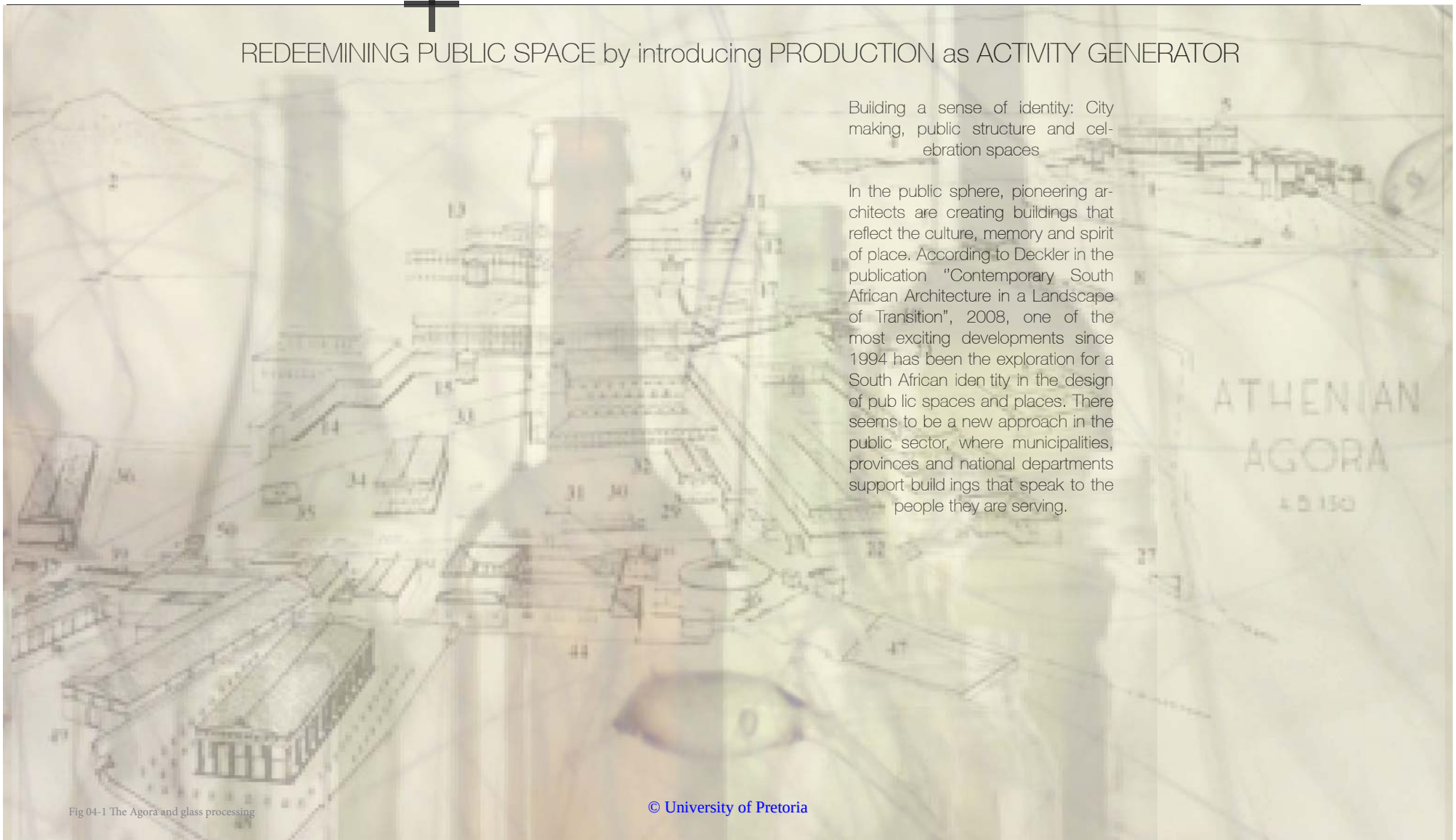


Fig 04-1 The Agora and glass processing

Public spaces have a social function in urban environments. They “represent the primary, and arguably the most important, form of social infrastructure” (Dewar and Todeschini 2004: 69). Public amenities, public places and institutions, which form the backbone of any public spatial network, usually enable significant issues such as health, education and social development to be dealt with communally (Dewar and Todeschini 2004: 50). Public spaces are places for people to gather, talk, do things together, and generally interact outside the boundaries of their private homes. These are significant spaces for activity and recreation as many lower income settlements treat their functional urban spaces as valuable entities. While it is important for local authorities to contribute to the development of public spaces, they also need to be cautious not to smother the artistic response of communities needing to express themselves. According to Mammon, Ewing and Patterson in ''Challenges of Inclusive Cities: Making urban spaces and places for all”, 2008, the public realm needs to provide a venue for the natural and creative energy of urban dwellers to be expressed.

Fig 04-2 The Eerste Fabrieken train station in its present state

The main goal of the proposed intervention is to create functional public spaces with production processes as generators of activity. Architectural intervention as generator of activity should contribute to the creation of opportunities and energy. A well designed public space should serve to anchor the sprout of energy. These spaces could become nodes of livelihood.

This productive public space will be an open public area surrounded by buildings of various functions, similar to the agora of ancient Athens. In those times, it formed the centre of the ancient city and was a large, open square where the citizens could assemble for a wide variety of purposes. On any given day this space could be used as a market, a space for a dramatic performance, a religious procession, military drill, or athletic competition. It could be argued that the Greek agora was the centre of the social activities in the entire ancient world, where people gathered and commerce took place. Some of the most acclaimed buildings surrounded this agora and allowed permeability and accessibility to the public square through columned facades that linked it to the public space.

The proposed public spaces can be understood as a contemporary agora. It becomes a space of various functions for everyday gathering and social engagement in the centre of Mamelodi. The building surrounding the public space is of great importance to Mamelodi due to the significant functions it performs. Eerste Fabrieken Train Station is one the busiest transport nodes in the settlement, and is used frequently by many people in Mamelodi. The space is significant in terms of use, but only acts as space of movement. To re-establish a public space that people could use other than a gateway out of the city, a secondary programme will be introduced to ensure community engagement. This programme will be glass collection and processing on a human scale, as well as a light industrial scale and will be discussed in the next section.

Fig 04-3 The Eerste Fabrieken train station as it is envisioned to become

GLASS COLLECTION and PROCESSING

The existing activity nodes identified in Mamelodi share the following characteristics

- wherever there is a high concentration of energy, there is also consumption in various forms.

An apparent by-product of consumption is an unlimited accumulation of waste. If left lying around, waste can disrupt the energy flow, causing active nodes to become stagnant spaces, where high energy spaces are left inaccessible; ultimately, the community will become stagnant and dysfunctional. Stressed space in Mamelodi is strained further by dead waste.

A recycling factory for glass is proposed to achieve community engagement. This programme utilises the glass resources that are visible all over Mamelodi. It is envisaged that the glass recycling programme will consist of collection points, glass blowing on a human scale, and the production of glass wool insulation on a light industrial scale. In addition to the direct participation on site, there is the potential of pick-up points along the spines of activity in Tsamaya Drive and the railway line. This programme of glass recycling allows for the participation of the whole of Mamelodi and surrounding areas for the following reasons:

Firstly, the processes involved in glass recycling would require manual labour in collecting, sorting and managing glass. Secondly, the product of glass processing would be able to generate further activities of distribution and trade. It would include the production of fibre glass insulation panels. This would contribute to the feedback loop, and positively add value to the housing in the area. The second output would be the production of glass art like beads, glasses, jars and bottles. This line of production would tie into the idea of livelihood and cultural significance as a product manufactured in a functional productive space.

Furthermore, social engagement though active participation from within the community is vital, because active participation ensures energy flow and activity in a previously dormant site. The development of infrastructures in these nodes will act as platforms where the community can access opportunities, like jobs, in spaces that were previously occupied by mere waste and idleness. If successful, these opportunities may create a thriving, independent and functional community. By incorporating the collection and management of the glass waste into the architectural intervention, the programme's focus can be on keeping an open flow of energy in these public spaces, as well as allowing for the participation of the community. This introduces the aspect of social cohesion to the programme (Henning 2009).

This architectural intervention aims to reintroduce a lost industry of glass making that used to be present in Eerste Fabrieken, so that natural growth and activity can (again) take place around it (Kostof, 1991). Its focus is architecture of redemption with an identity of resistance against the production of waste. The intervention would absorb the waste, so that places of public gathering become accessible. Waste is a collective produce, something that links people across economic, political, and social divides. An intervention like this should focus on a radical exposure to public waste management and a public interface for public participation.

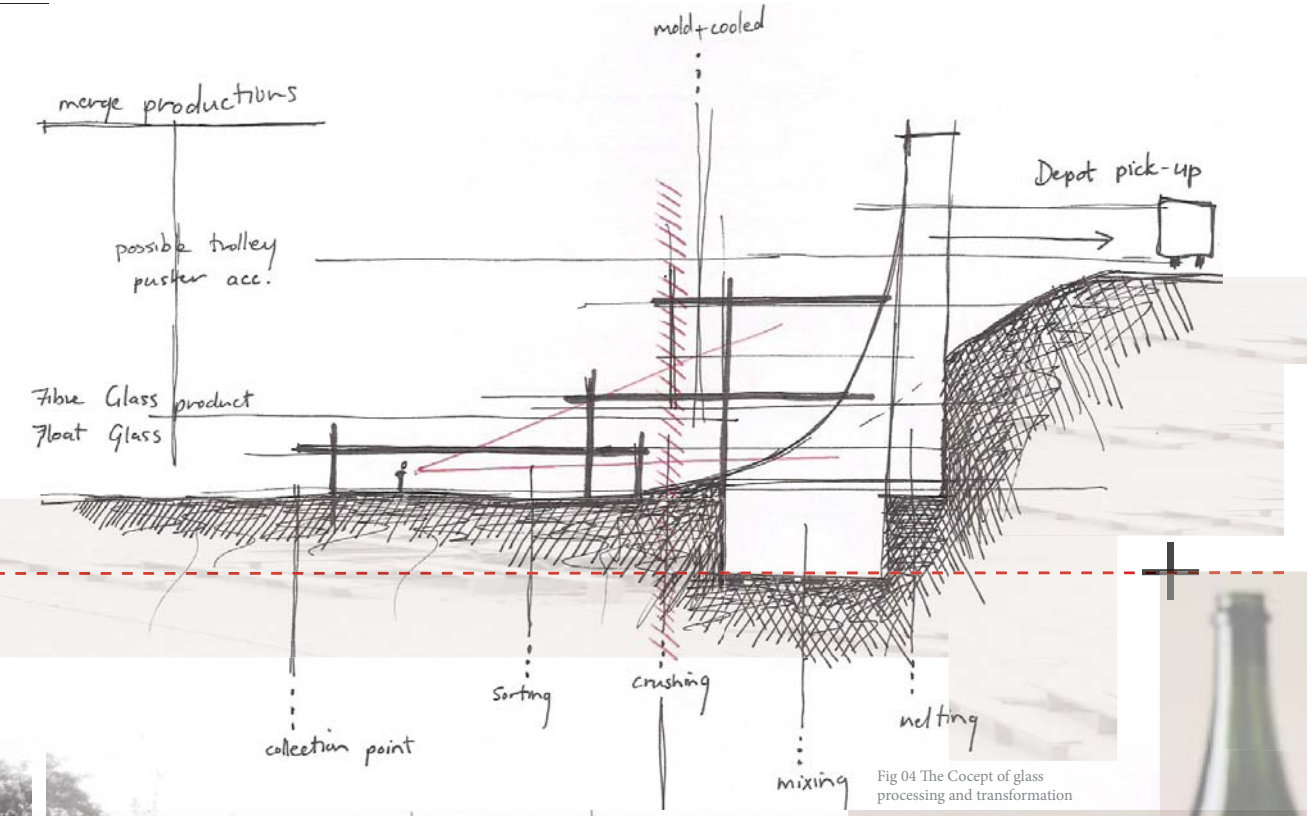


Fig 04-4 A proposal of what could happen to the accumulation of glass on site

Fig 04 The Cocept of glass processing and transformation

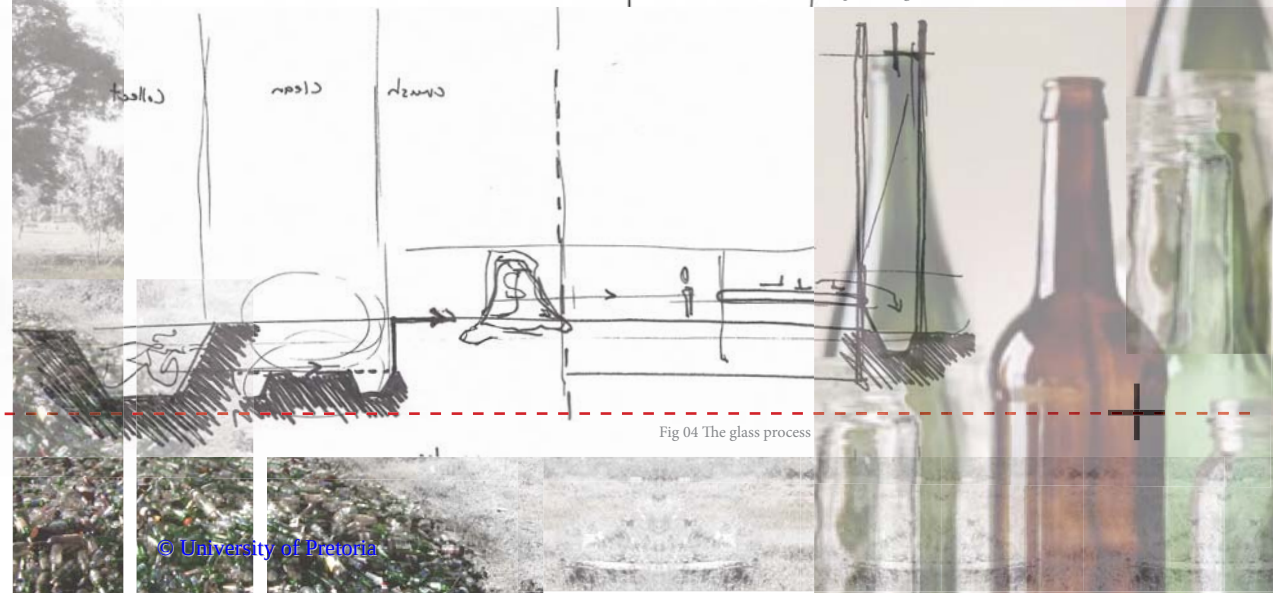
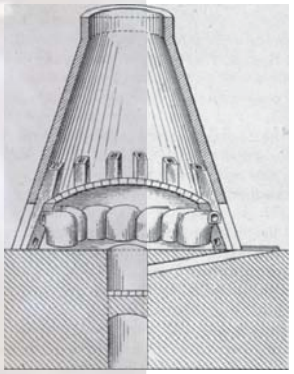
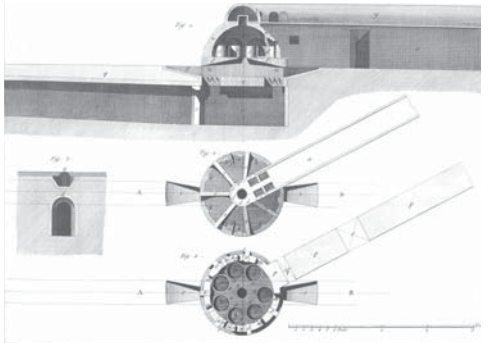
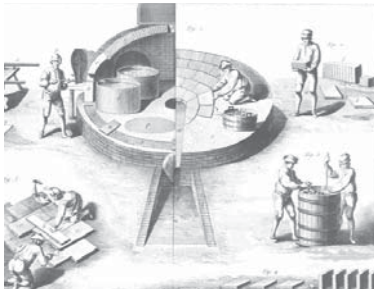
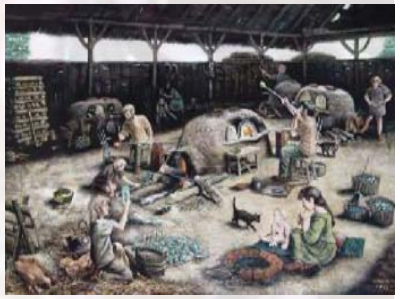
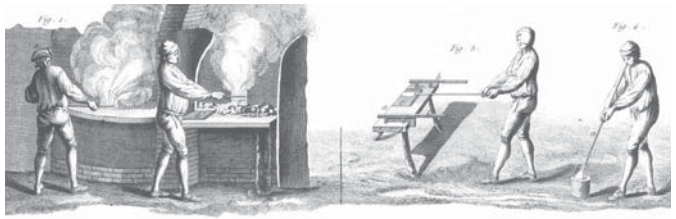
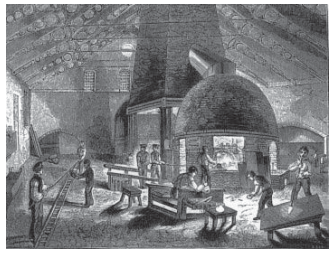
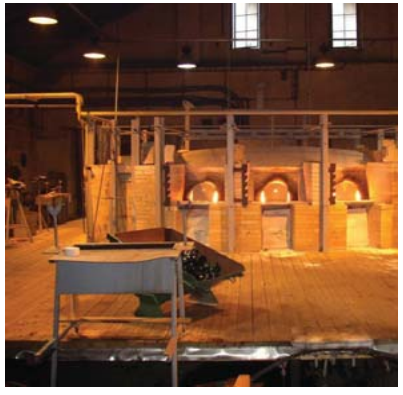


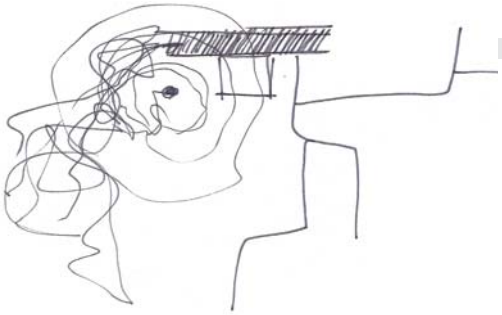
Fig 04 The glass process







Glass Blowing

GLASS PROCESSING on a human scale

The remarkable art of glassblowing involves fire, molten sand, a long blowpipe, and an intricate process. The technique dates back to the first century BC in Lebanon, where glassblowing is thought to have originated.

From there, the art spread to the Roman Empire, and then to the rest of the world. Glassblowing is still practiced today and involves mastering a series of complex techniques. In a process called gathering, glassblowers dip their blowpipes into the melted glass and turn them until they have a decent-sized blob at the end. At this point, the glass has the consistency of honey, making it difficult to control as it can easily drip off the end of the pipe. The next step is to roll the liquid onto a steel table to smooth it out and shape it evenly. The glassblower then blows through the pipe, forming a small air bubble on the inside of the molten glass. This is an extremely delicate process, because if the glass blower blows too much, the glass walls become too thin and collapse when more glass is added. Once the bubble is blown, different colours can be added using different techniques.

GLASS COLLECTION

WASHING

SORTING

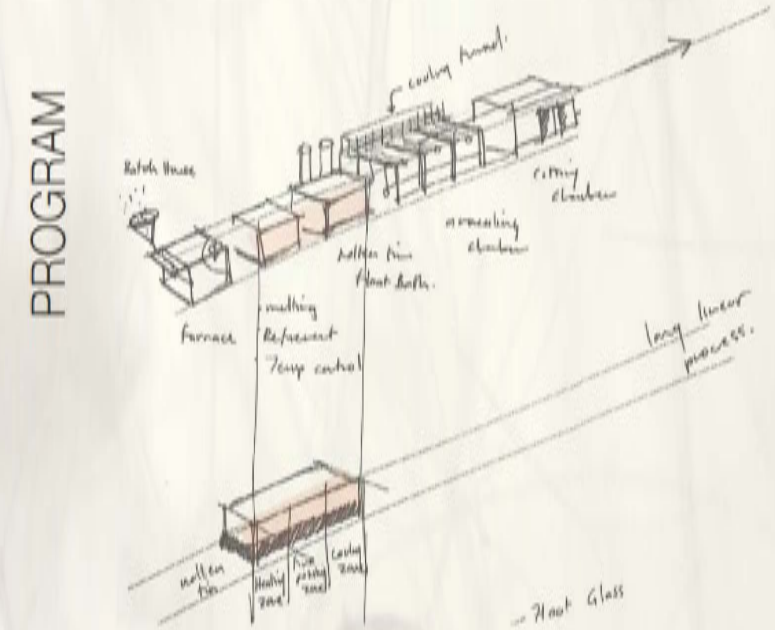
CRUSHING

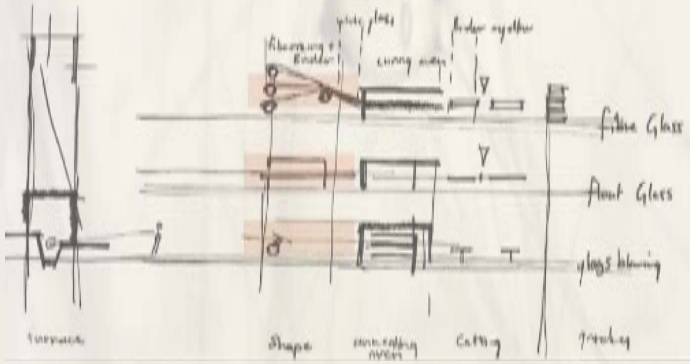
BLOWING

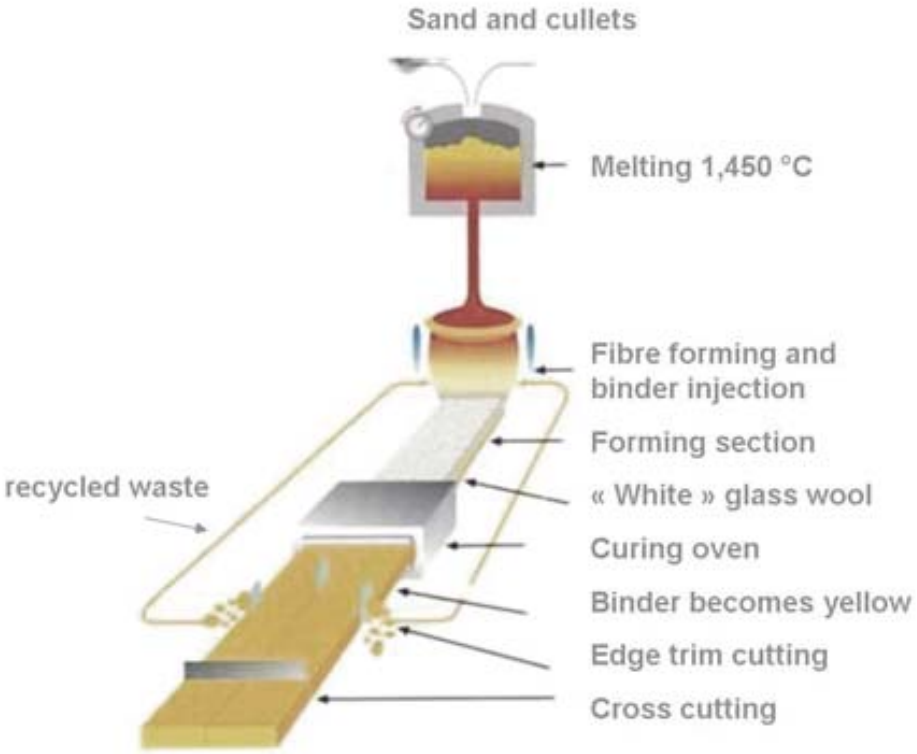
ANNEALING

Fig 04-5 Photographs of the glass blowing process

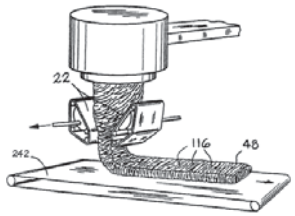
PROGRAM







Glass Wool Insulation



GLASS PROCESSING on a light industrial scale

Waste glass is not just waste, but a new resource. Fibre glass wool is an insulation product that is an artificial, light and porous foamed material that is made by crushing, milling, baking and foaming waste glass. A recycling plant such as this will recycle waste glass produced in the community.
OUTLINE of the programme

A waste-glass recycling plant consists of nine machine units: a bottle supply hopper, a bottle conveyor, a crusher, a cullet mill, powder conveyors, a powder sifter, a mixing machine, a baking machine, a cutting appliance, and the packaging space. The bottle supply hopper can hold about 4.5 cubic metres of waste glass, which is crushed into cullet of less than 6 millimetres in size by the crusher. The cullet mill mills the cullet into glass powder with a median grain diameter of 35 micrometres. The glass powder is sent to the powder sifter, which removes foreign objects and powder grains that are not of a specified size. The mixing machine mixes glass powder and add-in materials, and sends the resulting powder mixture to the glass melting furnace where glass is made workable at a temperature of 1 400 degrees Celsius. There the powder mixture is heated, softened and conveyed to the fiberising unit and injection of binders. The layer of glass powder mixture has an initial thickness of 15 millimetres, which is converted into a light porous slab that measures about 60 millimetres.

This type of waste glass processing enables large amounts of waste to be changed into something functional and practical for the community of Mamelodi to work with. In a sense, this part of the intervention would be able to sustain the whole intervention at an economic level.

Fig 04-6 Photographs of the glass wool insulation process

PRECEDENT STUDIES 5

+ ANALYSIS and INTENTIONS

This section intends to express noticeable commonalities in architecture and context to learn from successful interventions and tectonic approaches aimed at uplifting a society, a community and social spaces.

Fig 05-1 Public space and glass processing

PRECEDENT INTENTIONS

Contextual response
Tectonic response
Architectural response to programme
Social interaction
Client and users
Built form sustainability
Materiality
Theoretical approach

To gain a better understanding of how African public spaces work, a few examples of contem porary local architectural examples were examined. In the publication ''Contemporary South African Architecture in a Landscape of Transition" (Deckler; Graupner; Rasmuss, 2008), the authors write that buildings designed for the African context share an agenda of exploring, understanding and applying local culture and craft to the use of space. At the same time they all reflect divergent and particular local histories and also contribute to our biggest unfinished project that is "nation building" (Deckler; Graupner; Rasmuss, 2008).

Appropriate architectural examples

Contextual Precedent and Functional Precedents

Public Spaces in Informal Settlements

1. Khayelitsha Service Centre and Pay Point
   Khayelitsha
   Piet Louw Architects

2. Central Meat Market
   Gugulethu
   Carin Smuts

Transport interchanges

3. Kuyasa Transport interchange
   Khayelitsha
   Meyer and Vorster

Recycling Facility and Glass Processing

Programme Activity Driver

4. Ngwenya glass
   Mudersdrift

5. Nampak
   Germiston

1. Khayelitsha Service Centre and Pay Point

Piet Louw Architects

Key issues to investigate

Assessing the importance of creating public spaces where social functions, civic centres or production are assimilated.

The modest yet interesting Service Centre rises above the mixture of formal and informal houses in Khayelitsha. It is one of a series of such centres that have been clustered with existing community facilities to form places of civic significance. The robust, light-filled buildings have a layered portico that acts as a gathering and rec reational space. It also has offices for local councillors and a courtyard area for public interaction.

Tectonic response

- The external space is simple, elegant and framed
- The impression is strong and functional, as it was intended in the first place
- The appearance is minimalist, but with strong features
- The spaces are robust and flexible, and the structures show a balance between unity, proportion and rhythm.
- The response of the building to its surroundings, adds to the street's tectonics
- The raised ground floor contributes in defining important spaces

Space programming response

- The space has been designed to reinforce and integrate places of civic significance
- It has been designed to be conveniently and easily accessible on foot
- The Pay Point for governance tax and services acts as activity generator
- The built form realises interaction and social engagement through the provision of gathering spaces that are covered overhead, with steps to sit on, and a courtyard. The building's function also en sures the constant flow of people through the site
- A layered facade enables smooth transition between different functioning spaces

Theoretical approach

- The architecture is a response to public issues and needs, and addresses the role of architecture in a city or informal community
- The aim is to create meaningful city space through architecture that provides spaces that people are able to use freely
- Buildings are instruments of public place making
- Definition between public and private are explored

"The building is driven by the realisation that where there is no significance informing context, it becomes necessary to create one, to plant seeds that can become the beginnings of the public places, through the placement of the architectural elements." T. Deckler; A. Graupner; H. Rasmuss. 2008, p 77

Assessment of Khayelitsha Service Centres and Pay Points

This urban intervention proves to be successful on many levels. Firstly, one can assume that the success of the building lies in the aesthetic approachability and spaces that are provided for public interaction. Secondly, the fact that there is some sort of dual function in the space means that the space is used frequently by the consumers of the service centre and pay point, ensuring the constant presence of activity needed to keep the space alive.

Fig 05-2 Khayelitsha Service Centre and Pay Point is a centre for the community

Fig 05-3 Khayelitsha Service Centre and Pay Point in the settlement

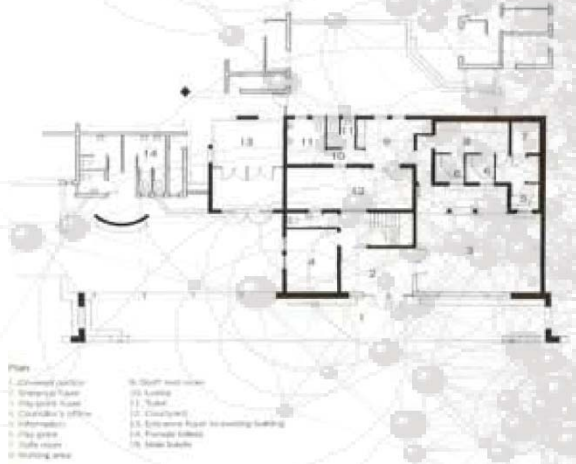


Fig 05-4 Khayelitsha Service Centre and Pay Point


Fig 05-5 Central Meat Market nestled in the settlement


Fig 05-6 Central Meat Market inside the building


Fig 05-7 Central Meat Market truss structure

2. The Central Meat Market, Gugulethu

Carin Smuts Architects

Key issues to investigate

Assessing the importance of creating public spaces where social functions, civic centres or production are as similated in an area with an already established function.

In 1994, it was decided to proceed with the development of Gugulethu and carry on with the design and development of the Central Market as the first project on the list of small business development initiatives, intended for Langa, Nyanga and Gugulethu. At a general meeting involving many informal businesses, a management committee was elected who then worked with CS Studio Architects to develop the project. It was agreed that the main aim was to solve the immediate problem of the traders and public space by providing a covered market area.

DESIGN

The design process for this project was complex and involved many workshops, meetings and negotiations. The executive went through a process of human capacity building, which involved input through workshops from Coopers & Lybrand on financial and other business skills. A legal representative, Mr. Sipho Puwani, also worked with the traders while various other professional organisations offered additional expertise and advice. At a later stage, the Canadian High Commission funded the installation of braai areas and stainless steel tables. Due to the active involvement of all the traders in the design discussion, the initial 'Eurocentric' market proposal was transformed into a more appropriate local and culturally expressive solution. The traders requested an L-shaped building which would form a boundary wall to the southern and western sides, cutting off the prevailing winds. This thickened "wall" accommodates the spaza shops, public toilets, offices, etc. The north and east sides of the market are open while the roof covers the whole trading area. Roller shutter doors close the market at night. Stainless steel tables, sinks and indoor fire places allow for braaing under the roof. The roof, resembling a giant wave, provides a pleasant and iconic shelter. At night when the roof is lit up, it creates the impression that it floats. This is when 'informal' market and "African restaurant" type activities add to a positive and vibrant urban space (Smuts, 1998).

Assessment of The Central Meat Market, Gugulethu

From this project it is clear that an intervention of this kind could enhance an existing space that is used for specific functions already. Adding infrastructure to an existing space, such as an informal meat market could improve the conditions in which produce is prepared and simultaneously contribute positively to social engagement. An accessible space encourages social interaction between people in a community when they go about their business at the market purchasing supplies. Various activities such as meat preparation, cutting, and braaing are present in one place, and allow members of the community to engage with the process at a certain level.


Fig 05-8 Central Meat Market view from the street

Fig 05-9 Central Meat Market market stalls

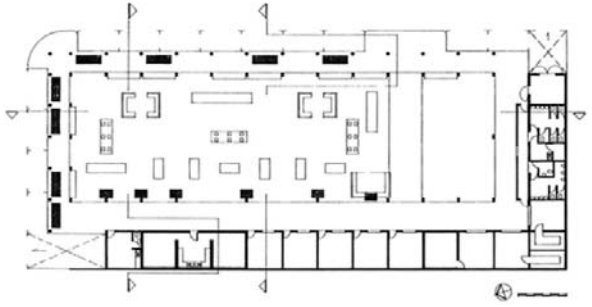


Fig 05-10 Central Meat Market ground floor plan

3. Kuyasa Transport Interchange – Khayelitsha

Meyer and Vorster

Key issues to investigate

Assessing the importance of transport nodes in informal settlements and the public spaces they could become.

This transport interchange and urban node at the Kuyasa Transport interchange in Khayelitsha includes a new taxi rank, trading space, ablution facilities, urban squares and landscaping on both sides of a new railway line. The project was subject to extensive community participation and was opened in 2009. It was anticipated that use would be intensive; the buildings were therefore designed to be simple, robust facilities, while the architectural language was dignified in order to restore a sense of pride in the area.

Social interaction

The aim was to create an integrated public environment that could stimulate further investment in the future. Structure and spaces were created to support existing hawkers and informal economies.

Materiality

- Concrete framed structures support lightweight corrugated sheet roofing
- The use of colour shows proportions and tone
- Panels used for the construction of market stalls were used to create human scale

Theoretical approach

- It is a creation of quiet architecture, made on a human scale with functional intention.
- The creation of outdoor living rooms is achieved by providing public furniture and trees in public spaces

''The building is driven by genuine 'usefulness' and yet has sufficient gravitas and delight to make them by default almost civic buildings." Deckler; Graupner; Rasmuss, 2006

Assessment of Interchange – Kuyasa Transport Interchange, Khayelitsha

Due to the constant movement and activity in this space, the building responds in a very appropriate manner. Spaces are easy to understand and move through, while materials and construction methods are robust and easy to understand.

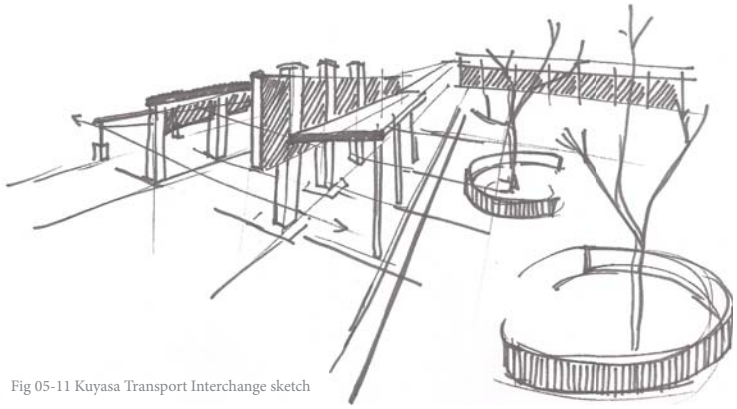


Fig 05-11 Kuyasa Transport Interchange sketch

Fig 05-12 Kuyasa Transport Interchange sketch

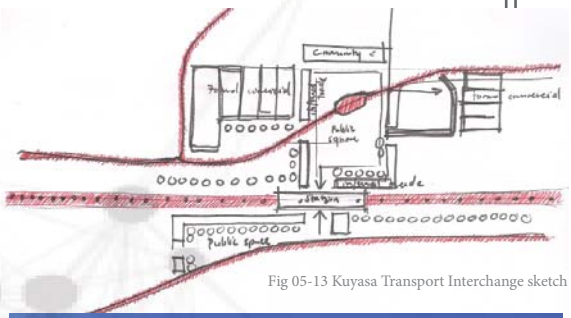


Fig 05-13 Kuyasa Transport Interchange sketch

Fig 05-14 Kuyasa Transport Interchange taxi rank structures

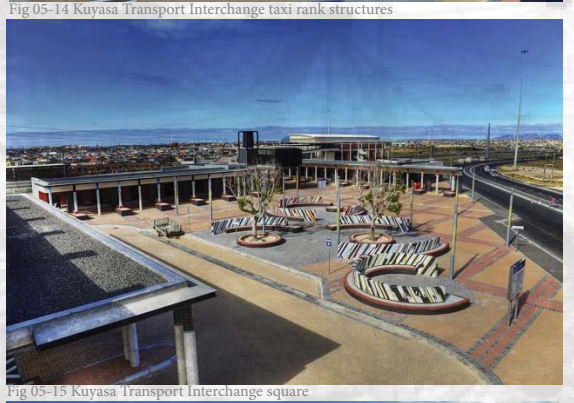


Fig 05-15 Kuyasa Transport Interchange square

Fig 05-16 Kuyasa Transport Interchange space defines by the building

PROGRAMME ACTIVITY DRIVER ON A HUMAN SCALE

GLASS COLLECTION and PROCESSING

4. Ngwenya Glass Factory – Muldersdrift

- 12 staff members all together run the glass blowing business
- R100 000 to run the furnace for a month constantly
- A payment of 50 cents per kilogramme only acts as an extra income, and not the primary income

Glass blowing facility

1. Collection Point
2. Pay per kilogram: buy back system – 50c per kilogram
   There is not a constant amount of glass that is brought in each day. It depends from day to day

   Wash labels off and clean outside

3. The glass is broken into pieces, but not crushed completely into powder

4. The furnace is run on RECYCLED OIL
   An oil tank is has a capacity of 4 500 litres, which last just under a week
   An oil tank costs R3 500

5. Pump and Fan room
   Pump room: fan and burner work on VENTURI principle
   Air pulls in and out and ignites flames, BURNER just outside the furnace, CHIM NEY from furnace

6. FURNACE: Furnace is made of 4 layers of insulation BRICK

   Different furnaces are required for different colours of glass

   Takes a week to reach temperatures
   Starts with gas burners around the furnace, gradually picks up temperatures in increments of 10 degrees Celsius, until it reaches 1000 degrees Celsius
   Then the main burner is turned on until it reaches 1250 degrees Celsius

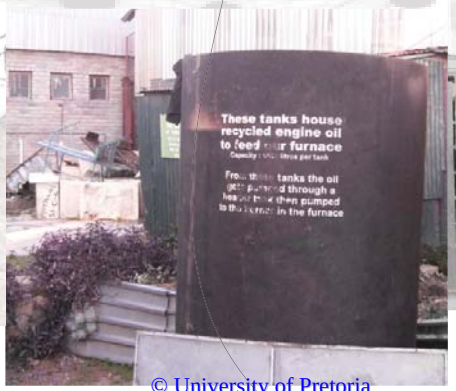
7. The furnace is loaded with glass at night, left to melt during night, some more glass is added during the day if necessary, as volume decrease when glass melts
   The furnace runs at 1400 degrees Celsius during the night and cools down to 1250 before one can work with it
   Melt glass during the evening so that one could do the glass blowing by day
8. There are 6 glass blowers
   Works with glass till it's about 600 degrees

9. Annealing oven: stress relieving
   This oven cools down glass slowly from 550 degrees Celsius to room tempera ture. This happens during the day in increments of 10 degrees Celsius
10. Colour additives, are added separately when working with glass. Glass balls are rolled in coloured crystals while the glass blower forms the glass.
    Steel mould also allow for shapes to be casted: Casting in moulds
11. Cutting room
    Glass is cut by blade under running water to prevent glass dust from forming

12. Grinder room: A grinder is a steelSteel plate that turns in order to crush the glass: add silicon carbon powder to the cone above the plate; - let water run through the cone onto plate where grinding takes place

13. The next step is to smooth the grinds out with cork conveyer belt belt, which measures between: 120 millimetres and 220 millimetres in width

14. EXTRA additions to the glass treatment include pasting of different glass parts and sandblasting of patterns. The glue is dried and strengthened under a uv ultraviolet light.



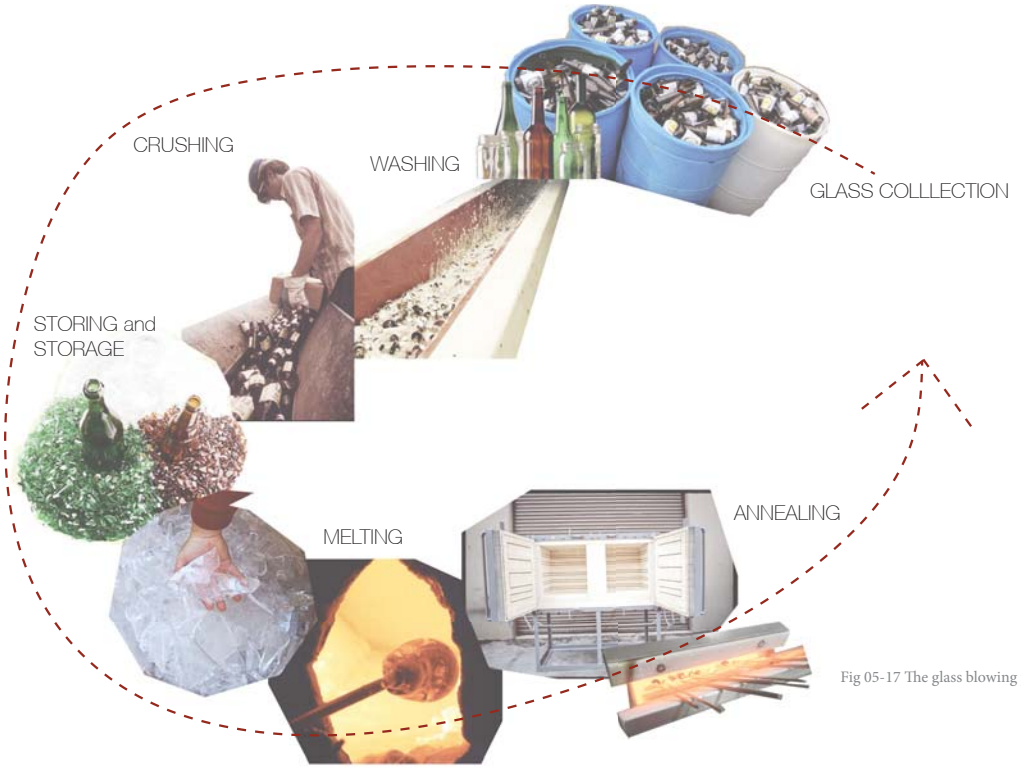


Fig 05-17 The glass blowing process

Fig 05-18
Collection of photographs explaining the process at the Ngwenya glass blowing factory

PROGRAMME ACTIVITY DRIVER on an INDUSTRIAL LEVEL

GLASS PROCESSING on a larger scale

5. NAMPAK Glass Recycling Plant, Germiston

Waste glass recycling plant
Glass Wool INSULATOR in architecture

400 tons of glass per day
example of 64 000 bottles per machines per day

Production stages and machines

1. Bottle Supply Hopper
   The bottle supply hopper can hold about 4.5 m3 (3.5 t) of waste glass bottles and the vivratory feeder attached to the hopper bottom supplies glass bottles firmly to the conveyor.
2. Crusher
   Waste glass bottles carried in by the conveyor are crushed in a single process into cullet less than 6 mm in size by a compact crusher having a diameter of 1,600 mm.
   Glass bottles are compressed and crushed by rollers, which is based on the mechanism of the mill.
3. Cullet Mill
   Glass cullet of less than 6 mm in size produced by the glass crusher is further milled to produce glass powder. The cullet mill is a tube mill modified for glass cullet. Its inlet can easily take in glass pieces of different sizes and shapes, and its outlet discharges glass powder in the order of smaller specific gravi ties. The produced glass powder is separated from paper, such as bottle labels, by a rotary sieve within the two-layer hopper.
4. Powder Sifter
   Glass powder produced by the cullet mill is sorted according to grain sizes, and powder of the specified grain size is taken out. Connection with a powder conveyor allows the continu ous sorting of powder.
5. Powder Conveyors
   Powder conveyors transfer glass powder from the cullet mill, the powder sifter, and the mixing machine.
6. Mixing Machine
   Glass powder sorted out by the powder sifter and two types of foaming materials are automatically measured and mixed. These materials which are different in quantity, specific gravity and shape, are thus uniformly mixed.
7. Glass Melting Furnace
   50 m, furnace
   Fire every 20 minutes
   Gas rather than electricity

   Fiberizing and Forming
8. Curing and Baking Machine
   Powder mixture produced by the mixing machine is baked to make a light porous foamed material. The baking machine consists of a baking section and an annealing section, each of which has a light, insulating and fireproof structure. The machine also has a wire-mesh belt conveyor to allow continu ous baking.
   Longitudinal and transversal cutting
   Packaging





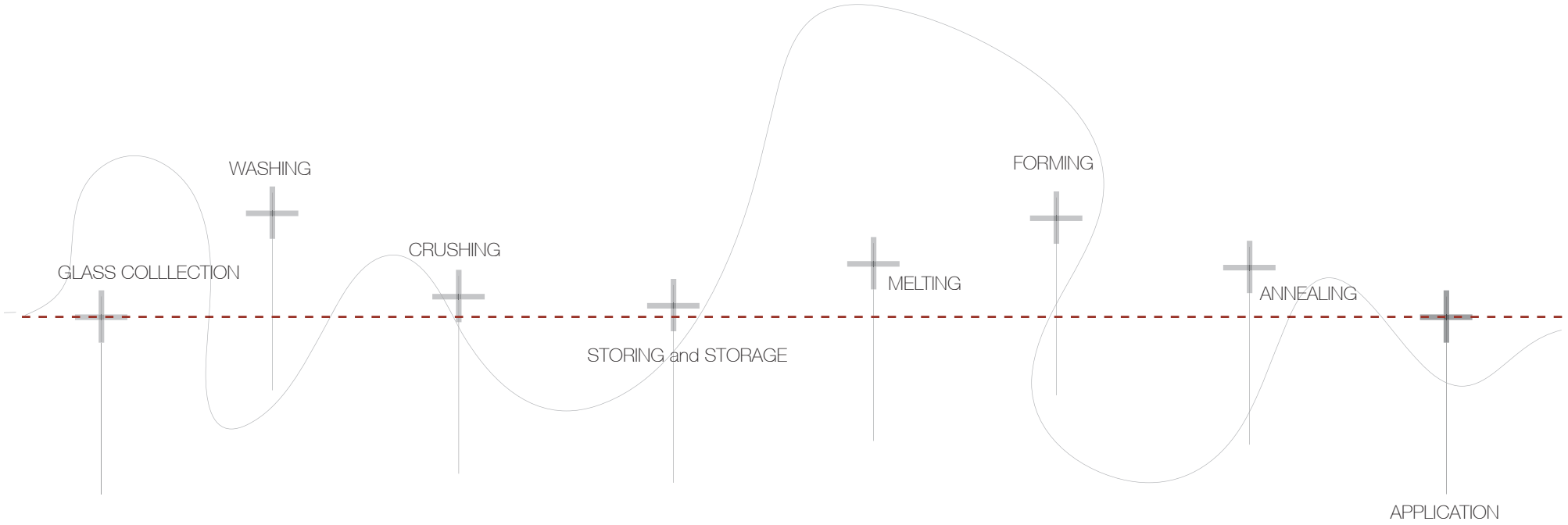



Fig 05-19 The process behind the production of glass wool insulation

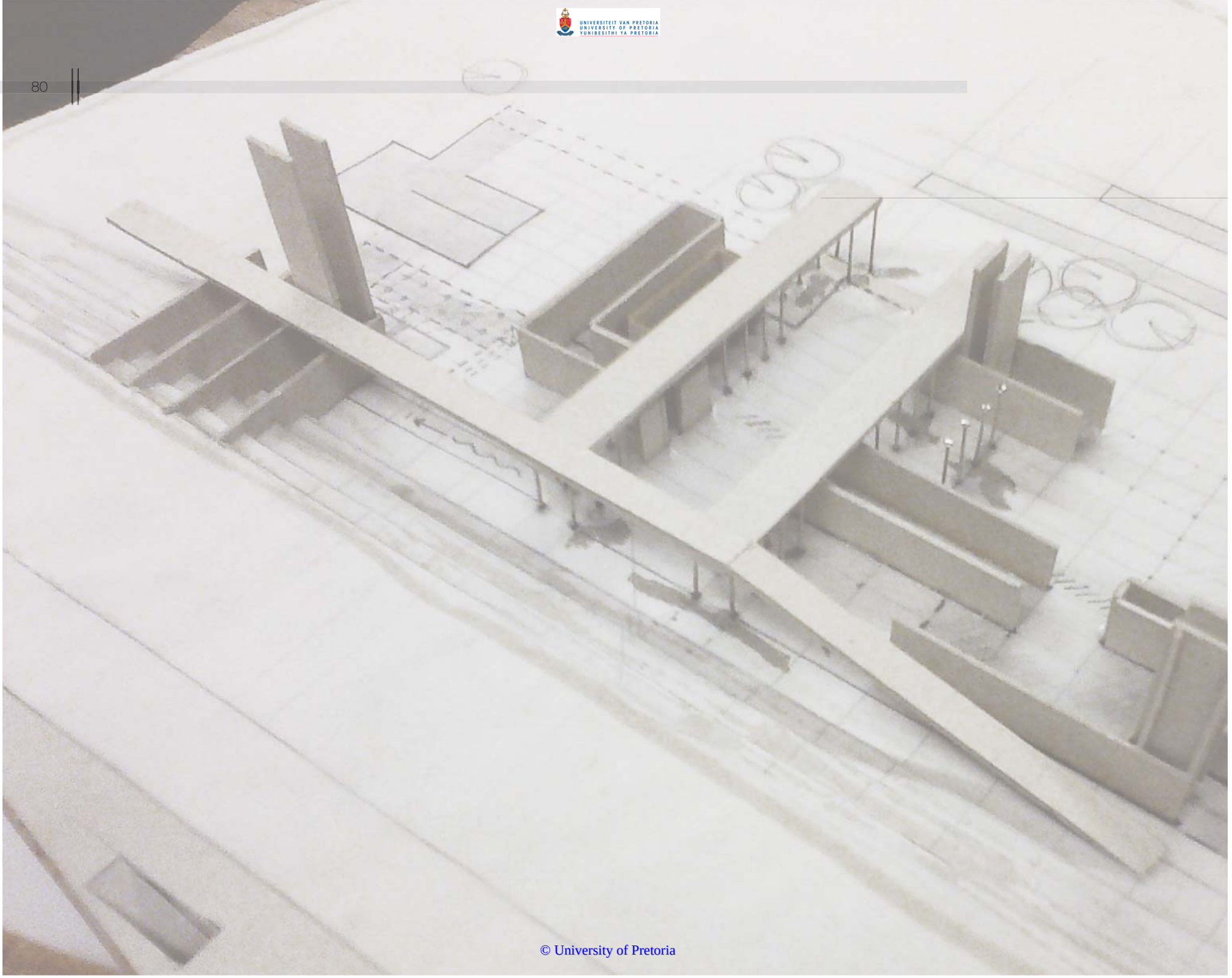
Fig 05-20
Collection of photographs explaining the process at the NAMPAK glass processing factory

CONCEPT and DESIGN DEVELOPMENT 6

+ REDEEM AND TRANSFORM

The aim of this project was to create a space which would transform and change the currently dormant landscape of Eerste Fabrieken Train Station into a functional, useful place by adding new infrastructure to support the process of glass collection and processing. This building and space should become a threshold that introduces production into a public realm and creates an in-between space which is accessible to the community.

Fig 06-1 Process of layering and exploration



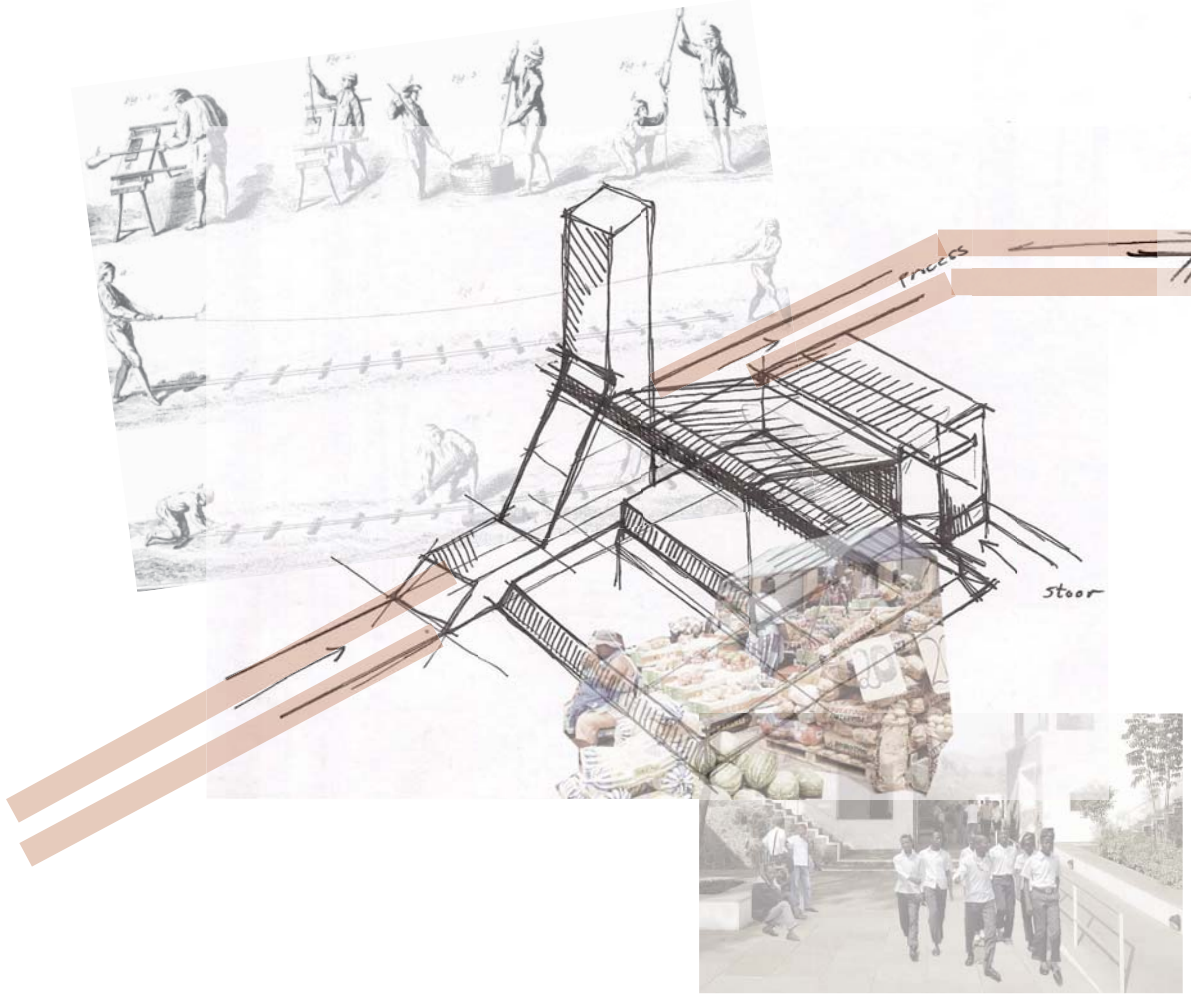
6.1

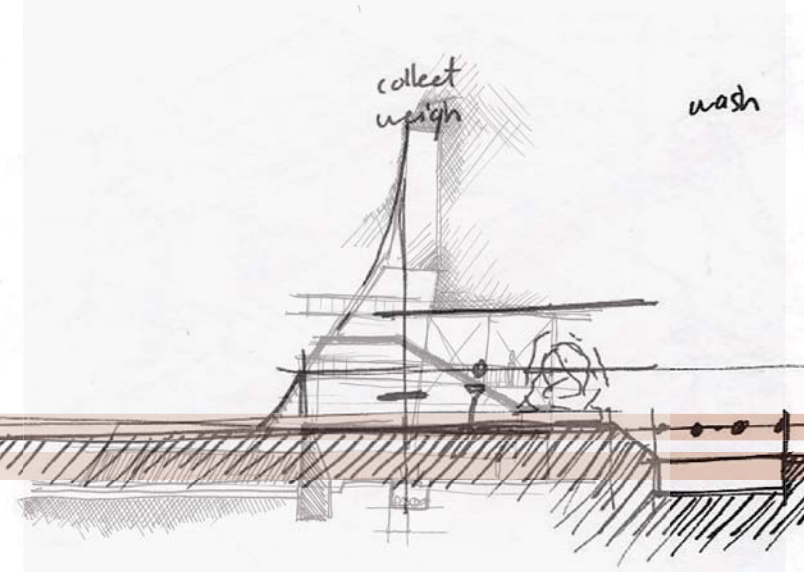
The concept of place making

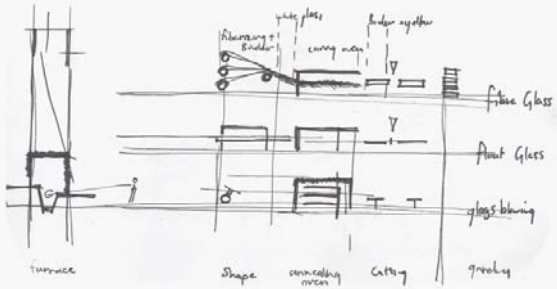
The threshold does not only concentrate on the boundary between the public interface and production, but includes the possibility of creating a passage from one to the other (Eliade, 1959: 18-25). The different zones are defined by the different programmatic functions which would be fully accessible to the public, the movement core in-between, which mediates the spaces, and the productive spaces which would only be visually accessible to the public. If one's interest is focussed only on the public space, everything beyond the public space becomes foreign. The blurred boundaries between the public space, the Eerste Fabrieken Train Station, and the light industrial zone enable participation and interaction. Public participation is crucial to this project, as an activity generator is proposed to regenerate the site functions and significance of place. This activity generator, namely glass collection and processing, is the key to transforming the site into a noteworthy place. By anchoring activity and energy of commuters that move through the station, the site could be revived by removing waste from these "wasted" spaces.

The proposed intervention intends to give structure to a space that once had a thriving industrial component, which disappeared and was replaced by a train station. It has one line of movement in and out of the city with small pockets of industry scattered around the site.

Fig 06-2 Model of site and basic process structures







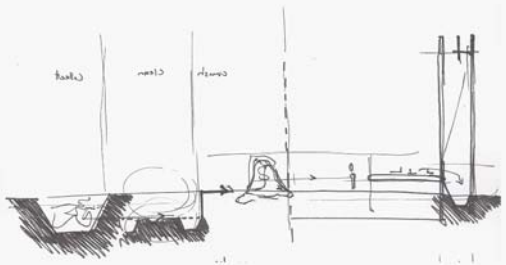


Fig 06-4
The steps in the glass recycling process

Conceptual informants

Context

- Adding infrastructure that would develop into a tangible project
- Anchoring activity in a dormant space
- Forgotten memory of production

Theory

-Generating new activity. Introducing a line of production to the edges of the social spaces to generate activity through participation. Recycling people as well as waste.

-Feedback loop

- o People
- o Waste

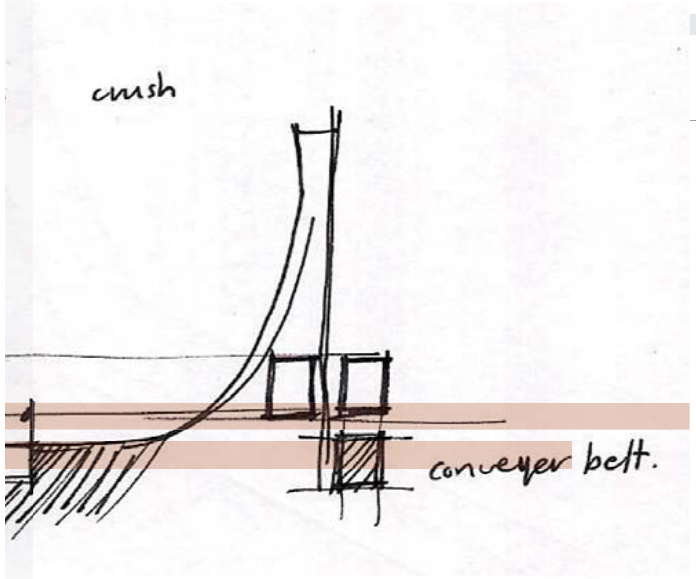


Fig 06-3
Description of the concept were process happens in the background of the public domain

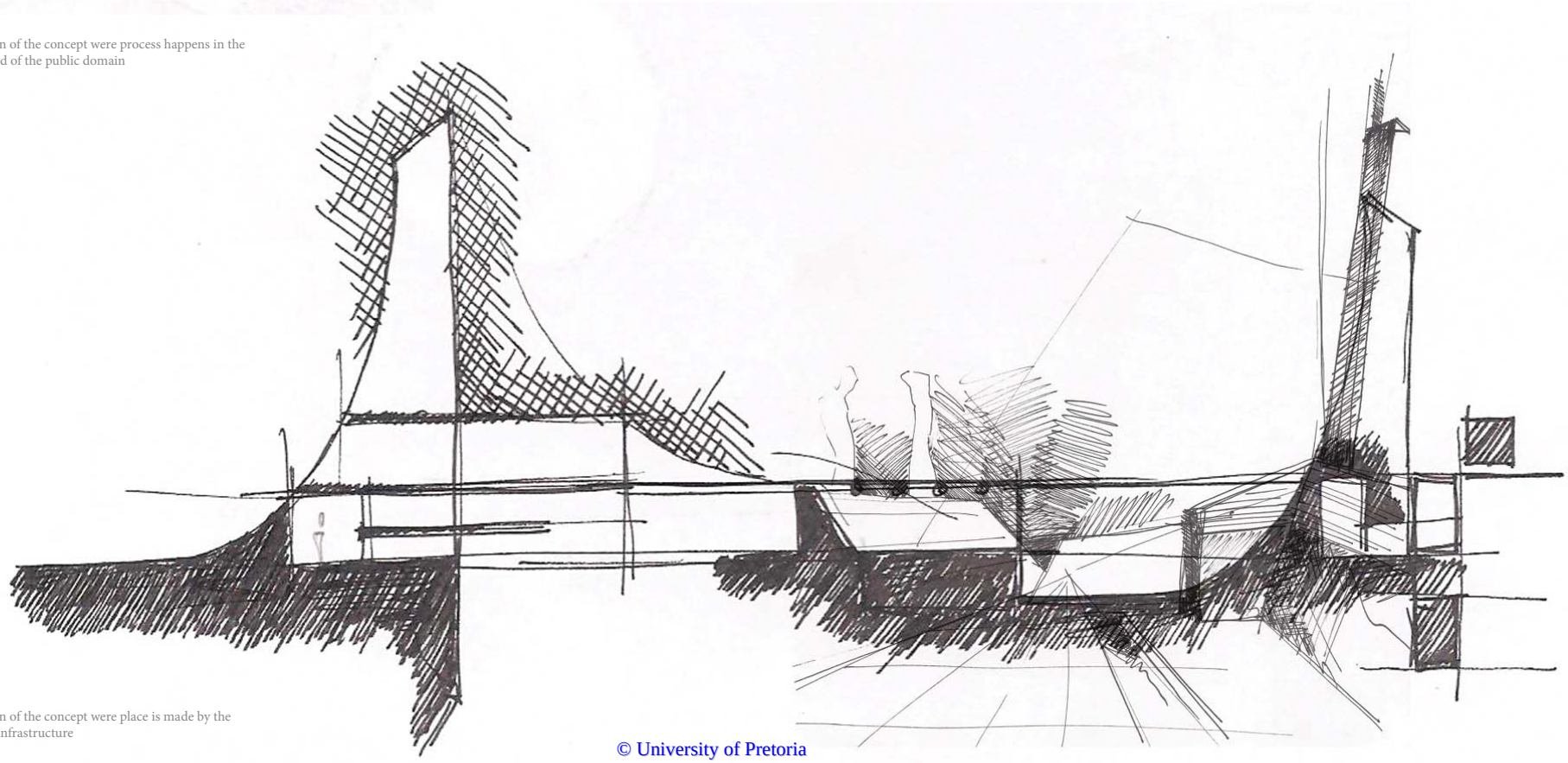


Fig 06-5
Description of the concept were place is made by the adding of infrastructure

Fig 06-6
The Eerste Fabrieken site with proposed structure in white

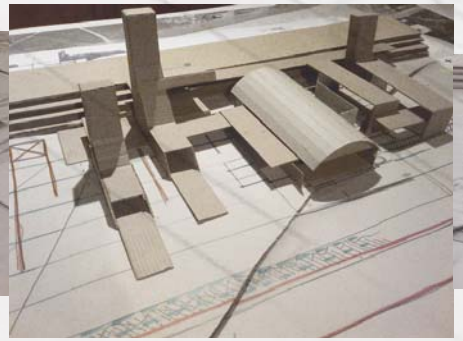


Fig 06-7
Initial ideas to build around the existing station

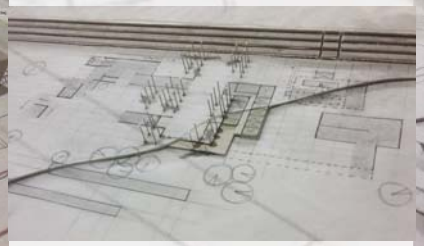


Fig 06-8
The existing column structure of the Eerste fabrieken train station

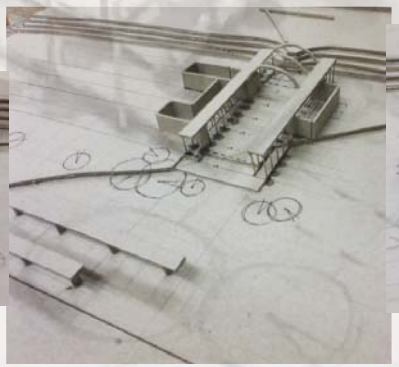


Fig 06-9
The existing column structure, box gutters and wall structures of the Eerste Fabrieken train station

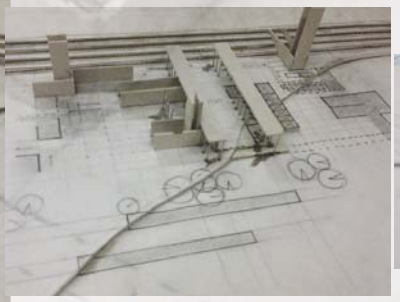


Fig 06-10
Defining the public space and light industry around the existing structures

MODEL EXPLORATION

Fig 06-12
Exploring structures around the station

Fig 06-13
Demostrating how the glass process happens in the back and around the public space

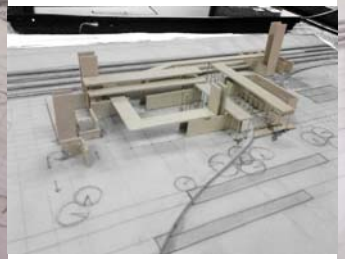


Fig 06-14
Exploring the idea of defining an agora like square

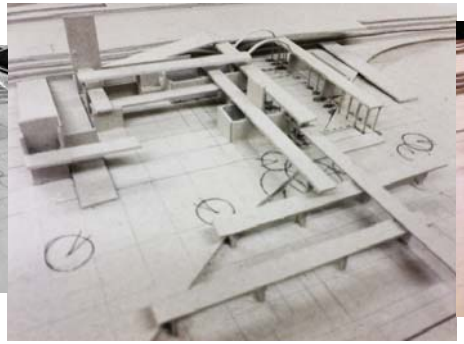


Fig 06-15
Linking the new taxi stop to the square and the station

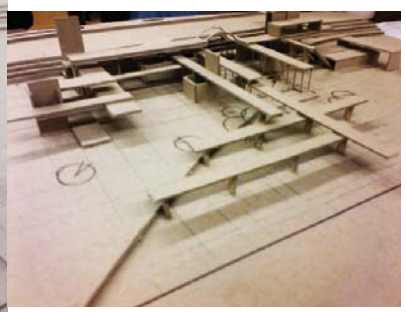


Fig 06-16
Adding the industrial structures to place on the western side of the station

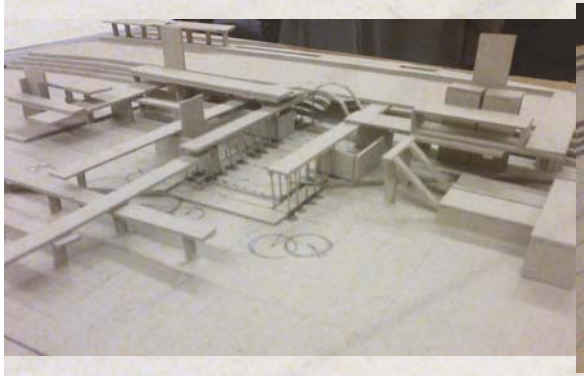


Fig 06-17
The station in relation to the light industry of the western side

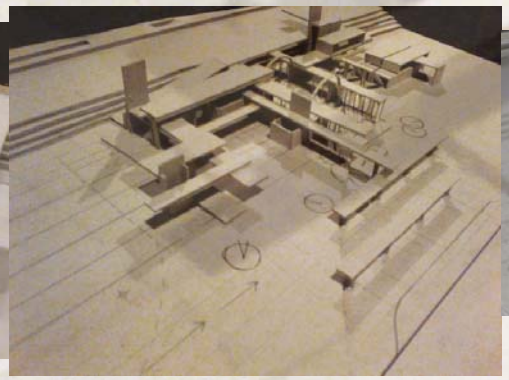


Fig 06-18
The station in relation to the public square

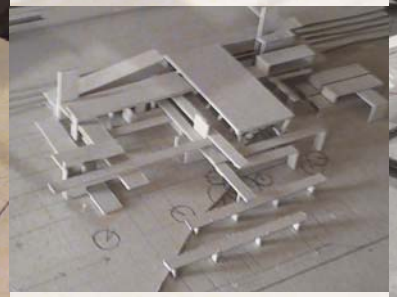


Fig 06-20
The site from in its whole, with proposed building

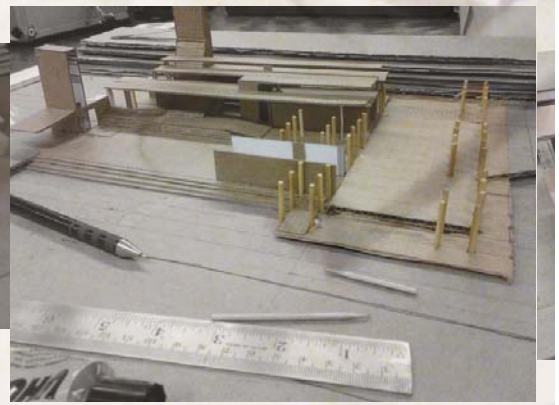


Fig 06-21
The station stripped down to its structure, with additions to the public side of the intervention

MODEL EXPLORATION

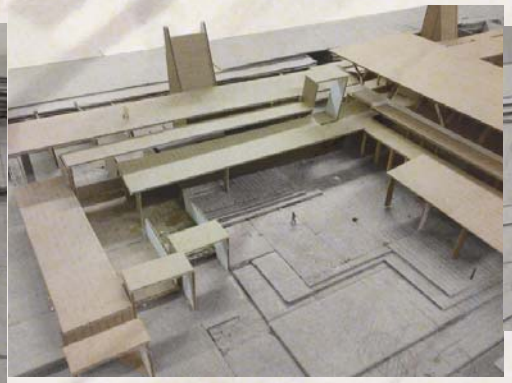


Fig 06-22
The development of the public square showing the glass collection points on the left of the image

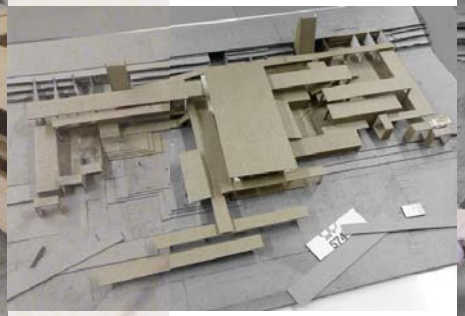


Fig 06-24
The proposed model as a whole

Fig 06-25
The structural exploration of the building as mediating space between the glass blowing activity and the public square

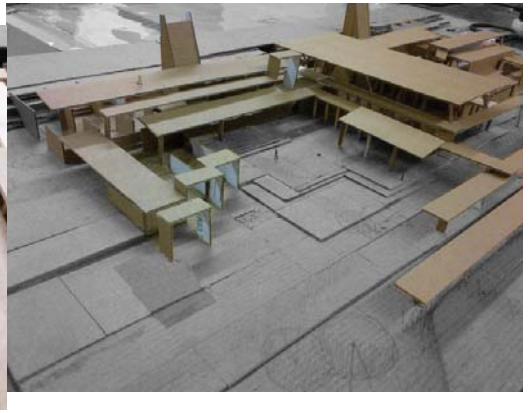


Fig 06-26
The approach from the east toward the proposed building and existing station

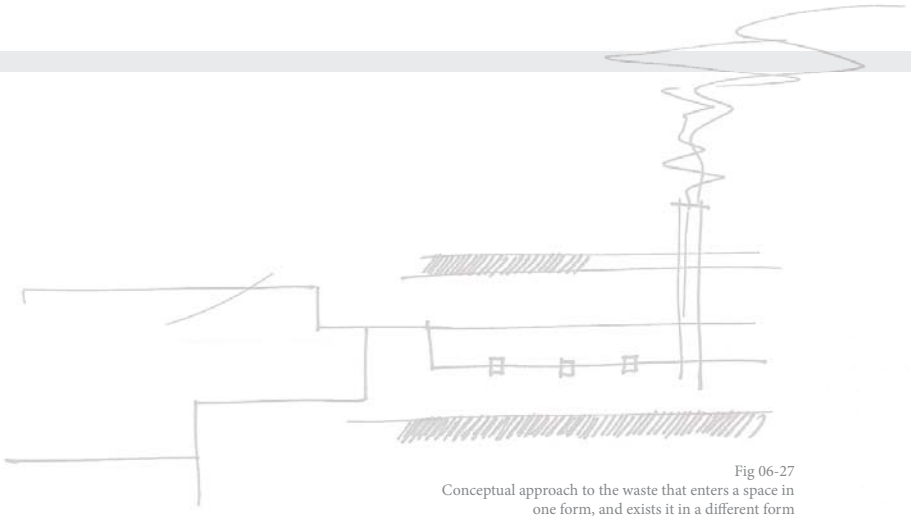


Fig 06-27
Conceptual approach to the waste that enters a space in one form, and exists it in a different form

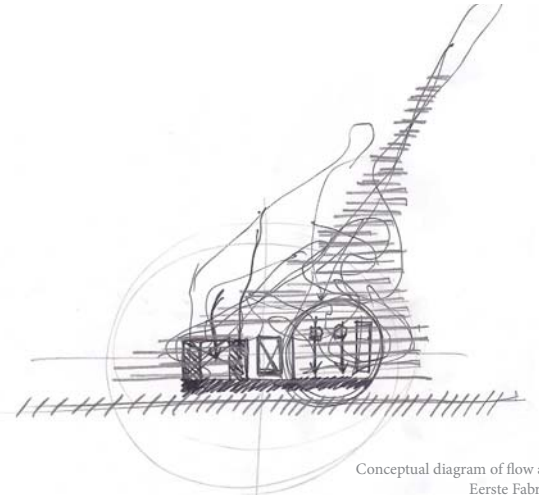


Fig 06-28
Conceptual diagram of flow across the Eerste Fabrieken site

CONTEMPORARY AGORA

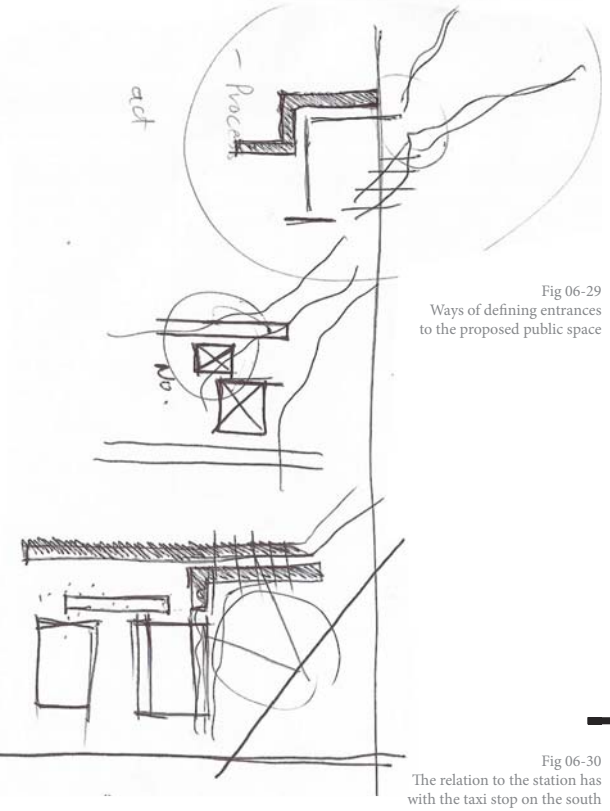


Fig 06-29
Ways of defining entrances to the proposed public space

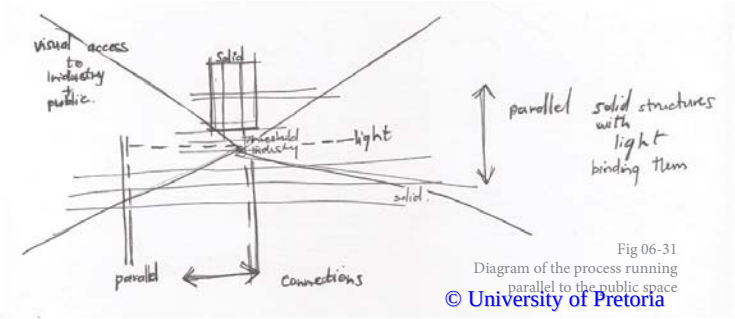


Fig 06-31
Diagram of the process running parallel to the public space

Fig 06-30
The relation to the station has with the taxi stop on the south

CONCEPT of the SITE

Project ideas

Through the process of design, it was also imagined how this proposed building could be rooted back into the settlement, to serve as a community centre. Thus the project was used as a staging ground or experiment to readdress some of these urban and architectural issues in the settlement itself.

A threshold building would allow constant interaction between the two activities, while still maintaining the integrity of the station building.

With the station precinct the intention is to transform from a space of departure to a place for everyday activity.

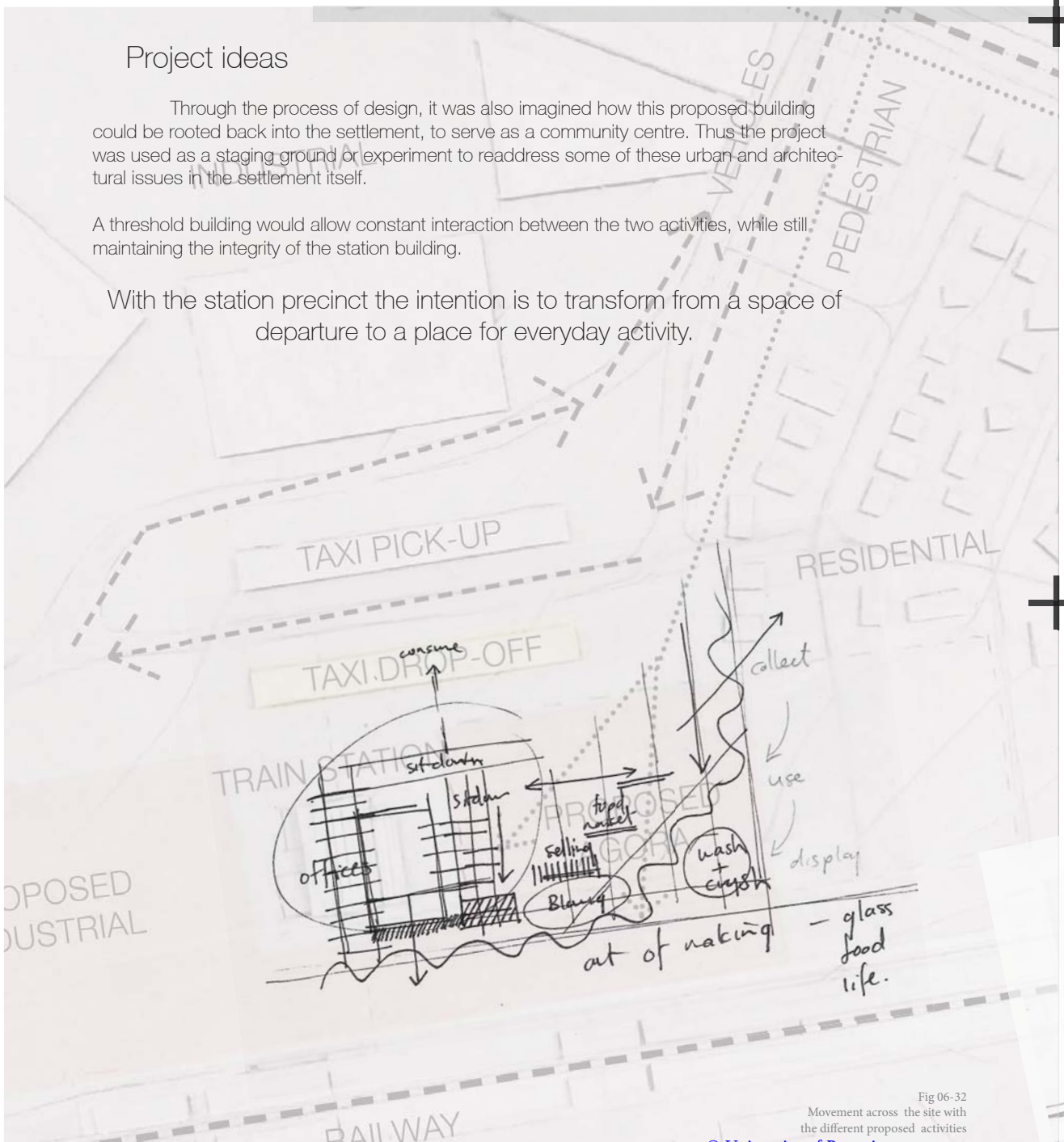


Fig 06-32
Movement across the site with the different proposed activities

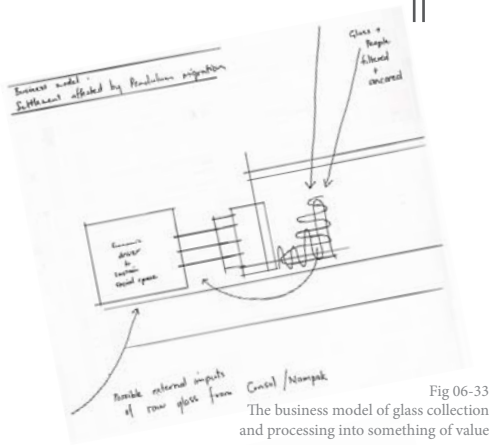


Fig 06-33
The business model of glass collection and processing into something of value

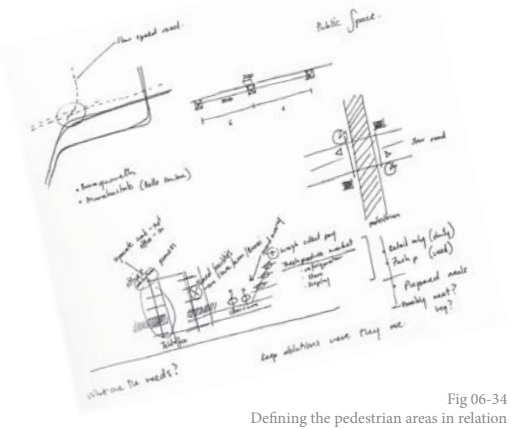


Fig 06-34
Defining the pedestrian areas in relation to areas designated for vehicles

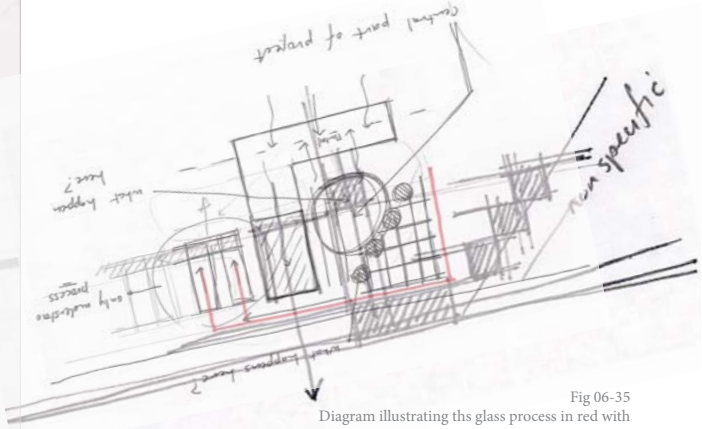


Fig 06-35
Diagram illustrating ths glass process in red with the taxi rank, square and market points

SPATIAL ARRANGEMENT

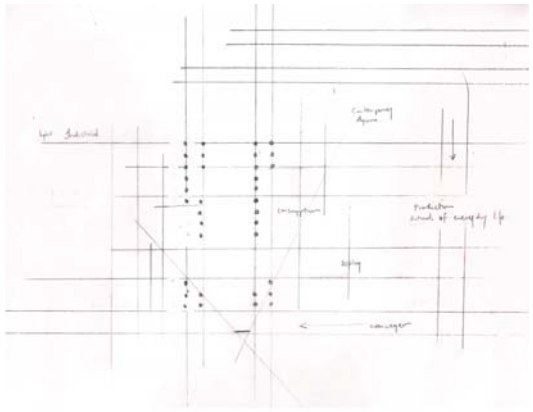


Fig 06-36
Existing structure on site with proposed areas of PRODUCTION_ CONSUMPTION_ DISPLAY

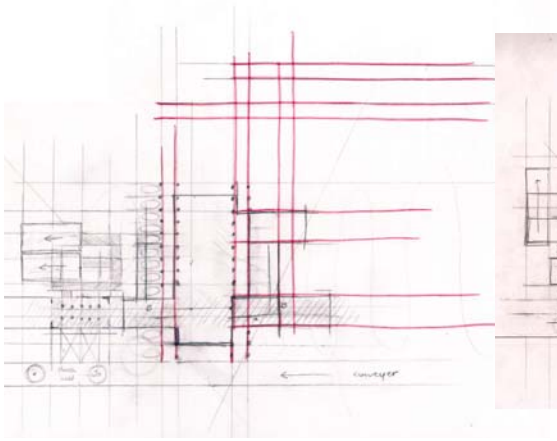


Fig 06-37
Pedestrian movement across the site

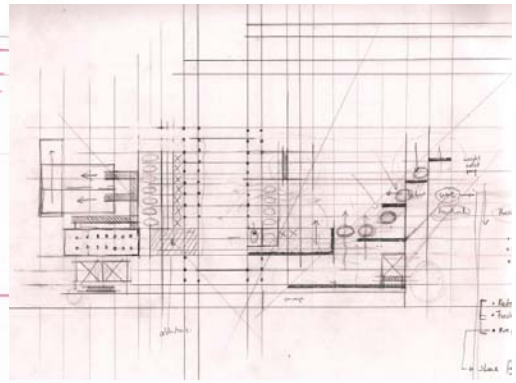


Fig 06-38
Lines of proposed activity across the site

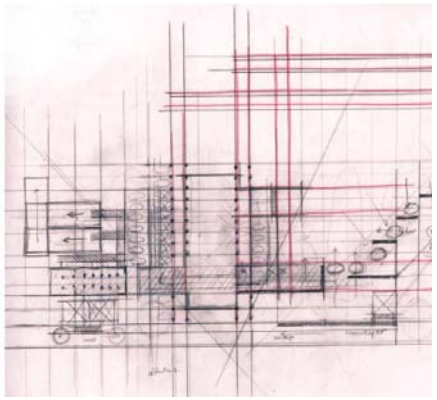


Fig 06-39
Lines of proposed activity in relation to the pedestrian movement across the site

Project intention

This intervention would act as a threshold that could anchor energy in a place of departure by generating activity through production. The intervention would therefore be occupying a space which has become redundant as a result of the historic context and events. The main intention of the spatial design includes

1. defining and controlling open public space;
2. letting the building frame the public space;
3. defining edges and threshold spaces; and
4. introducing a participative activity generator.

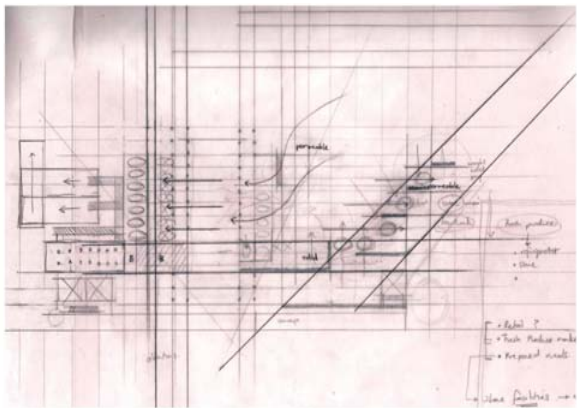


Fig 06-40
Identifying
SOLID and PERMEABLE EDGES

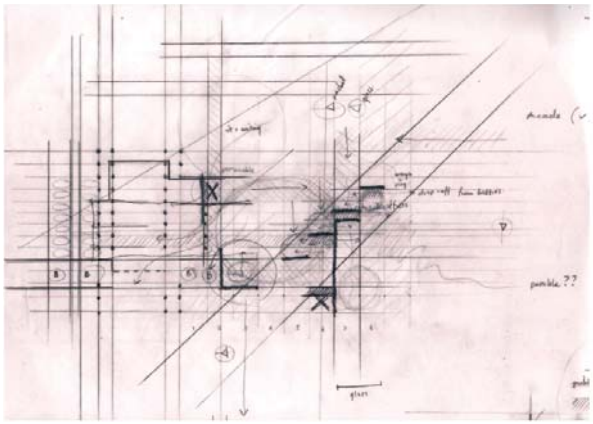


Fig 06-41
SOLID and PERMEABLE EDGES
with different functions on site

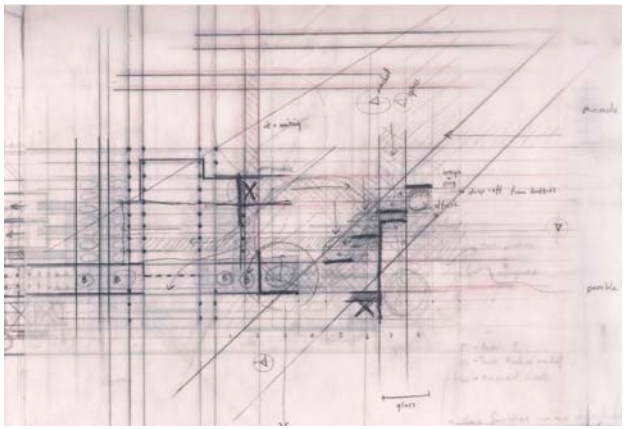


Fig 06-42
All factors considered and layered

SPATIAL ARRANGEMENT

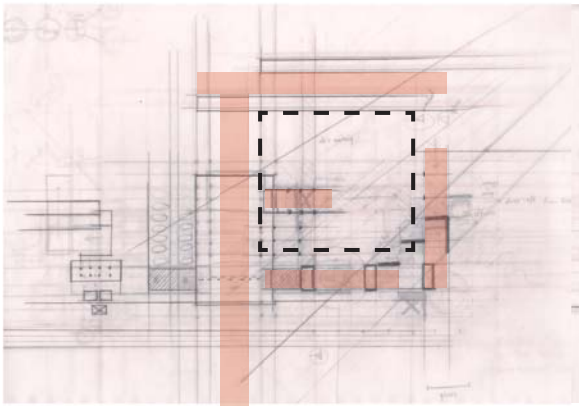


Fig 06-43
Public platforms
Reference to the Stoa's in the ancient AGORA

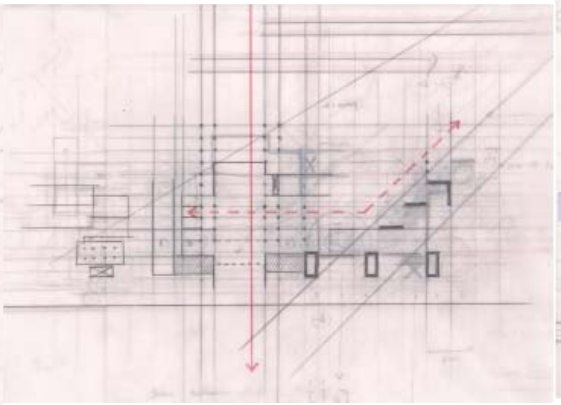


Fig 06-44
Hierarchy of Axis on site

Main existing station axis with an additional axis running horizontal across the site disrupting the constant exit from the station

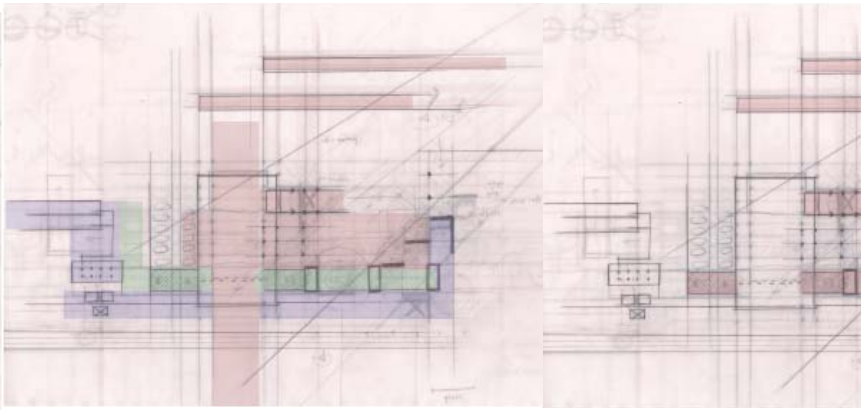


Fig 06-45
Merging social space with productive processes and the space in-between

Fig 06-46
Public spaces
TAXI STOP_ FOOD PREPERATION and CONSUMPTION_ BATHROOMS_ TRADING SPACES_ COLLECTIONS POINTS FOR GLASS RECYCLING

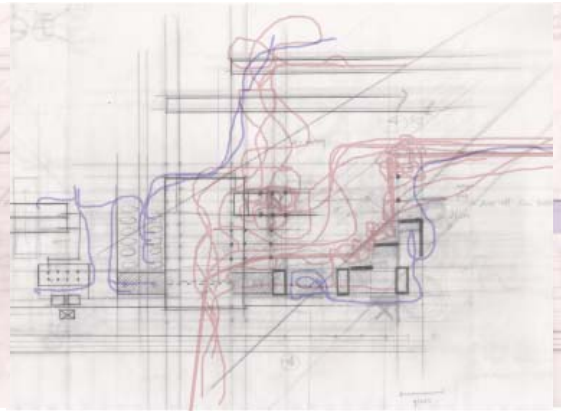


Fig 06-47
Movement across the site

Social movement in red
Movement of workers in blue

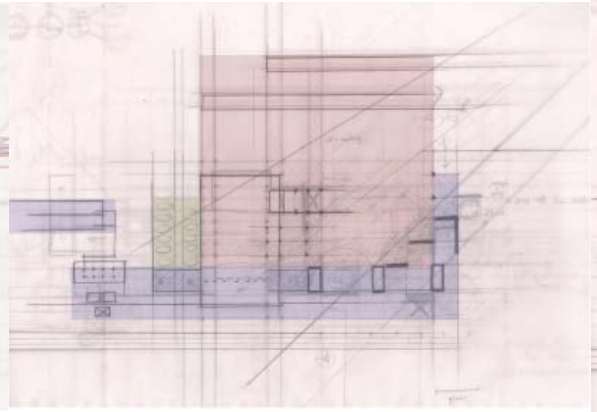


Fig 06-48
Public spaces in red, surrounded by the productive process

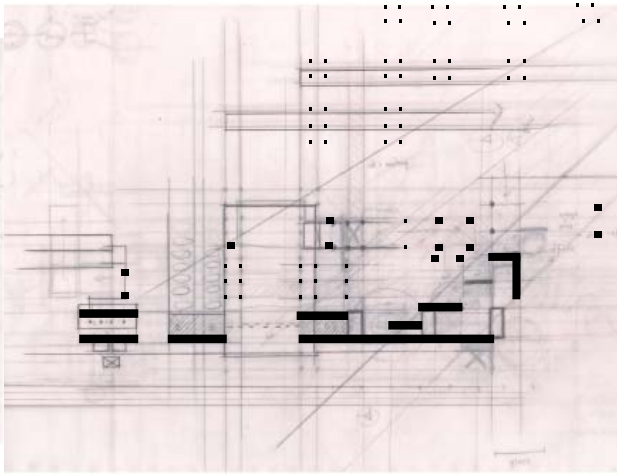


Fig 06-49
Tectonic approach

3 phases and thresholds

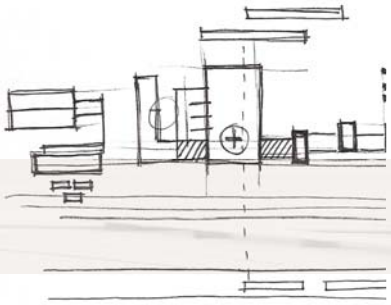


Fig 06-50
Layout of different structures on site

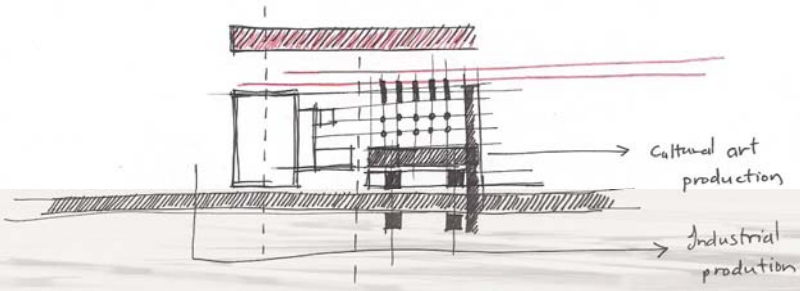


Fig 06-51
The proposed building in relation to the railway tracks on the south and taxi stop on the north

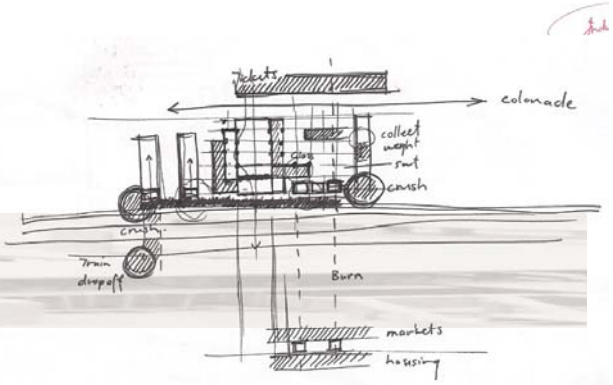


Fig 06-52
The stations in relation to the proposed collection point to the east and light industry to the west

PUBLIC SPACE and the PROCESS

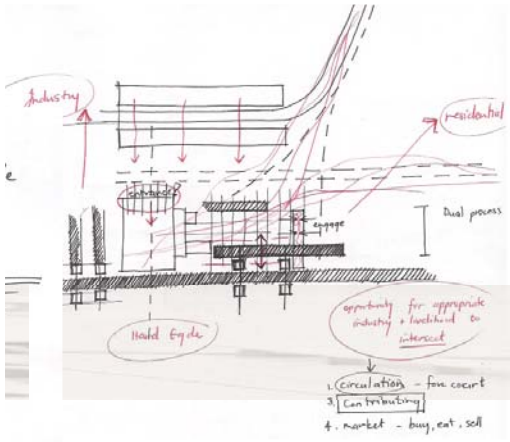


Fig 06-53
Identification of main pedestrian activity from the east and movement across the site

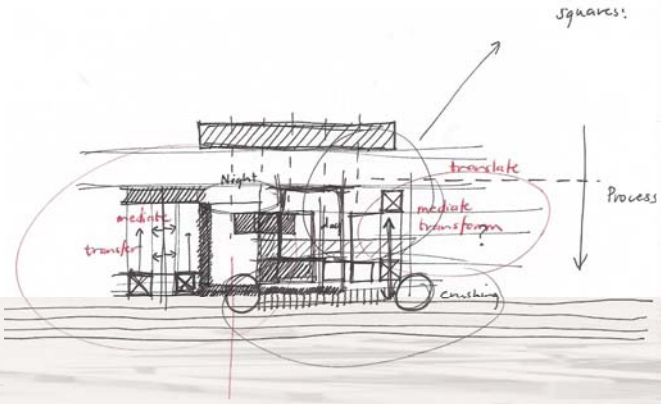


Fig 06-54
The layering of the site stresses the idea of transition and transformation

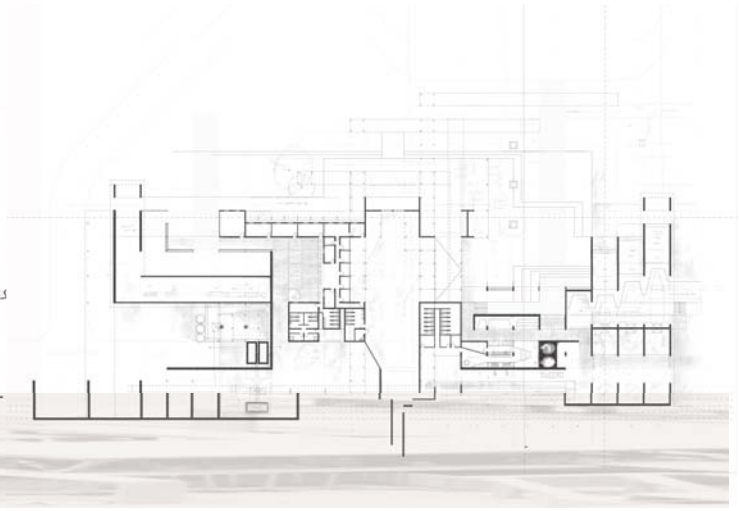
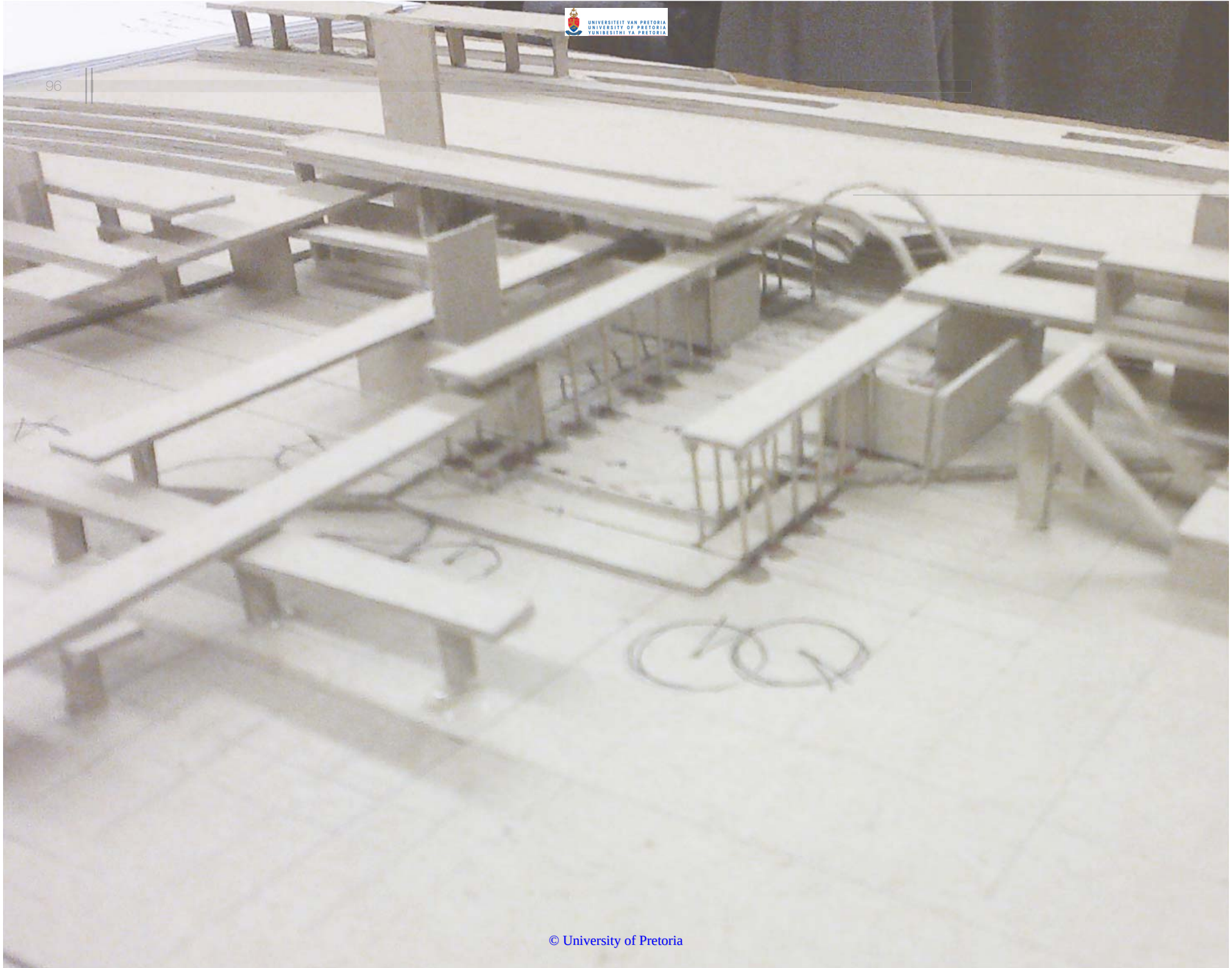
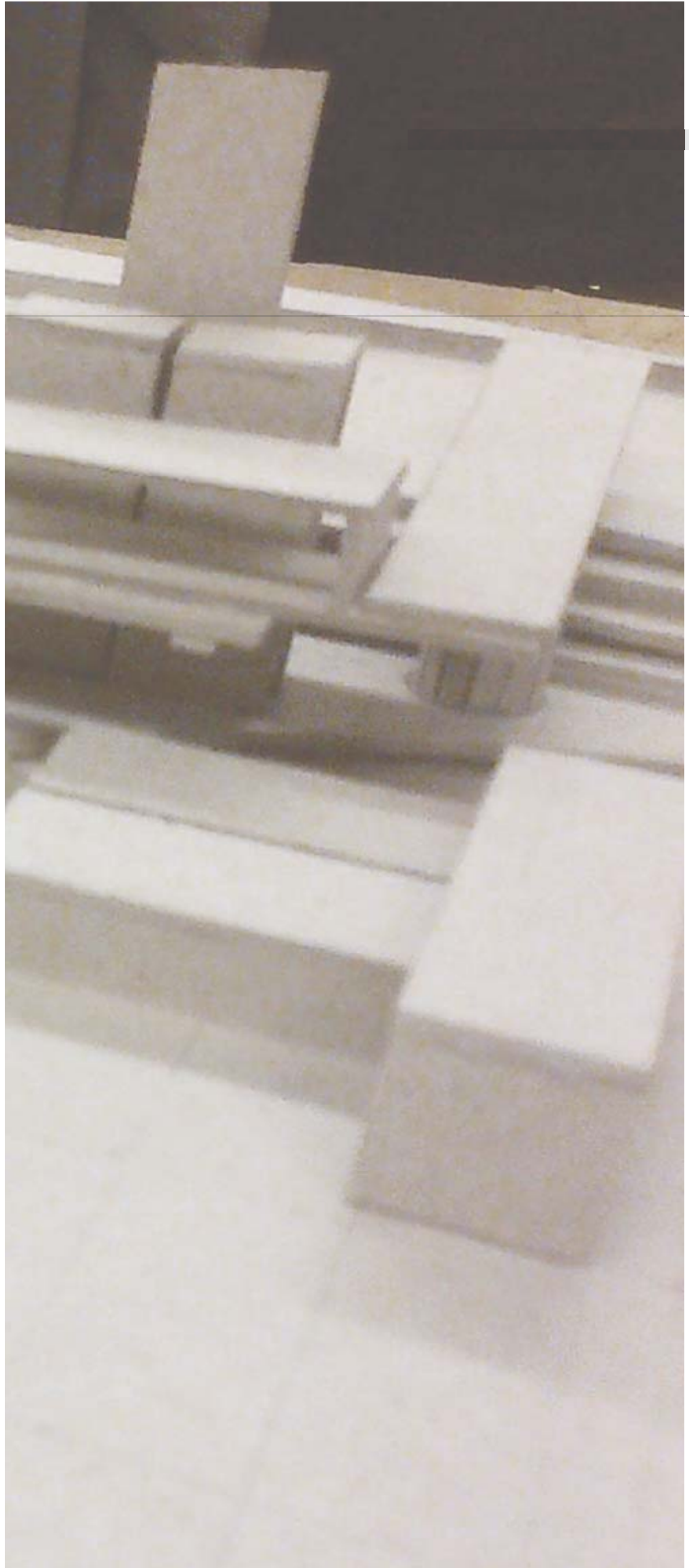


Fig 06-55
The proposed plan presented in October 2013





EXPLORING THE SECTION

Fig 06-56
The model from the north west perspective displaying the public square

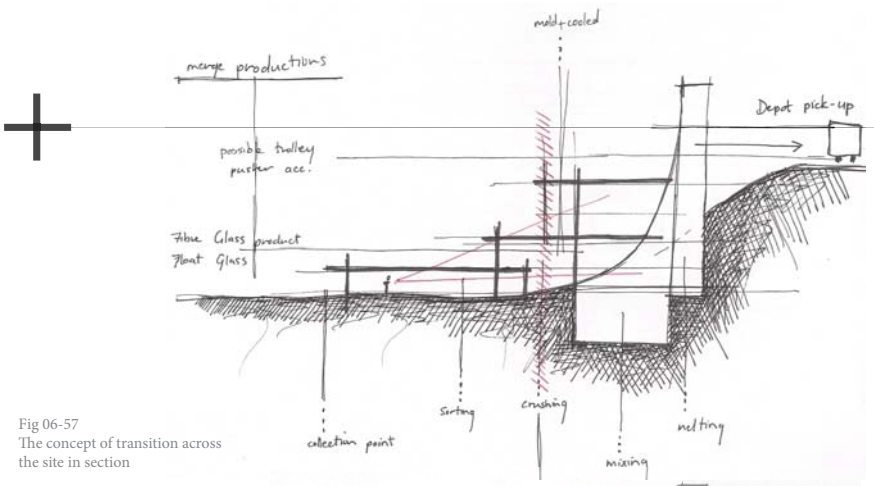


Fig 06-57
The concept of transition across the site in section

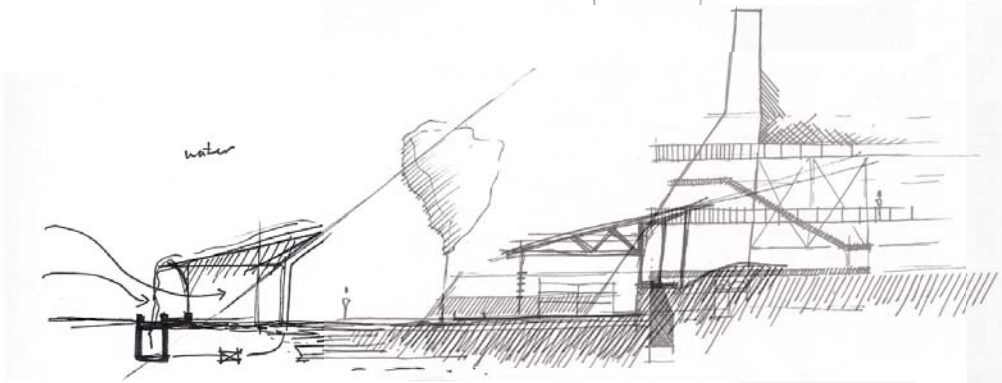
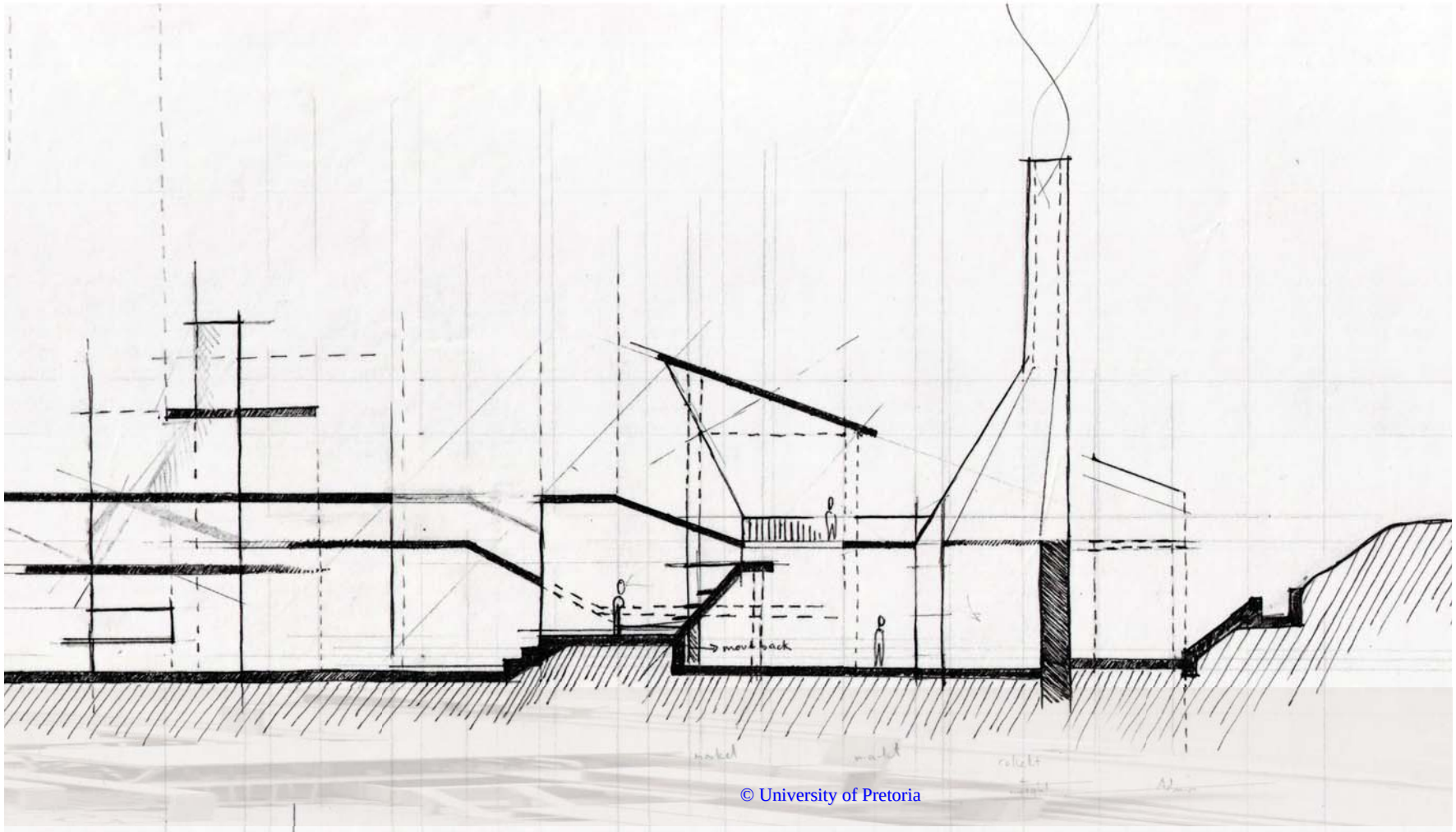


Fig 06-58
The building acting as a threshold between production and the public square

Fig 06-59
Section A-A presented in June 2013

PROCESS in SECTION



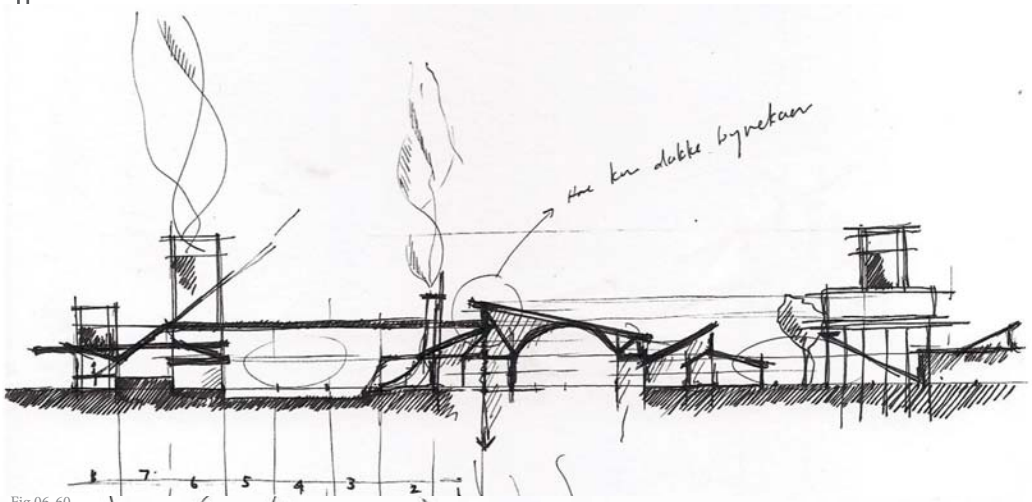


Fig 06-60
Diagrammatic exploration of the section through the station building in relation to the public square

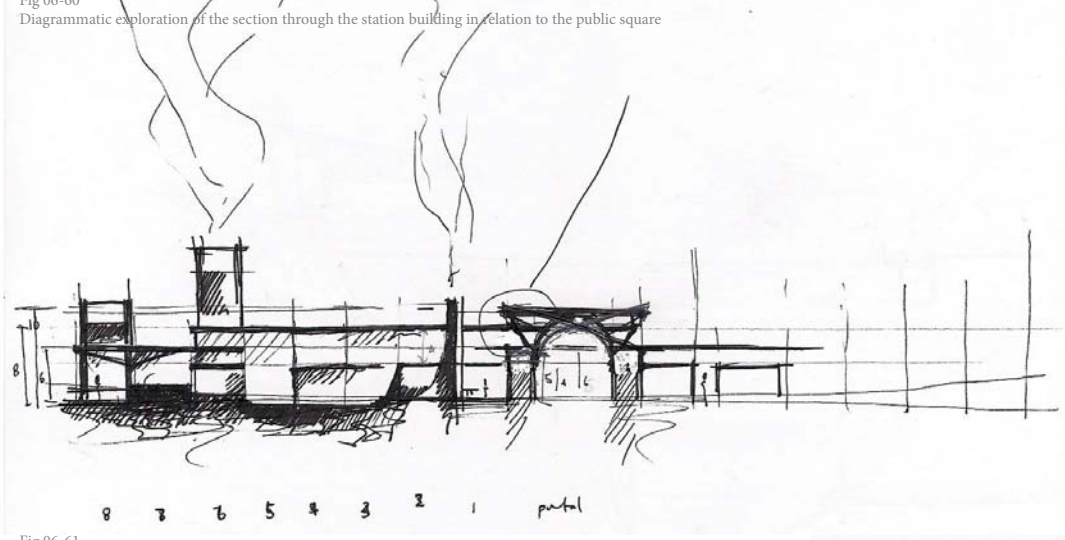


Fig 06-61
Further exploration of the southern elevation

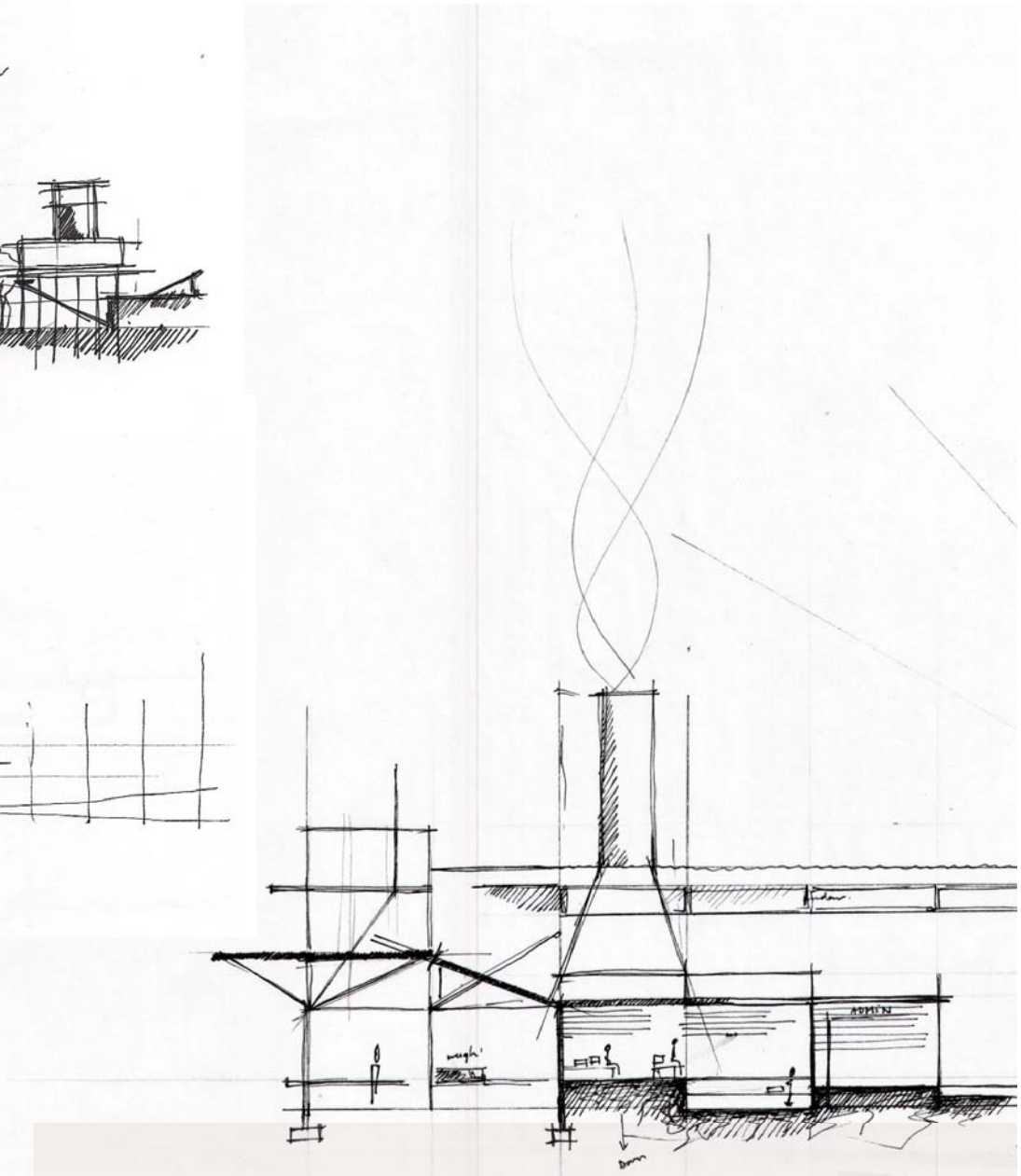


Fig 06-62
Section B-B presented in June 2013

PROCESS in SECTION

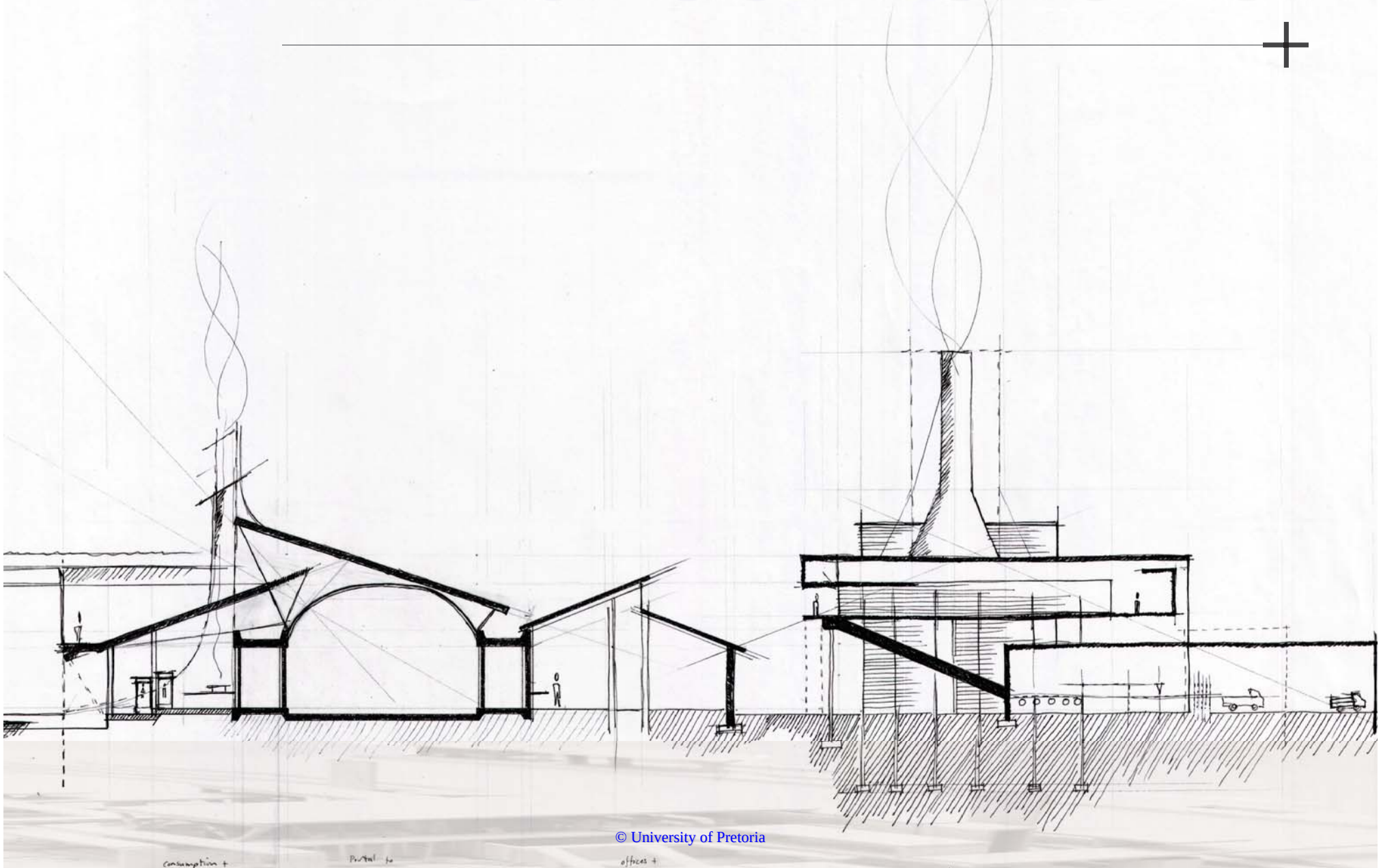


Fig 06-63
Plan presented in June 2013

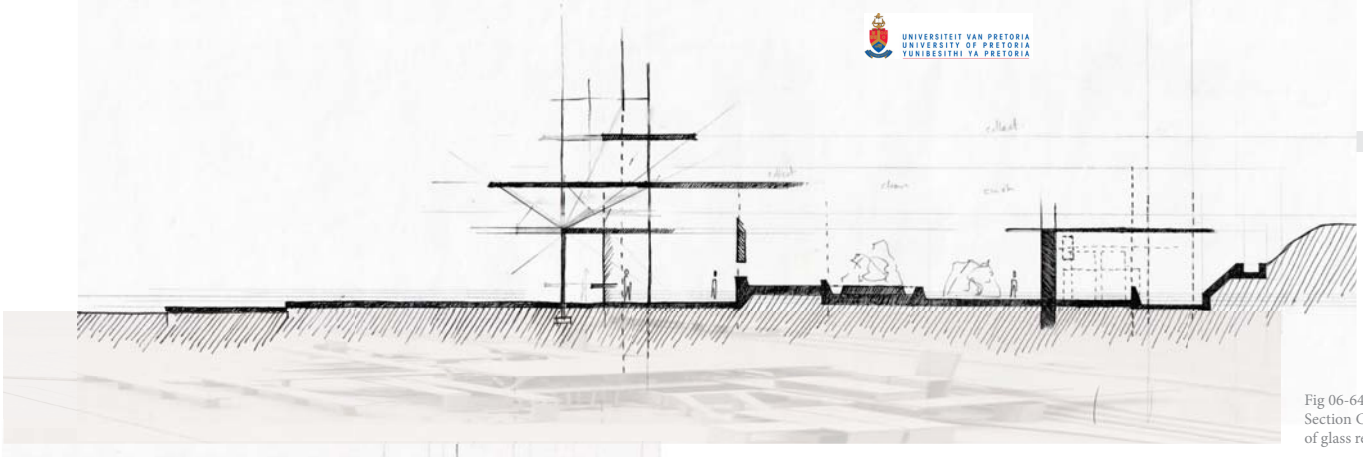


Fig 06-64
Section C-C representing the process of glass recycling in section

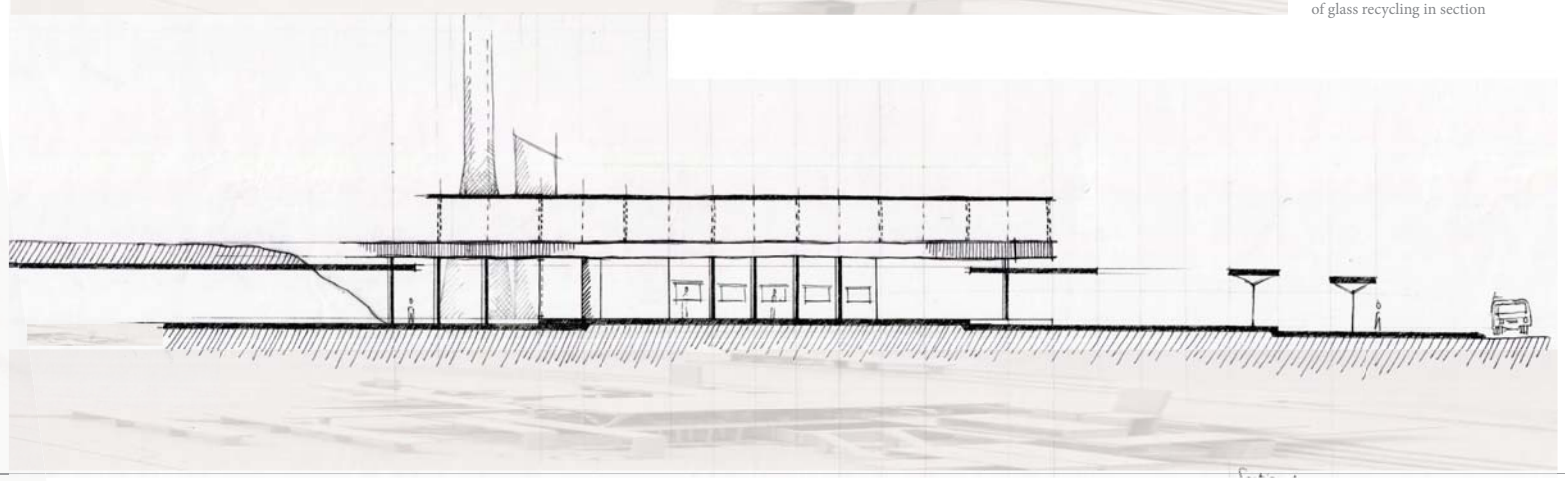


Fig 06-65
Section D-D through the existing station building

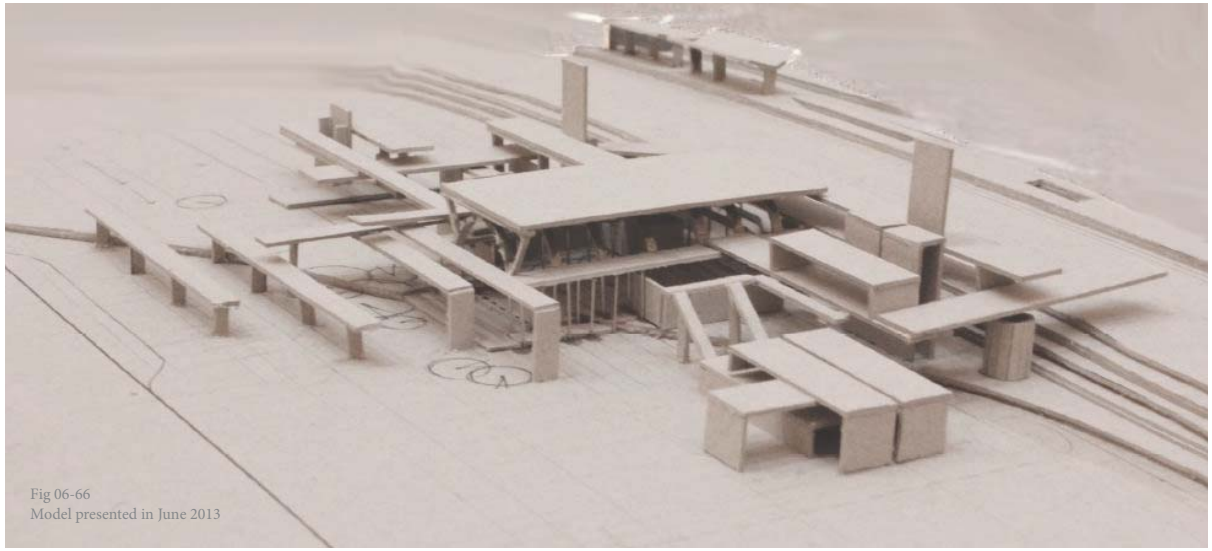


Fig 06-66
Model presented in June 2013

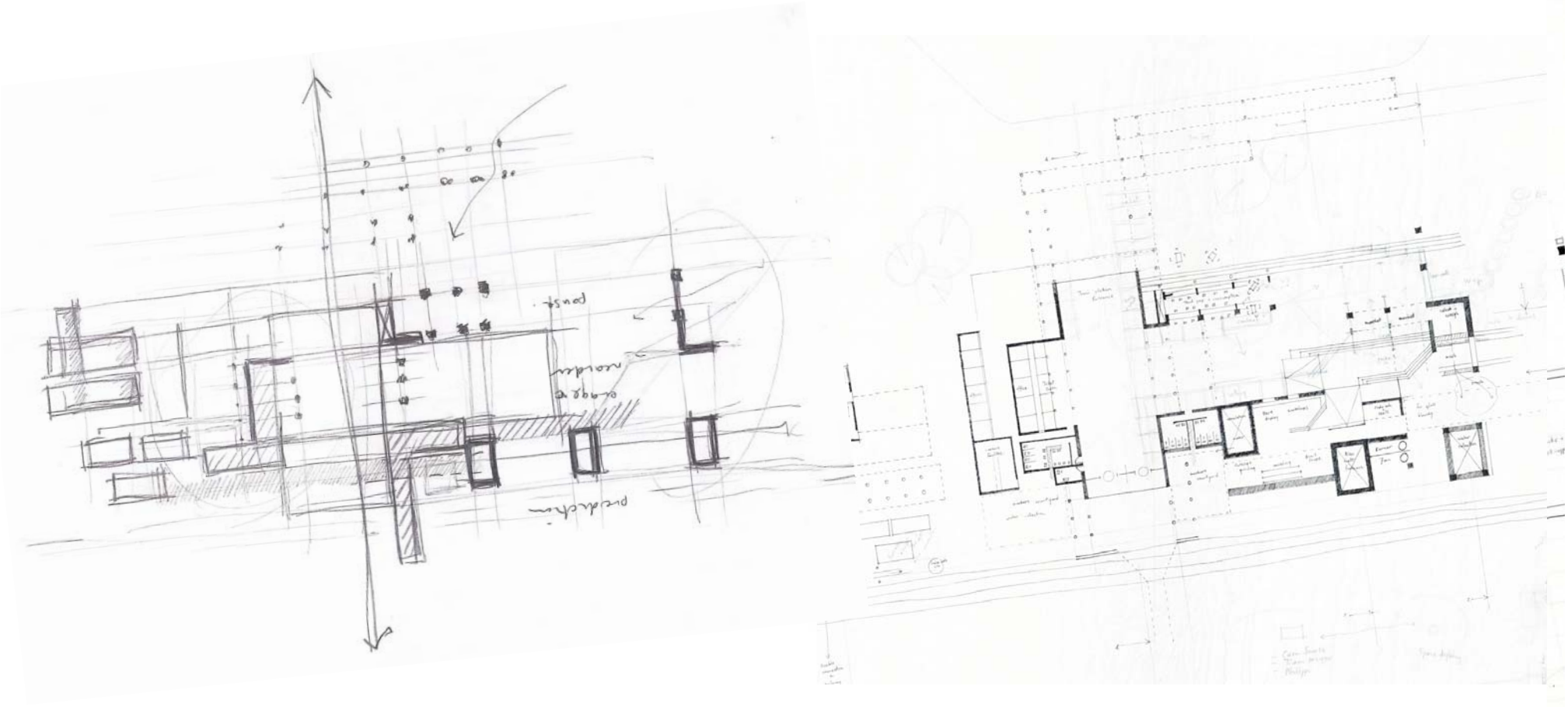


Fig 06-67
PARTI diagram of the plan

Fig 06-68
Plan explored in June 2013

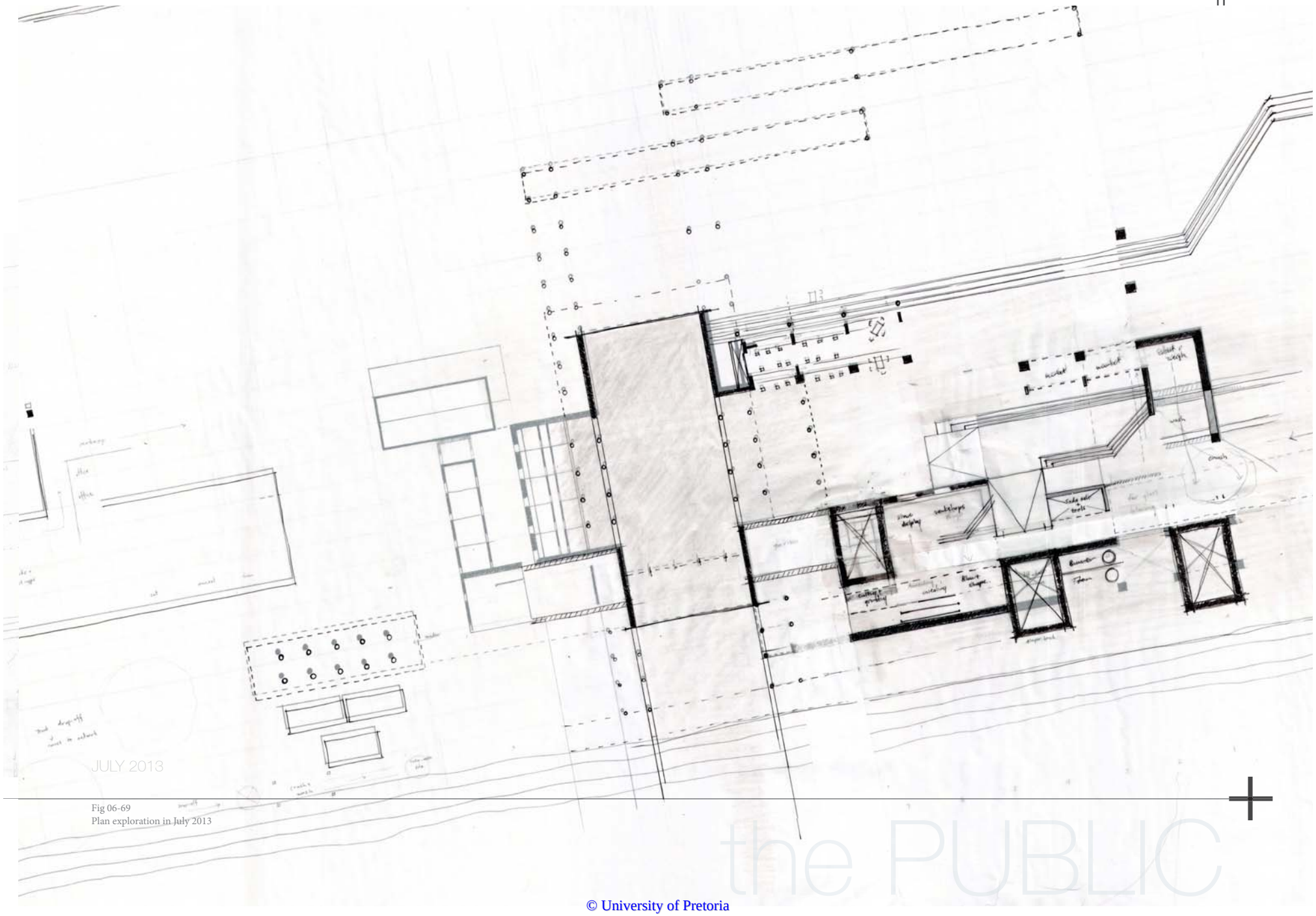
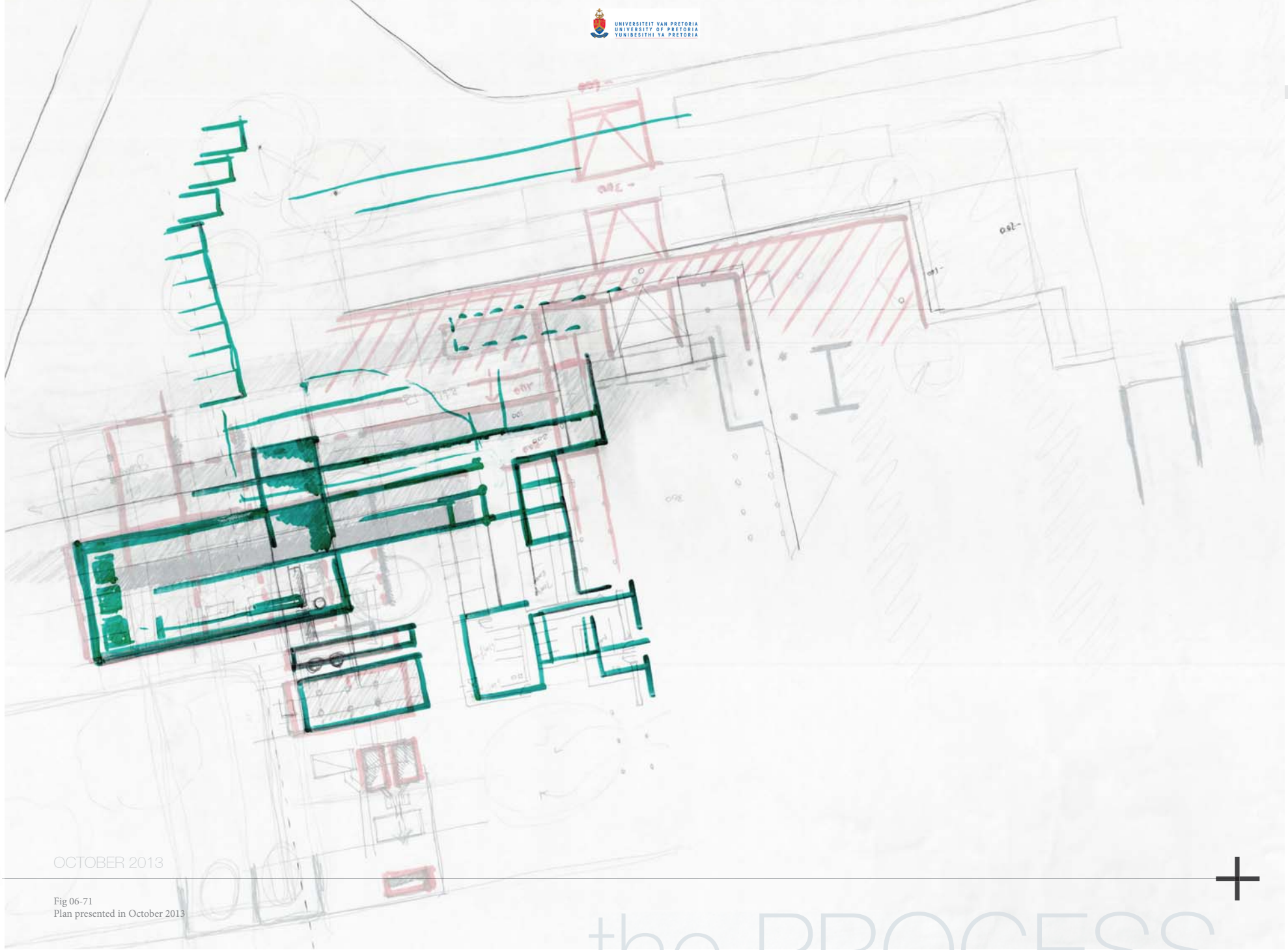


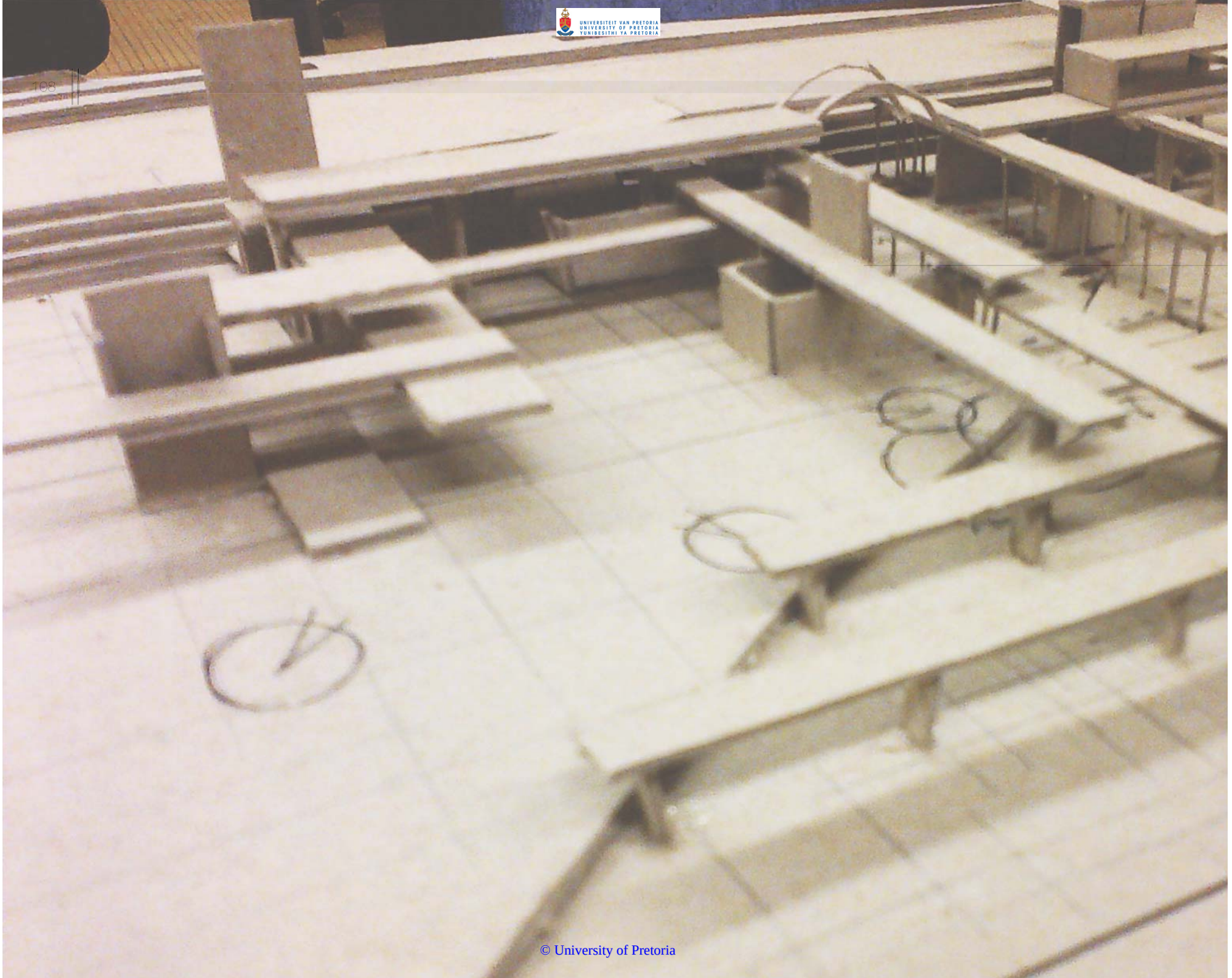
Fig 06-69
Plan exploration in July 2013

Fig 06-70
Plan presented in September 2013



OCTOBER 2013

Fig 06-71
Plan presented in October 2013



6.2

TECHNICAL DESIGN INVESTIGATION

Fig 06-75
Photograph of concept model

Fig 06-72
Photographs of concept models

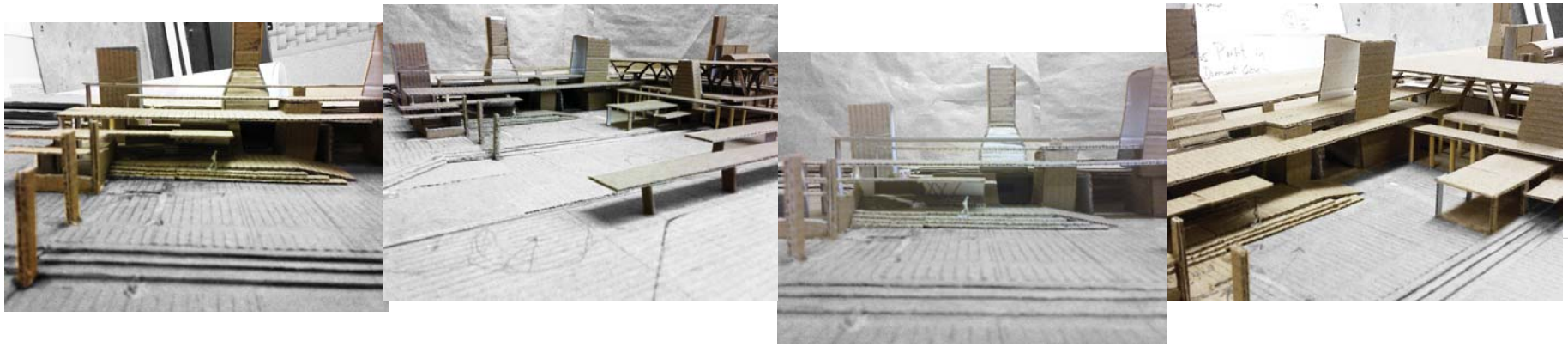
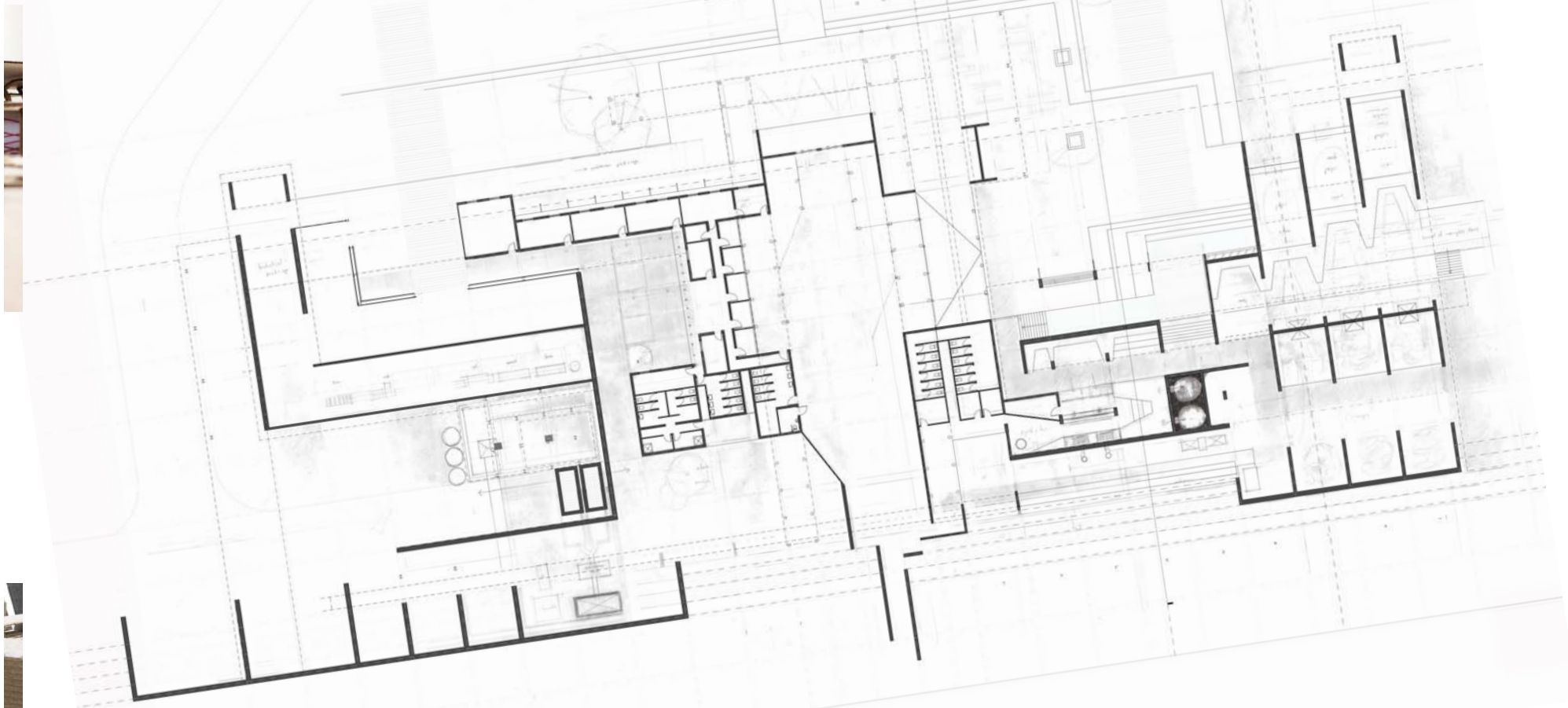


Fig 06-73
Photographs of concept models



OCTOBER 2013

Fig 06-74
Plan presented in October 2013

TRANFORMATION

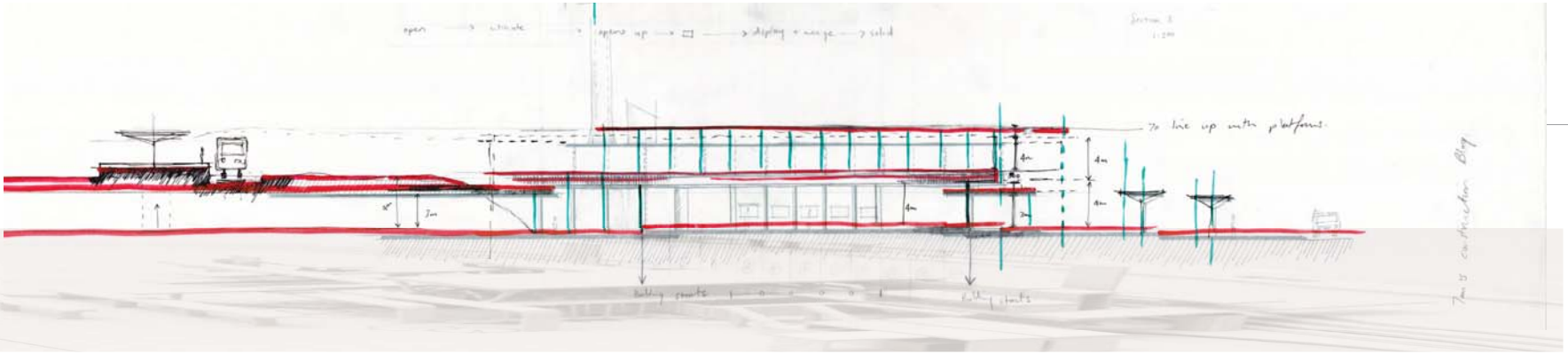


Fig 06-75
Adjusted Section D-D presented in August 2013

AUGUST 2013

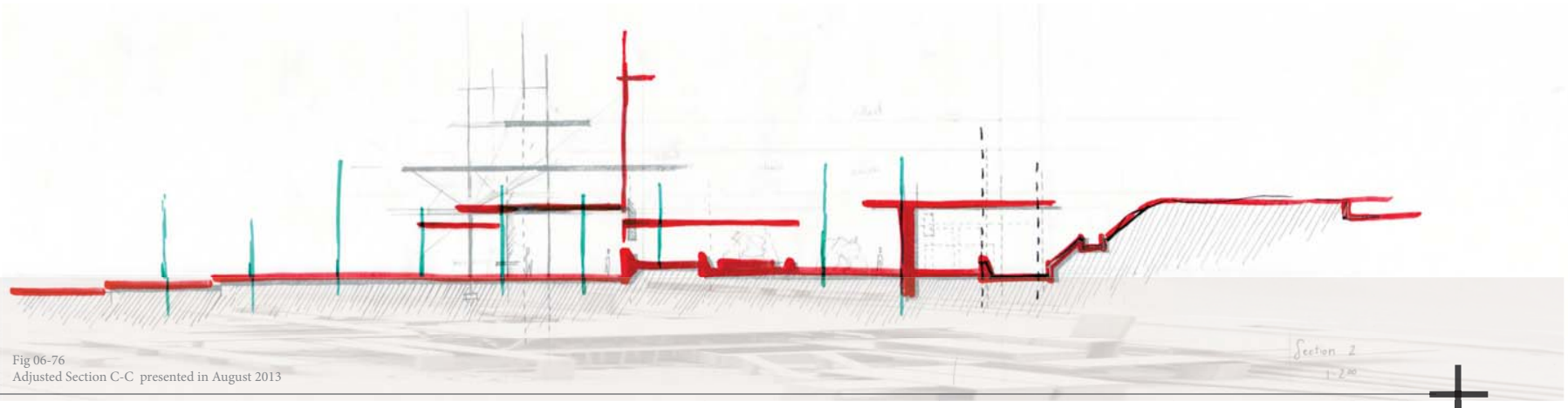


Fig 06-76
Adjusted Section C-C presented in August 2013

GLASS RECYCLING PROCESS IN SECTION

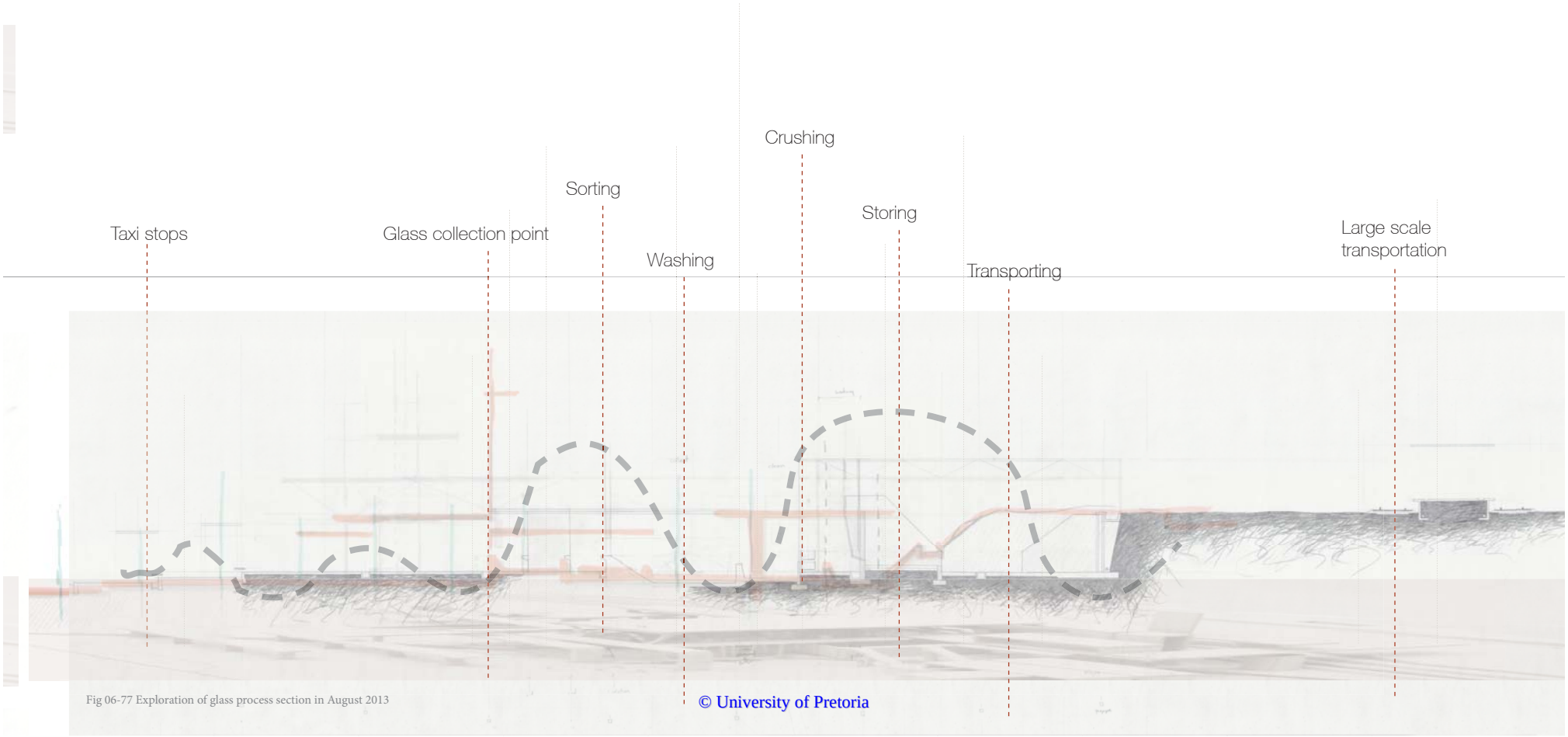


Fig 06-77 Exploration of glass process section in August 2013

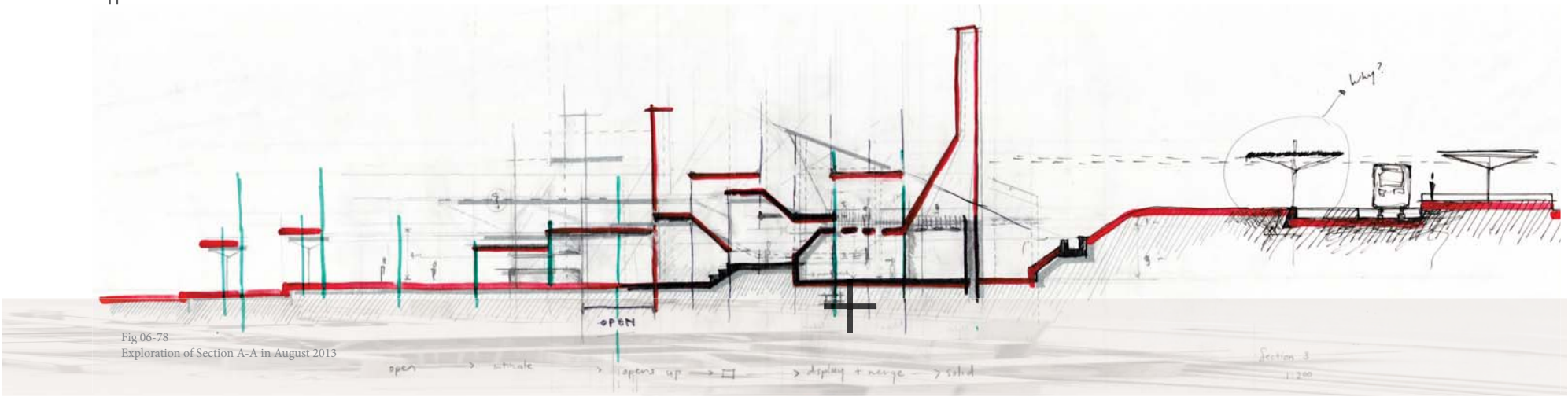


Fig 06-78
Exploration of Section A-A in August 2013

PUBLIC SPACE and PROCESS

Fig 06-79
Presentation of Section A-A in October 2013

PUBLIC SPACE and the PROCESS

PUBLIC SPACE and the PROCESS

Fig 06-80
Photograph of concept model

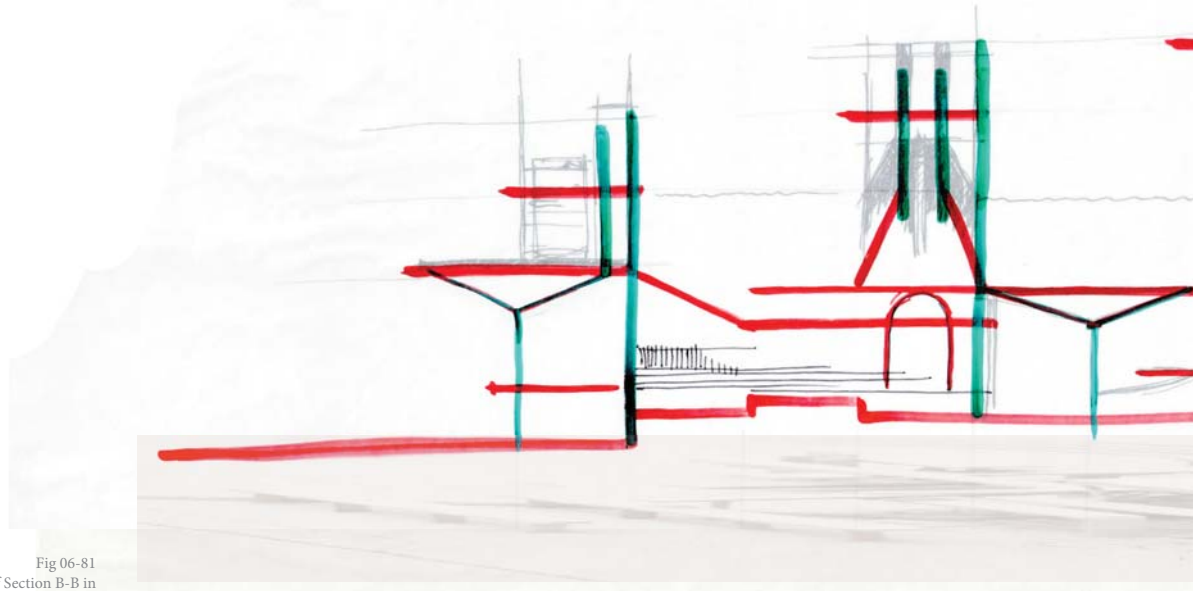


Fig 06-81
Exploration of Section B-B in August 2013

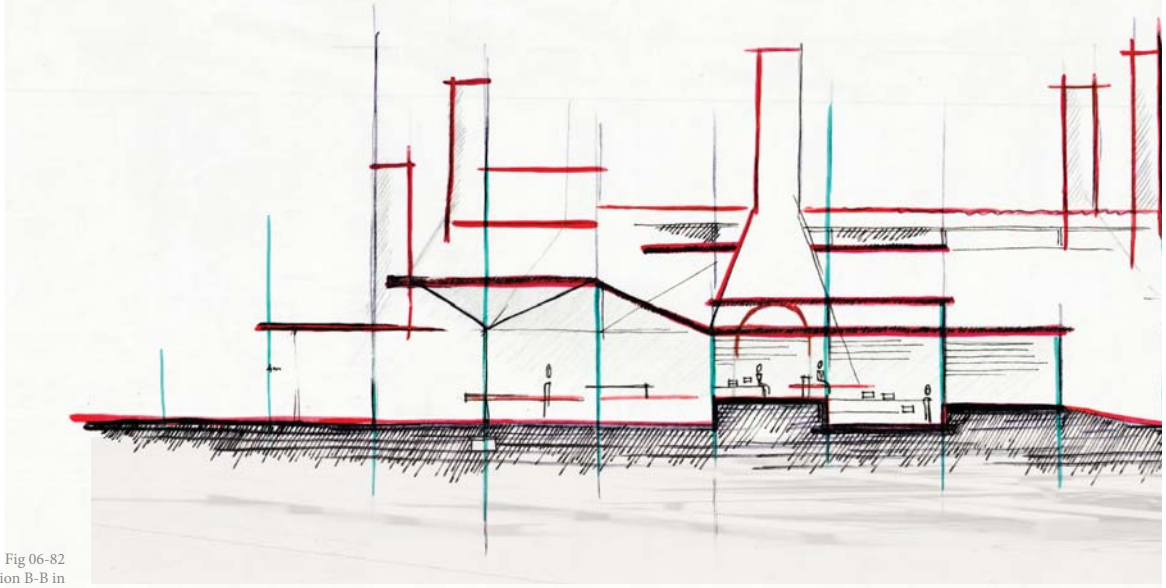
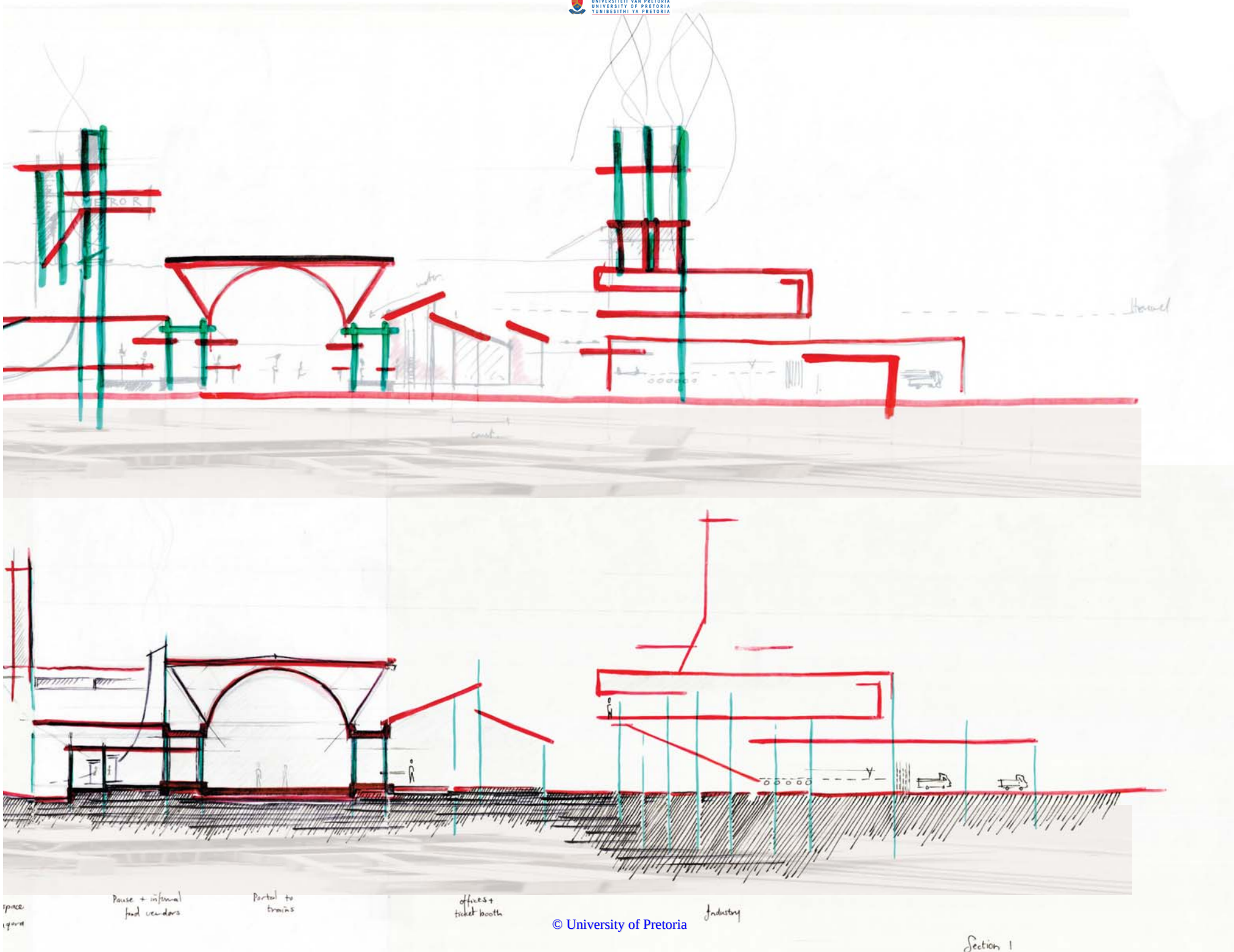


Fig 06-82
Exploration of Section B-B in September 2013



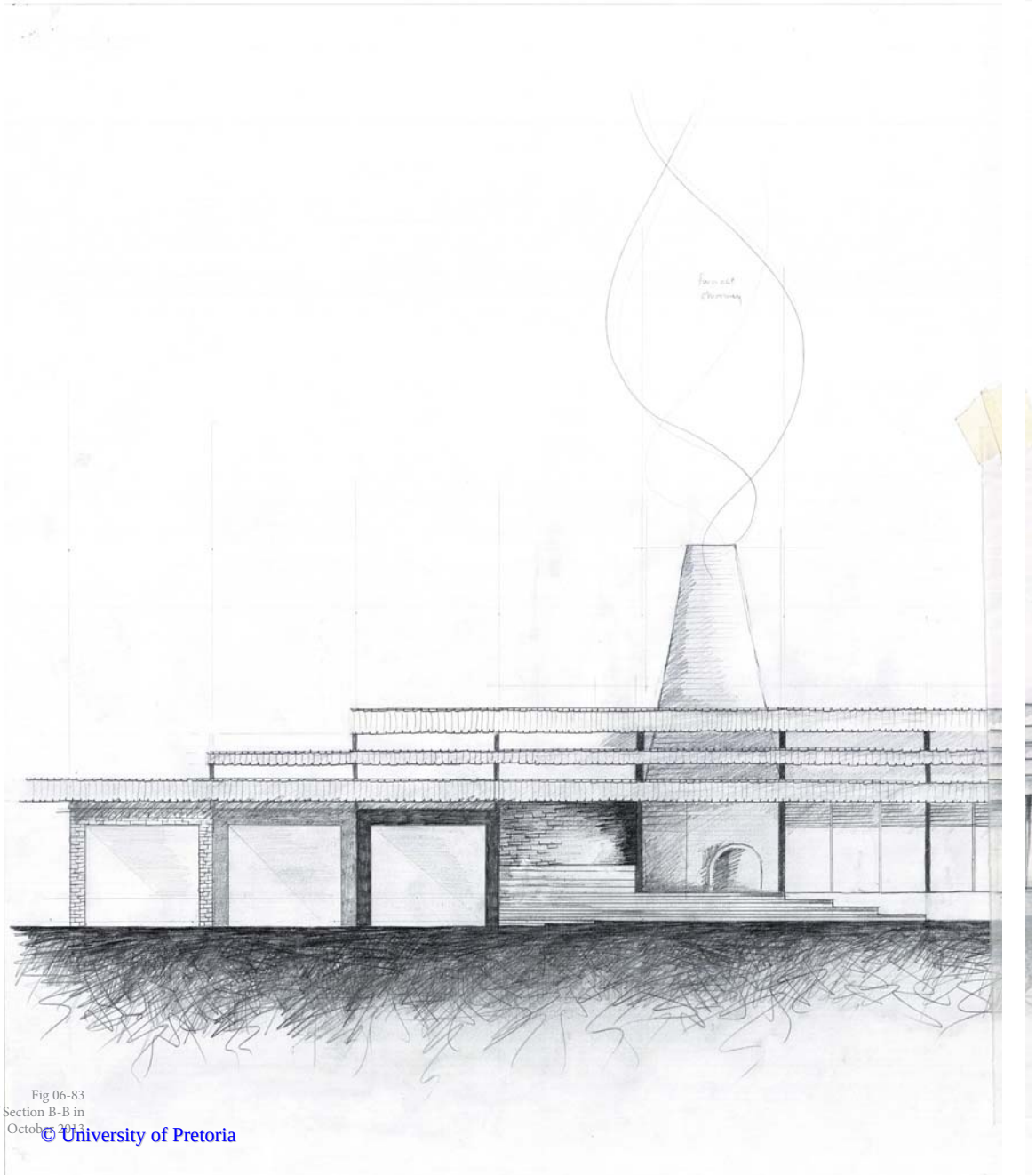
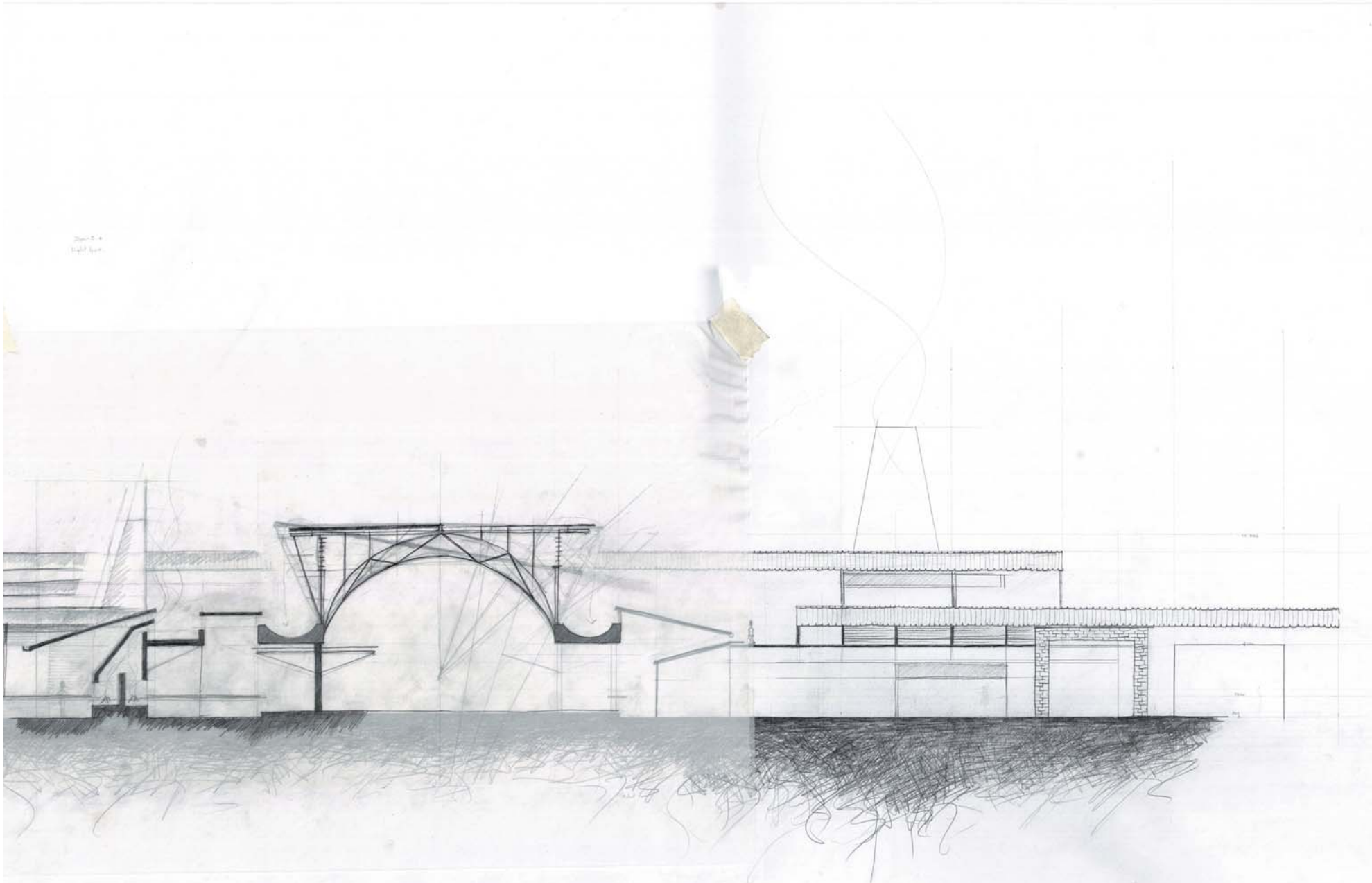


Fig 06-83
Exploration of Section B-B in
October 2013



PORTAL to MAMELODI

Fig 06-84
Photograph of the portal to Mamelodi

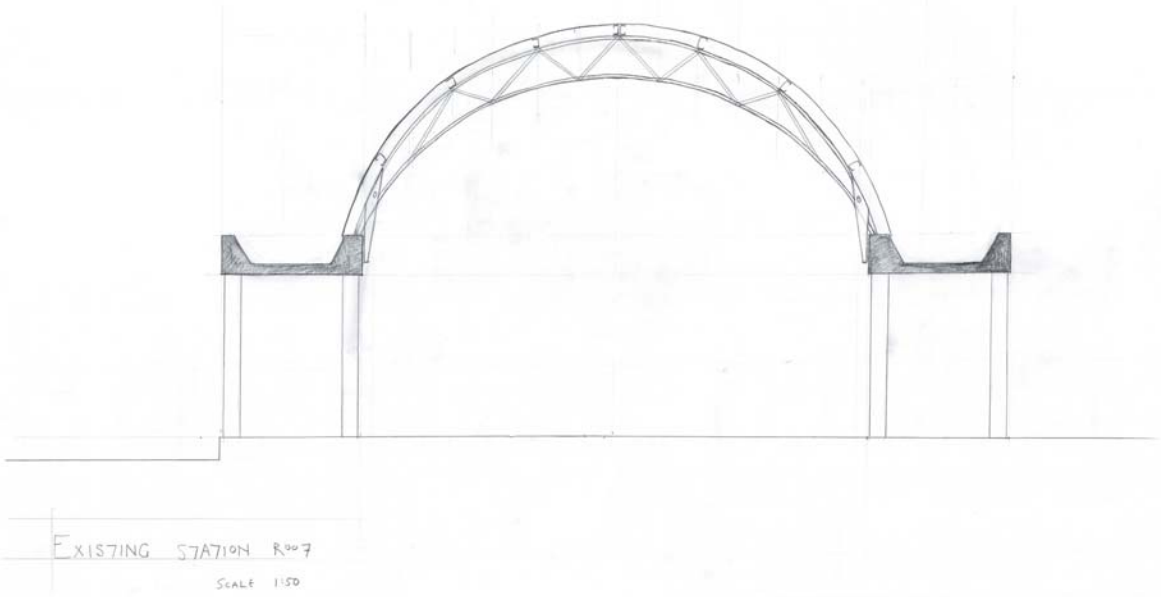


Fig 06-85
Drawing of the existing Truss, box gutter and Column Structure of Eerste Fabrieken train station

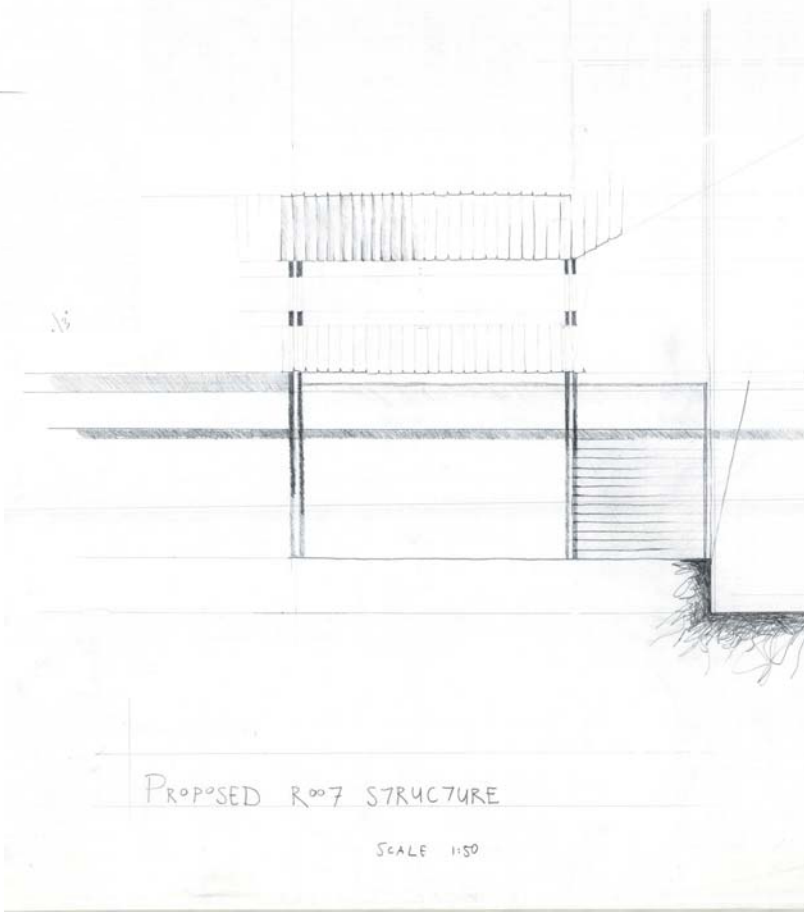
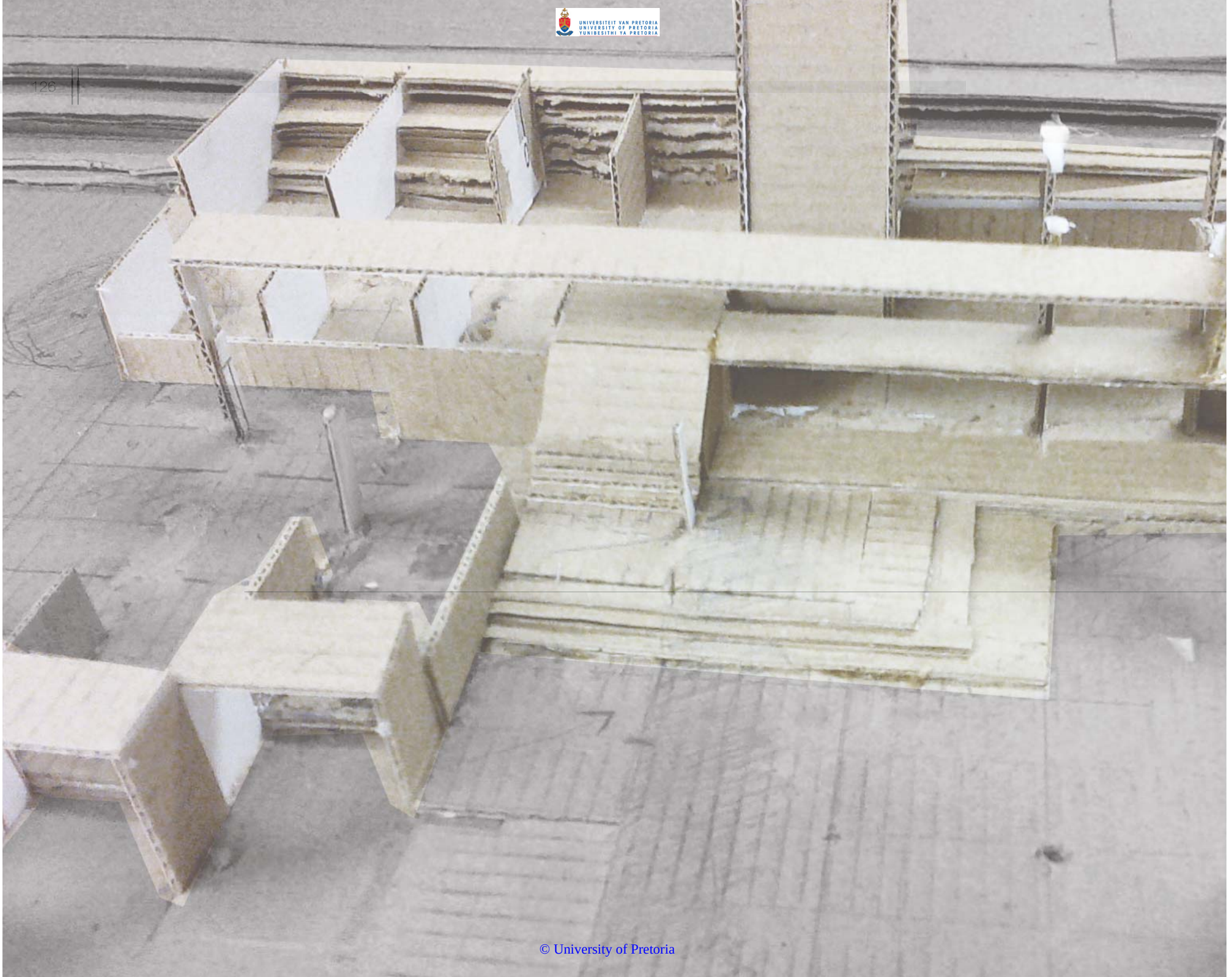


Fig 06-45
The steps in the glass

Fig 06-86
The Proposed structure over the existing Eerste Fabrieken train station



PUBLIC SPACE and PROCESS

Fig 06-87
Photograph of concept model

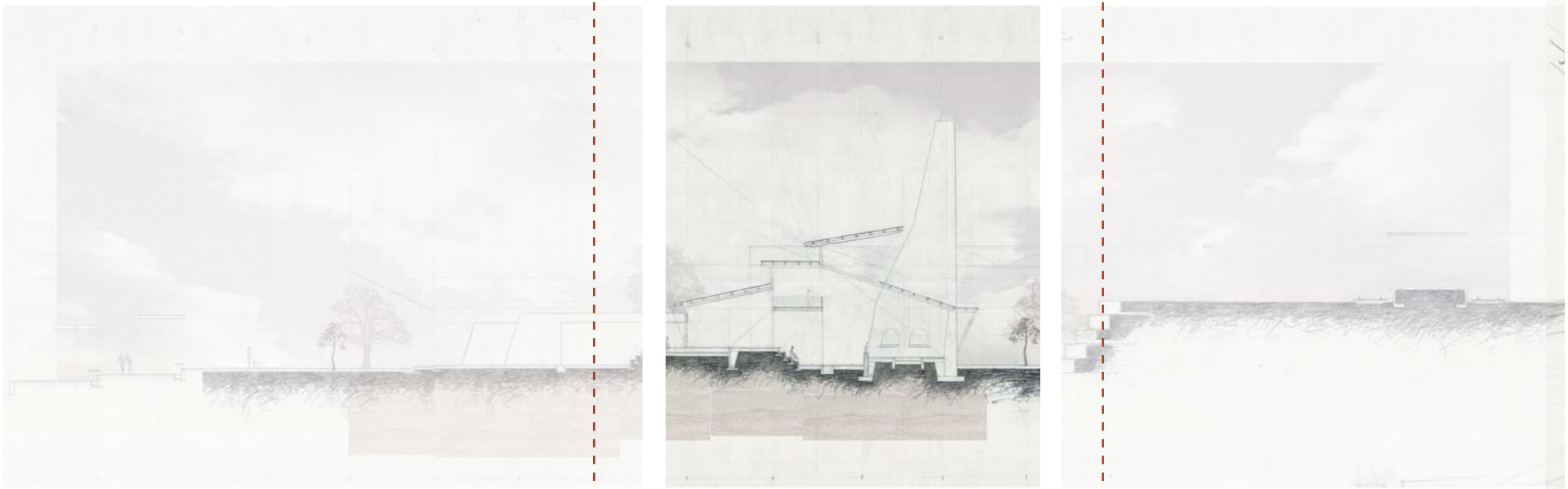


Fig 06-88
Section to be explored on larger scale

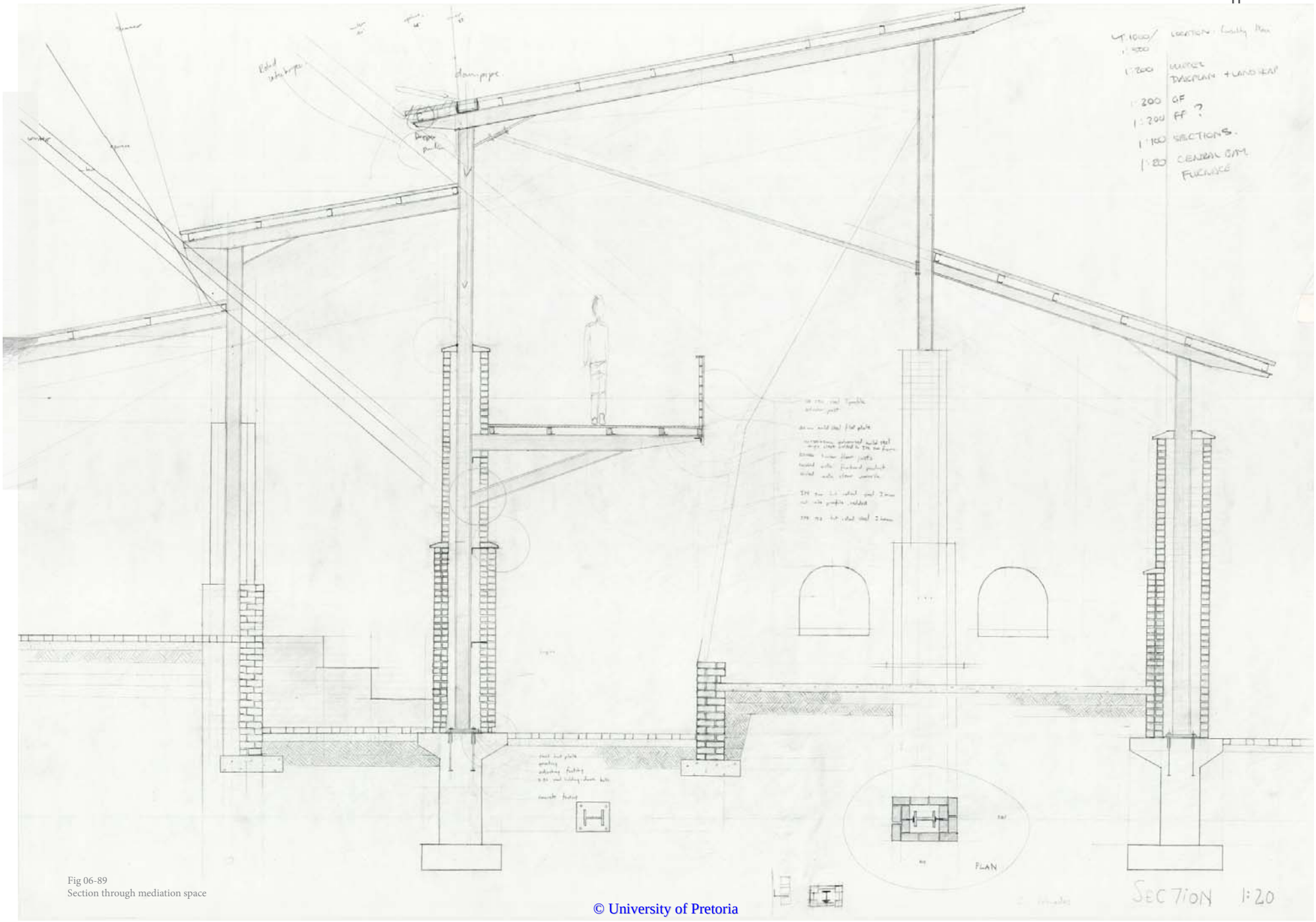


Fig 06-89
Section through mediation space

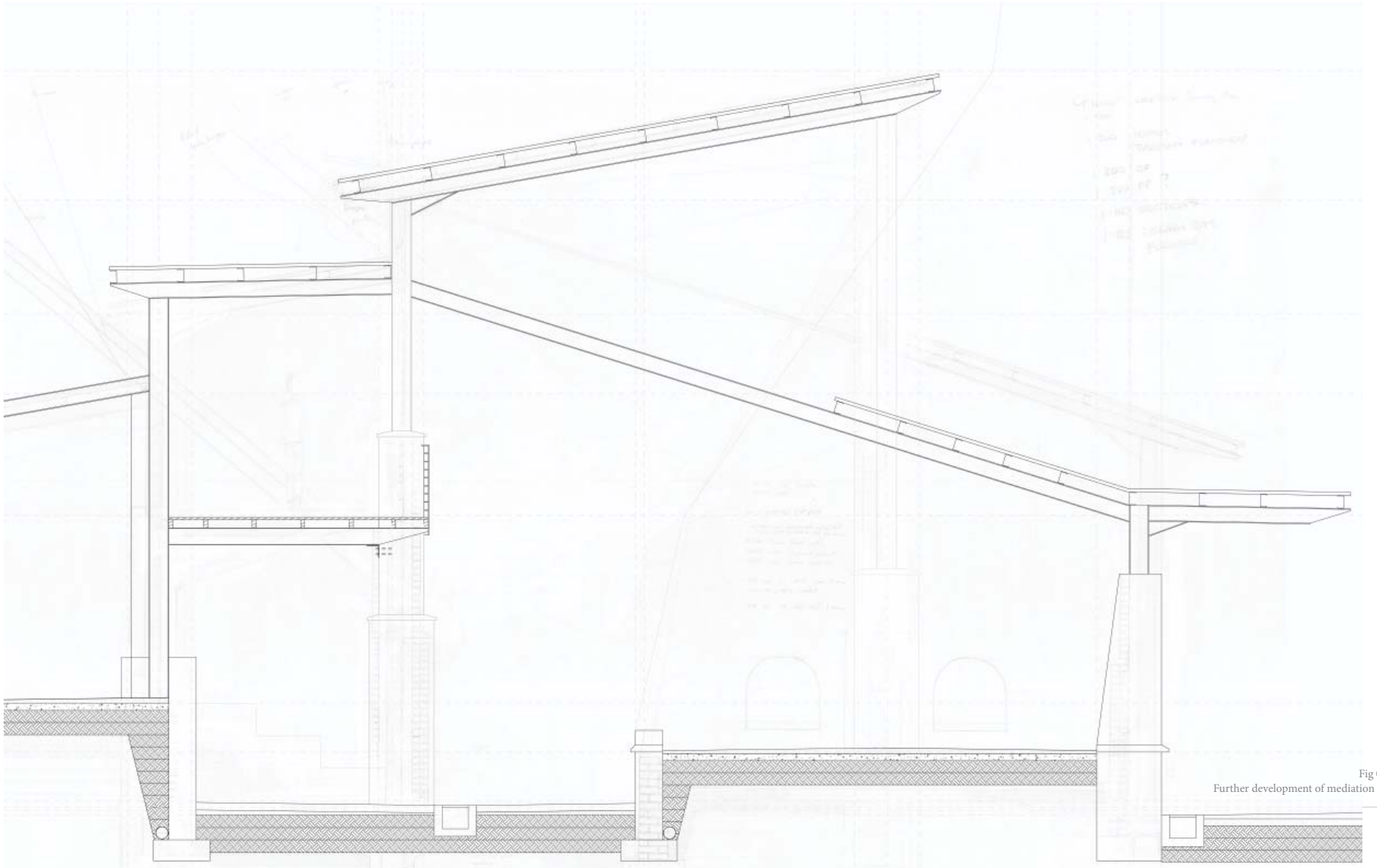


Fig 06-90
Further development of mediation space

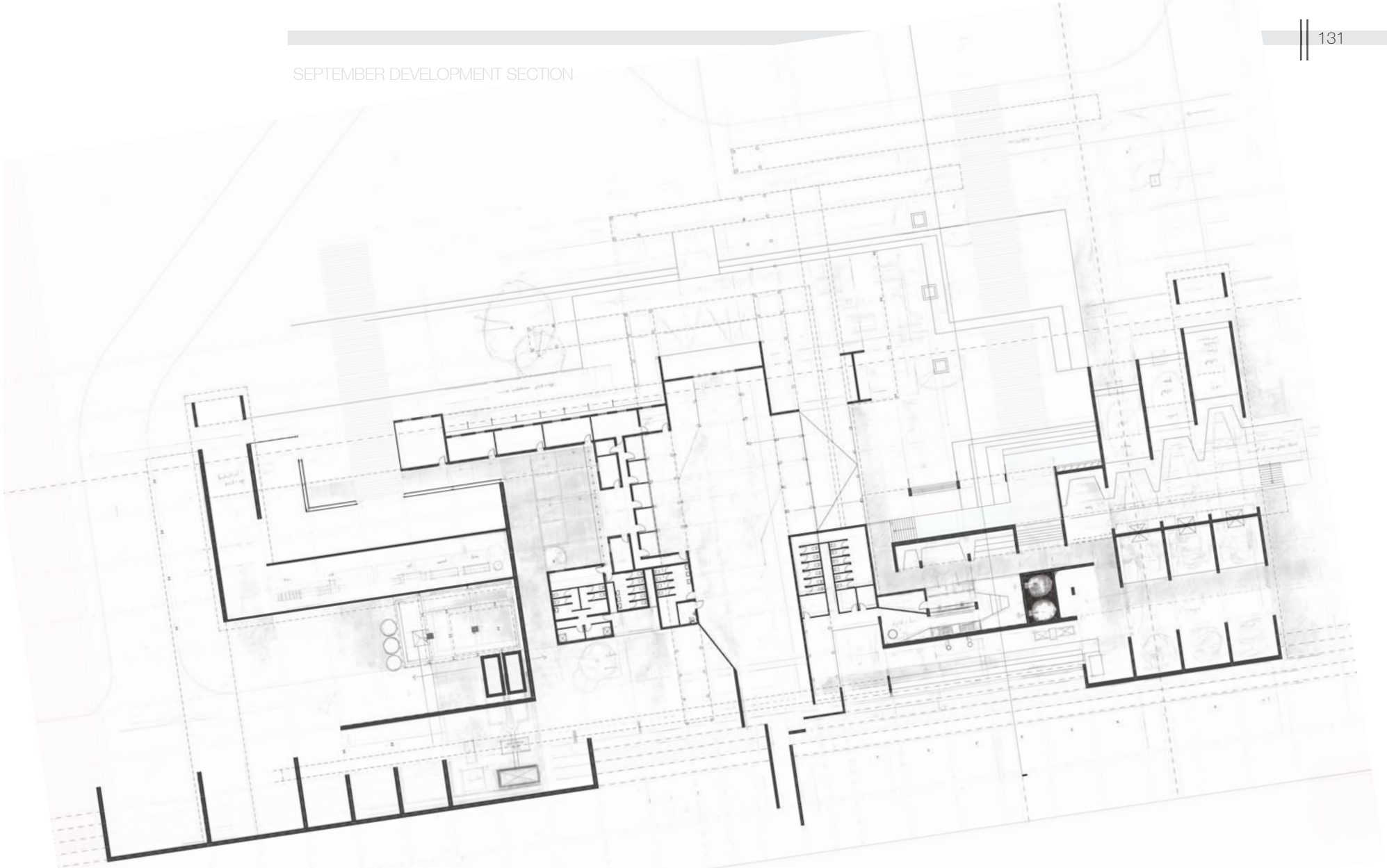


Fig 06-91
Plan Presented in final October 2013

TECHNICAL APPROACH 7

THE ART of ASSEMBLY and SELECTION

As an extension of the design concept, the technical approach will investigate the way in which construction methods, materials and technologies are currently used in Mamelodi, and how this can be translated in the building proposal for the Eerste Fabrieken Train Station precinct.

*This chapter is requires further development for the final presentation in November 2013, and us subject to change.

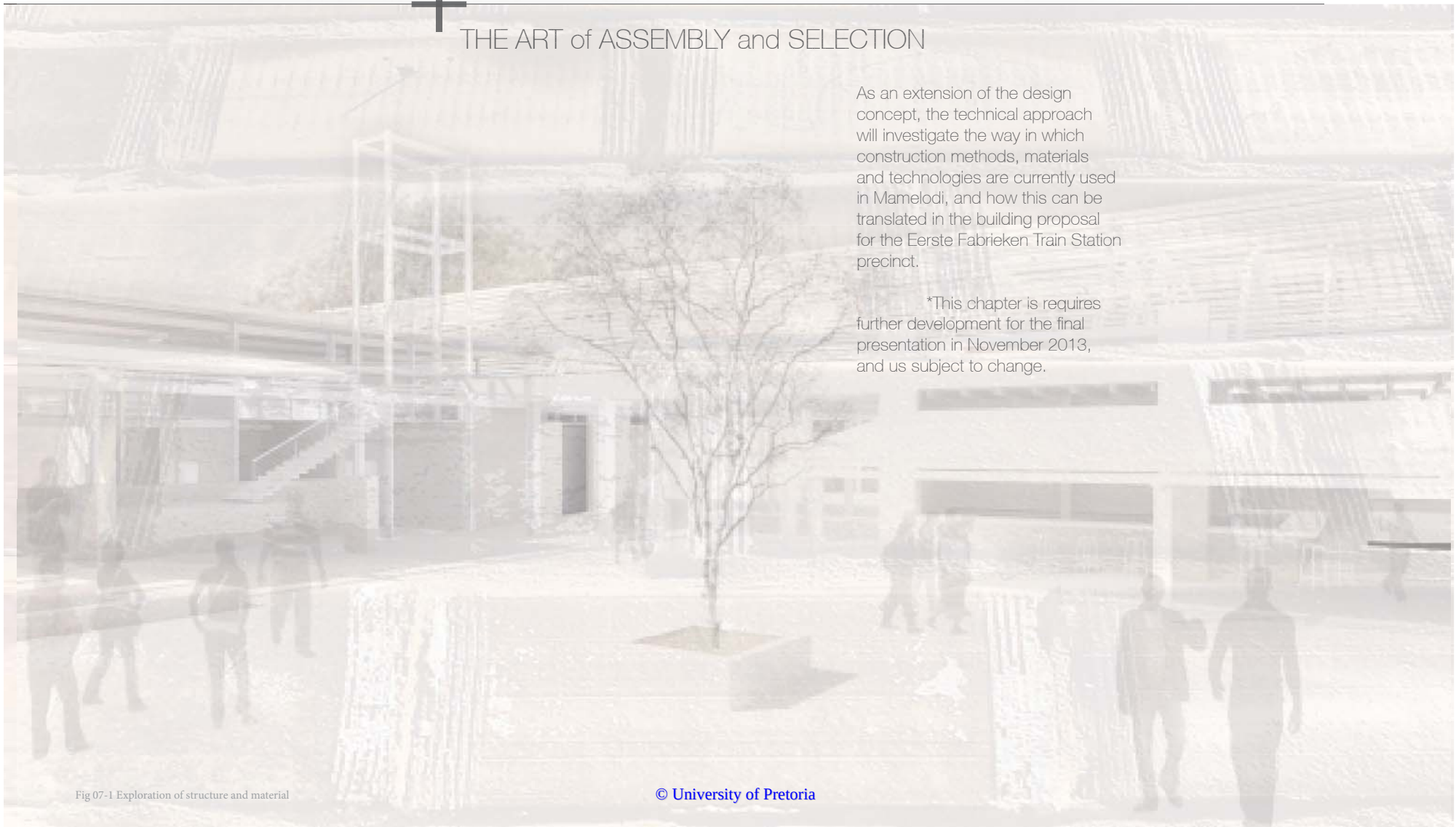


Fig 07-1 Exploration of structure and material

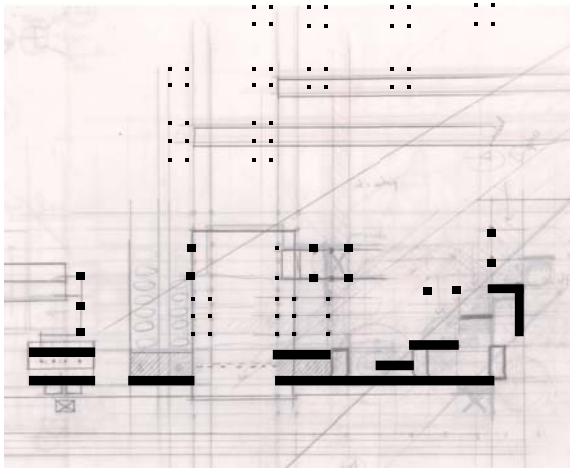


Fig 07-2
Tectonic concept
3 phases and thresholds

STRUCTURAL SYNTHESIS

TECTONIC APPROACH

The tectonics of the building were developed as a selection of parts that could be configured for various uses ranging from a social square to glass collection points and an existing train station. The idea here was to surround the community with a sense of familiarity through the creation of familiar spaces in scale and composition. The structure is aimed at controlling movement on the ground floor by guiding the user through spaces with barriers and openings. The spaces thus form movement cores for users to pass through. Whilst the ground floor is very rigid, the overhead structure speaks of lightness and change. These level changes in the roof structure make the user aware of the transition from one space to the other. This contributes to the realisation of merging programmes and the way in which these functions are able to relate in a spatial manner.

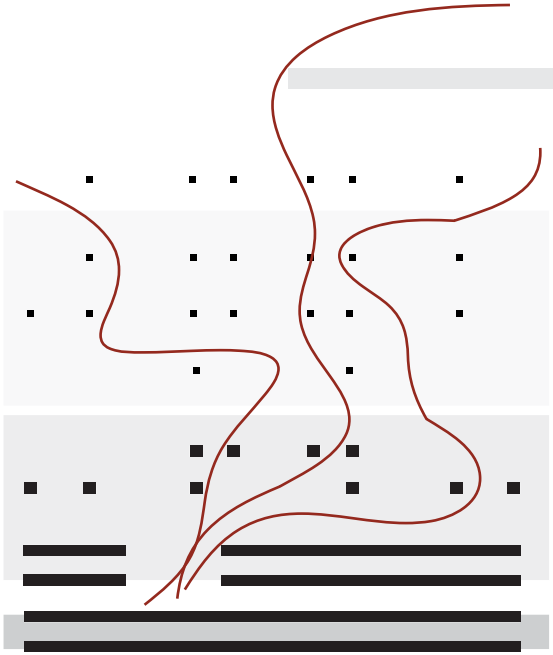


Fig 07-3
Tectonic approach that controls circulation

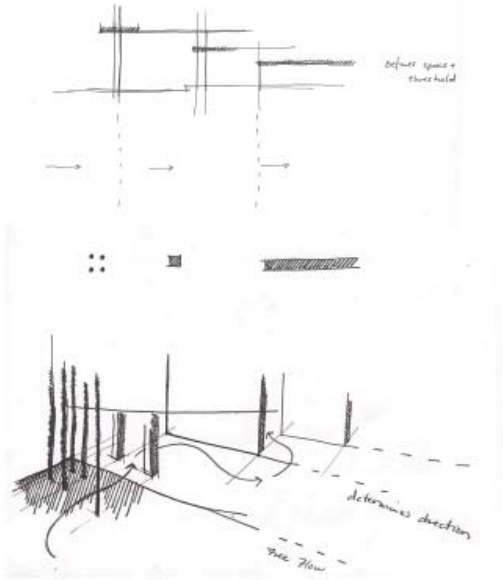


Fig 07-4
Tectonic concept
Solids determine direction, and columns allow free flow

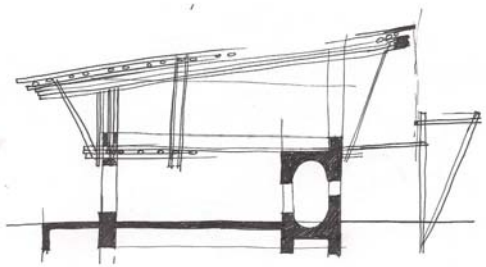


Fig 07-5
A solid base to determine movement, with a light overhead structure to indicate thresholds

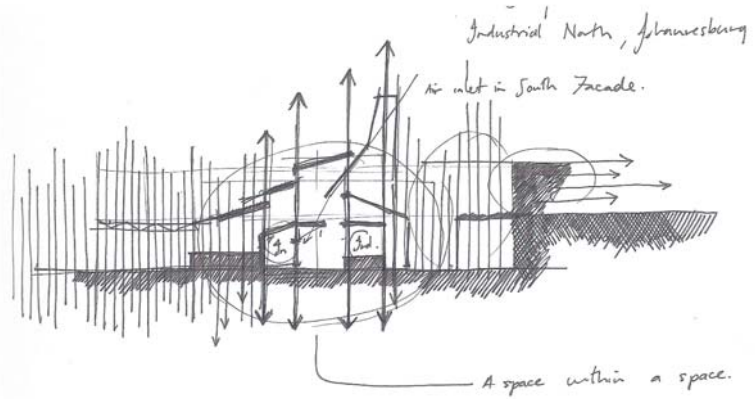


Fig 07-6
Social spaces allows for activity, while the building acts as a transitional space

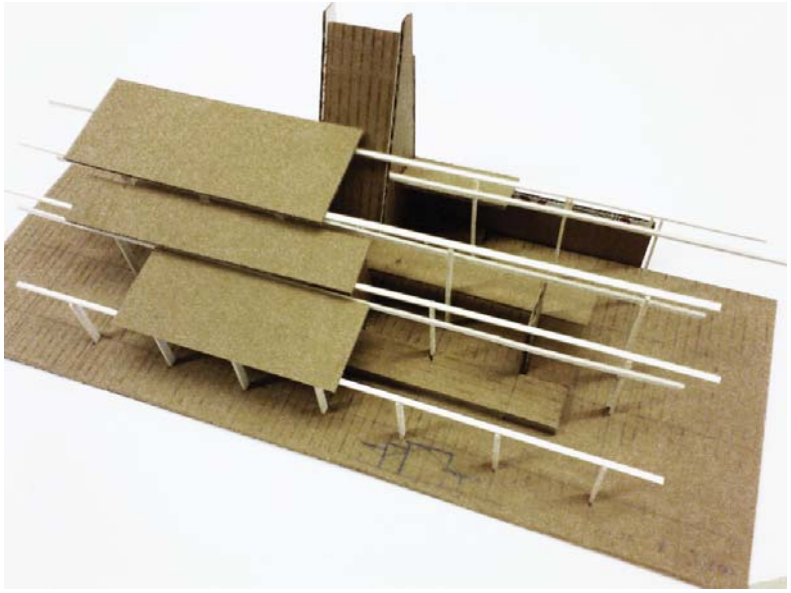


Fig 07-6 Models exploring the structure that will allow for a open public space inside

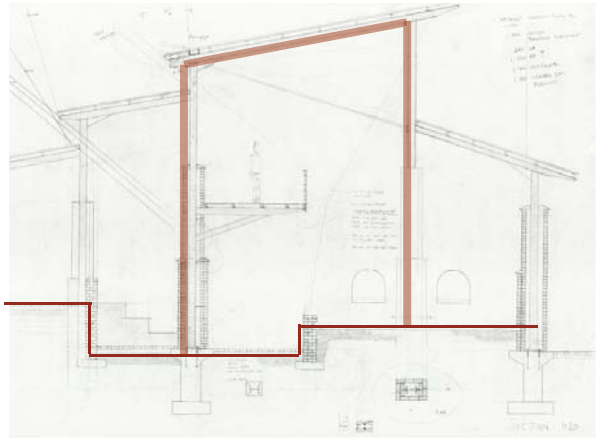


Fig 07-7 Primary structure
Creates a central bay that acts as transitional space and threshold between production and public movement

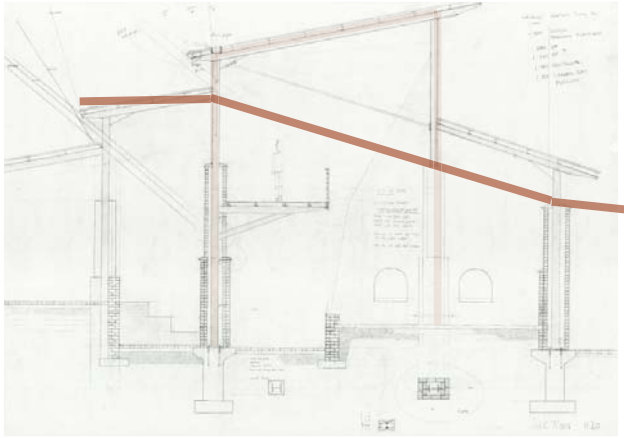


Fig 07-8 Secondary structure
This structure binds the two activities, and accentuates the in-between space

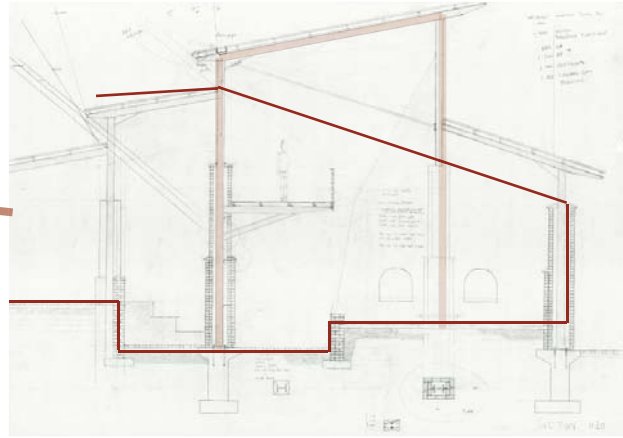


Fig 07-9 Tertiary structure
Finishes define the important inside safe space

STRUCTURAL SYSTEM

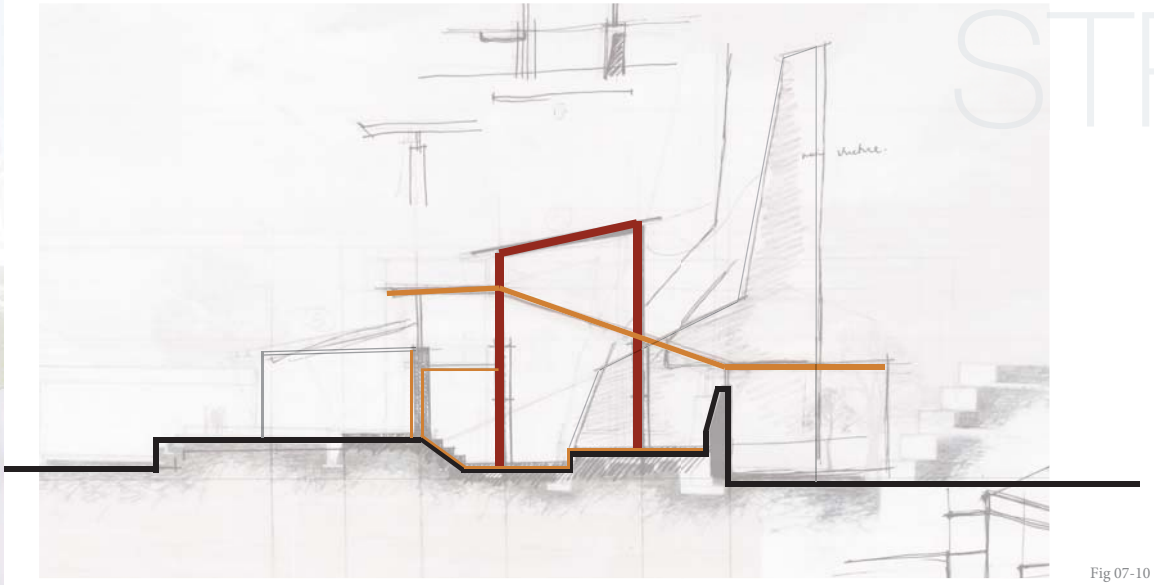
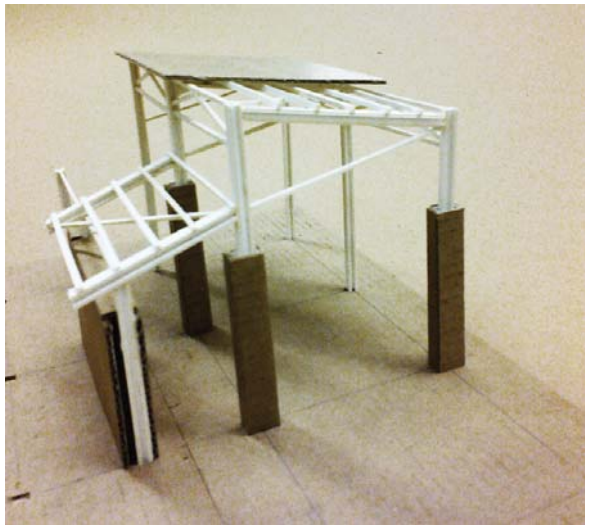


Fig 07-10 Structural diagram



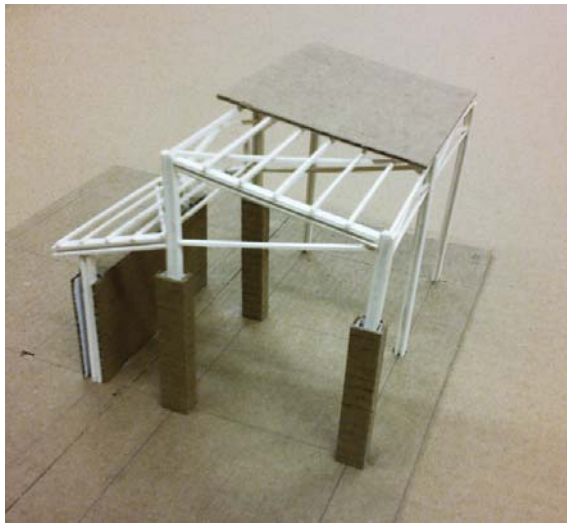


Fig 07-11 Models exploring the structure that will allow for a open public space inside

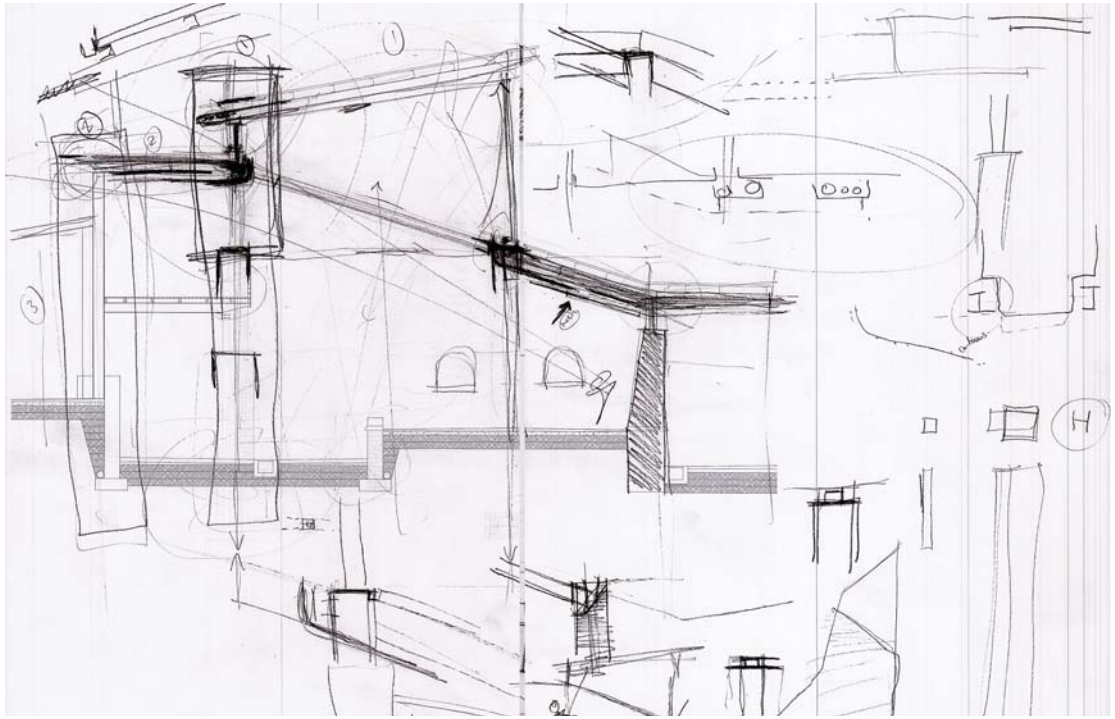


Fig 07-12 Sketch exploring the possible materials and connections for the central bay

Structural System

A Steel portal supports the light weight steel roof, and is clad in red brick to create humane spaces and areas of activity on ground floor.

Fig 07-13 Model of the central bay

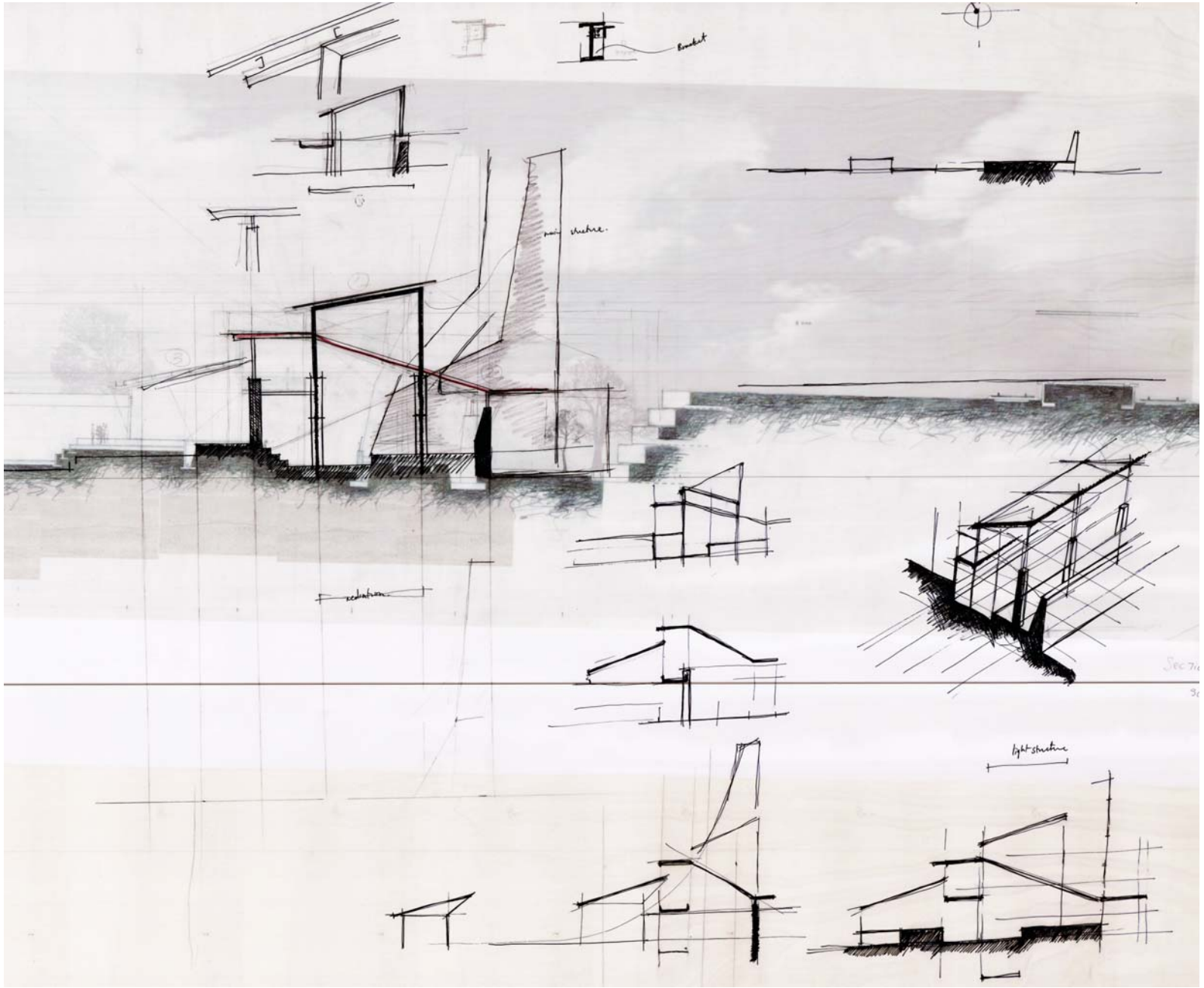
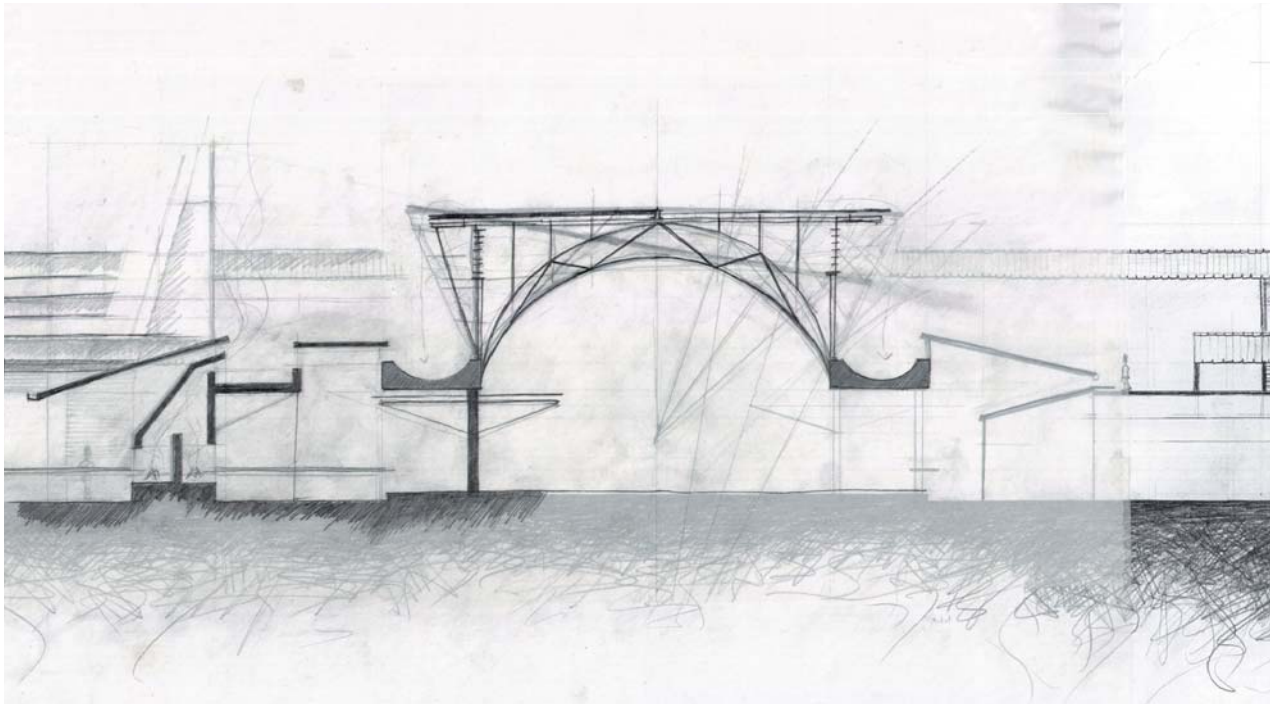
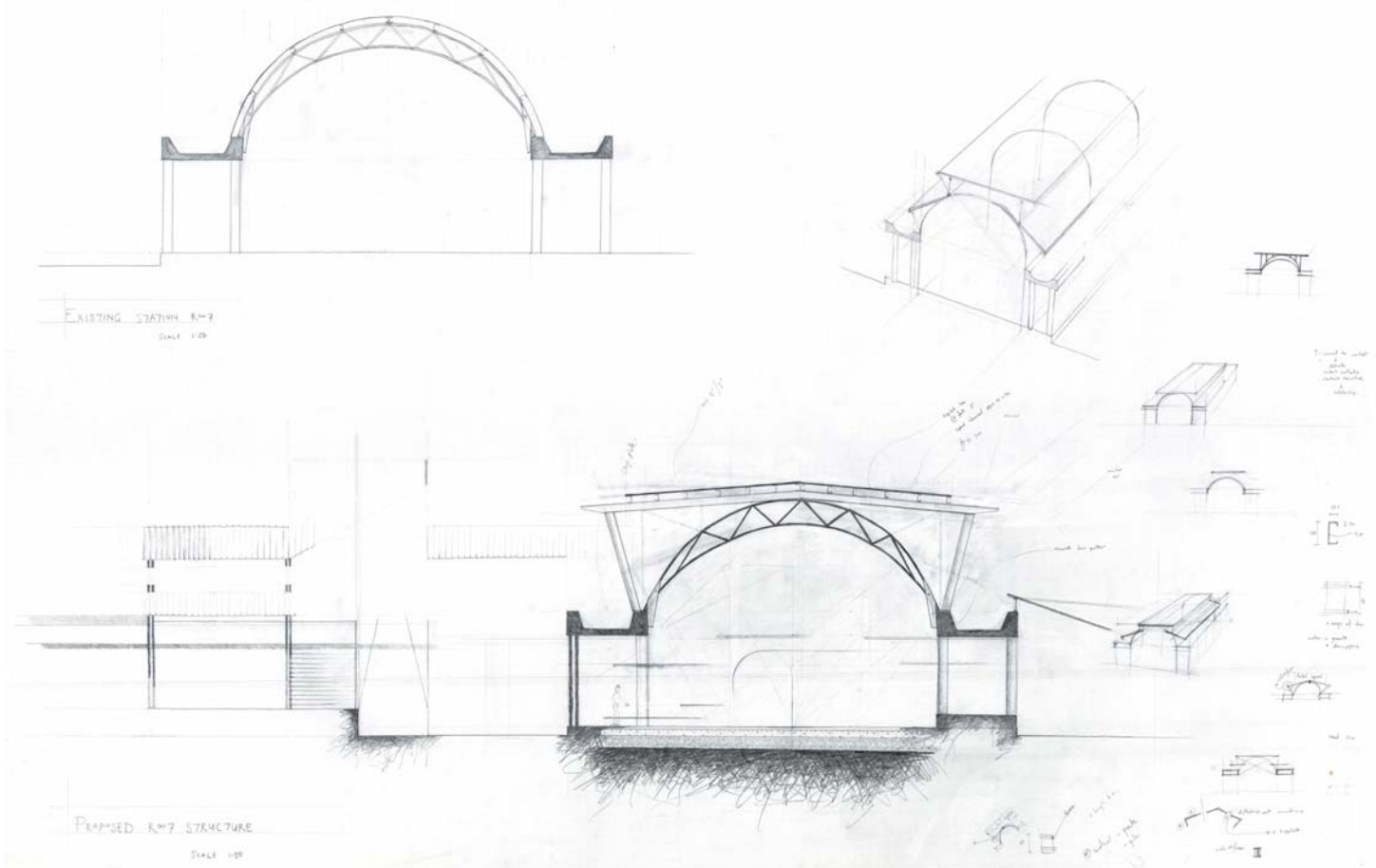
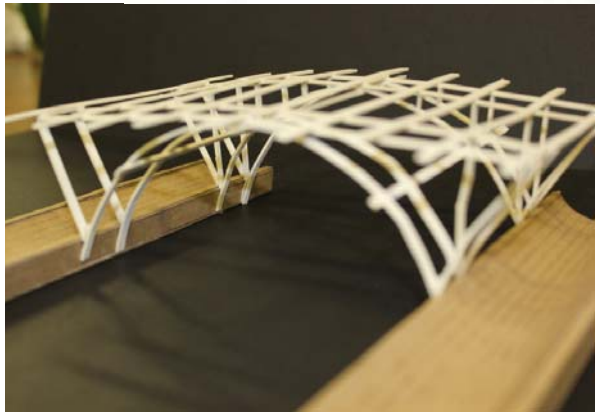
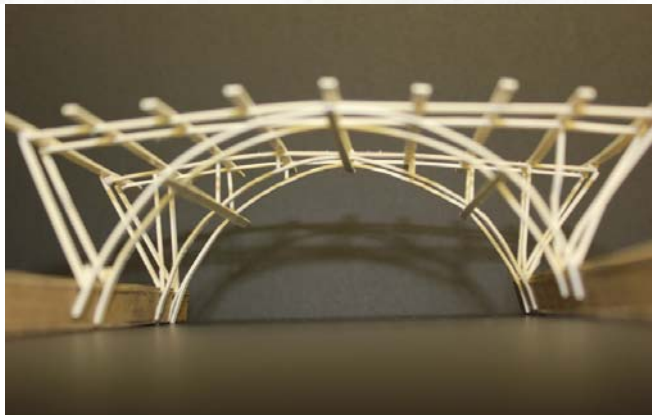


Fig 07-14 Sketches exploring the structure of the central bay









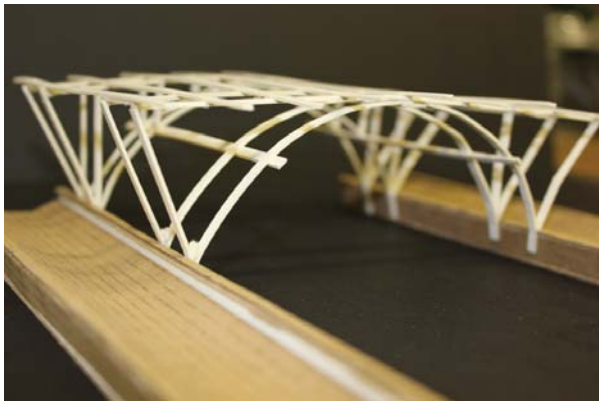


Fig 07-13 b Model of the proposed station roof

What does material and construction mean in Mamelodi?

economic
social
connectivity/community
services





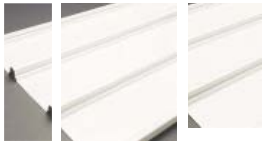


Fig 07-15
Photographs of Mamelodi and materials used every day for construction

Material Selection

In order to create this sense of familiarity, the palette of the buildings was comprised of the materials that are used for building in Mamelodi and the surrounding settlements, where most of the station users live.

The materials proposed for the construction of the building, were selected to strengthen the tectonic concept that aims to define heavy structure on ground floor, with light materials above.

KLIPLOK 700

GALVANIZED STRUCTURAL STEEL

STAINED GLASS

DE HOOP RED SATIN BRICK

CONCRETE AND BRICK PAVERS

CONCRETE ELEMENTS

Fig 07-16
Proposed material palette selected from existing materials in Mamelodi

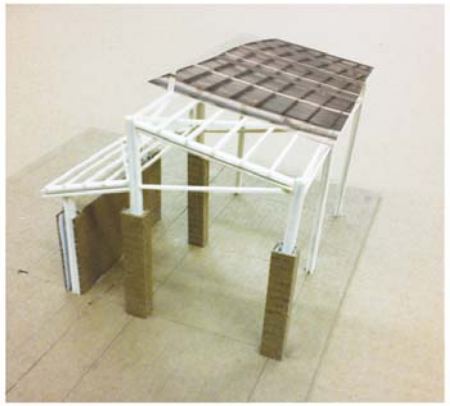


Fig 07-17 Models showing the application of materials

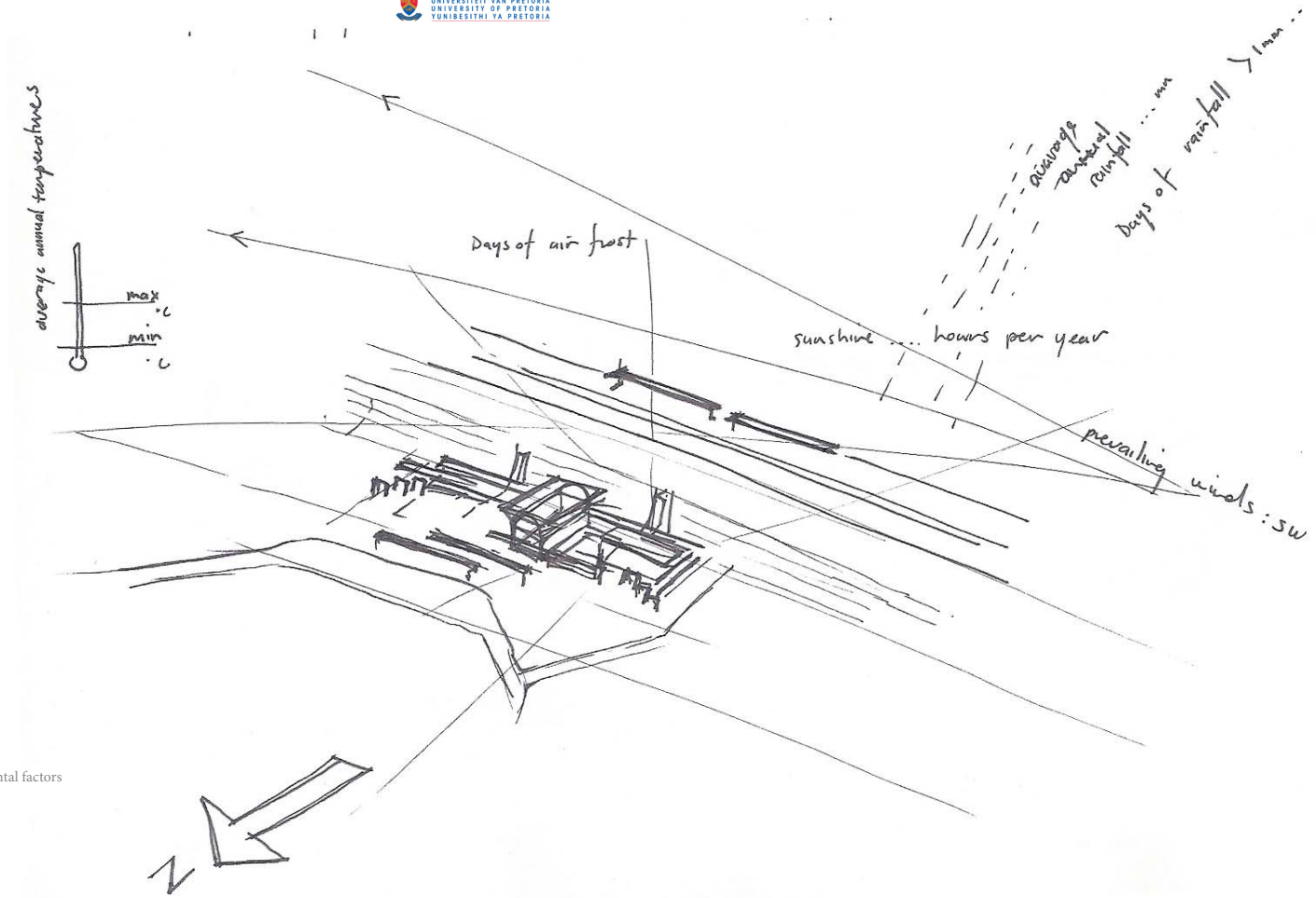


Fig 07-18
Orientation on site with the different environmental factors

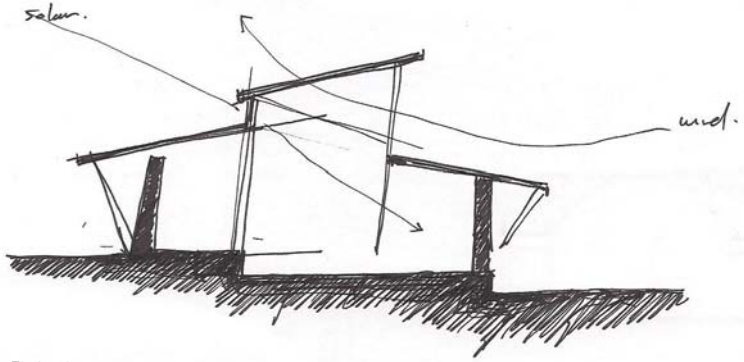


Fig 07-19
Conceptual ideas concerning solar and ventilation responses

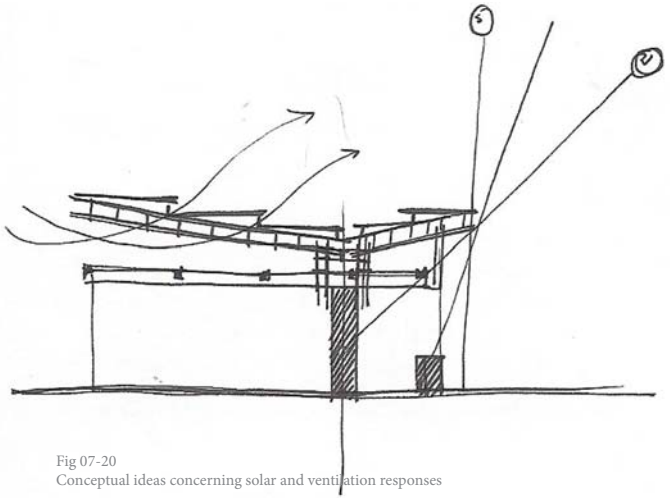


Fig 07-20
Conceptual ideas concerning solar and ventilation responses

SOLAR STUDY

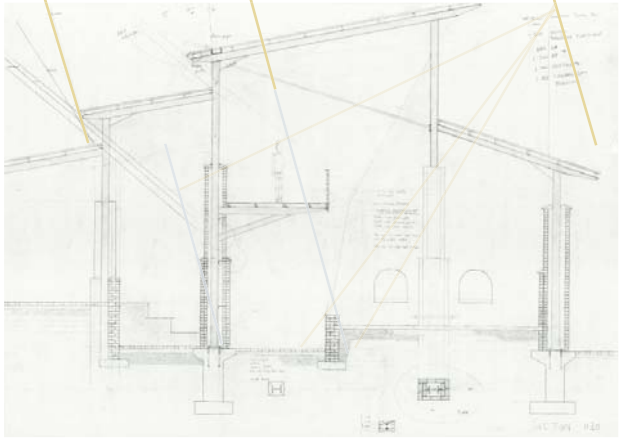


Fig 07-21
Summer Solar study

SOLAR STUDY

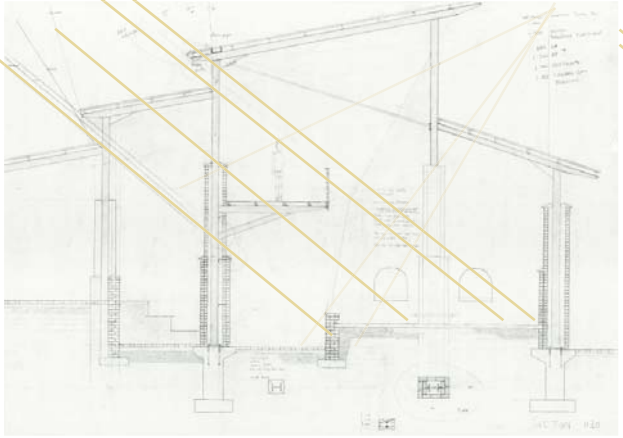


Fig 07-22
Winter solar study

THERMAL MASSING

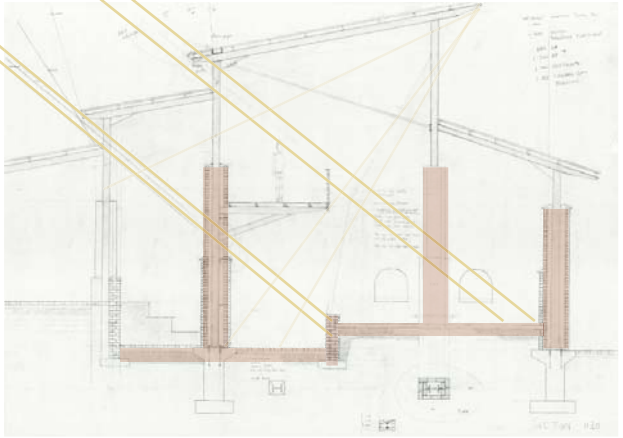


Fig 07-23
Thermal massing is provided to store heat during the winter months

VENTILATION

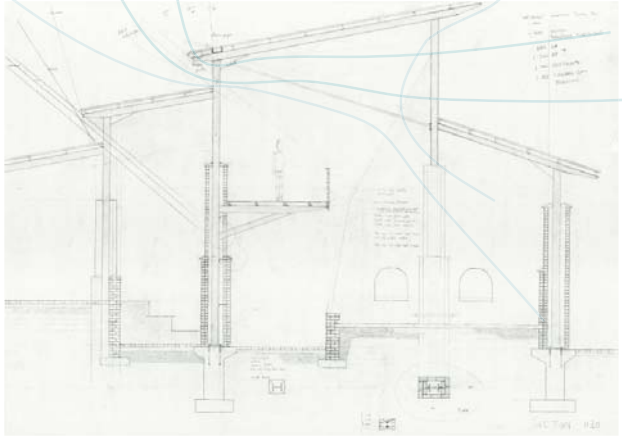
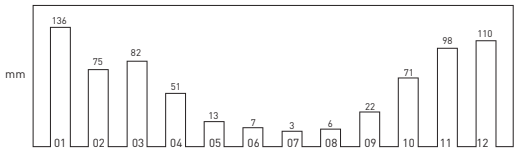


Fig 07-24
Ventilation with main wind from the south

Rainwater collection, storage and distribution

Rainwater collection should be utilized to help find alternative water sources for the process, which forms an integral part of the glass production process. The large exposed roof area and paving of the square has the capacity to catch a substantial amount of water. Proper filtering and cleaning will make stored water accessible for use in the glass making process, and for consumption by the traders, and in other public spaces.

Addendum C: Calculations



AVERAGE MONTHLY PRECIPITATION, P (mm) FOR PRETORIA

Calculation 1

There are approximately 3500 people that move through the Eerste Fabrieken train station per day. The 06h00 to 09h00 peak period carries 41% of the all day number of boarding passengers, with 19% and 32% in the inter-peak and evening peak periods respectively.

Water catchment roof
station roof area_ 50x 22 = 1100m$_{¿}$
Flank B roof area_ 40 x 6 = 240m$_{¿}$
Flank C roof area_ 36 x 3 = 108m$_{¿}$
Flank D roof area_ 65 x 6 = 390m$_{¿}$

Industrial furnace_ 36 x 6 = 216m$_{¿}$
Industrial warehouse_ 36 x 12 = 432m$_{¿}$
Industry offices_ 36 x 6 = 216m$_{¿}$

Total Area = 2702m$_{¿}$

Maximum rainfall past 17 years: 1546.3 mm / 365 = 4.24 mm per day average
Maximum monthly rainfall past 17 years = 281.1 mm / 31 = 9.07 mm per day average

Maximum month
9.07 x 1000 = 0.1 m
2702 (total roof area) x 0.1 = 1351 per day at maximum rainfall
1351 (total roof area) x 31 = 41881 per month at maximum rainfall
1000l = 1mł, thus per month at maximum rainfall x 1000l = 41881000 litre per month of maximum rainfall

DATA SHEETS

PRETORIA	Average Rainfall (mm)	m rain depth/month
January	87	0.087
February	114	0.114
March	81	0.081
April	45	0.045
May	12	0.012
June	6	0.006
July	18	0.018
August	18	0.018
September	48	0.048
October	51	0.051
November	72	0.072
December	96	0.096

Runoff co-efficient	c - value
buildings	0.9
paving	0.85
grass	0.55
veldgrass	0.35

toilets	7l/flush	0.007
HWB	1l/usage	0.001

WATER IN

m³ - (m rain depth / month) . c = m³

Runoff co-efficient	c - value	Collection area (m²)	m²
buildings On Site	0.9	2702	2432
Site Runoff	0.85	7800	6630
			9829

Month	m rain depth/month	m²	m³
January	0.087	9829	855
February	0.114	9829	1121
March	0.081	9829	796
April	0.045	9829	442
May	0.012	9829	118
June	0.006	9829	59
July	0.018	9829	177
August	0.018	9829	177
September	0.048	9829	472
October	0.051	9829	501
November	0.072	9829	708
December	0.096	9829	944
			6369

WATER OUT

Cleaning process/month	3500	0.16	560 m³/month
Toilets = 2/3 people x 1 flushes/day*30			80 m³/month
			640 m³/month

MONTH	IN	OUT	URPLUS/DEFICIT m
January	855	640	814
February	1121	640	1292
March	796	640	1448
April	442	640	1240
May	118	640	728
June	59	640	147
July	177	640	-316
August	0	640	-779
September	472	640	-1419
October	501	640	-1558
November	708	640	-1449
December	944	640	-1186
			-1038

Total deficit With Toilets:
1038 m³

STORAGE CAPACITY	area m²	depth m	volume m³	loss due to evaporation	TOTAL
Tanks	300	2.5	1200		1200
wetland	75	0.3	23	1	21
Pond	26	1	26	1	25
					1246

Water collection area

Annual maximum average
4.24 mm per day average / 1000 = 0.004
2702 total roof area) x 0.004 = 1351 per dag at maximum yearly average
1351 per dag at maximum yearly average x 365 days = 493115 per year at maximum yearly average
1000l = 1mł, thus 493115 per month at maximum rainfall x 1000l = 493115000 per year at yearly maximum

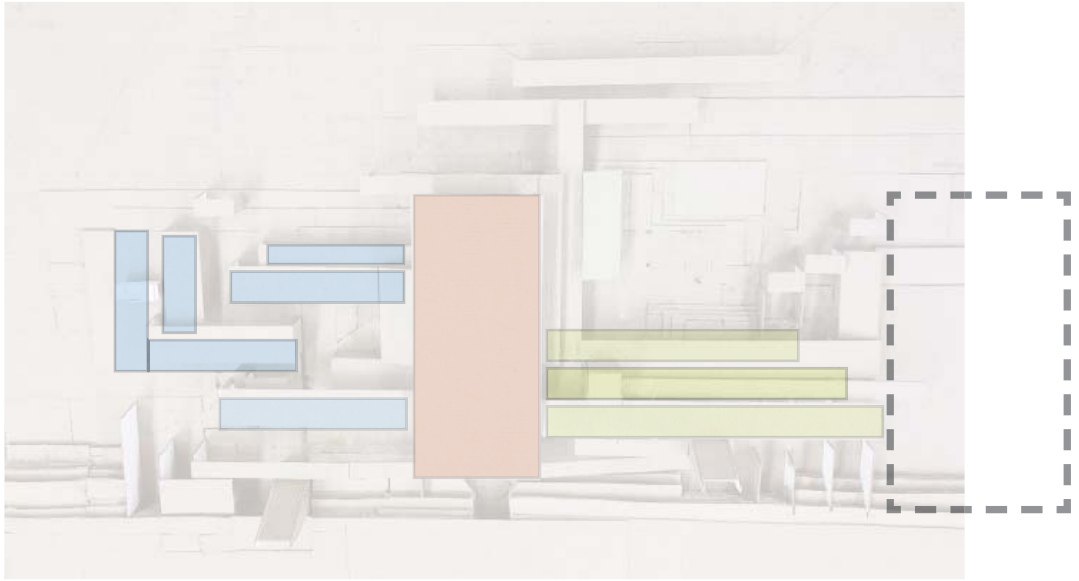


Fig 07-25
Areas that are used for water catchment

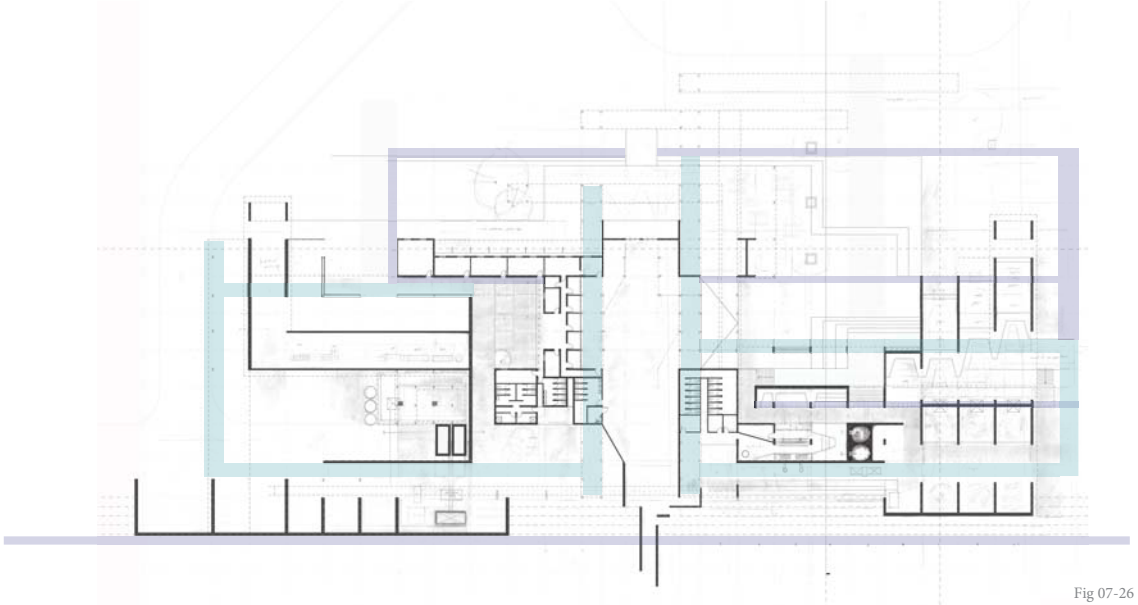


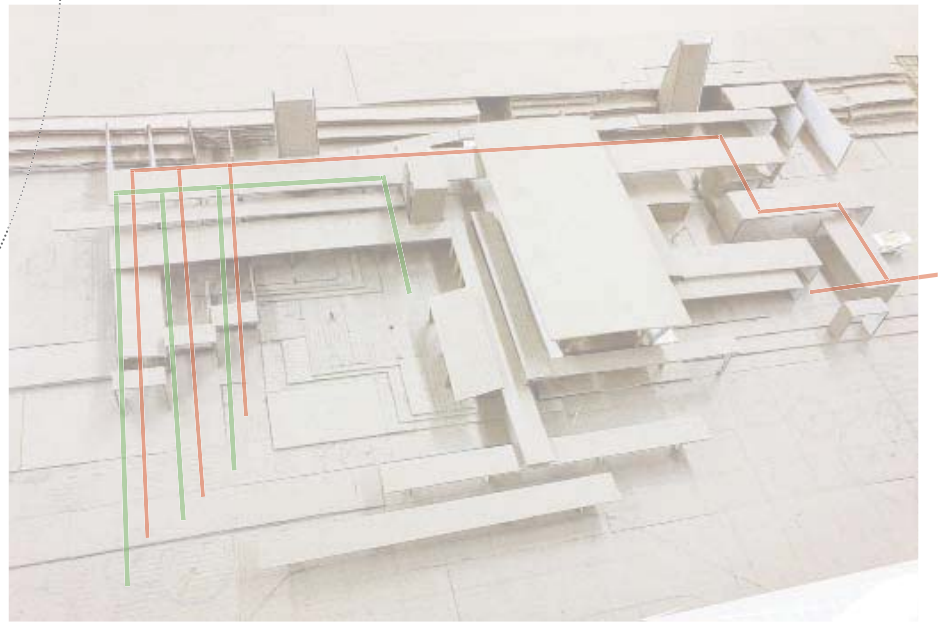
Fig 07-26
Gutters and water channels

GLASS PROCESSING

Recycling and downcycling of Glass

1. Glass processing on a human scale
   GLASS BLOWING
   - bottles and glasses
2. INDUSTRIAL PROCESS
   - Glass wool insulation

Recycling and downcycling of Glass



WASTE COLLECTION

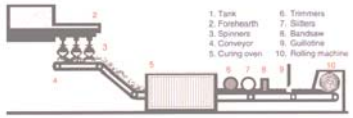
WASHING

ANNEALING

GLASS BLOWING

SORTING and STORAGE

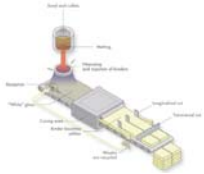
MELTING



FORMING

MELTING

ANNEALING



CUTTING

ROLLING

Fig 07-28
Diagram explaining the glass recycling and processing

DETAIL EXPLORATION

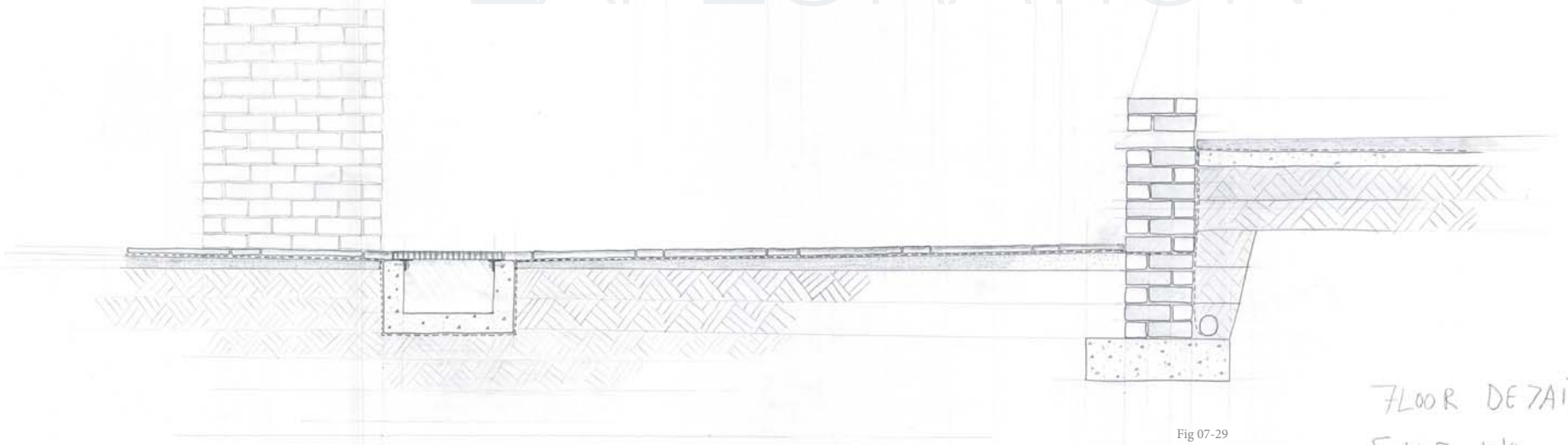


Fig 07-29
Ground floor detail

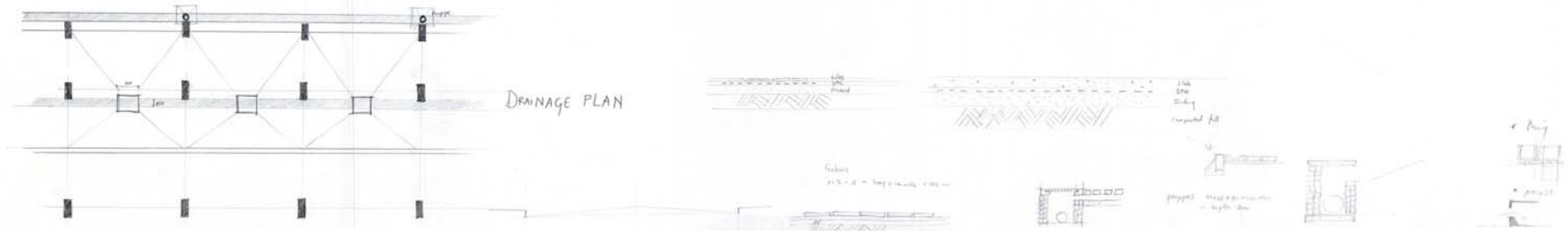


Fig 07-30
Ground floor water drainage plan

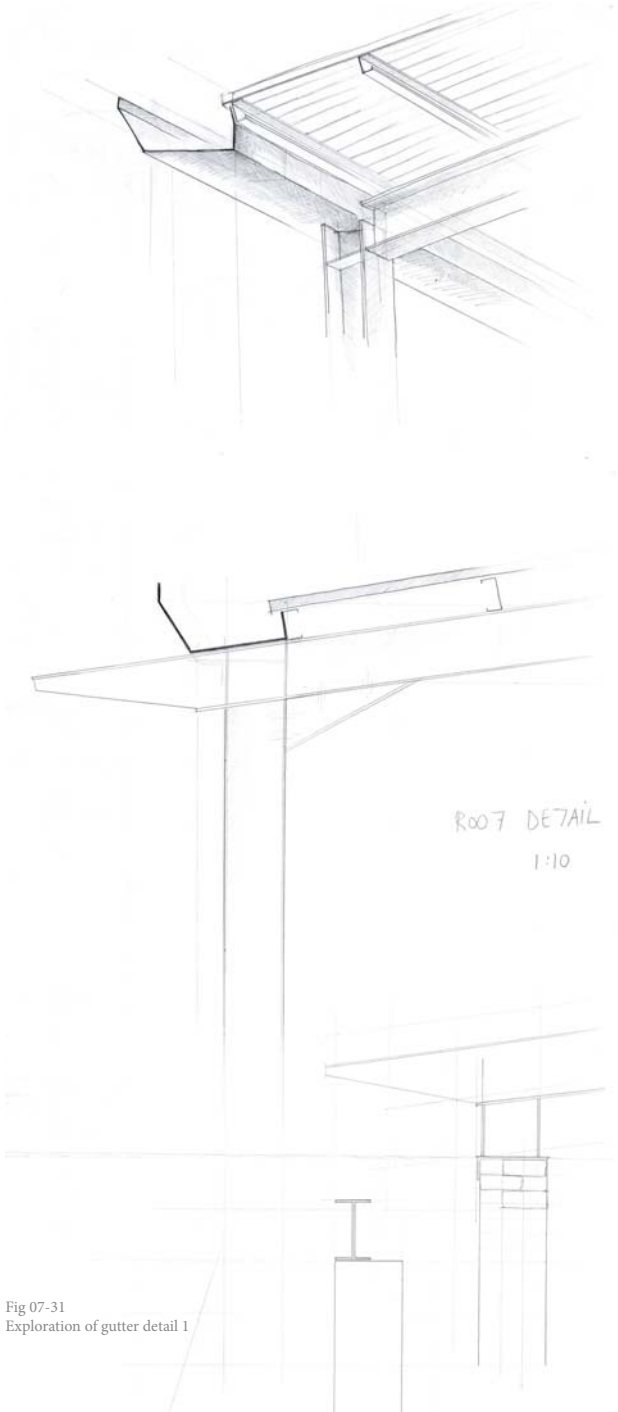


Fig 07-31
Exploration of gutter detail 1

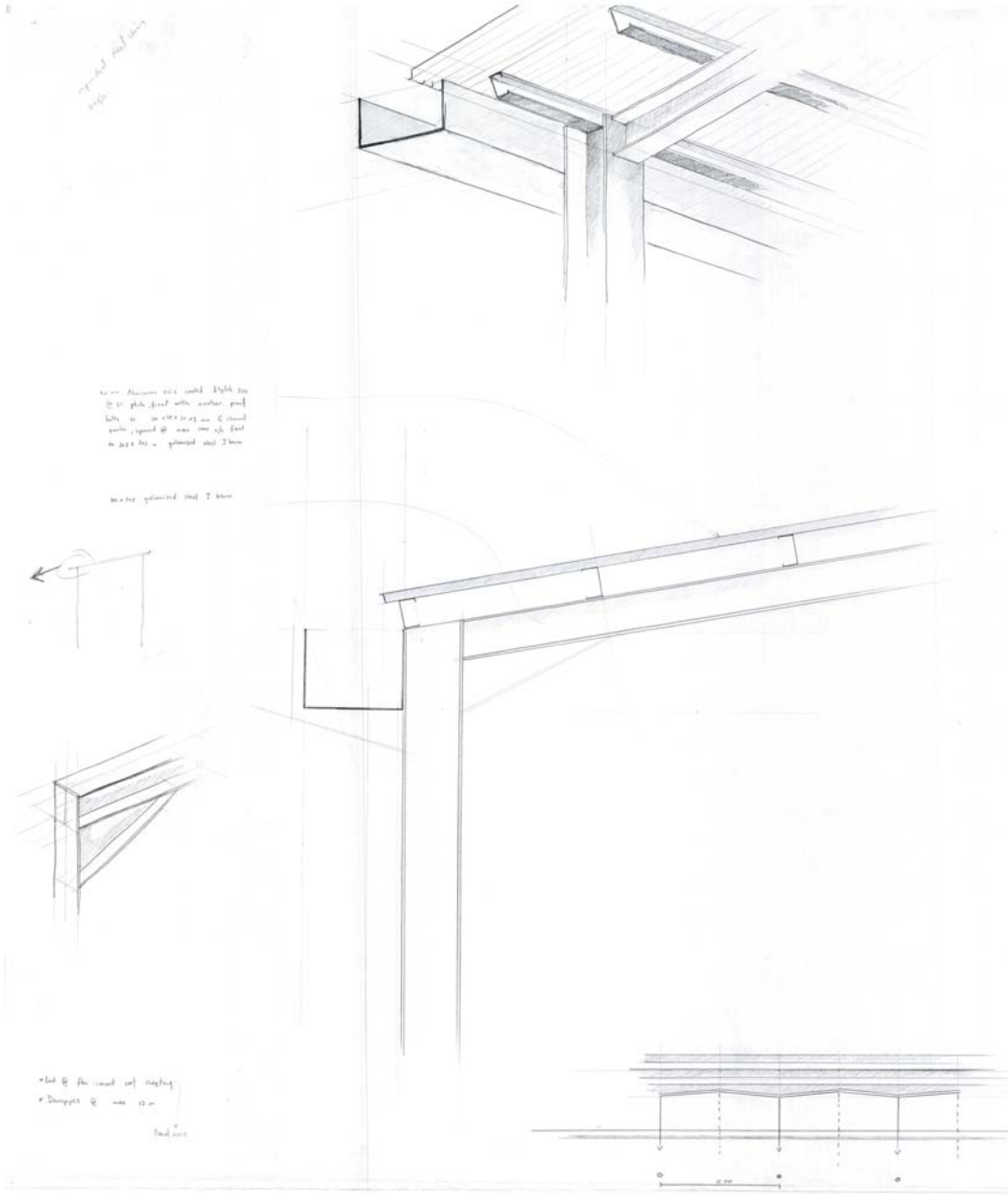
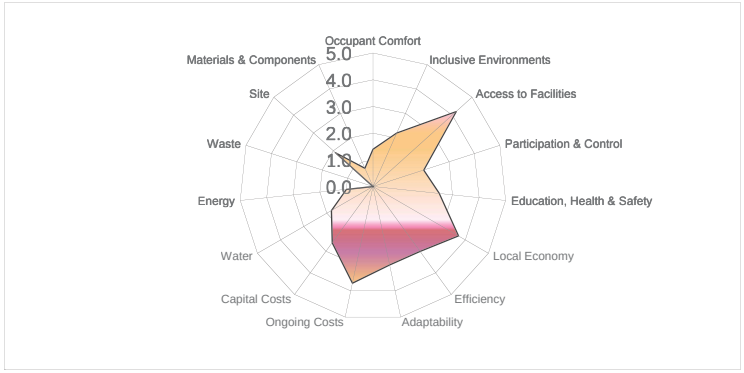


Fig 07-32
Exploration of gutter detail 2

SUSTAINABLE BUILDING ASSESSMENT TOOL (SBAT- P) V1

PROJECT		ASSESSMENT	
Project title:	Eerste Fabrieken train station	Date:	20/05/2013
Location:	Mamelodi, Tshwane	Undertaken by:	Tialise Taljaard
Building type:	Transport Interchange / Light industrial	Company / organisation:	
Internal area (m2):	2702	Telephone:	Fax:
Number of us	3500	Email:	tialise89@tuks.co.za

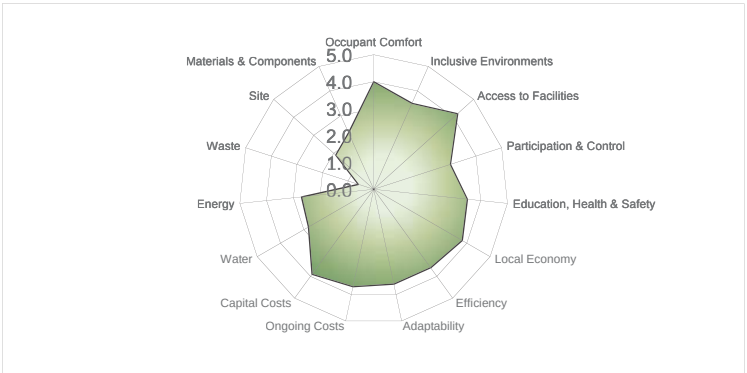


Social	2.5	Economic	3.2	Environmental	1.1
Overall	2.3	Classification			average

Fig 07-33
SBAT graphs from May 2013

SUSTAINABLE BUILDING ASSESSMENT TOOL (SBAT- P) V1

PROJECT		ASSESSMENT	
Project title:	Eerste Fabrieken train station	Date:	22/10/2013
Location:	Mamelodi, Tshwane	Undertaken by:	Tialise Taljaard
Building type:	Transport Interchange / Light industrial	Company / organisation:	
Internal area (m2):	2702	Telephone:	Fax:
Number of us	3500	Email:	tialise89@tuks.co.za



Social	3.6	Economic	3.7	Environmental	2.1
Overall	3.1	Classification			average

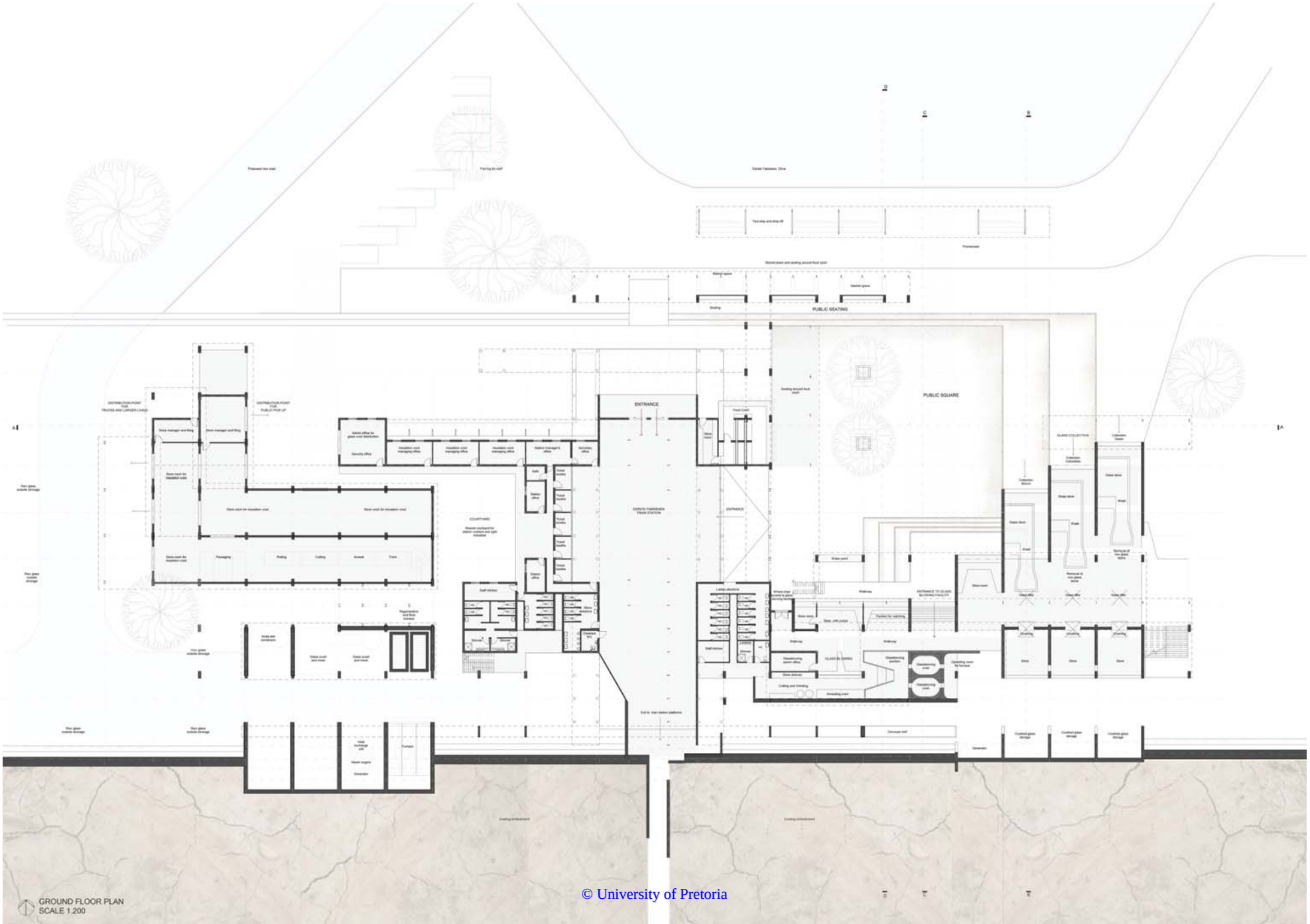
Fig 07-34
SBAT graphs from October 2013

FINAL DRAWINGS

Fig 07-35
Perspective of the collection points, glass blowing facility, square and station entrance

GROUND FLOOR PLAN

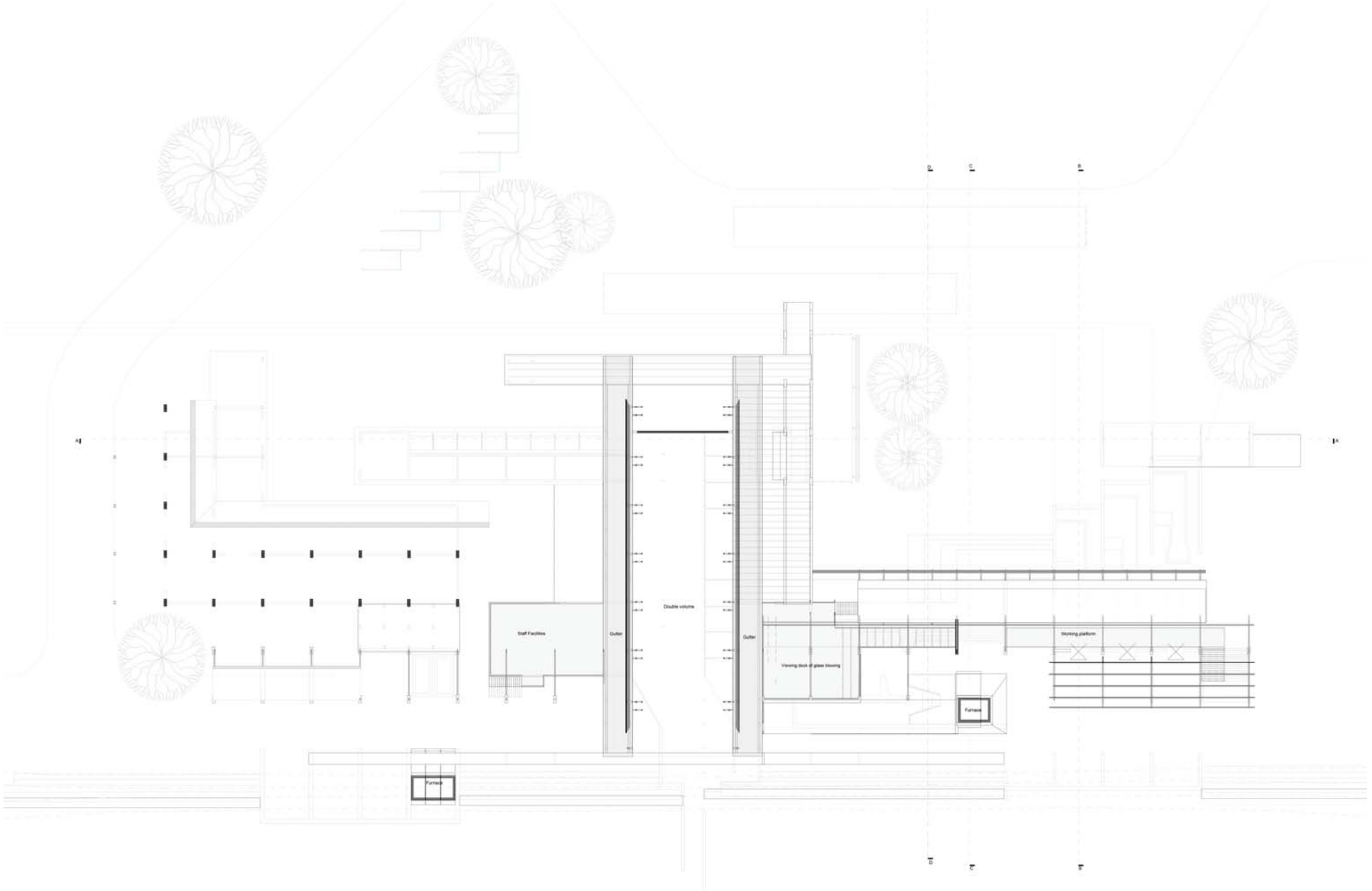
Fig 07-36
Ground Floor Plan
NTS



GROUND FLOOR PLAN
SCALE 1:200

FIRST FLOOR PLAN

Fig 07-37
First Floor Plan
NTS



FIRST FLOOR PLAN

SECTIONS

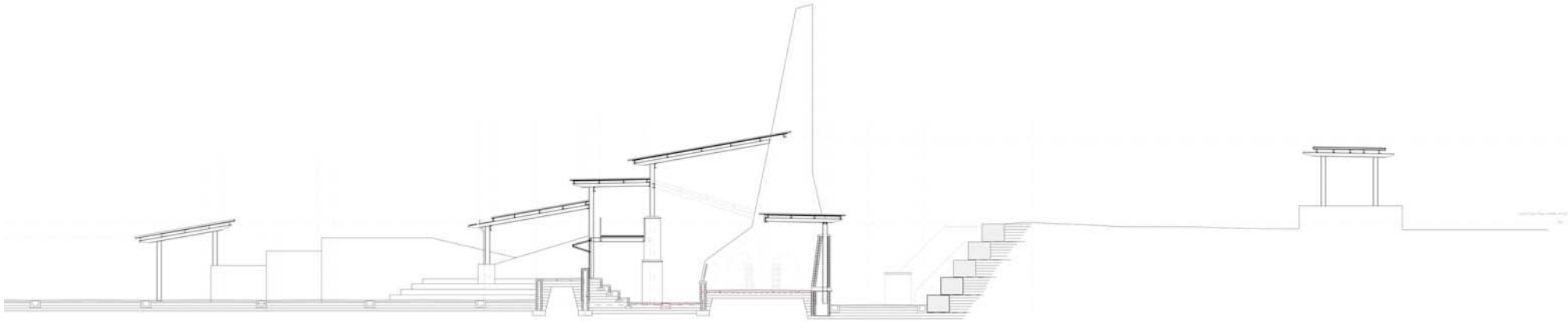
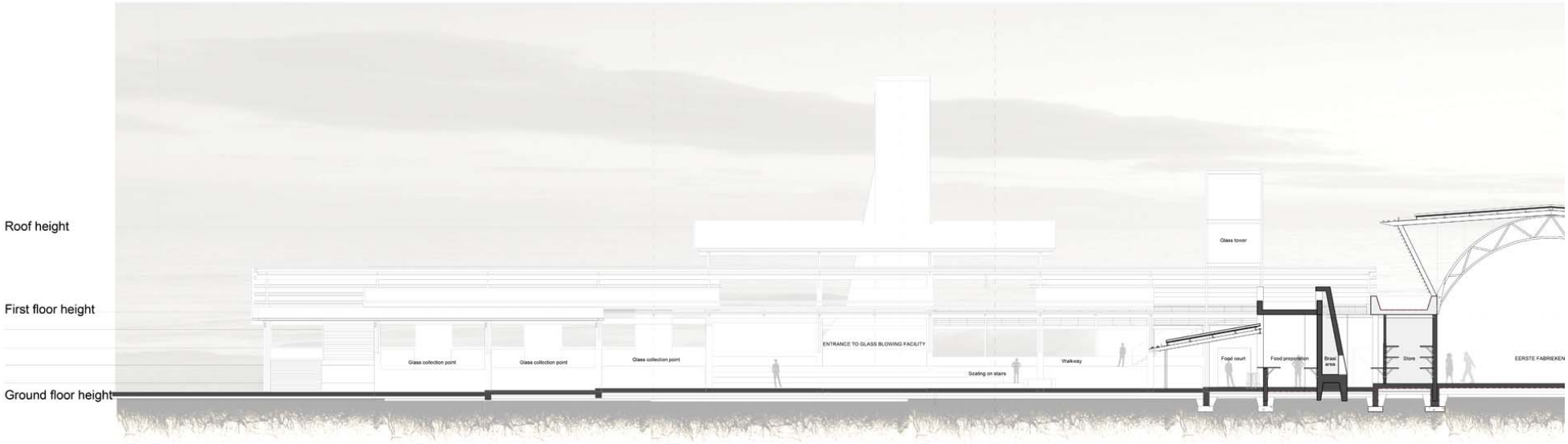


Fig 07-38
Section through central bay
NTS

Fig 07-39
Section through the process
NTS

Fig 07-40
Perspective of the Glass blowing facility edge
and Eerste Fabriken Station entrance



SECTION

Fig 07-41
Section through Station

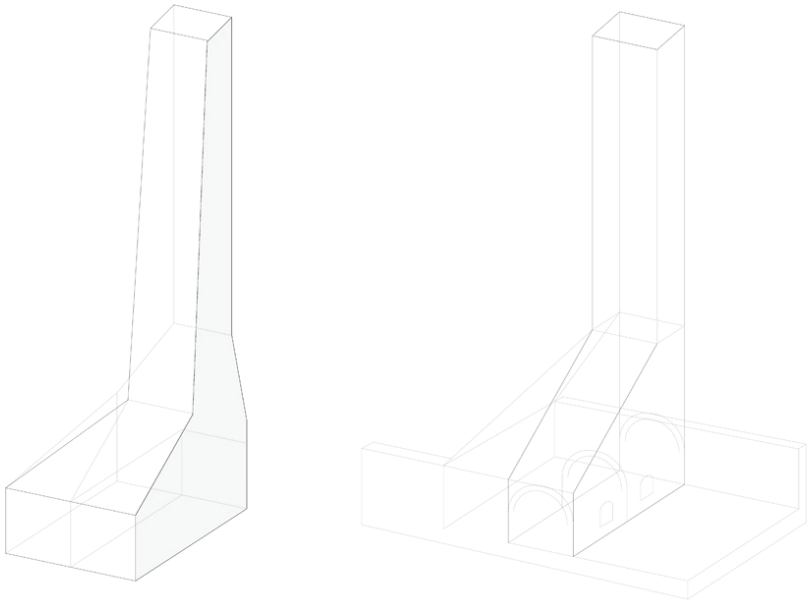


Fig 07-42
Section exploration through the furnace

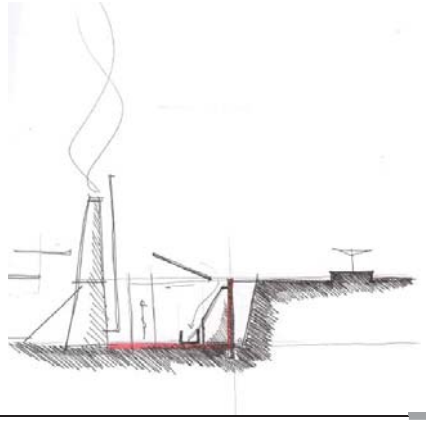
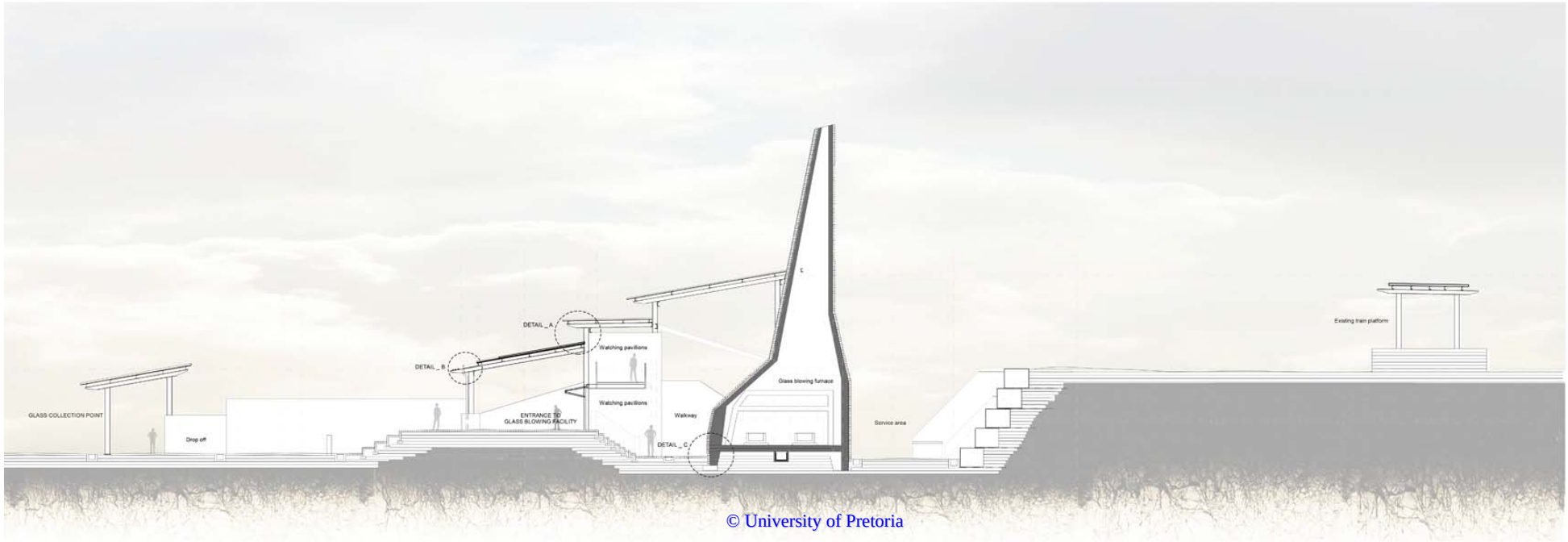


Fig 07-31
Ideas for the glass melting furnace

Fig 07-43
Section through the furnace



CENTRAL BAY

Fig 07-44
Perspective from within the building on the threshold edge between the public space and production

SECTION

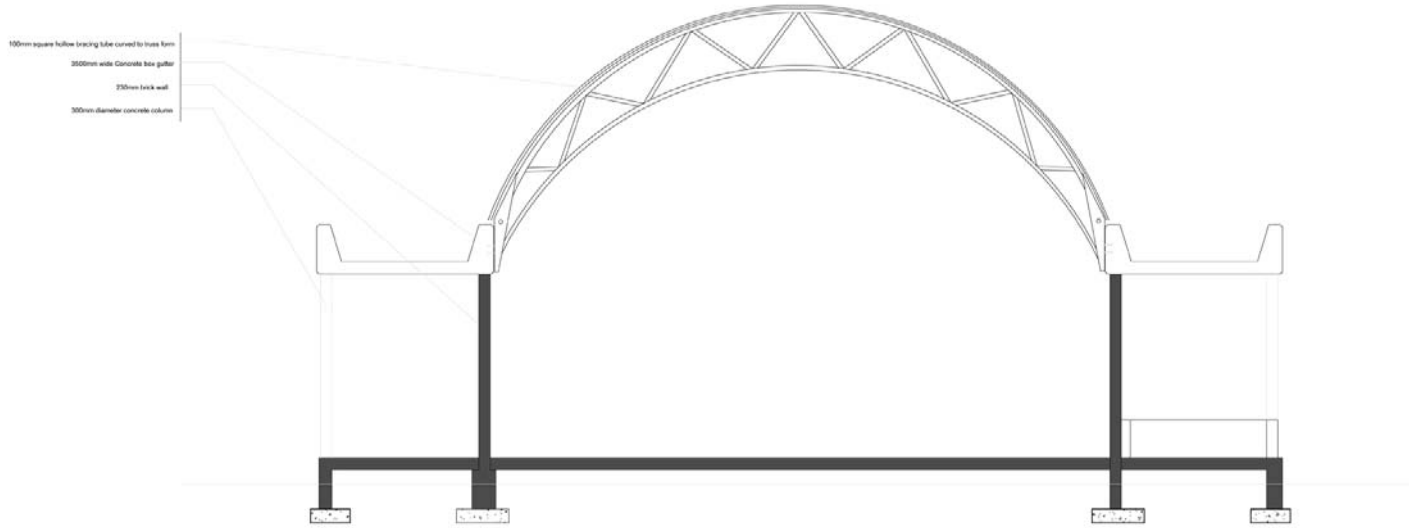


Fig 07-45
Existing Station Truss and roof

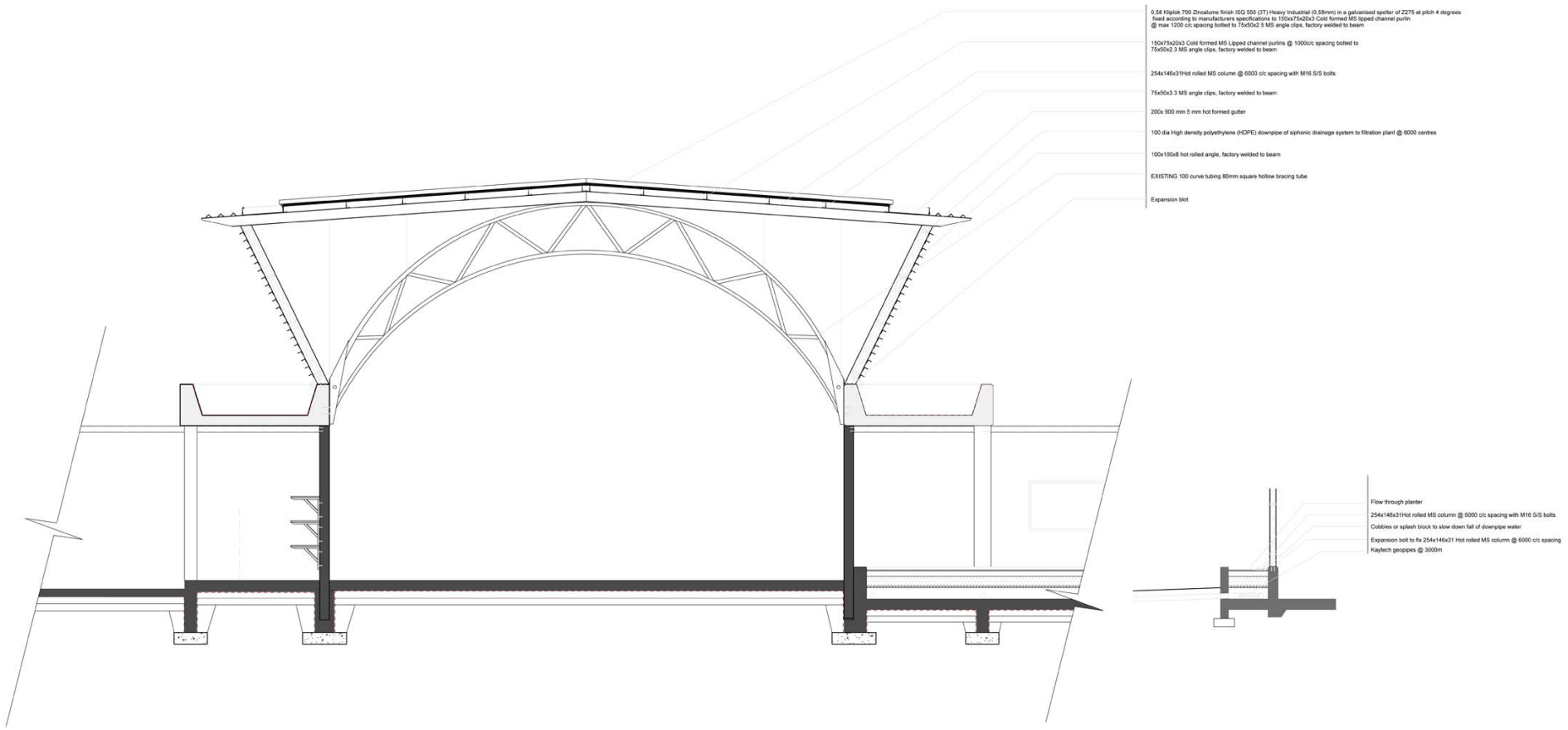


Fig 07-46
Proposed Station Truss and roof

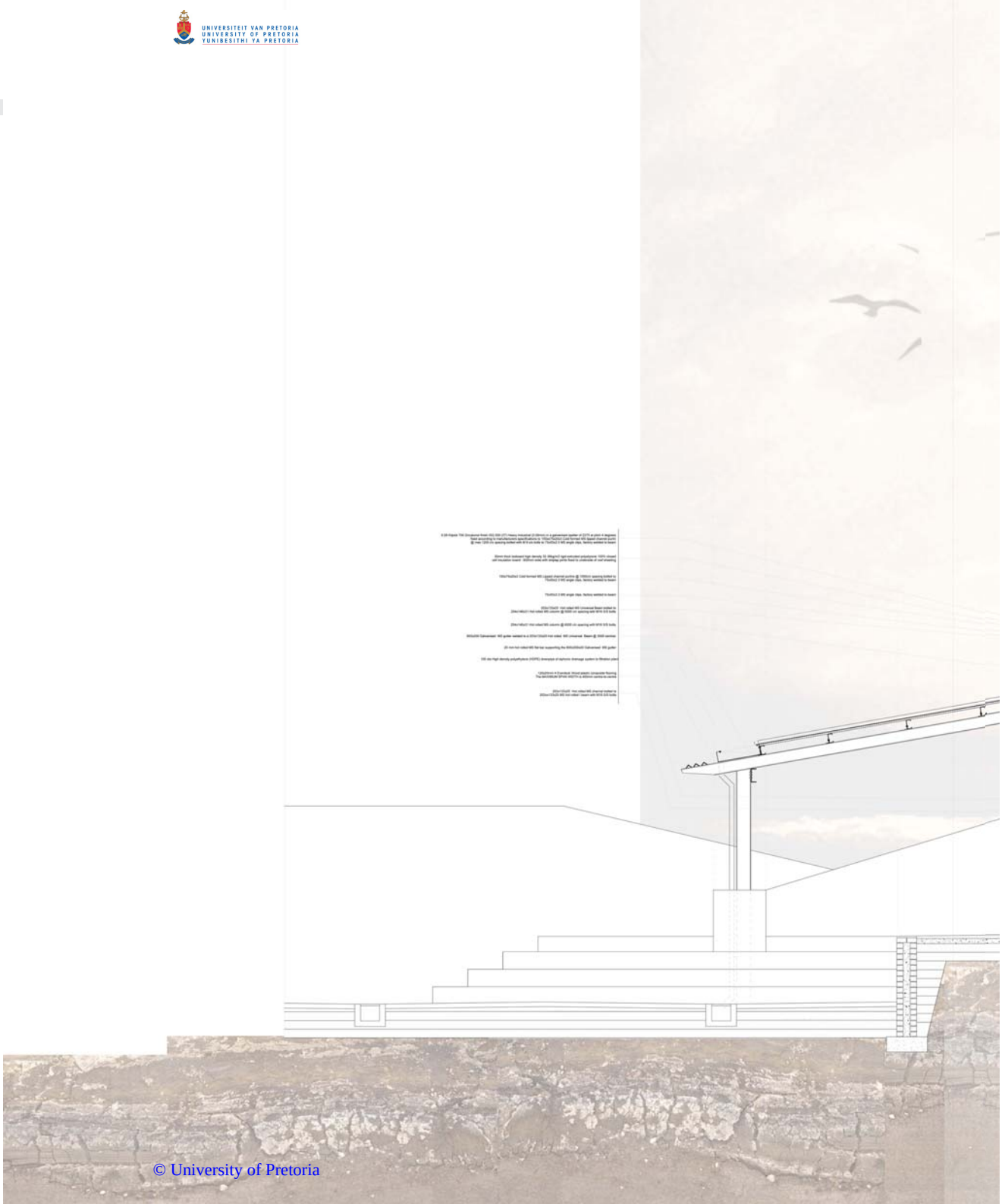


Fig 07-47
Section 1:20 section NTS

DETAIL 1

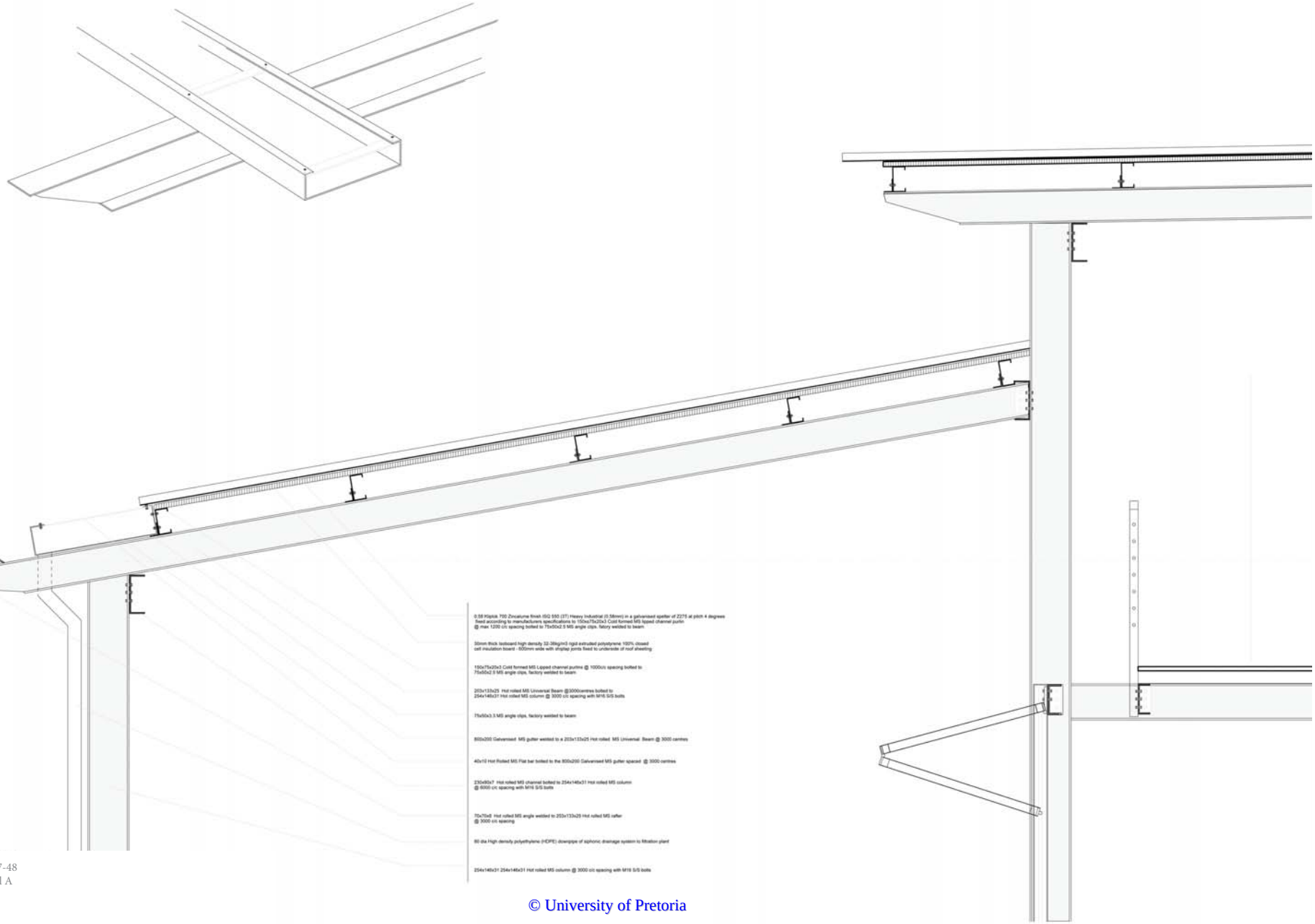


Fig 07-48
Detail A

DETAIL 2

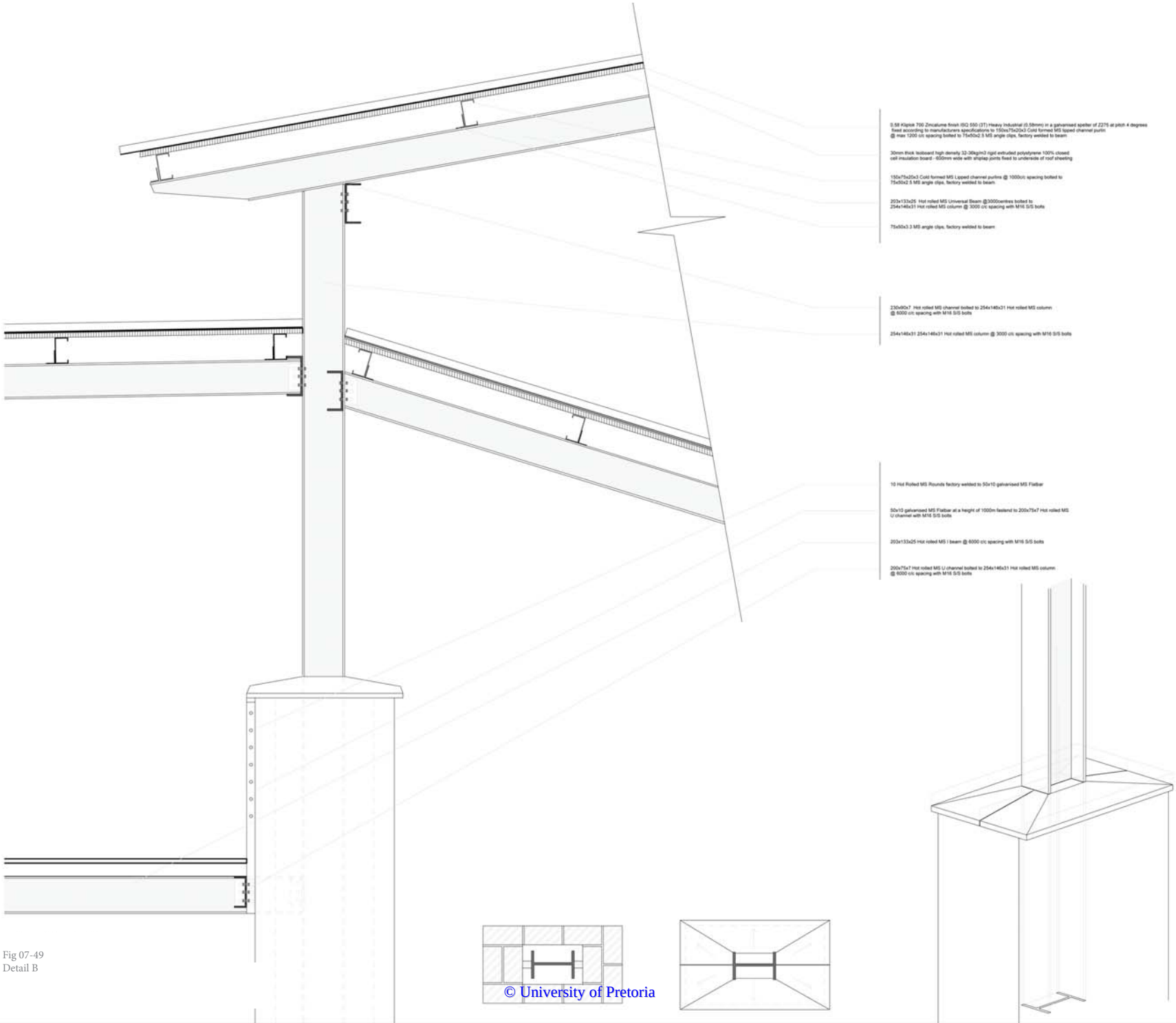


Fig 07-49
Detail B

DETAIL 3

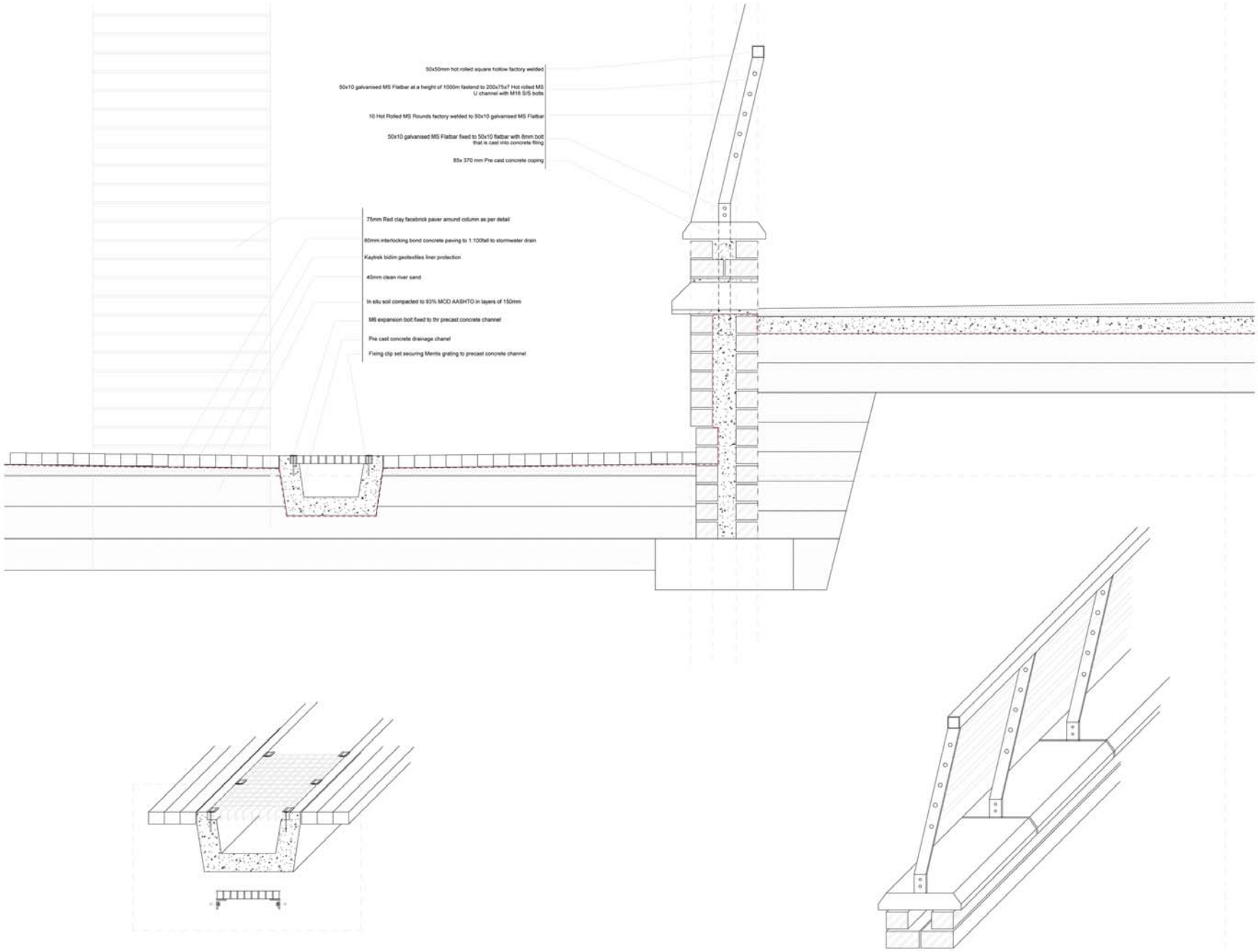


Fig 07-50
Detail C

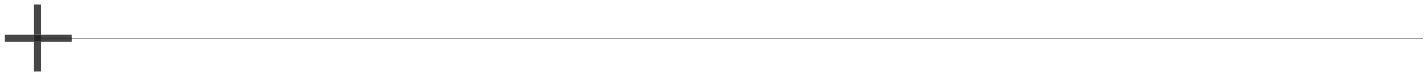
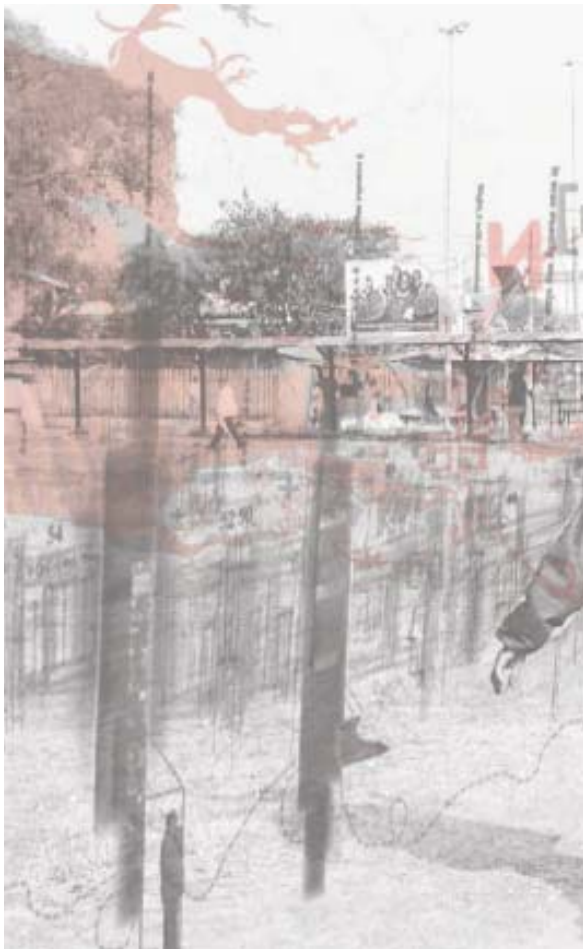


Fig 07-51
Perspective

CONCLUSION

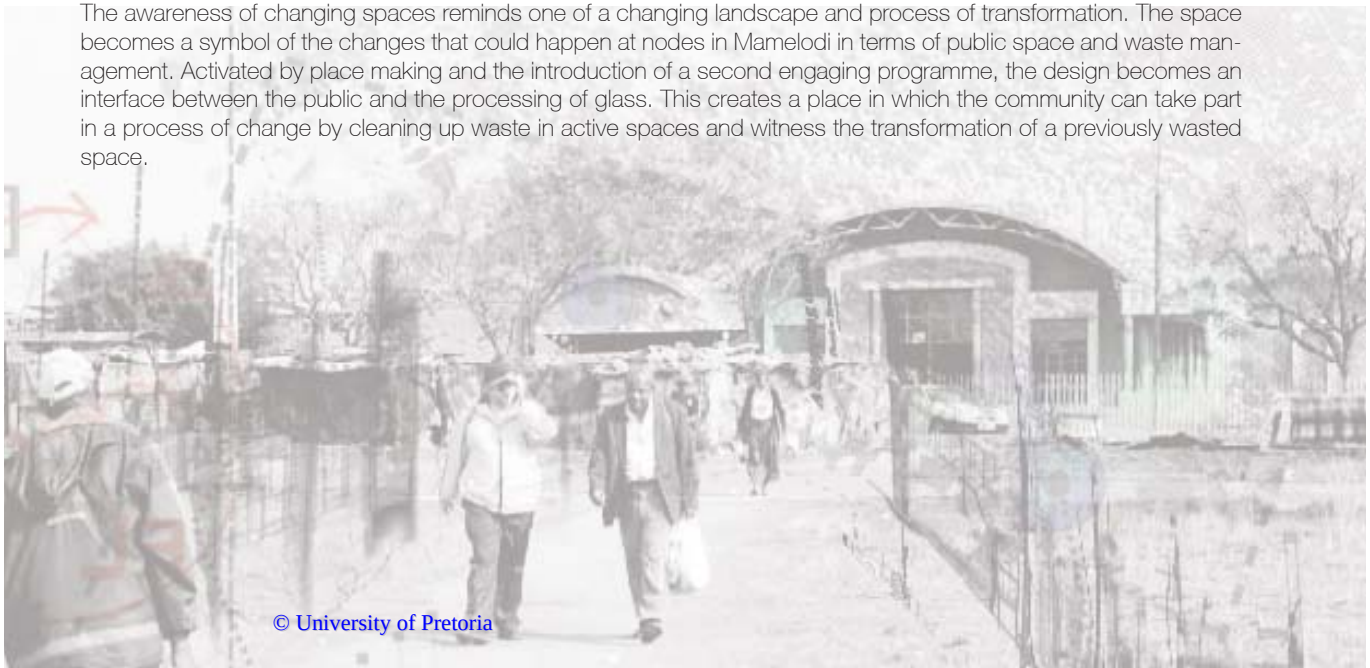


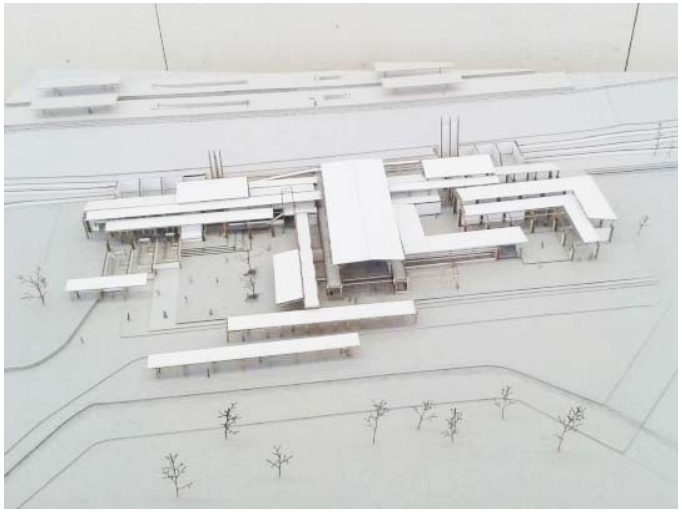
This dissertation was an enquiry into how, by introducing productive activity in a dormant area, a public space could become a place filled with activity and social engagement. This is one of the dormant areas in Mamelodi that experiences the effects of pendulum migration and waste accumulation. Apart from its function as a space of departure, the area is inaccessible. The site selected revealed a highly layered construct that captured the essence of what Mamelodi has become over time, with the potential to inspire transformation and change in the social and public realm of this informal settlement.

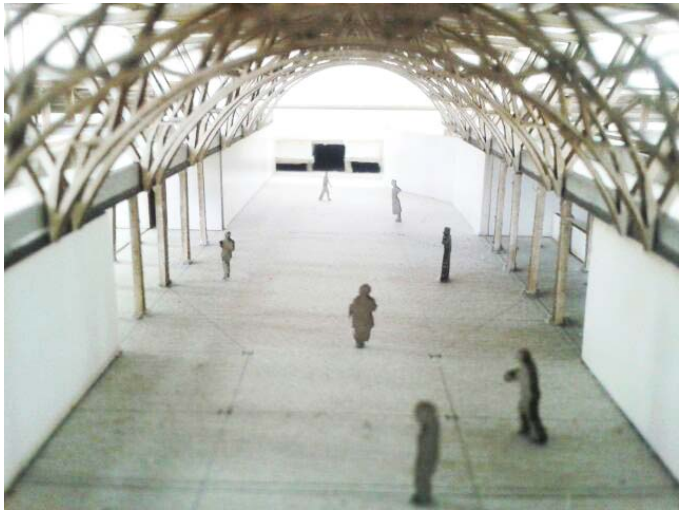
The design of the proposed building allowed for an exploration of architecture where transition, thresholds, change and transformation were the main drivers. It has been established that architecture could provide a platform for social awakening and the establishment of activity in a dormant space. These experiences of change and redemption are rooted in the physical aspects of the project's spaces, objects, history, and social participation. Consequently, every aspect of the architecture, including the construction of this space, places emphasis on the meanings of change and inspires transition through experiential and meaningful spaces.

The theoretical premise of place making and precedents investigated, indicate that social spaces, activity generators, existing contexts and past events could be layered to create a functional public place. The hierarchy and transition of spaces from one to another allows one to understand the process of change on site, as well as the process of change in terms of waste material that is reused and transformed into something useful. The result is a layered compilation of different spaces that are all directly related. The building therefore operates as a threshold and solvent of different spaces that would normally be split from each other.

The awareness of changing spaces reminds one of a changing landscape and process of transformation. The space becomes a symbol of the changes that could happen at nodes in Mamelodi in terms of public space and waste management. Activated by place making and the introduction of a second engaging programme, the design becomes an interface between the public and the processing of glass. This creates a place in which the community can take part in a process of change by cleaning up waste in active spaces and witness the transformation of a previously wasted space.







FINAL MODEL

Books:

Arendt, H. 1958. The Human Condition. Chicago: University of Chicago Press

Bunschoten, R. 2001. Urban Flotsam: Stirring the City: 1st edition.

Capra, F. 2002. The hidden Connection. New York: Anchor Books.

Dardel, E. 1952. L'Homme et La Terre: Nature de Realite Geography. Paris: University of France.

Durrell, L. 1969. The Sprirt of place. New York: Dutton

Deckler, T; Graupner, A; Rasmuss, H. 2008. Contemporary South African Architecture in a Landscape of Transition. Cape Town: Double Storey Books.

Dobson R. and Lees E. 2008. Intuitive Process(es) Towards Responsive Architecture. Architecture South Africa - Journal of the South African Institute of Architects, January / February 2008: 020-024.

Gehl, Jan. 1987. Live between buildings.

Gruson, L. 2008. Claude Nicolas Ledoux, visionary architecture et social utopia

Gussow, A. 1971. The social frameworks of knowledge. San Fransisco: Friends of the Earth

Leibbrandt, M. 2011. Economic History of Developing Regions. Jun 2011, Vol. 26 Issue 1, p101-119. 19

Lluís Sert, J; Léger, F; Giedion,S. 1984. Nine Points on Monumentality," Harvard Architecture Review 4 (1984): 62–63.

Hamdi, N. 2004. Small Change.3rd edition. London: Earthscan Ltd.

Hamdi, N. 2010. Placemakers guide. London: Earthscan Ltd.

Henning, C. Renblad, K. 2009. Perspectives on Empowerment, Social Cohesion and Democracy.

Jones, B. 2011. Virtual and Physical: architect Christopher Alexander on living spaces. VALA2008 Conference.

Kostof, S. 1995. A History of Architecture.: Settings and rituals. Oxford University Press, USA.

Kostof, S. 1993. The City Shaped: Urban Patterns and Meanings. Bulfinch.

Melsons, S. 2008. Formulating an architectural design paradigm for the quality improvement of informal settlements. University of Pretoria.

Mann, T. n.d. The Magic Mountain. New York: Random House.

Mansell, R. 1985. Circulation in 3rd world countries. London: Rouledge Kegan and Paul.

Mammon, N; Ewing, K; Patterson, J. 2008. Challenges of Inclusive Cities: Making urban spaces and places for all. For Urban LandMark.
Mehrotra, R. 2011. Architecture in India since 1996. University of Michigan.

Mehrotra, R. 2005. Everday Urbanism. University of Michigan.

Norberg-Schultz, N. 1971. Existence, Space and Architecture. New York: Praeger.

Norberg-Schultz, N. 1979. Genius Loci: towards a phenomenology of architecture. Rizolli.

Norberg-Schultz, N. 1976. The Phenomenon of Place. Architectural Association Quarterly.

Potgieter, G. 2002. City of Tshwane : a pictorial journey. Tshwane Metropolitan Municipality, Pretoria.

Skeldon, R. 2003. Migration and Poverty. Paper presented at the conference on African Migration and Urbanization in Comparative Perspective, Johannesburg, South Africa, June 4 – 7, 2003.

Therakomen, P. 2001. The Experiments for Exploring Dynamic Behaviours in Urban Places.

Vycinas, V. 1961. Earth and Gods. The Hague: Martinus Nijhoff

Wacquant, L. "Relocating Gentrification: The Working Class, Science and the State in Recent Urban Research." International Journal of Urban and Regional Research 32.1 (2008): 198-205.

Whitside, A. 1985. Labour Migration in Southern Africa. The South African Institute of National Affairs.

Wilson, F. 1972, Migrant Labour in South Africa, Johannesburg: The South Frican Council of Churches.

Gapp Architects. 2011. Tsosoloso Programme. Mamelodi and Nelmapius Master-plan.

Internet:

Gapp Architects. 2011. Tsosoloso Programme. Mamelodi and Nelmapius Master-plan.

Unknown author. 2012. 'Native (Black) Urban Areas Act No 21 of 1923'. http://africanhistory.about.com/library/bl/blsalaws.htm (accessed 15 March 2013)

Unknown author. 2012. The Great Soviet Encyclopedia http://encyclopedia2.thefreedictionary.com/Pendulum+Migration.

Unknown author. 2013. http://dictionary.infoplease.com/dormant.

Unknown author. 2013. http://www.placemakingchicago.com/about/.

Unknown author. 2013. http://www.businessdictionary.com/definition/production.html.

List of figures (unless otherwise cited, all images are that of the author)