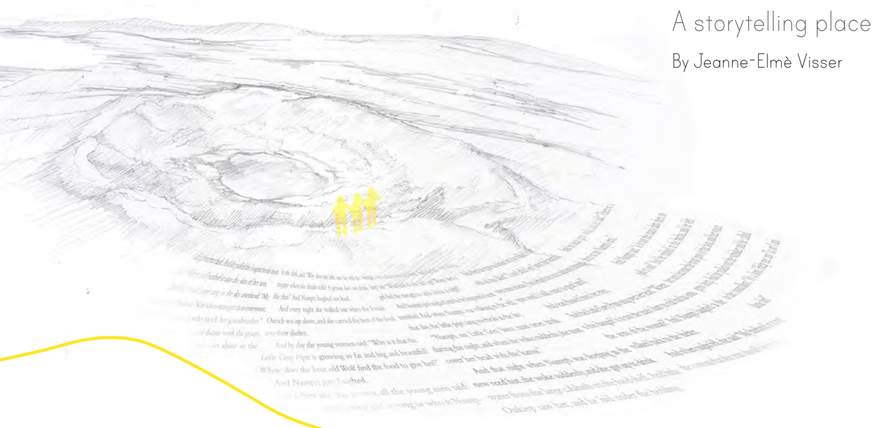
# REVELATION AND RECONNECTION



## A storytelling place at the Tswaing Crater

By Jeanne-Elmè Visser





Revelation and Reconnection: a storytelling place at the Tswaing Crater
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Submitted in partial fulfillment of the requirements for the degree
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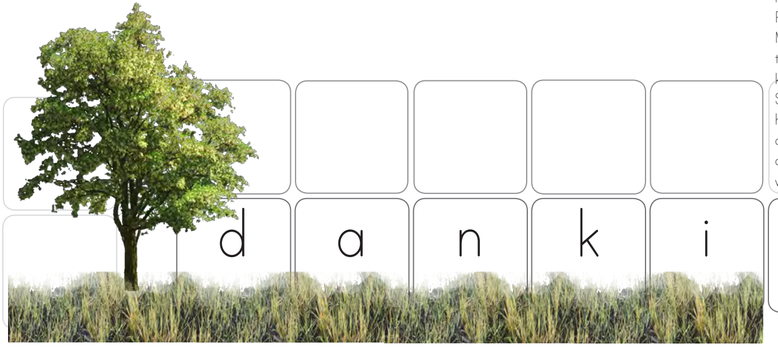


My ouers, vir hul ewige ondersteuning, liefde en geduld kan ek nie genoeg bedank nie. Die res van my gesin- Jaco, Paul, Carla en Ouma Jane wat nog altyd in my geglo het. My huismaats in 224, spesifiek Anomien en Anri- jul teenwoordigheid was 'n redding. Vir al my vriende en klasmaats wat die pad saam met my gestap het asook Suné en Anneke wat my in die dae voor die krit baie gehelp het, is ek baie dankbaar. Ook aan Jacques, Arthur en almal in Boukunde wat tyd afgestaan het om my help, baie dankie. Aan Prof. Bakker wat my aangemoedig het om my vlerke te sprei is ek baie dank verskuldig. Almal wat nie hier uitgesonder word nie, maar my ondersteun het met 'n bietjie tyd, 'n oproep of 'n sms: ek waardeer julle meer as wat ek kan uitdruk.

Baie dankie!

Fig. 1

## Abstract

The subject for this dissertation is a development for the Tswaing Crater nature reserve that is dedicated to the rediscovery of the significance of place, as well as a rediscovery of the significance of self. These discoveries are made through the medium of storytelling, which is a universally understandable activity. Different theories on the perception of architecture, existential presence in the world and methods of storytelling is explored to inform a design question. The study culminates in the proposal for a built intervention that responds to the cultural and bio-physical environment and addresses problems identified during the theoretical discourse.

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## Nobody Knows

Nobody knows how old it is. No-one
knows who made it, no-one knows
what it is for. Hands like these? No-one
knows. Stories laughter, words? Nobody knows.
The silent stone is silent. It does not
speak. Though the stone is written, it is
a text we cannot read since it does not
propose anything other than what it is.
The stone does not negate anything, it does not
argue against anything- it is silent,
it does not speak or choose to be silent.
Nobody knows how silent this stone is,
or how old, who, where, why this stone is.

Michael Cope, Ghaap, Sonnets from the Northern Cape, 2005

# 1 introduction

## 1.1 Overview of the context

Location of site:
Latitude 25° 24' 30'' S and
Longitude 28° 04' 59'' E
Tswaing, the Place of Salt in Setswana, is a 1946 hectare conservation area located 40km northwest of Pretoria CBD.

The Tswaing Crater nature reserve is located in the peri-urban environment of Soshanguve, easily reached by the city-dweller. It is a meteor impact site of natural heritage importance and is currently described as a 'open museum' hosting hiking trails and an undeveloped visitors centre. The theoretical enquiry is concerned with the problems relating to disorientation of the individual within his biophysical and cultural urban environment. The problems are addressed in the proposed project that is programmed as a built intervention housing opportunities to experience oral literature, while making the user aware of the landscape. The project function will reside under the title of a 'museum' that is accessible to both a local and foreign visitor as a universally important site.

## 1.2 Research methodology

The research methodology involved in this document is directed towards the end goal of a product in built form and the experience thereof. Thus the emergent theory is not confined to the written word, but rather embodies the eventual, proposed product.

In order to formulate a design question and subsequent solution, the extent of the problem has to be investigated using a research methodology. An architectural project is set in an environment that must address both the concrete and abstract needs of the client. This poses a uniquely complex problem. This is further perpetuated by the ambiguity of the client who represents not only the user of the building, but also the developer and manager. Consequently, a research methodology would include a host of elements to ultimately ensure a sufficiently complex solution.

Considering the nature of the site, it is clear that scientific and psychological data should investigated. Therefore, it is appropriate to adopt an approach that would involve both qualitative and quantitative data collection and interpretation. The combination of the two research methods enables one to understand the quantitative data in terms of their human context. (Trochim: 1999) Thus, while this document will take relevant quantitative data into account, this will be done within a predominantly qualitative framework.

As the product, in its capacity as a 'theoretical statement', is unknown at the outset of the project, it will evolve from the initial data collection and interpretation thereof. In light of this, the appropriate research methodology was deemed to be a simple qualitative- quantitative investigation during which relevant literature is reviewed and the experience of the site is recorded. These findings are then synthesized through logical argumentation and graphic analysis to justify the design as end- product.





The above process is applied to this project in the following manner. The biophysical and cultural setting of the building implies the use of architectural theory that is discussed, evaluated and built upon by related theory. Quantitative data includes the physical and numerically definable attributes of the site and environment investigated in a site analysis. The significance of the site and certain areas within the site will further direct the study in a qualitative manner that will suggest sensitivities and opportunities for development and programming. These will continually shape and feed the theoretical argument that will culminate in a relevant design solution.

Simply put, the approach is an attempt to discover a product, or theoretical statement in a generative manner, which is a solution that is responsive to the given situation. (Trochim: 1999)

## 1.3 Goal

The goal of the investigation is to identify the problem of disorientation of the individual within his environment and subsequently find a solution that will offer the individual the opportunity to reconnect to the environment. This should encompass not only the biophysical environment but also the cultural and historical within which each unique individual is located. The location begs a solution to this that is sensitive to the biophysical environment in term of the significant visual and ecological resources.

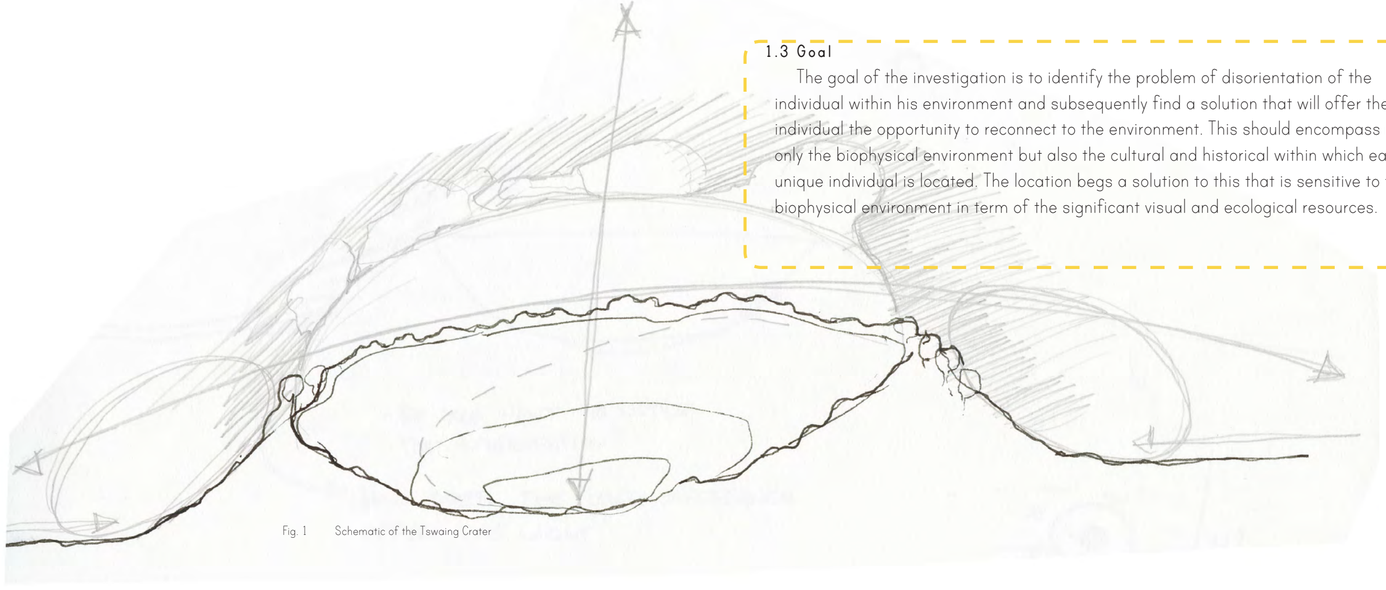
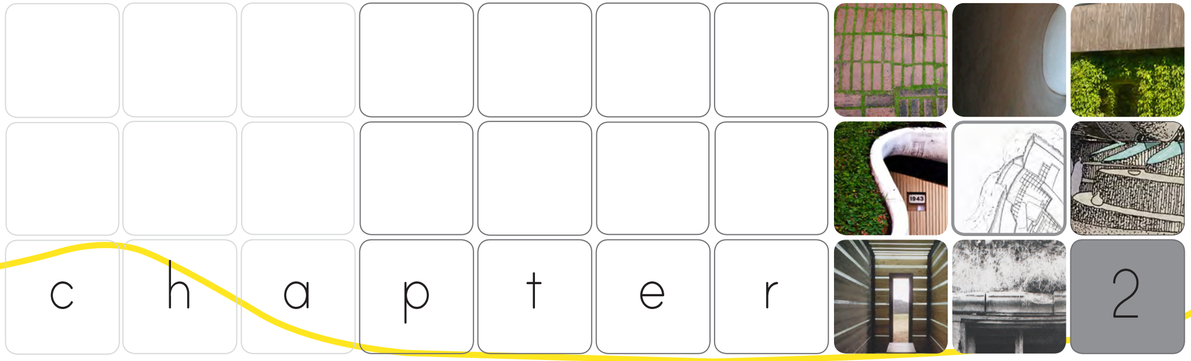


Fig. 1 Schematic of the Tswaing Crater

# LITERATURE STUDY





# 2.1 INTRODUCTION

to the contemporary cultural context:

"The human mind is a great city in which the individual is always lost. He spends his lifetime groping, trying to locate himself." (Heller 2003: 69)

This seems to be a contemporary affliction. Is it possible that mankind has lost its existential footing along its course through history? What is the reason for this, and what is a possible remedy?

It is significant that the author of this phrase associates the negative experience of being 'lost' with a city. Most often when issues related to the degradation of cultural and moral values are discussed, it is related to the urban context. Why is it that the contemporary urban environment is so toxic to the health and wealth of cultures that once flourished in the rural context?

> The human mind is a great city in which the individual is always lost. He spends his lifetime groping, trying to locate himself. (Heller 2003: 69)

Contemporary urban life has stripped people of many of the things that had previously rooted them to their world. Primitive life was once structured by the daily practice of rituals and the performance of essential tasks in order to survive. Life was once lived in close proximity to the family structure, shared with the community while enveloped and sustained by the biophysical environment. The deterioration of the family structure, the disappearance of communal interaction through declining religious practice and indifference toward the biophysical environment has fragmented the ritual of daily life.

The contemporary urban dwellers spends their life in the belly of shopping malls and office blocks, finds sustenance in supermarkets and drive-through windows with no connection to the sacred or the physical realm. This is in stark contrast to the following extract which is a description of a rural community in Bali: " The whole idea of Bali is a matrix, a massive and invisible grid of the spirits, guides, paths and customs. Every Balinese knows exactly where he or she belongs, orientated within this great, intangible map."(Gilbert 2006: 237)

The pre-urban intangible map has been replaced by other intangible maps in contemporary life, none of which connects one to the biophysical realm. Very simply put, the system looked something like this: the individual fitted into the family, that fitted into the community with similar beliefs and rituals, which fitted into the physical environment. The physical environment then served the community and the benefit was worked back to the individual. Although oversimplified, the idea serves to illustrate the cultural link that culture and society had with the environment. Later certain examples of communities will be discussed where the dependence upon the environment to regulate the daily lives of the people will become apparent.

The urban dweller, however, is completely unaware of his or her link to the earth and has therefore foregone connections to many other aspects of life.



# 2.2 LITERARY INVESTIGATION

of core theoretical concepts

## 2.2.1 Loss of orientation and identity

Colin St John-Wilson(1992: 10) states that what man fears most is emptiness. This emptiness is defined as a lack of identity and focus and a feeling of unreality. The statement refers to the ideas of Adrian Stokes who addressed the 'psychological position' of man in the world. (St John-Wilson 1992:5) Stokes directly relates the psychological well-being of man to his physical position in the world, in other words, where he is orientated.

This is not an unfamiliar thought. Although less specifically grounded in the discipline of psychology, the theory of phenomenology is fundamentally an exploration of the positioning of man in the world as an existential plane. "Together identification and orientation make up the general structure of dwelling..." (Norberg-Schulz 1985: 15) The human experience of dwelling is again claimed to be directly related to his position in the world.

It is clear from these examples that the problem of disconnection exists. Juhani Pallasmaa (2000:6) refers to this as cultural erosion. Accordingly, the need for cultural discovery and a reconnection with identity on a purely psychological level is identified. Later, possible architectural remedies for this problem will be suggested, as the author is of the opinion that this connection can be facilitated by the architect. The following statement is an illustration of the impact the profession can make on the well-being of an individual.

> ...to the tangled web of needs and annoyances, desires and frustrations by which each day we follow our course; and to find an answer to those needs is to give to the individual a kind of self-respect which constitutes a form of freedom that the politicians know nothing of, because it has nothing to do with dogma, but all to do with each person (Aalto's little man) who is helped to be at home in a world that can be marvelous in unison, but terrifying in alienation.
>
> (St John-Wilson 1992:97)

Fig. 2

## 2.2.2 Reconnection to the natural environment

"When we...identify ourselves, we use the place as our reference."(Norberg-Schulz 1985: 9), The importance of the environment around us emerges from this statement. The idea of reconnection to our own identity is incomplete when set in a void. Reconnecting to the physical world is essential. Norberg-Schulz describes the world as the 'multifarious between', that is, all that is between the earth and the sky. (Norberg-Schulz 1985:18) Thus, the environment forms the basis for our exploration of self, a guiding realization in the design process. The question remains: how do we achieve a connection to the physical and biophysical environment through the act of building, which fundamentally produces a cultural environment?

Various authors have been intrigued by the mysterious connection of mankind to his surroundings. A seemingly inherent awareness and experience of the world.

Pallasmaa (2000:1) claims that the sensory realm and experience of man has been reduced to that of visual perception. Within the discipline of architecture, the resulting built environment has the same focus: that of a visual image, rather than a sensory experience. (Pallasmaa 2000:11) The criticism rests upon the belief that architecture can be experienced as more than merely visual syntax. The practical solutions offered are all related to the meaning that can be instilled through human situations and encounters. (Pallasmaa 2000:6)

As mentioned before, St John Wilson relies on psychology for an explanation. He finds that all experience is situated between two extreme poles: envelopment as opposed to exposure. (St John-Wilson 1992:14). As both our 'psychological position' and spatial experience falls within this range, memory plays an integral role in our architectural experience. (St John-Wilson 1992:12). Additionally, all experiences relate to our body, our vehicle of experience. Architecture, in his opinion, is a transposition of the human body. (St John-Wilson 1992:5). Thus, as experience is subconsciously understood as the language of the body, the possibility exists to embed ambiguous meaning into architecture, if it is employed in terms of the polar positions of experience(St John-Wilson 1992:12)

From the above arguments, experience is cited as the main connection to the environment around us. In any attempt to establish a connection between an individual and the physical environment, the experience of it should be significant. Architecture is the vehicle of experience of a place.

### 2.2.3 Orientation in time

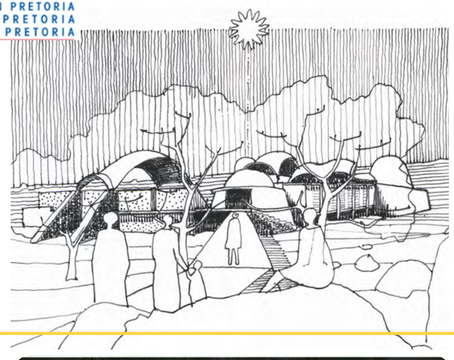
Orientation, however, is not restricted to physical presence or even the place of the individual within a social and cultural context. We are also orientated within time. This is what determines the world into which you have been 'thrown', as Heidegger describes it. All the factors that influence the identity of an individual that have been mentioned, such as the physical and metaphysical context, has a history and is the result of a singularly unique story. To fully understand your surroundings as they exist today, as well as one's own identity, one must be made aware of your orientation in time.

Both St John Wilson and Pallasmaa discuss how the concept of time becomes integral to that of meaningful experience.

Pallasmaa(2000:4) adds to his critique of a visually biased architecture: ''Vision places us in the present tense, whereas haptic experience evokes the experience of a temporal continuum.'' The underlying idea of both authors seems to be that of materiality. Many contemporary materials are designed to remain shiny and new until it is replaced, divulging nothing of its origins, whereas traditional building materials such as brick, stone, copper and wood tell a story of its lifetime: from the creation to the deterioration. (Pallasmaa 2000:4) A haptic experience, to the mind of Pallasmaa, becomes the concrete

Mapungubwe National Park Interpretive centre
Peter Rich

This approach can be seen in the selection of materials and structural system of the centre. The Mediterranean tradition of vaulting was selected based on the desire to use natural materials and labour intensive methods in order to empower the community. (Fitchett et al 2009:.28) The earth tiles are produced locally and have low embodied energy. (Fitchett et al 2009:..29) The structural form expel the need for steel reinforcement and relies on human labour instead of machinery. (Fitchett et al 2009:.30)



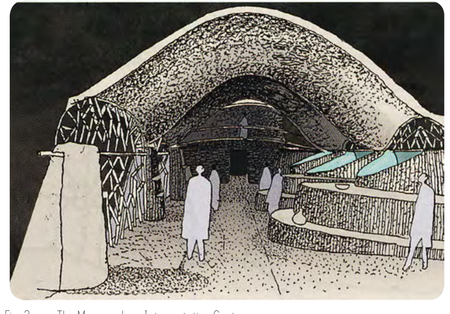


Fig. 3 The Mapungubwe Interpretation Centre

'' The place, therefore, unites a group of human beings, it is something that gives them common identity and hence the basis for a fellowship or society. The permanence of the place is what enables it to play this role.'' (Norberg-Schulz 1985: 9)

expression of time, thereby making it acceptable. (Pallasmaa 2000:6) This may be a valuable tool in orientating the architectural experience on an existential plane.

The use of traditional materials not only tells the tale of the manufacture of the object, but the many years it took to develop that tradition. St John-Wilson refers to the work of Alvar Aalto in this regard. Not only does the use of material and symbolism in his work tell the story of surrounding natural environment, it also embodies the ''...collective beliefs, the local colour of every cultural reign.''(St John-Wilson 1992:90) We often refer to culture in the present tense, but perhaps it is worthwhile to remind ourselves of how long it takes to develop a specific culture. Such an object has inherent content, as opposed to the reductive aesthetic of Modern architecture that excludes all subject matter.(St John-Wilson 1992:95)

Looking beyond purely traditional materials, we may consider the story that materials may tell about the world we live in today. The materials that we select are done so under the looming knowledge of the impact it will have on the environment. We consider the manufacture, transport, lifespan and demolition in addition to the look and feel. This is a direct and visible reflection of a cultural shift in our perception of the environment and the exploitation thereof.

### 2.2.4 Time in the natural environment

Being disconnected from tradition, history and culture and the natural environment means an existence isolated in time. St John Wilson(1992:10) claims that modern architecture succeeds in banishing space and time, thereby instilling a feeling of unreality. Consider the contemporary public space: the shopping mall. No sun, wind or rain penetrates the capsule to hinder the consumer from their primary task of self-indulgence. Individual identity plays no part in the transaction. Night may fall or tragedy may strike without the occupants having an inkling of the reality that exist beyond the unreality of those walls. In opposition we see the prominent role that the natural environment plays in the rural context. The calendar is determined by the seasons, the moon and the stars and because of its vital role in their survival, these elements are held in reverence by the inhabitants. As will be seen in precedents, this plays a guiding role in the production of architecture.

### 2.2.5 Conclusion

''...it is to match adequately , not only the criteria of function and environment, but also the other interlocking codes that spell out both the private and subliminal reactions, and the public realm of conventional narrative; and then, above all, so to weave the strands together that one can begin to conceive their counter-form in the architectural language... ''(St John-Wilson 1992: 90)

These core concepts of theory attempt to define the additional, less obvious characteristics that transform architecture from built form to place. Those strands that make up the DNA of a truly significant place.

# 2.3 PHYSICAL TRANSLATION

as proposed by theory

## 2.3.1 Dwelling

"To dwell implies the establishment of a meaningful relationship between man and a given environment..." (Norberg-Schulz 1985:13)

Dwelling, thus, is an important idea in terms of establishing a connection the environment. Although this is a very philosophical idea, Christian Norberg-Schulz does offer some suggestions as to how one can achieve this meaningful relationship. Breaking down the meaning of the term, Norberg-Schulz indentifies the key ingredients of dwelling to be a how, that relates to identification, and a where, that relates to orientation. (Norberg-Schulz 1985:15) These are both subject that have been raised previously and are clearly worth investigating further.

Identification refers to the "...qualities of things..." (Norberg-Schulz 1985:15) Again, we see the implication that objects contain an inherent meaning with which one can identify; and that aids us in understanding our world as it exists. (Norberg-Schulz 1985:18)

Orientation, on the other hand has to do with "...spatial interrelationship."(Norberg-Schulz 1985: 15) He describes the elements of spatial relationship as centres, paths, goals and domains. (Norberg-Schulz 1985:24) Domains are the larger plane on which paths and goals exist, which makes up the 'environmental image' of the mind, and thus the structure within which the environment is connected with paths and centres. (Norberg-Schulz 1985:24) A centre denotes a place of more importance, a destination, where horizontal movement comes to an end. Also important is that he claims a centre to create a vertical axis mundi which unites earth and sky, and that this can add a sacred dimension to a centre. (Norberg-Schulz 1985:23)

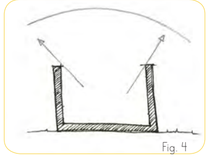


Fig. 4

"To dwell in the qualitative sense is a basic condition of humanity. When we identify with a place, we dedicate ourselves to a way of being in the world. Therefore dwelling demands something from us, as well as from our places. We have to have an open mind, and the places have to offer rich possibilities for identification."(Norberg-Schulz 1985:11)

## 2.3.2 Gathering

"The existential purpose of building (architecture) is... to make a site become a place, that is, to uncover the meanings potentially present in the given environment." (Norberg-Schulz 1985:422) This comment was made after discussing the phenomenon of a bridge gathering the environment around it and making it meaningful. (Norberg-Schulz 1985:422) This simple construction does not give the environment its meaning, but makes us aware of the environment and its inherent meaning. Thus, the act of building can gather the world around it.

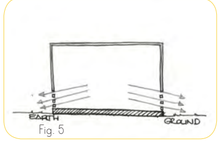


Fig. 5

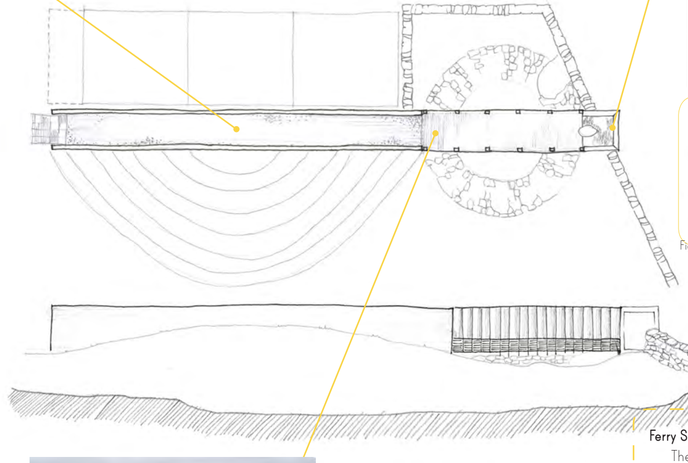


Fig. 6

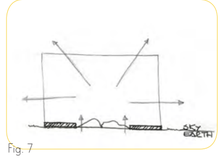


Fig. 7

"If we call this multifarious between the world, then the world is the house, which is inhabited by the mortals. The single house however, the villages, the cities, are works of architecture, which in and around themselves gather the multifarious between." (Norberg-Schulz 1985:18) This 'multifarious between' refers to everything that exists between the earth and the sky, and is subsequently called the world. So, architecture is given the task of becoming the connecting element between the earth and sky, which defines our world. This may become a guiding principle in pointing out the singular importance of the earth and sky in the design considerations. The scale involved should also be noted. He refers to cities, towns and single houses, making the concept one that can be of importance throughout all stages of a design.

## 2.3.3 Enclosure and exposure

"We may conclude that dwelling means to gather the world as a concrete building or 'thing' and that the archetypal act of building is to Umfriedung or enclosure." (Norberg-Schulz 1985:425) Following from the concept of gathering, Norberg-Schulz approaches that of enclosure. Previously, we have also discussed the polar range of enclosure and exposure suggested by Colin St John Wilson. (St John-Wilson 1992:14) Here, we encounter a link between the two theories that may result in an interesting practical application. While Norberg-Schulz focuses on the environment, St John Wilson shifts his focus to the human body in what he calls the "body language". (1992:5)

"It is the language drawn from a wide range of sensual and spatial experience, of rough and smooth, warm and cold; of being above and under, inside, outside, or in-between, exposed or enveloped. But then it is intrinsically these sensations that are the primary vehicle for architectural experience." (St John-Wilson 1992: 12) Where gathering creates awareness of the environment, the body language interprets the enclosure in term of the human experience.

**Ferry Shelter, Tiree Scotland, Sutherland Hussey Architects, 2003**

The precedent is a good example of the impact that enclosure and exposure can have on the experience of a place. Here, by means of obscuring view and focusing the eye on certain elements of the landscape in turn, the traveller is made acutely aware of his surroundings. What would merely have been a landscape quickly passed by, becomes an experience of the sky, the surface of the earth, the experience of natural elements and lastly all of these things are gathered in a single view.

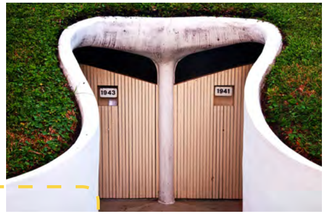
In the precedent (discussed to the left), both these theories can be seen. A complete experience is created by means of enclosure and exposure. Attention is focused on the elements in the landscape, gathering the environment. The play of enclosure and exposure also makes the user aware of the comfort and discomfort experienced as a result of climatic conditions, as well as leading him through different spatial sensations of being between, under, inside and outside.

## 2.3.4 Weak or fragile architecture

''Whereas the latter [image architecture] desires to impress through an outstanding singular image and consistent articulation of form, the architecture of the weak image is contextual and responsive.'' (Pallasmaa 2000:7) Previously, we have read the objection of Pallasmaa against a visually biased architecture. Here, an alternative is offered: the concept of 'weak' or 'fragile' architecture is introduced. (Pallasmaa 2000:7) Fragile architecture attempts to become a supportive background to human perception, rather than dominating the foreground with a purely visual image. (Pallasmaa 2000:12)

The Japanese garden is cited as an inspiration for this: it explains weak architecture as containing more than one meaning, as being subtle and a fusion of the man-made and natural environments. (Pallasmaa 2000:10) This is reminiscent of the DNA strands mentioned by John Wilson, and the idea that: ''...the moments of greatest poetic intensity gather around the points of ambiguity...'' (1992:11)

Incorporating this architecture into the physical environment implies it being subject to the effect of time and natural processes. As opposed to image architecture which is manufactured as a final product, weak architecture is open-ended and subject to change. (Pallasmaa 2000:11) The flexibility and sensitivity may be an indication of an architecture that is compatible with the constraints and opportunities presented by the subject of sustainability.




**Dune House, Atlantic Beach, William Morgan Architects, 1975**

One way in which weak architecture may be created is to employ shapes that have a reciprocal relationship with the landscape. The dune house is an example of such a construction. The house is located adjacent to the beach in Florida and is only visible as a planted mound with ocular shaped window openings. (Orton 1988: 231) The stereotomic structure is achieved with a sprayed concrete shell and the 500mm soil cover improves thermal performance in the hot climate. (Orton 1988: 231)

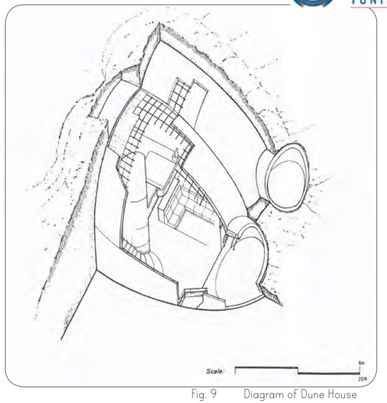



Fig. 9 Diagram of Dune House

Fig. 8 Photographs of Dune House

Fig. 10 Muuratsalo Experimental house

**Muuratsalo Experimental House, Western shore of Muuratsalo Island. Alvar Aalto**

The summer house is set in a lush landscape on a large site where the architect could be close to the influence of the environment. The building served as laboratory for Aalto to experiment with materials and building techniques, thus different parts of the building have different characters. However, the use of materials and space exhibits a profound awareness of the surrounding landscape and is constantly either repeating or inviting the landscape into the design. Along with experimenting with materials and texturex such as that of brick and stonework, different plants and mosses where incorporated to test the durability and effect. (Alvar Aalto Foundation)

Fig. 11

Fig. 12

Fig. 13

# SITE ANALYSIS



chapter 3

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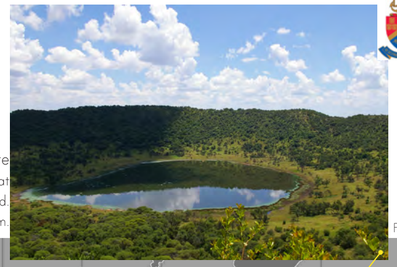

Tswaing impact structure
The Tswaing impact structure is young, at 220 000 years, and therefore well-preserved. The diameter is 1,13km.

Fig. 16

Roter Kamm impact structure, Namibia
This imapct structure is 3,4 million years old and 2,5km in diameter. However, very little of the structure is revealed as it is largely covered by sand. (Reimold et al 1999:12, 23)

Fig. 14

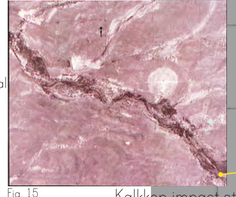

Fig. 15

Kalkkop impact structure, Eastern Cape, South Africa
Located in the rural area near Graaff-Reinet, erosion has caused the structure to only be visible from above. The rim is elevated a meter above ground level.

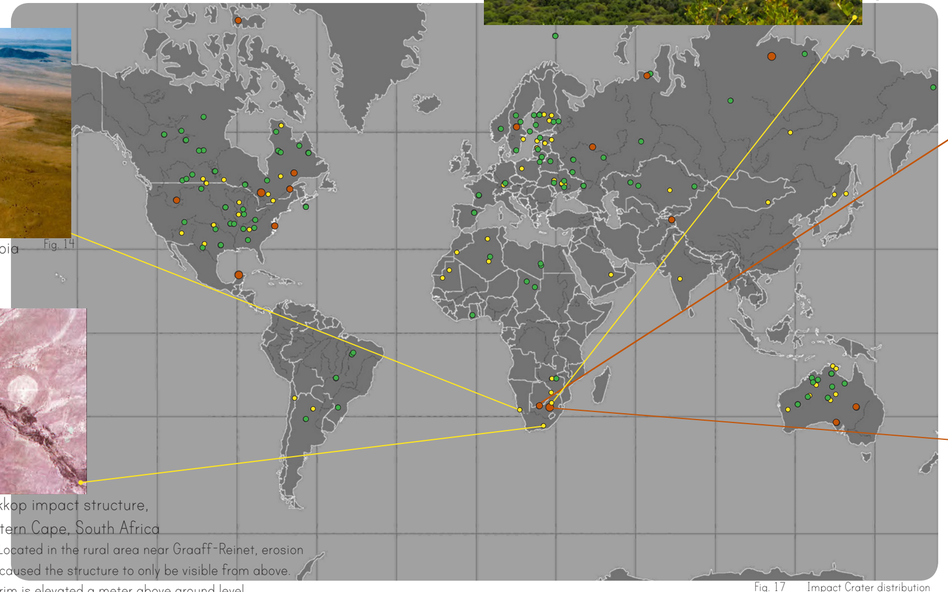

Fig. 17 Impact Crater distribution

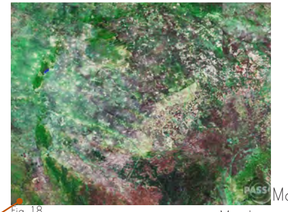

Fig. 18

Morokweng impact structure
Morokweng is another large impact structure, 75 km in diameter and almost invisible to the eye. The structure is covered by sands and calcretes of the Kalahari desert.

Vredefort Dome, Free State, South Africa
The Vredefort dome is classified as a very large impact structure, as it has a diameter of 250- 300km. It is the largest and oldest known impact structure. Due to its size and 2020 million years of erosion however, the crater can only be viewed as ridges in the landscape.

Fig. 19



# 3.1 IMPACT CRATERS

By considering the other impact craters located in Southern Africa, it becomes clear that the Tswaing crater offers a unique experience to the visitor. The well preserved form (thanks to the young age) and small scale of the crater means that the complete scope of the structure can be viewed from the rim. None of the other impact structures can offer this experience. Therefore, the Tswaing Crater should be celebrated and promoted as an attraction for locals and tourists alike. Awareness of the importance of the site will also contribute to the conservation of the crater.

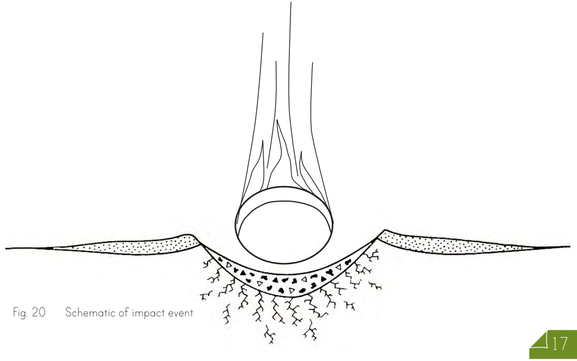

Fig. 20 Schematic of impact event

In the previous chapter the connection between man and the direct environment was discussed. Here, the inherent quality of the Tswaing Crater site will raise the issues of man's preoccupation with the universe and the concept of the sacred space.

### 3.1.2 The meaning of meteorites as seen from the earth

Scientifically, a meteor can simply be described as a piece of material that has broken away from a heavenly body and travels through space at enormous speeds. When a meteor, or bolide, enters the atmosphere of the earth, it may reach a speed of up to 260 000 km per hour before crashing nto the surface. From this moment the bolide is called a meteorite and the point of impact on the earth is called an impact structure.

Impact events, the landscape created by the event and the remnants of the bolide, have throughout time intrigued the human race. Evidently there is some mysterious and inherent meaning in these places and objects that will be explored further. The many historical accounts of celestial events that can be collected throughout time and media illustrate the drama surrounding the impact events. Merely seeing a comet is considered a great event. The top image dates back to 1577 and is entitled 'The Great comet of 1577'. The second image is the detailed flight of the comet from 1665. Below that is the Great comet of 1861, better known as Tebutt. In 1858, the comet Donati was depicted in the last image.

From biblical reference to meteorites in Joshua 10 verse 11, to metaphorical use by William Shakespeare and the dramatic description by JRR Tolkien, meteors have always been a symbol of immensely destructive force. Further, meteors have often been used to allude to the existence and power of God.

Contemporary art media such as film and graphic novels have also shown interest in heavenly catastrophes. Consider in how many films some asteroid or comet has threatened the continued existence of the human race. In the excerpt from a Tintin graphic novel we are again confronted with the drama surrounding such an event.

The fearful awe inspired by the event itself seems to be transformed into reverence for the product of the catastrophe. Many instances of meteoritic material becoming religious artefacts can be seen throughout history and in different parts of the world. Examples include the Needle of Cybele, a Roman religious artefact and the Hadschar al Aswad that can still be found embedded in the Kabaa in Mecca. Many meteoritic stones were deemed sacred in ancient South American cultures and swords cast from meteoritic iron were often surrounded by myth.

After seeing examples of the historical interpretation of meteorites one can draw certain conclusions as to the intrinsic meaning of the event and impact structure.



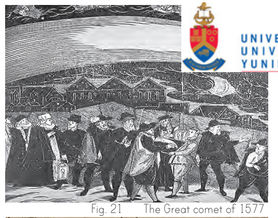

Fig. 21 The Great comet of 1577

Fig. 22 The flight of the comet of 1665

"...the Lord hurled large hailstones down on them from the sky." Joshua 10:11

William Shakespeare
"...meteors fright the fixed stars of heaven..." Richard ii Act 11 Scene iv (Shakespeare 1958: 370

Tolkien'
'...iron that fell from heaven as a blazing star, it would cleave earth-delved iron." The sword had malice (Tolkien 1995: 150)

Fig. 23 The Great comet of 1861

Fig. 24 The comet Donati of 1858

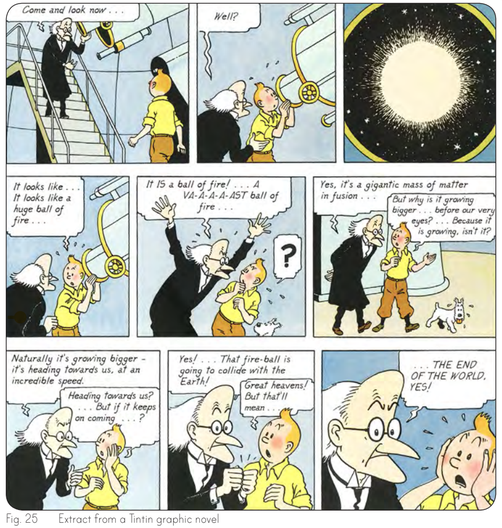


Fig. 25 Extract from a Tintin graphic novel



Firstly, the universe has always been a source of mystery to humankind due to its inaccessibility. A meteorite, however, serves as a direct link to those mysteries. Meteors have been called 'messengers from space, due to the information that can be gathered about their parent bodies. (Reimold et al 1999: 46) Projectiles may come from parts of the universe that are completely unexplored, but a meteor provides a glimpse of what exists outside our realm of discovery. Sir Fred Hoyle was an English astronomer that went as far as suggesting that viruses hail from different parts of the universe and that they were introduced to earth by meteorites and comets that entered our solar system. This may be a strange idea, but it illustrates the singular connection that a projectile provides to the rest of the universe. Thus, an impact structure such as the Tswaing Crater is a permanent reminder of this connection.

Fig. 26 Devastation caused by the Tunguska event

Fig. 27 Hadschar al Aswad

### 3.1.3 Impact craters as catastrophic sites

It has been noted that the depictions and descriptions of meteoritic events are that of power and fear, while the products have been revered. The Tswaing crater can be seen as an embodiment of this statement.

It is difficult to believe, observing the site as it exist today, the violent event that caused the structure. Within 10 seconds of the meteor's entrance into the atmosphere, the peaceful Highveld landscape was completely destroyed for about 30 kilometers around the impact point. (Reimold et al 1999: 45) Consider the testimony of a survivor of another impact event named the Tunguska incident. "... the sky split in two and fire appeared high and wide over the forest. The split in the sky grew larger, and the entire northern side was covered with fire. At that moment I became so hot that I couldn't bear it, as if my shirt was on fire; from the northern side, where the fire was, came strong heat. I wanted to tear my shirt off and throw it down, but then the sky closed, and a strong thump sounded, and I was thrown a few yards... After such noise came, as if rocks were falling or cannons were firing, the earth shook... When the sky opened up hot wind raced between the houses, like from cannons, which left traces in the ground like pathways..." Testimony of S.Semenov as recorded by Leonid Kulik's expedition in 1930. The eyewitness was at the Vanavra Trading Post, 65km from the source when the impact occurred.

Yet, today we are left with a tranquil and beautiful landscape. There is certain poetry in the knowledge of the ambiguous past embedded in the place.

Another facet of the landscape to consider is that the impact also rendered the site vulnerable in the future. The crater is in danger of being eaten away slowly by the elements that cause erosion until it may be merely an outline visible from the sky like the Kalkkop crater. A subtle catastrophe may well follow the dramatic one if the site is not treated with care.

### 3.1.4 Impact craters and orientation in time

The Tswaing Crater is estimated to be 220 000 years old. (Reimold et al 1999: 37) This in itself implies enormous amounts of inherent meaning when considering the thousands of years of historical layering that has taken place here. Physically, this is visible in the geology of the site and the remnants left by human presence and the water that has been in a closed system for the entire 220 000 years. Metaphysically, the site brings to mind the idea of deep time, a realisation that instills an awareness of the grandeur and extreme age of the biophysical environment. The content of the site is compatible with the theories that have already been discussed, as the theory attempts to strengthen the qualities that are already implied by the site: orientation in time, connection to the earth and the identity of the user.

TSWAING CRATER NATURE RESERVE

Latitude 25° 24' 30'' S

Longitude 28° 04' 59'' E

Tswaing, the Place of Salt in Setswana, is a 1946 hectare conservation area located 40km northwest of Pretoria CBD,

### 3.2.1 Location and context

The Tswaing crater is easily reachable by main routes such as the M35 or N4 from Pretoria. Further it is located near a train station and along the planned Mabopane-Centurion Development Corridor. This corridor will encourage economic growth in the area and bring the crater within reach of the future Bus Rapid Transit system. Therefore, the site is not only accessible to the local community and city-dwellers escaping from Pretoria, but also to foreign tourists. Currently the ticket sales are removed from the entrance to the site, forcing visitors to make an unnecessary and annoying stop.

The community of Soshanguve consists of many day labourers who travel to Pretoria daily to work. It is a densely populated area falling within the lowest average annual household income classification. Certain parts are considered informal settlement. (tshwane.gov) According to census statistics the level of illiteracy in the area ranges from 20% to as high as 90%.

Observation around the site showed neat residences that use the earth around them to grow crops such as mielies.

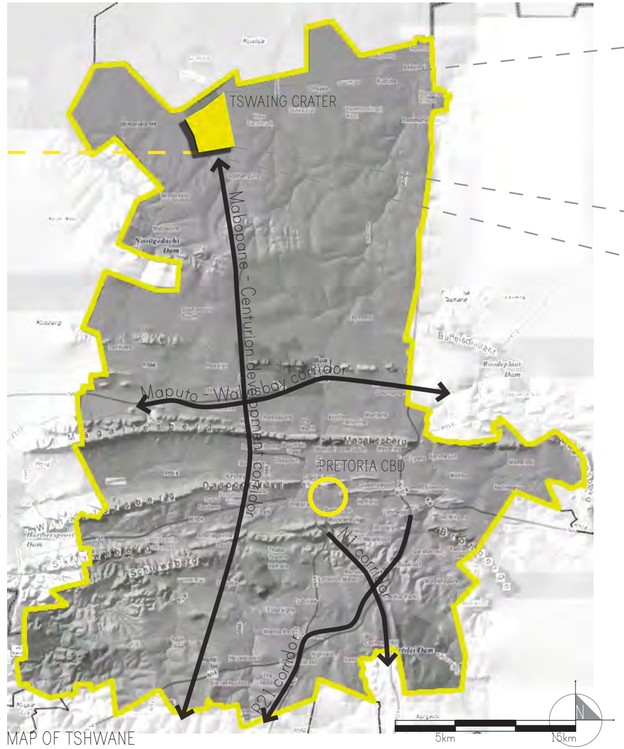


Fig. 28 Contextual location of the Tswaing Nature Reserve

Fig. 29 Surrounding area

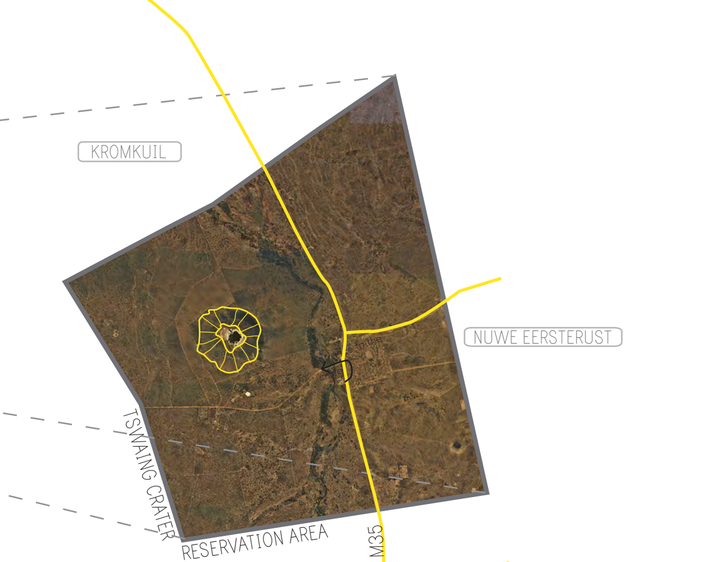


Fig. 30 Boundaries and circulation routes around Tswaing

### 3.2.2 Cultural history

Historical layering on the site is really the story of salt. From the Stone Age, the site was sporadically visited by humans , although little evidence remains of these nomadic hunter-gatherers. Various stone implements have been found along the river bank and near the crater. (Reimold et al 1999: 23) Of the Iron Age there are some remains such as the visible difference in vegetation of the ancient salt factory on the crater floor. Animal skins were used to filter the water from the brine lake, before being boiled in clay pots to evaporate. There are also signs of a small Iron Age settlement on the rim of the crater. (Reimold et al 1999: 25)

The oxwagon road is the most apparent mark left by the colonial settlers. These people created a direct oxwagon road to the crater floor to facilitate access to the most important salt lick in the North of the country. (Reimold et al 1999: 26)

The greatest impact on the landscape, however, was made during the commercial salt and soda ash mining period. There are various sites of ruins of the factory buildings, warming pools and ash dumps still present on the site. A deep physical scar also remains on the crater ridge, called Mauss's cutting. This was made to facilitate the transport of used brine back into the crater lake. (Reimold et al 1999: 28)

It becomes clear that the harvesting of salt was the main reason for human presence on the site. For this reason, the historical layering becomes a synopsis of technological development of the human race. Again we can clearly see the disjoint relationship between man and his environment.

As human presence on the site was minimal, the bio-physical environment comes into more prominent focus. However, the scars left behind by human activity evoke a response when designing new interventions. Again one may refer to the idea of weak architecture that not only preserves the visual character of the site, but also the bio-physical resources.

220 000 YEARS AGO
meteor impact

130 000 - 1750 YEARS AGO
stone age, iron age
sporadic human presence

1850-1880
colonial settlers

EARLY 19thC- 1902
salt mining

1950's-1992
experimental farming

TODAY
hiking trails
nguni cattle

Commercial salt mine ruins Fig. 31 salt mine ruins

Iron age factory site Fig. 32 iron age factory

Mining reservoir site Fig. 33 mining reservoir

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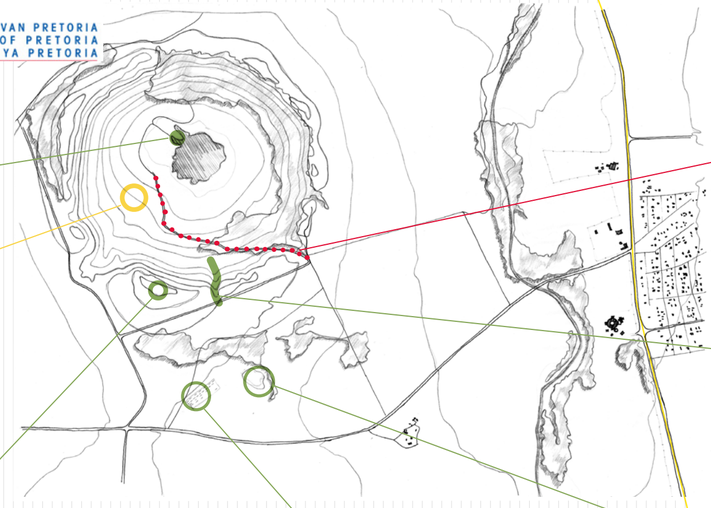

Mine warming pool remnants Fig. 34 warming pools

Fig. 35 Historical oxwagon road

Fig. 36 Mauss cutting

Commercial salt mine ruins Fig. 37 salt mine

### 3.2.3 Typical vegetation, topography and geology

The vegetation present on the site is a result of the impact event and resulting topographical and soil conditions. The dominant tree types are: Acacia, present on the lower parts of the crater rim, and Combretum, mainly found on the upper rim. ( Reimold et al 1999: 74) This can be attributed to the thin layers of soil on the upper rim, where trees with shallow root systems flourish, as opposed to the thicker, more fertile soil layers in the lower rim. (Reimold et al 1999: 74)

Tree lists have been compiled that include many trees with medicinal and practical uses that would have been exploited by the people present at Tswaing throughout history.

71 *Pouzolzia mixta* (Stinging nettle Tree)
103 *Ximenia caffra var caffra* (Large Sour Plum Tree)
162 *Acacia caffra* (Common Hook Thorn)
179 *Acacia nilotica subsp kraussiana* (Gum Acacia)
188 *Acacia tortilis* (Umbrella Thorn)
190 *Dichorstachys cinerea* (Sicklebush)
215 *Peltophorum africanum* (African Wattle)
360 *Sclerocarya caffra* (Marula Tree)
362 *Lannea discolour* (Tree Grape)
377 *Ozoroa Spaerocarpa* (Resin Tree)
433 *Pappea capensis* (Wild Plum Tree)
447 *Ziziphus mucronata* (Buffalo Thorn)
450 *Berchemia zeyheri* (Red Ivory)
471 *Dombeya rotundifolia* (Wild Pear)
532 *Combretum apiculatum subsp apiculatum* (Red Bush Willow)
546 *Combretum zeyheri* (Zeyher's Bush Willow.)
( Reimold et al 1999: 76- 84)

Fig. 38 Crater floor vegetation: predominantly Acacia species

Fig. 39 Crater rim vegetation: predominantly Combretum species

Fig. 40 salt mine
Surrounding vegetation: Sourish Mixed Bushveld

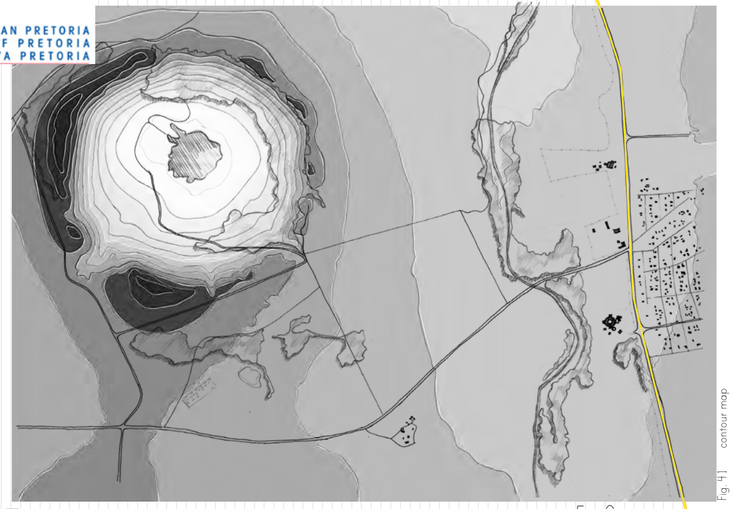

Fig. 41 contour map
5m Contour map

1175
1165
1155
1145
1135
1125
1115
1105
1095
1085
1075
1065

Granite breccia

Granite derived sand

Lamprophyte

Carbonatite

Fig. 42 Geology map

500m 1000m

Ridge sensitivity Fig. 43

Vehicular roads Fig. 44

Footpaths Fig. 45

Wetlands Fig. 46

### 3.2.4 Site sensitivity and existing infrastructure

The greatest risk to the crater landscape is erosion and as certain areas are more vulnerable, this will influence the choice of site for a built intervention and the eventual treatment of landscape elements.

Vegetation, topography and soil types are all contributing factors to the sensitivity of the site. Due to the steep nature of the slopes, the thin layer of soil and the nature of the vegetation renders the ridges particularly sensitive. Vegetation that is disturbed will take a long time to re-establish and bare slopes are vulnerable to erosion. Thus, developing the ridges should be avoided.

The grassland landscape sloping gently away from the crater is more appropriate for development as the vegetation will be easily re-established. Care should however be taken in the design of a storm water system that should concentrate on water infiltration and detention on the site.

The existing paths are also particularly vulnerable to erosion as water runoff is uninhibited and the soil is compacted. In order to decrease the risk of erosion, surfaces should be treated to optimise water infiltration,

The wetland areas are sensitive due to the fragile ecosystems that are vulnerable to change.

Due to all these dangers to the environment, the design strategy entails the minimum disturbance of the site. Further, disturbed areas should be treated to reduce the risk of erosion and disturbed soil and some vegetation should be re-established elsewhere. Although the site houses natural stone, this can not be sourced as building material as rich sources of geological research opportunities may be destroyed and erosion caused by quarrying activities.



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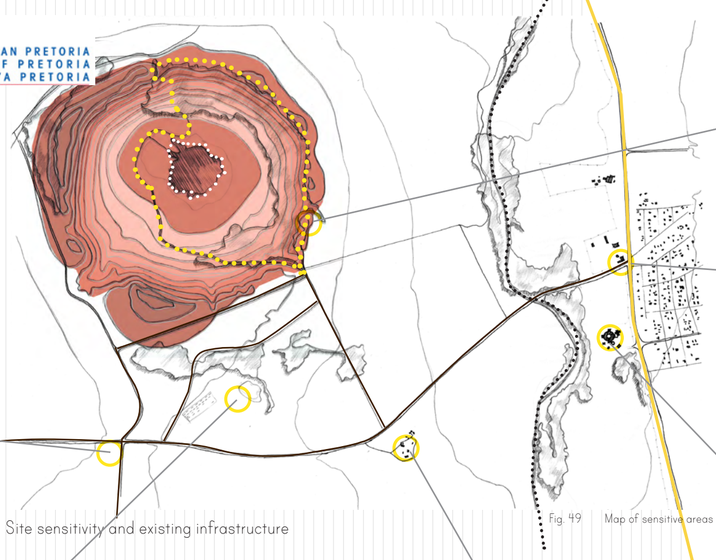
Existing staff housing Fig. 47

Mine building ruins Fig. 48




Site sensitivity and existing infrastructure Fig. 49 Map of sensitive areas

Existing viewpoint Fig. 50


Existing entrance Fig. 51

Existing Kgotla Fig. 53

Existing visitor's center Fig. 52

# 3.3 DEVELOPMENT FRAMEWORK

The framework utilises much of the existing infrastructure in new ways. The current entrance and edge does not sufficiently announce the site or respond to the activity around the site. The exisitng visitors' centre is completely removed from the crater and indeed impractical for the purpose of access control. It is proposed that the exisitng visitor's centre and the surrounding area should be utilised in service of the community. This may entail a satelite storytelling and reading workshop for community members and children where training may be provided. Commercial opportunity may also be created around the entrance where arriving tourist may be tempted. The entrance itself then becomes an effective threshold onto the site that will enforce the significance of the experience.

As the site has been used for experimental purposes in the past and offers much opportunity for research, the existing accommodation structures may house researchers, while research facilities are proposed.

Due to the ecologically sensitivity nature of the site, access to the site will be strictly regulated. This implies a possible centralised system of transport such as shuttles departing from the entrance of the site.

The new built interventions that will be introduced includes a visitor's centre that entails a public information and interpretation centre(6). The semi-public intervention(7) is more specifically programmed attracting a smaller amount of people. This is appropriate to the location closer to the ridge of the crater that a more sensitive area.

Although the crater itself should be very carefully handled, it is the opinion of the author that access to the footpaths down to the crater should not be denied. The perspective of the changing horizon as one descends into the crater adds a new dimension to the experience of the site, specifically enforcing the vertical connection to the sky and universe. Thus, the semi-public intervention leads to the viewpoint and acts as a gateway to this experience. From there, a small amount of visitors will be allowed to descend into the crater per day.





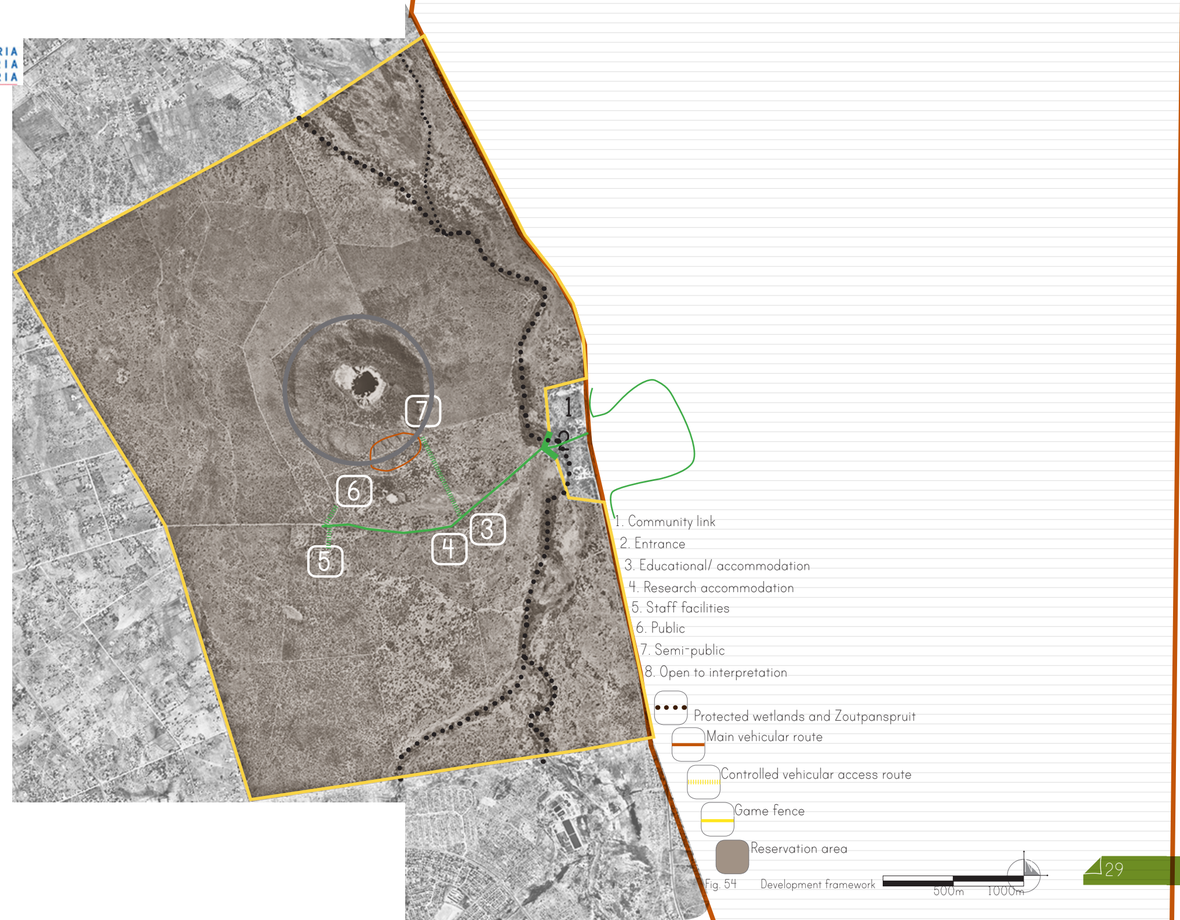



Fig. 54 Development framework

# 3.4 METAPHYSICAL ANALYSIS

## 3.4.1 The sacred nature of Tswaing

To this day, the site hosts religious connotations for a variety of people such as the Zionist and Apostolic churches as well as sangomas. Sangomas visit the site to perform rituals next to the lake, while church groups go there to pray, perform rituals and have all-night vigils. The collection of lake water and medicinal plants is also common, although strictly regulated. This begs the question: what is it about Tswaing that renders it culturally important and sacred?

There are various reasons for the site to be deemed as significant and sacred. The very form of it, a nearly perfect circle in the flat landscape, already instils a sense of wonder. Earlier, reference was made to the phenomenological idea that certain meanings already exist inherently on a given site, and can be uncovered, or 'gathered', by the act of building. (Norberg-Schulz 1976:422) This idea holds true for the phenomenological understanding of sacred place. The author of *The hermeneutics of sacred architecture*, Lindsay Jones (Jones 2000: 35), discusses the insistence of key phenomenologists such as Brede Kirstensen and Mircea Eliade, that sacred spaces are inherently "supernaturally potent places" that are discovered by man, rather than being chosen or created by the ritual of man. This point is supported by countless examples of natural features being the subject of religious veneration.(Jones 2000: 35) Clearly, when considered from this point of view, Tswaing could be such a place. Whether because of the unique topography of the crater, or the meaning introduced by the origin of the crater (a direct connection the universe), any visitor today experiences some mystical power emanating from the landscape. This is not confined to those who have a connection to the history of the site; in this document and project the site will be considered universal property. The human activity on the site is secondary to the intrinsic connection to the sky that was forged by a flaming rock from the heavens that left its imprint on the earth.

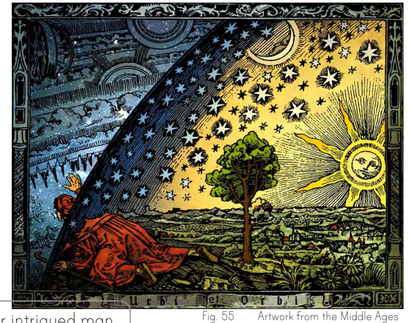


Fig. 55 Artwork from the Middle Ages

The connection of the earth to the universe has forever intrigued man.

Ancient examples of sacred space tended to be a representation of the cosmos, with the sacred point interpreted as the centre of the universe.(Jones 2000: 38) A famous, if not infamous, model for sacred space was suggested by Mircea Eliade which explained this phenomenon with three principles. The first is the mythical archetype, or patterns that governed organization. Then, the imago mundi is the representation of the macrocosm as a microcosm, and finally the axis mundi was a preoccupation with centres. (Jones 2000: 36) Although Jones deems this summary of sacred space incomplete and generalised, the model is visible in a many unrelated sacred sites, and therefore worth paying attention to. (Jones:2000: 37)

## 3.4.2 Ancient Precedents

### The Peruvian ceque system

The ceque system is located in Cuzco, Peru, and exhibits the possibility of sacred space to influence organization at a large scale. The roads that converge on the Coricancha, Temple of the Sun, radiate from the centre of the capital and divide the city into socioterritorial quarters. (Jones 2000:42) This organizational system inspired by the sky, governed the daily lives of the people of Cuzco: the social classes, occupations ritual practices and even colours used in the different quarters. (Jones 2000: 43) The entire city converges on their perceived spiritual centre, the centre of their universe.

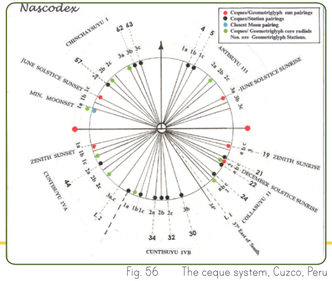



Fig. 56 The ceque system, Cuzco, Peru



Black- water, stars and night
Red- the Sun, fire and the
power of the Hogon

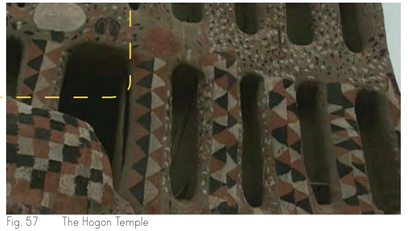


Fig. 57 The Hogon Temple

### The Hogon Temple

The Dogon people of Mali are legendary for their knowledge of the stars.(Cosmic Africa:2003) The daily activities of the Dogon are regulated by the skies above their heads. The women set out to fetch water as Venus rises in the morning and the earth is prepared for planting millet when Toro Jungo (Pleiades) appears on the horizon. This practice is preceded by the ritual of painting the Hogon's temple, and because of their relationship with the skies it is not surprising to learn that the decoration is symbolic of the universe. On the surface of this structure is applied white paint representing the air and the moon, black for water, stars and night; and finally, red is the Sun, fire and the power of the Hogon. (Cosmic Africa:2003) Their complete universe condensed into a few colours. An imago mundi that is created in such a simple way that it is quite in contrast to the immensity of the Peruvian ceque, demonstrating the varying scale with which the same idea is interpreted.

Fig. 58 The observatory at Nabta Playa

### The ancient observatory at Nabta Playa

The area of Nabta Playa in the South of Egypt, on the border of Sudan, is strewn with manmade artifacts that radiate from a central point. These artifacts date back 7000 years. In the film Cosmic Africa, the astronomer Thebe Medupe establishes that these alignments correlate with the rising points of the brightest stars in the sky in those days: Sirius, Dube and Orion's belt. Nabta Playa may be the origin of astronomy. (Cosmic Africa:2003) The stone circle focused on the Sun, and indicated the seasons to the people of Nabta Playa. The stones are arranged as a calendar of the rising and setting points of the Sun at different times of the year, and displayed these events through 'windows', directing the line of site. Again, the ritual observation of the skies served as a tool directing the lives and actions of the people. The film speculates that these early Africans may have been saved from climate change because of the timely realization that drought was eminent. (Cosmic Africa:2003)

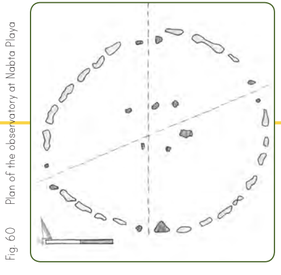


Fig. 60 Plan of the observatory at Nabta Playa

Fig. 59 The ceque system, Cuzco, Peru

The significance of these ancient precedents is the shift in the way we perceive ourselves to be separated from the environment. The knowledge of the origin of Tswaing forges a powerful connection to the universe: it is a place where a star breached the seemingly infinite divide between the earth and sky and here we see how it can not only be design generator, but can influence the daily lives of people living in the divide.

### 3.4.3 The journey throught the site

The topography of Tswaing offers the opportunity to create a journey through the site that provides a shifting view of the horizon. From the outside the crater rim can only be seen as a slightly raised area. From the rim the complete crater is visible and on the descent the visitor catches glimpses into the crater while being swallowed by the landscape. On the crater floor the visitor is completely surrounded by ridges. From this vantage point, the sky becomes a dome that is reflected in the crater lake. The serial vision is an important element in the experience of the site.

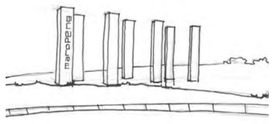
### 3.4.4 Precedent

Maropeng

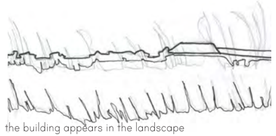
Maropeng was chosen as a precedent because of the clear emphasis on the experience of the site as a journey of discovery. Vignettes are used to illustrate the methods employed to guide the experience, hide and reveal certain aspects, and heighten awareness of others. The second characteristic of interest in the precedent is the use of built form in the landscape. The ambiguous use of a dominant visual image at the beginning of the journey is contrasted by the fragile architecture at the end. At the one point the landscape is dominated by the architecture and at the other the architecture attempts to blend into the background of the landscape.

On approach to the site, no sign of the building is visible. Geometric columns herald your arrival, but no other clues can be found. When penetrating the site, the tumulus building appears as an abnormality on the horizon. The path to the tumulus building is a clear geometric axis, to the dominant tumulus structure, but does not reveal all that is to come. As the path towards the tumulus descends, a space is revealed where provision is made for resting, commerce and ablutions. This was not apparent from a distance. Emerging from the interior of the building, one is suddenly offered a vista of the landscape, framed from the doorway. Looking back at the buildings, one is confronted with the ambiguity of the dominant man-made structure in the natural setting. From the building, however, the architecture can only be observed as subtle lines in the landscape. Looking towards the entrance, the commercial space is revealed more clearly. On departure, a new message is added to the same structures one found at the beginning of the journey. A clearly parting thought.

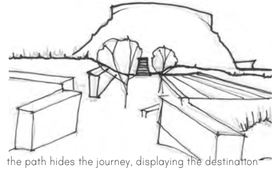
Fig. 61 View from atop the Tumulus building



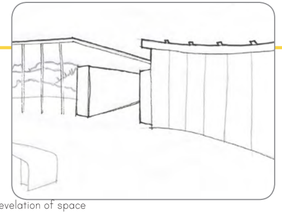

building remains a mystery on arrival



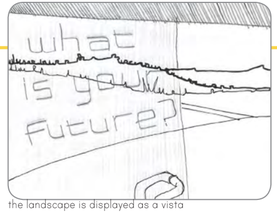
the building appears in the landscape



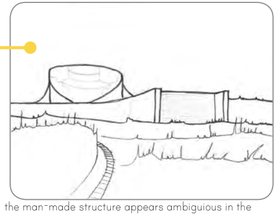
the path hides the journey, displaying the destination



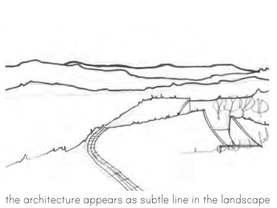
revelation of space



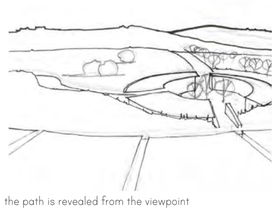

the landscape is displayed as a vista



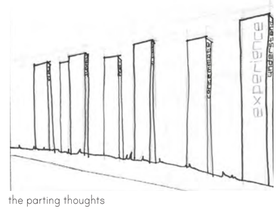
the man-made structure appears ambiguious in the landscape



the architecture appears as subtle line in the landscape



the path is revealed from the viewpoint




the parting thoughts

Fig. 62 Perspective views at Maropeng

# PROGRAMME



chapter 4

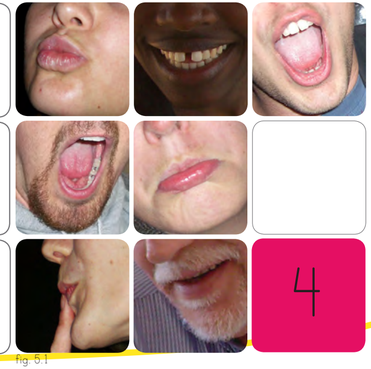


fig. 5.1

# 4.1 THE CLIENT

Currently the site is the property of the National Cultural History Museum resorting under the Department of Arts and Culture, and this project will maintain the ownership. The mission statement for the Tswaing Crater Museum written in 1993 reads thus:

> The Tswaing Crater Museum is a non-aligned independent people's project for the conservation and sustainable utilisation of the environment (natural, cultural, human) resources of the Tswaing area. Resources will be provided for the environmental management and education, training, research, tourism and recreation. This is done in a democratic, participatory manner to enrich the quality of life of people in a healthy environment.
>
> (Reimold et al 1999:117)

The framework for the development of the Tswaing crater stipulates the chosen site as a semi-public space. This implies that the site will be visited for a certain purpose and may focus on specific theme.

Firstly, one should consider by whom the site is currently being used in order to determine possible future development. Today, the site is mainly promoted for its natural beauty and hiking trails. The spiritual users such as the church groups and sangomas are tolerated, but not focused on or specifically catered for. Earlier, it was stated that the author considers the spiritual quality of the site to be universal. The spiritual interpretation should be facilitated by the experience of the inherent qualities of the site, while remaining accessible to a wide variety of visitors.

The location of the site presents some opportunities. Located within a low income community, the project has the potential to make a great social and economic contribution. The programme should encompass functions aimed at the local community as well as exploiting tourist potential of the site and programme. This will not only create a universally significant site, but will also provide an economic injection to the community. For this reason the development framework is zoned to specific uses. A community centre area, a public visitors centre, and a semi-public zone are specified. The semi-public zone will be visited by tourist and local community members at different occasions and provides job opportunities and exposure to local performance artists.

The programme of storytelling, or oral tradition, was selected as an appropriate medium for a meaningful experience.





# ORAL LITERATURE

## 4.2.1 Introduction

As a medium of information and entertainment, storytelling (or oral literature) has great value as a universally intelligible activity. The structure of storytelling can translate history, fantasy, traditional values and actual matters into an enjoyable and simple pass-time. The Tswaing Oral Literature Experience will provide a platform for performers of all cultures to exhibit their art and expose the audience to their culture and background.

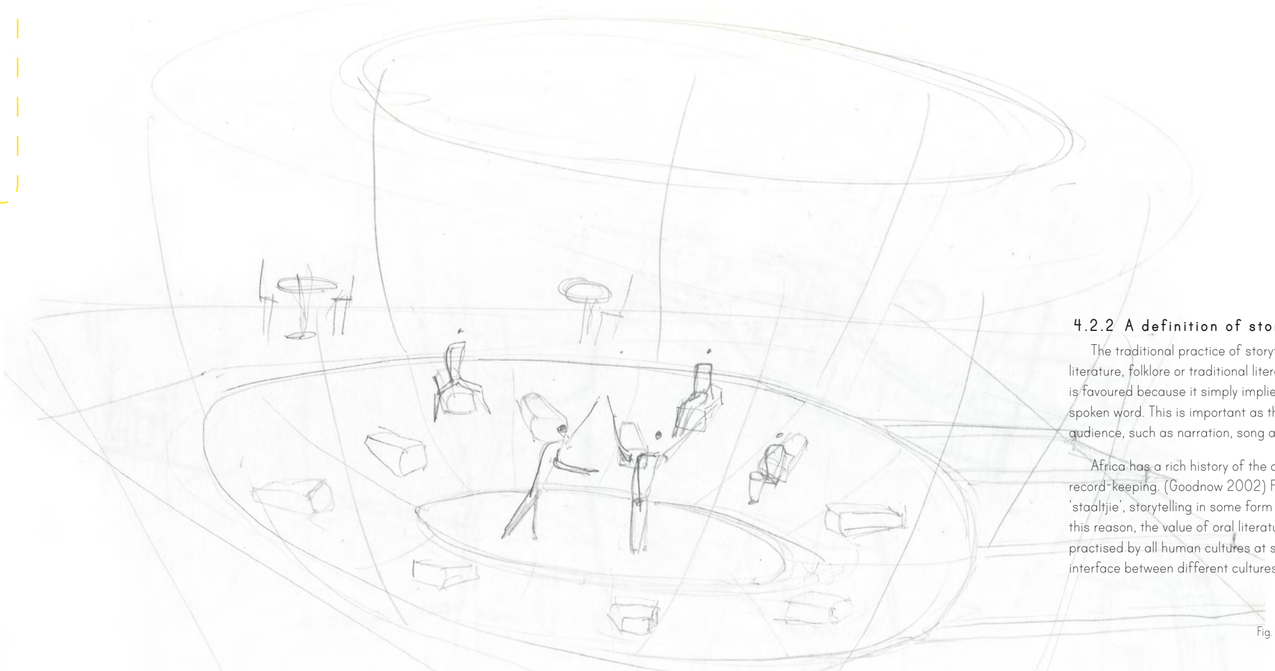


Fig. 63 The art of storytelling

## 4.2.2 A definition of storytelling

The traditional practice of storytelling goes by a variety of names, such as oral tradition, oral literature, folklore or traditional literature. (Okpewho 1992:3) In this instance, the term oral literature is favoured because it simply implies the transmission of creative writing, literature,( wiktionary) by spoken word. This is important as there are many different methods of relating oral literature to the audience, such as narration, song and poetry that are all covered by the blanket term.

Africa has a rich history of the oral literature that developed in an environment void of written record-keeping. (Goodnow 2002) From the Xhosa ntsomi, to Zulu praisepoetry to the Afrikaans 'staaltjie', storytelling in some form or another has enriched the life of every South African. For this reason, the value of oral literature in this study lies in its universality. Oral literature has been practised by all human cultures at some point and is therefore a powerful and understandable interface between different cultures.

# 4.3 ORAL LITERATURE IN AFRICA

## 4.3.1 Different styles of oral literature

It would be impossible to discuss all the different forms of oral literature here. Reference will be made to the most prominent forms in South Africa. Zulu oral performance varies from praisepoetry (izibongo), to folktales (izinganekwane) to various music styles such as isicathamiya or maskandi. (Groenewald 2003:87-88) The ntsomi is a dramatised Xhosa narrative. This a good example of the flexible nature of African oral literature. The ntsomi is based on a single image which is the expanded, linked to other images and embroided into a production. (Scheub 1975:4) When considering this, it is important to bear in mind the context of the performance, the audience. Throughout his narration the performer is aware of the audience and their reaction to the story. He can thus accordingly choose alternative methods to entertain a specific audience. In fact, the audience expects the performer to be highly innovative in manipulation of the story.(Okpewho 1992:45) Performances may be done by a single oral artist, or he may be backed by music, dance or vocals (Okpewho 1992:45)

## 4.3.2 The role of oral literature in society

Although storytelling may be practised by many people within one village, there are those individuals who possess a greater appreciation for the expression of images and idioms and who have the ability to capture an audience more effectively. In short, these are the oral artists. (Okpewho 1992:20)

The oral artist is not selected and trained, but simply absorbs stories and techniques from observing them from a young age. (Scheub1975:17) Repeating and adapting that which the young oral artist sees, their ability to build the complexity of nuances, stylistic devices, plot and body gestures grow and are honed by a critical audience. (Scheub1975:19) From this we can deduce that the very best way to learn and understand the art of oral literature is to experience it.

Today, however, there is the danger of talented oral artists disappearing in an urban environment and their skill and art being lost. Alternatively, the artist compromises his art as a mere form of entertainment in order to make a living in an environment that knows nothing of his cultural background. (Okpewho 1992:41) This point is significant in realising what the role of oral literature is within the society. Additional to the function of entertainment, oral literature is a way to express certain interests and outlooks shared by a community or a group within a community. (Okpewho 1992:110) Perhaps in South Africa this can be seen in the prominence of oral literature in political protest and work circumstances. Praise poetry is often used in mine compounds to comment on superiors and was a tool in orchestrating resistance to rulers in the Transkei. (Brown 1998:4) Religious groups have also retained the heritage of oral

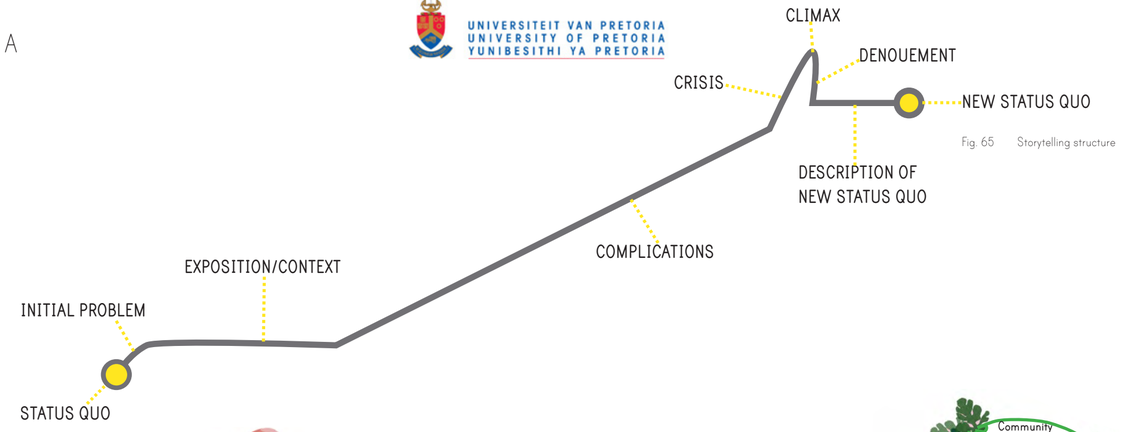



Fig. 65 Storytelling structure

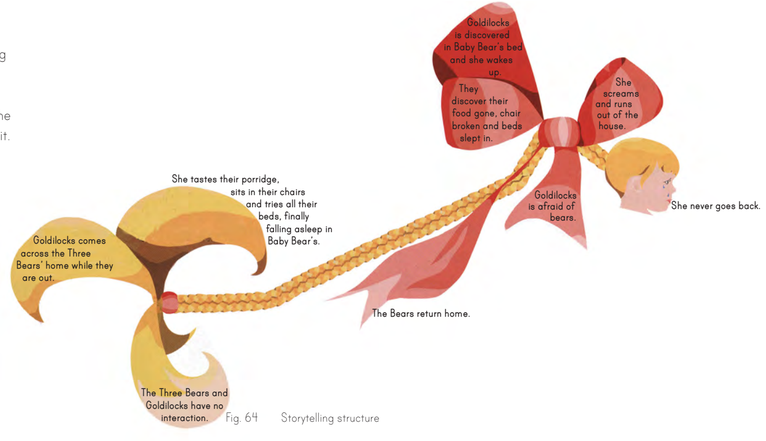



Fig. 64 Storytelling structure

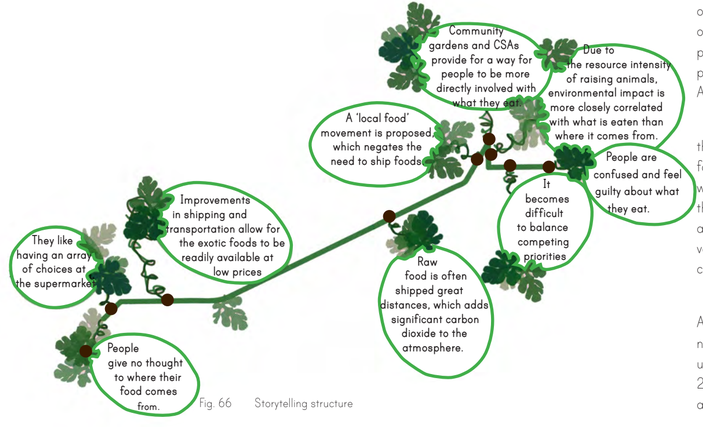



Fig. 66 Storytelling structure

literature, but infusing this with Western religious beliefs, such as the church of the Nazarites. The founder, Isaiah Shembe, sought to revitalise the customs and values of Zulu society, enriched with Christian beliefs. This system of beliefs was expressed in a hymnal, the Izihlabelelo zamaNazaretha, that synthesised the tradition Christian hymn with Zulu poetry and song. (Brown 1998:120) This ties with the function of oral literature as a way of teaching ideals and conduct. (Okpewho 1992:115) In Western culture, the story, such as the fairy tale, shares the function of elevating beliefs.

Further, oral literature plays a role in marking the course of an individual's journey through life. (Okpewho 1992:119) The naming of a child, not only tells the story of the birth, but also serves as encouragement for the future. (Groenewald 2003:87) The rites of passage such as initiation, a proposal for marriage and a wedding itself are occasions for much singing and dancing, in Zulu culture this is called izigiyo. (Groenewald 2003:88) The qualification of a traditional healer would also be marked with song and ceremony. (Groenewald 2003:88)

## 4.3.3 The role of oral literature in museums

Katherine Goodnow (Goodnow 2002) argues in favour of storytelling having a place in modern museums. She believes that storytelling has shifted from being a mere cultural activity, to being a recording of historical fact. This historical fact is necessarily the result of the teller's framework of knowledge, and can therefore afford multiple perspectives on the same subject. (Okpewho 1992:34) Duncan Brown states: "The retrieval of oral poetry and performance genres for critical debate is an important part of the larger process of human, social and political reconstruction currently taking place in South Africa."(2003:2)

Jeffrey Inaba describes the value of the Western fairy tale in addressing crisis. ".. the ability of a children's story to make sense of hard-to-describe events, given that its format addresses emotional-difficult, moral-complicated and ethical-charged issues with concision." (Inaba 2009: 2-3) A museum in South Africa is inevitably faced with the problem of telling morally and ethically charged stories, given the political history. At a tourism location the problem is elevated by the fact that the story is told to people of very different backgrounds. Simple narrative as a means of understanding our times and constructing a response (Inaba 2009: 2) may thus be a great asset to museum.

Although Western storytelling tradition is not identical, it comparable to that of African storytelling, and therefore should be understandable to the audience. The typical narrative arc such as the example developed by Gustav Freitag (Inaba 2009: 4) shows us the structure of the Western narrative. The interpretation done here by C-lab(Inaba 2009: 4) is worth noting in order to illustrate the ability of the narrative to explain and argue contemporary, real-life problems.

### 4.3.4 Precedents

Various projects have been undertaken here, as well as abroad in an attempt to preserve and perpetuate the art of traditional storytelling.

### Iziko Stories

In South Africa, the Iziko Stories program is such an attempt. The Iziko Museum in Cape Town partnered with a Norwegian university to develop a cross-continental network of storytelling. Traditional storytelling skills are preserved and passed on to younger generations by involving Elders and presenting workshop in various communities. Mobile units and technology enable the program to build a database of stories that can be taken to different locations in order to expose participants to a wide repertoire of perspectives and cultures. (Goodnow:2002) In addition to traditional stories, participants are encouraged to tell their own stories. Thus contemporary culture is introduced to a traditional medium, rendering the art relevant for the future and accessible to a younger audience. The participants also gain exposure to other cultures of storytelling and another's framework of experience, thus promoting understanding.

Fig. 67 Scottish Storytelling Centre facade

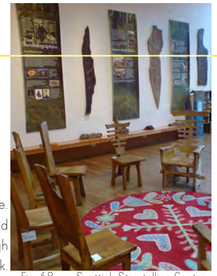


Fig. 68 Scottish Storytelling Centre

Fig. 69 Scottish Storytelling Centre library

Fig. 70 Scottish Storytelling Centre theatre

### Scottish Storytelling Centre, Malcolm Fraser Architects, 2006

In Edinburgh a Scottish initiative was created in the Scottish Storytelling Centre. The building hosts functions specific to the art of storytelling. A variety of spaces and theatres for storytelling vary in scale and intimacy from the 99 seat Netherbrough Theatre, to the informal 30 seat Global Story Bothy right down to a storytelling nook. Where these functions are mainly interior spaces, the Storytelling Court opens the building to the city and gardens outside with views on street level. A library provides the opportunity to conduct seminars and workshops.

### 4.3.4 Conclusion

Storytelling holds great and significant importance in the traditional environment, and the practice has to be preserved and exhibited. There is, however also great scope for the traditional practice to grow and evolve into a contemporary medium of understanding and education, as can be seen in the examples from C-Lab (fig.67,fig.69). This firmly establishes firmly the relevance for storytelling as a programme for a museum such as at Tswaing.



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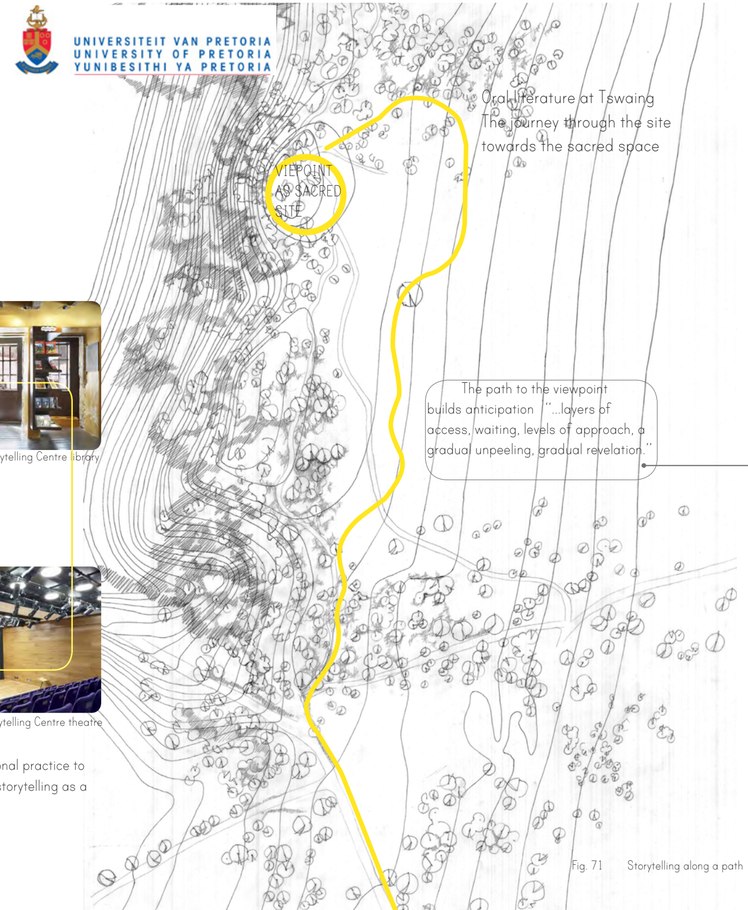



Fig. 71 Storytelling along a path

## 4.4 PROGRAMME

### 4.4.1 The aim of the programme

The goal of the project is to reveal the significance of the site and through creating awareness of this, establishing a reconnection to the environment and self.

The idea of the reconnection of the individual to the cultural and biophysical environment as well as to their own identity has been discussed at length. Tswaing should be a place where one can reconnect. In the landscape, we are reminded of our place in the world and of our world in the universe. Oral literature should remind us of our roots in our own culture, as well as the wealth of cultures that we are fortunate enough to learn from every day.

As we have seen, Tswaing is a place of inherent value. Thus, the interventions should serve to add to the experience of the place. For this purpose the audience is led through the site on a path that passes, crosses, goes through, goes under and in between different opportunities to be connected to and to experience oral literature. The viewpoint remains the destination, and is anticipated as such, while remaining hidden throughout the journey.

Currently at Tswaing, the people who visit the site for spiritual reasons confine their activity to the crater floor and reach this by a direct route that does not afford the experience of descending into the crater. Christopher Alexander describes the ritual of reaching a truly sacred place as such: "...it requires layers of access, waiting, level of approach, a gradual unpeeling, gradual revelation. Passage through a series of gates." (1977:333) This echoes the concept of ritual-architectural experience. Lindsay Jones adds to the theory of sacred space as a representation of the universe. Although this has been found true in many cases, he argues that this is not the entirety of the builder's intentions. He claims these methods to be an invitation for the participation of interested parties that is then substantiated by a deeper spiritual message. (2000: 45) This is then conveyed by the architectural experience. (Jones 2000: 46)

Thus, the journey through the site and changing perspective that this affords the visitors is of utmost importance. The path connecting different gathering places leads the visitor through different layers of access that eventually renders the moment of revelation more meaningful.

The programme thus aims are introducing the art of oral literature to the site, as well as accentuating the journey through the landscape towards the sacred space.

### 4.4.2 The influence of oral literature

Although it has been discussed that the use of paths and gathering places can involve the visitor of the site in a more meaningful experience, the nature and structure of the journey is still unclear. The influence of storytelling on the project is not confined to that of function. Narrative structures can be seen as a possible framework within which to ground the physical experience of the site. Throughout the many forms, academics have identified a structure, and various stylistic characteristics that are discernible in African oral literature.

It is the, "... ways in which the words are organised and the resources within the words that ensure the effectiveness of the oral performance."(Okpewho 1992:70)

#### Structure

Oral literature is an art based on that of performance. The true artist can manipulate the reactions of the audience and adjust the course of the narrative according to their response. Because of the spontaneous nature of the narrative, storytelling is very seldom a linear process. (Goodnow: 2002) Despite the involvement of the audience, the framework and eventual outcome of the story is within the bounds set by the teller. The structure in the narrative is followed roughly as a method of effectively moving the story towards a point, as well as guiding the experience of the audience. In the same way, the path guides the visitor through the site and different activities towards the viewpoint.

Before the story begins, the performer is transported from the present world to the world in which the story is set. This is referred to as the 'capturing' of the audience and storyteller. (Okpewho 1992:223) A 'crisis' follows that throws the subject into turmoil. (Okpewho 1992:224) The enjoyment of the is story is prolonged and enhanced by 'stabilizing' events that do not necessarily add any new information. (Okpewho 1992:224) The emotions of the audience is then 'depressed', or lulled, before the story ends with an ironic twist. (Okpewho 1992:224)





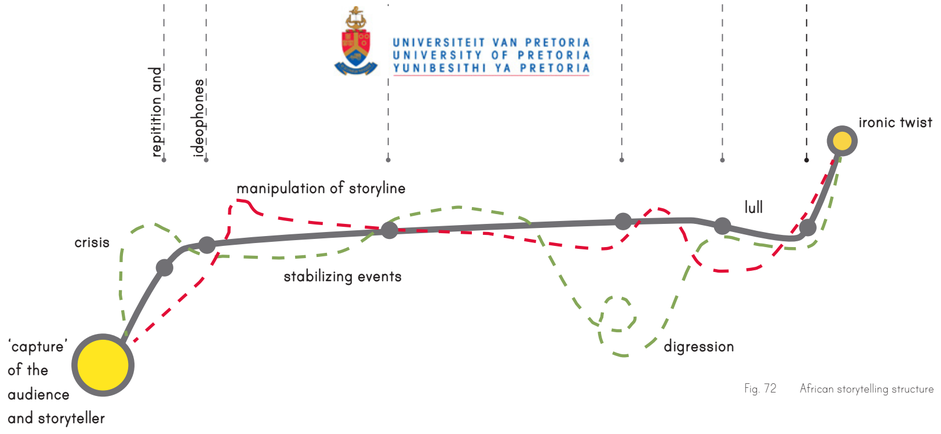



Fig. 72 African storytelling structure

#### Stylistic characteristics

As this storyline will always be part of a performance, it is inseparable from the stylistic characteristics of a good performance. (Scheub 1975:19) The stylistic tools aid the performer in keeping the attention of the audience, emphasizing a point, as well as linking together ideas. (Okpewho 1992:70-87) There are numerous such devices, but only a few will be discussed here.

Repetition is the main method of achieving these goals. The audience is delighted by elements that recur after intervals and their attention is gripped. (Okpewho 1992:71) Other stylistic characteristics are variations in repetition, such as the piling of meaning and parallelism. (Okpewho 1992:78, 83)

Give me pear
Parrot's pear
Give me parrot
Wren's parrot
Give me wren
Moth's wren
Give me moth
Palm's moth
Give me palm
Earth's palm
Give me earth
Wealthy earth
Give me wealth
Wealth is hatred! (Egudu 1975: 207
(Okpewho 1992:84)

The main idea or storyline is sometimes abandoned for a while in order to address a related object or theme. This is called a digression. (Okpewho 1992:96)

Finally, a popular tool is that of the ideophone. These are nonsensical sounds that are repeated throughout the performance to convey certain impressions. (Okpewho 1992:92)

Little bird, little bird
Tuluzamzam tuluzam
What are you doing up there?
Tuluzamzam tuluzam
I'm up there fetching food
Tuluzamzam tuluzam
After fetching what will you do?
Tuluzamzam tuluzam
After fetching I'll light a fire
Tuluzamzam tuluzam
(Okpewho 1992:92)

## 4.4.3 Site programming and concept development

The programming of the site involves many encounters with storytelling as an art in different settings and forms. The diagram illustrates the conceptualisation of the programme as a complete experience, while only selected were fully developed.

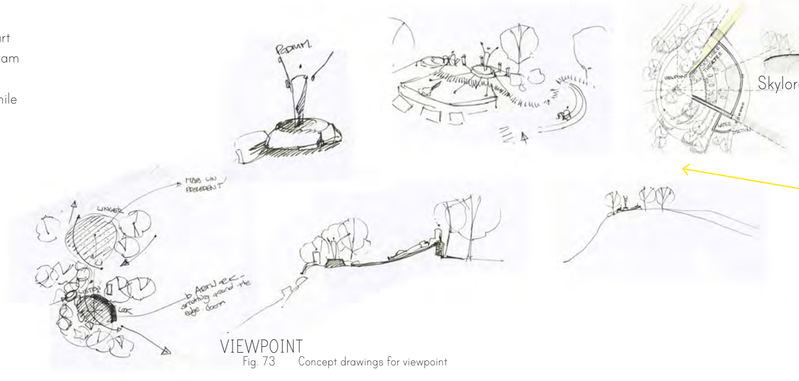



Fig. 73 Concept drawings for viewpoint

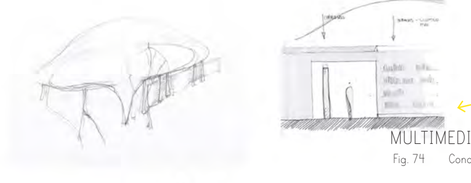



Fig. 74 Concept drawings for multimedia space


Fig. 75 Concept drawings for entrance

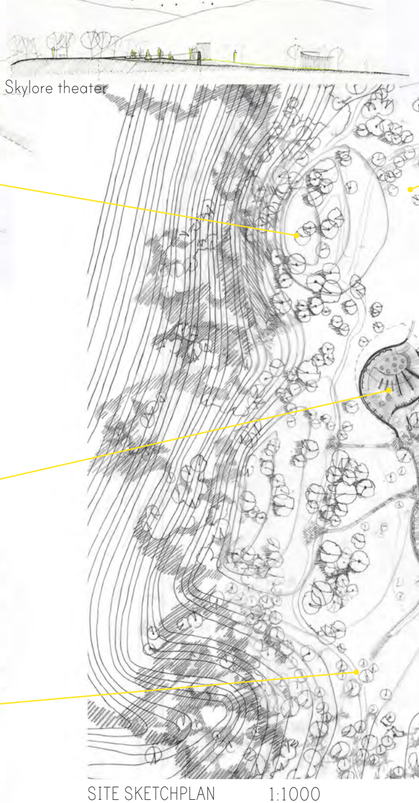



Fig. 78 Concept drawings for sketchplan

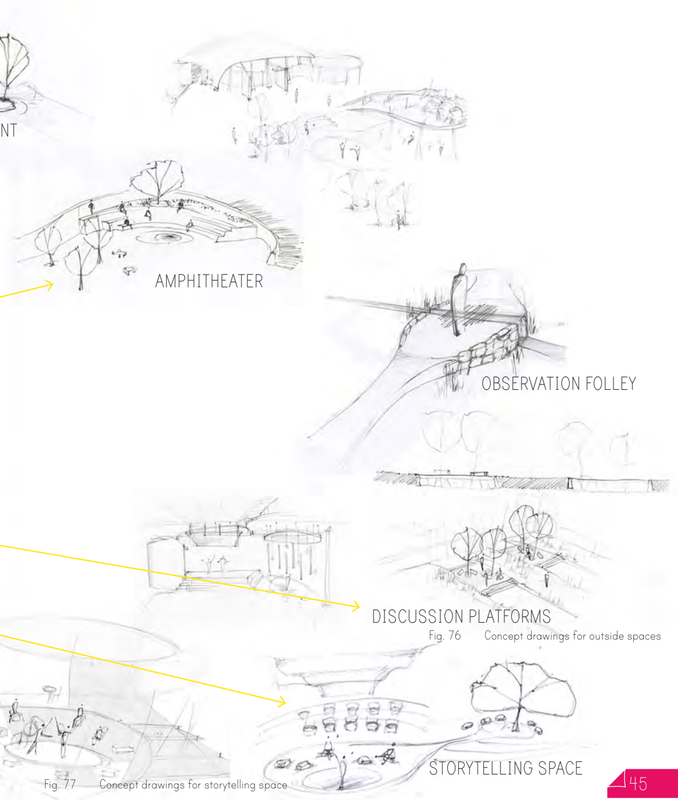
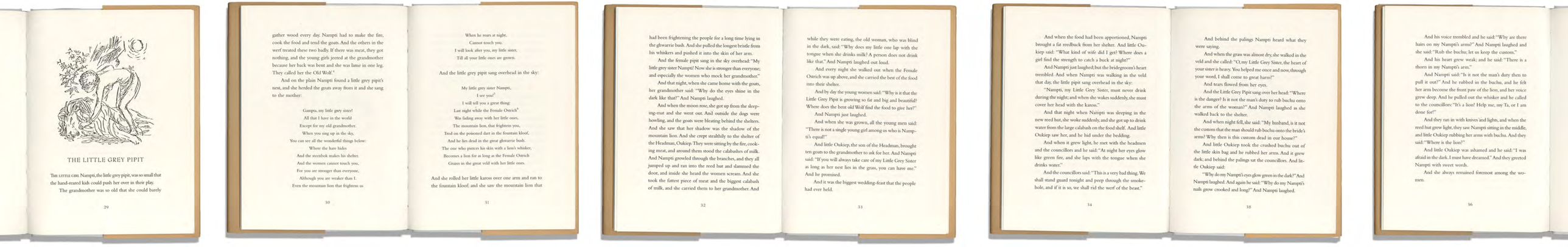



Fig. 77 Concept drawings for storytelling space

Fig. 76 Concept drawings for outside spaces



THE LITTLE GREY PIPIT

THE LITTLE GIRL Nampti, the little grey pipit, was so small that the hand-reared kids could push her over in their play.

The grandmother was so old that she could barely

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gather wood every day. Nampti had to make the fire, cook the food and tend the goats. And the others in the werf treated these two badly. If there was meat, they got nothing, and the young girls jeered at the grandmother because her back was bent and she was lame in one leg. They called her the Old Wolf.[4]

And on the plain Nampti found a little grey pipit's nest, and she herded the goats away from it and she sang to the mother:

Gampta, my little grey sister!
All that I have in the world
Except for my old grandmother.
When you sing up in the sky,
You can see all the wonderful things below:
Where the hare hides
And the steenbok makes his shelter.
And the women cannot touch you,
For you are stronger than everyone.
Although you are weaker than I.
Even the mountain lion that frightens us

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When he roars at night.
Cannot touch you.
I will look after you, my little sister,
Till all your little ones are grown.

And the little grey pipit sang overhead in the sky:

My little grey sister Nampti,
I see you![5]
I will tell you a great thing:
Last night while the Female Ostrich[6]
Was fading away with her little ones,
The mountain lion, that frightens you,
Trod on the poisoned dart in the fountain kloof,
And he lies dead in the great ghwarrie bush.
The one who pierces his skin with a lion's whisker,
Becomes a lion for as long as the Female Ostrich
Grazes in the great veld with her little ones.

And she rolled her little kaross over one arm and ran to the fountain kloof; and she saw the mountain lion that

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had been frightening the people for a long time lying in the ghwarrie bush. And she pulled the longest bristle from his whiskers and pushed it into the skin of her arm.

And the female pipit sang in the sky overhead: "My little grey sister Nampti! Now she is stronger than everyone; and especially the women who mock her grandmother."

And that night, when she came home with the goats, her grandmother said: "Why do the eyes shine in the dark like that?" And Nampti laughed.

And when the moon rose, she got up from the sleeping-mat and she went out. And outside the dogs were howling, and the goats were bleating behind the shelters. And she saw that her shadow was the shadow of the mountain lion. And she crept stealthily to the shelter of the Headman, Oukiep. They were sitting by the fire, cooking meat, and around them stood the calabashes of milk. And Nampti growled through the branches, and they all jumped up and ran into the reed hut and slammed the door, and inside she heard the women scream. And she took the fattest piece of meat and the biggest calabash of milk, and she carried them to her grandmother. And

32

while they were eating, the old woman, who was blind in the dark, said: "Why does my little one lap with the tongue when she drinks milk? A person does not drink like that." And Nampti laughed out loud.

And every night she walked out when the Female Ostrich was up above, and she carried the best of the food into their shelter.

And by day the young women said: "Why is it that the Little Grey Pipit is growing so fat and big and beautiful? Where does the bent old Wolf find the food to give her?"

And Nampti just laughed.

And when she was grown, all the young men said: "There is not a single young girl among us who is Nampti's equal!"

And little Oukiep, the son of the Headman, brought ten goats to the grandmother to ask for her. And Nampti said: "If you will always take care of my Little Grey Sister as long as her nest lies in the grass, you can have me." And he promised.

And it was the biggest wedding-feast that the people had ever held.

33

And when the food had been apportioned, Nampti brought a fat reedbuck from her shelter. And little Oukiep said: "What kind of wife did I get? Where does a girl find the strength to catch a buck at night?"

And Nampti just laughed; but the bridegroom's heart trembled. And when Nampti was walking in the veld that day, the little pipit sang overhead in the sky:

"Nampti, my Little Grey Sister, must never drink during the night; and when she wakes suddenly, she must cover her head with the kaross."

And that night when Nampti was sleeping in the new reed hut, she woke suddenly, and she got up to drink water from the large calabash on the food shelf. And little Oukiep saw her, and he hid under the bedding.

And when it grew light, he met with the headmen and the councillors and he said: "At night her eyes glow like green fire, and she laps with the tongue when she drinks water."

And the councillors said: "This is a very bad thing. We shall stand guard tonight and peep through the smoke-hole, and if it is so, we shall rid the werf of the beast."

34

And behind the palings Nampti heard what they were saying.

And when the grass was almost dry, she walked in the veld and she called: "O, my Little Grey Sister, the heart of your sister is heavy. You helped me once and now, through your word, I shall come to great harm!"

And tears flowed from her eyes.

And the Little Grey Pipit sang over her head: "Where is the danger? Is it not the man's duty to rub buchu onto the arms of the woman?" And Nampti laughed as she walked back to the shelter.

And when night fell, she said: "My husband, is it not the custom that the man should rub buchu onto the bride's arms? Why then is this custom dead in our house?"

And little Oukiep took the crushed buchu out of the little skin bag and he rubbed her arms. And it grew dark; and behind the palings sat the councillors. And little Oukiep said:

"Why do my Nampti's eyes glow green in the dark?" And Nampti laughed. And again he said: "Why do my Nampti's nails grow crooked and long?" And Nampti laughed.

35

And his voice trembled and he said: "Why are there hairs on my Nampti's arms?" And Nampti laughed and she said: "Rub the buchu; let us keep the custom."

And his heart grew weak; and he said: "There is a thorn in my Nampti's arm."

And Nampti said: "Is it not the man's duty then to pull it out?" And he rubbed in the buchu, and he felt her arm become the front paw of the lion, and her voice grew deep. And he pulled out the whisker and he called to the councillors: "It's a lion! Help me, my Ta, or I am done for!"

And they ran in with knives and lights, and when the reed hut grew light, they saw Nampti sitting in the middle, and little Oukiep rubbing her arms with buchu. And they said: "Where is the lion?"

And little Oukiep was ashamed and he said: "I was afraid in the dark. I must have dreamed." And they greeted Nampti with sweet words.

And she always remained foremost among the women.

36

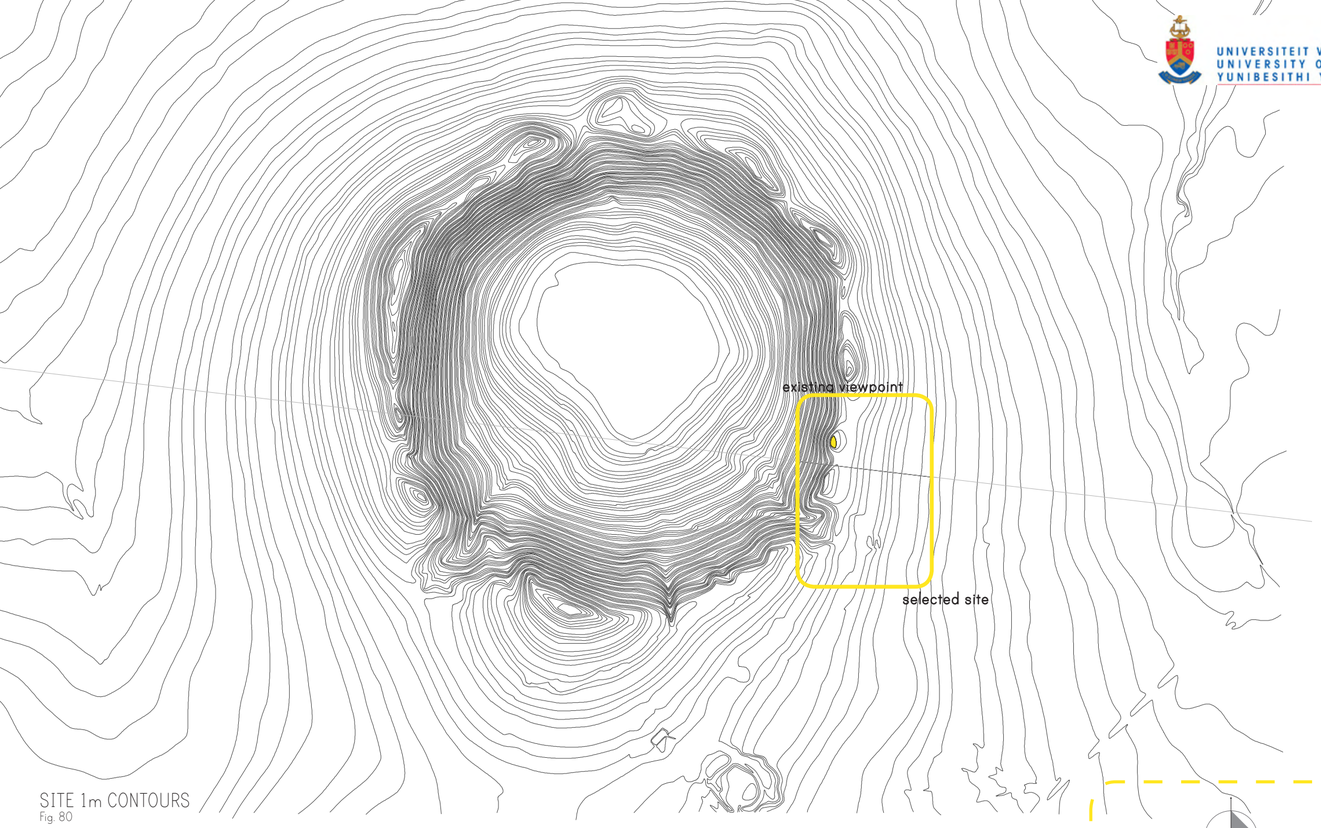
Fig. 79 Written interpretation of african stiorytelling

# DESIGN DEVELOPMENT



chapter 5

fig. 5.1




SITE 1m CONTOURS
Fig. 80

# 5.1 INTRODUCTION

Throughout the thesis, the theme of reconnection has been emphasised and discussed at length. The programme of storytelling has been selected as the vessel for discovery. Here, the theoretical concepts will be pursued in the physical design of the project. Firstly, a careful consideration of the landscape is essential in order to reveal that which already exists on the site. The story of Tswaing, within its historical and contemporary context can be told by every design decision. From the material selection to the form and technology employed, the relationship of the built environment to the cultural environment, the earth and the universe is implied. Here the logic of the design decisions will be explained at the hand of the contextual determinants.

Although the topography and vegetation in general has been discussed, a thorough analysis of the experience requires the careful study of the landform and specific landscape elements that reveal the character of the site.


THE EXISTING VIEWPOINT
Located on the ridge of the crater, the viewpoint offers the first view of the crater in its entirety.
THE BUILT INTERVENTION
The built intervention along a new path is constructed, sloping gently away from the crater. The characteristic vegetation consists of grassland that is less sensitive as it can easily be re-established if disturbed.
1,14 km diameter
1145
100m
300m

Fig. 81

# 5.2 THE PATH

The existing path to the viewpoint indicates a possibility for a meaningful experience of the landscape. The topography and vegetation obscures the view of the crater, thus building anticipation for the eventual revelation of the view. This also results in the experience of the surrounding landscape, where the focus would be on the crater itself if it were visible. Thus, the visitor is led along a path that reveals different aspects of the character of the site, instead of a single visual image. The path is thus a powerful mechanism to convey a meaningful experience to the visitor.

A path is proposed that leads the visitor along the desired topographical route, as well as focusing on important landscape elements along the way. The series of built interventions will take place along the path, creating different spatial and programmatic experiences along the way to the viewpoint.

The organisation of activities also drew from the idea of a storyline. Storyline, as well as the typical structure of African oral literature has been discussed and the influence can be seen in certain subtle aspects of the design.

The existing path houses many instances of revelation of the landscape and is therefore left in its current layout. The path can then offer a different experience when returning from the viewpoint. Views of and connections to the main path and buildings offers the visitor the opportunity to construct their own experience of the site as opposed to a rigidly regulated experience. In this another reference is made to African storytelling where crowd participation is encouraged and embraced.

Fig. 82

CONFLUENCE PARK, WASHINGTON
MAYA LIN, 2007

Fig. 83

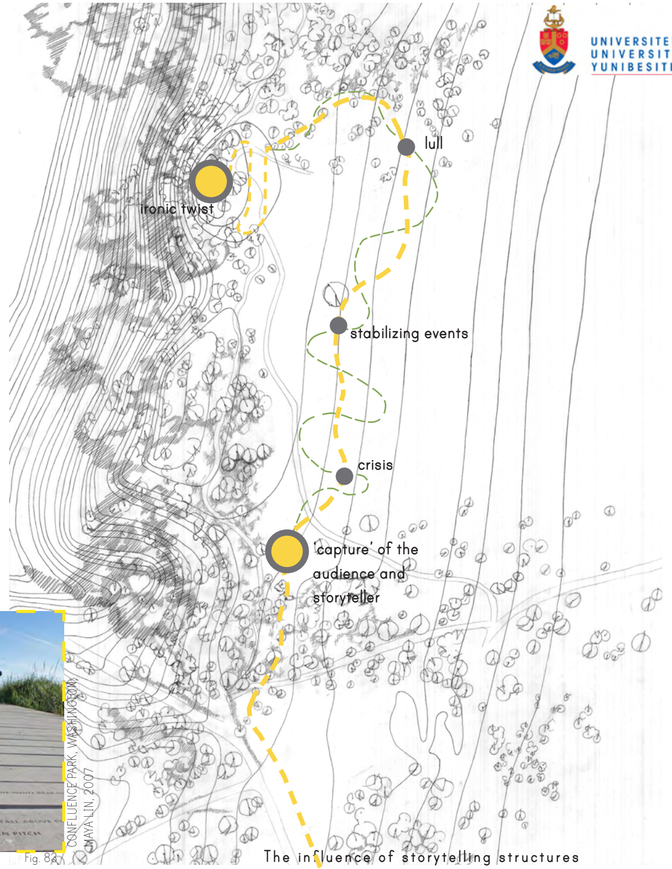



Fig. 84

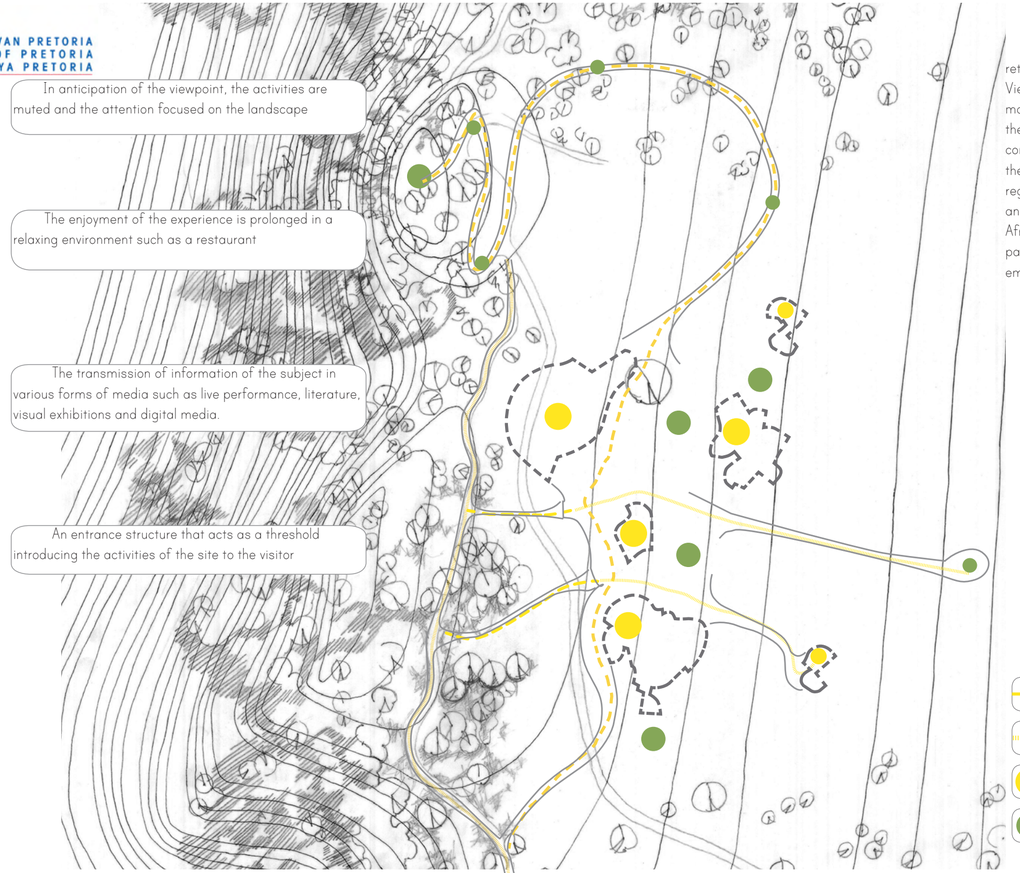



Fig. 85

## MULTIMEDIA EXPERIENCE

Although the focus of the project is that of oral literature, live performance is not the only way to experience the art. Stories can be recorded in different forms of media. Firstly, the only historical accounts of oral literature that we have available is in the form of the written word and should be included in the complete experience. Contemporary media can also be extremely useful in order to preserve oral literature. Thanks to audiovisual recording, performances can be recorded anywhere and collected in a database. In this way the project can reach beyond the boundaries of the Tswaing site. It also presents the possibility for the visitor to leave behind their own account or story at Tswaing.

## RESTAURANT AND AMPHITHEATRE

Situated adjacent to the multimedia experience is a restaurant and amphitheatre space. The restaurant is predominantly considered an outdoor space around the amphitheatre area, but the structure also provides a roofed deck space and indoor restaurant and bar space. The average volume of visitors at once is expected to be quite low, but adequate space should be available for larger gatherings as the space may be rented out for functions and be able to accommodate seminars and school groups entertained in the storytelling building.

## EXHIBITION SPACE

As all forms of storytelling is explored on the site, a space is required where exhibitions can be held informing the visitors of the background and context of certain forms of storytelling. Thus, the exhibition space should be flexible to accommodate changing exhibitions.

Art is also a powerful expression of a unique person and their story. Therefore, the exhibition space, along with the outdoor sculpture garden may exhibit the work of local artists.

## STORYTELLING PLACE

Although more opportunities for storytelling are planned, the main, or formal, storytelling space is the first built intervention found along the path. The space is envisaged to be intimate, although it would be beneficial to be able to use the space for larger gatherings.

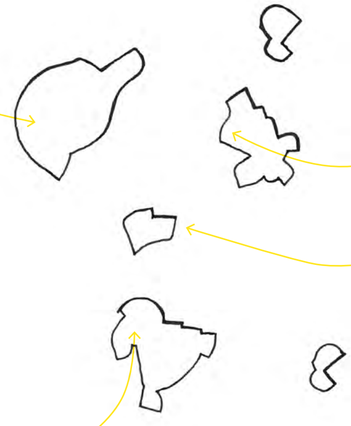


Fig. 86 Parti diagram





## OINT

The anticipation built along the path, culminates in the extraordinary view of the crater as a whole. As the view is a unique experience, very subtle (or weak) built interventions are required so as not to detract from the natural majesty. However, the crater viewpoint offers a great opportunity for storytelling. Specifically, the art of skylore. The unique perspective of the crater creates a powerful vertical connection that is a perfect setting within which to experience stories of the sky and universe.

## REST AREA AND WATERPOINT

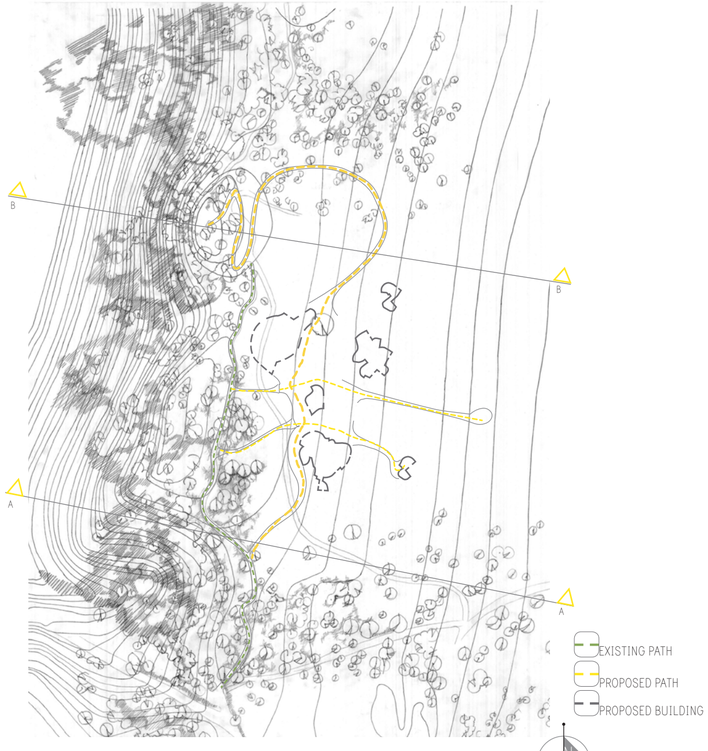
In order to minimise the potential littering of the site by the visitors, no disposable ware will be allowed on the site. To provide a source of cool water on the hot site water bottle can refilled at a the water point located by the rest area. A cool shady area provides a good rest stop before proceeding on the path to the viewpoint.

## DISCUSSION SPACE

Fig. 87

## OUTDOOR SPACE

The fact that the building are spread out along the path render the spaces in between the buildings significant. This importance is amplified by the context of the project and the emphasis that has been laid upon the connection to the landscape.




PLAN OF PATHS

1:2500 Fig. 88



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# 5.4 THE LANDSCAPE REVEALED

To facilitate the understanding of the site, a photographic analysis of the site fabric may give one an idea of what is present on the site that has the potential to be revealed.

Fig. 89

Fig. 90

Fig. 91 Existing entrance




Fig. 92







Fig. 93 Composite view from entrance

Fig. 96

Fig. 95

Fig. 97

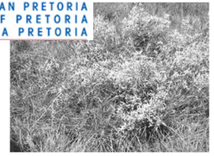


Fig. 98

Fig. 99

Fig. 100

Fig. 94

Fig. 101 Composite view around tree

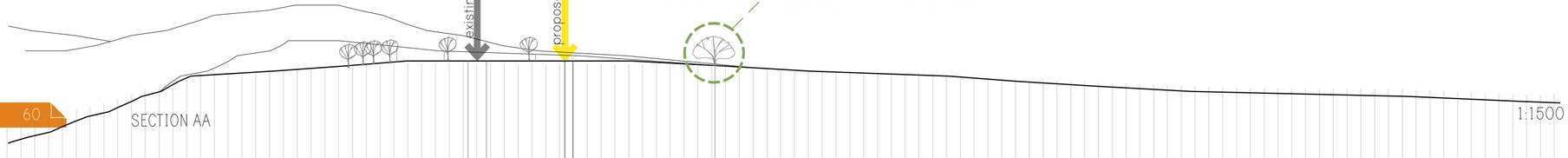



Fig. 102


Fig. 108

Viewpoint composite


Fig. 106


Fig. 107


Fig. 103


Fig. 105

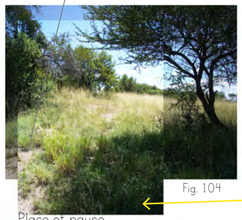


Fig. 104

Place of pause

existing viewpoint

existing path

proposed path


Fig. 109

Existng viewpoint
infrastructure


Fig. 110


Fig. 111

Place of pause


Fig. 112


Fig. 113

View from the place of pause


Fig. 114

View of proposed path

SECTION EE 1:1500

# 5.5 BUILT FORM

Any built form on a site such as Tswaing, where the landscape is dominant, will present a complex interplay between the man-made and natural environment. Indeed, at Tswaing this relationship becomes more complex as one considers that both the forces of the universe and man have scarred the landscape. Man and the universe have vied to exert their power and shape the landscape at Tswaing. Thus the juxtapositioning of the man-made and natural is of extreme importance to reflect the complexity of the site.

Steven Groak cites a simple diagram to illustrate the complex relationship found in the work of Alvar Alto.(Groak 1992: 227) The diagram represents the earth in relation to the sky, or the rational in relation to the natural. This order, as Groak explains, can be found both in plan and section in the work of Alvar Aalto. This suggests the versatiliy of the simple, but powerful concept.

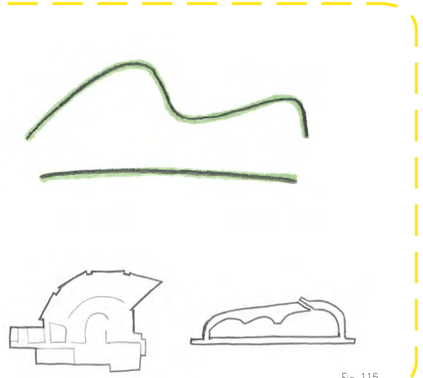


Fig. 115

Funicular shapes are essentially man-made technologies that mimic the natural. An organic shaped roof may attempt to climb into the landscape and because of this proximity, strengthens the idea of difference through juxtaposition. In this way, the architecture makes a bold statement without dominating the landscape.

Using linear geometry in addition to these organic shapes further serves to emphasise the point. The landscape may then encroach upon these structures in the form of planted roofs.

Fig. 116

Fig. 117

Relationship development on plan

Fig. 118

Throughout the conceptual stages of design, the relationship between the rational and natural order has been investigated.

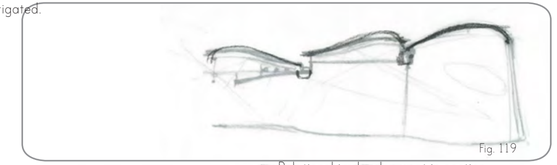
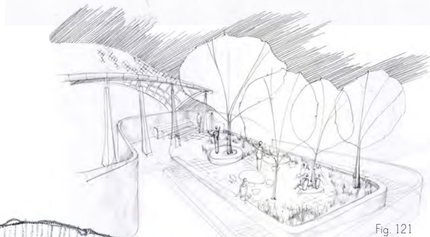


Fig. 119

Relationship development in section

Fig. 120



Relationship development in perspective

Fig. 121

Fig. 122

# 5.6 THE WALL IN THE LANDSCAPE

As discussed, the path to the viewpoint is designed in order to lead the visitor past certain elements and accentuate aspects of the landscape. To establish the latter, the path also cut into the landscape to explore the relationship to the earth. A wall along the path begins by sitting on top of the landscape and continues to cut deeper and deeper into the natural topography. The experience physically brings the visitor closer to the earth where it is cooler en sheltered. The visitors are also reminded of their metaphysical bond to the earth that they inhabit and live on and from.

The wall offers the opportunity for expression. Walls are used to commemorate the dead, as a blank canvas for artistic expression and for a community to express building techniques. In this way the wall itself becomes an archive of stories of the people that are remembered on its surface and in its structure. The desire to leave behind a piece of oneself can be seen in something as universal as names carved in the trunk of a tree. Graffiti becomes a more artistic expression of self.

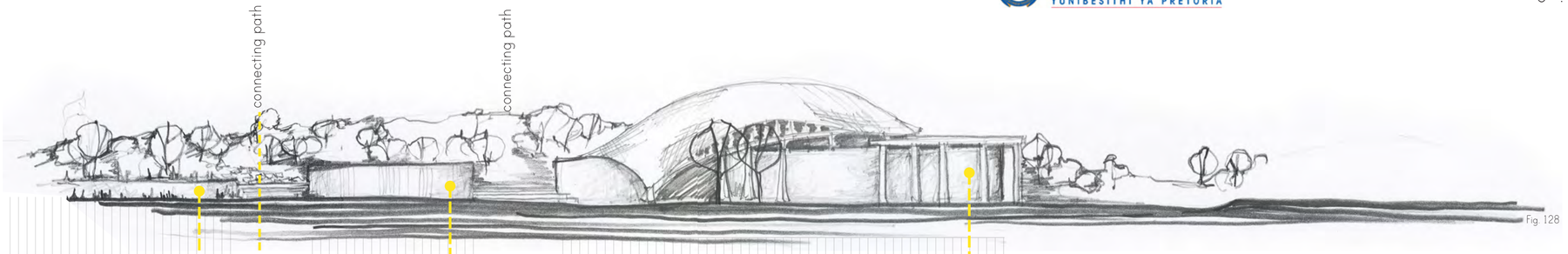


Fig. 128

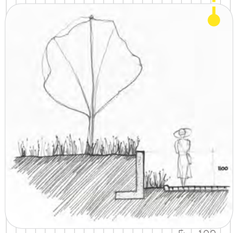


Fig. 123

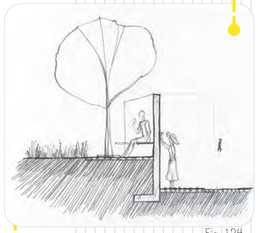


Fig. 124

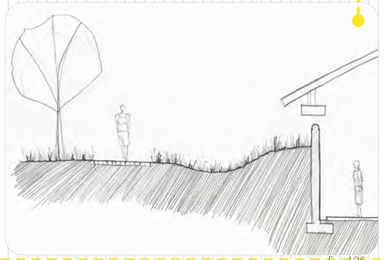


Fig. 125


Fig. 134


CONCEPT MODEL FOR THE WALL IN THE LANDSCAPE
Fig. 126


NAMES CARVED ON A TREE
Fig. 127


KAI-KAI WALL OF EXPRESSION, RICHTERSVELD, COMMUNITY PROJECT, 2006
Fig. 129


LETTERS ENGRAVED ON STEEL, CONSTITUTIONAL COURT
Fig. 130


VIETNAM VETERANS MEMORIAL, WASHINGTON DC, MAYA LIN, 1981
Fig. 131


THE CHALK WALL, VIRGINIA, STEVE AINSWORTH, 2006
Fig. 132

KAI KAI WALL OF EXPRESSION, RICHTERSVELD, COMMUNITY PROJECT, 2006
Fig. 133

# 5.7 CONCEPT DIAGRAMS

Creating the spaces for the different activities relating to storytelling throughout the site, a few basic principles served as design guidelines.

Intimate space, where one would be immersed in the metaphysical world of storytelling should be focused on itself. Thus a more enclosed, cave-like space is suitable. The connection to the exterior would be a vertical axis emphasizing the relationship between the earth and the sky. For this reason, the vertical elements respond to the earth from which they seem to grow.

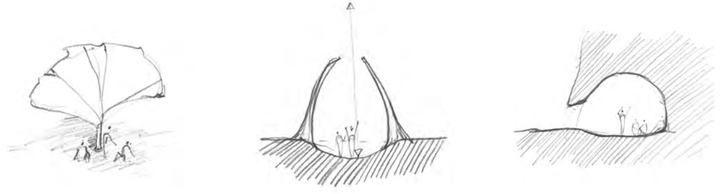


Fig. 135

The revelation of the horizon, the horizontal plane of the landscape should also be a concern of the designer hoping to reconnect the visitor to his environment. For this purpose, certain spaces reach out into the landscape with a horizontal axis. Being of a less intimate nature, these spaces are suitable for social interaction. Spaces where the view of the fellow visitors are unobstructed in addition to the visual link established with the landscape. The vertical elements would necessarily be lighter.

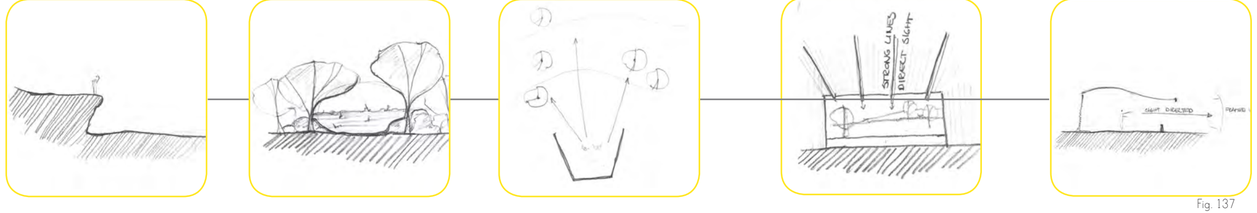



Fig. 137

Geometric roof shapes are suitable for service areas, although when combined with curved lines and framed views can also be used for visitor spaces. Vertical elements free the roof structure from the walls allowing for organic design on plan.

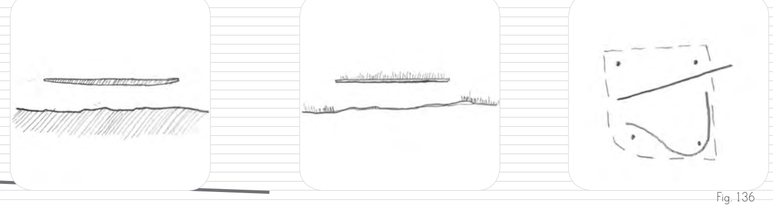


Fig. 136

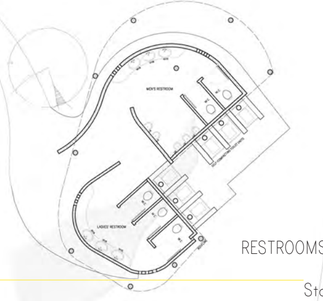
MAIN ENTRANCE

MAIN STORYTELLING DEPRESSION

INFORMATION THRESHOLD

AUDITORIUM SPACE

Storytelling sunroom




RESTROOMS

Storytelling platform

AV AND STORAGE SPACE

CHILDREN'S STORYTELLING CAVE

STORYTELLING TREE

PLAN OF STORYTELLING SPACES

1:200

Fig. 138

## 5.8.1 PROGRAMME

The main storytelling space with the depression as 'stage' and seating consisting of anchored stones arranged around the slopes of the depression.

A technical room from where a sound system may be operated and may serve as dressing rooms for the performers.

The large seating space is irregularly stepped to create platforms for smaller gatherings. No fixed seating is suggested in order to sustain the flexibility of the space. Although smaller gatherings would be expected during the day to day functioning of the building, the building has the capacity to house larger performances, or even be rented out for private functions such as seminars where more auditorium-like seating would be required.

A intimate space leading of the main seating space will be used as a children's storytelling space as noise will be more contained and the space leads directly to a storytelling space around an existing tree on the site.

The semi-basement houses a service area where the air handling unit is housed as well as spaces that will serve as small workshop areas. These lead to the ramped terrace adjacent the building where outdoor discussion space is proposed. The spaces are envisioned to be used in addition to the main storytelling spaces to entertain school and other educational groups.

The landscape interventions around the building include planted areas benefitting from rainwater harvesting from the roofs. Existing aloes found on the site will be reestablished on the terraced slope on approach to the building.

SOUTH-WEST FACADE OF STORYTELLING BUILDING

Scale 1:100

Fig. 139

Fig. 140

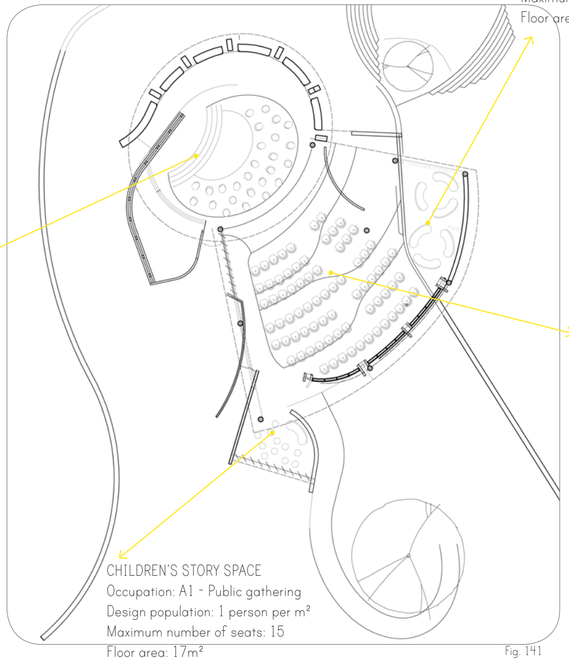
Entrance to the storytelling building

## 5.8.2 OCCUPATION

The storytelling space is intended to be a flexible space that can be adapted to the number of visitors. The nature of the site and programme of the project will cause the volume of visitors to fluctuate greatly according to the time of day, the time of year and the events presented at the site. The day-to-day volume of individual visitors will be far less than that of special occasions, seminars or tour groups. The population, however is indicated at the full capacity of the building.

DECK AREA
Occupation: A1 - Public gathering
Design population: 1 person per m²
Maximum number of seats: 12
Floor area: 22,5m²

MAIN STORYTELLING SPACE
Occupation: A2 - Theatre
Design population: 1 fixed seat per m²
Number of fixed seats: 25
Floor area: 58m²



AUDITORIUM SPACE
Occupation: A2 - Theatre
Design population: 1 person per m²
Maximum number of seats: 75
Floor area: 86m²

CHILDREN'S STORY SPACE
Occupation: A1 - Public gathering
Design population: 1 person per m²
Maximum number of seats: 15
Floor area: 17m²

Fig. 141

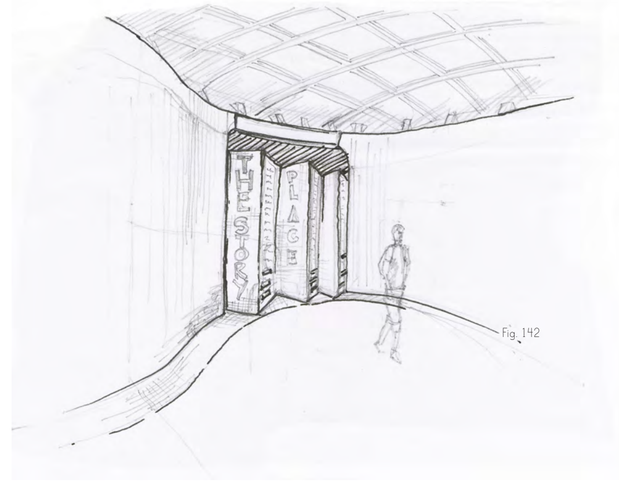


Fig. 142

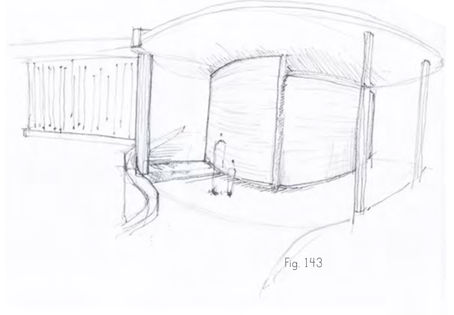


Fig. 143

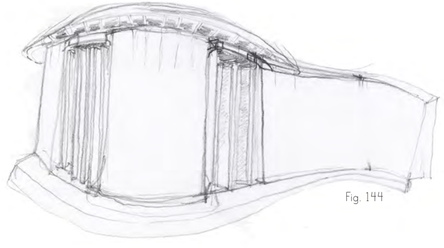


Fig. 144

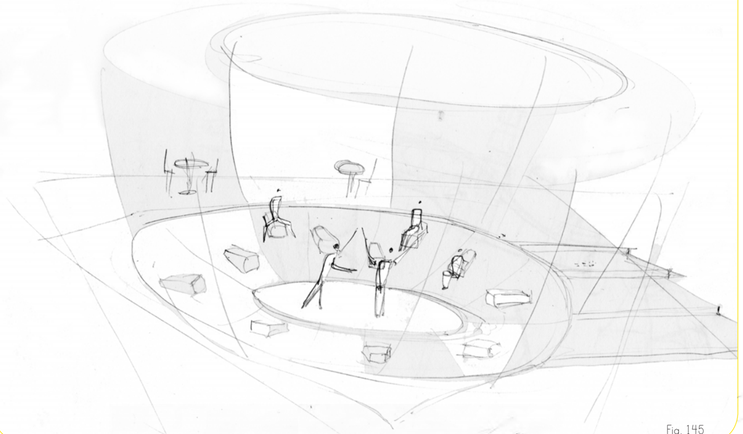


Fig. 145

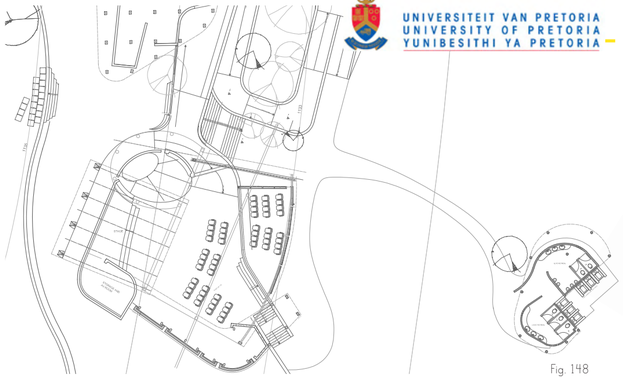
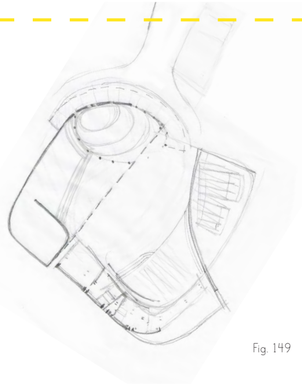


Fig. 148



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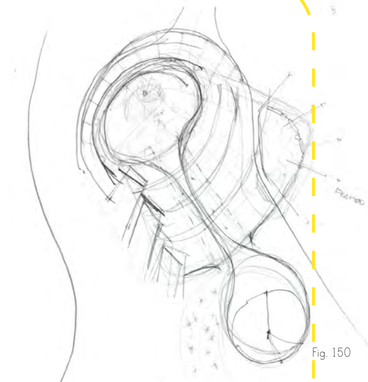


Fig. 150

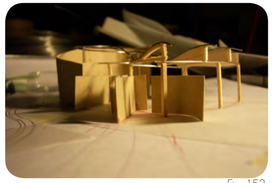


Fig. 153

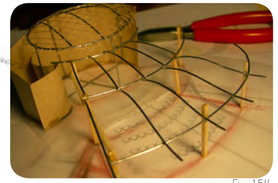


Fig. 154

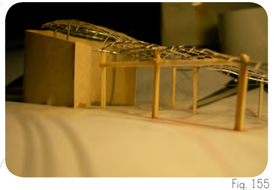


Fig. 155

Fig. 156

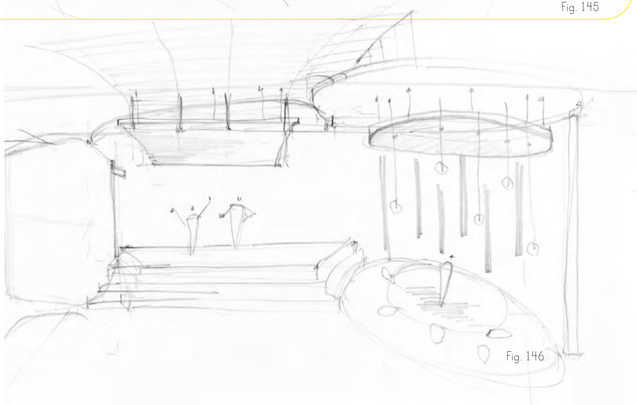


Fig. 146

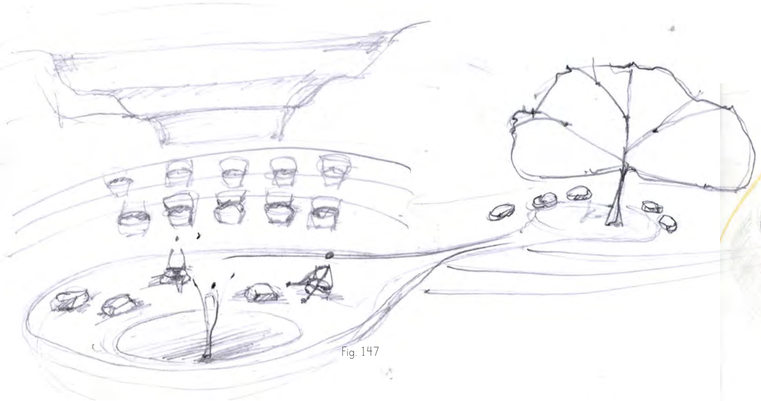
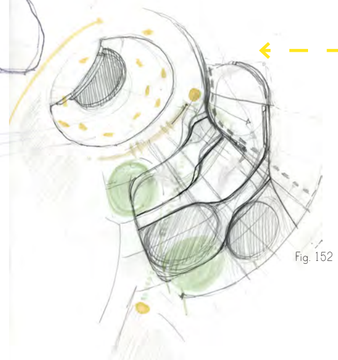


Fig. 147



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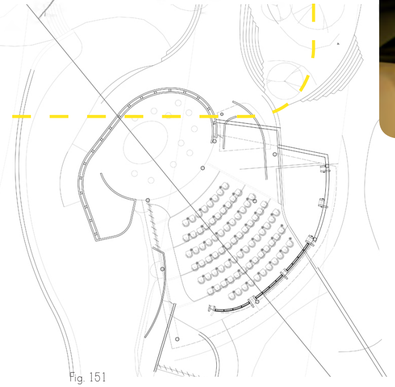
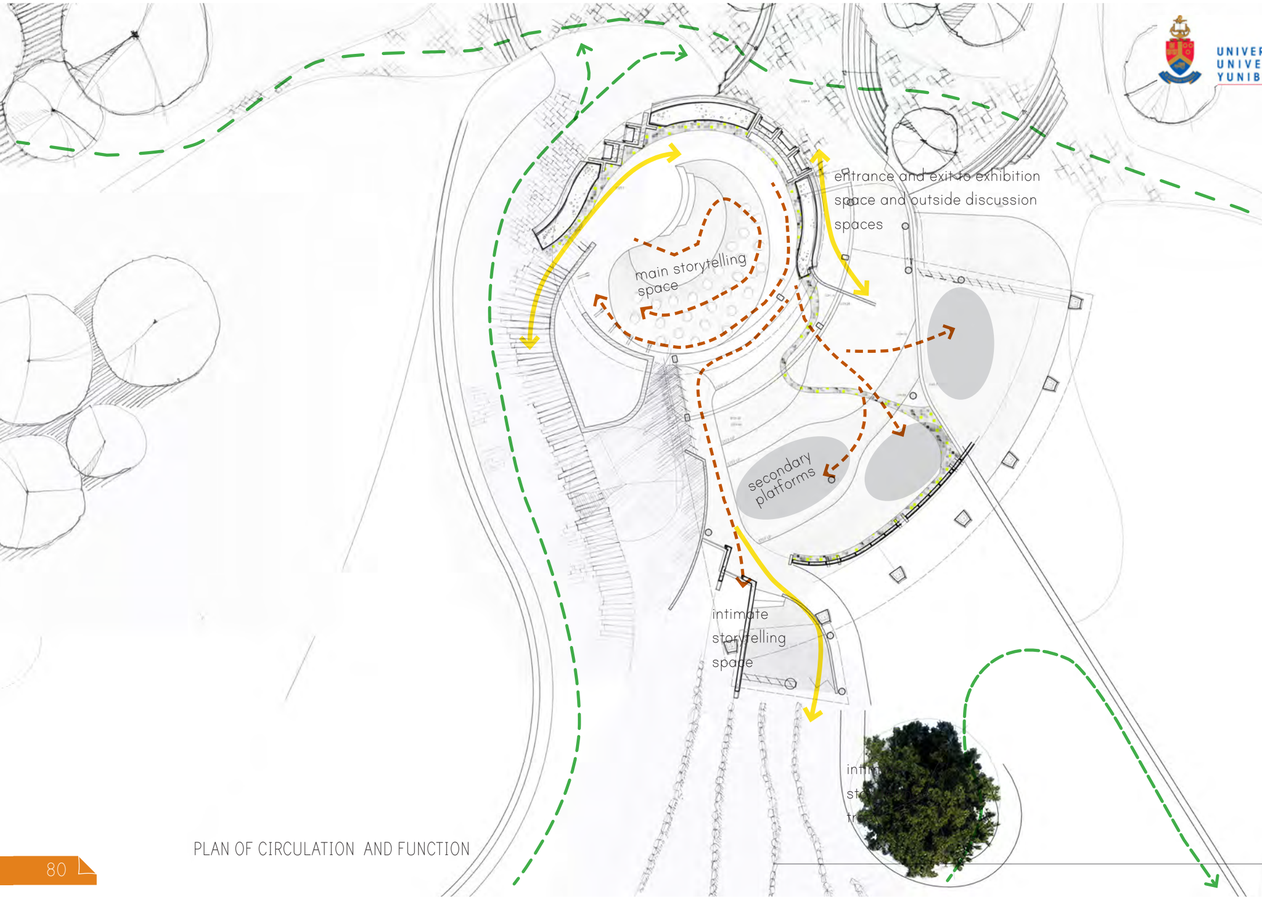


Fig. 151




PLAN OF CIRCULATION AND FUNCTION

1:200 Fig. 157

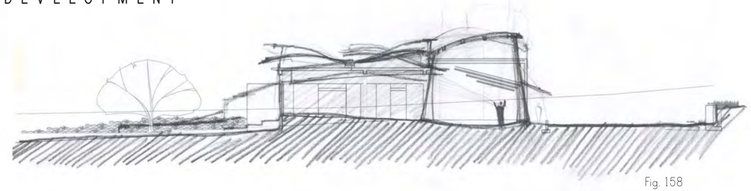
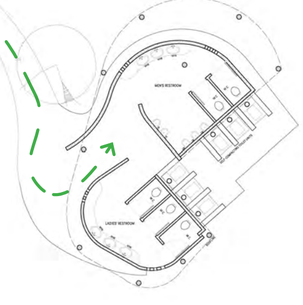


Fig. 158



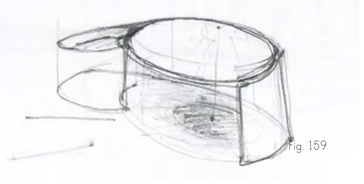


Fig. 159

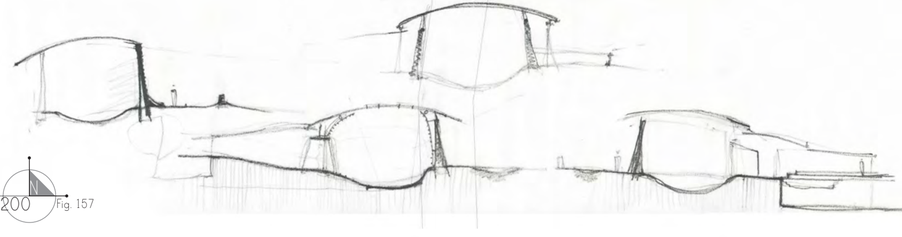


Fig. 160

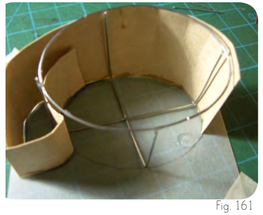


Fig. 161

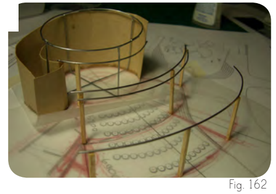


Fig. 162


Fig. 163

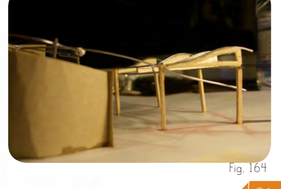


Fig. 164

Fig. 165

Fig. 166

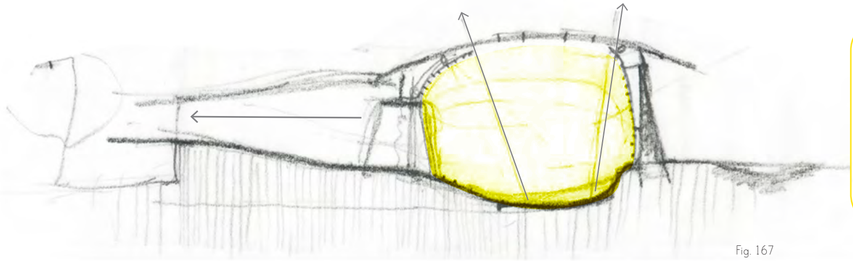


Fig. 167

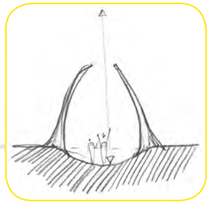
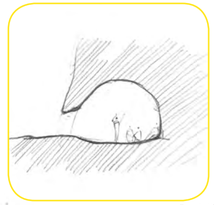


Fig. 169



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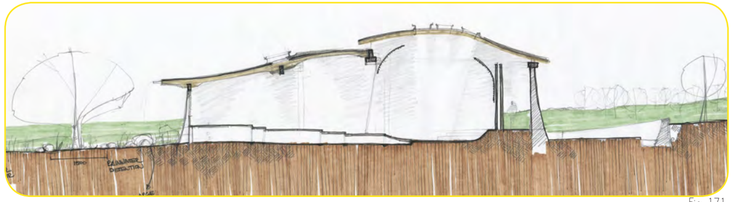


Fig. 171

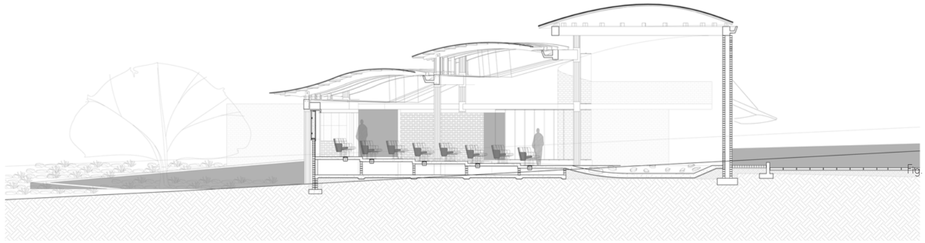


Fig. 168

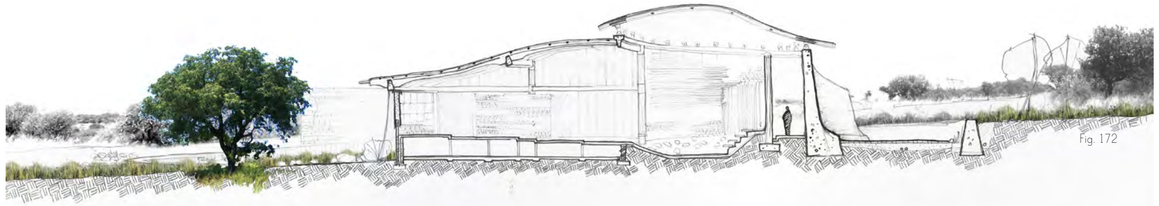
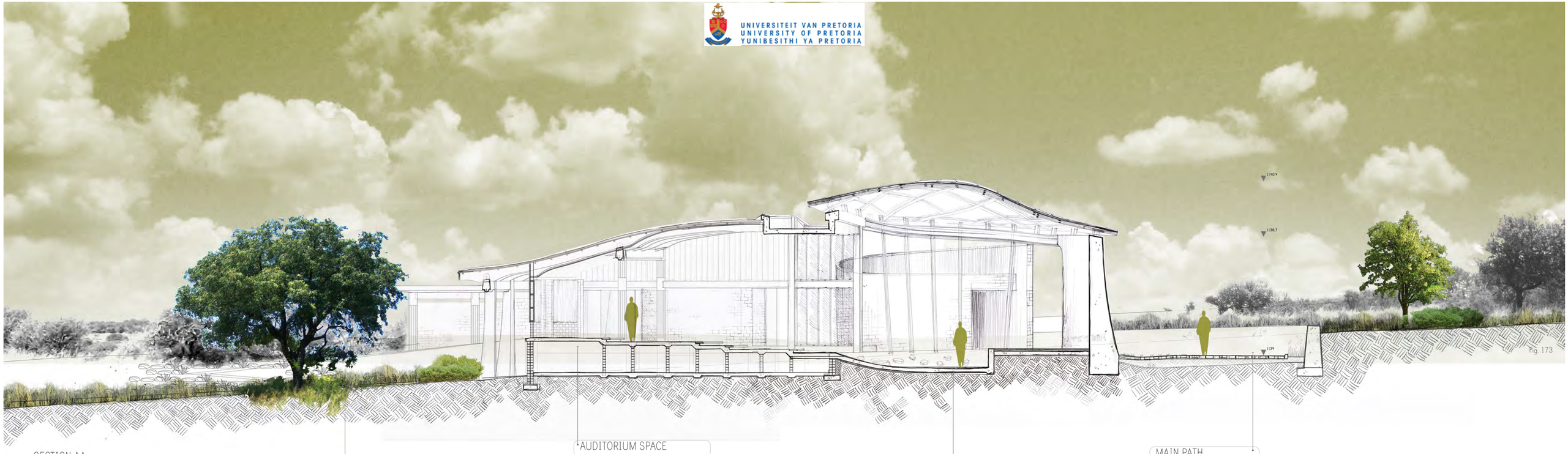


Fig. 172




SECTION AA

Fig. 173

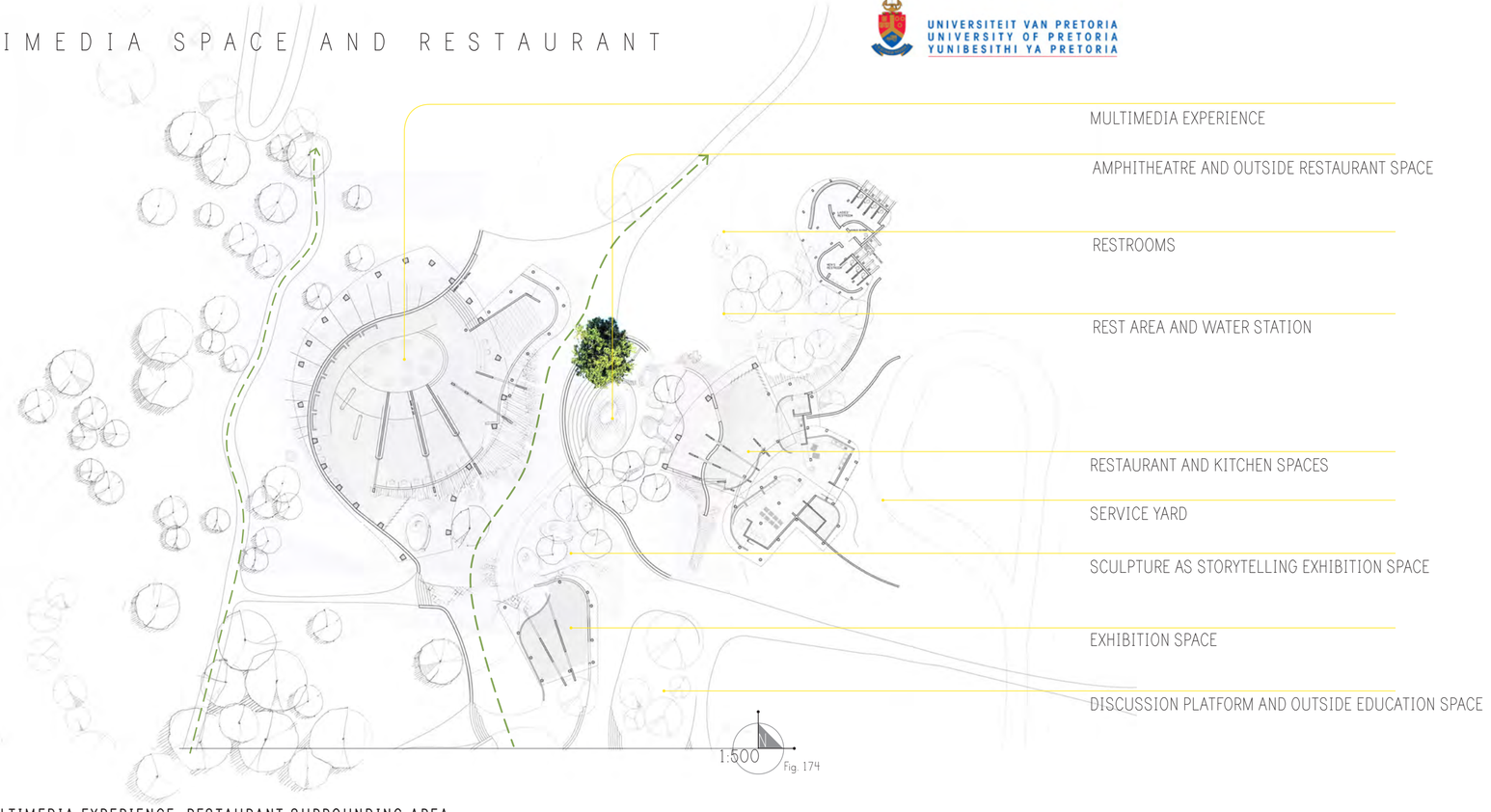

MULTIMEDIA EXPERIENCE
AMPHITHEATRE AND OUTSIDE RESTAURANT SPACE
RESTROOMS
REST AREA AND WATER STATION
RESTAURANT AND KITCHEN SPACES
SERVICE YARD
SCULPTURE AS STORYTELLING EXHIBITION SPACE
EXHIBITION SPACE
DISCUSSION PLATFORM AND OUTSIDE EDUCATION SPACE
1:500

Fig. 174


bookshelves
reading platform
help desk and archive
bookshelves
amphitheatre
restrooms
LADIES' RESTROOM
MEN'S RESTROOM
rest area
restaurant
bar
scullery
restaurant deck
service yard
kitchen
vegetable garden
sculpture garden
1:250

Fig 175


Fig. 176

## 5.9.2 PLAN OF CIRCULATION

## 5.9.3 OCCUPATION

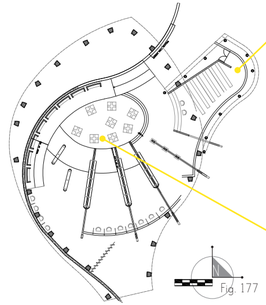


Fig. 177

OFFICE AND ARCHIVE
Occupation: G1 - Office
Design population: 1 person seat per 15m²
Floor area: 58m²
Population: 3 people

MULTIMEDIA EXPERIENCE
Occupation: C2 - Library
Design population: 1 person seat per 20m²
Floor area: 382,8m²
Population: 19 people

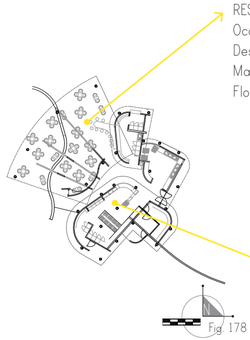


Fig. 178

RESTAURANT SPACE
Occupation: A1 - Restaurant
Design population: 1 person per m²
Maximum number of seats: 72
Floor area: 125m²

KITCHEN AND SERVICE SPACE
Occupation: D1 - Industry, moderate risk
Design population: 1 person per 15m²
Floor area: 127,22m²
Population: 8 people

Fig. 179 Multimedia elevation

Fig. 181

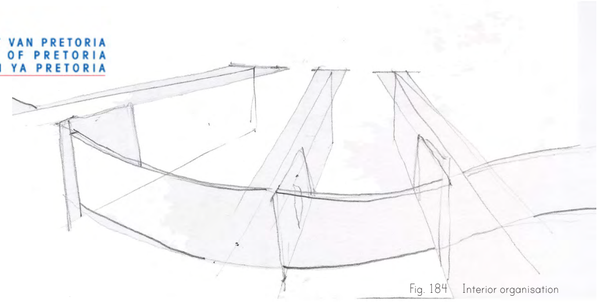


Fig. 184 Interior organisation

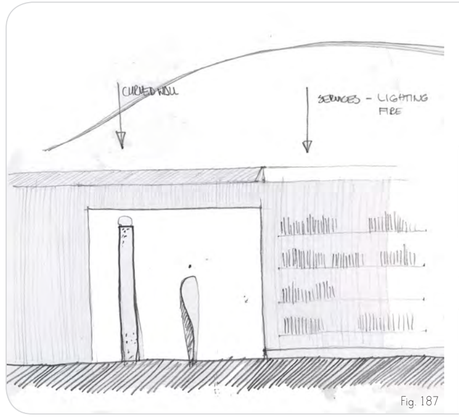



Fig. 187

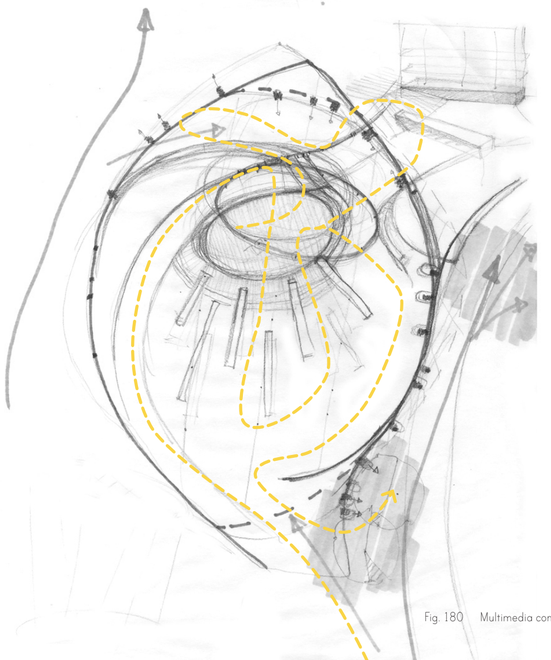


Fig. 180 Multimedia concept plan

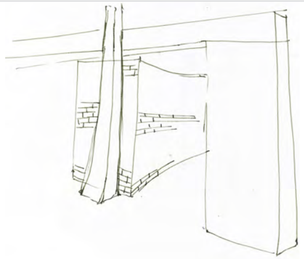


Fig. 182 Multimedia entrance

Fig. 185

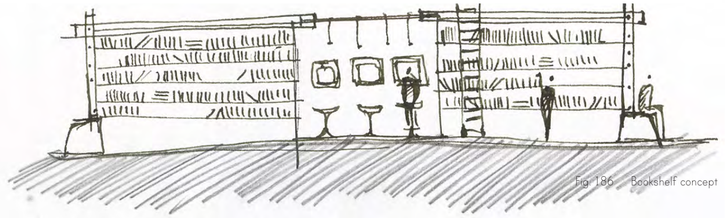


Fig. 186 Bookshelf concept

Fig. 188

Fig. 183 Outside space concept

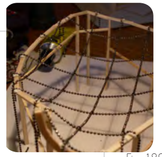


Fig. 189

Fig. 190

Fig. 191

Fig. 192

Fig. 193


Fig. 194

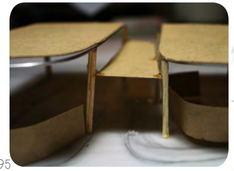


Fig. 195


Fig. 196

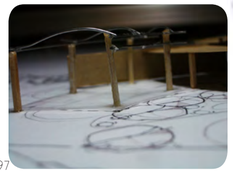


Fig. 197


Fig. 198

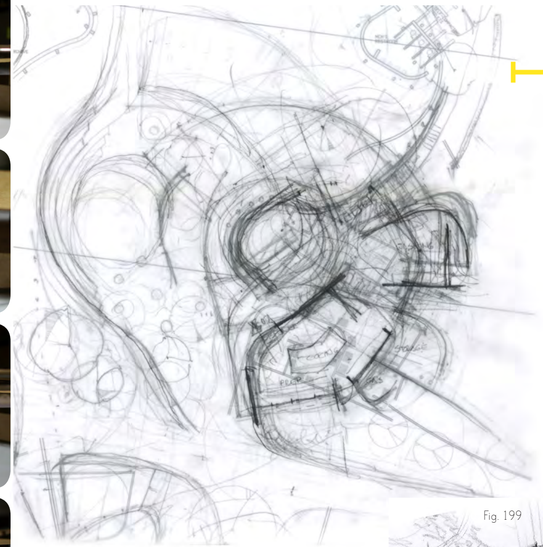


Fig. 199

Fig. 200


Fig. 203

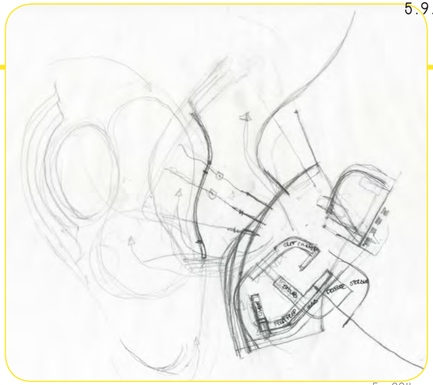


Fig. 204

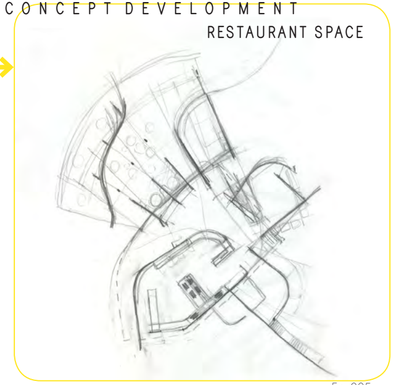


Fig. 205

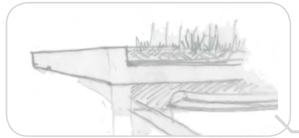


Fig. 207 Roof edge

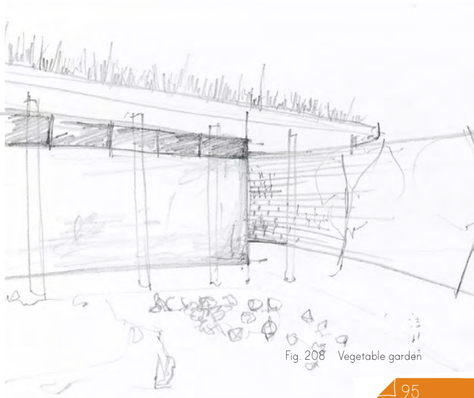


Fig. 208 Vegetable garden

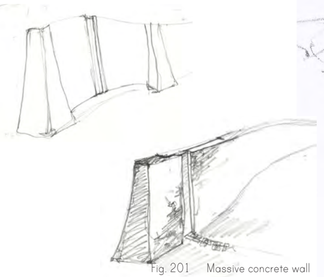


Fig. 201 Massive concrete wall

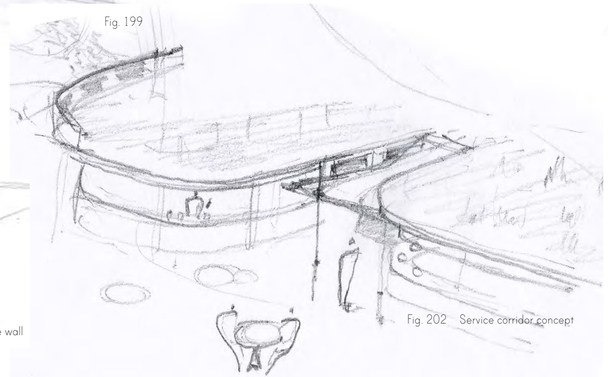


Fig. 202 Service corridor concept

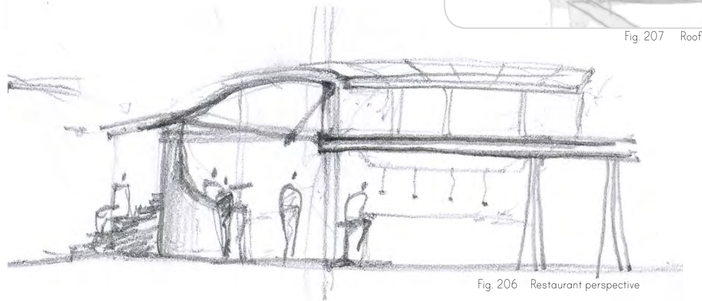


Fig. 206 Restaurant perspective

## 5.9.6 DEVELOPMENT OF THE SECTION

MULTIMEDIA AND RESTAURANT SPACE

Fig. 213

Fig. 209

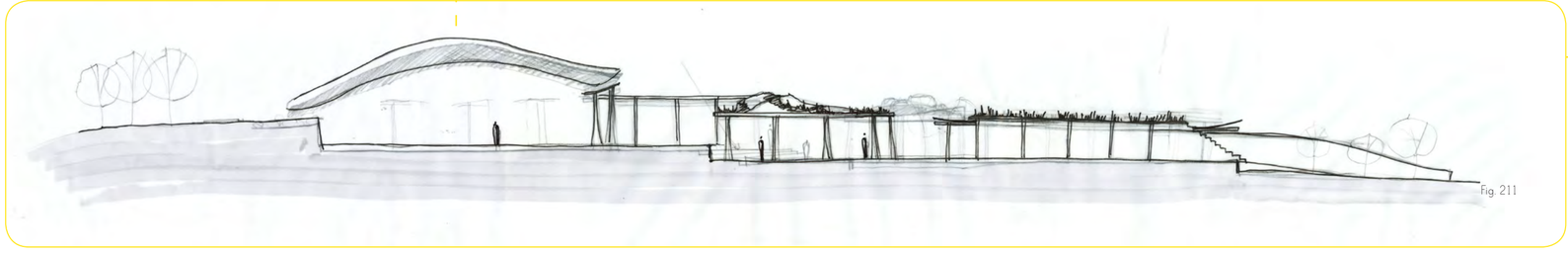


Fig. 211

Fig. 215

Fig. 210

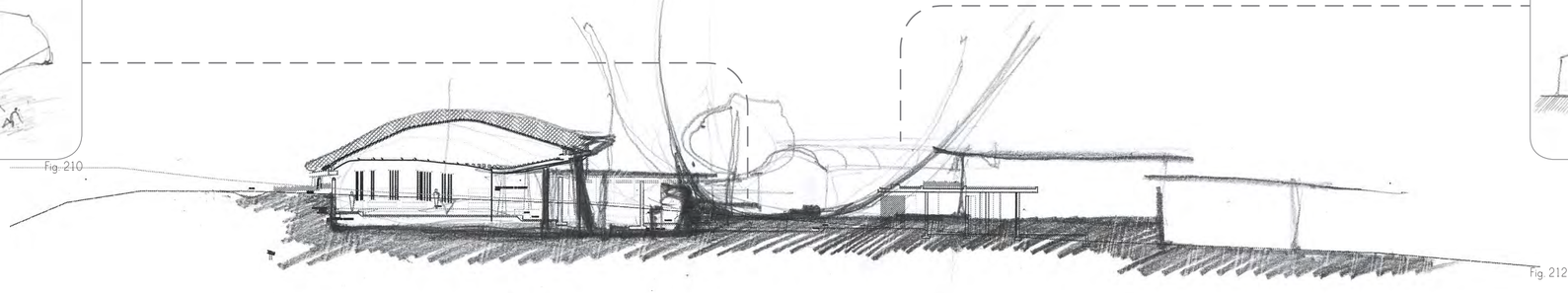


Fig. 212

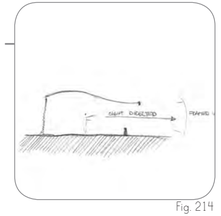
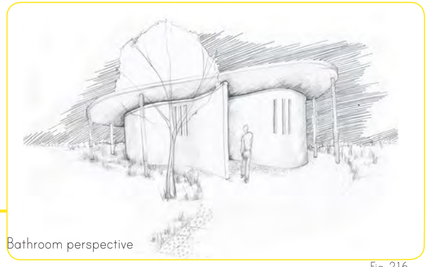
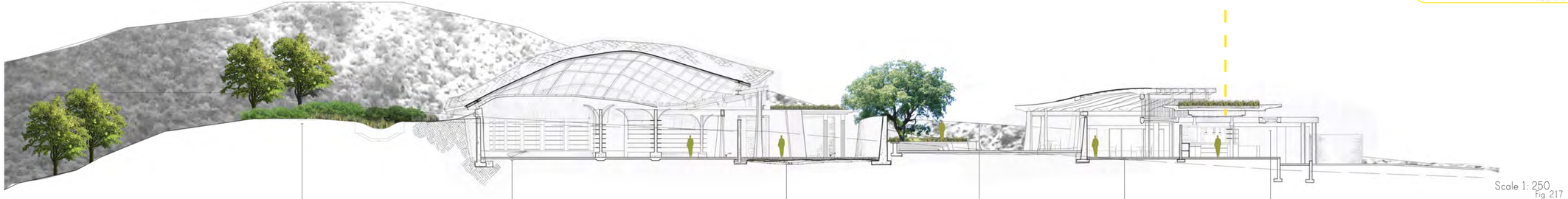


Fig. 214



Bathroom perspective

Fig. 216




SECTION CC

Scale 1: 250

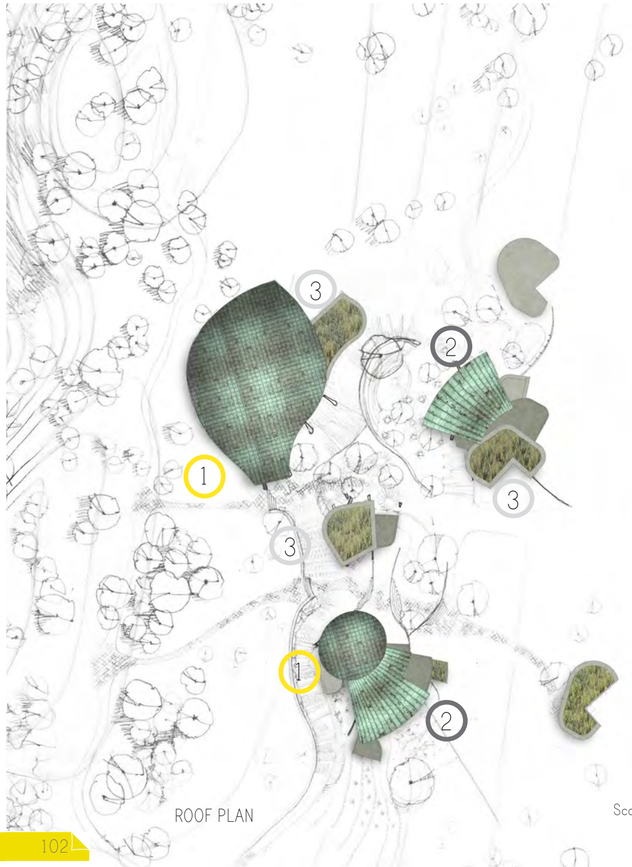
Fig. 217

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA



# chapter 6

fig. 5.1

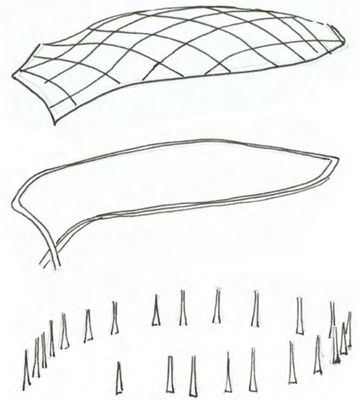



ROOF PLAN

Scale 1:750

Fig. 218 Roofplan

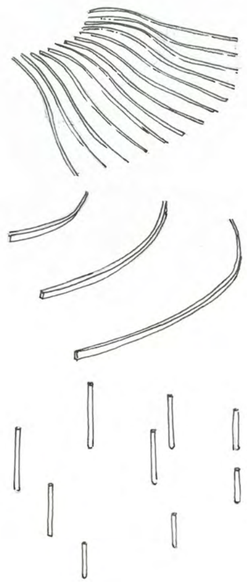
GRIDSHELL ROOF SYSTEM



1

Fig. 219 Gridshell

2

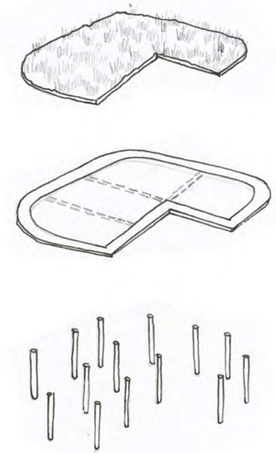


GLULAM BEAM SYSTEM

Fig. 220 Beam system



FLATROOF SYSTEM

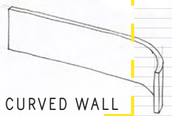


3

Fig. 221 Flat roof system

GEOMETRIC COLUMN

Fig. 222



CURVED WALL

Fig. 223

STRAIGHT WALL

Fig. 224

ORANIC COLUMN

Fig. 226

MASSIVE
CURVED WALL

Fig. 225

# 6.2 MATERIAL PALETTE

The precedent selected for the material choice, and specifically the combination of materials is, the NG Universiteitsoord church building by Jan van Wijk. The sculptural quality and rich texture and warmth achieved, displays qualities that are desirable in the Tswaing project. Therefore, the combination of materials were examined as a relevant precedent.

NG kerk Universiteitsoord, Jan van Wijk, 1965
Fig. 227

Fig. 228

Fig. 230

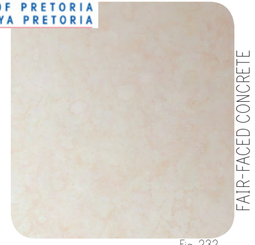


Fig. 232

FAIR-FACED CONCRETE

Fig. 233

EXPOSED AGGREGATE CONCRETE

Fig. 234

## 6.2.1 BRICK

Due to the fact that the natural stone on the site should be preserved and is thus out of bounds as a building material, brick was selected as an alternative. Although man-made, brick inherently tells the story of its creation, as mentioned by Colin St John-Wilson when discussing the work of Alvar Aalto( refer to chapter2). (1992:90) The colour and texture of the brick can also be selected to refer to the context and environment around it.

Brick is suitable to be built along a curve, as is required for the project, even by doing so stabilising freestanding walls.

Fig. 229

Fig. 231

## 6.2.2 TIMBER

Timber laths are laminated with finger and scarf joints, which enables one to cut out the weaker parts of the timber and thus maximise the strength and usability of the lath. This means that local timber may be used instead of importing exotic timber with superior strength qualities. The Saville building is supported by laminated timber lengths of 46m. (annular.org 2006)

## 6.2.3 CONCRETE

The organic nature of the built form required the selection of an exceedingly plastic and sculptural material. Rammed earth was considered, but the high slat quality of the earth on the site raised the concern of brittleness. The sculptural ability of the concrete can be increased by adding super plasticizers to the mix. These negate the necessity for vibration, thus the achievable form was less limited.

The variability of concrete was also deemed appropriate to the scheme. The texture can be manipulated by exposing the aggregate, brushing the concrete and by the type of shuttering used. Pigment can be added to change the colour of concrete.

Curves can be achieved with radius wall shuttering. Cost for the shuttering can be maximized by limiting the amount of different radii used in the design.

Adding fly-ash to the concrete offers a more sustainable solution to a product traditionally considered environmentally infriendly.

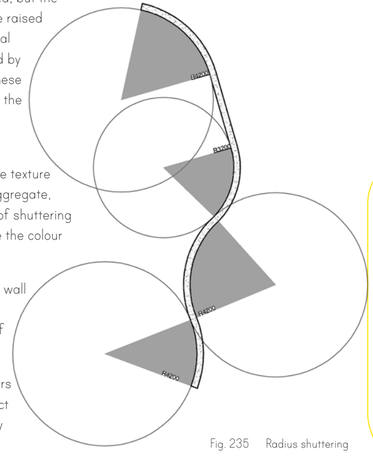


Fig. 235 Radius shuttering

## 6.2.4 COPPER

Copper is a natural material that changes its appearance over time. This indicates the connection to the natural environment that is at the core of the project.

The material is well suited to the organic form of the roofs as its pliability allows for different methods of fixing that is adaptable to the shape of the surface.

The visual impact of a copper roof is minimal in a natural landscape as it develops a green patina over time.

Although expensive, it is also a durable material that will last the lifetime of the building with virtually no maintenance needed.

Fig. 236 Concrete wall concept

# 6.3 GRIDSHELL ROOF

## 6.3.1 Background

Gridshell roofstructure is a timber lattice that is constructed on a flat plain and then lifted or lowered into the organic shape required. The structure has the ability to span great distances unsupported with the minimal use of material.

In order to generate a structurally sound form, a hanging chain model can be constructed. The hanging chain is an inverted representation of a catenary curve, a structural shape. The chain is in pure tension which translates into pure compression when upturned, dispelling tensile and bending forces. (Graefe 2009: 732 ) This method of form-finding was used in the past by Antonio Gaudi in buildings such as the the Sagrada Familia, where the organic roof structure was conceived by a complex chain model which was then measured, drawn and directly built. (Graefe 2009:730) Today, some digital aids exist to generate catenary structural forms, that simplify the transmission of the model to workable drawings. This simplifies the process, as a chain model is time consuming to build, difficult to adjust and often inaccurate when translated into reality. (Kilian 2004: 1) The modelling of geometry and physics of the gridshell also minimises the occurrence of breakages in the timber laths. This type of tool being unavailable to the author, the old method of a hanging chain model was built and measured to generate the organic form needed for the scheme.

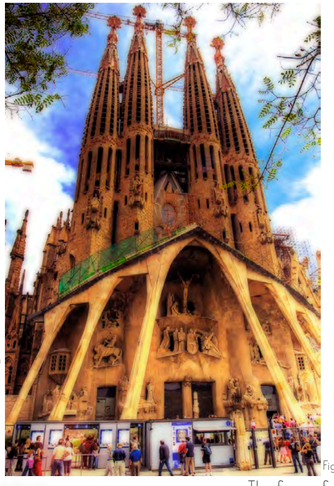


Fig. 237
The form of the Sagrada Familia by Gaudi in Barcelona, was generated by a hanging chain model

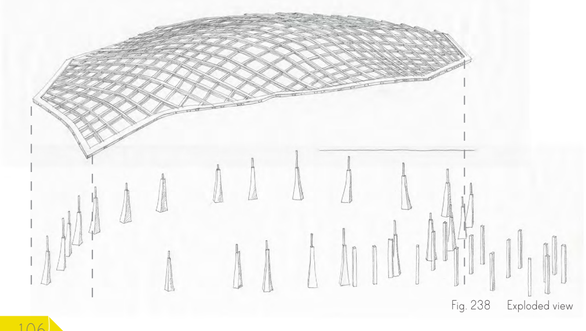
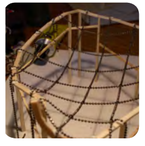


Fig. 238 Exploded view



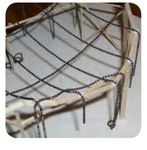


Fig. 239 Hanging chain model

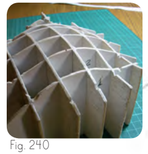
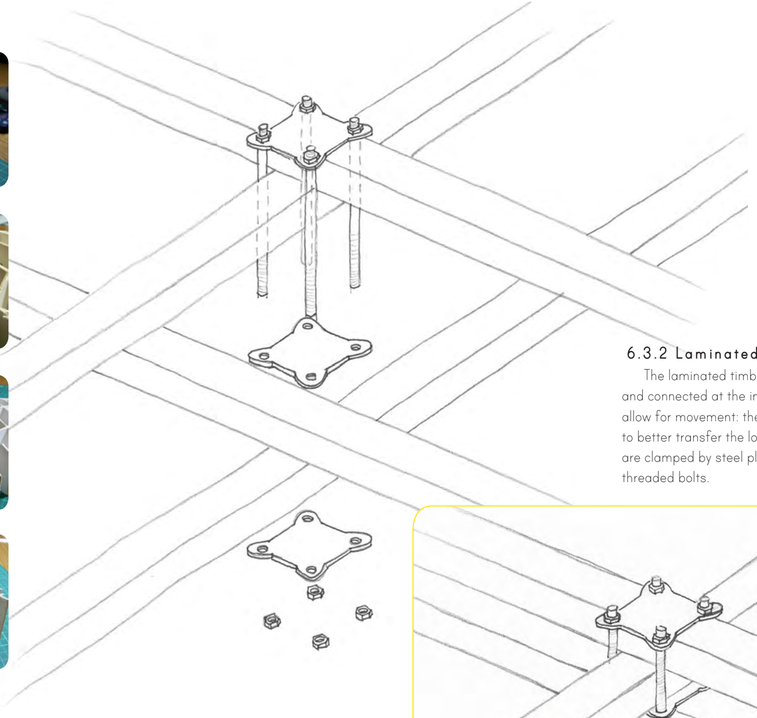


Fig. 240



## 6.3.2 Laminated timber

The laminated timber laths are layered into a double curvature and connected at the intersections with pinned joints. The connections allow for movement: the grid has the ability to skew into parallelograms to better transfer the load to the edges of the structure. The nodes are clamped by steel plates in between the laths and connected by threaded bolts.

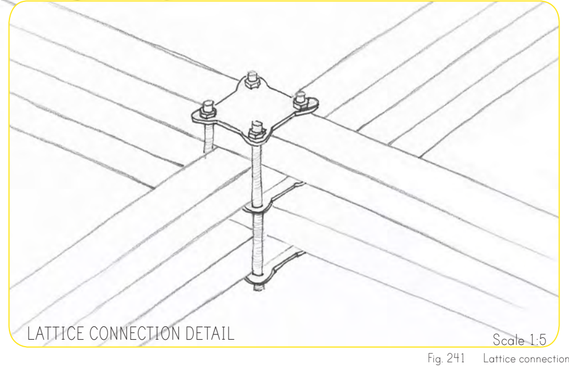
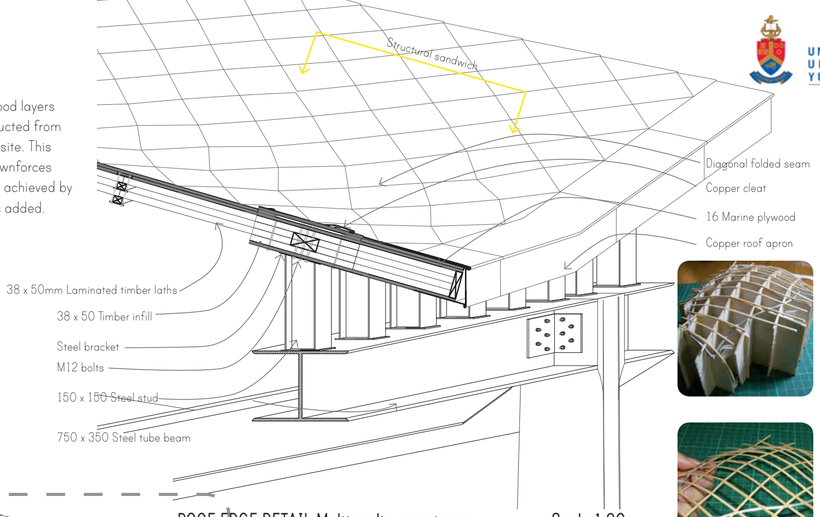



Fig. 241 Lattice connection

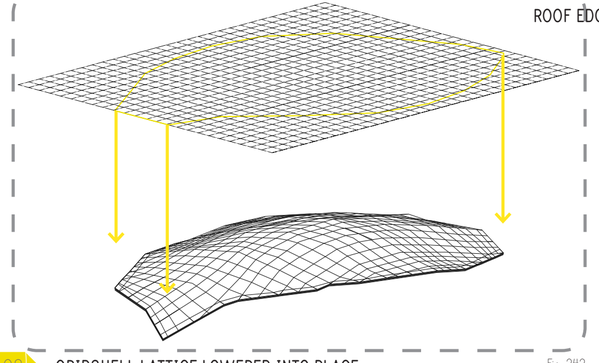
### 6.3.3 Construction

Along the edges the laths are sandwiched between plywood layers and connected to a steel beam. The sizeable beam is constructed from hollow steel sections, factory constructed and connected on-site. This construction absorbs any lateral forces ensuring that only downforces are exercised upon the supporting columns. Further rigidity is achieved by cladding the lattice with plywood before the cover material is added.

The construction process entails the construction of the lattice system on a flat surface, after which the form is achieved by lowering or raising the frame. In the case of the Weald Downland Museum, an adjustable scaffolding system was employed to lower the grid frame into position. The construction of the Mannheim Multihalle however, entailed the grid to be raised with scaffolding towers, hydraulic jacks and forklift trucks. (Orton 1988:440) In this case, the structural supports and non-loadbearing walls will be constructed before the roof, the adjustable scaffolding constructed over the structure and the lattice lowered into place.




ROOF EDGE DETAIL Multimedia experience Scale 1:20
Fig. 243



GRIDSHELL LATTICE LOWERED INTO PLACE
Fig. 242





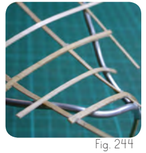


Fig. 244

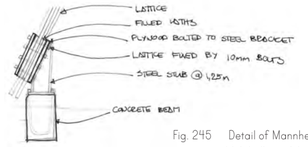



Fig. 245 Detail of Mannheim Multihalle gridshell

Fig. 246 Mannheim Multihalle, Frei Otto, 1975

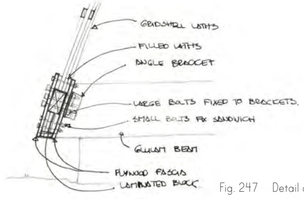



Fig. 247 Detail of Weald and Downlands gridshell

Fig. 248 The Weald and Downlands Museum, 2002

### 6.3.4 Precedents

#### The Mannheim Multihalle, Frei Otto, 1975

The first gridshell structure was designed as a temporary exhibition space for a flower festival in Dorset in South-West England by the German architect-engineer, Frei Otto. It consists of a lightweight structure that spans 60m and is covered by a pvc-coated polyester fabric. Being the first of its kind and built in pre-computer times, the breakages and physical prediction of the form were problems that could be improved on with contemporary computer technology. (Orton 1988:440)

#### The Weald Downlands Museum, 2002 and The Savill Building, 2006

The architects of this project, the Edward Cullinan Group, are known for a low environmental impact approach to architecture which is clearly visible in the scheme. The use of local material was later simulated in the Saville building where local timber from the park grounds where the building is located was used for the gridshell roof structure. The Saville Building, designed by the Glen Howells, compares to the Mannheim Multihalle at 90 x 25m and is supported by a steel tube rim. (annular.org 2006) The flatness of the gridshell roof blends into the surrounding landscape, as well as shading the interior and preventing the necessity of artificial cooling.( annular.org 2006)

Fig. 249 The Savill Building, Geln Howells Archtects, 2006


Fig. 250


Fig. 251

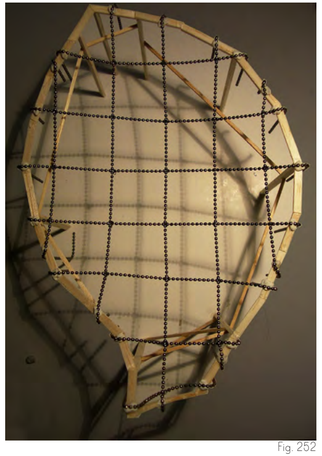


Fig. 252


Fig. 255

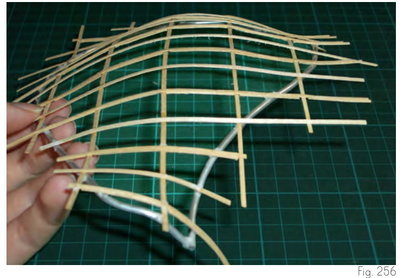


Fig. 256


Fig. 257

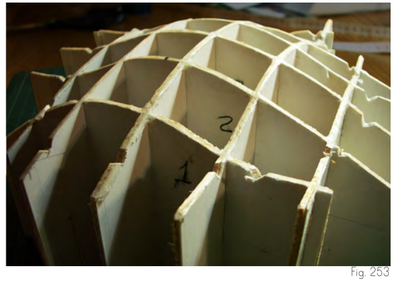


Fig. 253


Fig. 254


Fig. 258

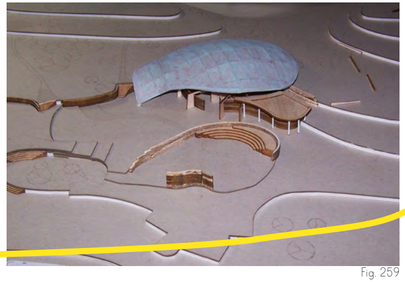


Fig. 259

6.3.5 Development of the gridshell roof

# 6.4 COPPER CLADDING

The visual impact of the project on the environment was a concern from the start, thus not only the form, but also the material had to be selected with care. Envisioning an organic form that echoes the surrounding topography, the gridshell structural system was investigated and selected for the central buildings where a focal point is desirable. Elsewhere unobtrusive flat roofs are used that are planted wherever possible.

Copper sheet metal

The most appropriate cover pattern for the copper sheet metal is a diagonal flat seam system. Diamond shaped copper panels are folded along the edges to form flat seams. The diamond shape easily accommodates the irregular curved shape of the roof. Where there is a low roof pitch, the seams are soldered, while the seams of a greater pitch should be treated with sealant. (copper.org)

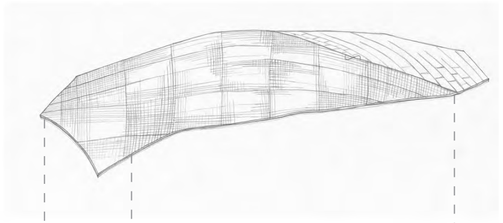


Fig. 262 Exploded view

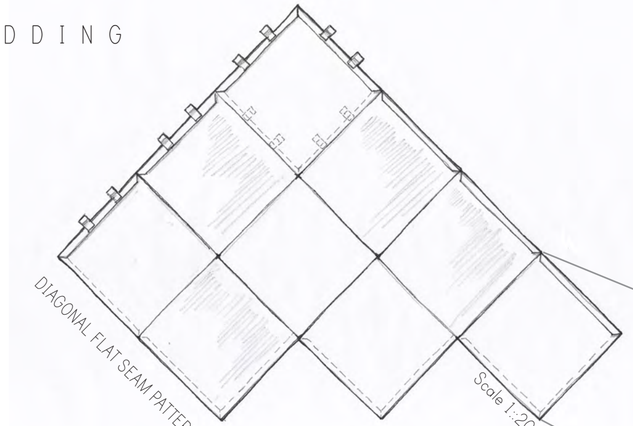



Fig. 260

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

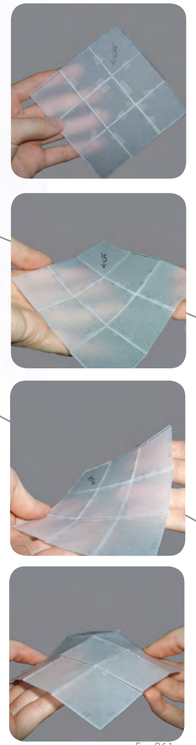
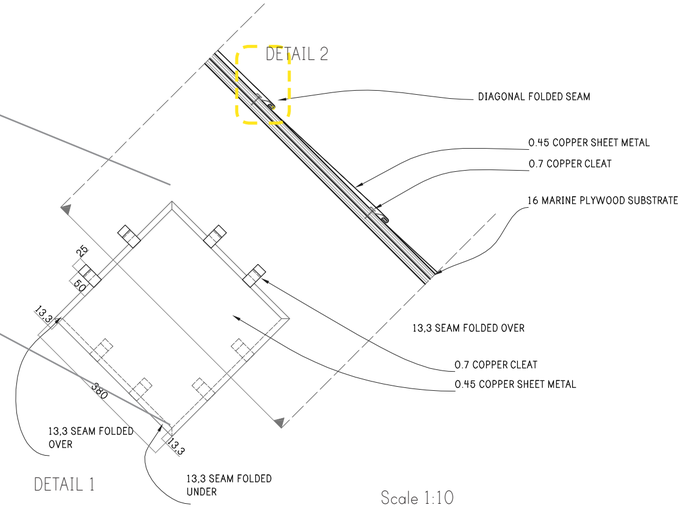
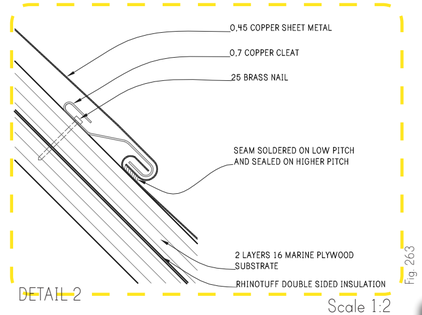


Fig. 261




Scale 1:10

Fig. 264




Scale 1:2

Fig. 263

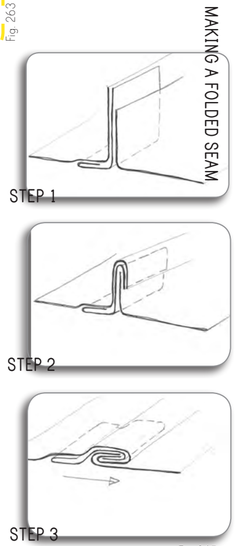



Fig. 265

# 6.5 GREEN ROOF

Where flat roofs are used, there are various benefits to establishing vegetation.

The visual impact of a green roof when viewed from a higher vantage point, is far less than that of a concrete flat roof. A vegetated roof also makes optimal use of the surface area, as it is possible to cultivate vegetables and herbs on a flat roof.

Further, the thermal advantages of a green roof are possibly the most important. The thermal mass of the earth greatly improves the insulation value of a green roof.

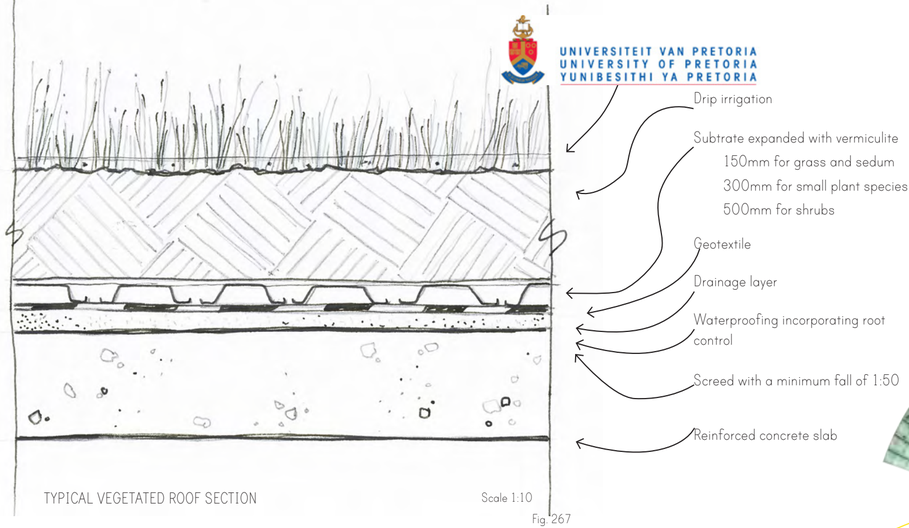
Different types of systems have different requirements such as the depth of the substrate, the types of vegetation that can be planted and the maintenance required. All of these variables determine the structural requirements and cost of establishing and maintaining the green roof.

An extensive green roof type houses vegetation types that only need a shallow substrate, such as grasses. The depth of the substrate would generally be 150mm. The depth of the substrate increases when larger plants such as shrubs and trees are desired. An intensive green roof has a greatly escalated price due to the deep substrate and subsequent structural requirements, as well as higher maintenance and irrigation costs.

Fig. 266

The vegetation of an extensive green roof can range from simple turf and sedum to a biodiverse roof that entails the relocation of growth medium from the relevant site to the roof garden. This is done in order to establish vegetation indigenous to the site as well as supporting naturally occurring ecosystems. This type of roof is appropriate where water is scarce, as indigenous plants are suited to the climate of the site. A biodiverse green roof is most successful when substrate depth is varied, which has implications when designing the supporting structure.

A simple system of drip irrigation can be installed, that consists of pipes laid on the substrate.




TYPICAL VEGETATED ROOF SECTION Scale 1:10

Fig. 267

Fig. 268 Roof edge NG Universiteitsoord

Fig. 269

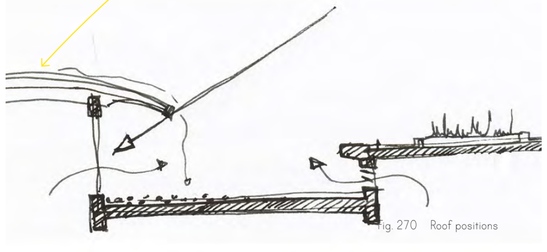


Fig. 270 Roof positions

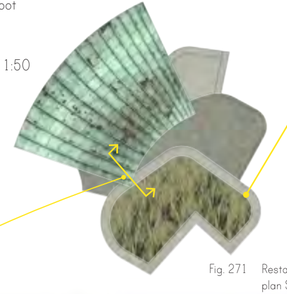
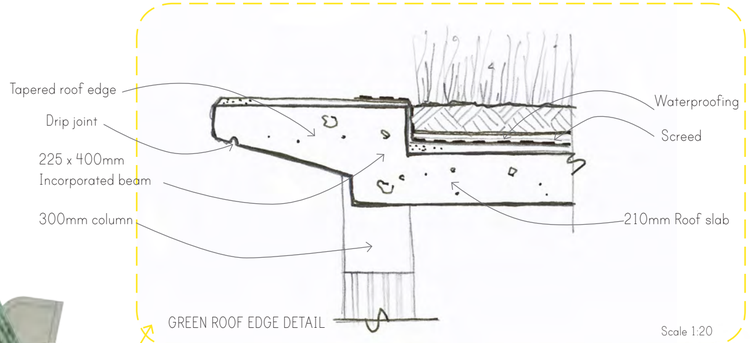


Fig. 271 Restaurant roof plan Scale 1:500




GREEN ROOF EDGE DETAIL Scale 1:20

Fig. 272

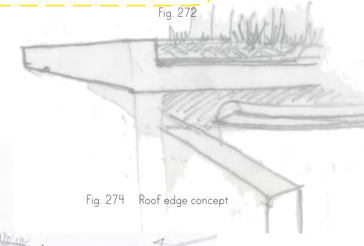


Fig. 274 Roof edge concept

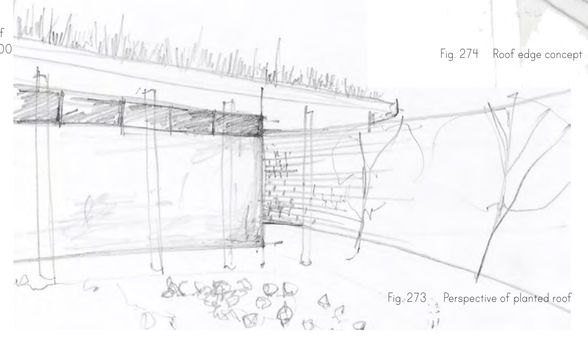


Fig. 273 Perspective of planted roof

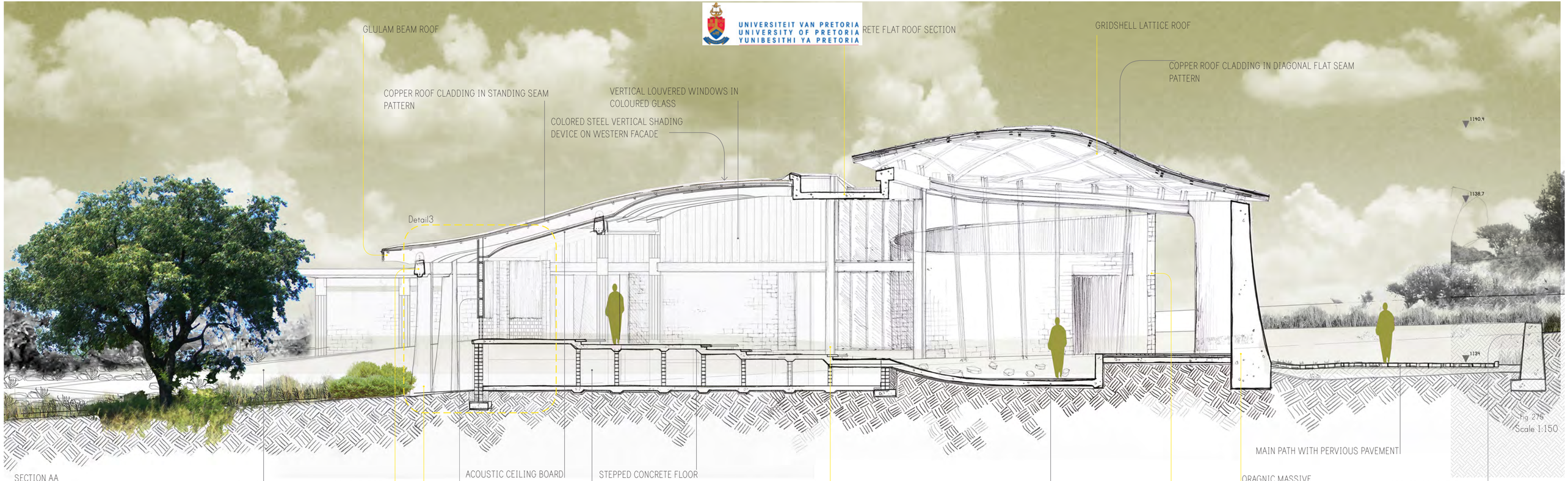



Fig. 275
Scale 1:150

# 6.7 THERMAL COMFORT

## 6.7.1 Passive cooling

As Tswaing becomes very hot during the summer, an important design consideration is thermal comfort. The need for air conditioning should be kept at a minimum designing in such a way that passive cooling is possible. The most important characteristic of passive cooling is constant air movement. This combats the build-up of heat in a space, while encouraging the cooler air to enter. Most strategies for passive cooling rely on the principle that when hot air rises and is removed, it is replaced by heavier cool air.

This can be seen in the commonly used cooling strategy called stack ventilation. This strategy depends upon high openings that expel rising hot air, creating an air void that is subsequently filled with cool air.

There are other methods that are based on the same principle, such as a trombe wall. The cavity is created with a dark wall on one side and a layer of glazing on the other. Strategic openings in the cavity regulate the flow of hot air, either into or out of the adjacent space thus alternatively heating or cooling the space.

Where the main objective is cooling, a similar but simpler solution is a solar chimney. This structure effectively vents air through the interior space. In this way, heated facades become an asset to the building instead of a problem.

Air flow can also be influenced by the surfaces surrounding the building. Hard surfaces that are heated and reflect heat also causes air to rise, while planted surfaces result in a cool micro-climate. Thus, when these surfaces are strategically applied around the building, air flow through the building can also be encouraged. This process can be enhanced by the size of openings. Smaller openings should be provided where hot air rises, as this becomes a natural vent, sucking air from the interior spaces. Larger openings should be provided near cool areas to ensure the provision of cool air to replace the warm.

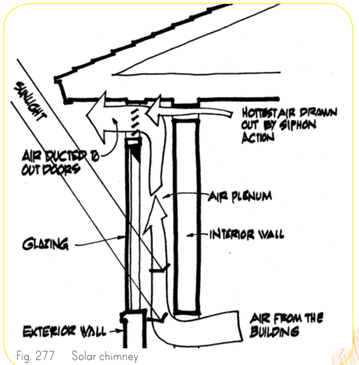
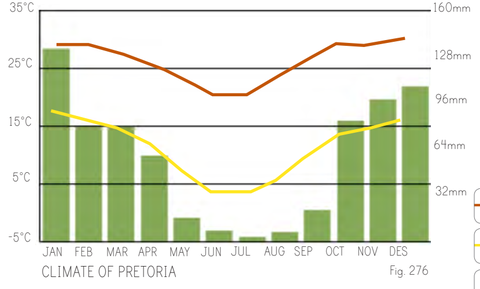


Fig. 277 Solar chimney



CLIMATE OF PRETORIA Fig. 276

Fig. 278 Concept sketch for the manipulation of the micro-climate

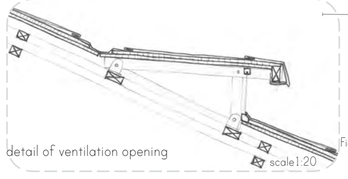


Fig. 279

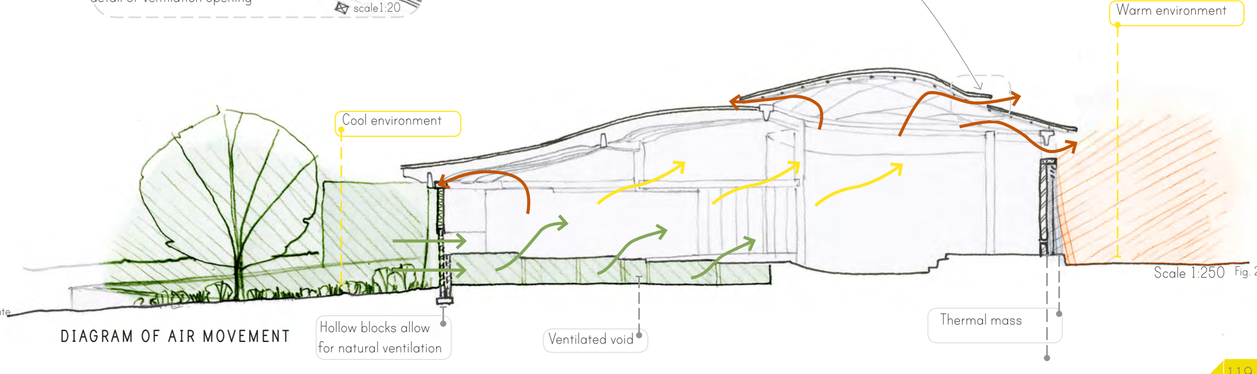


DIAGRAM OF AIR MOVEMENT Fig. 280

## 6.7.2 Trombé wall

12:00 21 DECEMBER

Solar altitude: 87°

Solar azimuth: 44°

12:00 21 JUNE

Solar altitude: 41°

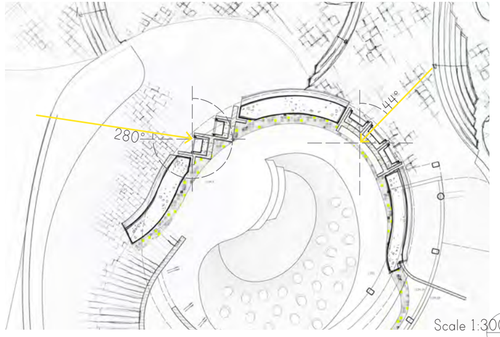
Solar azimuth: 19°

15:00 21 DECEMBER

Solar altitude: 50°

Solar azimuth: 280°

The massive concrete wall on the Northern and North-Western facade is articulated with sections of brick wall that act as Trombe walls, or thermo-syphons. The design allows the sections to be orientated towards the sunlight for maximum efficiency.




Scale 1:300

Fig. 281

Trombé wall acting as thermal syphon

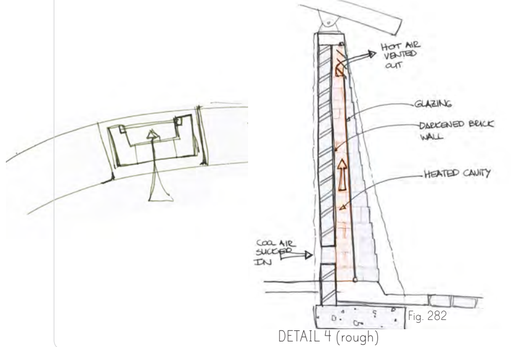



Fig. 282

DETAIL 4 (rough)

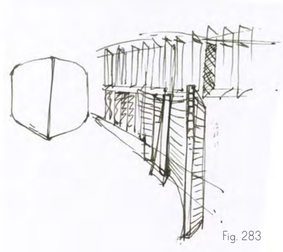


Fig. 283

Fig. 284

SOUTH-WEST FACADE OF STORYTELLING BUILDING

Scale 1:100

## 6.7.3 External shading devices

Sizing calculations of the external shading devices establish the overhang, depth and spacing of the fins for effective shading according to the position of the sun.

Northern facade

Depth of overhang for 2000mm window shading

$$h = \frac{D \times \tan(\text{solar altitude})}{\cos(\text{solar azimuth} - \text{window azimuth})}$$

$$2000 = \frac{D \times \tan(87°)}{\cos(33°)}$$

$$2000 = \frac{D \times 19.08}{0.84}$$

$$D = 88{,}05\text{mm}$$

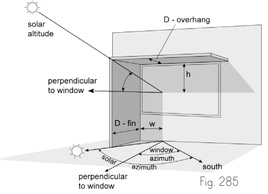



Fig. 285

South-Western facade

Spacing of fins assuming depth of 550mm

$$w = D \times \tan(\text{solar azimuth} - \text{window azimuth})$$

$$w = 550 \times \tan(280° - 258°)$$

$$= 550 \tan 22°$$

$$= 222\text{mm}$$

Overhang

$$h = \frac{D \times \tan(\text{solar altitude})}{\cos(\text{solar azimuth} - \text{window azimuth})}$$

$$h = \frac{550 \times \tan 50°}{\cos(22°)}$$

$$h = \frac{655.46}{0.93}$$

$$h = 704{,}8\text{mm}$$

D= 550mm
w= 225mm
h= 710mm

### 6.7.3 Earth-Coupled Cooling

In addition to passive climate control, air conditioning systems may be necessary, especially during the warmest times of the day. As HVAC systems are not very energy efficient, natural cooling such as an earth-coupled air cooling system can be considered.

The system relies on the fact that the temperature of the earth is much more constant than the fluctuating air temperature.

Different systems of earth-coupling exist, the main categories being those that operate using water and those that operate using air. Ground-coupling water systems can be installed in a horizontal loop configuration and vertical loop configuration. However, these methods require the disturbance of large areas of the landscape and additional equipment such as a water furnace that greatly escalates the cost of the system. As this is not desirable within the context of this project, a ground-coupled air system will be proposed.

The system consists of length of pipe laid underground with a n intake a distance from the building. The air is pumped to the building with a normal air-handling unit . The air is cooled by the lowered temperature under the ground and then distributed to the building. A depth of 2- 5m is recommended for a stable temperature. Piping laid underground is connected to an air intake a distance from the building at one end and connected to the air handling system intake at the other end. This can be used to pre-heat or pre-cool the building and significantly reduce the mechanical cooling requirements. The simple system can achieve a cooling effect of up to 45 W/m$^2$ at an outside air temperature of 32°C, a reduction of 11°C at an average temperature of 28°C (Pennycook 2008:36) The system can effectively pre-cool the building, requires very little maintenance and no equipment in addition to the traditional air conditioning system .(Pennycook 2008:36)

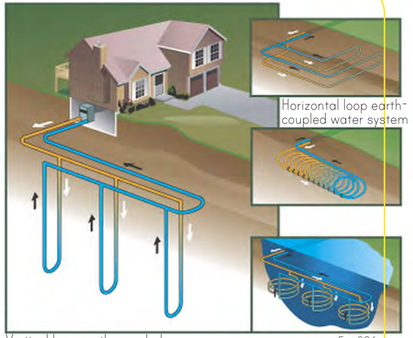



Fig. 286

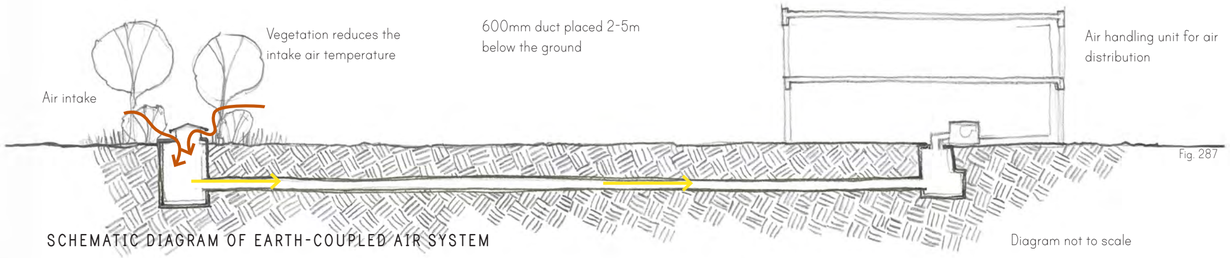



Fig. 287

SCHEMATIC DIAMGRAM OF EARTH-COUPLED AIR SYSTEM

Diagram not to scale

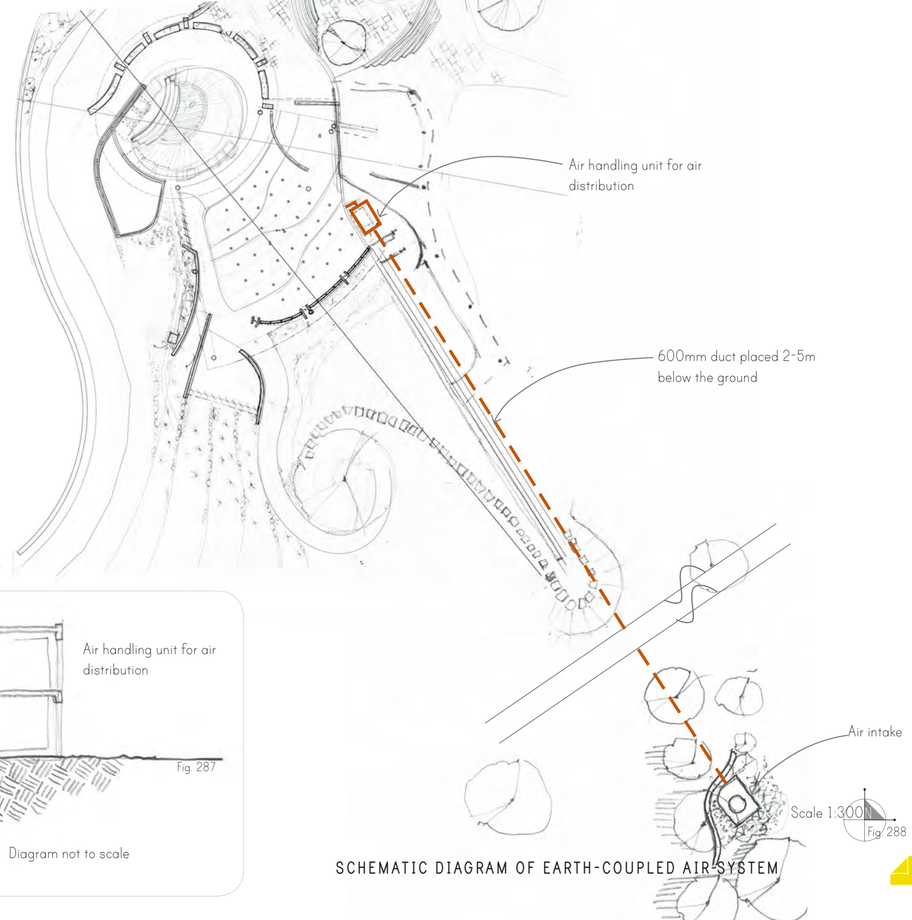
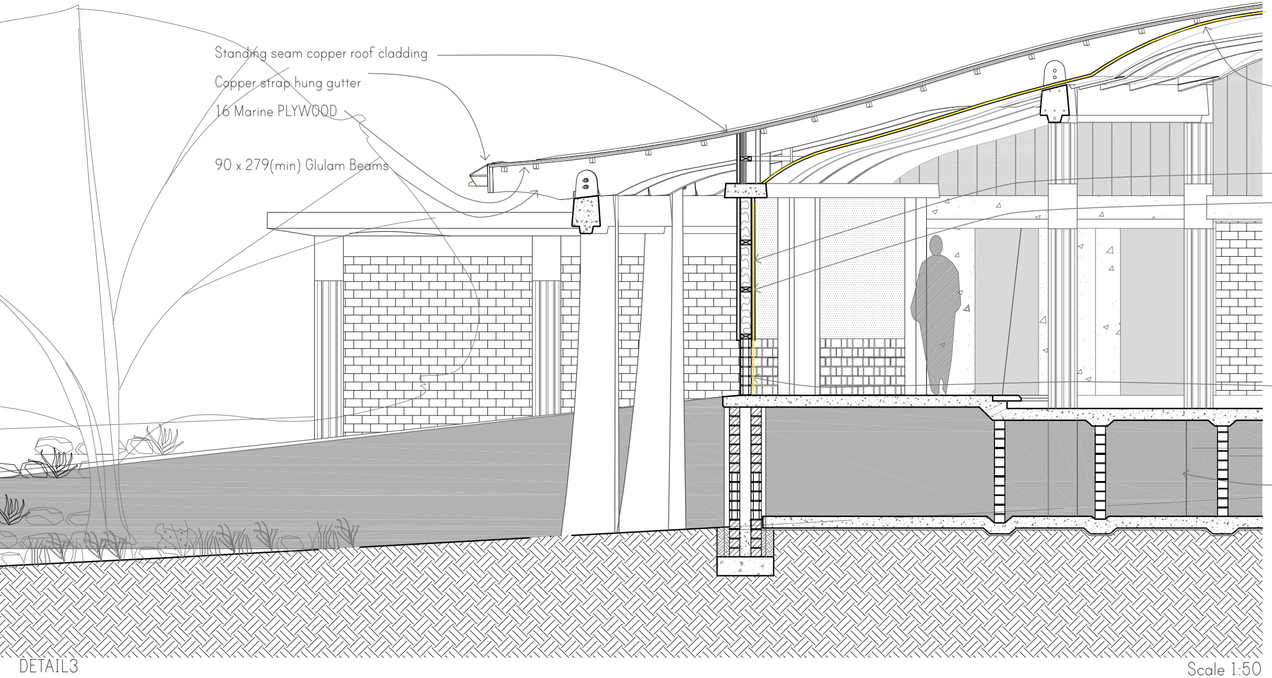



Fig. 288

SCHEMATIC DIAGRAM OF EARTH-COUPLED AIR SYSTEM




DETAIL3

Scale 1:50

Fig. 289

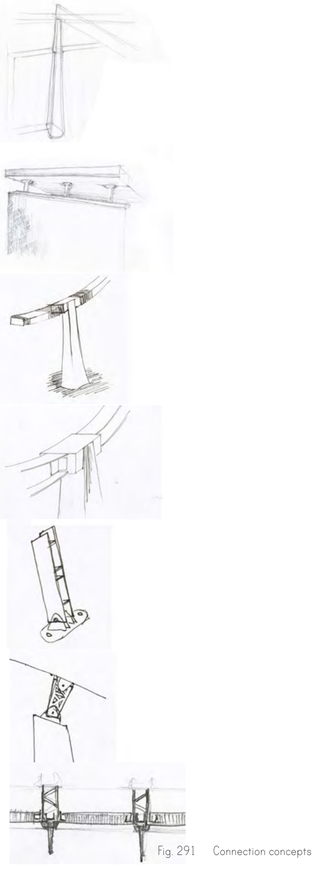


Fig. 291 Connection concepts

# 6.8 ACOUSTIC PERFORMANCE

The programme of storytelling hall involves a small theatre, a children's nook, and workshop space in the semi-basement area. The theatre space contains fixed seating, casual seating and a depression in the floor with low seating. The programme will mostly entail dramatic performance, although small-scale musical performance may be possible. Thus the acoustic performance of the building is an important design guideline.

The main considerations are:

The reduction of background noise

"When a theatre is truly quiet, an actor can use his entire dynamic rage, from a shout to a whisper, and still. be clearly understood." (Brooks:p.2) The art of storytelling has been explained to be a dynamic and interactive experience (chapter 5), and thus the importance of a quiet environment is reinforced by the specific programme of the building.

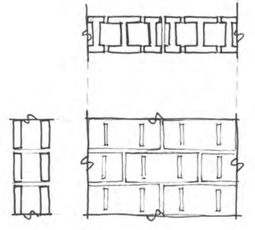


Fig. 290 Plan and section of hollow blocks

Historically, the main concern of the acoustic engineer and architect had been reverberation time.(Edwards 1984:133) Reverberation time is determined by the cubic volume of the room and the absorbing power of the room surfaces and contents. (Edwards 1984:133) However, little was known about the effect of the building form and the reason for alterations in the acoustic success of different building forms.

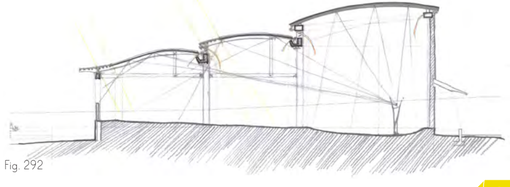


Fig. 292

# 6.9 STORMWATER TREATMENT

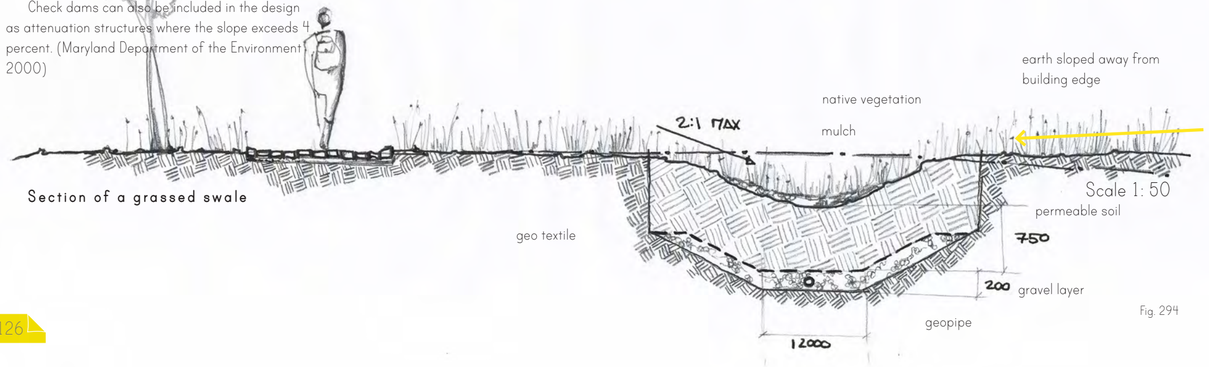
In a climate such as Tswaing where parts of the year are dry and precipitation consists mostly of thunderstorms, attention should be given to the ability of the landscape to retain water. During a thunderstorm, surface water does not infiltrate fast enough and a lot of runoff goes to waste. This also causes erosion, a real threat to the landscape at Tswaing. Therefore, measures should be taken to increase the infiltration rate and slow the flow of water down.

## 6.9.1 Grassed swales

A grassed swale is a landscape intervention that directs and slows stormwater runoff, as well as maximizing infiltration. (Maryland Department of the Environment 2000)

The vegetated parabolic channel system is constructed by replacing native soil with highly permeable soil and installing an underdrain system embedded in gravel. ( Metropolitan council 2002) Further, the channel is planted with resilient vegetation that slows the flow of stormwater, increasing attenuation. Vegetation should be selected for its deep root system, high stem density and resistance to flooding. (Duluth streams 2009)

Check dams can also be included in the design as attenuation structures where the slope exceeds 4 percent. (Maryland Department of the Environment 2000)




Section of a grassed swale

Fig. 294

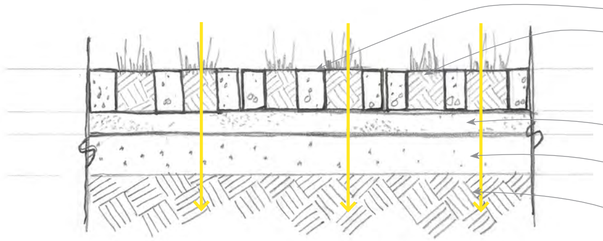


Fig. 293

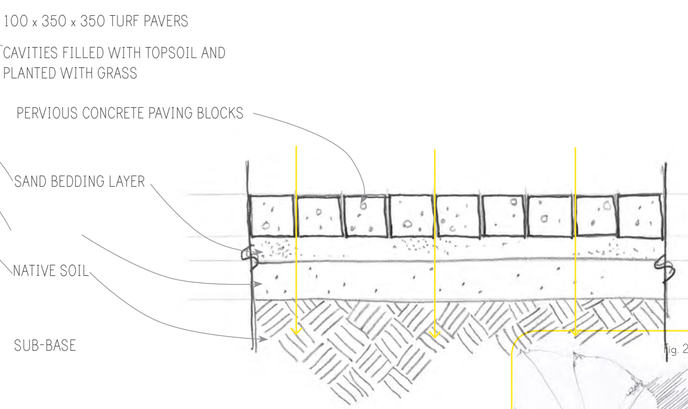



Fig. 295

## 6.9.2 Pervious Pavement

As the site plays host to many paths and potentially hard outside surfaces, methods of maximising stormwater infiltration are employed. Hard surfaces increase stormwater runoff that can cause erosion and carries harmful pollutants into the water sources on the site. Retaining stormwater in the site allows improves conditions for landscape intervention as well as food gardens in service of the project. Existing paths are at risk of being damaged by erosion, especially since greater foot traffic is to be expected from visitors to the site. Treating the paths with pervious pavement not only stabilizes the earth, but does not cause the runoff problems that other hard surfaces do.

Different types of pervious pavement are used. The textured appearance and the use of gravel and grass in certain pavers may indicate transitional zones from the paths to the buildings and also echoes the landscape in the built environment. These can effectively be combined with normal (pervious) paving and planted areas.

Fig. 296 Perspective of path along wall

Fig. 297

Fig. 298

## 6.9.3 Rainwater Retention

### Precedent
### Portland Water Pollution Control Laboratory

The sections are typical details of the stormwater solutions employed at the BES Water Pollution Control Laboratory in Portland.

In certain instances, where the design allows rainwater to cascade freely off a roof, or where water flows from scuppers at a height, the water may cause erosion around the buildings. To avoid a situation where hard surfaces are used to prevent this, large stones may dissipate the energy of the falling water and the spread the water into the surrounding landscape. (Liptan et al 2002:27) A gentle slope away from the building can serve as a vegetative filter(Liptan et al 2002: 16) Check dams serve as water spreaders that reduce the speed of flowing water. These are constructed from non-toxic material such as stone, brick or old concrete and a minimum length of 3000mm. The slope should not exceed 10%.(Liptan et al 2002: 25)

Planters with a pervious bottom are also beneficial to water infiltration. The reservoir of storage required can be calculated as follows: impervious area in square meter x. 0.45 =reservoir in cubic meter. The minimum infiltration rate is 50mm/h. (Liptan et al 2002: 16)

The above interventions will aid the designer in creating cool planted area around certain parts of the buildings. Microclimate can be manipulated to induce air flow from cool environments to warm.

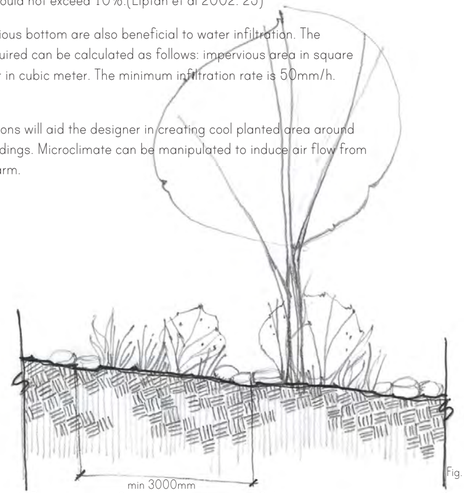
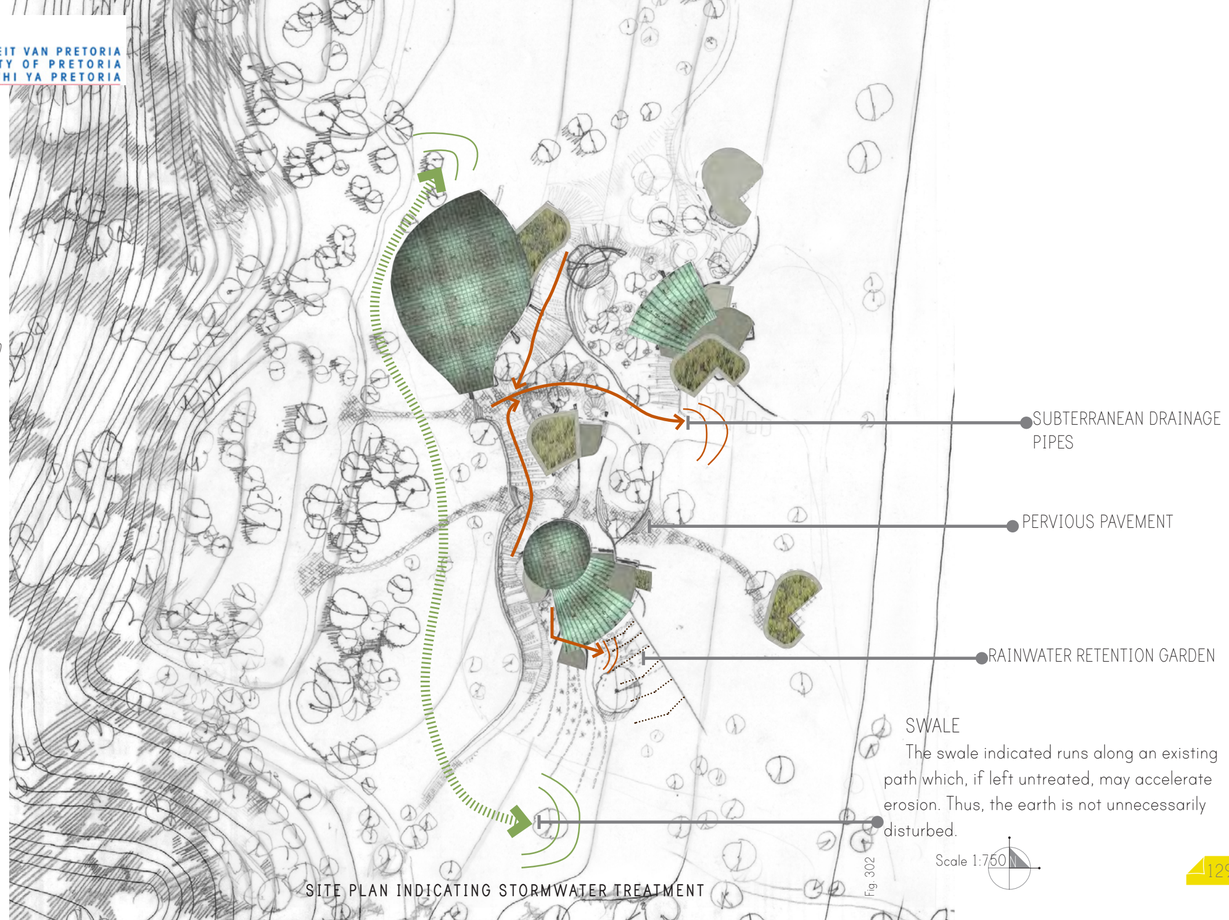


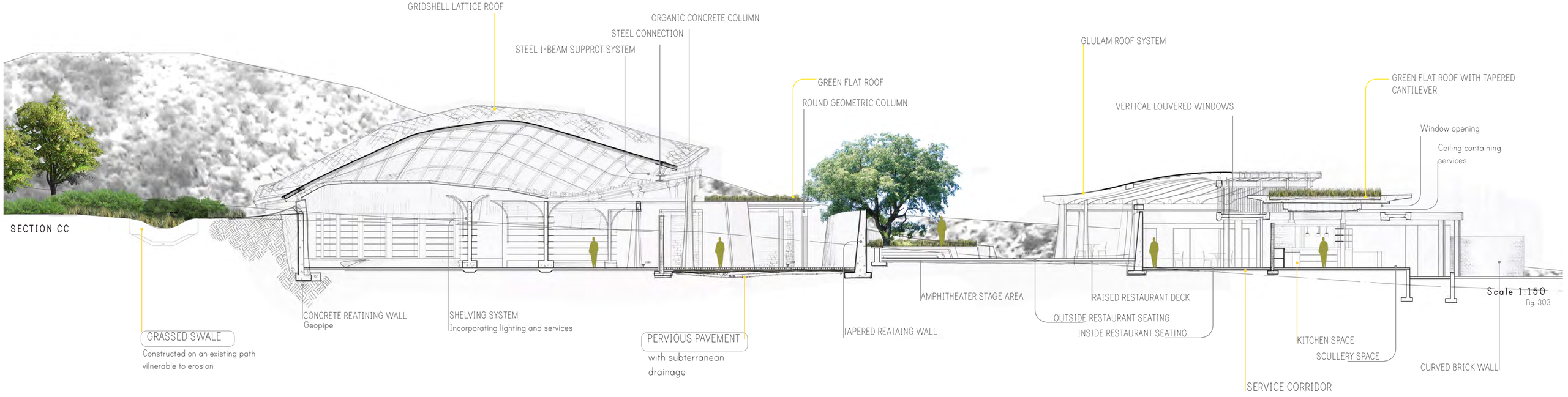

Fig. 299
Section of a vegetation filter *(not to scale)*

Section of an pervious bottom planter *(not to scale)*
Fig. 300

Fig. 301 Portland Water Pollution Control Laboratory




SITE PLAN INDICATING STORMWATER TREATMENT
Fig. 302


GRIDSHELL LATTICE ROOF
ORGANIC CONCRETE COLUMN
STEEL CONNECTION
STEEL I-BEAM SUPPROT SYSTEM
GREEN FLAT ROOF
ROUND GEOMETRIC COLUMN
GLULAM ROOF SYSTEM
VERTICAL LOUVERED WINDOWS
GREEN FLAT ROOF WITH TAPERED CANTILEVER
Window opening
Ceiling containing services
SECTION CC
GRASSED SWALE
Constructed on an existing path vilnerable to erosion
CONCRETE REATINING WALL
Geopipe
SHELVING SYSTEM
Incorporating lighting and services
PERVIOUS PAVEMENT
with subterranean drainage
TAPERED REATAING WALL
AMPHITHEATER STAGE AREA
OUTSIDE RESTAURANT SEATING
INSIDE RESTAURANT SEATING
RAISED RESTAURANT DECK
KITCHEN SPACE
SCULLERY SPACE
SERVICE CORRIDOR
CURVED BRICK WALL
Scale 1:150
Fig. 303

# 6.10 SELF-COMPOSTING TOILETS

Connecting the remote site of the project to a sewer line would be costly and harmful to the sensitive environment. Conventional toilet systems also require large amounts of water that is effectively wasted and contaminated. For these reasons a self-composting toilet system is suggested.

Self-composting toilets are self-contained aerobic break-down system that does not require water. Aerobic bacteria are organisms that thrive in aerobic conditions and break down excrement into a humus. The humus reduces the original volume of waste to 10 to 30 percent and can then be buried according to regulation.(United States Environmental Protection Agency 1999: 1)

Managing the self-composting system is of the utmost importance, but simple. No specialist labour is required to maintain the system. Maintenance entails, the regular addition of bulking agents such as ash or sawdust and the removal of the end-product.(United States Environmental Protection Agency 1999: 6)

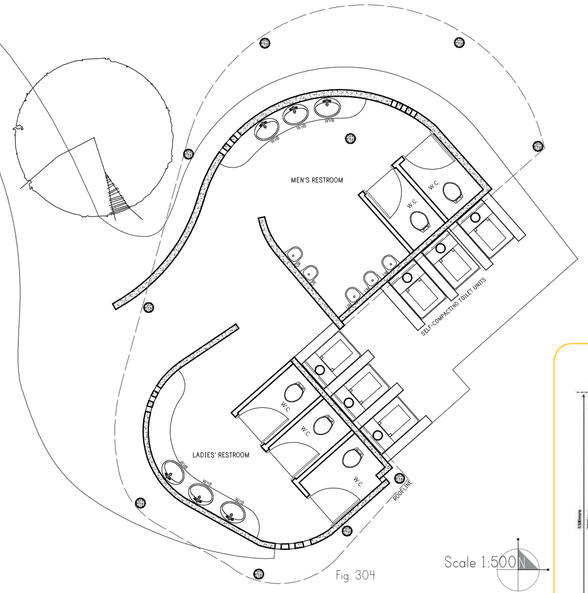
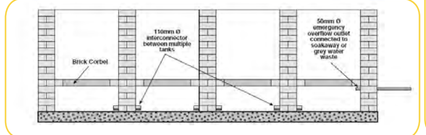



Fig. 304

Scale 1:500



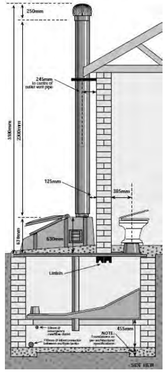




Fig. 305



# 6.11 GREYWATER SYSTEM

Having addressed black sewage disposal, one should consider the recycling of grey water. Bathroom and kitchen sinks, dishwashing machines and water points, all present on the site use enormous amounts of clean water. Grey water is defined as washwater. (greywater.com) Although grey water will become similar to blackwater if left untreated for a few days, it is a great source of minerals when used for irrigation quickly.

A grey water recycling system redirects grey water from different points to a central recycling unit, where it is filtered. The product can then be used for irrigation outside, greatly cutting fresh water consumption. On a site where there are proposed landscape interventions and food gardens this becomes an economic and environmentally friendly solution.

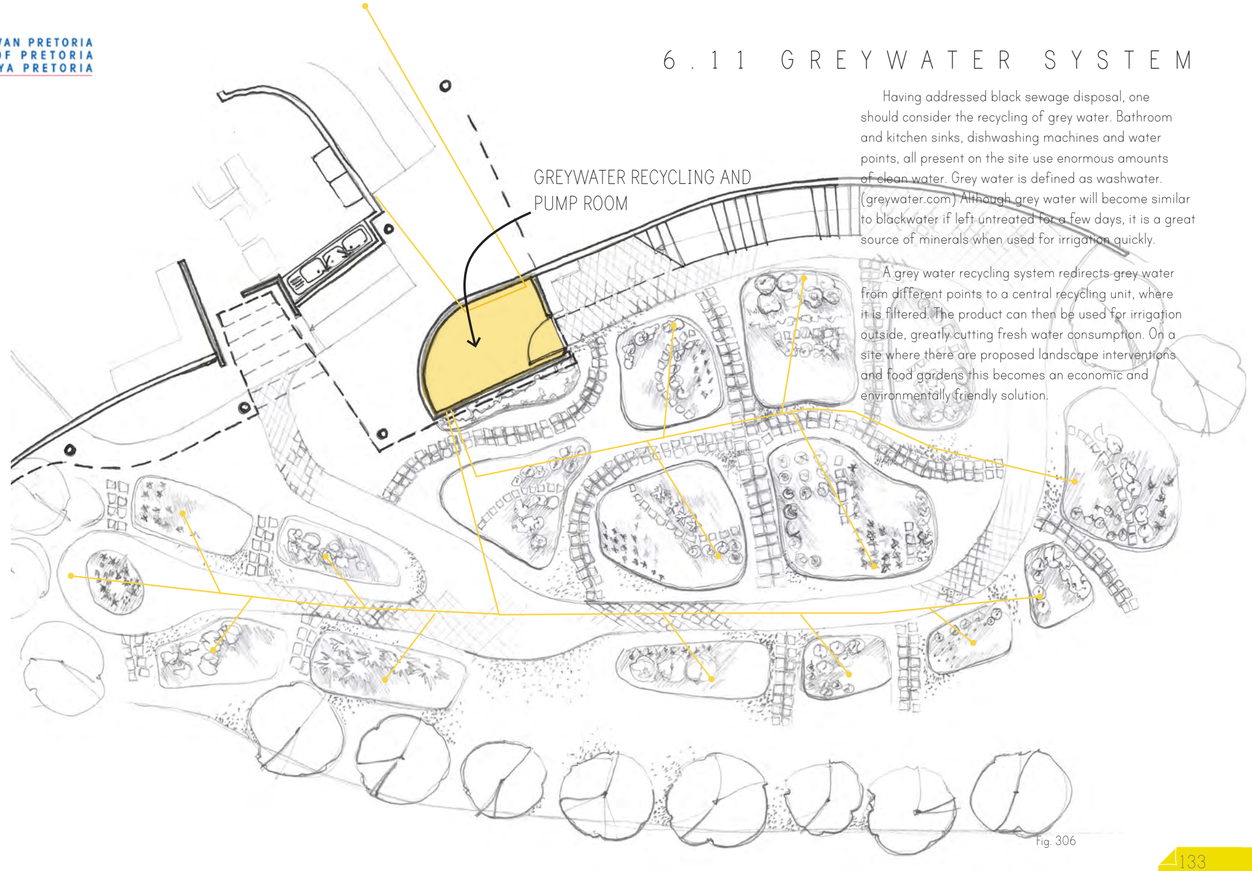



Fig. 306

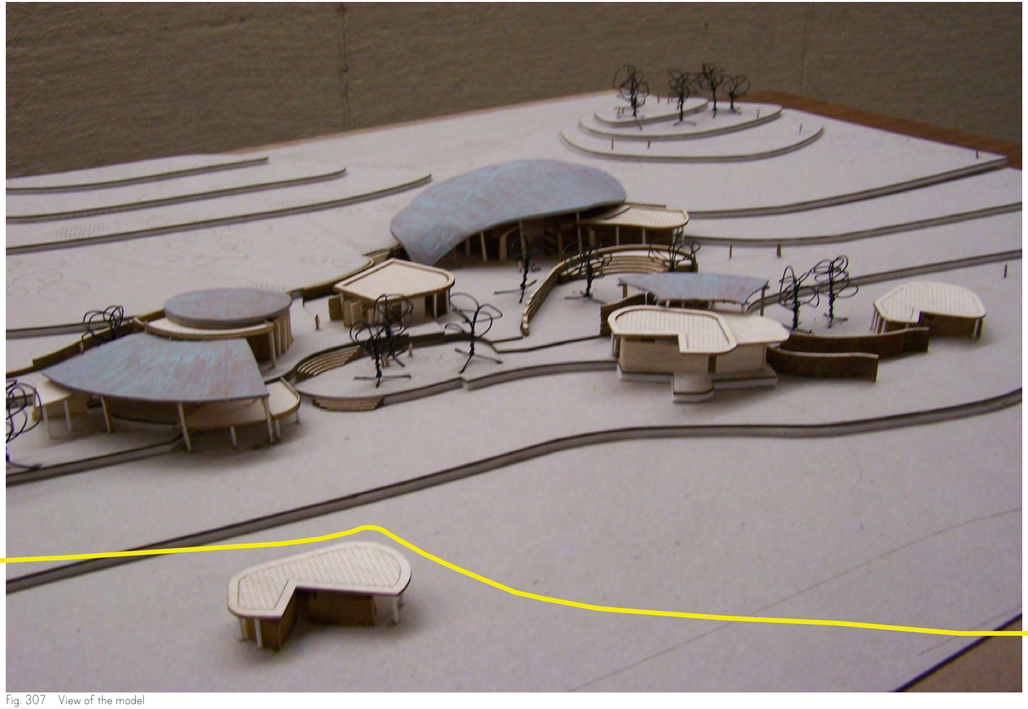


Fig. 307 View of the model

# CONCLUSION

The Tswaing Crater is an extraordinary place, not only in terms of beautiful scenery, but it is also rich in history and inherent meaning. The proposed project is an attempt to add layers of meaning to the experience of one visiting the site. It is seen as an opportunity to focus the attention of the visitor on certain characteristics of life that is often overlooked in contemporary day-to-day life. The existing landscape at the Tswaing Crater, as well as the knowledge of its origin, inherently reminds one of the earth that we inhabit, as well as the universe within which this earth resides.

The programme of storytelling is employed as a universal medium for understanding history and culture. In this way, a cultural layer is added to the experience of the site. The understanding of the programme is not limited to a single cultural group and indeed, has the potential to extend the experience to different communities and foreign cultures through the use of technology.

The project aims to lead the visitor along a path where different encounters; of the landscape, the architecture and the programme; creates a rich experience of a variety of elements and characteristics. The eventual revelation of the view of the crater, subsequently becomes more than a purely visual experience. The story of Tswaing has been revealed.

References:


Alexander, C. 1977. *A Pattern Language.* New York: Oxford University Press.

Alvar Aalto Foundation. The Muuratsalo Experimental House. [Online] Available at: alvaraalto.fi/info/experimentalhouse.htm [2009, October 22]

Anderson, B. 1996. *Passive Solar Energy -The Homeowner's Guide to Natural Heating and Cooling.* [Online] Available at: http://www.builditsolar.com/Projects/SolarHomes/PasSolEnergyBk/PSEbook.htm. [2010, April 16]

Brown, D. 1998. *Voicing the Text: South African oral poetry and performance.* Cape Town: Oxford University Press

Cope, M. 2005. *Ghaap, Sonnets fron the Northern Cape.* South Africa: Kwela Books/ Snailpress

Cosmic Africa(2003), motion picture, Cosmos Studios, outh Africa. Director: Craig Foster and Damon Foster. Starring Thebe Medupe

Bob. 2005. *Grounded theory: a thumbnail sketch.* [Online] Available at http://www.scu.edu.au/schools/gcm/ar/arp/grounded.html

Eisenman, T. 2006. Raising the bar on green roof design. *Landscape Architecture.* 11: 22-29.

Gilbert, E. 2006. *Eat, Pray, Love: A woman's search for everything across Italy, India and Indonesia.* Penguin Books: United Kingdom.

Goodnow, KJ. 2002. *Storytelling and the web in South African Museums.* [Online] Available at: http://www.archimuse.com/mw2002/papers/goodnow/goodnow.html [accessed 19 April 2009]

Groak, S. 1992. *The idea of building, thought and action in the desgn and production of buildings.* London: E&FN Spon.

Graefe, R. Reconstruction of Antonio Gaudi's Church of the Colonia Guell. Proceedings from the Third International Congress on Construction History. May 2009. Cottbus. 729- 736.
Groenewald, HC. 2003. Zulu Oral Art. *Oral Tradition* 18/1: 78.

Heller, J. 2003. *World full of great cities. Catch as catch can.* London: Scribner.

Inaba, J. 2009. Storytelling. *Volume Archis* 2: 2

Jones, L. 2000. *The Hermeneutics of Sacred Architecture: Experience, interpretation, Comparison.* Cambridge, Massachusetts: Harvard University Press.

Kilian, A. 2004. *Linking Hanging Chain Models to Fabrication.* [Online] Available at: http://www.designexplorer.net/newscreens/cadenarytool/KilianACADIA.pdf. [2009, September 17]

Lebens, RM. 1980. *Passive Solar Design.* London: Applied Science Publishers.

Liptan, T et al. Watergardens as Stormwater infrastructure in Portland, Oregon. Proceedings from the Water Sensitive Ecological Planning and Design symposium. February 25-26 2000. Harvard Design School. 1-31.

Maryland Department of the Environment. 2000. *Maryland Stormwater Design Manual.* Baltimore.

Norberg-Schulz, 1985. *The concept of dwelling.* University of Michigan: Electra.

Norberg-Schulz, C. *The Phenomenon of Place. In Theorizing A New Architecture, An anthology of architectural theory* 1965-1995. Edited by K. Nesbitt. New York: Princeton Architectural Press, p.414-427.

Norberg-Schulz, C. *Heidegger's thinking in architecture. In Theorizing A New Architecture, An anthology of architectural theory 1965-1995.* Edited by K. Nesbitt. New York: Princeton Architectural Press, p.430-439.

Okpewho, I. 1992. *African Oral Literature: Background, character and continuity.* Bloomington and Indianapolis: Indiana University Press.
Orton, A. 1988.. *The way we build now. Form, scale and technique.* London and New York: Spon Press.

Pallasmaa, J. 2000. Hapticity and time. *The Architectural Review* 207.1239: 78.

Pennycook, K. 2008. *The Illustrated Guide to Renewable technologies.* [Online] Available at: http://www.bsria.co.uk [2008, October 15]

Reimold, WU., Brandt, D., De Jong, R. & Hancox, J. 1999. *Tswaing Crater: An introduction to the natural and cultural history of the Tswaing region including a description of the hiking trail* . Council for Geoscience: Wits University.

Richardson, P.2007. *XS Green: Big Ideas, Small Buildings.* London: Thames & Hudson.

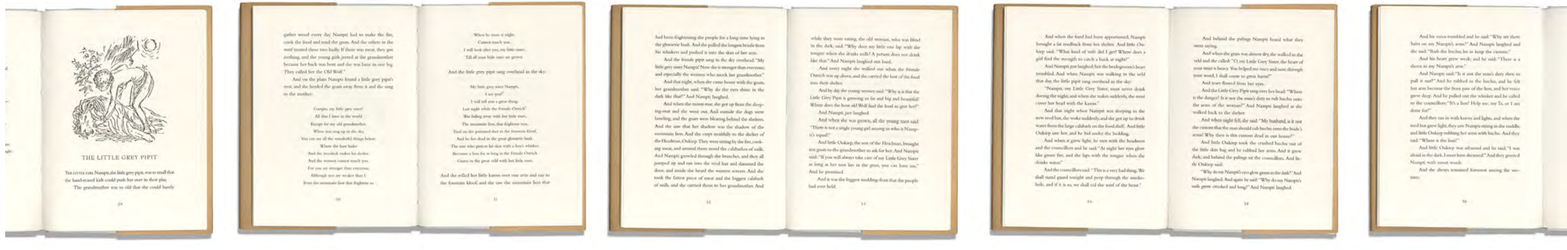
Scheub, H. 1975. *The Xhosa ntsomi.* London: Oxford University Press.

St John Wilson, C. 1992. *Architectural Reflections: Studies in the philosophy and practice of architecture.* Oxford: Butterworth Architecture.

Tolkien, J.R.R., 1995, *The Shaping of Middle-earth,* NY, Ballantine Books.

Trochim, W. 1999. *The Research Methods Knowledge Base, 2nd Edition.* [Online] Cornell Custom Publishing, Cornell University, Ithaca, New York. Available at: http://www.socialresearchmethods.net. [2009, May 9]

United States Environmental Protection Agency. 1999. *Water Efficiency Technology Fact Sheet. Composting Toilets.* Office of Water: Washington DC

# LIST OF FIGURES