

University of Pretoria, etd - Human, M (2003)

Encore Performing Arts Centre
an investigation into the contribution of
performing arts education to urban renewal

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Architecture can without a doubt be considered one of the most difficult but exciting and necessary art forms because of its links with functionality and reality. Where other art forms usually have either a visual or a time component, these are of equal importance in architecture.

The theme of this dissertation is to make an attempt to contribute to the urban domain, i.e. To the renewal and vitality of the Berea precinct in Pretoria. This particular development should be driven by its context - sociological, physical and hypothetical. Thus the final function and accommodation schedule would be derived from the investigation of the context.

The site is situated in Skinner Street, next to the Unisa Little Theatre, across the street from the Doxa Deo Church. The site forms part of the Berea precinct as proposed by Holm Jordaan Holm in their Apies River Urban Design Framework.

After the completion of the context study the project can be defined as a centre for the development of performing arts. Its main function will be the development of a campus for the SCC, the School of Creative Communication, which will initially be funded by collaboration between Doxa Deo and a capital provider such as the Nedbank Arts Affinity Trust and Business Arts South Africa.

For 30 years architects have been providing the outside for man, even on the inside. But that is not their job at all. Architecture means providing inside for men even outside. (Aldo van Eyck, Otterlo, 1959)

This dissertation explores the notion of creating space, but without the idea of an enclosed room that immediately springs to mind. It will be a search to define physical and sociological boundaries, to adhere, and in some cases, after careful consideration, transgress. The building will be explored as a piece of performing art in itself, exploring all the opportunities and limitations of other art forms. This implies that the building will have a beginning and an end, actors an audience..., and rhythm, beat and proportion.

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The present is not a time of style whatsoever, it is a time of groping – a time of discovery. It is a time, you might say, of realisation. Our problems are all new, our spatial demands are new, and it is time, therefore, more concerned with trying to create better institutions from those we have already established.

(Louis Khan, Otterlo, 1959)

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Problem statement

"The World Bank's central mission is to fight poverty. Over 2 billion people around the world live in poverty. With such pressing concerns, why bother about arts and culture. Because we must accept the importance of social well-being, educational and intellectual fulfilment. Culture is profoundly important. We need to understand the cultural dimension of development: for example effective educational projects must take into account the cultural expression and language of the community. We have moved from involvement solely with financial capital to a financial being balanced with social and structural factors, a more holistic view that incorporates lending criteria that accommodate 'social capital'. We will do our utmost to make a difference. Bank finance in culture is truly complementary to that of others.

A Kenyan proverb displayed at the Museum of Natural History in New York reads: "*Let us treat nature well. It was not given to us by our fathers but it was lent to us by our children*". I suggest we insert 'cultural heritage' for nature."

Ian Johnson - Vice President Environmentally and Socially Sustainable Development, The World Bank (<http://www.arts&culture.trust.htm>)

The Inner City of Pretoria is rapidly degrading. Businesses are moving out and poorer people are moving in. To create a place for real people, more than just economic stability is needed. At the Vienna Architecture Conference in 1993 "The End of Architecture?" Zaha Hadid stated: "*Being an architect today one is faced with the challenge of a profession torn in two distinct aspects. On the one hand architecture became pure technique, as if it were a branch of engineering; on the other hand, it becomes image production, as if it were a branch of advertising.*" (Noever, 1992; 27)

The theme at the conference alluded to the fact that architecture for architecture's sake no longer predominates, and it now seems that only fashion is being rewarded. Architecture for architecture's sake cannot be the solution, cannot be the antidote to fashion; only a social purpose to architecture, publicly formulated, can be such an antidote. There can be no great architecture without a social programme. A visionary architecture has to take part in a political vision, and its reality presupposes a political process, which puts a new architecture on the agenda and thus transforms the profession into a movement with new aims and inspirations.

What matters to the inhabitants of the Inner City, apart from the fundamentals for physical survival, is the quality of buildings and the in-between spaces that they generate. Keeping this in mind one should realise that designing outside spaces is as important as designing buildings. There has always been a distinction between interior and exterior space, with architects and interior architects responsible for the latter and landscape architects responsible for the first. If one intends to create a real people's place there should be a fusion between these two elements. They should be perceived as spaces created for people, without drawing a distinction between inside and outside.

This is one of the elements which the city lacks most. The open spaces in the Berea precinct are either not planned or not utilised in the way they were planned. Today cities may be increasingly sophisticated in meeting technical needs, but now is the time to bring deeper human needs into the brief.

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Design discourse

“Architecture is clearly a product of the human mind, reflecting the capacity and character of the individuals involved. In this respect the source of inspiration always remains within the imagination” (Hughes, 1996; 226).

The aim of this design essay is to explain decisions made whilst designing the building. It is important to mention that by trying to put the design into words one runs the risk of oversimplifying.

In 2002, at the International Union of Architects (IUA) congress A.G. Hempel, the president of the IUA Congress, said **“the primary aim of architecture in urban and landscape planning is to ensure the sustainable development and enhancement of urban civilisations”** (Architectural Review, July 2001; 33).



1

Throughout this discourse the main aim was not only to create a building, but to create spaces according to the different functions they needed to perform. To achieve this, the potential of the existing city fabric like the Doxa Deo Church in Visagie Street, the Unisa Little Theatre and Burgers Park was investigated to determine design decisions.

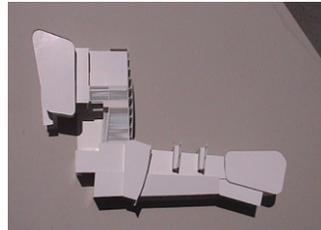
Urban investigation

In around 1730, when Caneletto painted the Piazza San Marco in Venice, the richness, quality and diversity of public life was already visible. This painting portrays people engaged in conversation, children running around, street vendors and hawkers, and people passing through. All of the abovementioned are needed to create an active urban space. The most important prerequisite for creating good public space remains the ongoing existence of public life. Our cities today seem to consist of fully public spaces and completely private spaces, missing most of the nuances in between. The Berea precinct consists mostly of medium-rise apartment buildings, so compared to, for instance, a suburban area, a greater number of people will spend various parts of their day in the public sphere. Because of the location of the site between the Paul Kruger Station and the CBD, the urban intervention should also cater for the ebb and flow of pedestrians through the area.



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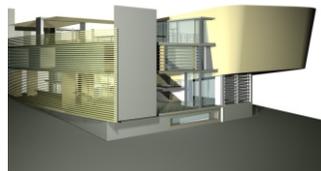
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This dissertation aims to initiate urban renewal in the Berea precinct through redesigning lost space. The site extends from Burgers Park up to Skinner Street. The proposed campus for the School of Creative Communication and the Original Arts Company is intended for public use, whereas campuses in the traditional sense are for use of the students only. Seen on an urban scale the campus forms a green link from Burgers Park through to Skinner Street, and aims to vitalise the whole neighborhood.

On this scale a spatial framework was created setting design guidelines for movement, public space, the Performing Arts Centre and workshops, and for two proposed multi-functional buildings. These guidelines were set in order to ensure that a variety of conditions and overlapping activities will occur in this space to make it vibrant and viable. Emphasis was placed on creating a sequence of outdoor and indoor spaces rather than individual spaces and buildings, on the site as a whole.



4

- 1 top view of site model
- 2 view to the south west
- 3 top view of model
- 4 view from Skinner Street

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Links

In *Investigations into Collective Form*, Fumihiko Maki addresses linkage as the most important characteristic of urban exterior space, stating that: **“Linkage is simply the glue of the city. It is the act by which we unite all the layers of activity and resulting physical form in the city...urban design is concerned with the question of making comprehensible links between discrete things”** (Trancik, 1986; 107).

The linkage theory, as described by R. Trancik in *Finding Lost Space*, involves the organisation of lines connecting different parts of the city in order to design a spatial datum to relate buildings to spaces. An analogy is drawn between the datum and a musical staff on which notes are composed. The staff acts as a datum providing the composer with continuous lines of reference, enabling him to compose notes in an infinite number of ways. In this case, existing links with the broader city and links with the immediate surroundings were investigated to determine a datum.

The link between Burgers Park and Skinner Street, the pedestrian routes on Van Der Walt and Visagie Street, and the link between Van Der Walt Street and the Unisa Little Theatre are considered as the main spatial datums acting as form generators for the movement routes, public open spaces and proposed buildings. Through using these linkages continuity is created across streets and property lines to establish urban cohesiveness.

There is no singular unobstructed view through the campus, but a series of views exist, each ending at a focus point like the sculptural staircase in the public square or a projection on an external wall of the Little Theatre. These lines of sight ending at focus points are used to connect elements, by presenting spaces as a series of snapshots of memorable events along the route.

Urban pauses

“When public life and public space are lacking or neglected, people become isolated, eroding any sense of communal spirit and cohesion” (Architectural Review, April 2001; 36).

To be able to create public space that is poetic as well as pragmatic it is important to realise that the relationship between public life and public space is directly proportional to each other. In order to humanise the space, pedestrian friendly edges such as animated facades are used and special attention is given to materials and textures where people are in direct contact with them. Public activities are integrated and overlapped to create a robust public space. The public space will be used for shows and projections in the amphitheatre, as an exterior extension for the restaurant and cafeteria, as a movement route for students using the campus, or the public using the proposed community or commercial facilities in the proposed buildings, and as a spill-over space for the workshops. The layout of the public spaces is created in such a way as to provide a variety of urban pauses in the pedestrian realm. Rather than using a collage of individual spaces creating different qualities in urban life in order to offer people choice and variety, each space is viewed as a fragment of a thread woven through the urban environment.

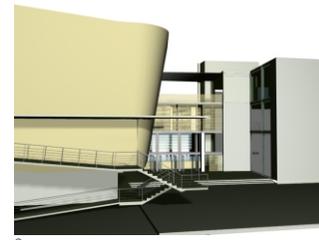
The most important individual public space is situated between the Unisa Little Theatre and the Performing Arts Centre. The Centre sits between the Unisa Little Theatre and the Lutheran Church, forming a respectful counterpoint. The experience of the route and the sculptural as well as geometric planes and surfaces of the new building encourage appreciation of the existing buildings. The main courtyard reinforces the link between the new and existing, and can be used as an outdoor arena with the landing of the external staircase forming a podium. Enclosure created by the Unisa Little Theatre and Performing Arts Centre is the most important physical they



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- 1 south east view
- 2 main public space
- 3 view towards courtyard
- 4 main entrance

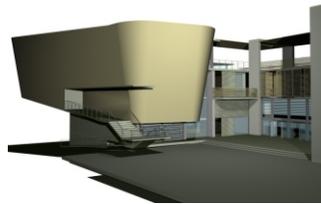
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quality used to create this space. Rather than using these facades as boundaries between the building and outdoor space they are designed as transition elements creating an opportunity for the integration of indoor and outdoor space.

Performing Arts Centre

“Architects may not be able to do much to alleviate the crisis of education, but at least they can invent humanely intelligent physical devices to help to resolve them” (Davey, 2002; 34).

an



1

For centuries, schools were private buildings surrounded by high blank walls. This building challenges this idea by being a public building surrounded by public spaces. Instead of being an introverted used only part-time, building this building takes part in the whole life of the precinct. The building offers flexibility, contact with the outdoors, light, and the wider urban environment.



2

The building tries to take advantage of the implicit contradictions in the program me, like education and catering, private and public, lectures and music. Through exploiting cohabitation as far as possible, spaces serving dual functions are created. By grouping the educational functions with the auditorium and theatres, students will be introduced to the professional world of performing arts, stimulating a synergy between amateurs, professionals and different types of performing arts. It is especially important from a financial point of view that the building is utilised by as many people as possible for the maximum amount of time per day. Through grouping the functions, spaces can be used optimally, for instance when no events are scheduled for the theatres they can be used by the students. The shape and geometry of the building is strongly influenced by its function, and it tries to be a poetic expression of this function.



3

The more public functions of the building, the auditorium, theatres and restaurant, are located to the north of the site, fronting on Skinner Street, with the educational functions located between this part and Van Der Walt Street. The main circulation and service shaft forms a spatial hinge connecting these two parts. The auditorium and dance studio serve as two focal points in the urban landscape. These two elements will be visible from a distance, particularly the dance studios when illuminated at night. They are used to announce the campus to people travelling in an east-west as well as in a north-south direction. The shapes of these two elements are juxtaposed with the geometry of the rest of the Performing Arts Centre and that of the surrounding buildings. Their main objective is to aid orientation in the public domain.

3

Circulation



4

The two main entrances to the campus are next to the dance studios and auditorium respectively. When entering under the auditorium, a straight ramp connected to the building is juxtaposed with the curved wall, to heighten the user's experience of the space. The ramp running next to a solid off-shutter concrete wall leads the eye to the sculptural staircase which forms the focal point of the public space. The other route starts next to the dance studios, where the glazed staircase where dancers warm-up is used as an active shop front to draw pedestrians into the campus. At night, multi-media projections of the events in the amphitheatre will be thrown onto a blank wall of the Unisa Little Theatre, to draw people in from the street. The two routes of entry culminate in a mixed-use space containing the reception area, bar and restaurant. In our electronic age tickets for the various shows will mostly be bought beforehand via the internet, but to cater for exceptions the reception area will also serve as a small box office. Throughout this more public part of the building furniture is used to define, shape and articulate space and movement routes. In this way

- 1 main entrance and auditorium
- 2 view into courtyard
- 3 dance studios
- 4 north facade

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the interior is kept fairly free from vertical obstructions, creating the opportunity for natural light to flood in through the facades. The ground floor has a generous four-and-a-half metre floor-to-ceiling height, because of the large numbers of people expected to use the space. This fact also makes the introduction of mezzanine floors possible. A triple-volume atrium ending one metre above roof level is used to bring natural light into the centre of the space down to basement level, and also to introduce a vertical connection between the floors, in the same manner as is done in the courtyard.

Restaurant

The restaurant opens onto a balcony fronting Skinner Street, which is one of the main pedestrian routes. The balcony is raised one-and-a-half meters, using the natural slope of the site, to maintain a certain degree of privacy. It is like a stage, offering the opportunity to the pedestrians passing by to observe the theatre of people using the restaurant.

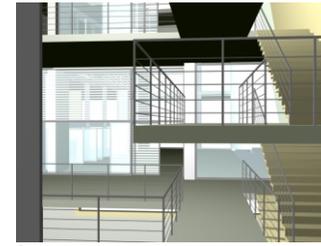
The kitchen is divided so that one part is open in order for people to see the activities inside, even from the outside courtyard. This heightens the idea of a very lively and active space. The storage, dishwashing area and cold room are situated in the basement, connected to the kitchen with a dumb waiter, freeing up valuable space on ground level.

Auditorium

The staircase connecting spaces from the basement foyer up to the roof is located next to the atrium. The first entrance into the auditorium is on mezzanine floor level and the other on first floor level. On the first floor level a spill-over space for the auditorium is created, with a glazed façade offering a view over what the ISDF proposes to be the Skinner Street Boulevard. To deal with the high noise levels from Skinner Street, a concrete shell structure is used for the auditorium. For acoustic insulation the mass of the concrete along with timber cladding and particle insulation, is used. At the sides, convex timber panels are used to diffuse and reflect sound waves to the audience and also to house the electrical and air-conditioning services. Timber ceiling panels float as acoustical clouds to reflect sound back to the audience. At the back of the auditorium, timber cladding with absorbent material is used to absorb sound. The landing of the emergency staircase cuts into the auditorium, forming a stark contrast with the solidity of the auditorium.

Theatres

Two small theatres are located in the basement, connected by a foyer where people can socialize before the shows. Two windows on opposite sides of the foyer offering glimpses of the performers to, on the north side, pedestrians in Skinner Street looking into the foyer, and on the other side, to people waiting for a performance to start. By being sunk into the earth good thermal and more important in this case acoustic insulation is achieved. Because of the simultaneous presence of the architecture and work on stage it is important that the space heightens the experience of viewing and involves the viewer more. Through the use of concrete and timber finishes, an unpretentious space is created to enhance, and not distract from, the performance on stage. A raked floor is used in both theatres, with a staggered seating arrangement to ensure that each audience member has a clear line of vision to the stage. One of the theatres will mainly be used for cabarets and solo performances and the other for complete small productions. There is also a complete backstage area with cloakrooms, a greenroom and a hydraulic platform to make it possible to lift sets from the basement.



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- 1 interior view towards the courtyard
- 2 view from the south west
- 3 public roof space
- 4 dance studios from the north
- 5 restaurant view from the kitchen

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1

Library

In the educational part of the centre, it was important to achieve a more human scale and intimacy than that of the public part, in order to nurture students and make them want to continue with their art. The library is a place for private contemplation and activity, relating to the exterior space between itself and the Lutheran Church. It is far more complex than just a storage place for facts. In the electronic age we are in now, vast amounts of information can be accessed through the internet, but we still need physical libraries where readers can be part of a scholarly community. The library is subject specific and offers multi-media rooms where students can watch videos and listen to music. These are located on mezzanine floor level. By using a mezzanine floor in the library the scale is reduced to a more human scale, heightening privacy.



2

A central corridor is used in this part of the building, so that valuable façade area can be used in the drama and music rooms to the north, and lecture rooms to the south of the corridor. On ground floor level natural light is allowed into this space through a glass plane that is used to divide the library from the corridor. To get light into the corridor on the first floor, small windows above eye level are introduced in the drama rooms, and the ventilation stack serves a dual purpose allowing light to penetrate from the north side. On the second floor, north facing clerestory windows admit light into the corridor. The corridor forms the movement spine through the educational part of the building, each time ending in a social space.



3

Dance studios

The landings of the stairs leading up to the dance studios are used as stretching zones. Pedestrians walking by in Van Der Walt Street will see silhouetted figures in motion, advertising the presence of the building. The dance studios are naturally ventilated with glazed facades to the north and east. Diffused natural light is allowed into the spaces through a timber shading device. This provides privacy, but allows dancers a view to the outside. Light is reflected from the timber sprung floor and mirrored wall to create a light and airy effect. The timber, glass and off-shutter concrete finishes used create a soft backdrop to allow the dancers to be the most important elements in the space.

5

Indoor and outdoor fusion

"Buildings should respond to outdoor conditions. They should be able to transform their own cloths, their own different skins, to open them up or to change them" (Hughes, 1996; 64).



4

The façade is seen as an envelope containing the space forming the building, as an imprint of interior and exterior spaces affecting it. It becomes the element negotiating between urban environment and architecture. The facade is made up of different skins and filters, not only influenced by atmospheric conditions but by social conditions as well. The skin is widely used as a metaphor for facades when their response to environmental conditions is discussed. When the design of the façade is discussed, people can be used as metaphors, especially their reactions to things they like or dislike. As people do, this façade is able to exclude things it dislikes by closing screens, doors and windows, and to open up to things it favours, whether these things are atmospheric or social. The above is important because the façade is not only the interruption between exterior and interior, but between private and public, silent and not silent, still and active. The façade in this case is the face of the building, enabled to be transformed into different expressions when necessary.

- 1 main entrance
- 2 north facade
- 3 view from Skinner Street
- 4 timber shading on north facade

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The above discussed the way users of the building can manipulate the façade, but the opposite of this is the way in which the façade manipulates the user. All views and connections to the exterior are determined by the façade. The notion that a transparent sheet of glass connects the interior and exterior is far from true, because not only is this not a mono-dimensional relationship, but a physical barrier still exists. Where the functions of the space permit, the façade is openable to allow the interior to extend into the exterior, and visa versa. Although the façade is seen as an element wrapping around the building, it consist of fragments influenced by the nature of the space it contains.

Timber screen cladding

Timber screens and cladding are used throughout the building as a constant which binds different spaces. The character of each of these screens is determined by the particular function it needs to serve in the allocated space. Sometimes the screen forms the cladding in front of a solid wall, sometimes the screen disappears and the wall continue or vica versa, and at times both disappears altogether, revealing large openings.

Materials

At the beginning of the design process lines on paper were given physicality through the use of physical models. At this stage, the first decisions concerning materials were made because of their sensory qualities as well as technical potential. Materials like timber and concrete appear raw or defined, depending on the use and character of the space. Detailing is expressed robustly, with joints and junctions exposed. Materials are expressed independently of the structural steel frame, which adds to the easy and simplistic comprehensibility of the building.

Light

The building depends on light to reveal its true form and nature. During the day sunlight is used to enhance textures formed by the pre-cast concrete elements, and the timber slats from the dance studio on the exterior. In the interior, sunlight is used in various ways to fill and define space. In the library and exhibition space, pre-cast concrete elements surround small glass panes to create a gentle luminance surrounding the spaces. In the drama and music rooms, light is filtered through timber screens to provide as much illuminance as possible without direct sun entering the spaces. Where the function permits it, like in circulation spaces, direct sunlight is allowed to enter the building. The two ventilation stacks are used to enable light to penetrate to the corridor. Painted white on the inside, they reflect light to create illuminated planes in the corridor. This means that light conditions range from possible total darkness in the theatres and auditorium, to diffused light, to filtered light, to the total opposite of direct sunlight in the building, in order to heighten the sensory experience of people passing through the building. During the evening, light from the inside of the dance studios will enhance their importance as focal points in the urban landscape.

The design of the public spaces, links and Performing Arts Centre can be summarised as an infill project in the existing fabric of the Berea precinct, to promote urban renewal in Pretoria. The campus is created for community use in order to have a positive influence on the quality of life of people resident in the precinct. It is an investigation into using performing arts and architecture as a tool to return life to the city.

- 1 courtyard with timber screens
- 2 roof space
- 3 movable screens
- 4 view from the north
- 5 view towards main Entrance



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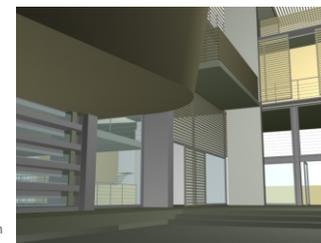
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What distinguishes architecture from painting and sculpture is its spatial quality. In this, and only in this, no other artist can emulate the architect. Thus the history of architecture is primarily a history of man shaping space (Johnston & Vulker, 1997; 11).

context study



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Urbanism

Our relation to the past is not a simple one. As Henry James pointed out, *"We are divided ... between liking to feel the past strange and liking to feel it familiar; the difficulty is, for intensity, to catch it at the moment when the scales of the balance hang with the right evenness."*

In this age cities that grow obsolete can be rebuilt very quickly. Numerous cities in the old East Germany are currently going through this process. The German Democratic Republic's policy on conservation was to leave everything as is, in order to protect the past. What this brought about was that people who could afford to moved to newer suburbs outside the cities. The degradation of the inner cities grew to such an extent that they really became dead places.

About ten years ago the German government decided to review this policy. Since then immense restoration as well as many new projects were carried out in the cities. What this has triggered is that at the moment property in the inner city is rapidly becoming the most sought after and prized on the market.

Our problem in South Africa is essentially the same, but with a few key differences. The most important one is that, in our case, business and public services is are moving out but poor people are moving in. What this ultimately entails is that our inner city is filled with people without the necessary resources to sustain themselves.

If one refers to history, throwing money at buildings was one of the signs of a successful government. Today the government wants to make its mark with schools, institutions, hospitals and infrastructure projects, as long as there is no sign of "wasting" the taxpayer's money. So any building not achieved in the minimum construction time with the maximum amount of lettable space for the minimum cost has to be left out of the equation. For buildings to fit into this realm architecture needs to be reduced to only patterning up elevations and ensuring that everything conforms to the minimum standards set by the National Building Regulations.

In our case we definitely won't be able to rebuild whole parts of the city as is the case at Potsdamer Platz in Berlin. It would neither be feasible to attempt to rebuild portions of the past nor to merge scenes in a set of forms inspired by the past. But it is our responsibility to provide architecture that can offer tenderness and particularity, nobility and generosity - buildings that respect and enhance their location, the environment and community; buildings in which space, materials and resources are used with efficiency and imagination.

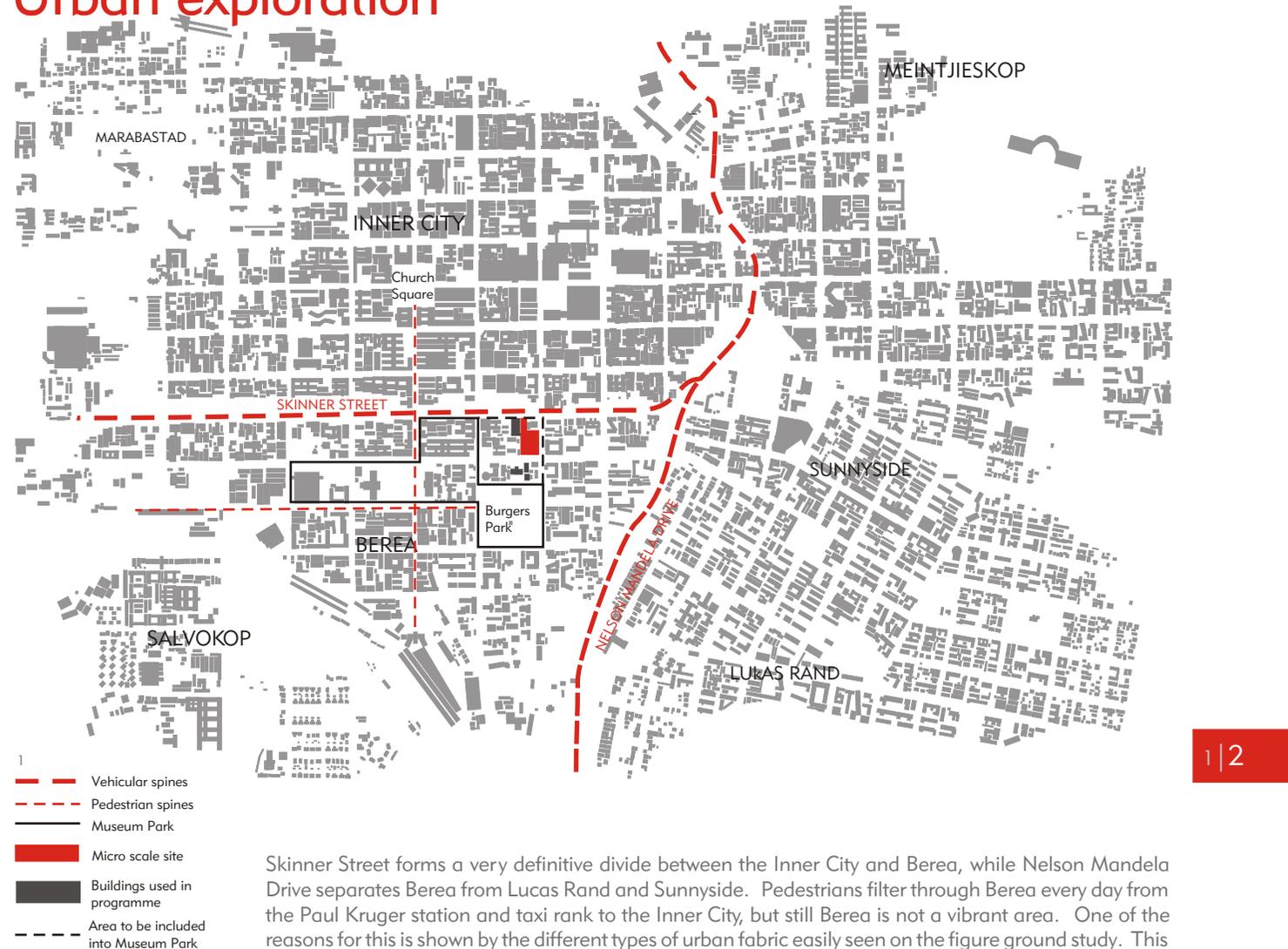


The chance of our government being able to invest such capital as is invested in Germany is really slim. This means that we will have to use other means to improve the quality of life in the inner city of Pretoria. The Pretoria Inner City Integrated Spatial Development Framework proposes design principles for the CBD.

The public realm is made up out of spaces that are used every day by the inhabitants of the city. To develop successful urban forms a high level of **congruence** is required between the various elements and components of the city. The primary aim should be to create a sustainable economical environment in the CBD. To achieve this, large numbers of people should be accommodated in the city. Most important is that they should be provided with all the necessary **public, social and institutional services** needed. By increasing the number of people, economical stability will be introduced into the system because of increased expenditure on goods and services. To achieve this it is important to realize that the profile of Inner City residents is changing to include people that are more dependent on public transport than before. The number of pedestrians has also increased.

This offers a unique opportunity to create a **vibrant activity node, that will be utilised 24-hours per day, 7-days a week**. In the past, South African cities were designed around private vehicular traffic with pedestrian use as an afterthought. It is important to design specific pedestrian spines in conjunction with lively activities, functions and facilities at street level. A multi-functional approach with robust building forms, vitality through diversity, and continuity of open space systems should be followed.

Urban exploration



Skinner Street forms a very definitive divide between the Inner City and Berea, while Nelson Mandela Drive separates Berea from Lucas Rand and Sunnyside. Pedestrians filter through Berea every day from the Paul Kruger station and taxi rank to the Inner City, but still Berea is not a vibrant area. One of the reasons for this is shown by the different types of urban fabric easily seen on the figure ground study. This problem needs to be addressed through selective densification of the Berea precinct.

Museum Park is the main feature of this precinct and this fact that it should influence any new development in the area. A proposal will be made for the area from Burgers Park Lane up to Skinner Street to be included into Museum Park. This proposal will not only be made because of the historical value of the Unisa Little Theatre, but also because of the educational nature of the proposed new development.

1 Figure ground, indicating influential factors

Inner City Development Framework

Vision:

To be the Hub of a World class City as the Capital of Africa by being a friendly and vibrant all-day-all-night People's Place catering for the social and human needs of all its people which proudly calls it Our City and Our Home (Capitol Consortium, 1999).

This Hub is to be supported and continually strengthened by sustainable economic growth and development, efficient service delivery and adequate infrastructure provision, as well as the political will-power and the institutional support to make it the best city in Africa.

It is further distinguished by a safe and clean environment, unique multi-cultural image and pleasing appearance, the unflinching preservation of its historical and cultural heritage, and the jealous protection and enhancement of its natural features.

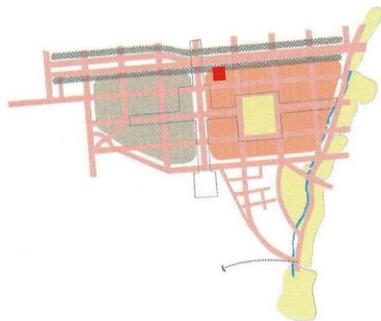
On an urban scale a high level of congruence is needed between the various elements of the city. To achieve this the design principles that are proposed primarily reflect a multi-functional approach towards streets and public spaces, robust building forms, vitality through diversity, sustainable neighborhood structures, continuity in open space structures and environmental management.

The development model will probably contain the following characteristics:

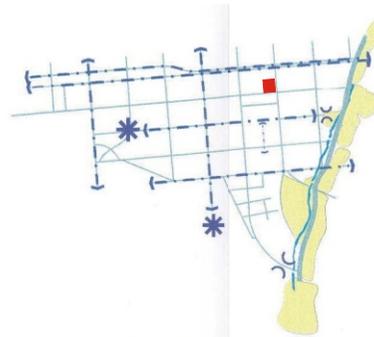
- Increase of mixed-use facilities
- Development of local urban centres
- Redevelopment of brownfield sites or open urban spaces to allow consolidation of urban form
- Selective increase in density of existing housing areas
- Promotion of the development of sustainable transport (cycle and pedestrian routes)
- Improvement of regional connectivity
- Participation and community involvement
- Improvement to the environment and green spaces
- Efficient maintenance of housing, improvements and mixes of tenures and types
- More efficient and accessible facilities and public services

In this design framework the city is divided into precincts according to the physical identity, activity and functionality of certain areas. The chosen site forms part of the Berea precinct.

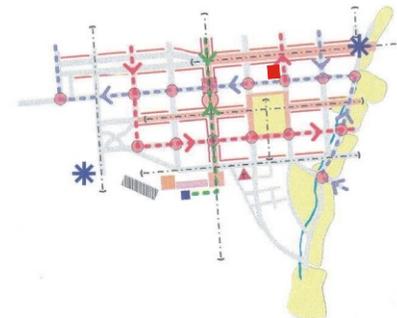
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The site is part of sub-functional areas 2.1 and 2.2 as per the ISDF, which is located to the south of Skinner Street, west of Nelson Mandela Drive, north of Scheiding Street and east of Potgieter Street. It is the Southern Gateway to the CBD from the Pretoria Station in the south. It contains low-density, "stagnant" land uses such as depots and high-density residential land use together with land uses related to the residential component, including parks/open space, churches/places of worship, educational and medical facilities. The most important attribute of this precinct is Museum Park.

Two edges of this area are major vehicular movement spines: Nelson Mandela Drive and Skinner Street. The ISDF proposes that Skinner Street be changed into a Boulevard. The traffic along these two routes mostly relates to external activities, therefore the traffic volumes are high and fast moving. Vehicular movement spines relating to internal activities are Visagie and Jacob Mare Street in an east-west direction and Van Der Walt, Andries and Bosman Street in a north-south direction.

Pedestrian movement is most concentrated in Bosman Street where the taxi rank and train station are situated, and to a lesser extent along Jacob Mare and Van Der Walt Streets.

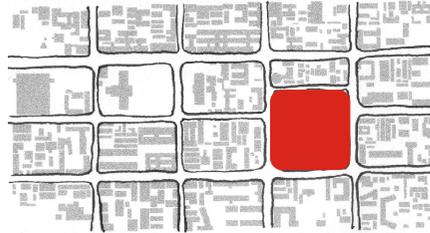
Implementation guidelines for the precinct according to the ISDF

- Maintain and uplift the cultural and historical elements in order to create a cultural precinct within the Inner City
- Integrate extensive land uses such as depots with extensive land uses and service industries to the west
- The nature of the area must respond to the transportation node to the south to cater for pedestrians and the informal sector
- Institute appropriate design and policy measures to effectively treat the interface between the cultural precinct and extensive land uses
- Provide social support services to cater for the residential population, and institute appropriate policies to maintain standards for these services
- Provide appropriate transportation planning and types, and re-evaluate the major traffic routes through the residential area
- Cater for pedestrians, in terms of facilities and pedestrian routes
- Integrate the Berea precinct with Sunnyside and appropriately relate the interface to the surrounding areas



Museum Park

Museum Park is the largest focus of cultural resources in Africa. It is a visual and structural grouping of museums, buildings, historical sites and open spaces in the inner city of Pretoria. There are facilities for functions and conferences as well as restaurants and museum shops. Parking is provided and pedestrian links promoted.



Burgers Park

- Green House for Exotic plants

The building is situated on the northern side of the park, facing Burgers Park Lane.

The plan is rectangular with rounded ends. With a concertina and single-pitched roof, constructed from wire glass protected with hail nets. The structure is a galvanized steel construction with red face brick exterior and interior walls (Le Roux, S. 1990; 143).

- Band Stand

A typical Victorian and Catalogue prefabricated by Macfarlane & Co in Glasgow. It has a decorated curved pitch roof supported on eight cast iron columns on a raised sandstone platform with a cast iron balustrade. The timber strip ceiling fans out from the middle. The roof is typical from the 19th century borrowing period and refers to the Chinese temples and Indian gazebos in Moslem gardens.

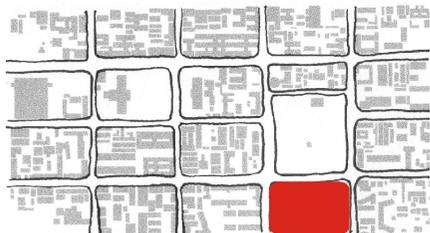
- Kiosk restaurant

In 1909 V S Rees-Poole were commissioned to design the kiosk because the 1897 design of Wierda were never realized because of financial trouble. The double-storey octagonal building is the central focal point of the park. The building consists of two rooms, one on top of the other, surrounded by wide verandas.

- Caretakers house

The house was completed in 1904, replacing the earlier "tuintmanswoning". It is designed by the city engineer, with a living room added in 1954 on the north eastern corner, designed by the city architect. In 1979 it was declared a National Monument. It is richly decorated with balconies and verandas with a steeple roof over the entrance. The roof is a shingle roof with ventilators. The exterior walls consist of large plastered and unplastered planes with stone- and plastered mouldings. The building can be classified as late-Victorian or early-Edwardian. It is an assembly of different building elements and a good example of the eclecticism of that time (Le Roux, S. 1990; 132).

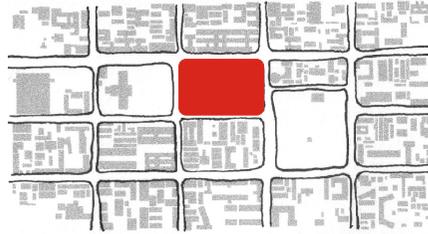
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Melrose House

This building was built in 1886 by Vale for George Heys and is a typical example of an exaggerated Victorian villa. The building is significant because it resembles the architecture of Sunnyside round the turn of the 19th century. The building creates the edge to Museum Park (Le Roux, S. 1990; 150).

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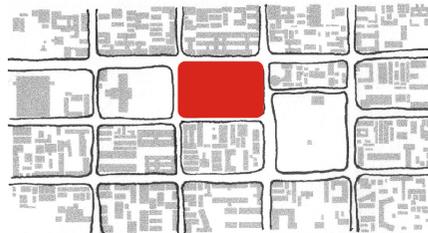


Transvaal Museum

The building was completed in 1913. It forms the eastern edge to Pretorius Square. The museum is set quite a distance from the street. It is a three-storey building with an oblong plan with a symmetrical façade. A plinth is used to compensate for the slope of the site. The original eastern façade is sandstone, with extensions done in 1998 by Jordaan Holm Architects, on both the northern and southern side in facebrick. On the eastern side a steel structure was added. Arched windows on the first floor and rectangular windows on the second is set back deeply behind massive sandstone columns, which carries the large roof overhang. A parapet wall conceals the roof (Le Roux, S. 1990; 130).

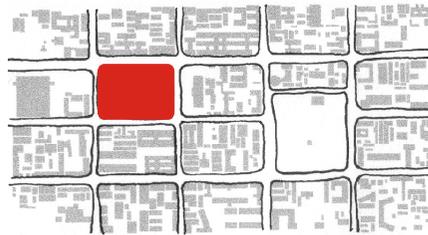
Geoscience Museum

The three storey building faces Skinner Street. The bottom two floors are set back, their glass façade protected by the overhang of the third floor and prefabricated panels on the western point. Walls are from terrazzo. The building is lifted on a plinth with a continuous staircase leading up to the entrance. It has a flat concrete roof (Le Roux, S. 1990; 121).



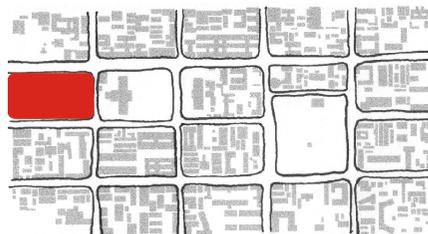
City Hall

It is three-storey building with two wings symmetrical around the clock tower, with a central porte cochère and ramp. Solid granite columns support a carved tympanum, by Steynberg. The plinth is of gray granite and the rest of the building is from concrete blocks with a granite gravel cover to give the impression of solid granite. The sides of the two wings are plastered. The roof is a clay tile hip roof (Le Roux, S. 1990; 130).



National Cultural History Museum

The Old Mint, which was designed in 1968 by Interplan with the last phase completed in 1976. The Mint House, which was occupied, by the Mint Director, and the Minnaar Street House, which was occupied by the Director of Works, and the out houses was built in the same year. The Mint House as a traditional building and was renovated at the same time as the development of the African Window. It was renovated with proposals to turn it into a restaurant, at present it used by an Environmental Centre. The Old Mint building was developed into an Arts and Culture Museum, The African Window by KWP Architects in association with Waterson Weyer Roon Architects (Le Roux, S. 1990; 22).



Old Firestation

The building is U-shaped with square opened to the west. The wing facing Bosman Street is symmetrical around the clock tower. The wings forming the north and south boundaries to square are identical. Cowin & Powers Architects designed the building in 1912. Currently the building is used as the Museum Park Headquarters as well as the, Tourism, Conference and Discovery Centre (Le Roux, S. 1990; 37).

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Unisa Little Theatre

Norman Musgrave Eaton was born in Pretoria on October 11, 1902.

Eaton entered the School of Architecture at Wits as a first year student in 1923, obtaining his degree five years later. During these years he worked in the office of Gordon Leith, whom he described as his "chief mentor". In 1930 he left South Africa to take up the Herbert Baker Scholarship at the British School of Architecture in Rome.

Early in 1933 he returned to South Africa and established himself in a private practice in Pretoria.

Most of Eaton's work can be found in Pretoria in the eastern suburbs of Brooklyn and Lynnwood and on the eastern ridges at Muckleneuk, Waterkloof and beyond. Here he developed his **modern regional vernacular style**: climatically responsive houses with small, well considered apertures that respond to the Pretoria climate, with projecting sun-hoods over windows and roof overhangs, sometimes up to a metre wide.

The **Children's Art Centre** was designed in the early 1940's, to accommodate extramural art classes for pre-high school children. The building consists of several large studio rooms, an office area, staff room and a library-cum-waiting room. The plan is U-shaped and double storeyed, with a semi-enclosed court, which was intended for outdoor activities such as large-scale sculpture. Facing onto this court is a covered veranda. In one of the studios a raised stage was included.

All the windows of the working areas face north and east, while the western facade is more solid with smaller windows. White-painted fascia boards mask gutters and the downpipes are incorporated into the walls. The roof pitches are at a low angle, which make them invisible from close by, and when viewed from a distance they relate to the overall horizontality of the design.

Smooth ochre coloured face-brick is used for all the external walls. Bricks with a smaller dimension are used in between the windows so that together with the windows a continuous band is formed. The vertical brick courses in the plant boxes relate to the two courses directly above ground level of the building, which are also laid vertical.

The north facades, which face Skinner Street, were given a considerable amount of interest through details like steps, plant boxes and projecting concrete hoods above the windows. These details are unfortunately lost to the public now, because the site is fenced.

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In 1994 MEG Architects were commissioned to do renovation and alterations to the Children's Art Centre and the Little Theatre. The only alteration that was made to the Children's Art Centre is the double volume exhibition space that was constructed by closing the courtyard. To do this, the existing window frames were removed and two new doors were added to connect the exhibition space to the studio.

The theatre itself, completed after years of delay, has been altered to the extent that it bears little resemblance to Eaton's original concept (Harrop-Allen, 1975; 97). The theatre is set at the back of the site, structurally connected to the Children's Art Centre on the northern side.

The approach to the theatre was added in 1950. Brick is used for both the walls and the pavement. The brick chosen is of a much rougher texture and darker colour than that of the Children's Art Centre. The brick is laid in long parallel bands following the direction of the pathway. In each band individual bricks and portions of bricks are laid in simple patterns. Curved patterns follow the contours of the boundary wall, and used to follow that of the circular pond, before it was replaced with a sculpture in 1994.

The wall is constructed mostly of vertically laid bricks with its convex sections closed and concave sections open. Two courses down from the top of the wall, the openings become twice that of the width of those below, forming a decorative band at about head height.

The curved wall was demolished and rebuilt because this was structurally unsound. The initial idea was to re-use the bricks but it was not possible. The wall is a replica of the original, with three differences. Firstly, the wall was shortened because the new approach to the Little Theatre was placed perpendicular to the wall. Secondly, instead of the original two courses at the top of the wall, there are now three courses, and thirdly, the openings - now three courses from the top - are of the same size as those in the rest of the wall.

The water feature in front of the Theatre was also removed. The client demanded this apparently because it required a high level of maintenance. It was replaced with a concrete plinth for a sculpture. Furthermore, exterior lights on columns were added, with the design strongly influenced by the column capitals inside the building.

In the interior the carpets were replaced with carpets of a similar type, and wallpaper was replaced by paint because similar wallpaper was not available. The timber floors were sanded down and linoleum strips were replaced. Original glazed tiles were replaced in the bathrooms.



- 1 approach to the theatre
- 2 main entrance
- 3 view from the parking area
- 4 view from Van Der Walt Street
- 5 view from the south
- 6 entrance from Skinner Street

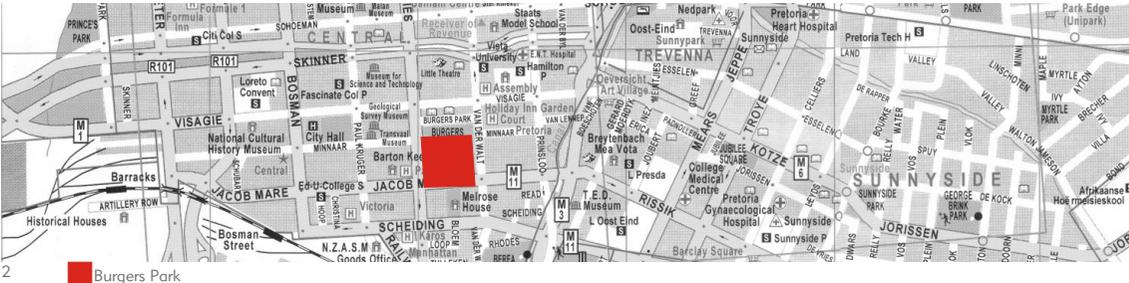
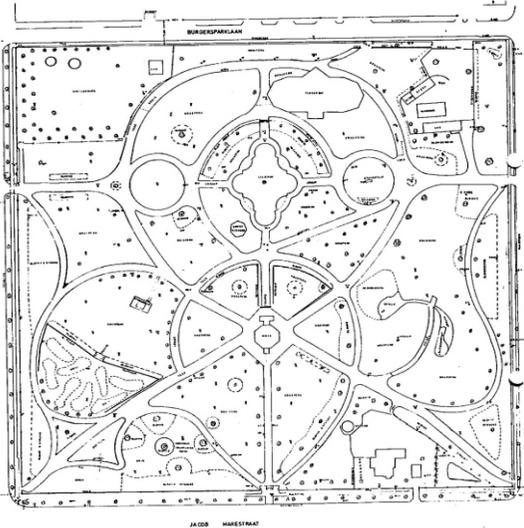
Burgers Park, Pretoria

Burgers Park is situated in the heart of Pretoria, in the Berea precinct, between Burgers Park Lane and Jacob Mare, Andries and Van der Walt Streets. It forms part of Museum Park.

The park is surrounded by medium-rise buildings and Melrose House to the south. However there is a need for a more defined vertical edge. Higher buildings on the surround that are fully occupied will ensure 24-hour informal surveillance of the park. In this way crime - which is currently a big problem in the area - will be reduced. The layout of the park is in Victorian style. Its organic forms create quite a few secluded spaces. Another way to address this particular problem is to attract more people to use the park. Proposals to address this will be made in the thesis.

The park, which is maintained by a 17 man team, is cleaned on a daily basis; structures and paths are repaired regularly; lawns maintained on a weekly basis; and planting of annuals, pruning and tree care done on a seasonal basis (Carol Knoll, 1998; 5).

Provision for pedestrians must also be made through and around the Park. This should include paved walking surfaces, street furniture and signage like those used in Minnaar Street.



1/9

- 1 Site plan
- 2 Location map
- 3 Andries Street sidewalk
- 4 Secluded space
- 5 Undefined vertical edge

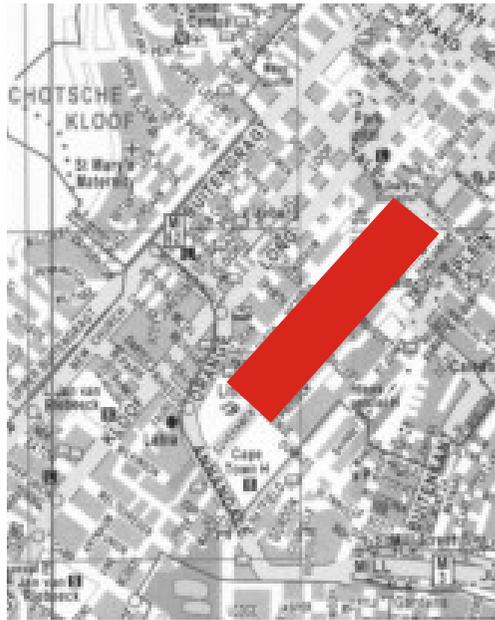


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Company Gardens, Cape Town

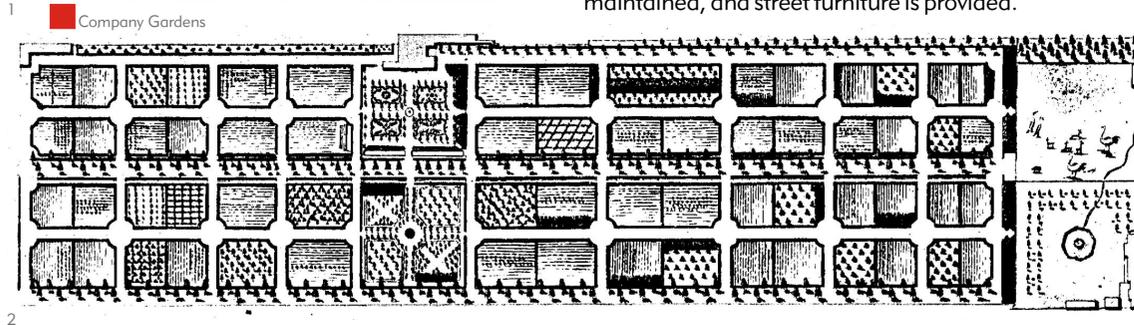


The Company Gardens are situated in the Cape Town inner city in the "museum belt" district. The Gardens form part of the redevelopment of the district.

The Gardens are flanked by three to nine storey buildings that accentuate the space they surround. The buildings form a hard edge, which is then softened by bringing the sidewalks down to a human scale. This is achieved by providing paved sidewalks with overhanging tree canopies and a human scaled fence surrounding the Gardens.

The Gardens are laid out in a square grid with circular focal points. These vistas are very important for orientation as well as for security. One of the main differences between the Gardens and Burgers Park concerns its safety, which is achieved through informal surveillance by the public using and living around the Gardens.

The Gardens are very well used because they are surrounded by educational and cultural facilities. Furthermore they are very well lit at night, well maintained, and street furniture is provided.



2

- 1 Location map
- 2 Site plan
- 3 Well defined edge
- 4 Vista
- 5 Focal point



3



4



5

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Site

Situated in the CBD of Pretoria, the site for the proposed thesis project forms part of the Berea precinct, which the ISDF identifies as the cultural hub of the City (Capital Consortium, 1999). The site on which the new building will be accommodated is directly adjacent to the **Unisa Little Theatre**, designed by **Norman Eaton**. On a larger scale, the site will extend through into Burgers Park.

Furthermore, the site is in very close proximity to Museum Park and it is proposed that it be incorporated, not only because of the Little Theatre that surely can be viewed as a very important historical landmark, but also on the grounds of the educational nature of the proposed development.

It is situated next to **Skinner Street**, which is one of the major vehicular movement spines running in an east-west direction. The ISDF proposes that Skinner Street is changed into a boulevard, which means that surrounding areas must be densified, opportunities for SMME development must be created, and provision must be made to cater for the increase in pedestrian use. The site is also easily accessible from Nelson Mandela Drive, which is a major entry artery into Pretoria. Skinner Street forms a hard edge to the north of the site. Van Der Walt Street running adjacent to the site and Burgers Park is one of the major pedestrian spines in the precinct.

The site consists of partly open space with temporary fibre-cement structures on the corner of Van Der Walt and Visagie Streets. The site is surrounded by high-density residential units and places of worship.

At the moment the Little Theatre is managed by Unisa, but completely underutilized. The Children's Art Centre, also owned by Unisa, is standing empty. Both of these buildings represent an important part in our architectural history. To only restore and maintain these two buildings will not solve the problem.



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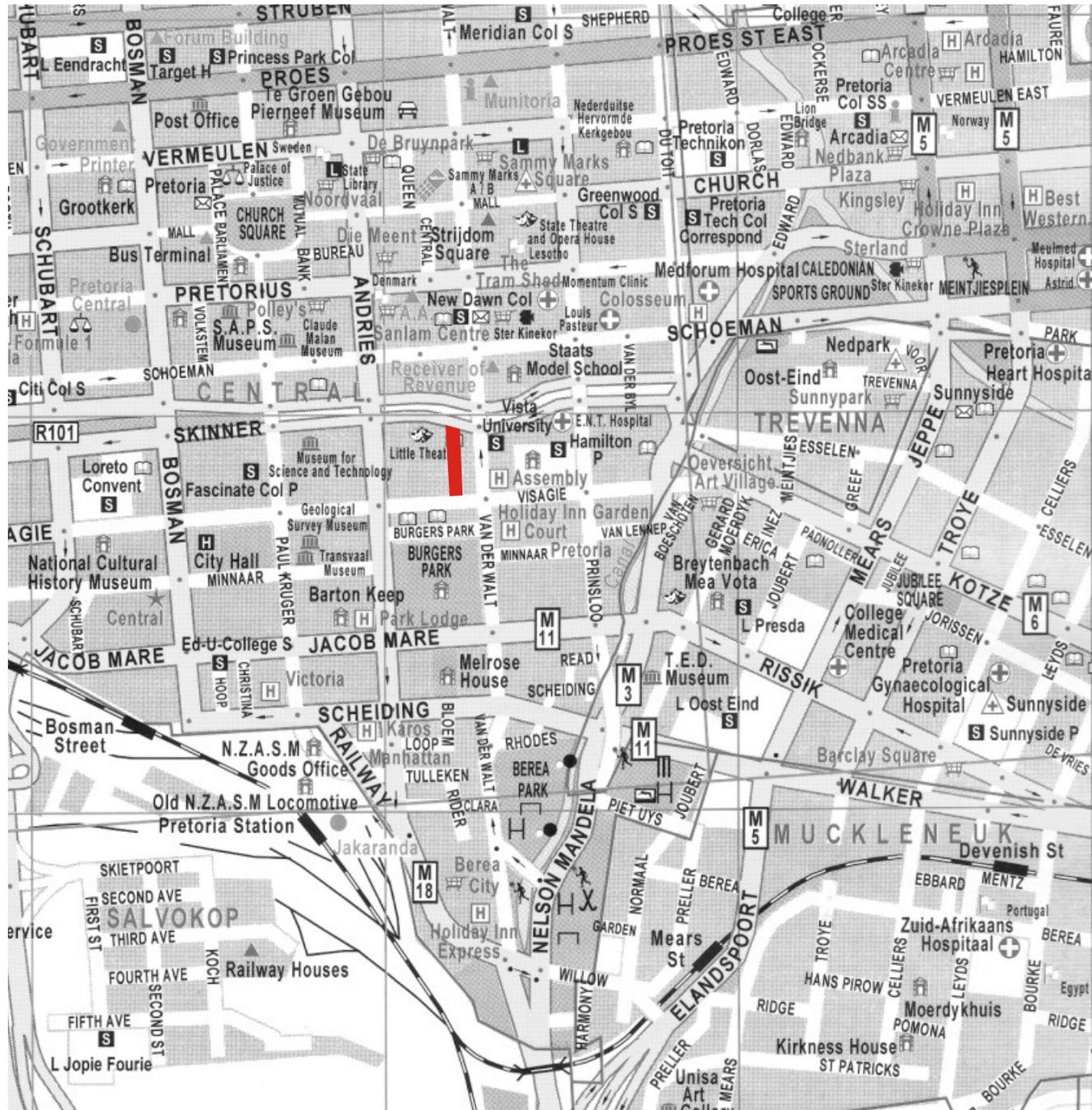
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4

- 1 view to Doxa Deo from site
- 2 vista down Skinner Street
- 3 fibre-cement structures
- 4 corner of Van Der Walt and Visagie Street

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1 Pretoria street map

Site

Macro climate

Location

Pretoria is located at longitude 25.5°E and 26°S. The noon altitudes of the sun are 88° in summer, 40° in winter, and the equinox is at 64°.

Rain

The average annual rainfall varies between 380mm and 700mm. The rain season occurs from November to March, reaching its peak in January. 50 to 80 rainy days, some with hail, can be expected. Rain occurs mostly in the form of thunderstorms in the late afternoons.

Temperature

Average maximum temperatures vary from 32°C in January to 22°C in July, with extremes of 42°C and 31°C respectively. Average daily minimums range from 18°C in January to 4°C in July, with extremes of 8°C and -7°C respectively. Days are oppressive in summer, whereas winter nights can be particularly cold.

Winds

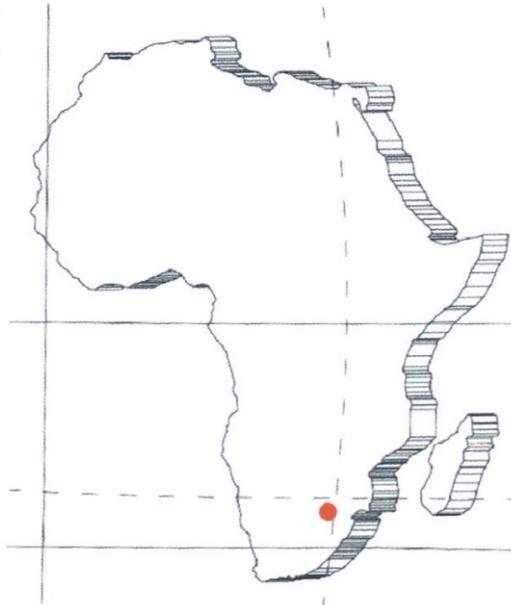
Winds are light to moderate and blow from a northeasterly direction, except during thunderstorms, early spring or weather changes, when they blow from the south.

Sunshine

The duration of bright sunshine exceeds 80% of the possible during winter and 60% of the possible during summer.

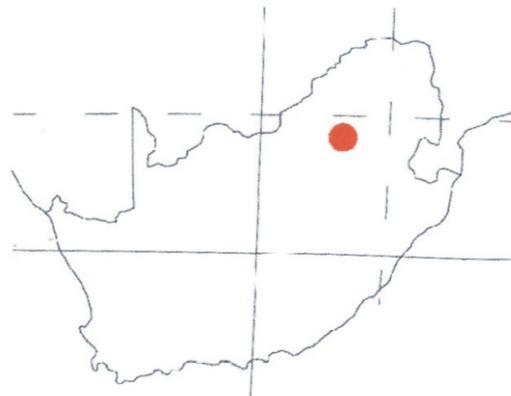
Humidity and evaporation

In Pretoria vapour-pressure and temperature are more or less parallel. Evaporation is the lowest during winter and the highest during summer.



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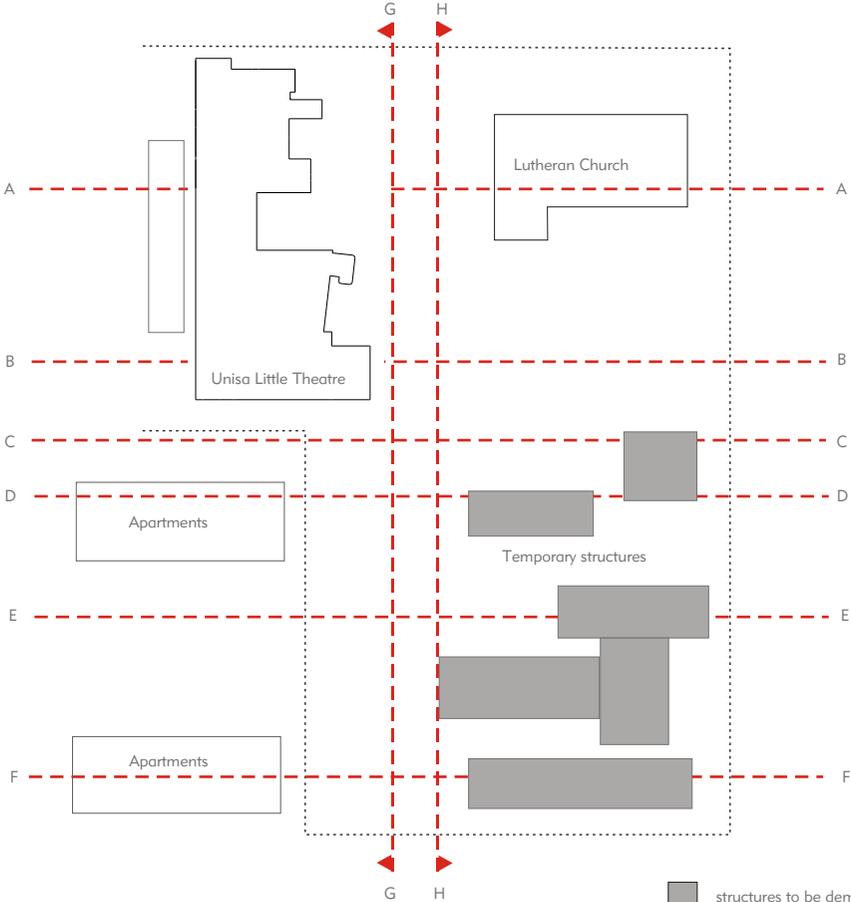
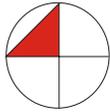
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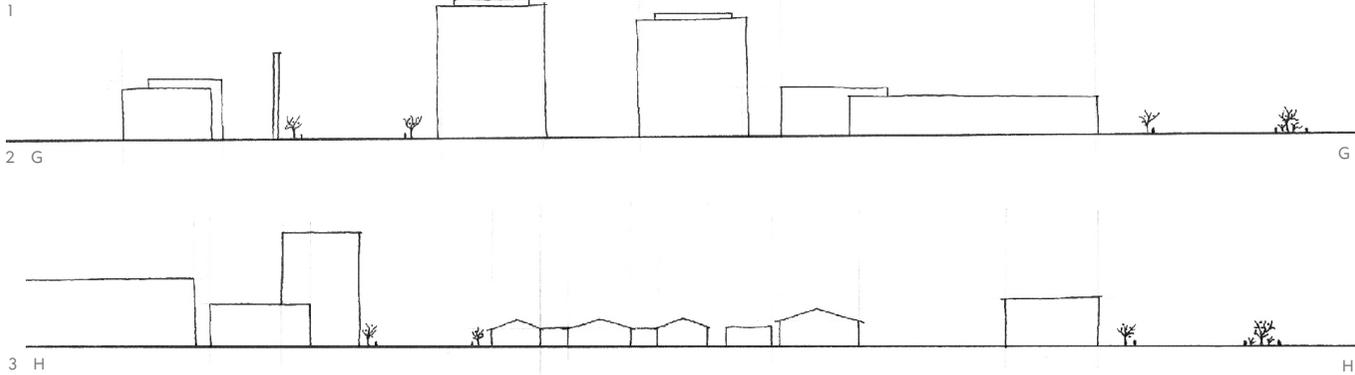
2

1 location in Africa
2 location in South Africa

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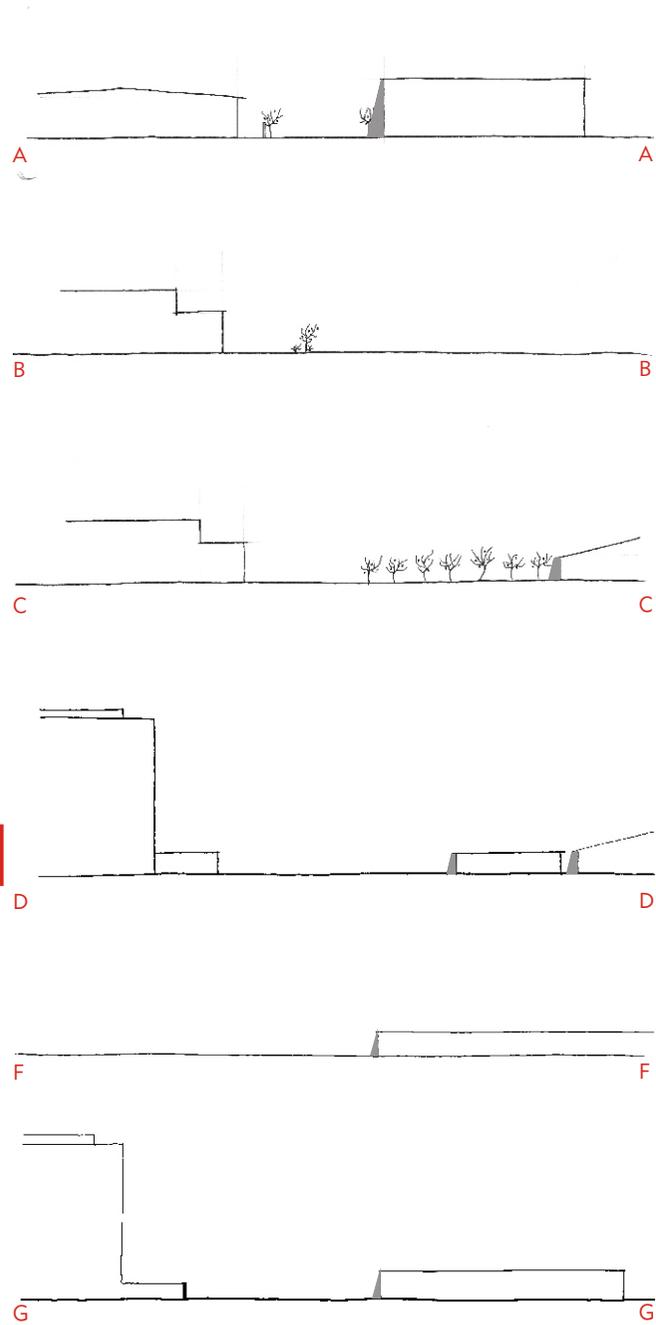
■ structures to be demolished
 site boundary



1 existing structures
 2 section G-G
 3 section H-H

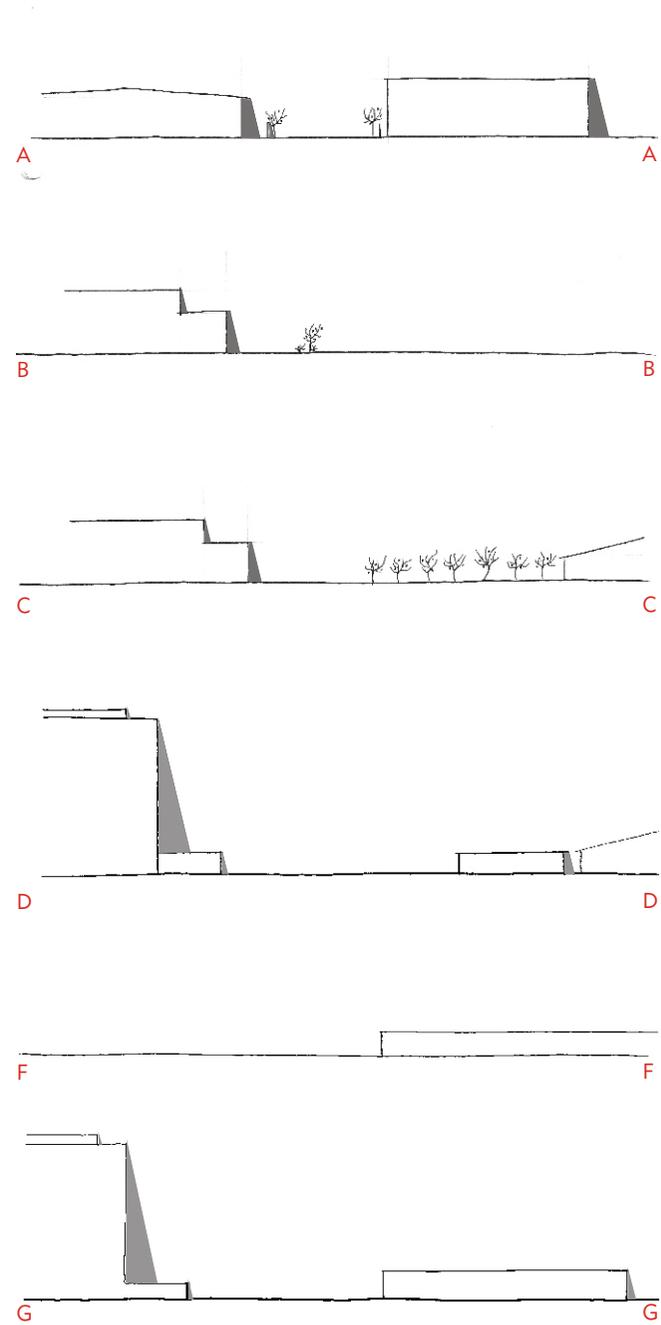
Exploration of shadows cast by existing buildings

Shadows on 21/6 @ 08:18



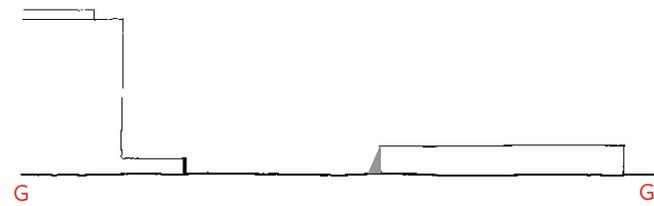
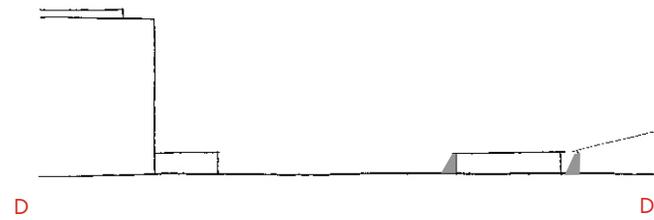
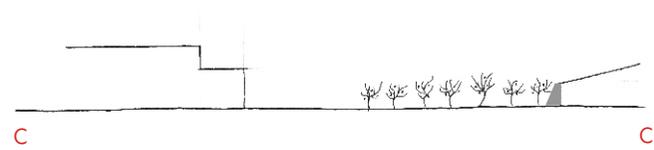
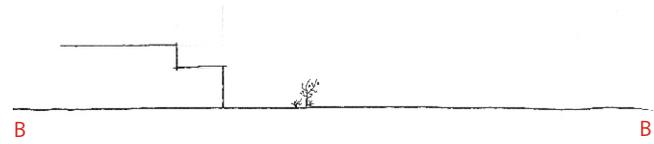
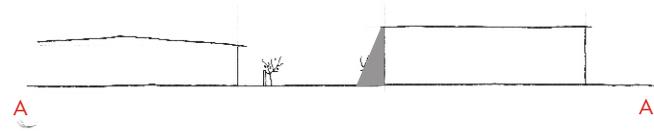
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Shadows on 21/6 @ 16:18

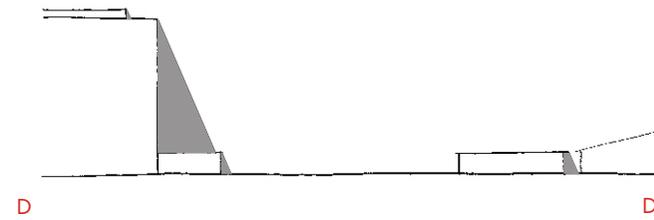
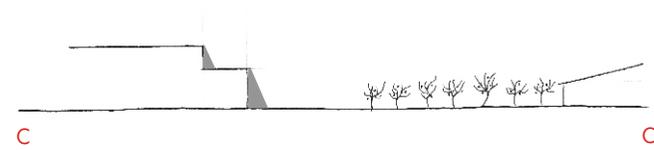
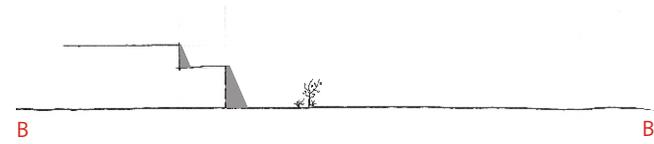
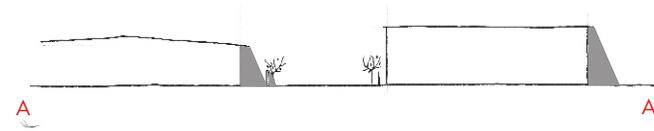


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Shadows on 21/3 & 9 @ 08:18



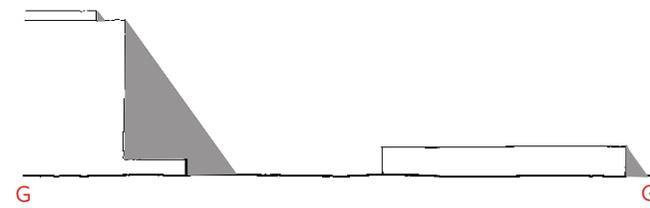
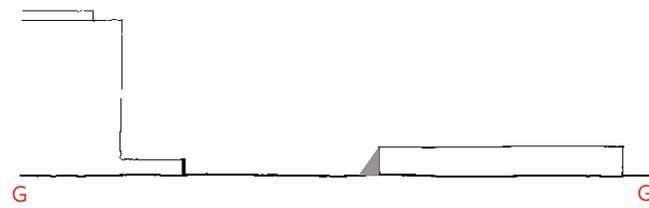
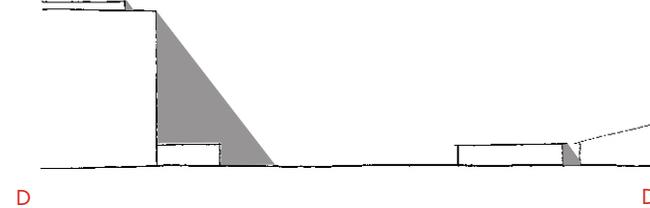
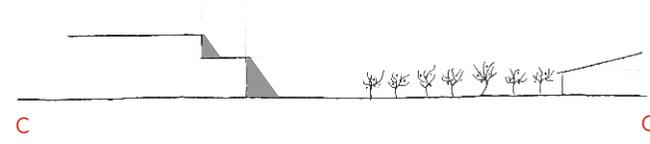
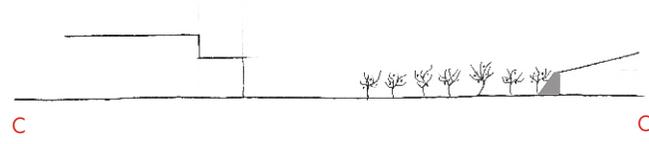
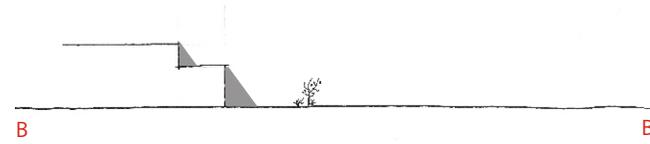
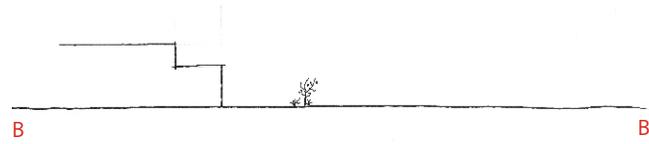
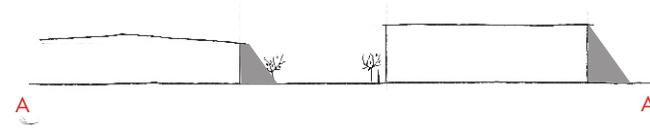
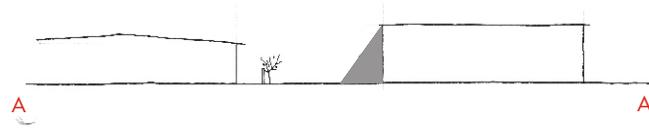
Shadows on 21/3 & 9 @ 16:18



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Shadows on 21/12 @ 08:18

Shadows on 21/12 @ 16:18



Edges



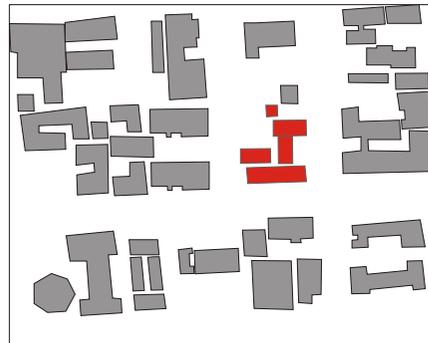
— Hard edges
- - - Soft edges

Green System



— Green spaces
- - - Pedestrian connection

Soft fabric



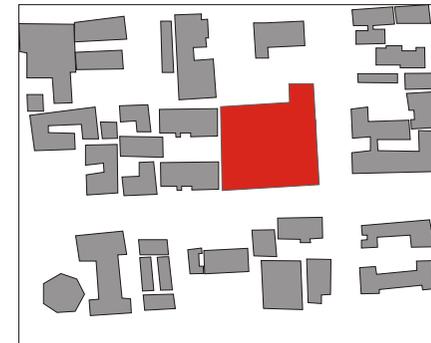
Structures to be demolished

Ground figure study



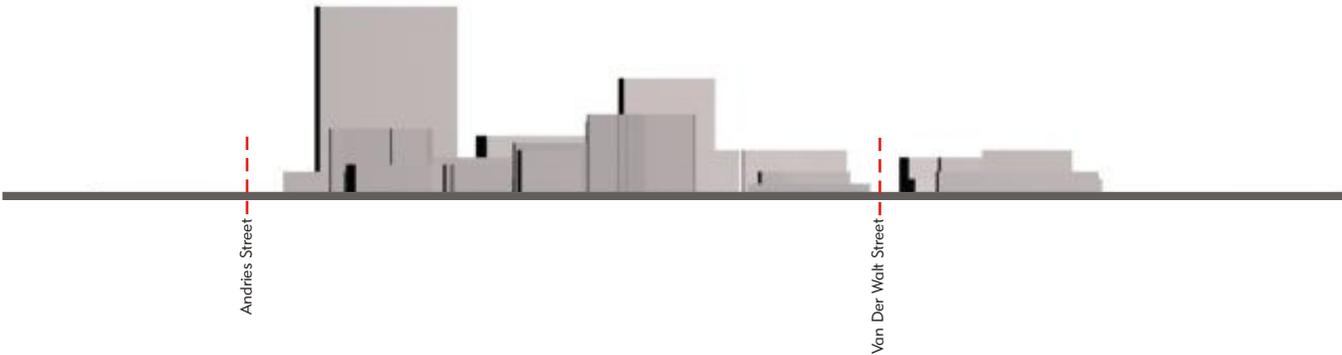
Indicating the relationship between built and unbuilt area

Unutilized space

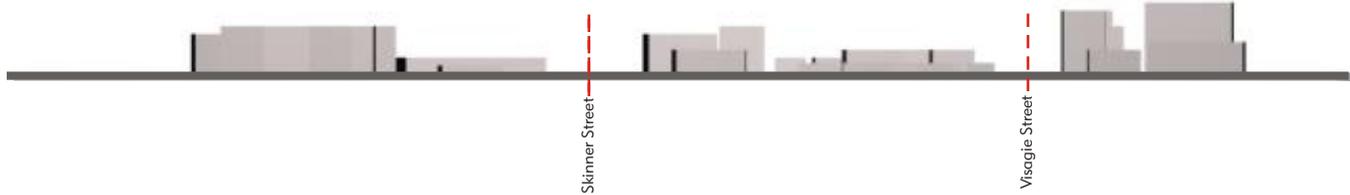


Area for which a new function should be proposed

Mass exploration

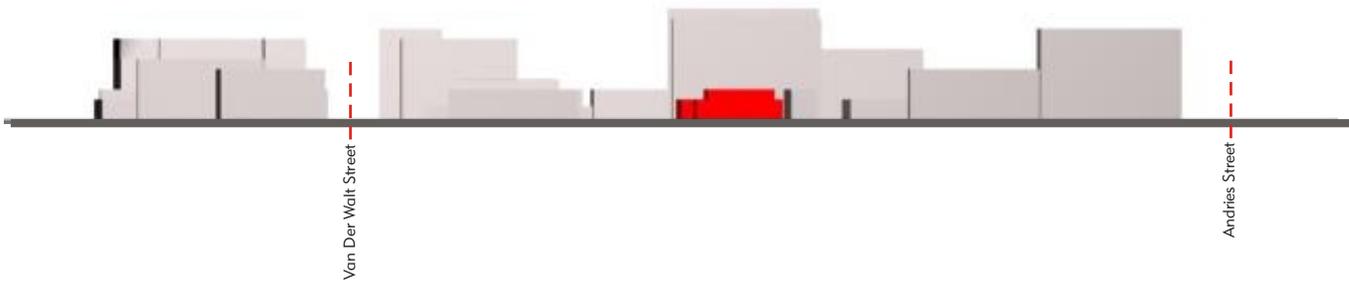


View to the north

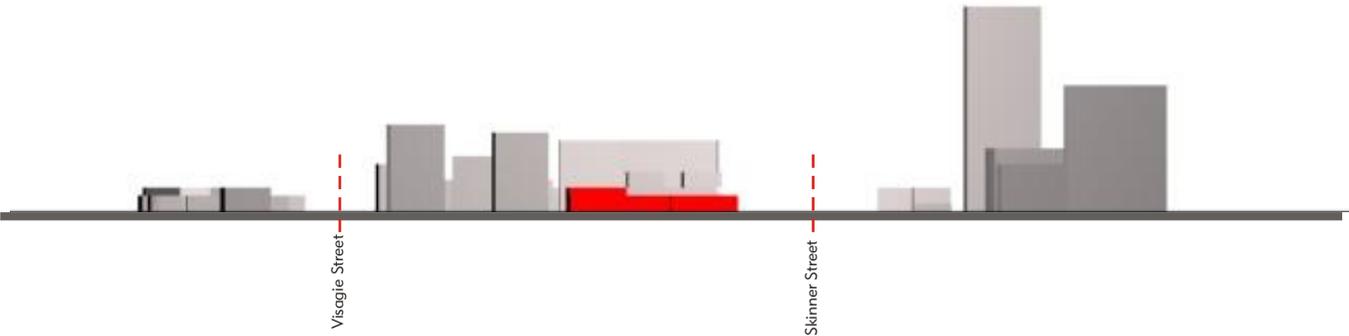


View to the east

University of Pretoria, etd - Human, M (2003)



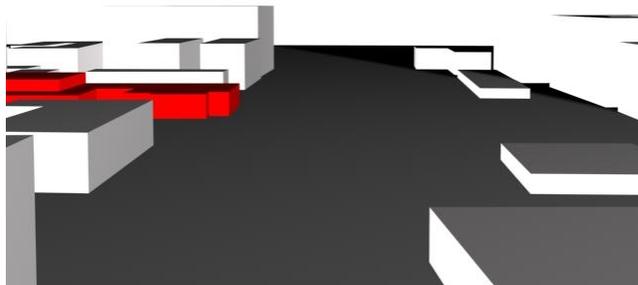
View to the south



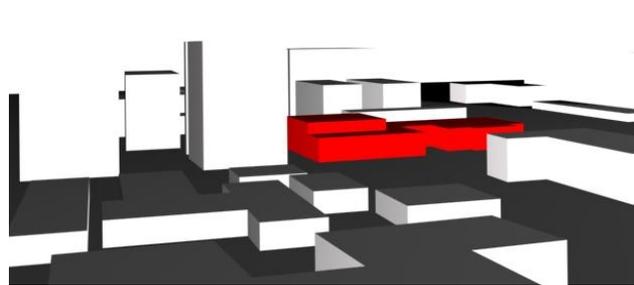
View to the west

University of Pretoria, etd - Human, M (2003)

3D mass exploration

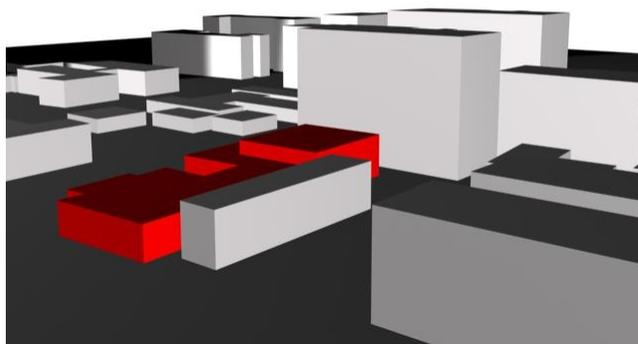


View to the west down Skinner Street

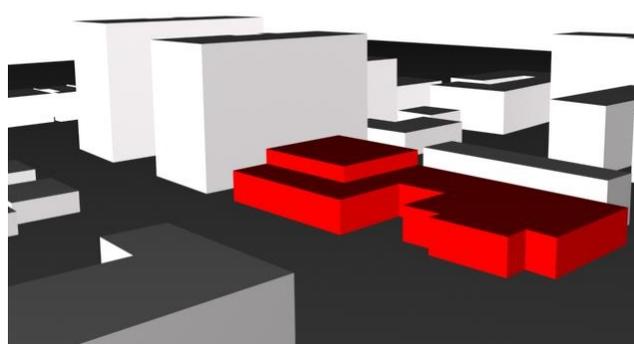


View from the east

1 | 21



View to the south east from Skinner Street



View to the south west from Skinner Street

formulation of design



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Dance and architecture

Studies on the relationship between dance and architecture are extremely rare. According to Curt Sachs, one of the world's noted authorities on ethnomusicology and the history of dance, dance gave birth to the other arts because it exists with time and space components (Antoniades, 1992; 260). It is the author's opinion that all arts consist of time and space components, with either time or space being emphasized. In dance, as in architecture, both these components are of equal importance. Another similarity is the notion of "real space", whereas in painting space is entirely illusory. Dance can be seen as a route or journey that the dancers as well as the audience follows, and this principle can also be applied to architecture. Modern choreography is a participatory affair between the choreographer, dancers and other people related to performance. The communication that needs to exist between the client and design team can be compared to this.

Music and architecture

Goethe once said: "a distinguished philosopher spoke of architecture as silent music, and his assertion caused many to shake their heads. We believe this really beautiful idea could not be better introduced than by calling architecture silent music" (Antoniades, 1992; 264).

In the 1930's, Georgiades, a Greek architect, studied the relationship between the placement of columns of ancient Greek temples and musical harmony canons. Through a visual chart known as "The Architectural Canon of Georgiades" he proved that the delight of harmony experienced by the eye when looking at Greek temples were due to the fact that columns have a relationship of column-void succession corresponding to specific musical harmonies.

Beauty through variety is the first concept to be shared by both these arts. Like in music, architecture brings together different elements, in proportion to one another to form a whole. Other similarities that are shared are those of tone, beat, proportion, scale, balance and rhythm. More dimensions in this relationship are individuality, freedom and plurality.

One of the dilemmas faced when using the analogy between music and architecture is that a person can perceive two buildings at the same time, but two pieces of music played simultaneously result in a blur. The work of two composers must be experienced separately, whilst the work of two architects can be experienced simultaneously. A way to deal with this dilemma might be that we should consider urban design as a musical symphony, with individual buildings as instruments, where all the architects should be sensitive to the harmony of the whole.

2 | 1



1 dance images

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Funding:

"Without the arts we run the risk of becoming a nation of housing and taps."

President Mr. T.M. Mbeki (<http://www.basa.co.za>)

The project will be funded by one or more of the following trusts and initiatives:

- Arts and Culture Trust (ACT)
- National Department of Arts, Culture, Science and Technology (DACST)
- Business and Arts South Africa (BASA)
- National Arts and Culture Lottery Initiative (NACLI)
- National Arts Council (NAC)

The **Arts and Culture Trust** is a private sector initiative, which aims to provide much-needed financial support for the promotion and celebration of South African arts and culture. The primary aim of the Trust is to increase the amount of funding available for arts and culture through means such as corporate donations, fundraising events, international donations, capital investment and income-generating affinity projects, and to then distribute these funds in support of innovative, sustainable projects which contribute to South African arts and culture.

ACT also seeks to help build a better arts and culture dispensation through proactive initiatives such as forums, conferences and campaigns around strategic issues, such as the ACT Awards which recognize the important contributions of players like administrators, journalists and educationists, and through establishing mutually-beneficial relationships between itself and the cultural community as part of its "culture helping culture" campaign. ACT was launched in October 1994, when Sun International and Nedcor Bank as founding partners each committed themselves to initial capital sums of R1 million, to be followed by R500 000 in each of the next two years. In the absence of tax incentives an before the launch of BASA, the **Department of Arts, Science, Culture and Technology** pledged R1 million over three years, to encourage private sector support for the arts.

The Arts and Culture Trust only became fully operational in September 1996.

Vodacom and the government of the Netherlands are the most recent founding sponsors to join the Trust, and are represented on the Board of Trustees along with Nedcor Bank and Sun International.

2|2

ACT continues to approach local and international donors to make similar capital contributions in return for the same status as founding partners, but also seeks to bring on board smaller private sector donors, to be afforded appropriate status. Founding partners reap the rewards of their investments in the Trust in association with a respected funding body. Corporate donors may also create affinity products, linked to ACT, which provide additional marketing and branding opportunities and generate business for the corporate donor and income for the Trust (<http://www.arts&culture.trust.htm>).

Nedbank's Affinity products are a good example of the partnership principle the Trust would like to encourage. In addition to the initial capital amount they further contribute to the Trust through its client's use of the ACT Affinity products, by donating a percentage of annual turnover on credit cards at no cost to the client, by charging a premium for every cheque book issued, which is paid directly to the Trust by Nedbank, and by making a donation to the Trust for every new savings account.

A supporter of the arts, Nedbank provides sponsorship for a wide range of cultural events outside of the Trust's activities. An association with ACT is often ensured at these occasions, which contributes to the positive building of the profiles of both Nedbank and ACT. The sense of the trust as a brand that is good for business is being increased all the time. This leads to profit and improved share prices (<http://www.nedbank.co.za>).

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ACT provides funding for all forms of arts and culture, including literature, music, visual arts, theatre, dance, film, festivals, community art, arts management, arts education, museums, heritage, as well as multi-disciplinary art forms. It also supports all aspects of arts and culture such as training, the creative process, the development of sustainable infrastructure and the dissemination of arts and culture. The full spectrum of arts and culture activities is covered, from professional endeavors to grassroots, community-based projects.

Annually, ACT provides bursary funds to formal and non-formal educational institutions specialising in arts and culture, and these in turn distribute such funds to individual students. ACT initiates activities that support the growth of cultural life in South Africa, and increase the possibilities for funding for the Trust. To this end, it has been involved in setting up and driving the National Arts Lottery Initiative and taking up the issue of tax incentives for arts support.

NACLI is a joint initiative involving the NAC and BASA, all independent, legitimate funding agencies that have a stake in the outcome of the National Lottery funding allocation to the arts. NACLI aims to promote the interests of the arts in all matters related to the lottery by lobbying government, political parties and all other relevant bodies to achieve the best possible deal for the arts from the lottery processes.

Furthermore, NACLI provides an important forum for co-operation around these issues, and encourages participation in the initiative from any national arts funding agency, which has the potential to be a national distributing agency of lottery funds. ACT strives to establish cooperative relationships with similar agencies, and this initiative is congruent with the policy. (<http://www.nac.org.za>)

For the first time in 1998, ACT established a series of annual awards, which seek to recognise and reward persons who, and institutions and activities which best support the development and promotion of arts and culture in the country. In the interests of developing an informed potential sponsor and support base, ACT has hosted forums in different provinces, on topics of contemporary debate, such as the lottery, tax incentives for corporate cultural donations, recent research in cultural industries, and political developments in policy and legislation.

The **National Arts and Culture Lottery Initiative**, which comprises BASA, ACT and NAC, is lobbying for a portion of lottery funding at least equal to that allocated to sport and welfare. Balancing the profitability of a lottery with the social needs of the country, the Department of Trade and Industry has capped the lottery operator's profit at 35%. At least 20% of revenues must be distributed to "good cause" funds.

Business and Arts South Africa was launched in February 1997 with President Thabo Mbeki as its patron. It is a joint initiative between government and the private sector to stimulate the development of the arts industry. BASA is established as a Section 21 company. It operates autonomously and is accountable to both government and its corporate members.

BASA aims to promote and encourage sustainable and strategic partnerships between the private sector and the arts, to their mutual benefit and to that of the community at large. With funding from the DACST, BASA has introduced the Matching Grant Scheme. Under this scheme, either a sponsoring business or an arts organization with one or more private sector sponsors in place can approach BASA for additional funding for a particular project, event or organization (<http://www.basa.co.za>).

The **National Arts Council's** priority is to fund organizations or individuals for projects that have national importance or are part of nation building. Projects must deal with the unique artistic wealth of the nation, assist in the process of fostering South African identity, promote the right of any person to freedom in the practice of the arts, seek to address national priorities and past and present imbalances, and seek to achieve artistic merit and excellence of national and international acclaim.

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Client: Doxa Deo Church

The building will be designed for two divisions of the Doxa Deo Church, who are concerning themselves with combining performing arts with Christianity. Both these divisions are non-profit companies, sharing the vision of equipping people with performing arts training that they can use in ministry or as professionals.

One of the divisions is OAC, the **Original Arts Company**. Currently it has five campuses in the Pretoria area. It offers classes in drama, dance and music. The drama classes consist of actor training without any technical subjects like set building. Modern contemporary dance as well as ballet are taught. Music training consists of music theory and practical sessions. At the moment six different instruments are taught, but arrangements are done for other instruments as well.

The classes are held twice a week, their length depending on the students' age and grade of knowledge in the particular field. Ages range from four years old to elderly. All class fees are the responsibility of the students, but OAC puts students in touch with sponsors where necessary. Students can obtain a certificate after successfully completing exams before a panel of external examiners.

Plays are staged twice a year, usually in the Aula or the Pretoria State Theatre.

The other division is SCC, the **School of Creative Communication**. Its aim is to provide holistic training in the performing arts. The training is balanced on four pillars: firstly dance, drama and music, secondly personal development, thirdly theological training and lastly adventure training.

Courses are taught over four years, with the first year as a bridging year aimed at those who might not have the necessary qualifications to study at a tertiary institution. After this year, students have the opportunity to complete their studies at SCC or move to another tertiary institution. After successfully completing the following three years, students will obtain a BA degree in performing arts, which is still in the process of being accredited.

2 | 4



1 a project of the Grahamstown Foundation

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School programme

The **School of Creative Communication** will utilize the proposed building as a campus from 8:00 – 17:00 on weekdays. In the evenings it will be utilized by the **Original Arts Company**, another initiative from Doxa Deo, and for an **adult education** programme.

230 students will use the campus daily in the following denominations, 80 first year, 50 second year, 50 third year, and 50 fourth year students. The course will consist of theoretical, practical, and theological components.

Study fields: Drama
 Dance
 Music

Practical sessions: 15 hours – field of choice
 7 hours divided between the other two fields
Workshop sessions: 5 hours divided between wardrobe and set design
Theoretical sessions: 8 hours per week
Theological component: 5 hours per week (Doxa Deo Church building)

The two apartment buildings next to the **Doxa Deo Church** building will be used as a residence for the students. Thus the campus will extend from Skinner Street, through Burgers Park, and up to Jacob Mare Street. **Burgers Park** will be used for open-air performances, which will introduce people from the community, who are unable to afford theatre tickets , to the performing arts.

Over weekends the cafeteria will be utilized as a **community kitchen**, serving meals to homeless people.



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Design Challenges and Responses

- Creating a sense of place on a flat landscape
- Using the building as a space defining element
- Form thresholds between private, semi-private, and public spaces
- Creating rich and meaningful city spaces
- Being sympathetic towards the Little Theatre
- Creating balance between scale, unity, proportion and rhythm
- Achieving a contextually appropriate timeless spatial quality, characterized by serenity, resilience, robustness and ambiguity
- Re-establishing the street as a seam that supports the daily activities of neighborhood life
- Creating a pedestrian friendly edge
- Creating a humanist relationship between exterior and interior
- Achieving a building that appears accessible and inviting to the public
- Creating a highly flexible environment
- Creating a "green building"

precedent studies



The Point

Project team

Client: Darts: Doncaster Community Arts

Architect: Groundworks Architects

Structural Engineer: Price and Myers

Quantity Surveyor: WT Partnership

Services Engineer: Leeds Environmental Design Associates

Project Manager: The Uccello Partnership

Main Contractor: Weaver Construction



Darts has been a registered charity since 1992. At first it employed outreach programmes, but in order to reach more people and host a wider variety of workshops a building was needed. Darts consists of a team of young artists and performers whose aim is to make the arts available to the whole of the Doncaster community, with emphasis on accessibility. Recent ventures include visual/writing sessions for children with interrelational problems, music workshops for children with physical impairments, a “quirky choir” for those who thought they could not sing, and dance classes for the over 50's.

Groundworks Architects is a Nottingham based practice, doing a lot of community and volunteer projects. To ensure the project's future financial feasibility and sustainability, income is generated through renting space to tenants such as a bookshop, a café and office accommodation.

The Point consists of three elements: two converted early Victorian houses, a glazed atrium and a new-build rear extension. The existing houses on the south Parade are listed. Doncaster has very few heritage buildings, and is extremely protective of what it does have (Singmaster, 1999; 31). Entrance to the building is through the Victorian houses, accentuating their importance. Their domestic scale and character is preserved. The comfort of wheelchair users is of utmost importance in this building because of the high percentage of disabled users. Introducing eight lift stops solved a difference of 1m in the adjacent floor levels.

The glazed atrium forms the link between the houses and the rear extension. The the glazing of the atrium is coated on the inside with a low-E coating to avoid overheating in summer. The connections to the existing fabric are very subtle. The atrium looks out onto a small courtyard, which merges exterior with interior. A glass bridge leads to the studio on the upper level of the extension, while stairs take one down to the floor of the atrium and the café below the studio.

The rear extension is lower than the existing houses in order for it not to compete with them in scale. The planning authority requested a pitched roof. The extension consists of a double height gallery space and a crèche. The studio is fitted with lighting and sound equipment to a professional standard, and has a changing room and shower/WC attached. Seen from the rear, the extension appears as a plain brick-faced building with a shallow pitched roof.

The project is a good example of utilising the constraints inherent in a listed building to enrich the design through the creative use of form and materials.

Applicable principles

Community involvement

Balance between old and new

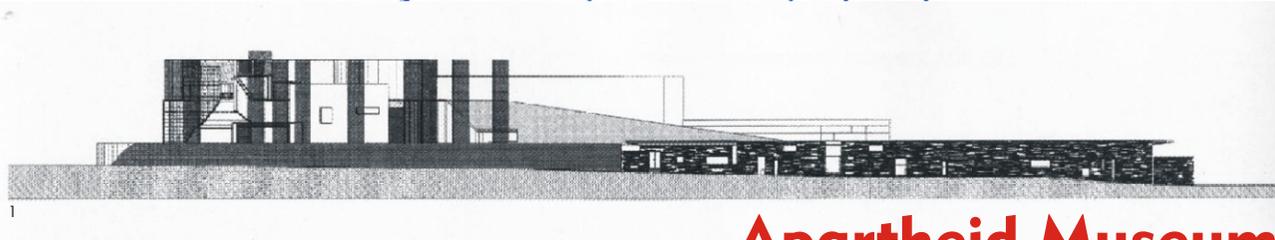
Connection between old and new

Letting of spaces to ensure financial sustainability

Merging of exterior and interior spaces

1 Glazed atrium link

2 Converted Victorian houses



Apartheid Museum

Professional team

Client: Akani Egoli (Pty) Ltd

Project architect & co-ordinator: Sidney Abramowitch Architect

Architects: GAPP Architects & Urban Designers

Mashabane Rose Architects

Britz Roodt Project Association

Linda Mvusi Architecture & Design

Landscape architect: Patrick Watson Landscape Architect

Quantity surveyors: Schneid Libera (Pty) Ltd

Thabo Senyolo & Partners cc

Structural engineers: Pure Consulting

Electrical Engineers: Monty Miller Associates cc

Claassen Auret Inc

Mechanical engineers: Richard Pearce & Partners

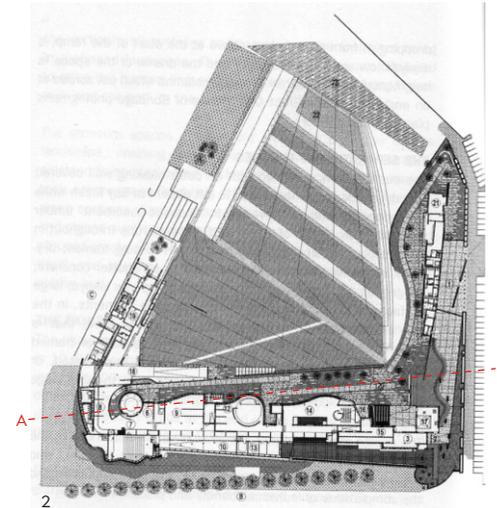
Traffic engineers: PD Naidoo & Associates

Curator: Christopher Till

Audio-visual consultants: Electrosonic

Fire consultants: Specialised Fire Technologies

Main contractor: Murray & Roberts.



The museum is located between the Johannesburg CBD and Soweto, in a semi-industrial zone that also accommodates office and retail facilities. Its juxtaposition to the indulgent frivolity of the adjacent casino and theme park, while considered by some as a potential negative, in effect reinforces the notion of separate realities that was at the core of the apartheid system; it accentuates the seriousness of the museum and a quality of stillness that is created in the newly built complex (Leigh Darrol, 2001;24).

3|2

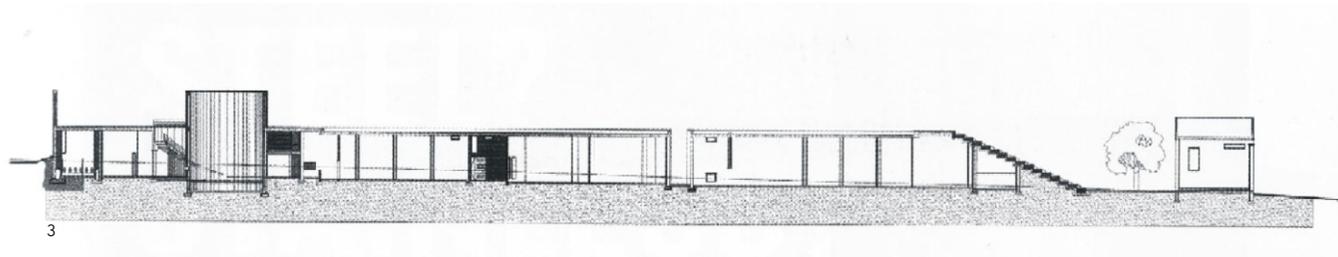
Elements of the spaces associated with apartheid, like separate entrances, the pass office, and security police cells, remind visitors of the dark side of apartheid. The building is greatly influenced by its function as well as context.

Influenced by context

The unique material qualities of the surrounding physical landscape are present inside and outside the building: rock-filled gabion baskets in rusting steel frames recall nearby mining structures and activities, while large planted earth mounds recall the planted mine dumps partly concealing and revealing the "dark world" of apartheid within.

The main body of this single-storey flat-roofed structure is partially submerged in the slope of the site, reducing the height relative to grade and allowing the large ramp to reach the roof comfortably.

Lowering the bulk of the structure also allows the building to merge with the landscape that is shaped upwards to reduce further vertical wall surfaces and to enhance the feeling of being in a shaped landscape. The important fill berms are deployed to raise the horizon line and block out the neighbouring theme park and car park to the north and east of the site.



A walk through space and time

The museum spaces are laid out along the perimeter of the landscape, creating long linear wall surfaces with carefully selected finishes to define each space: gabion walls, dry- stacked rock walls, narrow-gauge facebrick, off-shutter concrete and indigenous grass surfaces. Spatial separation, surface breaks, open-ended and closed surfaces sometimes de-materialised, separated and stepped create a layered sequence of finishes generating spatial depth and interest. This is especially noticeable on the south gabion wall.

The museum consists of 5000m² of exhibition space laid out in 10 display spaces along a concrete service duct or “spine”. It includes 500m² of administration/archive space and a detached low-slung building that houses the bookshop, coffee shop and security office at the end of the journey overlooking the 100m-long “slimes dam” lake.

The 40m long and 4m wide space under the concrete entrance ramp is a dimly-lit low space. It has a sloped floor and soffit, and light drops in from nine metres above at the start of the ramp. At the other end the drama of the space is heightened by a line of raw concrete columns which cut across at an angle and by the Ernst Cole House of Bondage Photographs.

The separation of finishes

The auditorium is designed with an outer snaking wall of dry-stacked stone. The inside is left without any finish while the opposite wall is covered in acoustically-absorbent timber wall panelling. This theme of separated finishes are expressed through the museum details: galvanized gates in rusting frames; dry-stacked stone adjacent to red-brick walls or off-shutter concrete; indigenous “rooigras” long grass banded alongside kikuyu; large surfaces of gravel beds and smooth concrete elements. In the interior the theme continues with the use of steel that is galvanised and suspended above the steel exhibit of framed cage-like structures which are left unprotected; timber panelling adjacent to smooth concrete, or benches made of folded steel plate with thick on-edge timber slats.



Applicable principles
 Relationship with the context
 Selection of materials
 Separation of finishes

Form influenced by function
 Definition of space
 Coherence between interior and exterior
 Journey through the building

1. East elevation
2. Groundfloor plan
3. Section A-A
4. View from the roof
5. Walkway along the north of the building
6. The exhibition space on the roof

South African Jewish Museum

Project team:

Client: South African Jewish Museum
Architect: Dennis Fabian Berman Hackner Architects
Project Partner: Michael Hackner
Design Architect: Paul Brislin
Quantity Surveyor: Chandler Hofmeyr Quantity Surveyors
Museologist: Reneé Sivan
Museum Designer: Harel Designers
Structural and Civil Engineer: Ninham Shand (Pty) Ltd
Mechanical and Electrical Engineer: Lewis & De Kroon cc
Landscape Architect: Tarna Klitzner
Contractor: Slingsby & De Jager (Pty) Ltd



The South African Jewish Museum project forms part of a larger simultaneous redevelopment of the historic Company Gardens Great Synagogue site and Albow Centre. The purpose of the museum is to celebrate the role and contribution of the Jewish Community within South African life and culture, as well as to focus on and act as a vehicle for dialogue with the broader South African community.

The site has particular historical and religious significance, both in terms of the Jewish Community and the larger South African Community. It is located in Cape Town, in the precinct of the Great Synagogue of Hatfield Street. It falls within the historical "museum belt", centered on Van Riebeeck's Company Gardens. The site was also subject to Road Widening Regulations, parking Restrictions, and a change of zoning. Fruit bearing trees on the site were protected by religious edict, and the local authority protected all the existing palm trees.

The museums form part of a unique and non-exclusive campus of related community activities, such as the separate Holocaust Centre and Gitlin Library. A restaurant, museum shop, community centre and conference centre are also located on the campus, as well as a number of religious buildings including a Succah, the 1905 Great Synagogue, and the historic Old Synagogue of 1863. The campus has two edges that relate to the public, one facing onto the Company Gardens and the other onto Hatfield Street. The intention was that an internal square would be the "oasis" beyond the solid and formidable front presented by the two buildings: the renovated Albow Centre and the museum.

3 | 4

Architectural parameters

- The project must reinstate the centrality of the existing synagogue and not compete with it in height or detail
- When viewed from within the site, the structure must express the contemporary spirit of the museological programme
- Viewed from Hatfield Street, the building should be simple and dignified, and appropriately scaled to its neighbours
- The building should also be completely without historical pastiche
- The new museum should help the entire campus of related community facilities to act as a unified whole, by using courtyards to allow movement through the buildings, all the way from Hatfield Street to the Company Gardens

(Architect & Builder, March/April 2001;28)

Both these buildings have clean, simple lines, so as not to compete with the richness in style of the existing two synagogues. Their scale and proportions were also influenced by this fact so that the existing buildings do not dominate. In order to achieve this a basement was created for the museum.

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The museum is a marriage between old and new. The old synagogue has been refurbished and forms the entrance to the museum. The synagogue houses the Judaica exhibition and is an exhibit in its own right.

The old synagogue is connected to the new building by way of a glass bridge spanning a reflection pond courtyard. Other than its function of connecting the two buildings, the structure is an architectural metaphor of bridging the old land to the new, across the water.

The new building has two levels, a basement and ground floor. A continuous view to Table Mountain can be attained from both these levels. The ever-present sight of Table Mountain was seen as the connection of the community to their new country. The building is essentially a box made up of planes that give it its detail, both in the treatment of the façade and the ground floor. The box curves out slightly towards the courtyard between it and the old synagogue. This not only adds a dynamic form but also leads the eye of the visitor from the entrance between the palms beyond and opens up a vista to the old synagogue.

The ground floor has been raised to just over a metre above the courtyard level. This achieves continuous horizontal glazing down to the basement level. The slab was stopped short of the Hatfield Street edge by the same distance, thereby creating the continuity of the space connecting the two levels. The glazing strip turns vertical at the ends, joining a horizontal strip at the top. This forms a continuous glass border on four sides, creating the feeling that the façade facing the main courtyard is floating. The street façade on Hatfield Street is solid, with the only relief a depressed rectangular plane that displays the museum signage and logo.

Jerusalem stone was imported to clad the building. As a contrast to the warm natural stone finish, stainless steel is used for the canopy at the exit above the floating ramp, and also for indoor and outdoor handrails. The bridge has floors of rusted metal panels, which have been heavily varnished.



3 | 5

Project information:

Building Cost: R9 million

Site Area: 1643m²

Built Area: 1227m²

Old Synagogue Renovation: 240m²

Commencement: April 1999

Completion: August 2000

Applicable principles

Bringing educational facilities into the city centre

Internal square/courtyard

Coherence between old and new

New complementing the old without competing

Using form to lead the eyes

Contrast between finishes

Different functions so that the project is sustainable

1 old synagogue and Albow Centre

2 courtyard

3 link between the synagogue and Museum

4 facade facing Hatfield Street

Munich Reinsurance Centre



Project team:

Client: Munich Reinsurance Company of Africa
Project manager: EC Harris South Africa (Pty) Ltds
Architects: Stauch Vorster MOM Architects
Project architect: Carlyn Winch
Quantity surveyors: Walters & Simpson / HOA
Structural and civil engineers: Ellmer Partnership
Mechanical engineers: Spoomaker & Partners Inc
Electrical engineers: Claasen Auret Inc
Fire consultants: Morgado & Bagus
Plumbing consultants: SJ Franklin & Associates
Acoustic consultants: Dr E Smith
Landscape architects: Landmark Studios
Interior design: SV MOM Architects in association
with Marion Allen Interiors
Town Planners: Steve Jaspan & Associates
Landscape contractors: Real Landscapes

The building is located in Johannesburg, at 47 Empire Road, which is one of the large vehicular movement spines of the city. The Parktown Ridge forms a large landscape reserve on the northern side of the building and this area is gradually being returned to its natural state. This presented a great opportunity in that when the building was orientated to the north for climatic reasons, with the majority of social areas located on this side of the building, the facade could open up onto this area. The southern side of the building, facing the busy Empire Road, is more solid, and set back quite a distance from the road. This not only aids noise control but also privacy, because this is not a public building. Double glazing and a large water feature that celebrates the entrance also helps to mask traffic noise.

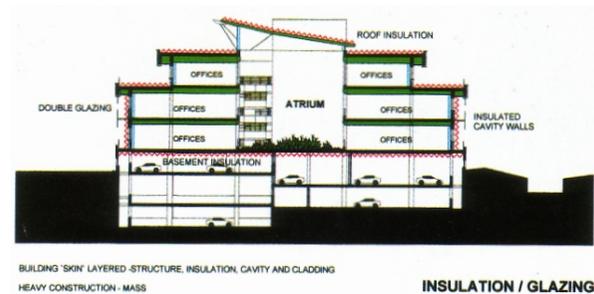
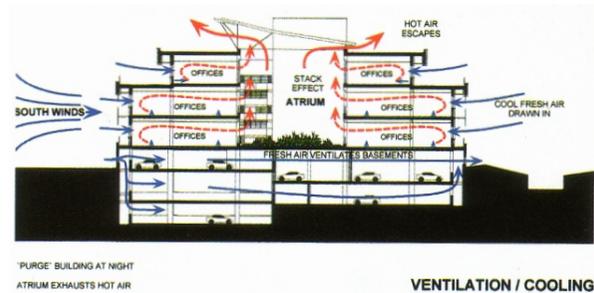
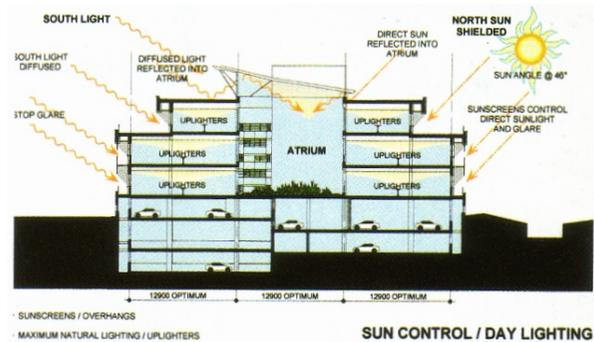
3|6

The company's slogan is "tradition with innovation". The architect expressed exactly this idea by specifying natural sandstone cladding with a steel and aluminium sunscreen and balustrade detail. In this case the client was really committed to building a green building, which meant that an integrated approach was followed.

The building design philosophy took into account orientation, mass, shape/form, fenestration/sun control and insulation (Knoll, 1999; 17). The building has a true north/south orientation that takes advantage of optimum natural light. On the south facade small overhangs diffuse light before it enters the offices. On the third storey terrace light is bounced from white pebbles into the clerestory to the atrium. The north facade is protected with sunscreens calculated by using a 46° sun angle, with a small amount of sunlight reflected into the atrium. The east/west facades are solid except for a few small north and south facing viewpoints at the ends of the main east/west corridors, providing natural light to the circulation corridor.

Heavyweight construction, in the form of concrete with brick infill and stonework facades, is used to mitigate the temperature fluctuations on the highveld. High thermal mass means that heat stored in the material during the daytime is only released at night time, so that a more constant temperature on the inside of the building is achieved. All the roofs and basement floors are fully insulated and all external walls are insulated with 25mm isoboard in the cavities and behind the stone cladding.

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2

Applicable principles

- True north orientation of the building
- No persons further away than 6m from natural light
- Use of sunscreens and overhangs
- Sourcing of local materials and craftsmen
- Insulation of the roof and exterior walls
- Use of water to mask vehicular noise
- Use of heavyweight construction for thermal comfort
- Creation of heat stacks to draw out stale, hot air

- 1 Main entrance
- 2 Passive design principles

The plan is rectangular with two 12.9m wide atriums flanked by two office wings, each also 12.9m wide. This was calculated by deciding that no employee should be further than 6m away from natural light and basement parking. The primary functions of the windows in this building are to provide views to the outside, particularly to the natural ridge, and to allow natural diffused light to enter the building. Window sills are just above workstation level to provide workers with a clear view. The continuous strip fenestration is double glazed to prevent re-radiation and loss of heat in the winter. Air-conditioning could not be done away with completely but is reduced to the minimum.

An attempt was made to source material and craftsmen locally. The boardroom table was carpentered by a two-man local business. Workstation lamps for direct/indirect lighting were custom designed by a local manufacturer in Gauteng. Partitioning was locally made in the Cape. Stone cladding was sourced from local quarries, and the large terracotta planters were locally made (Knoll, 1999; 19).

Because natural light is utilised through the orientation of the building and the atria, artificial lighting has been minimised. All lights are connected to dual switches, which allows occupants to make use of "half power".

Fresh air is introduced into floor voids to function as flushing at night, with hot stale air escaping through the atria, which acts as heat exhaust stacks. Cooling is by means of air cooled chillers through ceiling mounted fancoil units, while heaters in the same units provide for winter. The air-conditioning is designed so that it won't be affected by the opening of windows. Energy usage in the building is being monitored through a Building Management System (BMS) which will, over time, report on how efficiently the building is functioning. Aspects such as air conditioning, lighting, plumbing, security and the operation of the irrigation system and the pumps for the water feature are monitored electronically (Knoll, 1999; 19).

The site is divided by a stormwater culvert running between the building and the ridge, which is demarcated by the Johannesburg City Council as a landscape reserve. The parkland is connected to the building with a bridge spanning the culvert. Immediately to the north a small lawned area was created for use by the Munich staff. The rest of the land is in the process of being returned to its natural state. The reserve has been cleared of most of the invasive exotic vegetation except for the bluegum trees that are retained until the indigenous trees have matured.

Velocity Films

Professional team

Client: Velocity Film Productions

Architect: Jo Noero Architects

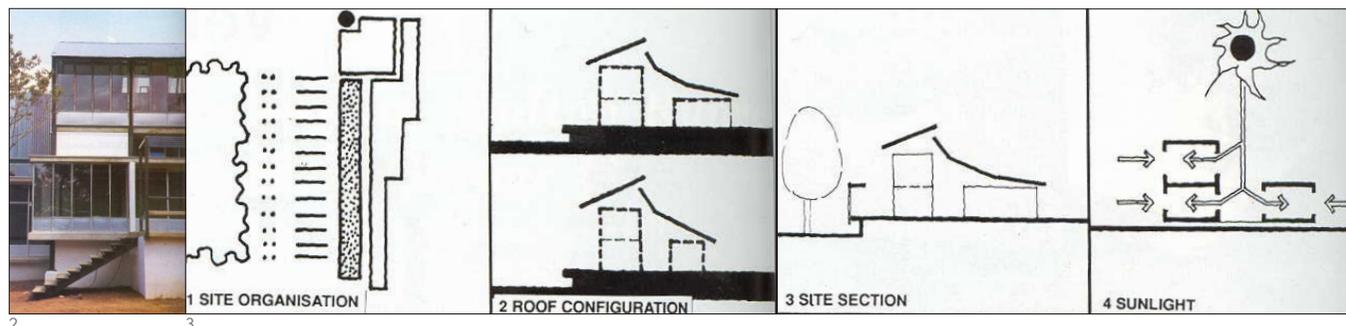
- 1 East facade
- 2 Detail showing materiality
- 3 Concept diagrams
- 4 Typical section
- 5 Site plan
- 6 Concept diagrams
- 7 Internal street



The building is situated in the northern Johannesburg suburb of Rivonia. It accommodates the headquarters of Velocity Films, one of South Africa's leading film production houses.

The site is wooded and slopes downhill from west to east. The building is positioned on the southern edge of the site, so that as much as possible of the site to the north is left open. This allows the building to borrow from the landscape and take advantage of the existing trees. Three large jacaranda trees on the north side become an integral part of the elevation of the building, and at the same time filter the north light. As the trees are deciduous they shade the building in summer and allow north light into the offices in winter. Along the north side of the building is a continuous terrace, running the length of the building. On elevation the terrace becomes the datum of the building, registering the horizontal of the building against the slope of the site.

The external facades of the building are each treated differently in response to site, climate and use. Overhangs are used on the north façade as sun protection, whilst the rest of the façade is visually transparent to allow the landscape into the building. The roof on the south side slopes sharply down to a height of 2.2 metres, responding to the domestic character and scale of the neighbouring house.



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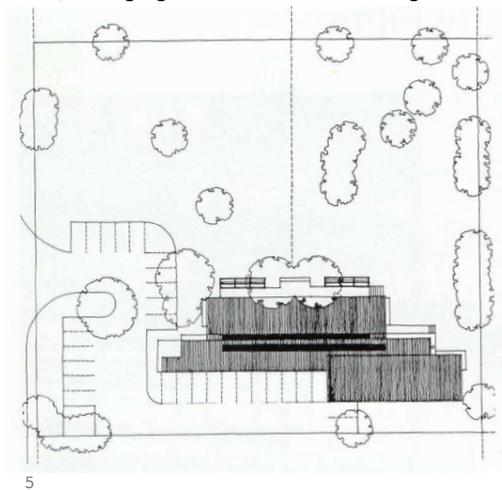
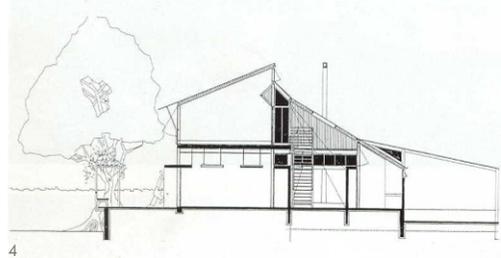
The building is arranged around an internal street that forms an axis, which acts as binding space for the accommodation on both ground and first floor. Furthermore, the street acts as a conduit to draw people into the building. Cross ventilation is achieved through ensuring that every room opens up to the outside while its opposite side opens to the internal street. Hot air is drawn from the offices into the street from where it is drawn out by two mechanical fans at the ends. This space is double volume and allows the first floor offices to be reached by a gallery.

“The order of the structural steel grid is maintained throughout the building. However, the order is disrupted where needed so that whilst the rules for the building are apparent in the structural order and the order of the street, it also becomes apparent throughout the building where these rules have been broken and for what purpose. In the words of Colin St John Wilson, ‘once order has been established, vitality resides in the careful disruption of that order to accommodate those uses which by their nature requires special consideration’ (Architecture SA, 1996; 19).

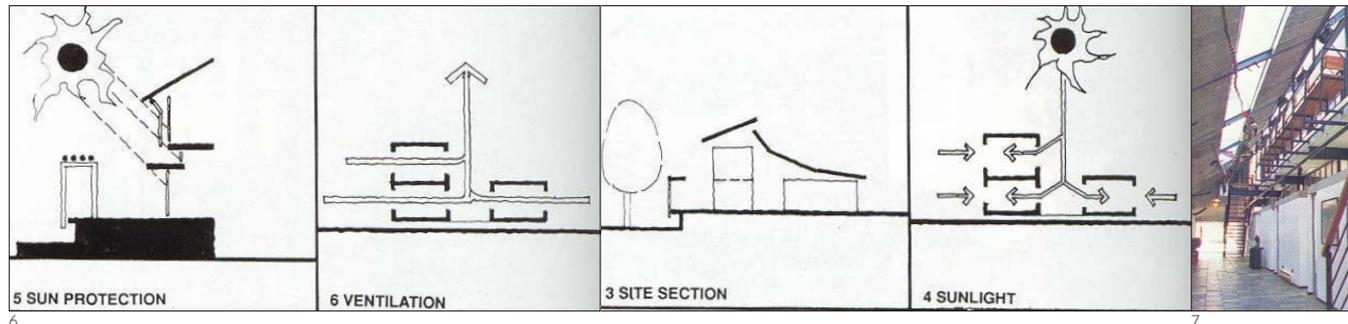
Materials were limited generally to steel, brick, timber and concrete and left unfinished where possible. The structural steel frame is left visible throughout the building, both inside and outside. The other materials are all expressed independently from the structural frame. Brick and concrete boxes housing film equipment protrude into the street, changing the scale of the building and animating its edges.

Applicable principles

- Simplicity of form influenced by function
- Honesty and selection of materials
- Visual and physical connection between interior and exterior
- Relationship with the context
- Sustainability principles



3 | 9



Stable Theatre

Professional team

Architects: OMM Design Workshop



3 | 10

One of the most noticeable features of South African cities is the lack of public facilities for their citizens. Not only did apartheid planning ensure the removal of public gathering places such as town squares, pavement cafés and city markets, which were so much a feature of public life, but this draining of the city's life blood continues today within our new democracy (van Wyk, 1999; 116).

One of the biggest problems we need to address in the Pretoria CBD is the way that introverted buildings distance themselves from street life. We need to respond to the demographic and socio-economic realities in our cities.

The author is of the opinion that the Stable Theatre is a step in this direction. A limited budget was provided by national RDP funds, through the conduit of the Kwazulu Natal Department of Education and Culture. Much emphasis is placed on creating spaces for the community instead of creating a defensive building.

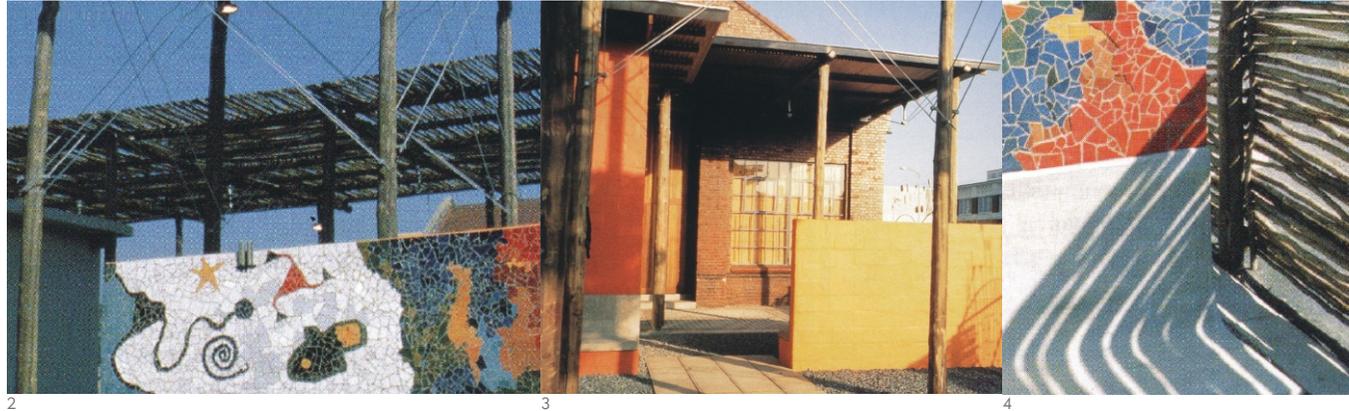
The building is located on the route from the Durban CBD to the central train, taxi and bus station interchange in Warwick Street. People gather here to listen to live music, have a drink, watch boxing, basketball, or dance theatre. The site is easily accessible from the CBD and the Berea residential precinct.

The building is centred around a collection of courtyards, some roofed, some shaded, some open to the sky. Every internal space, whether it is a rehearsal room, a restaurant or a large performance space, opens onto one of these courtyards. The building responds very well to the climatic conditions in Durban through providing a variety of outdoor spaces, so that no matter what the weather conditions are, a suitable outdoor space is provided.

The building caters for a variety of community activities during the day as well as in the evenings. Spaces are generously sized to ensure that they are multi-functional. Robustness is especially important in community projects like these to ensure that they are financially feasible and cater for as large a part of the community as possible.

In a time where sustainability has become a catch phrase, this building is a good example of how a project with a low budget can make a difference through innovative, simple design. All the materials were locally sourced and local labour was used. Through this not only skills transfer was introduced, but it also gave the community an immediate sense of responsibility and ownership towards the building, which is very important where public buildings are concerned. Detailing is simple but well resolved, for instance the way the gumpoles are

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connected to the floor, to ensure that the timber won't be in contact with water at floor level. A system of cables and ties is used in the roof structure, which means that the rest of the structure can be very light. Robust finishes, for instance the stones in the screed, are specified in order to keep maintenance costs to a minimum.

Space inside as well as outside are layered through the use of materials, strong colours and other elements such as wattle lath screens, mosaics and short walls.

The architects believe that: 'if more people were to live in the heart of Durban - say in the same proportion as live in downtown Paris, and there were as many facilities in the CBD performing the same role as the Stable Theatre as there are pubs in London, then Durban would be on its way to becoming a city that serves its ordinary people well. This is surely the purpose of architecture (van Wyk, 1999; 120).

Applicable principles

Sourcing of local materials, labour and skills

Robust forms and finishes

Catering for different activities

Simple detailing

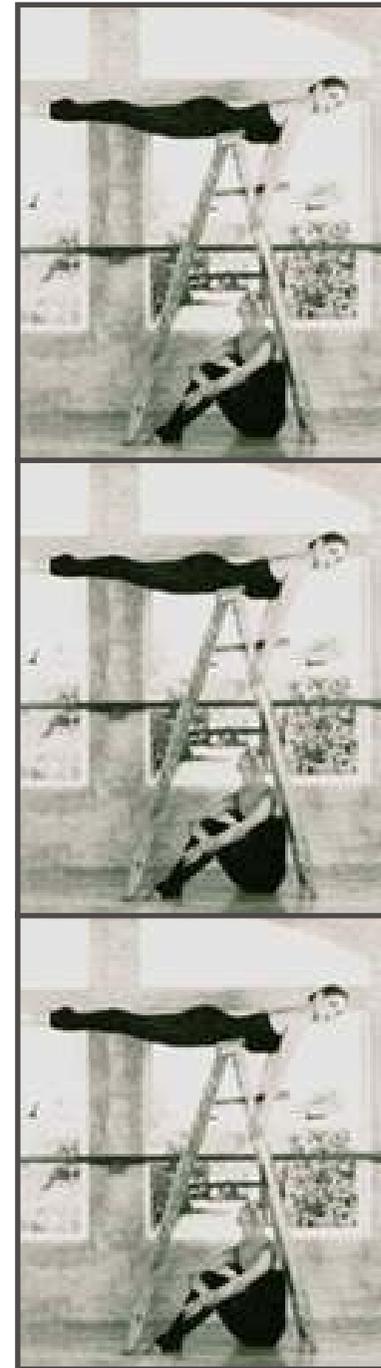
Responding to context

Creating places for the public

Using colour to create depth

- 1 Horizontal wattle lath screens
- 2 Lightweight roof structures
- 3 Layered space
- 4 Vertical wattle lath screen

design influences



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Concrete construct

The **Headquarters of K.J. McNitt** is situated in **Oklahoma City, USA**. The company specializes in precast concrete tilt-up slabs and used the building as an advertisement for the company's expertise. Slabs are cast in formwork on the ground, then craned or winched into a vertical position, they are propped until stiffening elements, like the roof and internal walls, were in place. At this stage the props can be removed. In this building the props are retained. To further emphasize the nature of the construction process, each 7m high panel is separated from the next by an 200mm wide glazed gap. The joints emphasize the separateness of the panels and their thinness.

4 | 1

- 1 From north, with pipe props left in position as buttresses, making an order which emphasises the articulation of the slabs and the nature of the structure.
- 2 South-west corner.

(Architectural Review, October 1997; p56-59)

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1



2

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Leading the Dance

The **London Contemporary Dance School** is to be found at The Place in the King's Cross Partnership area. Glass balconies between landings act as stretching zones, so that silhouetted dancers in motion, figures superimposed one above the other, can be seen from the street. This tower is the centre's shop window, advertising its presence to the neighbourhood. Studio walls on the north are made out of glass bricks which diffuse light, while maintaining privacy. For the dancers these studios are introverted places for **intense concentration**, but any sense of claustrophobia is dissipated by the subliminal impression of light, air and the reflection of sprung floors and mirrored walls.

1 glazed stair tower with stretching areas gives access to the studios on the right.
2 studio with glass brick wall to the north and sprung floor.
3 studio with a folding central dividing screen.

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Play House

Located in Surrey, **Frensham Heights** caters for activities from dance to orchestral music, conferences to drama, and three year olds to A-level students. A highly flexible environment was needed. The building is unpretentious, simply detailed and sits comfortably in its historical setting. Staging can be arranged in a variety of layouts to suit the performance space required.

4|5

- 1 main foyer and bar area with staircase access to first floor auditorium
- 2 main entrance with control room projecting at first floor level

(The Architects Journal, January 2001; p28-34)

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Wozocos

The building is situated in **Amsterdam-Osdorp**, in the Netherlands, designed by **MVRDV**. It is a block of 100 apartments for the elderly. Only 87 of the 100 planned homes could be built without blocking the sunlight to the neighbouring buildings. It was decided to hang the other 13 on the northern facade, literally suspending them in the air.

4 | 7

- 1 south facade with enclosed balconies
- 2 west facade with protruding apartments to the north

(Cerver, F.A. 2000; p850)

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1

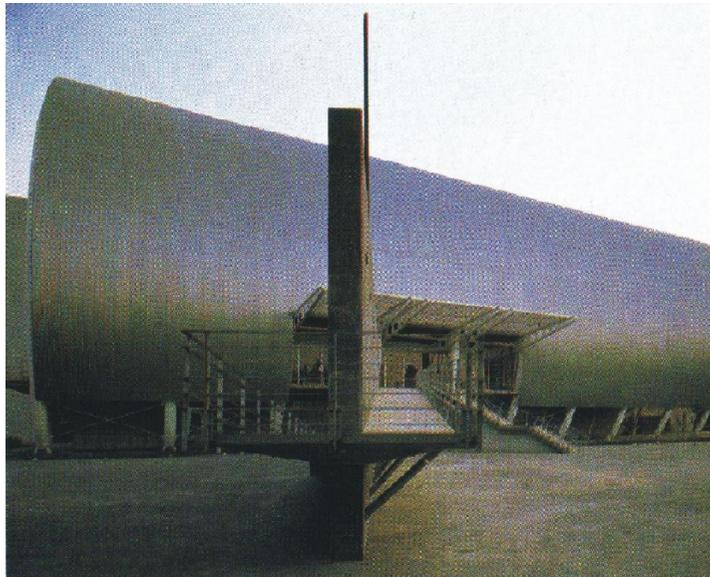
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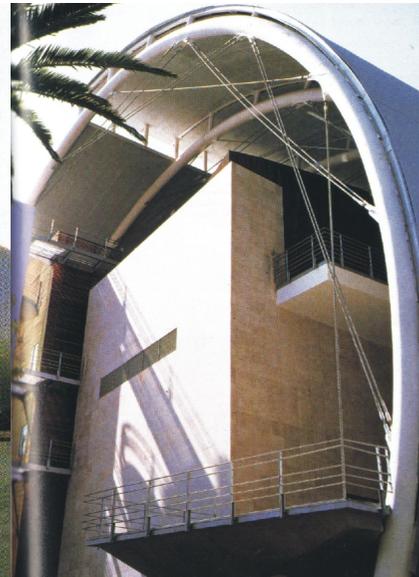
School of Dramatic Art

The building is located in **Avenida Rio Churubuscu, Mexico City**. The site is dominated by constant traffic and noise. The largest element of the building is its tubular metal roof. Designing on an urban scale, it is sufficiently abstract and monolithic to be recognized from a considerable distance and from a moving vehicle. Beneath the roof a collection of areas and planes contain and define the various activities, spontaneously and arbitrarily. The virtual chaos conceals an order derived from the specific function and **expression of each space**.

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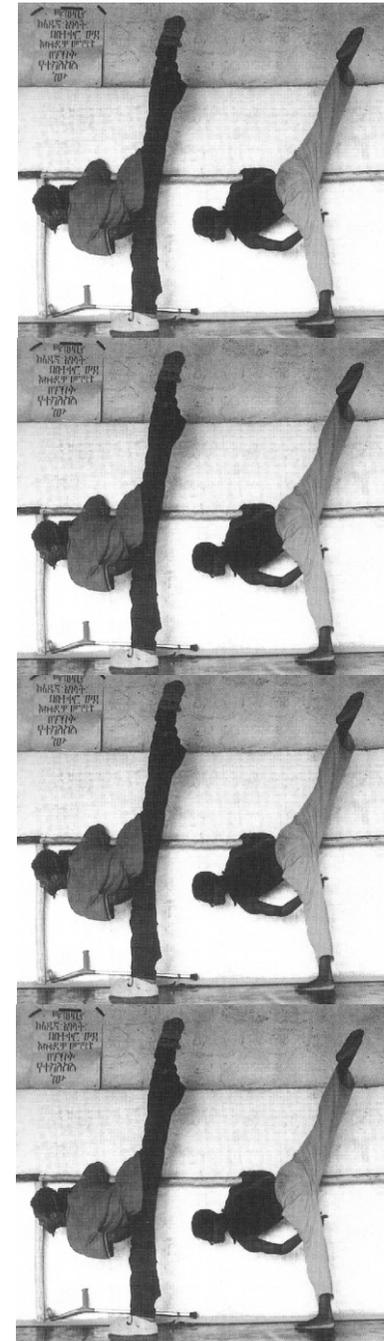


1



2

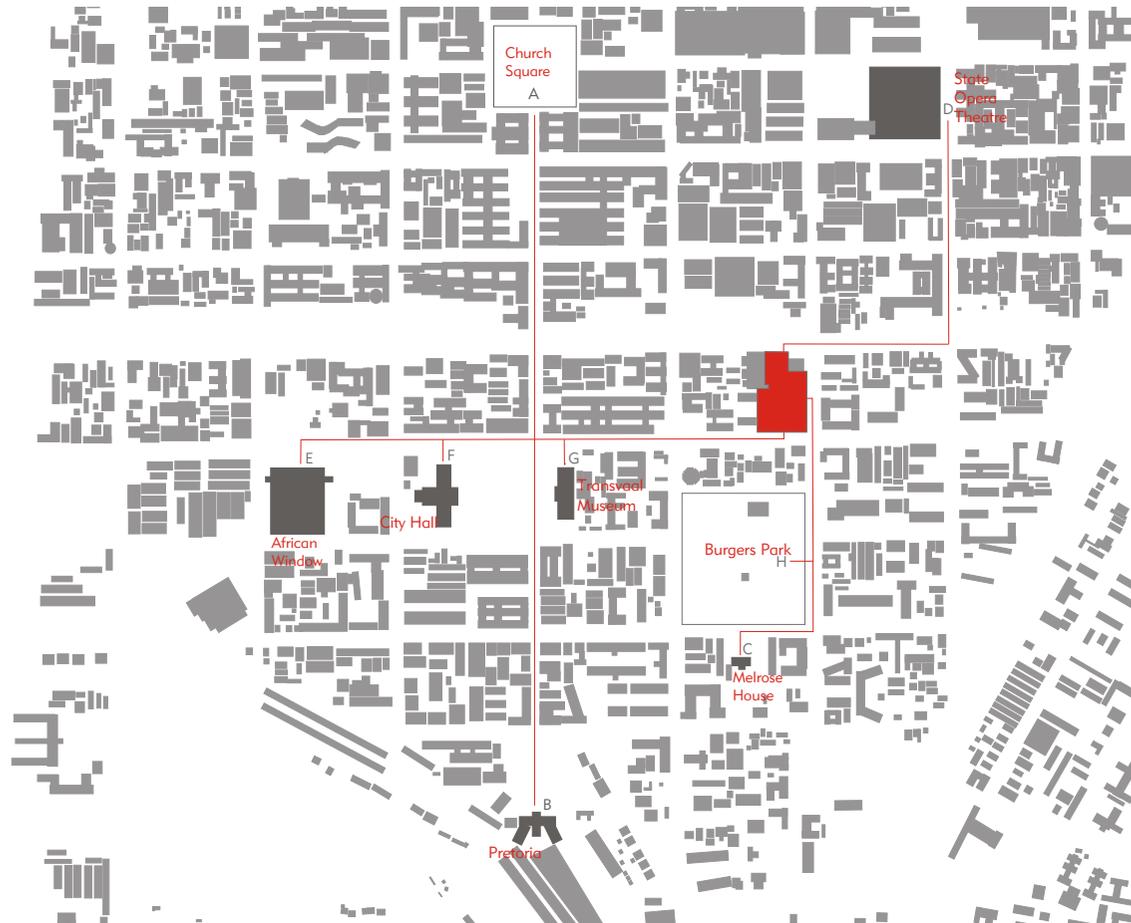
development framework



Development framework

To start of the design process after the completion of the brief a master plan needs to be set. At its simplest level the task requires the positioning of each building as a part of a plan on site, showing where each should be constructed. At its most complex, involves a theory of design composition that includes a hierarchy of ideas and elements that can be used to create concepts representing development frameworks, which in turn illustrate a particular set of functions and attitudes of part of a society's habits and culture (Billings, K, 1993; 1).

The system with its surroundings is taken apart in order to explore the relationship between hard and soft edges, hard and soft open spaces, vehicular and pedestrian spines as well as pedestrian links. The relationship and linkage of the site to nearby important vehicular routes and significant buildings are analysed by using a method suggested by Bentley in Responsive Environments.



A	B	C	D	E	F	G	H
6	6	5	4	4	3	2	2
Least	←	Connected	→	Most			

Analysis of links connecting the site to the city as a whole

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5|2

A	B	C	D	E
1	1	1	2	2
Most ← Direct → Least				

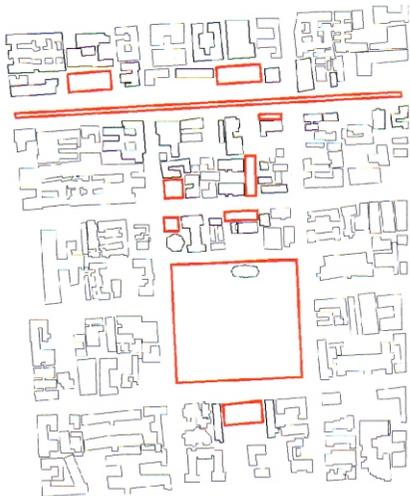
Analysis of links connecting the site to its immediate surroundings

The starting point for a permeable development framework is the existing system of links into and through the site from the surrounding areas. Permeability is important at two scales:

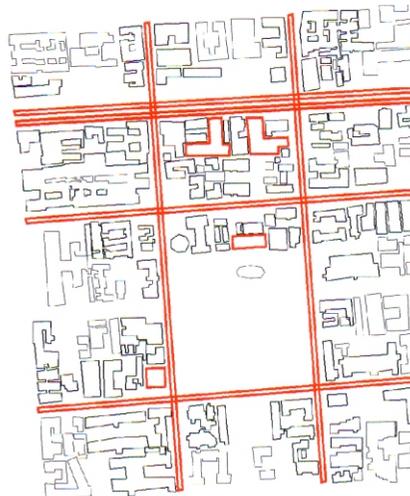
- links which connect the site to the city as a whole
- links which connect the site to its immediate local surroundings

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Site analysis



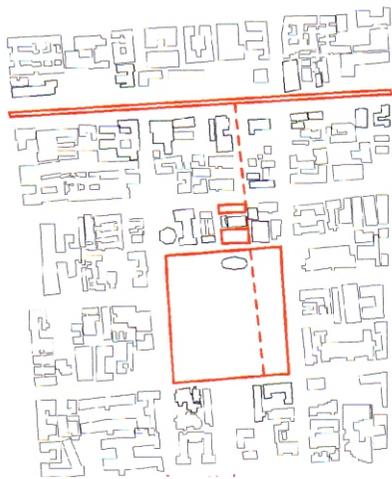
Soft open spaces



Hard open spaces



— Hard edges
- - - Soft edges



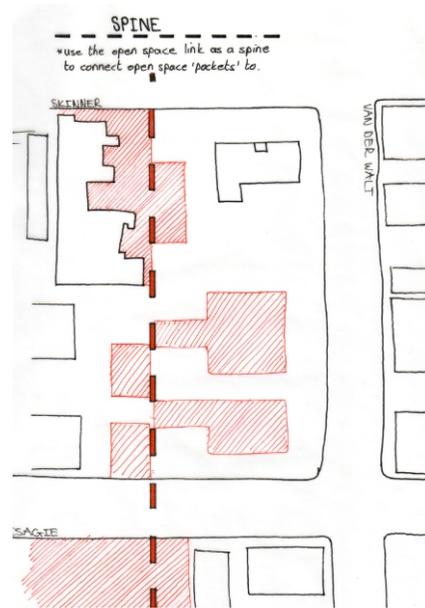
- - - Pedestrian link



— Main vehicular spine
- - - Main pedestrian routes



Vehicular traffic spines (directions indicated by arrows)



The 'spine' connecting Burgers Park with the Skinner Street Boulevard form the most important ordering element.

5|4

Problems:

- medium density
- lack of institutional facilities
- safety
- integration between sites
- provision for pedestrians
- lack of social gathering space
- public transport facilities

Objectives:

- a safe environment
- public access to and from site
- sustainable urban development
- mixed land-use
- sense of place
- cultural diversity
- recreational facilities
- social gathering spaces
- pedestrian friendly walkways
- adaptable multi-functional spaces
- parking facilities
- public square
- dense spaces
- educational facilities

Needs and requirements:

- institutional facilities
- integration and overlap of activities
- provision for pedestrians
- convenience and opportunity
- vibrant local economy
- eyes on the street
- visual and physical linkages
- linked soft open spaces
- comfort: noise, climate
- diversity of uses
- public spaces

Vision:

- liveable, clean, safe and welcoming
- urban diversity
- pedestrian centered, accessible and celebrating cultural diversity
- a vibrant 24 hour place

The following urban design ideas, as formulated by Bentley in Responsive Environments, will be used:

- ensure visual as well as physical permeability
- create alternative public routes
- create as many as possible entrances from the public space
- use existing links with immediate surroundings to connect the site to the city
- use existing links with main roads to establish routes on the site
- provide parking and public transport to attract large numbers of pedestrians
- locate shops close to main pedestrian flows
- make the building legible for pedestrians
- give each path a different character
- locate active areas on ground floor and first floor

Site specific principles:

- where privacy and security permit, the building must allow the passer-by to see the activities inside
- the above mentioned animated edges is especially important on ground and first floor on the facades adjacent to movement spines
- street furniture appropriately placed and arranged in a regulated manner in relation to other streetscape elements in Museum Park

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- tree-lined (deciduous trees) paths and pedestrian routes to protect pedestrians from direct sunlight
- external pause areas and waiting areas should provide protection against direct sun, rain and wind
- create pedestrian friendly edges to the space
- thresholds should be created between public, semi-private and private spaces
- create a humanist relationship between interior and exterior
- provide building set-backs at building entrances where high volumes of pedestrians can be expected
- the façade should respond equally well to the street and the occupiers on the inside
- the façade should also be influenced by external factors such as the sun and noise as well as by the use on the inside
- windows should be designed to promote informal surveillance on the street and open spaces
- material selection and detail are very important on ground floor level where people come in contact with the building
- the buildings should be robust so that future changes can be accommodated comfortably
- make provision for handicapped people
- create narrow shop units on ground floor level which can be surveyed internally
- use building elements that will assist surveillance on streets, like balconies
- secure clear pedestrian sightlines on ongoing vehicular traffic at pedestrian crossings
- calm traffic speeds at 40km/h at places of pedestrian crossing

The two elements that are initially used to create a plan are firstly the forms representing buildings, functions and spaces and secondly lines or bands representing movement patterns and sight lines. Forms can be either genetic or generic in origin, and can be strung together or connected. The term movement patterns in this case describe the system of paths, corridors and stairs that provide access for people and goods through the site and buildings. Movement patterns should be calculated and designed according to their needs based on functional relationships and volumes of movement. In these early stages, vertical movement should already be considered as an element as important as horizontal movement. The above-mentioned elements together forms an essential part of the development framework.

The majority of master plans should be designed (because of their likely physical impact by definition) on the basis of a program/brief that recognises community responses and where the planning, design, and construction process (phases) all allow for dialogue with the community during each stage of the development (Billings, K, 1993; 18). Because this discourse is about making an attempt to contribute to the urban domain, renewal and vitality of the Berea precinct the development is driven by context; sociological, physical and hypothetical. According to Dewar and Uitenbogaart in their book, *South African Cities: a Manifesto for Change*, urban spaces should be designed to contain a variety of overlapping conditions and activities, in order for them to provide the opportunity for the spontaneous and unexpected to occur.

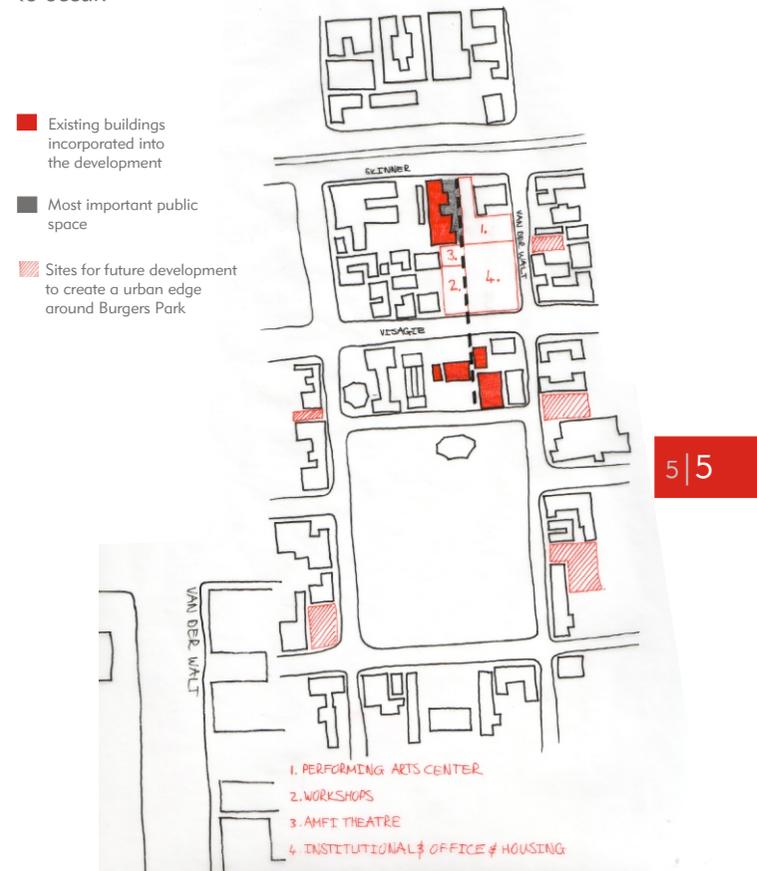
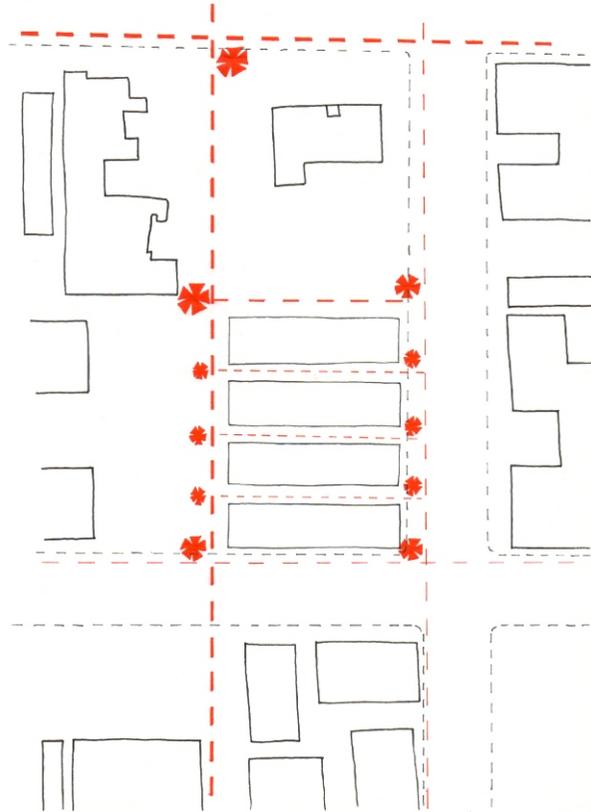


Diagram indicating all proposed and new infrastructure incorporated into the development framework.

Typology exploration



Fine grain response

Advantages

- good pedestrian penetration from Van Der Walt Street
- street edge on Visagie Street
- legibility
- visual permeability in the east west
- alternative routes
- narrow shop units
- width 9-14m
- 4 storey walk-up buildings

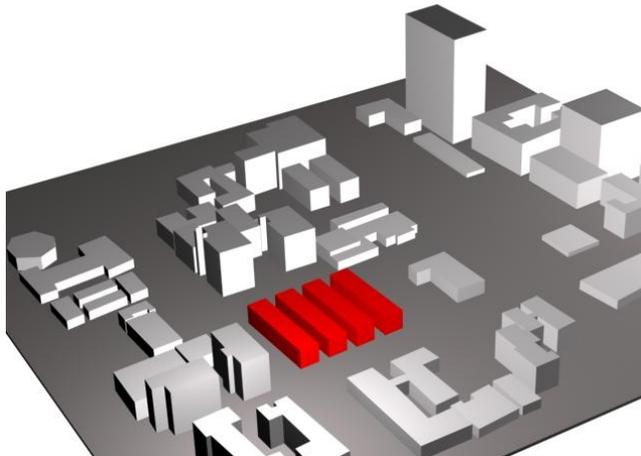
Disadvantages

- lack of animated edges
- orientation
- lack of public space "pockets"
- lack of thresholds
- no defined entrance
- little integration and overlap of facilities
- little diversity
- no street edge on Van Der Walt Street

Key to typology exploration diagrams

- | | |
|--|---|
|  Primary node |  Primary route |
|  Secondary node |  Secondary route |
|  Small node |  Private route |

5|6



1 2d fine grain exploration
2 3d fine grain mass exploration

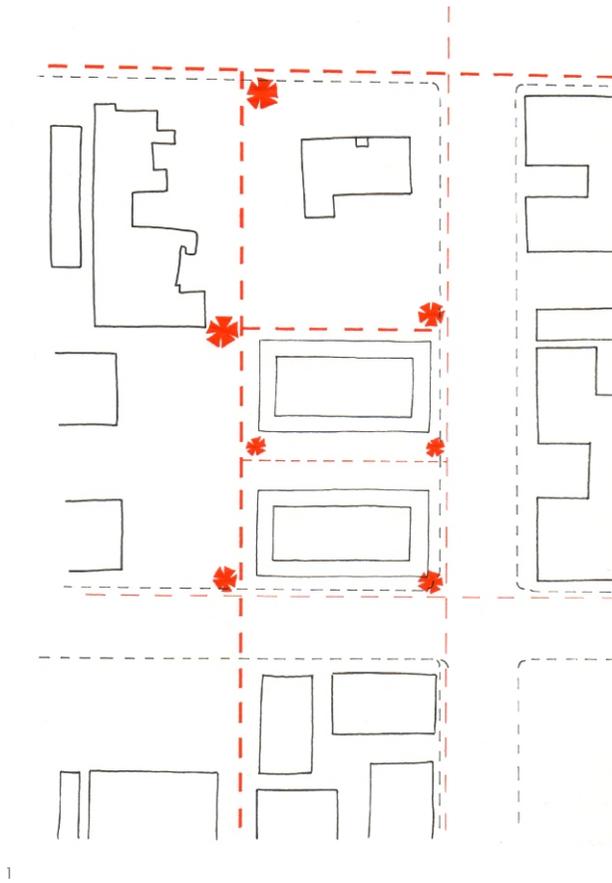
Podium response

Advantages

- visual permeability
- street edge on Visagie Street
- legibility
- high density
- relationship with other apartment buildings

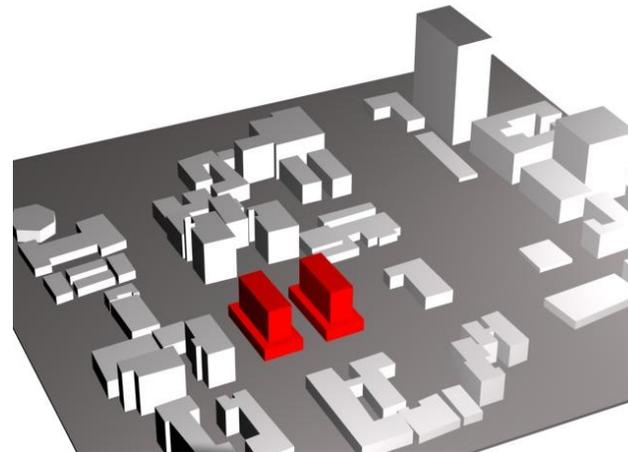
Disadvantages

- lack of public space "pockets"
- vertical circulation - elevators
- width - more than 14m
- orientation
- lack of alternative routes
- little diversity



1

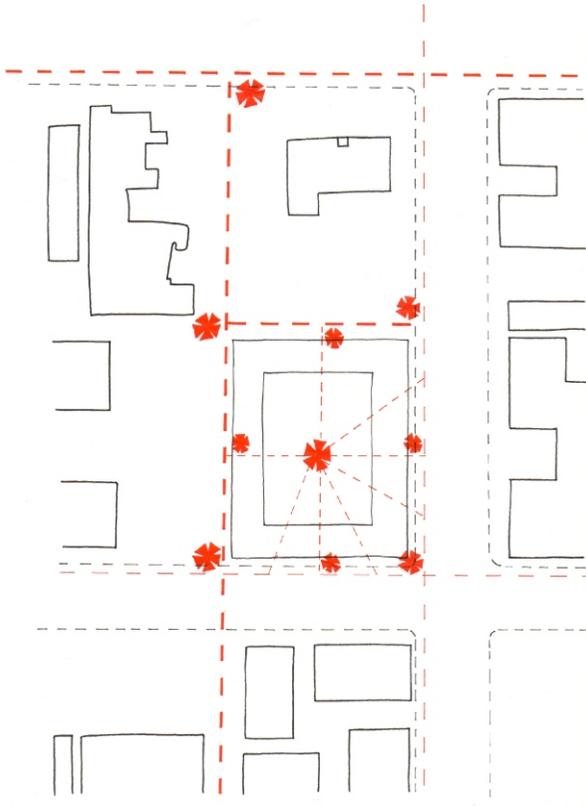
5|7



2

- 1 2d podium exploration
- 2 3d podium mass exploration

Courtyard response



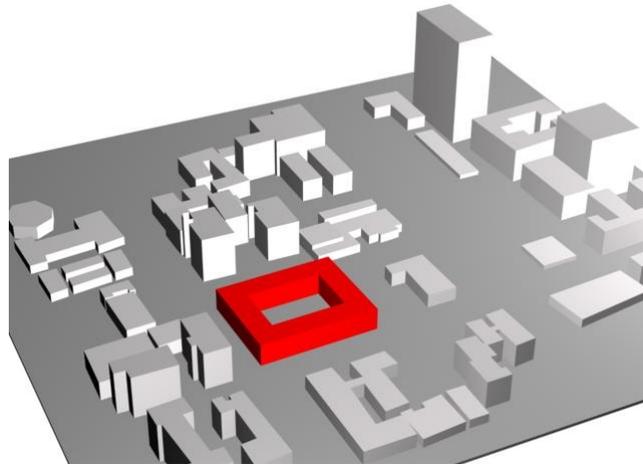
Advantages

- street edge on Visagie and Van Der Walt Street
- 9-14m width
- 4 storey walk-up building
- legible
- animated edges
- well defined public space "pocket"
- integration and overflow of activities
- orientation
- thresholds

Disadvantages

- visual permeability
- diversity

5|8



2

1 2d courtyard exploration
2 3d courtyard mass exploration

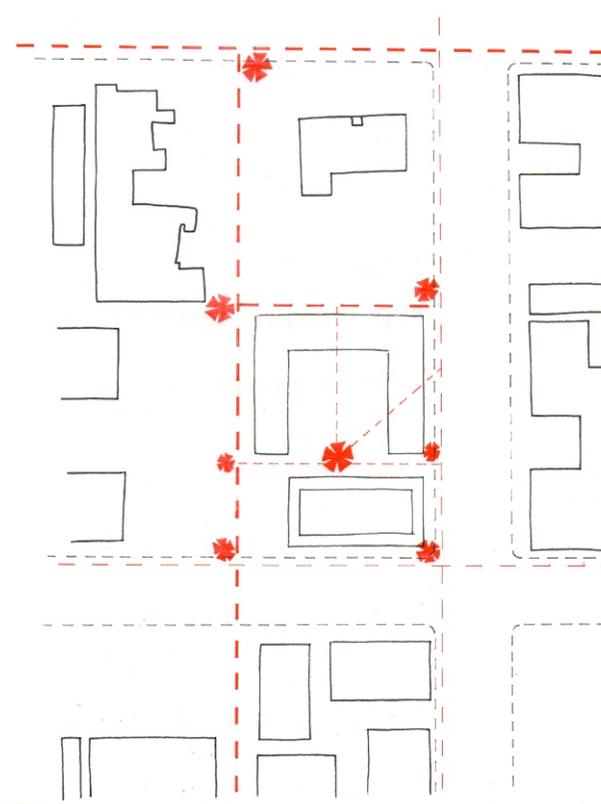
Combination response

Advantages

- visual permeability
- street edge on Visagie and Van Dr Walt Street
- 9-14m width
- 4 storey walk-up building
- high rise
- orientation
- integration and overflow of activities
- public space "pocket"
- diversity
- animated edges
- thresholds

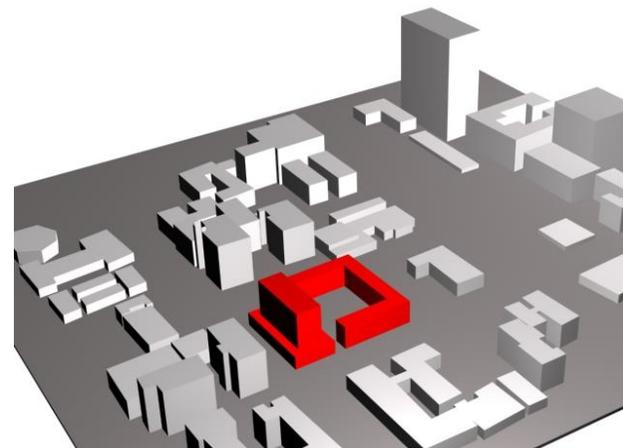
Disadvantages

- vertical circulation
- alternative routes



1

5 | 9

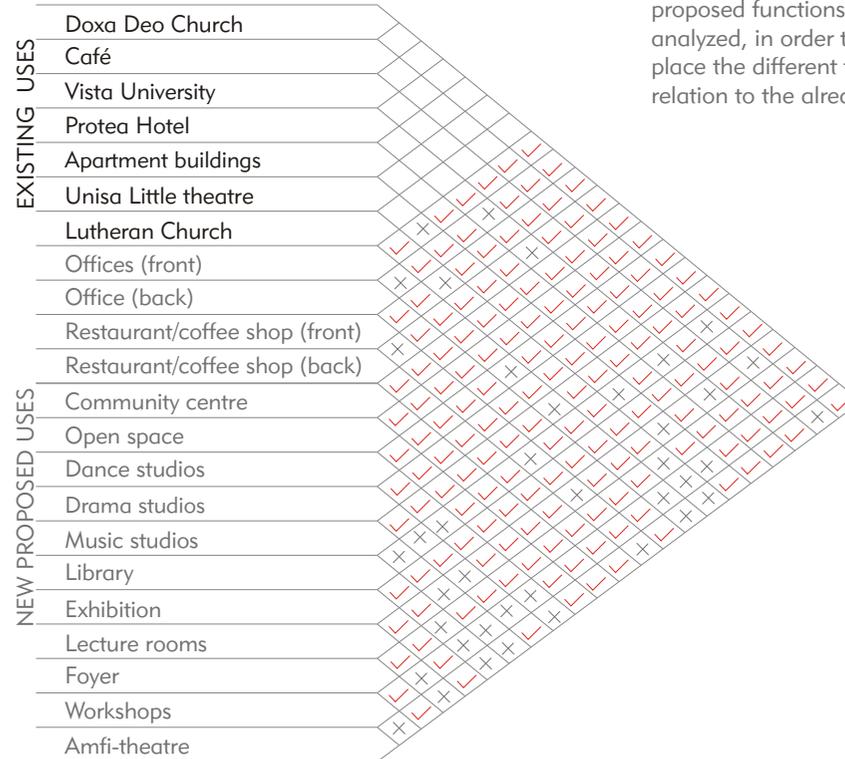


2

1 2d combination exploration
2 3d combination mass exploration

Final 3d exploration

Relationship between existing and new uses:



Functional factors like noise or traffic generation by the uses of already existing structures as well as new proposed functions have to be analyzed, in order to decide where to place the different functions in relation to the already existing.

5 | 10

1



2

After the above proposal for functions and spaces needed in the development, it is important to realise that on master plan level a high level on contiguity and flexibility is needed. Firstly because other designers will probably do the detail design of the different buildings, and secondly because buildings usually outlive their functions. Elements like movement patterns will be set, but elements like buildings and to a lesser degree public and private spaces should only have guidelines so that a certain degree of change can be accommodated.

1 Matrix indicating compatible functions
2 3D exploration, indicating all proposed buildings in red

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baseline document



Non-renewable resources are being depleted and there is increasing environmental damage as a result of human activities. It is therefore increasingly important that this is addressed, and sustainability becomes a key issue in the way we live and work. Buildings can play an important role in supporting sustainability. This is done through careful planning in which design decisions, material specifications and so on are carefully evaluated in terms of their long term impact on the economic, social and environmental sustainability of a society and the natural environment (Gibberd, 2002; 1).

The baseline document is to be managed as a multi faceted approach to the construction of the proposed buildings, highlighting certain points to create an overall understanding of what should be achieved with the design.

Social issues

Occupant comfort

Intelligently designed and operated buildings, sometimes erroneously called “intelligent buildings”, are distinguished not by the presence of a high degree of linked information, communication and building automation systems, but rather by the fact that they can serve user needs directly from the environment and avoid the use of technical installations. Natural lighting, natural ventilation, variable thermal transmittance, changeable total solar energy transmission values, adapted by daylight etc., decrease the energy requirements in the operation of such buildings by approximately 30% - 40% by comparison with today's buildings (Daniels, 1998; 9).

Personal comfort is the most important user need to be satisfied, especially in the parts of the building where people need to be creative and engage in physical activities. Standards of comfort grow out of a range of conditions with determining factors categorized as follows (Daniels, 1998; 90-104).

Thermal comfort:

Human performance is negatively influenced by room temperatures above 28°C or below 18°C. Thermal comfort is achieved when occupants find the temperature, humidity, air movement and heat radiation in the environment ideal, and wish neither to be warmer nor cooler, or to have drier nor more humid air.

Hygienic comfort:

The air quality in a room is determined by the quality of air intake and by air-contaminating factors such as room usage. Intake air consists mostly of outside air. Natural ventilation should ensure sufficient filtration of pollutants through outside air intake

Acoustic comfort:

Acoustic discomfort can be clearly define in cases where a very high noise level is produced on the other hand, soundless rooms are equally acoustically uncomfortable. We usually inhabit rooms that are neither the one nor the other. Rooms for sedentary activities, such as offices should have a noise level of about 35 dBA regardless of room size and number of occupants.

Visual comfort:

Depends on sufficient light in the area of visual focus and the avoidance of glare. Lit rooms should exhibit sufficient shadow effects to enhance the plasticity and three-dimensionality of objects and surfaces. Visual comfort also means contact from the outside in and from the inside out. People should not be more than 6m away from a window.

Access to green outside spaces should be provided

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Inclusive environments

Buildings can be designed to accommodate everyone, or specially designed buildings need to be provided. Ensuring that buildings are inclusive supports sustainability as replication is avoided and change of use supported (Gibberd, 2002, 3)

The building should be designed to not only include the students who attend this institution but the broader community. It is foreseen that through the schools programme, allowances will be made to cater for programmes for underprivileged children by Doxa Deo. Specialised facilities like the auditorium will be available to other institutions to assist in the financial sustainability of this building.

Public transport

A taxi and bus drop-off point are proposed in Visagie Street, next to the main pedestrian spine connecting Burgers Park with the ISDF proposed Skinner Street boulevard. This drop off should also be accessible for disabled persons.

Routes, signage and level changes

All pedestrian routes should be of smooth even surfaces that are easily navigable by wheelchair. Edges should be clearly distinguishable through the use of colour, material and finish. There should be lifts or ramps of 1:12 fall between all changes in level. Level changes can also be used as space defining elements in the building as well as the landscape.

Toilets

Provide the number of male, female, and disabled toilets according to SABS 400.

Participation and control

Environmental control

Users of the building should be provided with options for environmental control e.g. opening windows and blinds, control over light.

Social spaces

Spaces should be designed to accommodate comfortable social interaction. Users should be offered multiple choices for social interaction. These should include public places (open outdoor green furnished spaces, coffee shops, cafeteria, and a restaurant), semi-public spaces and private spaces such as staff areas and meeting rooms. Circulation spaces, the library and exhibition spaces should be designed to accommodate casual, unplanned social interaction.

6|2

Community involvement

The community will use space such as the auditorium, amfi-theatre, lecture rooms and computer room. Programs such as adult and computer literacy courses will be implemented by Doxa Deo, utilizing the building after hours.

Social upliftment

Use basic construction techniques and simple detail design that can be associated with the local building industry. Another important criteria that should influence the design process is the implementation of purpose designed prefabricated items such as composite slabs, treads and pre-cast concrete panels. If this approach is followed it would limit wastage and transportation of goods, therefore not only having a social implication on sustainability, but also environmental. Details and materials that require a fair amount of maintenance, which can be carried out by relatively unskilled people from the community, should be used to provide social sustainability. For the above to work a maintenance policy should be set.

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Education and safety

Education

Amongst others, one of the main aims of the institution is to provide a facility that will enable individuals to improve their current situation through providing them with a skill and education that can steer them in a direction to determine their own future. The Performing Art Centre should be designed to encourage this educational process through the encouragement of participation, involvement and contribution. As discussed under the school programme, Burgers Park and the amfi-theatre will be used for open-air performances, which will introduce people from the local community that might not have money to attend the theatre to performing arts.

Security

- Located within the inner city security has to be considered as one of the big concerns for the safety of the students as well as the public spaces. The following design aspects should be employed to provide a safe and secure environment.
- a spatial accessible layout should be provided with no inconspicuous and unsafe spaces
- informal occupant surveillance should be promoted for all spaces inside and outside the buildings
- adequate lighting should be provided, keeping in mind the user parameters set for energy efficient lighting appliances
- visual links and linkages across open spaces should be a prime concern if informal surveillance is to be promoted

Economic issues

The design and construction of these buildings is not only to provide for the bettering of the immediate area, the students and the public who make use of this facility, but also to provide for the community and local economy. Basic material usage and the restriction of hi-tech construction methods should be limited where possible, to allow, create and provide opportunity to the local community for involvement in this project.

There should be a realisation that not all work can be carried out by local contractors and laborers, therefore outsourcing will be needed in specialised situations. Local material from easy accessible and renewable sources should be used.

For the project to be economically sustainable one would tend to design details and use materials which needs the least maintenance possible, however there should be a balancing act between this and social sustainability, as discussed under social upliftment.

Efficiency of use

Maximum use of space needs to be achieved for the building to be sustainable. This can be achieved through a constructive management program that will enable most of the spaces in the building to be used after hours as well.

Adaptability and flexibility

The design should be able to accommodate possible change in the future, if necessary. Design parameters that should be adhered to include: minimum structural dimensions of 3m, the use of non-load bearing elements and partitions where possible and the design of services that will provide easy access and modification.

Ongoing costs

Detailing, material selection and system selection should be done to keep the ongoing cost to a minimum. Instead of specifying low maintenance materials, low costs maintenance materials should be specified where possible, so that job opportunities are created for the local community. However, specialised cleaning should be kept to a minimum.

Security usually forms a large part of the ongoing costs nowadays. This can be limited by ensuring informal surveillance through having the buildings occupied as much as possible.

Environmental issues

Rainwater

Rainwater should be controlled and harvested in two different levels. Storm water on ground level and rainwater on roof level. Rainwater should be collected, stored, tested and be used as a grey water supply.

Water consumption

- devices that can minimise water usage from the main water supply should be specified. Devices that can be used are:
- dual flush toilet system, connected to the grey water supply
- auto flow automatic taps in all toilets, runoff water from these taps should be reintroduced in the grey water system from where it can be used for landscape irrigation
- aerating shower heads

Runoff

The site slopes 2% to the north, which means that runoff can be considerable. Minimizing hard landscaping and using pervious or absorbant surfaces can reduce this.

Planting and landscaping

- planting and landscaping to be designed and coordinated by a landscape architect adhering to the sustainability guidelines which have been laid down for the project in terms of:
- water consumption
- top soil utilization
- indigenous plants to be planted

Energy

Buildings consume about 50% of all energy produced. Conventional energy production is responsible for making a large contribution to environmental damage and non-renewable resource depletion. (Gibberd, 2002; 9)

Ventilation system

Natural ventilation uses the natural forces of wind and buoyancy to deliver fresh air into the building. Fresh air replenishes oxygen for respiration and increase thermal comfort. Natural ventilation systems rely on the ability of air to move through a building, in order to equalize pressure. The pressure differences within a building can be caused by wind or the buoyancy effect created by stratified warm air. In either case, the amount of ventilation will depend critically on the size and placement of both external and internal openings.

Passive solar heating systems

Direct gain:

The sun is admitted directly into spaces in the building through windows, skylights etc. This principle is especially applicable to buildings orientated to the north. Through the use of solar shading sun can be kept out during summer and allowed into the building during winter. The mass of the building fabric itself is used as thermal storage material, storing excess solar energy during the day and releasing it back during the night. In building s where all the spaces do not have direct exposure to the sun, effective air circulation is necessary between "solar" rooms and "non-solar" rooms.

Factors affecting the performance of direct gain buildings are:

- orientation and location of the solar glazing
- size and type of the solar glazing
- the amount and design details of the mass available for thermal storage
- heat loss coefficient of the building as a whole
- arrangement of the furniture in the "solar" rooms
- thermal coupling between "solar" and "non-solar" rooms
- control options of heat gain and loss through the glazing

(Givoni, 1998; 150)

Solar glazing should face north but a deviation of up to 30° is acceptable. Clerestories can be used for spaces without any north facing windows, but from an energy aspect may be less efficient. The most common materials for thermal storage are masonry materials. The necessary thickness of the elements can be calculated by considering the daily cycle of the building.

Trombe walls:

Trombe walls combines into one building element the functions of solar energy collection, heat storage, and heat transfer into the interior. In its simplest form it consists of a glazed facade in front of a massive, conductive wall with an air gap in between. Solar radiation penetrating the glazing is absorbed into the wall, raising the external temperature of the wall and that of the air in contact with it. The time lapse between storage of thermal energy and its release into the interior are determined by the thickness and thermal conductivity of the wall. If vents are provided, at the top and the bottom of the wall, the heated air in the airspace rises and flows into the building through the upper vents. A thermosiphonic airflow forms, transferring heat to the room by convection, in addition to the conductive heat transfer.

Advantages of Trombe walls are:

- the indoor temperatures are more stable than in most other passive systems
- excessive sunshine, and its associated functional problems, does not penetrate into the inhabited space
- installation is relatively inexpensive where construction would normally be masonry

(Givoni, 1998; 161)

If windows are provided alongside or within the wall direct gain can provide light and quick heating in the morning, while the mass is still cold. For each 10cm of concrete there is a time lag of 2-2.5 hours between peak solar absorption, and heat delivery on the inside. 300 to 400 is the optimum thickness. Vented walls are about 10% more efficient, but it is important that the vents should be closed at night to prevent a reversed flow.

6|5

Passive cooling systems

The Trombe wall will be used as a cooling system during summer, by routing the airflow passage to the outside. Heat inside the building is stored in the wall at night. When it reaches the outside of the wall, it supplies heat to the air gap. Warm air rising in the gap escapes to the outside through a vent at the top of the glazing, drawing out warm air from the building.

Evaporative cooling towers

The "Arizona" tower consists of a downdraft tower that has at its top vertical wetted cellulose pads impregnated with anti-rot salts and rigidifying saturants. Water is distributed at the top of the pads, collected at the bottom by a sump, and recirculated by a pump. The complete system also includes a solar chimney at the opposite side of the building, to enhance the airflow rate through the cooling tower and the building.

Appliances and fittings

Energy efficient fittings and devices should be specified. 80% of light fittings should be fluorescent or low energy consumption.

Recycling and reuse

Inorganic waste

All recyclable waste should be sorted and stored on site, provision should be made for this in the basement.

Organic waste

Large quantities of organic waste will be produced by the restaurant and cafeteria. An agreement should be made with someone to collect this on a daily basis, for instance the owners of a piggery.

Construction waste

- modular design will reduce off cuts and other material wastage
- pre-fabricated elements reduce transportation costs as well as material wastage

Site

The proposed design should not be damaging to the site, but rather uses its qualities of location and attractiveness to add to the quality of the surrounding area and contribute through the design proposal to the local community.

The buildings themselves should not detract but rather add to the existing structures existing in the area to create a more interactive urban environment. New buildings should not have a harmful effect on neighbouring buildings, for instance over shading where access to sunlight is important or taking away parking without making provision for that.

The new landscape, designed by a landscape architect, should not require heavy artificial input such as fertilizer, insecticide and pesticide.

Materials and components

Embodied energy

At least 80% of the building materials and components should be made from materials and components with low embodied energy. Low embodied energy materials include locally made and sourced timber, concrete, concrete blocks, timber windows and doors (Gibberd, 2002; 10).

6|6

Material and component sources

At least 90% of materials and resources should be renewable.

Construction processes

The building and construction process should be designed to minimally impact the environment. This requires a construction programme that takes into consideration elements such as the monthly rainfall for erosion and runoff to be minimised.

Material selection

Materials can be divided into categories of permanent and non-permanent. Materials, which are in our culture perceived to be non-permanent, such as timber, lifespan can be prolonged through the correct treatment and maintenance. The use of such materials in buildings helps users to perceive the building as a living element in the urban context. The permanent materials should be of a very durable and robust nature, requiring little maintenance.

Preferably most of the permanent materials used for the structure should be able to serve a dual function such as structural functions and mass insulation.

- The construction methods, materials and techniques should be selected for the following reasons already explained in the baseline document:
- social and economic sustainability
- locally produced materials
- complexity of construction methods (simple methods equates to a high labour intensive workforce)
- speed of construction (reduced time period equals reduced cost)
- empowerment of NGO's

Steel, brick, timber, concrete and glass have been selected as the main materials to be used in the construction of the buildings, creating a robust structure as well as serving the needs of occupants.

Steel

Advantages

- recyclable and reusable
- trusses and beams can be manufactured off site, which will decrease the construction period
- good structural properties
- requires very little maintenance if well detailed

Disadvantages

- non-renewable resource

Steel is chosen mostly for its tensile qualities, which concrete and to a lesser degree timber lacks. Steel will be used in most of the joint-work and the reinforce timber and concrete.

Brick

Advantages

- recycleble and reusable
- good structural properties
- good thermal storage

The use of brick in stack bond will establish a relationship with the Lutheran Church and Doxa Deo, but contrasts in relation to the Unisa Little Theatre. Brick and mortar construction is labour intensive, cheap and empowers people through use of local labour.



1 Stack bond - Lutheran Church



2 Stretcher bond - Childrens Art Centre

Timber

Advantages

- renewable resource
- excellent insulating properties and ideal material for low-energy buildings
- low-tech with high-tech performances
- requires the least amount of energy to manufacture, transport and distribute include costs arising from environmental damage
- re-use increases if wood treatments are used which does not include heavy metals
- combination of finishes
- timber is supple and can absorb movement
- timber frames can be fabricated off-site

Timber has unique qualities, a building material that is completely recyclable, and its stocks are naturally replenished. As a source of energy it doesn't disturb the ecological balance of our environment. As a natural material, it is the perfect physical expression of our intimate connection with the world in which we live (Stungo, 1998; 8). Stungo compares the tree to a human being. It has its skin, the bark; the roots are its head and its hair; it has its distinctive markings and its senses and its sensitivity in the trunk. When the trunk is wounded, it dies. It has leaves, flowers and fruits as decoration, just as humans have hearing, facial features and language...

Visually timber buildings are perceived as temporary erections. This couples with the idea that people forms the most important element of the building.

The most important development in timber construction during the 20th century is the invention of glue-laminated timber, as a huge advance in bridging wide spans.

Preservation is compulsory and detailing to keep moisture out compulsory. Timber is mostly pressure treated with chromated copper arsenate (cca). Although this is considered much safer than many other processes, cca-treated wood does contain arsenic, and it should therefore only be used when the timber is in direct contact with the ground. Using chemically treated wood can be limited, however, by following a few rules: (i) eaves can protect the facade if extended far enough, (ii) water drips on horizontal boards will ensure that water runs off more quickly, and (iii) timber should rest on metal shoes, rather than to come in direct contact with the ground. Alternatively finishing wood with beeswax or repeated layers of approved woodoil, sanded inbetween applications, will suffice.

6|8



1 Naoshima Contemporary Art Museum - Tadao Ando

2 Juxta positioning of materials - Lutheran Church

3 Smooth and brushed off-shutter concrete

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Concrete

Advantages

- good thermal storage
- can achieve large spans
- easily moulded into desired profiles
- different finishes possible
- can be precast or cast in-situ
- precast panels can be reused

Disadvantages

- sand and cement is a non-renewable resource
- in-situ cast concrete can't be recycled except if crushed and used as a fill material

Tadao Ando treats this building material with true architectural passion, giving it a unique scale. His perfect concrete blocks measuring 90 x 180 cm wide with six drill holes each left exposed like the concrete itself are arranged in a grid of 40 x 60 cm, with a height of 22,5cm and a width of 30 cm. The drill holes have a diameter of 25mm. This pattern, which is consistent on the exterior and in the interior, is in measured, agreeable proportion to the human scale. The wall as a readable surface (Blaser, 2001; 52)

Concrete is chosen as medium to establish a visual link with the Doxa Deo building and the Lutheran church, but to be in contrast with the Unisa Little Theatre, which is the heart of this development. Concrete elements will either be precast panels as mentioned above, or concrete brut walls. Different finishes to off-shutter concrete e.g. power floated or brushed to expose aggregate can be used to define differences in scale and rhythm, which can be used to either lead people quickly through spaces or let them pause in certain areas. As a structural material it also has enough mass to serve as thermal storage elements.

Glass

Advantages:

- allows natural light into a spaces
- recyclable and reusable
- good heat energy conduction
- Allow views to the inside and outside

Disadvantages:

- glass admits solar radiation frequencies above and below the visible spectrum
- can pose a security risk
- little structural properties

Tadao Ando infuses us with breath through the depths and layers of spatial design flooded with light. He shows us the reflections of light. All is flowing light, without abstraction. It is a weaving and flowing of air and light as if there were no fixed spatial composition. All is continuous metamorphosis, a constant transformation, and a reflection of the seeing eye and the thinking brain (Blaser, 2001; 17)

Glass gives the ideal opportunity to introduce natural light into the building, merging interior and exterior into one scene. Through using shading devices, keeping in mind the orientation of the facade, can eliminate most disadvantages associated with glass.

1 Off shutter concrete structure, defining the Entrance - Doxa Deo



Critical performance

Facades

- exterior facades should respond to orientation and traffic
- the east and west facades should not be more than 20% glazed without sun protection
- reflected glass should be avoided, to alleviate the negative effect of direct solar radiation and reflection on neighboring buildings, spaces and places surrounding the building
- white or light colours and materials should not be used where direct reflections will result in glare on the streets and surrounding buildings in harsh sun-light on the north and west orientated facades
- where privacy and security permit, the building must allow the passer-by to see the activities inside
- attention to be given to the use of materials and the degree of detail on the ground floor level where most people come in close contact with the building
- create narrow shop units on ground floor level which can be surveyed internally
- ensure flush and continual frontages which eliminates recesses and alleyways
- prevent positioning of trees, gates, or other elements that could provide footholds for illegal entry to balconies and windows above ground floor
- define thresholds between interior and exterior as well as between different functions
- counteract dead frontages by locating active places with clear views in these areas
- use building elements that will assist surveillance on streets, like baywindows and balconies

Vehicles

No vehicle movement is allowed on site, except for occasional deliveries to the Unisa Little Theatre area. This decision was taken to highlight the idea that people forms the most important element of this development. Vehicular entrance into the basement is only from Visagie Street. The high level of pedestrian traffic in Van Der Walt Street and the proposal of the Skinner Street Boulevard influenced this decision, so that these main pedestrians spines won't be interrupted.

Design guidelines for basement

- floor to ceiling height should be a minimum of 2500 to enable light delivery vehicles into the basement
- parking for the new buildings, as well as the theatre, church and the two apartment blocks will be provided in a basement
- the parking garage entrance is in Visagie Street and should be clearly defined
- aisle widths 7,2m
- typical bays 2,5m x 5,4m

6|10



1 Noashima Contemporary Art Museum - Ando

2 Studio Archea - Double facade

3 London Contemporary Dance School

4 Zoological Gardens - Denmark

Exhibition space

Design guidelines:

- the space should be well lit suitable for the display of art
- double volume space with the possibility of a mezzanine
- interior should have a 'silent' character in order for the exhibited artwork to be the main focus

Theatre

The theatre would be used as a secondary theatre to the Unisa Little Theatre. It will serve a dual function and can serve as an auditorium as well. As a theatre it would mostly serve for smaller productions and musical performances.

Design guidelines

- audience not more than 20m from stage
- maximum gradient without steps is 1 in 12, with steps it is 35°
- stage should be raised by at least 800 in order for the performer to have a close relationship with the audience
- a noise criterion of NR 30 should not be exceeded
- reverberation time for speech should be between 0.7 and 1.2 second, and for music between 1 and 2 seconds (aim for 1.2 seconds)
- 5m³ per audience seat gives about the right total absorption to provide a satisfactory reverberation time for mixed used auditoria
- if the maximum distance to an audience seat exceeds 18m ceiling reflectors should be used
- materials for reflectors must be smooth and non-porous and should weigh not less than 5kg/m³ for speech only, or 40 kg/m³
- at least to exists should be provided
- doorways should not be less than 1070
- back-to-back distance between rows of seats is 760 minimum
- width of seats with arms is 500, without arms is 450 minimum
- unobstructed vertical space between rows is 300 minimum
- width of gangway is 1100 minimum
- the basement under the stage should have at least 2400 minimum clear height
- the stage floor must have some flexibility in its construction
(Ham, 1987; 8-49)
- because of the acoustical quality needed the theatre will need to be mechanically ventilated

Library

Activities within this facility differ from the usual quiet library environment, realising this, special attention should be given to the separation of activities. Providing relevant acoustic qualities to areas that require alternative measures e.g.. audiovisual section and study sections. Although different functions need to be incorporated into the library, there are not extremely diverse requirements to be incorporated to achieve performance required.

Speech intelligibility, acoustic comfort and noise privacy are the most important factors to consider. To achieve the necessary requirements in the above mentioned the ambient noise level should be kept between 20 and 30 dBa, in all spaces.

Dance studios

The studios should have sprung floors and adequate floor to ceiling height. As much as possible natural light should be provided without compromising privacy. It might be necessary to use mechanical ventilation, if the required number of air changes can't be met through using only natural ventilation.

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technical report



Passive systems

Good design exploits the potential for passive solar gain by consideration for glazing area, thermal mass and orientation (Baker & Steemers, 2000, 56). The basic idea of passive solar design is to allow daylight, heat, and airflow into a building only when beneficial. The objectives are to control the entrance of sunlight and airflows into the building at appropriate times and to store and distribute heat and cool air so it is available when needed. Many passive solar design options can be achieved at little or no additional cost.

Building orientation and layout

The plan of the building is spread out and irregular in shape which means that the building will be more responsive towards climatic changes and will have good potential for cross-ventilation. The area of envelope per given floor area is relatively large which means that direct and independent ventilation can be provided to various rooms, heightening user control.

The orientation of the building is east-west in order to have the largest facade to the north, which enable the use of passive heating systems during winter, and the smallest facades to the east and especially the west to limit excessive heat gain during summer.

The building's layout enable good natural lighting, with no person being further away than 6m from natural daylight in any of the occupiable rooms.

Facade proportions:

North facade	= 1011m ²	= 36%
East facade	= 514m ²	= 18%
South facade	= 833m ²	= 29%
West facade	= 493m ²	= 17%
Total facade	= 2851m²	

Relation between floor area, envelope and volume

	floor area	envelope	volume
Groundfloor	1258m ²	1110 m ²	5724m ³
First floor	1269m ²	774m ²	3807m ³
Second floor	1147m ²	939m ²	3441m ³
Total	3674m²	2823m²	12972m³

Floor area to envelope ratio

	floor area	:	envelope
Groundfloor	1	:	0.88
First floor	1	:	0.61
Second floor	1	:	0.82
Total	1	:	0.77



■ performing arts centre & workshops
 proposed multi-functional buildings

1 proposed buildings in existing city fabric
 2 site model
 3 concept model

Windows and glazed facades

Windows and glazed facades provide visual and auditory contact with the outdoors. All of the occupiable rooms have views to the outside in order for occupants to be aware of what is going on outside like changing weather conditions, time of day and outdoor activities. This is psychologically important for people. It was necessary to completely shut out the outdoor environment to avoid daylight and noise in the auditorium and two theatres.

The other important factor that came into play whilst designing windows and facades were energy considerations. The size and orientation of these two elements determines heat gain, heat loss and quality and quantity of natural interior lighting.

The most glazing occurs on the north and south facades. Through the use of solar shading on the north facade, direct radiation is kept out during the summer but allowed through the glazed facade during winter. In deciding on double or single glazing on the north facade a few factors were taken into consideration:

Comparison between single and double glazing

Factor	Single	Double
Heat loss	high	low
Heat gain	high	low
Acoustic insulation	low	high
Cost	low	high



After considering all the above it was decided that the most important function off the north facade was to allow heat gain during winter, because of this single glazing is used. Double glazing is used on the south facade because this is where most of the heat loss will occur during winter. The air cavity between the two panes reduces the heat transfer coefficient (U value) of the glass, thus reducing heat flow by convection through the glazing. Here it was also important to strike a balance between solid and glazed facade in order to limit heat loss during the winter but still keep the facade animated to draw people in from the street.

From a acoustical point of view it was possible to use single glazing on the north facade because it faces the existing Lutheran Church, but the south facade which forms the edge of a pedestrian movement spine needed acoustic insulation, which is partly provided by the double glazing.

The solar shading on the north facade in fixed timber louvers, stained dark brown to restrict reflected solar radiation during the summer months.

When designing the eastern and western facades the character was devised from considering daily solar patterns opposed to seasonal patterns, as was the case when designing the northern and southern facades. The southern facade is protected against direct solar radiation by 50 x 50 timber battens in order to provide contact with the exterior as well as opportunity for natural ventilation. The western facade is kept solid, except for where physical interaction between exterior and interior as well as vertical interaction is needed in the outdoor social space. Protection against direct solar radiation is provided by external sliding timber screens.



- 1 precast concrete elements fixed to steel H-profile column
- 2 south facade
- 3 detail model of north facade

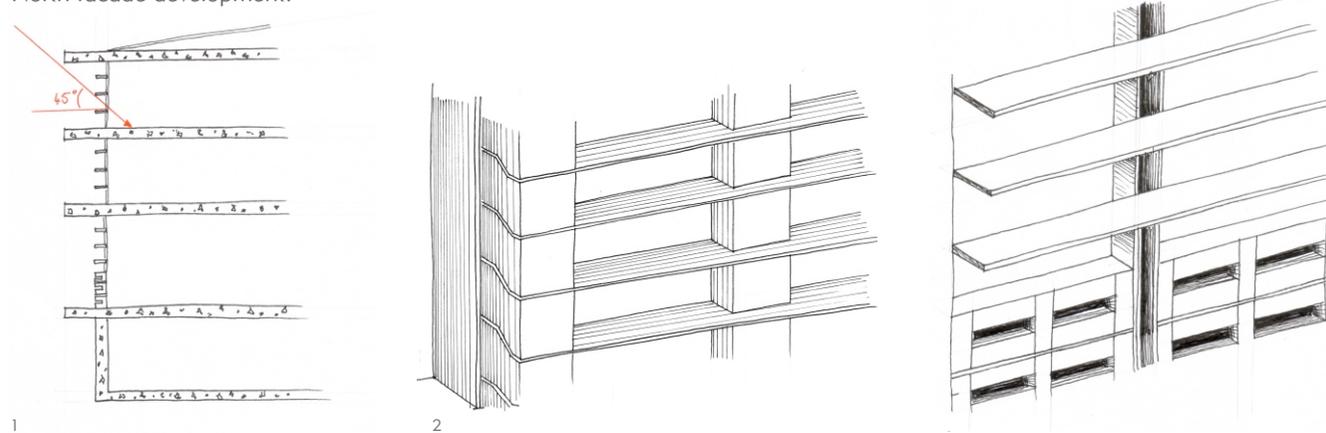
Heating

Because the building will be used during the evening heating two different forms of heating is introduced. Firstly heating during the day, this form of heat is provided through direct solar radiation and heated air, and secondly heat during the evening, which is provided through storing heat in thermal mass materials.

Solar rooms

All the rooms facing the north, with exception of the library and exhibition space, will be heated through admitting direct solar radiation. On groundfloor level, where the library and exhibition space is located, the envelope consists of a pre-cast concrete wall with 150 high strip glazing where the wall will be used as thermal storage element. This is done for mainly two reasons, firstly because direct sunlight is undesired in both cases, and secondly because the library will be used extensively during the evening, which means that the time lapse for heat release is necessary. Short wave solar radiation falls on surfaces in the rooms that absorb this energy. As the surfaces heats up, some of the energy is immediately re-radiated as long wave infrared radiation and the rest of the energy will be released after a certain time lapse. The amount of heat storage depends on the thermal mass and its colour. Concrete floor slabs finished with slate tiles, and to a lesser extent the internal partitions will be used as thermal storage elements, storing excess solar energy during the day and releasing it during the night.

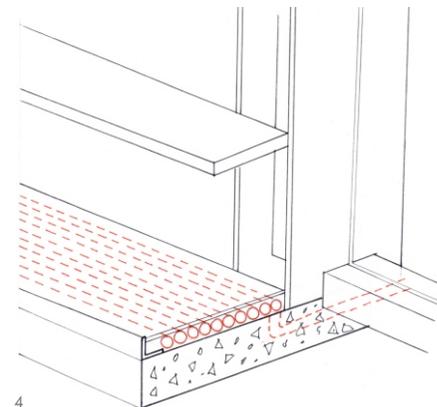
North facade development:



Non-solar rooms

Nighttime heating

To heat the non-solar rooms during the evening a low temperature radiant system, meaning that a surface temperature that is comfortable to touch must be created, is used. Water will be heated on the north facade, in a network of PVC pipes covered with glass on a steel sub-structure, by solar radiation and then be circulated through the pipes. Some of the heat energy will then be transferred from the water into the floor slab and after a time lapse energy from the concrete and water will be released into the room.

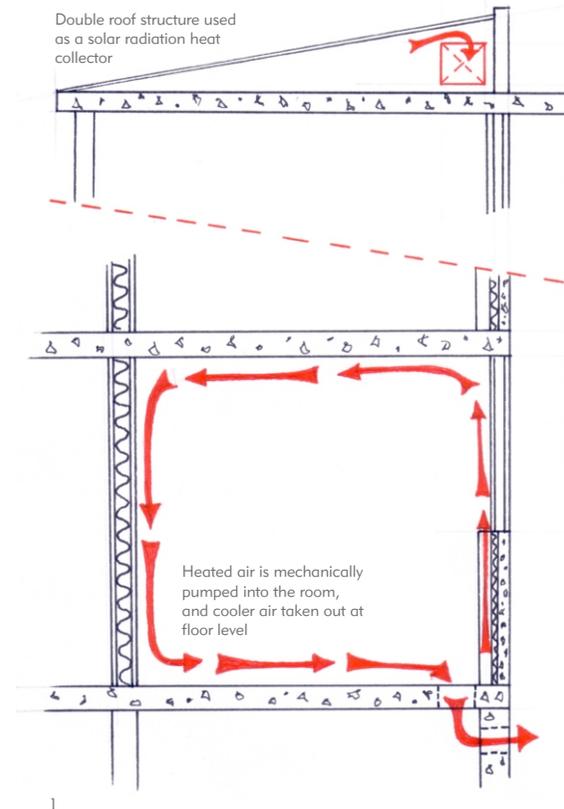


- 1 section through facade
- 2 precast concrete elements
- 3 timber shading, fixed to H-profile columns
- 4 section through water heating system

Daytime heating

The acoustic insulated drywall system used on the first and second floor will act as a thermal barrier, which make it impossible to introduce thermal coupling between solar and non-solar rooms. A convective heat emitter, using warm air, will be used because a quick response is needed during the day. The roof on the north side of the building is a double structure, to form a solar radiation heat collector. It consists of a 150 reinforced concrete slab, with a steel sub-structure and IBR sheeting. The air inside this cavity will heat up and travel to the highest point in the cavity from where it will be mechanically pumped through ducts into the south facade, which is a cavity wall. The wall will consist of 80 pre-cast woodcrete panels, which have a higher thermal insulation value than concrete, 60 extruded polystyrene panels and a 60 air cavity. All the mechanical fans will be directly connected to solar panels on the roof so that grid electricity will only be used as a back-up system. The heated air will be released next to the inner layer of glazing to counteract the natural process of air cooling and sinking down the glazing. The process of exchange ventilation, where stale air is taken out at the top of the room, will be changed so that cold air, which in this case will be a mixture of fresh and stale air, is taken out close to floor level. In summer this process will be reversed so that cool air from the outside is taken in at floor level and is extracted at a higher level.

The most influential element in both the above-mentioned cases is the south facade, which is well insulated, in order to minimise heat loss.



8 | 4

Natural ventilation

It appears that in many cases occupants are much happier and healthier in naturally ventilated buildings, in spite of the variability of environmental conditions which results (Baker et. al., 2000, 52). Two ways of generating natural ventilation is used, namely wind pressure and thermal buoyancy.

Wind pressure

The building is irregular in plan, which means that there is an opportunity to introduce cross ventilation. When wind blows up against the building there will be positive pressure on the windward side and negative pressure on the leeward side. Because openings are distributed over all the facades of the building it is ensured that, no matter what the wind direction is, openings will be at different pressures that will introduce a natural airflow through the building.



1 convective heat system
2 detail model of ventilation Stack

2

Thermal buoyancy

Thermal buoyancy generates a vertical pressure difference which is dependant upon the average temperature difference between the column of warm air and the external temperature, and the height of the column of warm air (Baker & Steemers, 2000, 56).

To suffice to the above mentioned criteria in order to create thermal buoyancy two solar chimneys is used. In order to increase the height of the column of warm air the solar chimneys is 3000 higher than roof level and protrude 2100 through the first floor slab. This offers the opportunity to have a part of the solar chimney exposed to direct solar radiation so that a temperature difference is created. The east facade of the stack will be off-shutter concrete and the west facade will be clad with black slate tiles, so that the temperature difference is even greater in the afternoon when ventilation is needed the most. To ensure that the stack effect gets started extraction fans will be fitted at the top of the chimneys. These fans will be directly connected to a solar panel, located on the roof. During the summer months air will be pulled in from the south side of the building, where the air will be cool because this area will be in shade throughout the day. During the winter months air will be pulled in from the north side where hard finishes, such as concrete and slate tiles, will be heated by direct solar radiation.

The main vertical circulation area will be ventilated through the use of supply and extract ventilation, driven by wind pressure and thermal buoyancy.

Day lighting

Daylight is desired not only for energy conservation but is usually considered superior (psychologically) to electric lighting (Givoni, 1998; 53).

Daylighting can save energy by displaying the electrical energy that would otherwise be used to provide artificial lighting. In most non-domestic buildings this is potentially the most significant energy-saving measure (Baker & Steemers, 2000; 42).

Because artificial lighting rarely contributes to over luminance, people rarely switch off lights when the daylight luminance is adequate. To save on energy an automatic lighting system which detects daylight illuminance levels is used. The system will switch off lights if the daylight illuminance is above the needed level, light may be switched on manually and will also be switched off when a nil occupancy is detected by an occupancy detector.

Day lighting requirements for lecture rooms are 70lux (Van Rensburg, 2001; 8). Daylight is defined as light under overcast conditions, which means that direct radiation is ignored in the calculations. For this reason the external shading device on the north is not taken into consideration, although it will have an effect on the internal illuminance. Day lighting levels of 540lux is achieved in the drama rooms, and 111lux in the lecture theatres.

Dimming controls are also introduced into the system. For instance when 300 lux is required but the daylight illuminance is only 200 lux, the artificial lights are dimmed to provide only 100 lux.

DRAMA ROOMS

$$ODF = \frac{\text{room depth}}{\text{window height}} = \frac{5000}{3000} = 1,6 = 5$$

GF = 1,2
DTF = 1,4
EOBF = 1

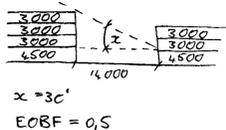
LECTURE ROOMS

$$ROF = \frac{ODF \times EOBF}{GF \times DTF} = \frac{5 \times 1}{1,2 \times 1,4} = 3,6 = 2,5$$

$$vint = \frac{ROF \times veks}{100} = \frac{3,6 \times 15000}{100} = 540 \text{ lux}$$

$$ODF = \frac{\text{room depth}}{\text{window height}} = \frac{5000}{1800} = 2,8 = 2,5$$

GF = 1,2
DTF = 1,4



EOBF = 0,5

$$ROF = \frac{ODF \times EOBF}{GF \times DTF} = \frac{2,5 \times 0,5}{1,2 \times 1,4} = 0,74$$

$$vint = \frac{0,74 \times 15000}{100} = 111 \text{ lux}$$



1 day lighting calculations
2 detail model of music room

Materials

In aiming towards sustainability the embodied energy of materials is very important. Factors influencing this are the actual sourcing of the material, renewability and recyclability or reusability. Using locally available materials will assist in saving cost and energy and less transportation will result in less pollution.

Timber

Timber resources are renewable.

Recycling

The biggest advantage when using timber is the relatively easy recyclability and reusability. Prefabricated components, such as battens and planks for external shading devices and internal screens, tongue and groove floor planks, standard timber board products and shiplap siding planks for external cladding, is used throughout the building. If the lifespan of the components exceeds that of the building, it will be possible to reuse it directly.

Wooden floors

The floors in the dance studios will be sprung wooden floors. *Wooden floors give good warmth and sound insulation. They are relatively soft, warm, physically comfortable and do not become electrostatically charged if not treated with varnish* (Berge, 1992; 349). The batten flooring system will be used. Tongue and groove boards are locked into position by hardwood battens. This means that individual floorboards can easily be changed and reused.

External cladding

According to Berge in the Ecology of Building Materials, Pine will last between 40 and 85 years when used unsheltered on the exterior of a building, if not in contact with the earth (Berge, 1992; 172).



1&2 detail section model of dance studio facade

8 | 6

Panelling for external walls should preferably be of high quality timber with no signs of rot. The planks should be sorted on site and the best ones placed on the most exposed facades of the building. External cladding should be nailed at an upward angle to avoid water seeping in and staying there (Berge, 1992; 345). The condition of external cladding is seldom good enough to be reused, so the treatment used is important so that it can be burned or used as compost. In this case the timber will be treated with beeswax or linseed oil.

Insulation

Timber has many good climatic properties both in its natural form and when reduced to fine particles (Berge, 1992; 279). Compressed wood shavings will be used as loose fill insulation between the concrete skin of the auditorium and the shiplap siding. Even though wood shavings are usually seen as waste, it is possible to re-use it, either by sucking it out and compressing it in another situation, as an energy source through burning or it can be made into compost.

Metal

Steel is used, with reinforced concrete, as the main structural material in this building. Good properties of steel are that it is completely recyclable. In this case standard steel sections are used as far as possible. Prefabricated steel components will be mechanically assembled on site, this increases to opportunity for reuse when compared to welding.

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Concrete

Concrete is produced from cement, aggregate, water and in some cases additives. The embodied energy of concrete is relatively high because of the large amount of energy used to produce cement. Lime cement is slightly weaker than Portland cement but because Portland cement with fly-ash releases soluble sulphurs into the environment it should be used as little as possible. The most important factors taken into account when concrete was chosen are embodied energy, compressive strength, fire resistance and heat capacity.

Steel used to reinforce the concrete should be recycled with 10 percent new steel added to increase the strength. Durability of reinforced concrete depend on the quality of workmanship and raw materials, as well as the proportions of the mix and the location of the building. *Carbon dioxide and sulphur dioxide, both of which occur in high concentrations around industrial areas and towns, are particularly damaging. It has been proved that carbon dioxide can carbonize up to 40 mm into concrete. The concrete loses its alkaline properties as a result and can be subject to corrosive attack* (Berge, 1992; 197). To prolong the lifespan of the concrete all reinforcement should have at least 40 mm coverage and construction detailing is done to minimise the time water takes to move off the surface.

The only way to recycle in-situ concrete is to crush it for use as aggregate and fill. Where concrete is not used for structural purposes but only for its thermal storage capacity, prefabricated elements are used. These elements are mechanically fixed to steel H-profile columns to make dismantling possible.

Prefabricated concrete with light aggregate

On the south façade prefabricated concrete panels that contains the highest possible proportion of wood shavings, for thermal and sound insulation, is used. It is also mechanically fixed to steel H-profile columns. The wood shaving will not rot because of the high PH of the cement.

Gypsum board

Acoustic gypsum boards with a woven fibreglass and cardboard cover, glued with potato paste, are used in the drywall system. If gypsum sourced as a by-product from power stations is used the waste situation is improved. The cardboard cover is produced from a

Structure

First a lightweight structure was considered because of attributes such as fast construction and the properties such as recyclability of materials like timber and steel. The main problem that this posed was that a lightweight structure reacts too much to temperature swings and that there is no thermal mass to store excess heat and coolth for later use. After this the idea was to use steel columns, timber beams and concrete floor slabs. Because of the large difference in Young's modulus of the timber and concrete, it will mean that the concrete slab will deflect more than is permitted before the timber beam will support and stop the deflection.

The structure that complied with most of the criteria set in the baseline document is a beneath surface structure of 350 thick load bearing concrete walls in the basement, to be able to withstand the soil pressure, and 500 x 200 reinforced concrete columns. The load bearing walls run through to roof level, with a steel H-profile column and I-beam structure with concrete floor slabs to provide mass for thermal storage. Where the load from the H-profile columns is eccentric, 500 deep reinforced concrete beams will span between the concrete columns and the load-bearing wall in the basement.

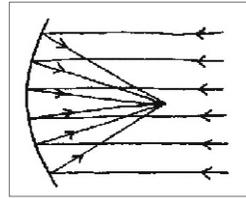
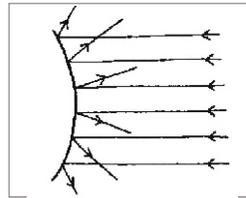
The structural challenge in the building was the auditorium and dance studios. The auditorium cantilever 6m over the sidewalk, to make this possible it will be cast as a solid shell concrete structure, with 200 off shutter walls, 250 roof and floor slab and 250 ribs @ 4500 centers. This structure is supported on a 350 load bearing concrete wall and 230 x 500 concrete columns from the basement.

The dance studios only cantilever 3,4m and is constructed in the same manner as the auditorium, except that steel H-profile columns are used so that the facade can be opened up.

Acoustics

Recommended sound levels:

Room	dB
Living area	30-40
Bedrooms	25-30
Foyer	45-55
Lecture theatres	30-35
Music rooms	30-35
Drama room	30-35
Library	40-45
Exhibition space	40-45
Kitchens	45-50
Restaurant	40-50
Conference room	30-35
Private offices	35-40
Open plan offices	40-45



- 1 convex surface - diffuse sound
- 2 concave surface - focus sound
- 3 auditorium - facing Skinner Street
- 4 absorption vs. frequency graph - helmholtz resonator
- 5 panel absorber
- 6 dissipative absorber
- 7 section through auditorium wall
- 8 composition of acoustic drywall

Theatres and auditorium

The auditorium faces Skinner Street, which means that external noise is a large factor. The auditorium will be constructed as a solid concrete shell. From the exterior to the interior it will consist of 50 timber shiplap siding, 100 loose particle insulation material, 200 concrete wall and a 40 mineral wool fiber board under open spaced timber battens.

On the sides, next to the chairs, convex acoustic panels will be used to reflect the diffused sound back to the audience. At the back of each of these panels will be timber slats to absorb sound.

8 | 8

At the back of the auditorium, where there is no audience seated, there is no need to reflect the sound so timber battens openly spaced over a low density mineral fiber board, with a 100 air cavity, is used to absorb the sound. The mass of air between the slats reacts with the springiness of air in the cavity to form a resonant system, again comparable to the Helmholtz resonator. The mineral fiber board usually introduced behind the slits acts as resistance, broadening the peak of absorption (Everest, 1973; 102). This is a form of dissipative absorber which works on the principle that sound energy penetrates a perforated surface, which in this case is the timber battens, and enters small passages and air-filled cavities in the material. Kinetic energy in the sound wave is then transferred to the material and sets fibers and particles into vibration. Due to the friction the energy ends up as heat. The material needed for this process must consist of elastic particles or thin fibers connected by small air cavities, to comply with this low density mineral fiber boards are used. Compared to other forms of absorbers this particular type is effective over a relatively wide frequency range.

The ceiling consists of suspended acoustic panels, which are partly concave and partly convex shaped. The concave part will focus sound back to the audience. The radius of the curvature should be determined so that the focus point of the reflected sound are lower than the audience so that sound is absorbed by them and the seats before the focus point is reached. The convex part will diffuse and reflect sound in behind the adjacent panel, where it will be absorbed.

Soft seating and a carpet floor finish will be used for absorption in the auditorium and theatres. In the theatres the audience won't be further than 10m from the stage, so there is no need for sound reflection. The same absorption system used at the back of the auditorium will be used throughout the theatres.

Drama rooms, music rooms and lecture theatres

The drama rooms and lecture theatres will acoustically be treated the same. Firstly none of the opposing walls are parallel to avoid successive reflections hitting the same spots each time, which will at least diffuse high frequency sound. In each of the drama rooms one wall will be convex. Three things can happen to sound falling on such a cylindrical surface; the sound can be reflected and thereby dispersed, the sound can be absorbed, or the sound can be reradiated (Everest, 1973; 71). These elements will also act as low-frequency absorbers. The internal walls will be a drywall system using independent tracks and studs for each side of the wall, so that the structure doesn't form a sound bridge. Furthermore it will consist of a gypsum board face layer with soft board glued to that, with a mineral wool blanket and IBR profile inside. The soft board will dampen vibration in the gypsum board, the mineral wool blanket will absorb sound and the IBR will reflect sound in different directions, diffusing it. The small strip windows which is used to bring natural light into the corridor on the first floor consists of double glazing with a 100 air cavity in between. A suspended 30 mineral fibre suspended ceiling is used with a 110 air cavity above it, in order to act as a dissipative absorber.

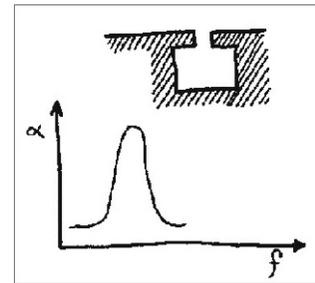
The music rooms will acoustically be treated the same with the exception of not having any windows to the corridor, and it will have a carpet floor finish for more absorption.

Lecture rooms

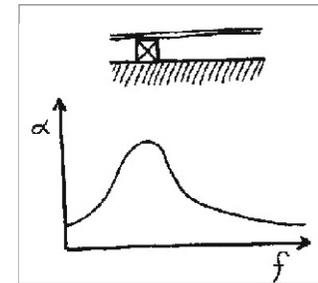
The same internal drywall system as for the drama and music rooms will be used to control noise from the corridor. The south façade consist of 80 pre-cast woodcrete elements, 60 extruded polystyrene panels and double-glazing for thermal insulation. This system will also act as acoustic insulation, which is necessary because of the public activities on the south side of the building.

Solar chimneys

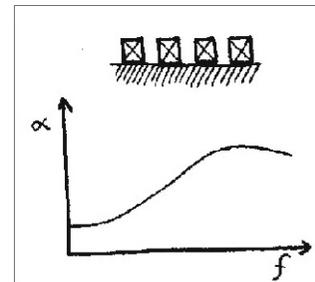
Because these elements is located in the library and forms the edges of the drama and music rooms the sound generated by the moving air is dealt with in the following way: a 80 mineral wool blanket between the off shutter concrete and a perforated IBR profile. The mineral wool blanket is used to absorb sounds and the IBR profile to reflect and diffuse sound.



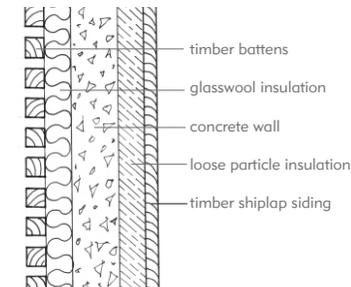
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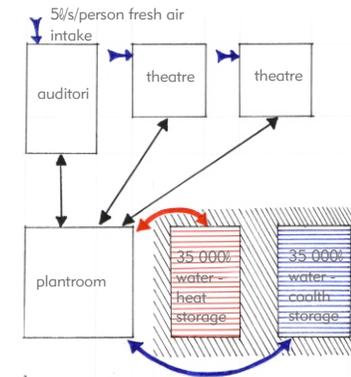
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Air-conditioning

The two theatres in the basement and the auditorium need to be air-conditioned because of acoustic requirements. The plantroom is located in the basement, with two 35 000 liter water storage tanks sunk into the soil. Instead of releasing the extracted heat or coolth into the atmosphere it is stored in the water. When the spaces are cooled, coolth from the water is used and when the process is reversed to warm the spaces heat stored in the water is used, which means that less energy is needed to either warm or cool the air. The soil around the water tanks will act as insulation so that as little as possible of the heat or coolth is lost. This system is used because air-conditioning in this case can't be viewed seasonally because of the large heat load from the audience, for instance in winter it might be necessary to heat the space to achieve the desired temperature before the audience enters, and then cooling might be necessary to keep the temperature constant.

To provide enough fresh air, as stipulated in the SABS, for 210 persons 0,9m² of duct is needed in the auditorium. To comply with this twelve 300 x 250 ducts, installed behind the acoustic screens, is used. Conditioned air will be introduced close to floor level and extracted at the top of the room. Air exchange will be done on the roof, where air will generally be the cleanest. Because the theatres in the basement are sunk into the soil and them as well as the auditorium is well insulated it will be very little affected by temperature swings, which will mean that less air-conditioning will be needed as opposed to uninsulated rooms.



1



2

1 air conditioning system
2 view to the auditorium from the south

Building management system

Effective controls are essential to obtain the best possible performance from low-energy design features. The low-energy building may in fact require a more sophisticated control regime than a conventional highly serviced building which makes less use of ambient conditions for 'free' heat or ventilation potential (Baker & Steemers, 2000, 89).

8 | 10

An automatic Building Energy Management System (BEMS) will be used, but with manual override capability in order to make occupant control possible. The most important things that will be controlled by the BEMS are heating, cooling, ventilation, HVAC and lighting.

Points that should be taken into consideration when the BEMS is set up:

- target temperatures that is dependent on the type of activity
- spaces with different uses should be in separate zones, as well as spaces behind differently orientated facades
- optimum start controls to adjust warm-up or cool down periods for intermittently occupied spaces, such as the auditorium and theatres, according to ambient temperatures
- lighting in differently zoned areas
- dimmers to adapt artificial light as natural light levels increases or decreases
- occupancy detecting switches for when the building is lightly occupied

The use of manual controls, such as opening windows, will have a large effect on the energy use. Therefore it is important that occupants should be empowered and motivated to use them correctly. The occupants should be aware of set targets for energy use, and how to optimally use the building. This will be included in the user's manual, and continuous feedback on the building's performance should be given.

Water harvesting

Rainwater will be harvested, stored, tested and used as greywater supply in toilets. When considering this system it is important to look past the financial savings and rather consider the ecological impact that this can have in the long term.

Total roof surface of the building on the site - including the Unisa Little Theatre, the Lutheran Church, the two proposed multi-functional buildings, the workshops and the performing arts centre = 7420m²

Possible annual savings by using greywater for flushings of wc's and urinals instead of municipal piped water:

Harvested rainwater volume = 5515m³
 Current cost per 1m³ = R3
 = 5515 x 3
 Possible annual savings = R16500

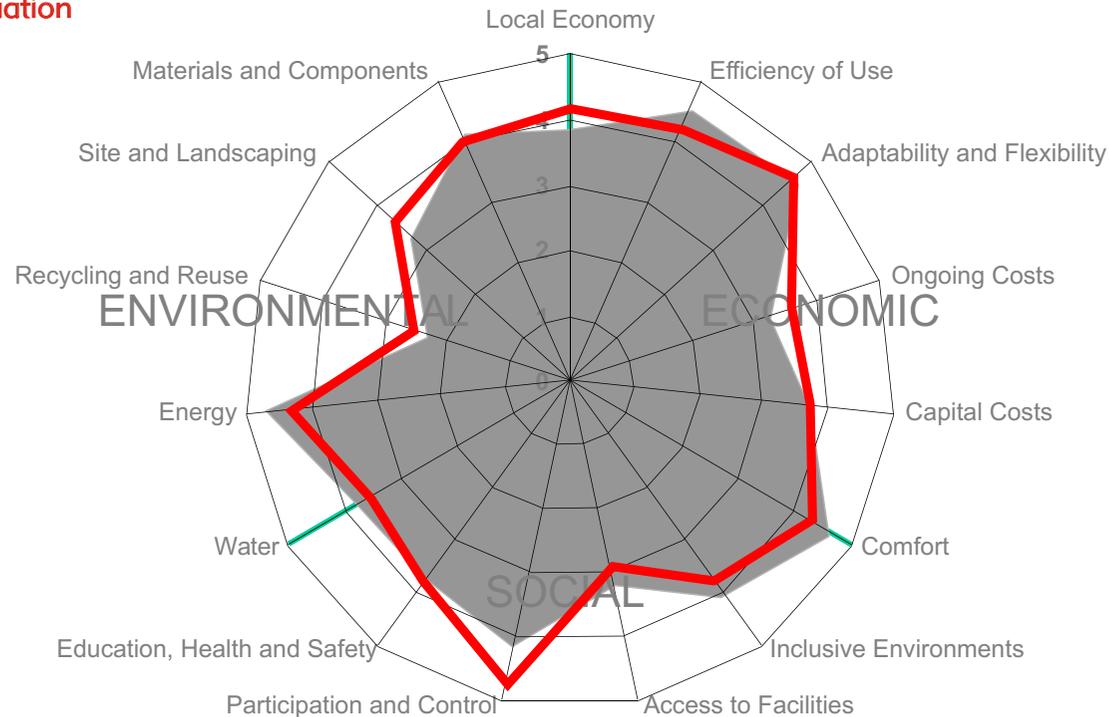
Aggregate rainfall in mm/month for the Pretoria area:

Jan. - 101.3mm
 Feb. - 108.8mm
 Mar. - 63.8mm
 Apr. - 37.5mm
 May - 48.4mm
 Jun. - 3.8mm
 Jul. - 2.3mm
 Aug. - 2.3mm
 Sept. - 11.3mm
 Oct. - 82.5mm
 Nov. - 168.8mm
 Des. - 112.5mm

Potential annual rainwater harvesting volume:

Jan. - 751kl
 Feb. - 807kl
 Mar. - 473kl
 Apr. - 278kl
 May - 362kl
 Jun. - 28kl
 Jul. - 17kl
 Aug. - 17kl
 Sept. - 84kl
 Oct. - 612kl
 Nov. - 1252kl
 Des. - 834kl
 5515kl water per annum

SBAT Evaluation



Target



Assessment

See appendix 1 for tables

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<http://cycd.bizland.com/images.htm>

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