contents

INTRODUCTION
From the theory investigation and site analysis, objectives are formulated. These are used to set pinciples to guide the conceptual design phase. The objectives become the criteria for evaluating the success of the project.

Define the site
The site cannot be analysed in isolation from its surroundings, as these influence activities on the site. In order to propose a design for the site, it is important to define how the surroundings influence the site. It is also important to establish what effect the new proposal will have on the site.

Integration
The site was analysed in terms of field-dependence/ independence. This investigation showed that different social and cultural groups use space differently. This resulted in the principle aim of this dissertation to design for the different social and cultural user groups.

Consistency
Areas of consistency provide a point of reference and give identity to the design.

Transformability
Adaptable elements interact with the constants. The transformative areas are event-driven and depend on their use.

Interaction
Create areas that will facilitate various means of interaction, such as between the users and the city, the users and the building and different user groups with each other.

Schedule
In order to determine which spaces in the design will be constant, transformative or interactive, a schedule is drawn up and each space should be analysed in terms of requirements and use.

Design Investigation

Concept Exploration

Prof Schalk le Roux (Plekke en Geboue van Pretoria Volume II 1990:130) refers to Pretorius Square as ill-defined. He suggests that better spatial definition will elevate the square from the through-route it currently is to a vibrant gathering place.

Currently the layout of Pretorius Square is based on the Roman Forum model. This model, with is strong axis, is a symbol of dominance (F. Motsepe 2006), hierarchy and exclusion and does not allow for interaction between users. It can therefore be compared to the field dependent diagram.

Bernard Tschumi strives for architecture to be a 'combination of space, events and movement without any hierarchy.' (Tschumi 1997) This can be done by applying principles of field-independence as it is a model for inclusion and equality of users. Finian Motsepe (presentation 2006) on designing for Ubuntu, names 4 principles: order, hospitality, dignity, sharing. The field-independent diagram allows for these four principles and the break down of hierarchy.

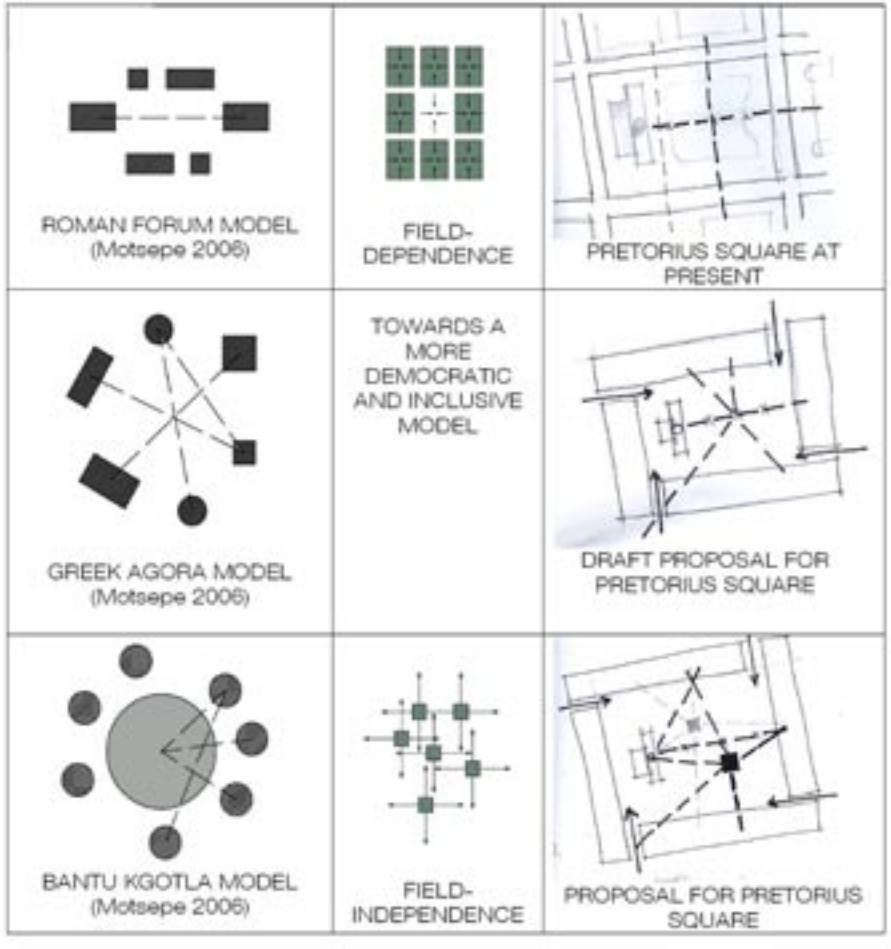


fig.5.1 Concept Design: Pretorius Square

Design Investigation

Two methods of setting up a programme can be implemented. The first is based on schedule and the second is based on events, as suggested by Bernard Tschumi.

'PROGRAMME: A determined set of expected occurrences, a list of required utilities, often based on social behaviour, habit or custom. (Tschumi 2000:13)

EVENTS: An intermediate set of unexpected outcomes.' (Tschumi 2000:13)

When reading the schedule based programme, words such as 'auditorium' evoke predetermined concepts, while the description 'area for discussion' is far more open-ended and allows for exploration. Each identified area in the event-based programme will be further investigated. From here models will be built identifying their ideal characteristics. These can then be used to in the design process by adapting them to the context.

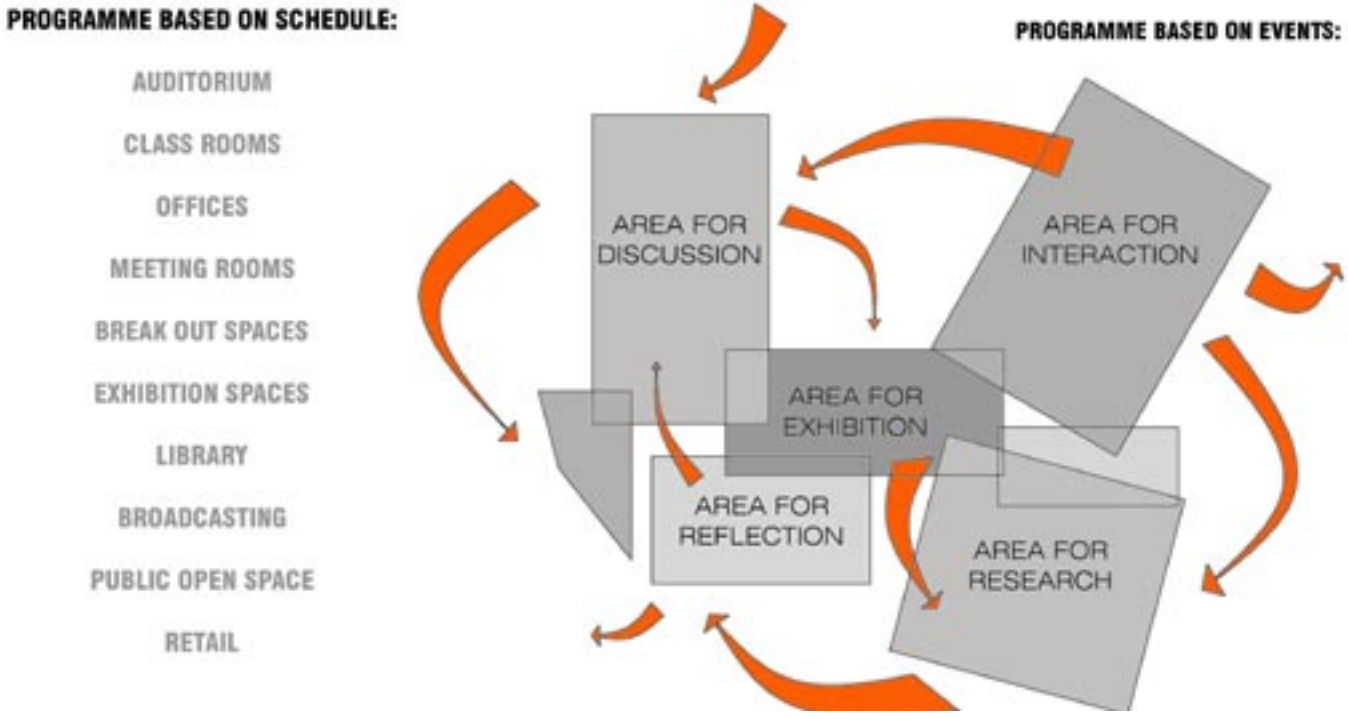


fig.5.2

University of Pretoria etd – Novellie, J (2007)

Design Investigation

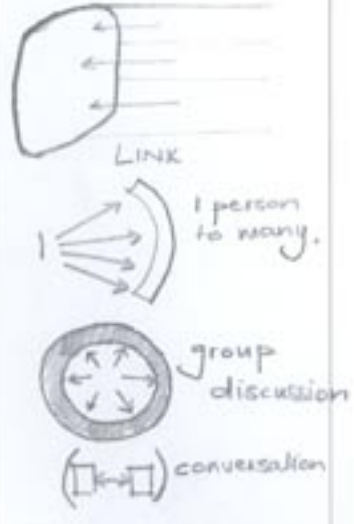
Exploration of Areas in the Programme

AREA FOR DISCUSSION

EVENTS: Exchange ideas Acquire knowledge through communication.'

SPOKEN LANGUAGE

CHARACTER: Visitors to the building must be aware of the discussions and must be invited to take part through visual or aural links.



AREA FOR INTERACTION

EVENTS: Informal discussion. Interchange. Relaxation. Eat. Socialise. Observe.

SPOKEN WORD

CHARACTER: Open, accessable, flow to and from other spaces, lively, inviting, non-threatening, readable.

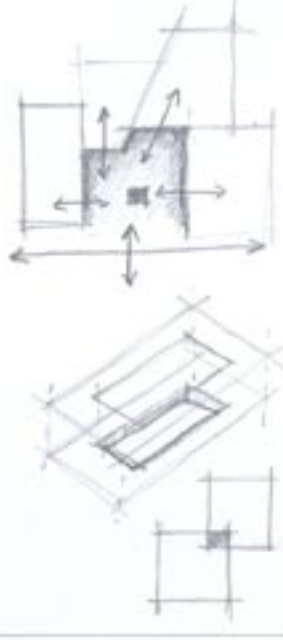


fig.5.3 - 5.7

University of Pretoria etd – Novellie, J (2007)

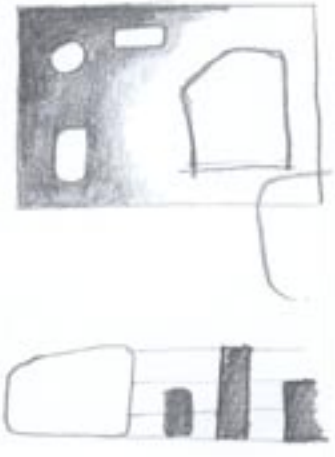
Design Investigation

AREA FOR REFLECTING

EVENTS: Write, study, compose, develope, test, examine, confirm, produce.

WRITTEN WORD

CHARACTER: Intimate, safe, private, solid.



AREA FOR RESEARCH

EVENTS: Collection of books, recordings, images, film and people with knowledge.

VARIOUS MEDIA

CHARACTER: Spine through building, used by all, connects different languages, connects users to other events in the building.

AREA FOR EXHIBITION

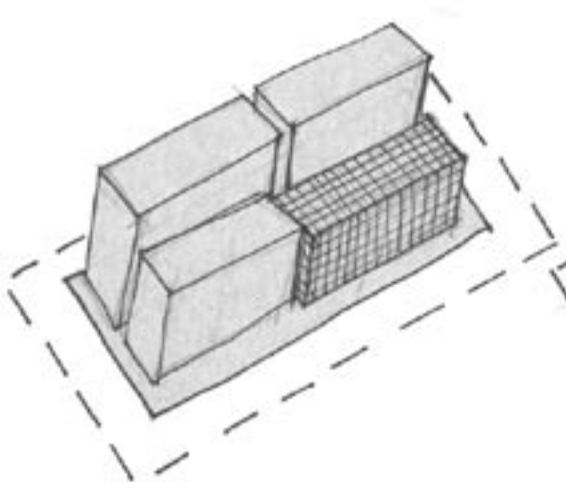
EVENTS: To engage the public. Show work being done. Link inside and outside spaces.

VARIOUS MEDIA

CHARACTER: Inviting, transforming, link users to events.

Design Investigation

Concept Sketches



THE SHELL *fig.5.8*

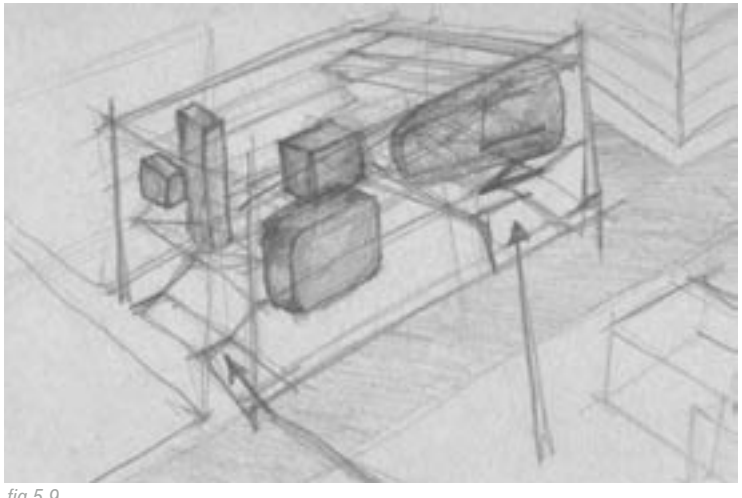
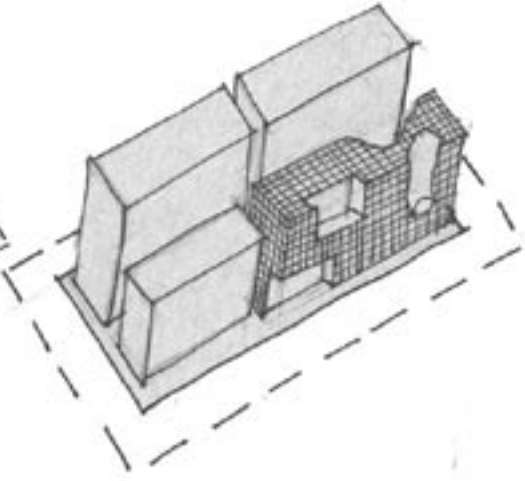


fig.5.9



THE TRANSFORMATIVE

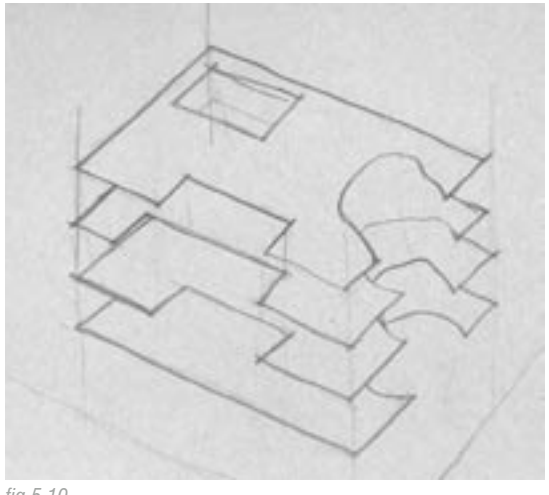
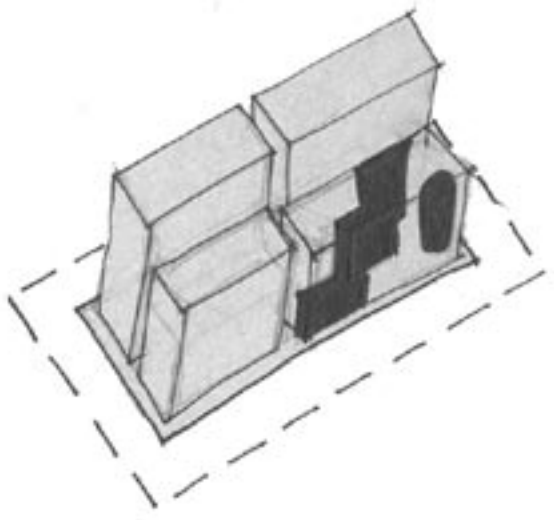


fig.5.10



THE CONSTANT

CONCEPT
Programme specific pods within a transformative building.

CONSTANT
Programme driven

TRANSFORMATIVE
Event driven

Design Investigation

Concept Exploration

These are the first concept sketches experimenting with the theoretical objectives.

In the first excercise (fig 5.8 - 5.10), the building is proposed as a shell, divided into constants and transformatives. The constants are illustrated as pods, floating inside the building. the rest of the building, a grid system, houses the transformative elements and can adapt to the needs of the users.

The next group of concept sketches (fig.5.11 - 5.13) starts investigating the concept in terms of site and requirements. A desician was made to pull the pods out of the building, thus having the constants housed seperately from the transformative part of the building. This was done for various reasons. Firstly, it allows the building to be read easily by passers by. The shape and material qualities of each part will portrey its use. Secondly, the pods can be elevated off the ground, allowing the ground floor below to be developed into a museum park in order to promote the museum park boulevard and to take the ISDF proposals into consideration. Lastly, by splitting them, a passage could be created between the two where circulation can happen. Such an area will allow for interaction between the two parts of the building and their users.

'PROGRAMME: a determined set of occurances, a list of required utilities, often based on social behaviour, habit or custom.
EVENTS: An intermediate set of unexpected outcomes.' (Tschumi 2000:13)

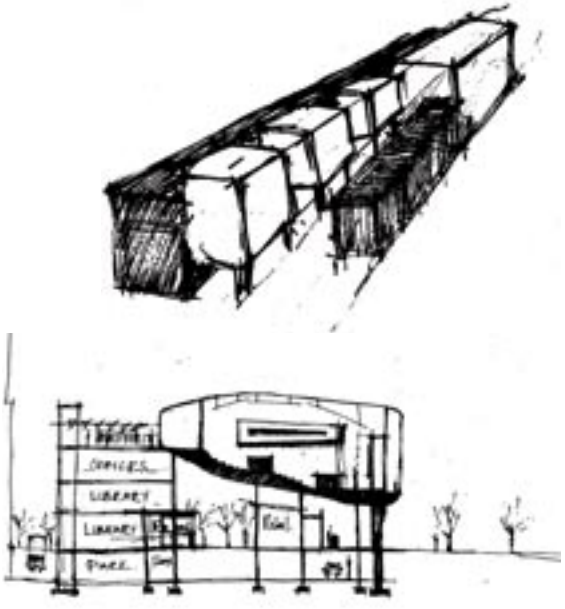


fig.5.11 - 5.13

Design Investigation

Concept Exploration

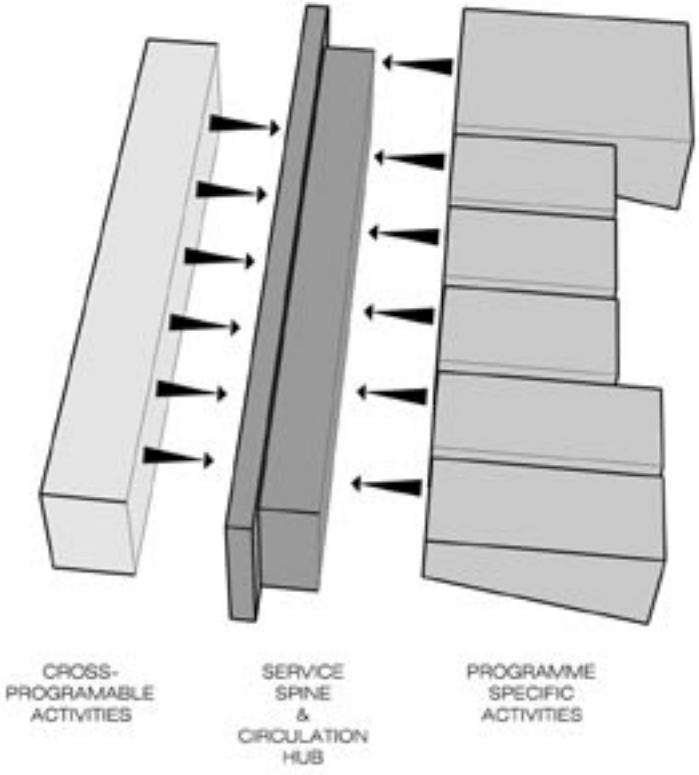


fig.5.14

CONCEPT

Interaction between constant and transformative

INTERACTION

In response to the context, the design should allow for a balance between elements of consistency and elements of an adaptive, transformative nature

The concept proposal shows the cross-programmable (transformative) activities in the main building, which will house the library and offices.

The programme specific (constant) activities are housed in pods. This allows for freedom in designing the pods. Each can be designed to the size, shape and quality required for its use. They will house an auditorium, lecture halls, studio's and workshops.

Between the two parts of the building is a service spine and the circulation hub. These house the services that both sides of the building depend on. Placed in the middle, the two parts share facilities, allowing for an area for interaction between the users of the two parts.

Design Investigation

Concept Exploration

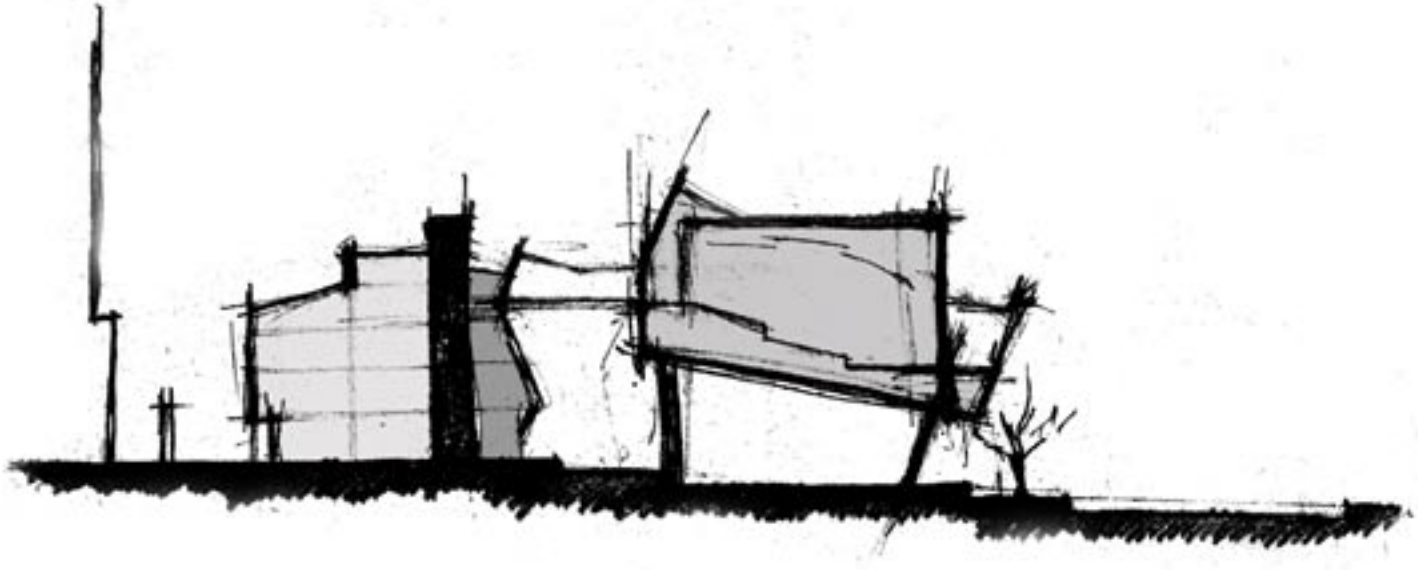


fig.5.15 Concept Sketch: Section

Design Investigation

Concept Exploration

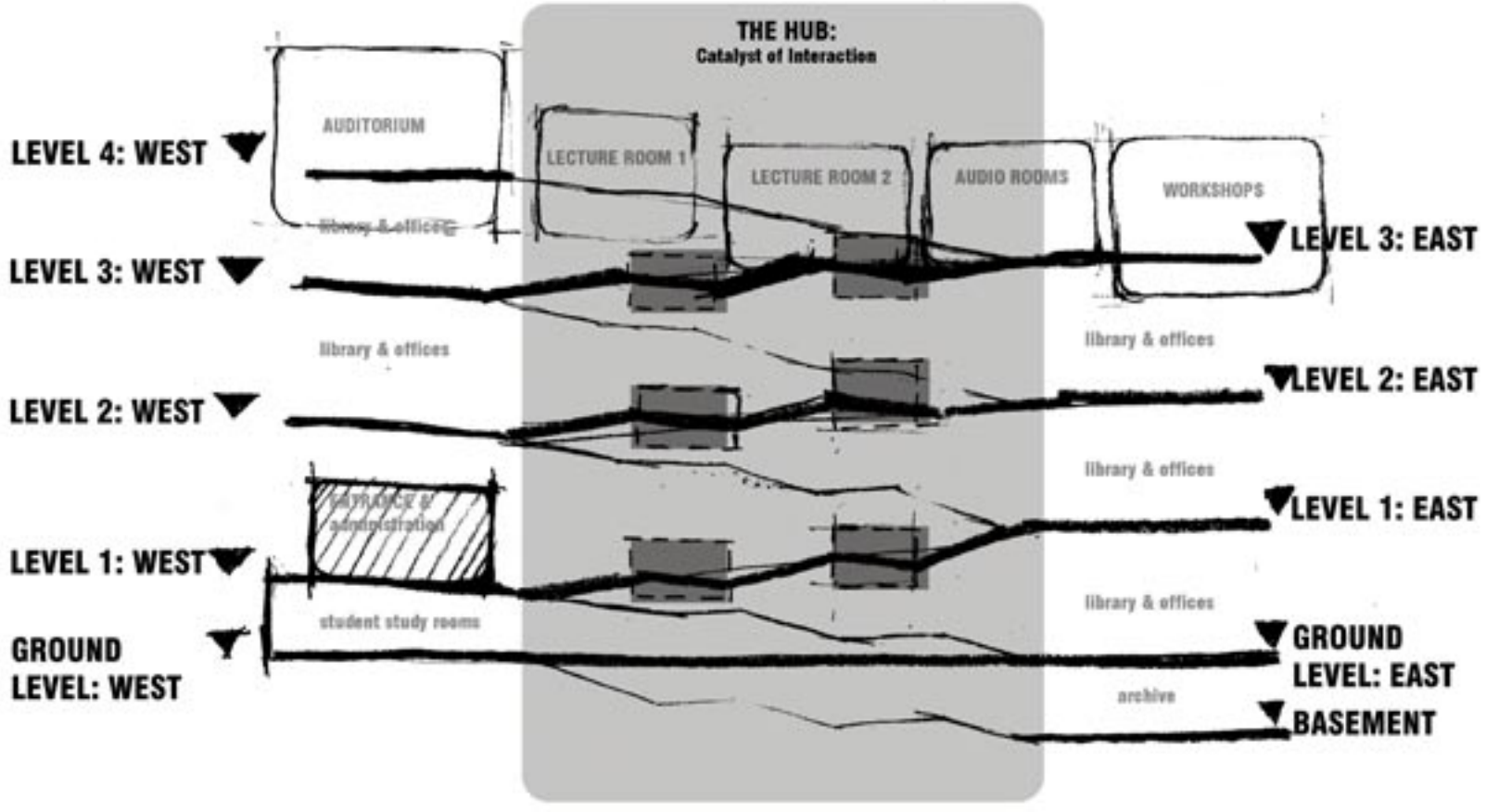


fig.5.16 **CONCEPT 1: Alternating levels connected with an internal ramp system.**

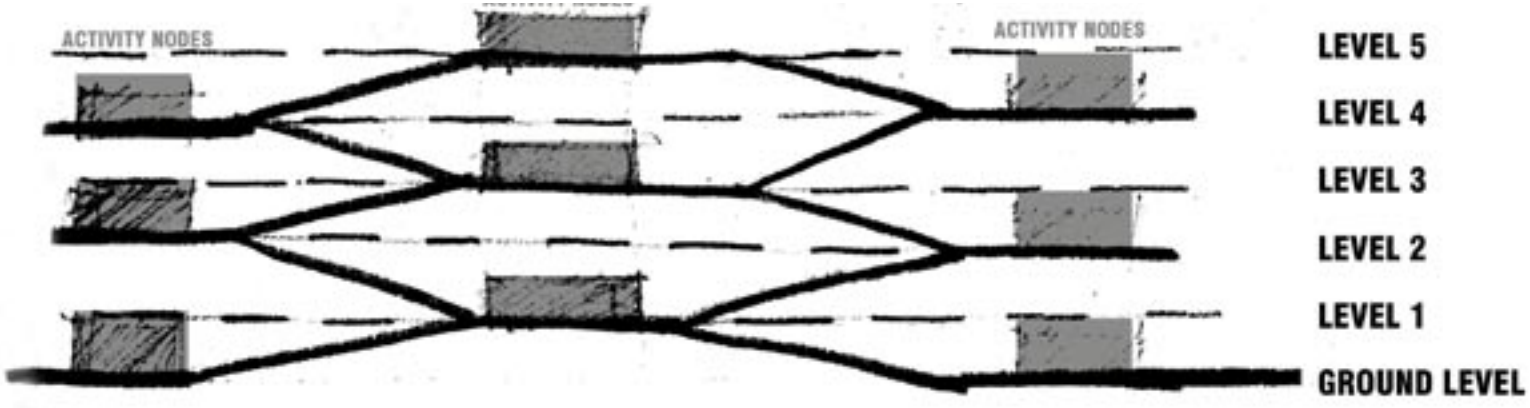


fig.5.17

CONCEPT 2: External ramp system connecting the programmed and unprogrammed buildings.

The ramp is a building on its own, housing movement and linkages. Activity nodes on the ramp act as thresholds into the building and create areas where activities can overflow and interaction can take place.

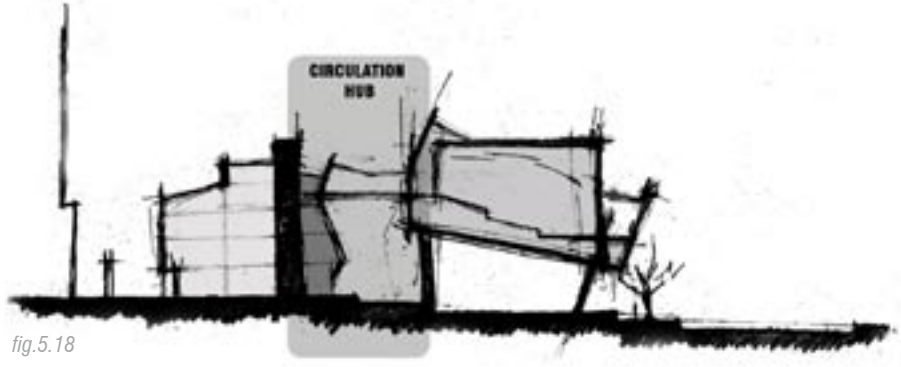


fig.5.18

TSCHUMI'S HUB:

The hub acts as the main circulatory system of the building, connecting the various activities whilst acting as an interactive node that links all users and events. (Tschumi 2000: 289)

DEVELOPING THE RAMP

Design Investigation

Design Considerations

INTEGRATION

This project is an experiment in designing for the different social and cultural groups inhabiting the periphery of Pretoria's CBD.

INTERACTION

As determined in the site analysis, the CBD buildings do not provide for new requirements set by its inhabitants. Not only were the buildings designed for one culture only, but also for administration and official use. The post-apartheid occupants require a more vibrant city centre. One in which they do not only work but live, play and interact.

The design addresses these needs by allowing for public, semi-public and private areas. The public area is provided by developing half the site into a museum-garden with infrastructure for a kiosk, informal trade, exhibitions and outdoor performances allowing opportunities for people to interact. The semi-public area flows from the public area by means of ramps, access doors and visual links. These invite members of the public into the building where they can interact with regular users as well as with the facilities provided.

The design is a connection between different cultural groups and communities as well as the historical and new trends in Pretoria's CBD.

CIRCULATION

Circulation at ground level

Circulation on ground level was designed to integrate passers by and users.

Tourists: The ground level functions as an open museum-garden where exhibitions and performances can take place. The restaurant or kiosk in the old NZASM building will attract tourists from Pretorius Square to the site.

Commuters: The ground level walkways provide infrastructure for the commuters who move to and from Bosman Street Station to the CBD during peak ours. Small trade can be put up during this time and taken away once the commuters leave.

Users: At any stage, the tourists and commuters will have opportunities to enter the building via ramps and stairs. Users can either enter through the north or will be able to park on the south or in the basement.

Staff: Staff parking is provided at the back near the staff entrance.

Deliveries: Deliveries will be via the basement.

Vertical Circulation

The circulation system is the most important part of the design as this is not only a space for movement but is where interaction between users will take place. The circulation hub is the centre of the building: connecting the constants and the transformative. However, it is clearly visible from outside. This will allow users and passers-by to understand the building and to be invited in. The hub is the semi-public zone of the building.

Design Investigation

Design Considerations

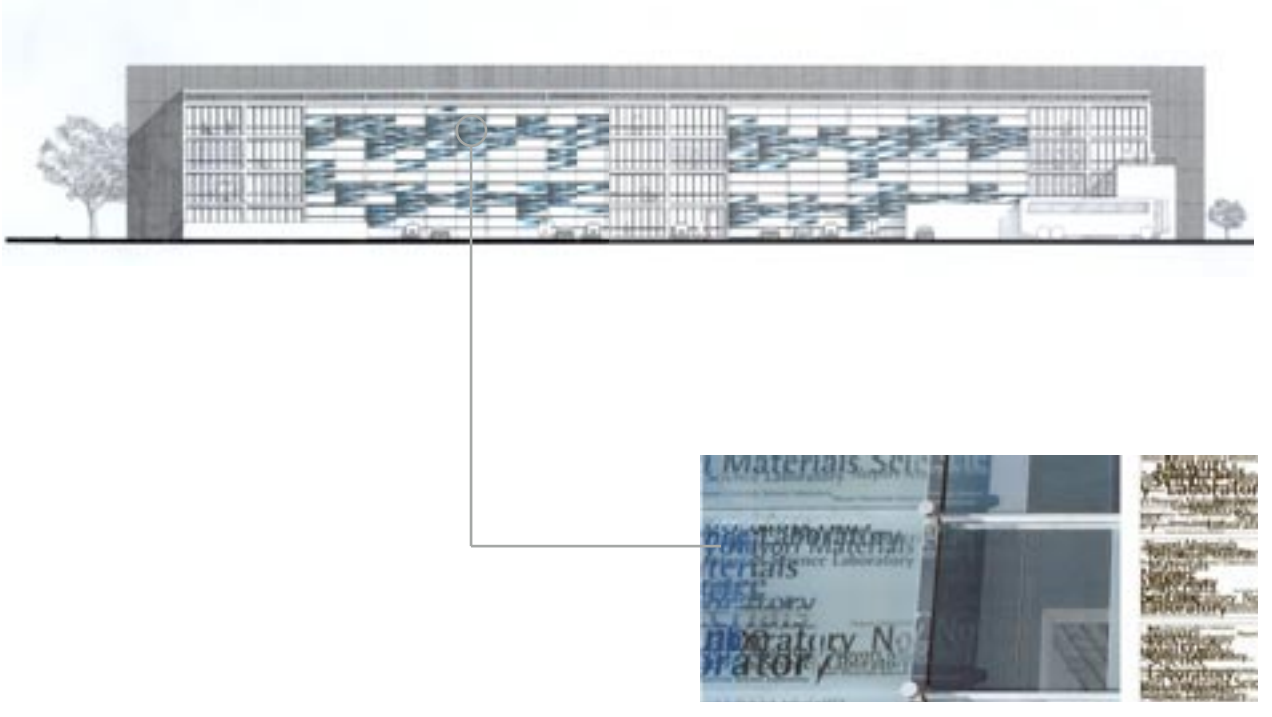
It allows more flexibility in the main building as this is almost free of circulation.

GATEWAY

As a capital city, the gateways to Pretoria will be governmental and institutional buildings. It is important to design a facility that is an example of current South African architecture.

TEXT

Text will be used on the facade to illustrate its use as an institute for African language studies. African artists will be commissioned to do murals inspired by literature.
The south facing glass facade will be covered in letterwork of poems written in African languages.
The concrete walls on the west and east facades can have text cast into the concrete depicting the name of the institute.
Walls can also be left open for graffiti to be done on them.



Design Investigation

Design Considerations

TRANSFORMABILITY

The main building is designed to be flexible and adaptable to a variety of uses. Flexibility is achieved in two categories.

Refurbishment

Care was taken to allow for low cost refurbishment of the building, if the users or function of the building were to change at a later stage. Every second floor of the main building is of timber and every other floor of reinforced concrete. These timber floors can be removed when double volumes are required, so the layout can be changed. A grid of steel I-section beams provide structural support on a 5mx8m grid. Raised floors allow for services, such as air-conditioning and cabling, to be taken through the floor. Raised floors will be installed on a grid system and will allow for flexibility of layout.

Every day use

Flexibility for everyday use includes the raised floor system which allows services to reach all parts of the building independent of the layout.

Movable parts of the timber floors allow for more flexibility. These floor panels are situated under the existing timber floor and can be slid out using a pulley system to increase the floor area as required.

Calculations:

Aim: To determine load that each wheel will carry in order to choose the correct system form the manufacturer.

Density of timber:
Pine = 480 – 720 kg/m^3 (use maximum)
Density of plasterboard = 1280 kg/m^3

Determine the amount of timber used:

- 3m x 0.125m x 0.038m = 0.01425m^3
- 2.5m x 0.125m x 0.038m = 0.0890625m^3
- 3m x 2.5m x 0.016m = 0.12m^3
- 3m x 2.5m x 0.008m = 0.048m^3

TOTAL = 0.2833125m^3

Determine the amount of plasterboard used:

- 3m x 2.5m x 0.0064 = 0.048m^3

Weight of timber:

0.2833125m^3 x 720kg/m^3 = 203,985kg

Weight of plasterboard:

0.048m^3 x 1280kg/m^3 = 61.4kg

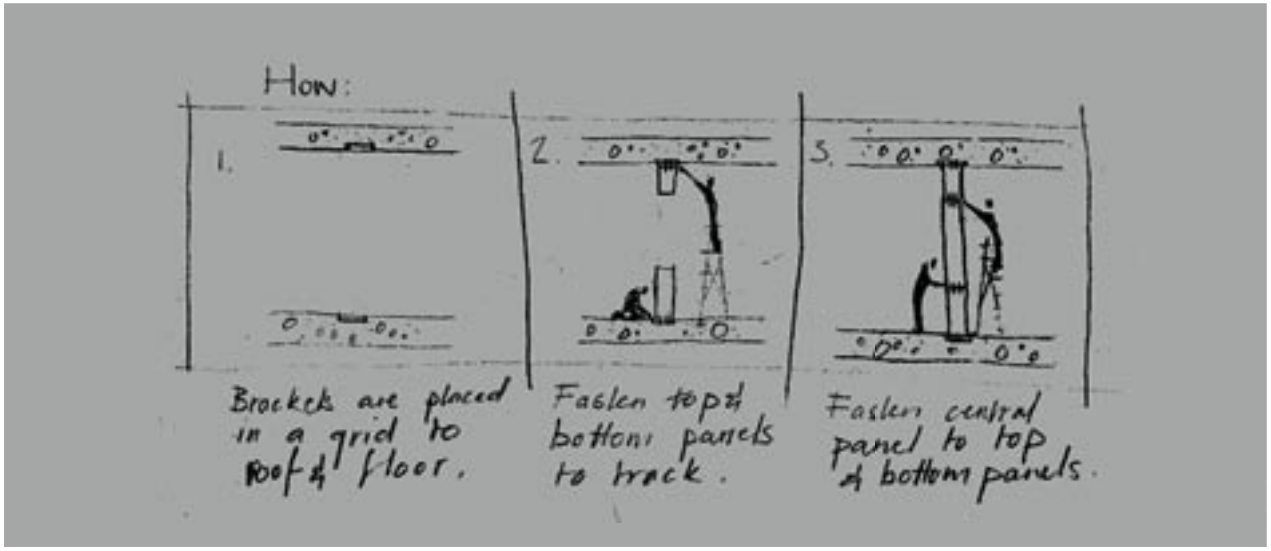
TOTAL: 265.4 kg on each wheel

Thus choose the following system:

Henderson 301H straight sliding gear to carry up to 400kg consisting of galvanised steel top track type 301H, side fix

aluminium brackets and end clips type 1A/301, adjustable hangers type 57A/S, brass roller guide type 106N/100, galvanised steel bottom guide channel 100, two bow handle type 463.

Interchangeable partition walls are provided on a grid system for ease of use. The grid consists of tracks built into the ceiling and floors. The panels can be clipped into these, or removed as required. When panels are not in use they can be rolled into storage rooms in the service core. Panels include: Closed panel, panel with opening, panel with glass window, panel with door, balustrade.



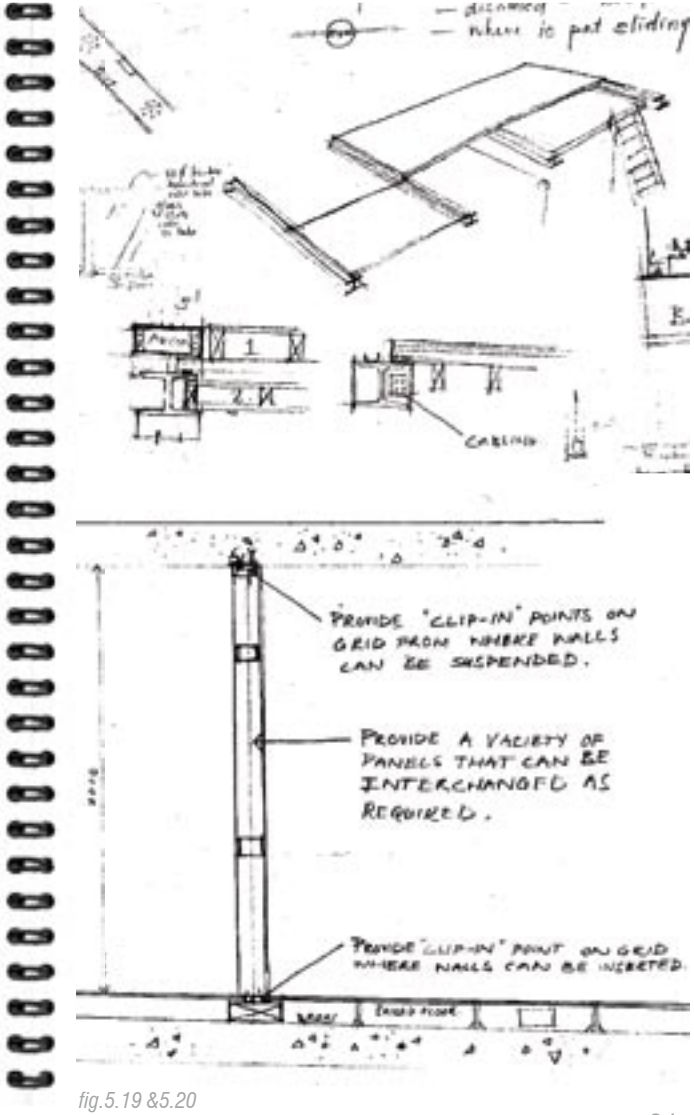


fig.5.19 &5.20

Design Investigation

Design Considerations

University of Pretoria etd – Novellie, J (2007)

ORIENTATION & CLIMATE

Orientation

The orientation is determined by the city framework, and the functions housed. The main building, which contains the library, is set back on site to create a public open space on ground level. The main façade faces north, favourable for the location of the public open space and the foyer of the main pod. The library building faces south, which is preferred as sunlight damages books.

The building is tilted slightly towards the north-west to accommodate the movement of commuters through the site and encourage them to move past and into the building.

Sunlight

With a maximum of 80% sun in summer and 67% in winter (AAL310, 2002: 19), sunlight is an abundant resource. Careful planning of glazing overhangs and orientation will ensure that glare is minimised but that a comfortable amount of heat is permitted into the building. The design process also focuses on harvesting sunlight for energy.

Vertical Sun Angles

TIME	21 MARCH	22 JUNE	23 SEP	22 DEC
08:00	26°	14°	26°	35°
10:00	51°	32°	51°	62°
12:00	65°	41°	65°	68°
14:00	51°	32°	51°	62°
16:00	26°	14°	26°	35°
18:00	-	-	-	18°

Existing Buildings

The existing department of home affairs has north-facing windows. Care was taken not to block direct sunlight onto the façade. This influenced the decision on shape and height of the proposed design.

Louvre System

Sunscreens block direct sunlight during summer whilst diffusing light and preventing glare. For this reason louvres are fitted over the glass roof of the circulation hub.

Natural Light

Direct sunlight is hazardous to books but indirect natural lighting is preferred to artificial light for reading. Therefore light is allowed into the building through glass walls on the south façade.

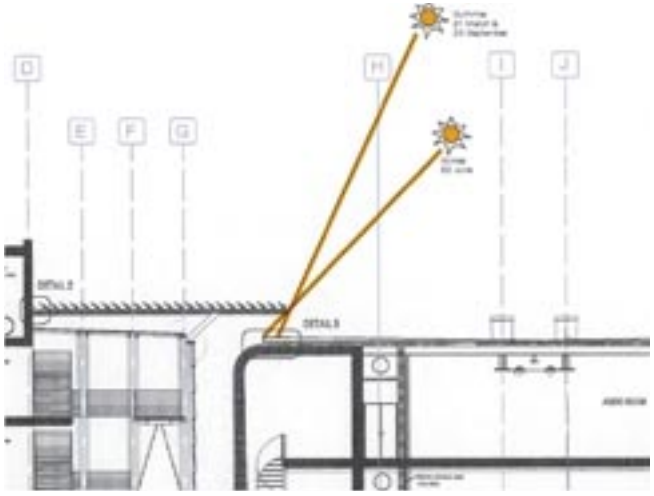


fig.5.21

Design Investigation

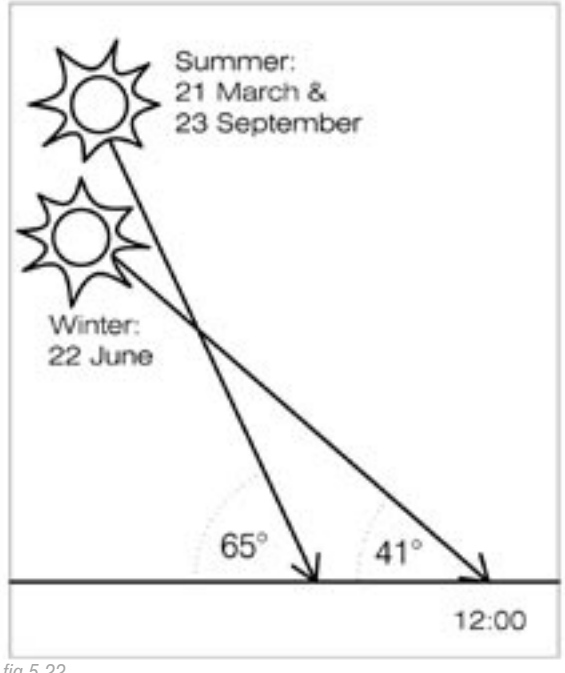


fig.5.22

The library building is set behind a semi-solid service wall and faces south. This is ideal because direct sunlight damages books, while natural indirect light is favoured above artificial light for reading. For this reason the offices and study rooms are located on the southern façade. Direct morning sun from the east should be blocked out of the building. For this reason the plant room is situated on the eastern façade. Direct sunlight from the west should also be avoided.

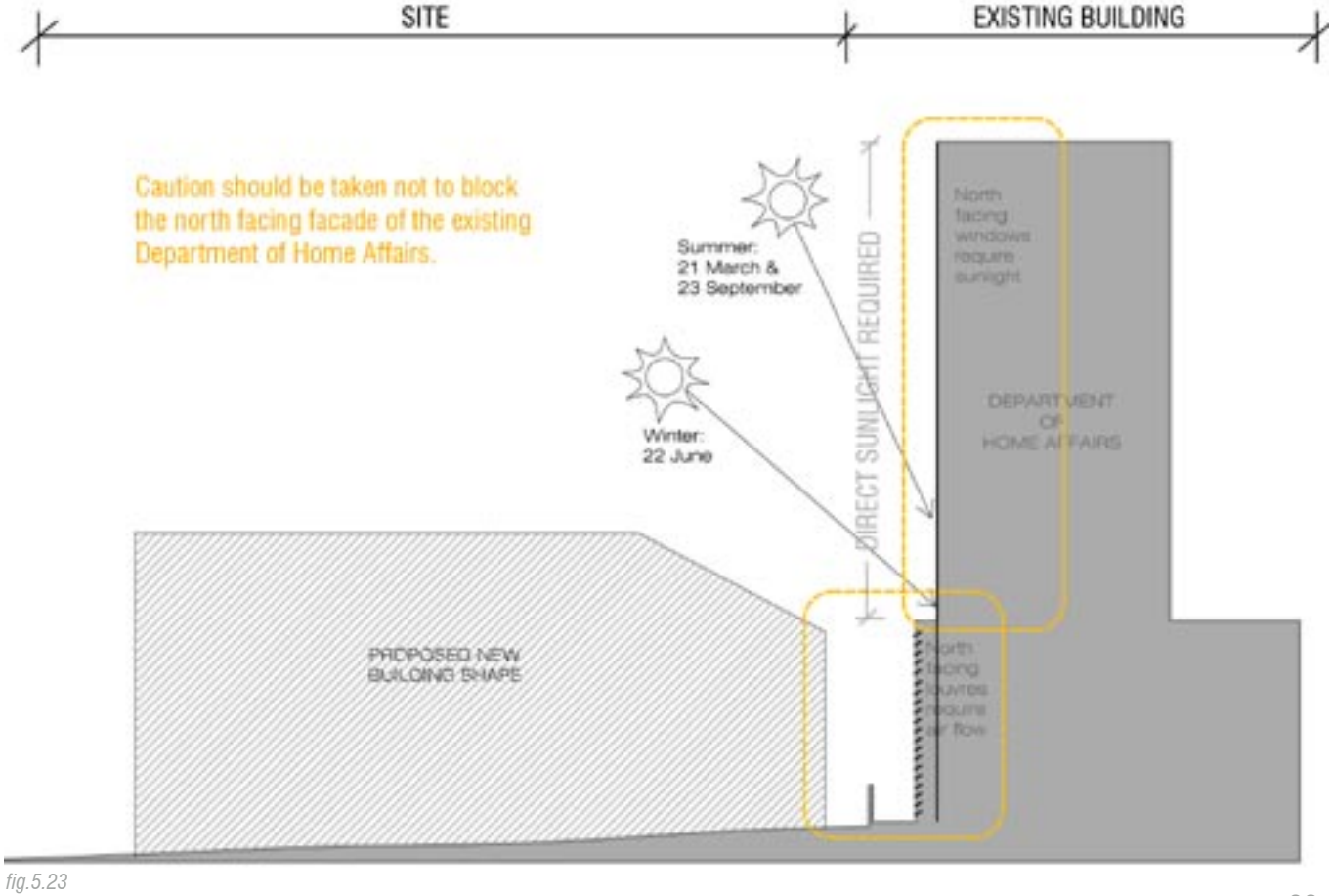


fig.5.23

Design Investigation

Design Considerations

University of Pretoria etd – Novellie, J (2007)

Rainfall

Summer rainfall area, thus November to March.
50-80 rainy days per year
380mm to 700mm per year
Hail 4 times per year
High evaporation levels during summer.
Average humidity: 59%
Water is harvested from the roof through downpipes into water tanks situated underground. The tank will be fitted with an overflow valve when it full. Stormwater channels and the basement water drainage is also stored in an underground tank. Stored water will be used for irrigation/cleaning of outside and basement surfaces. Grey water can also be used for flushing WC's.

Calculations:
Roof catchment area: 90mx12m= 1080m2
Average rainfall per rainstorm: 40mm
40 x 1080m2 = 43 200 litres per rainstorm
43 200 litres per rainstorm that can be used to irrigate the park.
Tank size:
5 000mm long x 3 456mm wide x 2500mm high will hold exactly 43 200 litres.

Design Investigation

Temperature

Summer : Average temperatures of 16°C to 30°C with occasional highs of 42°C. Maximum monthly average of 28,6°C in January.

Winter: Average temperatures of 7°C to 23°C with lows of up to 0°C at night.

Minimum monthly average of 4.5°C in July.

Thermal mass is provided by the concrete walls and roof absorbing direct and indirect solar radiation during the day and releasing it into the building later. The amount of time it takes to release the heat depends on the thickness of the wall/ roof. The 300mm thickness is ideal for allowing the heat to be absorbed during the day and be released at night. The lower temperatures absorbed during the night will be released during the day. This will provide a comfortable work environment and will alleviate the use of a mechanical heting and cooling system.

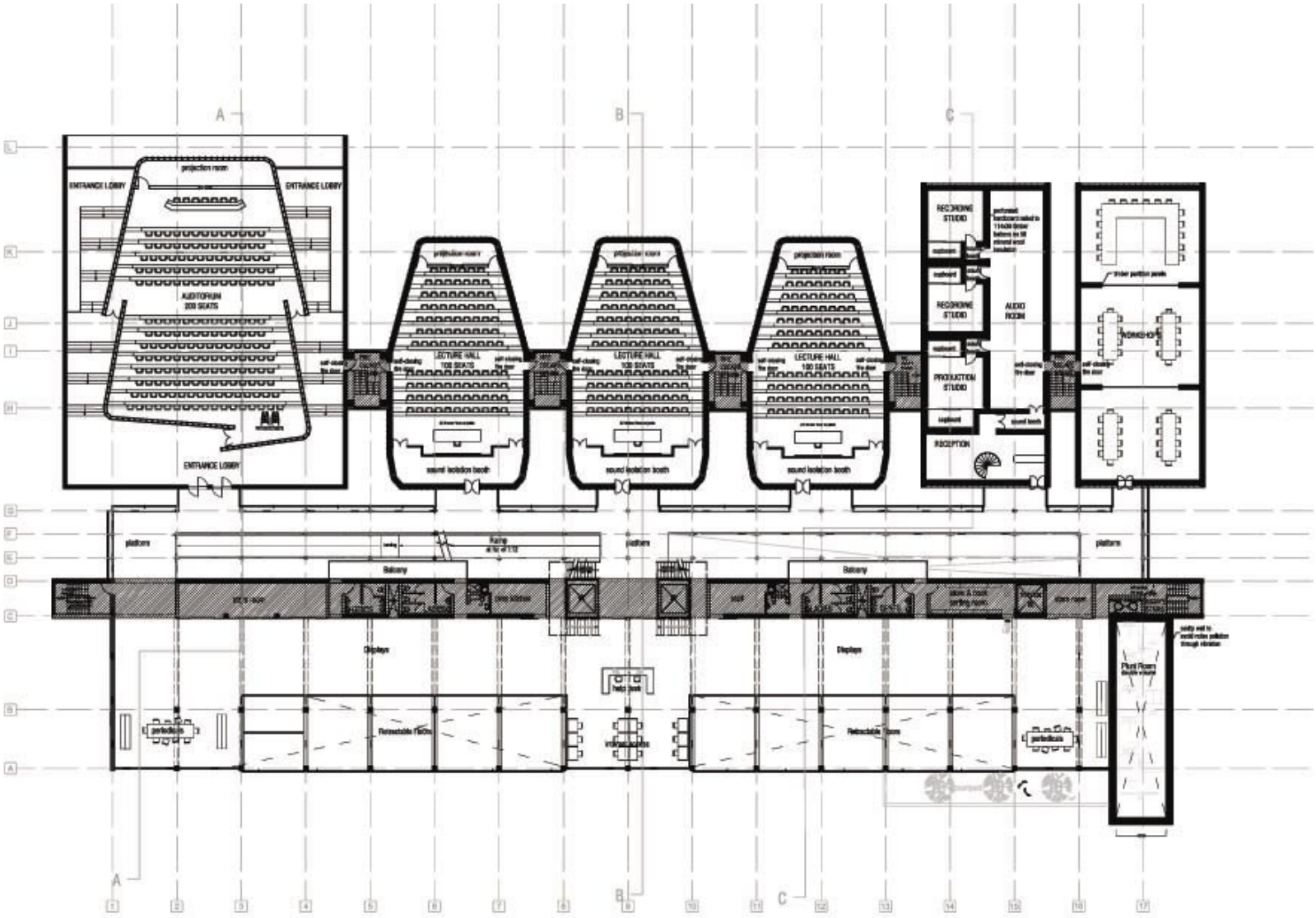
Wind

Summer winds blow from east/southeast to northwest.

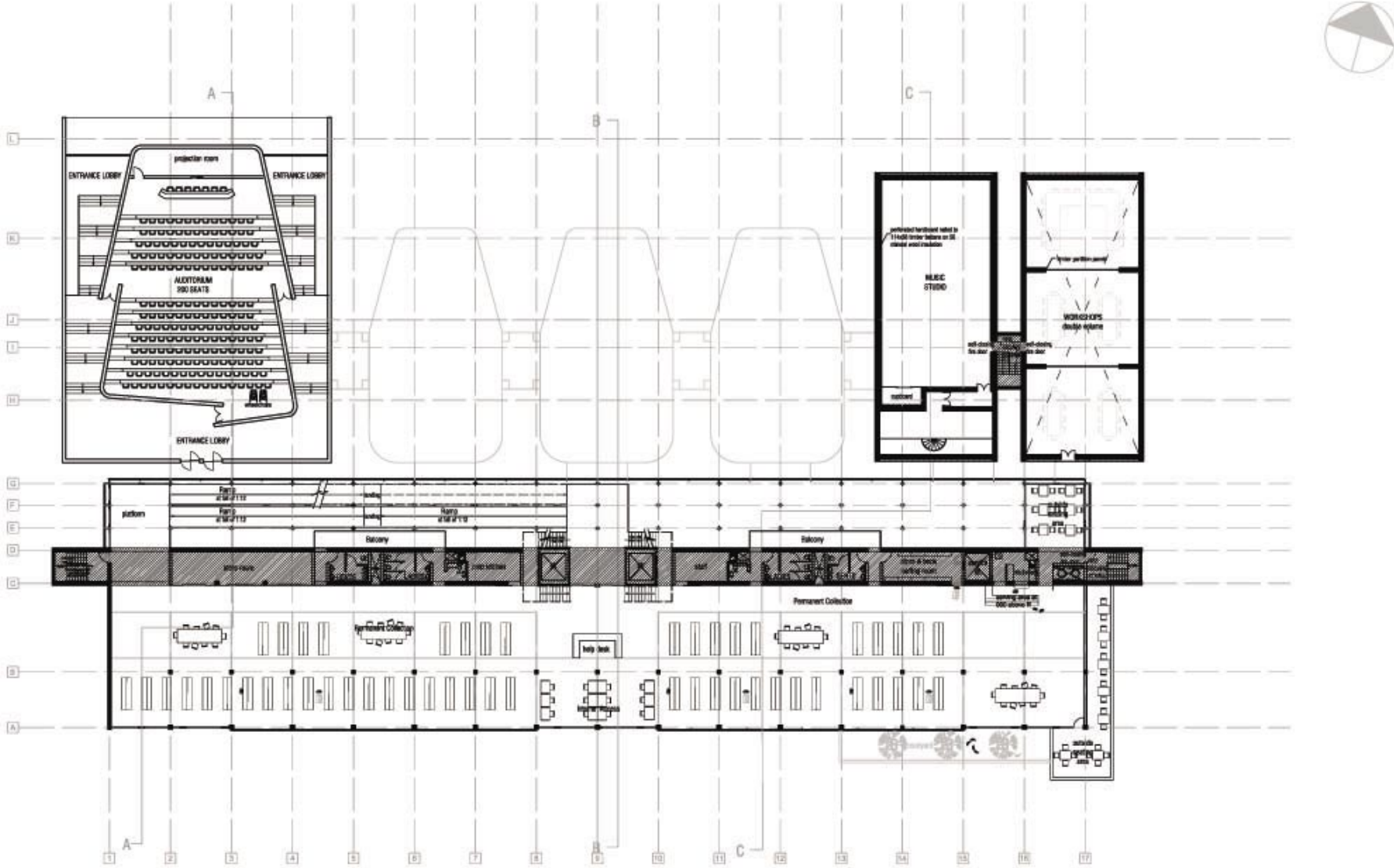
Winter winds form South-west and north-east.

The building is orientated for maximum cross ventilation. The summer breeze is encouraged to pass through the museum park area while the winter wind is blocked by the buildings to the north-east of the site.

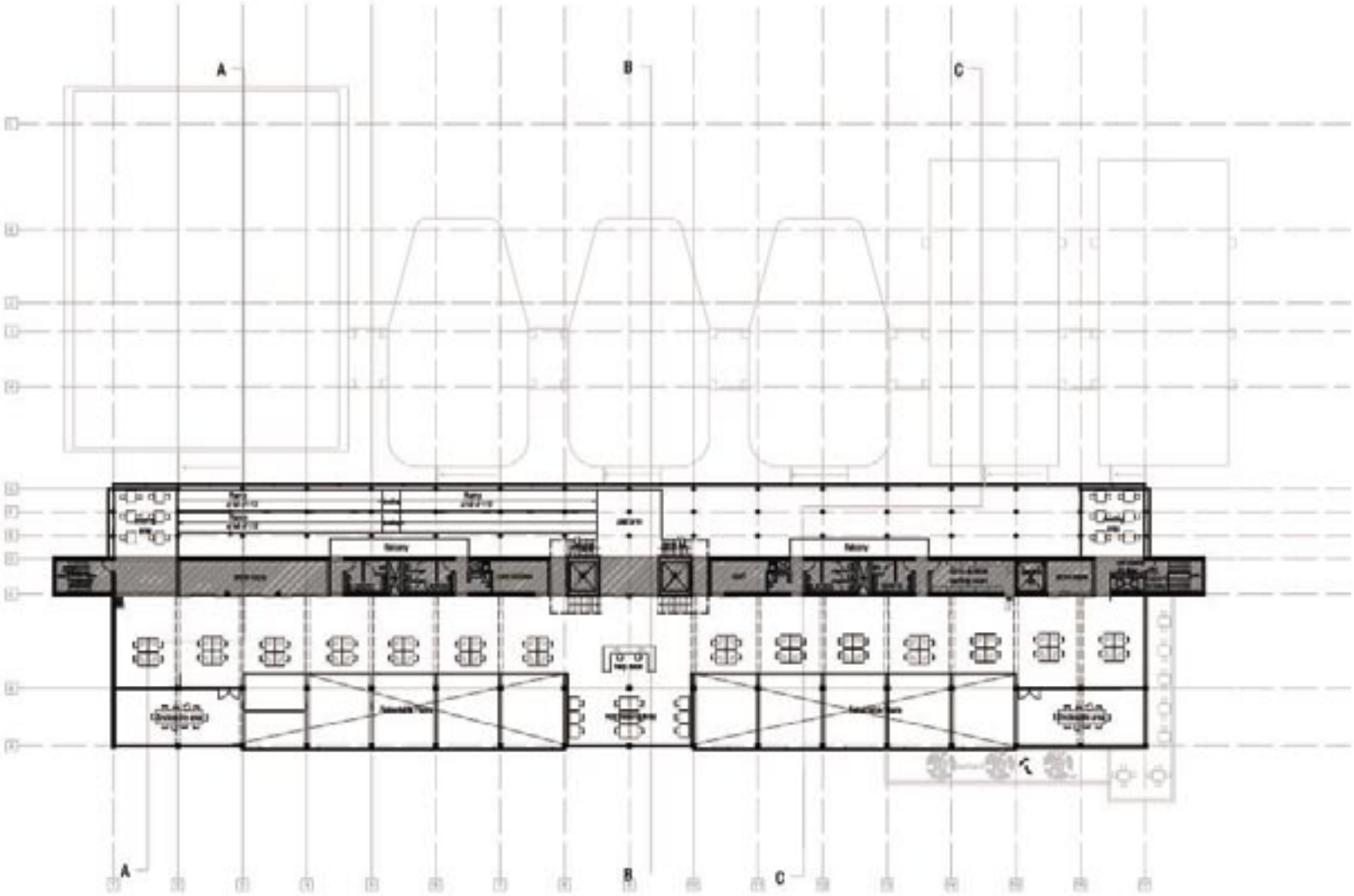
fig.5.25



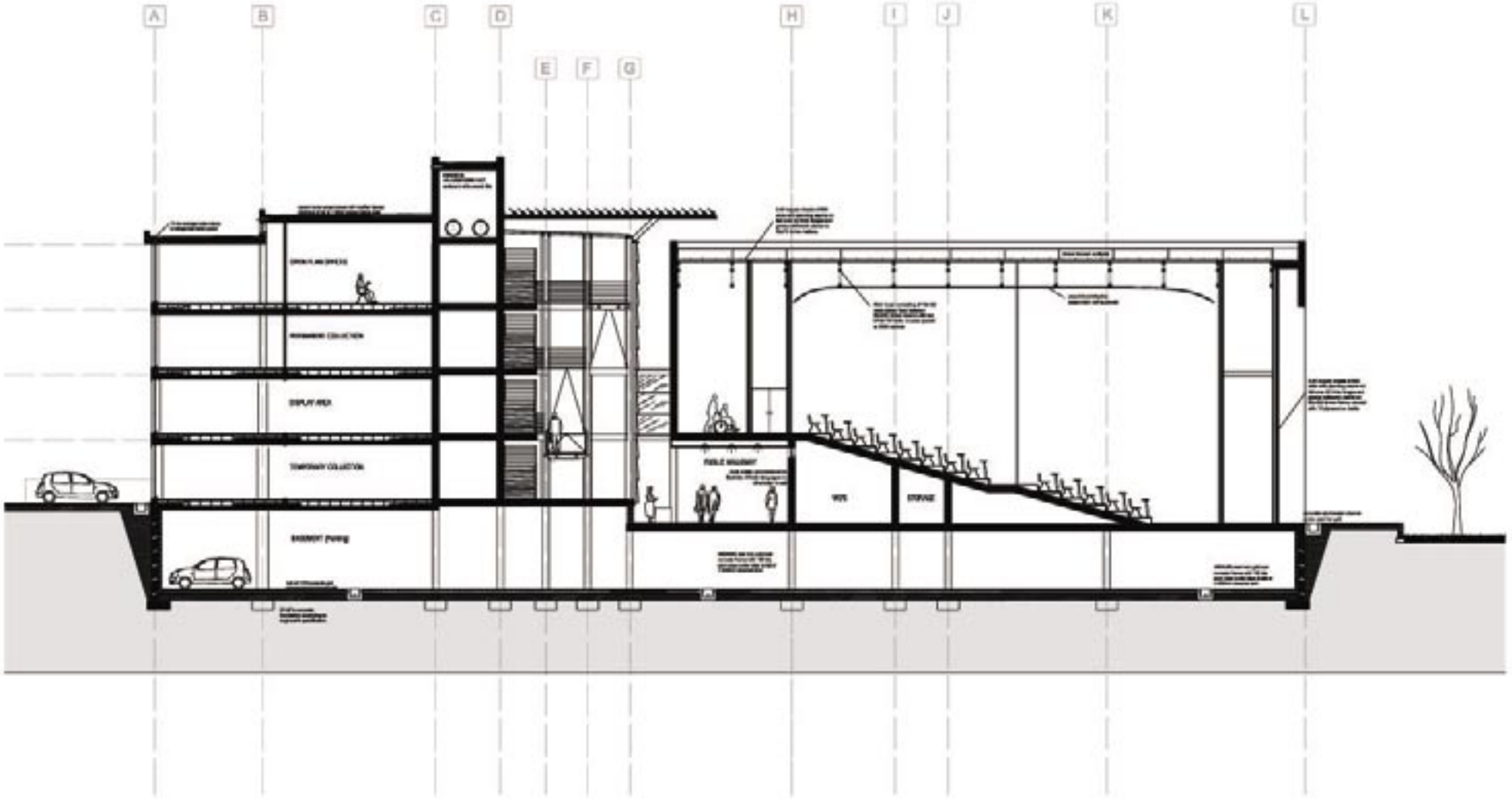
Institute for African Language Studies	Drawing: Level 1 Plan	Scale: 5m	Scale: 1:500	Name: Jacqueline Novellie	Mentor: R J van Rensburg	Date: November 2006



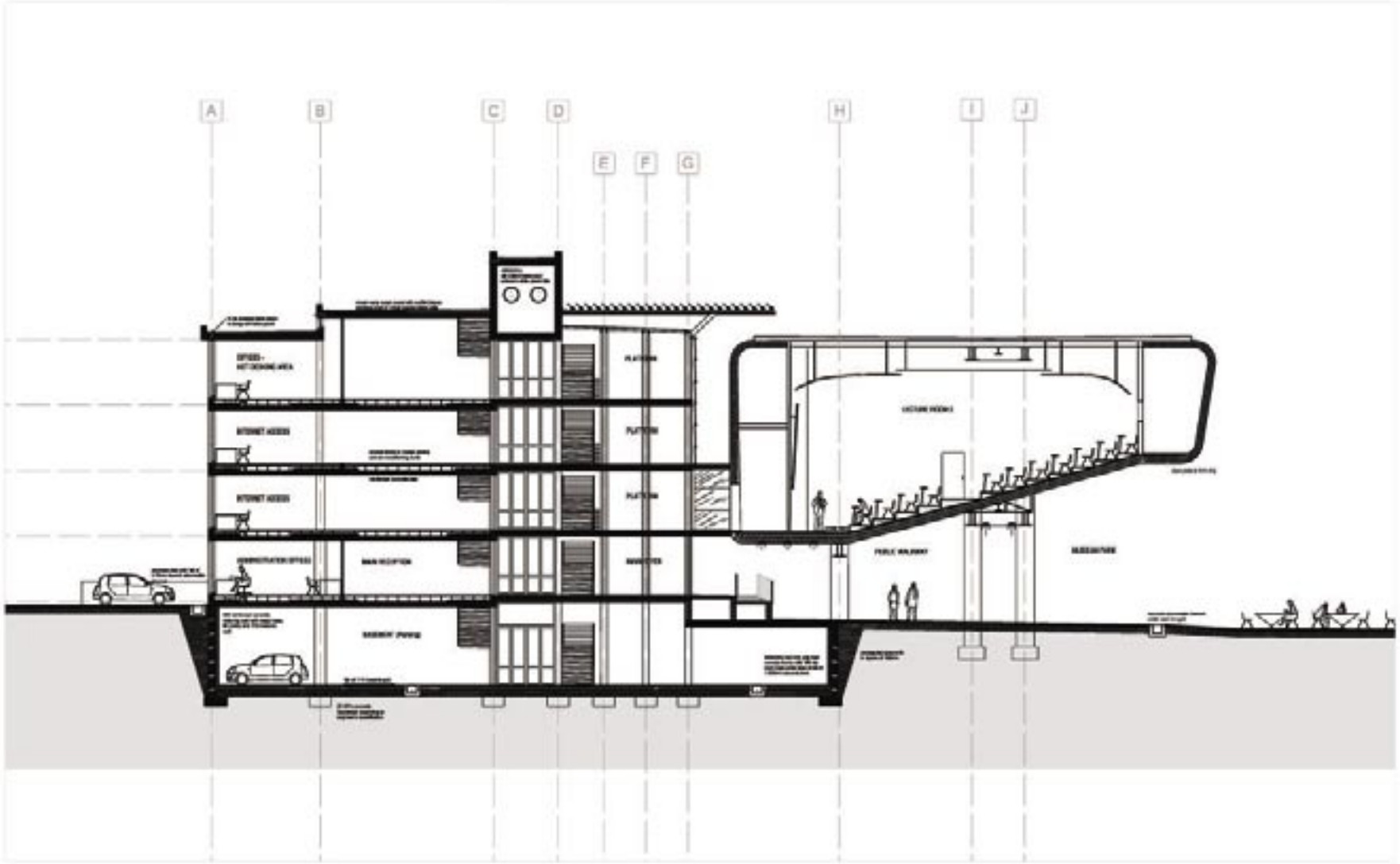
Institute for African Language Studies	Drawing: Level 2 Plan	Scale: 5m	Scale: 1:500	Name: Jacqueline Novellie	Mentor: R J van Rensburg	Date: November 2006



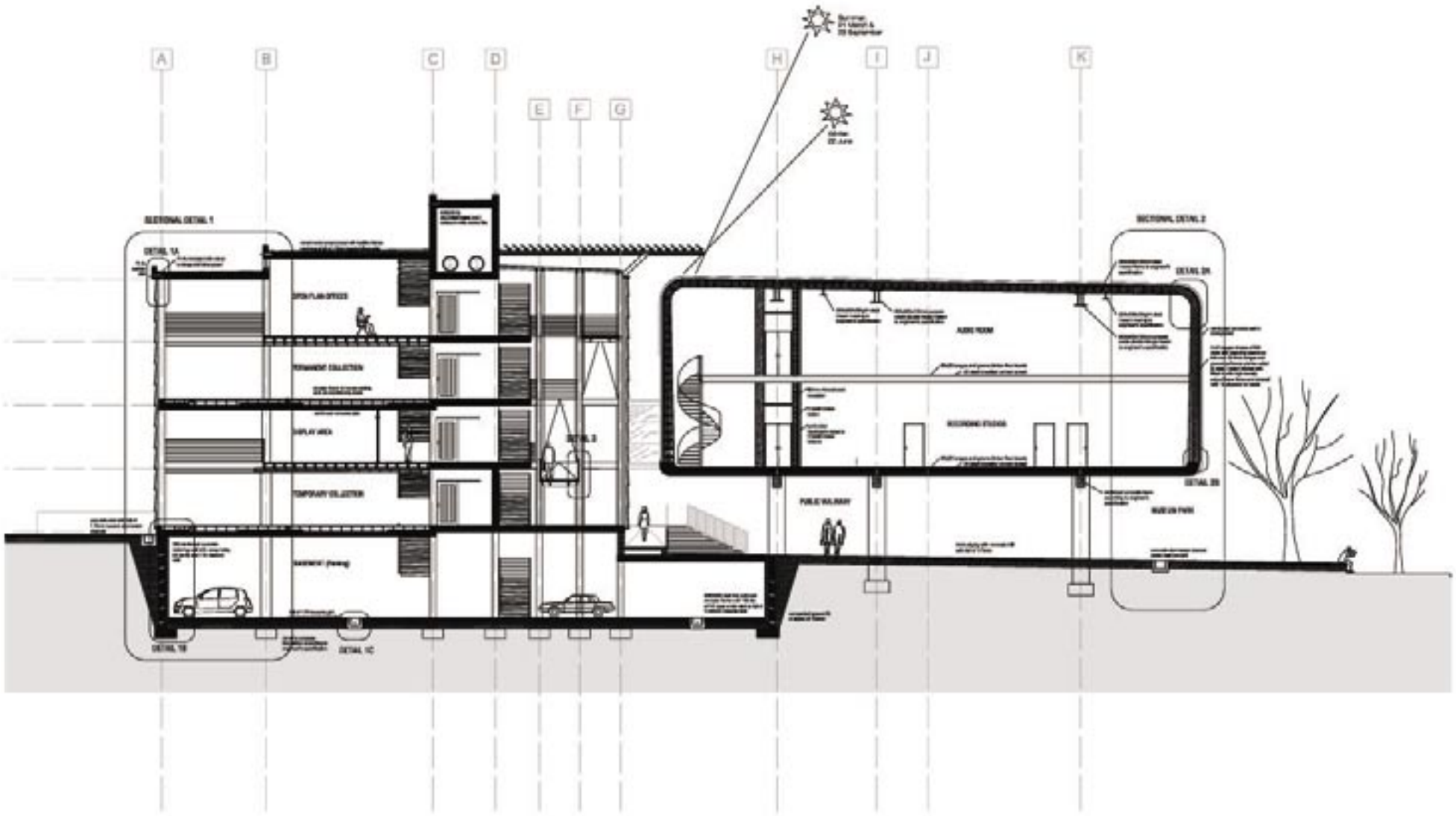
Institute for African Language Studies	Drawing: Level 3 Plan	Scale: 5m	Scale: 1:500	Name: Jacqueline Novellie	Master: R J van Rensburg	Date: November 2006



Institute for African Language Studies	Drawing: Section A-A	Scale: 2.5m	Scale: 1:250	Name: Jacqueline Novelle	Marker: R J van Rensburg	Date: November 2006



Institute for African Language Studies	Drawing: Section B-B	Scale: 2.5m	Date: 1:250	Name: Jacqueline Novellie	Partner: R J van Rensburg	Date: November 2006



Institute for African Language Studies	Drawing: Section C-C	Scale: 2.5m	Scale: 1:250	Name: Jacqueline Novellie	Mentor: R J van Rensburg	Date: November 2006

Institute for African Language Studies

Drawing: Sectional Detail 1

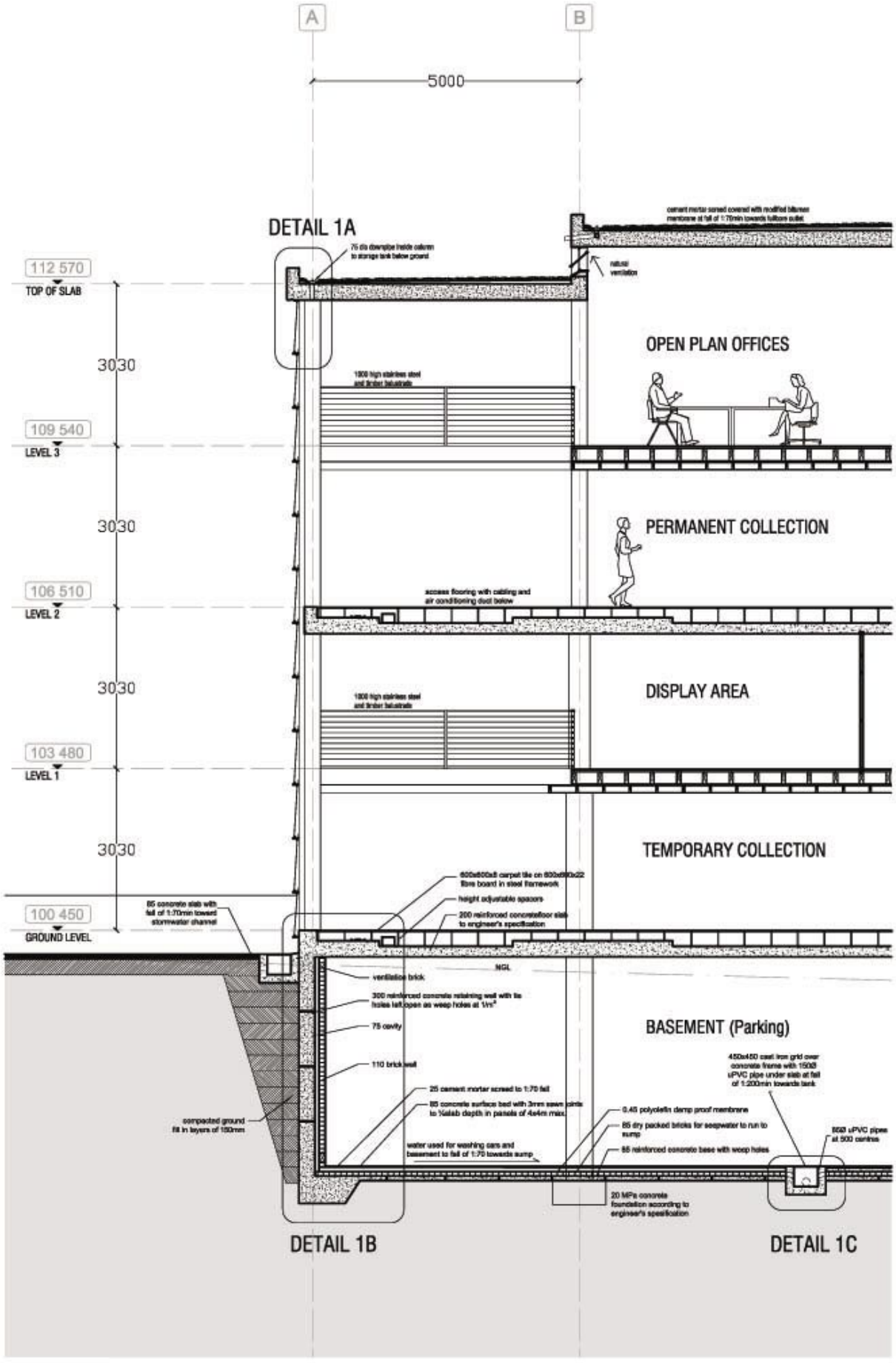
Scale: 1m

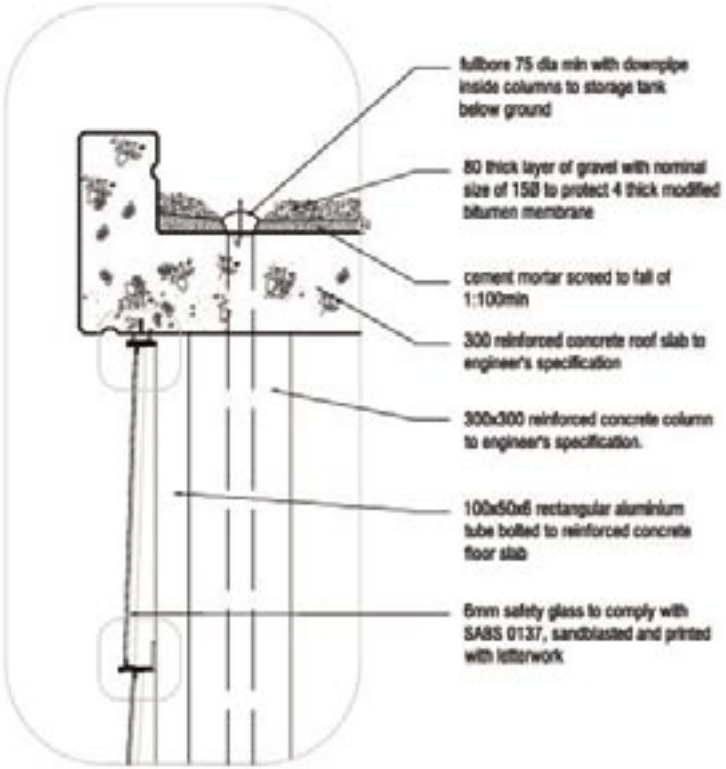
Date: 1:100

Name: Jacqueline Novellie

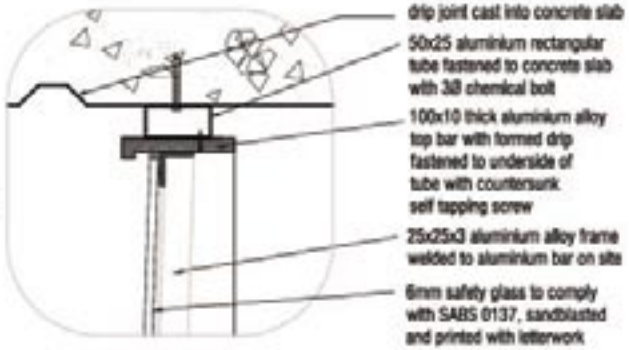
Mentor: R J van Rensburg

Date: November 2006

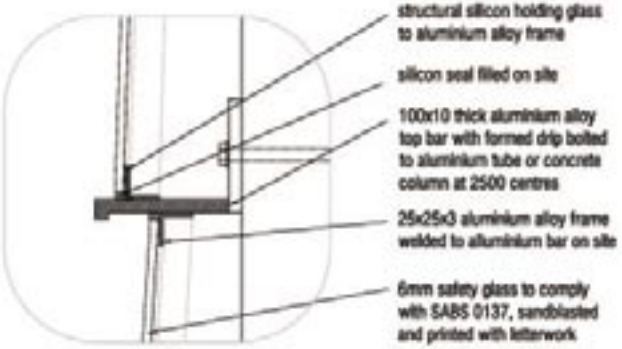




Detail 1A *Scale 1:20*



Detail 1A.a *Scale 1:5*



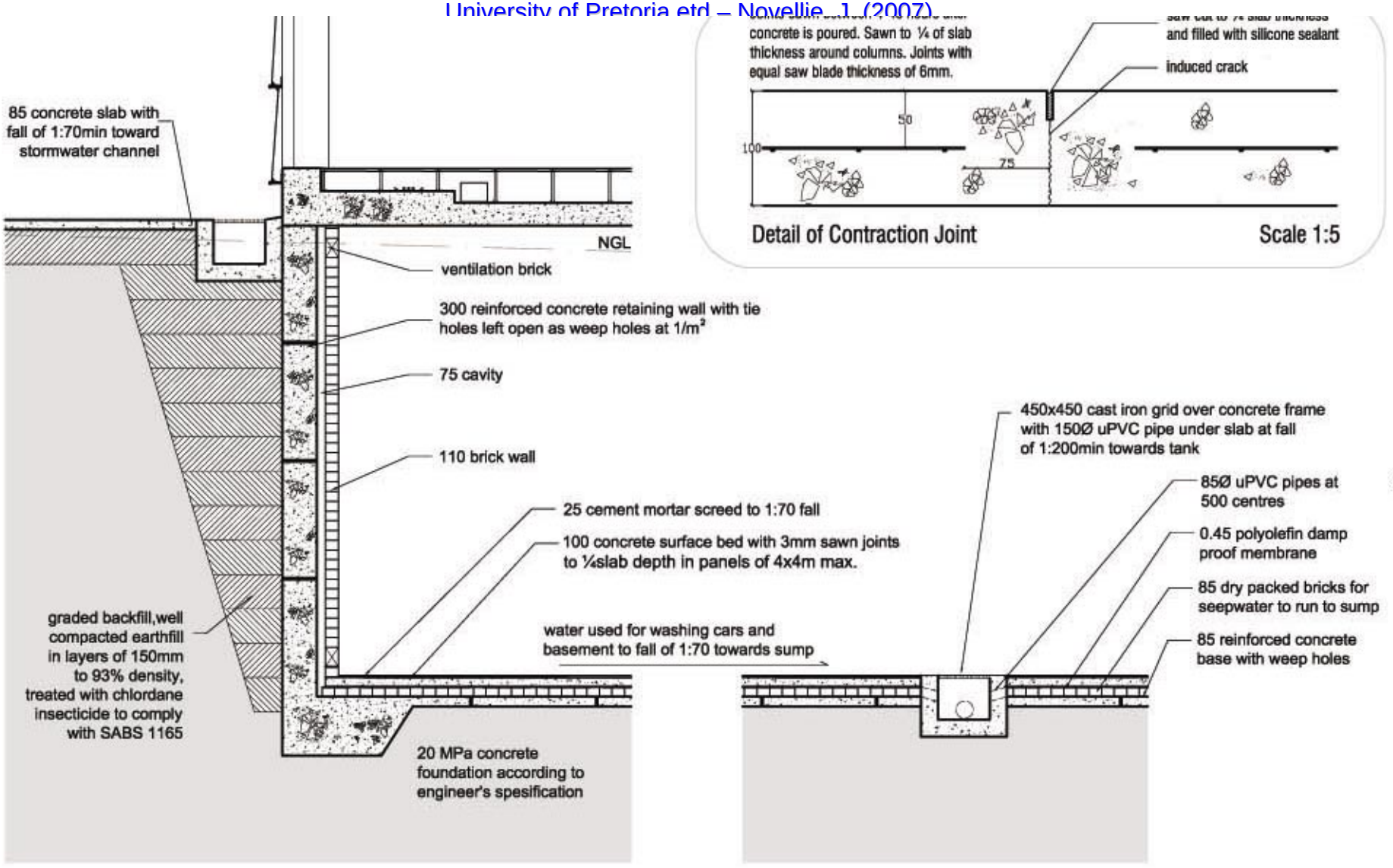
Detail 1A.b *Scale 1:5*

SPESIFICATIONS

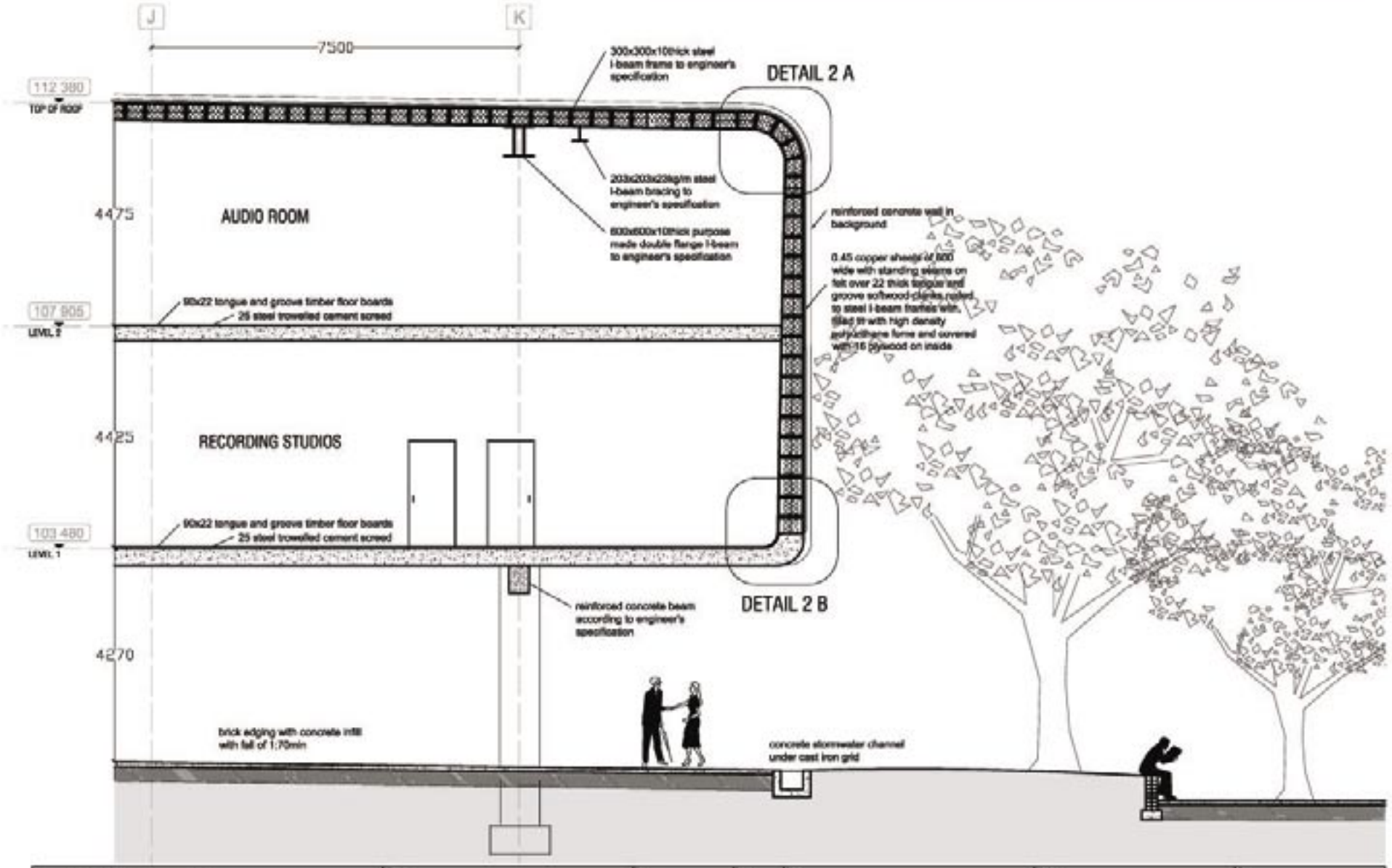
Modified Bitumen Sheeting

Modified bitumen sheeting consisting of a polyester core impregnated with polymer modified bitumen as spesified, 4mm thick. Apply in a double layer where sheeting is covered with gravel. Seal laps by heat fusion.
Surfaces to receive waterproofing must confirm to SABS 021. Screed must be minimum 40mm thick and laid at fall of 1:70 min. Screeds must be clean, smooth, even and stable. Cracks up to 0.3mm are acceptable. Moisture contents of the screed must be less than 7%. Outlets must have a minimum of 75mm diameter and not be of plastic material.
Waterproofing must be applied by trained artisans or contractor who is a member of the Waterproofing Federation of South Africa. A flood test of 48 hours should be conducted.
Lay a geocomposite drainage layer over the waterproofing for protection, consisting of 80mm thick layer of light coloured non-absorbent natural stone of 15mm nominal size. Keep the stone back from outlets, gutters and water shedding edges and bond the stone in these areas with a thinly applied dressing compound.

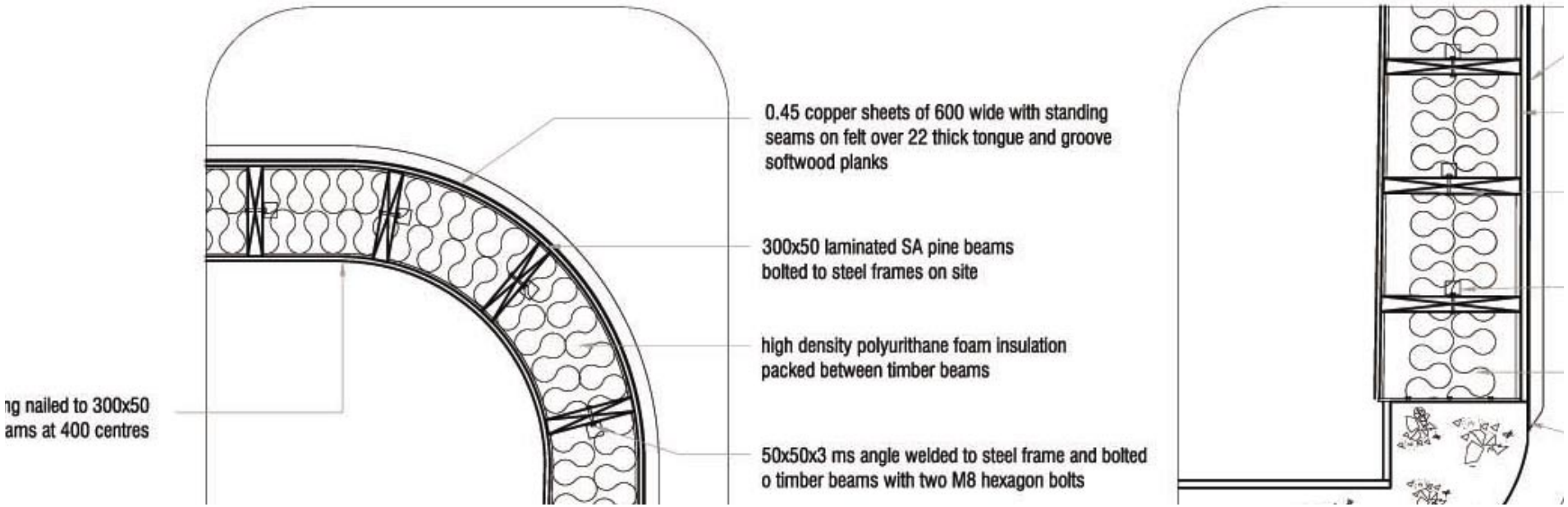
Institute for African Language Studies	Detail 1A		500 dwg	Jacqueline Nowelle	R J van Rensburg	November 2006

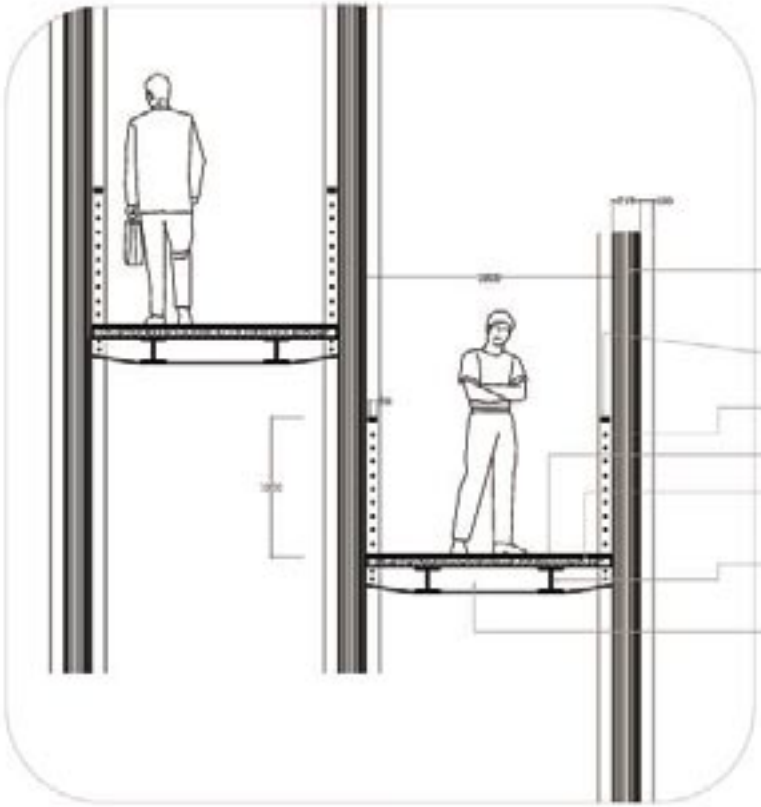


Institute for African Language Studies	Basement Details 1B & C	1m	see dwg	Jacqueline Novellie	R J van Rensburg



Institute for African Language Studies	Sectional Detail 2	1m	1:100	Jacqueline Novelle	R J van Rensburg	November 2006


0.45 copper sheets of 600 wide with standing seams on felt over 22 thick tongue and groove softwood planks
300x50 laminated SA pine beams bolted to steel frames on site
high density polyurithane foam insulation packed between timber beams
50x50x3 ms angle welded to steel frame and bolted o timber beams with two M8 hexagon bolts
ng nailed to 300x50
ams at 400 centres



2198 x 6 x 31,5kg/m hollow steel column with four 100x6 steel flanges welded to it

1000mm high handrail of 50x25 timber fastened to steel flage

stainless steel cables 100mm apart spanned between flanges

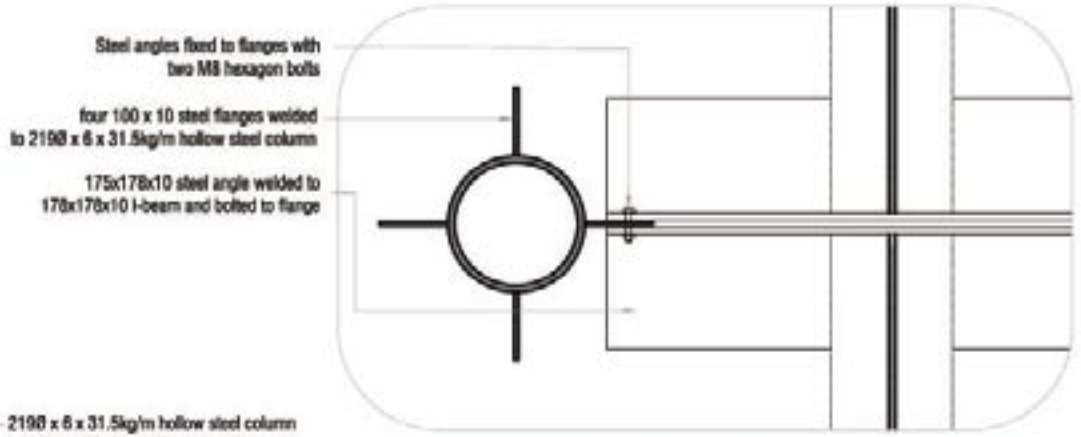
25 sandstone tile floor finish

100 precast, pre-stressed hollow core concrete slab in sizes of 1800x900

178x178x10 steel I-beamspanning 5000mm between steel angles

175x175x10 steel angle welded to I-beam at 5000 centres and bolted to 100x6 steel flange with two M8 hexagon bolts

Connection of ramp to columns *Scale 1:50*



Steel angles fixed to flanges with two M8 hexagon bolts

four 100 x 10 steel flanges welded to 2198 x 6 x 31.5kg/m hollow steel column

175x178x10 steel angle welded to 178x178x10 I-beam and bolted to flange

Plan: Connection of ramp to columns *Scale 1:10*

Institute for African Language Studies	Detail 3 Ramp	1m	1:50	Jacqueline Novelle	R J van Rensburg	November 2006