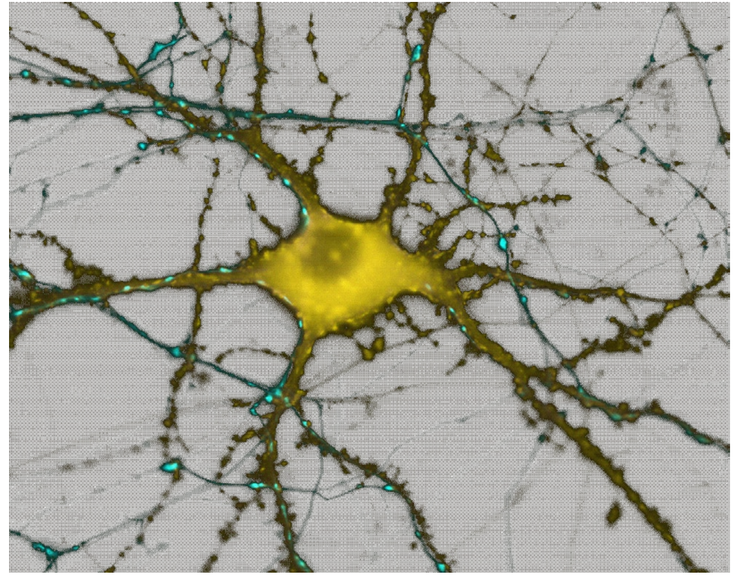
Design Discussion



What was done and why

Fig. 5a. A neuron with connections.

Design Discussion

The design of a Mind Development Centre requires consideration of several factors. The unity of mind and body, as proved by modern science, is critical. The principle of holanthropy, or the study of the whole human being, is central to this.

Design Aspects

1.) Normative position

Because the brain functions as an integrating, linking tool, providing an environment in which various different aspects of human life can be integrated, is essential. Designing within an urban environment provides fantastic opportunity for this linking, but increases the demands on the design.

The approach followed in this design was to integrate the programmatic requirements of the design with the nature and functioning of the mind. This was to be done within an urban context, taking into account the various external factors, like climate and physical context. The focus was on creating a unity that is whole in itself, yet forms part of a greater whole and contributes to the unity thereof.

Fig. 5.1

In this section, the design discourse is presented in parallel with the technical investigation. These two texts will also be interspersed with precedent studies which impacted on the design. Technical aspects will have a frame around them and appear in red, while precedent studies will be shaded.

Technical Aspects

1.) Technical goals

The aim during the design process was to resolve as many of the issues stated in the brief, factors that arose from the baseline study and other requirements that emerges from the study of thinking within a design that is practicable and pleasing.

The integrated nature of the problem meant that technical aspects and construction could not be separated from the design or functional aspects – everything is part of a whole.

During the design process it became apparent that certain goals set in the brief and baseline document are not feasible or practicable. These will be discussed.

2.) Site selection

Initially, it was considered to base the Mind Development Centre in the disused synagogue in Pretorius Street (Fig.5.1). This would have entailed mainly an addition and alteration project. The site was discarded as an option due to the following reasons:

- Scale of site and building in relation to programmatic requirements.
- Lack of associated functions in the direct vicinity.

The nature of the spaces in the synagogue is such that the entire spatial character would have had to be changed in order to accommodate the required functions. Destroying these spaces was considered inappropriate if the site was chosen in part from heritage considerations.

After this, a systematic approach was taken for site selection. It was decided that the design should be based close to an existing research/ educational facility. An urban location was preferred because of the presence of public transport and other infrastructures and the desire to utilise a brownfield site.

2.1.) Sites Considered

Several possible localities were considered:

2.1.1.) The CSIR

The CSIR provided an established campus with a great amount of research activity taking place. Library, information, security and other infrastructure exists on site. The campus is not located in a very central location, however, and the open areas are managed as an ecological conservancy. Development would have had to be done on virgin land.

2.1.2.) University of Pretoria

The U.P. main campus provides a developed infrastructure within a research environment, located next to the Hatfield urban village. The site is more central than the CSIR and is in close proximity to the Brooklyn development node. The site is unfortunately riddled with traffic and parking problems and public transport could be improved (the proposed Gautrain station in Hatfield would have served to make the area more accessible to long distance users. It is not clear whether the local transport infrastructure would be improved and in what way).

The medical faculties of the university are not based on the main campus and it was believed that the centre would benefit more from a location where an individual identity could be created.

2.1.3.) Pretoria Academic Hospital

The site provided access to advanced medical equipment and knowledge. It was again felt that individual identity should be considered. Potential building users might also be tempted to think that the centre is intended for people 'with something wrong' if it is associated too directly with the hospital.

2.1.4.) The HSRC

The site to the north of the HSRC provided a central urban location in close proximity to an established research body, whose work is incidentally closely related to the main fields of study at the Mind Development Centre. The area has very good public transport (Fig.5.2). and other infrastructure. The opportunity exits to create an individual identity for the centre. The site is a brownfield site. Developing this site would also give an economic injection to the area to the west of Church square and contribute to a revitalisation of the area. It was therefore decided to develop this site.

Fig. 5.2. Excellent transport facilities close to the site.

Fig. 5.3. Line of proposed arcade looking towards Poynton Building.

Fig. 5.4. Line of proposed arcade looking toward the HSRC.

3.) Topological decisions

3.1.) Arcade

Several design and contextual indicators led to the decision to create an arcade running through the site.

Due to the length of the street blocks in Pretoria in an east-west direction, a tradition of arcades has evolved.

Courtyards to the north of the HSRC building and to the south of the Poyntons Building provided the opportunity to create a link between them (Fig.5.3 and 5.4.), integrating these open spaces and adding to the public realm.

2.) Technical aspects of site-selection

The choice of site has several implications for a design. Availability of public transport affects the range of people that can reach the site and influences parking requirements. Provision of services and infrastructure needs to be considered, as well as zoning and land-use regulations.

The site chosen for the development is an urban brownfield site. Virgin land will not be disturbed for the construction, services and infrastructure exist in the area and public transport reduces the dependency on the polluting automobile.

These factors combine with urban zoning regulations to allow higher densities.

This site satisfies the requirements set in the baseline study for transport and access to amenities like childcare, banks and shops.

Sites are seldom perfect. The site chosen has limitations in terms of solar access. The central city location means that noise is a much bigger concern than it would have been in a suburban area. The urban climate and the topology dictated by the site made it clear very soon that air conditioner would be required. The aim changed to minimising the impact of HVAC.

Contractors, maintenance and labourers are all available well within the distances required by the baseline study.

3.) Topological factors

3.1.) Arcade and public open space

Using an arcade topology addresses several issues. More areas are provided with light, views and the opportunity for openable windows.

Linking parking garages would have meant that people using the parking garage and working at the Poyntons Building would have had to exit the garage through the HSRC in Pretorius Street and walk around the block to get to work. Alternatively, they would have had to move through the centre.

Design Discussion

A lane of trees existed on the site in the past. Some remnants of these trees still exist, as seen in the context study. Providing an arcade serves to remember this historical feature.

During the first phases of design development, the existing building on the site was retained. The arcade would have been respectful to the glazed eastern façade of this building. Although the decision was later made to remove this structure, the rationale for providing an arcade was strong enough to continue with this decision.

3.2.) Public open space

It was decided to provide a public open space to the rear of the site. This could be integrated with the courtyard to the north of the HSRC building (Fig. 5.7) to create a larger, mid-block courtyard.

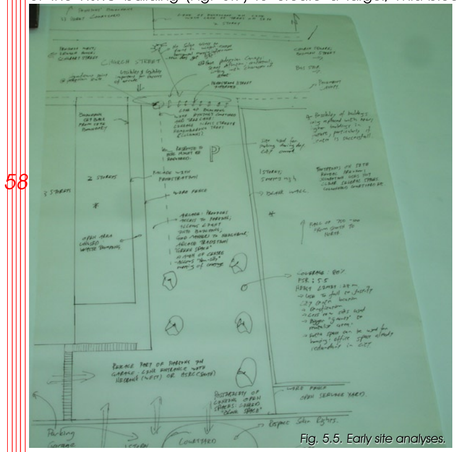


Fig. 5.5. Early site analyses.

Fig. 5.6. Late afternoon wintersun on the site.

Fig. 5.7. The HSRC Courtyard.

Fig. 5.8. The Poynton Building blocks out most of the sun to the site, particularly in winter.

This decision allows the use of sunlight to provide an area of greenery and respite in a busy urban environment. In line with the Integrated Spatial Development Framework for the Pretoria central area, a micro park could be created, improving the quality of the area in which the centre is located.

This decision was further motivated by the theories of Attention Restoration Theory (ART) as discussed before and the generally beneficial effects of being able to see natural features from ones workplace.

3.3.) Parking

In spite of the provision of good public transport facilities in the area, a centre of this nature would still require the provision of parking areas. This need is further strengthened by the existing use as a parking area, reflecting the need for parking in the area.

The need for parking in relation to the program that needs to be accommodated on the site made it clear that surface parking would not be adequate. Maintaining an urban character with well-defined public space also made surface parking inappropriate.

These factors made it clear that a parking garage will need to be provided. The site does have a relatively narrow street aspect, however, which could be better used in the provision of public functions and the definition of the street wall.

Parking facilities exist in the Nedbank building to the west of the site and in the HSRC building to the south. Both these facilities have existing access facilities and are managed by Interpark.

It was recognised that parking could be considered urban infrastructure, like streets and sidewalks. This insight led to the decision to combine the parking facilities of the Mind Development Centre with that of one of the neighbouring buildings.

This decision frees the street frontage from motor access and eliminates the need for added access facilities to the centre. It does bind the design, however, to the floor and plate heights of the arcade provides the opportunity for these people to use the arcade, which creates exposure for the centre. People attending the Magistrate's Court who need to get to the High Court or Advocate's chambers, as well as other pedestrians would make use of the arcade as a shortcut. This would lead, in turn, to increased viability for small shop- and business tenants of the centre.

The site is very deep, making it difficult to get light and air into all parts of the site (Fig. 5.6). The height of the Poyntons Building (Fig. 5.8) to the north complicates this further by cutting off direct sunlight onto all but the rear of the site during winter. Providing an arcade allows light and air into deep areas of the site while allowing the creation of a public open space at the southern side of the site and respecting the solar access the HSRC courtyard currently enjoys.

From the investigation of mental states, we know that the presence of natural elements and greenery adds to a sense of well-being, with associated positive effects. Many plants require at least some sunlight, and all water plants do.

Simulated sunlight can be used to cultivate plants. Natural light is cheaper, however, and it contributes to the psychological well-being of users.

The arcade and open space allows sunlight into the rear of the site, making plant cultivation possible. It also serves to respect the solar rights the HSRC currently enjoy on their courtyard.

3.2.) Parking

The Mind Development Centre will require parking to be provided. This need is increased through the current use of the site as a parking area.

Providing parking sets certain limitations on the design of the building:

3.2.1.) Size of structural bays

In order to provide an efficient parking garage that can financially support the cost of construction, it has to be optimised for the maximum number of cars.

This results in structural bays at 5 000mm or 7 500mm clear between columns. In the perpendicular direction, a 5 000 – 7 000 – 5000 rhythm would be needed.

In order to obtain the clear distance between columns yet minimise the centre to centre distance, rectangular columns oriented along with the parking bays will be required.

These requirements imply that a grid should be used to lay out the columns (unlike the HSRC Building that has no orthogonal grid). There is great risk that such a grid might restrict the design decision of the above-ground building in an undesired way.

In order to avoid these limitations, the design of the superstructure was done first, keeping in mind the requirements of basement parking. Thereafter a grid was superposed on the design and an iterative process of amendments to the grid and the superstructure followed to optimise the parking within the limits set by the design.

3.2.2.) Need for ventilation

According to the National Building Regulations, parking areas have to be provided with 7.5l/s/m² of ventilation. Not only does fresh air need to be provided, but carbon monoxide has to be extracted from the basement.

A series of vertical ducts, both for the supply of fresh air and air extraction was designed. Obstructions in the way of airflow, like vertical circulation shafts had to be kept in mind.

Air inlet is provided at the south-west corner from the public open area; in the middle of the site under the stairs leading up to the public open area and in the north through a raised air-inlet in the arcade (which also serves as seating on ground level).

Extraction is provided at the northeast in a custom duct, which lets stale air out above head-level on the sidewalk. A duct runs from the basement to the roof at the south-eastern corner and an extraction duct was fitted into the main eastern service duct. This lets the stale air out above head level on the public open space.

3.2.3.) Linking with existing

The decision to link the parking garage with that of the HSRC tied the floor-plate heights to that of the HSRC building (Fig. 5.9). This was considered beneficial as it makes a shared courtyard on top of the basement parking easier.

3.2.4.) Separate lift

The parking garage requires a separate lift to serve it.

Fig. 5.9. Rear view of the HSRC Building. The design needs to connect with the courtyard 2 850mm above ground level and the basement parking 450mm below natural ground.

Design Discussion

the neighbour with which the garage is shared.

The decision was made to join with the parking garage of the HSRC. This decision was informed by the following:

- The public open space provided to link with the HSRC courtyard already tied the plate heights of the developments.
- The proposed arcade will run through the HSRC building, next to the pay station for that garage.
- Having the HSRC as a partner in the joint venture managing the Mind Development Centre makes it easier in management terms to run a joint operation.
- Access to the parking garage as well as management of the garage would therefore be operated from the HSRC (Fig. 5.10).

3.4.) Building form

The existing buildings in the vicinity utilise several techniques to avoid overly deep plans and allow light into the interiors.

3.4.1.) Tower on a podium

The Merino Building on the northeastern corner of the block is the exception in the area being designed as a tower on a podium (Fig. 5.11).

This solution was eliminated from consideration for several reasons:

The scale of neighbouring buildings requires that a tower be significantly larger than the site or the program allowed to be read as a tower (Fig.5.12).

If future developments would occur on the neighbouring sites, the tower could end up looking into the blank sidewalls of adjacent developments.

A tower would not contribute as much to the character of the area or the street-space as other options would.

Fig. 5.10. Interior of the HSRC parking garage.

Fig. 5.11. The Merino Building can be seen in the background.

Fig. 5.12. The scale of the Poynton Building and the HSRC Building would have made an eight storey tower in-between look ridicilous.

Fig. 5.13. View down Church street showing several slab buildings and the predominant grain of the development.

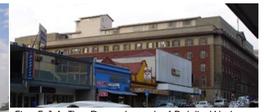


Fig. 5.14. The Department of Public Works block is organised around courtyards.

3.4.2.) Slabs

The HSRC, Poyntons building and the Nedbank building are essentially slab buildings. Spanning multiple erven in an east-west direction, this allows ample north and south facing facades with access to light and air. This approach is unsuitable for the site chosen, as the long sides of the erf face east and west, with the potential for tall development to either side.

Applying a slab solution would have led to a building not oriented to the dominant grain of development (Fig. 5.13). Future development on neighbouring buildings would mean that the light and views considered in the design might be changed in a way that cannot be accounted for at the current time.

The western block of the design functions as a slab to a certain extent. The design approach makes this a one-sided slab and determines the views and light that will be experienced from this building.

3.4.3.) Courtyards

The Department of Public Works Building and the Pretoria Magistrates Court both occupy large sections of the blocks on which they are situated. Both have three street fronts and span the entire width of their blocks (Fig. 5.14).

In both these cases, courtyards have been used to allow light and air into the buildings and reduce the depth of the plan.

In spite of the difference in the scale of the site chosen for the design and the sites these buildings occupy, this approach was considered sensible and applicable to the problems of this site.

3.4.4.) Block development

The Transvaal Provincial Administration building was designed with several east-west blocks with linking section joining them (Fig. 5.20). This created open areas in between that are too narrow to be considered courtyards, yet allows the penetration of light and air. This option was initially considered viable and was used in conjunction with the courtyard approach. As the design developed, it was replaced by the courtyard approach.

With the exception of the tower on a podium topology, all the other forms influenced the design at various stages of development and to different degrees.

3.4.5.) Full site development

The decision was made to design the building up to the edges of the site. The uncertainty of development on the neighbouring buildings and the desire to create a well-defined street space were the main contributing factors. It is in effect, a pre-emptive infill development.

This approach further allows a more efficient use of the site while permitting suitable open air spaces. Because of this decision, windows cannot be provided in the side walls of the envelope.

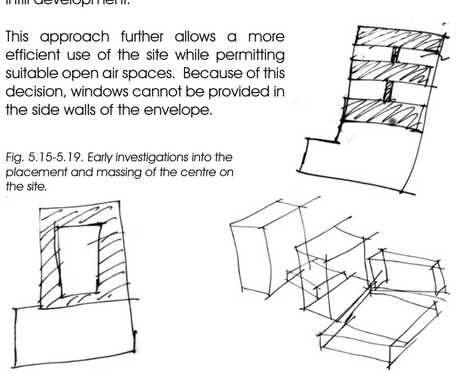


Fig. 5.15-5.19. Early investigations into the placement and massing of the centre on the site.

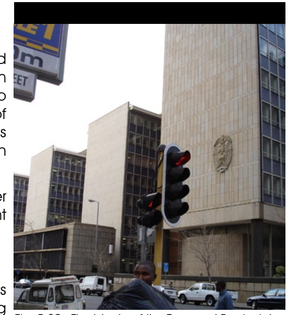


Fig. 5.20. The blocks of the Transvaal Provincial Administration Building.

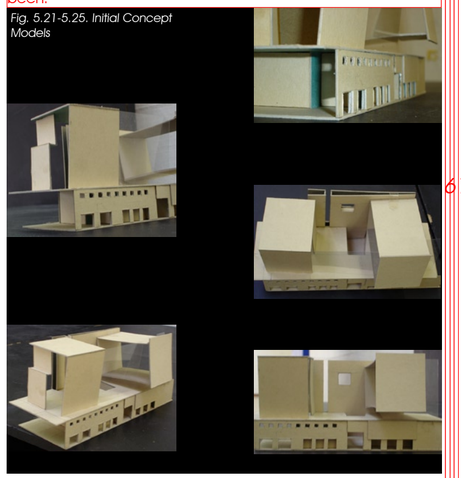
This addresses aspects of fire safety and prevents unwanted access into the building from the basement.

3.2.5.) Split of fire escapes

Fire escapes linking the above-ground building with a basement needs to be discontinuous at ground level to prevent panicked occupants inadvertently fleeing into the basement during an emergency. Separate exists have been provided for stairs in the same stairwell for this purpose and for access control.

The southern fire escape empties onto the public open space. This is not technically a ground level space, but it is considered safer and more in keeping with the intent of the regulation than emptying into the ground floor parking garage would have been.

Fig. 5.21-5.25. Initial Concept Models



Design Discussion

4.) Massing and geometry

The considerations as discussed above dictates that the parking area link with the parking-garage of the HSRC at the rear of the site, and that a raised open area be provided to link up with the courtyard of the HSRC.

On order to add to the streetscape, development up to the front edge of the site would be required.

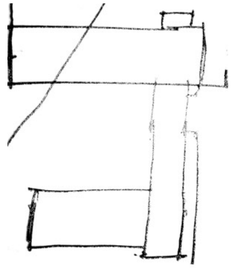
4.1.) Initial concept

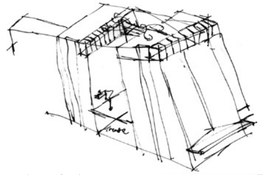
During the first design stages, these decisions combined with the courtyard approach as shown in Fig.5.15-5.19 and 5.21-5.25).

The arcade was formed by the furniture shop on the western portion of the site. The eastern edge was defined by a solid two-storey block containing shops and the entrance to the Mind Development Centre.

A single-storey parking block was provided at the rear with rooftop landscaping.

The solid two-storey block was topped by a continuous block at the northern end with an additional block midway down the block, raised by a storey to allow the courtyard garden formed between the blocks to link with the open space to the rear of the site.





The two blocks were linked by a glazed bridge block along the arcade. This defined the western edge of the courtyard garden. The eastern edge of this garden was defined by a water tank forming a continuous wall along the eastern edge for the full height of the building (Fig. 5.26-5.31).

This solution made use of the courtyard and block topologies to create a design solution. The solution was rather fragmented and the programmatic functions could not be fully accommodated. The relationship between the design and the furniture shop on the western edge was unsatisfactory.

This led to the decision to incorporate the western portion of the site into the design and demolish the existing structure.

4.2.) Revised concept

After merging the sites, the design approach was revisited. The initial decisions were maintained and the approach changed.

Designing an arcade through the combined site required that the design be split into two blocks.

From this point, the approach was to carve the arcade out of the site (Fig.5.40-5.44). Of prime importance in this process was the concept of sightlines. The theory underlying this is that people are more likely to use the arcade when they can see what it contains, where it leads and where threats might come from.

The arcade was lined up with the courtyard at the Poyntons building and linked to the HSRC courtyard to the south. It was deemed necessary to provide views from the entrance of the courtyard to the corners of the courtyard on the site boundary.

These sightlines were used as controlling lines for the building and a grid was generated consisting of the orthogonal lines, the diagonal sightlines and the perpendicular of the eastern sightline.

Several organisations based on this grid were considered (Fig.5.32-5.39). The layout chosen allowed the necessary views and made for a balanced and aesthetically pleasing composition.

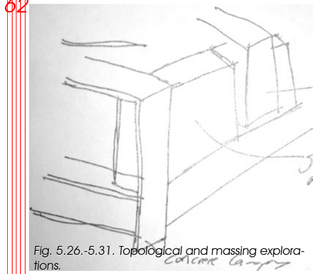
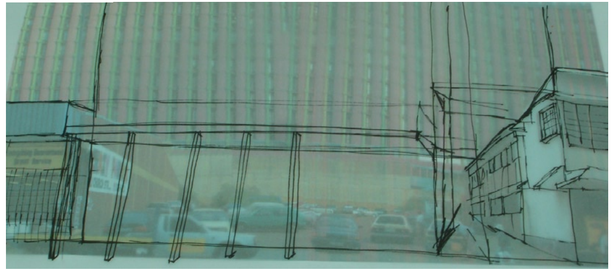


Fig. 5.26.-5.31. Topological and massing explorations.



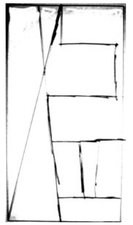


Fig. 5.32-5.39. Plan-form generated through the use of sightlines.

Fig. 5.40-5.44. Third model showing the arcade passing through the building.

4.) Massing and geometry

The use of courtyards allow light and air into the building. It also leads to shallower plans, providing the views and control required of the design.

Design Discussion

Precedent 1.

Centro Kursaal – Rafael Moneo – San Sebastián – Spain – 2000

The building consists of a conference centre and auditorium on the site of an old casino in the resort city of San Sebastián.

The building is made up out of two blocks sitting on a podium, with the main entrances situated between the two blocks.

The building proved informative to the design in several ways. First among these is the route to the entrance, passing between the two blocks while changing level. This confirmed the possibility of creating a successful space between two large objects while navigating a change in level, as occurs in the arcade of the Mind Development Centre.

The Kursaal presents negative precedents as well. Very poor linkage exists between the internal and external spaces of the Kursaal, in spite of the fact that the atrium spaces do not require privacy or visual isolation. The focus on integration within the Mind Development Centre called for the maximising of views from and into the building.

The layout allowed spaces that require privacy to be moved further from the visible envelope of the building.. The functions on the lower floors are public in nature, as are the restaurants placed in the podium of the Kursaal. In the case of the Mind Development Centre, the decision was, however, made to design these as public facilities, rather than burying them.

Moneo placed the auditoria as objects inside the space of the glass box. Using different materials and geometry, they are expressed as independent objects. This effect is diminished, however, by the rather solid junctions they make with the floors and ceiling of the atrium spaces.

The object within a space is a precedent for the auditoriums penetrating the main atrium and functioning as a freestanding object. The change in geometry is used in order to distinguish it from the surrounding functions.

Fig. 5.45

Fig. 5.46

Fig. 5.47

Lifting the auditorium off the ground and having a separate roof to it further enhances this separation, avoiding the heavy meeting of elements present in the Moneo design. The use of *beton brut* for the auditorium echoes the heavy concrete structural elements of the main building inside the auditorium, while it contrasts with the light-structured bridges that abut and cut through it.

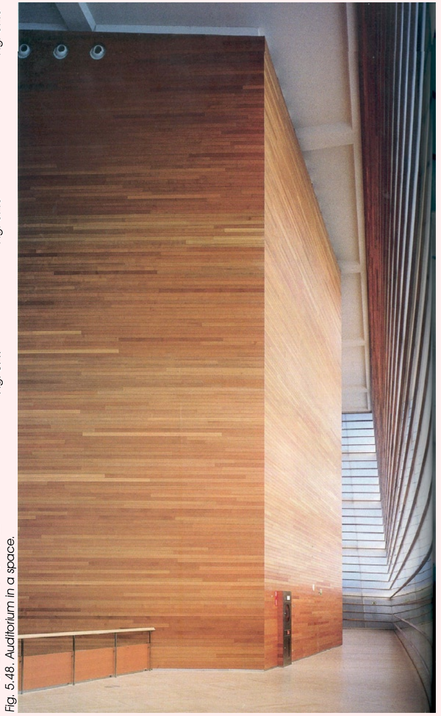


Fig. 5.48. Auditorium in a space.

It was considered to enter into a dialogue with the HSRC building to the south by using curved facades along the arcade (Fig.5.49-5.50). Using the principle expounded by Day that it is easier to create a firm curve from straight lines (1990 p.67), along with the practical rationalisation of design and construction through the use of straight lines, it was decided to rather use the implied curve generated by the grid.

The grid was next used to carve out courtyards and atria (Fig.5.55-5.56). The broad layout principles of the first concept was maintained, but changed drastically in the details.

Locating the auditoria within the organisation of the whole provided several alternatives.

4.2.1.) Burying in the base

The auditoria, which need to be separated from outside light and sound, could be placed in the basement or in the lower floors where deeper plans occur.

4.2.2.) Enclosure within the atrium

The atrium could be treated as an independent object enclosed within the atrium space (Fig. 5.64).

4.2.3.) Independent building

A larger space could be carved out of the arcade space to accommodate the auditoria as an independent, freestanding structure on the site.

4.2.4.) Central connector

The auditoria could be placed over the arcade, protruding into the atrium and penetrating the western block (Fig.5.57-5.60). In this way, it could be an object in space, have an individual identity and form a link between the eastern and western blocks of the design.

The placement of the auditorium was done in the fourth way. Separate organising lines were created for its form in order to create a separate identity and give integrity to the form.

The positioning of the auditoria makes used of the orthogonal

Fig. 5.49-5.50. Ways in which curves could be used in the atrium.

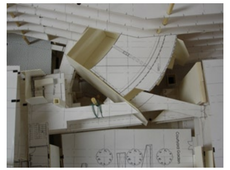
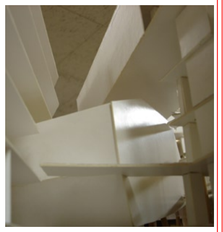


Fig. 5.51-5.54. Many curves can be found within the general orthogonal layout of Pretoria.

Fig. 5.55-5.56. Second model showing courtyards carved from the site.

Fig. 5.57-5.60. Third model showing atrium in relation to the other components of the building.



grid of the main building in the most effective manner in spite of contrasting with it. The positioning allowed three of the corners of the auditorium to be visible from the outside, making legible its form.

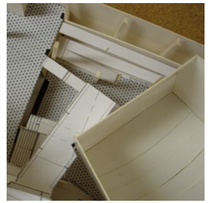
The fact that this block is part of the design yet forms an independent entity is expressed through its disconnectedness with the spaces surrounding the atrium and its embedded junction with the western block.

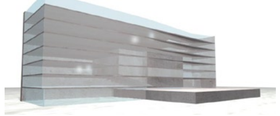
A somewhat more comfortable junction of forms might have been possible, at the expense of the integrity of the elements. The auditorium could have been a mere appendix to the western block. It might also have been swallowed up by the eastern block.

Rather than compromising for a slightly more comfortable solution, it was decided to use the positioning of the auditoriums to highlight the individual components making up the centre.

Fig. 5.61. Raised podium at the Transvaal Provincial Administration Building.

Fig. 5.62-5.63. The atrium seen in relation to the courtyard garden and the external circulation spaces.





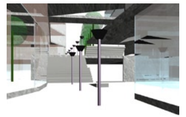
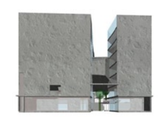
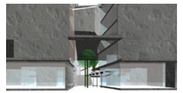


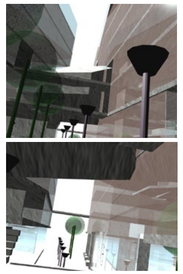
Fig. 5.64-5.65. 3D renderings showing the auditorium contained in the atrium and partially protruding from the building.

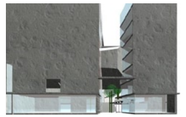
Fig. 5.66-5.76. Exploratory 3D renderings showing the auditorium in relation to the arcade.

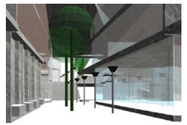
Fig. 5.76. An internet café in Soshanguve - something that seems to be lacking in central Pretoria.

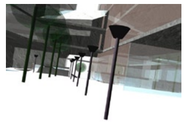


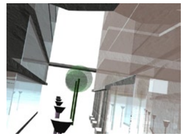












5.) Multi-use of building

Most non-residential buildings are used for eight or nine hours a day, leading to an inefficient use of facilities.

Several functions incorporated into the Mind Development Centre could be used by private individuals out of office hours. These include the gym, the computer lab (which can be operated as an internet café, Fig. 5.76)), as well as the auditoria and lecture rooms, (which can be used for discussions, performances, religious gatherings and the like).

Operating the building in this way provides a means of generating income for the centre. The presence of people in the building after business hours can help to deter crime through surveillance. Such an approach also serves to integrate the centre with the community in which it operates. This is not only socially responsible, but gains a sense of loyalty from the community, again increasing security. Avoiding the need for the duplication of facilities, this decision aids the environment and the wider economy.

In order for such an approach to operate effectively, facilities that will be used out of office hours need to be located closer to entrances and be more controlled. The more public functions of the building are placed on street level. Functions become more private and dedicated as one moves up in the building. This layout allows quiet and control in the upper floors, while allowing the independent operation of the appropriate facilities.

The floors that will be operated after normal working hours can be closed off from the rest of the building and be managed separately during those times.

6.) Contextual indicators

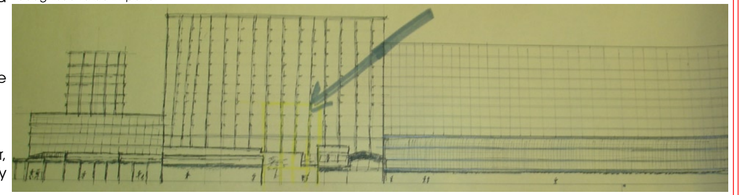
Several decisions were taken in order to link the design with the existing fabric of the area.

6.1.) Rhythm on the street front

The facades of central Pretoria buildings usually consist of modular, repetitive bays or panels (Fig. 5.77). The compositions normally

Fig. 5.77. Modular panels on the Nedbank Building.

Fig. 5.78. First drawing of the site. At this early stage, the rhythm of the facades was already recognised to be important.



5.) Multi-use of building

When some of the centre's facilities are being used after hours, access control and security becomes very important. It is possible to limit entrance to the building to one entrance at the reception desk.

All the area that will be used after hours face onto the atrium. Electronically controlled locks allow the receptionist to let users into the desired areas at need.

This also allows monitoring of the number of people in the building and their location in case of emergency, when the normal floor fire captains are not in the building.

6.) Contextual indicators

6.1.) Rhythm on the street front

The column spacing has been modified on the front façade to pick up the rhythm manifested in the other buildings. This has no impact on the functioning of any adjoining space. Floor plates are revealed on the front façade to give horizontal articulation.

The double skin in front of the façade-proper is made of glass and aluminium. Aluminium was chosen for its strength to weight ratio and its infinite recyclability.

This additional skin serves the following purposes:

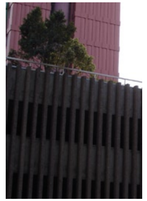
consist of a primary horizontal emphasis and a secondary vertical expression (Fig. 5.78).

As part of the environmental system, a second skin has been added to the front of this. This skin also consists of horizontal and vertical banding. The composition is based, however, not on regular bays, but on a random arrangement of horizontal and vertical elements. The distance between consecutive elements is calculated on the golden ratio.

The base rectangle from which these intervals were calculated, is the rectangle covering the area between the sidewalk canopy and the roof, and the two edges of the site, which is a golden rectangle.

The random arrangement derives from the statement that 'randomness is the highest form of order.' It was further inspired by Hameroffs' theory of the functioning of the mind, which includes quantum effects in the brain. Quantum effects are unpredictable and random.

The decision to use the golden section's is based on this ratio's association with life and growth. It also serves to make explicit the order possible in randomness.



Precedent 1 (cont.)

The exterior relates rather poorly to the urban fabric. Contrast with the existing is not a problem as such and the scale of the centre is well suited to the neighbouring buildings, yet there seems to be very little dialogue, through form, elements, rhythm or proportion. Creating a unity with the existing fabric and adopting elements from the environs was important in the design of the Mind Development Centre. This finds expression in the rhythm of the interior skin of the front façade, the continuity of the pedestrian canopy, the rhythmic structural expression relating to the HSRC building to the south, the vertical scaling of the building and the use of roof-level elements.

6.2.) Pavement canopy

Providing a canopy over the sidewalk is another Pretoria tradition (Fig. 5.79). The canopy provides protection from rain and the harsh summer sun to pedestrians passing below.

Such a canopy further establishes continuity along the street front and creates a direct relationship between buildings.

From the perspective of the building user, the canopy is beneficial in that it somewhat shelters the upper floors from noise on the sidewalk and to a certain extent traffic noise.

This feature has been included in the design.

Fig. 5.79. The pavement canopy shelters pedestrians from the elements.

Precedent 2

Smithfield Buildings – Stephenson Bell – Manchester – England – 1998

The buildings are a collection of nine buildings making up a city block in Manchesters' northern quarter. The buildings have been renovated and altered to accommodate a mix of retail, office and residential tenancies.

Fig. 5.80. The Smithfield buildings find harmony in different materials and expression.

The project explored the existing fabric and used what was there to create a new, integrated complex out of the disparate and run down elements and adding some new-build infill.

The design successfully integrates various styles and periods into a successful whole. It can be seen that sensitivity and coherence can be created through simple rhythms and reflection of proportions of the context. This approach has been followed in the design of the Mind Development Centre.

Fig. 5.83-5.85. Rooftop pergolas and living areas are a common feature in Pretoria.

Precedent 1 (cont.)

The custom cast aluminium framing of the glazing informed the decision to use custom cast aluminium framing for the construction of the sunshield/ convection tower double skin façade on the buildings street front. Several techniques were considered and Moneo's detailing made clear the versatility of aluminium to achieve the desired functional and aesthetic result.

Fig. 5.81. Aluminium framing for the Kursaal facade.

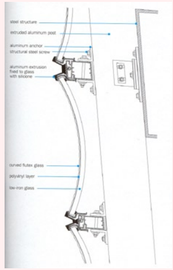
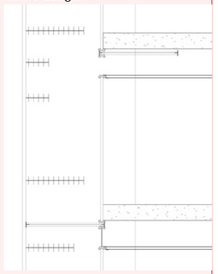


Fig. 5.82. Double facade making use of custom aluminium elements in the design.



6.1.1.) Climatic factors

The front façade is exposed to direct sunlight during the summer months, especially over the midday hours, when the heat is most intense. If this is allowed to enter the building, it will lead to significant heat gains and cause a very unpleasant zone just inside the window.

This heat could be used, however, to create a stack effect between the façade and the second skin. Because of these consideration, the solar shielding fins are placed behind the glass wall and in front of the windows. Solar heat enters the cavity, warming the air and setting in motion the stack effect, while being blocked from the windows by the louvres.

The negative pressure caused by rising air in the cavity is used to extract hot air from the ceiling voids inside the building. Of particular benefit is the ability to remove air heated by artificial lighting. This serves to reduce the cooling load on the HVAC system.

The 12m deep plans adjoining this façade requires large windows if it is to make use of natural light to a meaningful degree. The bulk of the Poyntons Building completely shades the façade during the winter. Combined with the large glazed areas, this will lead to a massive heat loss through the windows.

The double skin creates a buffer area between the outside and the building, effectively functioning as double-glazing. The openings between the ceilings and the cavity can be shut in order to avoid warm air escaping into the buffer zone. In order to prevent convection from extracting the warmer-than-outside buffer air, dividers are moved into the cavity during winter to cut off vertical air movement.

The design of these dividers allow light to pass through into the building. They can also be used by the cleaning staff to access the inside of the cavity (where rain does not wash off the dust) and for maintenance. To facilitate this, louvres that project too deep into the cavity for a person to pass, can be folded away when access is needed.

6.1.2.) Sound control

The northern façade edges on Church Street with street and traffic noise. The double skin will dampen this noise, improving the quality and usability of the interior spaces.

6.1.3.) Sense of privacy

The random arrangement of framing used for the skin will contribute to a sense of privacy inside the spaces, without interfering with views or light.

6.2.) Pavement canopy

The pavement canopy serves to make the building more user-friendly. It makes it easier to manage water at thresholds protected by it.

Such a canopy aids in the deflection of sound from the upper levels. This pertains particularly to the noise arising from the interaction of pedestrians.

6.3.) Architrave on arcade frontage

Many buildings in Pretoria have a pergola that serves apartments or offices on the roof (Fig. 5.83-5.85). It provides another feature of identity among these designs.

The design of the Mind Development Centre did not include any functions at roof level that might benefit from such a feature.

The centre requires sun shading to the upper floors facing the arcade, as these will have the most solar exposure.

A mobile sculpture is displayed over the public open space on the south side of the centre. Structure needs to be provided for this.

These considerations led to the design of the structural fins attached to the upper floors. These support the sun shading devices as well as the sculpture while referencing the pergolas on other buildings in the city.

7.) Structure

The structure is left exposed in the atrium and the external areas. Internal areas have received treatments as appropriate. The exposed elements are designed as heavy elements and the off shutter finish adds to this. This contrasts with the glazed curtain walling and the light steel structure of the bridges crossing the atrium.

All the columns have a square section in the basement floors. In the upper floors, round columns are often more appropriate. Where the shape of a column changes in an open space, like the atrium or the arcade, the change is made not in the floor slab, but is lifted beyond it in order to make users of the spaces aware of the change happening (See Fig. 5.86). This also serves to promote an understanding of or, at least a questioning of, the change and expose something of the nature or function of the spaces contained in adjacent floors.

The bridges linking across the atrium is made of steel and is visually light. If the bridges were heavy, concrete elements, they would read as part of the main building and the auditorium, destroying the separate identities created for these.

Designing the bridges in this way allows them to be objects crossing the void of the atrium, providing links to the separate functions. They symbolically become the neurochemicals transmitting signals between the synapses of brain cells (Fig. 5.87). Should concrete construction have been used, the void would disappear and become merely holes

Fig. 5.86. Columns changing profile at the HSRC Building.

Fig. 5.87. Neuritransmitters in the synapse of a brain cell.

Precedent 3

Baumschulenweg Crematorium – Axel Schultes – Berlin.

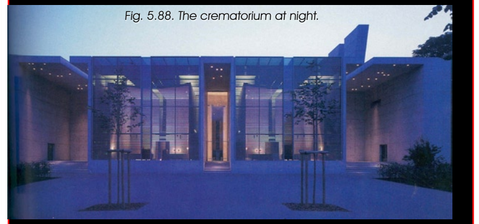
The crematorium is set in an early 20th century cemetery in the suburbs of Berlin. Massive concrete elements combine with glass and light screens to provide a dignified building where the grief of mourning can be shared.

The building illustrates the importance of dealing with intimidating vertical scales in an appropriate manner. The slit in the slab over the entrance canopy provides a connection with the sky and the external environment that transforms a potentially threatening space into one that is pleasant, yet dignified. The decision to include an external architrave-element on the arcade facades of the Mind Development Centre was motivated in part by the definition of the space it provides and the connection with the sky in an adaptation of the principle applied by Schultes.

The successful combination of very heavy and very light construction into a coherent whole inspired the use of these very different approaches in the design. Just like the crematorium brings together the apparently opposite nature of life and death, the contrast of materials show on contradiction in function and use even within a building housing a relatively simple program.

These aspects have found expression in the heavy, *beton brut*

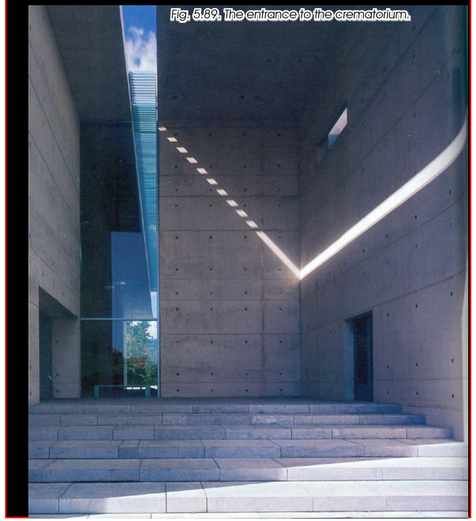
Fig. 5.88. The crematorium at night.



columns, structural walls and the volume of the auditoriums on the heavy side, contrasted with lightweight curtain walling, the bridges and stairs in the atrium space and the architrave on the arcade facades, supporting up shading and mobile sculpture.

On a symbolic level, these contrasts reflect the seemingly contradictory natures exhibited by thinking and creativity, and become an expression of the hemispheric specialisation in the human brain. The processes of analyses and integration, creativity and acceptance, even male and female, can be shown to work together for a bigger purpose, in spite of the superficial conflicts.

Fig. 5.89. The entrance to the crematorium.



The particularly distracting nature of the human voice when trying to concentrate has already been discussed.

6.3.) Architrave sun shading and structure

The architrave addresses both the need to provide solar shading to the upper floors as well as an opportunity to support the mobile sculpture without additional supports.

As the architrave connects to two slabs, the forces of this sculpture can be distributed over more supports, allowing a visually lighter solution.

7.) Structure

The structural grid was aimed at optimising the amount of parking in the basement levels without jeopardising the design of the aboveground building.

A reinforced concrete frame has been used throughout the design. The atrium is spanned by a double storey box-beam supported on a massive concrete wall at the northern end and two large columns in front of the lifts to the south. A single column provides some support along the beam. This box beam is expressed internally and to the arcade as an element that functions differently form the rest.

The requirements of the functions housed in this box calls for spaces that are separated from the outside, like audio and olfactory laboratories.

The western wall of the auditoria acts as a beam, which supports the footplates of the sixth and seventh floors. This wall supports floors adjoining the auditoria as well.

All the columns that run the full height of the building, with the exception of those in the atrium space, become smaller in section on the higher floors. This is revealed in the columns on the eastern side of the public open space, where the entire length of the column is visible. In this way, users of the space can gain an understanding of the construction and functioning of the building, i.e. creating a link between the designers and users of the building through revelation of thought.

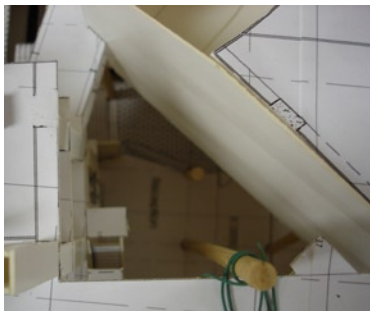
Design Discussion

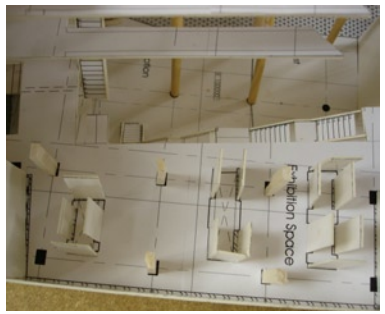
Precedent 1 (cont.)

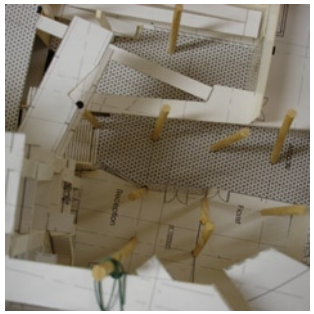
Moneo's use of stairs and walkways in the atrium spaces articulates the need to animate an atrium at the higher levels. Although the linking bridges and staircases in the atrium would have been a functional necessity, the decision to express these as sculptural entities rather than repetitive flights and corridors was at least in part informed by Moneo's example.

Fig. 5.90. The atrium of the Kursaal.

Fig. 5.92-5.94. Various views of the atrium in the design.







Precedent 2 (cont.)

Stephenson Bell utilised an existing light well in the centre of the block to create a top-lit atrium space, which allows the residential units a dual aspect and gives interior views to the functions adjoining it. This atrium is linked with a small, existing atrium. This approach is used in the Mind Development Centre to avoid deep plan areas without access to light and views. The main atrium is linked with the courtyard garden on the third floor in order to provide a flowing space and serve as a stack tower.

Fig. 5.91. The atrium in the Smithfield Buildings.