

# C

## hp 5

## DESIGN DEVELOPMENT

### DESIGN DEVELOPMENT:

- Analysis of Synagogue and Urban Framework
- Materiality
- Accomodation Schedule
- Design Process
- Discourse Implementation with Design
- Movement Within Design
- The Courtroom
- Technical Investigation:
  - Solar Penetration of *Brise Soleil* Structure
  - Courtrooms
  - Design Drawings

# ANALYSIS OF SYNAGOGUE AND URBAN FRAMEWORK:

In analysing the Synagogue one can pick up a specific pattern of elements apparent to the western façade. The building is divided through this façade in a vertical and horizontal manner. Horizontally the building is divided into four bands. Vertically it is seen as comprising of two main elements. These main elements extend beyond the building, heightening the emphasis on them. It is built of two different coloured face bricks creating an emphasised characteristic banding system.

All of these main elements must be taken into account, if one is to design in a complimentary fashion with the Synagogue.

## **The Urban Framework:**

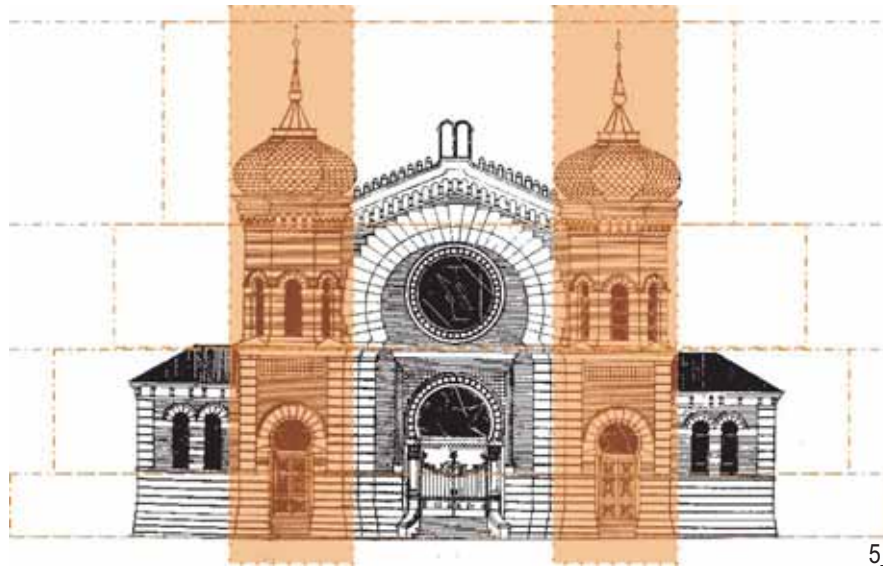
If one is to emphasise the Synagogue as a landmark, then it must be perceivable without obstruction from any buildings around it. Isolation was used to instil a sense of importance to the heritage building. With this, people who do not already associate the building as being an integral part of South African history can understand the nature of the building.

The design of the square is humble and does not detract from the Synagogue. It has adequate planting and seating for people to congregate comfortably. A symbolic re-presentation of a historic timeline will be incorporated in the paving, informing users about the historic connection of the site. This timeline will extend to the façade of the Family court. This south façade facing the square will have sandblasted windows with appropriate phrases of the Freedom charter printed on.

The square is penetrable from all sides and allows for easy movement through to the hawkers allocated on the western façade of the National Library.

A visual link to the Jansen house has been incorporated; this link can orientate one in the direction of another public square incorporated in the proposed urban framework. The node and square created will be named the Synagogue

Square, further emphasising the *Genius Loci*.



5\_01  
Analysis of the main elements  
of the old Synagogue

## **Accessibility:**

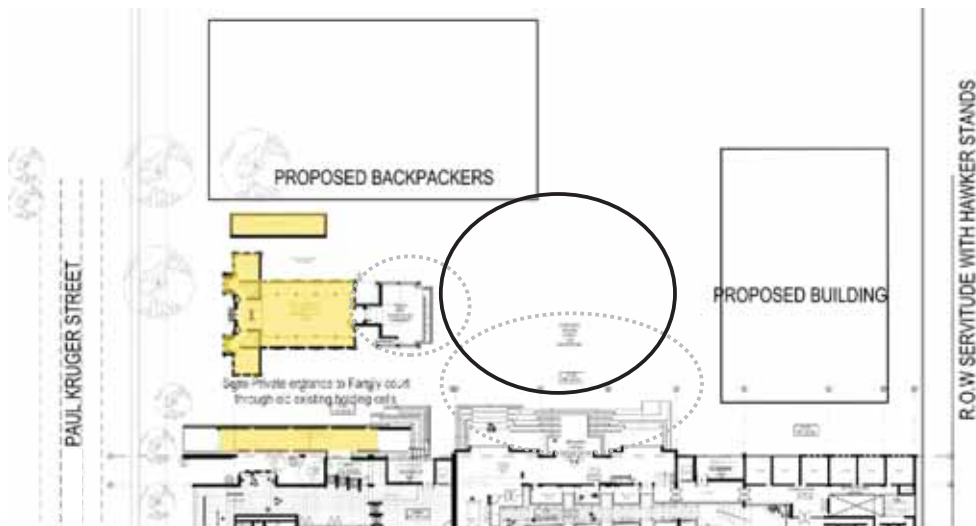
A tram system incorporated with the proposed urban framework will run parallel to the site, lending accessibility throughout the CBD. Pedestrian traffic will be heavily benefited by this system, and thus will increase. The location of the site is greatly afforded by being five minutes walking distance from Church Square, where the main central bus terminal is situated. Users in privately owned vehicles can access the site on the four roads flanking it. These vehicles can park either; in public parking accessed via the right of way servitude, or in the public parking facilities available in the Family court accessed through Proes street.

## **Integration of Family Court with the Synagogue Square:**

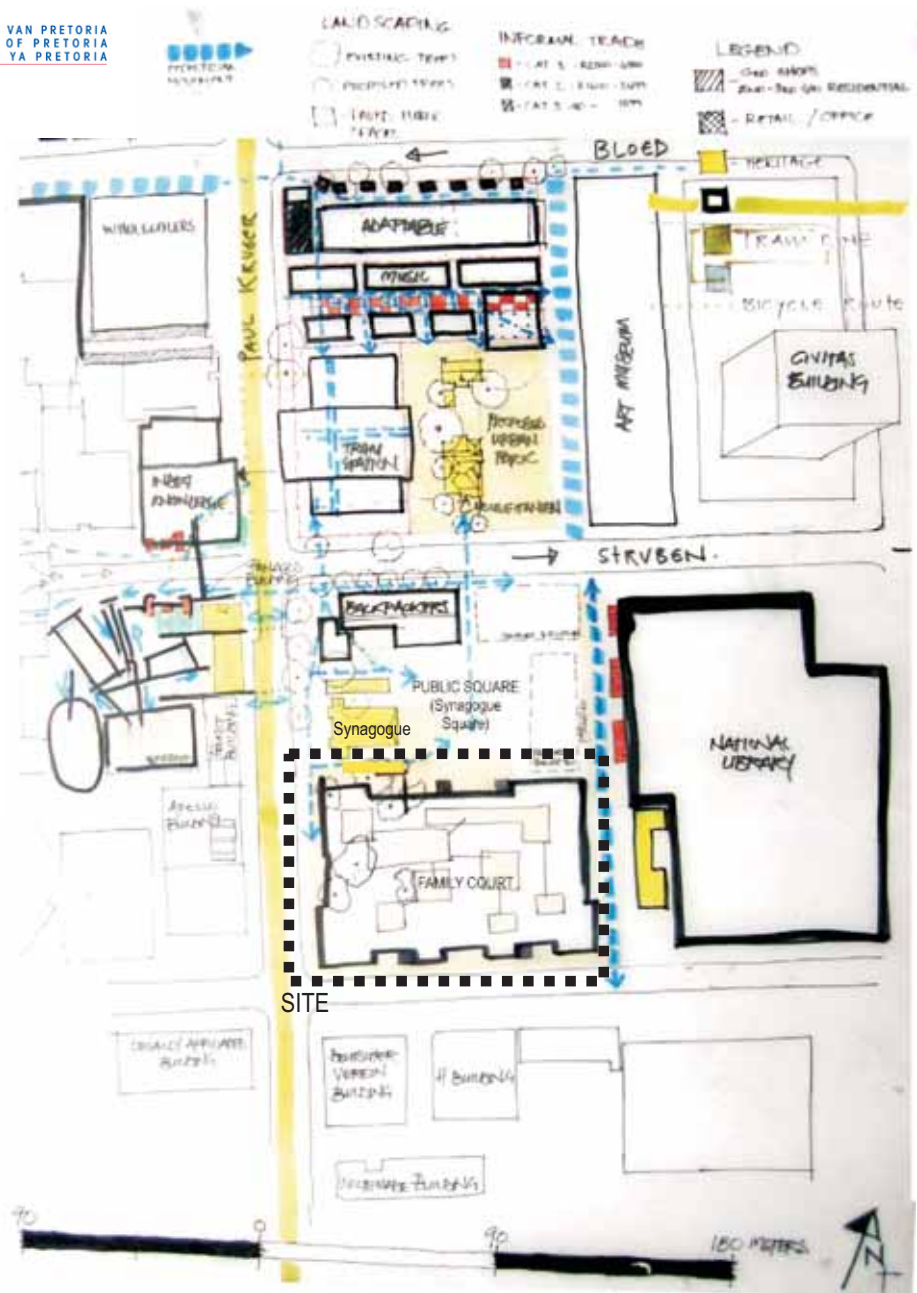
In designing the Family court as a fortified city of defensible space, the perimeter of the Family court was devised as an inclusive feature to public interaction.

The decision was taken to reappropriate the Synagogue in a dual manner. Firstly, it would be used as a tribunal court room where cases of greater importance are held. Larger public seating would be facilitated, along with an added area on the balcony for the press. Secondly, an added function to the Synagogue would be a community hall. This would be offered to the public at a fee, when not in use as a tribunal.

Necessary facilities for this dual function would be accommodated in the re-use of the northern block structure as a catering facility. An added structure to the eastern façade of the Synagogue would accommodate magistrates. This structure would carry through the architectural language of the Family court. Its location was not only chosen for easy access to magistrates, but also for a symbolic association of a spiritual re-birth associative to many cultures, including African. A balcony has been incorporated into the design of this chamber, to facilitate in the addressing of public crowds or protestors. In the event of public demonstration or protest an area of terraced gathering has been designed into the northern periphery of the Family court. Here, a speaker can address the crowd on a lifted podium and find a platform where he can be heard.



5\_02  
Relationship of Family court with Synagogue square



5\_03  
Urban framework as to the students of Pretoria University

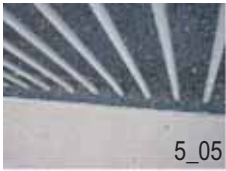


# MATERIALITY:



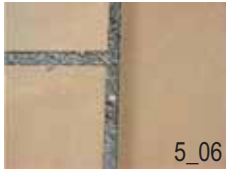
5\_04

The urban proposal aims to re-integrate and exemplify heritage buildings in an around the CBD. The Synagogue will be restored to its former glory, of face brick banding and stained glass windows. With this in mind, similar banding has been incorporated in specific walls of the Family court. All buildings will be built out of a masonry construction except for lift towers.



5\_05

Off-shuttered concrete work will be used throughout all lift towers as to create solid cores. Façade elements relating to the courtrooms inside will be constructed out of cantilevered off-shuttered concrete, finished with mosaic tiles. These mosaic tiles refer back to the Woltemade building, as they are of the same colour scheme, creating a greater contextual synergy.



5\_06

Weatherable steel is incorporated as a major design component. It is understood as a symbol of a legal authority wiser with age. In this application steel will be treated with a galvanising, oxidising agent, proving more efficient and economically rewarding.



5\_07

Furthermore all glazing will be made of an aluminium modular system.

All paving will be seen as a sensory experience further connecting the user to ones territory or domain. Gravel and pebbles are used in conjunction with concrete pavers, aiding in a therapeutic and melodic movement throughout the site.



5\_08

In these figures one can see influences of the previous precedents and how they informed the selection of materials .



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# ACCOMMODATION SCHEDULE:

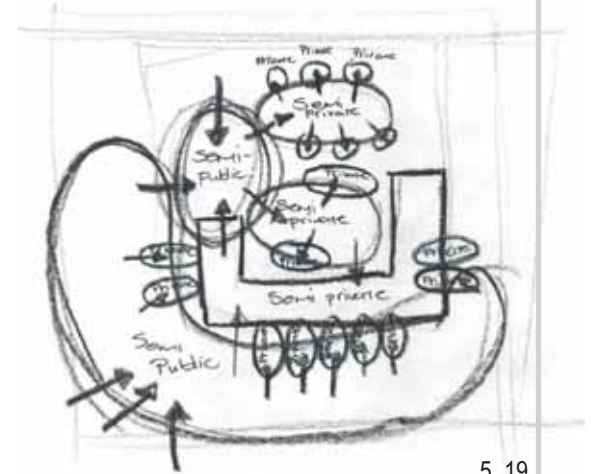
Facility description	Amount of people	Area allocated for these	Amount of facilities	Area allocated	Extra circulation & waiting areas	Total area (m <sup>2</sup> )
<b>Family court:</b>						
Divorce offices	8 people	X 1m <sup>2</sup> (each)	8 offices	X 8 m <sup>2</sup> (each)	+ 15% of area	= 73
Maintenance facilities	9 people	X 1m <sup>2</sup> (each)	8 cubicles	X 7,5 m <sup>2</sup> (each)	+ 15% of area	=69
Bank payment facilities	50 people	X 1m <sup>2</sup> (each)	8 cubicles	X 7,5 m <sup>2</sup> (each)	+ 15% of area + 5 m <sup>2</sup> for strong room	= 122
Domestic violence	30 people	X 1m <sup>2</sup> (each)	7 offices	X 8 m <sup>2</sup> (each)	+ 15% of area	= 94
Public waiting area	350 people	X 1m <sup>2</sup> (each)	1 concourse		+ 15% of area	= 405
Admin and accounts call centre	25 people	X 1m <sup>2</sup> (each)	25 open plan offices	X 8 m <sup>2</sup> (each)	+ 10% of area	= 220
Offices ( court clerk, court marshals, etc)	25 people	X 1m <sup>2</sup> (each)	25 open plan offices	X 8 m <sup>2</sup> (each)	+ 15% of area	=230
Magistrates chambers with changing room	19 magistrates	X 1m <sup>2</sup> (each)	19 chambers	X 25 m <sup>2</sup> (each)	+ 10% of area	=522
Attorneys offices	15 magistrates	X 1m <sup>2</sup> (each)	15 offices	X 12 m <sup>2</sup> (each)	+ 15% of area	=207
<b>Miscellaneous</b>						
10 courtrooms	70 people	X 1m <sup>2</sup> (each)			+ 15% of area	= 80
Archiving						=500
Detention cells	35 people	X 1m <sup>2</sup> (each)	2 cells	X 80m <sup>2</sup> (each)	+ 15% of area	= 160
Detention facility	10 people	X 1m <sup>2</sup> (each)	9 offices	X 20m <sup>2</sup> (each)	+ 15% of area	= 207
Storage and maintenance rooms			10 rooms	X 6 m <sup>2</sup> (each)		= 60
Hawkers stands	6 vendors		3 stalls & 3 shops	X 25m <sup>2</sup> (each)		=150
<b>Child component (including abused and non abused crèches)</b>						
Child welfare offices			4 offices	X 8 m <sup>2</sup> (each)		= 32
Social workers facilities			2 lounge areas	X 9 m <sup>2</sup> (each)		= 18
Crèche	10 children	X 1m <sup>2</sup> (each)	2 crèches with storage	X 10 m <sup>2</sup>	+ 15% of area	= 46
Open playground	10 children	X 2m <sup>2</sup> (each)	2 different playgrounds	X 10 m <sup>2</sup>	+ 15% of area	= 46
Canteen eating area	10 children	X 2m <sup>2</sup> (each)	1 serving both crèches		+ 15% of area	=40
<b>SUM OF AREAS NEEDED</b>						<b>=3281 m<sup>2</sup></b>

# DESIGN PROCESS:

In achieving an appropriate language for the Family court an analysis of elementary keywords was done. The Keywords allows one to understand the site better and to accommodate for an empathetic building design. They were understood as follows:

- **Memory:** Was viewed as an anchoring point in which the struggle of past individuals allowed new victims of trauma a starting point, redefining their identity. For the significance of the Synagogue to be apparent to the users of the family court, lines of site had to be designed without obstruction to the 'memory' that lay beyond.
- **Recognition:** The moment in which a traumatised person is able to recognise, and accept past injustices to them, the shorter the road to recovery. This commonly understood sentiment of acceptance can be dealt with in unobtrusive architectural scenario. For this reason a subtle side entrance/ *porte cochere* to the Family court was located to the left of the Synagogue through the existing holding cells. This concept was intended from inception to be heavily linked with the recognition of historical past struggles and ones own struggles allowing the user of the family court to feel less burdened.
- **Healing:** An incredibly necessary component of a Family court was discovered to be that of counselling and mediation. Therefore, all private facilities such as; domestic violence, divorce, and maintenance were designed with this in mind.

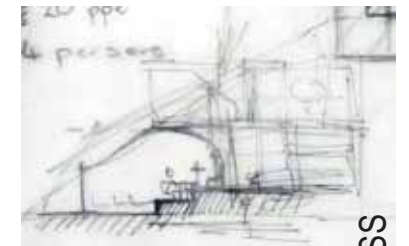
- **Reconciliation:** another understanding of acceptance was incorporated into the design. Here users of the divorce facilities can meet with councillors in unison with their partners and families. This makes not only for an easier and more amicable separation but one which is far less traumatising to family members.
- **Justice:** For the depiction of an understanding, and inviting legal system, the design of the legal peripheral building had to be designed in such a way as not to be imposing and grandiose. The concept of light boxes as court rooms, leading the way into the future for a transparent and understanding legal system was derived through this limitation. The courtrooms were designed as fingers stretching out of the legal realm to the people who need it most.
- **Freedom/ Identity:** was seen as a culmination of all journeys undertaken within the defensible space of the Family court. Here a survivor would be able to reconnect to the identity they possessed without question, before the family violence began. This can be seen as a spiritual conclusion to the journey within the legal system and the Family court itself. In the preliminary designs this was understood as an extra exit point which only survivors would be able to experience. This later proved to be a logistical and safety fracas, therefore enforcing only two main access points to the building.



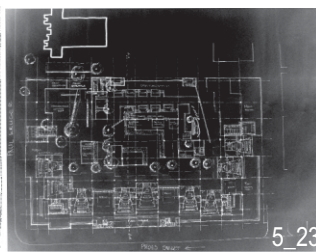
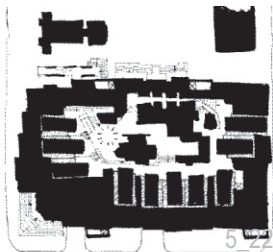
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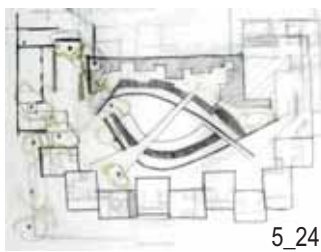
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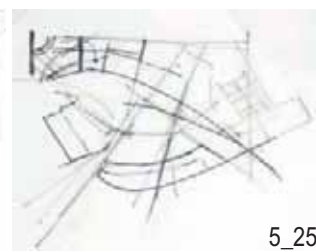
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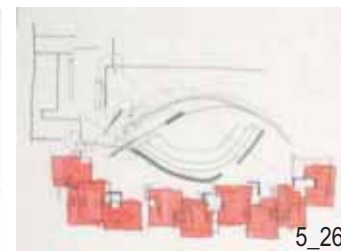
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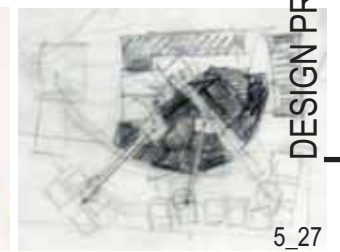
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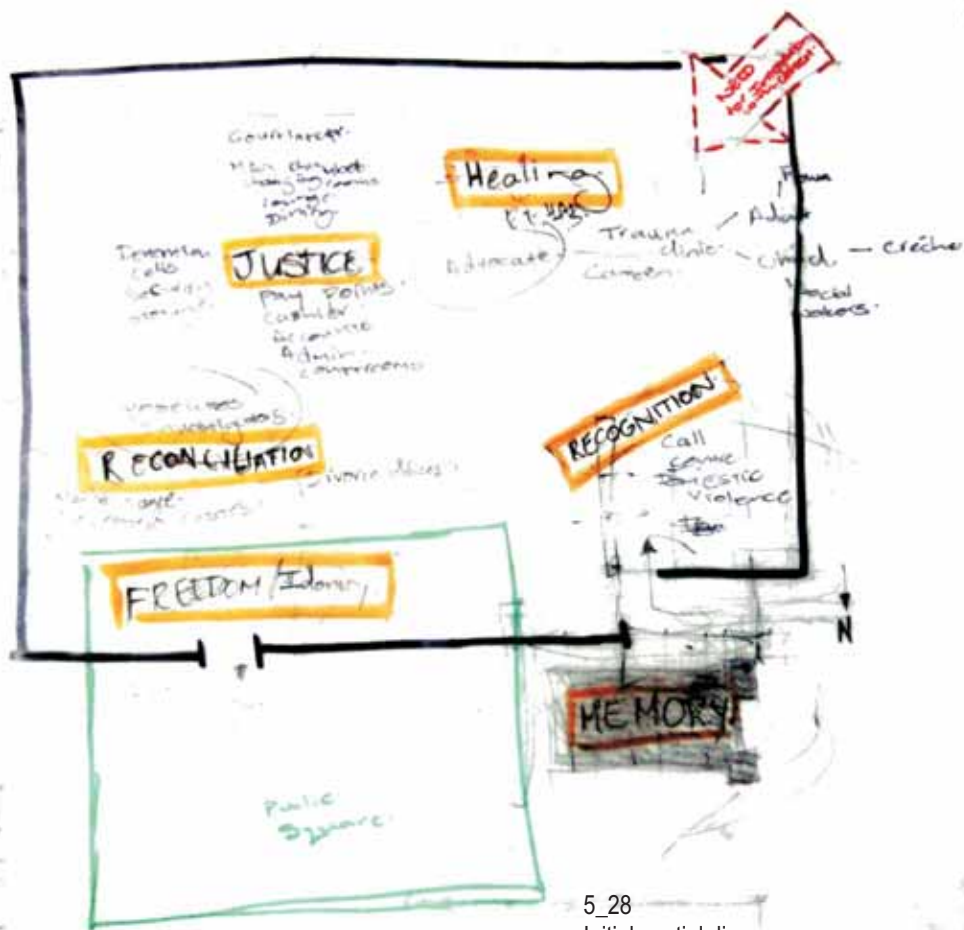


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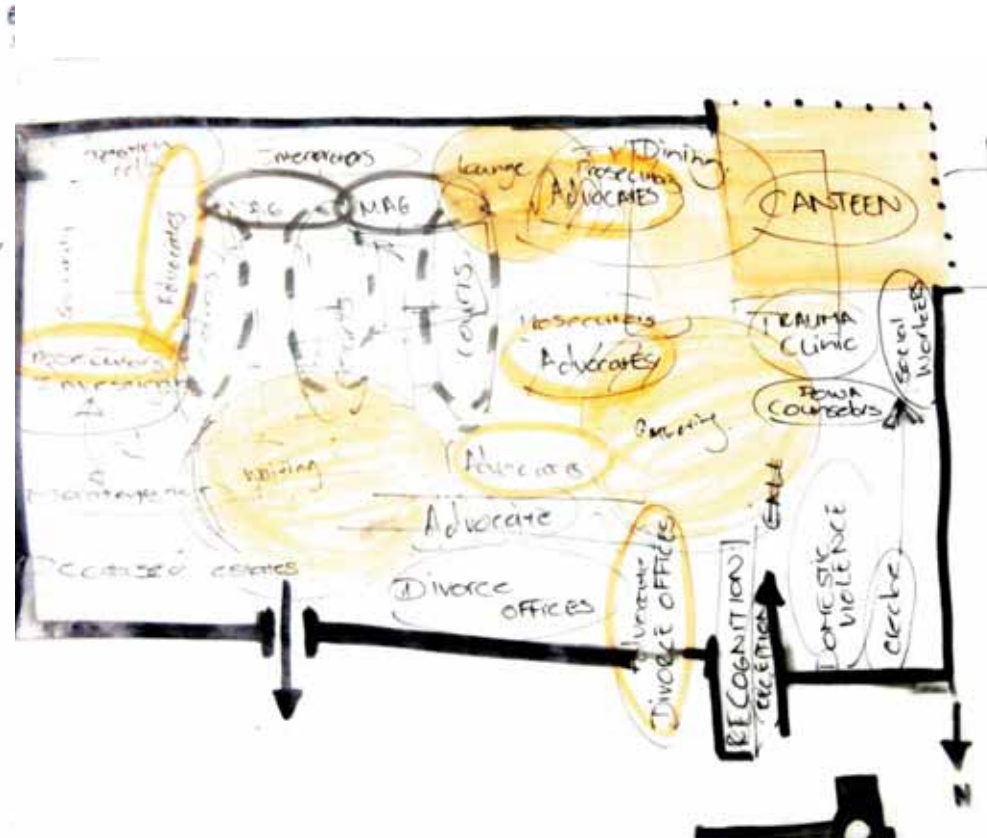
DESIGN PROCESS



In the pages that follow the design progress of the Family court is revealed.

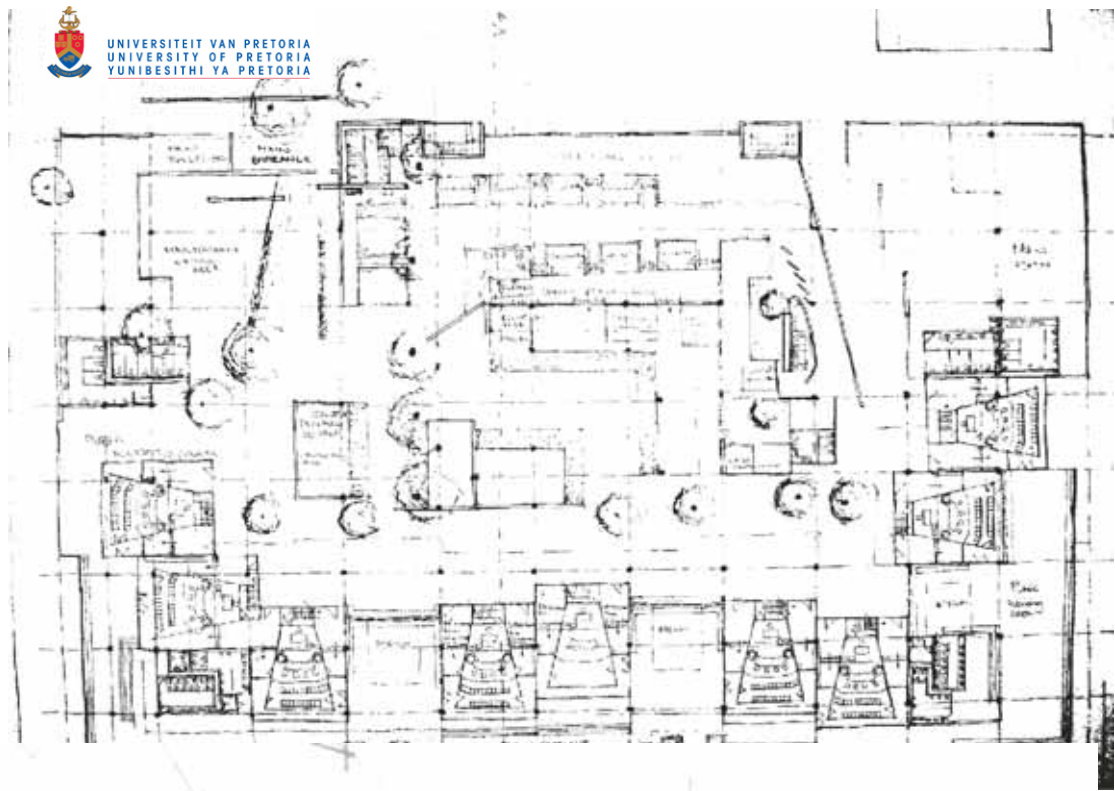


5\_28  
Initial spatial diagram

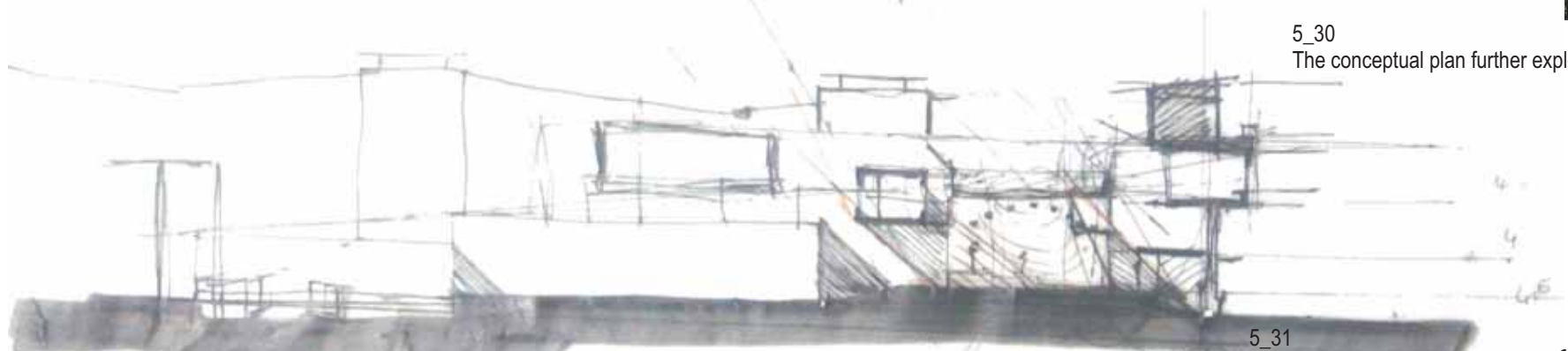


5\_29  
Initial spatial diagram connecting main keywords to services

In this initial phase one can see three main access points, one main entrance on the corners of Paul Kruger and Struben streets, one side entrance flanked by the Synagogue and another exit point leading to Synagogue Square. The facilities proved to be inefficient as disabled magistrates were not able to access the courtrooms, through their stair towers. These towers also proved to be too monolithic and seemed a bit distressing to users. The private zone of departments was conceived as a lower scale to that of the grander juridical building surrounding it. This zone was further broken down within itself through the terracing of levels in which different departments were located, creating a replicated sense of inner sanctum within every terrace leading up to the courts.



5\_30  
The conceptual plan further explored

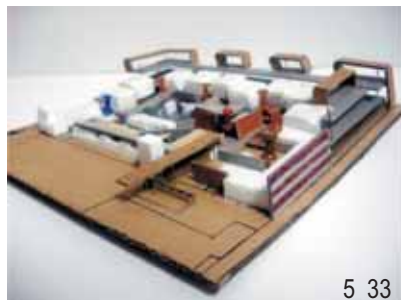


5\_31  
Conceptual section studying solar penetration

Photographs of spatial model:



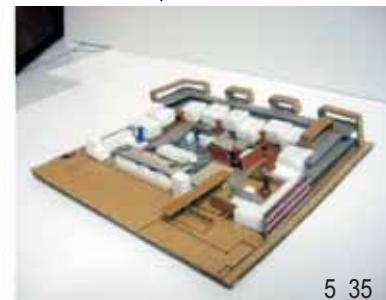
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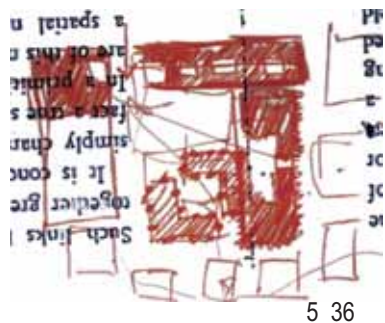


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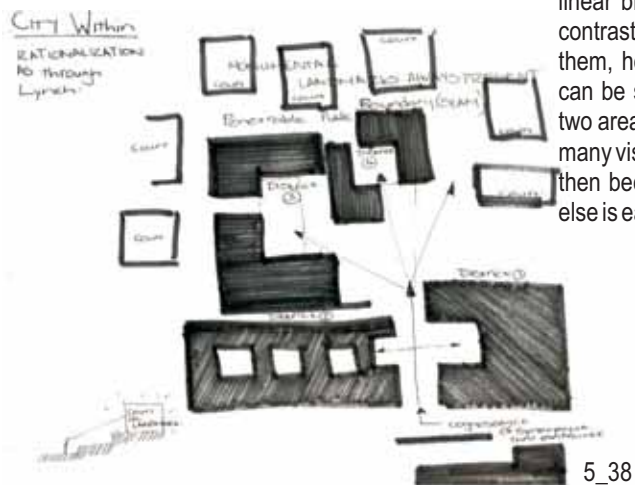
To improve a person's ability in orientating themselves within the building, the individual footprints of the internal buildings were altered. Through the understandings of Lynch and his city imaging concepts; nodes districts, seams, paths and landmarks were established. Here the design gathered wayfinding clues as to orientation and the importance of cognitive mapping.



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According to Lynch:

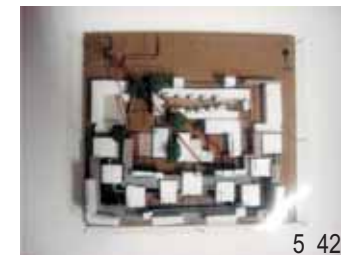
- **District:** is the medium to large section within a city which one enters 'inside of'. It has a common identifying character which may set limits, reinforcing its identity. A district can in itself be structured with sub-districts.
- **Seams:** also known as edges. Are the linear elements not used or considered as paths by the observer. They are boundaries between linear breaks in continuity and can strongly contrast regions set in close juxtaposition to them, holding generalized areas together. It can be seen as a line of exchange of which two areas are penetrable. If it is provided with many visual and circulation connections to it, it then becomes a feature to which everything else is easily aligned.



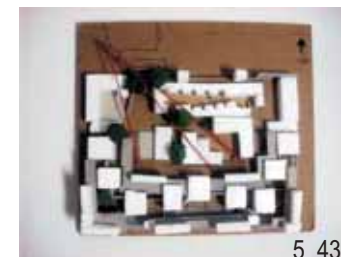
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- **Nodes:** or cores are places where strategic points of interaction are found. They are understood as the intensive foci to and from which one is travelling. A strong node can create a district in a more homogeneous zone. In essence it is an 'unforgettable space' to which a sharp closed boundary forms a static outdoor space. Paths leading to it must be understandable, so that the observer knows where to enter or exit. A series of nodes can be formed in a sequence forming a related structure, structuring substantial city regions.
- **Paths:** are the channels, along which one travels, they are experienced by moving through them. Through this journey one experiences other elements. They can be seen as central arteries with inherent directional properties creating a route. If one is to orientate themselves in a space paths must be visible, becoming the dynamic shaping in a movement line, thus creating an identity to an experience over time.
- **Landmarks:** are another type of point reference which the observer objectifies. Seen as something the viewer can constantly recognise within his routine. The image strength of these objects rise as the landmark coincides with a concentration of association.

(Lynch, K. 1960; 47-64, 105)



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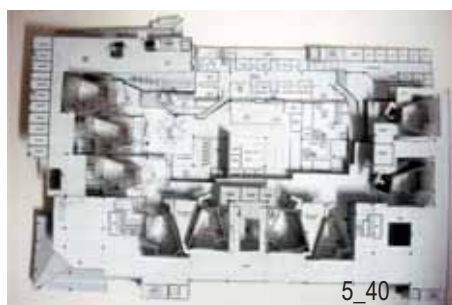
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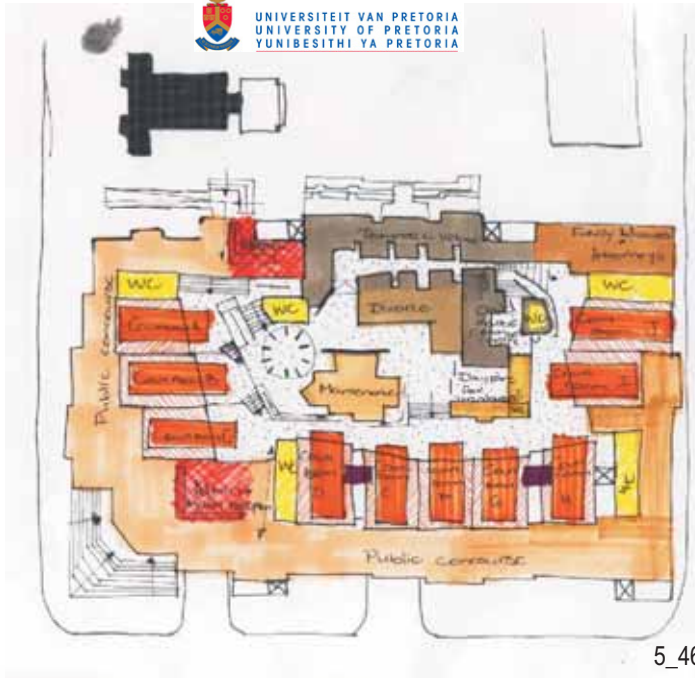
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The final design phase was able to incorporate all aspects learnt from the previous designs, in an understandable and congruous building. Empathy and 'rituals' were added, such as that of washing ones hands when entering as a survivor. The concept to which would be the mimesis of cleansing ones soul of past traumas. A more structured and understandable footprint allows the user to feel comfortable in their environment permitting them the experience of belonging.

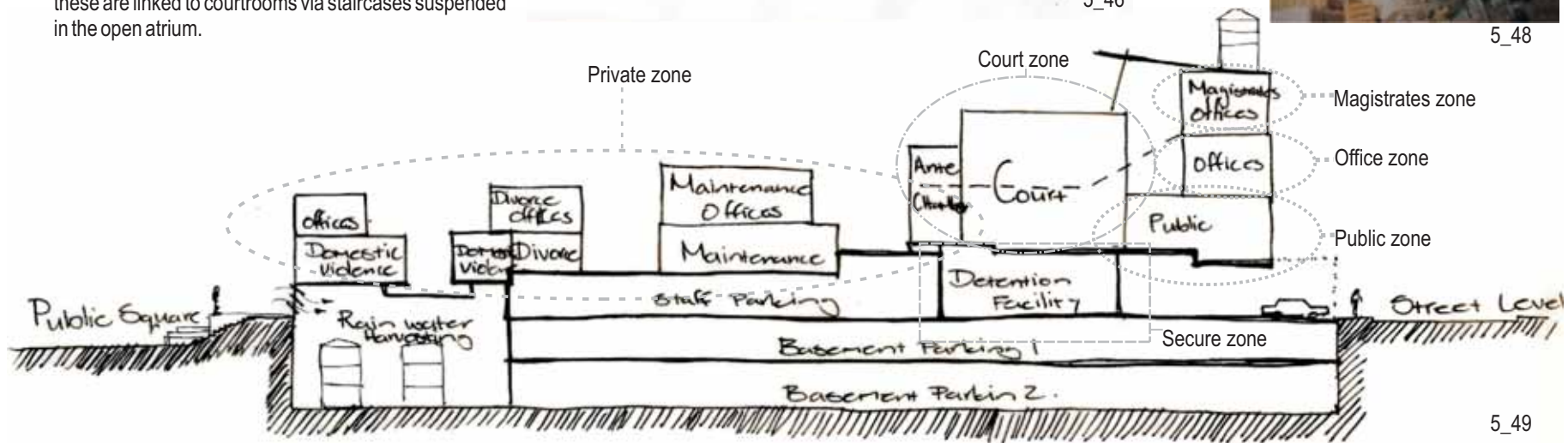
Circulation was seen as a major design generator, and therefore the judicial building was designed in a more efficient horizontal fashion. This enabled a secure detention facility on the ground floor in- accessible to the public. An unrestricted public zone was allocated on top of this level, allowing easy access to courtrooms on the same level. Admin and other offices are located on the floor above creating a more conducive environment, with bridges tying an atrium space together. Magistrate's lounges and chambers are located on the top floor; these are linked to courtrooms via staircases suspended in the open atrium.



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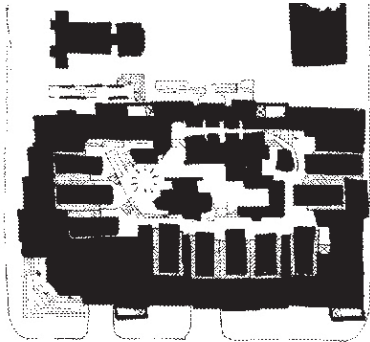


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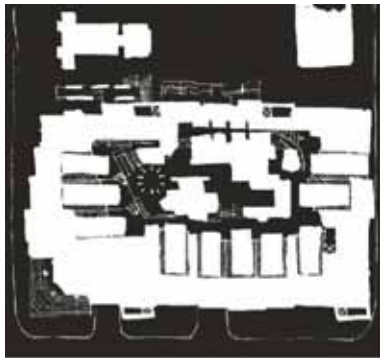


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The main design concept of the Family court was to create a stage for elements such as; memory, recognition, rehabilitation, justice, freedom and rebirth. These ideologies were all implemented in various ways, creating exciting experiential movement through the building. In this sense it is intended to communicate with or assist its users. Contrary to so many other civic buildings which refer to its users as merely statistical figures, to which they can dictate and lay their imposing judgements on.

Relating these elements to the ideologies of; space and place, belonging, defensible space and adequate behaviour settings discussed in chapter four, one can view the design in the following manner.

The memory of place and the *genius loci* is emphasised through subtly commemorating the Synagogue. Here the existing holding cells on the south side of it, have been re-adapted to a *porte cochere* side entrance (leading to the more private core of the Family court). This *porte cochere* allows one to experience the holding cells in a wholly unique way. Existing doors are removed from their frames to reveal melodic intervals of the Synagogue. Through this the observer is reminded of the pathological rhetoric of struggle and is able to feel an immediate connection to the place.

The division of the building in districts of semi-public leading to private sub-districts, allows a person to feel more adequate with their surroundings. As a person inhabits the specific areas allocated to them a sense of belonging and dwelling is achieved. Here emotion and reflection becomes the object of identity, something to which the observer can experience, remember and memorialize.

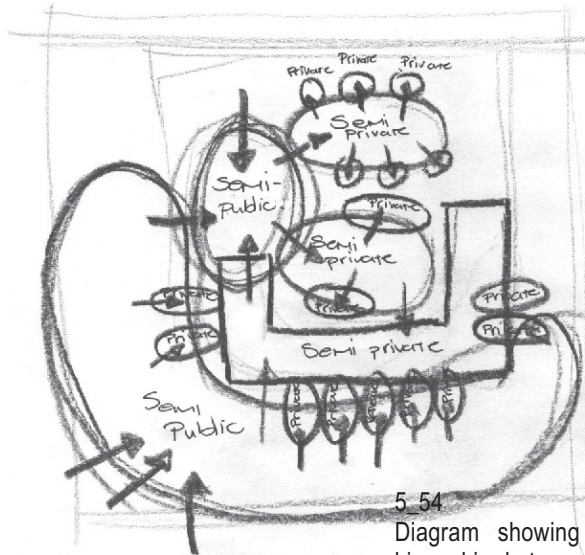
These elaborate emotional landscapes offer users a chance to congregate and create communities within these territories. Introducing an even stronger bond of dwelling within the building.

Nodes or waiting areas found in the private domain are spaces where contemplation occurs, survivors of family trauma establish themselves as both victims and witness. However, now due to an appropriate behavioural environment they are able to distinguish a temporal order to this idea, where victimisation is seen as a part of the past and remembered in the safe enclosure of the present.

A change in the state of the survivor, irrespective of their cultural heritage, occurs alongside a change in the context of testimony, from the entrance, to the point of legal intervention, to the climax of the trial.

The circular memorial mentioned in chapter four, can be viewed as a collective subject of traumatic history providing a way to overcome, confront or recognise one's conditions of subjection through this 'ritualistic' act of empathy and commemoration.

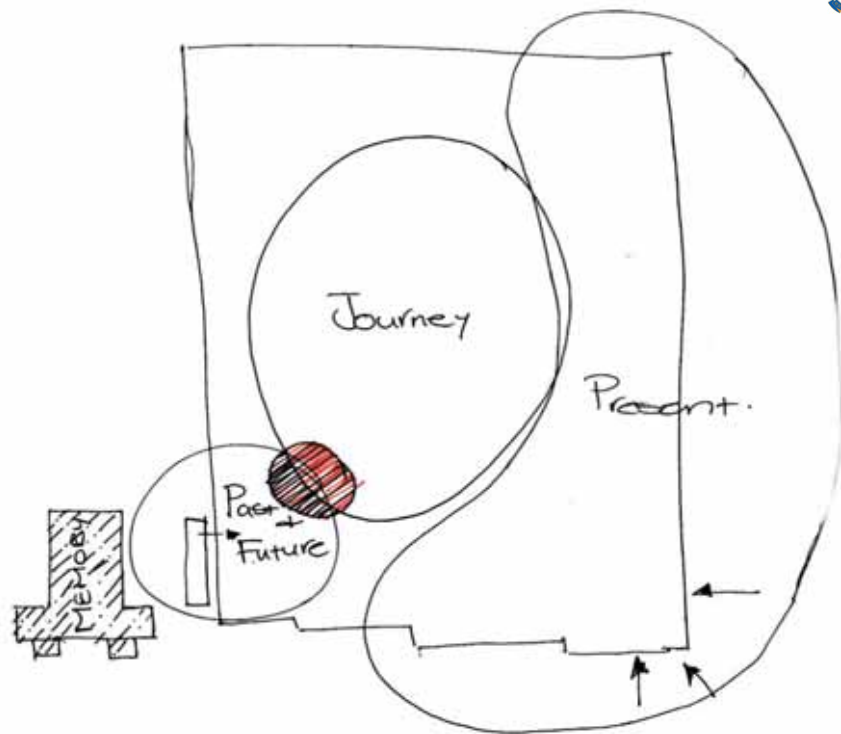
A further implementation of a mythical mimesis integrates the public realm to the private and traumatised realm. This can be experienced through the gallery space or terraced public waiting area descending towards the Synagogue and leading to the private core. This can be viewed not only as exhibition space for influential artworks but it can also be interpreted as that of a public exhibition of an empathetic legal system. This space adds to an individual's perception where one can relate to traumas associated with family disputes, thus heightening awareness to this growing social problem.



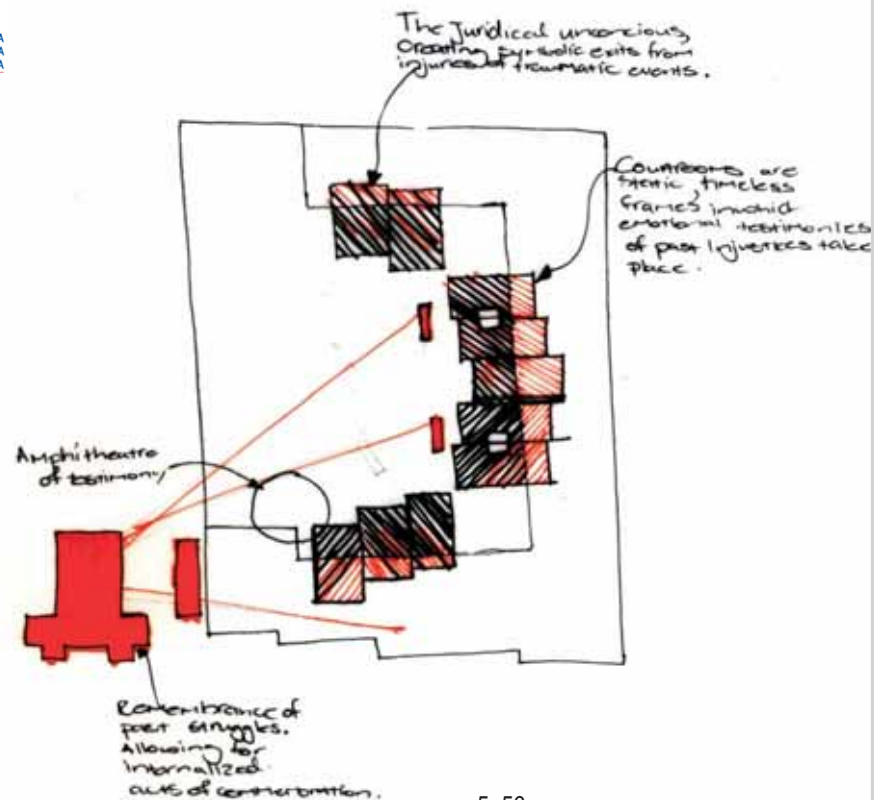
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Diagram showing the conceptual understanding of hierarchies between public to private in the Family court

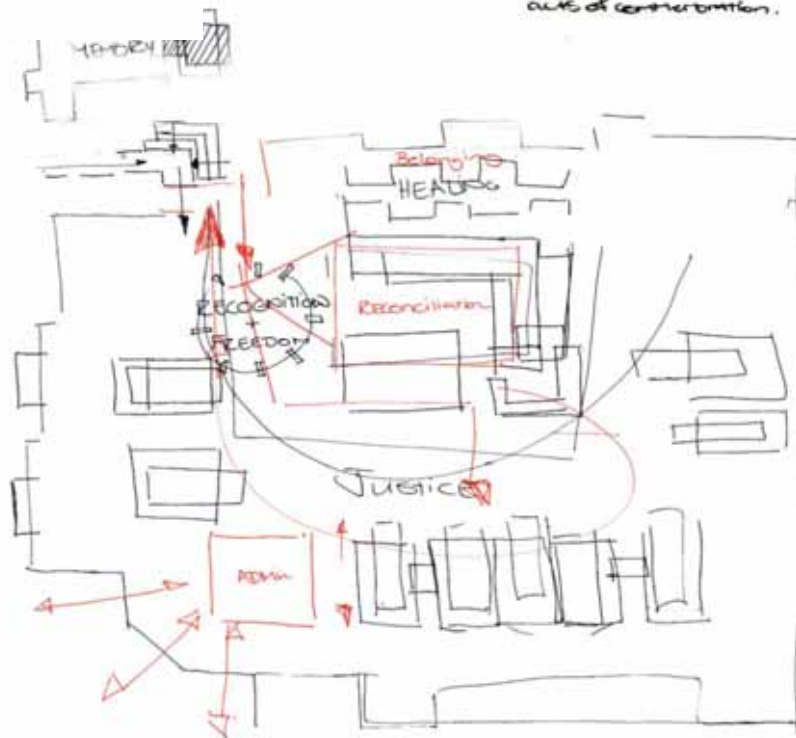




5\_55  
Diagram explaining timeline incorporated in the design



5\_56  
Diagram depicting narrative of empathy used in design



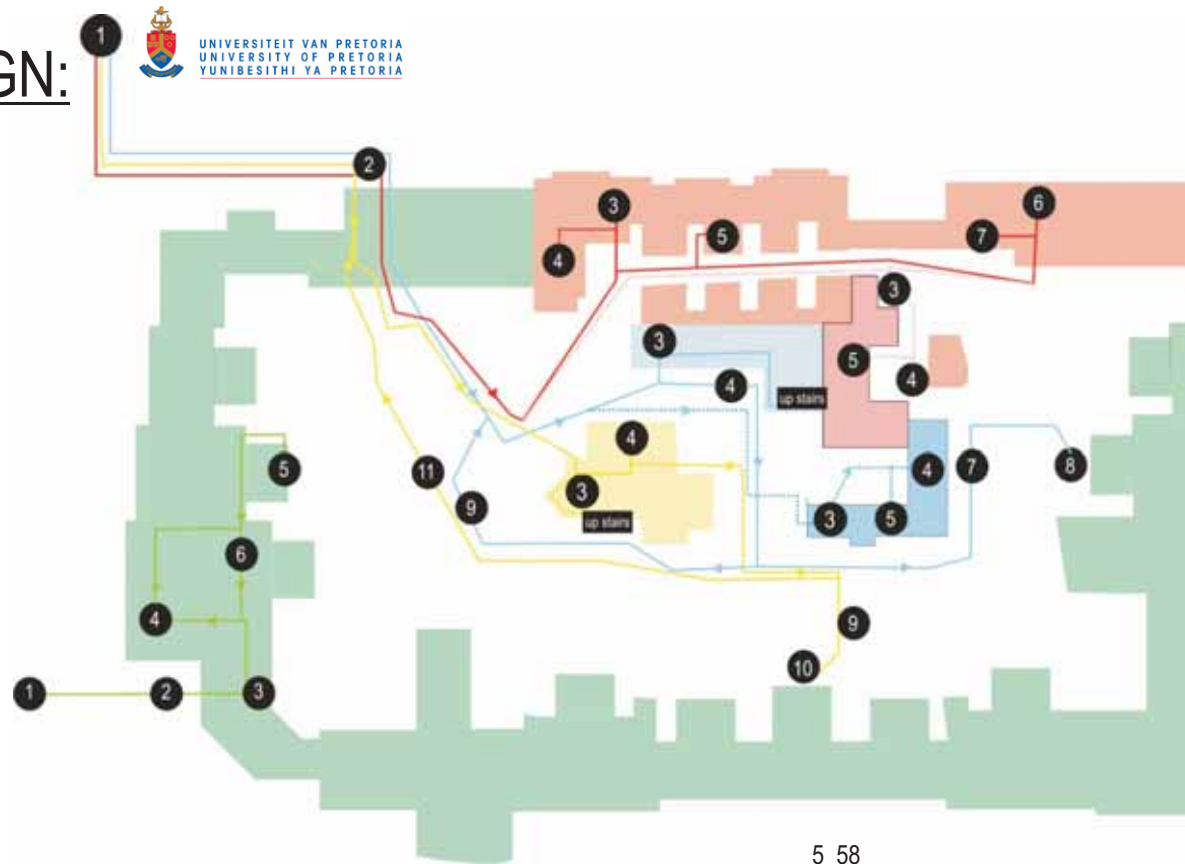
5\_57  
Final diagram of elements

# MOVEMENT WITHIN DESIGN:

Movement throughout the Family court can be viewed using the zones of a courthouse, discussed in chapter two:

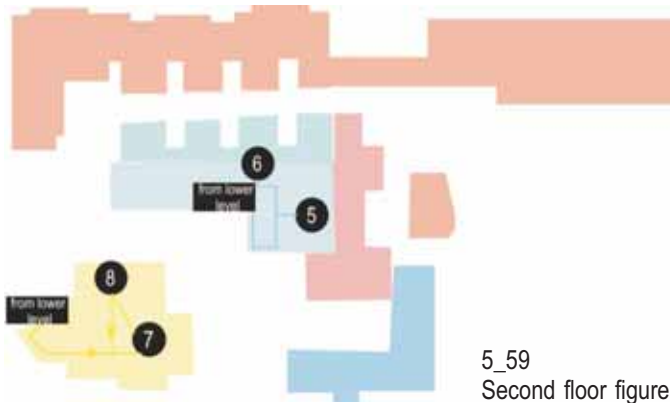
- Public zone movement: comprises solely of public awaiting a trial. They are accommodated in a main public concourse, constituting the periphery of the main legal building. This space is well ventilated and lit with natural ventilation through the implementation of an atrium area. Seating is mainly incorporated in the building landscape, creating interesting intimate spaces for gathering. An access through the main admin area or a gradual descent to the additional reception area leads one to the inner more private core of the building.
- Private zone movement: is that of survivors or people which intend to make use of the Family court. Accessed mainly form the side *porte cochere* entrance flanked by the Synagogue the movement is assisted through a main reception directing users to the specific buildings. Within the core of the building the user is yet again directed through the main *chora* (gathering space) space, from here all paths are visible and orientation is simple. The movement of a user of this portion of the building was understood as philosophical journey where one disconnects themselves from the external world and ultimately is re-born through a just trial, ready to face the outside world again.

The design of this zone lends itself to encouraging a communal interaction. Staff and users will be benefited through this, as referrals to known colleagues will increase efficiency.

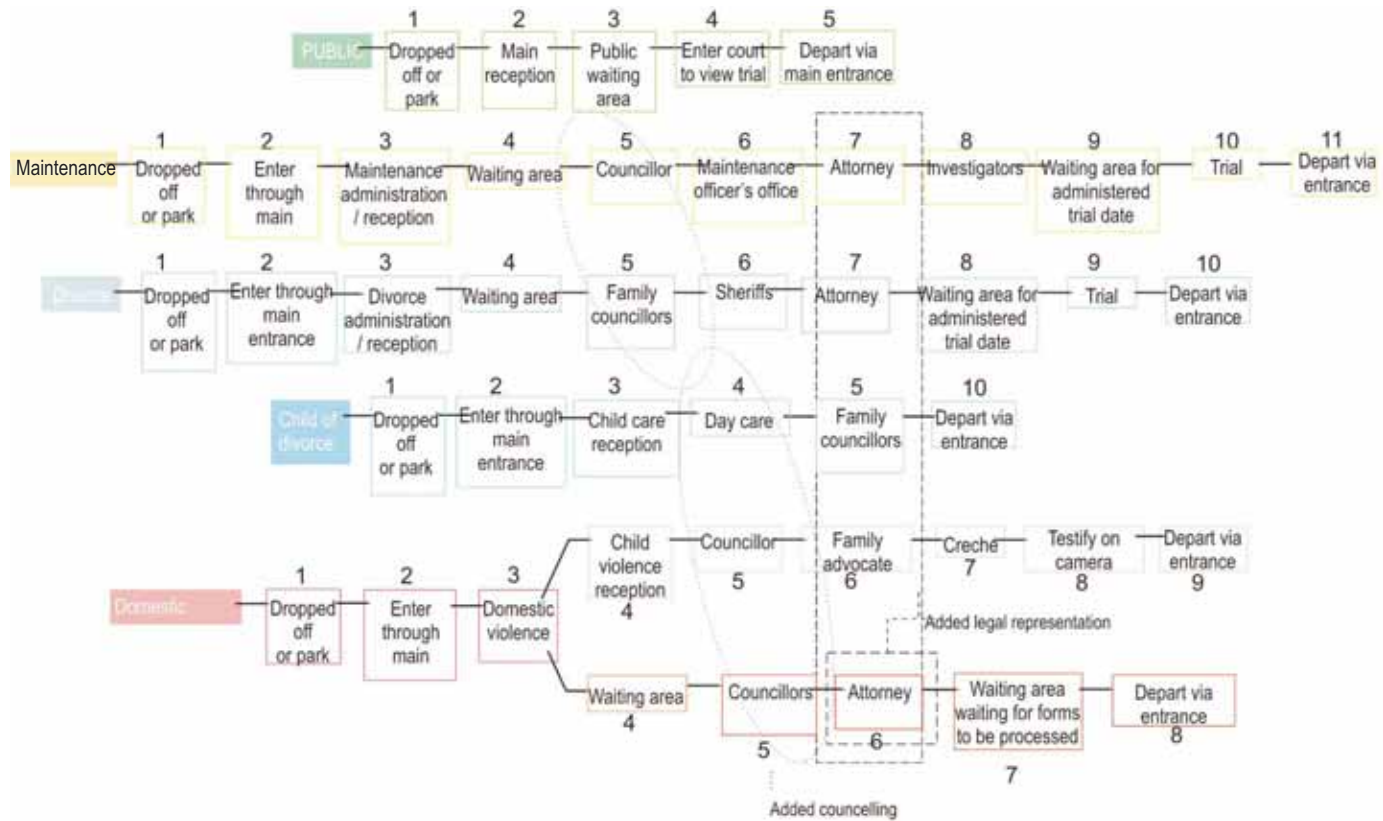


5\_58  
First floor figure ground movement diagram of public and private zones

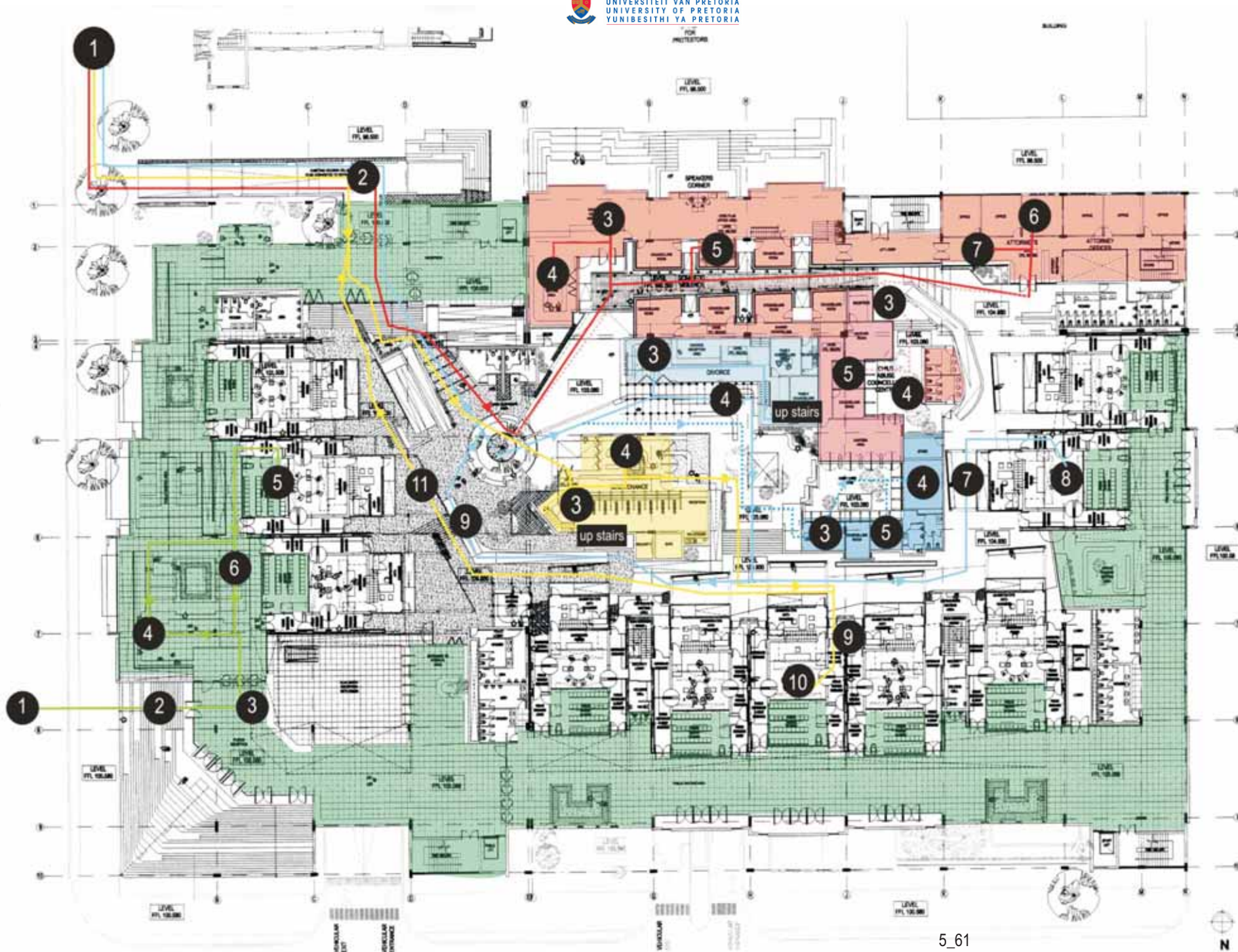
- Office zone movement: comprises of court clerks, admin staff, court interpreters, magistrates etc. It is isolated from most of the other zones as it is located on the top two floors of the main legal building. Here the environment is adapted to a more conducive setting to working through natural lighting and privacy.
- Security zone:, an additional zone necessary for criminal cases, where the detention facility accommodates the accused of domestic violence cases. This facility is located on the ground floor and access to it is through a security gate on Struben Street. A gated drop off facility has been allocated next to the entrance for greater security and convenience. The sole links to the courtrooms are through two secure staircases.
- Court zone movement: to be discussed in the courtroom analysis.



5\_59  
Second floor figure ground movement diagram of public and private zones

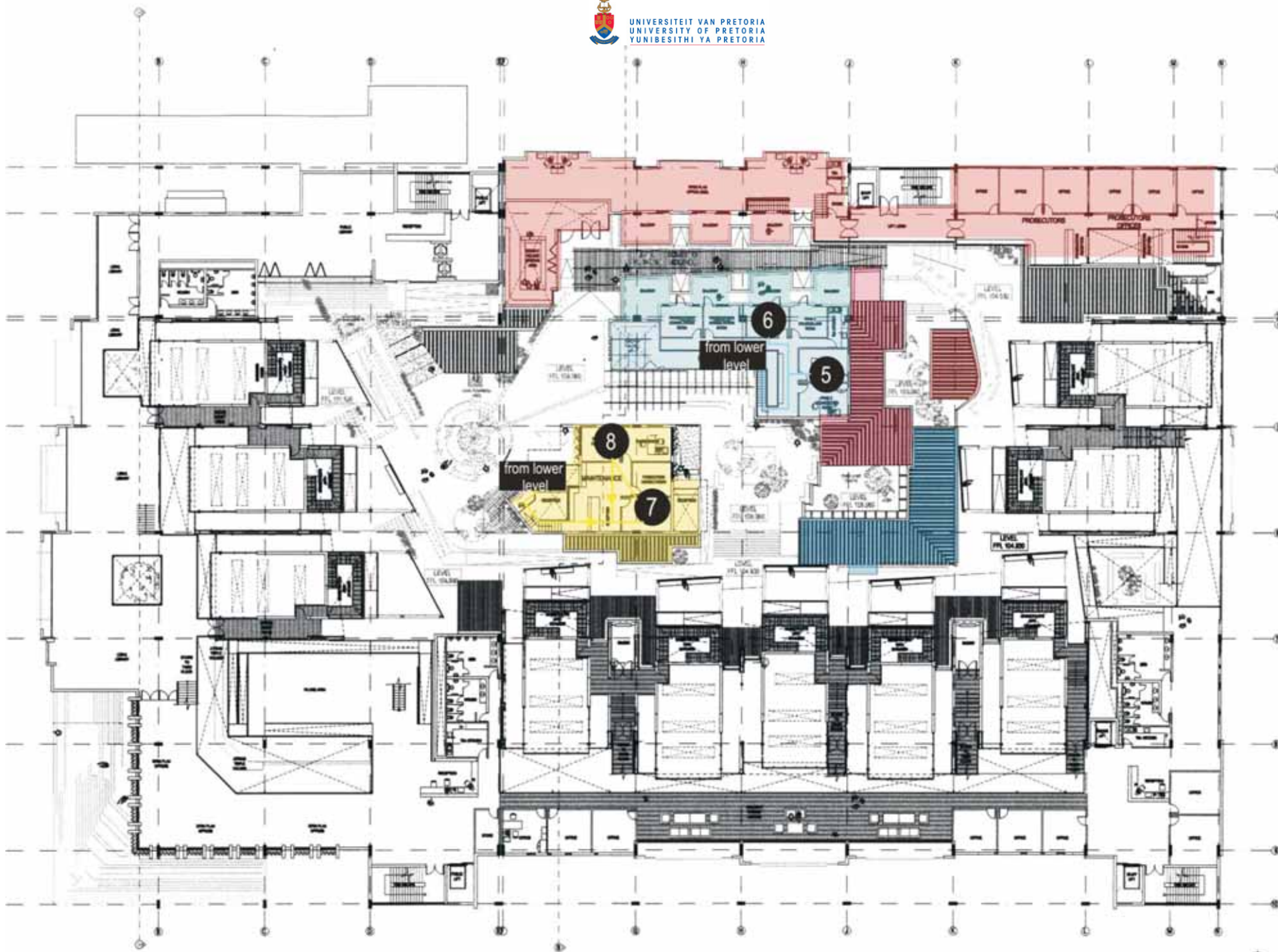






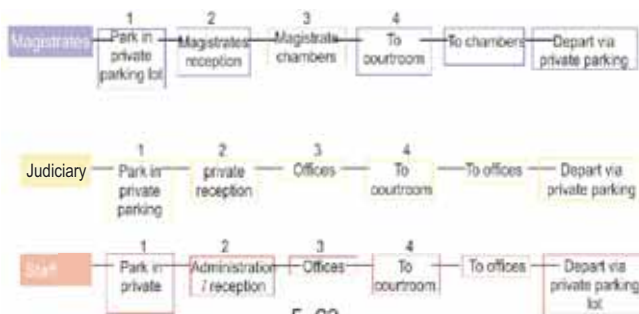
5\_61  
First floor movement diagram



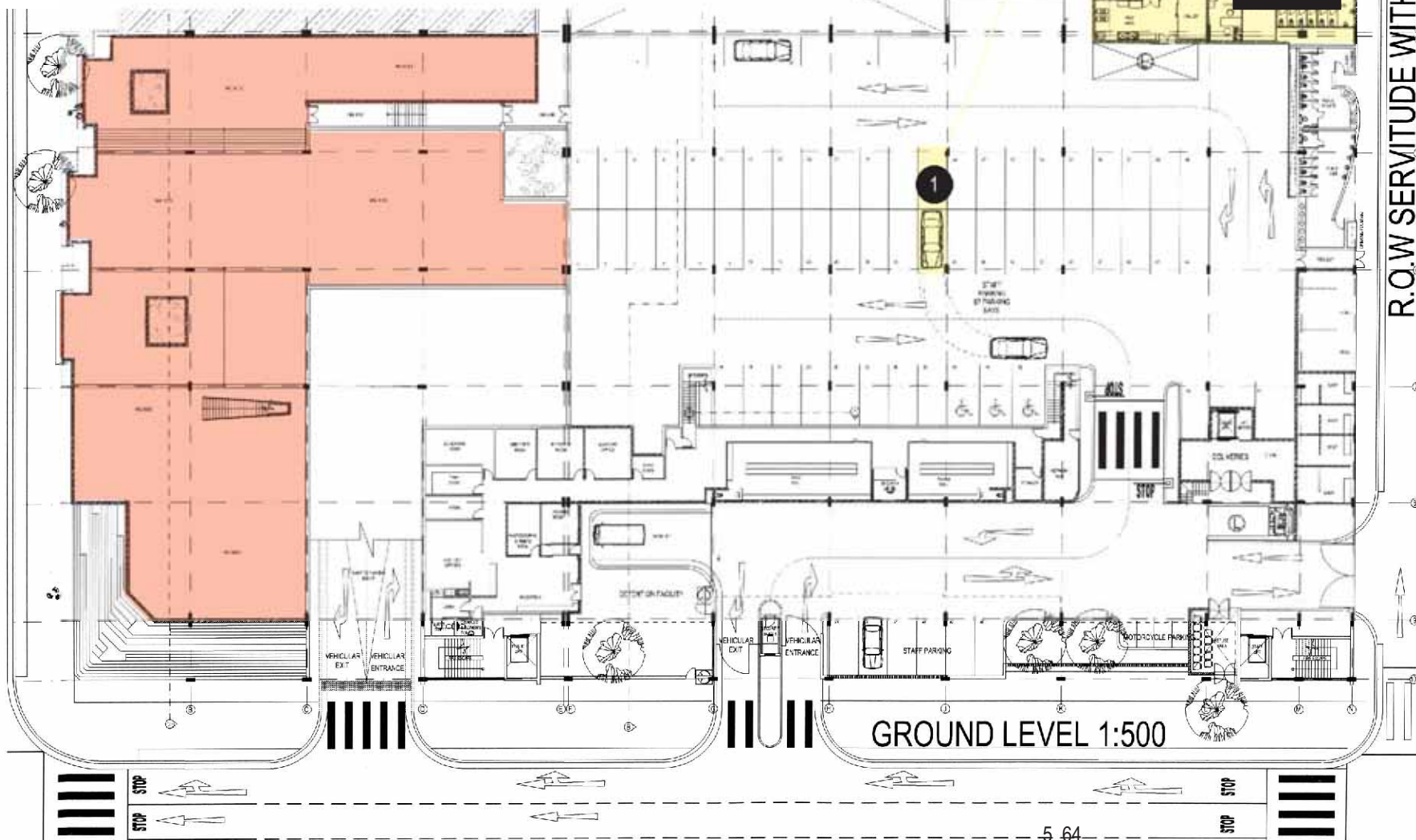


MOVEMENT WITHIN THE DESIGN

5\_62  
Second floor movement diagram

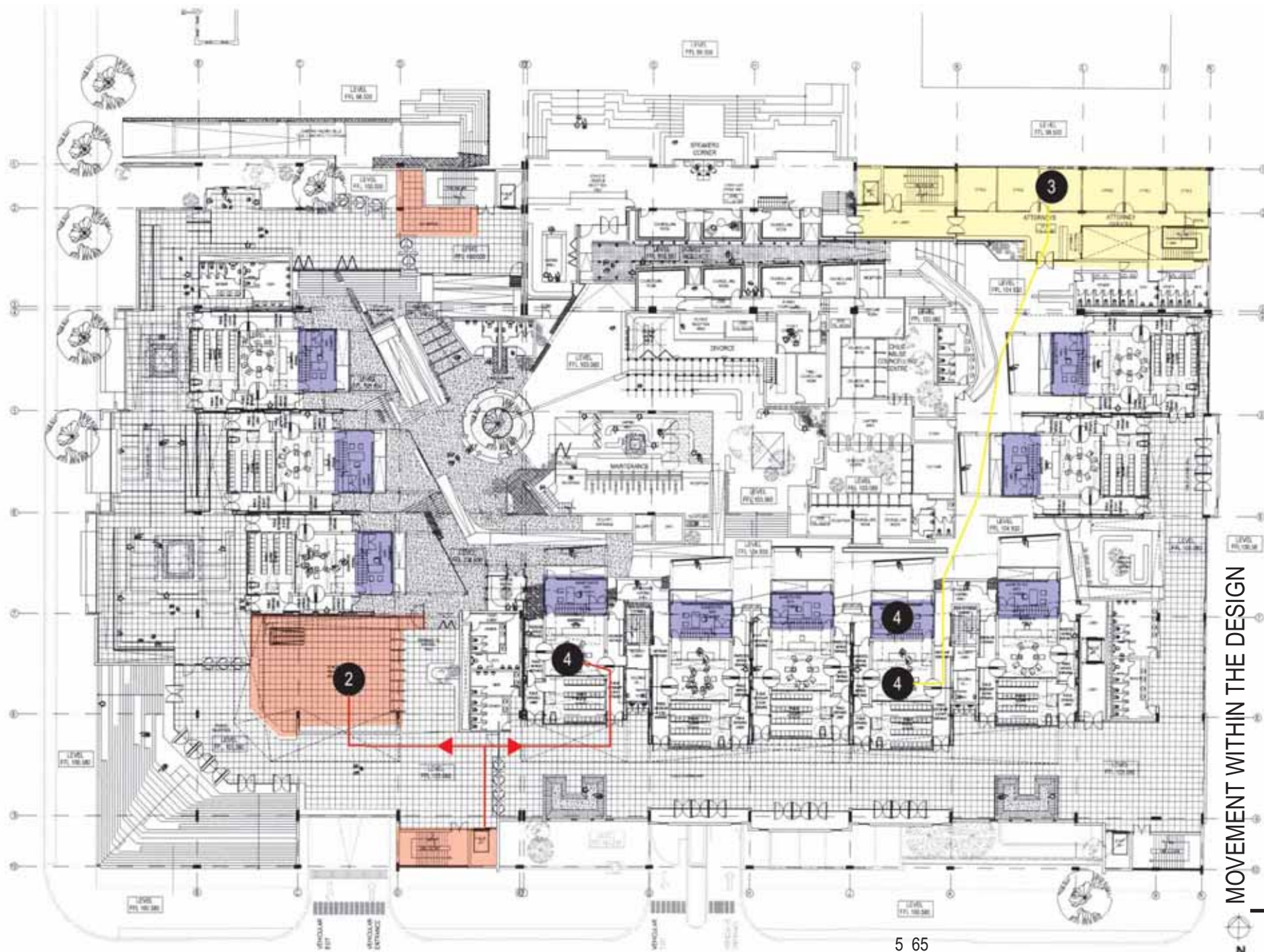


5\_63  
Movement diagram of office zone (not all parkings shown)



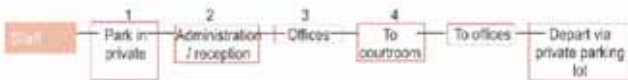
5\_64  
Ground floor movement diagram office zone



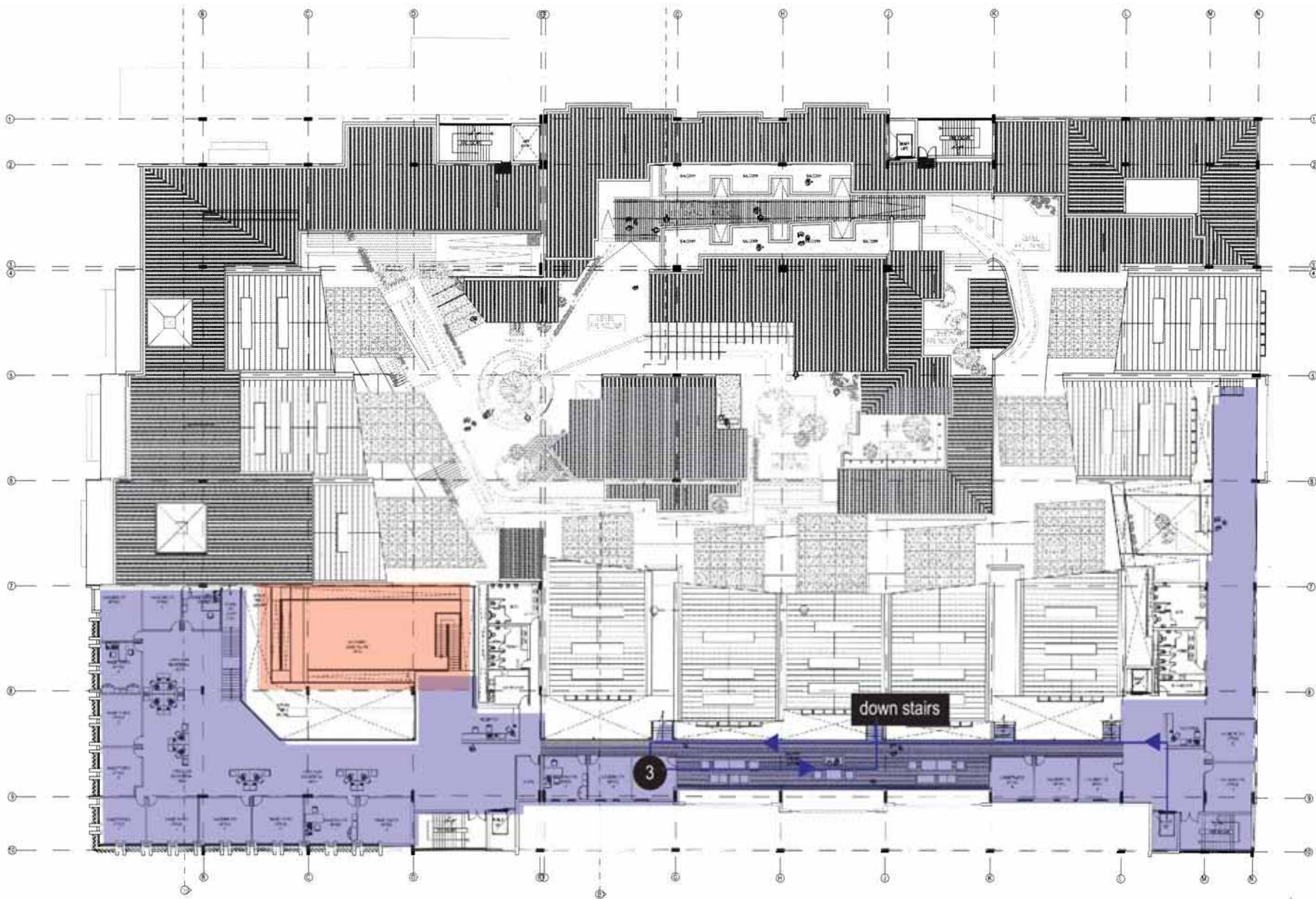


5\_65  
First floor movement diagram office zone

MOVEMENT WITHIN THE DESIGN







MOVEMENT WITHIN THE DESIGN

5\_67  
Third floor movement diagram office zone



# THE COURTROOM DESIGN:

The courtroom design was, from inception designed as a box within a box. Not only does this allow for better acoustics within the courtroom, through the implementation of sound foyers, but it also allows for better circulation and access to the courtroom.

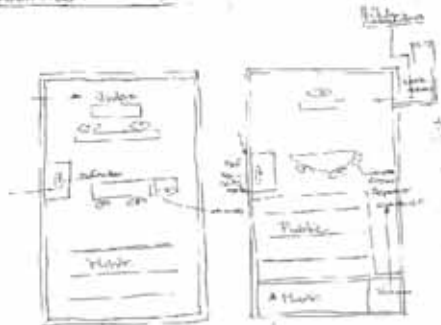
The concept behind the courtrooms as boxes can be understood as static timeless frames, where the juridical unconciuos are landmarks or beacons of hope. In this space emotional testimonies of past injustices take place. Therefore instead of creating heavy, soulless courtrooms buried deep within an incomprehensible legal building, the courtrooms are taken out of the building and set as finger like projections allowing for the inclusion of all, equally. To create an understanding of a transparent and just legal system, these courtrooms are designed as illuminated glazed boxes. In contrast to this weatherable steel is used for the outer 'shell' of the box symbolising a judicial system wise with age.

The courtroom environment is designed to be lit with 'diffused' skylights, allowing an atmosphere without glare and discomfort. Each individual courtroom will be ventilated through natural stack ventilation as well as an auxiliary air conditioning split system. The main desk shared by all who sit at the dock is intentionally designed as a circular table seating 8 people, so as to ease the tension and create a more relaxed environment.

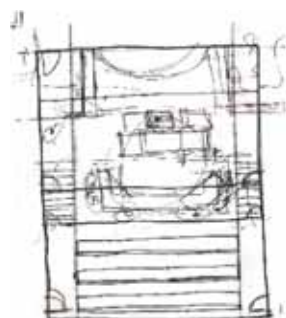
## Access to the courtroom:

- Public: through the public concourse on the southern periphery of the courtrooms. Access into the court is via a foyer seen as an acoustic stop. Their seating area is lowered by 170mm and access to the dock is restricted through the use of balustrading.
- Staff: such as court clerks and interpreters enter the court through the public concourse and into an alternate foyer. This foyer leads to the dock where they remain throughout the trial.
- Plaintiff or witness: can either access the courtroom from the private forecourt which surrounds the courts within the internal core, or from the public concourse. Within the forecourt waiting areas are allocated along the 'spine' and seats looking onto the Synagogue add to an atmosphere of contemplation. For a more private waiting area one can enter the plaintiffs foyer where access to the court is through another door leading directly to the dock.
- Defendant: just as the plaintiff would access the courts from either the internal core or the public concourse, so too would the defendant access the courtroom. However, the main difference would be that the defendant enters the courtroom from the opposite side as to that of the plaintiff.
- Detainee: in the event of a criminal case (domestic abuse) instead of a civil case, being held; the detainee can either present themselves to the detention facility on the ground floor, or in the case of previous police custody. They are detained elsewhere and brought to the facility on the morning of their trial. The two main cells are separated into male and female with a security office in-between. From the cells the detainee accesses the court under constant supervision via a staircase which leads to an additional holding cell, for an interim period. This cell is specifically designed as not to be in clear line of site to a defendant which is entering or exiting the court through the same access foyer.
- Magistrates: allocated on the top floor of the building access the court room via staircases leading to a mezzanine level linking to an additional ante- chamber where the magistrate can prepare for the trial and hold council.

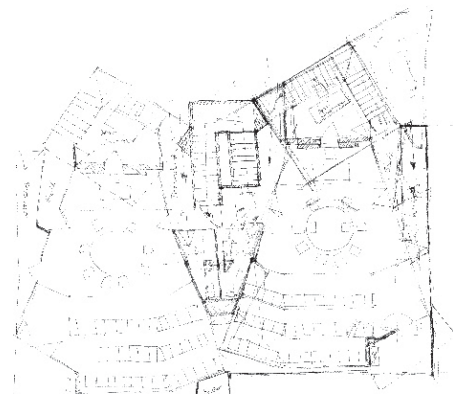
Courtroom Analysis



5\_68



5\_69



5\_70



- Magistrates
- Plaintiff
- Defendant
- Public
- Detainee

5\_71  
Plan of courtroom depicting zones of movement

MOVEMENT WITHIN THE COURTROOM

## Solar penetration of *brise soleil* structure:

“Survival, protection, and sustenance affect the need to perceive and feel comfortable with the environment. Lighting that provides well for biological needs in most spaces simultaneously takes care of most activity needs.” (Lam W M C, 1986, 20), this includes inactive activities such as protection from physical attack and orientation.

More subtle instances for the need of visual association with light can be seen in the need to maintain a sense of equilibrium within a defined horizon. This subtle need can influence our cognitive perceptions that we monitor continuously and unconsciously. These effects could include the perception of location, escape routes, time and other environmental conditions that relate to ones external schedules as well as our innate biological clocks (*ibid*, 20-21).

In considering the need for solar shading of the forecourt waiting areas (linked to the internal access to the courtrooms), roofed *brise soleil* structures were employed. These structures allow for diffused solar penetration and breezes to flow through, adding to a higher occupancy comfort.

Visually uneven gradients positively defining shapes of solid surfaces can seem pleasant to an observer therefore, two different studies were done incorporating different materials.

The initial *brise soleil* studied, was constructed from in-situ concrete frames with a logical ordering of concrete planters and grating. The planters were added into the design for greater user involvement with nature e. Creepers of *Combretum Bracteosum*, with an approximate covering of 35- 40% and flowering orange/ pink flowers, were chosen as the creepers to be planted in the planters. Roofing of this design was through a simple IBR roof sheeting at a gradient of 3°. The fall was located towards the planting so as to allow for some natural irrigation when precipitation occurs.

Advantages of this design are:

- A greater quality of diffused lighting with a natural experience
- The planting allows for an even cooler effect in summer as it creates its own micro- climate.

Disadvantages are:

- The weight of the structure would need a deep thickening of the floor slab below to stand
- The construction becomes more costly and time consuming, the structure becomes too dark and the scale of the frame begins to detract from the courtroom .

The second *brise soleil* studied was constructed from treated perforated steel sheet, welded to flat flanges of 254 x 146 I beams, braced and welded on 50 x 50 hollow tubes. The sheeting extends to the roof of the structure and is covered beneath with a translucent polycarbonate roofing system.

This structure's advantages:

- Quick and relatively simple construction, less elements incorporated in the design allow it to be more cost effective than concrete.
- The structure is light and no added reinforcement needs to be designed with the slab supporting it
- I beam supporting can be painted different colours so as to distinguish courtrooms from one another
- It allows for a complete and constantly changing diffused light pattern
- The diffused lighting will be brighter than the concrete design allowing for greater comfort in an already shaded site, through surrounding high rise buildings

Disadvantages:

- Does not implement any notion of a natural organic form as previous design

From the results shown in the following solar shading simulations one can detect that the second design is more adequate for the site and its environment, due primarily to the fact that the site is quite shaded throughout the year from surrounding high rise buildings.



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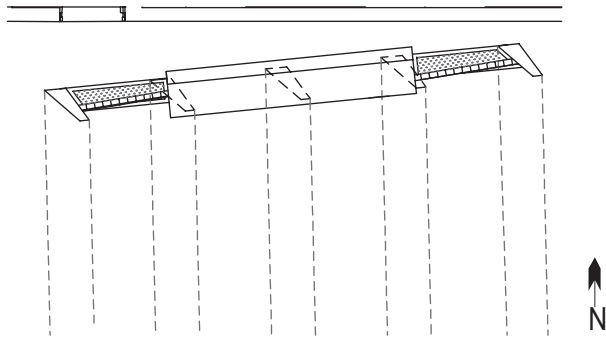
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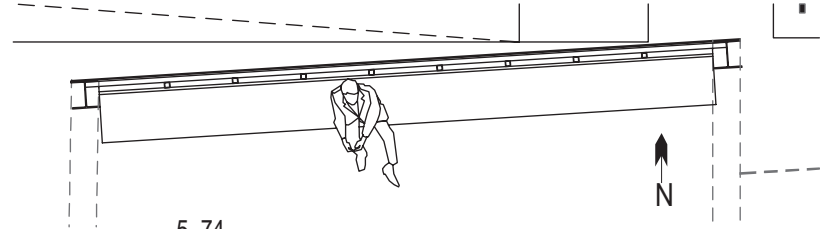
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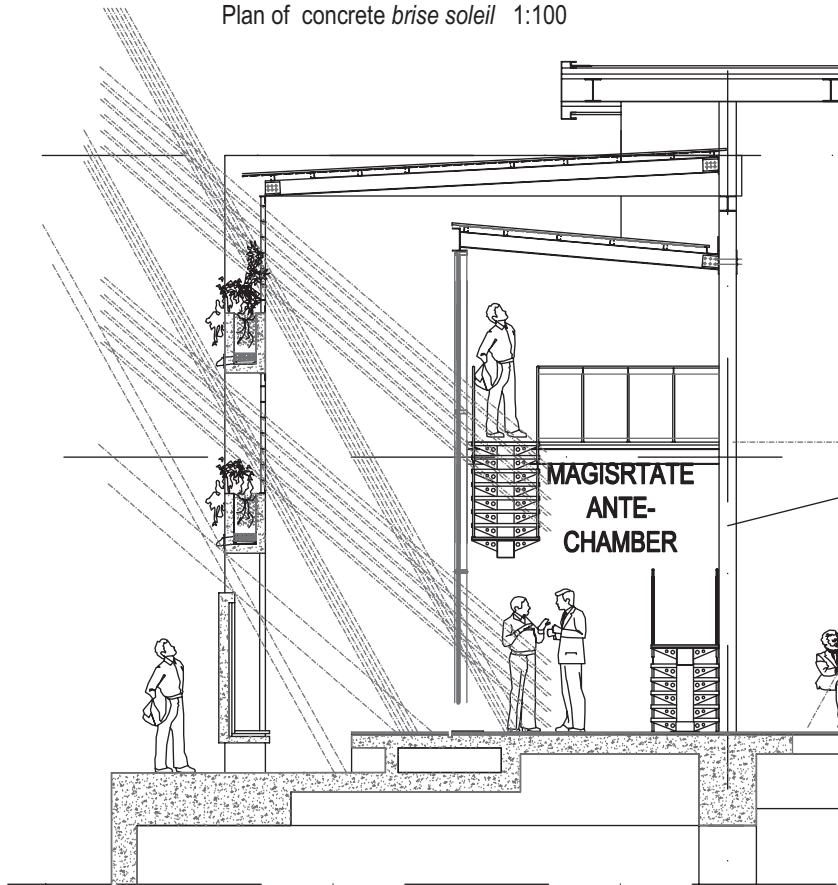
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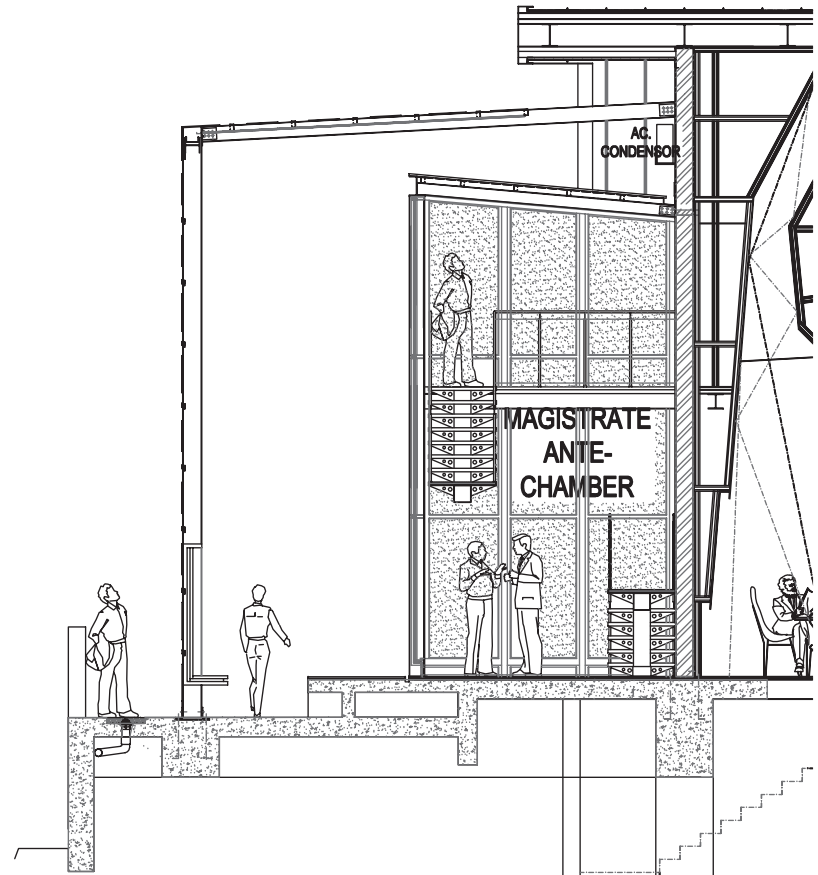
5\_72  
Plan of concrete *brise soleil* 1:100



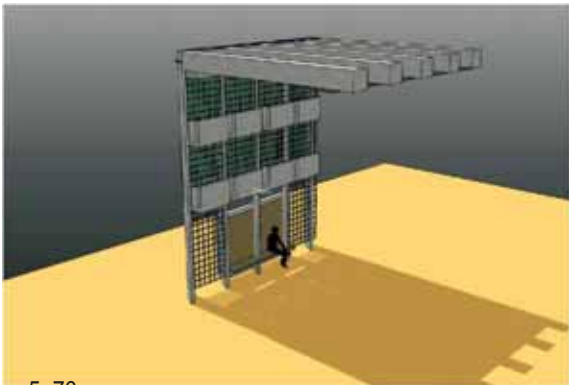
5\_74  
Plan of steel *brise soleil* 1:100



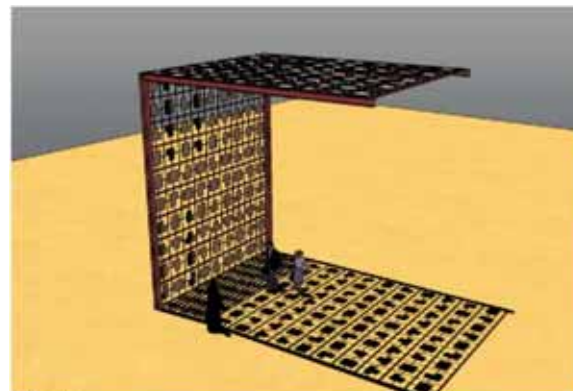
5\_73  
Section through concrete *brise soleil* 1:100



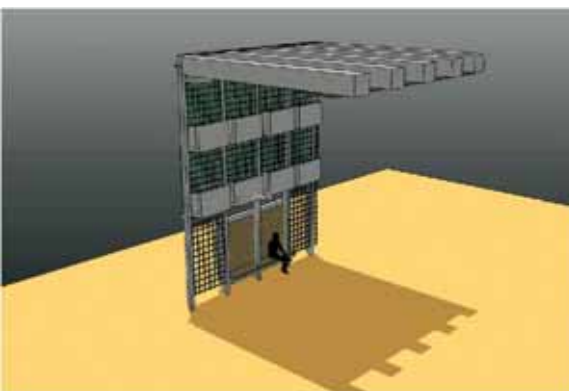
5\_75  
Section through steel *brise soleil* 1:100



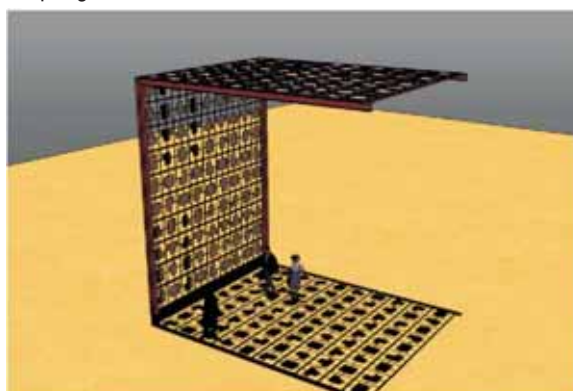
5\_76  
Concrete *brise soleil*, simulation of noon shadow projection, spring



5\_79  
Steel *brise soleil*, simulation of noon shadow projection, spring



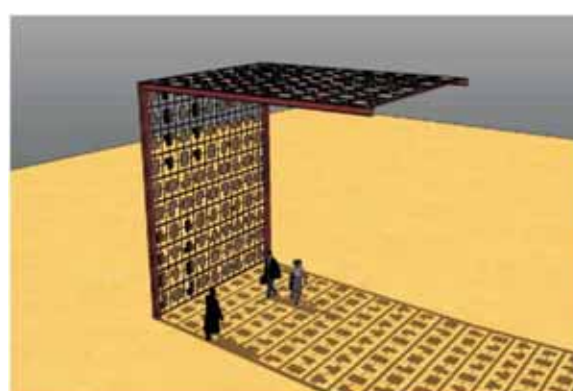
5\_77  
Concrete *brise soleil*, simulation of noon shadow projection, summer



5\_80  
Steel *brise soleil*, simulation of noon shadow projection, summer



5\_78  
Concrete *brise soleil*, simulation of noon shadow projection, winter



5\_81  
Steel *brise soleil*, simulation of noon shadow projection, winter



# THE COURTROOMS:

Materials chosen for the construction of the courtrooms were specifically meant to portray the language of a transparent, light and welcoming legal system. For this reason the 'box' structures are constructed from steel portal frames instead of concrete, the added advantage being a shorter construction time and a lighter structure which spans 8 m vertically without piers. Internally the structure remains lightweight with partitions of high spec dry walling, and opaque glazing.

## **Structurally:**

The frame is built on site, using 254 x 254 steel I beams as columns. These are connected to the floor slab via a base plate providing the necessary attachment to the concrete slab to transmit the load. In all cases a levelling grout is placed between the underside of the base plate and the top of the slab, ensuring accurate levelling of steelwork. Holding down bolts are fitted to the base plate and fixed to the concrete slab.

The columns and rafters making up the portal frame are from different sizes of I beams, with welded haunches at their ends. These haunches enable the members to be site bolted to each other forming the complete portal frame. They are provided at the highly loaded connections of rafter to column at the eaves and rafter to rafter at the apex. At the eaves haunch, the end plate is extended above the rafter flange to take the topmost bolts connecting it.

Because of their slender proportions and single span, these portal frames are spaced at a minimum of 4500mm centres. Connections between these portal frames are braced through secondary beams, thus preventing purlins and frames from buckling through lateral torsional wind loads.

The purlins are 125 x 50 cold formed lipped channels fitted to the frame via steel angle cleats welded to the rafters. These purlins are placed at 600 centres with their toes pointing upslope in order to minimise mid span- twist. The cleats on the contrary are placed at the down slope side of the purlin to avoid the latter from sliding down during erection.

The mezzanine level used as access for the magistrates to the courts, is of a light weight construction. Floor joists are made of 200 x 75 timber sections spaced at close centres. These are covered with tongue and groove boarding with an acoustic backing.

## **Cladding:**

The external shell is clad with sheet metal treated with a galvanising, oxidising agent causing a weathering effect similar to cor-ten steel. This type of cladding can prove to be economic and long lasting ( up to 30 years). These sheets are 0,6 mm strips in 600mm wide lengths of the full 8 m height. They are joined together at 525mm centres through standing seams folded over cleats. These cleats are nailed to 25mm rough boarding insulated by means of a felt underlay. Standing seams at ridges are turned down and folded in, to prevent water penetration. Internally the frames are clad in tongue and groove boarding and dry walling with a mineral wool insulation.

## **Internal lightweight framed structure:**

Due to the fact that none of the internal walls are load bearing a light steel frame construction of gypsum dry walling is used. This dry walling is constructed of bottom and top aluminium track rails with a further set of bracing joists at 600 mm intervals. These tracks are supported structurally through the implementation of 100 x 50 steel channels at 3500mm centres, welded back to back. Several panels of hi spec gypsum boarding are fixed to these rails with studs at 600mm spacing. An internal layer of 58 mm mineral wool is glued and fitted to the internal cladding of the walls, thus aiding with thermal insulation and acoustics.

## **Acoustics:**

The courtroom layout allows for the speaker or magistrate to be in front. Aiding in greater acoustic qualities as the direct sound path is in eyesight of the public, allowing the stepped flooring to heighten the auditory experience.

For greater sound enhancement the ceiling is designed to disperse sound into the audience and the

dock. The constant angling of this is optimum as it avoids flutter echoes.

Bearing in mind that the angle of sound incidence is equal to the angle of reflection, a study of how sound would potentially propagate within the courtrooms can be seen through dotted lines.

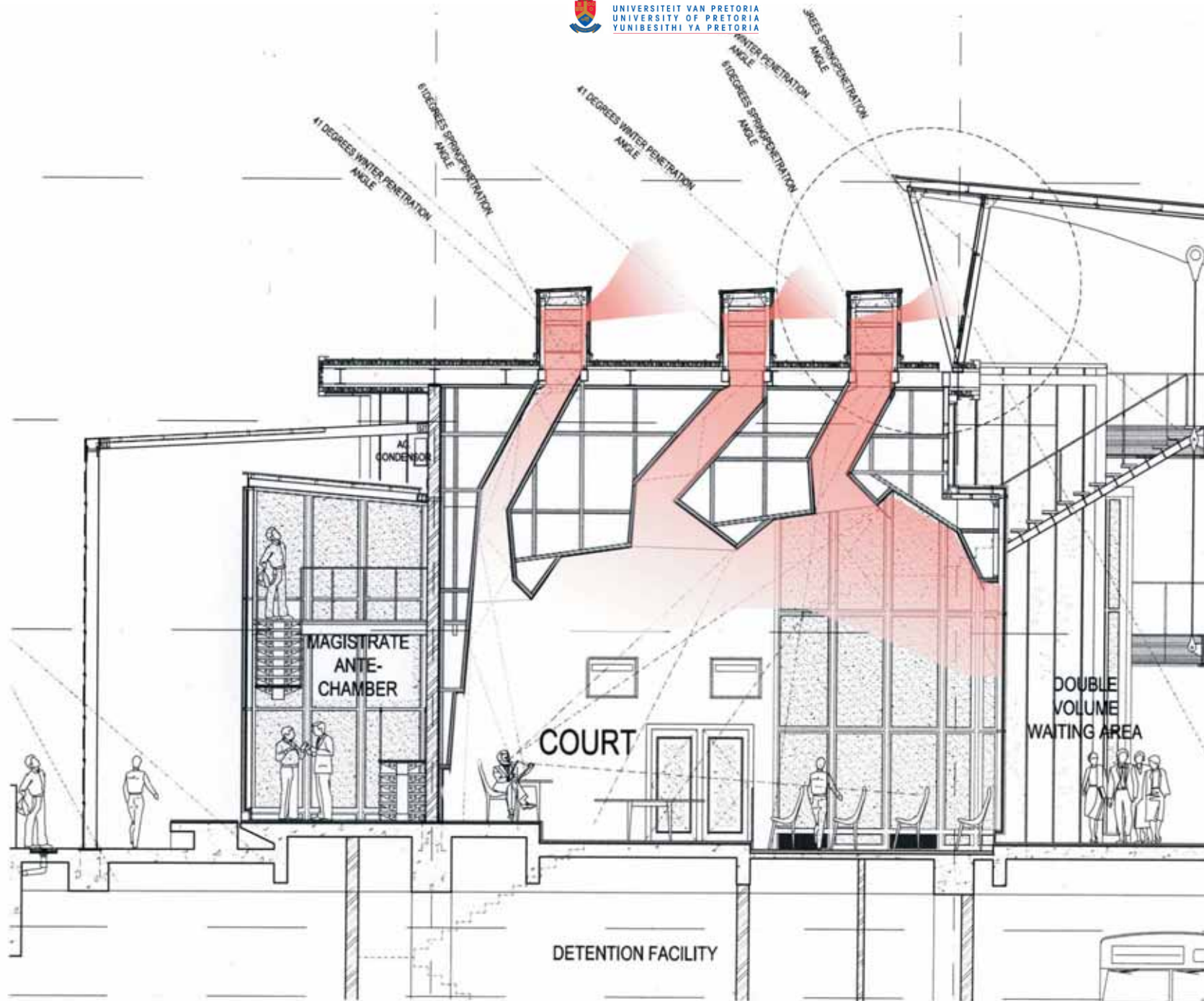
The ceiling is designed to reflect sound into the audience

The size of the courtrooms are intentionally designed as small boxes where the length of the direct sound path and the reflected sound path is not distorted by more than 10m. This, allows for good sound enhancement without the need for loudspeaker systems.

## **Lighting and Ventilation:**

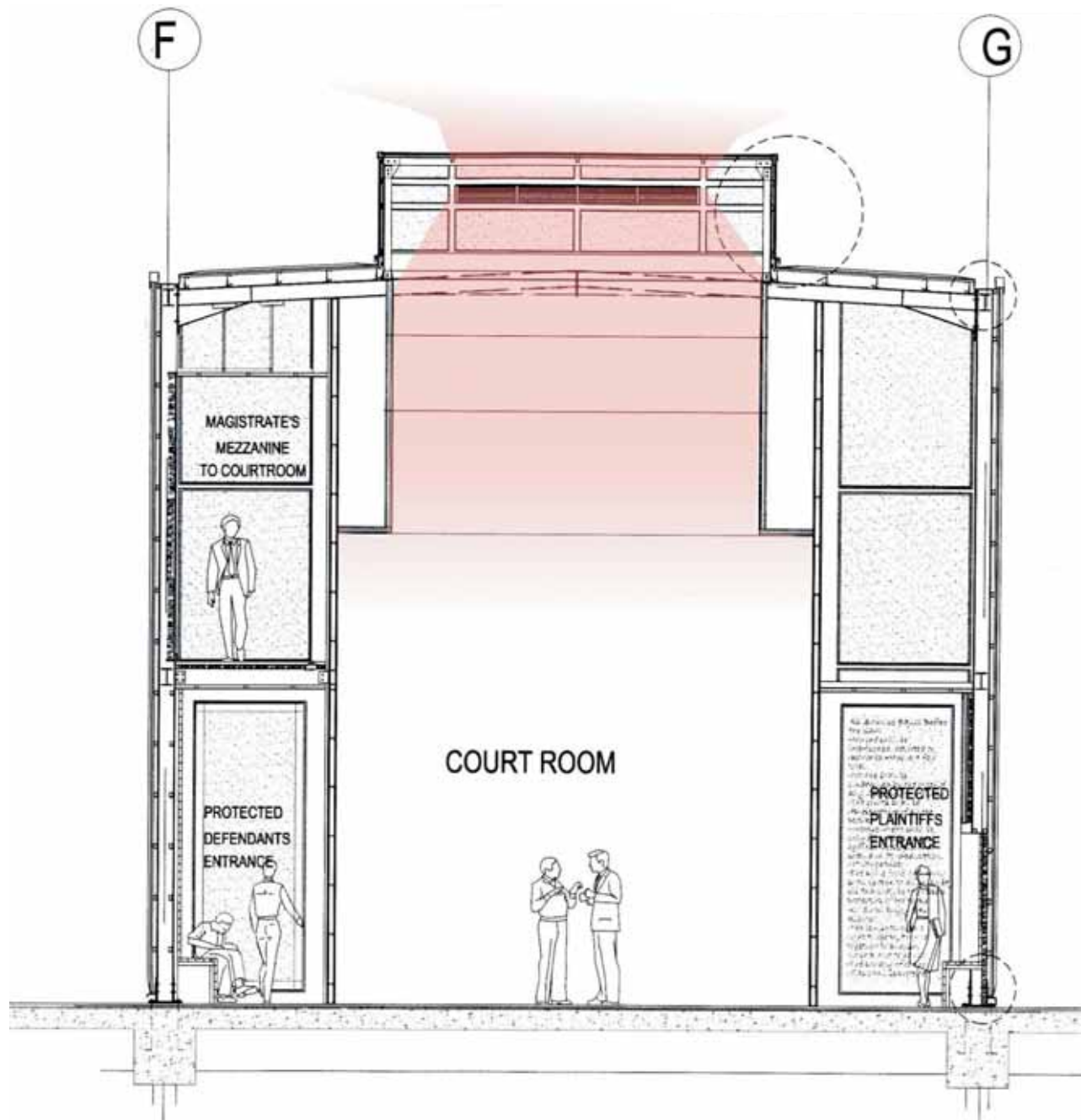
For maximum efficiency three highly insulative, opaque, polycarbonate skylights are designed per courtroom. The ceiling painted in a light colour has been designed as an integrated system to these light wells, maximizing the opportunity for light to be reflected. No direct sunlight is allowed in the design and therefore this type of sky lighting is more than adequate. Furthermore, this type of skylight gives the steadiest level of illumination and with the added benefit of the surrounding roofing being of a darker colour, they will receive more light on overcast days than on clear days.

Ventilation through this skylight is made possible by means of grills on the southern side, this position aids in the movement of air out, as the prevailing winds are generally oriented east to north east. Stack ventilation further benefits the courtroom as the light well opening is greater than that of the skylight, allowing rising hot air to escape more efficiently. Additional grills are located at the foot of the courtrooms in the public concourse; this potentially incorporates cool air to flow within on a lower level. Split units have been accommodated for, on either side of the courtrooms, permitting the user personal control over the environment within.



5\_82  
Section BB through courtroom showing sound reflection  
and hot air loss 1:50





5\_83  
Section CC through courtroom showing portal frame  
and structure 1:75

# C

## hp 5

### DESIGN DRAWINGS

DESIGN DRAWINGS: