TECHNICAL INVESTIGATION

Technical Investigation

Materials

The choice of materials is very important as the site is in a historical urban area. Unfortunately many of the more contemporary buildings inserted around the site have ignored this historical urban context. They are over scaled, and built from unsuitable materials, creating hard heavy citadel like buildings which do not relate to or enrich, the life of the city. Thus it is important that the materials chosen for this project should be light, transparent, and create a sense of visual permeability through the building.

Salvaged Materials

The Balustrade on the Western street edge of the building is to be salvaged from the garden of Dolobran, one of the randlords houses in Parktown. The balustrade was originally from the Eksteens Building, opposite the first Johannesburg Stock exchange in the CBD, which was demolished in 1906 to make way for the present Corner House. The Ballusrtading was salvaged and re-used on the balconies of Dolobran, however the excess ballustrading still stands unused in the garden 100 years later. (there is enough excess unused ballustrading to supply the Kopanong Club – no material will be removed from the balconies of Dolobran)

Left: Dolobran, Parktown Johannesburg

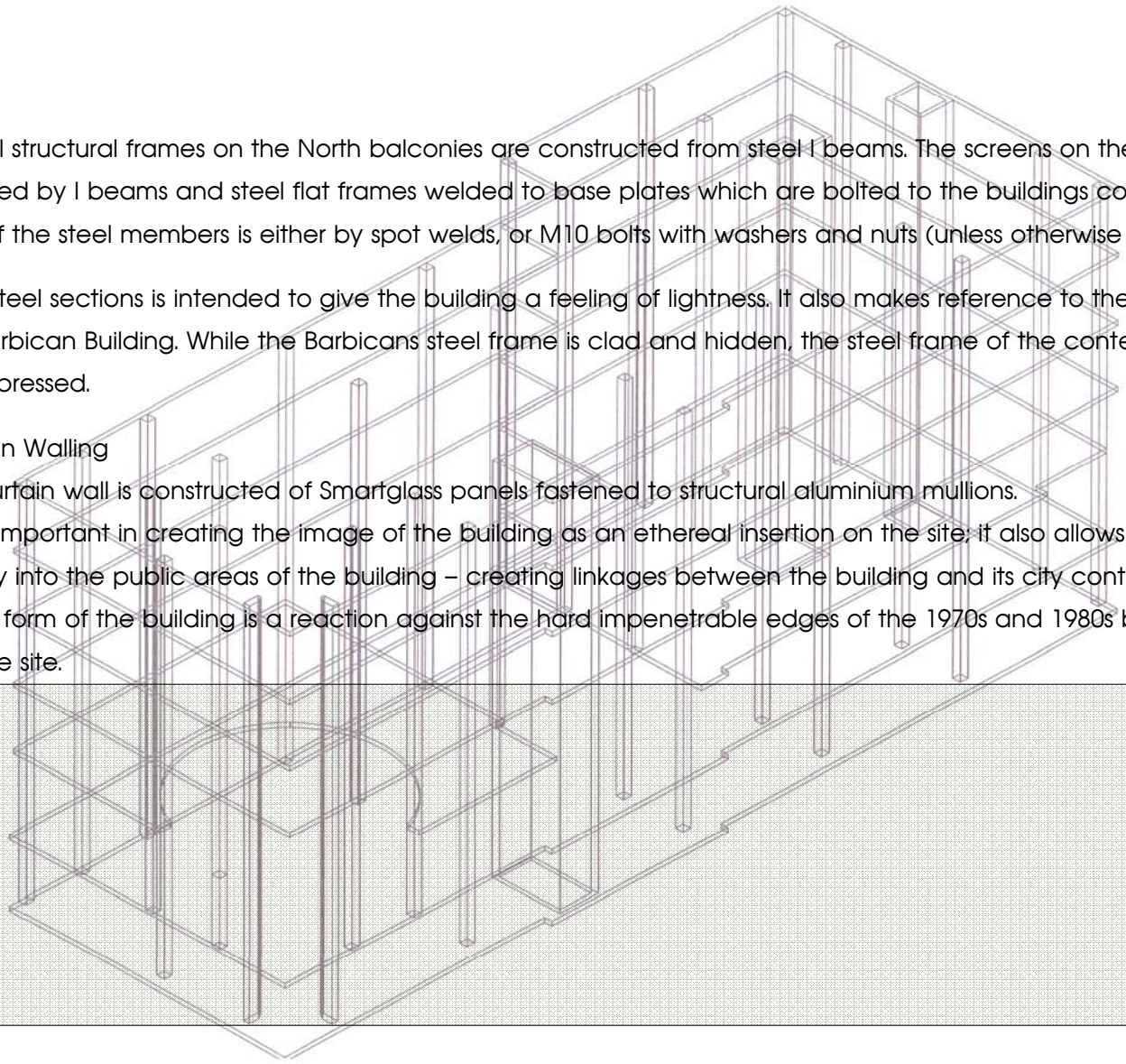
Steel

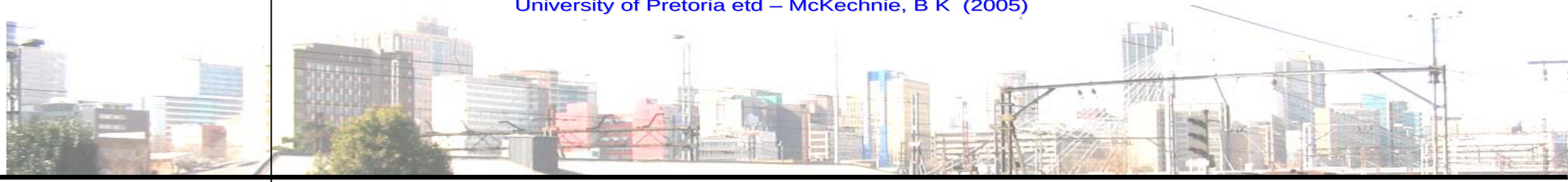
The external structural frames on the North balconies are constructed from steel I beams. The screens on the street façade are supported by I beams and steel flat frames welded to base plates which are bolted to the buildings concrete structure. Fastening of the steel members is either by spot welds, or M10 bolts with washers and nuts (unless otherwise specified).

The use of steel sections is intended to give the building a feeling of lightness. It also makes reference to the steel structure of historical Barbican Building. While the Barbicans steel frame is clad and hidden, the steel frame of the contemporary building is clearly expressed.

Glass Curtain Walling

The glass curtain wall is constructed of Smartglass panels fastened to structural aluminium mullions.
The glass is important in creating the image of the building as an ethereal insertion on the site; it also allows for visual permeability into the public areas of the building – creating linkages between the building and its city context. The light and transparent form of the building is a reaction against the hard impenetrable edges of the 1970s and 1980s buildings on the edges of the site.





TECHNICAL INVESTIGATION

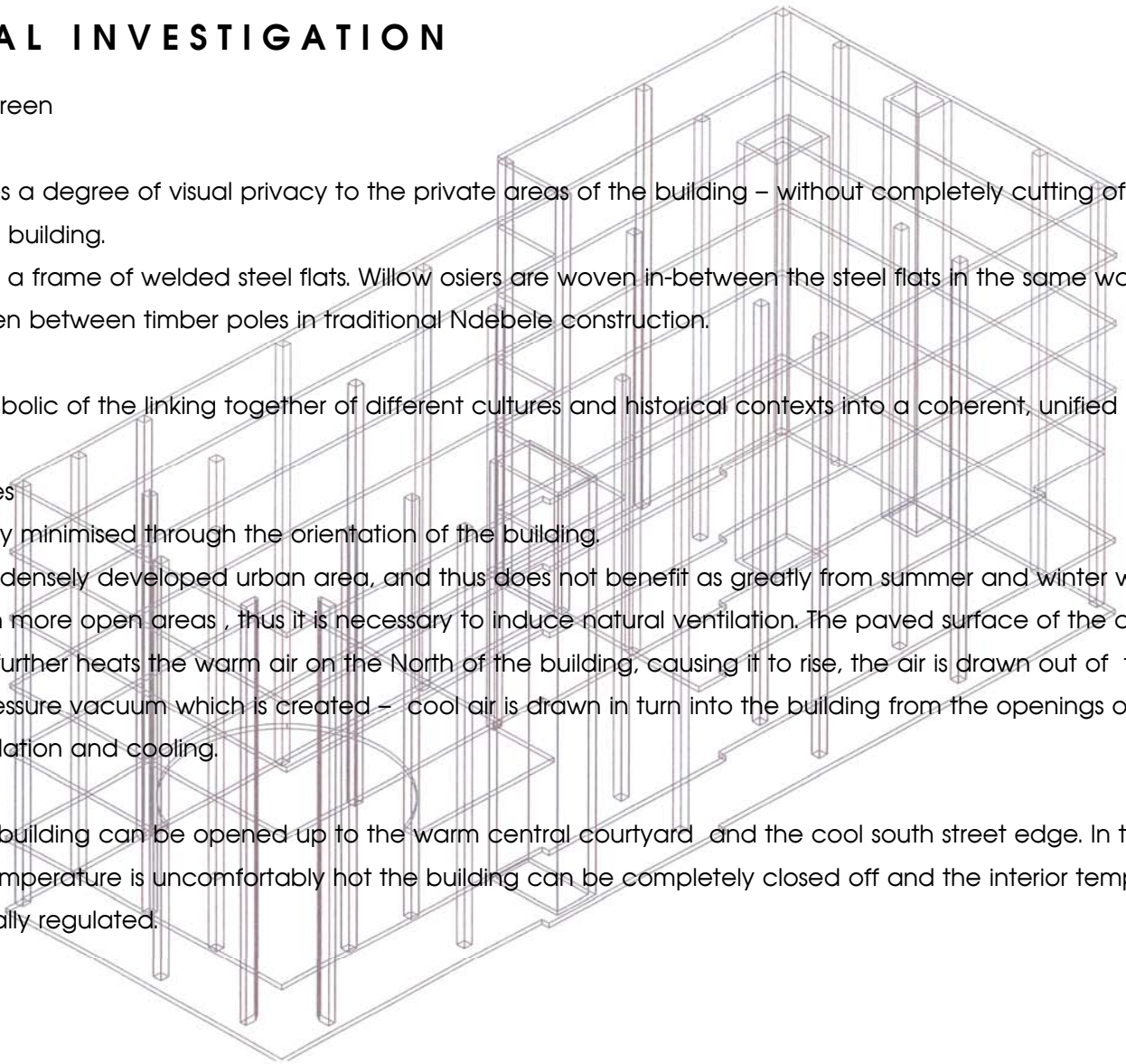
The Willow Osier Screen

The screen provides a degree of visual privacy to the private areas of the building – without completely cutting off the visual permeability of the building.
It is constructed on a frame of welded steel flats. Willow osiers are woven in-between the steel flats in the same way as wattle branches are woven between timber poles in traditional Ndebele construction.

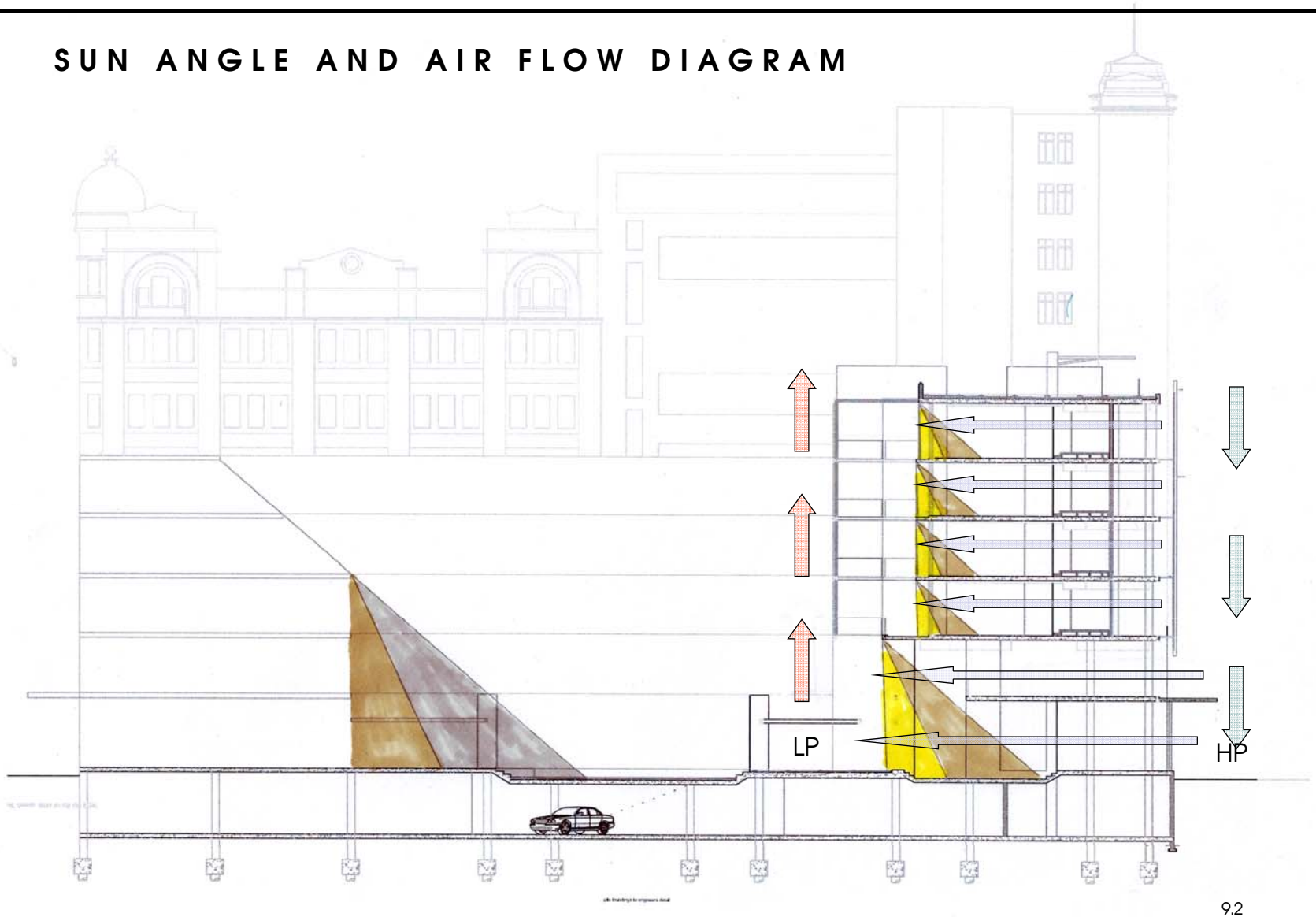
The weaving is symbolic of the linking together of different cultures and historical contexts into a coherent, unified present.

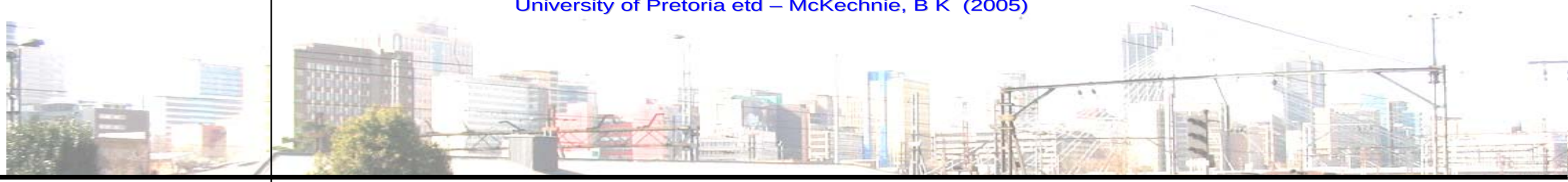
Environmental Issues
Solar gain is already minimised through the orientation of the building.
The building is in a densely developed urban area, and thus does not benefit as greatly from summer and winter wind patterns as buildings in more open areas , thus it is necessary to induce natural ventilation. The paved surface of the central courtyard terrace further heats the warm air on the North of the building, causing it to rise, the air is drawn out of the building into the low pressure vacuum which is created – cool air is drawn in turn into the building from the openings on the south thus inducing ventilation and cooling.

In the summer the building can be opened up to the warm central courtyard and the cool south street edge. In the winter or if the summer temperature is uncomfortably hot the building can be completely closed off and the interior temperature can be mechanically regulated.

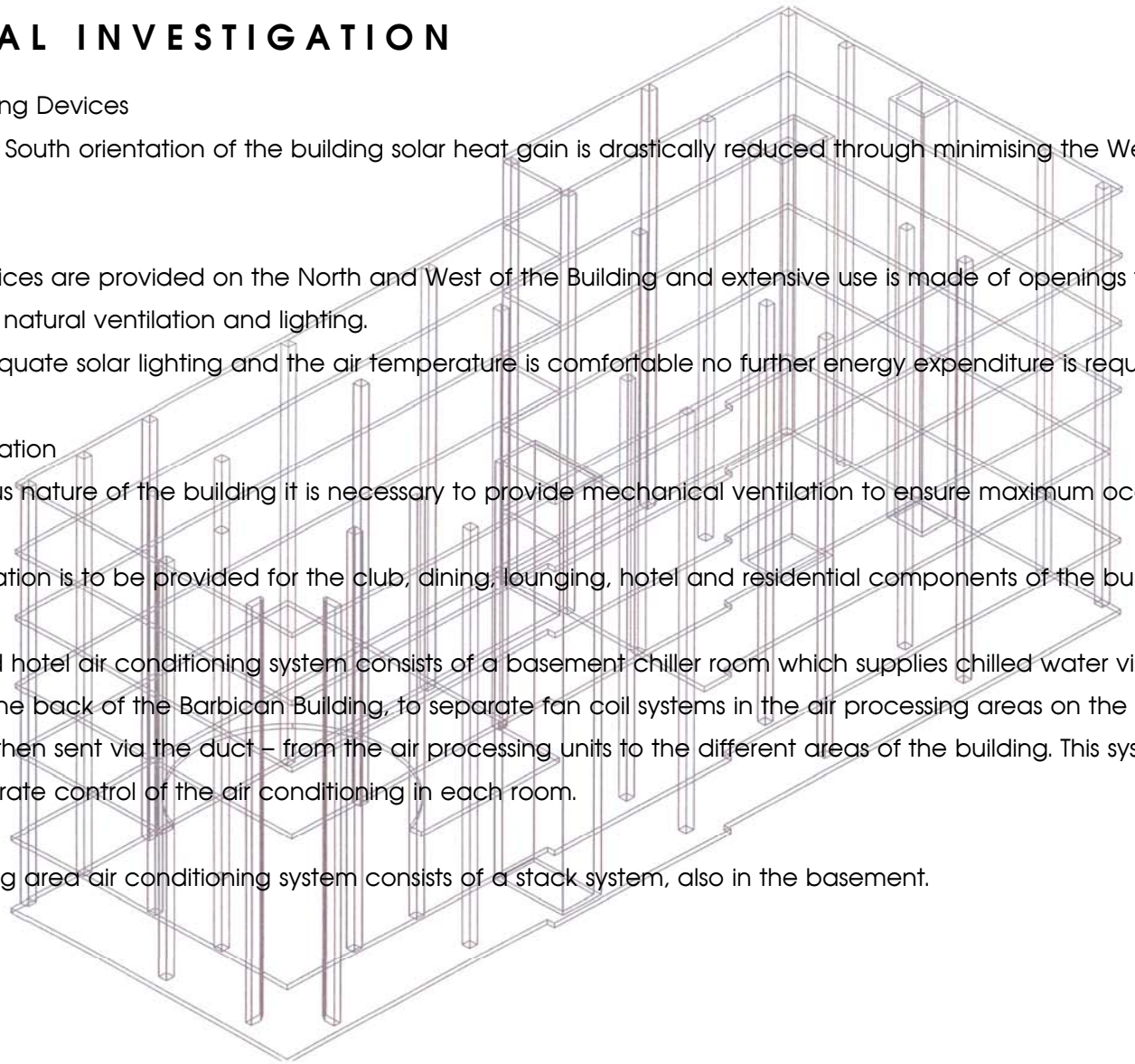


SUN ANGLE AND AIR FLOW DIAGRAM





TECHNICAL INVESTIGATION



Glazing and Shading Devices

Due to the North / South orientation of the building solar heat gain is drastically reduced through minimising the West and East building mass.

Sun screening devices are provided on the North and West of the Building and extensive use is made of openings to the outdoors, allowing for natural ventilation and lighting.

When there is adequate solar lighting and the air temperature is comfortable no further energy expenditure is required.

Mechanical Ventilation

Due to the luxurious nature of the building it is necessary to provide mechanical ventilation to ensure maximum occupant comfort.

Mechanical ventilation is to be provided for the club, dining, lounging, hotel and residential components of the building.

The residential and hotel air conditioning system consists of a basement chiller room which supplies chilled water via pipes running in a duct at the back of the Barbican Building, to separate fan coil systems in the air processing areas on the roof of the building. The air is then sent via the duct – from the air processing units to the different areas of the building. This system makes it possible for separate control of the air conditioning in each room.

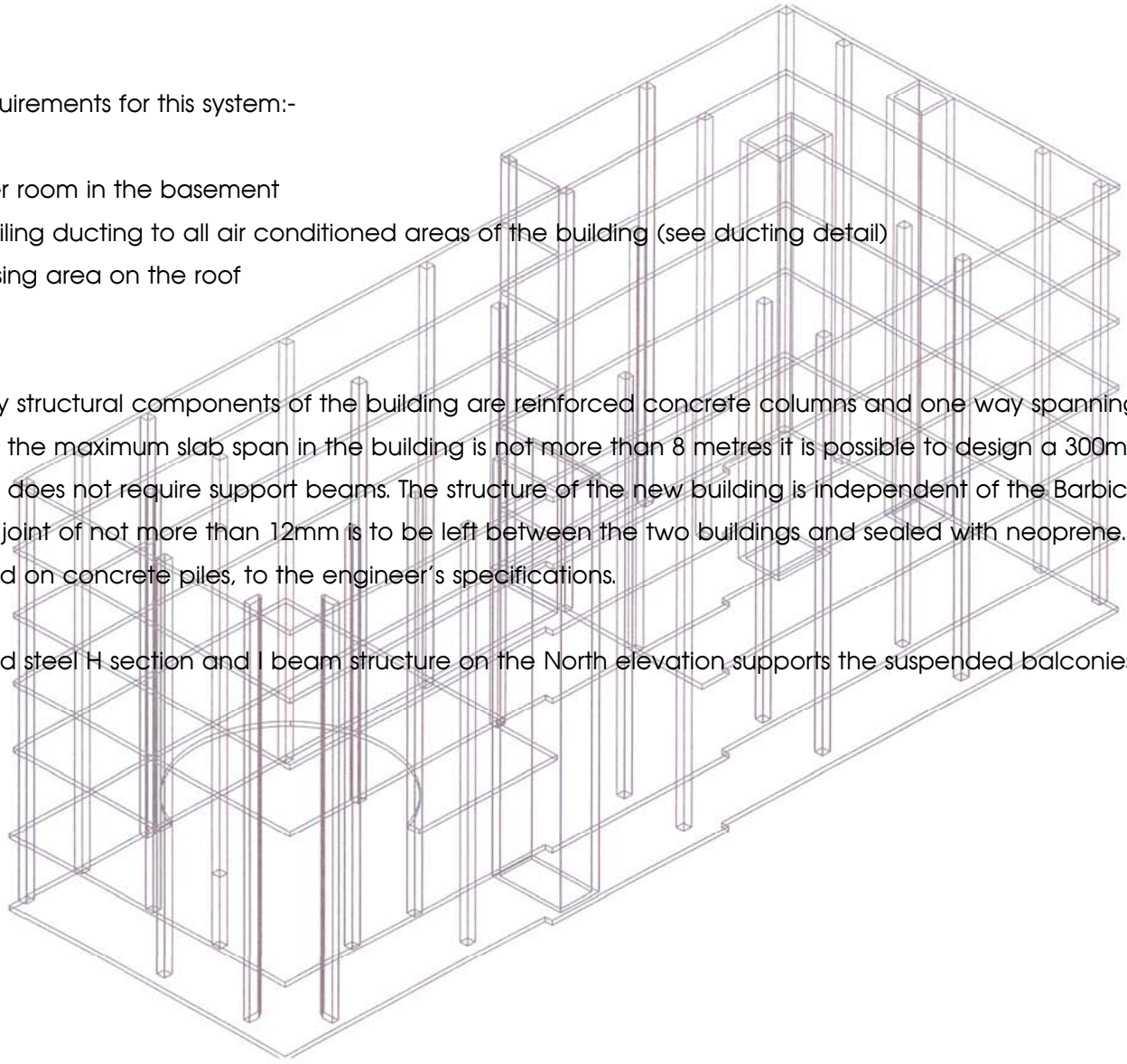
The club and dining area air conditioning system consists of a stack system, also in the basement.

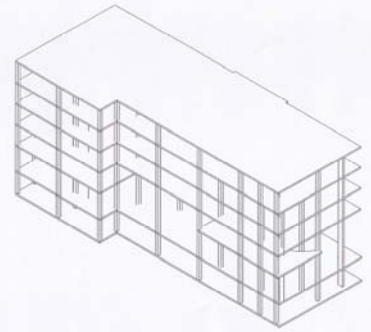
Space requirements for this system:-

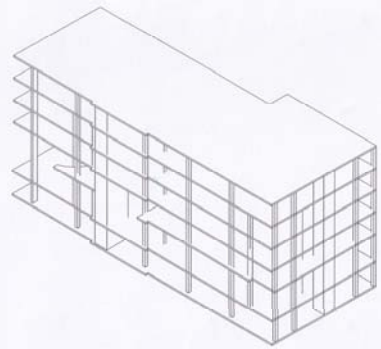
Plant chiller room in the basement
500mm ceiling ducting to all air conditioned areas of the building (see ducting detail)
Air processing area on the roof

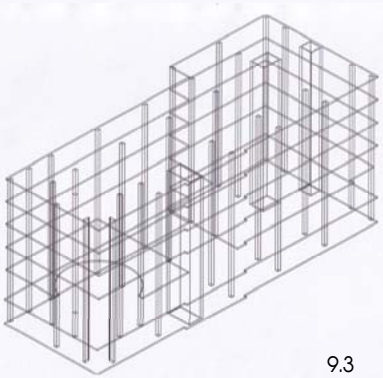
Structure
The Primary structural components of the building are reinforced concrete columns and one way spanning concrete slabs. Given that the maximum slab span in the building is not more than 8 metres it is possible to design a 300mm reinforced flat slab which does not require support beams. The structure of the new building is independent of the Barbican Structure. An expansion joint of not more than 12mm is to be left between the two buildings and sealed with neoprene. The building is to be founded on concrete piles, to the engineer's specifications.

An exposed steel H section and I beam structure on the North elevation supports the suspended balconies and screens.

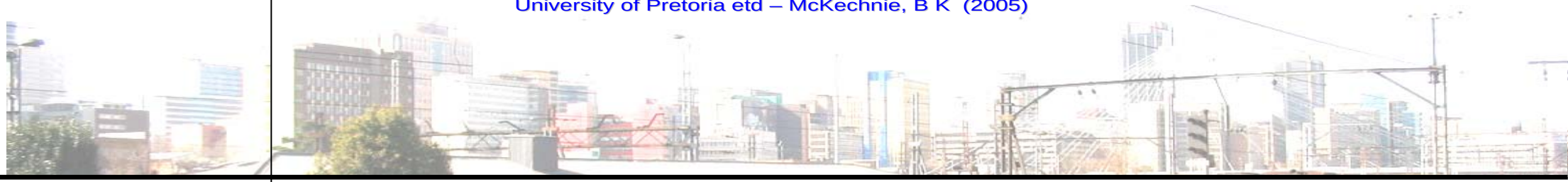








Structural Diagrams of the Kopanong Club



TECHNICAL INVESTIGATION

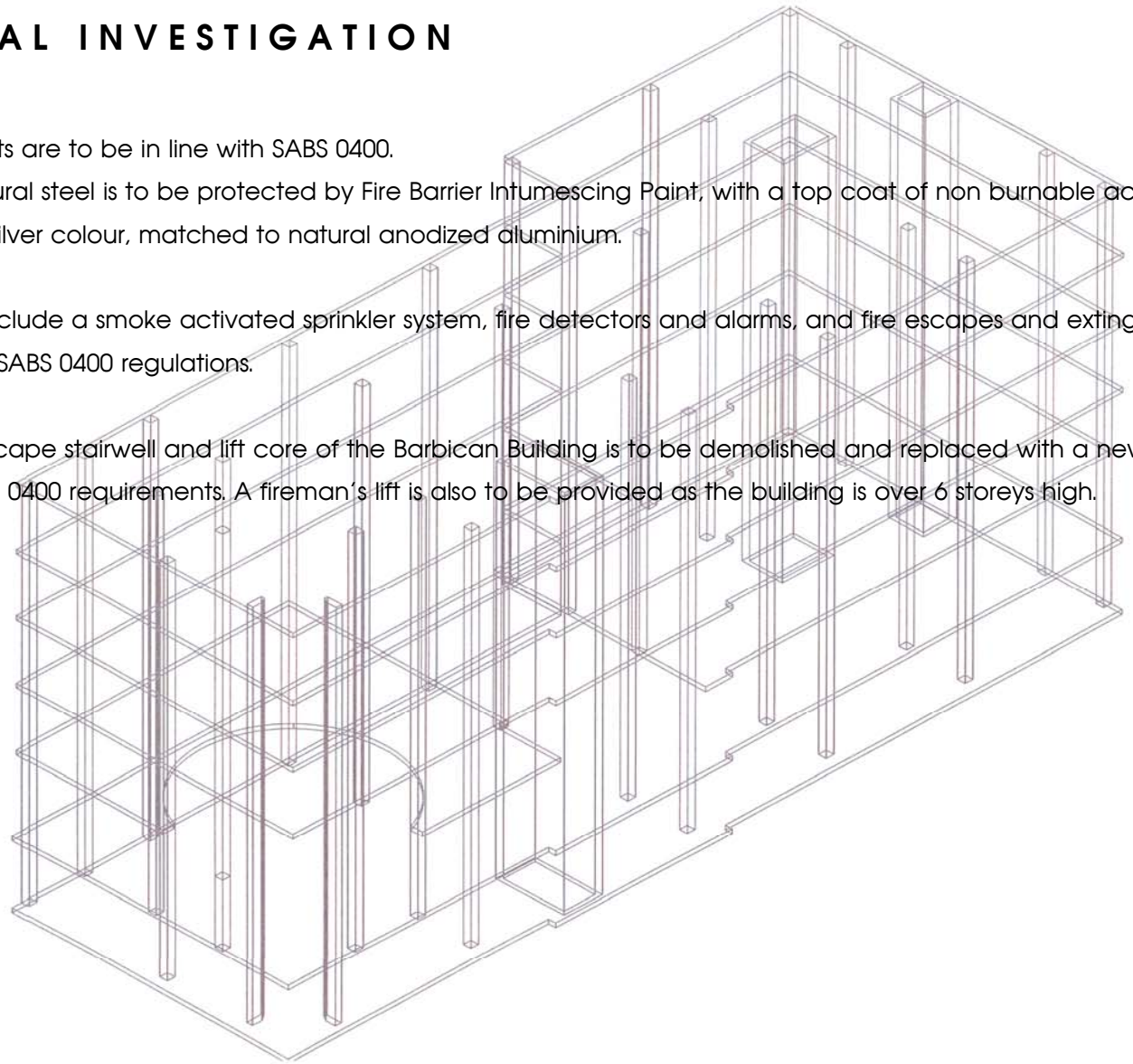
Fire Management

All fire requirements are to be in line with SABS 0400.

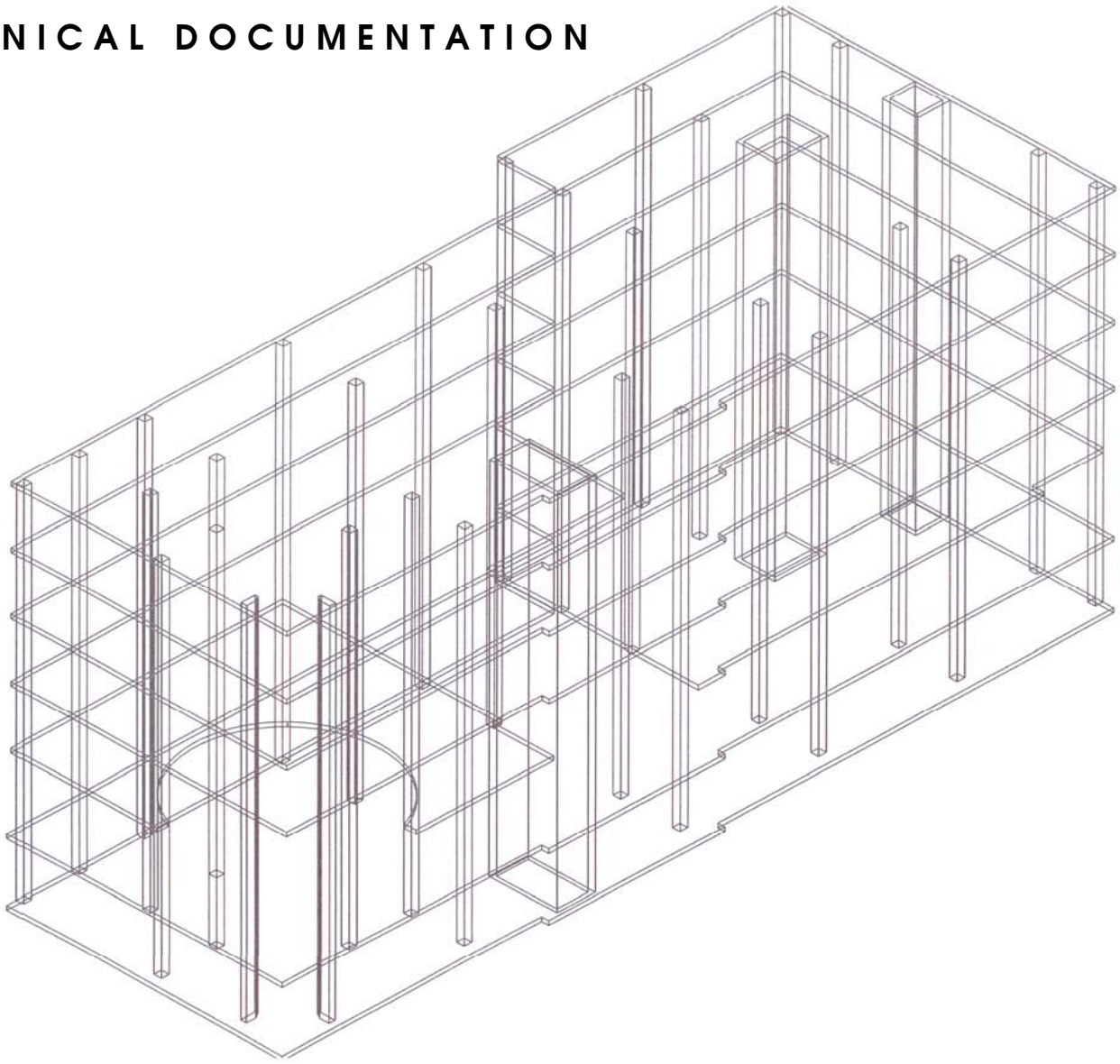
All exposed structural steel is to be protected by Fire Barrier Intumescing Paint, with a top coat of non burnable acrylic paint added in a matt silver colour, matched to natural anodized aluminium.

Other provisions include a smoke activated sprinkler system, fire detectors and alarms, and fire escapes and extinguishers, all in accordance with SABS 0400 regulations.

The existing fire escape stairwell and lift core of the Barbican Building is to be demolished and replaced with a new escape stair, to meet SABS 0400 requirements. A fireman's lift is also to be provided as the building is over 6 storeys high.



TECHNICAL DOCUMENTATION



BASELINE STUDY

Baseline Study

The primary considerations in the design of this project were to create a building that would serve as a flagship for regeneration and reinvestment in the CBD. It was important that the building should be sustainable and responsive to its urban context. Caring for the heritage of the city was also an important consideration. The design had to be mindful of the soul and grain of its existing historical context, in order to create a dialogue between the new building and the heritage buildings on the site.

The Burra Charter, the S.A. Heritage Resources Act and the ICOMOS Heritage at Risk Report acted as baselines for caring for the historical environment of the project.

Heritage as a Baseline Criteria

Urban Heritage

The South African Heritage Resources Agency (SAHRA) preamble states that

> "…the destruction of our heritage resources that are regarded as part of South Africa's national estate should be prevented at all costs." (SAHRA, act 25 of 1999).

The intention of the project is to conserve the Heritage building through adaptive reuse and reintegrate it into the city fabric. The development must also be mindful of the soul of the surrounding heritage buildings. The new forms must be generated in response to the heritage of the site.

Adaptive Re-Use

This is an important concept. It ensures that the heritage building is conserved through giving it a new use. It is also a baseline for sustainability, as existing materials and resources are re-used, resulting in less wastage of resources.

New Insertions

The new building must respond to the form and scale of the heritage buildings. It must reinforce their importance and help to integrate the heritage buildings into the contemporary city fabric.

Extracts fromArticle 22 of the Burra Charter 1999

Article 22	Relevance to Barbican Site
22,1. New work such as additions to the place may be acceptable where it does not distort or obscure the cultural significance of the place, or detract from its interpretation and appreciation. New work may be sympathetic if its siting, bulk, form, scale, character, colour, texture and material are similar to the existing fabric – but imitation should be avoided.	The new building should enhance the old building. It should enforce the importance of the heritage buildings rather than detract from it. The building should be of a suitable scale and grain.
22, 2. New work should be readily identifiable as such.	The new building should be a contemporary form, sympathetic to historical sensibilities; but not an imitation of the traditional forms, as this would detract from their integrity.

BASELINE STUDY

Scale and Form

- The scale of the new building should consider the historical urban scale, enhancing the importance of the City Hall, Post Office and Barbican buildings.
- The form of the building should reinstate the city block, restoring urban and pedestrian legibility.
- Human scale should be considered as the site is along major urban pedestrian routes. The building provides a pedestrian arcade along the street edges, bringing the form down to human scale.
- The form of the new building should express the importance of the corner of the site – historically an important aspect in Johannesburg architecture.
- The massing of the building should step back where it touches the historic Barbican Building – emphasizing the fact that it is an insertion on the site and that it is not "pretending" to be a historical aspect of the site.
- The new building should express the fact that although it is on a stand which is now consolidated, historically the site was broken up into 4 smaller stands.

SBAT as a Baseline

Social Issues

Occupant Comfort

An optimal environment for the users of the building is an important baseline criterion. The following are applicable for the design of the Kopanong Club, residential apartments and hotel:-

Natural Ventilation

When the temperature is mild, natural ventilation can be used as an alternative to air conditioning – saving between 10% and 30% of total energy consumption.

URBAN
CONSERVATION

BASELINE STUDY

Applicable Criteria for adaptive re-use, densification and historical conservation:-

Materials and form of inserted building must enhance the existing building.

Connections between old and new building must be carefully considered.

The existing Barbican building should be sensitively adapted to a new use.

Adaptive re-use is sustainable since fewer materials are wasted.

Natural materials should be used where possible, as they do not require large amounts of energy for their manufacture – limiting environmental impact.

Economic Issues

The use of local materials and contractors, where possible, will contribute to a stronger local economy. Furthermore, the building's function is in the service industry and will create jobs for local people in the service industry, stimulating the local economy through its life cycle.

Adaptability and Flexibility

The project encourages the re-use of an existing building. It is important that the building is not altered in such a way so as to undermine its historical integrity; and also that the alterations are not so drastic that its function can not be adapted again in the future.

Life Cycle Costs

On-going costs should be limited by the specification of robust building materials with low maintenance requirements.