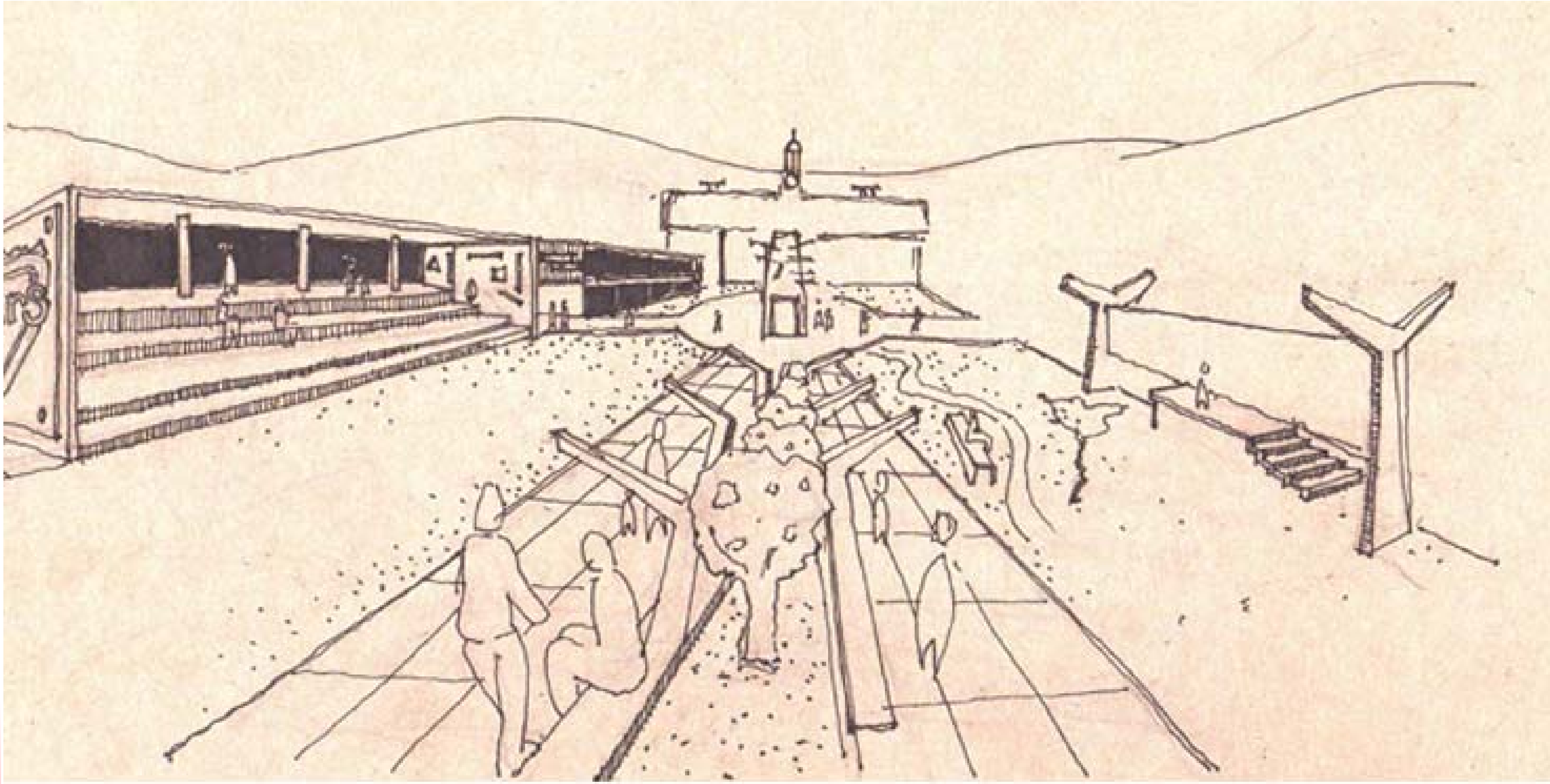
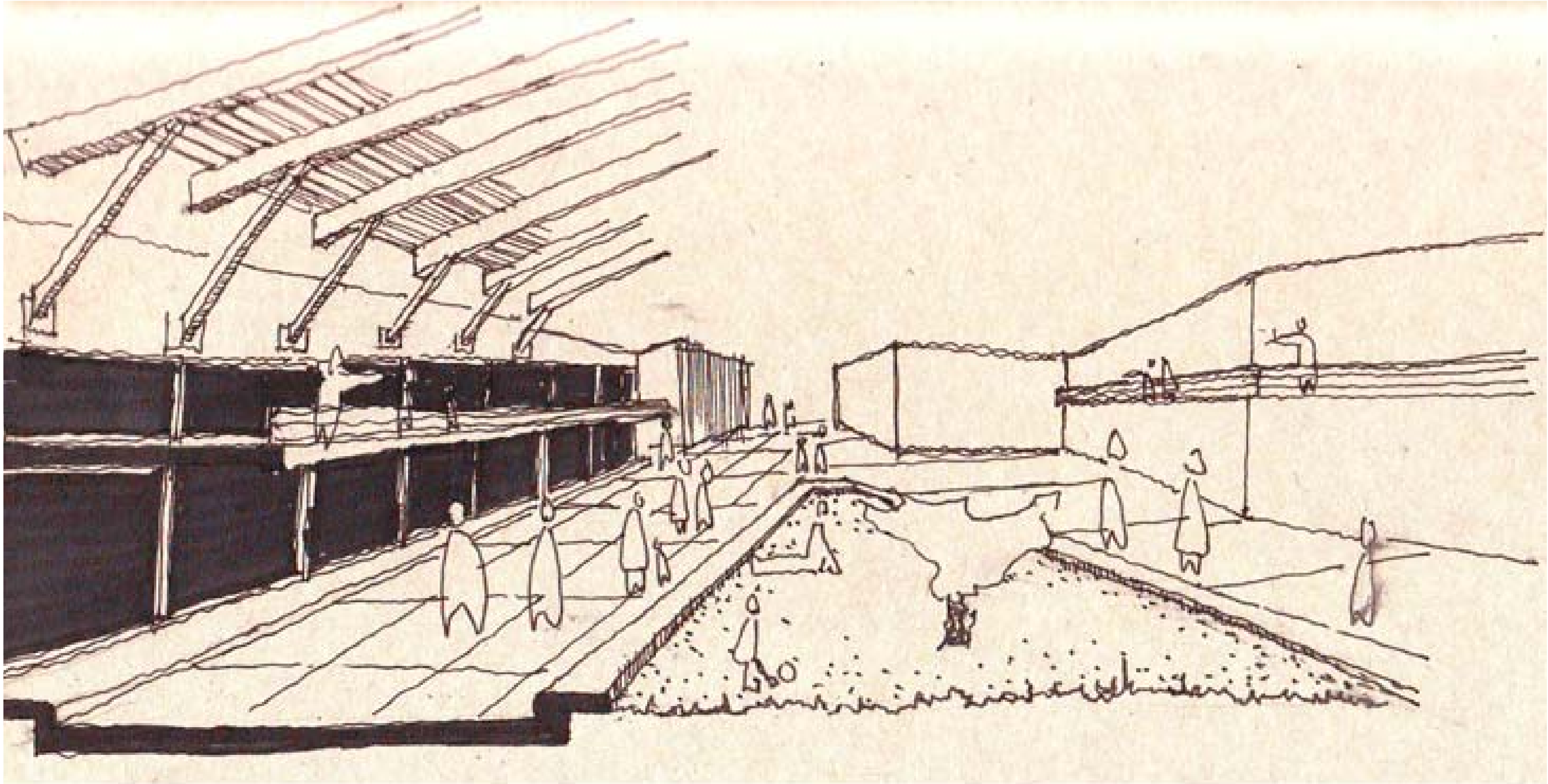


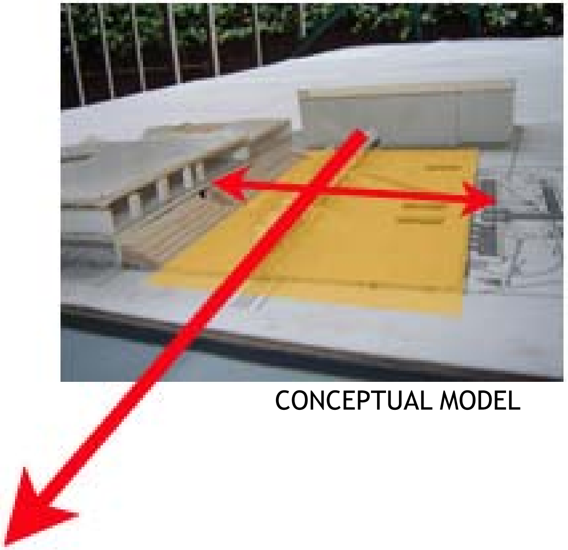
CONCEPTUAL CIVIC SQUARE PERSPECTIVE

Characterised by the articulated Church square linear axis. People movement occurs mainly on two perpendicular axii. Where the perpendicular axii intersect lies the centrally place water feature with orientation obelisk, and drinking fountains, and also the meeting junctions. The building on the left combined with the screen on the right contain the square and create the sense of enclosure.
The new buildings are scale-sensitive in relation to the existing Sir Herbert Baker building, thus mantaining its visual hierarchy.



CONCEPTUAL UNCOVERED COURTYARD

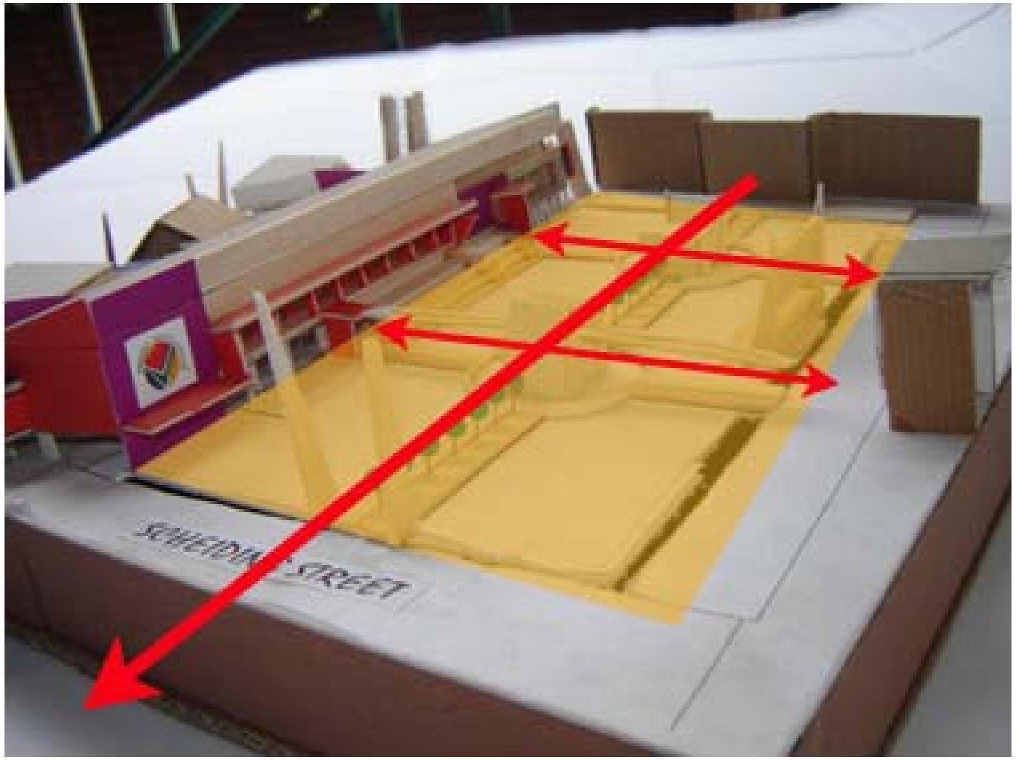
The courtyard brings green space into the development. It is intentionally uncovered in order to capitalise on the moderate climate, and to offer the feeling of being trully in the outdoors. To the building it acts as a light well, thus keeping the enclosing facades well lit.



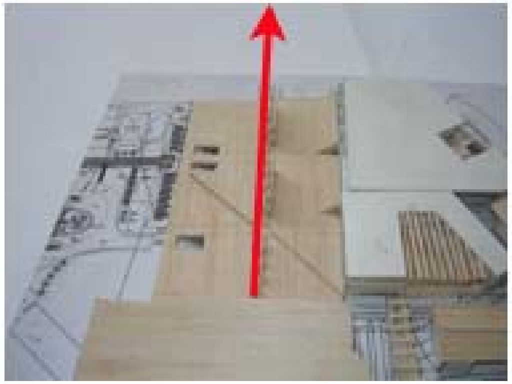
CONCEPTUAL MODEL

Initial development and articulation of movement routes, highlighted by the main spine and a single perpendicular secondary axis. The secondary axis connects the taxi rank to the proposed new bus terminus.

The progression sees the introduction of the second perpendicular secondary axis which connects the taxi rank to the Salvokop bridge, and still maintaining the main spine.
The movement patterns start to become defined and legible. The previously existing parking on the square is removed altogether, and the square is reclaimed as a public space. The sunken garden is re-moved and the square is set on two levels, namely the walkway, and square level. Public amenities are introduced by means of drinking fountains on the square, and public ablutions.

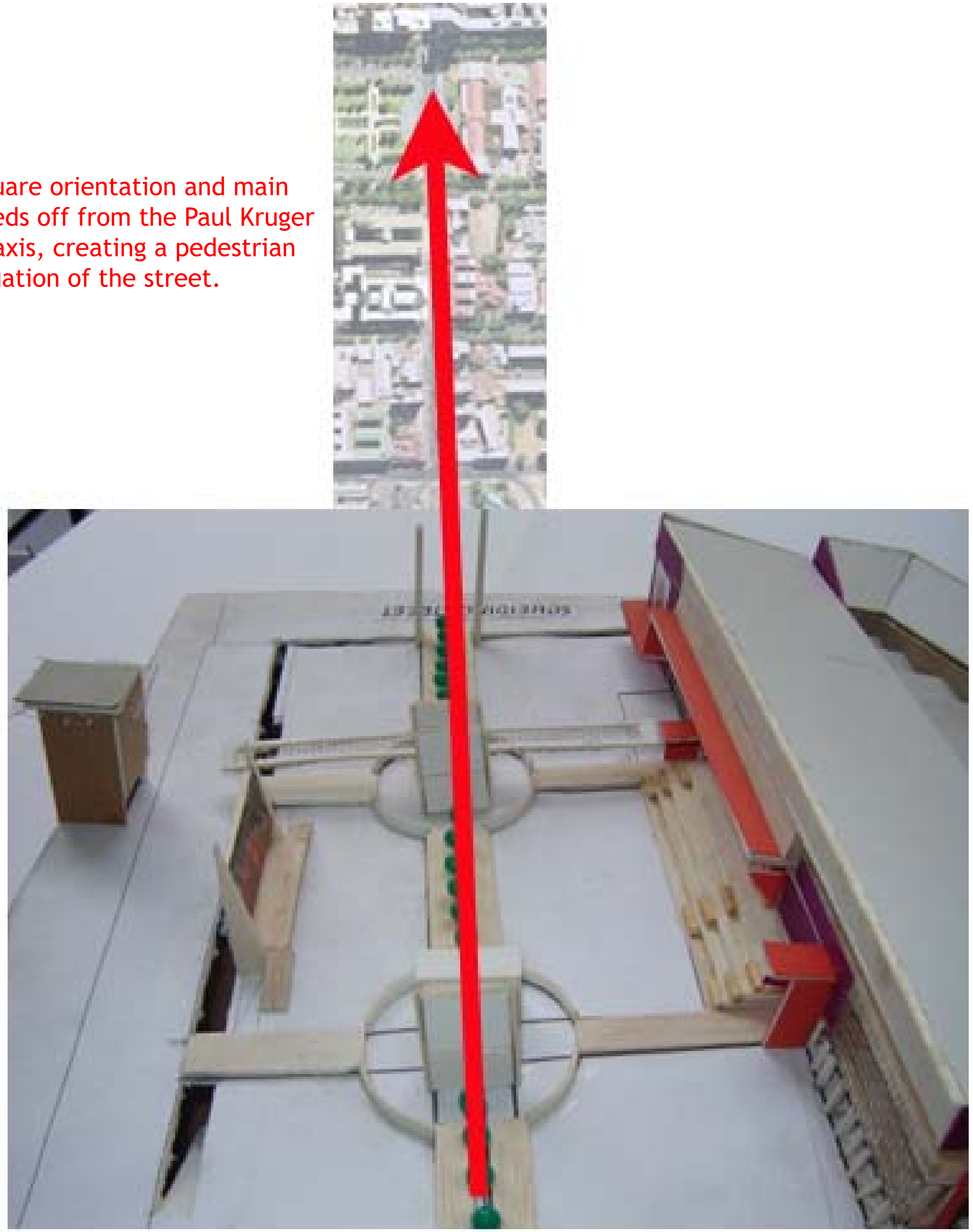


DEVELOPMENT MODEL



CONCEPTUAL MODEL

The square orientation and main axis feeds off from the Paul Kruger street axis, creating a pedestrian continuation of the street.



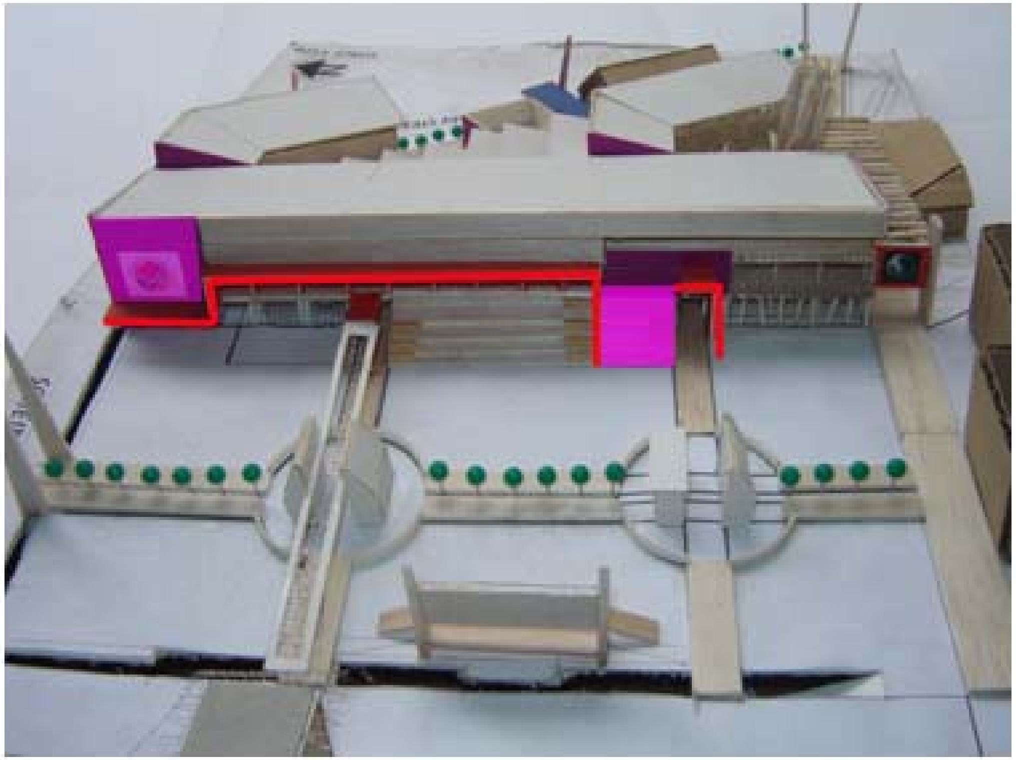
Looking towards the city.
Maintaining and prioritising the main axis through a walkway.

DEVELOPMENT MODEL

CONCEPTUAL MODEL

Initially, a red concrete box covered the restaurant area overlooking the square. This feature becomes a prominent element that visually attracts people towards the restaurant space, and creates a lively intervention on the facade.

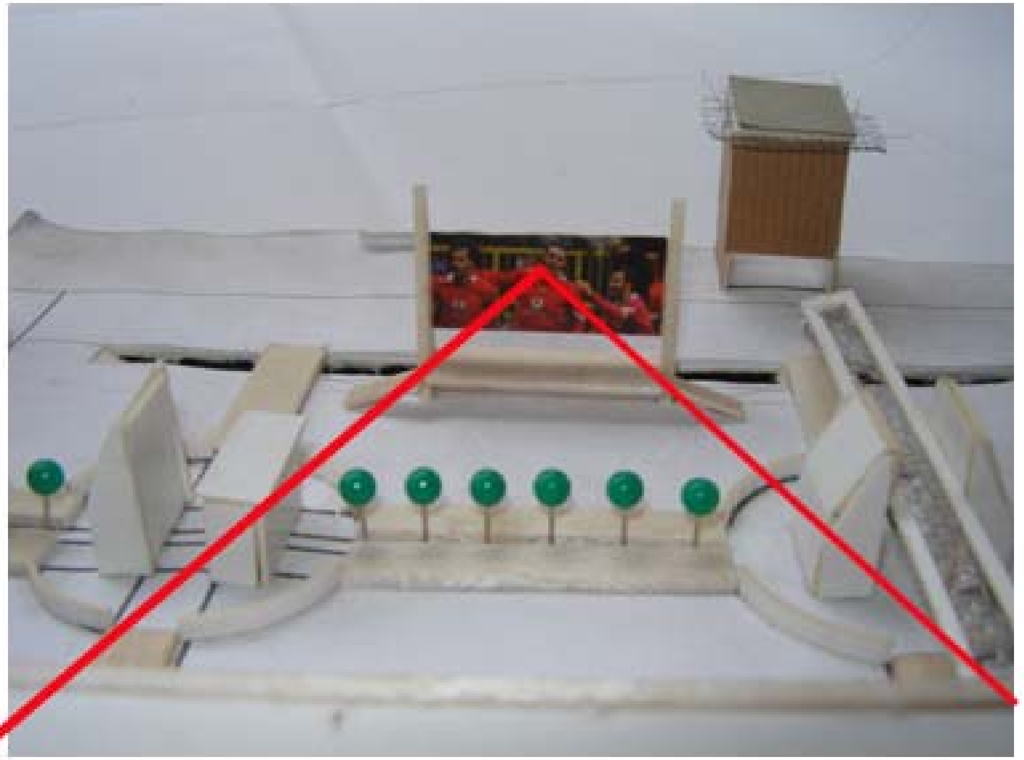
The red concrete box evolves in shape and doubles as walkway covering. A stark contrast is created by the introduction of purple coloured sections of the wall to further add liveliness to the facade.



DEVELOPMENT MODEL

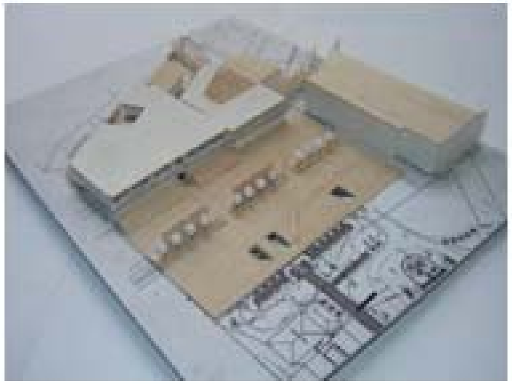
The initial location of the LED screen, along the main spine is illustrated. The screen is located such that it is fully visible from all the restaurants located on the first floor and overlooking the square.

CONCEPTUAL MODEL



The relocation of the screen and the symmetrical positioning, in order to accommodate a wider viewing angle.

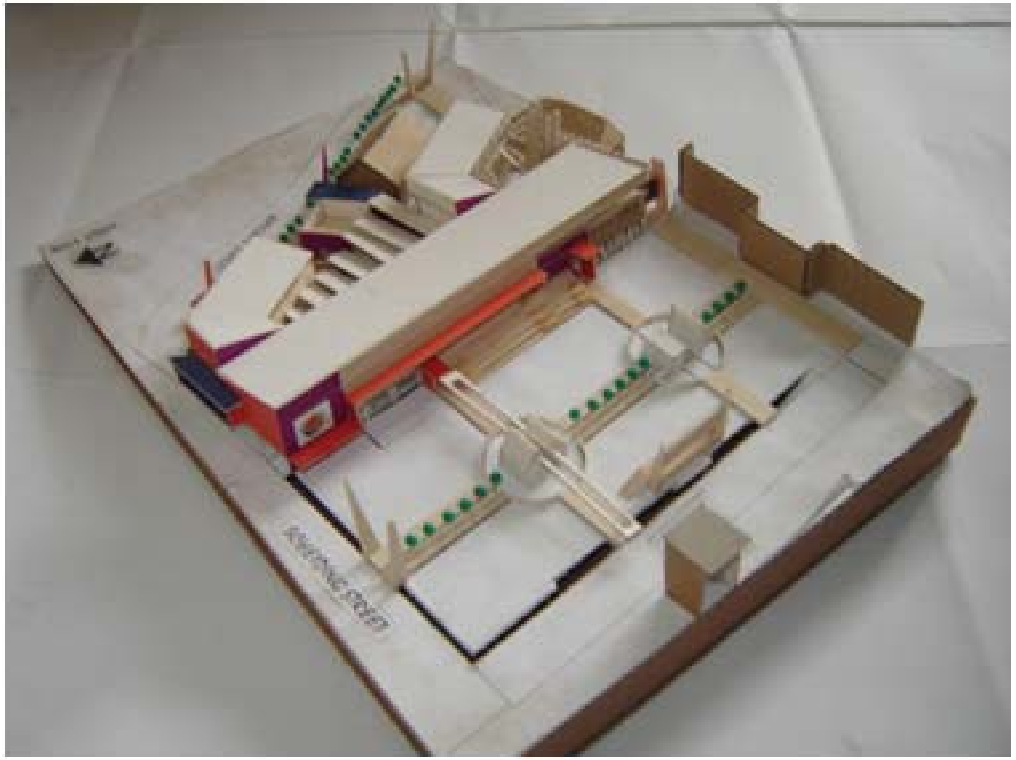
DEVELOPMENT MODEL



North west aerial view

CONCEPTUAL MODEL

North west aerial view

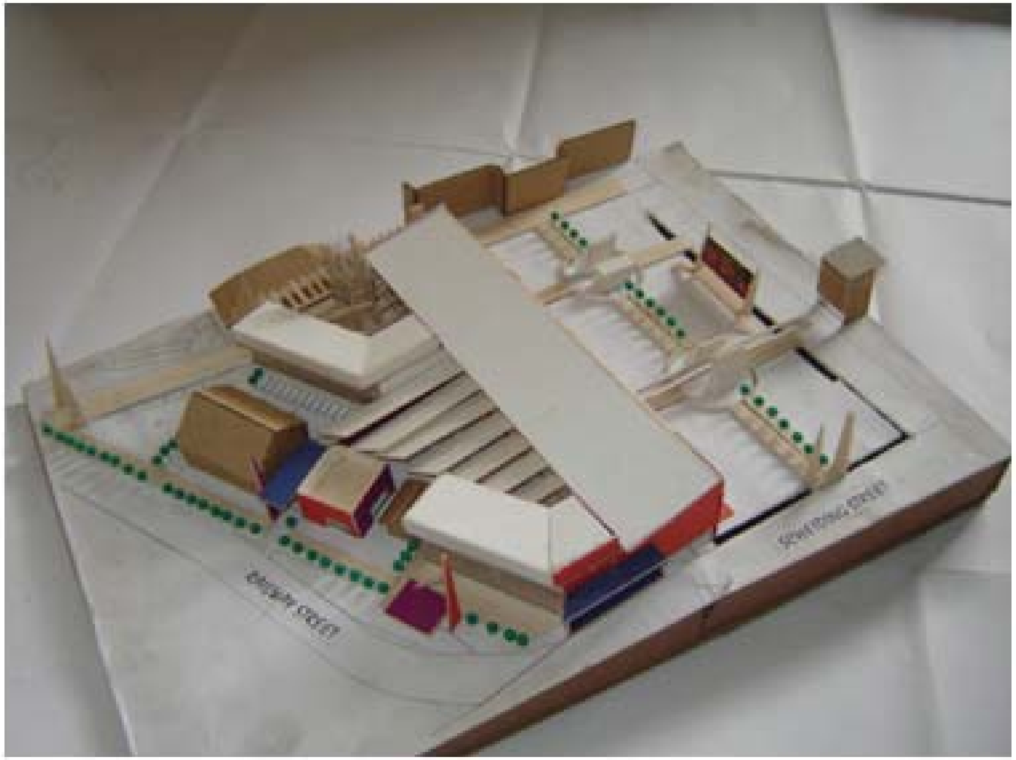


DEVELOPMENT MODEL

North east aerial view

CONCEPTUAL MODEL

North east aerial view

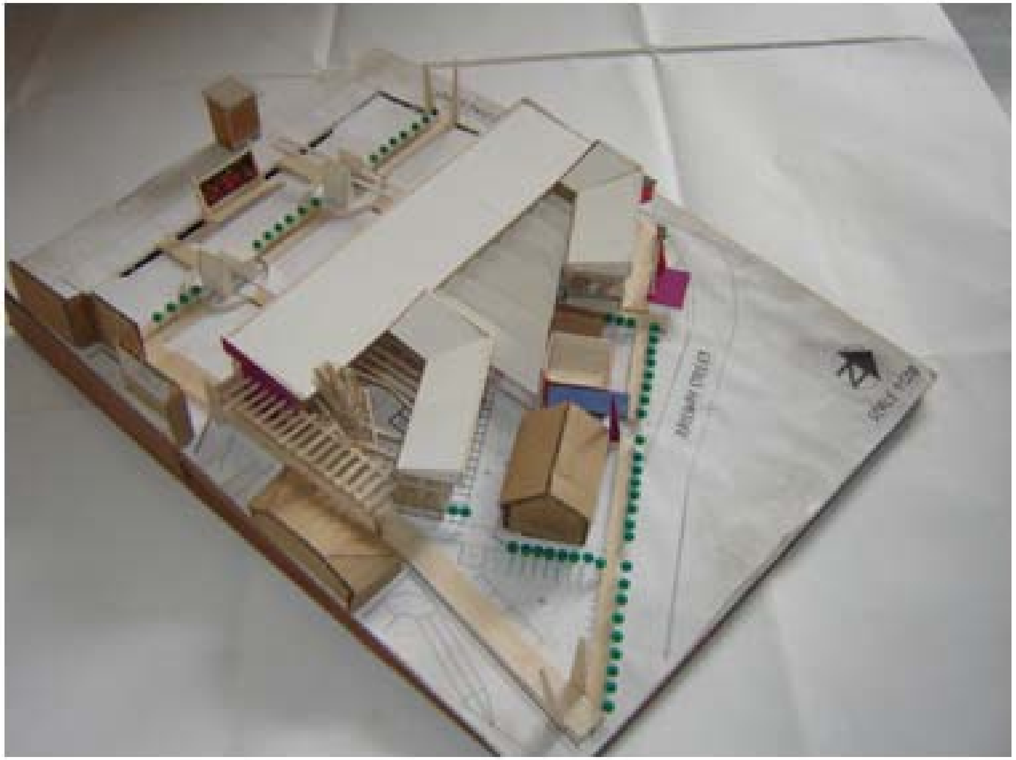


DEVELOPMENT MODEL

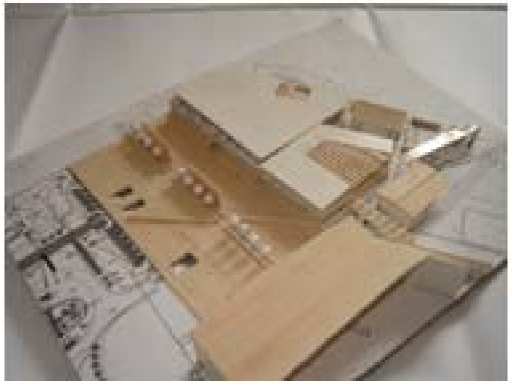
South east aerial view

CONCEPTUAL MODEL

South east aerial view



DEVELOPMENT MODEL

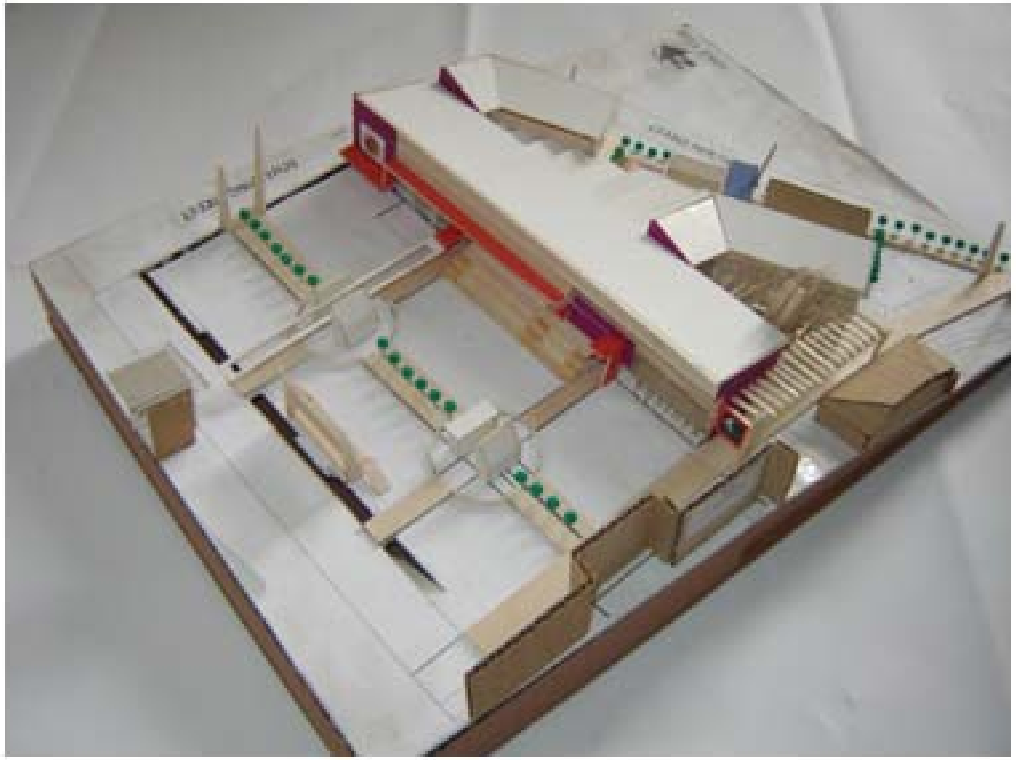


South west aerial view

CONCEPTUAL MODEL

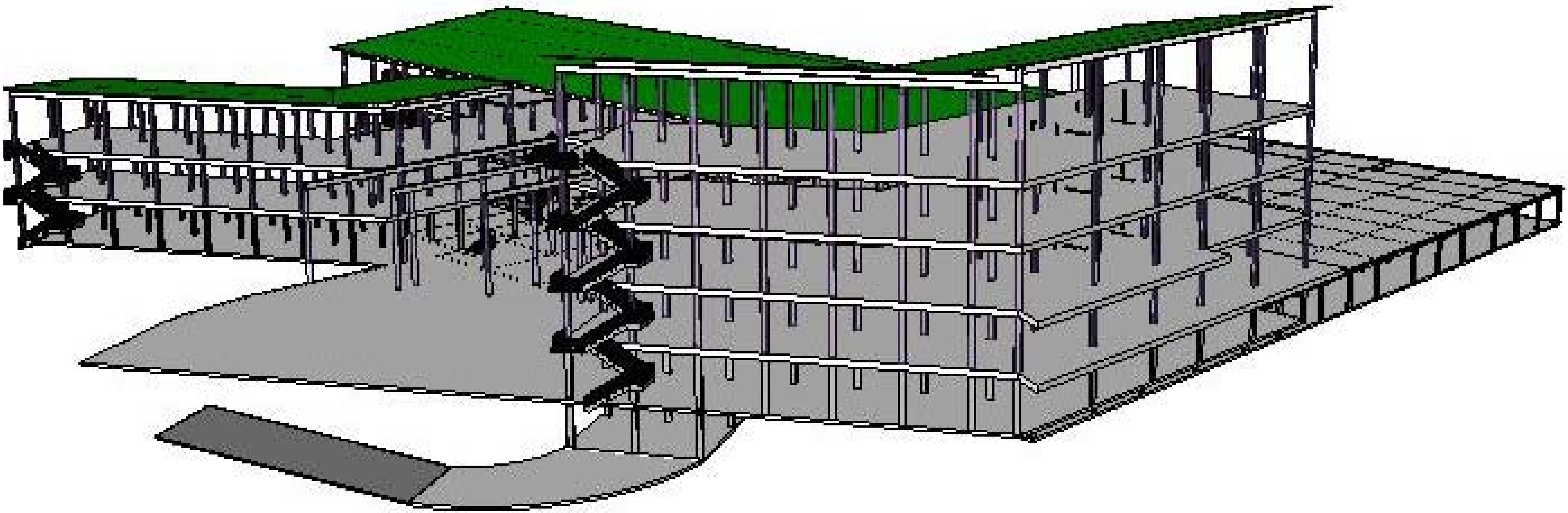
South west aerial view

DEVELOPMENT MODEL

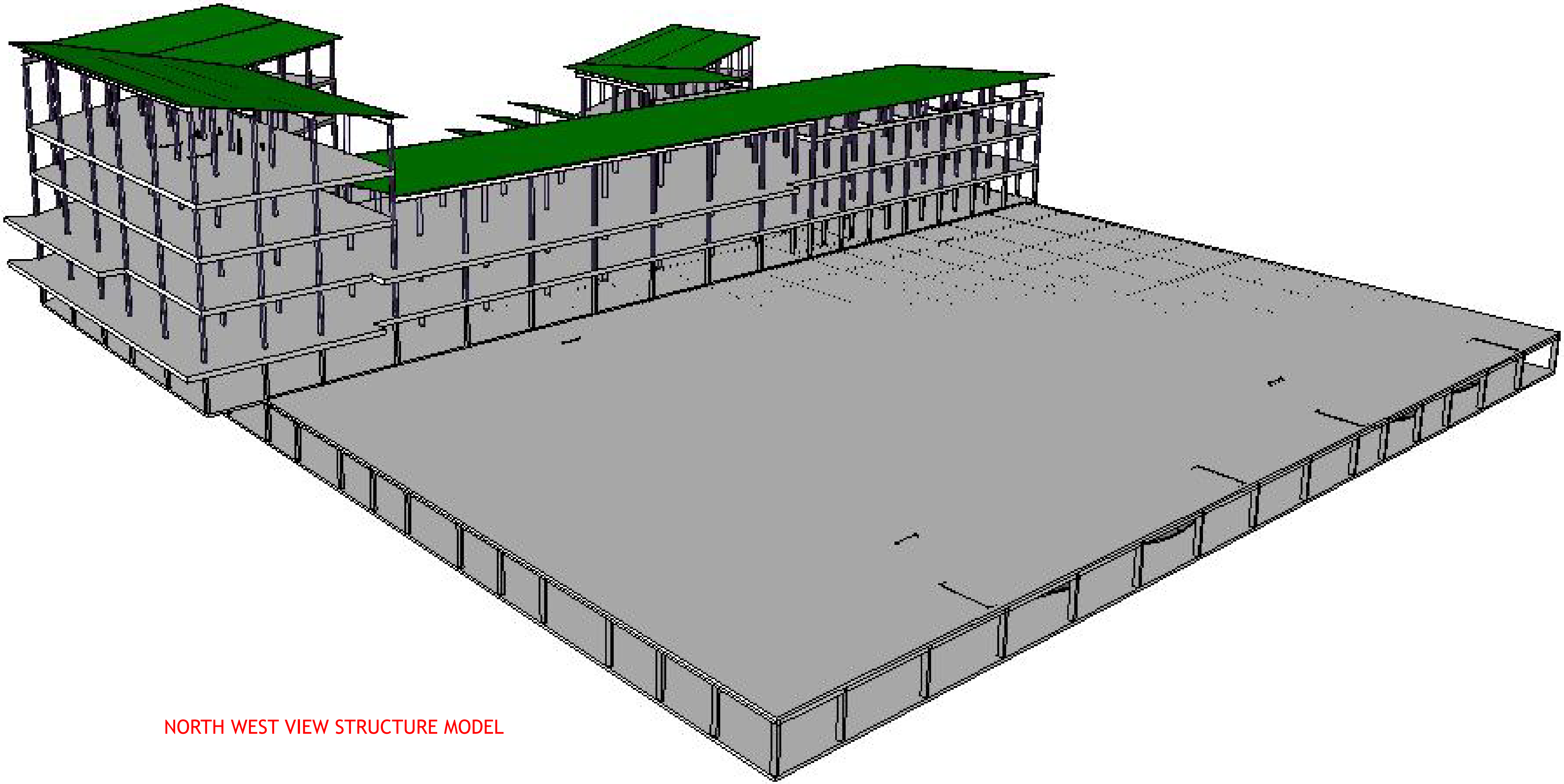


APPROACH TO TECHNICAL INVESTIGATION

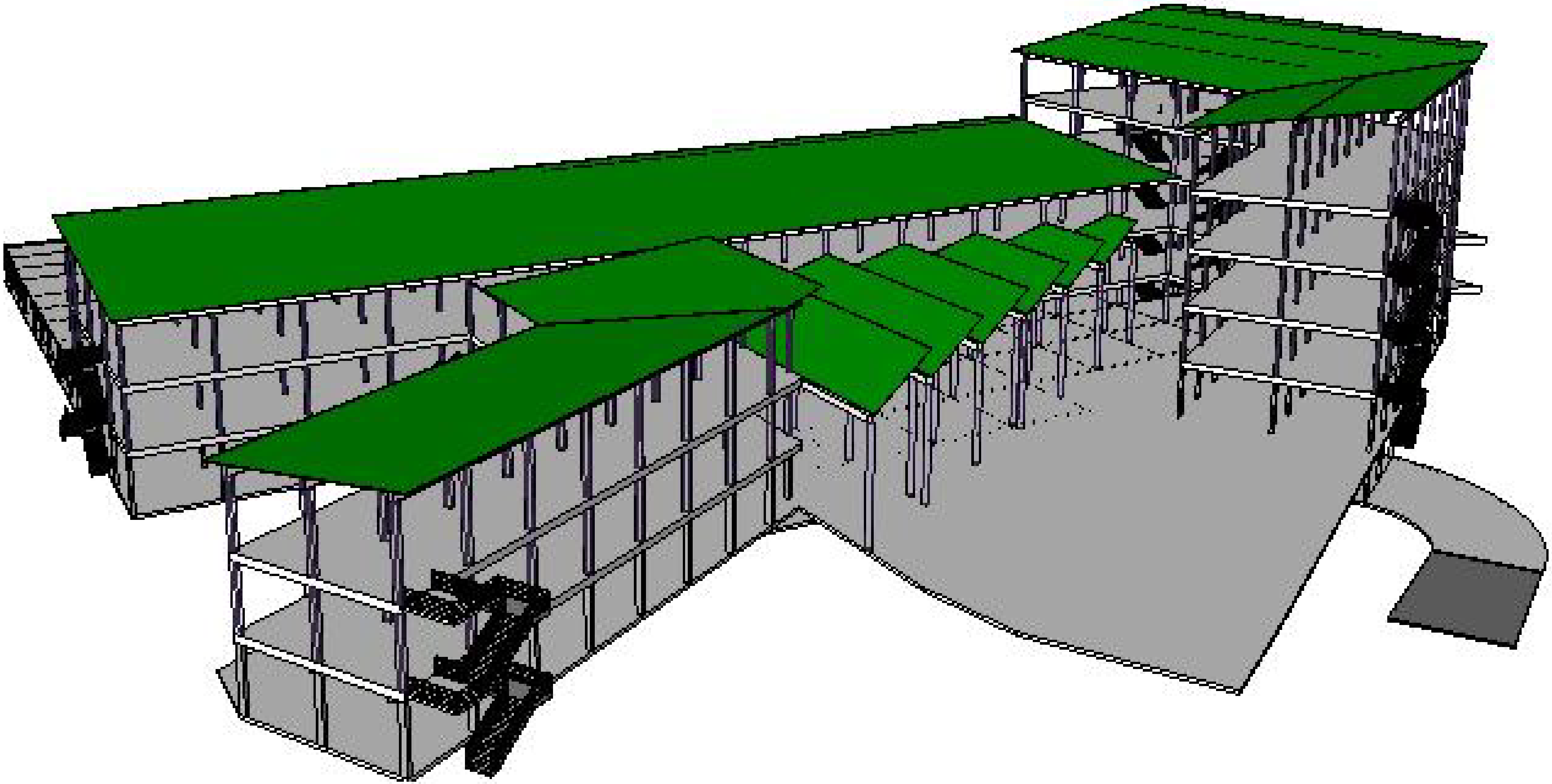
The technical composition of the building attempts where possible to minimise the use of materials with a high embodied energy towards arriving at a sustainable building. The construction technology is relatively simple to accommodate low skilled labour in order to afford job opportunities during the construction period. Emphasis is placed on locally manufactured and available materials. Another consideration is the life-cycle costs, which are kept at a minimun through the employment of simple technology. The building capitalizes on passive climate control elements thus reducing the need for energy consuming climate control means.



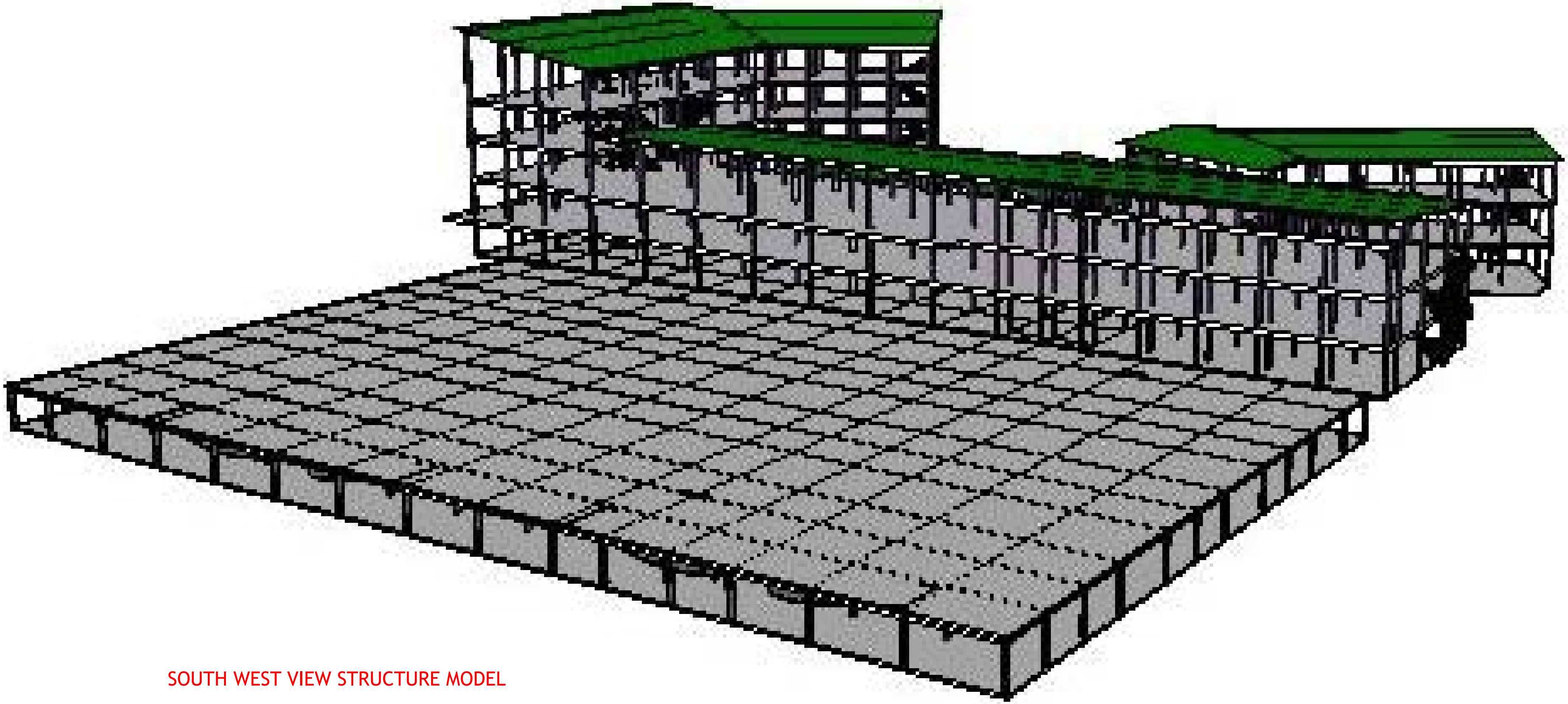
NORTH EAST VIEW STRUCTURE MODEL



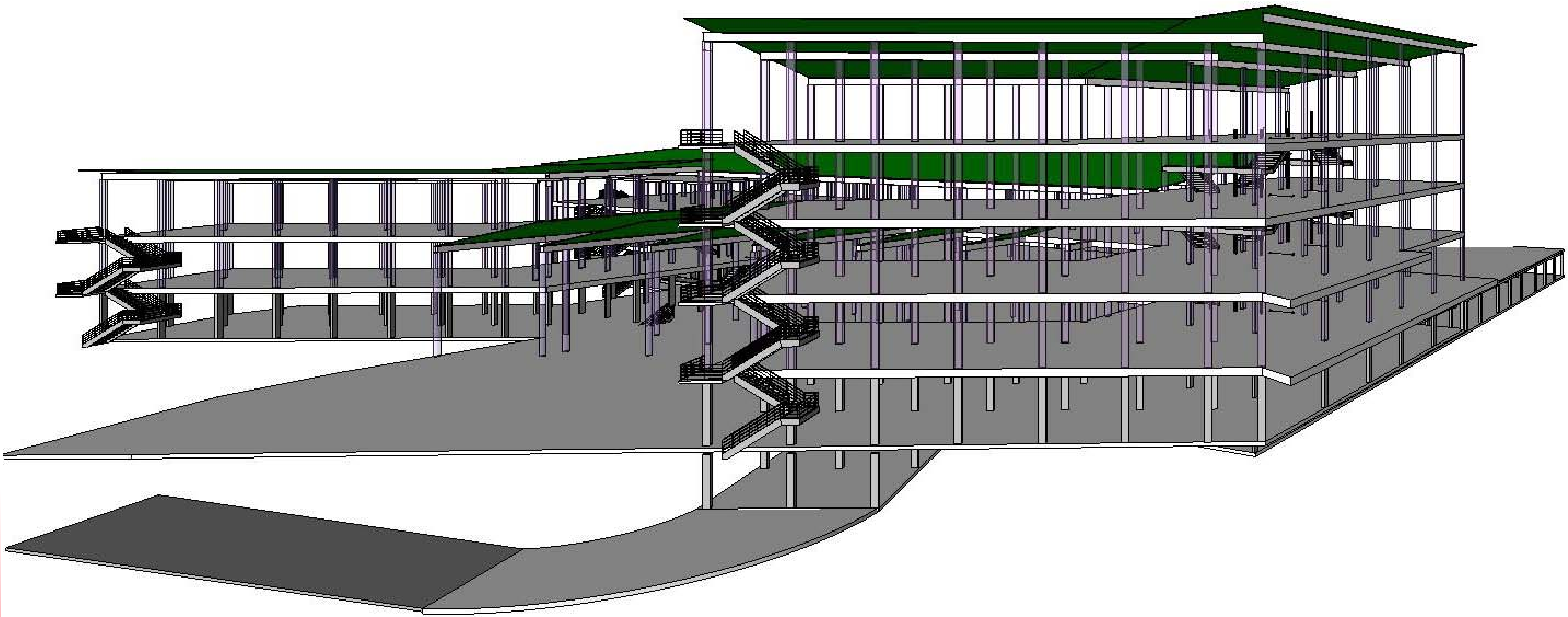
NORTH WEST VIEW STRUCTURE MODEL



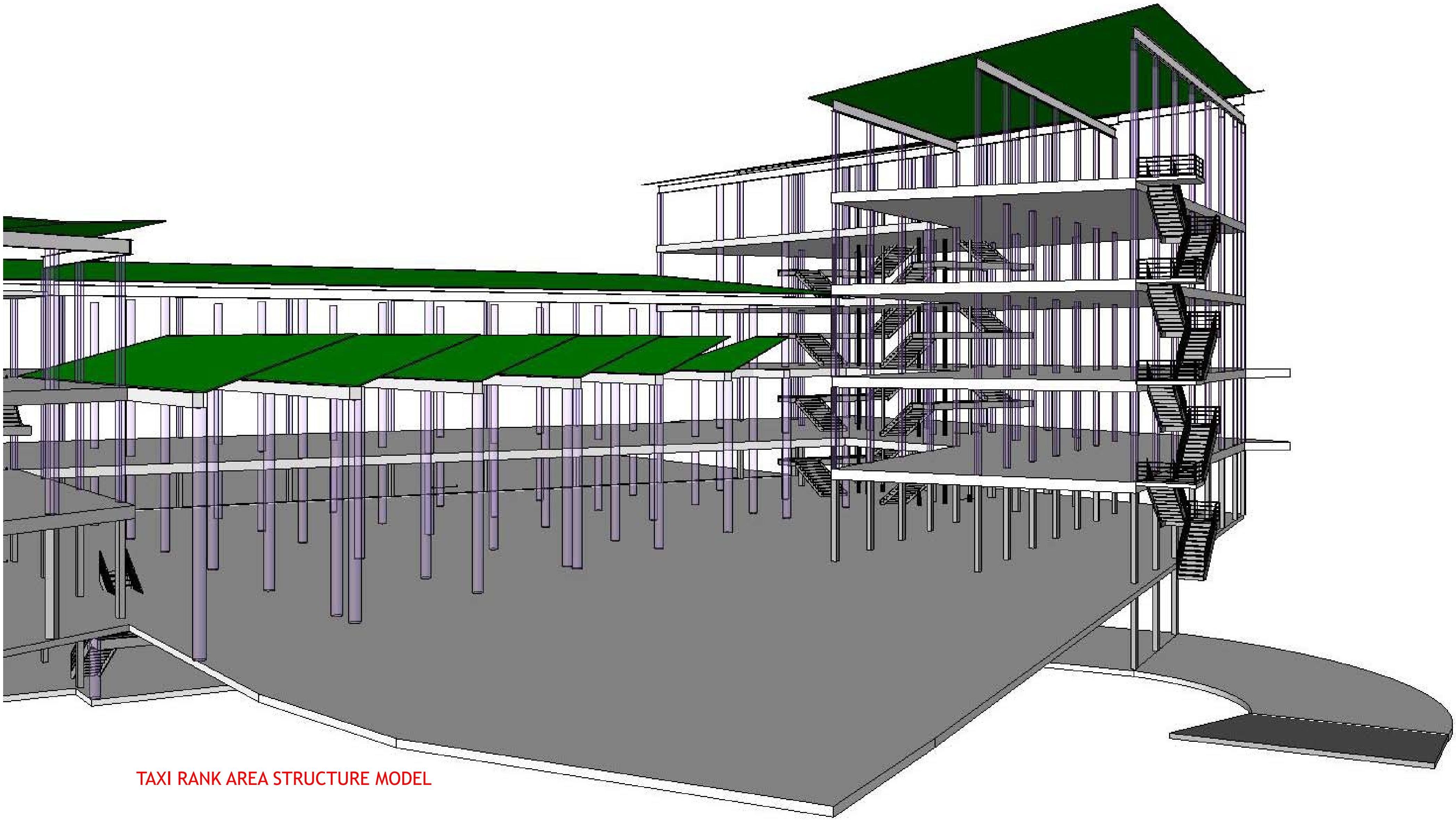
SOUTH EAST VIEW STRUCTURE MODEL



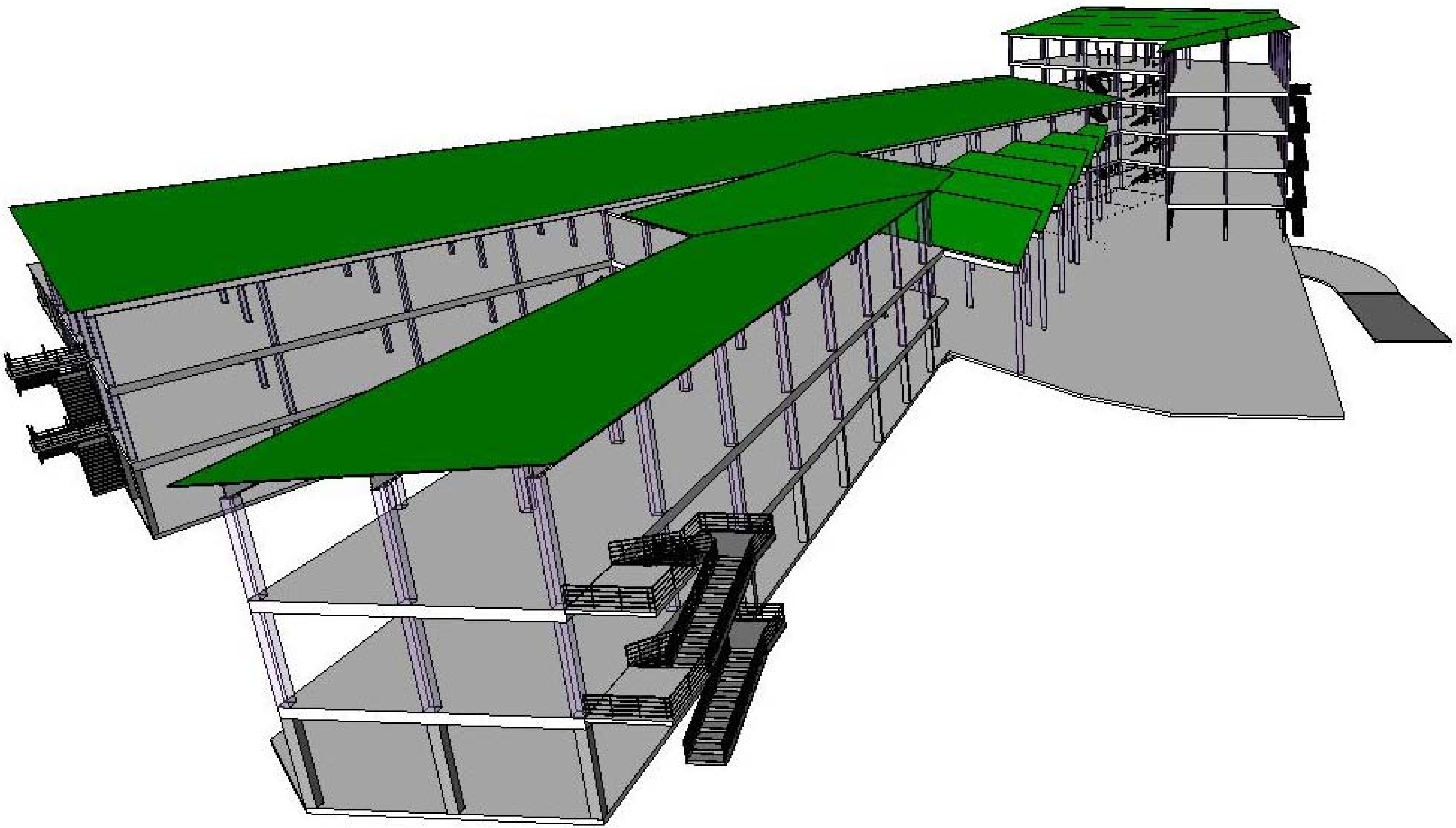
SOUTH WEST VIEW STRUCTURE MODEL



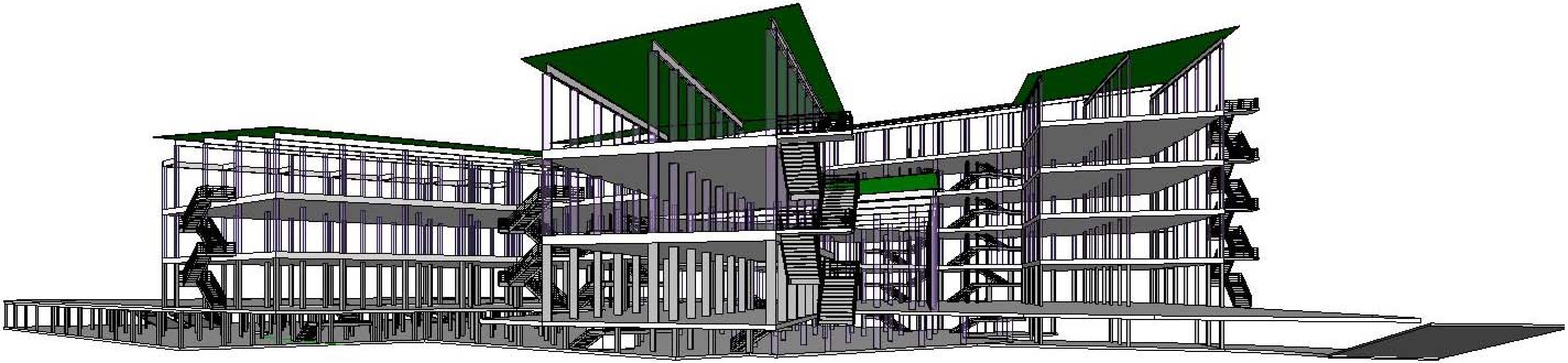
VIEW 1 STRUCTURE MODEL



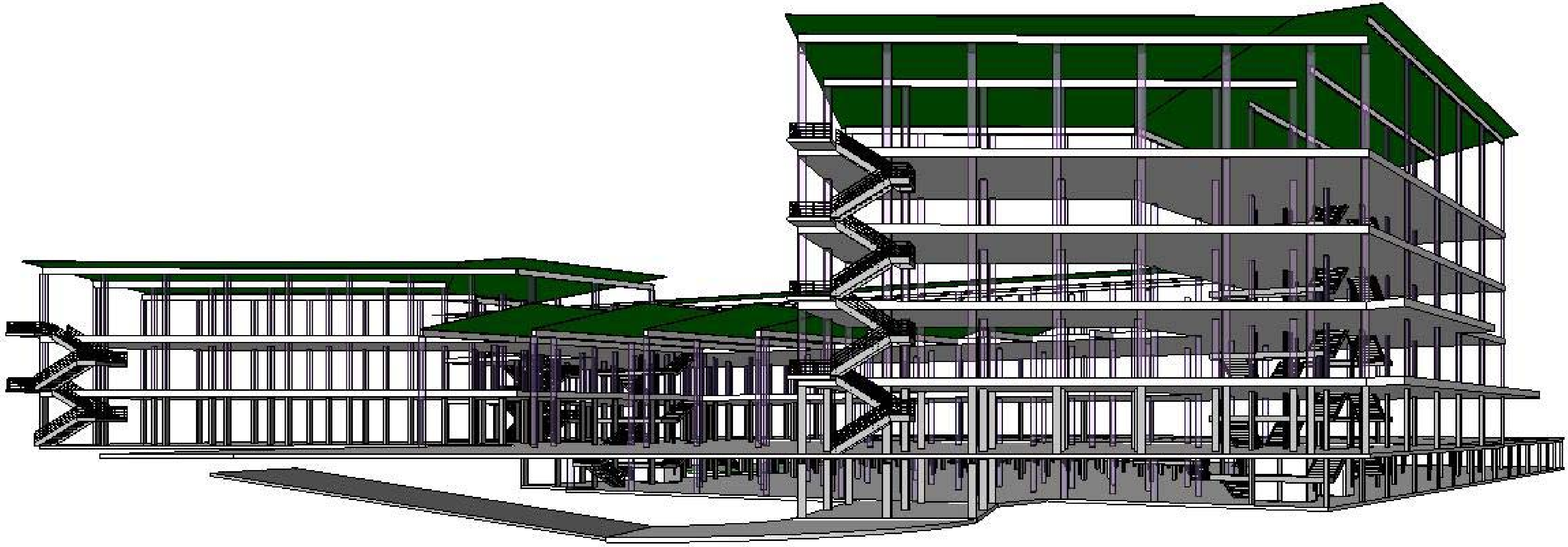
TAXI RANK AREA STRUCTURE MODEL



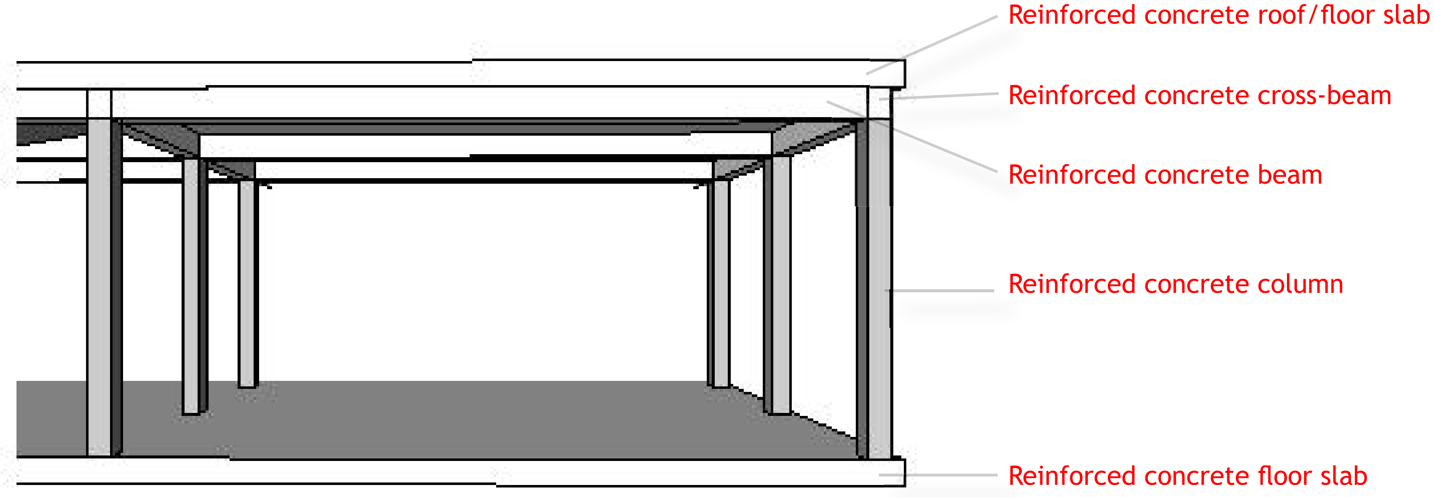
SOUTH BIRD'S EYE-VIEW STRUCTURE MODEL



SOUTH WORM'S EYE-VIEW STRUCTURE MODEL



LEVELS STRUCTURE MODEL



STRUCTURAL COMPOSITION OF BASEMENT

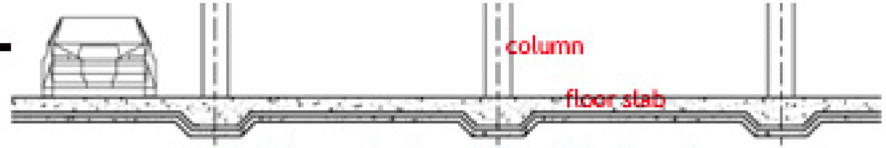
STRUCTURAL COMPOSITION OF THE BUILDING

SUB STRUCTURE

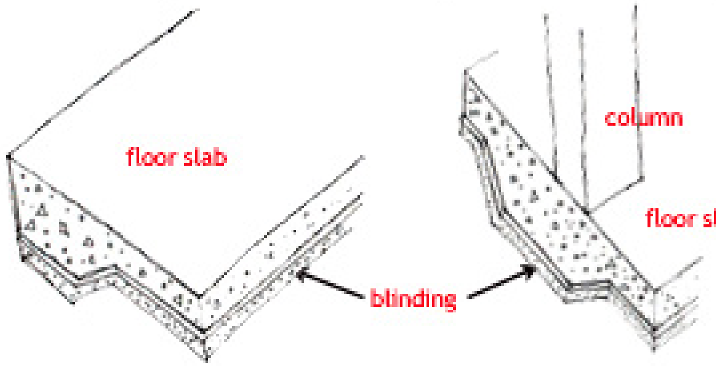
FOUNDATIONS

Raft foundations are best suitable for the combination of Quartzite and shale soil formation. Raft foundations are particularly ideal for spreading heavy column loads evenly over the entire area of the site.
A layer of 100mm thick concrete blinding is neccessary under the raft foundation to protect the waterproofing memebrane.

A reinforced concrete mix of 1:2:4/20mm aggregate with a strength of 25 MPa, at 28 days is ideal.



Typical example of a raft foundation in section



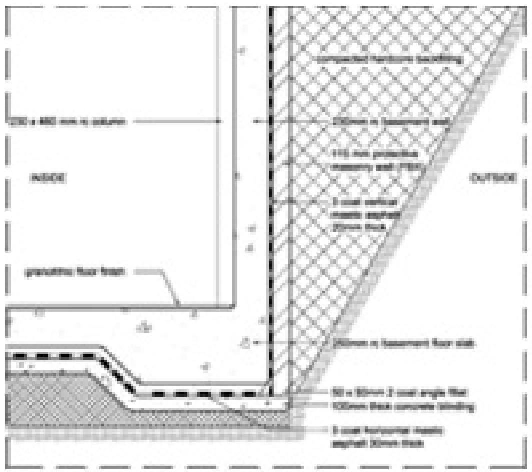
Typical raft end slab

Typical raft and column treatment

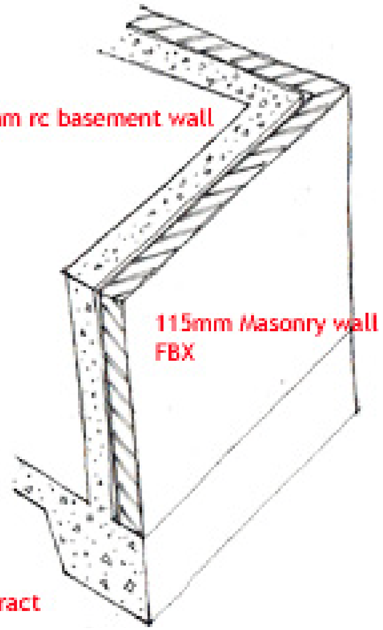
BASEMENT WALL

230mm reinforcement concrete basement wall protected on the outside by a 115mm masonry brick wall.

A reinforced concrete mix of 1:2:4/20mm aggregate with a strength of 30 MPa, at 28 days is ideal.



Basement wall detail



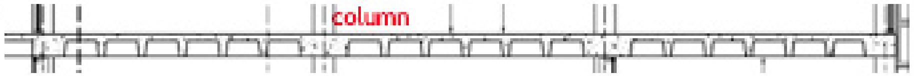
Basement wall extract

SUPER STRUCTURE

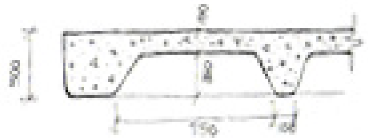
SLABS/FLOORS

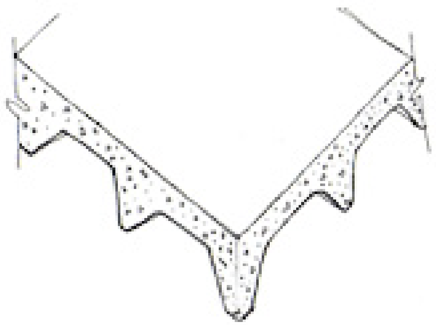
500mm Deep coffered slabs are used generally on the project for construction economy. Coffered slabs require less concrete in comparison to slab and beam construction furthermore, the need for reinforcements is reduced, the need for beams is almost eliminated. The two-directional span properties allow for large floor spans between column supports. The underside can be exposed for visual aesthetics. Coffered slabs can also act as mass floors, thus helping to regulate the interior climate, this is ideal for a climate zone with a high diurnal temeperature variation.The finish applied on the slab will be determined by the space usage.

A reinforced concrete mix of 1:2:4/20mm aggregate with a strength of 25-30 MPa, at 28 days is ideal.



Typical example of a coffered slab in section


Typical coffered slab profile

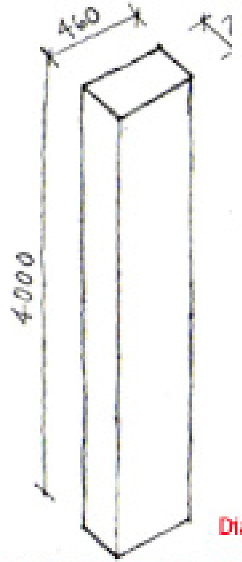

Typical coffered slab 3d extract

COLUMNS

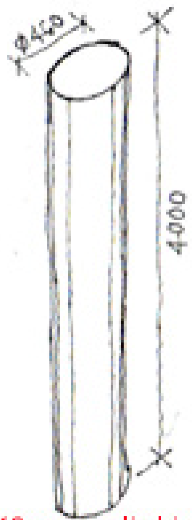
Two types of structural columns are used throughout the structure.

1. Rectangular 460 x 230mm rc columns.
2. Cylindrical diameter 460mm rc columns.

The use of 460 x 230mm columns is motivated by the ability to fit flush depending on the orientation within a 230mm masonry wall. However the cylindrical columns will be used in the taxi rank area, where there is no masonry infill between the columns. Artwork mosaic tiles are to be cladded onto the cylindrical columns.

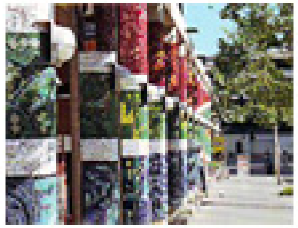


460 X 230mm rc rectangular column



Diam. 460mm rc cylindrical column


Example of column art treatment. (Architecture SA Nov/Dec 2004:36)


Example of column art treatment. (Aedes 2005:13)

WALLS

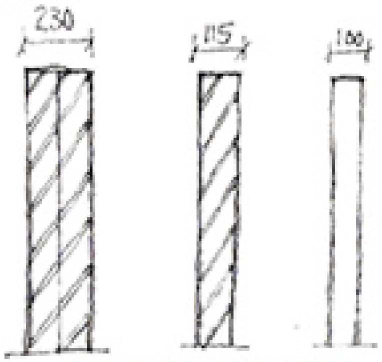
3 types of infill walls are used throughout the structure.

1. 230mm Masonry wall
2. 115mm Masonry wall
3. 100mm Rhinoboard partitions.

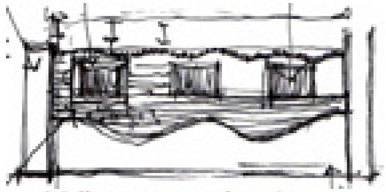
The 230mm wall is generally used as outside walls of the infill structure, the 115mm walls are used internally only, and the partitions are used mainly in the ablutions and office spaces. Common stcock-bricks are used for plastered sections, while fired facebrick (FBS) is used for sections where the brick work is unplastered.
Generally the brickwork is non-structural. The city's art in public places programme (ISDF 2005) is exercised through local artists showcasing their art work on large sections of exposed walls both internally and externally. The use of bright colour paints give a inviting feeling of liveliness.

Where possible the masonry walls are used as aesthetic features, layered with various textures and colours.

Climatically the 230mm masonry walls offer a thermal mass effect.
The walls and the bonding thereof are to be SABS 0400 (1990) Part K compliant.



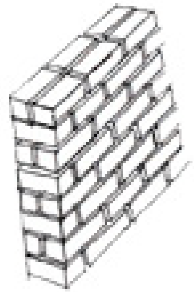
3 Types of wall thicknesses



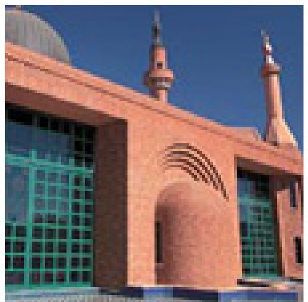
Wall texture exploration

Plastered wall extract

Effect of colours, Umkhumbane Community Health centre, Cato manor (Architecture SA Mar/April 2006:17)



Facebrick wall extract (FBS)



Facebrick example (www.corobrik.co.za)

Mural wall treatment, Bara taxi rank (Aedes 2005:23)

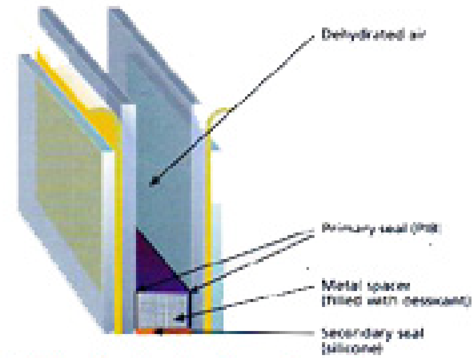
CURTAIN WALLS

Two types of glazing technology are employed throughout the structure, namely the framed glazing, and patch-fitted glazing panels.
The aluminium framed glazing panels are in the form of Solar Insulated Glazing Units (SIGU), with an air space of 12mm with varying glazing thickness according to the type of glazing selected.

The use of SIGU is motivated by its climate control properties, which are especially beneficial in combating the high diurnal temperature changes of the Northen Steppe climatic region. The selection of glazing will be informed by the orientation of the facade, in order to reduce heat loads and solar radiation. To further add to climate comfort, the framed glazing panels are to have opening section that will allow for cross-ventilation through the structure. Aother advantage of the glazed curtain wall system is the opputunity of taking advantage of the ample daylight available in this particular climatic region.

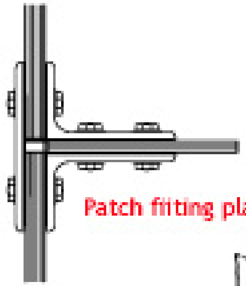
The patch-fitted glazing units are generally 25mm thick, however, the glazing selection is also subject to the orientation of the facade. The patch fittings are made from stainless steel, and the gaps between the glazing panels are filled with clear silicone sealant.

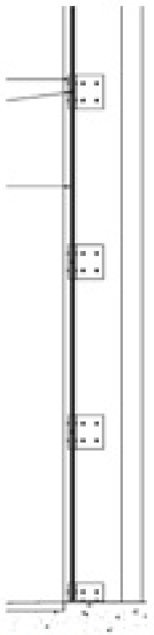
All glazing panels and fixing thereof is to be SABS 0400 Part N compliant.

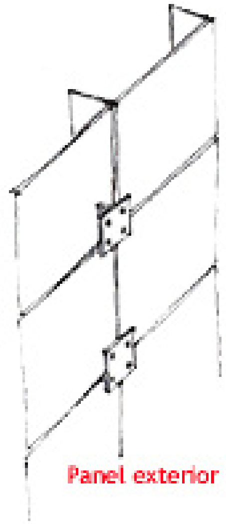


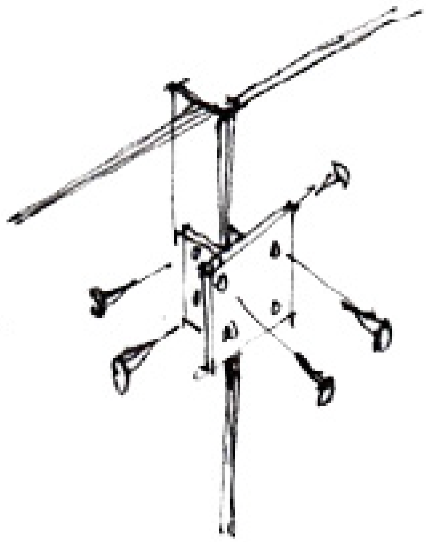
SIGU detail, obtained from Smartglass catalogue


SIGU sample panel, obtained from Smartglass catalogue


Patch fitting plan


Typical curtain wall section


Panel exterior


Exploring the method of fixing the glazing

COVERING

GALVANIZED SHEETING ROOFS

Two types of roofs are used throughout the structure.

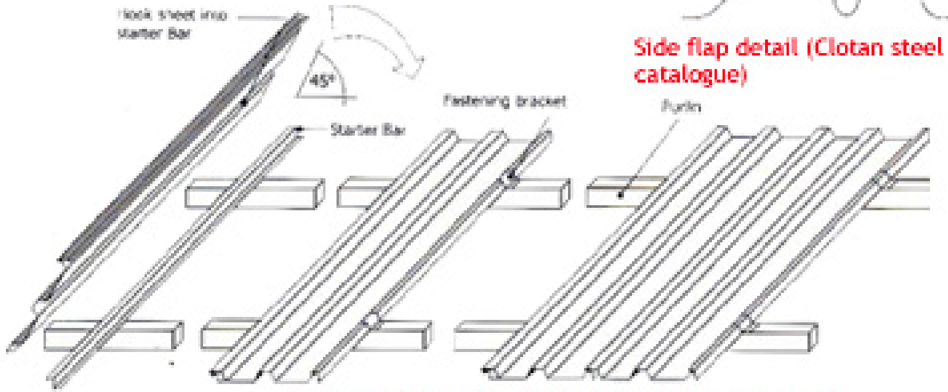
1. Galvanized metal sheeting, Craft-Lock profile.
2. Reinforced concrete flat roofs.

Generally the Craft-lock profile supported by steel trusses is used for over 90% of the entire structure. Galvanized metal roofing is used primarily because it a lightweight type of roof, as required for optimum climatic comfort for the Northern steppe climatic zone. The Craft-lock profile is preferred since it has concealed fixing cleats to the purlins/lipped channels, opposed to the bolt/nail technique, thus reducing the chances of water leaks, and consequently, maintenance costs. The Craft-lock profile is deep therefore helps water run-off at a pitch as low as 3 degrees.

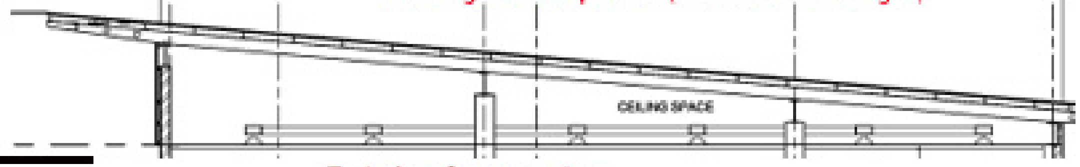
The exexution of the roof costruction must be SABS 0400 (1990) compliant.

Craft-lock sheeting profile (Clotan Steel Catalogue)

Side flap detail (Clotan steel catalogue)



Sheeting erection process (Clotan steel catalogue)

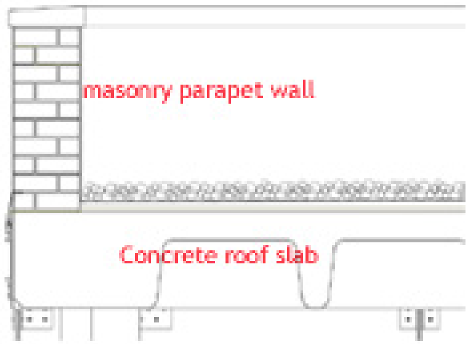


Typical roof truss section

RC FLAT ROOF

Reinforced and waterproofed concrete flat roof with a minimum of 1:50 shall be used in selected areas. Fine crushed rock pebbles are to be places on top of the torch-on waterproofing membrane for thermal insulation. Concrete roofs are used economically, only in sections where the galvanized sheeting creates akward junctions, to avoid high maintenance costs.

A reinforced concrete mix of 1:2:4/20mm aggregate with a strength of 30 MPa, at 28 days is ideal.
The exexution of the roof costruction must be SABS 0400 (1990) compliant.

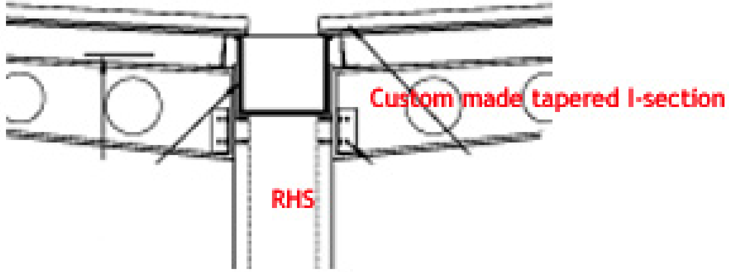


Rock pebbles used as thermal insulation.

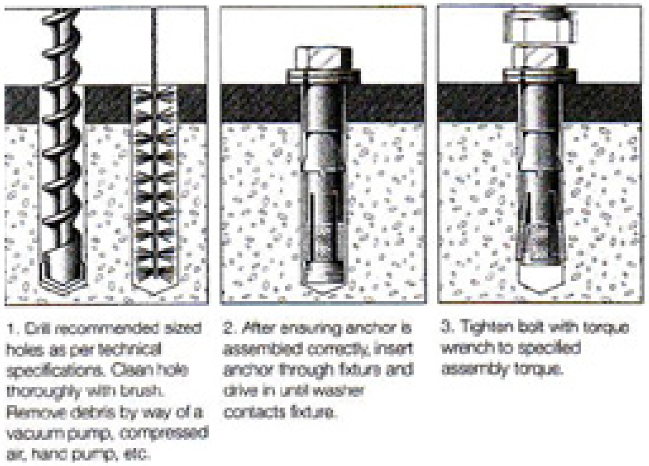
CONNECTIONS

FIXING METHODS

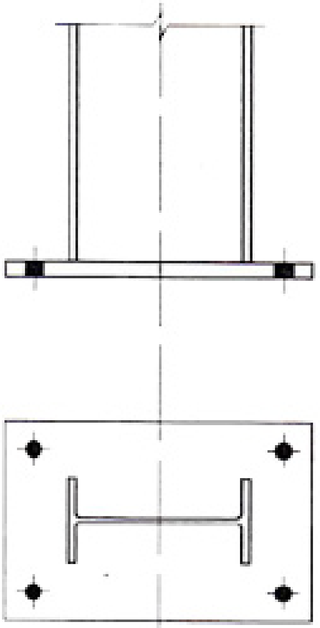
Exploring means of connecting the different materials.
Chemical bolts are used to anchor steel to concrete.
Normal bolts or welding is used to anchor steel to steel



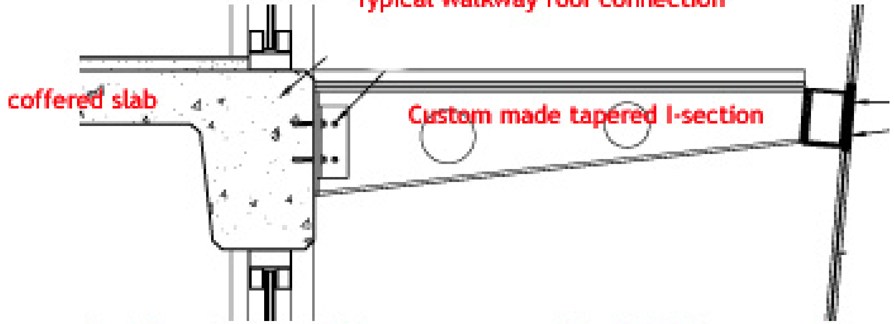
Typical walkway roof connection



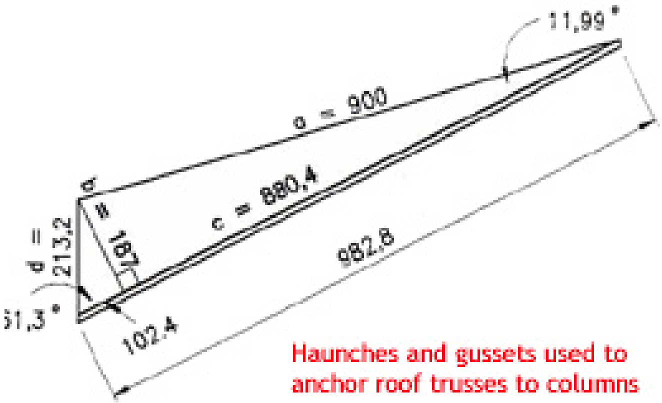
Example of chemical bolts (Ramset catalogue)



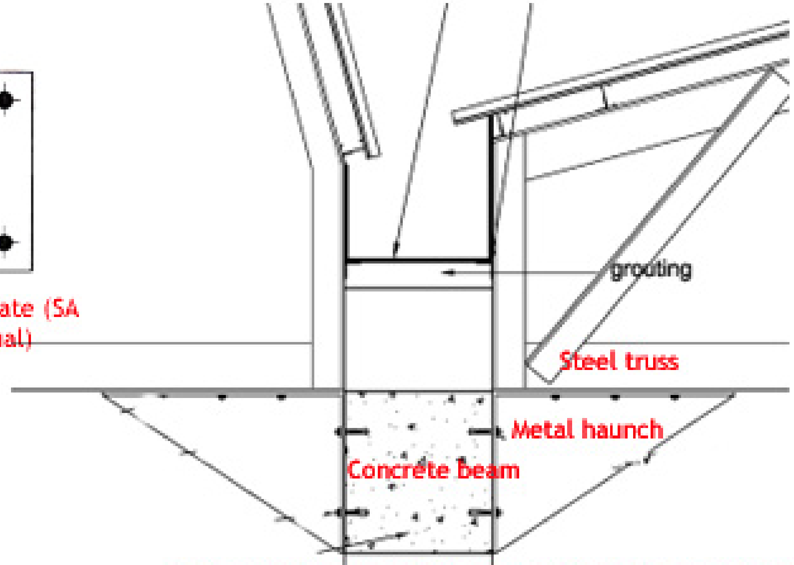
Simple slab gusset base plate (SA Structural steelwork manual)



Typical mesh screen fixing to concrete coffered slab by means of steel angle cleats



Haunches and gussets used to anchor roof trusses to columns



Typical taxi rank roof. Steel truss fixed to concrete beam by means of steel haunches.

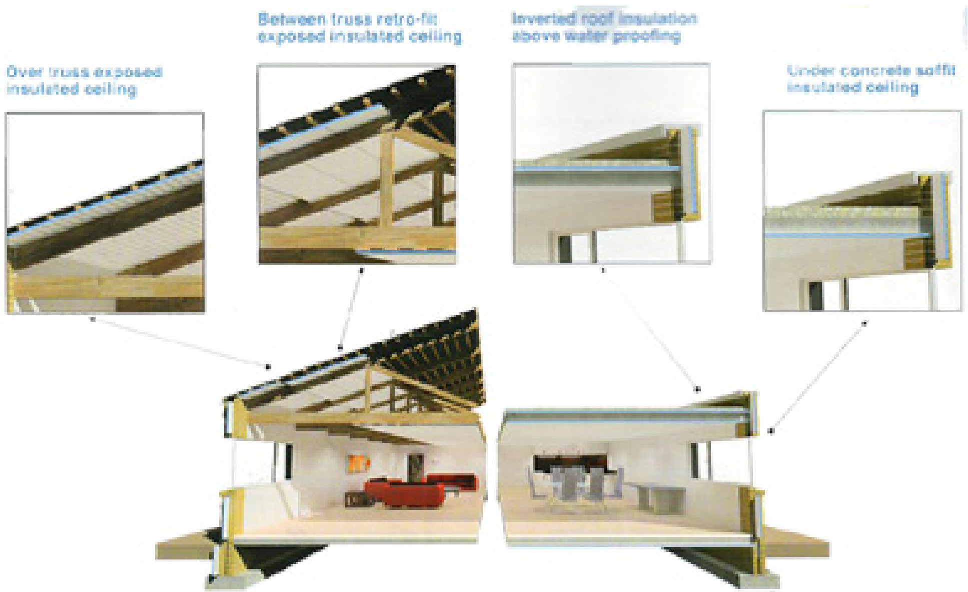
THERMAL INSULATION

ROOF HEAT LOAD CONTROL

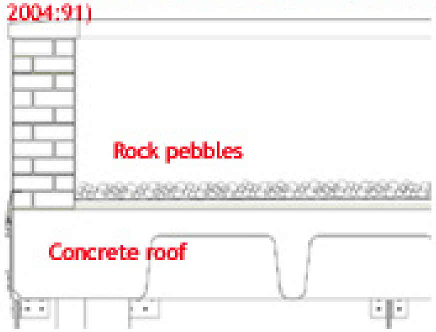
Isoboard extruded polystyrene insulation board fixed on the top chord truss members is used under the Craft-lock sheeting. Isoboard is rigid and lightweight and can be fitted directly on the purlins for ease of construction. Isoboard is an ideal thermal insulator for the combating of the high diurnal temperature variations synonymous with this particular climatic region.
In areas where rc flat roofing is used, rock pebbles are laid over the waterproofing membrane as thermal insulation.

Example of Isoboard insulation fixed overpurlin (Architect and builder 2004:91)

Example of Isoboard insulation used as a ceiling (Architect and builder 2004:91)



Various fixing methods of the Isoboard panels (Architect and builder 2004:91)

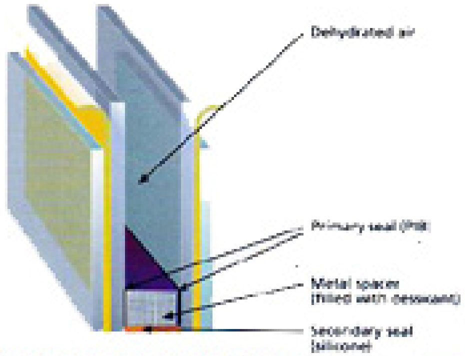


SOUND INSULATION

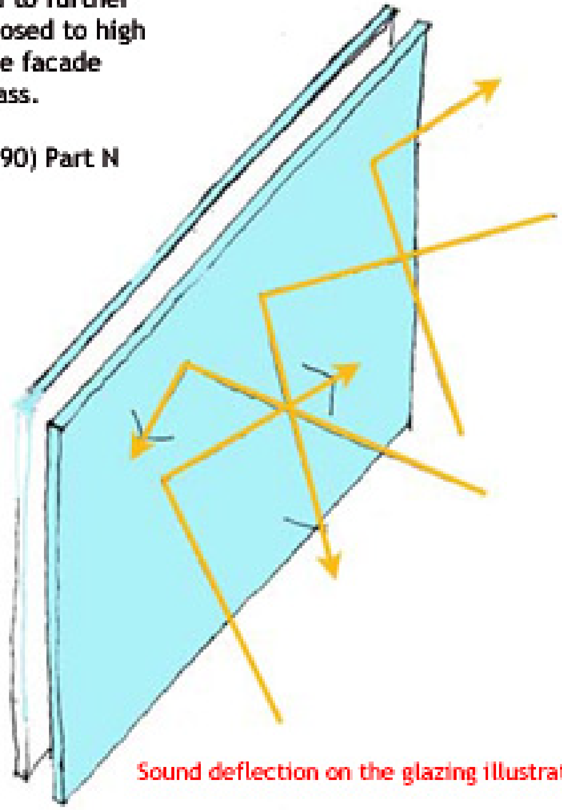
NOISE CONTROL

Noise is controlled throughout the structure by the use of Solar Insulated Glazing Units (SIGU). By virtue of being double glazed, these panels help reduce sound transfer. These double glazed units are to be fitted with Soundprufe glazing, a type of glazing manufactured with a special vinyl interlayer that offers better sound control than traditional polyvi-inal butyral (PVB) interlayers.
Soundprufe glazing is used mainly in the office space and resource centre to reduce the noise pollution generating from the taxi rank.
In addition to the glazing, blinds are used to further minimise sound pollution. In sections exposed to high noise levels like the taxi rank, most of the facade employs brickwork in order to achieve mass.

All glazing and fixing to be SABS 0400 (1990) Part N compliant.



SIG unit (Smartglass catalogue)


Sound deflection on the glazing illustration

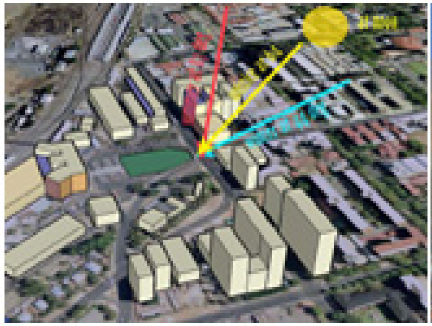
Diagramatic floor plan

CLIMATE CONTROL

SOLAR PROTECTION

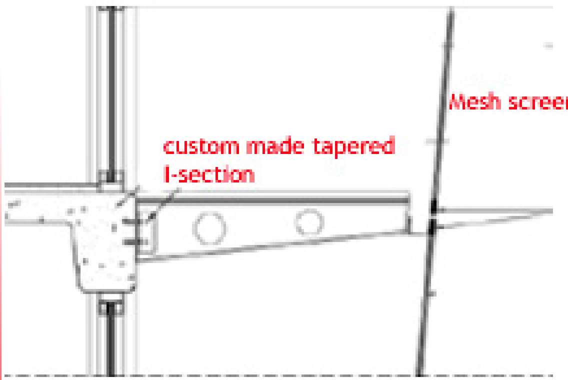
The Northern Steppe climatic zone is characterized amongst other factors, strong solar radiation. Such a situation neccessitates solar sreens and louvres, more especially on the north and west facades.

From a design perspective, the high traffic areas are recessed deeper into the structure on the northern facade, whilst on the west facade balconies act as overhangs to protect the glazing from solar gain.
The entire structure is wrapped in a stainless steel fine-grilled mesh screen, to screen out the sun, in addition the 1500mm wide horizontal placed perforated korten steel panel louvres add further solar protection. The mesh and louvres protect the surfaces from direct sun, while allowing natural light to penetrate.
The selection of glazing for the curtain walling is informed by the solar properties of the glazing in relation to the elements faced on the particular facade. Generally Solarshield glazing is used for its 99% UV protection, with an additional solar reflective metallic coat to help reflect the sun's rays.
The balcony overhangs and the space between the mesh screen and the curtain wall, create a 'cooler buffer zone' between the external temperature and the internal temperature of the structure.

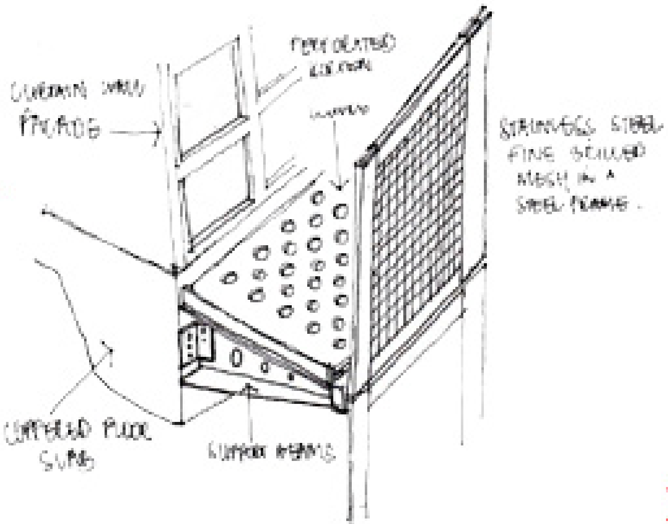


Sun angles for the site

Examples of the screen mesh in newtown ,JHB

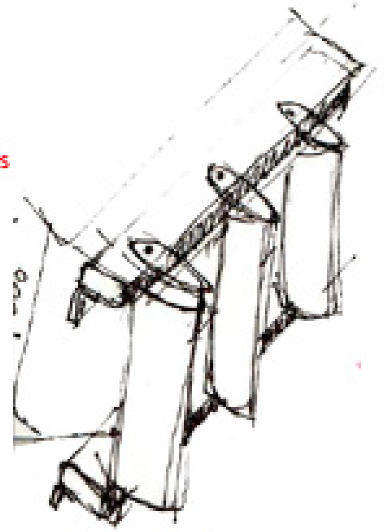


Typical north elevation screen detail



North facade screen axonometric

Typical east and west facade screen tratment



Typical east and west facade screen tratment axonometric