UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

004

DESIGN DEVELOPMENT

DESIGN EXPLORATION 1 **004**-1
DESIGN EXPLORATION 2 **004**-2
CONCEPT DEVELOPMENT **004**-3

LIVE & LEARN
ADAPTIVE

004 - DESIGN EXPLORATION

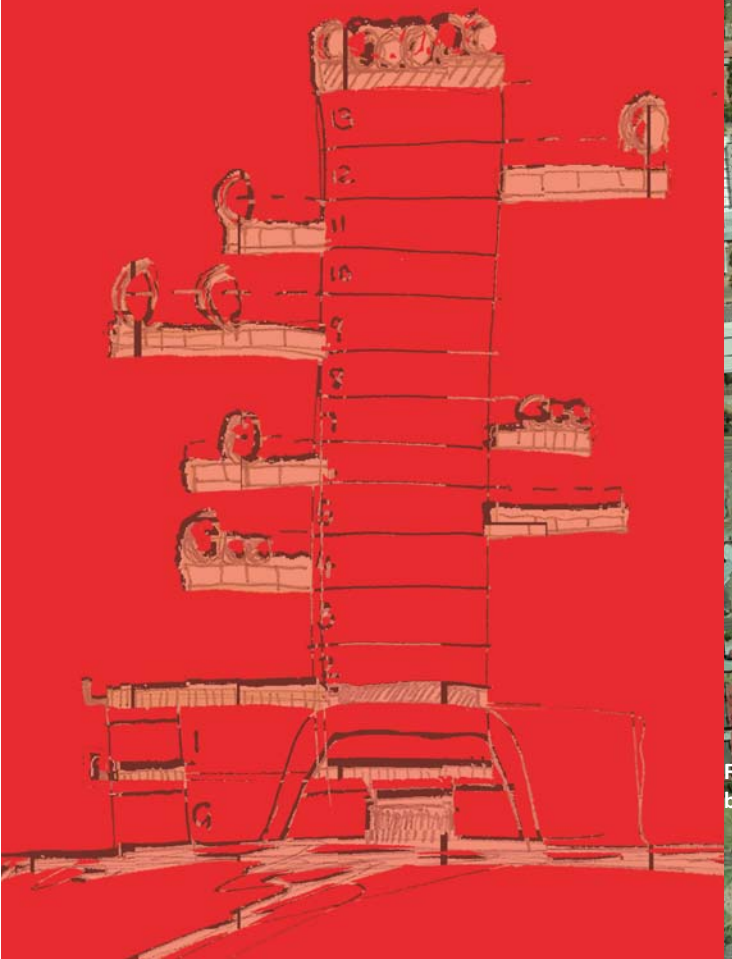

Fig 004.1: Aerial photograph indicating the various sites with existing buildings that were investigated for further development

004-1 DESIGN EXPLORATION 1

Fig 004.2: Aerial photographs illustrating the context of the site

Site 1: Malema College

Street: Bosman Street
No. Storeys: Ground plus two
Current Occuption: College

General Characteristics: Concrete frame structure with facebrick infill. Tree lined street frontage with basement parking. Sidewalk with palisade fencing blocking public access. Advantage of having a space for expansion because building is small and placed towards the front of the site

Fig 004.3: Site 1 from the south-west corner

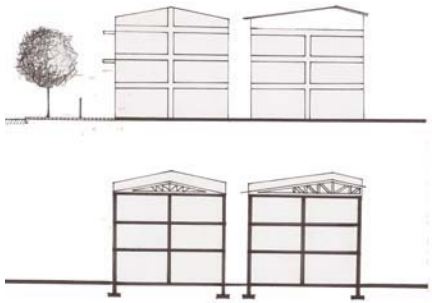

Fig 004.4: Existing elevation and section of Malema College

004-1.1 DESIGN Development

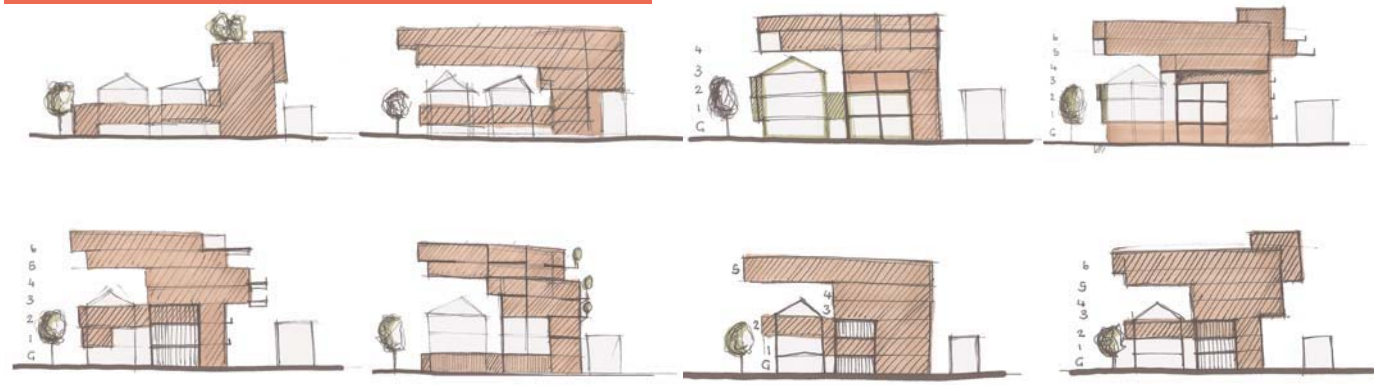

Fig 004.5: Series of sections through the site illustrating possible configurations of new versus old construction

Fig 004.6: Possible configuration of street elevation

Opportunities the Site Presented:
- it is located opposite a green space
- the school provides possible users

Reasons for not choosing the Site:
- not enough existing fabric
- harsh surrounding site conditions
- site is too small

004-1.2 PRELIMINARY Design

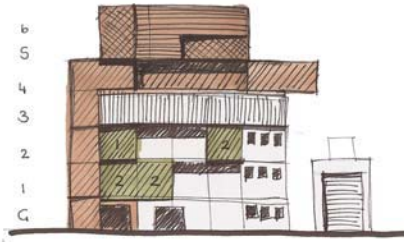

Fig 004.7: Elevation of Industrial Design Centre

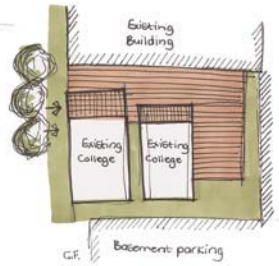

Fig 004.8: Ground floor plan of proposed Industrial Design Centre

Fig 004.9: Floor plans of first to sixth floors of proposal on Site 1

004-1.3 THREE DIMENSIONAL EXPLORATION

Fig 004.10: Street level view of the site model from Bosman Street looking towards the north-east

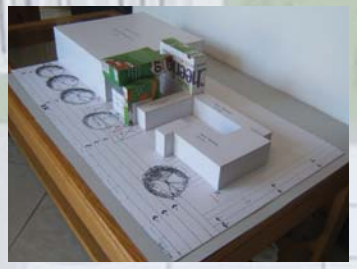

Fig 004.11: A similar view as in the previous image, this time **[re]**vealing the extent of the intervention

Fig 004.12: A bird's eye view of the proposed site which demonstrates the **[re]**lationship between adjacent buildings

Fig 004.13: A view towards the east depicting the abrupt break of the Department of Transport building to the left

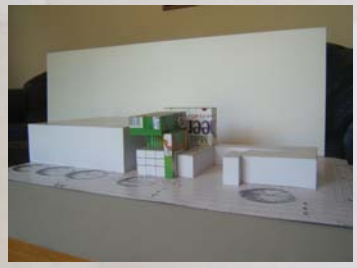

Fig 004.14: The massing **[re]**-lates to that of the surrounding buildings

Fig 004.15: The new intervention is not imposing to passers-by on street level as it merges with the existing architectural fabric

Fig 004.16: To a large extent the Department of Transport in the foreground blocks the view of the proposed intervention

Fig 004.17: A bird's eye view of the concept model looking towards the south

004-2 DESIGN EXPLORATION 2

Fig 004.18: Aerial photographs illustrating the site in context

Site 6: Genleral H.G. de Witt Building

Street: Corner Skinner and Bosman Streets
No. Storeys: Ground plus 13
Current Occupation: Vacant

General Characteristics: Double storey protrusion on northern side of block. Concrete frame building with brick infill and steel window frames. Possibility to expand out of structure.

004-2.1 STRUCTURAL Analysis

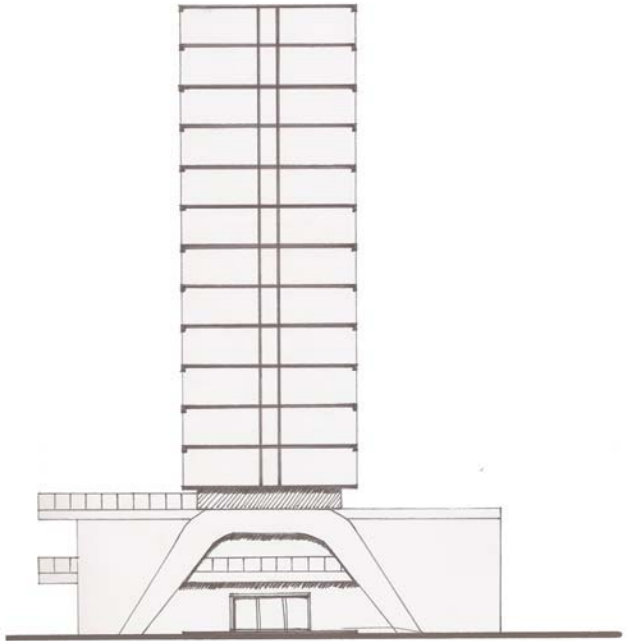

Fig 004.19: Section through the General H.G. de Witt Building

Fig 004.20: Series of photographs illustrating the character of Site 6, starting with the southern most border and moving towards the northern façade

004-2.2 PROGRAM Analysis

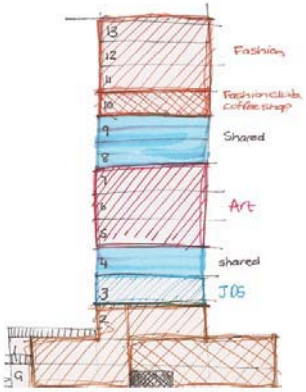

Fig 005.21: Diagram illustrating possible programme configuration

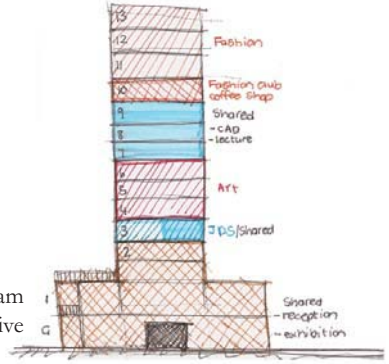

Fig 004.22: Diagram illustrating an alternative programme configuration

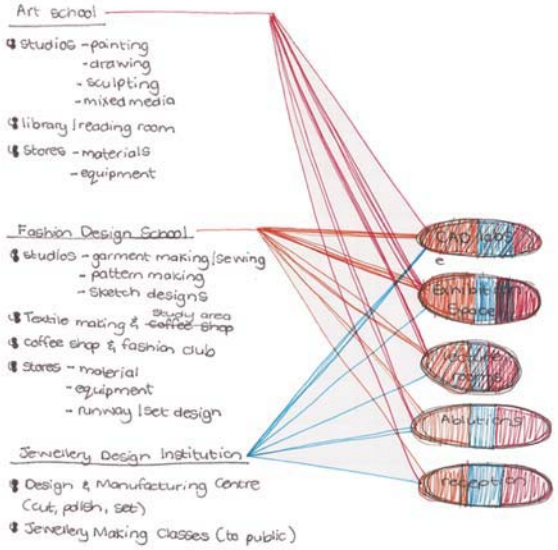

Fig 004.23: A bubble diagram showing the **[re]**lationship between the various programmes

004-2.3 CONCEPT Development

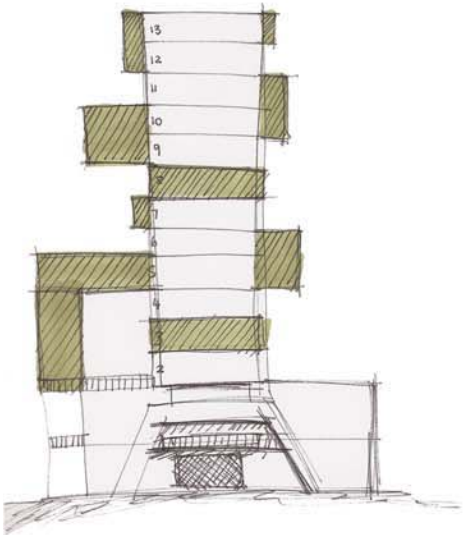

Fig 004.24: West elevation with new "clip-on" units indicated in green

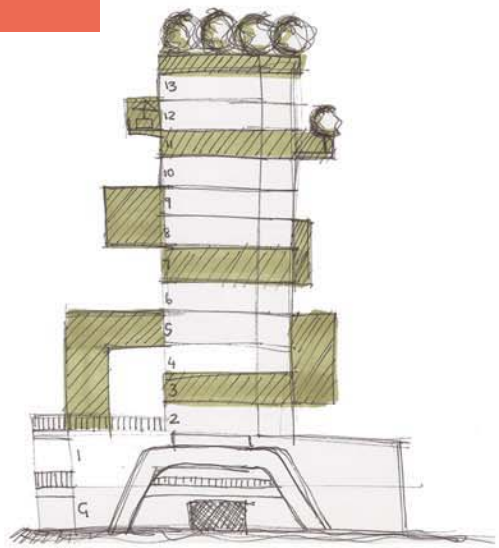

Fig 004.25: West elevation with roof garden and balconies with planting

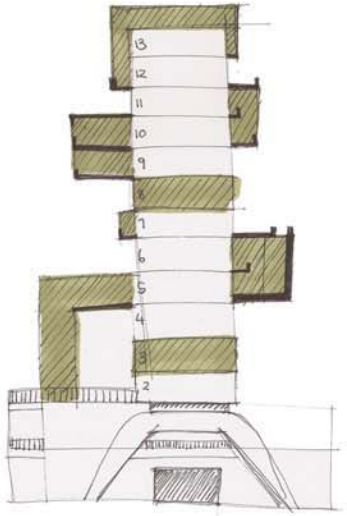

Fig 004.26: New "clip-on" units wrap over the top of the existing structure

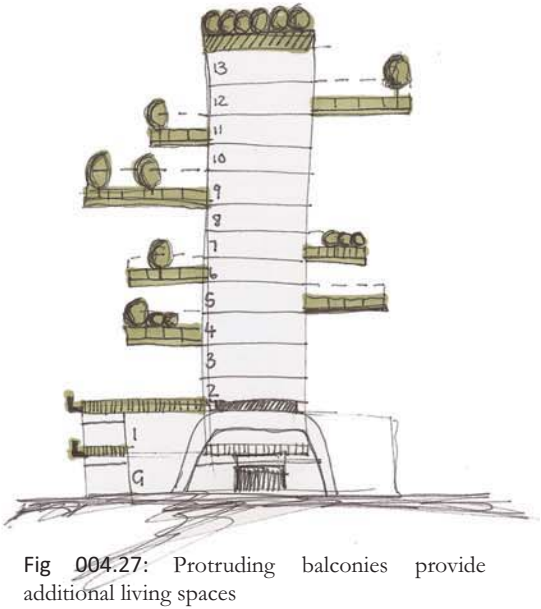

Fig 004.27: Protruding balconies provide additional living spaces

004-2.3 DESIGN Development

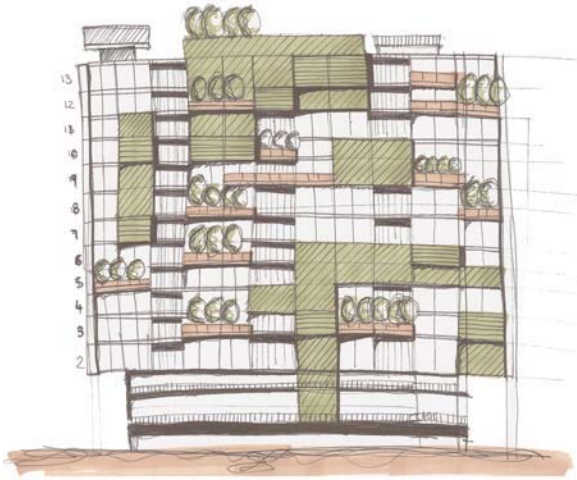

Fig 004.28: Northern elevation demonstrating the dynamic of components which could be achieved

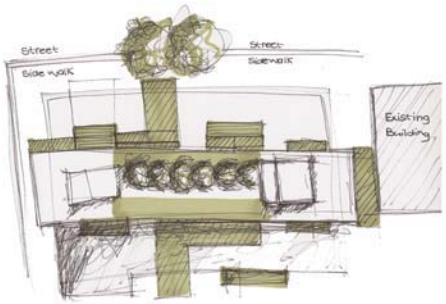

Fig 004.29: Roof plan showing the new box structures clipped to the northern and southern façade

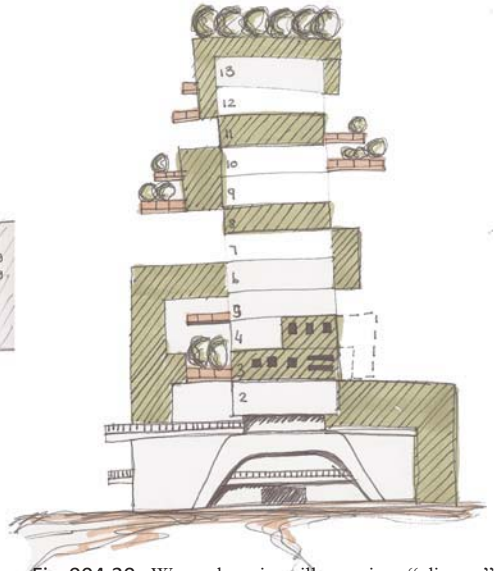

Fig 004.30: West elevation illustrating "clip-on" units and balconies

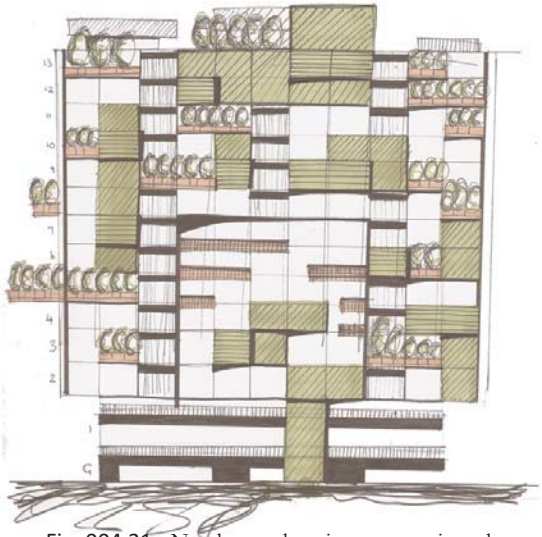

Fig 004.31: Northern elevation expressing the new "clip-on" units indicated in green

004-2.4 THREE Dimensional Exploration

Concept Model One

Fig 004.32: Series of images rotating clockwise around the concept model, starting with the western side of the model

Fig 004.33: The north-west corner of the General H.G. de Witt building. Additions to the existing building are indicated in green

Fig 004.34: New interventions are indicated in green

Fig 004.35: A photograph of the concept model from an elevated position **[re]** veals the extent of possible interventions

Fig 004.36: New interventions range in single blocks, blocks grouped together and external balconies which provide additional space

Fig 004.37: The north-east corner of the concept model

Fig 004.38: The roof of the existing building is altered in order to achieve additional space for future programming

Concept Model Two

Fig 004.39: Series of images rotating clockwise around the concept model, starting with the western side of the model

Fig 005.40: This concept model explores the possibilities of larger, more "solid" boxes protruding from the façade

Fig 004.41: Skinner Street runs past the northern façade of the building

Fig 004.42: Protruding balconies with greenery are suspended from the northern façade

Fig 004.43: The north-east corner of the concept model demonstrates additions to the northern façade, southern façade and roof

Fig 004.44: Additional service cores and spaces are added onto the southern façade

Fig 004.45: A new structure rises from the existing base and frames the southern façade

Fig 004.46: New service cores rise up the sides of the existing structure to accommodate additional programming

Fig 004.47: The new addition on the roof protrudes over the edges of the existing building. The additions to the southern side can also be seen

Fig 004.48: An image of the roof illustrating the relation of the new additions to one another

Opportunities the Site Presented:
- the site is centrally located to city landmarks
- located on a strong axis, with Skinner and Bosman Streets

Reasons for not choosing the Site:
- not connected to an existing urban framework
- building is very large and is unlikely to form a cohesive programme scenario
- not enough room for expansion as bulding extends the limits of the site

004 - 3 DESIGN DEVELOPMENT

004-3 DESIGN EXPLORATION 3

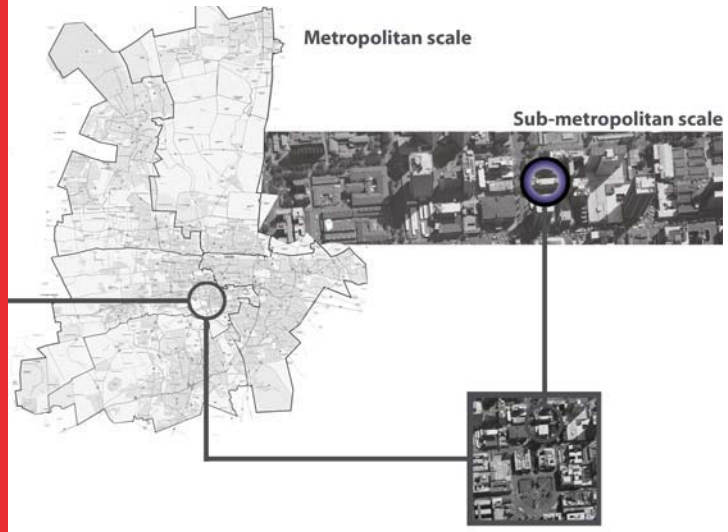

Fig 004.3.1: Digital collage illustrating the context of Site 14

Site 14: Woltemade building

Street: 118 Paul Kruger Street
No. Storeys: Ground plus 7
Current Occupation: Commercial on ground floor with residential above

General Characteristics: A flat-roof double-storey western wing/block on the street edge with commercial functions housed inside. Parking available on site on ground floor under the linear residential block above. Accents of mosaic tiles can be found on the sides of the building and on the "balconies" , which are in fact shelves to the residential units within.

Fig 004.3.2: Photograph illustrating the location of the shelves as well as the tile detail to the side of the building (on left)

004-3.1 ARCHITECTURAL CONCEPT + INTENTION

Fig 004.3.3: The synthesis of the architectural concept and intentions

Architectural Intention: Adaptive **[re]**use
Concept Statement: Existing structure as facilitator, with process as a means of learning
Architectural Concept Statement: Live and Learn
Architectural Concept Intentions: To demonstrate how an existing building can be **[re]**used and adapted to changes in programme and circumstances over time.

004-3.3 ARCHITECTURAL CONCEPT + INTENTION

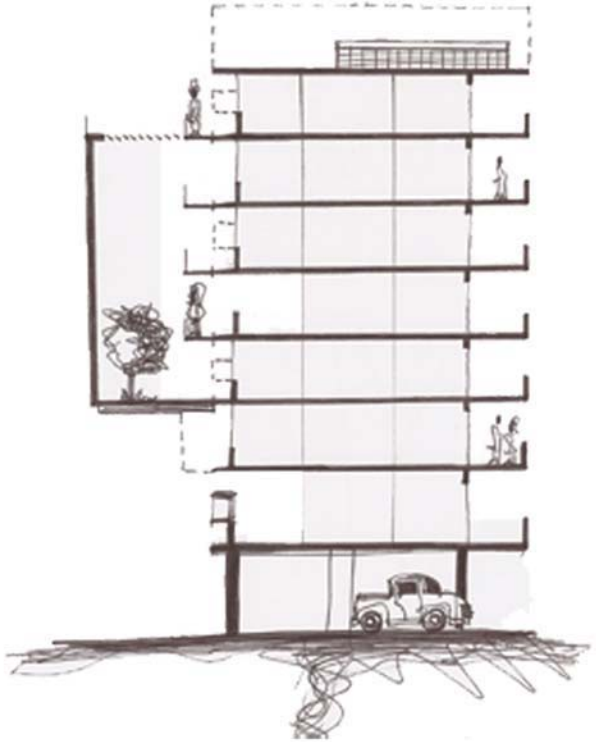

Fig 004.3.4: The synthesis of the architectural concept and premise

There are numerous ways in which to approach the incorporation of balcony extensions. Each method has its own set of advantages and **[re]**strictions. The intention is for the balconies to provide additional space to the individual units within, especially for the residential component.

The simplest way a balcony can be created is by fixing a balustrade or pre-fabricated steel component to the underside or edge of the existing floor slab, as shown in figures 3.5 and 3.6 below.

An alternative approach would be to increase the amount of available space by extending the steel components past the floor slab, as illustrated in figures 3.7 and figure 3.8. Figure 3.9 demonstrates the visual expansion of space as opposed to the physical addition of space.

Enclosed space can also be achieved by making use of pre-fabricated components at both of the exposed slab ends. These spaces can then be used for a multitude of functions, for example as dining rooms, living rooms or meeting spaces.

Possible Architectural Approaches to Balcony Extensions

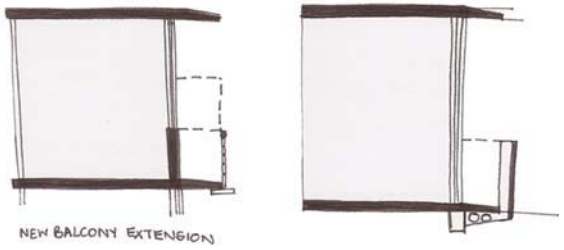

Fig 004.3.5 & 6: The erecton of a simple balustrade to form a balcony

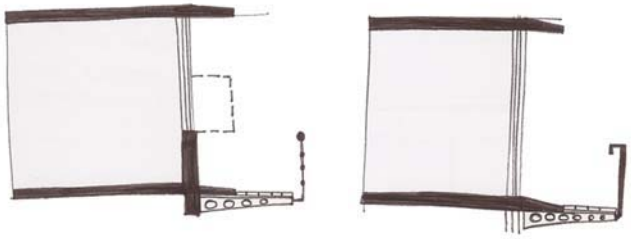

Fig 004.3.7 & 8: Pre-fabricated steel components extend past the existing structure to achieve additional space

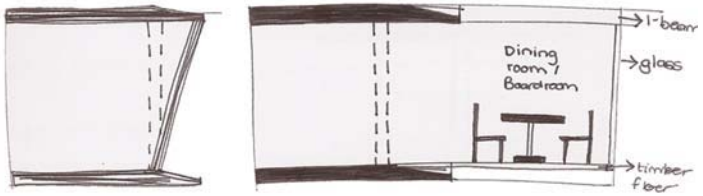

Fig 004.3.9: The enclosed space is determined by a diagonal element
Fig 004.10: Additional space can be enclosed on all sides

004-3.4 THREE-DIMENSIONAL EXPLORATION

Fig 004.3.11: A concept model of the existing northern façade of the Woltemade building

Fig 004.3.12: A concept model of the southern side of the building showing the horizontality of the various planes

Fig 004.3.13: The southern side of the concept model illustrating the internal configuration dictated by the dividing walls

Possible adaptations that could take place on different floors on the northern façade

Fig 004.3.14: Floor 5, 6 & 7 and the roof with new interventions indicated in green

Fig 004.3.15: Simple balustrades are added in addition to a "clip-on" box on floor 5

Fig 004.3.16: Simple and extended balconies are inserted on the fourth floor

Fig 004.3.17: A "clip-on" box extending the height of three floors is incorporated on the third floor

Fig 004.3.18: An option without the "clip-on" box spreading over three floors

Fig 004.3.19: Balconies and box extensions are added to the second floor

Fig 004.3.20: The building could possibly take this configuration over time

Methods of addressing the existing **[re]**cess of the circulation tower on the northern façade

Fig 004.3.21: The northern façade as it currently appears

Fig 004.3.22: The first option is to insert a structure that **[re]**-sults in a flush façade

Fig 004.3.23: The north western corner of the concept model displaying the flush finish

Fig 004.3.24: The second option inserts a structure that protrudes past the façade and extends past the height of the existing building

Fig 004.3.25: The new tower is emphasised by its height over the existing structure

Possible adaptaions that could take place on different floors on the southern façade

Fig 004.3.26: Possible interventions are indicated in green

Fig 004.3.27: A new room is added on the left and the open roof space gains a new programme

Fig 004.3.28: The length of the passage **[re]**ceives additional space

Fig 004.3.29: A hanging floor is added to a residential unit

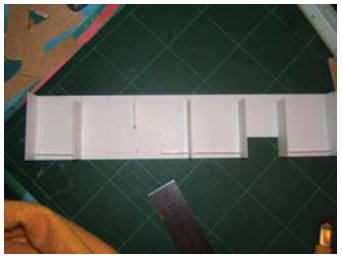

Fig 004.3.30: The internal configuration of the existing residential units are changed

Fig 004.3.31: A different angle of the image before showing the **[re]**-moval of an internal wall

Fig 004.3.32: Three altered floors are placed on ontop of another

Fig 004.3.33: The façade as it would appear with the altered floors

Fig 004.3.34: Another floor has a portion of the existing structure cut-out

Fig 004.3.35: Two floors with cut-outs are stacked on one another

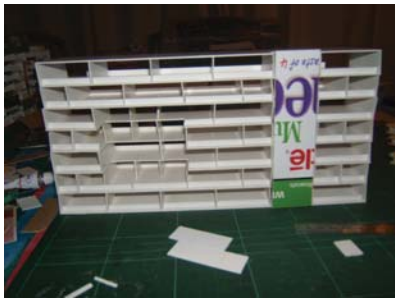

Fig 004.3.36: The northern façade as it would appear with cut-ots and the flush circulation tower

Fig 004.3.37: The façade as it would appear with cut-ots and the protruding tower

004-3.5 ALTERNATIVE INVESTIGATION THE WOLTEMADE AS A THEATRE

An investigation into the conversion of the Woltemade building as a theatre. The strategy for this concept was to remove a portion of the existing column and slab structure so as to provide an uninterrupted view of the stage.

To compensate for the the change in load, three new columns are inserted to **[re]**direct the structural load back

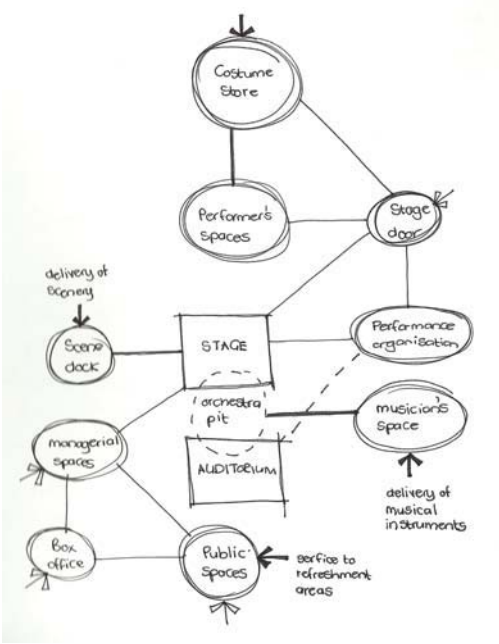

Fig 004.3.38: A simplified version of the New Metric Handbook's diagram that relates to the site

Fig 004.3.39: The new columns **[re]**direct the structural load of the building to the ground

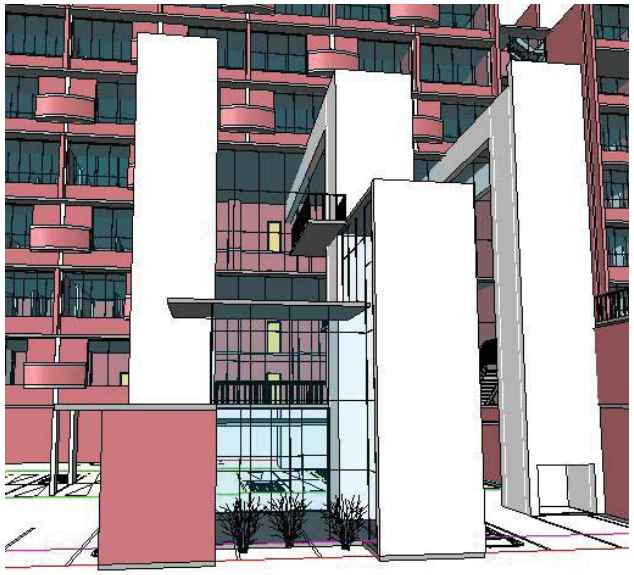

Fig 004.3.40: The ticketing office, scene dock and patron lift are located in and around the new column structures

Fig 004.3.41: Columns protrude past the existing structure to create an new dynamic of space between these two structures

to the ground. These columns additionally serve as means of getting patrons to the new theatre level, provide much needed storage and a scene dock.

Conclusion: The theatre concept was dismissed as too much demolition would have to take place and this would jeopardise the sustainability and adaptability of the new building.

004-3.5 THE LOCATION OF NEW INTERVENTIONS

Fig 004.3.42: The position of the various interventions are illustrated in different colours with the existing building located in the middle

004-4 WOLTEMADE AS A DESIGN DEPOT

Various programme scenarios were investigated throughout the concept development phase of the design process including; an industrial design school, a theatre and finally a Design Depot.

The term "Design Depot" refers to any programme **[re]**-lateing to the design realm. This may include design firms, concept stores, boutiques and exhibition spaces. A Design Depot allows for a great deal of diversity and a mix of programmes that are not traditionally placed together. This is true where live/work units are placed adjacent to a retail store.

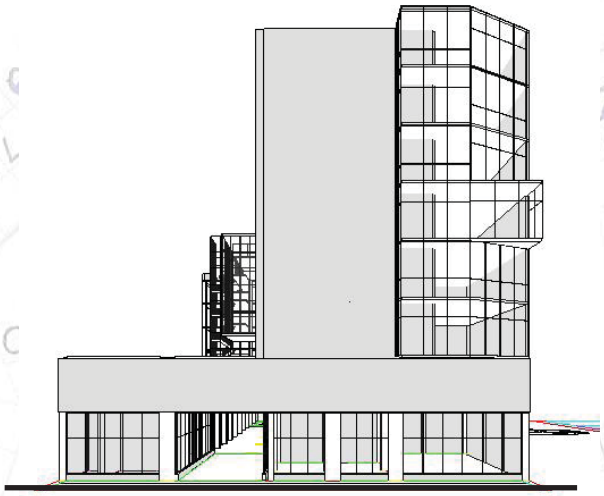

Fig 004.4.1: A perspective of the west, which borders Paul Kruger Street. The glass addition to the right is **[re]**served for product displays and exhibitions

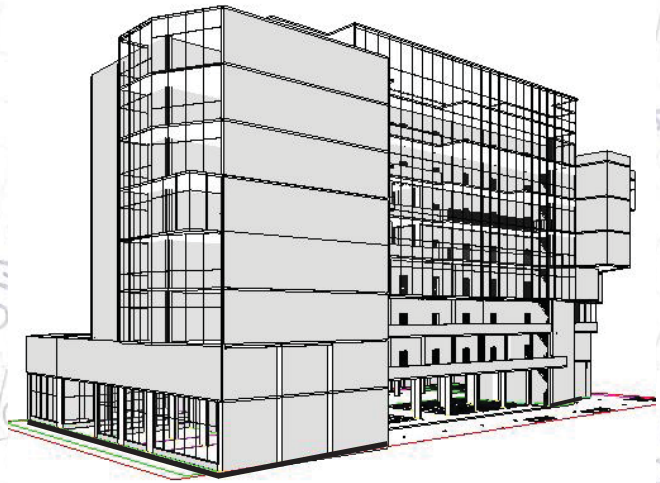

Fig 004.4.2: A perspective illustrating the new exhibition space (in the previous image) and the glass wrapping structure

Fig 004..3: The street perspective looking south towards Church Square. The exhibition space to the rear allows the building to showcase its contents

004-4.1 WOLTEMADE AS A DESIGN DEPOT - REVISION A

The first [re]vision includes a new public platform on the first floor aimed at drawing people in from the street and from the new link created to the north between the German Club and 215 on Proes Street.

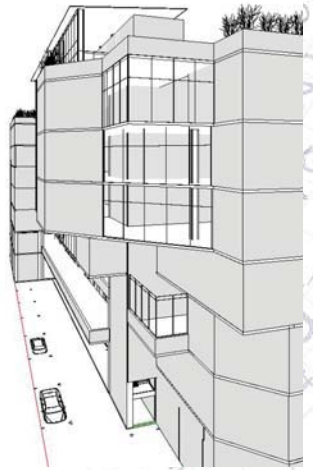

Fig 004.4.4: The south-east corner of the new intervention

Fig 004.4.5: The new stairs form part of the new link between the German Club and 215 on Proes leading up to the new platform. The new gallery and exhibition space is contained within the glass box

Fig 004.4.6: The new platform on first floor, otherwise known as intervention D, provides space for public activities to take place such as a market and dining areas. New planters are visible in the back

Fig 004.4.7: The new glass gallery box protrudes from the existing façade

Fig 004.4.8: Water storage tanks are provided under the market stall roofs

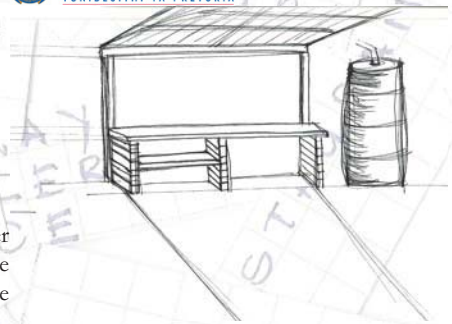

Fig 004.4.9: A diagramatic representation of what the market stalls could look like

Fig 004.4.10: The plan of the planter wall that occurs at the edge of the platform

Fig 004.4.11: An elevation of these new planters

Conclusion: This **[re]**vision of the Design Depot presented many valuable ideas that can be carried forward in further concept development. The first of one of these ideas is the inclusion of the new platform. Not only does it provide additional space to the entire building, but it also provides a public area which is not disrupted by the services and parking located on ground floor. In addition the platform **[re]**-sults in no floor spaces being taken away from the existing parking area therefore furthering the notion of flexibility.

The glass gallery box is another element that is explored in further development. The position of the Glass gallery box determines the starting point for Intervention B (the wrapping structure). These two points (glass gallery box and Intervention B) connect the building on a horizontal and vertical level.

004-4.2 THREE DIMENSIONAL EXPLORATION

Concept Model One: Southern Façade

The southern intervention on the Woltemade building, otherwise called Intervention B, is one of the larger interventions of this thesis project. The aim of this block is to provide additional space on the southern façade where activities are able to spill out from the variety of programmed units within.

This concept models investigates how the glass gallery box on the northern façade can be acknowledged on the new southern intervention. The design concept explored possible configurations of panels of framed glass. The inclusion of coloured glass is made on the façade only where the glass gallery box occurs while the **[re]**mainder of the intervention is completed with clear, opaque and translucent glass.

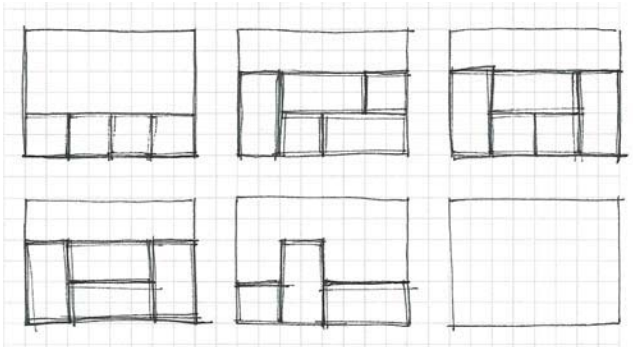

Fig 004.4.12: Series of images demonstrating possible glass panel configurations

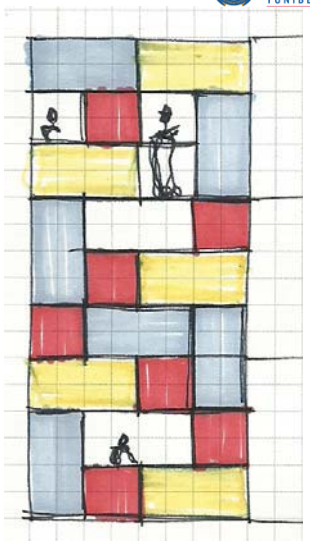

Fig 004.4.13: These images experiment with the **[re]**-lationship between coloured and open panels

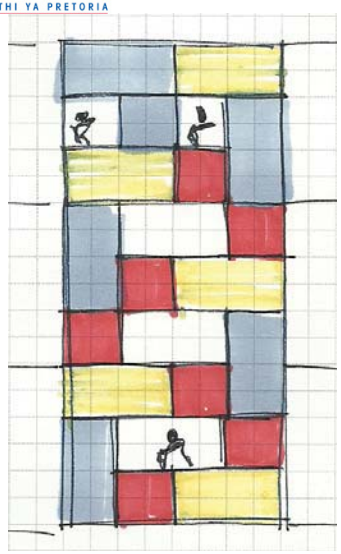

Fig 004.4.14: This coloured section of the façade is used to indicate the location of the glass gallery box on the north

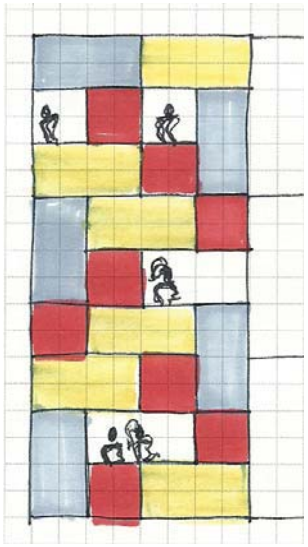

Fig 004.4.15: Colours used in the glass panels are the same in colour to the "balconies" on the northern façade

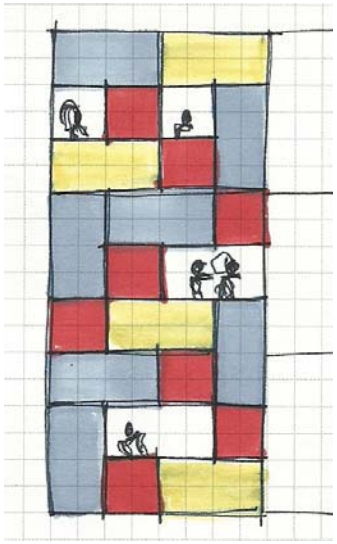

Fig 004.4.16: Sections are left open to take advantage of the views to the south

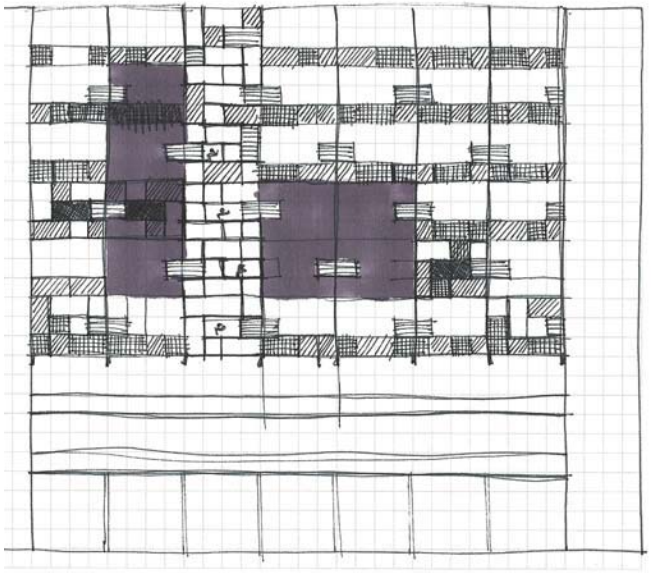

Fig 004.4.17: The southern façade of the Woltemade building indicating where **[re]**cesses occur behind the truss structure

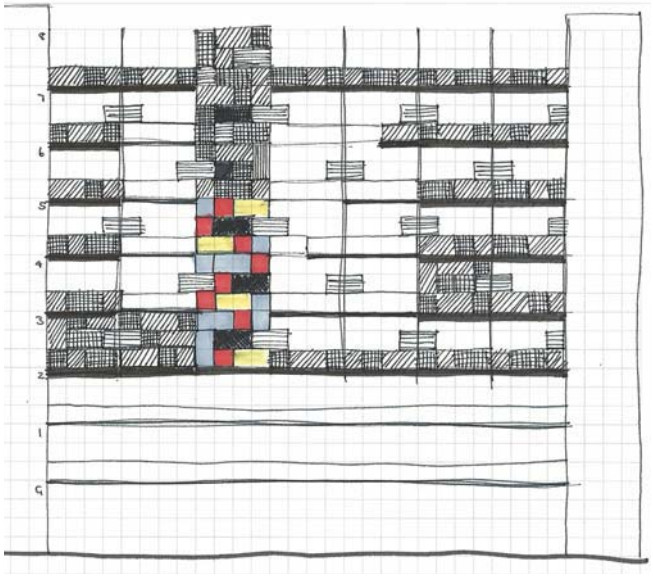

Fig 004.4.18: This image shows where the coloured panels occur on the façade in conjunction with spaces that are more enclosed

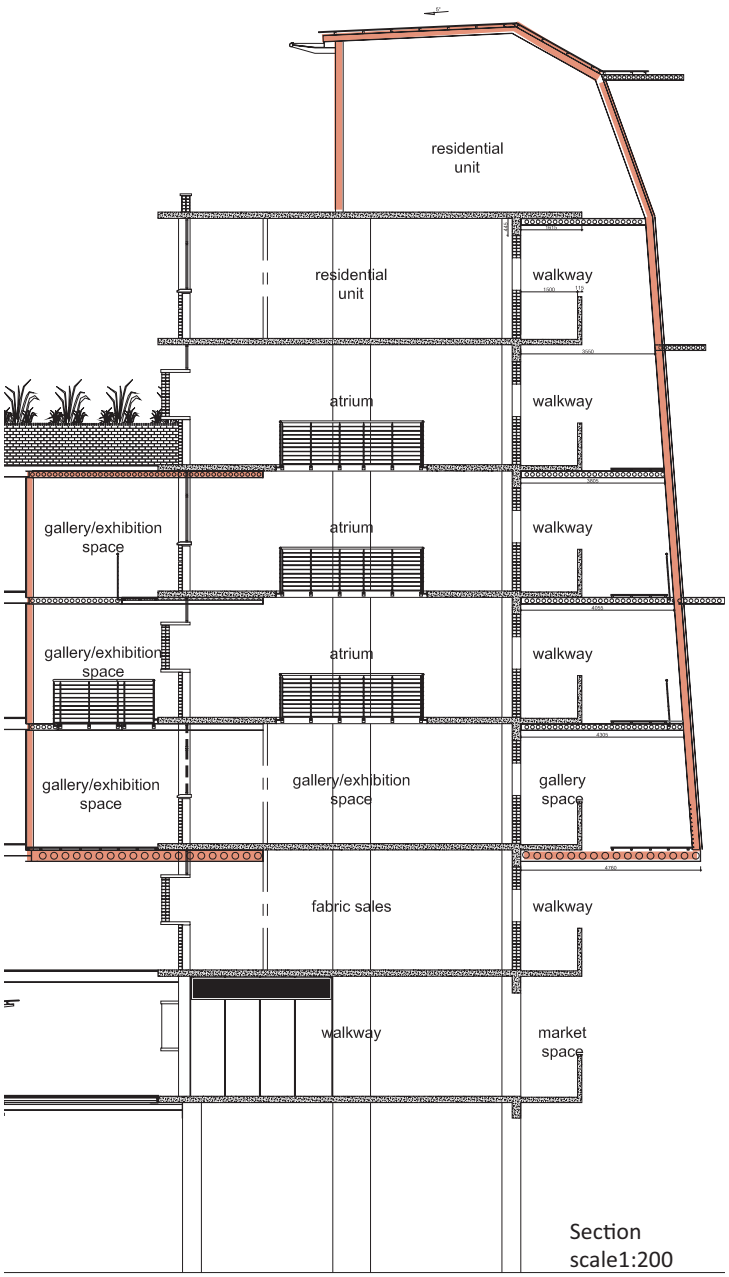

Fig 004.4.19: Section through the building. The glass box can be seen to the left while the wrapping structure can be found to the right

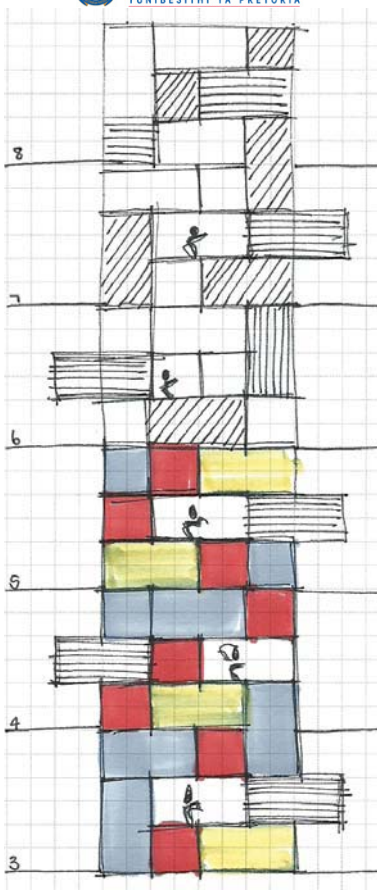

Fig 004.4.20: The configuration of coloured, clear, opaque and translucent glass extending the height of the building

Fig 004.4.21: South-east corner of the concept model with trusses wrapping the building

Fig 004.4.22: White, clear, translucent and coloured panels can be seen on the façade

Fig 004.4.23: Trusses wrap themselves around frames which are intended for residential units

Fig 004.4.24: Steel trusses define space with their change in shape causing a fan-effect along the walkway

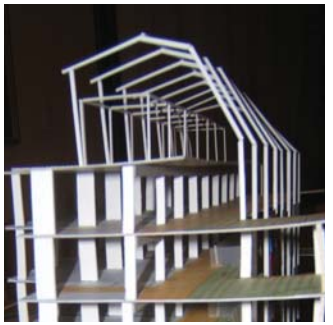

Fig 004.4.25: The wrapping structure defines space along the walkways

Conclusion: concept model one, utilises steel trusses which wrap around the southern façade while still **[re]**vealing the bottom edge of the host building. The northern façade is acknowledged on the southern façade by using white panes of glass to represent the balconies and coloured glass to indicate the position of the gallery box on the north.

Furthermore balconies are constructed using alternate sizes and panes of translucent and opaque glass.

Concept Model Two: Southern Façade

This concept model investigates how changing the shape of the steel trusses that wrap around the façade affect the space of the internal walkways.

The southern façade explores the use of different materials while at the same time **[re]**sponding to the surrounding environment.

Additionally this block controls the internal environment through the incorporation of solid, semi-solid and open screening elements. Internal activities and programmes are expressed on the exterior while at the same time **[re]** sponding to the surrounding context. This is achieved through the acknowledgement of the links to adjacent sites. Furthermore the new access point to the site is accentuated by dropping the panels past the base of the remaining wrapping trusses.

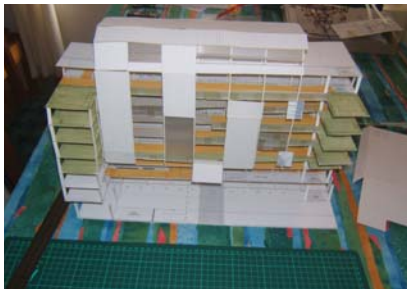

Fig 004.4.26: Corrugated panels run down the left hand side of the model, indicating more private areas such as meeting rooms. Large white panels mimic the positions of balconies on the opposite façade

Fig 004.4.27: The translucent area **[re]**-flects the position of the glass box on the northern façade. Screening panels are extended past the rest of the structure to indicate the entrance to the site below

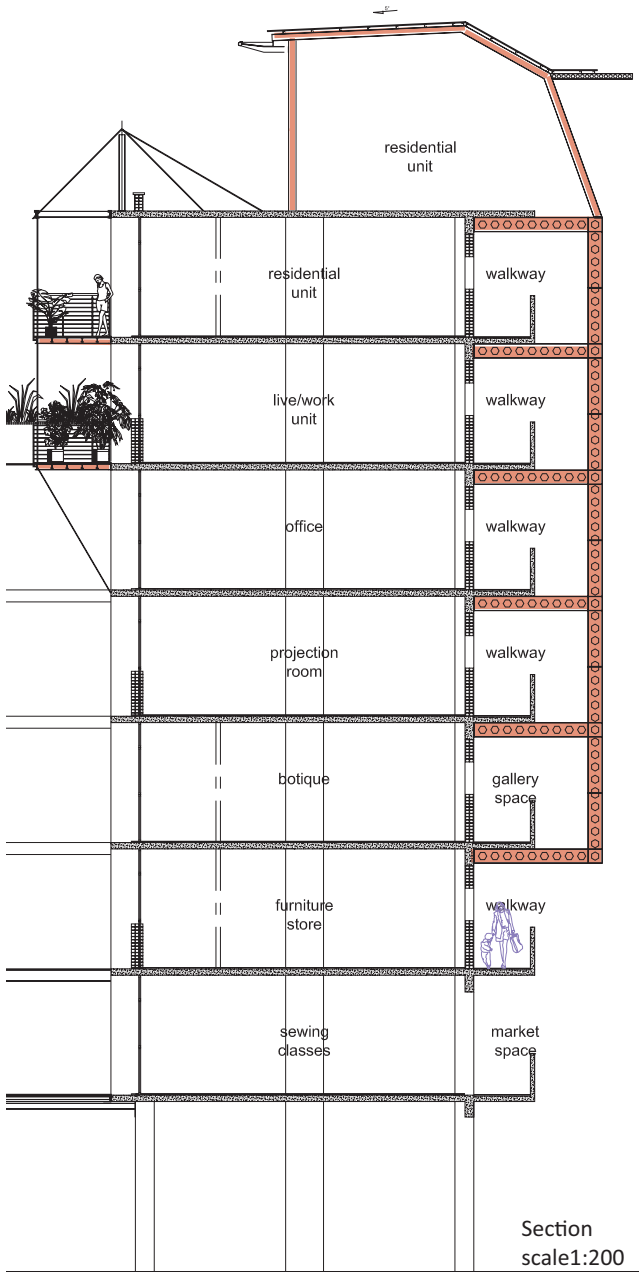

Fig 004.4.28: A section through the building. The wrapping structure has been **[re]**placed with a castellated beam. Even though there is enough head room the structure looks too bulky

Fig 004.4.29: Residential units can be found between the trusses that wrap themselves around the building

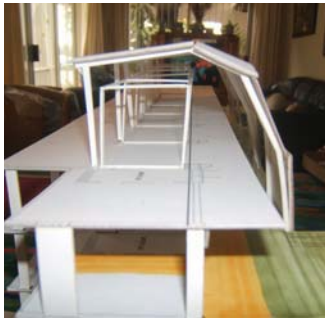

Fig 004.4.30: Trusses are regular in nature however the screening elements are not thereby allowing for different experiences throughout the space

Fig 004.4.31: Portions of the screening elements are fixed while others openable

Conclusion: concept model two, explores a different method of enclosing Intervention B. Portions of the buildings that are enclosed house private programmes like meeting or projection rooms. The translucent material indicates the position of the glass gallery box on the northern façade.

The most important **[re]**alisation of this exploration is that a steel truss system in not appropriate for this application as too much steel is used in **[re]**lation to the amount of space gained.

Fig 004.4.32: A photograph of the south-west corner of the concept model showing the **[re]**spective positions of different screening elements

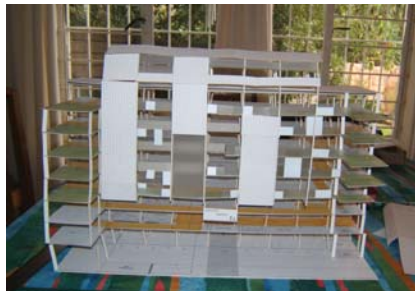

Fig 004.4.33: White panels have been included with the opaque and translucent glass. Large white panels indicate the position of balconies on the northern façade

Fig 004.4.34: A hanging floor is extended to indicate the entrance to the site below. This extension provides advertising opportunities

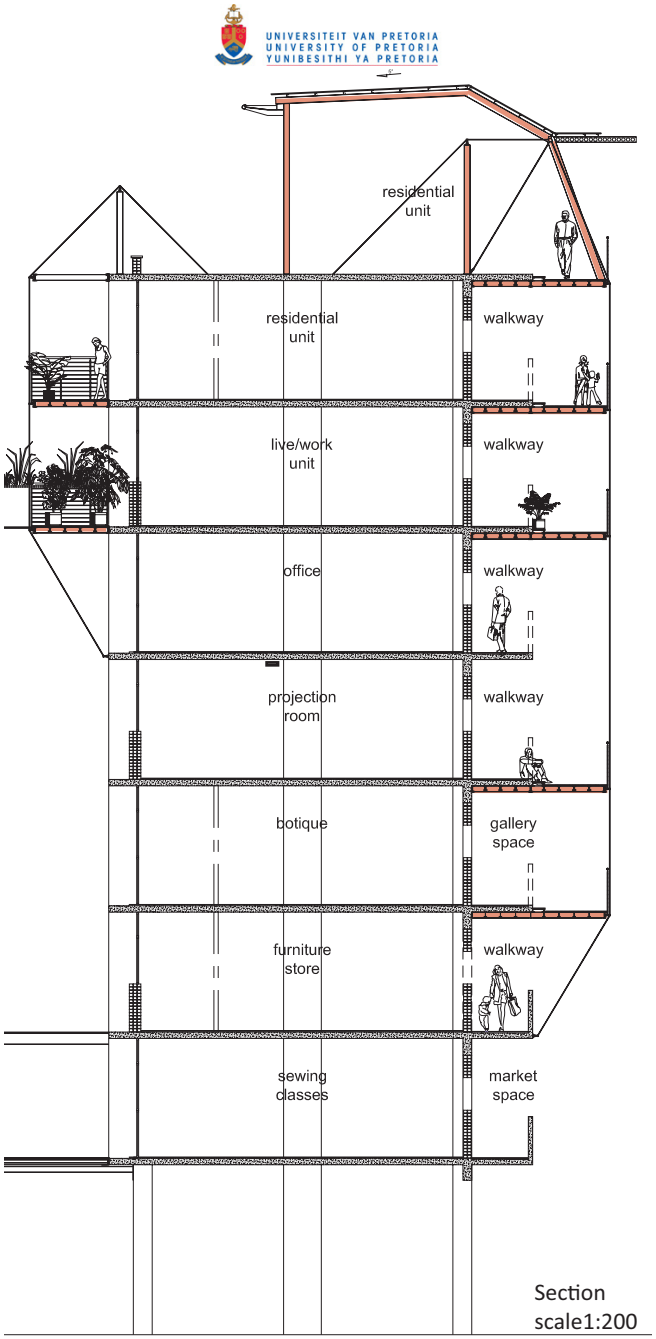

Fig 004.4.35: Solid trusses have been **[re]**placed with hanging floors **[re]**sulting in a much more elegant system

Conclusion: the section to the left demonstrates the use of a much lighter system that **[re]**quires less material to achieve the same goal. Hanging floors suspended with cables is therefore deemed the most appropriate system to implement for Intervention B as the most amount of flexibility is achieved with minimal material.

Enclosing materials **[re]**spond to the internal programmes, context and climate. Solid elements are placed in front of private areas and screens are placed in front of the circulation route, providing protection from the elements while still allow views so the south.

Residential unit

Residential units to receive hanging balconies suspended from cables. Each balcony is intended to be unique in character reflecting the personality of the occupant within.

Residential unit

Residential units to receive hanging balconies suspended from cables. Each balcony is intended to be unique in character **[re]**flecting the personality of the occupant within.

Office

Office spaces **[re]**quire light which is condusive to a productive workspace. Perforated screens will help filter light on a sunny day.

Projection room

Projection room require the most amount of controlled light. The room needs to be dark during daylight hours in order to view presentations, movies or hold conferences.

Boutique

[Re]tail spaces necessitates the need to provide a comfortable environment for visiting patrons. Merchandise needs to be displayed properly without glare in order to increase sales.

Meeting room

Meeting rooms call for less light than office spaces, however they still needs to be sufficient lighting to be a productive space.

Sewing classes

Workshops and other craft areas need to have sufficient light for tasks to take place therefore direct sunlight needs to be omitted.

Parking

Fig 004.4.36: A sectional model through the northern façade of the building. Various screening materials are used to address the programmatic needs of the internal spaces. These screens aid in a more comfortable environment