Design Development

John Maynard Keynes: "Practical men who believe themselves to be quite exempt from any intellectual influences are usually slaves of some defunct economist." (Groak, 1996:163)

DESIGN DEVELOPMENT

Fig: 136

Fig: 137

Fig: 138

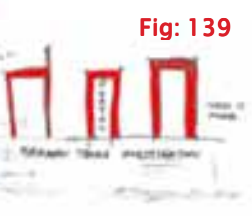


Fig: 139

Fig: 142

Fig: 141

Fig: 140

The Marabastad brand & street life

The future street façade of Marabastad will still have its busy and lively streets, businesses and street traders. Businesses on the ground floor can accommodate residential units on the top floor. Street furniture needs to be constructed by the municipality for the street traders and pedestrian pathways with a threshold (trees, art walls…etc) between the pedestrian route and vehicular road needs to be accommodated for.

Guidelines for developments in inner Marabastad should be mixed-use with both business and residential zones. Advertising could be linked to private business ventures, pedestrian walkways crossing vehicular routes should be raised, hawker facilities should be upgraded and be part of the streetscape and canopies over buildings should shelter pedestrians.

Heritage as guiding design principle: The Mariammen Temple and Southern Ndebele style

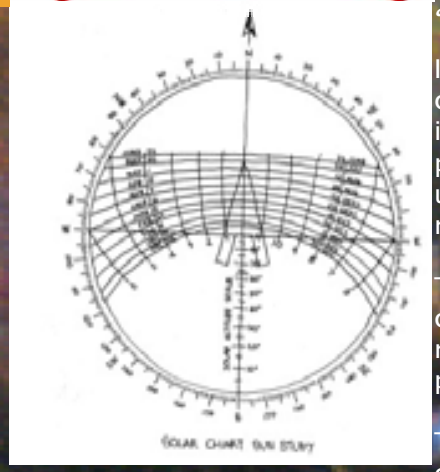
The entrance to any building needs to be clearly demarcated and the author was inspired by the local heritage and architecture of Marabastad, especially the Mariammen Temple as well as chief Maraba's Ndebele kraal.

The Mariammen Temple is fundamentally built up in layers of the vertical temple. The temple is a heritage project within Marabastad, therefore the new architecture should have clean lines as to not obstruct the temple from view and importance. The entrance feature to the proposed new facility should thus be a simple tower that utilizes the layering principle of the vertical temple.

Clockwise: (Figure136) Artistic impression of typical Marabastad streetscape of tomorrow (Author, 2009). (*Figure 137). Conceptual model showing Mariammen temple in its context between sixth street and fifth street (Author 2009). (Figure 138-139) Investigations into entrance portal/feature and technical resolution (Author, 2009). (Figure 140- 141) The Mariammen temple (Author 2009). (Figure 142) Site and context model (Author 2009).*

DESIGN DEVELOPMENT

(Figure143) Understanding wind and sun patterns of Tshwane. Predominant wind is from the north-east and south-east (indicated by red arrow) (Author, 2009).



(Figure 144) Solar chart sun study showing the different movement patterns of the sun throughout the year (Author, 2009).

Orientation: Wind and Sun

The author notices the global trend to be "GREEN" and follow "sustainable" practices. There is a modern global trend to make buildings ever more environmentally sustainable, and it is the architect's job to design buildings in such a way to minimize the carbon footprint of the building as well as the buildings dependency on mechanical ventilation. The author thus adopted a natural ventilation strategy to the building and minimizes the need for HVAC and high municipal energy consumption. This system consists of natural ventilation as well as the occupants option of using mechanical fans powered by solar panels located on the roof.

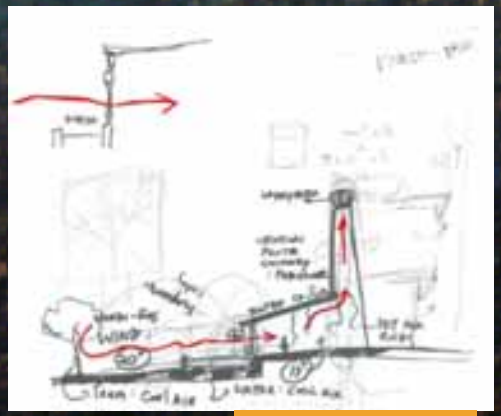
Natural ventilation is dependant on the orientation of the building and the best way to utilize natural ventilation is to understand the wind patterns of the context and the site. In Summer the predominant wind patterns of Marabastad are north-easterly to south-easterly and in Winter largely south-westerly and on occasion *north-easterly (see Site and Context table on page 23-24).*

In the final planning for the facility, the author designed "fins" to help capture gentle wind patterns which would aid the natural ventilation inside the building. Also, it was best to make the building as narrow as possible to minimise large covered spaces where air flow is poor. The use of this strategy is limited and can be used in gentle breezes and in narrow open plan spaces such as the workshop spaces.

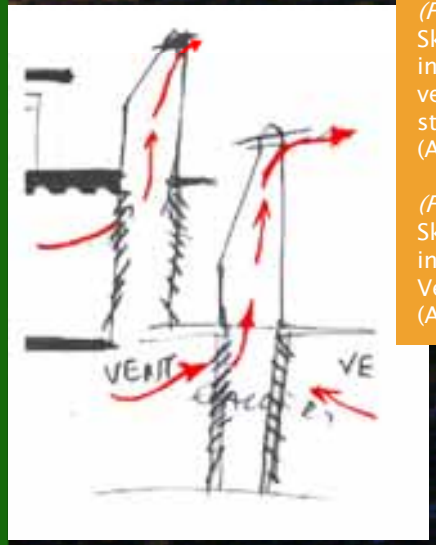
The orientation of the building also affects how the sun impacts internal climates within the building. The author orientated the building northwards in order to capture and make use of the Sun in the best possible way.

To further utilise the wind and utilize cooler air flow, evaporative cooling in the form of a water feature or trees is placed in front of the building. The theory is that wind would pass over the water feature (becoming cooler) and through the building, thus in summer bringer cooler air into the building.

DESIGN DEVELOPMENT



(Figure 145) Sketch investigation into ventilation strategies (Author, 2009).



(Figure 146) Sketch investigation into Venturi chimneys (Author, 2009).

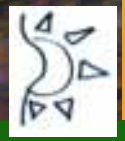
Energy: Photovoltaic Panels

To minimise electrical energy consumption from municipal lines, solar photovoltaic panels are placed on the roof facing north. The ideal orientation for photovoltaic cells in Pretoria is 30˚ for maximum use of the sun. However, the roof for the proposed facility is a mono-pitched roof and to build a roof pitch of 30˚ is neither feasible nor particularly practical and would produce countless economic and structural problems. The author added the photovoltaic cells to the 10˚ roof pitch as the panels would still receive energy because of the northerly orientation. The solar panels are designed to provide power for electrical lighting, heating of geysers, oxygenation (pumping) of water feature and to power the internal mechanical fans.

A battery room had to be accommodated for in the accommodation and the author assumes that solar batteries and panels will improve over the course of the next 15 years. It is not the size of the battery that counts but the weight of the battery and the technology used inside the battery. Therefore smaller battery rooms powering large buildings are a possibility for the future. With the advent of electrical cars and improved lithium batteries of our time, solar powered battery rooms would almost certainly become a prominent feature in contemporary sustainable design.

Venturi flute stack chimneys and ventilation strategies for large covered spaces

Areas such as the main gallery space, basement parking and pottery workshops required a different ventilation strategy. These areas are large covered spaces and the gallery and pottery workshop are squeezed between the two towering buildings and hence don't benefit immensely from the predominant south-westerly and north-easterly winds. Therefore combining Venturi's flute principle of a larger base area of the chimney and narrowing as the taller the chimney helps the circulation of air through the space. A whirlybird or roof turbine is placed on the top of these chimneys to reinforce the circulation of air outwards. Internal mechanical fans are also used to control the internal climate.



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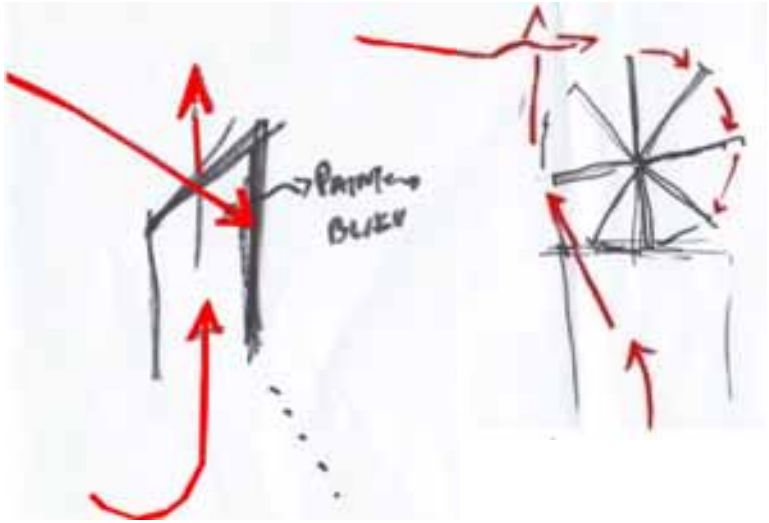


(Figure 147–149) Sketch investigation into ventilation strategies (Author, 2009).

The ventilation chimneys are a very important key part of the design as it extracts air from the internal ducts. To improve the efficiency of the chimneys, whirlybirds or roof turbines are attached as well as the exterior of the *solar chimneys* protruding from the roof are painted black to maximise hot air moving out of the chimneys (*stack effect).*

Solar chimneys

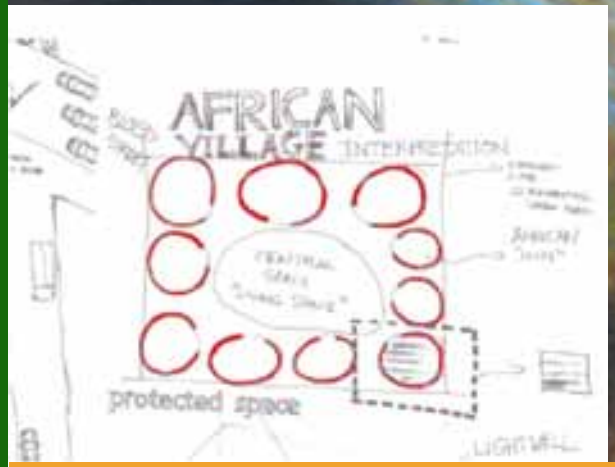
By utilizing the energy of the sun can be used in improving internal climate. Solar chimneys are painted a dark colour, thus absorbing more heat from the sun and allowing warm air to rise much faster.

Natural Gas

As mentioned in the Brief, the building has a residential component to it. In facilitating sustainability in the area means to use sustainable measures and practices. Such as simply using aerated shower nozzles in showers to save water. The author identified that what consumes a lot of energy consumption in buildings is cooking. Therefore the author made provision for natural gas canisters to be placed in the building and used to power the hot plates in the kitchens.

Cooking with gas is more sustainable than cooking with electricity. Using gas for cooking in the residential area will also ease the demand on the lighting requirements of the building and solar battery room. The energy stored from the sun will be reserved for lighting the building and external areas as well as heating the geysers and providing power to the mechanical fans.

DESIGN DEVELOPMENT



Above: (Figure 150) Sketch investigation into central courtyard space (Author, 2009).

Central Courtyard Space

The way African communities planned their vernacular dwellings such as the Kasiyulili village (northern Ghana) influenced the author's decision to place a courtyard central to the building plan. This courtyard is a relaxing space within the scheme and is a semi-private space that is also a protected space by means of surveillance as the surrounding buildings are "wrapped" around that space.

Design and Structural Investigation

The designing of the structure went through a number of phases which aided in building the final product. Namely *sketch plan 1* and *sketch plan 2.*

Above:(Figure 151) Site and context model (Author, 2009).

Left and far left: (Figure 152 & 153) Concept sketch plan 1 and interim submission (Author, 2009).

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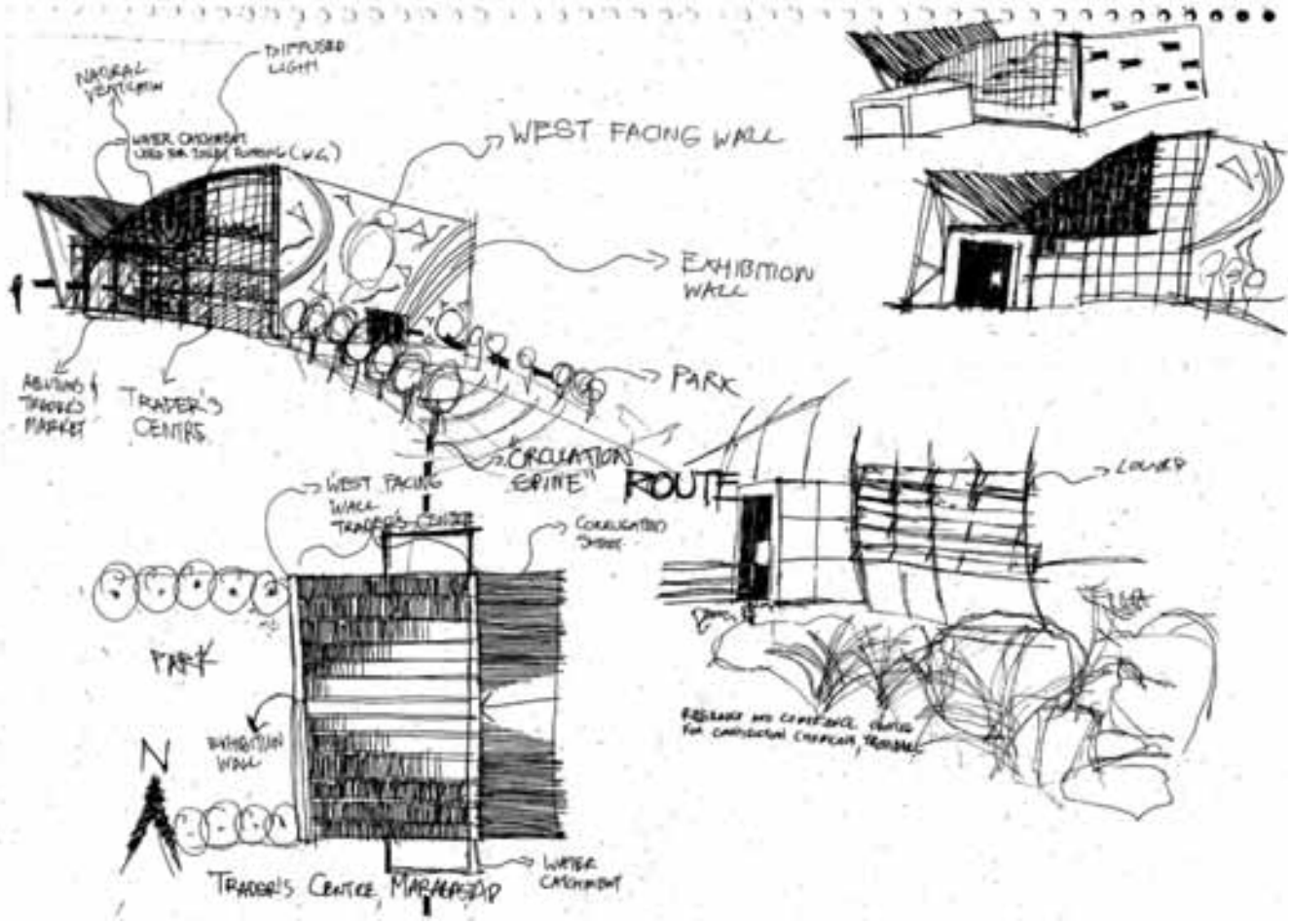
(Figure 154) Collage of conceptual sketch plans 1 & 2 and interim submission (Author, 2009).

(Figure 155) Conceptual sketch plan 2 and interim submission, This proposal turned out to be impractical and did not fit into the context of Marabastad (Author, 2009).



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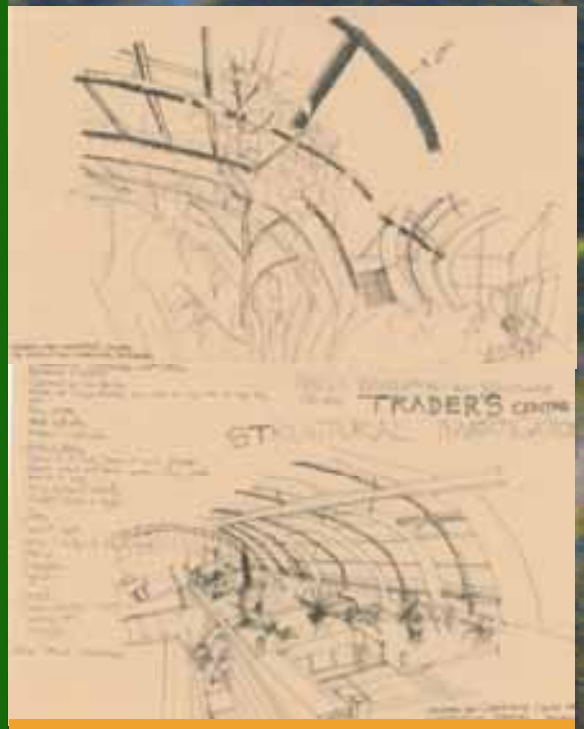


(Figure 156 & 157) Research and concept sketch 2. The precedent used is the Research and Competence Centre for Construction Chemicals, Trostberg (Author, 2009).

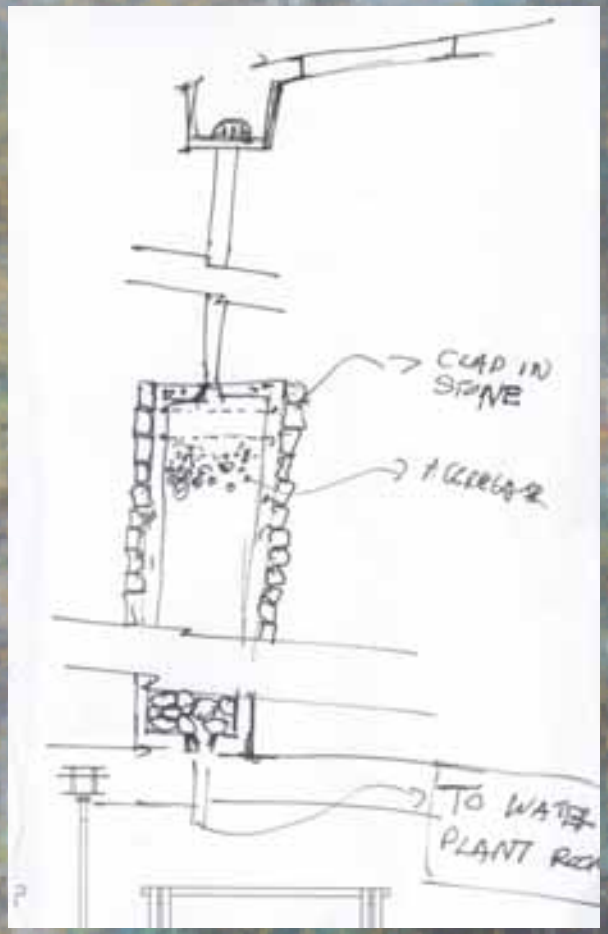
The concept sketch plans followed different paths and have different forms associated with them. The author decided to proceed to the next level of design with concept sketch 1 as it is a design that related to the context of Marabastad better.

Water Reticulation and Stormwater Management

The author thought it best to utilise all the rainwater runoff and stormwater runoff and direct it to on-site stormwater tanks. The rainwater in these tanks would be used in watering landscaping areas as well as in the flushing of toilets. The stormwater will go through a filtering and be purified before re-used in the building. This would equate to sustainable use of grey water as well as minimizing the amount of water leaving the site and entering municipality stormwater drains. The water that is forced to leave site (in the case of tanks reaching their maximum capacity and hence requiring water to be pumped out) and enter the stormwater drains would go through a system that purifies and cleans the water, thereby cleaner water enters the municipality stormwater drains and South Africa's rivers.

The downpipes become internal space features and on the first floor are the filtration unit clad in stone. On the ground floor the 110mm dia. downpipes feed stormwater drains directing stormwater to the basement tanks. Waterproofing is essential and the detailing of the stormwater features are extremely important to prevent flooding of the areas or leakage. When building the structure, supervision of such features needs to be consistently moderated on site by an architect and water proofing specialists. Stormwater from the flat roofs is directed to the courtyard space stormwater drains using appropriate falls. The stormwater passes through a full bore outlet and into a reinforced concrete stormwater channel. From there it reaches the ground floor and a fall directs it to the removable stormwater mentis grating and down to the basement where it is directed to the water reticulation plant room.

The water reticulation plant room can hold a maximum of 40 000 litres (2x 20 000 litre tanks) and the grey water plant room can also hold a maximum of 40 000 litres. This is to maximise the use and collection of rainwater and limit the amount of water leaving site.



(Figure 158) Investigation into filtering of stormwater system Author, 2009).

In the event of heavy rainwater showers and where the tanks have reached their limit, a ball lever placed in the tanks will expel the excess out and pump out the excess water to municipality stormwater drains.

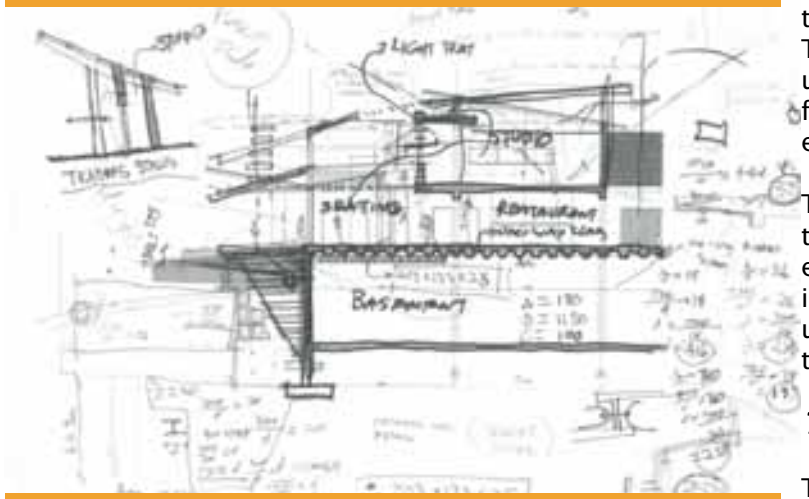
Filtration of the stormwater is important as dust can build up on roofs and cause unsightly darkened water to those wc's (water closet) using grey water for flushing. The stormwater being reticulated to be used for flushing waste thus needs to go through a filtration system to eliminate dust.

In some areas such as the north façade filters access points are limited. A built in ladder is placed in order for easier access to the top of the gutter filters.

Solar water purification system

Stormwater coming from the roof needs to be purified before it enters the water reticulation system. The author investigated another way of purifying the water collected from the roof such as using a solar water purification system. This water purification system would need to be custom built within the actual tanks and be done by a specialist. *[Note: the author however did not use this system in the final design as it is a relatively new system and one that is not well known and practiced in the South African construction industry.]*

Figure 159) Sketch plan 2 investigation into how roof forms can aid the collection of rainwater. This rendering informed the author on the possibilities of form vs. function. Sketch plan 1 was however used in the final design process and the curved roof element was removed (Author, 2009).



(Figure 160) Preliminary section and preliminary calculations of components (Author, 2009).

Which roof is best for rainwater catchment?

The author investigated different roof methods for the proposed facility including a curved roof that would catch water and direct it into a stormwater drain. This however proved to be too expensive, impractical and not a building that would easily 'sit' within the context of Marabastad. The roof of the building should not 'over-empower' the neighbourhood and should 'sit' comfortably in the context of Marabastad.

Sometimes the simplest solutions are the most appropriate solutions and a mono-pitched roof was rather incorporated in the building.

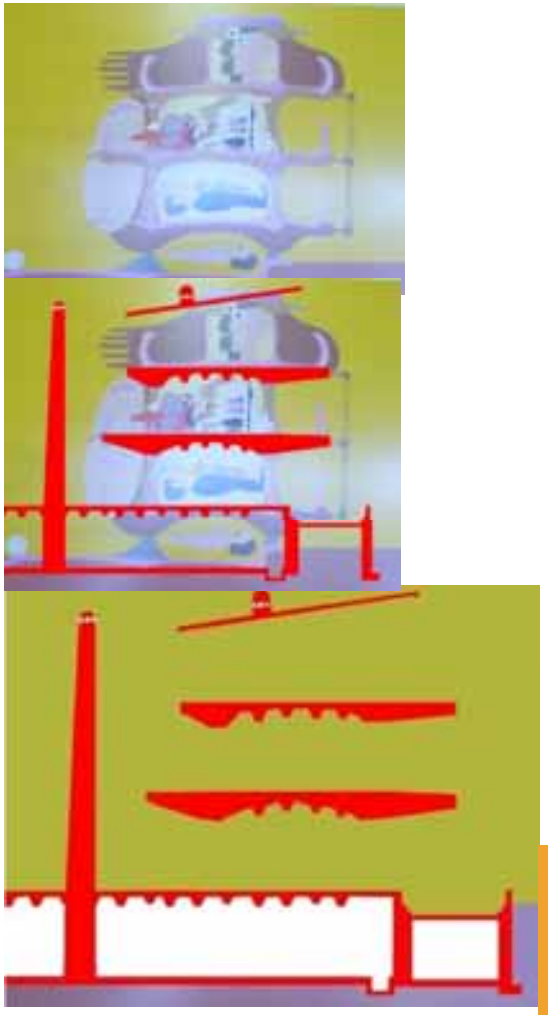
Local Material= Low Embodied Energy of Building

Local materials were only used in the construction of the facility as this utilises the least amount of embodied energy. Therefore there would be an economical saving in the choice of material. This would be beneficial economically as well as reducing the unnecessary ordering of materials from overseas which would further increase costs as well as increasing the buildings embodied energy (transportation costs, fuel usage...etc.).

To further save on costs, calculations were done on the sizes of the members within the building. Local material usage is not enough, the actual relevant sizes of the members is of utmost importance. The calculations were done by the author in order to use the most economical size of each member and thus utilizing the clients budget to the fullest.

The section

The final design depended primarily on the original section and calculations of components *(see figure 160).*



Experiment using the painting of the 'Smiling Lion'

ARTISTIC INTERPRETATIVE FORM TRANSLATED INTO ARCHITECTURAL PHYSICAL FORM. The paintings cantilevered slab section makes structural sense with the thickening and form of the slab in the painting. The author realised that structure can be manipulated into 'EXPRESSIVE' design qualities in building. The authors investigation into Art and Architecture carried through to the section.

How the experiment was conducted:

- *The author started off with Pancho Guedes' painting of The Smiling Lion apartment section-1982 (Guedes, 2009).*
- *The author then created a parti diagram section of the proposed new Marabastad Traders Centre for Arts and superimposed this parti diagram onto the painting.*
- *The author then removed the painting and the parti diagram remained. It was noted by the author that Pancho Guedes's form of the painting is similar to the structural form of the proposed new Traders Centre for Arts.*

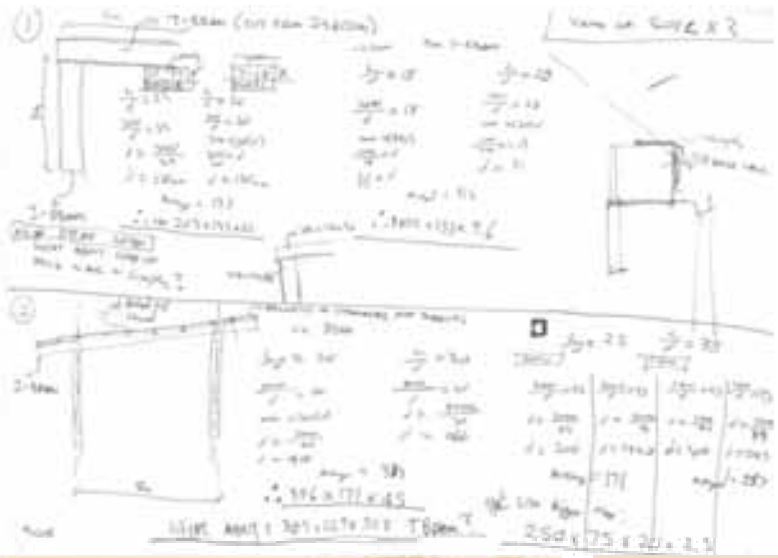
Conclusion:

- *The experiment proves that art can influence the overall structure of an architectural model in terms of form.*

(Figure 161) Painting based on 'Smiling Lion' apartment section-1982 (Guedes, 2009).

(Figure 162) Parti section of Marabastad Traders Centre for Arts superimposed onto the Smiling Lion paining (Author, 2009).

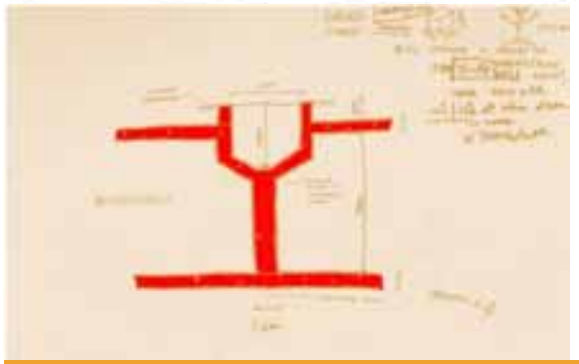
(Figure 163) Parti section of Marabastad Traders Centre for Arts (Author, 2009).

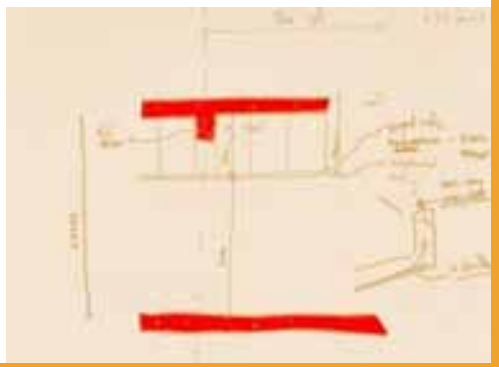


Calculations of components

To maximise the economy of the building. Calculations were made on the member sizes of each component using Andrew Orton's *"The way we build"* method.

It should be noted to the reader that the final calculations are to be done by a qualified engineer or structural engineer. The calculations informed the author on appropriate sizes to use and made the building more structurally and economically sound. The members chosen are both practical and well known by South African contractors which mean that the building would be easier to build and more cost effective.





*(Figure 164-167) Authors calculation of structural component sizes (*Author, 2009).

*(Figure 168) Investigation into skylight detail (*Author, 2009).

*(Figure 169) Investigation into brise-soleil (sunscreen) detail (*Author, 2009).

Acoustic factors

The design is located next to busy roads (Bloed Street and 4th Street Extension). To counteract from noise pollution the author used *double glazing* in windows to reduce the amount of noise coming from the street. Perforated mineral wool acoustic tiles are placed on suspended galvanized steel brandering. These tiles are removable and can be replaced.

Double Glazing

Double glazing is applied to the windows of the centre. The primary function of double glazing is to improve the thermal insulating properties as well contribute to safety, security and acoustics. The building is situated close to the busy Bloed Street and it is essential to combat the noise pollution from the street by using double glazing as a tool (Eagledoor aluminium windows and doors, 2009).

Brise-Soleil (Sun screening)

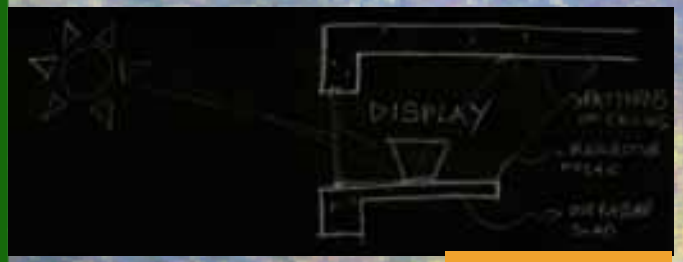
To combat the harsh sun adjustable brise-soleil or sunscreens are placed at the window locations. Angles of the brise-soleil depend on the angle of the sun and on which façade the brise-soleil will be located such as the north façade in comparison to the west façade.

The path of the sun and *azimuth* angle of the sun is much higher during noon whereby the sun is higher up and directs solar rays from a higher angle onto the northern façade of the building. Approaching sunset the suns path and azimuth angle is much lower and thus directing solar rays comparatively lower on the western façade of the building. The treatment of the sunscreen detailing thus needs to change in accordance with the suns path around the building.

Natural Light

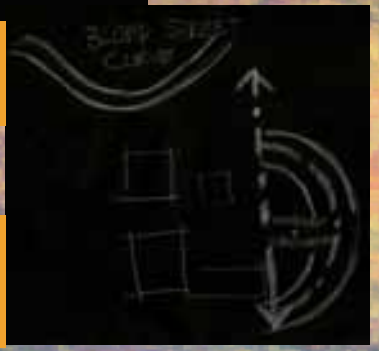
Crucial to work spaces in the building is the quality of light. Large glazed curtain wall panels are placed facing south to bring maximum natural light into the workshop spaces. On the outdoor view ports skylights are placed to bring in natural light into the pottery and gallery spaces.

DESIGN DEVELOPMENT



(Figure 170) Investigation into reflective mosaics on top of light well (Author, 2009).

(Figure 171) 5th street pedestrian spine (Author, 2009).



(Figure 172) Investigation into pedestrian circulation (Author, 2009).

Skylights facing north had to be given a different treatment and needed to be sheltered from the harsh sun. Sun screens were placed in the case.

Light wells *(figure 170)* are placed at the overhead clerestory windows to allow low-angled sun rays to hit the reflective 'coloured' and mosaic patterned overhead slab which will then project coloured patterns on the internal unfinished soffit of the slab, as well as bringing in light. This overhead clerestory also acts as a display to onlookers of the building and this coloured ceiling with patterns will draw the viewer to the items on display.

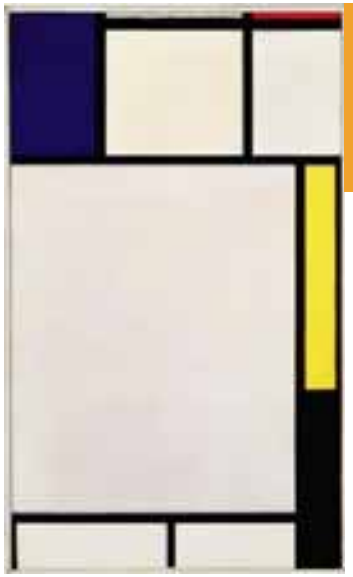
5th Street north-south Axis

One of the most important aspects of the group framework was the 5th Street pedestrian spine. One of the goals for the future planning of Marabastad, as seen by the author, was to create a pedestrian friendly environment. The positioning of the building on site had to relate directly to the new movement patterns of the now pedestrian orientated street. The building had to have a central courtyard and this central courtyard had to be intersected by 5th Street. Therefore the placement of the building related to the pedestrian movement patterns of 5th Street.

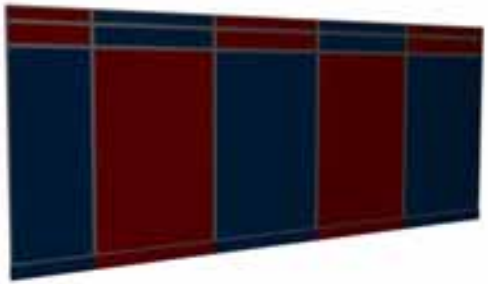
How to capture movement

The entrance to Marabastad is greeted by Bloed Street curving and this curve leads up to the proposed site. The author wanted to emphasize this curve on the ground floor plan as that is the level generally associated with people visiting the building. To capture movement into the pottery spaces and allow tourists to have the opportunity to view how items are made, the curved walls "draw" in the pedestrians and allow them to circulate through the pottery workshops.

The gallery draws in pedestrian movement in a different way by the use of a diagonal line. This wall line directs occupants through the central courtyard and to the entrance of the gallery.



(Figure 173) A composition by the artist Piet Mondrian (Mondrian, 2009).



(Figure 174) Panel details for art screens located at ablutions and gallery spaces (Author, 2009).

Colour is a tool in Art and Architecture

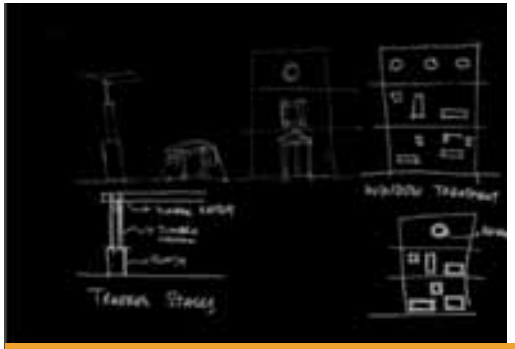
The artist Piet Mondrian inspired the initial choices of colour. The subject matter in his *De Stijl* paintings is coloured rectangles and is a minimalist way of painting using few colours. Colour is important to artwork, the author demonstrated with his own artwork whereby the artworks expressive quality lied fundamentally in the use of colour. The proposed facility also utilizes colour as a tool through expressive use of colour in the painting of the building. The occupants housed in the facility are of a creative nature and the exterior of the building should symbolize that.

The author first experimented with the exterior of the building and the colour co-ordination was inspired by an Ndebele influence and thus the façade was treated as a canvas whereby use of the primary colours: red, blue and orange were chosen by the author to best express use of colour and how it can relate to an architectural form. Applying artistic techniques in architecture such as the simple use of colour can create an awareness to the building that is fun and exciting to the arrival of a visitor to the building.

The author found that the use of these three stark colours brought way too much emphasis on the building and a Minimalist use of colour would be as effective. The author then chose red as the primary colour to draw emphasis to the building *(however still maintaining the use of the other colours).*

Light and colour shape internal environments. North facing skylights such as in the mosaic design studio and African handicrafts and motifs studios are clad with a transparent coloured UV sheet which shapes the internal environment through the use of light and colour. The use of colour of these sheets was inspired by colourful Southern Ndebele styled huts.

The author used the African Craft Market in Rosebank to finally make the final decision for colour for the building. The African Craft Market has rich earth colours which highlights an ‘urban African icon’ (Digest of South African Architecture, 2001) and the ‘feeling for colour association with African’ is what the author is experimenting with. Colour chosen is both earthy, lively, expressive and exciting. Colour can be a tool to portray the lively neighbourhood.



(Figure 175) Sketches of window placement (Author, 2009 + study leader sketches in lighter pen).

(Figure 176) Model showing view port to Jazz Centre (Author, 2009).

Window placement

The placement of windows is crucial to the character of the building. In the case of the facility, an expressive and yet creative manner of placement of the windows would justify the creative and artistic talent housed inside the building. The author decided to draw reference from contemporary Dutch architecture as the placement of these windows are both creative and aesthetically pleasing.

The placement of the contemporary Dutch windows almost resembles a kind of 'order in chaos' where it may seem the windows to be of haphazard placement but are actually placed in order of view, natural lighting or ventilation.

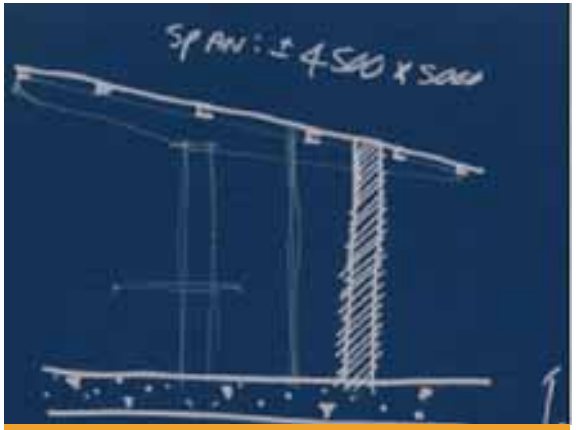
View ports to Jazz centre and inner city

The building is designed so that 'play' areas are located on the first floor. These 'play' areas are recreational space where an artist can leave the study, relax in these spaces and gaze to the Jazz Centre as well as central Marabastad. The spaces also offer views to the city, views to the traders market areas as well as the courtyard space. Since the view ports are located on a higher level such as the first floor, this would allow the viewer to view the Jazz Centre as well as the city unobstructed by trees.

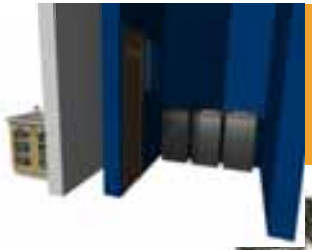
Texture

As shown in the precedents, texture is an important quality in architecture and this can be seen in the use of surface texture such as stone. The author decided to address the curve walls using brick as a surface material because it has a more 'heavier' presence than the 'softer' and 'lighter' primary colours used in the first and second stories. It is also a material that ages well and does not require much maintenance. The brick walls also aid the pedestrian movement patterns as their different texture guides the visitor to the gallery and pottery spaces.

Artist's walls are created where the artists at the centre can start "field trips" around Marabastad and be commissioned to actually paint on the provided artists walls which can be updated regularly.



(Figure 177) Original sketch of trader's stalls (Author, 2009).



(Figure 178) Model showing bin areas, gas canisters for kitchen stoves are also stored in bin areas (Author, 2009).

(Figure 179) Model showing trader's stalls (Author, 2009).

Storage Space

Storage space is necessary for the traders. The author noted that security of these items need to be addressed and lock up units on the ground floor next to their traders spaces would be insufficient security as padlocks can be broken. The author thus decided to place a storage facility in the basement for the traders and there is a storage space under the ramp, where there is enough head room and space for storage of artworks and materials from the art workshops. This storage facility can be accessed at the beginning of the day and locked up at the end of the day.

Storage for excess items made at the arts department can be stored in the basement as well and can be collected by vehicular transportation. The author made provision for occupant storage lockers as well as storage racks for pottery located in the pottery and art workshops.

Bin areas

Although the author strives for an efficient design and maximise use of materials, areas such as the carpentry and furniture workshops generally produce waste such as cut-offs. These workshop spaces need bin areas provided in close proximity and the service of the bin areas needs to be done on a regular basis. Since these particular workshops were located on the first floor a lift had to be placed in the building to service these areas. Ventilation of these bin areas are controlled using whirlybirds and chimneys.

Adaptability of traders stalls

The author designed the trader stalls to be as adaptable as possible. The three important criteria governing the design of the trader stalls were provided shade, water and electricity. To provide shade pergolas with latte screening were used as well as providing seating space and a slab platform for the traders to place their produce on. The next step was to identify key points to place water fountains to be used by the traders and the general public. The last criteria of electricity was to place sufficient workable light levels for the traders if there are functions at night such as a major performance in the Jazz Centre or an art show in the gallery.

(Figure 180) Investigation into stormwater channels (Author, 2009).

(Figure 181) An example of a threshold space. The outdoor seating area facing Bloed street becomes a threshold because of the positioning of the trees as well as the panel detailing between these two spaces (Author, 2009).

Building Services

It is important for the architect to make sure that all building services can be accessed and be placed at suitable locations. Where a duct is deemed necessary for the top floor, the "wet" areas on the floor beneath should be located in close proximity to the duct to minimise costs of separate ducting.

Also in terms of sewerage leaving the building, the author noted that suspended ceiling needed to be placed in order to omit from view these unsightly drain pipes.

Thermal Insulation

Cooling the internal air and natural ventilation strategies is a major priority inside the building. Natural ventilation of roof ceiling spaces (such as relying on wind) may not be the most effective in cooling the air in summer months. Thermal insulation is more effective in protecting the interior from heat gain in summer and loss of heat in winter. The thermal insulation used in the centre is Sisalation 405 multi-purpose grade with all overlaps being taped.

The mono-pitched roof and suspended ceiling is designed so that when hot air rises it will follow the slope of the ceiling and escape through a vent at the top opposite corner of the ceiling.

Oxygenation of water features

The water features designed around the north-eastern, east and south-east façade have become part of a 'threshold' space separating the traders from the workshops. These water features need to have a system that keeps the water healthy. One way to achieve this is to make sure that the water is not stagnant to prevent mosquitoes from nesting there. To make sure there is a continuous flow of water the author envisaged a pump system that would maintain movement of the water powered by a solar power.

(Figure 182) Image showing central courtyard and grassed steps (Author, 2009).

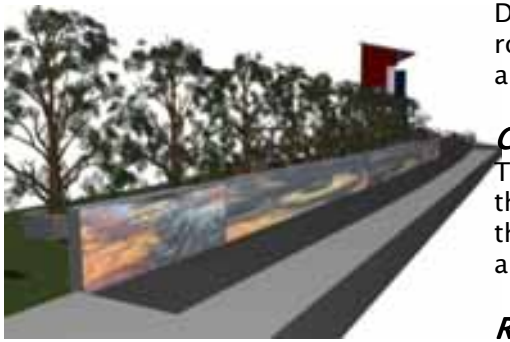
(Figure 183) Detailing of entrance portals (Author, 2009).

Grassed courtyard steps and entrance portals

From the beginning of the design process, the central courtyard was viewed as a 'private' space. The author envisaged this space as a 'break' area or 'threshold space' from the busy north-south pedestrian spine. To accomplish this transition from public to 'private' involved raising the courtyard to a higher level as well as defining the courtyard transition entrance point (in this case the steps). The steps were detailed to become grass steps and marked the entrance into a more natural and 'private' space. These grassed steps symbolize the transition into a natural environment.

Marking the entrance point to the building is important in terms of how pedestrians enter the building. The author used entrance portals with perforated galvanized steel sheets with a pattern detail that resembled Ndebele triangles, rectangles and circles. This detail links back to historical connotations of the context. The detail was also used to create a threshold for the outdoor seating area and 'shelters' the occupants from noise pollution coming from the busy Bloed Street.

The detail also plays with the lines from the Mariammen Temple. The Mariammen Temple has a larger vertical line defined by its height and more detailed horizontal lines. The final design thus has a strong emphasis of the vertical line in the form of the entrance portal and the much more detailed lines borrowed from the Mariammen Temples use of sculpture decoration and detailing on the façade.



(Figure 184) Model showing art walls (Author, 2009).

Art walls

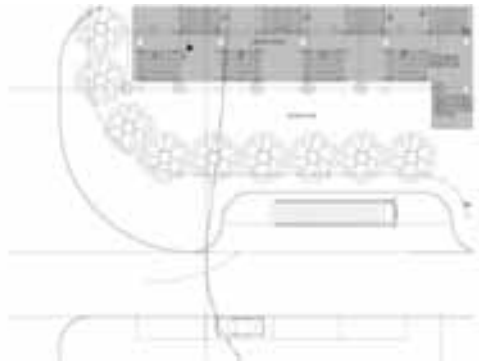
Art walls are placed along Bloed Street which also forms part as being 'barrier' walls to prevent jay-walkers from crossing the street at undesignated points of the road. Designated pedestrian routes are marked with paving and where it crosses a vehicular route it is raised. Pedestrians should use these raised platforms as they are much safer and designed for the pedestrian.

Community participation and Interaction

The author from the beginning of the document set out to improve the quality of life for the whole community and one way of doing this is to create jobs. Paving to all areas of the traders market will be laid by community members under the supervision of the architect.

Restoring a residential community to the neighbourhood

The Marabastad of the past was built up of residential families. Today that aspect is almost lost. The author believes in the Compact City approach and creating a mixed-use environment. In that way a traders market, art studios and workshops are all integrated with residential units at the top floor.



(Figure 185) Plan showing bus stop (Author, 2009).

Tourism

Integral to the economic sustainability of the proposal is tourism. The author designed the site so that it could accommodate tourist buses and the newly implemented BRT system that is taking shape through all South African cities. The tourist buses will come from Bloed Street, enter through the 4th Street extension, and park at the available bus stops on the *New Street*. The exit is *through 7th Street.*

A Marabi Tour of the neighbourhood can become part of the tourist package offered to the tourists. A tour guide can be met at the Tourist Information Centre where maps, books and merchandise of Marabastad can be sold. Tours through the art workshops and facility can be done before the main tour through Marabastad and visiting sites such as the Mariammen Temple, landscaped areas of the parks designed by the landscape architect partner (Marabastad Group work team), Jazz centre, the performance centre designed by an associate architect partner (Marabastad Group work team) and the rest of the Marabastad neighbourhood which should also become part of the municipalities future plans for upgrading the area.

(Figure 186) Plan showing parking space which also opens up to being a 'Weekend Trader's Market' (Author, 2009).

Teamwork and project partners

Important to any large urban project proposal is the interaction between team partners and architects. The 2009 Marabastad Group work team consisted of two architects and one landscape architect. Group work and team meetings were held in order to generate a balanced urban scheme proposal for the study area.

Parking

Marabastad has a problem in terms of insufficient parking which would also serve as a problem when there is a huge performance or gathering at the Jazz Centre. The author designed the facility to accommodate not only tourists and the occupants of the building; but also for those visiting the Jazz Centre for a performance. The group work proposal also accommodates parallel parking on Bloed Street. To prevent the parking from just being a massive span of space, the author looked to the writings of Christopher Alexander and *Pattern Language* whereby trees can be used to prevent a large unsightly parking lot from view. The parking is also multi-functional as it can be used as a *weekend trader's market* as well as an events and performance area.

The trader's stalls are carefully placed on the site. The traders market overlooks the performance or weekend traders market, there are trader's stalls centrally located along the 5th Street pedestrian spine and there are traders stalls to the south which are sheltered from the sun by the building and draw in visitors from the 5th Street pedestrian spine.

Salingaros's "parking ribbons" are placed on the periphery of the site and along roads and Christopher Alexander's "small parking lots" are applied to the surface parking.

(Figure 187) Sketches showing design investigation into product branding and logo for the proposed development and products sold at the facility (Author, 2009).

(Figure 188) Model showing bicycle holders (Author, 2009).

Work, Eat, Play and Sleep environment

Based on theory and the concept of the city as a 'living entity', the author's interpretation of this created 4 zones. A work zone consisting of the workshops and studio's, an eating zone consisting of the kiosk and outdoor seating arrangement, a play zone or relaxation zone at the outdoor view ports and central courtyard space and finally a resting zone consisting of a residential development.

Product Branding & Logo

A recognisable and trustable brand is important for economical sustainability of the products sold in the centre. The items and products developed and designed in the centre are done by creative artists who specialize and develop their skills at the centre. For international recognition into tourist markets the brand would inform that the product was made by skilled craftsmen and in a facility specializing in crafts. The author envisaged this brand as forming part of the building façade so that viewers can immediately associate the brand with the building.

Items sold in the centre will be packaged in recyclable box containers and packaged in the on-site packaging department. From there it can be posted to prospective clients. Clients that have purchased items at the centre can wait at the outdoor seating area while their items are being packaged. Clients will be educated that by purchasing this particular product brand would mean supporting sustainable and poorer communities.

Bicycle lanes

As important as pedestrian routes are bicycle lanes. Outdoor bicycle stands are neatly accommodated in the ground floor plan. The Art walls and light bollards also shield traffic from pedestrian and bicycle lanes. Use of bicycles is a much easier and quicker way from getting about Marabastad and these bicycle lanes need to be incorporated with the rest of the municipalities upgrade plans of the area. In terms of tourism, the "*Marabi Tour",* as it may become known, can incorporate a 'Bicycle Tour' as part of its tourism package to create a much more lively experience and would also allow the tourists to explore the area on much faster sustainable transportation. Bicycle stands are placed on axis with the 5th Street pedestrian routes.

*(Figure 189) Model showing raised pedestrian walkway over Bloed street which aids in slowing traffic down, additional speed humps are placed well before traffic meets the raised platform (*Author, 2009).

Raised walkway and measures to slow down traffic

"Where fast moving cars and pedestrians meet in cities, the cars overwhelm the pedestrians. The car is king, and people are made to feel small." (Alexander, 1977).

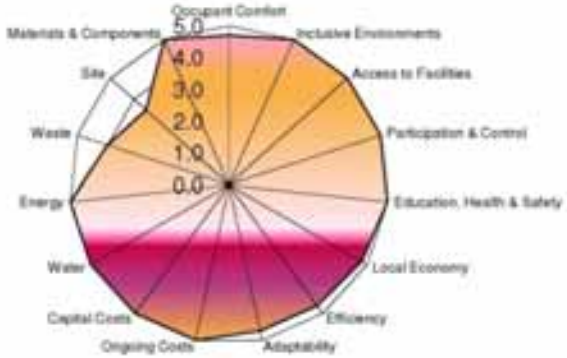
From the first stage of designing and through theory, the author new of the important decision of the pedestrian crossing over Bloed Street. Bloed Street is a very busy street at the moment and it would be too much of a challenge if the traffic in this area was not addressed. The author thus placed a raised walkway over Bloed Street which is in route with the 5th Street pedestrian spine. By doing this the author raised the building to be on the same level as the raised pedestrian route. Creating a raised walkway is not enough in this case as fast moving traffic will not have sufficient time to break. Therefore the traffic needs to be slowed down well before it ever reaches the raised walkway. There are a number of ways to do this such as providing robots at the 7th Street and Bloed Street intersection as well as using speed humps to slow down the traffic.

Employment Opportunities

The whole community can benefit from these facilities and jobs will be created. The traders can be employed by the facility and sell the produce at the trader stalls provided. Jobs for traders can also be created in the packaging department where traders can package products that clients have bought. Artists should be already employed by the facility as well as the lectures and instructors. Funding for these will be allocated by private art sponsors as well as from the national sector.

Security and Surveillance

During one of the site visits in Marabastad one of the group members was robbed and a camera was stolen. This proves that Marabastad is still not safe enough for tourists and needs to be a major concern in the sustainability of the project as the proposal encourages tour guides and potential buyers to come into Marabastad. The building counteracts this by creating proper surveillance in the form of large windows overlooking the central courtyard space. Sufficient lighting is placed outside in the form of street lights and light bollards, this will also improve lighting conditions for instance when there is a performance at the Jazz Centre.



*(Figure 190) SBAT formula results for the proposed new Marabastad Traders Centre for Arts. The formula shows that the prosed facility can still be improved in terms of better waste management systems that can be incorporated into the design as well as the possibility to grow crops on site (*Author, 2009).

Built in seats and built in furniture

" Built-in seats are great. Everybody loves them… place a seat so that a person sitting down is looking at something interesting." (Alexander, 1977).

The author used built in seats in the dining room of the residential units, and made them wide enough for the occupant. Workshops have built in lockers and gallery/pottery areas have built in display shelves. The built-in seats in the dining areas are placed next to a window which allows the viewer to look down into the courtyard area and main circulation routes. The built in shelves are placed where the use of light can aid the viewer to see the object on display such as in the pottery workshop. Built-in lockers are also in place to accommodate the occupant.

Rock store system

A similar system is used in the storage facilities of the basement as in the Constitutional Court. The precedent informed the author that there would be a need to store some artefacts and these artefacts (such as paintings or books) need to be stored at an ideal room temperature that is not too hot. The author from the onset of the design did not use air-con mechanical systems as this is more expensive and unsustainable practice. The rock system would make the storage areas cool and since it is in the basement an optimum cool average temperature would be maintained; which is further cooled by the rocks absorbing cool air.

SBAT sustainability formula

To measure the building performance and sustainability of the project the author used the SBAT formula. It was noted after using the formula that the building could still be improved if a recycling sewerage plant was placed on site. Although the author chose not to as this would not be an environment conducive to work in if a sewerage recycling plant was placed close to the building. It was also noted that the landscaping proposed in the project would require a lot of maintenance in the form of lawn cutting. This can however create additional jobs for people looking for a gardening position at the centre or be maintained in unison with Tshwane's Jazz Centre. The development proposal could also have been improved if food gardens were placed on site.