The design of an **Artisan Skills Training Centre** in Mamelodi, Pretoria
“Seja você quem for, seja qual for a posição social que você tenha na vida, a mais alta ou a mais baixa, tenha sempre como meta muita força, muita determinação e sempre faça tudo com muito amor e com muita fé em Deus, que um dia você chega lá. De alguma maneira você chega lá.”

“Whoever you are, whatever the social position you have in your life, either the highest or lowest one, you must always have as an objective, a lot of strength, a lot of determination and always do everything with lots of love and faith in God. This way one day you will get there, somehow you will get there.”

AYRTON SENNA
The Design of an Artisan Training Centre in Mamelodi
by
Manuel Freitas Pedro

Submitted in partial fulfilment of the requirements for the degree
MAGISTER TECHNOLOGIAE: ARCHITECTURE: PROFESSIONAL

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Opinions and conclusions expressed herein are those of the author
and do not necessarily represent the views of Tshwane University of
Technology

I hereby declare that the dissertation submitted towards the
fulfilment of the Masters degree: Technologiae Architecture:
Professional in the Faculty of Engineering and the Built Environment,
Department of Architecture, Tshwane University of Technology, is
my own original work and has not previously been submitted to any
other institution. I further declare that all quoted texts are indicated
and acknowledges by means of a comprehensive list of references.

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A microwave transformer, cloth, and plastic make up this homemade welding machine which has the capability of welding most things (MINGA, 2011).
Abstract

South Africa’s skills shortages are widely regarded as key factors preventing the achievement of targeted economic growth rates. The decline and massive shortage in artisan trades has been attributed to the sharp decline of the apprenticeship system and the failure of substitute interventions. Furthermore further education and training (FET) facilities have been found to be lacking with regard to their courses not aligning comprehensively with industry requirements.

It is obvious that the solution to the skills shortage is a broad and complex challenge that relies on a constructive interface between the various role players. This dissertation will focus on what can be done to improve the effectiveness of the training institutions on a micro-scale, by designing an educational artisan training facility aligned with latest market trends and developments.

As the institution aims to equip learners with the relevant skills to enable them to make a livelihood out of their chosen discipline, the dissertation addresses unemployment to a degree. For this reason the decision was taken to locate this facility within the Mamelodi township area, as this area is in the vicinity of Walthoo and Silverton which generates over 40 000 jobs in the Pretoria region. Discussions were conducted with Philip Minnaar, the Acting Head of Sol-Tech which is a technical training college offering an extensive range of courses in scarce skills. He iterated how for all its shortcomings, the learnership structure of education would be the most appropriate and does have merit especially in impoverished areas. He explained that learnerships were introduced specifically to focus on previously disadvantaged workers who had been denied accessible education under South Africa’s previous regime. This, together with the introduction of the National Qualification Framework (NQF), set out to provide a means in which these workers skills could be recognised. In so doing a worker could have the potential of greater mobility in terms of their skills being recognised with the prospect of progression and not being limited to a single employer or area.

The Department of Higher Education and Training (DHET) with Minister Blade Nzimande in charge, has declared 2013 to be the year of the artisan with various initiatives geared towards recruiting potential future artisans. One approach has seen the implementation of the Policy for a Generic National Artisan Learner Grant Funding Administration System. The purpose of this system is to make funds (R139 350 per learner) readily available for qualifying employers to facilitate and supplement the training of prospective learners for the duration of a learning programme.

In conclusion, this dissertation aims to investigate opportunities that could arise out of designing a facility of this nature to take advantage of the scarce skills shortage, and by placing the proposed facility within a township area will necessitate research into the dynamics of designing in such an area. Therefore the issues of concern which will be investigated will be:

- the shortage of skilled artisans;
- community ownership; and
- the rehabilitation of a degraded site.
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Green Roof Detail

Roof Drain

Edge Gravel

Root Barrier

centre with the concrete roofer allowing for the possibility of filtering

manner of managing storm water runoff.

As many case studies suggest, as much as 55% of raindrops that fall on
during the summer months rather than producing a potable water
source, and the cost of using these green roofs can o
Green Roof Detail

Roof Drain

Edge Gravel

Root Barrier

centre with the concrete roofing all

owing for the possibility of fil

manner of managing storm water runo

As many case studies suggest, as much as 55% of raindrops that fall on
during the summer months rather than producing a potable water

offset by installing
CHAPTER ONE

INTRODUCTION OF PROJECT

“South Africa is facing a serious and widespread skills shortage and decisive action is needed to reach an annual economic growth rate of 6%. This is according to the latest Fast Facts report by the Institute of Race Relations. The report says the country faces shortages in almost every profession, including technical and academic fields. There are shortages of engineers, artisans, draughtsmen and accountants.”

-Clayton Barnes
Skills shortage is real and it’s serious,
Sunday Argus, 9 Dec 2013, Page 3
1. INTRODUCTION

This dissertation documents the design of an artisan educational centre in Mamelodi, Pretoria. An artisan, according to Erasmus and Breier (2009:219), is essentially a skilled labourer who fabricates a product by hand. This definition can further be broadened to include labourers who employ tools or machinery within a certain trade; typical examples being auto-mechanics, welders and electricians.

The proposed architectural intervention is a response to the pressing skills shortage South Africa is currently experiencing. Further issues which will be explored and investigated are:

• the shortage of skilled artisans;
• community participation; and
• the rehabilitation of a degraded site.

1.1 CURRENT SITUATION REGARDING SKILLED LABOUR IN SOUTH AFRICA

In mid-2011, two buses were burnt and a further four vehicles were damaged by thousands of protesters who participated in a strike at the Medupi power station in Lephalale, Limpopo. According to Brigadier Hangwani Mulaudzi, the strike was triggered by residents claiming that Eskom, the public utility responsible for the construction of the Medupi power station, was employing foreign based specialist welders from Thailand while neglecting local artisans (IOL News, 2011).

The reality is that Eskom had no choice but to import these specialist skills as such South Africans do not possess the skills and capabilities required. In 2007, the trade union Solidarity compiled a report (Barnes, 2007:3) in which the findings were quite alarming. Their report highlights that South Africa has an estimated 10% of the artisans that it had twenty years ago. The report also forecasts that without an effective intervention, this current constraint could be negatively exacerbated with the average age of working artisans being 54.

According to the Skills Portal website, there is a high demand in South Africa for skilled expertise. However, due to the shortage of qualified artisans, this demand has not yet been met. This in turn has contributed partly to South Africa’s unemployment rate (Skills Portal, 2012).
The Financial Mail reported (2011), that Government is aware of this crisis and has responded by highlighting the shortage as a critical area in need of attention, with particular reference to the Department of Higher Education and Training. The same report describes how the education system simply is not fulfilling its mandate to produce competent graduates equipped with the necessary skills to match the needs of South Africa’s economy. Of concern is that only 40% of enrolled applicants at further education and training (FET) colleges are successful in completing the theoretical segment of their training.

The blame has been put down to insufficiently skilled lecturers as well as a general lack of access to the latest trends and respective technologies. This situation is amplified by recent statistics (Financial Mail, 2011) having revealed that nationally, South Africa is producing a ratio of one technical graduate for every one academic graduate. For the size of South Africa’s economy, economists affirm that the ideal ratio should be four times as many technical graduates.

Thus the dwindling number of artisans is not entirely due to a lack of applicants who wish to qualify as artisans but also the management of the educational facilities in place which require attention. Research has pointed out that an effort should be made to make technical jobs more attractive, likewise, as the Econometrix chief economist Azar Jammine points out (Financial Mail, 2011), there is unfortunately a stigma among all races in South Africa, that in order to get ahead, one needs a university qualification.

However, simply training local people will not alleviate the skills shortage crisis, according to the South African Federation of Civil Engineering Contractors economist Henk Langenhoven. He reasons that by employing foreigners for specialist work is in terms of the South African economy, the better option. He explains that normally specialist workers are employed on a project basis, meaning that once the project has been completed, the company responsible for employing the specialist worker simply moves on without that worker, leaving them with little demand for their specialist services (Financial Mail, 2011). Langenhoven proposes that it would be more beneficial for the economy to educate people to an intermediate level, such as electricians, because there would be more continuous and steady need for their services.
1.2 ARGUMENT

It is obvious that a single artisan training centre will not alleviate South Africa’s skills shortage. What this design realistically proposes is an opportunity to equip willing aspirants with the means to take advantage of the skills crisis that has gripped the country. It simultaneously proposes a means of addressing the unemployment issue by providing learners with skills in order to market themselves. As this dissertation seeks to address unemployment to a degree, a very early decision was made to situate the centre in a township study area as these areas are predominantly associated with high levels of unemployment. This study therefore attempts to explore and illustrate one approach of designing a facility of this nature and how it could be used as a mechanism to uplift and enrich an impoverished township community.

The proposed design will facilitate the development as well as the training of candidates within artisan related fields intended for the youth, unskilled, unemployed as well as any other interested parties by offering a learnership model. As stated before, the merit of utilising such a learning methodology at an intermediate level will, in theory, create employment opportunities for graduates. This is a view shared by Philip Minnaar of Sol-Tech (2012), who echoes Langenhoven’s sentiments, adding that if one’s intention is to locate such a training facility strategically, so as to uplift a disadvantaged community, the learnership form of training artisans is the most appropriate.

However, in underprivileged communities obtaining the necessary funding for self-education is difficult. For that reason inquiries were made regarding what financial aid is available for potential students. It was found that funding is readily available for learnerships through the various SETAs (Sector Education and Training Authorities). Freddie Osmond, the national manager of the technical training division of the DESTO education, training and development foundation, confirmed in an interview (2012), and reiterated how his organisation assists the majority of their students in obtaining the necessary funding, due to their limited financial resources.

1.3 CURRENT SITUATION

The Minister of Higher Education and Training Blade Nzimande has stressed the importance of Further Education and Training (FET) Colleges and how they are crucial for economic growth (Ntaltleng, 2012). Unfortunately technical and vocational education in South Africa suffers from a perception inferiority. There is a general view that FET college training is inferior to a university education. However the blame cannot be entirely attributed to the perception of FET colleges. Historically FET colleges have been associated with the apprenticeship system and due to the decline in this approach a divide has been created between colleges and the workplace (Sengooba, 2011)

![Degree + Diploma Enrolments versus Graduates all engineering disciplines 1998-2010 (Seggie, 2012. Re-drawn by Author)](image-url)
To make matters worse, technological advancement has increased the demand from industry for students to be competently knowledgeable in these areas, with many of the FET institutions failing to keep up with the demand. Regrettably, funding from Government has been insufficient; the 2006 recapitalisation of R1.9 billion being described as only scratching the surface in terms of the needs and infrastructure that colleges require (Sengooba, 2011).

Fortunately there are encouraging signs that there is an awareness of the problems that FET colleges are facing with remedial proposals being considered by the Department of Higher Education and Training. In addition to providing further funding, efforts are being made to align the FET college training system with South Africa’s human resource development strategy from 2010 through to 2030 (Sengooba, 2011). This initiative aims to equip and train the unemployed, youth and adults as well as anyone in need of upgrading their levels of competency. This will be carried out by means of implementing two types of curricula: one aimed at grade nine pupils and the other, a shorter programme for those who have completed matric. The benefit of this approach will be to shorten the period of learning for students who have already obtained their matric qualification, while integrating vocational skills at an early age for grade nine learners with an extended course. Skills development is crucial to the development of South Africa’s economy with the natural outflow of this phenomenon being the creation of jobs. The Department of Higher Education and Training should not only aim to produce more artisans with skills but a great deal of emphasis should be given to job creation.

1.4 RESEARCH METHODOLOGY

To research and investigate the various issues of concern identified for this dissertation, a mixed approach consisting of the following techniques was used in order to formulate a design response:

• consultation of relevant literature;
• deliberation by way of structured interviews with relevant personnel at existing FET colleges;
• visiting and documenting similar local building typologies and facilities;
• discussions with the local community of the proposed study area,
• observations and photo surveys made via field trips to the proposed study area.

1.5 LIMITATIONS

What may prove to be a hindrance in the design of an artisan educational centre is the lack of appropriate local or national precedents. The existing models available locally for study are generally of a makeshift nature. Very few of these facilities are housed within buildings that were exclusively designed with the intention of teaching artisan skills. The rare new facilities that are designed are mostly of a warehouse nature whereby huge, shed-like structures are designed which often pose ventilation and natural lighting issues. One would have to research a specific identity or typology with regard to artisan workshops. International precedents appropriate to South Africa’s context may assist in this regard.

1.6 DELIMITATIONS

Gerald Steyn (S.a.:6) singles out that one of the greatest hindrances of conventional township planning schemes is the failure to promote economic opportunities, with the majority of habitants dependent on neighbourhood-based informal mechanisms or alternatively seeking employment opportunities outside the confines of their community.

The purpose of this dissertation is not to formulate a restructuring strategy for these township areas, as this could more than adequately form the topic of a lengthy dissertation on its own and therefore falls beyond the scope this artisan educational centre dissertation. The approach of this dissertation is to explore the effect and impact the design proposal can have on its immediate surroundings on a neighbourhood scale.
“Most knowledge in the workplace is developed or transferred into beginners who eventually become successfully experienced through this process. However this process can take place if there is senior person guiding or mentoring the beginner. South Africa faces the issue of experienced staff members retiring or are unwilling to share their knowledge due to concerns over training themselves out of employment.”

- Erasmus and Breier

*Skills shortages in South Africa: Case studies of key professions*, Page 18

Vandalism and maintenance are tremendous problems in disadvantaged areas (Guest, 2010)
2.1 Shortage of Skilled Artisans

2.1.1 Relevance

The dwindling supply of capable and skilled artisans has received a great deal of media attention, often via the government, trade unions and the business sector. A number of indications of this shortage within the South African labour market have surfaced within the following instances:

• Murray and Roberts Cementation enticing potential artisan employees with a R20 000 commencement fee;
• roughly 100 artisans imported from abroad by the Bombela Concession Company to assist on the Gautrain project; and
• the importing of some 900 artisans from Asia by Sasol to carry out maintenance operations during 2006 (Mukora, 2008:9).

It is evident that the South African labour force is lacking the necessary skilled artisans, which together with vocational skills are vital for sustained economic growth as well as addressing unemployment.

Timeline of Artisans in South Africa from the 1800s to 2000 (Mukora, 2008. Re-drawn by Author)

1800s to 1920s
- Few South Africans with artisan skills therefore labour imported from Europe, USA and Australia.
- 1880s first attempt to restrict competition between white and black workers with 1883 Mining Act

1920s to 1930s
- Government increased artisan training dramatically to address growing poor white Afrikaner problem, and to supplement expansion of secondary industry around the mining industry

1944
- Introduction of Apprenticeship Act 37 of 1994, introducing concept of trade test

1960s to 1970s
- With an Annual Growth Rate of 6%, shortage of skills experienced and leads to last mass import of labour from abroad (mainly from the UK)
2.1.2 Current situation

Numerous reasons for this shortage of artisans have been identified by experts; these factors have also been linked with the decline of the apprenticeship training system.

**Economic condition**

The history of South Africa’s economic state has iterated that there is a direct link concerning the state of the economy and the training of artisans. In the 1960’s, South Africa experienced a boom period and due to a short supply of local artisans, the country had no choice but to import these skills from abroad. Years later, in 1975, having learnt from the lessons of the 1960’s, remedial measures were put in place and the result was that more than 30 000 local apprentices were registered. During the 1990’s, these numbers decreased due to the withdrawal of Government as well as state owned enterprises (SOE) as a result of privatisation and commercialism. Amid signals of an economic recovery in 2000, no remedial measures were employed as they were in 1975 and the result was a mere 10% of the number of registered apprentices were available in that year (Mukora, 2008:55).

**State Owned Enterprises (SOE)**

In the past, many SOEs such as ISCOR and Eskom played a prominent role in the delivery of artisans. However with the privatisation of many of these SOEs, during the 1990’s and the subsequent withdrawal of training artisans contributed significantly to the shortage. During an interview conducted with Philip Minnaar (2012), the Head of Sol-Tech Training College, he explained how these huge enterprises previously trained their personnel through apprenticeship systems. However, since becoming private companies, they would rather hire a qualified or skilled person than train him or her.

**1980s**

Despite mini-boom between 1981 and 1983, economy shrinks and many State Owned Enterprises are privatised (Iscor in 1989). Pressure from COSATU to introduce integrated education and training system based on a ladder-like framework

**1994**

South African Qualifications Authority introduced to oversee the National Qualifications Framework implemented as one of the first acts of South Africa’s first Democratic Government

**1997**

Learnerships introduced as a major vehicle for addressing skills development

**2000**

Sectorial Education and Training Authorities established to contribute towards increasing the country’s skills competitivness
Attitude of business to training
Analysts have revealed that the growing trend since the 1990s has been to dispense with the financial expense of training artisans. This has resulted in many local businesses resorting to importing skills as a quick-fix method during economic boom periods (Mukora, 2008:57).

Perception of artisans
Unfortunately, the shortage of artisans is also a result of a global phenomenon, which was pointed out by the CEO of Merseta (Manufacturing Engineering and Related Services, Sector Education Training Authority), Dr Raymond Patel. He pointed out that young people showed a preference to jobs which do not involve getting their hands dirty (Mukora, 2008:58). The extent of this perception is so severe in South Africa that Eskom made an effort to introduce an Institute of Artisans with a view to enhancing the image of artisans directed to the public arena.

Shortcomings of education and training institutions
The labour market for artisan skills has been hindered by the shortcomings of education and training institutions. Although there has been a significant influx of Further Education College (FET) enrolments, only some 34% of the 280 000 graduates in engineering studies were able to find employment in 2000. This has been attributed to the FET course structure failing to align with industry necessities, as well as students not being employer sponsored (Mukora, 2008: 8).

This situation has been aggravated by the introduction of learnerships. This form of training was introduced with the aim of addressing skills development needs. What has been found is that the training has been of a much more basic level than that which is required for an artisan, resulting in much scepticism from industry over learnership qualifications.

2.1.4 Criteria for proposed artisan educational centre
The proposed scheme intends to provide an enabling environment to facilitate the training of artisans. As discussed in the previous section, a modified learnership curriculum will be implemented and carried out by instructors experienced and qualified in their respective fields of expertise, in response to statements that FET college instructors lack workplace experience.

Following a report by Dr Jeffy Mukora (2008:67), trades that will be taught at the centre are based on the growing demand for specific skills. It has emerged that the greatest demand with regards to artisan labour is in manufacturing, then the construction sector followed by that of the repair of motor vehicles, and electrical trades.
2.1.3 Relevant ideas

The factors mentioned in the previous section are responsible, amongst others, for the failing labour market with regard to artisan skills. It is obvious that the solution to the skills shortage is a broad and complex challenge that relies on a constructive interface between the various role players. This dissertation will focus on what can be done to improve the effectiveness of the training institutions on a micro-scale, by designing an educational artisan training facility.

**Learnerships**

Due to the very early decision taken to place this facility within a township area, the relevant mode of education would be a learnership-type framework. For all its shortcomings, this mode of education does have merit, especially in impoverished areas.

This is a view expressed by Philip Minnaar (2012). He explains that learnerships were introduced specifically to focus on previously disadvantaged workers who had been denied accessible education under South Africa’s previous regime. This, together with the introduction of the National Qualification Framework (NQF), set out to provide a means in which these workers’ skills could be recognised. In so doing a worker could have the potential of greater mobility in terms of his/her skills being recognised with the prospect of progression and not being limited to a single employer (Mukora, 2008:48).

The proposed learnership structure is a dual system of education, which is a combination of institutional training and work experience on a broader base than apprenticeships. Learnerships were introduced at a time when the general feeling was that the apprenticeship system was declining due to rising costs, the economic downturn as well as technological advancements making certain skills obsolete (Mukora, 2008: 49).

A learnership does not equate to a full apprenticeship qualification. One of the reasons for this is that employers are legally responsible for ensuring that apprentices are experienced within all the stages of training, whereas in a traditional learnership, employers are only responsible for one stage or two at most. Since 1998, efforts have been made with the aid of the Skills Development Act (SDA) to facilitate the integration of learnerships and apprenticeships. The result has been widespread confusion within the artisan industry as well as conflict with the Manpower Training Act (Minnaar, 2012).

**Proposed curriculum**

Philip Minnaar suggests that the learnership route be taken with regards to this dissertation proposal but he advocates some minor adjustments. He advises that the facility affiliates with the various SETAs as well as the trade unions. This is a route Sol-Tech has very successfully taken with the Solidarity Trade Union. This has resulted in job placements for their students and has ensured that the level of training Sol-Tech offers is relevant to industry conditions. Their qualifications are on par with FET college qualifications and the result is that there is more of a demand for Sol-tech graduates than students from FETs, due to the former’s job readiness.

He goes on to suggest that additional levels be incorporated into the learnership system, allowing students to gain a basic knowledge of their respective fields in the initial levels of the course with an exit level at this point. Learners may study further allowing them to later focus on more specialised aspects at higher levels if they choose to study further. He emphasised that entrepreneurial skills should form part of the syllabus, which in addition to providing competent artisans, can promote job creation and allow a graduate to work for him/herself. This is particularly relevant in township areas which are far from employment opportunities. A qualified graduate could potentially start his/her own business with the entrepreneurial skills acquired and work within his/her respective community.

The approach Minnaar has suggested has been successful for Sol-Tech and is an example of trends which have been successful for other training institutions such as the Mpumalanga Regional Training Trust with training centres in Emalahleni (Witbank) and in Ekandustria (Bronkhorstspruit). This will form the basis of the curriculum for the proposed artisan educational centre.
2.2 Community ownership

2.2.1 Relevance

As Hans Harms (Marschall & Kearney, 2000: 17) points out, the typical approach to providing facilities in township areas in the past, was to assess the needs of a community and to design accordingly, often constructed with the aid of skilled non-local labour. Harms describes this process as being built for the people, and not with the people. In situations such as these it is very seldom that a community is instilled with any feeling of ownership or accountability. Due to these amenities being designed with minimal input from their communities, the results are often under-utilisation with cases of vandalism a common occurrence.

In an effort to avoid this scenario one should rather incorporate a more integrated and participatory attitude. By consulting with the community and identifying their needs one is able to determine to a large extent the manner in which they will identify with the proposed architectural intervention, increasing the likelihood of it being well utilised and thereby lessening the probability of vandalism.

2.2.2 Difficulties with community consultation

Despite the honourable intentions associated by consulting with the community, many architectural practises, such as CS Studio Architects, have articulated their experience of the process of consultation becoming an unpleasant, disheartening and frustrating exercise (Marschall & Kearney, 2000: 21-26). This can be attributed to the following factors:

Scepticism
Unfortunately there is stigma among the disadvantaged communities of South Africa in which the roles of architects and engineers are not fully understood resulting in distrust. However this is a two-way street as in most instances these professionals are ill-informed of the needs of these communities;

Painfully lengthy meetings
Frustrations typically experienced during meetings are usually as a result of community in-fighting, lack of communication, et cetera. CS Studio Architects described how their first three meetings with the community in which they designed the Wesbank Primary and Multi-Purpose Centre were cancelled due to the community instigating political arguments; a Governmental topic clearly not related to the architects (Smuts, 2012);
Representatives of the community
Difficulties additionally arise in instances where decisions were reached during the previous meetings, only to be overturned by the community, which is extremely frustrating, particularly during the construction process. Interestingly, some architects have recounted how former community leaders have suddenly returned from exile and demand a say in the project quite late into the delivery process;

Lack of communication
It was found that the ability to comprehend plans, drawings and three-dimensional models as well as the ability to make decisions was a huge stumbling block in disadvantaged areas with extreme cases of complete communication failures in some instances;

Maintenance and vandalism
Maintenance and vandalism are issues which have come up, even in cases where the community has been involved in a project every step of the way. Some architects have undertaken efforts to set aside financial measures to assist in maintenance operations resulting in the misappropriation of funds and confrontations as to who will regulate the funds; and

Local contractors and labour
A re-occurring theme is the appointment of local contractors not as a result of the quality of their workmanship, but rather due to their connections or social position within the community. Often the contractors appointed by the community have proven themselves to be inept.

2.2.3 Managing community consultations

As difficult as the situation may be when consulting with a community, it is none the less a very relevant practice. It can be a quite a cost-effective means of decreasing the likelihood of budget adjustments as well as time delays to the delivery process. Marshell and Kearney (2000:28-33) maintain that there are methodologies which are able to make certain that these difficulties are managed, ensuring that the process is worthwhile and fulfilling.

Architects and professionals need to come to the realisation that a better understanding and consideration for the culture of these township by consulting with the community, issues can be identified and an appropriate solution can be produced (Bennett, 2010)
communities by understanding their philosophy and way of thinking could reduce frustrations and difficulties.

Improved modes of communication
It is imperative that the community who is actually the client, should understand how the process of consultation will be to their advantage and the importance of their input.
A further recommendation is to ensure that all community groups are represented during the consultation process.

Workshops
The value of conducting workshops with the community should not be underestimated. This method is often avoided due to some of these workshops running as long as a week at a time. The information gathered from these sessions, however, will almost always positively compensate for the time saved later through the avoidance of conflict and additional meetings.

Managing internal community power struggles
This issue is best resolved even before the outset of the opening of any sort of dialogue with the community. By identifying the relevant role players within the community, the architect can prepare strategies to overcome any internal conflicts, which may potentially surface.

Needs assessment on an elementary level
An assessment of this nature can be a very challenging exercise, especially due to the gulf between the architect and community in terms of shared ideals. Nonetheless, by means of observation, conducting of interviews and the use of easily comprehensible interactive games with the community, this challenge is surmountable. A combination of this methodology, together with more conventional architectural approaches such as mapping, analysis of the area, amongst others, could resolve this concern.

Managing vandalism and maintenance
A great motivation for facilitating community participation with the design process is to reduce the risk of vandalism. Nevertheless, there are mechanisms for addressing this concern. They are:

- Surveillance: ensuring public spaces are well-lit and are visible to neighbouring buildings;
- integration of uses within a building complex. By encouraging more than one use for a building can promote activity which can stimulate ownership as well as passive surveillance; and
- active building façades.

With regard to maintenance, by utilising cost-effective construction methods and robust materials which do not incur labour intensive care, one can

Peter Rich Architects believe that in order to gain an understanding of context, one should research into local conditions and collaborate with communities (Australian Design Review, 2012)
ensure that a building looks reasonably good and contemporary despite a lack of routine upkeep.

CS Studio Architects’ approach to community participation

CS Studio Architects’ approach was profoundly influenced by the user participatory process of the German architect Gunter Behnisch (Smuts, 2012). The firm has adopted the community participatory process as an important part of the overall design and delivery of a project, with the view to promoting empowerment. Through experience, the architects have found the following aspects to be strongly influential as to whether a project within a disadvantaged area will be a success or a failure:

- shifting of mind-sets;
- Encouragement of individual and group work;
- a comprehension of the context; and
- an understanding of the local political dynamics.

The approach of CS Studio Architects can be summarised in the following sustainability diagram. It is very important to bear in mind that the architects’ view of sustainability refers to the long-term viability of a project as opposed to the popular environmental connotation of the term sustainability.

2.2.4 Proposed project integration

There is a shared belief among many architects that the community participatory approach is merely an overreaction to the absence of consultation in the past (Marschall & Kearney, 2000:37-38). However, practices such as CS Studio Architects have illustrated the merits of utilising this mechanism. As pointed out by them (Smuts, 2012), these disadvantaged township areas need a facilitator in order to produce positive and dignified resolutions by means of listening through participation. This approach will not alleviate all of the challenges these areas face on a continuous basis but it is able to make a positive contribution.

Having identified a need, which in this instance is the shortage of artisans in South Africa, the next step after identifying a study area would be to engage in a dialogue with the community. By gaining insight into the local inhabitants, learning their culture as well as appreciating and interpreting the context from the community’s point of view, the proposed training centre will hopefully enrich and successfully assimilate into its chosen environment.
2.3 Rehabilitation of a Degraded Site

2.3.1 Relevance
Christopher Alexander and his associates (1977: 509) recommend building on the parts of an environment that are the most in need of attention, in other words, the most unpleasant spaces. The reasoning behind this is to improve one’s environment. One should consider a building site as one entity or as a single ecosystem, preserving the pleasant spaces and rehabilitating the less pleasing areas (Alexander et al., 1977: 511). This theme is highly relevant particularly in disadvantaged township areas which suffer from urban spatial forms which adversely generate sprawl, fragmentation and disharmony, resulting in leftover unstructured areas which are commonly referred to as lost space (Trancik, 1986: 3). Typically these negative spaces tend to be very unpleasant often falling prey to criminal activity. Therefore, by identifying lost spaces and utilising these sites to accommodate buildings on them, one can positively occupy these leftover or forgotten spaces and contribute constructively to the community in which these spaces are situated.

2.3.2 Trends and recent developments
Sites that are undesirable and make no positive contribution to their environment or its users should be optimistically approached by designers as opportunities for urban redevelopment, which can benefit the surroundings (Trancik, 1986: 4). Ideally, these
spaces should be seen as a chance to rectify essential links which could be prominent pedestrian links between important destinations. These spaces need to be identified and appropriate activities should be chosen to activate them. Although identifying a site and applying a function does not necessarily result in desirable urban spaces, as the following case study illustrates:

In 2007, a group of honours-level students from Wits School of Architecture and Planning participated in a community outreach programme with the Kwathemba settlement located outside of Springs, Gauteng. The aim of the exercise was to consult with the community and gain an insight into the social and economic dynamics of the township and identify opportunities for small scale architectural interventions. Two sites were identified for this purpose; one being a dilapidated and discarded beer hall and the other a chess park. The students were split into two groups to focus on these projects.

The beer hall, was a derelict structure erected in the 1950’s and was burned during the 1976 uprisings. All that remains of the building is the concrete structure— the interior of the building, having been gutted for usable building materials. At the commencement of the outreach programme, the site was being used as a dumping ground as well as acting as a crude playground for local children. The children were identified as the target users for this intervention and the design concept of animating the remaining structure of the beer hall as a jungle gym, with the longer term aim of this project being for it to become a community centre. The project sparked the interest of the community members in spite of them not being very familiar with the project brief. Upon the brief being explained, it actually resulted in their participation in the construction process.

The chess park site entailed more of an orthodox designer-user relationship. An existing chess academy for local children located in a small extension to an existing residence was the focus for this intervention. The decision was taken to develop a chess park nearby the existing facility with a large chess board as the primary design feature of this concept— an idea initiated by the head of the existing academy, having acquired sponsored chess pieces. Hence, the focus of this project was to design an urban space to sustain this activity.

The completion of the modified beer hall and the introduction of the chess park were hailed as highly successful ventures due to the participation of the community and the innovation of the students, illustrating an effective approach in how to improve the living conditions in a township model. Both projects were revisited sixteen months later and the findings were quite astonishing. Inspection of the chess park revealed that the chessboard and gear was still intact and in working order with minimal maintenance required. Discussions with the head of the chess academy revealed that some of the youth had recently participated in a national tournament in Cape Town.

The state of the beer hall was not as encouraging, with the condition deteriorating alarmingly perhaps due to the lack of any elected caretaker. Swings and basketball hoops implemented had weathered very poorly; the tyre bollards were burnt in winter as a source of warmth. The structure showed signs of being damaged by fire and the site had once more become a garbage dumping ground (de Souza, 2008: 104-109).

What can be deduced from both projects is that sustainability with regard to maintenance is an essential critical component to the survival of a community facility. In addition, clear ownership of a facility needs to be identified or defined. The successful rehabilitation of an urban space is not merely a question of applying the most appropriate aesthetics and technical resolutions. It is the sustainability and maintenance that will determine whether an urban space, that has been successfully rehabilitated, will not easily fall back into a state of disrepair.
2.3.3 Relevant ideas and principles
Julian Cooke (2011:21) describes the many examples there are in South Africa of major community based facilities which are highly successful as architectural interventions as they occupy sites that are unpleasant and dangerous through a process of gentrification. Sadly over time these facilities fall into disrepair and their mistreatment is normally a result of mismanagement or insufficient funding.

The Violence Prevention through Urban Upgrading (VPUU) programme has identified a number of issues which if correctly addressed can prolong the use and life span of a previously degraded site:

- **Monitoring as well as feedback**: monthly meetings to be held in which concerns are discussed and advice can be offered to the relevant members. These meetings need to be managed in such a manner so as to avoid dissension as well as to ensure that proper records are kept regarding what is discussed and resolved in order to ensure accountability;

- **Employment of community members**: employing local community members can ensure that they can benefit financially by the preservation of the architectural intervention’s functional integrity; they can be employed as caretakers, landscapers, coordinators, and so forth;

- **Sustaining use of the rehabilitated site**: an effort must be made to ensure that efficient use of the architectural intervention is made. This can be achieved by structuring social activities to take place at the scheme, with the availability of social development funding from Government for the purpose of small projects. (Cooke, 2011: 21).
2.3.4 Principles to be applied

By investigating an urban environment and identifying areas of land that are in disrepair, one can fill these negative voids in a useful and constructive manner (Trancik, 1986: 90). However, as stated in the previous section, simply rehabilitating a site is not sufficient; it also requires maintenance. Township settlements typically suffer from a lack of place-defining features as well as defined constructive recreational areas (Dewar & Uytenbogaardt, 1991: 89).

Keeping this in mind, one approach is to introduce place-defining features such as trees. As Dewar and Uytenbogaardt (1991:89) explain that by introducing trees one provides structural constraints in a hostile environment possessing minimal forms of landscaping. This implementation of a tree network could create avenues as well as give definition to undefined spaces and in turn, these clearly defined spaces could prompt innovative responses from the community in which they inhabit the spaces and apply their own activities, such as street vendors trading under these trees.

Field observations have revealed that in the Mamelodi Township situated in Pretoria, the few green spaces available that are well defined and used, are sustainable with the local municipality even lending a hand to maintain them. These spaces serve as an urban relief in this specific settlement with local youth and adults alike benefiting.

In conclusion one needs to think clearly about rehabilitating a degraded site. An activity should be thought of as one that can prompt the restoration process, but perhaps more thought should be given to how the space will be maintained.
2.3.5 Further considerations

Establishment of public space
Cliff Moughtin (2003: 11) describes urban design as the means in which mankind makes use of the built environment in order to realise their goals and objectives. Sadly, the majority of South Africa’s township environments are suffering from a lack of social facilities and green spaces. Alarmingly, while the present government has provided impressive quantities of housing for the vulnerable and impoverished there are increasing concerns regarding the quality of these dwellings and newly developed areas. The rows and rows of housing clearly fail to give any identity with minimal provision for community facilities or random street patterns. In order for these public spaces to be successful in an underprivileged setting, they need to facilitate the informal and spontaneous happenings such as street markets and public forums that constitute an essential part of everyday urban life as these are places that can potentially encourage and enhance social interaction (Dewar & Uytenbogaardt, 1991: 108).

Towards the end of 2005, the VPUU programme was initiated by the City of Cape Town, the German Development Bank, and the Khayelitsha Development Forum. The programme set about to upgrade the Khayelitsha community by identifying and addressing the problem areas and by applying the following principles of:

- **Ownership**: Julian Cooke (2011: 19) advises that in order to encourage the community to take ownership of a facility, one must ensure that the project proposal is well-defined, encourages participation from the community and that it is generative;
- **Integration of varying activities**: A setting with diverse activities and functions attracts a mix of people throughout the day at different times (Bentley et al, 1985: 27).
- **Urban design principles**: It is important to reduce crime through the introduction of positive urban interventions (Cooke, 2011: 20), the VPUU programme pinpointed five principles for achieving this, namely: surveillance, defined and accessible movement routes, imageability, management and upkeep.

The introduction of facilities such as a multi-purpose hall and a reference library as part of the artisan educational centre can offer the dual purpose of also serving the community and encouraging their participation.

Further activities that can be incorporated are street vending. They not only bring surveillance to a space, but they are also able to enrich that space. A local example of how street vendors can bring vibrancy to long façades is illustrated by the UrbanWorks Architecture and Urbanism firm. The long façade which is the wall separating the Phefeni Secondary School from the streetscape in Johannesburg was transformed into a vibrant market street (Opper, 2011: 26).
Urban integration
Roger Trancik (1986: 3) laments the failure of urban environments, which do not fulfil their intended goals and often become undesirable urban spaces within our cities. He attributes this negative factor to the failure of incoherently connecting elements within an urban fabric. To successfully integrate a design proposal into an existing urban environment (Trancik, 1986: 98), one should adopt an integrated approach. This approach essentially combines:

- **Figure-ground theory**, essential for spatial definition;
- **Linkage theory**, to enhance connective qualities; and
- **Place theory**, crucial for social responsiveness.

The combination of these theories assists in developing spatial definition, ensuring that quality connections are made and that a place is socially responsive.

In addition, he recommends five physical design principles for creating an integrated urban space (Trancik, 1986: 220-225), namely:

- connection of sequential movement;
- lateral enclosure and continuation of edges;
- integrated bridging;
- organisation via axis and perspective; and
- merging of interior and exterior spaces.

In conclusion, by competently integrating a building into an urban environment, the placement of this building as well as designing for the spaces that this building creates, is able to exert a positive impact in a township which can be socially very demanding areas. With a rational approach to designing these public spaces should ideally be:

- defined;
- enclosed;
- secure; and
- **humanly scaled**


In so doing, the entire urban space is given a feeling of cohesion and place. When these factors are neglected, the space can become hostile and user unfriendly.
The following precedents were investigated in order to establish how similar building typologies or issues of concerns were resolved architecturally. As far as possible, locally sourced precedents were consulted.

Precedents selected within this section were done so as to formulate an approach to the following aspects:

- Appropriate contextual integration
- Community participation
- Circulation and functional zoning
- Structural considerations
- Appropriate aesthetics
- Sustainable technologies
- Security management
3.1 Lourier Park Community Centre


3.1.1 Background

As is the case with the proposed artisan educational centre, the intention of the Lourier Park Community Centre was for this architectural intervention to become a focal point in a community, which lacked civic presence, by contributing some much needed social facilities (Phaidon, 2008: 599). Additionally it can offer clues on how to approach a multi-purpose facility as it accommodates the following functions:

- A library;
- Community hall;
- Crèche;
- Clinic;
- Café; and
- Offices and meeting rooms.

These functions are foreseen as possible activities, which the proposed artisan educational centre could facilitate.

The centre revealed a few appropriate patterns, which may be used to approach the proposed scheme. Although the Lourier Park Community Centre is of a much smaller size in terms of the building footprint compared to the envisaged artisan centre, it still does offer useful principles.

Ordering principles

As Ching (1996:3 20) explains, forms and spaces of a building should be arranged in a manner so as to create order within an architectural configuration. He is not simply referring to geometric uniformity but also to how each part of the building relates to the other and how it contributes to the harmonious organisation of the buildings spaces.

On elevation, one can observe how the principle of hierarchy was applied to the Lourier Park Centre, with the articulation of the important spaces and forms in relation to one another. A tower demarcates the central courtyard, with surrounding one-storey buildings forming transitional elements from the street level. This ensures that the height of the tower does not overwhelm or become overbearing to its predominantly one-storey height context.

The next ordering principle is evident on plan in which a symmetrical approach was adopted, and in which a balanced arrangement is made...
with similar figures on the opposite sides of a dividing plane (Ching, 1996: 321). This plan arrangement additionally creates a courtyard typology, which is a private and protected outdoor living space with various buildings arranged around the space. This building typology has many benefits such as the creation of a micro-climate within the space as well as its responsiveness to social requirements.

Modesty of materials
The criteria for the choice of materials were to make use of materials that were not maintenance intensive but also had to be aesthetically pleasing. Unfortunately, regular maintenance often presents a real problem with regards to public buildings. By using robust materials that wear well, the designer can ensure that a building looks reasonably attractive and contemporary despite a lack of routine upkeep. The two primary materials used for this project were corrugated steel sheeting and maxi-brick.

Maxi-brick is a face-brick product which has been specially developed for low-cost housing, and with positive connotations: the maintenance is low and the one and a half brick scale, making the building appear somewhat larger than what it really is. The dominant roof material used is corrugated steel sheeting due to its durability, and is inexpensive compared to other materials. It is also re-useable if necessary.

Multi-functionality of the facility
The concept of introducing multi-functionality to the community centre has not only been cost-effective but has given the building complex a stimulating dynamic by offering a combination of various activities for the Lourier Park community. This is particularly relevant in disadvantaged areas as Marschall and Kearney (2000: 47) point out. By erecting isolated buildings with very precise functions, they are in danger of becoming unused due to transport difficulties.

3.1.2 Principles to be applied

- **Hierarchy as an ordering system:** the complex acknowledges the existing context without overpowering it and yet still retains its civic presence.
- **Multi-functionality of activities:** buildings with various uses and activities that mutually support one another, are able to ensure better utilisation.
- **Low-tech, maximum benefit materials:** the use of the maxi-brick can address the issue of maintaining the proposed centre while the dimensions of these products can instil some civic presence to the proposal in a sensitive manner.
3.2 Soweto Careers Centre


3.2.1 Background

The objective of the Soweto Careers Centre was to provide a facility in which the local youth could receive career counselling, preparing them for the challenges they may encounter in their future endeavours. The centre, at the time, was unique in that it was one of the very first institutions of this nature to cater for the black youth in South Africa. Upon opening its doors to the community, their target audience was further expanded towards the parents of the local youth, which was especially of importance as they had received little or almost no formal education (Noero Architects, 1999).

The positioning of the new careers centre is on the corner of Chris Hani Road and Immink Drive, near to a collection of existing prefabricated buildings which were incorporated into the scheme and re-used as offices.

Joe Noero approached the design with specific aims in mind in order for the building complex to successfully achieve its educational function:

Building as a didactic structure
This was an important feature for the architect as he would run construction workshops at the centre. It was found that he was able to use the clear detailing of the centre to explain what the building process entails and what the reasoning is behind the choice of different building materials to prospective candidates.

Passive cooling principles
This approach is very evident on a sectional view of the hall building. The hall was devised so as to promote the circulation of cool air on a low level, throughout the space, with the warmer air being expelled through the roof space by means of a cowl situated at the roof apex. This effect has been used successfully in explaining how buildings function to potential students visiting the centre, with the result of several students going on to pursue a career in architecture (Noero Architects, 1999).

Positive outdoor spaces
Careful attention was given to the creation of positive outdoor spaces in the form of courtyards which have been treated in a positive manner by creating these spaces with varying degrees of enclosure as well as using the buildings themselves to define these spaces.
The outdoor courtyards do not spill out in an undefined manner. According to Alexander et al. (1977:522), these are qualities which result in the creation of positive and pleasant outdoor spaces.

### 3.2.2 Principles to be applied

- **Buildings which overtly teach**: as the proposed artisan centre’s chief aim is to educate students, this approach is appropriate especially in the case of basic construction techniques, one of the fields which students can enrol in at the centre;
- **Cooling principles**: as workshop buildings will form a large constituent of the building complex, ways of cooling down these spaces are necessary; and
- **Creation of positive outdoor space**: these spaces need to be thought of at a very early stage in the design process, simultaneously with the actual buildings.
3.3 USASAZO SECONDARY SCHOOL

Completed in 2004 by Noero Wolff Architects situated in Bangiso Drive, Khayelitsha, Western Cape.

3.3.1 Background

The Usasazo Secondary School is a project that was commissioned by the provincial government and comprises of 37 classrooms, a library, computer room, assembly hall as well as an administrative division. In addition the architects responsible for this project developed the brief further by allowing for entrepreneurial training by public interaction, in the form of single storey classrooms with hatches, offering services such as vehicle maintenance, appliance repair, etc, located towards the street edge which encourages interaction with the community (Deckler, Graupner & Rasmuss, 2006: 89). Not only does this result in an active street edge but also encourages passive surveillance. The height of these classrooms were deliberately kept to one storey so as a response to the scale of its predominantly one storey informal settlement context.

The buildings and spaces within the school are regulated by means of a courtyard typology which is made up of three courtyards, one which forms a continuation of the street edge which is then linked to two further classroom courtyards.

This was an important feature for the architects as these sheltered courtyard spaces give a feeling of containment and climatically respond to the environment by providing protection from the south-easterly wind.

The typology of courtyard configurations has been emphasised by experts such as Steyn (2005: 128) highlighting the merits of this building arrangement. This typology can offer higher urban densities and is a traditional building form with an African identity and quality. Matthew Frederick (2007) describes the building typology of a courtyard as being a positive space which users enjoy inhabiting for congregating, social interaction and gathering.

The architects of the primary school interpreted this courtyard typology using it to great effect in the following instances:
as an ordering system for regulating the various learning phases and functions;
the creation of outdoor social spaces for teaching and interaction, and
the application of passive climate control methods in terms of natural ventilation (Kellerman, 2010: 2).

The school was designed with the objective of minimal maintenance in mind which resulted in the use of concrete block work, galvanised steel and sheet metal. Additionally the roof structure was designed in a manner so as to minimise openings on the troublesome south-easterly windy facade as well as to direct natural lighting into classrooms on the first floor. Furthermore the roof assembly is configured so as to create suction on the leeward side of the roof and therefore encourage natural ventilation.

3.3.2 Principles to be applied

- **Treatment of street edges**: a distinct continuation of the streetscape and the creation of a commercial edge;
- **Passive building principles**: ideally a building should have the ability to resist or harness elements of its given climate according to their unfavourable or beneficial potential to contribute to the comfort of the users of the building; and
- **The application of a courtyard typology as an ordering system**: promotes open living space as an organising structure as well as acting as a climatic moderator.
3.4 VPUU URBAN PARK + ACTIVE BOX

Completed in 2010, by Jonker and Barnes Architects in Ncumo Road, Khayelitsha, Cape Town.

3.4.1 Background

The Violence Prevention through Urban Upgrading (VPUU) is a project focussed on crime reduction by means of inhabiting recognised unsafe urban spaces within Khayelitsha with architectural interventions. Consulting relevant literature as well as drawing on many examples worldwide, has not only seen a reduction in criminal activities but, positively, the introduction of new urban spaces where the community can congregate as well as interact socially. The design intervention has successfully assimilated into its township context instilling not only some civic presence but also responsibility from the community members for the project.

An important aspect which this design encourages is to develop areas that are the least pleasant and do nothing for a neighbourhood. The VPUU project has proven to be so effective that it has been reported that since its implementation, crime has dropped by 20% in the vicinity of the intervention. Community members have eagerly volunteered to manage and run the facility as well as seen the formation of regular community patrols of the neighbourhood.

One of the first steps in the project, was to examine the urban context of the site chosen and determine what could be done to improve the environment. It was decided that it would be beneficial to the community to improve the existing pedestrian route serving the Khayelitsha Railway Station and Monwabisi informal settlement.

Secondly, it was noted how the area had a very low-density context with large portions of underdeveloped land with little passive surveillance (James, Kitzner & Krause, 2011:94).

A design decision was taken to occupy one of these large underdeveloped pieces of land with a community urban park with a multi-purpose building, dubbed the active box.

The active box assists in the creation of an identity for the community as well as a tool to assist in orientation. It further acts as a place of protection against crime should it be required along this pedestrian route.
3.4.2 Principles to be applied

- **Site restoration**: as Alexander et al. (1977: 509) advises, buildings should be erected in parts of the community that are the least pleasant now, which can contribute to the improvement of a community;
- **Public and private realms**: there needs to be a clear and legible distinction between the two;
- **Pedestrian paths**: these need to be well-lit and be able to be observed without difficulty, further more they need to follow pedestrian desire lines;
- **Maintainable landscape methods**: the context can be improved with the introduction of indigenous vegetation which can be maintained with the aid of borehole water and rainwater harvesting, which can act in a synergy with porous surfaces as well as using locally sourced materials as far as practically possible; and
- **Quality and user-friendly material choice**: by adopting a practice of designing as well as choice of materials will result in a longer lasting building which can be maintained by the local community (James, Klitzner & Krause, 2011: 95).
3.5 TSHWANE SOUTH COLLEGE

Established in 1937, by the National Defence Force in College Street, Lyttelton, Pretoria.

3.5.1 Background

During 1936, the South African National Defence Force (SADF), elected to form an in-house system of thoroughly educating their apprentices to ensure trade readiness and that their full potential could be attained. This led to the formation of the Civil School for Technical Training in 1937, falling under the authority of the Pretoria Technical College (known today as the Tshwane University of technology).

Upon the conclusion of World War 2, unused military buildings situated on the Tek Base in Lyttelton were made available and the SADF Basic Training Centre was born. Courses with regards to practical workshop education were introduced in 1947. During the 1970s and 1980s, the college fell under the Department of Education and was expanded to further include not only artisan training, but also academic ‘N’ classes, senior certificate, Secretarial and Commercial courses (Tshwane South College, 2013).

The name of the institution was changed in 1996 to Tshwane South College and currently employs a staff of 150 members and is responsible for 3000 students per trimester.

As this college accommodates a population of students which is much larger than what the envisaged artisan centre will cater for, the approach was taken to visit the college and talk to users in order to formulate views as well as gain insight into aspects which can influence the design.

Upon visiting the college, what was observed was that the classroom, cafeteria and outdoor amphitheatre spaces were pleasant and lively with numerous students populating them throughout the day. These areas are well shaded with trees as well as well-defined.

Many of the classrooms have been arranged so as to create pockets of courtyard spaces which was successfully observed to host activity. These pockets of activity are linked to one another through a series of pedestrian paths. As Alexander et al (1975: 115) advises, by doing this, one can help to unite the campus.

Spaces which were found to be least pleasant were the unused military warehouse buildings.
which currently house workshop activities. These buildings were originally designed for military use with little or no indoor/outdoor relationships. There is little opportunity for interaction between the various disciplines housed within them. Various lecturers and students, who were interviewed, complained of user discomfort. The exterior of these buildings are deserted with no vegetation or shade. Clearly this scenario is to be avoided if the aim is to create an environment conducive to learning. Other findings from interviews and surveys conducted include:

- Lighting and Ventilation need consideration. The idea of using tip-up doors on opposite walls which open up to a courtyard was popular with students and lecturers,
- The delivery of materials to workshops is minimal,
- Students in all study fields are trained in 12 modules with regards to first aid and how to conduct one’s self in an emergency,
- Workshops accommodate 20 students at a time with the maximum supposed to be 14.

3.5.2 Principles to be applied

- Activity pockets linked via pedestrian routes: as Alexander et al. (1975: 115) advises, buildings that are spread evenly across a campus do not create activity areas which encourage interaction,
- Consider the building edge: as is the case with the workshop buildings housed in the military warehouse buildings, if no consideration is given to orientate the building to the exterior as well as the interior, the area outside will be unpleasant and blank (Alexander et al. (1977: 753).
3.6 PRECEDENT COMPARITIVE ANALYSIS

SOWETO CAREERS CENTRE

CIRCULATION
Exterior: visitors to the centre are directed to connecting pedestrian routes which converges onto the main entrance
Interior: the main entrance is located on the south-east periphery of the centre and overlooks a generously shaded square. The courtyard configuration of the buildings serves to guide visitors throughout the centre

ACCESSIBILITY
Entry points are well defined and further enhanced with signage. The centre is placed on the busy Chris Hani Drive and is accessible by vehicle or foot

TECTONICS/MATERIALS
Different uses for ordinary materials were found. The buildings are comprised of an exposed steel structure with plastered walls and roof sheet cladding.

CLIMATIC RESPONSE
The buildings have been configured to allow for natural light to filter through and allow for natural ventilation, acting together with the open outdoor spaces

LOURIER PARK COMMUNITY CENTRE

CIRCULATION
Exterior: the main entrance is marked with a long and prominent entrance canopy, visible from all approaches to the centre
Interior: the various buildings are arranged around a large central courtyard space, with the entrances of the various buildings visible from this courtyard space

ACCESSIBILITY
The main entry point to the centre is highly visible from all paths leading to it. The centre was is highly accessible to the community with its placement being in the residential context of Lourier Park

TECTONICS/MATERIALS
Facebrick was predominantly used throughout the complex. Prominent buildings were plastered to break up this facebrick facade, with colours derived from the local context

CLIMATIC RESPONSE
Functions which are to be more frequently used have been placed with their long facades facing north and south, while amenities such as bathrooms have been placed on the western side of the complex. Strategically placed shaded clerestory windows, allow light to filter to the interior
USASAZO SECONDARY SCHOOL

Exterior: the entrance forms part of the school’s continuous, commercial street edge facade
Interior: the architect designed the central circulation space, filled with trees and seating, to mimic the character of the informal settlement context. From this courtyard one is able to access the various buildings within the school

Access is via a main entrance which forms an extension of the streetscape, which leads into the main courtyard of the school

Maintenance was a major consideration and influenced the use of concrete block work and galvanised steel and sheet metal

The L-shaped plan forms shield the open courtyard spaces from the strong directional winds. The roof has been configured so as to enhance natural ventilation

VPUU URBAN PARK + ACTIVE BOX

Exterior: the multi-purpose building is recognised by its centrally placed stair case which is cladded with red sheet metal and visually permeable mesh panelling.
Interior: the ground floor shop units have been designed with their dedicated entrances while the first floor functions are accessed via the central staircase

One of the objectives is for the building to be a place of refuge for anybody threatened by criminals. Therefore, it has been ensured that all of the various functions of the building are highly accessible

The active box is made up of a three-storey steel structure with brick infill as well as steel mesh panelling for surveillance and red sheet metal cladding to give the facility an identity

Thin rectangular plan shapes allow for adequate cross-ventilation. Unfortunately the multi-purpose building has been placed parallel to the street which has resulted in the majority of longer facades of the building facing east and west

TSHWANE SOUTH COLLEGE

Exterior: the college is set back over a large distance from Snake Valley Road, most probably as a result of the college not being originally being designed to function as an educational facility
Interior: although set out on a grid pattern, legibility is poor especially for pedestrians as the college is entered amongst the classrooms

Access to the site, especially for students utilising taxi’s, is difficult with the majority of students having to dodge traffic while crossing the Ben Schoeman highway in between their taxi drop-off and the college

The classrooms mainly comprise of facebrick walls offering a satisfactory degree of user comfort. The workshops are cladded with metal sheeting, with conditions extremely uncomfortable in summer and winter

Being originally part of the air force base, the only main climatic consideration was prevailing wind direction, with little attention being given to solar orientation. The newer buildings have simply followed the same layout as the original
CONTEXTUAL INTEGRATION

The building complex was placed on an underutilised and vacant piece of land. The material choice was inspired by the local industrial and low-cost housing context.

OUTDOOR SPACES

The outdoor spaces were not treated as leftover spaces which has resulted in positive and friendly spaces for people to use.

SECURITY MANAGEMENT

Entry points have been minimised. The buildings themselves have been arranged so as to secure the outside perimeter of the centre, with permeable walling used in between buildings.

CONCLUSION

The building bears testimony to what can be achieved with limited resources and with great determination by the client and architect.

LOURIER PARK COMMUNITY CENTRE

The centre blends into its context very well as a result of the architect taking note of the predominantly one-storey context, which has been applied to the perimeter of the centre, with higher elements being placed centrally.

The building complex within the community centre has been regulated and arranged by the large courtyard space, creating a safe and enjoyable outdoor room.

Various activities throughout the day ensure that there is passive surveillance. Access points to the centre have also been kept to a minimum.

The Lourier Park Community Centre gives scale to a scale less environment as well as provides context to future developments within the area.
USASAZO SECONDARY SCHOOL

Careful note has been taken of the low-height context and the school has been designed so there is a gradual increase of scale which does not alienate the design from its given context.

Three courtyard spaces, with circular planters for trees providing seating and shade, have been used to organise the placement of buildings.

Security is achieved by creating a building with active facades which is in contrast with conventional township schools which are set back from the street and masked behind security fencing.

Unfortunately, in areas such as the one in which Usasazo is situated in, very often the first public buildings are schools, which play crucial roles in the development of pleasant urban spaces. This is an attempt at trying to strengthen and create a distinct street facade.

VPUU URBAN PARK + ACTIVE BOX

Situated on major pedestrian routes, the active box helps to articulate the existing routes with a landmark intended to create a feeling of safety into the surrounding area and urban park.

The community urban park has been developed with well-lit, visible pedestrian path networks as well as sustainable landscaping practices.

Local people are employed as caretakers as well as workers in the multi-purpose building which comprises of shops on the ground and a flat for the caretaker on the first floor. Activity through the day ensures passive surveillance.

The lack of vandalism has illustrated the extent of which the community has assumed ownership. In addition the volunteers, who have assisted in the running of the facility, have used the project as a mechanism to gain access to skills development.

TSHWANE SOUTH COLLEGE

Due to its origins, the architecture has a primarily military feel to it, which compliments the other military facilities which surround the campus site.

The areas that are shaded and well-defined were found to be pleasant spaces. The spaces without these, were deserted with minimal activity.

Security is regulated by guard booths placed at entrances with high security fencing placed all around the campus, contributing to its fortress feel.

Although there are areas which are dysfunctional on the campus, one has to remember these are predominantly the spaces which were intended to serve the airforce. Lessons can be learnt from the areas that were later designed with particular reference to how the pedestrian routes have been treated.
WORKING TO
WE CAN DO
“According to a 2004 study by FinMark Trust, more than 40 per cent of South Africa’s urban population live in townships, and 20 per cent live in informal settlements and low-income housing estates. For example, 43 percent of Johannesburg’s residents live in Soweto alone, and a total of 73 percent live in townships, informal areas and low-cost housing estates. Emerging data indicates that townships are largely, but not exclusively, an urban challenge.”

-South African Cities Network
Township Renewal
Sourcebook
4.1 REGIONAL CONTEXT

Having established a topic, which this dissertation aims to respond to (the shortage of qualified artisans), the ensuing step was to identify a study area to implement the proposal. On a regional level, the Gauteng province is economically the more viable choice as it accounts for 30.7% of South Africa’s employment statistics, with Kwazulu Natal second with 18.5% (Department of Finance Mpumalanga Provincial Government, 2013:3).

In terms of sheer numbers, Gauteng is the province with the largest density with a population of 12.2 million. According to Census 2011 (Ngcobo, 2012), this large population in comparison with other provinces, can be attributed to the migration of labour to this part of South Africa to find work due to its industrialised nature.

Gauteng comprises of the city of Johannesburg, which was once the world’s most significant centre in terms of producing gold, and Pretoria, the country’s administrative capital. Other significant cities with commercial, industrial and mining natures, include Germiston, Springs, Alberton, Boksburg, Benoni, Vereeniging, Vanderbijlpark, Krugersdorp, Randfontein and Westonaria (Gauteng City-Region Observatory, 2012).

Pretoria was originally inhabited by the Ndebele during the 1600s, with the first Afrikaans settlers appearing in the 1840s. Pretoria was founded in 1855 by Marthinus Pretorius, and was later declared as the...
capital of the Republic of South Africa (Gore, 2013). With regards to industry, Pretoria possesses substantial industrial activities related to iron and steel casting as well as automobile and machinery manufacture (Department of Environmental Affairs and Tourism, 2013).

With regards to the sheer job numbers in Pretoria, it is evident from the table below, that the CBD is the main source of employment in the region with 70.36%. The next employment node accounts for a mere 11% in comparison, however one must take into account that the CBD only generates 21 069 jobs which are industrially related, while Waltloo and Rosslyn deliver 32 850 and 22 794 jobs respectively which are directly related towards industry. Interestingly, Waltloo and Silverton are neighbouring districts which share boundaries and are located within a few kilometres of one another. When adding their statistics together, they are responsible for some 40 000 jobs.

Based on these statistics it is apparent that by locating the proposed artisan centre in the vicinity of Waltloo and Silverton, one would have the advantage of possibly gaining opportunities for students to carry out the experiential component of their studies, and perhaps go onto obtaining employment in the existing industrial context. As iterated before, there are huge advantages to affiliating with the numerous industrial organisations based in the area. Not only can this result in job placements for the students, but also ensure that the level of training offered is relevant to industry standards.

Therefore the selection criteria for the study area are:
- Close proximity to economic opportunity
- Existing industry which can be ‘plugged’ into
- Not only should the skills shortage be addressed, but investigate how the centre can also influence social conditions.

### 4.2 STUDY AREA IDENTIFICATION

**Mamelodi, Pretoria, Gauteng**

25°42′08″S 28°19′39″E

Mamelodi was chosen as the focus area for this dissertation. Justification for this decision is obviously that it meets the pre-determined criteria discussed in the previous paragraph. Additionally, the author is acquainted with this area. The reasons for Mamelodi meeting these criteria, are intrinsically related to its historical fabric which will be discussed in the following section.
4.3 MAMELODI HISTORY

The earliest formal records which make mention of Mamelodi (known as Vlakfontein farm 329 JR until 1962) dates as far back as 1854. Archives mention how the farm was later divided in roughly 1874, with the Moretele River (known presently as Pienaar’s River) used as a boundary demarcating Western and Eastern Mamelodi. The area saw the introduction of the first factory (of the Transvaal region) in 1882 known as Eerste Fabrieke. Further development of the area saw a railway line built and thereby connecting Pretoria to Maputo in 1890 (National Cultural History Museum, 1995: 2). The factory made use of local labour and additionally attracted further labourers which saw the development of housing and other building structures. These labourers who fabricated bricks and glass bottles in the area, were later removed and relocated according to the Group Act.

1945 saw the purchase of the farm by the Pretoria City Council with the intention of developing a black township. The actual framework and layout was carried out by N.T. Cooper, later he would serve as head of the PCC’s Planning Department. The area was officially declared as the Township of Vlakfontein in 1953 under the Native (Urban Areas) Consolidation Act, No 25 of 1945 (National Cultural History Museum, 1995:2).
The farm was purchased by the council as a solution to containing the removed Africans from the inner city, which was the same reason for the establishment of Attridgeville in 1939. This was done by the forced removal of Africans and their relocation to townships established and chosen for their strategic locations, falling outside and on the periphery of white urban and industrial areas.

However for these townships to achieve their purposes, government reasoned that they needed to be economically viable, and for that reason industrial activities were implemented in 1960. That saw the development of Waltloo, supplying jobs to the population of Mamelodi. Additionally the Waltloo area was implemented to act as a buffer zone, separating Mamelodi from the white area of Silverton. This same approach saw the establishments of industrial areas such as Rosslyn and Hammanskraal (National Cultural History Museum, 1995: 3).

The Township of Vlakfontein was renamed Mamelodi in 1962. There are two versions of what the word means with one version describing it as a Tswana word meaning, a place of joy. A more popular version describes it as term associated to the former President Paul Kruger’s ability to imitate the whistling of birds (National Cultural History Museum, 1995:3).

In the 1970s South Africa experienced a period of economic recession and urban unrest. To address the general poverty among Africans the Government sought to create a Black middle class with property rights and with complementary residents associations founded in the 1980s (National Cultural History Museum, 1995: 4).

The abolishment of apartheid in the 1990s saw Mamelodi become fall under the Pretoria Municipality (known currently as the City of Tshwane Metropolitan Municipality).

A schematic of Mamelodi or Vlakfontein Native Location as it was known in 1947. The proposal for a train station never went ahead (Bruwer & Martinson, 2012: 20).
4.4 MAMELODI TODAY

The Mamelodi of today is a densely occupied township with considerable informal settlements predominantly in the easterly direction. With migration from the rural areas to more prosperous employment opportunities within Tshwane, these informal settlements continue to grow daily.

Employment opportunities within the township are scarce with the greater part of the population living in poverty. This is especially evident when moving from the older and much more developed, from an infrastructural point of view, western part of Mamelodi to the east which is primarily informal. With employment prospects limited, locals have taken to entrepreneurial activities such as running businesses from their homes, trading as informal street vendors, washing of cars and the manufacture of various construction materials, to make a living.

The western part of Mamelodi mainly consists of RDP housing which is serviced with potable water, water-borne sanitation and receives their electrical power from the municipality.

The informal settlements, which dominate the eastern side of the township, consist of single storey dwellings which primarily are erected straight on the ground with very limited resources. Walls are erected predominantly from sheet metal fixed to timber framing. Roofs are sloped just enough to ensure the roof can shed rainwater. Obviously services from the municipality are minimal or non-existent, although future developments from the local authority aim to address this problem.

Commuting within the area is dominated by public transport and mini-bus taxi transport means. Mamelodi is serviced by five train stations, namely:
- Denneboom,
- Eerste Fabrieke,
- Greenview,
- Mamelodi Gardens,
- Pienaarspoort,
which are situated along a railway track system which runs along the length of Mamelodi on the southern periphery. Awkwardly, these stations are not evenly spaced which creates difficulty for commuting. There are future proposals to revamp
and increase the capacity of 39 000 passengers these stations serve, to 58 000 per station. Pretoria-based architects Holm and Jordaan, propose a revamp of the station at Mamelodi Gardens.

Supporting the metro railway system is the minibus taxi service industry. These services make use of the following major roads in the area, which include: Stormvoël Road, which becomes Tsamaya Avenue linking Mamelodi to Zamebesi Drive; Solomon Mahlangu Drive (formerly Hans Strijdom Drive) which links to the N4 highway. Other major roads include Simon Vermooten Drive, Lubisi Avenue and Shabangu Avenue. Shabangu Avenue is a major linking element within the township and served as its main road for many years before the introduction of Tsamaya Avenue.

Although these modes are readily available, there remains a deficiency with their layout, with locals describing the inconvenience of changing modes of transport up to four times in a single trip.
4.5 DEDICATED PUBLIC PARKS

Dedicated public landscaped parks within an urban environment not only enhances the city’s value but also positively contributes to local people’s lifestyle, their moods, their sense of belonging. Christopher Alexander and his affiliates (1977: 305), emphasise the importance of accessible green spaces, and how in order for these spaces to be successful they need to be within a three minute walking distance.

An analysis and field trip to the dedicated public park facilities within Mamelodi was conducted, and the results revealed how successful and well utilised these spaces are by schools and the general public. These spaces are well maintained by the municipality and more facilities of this nature would almost certainly be well used by the various community.

Obviously to implement an accessible public park network within Mamelodi would require an intense framework not to mention an adequate maintenance plan. This falls outside the scope of this dissertation, and therefore this proposal will aim to explore how an individual building could access this deficiency of public parks on a micro-scale.
Presently the educational facilities within Mamelodi comprise of five pre-primary schools, roughly 55 independent day-care centres, 49 primary and high schools. Languages catered for within these institutions include Northern Sotho, Tswana, Zulu, Tsonga, etc. In terms of tertiary education, the area offers 4 institutions of this nature (Modiba: S.a.:18).

An inventory of existing primary and high school facilities in Mamelodi (Author, 2013).

An inventory of existing tertiary educational facilities in Mamelodi (Author, 2013).
4.7 SPATIAL DEVELOPMENT FRAMEWORK FOR PRETORIA
EASTERN REGION

In 2010, the City of Tshwane commissioned GAPP Architects to conduct an extensive framework proposal for the Mamelodi area. The aim of the proposal was to address the following aspects:

- The development of nodes to develop activity corridors;
- Creation of identity for various districts;
- Where to pinpoint private as well as public infrastructure investment;
- Identify preferred development and land use patterns;
- Recognise where development should be restricted;
- Indicate areas in need of urgent attention; and
- Draw up a development mandate for land use (Bennett, 2011: 67).

The suggestions by GAPP Architects echo a number of strategies that were proposed in the Regional Spatial Development Frameworks for each administrative planning region within its jurisdiction, developed in 2007. Mamelodi falls under the eastern region, along with areas such as Menlyn, Atterbury, Waltloo, etc. A few recommendations made by the proposal include:

- The development of Eerste Fabrieke as an urban core to facilitate activity nodes which encourage economic, social and housing opportunities;
- A new road link proposal from Tsamaya Avenue to Samcor, via Simon Vermooten Road;
- Exploit potential placemaking opportunities Tsamaya Avenue offers;
- Explore the possibility of developing Tsamaya Avenue as an activity spine; and
- Developing unoccupied spaces for infill development (City Of Tshwane, 2007: 35).
Activity Node at Intersection
By Developing these Nodes, further Activities are encouraged.

The aim of introducing an activity route is to link the various nodes together. Along its length various other routes intersect this activity spine and opportunities are thus created that respond to activities such as pedestrian movement, vehicular traffic, etc (Author, 2013).

The framework argues that road reserves, if not needed, are spaces that are lost opportunities. They believe that by developing these spaces, opportunities can be created (Author, 2013).

Mamelodi Proposed Framework Strategies as per GAAP Architects
(Bennett, 2011: 69)

Suggested Node Development Locations
Residential Densification Proposal

Proposed Vehicular Movement Routes
Proposed Public Green Open Areas
4.8 SITE SELECTION

Having established what future developments which will influence Mamelodi, the next task is to select a site. Taking into account the data researched, additional considerations which will influence the site selection process include:

- Access to the site;
- Availability of utilities;
- Space for future expansion;
- Security considerations;
- Proximity to economic opportunities; and
- the Possibility of linking to existing infrastructure.

Three sites were identified and investigated:

**Site A: 25°43,116ʹ S 28°21,531ʹ E**

**Strengths:**
- The site is situated on the main road of Tsamaya Avenue;
- The site allows for future expansion,
- Utilities are available on site;
- The site is highly accessible from Eerste Fabrieke Train Station as well as from Tsamaya Avenue;
- The longer boundaries of the site have a north and south orientation;
- The site offers the possibility of rehabilitating the Pienaar’s River which can benefit the community; and
- The site is reasonably flat with a gradual fall from south to north.

**Weaknesses:**
- Soil conditions are extremely poor and suffers extensively from erosion;
- Noise levels could be high as a result of traffic from Tsamaya Avenue;
- The site is being used as an illegal dumping ground by the residents currently; and
- The site in general can be described as a degraded site and if chosen will need a strategy to rehabilitate it.
Site B: 25°43,067′ S 28°22,086′ E  
Strengths:  
• The site is situated on the main road of Tsamaya Avenue;  
• The site is located near existing educational nodes such as the Tshwane North FET College and the Mamelodi Teachers Training Academy among others, and could serve to create an educational district; and  
• The site is reasonably flat with a gradual fall from south to north.  
Weaknesses:  
• The shape of the site is linear and extremely narrow, orientated towards the north-west;  
• Noise levels could be high as a result of traffic from Tsamaya Avenue;  
• The soil conditions are poor with erosion evident, and  
• Future expansion is not possible.

Site C: 25°43,361′ S 28°25,207′E  
Strengths:  
• The site is situated on the main road of Mathane Road;  
• The site is near the Meetse a Bophelo Primary School and the two facilities could engage in a symbiotic relationship;  
• The site is reasonably flat with a gradual fall from east to west; and  
• Soil conditions are rich enough to yield certain crop species.  
Weaknesses:  
• A general lack of utilities and infrastructure;  
• The area is of a predominantly informal nature;  
• The existing fabric is fragmented;  
• The site itself is being used to a degree by the Meetse a Bophelo Primary School; and  
• Future expansion is limited.

CONCLUSION
Of the three sites investigated, Site A is in the worst condition according to the Worksheet Site Selection Criteria drawn up (see Annexure A), Site A scores the highest and offers the highest potential for this proposal to be successful. By choosing this site it also echoes Alexander and his affiliates advice on the positioning of buildings on those parts of the land which are least pleasant and do not contribute to the community (1977: 511).
4.9 SITE APPRAISAL

The site is located along the busy Tsamaya Avenue, which accommodates large numbers of vehicular and pedestrian movement. The site is surrounded by a number of public amenities such as schools, clinics, independent commercial facilities, a pedestrian bridge as well as the Eesre Fabrieke Train Station. Tsamaya Avenue is a significant road as Stormvoël Road merges into it and thereby forms a link to the N4 highway. Furthermore, Tsamaya Avenue runs through the heart of Mamelodi, linking west to east.
4.10 KEY EXISTING PHYSICAL SITE FEATURES

Legibility is an important aspect of any environment as Kevin Lynch describes (Bentely et al, 1985: 42). It affords the users of any place to take full advantage and explore all the benefits a place has to offer by simply allowing the user to understand its layout. Although the proposed site is currently delapidated, there are however certain physical features which could be used as hints to inform the design process:

- **Landmarks**: although the arched HDPE-lined concrete pipe was not intended for landmark purposes, it has over time become a reference point within the community and many locals referred to this sewer pipe during interviews;

- **Edges**: these elements strongly influence accessibility and movement along the edges of the site. They are both man-made and natural with the Pienaar’s River on the northern periphery and Tsamaya Avenue on the southern periphery;

- **Paths**: the channels of movement are greatly influenced by the placement of nodes and the hierarchy of the road network with reference to Tsamaya Avenue as a main street. These movement paths are predominantly pedestrian orientated; and

- **Nodes**: the existing nodes which are prominent focal points on site include Eerste Fabrieke Train Station and the existing pedestrian bridge.
4.11 Findings from the Site Analysis and their impact on the Proposed Design

The following observations were made and will influence the design significantly:

1. Observations in the field have revealed a more direct but informal route that pedestrians prefer to take towards Eerste Fabriek. This route could be formalised to create an axis connecting the design proposal to the train station;
2. The direct link to the train station could be further strengthened with taxi drop-off points in either direction of Tsamaya Avenue;
3. This axis could be further developed to include an additional pedestrian bridge running over the Pienaar’s River. This will ensure better accessibility to three schools, which house community activities as well, located on the northern side of the river;
4. Currently motor car and exhaust repairs take place on the site. Consultation with the entrepreneur revealed his wish to be accommodated into the design with the request of having a covered area to work under and conduct his business activities;
5. As stated before, Tsamaya Avenue accommodates a large number of vehicular activity and existing attempts to regulate this have proven unsuccessful. If a link to the proposed design and the train station is to be successful, the manner in which a pedestrian crosses this avenue should be improved;
6. High levels of noise are generated from Tsamaya Avenue and the design of a buffer zone should be explored;
7. The height of built structures in the context of the site is one-storey with the odd building comprising of two-storeys. The design proposal should respond to this in a sensitive manner;
8. The advantages of rehabilitating the Pienaar’s River as discussed earlier within this chapter; and
9. The possibility of creating a pedestrian link to the existing residential area on the eastern periphery of the site should be explored.
An arched HDPE-lined concrete pipe running over the Pienaar’s River to the west of the site (Author)

A stormwater outlet on the west of the site, draining into the river

An example of the refuse contaminating the river presently

The extent of the erosion levels on the site along the river banks

The river is murky with locals complaining of the unpleasant smell it gives off

The Pienaar’s River was used early to demarcate Eastern and Western Mamelodi. From the north, it enters the area through the Magliesburg Mountain Range (Author)
Illegally dumped refuse currently dominates the site’s surface.

Discarded tyres which becomes a mosquito breeding ground during the rainy seasons.

An offender trying to make a get away after having dumped refuse on the site.

Street vendors ply their trade presently in the South-Eastern corner of the site. Consultation revealed their interests in being incorporated into the design proposal.

A sketch done on site of the street vendors plying their mobile repair service (Author)
The Northern Periphery of the site. Summer rainfall has enhanced the vegetation to a degree, which is masking the levels of illegal refuse occupying the site (Author).

The Southern Periphery of the site. The height context is generally one-storey with activities predominantly being commercial on the Tsamaya Avenue Edge. The road also facilitates large vehicular traffic volumes.

The Western Periphery of the site. The Pienaar’s River forms an Edge along site in the East, and Tsamaya Avenue forms the Southern Edge.

The Eastern Periphery of the site. This Edge comprises of mainly one-storey high residential dwellings, with many businesses run from these premises.
A proposal whereby a movement route could be introduced and used to link the Eerste Fabrieke Train Station with various existing School Facilities containing a variety of community functions (Google Maps, 2013. Redrawn by Author)
Framework Proposals have identified Eerste Fabrieke Train Station as an Urban Core with proposals aimed at reinforcing this identity (Author).

An informal pedestrian route leading from the station towards Tsamaya Avenue.

Tsamaya Avenue accommodates a large vehicular flow. Traffic calming methods and ways to facilitate pedestrian crossing will be explored.

An additional pedestrian bridge going over Pienaar’s River could be proposed. It would sit approximately 300m from the existing bridge.

An existing pedestrian bridge allowing movement across the river.
4.12 IMMEDIATE SURROUNDINGS

4.12.1 Accessibility:

The site is situated whereby a few transport modes converge on it, especially along the southern periphery. Pedestrian movement takes place primarily along the existing sidewalk situated on the southern side of the site. Taxi mini-buses frequently use this sidewalk to drop-off passengers throughout the day. The Eerste Fabrieke Train Station is in very close proximity to the site and in addition, certain segments of the site form part of the pedestrian route to this train station. The eastern periphery of the site forms an edge along the path pedestrians utilise on their way to a pedestrian bridge which goes over the Pienaar’s River. Tsamaya Avenue accommodates quite a significant amount of vehicular traffic and an effort has been made to calm this traffic down in the form of speed bumps. However, observations have shown this to be unsuccessful due to their placement along the road and pedestrians preferring to try and negotiate their way around on-coming traffic. In general there is some infrastructure for pedestrians, however this does not result in a user-friendly pedestrian environment. The majority of students that will attend the proposed design will access the site primarily on foot and make use of public transport. The design proposal should aim to provide a framework whereby traffic can be calmed and this system should be placed where it is convenient for its users. Proposing a formal taxi drop-off point will further enhance accessibility to the centre, while some secure on-site parking will be provided. Furthermore, the possibility of implementing another pedestrian bridge forming a link to Eerste Fabrieke Station and the surrounding public amenities, from the centre, will be explored.
4.12.2 Electricity

The surrounding context is serviced by the local authority and a connection for the proposed centre is possible.

4.12.3 Water

An assessment revealed that an existing water reservoir can be found roughly 4 km from the proposed site. Existing dwellings are supplied water by means of a gravity reticulation system.

4.12.4 Sewerage

At present, existing sewerage lines run through the site with the capacity to ensure that a connection to the municipality is possible.

4.12.5 Storm water

Presently stormwater is removed via drain points situated on Tsamaya Avenue. Surface drainage on the site itself is a major concern. Additionally, the site suffers extensively from erosion which results in large amounts of topsoil being eroded away in the event of a storm and thereby contaminating the Pienaar’s River. Not only is the topsoil swept off to the river, but also the refuse, which is being dumped illegally on the site. To address this issue and rehabilitate the river, systems such as sediment traps and detention basins will be implemented into the design. This together with the use of porous paving materials and the introduction of ground cover will address the problem of erosion.

Systems to harvest rainwater from the various roofs in the centre, as well as ground water, will be implemented and filtered and in turn used to flush toilets and to irrigate vegetation.

4.12.6 Waste management

Waste management will take place on-site. As far as possible, all waste material will be sorted in a dedicated sorting yard and be-reused. Recycling systems will be implemented whereby materials such as glass, metals and plastics will be sorted and processed. Any organic waste will be used for the gardens and plant life throughout the centre.

4.12.7 Topography

The site is reasonably flat with a gradual fall from south to north towards Pienaar’s River.

4.12.8 Scale of context

The site is predominantly surrounded by a one-storey high residential context with a few formal and informal commercial activities situated opposite the site on Tsamaya Avenue.

4.12.9 History of the site

Interviews and discussions with the local community did not clearly establish what the exact catalyst was for the state that the site currently finds itself in. According to their feedback, it seems as though it was a gradual process which took place over time. Locals have described how the river at one stage was used for religious services and baptisms within the river itself. However, with the declining state of the river over time, these activities have become minimal due to the stench from the river and the general murkiness. Locals also could not pinpoint exactly when the illegal dumping of refuse began on the site, nor could they remember any previous structures on the site that may have been demolished.
4.13 Climate and Geology

4.13.1 Soil conditions

The ground conditions comprise of moderate to extreme amounts of clayey-loam, comprising of approximately equal measures of sand, clay, silt and humus; ideal for producing most crops. Buildings on this soil will require small but deep foundations.

Erosion

Erosion of the site’s soil is a major concern. This condition is evident throughout the site and is negatively contributing towards the ecosystem along the banks of the Pienaar’s River. Due to the gradual slope of the site towards the river, in the event of a storm, various contaminants are carried into the river via the stormwater run-off area on the ground level. This situation is further aggravated due to little permeable ground cover, such as grass, to decrease the stormwater volume run-off into the river. The severity level of the contaminants are amplified with the illegal dumping of waste materials on the site, which is then carried into the river. Include other stormwater outlets which run into the river and the result is that the river is currently unhealthy and murky with locals complaining of the unpleasant smell it gives off.

Solutions to rehabilitate the river will start with initially controlling the amount of contaminants currently being swept into the river via filtration. This will be done by firstly addressing the erosion problem by ensuring a suitable permeable material, such as grass, is introduced. Secondly, by implementing a series of off-stream stormwater catch basins which will be embedded with the grass species *pennisetum clandestinum*, which grows rapidly. These basins will assist in regulating flood peaks. Further systems which can be implemented to assist in the filtration process are the introduction of reed filled ponds which can trap contaminants and require to be de-silted in plus minus five to seven years.

A case study of this exact process was investigated and findings revealed that the same methodology was adopted in the Klipspruit River Corridor in Soweto. The quality of the water was enhanced and achieved by widening the current river canal and thereby creating a floodplain, which the river channel follows. Rock barriers were introduced and positioned into the stream to create backwater effects and also ripples and in so doing create habitats for micro-organisms. Pathogenic organisms were removed via their filtration with the aid of wetland patches comprising of grasses and sedges mostly.
The regulating of river flooding was achieved by introducing a series of catch basins. With the rapid growth of grass in these basins, locals were afforded the opportunity to remove grass sods to create their own lawns on their individual properties. In winter these basins dry up and the local youth uses them for play activities. Further initiatives saw the addition of a silt-trap pond for the trapping of sediments further upstream.

This case study illustrates an approach on how to successfully rehabilitate a river. A crucial aspect that needs to be addressed with this process is community participation, which is crucial in terms of forming ownership and ensuring the upkeep and maintenance of the river. A similar approach to Pienaar’s River in Mamelodi should reap similar benefits.
4.13.2 Climatic region

According to Napier (2000: 9.8), Mamelodi falls under the climatic region classified as temperate eastern plateau. Summers in this region are generally warm to hot, relieved to an extent by thunderstorms produced by thermal air movement, with hail a common occurrence. Winters are sunny during the day, cold to extremely cold conditions prevail at night.

4.13.3 Rainfall

The average rainfall for Mamelodi is in the region of 763mm of which a total of 88% of that figure falls during the summer months (Napier, 2000: 9.8).

4.13.4 Temperature

Temperatures range from 20 to 32 degrees Celsius during the summer months, and come down to as low as 6 to 23 degrees Celsius during the winter months (Napier, 2000: 9.8).

4.13.5 Prevailing winds

The effects of the prevailing winds in Mamelodi are directly influenced by the site’s location in a low lying valley between parallel mountain ranges, and consequently running in a west-east direction. In the summer months the wind direction is commonly from the north-easterly to south-easterly direction, while in winter, winds originate from the north-east and as well as south-west (Napier, 2000: 9.8).

4.13.6 Humidity

Humidity within this region averages out to 59% (Napier, 2000: 9.8).

4.13.7 Solar conditions

The following angles are used to calculate roof overhangs as well as window heights and positioning (Napier, 2000: 4.9).
The main findings from interviews conducted with locals, ranging from entrepreneurs to the unemployed, revealed the following:

- Many locals have been taught artisanal related skills, informally and have no formal education and this limits them to Mamelodi, where people know their standard of work;
- The Tshwane North Technical College is not affordable for most people interviewed;
- Baptisms and religious services took place in and along the Pienaar’s River when it was in a better condition;
- Many would see the proposed centre as a mechanism in which to operate within their communities as entrepreneurs;
- Generally, the community to the north of the Pienaar’s River would benefit from an additional and direct route to the Eerste Fabriek Train Station;
- Numerous adults iterated that any form of safe public functions targeting the youth would be welcome and keep them away from negative influences;
- It was noted that there is a general lack of facilities, such as internet access, for artisans and entrepreneurs to market themselves outside of Mamelodi;
- All persons agreed that the rehabilitation of the Pienaar’s River and development as a public park facility would be of great benefit to the community; and
- Entrepreneurs currently operating on the proposed site (repairing motor vehicle exhausts and the sale of car tyres), welcomed the idea of the proposed centre that would incorporate them.

4.14 Findings from interviewing community members

The main findings from interviews conducted with locals, ranging from entrepreneurs to the unemployed, revealed the following:
EQUIPMENT CLEARANCES ON PLAN

EQUIPMENT CLEARANCES ON PLAN

WORKING SPACES: WOODWORKING EQUIPMENT.
CHAPTER FIVE

PROGRAMME + ACCOMMODATION

The preceding research has allowed for ideas to be identified as well as principles to be incorporated into the design. The next step of the following chapter is to finalise the brief and programme. The aim of this programme is to identify essentially what the proposed design should set out to achieve and avoid
5.1 Brief development

The proposed design intervention is a response to the skills shortage South Africa is currently experiencing with a particular emphasis on the artisan field. Realistically, the design proposal will not relieve this shortage significantly. Rather what this dissertation sets out to do is to provide a facility to enable willing students with a means to equip themselves with the necessary knowledge and qualifications, to take advantage within the job market in a field where there is great demand.

Bearing the above in mind, this dissertation therefore also deals with unemployment to an extent and therefore the decision to situate the center in a township study area was taken as these are areas predominantly associated with high levels of unemployment. The manner in which a center of this nature can successfully be implemented into a township environment depends fundamentally on how the community takes ownership of the facility and this scheme will explore methods to achieve this. Difficulties which still plague townships currently as a result of apartheid include: peripheral location, poor transport connections as well as being troubled with unpleasant and unsafe areas, but to name a few.

Practically, the proposed center can respond to one of these problems meaningfully by locating the proposal on a piece of land which is either unpleasant or unsafe and there positively occupy it.

Once a site is located, other approaches to improve its immediate surroundings will be explored. The above issues which will guide and inform the design of the proposed artisan center can be summed up in the following points:

• Identification of a national artisan skill shortage;
• Selection of a township study area to stimulate employment opportunities; and
• Choice of site which will benefit the community.

The expectation is that by acting in response to the above criteria, a degree of economic development can be encouraged within the study area whereby the flow of money into and within the township is stimulated. A well-functioning labour force is one approach by increasing employment opportunities for township inhabitants. This training needs to match current labour demands and methods of assisting in job placement as well as access to job databases need to be considered.

This study therefore attempts to explore and illustrate one approach of designing a facility of this nature and how it could be used as a mechanism to energise and enrich an impoverished township community.
5.2 Client Profile and Funding

5.2.1 Department of Higher Education and Training
At this time, the Department of Higher Education and Training (DHET) spearheaded by Minister Blade Nzimande, has declared 2013 to be the year of the artisan with various initiatives geared towards promoting this vocation.

One such initiative is the launch of the Policy for a Generic National Artisan Learner Grant Funding Administration System. The concept of this system is to make funds (R139 350 per learner) readily available for qualifying employers for the duration of a learning programme. An additional benefit of this funding is that employers can plan their approach to training candidates with the confidence that this funding will not fluctuate and will be available, which has not been the case with the fluctuating SETA grants over the last few years. With a planned R 3.6 trillion investment into major infrastructure over the next few years, the DHET is investing billions of rands into the development of Further Education and Training colleges to turn them into institutions of choice (Stuart, 2013).

5.2.2 National Skills Fund
The National Skills Fund is a fund set up with the aim of allowing government to address crucial skill-development policies by encouraging strategic partnerships and raising the standard of training in South Africa. Furthermore it falls within the framework of the Human Resource Development Strategy for South Africa (HRDSSA) and the National Skills Development Strategy (NSDS), which aims to target opportunities and resource shortages with regards to skills development.

The NSF allocates funding specifically with the intention of backing community-initiated skills development projects which coincides with the aims of the NSDS (Moleke, 2011).

5.2.3 SETA's
Sector Education and Training Authority’s (SETA) are responsible for liaising with industry and ensuring that their research is aligned with market research and they play a pivotal role in ensuring that the strategies of fulfilling the mandates, as set out in the National Skills Development Strategy, are fulfilled.

23 specific SETA's were established through the Skill Development Act (no.96 of 1998). An example of a SETA is MerSETA (Manufacturing, Engineering and Related Services Sector Education and Training Authority) which relates to the following trades:

- Metal and engineering;
- Auto manufacturing;
- Motor retail and component manufacturing; and
- Tyre manufacturing and plastics industries.

A recent strategy from MerSETA is to make grants of R90 000 available to candidates and have them trained in up to 90 weeks through an Accelerated Artisan Training Programme (AATP).

In addition, companies which earn less than R500 000 per annum or are MerSETA levy payers or are exempt, qualify for funding through a MerSETA and AA joint funding initiative (Moleke, 2011).

5.2.4 DESTO Technical Training College
Desto Education, Training, Development and Consulting Services, was established in 1994 as an educational institution which provides the market place with a competent and skilled workforce, while also providing consultation and recruitment services, accredited with the services SETA.

Following a survey into existing FET technical colleges as well as independent skills development centers located in the Pretoria area, an interview was conducted with Freddy Osmond who is the Head of the Technical Division of Desto. He described how his organization was in the process of finalising an announcement for architects and planners to submit proposals for their new technical division campus. Presently the technical division is scattered with workshops in Rosslyn and Pretoria North, accommodated in the Hoërskool Tuine. Osmond explained how this new development will bring these various workshops as well as administration facilities to one central location. Desto’s necessity for a new campus highlights that there is a need for institutions of this nature (Osmond, 2012).
<table>
<thead>
<tr>
<th>No</th>
<th>Design Criteria</th>
<th>Criteria in Conflict</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Security and Vandalism Prevention</td>
<td>Crimes normally occur after hours, with illegal entry done in blind spots as well as through isolated areas such as ablution facilities which are perceived to be unsupervised</td>
</tr>
<tr>
<td>2</td>
<td>Engaging the proposed building complex with its natural river context</td>
<td>How can the proposed building engage with its natural context along the Pienaar’s River, without compromising its security and also avoiding a fortress approach?</td>
</tr>
<tr>
<td>3</td>
<td>Connection to the existing context and its surroundings</td>
<td>The site is located in between 2 significant edges which is the Pienaar’s River and Tsamaya Avenue which accommodates substantial vehicular traffic</td>
</tr>
<tr>
<td>4</td>
<td>Response to the predominantly one-storey height context</td>
<td>How can the proposed centre ensure a civic presence without overwhelming its low height context?</td>
</tr>
<tr>
<td>5</td>
<td>Response to the noise generated from the traffic on Tsamaya Avenue</td>
<td>The Tsamaya Avenue is a significant arterial road which runs through Mamelodi and its reliance by vehicles will ensure that noise levels will be an ever-present issue</td>
</tr>
<tr>
<td>6</td>
<td>Community ownership</td>
<td>How is the safety of the proposed educational facility maintained while promoting the community to take ownership of the complex successfully</td>
</tr>
<tr>
<td>7</td>
<td>Use of local labour</td>
<td>Consideration must be given to how many jobs the building process can create within the community which also enhances ownership of the facility. However how can the structural integrity of the building process be regulated by utilising a largely unskilled local labour force?</td>
</tr>
<tr>
<td>8</td>
<td>User comfort within the workshop spaces</td>
<td>A re-occurring theme echoed by users of existing workshops studies, complained of how uncomfortable these spaces are to work in throughout the year. Users found issues with a lack of ventilation in summer and complained of the cold conditions on winter mornings</td>
</tr>
<tr>
<td>9</td>
<td>Rehabilitation of Pienaar’s River</td>
<td>To meaningfully address the current condition of the river would entail a regional approach which falls outside the scope of this dissertation. What this dissertation will propose is to explore what can be done on a micro-scale to address the river and its banks</td>
</tr>
<tr>
<td>10</td>
<td>Improvement of the pedestrian environment</td>
<td>Minimal consideration was given towards pedestrians with well-defined routes almost non-existant</td>
</tr>
</tbody>
</table>
Configurations

A courtyard configuration of arranging the building complex can ensure that the complex is compact and easily observable from the inside with no blind spots or uncomplicated perimeters. Introducing student housing as well as making the centre visible from the outside will encourage passive surveillance.

The courtyard configuration will ensure a controlled perimeter, while the dramatic 3m drop on the northern periphery of the site can be used to allow for the complex to open up towards the river side without compromising its security.

The implementation of a pedestrian route beginning from the Eertse Frabrieke Train Station, running over Tsamaya Avenue, through the proposed site, over the Pienaar’s River towards 3 primary schools located on the rivers norther bank will be proposed.

The complex will be designed with a definite hierarchy done in a sensitive manner whereby tall elements will be placed towards the centre of the complex and low elements will be placed on the peripheries of the site, ensuring a gradual increase in terms of height. This can give scale to a scale-less environment and provide context for future developments.

Create a pedestrian boulevard on the Tsamaya Avenue edge with trees and elements which can reduce the noise levels. The noiser activities the proposed centre will house, can be placed towards the Tsamaya Avenue edge.

By separating functions within the building complex into public and private realms, with the community able to freely access these public functions. For example the centre’s library and multi-purpose hall could be arranged in a manner whereby it is accessible to the centre as well as the community.

The approach will be to design in a manner whereby portal frames will be used as the main structural component in the building complex, allowing for more labour intensive approaches to the infilling of these frames, using conventional methods, which can be done predominantly with an unskilled labour force.

Workshop spaces can be configured around the outdoor spaces created by the courtyard typology of the building complex. When conditions are favourable, users can move into and make use of these open to the air spaces. During the summertime, large tip-up door panels can encourage cross-ventilation, which can be aided by long narrow building shapes.

The approach will be to control the amount of contaminants currently being swept into the river. The introduction of a permeable material will aim to address the erosion issue on the river banks. The site will be cleaned up and illegal dumping of refuse will also be addressed. A series of off-stream stormwater catch basins will be introduced on the river banks to assist in regulating flood peaks.

The opportunity is there to address the pedestrian environment. Current routes between nodes and also pedestrian desire lines have been documented and will inform the building complex configuration.
5.4 Design Considerations

Generally the most common approach to the design of a facility of this nature is to design a building complex with a warehouse typology, with often very little consideration with regards to user-comfort such as how these spaces are naturally lit and ventilated. Additionally little attention is given to any form of indoor-outdoor relationships. This dissertation proposes a departure from this approach with a particular emphasis on exploring how the threshold between a workshop space and a positive outdoor space can be used as a transitional element, and therefore encourages interaction between the two entities. This approach is however not unique which is evident with international and local examples such as Sol-Tech’s new campus in Kloofsig Pretoria by Jeremie Malan Architects, and the ASU Polytechnic Campus in Arizona by Lake Flato Architects. However, all examples, conventional and deviations from the norm were explored and together with following additional design considerations will inform the design process:

- Site response and building complex configuration;
- User identification;
- Master plan and urban intervention;
- Surrounding spaces and movement patterns;
- Aesthetics and response to context; and
- Future expansion.

5.4.1 Site response and building complex configuration

The manner in which the proposed design configuration will be influenced by the following factors:

- Integration of the artisan center with the rehabilitation of the Pienaar’s River, which are both proposals this dissertations is exploring;
- How the building complex can be configured to create a safe environment without resulting in a fortress type building and also displaying the activities it houses to the community;
- The manner in which the building will be legible in terms of tectonics to distinguish it from its immediate surroundings;
- Responsiveness to existing movement patterns and around the site;
• The exploration of possible links to the Eerste Fabrieke Train Station and other nodes within the community; and
• The provision of an additional pedestrian bridge which can form a movement route beginning from Eerste Fabrieke Train Station and linking three schools with various community functions situated north of the river.

5.4.2 User identification
The proposed artisan center aims to cater for a number of users groups. The facility will predominantly focus on the training of prospective artisans, with the level of training on offer dependent on what level the learner wishes to learn to. Courses will range from basic short introductory courses to more intense 10 month programmes aimed at preparing candidates for their respective trade tests.

Courses will combine structured theoretical learning with work experience. Evening classes as well as classes aimed at improving adult literacy levels will also be conducted after normal day classes have concluded for the day.

Staff
Various staff members specialising in their respective fields, will be sourced to cover a wide spectrum in order to ensure the required teaching standards are achieved. Lecturers on a part-time basis from local institutions such as the neighboring Tshwane North Technical College will be considered.

Community
Community engagement will be encouraged with facilities which can be utilised by the community as well as learners from the Artisan Centre. This manifests itself in the provision of a multipurpose hall and a reference library. Use of these facilities, especially the multipurpose hall, will be governed by means of a pre-determined schedule.

Street vendors
Street vendors play a prominent role within the economy of Mamelodi, with their location mainly based on the interaction of their product with potential clients. For this reason, they normally locate themselves along well-used pedestrian movement routes. Provision will be made for existing street vendors on the site, as well as incorporating them along the new proposed movement routes of the Centre.

5.4.3 Master plan and urban integration
A significant component of the design scheme is the formulation of a master plan which will guide the placement of various functions within the proposed design scheme, to ensure that the scheme successfully assimilates into its environment. To achieve this, the following factors must be taken into account:
• Rehabilitation of the Pienaar’s River;
• Public amenities;
• Patterns of movement;
• Linkages;
• Services;
• Delivery of materials and waste removal; and
• Incorporation of existing street vendors into the scheme.

5.4.4 Surrounding spaces and movement patterns
The circulation within the scheme has been articulated into public, staff and service realms with each zone equipped with direct accessibility to their particular destination. The following was influenced by existing pedestrian movement routes and current vehicular behavior as well as thoughts on how to enhance accessibility and connectivity of the proposed center:
• Boulevards proposed on the southern, eastern and parts of the northern periphery, designed with pedestrians and street vendors in mind and in-so doing to encourage an active streetscape;
• Implement a raised pedestrian crossing for the community to safely cross Tsamaya Avenue, and improve the connection of the center to Eerste Fabrieke Train Station;
• Introduce a pedestrian bridge over Pienaar’s River which will link up with center and therefore form a movement spine from Eerste Fabrieke Train Station, strengthening accessibility and connectivity; and
• Establish a vehicular drop-off point for busses and taxis which can form part of the movement route mentioned above. After rail, bus and taxi mini-buses are primary modes of transport within the area.

With regards to the building complex:
• Buildings will be placed to organize spaces and create positive outdoor spaces and take into account existing and proposed pedestrian movement routes;
• The various functions of the center will be arranged with the more private realms or functions placed deeper within the complex and the public functions placed nearby the entrance;
protected walkways; and

• Vehicular activities within the center will be kept to a minimum by demarcating an area towards the southern periphery (allowing for convenient access from Tsamaya Avenue), without intruding on pedestrian movement within the center.

5.4.5 Aesthetics and response to context

The aesthetics will indicate the nature of the activities housed within and also act as an element to tie in the various buildings by creating a distinct identity. Where possible, activities within the scheme will be arranged so as to be observable by the public to further enhance this identity.

An industrial aesthetic will be explored as this would to a very accurate degree indicate the nature of the activities taking place, and additionally, as an educational building, can be used as didactic mechanism with regards to its tectonics of how the building is put together from a building construction point of view. The proposed design will take cognisance of its one-story height context and respond to it in a sensitive manner by a gradual transition in height so as not to overwhelm the surround buildings.

5.4.6 Future expansion

The proposed design scheme is a very site specific building, however due to the building complex largely comprising of long rectangular shaped buildings, with open floor space (because of its portal framed structure), the interior offers that flexibility of being re-arranged and the function can change if so required. The height of these spaces allows for the introduction of mezzanine floor levels or even a first floor if need be. In terms of building footprint expansion, the proposed scheme will be limited, however due to the site being situated in the more formalised part of Mamelodi; the opportunity is possible of buying out residential properties (owned by its occupants) to the east of the site to facilitate expansion.

5.5 Accommodation Schedule

The proposed building complex will be divided into two distinct realms namely: educational and mixed use realms.

5.5.1 Educational realm

This realm will house the educational segment of the scheme and will be the area in which candidates will receive their tuition in the artisan fields. This segment of the building complex will comprise of the following functions and activities:

A. An administration building which will accommodate the following activities:
   • See to the registration and induction of candidates;
   • Provide career counselling;
   • Offer adult and basic computer skills literacy courses;
   • Contain individual offices and a staff room for members of staff; and
   • An exhibition space for students to exhibit work.

B. Workshops catering for welding, basic building construction, carpentry, automotive repair and electrical training accommodating classes of 14 learners at a time;

C. A bulk storage facility for the storing and processing of materials;

D. An experimental area;

E. An area for sorting of scrap and waste materials;

F. Yard for the exterior applications;

G. Classrooms to accommodate the theoretical component of the centre;

H. Service yard for deliveries; and

I. Retail facilities for students to gain entrepreneurial experience.

5.5.2 Mixed use realm

This area will comprise of functions which will be used by the public as well as learners of the proposed artisan centre which includes:

• Multi-purpose hall able to seat an audience of 500;

• Reference library comprising of literature aimed at the youth and adults as well as internet facilities with resources aimed at small businesses, such as fax, telephone and the preparation of documentation such as assisting with the drafting of a curriculum vitae, etc.;

• Live and work units with the intention of leasing these units to graduates of the artisan centre, however depending on availability, will also be made available to interested members of the community; and

• Provision for existing street vendors within the design proposal

5.5.3 Additional considerations

• Storage and ancillary considerations such as ablutions and parking will be taken into account for both the educational and mixed use realms; and

• Proposal for a pedestrian bridge to facilitate pedestrian movement across the Pienaar’s River.
VIEW TO RIVER

NORTH

WORKSHOP

ACCESS CONTROL, WORKSHOP PROTECTS CUSTODIANS WHO ONLY ATTEND CLASSROOMS.

VIEW TO RIVER
The intention of this chapter is to express the fundamental ideas and concepts which will influence the development of the design.

The criteria with regards to the performance standards, which the building should address, will be identified in the form of annotated sketches, drawings and diagrams illustrating possible solutions and alternative configurations which have been explored.
6.1 DESIGN RATIONALE

The proposed site for the architectural intervention generates a number of clues on how to approach the design of the Artisan Training Centre in Mamelodi:

- It has been discussed at length how the site is in a dilapidated condition at the moment. As it is currently, the site does not in any manner contribute towards uplifting its community or the urban context, so situating the project on this site will improve the imagability of this district.

- In previous chapters the rehabilitation of the Pienaar’s River has been mentioned, as this would contribute to the ecological and social upliftment of the area. As the rehabilitation of the entire river would constitute a separate in depth study and strategy, which falls outside the scope of this dissertation, this thesis will investigate ways in which to minimise the amount of contaminants entering the river from the proposed site.

- It is situated on the edge of Tsamaya Avenue which is one of the major vehicle arterial roads of Mamelodi which runs in an east to west direction. Its present configuration does not encourage a user-friendly environment for pedestrian movement, leaving pedestrians with few alternatives but to dangerously cross in front of on-coming vehicular traffic.

- The proximity of Eerste Fabrieke Train Station allows for the proposal of a pedestrian movement link from the train station, running through the site and converging on 5 educational facilities. As these facilities not only cater for educational purposes but also incorporate functions for the community, this link would not only be used by scholars but the community generally.

- In chapter 4 of this dissertation it is pointed out that the study area predominantly comprises of one-storey buildings. An effort will be made to develop a morphology type that does not overpower the surrounding context in scale, but at the same retain a degree of civic presence.

With respect to the above points, the design proposal offers a useful opportunity to revitalize the site and enhance its imagability as well as that of the district, as a place which functions better for pedestrians and vehicles alike.
The approach to the perimeter of the building facility edges will be to sensitively relate to the existing height context and to act accordingly by complementing the existing scale. However the Centre should ideally distinguish itself from the surrounding residential fabric and retain some civic presence. These objectives will be achieved by devising a building complex layout with a sensitive transition in height starting from low and increasing in height as one moves deeper within the Centre.

By adopting this method, the scale and integrity of the existing street scape of predominantly one storey height fabric can be positively complemented, without seeming overbearing to the existing fabric.

The site has a dramatic 3m drop on the northern periphery of the site. This level difference can used to create a podium effect which reinforces a civic presence for the proposed design while providing a secure perimeter in a subtle manner.

The introduction of a pedestrian avenue would serve the design in 2 manners. Firstly a more user-friendly pedestrian environment would be implemented affording the opportunity to introduce place-defining features such as planting and landscaping. Secondly these features would act to reduce noise levels from the street to a degree, by allowing the building to be setback as well as vegetation able to reduce noise up to 8 db.

A very early conceptual sketch depicting the proposed center’s height in relation to the context.
6.2 CONCEPT

Mamelodi is characterised by negative perceptions with regards to safety and security, with crime a daily reality for many of its residents. Township residents openly complain about the lawlessness within the region, with crimes such as vandalism, break-ins, robbery, etc. a normal occurrence.

The concept was derived as a response to predetermined criteria in terms of performance principles that the proposed artisan training centre must achieve and offer. The core principle is to provide learners with a safe and healthy environment which will equip learners with the necessary skills relating to artisan related fields.

In response to the aggressive context, the point of departure conceptually was to explore space making principles which could be conducive to the establishment of an empowering environment. Research revealed that the traditional African courtyard typology of arranging spaces could adequately fulfil this task of providing such an environment, and therefore serves as the formative idea or concept for regulating the building form. This traditional South African settlement model which promotes open living space as an organising structure was historically used by the Sotho, Pedi, Ndebele and Tswana. The use of courtyard typology as a formative idea for this dissertation relates rather to the principles of courtyard planning rather than incorporating direct aesthetical elements of traditional African settlements.

The traditional African homestead comprised of huts arranged hierarchically, from public through semi-public to private realms, around an open plan living space or communal area, which can be described as an outdoor room which formed the setting for daily activities. The hut was viewed as a place for sleeping or storing items while the entire ensemble (huts and courtyards) was viewed as the home.

An early sketch of how ordering buildings in a courtyard configuration can create a secure perimeter and a sheltered as well as safe space in the interior.
Therefore the specific principles of this space making principle which responds to the context and which will inform this design are:

- Arrangement of spaces according to Hierarchy,
- Clear demarcation of the private and public realms,
- Exploration of indoor and outdoor relationships,
- Use of outdoor living spaces for daily activities,
- Binding of the various buildings and functions within the complex together.

Furthermore, this building typology can be used as a climate moderator, allowing for cross-ventilation and daylight as well as offering private and protected outdoor habitable spaces.

With reference to vandalism and theft, by adopting a courtyard typology with a secure perimeter, results in a reasonably compact layout without detached buildings which are normally difficult to secure and supervise.

Feedback from interviews conducted at Tshwane South College (see Chapter 3) revealed how students welcomed the idea of being able to carry out their tasks in an outdoor environment especially in the summer months.

The central courtyard space can accommodate this function by providing a space for students to do certain work outside rather than within their respective workshops when desired.

Interdisciplinary interaction with the various trades offered can be encouraged
6.3 Opportunities and Constraints

1. High vehicular traffic main road,
2. Proposed site is located in close proximity to an existing residential fabric,
3. Site is situated nearby Eerste Fabrieke Train Station,
4. Frequently utilised existing pedestrian path from train station,
5. Proposed development of avenue system beginning from the train station and linking to existing community nodes,
6. Proposed pedestrian bridge located roughly 300m away from existing bridge,
7. Pienaar’s River Edge,
8. Existing pedestrian movement path going diagonally through the site,
9. Existing pedestrian bridge,
10. Existing pedestrian movement from bridge to train station

6.4 Zoning Configuration

Based on the opportunities and constraints diagram on the left, the proposed site has been zoned accordingly:

1. This portion of the site is not accessed frequently and the new proposed movement route does influence this condition greatly therefore the Artisan Center will be located here
2. The Public Realm is located nearby the existing residential fabric and will contain the public functions which can engage with the community, such as the library, multi-purpose hall and retail functions
6.5 Morphology

An investigation for an appropriate building form was carried to generate a building morphology which will be environmentally responsive and compliments its existing fabric, while providing a suitable building configuration to adequately accommodate the various functions of the Artisan Centre.

Massing Development: Step 1
Remarks:
- Property boundaries used as a guide,
- No consideration to natural lighting or ventilation,
- Lack of permeability.

Massing Development: Step 2
Remarks:
- Good solar orientation,
- Secure perimeter,
- Central communal outdoor space,
- Lack of interaction with context.

Massing Development: Step 3
Remarks:
- Previous block typology in Step 2 broken up,
- Acknowledgement of proposed route from Eerste Fabriek Station.

Massing Development: Step 4
Remarks:
- Fragmented layout,
- Lack of hierarchy and clear articulation,

Massing Development: Step 5
Remarks:
- Improved permeability,
- Hierarchy and clear articulation,
- Transitional courtyard spaces,
- Perimeters secure
Configuration 1
Remarks:
- Existing and proposed pedestrian movement network orders the Public and Private Realms,
- Does not take current diagonal pedestrian movement into account.

Artisan Centre ordering remarks:
- Linear form with elongated circulation,
- Interdisciplinary interaction with various workshops not encouraged with current layout,
- Blindspots (potential break-in areas for criminals) within the centre are minimal.

Configuration 2
Remarks:
- Public Realm permeability developed further with diagonal movement intergrated.

Artisan Centre ordering remarks:
- Many blindspots within the centre with surveilance difficulties,
- Perimeter secured from Tsamaya Avenue Edge.

Configuration 3
Artisan Centre ordering remarks:
- Workshop spaces broken up to enhance visibility and surveilance,
- Material storage facility very isolated from the rest of the complex and obstructs the river view on the western boundary.

Configuration 4
Artisan Centre ordering remarks:
- A generous central courtyard space used to order workshop spaces around it,
- Taxi minibus drop-off point too close to intersection of Tsamaya Avenue and Eerste Fabriek Road to accommodate convenient access for the minibuses to get back onto Tsamaya Avenue.

Configuration 5
Remarks:
- A central landmark feature proposed,
- Taxi minibus drop-off point located more centrally.

Artisan Centre ordering remarks:
- Large courtyard space broken up into outdoor transitional spaces which follow the natural topography,
- Minimal blindspots and a secure building perimeter
- Service yard located along Tsamaya Avenue.
6.6 Urban Proposal and Development

1. Identification of movement routes and nodes

2. Proposed rehabilitation of the Pienaar’s River and River Banks

3. Proposed Avenue System with linkages to the Identified Nodes
6.7 Further Development Sketches
An Axonometric View from the East overlooking the Entire Complex
“In response to the aggressive context, the point of departure conceptually was to explore space making principles which could be conducive to the establishment of an empowering environment. Research revealed that the traditional African courtyard typology of arranging spaces could adequately fulfil this task of providing such an environment, and therefore serves as the formative idea or concept for regulating the building form. This traditional South African settlement model which promotes open living space as an organising structure was historically used by the Sotho, Pedi, Ndebele and Tswana. The use of courtyard typology as a formative idea for this dissertation relates rather to the principles of courtyard planning rather than incorporating direct aesthetical elements of traditional African settlements.”
Legend

1 Pedestrian Bridge
2 Proposed Landmark
3 Taxi Drop-Off
4 Pedestrian Crossing
5 Avenue Development along street edge
6 Rehabilitation of Pienaar’s River
7 Development of pedestrian path towards Eerste Fabrieke Train Station
Legend

1. Library - study area
2. Multipurpose Hall (double volume)
3. Live and Work Unit Block (residences)
4. Administration Building
5. Mass Materials Store (double volume)
6. Mezzanine Classroom
7. Drawing Studio

FIRST FLOOR PLAN
1: 1000
An Axonometric View from the East overlooking the Entire Complex
A View from the North looking towards the Live & Work Units and Library in the Foreground
A View from the East looking towards the Live & Work Unit Blocks and the Administration Building
A View from the South looking towards the Administration building from the River
A View from the North looking towards the Administration building from the River
A View looking towards the Pedestrian Bridge from the East of the Building Complex
A View from the South looking towards the Multipurpose Hall and Library on the Left
A View from the East looking towards the Live & Work Unit Blocks
Green Roof Detail

Roof Drain

Edge Gravel

Root Barrier

centre with the concrete roofing allowing for the possibility of filtering

manner of managing storm water runoff.

- As many case studies suggest, as much as 55% of raindrops that fall on
during the summer months rather than producing a potable water

source, and the cost of using these green roofs can offset by installing
“The approach will be to design in a manner whereby portal frames will be used as the main structural component in the building complex, allowing for more labour intensive approaches to the infilling of these frames, using conventional methods, which can be done predominantly with an unskilled labour force without compromising structural integrity of the building complex.”
**Supply of water and drainage strategies**

A variety of water-saving techniques will be employed including fitting all tap fittings with aeration devices which reduce the amount of water being dispensed by mixing air into the water stream, while maintaining a steady pressure in flow. Grey water collected from basins and sinks will be filtered and grease traps will be introduced for sinks which may drain water containing organic matter.

**Harvesting of rainwater**

The centre will harvest rainwater in two manners, namely roof catchment and ground catchment systems and therefore will make use of storage tanks above and below the surface. The tanks located above the surface will be elevated and placed on a podium and use gravity to feed the water to the user via a tap outlet, while hand pumps can be used to draw water from tanks below the surface. The predominant roof material within the centre will be corrugated roof sheeting, while the storage tanks will be made of the same material which will thus reduce toxicity levels. The gutters will be fitted with a mesh to avoid blockages. The water collected will be used mostly for exterior applications such as irrigation. The harvesting of rainwater will provide the centre with additional water with minimal input or maintenance once installed.

**Compressed soil-cement blocks**

The blocks will be produced insitu via an on-site mixer as well as a compressor to produce these blocks. The soil will be sourced on site and will have to be tested to determine if there is adequate clay content, which performs the role of a binder. If the clay content is too little, cement can be added which should yield a cement-stabilised block of 4 mPa.

**Salvaged bricks**

As the site contains large amounts of illegally dumped building rubble, local unskilled labor will be hired to sort through the rubble and reclaim any cement or brick units which can be cleaned and reused for the construction for the centre. The locals can be remunerated on a cost per unit basis.
Clay brick units
Burned clay brick units produced by SA Brix (with one of their factories situated 18km from Mamelodi), will be used. This approach will result in labor intensive in filling of the portal frames, while from an embodied energy point of view, the charcoal used to fire up the bricks is produced from invasive plants species such as acaia mellifera and dichrostachys cinerea.

Rammed earth
A similar approach (such as that for the compressed soil-cement blocks) will be adopted for the rammed earth walling. Reusable steel shutters will be used while compaction will be carried out by hand, again favoring labor intensive methods.

Flooring
The criteria for the flooring is to that it is inexpensive, hardwearing and minimal maintenance with a high thermal mass to enable the floor to absorb heat via radiation and therefore concrete was used internally, with the surface being finished with a wax polish where dust control is important in the administration areas.

Discarded tyres
The recycling of tyres is a problem in South Africa with very little facilities available for this process and so a suitable approach would be to reuse these products. By filling layers of these discarded tyres with compacted soil can be used to create retaining walls of as high as 8 meters.

Roof sheeting, ceilings and insulation
Due to its long lifespan, cost and the possibility of re-use, corrugated roof sheeting will be the dominant roof material within the centre. Due to the material’s thermal inefficiency, the corrugated roof sheeting will be combined with reeds from the Pienaar’s River and orientated strand board to provide insulating value to the building complex.

Finishes
As far as possible, the natural state of surfaces will be retained with the intention of showcasing their aesthetic potential as well as their tectonics. Where weather and corrosion protection is required, sealants and water-based paints will be used. The compressed soil-cement blocks will be coated with a clear water-based silicate sealant to provide protection from water penetration. The walls on the interior will be lime-washed white to enhance the day-lighting effect within.

Green Roof Detail
Reinforced concrete roof edge construction will be used throughout the centre with the concrete roofing allowing for the possibility of filtering out serious unwanted metals from storm water by creating a green roof covered with vegetation. Green roof types have been found to be more effective than many conventional roof types and also serve as an effective manner of managing storm water runoff.

As many case studies suggest, as much as 55% of raindrops that fall on the roof make it into the collection tank with green roof absorbing the rest. This dissertation proposes to collect water for irrigation purposes during the summer months rather than producing a potable water source, and the cost of using these green roofs can offset by installing more cost effective and smaller water storage systems.
Structural analysis
The structure is predominantly consists of steel portal framing whereby structural roof members are fixed firmly to columns and in essence act together as one structural member unit with the advantage of freeing up the interior space with no columns located on the building perimeter. The portal frames comprise of 159x89x16mm mild steel members which will be placed at 6m intervals, centre to centre, on a grid which works out to 2m spacing’s with variations to accommodate other considerations. The portal frame construction method has the following advantages:
• Rapid construction time from when the pre-manufactured steel members arrive on site;
• The interior spaces can change use very easily with the floor area free of structural members;
• The steel members are prefabricated according to strict quality requirements off-site and therefore reduces the level of skills needed on site; and
• Non-load bearing masonry, compressed soil-cement blocks, etc. acting as infill walls for the portal frame structure can be carried by locals with high skill level not necessary without compromising structural integrity.

Light-weight corrugated roof sheeting and reinforced roof construction will be used throughout the centre with the concrete roofing allowing for the possibility of filtering out various unwanted metals from storm water by creating a green roof covered with vegetation. Green roof types have been found to be more effective that many conventional roof types and also serve as an effective manner of managing storm water runoff. As many case studies suggest, as much as 55% of raindrops that fall on the roof make it into the collection tank with green roof absorbing the rest. This dissertation proposes to collect water for irrigation purposes during the summer months rather than producing a potable water source, and the cost of using these green roofs can offset by installing more cost effective and smaller water storage systems.
280mm thick cavity wall below

80mm thick isoboard polystyrene XPS roof insulation boarding with tongue and groove joints fixed between purlins

125x65x20x2,5mm mild steel purlin bolted to portal frame at 1500mm centres maximum

0.6mm galvanised steel purpose made gutter

Galvanised steel cross-bracing

0.5mm thick concealed fix klip-lok galvanised steel roof sheeting fixed to kl 65 fixing clips @ 17º

0.6mm galvanised steel purpose made gutter

Pergola structure as per detail

110mm thick wall below

2000mm overhang

100 Ø x 0.6mm chromadek steel sheeting rainwater downpipe

850mm overhang

0.6mm thick galvanised apex flashing

0.6mm thick galvanised head wall flashing

0.6mm thick galvanised barge flashing

0.6mm thick galvanised head wall flashing

0.6mm thick galvanised ridge capping flashing

100 Ø x 0.6mm chromadek steel sheeting rainwater downpipe
159x89x16mm Galvanised mild steel portal frame column

127x127mm neoprene end capping

50,8Ø x 1,2mm galvanised mild steel round tubing

12mm thick plaster

127 x 127 x 6,4mm galvanised mild steel square tubing

Jointex polyethylene expansion joint

170mm thick reinforced concrete slab

1,0mm thick Brownbuilt bond-dek galvanised steel interlocking permanent formwork

19Ø x 100mm shear stud at every 2m intervals

2mm thick cemcrete cretecote cement-based floor covering applied to sand-cement screed substrate

15mm minimum self-leveling sand-cement screed

15mm thick compacted river sand bed

390x200mm precast concrete trench drain with Cast iron, drop-in grating

100 x 100 x 50mm thick clay cobbles laid in stack bond

100 Ø x 0,6mm chromadek galvanised steel sheeting rainwater downpipe fixed to portal frame column via 25 x 1,6mm galvanised steel fixed brackets at 2000mm vertical centres maximum

0,25mm green polyolefin membrane type c

Compacted ground fill in layers of 150mm max. thick max. To be laid to make up levels and compacted to 98% mod. aashto modulus of elasticity

Deep-strip foundation edge beam to a depth of 900mm minimum

MTPSSO UFL 100 000

Interim date in: 9/6/2013
Interim date out: 8:06:47 AM
Interim name: Manuel Pedro

Edge Detail 1 Scale: 1:20

Detail 4 Scale: 1:10

Detail 5.1 Scale: 1:10

Detail 5.2 Scale: 1:10

Detail 5.3 Scale: 1:10

Detail 5.4 Scale: 1:10

Detail 5.5 Scale: 1:10

Detail 3 Scale: 1:10

EDGE DETAIL 1 Scale: 1:20

Drawing description: EDGE DETAIL 1

Project description: AN ARTISAN CENTRE IN MAMELODI, PRETORIA

Name: Manuel Pedro

Date in: 9/6/2013
Date out: 8:06:47 AM
2mm thick cemcrete cretecote cement-based floor covering applied to sand-cement screed substrate and allow to cure for 24 hours. Apply 2 coats of cemcrete creteseal water-based sealer, all in accordance with manufacturer’s specifications.

15mm minimum self-leveling sand-cement screed

170mm thick reinforced concrete surface bed on USB green gundle membrane on fill compacted in layers of 150mm max.

Compacted ground fill in layers of 150mm thick max. To be laid to make up levels and compacted to 98% modulus AASHTO.

Deep-strip foundation edge beam to a depth of 900mm minimum.

NGL

12mm thick plaster

14 x 100mm vinyl skirting by Floorworx fixed with Floorworx no.1 solvent-based contact adhesive

1.0mm thick Brownbuilt bond-dekgalvanised steel interlocking permanent formwork spaced at 300mm centres maximum.

159x89x16mm galvanised mild steel beam

170mm thick reinforced concrete slab

2mm thick cemcrete cretecote cement-based floor covering applied to sand-cement screed substrate and allow to cure for 24 hours. Apply 2 coats of cemcrete creteseal water-based sealer, all in accordance with manufacturer’s specifications.

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15mm minimum self-leveling sand-cement screed

2mm thick cemcrete cretecote cement-based floor covering applied to sand-cement screed substrate and allow to cure for 24 hours. Apply 2 coats of cemcrete creteseal water-based sealer, all in accordance with manufacturer’s specifications.
Deep-strip foundation edge beam to a depth of 900mm minimum

21mm thick clay cobbles laid in stack bond with joints continuous in both directions with butt joints on 50mm thick compacted river sand bed

1,0mm thick Brownbuilt bond-dek galvanised steel interlocking permanent formwork spaced at 300mm centres maximum

305x152x10,8mm galvanised mild steel i-section acting as permanent shuttering for suspended composite floor slab

127 x 127 x 6,4mm galvanised mild steel square tubing balustrade post at every 2m intervals

50,8Ø x1,2mm galvanised mild steel round tubing welded to portal frame

159x89x16mm galvanised mild steel portal frame column

159x89x16mm galvanised mild steel beam

2mm thick cemcrete cretecote cement-based floor covering applied to sand-cement screed substrate and allow to cure for 24 hours. Apply 2 Coates of cemcrete creteseal water-based sealer, all in accordance with manufacturers specifications

15mm minimum self-leveling sand-cement screed

170mm thick reinforced concrete surface bed on USB green gundle membrane on fill compacted in layers of 150mm max.

Compacted ground fill in layers of 150mm thick max. To be laid to make up levels and compacted to 98% mod. AASHTO

390x200mm precast concrete trench drain with cast iron, drop-in grating

159x89x16mm galvanised mild steel portal frame column spaced at 6000mm centres maximum

170mm thick reinforced concrete slab

0,6mm galvanised steel purpose made gutter

0,5mm thick concealed fix klip-lok galvanised steel roof sheeting at 17º

152x89x16mm galvanised mild steel haunch

16mm thick galvanised mild steel end plate bolted to column with M20 bolts

Galvanised wire wall-tie with drip installed in every 5 brick courses

0,25mm polyolefin damp proof course

Open perpends at 900mm centres maximum

Galvanised wire wall-tie with drip installed in every 5 brick courses

159x89x16mm galvanised mild steel portal frame column

159x89x16mm galvanised mild steel beam

2mm thick cemcrete cretecote cement-based floor covering applied to sand-cement screed substrate

15mm minimum self-leveling sand-cement screed
Deep-strip foundation edge beam to a depth of 900mm minimum

100 x 100 x 50mm thick clay cobbles laid in stack bond with joints continuous in both directions with butt joints on 50mm thick compacted river sand bed

2mm thick cemcrete cretecote cement-based floor covering applied to sand-cement screed substrate and allow to cure for 24 hours. Apply 2 Coates of cemcrete creteseal water-based sealer, all in accordance with manufacturers specifications

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170mm thick reinforced concrete surface bed on usb green gundle membrane on fill compacted in layers of 150mm max.

Compacted ground fill in layers of 150mm thick max. To be laid to make up levels and compacted to 98% mod. aashto

159x89x16mm galvanised mild steel beam

Purpose made aluminum louvre unit by louvre master consisting of extruded aluminum blades. Blades to be manually operated via handcranks cable system

12,5mm thick gypsum plasterboard to be plastered with a 3mm plaster finish. Plasterboard to be fixed to 63x35x2,7mm gauge steel support structure with studs spaced at 1200mm centers maximum

Purpose made Areobrise vertical adjustable louvre fins, attached to a galvanised mild steel frame, fixed to a concrete base. Louvre fin size 600x82mm and to be assembled as per detail

305x165x40mm galvanised mild steel universal beam

0,5mm thick concealed fix klip-lok galvanised steel sheeting side cladding clipped to kl 700 fixing clips.

12,5mm thick gypsum plasterboard

1,4mm thick aluminum powder coated trim

0,6mm thick purpose made galvanised steel trim

Purpose made concrete seating slab

165x40mm aluminum curtain wall system with grey-annodised finish

80mm x 600mm isoboard extruded polystyrene xps roof insulation boarding with tongue and groove joints between purlins

125x65x20x2,5mm mild steel purlin bolted to portal frame at 1500mm centers maximum

80mm x 600mm isoboard extruded polystyrene xps roof insulation boarding with tongue and groove joints between purlins

152x89x16mm galvanised mild steel portal frame rafter

150x75x20x2,5mm galvanised mild steel lipped channel

305x165x40mm galvanised mild steel universal beam

12,5mm thick gypsum plasterboard

1,4mm thick aluminum powder coated trim

0,6mm thick purpose made galvanised steel trim

Purpose made concrete seating slab

165x40mm aluminum curtain wall system with grey-annodised finish

80mm x 600mm isoboard extruded polystyrene xps roof insulation boarding with tongue and groove joints between purlins
AN ARTISAN CENTRE IN MAMELODI, PRETORIA
ON ERF'S 122 & 123

ASSEMBLY DETAIL

19 JULY 2013

SCALE: 1:20
“The proposed design intervention is a response to the skills shortage South Africa is currently experiencing with a particular emphasis on the artisan field. Realistically, the design proposal will not relieve this shortage significantly. Rather what this dissertation sets out to do is to provide a facility to enable willing students with a means to equip themselves with the necessary knowledge and qualifications, to take advantage within the job market in a field where there is great demand.”


BARNES, Clayton. 2007. Skills shortage is real and it’s serious. Sunday Argus, Dec. 9:3.


CHING, Francis. 1996. Architecture: Form, Space and Order. 2nd ed. USA: John Wiley & Sons.


MODIBA, Mabule. S.a. The School as a Reconstruction Agent in Mamelodi. M.Sc. dissertation, Johannesburg, RAU.


## Worksheet for Site Selection

Site Identification: _______________________

Site Location: __________________________

<table>
<thead>
<tr>
<th>Site Selection Factors</th>
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<td>Size of Site (Inadequate to Adequate)</td>
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<td>Location of Site (Remote to Convenient)</td>
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<td>Topography and Drainage (Unsuitable to Suitable)</td>
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<td>Accessibility and Traffic (Obstructed to Accessible)</td>
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<td>Security and Safety (Dangerous to Safe)</td>
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<td>Soil Conditions and Plant Life (Unsuitable to Suitable)</td>
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<td>Noise Levels (Unsuitable to Suitable)</td>
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<td>Utilities (Unavailable to Available)</td>
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<td>Other Considerations</td>
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Total Points
Skills shortage is real and it’s serious

Analysts say decisive action is needed if economic growth rate of 6% is to be achieved

By CLAYTON DAVIES

South Africa is facing a serious and widespread skills shortage and decisive action is needed to reach an annual economic growth rate of 6%.

This is according to the latest Fast Facts report by the Institute of Race Relations.

The report says the country faces shortages in almost every profession, including technical and academic fields. There are shortages of engineers, artisans, draughtsmen and accountants.

In addition, it says the number of teachers is unacceptably low.

The report’s publication follows recent comments by Jimmy Manyi, chairman of the Commission for Employment Equity, who claimed the skills shortage was “a national calamity”, and that skilled blacks “who are out there are simply ignored”.

The extensive report, to be published tomorrow, indicates that contrary to Manyi’s statements, the country is indeed facing a serious skills shortage.

In a brief overview of South Africa’s skills crisis, the report says a number of studies show that this is a “particular problem”.

According to a report by Grant Thornton, an international accounting firm, some 18% of medium to large businesses say the shortage of skills is a “particular problem”.

An accounting firm, Deloitte, released a report in June indicating that 86% of companies struggled to find appropriate staff, with 76% saying that finding employment equity candidates was a particular problem.

The report noted a pronounced shortage of chartered accountants, information technology specialists, sales and marketing personnel and scientists.

Also in June, a study by the Bureau for Economic Research at the University of Stellenbosch found that 47% of manufacturers said the skills shortage was their “most serious difficulty.”

A survey of 40 companies in Gauteng, South Africa’s economic and industrial heartland, by the Centre for Development and Enterprise, showed that 28% of the companies mentioned the skills shortage as a specific challenge to doing business; half the firms said they had to source skills from abroad.

In September, Labour Minster Mthathu Mbeki said the skills shortage was a “hitting time bomb”.

Mthathu said although the economy was creating jobs, overseas workers and semi-skilled labour were taking up a large proportion of the workforce.

In addition, the shortage of skills was called a “total constraint” upon the goal of shared growth by Deputy President Phumzile Mlambo-Ngcuka last year.

In the Fast Facts report, trade union Solidarity claims that this year South Africa has only 10% of the number of artisans that it had 20 years ago.

The average age of a working artisan this year is 54, meaning in 10 years’ time South Africa will be facing an even more serious shortage of skilled labour.

Illustrative of the decline in skills is that last year there are only 500 apprentices in training in the metals industry, compared to nearly 13,000 in 1982.

This, according to the report, can largely be attributed to the abolition of the apprenticeship system, which was replaced by Sector Education and Training Authority learnships in 1998.

The report says South Africa also has an enormous engineering deficit.

There was only one engineer for every 300 people last year, compared to one to every 130 people in China, one for between 200 and 300 people in Europe, and one for 400 people in Australia, according to the South African Institution of Civil Engineers.

Martin Westcott, the managing director of IFP Corporate Services, said in June that one-third of South Africa’s engineering graduates of the past 40 years lived abroad.

The report further says only about half of engineering graduates remain in the profession, adding to the skills shortage in the sector.

South Africa produces about 1,600 engineering graduates every year, and the report says this needs to be expanded to at least 2,000 to close the deficit.

The South African Association of Consulting Engineers recently added its voice to the skills debate.

The association conducted a management information survey in the second half of last year. More than 90% of firms were looking for engineering personnel.

In conclusion, the report says South Africa is in a global struggle for skills.

“Since the country needs to make sure that its investment in the local workforce is a global attraction,” said the report.

A study by The Economist’s Intelligence Unit and the global recruitment firm Hewitt & Partners, found that of 30 countries studied, South Africa came 14th in terms of attracting and retaining global talent. The report concluded that South Africa must attract foreign skilled workers.

Loss of expertise trips up Knockberg, page 8