6.0 BASELINE STUDY

6.1 ENVIRONMENTAL ISSUES

6.1.1 WATER

The consumption, collection, storage and re-use of water will be given special attention in the design for overall sustainability of the project.

- Rainwater will be harvested through the careful design of some of the roofs in the centre which will aid in its collection. The water will then be stored in order to be used in the Centre's operation, for the many different activities and programmes proposed.

- Grey water where possible from washing is to be recycled and re-used so as to reduce water consumption and sewerage charges. It can be used for maintaining courtyard lawns and construction purposes.

- Water devices with special, purpose made water collection, recycling and storage will be incorporated into the Centre's design to increase efficiency and use of water. Ultra-low flush toilets and manually flushed urinals will aid the Centre's water efficiency.

- The site existing topographic conditions which have a drop of 2m which will be manipulated and enhanced to improve the site's ability to catch and absorb water for landscaping.

6.1.2 ENERGY

It is important to reduce energy levels as almost 50% of all human energy produced is consumed by building and construction industry. This industry contributes to environmental damage as well as the depletion of precious non-renewable resources (Gibberd, 2002:10 cited in Araujo: 2004:59).

- Location of the facility will be within 400m of existing public transport services to minimise transport cost and energy as well as the environmental implications associated with burning of fuel.

Fig.53: Location of Municipal Bus Station to the proposed site and points of taxi stops

- Passive environmental control systems need to be designed and implemented. Solar energy must be used to meet passive solar heating in the building (solar water heater will be used to heat water). Buildings with permanent inhabitants must have direct heat gain by allowing sunlight to be admitted into spaces through openings and skylight by orienting the required buildings to the

north. Solar shading devices like trees and large overhang are essential for keeping the heat out during summer while maximum penetration of sunlight is required for heating in winter. Excess solar energy during the day is stored as heat through the thermal mass (brick wall) of the building fabric and then released back during the night. Effective air circulation is necessary in spaces or areas that do not have direct exposure to the sun.

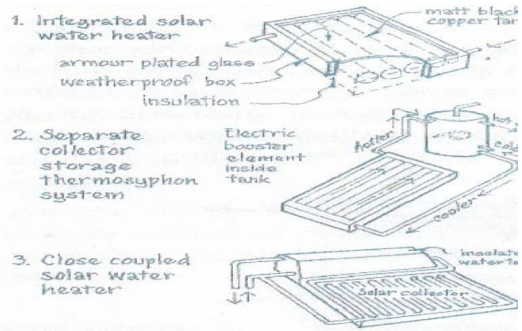

Fig.54: Types of water heaters (Ward, 2002: cited in Araujo: 2004:59)

- Natural ventilation must be designed and incorporated into the design and planning of the facilities to ensure that outside airflow is maximised. Windows, doors and screens must be opened and closed as desired by occupants to provide better control over their surrounding environment. Placement and size of internal and external openings become important when using passive ventilation principles such as the stack effect to create pressure differences in the building.

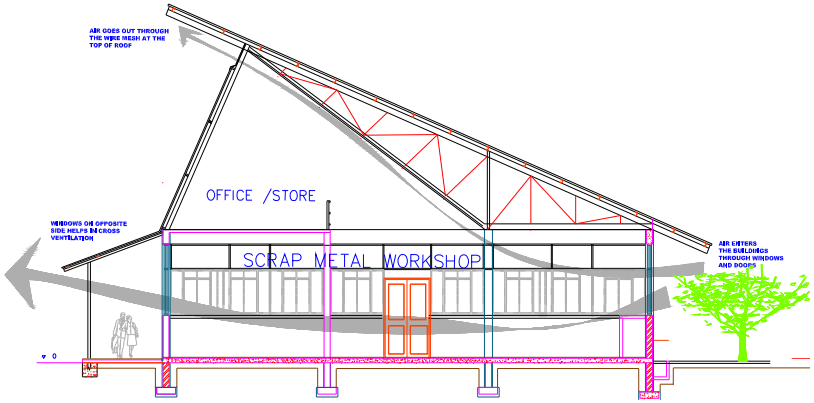

Fig.55: Ventilation strategy at the Centre (author)

- Sunlight is most abundant natural resource that can be used in yhe generation of energy and power by using photovoltaic cells. One building on the Centre will be designed to use this technology as a model to show the community as an alternative source of energy and power.

6.1.3 SITE

The proposed intervention or the proposed building will not cause destruction of natural environment or eco-system. The design will follow the natural fall of the slope such that all existing eco-system of the area will be incorporated.

Although, there has been no previously constructed building on the site. The site is being used as a playground; the proposed intervention will use natural vegetation to green –up the area.

MATERIALS AND COMPONETS

Large quantities of materials and components are essential for the construction of buildings. In manufacturing there is a requirement of great amounts of energy to produce while the process used to make them are often harmful to the natural environment and consumes non –renewable resources.

- The process of building of the Centre will incorporate at least 80% of building materials and components that have a low embodied energy. Locally made and sourced materials such as earth blocks, timber , timber window, frames and doors; concrete bricks/blocks will be specified. Some materials will be made through labour –intensive process at the Centre that will incorporate waste and other sourced materials.

- Due to the nature of the proposed Centre and its ideologies, most of the materials will be manufactured from renewable resources using environmentally friendly methods. A large portion of the building materials, methods components will be developed at the Centre.

Fig.56: Sun dried Cement /sand brick in Mamelodi (Author).

- All manufacturing process, wherever possible should incorporate environmentally friendly procedures and practices so as not to release any green house gases.

- Recycled and reused materials and components will be incorporated in the design wherever possible so that the Centre will become a showcase on its own.

Most conventional buildings accommodate activities that consume large amounts of resources. So specifying materials which are modular, locally manufactured with a low embodied energy is crucial to contributing to a greater system in the quest for holistic sustainability of the project.

6.2 ECONOMIC ISSUES

LOCAL ECONOMY

It became evident that the greater residential population of Mamelodi is in need of economic upliftment and empowerment opportunities. This was highlighted during personal investigation held with the people around the proposed area.

- At least 60% of the construction and building of the Centre will be carried out by local contractors using local workforce in Mamelodi. The remaining percentage must be carried out by training the local community in the art of building and construction using various alternative methods, materials and systems. Students enrolled in education institutions will also be involved in supervising and design of the Centre.

- Most of the building materials will be produced within 100 kilometres of the site and the Centre will aim at using products made and sourced by and made in and around Mamelodi. Much

emphasis and investigation will be placed upon the use of alternative building methods and materials.

- A large contributing factor to the Centre's economic upliftment of an area is to tackle poverty through skills and knowledge transfer. Training and empowering the people in a range of various building and skills workshops as well as building on and incorporating local skills and traditions is vital to the operation and implementation of the Centre.

- Provision will be made for small and emerging businesses created through the Centres operation, training and focus of using waste for the creation of arts, crafts and furniture, spaces and vending structure will be provided as well as after hour community and business activities such as computer, sewing and literacy classes to take place within the proposed facilities. Members of the targeted communities who have undergone training at the centre can later be employed through building, upgrade and housing activities initiatives proposed by the Centre.

EFFICIENCY OF USE

Internal and external areas of the facility are to be designed with multi-purpose and multi-function use of space. Maximum and constant use of many spaces must be designed and encouraged for the buildings to meet sustainability requirements and to ensure effective use of facility.

- The facility if possible should be occupied for 7days. The buildings must engage all activities needed by the community and new ones to be developed for the community. If the buildings are to be occupied successfully, the facility must be seen and accepted by the community as a tool or mechanism for the bringing about of economic, social and environmental change and sustainability.

- Shared use of space will be encouraged wherever possible

- The use modern technology will be emphasised at the Centre. Workshops should be of robust and flexible nature while the floor surfaces need to be durable and impact resistant. Majority of the other process at the Centre will be investigating new sustainable technologies that are people driven and labour intensive.

ADAPTABILITY AND FLEXIBILTY

The proposed design will be able to accommodate future changes and extensions relatively easily. The facility will be designed so that the buildings can serve purposes as required by future users or clients.

- Internal partitions will be free from structural or load bearing responsibilities and should be flexible enough to allow the user to move and allow free placement or modification within a modular support system. An open plan office layout will be investigated. Infill panels developed at the Centre will be incorporated into the design and construction of various buildings.

- The buildings, construction and support systems must allow for easy access and modification to electrical or communication services. The design of water, grey water and sewerage services or pipes should allow for easy access and modification of the

system. Any service must be done with minimum disruption to the occupants.

- The design of the facility will focus on using modular structural dimensions and systems, which will call for easy, cost effective use and experimentation with modular and other alternative infill methods and techniques. A variety of structural support systems, incorporating various structural materials, will be investigated, depending on their availability and price.

- The execution of the various proposed facilities will adopt a construction process that is based on phased development. This is important for the feasibility of the project allowing some activities to start taking place within the preliminary structures provided. Providing the structural shell and encouraging the community to become involved with the infill stages and personalisation of certain sections, will greatly contribute to creating an overall sense of identity and belonging for both the building in its surrounding environment as well as the members of the immediate and surrounding communities.

- It is vital for the proposed building, along with all the activities and programmes offered, to provide opportunity for future growth, flexibility and adaptability. Design parameters incorporating size and type of structure as well as modular construction methods and innovative use of materials are important to the vision of creating a dynamic environment that encompasses and encourages growth and change. This will ensure a prolonged building lifespan that can accommodate change easily and ensure that the facility meets the future needs of the community and again supports the sustainability of a greater, holistic system.

COST

It is important to create spaces that will provide for long hours of occupancy. The other means of sourcing money to run the Centre should come from the sale of products and items from the Centre.

- Specialised detailing and system selection to keep on going costs to a minimum.

- The provision of housing accommodation will reduce risk of security cost issues at the Centre.

- The facility must be cost-effective in its implementation, construction and maintenance by encouraging participation.

6.3 SOCIAL ISSUES.

OCCUPATION COMFORT

User comfort and the creation of quality environment will be the main focus that will stimulate, encourage and promote social interaction. The design of positive environment and spaces can have a direct impact on the health, happiness and productivity of the occupants.

- All working, learning and recreation spaces will require electrical lighting to ensure multifunction use of the space after hours. During the day, the facility will make use of natural daylight while the buildings due to their construction methods, materials and

techniques will require users to adjust elements of lighting and lighting control to suite their needs. No spaces should require constant electrical lighting.

- Natural ventilation must be manipulated and maximised throughout the facility. Design parameters regarding building dimensions such as depth, height and structural spacing and placement can all contribute to ensuring maximum and effective use of natural ventilation. No mechanical ventilation will be used unless there is no alternative.

- Some of the operations taking place in the workshops and other construction areas will be separated or screened from other areas such as offices, learning and working environment to reduce disturbances of noise.

- All working, learning and recreation spaces will have views out.

- A clear relationship between inside –outside needs to be set up by enhancing and promoting contact from outside in, and from the inside out. Access to green outside spaces must be provided.

The buildings should not to be designed as an isolated object in the surrounding landscape, but rather as a vital component to an overall system of social, economic and environmental sustainability.

INCLUSIVE ENVIRONMENT

The buildings are designed to accommodate everyone, which includes the poorest of poor, the youth and the aged, professionals, the disabled and /or any other persons interested in the use of the facility. Ultimately the Centre is a peoples building for Mamelodi community that aims to improve and uplift the existing socio-economic and environmental context of the surrounding areas.

- The Centre is within 100metre from the municipal bus station and on the intersection of two the main streets, Hinterland and Hans Strijdom. It will allow for easy access for both vehicular and pedestrian access.

- It is vital that all activities and programmes that the Centre will be offering should have access to surrounding communities especially where the most desperate people are situated.

- All routes must be of a smooth and even surface so as to allow for easy access for wheelchair and manoeuvrability. The routes and circulation should be well lit and incorporate effective and legible signage that can be understood by all cultural groups. Changes in levels should have a ramp of 1:12 fall. Artwork by community members is incorporated in all routes and signage.

- The Centre will use contrasting colours and textures so that visually impaired people can distinguish between walls, floors, stairs, and various areas.

- The use of composting toilets and alternative methods of sewerage recycling and re-use will be investigated.

- The design and development of the Centre must allow for the provision and development of inclusive environment, especially in

the form of amenities such as shops and services within the community.

PARTICIPATION AND CONTROL

The success of the Centre will be achieved through the participation, involvement, positive interaction or feedback from the community. The Centre aims at uplifting and empowering people through information, skills, and knowledge transfer to ensuring and promotes participation and awareness

- Factors affecting the conditions of general working environments which include thermal comfort, ventilation and lighting, should be incorporated into user-friendly system that allows for optimum control and effective usage.

- Planning, layouts, design and construction of the facility and majority of its spaces allow and provide for user arrangement or re-arrangement. Items such as internal partitions, fittings and furniture should be of a flexible nature to accommodate different user requirements. Provision should be made for the personalisation of working spaces as well as flexible support structures that allow for easy removal or erection of screening, walling and shading panels.

- Careful attention is given to the zoning of areas within the Centre. Public, semi-public and private areas need a clear identification. A number of public spaces will be incorporated into the design to stimulate interaction between people. Circulation, seating and landscaped areas will be designed and provided.

- Amenities such as shops toilets, access to water open spaces and comfortable seating should contribute to the creation of a quality environment that will encourage and stimulate their use by the user and the general community.

- The conception and ideology behind the establishment and successful implementation of the Centre is based on upon the will of the community to become actively involved in shaping and changing their existing and future situation.

EDUCATION, HEALTH AND SAFETY.

The proposed development must ensure that issues regarding the health and safety of its users and surroundings are taken into account as a healthy, economically active workforce greatly contributing to the creation of a sustainable environment.

- Education, knowledge and skill transfer will be provided to the community. These will be in the form of structured courses, which focus on the sharing and implementing of the information regarding sustainability principles, practices, building and initiatives. Further access to education materials will be made available through books, brochures, journals, newspaper, and access to a technical advisor and internet facilities.

- Due to the nature of activities proposed at the Centre and work normally associated with building and construction, issues regarding injuries and other health hazards need to be taken very seriously. The provision of health and safety, protective gear and hazardous environment signage as well as general information

regarding the treatment of injuries must be available and easily accessible. First aid kits must be easily accessible while the buildings must comply with health and safety regulations.

- The Centre aims to steer the community in a direction of prosperity and empowerment by encouraging awareness towards their own development that is environmentally sensitive and sustainable.