TECHNICAL DOCUMENTATION
The Building

The Art Centre is basically a low cost building. Thus, the use of standard components and construction details will be essential.

Concept

The basic assumption is that simple construction works would be done by local workers, as part of a training process. Brickwork, steel work, plumbing and other basic components, could be “home made” elements, which achieve two aims: first, creating jobs for unemployed people and second, involving the community with the establishment of the centre from its beginning.

Using the scrap metal workshop as a main space for preparation, could be efficient for that purpose.

Structure

A structure of load bearing walls is used in most of the centre’s components. Masonry columns with steel beams used to support roof overhangs. All outdoor construction (shading etc.) consists of steel/brick components that demand low maintenance for the long term.

Roof

The concept of the roofs is to have low pitch in order to create vast shaded areas while keeping reasonable height. In addition, all slopes rise to the core of the centre to define its importance. This concept requires corrugated sheet metal with IBR profile.

Roof structure in the exhibition hall and multi purpose hall combines laminated timber beams supported by masonry columns. This combination distinguishes the two halls, which have double volume space, from the other workshops. Still, use of timber keeps a warm feeling within the space.

Timber structure is used for all roofs in the workshops, to give a warm feeling within a community centre. The scrap metal workshop is the only one with a steel structure.

Materials

Gates, windows louvres and hand rails are made of steel and when most of the work, as mentioned, can be done by local workers at the scrap metal workshop.

The outside walls are rough plastered painted with exposed brickwork for columns and benches. Internal walls are plastered and painted.
Solar Heating

In order to reduce electricity costs for water heating, solar systems will be allocated in high consumption facilities. Usage of solar systems will also serve an educational purpose.

Assumptions

- Solar systems serve for showers and workshop sinks (toilet sinks don’t need hot water).
- Costs - reduce electricity heating consumption by 80%.
- System’s pay back period is between two and three years.

Technical Database

- Normal system for sinks usage contains 200l tank and two panels.
- Panel angle to the north should be 30 degrees.
- Water tank should be higher than panels.
- Plumbing to be installed into masonry wall.

Allocation of Solar Systems

1. MultiPurpose Hall
   Consumption - two showers and one sink
   Showers - 30l pp x 10p/day
   Systems - 300l tank (with three panels) and 20l tank (with two panels)
   Installation - connecting to south pitch roof (5 degree) on metal sheets

2. Restaurant
   Consumption - five sinks
   System - 200l tank (with two panels)
   Installation - on toilet’s concrete roof.

3. Artist’s Workshop and Ceramic Workshop
   Consumption - five sinks
   System - 200l tank (with two panels)
   Installation - on concrete roof for demonstration purposes.

Figure 125
Allocation of solar systems.
Solar scheme.

Solar tank. Cold water surrounded by Anti-freeze liquid.

Combined system for shower and sink.

Installation on the restaurant’s roof.

Installation on the workshop’s southern roof.

Figure 126
Solar systems.
Rainwater Harvesting
In order to increase economic water usage, water tanks, for rain harvesting, will be allocated near main toilets. Since toilet usage is the major water consumption, it could save a major amount of maintenance expenses.

Assumption
* Rainwater harvesting to be used only for toilets (not for drinking/sinks)
* Water tanks serves toilets’ facilities which are connected to them for vegetation watering.
* Water tanks capacity should be enough to gather rainfall of three average days (10 rainy days per month).
* Water tanks lean on a stand, which raise the water to cistern level.

Data
Annual average rainfall (Johannesburg) - 713 m”m
Total summer rainfall (October - April): 654 m”m
Average monthly rainfall- 93m”m
Average rainy days (1 m”m +) per month: 10-15 days

Allocation of Watertanks
Exhibition hall
Roof surface - 290m²
Monthly water gathering from roof:
290m² x 93m”m = 26.9 kilo litres
2.6 kilo litres per rainy day = Tank size
Consumption - 8 public toilets

Scrap metal workshop
Roof surface - 200m²
Monthly water gathering from roof:
200m² x 93m”m = 18.6 kilo litres
1.8 kilo litres per rainy day = Tank size
Consumption - washing area

Multi purpose hall
Roof surface - 390m²
Monthly water gathering from roof:
390m² x 93m”m = 36.2 kilo litres
3.6 cubic water per rainy day = Tank size
Consumption - 4 toilets + vegetation watering

Environmental centre
Roof surface - 250m²
Monthly water gathering from roof:
250m² x 93m”m = 23.2 kilo litres
2.3 cubic water per rainy day = Tank size
Consumption - 4 toilets + vegetation watering

Demonstration flat roof
Roof surface - 60m²
Monthly water gathering from roof:
60m² x 93m”m = 5.5 kilo litres
0.5 cubic water per rainy day = tank size
Consumption - education water tests + vegetation watering
Restaurant

Roof surface - 250m²

Monthly water gathering from roof:

250m² x 93m”m = 23.2 kilo litres

2.3 kilo litres per rainy day = Tank size

Consumption - 4 toilets + washing

Figure 127

Allocation of water tanks in relation to roof slope.
Financial Strategy

1. Calculation of design parameters

<table>
<thead>
<tr>
<th>Site area</th>
<th>Gross construction area m²</th>
<th>Coverage allowed</th>
<th>Ground floor area m²</th>
<th>First floor area m²</th>
<th>Total paved area m²</th>
<th>Green Strip area m²</th>
<th>External parking m²</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>2,828</td>
<td>45%</td>
<td>1,270</td>
<td>205</td>
<td>1,020</td>
<td>1,500</td>
<td>250</td>
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</table>

2. Estimated current building costs

<table>
<thead>
<tr>
<th>Description</th>
<th>Total construction area of building - m²</th>
<th>Cost per m²</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ground floor + first floor (Sum of ground floor area and first floor area)</td>
<td>1,475</td>
<td>R 4,200</td>
<td>R 6,195,000</td>
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<td>Passage area</td>
<td>525</td>
<td>R 120</td>
<td>R 63,000</td>
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<tr>
<td>Landscape area (Gross construction area less Ground floor area less Total paved area)</td>
<td>538</td>
<td>R 70</td>
<td>R 37,660</td>
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<tr>
<td>Paved area</td>
<td>1,020</td>
<td>R 160</td>
<td>R 163,200</td>
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<td>External parking (1 row x 15 bays)</td>
<td>250</td>
<td>R 120</td>
<td>R 30,000</td>
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</table>

**Building cost at start of construction**

R 6,488,860

**ADD: Escalation**

R 483,394

<table>
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<tr>
<th>Description</th>
<th>Escalation</th>
<th>Cumulative</th>
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<tbody>
<tr>
<td>Pre contract escalation for 6 months period @ 0.5% p/m comp</td>
<td>R 194,666</td>
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<tr>
<td>Building cost at start of construction</td>
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<td>R 6,683,526</td>
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<tr>
<td>Construction escalation for 12 months period @ 0.6% p/m comp adjusted by Draw Down factor of 0.6</td>
<td>R 288,728</td>
<td>R 6,972,254</td>
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</tbody>
</table>

**Estimated total escalated building costs (start costs+ adjusted escalation)**

R 6,972,254

**Add: Professional fees**

R 906,393

<table>
<thead>
<tr>
<th>Description</th>
<th>Per Item</th>
<th>Cumulative</th>
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</thead>
<tbody>
<tr>
<td>Professional fees @ 13% of total escalated building costs</td>
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<td>R 906,393</td>
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**Add: Sundry fees**

R 64,000

<table>
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<th>Description</th>
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<tr>
<td>Legal fees</td>
<td>R 25,000</td>
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<tr>
<td>Rates &amp; Taxes @ 2,000 p/m</td>
<td>R 24,000</td>
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<td>Plan approval fees</td>
<td>R 15,000</td>
<td>R 64,000</td>
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<td>Total cost excluding land and cost of capital</td>
<td>R 7,942,647</td>
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<td>Add: Land related costs</td>
<td>R 454,200</td>
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<td>Land cost @ R150 per m²</td>
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<td>Total</td>
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<td>R 150</td>
<td>R 424,200</td>
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<td>Rezoning of 2 plots</td>
<td>R 0</td>
<td>R 0</td>
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<td>River edge stabilization (100m) - N/C</td>
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<td>R 0</td>
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<td>Landscape development of Green Strip @ R20 Per m²</td>
<td>R 20</td>
<td>R 30,000</td>
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<td>Total costs before cost of capital</td>
<td>R 8,396,847</td>
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<tr>
<td>Add: Cost of capital</td>
<td>R 396,138</td>
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<tr>
<td>Cost of capital for construction period @ 11% p/a - Land</td>
<td>Item</td>
<td>Cumulative</td>
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<tr>
<td>R 46,662</td>
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<tr>
<td>Cost of capital for construction period of 12 m @ 11% p/a including Draw Down allowance factor of 0.4 - Construction</td>
<td>R 349,476</td>
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<td>Total project cost</td>
<td>R 8,792,986</td>
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</table>
List of Sources

INTERNET SOURCES:
Alexandra Renewal Project: Urban Redevelopment Initiative.
http://www.alexandra.co.za
Learn To Earn: Skills Training and Job Creation Organisation.
http://www.learn to earn.org.za

PERSONAL CONNECTIONS:
Acknowledgements

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Golan Haas