



## MOSHOESHOE ECO VILLAGE



# Project Review Series



# Project Description

## Background

The Moshoeshoe Eco Village was built as a pilot project to the larger low- and middle-income Hull Street housing project. The Hull Street Integration Project was initiated by the Swedish International Development Co-operation Agency (Sida) and launched in co-operation with the Swedish and South African governments.

As sustainability issues are of the utmost importance to any building project, the aim was to place people and their environments at the very centre of the project. The character of the built environment influences how people live and how future generations will live.

The Moshoeshoe Eco Village consists of 13 units and demonstrates a number of alternative or eco-technologies. These could turn out to be the ideal response measures for integration into future low-income housing projects. The project has been noted as one of the most significant South African local government projects in recent years for its contribution to the use of sustainable design criteria (Swilling 2004).

## Location

The Moshoeshoe Eco Village is situated within the municipality of Sol Plaatje, Kimberley. It is located in the former black township Galeshewe, some 3km from the city centre. The development is within a 500m radius of schools, a church and economic nodes.

## Site topography

The site is flat with a slight gradient to allow grey water run-off into a collection pond on site.

## Planning

The simple setting of the units along the street frontage offers an opportunity to demonstrate the various residential typologies: two-, three- and four-unit row modules. Single- and double-storey units are built side by side, achieving an interesting and varied streetscape. Each unit has a front garden facing on to the street with its own entrance gate and low diamond-mesh fencing. The back gardens have an opening onto a common green space which will be used for ecological and community recreation.



The colourful units make for an attractive street frontage

## Alternative technologies

Energy efficiency was a very important aspect of the development and was addressed in several ways.

The usage of renewable energy was integrated into the development through the installation of solar water heaters as well as photovoltaics. A back-up system of instantaneous gas water heaters was also installed. Although this system is more expensive than electric geysers, it is more energy-efficient and cost-effective. All units were fitted with gas stoves and energy-efficient light bulbs and appliances. The gas for heating and cooking lasts about four months but residents have found that they cannot bake in the gas stoves. Electricity is only used for lighting and to run appliances such as refrigerators. It was thought that the electricity generated by the photovoltaics could be fed back into the grid and sold to the municipality by the beneficiaries, however this plan was not accepted. A wind turbine was installed as a source of energy but it has blown off and is not being used. Nevertheless, beneficiaries have saved substantially on electricity bills, thanks to the use of these various alternative energy sources.

The use of an innovative urine-diversion toilet system addresses both water conservation and efficiency. A dual-type alternative dry-sanitation system has been developed which recycles the black wastewater through a filtration process. Urine is diverted through a plastic tube into individual 25- or 50-litre tanks outside each household, and solid waste is collected in 50-litre containers and turned into compost. These containers are rotated twice a year. The toilet is well ventilated to minimise odours. The grey wastewater passes through a sand filter pump before being diverted to a collection pond. All water in the pond can then be re-used for irrigation.

## Unit design

The aim of the design was to create a compact, cost-effective living-unit module, while releasing open space on the site to be used as common urban agricultural land.

There are single- and double-storey units, all comprising up to two bedrooms, a kitchen, a living area and a bathroom with a shower and toilet. The units allow for a larger living area than is usually provided for in subsidised housing.

All units have front and back doors and each block has windows on the sides which encourages the use of natural lighting.



Solar water geysers are situated on the roof of each unit



Wastewater is recycled and used for irrigation



All units are fitted with gas for heating and cooking



Windows on the front and sides of units encourage the use of natural lighting within

## Materials and construction

The unit blocks were constructed from traditional load-bearing brickwork with either timber or concrete first-floor slabs. Handmade bricks were tested but found to be unsuitable. Instead, the use of concrete bricks was adopted. The first-floor slabs are a type of rib-and-block construction. First-floor partition walls are lightweight dry-walls, achieving minimal loading on slab and providing a cost-effective solution.

Timber staircases were used for internal access in double-storey units. Roofs are formed of local pine trusses supporting corrugated-iron roof sheeting. A Rhino board ceiling with sisalation insulative material was used. Steel window- and doorframes, and timber doors were installed. The majority of the units were plastered and painted internally and externally, but a few units were built from semi-face brick. Each unit has skirting and floor tiles as well as an outside water point.

## Security

There is a mesh-wire fence and a palisade security fence around the perimeter of the development, with an unmanned sliding gate at the entrance for vehicles. It is intended that guards will be employed in the future.



Palisade fencing secures the perimeter of the development



Residents can get together at the communal braai facility and children's play areas

## Amenities

One parking space is provided for each unit within its back garden, and a larger grassed parking area is provided for visitors' cars. There is a large communal garden in the centre of the development for growing vegetables. A braai area is also provided.

# Project Evaluation

## Ecological design

Most of the ecological elements in the project are novel for South African developments and the residents who will live in the development.

The commitment to ecological design within the housing sector is encouraging. The pilot project will be monitored and will produce findings on the cost of green developments versus the cost of conventional buildings, taking into account that additional funding or donor finance was required for solar panels and the wind turbine. However, as the demand for and awareness around green developments increases, material costs and financing charges may come down.

## Community involvement

Overwhelming community support for the pilot project is evidence that a successful consultative process occurred. Key objectives were to enhance the community and share responsibilities, and social integration, residents' participation and capacity building was achieved.

The consultative process included holding public meetings to introduce the concept of the development to potential beneficiaries. Prospective tenants attended workshops and completed a questionnaire, and those who were interested made an application to be part of the pilot project. Various criteria were used to select beneficiaries, including willingness to participate, conditions of employment, savings schemes and eligibility for government subsidies.

Savings of the equivalent of three months' rental determined prospective residents' place in the queue.

## Planning and layout

This project addressed the dynamic tension between pursuing the ideals of sustainable housing development through the use of alternative and environmentally responsive technologies, renewable energy and full participation of all stakeholders; and maintaining a level of practicality and affordability.

## Unit mix, size and distribution

Two units have been occupied by the housing support centre. The project developed an array of unit typologies through the remaining 11 units which provided lessons that could be applied to the overall project.

## Open space and other amenities

**Recreation:** A children's play area and braai facilities are in the centre of the development. An urban agriculture plot was proposed but has not yet been realised, as tenants have not had time to develop and sustain the plot.



Various community initiatives are managed from the housing support centre



Residents take pride in their gardens



Double gates allow cars to access the parking space on each plot



A rotary washing line has been erected on each plot



Trees, shrubs and grass have been planted around the development to provide greenery

**Parking:** Although enough parking space is provided, it is not demarcated as such. There may be problems with the maintenance of the landscaped areas in the backyards of the plots as well as the communal grassed parking area.

**Laundry:** No laundrette facility is provided but there is a rotary washing line on each plot.

**Refuse:** Each unit has a municipal wheelie bin that is collected weekly by the municipality. Recycling was envisaged as part of the project but is still to be initiated.

**Social amenities:** A housing support centre is provided from which housing support and other community initiatives are managed. Residents have access to a public phone across the road from the compound.

**Landscaping:** Each plot has a unique form of landscape with grassed areas, paving and/or flowerbeds.

**Security:** Perimeter fencing is provided, with a main entrance gate. Residents are responsible for providing additional security for their units. Burglar bars and security gates have not been provided for individual units but some residents have installed these security elements at their own expense.

### Management of the project

The project is managed by Sol Plaatje Housing Company in Kimberley, which performs all the necessary management agent duties including the allocation of the units, rent collection, and development and implementation of community projects. Community structures actively participate in the management of the project.

# Key Lessons Learnt

- Community participation is vital and residents need to be engaged fairly and openly during each step of the project. Getting the residents to accept certain environmental aspects of the project, especially the sanitation systems, needed frank and open discussion. Communicating the benefits, especially financial savings, to the community will assist in getting them to accept alternative technologies.
- Community development should not only be done prior to the occupation of units, but should be a continuous program to contribute to the sustainability of a project.
- As is usual with innovative projects that address environmental concerns, the capital investment is very expensive, but this has to be considered over the long term where significant savings are realised.
- Mixed unit sizes accommodate different family types and encourage a mixed community profile.
- The design of units overlooking central open spaces (play-areas, parking areas and gardens) enhances the security of the project.
- Careful planning and co-ordination is necessary when using small, medium and micro-enterprise (SMME) builders and contractors, to ensure that the National Home Builders Registration Council (NHBRC) requirements are met.



Community participation is an important factor in the success of a development



Each unit has a front garden facing onto the street with its own entrance gate

# PROJECT STATISTICS

Name	MOSHOESHOE ECO VILLAGE
Project strengths	<ul style="list-style-type: none"> <li>The project is located 3 km from the CBD</li> <li>Environmental aspects, especially the sanitary systems, have made the units affordable for residents</li> <li>The project has had a positive environmental impact</li> <li>The project boasts innovative housing design with urban agriculture and re-use of grey water</li> <li>The medium-density development is a first for the Northern Cape</li> </ul>
Location	<ul style="list-style-type: none"> <li>Sol Plaatje (Kimberley), Galeshewe Township</li> </ul>
Developer	<ul style="list-style-type: none"> <li>Sol Plaatje Municipality</li> </ul>
Professional team	<ul style="list-style-type: none"> <li>Architects: ABAKO International Partners AD SweDevelop</li> <li>Project managers: Sol Plaatje Municipality: Johan Schoeman</li> <li>Engineers, Structural &amp; Civil: Deputy City Engineers: Les O'Connor</li> <li>Engineers, Electrical: City Electrical Engineers: Raymond Pretorius</li> <li>Energy consultants: AGAMA Energy</li> <li>Marketing Manager: NURCHA: Pam Grant-Struthers</li> <li>Solar Water Heater Suppliers: Solar Primeg</li> <li>Solar Electricity Suppliers: KG Electric</li> <li>Wind Electricity Suppliers: SVIAB.ZA</li> <li>LPG Suppliers: Shell Easigas &amp; Kingas</li> <li>Energy Efficient Lighting Initiative: Bonesa</li> </ul>
Vision for the project	<ul style="list-style-type: none"> <li>To ensure affordable housing by incorporating environmental innovation to the scheme</li> </ul>
Unit mix, size & distribution	<ul style="list-style-type: none"> <li>13 units</li> <li>Unit type 1: Single-storey semi-detached (extendable to second storey) 1 x 84m<sup>2</sup> (extended unit) and 3 x 42m<sup>2</sup> two-bedroomed units – plot size 192 &amp; 216m<sup>2</sup> (face brick)</li> <li>Unit type 2: Single-storey semi-detached (adaptable for disabled residents) 2 x 45m<sup>2</sup> three-bedroomed units – plot size 168m<sup>2</sup></li> <li>Unit types 3 &amp; 4: Double-storey row house with three or four units per row (4 x 53m<sup>2</sup> units – plot size 152m<sup>2</sup> and 3 x 55m<sup>2</sup> units – plot size 112m<sup>2</sup>)</li> </ul>
Density	<ul style="list-style-type: none"> <li>Adjacent areas: 250m<sup>2</sup> - 500m<sup>2</sup></li> <li>Actual: 190m<sup>2</sup> -120m<sup>2</sup></li> </ul>
Tenure type	<ul style="list-style-type: none"> <li>Rent-to-buy/instalment sale</li> </ul>
Rental	<ul style="list-style-type: none"> <li>R555-R715 per month</li> </ul>
Target market	<ul style="list-style-type: none"> <li>Households with a monthly income of between R1 400 and R2 344</li> </ul>
Type of development	<ul style="list-style-type: none"> <li>Medium-density walk-up apartments with environmental aspects on a greenfield site</li> </ul>
History	<ul style="list-style-type: none"> <li>Project began October 2000 and construction began on November 2001</li> <li>Construction period: 6 months</li> <li>Projected completed May 2002</li> <li>Units occupied June 2002</li> </ul>
Project funding	<ul style="list-style-type: none"> <li>Sida Grant Funding R1,252 million</li> <li>Sol Plaatje Municipality R229 600</li> <li>Dept of Housing &amp; Local Government, Northern Cape Province R202 400 (institutional subsidy)</li> <li>National Electrical Regulator R29 400</li> </ul>
Project costs	<ul style="list-style-type: none"> <li>Construction costs: R 850.00 / m<sup>2</sup></li> <li>Cost of land: approx R 20 000</li> <li>Total development costs: R1,713,520</li> </ul>

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