



# Building sustainable neighbourhoods in South Africa: learning from the Lynedoch case

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1. Swilling, Mark (2006), "Sustainability and infrastructure planning in South Africa: a Cape Town case study", *Environment & Urbanization* Vol 18, No 1, April, pages 23–50.

**ABSTRACT** Urban development strategies that aim to eradicate poverty will only be successful if these strategies include ecological sustainability criteria relating to sanitation, solid waste removal, energy, building materials and food security.<sup>(1)</sup> This paper uses the Lynedoch EcoVillage development in Stellenbosch (near Cape Town) to demonstrate that this can result in a balance between growth, equity and sustainability without any one of these criteria being seen as less or more important. In practice, however, judgments need to be made, and original intentions are often thwarted by conditions as they emerge during the course of the development process. Lynedoch EcoVillage is a significant case because it is the first intentional, socially mixed ecologically designed urban development in the South African context. To this extent, the Lynedoch Development is a challenge to both the traditional unsustainable approaches to urban design and infrastructure that have dominated the democratic period in South Africa since 1994, and to the perpetuation of economic apartheid whereby the rich and poor have remained segregated.

**KEYWORDS** ecological design / sustainable development / sustainable urban development / sustainability

## I. INTRODUCTION

Lynedoch EcoVillage is the first ecologically designed, socially mixed, intentional community in South Africa. It is located on the site of the old Drie Gewels Hotel, which is 200 metres from Lynedoch Station on the main train line between Cape Town and Stellenbosch.

Lynedoch is not just a dream; it has started to happen. What used to be a huge, ugly corrugated iron shed built for white University of Stellenbosch student parties has been renovated to accommodate the Lynedoch primary school (up to Grade 9) for 450 children from poor black farm worker families, a large all-purpose hall, and the offices and classrooms of the Sustainability Institute. There is also a Montessori-based pre-school which, like the primary school, is attended mainly by children from the families who live on the surrounding farms. Although Lynedoch primary school is a government school, the pre-school is a non-government community school. In addition to these educational facilities, a R4 million (US\$ 670,000) infrastructure programme was completed in October 2005 that provides the ecologically designed infrastructure (water, roads, sanitation, electricity and telecommunications pipes) for Phase 1 of the housing development.

The most significant aspect of Lynedoch from a sustainable design and construction point of view is that it provides a working example of integrated sustainable development: integrated because it connects social, economic and ecological objectives and because it incorporates technologies that span the energy, water, sanitation and building materials fields; sustainable because of the commitment to a long-term vision of social, economic and ecological sustainability; and developmental because of the anti-poverty and local economic development objectives.

## II. VISION AND GOALS

The non-profit Lynedoch Development Company (LDC) is responsible for managing the development of the Lynedoch EcoVillage. The Board comprises a mixed group of local community leaders and professionals.

Set up in 2000, this Board was energized by the possibility of building an inclusive living and learning community that would demonstrate in practice what it means to live in a sustainable way. This Board, however, was never able to raise the necessary resources to cover the full costs of the innovation and social facilitation processes that were needed to close the gap between vision and implementation. This is a gap that often results in visionary and/or innovative projects being stillborn. In this case, the gap was addressed by the Sustainability Institute (a non-profit trust based at Lynedoch),<sup>(2)</sup> which worked in partnership (from 2002) with the School of Public Management and Planning (SOPMP) at the University of Stellenbosch.<sup>(3)</sup> The Sustainability Institute effectively acts as the animator of the design innovation, institutionalization and community-building processes. This NGO–University alliance was able to mobilize intellectual capital, research networks and a sense of vision-in-practice that made the project credible in the eyes of the providers of senior debt<sup>(4)</sup> (the Development Bank), local bankers (Nedbank), local authorities and, most importantly of all, the buyers of the properties.

Inspired by this commitment, three goals were formulated in 2000 to guide the various aspects of the planning and implementation of the project:

- Lynedoch EcoVillage should be a socially mixed community (both in terms of race and class) organized around a child-centred learning precinct;
- it should strive to be a working example of a liveable ecologically designed urban system; and
- it would be a financially and economically viable community that would not require external funding to sustain itself.

Above all else, the Board of the LDC were determined that Lynedoch EcoVillage should provide a safe space where South Africans from all backgrounds could live in peace with each other and in harmony with nature. It should also, they believed, be a place where people from all over the world could come and share in the life of the community while they learn, think and create works of art and knowledge that will contribute to the making of a better world. It must, in other words, be a place where all life is celebrated and beauty in all its forms treasured for this and future generations.

The key features of the Lynedoch EcoVillage development, both

2. The Sustainability Institute obtained core funding from the Ford Foundation for the period 2002–2004. This grant enabled the Institute to engage generally with the Lynedoch EcoVillage Development, while simultaneously setting up a new Masters Programme in Sustainable Development that included in the curriculum of the various modules the learning from Lynedoch.

3. See [www.sustainabilityinstitute.net](http://www.sustainabilityinstitute.net).

4. Senior debt is large-scale debt that is repaid over a long period of time, with all other short-term debt (such as overdraft facilities) regarded as subordinated to the senior debt.

those that have already been achieved and those planned for the remainder of the second phase of development are as follows:

- a primary school for 450 children drawn mainly from the families of local farm workers (completed December 2001);
- a pre-school for 40 children (completed in February 2002);
- a large multi-purpose hall (completed in December 2001);
- offices and classrooms for the Sustainability Institute (completed in December 2001);
- conversion of the old Drie Gewels Hotel and an existing residential house into 18 residences that will provide accommodation for participants in the programmes of the Sustainability Institute, as well as a conference venue for general use;
- 42 new residential sites in Phase 2 (12 of which were completed in March 2006), with 15 earmarked for purchase at a price of R20,000 by people who qualify for a government housing subsidy, and with the remainder being sold at a commercial rate ranging from R90,000 to R275,000 per *erf*, using an urban design layout that does not spatially separate the subsidized *erven* from the commercially priced *erven*;<sup>(5)</sup>
- commercial space for offices or for small manufacturers and crafts people;
- a village green and landscaped areas to be planted with indigenous plants; and
- a traffic environment that limits the number of cars that can move around the village and that restricts the parking of cars to designated communal parking areas which, in turn, secures the space for children and pedestrians.

5. An *erf* is a formally defined plot of land with a surveyed boundary that is registered with a title deed and which can legally be bought and sold on the market. *Erven* is used to refer to two or more of these plots of land.

The nature and extent of Phase 3 of the development will be determined during an extended negotiation process between the LDC and the Lynedoch Home Owners Association (LHOA), which is also a Section 21 company. It is compulsory for every property owner to be a member of the LHOA. This means that after the sites were transferred to the property owners in February 2005, the LHOA had 35 members plus the LDC. These LHOA members will now become involved in the participatory planning process that will determine the nature and extent of Phase 3.

### **III. HISTORY AND BACKGROUND**

Stellenbosch is a small university town some 35 minutes drive inland from Cape Town. Known as the unofficial capital of the so-called Cape Winelands, it is surrounded by the Helderberg, Simonsig and Stellenbosch mountain ranges and has been the historic commercial centre of a wealthy white-owned agricultural community dominated by the wine-making industry. Black people have not only suffered from exclusion from economic ownership in this region since agriculture began in the late 1600s, but also from housing, education and higher learning. The infamous “*dop*” system (which involves paying labour partially in alcohol) has caused profound social damage that will take at least a generation to heal, with children as the key to a better, safer future for this region. The LDC Board sees the design and development of the Lynedoch

EcoVillage as an explicit intervention to demonstrate in practice an alternative to the power and social relations that have shaped the history of the Cape Winelands.

### a. Phase 1

The LDC submitted a development application to the authorities for approval in June 2000, and approval was finally secured in May 2002. The delay was caused by objections from white neighbours (who were accused by some local residents of having racist motives), which made it necessary to obtain approval from the Western Cape provincial government. Approval was obtained for 150 housing units on plots ranging in size from 80 square metres to more than 300 square metres. During the participatory planning process, it became clear that a more mixed community, with a diverse range of activities and incomes, had a greater chance of being economically self-sustaining than a community that was entirely dependent on returns from workers earning very low wages. The reason for this is that the approvals from local and provincial government were based on the assumption that neither of these levels of government would contribute financially to the development. (This later changed when, under pressure from the emerging Lynedoch community and school, the provincial government agreed to provide R6 million for the upgrading of the road intersection, which was a zoning condition.) Finally, whereas the initial development plan presumed that deals would be made with farmers to relocate entire groups of workers from the farms and into Lynedoch, the Board – which included two people who lived on farms and played leadership roles in defending farm dwellers from forced evictions – decided that it did not want to be party to this because the end result would be another dumping ground for disgruntled workers who may have preferred to remain living where they had lived for generations. Furthermore, the housing stock on the farms would have been demolished, meaning that there would be no net gain in housing stock for the country, just a relocation of stock from the farms into Lynedoch EcoVillage. At the time, local community leaders and elected councillors were vociferously opposed to housing developments that reinforced the farmer's agenda to evict farm dwellers.

The initial development plan, as approved by the local authorities, envisaged a single-phase, largely low-income housing development built around the conversion of the main building into premises for the Lynedoch primary school. However, after the school premises were completed in December 2001, and occupied by the school in January 2002, the LDC Board hosted a strategic planning session in April 2002 to consider options for the way forward. It was at this meeting that local community stakeholders expressed reservations about the idea of building 150 low-income houses around the school. They argued that the school had become a safe, protected and beautiful learning space for the children, with the advantage of being separate from their local communities where all sorts of social problems created challenging and often threatening environments for children. They argued that by building an exclusive low-income housing development there, along lines similar to other areas where failure levels were high, this new safe space from which the children were benefiting could be threatened. Together, all these factors triggered the strategic decision to adopt a two-phase approach to

the housing. Phase 2, with a reduced number of housing units, would only be viable if an increased number of commercially priced units were included to recover the land and infrastructure costs of a smaller Phase 2. Phase 3 was left for further negotiations with the community, to take place after the completion of Phases 1 and 2.

The initial R3 million land purchase (which took place in 1999) bought a six-hectare property with the following structures:

- an old historic country hotel in a dilapidated condition and barely functional – 717 square metres;
- three family-sized residential houses in varying degrees of disrepair;
- a large, dominating dance-hall-cum-restaurant (referred to as the main building) – 4,023 square metres;
- a small brick shed (currently used as a crèche) – 50 square metres; and
- approximately 30 prefabricated units of about 10 square metres each that previously served as guest rooms for the hotel and which needed to be demolished immediately.

The R3 million was raised from a R2 million loan (at above prime interest rates) from a local commercial bank and a R1 million donation from the Spier wine estate. Spier's senior management provided strategic and management support for setting up the LDC and negotiating the transaction.

The renovation of the main building to provide premises for the Lynedoch primary school, the community hall and the Sustainability Institute was funded through a R5.5 million interest-free loan from the Spier wine estate. This will be liquidated once the main building is transferred via a deed of sale to Spier at some point in the future. The agreement with Spier is that the primary school, the Sustainability Institute, the performing arts group and various other groups have rent-free use of the premises on condition they cover all service charges and maintenance costs.

Other sources of grant funding have come from Danish government aid (R450,000); the Winemakers Guild (R40,200); the Enthoven family trust (R600,000); and the United States Agency for International Development (USAID) (R600,000).

This funding covered the costs of the professional team that did the design work, and of the submissions for development approvals, the establishment of a website,<sup>(6)</sup> and investment in experimental infrastructure (such as the Biolytix filter,<sup>(7)</sup> passive heating and cooling systems, etc). The R600,000 from the Enthoven family trust was used to renovate the old Drie Gewels Hotel building into an 11-bedroom guesthouse.

Operating costs and interest payments were covered by a combination of further short-term commercial loans and revenue from leasing various premises to various NGOs and small businesses and, for a short while, to Spier, who required additional office space.

## **b. Phase 2: the housing development**

Phase 2 consists of 42 approved *erven*. One 1,488 square-metre *erf* on which the renovated guesthouse is located was not sold because the structure is to be retained as an income-generating asset for the benefit of the community. With the exception of two subsidized sites, to be held in

6. See reference 3.

7. A Biolytix filter is the trademark name for an ecological wastewater treatment system that is totally free of chemical inputs and that has no negative sludge or liquid effluent penetrating the surrounding ecosystems.

reserve in case of budget over-runs, the remaining sites had all been sold by the end of 2005, with no marketing costs having been incurred and with no estate agents having been used. Because some buyers bought double stands, the end result will be 19 units on commercially priced sites (of which two already exist), 15 units on subsidized sites, the guesthouse, plus an existing house on 979 square metres that will be purchased by the Sustainability Institute as an extension to the guesthouse facility (providing seven additional rooms for overnight guests and students who participate in learning programmes). If the four *erven* with existing buildings are excluded, the average size of the plots is 177 square metres. The smallest plots measure 80 square metres (one *erf*), the majority are in the 120–160 square metre range, and a few large sites measure between 200 and 300 square metres.

All except nine buyers purchased *erven* in accordance with deeds of sale that defined the purchaser as the party responsible for building the house after transfer. In terms of the deed of sale, not only did the purchasers automatically become members of the LHOA, they also made a commitment to build in accordance with the architectural guidelines that form an integral part of the constitution of the LHOA. Nine buyers earned too little to be regarded as “bankable” by the commercial banks. To remedy this, the LDC sold them their properties on an instalment sale agreement under the terms of the Alienation of Land Act, which allows a purchaser to take possession and occupation, with transfer to ownership delayed until final payment is made (in this case 108 months later). The LDC also provided them with housing loans of R35,000 to build their houses which, together with their housing subsidies, proved sufficient.

Phase 2 was funded through a R3 million loan from the Development Bank of Southern Africa (DBSA). This was provided at a 10.4 per cent fixed interest rate repayable over 10 years, with all interest and capital repayments deferred for the first 12 months. The final unaudited financial results for Phase 2 of the development (as at February 2006) were as follows:

- total revenue from sales plus interest earned from loans: R5,900,000;
- land cost: R1,628,459;
- cost of Phase 1 infrastructure (including professional fees): R2,353,091;
- interest: R1,758,493;<sup>(8)</sup>
- total expenditure: R5,740,043;
- revenue after costs: R159,957;
- market value of retained assets (hotel): R3,000,000; and
- market value of undeveloped portion of the land: R6,000,000.<sup>(9)</sup>

As is normal in most multi-phase developments, the first two phases are less profitable than the third because the latter can benefit from the connections to the main infrastructure built in the earlier phases.

The ecologically designed infrastructure that was constructed is described in greater detail below. However, it is important to note here that, as required by the zoning conditions, this infrastructure was transferred to the LHOA, which becomes the body responsible for the operation and maintenance of Lynedoch's entire service infrastructure in terms of the legal framework provided for in the Western Cape's Land Use Planning Ordinance and the Municipal Systems Act.

8. The DBSA requires monthly payments over 10 years, which means that all unpaid cash is held in an interest-bearing account. It has been assumed that the average interest rate over 10 years will be 6 per cent.

9. The market values were determined by two reports: one by an independent valuer and the other by an estate agent.

10. We are grateful to the students who did the Ecological Design Module of the Masters Programme in 2004 for helping us to articulate the essence of these assumptions.

As already mentioned, technical and institutional arrangements and procedures for this development were structured to meet the three strategic aims of sustainable development, namely ecological, social and economic sustainability. Besides a general value commitment to ecological sustainability, the Lynedoch EcoVillage development has always proceeded on the assumption that ecological design must make financial sense, and that this was particularly important for the low-income households. A 20-year perspective was adopted and the following general assumptions were made from the start.<sup>(10)</sup>

- The cost of potable water in the Western Cape will rise faster than the average rate of inflation over the 20-year period due to increasing water scarcity and the rising costs of accessing potable water from new capital-intensive dams and aquifer exploitation projects.
- The cost of off-site sanitation services will rise faster than the average rate of inflation over the 20-year period, in particular for communities not currently serviced by bulk sanitation services (such as Lynedoch), which will, later on, be expected to contribute to capital costs and increasingly expensive operating costs for traditional bulk sanitation systems.
- The cost of grid energy will also rise faster than the average rate of inflation over the 20-year period as a result of the increasing scarcity of fossil fuels, the restrictions on high CO<sub>2</sub> emissions (which makes coal-fired power less viable despite extensive reserves), and restrictions on the expanded use of nuclear power caused by environmental opposition movements.
- The cost of solid waste removal will increase faster than the average rate of inflation due to rapid exhaustion of the holding capacity of existing landfill sites in the Western Cape, the high cost of new landfill sites (which will also be difficult to locate and secure), increased transportation costs as landfill sites are located further and further away while, at the same time, recycling costs will decrease as economies of scale in the recycling business are reached.
- The cost of the monthly bond repayments as a percentage of total average household expenditure will gradually drop to zero over the 20-year period, while operating costs will rise faster than inflation.
- If suburban sprawl, driven by large *erven*, remains the norm, unsustainable low-density settlements will result, which, in turn, will cause the destruction of agricultural land, increase infrastructure and transportation costs, and force up land prices in a way that will have an exclusionary effect on the urban poor.

Based on this scenario, it made sense to focus on: reducing water consumption in each house; treating all waste water (black and grey water streams) on site and re-using the treated water; reducing household energy consumption; eliminating the need for solid waste removal from the site; raising densities by shrinking the average size of *erven* in a way that does not discriminate between rich and poor; and maximizing the economic benefits of a socially mixed development.

#### IV. ECOLOGICAL SUSTAINABILITY

The following system has been constructed.

### a. Water and stormwater

- Dual water supply:
  - potable water is supplied direct to each unit from the main municipal water line, with one meter for the whole development;
  - recycled water is supplied to each household for use in toilet flushing (which reduces potable water consumption by at least 40 per cent per house) and irrigation (which reduces potable water consumption in richer households by up to 60 per cent);
  - two water meters have been installed per household, one for potable water and the other for recycled water; readings are taken by the LHOA to generate one invoice per household with two line items – a fee for potable water, which the LHOA must then forward to the municipality, and a fee for recycled water, which goes towards the operation and maintenance of the on-site water-recycling system (described in greater detail below).
- Water-saving taps and showerheads have been installed where possible, as well as dual-flush or low-flush toilet systems.
- To reduce the cost of the recycled water infrastructure, these pipes were combined with the pipes dedicated to the fire-fighting water supply system that is required by law.
- Stormwater run-off from ground and roof areas is conveyed in open channels and pipes to a dam located at the bottom of the site.
- The open stormwater channels were planted with *kikuyu* grass and designed to complement the natural character of the development.
- Stormwater run-off has been minimized by restricting hard landscaping, thereby increasing percolation into the groundwater supply, which, in turn, is accessed via a functioning borehole when required.
- Rainwater harvesting is optional for each household, although strongly encouraged, especially for those who will require irrigation water, which may not be forthcoming in the dry summer months if the dam drops below the required levels.
- It has been calculated that low-income households will save 90 per cent of their normal monthly water bill and middle-income households around 70 per cent.

### b. Household effluent

- The system has been constructed so that grey and black effluent from households passes through septic tanks (one per two or three *erven*), where the main solids are deposited, and then proceeds on to a “vertically integrated constructed wetland” at the bottom of the site, where treatment is aerobic on top of the wetland (where the effluent enters) and anaerobic at the bottom, as the effluent sinks down through a multi-layered filter (comprising river sand, small stones, straw, geofabric and iron filings to capture the phosphates), after which it goes into a dam, from where it gets pumped into storage tanks at the top of the site for onward transmission to the households, for toilet flushing and irrigation.
- The grey and black effluent from the guesthouse and main building is channelled directly into a Biolytix filter, which is an engineered

micro-ecology consisting of a peat filter inoculated with earthworms that effectively deals with the solids in an aerobic environment, and results in treated water that has retained the primary nutrients (nitrogen and phosphorus) for re-use as a natural organic fertilizer for developing a nursery or irrigating orchards.

- Both the vertically integrated constructed wetland and the Biolytix filter are rapid, odour-free, fly-free, environmentally appropriate filtration systems that do not require the use of chemicals.
- Nutrient and pathogen removal takes place via the anaerobic elements of the vertically integrated constructed wetland and the dam, which makes it possible to re-use the effluent for flushing and irrigation in the households.
- Although pathogen removal through the Biolytix filter is limited, pathogen removal is achieved by passing the effluent from the Biolytix filter through an ultraviolet light.
- No stormwater or black or grey wastewater will leave the boundary of the site except via groundwater flows and evaporation.
- By treating all black and grey water on site, Lynedoch EcoVillage will never need to face the burden of capital costs for bulk sanitation, or operating costs for such a service (normally indirectly via rates).
- It is worth noting that three buyers with neighbouring *erven* collaborated during the infrastructure construction phase to replace their septic tanks with a single biogas digester. This biogas digester (a brick dome structure) collects all the grey and black water, plus kitchen organic waste, and captures the methane gas at the top of the dome, where it is released via a pressure valve back into the houses for use as cooking gas that replaces the LPG gas supply.

### **c. Energy**

- The electrical infrastructure was designed to ensure that each structure has an electricity supply from the national electricity grid, which, in turn, is mainly supplied by coal-fired power stations and a small percentage by nuclear power.
- Solar water heaters were installed on existing and new buildings (and will be on all future buildings), with each solar water heater fitted with a thermostat that will switch to electricity on those days when there is not enough sunlight to heat up the water – this eliminates 60 per cent of normal electricity consumption.
- No electric stoves are permitted – all cooking is done via low-pressure gas hobs.
- Space heating and cooling has been achieved naturally through effective design, a proper north–south orientation (in most cases), correct roof overhangs (long enough to provide shade in the summer and short enough to allow in the winter sun), the most appropriate insulation (varying with affordability levels), and the use of various thermal mass (e.g. rock stores) or even geothermal systems (underground piping systems that make use of steady-state temperatures lying below the earth’s outer crust) – all this will save money by reducing the consumption of natural resources.
- Low-energy lighting has been installed, namely compact fluorescents lights (CFLs) or low-energy diodes (LEDs) – this translates into 11 KWs for CFLs or 2 KWs for LEDs, compared to the normal 60 KW or

100 KW incandescent bulbs that are costly to operate and at present only slightly cheaper to buy.

- Streetlights, which at the time of writing in March 2006 had not been installed, will consist of LEDs powered by solar panels – which means a one-off capital cost to the developer and no ongoing operating costs to the residents.
- Savings on electrical cabling infrastructure were achieved by specifying that there would be no geysers, electric stoves or electric streetlights in Lynedoch EcoVillage – these savings translated into lower monthly repayments for those paying via bonds or loans.
- Lynedoch is the ideal site for a mixed system that could be constructed in future, building on what has already been achieved, namely on-site energy generation for feeding back into the grid using solar, wind and hydro systems, plus possibly a hydrogen storage system coupled to a fuel cell that could be used for peak lopping and/or ensuring a steady feed into the grid.

#### **d. Refuse**

- Municipal refuse collection is managed entirely by the LHOA.
- All members are required to separate their refuse into different containers (currently mainly organic waste and solid waste, which is then separated further at a depot, but further separations at source might be introduced in future).
- The LHOA is responsible for collecting the separated refuse and selling it to recyclers.
- A composting depot has been established and is used to process organic waste for use in the community gardens.
- The ideal is to ensure that 95 per cent of solid waste is either sold to recyclers or retained on site for productive re-use, which means that, at most, 5 per cent should reach the landfill site – the LHOA hopes to achieve this by the end of 2006.

#### **e. Roads**

- Internal roads were constructed as gravel-covered coarse surfaces.
- No kerbs were provided, in order to complement the natural character of the development and to reduce costs.

#### **f. Housing**

- Five pre-designed housing types were worked out, ranging from single residential dwellings to semi-detached houses and terraced housing.
- However, purchasers have generated their own designs in accordance with the architectural guidelines that are attached to the Constitution of the LHOA.
- All the houses thus far (12) have been built by a contractor, with active involvement from the buyers in the design, checking on construction quality, and in post-occupation improvements.
- Eleven of the 12 houses that have been constructed to date are built of adobe brick (300 mm wide clay and straw sun-dried bricks), and 10 of them are two-storey, with 70 square metres of space on the

bottom floor and about 60 square metres on the top floor. They have corrugated iron roofs with insulation, the foundations and bottom floors are of concrete, and the roofing system is called “eco-beam”, comprising beams made of two strips of wood held apart by a zigzag pattern of corrugated iron strips; there is a single inside toilet plus bath/shower, and an inside staircase; the window and door frames are made from hardwoods imported from West Africa (with sustainable harvesting certificates where possible) because hardwoods are not available in South Africa. The 12 houses that have been built are owned by a mix of people, seven of whom qualified for government housing subsidies because they earn less than R3,500 per month. The other five earn a wide range of incomes, from R7,500 to R16,000 per month. They come from four different language group/ethnic backgrounds, for example a Sotho-speaking woman and her family from the Johannesburg area, an English-speaking male Capetonian (who has the smallest house and is a bachelor), the local school headmaster (and his son), who would colloquially be referred to as “coloured” in the South African context, a Xhosa-speaking woman and her family of two children who was born in the Winelands, and a small-scale organic farmer and his family, who comes from the historically coloured communities of the Stellenbosch region.

- A community-based sustainably managed forest-harvesting project in Mozambique has agreed to supply hardwoods for the manufacture of windows and door frames in order to prevent the use of Meranti, which is the most widely used hardwood in the Western Cape but is imported from unsustainable forests in Indonesia and Brazil – however, aluminium has already been used for window frames in one house, and although it has a high embodied energy content, it is maintenance-free, insulates well, does not need to be painted and is very durable.
- All finishes have, to date, and will, in future, be selected in accordance with the architectural guidelines, i.e. paints, wood treatments, fixtures, etc.
- Indigenous plants are used for landscaping of the gardens in a way that enhances the connection between the natural landscape and the buildings.

## **V. SOCIAL SUSTAINABILITY**

There are three aspects to the social sustainability of Lynedoch Eco-Village. The first relates to governance. The second relates to the complexities of ensuring and maintaining a proper social mix. Social mix refers to the fact that the current group of homeowners includes people who could be described using the following categories: black farm workers, school teachers (black and white), mainly black skilled manual labourers/service workers and supervisors, university-employed academics (black and white), black and white self-employed professionals (consultants in various fields), local government officials (black and white), mental health practitioners, media workers and NGO project workers. These identities cross-cut others, such as environmental activists, human rights campaigners, gender and child rights organizers, social/public critics, policy analysts, peace workers, business

owners, investors, etc. The third aspect relates to the development of the next generation in a child-centred approach that pervades the Lynedoch EcoVillage.

### **a. Governance**

The LDC has acted as the developer. This means that it applied for the development rights, raised the funding and managed the infrastructure construction and community-building aspects of the development.

When the local authorities approved the development, this was on condition that a homeowners association and a Special Management Zone Trust should be established (more on this below). As previously mentioned, the Lynedoch Home Owners Association (LHOA) was constituted as a Section 21 company with a detailed Memorandum of Association, Articles of Association and several appendices, one of which is the Code of Conduct that governs daily living in the EcoVillage. All property owners, including the LDC, are members of the LHOA. The association is responsible for ensuring that the community has the services it requires, such as water, refuse collection, sewerage treatment, cleansing, gardens and grounds maintenance, and so on. These services are paid for from service charges and levies paid by members of the association. The association pays the bulk service providers such as ESKOM, Stellenbosch municipality and various private contractors (e.g. for waste recycling and removal), and for this purpose it employs an operations manager and has a local site office. The association holds an Annual General Meeting where members vote for a Board of Trustees. There have already been three AGMs.

The most important document is the Code of Conduct, which defines the way the community would like to live on a daily basis. This Code of Conduct governs matters such as litter, waste disposal (including separating waste at source), the number of pets each owner is allowed, noise pollution, traffic control, building extensions, the use of energy and water, the use of common areas, the planting of vegetation and food gardens, the disposal of compostable organic waste, safety and security matters (especially for children), the use of the community hall, conflict resolution, air pollution, the external appearance of buildings, procedures for managing community events (e.g. parties, marriages, funerals, etc.), the behaviour of temporary residents (e.g. students, etc.), and the right to privacy in a context that is already inundated by visitors.

As far as the Special Management Zone Trust is concerned, one of the zoning conditions was that the LDC establish a trust into which 1 per cent of all land sales must be deposited for future investment in the natural environment, such as gardens, river rehabilitation, removal of alien plant species, biodiversity promotion, etc. This remarkably progressive intervention, along with the quota for the provision of subsidized sites, confirms the important role that zoning conditions can play in directing the investments of developers.

### **b. Achieving the social mix**

The intention of the LDC has been to ensure a social mix through the provision of both commercially priced and subsidized plots.

However, over the course of nearly a year of participatory planning

with the prospective subsidized buyers, it became clear that they would all, in one way or another, face the following problems:

- The commercial banks would not regard them as being worthy of bond finance (normally for reasons that the banks refuse to commit to writing and, because of this, the banks are seen as either racist or biased when it comes to bonding unfired clay buildings).
- They will only qualify for the housing subsidy (of about R40,000) if they can demonstrate that they already have access to land and will not, therefore, be using the housing subsidy to purchase the land.
- Most cannot afford more than a R80,000 loan (for both plot and house).
- The greatest challenge will be the first three or four years, when payments for housing-related costs (interest, capital, levy, insurance and service charges) will consume a large part of household revenues, after which the pressure will ease as wage/salary levels rise with inflation and with (hopefully) no increase in interest rates.

Given these challenges, initially it appeared that the social mix objective would be compromised. However, cutting a very long story short, the participatory planning process resulted in the following delivery framework for subsidized buyers:

- All sales will be via an instalment sale agreement according to the Alienation of Land Act.<sup>(11)</sup>
- The LDC will access a group loan from the Development Bank of Southern Africa to finance the housing construction, and will use its ownership of the plots as security for the group loan.
- A so-called institutional housing subsidy from the Western Cape provincial government will be secured, most of which will be used to reduce the capital cost of the houses, but there is also the option that instead of using the subsidy to cover a portion of the capital cost of the houses, it will be used on a gradually decreasing basis over seven years to subsidize the monthly payments the households need to make – this effectively helps the households over that critical three-to four-year period when housing-related costs consume too much household income.
- A separate “building contract” will be drawn up between the LDC, each purchaser and a contractor, whereby the contractor will build a house in accordance with the purchaser’s specifications and affordability capacity.
- The LDC has secured grant funding from the Swiss South Africa Cooperation Initiative, whereby the labour employed by the contractor will be enrolled in a training programme to qualify for the National Certificate in Community House Building, which is a qualification in sustainable housing construction.

In addition to this enabling legal and financial arrangement, the subsidized sites were not grouped together in one place. Instead, both the subsidized and non-subsidized buyers were invited to choose their plots. This was possible because the urban design did not create large, expensive plots and cheap plots in accordance with the usual South African way. The end result is a relatively good (but not complete) spatial mix of lower- and higher-income people. In addition, the LHOA agreed that the subsidized site owners should pay only 50 per cent of the levy payable by the non-subsidized site owners (unless their household income increases

11. This Act is a progressive piece of legislation that makes it possible to craft a variety of legal mechanisms for purchasing and owning land other than via private property ownership.

to R5,000 per month or more). However, service charges will be at the same unit rate for everyone.

The most significant community-building process took place in the three months that led up to the founding Annual General Meeting of the LHOA in May 2004. During this 3–4-month period, a steering committee took responsibility for translating the rather bulky Constitution of the LHOA (Memorandum and Articles plus appendices) into simplified English and simplified Afrikaans versions, and then the steering committee members had individual meetings with the rest of the homeowners in order to explain clause by clause what the Constitution was all about. By the time the homeowners met at the founding meeting, there was a high level of understanding by everyone of the document, which was duly adopted together with a budget for the first year.

### c. Focus on children

It is clear that the most vital aspect of achieving and sustaining social integration in Lynedoch EcoVillage is the centrality of children in both the spatial structure of the development process and in the social dynamic that characterizes daily life. In a part of the world where the levels of violence against children and between children are increasing, it is clear that unless children are placed at the centre of the development process, social integration will remain a chimera. Because the Lynedoch primary school sits at the very centre of the site, it is not surprising that everyone who visits Lynedoch for the first time is struck by the centrality and presence of children of all ages. More commonly, children are warehoused by our educational system rather than educated – and this normally happens in buildings that are constructed in places that are marginal to the traffic and intersections of daily life. This is not the case at Lynedoch. As the head boy of the school recently remarked when asked what he liked most about his school: *“It is all the other things that happen around our school.”*

A combination of partnerships between Lynedoch EcoVillage, the Sustainability Institute, Spier and the Western Cape Education Department (WCED) have seen the development of the following:

- A focus on children aged two to five, combining healing, sustainability and ecological early learning – replicated in an accredited training programme for 30 women from other poverty-stricken and violent areas.
- Combining this community-owned early learning centre with the WCED Grade R,<sup>(12)</sup> and providing ecological early learning to the Grade R teacher.
- Facilitating the appointment of an extra teacher, also qualified as a clinical psychologist, at the WCED Lynedoch primary school to generate an ecological approach to teaching and learning that focuses specifically on non-violence in teaching, and that builds within children the ability to create a language of non-violence. The Spier estate pays for this appointment.
- The development of an IT centre that links the primary school, the Sustainability Institute and the University of Stellenbosch, for use by the children, university students and community members.
- The support of an aftercare facility that creates space for many

12. Grade R is the preparatory grade prior to Grade 1.

activities hitherto not experienced by the children, such as athletics, dancing, computer club, sewing, etc.

## VI. ECONOMIC SUSTAINABILITY FOR URBAN DEVELOPMENT

The most destructive consequence of apartheid is that richer communities can survive within enclosed local economies that do not need anything from the poor other than their labour, but the reverse is not true. There are, quite simply, insufficient resources within poor communities for poor households to be able to survive without commuting to the rich communities to work, beg or steal. Lynedoch EcoVillage has overcome this problem in various ways.

First, the assets acquired by the buyers of subsidized sites in Lynedoch are worth a lot of money – unlike the case for the poor households who buy land in marginal poverty-stricken urban ghettoscapes. A R20,000 plot in one of the current low-income housing developments, inevitably located on the margins of the city boundary, probably has a market value of less than R20,000, and there are many cases of families obtaining their serviced plots and reselling them almost immediately at sub-market rates. A plot bought for R20,000 in Lynedoch EcoVillage is worth at least R100,000 on the open market. This immediately places the buyer in an advantageous position, but not through overpricing the commercially priced sites. In fact, an independent property valuer argued that the prices of the non-subsidized plots set by the LDC were too low – a view subsequently confirmed by the fact that quite a number of non-subsidized buyers were able to afford more than one plot (thus also subverting an aspect of the social sustainability of the Lynedoch urban design). In other words, without overburdening middle-income buyers, it was possible to give low-income buyers a high-value asset at a massively discounted price. This should immediately reposition them in the eyes of the banking system because they can now offer a substantial asset as security. However, and this is the key point, the value of this asset is much greater than the actual capital cost – this has major implications for the practical operationalization of the current commitment by government to an “asset-based” approach to community development. This might not have been the case if the municipality had not imposed a quota for the number of subsidized sites that must be provided when it approved the zoning conditions to this effect.

The challenge, of course, is to make sure that the intended beneficiaries remain the beneficiaries. The Constitution of the LHOA imposes on all homeowners severe restrictions on resale, by making it compulsory that any seller of any property must first offer the property to the LHOA and only then offer it to a third party at a price that is not lower than the price proposed to the LHOA. This, plus a provision that allows the LHOA to approve or disapprove of a potential buyer, is intended to enable the LHOA to ensure that the community members remain committed to the vision and values of the EcoVillage. Given that the Board of Trustees is elected annually, value shifts within the community could, of course, thwart this intention. Nevertheless, it is via this mechanism that it is possible to ensure that the sale of a subsidized site is treated in one of two ways. Either it is sold to someone who has qualified for a housing subsidy and can take over the financial obligations from the seller, or the buyer

is prepared to pay a commercial market rate that will generate a considerable profit for the seller. In the latter case, the Constitution of the LHOA requires that an amount of at least R20,000 (plus inflation) is contributed to the LHOA out of this transaction, for the LHOA to use for re-investment in the social housing stock. In this way, the total stock of social housing does not get eroded and the sellers can realize a profit on their investment if they want to sell and move elsewhere. Either way, the difference between the poorest and richest members of the community will change, and has already started to change due to the impact of the multiplicity of developmental processes underway in the community. Some households that qualified for a housing subsidy two years ago are already earning well above the R3,500 level required to qualify for a housing subsidy – this is, after all, a sign of development in practice. Even if they don't sell, the original definition of "social mix" will change. Similarly, it will not be possible to prevent the gradual sale of subsidized sites to buyers who earn above the subsidy requirement. The objective, therefore, is not to retain the number of social housing units within Phase 2, but to make sure that transfers result in a build up of funds for investment in social housing units in Phase 3, or even a similar development located elsewhere. Maintaining the *size* of the total social housing stock is the objective, not necessarily to ensure that this stock remains fixed in a specific spatial location.

The LDC has worked closely with the Sustainability Institute to assist with the establishment of a Savings and Credit Cooperative (SACCO) at Lynedoch. This is essentially a non-profit community bank that provides non-secured loans to poor people based on their savings record. Affiliated to the South African Credit Union League (SACUL), the SACCO will become an important vehicle for mobilizing the savings of all members of the Lynedoch community. However, more importantly, it will provide a vehicle for managing the savings and loans procedures related to the housing construction process. The SACCO's relational approach to banking services makes it the ideal vehicle for ensuring that the savings and interest generated by poor households is not redirected into loans for the rich, as is the case with most banks. All over the world where development has succeeded in reducing poverty, this will invariably have been achieved via the mobilization of savings and loans in a way that ensures that poor communities are not drained of financial resources. Although there is no space to discuss the full role of the SACCO, it is worth noting that everyone who has taken a loan from the LDC (which includes both people who qualify for government housing subsidies and those who do not) must save 5 per cent of the value of their monthly repayment in the SACCO. They redeem these savings (plus interest) when they have paid off their loans. The SACCO, however, uses these funds to add to its total funds that get loaned out to poor members of the Lynedoch community and surrounding areas to meet a wide range of economic and social needs. In short, in addition to all the other economic benefits of the housing approach at Lynedoch that have been described, this particular linkage to the SACCO increases personal savings and improves access to credit for poor households in the local area.

Finally, it needs to be noted that Lynedoch EcoVillage is connected to a land reform project led by farmers from historically disadvantaged backgrounds. This project aims to supply food directly to Lynedoch EcoVillage members, thus by-passing the intermediaries in the food

chain, namely the packhouse operators who normally buy from the farmers at ridiculously low prices, and the supermarkets who require such a standardized product that wastage levels are extremely and unnecessarily high; this is purely because the supermarkets have failed to educate their consumers into understanding that nature's products cannot always be perfect. Also, early harvesting, plastic packaging, cooling systems and transportation systems severely undermine the nutrient content of the food bought at supermarkets. Direct supply of organically grown food is a fast-growing industry worldwide because it delivers a better product for less to the consumer and gives the farmer a larger slice of the value chain. Without this approach to food supplies in the urban system, it will not be possible to reverse the alarming decline in household expenditures on fresh fruit and vegetables, with the concomitant negative impacts on physical and mental health. Fresh fruit and vegetables are rapidly becoming a luxury for the rich.

### **a. Implications of the Lynedoch case for urban policy and strategy**

There are three key lessons to be learnt from the Lynedoch case that contradict common, widely held assumptions about urban development in South Africa:

- Ecologically designed urban systems and built forms can save households money and can reduce the operating costs of municipal infrastructures (in particular the infrastructures required to deliver water, sanitation, solid waste removal and energy).
- It is possible to develop child-centered socially mixed communities, and this can best be done if municipalities impose, via zoning conditions, a requirement that all proposed property developments must provide equally for low- and middle/higher-income households.
- If spatial integration of low- and high-income households takes place, it becomes possible to create all sorts of markets that incorporate rather than exclude the urban poor – in particular housing markets that promote rather than disrupt community building; financial markets that build relational capital, and therefore reinvestment, rather than suck resources out of poor areas; and food markets that increase household nutritional levels at a lower cost to the end user and with higher returns for the farmer.

It is time that urban policy makers climb down from the lofty heights of grand theory, and practitioners should look up for a moment from the messy embarrassments of compromised projects that serve only to further marginalize the poor, so that they can all start to tackle the real practical challenges of the day. The funds are there, the legal powers exist, and from pilots such as Lynedoch, we have started to learn important lessons about the technical designs, governance structures and social dynamics of building sustainable neighbourhoods. Future research will need to document these lessons. At this stage, the Lynedoch story is about a vision that has been realized in practice, but it remains too early to judge whether it has succeeded or not. Similar projects are emerging across the greater Cape Town region, inspired by the Lynedoch experience, and every week there are visitors from all sectors who flock in to get a better

understanding. The Lynedoch experience has helped to trigger the imagination as to what is possible, and it has helped to build the courage of those who have had dreams but who have lacked examples of how to achieve them.

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