Beyond (conventional) ecological design to Blessing in Auroville.

I hereby confirm that the assignment is the product of my own work and research and has been written by me and further all sources used therein have been acknowledged.
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INDIVIDUAL ASSIGNMENT

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The Earth

If the earth were only a few feet in diameter, floating a few feet above a field somewhere, people would come from everywhere to marvel at it. People would walk around it, marvelling at its big pools of water, its little pools and the water flowing between the pools. People would marvel at the bumps on it, and the holes in it, and they would marvel at the very thin layer of gas surrounding it and the water suspended in the gas. The people would marvel at all the creatures walking around the surface of the ball, and at the creatures in the water. The people would declare it as sacred because it was the only one, and they would protect it so that it would not be hurt. The ball would be the greatest wonder known, and people would come to pray to it, to be healed, to gain knowledge, to know beauty and to wonder how they could love it, and defend it with their lives because they would somehow know that their lives, their own roundness, could be nothing without it.

If the earth were only a few feet in diameter (Pichandikulum Forest, Auroville, India 2008).

1. Introduction

As far as we know life is naturally only possible on a mere 13 km periphery of the spherical casing that surrounds the earth’s core. Beyond 5km below and 8,1 km above the earth’s soil surface lie spaces with insufficient water and oxygen and either too little or too much sunlight and gravitation forces to sustain life. From this unique and life-supporting atmosphere we withdraw all of our necessary resources and discharge all of our waste back into it. For thousands of years this has been the way of life, but with the start of the industrial era and the human population consequently growing faster in the last 60 years than in the four million years since our species’ origin, this delicate balance has been disrupted (CAA 2006).

Mathis Walker, an analyst for a program called Redefining Progress, determined that our consumption rate surpassed the earth’s capacity to regenerate in 1980. Technology enabled six billion humans to accelerate the extraction process to the point where demand exceeded supply and the amount of consequently produced waste superseded the earth’s capacity to absorb and recycle it (CAA 2006). This has resulted in climate change, water scarcity, eroding soils and expanding desserts that aren’t only consequences of our stupidity, ignorance and/or ill intent, but also lock us into a vicious cycle that together with the realities of population growth, urbanization, poverty and HIV aids aggravate our already impaired situation.

Washing my hands with Bloublommetjie’s biodegradable soap, I think of how the drinkable water running from the tap and down the drain could have been redirected to water the herbs and vegetables growing in pots on my balcony or for washing my clothes or for flushing the toilet. The pipes, however, disappear into the wall to join those coming from the other basins, showers and toilets of the other 20 odd apartments in my building and probably run into a drain somewhere linked to pipes that channel it to a treatment plant. I can’t be sure and the system’s functioning does not depend on my knowledge of it. This system is so different from the one in Auroville in India where I lived a year ago. There the water used in the bathrooms and the kitchen was treated to be reused
for irrigation. I know this, because it was explained to me. For the system to function properly, those utilizing it had to know how it worked in order to interact with it responsibly, using biodegradable soaps and water sparingly.

Most of the systems here in Stellenbosch are unfortunately set up in a way to support a life of luxurious slow decay. I live a life of convenience, not having to think or be held accountable for the way in which I use water or energy or for the amount or kind of waste that I produce. I pay for other people to deal with it and pay nothing to the environment from where it all originates and to where it ultimately returns, polluted and altered to such a degree that it cannot be absorbed again. Taking responsibility for my actions is left up to me, but the systems are set up in such a way that I’m left with very little space for integrating my survival activities harmlessly with the processes of nature. The cement bricks of my apartment building have been laid on a concrete foundation sinking meters into the earth, orientated in such a way that a slither of sun enters through my window for only a few minutes in summer and perhaps only moments in winter. Water pipes have been embedded out of sight into the wall channelling used water off somewhere. Coal-powered electricity conveniently reaches the pre-paid meter next to my door and feeds the air conditioner in summer and the under-floor heating in winter. Insulation is a foreign concept in this space. Either never heard of, or not conveniently enough presented as an option for the energy it can preserve. Recycling solid waste is an option if I’m willing to drive my separated rubbish to the Sustainability Institute, the Fresh Food Market on Saturdays or to Huis Horison, all three further than 10km away. The recycling services in Cape Town and Somerset West don’t consider the central town area of Stellenbosch a lucrative enough business for pick-ups. I guess this is what Janis Birkeland meant when she said: “[t]he design of urban development both externalizes and conceals negative impacts,” (2008:3).

Closing the tap and sitting down in front of my computer I’m left with an essay to write on ecological design. The question requires me to summarize my understanding of ecological design and to then apply it to a built structure in order to determine what could be done to substantially improve the ecological quality of the structure. It was a toss up between the apartment building I currently reside in and a house introduced to me in India called Blessing, until I found the construction company that built my apartment building to be “too busy for student projects” and their website to only state the financial value of the construction done to erect the building. In the second part of this essay, I will therefore consider Blessing as a case study. The ecological quality of Blessing is exceptional and not much can be done to improve on it, but I chose it as a case study to present a success story, to share some of the innovative technologies used in the structure and to consider the social framework that makes ecological design possible and that sustains it.

For the first part of the essay I will state some of the environmental and social impacts of poor design and construction according to Janis Birkeland (2002) and the Commonwealth Association of Architects’ Guide to Designing for Sustainability (2006). A short discussion on the history of ecological design according to Sin van der Ryn and Stuart Cowan’s book, Ecological Design (1996), and possible definition(s) of the concept will follow. Finally I will introduce Janis Birkeland’s concept of ‘positive development’ as put forward in her book, Positive Development from Vicious Circles to Virtuous Cycles through Built Environment Design (2008), and explain why this is a crucial step forward, away from conventional ecological design. Ted Trainer’s writing on limits to growth...
(2002) and Christopher Alexander’s timeless way of building (1979) are also considered.

2. The impacts of bad design

When one tugs at a single thing in nature, one finds it attached to the rest of the world
(John Muir in Parry-Davies 2008:416).

Beyond “collect[ing] materials from one place and assembl[ing] them in another in a manner that does not easily or readily allow them to be… collected again” (CAA 2006:11), construction based on bad design, and the ideologies that perpetuate it, have other more severe impacts, manifesting as “…monumental waste, environmental degradation and social dislocation...” (CAA 2006:11). Birkeland agrees that today’s construction industry is organized in a manner that is “…wasteful of energy, resources, land and increasingly human skills and talent,” (2002:13). It is thus clear that badly designed built structures have negative impacts on both the environment and society.

2.1 On the environment

It is often cited that buildings, in their construction, renovation, maintenance and later operations make up more than 40 percent of the world’s energy consumption1 and are accountable for the same percentage of all atmospheric emissions (CAA 2006), 44 percent of landfill waste and 50 percent of packaging waste in industrial countries (Birkeland 2002). The amount of extracted non-renewable natural resources that end up in the form of built structures is estimated by weight at 50 percent (Birkeland 2002, Birkeland 2008, CAA 2006). This has dire impacts. Birkeland provides some statistics: 50 percent of the earth’s forest cover has been lost (Brown et al in Birkeland 2002) with one quarter ending up in buildings, while one sixth of fresh water supply is consumed by buildings and rapidly becoming the most scarce life-sustaining resource on earth (Brown in Birkeland 2002).

The impacts of other sectors such as mining, forestry and transport that support construction operations are not even taken into account here. What is obvious, however, is that construction extensively extracts resources and produces excessive waste and these are serious concerns, urgently calling for ecologically informed and ecologically sensitive design. Systems need to be put into place that can restore and support deteriorating ecological services.

2.2 On society

With the current world population at 6 billion, estimated to grow to over 8 billion in 2030, we have already passed the 50 percent urbanised mark in 2007 (Swilling 2009), and this figure is said to increase to more than two thirds in 2050 (CAA 2006). This means that more than half of the world population currently has to survive in completely human constructed environments and that our future will surely be an urban one. The design of cities is thus critically important, because it determines the flow and amount of resources, space and energy consumed by its inhabitants (Birkeland 2008). The built environment and its design have major impacts on human well-being, both

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1 With buildings in some countries like the UK reaching 66 percent of annual energy use (Vale and Vale in Birkeland 2002).
economically and health related.

Ignorant of its impacts, conventional construction has organized itself to either get the job done at the lowest possible cost or if money isn’t a constraint, to build for an existence of luxury and convenience where costs, including environmental and social, aren’t factored into the equation at all. Economics and convenience are its main design criteria (Van der Ryn & Cowan 1996). Both motivations support a system where the rich get wealthier and the poor get nothing or poorer, subsidising the rich (Birkeland 2008).

Intellectual and institutional power structures, responsible for the design of society, are biased in favour of benefiting itself. In most countries the built environment, which Birkeland regards as central to most sustainability issues, receives half of the capital investment allocated by these power structures (2008). Cities thus get built with the capital of those in power and subsequently for those in power, at the expense of the powerless who is kept on the peripheries. The rich can only have their disproportionate riches because the poor has less than their fair share and for the rich to continue enjoying excessive lifestyles, it is essential that power structures keep those who are disadvantaged by the system in a weak state.

With the built environment playing such a major role in contemporary life, it is not surprising that many governments attempt to utilize it for improving people’s quality of life. It is used for providing health care, education and housing (CAA 2002). Ironically, however, design using convenience and economics as design criteria, neglects the larger picture which includes the aspect of human health. The indoor environment of a structure, which hugely affects air quality and temperature regulation, is determined by its design and chosen building materials. Many cheaper mass produced conventional building materials result in mould or toxic air quality (Birkeland 2006), while bad design negatively shapes the bio-climatic conditions and ventilation of a building that not only affects the health, but consequently also the productivity of its inhabitants (CAA 2002).

Bad design and construction that revolves only around keeping costs down and maximizing convenience thus impacts negatively on human well-being. Sin van der Ryn calls this “dumb design” (in Birkeland 2008:3). Birkeland also states that “dumb design” has locked us into vicious cycles of waste, consumption and pollution with frightening impacts on social welfare (2008) and consequently fuels conflict over resources, reduces access to food and water and reduces choices for future generations. The social impacts of construction are thus evident and also accentuate the crucial role of ecological design in future constructions.

3. Who started designing ecologically and what does it mean?
Conventional building has left little or no space for ecological design, which considers the health of humans and ecosystems, and environmental economics as the most important criteria for design (Van der Ryn & Cowan 1996), and yet ecological design is not a novel concept. Over many years humans used the principles of ecological design to shape their environments in accordance with the functions of nature, but also to meet their own basic needs. Today it is considered a separate area of study and a number of definitions exist for ecological design.
### 3.1 A short history

“By necessity [ecological design] has been brought to a high level of excellence by many different cultures,” (Van der Ryn & Cowan 1996:25). Examples include the Yanomamo’s support of biodiversity in the Amazon, the Balinese’s aquaculture and rice terracing enabling them to feed large groups of people while keeping the soil fertile and the water pure and the Australian aborigines using stories to conserve an ecological map of their home in the Outback. These rules of design have assisted many cultures to live in accordance with nature’s own cycles, persisting for thousands of years through varying conditions (Van der Ryn & Cowan 1996).

Even industrialized nations have shown different degrees of integrating ecological design into their construction. Van der Ryn and Cowan place these ecologically informed design activities into three eras. The first emerged over the ignorant growth periods of industrialization after World War II, propagating interdisciplinary approaches to design by using appropriate technology, renewable energy, organic farming, sound town planning and healthy building. The second, considered the first proclaimed generation of ecological design, reacted against the unchecked activities of industrialization in the 1960’s. Their first mission was to rethink the metabolism of the home. They continued through the 1970’s and in the 1980’s developed into a “broad-based sustainability movement” (1996:30) that amongst other things greatly advanced technologies in solar and wind energy. In the 1990’s the international ecocities movement stepped forward focusing its attention on the health and resource-efficiency of cities and in the later part of the decade on integrating ecology and economics (1996).

All of these movements, however, have focused on creating alternatives to conventional design informed by industrialization (Van der Ryn & Cowan 1996) and consequently have emerged as “fringe activities” that relieved design professionals from any obligation to take sustainability seriously (CAA 2002:7). Furthermore, the conventional construction industry, being of an extremely competitive nature, obstruct low-cost ecological solutions by subsidising conventional building and by generating more product differentiation in the conventional market, consequently pushing ecological design to the periphery, considering it a mere communication tool or form of self-expression (Birkeland 2008). For van Ryn and Cowan, the new generation of ecological design cannot only be an alternative to convention, but must be an interdisciplinary approach that weaves insights from different cultures and epistemologies to become a framework that guides a culture of sustainability (1996).

### 3.2 Possible definitions

Van der Ryn and Cowan wrote about a new generation of ecological design more than a decade ago. In 1996 they defined the concept of ecological design as “…any form of design that minimizes environmentally destructive impacts by integrating itself with living processes,” (18). They also stated that “[b]y explicitly taking ecology as the basis of design, we can vastly diminish the environmental impacts of everything we make and build,” (166:19). However, minimizing human impact on the environment through designed integration makes no mention of two of the three critical strategies that Van der Ryn and Cowan put forward for effectively addressing the loss of natural resources through design. It implies conservation, but ignores regeneration and stewardship (1996). It also neglects to mention the social aspect of design.
This definition and approach may encourage environmental management that do nothing more than what it says. It attempts to control nature in the name of development or at the very best attempts to reduce the damage of development. Ecological design as a "fringe activity" also means that the majority of designers of the built environment, to a great extent still informed by a dominating industrial agenda, do not see themselves as having a major impact on the way in which society extracts and distributes resources or on the environment society depends upon. Design is thus not yet seen as “…a method of social and environmental problem prevention and problem solving,” (CAA 2006).

Recently this understanding of ecological design has started to shift. Either compelled by the mounting pressure of crises like global warming, resource depletion and soil degradation or because of the ongoing deterioration of society or both, ecological design has gradually started to move away from “transforming nature” with as little impact as possible towards “transforming society” by improving quality of life and the “…relationships between, all living things, communities and the natural/built environment,” (CAA 2006:12). Recognition of our dependence on nature and thus a responsibility towards nature seems to be increasing out of necessity for our survival.

The CSIR Built Environment Unit, the Commonwealth Foundation and the Commonwealth Association of Architects in South Africa put together a design guide for architects in 2006 with an emphasis on building sustainably. As part of its philosophy the guide propagates recognizing ecological design as a highly intellectual activity that has to take into consideration contexts of “…anachronistic social, political and institutional structures, as well as its natural environment… yet it must also function to transform those very systems, as these mitigate against life quality, social justice and healthy, symbiotic relationships” (2006:12) when designing technologies, buildings and products. It recognizes the importance of adjusting design processes and education to achieve this (2006). Janis Birkeland has also recently published a book, Positive Development from Vicious Circles to Virtuous Cycles through Built Environment Design, which supports this shift. In the book she introduces and promulgates the concept of “positive development” (2008).

4. Positive development

Let us permit nature to have her way:
She understands her business better than we do
(Michel De Montaigne in Parry-Davies 2008:361).

Birkeland writes that the negative impacts of “dumb design” are not inevitable and also not a necessary outcome of development or of economic growth. She believes it to be a function of “dumb design”. Departing from the recognition that unsustainability is a design problem, Birkeland introduces the new concept of positive development which believes that development can “become the solution instead of the problem…[by providing] infrastructure for nature to regenerate, flourish and deliver ecosystem goods and services in perpetuity…[and so be] a lever for social transformation as well as better environmental management” (2008:4).
4.1 Where (conventional) ecological design still gets stuck
Birkeland makes a crucial leap beyond minimizing damage. Crucial because the regenerative ability of natural systems have been impaired beyond its capacity to supply sufficient services or absorb our discharged toxins any longer. This decline is also ongoing (2008). An approach that promotes conserving what we have left is simply not enough anymore. Ted Trainer states that conventional design only assesses its destructive impact on the environment and does not design according to environmental limits. It therefore discourages productive local self-sustainability and encourages transport and waste and its impacts on the environment (2002). “Biophysical sustainability” cannot be achieved by best (green) practices that substitutes genuine sustainable efforts with “bargaining, pay-offs,…trade-offs” (Birkeland 2008:8), “offsets” and “‘less bad’ designs” that are orientated towards only reducing the negative impacts of standard practices (Birkeland 2008:15).

4.2 The giant leap
Birkeland calls for development to make a “net positive contribution to sustainability” by reversing its past and current social and ecological impacts (2008:15), increasing the ecological base and public estate and improving quality of life (2008:8). Spaces designed for positive development must therefore accommodate both people and nature (re-coupling them), while de-coupling the “negative environmental impacts from economic development,” (2008:14).

Birkeland’s greatest impediment to change, however, “…is the fear of change itself,” (2008:4) and a lot of things need to change for positive development to become a reality. The first step to bring about change is to challenge the current systems of concentration of wealth and power that legitimize “efficient resource use”, “best practices”, “offsets” and “environmental management” as ultimate solutions and replace it with innovative design systems that promote ecology and equality (2008:22). Positive development requires design systems that encourage “…diversity, adaptability and genuine reversibility,” (2008:5).

4.3 Environmental transformation
Birkeland means that current development approaches are promoting “off the planet living” (2008:10). Consequently we have lost our ability to develop with nature. Christopher Alexander writes that we have lost this ancient language, but if we can give up all of our current ideas and opinions about development, he means that this language could once again emerge, reminding us how to articulate what we already know to develop with nature (1979).

Design required for positive development means designing for ecoservices, enabling nature to have its way, “…to flourish and deliver ecogoods and services in perpetuity,” (Birkeland 2008:4). More spaces are thus required to support natural ecosystems that in turn also support human functioning. Birkeland does not mean to recreate nature, but encourages design that allows nature to do its job. Some spaces that already exist, skilfully combining economic, human and ecological functions, include vertical wetlands, breathing walls, sunspaces and solar ponds (2008).
4.4 Social transformation

As already stated, Birkeland does not hold people responsible for the degraded environment, but the design of the systems that determine the flow of resources and energy. These systems consolidate the idea that negative impacts are inevitable to development and are forever creating more consumer goods that nobody needs, locking people into vicious cycles of increasing consumption of non-renewable resources resulting in more waste with nowhere to put it. Fear locks people into believing that they have to claw their way to the top of the social hierarchy to escape their horrible living conditions. Birkeland calls consumption the axis around which society organizes itself and means that the forever-striving quest to obtain more material wealth, is not only degrading the environment, but also widening the inequality gap between those who have too much and those who are deprived and suffering. With industrialized development attempting to deal with a growing population and deficient resource base, more materials and resources are transferred from the poor, rural, nature and future to the rich, urban, developed and present (2008).

Birkeland does not undermine the importance of changing social behaviour, but emphasizes that this will be futile if the underlying power structures are not adjusted or replaced. Current structures propagating ‘best practices’ and ‘eco-efficiency’ mean that we never have to do better than our past best and continue to expand consumer choices for material goods we do not need. Instead she calls for structures with a better understanding of nature as being alive, which could support environmental and social connections to increase access to shared materials and energy and deliver a wider range of healthy lifestyle choices. She believes that positive development can improve life quality by increasing access to resources, security and amenity without the need of additional space or money (2008). Turner also promotes simpler lifestyles that accept material sufficiency and through cooperation and the sharing of resources reduce unnecessary production and consumption (2002).

Direct public involvement is therefore critical, but must be supported by what Birkeland terms “eco-governance” or structures for sustainable decision making: “…intellectual, institutional and technical systems that respect a diversity of responsible cultures, lifestyles and values – while enhancing the underlying ecological and democratic platforms that make these possible,” (2008:22). Positive development requires and must also develop more interdisciplinary and “… creative capacity and know-how,” (2008:11) that can find on the ground and people-orientated solutions. Targets with subsequent action need to be set (2008).

5. Conclusion

We are faced with crises, including the most recent global economic crisis, which do not permit us to continue development according to conventional standards. The global population is growing exponentially faster than ever before. Everyday we have fewer resources at our disposal and less space to put our waste. Even ecological design as an alternative is not enough anymore. Reconsidered and enhanced to directly address and solve the problems of global warming, eco-system breakdown, resource depletion, poverty and urbanization by designing with and for nature, it must become the new standard. Our social structures need to be replaced or adjusted for eco governance that supports investments in creative and innovative capacity building for solutions and decisions made for the environment. Only through these new structures will people be able to change their behaviour and live more
sustainable and healthy lives with and for nature. Birkeland’s positive development seems to be the next, if not only, logical step forward if living species, including our own, are to survive. Addressing these issues in the constructed environment will have a prominent effect.

Part 2: Case study

Our home, this forest, with its thousand cries
And the whisper of the wind among the leaves
And through rifts in emerald scene, the evening sky,
God's canopy of blue sheltering our lives
(Environment & Bioregion n.d.).

1. Introduction

The literature review informs a dire image of our present crises wrought situation. The impact of the built environment, both the catalyst it currently is for disaster and the catalyst it could be for change, has been made apparent. Ecological design, as it is desperately holding onto the periphery of the dominant industrial development regime, does not guarantee a sustainable future. It must grow to be an overarching transdisciplinary framework for all design sectors, supported by new governance structures that make decisions for and with nature in order to sustain life. As a species we need a paradigm shift that value simplicity, frugality, durability, re reparability and distributive fairness (Trainer 2002).

Now imagine a place where people from different cultures and nations have come together with a common vision to build a sustainable universal city, where a mutually supporting relationship with nature forms the groundwork for growth towards the next stage in mortal evolution (The web of life n.d.). This place exists and is called Auroville. It is located in Tamil Nadu state in the south of India and was started on 28 February 1968. Today, more than 40 years later, Aurovillians are still conscientiously organizing their activities towards a sustainable future.

I was fortunate enough to spend seven months amongst Auroville’s residents to learn the true meaning of living lightly on the earth. During my stay in one of Auroville’s communities, Verite, I was introduced to Dhanya and Susan. Dhanya is the last pioneer of Verite still housed there. Others have moved onto other communities in Auroville. He has lived in Auroville since 1985 and helped plant the trees that today form the green canopy that shelters the city. His first dwelling was a capsule made of wood and palm trees, later a room in a building that currently functions as a guest room and office space and finally a small house called Blessing. Blessing was later transformed into the building Dhanya and Susan lives in today. The second part of my essay concerns a comprehensive consideration of the existing Blessing within the bigger context of Auroville, as I believe that much of what Birkeland has described as positive development has been accomplished in its construction 20 years ago. Two recordings made of tours Dhanya gave me, first in Verite community and later in Blessing, my experiences in Auroville, correspondence with other inhabitants of Verite and the Auroville website informs my writing.

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2 More information on Auroville is available on www.auroville.org.
First I will introduce Blessing as a structure, considering its different spaces, construction materials, the flows of energy, water, sewage and waste, and throughout these sections refer to some of the innovative technologies that emerged through its construction. I will then place it into its larger communal context (Verite) to consider quality of life issues such as its social use, connections to nature and food security (via food planting and composting). Finally I will briefly consider the governance structure of Auroville and how it supports the way of life that realized Blessing.

2. Blessing

In 1987, after many considerations and careful planning, a two-year building process started that materialized its owners’ (Dhanya and Susan) vision of what they deemed an ecologically designed house.

2.1 Spaces

The three-storey house consists of two bedrooms (one main bedroom and the other a guest room), two bathrooms with an extra guest toilet, two office spaces, a kitchen and living area, a gym and a roof space. The organization of these spaces has been carefully considered according to their specific functions (family life, work, relaxation, exercise and independent guest facilities).

The main entrance lies central to these functions. It allows guests to move freely from outside activities to their own private room and bathroom on the ground level. The room is connected to the rest of the house, but can also function separately. The main staircase is positioned next to the front door to allow clients to move directly towards the office spaces on the second floor without having to walk through the family area. Dhanya and Susan both do mentoring and psychological consultations for the broader Auroville community. An extra toilet is also situated next to the front door on the ground level for client use. The rest of the ground floor forms the kitchen and living area.

The staircase opens up on a balcony on the first floor, which connects the two office spaces on either side of the house. These spaces were designed to fulfil the needs of the individuals using them. Identical in size and design, they have been converted into a library and office space at the one end and a leisure and office space on the other. One office space has the chimney of the fireplace in the living area on the ground floor running through its cupboards. In winter it dries out the air to prevent clothes of getting mildew. Slanting ceilings in both spaces insure that hot air rises up and escapes through small window openings underneath the roof.

The main room and bathroom connect these office spaces in the middle of the first floor and also faction as a soundproofing buffer to give the offices the required silence. The main bedroom is the most private room in the house and situated behind the bathroom, perfectly suitable for a resting space. Having only one opening with double glass windows it is the coolest and quietest room in the house. A switch by the door is able to switch off all electrical circuits around the bed, including the ones in the floor that power the lights in the kitchen downstairs. There is therefore no electro magnetic field around the bed when people are sleeping in it.
A second staircase, starting from just outside the main room’s door, leads up to the gym area and to the roof. The intermediate area between the two offices has thus been divided up into two floors. The main water tank that supplies the needs of the house is cleverly disguised in the topmost area of the second floor. The exercising area can also be used as a massage room and has space that could accommodate a sauna. The solar panels, a solar geyser and the clothesline are situated on the roof. White tiles covering the roof’s surface reflect the rays of the sun up towards the drying clothes. The reflection also directs heat away from the roof, adding to the efficiency of the layer of fly-ash bricks that insulates the roof underneath it. Dhanya explained that fly-ash bricks are made from the waste outputs of burning coal for electricity.

Glass was used in parts were walls could have been to connect these different spaces and to keep the continuity of the house. The simplicity of the house makes it easy to maintain and leaves it unimprinted and open to others who may live within its walls in the future.

2.2 Materials

The materials used for the construction of Blessing and all of the furniture (except one couch and six chairs) in the house, were all locally sourced. These include compressed earth bricks3 (made on site with mud from a hole that today functions as a raincatchment and swimming pool), fly-ash bricks, granite from a local open quarry, locally sourced organic rubberwood, glass and aluminium.

Because of earthquake risks in the area, it was decided to build the foundation on twelve concrete pillars instead of the conventional solid and deep concrete foundation. It’s called a concrete pillar beam structure and it carries the weight of the building, allowing the house to be built with non-load-bearing walls. The walls are made up of compressed earth bricks on the inside and an insulation layer of fly-ash bricks on the outside. The earth bricks had to be cured (sprinkled with water) for 10 days before they were ready for use. Manufacturing compressed earth bricks on site cut out a lot of energy, transport and cement.

Plywood made from local organic woods was used for all the cabinet frames in Blessing. 7mm of rubberwood was then glued onto it as a veneer. Together the two layers of wood holds up very well without cracking, tearing or wobbling. Thicker planks of rubberwood were used for the steps in both staircases. Glass was used for cutting out sound and also for insulation. Aluminium, even with its high-embodied energy, was chosen for the window frames and doors. Embodied energy refers to the energy used during the entire life cycle of a specific material, including the energy used for the manufacture, transportation, actual use and disposal of the material (CAA 2006). Frames made of local wood, even though having a low embodied energy, do not last long in the area, because it is pestered by termites throughout the year and by mould in the monsoon season. Constantly having to replace deteriorated wooden frames means that the embodied energy of the frames will increase and that aluminium might be a more sustainable option. Aluminium does not rust, lasts forever and could be recycled if the house was ever demolished.

3 Satprem from the Earth Institute in Auroville developed the technology behind compressed earth blocks. For more information see http://www.earth-auroville.com/index.php?nav=menu&pg=earthworld&id1=54&lang_code=en.
2.3 Energy

As already mentioned, the spaces in Blessing were arranged to allow energy to flow purposefully, both the energy of human activities and the energy necessary to sustain these activities (sunlight, air and electricity).

The main entrance faces south, the lounge and kitchen stretches from south to north on the east side and the guest bedroom and bathroom from south to north on the west side. In combination the orientation of Blessing, large openings, long overhangs and strategically placed smaller openings regulate the amount of sunlight that enters the core of the house. Indirect sunlight during the day supplies the inside of the house with enough light, eliminating the need for electrical lights, but without heating up the interior of the house.

A successful experiment combining a layer of compressed earth bricks on the inside and layer of fly-ash bricks on the outside of the house helps to regulate the temperature in Blessing. The fly-ash bricks insulate it against heat and humidity, while the layer of compressed earth bricks on the inside stores the coolness that entered the house through opened windows at night. During the day the windows are kept closed to keep the heat out and to keep the coolness released by the earth bricks in. Walls on the inside of the house were built using only earth bricks. This technology means that the difference between morning and evening temperatures are between 1 °C and 1.5 °C. This is quite extraordinary when one considers that the outside temperature fluctuates between 10 °C and 15 °C from morning to evening. Designed to also keep the rain out with the windows open, the overhangs allow for natural airflow during the monsoon season. For additional airflow in the heat of summer a fan is sometimes switched on and the hall door is left open. On a cool day opening the windows creates sufficient cross-ventilation.

The electricity needed for the construction of Blessing was supplied by solar panels from the larger Verite community. Today sufficient electricity is generated by the three solar panels on the roof. Being a three storey house, the roof lines up with the tree line of the forest and exposes the panels to enough sunlight to supply Blessing with the electricity it needs on a daily basis and an excess worth two days of electricity stored in the batteries on-site. The electricity is converted from direct current to 240V by a converter in the battery bank. Blessing is thus self-sufficient and not affected by the power cuts in the local area.

2.4 Water

Currently boreholes from the larger Verite community meet Blessing’s water requirements. Dhanya believes, however, that their needs can be completely met by effectively collecting surface water, especially during the monsoon season. Rainwater is collected from the roof and runs through four pipes to a passive filter on ground level. The filter is made of pebbles, rock and sand and channels the water into the catchment pool where soil was extracted for the compressed earth bricks. In addition to the pool, the house has been designed to accommodate another larger tank that would total the sufficient capacity for Blessing’s water requirements.

At the bottom of the catchment pool is a river pebble layer of about 20 cm. Carrying the frequency of clean running water from the river, it keeps the pool clean without having to add any additional salt or chemicals to it. Dhanya means that the direct impact of vibrational energy makes out a very important part of sustainable living and that
one has to be aware of these subtler dimensions. Mr. Masaru Emoto, a Japanese researcher, has done extended research on the effects of vibrational energy on the molecular structure of water. His research explains the success of Dhanya’s experiment (Sharp 2008).

2.5 Sewage
A wastewater plant was installed on the premises to treat used water from the kitchen, showers and toilets. It consists of an underground tank with four compartments where sediments settle before flowing into another tank with water hyacinths that remove toxins from the water. These plants work better than an open-air reed bed with a root structure, because less water is lost through evaporation. The water must then run into the future planned collection tank. This could later on be used for landscaping, but is not currently utilized. The garden has not been laid out yet. Edible landscaping seems to be the most sustainable way of gardening, both beautifying and edible. An area next to the main entrance has been built to accommodate either a rock garden or herb garden.

Effective micro-organisms (EM)\(^4\) are bred in the storeroom and flushed down the toilets in the house on a daily basis. These organisms create an aerobic water environment and remove toxins from the water. The solution travels through the whole water system, cleaning the pipes. Dhanya means that EM is also beneficial to plants, as was established in the Verite community vegetable garden, and thus would be valuable to future gardens around the house.

2.6 Waste
Dhanya and Susan live a simple life and Blessing is a manifestation of this, but it has also been designed to support it. Verite’s organic vegetable garden, organic farms in Auroville, a community grocery service in Auroville, Pour Tous, and an organic shop in Pondicherry\(^5\) fulfil their vegetarian diet. This food is sustainably packaged, if at all. Very little waste is thus generated and the waste that is generated is recycled to become useful inputs. Although some meals are prepared at home, most are taken in the community kitchen.

Even though the ecological design principles used in Blessing prove extensive, its successful operation cannot be considered in isolation. Blessing is situated in Verite community and its design and functioning is supported and integrated with other buildings on the grounds. In order to understand what makes Blessing a thriving ecologically functioning structure, a short consideration of Verite is called for.

3. Verite
Established on 10 acres of land in November 1985, Verite is one of the numerous community settlements in Auroville. Verite was started with the aspiration to build a community that would as consciously as possible integrate the interdependent aspects of integral health, healing and sustainability, a shared foundation of economic

\(^4\) It is a mixture of 20l of water and 1kg of organic jaggery, left for ten days and then used with the slight fungus growing on the water surface.

\(^5\) Pondicherry is the nearest town to Auroville. Located 8 km away, it can be reached either by the Auroville bus that drives there twice a week or by one of Auroville’s public taxi services in an emergency.
and collective resources, community building and conscious group facilitation, integral development and learning, and spiritual practice based on the understanding that truth heals (Translated from French, Verite means truth).

Today it includes 15 acres of rehabilitated land. Verite accommodates a small forest and thirteen permanent residents who collectively run a guesthouse that can lodge up to twenty guests. Activities are organized around community living (including a community kitchen, vegetable garden, laundry and recycling) and healing workshops and services (including counselling, meditation, music, yoga, massages and acupuncture).

Verite is the only community in Auroville that entirely uses solar generated electricity. The energy systems consist of a few smaller systems between permanent residences and a main central solar system on the roof of the community’s Integral Learning Centre (ILC), with a total capacity of 15 kilowatts. The energy generated by these panels is stored in 4 battery banks in the storeroom under the staircase of the ILC and inverted to AC by four invertors. Even though Blessing doesn’t currently use any of the electricity kept in these batteries, its construction was powered by it.

A windmill pumps water from a hand-dug well and supplies all the houses, currently including Blessing, and a sophisticated water system recycles used grey water from all the guesthouse facilities, community kitchen and other permanent residences to be re-used for landscaping and the vegetable garden. Gutters on the ILC roof channel rainwater back into the well to recharge the aquifer.

The kitchen uses everything possible from the garden. The garden supplies 40 percent of all fruits and about 20 percent of the vegetables required by the kitchen. The balance of consumed food is obtained from surrounding organic farms and local organic markets. Surplus produce (in season) is distributed to other institutions in Auroville, including Solar Kitchen and Naturellement, for fresh use or processing.

Organic wastes from permanent residencies and the community kitchen contribute to Verite’s two composting heaps to produce compost for the gardens. Glass, plastic and metals are recycled for reuse in either the Verite community kitchen or by Auroville’s EcoService for use in the larger Auroville community. The EcoService does regular pickups according to the volume of waste or on a regular basis once a week. It has a service charge, but refunds the amount made from recyclable materials.

The functioning and organization of Verite, which in turn supports the workings of Blessing, are embedded and supported by the greater structures and operations of Auroville city. Once again it is necessary to briefly look at Auroville in order to appreciate Blessing.

6 Other communities are connected to the national grid for additional back-up electricity.
4. Auroville

An amusing definition occurs to me: a divine anarchy. But the world will not understand. Men must become conscious of their psychic being and organise themselves spontaneously, without fixed rules and laws – that is the ideal. For this one must be in contact with one's psychic being, one must be guided by it and the ego's authority and influence must disappear (Organization & credentials n.d.).

In accordance with its vision and aspirations, Auroville has a unique organizational structure informed by the excerpt above. This excerpt is also in accordance with what Alexander wrote in *The timeless way of building* as mentioned earlier. In order for us to rediscover the ancient language we have lost, we have to give up our preconceived ideas that are informed by the ego. With this mindset framing the organization of Auroville, it is clear that the city strives to communicate in Alexander’s ancient language. To explore the organization of Auroville I could look at the intricate details and subdivisions of its government structures, but these are not relevant here. Instead I want to briefly consider the vision that informs the decisions made for the city and the nature of the decision-making processes on the ground.

More than 40 years ago, the pioneers of Auroville set out with a vision to create a city that would realize human unity. As a crucial first step they then started the process by rehabilitating and growing a forest on a barren dessert, realizing that their very survival depended on it (Environmental work n.d.). From the very first day these pioneers realised their absolute dependence on a healthy ecosystem. Since then, similar to Birkeland’s eco-governance, policies, programmes and decisions have been made in compliance with nature in aspiring to the city’s uniting vision and Auroville has grown to what it is today through this process.

The nature of decision-making processes, which formed the policies and programmes that shaped the city, is also important to consider. They are based on the principal of universal suffrage, meaning that every Aurovillian has the right to participate, but that participation is not compulsory, and decisions are made by consensus rather than voting (Residents Assembly n.d.). Regular community meetings, open to all Aurovillians, are held. The majority of Auroville’s governing decisions are made during these meetings, which occur through open dialogue. Much deliberation during these meetings has meant that progress is slow, but it has also insured that the city grows in accordance with its vision and the expressions of its inhabitants (Internal organization n.d.).

With a unifying vision and people-orientated and transparent decision-making processes the city has nurtured slow, but deliberate and environmentally sound developmental progression. Their methods are not without fault and their website often expresses the difficulties and struggles associated with these processes. What stands out, however, is that Aurovillians are untiringly willing to address the complexities related to development and to keep doing so to reach their vision. It is also then this vision and decision-making processes that have brought Blessing into being and that will sustainably support its operation in accordance and support of nature into the future.

5. Conclusion

The human heart and the environment are inseparably linked together.
If you think only of yourself, ultimately you will lose
(Dalai Lama in Taylor 2008:1).
The lady who sent me to Auroville is the originator of an organic body product range called Enchantrix and the editor of Biophile magazine. Her name is Anthea Torr. She knows what it means to live sustainably and has ecologically renovated a house in Noordhoek outside Cape Town and built a life that supports a healthy relationship with the environment. She consumes very little external inputs, grows her own vegetables and recycles her waste. A tank in the garden is kept full of bio-diesel to fuel her car. This life is honourable, but when she leaves her home and drives into Cape Town to the Enchantrix factory in Muizenburg or to take her boys to school, she also leaves behind the structure that supports her sustainable intentions and has to choose carefully between available options in order to do as little damage to the environment as possible (Smith n.d.). I use this example to show that positive development is possible without a larger social structure that supports it, but only ever as a fringe reality to the rest of society. To make a real and urgent difference in the world, positive development must move into the city and this is only workable if government structures change to make positive development the vision for their operations.

Auroville stands as an eminent example of how this can be achieved. Aurovillians’ critical awareness of the dependence and impacts of human activities on the environment emerged from their close relationship with the earth. They know the significance of creating spaces where both nature and humans can prosper. Keeping true to this knowledge and by engaging in open dialogue, the residents of Auroville strive to make informed choices that would bring them closer to their vision of human unity. Their unique organizational structure supports their decision-making processes. The implications of their decisions pulsate through every community in the city, including Verite, and are for example realized in buildings such as Blessing.

In Blessing I have come across many principles of positive development before it was introduced to me as a concept. Without knowing why, I can recall walking through the house with Dhanya and knowing that this was the closest I have ever gotten to a real home. A home within and at peace with the bigger natural home that surrounds it. With the support of Auroville and the way it has influenced the flow of energy throughout the city, Dhanya was able to realize his vision, using numerous innovative approaches and insuring that his actions were always informed by how nature could be supported and sustainably utilized. In my life (so far), Blessing has set the bar for an ecologically designed and sustainably operating structure. Not as a ceiling that I cannot break through, but as a sound platform from which I can positively develop further.
Bibliography


