

Design report submitted in partial fulfilment of the degree

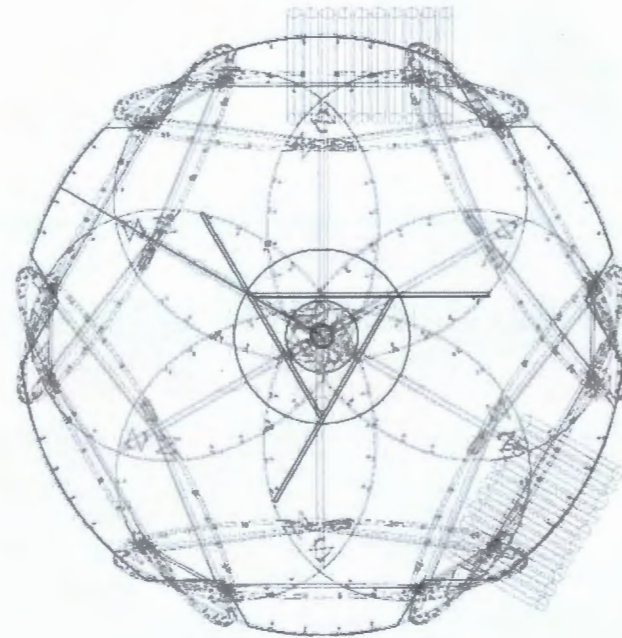
Master of Architecture (Professional)

THE SEED POD

Facilitating self organizing robust settlement patterns in developing countries

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ARBRUP001



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Driftsands Environmental centre

All the people at Lwandle, The Park and Driftsands Nature Reserve



Image from (Yann Arthus-Bertrand 2009) Documentary film (Home)

Image from (Yann Arthus-Bertrand 2009) Documentary film (Home)



Introduction

Darwin's theory of natural selection defines a conscious process of self organisation in which traits become more or less common in such a way that an organism is able to survive and flourish in a particular environment.¹

Rapid growth in the last fifty years made possible by more and more efficient ways of harvesting resource has created rapid environmental change. Intricately balanced ecologies that have taken millions of years to evolve are suffering from unravelling diversity. It is essential that ballooning populations around the world develop systems in which individual settlements positively affect surrounding ecologies. The effect of sick ecologies and drained resources are most harshly felt by the poor in developing countries.

The situation boils down to provision of an element which firstly provides the vital requirements for survival while positively affecting the ecologies of which it is a part; secondly allows settlements to adapt over time according to the traits of users in an environment rather than those of a hierarchical disconnected third party and thirdly insures that survival does not depend on having lots of children.

The seed pod aims to grow a localized ecology which allows urbanisation for the poor in developing countries to follow self organizing settlement patterns.

Goals: Healthy living becomes possible in the local ecology without employment (unemployment is a reality)

Financial resources are freed up for facilities such as schools

Social support networks strengthen

Minimization of strain on resources allows diversity to flourish

Construction of instant communities is replaced by a robust self organizing process of development with the capacity to adapt to rapidly changing conditions

The seeds are sown and the settlement grows organically from each unique social and ecological environment

Empowerment, self reliance and local skills are generated

A community lease and a community-managed register of rights holders with the potential for upgrade to individual ownership provides people the opportunity for long term investment in a great living environment. Resolution at a micro scale is likely to result in more conflict than provision of large scale identically defined units. If systems are put in place to help resolve conflict, however, the process would be tangibly more democratic. The seed pod goes hand in hand with a system for conflict resolution illustrated by the phased growth of Green Park an informal settlement in Driftsands Nature Reserve and by notionally suggesting the integration of the education system into the community through a transition of safe, contained learning spaces and permeable public spaces.



http://www.novinite.com/view_news.php?id=102920
Accessed 14/10/2010



<http://www.elrst.com/2008/12/01/amazon-deforestation-increasing-again/>
Accessed 14/10/2010

Global context – situating the idea

Around the world nearly one billion people are going hungry

40 percent of arable land has suffered long-term damage

Every year 13 million hectares of forest disappear

One mammal in four, one bird in eight, one amphibian in three are threatened with extinction

Species are dying out at a rhythm one thousand times faster than the natural rate

Three quarters of fishing grounds are exhausted, depleted or in dangerous decline

The ice cap is forty percent thinner than forty years ago

There may be at least 200 million climate refugees by 2050²

A United Nations forecast in 2005 predicted that the world's population would grow from 6 billion in 1999 to stabilize at around 8.9 billion in 2045.³

Every week over a million people swell the population of the world's cities.

One human being in six now lives in precarious, unhealthy, overpopulated environments, without access to daily necessities such as water, sanitation and electricity.⁴

² (Isabelle Delannoy 2009) Documentary film (Home)

³ (Martin 2006, 56)

⁴ (Isabelle Delannoy 2009) Documentary film (Home)



Children at Green Park [the design site]. This informal settlement in Driftsands Nature Reserve located across the N2 from Khayalitsha is going to be formalized insitu to conserve the nature reserve for the Cape Flats. An urban planning scheme has been drawn up. The seed pods are architectural elements that fit into the constraints of this framework while allowing robust self organizing settlement patterns to develop over time.



In South Africa it has been estimated that there are around 1.6 million informal units⁵ and that around 400 000 households live in back yard shacks⁶. In 2004 the National Department of Housing released the Comprehensive Plan for the Development of Sustainable Human Settlements (Breaking New Ground) with the goal to provide adequate shelter to every South African citizen. The Reconstruction and Development Programme (RDP), however, has fallen far short of keeping up with the growing housing backlog and the real housing problem is that large numbers of people who have access to adequate levels of shelter live in conditions of extreme insecurity.⁷

“The natural landscape is being desecrated at an alarming rate; the poor frequently live in poor locations which impose considerable inconvenience and high costs of living; for many social facilities are inadequate relative to need; levels of utility services are frequently inadequate and inappropriate in form, in the sense that people cannot afford the costs associated with them; community ties have frequently been shattered through forced removals; and the quality of the public spatial environment is almost ubiquitously poor, non-defined and (frequently) hostile.”⁸

The introduction of new housing policy such as the Enhanced People’s Housing Process (EHP) are starting to look more closely at a process of implementation defined by the end users in established informal communities that survive through networks of support.⁹

5 (Cape Times 9/7/2001)

6 (Morange: 2002)

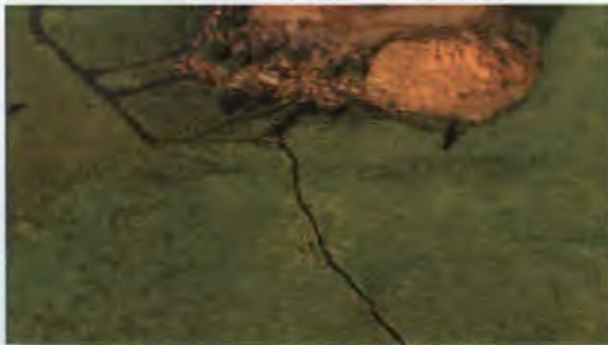
7 (Dewar, Accommodating informal settlements: Policy and design lessons from South Africa manuscript, 9)

8 (Dewar, Accommodating informal settlements: Policy and design lessons from South Africa manuscript, 9)

9 (Department of Housing 2008, 3) EHP



Images from (Yann Arthus-Bertrand 2009) Documentary film (Home)



“Until the collapse of cultural frontiers in the last century, there were all over the world distinctive local shapes and details in architecture, and the buildings of any locality were the beautiful children of a happy marriage between the imagination of the people and the demands of their countryside ... no one can look with complacency upon buildings transplanted to an alien environment.”¹⁰



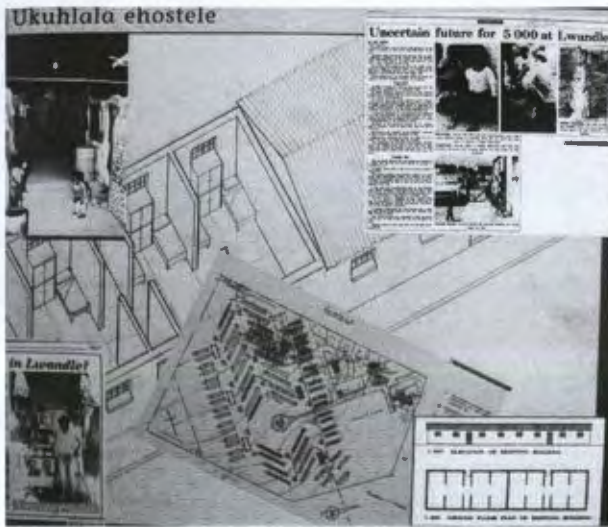
The difference between housing in Zanzibar which responds to its ecology (top left) and new imported Western housing in Japan from which traditional tea house construction has been exorcized (bottom middle) and the artificial ski slope in Dubai (bottom right) represents the distance industrialized nations have gone out of sync with nature due to the power of oil. Our potential for draining resources is clearly illustrated. It won't take long for nine billion people to change the world.¹¹



The seed pod would provide a flexible, sustainable micro-infrastructure that lets users self-organize the rest of the settlement pattern according to the unique qualities of Driftsands Nature Reserve (an ongoing adaptable process).

¹⁰ (Fathy, Architecture for the poor 1973, 19)

¹¹ Image from (Yann Arthus-Bertrand 2009) Documentary film (Home)



Lwandle museum: Apartheid architecture

Lwandle museum:
Umdiya-diya



Lwandle museum:
Bucket system



Part 1: Levels of control in the housing process

Displacement and resettlement in conditions of poverty an investigation into architectural response

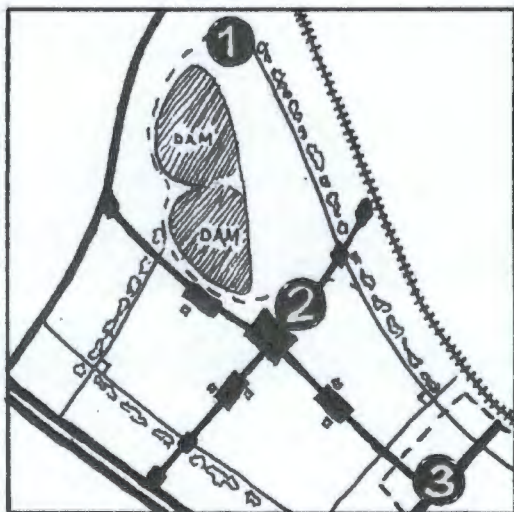
- **Displacement during Apartheid (case study: Lwandle)**

This study looks at the architecture of extreme displacement defined by the apartheid state and subsequent response trying to heal it. On calling up Lwandle museum (the only museum in the Cape located in a township) I discovered that they were prepared to give free individual walking tours of the area on request. My guide - Simphiwe took me through the history of Lwandle laid out in the museum before taking me to the library, to a preserved apartheid hostel block various shebeens and the market space. He has lived in Lwandle since he was fifteen having grown up in the Eastern Cape and was therefore able to explain things from firsthand experience along with drawing from historical records.

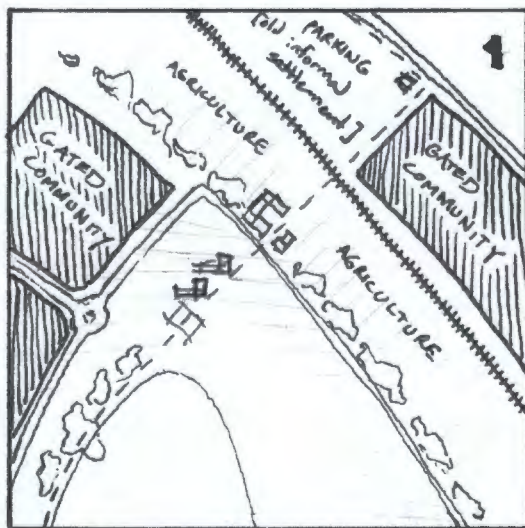
In 1977 the apartheid state set up a series of hostels for black migrant workers from the Eastern Cape (the only black location in the Bay area) controlled by a single road (see 1977 image page 9). No women were allowed into it and men could only see their families for three weeks of the year one of which was spent travelling to and from the Eastern Cape. Four men would share one room and there were six rooms to each hostel. A bucket system was used for sanitation. The passbook system formed a method of social control.

The apartheid state constructed a beer hall on the single road leading in and out of Lwandle. Men who became known as 'amachipa' would spend half of their money here and the other half on living costs – leaving nothing for their families back in the Eastern Cape – often a second family would be established in Cape Town. The rule excluding women was later relaxed, but the entire family had to sleep on a single bed which meant four families to a room separated only by a curtain (umdiya-diya). The bucket system did not separate male and female spaces. Later a single toilet was installed to service each hostel. In the 80's residents rebelled and burnt down the beer hall "a place of oppression". Churches began a fight against the apartheid state for the education of black children and won. In 1993 the beer hall was rebuilt as a community centre and a place for the old including a gymnasium and an arts and crafts centre.

In the year 2000 government upgraded the hostels also adding solar water geysers – each family received a separate room and the museum was built in order to recognise the struggles of those who had lived in the area and to provide cultural memory. In 2004 government granted tenure to the owners of each plot of land in Lwandle and built new doors into the hostels ensuring that every family had their own private space. The scars of displacement cannot be removed that easily, however, while I was walking with Simphiwe he casually mentioned that we were crossing the place where he had been mugged at knife point the previous night. Poverty, a brake down of social capital and a feeling of entitlement in these



Early design ideas in the area: 1 Integration, 2 Catalyst for housing autonomy and 3 Renewal (see p.14 for 2 and 3)

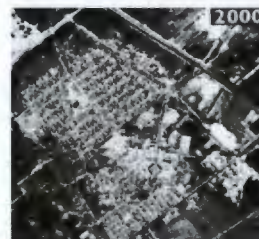


conditions have many consequences violent crime and rape are among the worst of these. RDP housing itself creates a range of hierarchical tensions, many due to inaccessible location and a lack of economic opportunity. Simphiwe described how semidetached government built RDP housing in Lwandle with half skin brick dividing walls allow residents to hear everything their neighbours do while the few American NGO built houses are larger of better quality and built for one family. A man with a fair amount of political swing landed up with one of these and was murdered shortly afterwards. Mostly the feeling in Lwandle is quite positive especially around the town centre which has become quite vibrant, developing richness over time. A huge amount of frustration still surrounds the RDP/ PHP waiting list.

The Hector Peterson Memorial Library near the museum is now seen as a beacon of hope by the community in Lwandle – a place always packed with children doing their homework. The librarian is often forced to close the gates due to the library being to full. People are very motivated to improve the quality of living conditions for their children. In 1998 all of the farm labourers from the Waterkloof area across the N2 were given RDP houses in Nomzamo adjacent to Lwandle, the urban fabric remains entirely monotonous. Unemployment is high.

According to Simphiwe and others at the museum hundreds of people came to Lwandle Municipal Office (located next to the museum) every Tuesday and Thursday once a month to get onto the Reconstruction and Development Program (RDP) waiting list, most arrived at 4am and waited the whole day only to be turned away at 4pm without even having got into the building. He also mentioned that corrupt officials can sell or rent out houses intended for someone else, a person may eventually find out that they were given a house years earlier but that someone else is living in it and refuses to move since they paid for it (thinking it was a legitimate deal). Simphiwe describes a growing frustration with the bureaucracy and poor quality of the housing process. It has not been uncommon that people wait twenty years for a house. These are some of the main reasons that government policy is starting to shift away from a system of hierarchical housing provision to programmes like the People Housing Process (PHP) housing subsidies in which people are taught building skills and construct their own homes.¹²

Lwandle museum: Aerial photographs



Lwandle: Block 12



Hector Peterson Memorial Library



• **The Reconstruction and Development Programme (case study: Die Bos/ The Park/ The village)**

'*Raw Life New Hope: Decency housing and everyday life in the post apartheid community*' is a beautifully written book by anthropologist Fiona Ross. Displacement and the harsh struggle for survival during apartheid are slowly offset by emergent deep networks of support in the formation of a community reflecting spatial and social transformations, "material need prescribes networks of mutual obligation"¹³. These networks are reflected spatially - they give life meaning and are far more valuable in terms of creating a livable environment than durable shelter - Ross describes "shifting sites of emergent complexity and unfolding relationship" this process cannot occur when all spaces are prescribed by a third party.¹⁴ When external political forces come into play... "residents rework the authoritative with their own version of the ethical"¹⁵ a kind of mutual code for survival. South Africa has rigorously been creating instant communities of monotonous block houses for the poor in an attempt to create healthy living environments. While this does improve issues of sanitation it does very little at best to help the formation of stable family units with regular income and access to good education. The cost and bureaucracy associated with employing commercial contractors to demolish informal settlements and build these instant communities has also meant that the government is falling far short of keeping up with the constantly growing housing back log. Action was taken because of the displacement created by apartheid and rapid urbanisation to boost the economy by allowing people to climb the housing ladder. Current implementation methods are creating a strain on the economy rather than boosting it.

"... there is a real danger that unless economic benefits accrue to poor people, education outcomes are improved, welfare programs sustained and opportunities (jobs among them) offered, interventions such as housing initiatives will be little more than aesthetic acts that cast responsibility for material and social maintenance back onto the 'poorest of the poor'."¹⁶

Die Bos during Apartheid was defined by impermanency the Apartheid state prohibited any form of settlement shelters were made against the side of trees.

The Park grew from Die Bos under a democratic government. Water taps were provided. These became spaces where women would get their daily quota and share stories while music drifted in from the shebeen's and children played¹⁷. Implied social rules were policed by the residents. Noise, gossip, a lack of privacy, the danger of fire, sickness, poor sanitation and poor shelter also characterized life there but The Park was something the community had built together under great hardship. A strong Rastafarian group highly prized the quality of the natural surroundings. The community was then given RDP houses in the Village.



(Ross 2010, 166) Demolition



Patience



Xhosa grandmother

Valencie



Pitie and Duba



13 (Ross 2010, 125)
 14 (Ross 2010, 89)
 15 (Ross 2010, 102)
 16 (Ross 2010, 245)
 17 (Ross 2010, 30)



11 people from two families live in one room



My first experience of The Village was walking along the railway line and being warned by someone walking in the opposite direction that muggers with knives often wait in the trees up ahead. The Village itself seemed fairly intimidating with a single point of entry into the RDP houses. The first person I met, however, was Patience who was very friendly and took me to see Duba a Rastafarian and one of the community leaders from 'the early days', on the way she described how she felt the government had tricked them with all of its promises about RDP houses and that things had been better before for the community. I think what she meant was that people could not take ownership of the rigid and identically defined spaces of the RDP hand outs in the same way they could in a creative environment where the community defines its own spaces according to an ongoing process of change based on social and ecological needs. Shelter and sanitation are a lot better now and the community has a flourishing vegetable garden but in many cases as Duba described people have no work and are unable to pay for services, often two families have to share the single RDP room to qualify for a house, people are unable to sell their RDP houses and facilities are inaccessible for example the only clinic they can use is always full. A lady named Valenice Faro described how she could not get enough food for her three month old baby and that she could not afford mid terms at the hospital. Mable has nine children in her single RDP room.

A rigid relation with the state is defined (most people will never be able to pay for the services, even if for example they receive the first 1000kW free once it has been used many people fall into arrears - inevitably they will be cut off. People have different aspiration yet if they do not share they cannot survive in these conditions.

Raw Life New Hope also relates a concept of *ordentlikheid* (decency) that has evolved in this community tying into its origins 'colonial models of propriety'¹⁸ funerals, marriage, housing and the idea of bosemens (a term commonly used to refer to the area's inhabitants) as being derogatory – opposite to *ordentlikheid*. Among many other complexities, it has also come to represent modes of survival - "living together was literally an ethic of life-giving". *Ordentlikheid* encompasses care for the dying and a reliable income along with stability of temperament. The book also describes the intricacies of the stigma surrounding AIDS along with complex social movement routes that develop over time. "The potential to be the subject of gossip has the effect of shaping when, where and how one moves."¹⁹



Ordentlikheid seems to represent the ties between this community that allow it to survive against all odds, but also represents the image of the community in relation to the rest of the world. Social network cannot be anticipated by any planner, for the poor they are vital for survival.

18 (Ross 2010, 75)
19 (Ross 2010, 183)



Fathy 1973, 251: New Gournia settlement plan

Fathy 1973, 251: Mud brick dome construction



- **Hassan Fathy (case study: New Gournia)**

In the case of New Gournia 1946-1953 (the subject of *Architecture for the poor*) Hassan Fathy had to struggle with the fact that the community of tomb robbers did not wish to move. The project also faced the outbreak of cholera and many other difficulties, which meant that it was never finished and has now mostly been destroyed, although the mosque, market place and a few other buildings have been conserved. In spite of these setbacks and difficulties the project still succeeded in reawakening a connection to history and place and it built on tradition creating an architecture that belonged and was naturally beautiful. The real success of the project, along with creating inspiring spaces, lay in what it gave to the people involved in the process of construction (many unskilled people became master craftsman in a technique that resonates with the Egyptian culture, climate and landscape) the skills learnt gave people an alternate source of income to tomb robbing, and the project presented an alternative to the rapid spread of mindless bunker architecture that erases the evolved historical, ecological and social quality of a place.²⁰ The lessons learnt by Hassan Fathy here, advocating place based architecture, have also been applied in his subsequent work to the benefit of many people.

- **John Turner (case study: Manila, Calcutta and Jakarta)**

If individuals are looking for formalized housing of their own free will rather than being forced into it by a political decision this process becomes easier. John Turner suggests a method that simplifies intervention in these conditions by providing only the infra structure necessary for housing autonomy to take place. In most cases people are capable of building or upgrading their own houses removing the uncertainties of government delivery and building support networks rather than breaking them. Upgrading infrastructure in slums seemed to be the least expensive method for dealing with the urban poor.

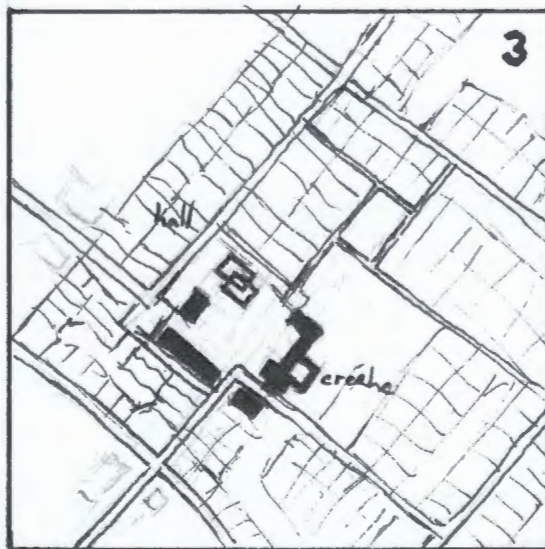
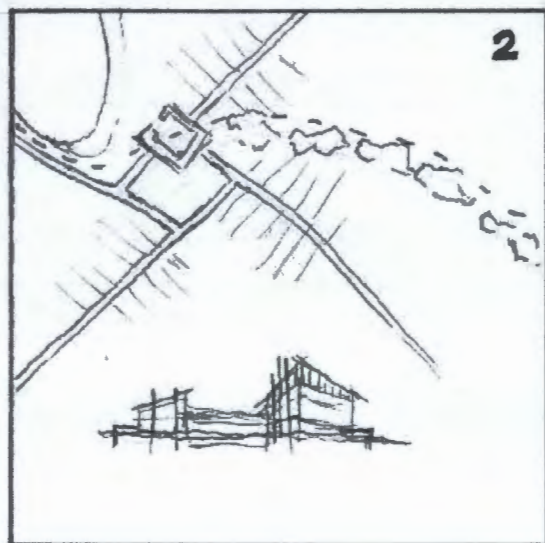
“In 1980 Churchill estimated the cost of World Bank upgrade projects to average US\$38 per household as against US\$1000-2000 for a core housing unit in a site-service area and more than US\$10 000 for a low cost house or apartment.”²¹

During the 1972-92 period the World Bank invested (in millions) US\$428.4; US\$353.7; US\$280 in upgrade projects for Calcutta, Jakarta and Manila respectively based largely on Turner’s method proposed in ‘Freedom to build’. Early evaluations of these projects indicated not only remarkable success, but also the validity of Turner’s theory. Health improved dramatically and people invested far more into their houses. Home industries and workshops also benefitted. In ten years the lives of roughly 6.5 million people had been positively affected. Some areas achieved not only better housing and environmental conditions, but also increased business opportunities, more recreational, transport and health facilities, and greater family stability and community cohesion.²²

20 (Fathy, *Architecture for the poor* 1973)

21 (Werlin 1999, 1526)

22 (Werlin 1999, 1526)



By the end of the 1980's much of the infrastructure had fallen into disrepair. Leaky sewage systems and intermittent water supply caused serious bacterial contamination. Many of the standposts had become useless because 25-35 per cent of the water supplied was wasted through leakages in the worn-out pipes, public taps and standposts. And in the non-municipal urban areas, there was no organised public water supply system whatsoever. Non-existent services such as street cleaning or garbage pickup, electricity and transport along with the pickup and disposal of human excreta brought planning back to square one in many cases although houses have been significantly improved.²³

Herbert Werlin a former editor of a newsletter for the World Bank, a retired faculty member in the Urban Studies Department at the University of Maryland and an independent consultant describes the situation:

“What these evaluations indicated to me was not so much that the slum upgrading approach is wrong, but that it requires a very powerful as well as humanistic bureaucracy to carry it out successfully. While such a bureaucracy is rare in LDCs [Least Developed Countries], that the ‘minimal state,’ advocated by Turner can deal with the problems typically encountered in slum upgrading is a dangerous illusion.”²⁴

Land acquisition, tenure, maintenance and community participation present challenges to Turner's method of providing public infrastructure in slum conditions. Over a period of time securing money to pay for services (tenure), clever systems to ensure vandalism does not occur and good governance to ensure maintenance is carried out when needed become extremely important for long term sustainability of this method.

His work in Peru "the absurd but, within its own terms, largely successful aided self - help housing project in the squatter settlements of Arequipa" (after an earthquake) and "a supervised housing credit experiment carried out in a squatter settlement extension of Lima called Huascarán – lead him to develop a hypothesis which goes as follows:

"When dwellers control the major decisions and are free to make their own contributions in the design, construction or management of their housing, both this process and the environment produced stimulate individual and social well-being. When people have no control over nor responsibility for key decisions in the housing process, on the other hand, dwelling environments may instead become a barrier to personal fulfillment and a burden on the economy"²⁵

It seems clear that housing policy needs to shift away from a hierarchically organized agency that gives virtually no say to the people for whom the houses are intended, to a situation where area, neighbourhood and street committees are given the resources necessary to respond to the situation on the ground.

23 (Werlin 1999, 1527)

24 (Werlin 1999, 1528)

25 (Fitcher 1972, 241) Freedom to build: Dweller control of the housing process



Kampung Kali Cho De
(Culture 1999, 48)



Grameen Bank housing Programme
(Culture 1999, 55, 56)



- **Kampung Kali Cho-De**

Kampung Kali Cho-De is an informal settlement built on government - owned land in Indonesia on the banks of the river Cho-De. The site had been used as a refuse dump. The inhabitants comprise 30 to 40 families. All the squatter dwellings originally consisted of plastic sheet covered cardboard cartons which disintegrated, along with the site itself with each hard rain. The government wished to demolish the settlement but were persuaded by community leaders to upgrade instead. Three carpenters and two masons were employed from rural villages, the remaining labour force comprising the tenants and volunteers. Volunteer art students helped tenants to paint the bamboo screen exterior walls using traditional animal, plant and monster motifs.²⁶

This method mostly uses renewable materials bamboo for walls and floors, timber poles form an A frame structure but concrete foundations and corrugated iron roof sheeting are also used.

- **Grameen Bank housing programme**

Bangladesh has a severe housing problem. The Grameen Bank is a co-operative non-governmental association which first began a loan programme, without collateral, for the rural poor to help them initiate income generating schemes which proved successful. They now offer credit to its shelterless members, 84% being women, to build flood and water resistant modest houses. Along with loans of approximately US\$350 at 5% interest, each borrower receives four concrete columns, a prefabricated sanitary slab and 26 corrugated iron roofing sheets. Other building materials are acquired as needed. In the first five years of the programme 44 500 houses were built, and 98% of the participants had paid back their loans.²⁷

²⁶ (Culture 1999, 46) Architecture for a changing world
²⁷ (Culture 1999, 54) Architecture for a changing world



Case study findings

Lwandle: A hierarchical system designed to exploit the users while also splitting up families causes cultural and moral erosion. The extent is hard to measure but although people find ways to overcome it the damage is very hard to reverse. [Instant displacement]

The Park: A hierarchical system designed to provide shelter and improve sanitation creates a monotonous and foreign environment over which people struggle to take ownership. It is not financially or ecologically sustainable unless people are able to completely rewrite the urban fabric. Social impacts have generally been negative but people find a way to overcome them. Buildings slowly fall into disrepair rather than increasing in value. [Instant displacement]

Fathy: An architect designed system based on a traditional technology and constructed by the users. People learn usable skills, the buildings are very beautiful and ecological (apart from services). The system, however, was designed for a community that had to be displaced and is therefore not robust, if it loses momentum it is difficult to restart. The organisational skills of the architect are constantly required. [Displacement]

Turner: A user defined system based around generic communal service provision. Financially, socially and potentially ecologically sustainable in the short term but requires a wealthy and benevolent state to maintain indefinitely, otherwise conditions return to square one. [No displacement]

Kampung Kali: An architect designed system based mostly on traditional technology and constructed by the users and volunteers. Construction skills are learnt, people take ownership in the process of construction and support networks strengthen. The system is ecological (apart from services) it only deals with shelter. On a larger scale it would be very difficult to achieve the same quality; organisational challenges would be far greater. [No displacement]

Grameen Bank: A user defined modular based system. Financially and socially sustainable services are rudimentary and applicable to a rural situation. Construction skills are learnt, people take ownership in the process of construction and support networks strengthen. Not particularly responsive to cultural context. [No displacement]

Upgrading services in informal settlements to create a healthy living environment (a healthy ecology) seems at first to be the method least likely to destroy social capital and act as a burden on the economy. The chaotic nature of informal settlements, however, makes land acquisition, tenure, maintenance and community participation very difficult.²⁸ In the long term the lack of tenure and the associated maintenance from the state results in the slow deterioration of the initial investment in services (such as water points, toilet blocks and bath houses). The scale of the problem requires a wealthy and benevolent state to provide free inspection and maintenance up to some indefinite point in the future where houses become formalized.²⁹ If the services cease to function after about 10 years or so then planning goes back to square one and the initial investment is largely wasted.

The idea of minimal intervention – simply providing site service upgrade is an interesting concept because it is a lot cheaper than a complete hierarchical scheme and the money saved can go into facilities such as schools, market space, public transport etc. In order to prevent vandalism and deterioration services could plug directly into every household unit as an ecological core that requires no sewage connection and drastically reduces water and energy consumption. If people assembled the core from a kit of parts commercial contractors would not be required people would learn building skills and take ownership of the space. A couple of carpenters could help with construction of the core structures they could also help waterproof existing roofs and prevent ground water infiltration. The placement of the seed pod food gardens and the definition of living spaces would be completely in the hands of the users. Learning construction techniques using local and replenishable materials would come in very handy for the poor.

28 (Werlin 1999, 1528)

29 (Werlin 1999, 1529)

Important elements for a healthy living environment

Given that most people are unemployed and the rate of urbanisation is high

Physical/Biological

- Sanitation – minimize utility bills
- Subsistence food production (a necessity for health in many cases)
- Insure that resources and diversity flourish
- Direct service plug in to each household unit to insure long term maintenance through ownership
- Keep out damp (TB)

Social

- Education
- Allow users to self organize their living environment around a micro infrastructure
- Take ownership
- Build support networks
- Find cultural meaning through the process of inhabitation

Economic

- Allow people to invest in their home
- Lessen the struggle for survival so that people can take advantage of opportunities.
- Empowerment through education and usable construction skills



Tsavo National Park: Yann Arthus-Bertrand / Altitude
http://www.eduplace.com/science/hmsc/2/c/cricket/cktcontent_2c72.shtml

Process driven development

Dave Dewar refers to 'a growing culture of entitlement'.³⁰ People do not have the opportunity to see themselves as facilitators of change in the housing process and are reduced to claiming from government (the provider – not the facilitator). The government puts people onto a waiting list – giving them no clear idea when they will reach the top. If people are not given a major role in shaping a unique environment the complexities of social, cultural, and economic life of the individual will always be overlooked, as John Turner warns:

“When users of housing must rely on central authorities or favored supplier interests, or both, for the necessities of shelter, it is quite unrealistic to expect them to behave other than as passive or rebellious dependents.”³¹

The backlog of housing demand is increasing at a faster rate than the government could hope to provide (as mentioned previously), and in many cases buildings quickly deteriorate due partly to bad craftsmanship and partly to a growing dependence on government (people do not take ownership, because they are inevitably unsatisfied, since they have not understood all of the limits in the process of construction and because in most cases their social world has been overwritten by monotony).

The problem is complex, but ultimately it comes down to a built environment that does not respond to the needs of users on the ground. Housing autonomy provides a financially viable method for development but it requires direction and momentum. John Turner, building on the historical context and working from a comprehensive ethnographic understanding of the area could derive architectural program that function as suggestive elements of renewal, of integration between communities and as a catalyst for housing autonomy, but only if it is linked into a process of training and an appropriately scaled network of support from which the community can take complete ownership in the future.

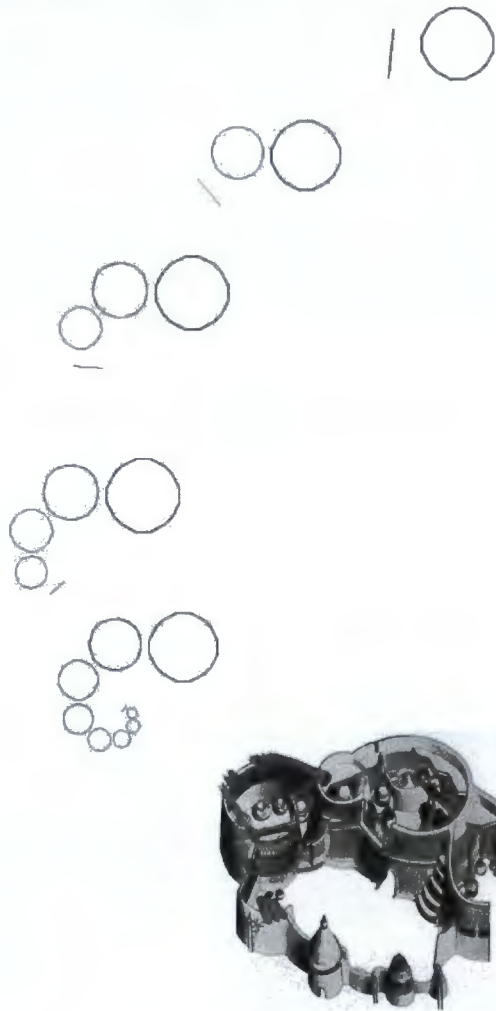
Responding to traditional building methods is very difficult in an area that is a melting pot of different cultures such as The Village which is made up mostly of Cape Coloured's from the Eastern Cape and Rastafarians, Lwandle and Nomzamo are mostly Xhosa and the gated communities that surround them are predominantly English and Afrikaans. Designing according to the traditions of any one of these cultures would promote reification of cultural difference which has historically resulted in separatism and intolerance.³²

People come to the city looking for a new way of life. Expression needs to be generated that falls within the constraints of the market networks of the area, available materials from the site, climatic conditions and most importantly allows for slow incremental growth over time driven by a process that passes down building skills, is financially sustainable and optimizes the freedom people have to take advantage of opportunities.

30 (Dewar 2009 March/April, 013) The potential role of housing policy as a broader development instrument in South Africa

31 (Fitcher 1972, 261)

32 (Watson 2007, 74)



Nankani fractal design - the construction technique took a long time to evolve into this particular context.
Diagrams: Ron Eglash
<http://www.rpi.edu/~eglash/eglash.htm>
accessed 10/09/2010

As described in part A Hassan Fathy's method depended on a cheap traditional technology and a training process that relied on master craftsman passing on their skills to the future inhabitants. John Turner focused on the design of infrastructure leaving housing in the hands of users - he realised the ease with which social support networks and established links to employment opportunity could be broken. On the other hand RDP represents a situation where government provides identical fully serviced units. Fathy's method creates inspiring environments and skills development; Turner's, strong support networks and individual well being. The Reconstruction and Development Programme - destroys social capital and acts as a burden on the economy but is more easily controllable by government.

A long term process of improvement, in which the state seeks to assist those who are prepared to assist themselves is needed. "The role of the state as provider should be restricted to special cases - particularly the aged the infirm and orphans." Significant improvement requires changing the current theoretical framework to one which views the role of the state not as a provider, but as "an active, energetic facilitator". The role of the facilitative state in housing provision is to provide the poor with access to essential resources, particularly finance and land.³³

An incredible amount of capital has been invested into RDP housing. It is very necessary that it does not become dead capital, but in many cases this is the case RDP houses are sold by the residents (after a period of occupation) for less than the building cost, mainly due to rapid deterioration, inaccessible location or negative living environments.³⁴ It is also very important to stop the destruction of social capital in the country. Engaging with difference – an article by Vanessa Watson, director of the school of architecture and planning at the University of Cape Town – highlights these issues:

1. "Significantly as the Cross Roads case shows, the splitting of extended families into individual, formal housing units is breaking social and family networks and probably doing a great deal to destroy social capital rather than to build it."
2. "Nancy Fraser (2000) ... demands for recognition are eclipsing demands for redistribution (in a context of growing economic disparity), and second that the reification of cultural difference is encouraging separatism and intolerance."
3. "Finally the central assumption underlying housing projects in this context - that people will attach value to urban land as a marketable commodity - may hold for some, but clearly not for all."³⁵

33 (Dewar, The potential role of housing policy as a broader development instrument in South Africa 2009 March/April, 012)
34 Dewar. Accommodating informality, 4
35 Watson, Vanessa. Engaging with difference: Understanding the limits of multiculturalism in planning in the South African context, 71, 74, 75

South Africa's current housing policy

The housing white paper was written up in 1994 followed ten years later by the Development of Human Settlements plan also known as the Breaking New Ground Document which attempted to refocus policy attention on the development of sustainable human settlements, rather than just on the delivery of subsidised housing units. The National Housing Subsidy Scheme provided a subsidised housing unit to eligible households – persons with dependents, resident in South Africa, earning less than R3500 per month, and who had never before owned a home. Virtually all RDP housing subsidy delivery was targeted at the very bottom end of the scale; the delivery of the RDP house at a presumed value of about R36 000 a 30m² unit (usually one room with a toilet), on a 250m² plot of land. For households earning just outside the subsidy eligibility threshold of R3500 per month, there was very little, if any delivery of housing affordable to their budgets. And, as noted above, very little rental accommodation has been developed that is targeted to their affordability levels. As a result, many households doubled up: two families per house; while others moved into growing informal settlements, or inner city flats.³⁶

BNG defines four primary ends:

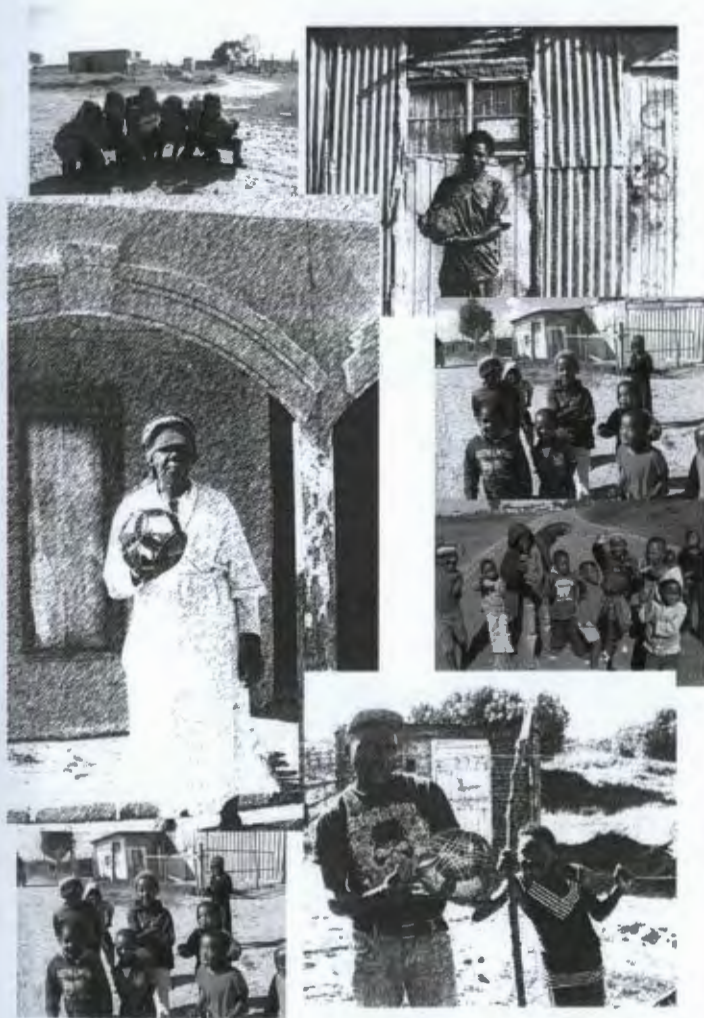
- Sustainable human settlements: “well-managed entities in which economic growth and social development are in balance with the carrying capacity of the natural systems on which they depend for their existence and result in sustainable development, wealth creation, poverty alleviation and equity.”
- Integration: The shift from “housing units”, to “sustainable human settlements” in BNG largely captures the integration end. Spatial restructuring is also critical and sustainable human settlements are seen to support spatial restructuring: “... utilising housing as an instrument for the development of sustainable human settlements, in support of spatial restructuring”. There is also an institutional dimension as integration is both intra-governmental (within a sphere of government) and inter-governmental, requiring integrated planning and coordinated investment.
- Housing assets: “ensuring property can be accessed by all as an asset for wealth creation and empowerment” and “supporting the functioning of the entire residential property market to reduce duality ...”
- Upgraded informal settlements: progressive eradication of informal settlements and urban inclusion: “informal settlements must urgently be integrated into the broader urban fabric to overcome spatial, social and economic exclusion”³⁷ (see appendix 2 for the seven strategies of the housing code)

Tenure: A community lease and a community-managed register of rights holders with the potential for upgrade to individual ownership provides people the opportunity for long term investment in a great living environment. Upgrading to individual ownership would be relatively time consuming and would have a cost attached to it, because (as where granting it up front) it would require subdivision and registration of title deeds in the deeds registry, and there would be land surveyor's fees and conveyancer's fees involved. The community lease would be by a community organisation from the state, so it would have to be free or at a nominal cost, otherwise they couldn't afford it.³⁸

36 (Rust 2006, 7)

37 (BNG 2004, 1)

38 (Abrahams, Smit 2010, 18)



People at Green Park:
Top right Maxwell,
middle left Mable,
bottom right Robert

According to Rust with all of the financial pressures users find themselves under, subsidy beneficiaries for RDP houses have little incentive to invest in their housing, because the subsidy does not cover tenure of the plot of land and people generally don't take ownership of the monotonous housing units so the structure is worth little more than the shelter it provides. And if subsidy beneficiaries don't invest in their housing, neighbourhoods of subsidized properties deteriorate while their residents rather prioritise investments in other things including white goods such as televisions, hi-fi systems, and so on. And finally, if neighbourhoods deteriorate, the government's investment of R25 000 or R30 000 or R32 000 in the housing of each beneficiary becomes stagnant – and housing becomes a "consumptive good rather than a productive good"¹.

The People Housing Process (PHP) in which people construct their own homes while learning building skills is ideal in terms of facilitating supply and empowering users. This method is inaccessible to many people, however, due to the required building skills, physical stamina needed and time constraints involved using standard construction. The seed pod aims to provide a durable light weight easy to assemble, aesthetic service core from which living spaces can be defined over time defining a living environment that people would want to be a part of and thereby increasing its value.²

- a) Beneficiaries are empowered individually and collectively so that the community ultimately takes control of the housing process themselves. This includes identifying the land, planning the settlement, getting approvals and resources to begin the development, contracting out or building the houses and providing the services, living in and upgrading their homes and continually improving the community;
- b) Various partnerships are created;
- c) Social capital is retained and expanded upon as the process builds on existing livelihood strategies and creates all kinds of associated poverty alleviation opportunities for the community;
- d) Housing is valued as an asset far beyond its monetary value for all the value added components it provides for individual household members and for the family as a whole;
- e) Housing citizenship is built, with beneficiaries being aware of their housing rights and responsibilities;
- f) Local economic development is promoted with money spent being kept in the community increasing the local multiplier effect;
- g) Stable communities with a direct stake in the future of their neighbourhoods are fostered;
- h) Houses are built that are better suited to the needs of individual households;
- i) Women and the youth are more directly involved in the process, ensuring skills transfer;
- j) Human settlements are built that are more sustainable because they are more inclusive and more responsive to the needs of the community and because communities have invested directly in the process³

1 (Rust 2006, 12)

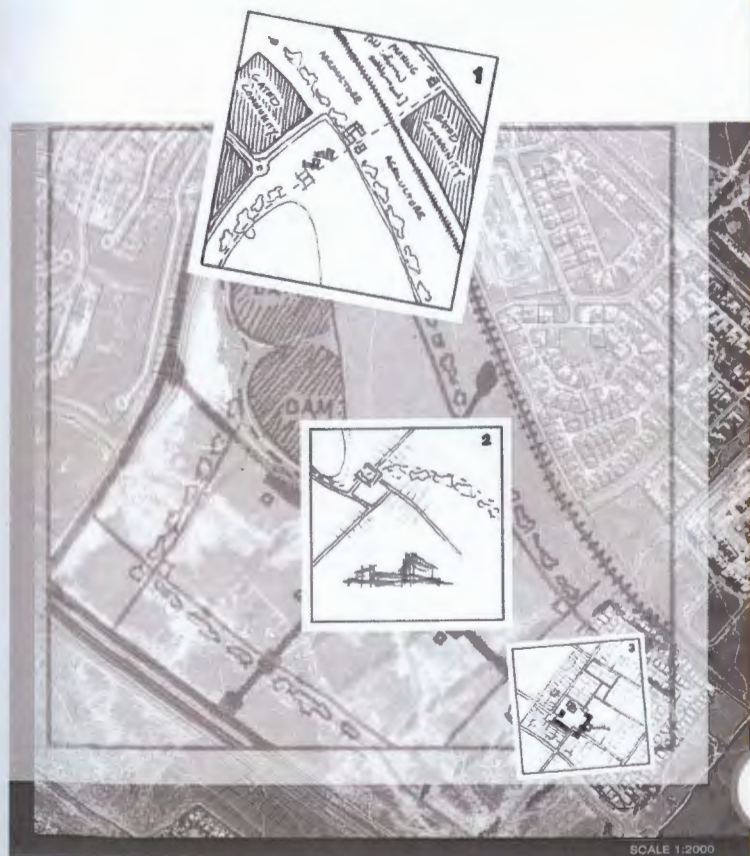
2 (Ogunfiditimi 2008, 16)

3 People's Housing Process 2008, Government publication

This early concept explored the idea of allowing the poor to be the principal actors in their housing process, overcoming the hierarchical housing scheme through renewal, integration and autonomy. Renewal through a market space, integration through access routes and agricultural plots, and autonomy through process driven development.

While developing this scheme I came up against reality. Where does the money come from? How do you deal with the politics? Who owns the land? Is this actually possible to accomplish and what are steps required to accomplish it in the real world?

The planning framework for Driftsands Nature Reserve answered all of these questions. By taking on the reserve as my site I was able to explore levels of architectural intervention in a context already set up for implementation.



Part B An inquiry into the relationship between process driven development and a healthy ecology through design

[Study location – The Park and a 57ha area surrounding two dams Southeast of Somerset West].

Building perspective vs. dwelling perspective

A building perspective can be described as the planning and construction of a built environment according to design specifications before people inhabit it.³⁹ Rapid new development in the area Southeast of Somerset West – the South-eastern protrusion of Cape Town’s municipality is a showcase of this way of thinking. Dwellers play no role in shaping the environment in which they will live. Rich gated communities are finished off and fenced in before any inhabitant moves in, and right beside them the Reconstruction and Development Programme provides identical concrete box after identical concrete box for the poor in a complete and monotonous planning framework.

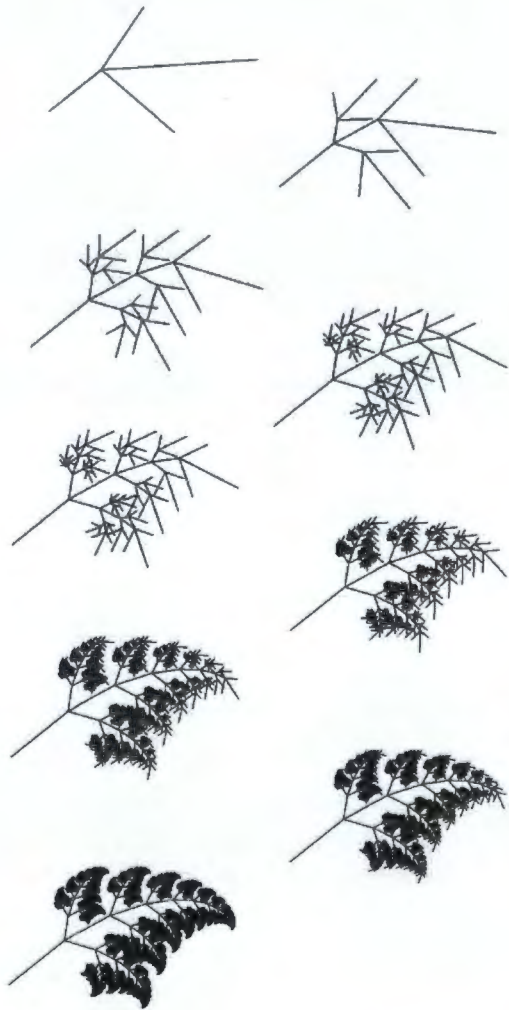
A dwelling perspective reverses form over process. It is through the process of occupation that people derive richness and meaning in an urban fabric that remains open to change over time.⁴⁰

If this process does not occur there is a danger that settlements will remain empty of cultural meaning and will intensify social division. If a single person prescribes every element of a settlement it will inevitably have far less richness than if a whole community are involved in a growing and changing *process* of settlement driven by the unique needs of individuals.

A dwelling perspective is the principal element behind the concept of the seed pod

39 (Ingold 2003, 162)

40 (Ingold 2003, 173)



Fern leaf fractal
diagrams: Ron Eglash
<http://www.rpi.edu/~eglash/eglash.htm>
accessed 10/09/2010

Equating process driven development with the process of ecological evolution

People are organisms living in an environment and just like any other organism we need to adapt to changing conditions. The building perspective inserts people into a static environment that physically prevents growth over time. In conditions of displacement a great deal of adaptability is required as people find their place in a new community freedom is needed to take advantage of opportunities as they arise. This freedom of adaptability is evident in informal settlements which naturally align to the constraints of economy, education and health. However, the globalised and industrialized world creates conditions that do not suit people as organisms in a living environment. This incongruity manifests as waste which makes healthy ecologies sick and creates an unpleasant living environment.

To equate process driven development with the process of ecological evolution in the past people just gathered materials from the landscape and through a process of trial and error adapted them into built structure to suit the climate (zero waste). Through this process of occupation a deep and meaningful cultural connection to each unique landscape is established.

Tim Ingold presents the idea of inter-subjectivity that culture forms a set of control mechanism, that a living space comes to represent shared meanings and common sense solutions through social interaction. He believes that spaces such as the entrance to a house (stoep), the marketplace, and the town square "impose meaning upon experience".⁴¹

Messages from the senses do not define perception of a living environment; adequate shelter does not necessarily translate into an adequate living space. Perception is "the intentional movement of the whole being (indissolubly body and mind) in its environment".⁴²

"Human life is conducted simultaneously in two domains - a social domain of interpersonal relations and an ecological domain of inter-organismic relations."⁴³

41 (Ingold 2003, 159)

42 (Ingold 2003, 160)

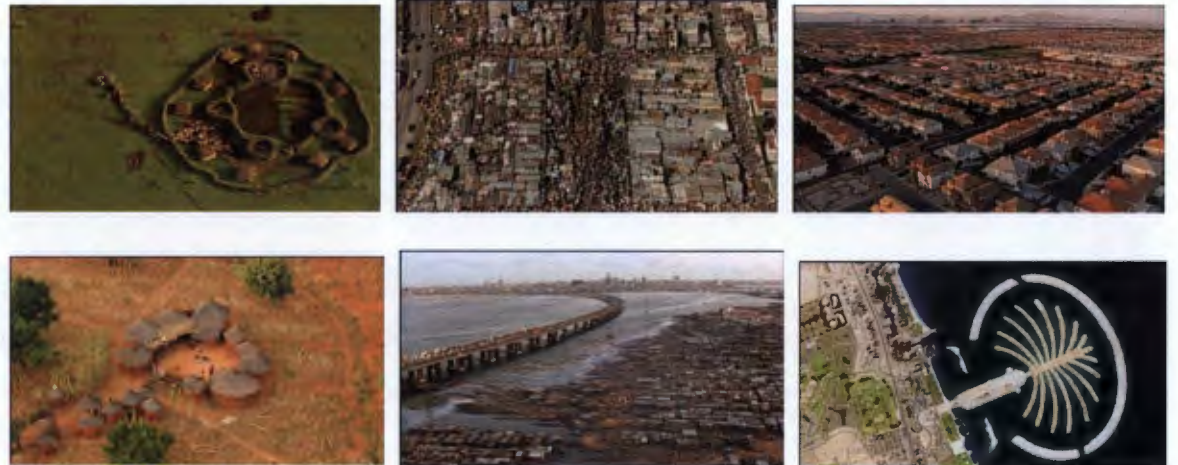
43 (Ingold 2003, 172)

Why is it important to create a liveable environment for the displaced in conditions of poverty?

The displacement created by Apartheid planning broke up many families and support networks this instability often leads to crime when survival is threatened the consequences are far reaching. Opportunity for the displaced was also severely limited. It is not surprising that violent crime flourishes.

Strong support networks are vital for survival of the poor in the increasingly precarious conditions appearing in developing countries. Splitting up support networks further through relocating people into complete housing schemes cannot help the situation. Having the chance to be part of creating a healthy liveable environment in a financially viable situation with access to good public facilities building on existing networks may provide motivation for investment in housing.

This structure should allow for adaptability in conditions of rapid growth responding to interpersonal and interorganismic relationships.

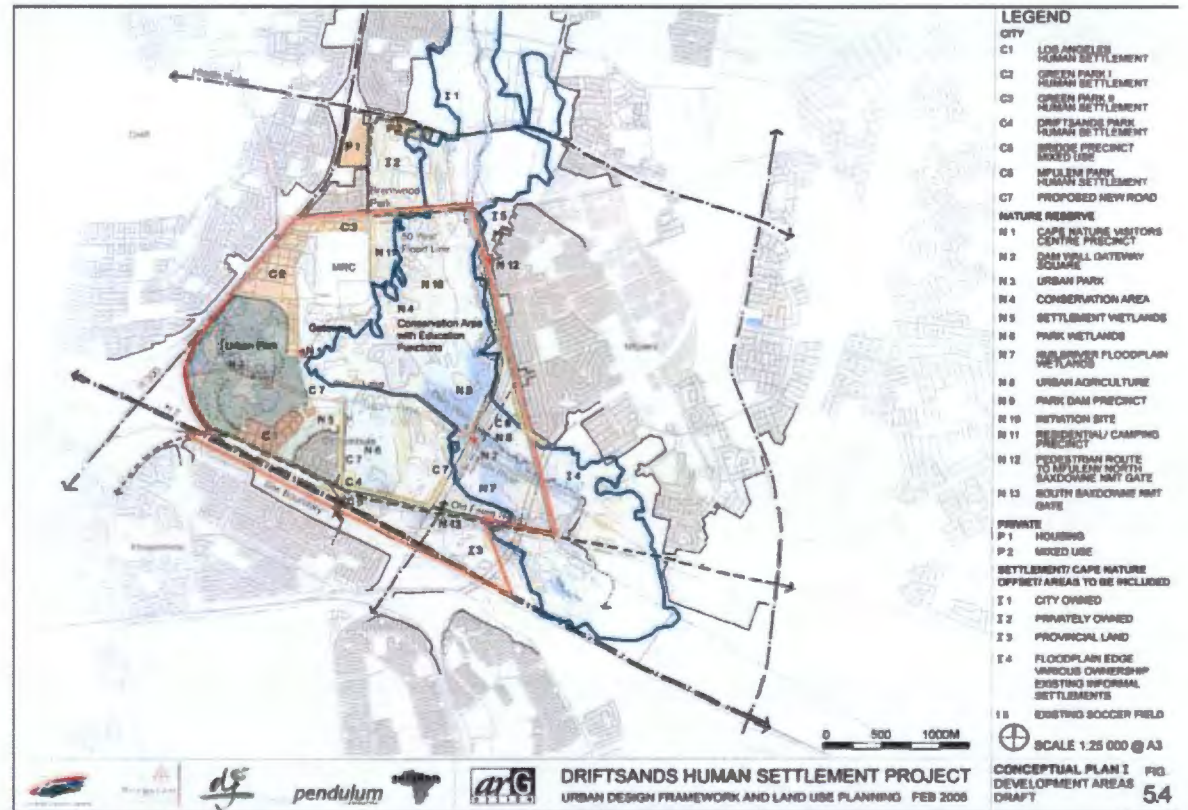


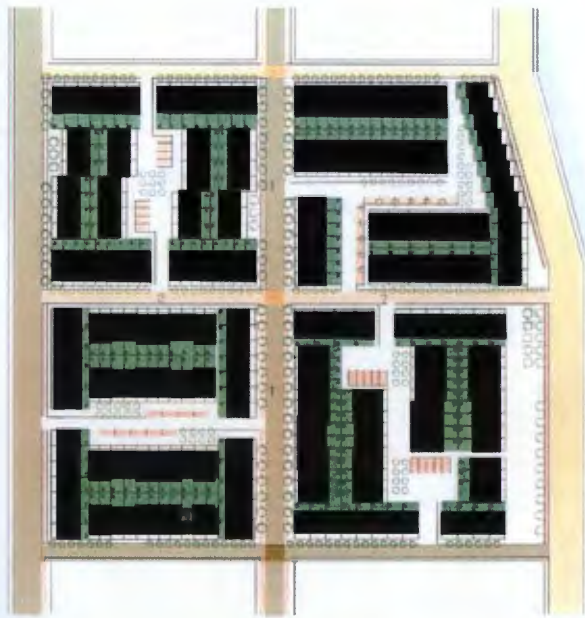
Images: Masai settlement Kenya, Haiti, Las Vegas, rural village, Legos, Dubai

Driftsands final environmental impact assesment (EIA)

Driftsands Nature Reserve, which is situated across the R300 from Delft, and across the N2 from Khayalitsha, was proclaimed as a Provincial Nature Reserve in 1983. While the site is currently managed as a nature reserve by CapeNature, it also accommodates both formalised (Sikhumbule Township) and informal housing (Green Park and Los Angeles).¹

This is the only portion of the original Fynbos dune landscape left in the Cape Flats. There are bridges over the N2 and R300 that connect the townships to this unspoilt landscape well laid paths are currently being laid through the reserve connecting people in the dense townships to this natural environment.





CCA Environmental (Pty) Ltd 2010
 Figure 3.13: A typical example of a residential block (after ARG Design 2008).

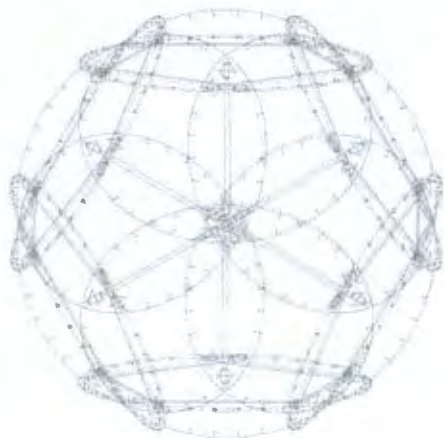
The provincial Department of Local Government and Housing appointed Marlene Laros & Associates to undertake a Driftsands Potential Study to investigate and recommend sustainable land uses for the Driftsands Nature Reserve. The resulting report identified five land use options for the nature reserve. The City of Cape Town (CoCT), based on the Driftsands Potential Study, is proposing to implement one of the land use options, which comprises the rezoning, subdivision and deproclamation of portions of the Driftsands Nature Reserve for the upgrading of the existing informal settlements of Green Park and Los Angeles (see image on previous page).²

In April 2006, CoCT appointed CCA Environmental (Pty) Ltd to undertake an Environmental Impact Report for the proposed Driftsands Human Settlement Project in order to comply with the EIA Regulations laid out in terms of the Environment Conservation Act, 1989 (No. 73 of 1989). However, before the EIA could be completed a more detailed planning process needed to be undertaken. In June 2007, the City of Cape Town appointed a team of consultants led by ARG Design to undertake the detailed planning process up to precinct level for the proposed project for consideration in the EIA process. This planning process culminated in February 2008 with the preparation of an Urban Design Framework for the Driftsands Nature Reserve, which considered both the biophysical and socio-economic aspects of the reserve and its surrounds in order to create a sustainable human settlement in the long-term.³

Based on the findings of the Urban Design Framework it was decided to change the preferred development alternative and expand the scope of the EIA to include all aspects of the Urban Design Framework relating to residential areas and bulk services inside the Driftsands Nature Reserve. The preferred development alternative was changed from the consolidation of the informal settlements in an area to the west of the Medical Research Facility (MRC) to the in situ upgrading of the informal settlements. This decision was based on the fact that "the consolidation of informal settlements could possibly result in socio-political tensions between these two communities"⁴. The city of Cape Town appointed CCA Environmental (Pty) Ltd to undertake the EIA (See Appendix 1). Sewage systems are already nearly at capacity in the area. A large amount of reworking would have to be done.

The plan currently involves temporarily housing the whole community demolishing all the existing structures and getting in contractors to build a regular housing development with three housing types. The argument for providing seed pods instead is that at a fraction of the cost a better living environment could be developed over time - one that is completely a part of the community. The money saved could go towards great communal facilities, landscaping and roads in the settlement. The seed pods as ecological cores also complement the green lung of the reserve.

2 (CCA Environmental (Pty) Ltd 2010, 3)
 3 (CCA Environmental (Pty) Ltd 2010, 4)
 4 (CCA Environmental (Pty) Ltd 2010, 6)



SEED POD

The seed pod facilitates self organizing chaotic algorithms transforming the process of urbanisation in developing countries into an ecology driven by the social and ecological needs of the users. In that way it reflects the origins of shelter and the potential growth of sustainable human settlements.

Location: Cape Town, South Africa a city of extreme inequality

Use: An environmental core of water works for sanitation and health feeding into a communal food garden for the displaced poor in developing countries.

Place: Green Park, Cape Flats (an informal settlement in Drift Sands Nature Reserve)

A space in which communal support networks and ethical (or religious) codes are essential for survival. The seed pod responds according to the ecology of the landscape.

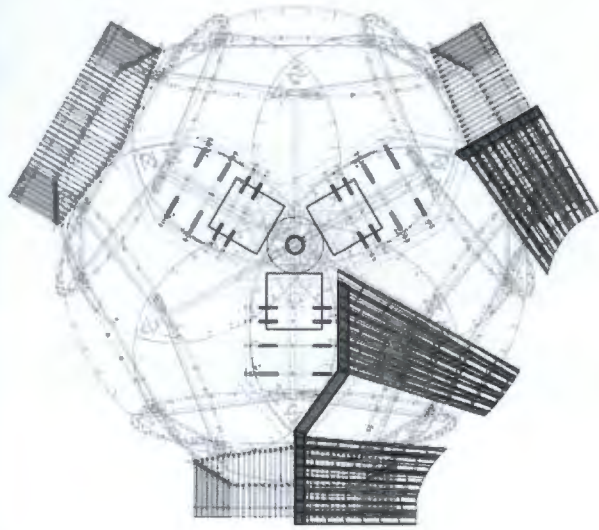
By facilitating the essential elements of health, sanitation and food drawing upon technology that does not burden users with large utility bills the seed pod responds to the modern urban condition of Cape Flats inhabitants whilst allowing the ingenuity, intelligence and creativity of the users to form social and ecological richness through the process of habitation. Generated by the ecology and climate of the surrounding area the settlement pattern becomes organically part of the landscape and culture over a long period of time.

SOCIAL

SEED POD: A POD FROM WHICH THE BUILDING GROWS LIKE AN ORGANISM ACCORDING TO THE SOCIAL, CULTURAL, ECONOMIC, RELIGIOUS, CLIMACTIC AND MATERIAL CONSTRAINTS OF THE USERS. THE SEED POD PROVIDES THE ESSENTIAL BASIC ELEMENTS THAT ALLOW A HUMAN TO LIVE IN BALANCE WITH NATURE THROUGHOUT THE PROCESS OF URBANISATION IN DEVELOPING COUNTRIES.

THE PRIMARY FUNCTIONS OF THE SEED POD:

- 1. TO STRENGTHEN SOCIAL SUPPORT NETWORKS**
- 2. TO CREATE A HEALTHY LIVING ENVIRONMENT**



AS AN ECOLOGICAL SANITATION CORE

3. TO INCREASE FOOD PRODUCTION THROUGH

GREY WATER AND COMPOSTING SYSTEMS

The core minimizes energy consumption and does not require a sewage connection as it uses a urine diversion completely odourless composting toilet that has just been developed in South Africa at low cost.

THE LOCATION OF THE POD CAN THEREFORE BE DEFINED ENTIRELY BY THE USER (which facilitates African fractal settlement patterns - see http://www.ted.com/talks/lang/eng/ron_eglash_on_african_fractals.html).

IT IS ALSO ASSEMBLED BY THE USER FROM A KIT OF PARTS. The pod clips into living spaces that people have defined with their own hands. The skills learnt from constructing the pod would feed back into the slow progression of finding cultural expression.

THIS METHOD OF PROCESS DRIVEN DEVELOPMENT SHOULD HELP BUILD RICHNESS AND SOCIAL CAPITAL OVER A LONG PERIOD OF TIME RATHER THEN CREATING INSTANT MONOTONOUS COMMUNITIES FOR THE POOR.

PHASES

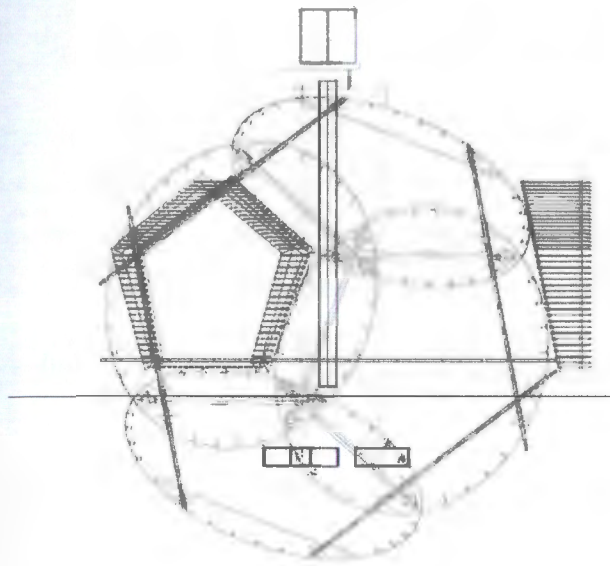
PHASE 1: 4-7 PEOPLE APPLY FOR A SEED POD

PHASE 2: THE MONEY SAVED GOES INTO BUILDING REALLY GOOD QUALITY FACILITIES WHICH STIMULATE GROWTH. FOOD GARDENS WOULD ALSO BE DEFINED.

PHASE 3: NEW PEOPLE WOULD BE REQUIRED TO APPLY FOR A SEED POD (4-7 PEOPLE/POD)

[LIMITS WOULD BE DEFINED BY THE BOUNDARY OF THE SETTLEMENT AND THE NUMBER OF SEED PODS]

Growth from 400 households to 800 + 500 new + 600 cross subsidizing growth (according to the planning scheme this would support facilities that would make the settlement viable) [1300 pods]. I found that most people were very happy for the community to grow if it meant that a school could be built.



PHASE 4: A COMMUNITY LEASE AND A COMMUNITY-MANAGED REGISTER OF RIGHTS HOLDERS WITH THE POTENTIAL FOR UPGRADE TO INDIVIDUAL OWNERSHIP PROVIDES PEOPLE THE OPPORTUNITY FOR LONG TERM INVESTMENT IN A GREAT LIVING ENVIRONMENT, WITH THE POTENTIAL FOR UPGRADING TO INDIVIDUAL OWNERSHIP.

THE SEED POD IS DESIGNED SO THAT ALL OF THE PIECES CAN BE SLOTTED TOGETHER BY THE USERS. ALL OF THE PIECES ARE CUT FROM STANDARD 22 x 1220 x 2440mm SHUTTER PLY @ R250 A SHEET - THIS WOULD BE SUBSTANTIALLY CHEAPER THEN A WESTERN SPEC HOUSE CONSTRUCTED BY COMMERCIAL CONTRACTORS ESPECIALLY SINCE SHUTTER PLY AND BAMBOO ARE CHEAP, LOCALLY AVAILABLE AND SUSTAINABLE MATERIALS. BRIGHT FIELDS A COMPANY IN CAPE TOWN CURRENTLY IMPORTS BAMBOO BUT ARE IN THE PROCESS OF ESTABLISHING A BAMBOO FARM. THEY ALSO TREAT IT WITH POLYURETHANE FOR EXTERNAL USE AND GUARANTEE AT LEAST 20 YEARS WITHOUT DETERIORATION - FULL EXPOSURE. THE SOLAR WATER HEATER AND GREY WATER SYSTEMS COST VERY LITTLE AND THE COMPOSTING TOILET SAVES ON CREATING A SEWAGE CONNECTION. ALL MONEY SAVED WOULD GO TO FACILITIES SUCH AS A SCHOOL, LIBRARY AND MARKET SPACE.



1) if the core is a "seed pod" then parts that grow from it could be referred to as something like "habitation branches" and the system as a whole as something like the "vegetating space." Or simply "primary core" and "secondary growth".

2) Entrepreneurial opportunities could be integrated. A bamboo grove could be established in the landuse area marked communal park since this is not part of the reserve this could potentially even be a part of The Natural Trading Co. Seed pods associated with certain commercial activities could be different; such as pods specialized for energy generation, garbage disposal (biomass conversion to energy), etc.

3) Just as the seed pods can allow material self-organization, it might be helpful to have some means by which they can facilitate information self-organization. For example each seed pod could have a communication option in the form of solar panel and device (something like the \$30 pad that India has developed). Or simply a \$1 RF chip. That could allow a display that shows you the location of all the other seed pods, giving a global feedback to the community about how it is laying itself out spatially. That kind of global awareness is present in traditional African settlements, but might be missing in this settlement. The pods have the potential to clip together into various configurations six pods can define an inclosed larger central space. A communal space for conflict resolution could be defined in this way linking into the education system.

John Turner sets out an argument for market networks which he defines as allowing multiple access to information and the basic resources for housing: Land, materials, tools, skilled labour, and credit.¹ He has found that they equalize access to resources, and function as distributors of wealth. Turner also states that:

"In contexts of national poverty resources are much better spent on land reform, material supply systems, and community infrastructures to aid poor majorities whose lot will not be in the least bettered by a scattering of imitations of Western housing projects."²

The need for simplified technology:

"The ease with which the elements of housing can be purchased to a large extent defines autonomy."³

1 (Fitcher 1972, 251)

2 (Fitcher 1972, 265)

3 (Fitcher 1972, 268)



Black Bamboo 'Hale'
Phyllostachys nigra 'Hale'
Cold hady1



Yellow Groove Bamboo
Phyllostachys aureosulcata
Cold hady1

Contact BrightFields

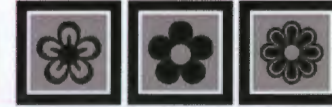
We are contactable at our Woodstock office.
The street address is Unit 1 ,Tollgate Industrial Centre,

12 Ravenscraig Road, Woodstock, Cape Town

Local material, technology and skills

Bamboo

BRIGHTFIELDS
Natural Trading Company



Bright Fields is in the process of starting a bamboo farm in Cape Town. The land between the two informal settlements in Driftsands is not part of the reserve. It would be technically possible that Brightfields start a grove there. The landuse has been defined as 'communal park'. The phyllostachys species of bamboo grows best near a source of water but it does not like to get its feet wet, it survives colder winters than those in the Cape but grows most quickly in full sunshine. Digging a trench around the bamboo grove will limit spread since this species sends out runners a few inches beneath the surface. Brightfields guaranties that with their polyurethane treatment roofs will not suffer any noticeable deterioration for at least 20 years.



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INGREDIENTS

Linseed oil, Wood oil, Gum turpentine, essential oils, lead-free driers and pigments of natural occurrence or non-toxic mineral pigments. *Natural paints are not odour and emission free and may cause allergies. Always provide for good ventilation!*

In a report on the field durability of CCA and ACA treated plywood composed of hardwood and softwood veneers De Groot, et al drove treated plywood steaks with varying densities from 0 to 9.6kg/m³ into the ground. These were monitored annually for ten years.

Their findings among many others were:

All of the softwood plywood steaks cut to size prior to treatment with 9.6kg/m³ CCA treatment showed no decay at all after 10 years

Some of the softwood plywood steaks cut to size prior to treatment with 6.4kg/m³ CCA treatment showed suspicion or trace of decay after 10 years

That soft woods absorb treatment more effectively than hardwoods and therefore decay less.

Steaks treated after being cut from the sheat decay less.

CCA is more effective

Painting treatment onto the plywood edge makes no difference.¹

The treating cycle consisted of a vacuum at 27 inch Hg for 30 minutes, followed by pressurization at 150 psi (0.105 kg/mm²) for 2 hours. Plywood quarter panels were stickered to permit uniform flow of liquids between panels during treatment. Immediately after pressure was released, panels were removed from the treating cylinder, wiped free of excess preservative on the surface, and weighed. Preservative uptake was calculated on the basis of weight gain during treatment. After weight gain was determined, all plywood panels were stacked, draped with polyethylene, and allowed to stand for 2 weeks. After 2 weeks, plywood panels were kiln-dried at a moderate schedule that did not exceed 140°F (60°C) to an MC of 19 percent or less.²

The seed pod uses a permanent plywood foundation system. According to the Canadian Plywood Association "thousands of PWF homeowners are delighted with comfort and liveability of their homes."⁴⁴



Plywood treatment

Generally, when wood is exposed to the elements, excessive moisture, or in contact with the ground, it is susceptible to fungal decay and insect attack. Four conditions are required for decay and insect attack to occur: wood moisture content in excess of 19%, a favorable temperature range (approximately 10° to 32° Celsius), oxygen, and a source of food (wood fiber). If any one of these conditions is removed, infestation and decomposition will not occur. Pressure treatment eliminates wood fiber as a food source.⁴⁵

TABLE 3

RECOMMENDED TREATMENTS

Exposure	Typical Application ⁽¹⁾	Minimum Preservative Treatment ⁽²⁾ (lb. per cu. ft. by assay)				
		Creosote	Pentachloro-Phenol ⁽⁴⁾	Copper-8-Quinolinate ⁽⁶⁾	Waterborne Preservatives ⁽³⁾	
Contact with sea water, exposed to marine borer attack	Pontons, wharf bulkheads, scows, floats and flood gates, etc.	Creosote full-cell	25.0	Not recommended	Not recommended	ACZA 2.50 ACA 2.50 CCA (Type A, B or C) 2.50
Contact with ground chemicals, construction moisture or high humidity	Permanent trench and tunnel lining, retaining walls, skirting for post and pier or pole type foundations, snow sheds, floats, irrigation structures, tanks, linings for wet process industries, poultry dropping trays, septic tanks, some chemical storage tanks, industrial sewers, and smelter roofs	Creosote: empty-cell	10.0	Penta: empty-cell 0.50	Not recommended	ACZA 0.40 ACA 0.40 ACC 0.40 CCA (Type A, B or C) 0.40 CCO (Type B or D) 0.40 CC 0.40
Permanent Wood Foundation system ⁽⁵⁾		Not recommended	Not recommended	Not recommended		ACA 0.60 ACZA, CCA (Type A, B or C) or ACC (Type B)

⁽¹⁾ Plywood treated in accordance with AW-1194 or AW-1195 (CCA) or AW-1196 (Creosote) or AW-1197 (Waterborne Preservative).

**PRESERVATIVE-TREATED
PLYWOOD**

Data file, Preserved treated plywood, accessed 16/08/2010

44

CANPLY, <http://www.canply.org/english/products/pwf.htm>, accessed 16/10/2010

45

<http://www.raisedfloorlivingpro.com/ptwproducts.shtml#table4>

Architectural approach to designing the seed pod

Alvar Aalto

The qualities Aalto chose to revive in a modernist age were individuality, natural materials, rootedness to land, unspoilt nature, a vernacular Heimatstil (craftsmanship) Each “contradictions to European and American industrialized society”⁴⁶

“Aalto wanted to recapture ... exactly what everyday life denied.” This has earned him the title in the words of Porphyrus as a “humanist master” – exactly what the world needed to be reminded of in the time of modernism.

In a lecture on rationalism and man in 1935 Aalto expressed the view that if an object could be described as rational it would often suffer from a considerable lack of human quality

Aalto developed the idea of Heterotopia – he considered a huge range of topics in his designs so that he was able to unite: the new abstract ideas of space and time, technology and materials a Newly democratic Finland, site and nature, developing architectural expression that feels like it belongs in that part of the world.

Lina Bo Bardi

“Her architectures have the rare capacity to narrate and present the memory of a place.”⁴⁷

“The past for Lina was something forever alive, something occurring in the present”

“It is an architecture that takes advantage of the unexpected, of chance, precariousness and a lack of resources.” Lina’s work is completely free of the usual limits of an imported colonial style. It is entirely Brazilian and related to the intricacies of each unique site. It respects history, is for culture and against commercialism. Like Aalto Lina’s detailing celebrates light and nature and its aesthetic lies in its rootedness to the site and to history.

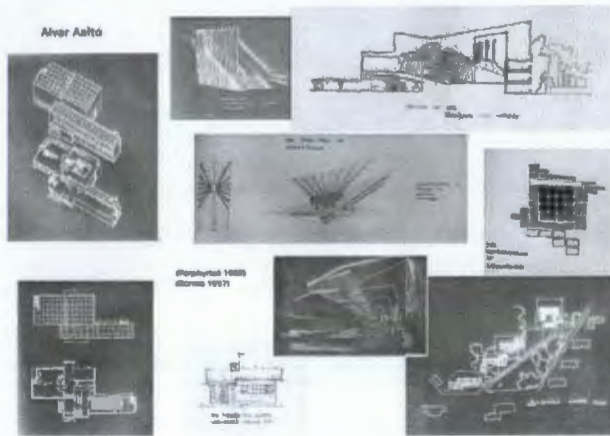
Aalto

“It is a long road that [Aalto] has covered, starting from a rational approach and arriving at an organic functionalism that never adheres to any specific formula, each new creation being in accordance with imposed exigencies.”⁴⁸ Geometry should be appropriate for space (functionalism), so that a building is not cohesive but rather applies the idea of Heterotopia, a coalition of concepts

46 (Porphyrius 1982, 115)

47 (Olivera 2003, 4)

48 (Borras 1997, 31)



Carl Scarpa



<http://www.toleng.com/interiors/200502/Scarpa1.htm>

In the work of Carlo Scarpa
Beauty
the first sense
Art
the first word
then wonder
then the inner realization of Form
the sense of wholeness of inseparable elements.
Design consults Nature
to give presence to the elements.
A work of art makes manifest
the wholeness of Form of the
symphony of the selected shapes
of the elements
the joint inspires ornament, its
celebration.
The detail is the adoration of Nature



<http://www.archi.ru/Art/ARCH/Scarpa1.JPG>

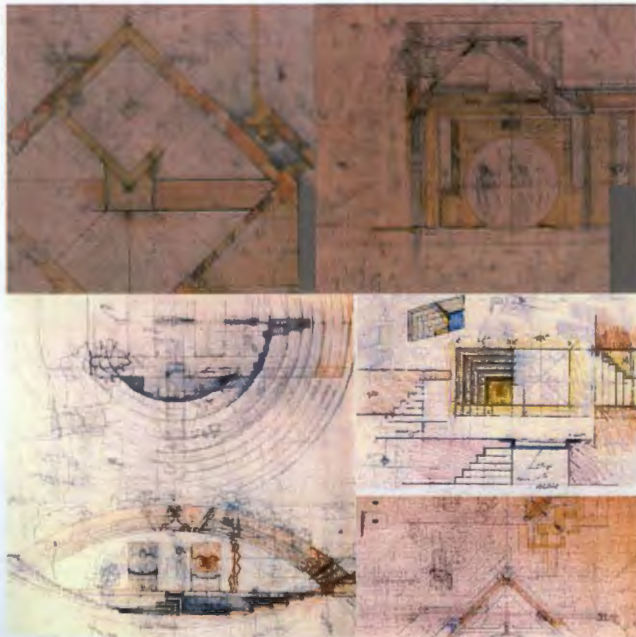


http://www.italianart.com/interiors/interiors/scarpa_scarpa_diora.JPG

Louis Khan



http://www.italianart.com/interiors/interiors/scarpa_scarpa_diora.JPG



[Alvar Aalto's design] "is characterised by always having been indisputably conceived and designed with at its centre the human being."⁴⁹ "The fundamental a priori upon which Aalto's architecture rests is ... the sensuously loaded materiality of its elements."⁵⁰ "Every year we have a new synthetic material. But material requires time, and not all new materials are mature enough to be used fully for human purposes. Many of them will never be, for they are so quickly overtaken by others that we have no time to get friends with them." -Aalto

Tectonic buildings become multi layered and differentiated so that they belong to the landscape. Textures are varied reintegrating craft into the building process. Detailing becomes a means of expression not just a functional response. The tectonic tries to undermine the tyranny of industry; it aspires to be local responding to the climate and the context, indigenous materials and construction skills.⁵¹

Detailing describes the 'crisis of architectural language'. The sensual and intellectual experience of a building depends on this language and is expressed through the tectonic – Gregotti.⁵²

The detailing of a building marks the transition from concept to reality; this is where the meaning of architectural theory can be expressed at various scales always in relation to something much larger than itself. Detailing is about focusing in on the technology appropriate to material expressing 'truth to material'. August Perret's famous saying sums it up pretty well: "Il n'y a pas de détail dans la construction", detail is certainly not just a matter of detail. I have been looking at another method that attempts to follow the chaotic process of an ecology and out of which users may consciously define fractal settlement patterns through strengthening social support networks and taking ownership of a creative environment.

The form

The structure is optimized and uses natural replenishable materials

It is defined by the details of its assembly

Appealing

Novel

Very cost effective



Structural defects connected to the PHP process would be eliminated

The structure is self supporting, uses minimal materials and forms part of a larger ecology like an organism

49 (Borras 1997, 28)
50 (Borras 1997, 13)
51 (Cuyer 2001, 17-18)
52 (Nesbit 1996, 495)

Part 3: Application of theory through the design and construction process

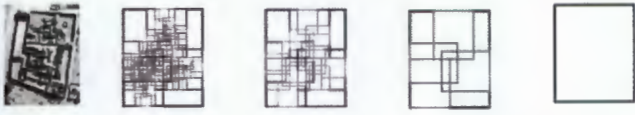


 <p>CitySpace Planning Cape Town</p> <p>PLAN. P1</p>	<p>New Development Areas</p> <p>DISTRICT E</p> <p>Meters 0 1,000 2,000 4,000</p>	<ul style="list-style-type: none"> ■ Potential High Density Development ■ Potential Medium Density Development ■ Potential Low Density Development ■ Commercial /Business Area ■ Mixed Use Area ■ New Industrial Development ■ New Public Facilities ■ Open Space / Sport Field /School 	<ul style="list-style-type: none"> ▨ Landfill Sites ⊞ District Parks ● Metropolitan Park — Development Route — Activity Street — Connector Route --- Activity Route — Other Structuring Route 	<ul style="list-style-type: none"> — Urban Freeway — New Railway Lines ● New Railway Station □ District Boundary □ Urban Edge --- Coastal Edge 	 <p>N</p>
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SITE DEVELOPMENT PLAN
SCALE 1:2500



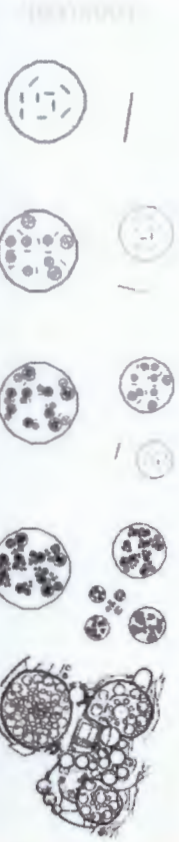
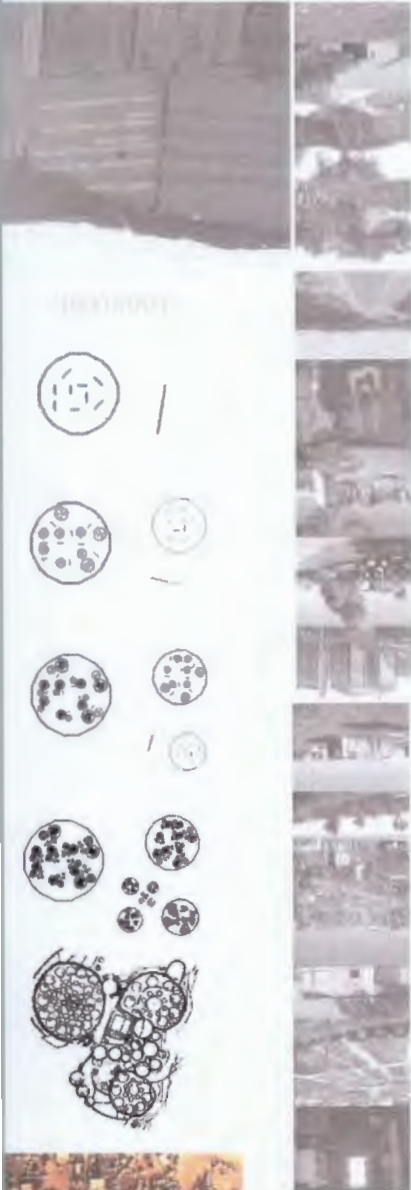
robust self organizing algorithms



Seed pods and food gardens

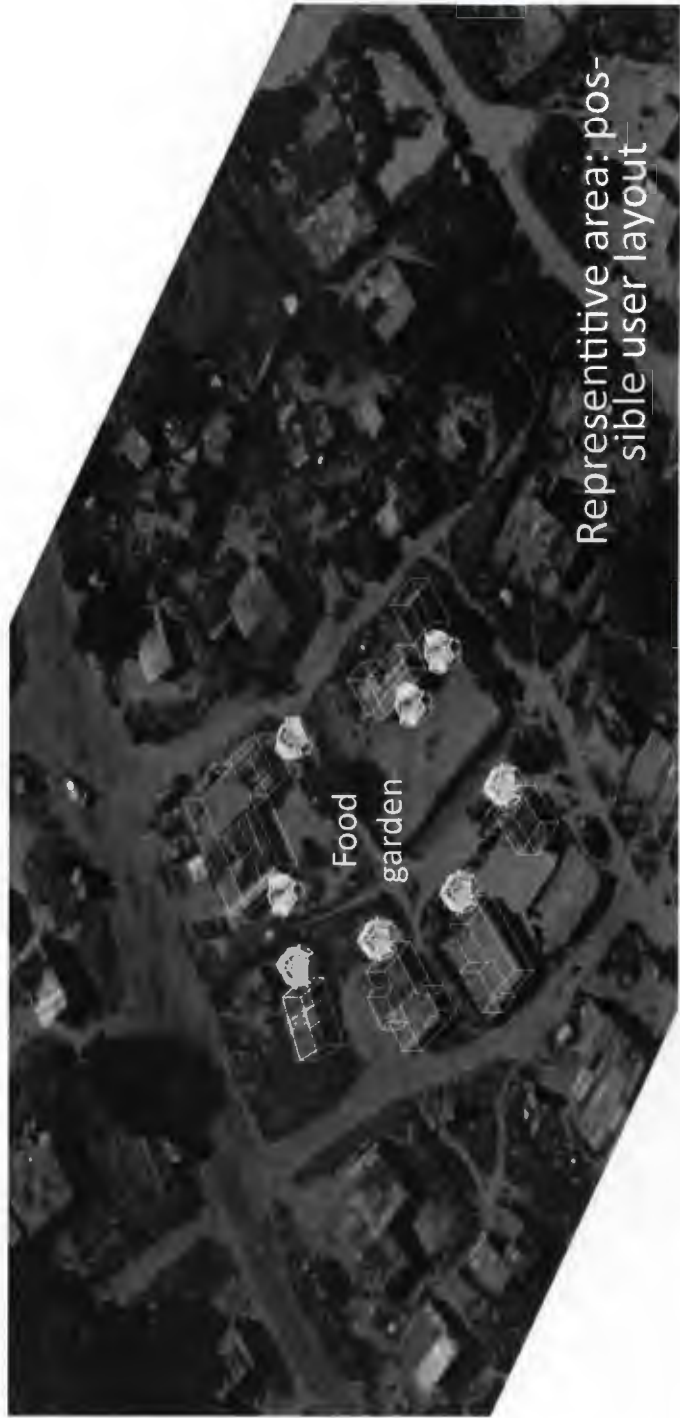


Existing settlement



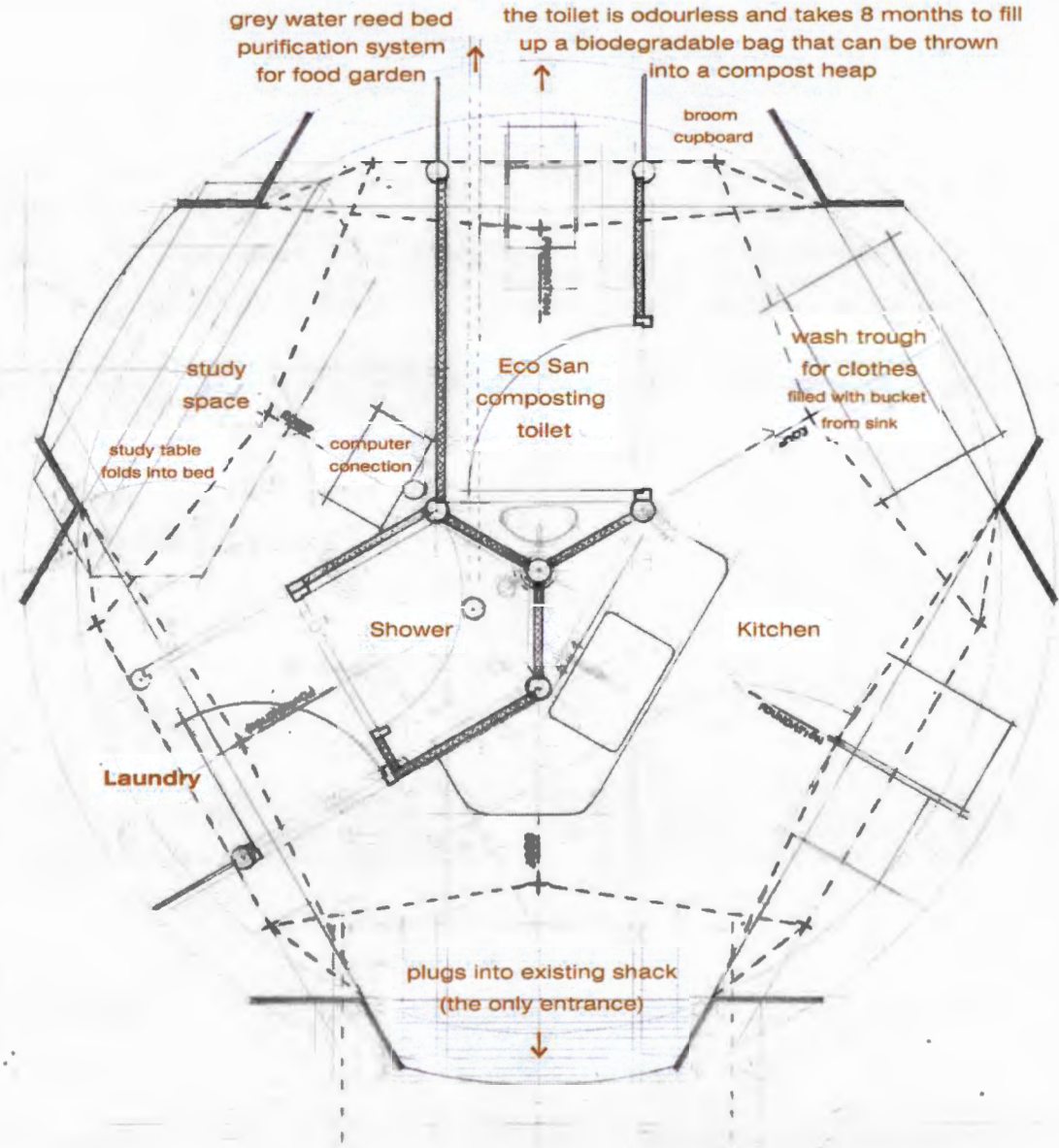
Legend
 ● (orange)
 ● (black)



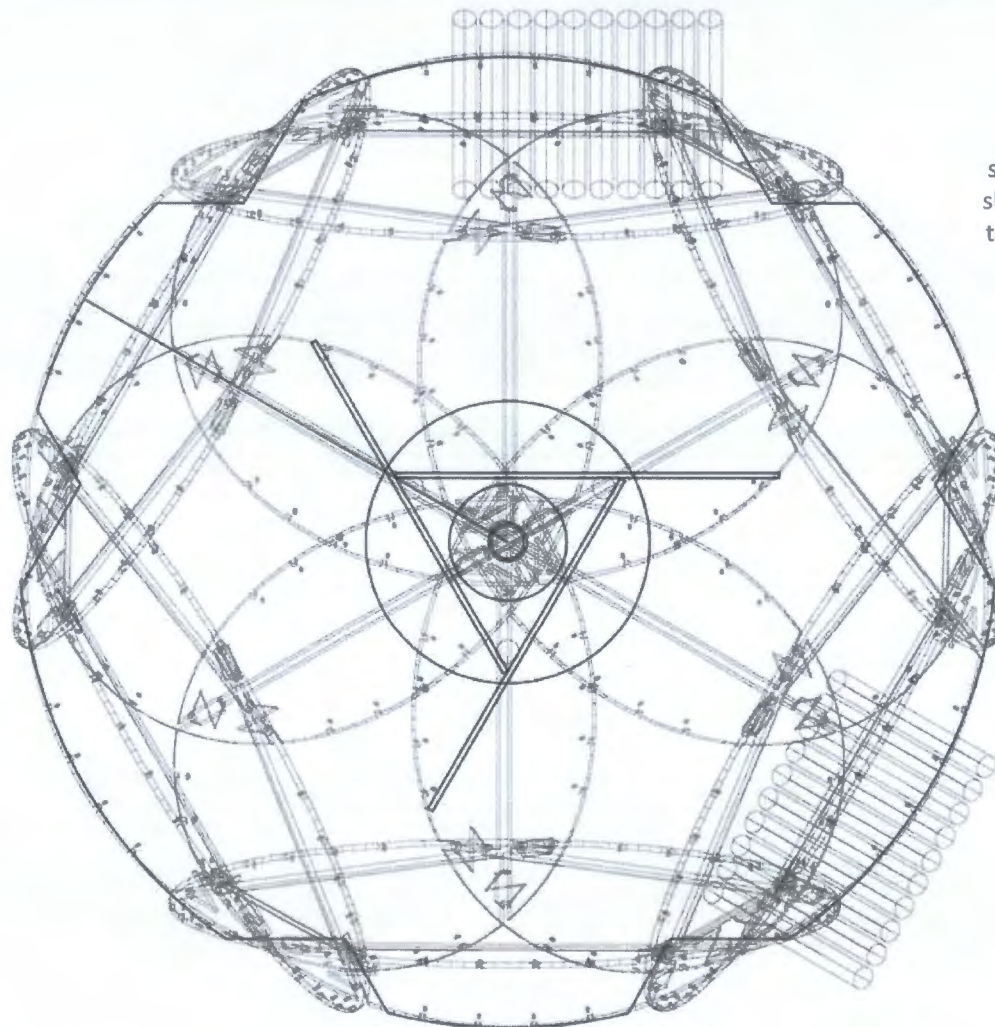
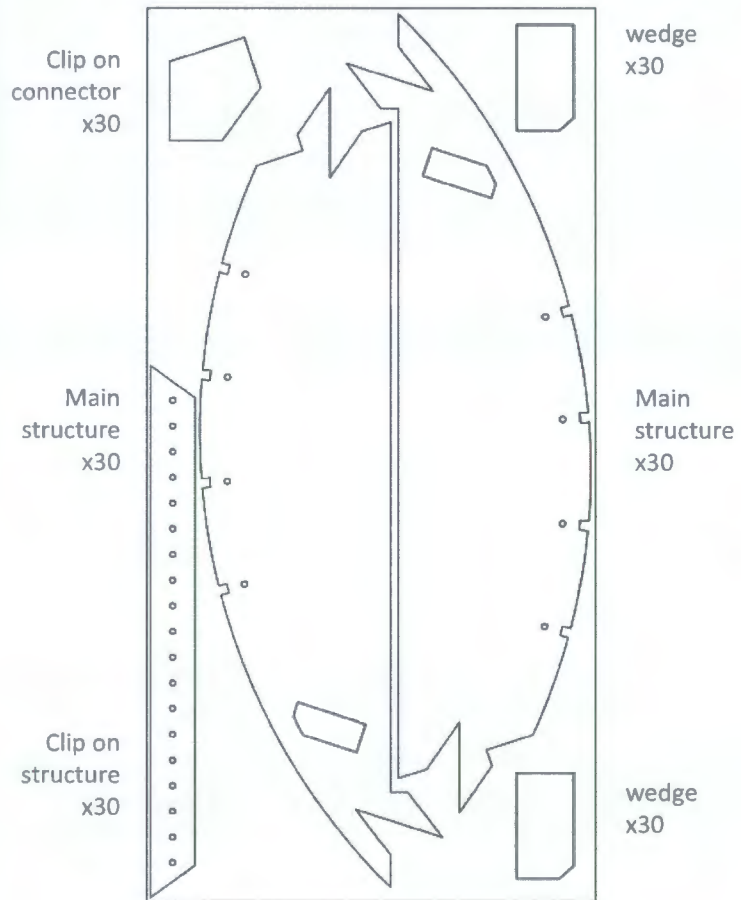


Representative area: possible user layout

Plan



30 sheets of standard 22 x 1440 x 1220mm shutter ply make up the basic structure.

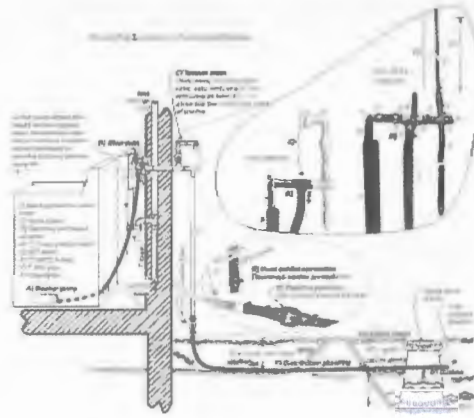
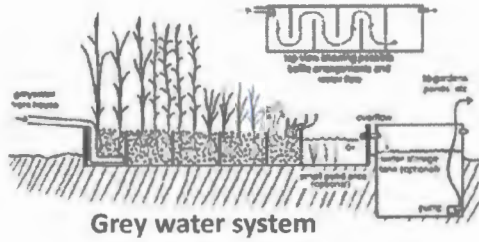


60 piece main structure also showing water tank and solar collectors

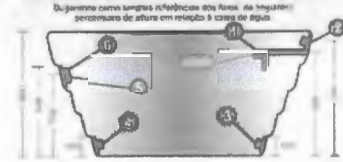
The pieces are engraved on a laser cutter with 1 cm lines cut through strategically so that they can be accurately cut by jigsaw. The pieces slide together to form a self supporting structure. Wedges reinforce each joint making construction quick and easy.

Energy, water and waste systems

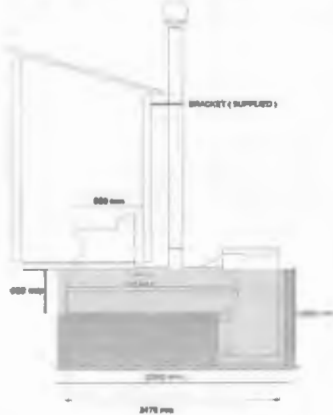
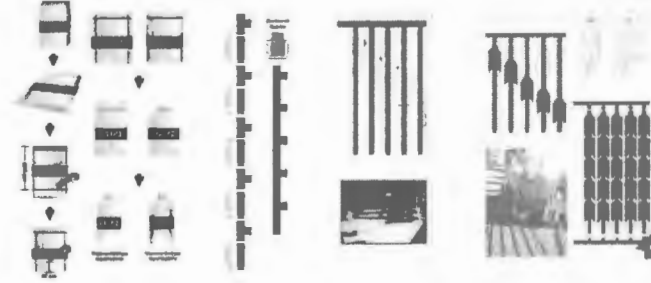
To instal a washing machine



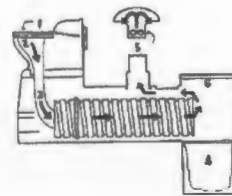
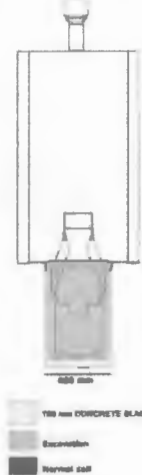
- 1 float and cold water entry
- 2 overflow
- 3 cold water to back up tank (optional)
- 4 cold water to solar panels
- 5 hot water from panels
- 6 hot water to taps



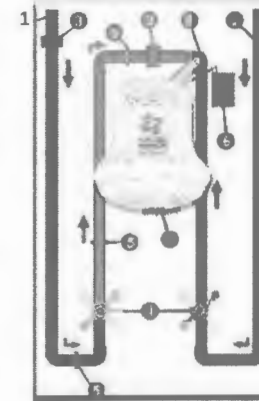
Solar water heater



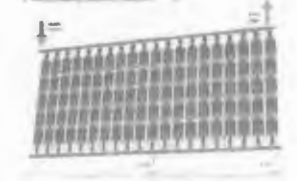
Eco San composting toilet



The solar water system used for a hotel in Curitiba



- 1 Hot water entry
- 2 cold water entry
- 3 hot and cold connection
- 4 taps
- 5 wall connection
- 6 optional temperature control



Cost benefit analysis

Since the standard PHP subsidy is R36 000 for the income group R0 to R3500 per month a substantial amount is left over for using the skills learnt with bamboo and shutter ply construction in waterproofing and insulating and adapting living spaces as a creative ongoing process of skills development.

PHP schemes which require brick laying skills have lead to structural defects such as leaning or cracked walls, concrete mixes can be weak and joinery sloppy reference. The standard components mostly are harmful to the environment and create similar settlement patterns to the RDP model because of the constraints of the sewage system. The monetary and ecological cost of water born sewage is alleviated by the seed pod and environmentally a huge amount of fresh water is not wasted.

Solar water heaters reduce demand on electricity along with passive heating in winter and cooling in summer. Only two energy saving bulbs would be required one for the study space and one for the others.

All plumbing connections directly link into the central column reducing cost. Although the materials are unconventional this method fits into the People Housing Process policy.

Approximate quantity survey

Structural

30 sheets shutterply (2440 by 1220 by 21) R249 each [www.online building.co.za]	R7470
4.2m 179/160mm diameter pine tapered poles SABS 457 @ R295 x3	R885
Clear Corrugated polycarbonate @ R35 per meter x 7.5m	R263
Connector pieces (offcuts)	
8 sheets shutterply floor (2440 by 1220 by 21) R249 each	R1992
Treated timber joists 38 x 114 x 2.4 x 13 pieces @R15.35 per meter	R480
Window panel @ approx R800 x2	R1600
Bamboo grown on site	

Plumbing

Approx. R3000

sink
wash trough
basin
all fixtures
pipes
shower

Finishes

Enviro Touch indoor wood sealer	R250
Bamboo 216m (grown near site) treatment approx. R5 per meter @ Natural Trading Co.	R1080
Internal bamboo screens 8.5m x 2m woven by users (Approx R500 training)	R641

Electrical

Approx. R400

Energy saving bulb
Study light
\$30 pad

Solar water heaters

R50

260 liter Jojo tank

R415

EcoSAN waterless toilet R4950 excl.vat

R5640

Grey water system

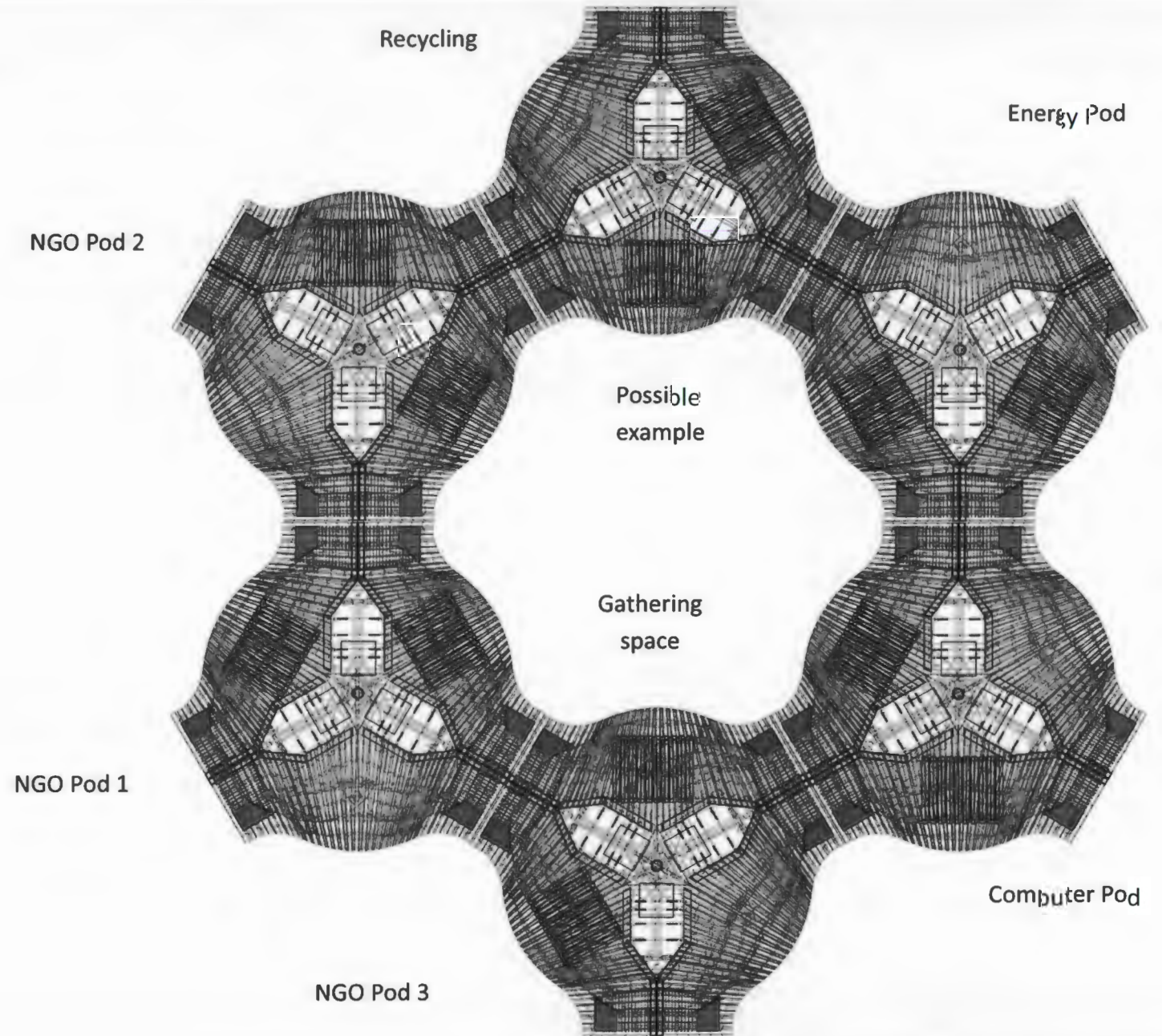
R300

Rough estimate TOTAL

R24 466

A cost benefit analysis of energy efficiency in low cost-housing by Winkler et al (2000) found that financial and carbon footprint savings would be substantial.¹ **Not having to rework the whole sewage system and put in connections to each house would create very large savings**

Possible Adaptability - Seed Pod conflict resolution, education configuration and design



The seed pod in its context

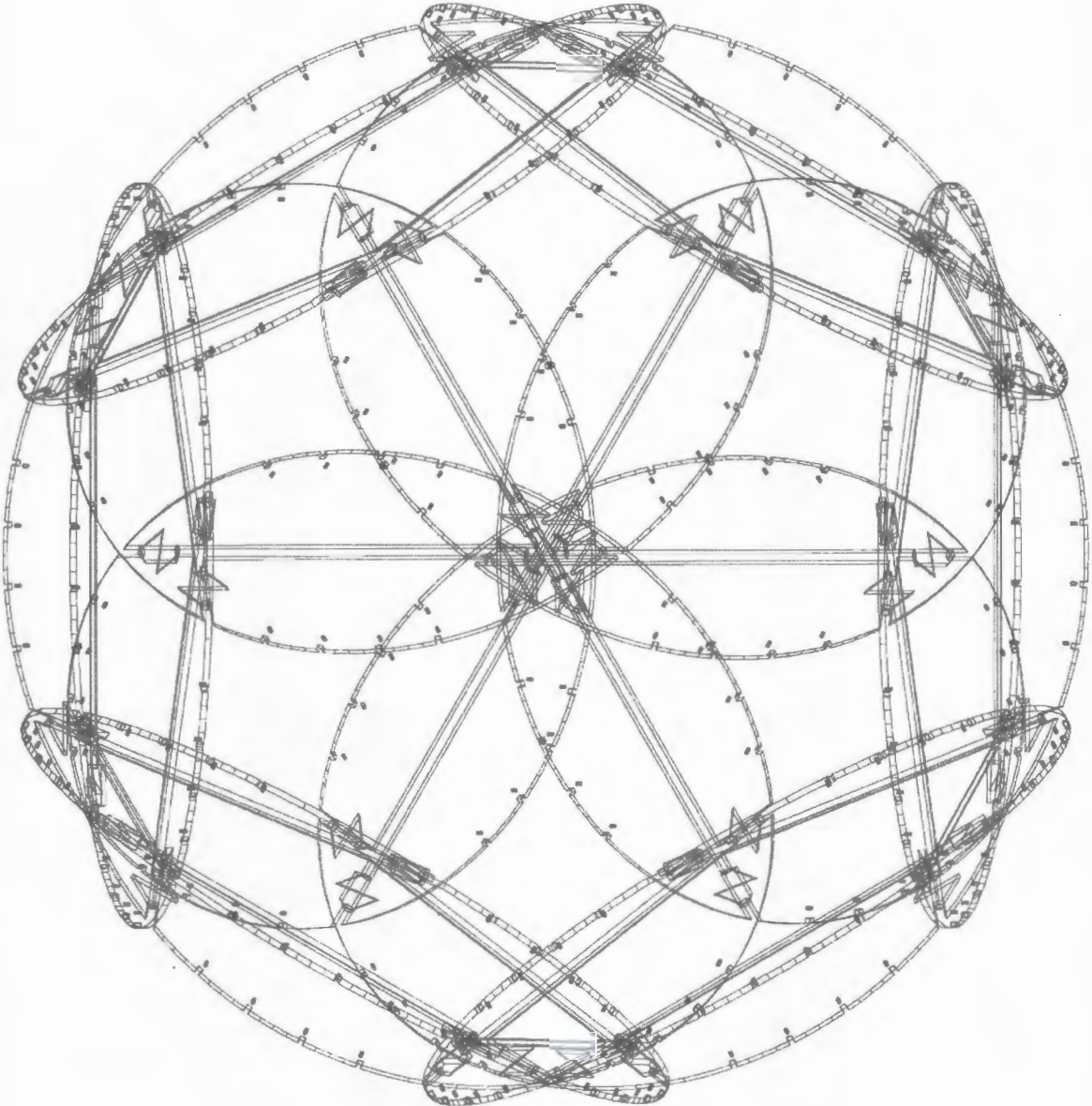




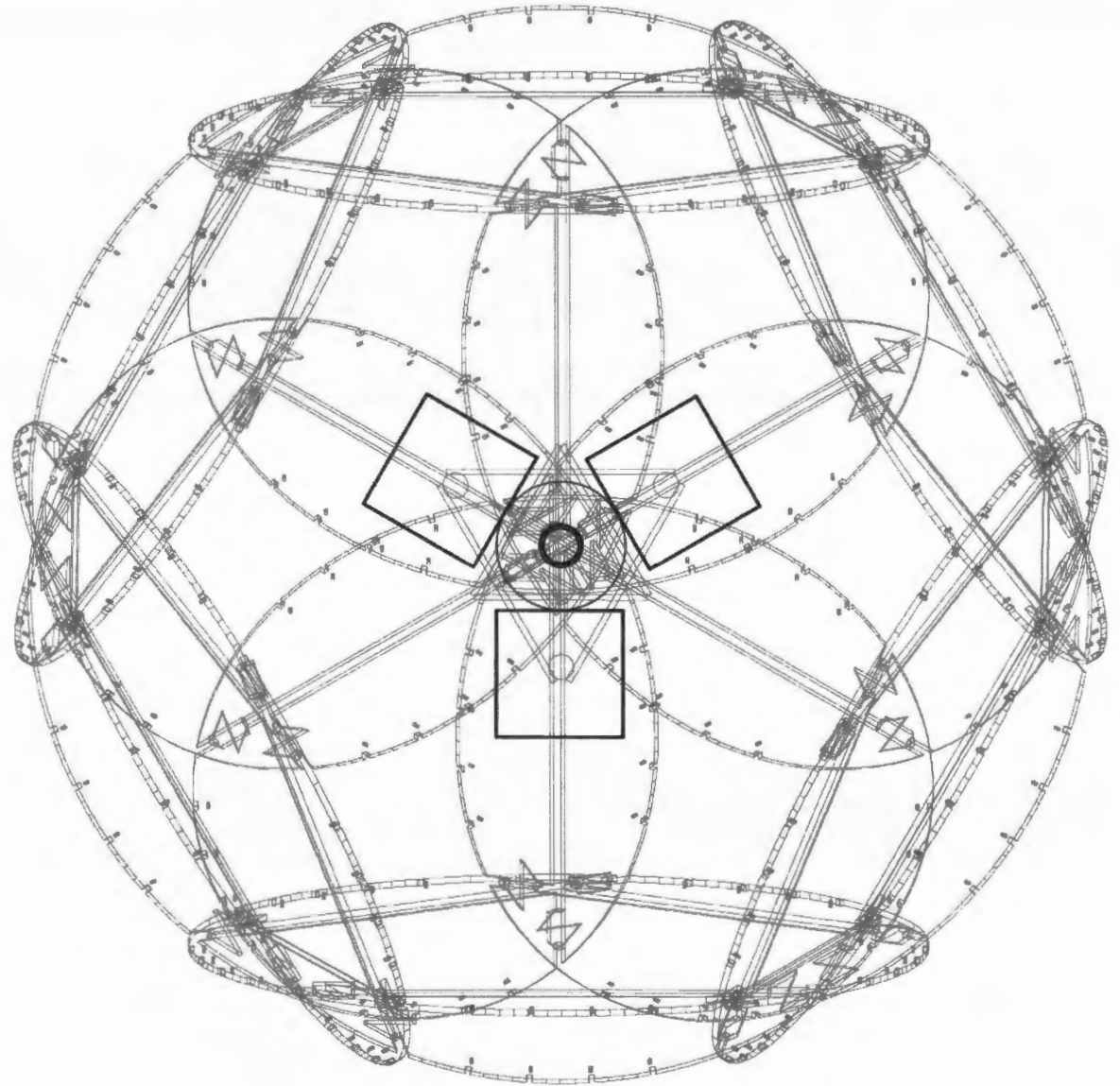




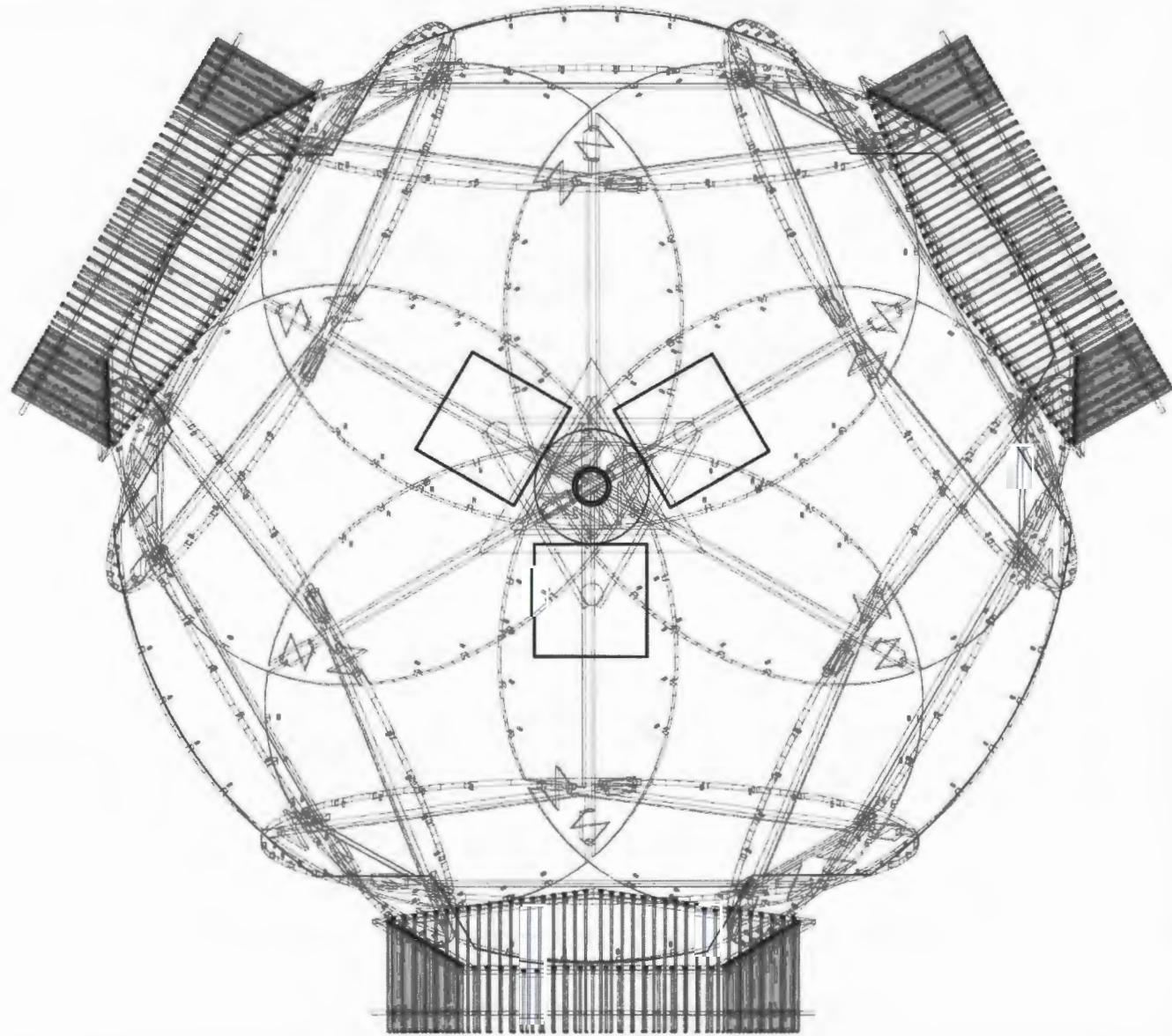
The Process of assembly



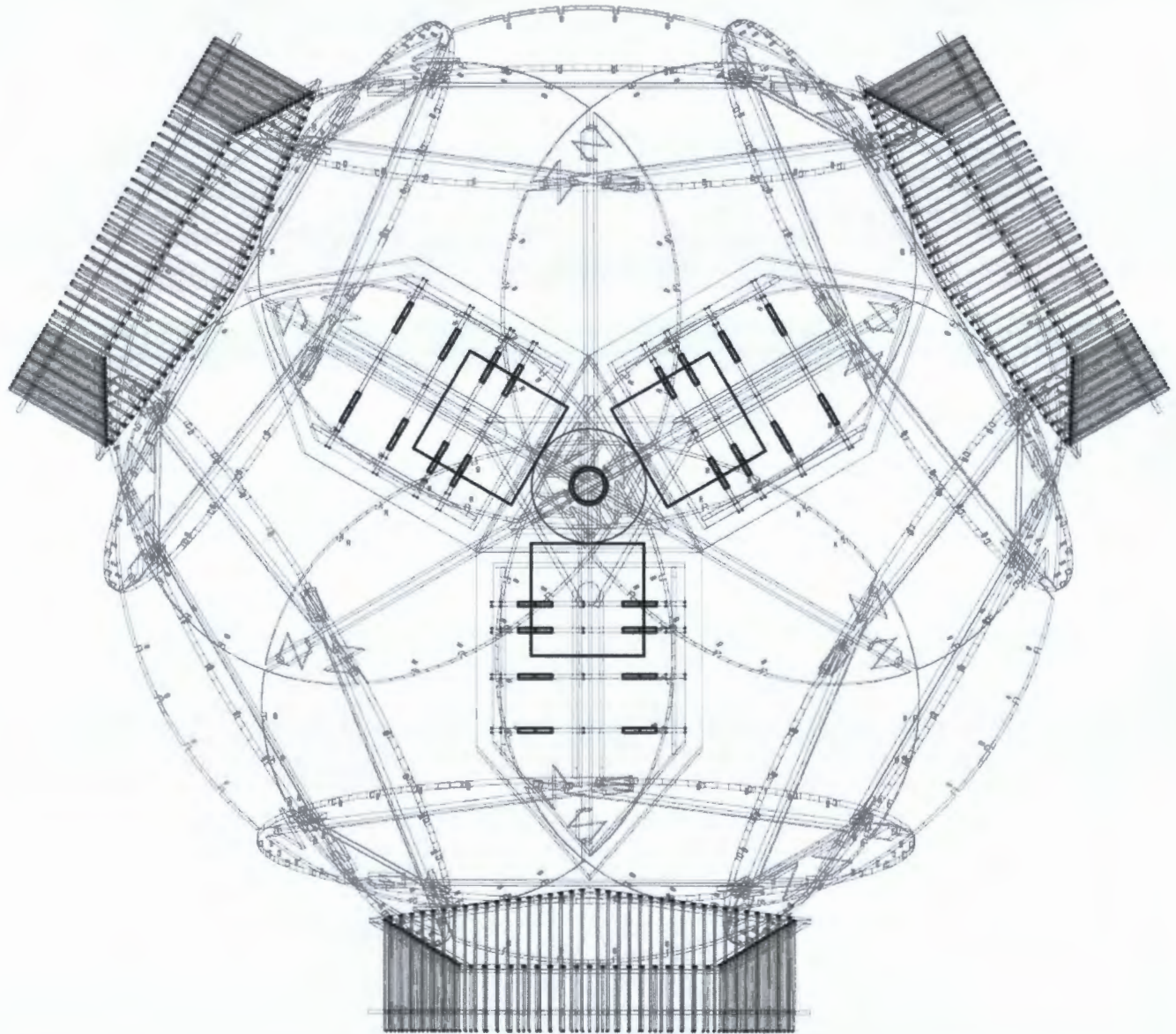
Three structural timber columns on pads support the insulated geyser which is fed by the solar water collector system. Pipes run down the central bamboo shaft. all water connections link directly into it and drain out to the grey water system



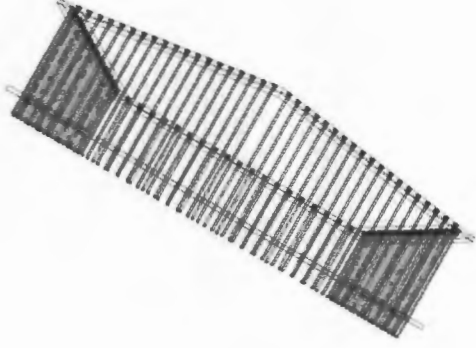
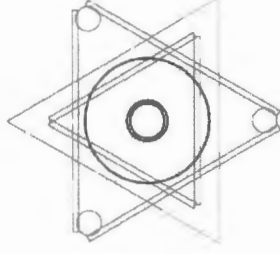
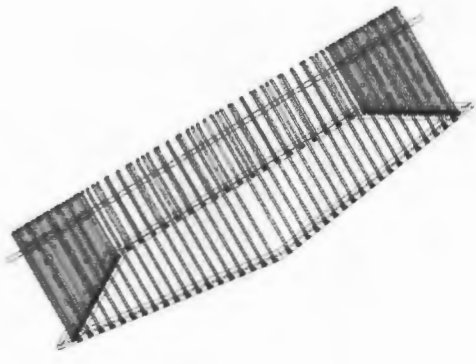
The clip on structures are then attached - they are cut from the plywood offcuts of the primary structure.



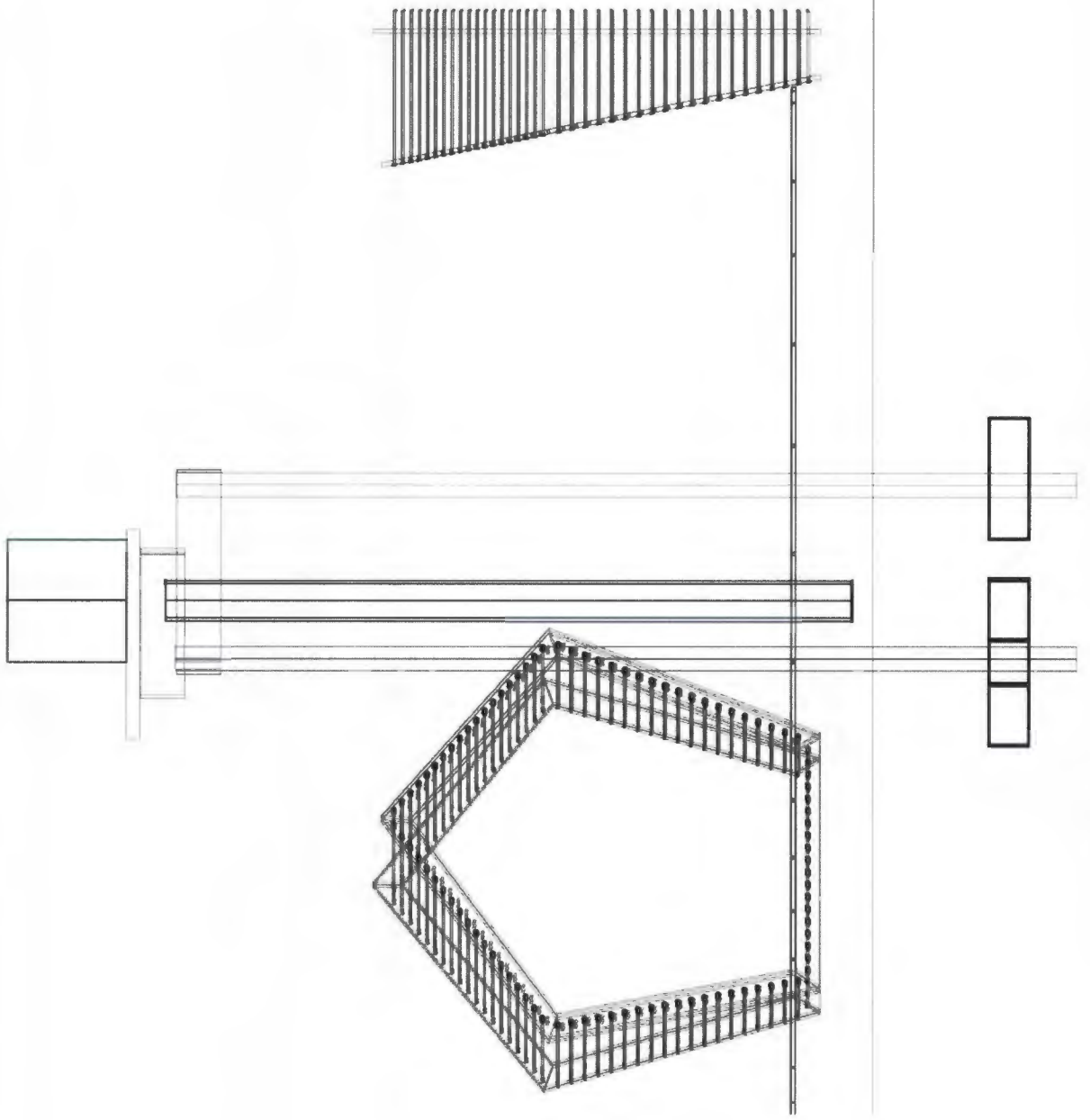
The skylight framework is then added functioning as connector pieces between the roof cladding and the primary structure



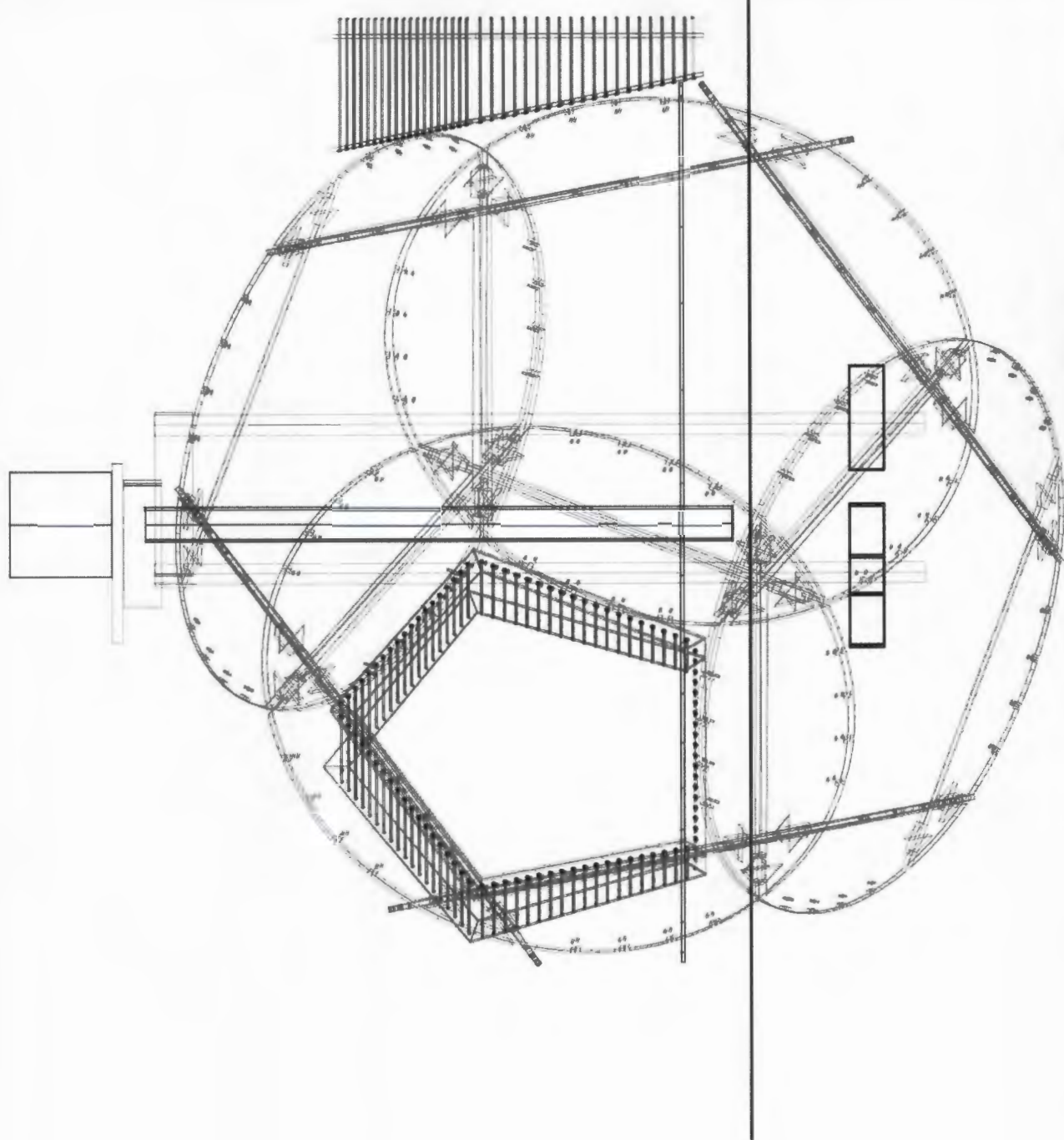
Isolated clip on and core structure



Section of clip on and core structure
showing bamboo shaft



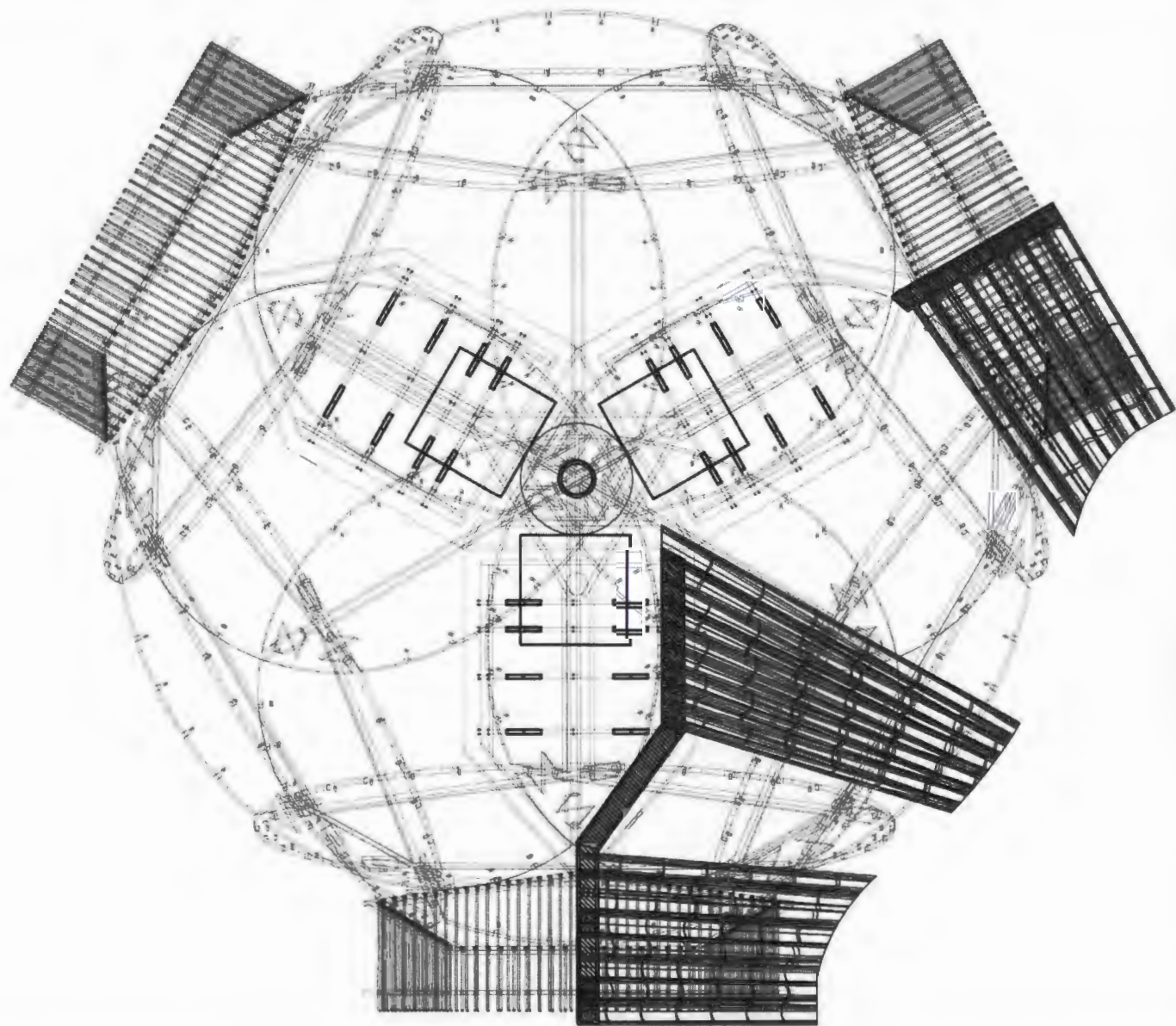
Section with primary structure



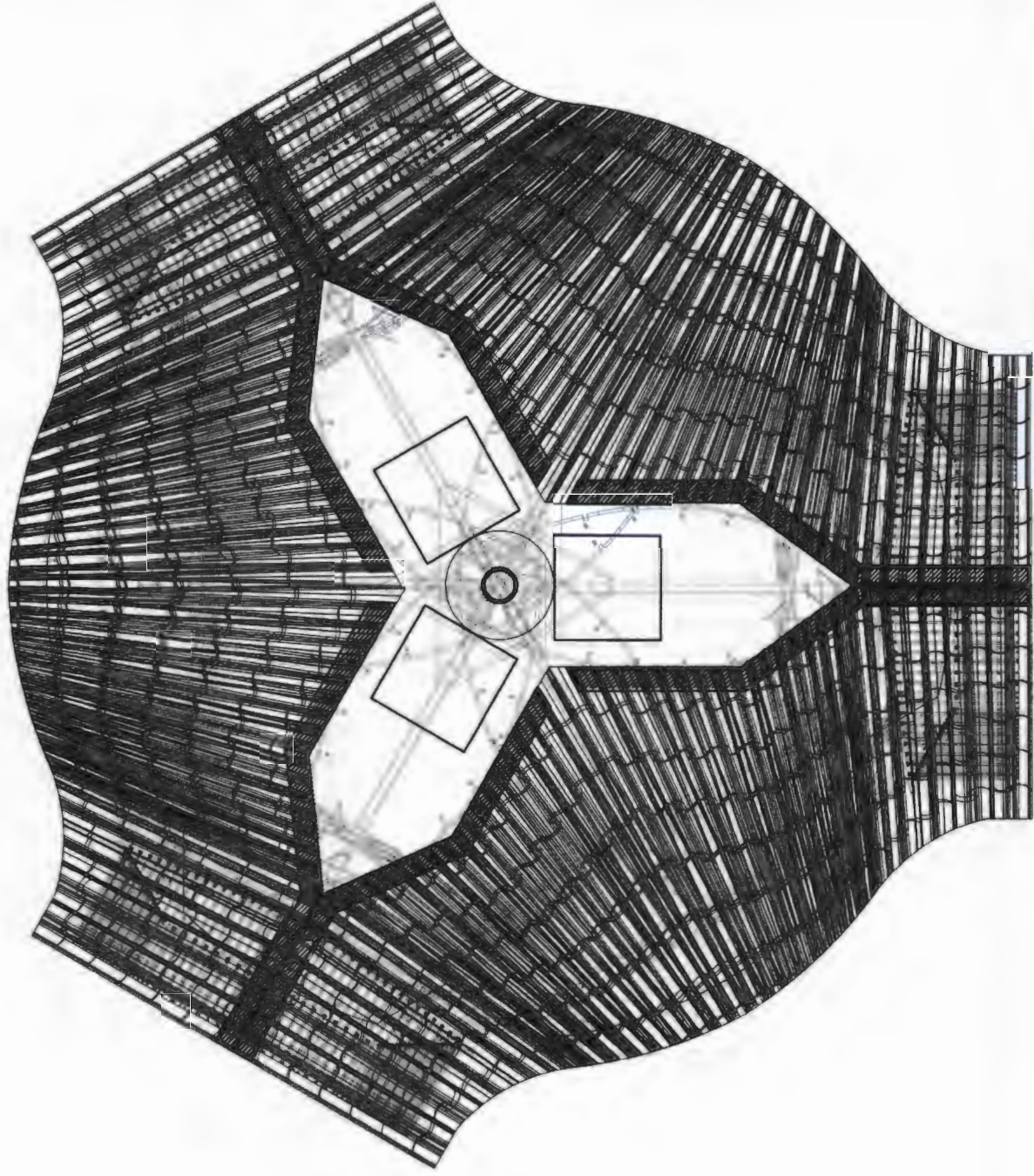
The polyurethane coated bamboo roof cladding is assembled in segments and attached to the skylight structure



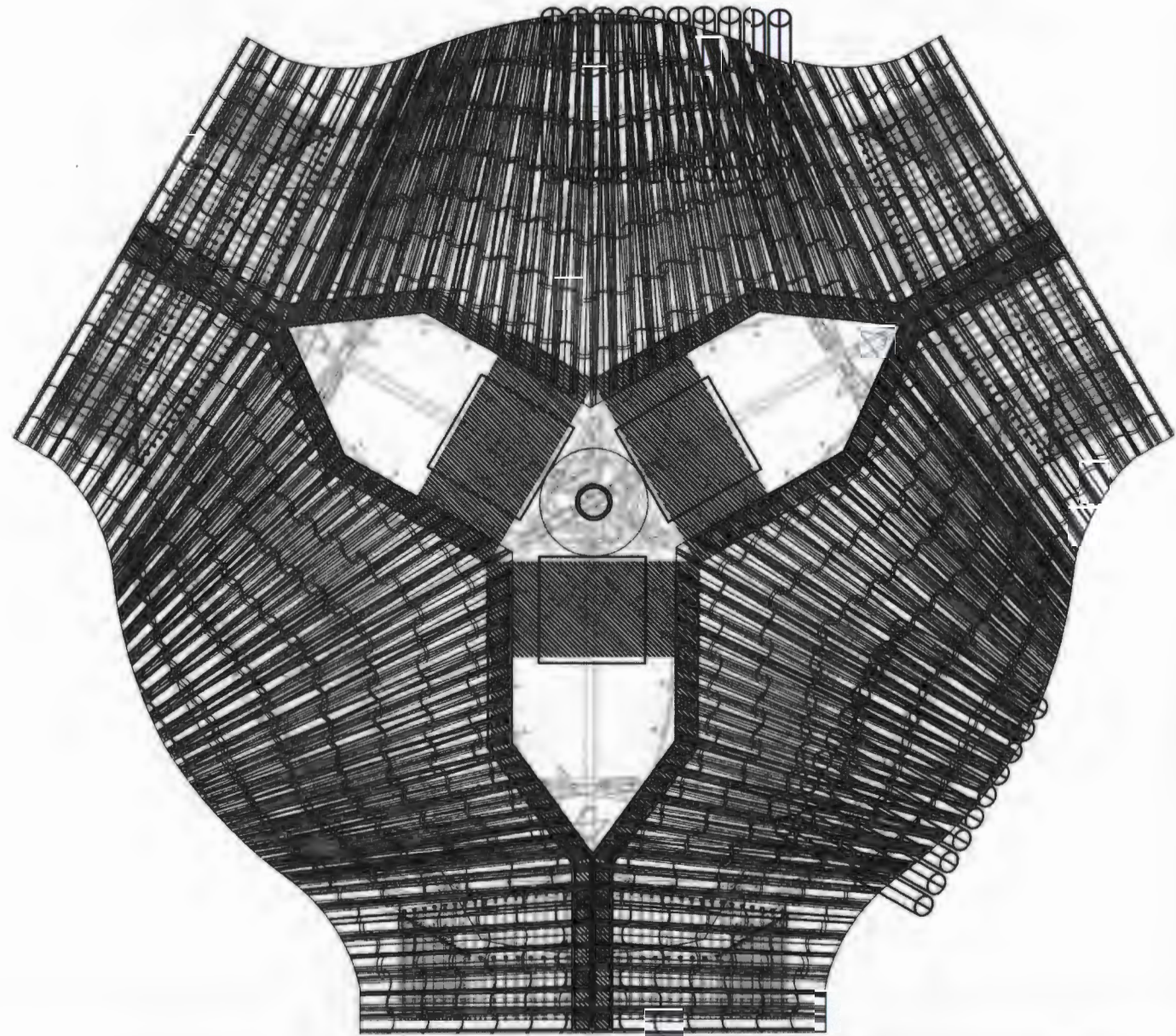
20 years durability is guaranteed



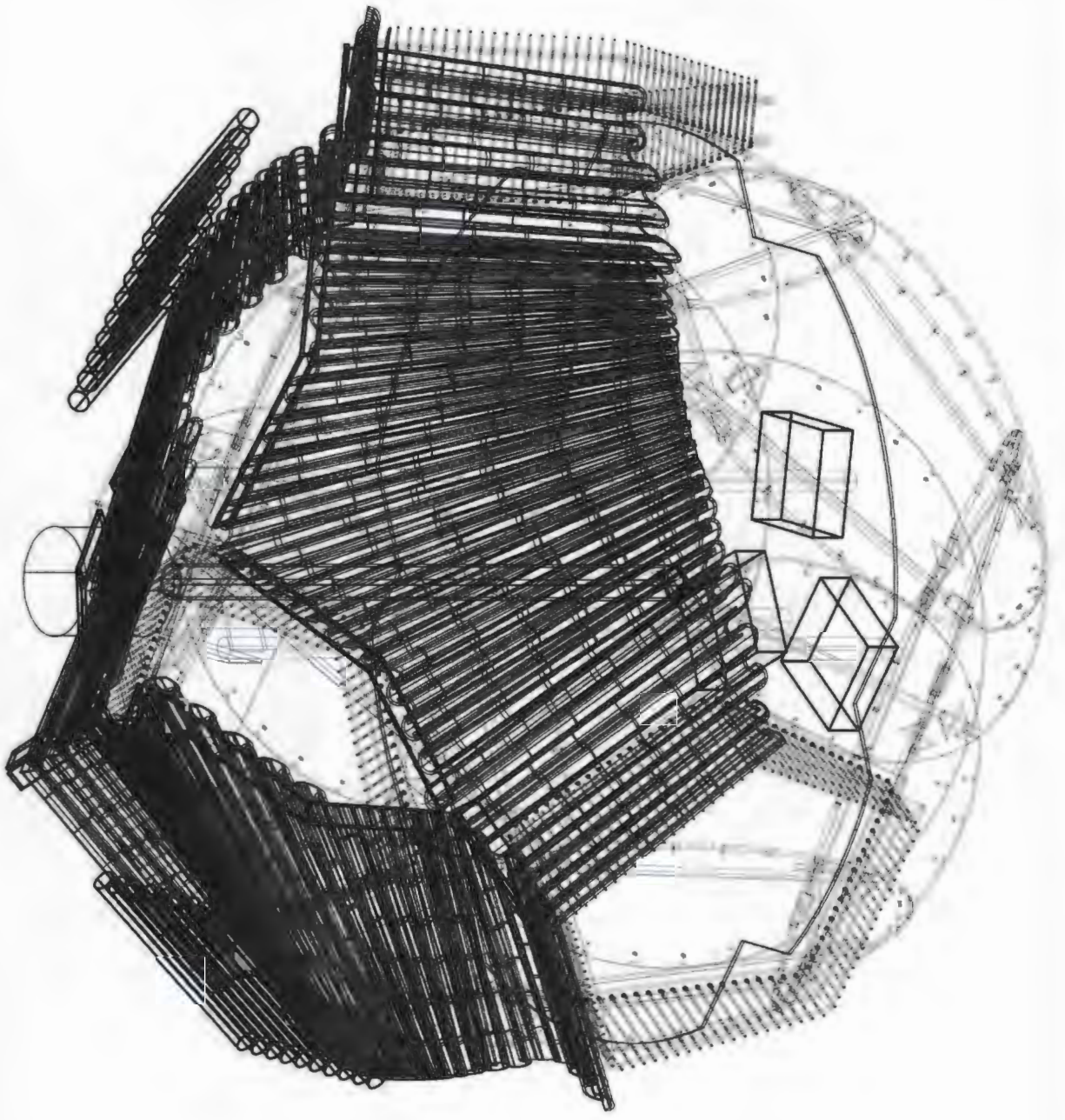
Cladding complete



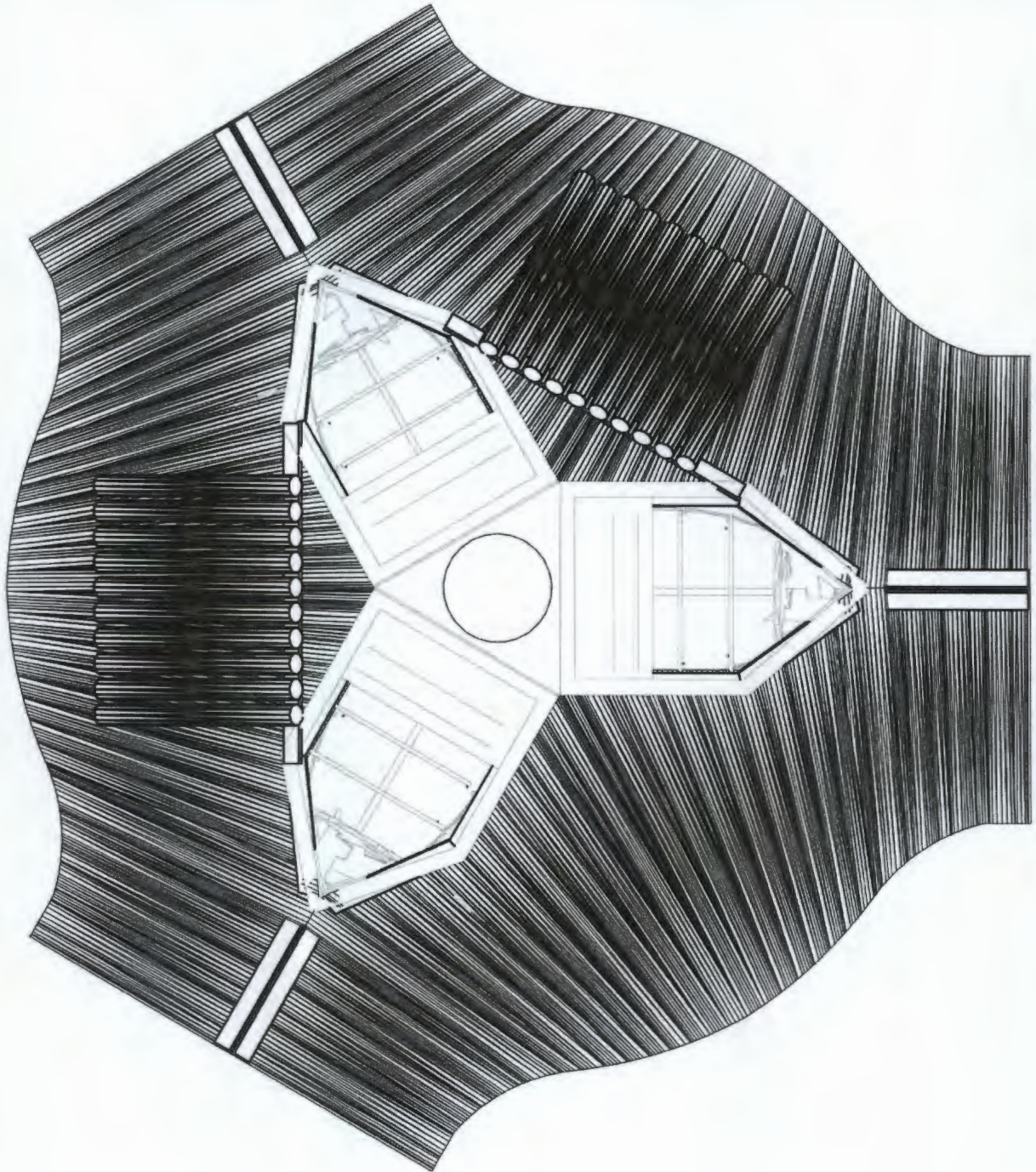
Openable flaps are attached to the underside of the tank support and close over the skight structure. These are opened by a rope and a pivot.



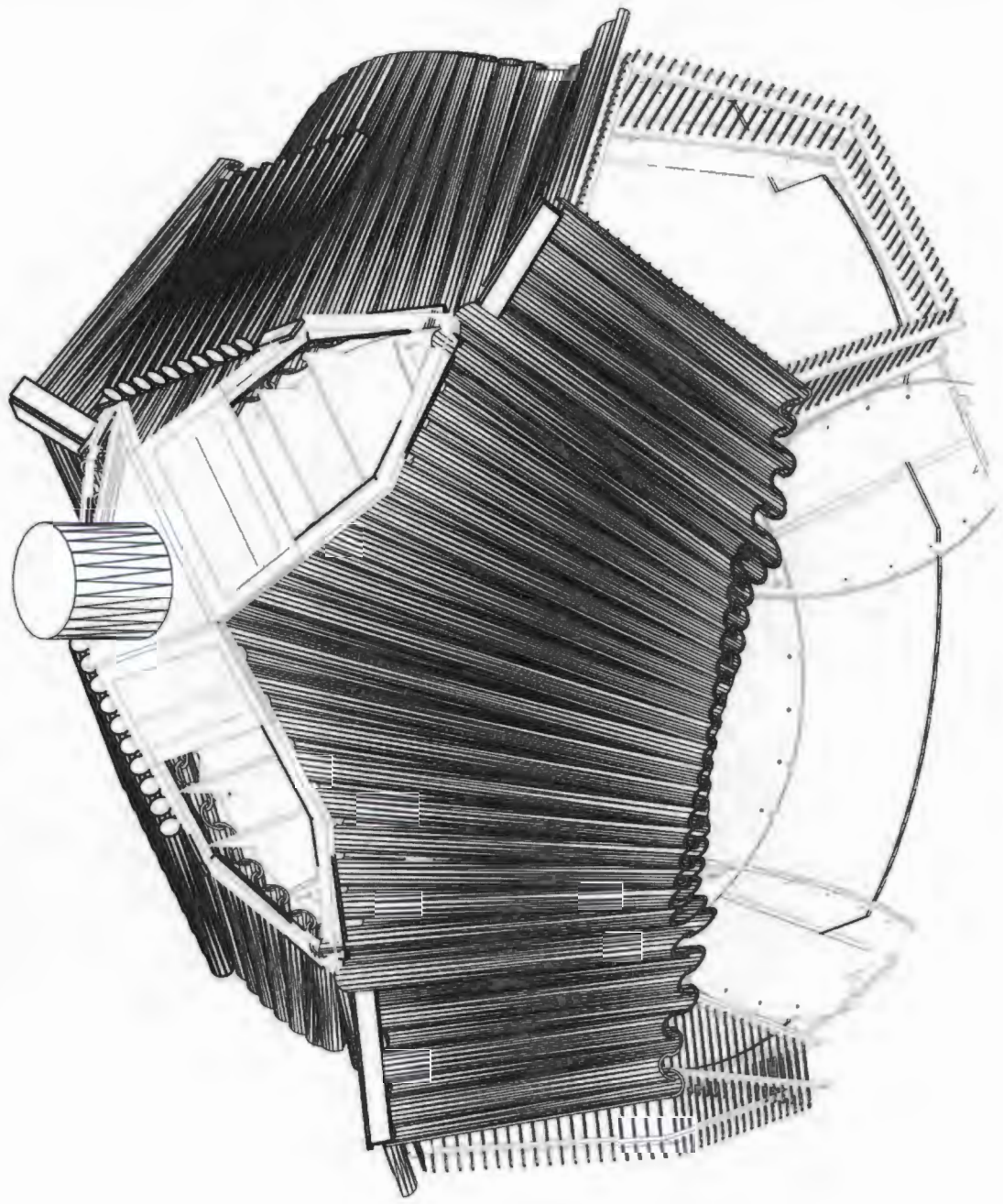
Wire frame perspective

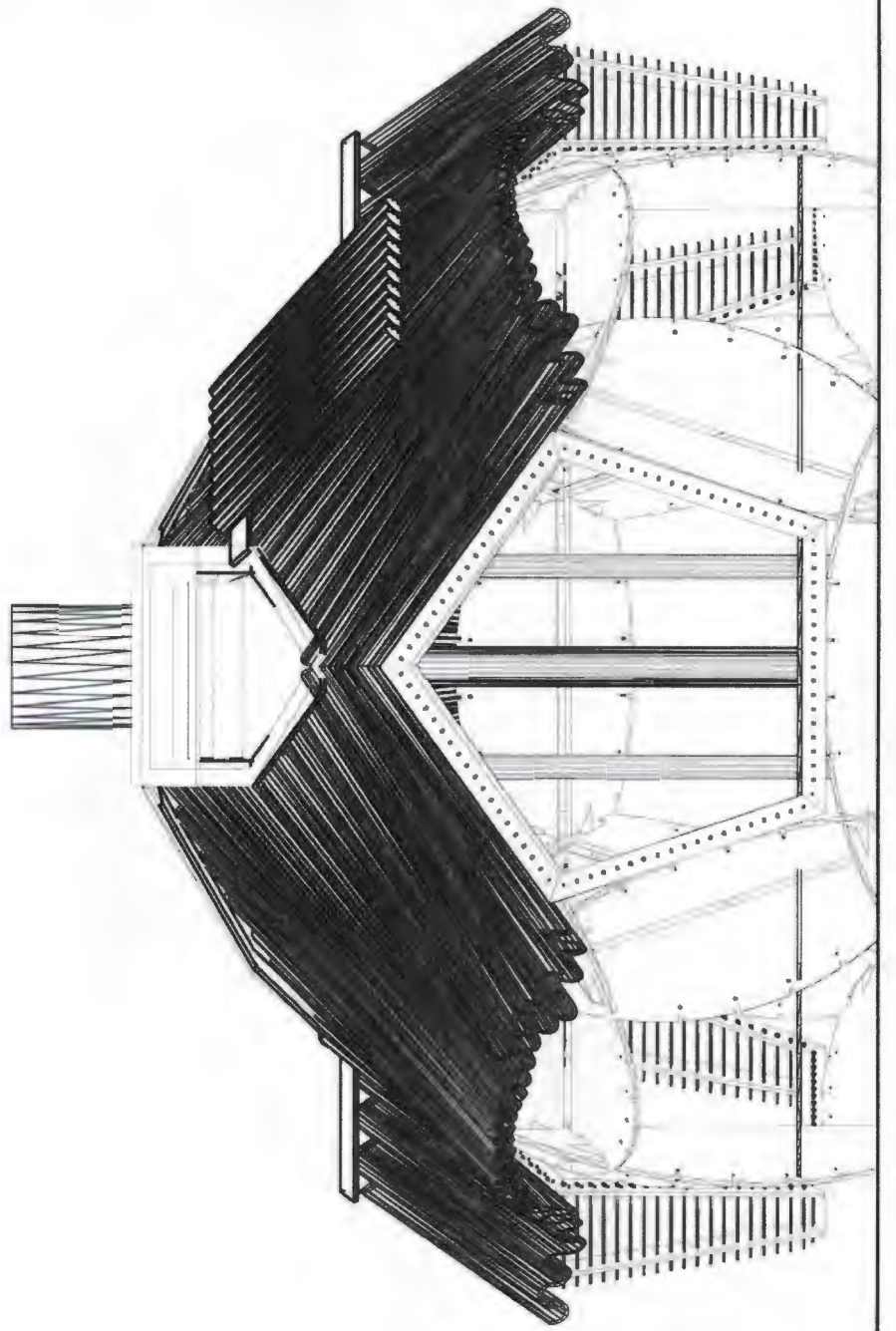


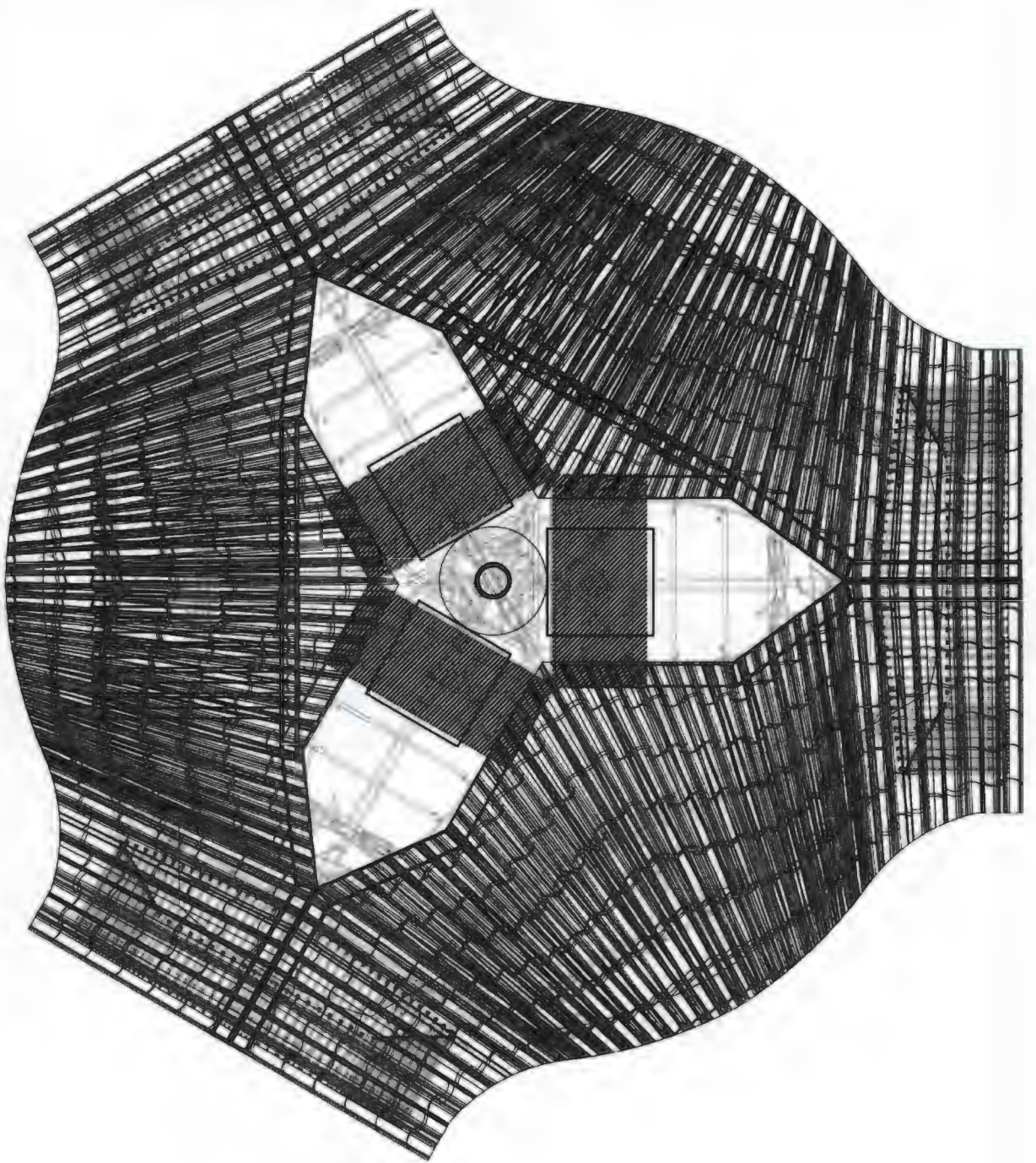
The solar collectors are connected in place



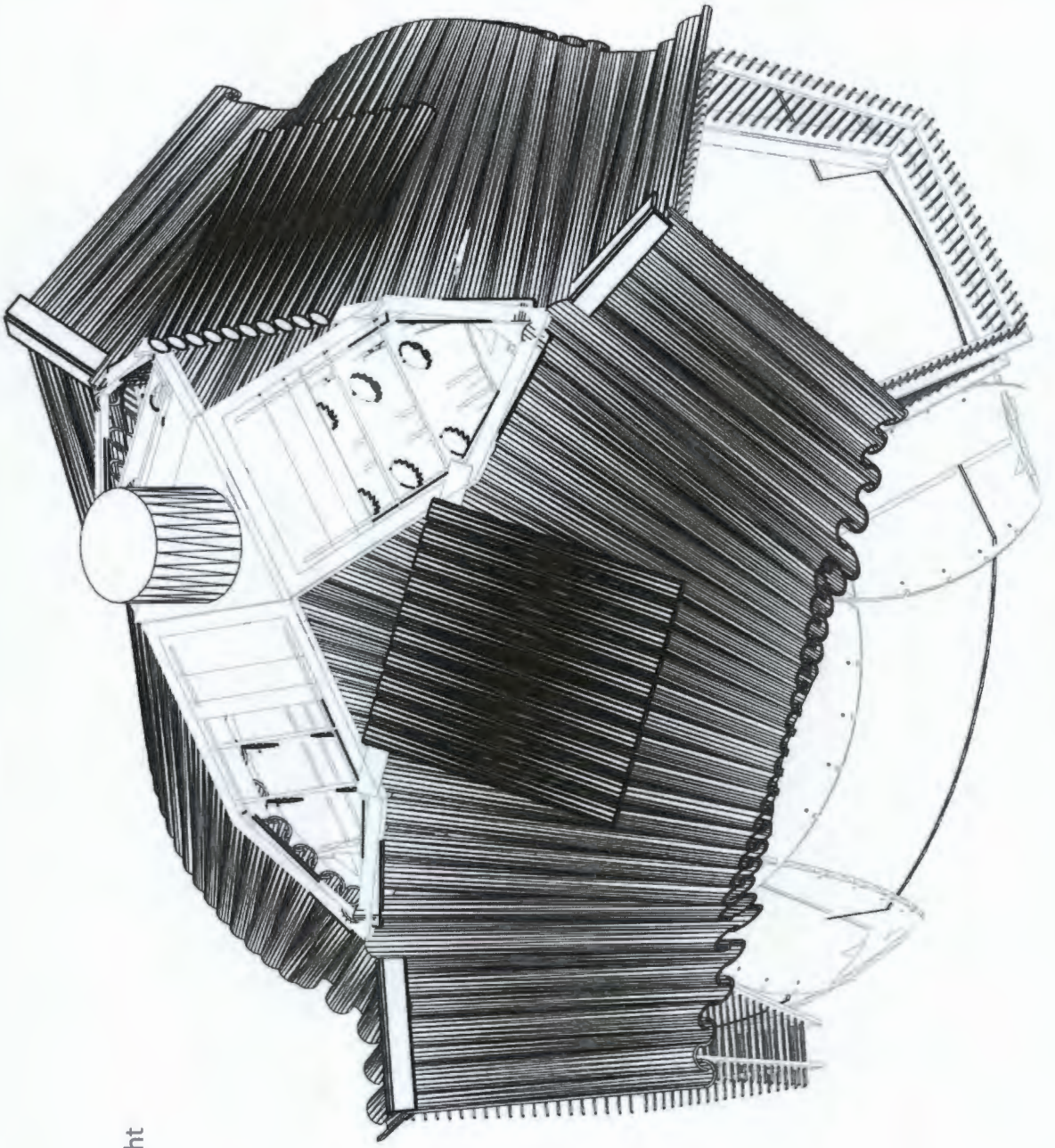
Perspective. The design allows for a versatile orientation

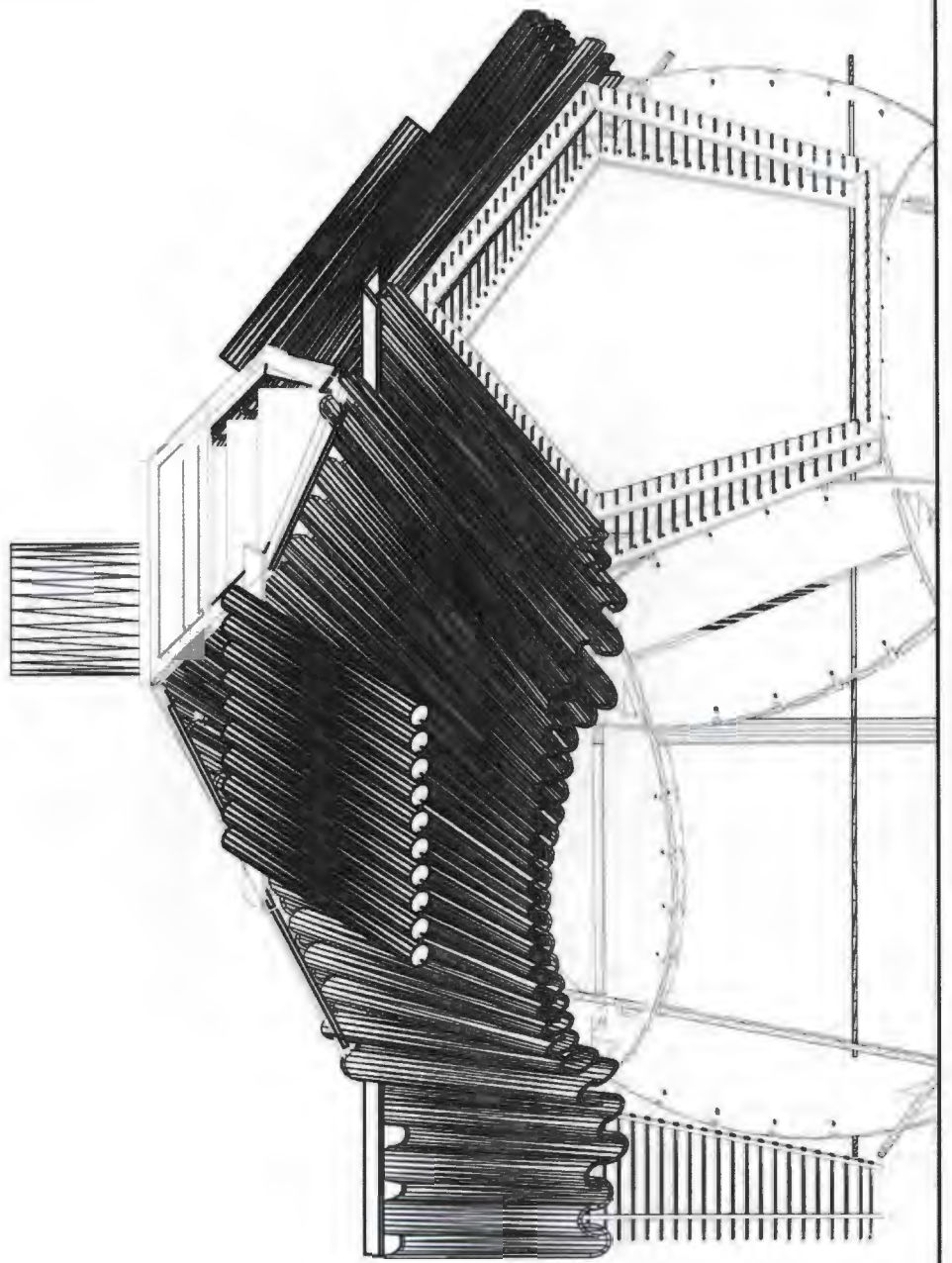




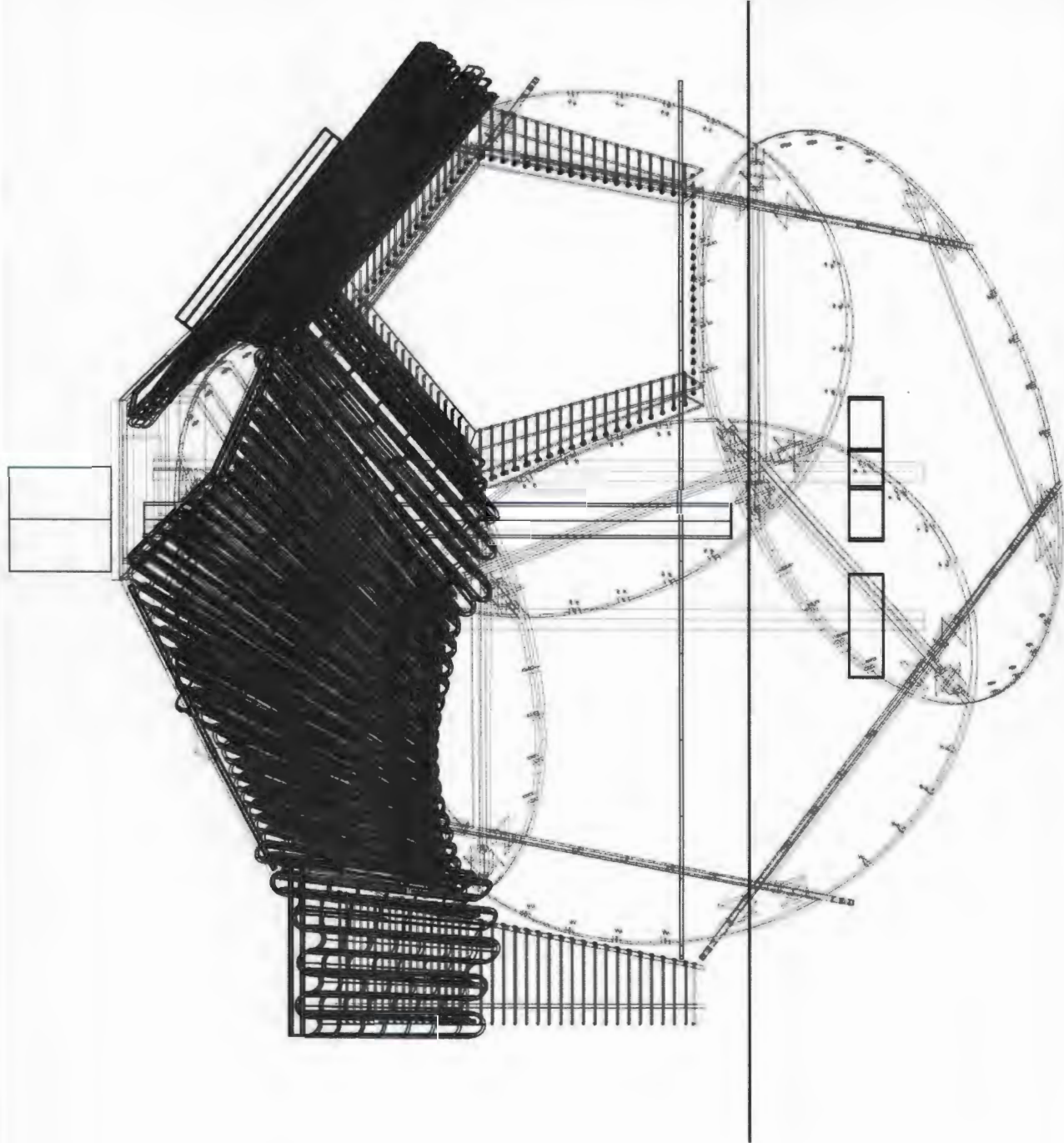


Airflow holes and internal structure of the skylight





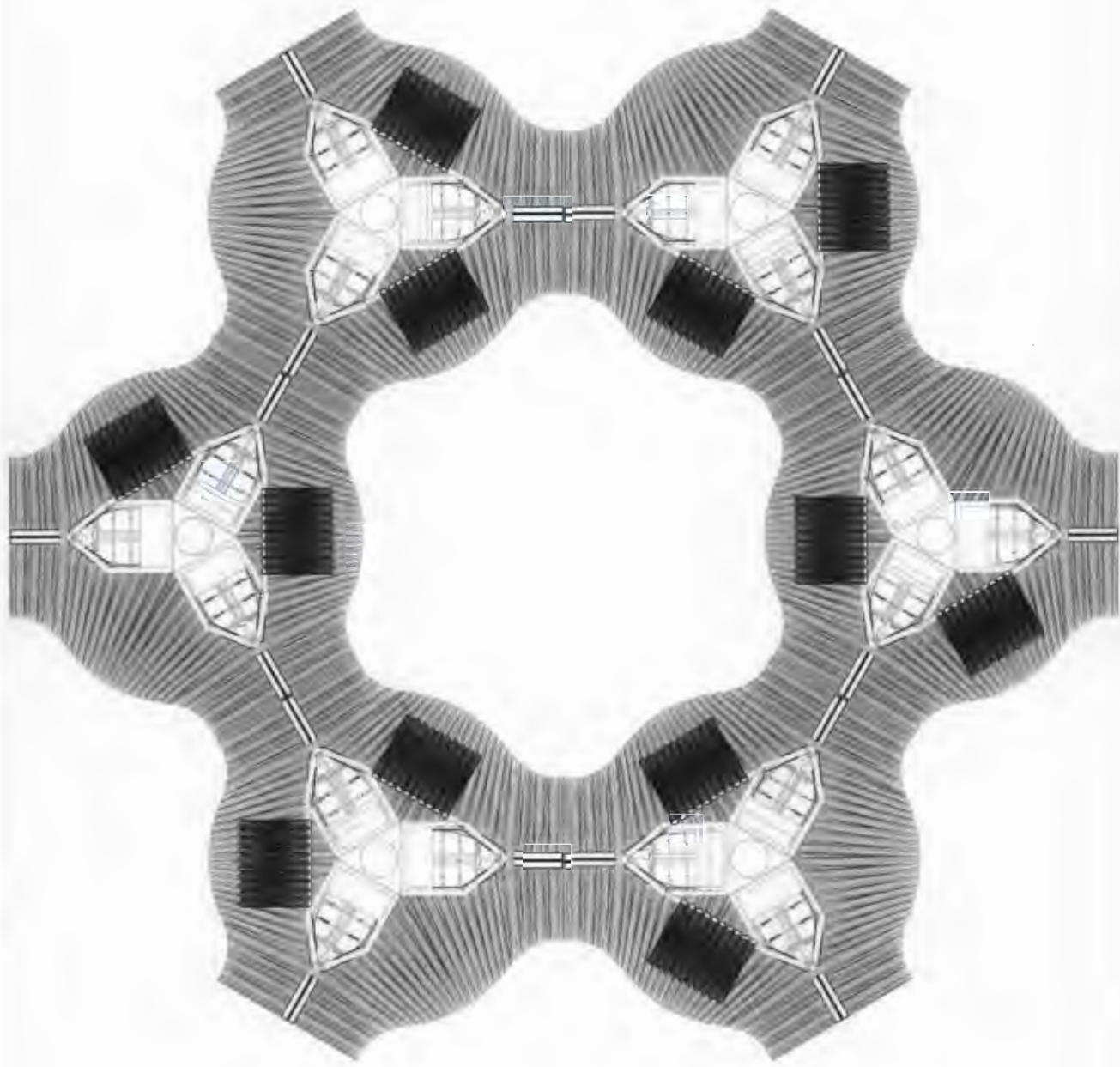
Structural section





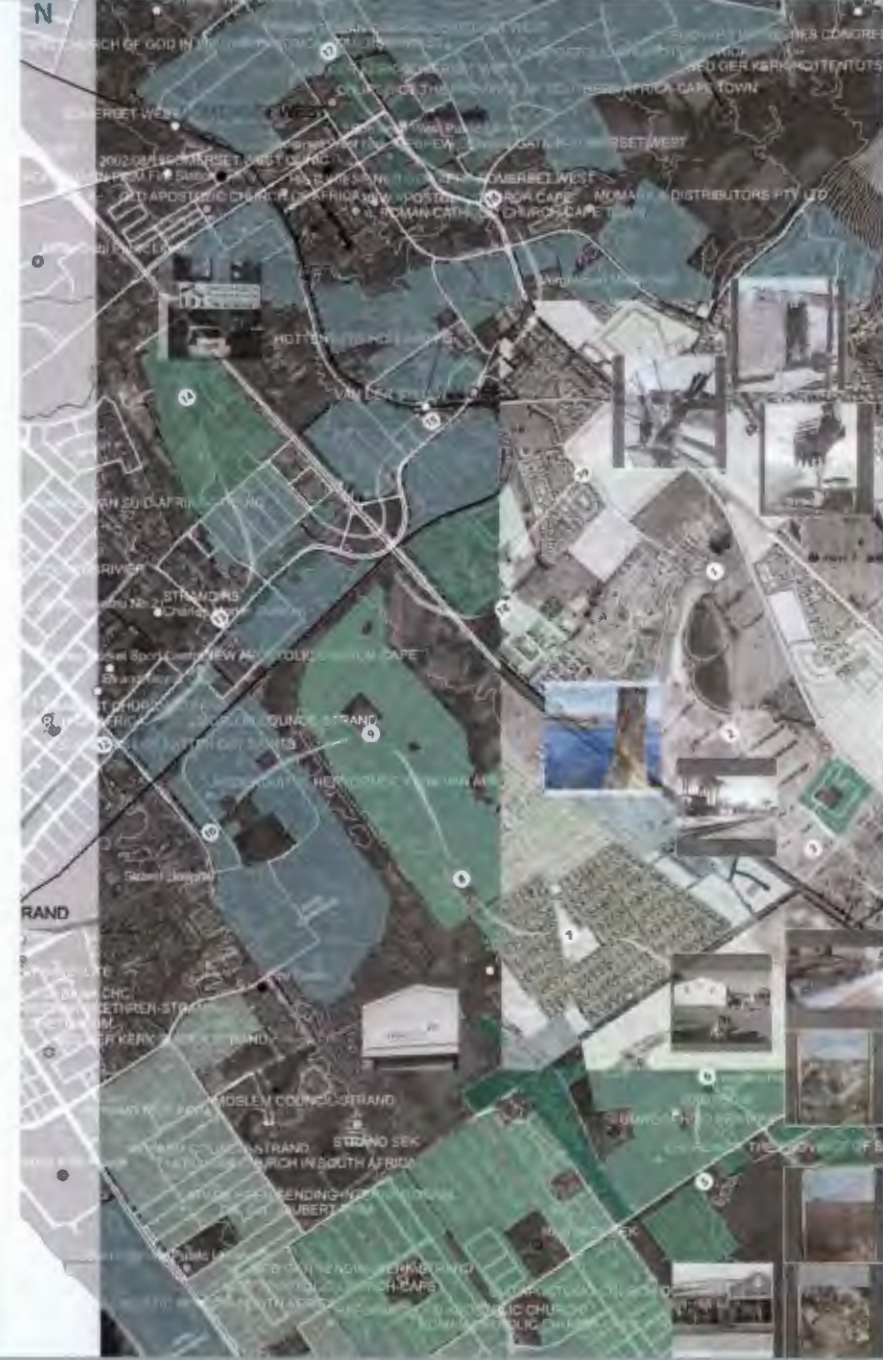


top view of possible conflict resolution centre



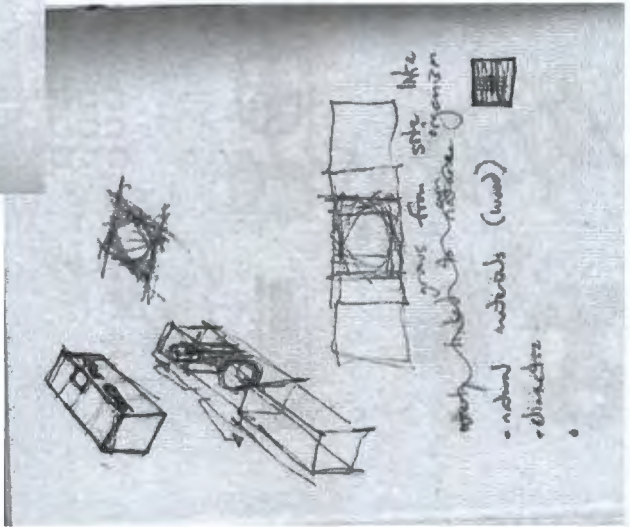
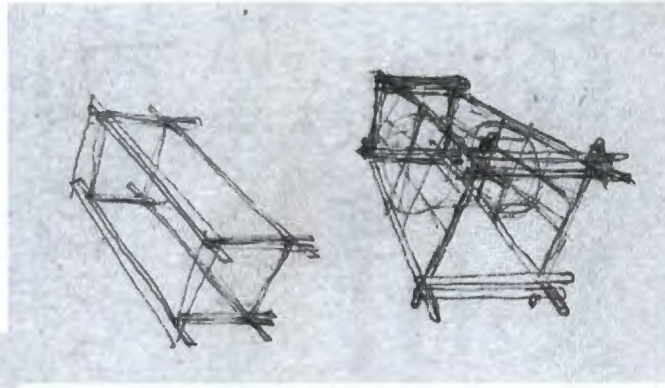
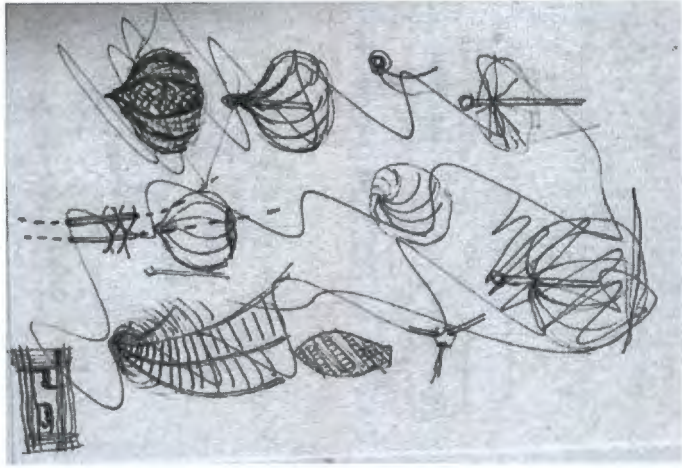
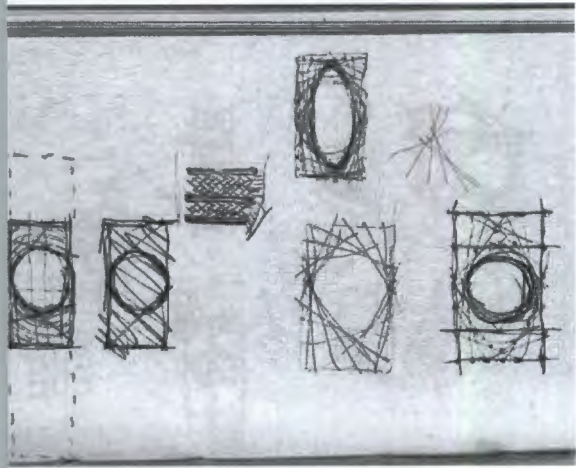
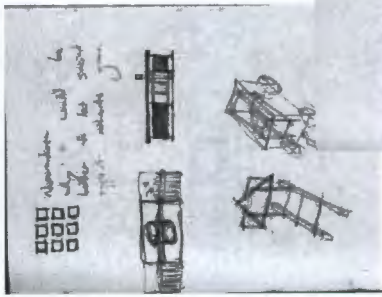
Design process

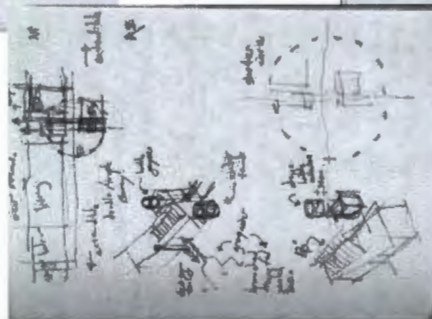
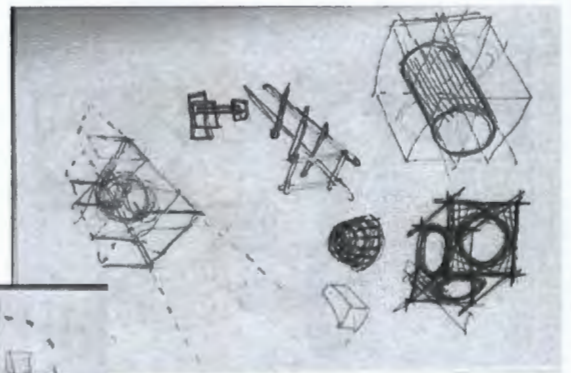
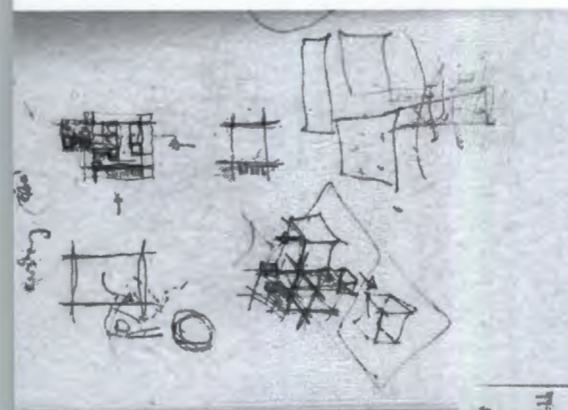
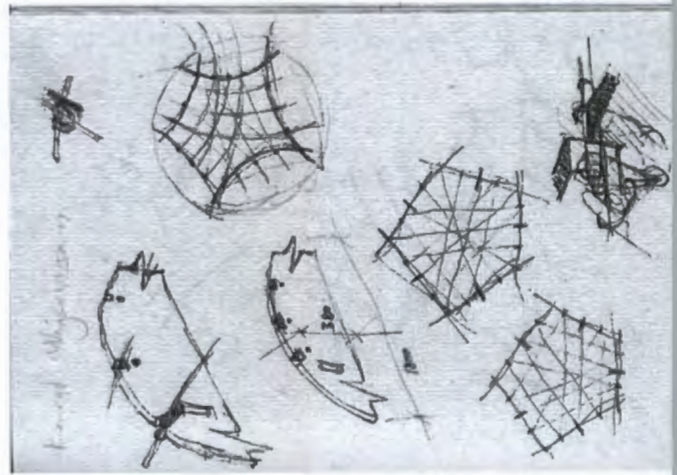
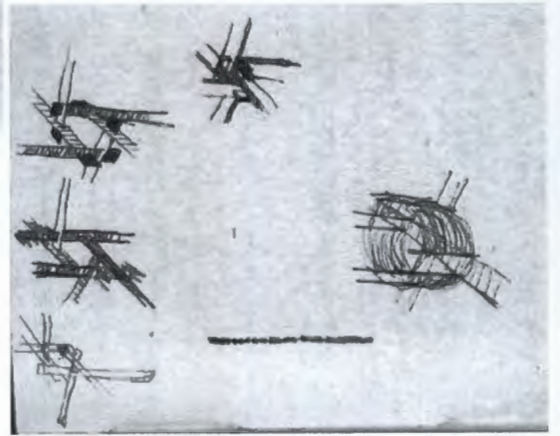
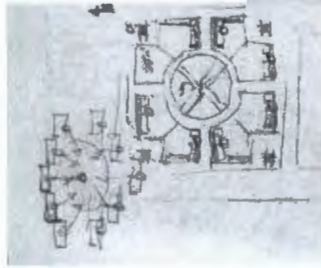
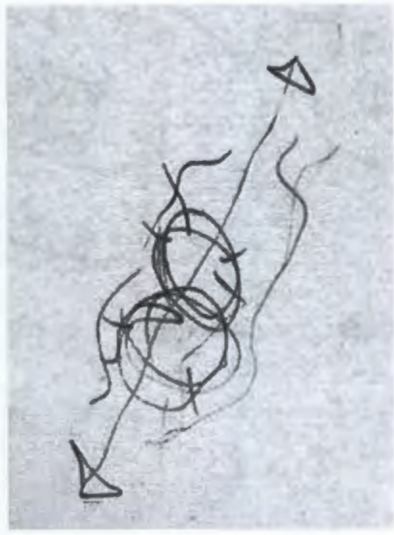
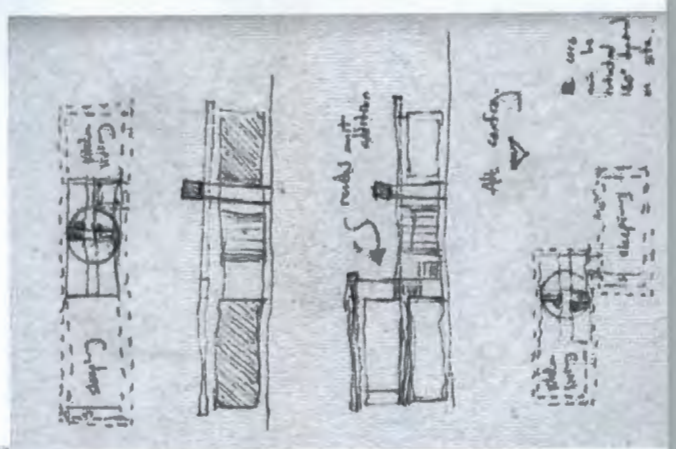
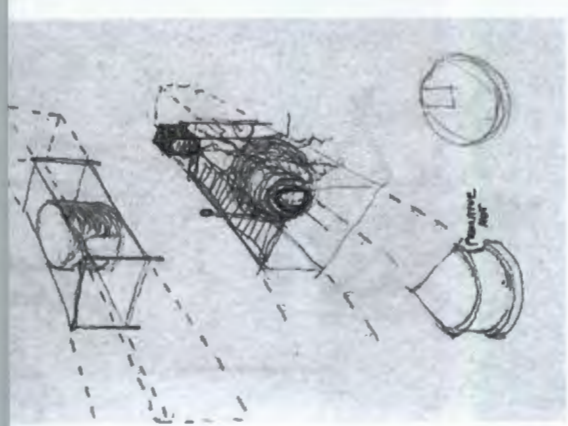
Finding the site



Initial investigation: Renewal, integration and autonomy, connections between Chris Nissen settlement, Lwandle and Sommerset West









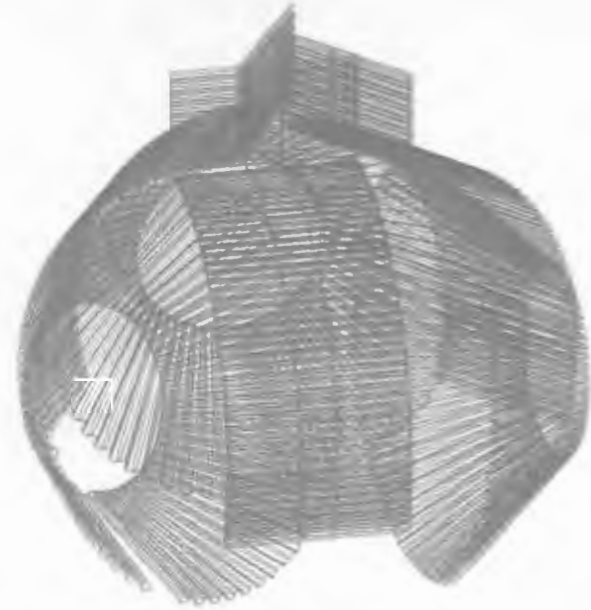
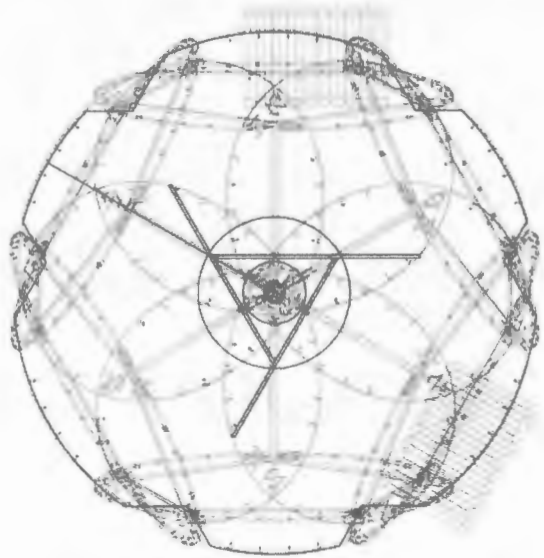
Mable



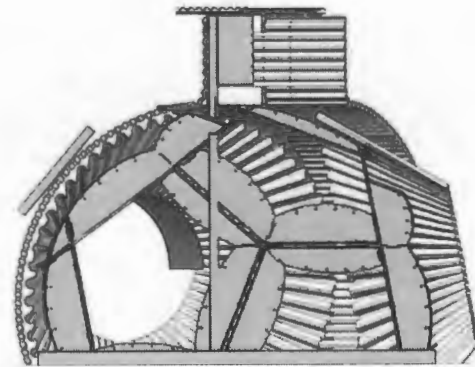
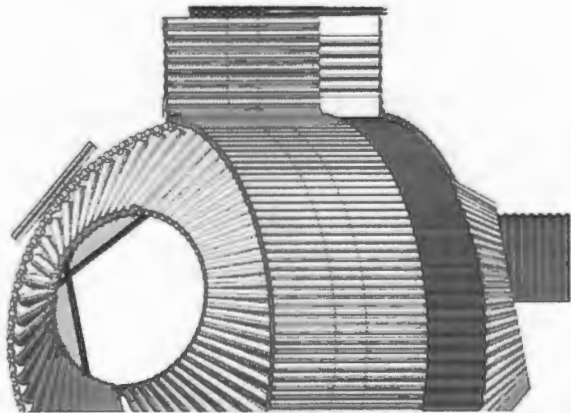
Maxwell



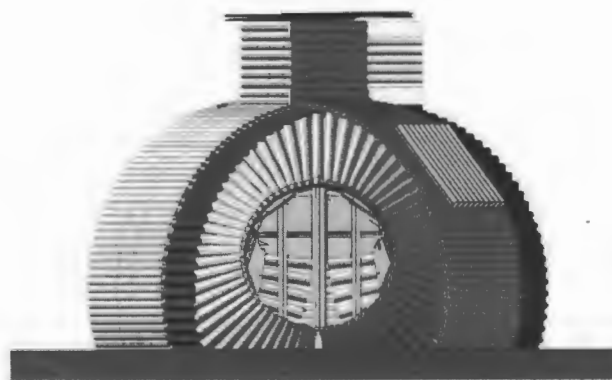
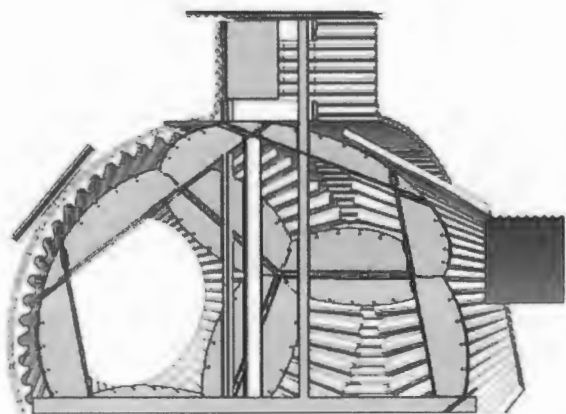
Robert



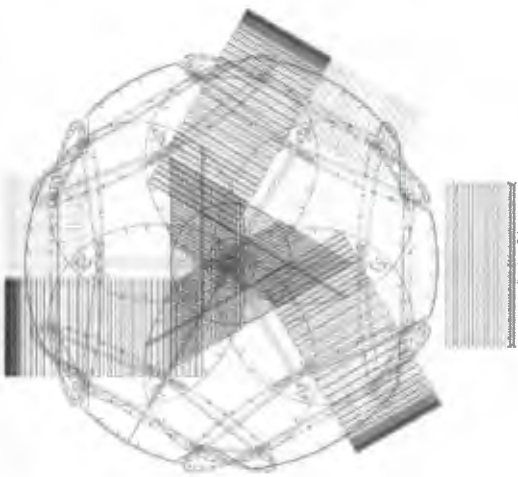
1. 60 identical laser or cnc cut shutter ply pieces slide together to form a self supporting structure. wedges reinforce each joint - making construction quick and easy.



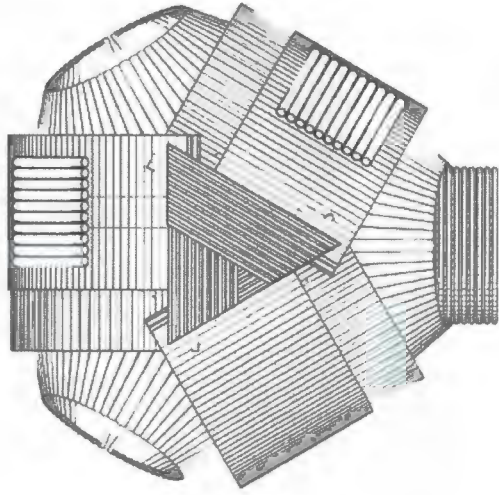
Design process continued



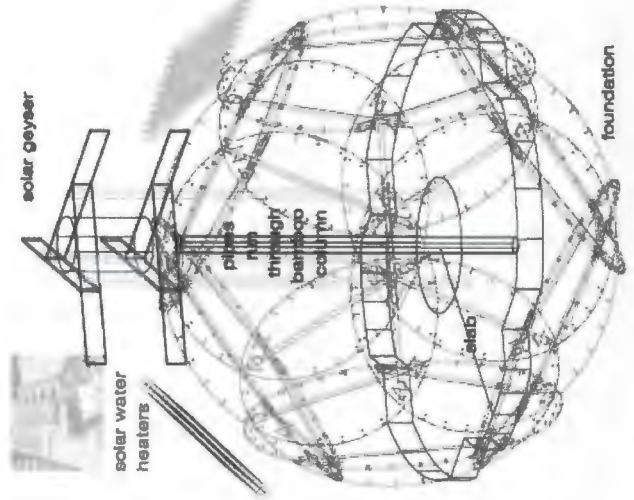
2. The structure is buried 1.5m in the earth so that it creates its own foundation. It has a 5m diameter. Split pieces of polyurethane coated bamboo form three cones (see detail 1)



3. Corrugated iron pieces are put in place



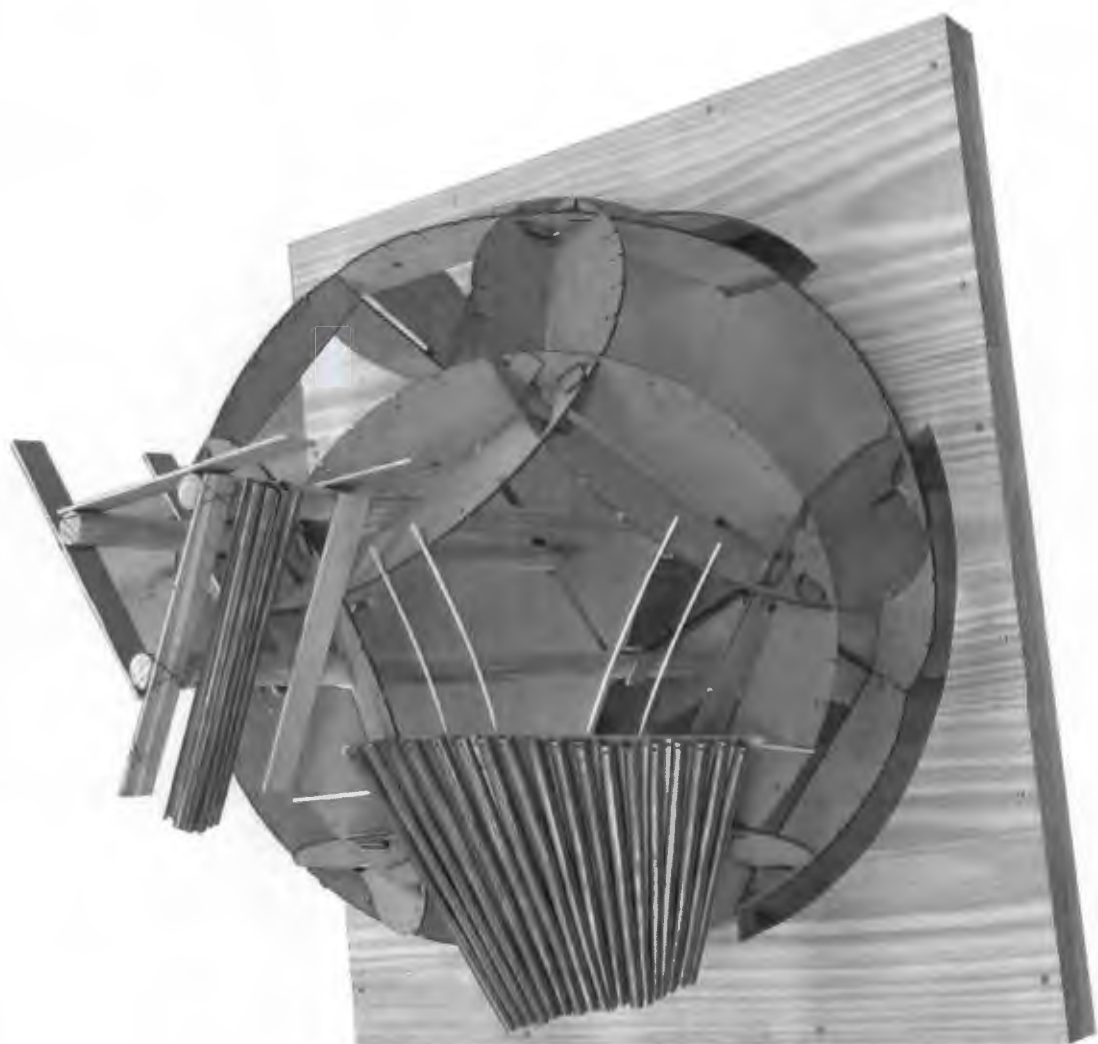
4. Three strips of polyurethane coated bamboo are tied in place to create a waterproof sphere (see detail 2). Heat from insulating concrete slab radiates into space internally

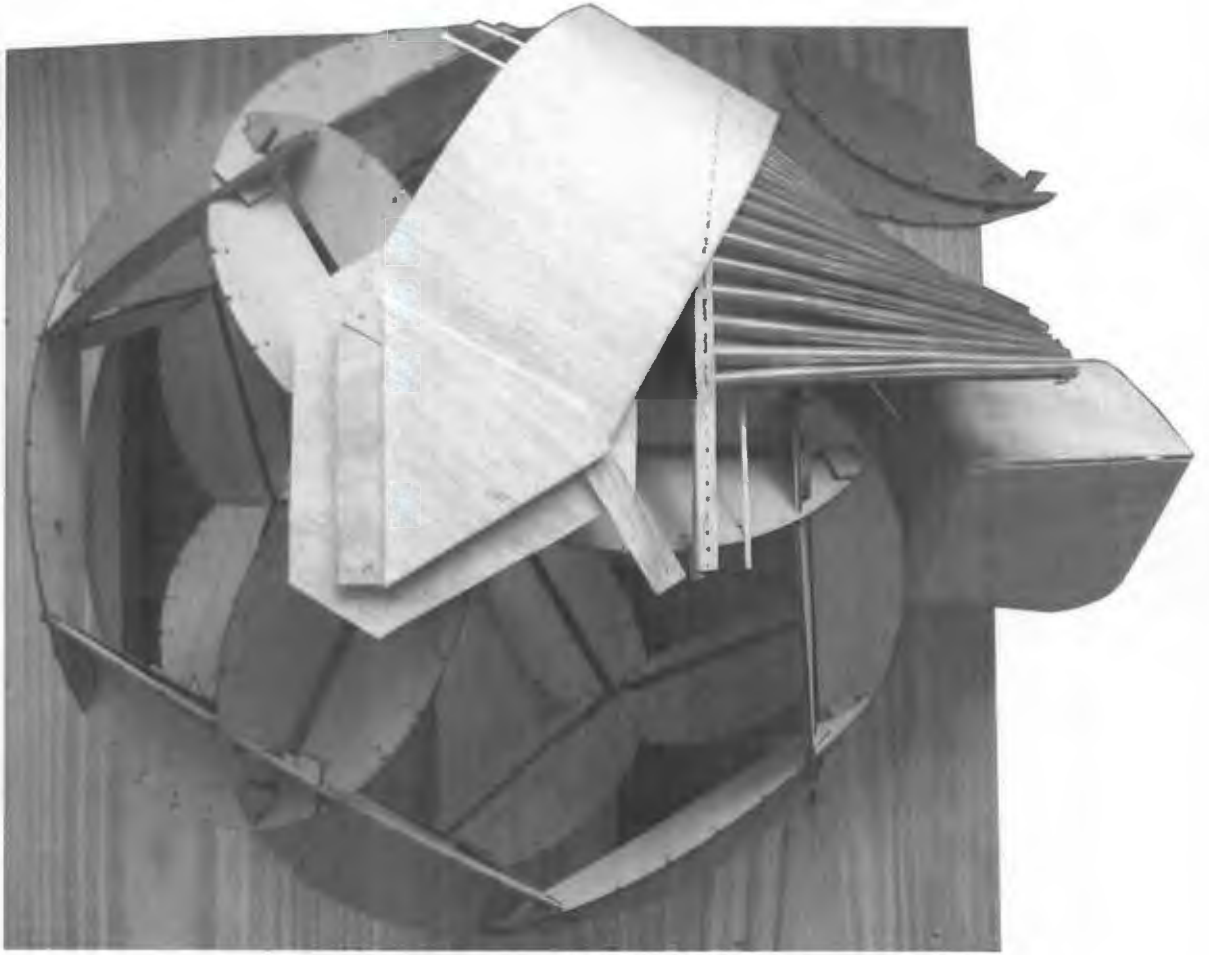


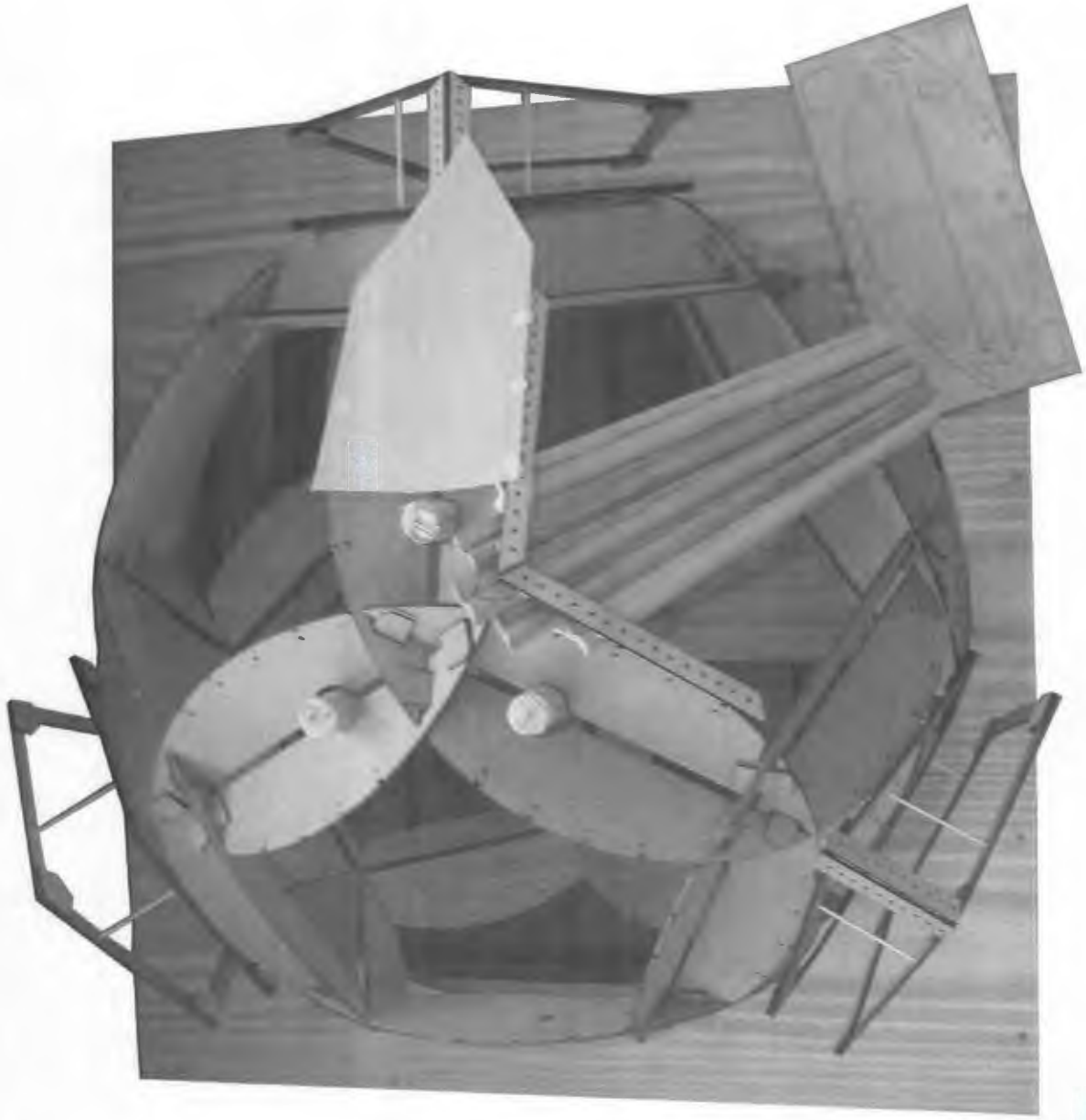
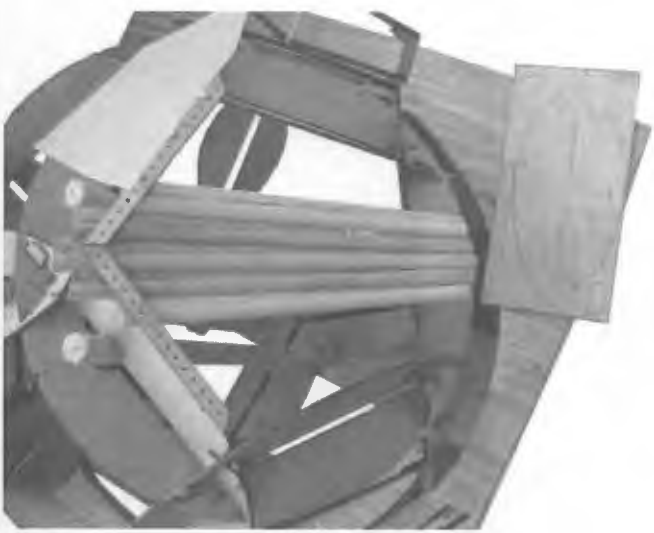












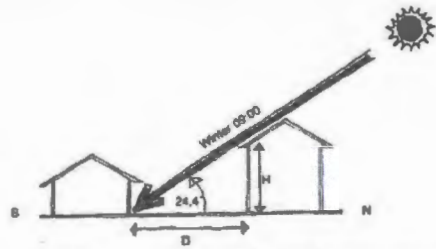


Fig. 6.2.5 – Solar access for building spacing in Cape Town. $D = 2,2H$.

Holm 1996, 15

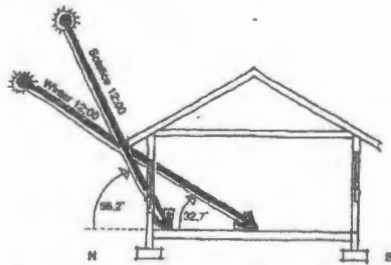


Fig. 6.2.7 – Roof overhang, window height and positioning for Cape Town.

Holm 1996, 15

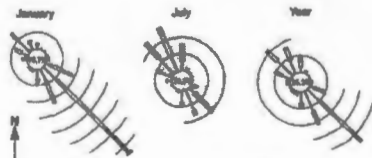


Fig. 6.2.3 – Wind rose for Cape Town

Holm 1996, 15

A healthy ecology: Climactic response

Passive design can significantly reduce the amount of energy needed to light, ventilate and heat a space. This is a significant consideration while designing for people who generally do not have enough money for food.

A window of comfort is shown below as a thick solid rectangle between 20° - 27°C. Twelve lines representing average temperatures and humidity levels in Cape Town per month span between 6° - 27°C. This Psychrometric chart represents the mass effect (a well insulated structure that stores heat from the sun – keeping a building cool in the day but radiating heat at night). Internal temperatures will remain within the window of comfort for external temperatures that fall within the dotted lines. It shows that in Cape Town even with the mass effect additional heating is required for approximately half of the winter period. In the day this can be provided by through heat from the sun (see fig. 6.2.6); which also helps to reduce humidity. At night thermal storage can take the edge off the cold. Night cooling is not required.¹

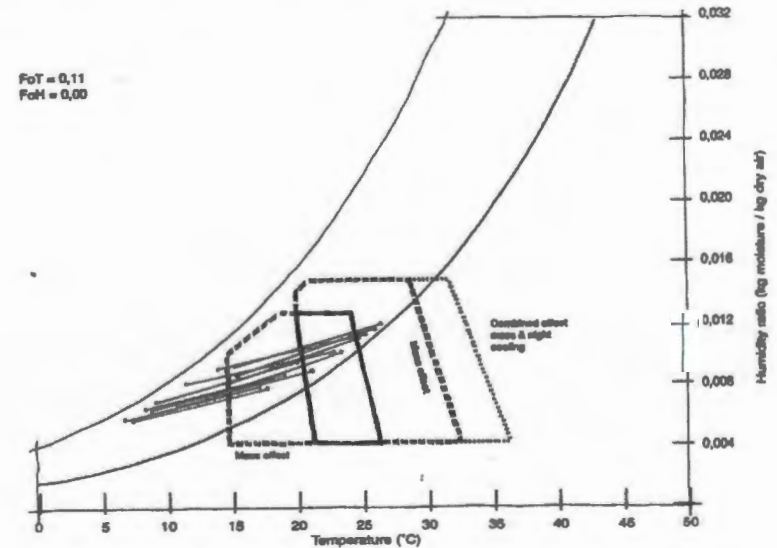
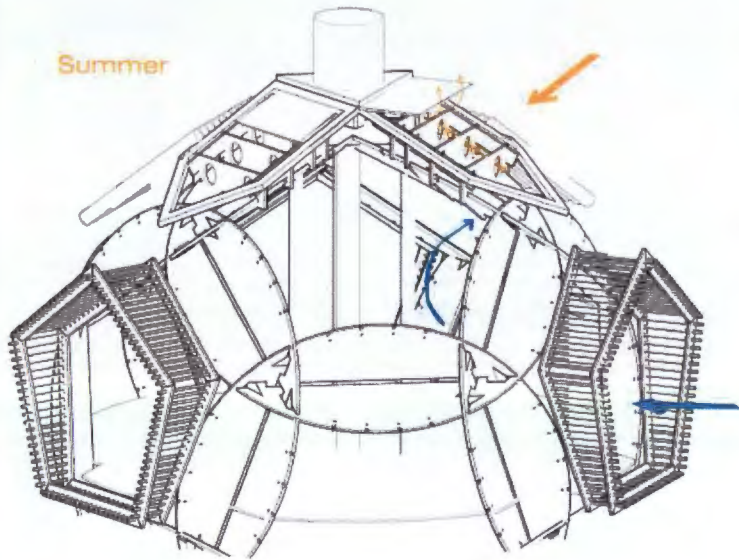


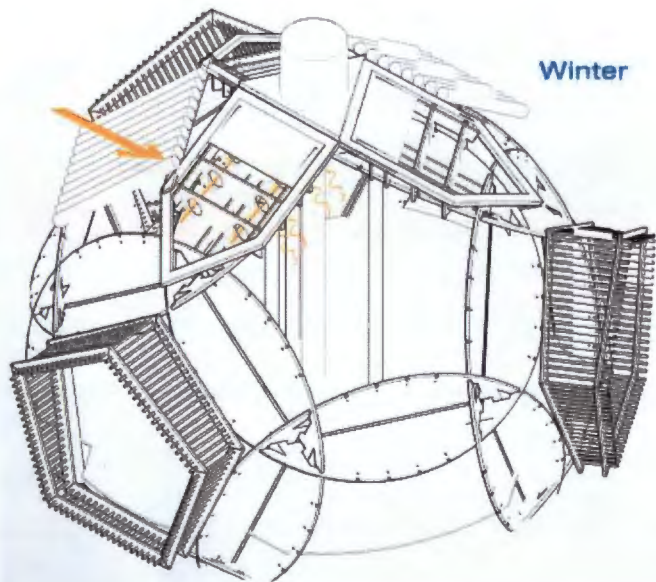
Fig. 6.2.4 – Psychrometric chart showing the enlarged comfort zone obtained by supplying more thermal mass to the structure. The combined effect of night ventilation and thermal mass on the comfort zone is also shown (right).

Holm 1996, 16

Summer



Winter



If windows face north in habitable spaces direct sun can be screened in summer and allowed into the space in winter. In Cape Town equatorial windows facing north should make up 21% of the floor area of habitable spaces. The summer sun should be screened between the equinoxes (56.20° and greater) but should be allowed in winter (down to 32.70°). Minimal air flow is 0.55m/s.² A depth of 7m from the North wall allows for good daylighting. East and West walls should be well insulated.

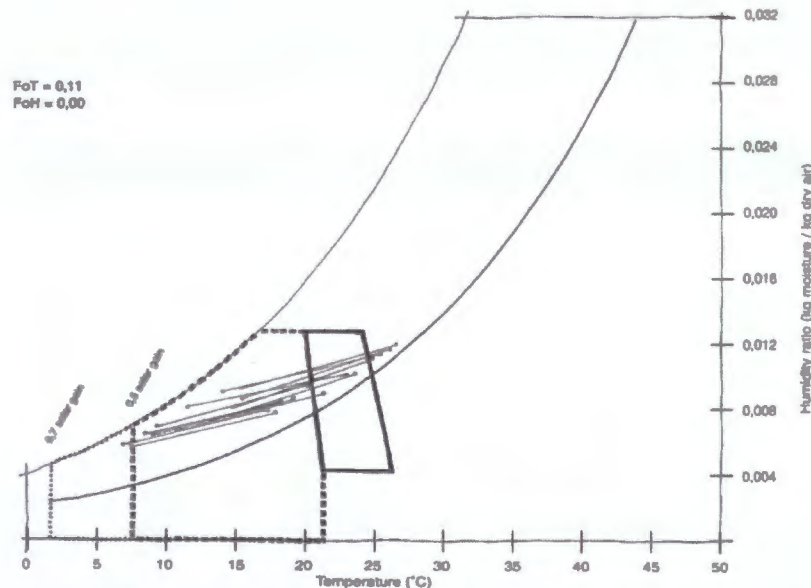


Fig. 6.2.6 – Psychrometric chart with equatorial window with efficiency of 0,5 (heavy dots) and 0,7 (light dots) and size 21% of floor area.

Since the orientation and future adaptability of the seed pod cannot be controlled a general solution has been defined using indirect light from above that heats three channels. In summer a flap is opened hot air rises through this drawing cool air in from below. In winter the flap is closed radiating heat into the structure.



Conclusion

The world's cities cannot continue to grow according to an industrial model. Its resources are being drained and the effects are most strongly felt by the poor. In South Africa the Reconstruction and Development Programme provides shelter but it is inflexible and is incapable of adapting to social and ecological conditions. In nature every system helps and supports the other. This is only possible if systems are capable of adaptation over time the complexities of all elements are woven into their relationship.

"The ruin restores man to nature. Rust on the other hand confines him in the middle of his productions as if within a prison, a prison all the more terrible since he is the builder."¹

People derive meaning through the process of occupation. In conditions of rapid growth social support networks can be maintained or established if users are part of the construction process. It is also vital that a settlement has the capacity to adapt so that people can take advantage of opportunities. A financially sustainable framework is required so that the system does not decay over time.

To create a liveable environment for the displaced poor a settlement needs to grow from and respond to all of the elements that immediately surround it (like an organism). In this way a positive and sustainable relationship can be established between them.

The method derived here is intended to respond to the housing need without destroying social capital or acting as a burden on the economy, simply because users would have to take ownership of the project and work together to get it done.

By using local skills and materials and responding to the context, the technology becomes site based and sustainable. John Turner describes market networks as achieving 'extraordinary economies' far better than a model using large commercial contractors.

By giving people the opportunity to respond to their own needs both in terms of the size, location and future adaptability of the place they live the condition of displacement could slowly be unwound.



"Housing of South Africa's poor seems a great opportunity - to develop building skill, to give a chance to small emerging contractors, to provide ongoing employment, to evoke a pride in place, to make better, more sustainable living environments and, not least to connect the fractured components of the cities. But this has not happened."²

"Architecture cannot be seen as completed once it has been erected."³

The model should have the capacity to deal with rapid growth in a financially sustainable framework. Fiona Ross describes how "residents rework the authoritative with their own version of the ethical"⁴, and that "material need [creates] networks of mutual obligation."⁵

The creation of vast monotonous and unpleasant development for the poor is not ideal and does little to address the insecurities of the displaced. Violent crime and hunger continue to grow. These elements cannot be solved by any housing scheme but social support networks do at least generate a communal sense of ethics, and if people have hope and motivation good things can happen.

Where people are allowed to adapt over time to the intricacies of a site the elements of history, ethnography and process driven development are naturally woven into the urban fabric. It is only when they are evidently missing that intervention becomes necessary. The displacement of a community into a prefabricated and monotonous environment is usually the cause for the erosion of historical rootedness and a brake down of social capital. In South Africa this phenomenon occurred at a huge scale and over an extended period of time. The scale of the problem was so large that a general solution in the form of RDP housing was devised. Fiona Ross describes a condition of rawness – a state of living that is less than human – on the edge of wildness.

"The post Apartheid tragedy is two-fold: That rawness exists and that individuals believe that they are solely responsible for it."⁶


2 (Cooke 2009 March/April)

3 (Yeang 1995, 83)

4 (Ross 2010, 102)

5 (Ross 2010, 125)

6 (Ross 2010, 241)




It seems that South Africa has reached a stage where localised intervention such as that of Turner and Fathy are necessary to combat the creation of placeless spaces.

Along with the lack of opportunity due to geographical location monotonous low quality high density housing schemes generally contribute to crime as a legitimate alternative to regular employment. The result is a pattern of segregated enclaves generally divided by physical boundaries such as highways or railway tracks. Rich gated communities develop on the more scenic land behind triple strand electric fences and the poor on the less attractive side of the boundary in very badly planned low density clusters of identical housing. Any natural open space becomes unsafe and unused. Problems in the urban fabric just tend to intensify and the division between rich and poor continues to grow. A survey for the period 1998–2000 compiled by the [United Nations Office on Drugs and Crime](#) ranked South Africa second for assault and murder (by all means) per capita and first for rapes per capita⁷ of the 60 countries included.

Many of the most beautiful and lasting architectural spaces in the world are those that are indivisibly part of their physical and cultural landscape. Making durable structures in this way can be difficult and expensive. An appropriate level of durability therefore needs to be found corresponding to the significance of a civic structure. Housing autonomy allows people to upgrade their houses when necessary rather than letting them fall into a state of disrepair. It also means that people take ownership in creating a rich urban fabric that builds social support networks when times are hard.

In many ways RDP housing continues to echo apartheid planning – reinforcing segregation and eroding social movement patterns, erasing gathering spaces and any previous formation of identity as a community, a connection to the land is also lost, but most importantly the centralized and hierarchical government structure controlling RDP housing means that the user has virtually no say in where they will land up and what their prospects will be.

In summary history, ethnography and the potential for process driven development are some of the important tools that have been successfully used in the past to allow a place based architecture to emerge, and this is the condition required in South Africa. The seed pod facilitates this process in a rapidly changing global context so that rather than slums we have ecologies.



Bibliography

Abrahams, Dan Smit and Gemey. *Incrementally Securing Tenure An Approach for Informal Settlement Upgrading in South Africa*. Hatfield: Urban Land Market, 2010.

Borras. *Arquitectura Finlanesa*. Barcelona: Ediciouness Poligrefa, 1997.

contributors, Wikipedia. *Natural selection*. Date of last revision: 2 October 2010 21:16 UTC. http://en.wikipedia.org/w/index.php?title=Natural_selection&oldid=388348592 (accessed Date retrieved: 4 October 2010 06:35 UTC).

Cooke, Julian. "Taking the opportunity." *Journal of the South African Institute of Architects*, 2009 March/April: 001.

Cowen, Anna M. *Making public spaces in areas of great need: The spatial design disciplines at work in Philippi Cape Town*. Master of Philosophy, Cape Town: University of Cape Town press, 2003, 1-112.

crime, United Nations Office on drugs and. *Crime Survey 1998-2000*. <http://en.wikipedia.org/wiki/Crime> (accessed February 27, 2010).

Culture, Fundacion Internacional de Sintesis Arquitectonica and The Aga Khan Trust for. *Architecture for a changing world*. Malaga: Graficas Urania, 1999.


Cuyer, Annette Le. *Radical Tectonics*. New York: Princeton Architectural Press, 2001.

David Dewar, Fabio Todeschini. *Urban management and economic integration in South Africa*. Cape Town: Francolin Publishers, 1999.

David Dewar, Uytenbogaardt. *Creating vibrant urban places to live: A primer*. Cape Town: Head-start Developments, New Housing Company, 1995.

Data file, Preserved treated plywood, <http://www.gp.com/BUILD/DocumentViewer.aspx?repository=BP&elementid=3839> accessed 16/08/2010

Department, Spatial Planning and Urban Design. *Cape Town Spatial Development Framework 2nd public consultation draft*. 2009. <http://www.capetown.gov.za/en/sdf/Pages/default.aspx> (accessed September 13, 2009).



Dewar, David. *Accommodating informal settlements: Policy and design lessons from South Africa*. Cape Town, manuscript.

Dewar, David. "Design as a catalyst for social change." *ARCCA* 4(2), 2004: 25-31.

Dewar, David. "The potential role of housing policy as a broader development instrument in South Africa." *Journal of the South African Institute of Architects*, 2009 March/April: 8-13.

Eglash, Ron. African fractal settlement patterns. 06 2007. http://www.ted.com/talks/lang/eng/ron_eglash_on_african_fractals.html (accessed 08 16, 2010).

Fathy, Hassan. *Architecture for the poor*. Chicago: The University of Chicago Press, 1973.

Fitcher, John F C Turner and Robert. *Freedom to build: Dweller control of the housing process*. New York: The MacMillan Company, 1972.

Holm, Dieter. *Manual for energy conscious design*. Pretoria: Department Minerals and Energy, Directorate of Energy Development, 1996.

Ingold, Tim. *The perception of the environment*. New York: Routledge, 2003.

Isabelle Delannoy, Denis Carot, Yen Le Van. *Home*. Directed by Yann Arthus-Bertrand. Narrated by Isabelle Delannoy. 2009.

J F Whittal, I F Muzzonda, D Dewar and M B Barry. "Informal settlements: Breeding grounds for conflict." *South African Barometer: Tracking Socio-political trends* 2(2), 2004: 5-8.

Low, Ian. "A city under transformation." *Journal of the South African Institute of Architects* Jul/Aug, 2004: 42-48.

—. "Design as an instrument in transformation, settlement as empowerment opportunity for socio-economic development." *XXXIII International Association of Housing Science*. Pretoria: ISBN 1-86854-627-6 CD-ROM, 2005.

CCA Environmental (Pty) Ltd. *Proposed Dfirtsands human settlement project*. FINAL ENVIRONMENTAL IMPACT REPORT, Cape Town: Department of Environmental Affairs and Development Planning, 2010 July.



Martin, James. *The meaning of the 21st century*. London: Transworld publishers, 2006.

McDonough, William, and Michael Braungart. *Cradle to cradle: Remaking the way we make things*. New York: North Point Press, 2002.

Nesbit, Kate. *Theorizing a new agenda for architecture*. New York: Princeton Architectural Press, 1996.

Ogunfitimi. *Assesment of structural quality of houses delivered through the people's housing process*. Construction management and quantity surveying dissertation, Johannesburg: University of Johannesburg, 2008.

Olivera, Olivia De. *2G Lina Bo Bardi – Built Work*. Madrid: Gustavo Gili, 2003.

Organization, The Shelter. *Shelter*. Bolinas, California: Shelter Publications, 1973.

Picon, Antoine, and Karen Bates. "From ruin to rust." *Grey Room*, 2000: 64-83.

Porphyrus, Demitri. *Sources of Modern Eclecticism: Studies on Alvar Aalto*. Academy Editions Ltd, 1982.

Ross, Fiona. *Raw Life New Hope: Decency housing and everyday life in the post apartheid community*. Cape Town: UCT Press, 2010.

RODNEY C. DEGROOT, LEE R. GJOVIK, DOUGLAS CRAWFORD, BESSIE WOODWARD. *FIELD DURABILITY OF CCA- AND ACA -TREATED PLYWOOD COMPOSED OF HARDWOOD AND SOFTWOOD VENEERS*. Madison: Foresr Products Society, 1998.

Rust, Kecia. "Fin Mark Trust making financial markets work for the poor." *Analysis of South Africa's housing sector performance*. December 2006. <http://www.finmarktrust.org.za/documents/HSectorPerformance.pdf> (accessed 8 16, 2010).

Tony Barber, VuyisileZenani. *Social impact assesment for the proposed driftsands human settlement project*. Executive summary, Cape Town: CCA Environmental Pty (Ltd), 2009.

Watson, Vanessa. "Engaging with difference: Understanding the limits of multiculturalism in planning in the South African context." In *Desire Lines: Space memory and identity in the post-apartheid city*, by Noeleen Murray et al, 67-75. New York: Routledge, 2007.



Werlin, Herbert. "The slum upgrading myth." *Urban Studies Journal Limited* 36, no. 9 (1999): 1523-1534.

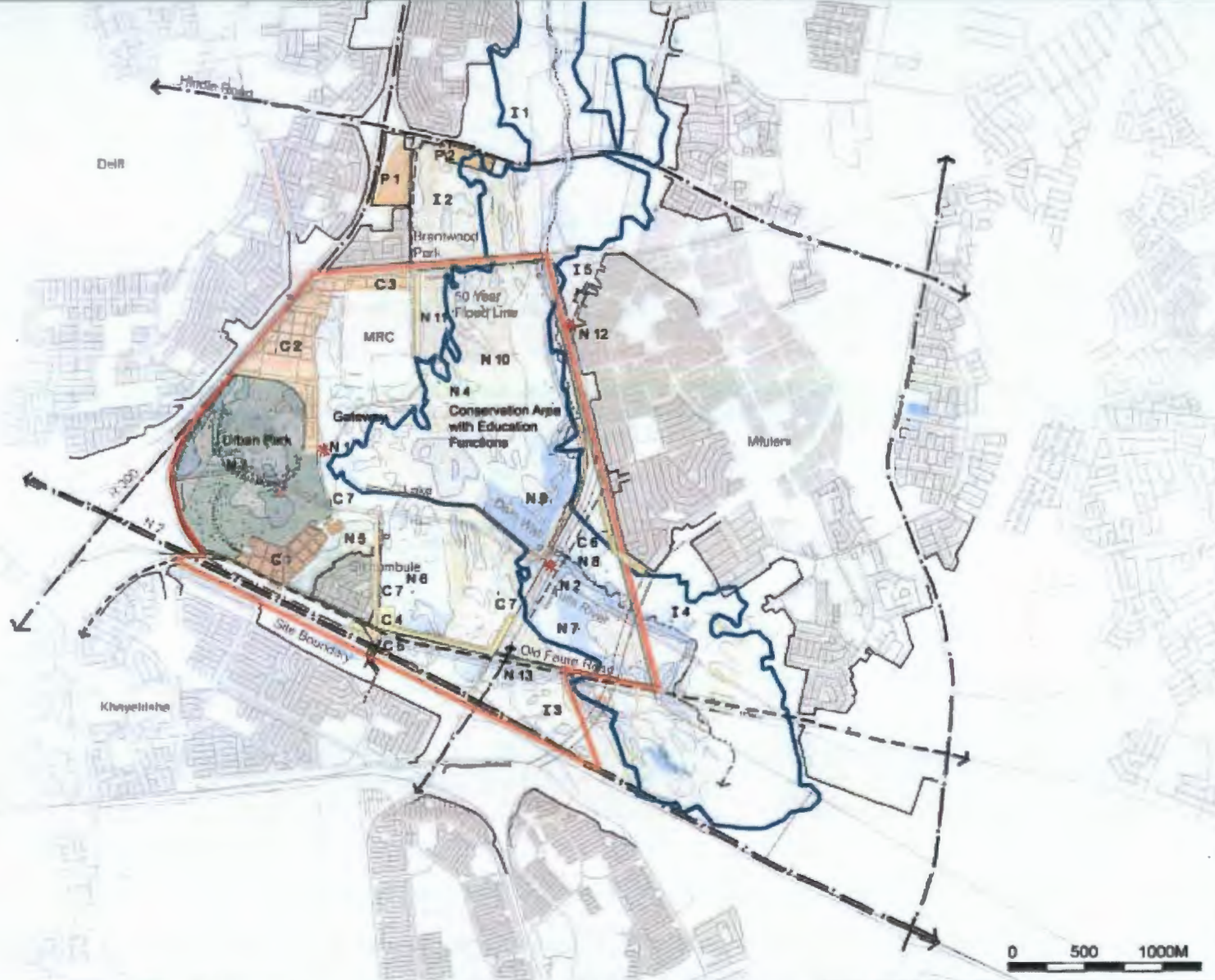
Yeang, Ken. *Designing with nature: the Ecological Basis for Architectural Design*. Ohio: McGraw-Hill, 1995.


Policy documents

1. Department of Housing (1994) Housing White Paper
2. Department of Housing (2004) "Breaking New Ground" – The Comprehensive Plan for the Development of Sustainable Human Settlements.
3. People's housing process (2008) part 3 of the housing code)

Appendix 1: I have included the table of contents from the Environmental Impact Assessment for Driftsands Nature Reserve to give an indication of the scope of the study undertaken by CCA Environmental and several figures from the detailed planning scheme by ARG

Proposed Driftsands Human Settlement Project: Final Environmental Impact Report		Proposed Driftsands Human Settlement Project: Final Environmental Impact Report		Proposed Driftsands Human Settlement Project: Final Environmental Impact Report	
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EXPERTISE OF ENVIRONMENTAL ASSESSMENT PRACTITIONER.....					
EXECUTIVE SUMMARY.....					
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1.2 TERMS OF REFERENCE.....		4.1.2.3 Harvesting of vegetation.....		5.2.3 Graves and burials.....	
1.3 ASSUMPTIONS AND LIMITATIONS.....		4.1.3 Demographic overview.....		5.2.4 Cultural landscape.....	
1.4 WAY FORWARD IN THE EIA PROCESS AND AVAILABILITY OF THE REPORT.....		4.1.3.1 Population.....		5.3 TRAFFIC.....	
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2.1.2 National Environmental Management Act, 1996.....		4.1.3.6 Employment status.....		5.4 Vegetation.....	
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3.2.3.2 Los Angeles precinct.....		4.1.7.6 Protected structures.....		6.2.2.4 Other.....	
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3.2.5 Services.....		4.2 BIOPHYSICAL ENVIRONMENT.....		6.2.3.1 Social and heritage.....	
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		5.1.2 Operation (or developed) phase.....			
		5.1.2.1 Provision of housing and community facilities.....			
		5.1.2.2 Securing the future of Driftsands Nature Reserve.....			
		5.1.3 Construction phase.....			
		5.1.3.1 Creation of employment and business opportunities.....			
		5.1.3.2 Impact of construction vehicles.....			
		5.1.3.3 Increased risk to personal safety and security of local community members.....			
		5.2 HERITAGE.....			



LEGEND	
CITY	
C1	LOS ANGELES HUMAN SETTLEMENT
C2	GREEN PARK I HUMAN SETTLEMENT
C3	GREEN PARK II HUMAN SETTLEMENT
C4	DRIFTSANDS PARK HUMAN SETTLEMENT
C5	BRIDGE PRECINCT MIXED USE
C6	MFULENI PARK HUMAN SETTLEMENT
C7	PROPOSED NEW ROAD
NATURE RESERVE	
N1	CAPE NATURE VISITORS CENTRE PRECINCT
N2	DAM WALL GATEWAY SQUARE
N3	URBAN PARK
N4	CONSERVATION AREA
N5	SETTLEMENT WETLANDS
N6	PARK WETLANDS
N7	KULSRIVER FLOODPLAIN WETLANDS
N8	URBAN AGRICULTURE
N9	PARK DAM PRECINCT
N10	INITIATION SITE
N11	RESIDENTIAL/ CAMPING PRECINCT
N12	PEDESTRIAN ROUTE TO MFULENI/ NORTH SAXDOWNE NMT GATE
N13	SOUTH SAXDOWNE NMT GATE
PRIVATE	
P1	HOUSING
P2	MIXED USE
SETTLEMENT/ CAPE NATURE OFFSET/ AREAS TO BE INCLUDED	
I1	CITY OWNED
I2	PRIVATELY OWNED
I3	PROVINCIAL LAND
I4	FLOODPLAIN EDGE VARIOUS OWNERSHIP EXISTING INFORMAL SETTLEMENTS
I5	EXISTING SOCCER FIELD
 SCALE 1:25 000 @ A3	

Preferred conceptual plan developed for the Driftsands Nature Reserve (after ARG Design 2008). Orange boundary represents the Urban Design Framework study area.



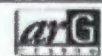
KEY	ZONING	AREA (HA)
	GENERAL RESIDENTIAL	28.23
	COMMERCIAL	3.46
	PRIVATE OPEN SPACE	5.29
	PUBLIC OPEN SPACE	2.38
	INSTITUTIONAL	6.41
	TRANSPORT ZONE 3 (PARKING)	0.4
	TRANSPORT ZONE 1 (TAXI RANK)	0.2
	TRANSPORT ZONE 2 (ROAD)	12.29
	TOTAL	58.67 ha

SCALE 1:10 000 @ A3

OVERALL ZONING FIG



pendulum



DRIFTSANDS HUMAN SETTLEMENT PROJECT
REZONING APPLICATION JANUARY 2009



LEGEND

- SPACES**
- 1
- RESIDENTIAL**
- 2
- COMMERCIAL/ MULTI-PURPOSE**
- 3
- INSTITUTIONAL - CHURCHES**
- 4
- INSTITUTIONAL - SCHOOL**
- 5
- EARLY CHILD CARE DEVELOPMENT**
- 6
- PUBLIC TRANSPORT/ TAXI RANK**
- 7
- PARKING SPACES**
- 8
- GREEN OPEN SPACES**
- 9
- WETLANDS/ WATER BODIES**

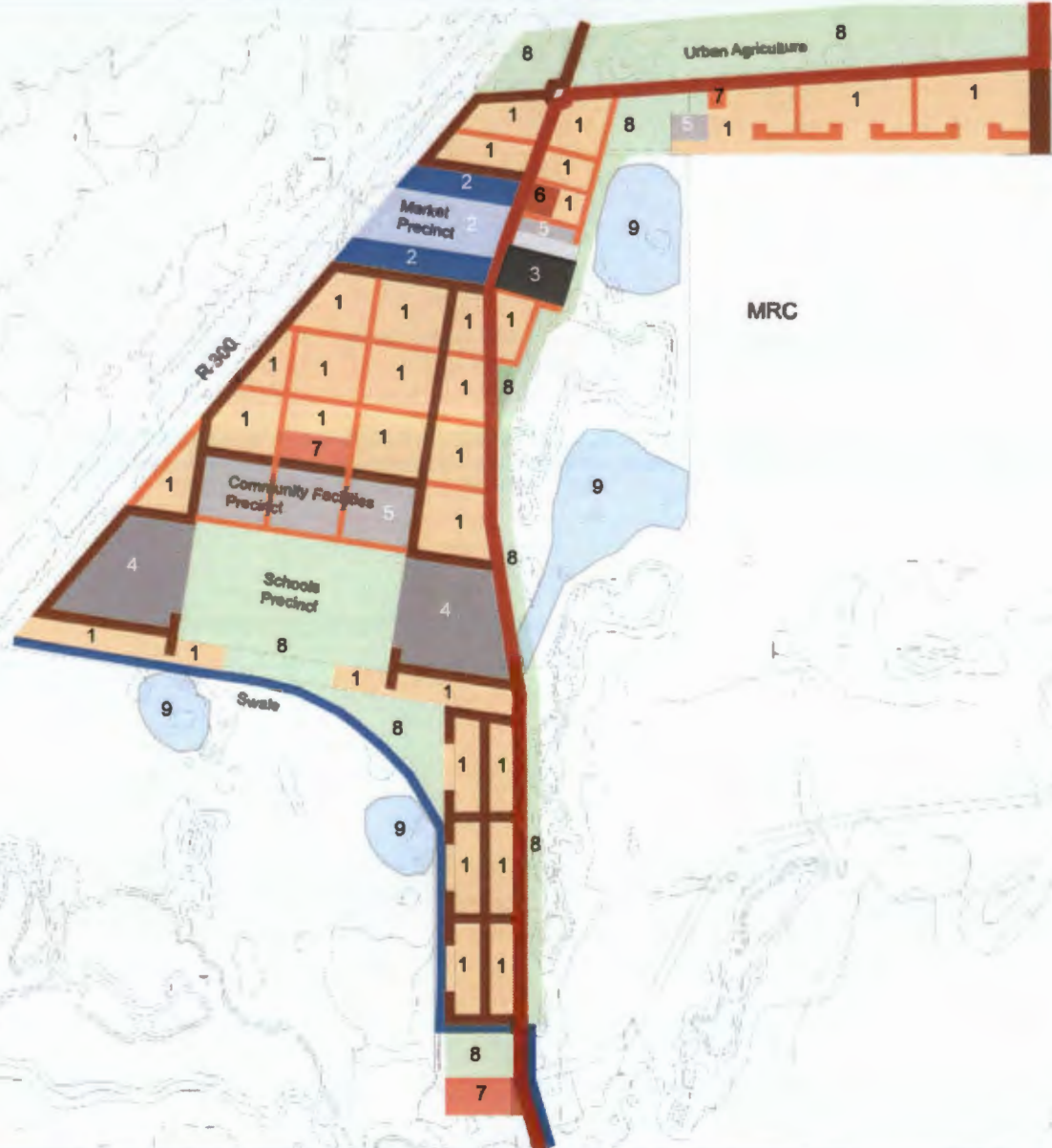
SCALE 1: 2500 @ A3



DRIFTSANDS HUMAN SETTLEMENT PROJECT
 URBAN DESIGN FRAMEWORK AND LAND USE PLANNING FEB 2007

DETAILED PRECINCT PLAN LOS ANGELES DRAFT
 FIG. 01

Delft



LEGEND

HIERARCHY OF SPACES

1

RESIDENTIAL

2

COMMERCIAL

3

INSTITUTIONAL - CHURCHES

4

INSTITUTIONAL - SCHOOL

5

EARLY CHILD CARE DEVELOPMENT

6

PUBLIC TRANSPORT/ TAXI RANK

7

PARKING SPACES

8

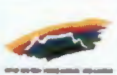
GREEN OPEN SPACES

9

WETLANDS/ WATER BODIES



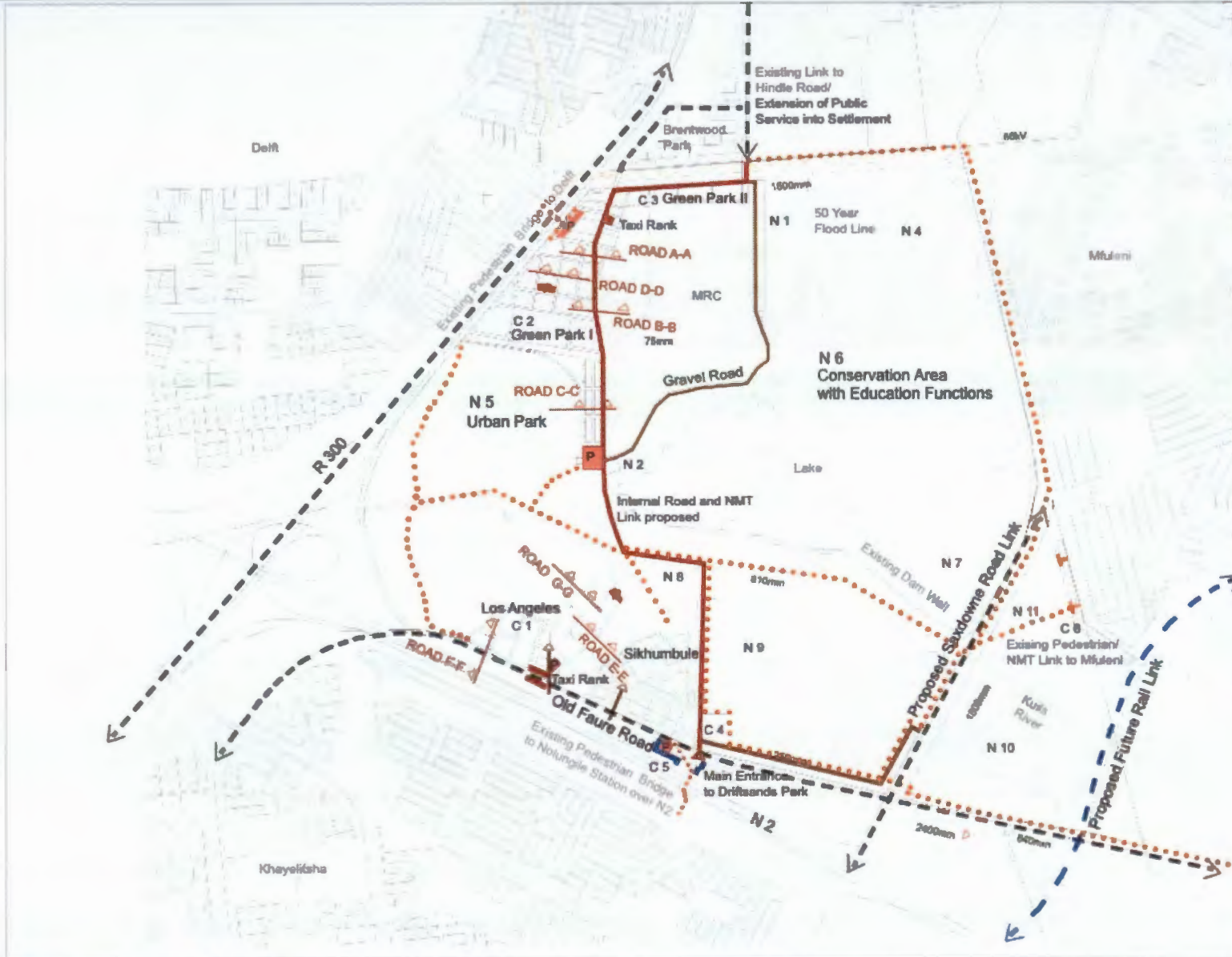
SCALE 1: 5000 @ A3



DRIFTSANDS HUMAN SETTLEMENT PROJECT
URBAN DESIGN FRAMEWORK AND LAND USE PLANNING FEB 2007

DETAILED
PRECINCT PLAN
GREEN PARK

FIG.
01



LEGEND

MOVEMENT SYSTEM

- CLASS 4 _ DISTRIBUTOR ROAD**
(Incl. Services, 2 Way Vehicles, Cycling Path, Pedestrians, Trees)
- CLASS 5 _ LOCAL COLLECTOR**
- NEIGHBOURHOOD ROAD**
- BICYCLE/ PEDESTRIAN PATH**
- PUBLIC TRANSPORT/ TAXI RANK**
- PARKING SPACES**

ROAD SECTIONS A_A TO G-G SEE FOLLOWING FIGURES

SCALE 1: 15 000 @ A3




- Proposed Development
- Taxi Rank
- Pedestrian Bridge
- Parking
- NMT Route
(Bicycles/Pedestrian Path)

FIGURE

2.3

PROPOSED DRIFTSANDS DEVELOPMENT
NON-MOTORIZED TRAFFIC (NMT)





Appendix 2: Seven Strategies of the National Housing Code

The following seven strategies comprise the national housing policy as set out in the Code.

1. Stabilising the Housing Environment: This strategy has emerged from the history of bond boycotts in South Africa, in which many mortgage lenders found themselves exposed as borrowers defaulted on their loans. For financiers, the key aspect of stabilising the housing environment is ensuring that the “sanctity of contract” is respected and upheld by all parties.

This strategy led to the establishment of:


- The Mortgage Indemnity Fund (since terminated)
- Servcon Housing Solutions (currently being transformed into a “Land Bank” to assist the state access affordable, well located land for housing delivery)
- Thubelisha Homes
- The National Home Builders’ Registration Council (NHBC)

2. Mobilising Housing Credit: The strategy to mobilise housing credit is closely linked with the strategy to stabilise the housing environment, in that both seek to increase the level of investment in the low income housing sector.

This strategy led to the establishment of:

- The National Housing Finance Corporation (NHFC) (currently undergoing transformation)
- The Rural Housing Loan Fund (RHLF),
- Nurcha (recently defined as the State construction bank)
- The Social Housing Foundation (soon to undergo a transformation in line with the new social housing policy and legislation)

Some have argued that the Financial Sector Charter was a result of pressure put to bear on the financial sector by the national Department of Housing (among others) to provide housing credit to low income earners. Certainly, as a result of the signing of the FSC and specifically the commitment to provide housing finance of R42 billion to a low income target market, the Department of Housing shelved its efforts to draft a “Community Reinvestment Act”.



3. Subsidies: Probably the most well known of the seven strategies, the introduction of once-off capital grants is an acknowledgement of the income disparities that exist and the negative impact this has on a low income family's ability to access the housing it needs. Subsidies provide a lump sum of money, available only once in the beneficiary's lifetime, as a financial leg-up into the market process.

Although not initially introduced with the White Paper in December 1994, an institutional subsidy, allowing for collective ownership and rental tenure, was implemented in late 1995. Here, the assumption is that this form of ownership is temporary, a respite between homelessness and ownership. When the beneficiary acquires sufficient personal equity which, when added to the individual subsidy, allows them access the housing they need, it is assumed that the beneficiary will excuse themselves from the co-operative or rental housing arrangement and enter the market on an individual ownership basis.

4. Supporting the Peoples Housing Process: This strategy is to provide support to people wishing to build or organise the building of their houses themselves. It is targeted at what government has called the "hard core" poor – those earning less than R1500 per month. This strategy led to the establishment of the Peoples Housing Partnership Trust.

5. Rationalising institutional capacities: South Africa's housing sector has a history of complex and fragmented institutions that operated at cross purposes to one another. The assumptions behind this strategy are that a single institutional framework for housing is necessary, and that the role of the state is "to reduce levels of dependency and increase levels of independence from State financial assistance".

6. Facilitating the speedy release and servicing of land: Perhaps the most obvious and visible remnant of apartheid policy is the lack of access to well located land. However, this strategy was not pursued energetically within the Department of Housing, as it was being pursued in the Department of Land Affairs, through legislation such as the Development Facilitation Act, the Less Formal Townships Establishment Act, and others, all set out in the Department of Land Affairs' white paper. The Communal Property Associations Act also arises from this strategy.

7. Co-ordinating state investment in development: Finally, the Code emphasises the RDP principles of co-ordinated development. Under the ambit of this strategy, the Urban and Rural Development Frameworks were developed. However, until the launch of Breaking New Ground which seeks to address this point specifically, very little in respect of inter-governmental coordination was done.