

# ECOLOGICAL DESIGN

- an essay about ecological sustainability and landscape architecture

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# Foreword

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I would like to thank my supervisor Karl Lövrie for his support.

I would also like to thank Karin for the trip to China, Elisabeth Macaulay for proofreading and Kong Xiangfeng at the landscape architecture program at Peking University for giving me an insight into how the profession functions in China and for taking me on a study visit to the *Turenscape* office.

Malmö, 15 June 2007  
Karolina Lundblad

# Sammanfattning

Det har blivit alltmer uppenbart att människans handlingar påverkar vår planet dramatiskt. Genom en för stor användning av fossila bränslen och kemikalier som förorenar luft, vatten och mark, och genom att vi fiskar ut världshaven, skövlar skog och homogenisera landskapet genom jordbruk orsakar människan global uppvärmning och utrotningen av miljontals växt- och djurarter. Samtidigt är fler människor än någonsin medvetna om miljöproblemen, och många är också villiga att förändra sin livsstil för att bidra till ett mer hållbart samhälle.

I den här uppsatsen undersöker jag kopplingen mellan ekologisk hållbarhet och landskapsarkitektur. Vilken är landskapsarkitektens roll i strävan efter ekologisk hållbarhet? Vilka verktyg/ideér/koncept är centrala för ekologisk design och planering idag? Hur påverkas landskapets estetik av det ekologiska tänkandet?

Landskapsarkitekter kan påverka utvecklingen i en hållbar riktning genom att arbeta med landskapsanalys, markanvändning, trafikplanering, grönstruktur, dagvattenhantering och hållbara materialval. Vi kan också verka för hållbarhet genom att designa landskap som inte kräver så mycket underhåll, vars form är tidlös och varaktig. Det ökande intresset för ekologisk design har lett till en diskussion om en *ekologisk estetik*. Begreppet innefattar både tankar om hur vi genom att designa ”transparenta” landskap kan konfrontera människor med deras ekologiskt destruktiva beteende, och strategier för hur vi kan på ett smidigt sätt kan integrera ”fula” men ekologiskt funktionella landskap i mänskliga miljöer.

# Abstract

It has become increasingly clear that the actions of humans are affecting the biosphere in a dramatic way. By using too much fossil fuel and chemicals that pollutes air, water and land, by devastating large areas of forest, homogenizing large tracks of land through agriculture and by fishing the seas dry, humans cause global warming and the extinction of millions of plant and animal species. At the same time there is an unprecedented awareness of environmental issues, and many people are willing to change their lifestyle in order to contribute to a more sustainable society.

In this essay I investigate the connection between ecological sustainability and landscape architecture. What is the landscape architect's role in the aspiration for ecological sustainability? What tools/ideas/concepts are central for ecological design and planning today? How are the aesthetics of the landscape affected by ecological thinking among landscape architects?

Landscape architects can contribute to sustainability through landscape analysis, land-use planning, traffic planning, green structure, stormwater management and by choosing sustainable materials. We can also work for sustainability by designing low-maintenance landscapes that will be time-less and enduring. The increased interest for ecological design has started a discussion about *ecological aesthetics*. The concept comprises both ideas about how we by designing "transparent" landscapes, can confront people with their ecologically destructive behavior, and strategies for how we can integrate "ugly" landscapes with important ecological function into human environments.

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# *Introduction*

This is an essay about the connections between ecological sustainability and landscape architecture. It deals with sustainability on a global scale, and discusses the different ways in which landscape architects can contribute to a sustainable development.

Through the study of sustainability literature, both classics and more recent books, and through a study trip to eastern China, where I came face to face with many of the problems described in the literature, I have tried to get an understanding of the role that environmental ethics has in our profession, and what role landscape architects should take in the aspiration to create a sustainable future.

# Part One

Landscape Architecture in the  
Environmental Age

# Intro

*It is so small and fragile and such a precious little spot in the universe that you can block it out with your thumb, and you realize that on that small spot, that little blue and white thing, is everything that means anything to you – all of history and music and poetry and art and death and birth and love, tears, joy, games, all of it on that little spot out there that you can cover with your thumb.<sup>1</sup>*

Astronaut Russel Schweickart

Ever since we ventured into space and were able to look back on the earth through satellite pictures and video clips, it has somehow seemed a lot smaller and more fragile. In the past it was generally assumed that the capacity of the atmosphere, rivers, land and sea to absorb pollutions was limitless. Our view was that the biosphere is stable and infinitely resilient. We used to think that we could do anything we wanted, and the biosphere would just repair itself all the time. It has become clear that there was much we did not understand about our effect on the environment. We have come to recognize that natural resources are much less abundant than had previously been assumed and natural ecosystems much less resilient.<sup>2</sup>

**Part One** is divided into four sections. *Global change* deals with the changes in the biosphere that are becoming more and more obvious all around the world. I discuss the driving forces behind global change, and the consequences these have on our planet. *Towards a sustainable future* provides two contrasting visions of what a sustainable future might look like, and gives some background to the concept of sustainability and sustainable development, *Green goes mainstream* describes how environmental awareness is spreading

throughout all layers of society. The section *Ecological design and planning* shows how environmental ethics has become a main value in landscape architecture and discusses whether ecological design will be a more important part of the profession as we enter “The Environmental Age”.

# Global Change

Evidence has accumulated that natural systems are being thrown out of balance leading to a long list of physical signs of environmental stress such as shrinking forests, expanding desert, falling water tables, eroding soils, disappearing species and habitats, rising temperatures, ice melting, more destructive storms and rising sea levels<sup>3</sup>. In the Swedish TV documentary “Planeten”, scientist Will Steffen reflects on the situation:

*This is a really unique time in human history, because for almost all of our history it didn't matter that the earth is a system. We did not have to look at it as a whole, because we were very local people. We affected the environment around us where we lived, but we didn't affect it very far away. (...) But now we live in a completely different situation. There are 6,3 billion people in the world, we're becoming economically more powerful and active all the time, consuming more energy, manufacturing more things, creating more services. And all this is affecting the global environment in ways that we could not conceive of a hundred years ago.*<sup>4</sup>

Robert Thayer, professor and head of the landscape architecture program at the University of California, thinks that the conflict between nature and technology has become large and inescapable. He describes the dilemma in his book *Gray world, green heart*:

*From a scattering of crudely chipped flint tools to a near-complete transformation of the earth's surface and climate, technology has presented human nature with an ever-widening paradox: we developed technology as a means of survival in nature, and now it is killing other life forms and threatening us as well. Yet technology is the “nature” of human nature. In spite of a green heart, we have made an ambivalent grey world; with creative vision of paradise, we have begun to create a hell on earth. Our intent was not*

*malicious, only nearsighted. As if caught by the curve of space-time, our good intentions went out freely, yet came back to hit us from behind.*<sup>5</sup>

Will Steffen explains that the human driving forces behind global change are things that we do every day, especially in the western world. We consume more things than we actually need, we like personal mobility, we like to travel and we enjoy eating food that has to be flown in from different parts of the world. That type of lifestyle is energy consuming, and that means that we have to burn a lot of fossil fuels. It also requires a lot of land - so we have to clear our land. We like to go down to the coast on our holidays - so we put a lot of pressure on the coastal zones.<sup>6</sup>

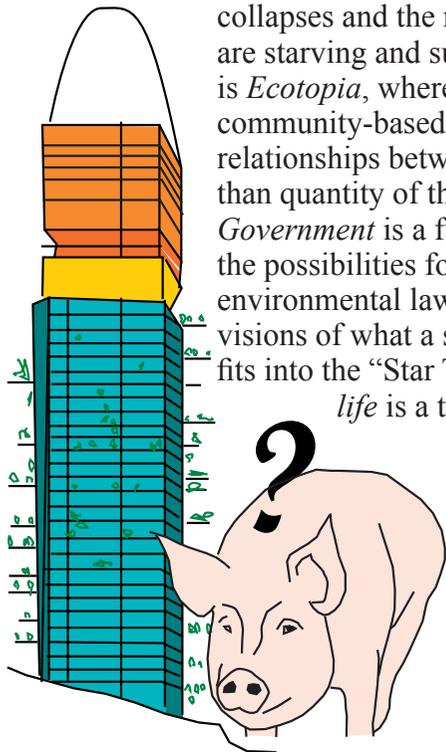
Some say that world population growth is the largest threat to a sustainable future. Scientists believe that the world population will continue to grow throughout the first half of this decade, and stabilize when it has reached 9 billion people around 2050. However, Will Steffen doesn't think that population growth alone will be the biggest threat to the environment. Instead it is the growth of the economies in developing countries that will affect us most.<sup>7</sup> As the economies in countries like China and India grow stronger, more and more people will be able to live a western lifestyle. The problem is that our fossil fuel dependent, throw away model can never work for the whole population of the earth. A conclusion that has emerged from ecological footprint analyses is that it would be necessary to have 4 or 5 back up planets engage in nothing but agriculture for all those alive today to live a Western lifestyle<sup>8</sup>.

# Towards a sustainable future

Imagine a day in a sustainable future. What will it look like? Will we travel abroad as much as we do today? Will we own a lot of things? How and where will we live? Where will we work? How will we transport ourselves? What type of food will we eat?

The scientist Robert Costanza has developed four possible visions for the 21st Century. *Star Trek* is the name of a future where technology has solved the environmental problems, and “man has conquered nature.” *Mad Max* is a future where humans didn’t manage to conquer nature. The environment has been destroyed

and the natural resources are depleted. Civilization collapses and the majority of the earth’s population are starving and suffering. The third possible future is *Ecotopia*, where humans live primitively in a community-based society where quality of life and relationships between people are more important than quantity of things and consumption. Finally, *Big Government* is a future where a dictator will restrict the possibilities for growth and expansion through environmental laws. Below are two examples of visions of what a sustainable could look like. *Pig City* fits into the “*Star Trek*”- category while *The simple life* is a typical “*Ecotopia*” vision.<sup>9</sup>



## Winy Maas: Pig City

Winy Maas is a landscape architect and architect/city planner who founded the Rotterdam architecture office, MVRDV. His practice has developed a visionary concept for the future: Pig City.

If meat consumption was to stay at today’s levels and purely organic farming methods were introduced, the pig industry would need 75% of the surface area of the Netherlands. MVRDV explored the option of concentrating the entire pig farming industry into compact farm units, eliminating the need for transport and distribution and reducing the risk of spreading diseases.

Pig City proposes 76 towers, each measuring 622 metres in height. The pigs are kept on the 87x87metre floors. Large balconies allow the animals to rummage around under trees outside. A central abattoir is housed in the plinth, and pigs for slaughter are moved in lifts. On top is a fish farm that supplies some of the food needed. Each tower also contains a central slurry-processing plant and a biogas tank, which easily caters for the tower’s energy needs. To reduce transport costs, 44 towers are located in the port; the other towers are located close to major cities.<sup>10</sup> Winy Maas explains his thoughts further in an interview in the documentary “*Planeten*”:

*Due to globalization and internationalization, borders are disappearing. Countries will be less important than cities and regions. The cities have their own logic, they have to compete with each other. Within only a couple of years or decennias, that can lead to an increased specialization. If we open up our frontiers completely and we specialize, then the world population can still grow until about 90 billion people. The Netherlands has 15 million pigs and 15 million Dutch, the relationship is exactly one to one. When opening up our borders, one starts to wonder, should we keep that big industry or not? We showed that you can concentrate the pig industry in the Netherlands in towers. The towers will be based on*

*the lifecycle of the pig (...) Each tower can produce food for about 3000 households. They will be fascinating objects, 600 meter high. The towers will be placed in the ports, and from there the pigs will be shipped all over the earth. (...) They will create a shoreline of pig skyscrapers that welcomes you to the Netherlands.<sup>11</sup>*

### ***Ted Trainer: The simpler way***

Ted Trainer is a Senior Lecturer at the School of Social Work, University of New South Wales (Australia) and author of books on the transition to a sustainable society. He has put forward his thoughts and visions under five headings under the title “The Simple Way: working for a transition from consumer society to a simpler, more cooperative, just and ecologically sustainable society.”

#### *1.Simpler and Less Affluent Lifestyles.*

*We must aim at producing and consuming only as much as we need for comfortable and convenient living standards. We must live very cheaply, recycle, design things to last and/or to be repaired.*

#### *2.Self-sufficiency. Decentralization. "Small is Beautiful".*

*We must develop as much self-sufficiency as we reasonably can at the national level, at the household level, and especially at the neighbourhood and town level. We need to convert our present barren suburbs into thriving local economies which produce most of the goods and services they need from local resources of land, labour, skill and capital. Backyards would (again) contain vegetable gardens, fruit trees, workshops and poultry.*

#### *3.More Communal. Cooperative and Participatory Ways.*

*There must be much more communal, cooperative and participatory ways. We must share more things. For example, we could have one stepladder in the neighbourhood workshop, rather than one for each household. The alternative neighbourhood would be full of interesting things to do, familiar people, common projects, animals, gardens, forests, windmills, lakes, little firms and community workshops. It would be leisure-rich. Consequently, people would be less inclined to go away at weekends and holidays, thereby reducing national energy consumption. There would be far more community spirit than there is now. People would know each other and be interacting on community projects. One would certainly predict a huge decrease in the incidence of drug abuse, stress, loneliness, depression and similar social problems.*

#### *4.Alternative Technologies.*

*Our new neighbourhoods would make intensive use of alternative technologies, such as windmills and building houses from earth. Although The Simpler Way looks for the simplest ways of doing things, it is not opposed to modern technology. Photovoltaic cells for instance are desirable although they are technically complex. However The Simpler Way recognises that sophisticated modern technology is mostly unnecessary and that technical advance is of little significance in solving the world's problems or in providing a good quality of life.*

#### *5.A New Economy*

*There is no chance whatsoever of making these changes while we retain the present economic system. The most important unit in the new economy will be the small local town, region or suburb. There*

*will be relatively few big firms, little international trade, not much transporting of goods between regions and very little need for transnational corporations and banks. Most of us would live well without much need for cash income, because we would not need to buy very much. Consequently many of us might work only one day a week for money and spend the rest of the week work-playing around our neighbourhoods in a wide variety of interesting and useful activities. There would be no unemployment and no poverty.*<sup>12</sup>

### ***Sustainable development***

In 1987 the World Commission of Environment and Development published the report “Our common future” (also known as the Brundtland Report) in which sustainable development is defined as *development that meets the needs of the present without compromising the ability of future generations to meet their own need*. The formulation has since been further developed and, in 1991, the World Conservation Union, UNEP (United Nations Environmental Program), and WWF released the following definition: Sustainable development of human culture means *improving the quality of human life while living within the carrying capacity of supporting ecosystems*.<sup>13</sup>

### ***The Rio Declaration and Agenda 21***

The concept of sustainable development was further promoted during the 1992 United Nations Conference on Environment and Development (UNCED), a conference resulting in Agenda 21, the Rio Declaration, the Statement of Forest Principles, the United Nations Framework Convention on Climate Change, and the United Nations Convention on Biological Diversity. The Rio Declaration on Environment and Development is a short document consisting of

27 principles such as the precautionary principle and the approach that the polluter should bear the cost of pollution. The document is intended to guide future sustainable development around the world.

Agenda 21 is a comprehensive description of actions to be taken globally, nationally and locally by organizations of the UN, governments, and major groups in every area in which humans impact on the environment. The goal of Agenda 21 is to achieve long-term sustainable development all around the world.<sup>14</sup>

Consumption of renewable resources	State of environment	Sustainability
More than nature's ability to replenish	Environmental degradation	Not sustainable
Equal to nature's ability to replenish	Environmental equilibrium	Steady-State Sustainability
Less than nature's ability to replenish	Environmental renewal	Sustainable development

**Sustainability** requires that human activity only uses nature's resources at a rate at which they can be replenished naturally. The figure is based on a table in Wikipedia online dictionary.

### ***Local Agenda 21***

One of the suggestions for Agenda 21 is that it should be implemented at a local and regional level as well as at a national and international level. The local Agenda 21 focuses on the problems that are important to solve in order to achieve sustainable development in a city or region. For example, in Malmö, a city in south Sweden, the local Agenda 21 aims to achieve long-term sustainability by focusing on four main goals: The use of fossil fuels has to be minimized, pollution as a result of production has to decrease to a level that nature can handle, biodiversity has to be preserved - plants and animals should be given more space, and resource utilization should be effective and fair.<sup>15</sup>

## *The three dimensions of sustainability*

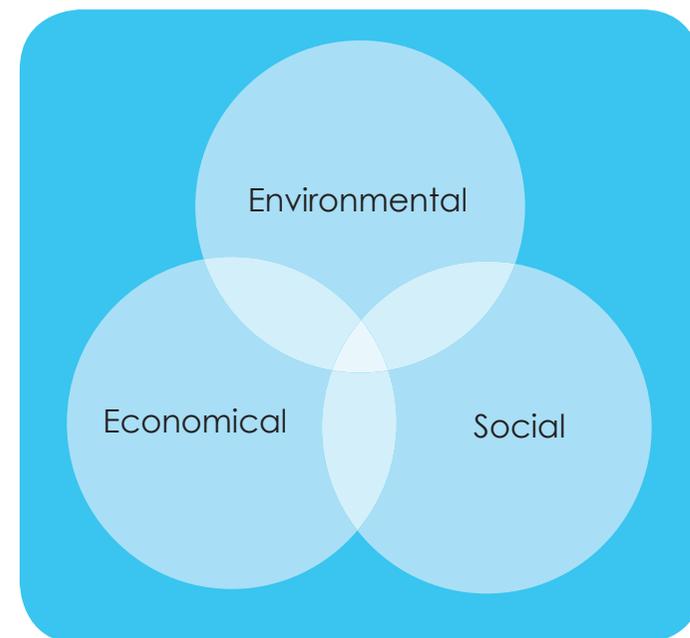
Sustainable development does not focus only on environmental issues; it also includes a social and an economic dimension.

**Environmental sustainability:** Economic growth and the wellbeing of people are only possible if the natural environment is healthy. Environmental depletion is expensive for society and lack of natural resources can result in conflicts and wars.

**Economical sustainability** involves economic growth, land use, living standards and employment. The state of the economy affects both the environment and society. Poverty can sometimes force people to behave in ways that isn't good for the environment.

**Social sustainability** involves democracy, security, equality, a fair distribution of resources and quality of life. One of the important things that the Bruntland report showed was that it is possible to solve environmental problems while maintaining economic growth. The report states that economic growth is necessary in order to solve long-term problems with the environment and with natural resources. That statement has been criticized by many environmentalists who claim that economic policies based on growth and continued depletion of natural resources cannot be sustainable. They prefer the term “developing sustainability”, as it does not imply that something needs to be created.<sup>16</sup>

Sometimes a fourth dimension, cultural sustainability, is mentioned. A culturally sustainability city respects its cultural heritage, provides places where people can meet and promotes integration and diversity.<sup>17</sup>



**Sustainable development** demands an interplay between environmental, economical and social aspects. The overlaps between the different circles represents goals that include all three dimensions. The figure is based on an illustration in Boverket and Naturvårdsverket, 2000, p. 17

## Sweden's environmental objectives

In 1999 the Swedish parliament (Riksdagen) decided to establish an overall goal for all environmental work until 2020, called the generation goal (generationsmålet). It means that we will leave a society to the next generation where all major environmental problems are solved. To achieve this, 16 environmental goals have been set. The environmental objectives are a clarification of the ecological dimension of sustainable development. They define the state of the environment which environmental policy aims to achieve and provide a framework for environmental programmes and initiatives at national, regional and local level.<sup>18</sup>



1. Reduced Climate Impact



4. A Non-Toxic Environment



9. Good-quality Groundwater



14. A Magnificent Mountain Landscape



2. Clean air



5. A Protective Ozone Layer



10. A Balanced Marine Environment, Flourishing Coastal Areas and Archipelagos



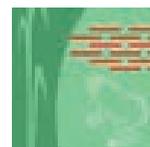
15. A Good Built Environment



3. Natural Acidification Only



6. A Safe Radiation Environment



11. Thriving Wetlands



16. A Rich Diversity of Plant and Animal Life



7. Zero Eutrophication



12. Sustainable forests



8. Flourishing lakes and streams



13. A Varied Agricultural Landscape

# Green goes mainstream

The growth in the environmental movement has been one of the most significant influences on government policy and public attitudes in the last three decades. It has developed from the concern of fringe groups into a principle which, whilst not always followed, is at least accepted by a large majority of decision makers.<sup>19</sup> The film “An inconvenient truth”, in which the former United States Vice President Al Gore reviews the scientific evidence for global warming, discusses the politics and economics of global warming, and describes the consequences he believes global climate change will produce if the amount of human-generated greenhouse gases is not significantly reduced in the very near future, was released in the USA in January 2006. It has started a world debate about climate change, in all layers of society. All of a sudden everyone is talking about global warming, strange weather conditions and CO<sub>2</sub> emissions. There is an unprecedented level of awareness about environmental issues. Information about the condition of our planet, and what we can do to make it healthier is easily accessible through Internet resources and documentaries and debate programs on TV.

A study made by the Swedish Environmental Protection Agency (Naturvårdsverket) shows that 7 out of 10 people in Sweden are willing to change their lifestyles in order to cause less harm to the environment<sup>20</sup>. It seems as if things are finally about to change. But are they? Will Steffen reflects:

*The question is whether we really are at the beginning of a new era, a new way of looking at the planet, and the beginning of a transition to a new lifestyle, a new economy. Or whether, as many others in the past, this is simply a debate on the fringes of society, and if we will continue to push the western culture of consumption to many parts of the planet.*<sup>21</sup>

Klimatförändringen får väx-  
terna att flytta norrut  
Fyra kilometer i månaden - så snabbt flyttar växtzo-  
nerna norrut. Och nu kan man odla magnolia i Gävleom-  
rådet.



Det är märkligt att saker är så svårt att ta på allvar!  
Klimatförändringarna är bara påhitt säger flera som skrivit på denna sida, det tycker jag är häpnadsväckande inskränkt!! Visst, tro gärna att den absoluta majoriteten av världens forskare hittar på, fundera gärna på hur du skall förklara din åsikt tex för dina barn när rejäla temperaturhöjningarna är ett faktum om såg 50 år. Skulle du kalla dig själv klimatsmart då?  
Mycket bättre att inte vara så säker på saker som man vet så lite om, jmf med tex världens majoritet av forskare. Mycket bättre att arbeta för att bli klimatsmart än att gnälla för att du kanske behöver ändra en del på dig/er själva.

Lefte

27 april 2007 kl. 00:12

Citera Anmäl



Bli isbjörnsfader nu!  
Din insats behövs.

Konsument  
verket • KO

## Miljömätaren

### Små detaljer betyder mycket

Det går att åstadkomma mycket för miljön med små medel. Så enkla saker som hur man hanterar sin kyl, spis och tvättmaskin betyder massor - om många gör likadant! Klicka på föremålen till höger så får du se vad olika vanor i vardagen kan betyda för miljön.

Om alla i Sverige gjorde som du skulle ytterligare

5 121 700 Rensa

människor kunna leva på jorden med svensk levnadsstandard utan att öka belastningen på miljön.

Se sammanställning av dina val

### Många bäckar små



Save the icebears, check how environmentally friendly your lifestyle is, buy green electricity...  
With the help of media, awareness about environmental issues are rising in all layers of society.

# Ecological design and planning

...as we anticipate the world of the twenty-first century, landscape architecture is at a crossroads. If the discipline embraces ecological design and planning, then it has a leadership role in contemporary society throughout the world. If landscape architecture, however, turns inwards and ignores its larger responsibility to the public good, then it will become marginalized and less relevant.<sup>22</sup>

Steiner and Thompson

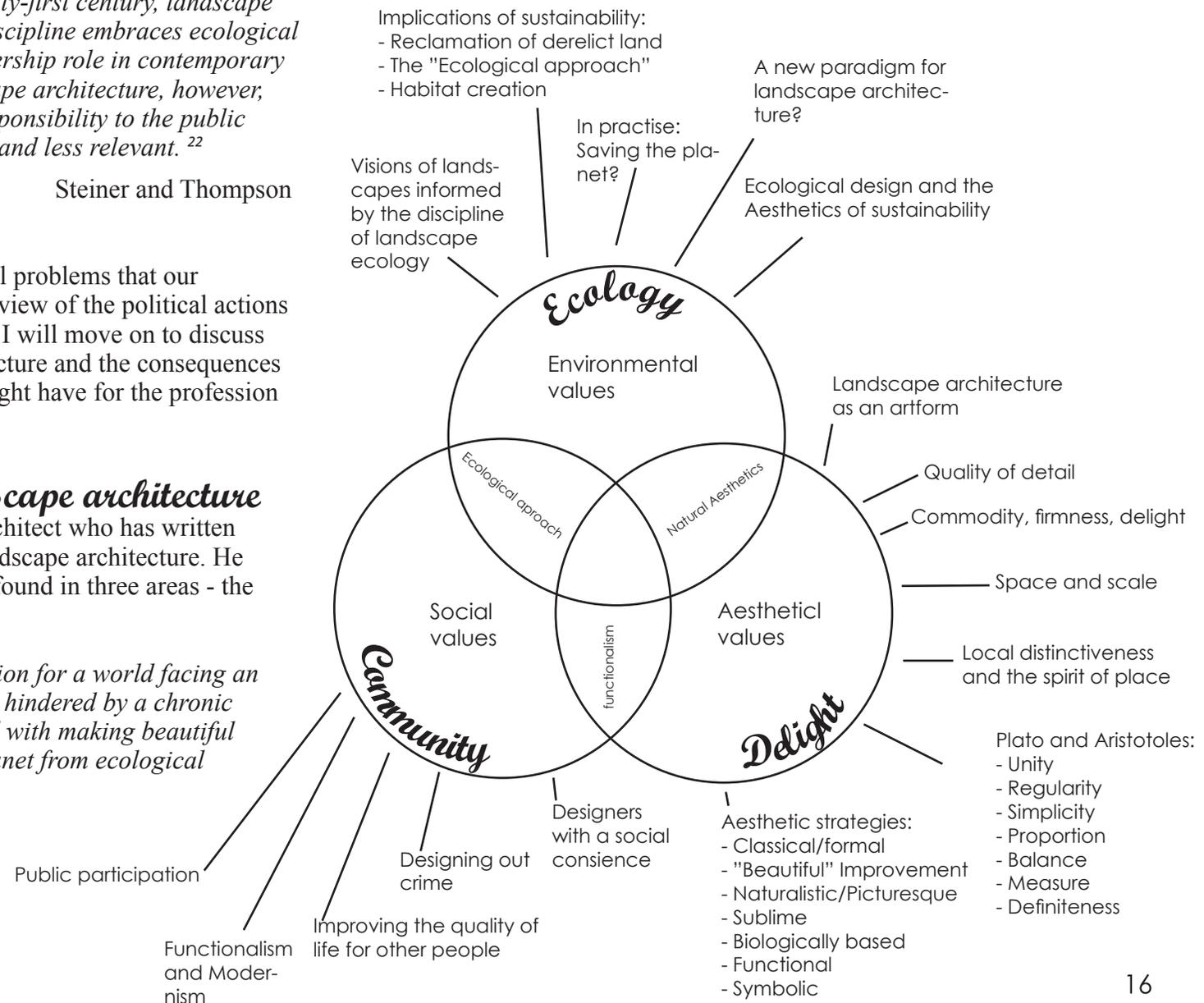
So far I have outlined the environmental problems that our generation faces, and given a brief overview of the political actions that has been taken to solve them. Now I will move on to discuss the role of ecology in landscape architecture and the consequences that society's focus on sustainability might have for the profession of landscape architecture.

## Three main values in landscape architecture

Ian Thompson is a British landscape architect who has written a book about the values that exist in landscape architecture. He suggests that the main values are to be found in three areas - the aesthetic, the social and the ecological:

*Landscape architecture is a key profession for a world facing an uncertain environmental future, yet it is hindered by a chronic identity crisis. Is it primarily concerned with making beautiful places, helping people or saving the planet from ecological catastrophe?*<sup>23</sup>

**Illustration of the three main areas of value in landscape architecture** ►  
Based on a figure in Thompson, 1999, p.7



## *The emergence of environmental ethics*

Ecology and environmental sustainability has been a cornerstone of landscape architecture since the 1960s, but signs of environmental awareness in the profession were visible already in the 1950s. For example, when NCILA (National Council of Instructors in Landscape Architecture) met at Harvard in 1951 one of the topics discussed was the ecological approach to analysis and design. Aldo Leopold's book, *A Sand County Almanac*, published in 1949, initiated the development of environmental ethics and ecological thinking in landscape architecture. Peter Walker comments:

*Even if few landscape architects had read Leopold's wonderful book in the 1950s, the profession would soon inherit Leopold's concern for ecological balance and stewardship of natural resources.*<sup>24</sup>

In 1962, Rachel Carson published the book *Silent Spring* which described how uncontrolled pesticide use led to the deaths of not only animals but also humans. The environmental concern among the general public grew stronger and stronger throughout the decade. In 1968, the first picture of earth from space was published and, as mentioned in the introduction, it gave us a new perspective of our planet. Already in the late 1950s, the landscape architect Philip Lewis promoted environmental awareness by developing an approach to large-scale landscape planning which recognized a relationship between visual quality and underlying environmental factors. The most well-known name in this context however is Ian McHarg. His book *Design with nature* is a milestone in landscape architecture. In the book he attempts to establish an entire system of values based upon natural science. He expresses his worldview through an imaginary people, the Naturalists, who live close to nature, believing that *the earth and its denizens are involved in a totally creative process and that there is a unique and important role for man.*<sup>25</sup>

McHarg also introduced a method for approaching the landscape:

*We live in a physical world, a biological world, and a social world, and our investigations must include them all. As matter preceded life and human species was late in biological evolution, we can employ chronology as a unifying force. We can recapitulate events and retrace time. Thus, when we design and plan, we should begin with the geological history of a landscape, working in concert with an understanding of climate. Bedrock and surficial geology can be reinterpreted to explain geomorphology and hydrology. These processes set the stage of soil formation. Now, the relationships among the constituent parts of landscape become clear: The past informs the present, and each feature is only comprehensible from understanding its earlier layers. After we learn about a landscape's geology, climate, hydrology and soils, then vegetation patterns become more apparent, as does the resultant wildlife. At which point we can ask human occupants who they are, how they distinguish themselves from others, how they view the environment and its occupants, and what are their needs and desires, their preferences and aversions. I wish to emphasize my belief that ecological study includes natural and cultural processes. We will find that discrete value systems are associated with distinct human constituencies, and we can associate these groups with their needs and values. This approach allows landscape architects to interpret all phenomena in light of these systems. With such vision and knowledge, we can plan, because we have developed a context for planning.*<sup>26</sup>

The model that McHarg presents allows landscape architects to get a deep understanding of the landscape. By analyzing how the landscape has been successively modified through history, we are more likely to make the right decision about how to use it in the future. By overlaying transparency maps, each of which reflected social

values placed on different environmental factors, he could present a composite map showing where development was most suitable. Today, McHarg's approach forms the basis of many complex analyses and reports performed with Geographic Information Systems (GIS).

In the 1970s the "Ecological approach" to design, planting, maintenance and management was very popular. The method, who originated from Holland, is summarized in Thompson's book:

1. Planting ceases to be a decorative feature and becomes a functional structural element in the external environment.
2. The planning design is not designed for visual effect but to achieve the status of woodland in the shortest possible time.
3. The landscape is a low-cost/high-return landscape. Maintenance costs decrease as social benefits rise.
4. The landscape's users determine its form. It is a place for use rather than looking at.
5. The scheme moves towards greater ecological stability, therefore requires less and less human intervention.<sup>27</sup>

In technical terms the ecological approach was very successful. The landscapes created with this method worked with natural processes instead of against them, with very little need for maintenance. But many landscape architects criticize the approach for leaving out social, aesthetic and functional requirements in the design. The ecological planting would look fresh and green and attract a lot of wildlife, but people would avoid walking in these areas because they were afraid of being robbed. Another problem was that because

the planting looked a bit monotonous and "common" it wouldn't be treated as a significant landscape. Developers would do what they could to build on the land, ignoring the fact that it was of great importance as a habitat for wildlife and flora.<sup>28</sup>

### *Will environmental ethics become more important?*

Since the 1960s, ecology and environmental concern have grown into being an important part of the landscape profession, and as contemporary society is focusing more and more on environmental issues, there is no way that landscape architects can overlook environmental ethics. The question is what place they should have in the professional value structure. Should environmental considerations be secondary to aesthetic and social ones, or should they be the primary motivating concern for the landscape architect?

## Footnotes

- <sup>1</sup> Astronaut Russel Schweickart in Thayer, 1994, p. 3
- <sup>2</sup> Rudling, 1999, s.73
- <sup>3</sup> Brown, SVT Planeten, part 1:Global Förändring. 02:11
- <sup>4</sup> Steffen, SVT Online faktabank,  
<http://www.forskning.se/planeten/index.html>, "Hur mår jorden?" 2007-05-11
- <sup>5</sup> Thayer, 1994, p.307
- <sup>6</sup> Steffen, SVT Online faktabank,  
<http://www.forskning.se/planeten/index.html>, "Hur mår jorden?" 2007-05-11
- <sup>7</sup> Ibid
- <sup>8</sup> Wikipedia dictionary, <http://en.wikipedia.org/wiki/sustainability>, 2007-05-11
- <sup>9</sup> Costanza in SVT "Planeten" part 4: Tid att välja, 15:37
- <sup>10</sup> <http://www.archined.nl/archined/3251.html>, 2007-05-11
- <sup>11</sup> Winy Maas, SVT Planeten part 4: tid att välja 20:30
- <sup>12</sup> Trainer, *The Simpler Way*,  
<http://socialworks.arts.unsw.edu.au/tsw/02-The-Simpler-Way.html>, 2007-05-11
- <sup>13</sup> Boverket and Naturvårdsverket, 2000, s.16
- <sup>14</sup> Wikipedia dictionary, [http://en.wikipedia.org/wiki/Agenda\\_21](http://en.wikipedia.org/wiki/Agenda_21), 2007-05-11
- <sup>15</sup> Malmö local Agenda 21,  
<http://www.malmo.se/download/18.33aee30d103b8f1591680006113/agenda.pdf>, 2007-05-20
- <sup>16</sup> [http://en.wikipedia.org/wiki/sustainable\\_development](http://en.wikipedia.org/wiki/sustainable_development), 2005-05-20
- <sup>17</sup> <http://www.vasteras.se/NR/rdonlyres/3F7A1E5E-DA79-4110-B4CF-639FE0EDBD34/0/M%C3%A51ochstrategier.pdf>
- <sup>18</sup>Environmental objectives portal,  
[www.miljomal.nu](http://www.miljomal.nu), 2007-05-12
- <sup>19</sup> Rudlin, 1999, s. 73
- <sup>20</sup> P1 Konsument 2006-11-22,  
[SR\\_p1\\_konsument\\_061122022453.mp3](http://www.svt.se/mediaservice/2006/11/22/SR_p1_konsument_061122022453.mp3) , 2007-05-11
- <sup>21</sup> Steffen, SVT Planeten, part 1: Global förändring
- <sup>22</sup> Steiner and Thompson, 1997, p. 1
- <sup>23</sup>Thompson, 1999, backcover
- <sup>24</sup> Walker in Thompson, 1999, p. 151
- <sup>25</sup> McHarg, 1969, p. 117
- <sup>26</sup> McHarg in Steiner, 1997, p. 156
- <sup>27</sup> Thompson, 1999, p. 152
- <sup>27</sup> Ibid

# Part Two

The implications of sustainability

# Intro

How can landscape architecture contribute to a sustainable future, and what impact does the ecological perspective have on the aesthetics of the landscape? In this chapter I attempt to describe how ecological thinking can be integrated into the work of the landscape architect, and discuss some theories of an emerging ecological aesthetic.

I begin with looking at what the concept of sustainability implies for some practising landscape architects, in the first section *What can we do?* To do so I have taken part of research done by Ian Thompson in his book *Ecology, Community, Delight*<sup>1</sup>, where he interviewed 23 practising landscape architects about how they relate to ecology and sustainability in their daily work. I have also taken part of the answers that the Swedish landscape architect Hanna Hermansson presented in her masters thesis *Landscape planning from a sustainability perspective*<sup>2</sup>, after interviewing landscape architects in planning positions about what sustainable development meant to them, and how they worked for sustainability in their professional practice.

After that, in *Science-based solutions*, I introduce some ways in which landscape architects can contribute to sustainability by creating solutions where the *function* of the design helps improve the environment. Examples of this is landscape planning that avoids development on ecologically sensitive lands, green structure that improves biodiversity and the creation of green roofs that reduces storm water runoff. In *Ecological aesthetics*, I discuss the relationship between aesthetic and environmental values under the heading “Ecological aesthetics”, and I also introduce the idea that landscape architects can work for sustainability by expressing ecological values through landscape design.

# *What can we do?*

When Thompson interviewed practising landscape architects to find out what the concept of sustainability and ecology implied to them, he received answers that varied greatly from person to person. Some practitioners thought that issues of ecological design and sustainability were absolutely central, while others thought that they had their place but that they weren't relevant in every project. The practitioners often linked the concept of ecology to the idea of using native species in planting designs, and the concept of sustainability to creating low-maintenance designs which would be enduring. Some viewed sustainability as a matter of choosing the right material.<sup>3</sup>

Landscape architect Hanna Hermansson received similar answers when interviewing Swedish landscape architects in planning positions. Apart from the aspects mentioned above, her interviewees talked about handling rain water locally with green roofs, open rain water systems and direct infiltration, and the importance of favouring environmentally friendly ways of transportation. They also pointed out how documents in the physical planning can steer development in a sustainable direction.<sup>4</sup>

# Science-based solutions

Landscape architects have the knowledge to contribute a large number of practical, scientifically based solutions that are beneficial for the environment. Examples on a large scale are the design of an “ecological infrastructure” and the planning and design of more compact, high-density settlements, with an increased reliance on mass transportation. Examples of what the landscape architect can do on the site scale include specifying environmentally responsible materials, using native plants and designing storm water systems which reduce runoff.

In a time when environmental concern has grown deep and widespread, and when the debate evolves around enormous threats such as global warming and the greenhouse effect, it sometimes feels as if the small actions that we can take will not make a difference. I think that Robert Thayer has a good point when he writes:

*Can a few conspicuous solar houses, constructed wetlands, bike paths, recycling industries, wildlife habitat corridors, organic agricultural plots, and wind farms really be the key to saving the world? Isn't a much greater transformation needed in the global economic, political, and social institutions? The answer to the last question is, of course, yes. But the new institutions needed for a transition to a sustainable world must ultimately be based on the perception and comprehension of the ordinary people who will create them. In turn, their ultimate reality is the land and the spaces around them. The small steps taken to build sustainability into the local landscape in discreet, manageable chunks which people can observe, try out, experience and improve are actually large steps for humankind.<sup>5</sup>*

## *An ecological infrastructure*

Dr Kongjian is a professor of landscape architecture at the University of Peking and the founder of the Chinese architecture bureau “Turenscape”. He advocates a multi-scaled ecological infrastructure – a system that safeguards ecological processes and cultural heritage before the land development planning stage. The idea that landscape architects should be involved in the very beginning of the planning process is mentioned over and over in landscape architecture theory. Thompson writes:

*Priorities should be reversed in the sense that instead of planning the human habitat first, by allocating land for housing, industry or recreation, and only then seeking to preserve what remnants of other habitats remains, we should be putting the best habitats first whilst also taking steps to ensure that the hydrological circle is disturbed and polluted as little as possible.<sup>6</sup>*

On a large scale the ecological infrastructure consists of security patterns for flood prevention, ecological networks for biodiversity, heritage corridors and recreational corridors. They define urban growth patterns and the form of the city. GIS is used to present different security patterns.<sup>7</sup>

## **Flood security patterns**

In some parts of China, where this method was developed, floods are a serious problem, and an important area of work for landscape architects. The flood security pattern consists of existing water systems, an analysis of the surface flow and the risk of tides. This layer shows where urban development will be safe from floods.

### Security patterns for biodiversity

Existing and potential habitats are identified using index species, terrain and land cover maps. Spatial relationships between habitats are simulated using GIS models and landscape ecological principles, and an ecological network for biodiversity is designed. The layer shows where urban developments will not disturb important habitats. Critical areas and points that need special attention are indicated in the GIS system.

### Security pattern for cultural heritage

Cultural heritage sites are identified so that they can be protected. Linkages are drawn between the sites, creating a heritage network that can be used for both education and recreation.

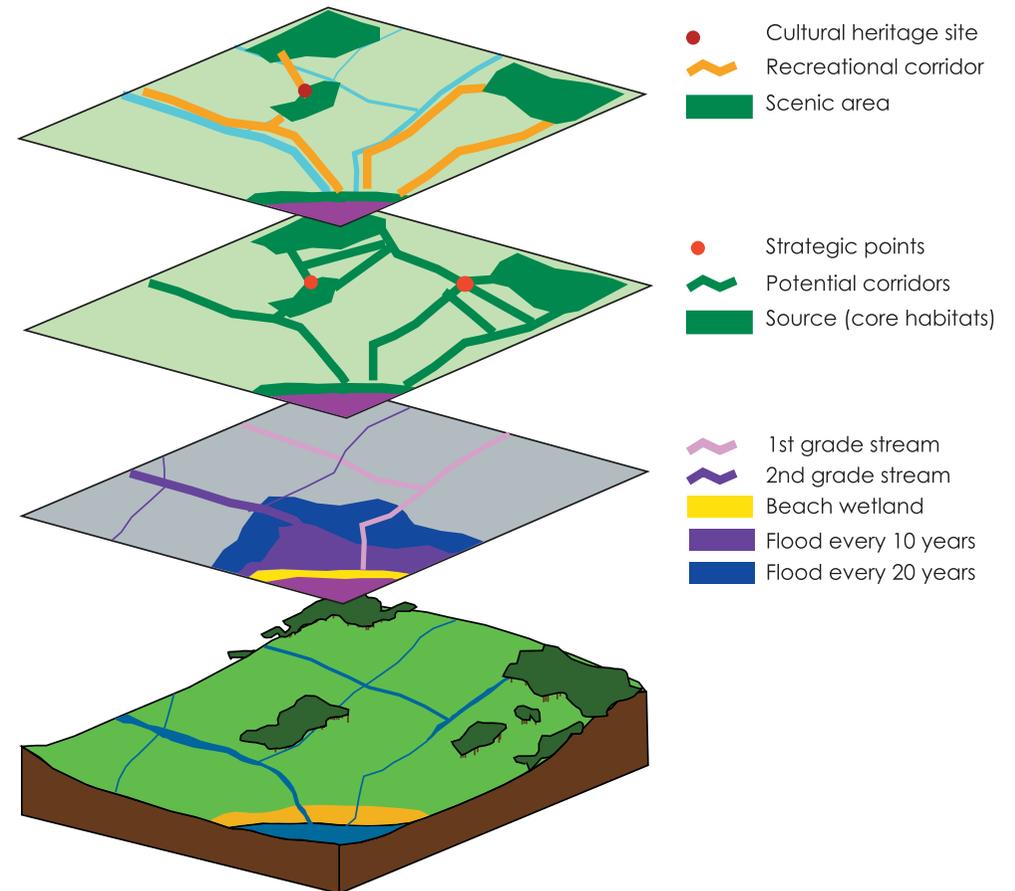
### Security pattern for recreation

In this layer, places that can be used for recreation are shown. Examples of places for recreation are wetlands, forests, water features, hills and cultural heritages. A recreational landscape network is created based on their spatial relationship.

### Regional ecological infrastructure

In this layer, all the security patterns are integrated. With the help of this map, developers will be able to find the areas where development is best suited.

On an intermediate scale, design guidelines are made for individual corridors and areas that are a part of the regional ecological infrastructure. On the small scale, the ecological infrastructure defines the structure for urban land development, and guides site-specific design.<sup>8</sup>



The security patterns illustrated in the figure are taken from a real project in Taizhou in China. The project is described in Yu, K and Padua, M, 2006, p.68-73

## *Sustainable city patterns*

For landscape architects involved with physical planning and town planning, a major task is developing towns or cities in a sustainable way through the physical form of the city. A lot of studies have been conducted in order to find out to what degree a city structure affects sustainable development. There is no certain knowledge of an optimal city form, since so many aspects have to be taken into account. For example there are no clear-cut data that show that one type of city structure has a lower use of energy than the other. However, a lot of books and most schools of architecture seem to recommend the development of dense areas with mixed use. It is also popular to reuse land that has previously been used for something else, for example industrial areas. I will discuss three questions that recur in the debate on sustainable development and the physical form of the city: the question of whether cities should be dense or sparse, what geographical form of the city that is most beneficial for sustainability and why cities should be integrated and not fragmented.

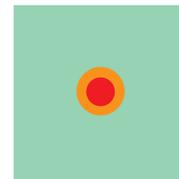
### **Should cities be dense or sparse?**

The compact and dense city is characterized by short walking distances, a well-developed cycling and public transport system, energy efficient buildings, low costs for technical infrastructure and advantages when installing heating and electricity. It is also a condition for a controlled handling of waste that is harmful to the environment. The sparse city will bring nature into the every-day life of all its citizens. Large, open spaces will bring fresh air into the city and will allow animals and plants to reproduce. It will have all the conditions needed for a resource-effective food production, and enough room to use solar-energy and handle biofuels.<sup>9</sup> In practice, it is impossible to choose one strategy for a whole city,

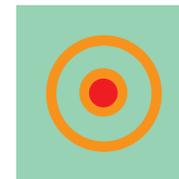
it is always necessary to combine dense and sparse development to some extent. In some places, for example in unattractive dense suburbs, it might be suitable to make the settlement sparser, while other areas should be made denser in order to create a basis for public transport.<sup>10</sup>

### **A sustainable geographic form**

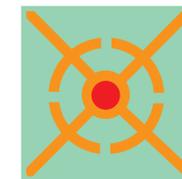
The form of the city is closely linked to the question of whether it should be dense or sparse. According to Orrskog, the sustainable city form should be compact, concentric or in some other way kept together in order to have a well-functioning system of public transport and centralized systems for heating, water supply and sewage systems. He illustrates how an environmentally friendly city can grow in four steps:



The city center is allowed to grow to a certain extent of density and spreading



Further growth is located in a ring outside a green-belt...



...and along radial fairways. The growth is given a form that is adapted to public transport



You should be able to see the pattern in the actual landscape. The illustration is based on a figure by Orrskog in *Boverket* and *Natuvårdsverket*, p.33

This creates a city that to the form looks a bit like seaweed in a bicycle wheel. Both Stockholm and Copenhagen and many other Scandinavian cities have this shape - a sign that cities in Scandinavia are in a good initial position for sustainable city building compared to many other cities in the world.<sup>11</sup>

### **An integrated city with mixed use**

During the 20<sup>th</sup> century there was a trend towards increased zoning and specialization of the functions of the city. This way of planning cities was largely influenced by economic driving forces but also by a planning philosophy that had its roots in functionalism. The zoned or fragmented city is often criticized for creating bubbles or islands of functions and social fellowships without connections to one another. Today town planning focuses on mixing residential, commercial, industrial, office and institutional land uses. Historical cities and smaller towns and villages are built this way, resulting in lively environments with many social and cultural benefits. In terms of resource-use, mixed use areas result in a more effective use of land, premises and infrastructure. The downside of the integrated city is the increased level of noise and risk factor associated with light industry located close to housing areas.<sup>12</sup>

### ***Transports***

Emissions from road vehicles account for a large part of the world's air pollution. People have to transport themselves long distances to reach different functions in the city. Energy, water, food and waste have to be imported and exported between the city and the countryside. By taking part in creating a society based on local production, by making public transport attractive and easily accessible and by building an effective system of bicycle paths, landscape architects can help reduce the emissions produced by cars.

### **Public transport**

From an environmental viewpoint, cars should be used as little as possible. Therefore, a well-functioning public transport system is of

great importance to the sustainable city. An important factor in making public transport attractive is to localize bus and train stops in the right places and to make them accessible and safe. The localization should be studied in relationship to land use (housing, workplaces and service), with consideration to where popular destinations are located, and with consideration to the number of inhabitants within walking distance to the stop. Accessibility can be increased by reducing the distance between parking lots and train platforms, and between bus stops in connection areas.

### **Walking and cycling**

In order for people to choose to walk or cycle instead of driving, cities need to have a well-developed system of attractive bicycle paths and walking lanes. Bicycle routes have to be safe and accessible, and they have to reach all parts of the city. They should also be comfortable to use. Tom Turner describes some of the problems a cyclist may face:

*A cyclist's joy is too easily destroyed by motor vehicles. Not only are they noisy and smelly, they cause severe turbulence and threaten to crush the unlucky pedaller. If one is being deafened by internal combustion engines, bored by a featureless landscape, poisoned by diesel fumes or forced to take diversions through back streets, one's enthusiasm for cycling can dim.*<sup>13</sup>



The Swedish Society for Nature Conservation (Naturskyddsföreningen) summarize the criteria that make cycle paths attractive:

- *Safety* – not to have to worry about collisions with motorized vehicles.
- *Accessibility and continuity* – to get from A to B as fast as possible without having to take detours.
- *Convenience* – cycling should be a calm, uncomplicated and pleasant experience.
- *Combined transportation* – possibility of combining cycling with other means of travelling. This requires safe and well-located bike parking and the possibility of bringing bikes on board buses and trains.
- *Clear signposting* – clear and relevant signposting in strategic places.
- *Design* – roads with good visibility that are comfortable to cycle on.
- *Good road quality* – flat and well kept roads; during winter, cycle paths require maintenance of the same quality as main roads.
- *Lighting* – good lighting along cycle lanes, at road crossings and in tunnels.<sup>14</sup>

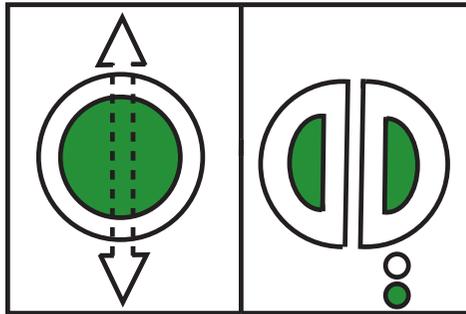
## *Green structure*

Green spaces and lush verdure is a natural part of ecological design. The elements that forms the green structure of a city can be anything from wild nature to city parks and community gardens. It has two major functions in the city. By letting green spaces with different biotopes be an important part of the city, and by connecting these areas with green corridors where animal and plants can move, the biodiversity in the city is likely to increase. Green spaces also affect our health in a positive way. Patients that can see trees and grass outside of their hospital window recover quicker than those who look out on asphalt and building facades. Children in pre-school who spend time outdoors in a wild-looking environment are less likely to be sick, have better mobility and can concentrate better than children who spend time outdoors in playgrounds with play equipment, orderly rows of plants, and asphalt paths. The scientific proofs are now so strong that it is possible to create criteria for the localization and dimensions of green spaces in physical planning.<sup>15</sup> As my focus is upon ecological design in this essay, I will only discuss the environmentally beneficial aspects of green structure here.

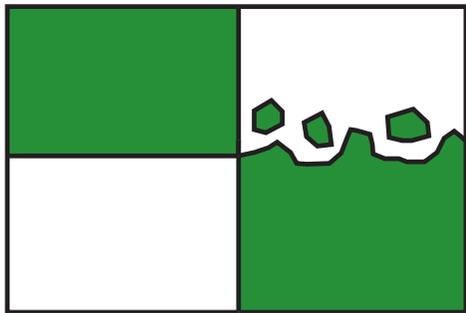
### **Green structures with the aim to improve biodiversity**

Urbanization and agriculture causes large disturbances to the ecological functions in the landscape. The science of landscape ecology provides guidance in how to maximize biodiversity through the spatial arrangement of habitats. It focuses upon ecological processes at the scale of the landscape or the region, and uses concepts such as *patches, edges and boundaries, corridors and connectivity*, and *mosaics* as analytical tools. The book *Landscape Ecology Principles in Landscape Architecture and Land-Use Planning*<sup>16</sup> describes

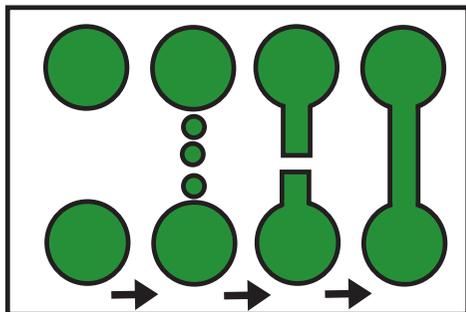
landscape ecological principles in an easily accessible way with the help of simple illustrations. These are some examples:



*“Interior habitat and species: Dividing a large patch into two smaller ones removes interior habitat, leading to reduced population sizes and number of interior species, which are often of conservation importance.”<sup>17</sup>*



*“Hard and soft boundaries: Compared with a straight boundary between two areas, a curvilinear “tiny-patch” boundary may provide a number of ecological benefits, including less soil erosion and greater wildlife usage.”<sup>18</sup>*



*“Stepping stone connectivity: A row of stepping stones (small patches) is intermediate in connectivity between a corridor and no corridor, and hence intermediate in providing for movement of interior species between patches”<sup>19</sup>*

The illustrations are based on drawings in Dramstad E.W, Olson, J.D, Forman, R.TT, 1996, p. 20, p.30 and p. 37

Another way to improve the conditions for biodiversity is through the reclamation of derelict land, and the creation of specific *habitats*. The goal of land reclamation is to restore the landscape to something that resembles its condition before it was disturbed, often with some sort of nature conservation objective in mind. Habitat creation is something which has grown out of both land reclamation and “the ecological approach” described in Part One. After proving that it is possible to create meadows and quasi-indigenous woodlands, some landscape architects have become more ambitious in the type of natural habitats that they seek to create. Habitat creation is still seen as specialist work, but it is an area of landscape architecture that will probably grow bigger as environmental concern increases.<sup>20</sup>

### Urban forestry

An urban forest is a forest or a collection of trees that grows within a city, town or suburb. Trees play an important role in improving the urban environment: they clean the air, create oxygen, bind airborne particles and filter water and sunlight. Urban forests provide shelter for animals and recreational areas for people. They slow down wind and storm water and they shade homes and businesses, reducing the need for air-conditioning and thereby conserving energy. They moderate the local climate and they reduce the urban heat island effect.<sup>21</sup> It is important for landscape architects to choose suitable tree-species with consideration to the size of the full-grown tree and its soil and temperature requirements. Big trees such as poplar, willow, ash and elm should be planted along the largest and widest streets of the city. Smaller trees such as mountain ash and fruit trees are suitable for small streets and urban spaces. Around parking lots it is best to choose ash, hornbeam, plane tree or some

sort of willow, as other species might emit sticky seeds or fluids that drip on the cars and destroy their lacquer.<sup>22</sup> Monocultures should be avoided as they increase the risk for disease.

### ***Stormwater management***

Stormwater is the part of melt- or rainwater that doesn't filter down through the ground but has to be transported from the site in some other way. Old sewage and drainage systems have a so called *combined system*, where sewage water and stormwater are mixed on their way to the wastewater treatment plants. When it rains a lot these systems can't handle all the wastewater, and some of the water will be sent directly to the recipient, causing eutrophication. New systems are called duplicate systems. They lead wastewater and storm water in separate pipes, and when storms causes flooding, only the storm water will reach the recipient.

Managing the stormwater locally is better for the environment as it relieves pressure on the underground sewage systems and the wastewater treatment plants, and lessens the risk of untreated water reaching the recipient. Landscape architects often work with stormwater management through the construction of ponds and wetlands, or the creation of green roofs.

### **Ponds and wetlands**

Constructed wetlands and ponds have become increasingly popular in stormwater management as they can both improve the quality of stormwater runoff and control runoff volume. Properly designed ponds and wetlands can remove large percentages of the pollutants in urban stormwater runoff such as phosphorus and nitrogen. They

add an aesthetic quality and possibilities for recreation in urban areas, and they can enhance biodiversity through habitat creation.<sup>23</sup>

### **Green roofs**

Green roofs detain and slowly release rainwater. They can reduce the annual runoff by up to 60% through evapotranspiration. They also have other benefits such as providing habitat for birds and insects, energy conservation through thermal insulation and the improvement of local microclimate through evaporation, and they help create a balance between vegetation and urban infrastructure. *Sedum* is commonly used in Sweden as it is resistant to drought and high exposure to wind and sun.<sup>24</sup>



**Water** is a natural part of the ecologically friendly city district *Hammarby sjöstad* in Stockholm

## *Sustainable materials*

In order to create an environmental profile for a material, all phases of the life-cycle of the material must be studied. By comparing the energy and raw material needed, and the discharge the production results in, materials can be ranked according to grade of sustainability. The phases studied in a life-cycle analysis are the harvesting of the raw material, production, transports, construction, use and demolition.<sup>25</sup>

Renewable materials are organic materials that get their energy to grow from the sun through photosynthesis. The basic rule is that as long as we don not use more than the growth, renewable materials are the best choice from an environmental perspective.<sup>26</sup> The book *Byggekologi* (building ecology) features tables that shows which materials are recommended, accepted or should be avoided in different areas of construction. This table discusses paving materials and geoproducts:<sup>27</sup>

<b>Recommended</b>	<b>Accepted</b>	<b>Should be avoided</b>
Gravel, sand	Concrete tiles <sup>28</sup>	Asphalt <sup>29</sup>
Grass	Grass reinforcement <sup>30</sup>	Wood, pressure-treated
Geoproducts in coconut fiber	Geoproducts, synthetic	PVC
Chip bark	Ceramic tiles	
Stone, domestic production	Brick paving	
Wood	Stone, imported	



# Ecological aesthetics

As sustainable and ecological values have become more and more important in the profession of landscape architecture, questions have arisen of what impact ecological thinking will have upon the aesthetics of landscape. Will an interest in creating ecological quality also mean the favouring of a particular style of design?

You could argue that as long as the right landscape ecological relationships between green spaces are there, insects, birds and animals do not mind whether the design of the green space is formal or wild-looking. But, as Thompson writes, there seem to be styles of design that maximize wildlife and those which do not. A classic urban plaza, consisting of mostly hard landscape and maybe a few trees in containers, does not contribute very much to the ecology of the city. If it contains a formal water feature e.g. fountains powered by electricity, this type of urban space is actually negative for the environment.

It seems as if most designers interested in ecological quality are drawn to a less formal aesthetic.

*Instead of admiring a landscape that is ornamental, paved, groomed and relatively static, an alternative design language would emphasise a diversity and complexity that the human component can interrelate with – water resources, wildlife habitats, edible landscapes, and urban woodlots.<sup>31</sup>*

It also seems as if the main goal is to find a “deep form”, some sort of underlying “truth” that rises above trends, styles and “meaningless shapes”.

## *Deep form*

Robert Thayer thinks that in order to create deep form, landscape architects should let underlying ecological processes and cultural traditions determine the design of the site. A design where ecological function is expressed as form will be timeless, enduring and sustainable.<sup>32</sup> This approach is similar to modernism in the sense that “form follows function”, but this time the function is not mechanistic but ecological. Thayer explains:

*Form will follow a highly complex, evolving notion of the core interrelationships of nature, and will be expressed uniquely in the surfaces of local landscapes as expressed by local cultures. Sustainable landscapes’ form and content will seek to reveal this ecological order through an interplay of surface and core unique to both place and culture. Consequently, there will be no style, since “style” itself necessarily separates the surface from the core.<sup>33</sup>*

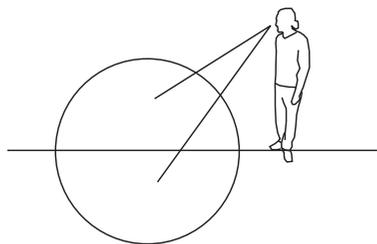
Deep form is described by John T. Lyle as a meeting of appearance and reality, mind and nature, art and science. He says that in order to generate deep form, landscape architects need a rational understanding of natural systems in combination with intuitive imagery. Human creativity and vision should interact with inner ecological processes, in order to make underlying order visible and meaningful:

*What I propose (then) is that we take the underlying complex and elegant ecosystematic order of nature as the essential and fundamental inspiration for design. Too often, landscape architects have ignored the inspiration for creativity offered by natural processes*

and have chosen instead to view “ecological factors” as constraints to creativity. Too often, too, they have responded to nature by shaping pale imitations of her forms in the picturesque tradition and in so doing have produced shallow form.<sup>34</sup>

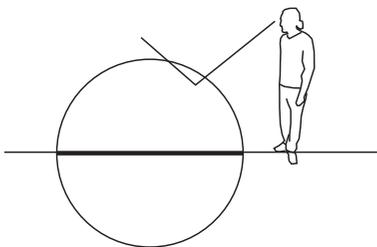
### Transparency

Robert Thayer stresses the importance of making landscapes “transparent”. Ecosystem function should be visible in the landscape so that people can learn the ecological consequences of their actions and behaviors. It should be possible to judge from the land surface if the underlying ecosystem has been disturbed, even if this means that the surface looks untidy or untended.



#### Transparent

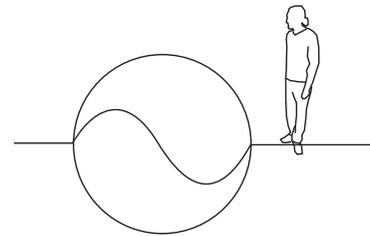
“What you see is what you get”  
Landscapes are transparent if their core properties are visible, if one is able to see into them.



#### Opaque

“You can’t tell what you get”  
Landscapes are opaque when the ecological connections and technological functions remain obscure and inaccessible.

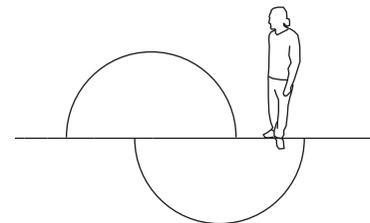
▲  
Illustrations based on drawings in Thayer, R, 1994, p.141



#### Congruent

“What you see is compatible with what you get”

When surface and core values are compatible, the landscape can be said to be congruent. A constructed wetland that not only safely processes the human wastes that it receives but also provides safe habitat for birds and recreation for humans is an example of a congruent and sustainable landscape. Congruency is often prevented by opaqueness, because if we are unable to see how the landscape functions, we can’t detect possible incongruities.



#### Incongruent

“What you see is incompatible with what you get”

When surface and core values are incompatible, the landscape can be said to be incongruent. Air conditioners powered by fossil fuels create the illusion of coolness in one place, but are contributing to making the whole planet hotter through global warming. The perceptual function of this technology is to convince us that the world is a more pleasant place, but the practical dimension of the technology functionally contributes to making the world a worse place.

According to Thayer, transparency is an essential ingredient in sustainability. Even if not every transparent landscape will be beneficial, nurturing or functionally sustainable, the aesthetic of that landscape will be sustainable. He argues that

*(...)the first step toward building a sustainable world is to open up our landscapes to view, so that we may learn from them where we are, how we are doing, and what we need to do to make the world better. Opacity and fakery in the landscape ultimately only serve to perpetuate the unsustainable status quo.<sup>35</sup>*

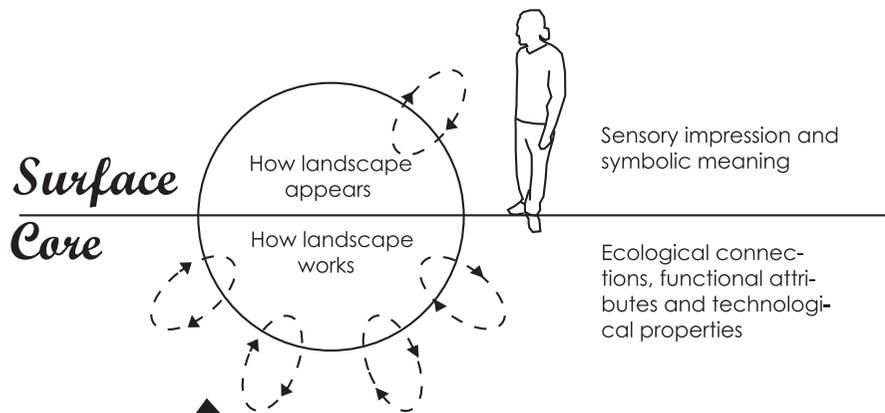


Illustration based on drawing in Thayer, R., 1994, p.140

The ecological processes should never be disguised by a “false surface”, something that Thayer and other spokesmen for this type of ecological aesthetics often criticize modern landscapes for doing.

## *Messy ecosystems, orderly frames*

Joan Nassauer proposes an entirely different type of ecological aesthetic. She argues that ecologically functional landscapes tend to look messy, and that they violate cultural norms about tidiness and order when they are introduced in urban environments. Unlike Thayer, she does not have a problem with the distinction between function and appearance:

*A belief that nature needs no presentation and that presentation is essentially sinister in its intent leaves ecosystems highly susceptible to misunderstanding.*

She says that people do not know how to see ecological quality directly.

*We know how to see ecological quality only through our cultural lenses, and through those lenses, it may or may not look like nature. Nature has come to be identified with pictorial conventions of the picturesque, a cultural not ecological concept. More significantly, picturesque conventions have become so integral to landscape perception that we are no longer able to accept their origin in culture. Picturesque conventions seem so intrinsic to nature that they are mistaken for ecological quality.*

The recognizable system of form is often characterized by neatness and order. Neatness communicates that a place is under the care of a person, and people expect to see the look of human intention when they are in an urban setting. If a landscape architect has created a wildlife habitat without communicating the intention behind the place, people might mistake it for neglected land and dislike it.

Therefore, Nassauer suggests that designers should frame ecological function within a recognizable system of form. Ecological function that is framed with cultural language is not obliterated, covered up or compromised. It is just set up for viewing, so that people can see it in a new way. “Cues to care” will tell the public that an apparently untidy landscape is part of a larger intended pattern. The cues may vary from region to region and among ethnic groups, but they will always express care of the landscape. It has to be obvious that the landscape is meant to be like that and that it isn’t “not-managed”. She mentions mowing as an example of a cue for care:

*While the omnipresent, large, continuous lawn is not necessary to communicate care, mowing a strip along human paths (streets, walkways) frames patches of greater biodiversity with clear signs of human intention.<sup>36</sup>*

Other examples are the use of flowering trees and plants, the installation of wildlife feeders and houses, the introduction of bold, clearly visible patterns of soil conservation practices like strip cropping, grassed waterways and terracing.

Nassauer’s model is fundamentally different from Thayer’s in the sense that it doesn’t require people to be confronted with ecologically destructive behavior.

*An “in your face” approach to displaying ecological function would logically extend to exposed septic tanks, a landfill in every yard, corporate headquarters sited at chemical dumps, and a sense of ecological justice about natural disasters like flooding and drought. It requires people to accept what they regard as ugly and uncomfortable in exchange for what is attractive and familiar.<sup>37</sup>*

She does not think that landscapes of purism or penance will work.

*What will work is to acknowledge that cultural expectations and human pleasure will continue to be measures of ecological function, at least in everyday experience. Orderly frames are not a means of dominating ecological phenomena for the sake of human pleasure. Orderly frames can be used to construct a widely recognizable cultural framework for ecological quality.<sup>38</sup>*

## Footnotes

- <sup>1</sup> Thompson, 1999
- <sup>2</sup> Hermansson, 2007
- <sup>3</sup> Thompson, 1999, p. 163
- <sup>4</sup> Hermansson, 2007, p. 30
- <sup>5</sup> Robert Thayer in Swaffield ,2002, p.189
- <sup>6</sup> Thompson, 1999, p. 157
- <sup>7</sup> Yu, Positioning contemporary landscape architecture in China, *Topos* 56, p. 91-98
- <sup>8</sup> Yu and Padua, 2006, p. 68-79
- <sup>9</sup> Boverket and Naturvårdsverket, 2000, p. 32
- <sup>10</sup> Boverket and Naturvårdsverket, 2000, p.32
- <sup>11</sup> Orrskog, 1993 in Boverket and Natuvårdsverket, 2000, p.33
- <sup>12</sup> Boverket and Naturvårdsverket, 2000 p.34
- <sup>13</sup> Turner, 1998, p. 335
- <sup>14</sup> <http://www.snf.se/verksamhet/trafik/fakta-cyke-cykelvag.htm>, 2007/06/06
- <sup>15</sup> Boverket and Naturvårdsverket, 2000, p. 37
- <sup>16</sup> Dramstad et al. 1996, p.30
- <sup>17</sup> Ibid, p. 30
- <sup>18</sup> Ibid, p. 30
- <sup>19</sup> Ibid, p.37
- <sup>20</sup> Thompson, 2000, p. 172
- <sup>21</sup> Wikipedia Online Dictionary, [http://en.wikipedia.org/wiki/Urban\\_forestry](http://en.wikipedia.org/wiki/Urban_forestry), 2007/06/01
- <sup>22</sup> Block and Bokalders, 2004, p. 336
- <sup>23</sup> Villarreal, 2005, p.20
- <sup>24</sup> Ibid, p.20
- <sup>25</sup> Block and Bokalders, 2004, p. 39
- <sup>26</sup> Ibid, p. 41
- <sup>27</sup> Ibid, p. 52
- <sup>28</sup> Reinforced concrete tiles are not accepted. Concrete tiles with recycled ballast material are recommended.
- <sup>29</sup> There is no good substitute for asphalt, but we can reduce the areas that are asphalted.

<sup>30</sup> Plastic grass reinforcement is only accepted if it is recycled PP or PE plastic.

<sup>31</sup>Ann Rosenberg in Thompson, 1999, p. 158

<sup>32</sup> Thayer, 1994, p. 315

<sup>33</sup> Ibid, p. 315

<sup>34</sup> John T. Lyle in Swaffield, 2002, p.188

<sup>35</sup> Thayer, 1994, p. 311

<sup>36</sup> Nassauer 1995, in Swaffield, 2002, p.203

<sup>37</sup> Ibid, p.205

<sup>38</sup> Ibid, p.206

# Part Three

Reference: Shanghai and  
Dongtan

# Intro

As a part of the studies behind my bachelor's thesis, I went on a three-week long study trip to eastern China. This was a time for the theory I had read to sink in, and presented the possibility of seeing and experiencing problems described in sustainability literature for myself. I found Shanghai particularly interesting to analyse from a sustainability perspective. In many ways it represents the fast-growing Chinese economy, the consumer society and the aspiration of living a western lifestyle. But it also represents a new, environmentally responsible way of thinking in China. At the urban planning exhibition center, town planners are presenting their visions of transforming Shanghai into a green, environmentally friendly and healthy city. A part of this effort is the development of Dongtan, a new city district on an island outside the city that is said to be the world's first true Eco-City. This statement made me curious. What aspects of sustainability have the planners behind Dongtan taken into consideration?

In the introductory sections *The Chinese miracle* and *Shanghai*, I discuss the environmental consequences of the rapid economic growth that China is experiencing and introduce the city of Shanghai. In *Eco-Shanghai and Dongtan* I talk about the visions of turning Shanghai into a sustainable city, focusing on the development of the ecological district Dongtan on Chongming Island. I describe the core ideas of Dongtan and I look closer at the landscape planning and design in order to get an understanding of ecological design in practice.

# The chinese miracle

When discussing sustainability on a global scale, China is always mentioned. “A sustainable world needs a sustainable China” some people say and point at the serious environmental challenges that China is facing, from energy and water scarcity to air pollution, flooding and erosion. China is experiencing a very rapid economic growth. It boosts a global economy, but it also increases air pollution, the consumption of natural resources and the price of raw materials. Super-modern, futuristic buildings are being built for the 2008 Olympics. Simultaneously, rivers run dry and polluted and the groundwater table continues to drop, causing a major part of the population to lack sufficient water.<sup>1</sup>

The first priority of the Chinese government is to further promote economic growth - the goal is to quadruple the GNP of 2000 by 2020<sup>2</sup>. However, during the past few years, the problems with a policy based on economic growth have become clear. Pan Yue, Deputy Director of China's State Environmental Protection Administration, explains how the environment is affected by the rapid development:

*Of course I am pleased with the success of China's economy. But at the same time I am worried. We are using too many raw materials to sustain this growth. To produce goods worth \$10,000, for example, we need seven times more resources than Japan, nearly six times more than the United States and, perhaps most embarrassing, nearly three times more than India. Things can't, nor should they be allowed, to go on like that [...] This miracle will end soon because the environment can no longer keep pace. Acid rain is falling on one third of Chinese territory, half of the water in our seven largest rivers is completely useless, while one fourth of our citizens does not have access to clean drinking water. One third of the urban population is breathing polluted air, and less than 20 per cent of the trash in cities is treated and processed in an environmentally sustainable manner. Finally, five of the ten most polluted cities worldwide are in China.*<sup>3</sup>

More and more of the Chinese population are moving into the cities. Today, 40 per cent of China's 1, 3 billion people lives in cities. The government project that in 2020 the number will be closer to 60 per cent<sup>4</sup>. That means that over 250 million people will move from the countryside to the cities in the near future. The number of cities with more than 1 million inhabitants will increase from 171 to approximately 200. As a response to the environmental crises, China has started to focus on finding ways to grow in a sustainable way. This has resulted in new green urban development projects in Shanghai, Beijing and Huangbaiyu.



# Shanghai

Shanghai glitters, shines and radiates. It rises higher than most cities on the earth and spreads over an incomprehensibly large area. Shanghai has the largest shopping mall in Asia, the highest hotel in the world and the world's fastest train. It has the largest industrial base and the biggest port in China. With a population of more than 13 million, it is one of China's largest cities. The first thing you witness as a visitor might be the luxurious shopping districts and business areas, and the elegantly dressed people on the streets. But behind the shiny facades lie areas with traditional shikumen-buildings, small bakeries, restaurants, food shops and workshops

for the locals. In the early mornings, before the city wakes, you can see old women and men starting their day by dancing, doing gymnastics and tai chi, or flying their kites in the public spaces of Shanghai.

Shanghai is relatively young compared to other cities in China. It originated in the main because of its location next to the Huangpu river, functioning as a fishing village up until the 17th and 18th century, when the silk production in the area made it into an important commercial city. In the 19th century foreign powers recognized

Shanghai's potential as a port, and the west side of the Huangpu river experienced rapid growth. The treaty of Nanjing in 1842, which concluded the Opium Wars, ceded areas of Shanghai first to the British and then to the French, the Americans and the Japanese. Each of the three Western powers took over large areas of Shanghai and turned them into separate, self-governed enclaves. Immune from Chinese law, each settlement had its own police force, schools, courts, building code, sanitation and electric power system. Up until 1949, foreigners dominated commerce and industry in the city. When the communists took over, the first priority was to clean up the slum, rehabilitate the hundreds of thousands of opium addicts that lived in the city, and to exterminate child and slave labor. The city developed relatively slowly up until 1990, when the Shanghai municipal government decided that it should expand eastwards across the Huangpu river. The goal was, and is, to make Shanghai the center for finance and commerce in China and Asia, while continuing to develop the traditional economy.<sup>5</sup>



The Huangpu river with the Bund to the right in the picture and the Pudong area to the left.

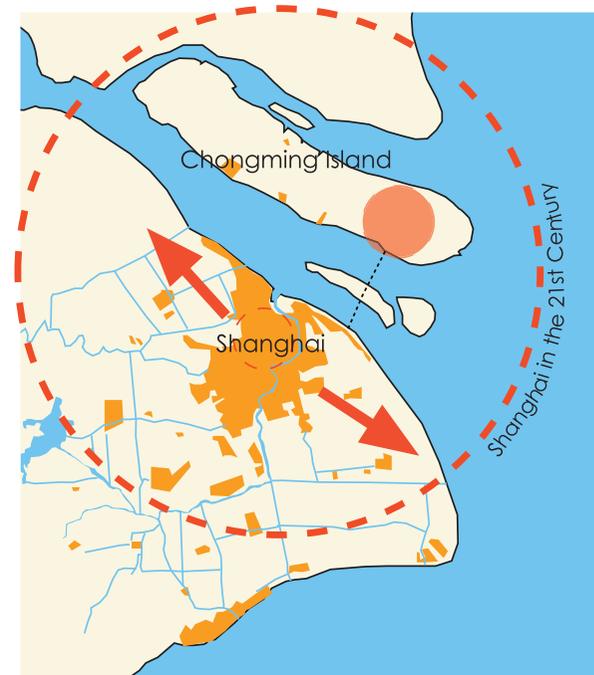


Foto: Hans-Olof Lisper



Foto: Hans-Olof Lisper

Shanghai is located on the east coast of China. The city covers an area of about 6200 km<sup>2</sup> today. In the future the city will expand along the coast and onto the surrounding fields. The development will also spread to Chongming Island.<sup>6</sup>



## *Better cities – better life*

Shanghai is a city that is transforming itself. Everyday a new skyscraper is built, and a block in the old neighborhood is demolished. There is a Chinese saying: “Jiude bu qū, xinde bu lai”, if the old doesn’t go, the new can’t arrive.<sup>7</sup>

In 2010, Shanghai will host the World Expo with the theme *Better City-Better Life*, and the preparations are visible everywhere. The major part of the work is infrastructure upgrades - highway expansion and railway development, but Shanghai is also investing around 40 billion Yuan (about 40 billion kr) on improving the environment. This will finance 260 projects, including an improved environmental protection infrastructure, pollution reduction and upgraded environmental management. One of the biggest attractions at the World Expo will be the eco sensitive city district of Dongtan.

So what will Expo 2010 Shanghai China deliver to the world? There is no doubt the Chinese people will present to the world a successful, splendid and unforgettable exposition.

Expo 2010 Shanghai China will be a great event to explore the full potential of urban life in the 21st century and a significant period in urban evolution. Fifty-five percent of the world population is expected to live in cities by the year 2010. The prospect of future urban life, a subject of global interest, concerns all nations, developed or less developed, and their people. Being the first World Exposition on the theme of city, Exposition 2010 will attract governments and people from across the world, focusing on the theme "Better City, Better Life." For its 184 days, participants will display urban civilisation to the full extent, exchange their experiences of urban development, disseminate advanced notions on cities and explore new approaches to human habitat, lifestyle and working conditions in the new century. They will learn how to create eco-friendly society and maintain the sustainable development of human beings.

From the official website for World Expo 2010 ([www.expo2010china.com](http://www.expo2010china.com))



# Eco-Shanghai and Dongtan

Shanghai is a city that is driven by consumerism, but it is also a city with a great vision of its sustainable future. At Shanghai urban planning exhibition, a whole floor is dedicated to explaining how the city can diminish its ecological footprint by producing environmentally friendly solutions for future development. The most exciting project is Dongtan, a new city district that is being built on Chongming Island at the mouth of the Yangtze River near Shanghai. When the development is completed Dongtan will have a population a third the size of Manhattan's. The first phase, a 630-hectare development intended to house a 50,000-person community, is set to be completed by 2010 so that it can be displayed at the World Expo.<sup>8</sup>

Dongtan is said to be the world's first true eco-city. It is designed from the ground up to be self-sustaining, environmentally, socially and economically. Dongtan will be self-sufficient in energy and water and it will be completely carbon-neutral. People will transport themselves on foot, by bicycle, solar-powered boats and fuel-cell-driven buses.<sup>9</sup> The city is being designed by the British design and consulting firm Arup on behalf of Shanghai Industrial Investment Corporation. Arup gives this overview of what makes Dongtan truly eco-friendly:

*Priority projects include the process of capturing and purifying water in the landscape to support life in the city. Community waste management recycling will generate clean energy from organic waste, reducing landfills that damage the environment. Combined heat and power systems will provide the technology to source clean and reliable energy. Dongtan will be a model ecological city, and its buildings will help to reduce energy use, making efficient use of energy sources and generating energy from renewable sources.<sup>10</sup>*

Chongming is an island of alluvial silt about 80km long and 17km wide. Today there are about 650,000 people living here. The developer's plan is to turn some of the farmland into forest and to make all agriculture organic. Chongming also hopes to attract low-polluting, high-tech industries.

Wetlands are among the landscapes with the richest biodiversity on the planet. The tidal reed-covered mudflats of Dongtan is one of China's most important bird reserves. Nearly two million birds of nearly 100 different species pass through every year, many of which are rare, endangered species under national and international protection.

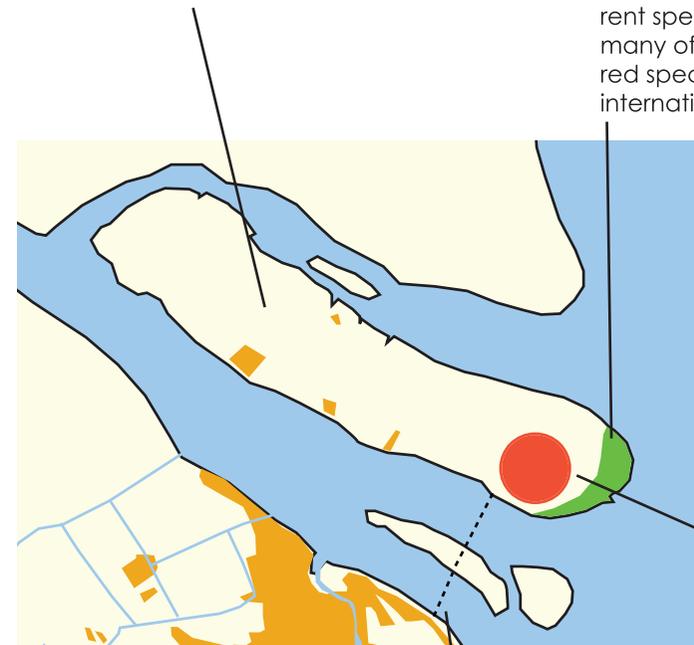


Illustration of Chongming Island based on a picture in Yan, Z and Girardet, H, 2006, p.161

The first stage of the development will be situated on the southeast tip of the island.

The Yangtze River Tunnel-Bridge, 25,5 km in length, will connect Chongming with Shanghai

## *Design concepts in Dongtan*

Dongtan will be a **compact city surrounded by parkland**. The master plan proposes a network of pedestrian and cycle routes, protected and separated from motorised vehicles. Mixed land use reduces the demands for motorised travel as services and activities are mixed into the residential areas. A compact design with mixed land use has many benefits. It encourages people to walk, which is good for them as well as the environment, it enhances opportunities for social interaction and community links and, by reducing the need for transport by car, it reduces road accidents.

Dongtan will be an **inclusive city**. The local community and its current economic activities like agriculture, fishing and recycling should be given an active role on the site. An education facility relating to food science would enhance the skills of the existing farming and fishing and would benefit the food/leisure/tourism industry. Part of the broad socio-economic strategy would be to mix residential development with other development and to avoid building large areas of low-income housing separated from mid-to-high income areas. This will contribute to social sustainability.

The city will have **balance between continuity and diversity**. Different places within the city and the outer region will be connected by a continuous network of green spaces and water bodies of different sizes and spatial qualities. These will add richness and a sense of place and orientation to each of the city districts. The housing will be inspired by traditional residential buildings in Shanghai. The traditional model in China is a gradual transition between public and private spaces - from main roads to the central lane, to alleys, to house courtyards and then to the internal rooms. The developers want to reinterpret this model in a contemporary manner in Dongtan.

**A city of linked villages**. Dongtan will be made up of a collection of towns connected by public transport and cycle routes. The first settlement of the Eco-City, at the southern end of Dongtan, will be a town consisting of three villages, where every village will provide all the facilities needed to support a community. Each village will have its own distinct character based on a water theme. The “Marina village” is built around a marina and ferry port and plans have been made for an equine theme park. It will have a large lake that can be used for water sports and rowing and there will be hotels, restaurant and other visitor attractions. The “Lake village” will feature a “food science cluster” that will draw on Chongming’s existing farming and fishing activities. It will involve education and research facilities, and there are also plans for an interpretation centre that will explain the elements of the village that make it truly sustainable. The “Pond Village” focuses on knowledge-based industries and residential development. It will feature neighborhoods on an intimate scale based around canals and ponds.

The final point has to do with **density and diversity**. As mentioned before the aim is to create a mixed and socially sustainable city. This will be achieved by using different building typologies that cater for different users - families, couples, single young professionals, older people and so on. The development will vary in density. The highest density (12500-15000 dwellings per square km) will be concentrated in the city centre, with the next highest density in the village centers. The lowest density (7500-10000 dwelling per square km) will be located in the residential areas. The villages will be designed so that sunlight can penetrate streets, sidewalks and green open spaces, and that the adverse condition of wind and the local microclimate will be minimized.<sup>11</sup>

## *Greening strategies*

### **Green spaces for wildlife and ecology**

A system of continuous green corridors for wildlife and ecology will be integrated into the city of Dongtan. It will be surrounded by an ecological buffer that will allow for wildlife movement and ecological continuity across the island.

### **Green spaces for people**

The aim is to create an urban environment where people are connected with green open spaces as part of their day-to-day life. For this to be possible, parks should always be as close to the people as possible. The rule in Dongtan is that there should be a park within three minutes walking distance no matter where you are in the city.

### **Flood protection and landscaped topography**

Dongtan is situated on land that is dependent on dykes to avoid flooding. The flood protection on the inland side of the development will be conceived as an integrated landscape component of the city and it has multiple functions. It protects the inland from flooding, it creates a linear park, it can accommodate water capture tanks, provides parking areas, prevents informal urban sprawl and creates a sense of a city border. In Part Two, I described Dr Yu's "ecological infrastructure". The purpose of that method is to locate places that are best suited for urban development, places where it is possible to work against nature as little as possible. He might argue that development isn't suitable where measures like this have to be taken to avoid flooding.

### **Preserve the unique spatial history of agricultural plots**

One of the most interesting ideas in the green structure is how the landscape architects have drawn inspiration from the historical

landscape of Chongming Island when designing the city parks. The geometric order of the agricultural plots will be the basic component, and when connected throughout the city they will create a network of green spaces that will bring a sense of orientation as well as rhythm and relief to the development. This will contribute to a historical continuity in Dongtan (cultural sustainability) and at the same time it is a fresh way of looking at landscape in China.<sup>12</sup>

## *Water strategies*

### **Flooding strategy**

Dykes and ponds will be dug out and provide landfill to raise the level of the city. This will prevent storm-water flooding to a certain degree and reduce the risk of it penetrating the shallow water table. The inland dyke mentioned before will control floods caused by substandard dykes elsewhere on the island. Water retention areas, including water bodies, parkland and rain water accumulation areas such as green roofs and a dyke hill will be created.

### **A network of canals**

In traditional towns and villages located in the area around Shanghai, canals have a very important role in creating access and mobility for people and goods. This is something that the designers have drawn inspiration from. Dongtan aims to use the canals as an integral part of the transport and movement system in order to minimise the need for road-based transport but also to create a sense of place and give Dongtan a unique feeling. The canals will be structured into a hierarchy with main canals, secondary canals and small inlets and docks.

### **Water bodies that build the identity and character of the villages**

Lakes and ponds will create focal points and function as central features in the parks in the city. As described before each of the three villages which constitute the first phase of Dongtan has its own character and theme. Water has had an important role in defining the different characters. The Marina village has a marina promenade and a small scale ferry port, the Lake village is built around an activity lake for tourism and water sport, and the Pond village features a number of small ponds and canals intermingled with a collection of residential neighbourhoods.<sup>13</sup>

### ***Dongtan National Wetland Park***

The last feature in the Dongtan project that I want to describe is the National Wetland Park that will be situated to the east of the Dongtan settlements next to the Dongtan Wetlands. The park is said to become for Shanghai what Central Park is to New York. It will be a “serene and aromatic place for nature-loving people to retreat to”, and a contrast to the busy downtown area of Shanghai. The park will be 2km in width and 10km in length. Because of its location next to a nature reserve in the form of an alluvial wetland, the most important task of the park is to restore and reconstruct its sustainable wetland ecosystem, so that it can work as a buffer zone and protective screen between the city and the nature reserve.

The first stage in creating the park will be to remove the man-made ditches and fishponds that are situated there today so that the area can go back to being a lake with small islands. After that, a large variety of native vegetation such as aquatic plants, floating plants, emergent plants, shrubs and both salt and water tolerant arbors will

be test grown, all the way from the lake bed to the sloping shore, in an effort to create a sustainable and stable wetland ecosystem. Inside the park a linear wetland system will treat waste water from the city. The system will stretch to almost all parts of the park, creating a sort of wetland corridor that purifies water, functioning as a “natural kidney”. After preliminary treatment the water will flow slowly through the wetland purification system where it will undergo bio-degradation with the help of wetland plants. The degraded water will eventually make its way into a great lake in the park. The park is meant to be finished in time for the World Expo 2010. By then it will have numerous function sites such as a waterfowl centre, rare and endangered wetland species reintroduction site and a wetland service function exhibition site. There will also be various scientific research institutes including a wetland education training centre, a wetland eco-engineering exhibition, an eco-tourism training centre, a green energy exhibition centre, a wetland scientific research station, a weather monitor station, an alligator monitoring station, a seismic monitoring station and a geology museum.

The computer generations that illustrate the visions of the park show a wetland consisting of blue water with green islands covered in a soft mist. The pictures show blue skies and clusters of white birds, or beautiful sunsets. Inserted into this natural looking landscape are small houses, roads, boats, wind power stations and imaginative buildings that all seem to have some reference to nature. One building looks like an opening flower, another one like a giant globe made of glass, the third spreads out over the water and has the shape of some sort of insect. Wooden walking decks provide views of scenic spots in the wetland.<sup>14</sup>

The park is a good example of land reclamation as the designers seeks to recreate the landscape as it was before it became agricul-

tural land. It is transparent in the sense that the design communicates the ecological function of the landscape. The park also has clear signs of human presence and care, and can therefore be said to contain “cues for care” as advocated by Nassauer.

#### Footnotes

<sup>1</sup> Yu and Padua, 2006, p.15

<sup>2</sup> Ibid

<sup>3</sup> Lorenz, “*The Chinese miracle will end soon*” in Spiegel 07/05 2005, <http://www.spiegel.de/international/spiegel/0,1518,345694,00.html>,

<sup>4</sup> Yu and Padua, 2006, p.15

<sup>5</sup> Lindblad and Westby, 2007, p. 454- 455

<sup>6</sup> Yan and Girardet, 2006, p. 161

<sup>7</sup> Lindblad and Westby, 2007, p. 455

<sup>8</sup> Yan and Girardet, 2006, p. 161

<sup>9</sup> Ibid

<sup>10</sup> Press release: Arup unveils plans for world’s first sustainable city in Dongtan, China Release date: 24/08/2005, <http://www.arup.com/newsitem.cfm?pageid=7009>, 2007-05-25

<sup>11</sup> Yan and Girardet, 2006, p. 156

<sup>12</sup> Ibid, p. 162

<sup>13</sup> Ibid, p. 161

<sup>13</sup> Ibid, p. 163-165

# Discussion

The goal of this essay has been to get a picture of the relationship between ecological sustainability and landscape architecture. I have tried to describe *why* ecological design is important, and to give examples of what it implies - *how* we can be part of creating a sustainable world.

## *Why?*

It's relatively easy to answer the question *why*. Global change, including global warming and the loss of species and habitats, is a clear sign that social development is going in the wrong direction. This has been given a lot of attention in the media and on a political level, resulting in an unprecedented awareness of environmental issues among the general public. An increasing number of people want to live in a more sustainable way and the demand for professionals with ecological competence is growing.

As landscape architects, we are in a unique position to work with issues relating to the health of our planet. We understand both the will to develop and expand human settlements, and the need for protecting the landscape and environment. While other professions specialise in either urban development or environmental protection, our job is to maintain an objective and holistic approach, thereby contributing to making the right decisions.

## *How?*

In Part Two I introduced some of the many ways in which landscape architects can contribute to sustainability. Ecological design is about creating ecologically functional landscapes: landscapes that minimize the risk for eutrophication by effective stormwater management, landscapes that improve biodiversity through an optimal spatial arrangement of different habitats, landscapes that are

constructed with sustainable materials. Ecological design is also about reflecting over what signals the designed landscape sends out.

I believe that as society gets increasingly interested in environmental issues and sustainable solutions, they will want to see the landscapes and spaces around them respond to their interest and efforts. By introducing ecological design in the public spaces of our cities, firstly by creating landscapes with ecological quality and function, but also by introducing an aesthetic that communicates or even clarifies the underlying ecological function, landscape architects can meet this demand.

## *Dongtan and sustainability*

Ted Trainer says that the move towards sustainability and away from damaging forms of development can be divided into things which are "simple and easy" and things that are more difficult. The simple things involve adaption of new technology and new approaches to town planning. For landscape architects it can be things such as greening cities, the creation of wildlife corridors and urban commons, the provision of cycle paths, site planning for solar efficiency and alternative water collection and sewage systems. Things become difficult when they involve changes in people's fundamental attitudes and lifestyles. The plans for Dongtan are ambitious in the sense that both the easy and the more difficult aspects are considered. Advanced technology has been developed in order to make Dongtan carbon neutral, to clean wastewater naturally and to generate heat and energy from renewable resources. Dongtan is also designed to present a new lifestyle to its future inhabitants, where quality of life, closeness to nature and social bonds are more important than status and consumption. A tough task in China where

people, who can afford to, drive to work instead of taking the underground, even though the underground is twice as quick!

The reaction to Dongtan has been mixed. The mayor of London has praised the project as pioneering work leading to a more sustainable future, and is interested in using Dongtan as a blueprint for development in London. Some argue that the enormous amount of money that is being invested in Dongtan could finance pro-environment and energy saving measures that could be applied to thousands of existing buildings.<sup>1</sup> Others say that Dongtan can never be sustainable because it is being built on such ecologically sensitive ground. They think that Dongtan should remain a nature reserve and that Chongming Island should be left undeveloped.<sup>2</sup>

In a world that is getting more and more urbanised it is essential to find ways to make cities sustainable. Dongtan may or may not become a blueprint for sustainable development all over the world, as the engineering firm behind the project claims, but the project does at least show that there is a will to create a more sustainable way of urban life in China.

### *Ten weeks later...*

During the past ten weeks I have devoted myself to learning more about ecological design and planning, and it has been both interesting and inspiring.

I have become familiar with some of the big names in landscape architecture theory and sustainability literature, I have developed an understanding of environmental issues discussed in the current debate about global change, and I have reflected over how the

environmental crises we face will affect social development and thereby the profession of landscape architecture.

Writing this essay has triggered many thoughts that I will carry with me during my final two years of the landscape architecture program, and in my future professional practice.

#### **Footnotes**

<sup>1</sup> Excerpt from from the AccessAsia newsletter, published by Ethical Corporation blog, <http://ethicalcorporation.blogspot.com/2007/04/chinas-dongtan-eco-village-and-how.html>, 2007-06-10

<sup>2</sup> Oppenheim, 2006, "Will the Dongtan development in China be the world's first Eco-City?" [http://www.treehugger.com/files/2006/04/will\\_the\\_dongta.php](http://www.treehugger.com/files/2006/04/will_the_dongta.php)

# Picture references

Where nothing else is stated, I have taken the photos and drawn the illustrations.

- p. 10: Pig tower and a confused pig, illustration based on a computer animation from MRVD.  
The original picture can be found at Archined, [http://www.archined.nl/news/3251.html?&tt\\_board\\_uid=8897&cHash=92cc014bf7](http://www.archined.nl/news/3251.html?&tt_board_uid=8897&cHash=92cc014bf7), 2007-06-15
- p. 13: Table illustrating environmental sustainability, [http://en.wikipedia.org/wiki/Sustainable\\_development](http://en.wikipedia.org/wiki/Sustainable_development), 2007-06-15
- p.14: Figure illustrating the interplay between social, environmental and economic sustainability, based on an illustration in Boverket and Naturvårdsverket,2000, p. 17
- p. 15: Icons for our 16 environmental objectives, <http://www.miljomal.nu/>, 2007-06-15
- p.17: Illustration of the three main areas of value in landscape architecture. Based on a figure in Thompson, 1999, p. 7
- p.25: The security patterns illustrated in the figure are taken from a real project in Taizhou in China. The project is described in Yu, K and Padua, M, 2006, p. 68-73
- p.26: This illustration is based on a figure by Orrskog in Boverket and Natuvårdsverket, 2000, p. 33
- p.29: Illustrations based on drawings in Dramstad E.W, Olson, J.D, Forman, R.T.T , 1996, p20, p. 30 and p. 37
- p.33: Illustrations based on drawings in Thayer, R, 1994, p. 141
- p.34: Illustration based on drawing in Thayer, R, 1994, p. 140
- p. 41: Map of east China based on illustration available at: [http://www.computing.dcu.ie/~mhearne/pictures/china\\_east\\_map.gif](http://www.computing.dcu.ie/~mhearne/pictures/china_east_map.gif), 2007-06-15  
Illustration showing Shanghais future development based on picture in Yan,Z and Girardet,H, 2006, p. 161
- p.43: Illustration of Chongming Island based on a picture in Yan,Z and Girardet,H, 2006, p. 161

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