

Balance in the Lomma Harbour Housing Project

Erik Skärbäck, Sweden¹

Health Aspects in Theory, Planning and Design – The Lomma Harbour Housing Project Case

Abstract

Our knowledge regarding the importance of the outdoor environment to our health is constantly increasing. Playground qualities have been shown to have an influence on the development of physical and mental abilities in children. We know that garden therapy facilitates the recovery and rehabilitation of people suffering from burnout syndrome. The outdoor environment has become an increasingly decisive factor in the choices people make regarding where to live and work. The landscape is becoming a competitive factor in the attempts made by companies and local authorities to attract well-educated, mobile manpower and housing.

City planning that fails to appropriately integrate green spaces into our work, housing and everyday environments will likely result in lower productivity, poorer public health and associated increases in social expenditures.

Research on environmental perception has increased our knowledge of how environmental qualities, e.g. green areas, affect people's well-being. The distance from green areas to your home can largely explain your well-being. Also short relaxing views, called "micro-pauses", have been shown to have positive effects. Frequent opportunities for recreational experiences of "non-demanding" natural elements, e.g., water, stones, earth, plants and animals, seem to facilitate the emergence of creative, innovative environments.

The brain's capacity to deal with large amounts of information in higher consciousness is highly limited. Processing of impressions such as office work, driving a car in traffic, etc., requires a great deal of mental energy.

Impressions from nature, however, such as rustling in a bush, a butterfly flying over a meadow, etc., require very little mental energy. That kind of attention is located in the limbic system and brainstem. Information taken in via our vision, hearing, sense of touch and smell is largely processed subconsciously, likely partly in accordance with innate genetic memory functions from millions of years of human evolution.

Stays in green environments seem to facilitate processing of information in higher consciousness. Thus, such stays may help to prevent burnout caused by prolonged and high workloads and stress.

Researchers have come to conclude that eight general characteristics of the outdoor green environment correspond to people's basic needs and demands: "Serene", "Wild", "Lush", "Space", "Culture", "The Common", "The Pleasure Garden", and "Festive/centre". In a recent study of southern-most Sweden that was carried out on a regional scale, the first five of the characteristics have been elaborated using GIS landscape data and have been compared with data from a large social health questionnaire (n=25,000 persons) covering the same area. The study showed that the quality of green areas expressed as the number of valuable characteristics in your neighborhood (within 300 m) is highly correlated with your well-being,

¹ Landscape Architect Erik Skärbäck, Professor in Landscape Planning at, Department of Landscape Architecture, SLU, Box 58, 230 53 Alnarp, Sweden. E-mail: erik.skarback@ltj.slu.se. Prof. Skärbäck was the Swedish delegate for 6 years on the IFLA Grand Councils at the beginning of the 1980s.

your frequency of moderate physical activity and whether or not you are overweight, that is, your BMI (ibid.). The results were controlled for social economic differences. Epidemiologic studies seldom show associations as strong as those revealed in this case. This is valuable evidence for our profession as landscape architects.

The eight characteristics can be seen as resources for housing, recreation, tourism and establishment of business parks, where the outdoor environment is an important attraction both for companies' employees and for their customers. They can be seen as indicators for use in impact assessment in planning projects. The eight characteristics can be handled as quality criteria. If they are lost in development projects, authorities can require that developers use compensation measures to mitigate negative impacts, renovate impaired resources, or replace qualities and recreational functions that are severely damaged.

In a recently finished Interreg-project "Landscape as a Resource for health and development" (http://www.sundskap.se/index_sv.htm), impact analyses of health and recreation have been used in a development plans in the Öresund Region in a partnership between Sweden and Denmark. Mitigation and compensation measures are being created to achieve environmental quality goals.

Keywords: Well-being, health, balancing, compensation, green area factor, landscape characteristics.

Introduction

Our knowledge regarding the importance of the outdoor environment to our health is constantly increasing. Playground qualities have been shown to have an influence on the development of physical and mental abilities in children (Mårtensson et al., 2009). It is well known from many countries that garden therapy facilitates the recovery and rehabilitation of people suffering from burnout syndrome. However, how the qualities of green environments influence the well-being of healthy people is not equally well understood. In other words, how do green areas make healthy people even healthier? The outdoor environment seems to be an increasingly decisive factor in the choices people make regarding where to live and work. The landscape is becoming a competitive factor in the attempts made by companies and local authorities to attract well-educated, mobile manpower and housing.

City planning that fails to appropriately integrate green spaces into our work, housing and everyday environments will likely result in lower productivity, poorer public health and associated increases in social expenditures.

Research on environmental perception has increased our knowledge of how environmental qualities, e.g. green areas, affect people's well-being. The distance from green areas to your home can largely explain your well-being (Grahn, 2003). Also short relaxing views, called micro-pauses, have been shown to have positive effects (Parsons et al., 1998). Frequent opportunities for recreational experiences of "non-demanding" natural elements, e.g., water, stones, earth, plants and animals, seem to facilitate the emergence of creative, innovative environments.

The brain's capacity to deal with large amounts of information in higher consciousness is highly limited. Processing impressions such as office work, driving a car in traffic, etc., requires a great deal of mental energy (Kaplan & Kaplan, 1989; Kaplan, 1990).

Impressions from nature, however, such as rustling in a bush, a butterfly flying over a meadow, etc., require very little mental energy. That kind of attention is located in the limbic

system and brainstem. Information taken in via our vision, hearing, sense of touch and smell is largely processed subconsciously, likely partly in accordance with innate genetic memory functions from millions of years of human evolution (Coss, 1991).

Stays in green environments seem to facilitate processing of information in higher consciousness. Thus, such stays may help to prevent burnout caused by prolonged and high workloads and stress (Kaplan, 1990; Kaplan, Kaplan & Ryan, 1998).

Researchers have come to conclude that eight general characteristics of the outdoor green environment correspond to people's basic needs and demands: "Serene", "Wild", "Lush", "Space", "Culture", "The Common", "The Pleasure Garden", and "Festive/centre" (Grahn, Stigsdotter, Berggren-Bärring, 2005). In a recent study of Scania, the southern-most region of Sweden, the first five of the characteristics were elaborated using GIS landscape data. In a second step, they were compared with data from a large social health questionnaire (n=25,000 persons) covering the same area. The study showed that the quality of green areas expressed as the number of valuable characteristics in your neighbourhood (within 300 m) is highly correlated with your well-being, your frequency of moderate physical activity and whether or not you are overweight, that is, your BMI. The results were controlled for social economic differences (Björk et al., 2008). Epidemiological studies seldom show associations as strong as those revealed in this case. This is valuable evidence for our profession as landscape architects.

The eight characteristics can be seen as resources for housing, recreation, tourism and establishment of business parks, where the outdoor environment is an important attraction for both companies' employees and their customers. They can be seen as indicators for use in impact assessment in planning projects. The eight characteristics can be handled as quality criteria. If they are lost in development projects, authorities can require that developers use compensation measures to mitigate negative impacts, renovate impaired resources, or replace qualities and recreational functions that are severely damaged. (Rundcrantz & Skärbäck, 2003).

In a recently finished Interreg-project "Landscape as a Resource for health and development" (http://www.sundskap.se/index_sv.htm), impact analyses of health and recreation have been used in development plans in the Öresund Region in a partnership between Sweden and Denmark. One of the projects is the "Lomma Harbour Housing Project", figure 1 and 2. Mitigation and compensation measures are being created to achieve environmental quality goals. Also used have been the balancing method of nature and landscape resources and a "green area" factor.

Discussion

The principle of balancing

The balancing method has also been called the compensation method. The method involves developing concepts or taking special measures when planning urban development projects that serve to balance any encroachments made in the natural environment and landscape. Balancing has been used in Germany for about 30 years, and has now been introduced in many countries.

The ethical aspect here is quite clear: The party that removes certain functions of nature, i.e. the developer, must also give something back in direct connection with the project. Thus, environmental measures are not to amount to mere a "clean-up" that occurs afterwards and

that is financed by taxpayers. The rules of the game are clear: It is the developer and the builders who are to meet society's demands for environmental considerations. Exploitation and changes in land use can occur in a way that destroys ecological functions and values, but also in a way that maintains and develops them.

The principle is that negative changes in ecological functions should first of all be avoided, secondly minimized, thirdly balanced and fourthly replaced. Balancing refers to attempts to repair/re-establish removed biotopes by creating the same function in close connection within the same area. Replacement means establishing other equally valuable ecological functions in another appropriate place within the area or outside but near the planning area. Taking measures outside the planning area can be more complicated if one is forced to sign agreements with partners outside the area. It may be easier, however, to locate such replacement measures on municipal land, e.g., by building a new park.

Balancing is not only a matter of maintaining the ecological functions of land, water and vegetation, but also of preserving health-related factors tied to the natural environment and landscape. Thus, adequate air and landscape qualities must also be ensured, e.g., a good micro-climate, adequate air humidity, prevention of dry/dusty inner-city air, emission-absorbing vegetation, as well as green areas in which people can enjoy pleasant fragrances, the wind in the trees, insects and birds. A great variety of species and varying biotopes lead to richer insect and bird life. Biological diversity is valuable, as are quiet and peaceful areas and natural areas that give a sense of space – figure 3. All of these things should be as close to our homes as possible – a good rule of thumb being within 300 metres.

Calculating the balance

An investigation of balancing is made in steps. First, before the planning has begun, an inventory of the area's biotopes is made. Each biotope is assigned a biotope value between 0 and 1. Determination of biotope values has been made using a classification template that has been in use in Germany for some time.

The classification template has also been applied in a collaborative project between the City Building Offices in Helsingborg – Lund – Malmö in the Scania Region – (*"Balanseringsprincipen, tillämpad i fysisk samhällsplanering"* -översätt också) (http://www.helsingborg.se/upload/Luft%20vatten%20och%20miljo/Stadens%20miljoarbete/1athund_Balansering2.pdf) – see Table 1, Classification of biotopes before the development.

Figure 4 shows the biotope inventory for Stage 2 of the Lomma Harbour Project prior to exploitation. The area for Stage 2 is 603,100 m². The abbreviations on the map are designations for the various biotopes, where each has been assigned a factor between 0 and 1. Based on this map, every biotope's factor is multiplied by its area in m². This gives each area's biotope value in terms of the unit Bv1.

Figure 5 illustrates in the form of a preliminary, rough plan where the development areas (solid boundary lines) coincide with the various biotope classifications.

The biotopes on the first plan map were classified, and the sum of the biotope values was calculated in a similar manner and amounted to 284,823 Bv1, with biotope factors for the newly build surfaces, as seen in Table 2.

As can be seen, the first design resulted in an under-balance ($297,222 - 284,823 =$) 12,399 Bv1.

In Stage 1 of the Lomma Harbour Project, between Hamnallén and Höje River, a balance investigation was also made. This also showed a deficit of 8,700 Bv1. It was assumed that this deficit could be balanced during Stage 2. Thus, given the previous measures, the cumulative under-balance for Stage 2 was $12,399 + 8,700 = 21\ 099$ Bv1.

For this reason, the rough plan for Stage 2 was reworked to include replacement measures, by planting rows of trees along the road Södra Västkustvägen and by establishing a new strip of forest land south of the square dam, from Habo Fure up to Södra Västkustvägen.

Essentially, the under-balance was compensated for by establishing parks or nature elements with high biotope values on land with low biotope values. For instance, an under-balance or deficit of 21,099 Bv1 can be compensated for by planting a mixed forest stand of biotope value 0.7 on 8.4 hectares of land of biotope value 0.3.

Recreational functions

Balancing biotope values does not automatically mean that recreational functions are also balanced. For this reason, we made a special analysis of the presence of the eight general characteristics of the outdoor green environment that correspond to people's basic needs and demands – see Table 3.

Notice that the characteristics do not stand for certain concrete physical qualities, but for more abstract environmental perceptual demands. Which kind of concrete qualities are of value to each person depends on individual experiences. Also, some of the characteristics seem very similar, and may be difficult to separate in an evaluation process.

“Before” and “after” maps were also made in this analysis – see figure 6. Since the land had been an industrial area, permission to build was given in this case. Normally it is forbidden to exploit previously unbuilt land within 300 m of the sea – figure 7. There is a clear boundary between the development area and the natural beach zone – figure 8.

Conclusion

A comparison of the maps shows that the recreational values were significantly improved through exploitation. The Lomma harbour project was awarded the prize as the best planning project of Sweden 2004.

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Tables

Table 1. Classification of Biotopes before the development

Classification of biotopes			
Biotope type	Biotope factor	Pasture and scrub-pasture	
High Vegetation		} Dry	0.7
		} Normal	0.5
		} Moist	0.7
Broad-leaved trees			
} Noble ¹ trees: <i>Ulmus sp.</i> , <i>Fraxinus Excelsior</i> , <i>Carpinus betulus</i> , <i>Fagus sylvatica</i> , <i>Quercus robur</i> , <i>Prunus sp.</i> , <i>Tilia sp.</i> , <i>Acer sp.</i>	0.9	Arable fields	0.3
		Arable grassland (ploughed 7 years)	0.3
		Lawn	0.3
		Allotments	0.7
		Brownfield sites	0.3
} Noble trees mixed with other broadleaved trees	0.8	e.g. Disused roads, railway, old industrial sites with weeds, pioneer spp. and bare ground.	
} Other trees, pioneer sp. <i>Betula sp.</i> , <i>Populus sp.</i> , <i>Alnus sp.</i>	0.7		
Mixture of broadleaved and coniferous stand	0.7	Green roofs	0.4
Coniferous trees		Semi-permeable surfaces	
} <i>Pinus sp.</i> (and <i>Larix sp...</i> ?)	0.7	} Permeable paving systems	0.1
} <i>Abies sp.</i> , <i>Picea sp.</i>	0.4	} Gravel	0.2
		Totally impemeable surfaces e.g. tarmac/asphalt and buildings without green roofs	0.01
	With shrub layer +0.1 With ground cover +0.1		
Freestanding trees are counted as 50m ² (young or diseased trees as 25m ²) Newly planted trees as 10 m ² per tree.		Water	0.8
Bushes with climbing plants	0.6	Water	0.8
Monoculture of bushes	0.4	Old gravel pits – small ponds ²	0.7
Vegetation on walls	0.4	Wetland, bog	0.7
		Ditch	0.8
		Beach	0.8
Low vegetation			

¹ Noble trees in Swedish, unsure in other countries.?

² Built in the past in Sweden to dig up the calcium-rich soil from below on agricultural land.

Table 2. Expected biotope value of planned design areas in the Lomma Harbour Housing Project

Design element	Biotope factor
Parks	0,4
Lot different size 225 – 700 m ²	0,13-0,4
Open water	0,8
Nature	0,5-0,9
Sealed ground small stones	0,2
Big trees 20-25	12
Small trees, 16-18	4
Street asphalt	0,01

Table 3. Eight characteristics that meet recreational needs (from Grahn, Stigsdotter and Berggren-Bärring, 2005).

1. Serene	A place of peace, silence and care. Sounds of wind, water, birds and insects. No rubbish, no weeds, no disturbing people.
2. Wild	A place of fascination with wild nature. Plants seem self-sown. Lichen and moss-grown rocks, old paths.
3. Lush	A place rich in species. A room offering a variety of wild species of animals and plants.
4. Spacious	A room offering a restful feeling of “entering another world”, a coherent whole, like a beech forest.
5. The Common	A green open place allowing vistas and stays.
6. The Pleasure garden	A place of imagination. An enclosed, safe and secluded place where you can relax and be yourself, let your children play freely.
7. Festive/centre	A meeting place for festivity and pleasure.
8. Culture	The essence of human culture: A historical place offering fascination with the course of time.

Figures



Figure 1. The housing project in the city of Lomma, outside Malmö, was named by the Swedish Architect Association as the best plan in Sweden in 2004. The contact to the Höjeå River and the sea is extraordinary.



Figure 2. The beach area is used all the year round by anyone who wishes to use it.

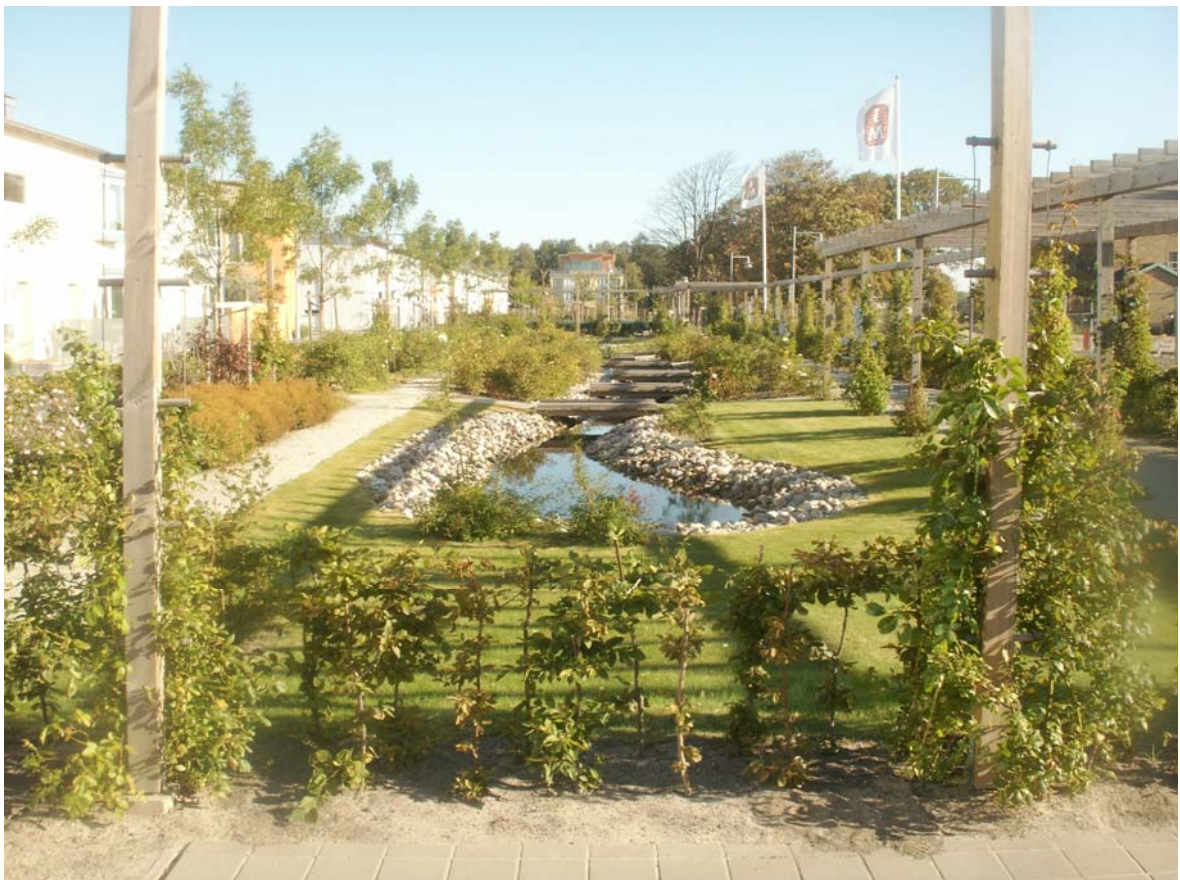


Figure 3. The green area factor was used and gives here biological diversity



Figure 4. Biotope map prior to exploitation – The sum of the biotope values is 297,222 Bv1



Figure 5. A preliminary, rough plan where the development areas (solid boundary lines) coincide with the various biotope classifications.

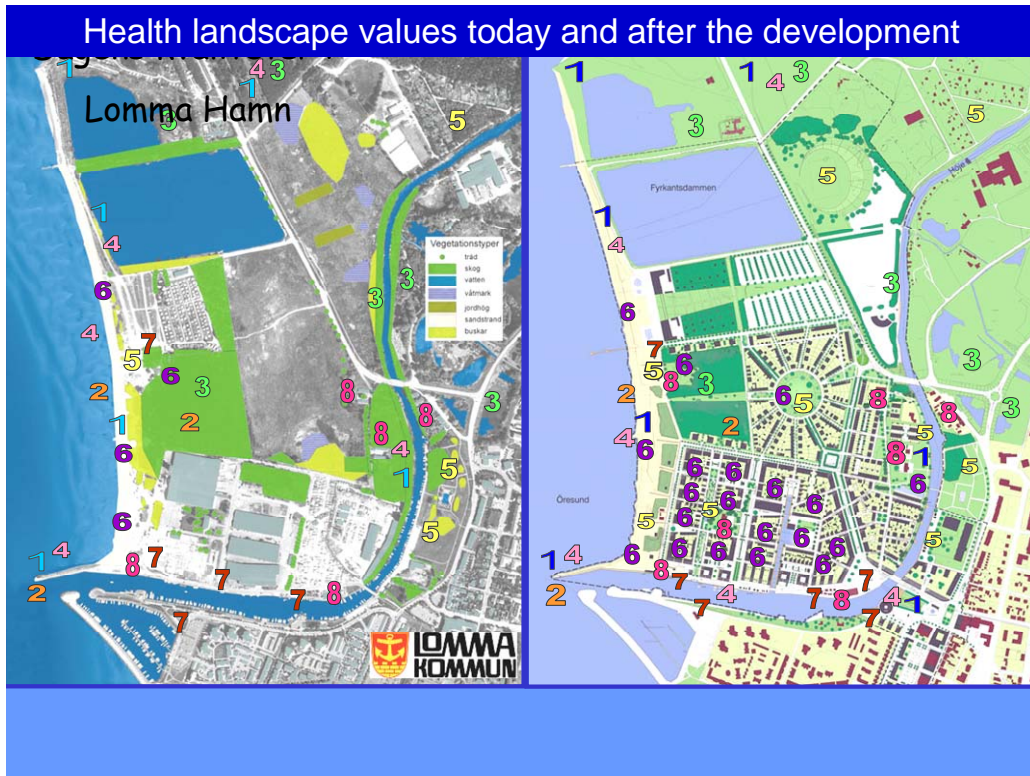


Figure 6. The “eight characteristics of the outdoor green environment” were assessed before and after development.



Figure 7. It is normally forbidden to exploit previously unbuilt land within 300 m of the sea. But because the land had been an industrial area, permission to build was given in this case.



Figure 8. There is a clear boundary between the development area and the natural beach zone.