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Sustainability in the Planning of Urban Courtyards

Case: Varma, New Properties in Helsinki

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ABSTRACT

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The aim of this thesis was to find out what sustainable development means in urban planning both internationally and nationally. This study investigates the history of sustainable development and how it appears in EU level directives, international conventions, in legislation, and in the land use planning system in Finland.

Another aim was to study how architects working for Varma Mutual Pension Insurance Company take note of sustainable development in their work, and how the planning process proceeds in Varma. The purpose of this study was to investigate whether sustainable development can be taken more widely into account in property yard planning in Varma and what should be improved in the planning process in order to truly pay attention to sustainability. The research presumption is that architects do not adequately take advantage of the aspects of sustainability when planning new property yards and, moreover, that planners are not fully aware of the meaning of sustainable development.

The research is based on literature, electronic information and observations of two current yard plans on Varma properties in Helsinki. One of the yards was under construction and the other has already been completed. Four architect interviews and several discussions with the construction manager of Varma were carried out during the study. The research is qualitative.

This study revealed that the international and national conventions, the SEA directive, the Constitution of Finland, the Land Use and Building Act, and all the levels of the land use planning system have a strong quest for sustainability. The planning procedure of the Varma Corporation could be partially redefined to achieve a new practice of green space and yard planning.

Key words: sustainable development, sustainability, urban planning, residential property yard planning.

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TIIVISTELMÄ

Kestävä kehitys kiinteistöpihojen suunnittelussa

Opinnäytetyön aiheena oli selvittää, mitä kestävä kehitys tarkoittaa kaupunkisuunnittelussa kansainvälisesti ja kansallisesti. Tutkimuksen aikana selvitettiin kestävän kehityksen historiaa, miten se näyttäytyy EU tasolla direktiiveissä, kansainvälisissä sopimuksissa, kansallisessa lainsäädännössä ja kaavoituksessa.

Opinnäytetyön toinen tavoite oli tutkia, miten Vakuutusyhtiö Varman käyttämät arkkitehdit suunnittelevat kestävän kehityksen näkökulmasta ja miten tämä suunnitteluprosessi etenee. Tutkimuksen tarkoituksena oli selvittää voidaanko kestävä kehitys huomioida laajemmin kiinteistöpihan suunnittelussa ja mitä asioita pitäisi parantaa Varman suunnitteluprosessissa jotta kestävä kehitys voidaan todella huomioida. Tutkimuksen olettamus on, että arkkitehdit eivät riittävästi hyödynnä kestävän kehityksen näkökohtia suunnittelussaan eivätkä myöskään ole tietoisia siitä mistä kestävä kehitys koostuu.

Tutkimustyö perustuu kirjallisuuteen ja digitaalisiin tietolähteisiin sekä kahden Varmalle suunnitellun pihan havainnointiin. Toinen pihoista oli valmis ja toinen rakenteilla. Työn aikana suoritettiin myös neljä arkkitehtihaastattelua ja useita keskusteluja Varman rakennuttajapäällikön kanssa. Tutkimus on laadullinen.

Tutkimus osoitti että kansainväliset ja kansallisten sopimukset, SEA direktiivi, Suomen perustuslaki, maankäyttö- ja rakennuslaki sisältävät voimakkaan pyrkimyksen kestävään kehitykseen. Myös Suomen maankäytön suunnittelujärjestelmä tukee tätä tavoitetta. Tutkimus osoitti myös että Varman viheralueiden ja pihojen suunnitteluprosessia voidaan tältä osin parantaa.

Avainsanat: kestävä kehitys, kestävyys, kaupunkisuunnittelu, pihasuunnittelu

1 INTRODUCTION

1.1 Research Topic

In this thesis, sustainable development is analysed in the context of urban planning. The concept itself is wide, and delimitation was necessary so that sustainable development can be viewed on a reasonable scale. It became clear right from the start of the research that there are a number of different international planning policies which all hold a different perspective on sustainable development. This research introduces the historically significant conventions which have created the current perception of sustainability and have had an impact on sustainable urban planning at the different levels of planning, as well as various regulations and design guidelines. The thesis does not speak out on the practical political achievements in sustainable development, but introduces this concept at a theoretical level.

My current studies on sustainable development, climate change and migration, and the challenges of urbanization made an impact on the choice of the topic. Furhermore, my profession as a urban courtyard planner had an influence on the selection. The above-mentioned issues affected the scoping just as the fact that two of the selected yard plans were located in Helsinki. Sustainability was studied in the context of urban planning.

In the empirical phase, the knowledge base of architects was examined in terms of sustainability, how the concept is perceived and how it shows in their work. Two yard plans and the planning process of Varma Mutual Pension Insurance Company were studied and four interviews with questionnaires were carried out.

This study based on qualitative research method and the aim was to understand what sustainable development means in the context of urban planning, and to form a general view of the interaction between constructor and architects.

1.2 Research Background and Foreknowledge

My professional background and the working experience which includes the renovation and revision of several urban courtyards in the metropolitan area brought personal perspective to the study. Sustainable development is a continuous process and designers are bound and obliged to follow a number of laws, regulations as well as various instructions and recommendations. To be able to act more professionally in the future, I wanted to deepen my knowledge of the laws, regulations and guidelines which affect yard planning.

The starting point was my personal experience in environmental planning, as well as an interest to dig beneath the surface of the concept. Furthermore, the desire to understand the planning process in Varma, and the co-operation between the selected architects was the driving force. Sustainable development takes place on a large scale only if all stakeholders of the planning process realize the importance of it and act according to the principles. My planning practice differs largely from the operative means of the selected architects. The analysed yards were new property yards while my work assignments were renovation projects.

The local detailed plans and the design guidelines of the analysed yards were more detailed than what they have been in the renovation projects. This was due to the fact that the buildings were new and located in formative construction areas. Varma was the investor and the constructor while I worked with the housing cooperatives and with end users. Varma is a pension company, which owns a number of real estate in the Helsinki region. The planning process of Varma was also more extensive. Varma was selected for this study because I wanted to know the new property yard planning processes and find a new perspective to my own work. Moreover, a long tradition in real estate and construction management influenced my choice.

Urbanization is a phenomenon which impacts on the entire world. About 54 per cent of the world´s population lives in urban areas at the moment (UN 2014.)

The same trend is continuing in Finland. According to a study produced by The Statistics Finland and the Finnish Environment Institute, almost 85 per cent of Finns lived within conurbations at the end of 2013. (Tilastokeskus 2014). One assumption in the new local master plan of Helsinki was that the population will increase by 250 000 people by the end of 2050. (Helsingin yleiskaava 2014).

According to the draft of the new local master plan, areas will be built by supplementing and that means more efficient site arrangements. (Helsingin kaupunki 2014, 128). From those premises, it is not the same what kind of yards will be used by more and more people, and how sustainability is implemented. Cities also have a large role in the climate change adaptation; how an increasing number of people in smaller areas work, travel and consume and how organize the work, travel and consumer habits of denser population.

1.3 Objective and Definition

It was assumed that architects do not adequately take into consideration sustainable development issues when planning new property yards, and planners are also not sufficiently aware of the concept of sustainable development. The objective of the study was to examine, whether the assumption is correct, and which factors affect the procedures.

This study aims to answer the following questions:

1) What does sustainability mean in urban city planning and urban property garden planning?
2) Is the concept so all-inclusive that it is difficult to implement in practice?
3) What kind of obstacles do designers face if they follow these principles?
4) Is sustainable development a desirable matter in the actions of Varma?
5) What kind of experiences do the designers have of sustainability?
6) What are the principles in sustainable urban property garden planning?

Questionnaires were compiled to find out the architects´ experiences and feelings about planning according to sustainability. Based on these interviews, it was possible to detect obstacles or lack of knowledge which forestall sustainable

planning and the freedom to implement this type of planning.
The prevailing perception is that the implementation of sustainable development starts from the individual, hence, the designer has an important role and opportunity to take into account the principles of sustainability in their work.

The assumption is that the profound principles of sustainability are not recognized and exploited sufficiently in a yard planning process, and the aim of this thesis is to expand my own vision of sustainable development, its origins and history, and to find methods to evaluate sustainability in residential property yard planning, as well as to increase the understanding of the concept in Varma. This study will present a sustainable checklist for yard planning, and it can be used in the planning process in Varma. In my work as a planner, I have often faced communication problems, lack of knowledge and disregard between the different professionals, residents and contractors, when discussing sustainability.

2 RESEARCH METHODS

2.1 Research Structure and Method

The theoretical part describes the definition of sustainable development in the concept of urban planning. How international and national conventions determine sustainable planning and which Finnish laws, regulations and guidelines have an influence on sustainable planning, the operations of the real estate investor are also discussed.

The empirical section aims to clarify the architects´ knowledge and opinions on sustainability and to find issues, which can be further researched. During the research, there were several discussions with construction manager Tuomas Vaarasalo, and two yard plans were also examined. The results of the study and the interviews are presented at the end and critically analyzed in the conclusions.

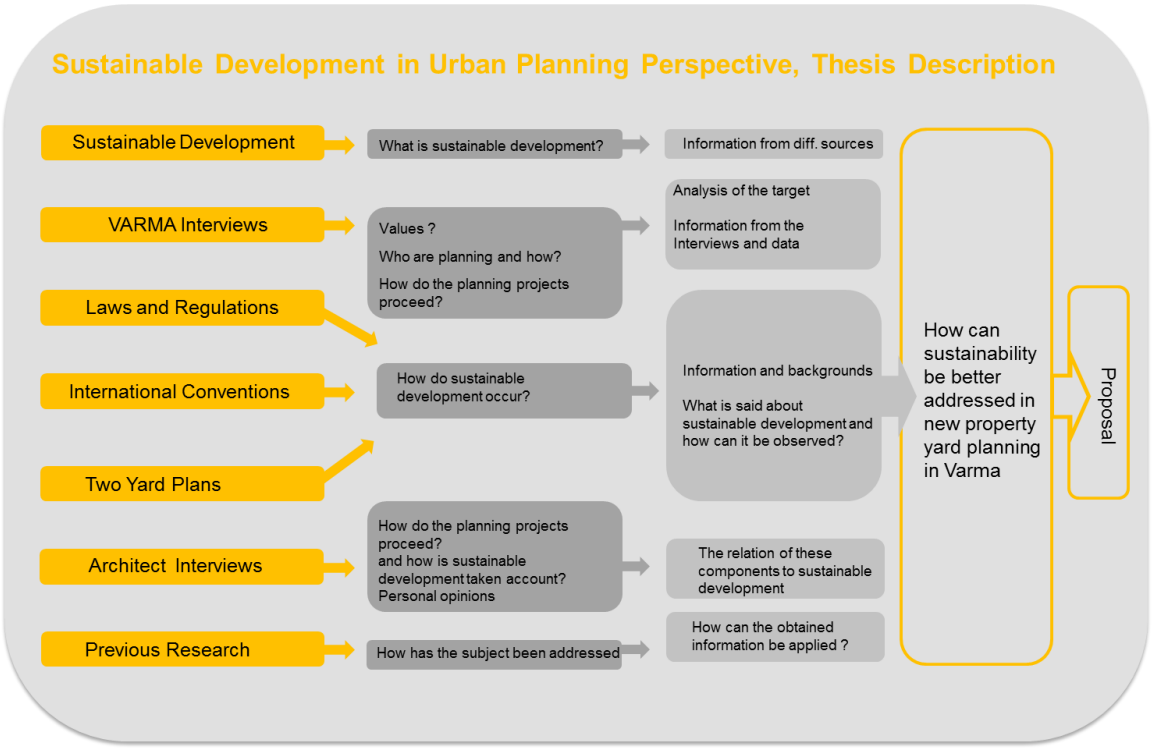


Figure 1. Description of the study and research data.

2.2 Qualitative Case Study

Qualitative research methods were used because the purpose was to describe, understand and interpret sustainable development, Varma`s planning process, the architects´ work and their two yard plans. The study tries to understand the principles of sustainability, and its potential effect on yard planning. (Kananen 2008, 24). The researcher´s own experiences and views functioned as background information.

A qualitative research mainly addresses the meanings. Additionally, it is interested in how people feel and see the real world. The role of the researcher is to be a sympathizer and participant. The nature of knowledge is subjective. (Kananen 2008, 25, 27.)

Varma´s architects who were interviewed, were the same that had planned the observed yards. So they knew about the studied phenomenon as much as possible, and they were also represented as the essential observation units of the phenomenon. The needed information of Varma`s actions was based on several conversations with construction manager Tuomas Vaarasalo.

The architects interviews were semi-structured interviews. The questionnaire had questions and the proposition level of the transcripts was used in the interviews and only the core content of the message was recorded. The aim was to get information about the interviewees' knowledge and feelings. The questionnaire is included as Appendix 1. The interviews were conducted individually.

The case study examined one or more cases. It is an approach to look at a variety of materials and to exploit the information related to the phenomenon under examination. The case study combines various sources of information, and the first basic prerequisite for research is the use of multiple sources. (Kananen 2008, 40, 84.) In qualitative research, the research data guides the research. The study is used as a "data-driven" research. This cyclical and continuous reflection belongs to this research approach. (Kananen 2008, 57.) The research process,

and each stage of the study affects the ongoing research process phases. (Kananen 2008, 50). Below is a description of this research process.

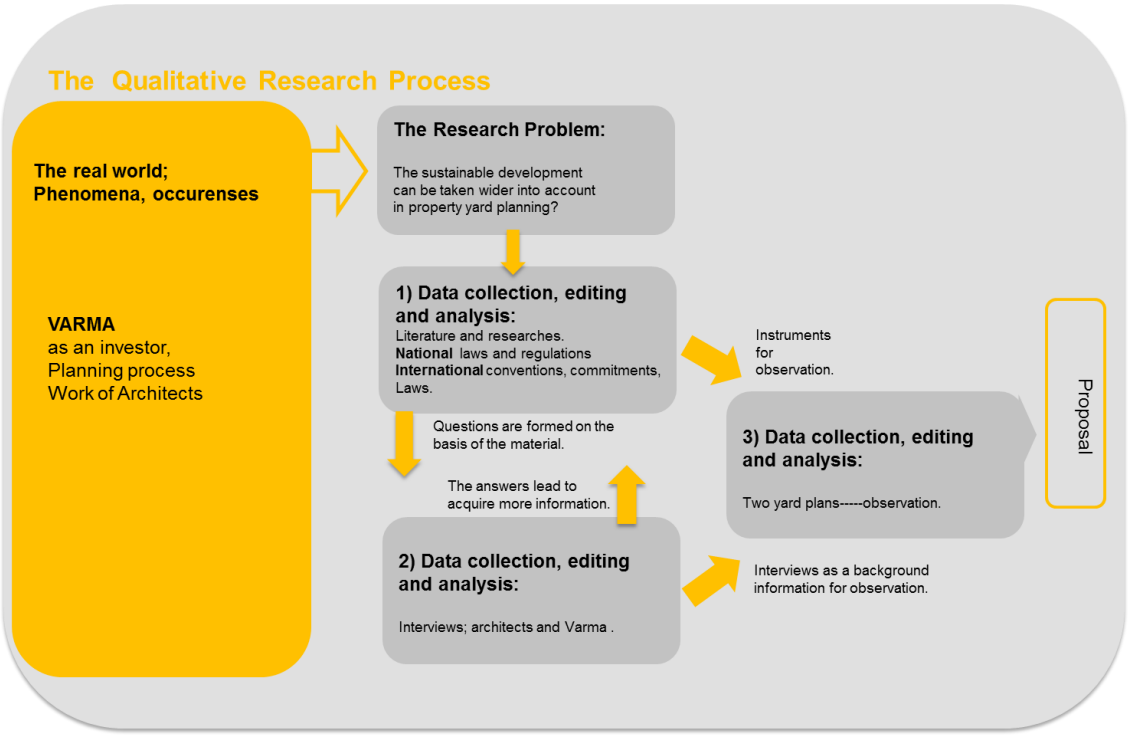


Figure 2. Thesis research process. (Adapted from Kananen. 2008, 26).

3 SUSTAINABLE DEVELOPMENT

Our Common Future: "Development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (UN 1987.)

Prime Minister`s Office Finland: "Sustainable development is a globally, regionally and locally ongoing process of continuous and targeted change in society" (Prime Minister`s Office Finland 2014.)

"The fact is that the planet is changing faster than even pessimists expected: ice caps are shrinking, arid zones spreading, at a terrifying rate. And according to a number of recent studies, catastrophe — a rise in temperature so large as to be almost unthinkable — can no longer be considered a mere possibility. It is, instead, the most likely outcome if we continue along our present course. In other words, we're facing a clear and present danger to our way of life, perhaps even to civilization itself. How can anyone justify failing to act?" (Krugman 2009.)

"We have not done the things that are necessary to lower emissions because those things fundamentally conflict with deregulated capitalism, the reigning ideology for the entire period we have been struggling to find a way out of crisis" (Klein 2014.)

Sustainable development starts from the understanding that we consume and destroy the environment more than our planet lasts. We have also recognized the fact that the welfare in the developed countries is largely based on the natural resources and the use of cheap labor in poor countries.

Sustainable development includes the sharing of responsibilities: how the industrialized and wealthy countries can obligate the developing countries to take care of the environment as well as wealthy countries which have reached their standard of living at the expense of the developing countries. However, the problem is not only the developing countries; it is lack of understanding and the pursuit of self-interest. When environmentalists opposed oil production in the

Barents Sea, the Norwegian Prime Minister Solberg said; "*Northern Norway has the right to work and have the same standard of living, which is already elsewhere in Norway*" (Huhta 2015.)

3.1 Background

Global environmental debate has begun in the 1960`s and the 1970's. Environmental research “woke up” and the expansion of international environmental legislation took a firm. This was influenced by, among other things, the **UN Environment Conference in 1972**. (Kumpula 2014, 48). The development was also influenced by the **Silence Spring** - book in 1962, which addressed the poisoning of the environment and its consequences as well as human responsibility to nature. (Natural Resources Defence Council 2013).

Environmental pollution, hazardous substances, and the weakening of environmental resources rose to be the most important aspect in international environmental law during the 1960`s and the 1970's. (Kumpula 2014, 48). In 1972 the Club of Rome´s report **Limits to Growth** was the first attack against the ideology of continuing growth. The report is extensive with more than 200 pages and its purpose is to provide new information for the use of global political decision-makers and the general public on the economic, political, natural, and social structures that form the system in which we live. The five elements of the study were population, food production, industrialization, pollution, and the consumption of nonrenewable natural resources. (Meadows 1972,9). The report contained understandable diagrams and statements on such as , the growth of the world population, the world industrial production, the economic and world fertilizer consumption. (Meadows 1972, 26-40)

Sustainable development became widely known as **Our Common Future** report, which was completed in 1987 by the Brundtland Committee´s document. (Koskiaho 1997, 109.) This report influenced **the Earth Summit** (UNCED) in **Rio de Janeiro, Brazil** in 1992. (Opetusministeriön verkkolehti 2008).

A number of international conventions were examined as part of this thesis. Among other things, the international climate, biodiversity or water convention were not excluded. The thesis concentrates on conventions and laws which clearly include sustainability and have contributed to the current understanding of sustainability in the urban planning perspective.

Kumpula (2014, 60) propounds that the European Union is an internationally special regional economic integration because its constitution confirms the objective of sustainable development, economic growth and a high level of environmental protection. The European Council adopted the first EU Sustainable Development Strategy in 2001. According to that, the objectives of sustainable development should be taken into account in the decision-making process. The review of the strategy was adopted in 2006. (Vantaa 2015).

The first Nordic Sustainable Strategy approved by the Nordic Prime Ministers and the Nordic Council came into force in 2001. The strategy was defined as a long-term sustainable development guideline by the year 2020 and it described the measures which the Nordic countries were committed to in 2005-2008. (Vantaa 2015). Sustainable development strategy was defined for the years 2009-2012 and it was updated in 2013. (Ympäristöministeriö 2013b).

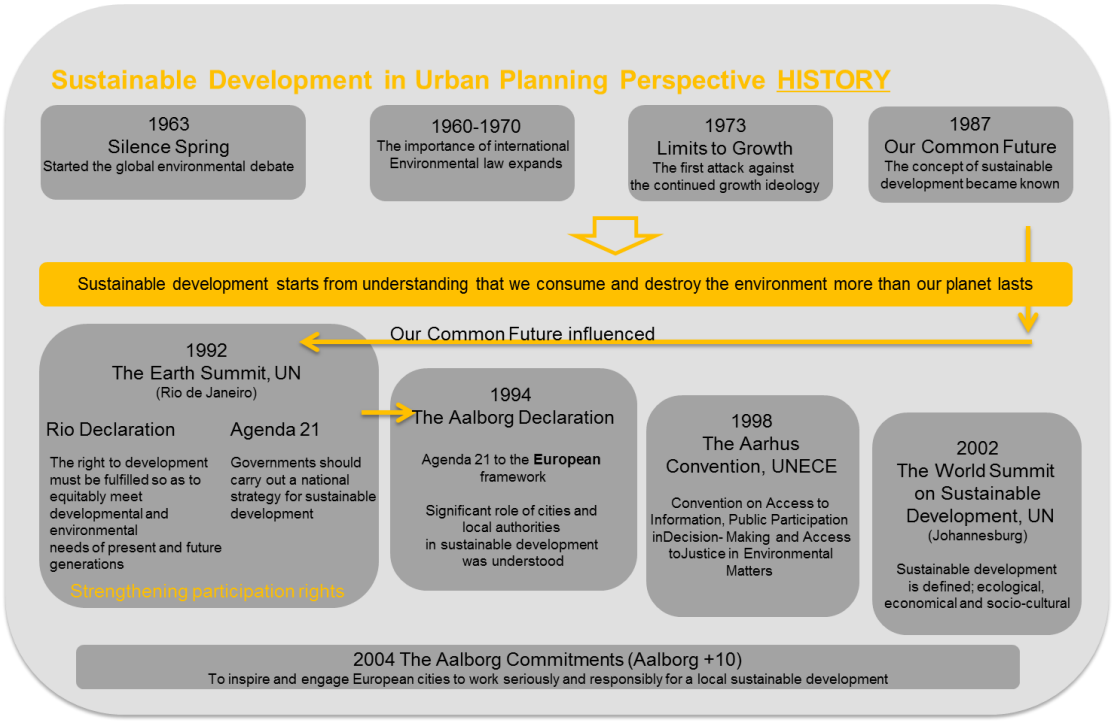


Figure 3 Major milestones of sustainable development

3.2 Sustainability and Participation

The Earth Summit UN Conference on the Environment and the Development in Rio de Janeiro was a major environmental conference in the UN history, because it gave a strong political impetus to promote solutions that support sustainable development throughout the world. The decisions made at the meeting were summarized in three documents. The following two documents that deal with the environment and the development are significant for the study: 1) **the Rio Declaration** 2) **Agenda 21,** of which more in the next part. (Maa-ja Metsätalousministeriö 2014).

Sustainable development has become a key principle in environmental practice after the UN Environment Conference. (Jääskeläinen 2010, 105). The Rio Declaration is a political document and it contains 27 principles that the states and the citizens undertake to comply with sustainable development.

A few principles of the Rio Declaration can be presented here. The present and future generations´ potentiality and environment cannot be endangered. Unsustainable patterns of production and consumption should be reduced and eliminated. Citizens' opportunities to influence environmental decisions should be strengthened The proposed economical or other activities that are likely to have a significant adverse impact on the environment shall be evaluated beforehand (UNEP 2015.)

One created process by the Rio Conference was the strengthening of the participation of the civil society. The ten principles of the Rio Declaration reflect the importance of the participation rights. Three pillars of the participatory rights are mentioned: the right to environmental information, the preliminary participation rights, and the means to obtain redress and rectify. (Kumpula 2014, 50).

3.3 National Sustainable Development Programs

The United Nations Environment Conference also adopted the Global Plan of Action on Sustainable Development, **Agenda 21** in Rio de Janeiro (Opetusministeriön verkkolehti 2008.) Agenda 21 is a major program in urban planning. In this agenda, cities and municipalities commit themselves to their own sustainable development strategy. Sustainable development began to have an influence on the operation of citizens and authorities, exactly where it was needed in practice.

Agenda 21 is comprehensive and comprises 351 pages which set out, inter alia, that governments have to make a national sustainable development strategy, and it should be developed through participation. The program has also set out the obligation to increase public awareness of environmental issues, and to strengthen the role of stakeholders. The participation and the commitment of all social groups is important for the implementation of the program. (UN 1992).

3.4 Crucial Role of Cities and Local Authorities

European cities gathered in Denmark in Aalborg to coordinate the UN´s Agenda 21 program objectives of the European qualifications framework in 1994. (Mukkula 2013, 8). The result was **the Aalborg Declaration** or **the Charter of European Sustainable Cities and Towns towards Sustainability** otherwise known as the **Aalborg Charter.** The Protocol entered into force on 23rd October 2003. It has been signed by 35 countries and the EU, and ratified by 32 States and the EU. Finland has ratified the Protocol on 3rd September 2002. (Helsingin kaupunki 2003, 6; Ympäristöministeriö 2013a).

The important perception of the Protocol was that the significant role of the cities and municipalities in the realization of sustainable development was understood and that sustainability cannot be achieved without sustainable communities. The current lifestyle of the cities has caused the current

environmental problems. It has also been understood that every city is different and they have to find their own practices towards sustainability. (UNECE 2014a).

The United Nations World Summit on Sustainable Development was held in Johannesburg, South Africa in 2002. The summit was the 10-year follow-up meeting of the Rio Declaration Environment and Development Conference of. (Vantaa 2015). An action plan to support Agenda 21 was created. Sustainable development was defined as a whole, taking into account the equal and interdependent dimensions of the **ecological**, **economic** and **socio-cultural** dimension. (Opetusministeriön verkkolehti 2008.)

The Aalborg commitments were signed after ten years of cooperation between the municipalities in Aalborg in 2004. It consists of 50 sustainable development commitments that cover the different aspects of sustainable development. (Mukkula 2013, 8). Also, 2250 European municipalities involved in, 44 towns or municipalities and two provincial unions from Finland underwrote the commitments. (Suomen kuntaliitto 2015).

The Aalborg + 10 conference adopted the so-called **Aalborg Commitments** and the aim was to strengthen the municipalities' sustainable development efforts. Based on this commitment, each municipality shall determine the Aalborg Charter and defines the objectives and measures of the ten topic commitments that are relevant to the local conditions. (Suomen kuntaliitto 2015).

The Aalborg Commitments addressed ten themes in which the local governments engaged to increase the citizen´s participation and cooperation and to improve urban sustainability. The governments also promised to preserve the natural common good and to protect the health of citizens. They committed to the fact that they have a key role in urban planning in addressing environmental, social, economic, health and cultural aspects. They also obliged to adopt and facilitate the prudent and efficient use of resources and to encourage sustainable consumption and production. (Suomen kuntaliitto 2015).

3.5 Access to Information and Justice and Public Participation

The Aarhus Convention (Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters) of the United Nations Economic Commission for Europe (UNECE) was adopted in 1998 in the Danish city of Aarhus at the Fourth Ministerial Conference. It entered into force on 30 October 2001 (European Commission 2015a.)

The Convention´s basic rules to promote the citizens´ involvement in the environmental matters and the enforcement of environmental legislation were confirmed. (UNECE 2014b).

The Aarhus Convention is significant to this study, because, in the opinion of the researcher everyone has the right to obtain environmental informationof the authorities in public documents. The authorities also have the duty to collect and disseminate the available information. Everyone has the right to participate in the preparation and influence the decisions on environmental matters. Preliminary opportunities for participation should be extended to the preparation of both individual projects, plans, programs and policies. (Kumpula 2014, 124).

3.6 Environmental Assessments

The EU directives are binding. However, each member state shall have the possibility to choose the practice to implement the directives. (Kokko 2007, 16). The environmental impact assessment on projects, the EIA Directive, was adopted in the EU in 1985. (Kokko 2007, 5). The projects that have significant impacts on the environment have to be subjected to the authorization procedure, and the impact must be assessed before a consent is given. (Ekroos 2010, 80). However, in practice it was found that the environmental impact assessment of projects was not sufficient, because the assessment begins too late and ends too early and is too tied to the site. (Kokko 2007, 7).

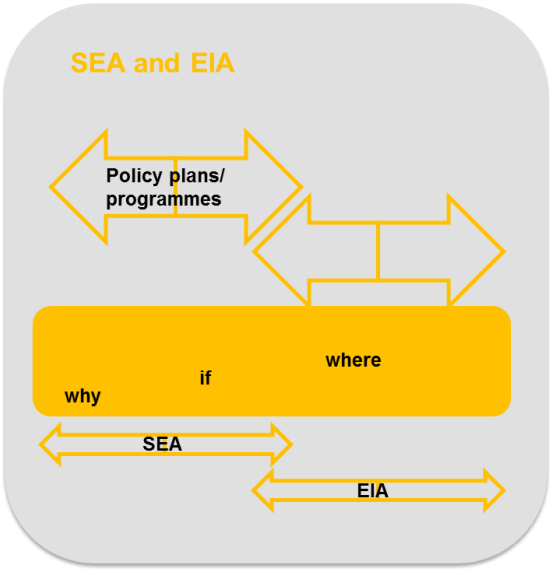


Figure 4. Swedish National Board of Housing 2000

The SEA Directive is a tool for sustainability because it imposes an obligation to make environmental assessments of the plans and the programs. The Protocol provide for extensive public participation in the government decision-making and it is undertaken earlier in the decision-making process than the EIA. The SEA - directive (2001/42/EY, Strategic Environmental Assessment) was adopted in 2001. (European Commission 2015b). The SEA Directive took account the decisions of the conferences which were made in Johannesburg in 2002 and in Rio de Janeiro in 1992, and also the Aarhus Convention´s obligations on access to information and citizens´ participation in the decision-making processes. (Kokko 2007, 4.)

3.7 Principles of Sustainability

Ecological sustainability means sustainable use of energy and natural resources and the adaptation of the environmental load to the carrying capacity of nature as well as sustainable material economy and the preservation of biodiversity. (Valtakunnalliset alueidenkäyttötavoitteet 2000, 3). Another main objective is to mitigate climate change. (Jääskeläinen 2010, 105). The climate change, the narrowing of the biodiversity and the sustainable use of natural resources set the pressure on ecological sustainability. (Rundgren 2003, 6).

Social and **cultural** sustainability associate with the promotion of the equitable development and the health conditions. It also means implementing a satisfactory living environment for different population groups and preserving the cultural values. Social and cultural sustainability secure the well-being of the citizens. (Jääskeläinen 2010, 105).

Population growth, poverty reduction, nutrition, and increasing equality between education and gender are challenges to social and cultural sustainability. Citizens have to have a good opportunity to influence. (Rundgren 2003, 6). In terms of cultural sustainability it is essential to preserve the regional characteristics of the national cultural heritage. (Ympäristöhallinnon yhteinen verkkopalvelu 2013, 3.)

Economical sustainability requires both economically and ecologically sensible and effective solutions at the same time. (Ympäristöhallinnon yhteinen verkkopalvelu 2013, 3.) The activities of society, goods and services can be delivered by the burden the environment as little as possible. (Rundgren 2003, 6).

Figure 5. Sustainability.

4 SUSTAINABLE DEVELOPMENT IN FINLAND

The principles of sustainable development go through the Finnish legislation. (Kumpula 2014, 60). The Finnish national sustainable development work is enforced by the UN, the European Union, the guidelines of the Arctic Council and the Nordic Council of Ministers. (Ympäristöministeriö 2015e). The principles of the programs of sustainable development were drawn up since 1990. The first program document was called **Sustainable Development and Finland** from the Government to Parliament. (Helsingin kaupunki 2003, 7).

The Finnish Government founded a Commission on Sustainable Development in 1993 (Commission on Sustainable Development) which published the document *Sustainable Development Activity during the next few years in Finland and in connection with Finland`s international cooperation* in 1995. The Government`s program on sustainable development, **the National Strategy for Sustainable Development**, was adopted in 1998. (Helsingin kaupunki 2003, 7).

The national strategy for sustainable development called **"Towards sustainable choices - nationally and globally sustainable Finland"** defined the objectives and the principles of sustainable development. It was drawn up in 2006. The vision of the Strategy was to ensure the well-being within the limits of the carrying capacity. The aim is to create sustainable well-being in a safe, inclusive and pluralistic society in which all people take the responsibility for environment. (Ympäristöministeriö. 2014c). The national sustainable development strategy was revised in 2013. As part of the strategy process, the committee drew up society´s commitment to sustainable development - under the title **The Finland we want by 2050**. The objectives of this commitment is monitored by indicators. (Ympäristöministeriö. 2014).

The Local Agenda 21 programs have been running for several years in local governments. For example, the City of Lahti was a pioneer and wrote the Aalborg commitments in 2007. (Lahden kaupunki 2015). The City of Helsinki committed to the objectives of sustainable development when the city government signed the Aalborg Charter in 1995. For the first time the City Council identified

sustainable development as one of the city's strategies in 1997. (Helsingin kaupunki 2003, 3).

4.1 Environmental Assessment

The national environmental impact assessment norms were implemented nationally as the **YVA Act**. The law filled the requirements of both the EIA Directive and the Convention on Environmental Impact Assessment in a Transboundary Context (Espoo Convention). (Ekroos 2010, 75). The main legislation concerning environmental impact assessment is the YVA Act which entered into force in 1994 and SOVA Act in 2005. The YVA Act assesses the environmental impact of **projects** while the SOVA Act assesses the environmental impact of the authorities' **plans** and **programs**. (Ekroos 2010, 269).

The aim of the SOVA Act is, among other things, to support sustainable development (Kokko 2007, 9) and the purpose is to gather information about the environment and the environmental impact alternatives, as well as the transmission of this information in the preparation of plans or programs. The environmental assessment also intends to take this information into account during the executive stage. The public can participate by criticizing, defending and supplementing the gathered information. (Kokko 2007, 24).

The **SOVA** act implemented the **SEA** Directive and the **UN European Economic Commission for Europe (ECE) Strategic Environmental Assessment Protocol**. The new legislation contributed to the environmental impact assessment and its consideration in preparation of plans and programs and to more public access to information and opportunities for participation. (Finlex 2005).

The SOVA Act is applied to, inter alia, the preparation of the National Land Use Guidelines and the regional programs**. The land use planning preparation is applied by the environment assessment** of the **Land Use and Building Act (9§)** (Ekroos 2010, 280).

Environmental assessment is the basis for sustainability. The environmental aspect has to be considered in all plans, programs and projects with a potential environmental impact. The SEA is an EU-level directive on environmental assessment and it is applied in Finland as the YVA Act and the SOVA Acts and the environment assessment of the Land Use and Building Act.

When the citizens´ opportunity to influence the planning process and the understanding about ecological, economical, cultural and social aspects will be included in policy making, we are coming close to sustainability.

4.2 Constitution of Finland and Local Government Act

The objectives and obligations of sustainable development have been enshrined in the Finnish laws since the 1990´s. The term sustainable development was used in the legislation for the first time in 1990 when the Building Act was signed; "*The area and use of it has to be planned by supporting sustainable natural resources and environmental development….*" (Helsingin kaupunki 2003, 8.)

According to the Constitution of Finland, individuals have the right to participate and influence the development of society and living environment. Also the responsibility for nature belongs to everyone. The public authorities shall guarantee for everyone the right to a healthy environment as well as the opportunity to influence the decisions that concern their living environment. (Suomen perustuslaki 2014). By the Local Government Act municipalities have to to promote the well-being of their inhabitants and the sustainable development of the territory. (Kuntalaki 2014).

Figure 6. The Land Use Planning System.

4.3 Land Use and Building Act

The Land Use and Building Act is the most important norm from the point of view of land use. It includes provisions on the local detailed planning, the local master planning, the regional land use planning and the national land use guidelines. The main general objectives of the Act are good living environment and sustainable development. (Ekroos 2010, 135, 137).

According to the Land Use and Building Act; ”*Land use and construction should be arranged so that they create the conditions for a good living environment* and promote ecologically, economically, socially and culturally sustainable development**”**. Also, each opportunity to participate in preparatory matters has to be secured. (Suomen perustuslaki 2014).

The law requires that there is interactive planning and reporting in the planning process and that the stakeholders have an opportunity to participate in the preparation process. (Maankäyttö- ja rakennuslaki 2014). The interactive

planning has a key role in the planning process based on this Act. (Ekroos 2010, 243).

The Building Order (MRL 14 §) supplements the land use planning system and it should be in every municipality. It contains orders that promote good construction and land use implementation. These guidelines takes into account the local conditions of the municipality. (Jääskeläinen 2010, 48).

Since both yards presented in this thesis are located in Helsinki, some of the themes of the Helsinki building order were gathered below; According to the Helsinki building order the buildings have to form a **harmonious townscape** and **the natural values** of the area have to be taken into account. **Usability** and **comfortability** have to be ensured when building yards and **materials** that are **durable**, **serviceable** and **reparable** have to be used in construction. Buildings and the use of the land have to be **designed and implemented** so that the **position of vegetation, topography, and the specific natural and cultural values are preserved as far as possible**. (Helsingin kaupungin rakennusjärjestys 2015).

The National Land Use Objectives (§ 22 MRL) are to support and promote the general objectives of the Land Use and Building Act and to achieve the land use planning objectives as defined in the Act. (Ympäristöhallinnon yhteinen verkkopalvelu 2013, 2).

The most important objectives are the sustainable development and good living environment. The aim is to promote the implementation of international agreements and commitments in Finland and to secure the land use conditions for national projects. (Ympäristöhallinnon yhteinen verkkopalvelu 2013, 2).

4.4 Sustainable Yard Planning

The history of sustainable development and what sustainability means in the urban planning concept were clarified above. The observation of sustainable development in the policy-making and the following practical acts are considered

worldwide. The EU directives such as the SEA, as well as various conventions continue this goal.

The Constitution of Finland and The Land Use and Building Act are in accordance with sustainable development at the national level. In addition, cities and municipalities have their own programs for sustainable development. Sustainability is examined in more detail in the following sections.

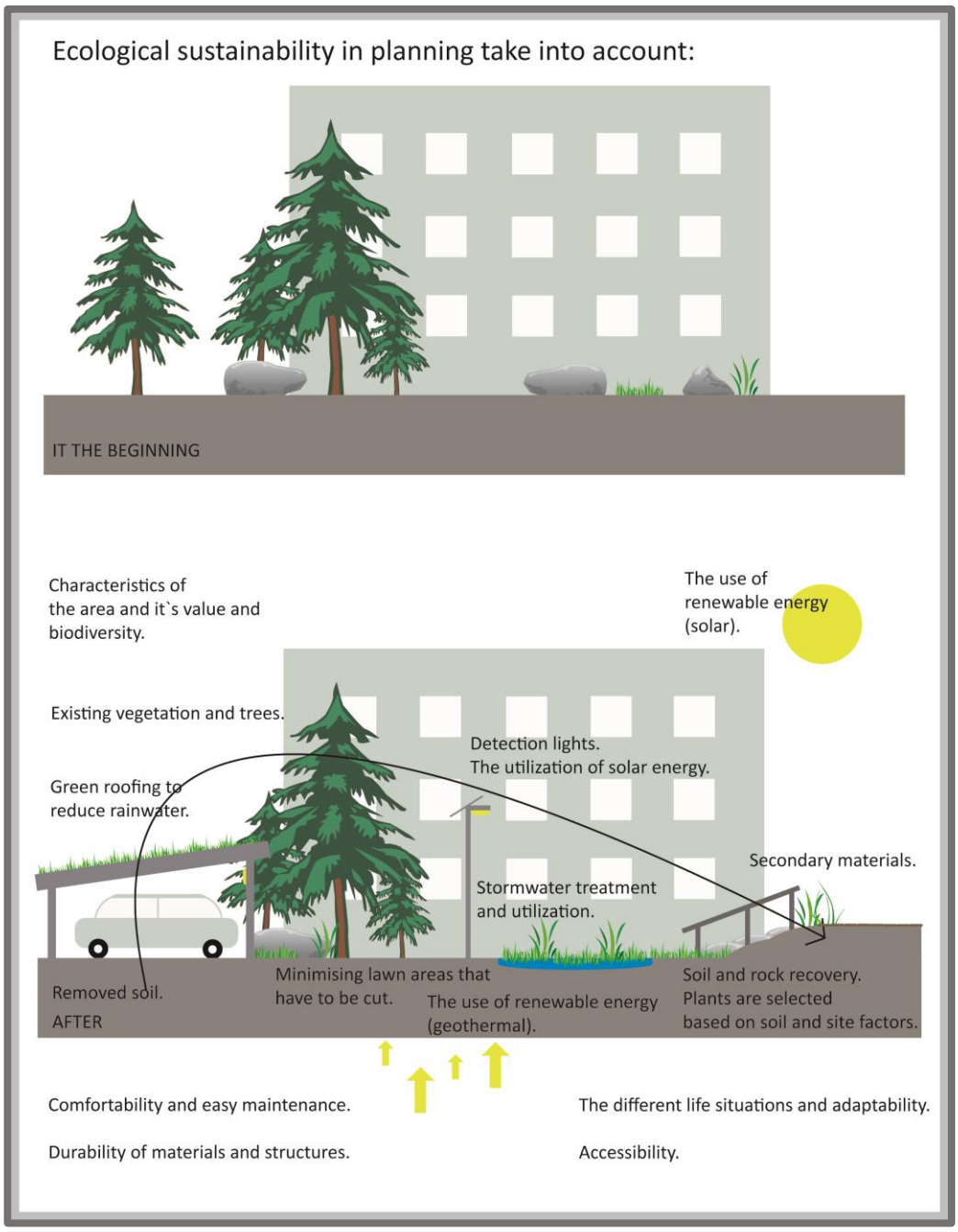


Figure 7. Illustration of the author. (According to Nuotio 2011,13).

The yard planning starts from sustainable development and ecological point of view and the yard planning is affecting the functional, physical, psychological and social environment. (Nuotio 2011, 10). The planning has to sort out the possible location of the national significance environment, classified as cultural historical environment. The nationally significant cultural environments are collected by the Finnish National Board of Antiquities. (Nuotio 2011, 72).

As explained earlier, sustainable development is widely recognized internationally and nationally and Finland follows the conventions, directives and decisions carefully. We all have a responsibility for nature as is written in the Constitution of Finland and each individual has a major role in making more sustainable choices. The yard planners are primarily bound by the local detailed plan and design guidelines guided by the Land Use and Building Act which is founded on sustainability. We also have various yard plan and construction guides at municipal level. A good example is **Pihan yleinen rakentamistapaohje 2011**. Basically, when an architect is planning according to this introduction he will automatically follow the required laws, regulations and instructions.

Consequently, it can be thought that if a single architect/planner plans a yard according to all these instructions and obligatory laws, the plans will automatically be sustainable. It has to be remembered that planning is also controlled by authorities, who have to act according to sustainability.

It is proved that the architects should draw the plans in accordance with sustainability but it is still possible to act more sustainably. Sustainable development is a continuous process and affected by individual choices and everyday activities. They either help to achieve sustainability or hamper sustainability. The designer's personal view and knowledge of the concept is another significant key towards sustainability.

Next chapter describes what the planning consists of and how sustainability is taken into consideration in practice. The questionnaires were made to find out

the architects` experiences and thoughts about planning in accordance with sustainability. The multidimensionality of the issues of the planning process came up both in the questions as in the responses.

5 INTERVIEWS

The assumption was that architects do not adequately take advantage of sustainability when planning new property yards and the planners are not aware of the components of sustainability.

The designers´ experiences of sustainability and the obstacles designers face if they follow these principles were studied by interviewing four architects. Architect J-P Lehtinen from B&M Architects Ltd was in charge of the planning of Arabiankatu 8 planning and architect Kirsti Sivèn from Kirsti Sivèn & Asko Takala Arkkitehdit Ltd worked with Tyynenmerenkatu 5. Architect Pekka Ojalammi from Brunow & Maunula and landscape architect Petri Eurasto from Geotek Ltd were also interviewed. They both co-operate with Varma.

A questionnaire was used as a basis of the individual interviews. The answers were writen down by the researcher and after that a summary was made. The colloquial title format is highlighted when its effectiveness is essential. Tuomas Vaarasalo was interviewed in order to get information about the planning process and Varma´s view of sustainability and problems in planning. The results of these interviews are presented in section 6. Next is a summary of the architects` responses. The questionnaire can be found in Appendix 1.

1) **What do you understand by sustainability in urban planning?**

The answers differed and depended on the perspective how the architects perceived urban planning. The following issues emerged: Sustainable development is question **of land use planning and in urban planning** point of view it is largely related to the transport arrangement. **Transportation** is one of the biggest energy consumers. **Heating** is also a part of infrastructure that affects sustainability. The choices and decisions should favor **materials that do not burden the environment**. In the planning attention has to be paid on the **access of natural light**, **the traffic noise and the exterior materials of the buildings**

2) **What do you understand by sustainability in yard planning?**

75 per cent of the interviewees mentioned **sustainable materials**. The **longevity of materials**, **aesthetical issues, easy maintenance** and **natural materials** such as wood and stone are subsumed in the concept of sustainability. Highly refined materials were not sustainable. One answered that he uses suppliers who pay attention to the sustainability. *"Residents have to like materials and structures and they have to feel comfortable. In that way, they can take care of the environment and there is no need to change the materials and structures so often."* From a social point of view, one interviewee said that it is important to **improve the everyday life of the residents**, and highlighted **common seating areas**.

3) **Does the compliance with the local detailed plan, the design guidelines and the different acts and recommendations assist in or hamper sustainable planning. How?**

From the architects` point of view the local detailed plan **does not usually hamper sustainable planning**. One architect emphasized that the local detailed plan only hampers planning if there is a binding order that is not accordance with sustainability. In another architect`s points of view, the planning ordinances can be too tight, for example if parking require too much space so there is no place for other activities.

According to the answerers, the compliance with the local detailed plan, the design guidelines and the different acts and recommendations do not hamper sustainable planning. Though according to one interviewee, there are sometimes plenty of guidelines which are contradictory or difficult to combine. One interviewee highlighted that strict accessibility regulations may cause problems as well as if the design guideline determines on the use of durable and high cost materials, which not fit the budget. *"The developer's decisions are usually based on technical solutions and money – then sustainable development goes to the lowest batten."*

4) **Answer in your own words how you observe sustainability in planning:** (*The surrounding environment / landscape*. *Material and vegetation choices*. Maintenance of the yard. *Social* and *financial aspects).*

All architects indicated that the **environment and the landscape are taken into account in planning**. 75 per cent of them announced that **durable materials** are important and half of them highlighted **yard maintenance**. According to them it is not necessary to work with big machines. *"A man with a rake is in some cases more profitable but unfortunately rare."* One stressed the importance of the **storm water management** planning by professionals.

One answerer preferred the classic vegetation species and not a lot of colors. One stressed the importance of easy care and one recoursed **the service of professional** in the vegetation choices. One answered: "*In my planning I do not leave areas for the care of the residents although it is currently common ".* Other: *"Architects can also design plants that will provide an opportunity for residents to take care of them, for example as voluntary work."*

According to one of the architects, social sustainability is important as, for example, it create opportunities to **gather together in the courtyard**. One of the respondents highlighted the **ethical** point of view: *"Sustainable development also has an ethical aspect. Is it ethical to bring paving stones from China? The products transportation distances have to be considered*." One said: *"The frames have to be aesthetically durable. People care for things that they consider beautiful."*

From an economic point of view it was said that the building area will **determine the price level and this is reflecting in the material choices.** The yard is part of the total budget and it has to be planned within the limits. One said: *"If there is not much money available, you can make things right with the simple choices."*

5) **Is it possible to take into consideration the wishes of the future residents?**

The architects **did not have a possibility to take into account the wishes** of the future residents in these two yard plans. One answeree tried to 'empathize' with the needs of the residents. One suggested that the architects could make optional sketches, of which residents would be able to choose, or at the beginning of the design process, the residents could write wishes to the architect and then the architect would ponder how these wishes could be implemented in practice.

6) **Do you need to justify those choices which sustainability has been taken into account to the customer? How?**

They did not have to justify their choices. One made a remark that the constructor tends to think first about financial aspects, not really that much sustainability. *"Sometimes you have to justify that granite is durable, but if it does not fit in the budget there is no need for sustainable development. The choices are always easier to propound when they are technically justified."* There was also an opinion that when the real estate owner invests in constructing rental housing, many solutions are more sustainable.

7) **Do you need to justify those choises which sustainability has been taken into account to the builder? How?**

Varma made the decisions for these two yards and the interviewees **did not have to justify their choices**. One mentioned; *"Especially, the economic justification would be necessary for the constructor if people would pay more for sustainable housing. However, that is* not *going to happen. The location is the only thing* that *influences the prices."*

8) **What kind of additional information about sustainable development you need so that you could** better take it into **consideration** in planning**?**

50 per cent of the interviewees would like to get more information about sustainability. One would need information about the energy balance of products. One responded that: *"fortunately, sustainability is usually common sense".*

6 VARMA AS A PROPERTY INVESTOR

Varma is the largest private investor in Finland. The real estate investments include direct national real estate investments and international real estate funds. In addition, it is important to have good and affordable rental housing provisions, particularly in the growth center. (Varma 2013, 29).

The life-cycle economy is one of the fundamental cornerstones in real estate investment. Building and renovating emphaszes materials that are economical, durable, and ecological and the architects are guided to use them. The construction has to be sustainable and has to give benefit in the long term. (Vaarasalo 2014b).

The 2014 annual report states that Varma's values are profitability, customer orientation and cooperation. The customer orientation means recognizing and observing the customer needs and acting based on them. The cooperation is based on openness and flexibility. (Varma 2013, 23, 27).

Varma has signed the UN Principles for Responsible Investment "PRI". (Varma 2013, 33). Varma has also committed to linking environmental considerations to the investment analysis and the decision-making processes, and to applying environment-related aspects on the ownership practices. Varma has also committed to evaluating investments with higher than average risks related to the environment and to promoting the proper reporting of investments on the environment. (Varma 2015, 1, 2).

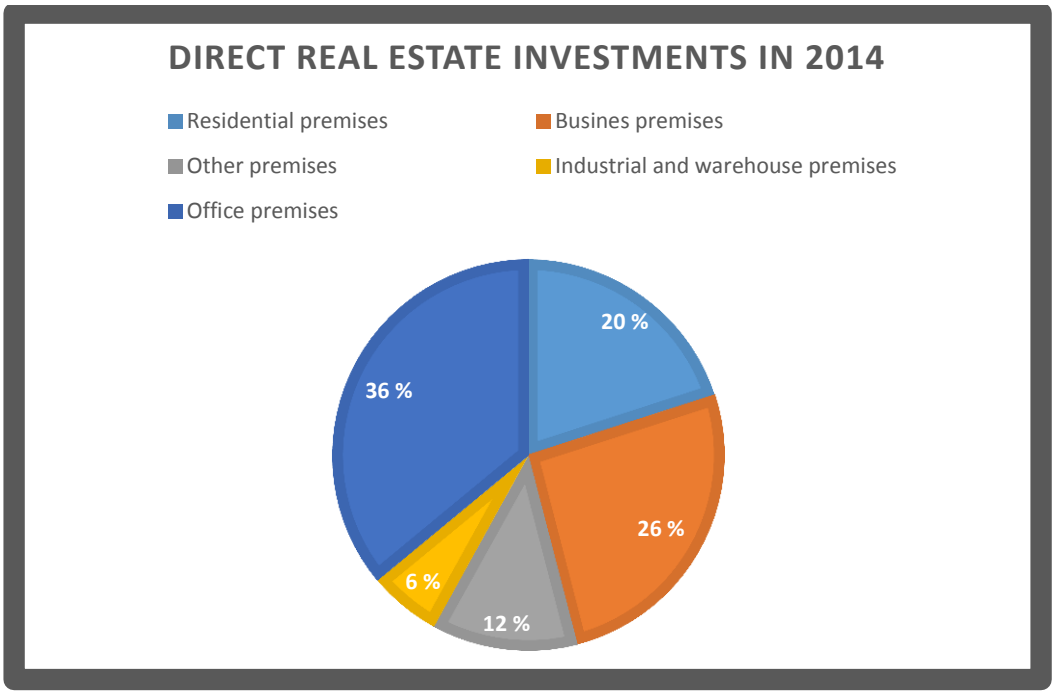


Figure 8. (Varma 2014, 39)

Varma has built 230 new rental apartments in 2013 (Varma 2013, 42) and 220 new rental apartments in the metropolitan area in 2014. (Varma 2014, 39). Varma has focused on reducing energy consumption in commercial properties. The aim is to reduce energy consumption by 6 per cent by 2016. (Varma 2013, 43).

All rental homes are hard-money apartments and residents rarely exist during the planning or the construction. Only a few people have already committed to during construction, so the participatory planning is not possible. (Vaarasalo 2014b).

6.1 Planning Process in Varma

The question was, whether sustainable development was a desired concept in Varma`s operation? The answer to this question was searched with the help of discussions and interviews with Tuomas Vaarasalo. The information gathered from these interviews and the correspondences are below.

The planning process or -project can start by identifying the need a for productive and secure investment. It can also start from the real estate needs of some company. Hence, there will be analysis on whether the new real estate meets the investment criteria. The decision making process is complex. (Vaarasalo 2014a).

The head architects are selected either through a competitive tender or a negotiating procedure. The tenders are often closed and in the negotiating procedure Varma agrees directly with the head designer. In both cases, Varma selects architects who have previous experience and references. **Varma has reliable designers** who understand the objectives and **the principles of the life-cycle economy** of Varma. The head architect and the other planners can share planning tasks within their own office. (Vaarasalo 2014a).

If the proposed operation differs from the local detailed plan, negotiations are held before the actual work concerning the modification of the local detailed plan. If the use of the site is suitable in redard to the local detailed plan, the project plan is made after which the draft design is started. (Vaarasalo 2014a).

The character, scope and objectives of the project are described in the design assignment as well as more precise list of tasks. Typically, the architectural design assignment includes several tasks that last for a long period, whereas, **a yard and landscape design assignment includes more limited tasks within shorter time frame.** The project-specific design guidelines are given to the architects at the beginning of the work. (Vaarasalo 2014a).

The assignment can be sequenced in various stages and between them the decisions on which solutions will be taken forward in the next stage, are made. An architectural design is typically staggered over a draft design in L1- and L2-phases and T1- and T2- and T3- phases of the implementation planning. Specialty designers, technical designers, structural engineers, etc., will be involved in the draft design phase. All planning areas are not necessarily included in the draft design stage for example **yard plans are drawn in T2 implementation phase.** (Vaarasalo 2014a).

Tuomas Vaarasalo is responsible for the new construction and redevelopment of the buildings. He actively directs the planning and meets the architects during the project planning and meetings. **Mr Vaarasalo does not necessarily meet the yard or landscape designers. These designers work as sub-designers of the projects.** (Vaarasalo 2014a).

The head architect determines **the main lines of the yard plan and garden planner makes detailed pictures according to these in collaboration with the head architect**. (Vaarasalo 2014a).

The architects are free to choose the materials. Varma's architects understand which materials have good **economic life-cycle**. Varma does not accept ethically dubious solutions such as tropical woods. In principle, the Finnish stone and solutions that are technically functional and comfortable are used. (Vaarasalo 2014a).

6.2 Arabiankatu 8

Figure 9. Arabiankatu 8. (BM Architects. 2014.)

Varma is building a block of flats that consist of rented apartments and retail space in Arabiankatu 8. There will be about 65 residential apartments with an average surface area of about 50 square meters and approximately 375 m2 of retail space. The building will be completed in 2015. (Arkkitehtuuritoimisto B&M Oy 2013, 1).

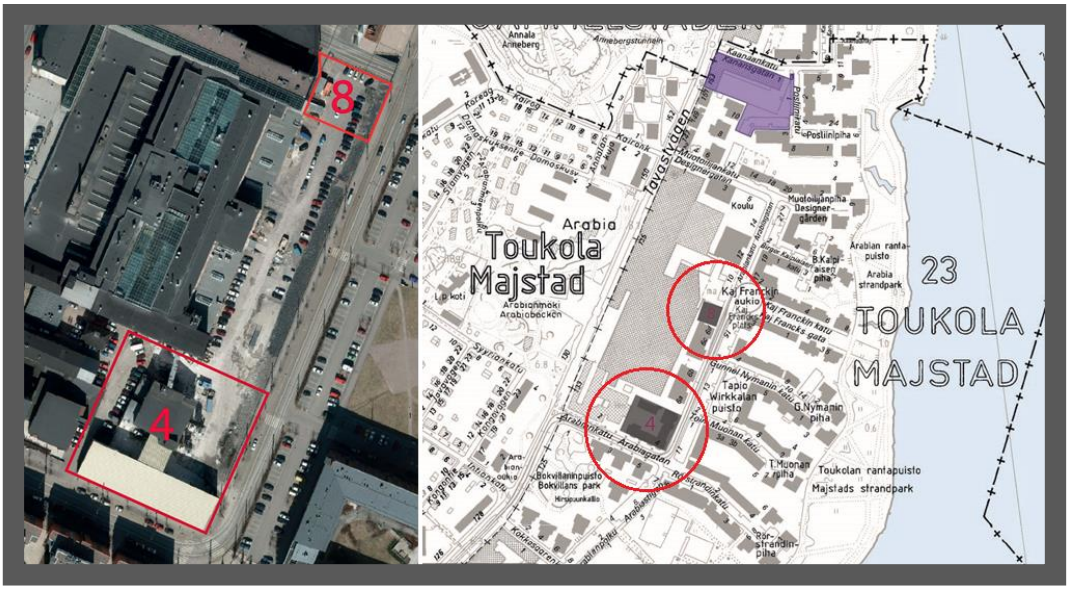


Figure 10. Aerial photo. (Helsingin kaupunki 2012b.) Area map. (Helsingin kaupunki 2015a.)

Figure 11. Site before construction. (Google map. 2015.)

6.2.1 Local Detailed Plan 12122

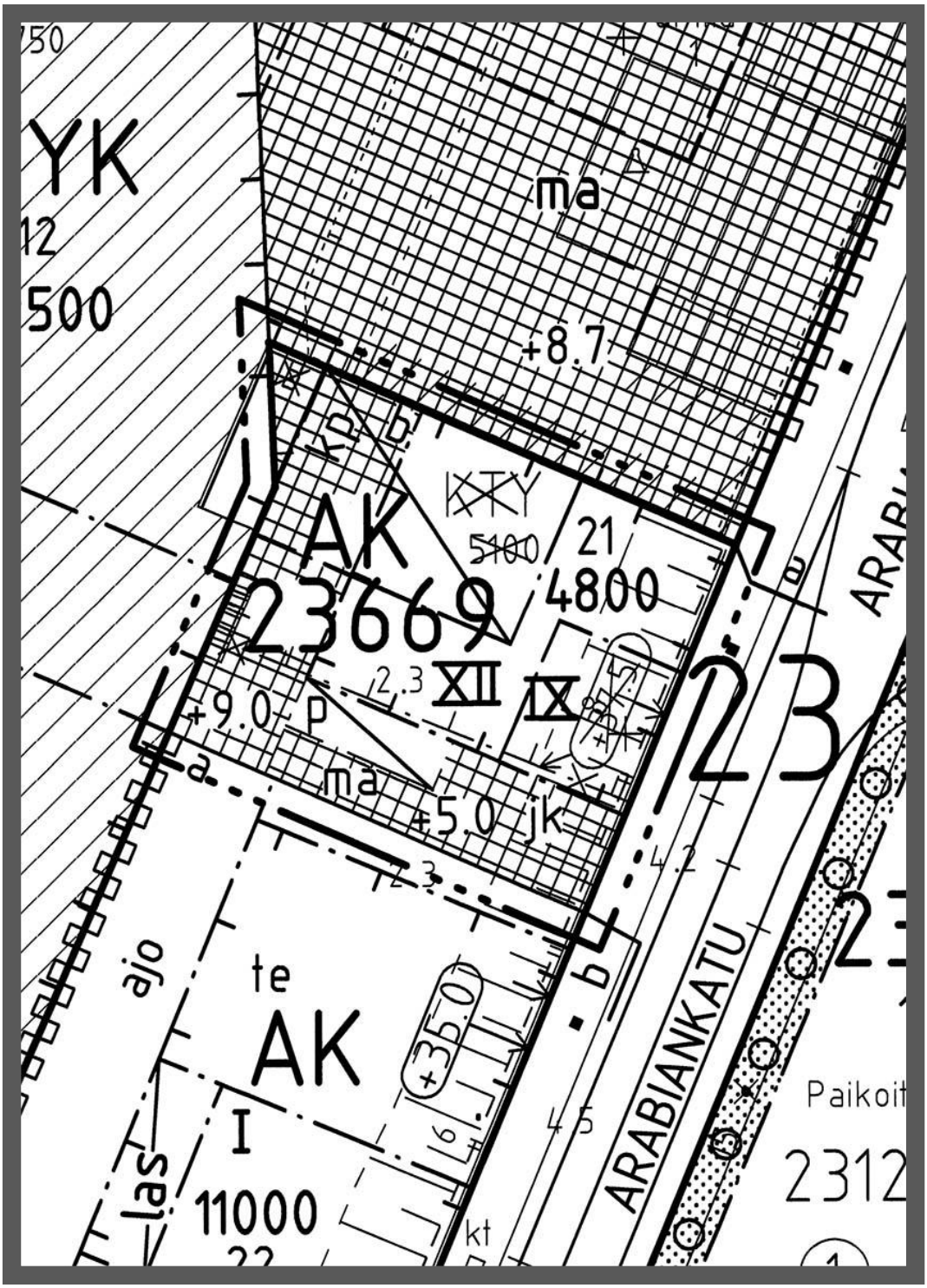


Figure 12. Local detailed plan. (Helsingin kaupunki 2015a.)

Figure 13. The plan regulations of the local detailed plan. (Helsingin kaupunki 2015a.)

The area is part of the oldest industrial area in Helsinki. The local detailed plan came into force on 08. September 2013 which enables the conversion of the old office buildings into residential use.

The land areas were found contaminated in many places. The use of waste of the ceramics industry as landfills affected this. There is a provision on the investigation and reconditioning of the soil in the local detailed plan. (Helsingin kaupunki 2012, 5).

The ceramics factory causes a variety of emissions such as hydrogen fluoride, volatile organic compounds and particulate matter in the air. In an average normal operation the hydrogen fluoride emissions are much lower than the limit

values of the health assessment. The ventilation of the factory causes noise. (Helsingin kaupunki 2012, 5, 10).

The site is small so there can not be an actual yard area. Because of this, the roof surfaces of the building have to be constructed and planted as playground and recreation areas. Adequate recreation and playground areas in the public parks c of Arabia have to be ensured for the residents. (Helsingin kaupunki 2012, 8).

6.2.2 Design Guidelines, Arabianranta

The site is situated in Toukola neighborhood. Toukola area does not have the design guidelines, therefore, the guidelines of Arabianranta apply. The instructions are very short with a few comments on yard panning.

The courtyard has to be designed for common use of the local residents with trees, plants and possible water features. The play and recreation areas should be placed in sunny places and they should be protected by shrubs. The yards have to be suitable also for the disabled. (Helsingin kaupunki 1997, 18- 19).

Plantations have to be protected with the help of level differences, stone structures and painted metal fences. The passages are gravel and the entrances are tiled. (Helsingin kaupunki 1997, 19).

6.2.3 Yard Description

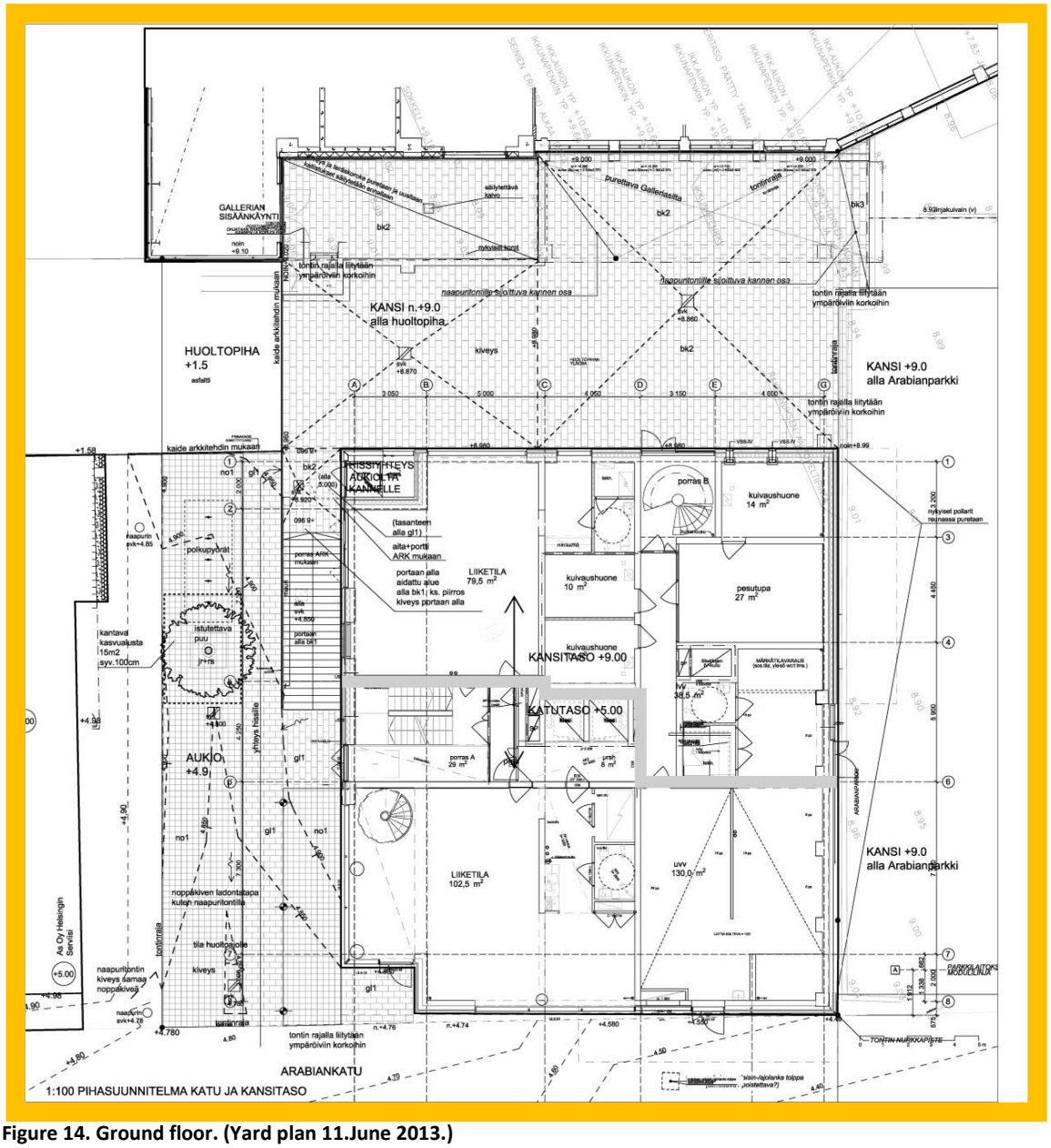


Figure 14. Ground floor. (Yard plan 11.June 2013.)

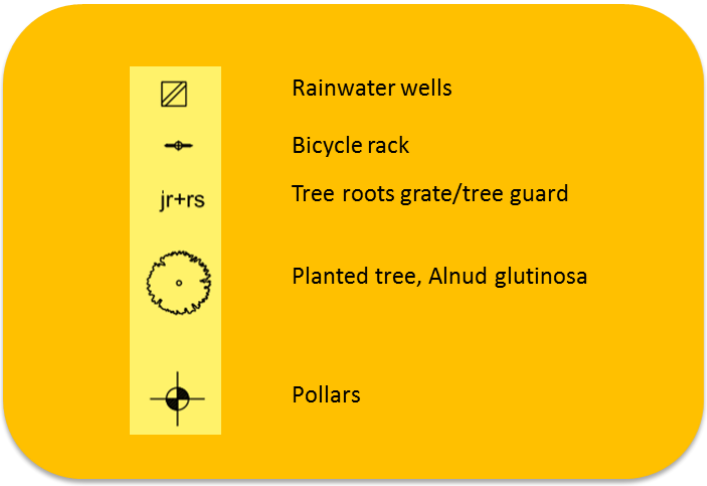


Figure 15. Ground floor. (Yard plan 11.June 2013.)

Evaluation

The surfaces are made from small granite cubes (no1), granite stones (gl1) and different size of concrete paving stones (bk1, bk2, bk3). The surfaces are completely coated also on the upper terraces. The only green element is one Alnus glutinosa -tree on the ground floor. There is a place for bicycles and bike stands are the products of Norwegian Vestre.

The tables and chairs on the upper terraces are also products of Vestre. Wooden parts are pressure-treated Scandinavian pine and the steel details are galvanized. The shapes of the selected furnishings are simple and they are developed for demanding use.

The terrace yards were designed in accordance with the local detailed plan and the design guidance. This project is interesting because both two “yards” are situated on the upper floors. The green areas cover a third of the tenth floor and approximately a fifth of the thirteenth floor.

The size of the green areas is sufficent if considered the small area of the terrace yards. The plants that thrives in the sun or semi-sun were used in the plan. There are ornamental grasses, junipers and hawthorn. The yards are facing to the south-east.

The windiness may be an uncomfortable factor on these terraces as well as the noise of the ventilation of the factory and tram trams. Another question is whether the people will use the small terraces where they have to go by an elevator. The practice will demonstrate it.

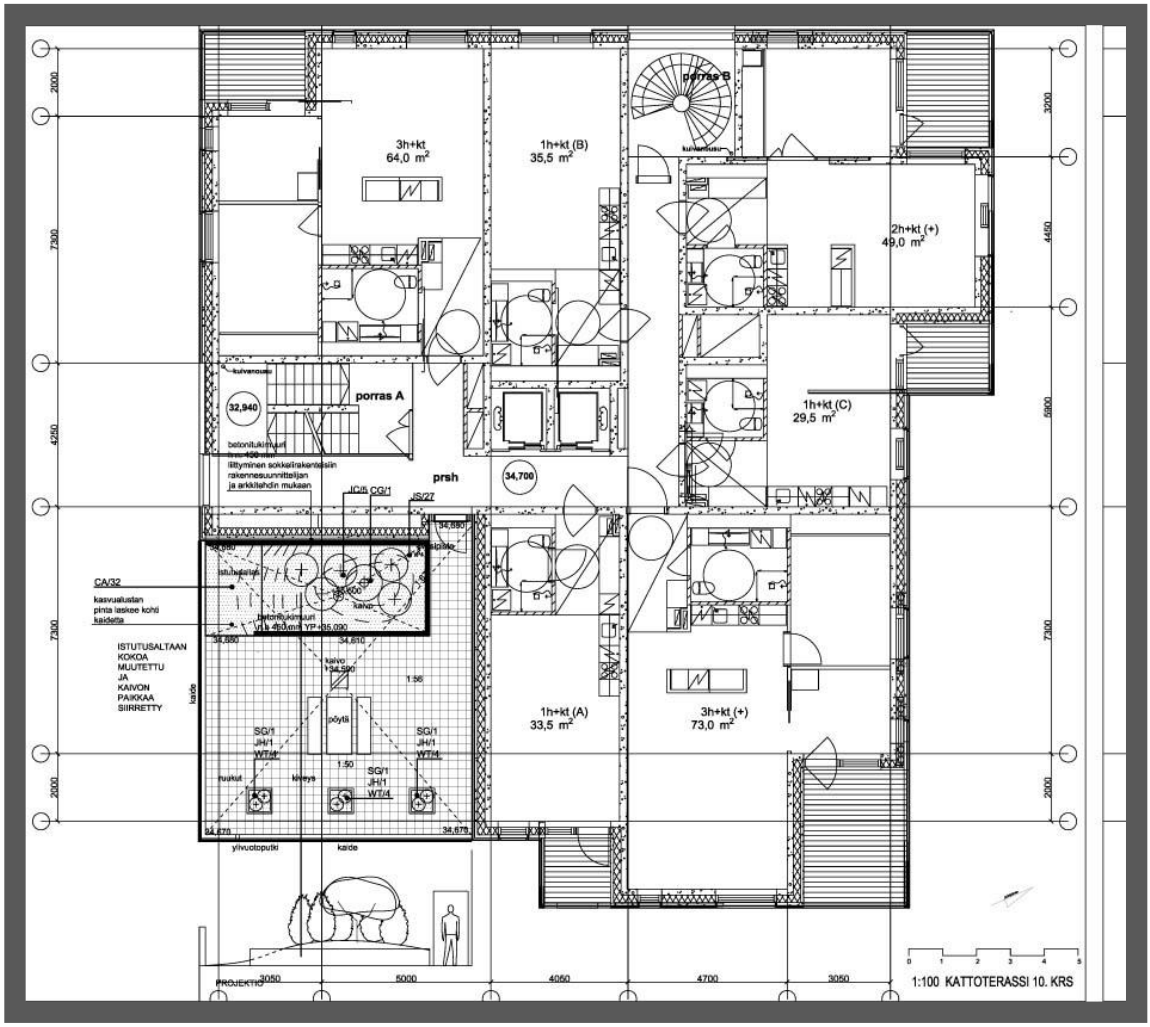


Figure 16. Terrace 1. (Yard plan 11.June 2013.)

CA	Calamagrostis x acutiflora 'Karl Foerster', Koristekastikka		32 kpl
LA	Leymus arenaria, Rantavehnä		12 kpl
CG	Crataegus grayana, Orapihlaja RUNGOLLINEN	150-200	4 kpl
JC	Juniperus communis 'Lotta Svärd', Kataja	80-100	11 kpl
JH	Juniperus horizontalis 'Prince of Wales'	30-40	8 kpl
JS	Juniperus sabina, Rohtokataja 'Mas'	30-40	53 kpl
SG	Spiraea japonica Goldflame	30-50	8 kpl
WT	Waldsteinia ternata Rönsyansikka		32 kpl

Kpl = piece.

Figure 17. Plants. (Yard plan 11.June 2013.)

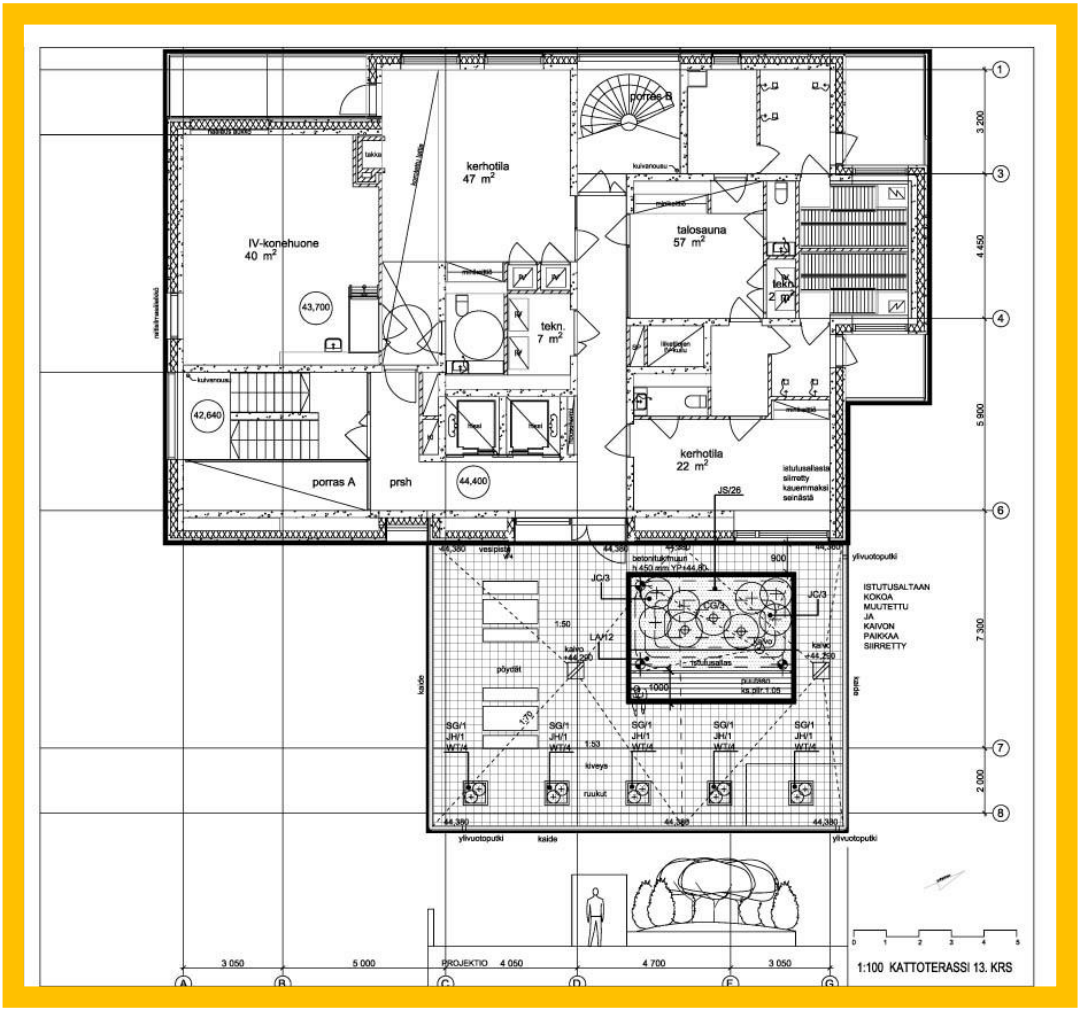


Figure 18. Terrace 2. (Yard plan 11.June 2013.)

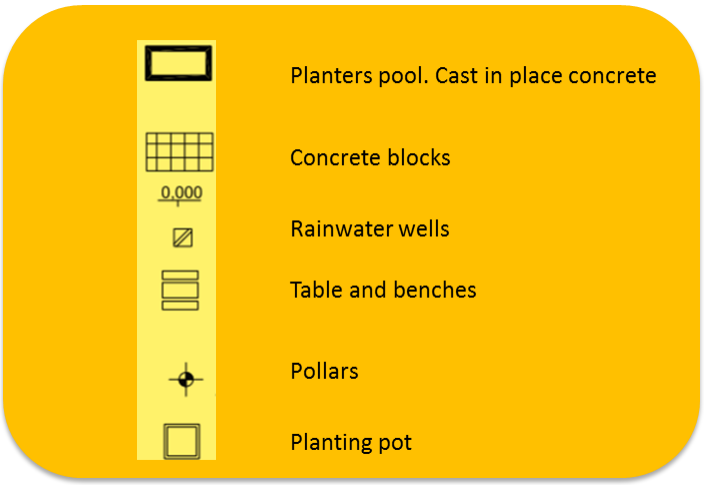


Figure 19. Structures. (Yard plan 11.June 2013.)

6.3 Tyynenmerenkatu 5

Figure 20. Tyynenmerenkatu 5. (Jätkäsaaren infokonttori 2014, Minna Vierula).

There are 89 rental apartments and approximately 450 m² of retail space as well as a garage. The total value of the project is more than 20 million euros. The building was completed in 2014.

Figure 21. Site before constructions. (Jätkäsaaren infokonttori 2014, Minna Vierula). Scale model. (Jätkäsaaren infokonttori 2014, Minna Vierula).

6.3.1 Local Detailed Plan 11770

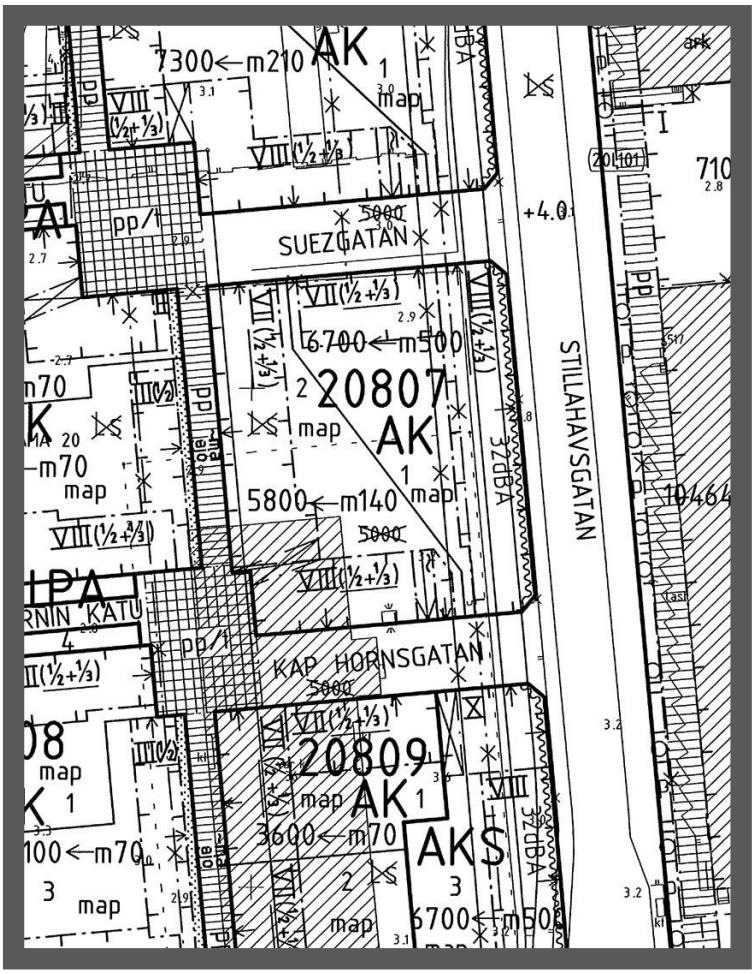


Figure 22. Local detailed plan. (Helsingin kaupunki 2015b.)

Figure 23. The plan regulations of the local detailed plan. (Helsingin kaupunki 2015b.)

Helsinki cargo port operated in this area until the end of 2008 after which the cargo port was transferred to Vuosaari. This enabled the conversion of the area mainly into the residential and office use. The detailed local plan area covers 37.6 hectares, of which 33.7 hectares is land area and 3.9 hectares is water area. (Helsingin kaupunki 2009, 4, 14).

Figure 24. Aerial view on Jätkäsaari neighbourhood. (Jätkäsaaren infokonttori 2014.)

Länsisatama (3) is part of the expansion project of the city of Helsinki. Other areas are: Salmisaari (1), Ruoholahti (2), Rööperinranta (4), Hernesaari (5) and Eiranranta (6). (Jätkäsaaren infokonttori 2014).

The aim of changing the detailed local plan was to transform the area into a neighborhood for seniors and families with children. (Helsingin kaupunkisuunnitteluvirasto 2009, 35-36). When Jätkäsaari is completed, it will accommodate 16 000 inhabitants and there will be approximately 6 000 jobs. (Port of Helsinki 2014, 9).

The Jätkäsaari planning area can be considered to be operating on the principle of sustainability because it follows compact urban development, aims to take into account the inhabitants of all ages and emphasizes public transport.

6.3.2 Design Guidelines Hietasaari

The sesign Guidelines of Hietasaari 2010 aim to refine the townscape goals set by the detailed local plan. Jätkäsaari will be designed in accordance with the objectives of sustainable development and the planning solutions should be justified from the viewpoint of energy efficiency. (Helsingin kaupunki 2010, 5)

Lot of attention is paid to yard planning and the objective of a high standard of outcome in the design guidelines. The aim is to generate aesthetically and functionally high-quality, comfortable, and distinctive yards to be used by all ages. The yard planner has to be an experienced landscape architect. A lightning plan is also required. The planning requirement category is A. (Helsingin kaupunki 2010, 55).

Figure 25. Yard photos 2014, Minna Vierula

The aim is to design individual and sheltered islet type outer spaces, which function as recreational areas, and to form safe urban surroundings that are delineated from public areas. (Helsingin kaupunki 2010, 9).

The instructions for the design of urban courtyards is summarized below. The facts clearly promoting sustainable development are in bold print.

A General Overview of Urban courtyards:

- Urban courtyards should be formulated as joint premises which contain **shared playgrounds** and **recreational areas**.
- Courtyards should be designed so that they are visually and functionally coherent yard compositions.
- Urban courtyards mainly stand on beamed deck surfaces. The depth and dynamic press of large tree planting beds as well as the requirements for **safety** and **emergency services** should be taken into account when calculating the load-bearing capacity and determining the depth and broadness of the deck structures.

- The aim is to create an ensemble which resembles natural islands and holds the mental images of their characteristics. Each yard should have its distinct, identifying theme.
- **Unobstructed entrance** platforms should be designed on all entrance ways. (Helsingin kaupunki 2010, 9-36).

Functional features of the yards:

- The yard features should be planned in a way that forms the best possible entity.
- **Luminous** intensity should be regarded when positioning functional elements and choosing plant varieties.
- Collective yards should contain **sojourn areas** which adjust smoothly to the general yard layout.
- **One shared playground** should be placed on every courtyard. A playground should be designed as an inseparable part of the general layout regarding design format, equipment, fittings and materials.
- Bicycle racks should be placed along pathways, preferably under shelter or delineated by structural elements. (Helsingin kaupunki 2010, 34).

The visual outlook, principles of the use of paving and coating materials

- **Natural stone** and fibrous concrete should be used as large contiguous planes and as the main solid paving material.
- The atmosphere can be softened with gravel, chippings or crushed stone. Such substances also **diminish acoustic reverberation**. Softer paving materials decrease stormwater runoff and improve permeability.
- Structural engineering products like walls, fences and barriers should be designed carefully and case-by-case to match the other materials.
- **Stormwater management** should be designed as part of the courtyard of the basic surface.
- The adequate protection of vegetation should be ensured, but the protective barriers are used only if it is necessary. (Helsingin kaupunki 2010, 45-48).

Technical regulations and application

- If possible, **the storm water** should be **utilized at the site** and **directed at the vegetation**.
- **The acoustic** characteristics of facades and blocks should be taken into account in the planning. (Helsingin kaupunki. 2010, 49-50,52).

Waste disposal

- **Mixed waste**, bio **waste**, paper **and cardboard waste** should be **managed** by the **pipeline collection system**. (Helsingin kaupunki. 2010, 56).

Figure 26. Yard photos. 2014, Minna Vierula

6.3.3 Yard Description

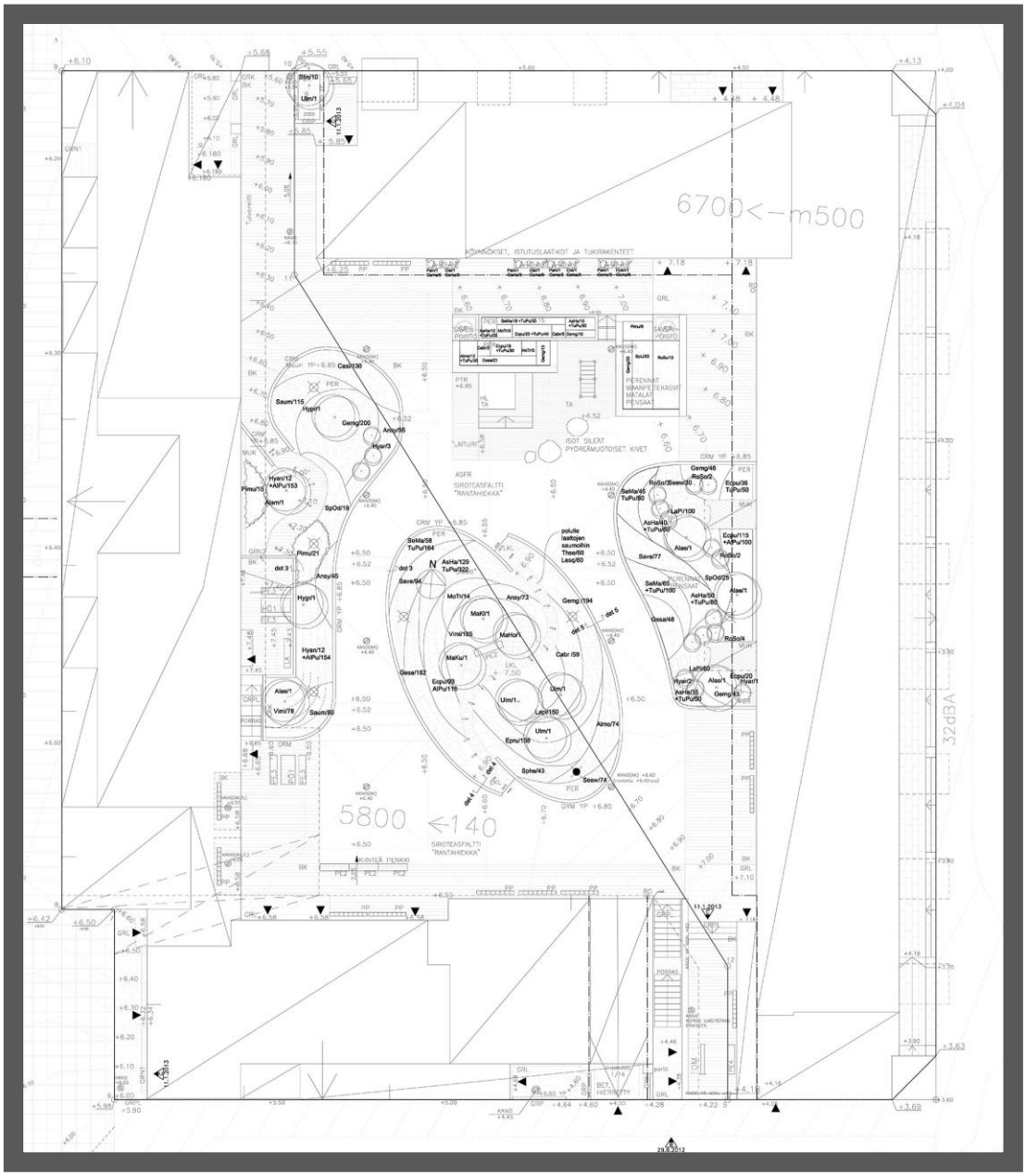
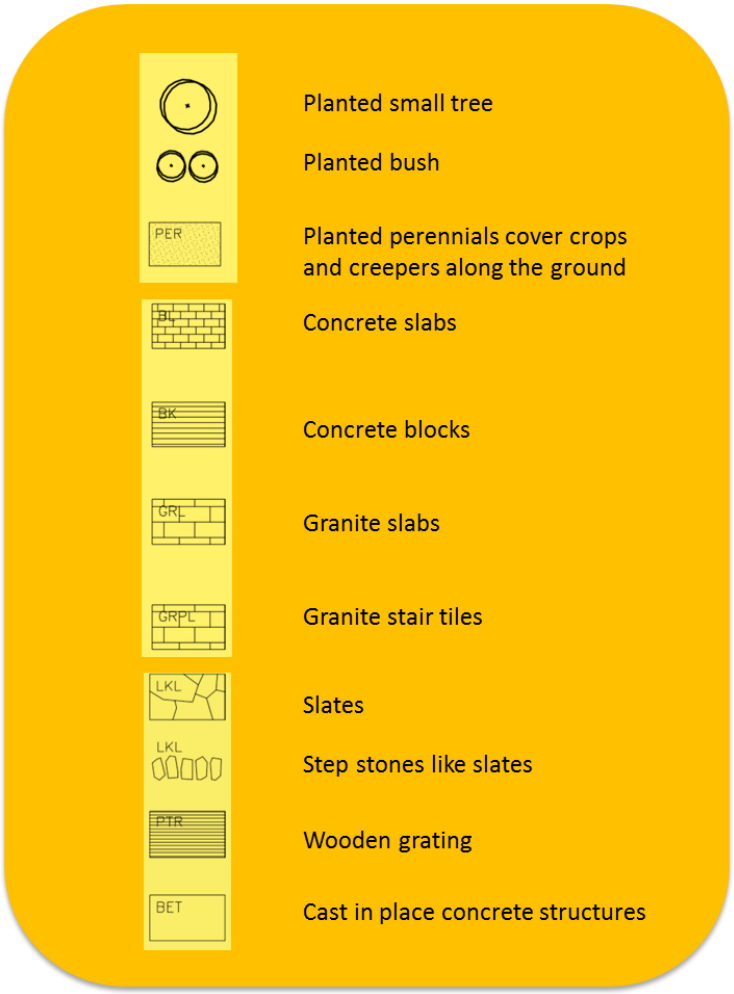


Figure 27 . Yard plan: 13.April 2012, Kirsti Sivèn, Kirsti Sivèn & Asko Takala Arkkitehdit Oy.



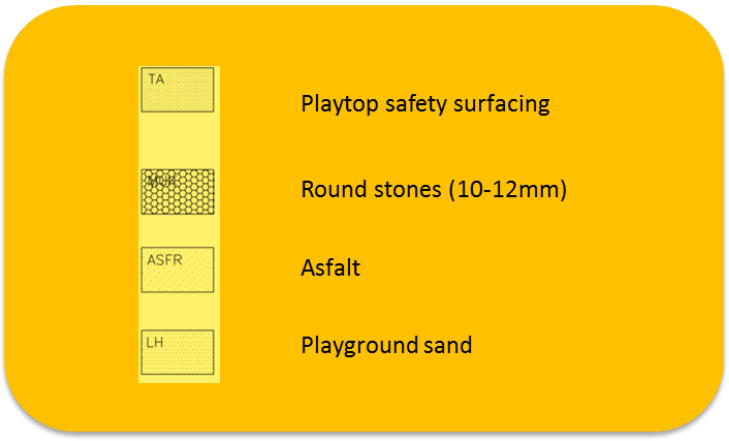


Figure 28. Yard plan: 13.April 2012, Kirsti Sivèn, Kirsti Sivèn & Asko Takala Arkkitehdit Oy.

Evaluation

There are also granite cubes (GRN1 and GRN2), granite kerbstones (GRK), granite wall stones (GPR) and granite fence walls (GRM). These surfaces make the aesthetic, architectural whole as required.These surfaces make the aesthetic, architectural whole as required.

The benches (PE1) are products of Euroform, an Italian manufacturer. The concrete parts are casted on site and the seats are heat-treated ash. The benches (PE2, PE3, PE4) have steel bases and the seats are heat-treated ash. They come from abroad and are made by Extery. The metal parts of the table (PÖ) are hot-dip galvanized powder coated steel and the top is heat-treated ash. The grey concrete planter blocks (LA1) come from Swedish NOLA. The bike racks are made by a Finnish company Lappset as well as the dusting stand (TOM) and the climbing frame. The wastebaskets (RO) are made by Säkkiväline in Finland and the flagpole (LT) by Finnish Flagmore Ltd. The sandbox is built on site. The shapes of the selected furnishings are simple and they are developed for demanding use.

One- third of the courtyards are green areas and there is an abundant number of plant species. The apple trees are old and hardy cultivars and they thrives in the sun. Ulmus glabra Pendula and Amelanchier laevis needs sunny or semi- sunny places to grow, tolerate the wind well, and binds the pollutants in the air effectively. Three Hydrangeas cultivars thrive in the sun and in the shade. Rosa `Sointu´, Spiraea japonicas and Stefananda incisa are hardy cultivars and thrive in the sun or semi-sun. Some of the perennials are used as cover crops and rockery plants and they all are hardy cultivars (Suomalainen taimi 2015; Viherpeukalot 2015).

		koko			kpl
TREES					
MaHo	Malus purpurea `Hopa´, purppuraomenapuu	rym 10-12			1
MaKi	Malus purpurea `Kirjailija´, purppuraomenapuu	rym 10-12			1
MaKu	Malus prunifolia `Kuohu´, paratiisiomenapuu	rym 10-12			1
Ulm	Ulmus glabra `Pendula´, riippajalava	rym 10-12			4
BUSHES		koko	i.e/m	kpl/m²	kpl
Alae	Amelanchier laevis, sirotuomipihlaja	60-80	merk. paikat		5
Hyar	Hydrangea arborescens `Grandiflora´, pallohortensia	40-60	merk. paikat		6
HyGr	Hydrangea paniculata `Grandiflora´ FinE, syyshortensia	60-80	merk. paikat		1
HyPr	Hydrangea paniculata `Praecox´, kuutamohortensia	60-80	merk. paikat		1
Pimu	Pinus mugo `Pumilio´, kääpiövuorimänty	50-60	0,6	3	44
RoSo	Rosa `Sointu´, tarhakurtturuusu	40-60	0,8	1,5	24
SpLi	Spiraea japonica `Little Princess´, keijuangervo	20-40	0,5	4	33
SpOd	Spiraea japonica `Odensala´, loistoangervo	40-60	0,65	2,5	44
Stin	Stefanandra incisa `Crispa´, seppelvarpu	30-50	0,7	2	10

CREEPERS		ist.et.	kpl
Clsi	Clematis sibirica, siperiankärhö	merk. paikat	3
Hyan	Hydrangea anomala ssp.petiolaris, köynnöshortensia	0,8	25
Pain	Parthenocissus inserta, säleikkövilliviini	merk. paikat	4
PERENNIALS		kpl/m²	kpl
Almo	Alchemilla mollis, jättipomulehti	6	86
Ansy	Anemone sylvestris, arovuokko	10	213
AsHa	Aster `Harry Smith´, elokuunasteri	8	281
Epru	Epimedium rubrum, tarhavarjohiippa	10	158
Ecpu	Echinacea purpurea `Rubinstern´, kaunopunahattu	8	302
Gema	Geranium macrorhizzum, tuoksukurjenpolvi	8	48
Gemg	Geranium magnificum, tarhakurjenpolvi	8	533
Gesa	Geranium sanguineum, verikurjenpolvi	10	251
LaPi	Lamium maculatum `Pink Nancy´, hopeatäpläpeippi	10	310
Lesq	Leptinella squalida, saumayrtti	12	60
Saum	Saxifraga umbrosa, varjorikko	10	195
Save	Salvia verticillata, kiehkurasalvia	8	171
Seew	Sedum ewersii, turkestaninmaksaruoho	10	104
SeMa	Sedum `Matrona´, komeamaksaruoho	8	186
Thse	Thymus serphyllum, kangasajuruoho	12	60
Vimi	Vinca minor, pikkutalvio	10	263

ORNAMENTAL GRASSES		kpl/m²	kpl
Cabr	Calamagrostis brachytricha, timanttikastikka	6	102
Casi	Carex siderosticha, idänvarjosara	10	130
MoTr	Molinia caerulea var. arundinacea `Transparent´, isosiniheinä	3	20
Sphe	Sporobolus heterolepis, preeriaheinä	5	15
BULBOUS PLANTS		kpl/m²	kpl
AlPu	Allium aflatunense `Purple Sensation´, ukkolaukka	10	520
TuPu	Tulipa `Purissima´, tulppaani	10-20	950

Koko = size, kpl = piece, Ist.et = planting distance.

Figure 29. Yard plan: 13. April 2012, Kirsti Sivèn, Kirsti Sivèn & Asko Takala Arkkitehdit Oy.

7 CHECKLIST FOR SUSTAINABLE YARD PLANNING

A reliable comparison of various components of sustainability is not included in this study: it would be too challenging. Rather, each component can be approached from different viewpoints and accentuated in a different manner. The assessment of sustainability is agonizing as some of the criteria can be measured accurately but certain viewpoints can only be accessed through experience and common knowledge. For example, we can measure the housing density and the amount of traffic numerically but the comfort of living is a matter that cannot be evaluated or compared straightforward.

A variety of programs of sustainability which assist land use planning have been developed both internationally and nationally. Green Building Council Finland maintains a website that brings together the important tools and studies regarding sustainable urban planning. (Green Building Council Finland, 2014). The Climate-Proof City – The Planner's Workbook can also be found on the Internet. The pages contain different tools to support climate change adaptation in planning. (Ilmastonkestävän kaupungin suunnitteluopas 2015).

The Seutukeke, Sustainable urban areas - criteria and indicator tools for planning- project, has assembled ecological, social and economic research regarding urban areas, as well as the views of experts and the practical experience of planners. (Söderman 2011, 8). The final report of Seutukeke-project gives a comprehensive picture of everything that has to be taken into account in urban planning in terms of sustainability.

The information in the theoretical part of this thesis has been complied in a checklist for sustainable yard planning. The sustainable principles can be found in the international conventions, the national acts, regulations, design guidelines and the Helsinki building order. Some of the criteria were found by the aid of the interviews.

The criteria described below can be viewed from different perspectives and they can be highlighted differently but it is not the purpose of this thesis. The checklist

can be used by Varma, architects, different planners and engineers. The points can also be applied as planning guidelines, which are given to the architects in the beginning of the design project of Varma. In this way, the planners can immediately take into account the real estate as a whole and not the yard as a separate part of the planning process. Most of the criteria are closely linked to the overall plan; its technical solutions, structuring of the functions and, of course, the landscape.

The checklists have been given to the two architects who planned the presented yards. Hence, it was possible to test the functionality of the checklist in practice and to get the planner foreground knowledge of the yards.

The checklist for sustainable yard planning is one result of this thesis and it answers the question: what the sustainability principles are in urban property yard planning. The names of the architects are not mentioned.

Arabiankatu 8

Yard planning takes into consideration	YES	NO	**Justify**
Social Sustainability:			
Residents can participate in the planning.		X	The rental house and residents are not known yet.
Residents have the opportunity to freshen up / self-realization.	X	X	Quite small yards, but the terraces are close to the apartments and offer different types of recreation possibilities. In addition,it is possible to use common yards.
Children, senior and disabled have been taken into account.	X	X	The yards are accessible, but there are little playing opportunities. (safety). Furthermore, those common courtyards help.
Access to everyone		X	The terraces are only for the residents.

The yard activates the users.		X	The yards are quite small, the activities do not fit. (Common courtyards).
The yard is safe for its users.	X		Naturally. Attention has been paid to the roof terraces particularly.
The yard is practical and its functions are varied	X	X	Small yards. (Common courtyards).
The yard is modifiable for different uses	X	X	Small yards.
Economic Sustainability:			
Are the selected structures durable?	X		They are part of the building, so they are as durable as possible.
Are the structures easy to repair?	X		As normal.
Have the transportation distances of the products been taken into account?	X		The elevator is needed when going to the terrace. So the number of the structures is low.
Has the maintenance of the yard been taken into account?	X		The aim was to minimize maintenance requirements. Also, the snow gathering on the terraces was considered, since the dropping is a challenge.
Is the cost level of the yard plan in relation to the cost level in the surrounding area?	X		The same quality and cost level.
Is the sorting of waste taken into account?	X		In the building, but not in the yards
Does the plan includes the use of alternative energy sources; solar panels, geothermal etc.?		X	The building itself has a mass and shape that is compact and energy efficient and it is centrally located in the structure. The tram stop is near.
Ecological Sustainability:			

Does the yard fit the environment?	X		Like nother yard.
Do the selected plants fit the environment?	X		Very few plants…
Do the materials fit the environment?	X		Like other yards in the blocks
Are the used seedlings Fin E -seedlings?			The yard planner knows…
The green factor? (http://ilmastotyokalut.fi/laskuri) Scored green are/lot are =green factor			In the street square there is one tree, another green areas are in the terraces, planting boxes. The building is almost as big as the site.
Has the plants´ snow and contamination resistance taken into account?	X		In the yard plan.
Are the used plants suitable for the climate?	X		In the yard plan.
Have the preservation of biodiversity been taken into account?		X	A small plot in the factory district. No green.
Is there typically growing species?		X	A small plot in the factory district. No green.
How has the storm water absorption been taken into account?		X	Not possible.
How has the re-use of the storm water been taken into account?		X	Not possible.
Is there a green roof in the structures?		X	Not possible.
Windiness?	X		The roof terraces are naturally very windy. (FloorS 10 and 13)
Noise polution?	X		Normal street and tram noises.
Has the access of natural light been taken into account?	X		In the close structure wherever possible.
Has the climate change adaptation been taken into account?	X		Prepared for flooding (the yards clearly above ...)

Tyynenmerenkatu 5:

Yard planning takes into consideration	YES	NO	Justify
Social Sustainability:			
Residents can participate in the planning.		X	The rental houses and the residents were not known at the planning stage.
Residents have the opportunity to freshen up / self-realization.	X		
Children, senior and disabled have been taken into account.	X		There are also special apartments for disabled on the ground floor, so more than usual was invested in the accessibility.
Access to everyone	X		
The yard activates the users.	X		
The yard is safe for its users.	X		Minimum requirement as always.
The yard is practical and its functions are varied	X		
The yard is modifiable for different uses		X	The yard is a small cover yard, it is not possible to arrange playing fields, etc.
Economic Sustainability:			
Are the selected structures durable?	X		
Are the structures easy to repair?	X		
Have the transportation distances of the products been taken into account?			I cannot say. The contractors make a final decision of purchases, if the product is equivalent to the documents.
Has the maintenance of the yard been taken into account?	X		
Is the cost level of the yard plan in relation to the cost level in the surrounding area?	X		

Is the sorting of waste taken into account?	X		The regional pipeline collection system.
Does the plan includes the use of alternative energy sources; solar panels, geothermal etc.?		X	
Ecological Sustainability:			
Does the yard fit the environment?	X		
Does the selected plants fit the environment?	X		The area was in use of the harbor, so the landscape will be renewed by building.
Does the materials fit the environment?	X		The paving materials were designed to be compatible with the facades, a lot of natural stone.
Does the materials fit the environment?	X		
Are the used seedlings Fin E -seedlings?	X		The green space construction required the use of Finnish plants and some of them are FinE class.
The green factor? (http://ilmastotyokalut.fi/laskuri) Scored green are/lot are =green factor	X		The yard deck affected to the green factor.
Have the plants´ snow and contamination resistance taken into account?	X		
Are the used plants suitable for the climate?	X		Most of these plants are perennials and do not have a zone recommendation.
Have the preservation of biodiversity been taken into account?			There is no original nature in the region.
Is there typically growing species?		X	Old harbor, no original garden plants.
How has the storm water absorption been taken into account?		X	Water is discharged by storm water drains through the garage.
How has the re-use of the storm water been taken into account?		X	

Is there green roof in the structures?		X	
Windiness?	X		Closed block.
Noise polution?	X		Closed block.
Has the access of natural light been taken into account?	X		The building massing; the south side of the building is the lowest, and shaded area plants are used
Has the climate change adaptation been taken into account?	X		

8 CONCLUSIONS

What does sustainability mean in urban city planning and in urban property yard planning? The answers were found in the international and national conventions as well in the Finnish legislation and different constructions. All of them include a strong pursuit of sustainability. When the architects observe the Land Use and Building Act, the local detailed plan and design guidance as well as the building order of the municipality, it can be said that they have automatically taken into account sustainability in the planning.

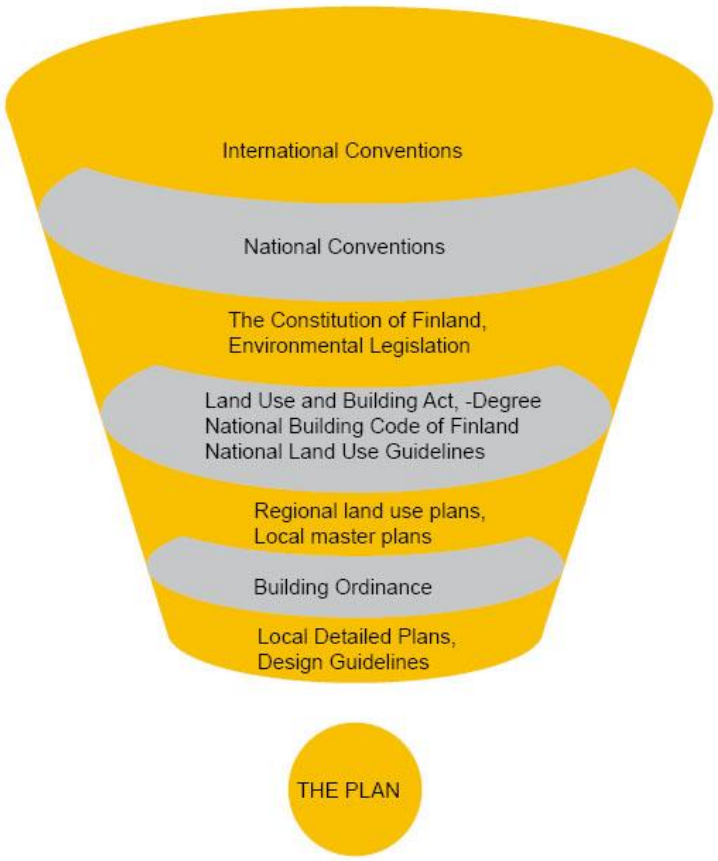


Figure 30. Planning strainer. (Vierula 2015).

The sustainable yard planning checklist answered the question: what the sustainability principles are in urban property yard planning. The collected issues have been sorted to social, economic and ecological sustainability.

The architect interviews and the discussion with Mr Vaarasalo indicated that the architects have a wide freedom to choose sustainable materials and to present sustainable solutions after they have taken into account the acts and different guidelines. Although the questions were prepared from the viewpoint of the yard planning, all answers revealed that the architects consider the property and its placement in environment as a whole, not the yard as a separated part. This is partly due to the fact that the architects' planning processes generally include observing, monitoring and comparing the social, ecological and economic aspects, such as the environment, cultural landscape, residents and different technical solutions.

The answers revealed that detailed aspects of sustainability or the mention of climate change adaptation, - thus, those aspects which are presented in the yard planning checklist and partly affect sustainable planning -, have not been mentioned. Answers can be deduced to be the general preconditions of architectural plans.

A broad understanding of the concept and its consideration of the planning is not only the responsibility of architects; it requires sincere cooperation in various fields. As stated above, Varma´s planning process is extensive and involves many professionals in various fields. In this study, it was not possible to solve the problem areas of the planning process, which were related to the sustainable activities of the various professionals. However, the thesis propounds the aspects that should be considered in order to achieve sustainable planning and to stimulate the architects´ and Varma's attentiveness towards sustainability.

For further development, it is important to examine the planning process as a whole, as well as the items which have to be improved in the multi-disciplinary co-design process, so that the result is sustainable.

The importance of the use of the ecological and environmentally friendly materials has been mentioned in the answers. Architects favor materials that are durable and easy to maintain. These features were considered to play a significant role in sustainable development. In order for material to be ecological

and environmentally friendly, the environmental impact of the award process, transport, end-use and possible recycling should also be taken into account. This thesis did not dig into details but is recommended such information should be asked from the manufacturer of the materials and the products.

To the question whether the concept is so comprehensive that it is difficult to implement in practice, it can be noted that the architects used by Varma realize the different aspects of sustainability and try to implement them in their work. Both yard plans were in compliance with the local detailed plan and followed the regional design guidelines.

The architect interviews and discussions with Mr Vaarasalo demonstrated, however, that the architects' hands are tied as regards the residents´ opportunity to participate in the planning process. This is partly due to the fact that the participatory planning, the population surveys or the meetings, do not take place in rental housing. It is not known who will live in the apartments. However, one of the main premises of sustainability is the residents´ opportunity to participate in the planning process and to have and influence their living environment.

According to Niemenmaa (2002, 200), participation is seen as an integral part of the concept of sustainable development. On the other hand participation is justified by the fact that sustainable development cannot be achieved without personal commitment to it. Pakarinen (2002, 89, 90) submitted that the residents should be seen as actor, after that they have more power than simply from a resident point of view.

The future research could look into participatory planning and its social aspects. A few options are presented here: 1) A random group of tenants of Varma could be assembled to plan the new project together with the architects. 2) A random group of tenants in the area could be assembled. 3) A group of individuals representing the target group could be assembled and invited to the planning process.

These three options are limited vision of how the concept of participation could be improved; but they are better than the alternative solution where the architects try to "empathize" with the residents needs and wishes during the planning process.

The study revealed that the construction manager Mr Vaarasalo does not necessarily meet the yard or landscape planners, but discusses with the head architects. The research also revealed that the yard plans and the yard implementations are made in the end of the planning process. If this process is carried out according to the principles of sustainable development, this arrangement should be changed. Yard plans, and their technical solutions and implementation should be put on to the table at the same time when deciding on the solutions for the entire property. Otherwise, sustainable development would not be considered sufficiently.

In Varma's operations, the life cycle economy is important, which means, above all, sustainable quality. A clear guidance to sustainability should be given to the architects so that they can take into account sustainability and all its principles in the future.

All the presented yard plans complied with the local detailed plans and the design guidelines. The yards include the necessary activities and the accessibility requirements have taken into consideration. Arabiankatu 8 was exceptional because of its courtyard areas were placed on the terraces. However, residents can also use the common courtyards of Arabianranta.

8.1 Improvement for the Future

Some impovement for the future: The architects begin to use the checklist for sustainable yard planning and the yard planning will be raised to a corresponding level with other sectors of the planning process and no longer in the end. All yards, technical solutions and implementations which are included in the property layout have to be brought on the design table at the same time when

deciding on the solutions for the entire property. Varma as the developer has to meet the yard planners during the project and the residents have to be involved in the planning process. Various methods of climate change adaptation have to taken into account in yard planning. In order to truly take into account sustainable development in the yard planning, Varma should give clear instructions to the architects so that all principles of sustainability will be included. The work of the different professionals in the planning process will be examined in the future.

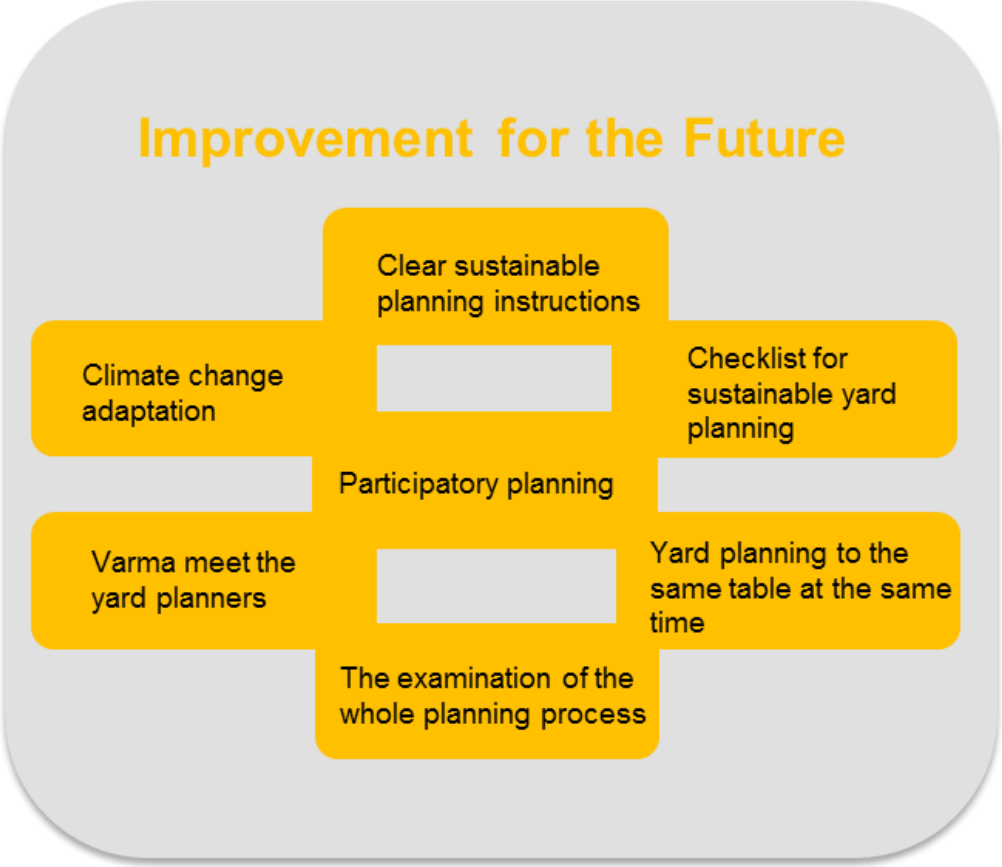


Figure 31. Improvement for the future. (Vierula 2015).

8.2 Reflection on the Study

At first, my aim was to develop a sustainable tool for yard planning, but very quickly I found out that sustainable development is too complex and multi-dimensional so that the development of such a tool would not be possible within the framework of this study. Versatile professional co-operations and a longer

time for development would have been necessary. Thus, I decided to focus on the checklist for sustainable yard planning that can be used by the architects and in Varma in this study. There is a lot of information about sustainable development and it was challenging to select relevant data from the information overload. It was also problematic for me to keep the thesis within reasonable limits.

I was able to carry out my thesis at the University of Salento in Italy and it was a great experience. My supervisor Dr. Zurlini assisted me to the right direction when I was drowning in the flood of information at the beginning. With his guidance I found the SEA Directive and the Aalborg Charter which have had an strong impact on sustainable urban planning, and thereby I created realistic limits to my work.

It was pleasant to make the interviews with the architects and to have discussions with Tuomas Vaarasalo. The architects cooperated willingly and were interested in the matter. The whole process expanded my understanding about urban design and its various levels.

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10 LIST OF FIGURES

APPENDIX 1

KYSELY LOPPUTYÖHÖN LIITTYEN 9.9.2014

(Minna Vierula, **Master's Degree Programme in Environmental Technology)**

Vastaa alla oleviin kysymyksiin pohtien suunnittelemasi Varman pihoja yleisesti.

NIMI JA AMMATTI: _____

YRITYS: _____

9) Mitä ymmärrät kestävällä kehityksellä kaupunkisuunnittelun yhteydessä?

10) Mitä ymmärrät kestävällä kehityksellä pihasuunnittelun yhteydessä?

11) Auttaako vai vaikeuttaako asemakaavan, rakentamistapaohjeiden ja eri lakien/asetusten/suositusten noudattaminen kestävän kehityksen mukaista suunnittelua. Miten?

12) Vastaa omin sanoin miten huomioit kestävän kehityksen piha-alueita suunnitellessasi:

- Ympäröivä ympäristö/maisema.
- Materiaali- ja kasvivalinnat.
- Pihan huollettavuus ja hoidettavuus.
- Sosiaalinen näkökulma.
- Taloudelliset näkökulmat.

13) Onko sinulla mahdollista ottaa huomioon tulevien asukkaiden toiveita? Miten?

14) Joudutko perustelemaan tilaajalle valintojasi joissa kestävä kehitys on huomioitu? Miten?

15) Joudutko perustelemaan rakentajalle valintojasi joissa kestävä kehitys on huomioitu? Miten?

16) Mitä lisätietoa kestävästä kehityksestä koet tarvitsevasi jotta voisit huomioida sen paremmin suunnittelussasi?

PALAUTUS 23.9.2014 mennessä: minna@ideakellari.fi

KIITOS!

APPENDIX 2

PIHASUUNNITTELUSSA HUOMIOTAVA	KYLLÄ	EI	PERUSTELU
Sosiaalinen kestävyys:			
Asukkaiden on mahdollista osallistua suunnitteluun.			
Asukkailla on mahdollisuus virkistäytyä/toteuttaa itseään.			
Lapset, vanhukset ja liikuntaesteiset on huomioitu.			
Piha on avoin kaikille.			
Piha aktivoi käyttäjää.			
Piha on käyttäjilleen turvallinen.			
Piha on toiminnoiltaan monipuolinen ja käytännöllinen.			
Piha on muunneltavissa eri käyttötarkoituksiin			
Taloudellinen kestävyys:			
Ovatko valitut rakenteet kestäviä?			
Ovatko rakenteet helposti korjattavissa?			
Ovatko piharakenteiden kuljetusmatkat huomioitu?			
Onko pihan kokonaishuoltotarve huomioitu?			

Onko pihasuunnitelman kustannustaso suhteessa ympäröivän alueen kustannustasoon?			
Onko jätteiden lajittelu huomioitu?			
Sisältääkö suunnitelma vaihtoehtoisten energiamuotojen hyödyntämistä; aurinkopaneelit, maalämpö jne.?			
Ekologinen kestävyys:			
Sopiiko piha alueen muuhun ympäristöön?			
Sopivatko valitut kasvit maisemaan?			
Sopivatko materiaalit maisemaan? Ovatko käytetyt taimet Fin E-taimia?			
Viherpinta- ala? (http://ilmastotyokalut.fi/laskuri) eli kasvillisuuden osuus muusta alueesta			
Onko kasvien lumen ja saasteen kestävyys huomioitu?			
Onko käytetty ilmastoon sopivia kasveja?			
Onko luonnon moninaisuuden säilyt-täminen ja biodiversiteetti huomioitu?			

Onko alueella tyypillisesti kasvavia lajeja?			
Miten hulevesien imeytys tontilla on huomioitu?			
Miten hulevesien uudelleenkäyttö on huomioitu?			
Onko piharakenteissa viherkatteita?			
Pihan tuulisuus?			
Meluhaitat?	X		Normaalit katu ja ratikkamelut
Onko luonnonvalon pääsy pihaan huomioitu?	X		Tiiviissä rakenteessa mahdollisuuksien mukaan
Onko sopeuttaminen ilmastonmuutokseen huomioitu?	X		Varauduttu tulvimiseen (rakennuksessa, pihat selvästi ylempänä…)