



BIODIVERSITY AND ECOSYSTEM SERVICES

GROUP 2

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WHAT IS BIODIVERSITY?

WHAT ARE ECOSYSTEM SERVICES?

CONCEPTS:

Eco-Viikki

Alusta Pavilion, Elina Koivisto & Maiju Suomi

Kissankäpälä, Jenni Reuter

CONCLUSION

B I O D I V E R S I T Y = a feature of ecosystem - **all living things** (animals, plants, fungi, microorganisms) **work together in ecosystems to maintain balance and support life**

biodiversity & ecosystems

(biological structure / process & functions)

→ **ecosystem services** →

← natural based solutions & recognizing natural capital's value ←

human well-being

(benefits and value)

Necessary actions:

- ensuring biodiversity at all scales
- utilizing ecosystem services sustainably
- natural based solutions that consume little resources and maintain relationship with nature

ECOSYSTEM SERVICES

Support & regulation services

- Rainwater & meltwater flow regulation
- Water quality regulation
- Carbon sequestration
- Erosion control & land fertility
- Cleaning harmful substances
- Formation of soil and consistency regulation
- Circulation of nutrients
- Mitigation of smells, noise or visual harm
- Regulating microclimate
- Regulating air quality
- Maintaining living environments
- Pollination
- Biological control

Production services

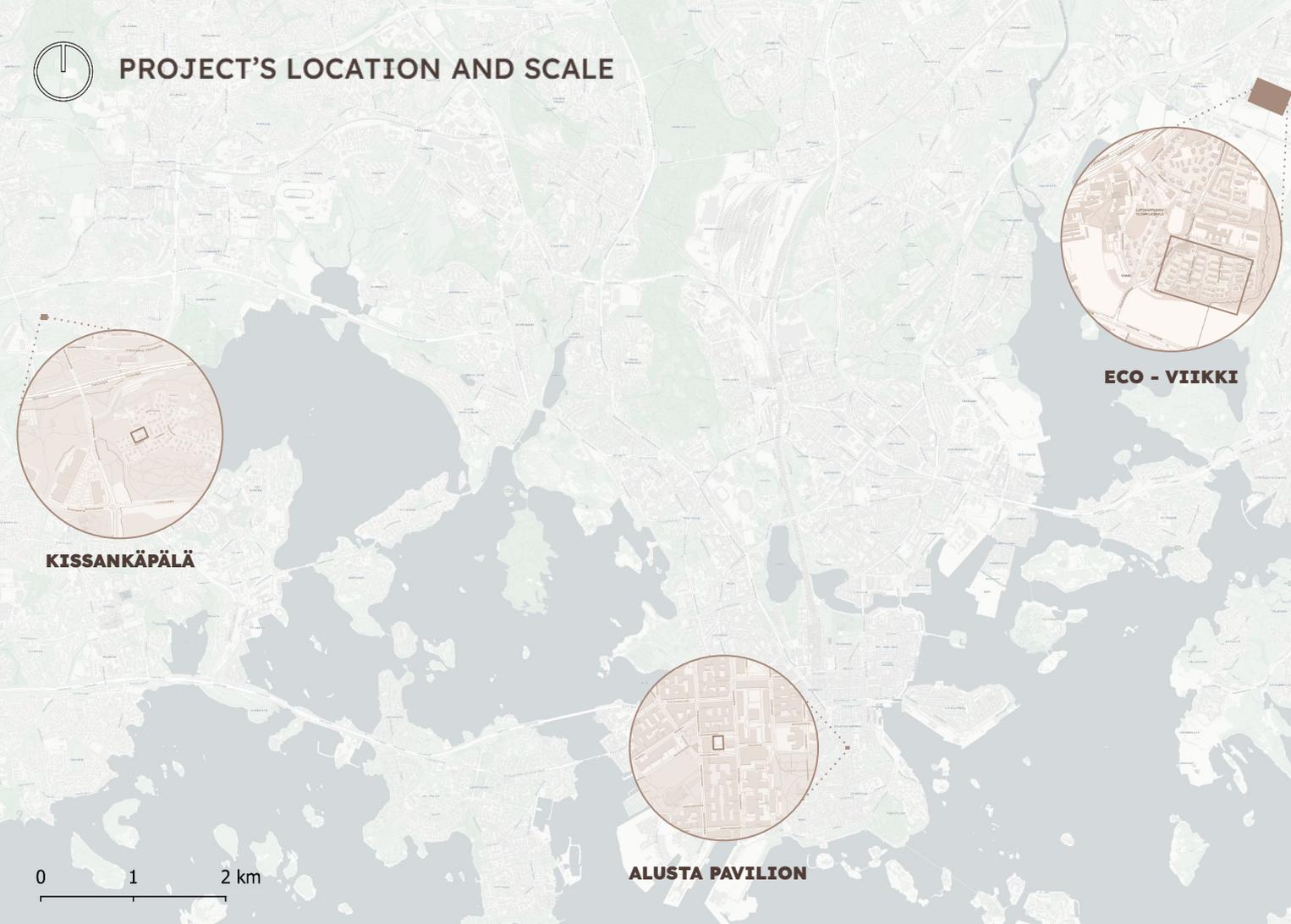
- Gene recourses
- Clean water
- Materials
- Sustenance
- Energy

Cultural services

- Refreshment, mental & physical health
- Experiences
- Possibilities for teaching and science
- Aesthetics & source of inspiration
- Nature's symbolic and spiritual values
- Maintaining cultural heritage
- Intrinsic value of nature



PROJECT'S LOCATION AND SCALE



KISSANKÄPÄLÄ

ECO - VIIKKI

ALUSTA PAVILION

ECO - VIIKKI



ALUSTA PAVILION



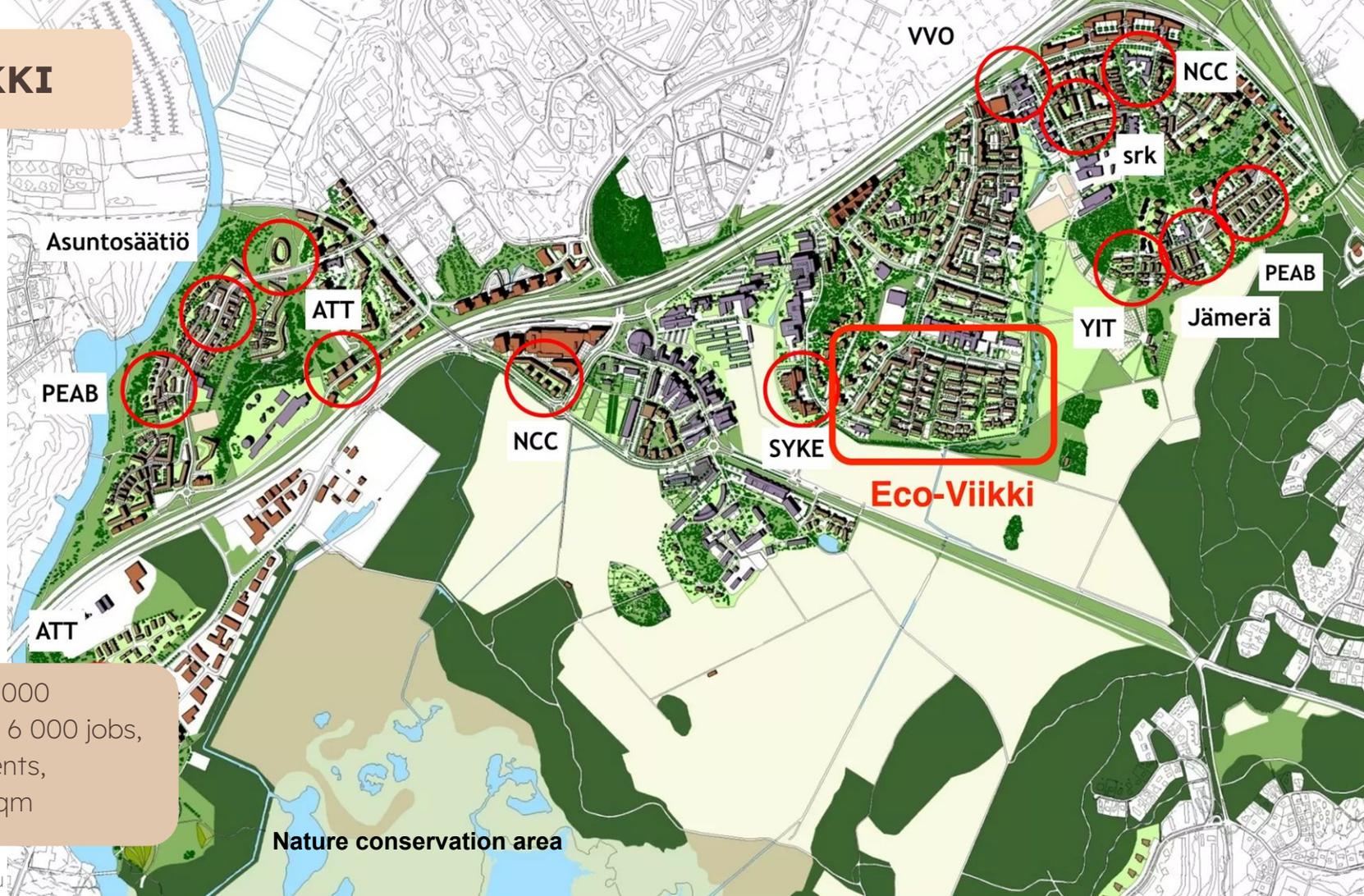
KISSANKÄPÄLÄ



An aerial photograph of a residential development. The image shows several multi-story apartment buildings with balconies, interspersed with green spaces and parking areas. A large, semi-transparent orange rounded rectangle is overlaid in the center of the image, containing the text 'ECO - VIIKKI' in bold, black, sans-serif font. The background shows a mix of urban infrastructure and natural greenery, including a large open field and a forested area in the distance.

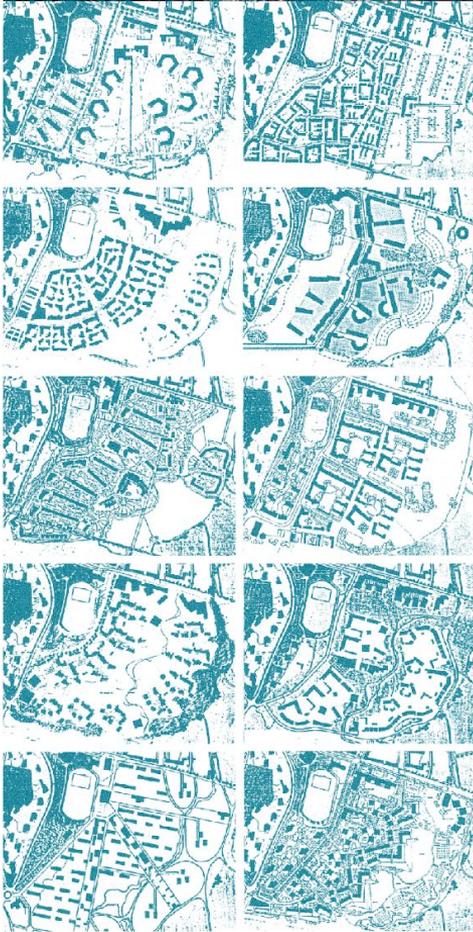
ECO - VIIKKI

VIIKKI



By 2020: 17 000
inhabitants, 6 000 jobs,
6 000 students,
~ 1 million sqm

Nature conservation area



The beginning...

Models for an ecological city: some of the “Upper Class” entries in the 1995 Viikki detailed plan competition. With black and white color, the winning entry by architect Petri Laaksonen.

Preparation of the Master Plan starts	1989
New “sustainable” building legislation in Finland	1990
Local Master Plan for Viikki	1993
Eco-Community Project	1993
<u>Eco-Viikki competition</u>	1994
Ecological Building Criteria for Eco-Viikki	1997
Ecological Building Criteria for other areas in Viikki	2000
Eco-Viikki housing area was completed	2004
Building in the Viikki area will be completed	2015



The ecological ideas in Viikki were generated in two open planning competitions. The first was for the town plan and the second concentrated on the **ecological building design**.

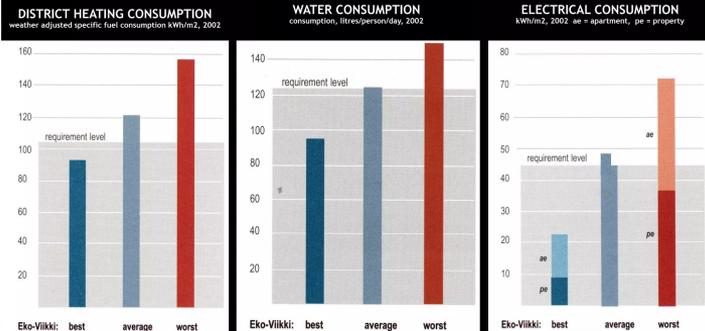
Eco - Viikki: The “green finger”



Collecting surface water



Surface water management of the residential area.



Eco Viikki - Monitoring Project (2004)

Eco-friendly neighborhood that occupies a space of over **6.400 m²** and contains buildings for **residential use, public services and basic necessities** (a school, a medical-social center, a hospital), **trade services and entertainment**.

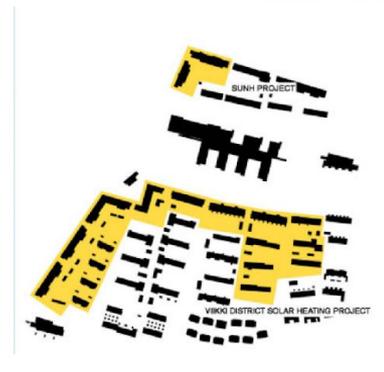
The neighbourhood was built according to strict criteria of **environmental sustainability**, established by the City and defined by a specific national program. Eco-Viikki is a neighborhood built to balance **energy savings and consumption**.

A finger shaped pattern, "**Green fingers**" with farming plots between the housing quarters. Almost all the houses directed to south to exploit solar energy
A **wind shelter zone**, formed by vegetation between the open field and the built up area

Ecological building design



Timber houses typologies



Ecological houses – solar panel system



Eco-Viikki has served as an **interesting experimentation platform** and provided new information, as well as technical and policy solutions from the beginning of 1990s, when sustainability was only beginning to be taken into account in building and urban planning.



In our way to urban sustainability transformation?

A more sustainable future?



ALUSTA PAVILION

Elina Koivisto & Maiju Suomi



Alusta pavilion is built on the courtyard of the Museum of Finnish Architecture and the Design museum in 2022. The pavilion explores nature-culture relations and offers a place for encounters between humans and non-human animals in urban space.

Alusta pavilion functions as a platform for environmental discourse, both on the level of its form and materiality, as well as the different events that are being organized there. It comprises a pollinator friendly meadow and structures made with clay in its different forms; unfired and fired brick and rammed earth.

Suomi/Koivisto Architects

In collaboration with researchers in ecology from the University of Helsinki, the project aims to enhance biodiversity in urban environments and highlight the crucial role of soil and its organisms in the well-being of ecosystems.

The Alusta is part of Maiju Suomi's doctoral research, which examines the aesthetic and political dimensions of environmentally conscious architecture. Simultaneously, the space serves as a testing laboratory for Elina Koivisto's research on the use of natural materials in construction.



"It is not enough to merely modify our current practices to be slightly more efficient. We must change our entire mindset and start from scratch." -Maiju Suomi

"In our current materialistic world, I am concerned about a certain form of material absence. It is related to the exclusion of nature: efforts have been made to develop building materials that are as smooth, neutral, and repellent as possible, so that nothing living adheres to them."

-Elina Koivisto



The image shows a lush garden area with various plants, including tall grasses and yellow flowers. In the background, there is a building with a brick wall and a black metal structure. The garden is enclosed by a brick wall in the foreground. Five callout boxes provide information about the garden and its construction.

More diverse urban nature increases well-being and alleviates extreme phenomena related to climate change.

The pavilion was named after the notion of having to think things over from the beginning. The word also denotes a platform, in this case for environmental discussion, collaboration, and different events.

A total of 50 architecture students took part in building Alusta.

Alusta pavilion is a home for over 1000 different plant species.

Clay is found in Finnish gardens and it is an affordable and reusable material.

A photograph of a modern courtyard. The foreground features a stone path leading through a space enclosed by walls made of perforated brick and wood. A wooden planter with green plants sits on the path. In the background, a person is visible near a car, and a building with a stone facade is partially seen. The scene is brightly lit, suggesting a sunny day.

"What if we sought alternatives that don't harm at all, or which are even beneficial for us?"

<https://youtu.be/NZhhvNsMkmY>

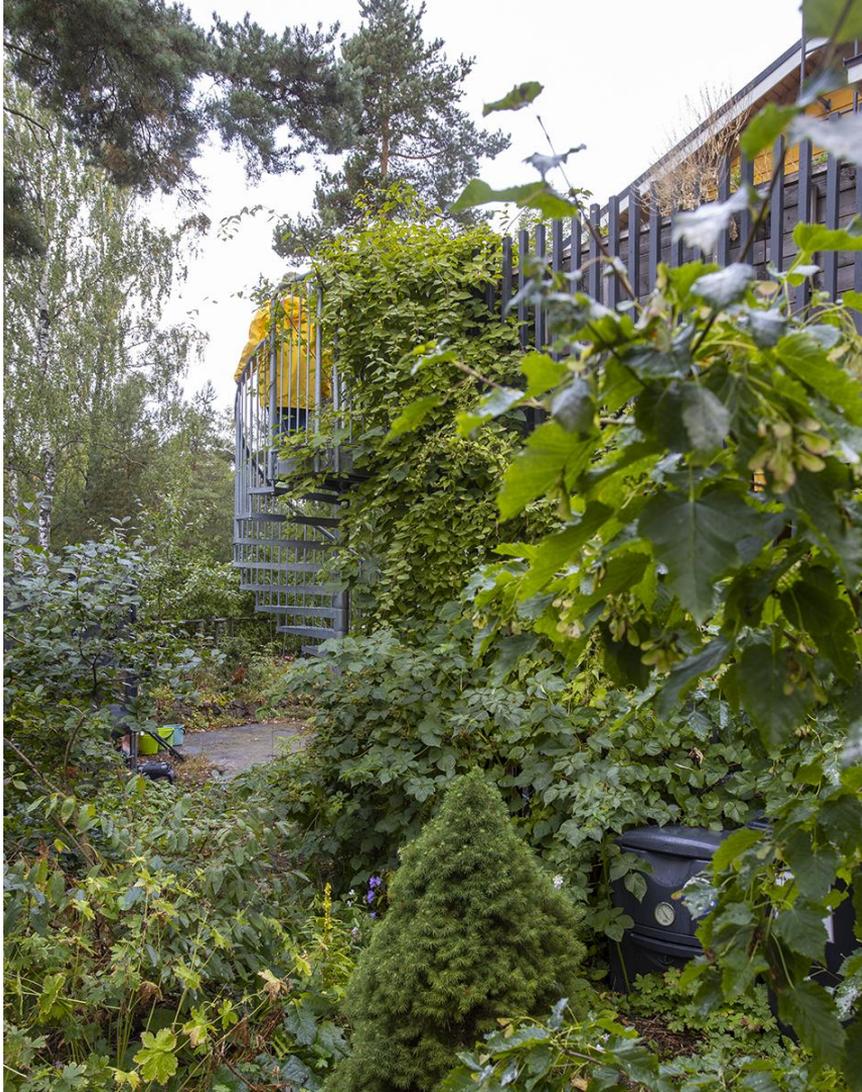
The structure is made mostly from clay



KISSANKÄPÄLÄ

Architect: Jenni Reuter, 2015

Photo: Pekka Hänninen



House Kissankäpälä is a private detached house in the Espoo suburb.

Kissankäpälä enables an ecological lifestyle in an urban environment.

The 3-storey house (180 m²) doesn't take much room in the 500 m² plot. The client wished for a home that had as small carbon footprint as possible, low energy consumption, natural and ecological materials and a biodiverse garden.

A photograph of a modern, two-story yellow wooden house. The house features a balcony on the upper level with a metal railing. A staircase leads up to the balcony. The house is surrounded by lush greenery, including trees and a garden with purple flowers in the foreground. A black car and bicycles are parked under a covered area of the house. The sky is blue with some light clouds.

Kissankäpälä has **an exceptionally small energy consumption** due to compact form, moderate amount of windows and energy efficient structure paired with gravity ventilation.

Windows frame pleasant views to the garden. High and narrow windows enable lots of sunlight inside the premises.

→ the surroundings allow the client to experience nature, it impacts mental health, comforts, has aesthetic value and is a source of inspiration



The materials were chosen with a low carbon footprint in mind.

Natural materials

Goal: as little unwanted chemicals and microorganisms as possible

In Kissankäpälä they use as little chemicals and plastic as possible (even drinking water pipes are copper).

Main material is **wood**: frame, exterior and interior. Wood controls air humidity, wood breathes, wood has psychological impacts and wood creates pleasant acoustics.

→ natural materials serve by regulating air quality and improving and maintaining our health

BIODIVERSITY

The yard has been designed so that it provides room for as diverse plant and animal species as possible!

Structures (such as holes in the rock fence) are **places for animals to take shelter**; flowers that bloom at different times **invite butterflies** and other insects; animals can dip in the natural pond and many **wetland plants** thrive at its shoreline.

Vegetation mainly consist of **rare or endangered species** such as native dry meadow plants; birch logs have been left to decay under bushes to support **moss growth, mushrooms, insects and animals eating insects**; the amount of outdoor lighting is moderate and directed downwards so that **surrounding nocturnal animals** can keep their habitat.

photo: Teija Tuisku



The garden is an essential part of the house. The most important things were to **coexist** with the surrounding animals, the **aesthetics** of the surroundings and **food production**.

Rain water

Plants in the garden have been situated so that they need little watering. Urban runoff is controlled by settling and absorption and the gardens surface has rainwater permeable materials. Also the amount of vegetated land area is high.

Food

On the balcony there is small scale production of vegetables. Water from the roof is steered directly to the plants. There is no need for other fertilizers than their own from the compost.



photos: Teija Tuisku



The integration of biodiversity and ecosystem services in architectural study cases, as exemplified by Kissankäpälä, Alusta Pavilion and Eco-Viikki, highlights positive trends in **sustainable design**.

In the quest for a sustainable future, it is crucial to consider ecological design principles at various scales. The examples shown in this presentation—Eco-Viikki, Alusta pavilion, and Kissankäpälä—each tackle different aspects of the overarching issue.

Eco-Viikki demonstrates the potential for **ecological urban design** on a larger scale, Alusta pavilion provides **a sustainable event space for environmental discourse**, and Kissankäpälä exemplifies **energy-efficient and low carbon footprint** private detached housing.

Moreover, all these projects incorporate **natural and ecological materials**, further emphasizing their commitment to sustainable practices. By examining these examples, we can draw inspiration and learn valuable lessons to inform future designs and construction practices, ultimately contributing to a more sustainable and environmentally conscious society.