Helsinki, Finland
Department of Architecture, AALTO UNIVERSITY School of ARTS
2017-2018
BIOTANIEMI, A SUSTAINABLE CITY MADE FOR PEOPLE
Venessa Mok, Titouan Joulain & Elina Renkonen

The studio course will advance in the integration of Natural Sciences and Planning by combining scientific methods to analyze the abiotic and biotic conditions of the urban environment with planning methods to promote the integration of multifunctional green infrastructures in more sustainable urban fabrics. In particular, the course will use the Urban Biotopes of Otaniemi to develop strategic proposals, fieldwork, lab work and advanced plans in current and future Otaniemi, in which new Urban Biotopes might emerge as a consequence of densification, climate change and social transformations.

The work will be developed in teams and will be structured in the following phases:

- PART 1: An academic reflection about Urban Nature and Urban Ecology
- PART 2: A scientific study of Abiotic and Biotic factors + "Biotopes based" analysis of the Green Infrastructure of Otaniemi
- PART 3: Strategic planning approaches in current and future Otaniemi (year 2017>year 2030)

*optional: Study trip to Berlin, London or Rotterdam (4-5 days)
PERFORMATIVE NATURE
Barcelona International Landscape Architecture Biennial
September 2018
SCHOOL PRIZE

X International Landscape Architecture Biennial
Máster d’Arquitectura del Paisatge -DUOT - UPC
ETSAB- Escola Tècnica Superior
d’Arquitectura de Barcelona
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TECHNICAL DOSSIER

Title of the project: BIOTANIEMI: A Sustainable Town made for People and Nature
Authors: Venessa Mok, Titouan Joulain & Elina Renkonen
Title of the course: URBAN BIOTOPES: OTANIMEMI 2017 > 2030
Academic year: 2017-2018
Teaching Staff: Juanjo Galan, Johan Kotze
Department/Section/Program of belonging: MASTER OF LANDSCAPE ARCHITECTURE, Department of Architecture, School of ARTS
University/School: AALTO UNIVERSITY

Written statement, short description of the project in English, no more than 250 words

Our project advanced in the integration of Natural Sciences and Planning by combining scientific methods to analyse the abiotic and biotic conditions of the urban environment with planning methods to promote the integration of multi-functional green infrastructures in more sustainable urban fabrics. In particular, our work used the Biotopes of Otaniemi to develop strategic proposals, fieldwork, lab work and advanced plans in current and future Otaniemi, in which new Urban Biotopes might emerge as a consequence of densification, climate change and social transformations.

Otaniemi is located in Southern Finland, in Helsinki metropolitan area, in the South-eastern part of city of Espoo. It’s a peninsula of 1.68 km2 reaching in the gulf of Laajalahti. Today Otaniemi is mainly home for students of Aalto University and has a population of 2.500 people, mainly students and researchers. By 2030, the population of Otaniemi will increase up to 10.000 people and new land uses will be incorporated (offices, services, commerce, etc). Our goal was to plan the evolution of Otaniemi from the existing mono-functional campus to a multifunctional, vibrant and sustainable town. In this endeavor, we used nature as an essential resource an asset. Firstly, we analysed the existing biotopes of Otaniemi and we assessed the current state and performance of its blue-green infrastructure. Then we developed a strategic vision for Otaniemi highly informed by landscape and ecological issues. The result is a project in which new synergic interactions between nature and people occur in a denser and more diverse, resilient and sustainable Otaniemi.

For further information
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1. GREEN CLASSIFICATION FOR PLANNING

From biotopes to Green Types

At first, we categorized the nature of Otaniemi into 21 different biotopes, based on their openness and differences in species.

A biotope is an area of uniform environmental conditions providing a living place for a specific assemblage of plants and animals. In a biotope, different species and abiotic conditions are in deep interaction. Biotopes happen in microscale but they function as networks. In Otaniemi, they are impacted strongly impacted by daily human life, and many of them are partially artificial.

Then we continued analyzing the different conditions inside each biotope: the species, non-native and native, and their interaction with the abiotic conditions, soil permeability, organic matter, pH of soil and the water. Human influence, noise and maintenance level. After dealing with 21 different biotopes, we realized that some of them have similarities, and therefore it would make sense to combine some of them in order to get more clear and logical picture of nature in Otaniemi. Biotopes were categorized into 9 Green types.

Green conditions of Otaniemi in Summer and Winter

Pattern of green type
2. PROPOSAL FOR OTANIEMI IN 2030

From monofunctional campus to sustainable town

Otaniemi is located in Southern Finland, in Helsinki metropolitan area, in the South-Eastern part of city of Espoo. It’s a peninsula of 1,68 km2 reaching in the gulf of Laajalahi. Today Otaniemi is mainly home for students of Aalto University. By 2030, Otaniemi has turned into one of the flourishing and sustainable city centers of Espoo. The needed amount of squaremeters for new in-habitants was calculated so, that 40 m2 was reserved for each new inhabitant. Estimated amount for offices, retail and services was 180 000 m2, but since the 6000 m2 of shopping facilities in Väre was included, our number turned out to be 174 000 m2. Students, young professionals, couples, young families with children, visitors, and senior citizens are all new inhabitants to Otaniemi.

In the new phase of development, Otaniemi will face the challenge of climate change and social change from densification. The master plan proposal is an ecological urbanization plan build upon the response of the challenges. The vision is to create a sustainably city that the new dweller will enrich the social dynamic, while the campus is the core engine of creativity and collaborate with new offices and start-ups.

Master planning proposal

Buildings proposal

Walk-ability and transportation

Green gradient network

Denifcation massing and green

URBAN DATA

<table>
<thead>
<tr>
<th>EXISTING</th>
<th>VISION 2030</th>
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<tbody>
<tr>
<td>AREA</td>
<td>1.68 km²</td>
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<tr>
<td>DENSITY</td>
<td>2 321 hab / km²</td>
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<tr>
<td>POPULATION</td>
<td></td>
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<tr>
<td>TRANSPORTATION</td>
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<td>BUILDINGS</td>
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<tr>
<td>TEMPERATURE</td>
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<tr>
<td>GREEN INFRASTRUCTURE</td>
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</tbody>
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URBAN CONCEPT

OVERLAYING NETWORK OF PEOPLE AND GREEN

GRADIENT OF GREEN AND URBANISM

WALKABLE AND SUSTAINABLE CITY
3. GREEN INFRASTRUCTURE RESEARCH & ENHANCEMENT

The green infrastructure is studied by the biotope conditions and ecosystem service that each provided. These data are critical in the process of decision making in enhancing the green infrastructure, considering the growth of population and balance with the quality of nature.

Chart from biotope research
Chart from eco-system services study for green infrastructure

EXISTING

Existing fully-layered forest connectivity
Potential forest link
10M Edge of existing core forest
Habitat for smaller animals
20M Edge of existing core forest
Habitat for larger animals

Cultural ecosystem services
Supporting ecosystem services
Regulating ecosystem services
Provisioning ecosystem services

Cultural services are the best performing in improving the living quality of inhabitants. They are used to be assessed using ecosystem services.

They are important as they give the framework and support for other ecosystem services. Important as for the living condition include carbon sequestration and climate regulation, water management, purification of water and air, pest and disease control.

4. LEVELS IN THE GREEN GRADIENT NETWORK

PROPOSAL

Green infrastructure is enhanced by regrouping into four level of green beside on the biological value and ecosystem services that they provide for human. Each level of green in Otaniemi are improved based on their needs.

I Natural Network
II Semi-natural Network
1. Linked Forest
2. Seashore
3. Sessile
4. Semi-open Green
6 Urban Agriculture

III Horizontal Stepping stone
Vertical stepping stones are the gaps integrated to the buildings: green facade and roof garden. Green façade was a completely new type. Green roofs consist of urban agriculture, wild open area and semi-open area.

The maintained open area of Otaniemi is at a key location that connect the semi-open green patches and fully layered green patches. I quality of performing is very important. With this typology, we aim to provide some low vegetation of wild plant species to be a patch and to develop into quality semi-open space with some trees. I wild open area has little benefit to humans at the moment, regardless the regulating and supporting services that it provided. It can be transformed into green infrastructure that with higher provision services for human in building.

II Linked Forest of Otaniemi is the green infrastructure that has the highest performance of all originally. With the proposed master plan, we try to preserve the current status of services. More biological value is added while adding connections and turning scattered forest patches into part of the network. Even though we avoid blanding on the green infrastructure, we cannot retain the patch size in all places.

Therefore, we use smaller edges for larger core forest size and we try to lead the inhabitants through the core forest and smaller patches. In contrast, trampling which can turn core forest into an edge. The existence is low in this core type, and it becomes a place for exploring natural succession.

The maintenance of services is provided in Otaniemi: green facade and roof garden. Green façade was a completely new type. Green roofs consist of urban agriculture, wild open area and semi-open area.