

URBAN ECOLOGY LAB HEMBRUG

- Re-designing an industrial heritage landscape -

Reflection
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GRADUATION STUDIO 'REVITALISING HERITAGE'

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INTRODUCTION

The graduation studio 'Revitalising Heritage' revolves around the former military production site Hembrug. Since the re-opening of the terrain in 2018, Hembrug has been part of the development plans of the surrounding cities. Due to this re-opening, the following two questions for this graduation studio arise: 'What is the tolerance for change of this cultural historical site of Hembrug?' and 'What is the meaning of an ensemble of existing buildings in the context of planned urban development?'

In the MSc 3, the site and its context were analysed, to form a foundation for the design project and an initial design approach was pitched. The MSc4 elaborates on this design approach. The goal is to deliver an in-depth design project, substantiated by the executed research. This reflection is part of the graduation project and contains an answer to the question of how and why the design approach, defined in the MSc3, did or did not work, and to what extent.

REFLECTION

Graduation Project & the Master Education

This graduation project and the main topic that will be addressed derives from the context of the Hembrug terrain, in which the studio 'Revitalising Heritage' is placed. The problem statement, based on the initial site analysis, illustrated that the green and historical character of the Hembrug terrain may disappear due to the new proposed developments. The peninsula Hembrug is located between the expanding cities of Amsterdam and Zaandam. Because of its formerly closed function as a military production complex, the nature on the site and especially the ensemble named 'Plots in the woods' has been able to develop and grow without any human interference. Since its re-opening, Hembrug has become part of the expansion plans of the surrounding cities. These plans for extra housing and working spaces are pushing the greenery further outside of the city centres and putting pressure on the ecological quality of the area.

This led to the research question that will be explored in this project. 'How can the re-design of the heritage site of Hembrug facilitate ecological growth and increase biodiversity while contributing to the public awareness on the importance of preserving nature?' The combination of natural preservation and architectural design is a field that has been developing lately under the term 'urban ecology'. This research field ventures beyond the traditional approach towards ecology and introduces the city as an ecosystem of its own. 'Urban ecology' deals with questions such as: 'How to deal with the intensification of cities while improving the existing ecological systems?', 'How is the human health impacted by nature in the cities?' and 'What is the role of the architect in these new approach towards designing cities?'

The location of Hembrug lends itself perfectly to explore the theme of 'urban ecology'. Traditional ecological institutes, such as the NIOO-KNAW in Wageningen, are typically located in rural areas. However, as Kowarik (2011) states: "Cities can be richer in plant species, including in native species, than rural areas." Hembrug lays between two major cities which could serve as case studies, the site contains plenty of buildings for possible future expansion and is close to water and greenery which provide for testing locations and field labs. The posed program for the 'Plots in the woods' ensemble on Hembrug is therefore a research facility focussed on urban ecology.

The theme of urban ecology is strongly represented in the program envisioned for the area of Hembrug, but also in the design approach for the area itself. The landscape and architectural design should reflect this combination of nature with the existing built fabric and can be viewed as an experiment to test the principles of urban ecological design. The design needs to address these ecological issues while creating synergy between the heritage buildings, landscape of the Hembrug terrain and the new interventions. The combination of heritage architecture with a fairly new field of urban ecology may present some conflicts. However, it also seems the most relevant in the broader context of redesigning our existing cities. Architects will have to deal with the existing building stock when

developing our cities to contribute to a better ecological system. Unfortunately, there are not a lot of realized projects dealing with this matter yet.

However, the synergy between nature and buildings is a topic of interest for many students and staff at the TU Delft, but does not have a specific chair or department in the master program and faculty yet. Relations between the different tracks are however stimulated and beside input from the Heritage and Architecture tutors from the studio, also a Landscape Architecture tutor (Nico Tillie) has been willing to share his knowledge on the subject. So, while strongly related and derived from the studio of 'Revitalising Heritage', this graduation project theme searches to bridge the gaps between the different disciplines within the architectural education.

Graduation Project & The Wider Context

Designing with ecology is nowadays mainly attributed to the field of landscape architecture. However, the built environment takes up 13% of the surface in the Netherlands (CBS, 2016). If preservation of our natural resources and stimulation of the biodiversity are to be realized, then only focussing on ecology in the landscape architecture design is not going to be enough. To truly make an impact, architects need to recognize the fact that our buildings have a responsibility in preserving our environment. Although there is a rise in popularity, the framework of knowledge on ecological building design and urban ecology is still lacking. Especially knowledge on the development of ecological systems in the urban environment and the impact of the built environment on these systems is under represented. Currently urban ecosystems are already present in cities, as research has indicated. However, most urban species seem to be able to sustain in the small habitats that the urban context offers, but do not grow or develop outside of those habitats (Schilthuizen, 2018). Here the designer can make a difference, by in-cooperating ecological habitats for certain species in their project. This is not only beneficial for these species, but also provides a better environment for us humans. Mangone (2015, p.24) states: "The design of constructed environments has a significant impact on the performance

and value of building projects, from economic, social, and ecological performance perspectives. More specifically, the integration of microforests into office environments was found to yield a diverse range of building, worker, and ecological performance benefits." However, further research on ecological habitat design and experience are needed to fully implement the required knowledge into the daily practice of architecture.

The project results will attribute to this system of knowledge by examining the possible interventions in the existing built fabric in relation to the topic of urban ecology. However, as the graduation project is purely hypothetical, the actual impact of the interventions can not be monitored. Further research in the field of urban ecology will require testing sites and design projects that will be realized, especially related to the existing fabric of our cities.

Research Methods

The following methods were defined to execute the research and design.

- *Literature studies* on the topics of ecological regeneration, drosscapes, circular materials and biodiversity in cities/buildings and urban ecology. These will provide the necessary background information to make balanced and well-informed design decisions.

Elaboration: During the literature research, a lack of knowledge in the integral field of urban ecology was encountered. With ecology being an entire field of study in itself, it was not possible to get to the level of depth on an ecological scale that was aimed for in the design project. Support from landscape tutors was helpful, but for a fully substantiated ecological approach, an actual ecologist would have to cooperate in the design process.

- *Case studies* of both landscape and architectural projects will be used to investigate the possibilities of ecology focused re-design. The selected case studies will, as far as possible, be visited to experience the implications of the design decisions first-hand. These experiences will help to determinate which interventions were found to be successful and could be useful to implement in this

graduation project.

This extends to multiple site visits of the Hembrug terrain itself through the course of the graduation project. Dealing with landscape means dealing with variations during the passing seasons and the re-design should work within all these variations.

Elaboration: Unfortunately, no project was found that entails all aspects of the research in one approach: heritage architecture, ecological approach, similar program and scale. The case studies are still useful, however this does confirm that the field of urban ecology is still developing and that more testing is required.

- *The value assessment method* (Kuipers & de Jonge, 2017) supported by the historical analysis of the site will provide means to achieve a synergy between old and new. The value assessment method is general practice in the field of Heritage and is essential to create a balanced design approach and will therefore also be incorporated into this project.

Elaboration: Revisiting these values later in the design process helped to maintain a clear direction and to make choices between certain interventions. It provided argumentation for decisions that were otherwise more 'instinct'-based, creating a solid base for the project. However, it did clash with the ecological and sustainable intentions on several occasions (further elaborated in the chapter 'Ethical Issues & Dilemmas').

Research & Design

By definition, urban ecological design is research based design. The research methods mentioned before showcase the influence of research in this design project. Ecological systems are very complex, which means that the outcome of certain interventions in these systems can not always be accurately predicted. Many ecological design projects are therefore still 'trial and error' based. Design projects can be monitored and adapted to ensure the desired outcome. This will require local testing sites, to truly adapt to the local ecosystem.

Within this project, the ecological impact can only be hypothesized, due to lack of real life testing possibilities. The supporting research does

however provide a solid base to explore this theme. Therefore, the compatibility of the urban ecology design principles with the heritage design principles will be explored, as described more in-depth in the next chapter.

Ethical Issues & Dilemmas

The impact of interventions in ecological systems presents an ethical dilemma in itself. As stated by Koster (1998) in *Architecture for Nature*, "Nature development is dominated today by such desperation for tangible results that people often do not have the patience to consider why [certain species] disappear". This means that even for trained ecologists it can be difficult to determine the outcome of their interventions and extensive measuring is often required. For a layman in the field of ecology, these implications are even more complex to comprehend.

As predicted while introducing the graduation topic, ethical dilemmas especially occurred in the design phase, when the before mentioned research had to be implemented. The preservation mentality commonly present in the field of Heritage & Architecture has on several occasions clashed with the interventions led by a wish for a sustainable and ecological approach. While the value assessment method from the chair of Heritage & Architecture works well with the buildings and landscape in itself, the ecological qualities and potential of the area could not be measured in a similar way. Therefore, when combining the two, it becomes difficult to make informed and balanced decisions. Besides that, ecology driven design is very location specific, similar to heritage design. One approach may work very well on location A, but not at all on location B. This meant that in the graduation project different approaches on both building and ecology scale are implemented on different building locations.

In practice the location specificity means that a lot of initial research is needed to determine the design strategy that is 'most likely' to work. Sharing of knowledge between trained ecologists and spatial designers is key. This does however mean that the role of the architect might change. As ecologist Nico Wissing posed during the symposium 'Natuur-inclusief Bouwen' (2019), the design process should

be inverted. Instead of starting with the client and spatial designers (including urban planners and architects), the ecologist is at the head of the project. He or she does the site-specific research and formulates a plan that benefits the ecological system the most. Only later in the process, the architects become involved. As a student of an architecture faculty, this statement presented an ethical dilemma. To be able to remain involved in the outcome of a design, the architect should learn more about the impact of the built environment on ecology and would require a different mindset in cooperating with other parties. As a result, the role of the architect would change to a less dominant and influential position.

CONCLUSION

During this multi-disciplinary graduation project, the limitations and clashes of the ecological theme within the context of Heritage Architecture became clear (as described in the previous chapters). These limitations and clashes translate to the real-life practice of architecture, as these integral projects require knowledge from many different research fields.

In the graduation project, the feedback from the tutors (architectural, technological and landscape) helped to more closely pinpoint the programmatic approach and the spatial relations between the buildings and landscape. This required more research in the field of ecology and in similar programmatic projects. The research revealed a complex system of functions with different mutual relationships which each need an individual climatic approach. This also influenced the overall sustainability concept of the whole ensemble, circling back to one of the core principles of urban ecology 'benefiting both nature and humans through design'.

To conclude, while under development, the integration of urban ecology in the field of architecture has benefits for both the users of the built environment and for the local ecosystems. The period towards the P5 presentation will be used to spatially visualize this beneficial relation between nature and people in images and models.

SOURCES

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