Reflection

Architectural Engineering Graduation Studio
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My fascination for the combination of nature and architecture was there in my studies from the beginning. The first dilemma was: will I study architecture or landscape architecture? I started my studies in Landscape architecture in Wageningen and then decided to switch to Architecture in Delft for my masters, because of personal interest and to have knowledge of both topics. To be able to investigate what it means to combine architecture and nature was a really exciting thing to look forward to in my graduation project.

In the research, I formulated what nature inclusive design means to me. I found that in the field of architecture ‘nature inclusive design’ is relatively new and therefore the definition is vague; it can mean all sorts of things, but it is mostly focused on plants on buildings. For me it is important that my design focuses on both flora and fauna, and the architectural requirements to provide a qualitative habitat in my building envelope. I thought that I would find examples of this type of nature inclusive architecture that would inspire me and provide me with elements and principles I could use for my design. However, almost no building checked all the boxes in my research and this was really disappointing. One criterion that might have caused this is that I wanted the selected projects to be realised to check the influence of the building on the environment. Because nature inclusive design is relatively new and the ambition to include both plants and elements to house animals too, there are a couple of projects that are yet to be realised that can be inspirational.

The research therefore mostly focuses on a general overview of architectural interventions to house animals and implement plants, and a more specific understanding of the environmental requirements for the habitats of local animals. The results from the research function as basis input for the design. The shape of the volume creates a roof top park, of which the height is informed by behaviour of insects. The green walls are all differently orientated, which creates different climates and allows for different types of vegetation to grow on each orientation, therefore creating a variety in habitats. The overall height of the building is also based on the behaviour of animals. Bats and most birds nest until approximately 50 metres high. Way above this remains only nesting for peregrine falcons, as high as possible.

Nature inclusive design and/or trying to create a natural environment in the built environment is very much an assignment for (landscape) architects and urbanists. Architects create spaces for humans, buildings. They create spaces that are pleasant and safe. The natural environment provides ecosystem services that can contribute to the comfort of the human living environment. Because of densification and the pressure on urban greenery, the role of planners and architects in conserving or reintroducing nature in the built environment for the improvement of the comfort of the living environment, is increasingly significant.
By investigating urban ecology, ecosystems and habitats, one can learn what is missing in the existing environment, and what can be added through nature inclusive design in order to provide qualitative space for (endangered) flora and fauna. I think nature inclusive design is

a multidisciplinary performance. I would say that to acquire all the specific information on ecosystems, species and requirements is not necessarily a task for architects, but how to implement this in a correct manner in a building that can function well for humans is.
I enrolled for the Architectural Engineering graduation studio because of my interests in timber construction and the natural environment, and the freedom this studio would offer in choosing my own topic for the research. My focus on nature inclusive design was prefered over the plan to investigate timber construction, so I would say that my graduation project does not link to my studio's technical part as much as to the societal challenges part. Because of the high density of the context and the ambition to include for the larger part a residential function, the project is part of the 1 Million Homes topic. However, the goal of this project was not to create as many residential units as possible, but to create a desirable living environment with a focus on nature. My research into nature inclusive design in the end is an inventory of the general and species-specific architectural interventions and requirements. The final design is a building where the most important aspect is the livability for both humans and fauna in a densely built environment, where the requirements for the natural environment dictated the first parameters and the human requirements finished the design.

In AE there are three main research domains: make, flow and stock. I did not perform research to make my own nature inclusive element, and I did not investigate how to renovate or redesign an existing building in a nature inclusive way, so I find it difficult to link my project to one of the three domains. A part of the research was to investigate the life cycle of animals and what their behaviour and environmental requirements are. In the end I want to be able to conclude whether my building performs as desired within the natural environment; as a stepping stone, connecting the natural areas in the Brettenscheg. But personally I feel like I can not really place my project in the flow domain. My research covered a lot of topics, because of the small parts that could be elaborated and worked on separately.

The research is first of all an overview of the possibilities in nature inclusive design in architecture. It is information gathered from prominent dutch organisations and websites in the field of flora, fauna and nature inclusive design. The information used is therefore trustworthy and of scientific relevance.

My approach for the project can be used in other projects as well, although the results are probably not the same, because of the site-specificness. Before starting the design, perhaps together with a contextual analysis, the architect/team could research species that are desired or present in the area, and the elements these species need in their surroundings for survival. The outcome of this research will give the first input for the design and then the design can be informed by other factors such as target group or target function of the building, and the requirements connected to that. Not every nature inclusive building has to have large green facades, in my opinion, as long as the surroundings meet the needs of the target species and the building plays a role in the settlement of the target species in the area.

I do not think I have encountered ethical issues in my research, for it is an investigation of the currently available interventions for nature inclusive design and I did not include or exclude specific elements because of ethical reasons. I did not design an element or method, but in the end only added the (in my opinion) best suited options from my research

into my building's design. However, the implementation of these options did bring some dilemmas. For example: Nesting boxes are not placed near windows. And to create a natural environment, as large as possible surfaces should be used for the implementation of plants. But the function inside of the building is human use, mainly residential, so there is a need for natural daylight inside the building. What is the balance between fully closed and glass facades? Where can nest boxes be implemented? What parts can be covered with vegetation?

It would be very helpful, I think, for future architects and other actors in nature inclusive design to have a central information/data point, where the local biodiversity of a project (animal and plant species) can be linked to architectural interventions and spatial requirements, that the designers can use as tools in their design for a project. My graduation project has been a first attempt to combine the information of various sources in one report, but there is much more information out there that, when put in one place, can have a significant impact on the way we build our cities.