Reflection

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ADVANCED HOUSING | REGENERATIVE HOUSING

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Embarking on this project to integrate architecture and biodiversity in urban environments has been a transformative experience, both professionally and personally. At the start of this journey, my understanding of urban ecology was limited. I approached the concept of biodiversity through a surface-level lens, focusing on incorporating greenery into built environments. While this seemed like a straightforward solution, it quickly became clear that such an approach risked falling into the trap of greenwashing—an aesthetic rather than substantive integration of nature. Recognizing this, I pivoted towards a deeper, more systematic understanding of biodiversity and its relationship with architecture. This shift formed the backbone of my research and design process.

Background

The purpose of this study was to gain in-depth insight into nature-inclusive construction, a topic that increasingly captivated my interest during my academic journey within the Faculty of Architecture. In previous study periods, I had delved into various facets of this subject, including biobased construction and sustainable building renovation. Nature-inclusive measures had frequently served as a starting point for various design challenges. This specific studio, focused on inner-city densification, presented additional challenges, and consequently, more interesting aspects, due to the convergence of contemporary dilemmas in reshaping our living environment. These dilemmas included socio-economic issues in certain urban neighborhoods, as well as challenges related to climate issues such as water overflow and heat stress. The awareness of a housing crisis in the Netherlands added an extra dimension to the complexity of urban issues, accentuated by urbanization.

These issues raised intriguing questions for me, particularly about the appeal of urban living and my own preference for a small town on the periphery of the Netherlands, located in the head of Overijssel. This location, surrounded by greenery and characterized by strong social cohesion, embodies elements that I miss in the urban environment. These personal considerations led to intrinsic questions about this studio and the densification challenge in the Rotterdam district of Groot IJsselmonde. My ideal living environment was quickly defined as a green living space with significant social cohesion, becoming the leading theme and goal of my research.

Integrating these diverse issues into a comprehensive research question proved to be a challenging task. For this reason, I chose to focus the research question specifically on the outcome of the research, namely a regenerative design that could serve as a solution to all problems in the Groot IJsselmonde district.

Initial Assumptions and Challenges

Initially, I believed that incorporating nature into housing could follow established frameworks and examples. However, I soon discovered that existing case studies often lacked the ecological depth needed to support sustainable biodiversity. Many focused on visual or recreational aspects of greenery without addressing the needs of specific species or ecological systems. This gap presented both a challenge and an opportunity: to create a design methodology that went beyond tokenistic greenery and addressed the ecological, architectural, and social dimensions of urban living.

Recognizing this, I decided to focus my research on the flora and fauna of urban environments, creating case studies tailored to the species that thrive in these spaces. For example, by studying the habitat requirements of the house sparrow

and insects in detail, I was able to design interventions that catered specifically to their needs. This approach grounded my project in ecological reality, allowing me to move beyond abstract principles and into actionable strategies.

Despite this focus, I also had to grapple with the sheer complexity of biodiversity. Early in the process, I fell into a rabbit hole of exploring the intricacies of biodiversity in the city. The more I learned, the more I wanted to understand its layers and dynamics. However, I eventually realized that even for ecologists, this is an exceptionally complex subject. Rather than positioning myself as an ecologist, I needed to act as a connector—someone who could translate ecological complexity into clear, actionable design strategies for architecture.

Key Insights and Methodology

One of the most significant realizations during this project was the importance of variation in fostering resilient ecosystems. Through literature such as Darwin in de Stad and Stadsnatuur Maken, I came to understand that ecological resilience depends on diversity—of species, habitats, and spatial configurations. Translating this principle into architecture meant creating diverse housing typologies and layouts that reflected the needs of both humans and nature.

This emphasis on variation informed the concept of terraced landscapes, where each level supports a distinct biotope. By layering habitats and connecting them through ecological corridors, I sought to create a built environment that mimics natural ecosystems while fostering human interaction with nature. However, achieving this required a significant methodological shift. Instead of applying existing solutions, I had to develop new strategies based on the ecological needs of the species I studied. For example, the Garden Biotope was designed to cater to active users and songbirds like the house sparrow. Features such as raised planters for gardening, and integrated nesting spaces emerged directly from my case studies on urban flora and fauna. This approach ensured that the design was not only ecologically informed but also adaptable to the specific conditions of Groot-IJsselmonde.

Challenges and Opportunities

One of the recurring challenges during this process was the lack of concrete examples of successful nature-inclusive architecture. While many projects claimed to integrate biodiversity, few offered detailed insights into their ecological or architectural strategies. This forced me to rely on theoretical research and iterative experimentation, which, while rewarding, often felt like navigating uncharted territory.

The socio-economic context of Groot-IJsselmonde introduced a complex yet enriching layer to the research and design process. As a post-war district characterized by economic challenges and monotonous housing typologies, the area required a careful balance between ecological ambitions and social realities. While the ecological interventions aimed to foster biodiversity and resilience, these needed to align with the affordability and needs of the residents, many of whom face economic constraints and may have limited interaction with nature in their daily lives.

This balancing act brought an additional dimension to the project, which often felt challenging to navigate. The diversity I aimed to introduce—through varied housing typologies, ecological corridors, and interactive green spaces—needed to serve both the ecological systems and the social fabric of the neighborhood. For instance, introducing communal gardens and biotope-specific habitats required

careful consideration of how they would be perceived and utilized by the residents. Would they feel ownership and connection, or would these spaces feel imposed and inaccessible?

Reflecting on this, I see opportunities where I could have bridged this gap more effectively. Engaging with the current residents through surveys or interviews about their connection to nature might have provided valuable insights into their needs, preferences, and willingness to engage with biodiversity initiatives. For example, understanding whether residents already value green spaces or what barriers they face in accessing nature could have informed more targeted and inclusive design strategies.

Similarly, connecting with local experts, such as ecologists familiar with the area or bird enthusiasts who observe the district's avian population, could have deepened the ecological relevance of my design. These perspectives would have offered invaluable site-specific knowledge, enriching the project with nuances that are difficult to grasp through literature alone.

This lack of direct engagement—both with residents and ecological specialists—is something I would address differently in future projects. The socio-economic realities of Groot-IJsselmonde highlighted the importance of not only designing for communities but designing with them, ensuring that ecological goals align seamlessly with social and cultural contexts.

Personal Growth and Development

Reflecting on my growth during this project, I recognize how much my perspective on architecture has evolved. Initially, I viewed architecture as a framework for human habitation, with nature as an accessory. Now, I see it as a mediator between humans and ecosystems, capable of fostering symbiosis and resilience. This shift in perspective was shaped not only by theoretical research but also by the iterative design process.

This process taught me the importance of adaptability and collaboration. By embracing a role as a connector rather than an expert in biodiversity, I was able to focus on translating ecological complexity into design strategies that are both practical and impactful. For example, designing multi-functional elements like vertical greenery, water-sand cascades, and nesting spaces demonstrated how architecture can simultaneously serve human and ecological needs.

Time management was another area where I encountered difficulties. Early in the process, I underestimated the time needed for ecological research, focusing instead on architectural solutions. As a result, I had to revisit foundational ecological principles midway through the project. In future endeavors, I plan to allocate more time upfront to understanding the ecological context, which will provide a stronger foundation for design iterations.

This project has reshaped how I view the role of biodiversity in architecture. Moving forward, I believe biodiversity must be treated as a fundamental stakeholder in every architectural project, not as an afterthought or an addition during the final phases of design. Just as human users influence the design process through their needs and behaviors, the requirements of flora and fauna should also be carefully considered from the very beginning.

Integrating biodiversity throughout the design process demands a shift in mindset. It requires architects and planners to approach each project with an understanding that buildings are not isolated entities but part of a larger ecosystem. For future projects, this means involving ecological considerations at every stage—from

site analysis and initial concept development to material selection and detailing. For example, understanding the nesting habits of birds or the migration patterns of insects early on can inform decisions about façade design, green roofs, or the orientation of outdoor spaces.

Collaboration will also play a key role in this vision. Partnering with ecologists, biologists, and local wildlife experts can provide site-specific insights that are critical for designing habitats that truly support biodiversity. Engaging communities, especially in urban contexts, will ensure that these ecological interventions align with the social fabric and create spaces where both humans and nature can thrive.

Additionally, I aim to develop new tools and frameworks to integrate biodiversity into architectural practice more systematically. These could include guidelines for creating species-specific habitats, modular design strategies that accommodate natural systems, or participatory models where residents contribute to biodiversity initiatives.

Ultimately, this approach challenges the boundaries of what architecture can achieve. By embedding biodiversity as a core stakeholder in the design process, we can create environments that are not only habitable for humans but also support vibrant, resilient ecosystems. In doing so, architecture becomes a facilitator of coexistence and adaptation, contributing to a future where urban spaces benefit all forms of life.