

Graduation Plan

Master of Science Architecture, Urbanism & Building Sciences



Graduation Plan: All tracks

Submit your Graduation Plan to the Board of Examiners (Examcommissie-BK@tudelft.nl), Mentors and Delegate of the Board of Examiners one week before P2 at the latest.

The graduation plan consists of at least the following data/segments:

Personal information	
Name	Annelies ter Pelkwijk
Student number	4358147

Studio	
Name / Theme	Urban Ecology & Eco-cities
Main mentor	Nico Tillie
Second mentor	Els Bet
Argumentation of choice of the studio	<p>Why I have chosen for the urban ecology & Eco-cities is firstly because of what it says in the semesterbook;</p> <p><i>"UECL is a novel cross domain lab which uses the lenses of urban ecology to improve quality of life and environmental performance in cities through planning, design and engineering."</i></p> <p>I find it very interesting to use ecology as a basis to improve the built environment. Not only because nature is very healthy for the people but also because we see the decline of biodiversity happening all over the world which can have enormous consequences for nature but also for the people. Looking through the lenses of urban ecology will give nature a strong basis in the design.</p> <p>Secondly nature often does not have a voice only when it is represented by a party or action group. In developments there are stakeholders which are involved who have a say in the development how the development is being built and with what aspects should be taken into account. These stakeholders are often the municipality, the developer, project manager, and maybe someone who represents the people who will become the users or who will be the future neighbors. But nature is often not seen as a stakeholder. Within this studio I hope I can design more from the point of view of nature and use nature as a base for designing. Because designing with nature and making sure nature is included and even plays an important role will give benefits not only for nature but eventually also for the people.</p>

Graduation project	
Title of the graduation project	<p>MAKING GREY GREEN</p> <p>Redesigning business parks as an additional step to bringing back biodiversity in these areas and to the city</p>
Goal	
Location:	Spaanse Polder and North-West Business park Rotterdam
The posed problem,	<p>Biodiversity loss</p> <p>Biodiversity is declining worldwide (Lavery et al., 2008). Next to the fact biodiversity is declining because of population growth and the rising demand of goods there are five main reasons why the biodiversity is declining (Millennium Ecosystem Assessment, 2003). These are; habitat</p>

	<p>destruction, invasive species, overexploitation, pollution, and climate change (Laverty et al., 2008; Millennium Ecosystem Assessment, 2005).</p> <p>Densification Because of the population growth the cities are densified. There is an enormous shortage of housing in the Netherlands, right now there is a housing shortage of 300.000 according to onderzoeksbureau ABF Research (NOS, 2021). This means there is a need for new housing where the natural environment has to make space for the built environment. And not only is nature replaced by buildings for densification, with this densification there is the urban heat island and the floodings which have a bad influence on the health of the people.</p> <p>Business parks Business parks are large areas which are often situated on the border of the city this is because in the 1950s business parks were seen as polluters of noise and air and had to be moved to the border of the city (WUR, n.d.). These business parks are made for the purpose of doing business from office jobs to heavy industry which did not leave a lot of attention for green spaces. And because these business parks are often situated on the border of the city between the green and the city they form a barrier for the green to go into the city. Which makes the business park one of the reasons for spatial fragmentation of habitats.</p> <p>Our population is growing, the demand for resources is rising and with this our cities are densifying and biodiversity is declining. Business parks are large grey areas who add onto the urban heat island and the floodings and who form barriers for the city and the green. The aim of this thesis is to find creative solutions to bring biodiversity into business parks and together with this creating corridors towards the city and improving the well-being of nature and people.</p>
<p>Research questions and sub-questions</p>	<p>Main question: How to redesign business parks to enhance biodiversity on-site and with this also creating a corridor towards the city?</p> <p>Sub-questions</p> <ol style="list-style-type: none"> 1. What are the different types of business parks and why are they important? 2. What is biodiversity and why do people need it and how can we restore and protect biodiversity on a business site? 3. Which structures form threats or opportunities for the ecological network in and around the business park? 4. What are corridors and how can they be created and connected to the ecological networks? 5. What are design solutions to enhance biodiversity on a business site, from the smaller scale to the larger scale? 6. How can these design solutions make it interesting for the business parks owners to invest in it?
<p>design assignment in which these result.</p>	<p>Having multiple design solutions on three scale levels for the business parks to enhance biodiversity.</p>
<p>Firstly some of the sub-questions are for background information. The first two questions will answer the question of what is biodiversity and what are business parks. The third and fourth question is about analysis of the existing structures and how to connect them to make ecological networks this will be a back and forth of designing and researching. The fifth question is the actual design assignment where design solutions for the business park on different scale levels from a small scale of</p>	

small initiatives on-site to large design solutions of how to connect the green structure which has been created on the business site to the surrounding ecological networks. And the last question is about the feasibility of the project, why would business park owners want to invest in these initiatives. Where this question comes around on multiple moments while answering the other sub-questions.

There will be multiple design solutions for the different scale levels to be able to compare the solutions which have been designed. Using case studies of other business sites and how they tackled biodiversity restoration on their site will help with creating these multiple designs.

Process

Method description

There will be 7 different methods used in this thesis. Every method is linked to the sub-questions where this method will be used to answer the question.

Methods used in this thesis are:

1. Literature review
2. Mapping
3. Fieldwork
4. Case studies
5. Stakeholder analysis
6. Scenarios
7. Feasibility analysis

Literature review

The literature review is important to have a base of knowledge about the subjects the thesis is talking about. With the help of the literature, knowledge, definitions, and methods will give an efficient backbone to the thesis. Using knowledge and research of other people is very useful to find the right answers to the questions that have been asked. The literature review will never stop thinking about the process. There is always a need to understand something new which has been found later in the process. This is also why all the sub-questions are linked with this method.

Mapping

Creating maps for the existing habitats and the business parks gives a basis for the thesis. These maps can be used to show the threats and opportunities of the habitats and the business parks. The mapping will be done on different scales from the scale of the Netherlands to the local scale. Every time a switch of scale to a smaller scale more details will be fishable. This detail is needed to base the designing process on. This means the mapping needs to be as elaborated as possible before the design of these business parks can happen.

Fieldwork

Fieldwork will give first-hand information about the site that will be investigated. It is a continuation of the mapping where the information is gathered and compared to the real situation on site. Fieldwork can give more specific details to the mapping method.

- In the summer holiday some field trips will be done to gather research and information about the location.

Case studies

Case studies will give an understanding of the possibilities and threats there are for different sites. The downfall of case studies is that it is never the same as the location the thesis is tackling. Case studies can give a first impression of different design ideas and how they have implemented these. Because case studies have often already been executed the results can be seen not only after a month but after a few years.

Case studies that can be used are;

- Chiswick Park in London

This is a business spark which is already been realised

- Area Wijkevoort

This is an area where a business park is going to be realised and there has been researching done to make this business park inclusive with nature

- High tech campus in Eindhoven

This is an business park which has a lot of initiatives with biodiversity

Stakeholder analyses

Knowing which stakeholders are intertwined in the process is important. Every business park has one owner or multiple owners. Knowing which parties are involved in the location will help with managing and executing the design solutions. If the owners are interested in bringing back biodiversity to their site, that will make the process a lot easier in comparison to owners who do not want to know anything about biodiversity.

Scenarios

Making scenarios for the site can help with different solutions. Having multiple options for a site can be useful. This will make the design solutions more diverse and give more possibilities. This could also be dependent on the stakeholder analyses. Scenarios should be made more at the end of the process. Once you have most of the information and solutions that need to be presented different scenarios can be made.

Feasibility analysis

A feasibility analysis is needed to see if the design solutions which will be made are feasible. The method which will be used to make the analysis still has to be chosen. This method is important for the actual possibility of the design to be implemented. Making a design and researching if the designs can be fulfilled gives added value to this thesis.

Literature and general practical preference

For the knowledge and literature of biodiversity, ecosystem services, and human well-being reports from the Millennium Ecosystem Assessment have been used and will be used further.

Using the reports and the site of the municipality of Rotterdam also helps in understanding where the city of Rotterdam wants to go to in terms of biodiversity and nature inclusive design.

Other knowledge can be gained from articles and books and the knowledge of the mentors will be used on the area of ecology/biodiversity and design.

Reflection

1. What is the relation between your graduation (project) topic, the studio topic (if applicable), your master track (A,U,BT,LA,MBE), and your master programme (MSc AUBS)?

The relation between my graduation topic and the studio is that the studio takes up designing through the lens of urban ecology, which is how I am tackling my topic. My topic is about redesigning the business parks to enhance the biodiversity on-site. Where biodiversity and the ecological networks are central to the design.

How my topic relates to the master track urbanism is because of the urban design solutions which will be made on different scale levels. Initiatives on the small scale will be implemented and these initiatives are connected to larger green structures to eventually connect these to the ecological network outside the boundaries of my location site.

2. What is the relevance of your graduation work in the larger social, professional and scientific framework.

Scientific relevance

This thesis topic is a fairly new topic, there has been a lot of research about biodiversity and the use of it but in combination with business parks, there has not been a lot of research yet. Because business parks are spaces meant for business and work there has not been a lot of research done to enhance the biodiversity and certainly not yet by creating corridors.

Most literature reviews about business parks are about how to make them more sustainable. Snep et al. (2009) has done research about enhancing biodiversity on business sites and came up with multiple scenarios. But this study only focuses on the site itself and not on its surroundings.

This thesis focuses on how to enhance biodiversity on different business parks typologies with also taking into account the surroundings. The different design solutions on these business park types on different scales can give a new insight into how other business parks could also enhance their biodiversity.

Societal relevance

With the enhancing of biodiversity on business parks and with this creating a corridor towards the city there are not only environmental aspects which will become better but also the social aspects. This because the presence of green has a positive effect on our human well-being and our health. There are more studies that show the effect of green is positive on people.

This thesis not only wants to add green to the business parks so the people who work there can have a better surrounding with green but this green on the business park functions also as a corridor towards cities. Which has as effect that cities can also become greener. There is not a rule for how much green there is needed in the built environment but Konijnendijk van den Bosch (2021) came up with the 3-30-300 rule where 3 trees should be seen from every house, 30 percent of canopy cover in every neighbourhood, and there should be a park no further away than 300 meters from your home. There is maybe not an exact rule of how much green there is needed but the knowledge of the positive influence green has on people is known.

Especially in times of a pandemic where people have to self-quarantine or can not go to the park, it is important to have green close to your home to feel connected.

Ethical considerations

The ethical considerations in this thesis are mostly focused on who is going to pay for it and who will have the benefits of the added green. If the green is added to the business parks and with this, the biodiversity has enhanced the people who work on these business parks will get to enjoy this green. There is no social group that will be overlooked if neighbourhoods will be greenified that only the rich neighbourhoods can pay for this.

By bringing biodiversity back to the business parks these areas will become better resilient to heavy rainfall and will not contribute to the urban heat island which will make it safer and a more enjoyable place to work. If these business parks are used as corridors to bring the green into the city they will also have a better effect on the neighbourhoods these business parks are next to.

References

- Konijnendijk van den Bosch, C. (2021). *Promoting health and wellbeing through urban forests – Introducing the 3-30-300 rule*. Retrieved April 8, from <https://www.linkedin.com/pulse/promoting-health-wellbeing-through-urban-forests-rule-cecil>
- Lavery, M., Sterling, E., Chiles, A., & Cullman, G. (2008). *Biodiversity 101 (Science 101)* (First Edition). Greenwood.
- Millennium Ecosystem Assessment. (2003). *Ecosystems and Human Well-being: Current state and trends, Chapter 1 MA Conceptual Framework, 25-36*. Island Press, Washington, DC.
- Millennium Ecosystem Assessment. (2005). *Ecosystem and Human Well-being: Current state and trends. Chapter 4 Biodiversity, 77-122*. Island Press, Washington, DC.
- NOS. (2021, February 17). *Schreeuwend tekort aan woningen, wat moet eraan gedaan worden?* Retrieved March 23, 2021, from <https://nos.nl/artikel/2369109-schreeuwend-tekort-aan-woningen-wat-moet-eraan-gedaan-worden.html>
- Snep, R., Van Ierland, E., & Opdam, P. (2009). Enhancing biodiversity at business sites: What are the options, and which of these do stakeholders prefer? *Landscape and Urban Planning, 91*(1), 26–35. <https://doi.org/10.1016/j.landurbplan.2008.11.007>
- WUR (n.d.). *Green business park works better*. Retrieved March 23, 2021, from <https://www.wur.nl/en/article/Green-business-park-works-better.htm>