

Graduation Plan

Master of Science Architecture, Urbanism & Building Sciences



Graduation Plan: All tracks

Submit your Graduation Plan to the Board of Examiners (Examencommissie-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	Ruben Koppes
Student number	4727681

Studio		
Name / Theme	Architectural Engineering – Harvest	
Main mentor	Mo Smit	Design tutor
Second mentor	Pierre Jennen	Research tutor
Argumentation of choice of the studio	I chose the studio architectural engineering because the studio gives the opportunity to improve myself as an architect with the ability to develop certain ideas, fascinations, or presumptions into technical and practical design solutions on how to build and realize these ideas. With the intention that I, as an architect, can contribute to the build environment with innovative ideas.	

Graduation project	
Title of the graduation project	The integration of forest ecologies into the urban environment
Goal	
Location:	Amsterdam IJburg Buiteneiland
The posed problem,	In today's world, time seems to be moving faster and faster with cities growing exponentially in size and human inhabitants (Bairoch & Braider, 1988). As a result, land and resources are devoured to enable the growth of these continuous cities. Due to the urbanization, digitalization and people tending to have a busier schedule, the relation between man and nature has been displaced, in which we outsource nature and non-humans to places outside the city (IVN, n.d.). The rapid urbanization and growth of the continuous city pressure the surrounding landscape and the urban landscape, often neglecting the existing

	<p>ecologies. Architecture has the potential to battle the continuous city, through multiplying the places for the generation of plant biodiversity and wildlife within the denser urban areas. However, this alone will not be enough to limit the pressures of urbanization, therefore there is a need for "urban forestry" where architecture is not just a frame or focal point for nature, but which is created together with it, becoming inseparable. As space in urban environments becomes more precious, planning for a nature inclusive infrastructure needs to be considered using a multi-layered approach.</p>
<p>research questions and</p>	<p>How can urban ecologies and forest ecologies be integrated?</p>
<p>design assignment in which these result.</p>	<p>The topic of the graduation project is the integration of forest ecologies in the urban environment. The design assignment thereby focusses on the architectural and ecological relations with native wetland forests (riparian forest/broekbossen).</p>
<p>Buiteneiland is an artificial island which is going to be constructed in the IJsselmeer. The presence of water and the existing ecological structure of the IJsselmeer influences the structure of Buiteneiland. Whereas historically in the Netherlands water was kept out of the inhabited area, Buiteneiland embraces the water and explores new housing typologies and the benefits of water that go hand in hand with the urban environment.</p> <p>Due to the decreasing supply of fresh water from the Rhine and the IJsselmeer, together with the increasing amount of saltwater penetrating through the bottoms of the polders and the locks at IJmuiden, there is less and less fresh water available in Amsterdam. The problem of salinification and the decreasing availability of freshwater not only applies to Amsterdam but to all the Dutch coastal provinces. The reuse of fresh water and desalination via purifying forests could be part of the solution. "Cities can combine green water purification with the collection of extreme rainfall events," states Huub Rijnaarts, Professor of Environmental Technology at Wageningen University.</p> <p>Besides less availability of fresh water in the region of Amsterdam, the surrounding landscape also has many problems caused by oxidating peat lands, for example in 'het groene hart' or 'waterland'. It is subsiding and produces a substantial greenhouse gas contribution through CO2 and methane from peat decomposition and cow manure, livestock farming is economically weak, grass with cows looks like nature but is poor in biodiversity, the water boards are having increasing difficulty keeping the polders dry, a lot of fresh water is needed to combat salinisation, pile rot is threatening homes and the soft soil is difficult to inhabit. In short, there is a need</p>	

for more wetlands in the Netherlands to counteract these problems. Therefore, central to the design, is the characteristic wetland forest, which has the ability to purify water and can provide an alternative solution for the oxidating peat lands. The design and engineering assignment aims to be an architectural experiment on how to design an ecological and integrated neighbourhood in a wetland forest.

Process

Method description

To integrate forest ecologies into the urban environment, a schematic diagram developed by the European Environment Agency (appendix I), is used to research the ecological relations within the urban environment. The diagram divides the urban environment into three sections, first, the societal aspect, which is considering the individual and its ecological awareness. Secondly, the urban technical system including buildings, transport, energy, water, and waste flows, and lastly the environmental aspect on local, regional, and global level. In the research each sub-chapter represents a section of the urban environment. In the first sub-chapter the embedded and interconnected ecological relation between humans and non-humans are researched through a literature study into the work, environmental ethics and ecological approach towards architecture and the individual of Friendsreich Hundertwasser. Secondly, urban ecologies and the urban technical system are researched and schematized through another literature review of data sheets, together with interviews with Geert Timmermans, city ecologist of Amsterdam, and Jeroen Jacobs, landscape architect at DELVA. Whereafter, forest ecologies, planting methods and local soil and tree species are researched through a literature study and an interview with Jeroen Jacobs. Finally, the qualitative data and schematics are used to link and integrate ecologies and flows to create circularities, a sustainable, resilient urban forest, and an integrated social community on a neighbourhood scale.

Literature and general practical preference

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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 graduation project focusses on urban forestry and the integration of ecosystems in a wetland forest landscape. To construct buildings in a wetland forest, while maintaining, creating, or recovering the landscape, requires a new innovative approach towards architecture and engineering. Should the buildings be constructed on stilts above the landscape? And how is this engineered? How can the facilities of a building be connected to the ecosystem of a forest? These are a few of the architectural engineering questions that arise when researching and designing this graduation topic. Besides the engineering aspect, the graduation topic also has to deal with new arising architectural questions, like, how do people live in a forest? How can the ecological awareness of the individual be stimulated? What kind of quality, spaces and functions does the forest have to offer in the urban environment?

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

There is already a lot of knowledge about the technical benefits of urban forests on the urban environment, so do they improve biodiversity, reduce the 'urban heat island' effect, decrease pollution, and so on. These urban forests provide ecosystem services for free, of which some are even too complicated to imitate by using technology. This graduation project researches urban forests as an integral part of the urban environment. This means that the buildings and urban spaces are part of the forest landscape and are benefitting from the ecosystem services that an urban forest provide. The thematic research is used to study how to integrate forest ecologies into the urban environment and how its ecosystem services can create local circularities. Whereas the design assignment specifies and explores the architectural and engineering question regarding building in an urban wetland forest and tries to contribute to the build environment with a solution for the lack of fresh water and the oxidating peatlands. Therefore, the topic has as well societal relevance as scientific relevance, with as main goal to answer the question: how to design an ecological and integrated neighbourhood in a wetland forest?