

Student: Maria Sachsamanoglou (4616952)
Mentors: Frits van Loon, Kristel Aalbers

DORDRECHT FLOODSCAPES
TOWARDS THE AMPHIBIOUS CITY

reflection

This document is a reflection on the outcomes of the graduation project and its scientific and societal relevance. Firstly, the design proposal is evaluated in terms of answering or not to the initially posed research objectives, looking into each objective separately but also as a whole. Furthermore, the relationship of the project with the proposed scientific framework is discussed as far as inquiry methods are concerned, as well as its integration into the general theme of the Flowscapes Graduation Studio. Ethical issues and dilemmas that emerged throughout the process are also analyzed, revealing personal queries and agonies and, at the same time, explaining design decisions. Finally, the relationship of the project with the wider societal context is discussed, looking into potential non-academic extensions and emphasizing on the multi-faceted and powerful nature of landscape architecture, as a field with great potential that can form and re-form modern society.

1. The design proposal as a response to the research objective

The project, after thorough research on the existing insufficiencies of the urban fabric of Dordrecht in relation to cloudburst flooding, focusing in the area of the 19th cent Schil and including factors like paved/ green areas, open water surfaces, specific materials of the streets and the public spaces, dimensions and character, resulted in the design of a green-blue network; this network can withstand future increased levels of precipitation and sufficiently accommodate the calculated water retention area, using a system of nodes (seasonal buffers) and lines (waterlines) that direct excess stormwater to an inundation park with high water capacity, solving thus the major problem of rainwater nuisance in the area.

Apart from that, however, the design proposal has also great value in terms of ecology and biodiversity, since it seeks to maximize the potential of urban nature thanks to this green-blue network providing, room for flora and fauna to thrive within the city; by reducing the paved ratio in relation to green and water, it contributes to the emergence of an urban wetland ecosystem that is further enhanced, especially in the Johan de Witstraat parkway through the creation of height differences; a cut-and-fill process results in a green, hilly landscape that allows the emergence of different plant species and the attraction of a rich diversity of insects, birds and small animal communities; it can, therefore, facilitate migration processes and species flows to and from Dordrecht via the 19th cent. Schil corridor.

The project is also an attempt to foster community spirit and social dynamics, by designing urban spaces of high quality, where personal engagement and sense of belonging will be top priorities. In these spaces, one can experience different degrees of privacy; from the private and semi-private "hofjes", where a different more, intimate bond is created with the residents that are fully in charge of their maintenance, to the more public "hofjes", watersquares, waterfronts and the park, where everyday city life unfolds in all its grandeur. By creating room for small-scale initiatives and participation and promoting interaction and activity, they contribute to a lively urban environment, while at the same time they raise awareness in relation to climate issues, water management and ecology through tangible examples. Hence, they are transformed into "places", to which new, stronger meanings will be ascribed and where a future, prosperous society can flourish and evolve.

In this context, water is the element that upgrades the experience of space through a visible flooding process and mainly above-ground waterbodies, which can be formed and transformed according to the amount of precipitation, taking up more or less space and creating, thus, everchanging landscapes where one can see, hear and touch different things every time. This constant dialogue of wet and dry, but also the in-between stages of filling in and drying out, is what makes the city so dynamic; *amphibious*. The water, now a prominent and tactile feature, calls for interaction and play; it is not merely a decoration, but on the contrary a major part of life, strengthening the identity of Dordrecht as a unique watercity.

In this sense, the design proposal fully responds to the initial research objective: "To create a blue-green network that can accommodate excessive rainfall, but at the same time act as a series of public spaces intertwined with urban life, enhancing biodiversity, fostering social dynamics, offering alternative and contrasting spatial experiences and strengthening the identity of Dordrecht as a contemporary watercity, where water is a visible and tactile feature."

2. Relationship between the graduation project and the studio topic

Throughout this project, the landscape is addressed as a system, upon which different processes and flows create a dynamic interplay. The landscape, thus, is seen as an endlessly transforming spatial entity, characterized by change, instability and uncertainty. The flows, themselves -here flows of water, green and people-, are subject to change and transformation, hence the resulting entity, emerging from their interrelations and their interaction with the pre-existing spatial background, also bears a high degree of temporality. This space of movement and flows is one that enhances and promotes a dynamic interaction between natural and human systems, between processes and forms and is, therefore, directly related to the theme of the Landscape Architecture Graduation Studio "Flowscapes".

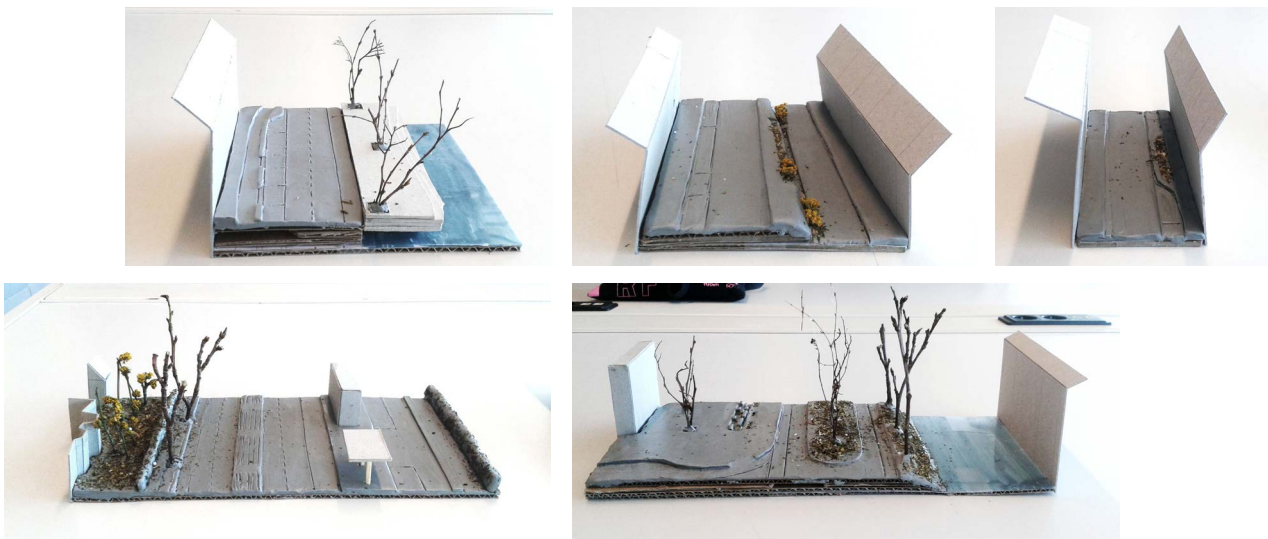
Focusing on water infrastructure within an urban environment, the project aims to hybridize the concepts of "infrastructure" and "landscape", where the first can overtake its strictly utilitarian purpose, embracing a more multi-functional nature and being upgraded from a no-man's space to a place full of meanings and personal or collective memories; at the same time, the latter's role in territorial transformations can be enhanced and boosted, proving that landscape architecture can provide effective and multi-faceted solutions for urban infrastructure, which not only address and solve a specific issue -here stormwater management, but they also seize the opportunity to improve a range of other factors or give answers to different problems, such as ecology or social life.

3. Relationship between the chosen research method(s) and the graduation studio methodical line of inquiry (scientific relevance)

The “Flowscapes” graduation studio introduces and promotes a scientific approach, where design research and research-by-design are combined into an integral whole. More specifically, design research is defined as “the analysis of existing designs or precedents” (Nijhuis & Bobbink, 2012), while research-by-design as “the formulation of new designs” serving the goal of research. There is, therefore, a constant back and forth from generic to specific knowledge and from non-determined to determined context.

Throughout the “Dordrecht floodscapes” project both methods were merged into a constant dialogue. The project started with a thorough analysis of existing problems, networks and flows that make up the city system, as well as precedents. This extensive research led to valuable outcomes and conclusions that helped me formulate the principles and better structure the design goals. Soon before the masterplan, even before the completion of the analytical phase, I already started envisioning the design through experimental collages and sketches that helped me create a consistent image in my mind and keep pursuing it until the end, thinking how it could become possible. The study of precedents played a major role in this, triggering my imagination, inspiring me and allowing me to conceivably project these images to the context of Dordrecht. These design experiments, however, were calling for verification and more concrete data in order to be translated into a coherent proposal; that implied more research on a smaller scale on history, streets and public spaces, structural elements of the area, weaknesses and potential etc., a process that provided more insight into the 19th cent. Schil, where I would focus my design. And even then, there was more to discover, more to know before jumping to the masterplan; a series of models of street sections, more collages, data and calculations, scenarios and endless brainstorming.

The final design was, therefore, the outcome of all these processes, analytical and experimental, design research and research-by-design, where the one was constantly informing and enhancing the other and vice versa.



Models of street sections, scale 1:300

4. Relationship between research and design

From the previous paragraph it already becomes obvious that throughout the graduation project a continuous loop between research and design took place. Instead of them being two successive stages, they were blended together in a process that was not predefined and fixed, but endlessly evolving according to the findings extracted from the one or the other. In contrast with my usual way of working, this approach provided deeper insight into the topic and offered more possibilities, since both research and design were used as tools for gaining knowledge, rather than as expected results. Although this process might seem less structured or organized, the benefits greatly outnumber these weaknesses provided that the final goals are clearly articulated and explicit.

5. Ethical issues and dilemmas during research/design and in potential application of results in practice

Coming from a country with a long and rich history and having a background in architecture and in heritage issues, the design proposal was a challenging stage for me during the thesis. Since Dordrecht is the oldest city of Holland, with numerous traces of the past dispersed in its urban fabric, I was rather hesitant making outrageous design decisions. Diving in the micro scale of the 19th cent. Schil, in the question "How much green?" I had to think of a scheme that would respect the identity of the area, so I came up with the principle of the city-nature transition and the idea of the red-green balance.

Looking closely into the existing characters of the city from the historic core to the suburbs and the Biesbosch, I discovered that red (built) and green (nature) were following a gradual transition along this axis, acting as negatives of the same image. This landscape succession was following a normal pattern, apart from the area of the Schil, which seemed rather ambiguous; less dense than the "Binnenstad" but, at the same time, less green than expected. The introduction of small green fragments in this fabric would restore the balance, without however disrupting or altering the identity of the area. These green fragments were later interpreted in the form of the traditional "hofje", an element so characteristic of the history of Dutch cities, linking, thus, culture and future development in a concrete bond.

Another equally crucial issue was that this idea of the "hofjes" that would function as seasonal buffers included interventions in private spaces, even if these are public or semi-public. This implies that the interventions cannot be fully controlled apart from the initial planning. In case future owners decided to completely pave their plots, the concept would fall apart. In this dispute of ownership versus planning, I would have to come up with a proposal that would be able to reconcile these two.

One could argue that a solution would be the adoption of a legislative framework that would clearly define the green-paved ratios in each area and within each plot, preventing an 100% paved coverage of the plots but allowing the owners to design their courtyards in their own will. Instead, in this proposal, another scenario was generated; in this case, in the calculations of the additional retention area, the existing private green spaces were not included leading to a different numeric result than the initial one. This was translated into a concept where, instead of the "hofjes", existing or new (concessed) public spaces would play the role of the buffers and the rest would remain unchanged.

Apart from that, I went even further to imagine a future scenario where no interventions whatsoever would take place and compare it with the current image of the area as well as with the scenario where the design proposal would be applied. Given the steady, exponential increase of precipitation, it became clear that this future image would certainly be worse than the present one, but also worse than the proposed scenario, giving credits to the design proposal and affirming its significance.

Finally, the question that is torturing all designers as I imagine is "Will it function the way I have envisioned it?". Will the water flow efficiently along the waterlines or a general restructuring of the whole surface of the streets is necessary to create height differences in a relatively flat area like the Schil? Or even worse do we need to resort to the solution of water pumps? Will the chosen materials create a pleasant environment or will the design end up as a muddy swamp, repelling and hardly accessible? And what about people's response to the interventions? Will they embrace the changes or will they reject them in favor of convenience and habit? Is it an economically feasible project or will the maintenance costs shoot the budget to unexpected levels? As a landscape architect, I can only partly answer to these questions, a fact that reveals the complexity of the proposal as well as the need for an involvement of multiple disciplines in the process of application.

6. Relationship between the graduation project and the wider societal and professional context (societal-professional relevance)

This project can be seen as part of an ongoing global discourse concerning climate change and its widely discussed manifestations; scientists talk about global warming, sea level rise and extreme weather events, such as sudden and heavy downpours or prolonged periods of drought, and politicians organize summit conferences to discuss on possible adaptation measures and prevention of natural disasters, while at the same time another part of the globe is struck by a storm, completely flooded or buried under tons of mud, because a stream was muted or because a forest was recently burnt; after centuries of human over-exploitation, nature strikes back, reclaiming its lost territory. The reclamation process is fierce, often leaving hundreds of casualties on its way.

In this sense, the project is expressing the fears and desires of a society that dreams of a sustainable future and of responsive, adaptive new environments. Having a clear, climate-proofing orientation, it aspires to become part of a global agenda, contributing the least in the aforementioned discourse. It can, there-



Glaciogenic Art, Jill Pelto (source: <http://www.jillpelto.com/gallery/>)

fore, become a starting point towards cloudburst treatment and urban resiliency, highlighting the role of landscape architecture among the disciplines involved in this purpose and demonstrating how design can provide sufficient answers to major societal issues.

Despite the site-specific features addressing the city's unique character, such as the principle of city-nature transition or the scheme of the "hofjes", this research aims to develop a framework and an approach, the principles of which can be extracted and applied in any flood-sensitive urban context, transforming it into a resilient and robust spatial entity. Ideas like using existing networks (water, ecology, recreation etc.) to create a system of waterlines and buffers, addressing the city as a sponge with increased permeable surfaces and a separate water system for collection, storage and reuse of the rainwater, allowing visible flooding processes and aiming towards multifunctional, flexible spaces that can adapt to any given circumstance, could be applied in any other vulnerable area. Giving enough room for the water within the urban fabric, instead of restricting and suppressing it, seems in fact to be the key in these cases, welcoming it, instead of expelling it.

This graduation project, however, might have further extensions in the field of climate change, taking into account that cloudburst flooding is only one aspect of the problem. Its opposite, drought, is yet another phenomenon equally present in contemporary urban environments, such as the one of Dordrecht, since groundwater levels are severely decreasing during summer months. In Dutch cities, the phenomenon of rotting wooden foundations due to exposure to O₂ is very common ("paalrot"). The project addresses the city as a sponge that can, apart from retain and dispose rainwater, also store it temporarily aboveground and for a prolonged period underground. Of course, this necessitates an extensive network of subterranean facilities -pipings, tanks etc., independent from the existing sewage network of the city and with sufficient capacities. The design of such a network is outside the boundaries of the project in question, falling into fields other than landscape architecture and can, therefore, only constitute a proposal.

Similarly to drought, the project can also provide an answer to the UHI (urban heat island) effect by increasing the ratio of green spaces in the city. More tree shade, better evapotranspiration and cooling are only few of the benefits that go along with the green-blue network and contribute to the prevention of a heat island within the city. At the same time, better water quality is ensured thanks to maze-like water loops; during this prolonged movement, water is purified under the influence of sunlight, while the introduction of natural banks around the buffers (hofjes, park etc.) or along the waterlines or the use of helophytes (park) further enhances the water quality.

Since the graduation project is focused on flooding, concrete data are mostly provided for this aspect; it is yet important to emphasize on the nature of landscape architecture as a discipline that *can* and *should* provide multiple answers to crucial issues through a design that is inclusive and multi-faceted.

Multidisciplinarity, hence, is vital in landscape architecture practice, a fact that we as students learn from the very early days of our education and realize later in the professional realm. This means that various factors should be included and different fields should be embraced and incorporated. Economics is a knowledge field often pursued in technical education and practice, adding a new dimension and opening doors to the future, allowing urban planners and landscape architects to design based on possible -and impossible- scenarios and, therefore, better predict and control the evolution of their design.

In a Europe of economic decline, this climate-driven approach can trigger economic development, by introducing the concept of the "innovative watercity", that can provide a role model for sustainable urban design and, therefore, attract investments and capital, thanks to new permanent residents, professionals, tourists or researchers; consequently, the role of Dordrecht itself might significantly change in respect to other cities, allowing, for instance, for an upgrading from Rotterdam's "satellite city" to a major, self-reliant city of South Holland and proving, thus, that even small-scale design decisions may have a huge impact on the wider framework.

Finally, the project can contribute to a double attitude shift: from the conventional, monofunctional prac-

tices to more sustainable, multifunctional ones and from the fear of water to its re-integration in the urban realm, since it is no more considered as an unwanted feature but, on the contrary, a desired quality. We are used to urban water infrastructure that consists of underground pipes and carries clean rainwater together with grey household water. In the same way, we are used to dislike water that is accumulated above the surface of the ground, especially if that is within the city borders, considering that it can be dangerous threatening our doorstep or even unhealthy challenging public sanitation standards.

In their paper *The emotional landscape*, Dirk Sijmons and Machiel van Dorst discuss about the natural resistance of human to change and the fear of the uncertain in exchange for security. Talking about the aestheticization of our worldview, they argue that in Western society "the engine room should really be kept away from view"; and by *engine room* they mean all the production and infrastructure facilities where everything is generated: food, electricity etc. What if that engine room became again visible? What if the rainwater "engine" of the city went out unconcealed in open view? Would that shock us irreversibly or would it become a cause to overcome our fear of change and embrace the new?

This project aims, most of all, to unveil if design can subvert deeply-rooted mentalities and strongly established conventions, in a way that it can influence our worldviews and the ways we perceive our surroundings. The previous questions remain yet to be answered.

Conclusion

To summarize, this project is an attempt to prove that landscape architecture can, in fact, achieve much more than merely providing an answer to a specific problem, addressing a wide range of other issues of ecological, social, political, economic or anthropological nature. Most of all though, it is a discipline capable of revolutionizing our way of thinking, becoming food for thought and triggering conversation over matters considered given and established until today. It can, hence, be seen as a new expression of a democratic movement, allowing for polyphony, debate and change, challenging the old and welcoming the new. The latter may not necessarily be better than the first, yet we can only know by giving it a chance.

"Intelligence is the ability to adapt to change"

Stephen Hawking



Fires of change, Shawn Skabelund (source: <http://artmuseum.arizona.edu/events/event/fires-change#!prettyPhoto>)