

Paul Kuitenbrouwer
Stefano Corbo
Elina Karanastasi

Joyce de Louw
5326486
17/06/2025

The Water Hub

Celebrating Diversity a Waterscape

Public Building Graduation Studio
Graduation Report

Graduation Plan with Design Objectives for MSc. 4

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	Joyce Maria de Louw
Student number	5326486

Studio		
Name / Theme	AR3AP100 2024-25 Public Building Graduation Studio "Public Condenser, Copenhagen"	
Main mentor	Paul Kuitenbrouwer	Project Design
Second mentor	Elina Karanastas	Technical Building Design
Third mentor	Stefano Corbo	Theory & Delineation
Argumentation of choice of the studio	I like to approach architectural design from a standpoint that emphasizes not only aesthetics and functionality but also the human experience. This also led to my interest in Public Buildings. I see public buildings and spaces as a common good that reflects who we are as a community and as people. Public buildings embrace connections between people in ways that people can also define and support their community. So, I was excited to learn more about public architecture and to research how connections and bridges can be built between people.	

Graduation project	
Title of the graduation project	The Water Hub: Celebrating diversity through water and providing a water infrastructure for Bispebjerg, Copenhagen
Goal	
Location:	Nordvest / Bispebjerg Bakke, Copenhagen, Denmark
The posed problem,	In the last two decades, Copenhagen and its city authorities have been experiencing problems with pluvial flooding, negative biases to migrants and water service disruption. These problem statements are touching three different levels: environmental, cultural and health.

	<p>Pluvial Flooding In the summer of 2011, Copenhagen faced the most devastating cloudburst in its history causing approximately 1,6 billion euros in damage (State of Green, 2023). Copenhagen’s Cloudburst Management Plan, introduced in 2012, is a comprehensive strategy aimed at tackling the growing threat of extreme rainfall and urban flooding (Cloudburst Initiative Copenhagen, n.d.).</p> <p>Negative biases to migration The “Ghetto plan” in 2020 received a lot of criticism that it is discriminatory and potentially racist in its targeting of non-Western immigrants (Denmark: UN Human Rights Experts Urge Halt in Sale of “ghetto” Buildings, 2020). Targeting non-Western immigrants as one of these set of laws to define a “ghetto”, can be explained by negative biases of the Danes towards migrants. Research shows that three in four Danes believe that integration is far less successful than facts show (Denmark: Majority Strongly Overestimates Integration Problems, 2024).</p> <p>Water service disruption This year, a study revealed that more than half of Denmark’s drinking water resources are contaminated with pesticides and other toxins (Euronews, 2024). In Copenhagen, all drinking water is produced from groundwater and there are multiple polluted sites because of its industrial harbour history (Overblik: Her Ligger 61 Farlige Giftgrunde Nær Hovedstaden, n.d.).</p> <p>Focusing on Bispebjerg, all three environmental, cultural and health problems are extremely applicable. This area is experiencing a lot of flooding issues, it is very ethnically diverse and there are residential places without water service for a bath or a toilet.</p>
--	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

	<p>However, these problems all share a unique relation with water. Architecture can tackle these three problems on environmental, cultural and health levels through water as common theme.</p> <p>With regard to pluvial flooding by heavy rains, rainwater can be collected and reused by a public condenser. With regard to negative biases to migration, it is important to celebrate water as the common ground between different cultural groups. With regard to service disruption, providing an accessible water infrastructure can overcome health problems.</p>
research questions and	<p>Main question: How can a public condenser celebrate cultural variety through water and at the same time provide a water infrastructure for the neighborhood in Bispebjerg, Copenhagen?</p> <p>Sub questions:</p> <ol style="list-style-type: none">1. How can rainwater be reused through design in architecture?2. How do different cultures use water as a common ground in architecture?3. How can architecture provide water accessibility to address neighborhood issues?4. How can public architecture address climate, integration, and health issues in general?
design assignment in which these result.	[Design Assignment]
<p>The overall goal of this project is to design a Public Condenser connected through water. A place where people can identify themselves through water, a place that connects people by water and a place that gives accessibility to water as valuable source of life. It will address a more pragmatic side of water by providing a water infrastructure, but it will also address the more symbolic and cultural side of water by creating a waterscape.</p> <p>How? It will collect rainwater through a variety of project surfaces and roofs in the neighborhood. This rainwater will be reused to provide clean water for the local community in the form of a public condenser. This public condenser provides</p>	

functions like a laundry room, a public bath house and a multi-cultural steam room. It will find the common ground between different cultures, how we all use water. Besides that, the local community can benefit from the free use of a clean water infrastructure, based on rainwater collection.

Process

Method description

This proposal is a combination between quantitative (literature review) and qualitative (case study examples) research, leading to a multi-method approach. Above this, the research that I am conducting is also defined by my studio’s approach: “research by design”.

The literature review establishes a theoretical foundation for this research. Sources include peer-reviewed journal articles, seminal books, and recent reports, with a focus on works that address how rainwater can be reused through design, how different cultures use water in architecture, and how architecture can provide water accessibility. Moreover, reviewing literature gives this research a broader academic context by highlighting theoretical frameworks and relevant concepts for these topics. This will also help me selecting case studies and formulating the interview questions. Literature is found by identifying sources from databases such as JSTOR, Google Scholar, and TU Delft Catalog, using keywords such as “Architecture AND Rainwater” or “Water AND Culture”.

Moreover, this research includes an analysis of selected case studies to bridge the theoretical insights gained from the literature with practical applications. Each case was chosen based on its relevance to the three themes. These case study examples will provide contextual and spatial understanding by analysing design in its environmental and cultural context.

Research by Design is a methodology that goes hand-in-hand with my studio’s approach. In this approach, the process of designing and creating is both a means of exploring research questions and a way to produce insights, rather than just a way to create a final product. This approach is commonly used in fields such as architecture. Also, because of this approach I am currently doing research by design through mapping, diagramming, using ArcGis, etc.

Literature and general practical references

Books

Balzer, G., & Schorn, C. (2015). *Asset management for infrastructure systems : energy and water*. Springer. <https://doi.org/10.1007/978-3-319-17879-0>

Blair, S., Bloom, J., Virginia Commonwealth University School of the Arts (Qatar), & Hamad Bin Khalifa Symposium on Islamic Art and Culture Dawhah, Qatar) 2007 : (2009). *Rivers of paradise : water in Islamic art and culture*. Yale University Press in ass. with the Qatar Foundation, Virginia Commonwealth University and Virginia Commonwealth University School of the Arts in Qatar.

Cultural change in post-migrant societies : re-imagining communities through arts and cultural activities. (2024). In W. Sievers (Ed.), *OAPEN (Open Access Publishing in European Networks)*. Springer. <https://doi.org/10.1007/978-3-031-39900-8>

Dreiseitl, H., & Grau, D. (2005). *New waterscapes : planning, building and designing with water* (Expanded and rev. ed). Birkhäuser.

Echols, S., & Pennypacker, E. (2015). *Artful rainwater design : creative ways to manage stormwater*. Island Press. <https://doi.org/10.5822/978-1-61091-318-8>

Grau, D., Dreiseitl, H., & Ludwig, K. H. C. (2001). *Waterscapes : planning, building and designing with water*. Birkhäuser.

Johnston, B. R., & Hiwasaki, L. (2012). *Water, cultural diversity, and global environmental change : emerging trends, sustainable futures?* UNESCO ; Springer. <http://site.ebrary.com/id/10520158>

Massachusetts Institute of Technology Department of Architecture. (2019). *Architecture and action* (J. M. Yoon, I. Chernyakova, A. Ahmed, S. Ghantous, & M. Shopova, Eds.). SA+P Press.

McDowell, S. (2016). *Water index : design strategies for drought, flooding and contamination*. University of Virginia School of Architecture ; Actar D Inc.

Murotani, B. (1981). *Architecture and water space*. Process Architecture Publishing.

Novak, C. A., Van Giesen, E., & DeBusk, K. M. (2014). *Designing rainwater harvesting systems : integrating rainwater into building systems*. John Wiley & Sons. <http://swbplus.bsz-bw.de/bsz405673906cov.htm>

Rahman, M. S., & Islam, R. (2020). *Sustainable water purification*. Wiley-Scrivener. <http://search.ebscohost.com/login.aspx?direct=true&scope=site&db=nlebk&db=nlabk&AN=2530915>

University of Pennsylvania School of Design. (2014). *Design in the terrain of water* (A. Mathur & D. d. Cunha, Eds.; First edition). Applied Research + Design Publishing ; University of Pennsylvania School of Design.

Wright, M. (2015). *Rainwater park : stormwater management and utilization in landscape design*. The Images Publishing Group Pty Ltd.

Wylson, A. (1986). *Aquatecture : architecture and water*. Architectural Press

Journal Articles

Høghøj, M., & Thelle, M. (2023). Material politics: approaching welfare history through urban water in 20 th century Denmark. *Scandinavian Journal of History*, 49(3), 397–419.
<https://doi.org/10.1080/03468755.2023.2289665>

Quitau, M., & Røpke, I. (2009). Bathroom Transformation: From Hygiene to Well-Being? *Home Cultures*, 6(3), 219–242. <https://doi.org/10.2752/174063109x12462745321345>

Singh, R. S., & Ahmad, S. (2021). Water in Cultural Perspective with Special Reference to Islam. *In Sustainable development goals series* (pp. 147–155). https://doi.org/10.1007/978-3-030-57488-8_11

Zarghami, I., Nezhad, J. a. D. M., & Fatoorehchi, D. (2015). The symbolic Role of Water in Iranian-Islamic Architecture based on Spirituality. *European Online Journal of Natural and Social Sciences*, 4, 121–127. http://european-science.com/eojnss_proc/article/view/4462

Podcasts

Innovative Water Solutions (2019, March 26). How to Conserve Water, Harvest Rainwater, and Reuse Graywater. *Hippie Haven Podcast*. https://www.watercache.com/faqs/hippie-in-a-van-podcast?srsId=AfmBOoovZvW3_bIlhpP02grBpCKgU4T7LrXOzQjJJdcULoqGzp9x__f

Salim Kassam (2023, March 22). Episode 149 - The Intersection of Islam & Environmentalism. *The Muslim Vibe Podcast*. <https://podcasters.spotify.com/pod/show/themuslimvibe/episodes/EP149-Two-Billion-Strong-The-Intersection-of-Islam--Environmentalism-ft--Hamzah-Iqbal-e20su88>

Sound of Green (2023, January). The day Copenhagen flooded - A story of urban water management. *Stories from Denmark's green transition*.
<https://open.spotify.com/episode/5k1H0VUchGYxQrkJaxMnUm>

Stormsaver Ltd. (2024, June 13). Episode 1 - The Importance of Rainwater Harvesting & Greywater Recycling. *The Water Reuse Podcast*. <https://www.youtube.com/watch?v=CaXavoEAhaI>

Documentaries

Gomez, J. (Director). (1979). *The Story of Water* [Documentary]. Uisce Éireann.

Reflection

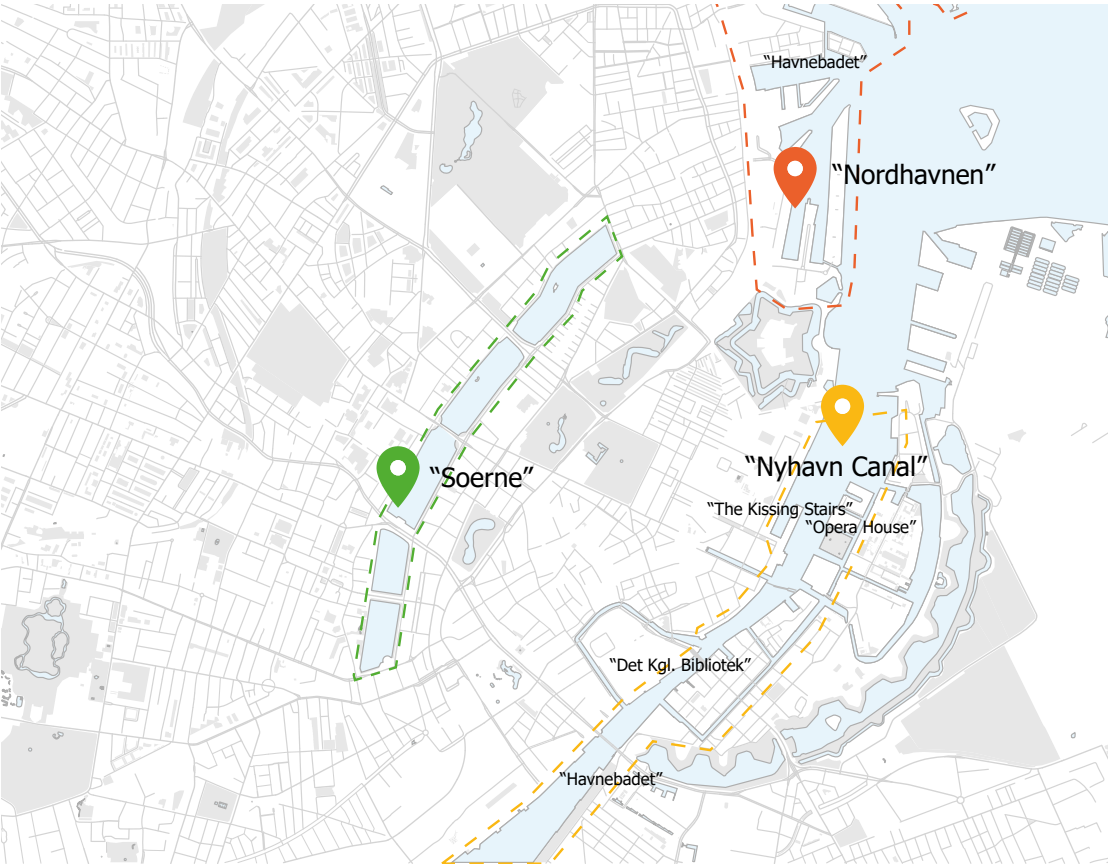
1. What is the relation between your graduation (project) topic, the studio topic (if applicable), your master track (A,U,BT,LA,MBE), and your master programme (MSc AUBS)?

The graduation (project) topic tries to find answers to how a public condenser can celebrate cultural variety through water and at the same time provide a water infrastructure for the neighborhood in Bispebjerg, Copenhagen. The overall goal of this project is to design a Public Condenser connected through water. The Public Building studio investigates how public architecture can improve quality of living in city neighborhoods. This is a highly essential topic within architecture. Improving the quality of living by public architecture touches different domains answering technical, social and spatial questions with regard to architecture. This is in close relation with the Architecture master track of the TU Delft, which teaches to develop creative and innovative building projects that use design as a means to deal with the technical, social and spatial challenges encountered in the built environment.

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

By my project topic, I will design a prototype that is relevant not only for my graduation work, but also in the larger social, professional and scientific framework. This research is focused on solving problems of this specific site, but the findings can be applicable at more locations within the future or create more insights into how to tackle these (future) problems elsewhere. It can create a starting point how to connect people and different cultures through water, while finding a common ground. But also, it gives more understanding in how pluvial flooding can be tackled within the future and how to reuse rainwater in a way that is beneficial for the whole local community. Creating opportunities and giving public services and a water infrastructure back to the neighborhood. Also, looking at the future, a looming crisis threatens the health and livelihoods of billions: the scarcity of clean drinking water. Despite being fundamental to life, access to safe water is becoming an increasingly precarious privilege. Experts warn that this challenge, driven by climate change, population growth, and mismanagement of resources, could define the global narrative for the decades to come. Thus, examining how rainwater management can provide a clean water infrastructure creates more insights for future social, professional and scientific research.

**Research
By
Design
Journal**



The revival of Copenhagen’s inner harbour waterfront serves as an interesting example of a reimagined public space, aligning well with Feinberg’s concept of the urban commons and Sennett’s exploration of the open city (Feinberg et al. 2021; Sennett 2020). In the 1980s, during a post-industrial slump, Copenhagen’s main canal was largely abandoned and the water was deemed too polluted to swim in. The municipal authorities, seeing the area as an opportunity for redevelopment, undertook a series of ambitious

initiatives to transform the canal from an industrial wasteland into one of Copenhagen’s most vibrant areas. Those interventions included the modernization of the sewage system and cleaning of the harbour water, the creation of public landmarks such as a library and opera house, the introduction of the harbour bus boat, swimming areas and new pedestrian bridges across the water, all leading to the area being completely revitalized (Santamaria 2024).

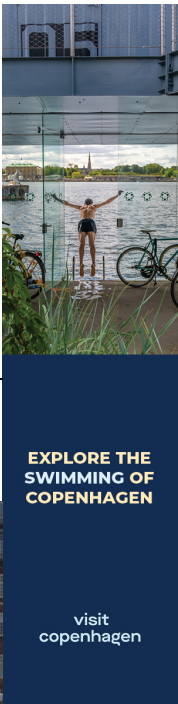
10th July 2024

COPENHAGEN: FROM WASTE TO WONDERFUL

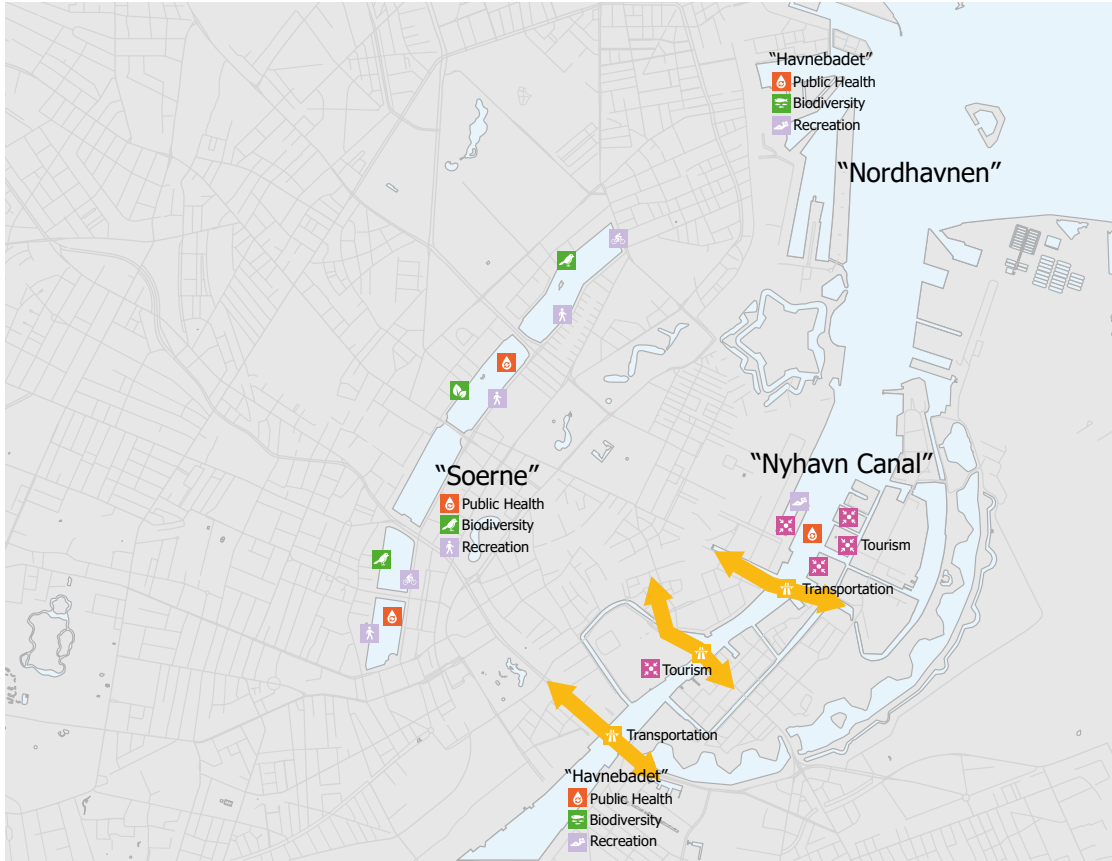
Written by [Damian Santamaria](#) Published in [Eco Travel](#)



THE ONCE HEAVILY POLLUTED COPENHAGEN HARBOUR HAS BECOME A HALLMARK OF SUSTAINABLE DEVELOPMENT. WHAT USED TO BE A DUMPING GROUND FOR WASTEWATER FROM SEWERS AND NEARBY INDUSTRIES IS NOW AN ALL-YEAR SWIMMING HOTSPOT FOR LOCALS AND VISITORS LOOKING TO TAKE THE PLUNGE IN SOME OF THE FINEST HARBOUR WATER THERE IS.



Sennett’s exploration of borders and boundaries in "The Public Realm" (2020) offers yet another lens through which to view the success of Copenhagen’s waterfront. In his text, he introduces a distinction between "porous borders," or so-called "exchange zones," and hard boundaries, which create a sense of closure. He advocates for open urban tissues that encourage interaction and exchange between various groups, promoting diversity and communication within the urban environment. Also, Kevin Lynch, in his work The Image of the City, analyses the morphology of urban environments. Lynch categorizes the structural components of cities, one of which he calls "edges." These edges, such as rivers or highways, are boundaries that demarcate one area from another, effectively acting as barriers to movement and interaction. In traditional urban design, such boundaries often constrain the flow of people, ideas, and activities, thus reinforcing separation.



This text of
Feinberg (2021)
gave me more
insights into the
Urban Commons
and how water
can contribute
to that in
Copenhagen

International Journal
of the Commons

RESEARCH ARTICLE

]

u

[

ubiquity press

ARTHUR FEINBERG

AMINEH GHORBANI

PAULIEN HERDER

*Author affiliations can be found in the back matter of this article

ABSTRACT

This study is a comprehensive literature review about the field of the urban commons and its diversity, which we investigate through the lens of the new commons. Acknowledging a potential for adaptive capacity in the urban commons, we classify its traits into ecosystem, socio-economic and institutional factors. To make our work more practical, we further arrange them as benefits, challenges or supports. Our literature review highlights the need to further study the institutions which have an impact on the urban commons, as well as the individual and collective behaviour mechanisms at stake in the emergence and management of this commons. In addition, more light needs to be shed on the property-regimes relevant to the urban commons, with a focus on the access or use rules, rather than on ownership.

CORRESPONDING AUTHOR:

Arthur Feinberg

Delft University of Technology,
The Netherlands
arthur.feinberg@alumni.epfl.ch

KEYWORDS:

urban commons; city;
literature review; assemblage
approach; diversity; challenges;
institutions

TO CITE THIS ARTICLE:

Feinberg, A., Ghorbani, A., &
Herder, P. (2021). Diversity
and Challenges of the Urban
Commons: A Comprehensive
Review. *International Journal of
the Commons*, 15(1), pp. 1-20.
DOI: [https://doi.org/10.5334/
jic.1033](https://doi.org/10.5334/jic.1033)

This content downloaded from
154.59.124.113 on Sun, 21 Aug 2022 12:47:48 UTC
All use subject to <https://about.jstor.org/terms>

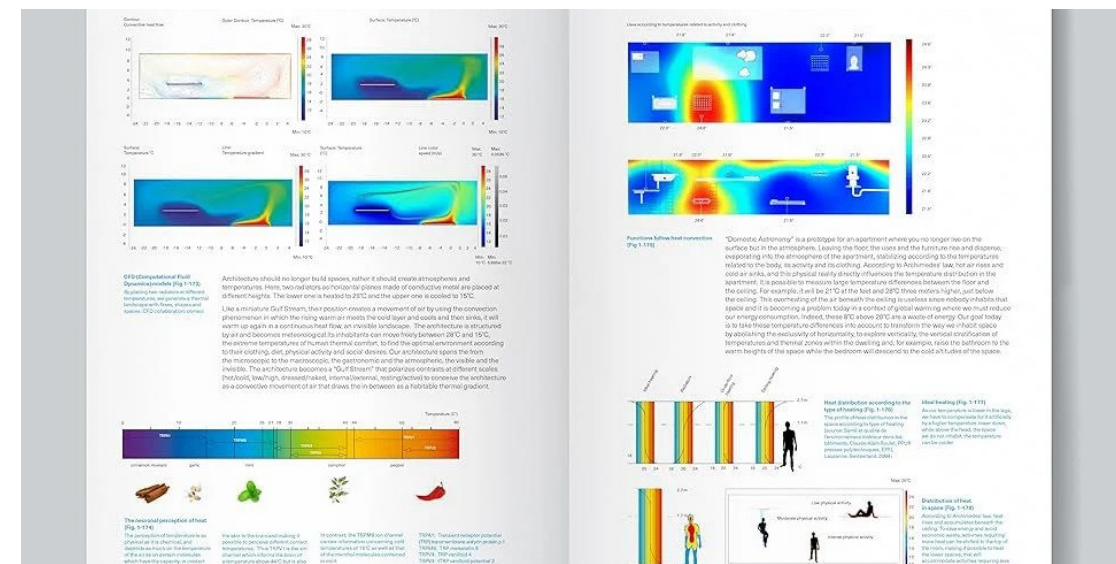
WEEK 1.2

Tutoring of Stefano Corbo

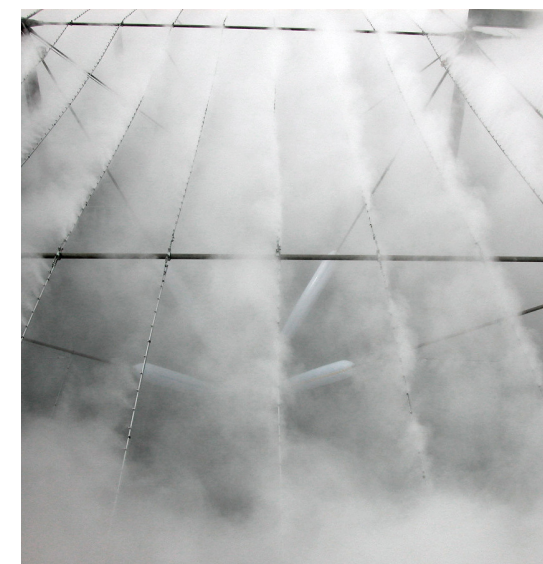
12 | 09 | 24

- suggestion for books:
 - 1) building and dwelling
 - 2) the craftsman
 - 3) lessons for students in arch
- 20th century approach = the architect is a genius
 - are you as an architect a fascilitator, a mediator or a nobody?
- water as a design element / tool
 - the blur building, yverdon-les-bains
- philippe rahm
 - by controlling climate (temperature), movement can be influenced
 - climate architecture

The Blur Building, by Yverdon-les-Bains, is an architecture of atmosphere – a fog mass resulting from natural and manmade forces



Climatic Architecture by Philippe Rahm architects: movement can be influenced by climate (temperature)





I worked with five others, together the “compillers group”, to compile the pdf document of the excursion guide

Together with Richard, also part of the “compillers group”, we supervised the “culture” group



Copenhagen is a city where connections, both human and cultural, are woven into everyday life. At the heart of this Danish capital is a seamless blend of traditional and modern influences that reflect its people’s deep sense of community and identity. In this chapter, we will give more insights into the city, connections and culture of Copenhagen. How do these themes relate to each other?

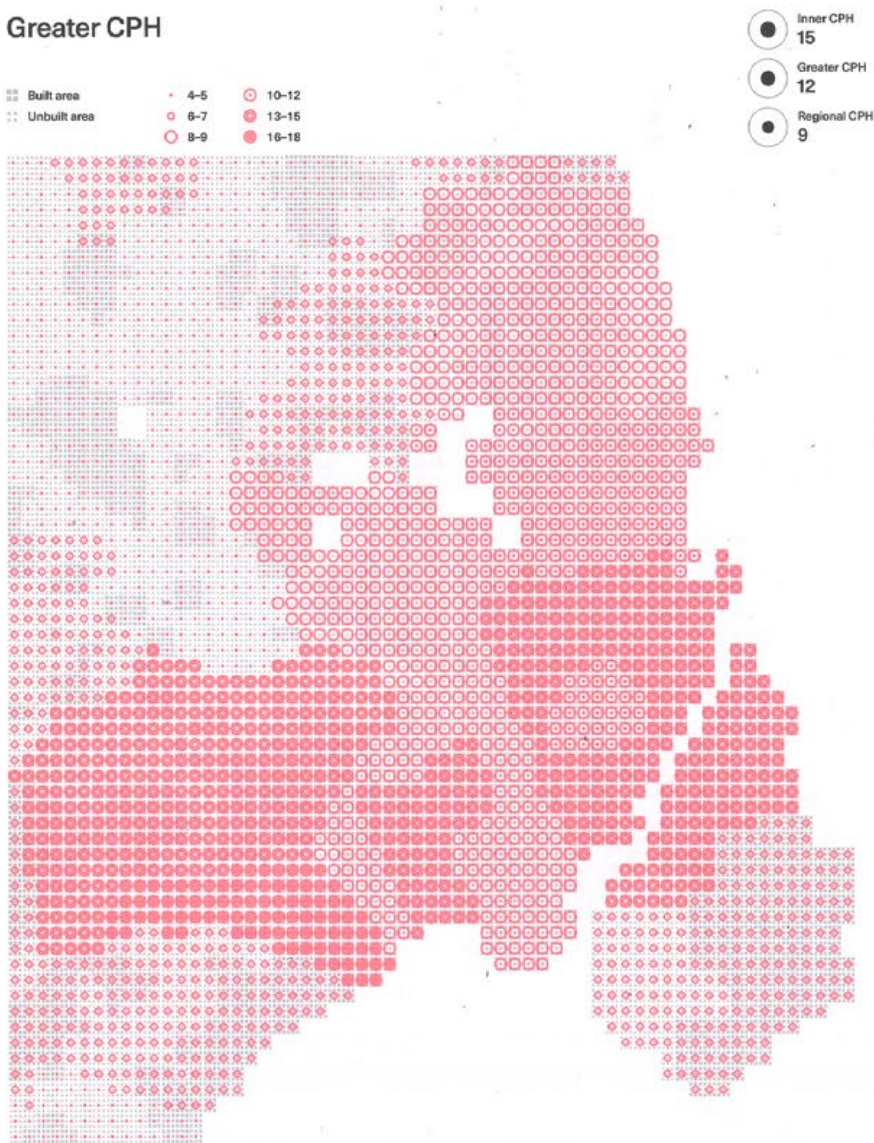
The term “city” is broad and multifaceted, encompassing various layers and scales. A city is not just a place where people live; it is a dynamic organism where elements such as economy, culture, and social interactions create a unique urban environment. Cities are complex and constantly evolving, shaped by their history and inhabitants. The city’s morphology, from its streets to its buildings, reflects not only its past but also how it functions in the present. Every neighborhood, park, and corner has stories that contribute to the city’s unique character. The public sphere within a city also holds a paradox of anonymity and community. It’s a space where strangers cross paths daily yet often remain strangers. Analyzing the City involves exploring

its various layers, from its broader morphology to its finer details. This includes studying its overall structure and function, examining urban typologies, and understanding the role of public spaces in daily life. On a more granular level, it requires looking at how architectural and urban materials shape the atmosphere and experience of the city. By focusing on both large and small scales, we can gain a deeper understanding of how cities function and how people live within them.

In a city, “connections” are made. Derived from the Latin verb *Connectere*, meaning “a binding or joining together”. Usually, physical connections are the first thing that come to mind when thinking of this word. However, in an era where the human scale is more important than ever, understanding the social dimension of urban connections is crucial for shaping cities. Taking this into consideration, a distinction is made between these two aspects in this analysis. The physical connections can be visualized as the lines which connect places with one another: they can be found in urban infrastructure, such as roads, bridges, public transport, cycling and pedestrian infrastructure, waterways and airports.

Citizenship

Percentage of population with non-Danish/Swedish citizenship

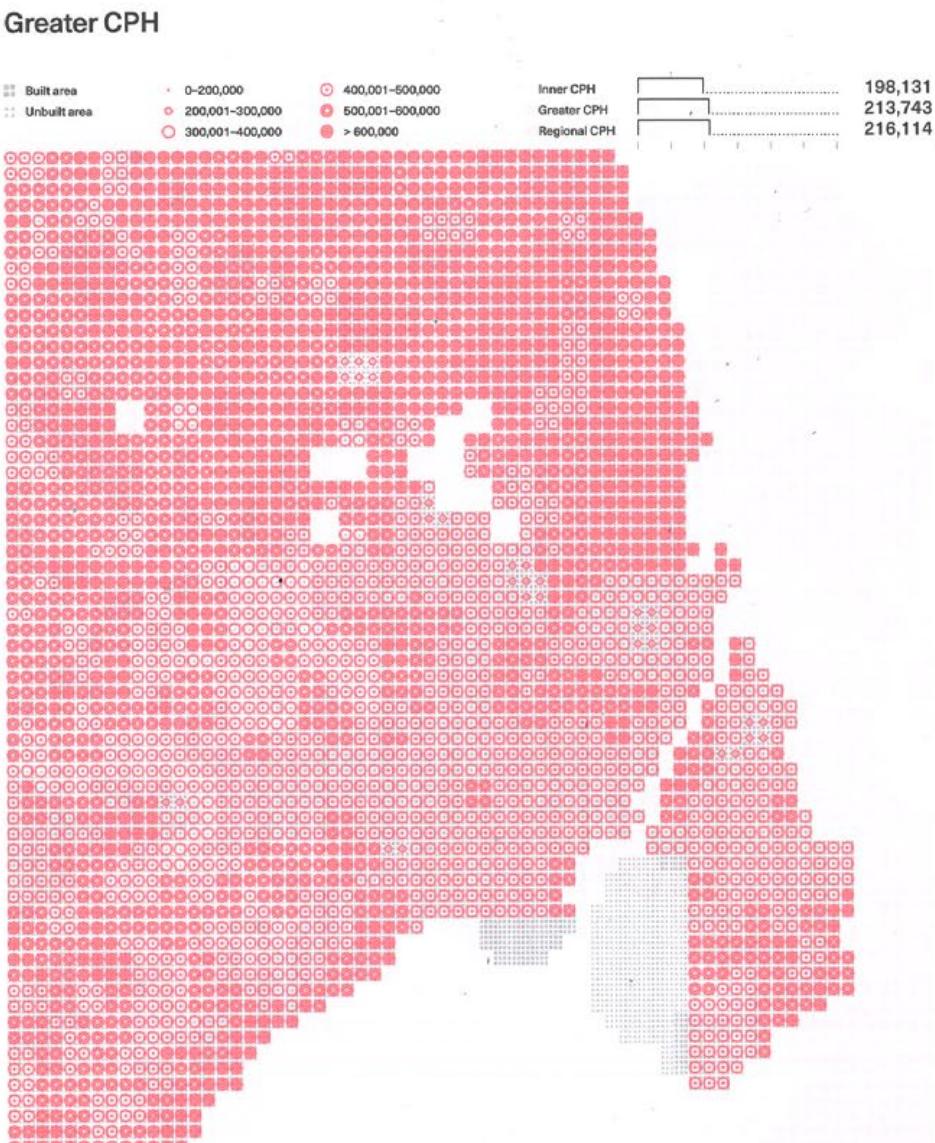


These diagrams are from the "Atlas of the Copenhagen" by Deane Simpson

Can I use this information to address something social or cultural?

Income

Mean disposable salary/capita/year (DKK)



Case studies Public Condenser
Case studies Copenhagen



ARCHITECT: AG5 and KEINGART
YEAR: 2012 + 2019
DISTRICT: Nørrebro

Also, we chose
to analyse the
Ku.Be project
of MVRDV
as a Public
Condenser in
Copenhagen



ARCHITECT: MVRDV & ADEPT
YEAR: 2016
DISTRICT: Frederiksberg

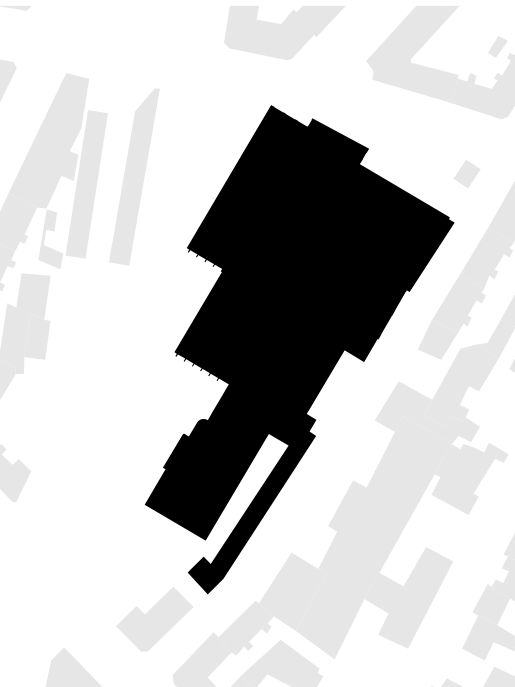
CASE 06

NØRREBROHALLEN + LIBRARY

The old tram depot building underwent renovation in two stages, transforming it into a vibrant public space. In 2012, the first phase, designed by AG5 Studio, was completed as a sports center. The renovation included opening the building toward the square with a striking copper-clad façade, which provides visibility into the structure and emphasizes the main entrance. The sports center includes various multifunctional spaces and a large sports hall with a capacity of up to 800 people.

In 2019, the second phase converted the remaining part of the building into a public library, designed by Keingart. This space features an open-plan layout with a mezzanine and integrates reading areas with play spaces for children. While the library hosts numerous events, workshops, and social services, some visitors have noted that the noise from play areas makes it less suitable for focused study. The library also showcases six significant artworks by Danish artist Eske Kath.

Connecting both the sports center and the library is the café "Send Flere Krydderier," a social enterprise aimed at addressing employment challenges faced by



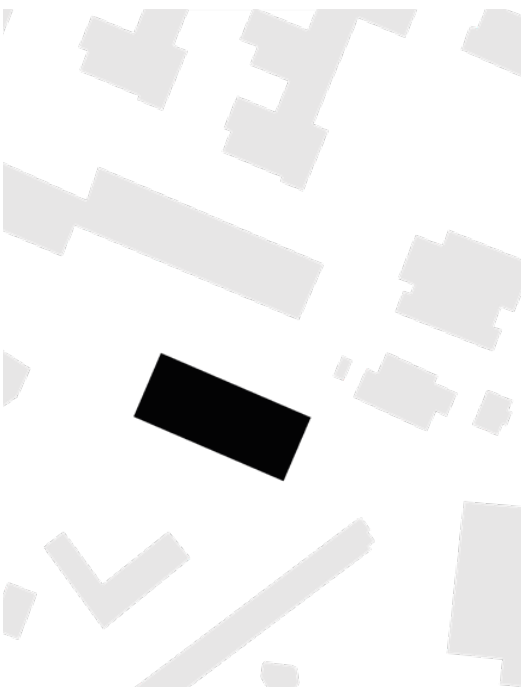
With the group
of four, we
chose the
Norrebrohallen +
Library as a Case
Study of a Public
Condenser in
Norrebro

CASE 11

KU.BE House

The House of Culture and Movement in Frederiksberg represents a novel type of institution, meant to equally stimulate bodies and minds. Designed by the Dutch MVRDV and Danish ADEPT, it offers facilities for theatre, physical activities, and learning in an environment where people of all ages, abilities and interests can participate. Like a shoe box filled with a variety of toy blocks, KU.BE (the acronym of its name in Danish), consists of a seemingly cluttered collection of nine distinctive volumes within a rectangular building with large openings. These 'toy blocks' accommodate different activities, and are connected by animated interstitial spaces. Together they produce - with room for spectacle, action and meditation - a playful architectural landscape, which one could walk through normally, but which also invites crawling, climbing, sliding, jumping, dancing and running. This architectural landscape continues into the gardens and terminates in an outdoor amphitheatre, which helps to anchor KU.BE firmly in the community.

KU.BE demonstrates sustainability through energy efficiency, use of sustainable materials, social inclusivity,



Joyce de Louw

Van:

Verzonden:

Aan:

Onderwerp:

Joyce de Louw

vrijdag 20 september 2024 18:54

Stefano Corbo

Re: Your initial thoughts

Hi Stefano,

I hope you are doing well. I have some general topics I am very interested in, and since you emphasized that it is very important to make a personal interest a starting point of a research, I would like to try to integrate these ideas. However, I am not sure how and which ideas make most sense to go with, if one of these ideas make sense at all.

So here are my thoughts:

1.

I am very interested (or honestly, a bit worried maybe) in polarization and radicalization. Because of social media and algorithms, people tend to get less confronted by different ideas and opinions. I also see this happening close by and extreme right or extreme left ideas are “fed” by their own bubble on social media. I feel like in this 21st century it might be more important to “encourage” the dialogue between different (political) ideas and to bring these two extreme groups closer together instead of more distant. Also, research in Denmark shows traces of a transformation from a tolerant, open nation to a country that has embraced increasingly restrictive policies and highly polarized rhetoric around immigration. And I am wondering if (and how) architecture can contribute to this dialogue again and perhaps decrease polarization (?).

2.

Also, I read an article lately about a critical note mentioned by an architect about how the bubble that most architects live in is not representative for the people they design for. It was about the fact that predominantly white male architects design for a city (such as Amsterdam in this article) that includes a large group of people with a migration background. It gave a lot of examples of cultural preferences in architectural design for Surinamese or Asian people that differ from the Dutch. Since our neighborhood in Copenhagen also has relatively more residents with a migration background - but they obviously still exist to be the minority in this city - I am also interested in analyzing/mapping/asking these different design wishes and preferences of all cultures and nationalities living there. So not to design “only” for the Danish people, but to at least try to design for more cultures. I am curious if I can combine these architectural design preferences or whether one cultural preference indirectly excludes another cultural preference. Probably “designing for all” is an illusion, but I am interested in forcing myself to try my best/learn more.

So, to sum it up, my interests are probably a bit more social/political. I am curious about your ideas, and I hope I have not bombarded you with too many thoughts on a Friday evening. :)

Thanks in advance!

Kind regards,
Joyce

This week, I sent Stefano Corbo my initial thoughts of the interests I have, and which directions I wanted to explore.

He replied with possible research and sub questions when choosing one of the two subjects

Do I want to celebrate diversities, cultures, and identities in my project?

Joyce de Louw

Van:

Verzonden:

Aan:

Onderwerp:

Stefano Corbo

zaterdag 21 september 2024 09:57

Joyce de Louw

Re: Your initial thoughts

Hi Joyce!

Both options are interesting and absolutely viable; we just need to build a (research) argument around them, and to connect them to possible design applications. You will choose which one suits you best, of course.

1.

One of your peers, Maarten, came up with the same idea. The starting point of his reflections is the extreme polarization that we are facing these days, fuelled by social media. High-fascinating topic, for sure. We joked about a possible name for his public condenser: the DE-POLARIZER... Apart from jokes, if you want to go ahead with this idea, you first have to describe the "context" of your research: what type of polarization are you talking about? Political? Cultural? Societal? Where is this polarization taking place? In cities? In suburban areas? etc. In which country? Denmark? Do you have data for it?

After that, we can introduce your MAIN research question: Can public architecture facilitate dialogue and coexistence?

Sub-questions: How? What tools do architects have to overcome this polarization? What identity (identities) will your public condenser express? etc.

One way to look at this from an architectural point of view is to design a space that acts as an agora or as a forum (large open assembly halls, like in the Greek and Roman history). However, this is a very traditional approach. I'm not sure it will be enough. You want people to get together, but also to get out of their internet bubble, and to experience a physical relationship with the world. We don't have to think right now of how your building will look like, but start considering how your building can actually promote dialogue.

2.

As you write, maybe the "design for all" thing is a bit unrealistic, but you can certainly investigate about the need for public buildings to celebrate diversities, cultures, and identities.

In this case, the context of your research (or research problem) is that for many years our public buildings have been designed for ONE social and ethnic group by white male architects. You can talk about modern architecture and International Style as examples. Contrary to that, your main challenge (research aim) would be to investigate how architecture can respond to actual societal needs and represent the diversity of ideas, ethnicities, genders of today. So, if in the past architecture only represented ONE identity, your public condenser wants to honor MULTIPLE diversities that coexist in the same building.

When it comes to design solutions, here you might have interesting options.
How would such a condenser look like?
Will it be a "collection" of rooms – each room being completely different in terms of colors, atmospheres, textures, etc.? In other words: a PATCHWORK of spaces.

Or will your building look like a continuous journey, where you move from one space to another to understand how diversity society is? In a work: a FUSION of spaces.

Let me know if this is clear and what you think!
Stefano

Stefano Corbo, Ph.D
MSc Coordinator | Chair of Public Building



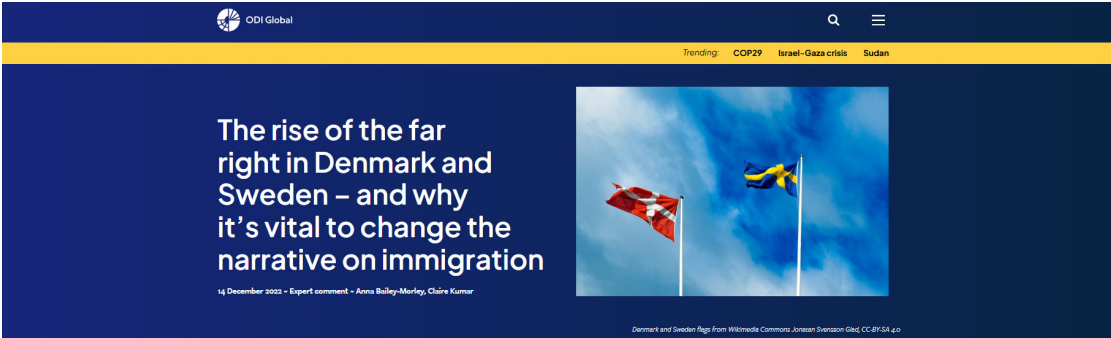
TU Delft | Faculty of Architecture and the Built Environment
Julianalaan 134
2628 BL
Delft, The Netherlands

Management assistants: Caitlin Lima / Salma Ibrahim
C.Lima@tudelft.nl / S.Ibrahim@tudelft.nl
Tel: +31(0)152784220 / +31(0)152783977



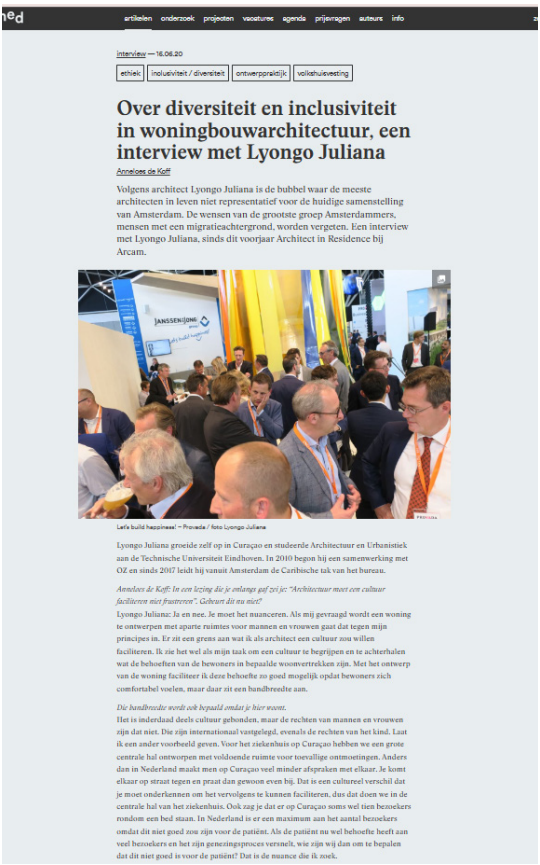
Do I want a
patchwork
of spaces or
a fusion of
spaces in my
design?

These articles
caught my
interest, leading
to the two topics
I find interesting



SHARE
in f t s e
TAGS
Refugees Denmark Sweden Migration

We are used to seeing Nordic countries **topping global rankings** thanks to their stable democracies, generous welfare policies and commitments to equality. But when it comes to immigration, Denmark – and more recently Sweden – appear intent on modelling more regressive approaches. ODI's **new research** traces Denmark's transformation from a tolerant, open nation to a country that has embraced increasingly restrictive policies and highly polarised rhetoric around immigration.





During my excursion, I saw a lot of surface projects reducing the impacts of pluvial flooding caused by heavy rains, which caught my interest



NEWS FLOOD PREVENTION CLIMATE CHANGE ADAPTATION WATER MANAGEMENT +1

Sound of Green: The cloudburst that changed Copenhagen and urban water management

In the summer of 2011, Copenhagen experienced the most destructive cloudburst in the city's history. While the event was damaging, it also became the catalyst for a new way of approaching urban water management. Building on this experience, the public and private sector in Denmark has developed numerous solutions, know-how and expertise to adapt the unpredictable extreme weather events of the future.



I started to read more about it, and found out about the Copenhagen's Cloudburst Management Plan, which implemented many surface projects



By [State of Green](#) | info@stateofgreen.com
1 FEBRUARY 2023



This article of the State of Green was an important source for the initial start of my research plan

Also this article, published by the Cloudburst Initiative Copenhagen, is an important source for the start of my research plan

The cloudburst was a catalyst for change

The cloudburst itself was remarkable, but it was the work that came after to secure Copenhagen in the future that has made the city a global frontrunner in urban water management solutions. And central to that work was creating the cloudburst management plan.

As one of the first cities in the world, Copenhagen developed a comprehensive plan to manage future rainwater. Against the backdrop of the cloudburst in 2011, it was easy to rally around the need for action.


But it wasn't just the sense of urgency that made the plan possible. Another key factor was the close collaboration between public and private stakeholders. The engineering and consultancy firm Rambøll is primary private partner in the cloudburst management plan. And as they can attest to, this kind of public private collaboration is uniquely Danish:

"In contrast to most projects, we as a private company were very closely involved in the decision-making processes and were developing the solutions alongside the municipality and the utility company. And this is different compared to other countries," says Ida Marie Knudsen, Senior Climate Adaptation and Urban Water Management specialist at Rambøll.

As part of Rambøll's contribution to the cloudburst management plan, they developed a framework for stakeholder involvement, a framework that has since been adopted by cities like New York:

Log in

Case studiesCommunityPartnersNewsroomAbout



Copenhagen · © Anders Pedersen

Cloudburst Initiative Copenhagen

Status

ongoing

City

Copenhagen

Main actors

Local Government

Project area

Whole City/Administrative Region

Duration

Ongoing since 2011

Climate adaptation and environmental improvements through nature-based solutions

The City of Copenhagen is implementing a Cloudburst Management Plan based on the Copenhagen Climate Adaptation Plan approved by the City Council in 2011. The goal of the plan is to take a sustainable approach to urban development, nature conservation and community engagement, with a focus on surface solutions for rainwater management. The project includes approximately 300 surface projects, financed through water taxes and tax funds, which aim to improve the quality of life for citizen by creating green and blue recreational areas and increasing biodiversity.

Originally published by EUROCITIES, the network of 130 European cities – [Link](#)

This project was awarded the 'Eurocities Awards' in 2021 in the following category: Planning public spaces – presenting innovative solutions.

For further information about the case study, click here.

Sustainable Development Goals



Close to the site, one of these surface projects of the Cloudburst Management Plan was located, called Grønningen Nordvest

This surface project of the Cloudburst Management Plan has recently been finished



Do I want to integrate a water landscape, such as Grønningen Nordvest, in my own project?

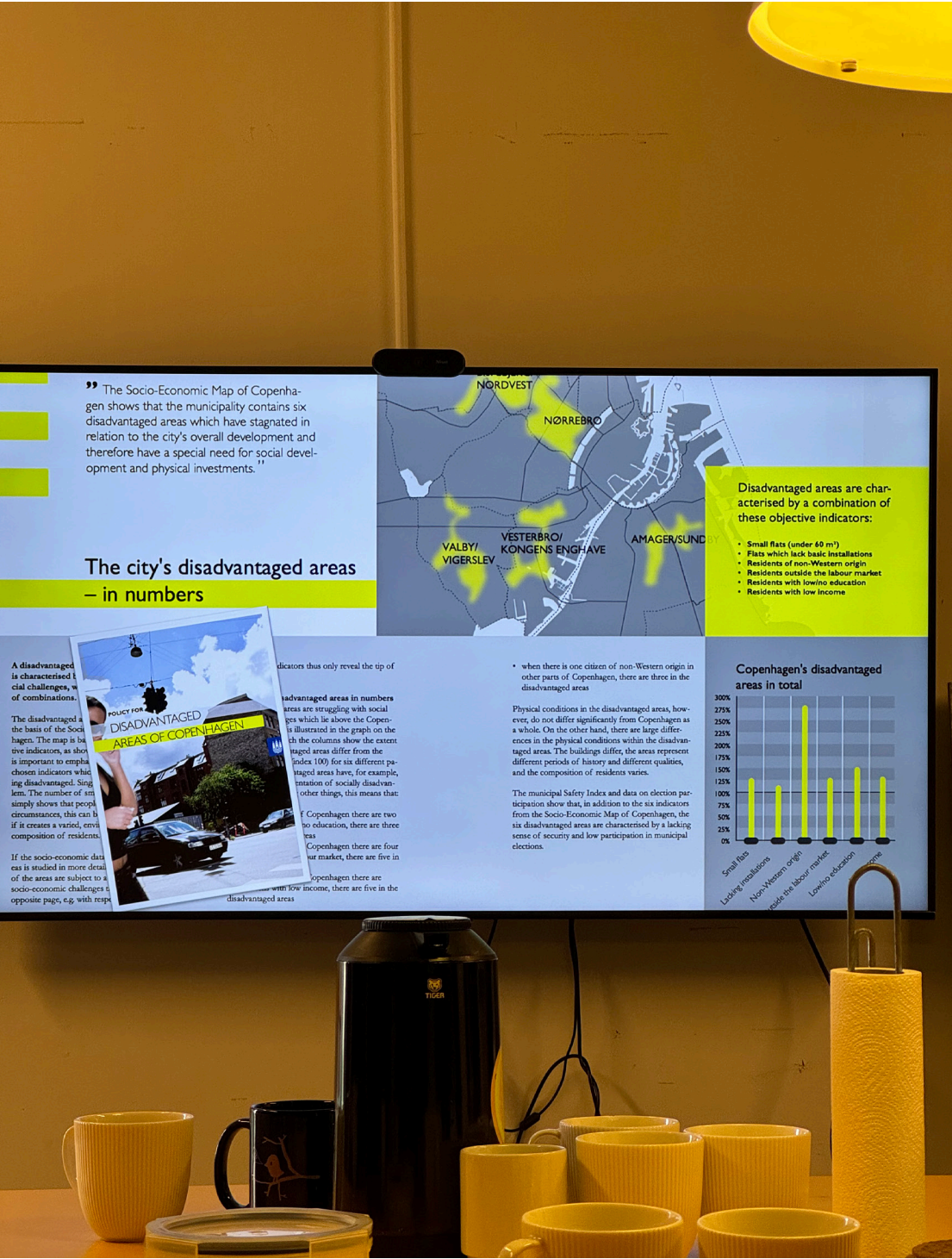




When going to our site, I experienced some hardened surfaces, which had difficulty with absorbing the rainwater

However, I also saw some retention areas that helped rainwater to be collected by the earth





During the lecture of Rikke Rikke Lequick Larsen, Urban spatial architect and chief consultant at the Copenhagen City Council, the "Ghetto Plan" was mentioned, which caught my interest

Do I want to turn it around and celebrate cultural diversity in Nordvest, Copenhagen?



Denmark’s Shameful Ghetto Plan

BY
ANTON ÖSGÅRD / JONAS ALGERS

Denmark’s “ghetto plan” promises harsher policing of districts with high unemployed and ethnic-minority populations and selling off the public housing where they live. The Social Democrats’ shameful policy shows that anti-immigrant chauvinism isn’t a way of defending the welfare state — it’s an instrument of privatization.

Denmark’s general election in June 2019 was an important victory for the Left. Deploying left-wing rhetoric on economic issues, Mette Frederiksen led her Social Democratic Party back to government in a country renowned for its strong welfare state and almost universally unionized working class. Yet if this success promised an end to the decades-long onslaught of privatization, financialization, and deregulation, it is rather less clear that her government has, indeed, made a left-wing turn.

This is particularly apparent when we look at its adoption of the agenda proposed by the previous liberal-conservative government in 2018, notably a so-called “ghetto plan” that defines certain areas as “ghettos” based on the rates of “non-Western immigrants,” unemployment, and crime. For residents of these areas, the plan spells a regime of arbitrary rules and punishments — a disciplining process that will likely end in eviction and the privatization of their homes.

Fueled by racism and masked as social policy, the ghetto plan’s real aim is the dismantling of Denmark’s long-mighty system of public housing. In the campaign for June’s election, it was widely claimed that Denmark’s Social Democrats had adopted a harsh line on immigration in order to buy themselves political space to move left on economics. Yet looking deeper into the Ghetto Plan, we see that the two are not counterposed — and that the racialized stigmatization of the poor in fact

I started to read more about it, and found out about the criticism towards the Ghetto Plan, which is applicable to our site as well

Do I want to turn it around and celebrate cultural diversity in Nordvest, Copenhagen?



Features | Migration

Denmark’s ‘ghetto plan’ and the communities it targets

Residents of largely Muslim neighbourhoods face increased penalties for crimes and ‘Danish values’ lessons for children.

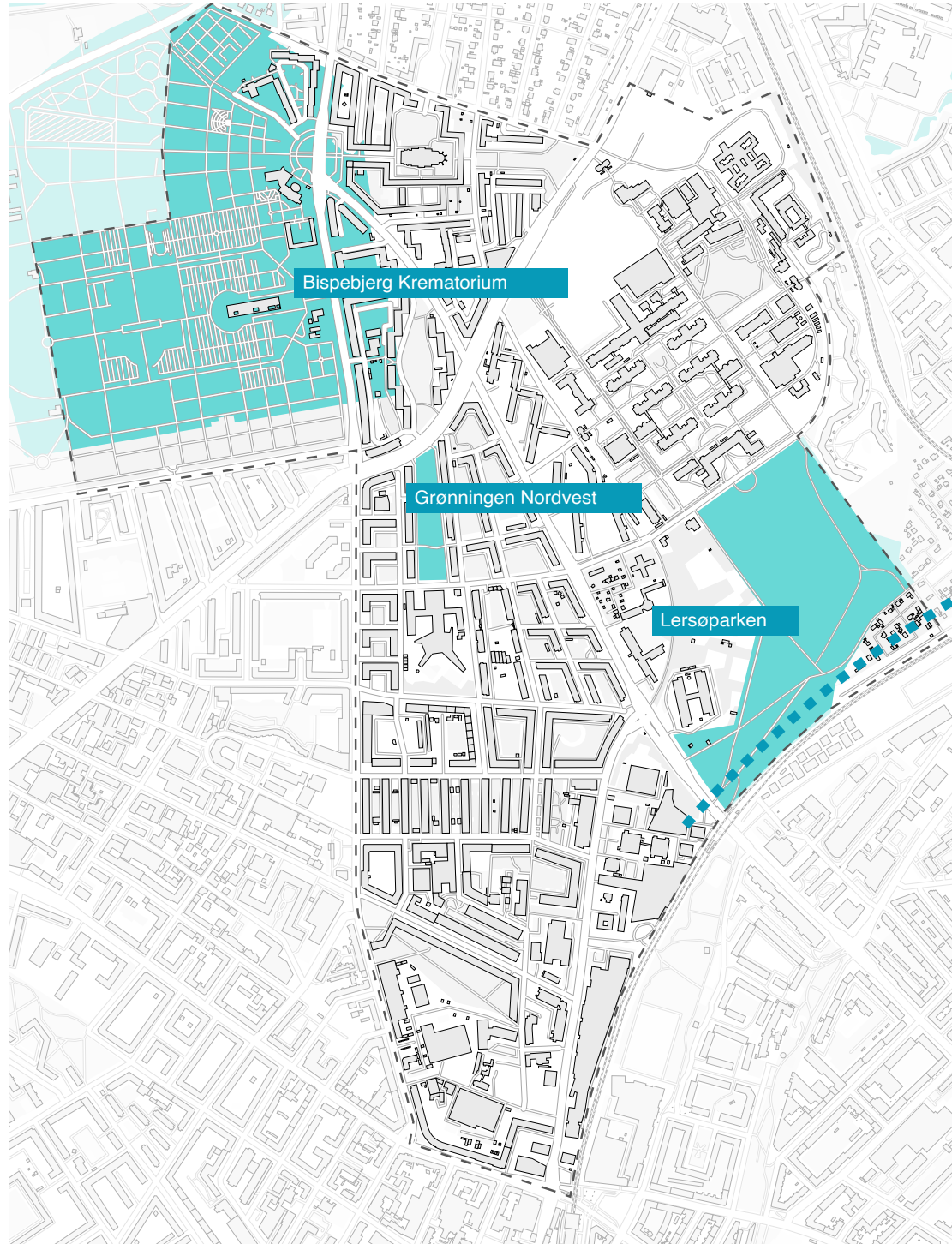


Windows in Mjølnerparken are covered in stickers from Almen Modstand, a group organising against forced re-locations. The stickers read: 'Our home is not for sale!' [Jamila Versi/Al Jazeera]

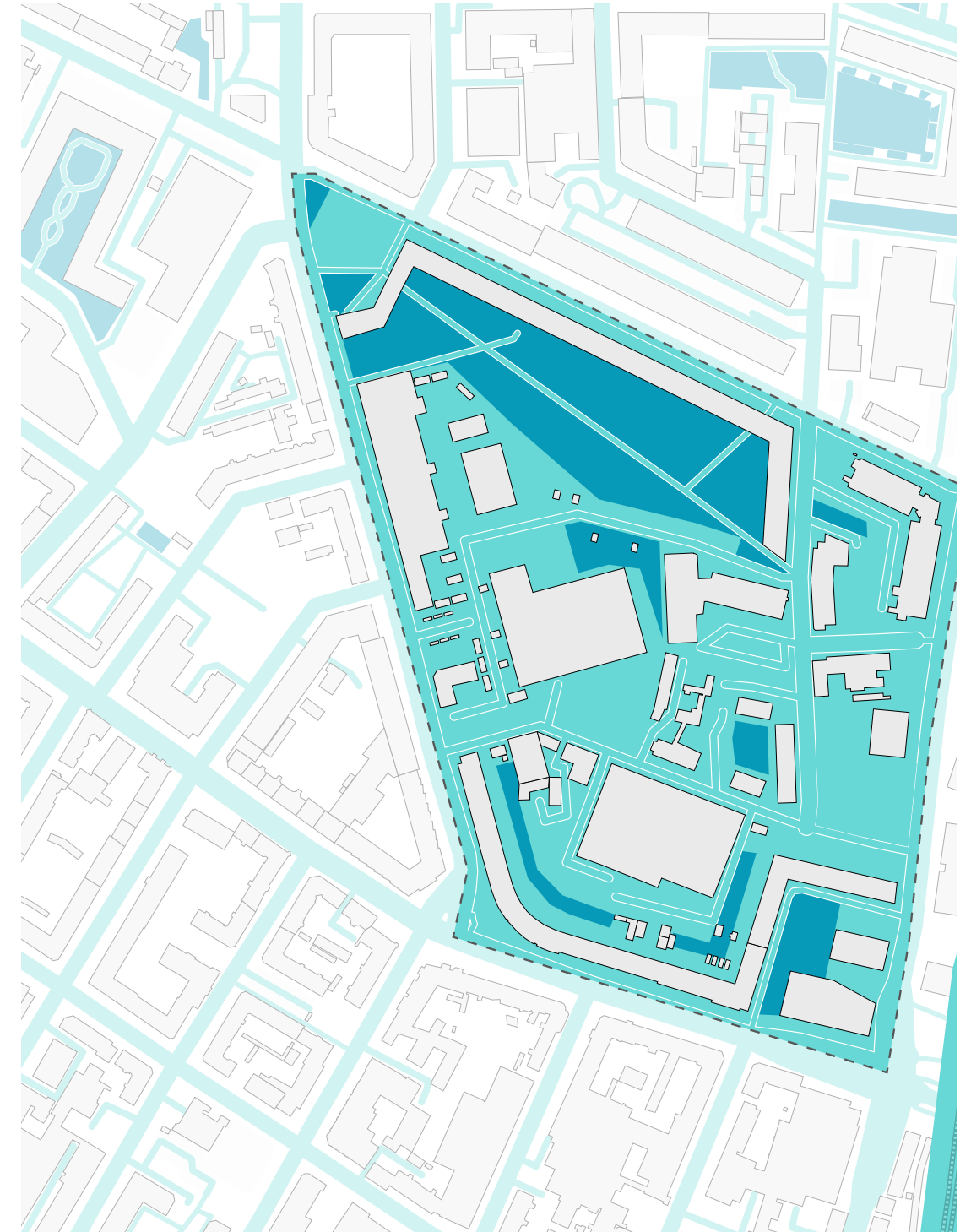
By **Jamila Versi**
15 Jan 2020



At the end of each year, the Danish government publishes a list of what it classifies as the country’s “ghettos”. There are currently 28.



After going to our site, I mapped the different surface projects of the Cloudburst Management Plan in the district



Also I mapped the problematic hardened surfaces and the retention areas that helped rainwater to be collected by the earth



I looked into this document after the lecture of Rikke, looking up the cultural diversity in Nordvest

Do I want to turn it around and celebrate cultural diversity in Nordvest, Copenhagen?

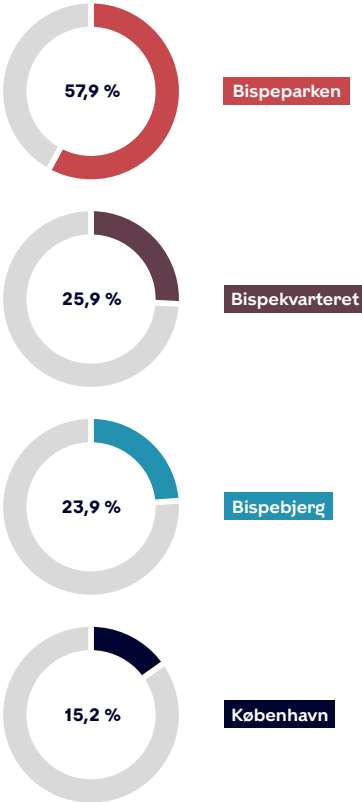
HERKOMST

EN FJERDEDEL AF BEBOERNE I KVARTERET HAR IKKE-VESTLIG BAGGRUND

Over en fjerdedel af beboerne i Bispekvarteret har ikke-vestlig baggrund, hvilket er væsentligt flere end i København som helhed, hvor det er ca. 15 %. I Bispeparken er det 57,9 % af beboerne der har ikke-vestlig baggrund, knap 8 procentpoint over grænsen på 50 % der er en forudsætning for at blive optaget på statens liste over 'ghettooråder'.¹¹

ANDEL INDVANDRERE OG EFTERKOMMERE MED IKKE-VESTLIG BAGGRUND

Kilde: Danmarks Statistik / Den Tværgående analyseenhed, Økonomiforvaltningen - Datatræk lavet efter metoden anvendt til udformning af det Socioøkonomiske Københavnerkort



joycedelouw@hotmail.com

Van: Joyce de Louw

Verzonden: dinsdag 1 oktober 2024 14:13

Aan: F94W@kk.dk

Onderwerp: Demographics of site

Bijlagen: Kvarteranalyse_Bispekvarteret_Hæfte_Komprimeret.pdf

Dear Rikke Lequick Larsen,

I am a TU Delft's Master student and last Friday you gave us a very interesting lecture on our site in Copenhagen, together with our teacher Paul. Thank you for that!

For my research plan, it would help me a lot to get very specific demographics of the residents living on the site. Specifically, I am interested in what nationalities people have.

From Paul, I received the document 'Kvarteranalyse_Bispekvarteret_Hæfte_Komprimeret' (see attached to this e-mail), with the exact percentage of residents with a non-western background.

However, is there also exact information on what nationalities these residents have, and what nationality makes the biggest groups (percentages)?

It would be very helpful, and I would be very grateful, thanks in advance!

Kind regards,
Joyce

Van: Rikke Lequick Larsen <F94W@kk.dk>

Verzonden: woensdag, oktober 2, 2024 8:06 PM

Aan: Joyce de Louw <joycedelouw@hotmail.com>

Onderwerp: Re: [EKSTERN] Demographics of site

Dear Joyce,

Due to gpdr it is not possible to trace nationalities within such a small area. In other words i do not have the data.

Sorry for that.

Best Rikke

Also, as a follow-up, I e-mailed Rikke asking her more specific information about the nationalities of the residents living in Nordvest, Copenhagen

Do I want to turn it around and celebrate cultural diversity in Nordvest, Copenhagen?

joycedelouw@hotmail.com

Van: Rikke Lequick Larsen <F94W@kk.dk>

Verzonden: maandag 7 oktober 2024 20:15

Aan: Joyce de Louw

Onderwerp: SV: [EKSTERN] Demographics of site

Hi Joyce

The Københavner kort has some info

[Kort over København | Københavns Kommune \(kk.dk\)](#)

In short i would say that

Turkish
Ukraine
Afghanistan
Syria
Pakistan

About ukraine there is a welcome center and housing near by your site

Hope this helps a bit.

Fra: Joyce de Louw <joycedelouw@hotmail.com>

Sendt: 7. oktober 2024 13:16

Til: Rikke Lequick Larsen <F94W@kk.dk>

Emne: Re: [EKSTERN] Demographics of site

Dear Rikke,

Thank you for your e-mail back! Very much appreciated. I get that it involves private data.

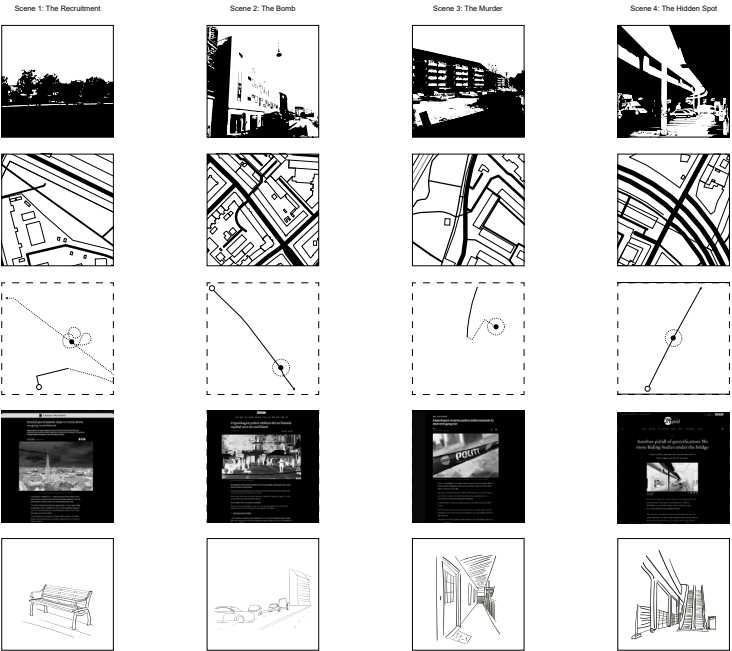
Might it be possible for you to tell me what kind of nationalities (top 3 or top 5) live there mostly? Even if it is in random order. Out of interest, not with specific numbers. Are the residents mostly Turkish or people from Pakistan for example?

I would like to embrace the different cultures within my public building and this general information would also already be very helpful :)

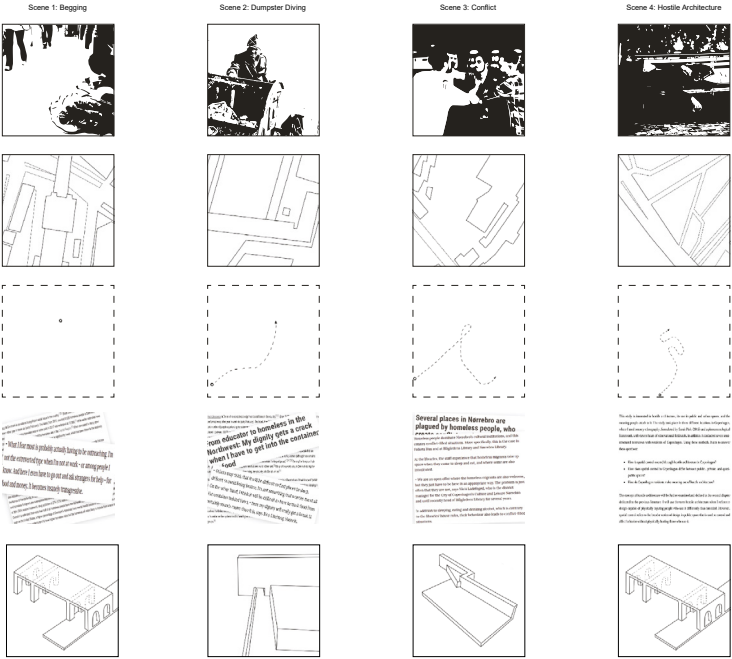
Thanks in advance!

Kind regards,
Joyce

THE GANGSTER

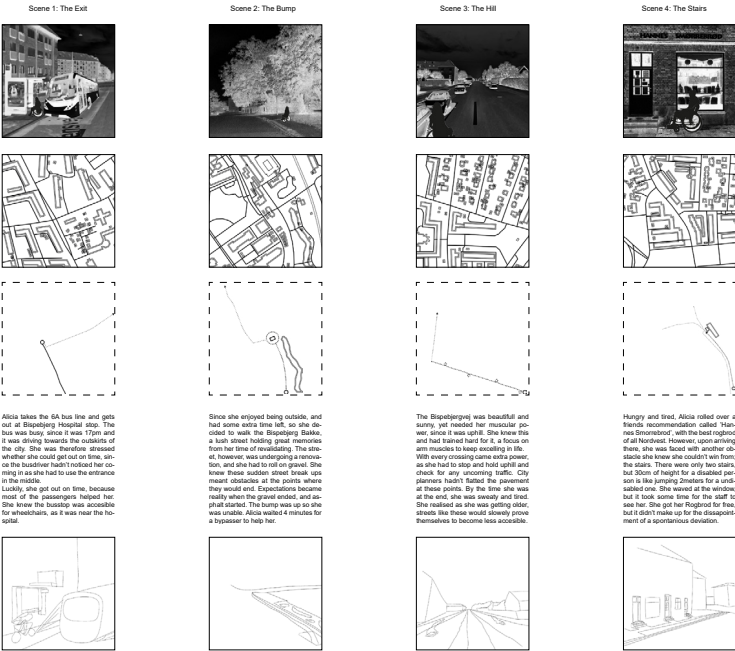


THE HOMELESS

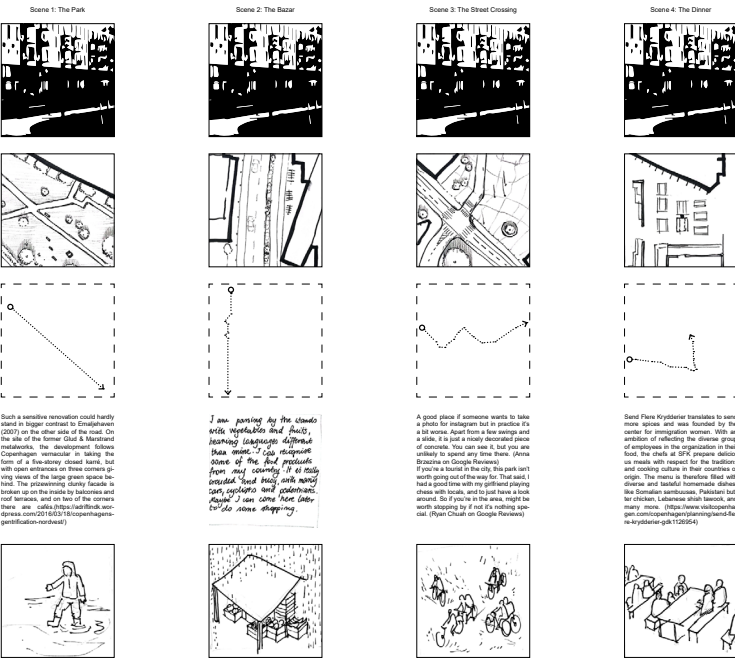


Inspired on The Manhattan Transcripts, of Bernard Tschumi Architects, we mapped our district in the perspective of four different characters: the gangster, the disabeld, the homeless, and the migrant

THE DISABLED



THE MIGRANT



At first, we pictured a scene. Underneath we mapped the place of the scene, and described the movement and routing. Our last input is a 3D sketch of how we experienced this context in reality

Screening of Alternative Water Sources for Copenhagen’s Lakes and Streams



Miljøpunkt Nørrebro

Juni 2019

By Fionn Murphy & Anders Jørn Jensen

1. Overview

This report aims to identify water sources within close proximity to Copenhagen’s network of rivers and lakes, so as to ensure security of water supply and to make savings on the expensive and needless treatment of clean water.

In the summer of 2018, Copenhagen’s lakes and streams experienced massive water shortages. The impact of which was most obvious in the inner lakes, where huge sections of lake bed became exposed for numerous months. Superficially, this presents an eye sore and a source of unpleasant odour in an important recreational focal point of the city. However, the most concerning aspect of this is the diminished cooling effect brought about by this decrease in water surface area. This is particularly important in the city centre, where the urban heat island effect results in central parts of Copenhagen being up to 12 degrees warmer than the outskirts in summer months (Bühler *et al.*, KU, 2010). The Serum Institute estimates that intense heat wave this summer resulted in 250 additional mortalities.

Although similar droughts have occurred in previous years, the intensity on this occasion was more extreme, with the loss of 90.000 litres of water an hour from the inner lakes alone (Michelsen 2018). The length of the drought also led to a watering ban and increased die-off of trees throughout the city, underlining the need for robust alternative water sources. With drought events predicted to increase in frequency with a changing climate, it is important to find feasible solutions to offset loss of water, both in existing and new blue and green infrastructural projects.

The preferred management option is to utilise water sources that are today needlessly subjected to sewage treatment. By prioritising the use of clean water which is currently lead to the sewers, this would lead to savings in treatment costs and increased space in the sewer network. The Danish EPA estimates that 25-30% of water in the sewage system is from extraneous sources and does not require treatment, leading to additional costs of approximately 500 million DKK annually (Miljøstyrelsen 2018).

Another effect of a changing climate is more rain, heat waves and rising groundwater. Rising groundwater levels are predicted throughout the city, threatening the foundations of our existing building mass, while at the same time representing a significant robust water resource for the city’s needs, if harnessed in a public regime of groundwater control.

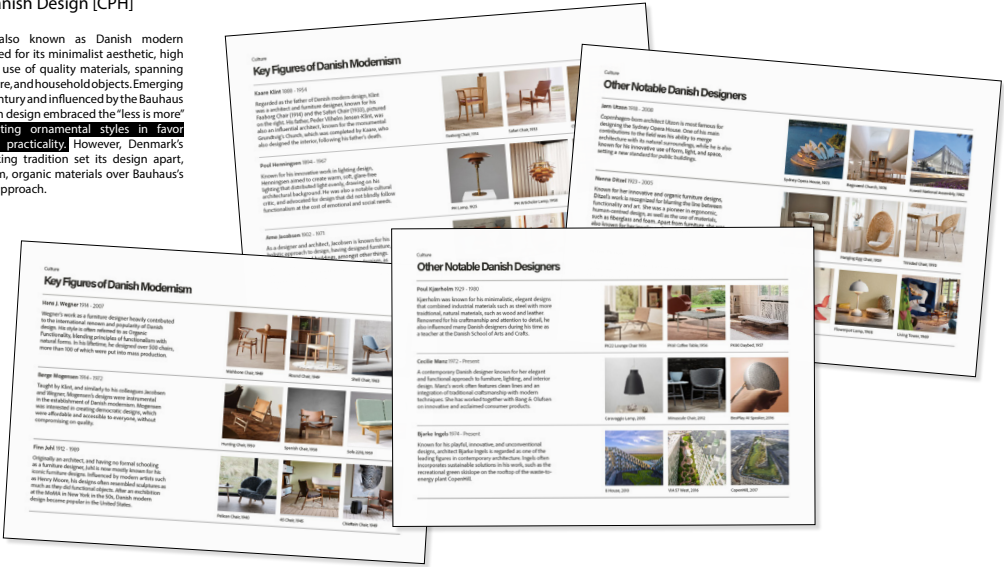
It I assessed, based upon studies conducted in Frederiksberg, that an active groundwater control regime in Copenhagen could save billions of DKK in the most likely future climate and groundwater scenarios.

Progress Pin-up – part 1

Collective review of student work

Culture | Danish Design [CPH]

Danish design, also known as Danish modern design, is renowned for its minimalist aesthetic, high functionality, and use of quality materials, spanning fashion, architecture, and household objects. Emerging in the mid-20th century and influenced by the Bauhaus movement, Danish design embraced the "less is more" philosophy, **rejecting ornamental styles in favor of simplicity and practicality.** However, Denmark's strong woodworking tradition set its design apart, emphasizing warm, organic materials over Bauhaus's colder, industrial approach.



This presentation, gave me more insights into the culture of Copenhagen, but also looking into our more specific site: Nordvest

Culture | Cultural Heritage [Nordvest]

Danish design as seen in the city of Copenhagen is inspired by the cultural tradition of woodworking and craftsmanship. Similarly, in Nordvest the art and architecture of the area is also said to have been influenced by the area's history of crafts and industry. **The architectural identity of Nordvest is distinct from the city centre.** The area was host to large factories that produced products ranging from soap to toy cars, as well as countless smaller carpentry and metal shops, paint factories, and car workshops. To a certain extent, this cultural heritage is still evident in the industrial architecture in the area, as well as in the modern facade paintings of housing blocks. Many of these buildings are utilitarian and functional, lacking the uniformity as seen in central Copenhagen or the distinct Scandinavian minimalism found in newer developments.

However, despite this distinct identity, the local committee in Nordvest has expressed their worry that **the cultural heritage of the site, especially with regards to its architecture, is being diminished.** Yellow brick buildings and colourful facades used to be a defining feature of Nordvest, but are slowly being replaced by homogeneous gray concrete structures. The committee has called this a "regrettable development", and hope to see more variation and colour in the architecture of Nordvest in the future. Gentrification, as is often the case, seems to be leading to a loss of local culture.



Jers Peter Brask's Open Air Gable Gallery Project, Scandinavia's largest open air gallery



Demokati Garage, a former blacksmith and car workshop turned into a cultural center



Gray, undefined concrete architecture and abandoned lots



Farvemøllen, a former paint warehouse now housing a sound studio

Culture | Danish Design [CPH]

The principles of Danish design are evident in the architecture of Copenhagen. Iconic figures of the design movement, such as Arne Jacobsen and Finn Juhl, have designed buildings in the city, such as the National Bank of Denmark, pictured on the right. The building, designed in 1971, combined modernism with the Danish functionalist expression that favoured simplicity, clean lines, and a lack of ornamentation. As part of the design, or gesamtkunstwerk, Jacobsen created custom design objects, including furniture, glasses, light fittings, and door handles, resulting in a cohesive whole.

Copenhagen is home to many buildings that exemplify the Danish modern design principles, but this is not limited to buildings that are now seen as architectural landmarks; the qualities of simplicity, functionality, and craftsmanship are evident in even the most common building types in the city.

In Danish Design Heritage and Global Sustainability, Ditte Lysgaard Vind explores how these design values contribute to sustainability. She highlights how the use of durable materials, skilled craftsmanship, and **aesthetic resilience**—the timelessness of Danish design—enable these objects to endure beyond fleeting trends, fostering long-term sustainability.



Culture | Cuisine + Crafts [CPH]

Danish food culture is vibrant! They start their day either with a hearty yoghurt (skir) with granola or at local bakery, ordering a cinnamon bun. This can be found at many kiosks and other small take out venues at stations. The lunch is quick and light consisting of a rye bread with spread. The main dish is dinner (aftensmad), which takes long and must be very hyggel Stegt Flæsk, generally consisting of pork belly and potatoes with parsley sauce, is their traditional dinner. Drink wise, the Danes enjoy a good Carlsberg or Tuborg pilsner, but more recently started adopting nature wines as part of their newly adopted **Nordic Cuisine kitchen**. This emphasizes sustainability, seasonality, and locally-sourced ingredients, based on reviving traditional Nordic cooking techniques while innovating with contemporary presentations, an approach adapted throughout all aspects of Danish culture. Its most famous example is Noma, a two star michelin restaurant led by René Redzepi.



St. Peder's Baget is an established bakery in the city centre of Copenhagen



The team of Noma, 20 years of establishment rooted in an exploration of the natural world



All Danish craftsmanship is combined in the scope of Danish chairs



Example of public data collection of daily passing bicyclists in Copenhagen Centre

How to represent culture in my design?

Progress Pin-up – part 1

Collective review of student work

Culture | Cuisine + Crafts [Nordvest]

The Nordvest district offers a rich mix of traditional Danish dishes alongside diverse international options, making it a vibrant culinary destination in Copenhagen. Whether you're enjoying a classic smørrebrød or indulging in Middle Eastern flavors, there's something for every palate. The middle eastern establishments are cheaper than the bakeries. Popular middle eastern establishments are often of Libanese origin, with 'Liban Cuisine Nordvest' being the most notable. Nordvest doesn't have a lot of wine bars compared to other districts, but has bars in general.

The area of Nordvest, or the south part of Bispebjerg, is known for its industry, and since industry in Denmark is based on craftsmanship, it is therefore very crafty. This can be seen in the heritage of Tagensvej industrial building, breathing the past, but it's also upheld today, with the presence of **NEXT** a higher education school for craftsmanship.

With innovation considering the governance, Bispebjerg makes use of a more local approach to area development called **integrated urban renewal**. The approach is a bottom up one instead of a top down one like the data governance and smart city strategy. Its new generation flagships aren't loud like Superkilen and aren't based on data, but on human interaction and communication.



Ali Baget is a well known established Libanese bakery where you can enjoy a large lunch for 10 euro total



AUTOPOOL is one of few wine bars, but is very simple and therefor accessible in its appearance



The newly opened Grønningspark is a result of integrated urban renewal approach



NEXT school in Bispebjerg offers many courses in woodworking

Culture | Events + Traditions [CPH]

Danish culture is **full of various festivities** and customs across the year. Many of these happen in the areas near the city center, such as spacious parks, squares, or by the main canal.

As a capitol city, Copenhagen hosts **various festivals**, such as CPH-DOC, Distortion or Copenhagen Light Festival.



Fattaliam



Studentergilde



Sankt Hans



St. Lucy's day

Culture | Religion [CPH]

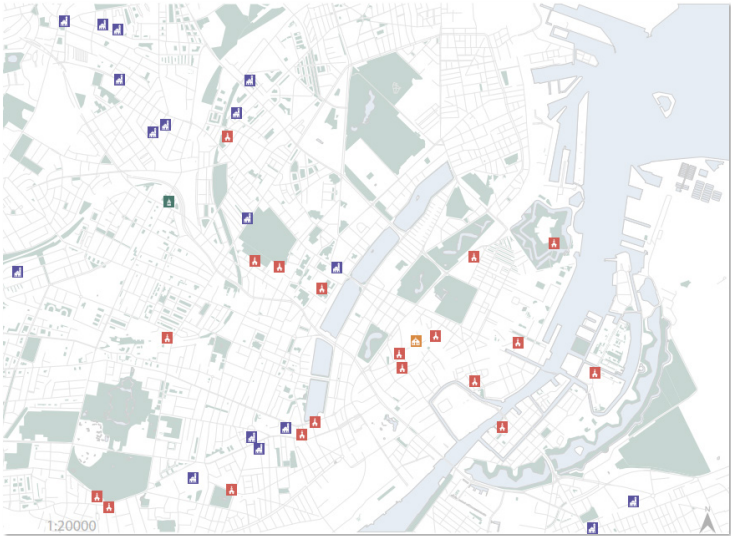
Denmark is a predominantly Lutheran Christian country, which is practiced through the Church of Denmark (**Dansk Folkekirke**). As of 1 January 2024, 71.4% of the population of Denmark are members, though membership is voluntary (Danmark Statistik). Although most Danes are members, regular church attendance is low, with only about 1/3% attending services weekly. Other religions in Copenhagen are:

1. **Islam** is the second-largest religion in Denmark, with approximately 5% of the population identifying as Muslim. Most Danish Muslims are either immigrants or descendants of immigrants, particularly from countries like Turkey, Pakistan, Libanon and Iraq. There are around 150 mosques across Denmark, with Copenhagen having the largest Muslim community.

2. **Christian** minorities such as Roman Catholicism, Eastern Orthodoxy, and various Protestant denominations such as Baptists and Pentecostals. Roman Catholics make up about 1% of the population.

3. **Judaism** consists of approximately 6.000 people. The Jewish history in Copenhagen is notable, particularly during World War II.

4. **Buddhism, Hinduism, and other religions** also practiced by a small percentage of the population, primarily among immigrants from countries like Thailand, Vietnam, and Sri Lanka. These religions account for less than 1% of the population.



Religious venues across Copenhagen

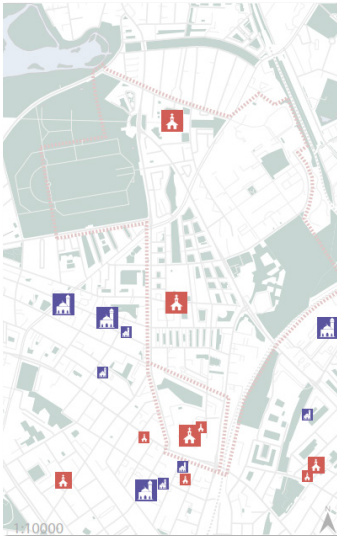
Culture | Religion [Nordvest]

With regard to the site, you can see that there are relatively **more mosques compared to the city centre** of Copenhagen. The four biggest mosques close to our site are:

1. Imam Ali Mosque
2. Hamad Bin Khalifa Civilisation Centre & Mosque
3. Imam Ali Mosque
4. Minhaj Ul Quran International Denmark

Imam Ali Mosque is also the largest Mosque for the Shias in Denmark. However, none of these mosques are located in our plot. Nevertheless, three big churches are located at our plot. One of these churches, the **Grundtvig's Church**, is a Protestant Church and highly well-known among the public. It is now used multifunctionally as well.

Lastly, it is remarkable that there are no synagogues nor temples located in or nearby our plot.



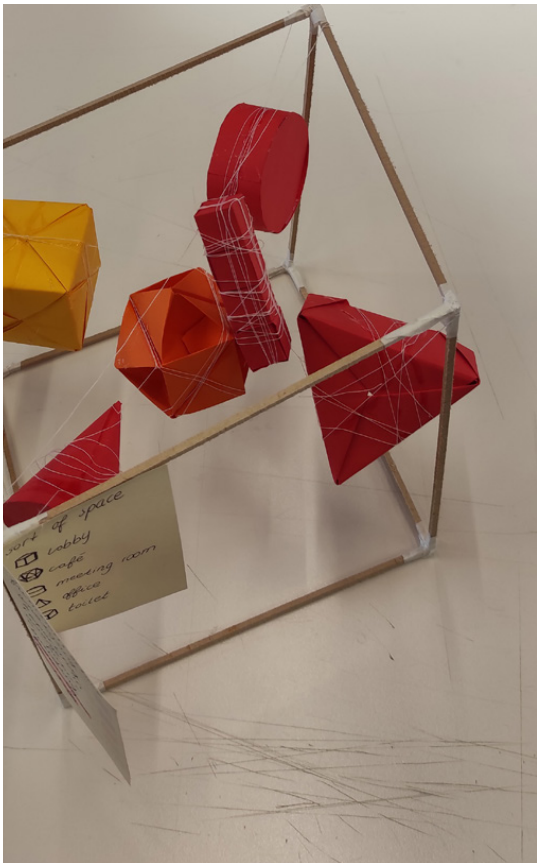
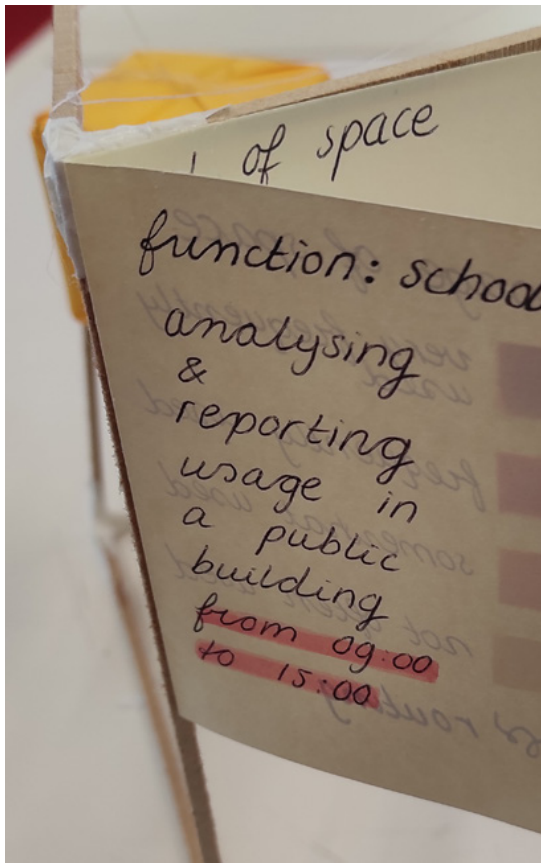
Religious venues in Nordvest (Bispebjerg area)



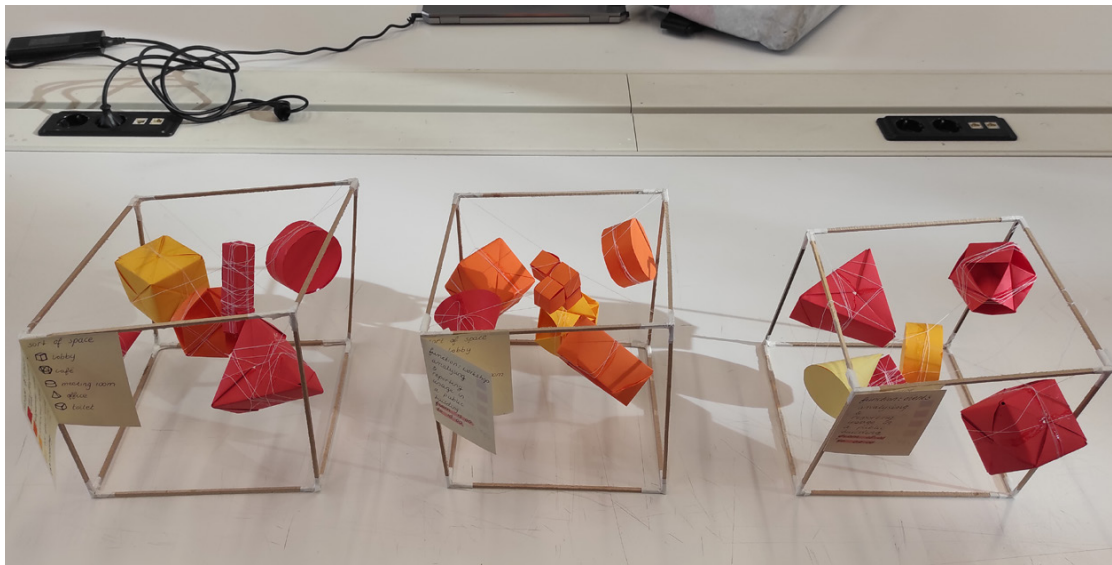
Grundtvig's Church is known for its minimalist architecture, and is Bispebjerg's landmark



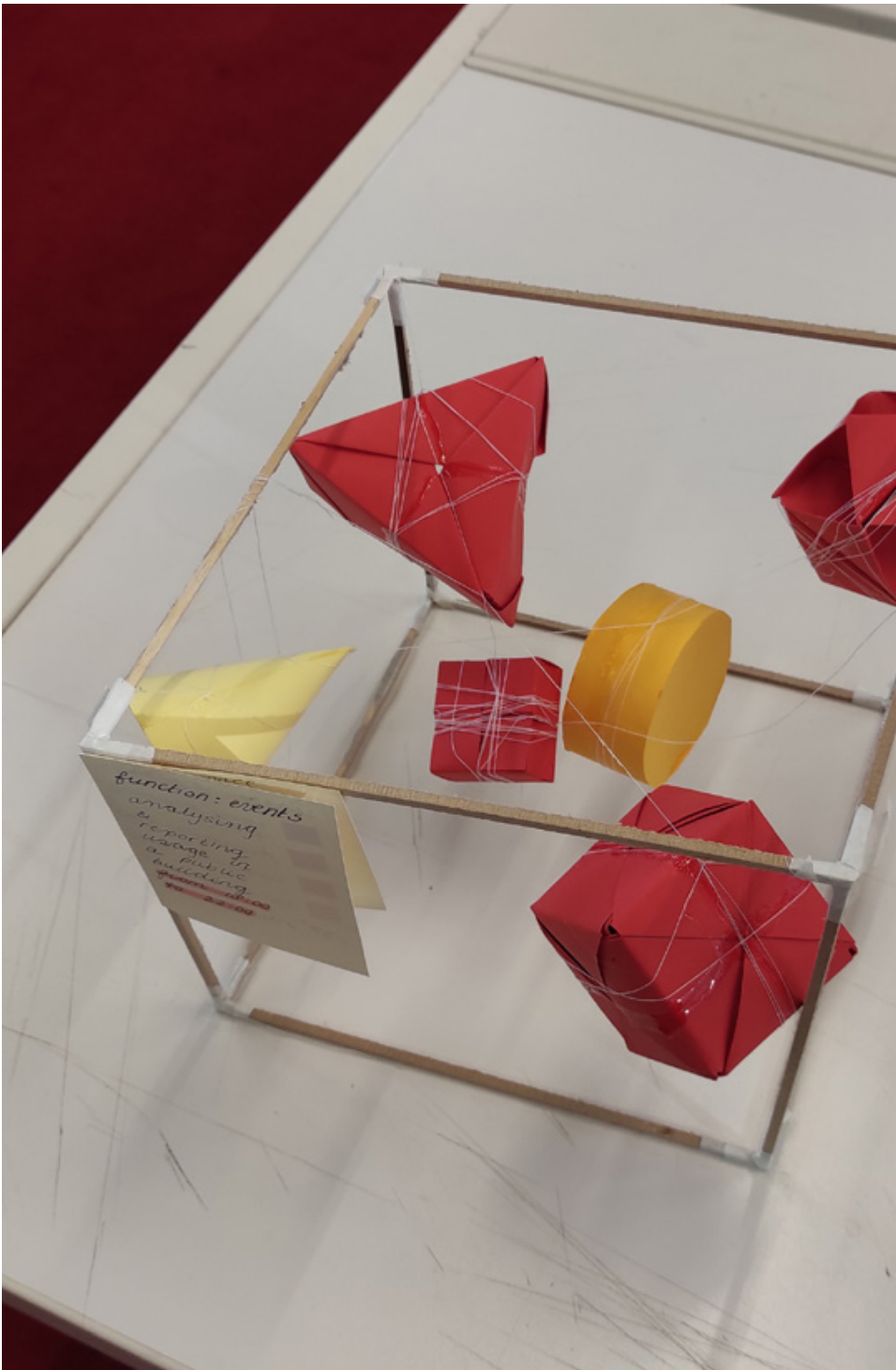
Imam Ali Mosque in Nordvest



For this assignment, we created three abstract models of a public building, representing a different timeframe during the day: during school hours, after work and school, and during the evening.



Different geometrical figures serve as various functional areas within the building, while the color gradient represents how many people are using these spaces



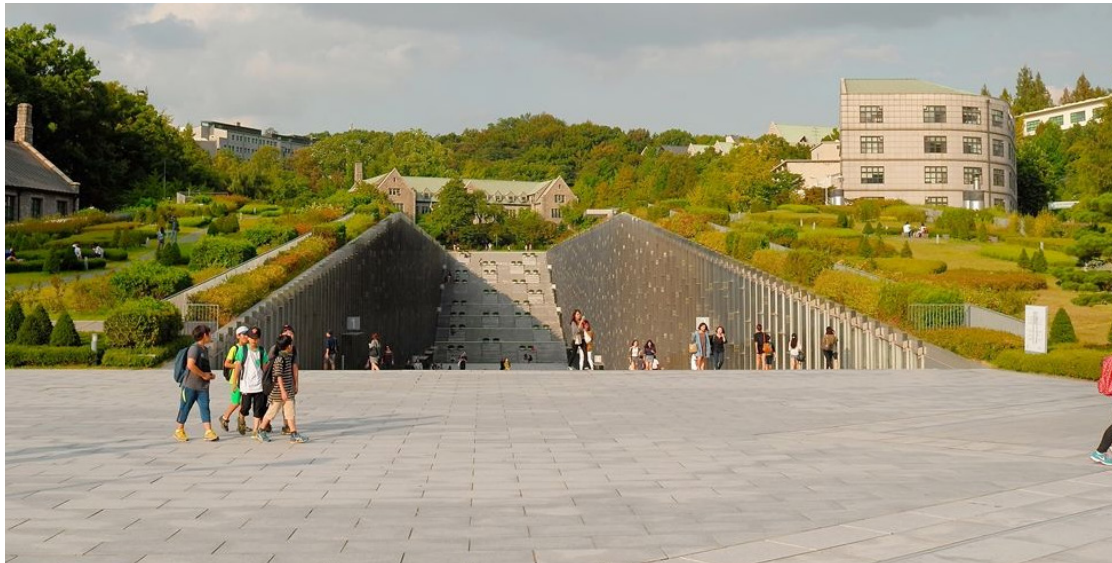
Hybrid Functions

- Le Corbusier: designing with no interaction between functions
- Mixed use buildings nowadays: hybrid and fluid the functions as a reaction to Le Corbusier
- American culture: experimented with combining different functions
- Westbeth Artists Community: 1898 (multifunctional buildings were already present in 19th century)
- Marina City Complex: city within a city
- Joseph Fenton (1985): Architecture as Hybrid Buildings:
 1. Fabric hybrids: one building block suiting the fabric
 2. Graft hybrids: attach volumes to other existing volume
 3. Monolith hybrids: components

- within a single application or system
- Mixed use buildings: stacking functions
 - Hybrid building: connecting functions
 - Steven Holl: Horizontal Skyscraper
 - Elevated functions, only support on the plinth
 - One function: connecting all functions
 - Hans Kollhoff: Atlanpole > Choice: Are you going to interact with the existing fabric?

Hybrid Form

- What if we fuse the building and the park?
- Landform building: merge different landscapes and objects
- Hybrid: architecture and landscape



Do I want my design to merge into the water landscape?

How can the design also address a pragmatic side?

General feedback

- Talk about architecture! How do you see this topics relate to architecture?
- Include the design aspect to the research question
- How can architecture respond to cultural diversity in spacial layout?
- Mention the research is about a building
- Herzberger (1991): book about social interaction
- Structure of Research Plan: 1) Theory 2) Context 3) My reaction to the context

Personal feedback

- Theme: celebrate water while addressing cultural diversity
- Water is not only liquid: it is not only horizontal
- Water is not only a service

- Water is a shared common: we all embrace water in a different way
- Sore water to improve energy: donate water
- Water is a common ground: water is serving people
- How? Water is defined by different cultures
- Water goes beyond liquid state
- Designing a waterscape that celebrates variety, but at the same time it is something concrete, infrastructure
- Carlos Ca Venice foundation: building made out of water
- Also addressing a pragmatic value: providing water infrastructure for the local community
- How can water address neighborhood issues?

How can the Carlos Ca Venice foundation help me with my design?



9

PRECIOUS PROPERTY

Water and Oil in Twentieth-Century Kuwait

Laura Hindelang

In early 1962, Kuwait’s first substantial subterranean water reservoir was discovered at Raudhatain in northern Kuwait.¹ The Ralph M. Parsons company, which was conducting hydrogeological surveys on behalf of the government of Kuwait, was a US firm formerly active in building oil refineries. Geologists described how “the fresh water [had] gathered in a geological basin one side of which is an anticline of the structure forming the Raudhatain oil-field.”² Raudhatain’s water (most of it fossil) and petroleum effectively sprang from the same geological formation and were accessed by similar technologies. This multifaceted historical relationship between Kuwait’s water(scape) and petroleumscape, with its spatial and architectural, social, and political as well as symbolic and representational layers, is the topic of this chapter.

One can trace petroleum’s impact on twentieth-century Kuwait in many ways: airplane and automobile culture, gas stations, air-conditioning, and the proliferation of plastics—all depend on petroleum. In Kuwait, the oil industry but also the oil revenue-financed government transformed the city-state’s urban and desert landscapes, its architectural forms, and the built environment. However, despite the growing omnipresence of petroleum-derived products and lifestyles, petroleum as a raw material, as an unprocessed liquid, has usually remained invisible in urban space. Chemically, oil and water do not mix, but in Kuwait, as the brief example of Raudhatain illustrates, the history of oil and the history of water flow together. Yet, the visual-spatial absence of oil has obscured the two fluids’ interdependent conditions of existence. Water has been given a direct material and spatial presence in a way that oil has not, whereby potable water, whose production, transport, and distribution has relied substantially on petroleum and the petroleumscape in one way or another, became the representative liquid of Kuwait’s oil-based modernization.

Water has been celebrated with direct contact in ways petroleum was not because of oil’s physical characteristics (toxic, inflammable, smelly). At the official inauguration of the opening of the Raudhatain water reservoirs, Kuwait’s deputy prime minister drank

I found this paper after the personal communication with Stefano, addressing a more pragmatic side to water: an infrastructure

These water tanks, known as the Kuwait Water Towers, store water at a certain height from the ground and provide residences in the area

Can I provide a water infrastructure with my design?

168 Laura Hindelang



FIGURE 9.5 A group of mushroom-shaped Kuwait Water Towers built in the 1970s in the neighborhood of Abdullah Al-Salem, Kuwait City. *Source:* Photograph taken by author, February 2018.

al-Sabah (r. 1977–2016) demanded a different concept for this sixth group, which would be in sight of his residency—or so the story is usually told—and finally opted for Bjørn’s design.⁴¹

The Kuwait Towers consist of three white shafts of different heights made of reinforced concrete and finished with silver spires of stainless steel that serve as lightning conductors. The highest tower (185 m) combines the shaft with two spheres covered with a multitude of enameled steel disks of blue and green shades that deflect solar radiation. The larger sphere contains a restaurant, a banquet hall, and an indoor garden in its upper half and a water tank in the lower, while featuring a horizontally extending shade much like a planetary ring. The upper, smaller sphere houses a rotating café and a viewing platform; the sphere’s skin consists of dark blue triangular glass shapes to allow for a view. The second, smaller shaft (140 m) carries one sphere that serves as a water tank. Harnessed with lighting equipment, the third and smallest needle-like shaft (100 m), with no sphere, illuminates the other two and completes the ensemble harmoniously.⁴²

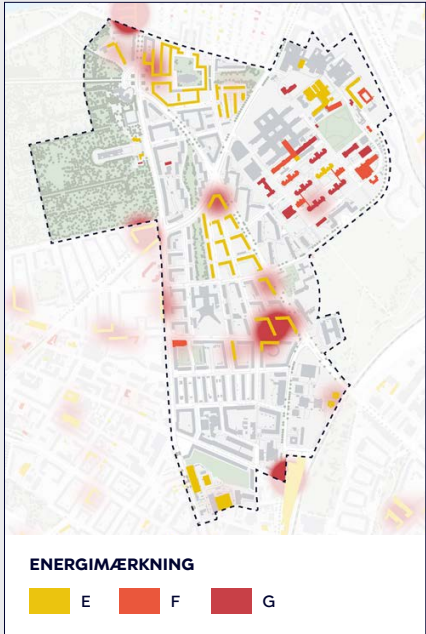
Officially inaugurated in 1976 and 1977, respectively, the Water Towers (mushrooms) and the Kuwait Towers were awarded the first Aga Khan Award for Architecture 1980, and thus attracted much international attention to Kuwait. The award statement argued that the Kuwait Towers, an impressive technological achievement, references mosque architecture in its “minaret-like quality of the shafts” and green-to-blue steel disks, “recalling the tiled domes of historic mosques and shrines,” and hence praised the architecture as a model for



I looked into this document after the personal communication with Stefano, addressing a more pragmatic side to water: an infrastructure

Residential places in the neighborhood of Nordvest that are currently lacking either a bath or a toilet, or both

Can I provide this as a water infrastructure in my design?



Byfornyelsen har en række indsatser som områdefornyelsen og/eller beboere og ejendomme kan få inspiration og ressourcer fra:

BYGNINGSFORNYELSE

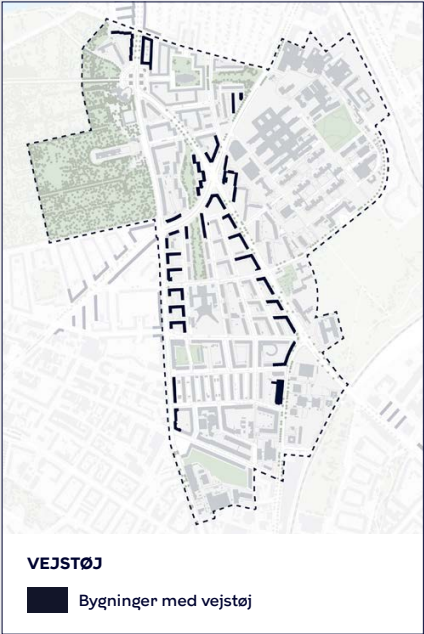
- Toiletpulje til beboere, som enten mangler bad eller eget toilet. Den kan søges af enkelt beboer eller af en ejendom.
- Støjpuljen til ejendomme, som ligger ud til stærkt støjende gader. Den kan søges af ejendomme.
- Bygningsfornyelse til generelle renoveringer af toilet/bad, tage og facader. Den kan søges af ejendomme.

ENERGIOMSTILLING

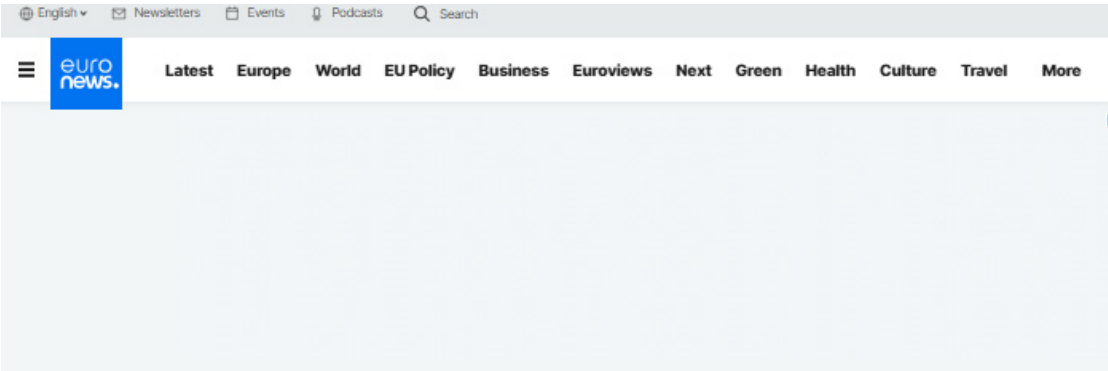
- Deep Demonstration er et EU-finansieret program, som blandt andet støtter områdefornyelser med ressourcer til analyser, kampagner, energifællesskaber og test af nye teknologier.
- Sol over Byen er finansieret af Grundejernes Investeringsfond, som støtter områdefornyelser med at udvikle energifællesskaber.
- Energispring i Byfornyelsen er et tilbud til ejendomme, som ønsker at spare på energien og samtidig indgå i et netværk af bestyrelsesmedlemmer og ejendomsfunktionærer.

CIRKULÆR ØKONOMI

- URGE er et EU-finansieret netværk, som blandt andet kan støtte områdefornyelserne med inspiration, viden og mulighed for at udvikle egne projekter.
- CirculT er et EU-finansieret program, hvor områdefornyelserne kan deltage i forsøg med cirkulær økonomi i byggeprojekter.



Kilde: Bygningsfornyelsen



Green > Green News

Half of Denmark's water supplies contaminated with toxins, new report reveals



Copyright Associated Press

By Euronews
Published on 29/02/2024 - 15:33 GMT+1 • Updated 01/03/2024 - 16:57 GMT+1

Share this article Comments

An investigation commissioned by several Danish regional councils says the situation is critical and threatens the country's transition to a green economy.

More than half of Denmark's drinking water supplies are contaminated with pesticides and other toxins, a new report has revealed.

The investigation commissioned by Danske Regioner, which covers Denmark's five regions, also found that one in ten water sources exceeds acceptable levels for various dangerous substances.

ADVERT



Top stories



C
G
U

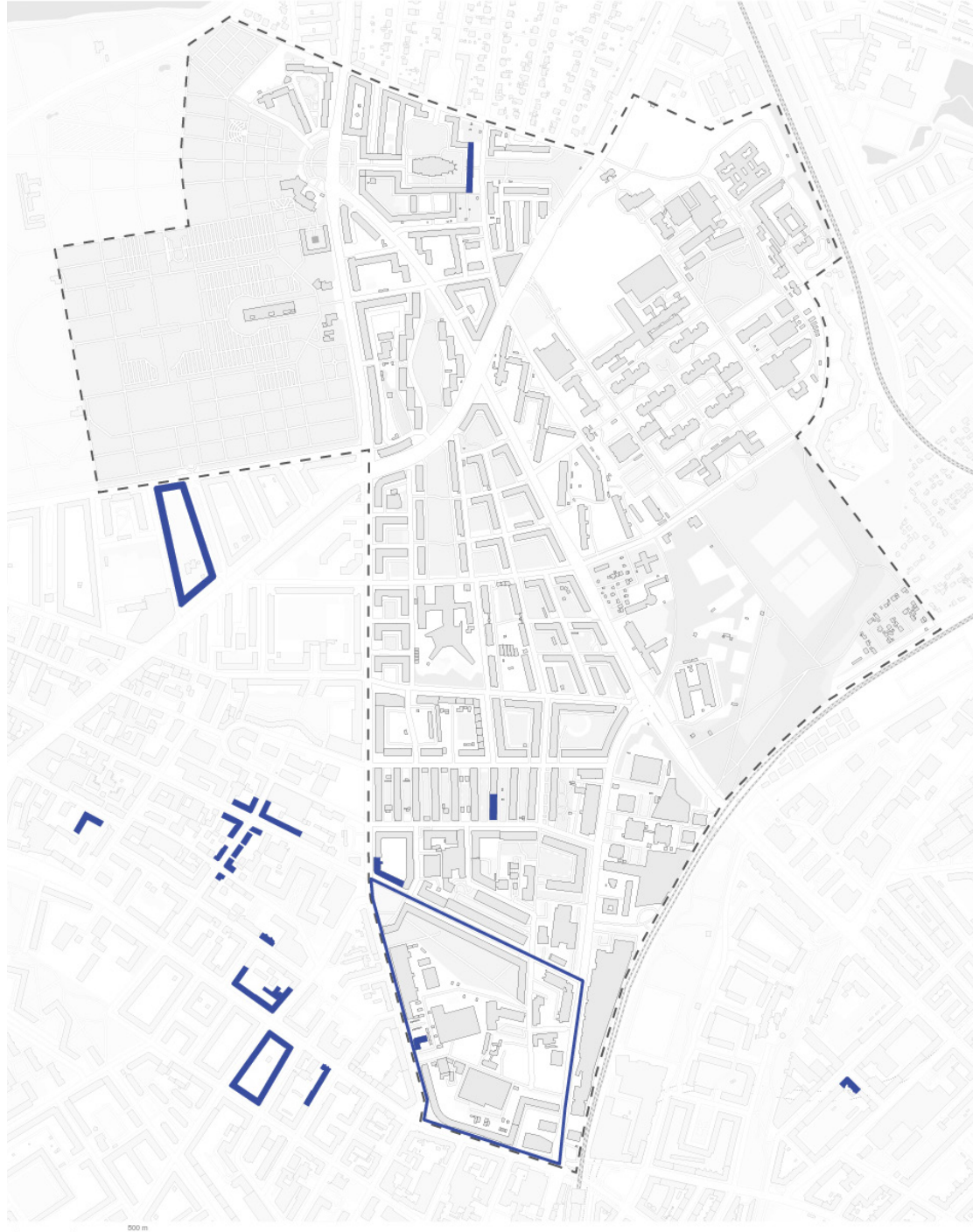


A
c
e
p

Also, I looked into this newspaper after the personal communication with Stefano, addressing a problem statement focusing on health + water

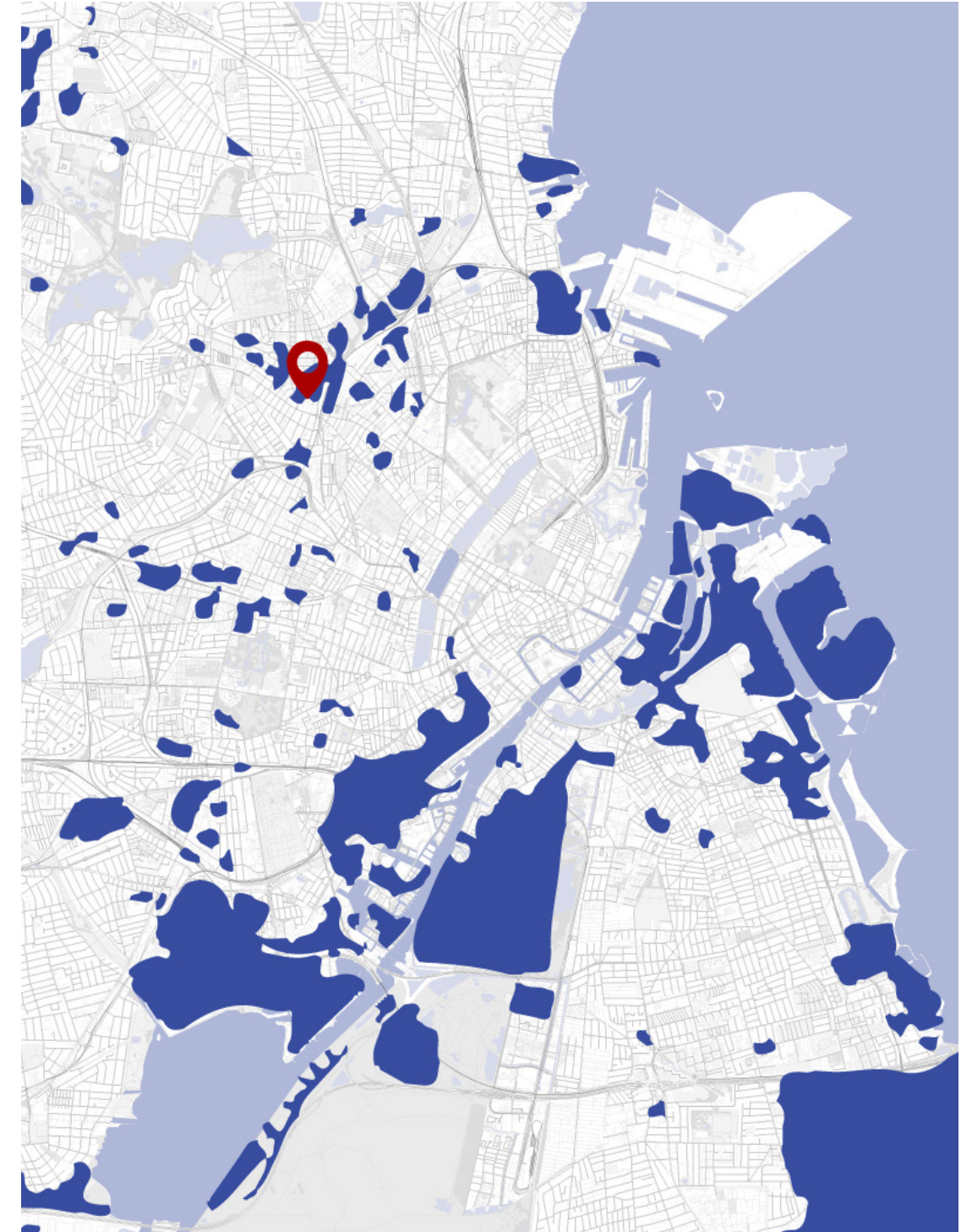
Can I provide this as a water infrastructure in my design?





Mapping the residential places without toilet/bath in the district myself, based on the Bispekvartret Kvarteranalyse

Mapping the polluted sites in Copenhagen myself, based on the Overblik: Her Ligger 61 Farlige Giftgrunde Nær Hovedstaden, n.d



Can I provide this as a water infrastructure in my design?

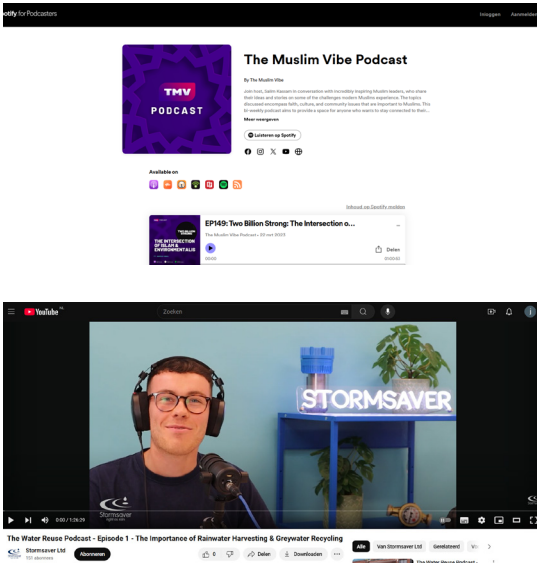
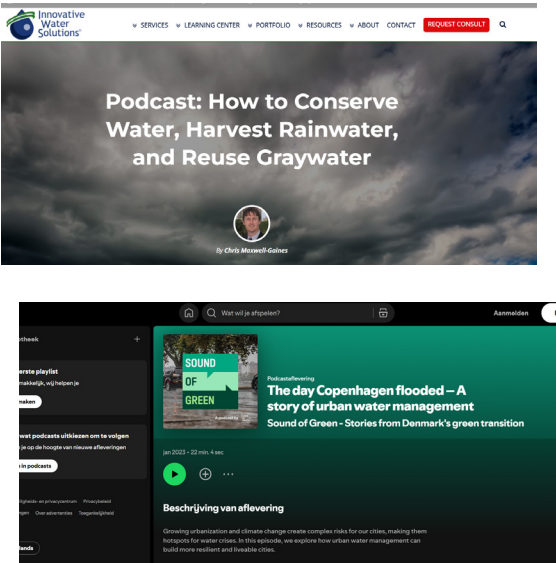
Personal Communication Stefano
Personal Communication Paul

- Research Question: remove “by reusing rainwater”, remove “I can design”;
 - Sub Questions: relate each subquestion to one of the three themes (social, health, environmental);
 - Methodology: interviews can be conducted by asking questions to Dutch citizens that are representative, but needs to be mentioned as a shortcoming;
 - Methodology: “my proposal is a combination between quantitative (literature) and qualitative (interviews) research, but the research that I am conducted is also defined by my studio’s approach: research by design”;
 - Research question can also be: “How can water act for integration, dialogue etc?”
- Introduction P1: Show an example of a typical Public Condenser in Denmark, and show afterwards what I am proposing. For example: water on different levels. Make a collage of this;
 - Discuss during P1: Will this public condenser be bold? Or more modest? A landmark or a more subtle building? Will I build from skretch or use / merge it with an existing building? What is the program? What scale? What are the functions? Does it consist of one building or more fragments? How does it integrate in the landscape? Where am I going to build?
 - Come up with a title;
 - Add list of bibliography to Research Plan as well as P1. List of bibliography can be from different media.

There is a debate in Copenhagen about excavating Ladegårdsåen (a river), which runs under Åboulevarden

- Existing boundaries on the plot can be broken. Boundaries will change anyway when adding a new building;
- It is possible to suggest more than one option where I would like to build in my P1;
- Answering the questions for the Workshop preparations will give us more clarity (action, target group, stakeholders, outcome, context);
- Urban River Project: <https://koebenhavn.dn.dk/vigtigste-sager/arkiv/arkiv-byudvikling/opgrav-ladegaardsaaen/>
- “DN København has followed with interest the debate in Copenhagen about excavating Ladegårdsåen (a river), which runs under Åboulevarden. We have always wanted the piped

- streams in the city to be dug up and also to have Copenhagen’s water environment cleaned so that it is far less polluted. The debate surrounding the excavation of Ladegårdsåen really flared up in the city in 2012, after Nørrebro Miljøpunkt drew up an ambitious plan for how this work can be done”
- There used to be a river running next to our plot
 - Look into the historical map and the historical (water) structures. What is left? What waterstructures are non-existing anymore? Can these be excavated? How would this help my project? What are the benefits of excavating a river?
 - Extra information: <https://www.ladegaardsaaen.dk/>
 - Research the plot and its history



After the personal communication with Stefano, I looked up into sources that I want to research from different media, such as podcasts

Do I want to dig up old water structures of Norvest in my design?



Research I want to investigate

<p>Asset management for infrastructure systems : energy and water door Gerd Balzer, Christian Schorn</p> <p>eBook 2022</p> <p>ISBN: 9783030908546 3030908542 OCLC-nummer: 1298383839</p>	<p>I looked up in the TU Delft Catalog, what books I want to research the upcoming weeks</p>	<p>Artful rainwater design : creative ways to manage stormwater door Stuart Echols 1961-, Eliza Pennypacker</p> <p>ISBN: 9781610913188 1610913183 1610910516 9781610910514 OCLC-nummer: 908252720</p>
<p>Rivers of paradise : water in Islamic art and culture door Sheila Blair (Sheila S.), Jonathan Bloom (Jonathan M.), 1950-, Virginia Commonwealth University. School of the Arts (Qatar), Hamad Bin Khalifa Symposium on Islamic Art and Culture (2nd : 2007 : Dawhah, Qatar)</p> <p>Gedrukt boek cop. 2009</p> <p>ISBN: 0300158998 9780300158991 OCLC-nummer: 783449289</p> <p>Signaturen: • BK A.VI.377 - Architecture open stacks (for loan)</p>		<p>Waterscapes : planning, building and designing with water door Dieter Grau 1963-, Herbert. Dreiseitl, Karl H. C. Ludwig</p> <p>Gedrukt boek 2001</p> <p>ISBN: 3764365080 9783764365080 3764364106 9783764364106 OCLC-nummer: 47702157</p> <p>Signaturen: • BK Z.VII.D.105 - Architecture open stacks (for loan)</p>
<p>Cultural change in post-migrant societies : re-imagining communities through arts and cultural activities door Wiebke Sievers</p> <p>OAPEN (Open Access Publishing in European Networks)</p> <p>eBook 2024</p> <p>ISBN: 9783031399008 3031399005 ISSN: 2364-4095 OCLC-nummer: 1415633494</p>		<p>Architecture and action door J. Meejin Yoon (Jeannie Meejin), 1972-, Irina Chernyakova, Ammar Ahmed 1983-, Sam Ghantous, Maya Shopova, Massachusetts Institute of Technology. Department of Architecture,</p> <p>Gedrukt boek 2019</p> <p>ISBN: 0998117064 9780998117065 OCLC-nummer: 1030591825</p> <p>Signaturen: • BK A.IX. 86 - Architecture open stacks (for loan)</p>
<p>New waterscapes : planning, building and designing with water door Herbert. Dreiseitl, Dieter Grau 1963-</p> <p>Gedrukt boek ©2005</p> <p>ISBN: 3764372451 9783764372453 9783764374761 3764374764 OCLC-nummer: 62462032</p> <p>Signaturen: • BK Z.VII.D.116 - Architecture open stacks (for loan)</p>		<p>Water Index Design Strategies for Drought, Flooding and Contamination. door Seth. McDowell</p> <p>eBook 2017</p> <p>ISBN: 9781638409076 1638409072 OCLC-nummer: 1244624291</p>

How can these
books help me
with my design?

WEEK 1.8

Research I want to investigate

25 | 10 | 24

Architecture and water space.

door Bunji. Murotani

Gedrukt boek 1981

ISBN: 089860057X 9780898600575

OLC-nummer: 839675651

Signaturen:

- BK Z.VII.D. 74 - Architecture open stacks (for loan)

Designing rainwater harvesting systems : integrating rainwater into building systems

door Celeste Allen. Novak, Eddie. Van Giesen, Kathy M. DeBusk

eBook 2014

ISBN: 9781118421888 1118421884 9781118417867 1118417860

9781306532556 1306532558

OLC-nummer: 859253580

Sustainable water purification

door M. Safiur Rahman, Rafiqul Islam 1959-

eBook 2020

ISBN: 9781119651130 1119651131 111965114X 9781119651147

9781119651123 1119651123

OCLC-nummer: 1176319689

Design in the terrain of water

door Anuradha Mathur, Dilip da Cunha, Anuradha. Mathur, University of Pennsylvania. School of Design.

Gedrukt boek 2014

ISBN: 9781941806241 1941806244

OCLC-nummer: 868639610

Signaturen:

- BK U.III. 84 - Architecture open stacks (for loan)
- BK U.III. 85 - Architecture open stacks (for loan)

Rainwater park : stormwater management and utilization in landscape design

door Michael Wright (Michael Courtney),

Gedrukt boek 2015

ISBN: 9781864706314 1864706317

OCLC-nummer: 903486625

Signaturen:

- BK Z.VII.C.564 - Architecture open stacks (for loan)

Aquatecture : architecture and water

door Anthony. Wylson

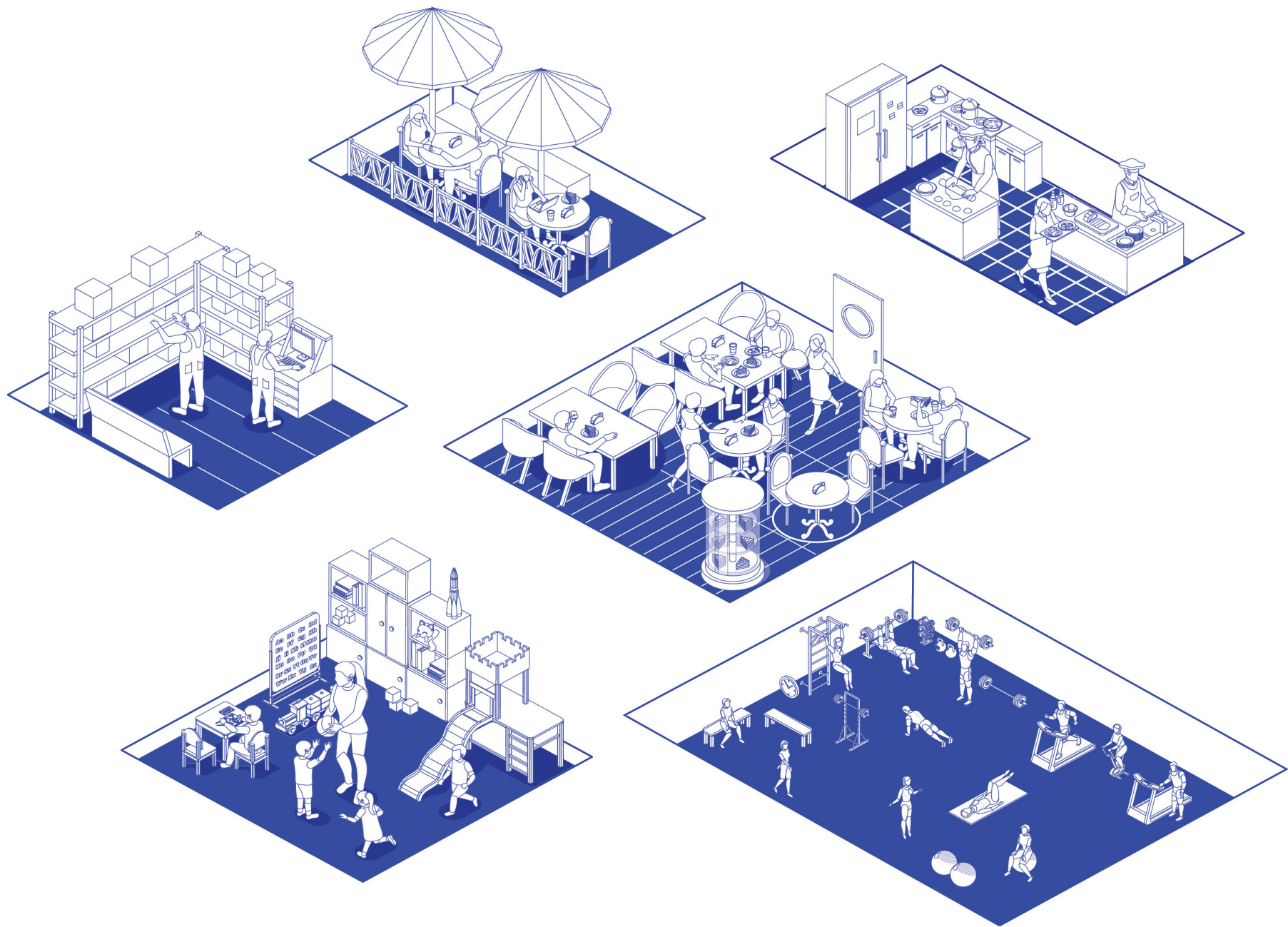
Gedrukt boek 1986

ISBN: 0851397271 9780851397276 0442291914 9780442291914

OLC-nummer: 16126825

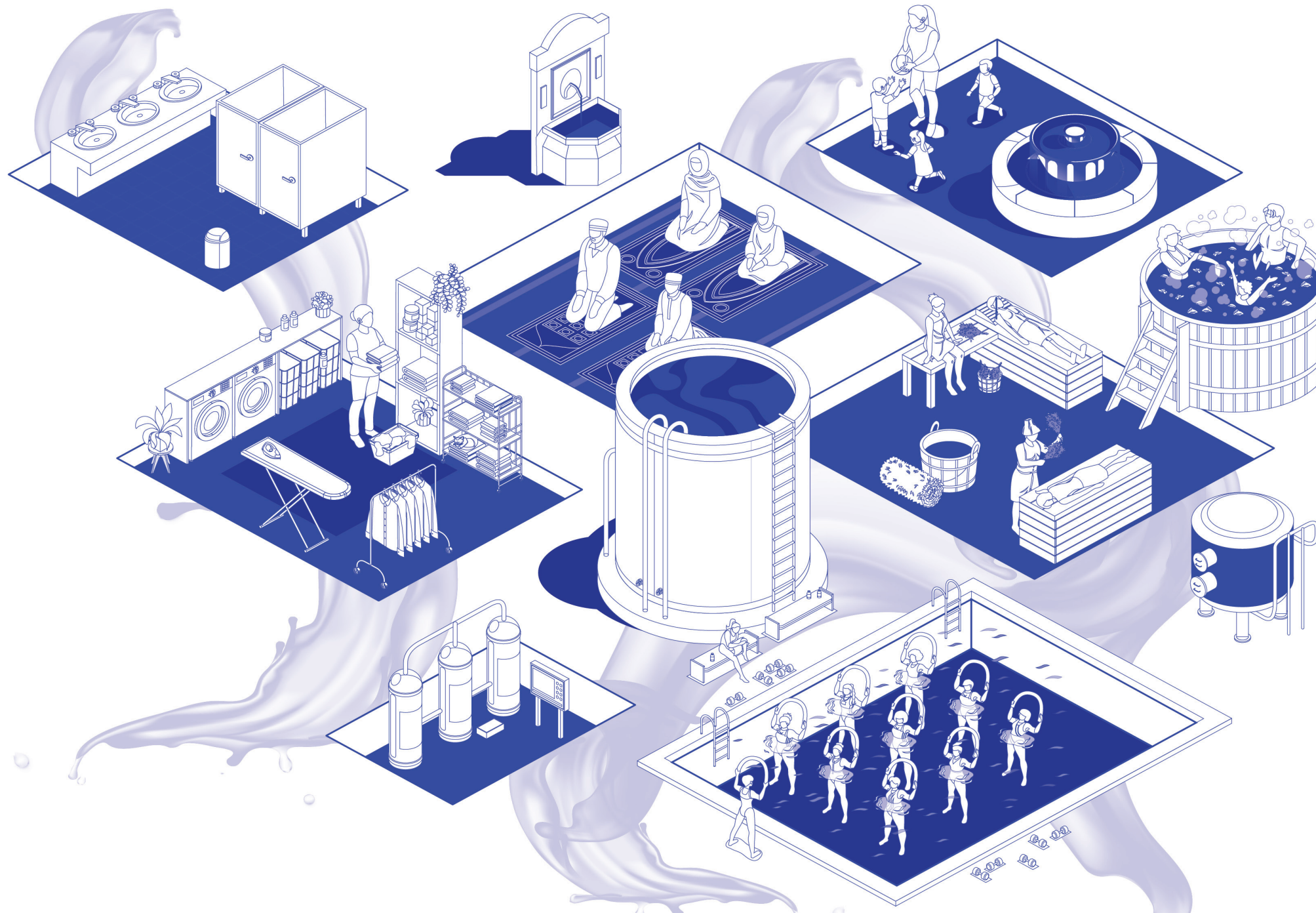
Signaturen:

- VCA186 - Central Library open stacks (for loan)



A PUBLIC CONDENSER

For years, a Public Condenser has usually had its 'traditional' interpretation, consisting of e.g. recreational and sport spaces, event spaces, eating and cooking spaces, children's play and family activity spaces.



MY PROPOSAL

However, I am proposing a Public Condenser connected through water.

A place where people can identify themselves through water, a place that connects people by water and a place that gives accessibility to water as valuable source of life.

It will address a more pragmatic side of water by providing a water infrastructure, but it will also address the more symbolic and cultural side of water by creating a waterscape.

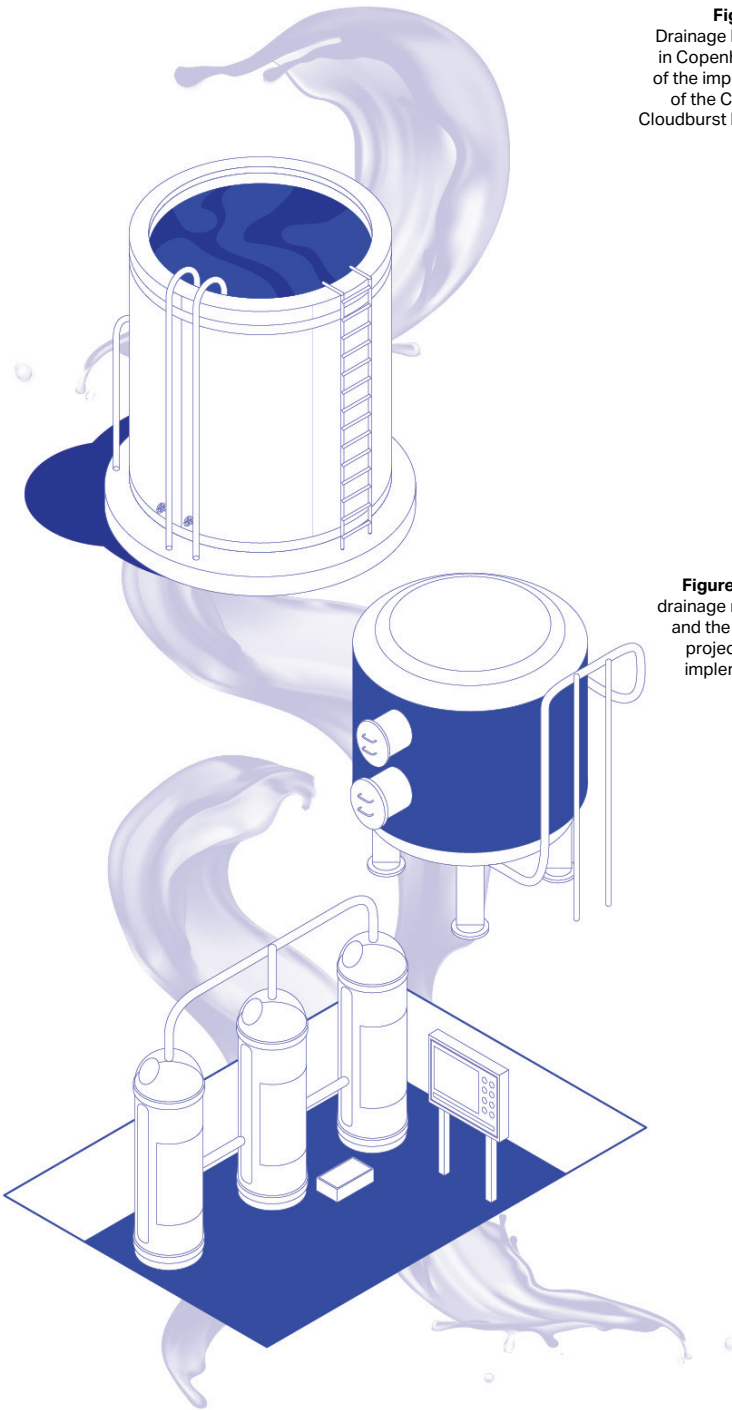
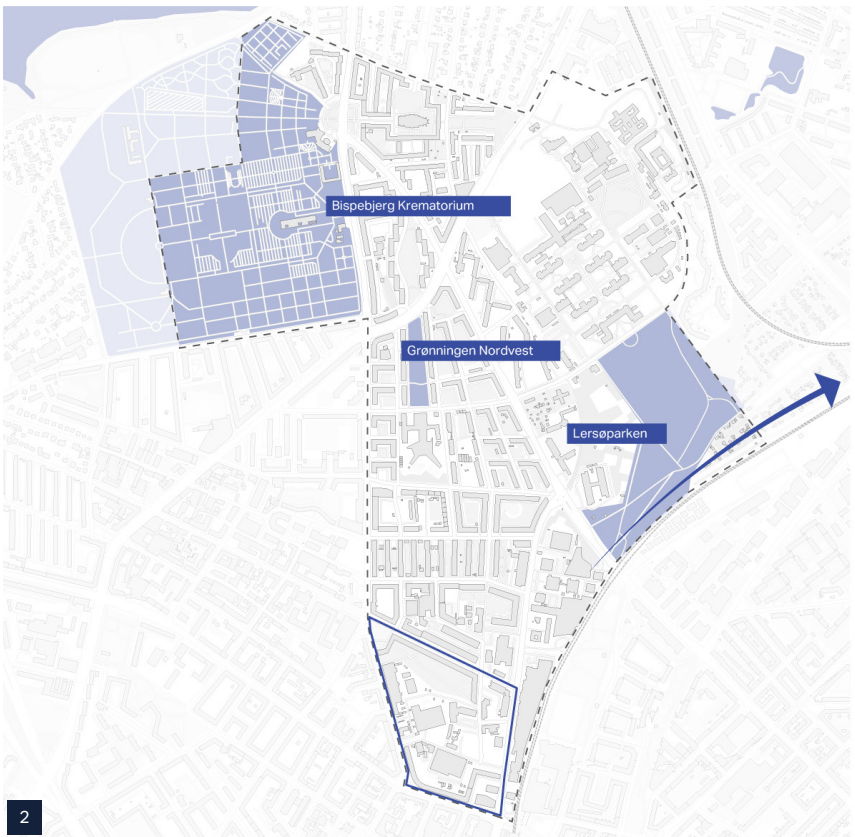


Figure 1: Water Drainage Management in Copenhagen as one of the implementations of the Copenhagen's Cloudburst Management Plan⁵



Figure 2: The water drainage management and the surface level projects as current implementations in Nordvest⁴



WHY? ENVIRONMENTAL

COPENHAGEN	NORDVEST
------------	----------

- | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none">• In the summer of 2011, Copenhagen faced the most devastating cloudburst in its history¹;• Copenhagen's Cloudburst Management Plan is a comprehensive strategy aimed at tackling the growing threat of extreme rainfall and urban flooding²;• This plan consists of an expansion of the sewer network, but also prioritizes 300 surface-level projects¹. | <ul style="list-style-type: none">• The surface-level projects in Nordvest were not prioritized in timeline as the district is higher in elevation¹;• Rikke Larsen: "It is even more important to control the flooding before the water goes down"³;• Two surface projects are realized in Nordvest, and the one is in development⁴;• However, these surface projects are not located on the site of our plot. |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

FLOODING, WATER & ARCHITECTURE

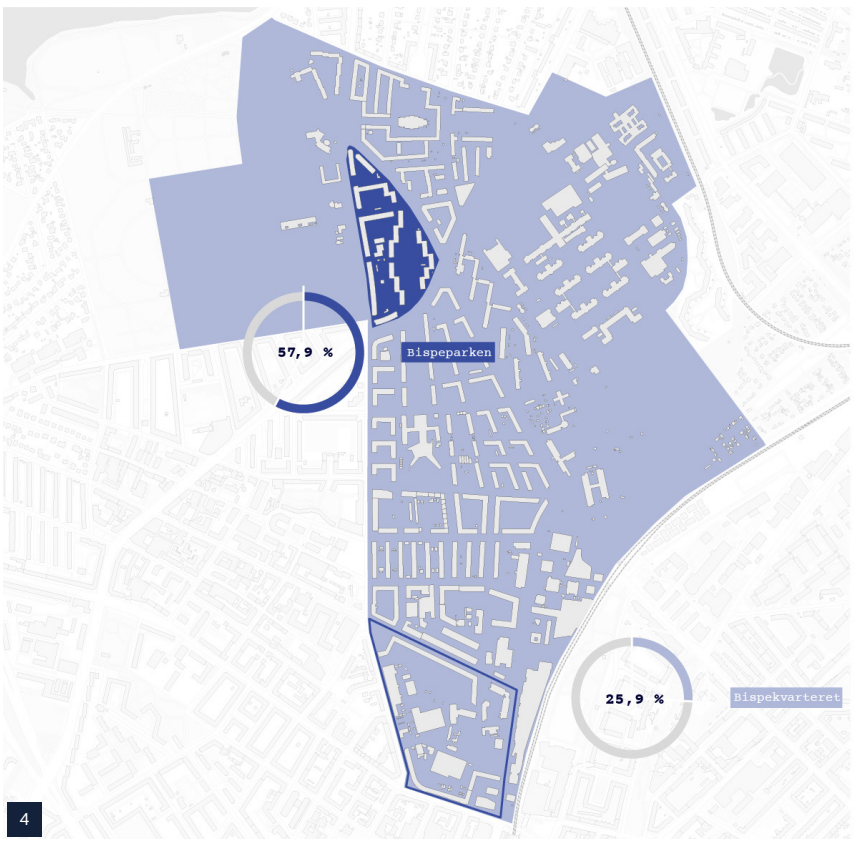
However, this problem can be tackled by architecture, while focusing on one common theme: water. With regard to pluvial flooding by heavy rains, [rainwater can be collected and reused](#) by a public condenser.



Figure 3: Women getting water for ablutions, Mausoleum of Moulay Idris II, Fes, Morocco, Photograph courtesy of Charles O. Cecil / Alamy Stock Photo.



Figure 4: Percentages of residents with a non-Western background in Bispekvarteret and Bispeparken⁹



WHY? CULTURAL

COPENHAGEN

NORDVEST

- The Ghetto plan has received a lot of criticism that it is discriminatory and potentially racist in its targeting of non-Western immigrant communities⁶;
- Research shows that three in four Danes believe that integration is far less successful than facts show⁷;
- Non-western individuals revealed that 84% have personally experienced illegal discrimination⁸.
- Over a quarter of the residents in the Bispeparken have a non-Western background, compared to 15 percent⁹;
- Nordvest is experiencing increasing gentrification, leading to significant and often unnecessary cultural displacement¹⁰;
- Non-Western residents feel that the “Ghetto” plan is meant to isolate and scatter them¹¹.

CULTURE, WATER & ARCHITECTURE

However, this problem can be tackled by architecture, while focusing on one common theme: water. With regard to negative biases to migration, it is important to **celebrate water as the common ground** between different cultural groups.

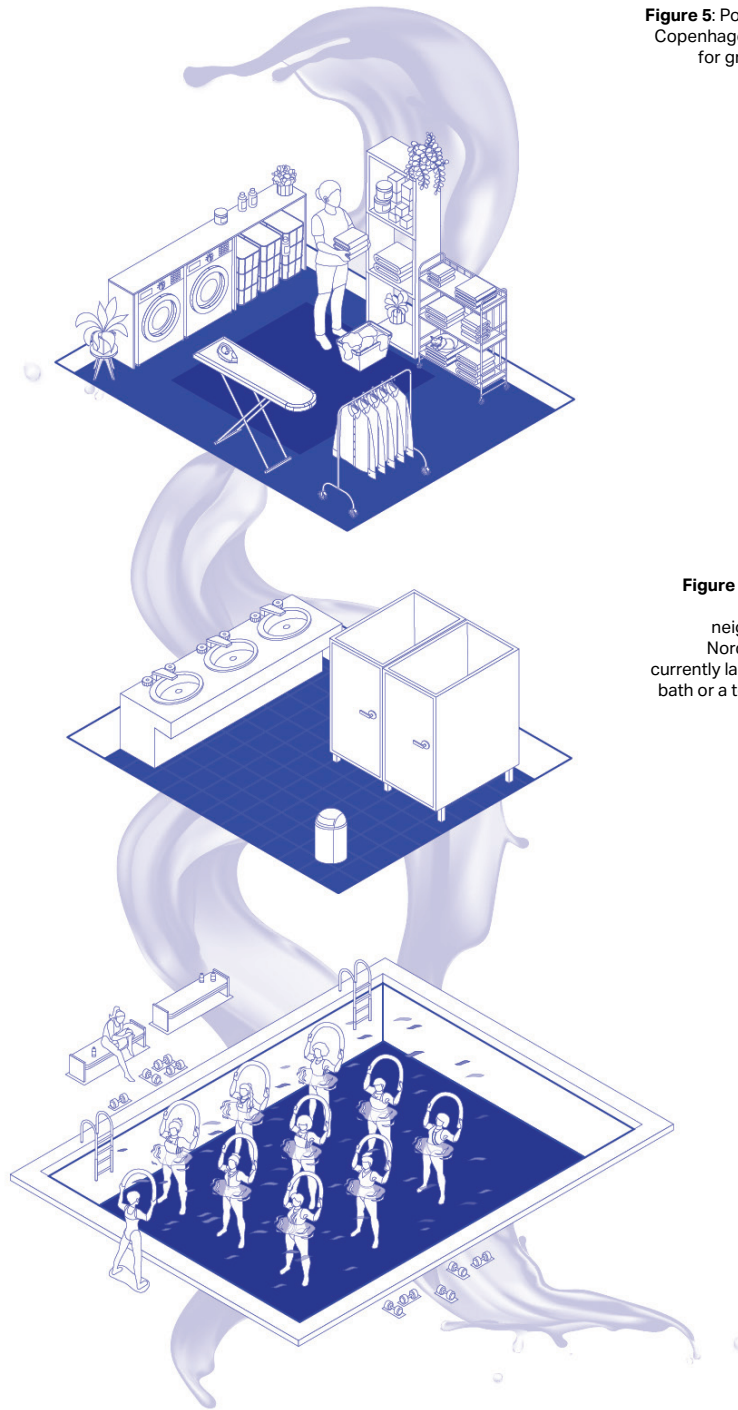


Figure 5: Polluted sites in Copenhagen that serve for groundwater¹³.

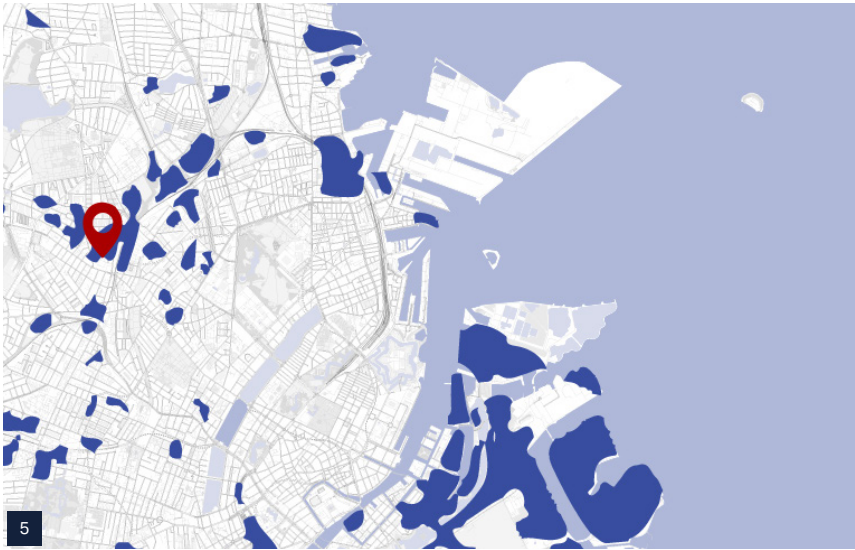
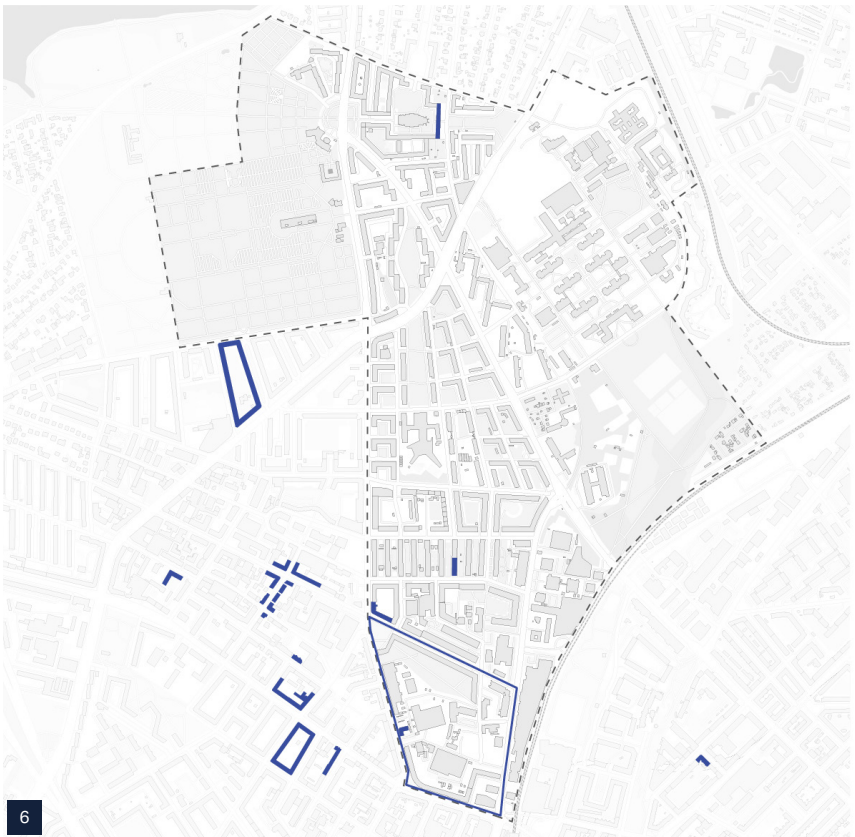


Figure 6: Residential places in the neighborhood of Nordvest that are currently lacking either a bath or a toilet, or both⁹.



WHY? HEALTH

COPENHAGEN	NORDVEST
------------	----------

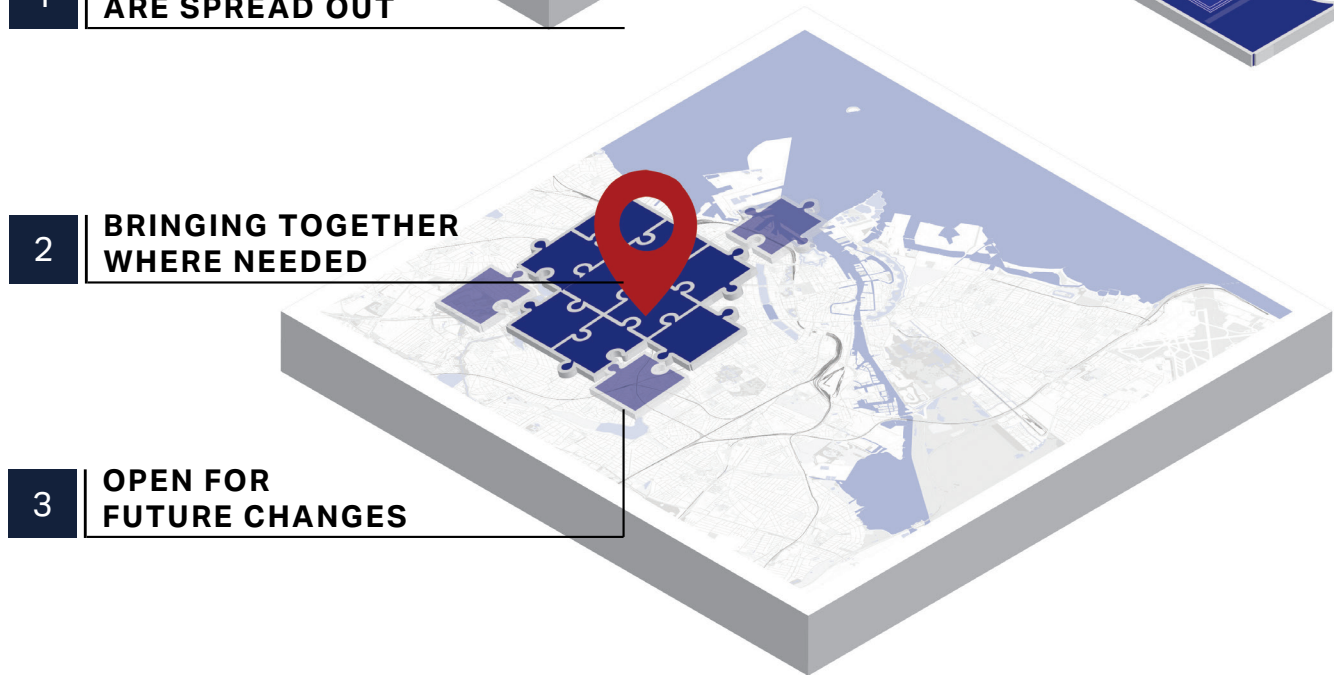
- | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none">• More than half of Denmark's drinking water resources are contaminated with toxins¹²;• In Denmark, all drinking water is produced from groundwater¹³;• However, several sites are polluted because of its industrial harbour history¹³. | <ul style="list-style-type: none">• Nordvest also deals with the problem of polluted sites¹³;• Above this, Nordvest is an older urban area with several buildings that do not meet today's standards⁹;• Some properties in the area are currently lacking either a bath or a toilet, or both⁹. |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

DISRUPTION, WATER & ARCHITECTURE

However, these problems can be tackled by architecture, while focusing on one common theme: water. With regard to service disruption, providing an accessible water infrastructure can overcome health problems.



1 | WATER FACILITIES
ARE SPREAD OUT



2 | BRINGING TOGETHER
WHERE NEEDED

3 | OPEN FOR
FUTURE CHANGES



DESIGN AIM

The Water Hub aims to bring all water facilities together in Norvest, which are now spread out over the whole city.

Like a puzzle, these pieces will be all put together in a building that functions independently.

However, the puzzle will stay unfinished so the design will always be open to future implementations.

HYBRIDITY

1 PUZZLE: ONE TO FOUR CONNECTIONS PER FUNCTION

2 WATER: ALWAYS VISUAL CONNECTION WITH FUNCTION

3 ROUTING: AT LEAST ONE PHYSICAL CONNECTION PER FUNCTION

But how to design a hybrid building and not a mixed used building?

The puzzle of functions can be put together in multiple ways creating different connections.

However, I will create a rule of thumb where visual connections are always made with water and physical connection always made by routing.



SUMMARY

1. For whom do you design the Public Condenser?

For the **local community** in Bispebjerg, Copenhagen.

2. What is the role of this public building in the Copenhagen societal context?

Celebrating diversity through water and providing a water infrastructure.

3. Which core elements define your Public Condenser as a HYBRID?

The **puzzle of functions** can be put together in multiple ways creating different connections. However, I will create a rule of thumb where **visual connections** are always made with **water** and **physical connection** always made by **routing**.

4. What are the key sustainability and future-proofing measures you include in your project?

Pluvial flooding is tackled by architecture, **rainwater will be collected and reused** tackling the growing threat of extreme rainfall and urban flooding in the future. Also, the puzzle of functions will stay unfinished so the design will always be open to **future implementations**.

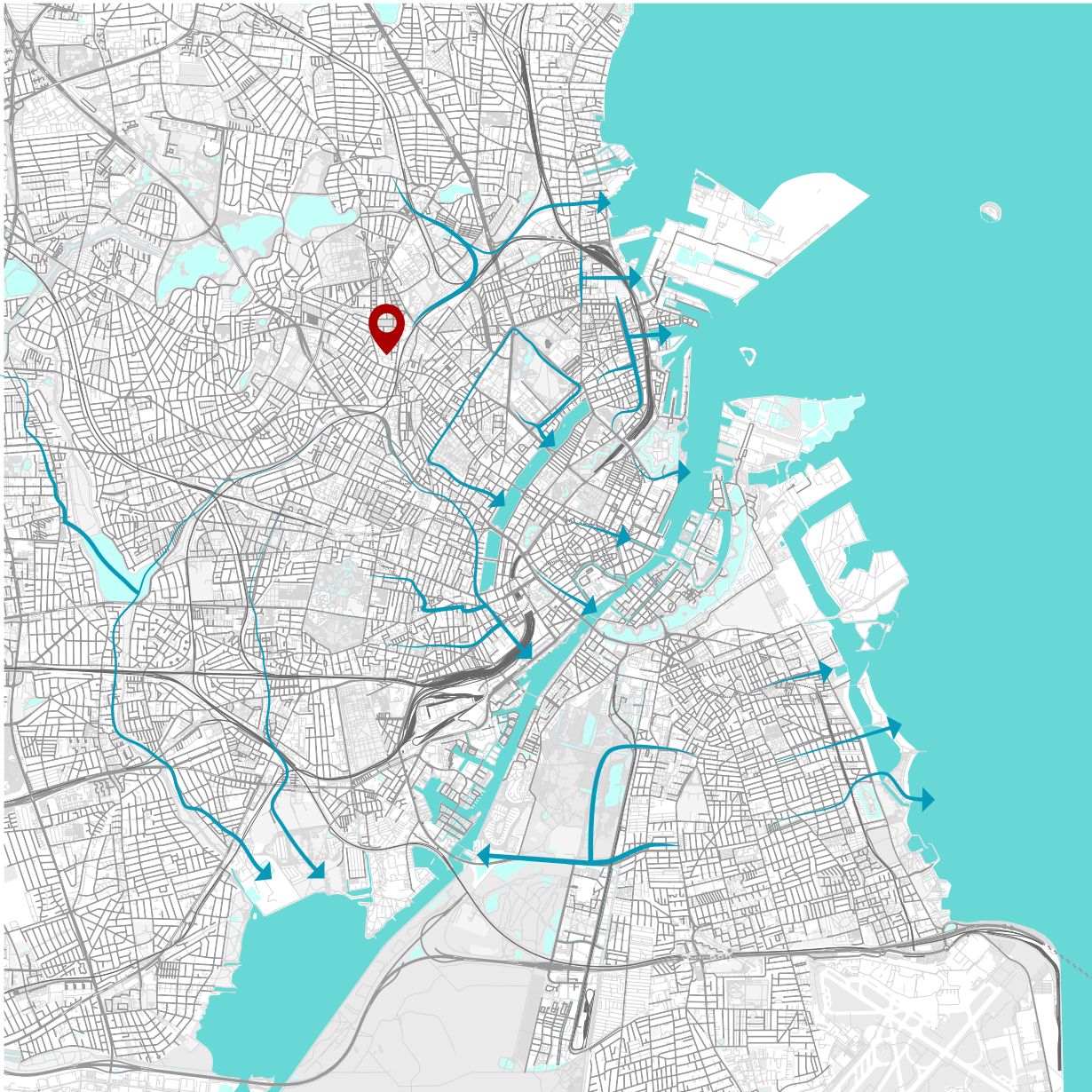
5. How does the neighbourhood and site research inform your PUBLIC CONDENSER brief?

Focusing on Nordvest, all three environmental, cultural and health problems are extremely applicable. However, **these problems all share a unique relation with water**. Architecture can tackle these three problems on environmental, cultural and health levels through water as common theme.

7. How will your design merge elements of green, blue, sensory, sociable, and inclusive spaces to enhance overall HEALTHINESS?

It will merge different elements as the public condenser addresses a **more pragmatic side of water by providing a water infrastructure (healthiness, blue)**, but it will also address a more symbolic and cultural side of water by creating a **waterscape (sociable, inclusive)**.

Thank you.



04. Water

In this map, you see how rainwater is managed and how water is drained. The overall principles of the strategy are to retain rainwater in the higher elevated areas; to provide robust and flexible drainage of lower-lying areas; and to focus on waterflows ending in the Øresund.

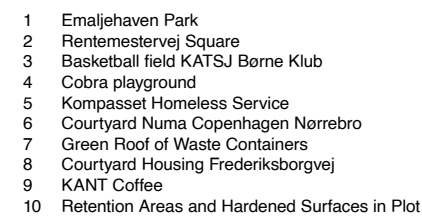
In Bispebjerg, two surface projects are realized that deal with reducing the impacts of pluvial flooding caused by heavy rains: the Grønningen Nordvest and the Bispebjerg Krematorium. Also, Lersøparken is currently earmarked for development under the Cloudburst Management Plan. Although this renovation will be finalized in 2026, it is proposed that a small lake will be created in the park, acting as a storage basin. The water drainage is marked with an arrow.



- 1 Bispebjerg Krematorium
- 2 Grønningen Nordvest
- 3 Lersøparken
- 4 Cloudburst surface projects in Bispebjerg



4.4



5 / 30

Look into these two concepts:

1. Pluvial flooding
 - Look into architectural case study examples
 - Recommendation book: The Flexible City, Solutions for a Circular and Climate Adaptive Europe
 - Look into architectural scale, and landscape scale
2. Cultural + water
 - Look into architectural case study examples
 - How to describe this common ground?

General comments:

- What effects a space?
- An example is Parc Esportiu Llobregat in Barcelona, Spain by Architect Alvaro Siza
- Connecting inside with outside

Ideas for P2:

- Look into three scales:

1. Landscape
2. Architecture
3. Interior
 - Interior can also integrate with water elements
 - An example is the Digital Water Pavilion by Carlo Ratti at an Expo in Zaragoza (2008)
 - We always consider water as an outside component, but it can be brought inside
 - You can show a 1:500 landscape plan, which includes your architecture as an integral design, but don't forget to keep focusing on architecture

The challenge was to use water – the theme of Expo 2008 – as an architectural element.

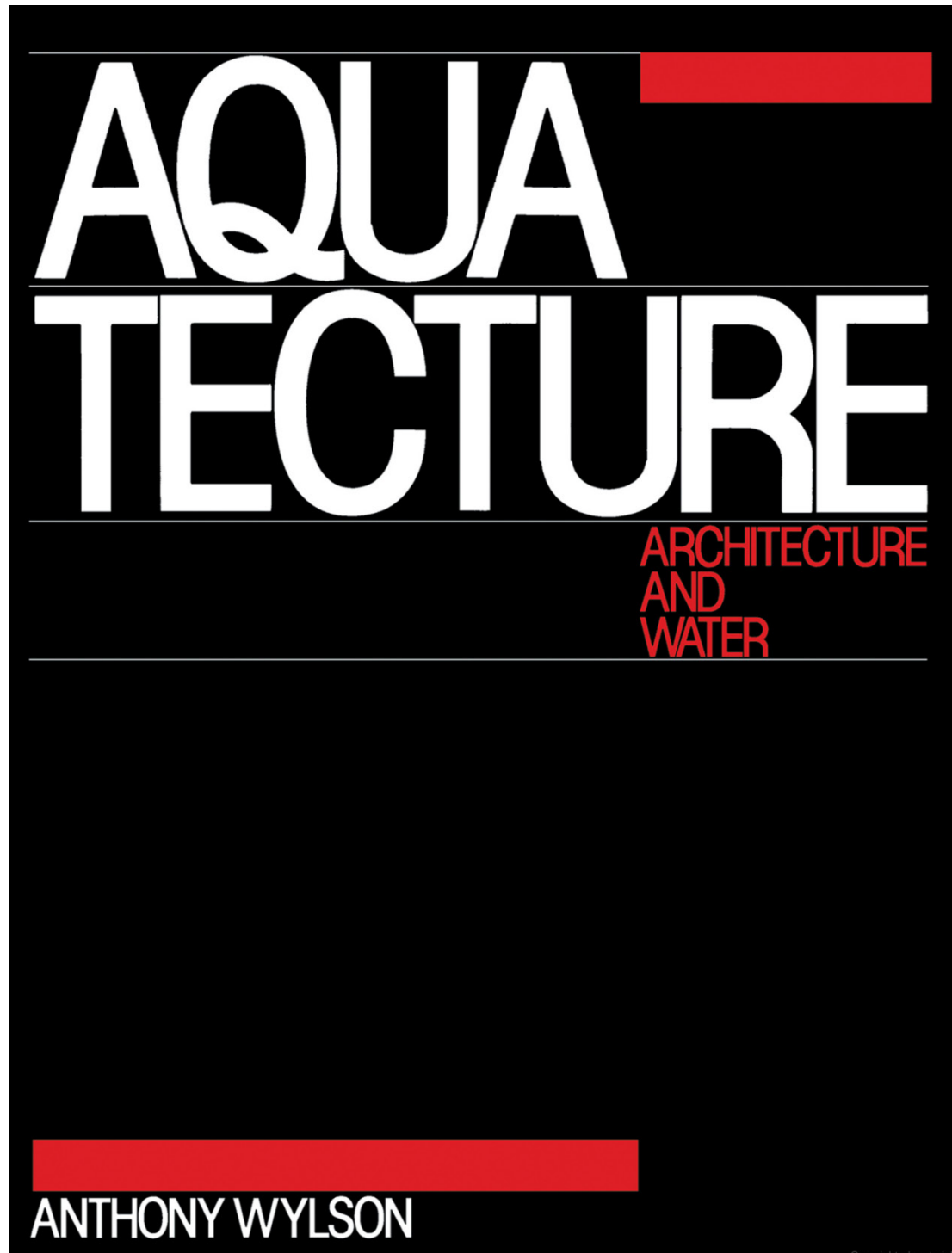
The walls are composed of digitally controlled water droplets, which can generate writing or patterns or access to spaces.



The Parc Esportiu Llobregat in Barcelona, Spain designed by Architect Alvaro Siza: connecting inside with outside space through water

The result is a space that is interactive and reconfigurable in that each wall can potentially become an entrance or exit, while the internal partitions can shift depending on the number of people present.





The term 'aquatecture' is adopted for architecture associated with the water element, either in the utilitarian, symbolic, therapeutic, leisure or visual context. This book studies aquatecture both from historical and contemporary viewpoints

Public buildings located along the river embankment next to the Assyrian river city is comparable to Copenhagen's landmarks located next to the waterfront

1 Water Context

Water not only provides a basis for man's existence and a continuous challenge to secure its use, but it is a source of metaphysical symbolism, aesthetic pleasure and therapeutic value. Water gives expression to nature's moods and provides substance to seasonal change. Landscape is fashioned by water, which as cascades, resurgent sea or reflective calm, bears witness to a beneficial universe.

According to Arnold J. Toynbee, the birth of great civilisations was generated by a challenge to which man responded by action and achievement. Such a challenge was provided by historic rivers in equable climates. The Yellow River of China, the Tigris, Euphrates, Indus and Nile, each created the optimum stimulant to the skills inherent in man, awakening his capabilities for survival. As the fertility of the land was dependent upon complete systems of irrigation and flood control, the construction of dykes, embankments and canals were the earliest forms of engineering. The social structure necessary to achieve these measures meant that the family or clan unit gave way to the city state.

The planning of the great river cities, such as Babylon, utilised waterways to provide for defence and river transport. The transverse location of the river corridor through the city with the surrounding moat and canal system constituted a form similar to that of the later fortified cities of western Europe.

In addition to the mastery of utilitarian needs that in certain cultures gained expression in great engineering achievements, rivers developed metaphysical significance.

The great Assyrian river city of Assur had its temples and public buildings located along the river embankment. For the Egyptians, the annual flooding of the Nile represented divine order; the monumental structures, temples and secondary canals, that lined the river bank added to the metaphysical theme, and a river provided a symbolic route for festivals and for processions of sacred boats.

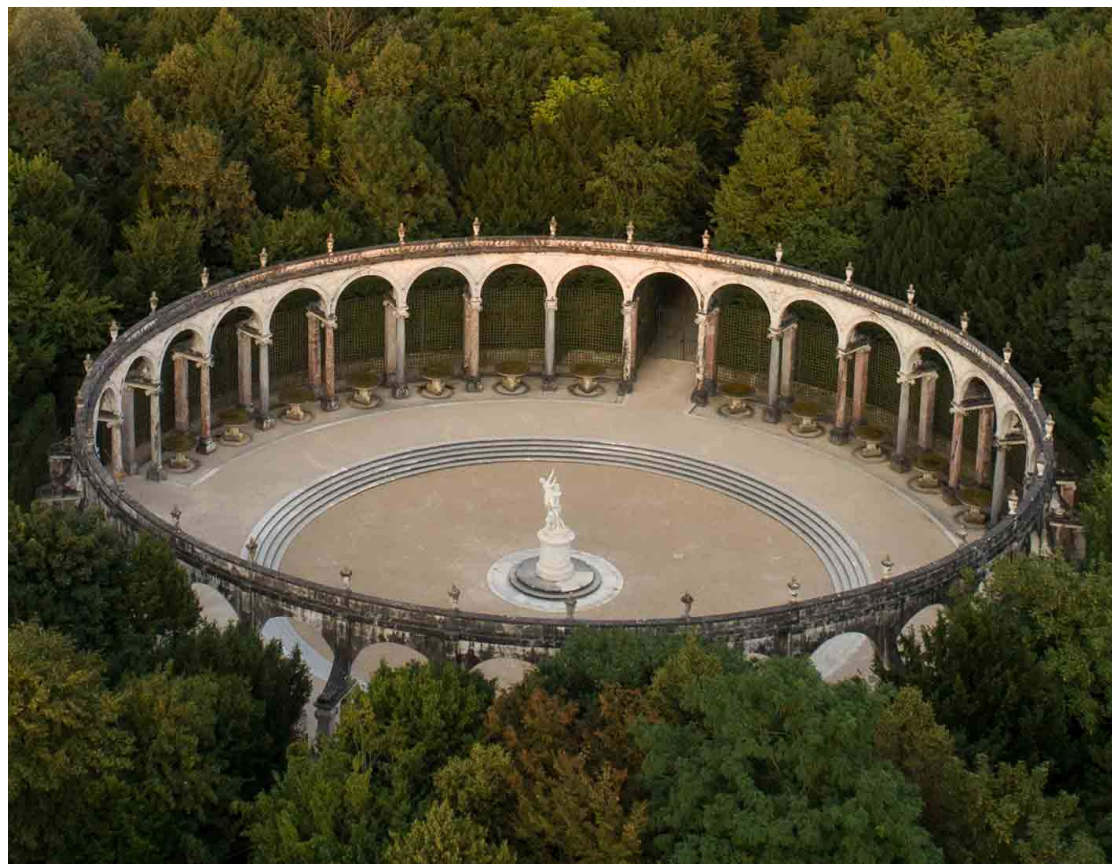
Colonnade Grove (1685)

Le Nôtre, France, Jules Hardouin-Mansart



For the Greeks the sacred springs as the source of water were imbued with mythology, the water was released into carved basins that incorporated sculptures

The Roman architectural authority, Vitruvius, justified the benefit of open colonnades for walking to allow the air to suck out the humours from the frame 'as misty vapours never rise from springs of water which are covered'



The Ferreres Aqueduct (27 BC–14 AD)

Tarragona, Spain, the Emperor Augustus



Late in the late first century BCE the emperor Augustus built an aqueduct to bring fresh water to the settlements around the bay of Naples. Surprisingly, this private water supply was not directed to kitchens or toilets, but was largely reserved for the atrium, domestic bath and the garden. This caused a revolution in garden design, and fountains became a major feature

Case Study Example: Water & Classical World

*Viridarium garden in House of the Vettii (second century BC),
Pompeii, Italy, Aulus Vettius Conviva and Aulus Vettius Restitutus*

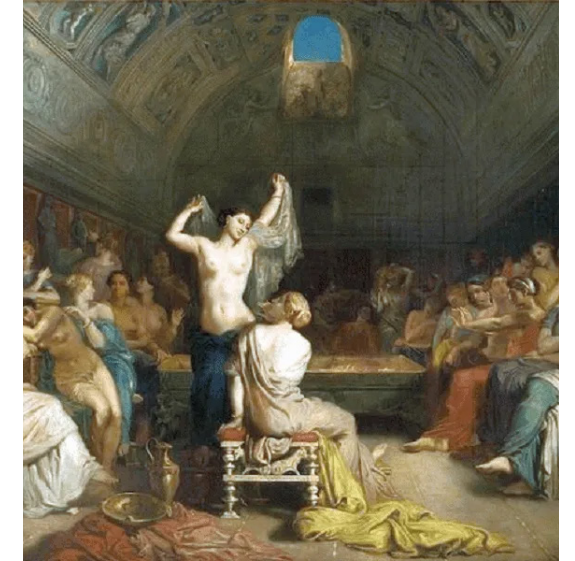


In both the small patio gardens of Pompeii and the large villa gardens of Rome, water was used for fountains and channels to provide an atmosphere conducive to leisure



Greek and Roman water elements were closely associated with public areas and were lined with significant public buildings

The aqueducts of imperial Rome provided the supply of water for the 121 public fountains, 11 imperial thermae, and 926 public baths



*The Roman Baths (60 and 70 AD)
Bath, Somerset, England, Roman British king Bladud*

The Romans recognised the social and therapeutic qualities of bathing. The massive thermae structures combined technical, architectural and engineering skill to provide a significant social amenity in Roman life



Shazdej Mahan Garden (1298-1309)
Kerman, Iran, Mohammad Sardar



The Islamic view of paradise included a garden of pleasure with cool springs and fountains, and the traditional persian garden utilised water for irrigation, display and sound effects




Persian culture was absorbed by Islam and spread through the Muslim world. The architecture took a religious symbolism with water representing the source of life, wealth and spiritual strength

The basic form of the courtyard garden was an enclosed quadrenge, divided into four sections by channels symbolic of four rivers branching from a common source, dividing the Earth



Special aspects of water use in Persian gardens
Albert Fekete, Reza Haidari, 2015

The Persian garden is one of the most characteristic and notable element in the Iranian landscape. Considering Iran’s hot and dry climate along with water deficit for plantation, it becomes noticeable how important the art of making gardens is to Iranians. Water is one of the most crucial elements in the Persian garden, and we can state that gardens would be meaningless without it (Fekete, 2015)

WATER FEATURE	DENOMINATION	FUNCTIONAL AND AESTHETICAL ASPECT	GARDEN’S NAME
	JET/ FOUNTAIN	dynamism, action, movement, symbol of spring, sound effects	Hezar Jarib garden Fin garden
	POOL/ BASIN	compositional centre, turning point, reflection, water reservoir, static aspect	Eram garden Chehelsoton garden
	CHANEL/ CREEK	dynamism, linear compositional element, water transfer, irrigation, linkage and separation, visual axis	Fin garden, Shahzadeh Mahan garden, Dolat Abad garden
	SINEH-E KABUKI	perturbation, movement, wave making, showing more water in channel, sound effects	Chehelsoton garden Dolat Abad garden
	CASCADE/ WATERFALL	linkage and separation of different garden levels, visual axis, movement, sound effects	Shahzadeh Mahan garden Fin garden

Takht-e Rostam or Stupa of Takht-e Rostamis (3rd-4th century AD)
Haibak, Afghanistan, Kushano-Sasanian Kingdom



In the Persian tradition, architecture was not considered as one of the major arts and not complementary to paintings and sculptures as in the ancient world. This led to a frequent use of symbolism related to the universe and chosen site with geomantic appraisals.

The *stupa* of the Haibak complex in Afghanistan consisted of a cupola form surrounded by a ring of water, symbolising Earth and ocean; the *stupa* itself was a structure without interior space representing the universe



Sacred waters of the Ganges river
Himalayas, India, Bangladesh



Also in the Hindu tradition, symbolism is related to the significance of water. An example is the sacred waters of the Ganges (a celestial stream flowing upon earth) and the use of water in the performance of religious ritual



Shālīmār Bāgh (1619)
Lahore, Pakistan, Emperor Jahangir



During the fourth century, the architecture of Afghanistan and North India with its tradition of gardens utilising irrigation for pools, channels, fountains and lily ponds, was significantly influenced by the Moghul Islamic Empire and the Persian gardens

Water would be directed around or under the pavillion to achieve a cooling effect. At the Shālīmār Bāgh, water flows past stepping stoned and under the seating platform before it falls over a cascade and into a pool

Although the spiritual, poetic and secluded nature of the Islamic garden was in contrast to the social and ceremonial character of the Renaissance, the Islamic world assimilated the tradition of the classical *thermae*

The Islamic baths, the *hammam*, discarded the active elements of the Roman establishment (the gymnasium, swimming pool, exedra and library), and retained the sequence of hot rooms

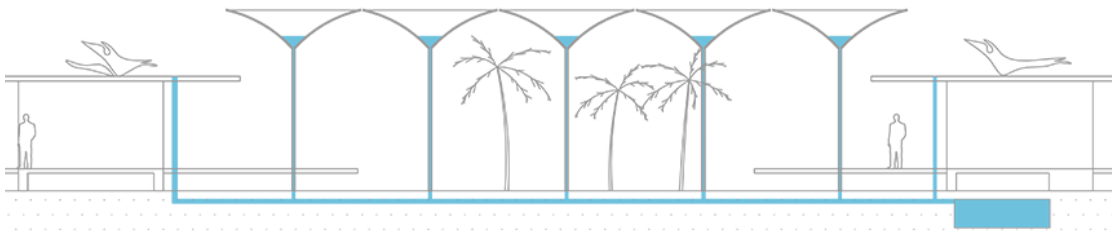
Hamam Al Jadeed (14th century),
Sidon, Lebanon, Izz al Din Aybak



Rio Olympic Golf Course (2016)
Barra da Tijuca, Brazil, Rua Arquitetos



These elements provide sun shading for both indoor and outdoor spaces, but also integrate a rainwater recycling system.



Water collected by the tree-like structures drains down into an underwater storage tank, ready to be pumped out across the greenway.

The People Tree House (2023)
Noida, India, Archiopteryx



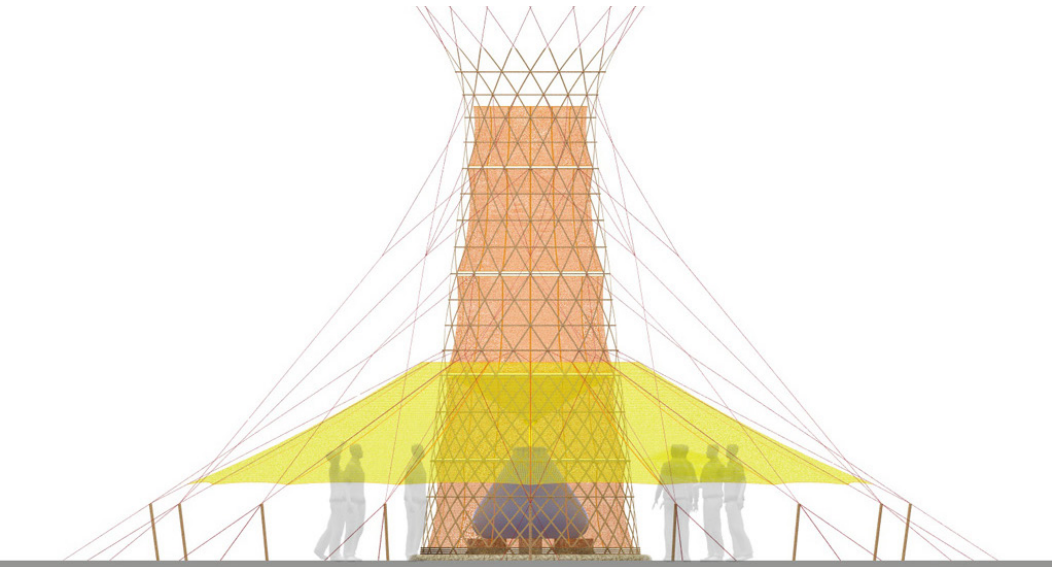
The water is collected in a tank at an upper level, which is connected to a rainwater manhole below ground with a bright red pipe that runs through the middle of the house – at points functioning as a staircase handrail



"Water is released from the upper level tanks, under gravity, via drip irrigation pipes," explained Shrinagesh. "When required, stored water is diverted to the home's upper levels, creating a cycle of collect-irrigate-store-reuse."



Warka Water Towers (2016)
Ethiopia, Arturo Vittori

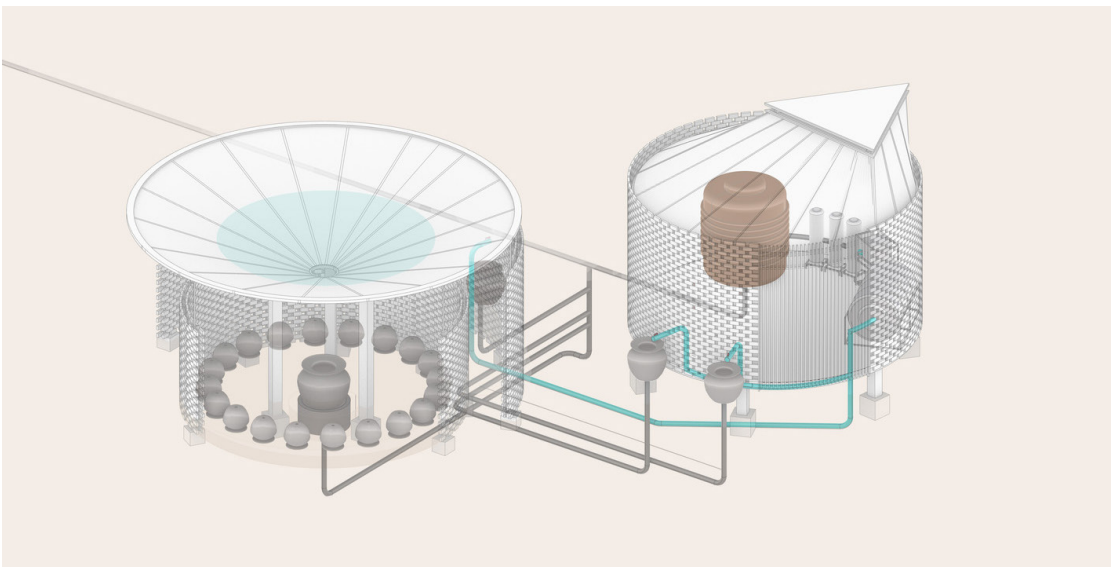


Italian architect Arturo Vittori explains how his wooden Warka Water structures can provide clean drinking water for rural communities in the developing world



The tower consists of a bamboo frame supporting a mesh polyester material inside. Rain, fog and dew condenses against the mesh and trickles down a funnel into a reservoir at the base of the structure. A fabric canopy shades the lower sections of the tower to prevent the collected water from evaporating

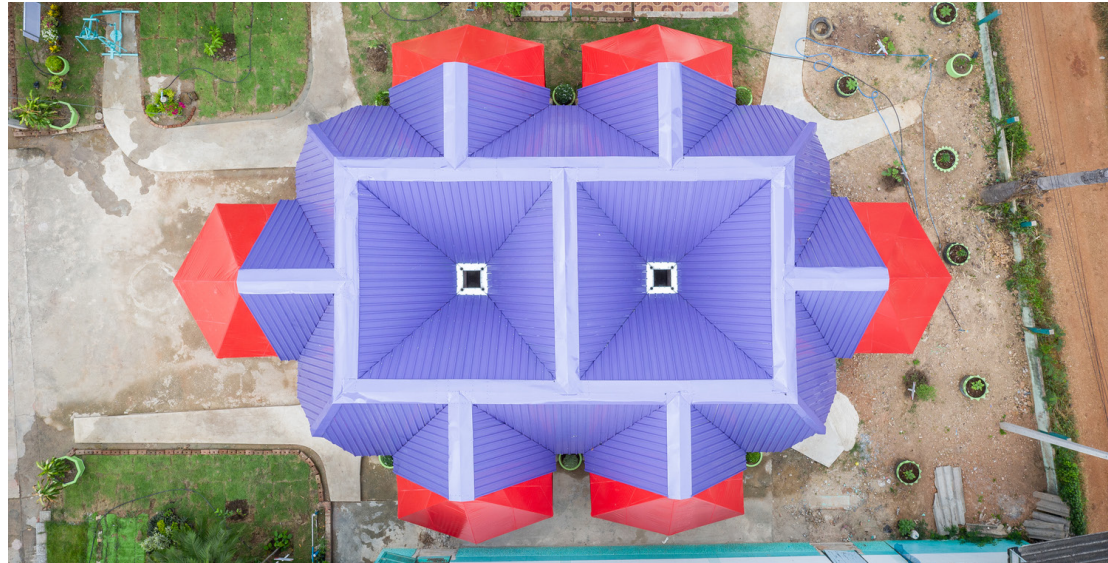
One building is entirely closed to the public in order to preserve the interior pump, which brings water in from a nearby lake using a system of underground pipes, and the water filtration system through which it is purified.



Community Centre (2020)
Sneung, Colombia, Orient Occident Atelier



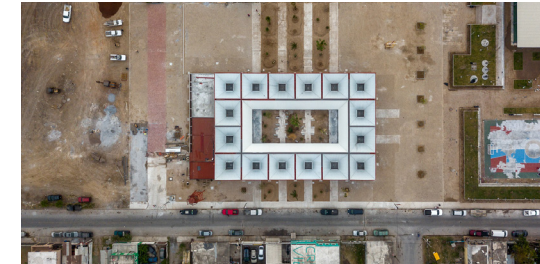
Pylonesque: A Water Harvesting Structure (2019)
 Tambon, Thailand, Pareid



Pylonesque combines climatic context and vernacular typologies into a semi-enclosed multi-purpose space for a primary and middle school in Thailand, which experiences heavy rain seasons followed by extensive hot dry periods—where water holds cultural and practical significance as it is linked to agriculture, tradition, and festivities



Matamoros Market (2021)
 Matamoros, Mexico, Colectivo C733



The building's distinctive roof is composed of inverted, trapezoid-shaped modules that the designers refer to as "umbrellas"



Jewel Changi Airport (2014)
Singapore, Moshe Safdie RSP



To create that even circular flow of water down the Rain Vortex, there are structural features built into the exterior of the building. The "fins" outside the dome structure make up a network of pipes that channel water to the ring in the middle of the oculus. The oculus then distributes the water down the Rain Vortex and gives it an even complete circular effect.



The water stretches all the way from the roof, down to Basement 3 (B3), where the catchment area is. The water stored in B3 is then pumped back up around the perimeter of the building to the oculus, where the cycle repeats itself.

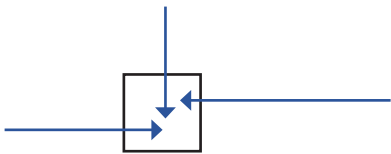


On rainy days, rainwater is also collected and stored at B3, before it is channeled back up to Level 5 into the oculus. When the tanks are full, excess water is used for irrigation or diverted to other uses.



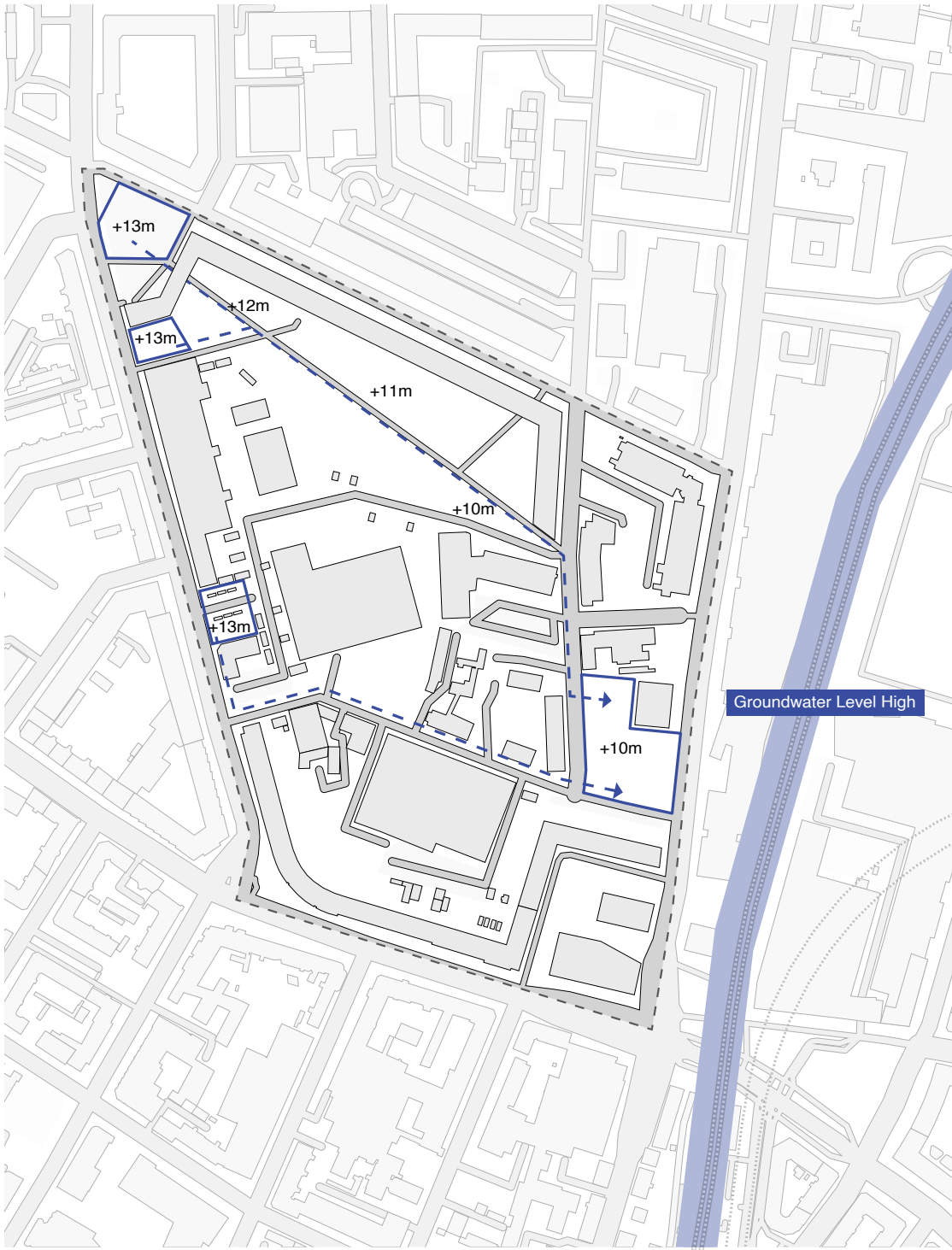
Feedback:

- Why not choose both plots?
- Is it really the case that a traditional public condenser in this area looks like this, define why this is the case and what you would normally expect in this neighborhood
- Point out on a GIS map what the elevations of the plot are, what are height differences, where are flooding problems occurring and where is water going to?
- Point out the different water sources for the district: rainwater, are you using the local water infrastructure? What are the guidelines in Copenhagen for this?
- Where does the water come from and where does the water go to?
- The puzzle suggests that all the functions are the same dimensions, which is not the case
- Make a connection between the space and the function of the building
- Point out the movement of water
- Are all water flows going to my building?



The Kralings Zwembad in Rotterdam is a nature swimmingpool that Nathalie suggested, can rainwater be used for my project in this way?

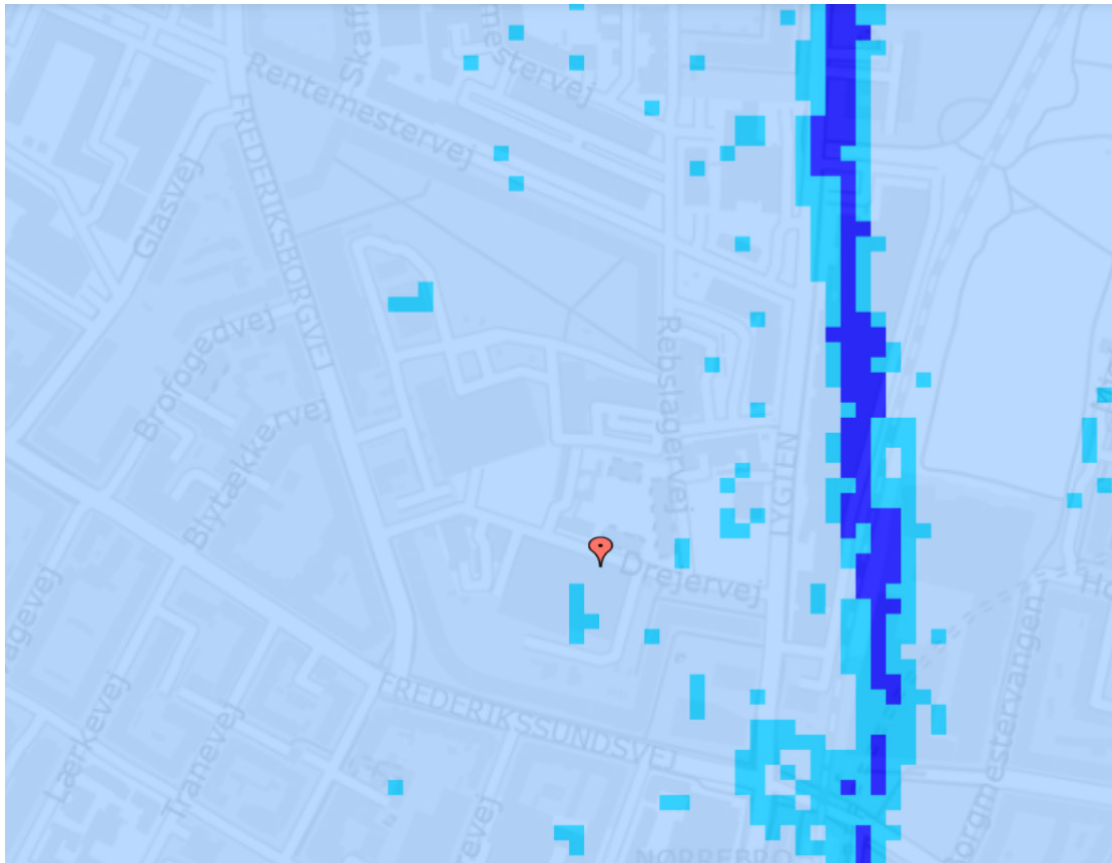
Looking at the plot, there are different levels in elevation that I mapped, more plots can be chosen in order to create a masterplan and drain (rain)water to lower elevated areas





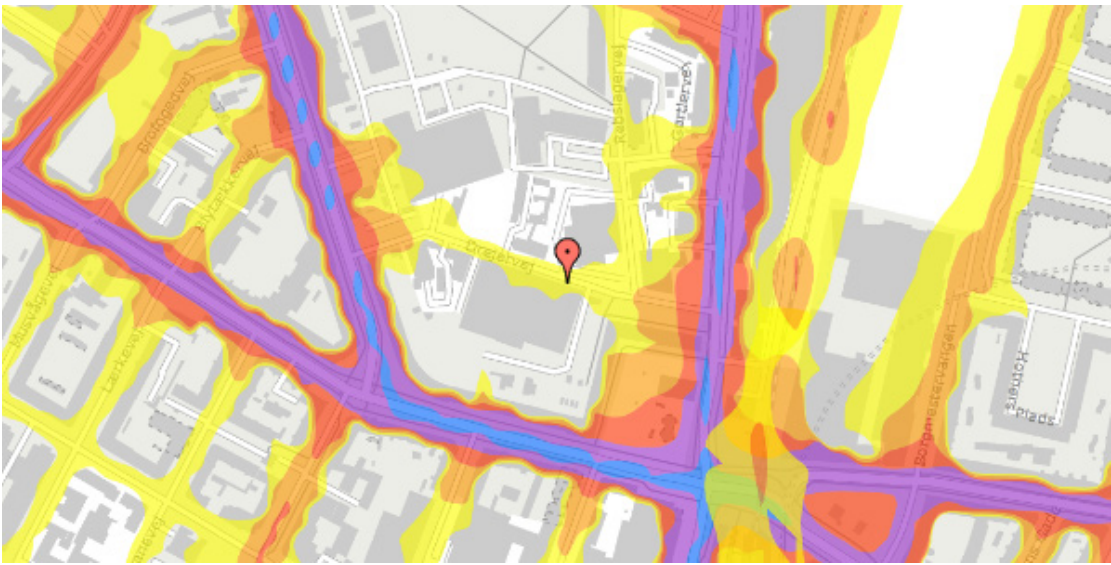
Within a radius of approx. 500 meters, there are 102 soil contaminations. This is a very high number. Among the total number of soil contaminations, 57 are actual soil contaminations (type V2), while 45 are possible contaminations that have not yet been investigated (type V1).

The average degree of fastening in the area is 80 percent. This means that approximately 80 percent of the surface is built or paved with asphalt, tiles, cobblestones, etc., which prevents rainwater and surface water from seeping into the ground.



The true depth of the groundwater is only 0.8 meters and in periods of heavy precipitation, the groundwater may therefore make it difficult/impossible for surface water to penetrate the already water-saturated soil.

The noise is estimated to be 55-60 dB. This is a noise level that is equivalent to the noise from a washing machine.



Feedback Paul:

- Paul mentioned he went to The Therme Vals, very beautiful and a great experience between different temperatures, but also different sounds
- Can I work with sounds? Depending on the different temperatures and states of water in a Thermal Bath
- Also look into Danish (historic) examples that might relate to the Classical, Islamic and Asian world
- Denmark also have a rich history with water, think of the Danish Harbour Baths and the Canals: make a connection
- You can also design on both plots, there is a difference in elevation, which can be interesting to work with

Feedback Stefano:

- Look into the following reference of Lydia Xynogala: The 750 Mineral Springs of Greece
- How the scientific analysis of mineral springs, rocks, and soil in Greece led to a new understanding of the country's resources: its airs, waters and places
- Make three matrixes:
 1. Role of water in History in different cultures
 2. Water as program in contemporary architecture
 3. Site Analysis in diagrams
 4. List of program: what will be in the building?

The wealth of mineral springs conveyed in the book presents an extraordinary imaginary of Greece: a geography centered around a healing network. Today however, a large number of them has been greatly impacted due to man-made activities



A 1938 book publication by Nikolaos Lekkas titled "The 750 Mineral Springs of Greece" shows how the scientific analysis of mineral springs, rocks, and soil in Greece led to a new understanding of the country's resources: its airs, waters and places



The House in Achladies by Lydia Xynogala is conceived as a series of parallel adjoining rooms on a sloping triangular site facing the sea



WEEK 1.13

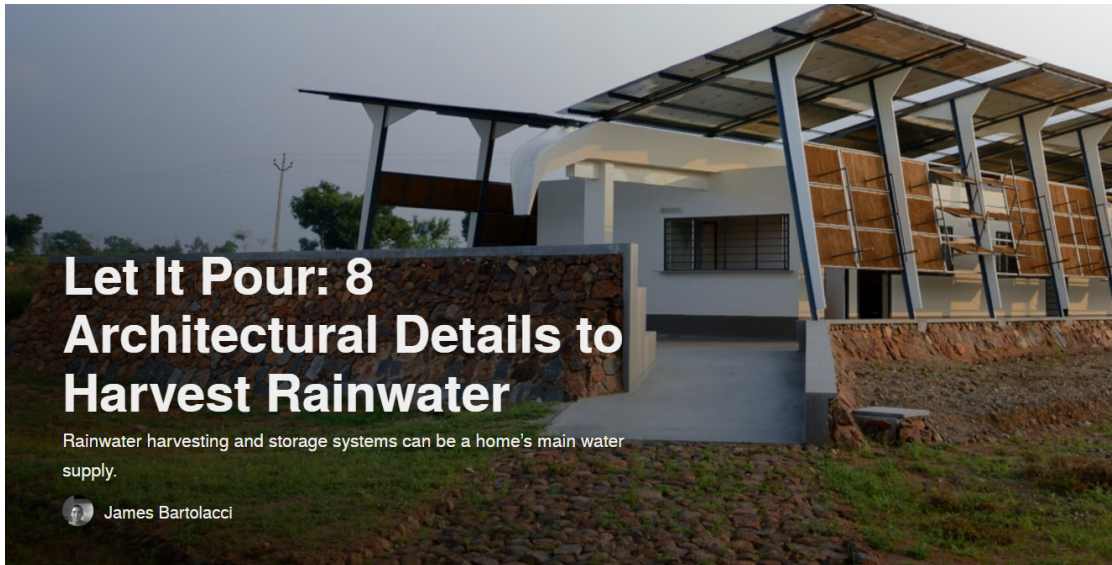
28 | 11 | 24

Personal communication with Paul & Stefano

Feedback:

- Focus on some of these contemporary case studies, the ones that are most useful to you
 - Work on the graphics of your comparison, when you use symbols you can see visual patterns directly
 - Would you like to collect rainwater on roofs as well, which contributes to your design? Think of a masterplan
 - Make connections in blue, how does water move and go from the one place to the other?
 - Water also have hidden qualities, it is not always notible, how does water move underground or in a building?
 - It can contribute to a identity of the district: based on rainwater collection and harvesting
- recognizable by this identity
 - Elebaborate the crossing paths of different cultures further, focus on this as the common ground
 - List these functions in a site analysis, are these functions already represented in the district?
 - Analyse the sun orientation and flows in the district
 - Do people already have access to these functions?
 - How do shadows work in the plot?
 - Focus during the P2 how this project contributes to health, what does it do?
 - Start with massing studies, use excisting case study examples and place them on the plot
 - What is the character of the project? A hybrid between lanscape and architecture? How does this work?
 - List the access to the plot in an analysis
 - The project doesn't necessarily have to be a landmark, but can create an identity of the district



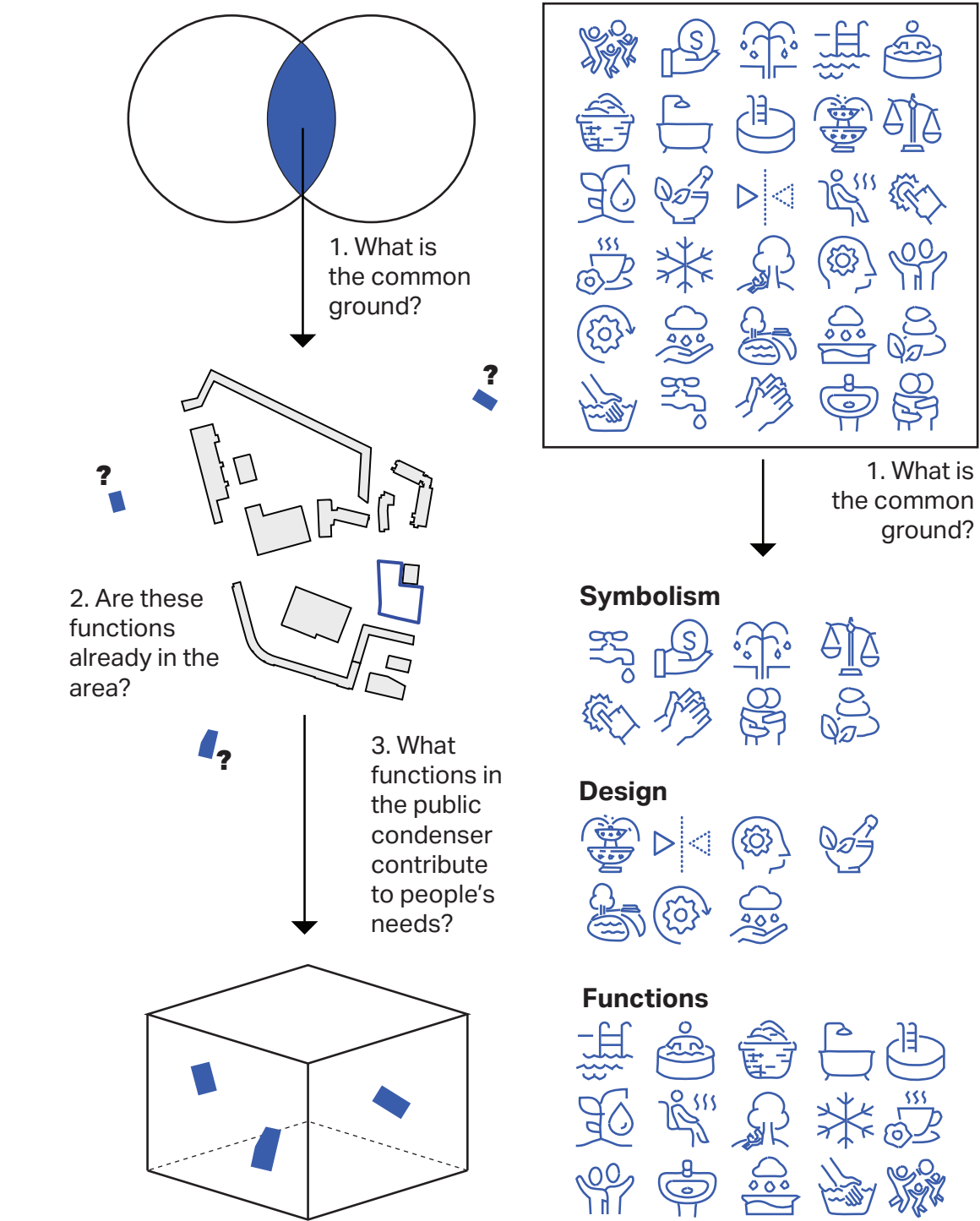
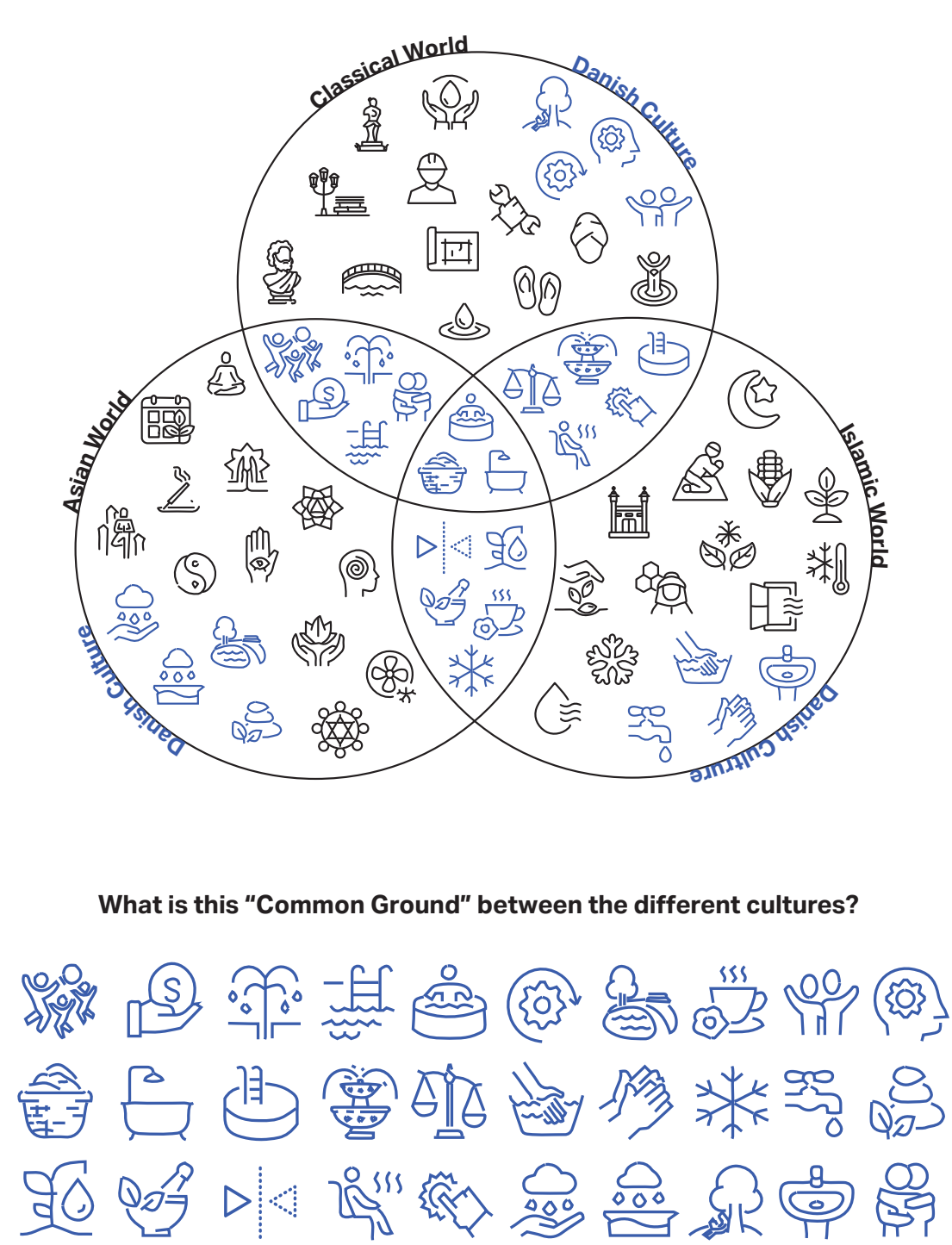


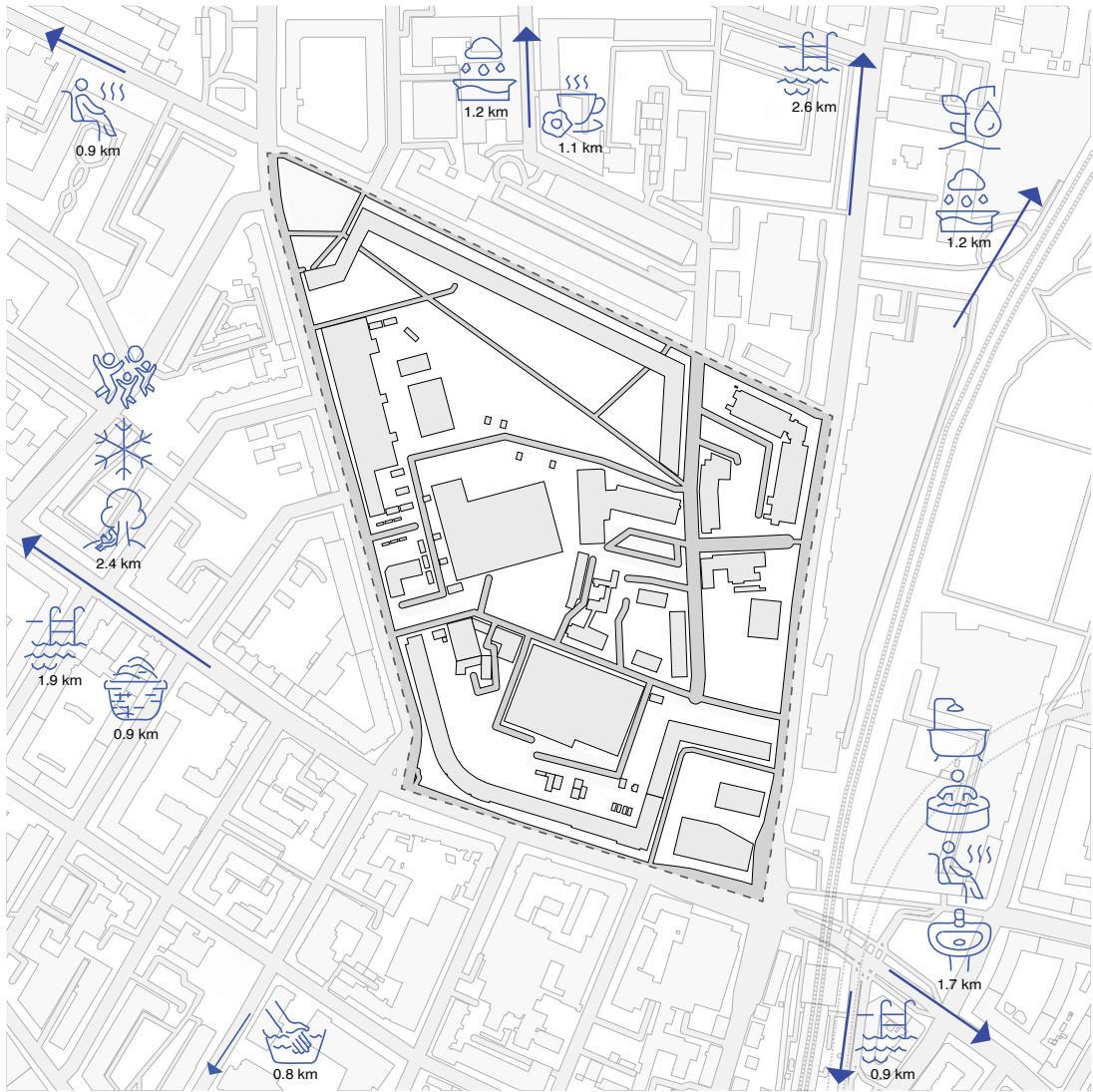
House in the
Countryside
(2008) in
Arta, Spain
by Herreros
Arquitectos



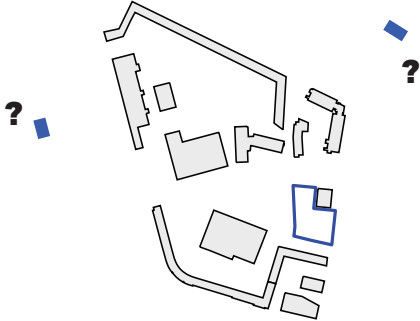
Shishiodoshi
Houseby
Avignon-Clouet
Architecture,
Rez , France







2. Are these functions in the area?



Functions



1. Nature Swimming Pool

- There are three indoor swimmingpools < 3km, but no outside nor nature swimmingpool

2. Spa

- There is one spa in < 3km, but it is old and neglected

3. Laundry

- There is one laundry room in < 3km, but it is paid, can I design one for public and free?

4. Bathing

- There is one bathing space in < 3km, but it is old and neglected

5. Community Garden

- There is one community garden in < 3km, but it is not for the direct neighborhood

6. Sauna / Hammam

- There is one sauna in < 3km, but very small, also there is no hammam

7. Recreation Space

- There is one water recreation space in < 3km, but mainly for summer time also providing urban cooling

8. Tea House

- There is one tea house in < 3km, but also serving as a normal café and only focusing on Turkish Culture


9. Rainwater Collecting

- There is two rainwater collecting areas in < 3km, but also needed for our plot


10. Ablution Room

- There are more than one ablution rooms in < 3km, but only in mosques serving for Islamic religion


Functions




1. Nature Swimming Pool

 There are three indoor swimmingpools < 3km, but no outside nor nature swimmingpool


2. Spa

 There is one spa in < 3km, but it is old and neglected


3. Laundry

 There is one laundry room in < 3km, but it is paid, can I design one for public and free?


4. Bathing

 There is one bathing space in < 3km, but it is old and neglected


5. Community Garden

 There is one community garden in < 3km, but it is not for the direct neighborhood


6. Sauna / Hammam

 There is one sauna in < 3km, but very small, also there is no hammam


7. Recreation Space

 There is one water recreation space in < 3km, but mainly for summer time also providing urban cooling


8. Tea House

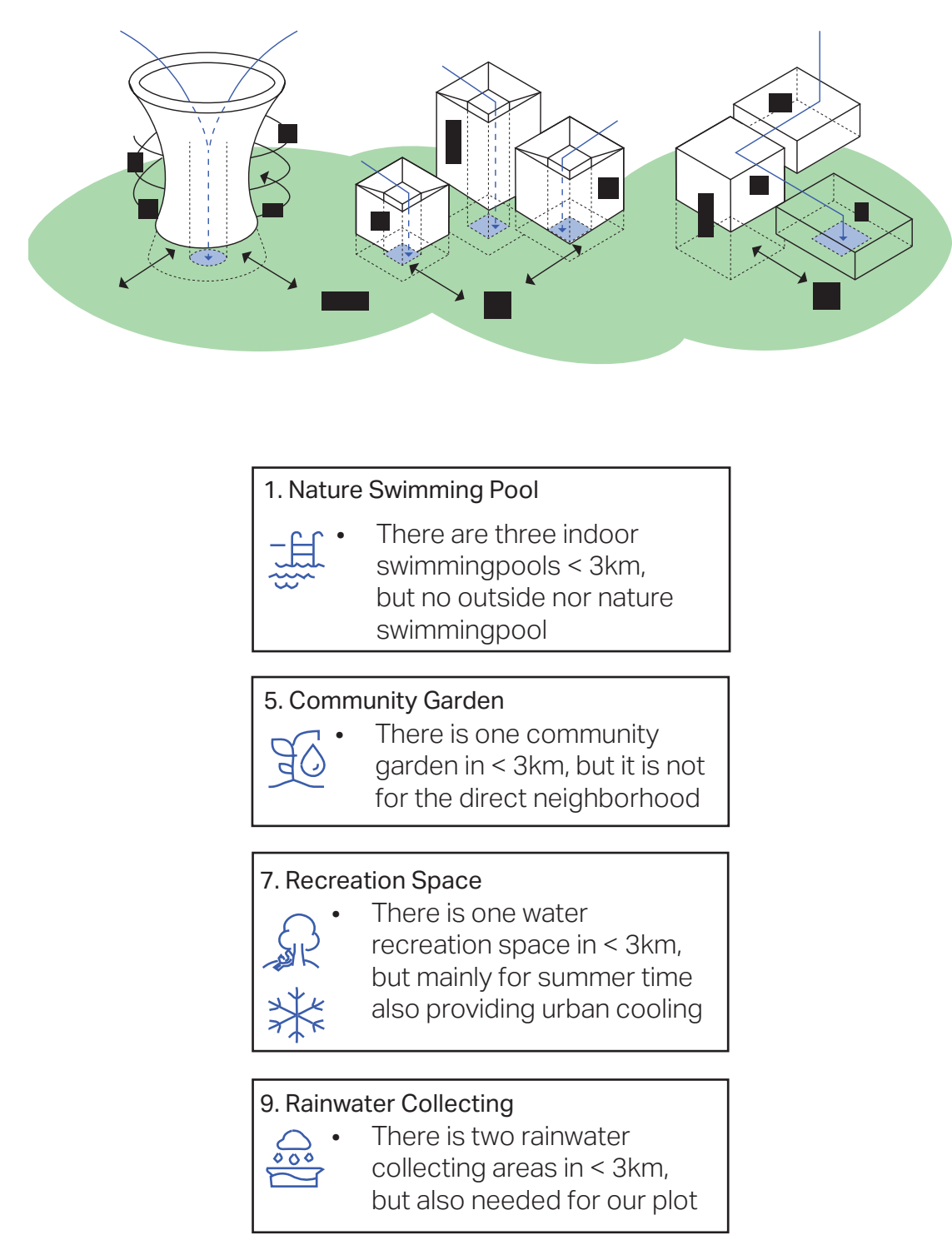
 There is one tea house in < 3km, but also serving as a normal café and only focusing on Turkish Culture

9. Rainwater Collecting

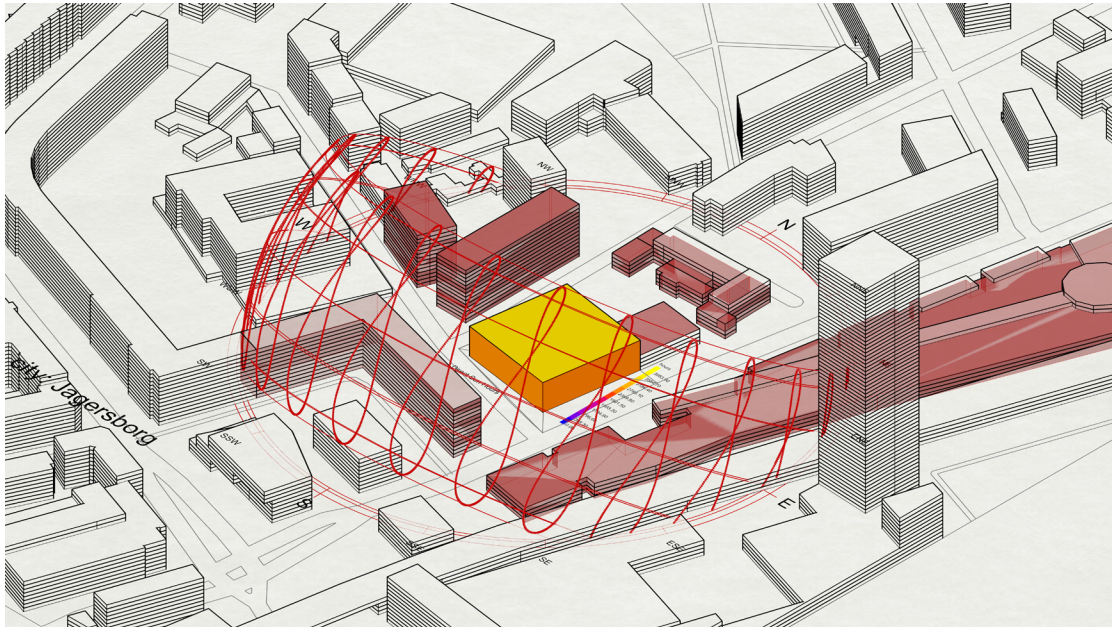
 There is two rainwater collecting areas in < 3km, but also needed for our plot

10. Ablution Room

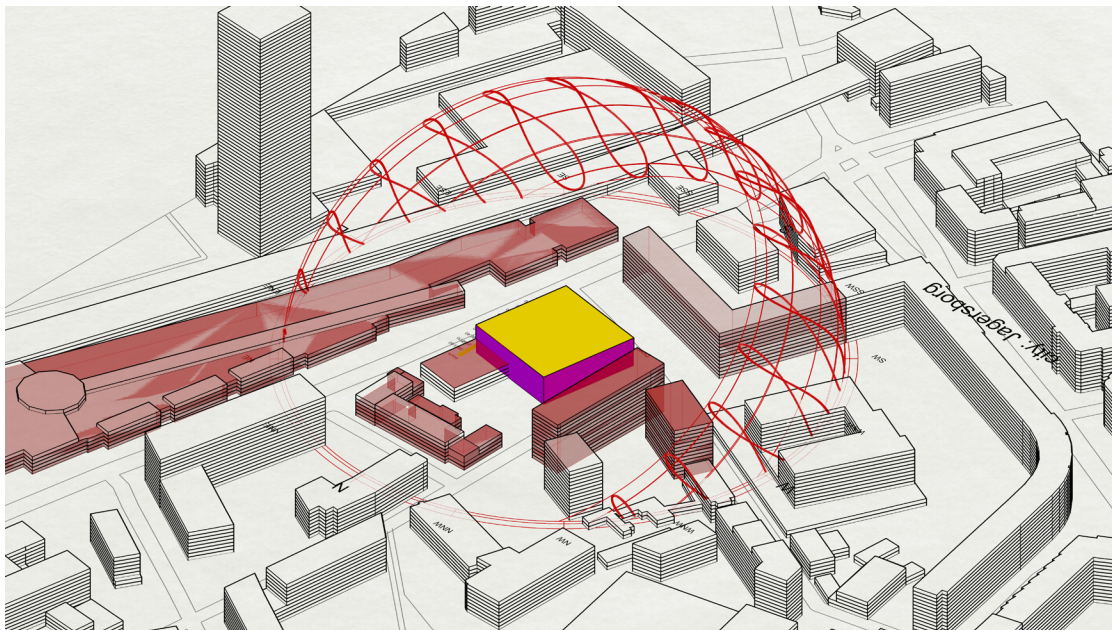
 There are more than one ablution rooms in < 3km, but only in mosques serving for Islamic religion



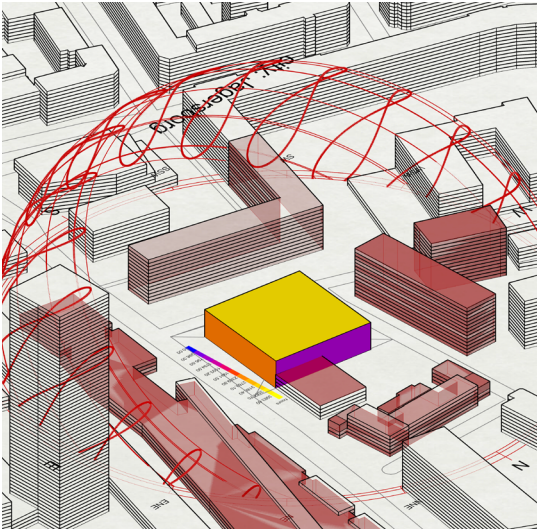
1. South-East



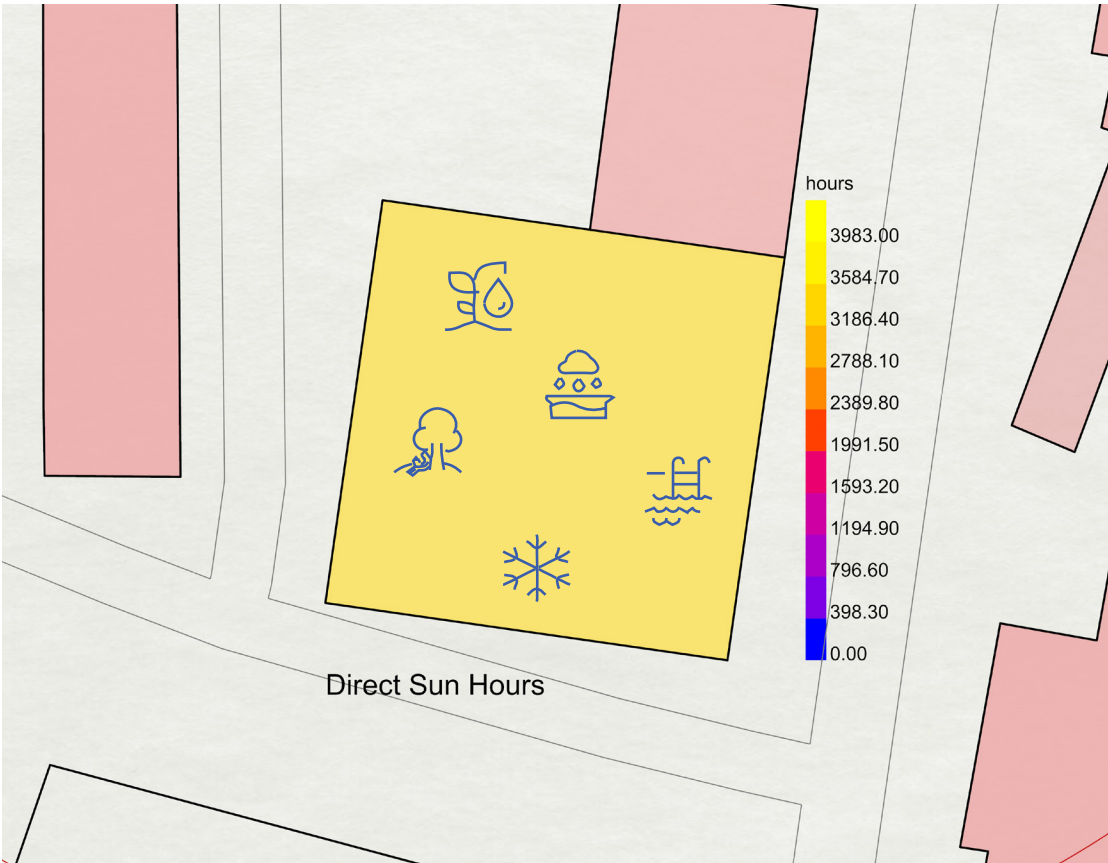
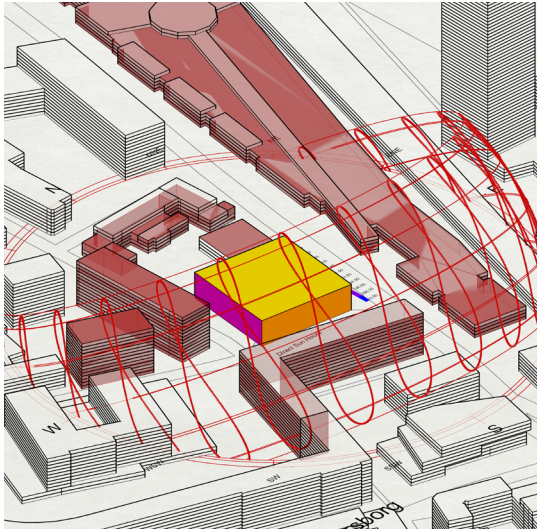
2. North-West



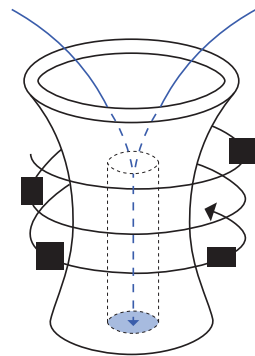
3. North-East



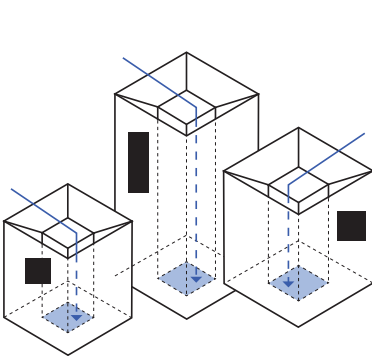
4. South-West



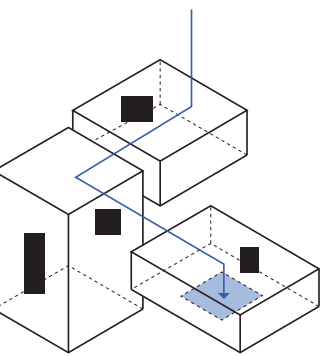
1. The Common



2. The Collection



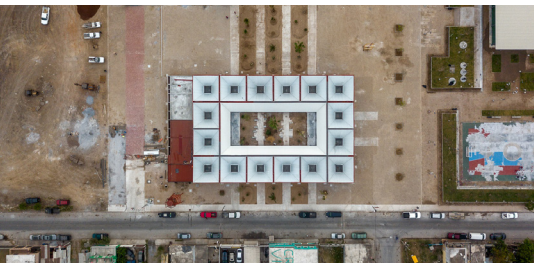
3. The Journey



1. The Common



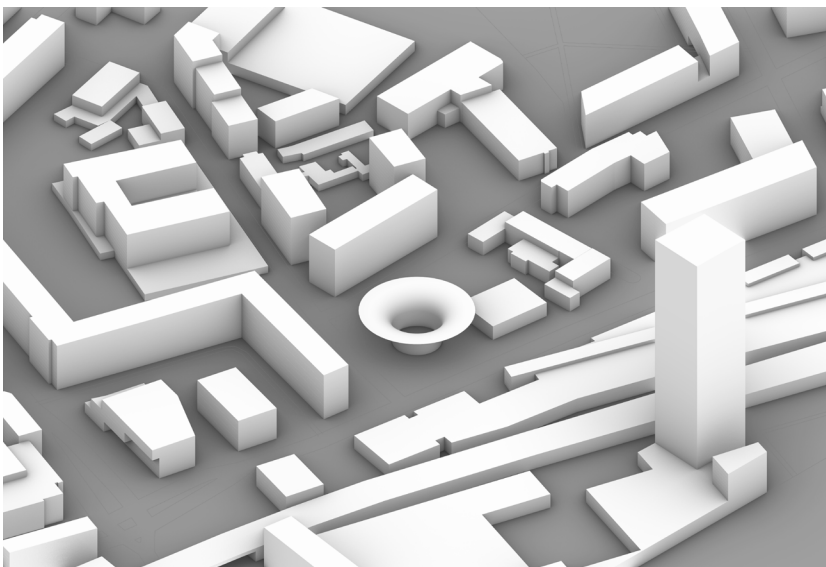
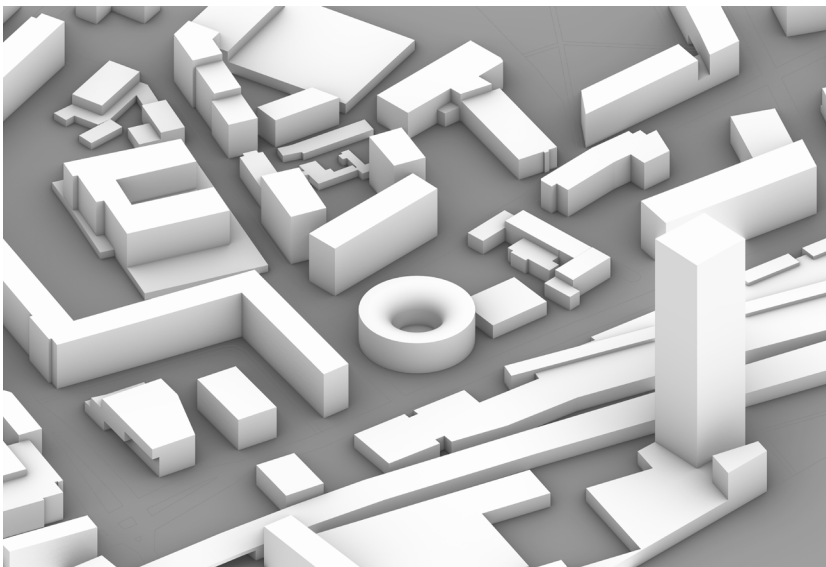
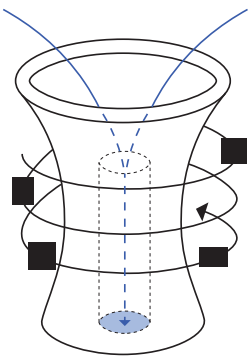
2. The Collection



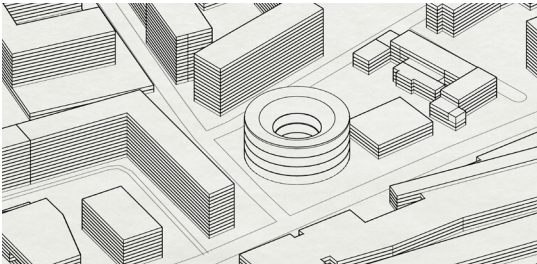
3. The Journey



1. The Common

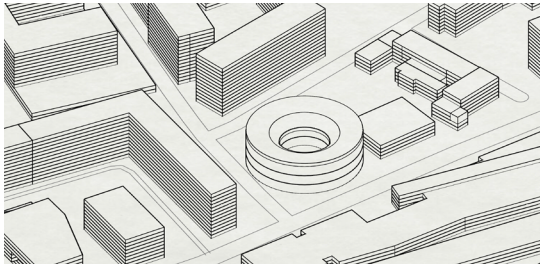


Four levels



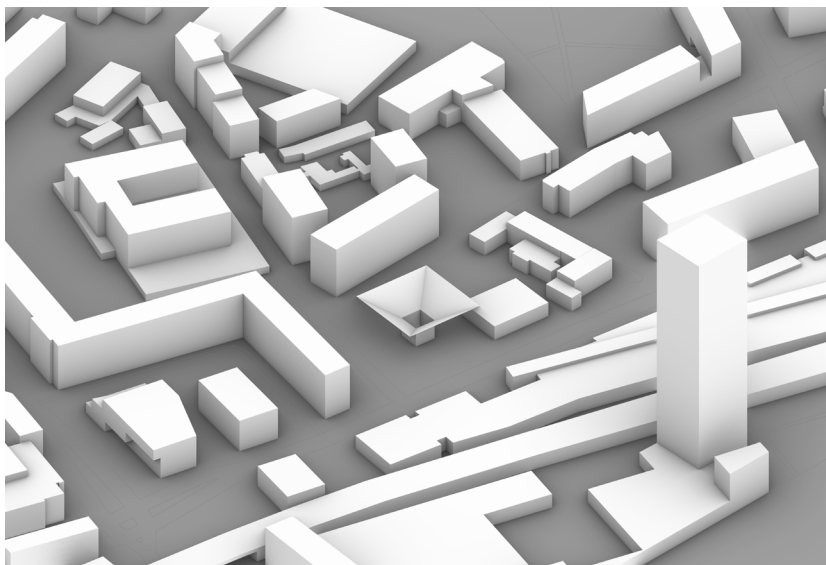
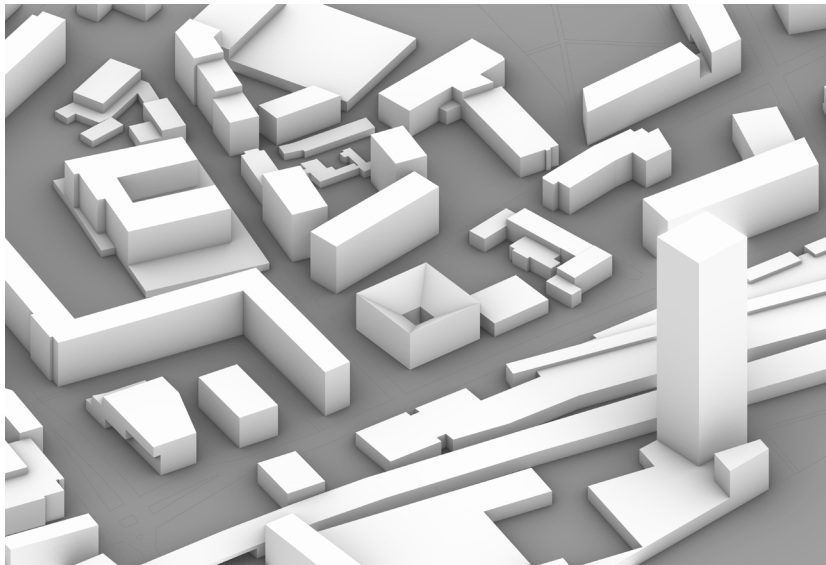
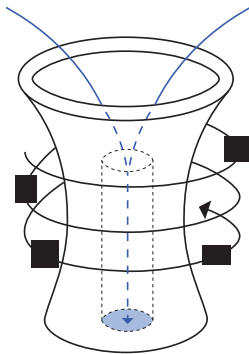
3300m2

Three levels



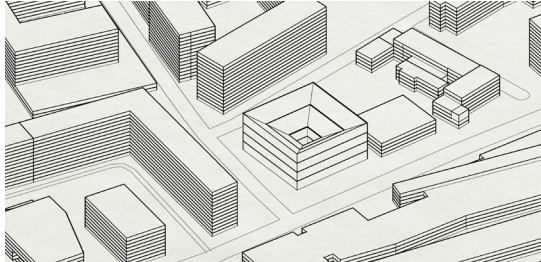
3400m2

1. The Common



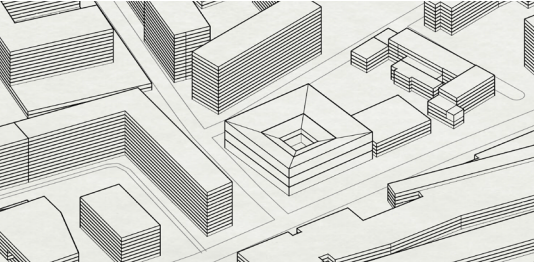
Four levels

3500m2

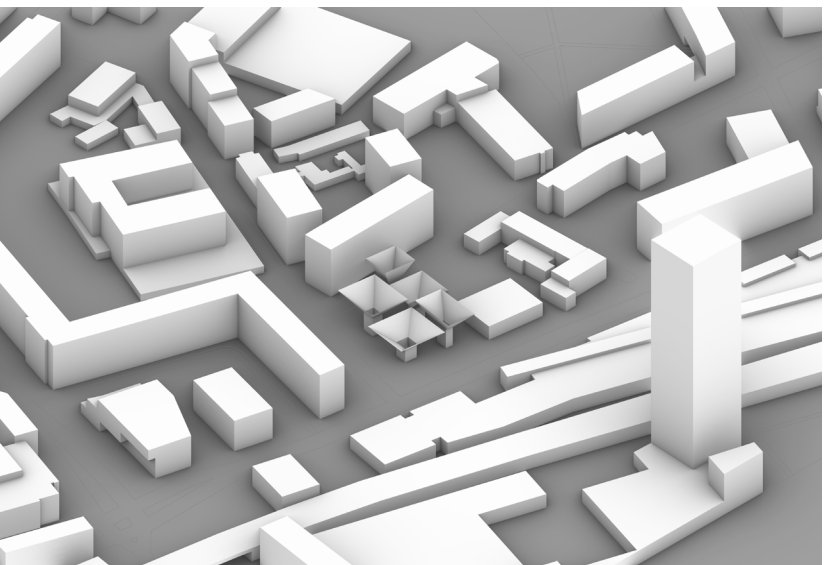
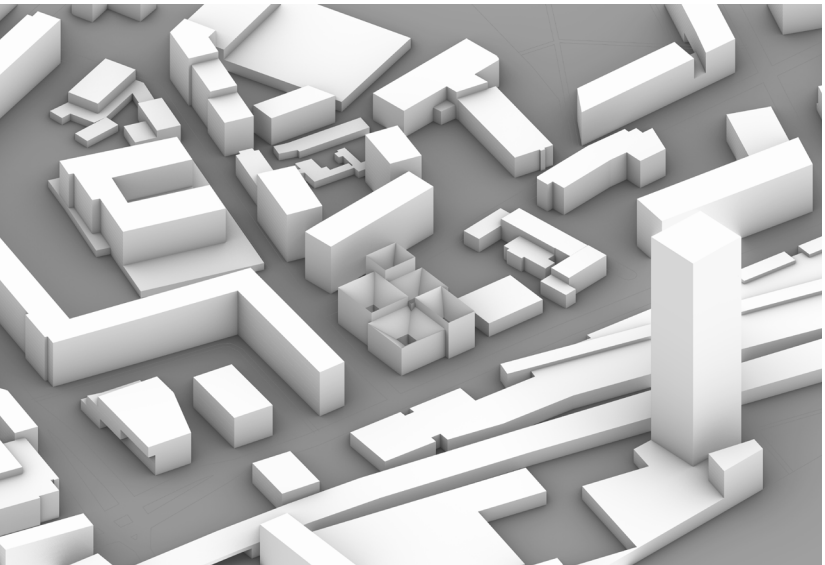
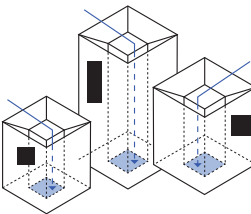


Three levels

3600m2

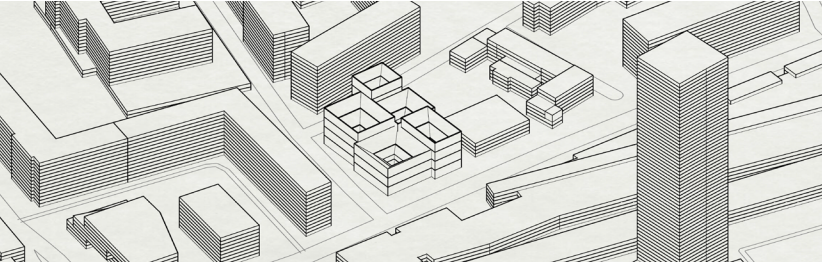


2. The Collection

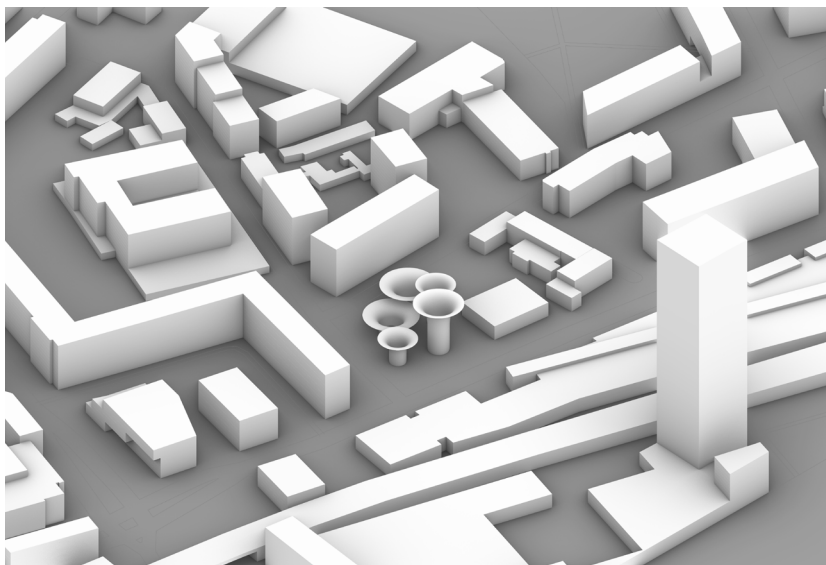
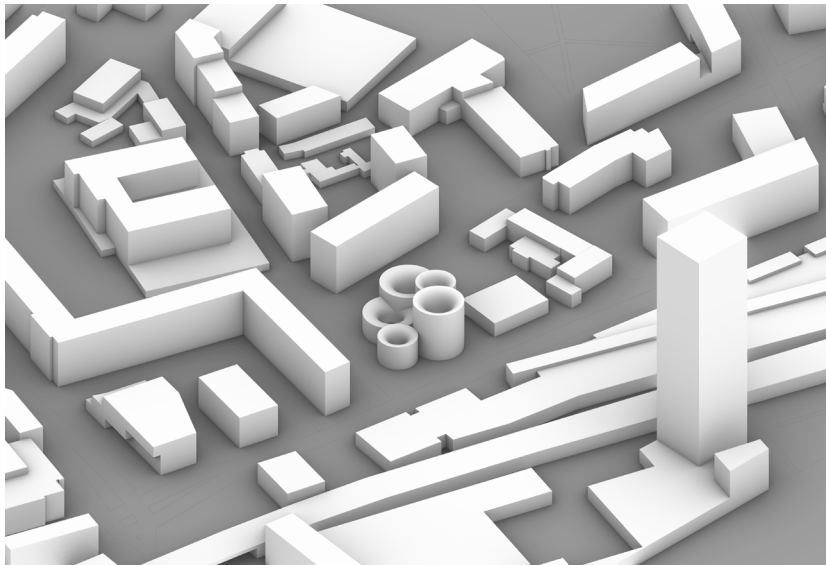
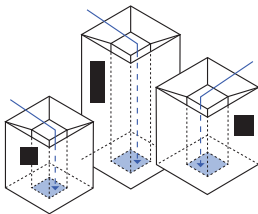


Three to five levels

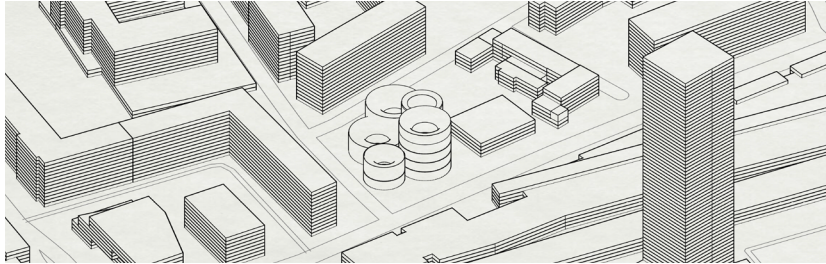
3400m2



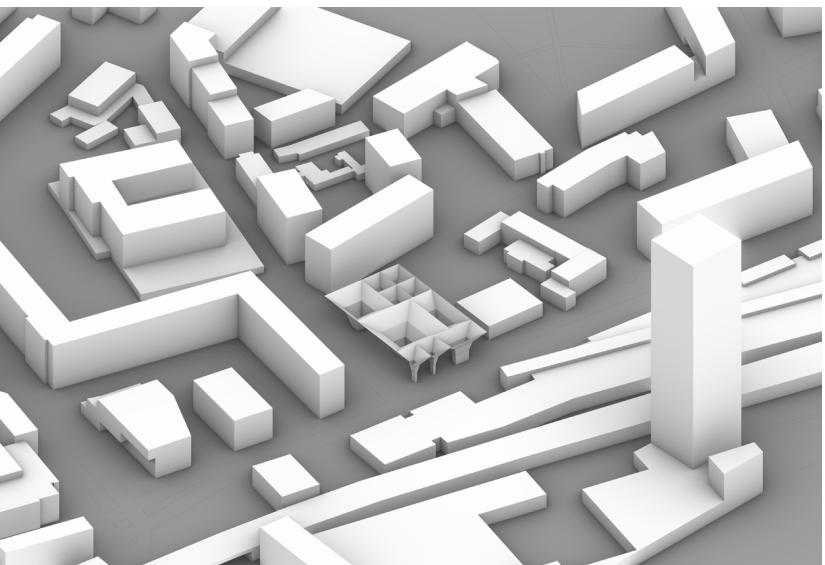
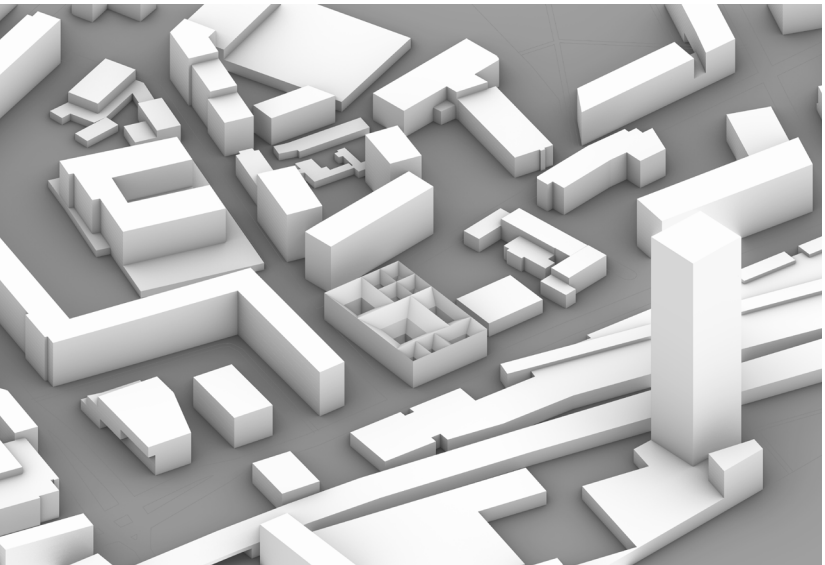
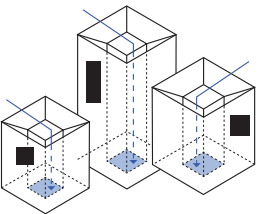
2. The Collection



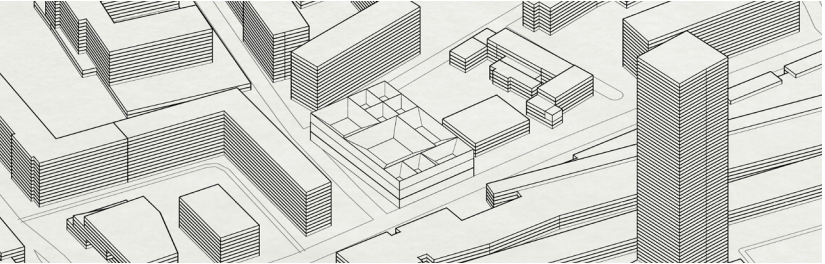
Three to five levels 3400m2



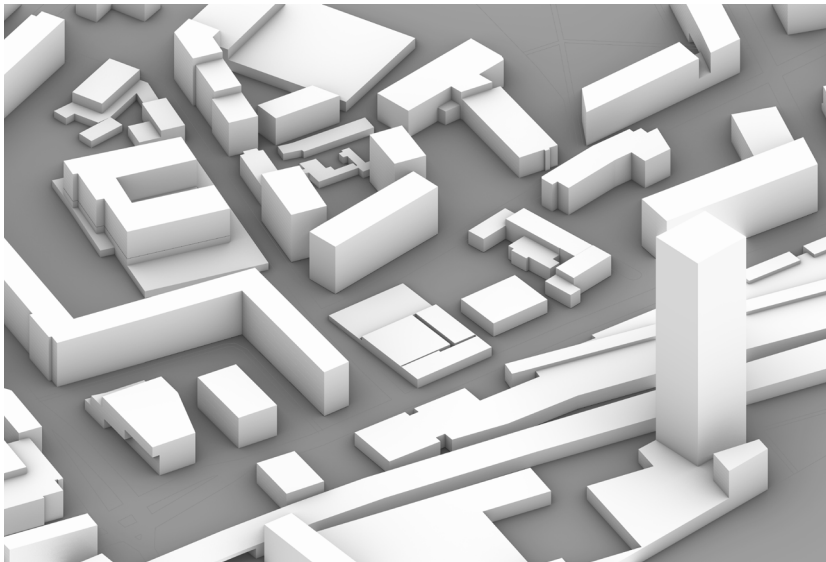
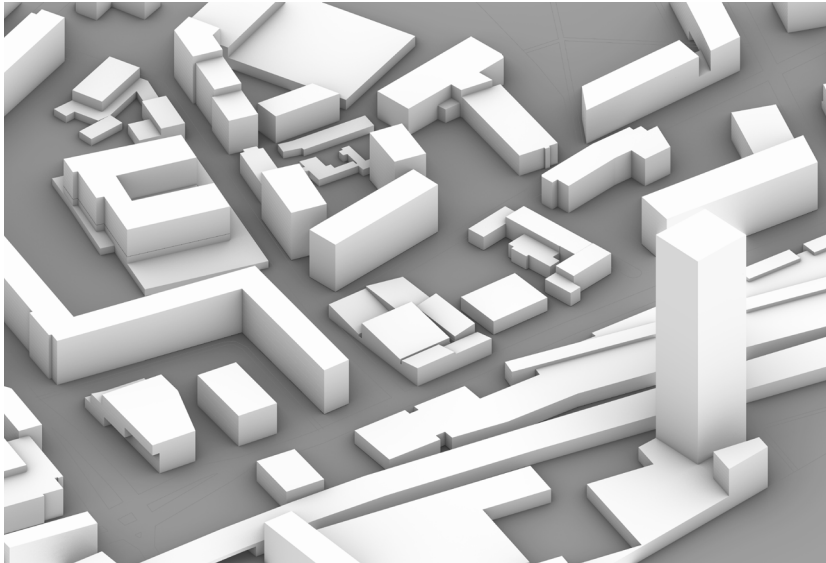
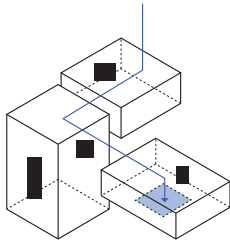
2. The Collection



Two levels 3400m2

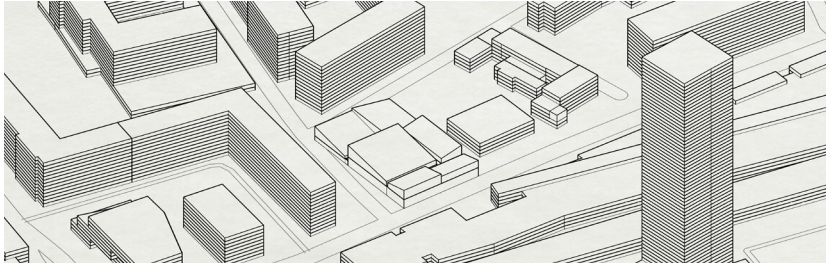


3. The Journey

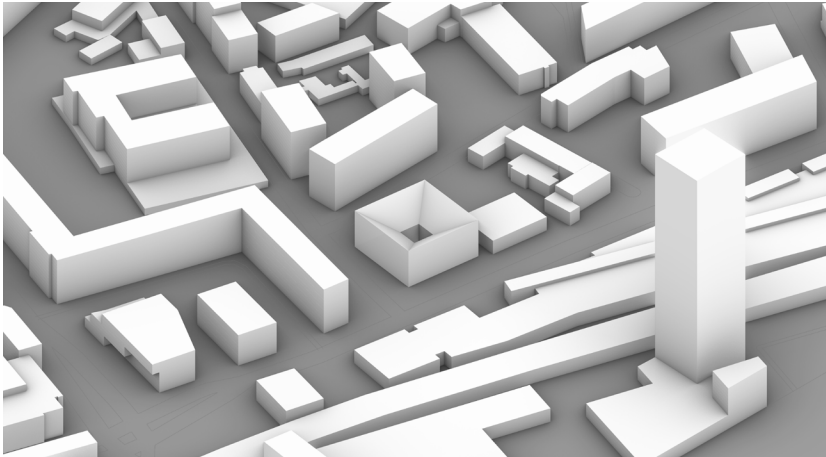
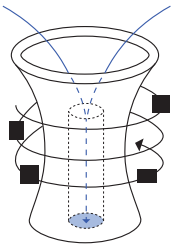


Two levels

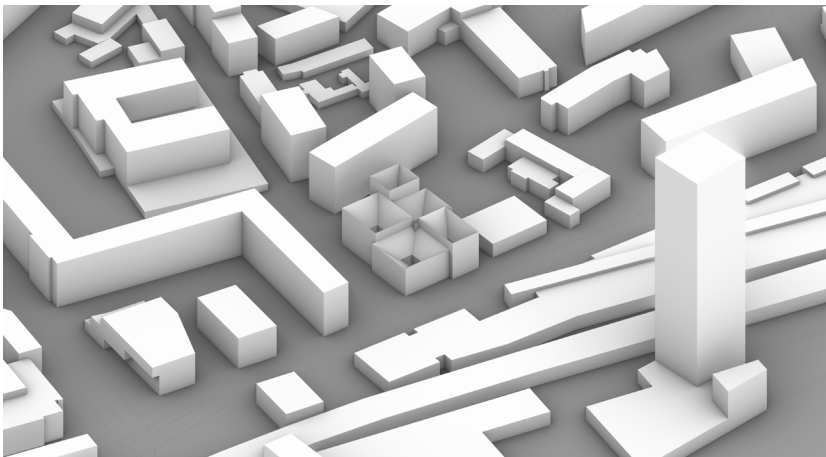
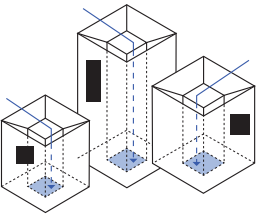
3400m2



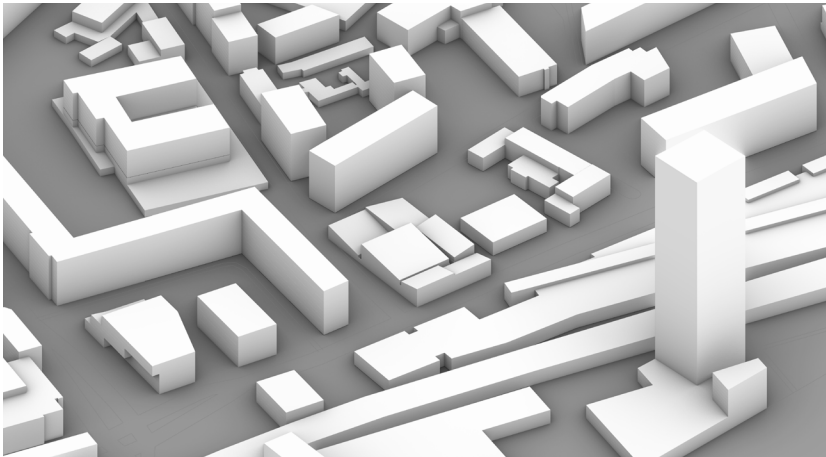
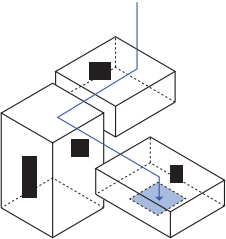
1. The Common



2. The Collection



3. The Journey



Feedback:

- For next week, elaborate more on the massing options
- Can the massing options be combined?
- "The common" makes sense as a landmark, attracting visitors, but the "collection" makes sense to create this scattered building combining different functions, while "the journey" can still be combined inside of the building, or as a roof
- A diagram as section would explain this project better, visualising the relation between indoor and outdoor spaces
- Make physical models of the massing options: two or three in total, combining or choosing one of the options
- Come with a concrete program, including the square metres
- Consider 25% more for technical facilities and creating the opportunity to grow as a project
- Bazaar can be integrated in the building, because
 1. Creates more space to integrate the natural landscape with the project due to demolishing
 2. Addressing a multi-cultural side of the Bazaar, which can also attract diverse visitors
- Make a functional diagram of the connections and the routing throughout the building, is it a loop? Or is it from A to B to C?
- Create a plan for the relation between outdoor and inside spaces, and elaborate it with percentages: 60% is outdoor and 40% is indoor
- Also, a minimum of 3000m² of public space
- Create this masterplan of what areas you will connect with the building, and how
- Outdoor spaces don't have to be only on the ground floor level, it can also be up the roof etc
- Name the functions differently, a name that doesn't concern only one culture/religion (ablution room or hammam) but something that concerns all (purification room and multi-cultural bath)
- The 19th of December you have to make a decision of the plot and type of building
- During the P2, explain your reasoning for the plot, which is:
 1. The site is already fragmented, allowing my design to not be homogeneous with the surroundings and having its own unique appearance
 2. The site being lower in elevation compared to the district, allowing my design to be connected to other rainwater collecting surfaces in a masterplan
 3. Next to the main street, which fits the landmark character of the project and creates a visible unique identity for the district



Functions

1. Nature Swimming Pool

- There are three indoor swimmingpools < 3km, but no outside nor nature swimmingpool

2. Spa

- There is one spa in < 3km, but it is old and neglected

3. Laundry

- There is one laundry room in < 3km, but it is paid, can I design one for public and free?

4. Bathing

- There is one bathing space in < 3km, but it is old and neglected

5. Community Garden

- There is one community garden in < 3km, but it is not for the direct neighborhood

6. Steam Bath

- There is one sauna in < 3km, but very small, also there is no hammam

7. Recreation Space

- There is one water recreation space in < 3km, but mainly for summer time also providing urban cooling

8. Tea House

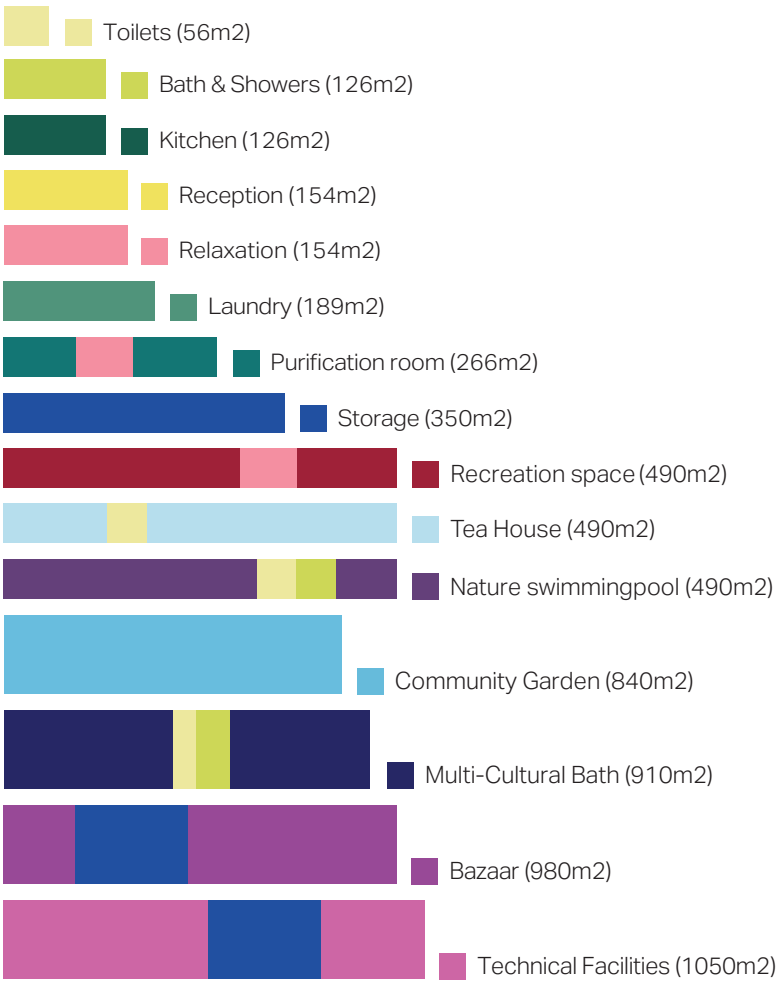
- There is one tea house in < 3km, but also serving as a normal café and only focusing on Turkish Culture

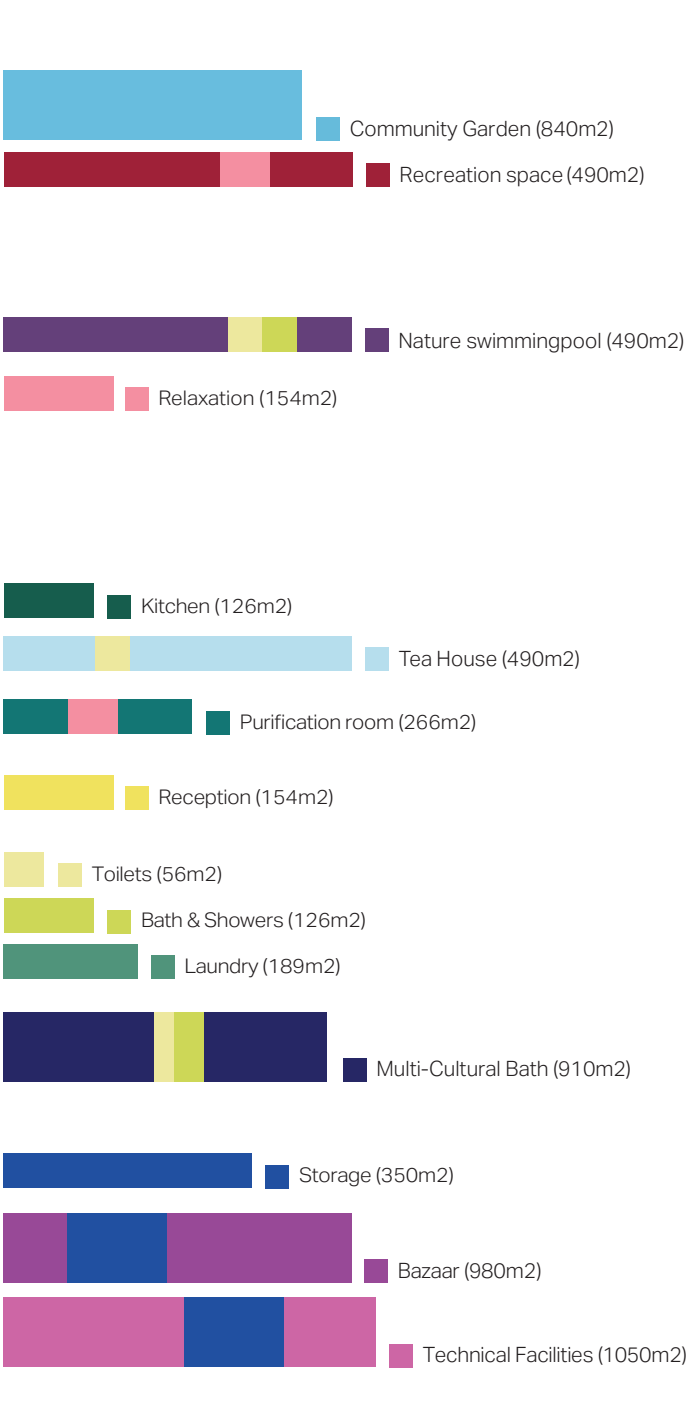
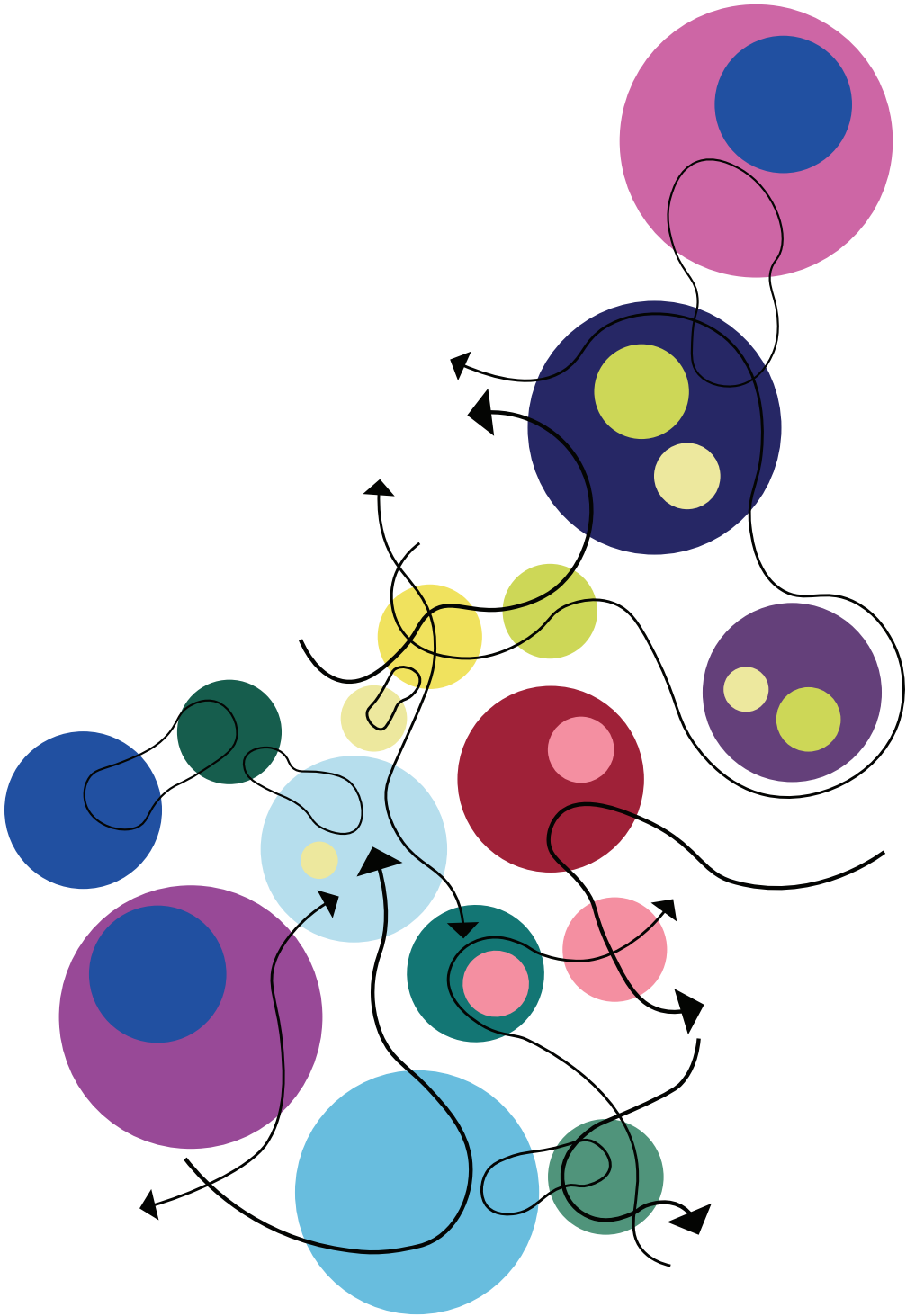
9. Rainwater Collecting

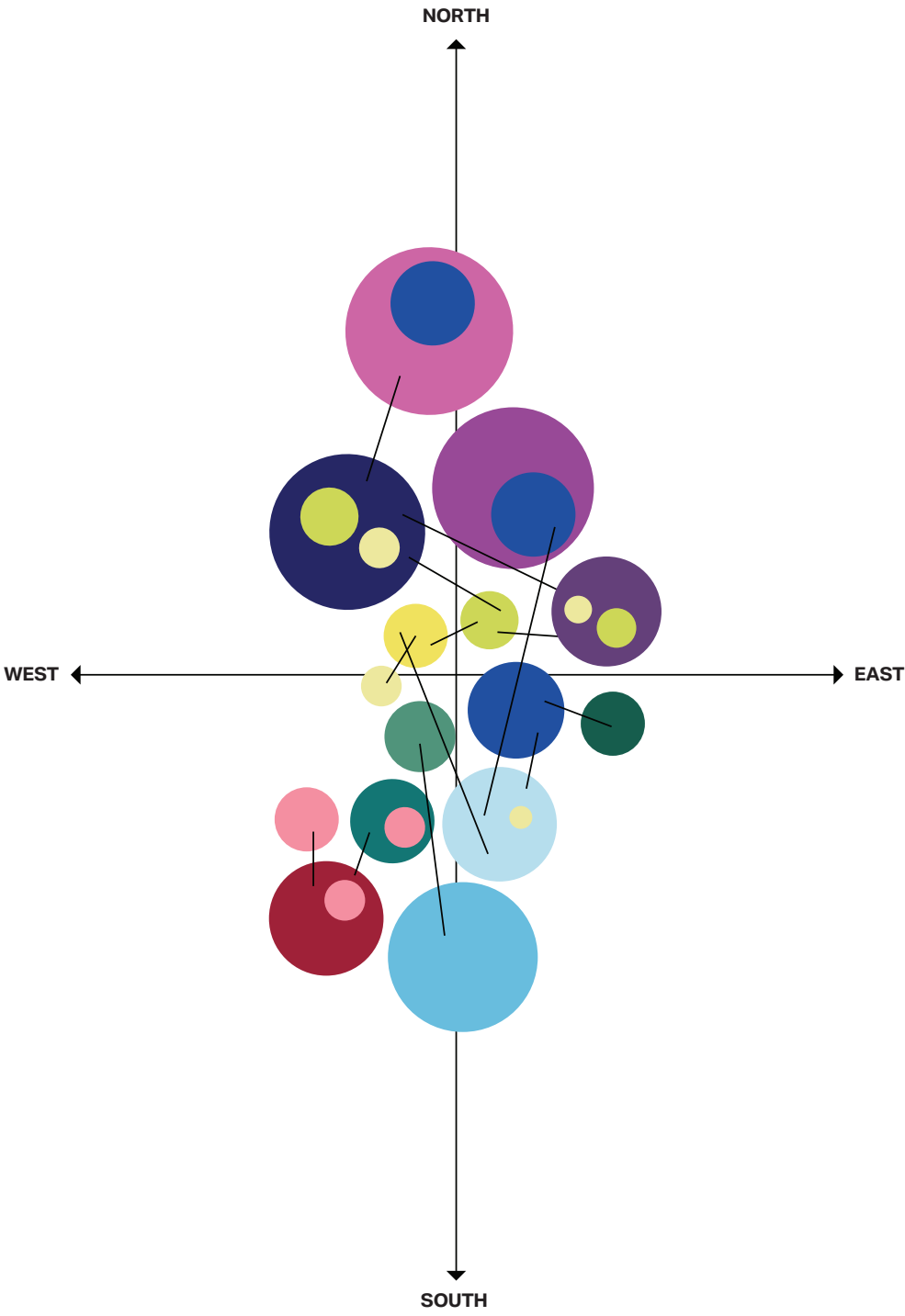
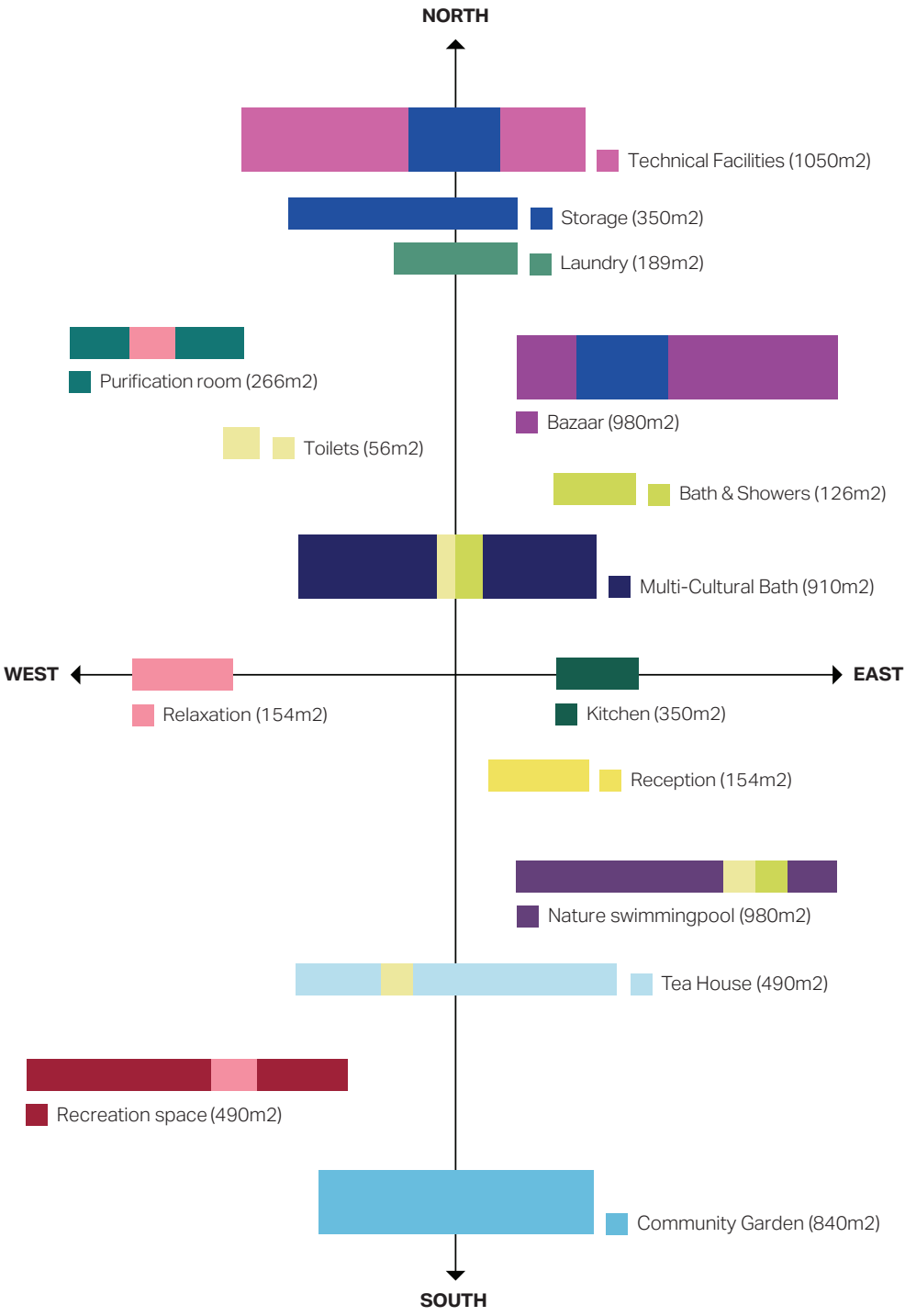
- There is two rainwater collecting areas in < 3km, but also needed for our plot

10. Purification Room

- There are more than one ablution rooms in < 3km, but only in mosques serving for Islamic religion



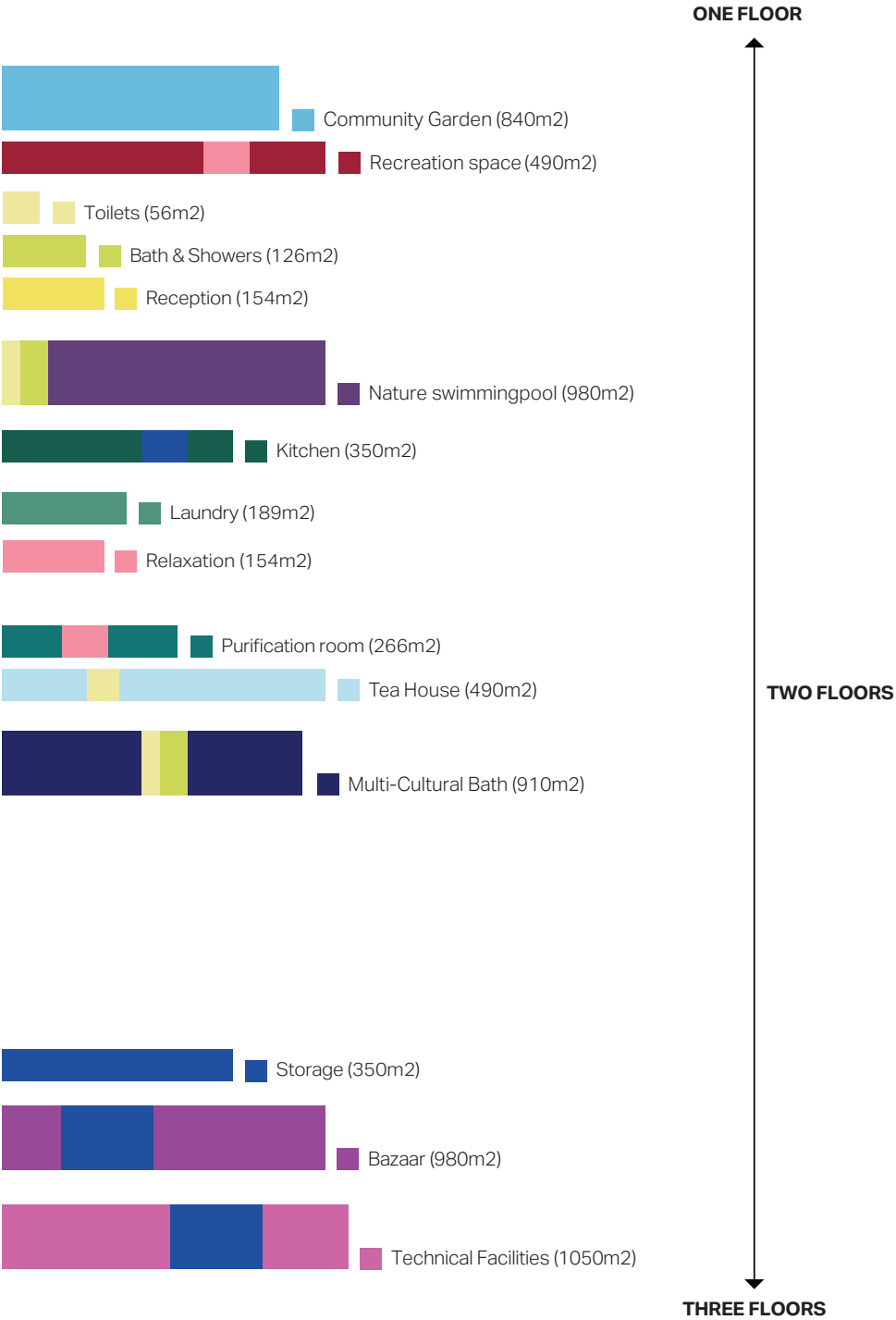
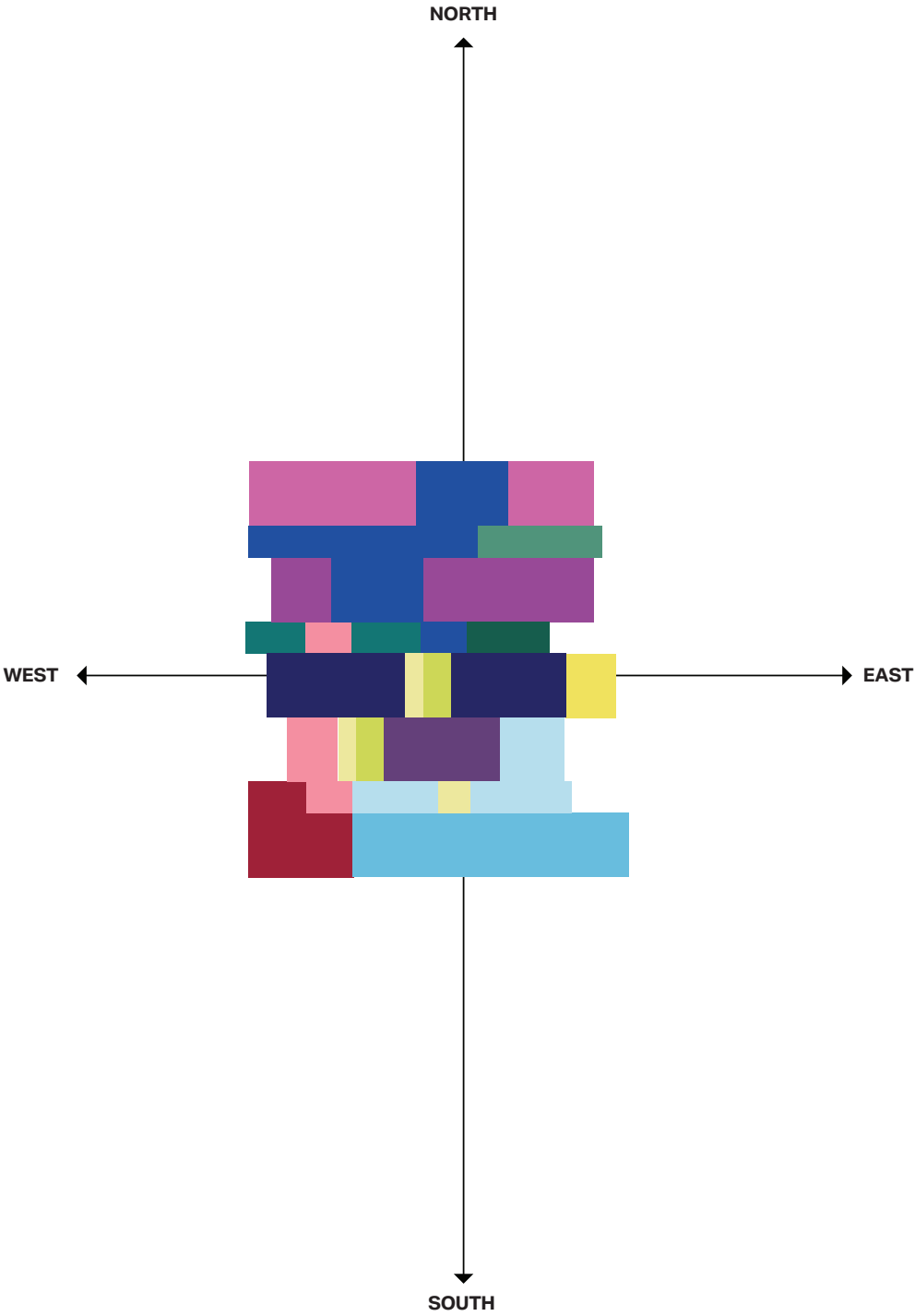


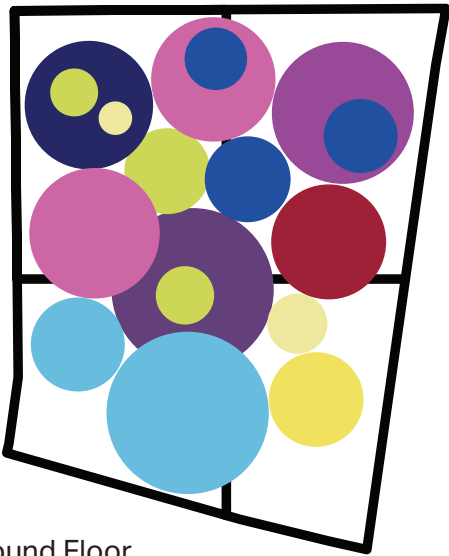
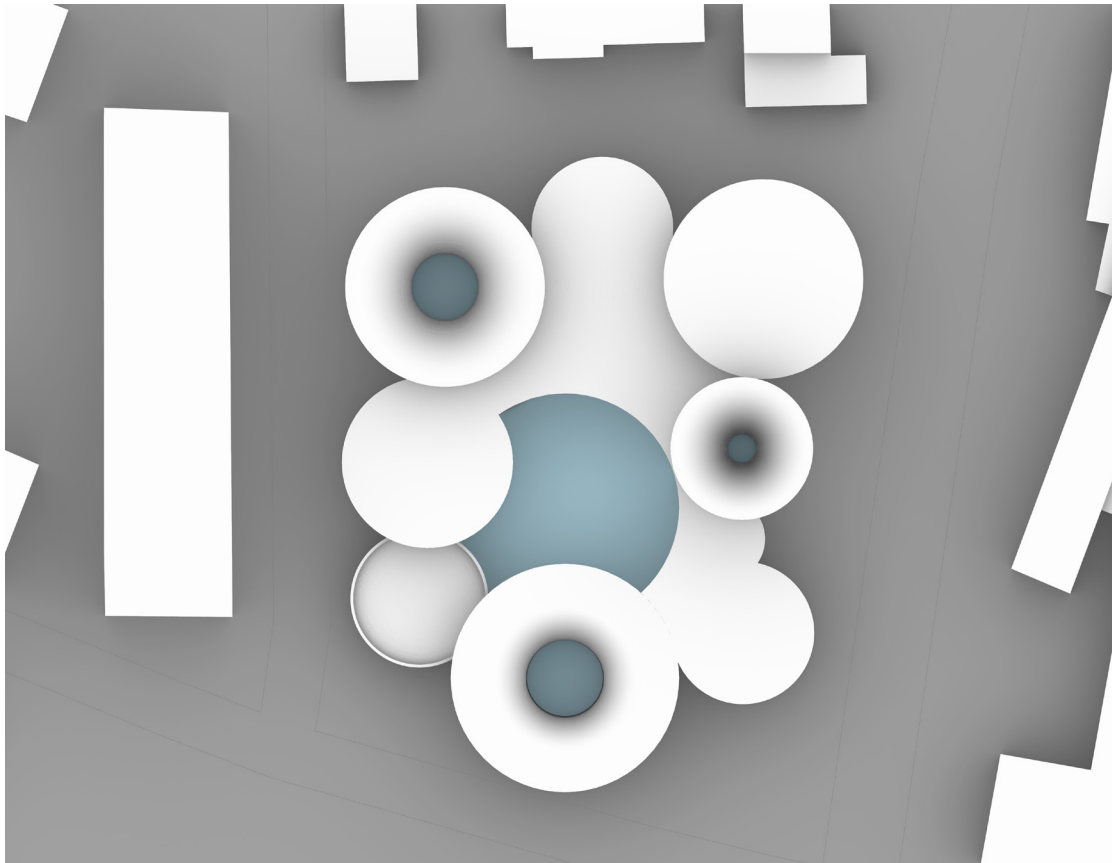


WEEK 1.15

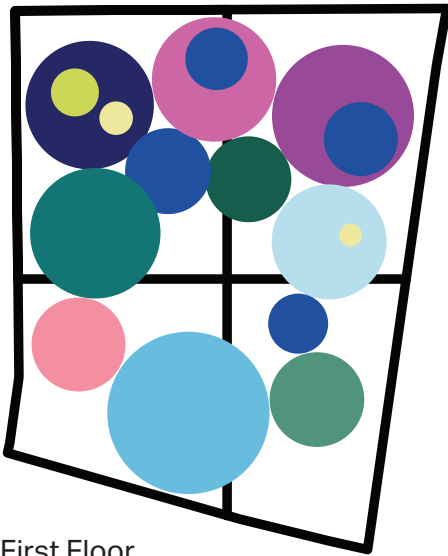
10 | 12 | 24

Study: Sun orientation and Program in the building

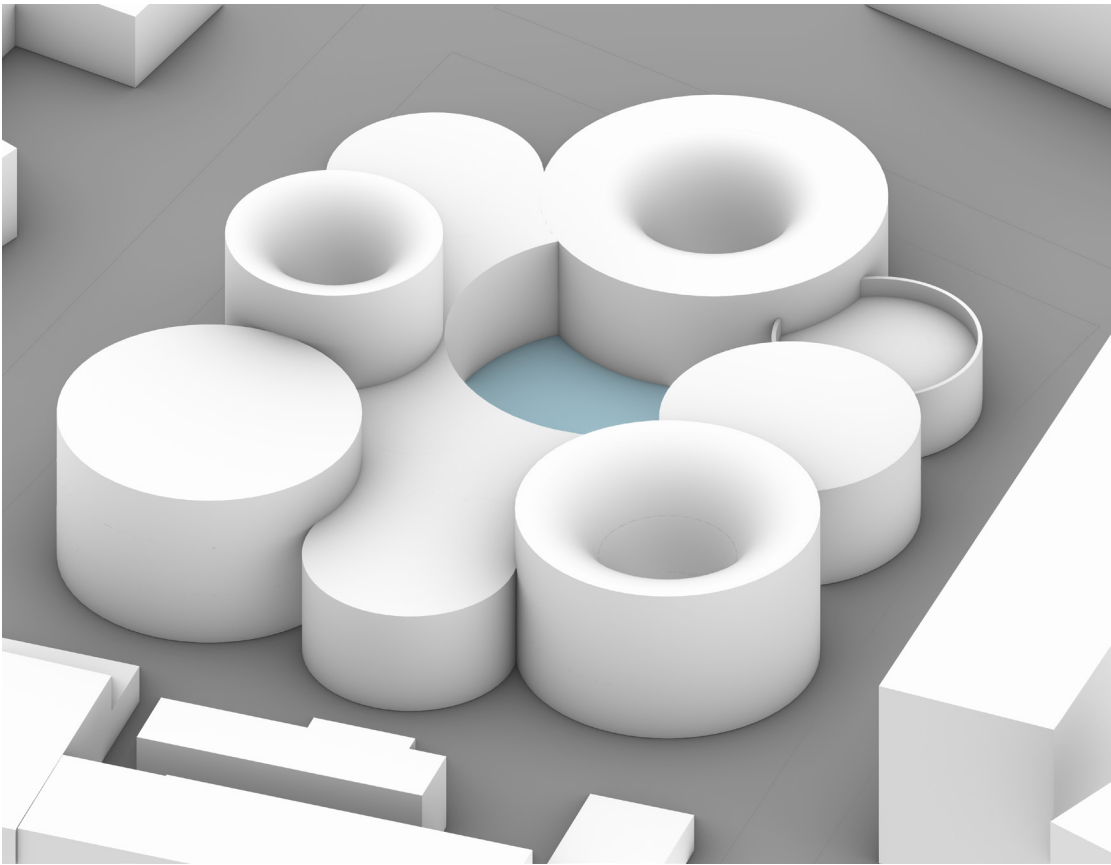
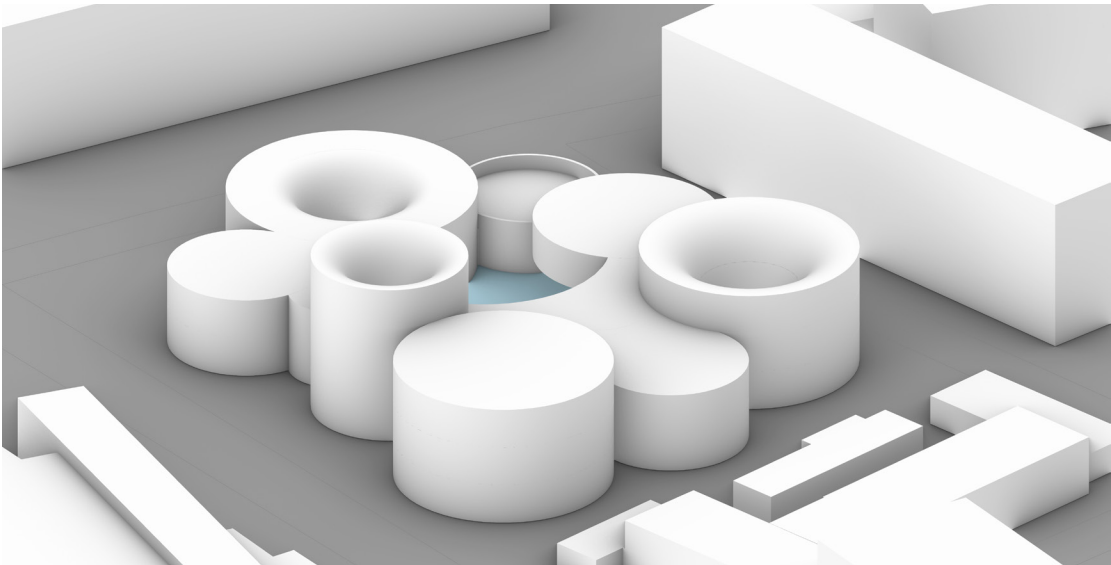


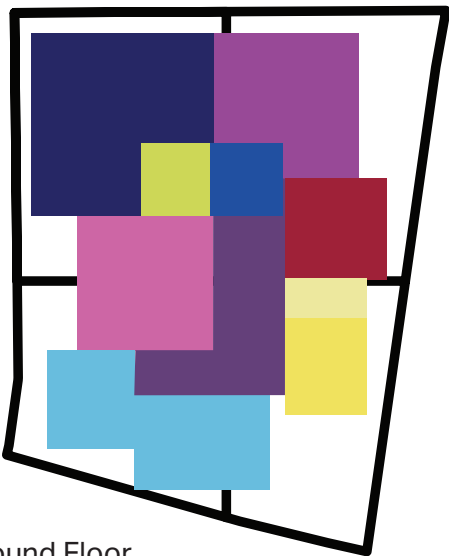
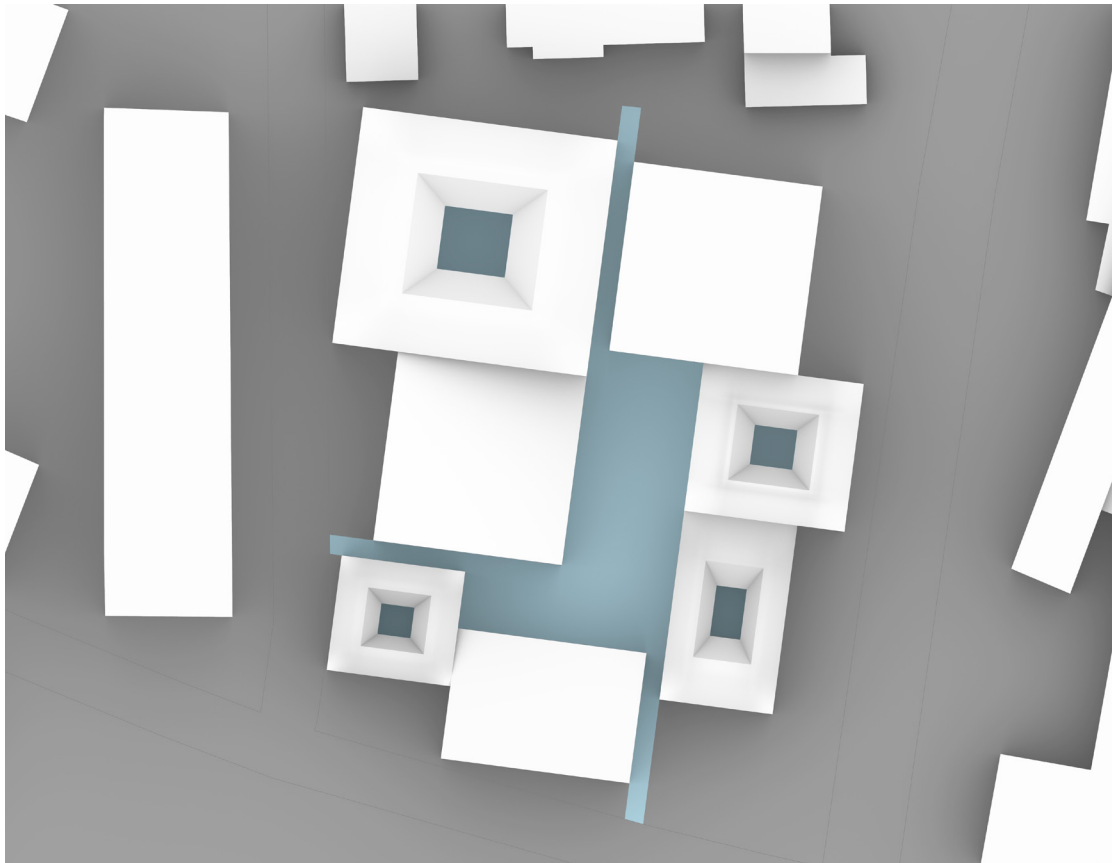


Ground Floor

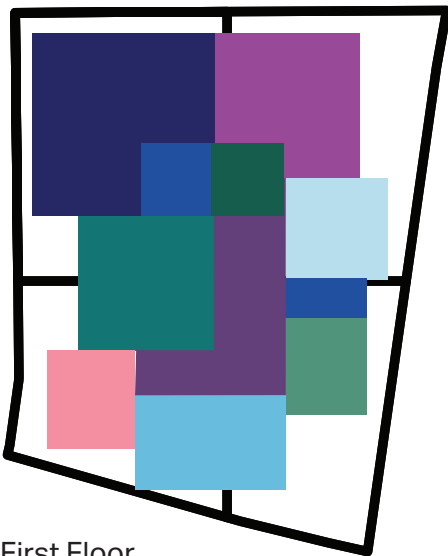


First Floor

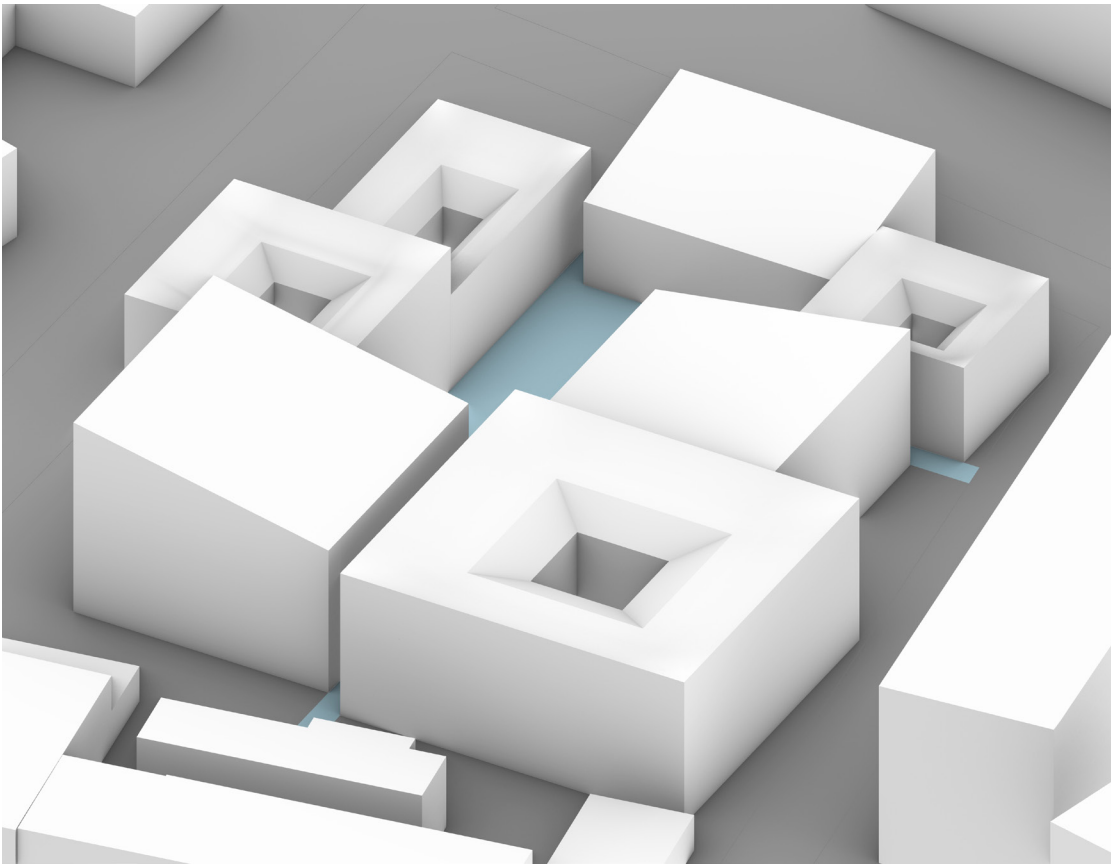
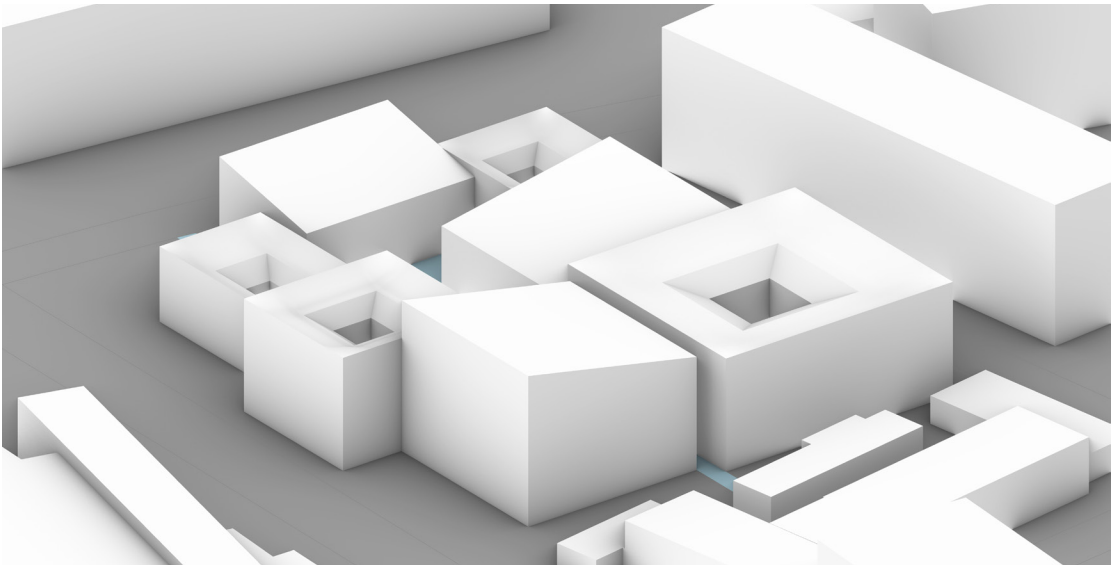


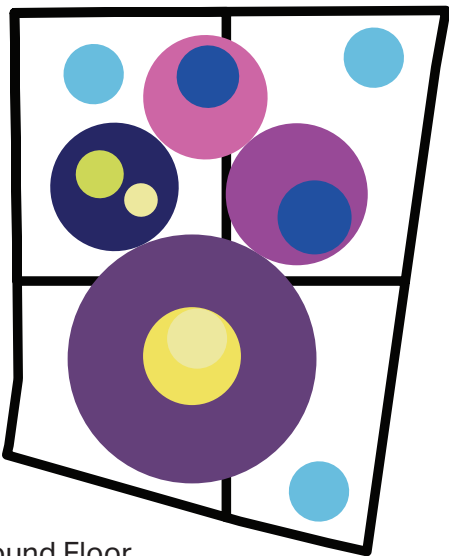
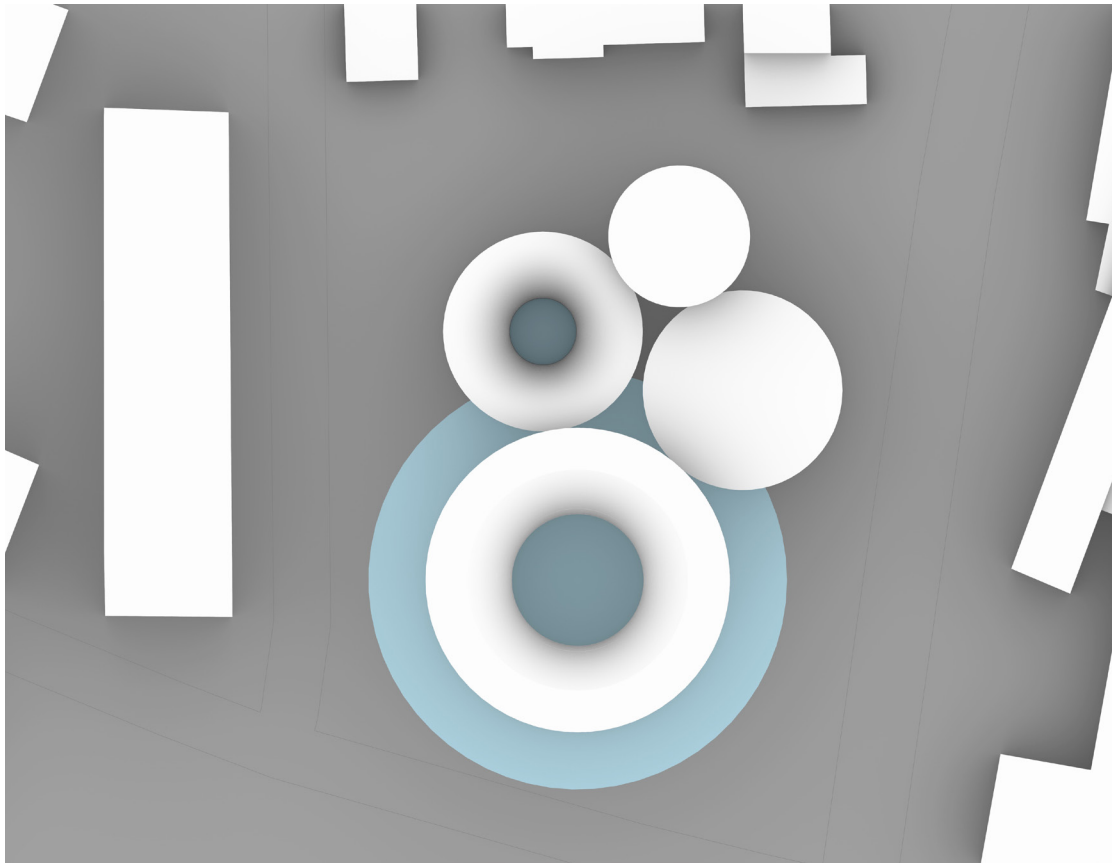


Ground Floor

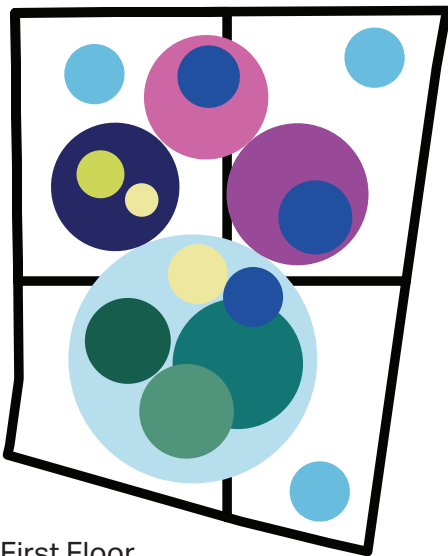


First Floor

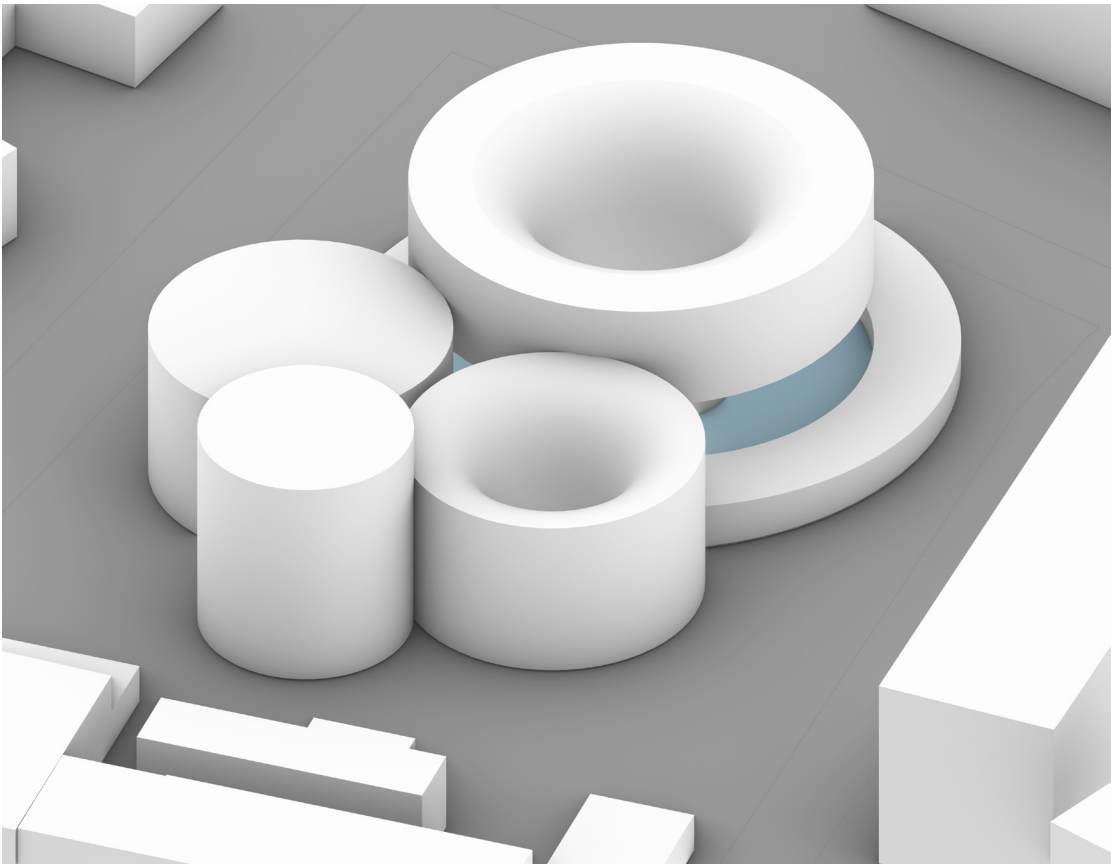
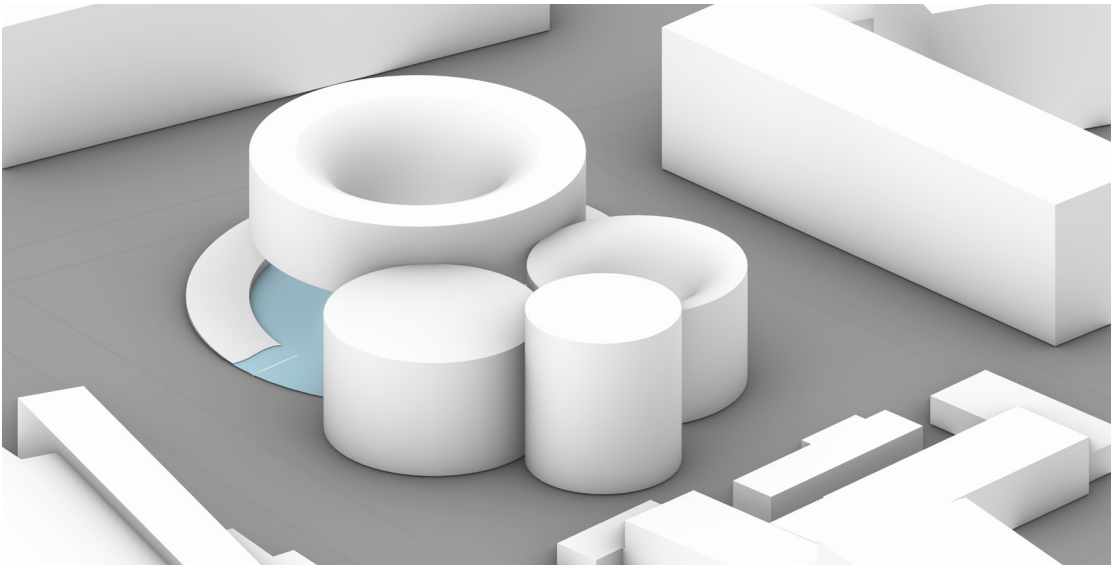




Ground Floor



First Floor



WEEK 1.15

12 | 12 | 24

Personal Communication with Stefano & Paul

Feedback:

- A building doesn't have to be square or circular, there is also an in between
- Forfatterhuset of Cobe is a good example of an in between shape
- Not all spaces have to be public, it can also be the case that all outdoor spaces are public but all indoor spaces have a more private character
- Define which spaces need to be private and what needs to be public
- Does the natural swimmingpool need to be located in an introverted world or opening up to the city?
- Maybe you want to open up the sightline between the surfaces you collect rainwater and the mainstreet
- Explore the different states of water, water is not only liquid
- Everytime there is too much 'building' and it gets too solid, take a step back
- The principle is simple: 1) Watertank: Visible and High, giving the sense of "we are talking about water" 2) Scattered and fragmentated functions 3) Interesting outdoor en indoor spaces connected by water in different forms
- Take a step back and design a waterscape first instead of massing

- Make the diagram more concrete with icons and define entrances, what is it connected to?
- If you don't feel comfortable with the circular shapes, don't do it
- Demolishing the Bazaar can be a reason for you to implement the same concept of Bazaar streets and its floorplan
- P2: Don't forget to talk about hybridity and sustainability
- P2: Talk about how you will reuse the materiality of the building you like to demolish, when talking about sustainability



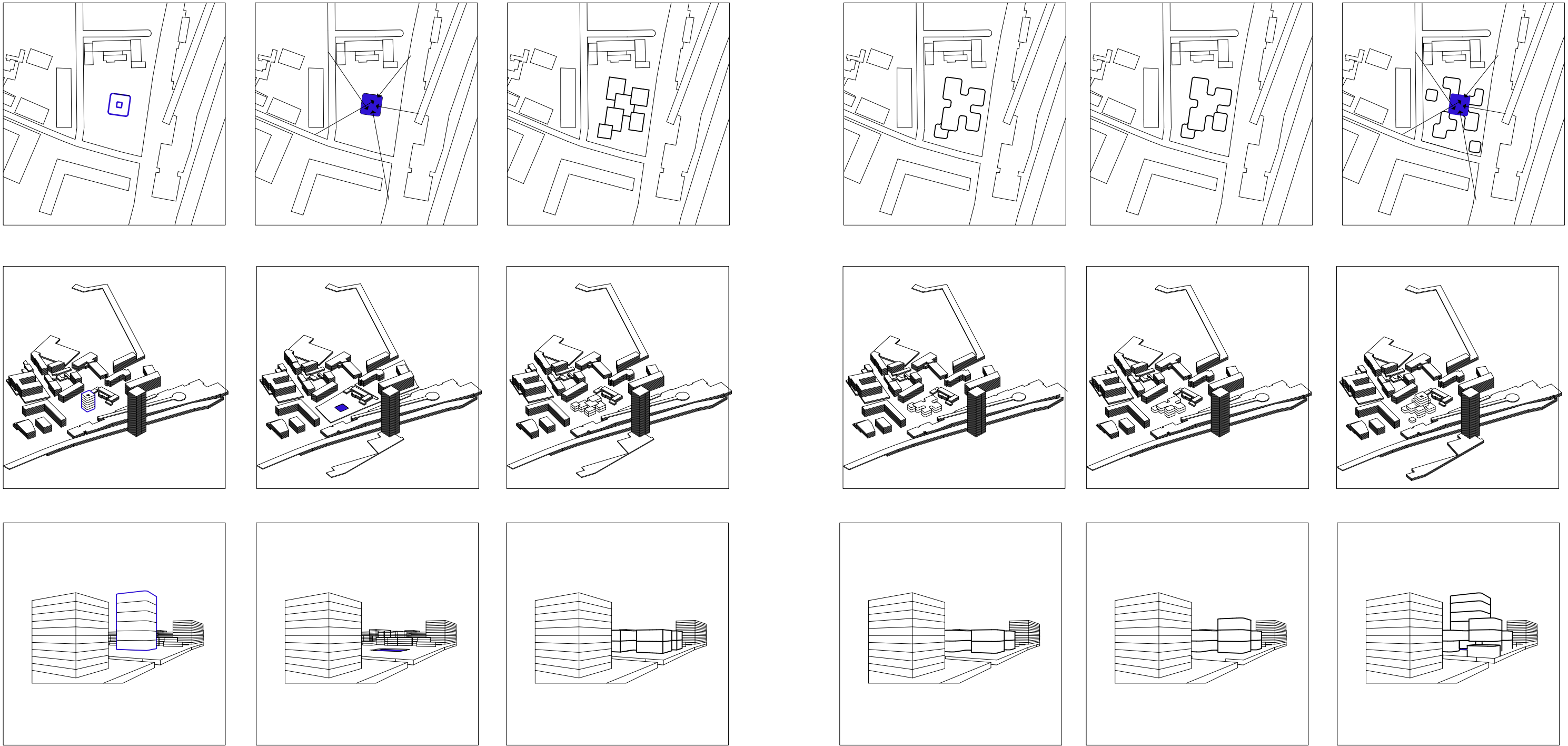
Forfatterhuset
Kindergarten /
Cobe

Grand Bazaar,
Tehran



Eco Boulevard
in Vallecas /
Ecosistema
Urbano





1. Nature Swimming Pool (450m2)



- Natural pools don't need frequent refilling but experience evaporation and seepage losses
- Evaporation Rate: Approximately 5–7 liters per square meter per day (depending on climate)
- Assumption: 6 liters/m²/day evaporation, minimal leakage
- Monthly Water Loss = 450m2 x 6 litres/m2/day x 30 days = **81,000 liters/month (81m3)**

2. Kitchen (100m2) & Tea House



- Water Usage per m2: On average, commercial kitchens use 50 liters/m²/day for cooking, cleaning, and dishwashing
- Monthly Water Usage for Kitchen = 100m2 x 50 liters/m2/day x 30 days = **150,000 liters/month (150m3)**

3. Laundry Room (150m2)



- Water Usage per Wash: A modern washing machine uses 50 liters per wash (range: 40–60 liters)
- Assumption: 10 Washing Machines in total and each machine is used 4 times per day
- Monthly Water Usage for Washing Machines = 10 machines x 4 washes/day x 50 liters/wash x 30 days = **60,000 liters/month (60m3)**

4. Purification Room (250m2)



- Water Usage per Use of one Sink: On average, 3 liters per use
- Assumption: 10 Sinks in total and each sink is used 30 times/day, for tasks such as hand washing
- Monthly Water Usage for Sinks = 10 sinks x 30 uses/day x 3 liters/use x 30 days = **27,000 liters/month (27m3)**

5. Public Bath (130m2)



- Water Usage per Shower: A standard showerhead uses 9 liters/minute, and an average shower lasts 8 minute
- Assumption: Each shower is used 10 times/day
- Monthly Water Usage for Showers = 10 showers x 10 uses/day x 9 litres/min x 8 min = **216,000 liters/month (432m3)**
- Water Usage per Bath: An average bathtub uses 150 liters per bath
- Assumption: Each bath is used 5 times/day
- Monthly Water Usage for Baths = 10 baths x 5 uses/day x 150 litres/bath x 30 days = **225,000 liters/month (432m3)**
- **Total Water Usage for Public Bath: 216,000 liters + 225,000 liters = 441,000 liters/month (441 m3)**

6. Multicultural Steam Room (400m2)



- Includes multiple rooms: warm room (tepidarium), hot room (caldarium), cold room (frigidarium), and changing rooms
- Steam Generation: Hammams use water to generate steam, and this depends on the size and duration of operation
- Average Water Usage: 10–15 liters/hour for every cubic meter of space for steam production
- For a hammam of 300 square meters with 3-meter-high ceilings (900 m³ total), this equates to appr. 9,000–13,500 liters/day during continuous operation
- Assumption: The hammam/ sauna operates 6 hours/day and serves 20 - 40 users/day
- Monthly Water Usage for Steaming = 13,500 litres/day : 2 (consumption is halved) x 30 days = **202,500 liters/month (202m3)**

7. Community Garden (500m2)



- Plants typically need 2.5–5 liters of water per square meter per day during active growth, depending on the climate and plant type
- Lower range: Cooler climates or drought-tolerant plants, like in Denmark
- Efficient systems (e.g., drip irrigation) reduce water usage by ~30–50%
- Local rainfall can significantly reduce water needs. Adjusting for rainfall involves subtracting the effective precipitation from total water requirements
- Water Usage for Community Garden: 2,5liters/m2/day x 500m2 x 30 days x 0,7 (reduction of drip irrigation) = appr. **26,000 liters/month (26m3)**

8. Toilets (50m2) and Reception



- Water Usage per Flush: Modern toilets use 6 liters per flush (low-flush models may use less, e.g., 3–4 liters)
- Assumption: Each toilet is flushed 20 times/day
- Water Usage for Toilets: 10 toilets x 20 flushes/day x 6 liters/flush x 30 days = **36,000 liters/month (36m3)**

TOTAL = 1.023,000 litres/month (1023m3) x +/- 20% = appr. 1.200,000 litres/month (1200m3)

BUT, water can be reused !

HOW MUCH RAINWATER NEEDS TO BE COLLECTED?



- Copenhagen receives approximately 613 mm (millimeters) of precipitation annually. This includes rain, snow, and other forms of precipitation
- 1 mm of rain corresponds to 1 liter of water per square meter.
- Therefore: 613 mm/year = 613 liters of water per square meter per year
- Harvested Water (liters): Rainfall (mm) x Collection area (m2) x Runoff Coefficient)
- In total, my project will collect rainwater from three surfaces, which is in total 2.700m2 + 1.400m2 + 2.200m2 = 10.700m2
- In addition to this, the rainwater will be collected by a slope of 1.700m2
- Harvested Water (liters): 613mm x (10.700m2 + 1.700m2 + 12.000m2) x 0.85 = appr. 12.700,000 litres per year / 12 = appr. **1060,000 litres per month (1060m3)**
- **Do the roofs in the area also need to contribute to rainwater harvesting?**
- So, in total, my project needs an additional collection of 500.000 litres rainwater per month, which counts for 500.000 : 613mm : 0,85 x 12 = appr. 11.500m2 of roofs contributing to the rainwater harvesting
- Total surface of roofs close to the already implemented water application area: 16.00m2

Feedback:

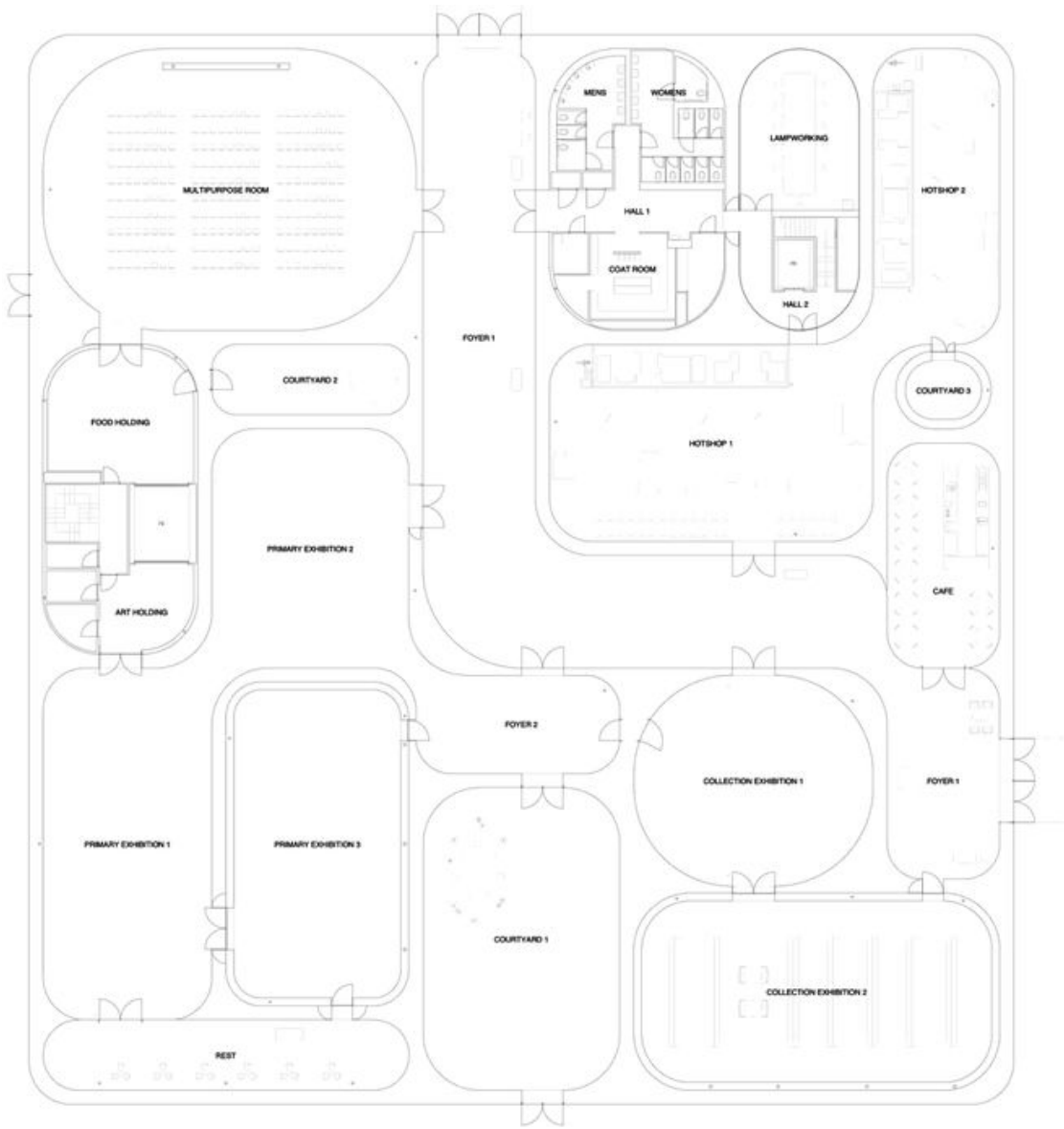
- Look into the floorplans of SANAA Museum Taledo
- Floorplans can be made by
- Don't locate the Water Tower in the middle
- Also get a feeling of how the building looks in urban context
- P2: Motivate that your project is about the importance of water
- Also create guidelines in space, for example: 1) Space is always connected with water, 2) The vertical elements of water area always at the end of the journey 3) Water is always visible from every space
- Look into Philipe Rahm: maybe steam or evaporation can affect the temperature in the building
- Can water also control the temperature in the interior? Or exterior?
- The water usage per function says a lot, make it visual: it can also be educative if you make visitors aware of what they are using
- After the Christmas break: show diagrams explaining sustainability and hybridity
- Hand in the report 1 week before the P2, talking about your choices for the examination commission
- Don't try to completely take over the water cycle, it is fine to partly use the urban network for this

- All buildings in the end contribute to the urban context, don't overcomplicate it
- Try to design spaces rather than volumes, and create guidelines or this as well as what you did for the architectural context
- Think of the open outdoor spaces, indoor outdoor spaces, buildings, water spaces: as a floorplan and collection of one big building rather than designing volumes vs open space



Museum Taledo / SANAA

Museum Taledo / SANAA



Marjolein studied Water Management and was willing to have a conversation with me about the project.

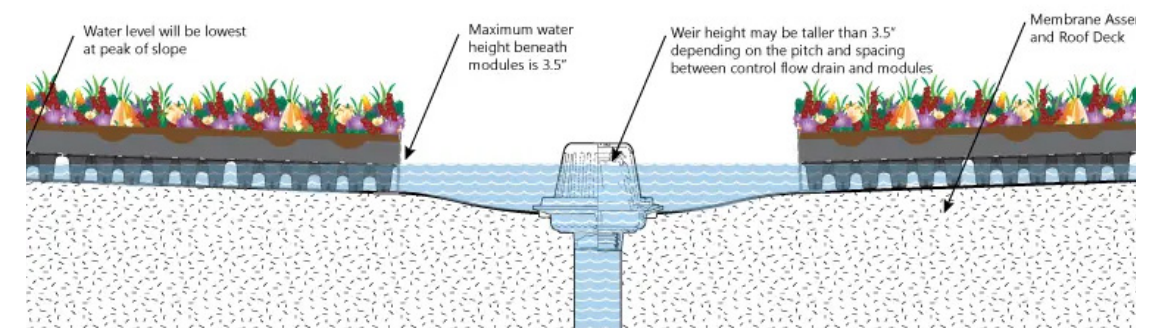
Feedback:

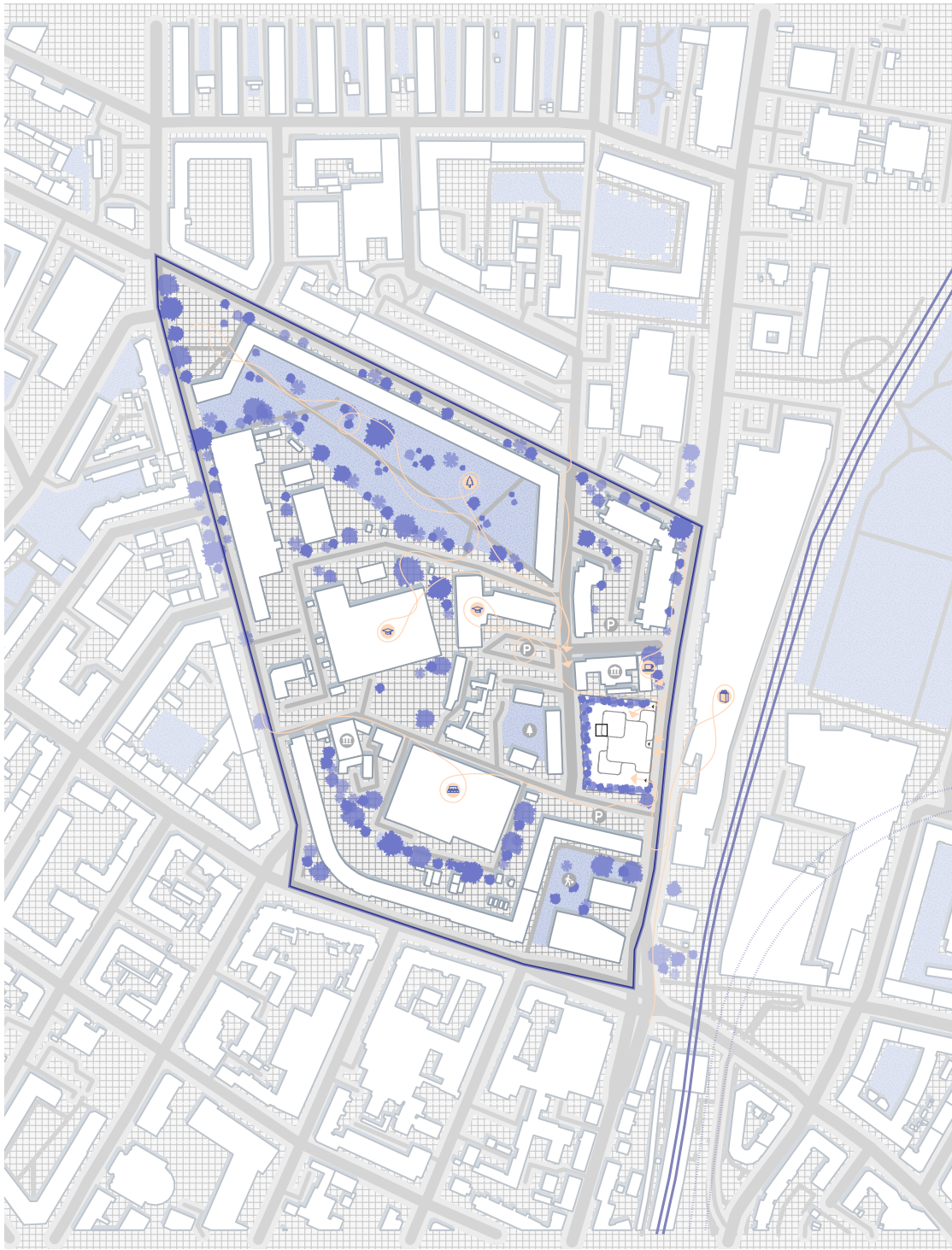
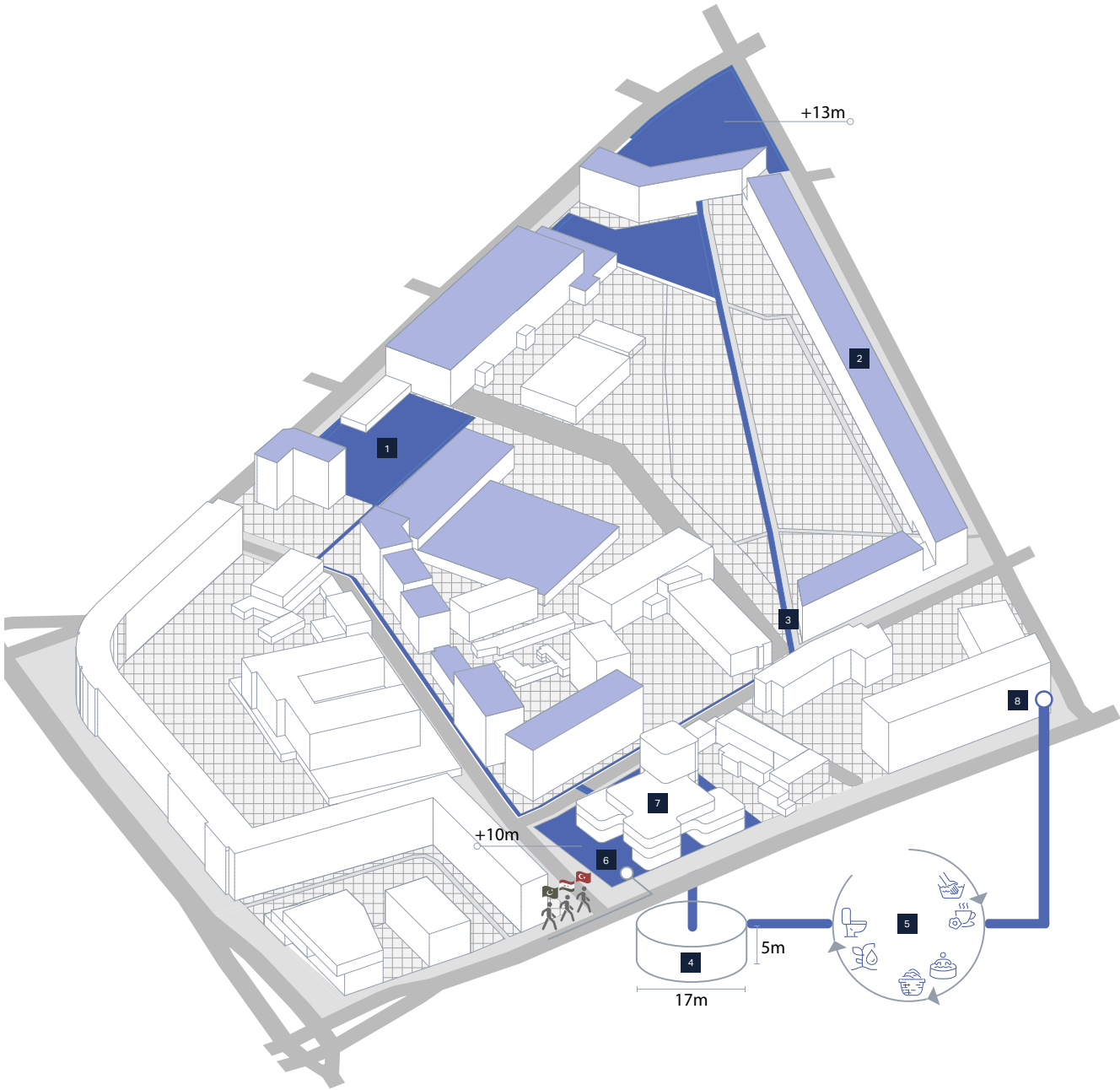
- The rainwater tank doesn't have to be way bigger than the water usage
- In Copenhagen, since there are no prolonged dry seasons and precipitation is relatively evenly distributed throughout the year, a water tank does not need to be significantly oversized. However, to ensure reliable water supply during slightly drier months (like March and April), a modest buffer is advisable
- Keep in mind a buffer of 25%
- It is all about water management, pluvial flooding can also be predicted and the buffer can be drained if it is too much rainwater
- In this case, the sewage never have to be overloaded
- Green-blue roofs also help with isolation in the building, making it cooler in the summer, and counter the urban heat effect
- It is all about slowing down the rainwater drainage process, collecting it already on the roof and retaining it there is better than directly transporting it to the ground floor level
- The slower the process goes, the

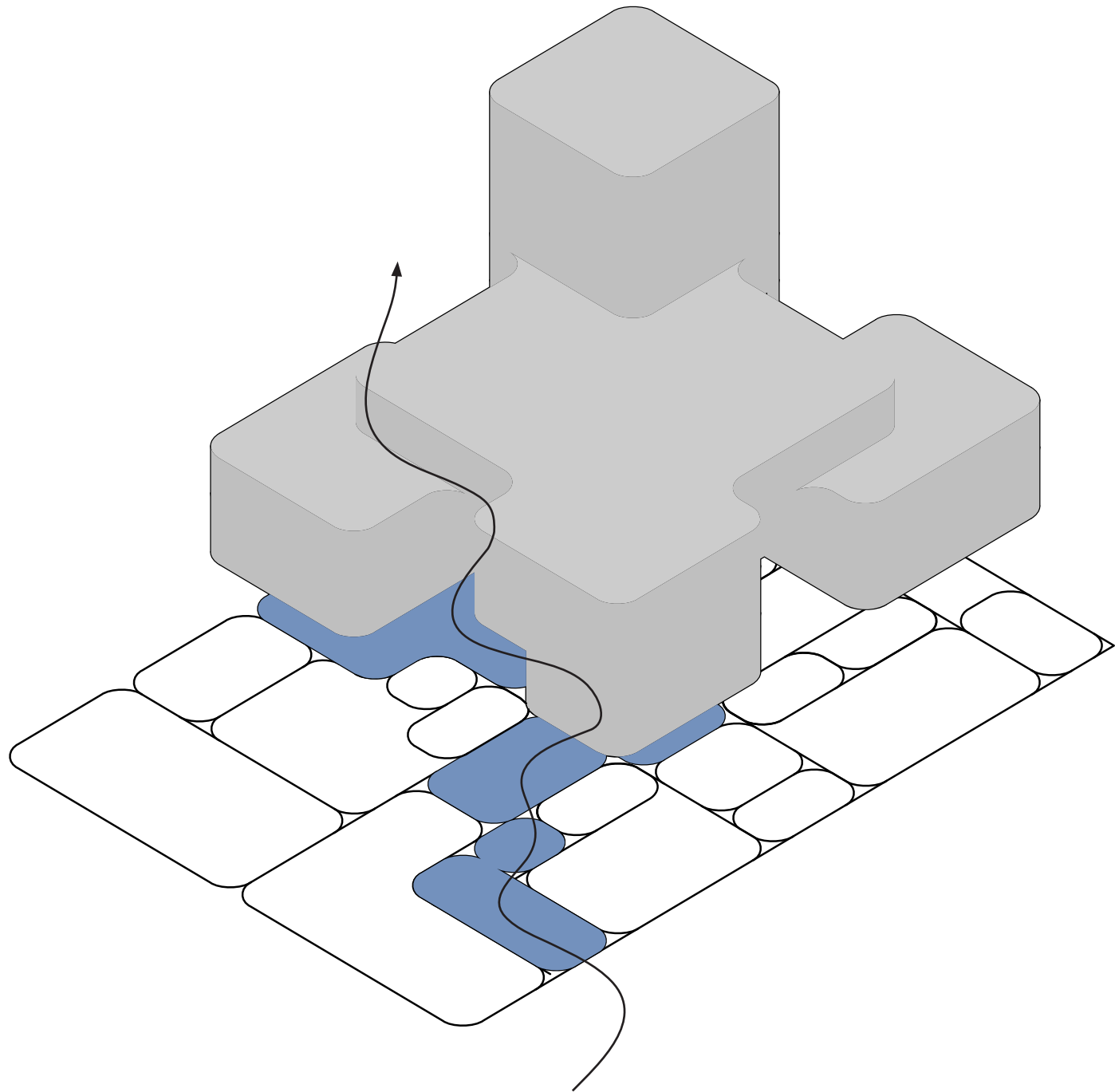
more control we have and the more rainwater can be managed

- These surface projects with public spaces are great as it increases the buffer capacity
- It is recommended to store the rainwater at least 90% underground, in an enclosed watertank in order to keep it away from environmental exposure
- Also, the groundwater is polluted, this is the whole argument for creating a new clean water infrastructure, so keeping it away from the groundwater level in an enclosed tank makes most sense
- Think about green/blue roofs, roofs that collect water and store water already on the roof (see references)

Green Blue Roofs: Collects and stores the rainwater on the roof, in order to slow down the process and manage the rainwater







The Water Line



Schematic Design Proposal P2

THE WATER HUB

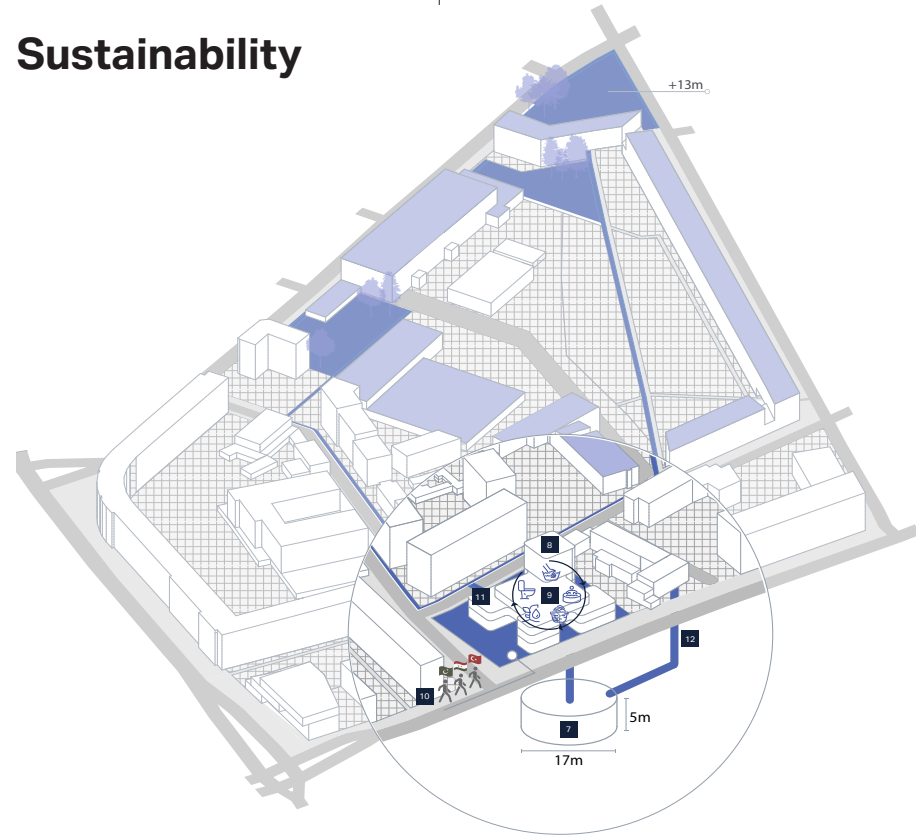
Celebrating diversity through water and providing a water infrastructure for Bispebjerg, Copenhagen

JOYCE DE LOUW
5326486

PAUL KUITENBROUWER
STEFANO CORBO
ELINA KARANASTASI

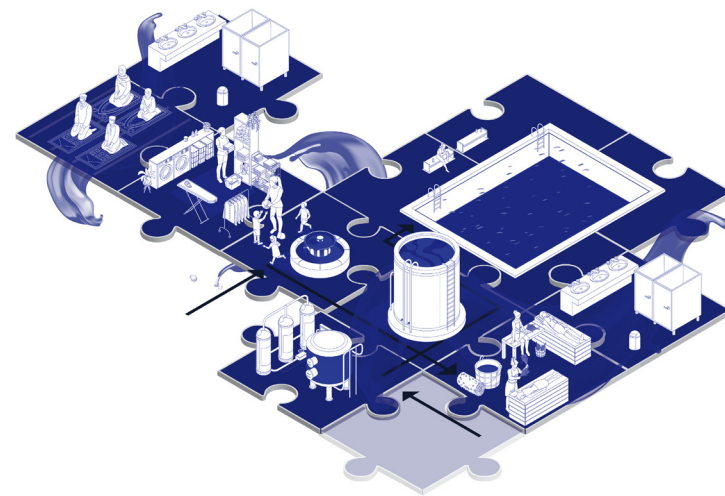
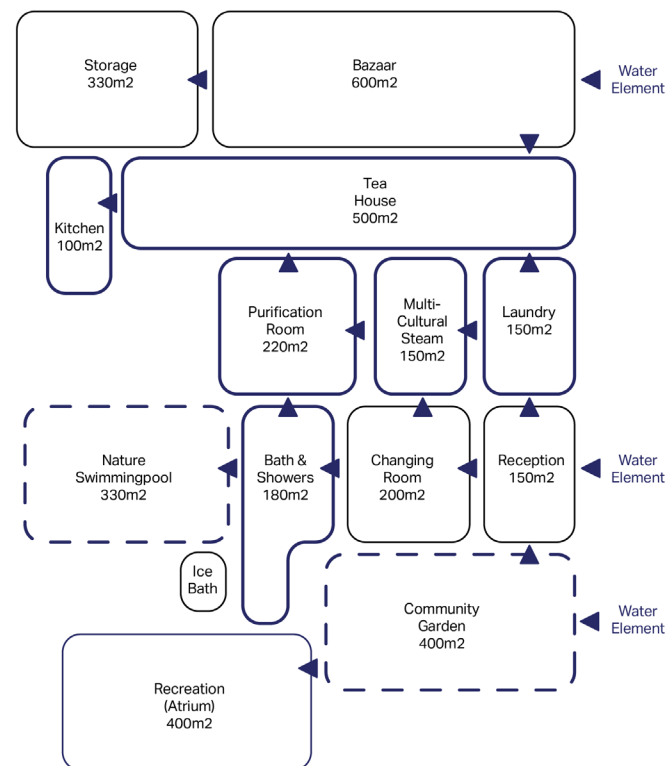
PUBLIC BUILDING
GRADUATION STUDIO

Sustainability



- 7 Storing rainwater in a 10000m3 water tank, which is 90% underground
- 8 Storing rainwater in the water tower for a buffer of 25% in dry periods
- 9 Re-using water in the water cycle of the building, for example for toilet purposes
- 10 Focusing on social sustainability by designing an inclusive building, bringing cultures together
- 11 A green-blue roof, that stores rainwater on the roof in order to slow down the process
- 12 Giving back the surplus of clean water to the waterinfrastructure of the local community

Hybridity

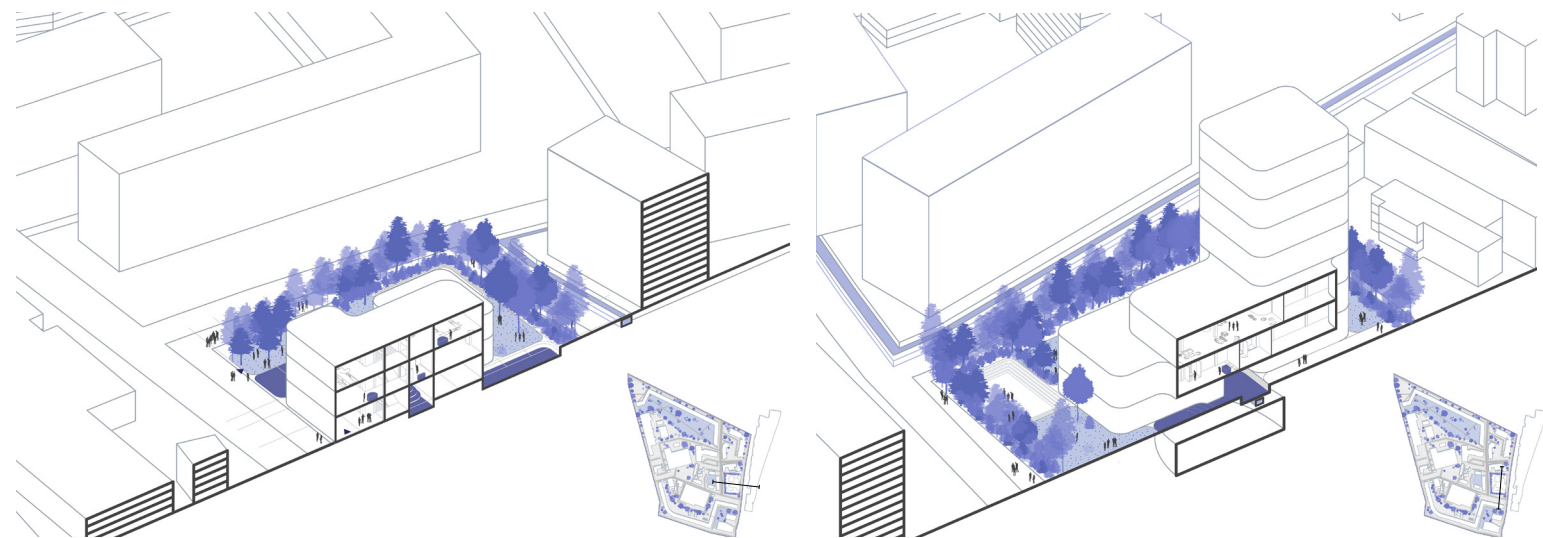


- 1 Routing as hybridity:
At least one physical connection per function
- 2 Water as hybridity:
Always physical or visual connection at the entrances
- 3 Water as hybridity:
Always symbolic connection with the function

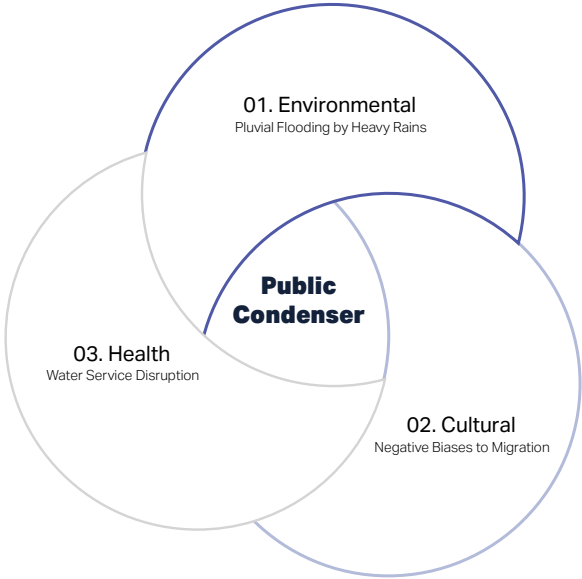
Urban Flows & Accessibility 1:1000



Urban Flows & Accessibility 1:1000



Problem Statement



01. Pluvial Flooding by Heavy Rains



Why?
Environmental

Copenhagen	Nordvest
<ul style="list-style-type: none">In the summer of 2011, Copenhagen faced the most devastating cloudburst in its history⁶;Copenhagen's Cloudburst Management Plan is a comprehensive strategy aimed at tackling the growing threat of extreme rainfall and urban flooding⁷;This plan consists of an expansion of the sewer network, but also prioritizes 300 surface-level projects⁸.	<ul style="list-style-type: none">The surface-level projects in Nordvest were not prioritized in timeline as the district is higher in elevation⁹;Rikke Larsen: "It is even more important to control the flooding before the water goes down"⁸;Two surface projects are realized in Nordvest, and the one is in development⁹;However, these surface projects are not located on the site of our plot.

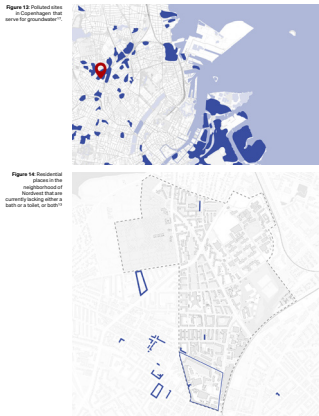
02. Negative Biases to Migration



Why?
Cultural

Copenhagen	Nordvest
<ul style="list-style-type: none">The Ghetto plan has received a lot of criticism that it is discriminatory and potentially racist in its targeting of non-Western immigrant communities¹⁰;Research shows that three in four Danes believe that integration is far less successful than facts show¹¹;Non-western individuals revealed that 84% have personally experienced illegal discrimination¹².	<ul style="list-style-type: none">Over a quarter of the residents in the Bispebjerg area have a non-Western background, compared to 15 percent¹³;Nordvest is experiencing increasing gentrification, leading to significant and often unnecessary cultural displacement¹⁴;Non-Western residents feel that the "Ghetto" plan is meant to isolate and scatter them¹⁵.

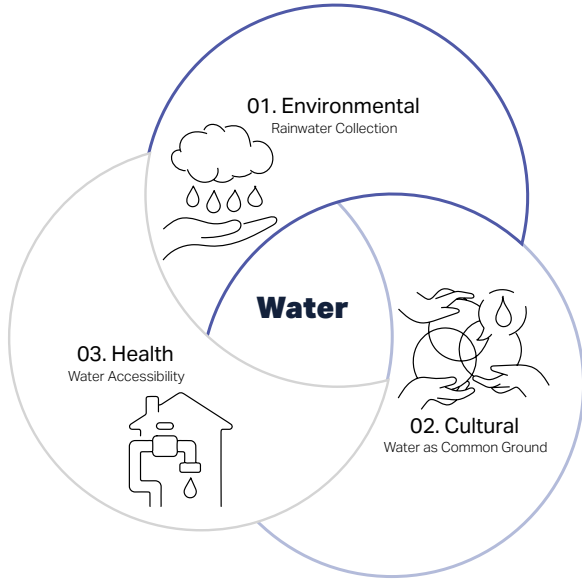
03. Water Service Disruption



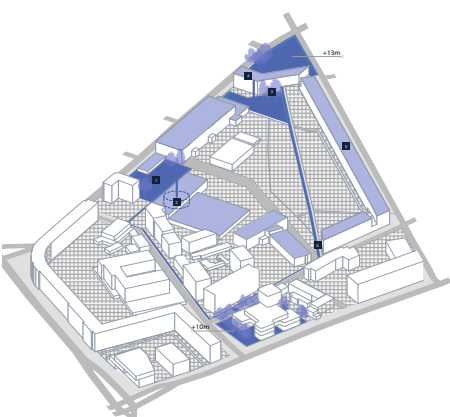
Why?
Health

Copenhagen	Nordvest
<ul style="list-style-type: none">More than half of Denmark's drinking water resources are contaminated with toxins¹⁶;In Denmark, all drinking water is produced from groundwater¹⁷;However, several sites are polluted because of its industrial harbour history¹⁷.	<ul style="list-style-type: none">Nordvest also deals with the problem of polluted sites¹⁷;Above this, Nordvest is an older urban area with several buildings that do not meet today's standards¹⁸;Some properties in the area are currently lacking either a bath or a toilet, or both¹⁹.

Solution Statement

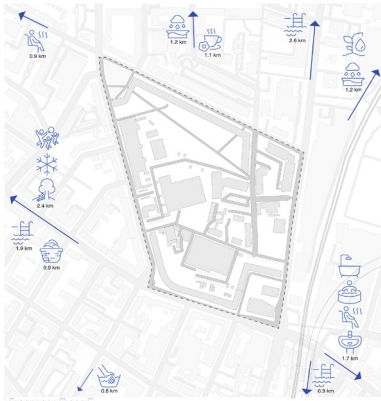


01. Rainwater Collection



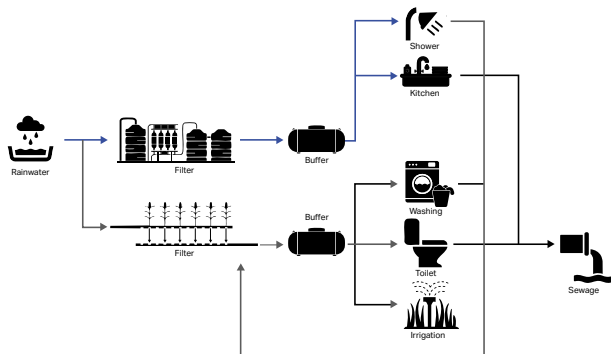
- Collecting rainwater on project surfaces with a public function
- Surfaces having its own watertank in cases of extreme flooding
- Surfaces containing 20% of new green spaces for bio-diversity and wellbeing
- Collecting rainwater on roofs, transforming some into green blue roofs
- Green Blue roofs also enhances insulation & Reduces Urban Heat Island effect
- Bringing collected rainwater to the plot, bridging 400m in +3m elevation = 0.5 cm/m

02. Common ground



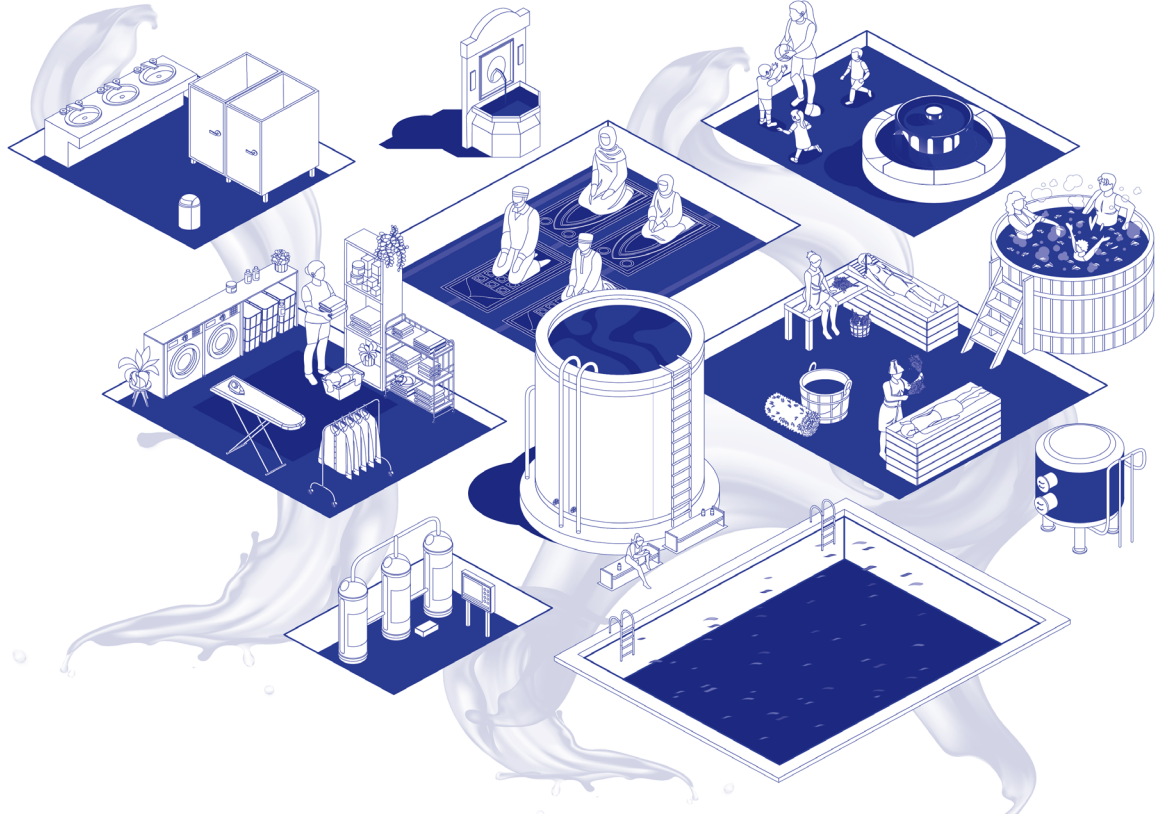
- What is the common ground?
- Are these functions located closely?
- What contributes to people's needs?

03. Water Accessibility



"How can a public condenser celebrate cultural variety through water and at the same time provide a water infrastructure for the neighborhood in Nordvest, Copenhagen?"

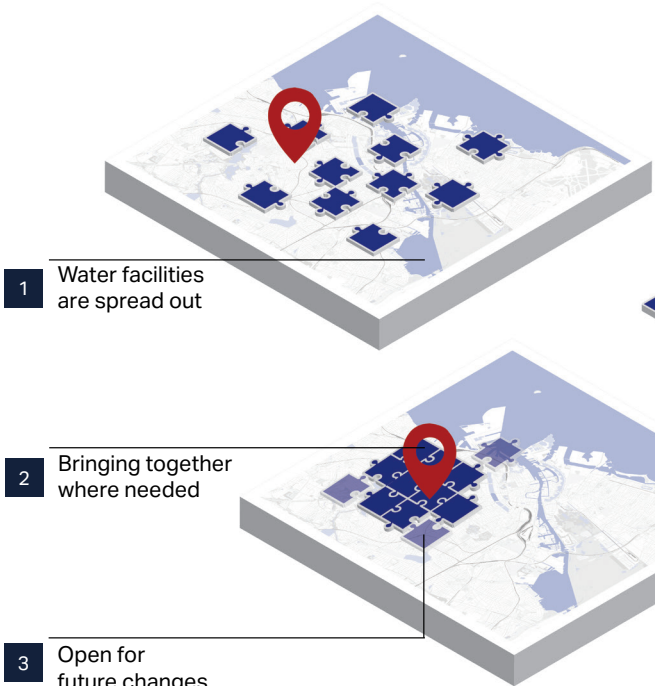
Concept



A Public Condenser where people can identify themselves through water, a place that connects people by water and a place that gives accessibility to water as valuable source of life.

It will address a more pragmatic side of water by providing a water infrastructure, but it will also address the more symbolic and cultural side of water by creating a waterscape.

Design Aim



- Water facilities are spread out
- Bringing together where needed
- Open for future changes

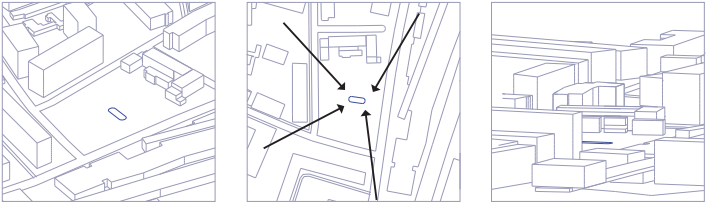
The Water Hub aims to bring all water facilities together in Nordvest, which are now spread out over the whole city.

Like a puzzle, these pieces will be all put together in a building that functions independently.

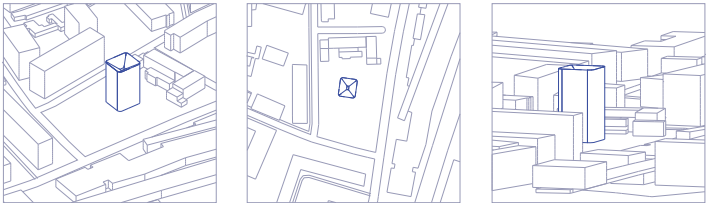
However, the puzzle will stay unfinished so the design will always be open to future implementations.

Design Principles

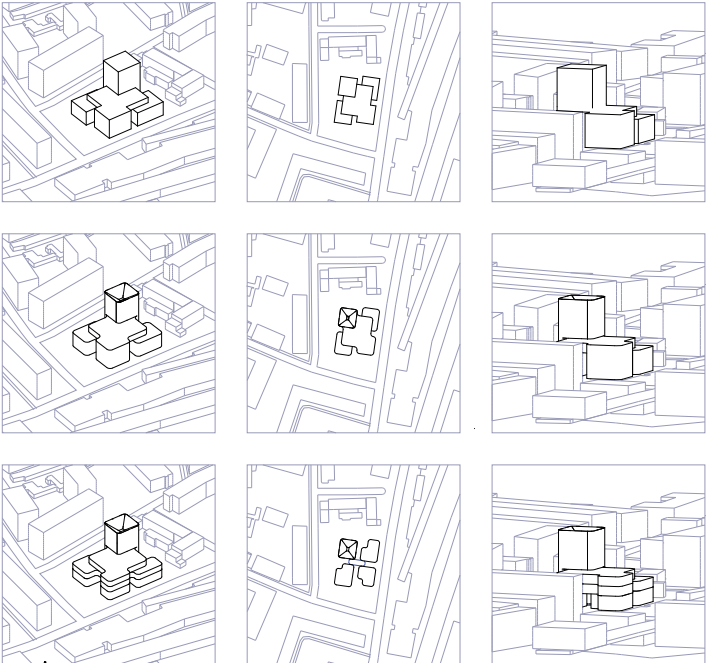
1 One big rainwater reservoir:
Seeing this from all five sight lines



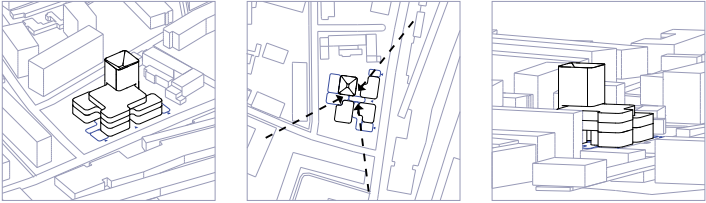
2 Well visible & large 'Rain Vortex':
The idea we are talking about water



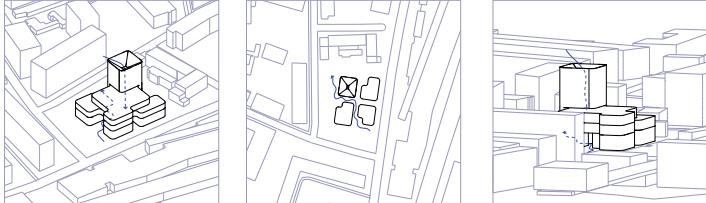
3 Fragmented/Scattered functions:
Based on routing & orientation



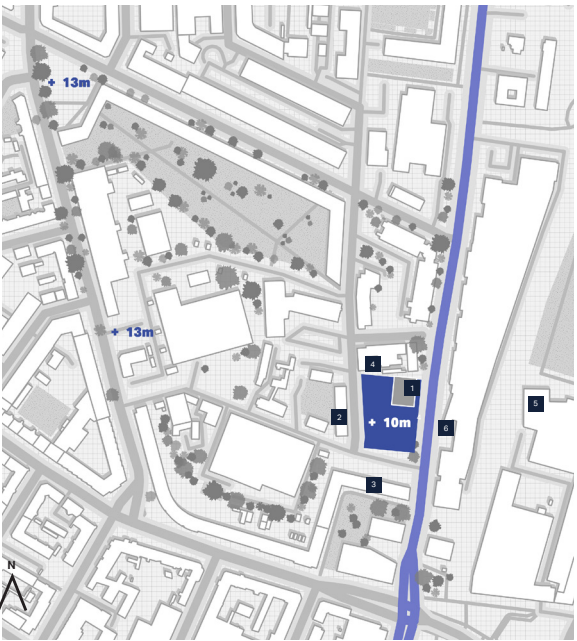
4 Connected with water through routing:
Entrances consist of a water element



5 Connected with water through routing:
Different states and meaning of water



Site

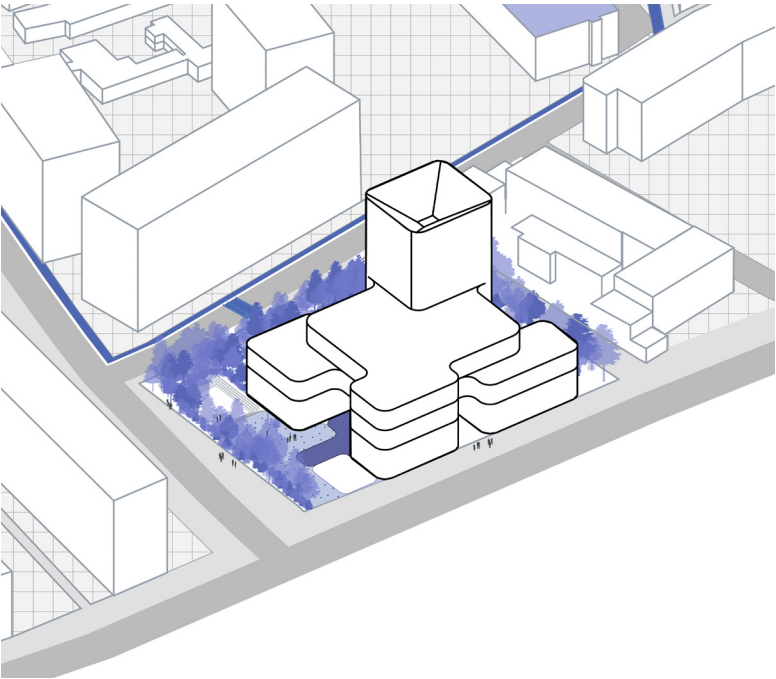


The project will be located at this plot, because it is lower in elevation, which allows to collect rainwater at higher elevated surfaces.

Furthermore, the site is already fragmented, allowing my design to not be homogeneous and have its own unique appearance.

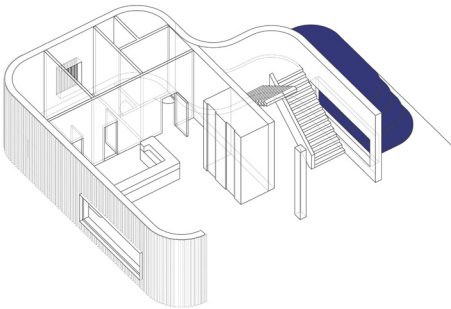
Lastly, it is next to the mainstreet, which fits the landmark character and creates a unique identity for the district.

The Design

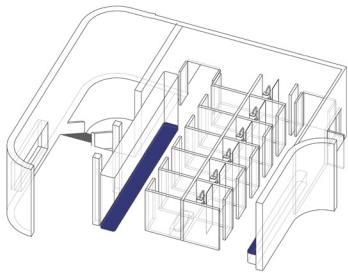


Impressions

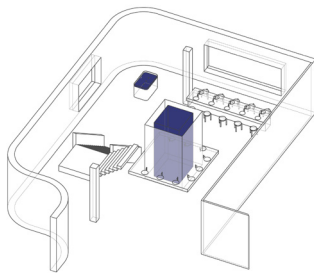
1 The Reception:
Entrances consist of a water element



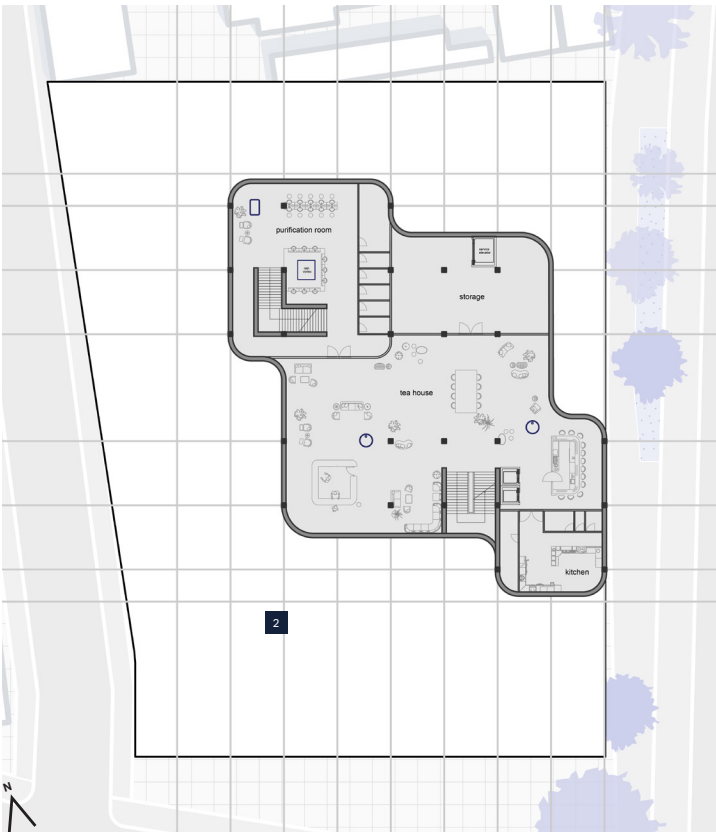
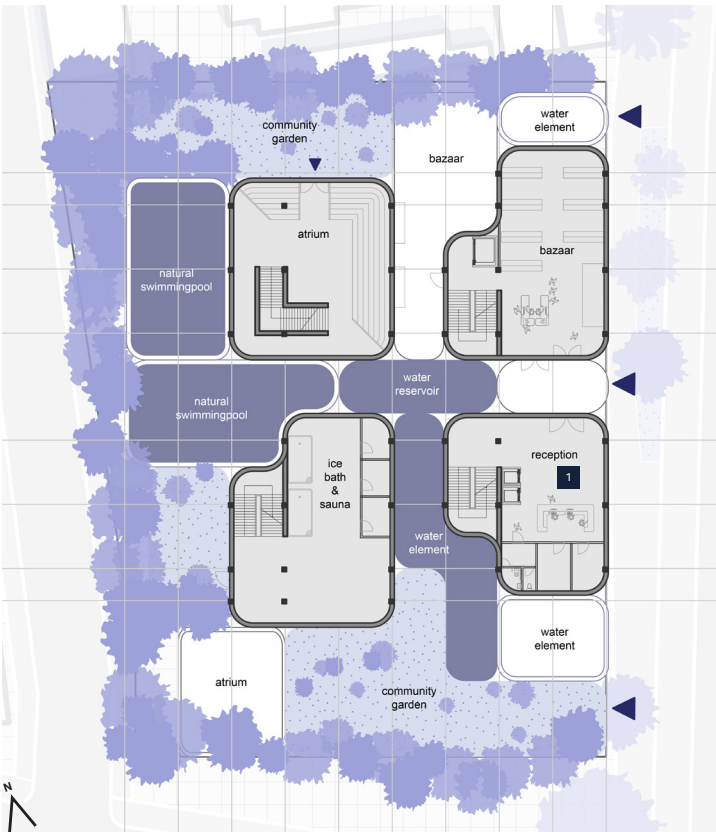
2 Bath & Showers:
Different meaning of water



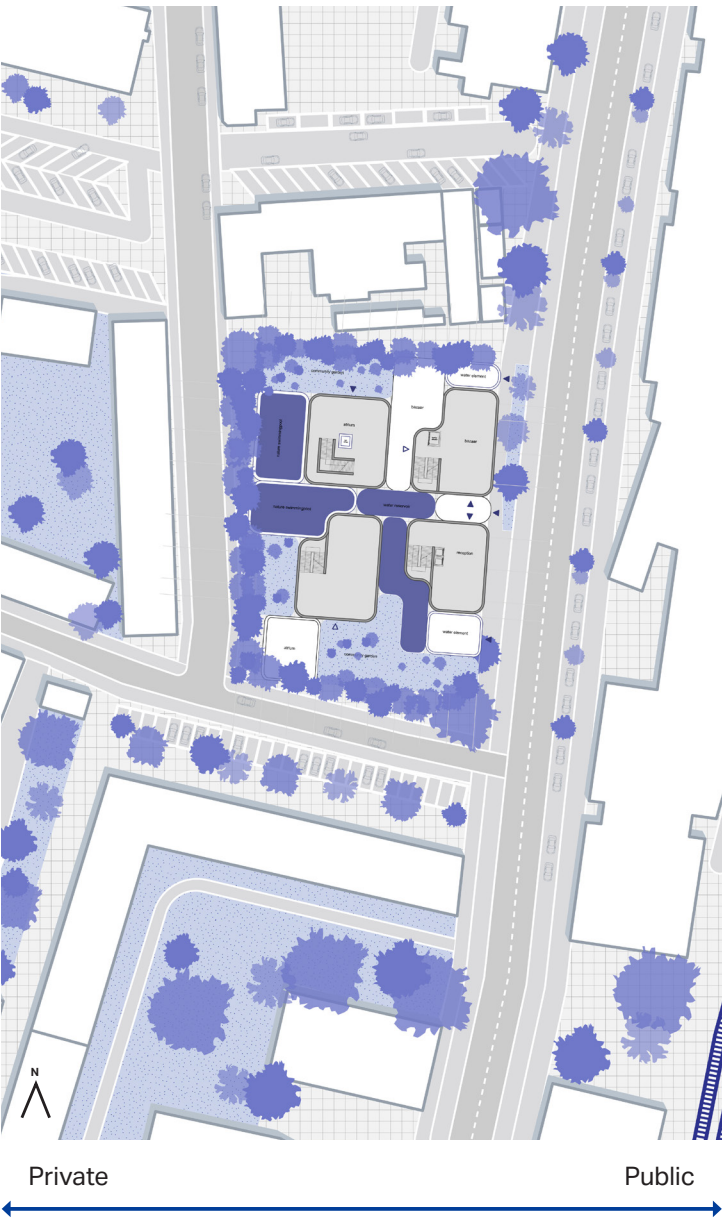
3 The Purification Room:
Different states of water



Floorplans 1:250

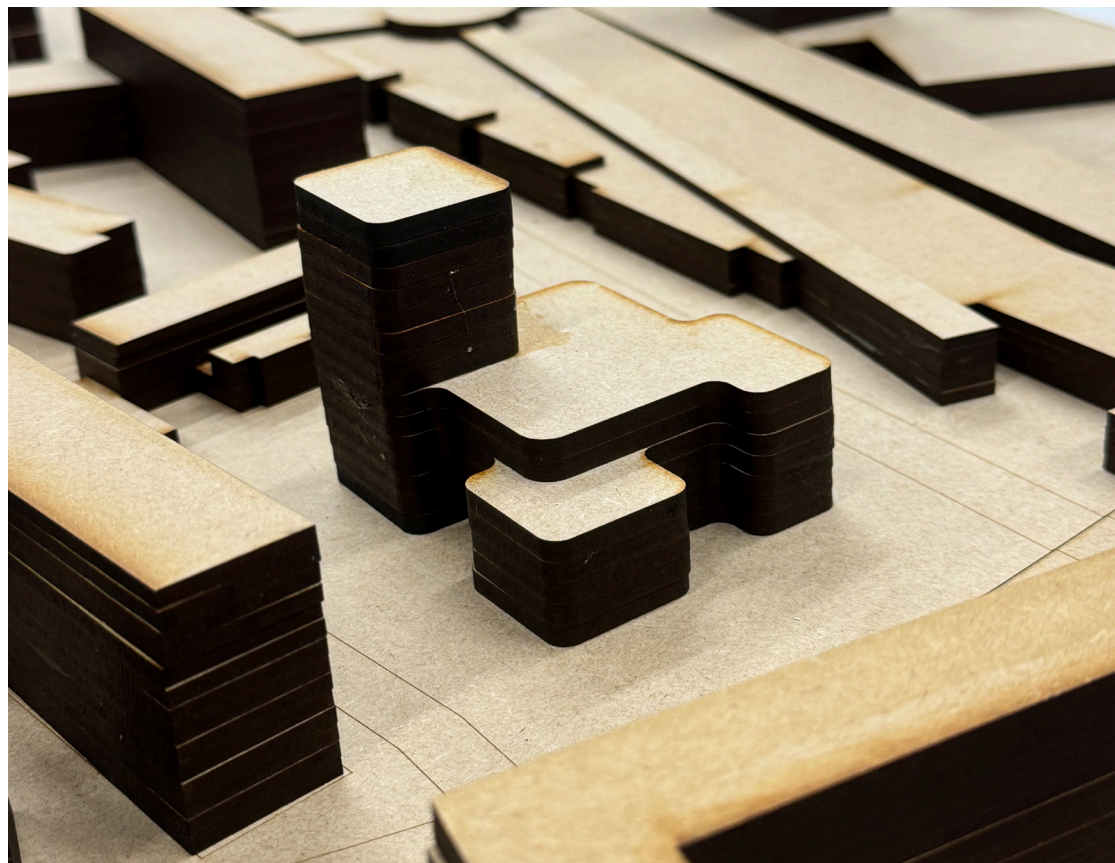


Site Plan 1:500



P2 Physical Model

1:500



Feedback:

- Congratulations with your GO, Joyce!
- It is a convincing GO, that demonstrates very well the studio's approach of research-by-design.
- Some aspects to reflect on upon the start of MSc 4:
- You stated that your building will be **'unfinished' by nature**. How can the building change and / or expand / shrink over time?
- Address sustainability and hybridity more profound.
- What about the replacement of the Lygten Bazar? You have justified this merely from a technical point of view. At this time, it is a social condenser in itself, as it plays this role for many inhabitants of our site area. Of course you already have embedded the bazar into the program of your public condenser. This remark is in its essence about reasoning.
- Is the FORM decided on too rapidly? It seems to dominate all design decisions... Maybe explore on a range of principles where you might also test different **programmatic configurations**. What is on which level? Maybe the Laundry Café could be on Ground Floor and the reception on +1 (as discussed earlier).
- Start approaching the project starting from the water technique. Can it be related to **energy**? (especially related to warming up the water...)
- Humidity versus **materialization**? Pay attention to this.
- And what about animals related to your water landscape? Give it some thoughts as well!
- Be open for changes in your design as you will add new angles. We are confident for next semester's further progress!
- Having said that, very well crafted and presented, Joyce!
- And: your Design Journal is a very interesting week-by-week collection of all the work, talks and collected knowledge!



Job told AT5 about the design of the Ziggo Dome, for which he designed as a project architect at Benthem Crouwel, and has now designed various renovations at September architecture.



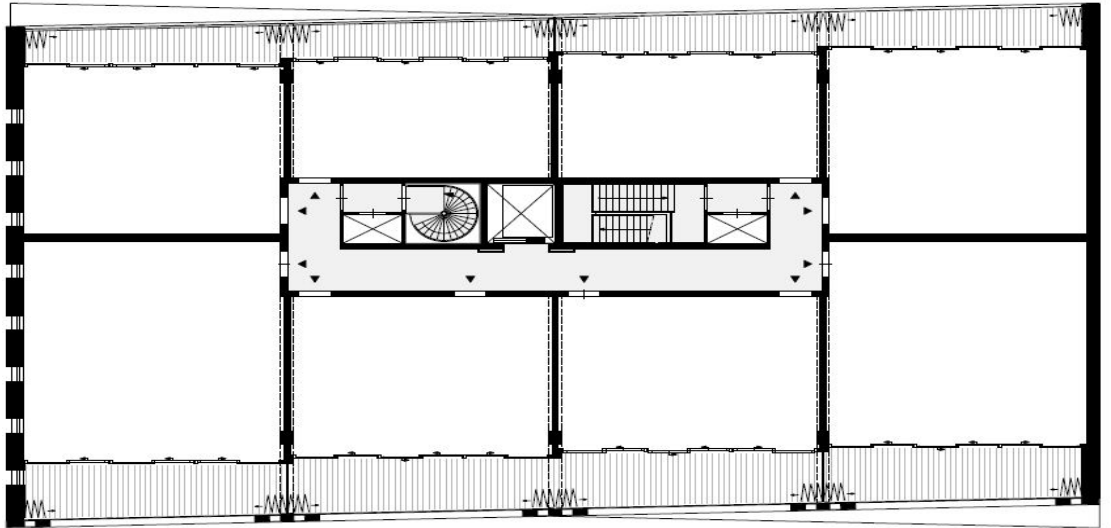
"Depending on the number of visitors to a gender, the number of toilets can be adapted. Due to the design of a movable wall between the toilets, more male or female toilets can be created as desired."

Can I use this in my design?
Flexible way of designing toilets or bathrooms for cultures?

PATCH22, a 30m tall high-rise in wood, by the architect Tom Frantzen. Frantzen believes that we should look at sustainability in a much longer term, making the design as flexibly as possible, so that it can also be used as an office, shop or school in the future. The toilet drain plays a key role. 'We discovered that office buildings can hardly be converted into homes because there is nowhere to store the drain.' Holes then have to be drilled in floors and walls, or coves built around thick pipes - expensive and spatially undesirable. Here the pipes are bundled in the raised floor of the central corridor, from which you can connect anywhere in the homes. This gives residents the freedom to organize their (shell) home as they wish.



Can I use this in my design?
Flexible way of designing water pipes so that it can also change in the future?



Generating energy by water

There are several ways buildings can generate energy using water. Here are some notable examples:

1. Micro Hydropower Systems

- Buildings near a natural water source, such as a river or stream, can install small-scale hydroelectric generators.
- However, there is *no river or stream* located next to the project;

2. Tidal and Wave Energy for Coastal Buildings

- Buildings near the ocean can harness tidal or wave energy using turbines or oscillating water columns.
- However, there are *no waves* located next to the project;

3. Rainwater-Driven Hydropower

- Some green buildings integrate rainwater harvesting with microturbines to generate power as water flows from the one reservoir to the other reservoir
- This can be possible, but *how much difference in elevation is needed?*

How high in elevation does one water reservoir need to be compared to another water reservoir if you want to make use of gravity of water flows to generate energy?

If you want to use gravity-driven water flow to generate energy, the key factors to consider are **elevation difference (head), water flow rate, and efficiency of the system**. The potential energy of the water is converted into mechanical energy (by a turbine) and then into electrical energy (by a generator).

The theoretical power (P) available from the flowing water is given by:

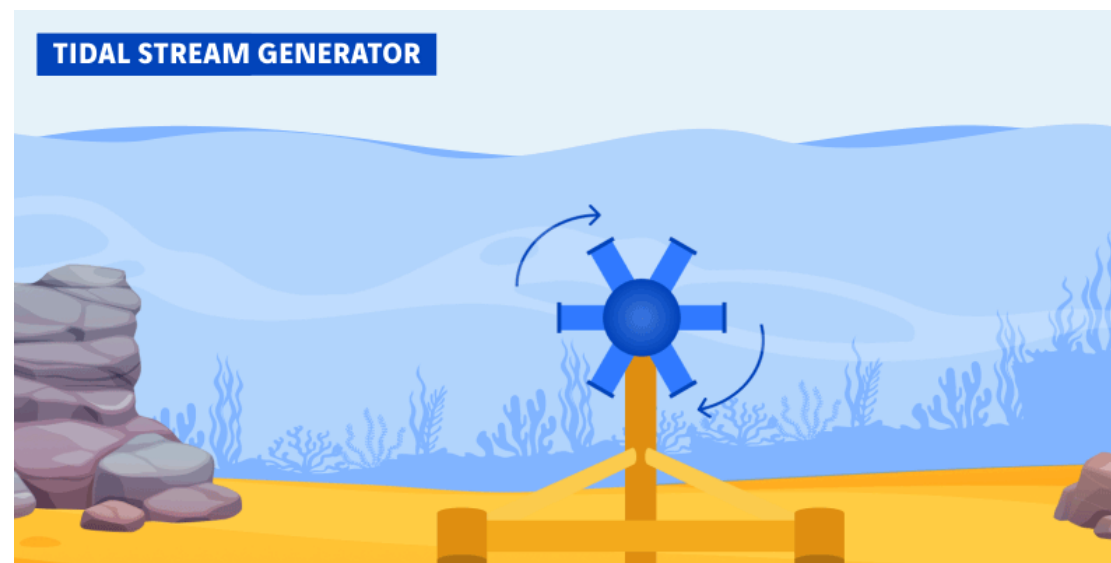
$$P = \eta \cdot \rho g Q H$$

The higher the elevation difference (H), and the higher the flow rate (Q) the more energy can be extracted. For significant power generation, aim for 20m+ elevation and large flow rate of 0,5 (m³/s):

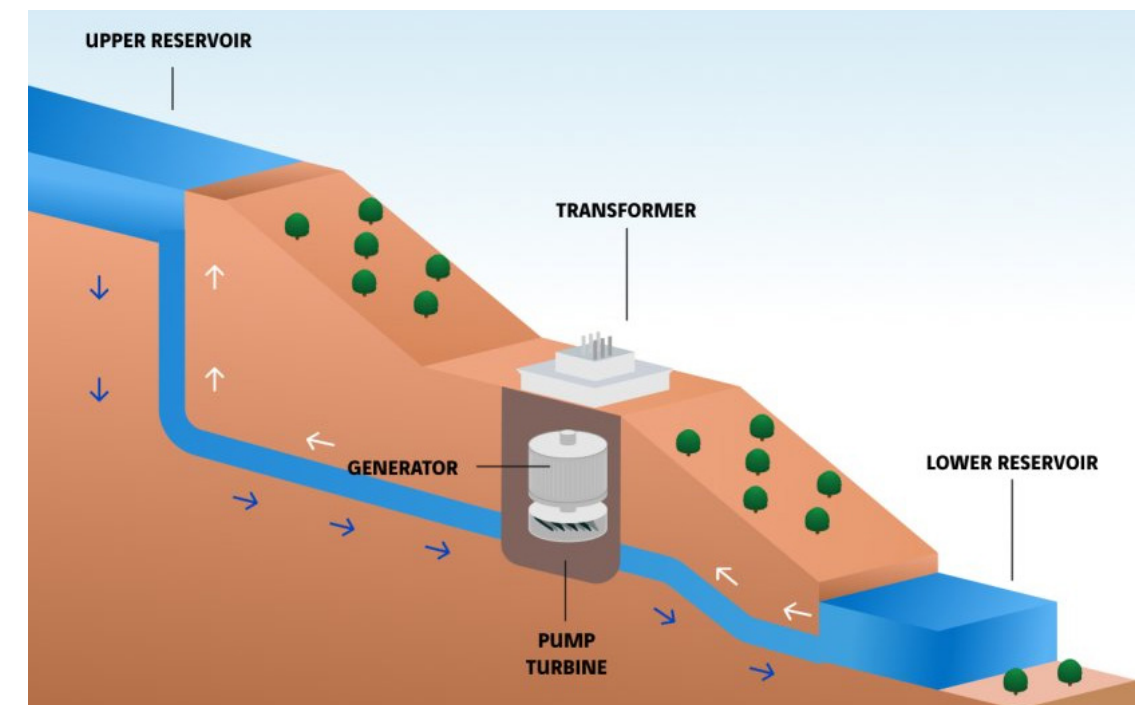
$$P = 0.8 \times 1000 \times 9.81 \times 0.5 \times 20 = 7848 \text{ W} \approx 7.85 \text{ kW}$$

For significant power generation, aim for 20m+ elevation and large flow rate of 0,5 (m³/s): giving 7.85kW

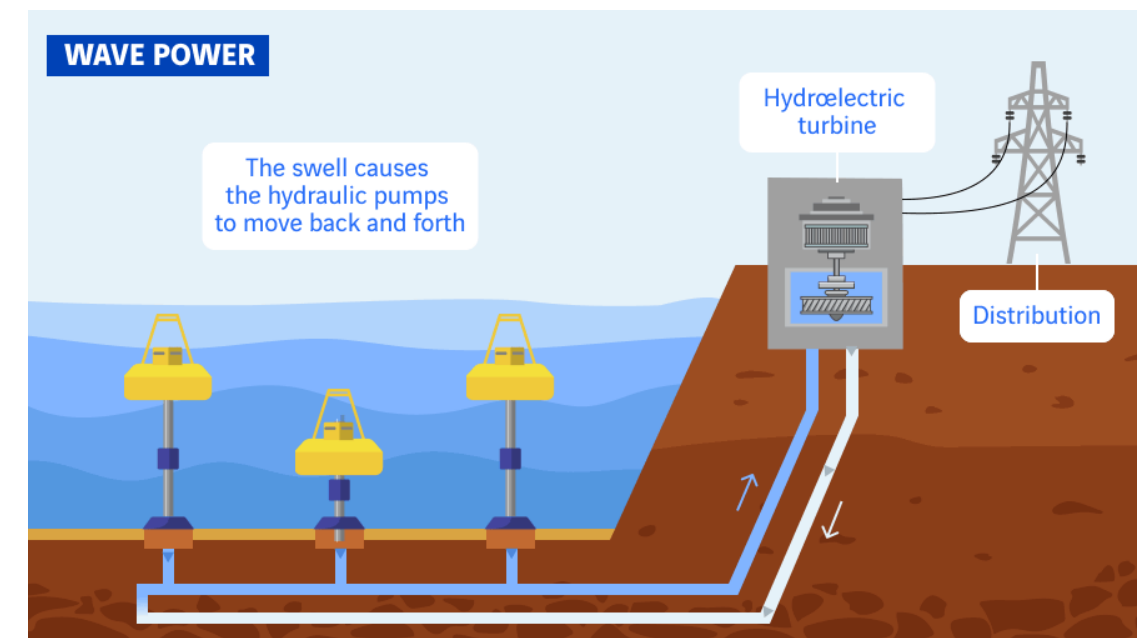
For this, stream is needed to extract energy from moving masses of water



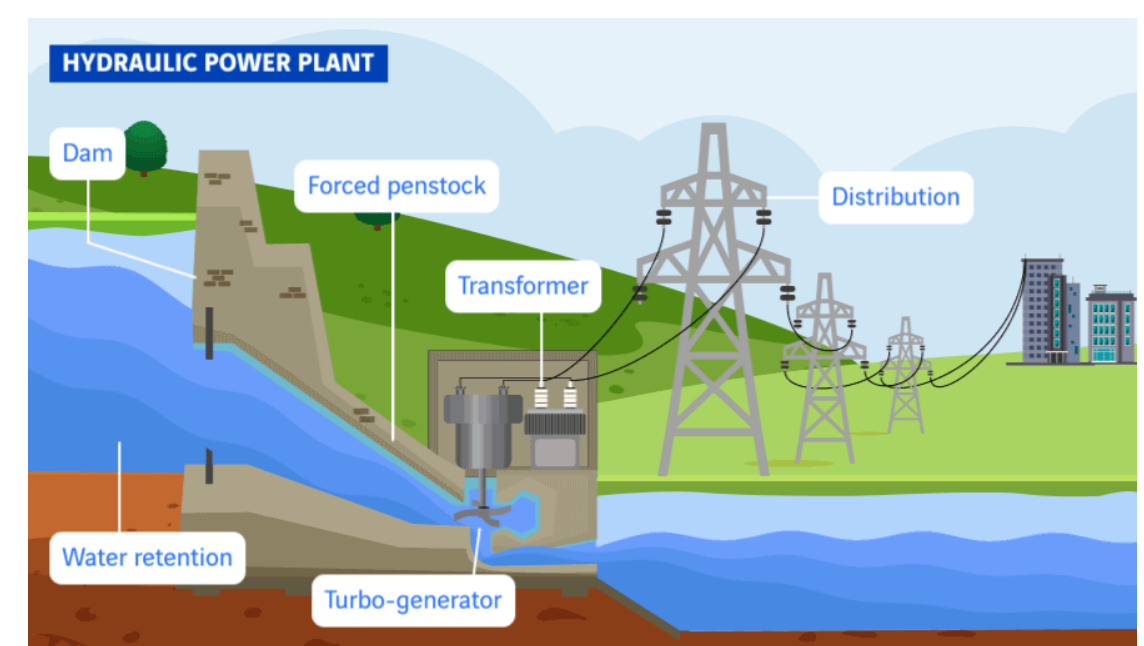
For this, a high difference in upper and lower reservoir is needed so the water flows by gravity through a penstock to a turbine



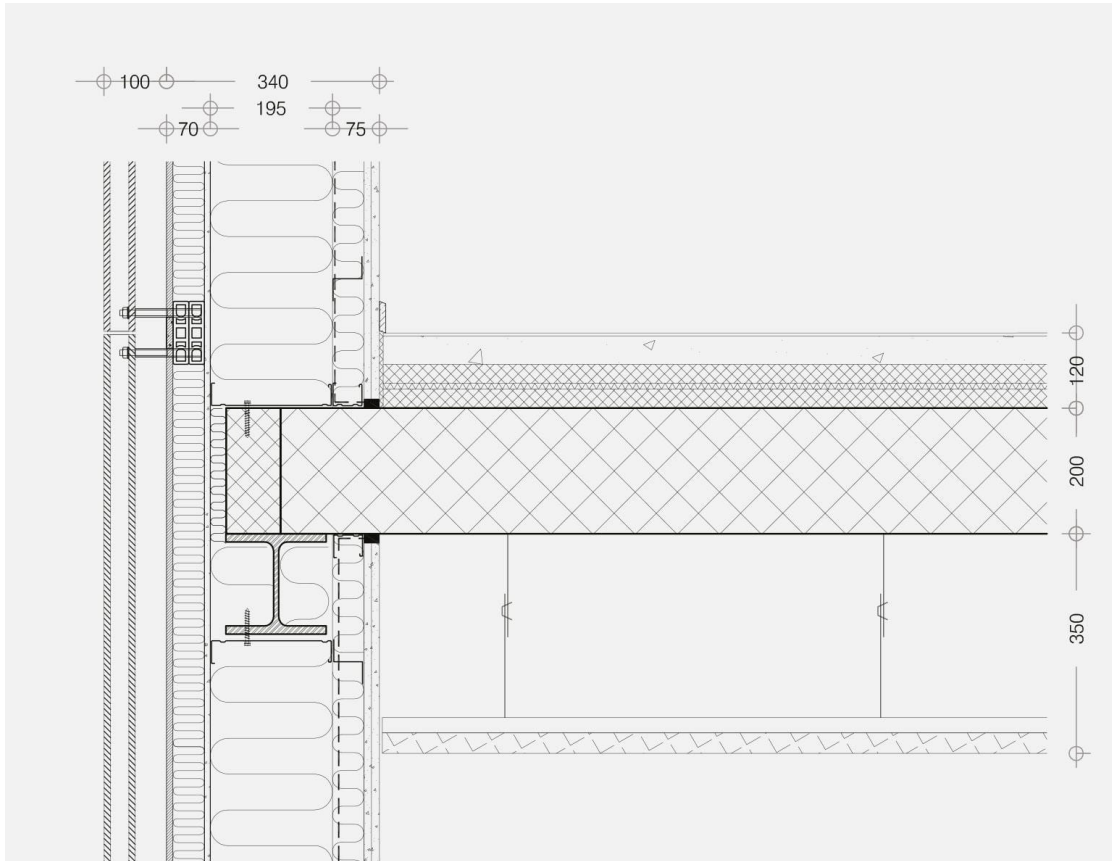
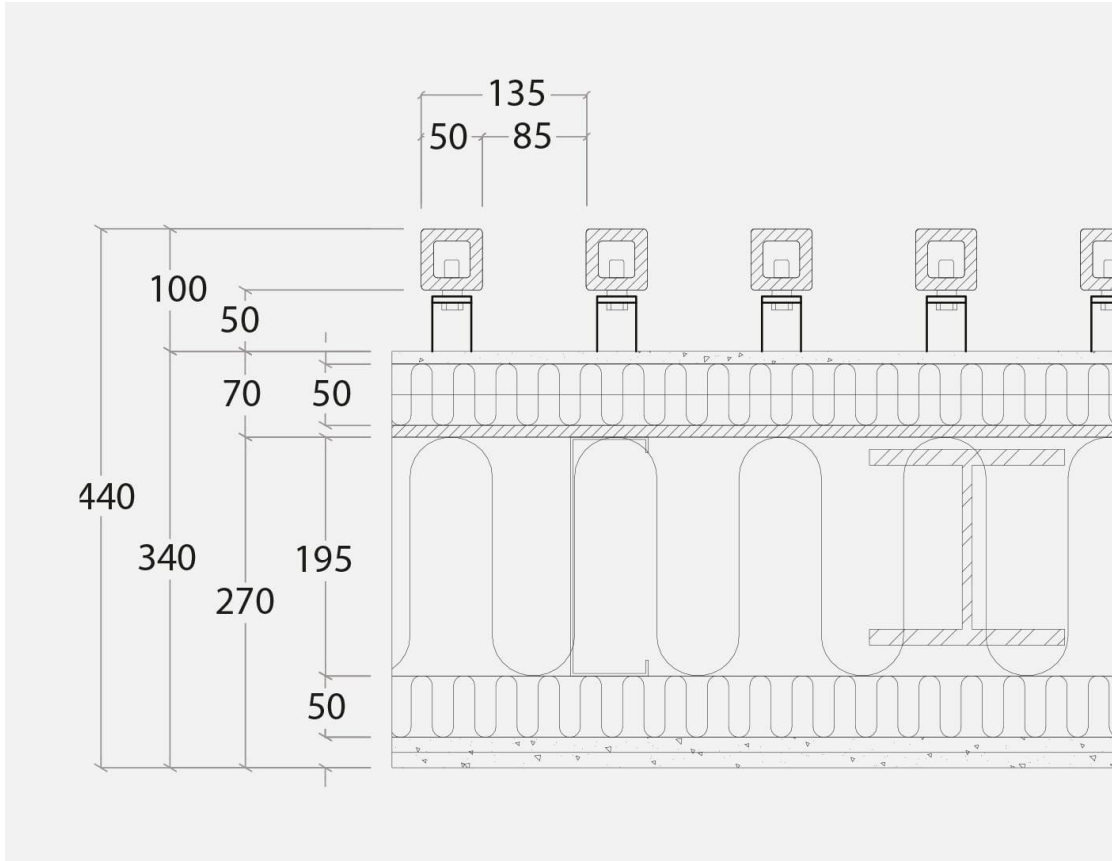
For this, harnessing the movement of waves is needed



For this, mountainous areas is needed to have a very pronounced height difference, and so a low flow rate is sufficient to produce energy



Cobe -
Forfatterhuset
Kindergarten
(2014) detailing



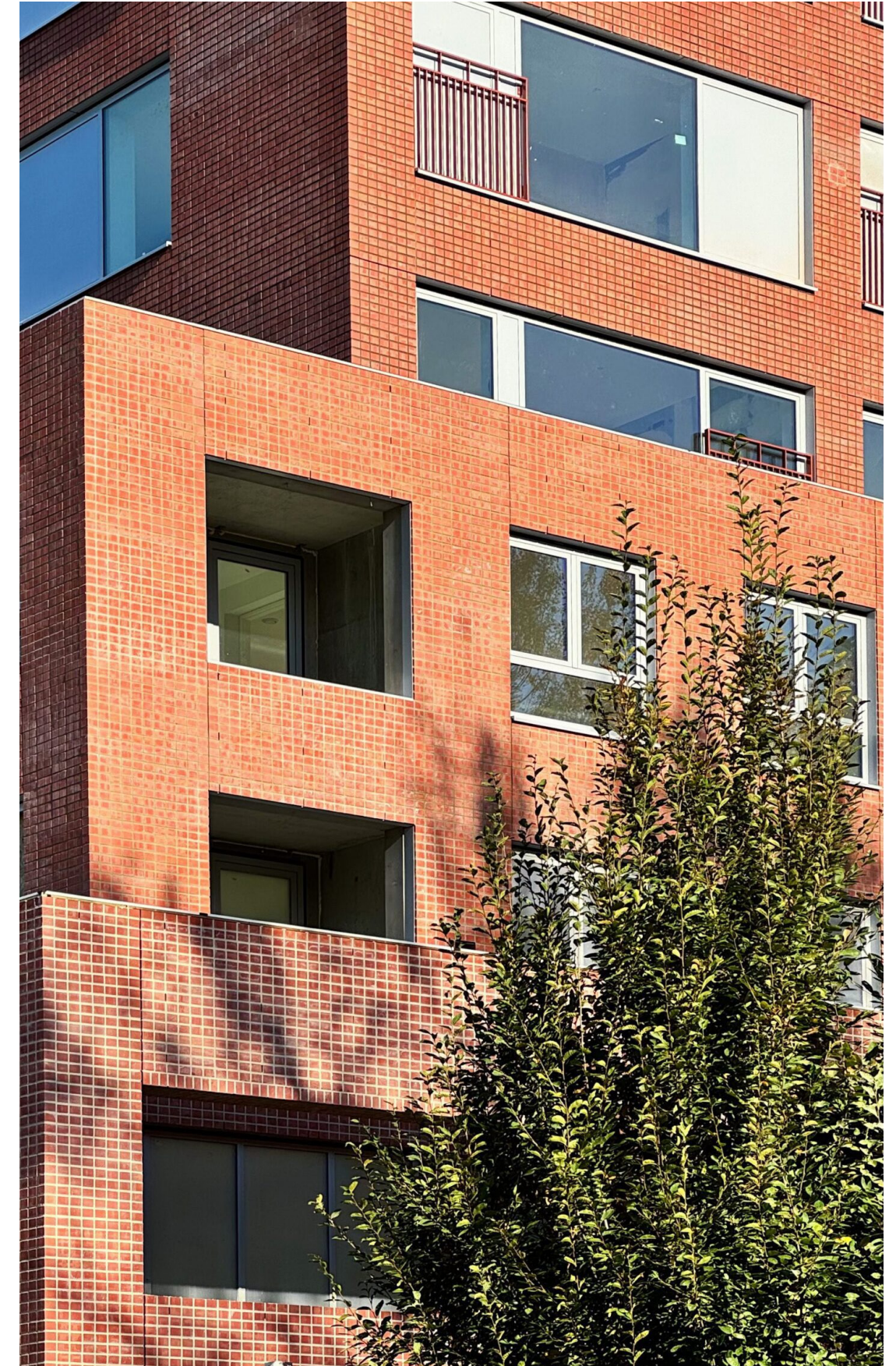
Do I want to
work with
vertical brick
lamellae?





Ammattiopisto
Live (College and
training center) -
Linja Arkkitehdit
Oy (2019)

**Do I want a
ceramic façade
system?**



Wisselspoor
- Space
Encounters
(2022)

**Do I want to
work with red
tiles?**



Komaeyu Public Bathhouse
- Schemata Architects + Jo Naqasaka (2024)

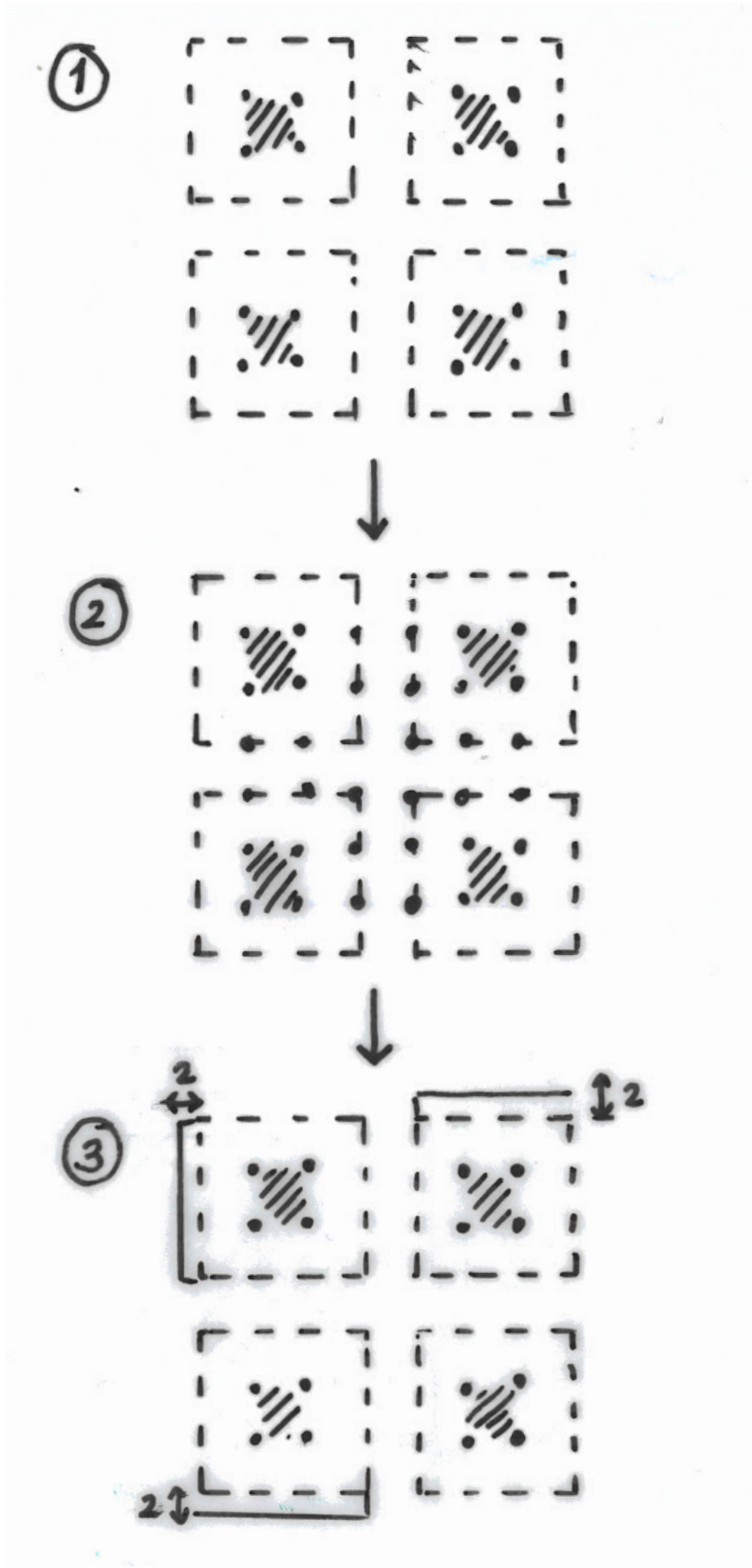
Do I want to work with tiles in the interior?



Wasbar
- Antwerp, Belgium

Do I want a transition zone outside between street and building?



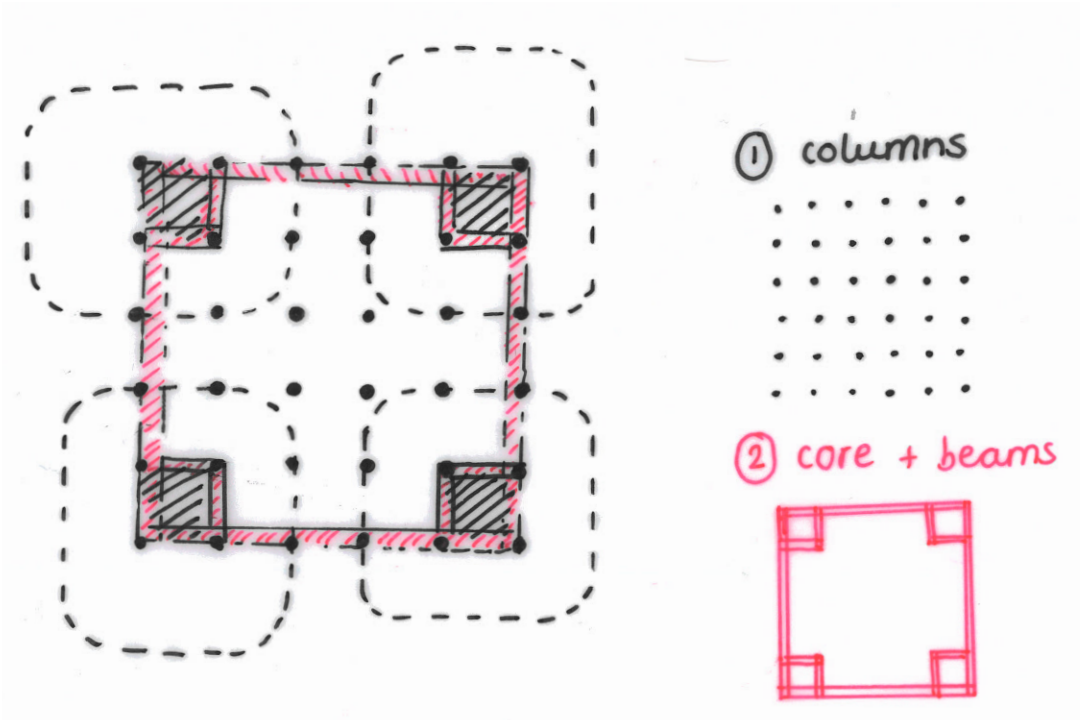


Placing all technical facilities in four different cores: designing a system that can be repeated

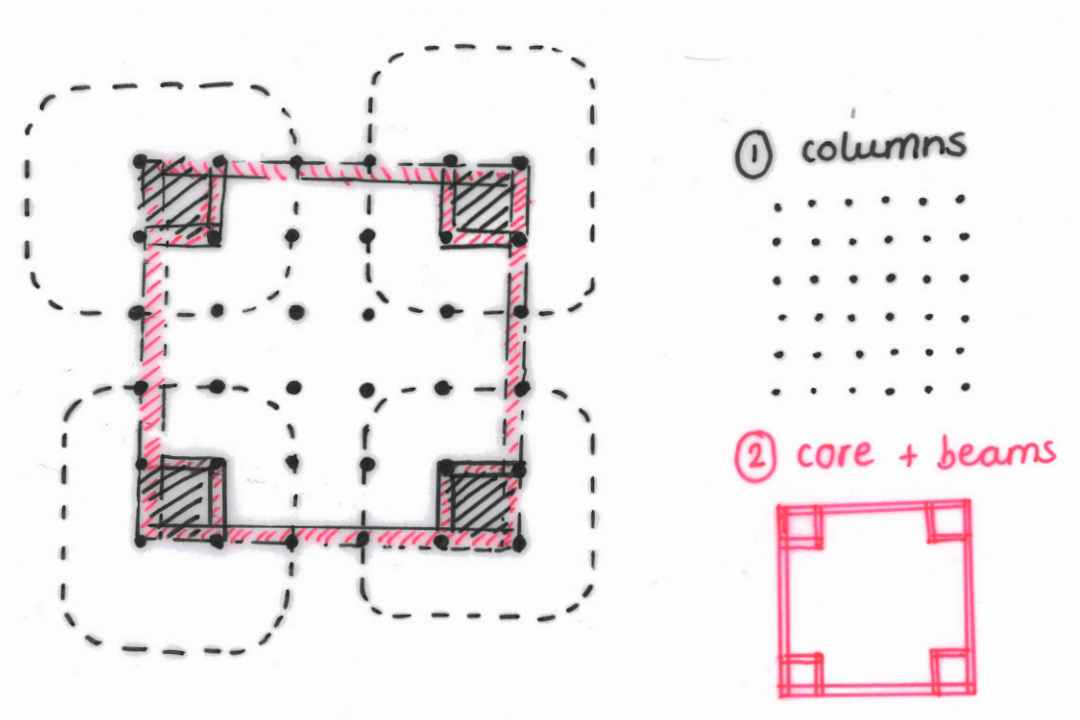
Placing columns on the inside of the building: creating open facades and connecting with the first and second floor

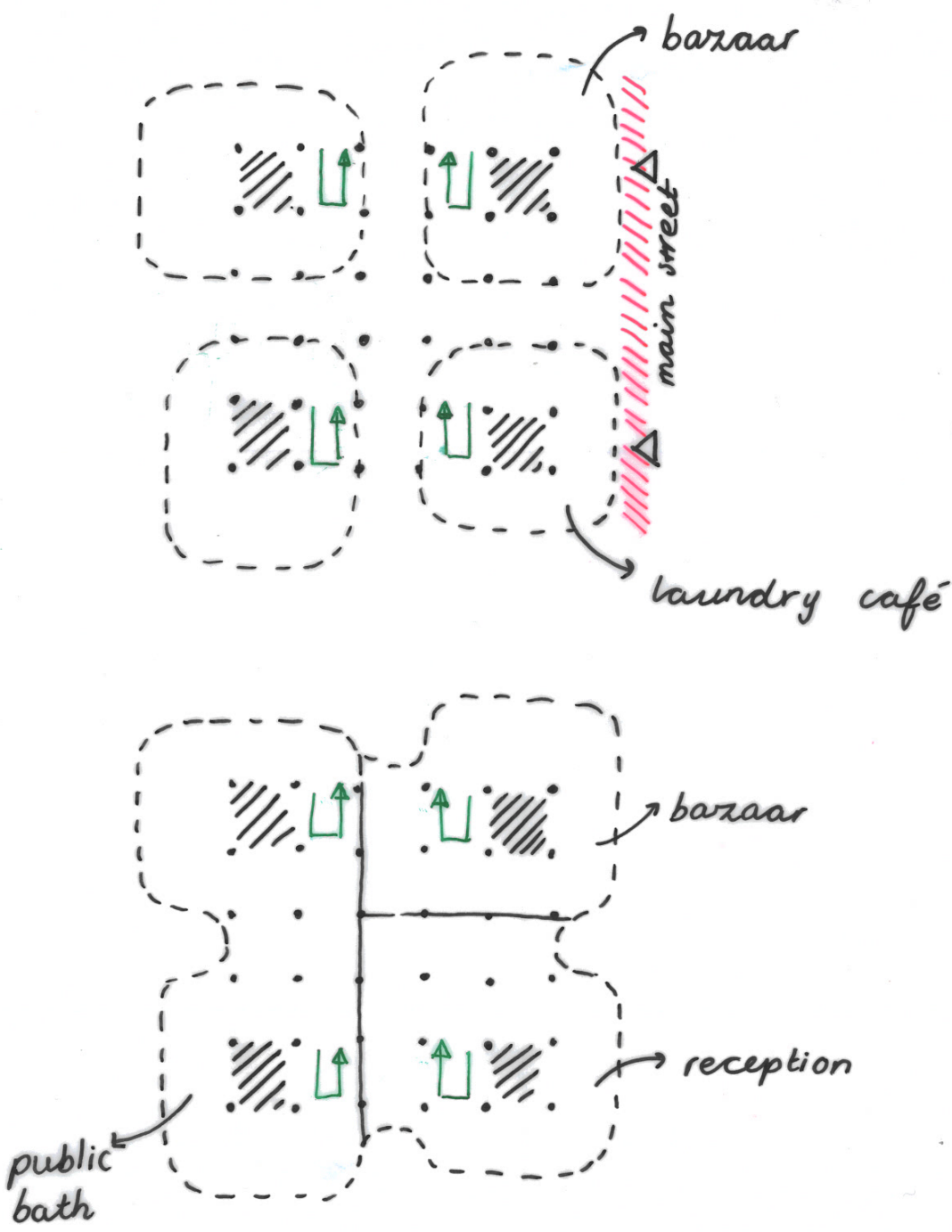
Extending some spaces in square metres: depending on function and needs

Feedback: two possible construction types are possible, either working with columns or concrete cores + connecting beams



Feedback: Core needs to connect the ground floor with the first and second floor






Placing all technical facilities in four different cores: placing the staircase elements next to it


Placing a transition zone outside between street and building: buffer zone between public spaces

Dividing space into three zones on the first floor: connected by reception area

Is a water tower or a rain vortex better fitting my concept?



① water tower
→ storing rainwater
benefits = gravity manages water supply, landmark / iconic statement

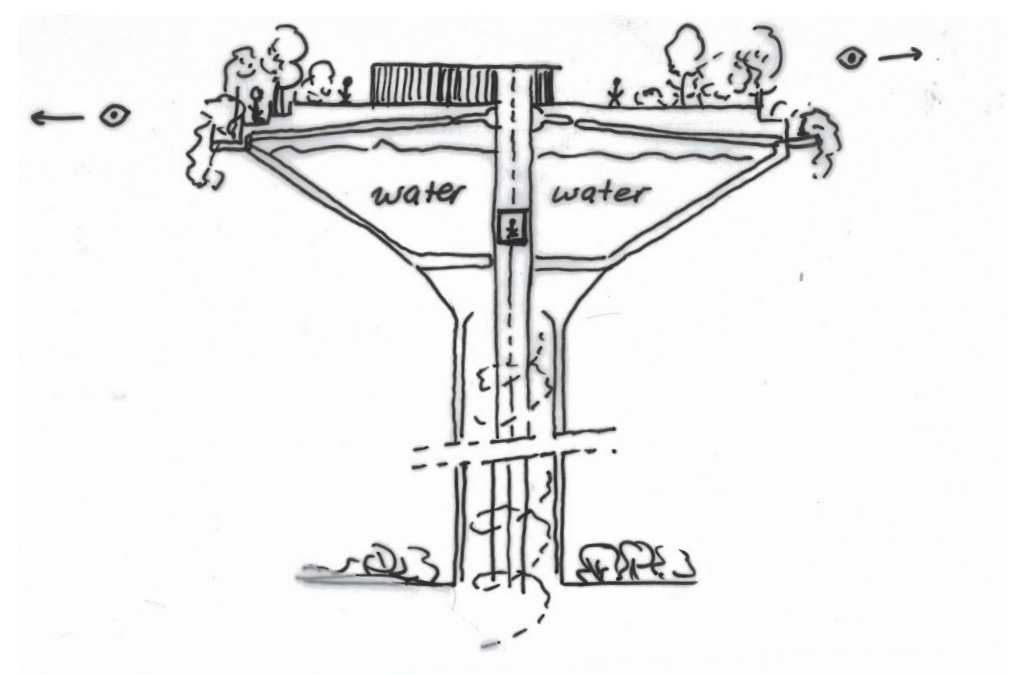


② rain vortex
→ collecting rainwater
benefits = relaxing, "secret" surprise
but... too small for a landmark effect and too small to collect water

what is my key take away?
→ the main concept

① storing rainwater
② collecting rainwater
→ this needs to be visible

Can I design the water tower with a double public function?



Option 01: Collecting rainwater through a roof

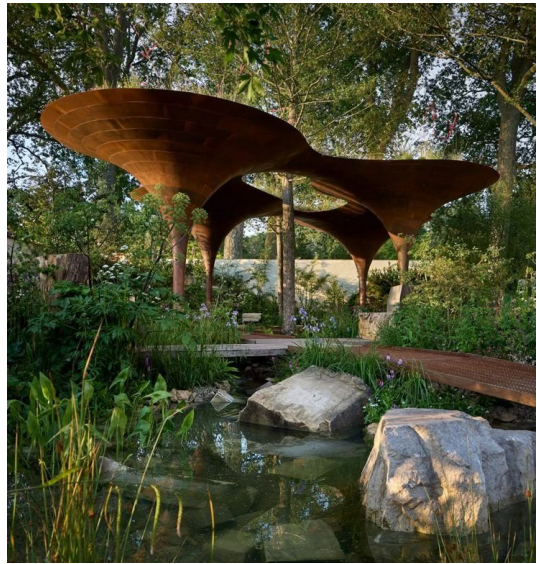
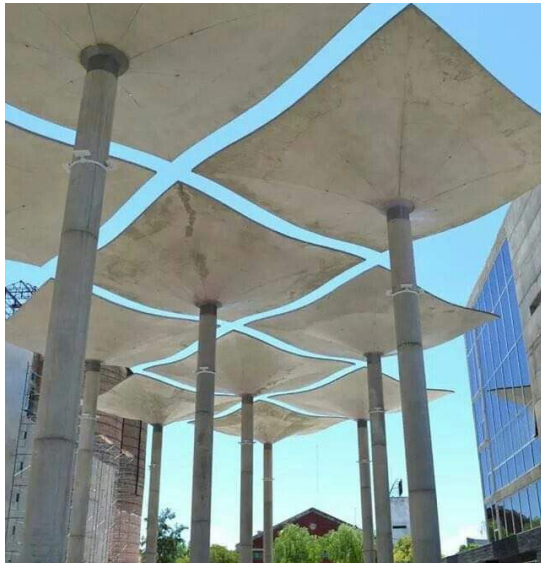
Option 02: Storing rainwater through a watertank



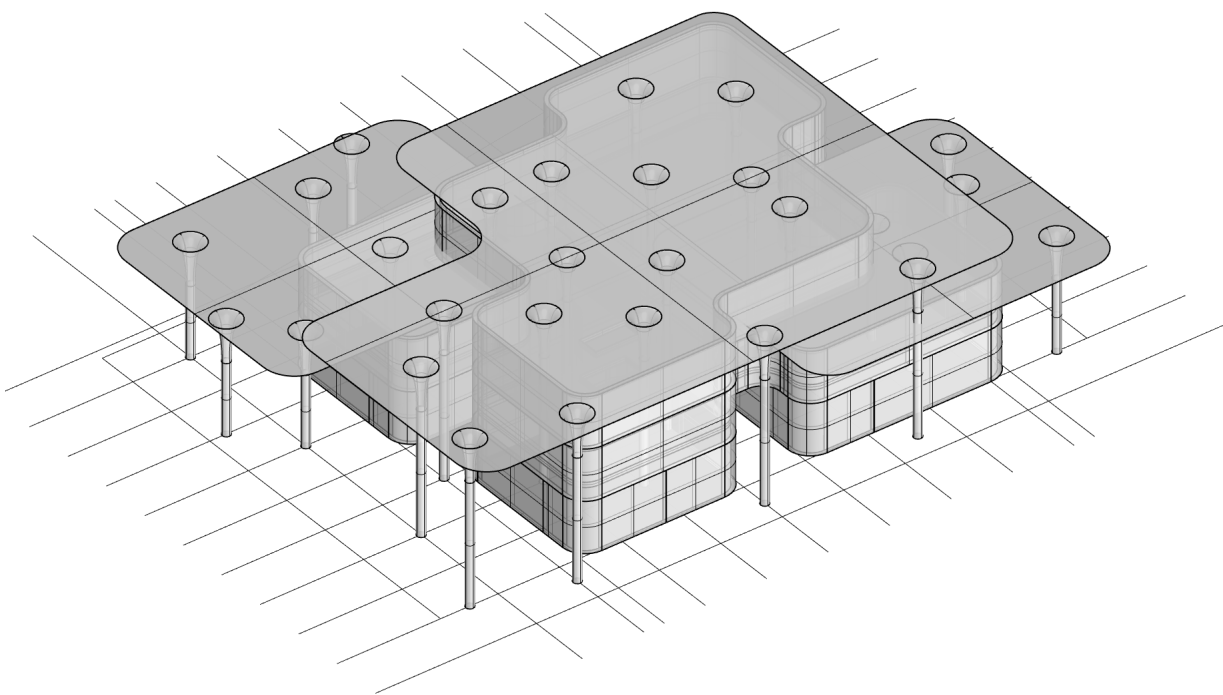
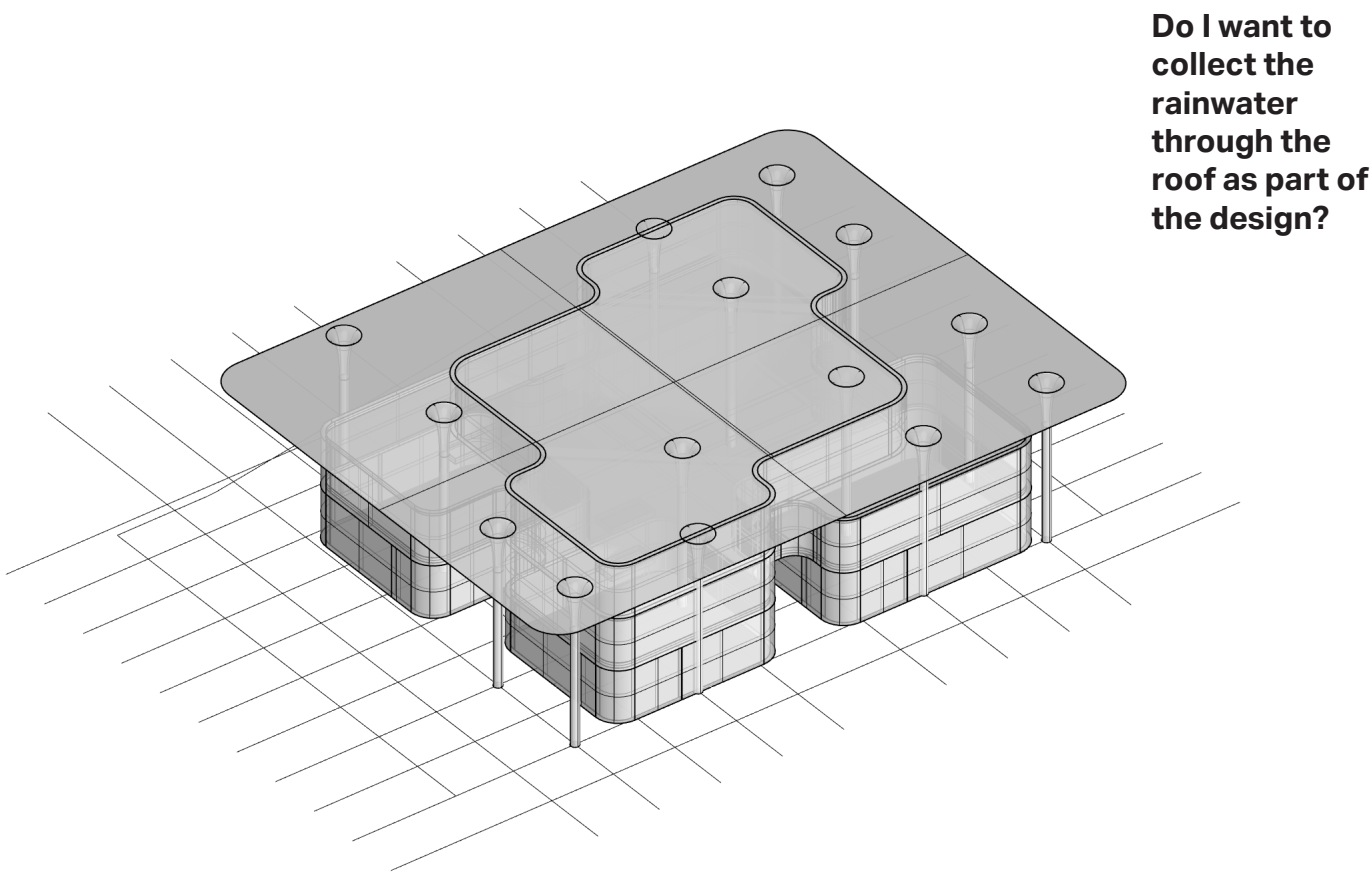
Do I want to collect the rainwater through the roof as part of the design?



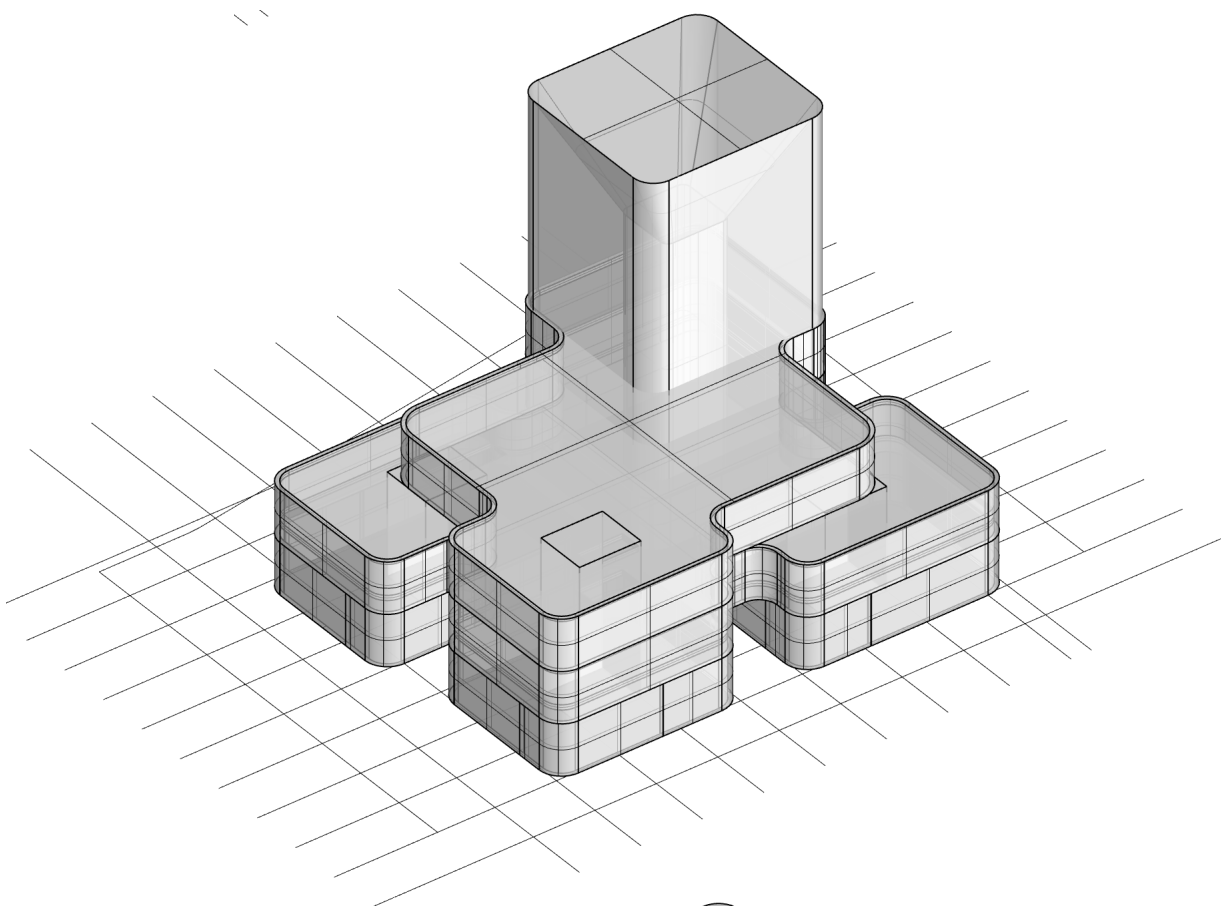
Do I want to store the rainwater in a watertower as part of the design?



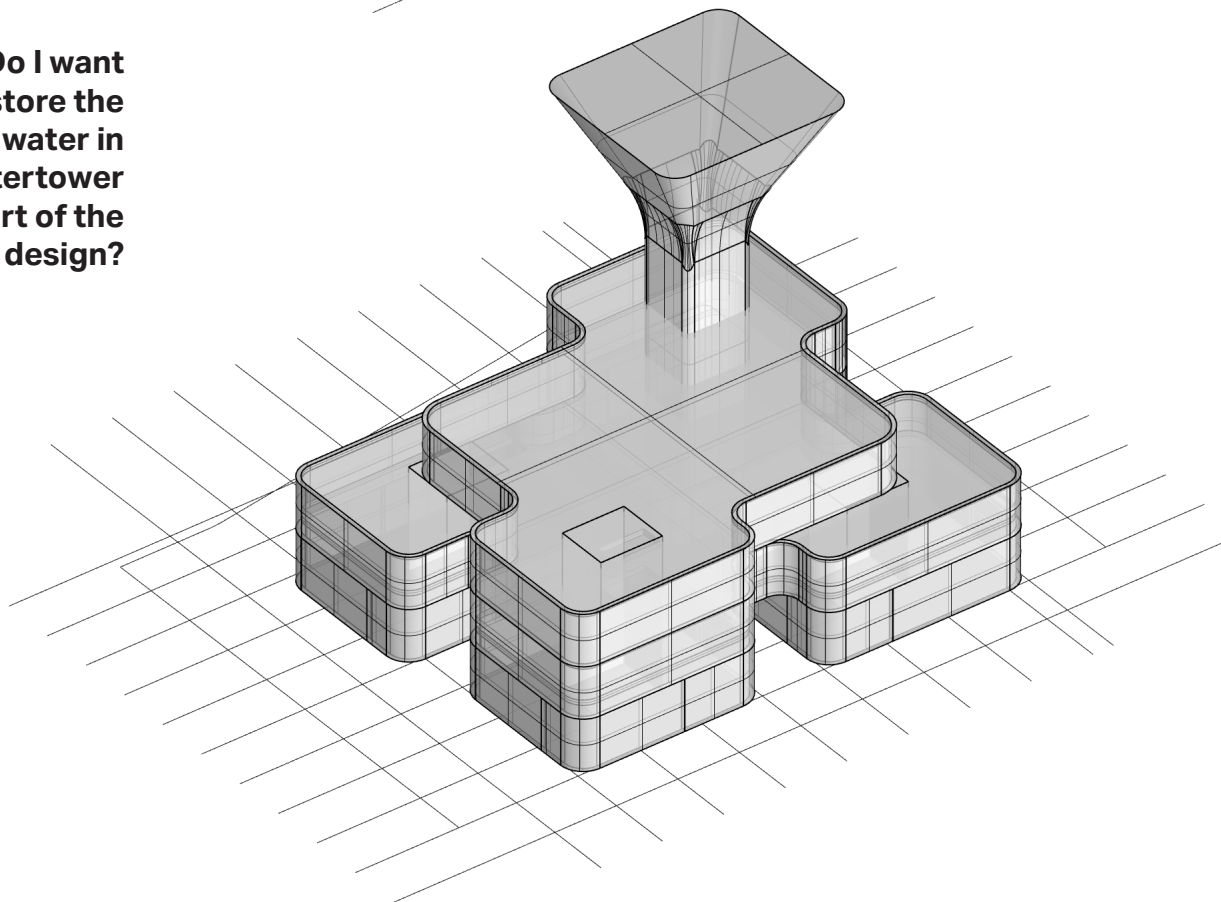
Option 01: Collecting rainwater through a roof



Option 02: Storing rainwater through a watertank



Do I want to store the rainwater in a watertower as part of the design?

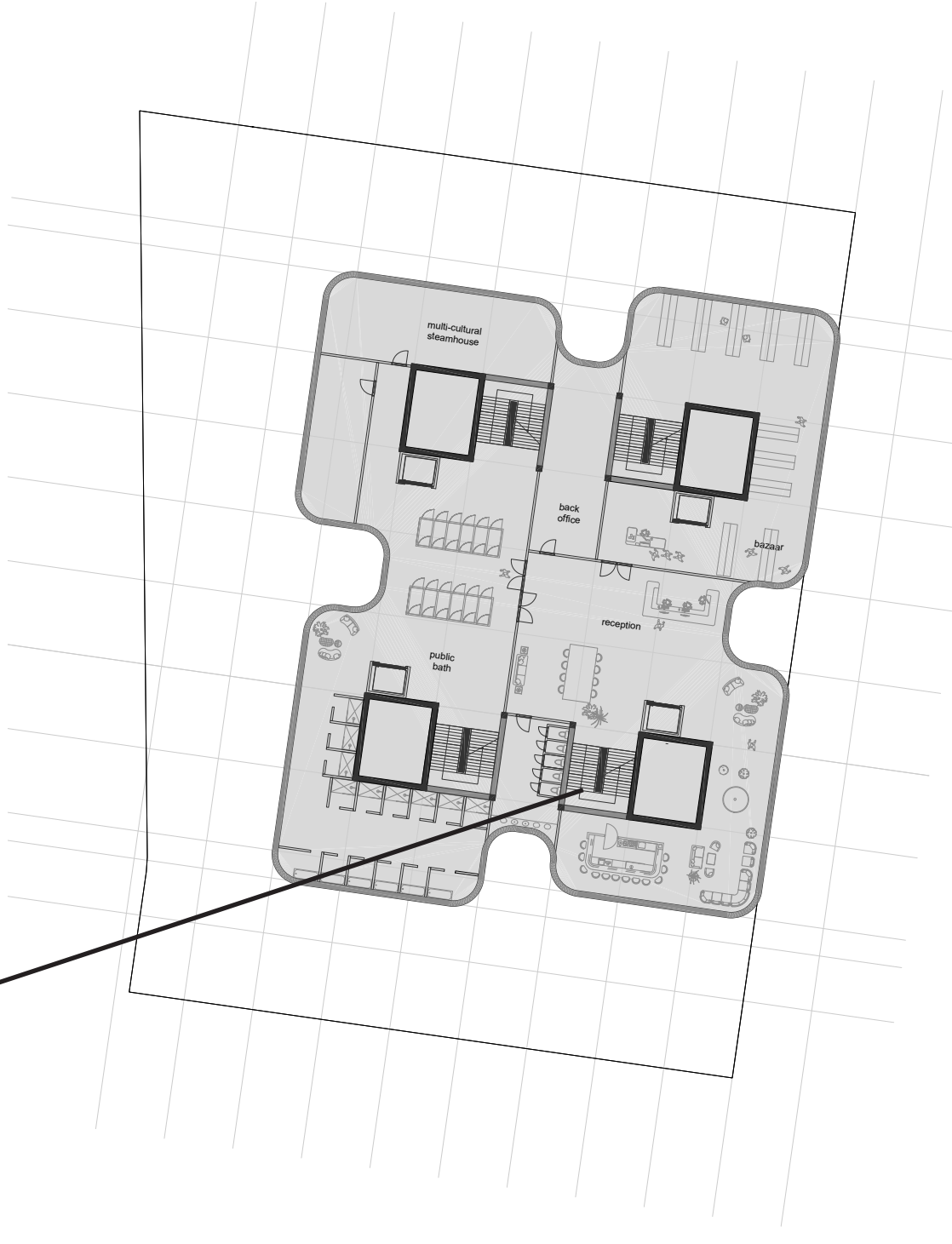




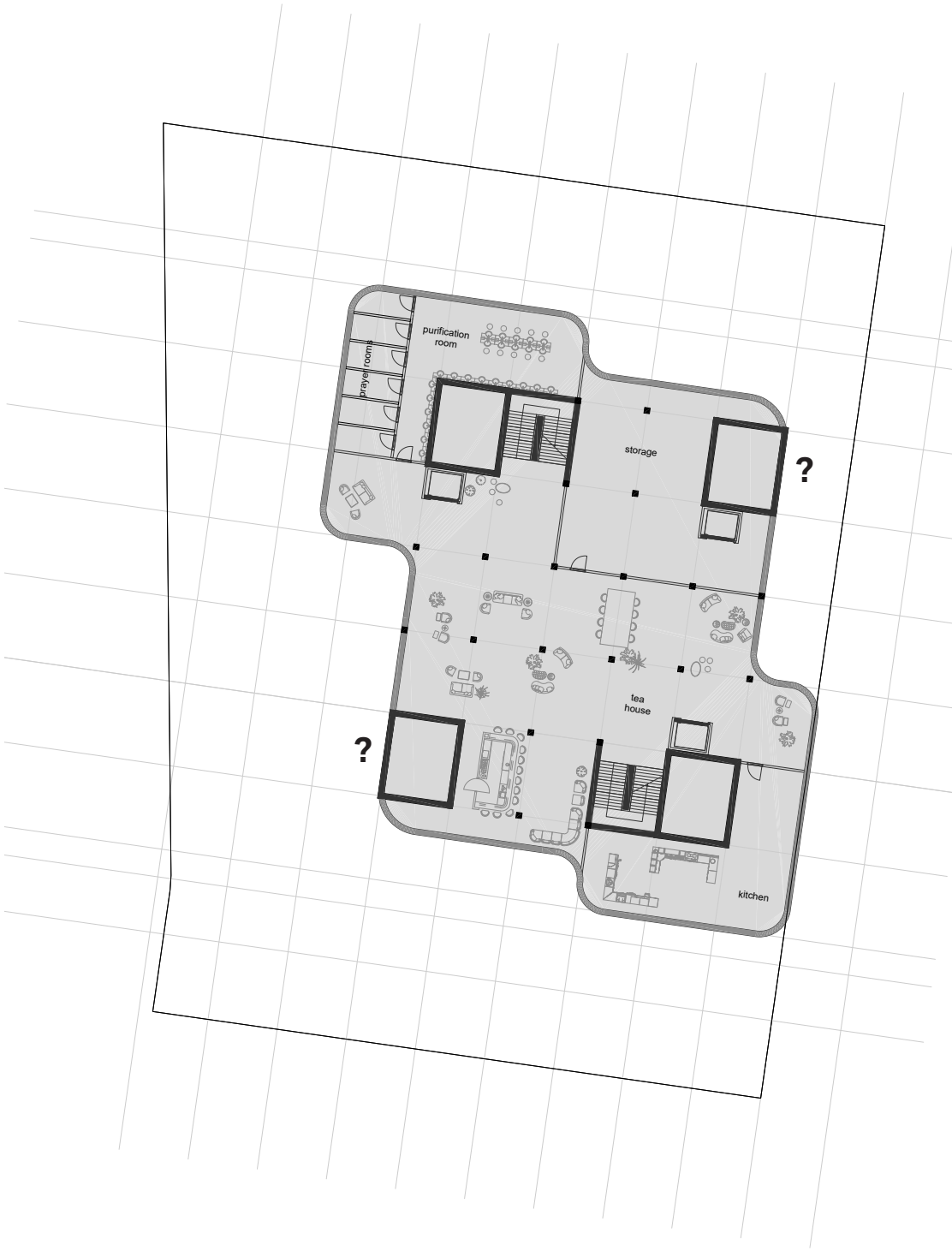
Do I also want
to connect the
public bath area
on the ground
floor?



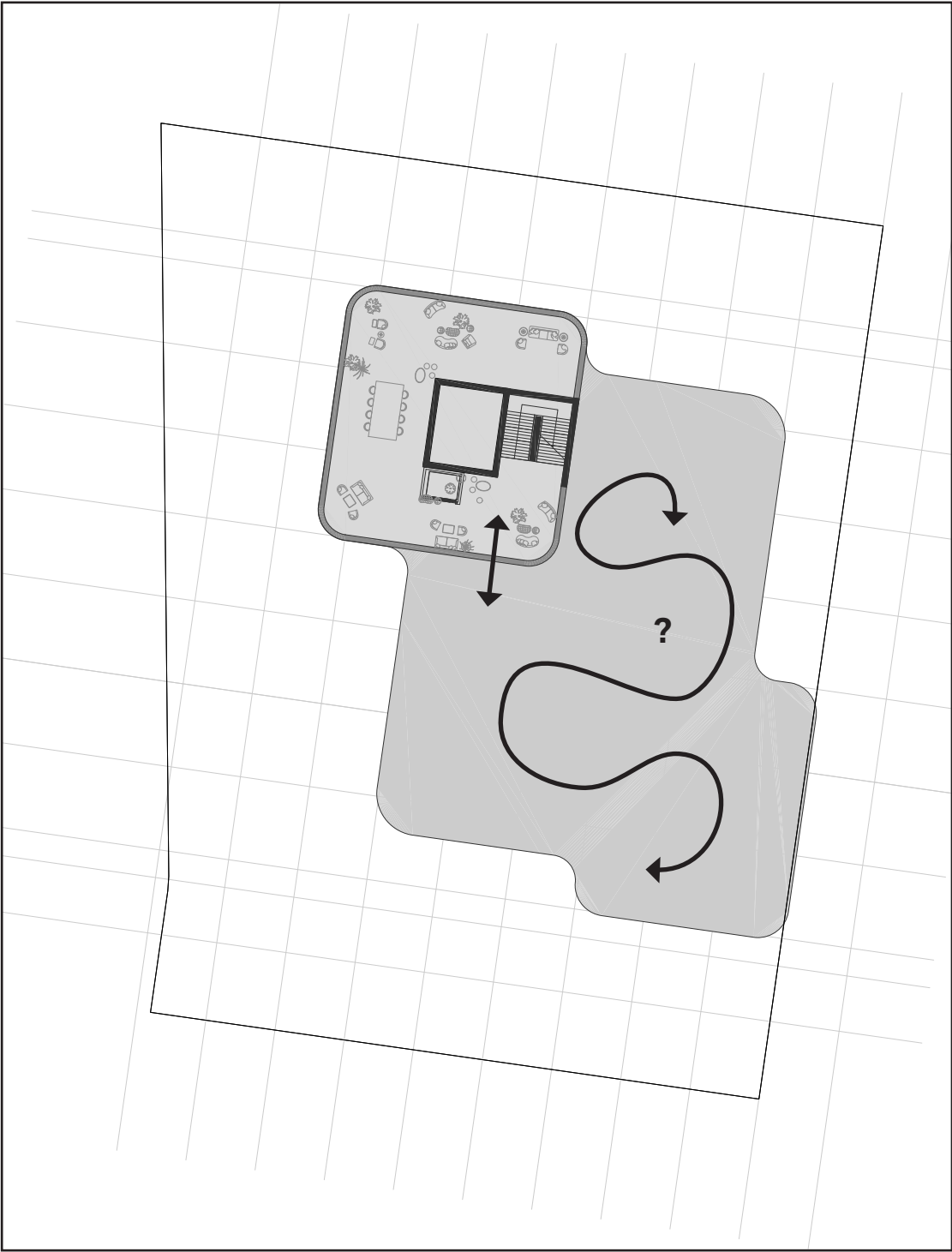
Adding columns
for more
stability, is it
necessary?
What is the
impact when we
take it out?



Feedback:
Change the
staircase to
same sizes



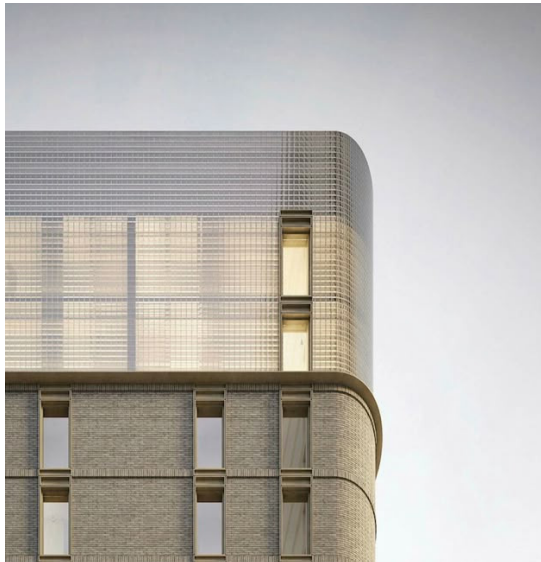
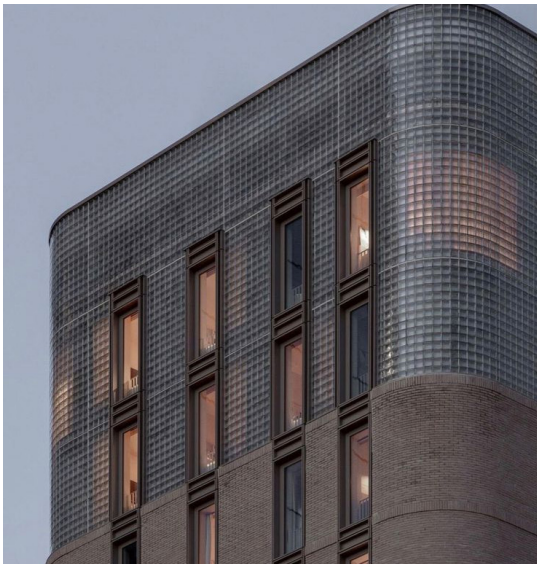
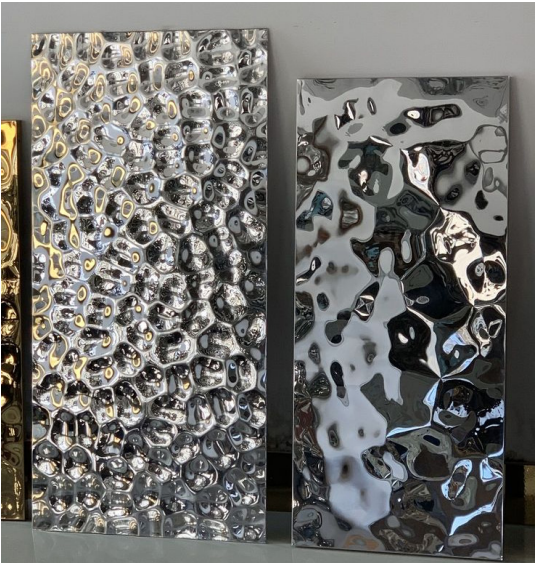
Feedback:
How does the
facade look
like when
"touching" this
concrete core?



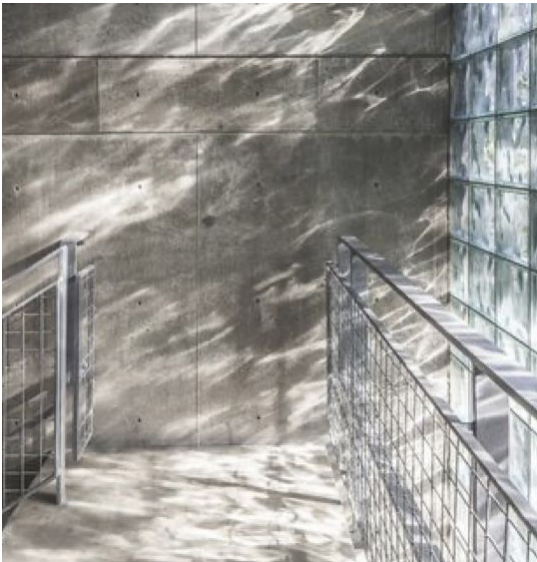
Feedback:
What happens
on the roof? Is
it an extension
of what
happens on the
groundfloor?

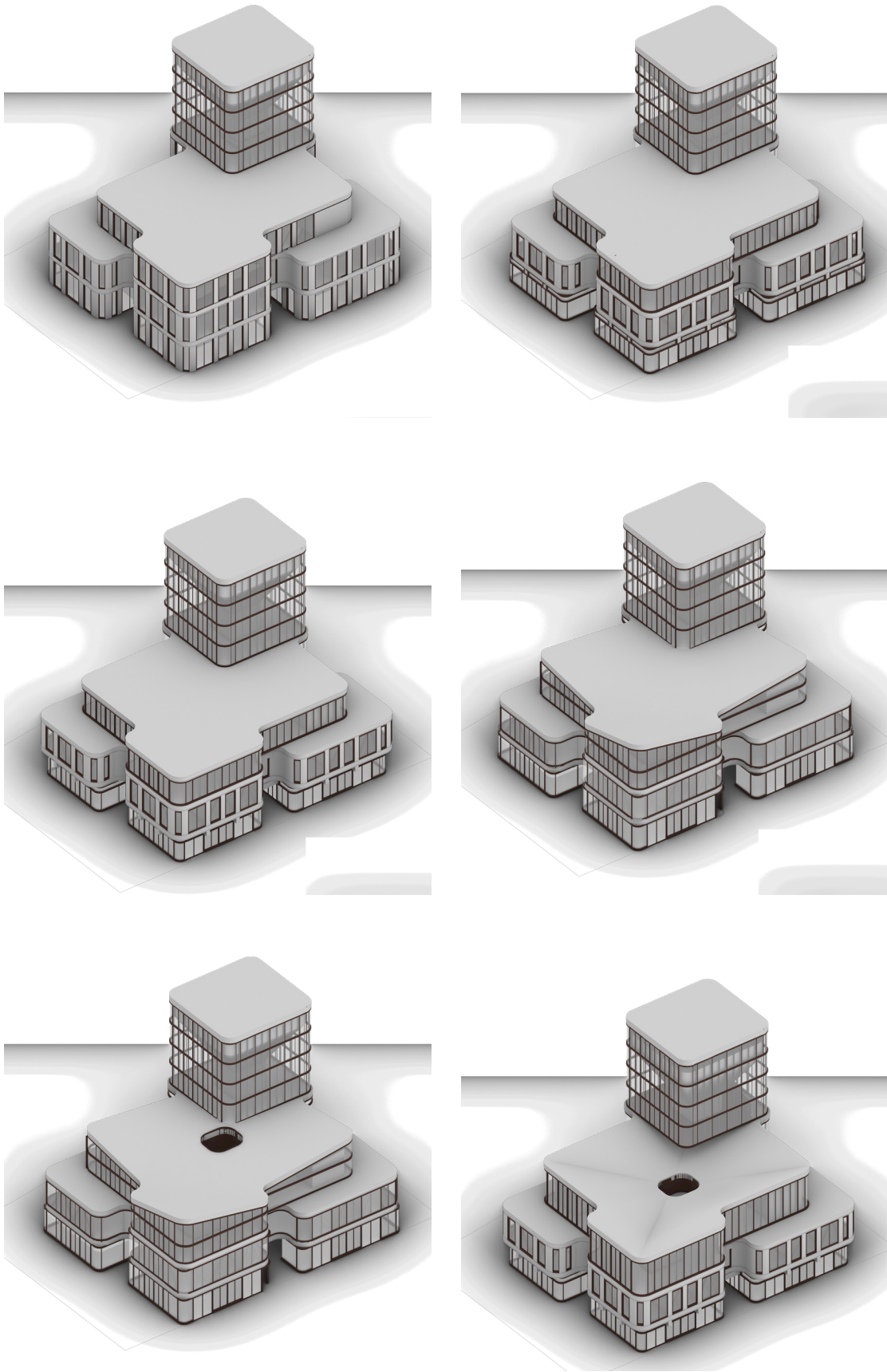


Do I want to work with the character of tiles?

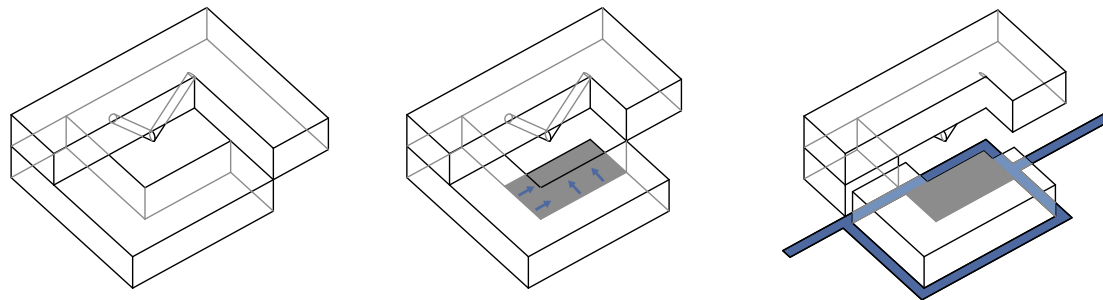
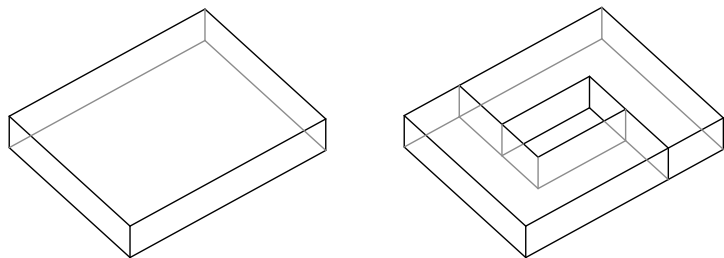


Do I need to work with reflections?





- In this week I changed my massing concept
- For my design, I want water to go through my buildings
- More inside/outside relation: spaces where I can open the sliding doors in summer time, and extend the space
- I want the building to be more fragmentated, with water running through it
- I am missing the 'water touch' in my design: how do we know we are talking about water?
- Design a waterscape! This is where water can be collected and where



Lifting the massing to create more space on the groundfloor, while water is running through?

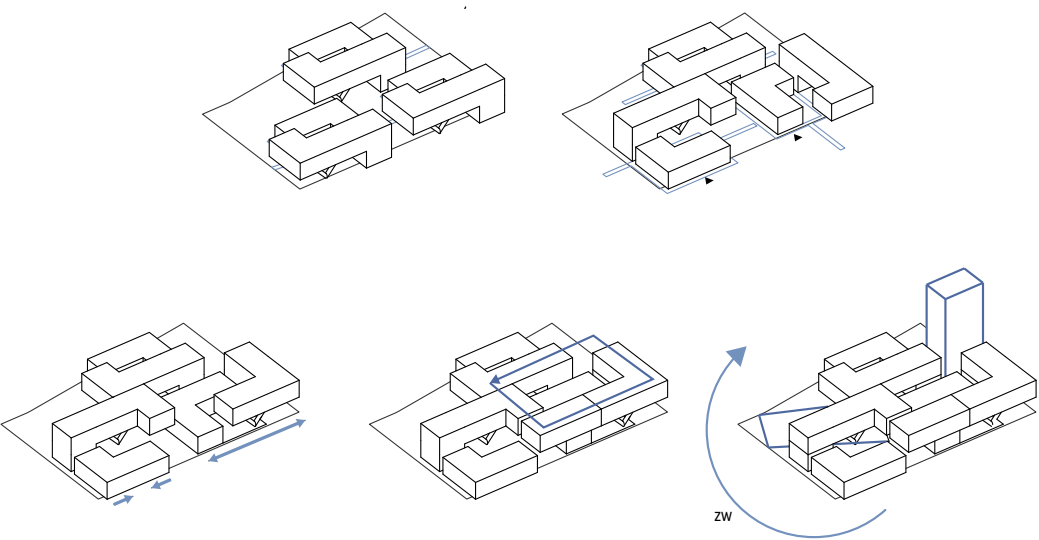
Do I want this to be multiplied? Which so-called 'clusters' do I need?

A waterscape where water has a recreation funtion while collecting rainwater at the same time



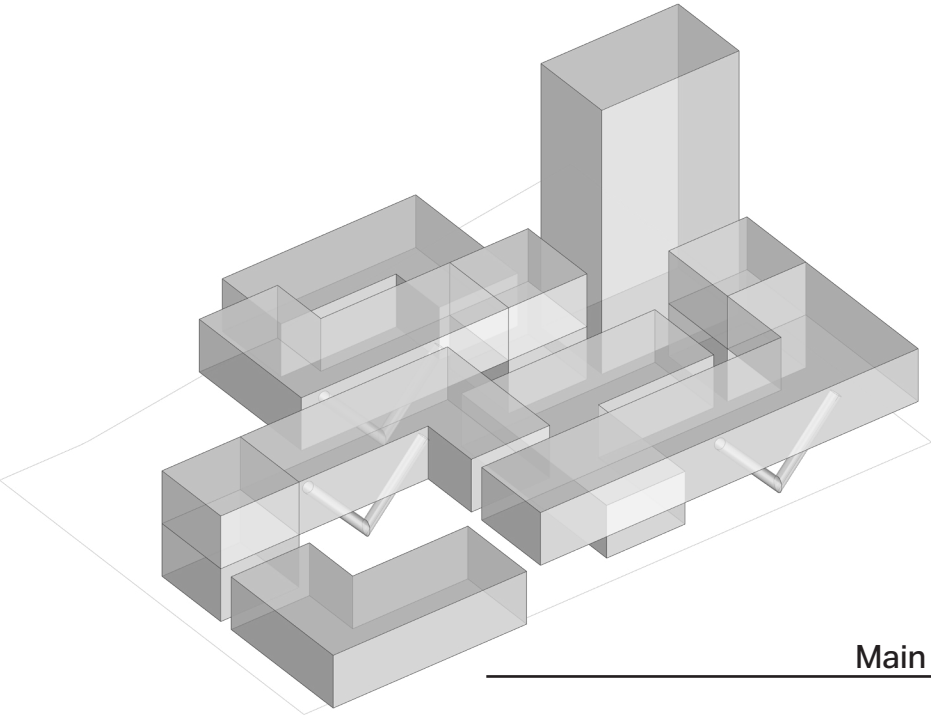
Tainan Spring, MVRDV



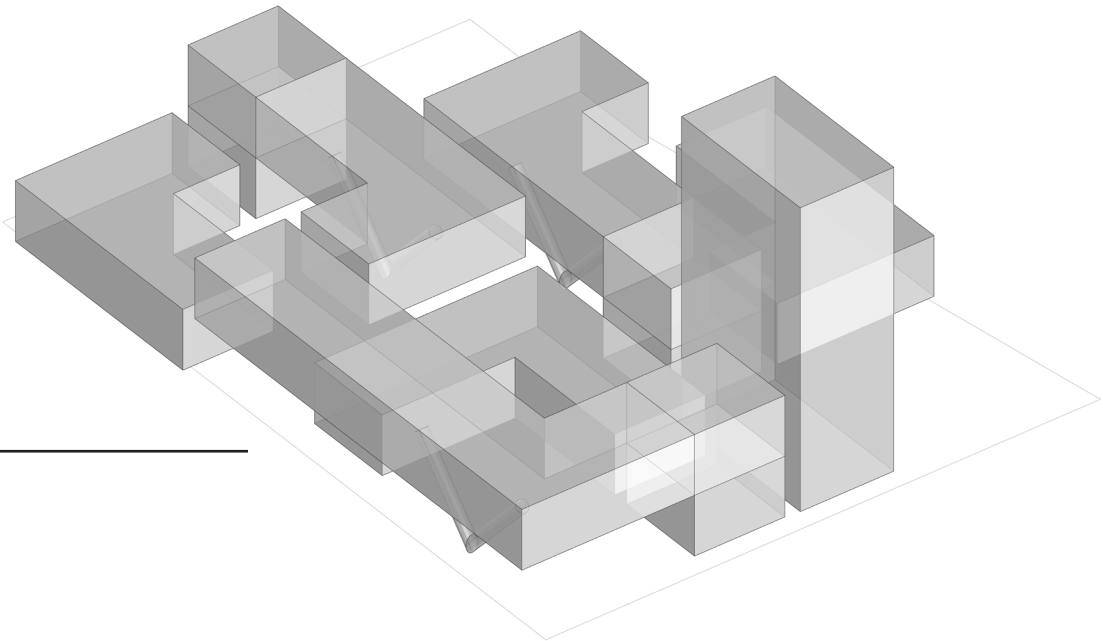
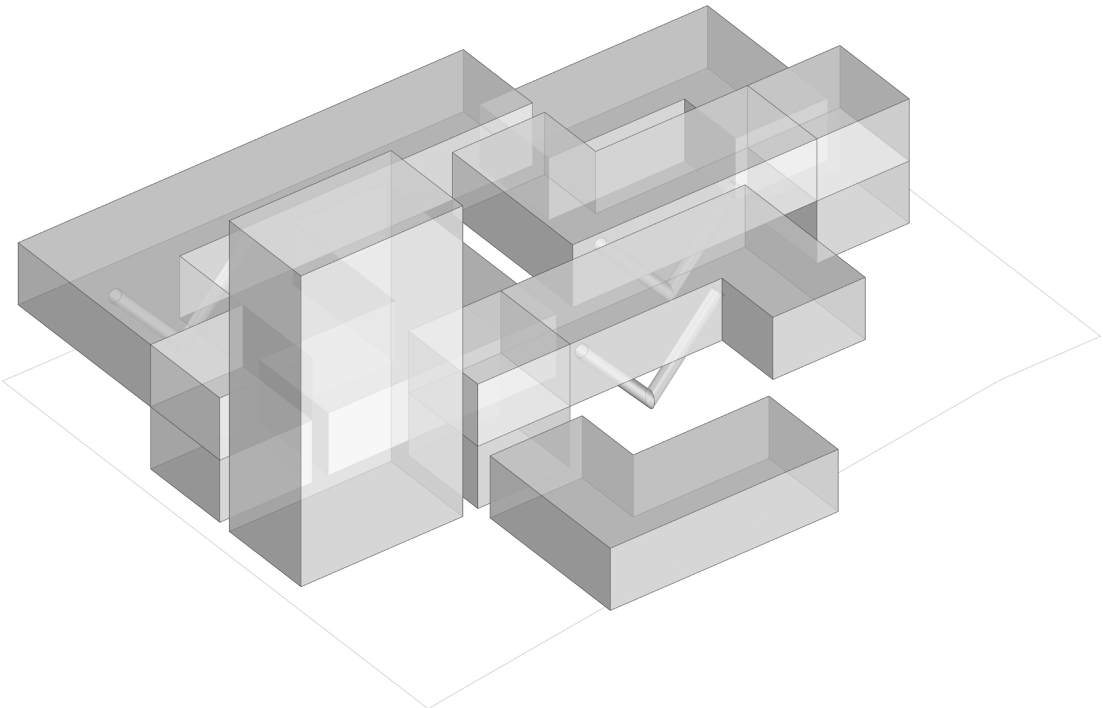


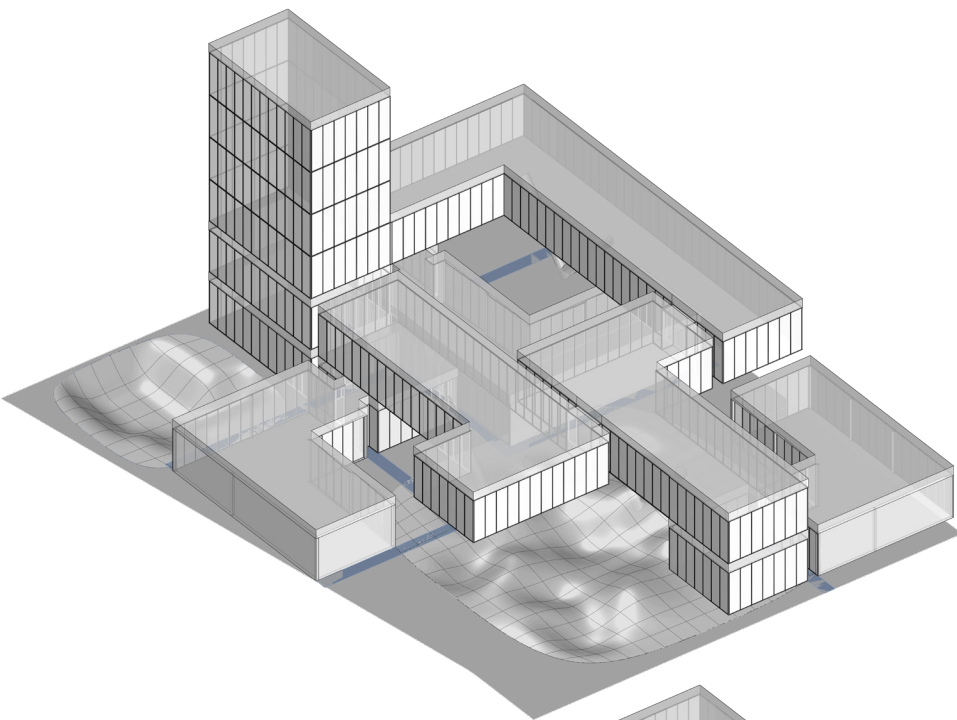
I had three different clusters in my previous design due to routing research:

- 1) Bath House + Multi-Cultural Steamhouse
- 2) Bazaar + Tea House
- 3) Laundry Café + Reception



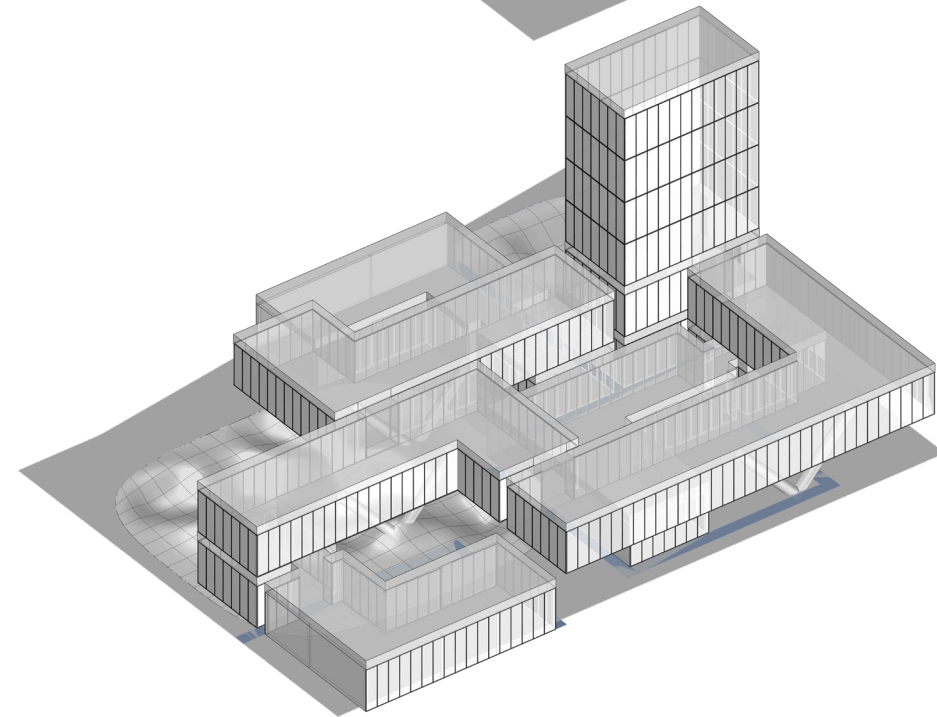
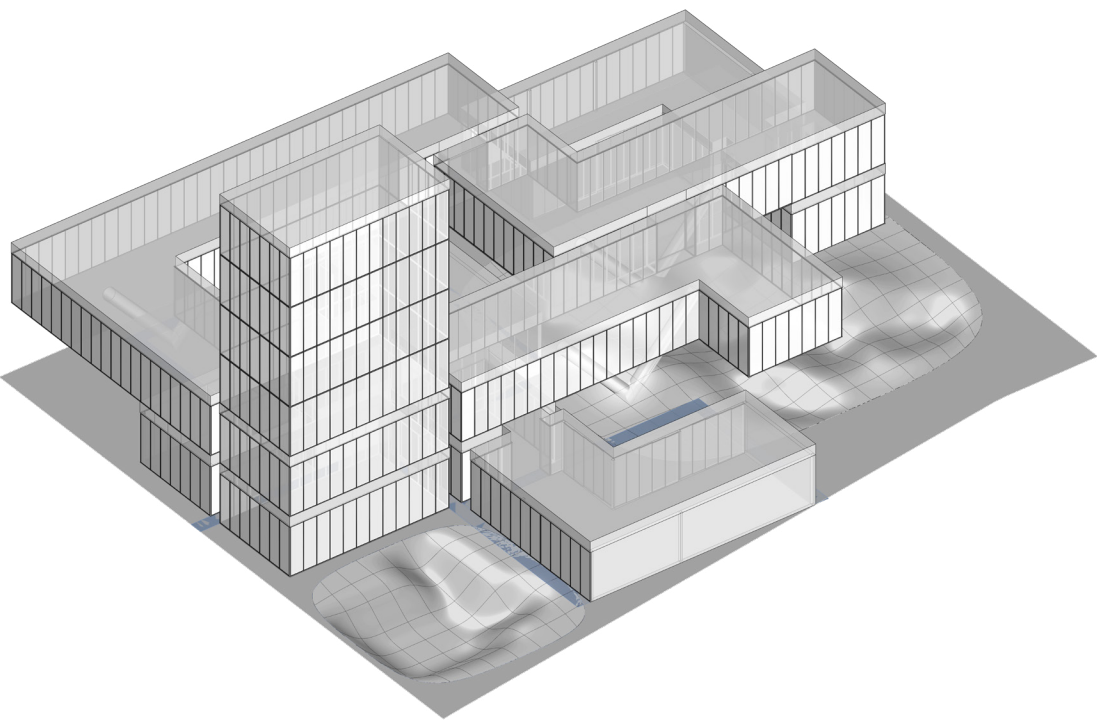
Do I want the laundry café and bazaar next to the main street, just like my last design?



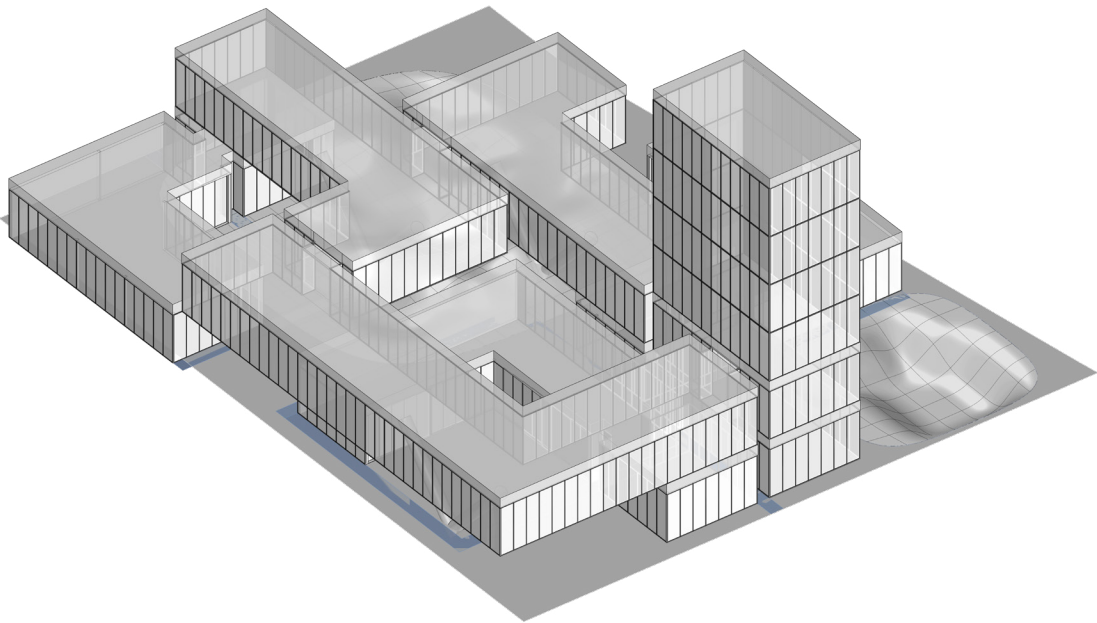


How does this look like with the waterscape surrounding?

Do I want my watertower to have a second skin from glass, just like the other buldings?



Organic shapes (waterscape) versus sharp lines (building and water canals)?





Bazaar and Laundry Café facing the main street, just like the previous design

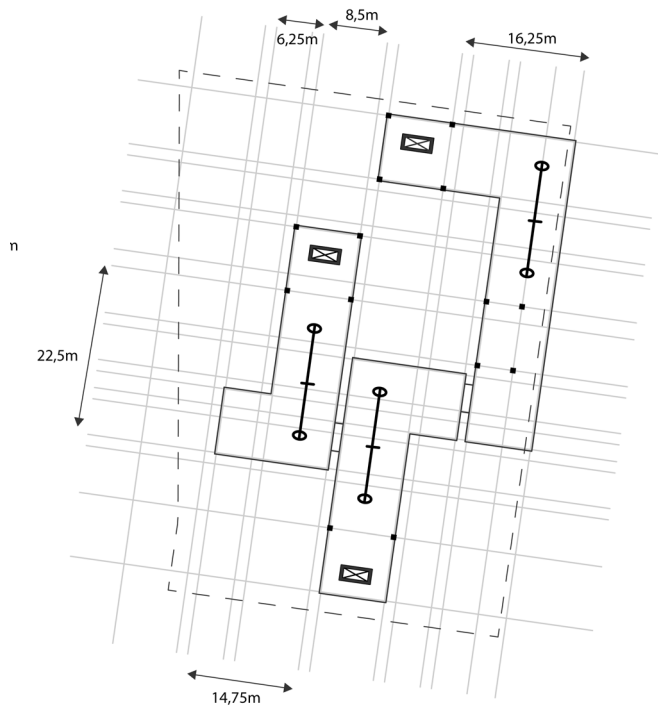
What do I for functions on the roofs?
Can it match the cluster identity?





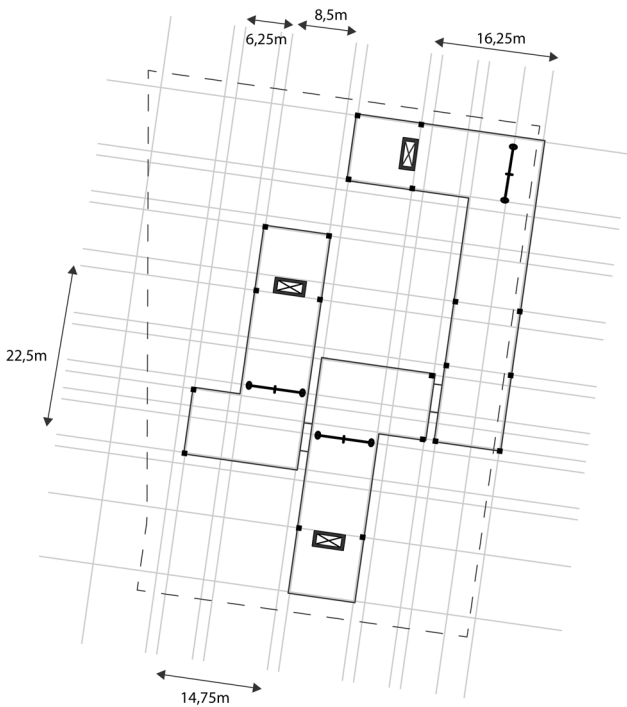
To make my design work, and lift as much of the mass possible from the groundfloor, I planned a structural engineering appointment

In order to let the technical core function for stability, it needs to be pushed to the edges, also working as windbraces in the opposite direction



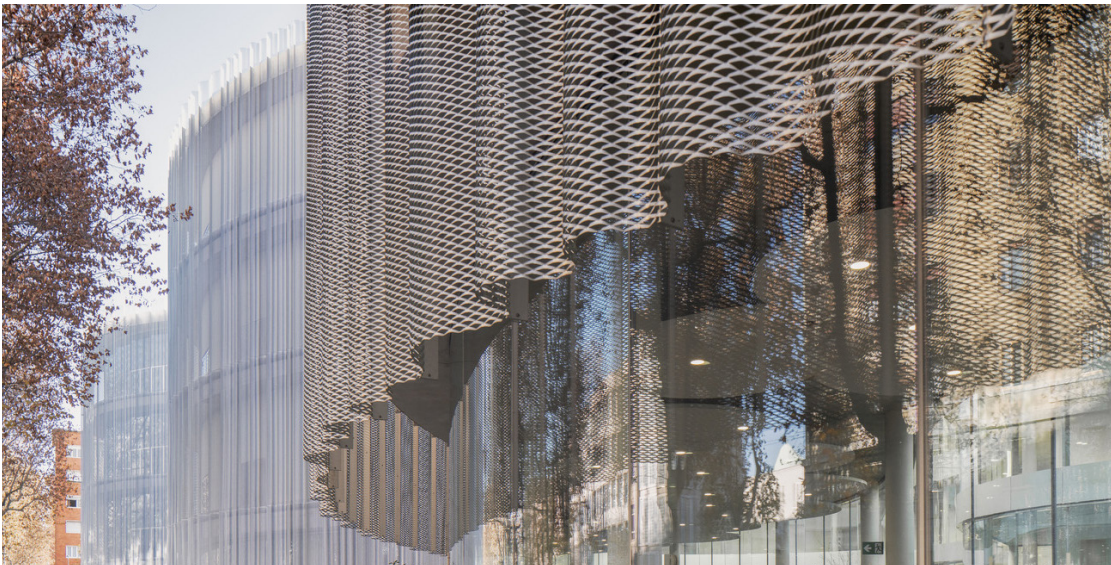
This was my proposal, using the technical shafts (needed for water and ventilation installations) again as part of the construction

V-columns needed to be placed in the other direction with regard to wind stability



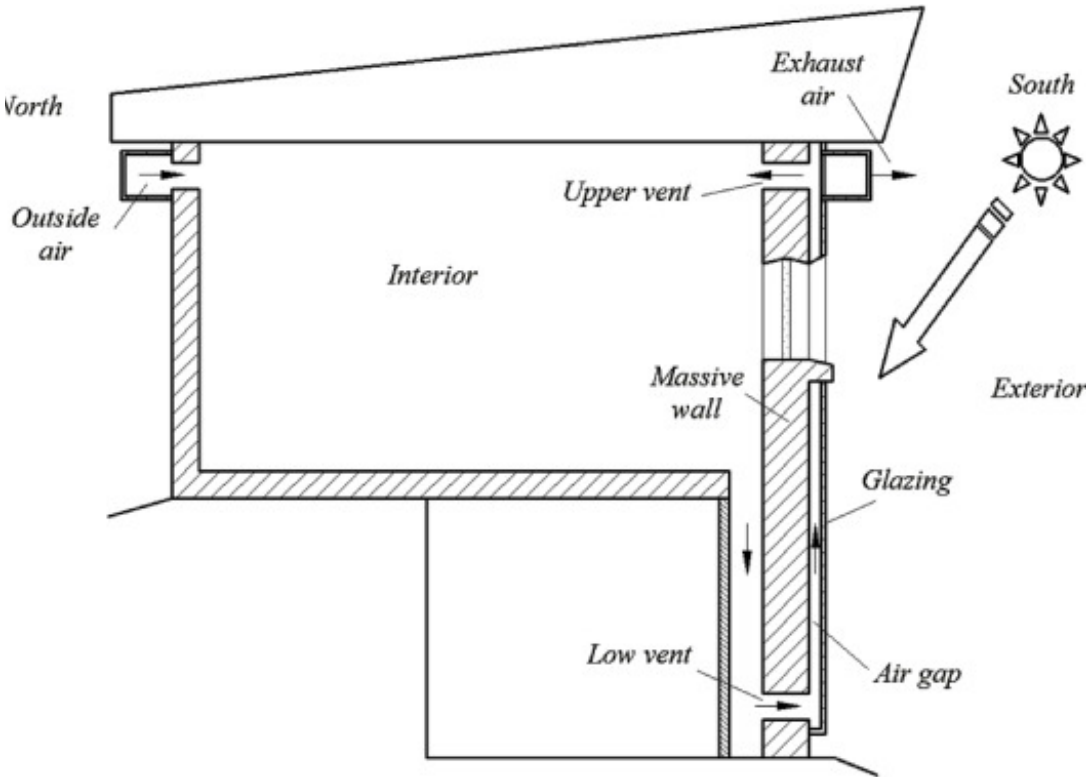


Do I want the second floor, which has a more private character, enclosed with a 'second skin' in a wavy pattern?



New Urban Campus for Bocconi University / SANAA

If I will design a facade with a 'second skin' principle on the first floor, can I not continue this principle on the ground floor facing the south?

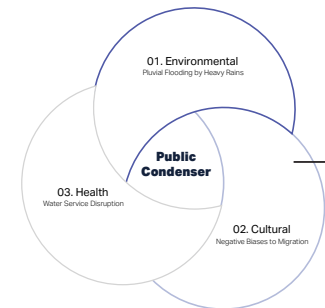


Design Posters P3

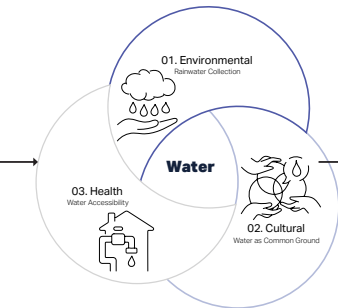
THE WATER HUB

Celebrating diversity through water and providing a water infrastructure for Bispebjerg, Copenhagen

Problem Statement



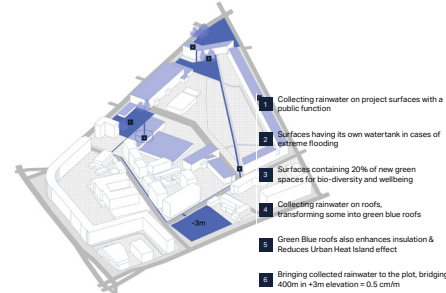
Solution Statement



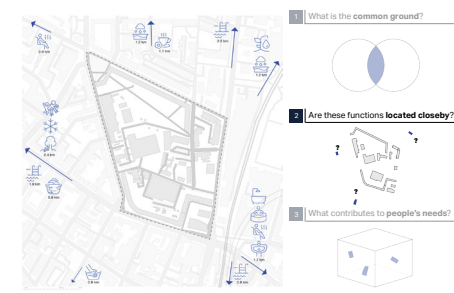
Concept



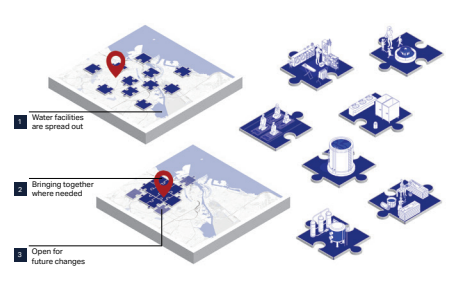
01) Rainwater Collection



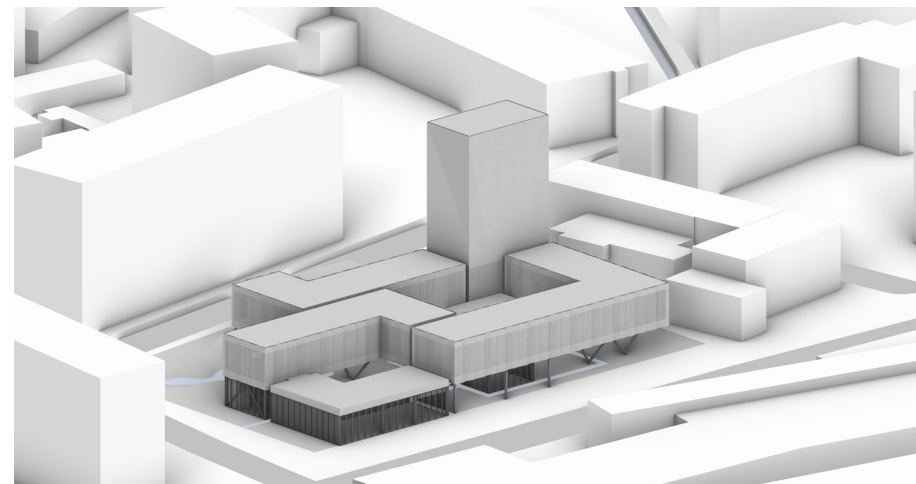
02) Common Ground



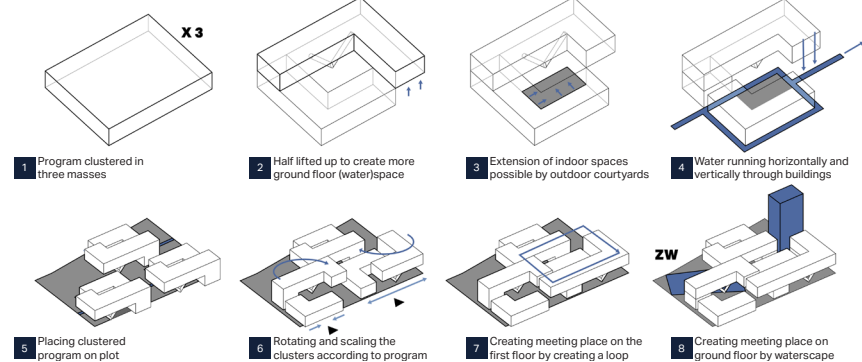
03) Water Infrastructure



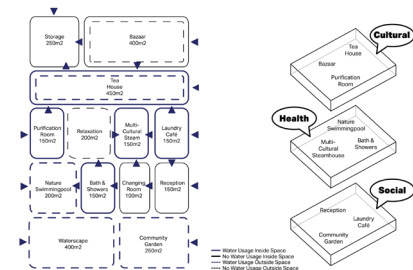
Axo (South-East)



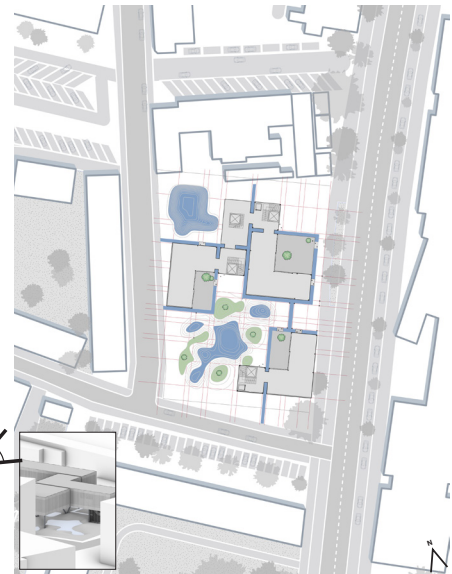
Design Principles



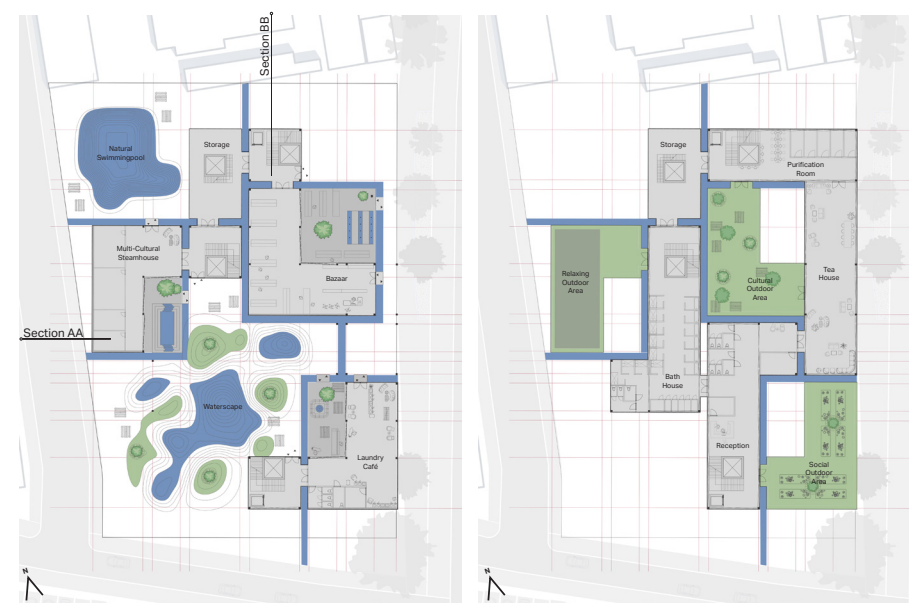
Program



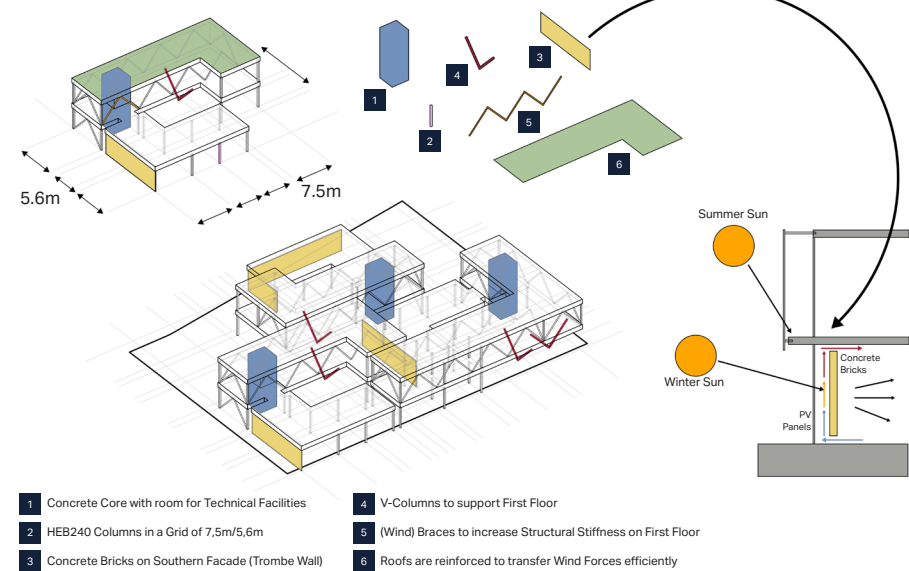
Site Plan 1:500



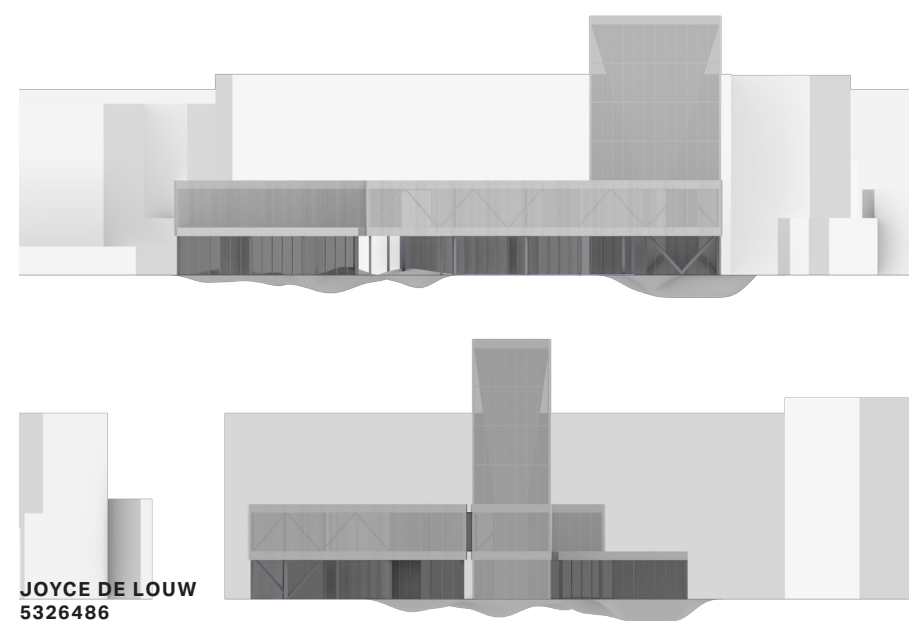
Floorplans 1:250



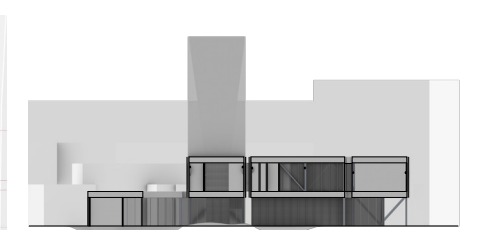
Construction



Facades



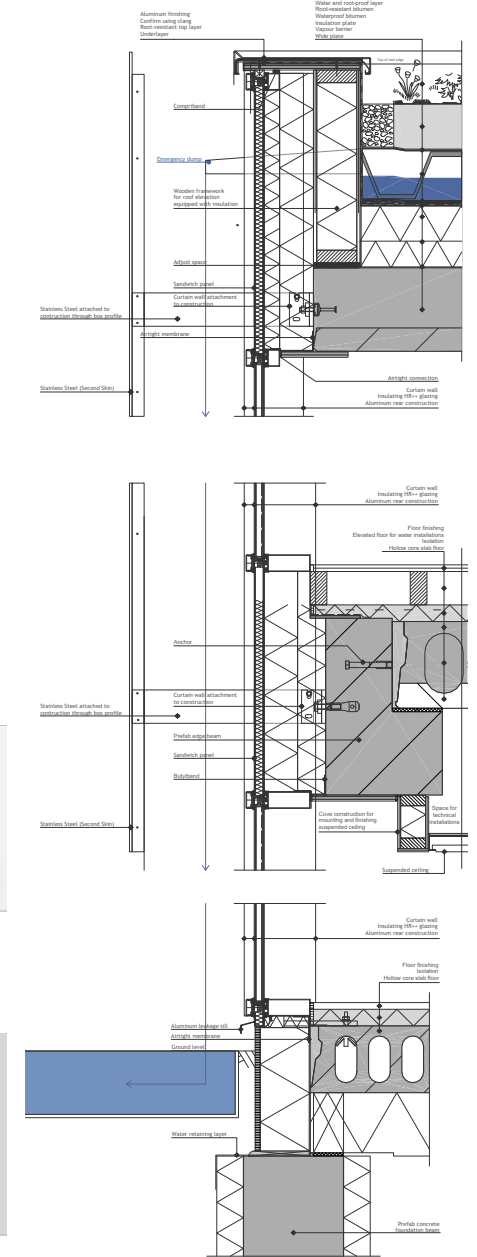
Section AA



Section BB



Details 1:5



Physical Model P3



Feedback P3

Feedback:

- Joyce, we support your step into another building composition compared to your P2 design. From a on three sides secluded 3 storey building plus watertower, you have opened-up your building on the groundfloor much more towards the neighbourhood, and lowered the building by one floor, yet making a larger footprint on the site.
- Yet, as Nathalie also mentioned: the water does not have to be omnipresent everywhere, yet can appear, disappear and reappear in different ways in your proposal (comparison case: Parc Güell by Antonio Gaudi in Barcelona).
- The technical aspects of water collection should be made clearer! How does water surround your building, or does it take over your building? Design a waterscape, especially on the ground floor.
- And what expression will you give to the water tower? This is your main asset! Will it remain abstract? Sacelless or scaled? What about its height? You already made a good model inserted in the groups site area model.
- Having said that, graphically, the chosen style of crafting your drawings doesn't add to its legibility. Your sections look like

façades, and the InDesign layer does not help in this respect. Your program distribution could be supported by use of colour in diagrams and floor plans.

- Go ahead towards P4!

How do I want to design my water tower?

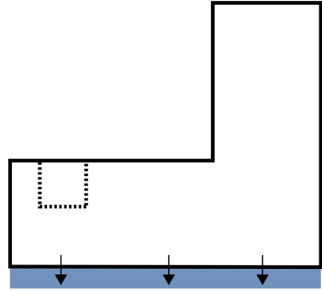


WEEK 1.33

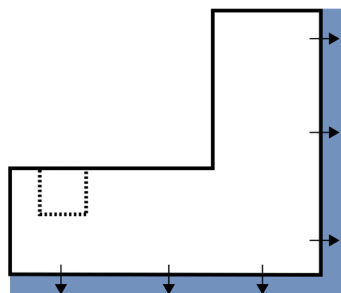
How does water move?

10 | 04 | 24

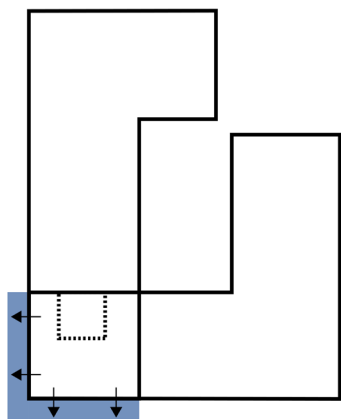
1) One side of the roof?



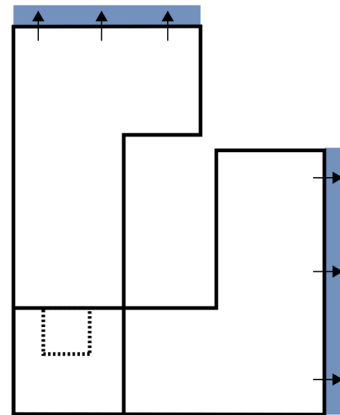
2) More sides of the roof?



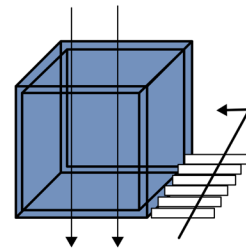
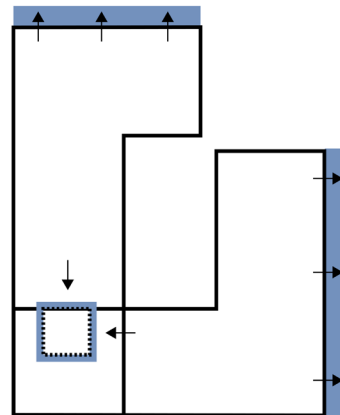
3) Same side for GF roof and 1F roof?



4) Different sides for both roofs?

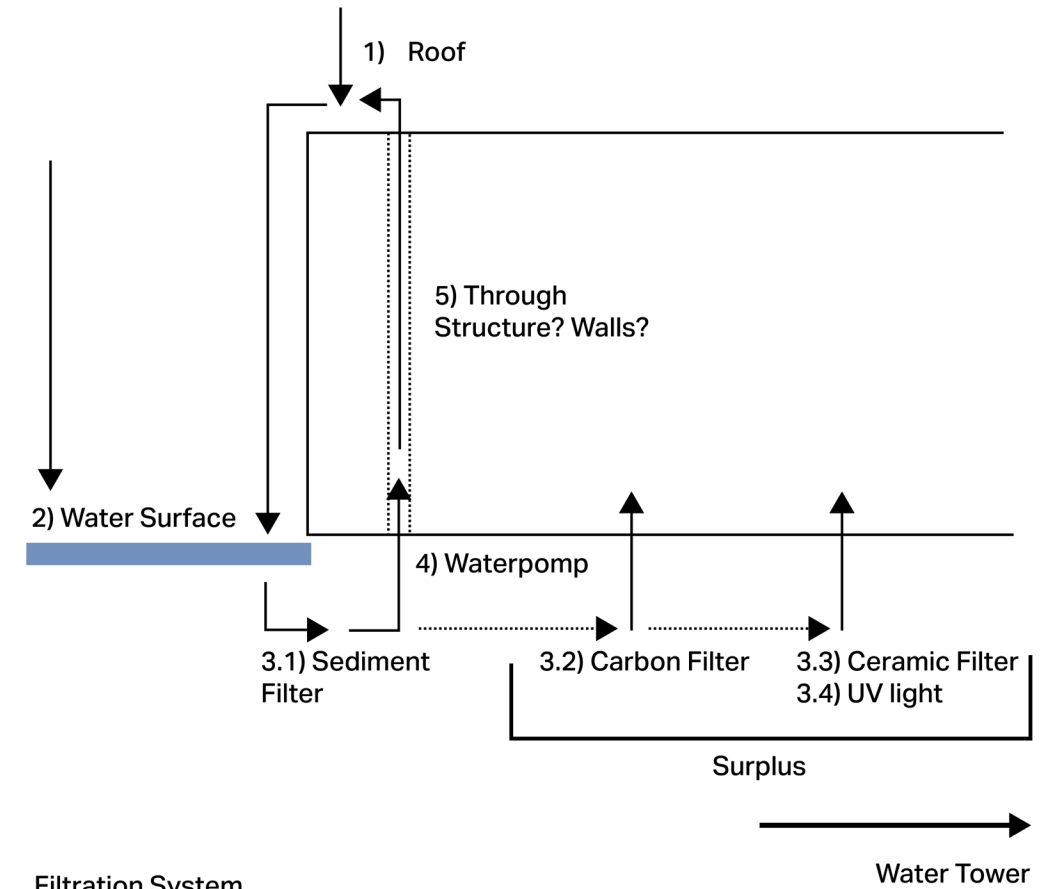


5) Combine it with core: make a special circulation attribute



Feedback:
Do I not want to connect the water canals which each other?

Feedback:
How do I want the water to go from the roof to the water tower?



Filtration System
Depends on use:

1) For garden/irrigation use:

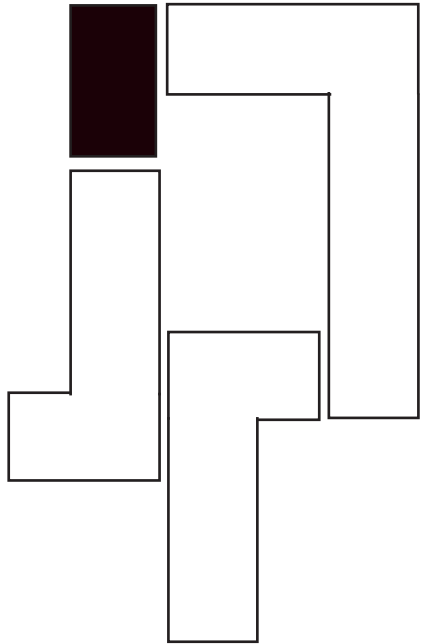
- Basic sediment filter (e.g. 100–200 micron) is usually enough.
- Optional: a fine screen before the outlet.

2) For household use (washing, flushing toilets):

- Sediment filter
- Carbon filter (removes odors and some chemicals)
- Optional: UV sterilizer or chlorination for pathogens.

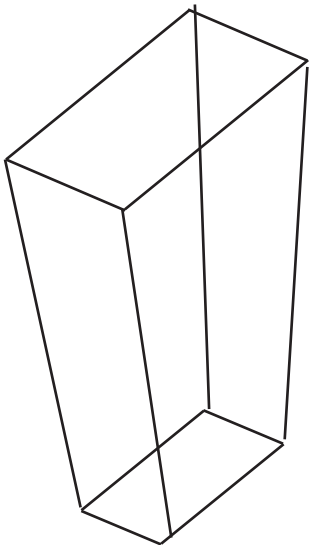
3) For drinking water:

- Sediment filter (removes dirt, debris)
- Activated carbon filter (removes odors, chlorine, organic compounds)
- Ceramic or micron filter (removes bacteria)
- UV light or reverse osmosis (kills viruses, bacteria, purifies water)



1. In the Enveloo

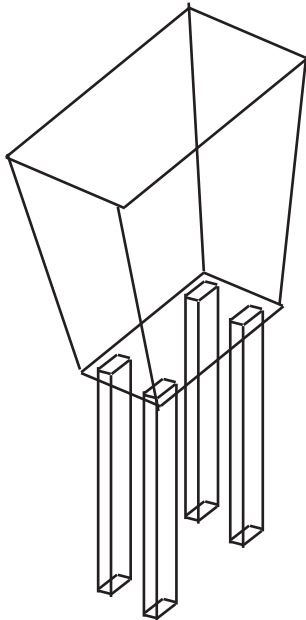
What are my principles for designing a water tower?



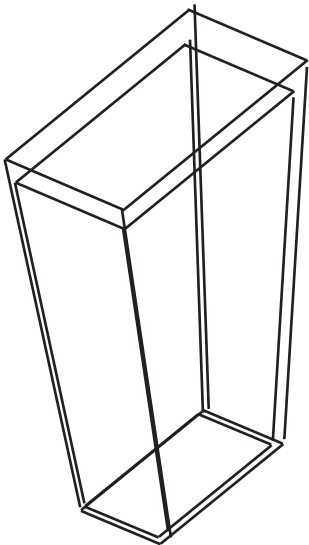
Twisted?

Feedback:
Why not on columns instead of a big massing?

How can I make this part of the rest of my design?

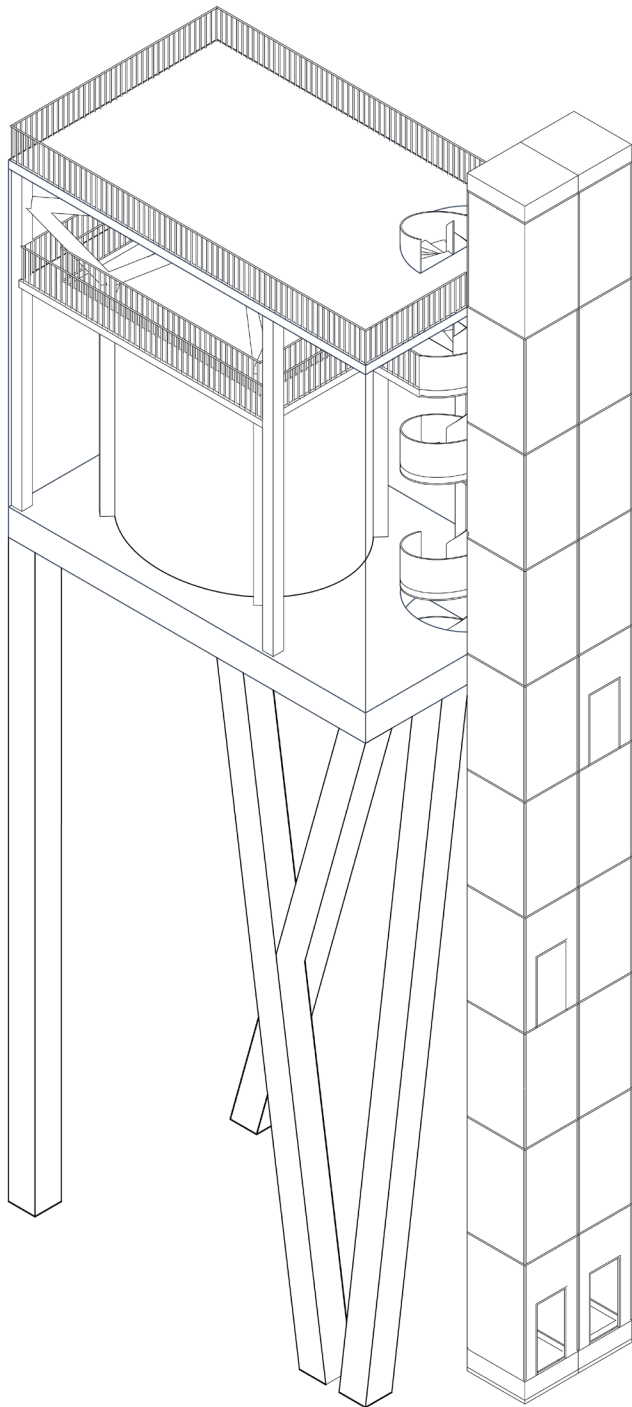


2. On Columns creating more ground floor space



With a second skin? Half transparant?





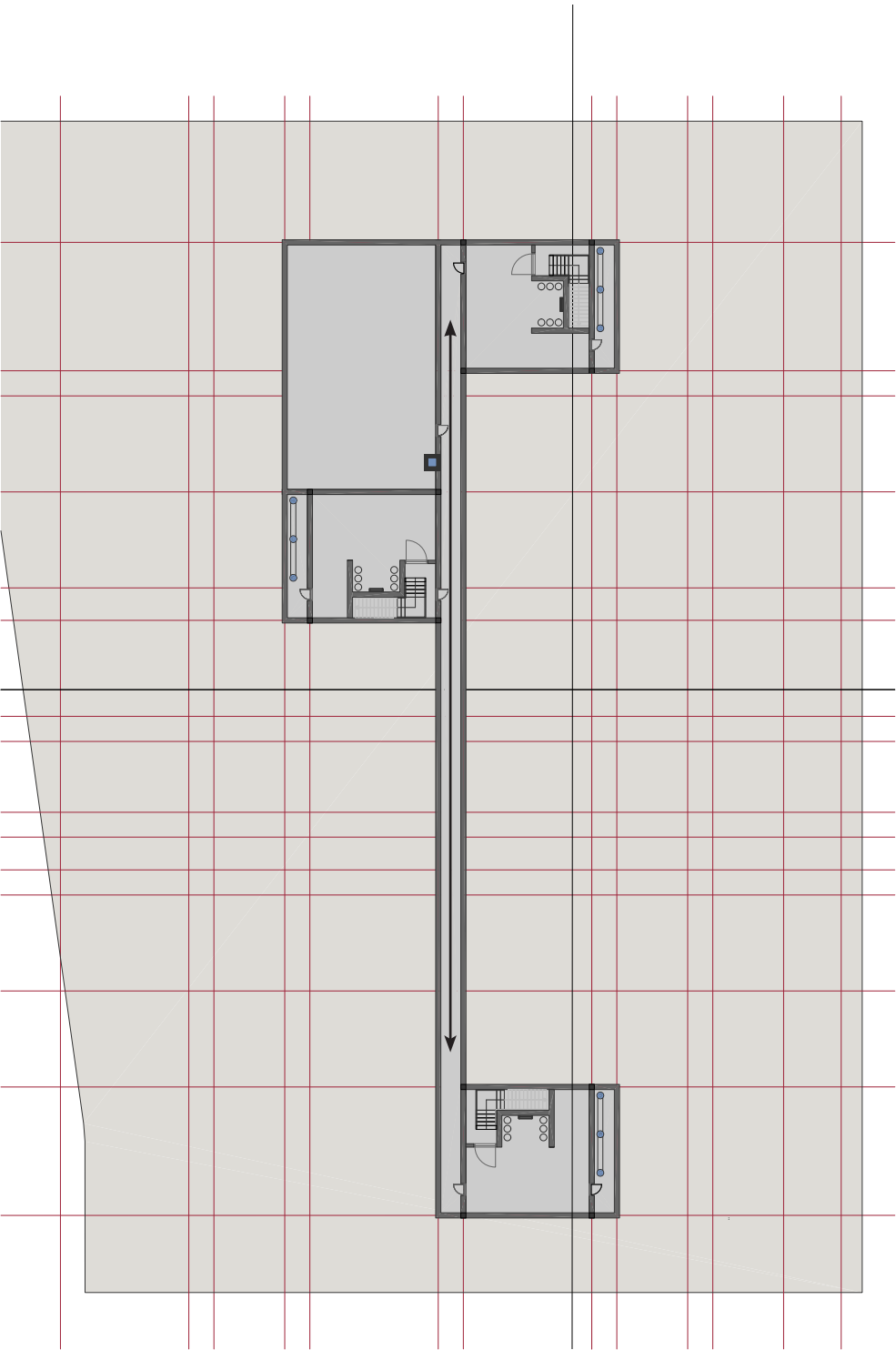
The language of the V-Columns throughout the rest of my building is continued in the water tower:

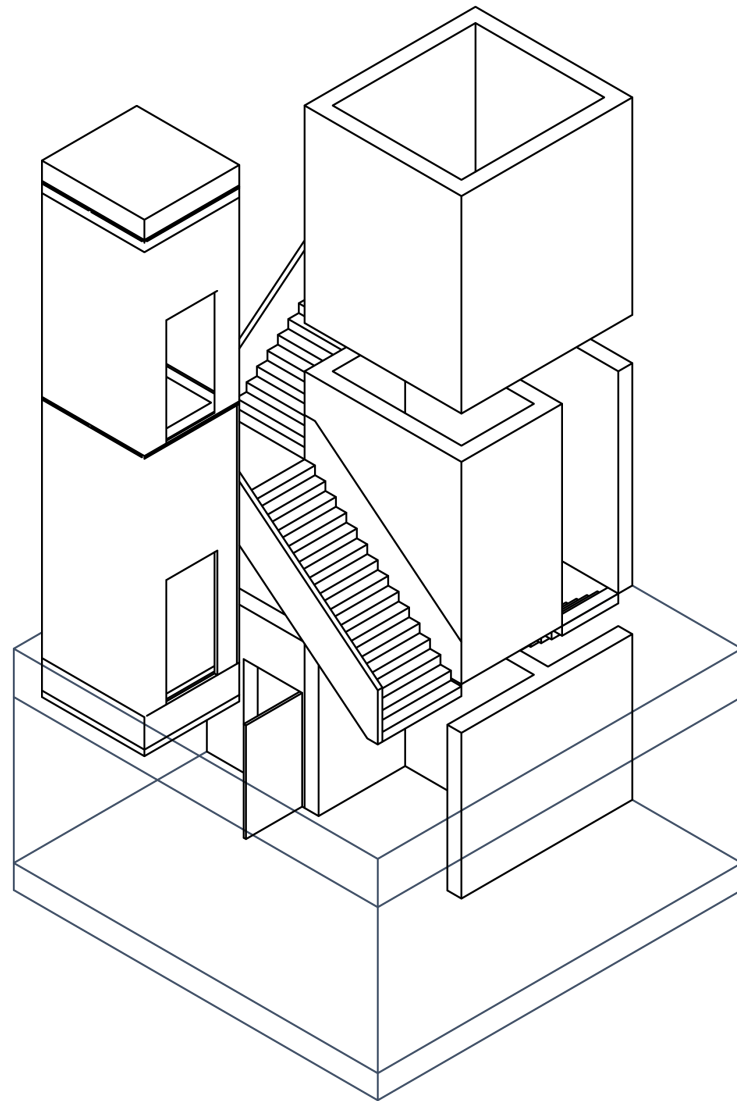
Lifted on a visible structure

Visual relationship with the water spaces of the rest of Denmark when making it public as a viewing point!

Water is collected at three different points and all transferred to
1) Filter processes
2) Storing (Watertower)

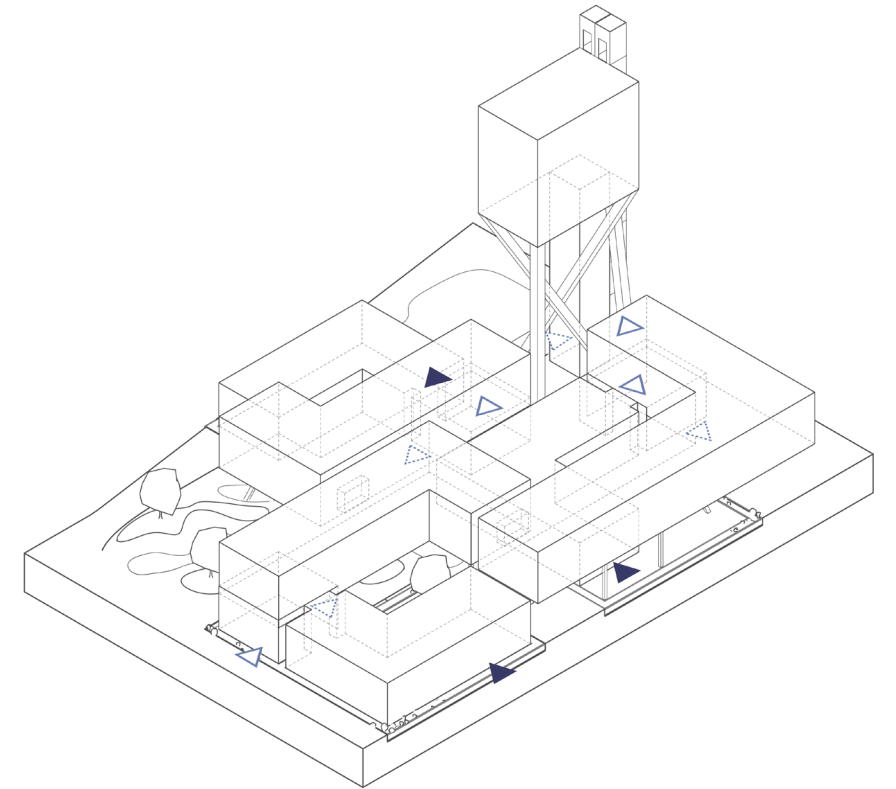
Basement with three technical rooms are added, with open space for storing / technical facilities





Adding different entrances into the design:

- 1) Main entrance
- 2) Secondary entrance
- 3) Emergency

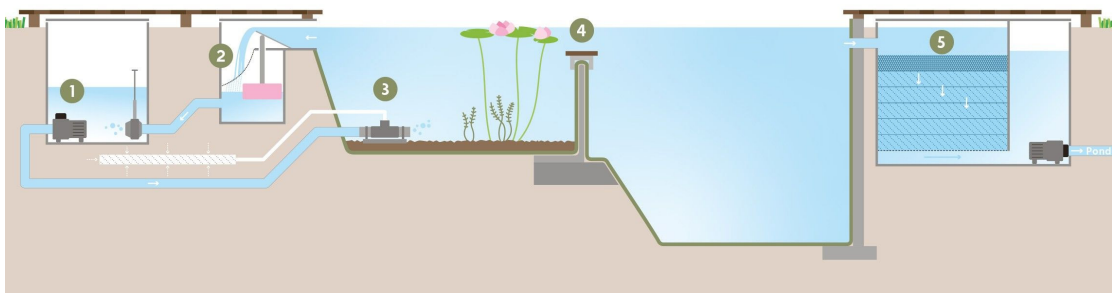


Feedback:
You can add a secondary / security door so the technical room can always be entered



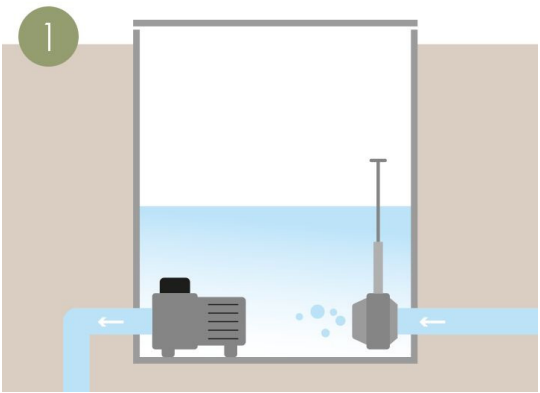
Due to the natural design, the biological self-cleansing forces of the Natural Pool are extremely effective. Impurities are absorbed by the plants as nutrients and harmful bacteria are destroyed by natural water organisms. Thanks to the biological self-cleansing properties **absolutely no chemicals are required**. Technology is used to support and enhance the natural processes. Biotop has always attached a great deal of importance to designing technical components that are simple and easy for the user to understand.

In the planning of Natural Pools, generally the ratio of the swimming zone to the regeneration zone is **1:1** and the depth is **at least two meters** in the swimming area. This is the basis for a functioning pool. If more technology is use, the regeneration area can be smaller with less depth.



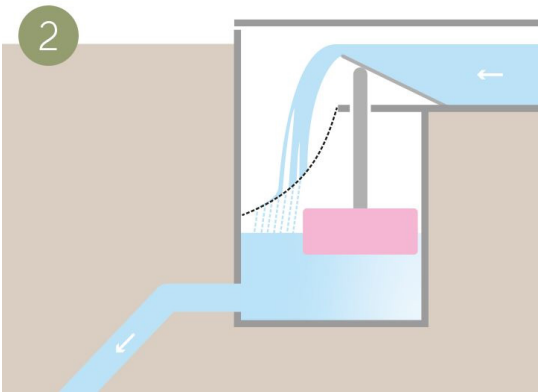
A Natural Pool will function as it should if the regeneration area is designed correctly and the underwater plants are used properly. The pool is **fortified with zooplankton** (water fleas, rotifers, paramecia), which play an important role in keeping the water clean on a continual basis. All it takes is a little bit of patience until the pool finds its natural balance. A Biotop Natural Pool functions in perfect balance **starting from a water surface area of 30 to 40 m2**. And in terms of size, the sky's the limit.

Feedback:
Can I not make a natural pond of the water canals?



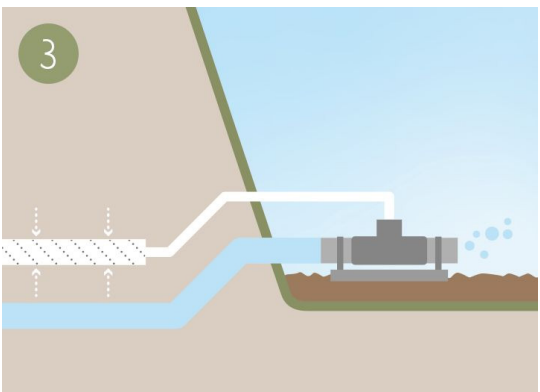
Submersible pump chamber:

The pump is completely submersed in water in a chamber, allowing water to flow to it simply by the force of gravity instead of being "sucked in" by the pump. Mounted at the bottom of the chamber, the pump conveys the water back into the pond through pressure pipes.



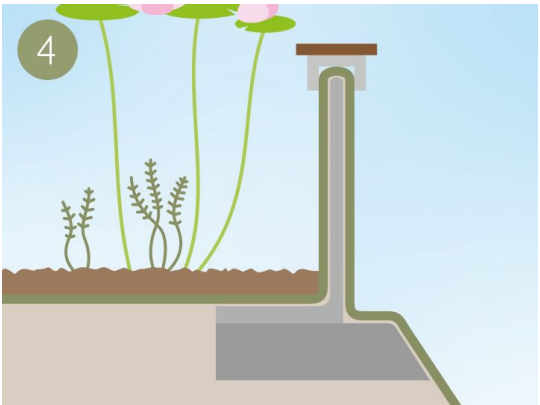
Curved Sieve skimmer:

The purpose of the curved sieve skimmer is to remove floating particles from the Swimming Pond. The water flows over a curved screen with a mesh of only 0.3 millimetres that removes even the smallest particles.



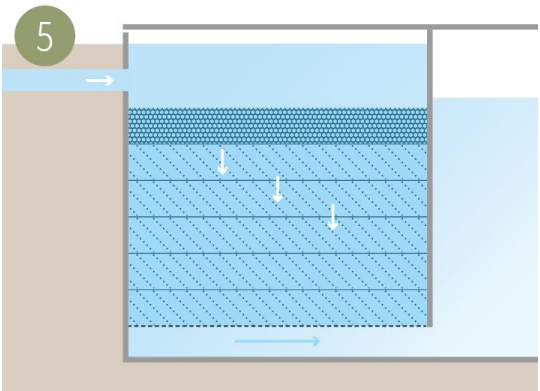
Carbonator:

The Carbonator provides the water plants with carbon dioxide, thereby helping to regulate the pH value of the water.



Seperation:

A separation between swimming zone and regeneration zone can be created by fitting special wall units, as shown in the illustration above.



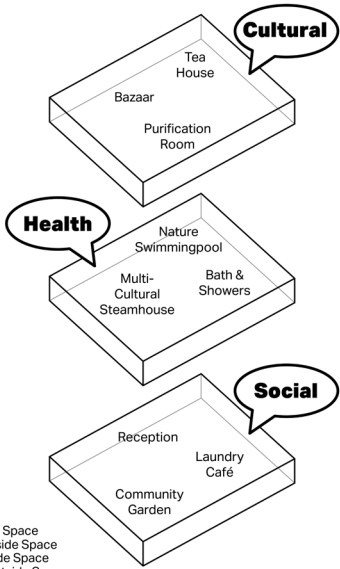
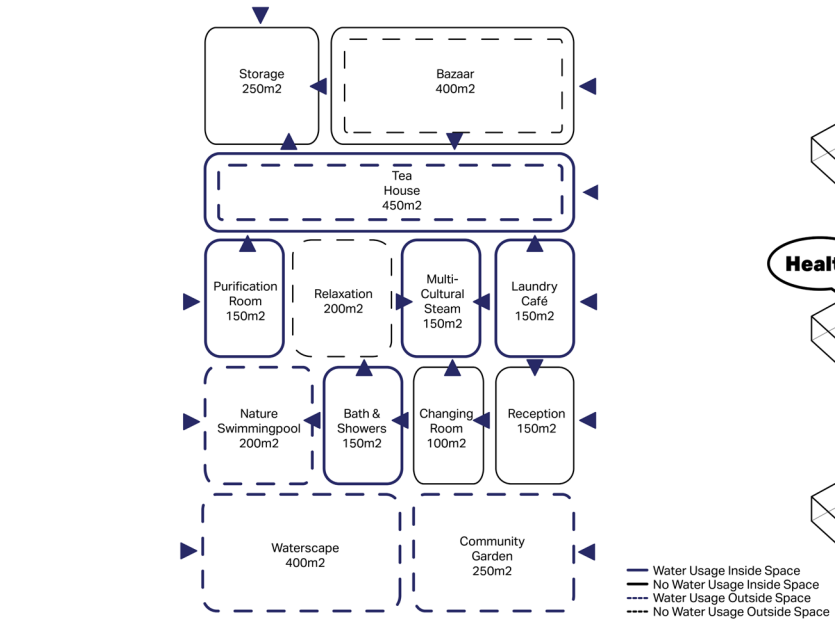
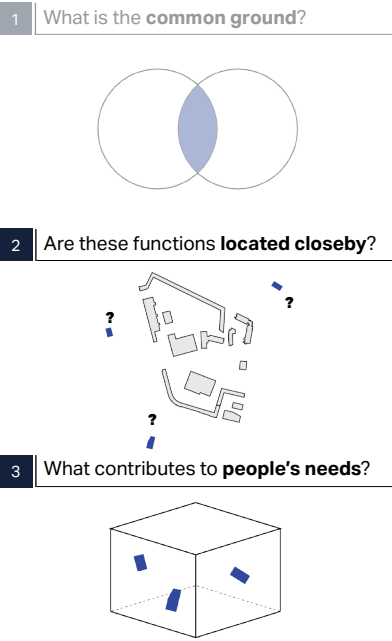
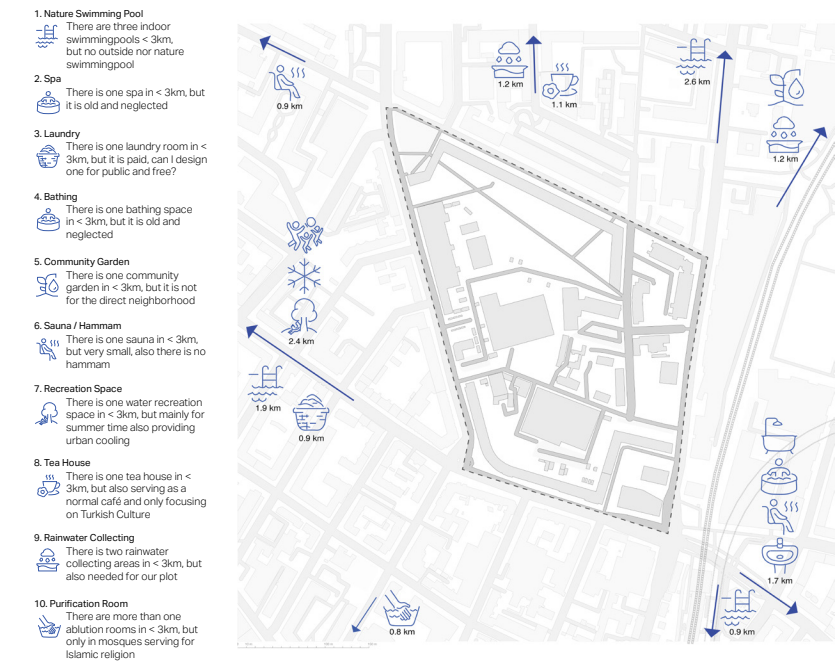
Bio Compact Filter:

Water flows vertically through the bio compact filter from top to bottom and is biologically cleaned along the way. The result is crystal-clear water. To optimise the cleaning performance of the microorganisms, water flows through the biofilter permanently.

Final Design P4

Final Design

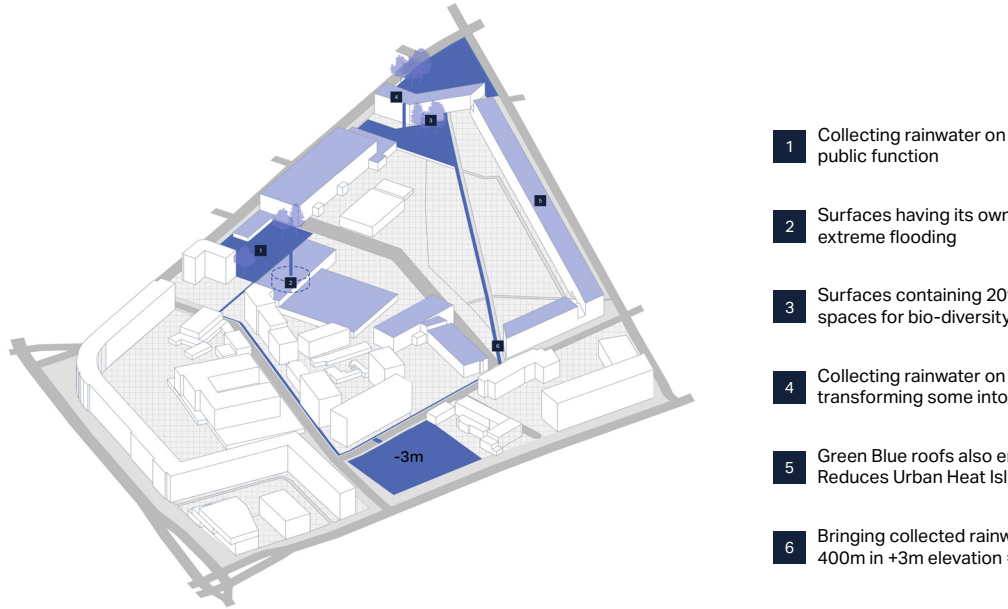
Design Brief & Location



The project will be located at this plot, because it is lower in elevation, which allows to collect rainwater at higher elevated surfaces.

Furthermore, the site is already fragmentated, allowing my design to not be homogeneous and have is own unique appearance.

Lastly, is next to the mainstreet, which fits the landmark character and creates a unique identity for the district.



- 1

Collecting rainwater on project surfaces with a public function
- 2

Surfaces having its own watertank in cases of extreme flooding
- 3

Surfaces containing 20% of new green spaces for bio-diversity and wellbeing
- 4

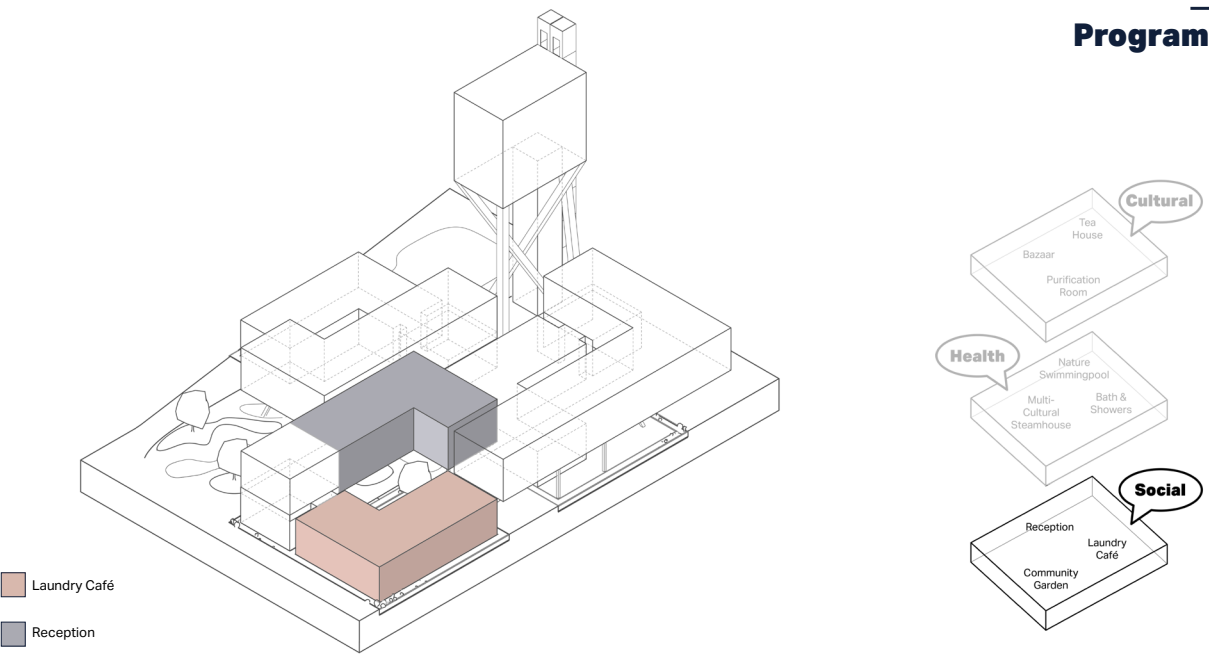
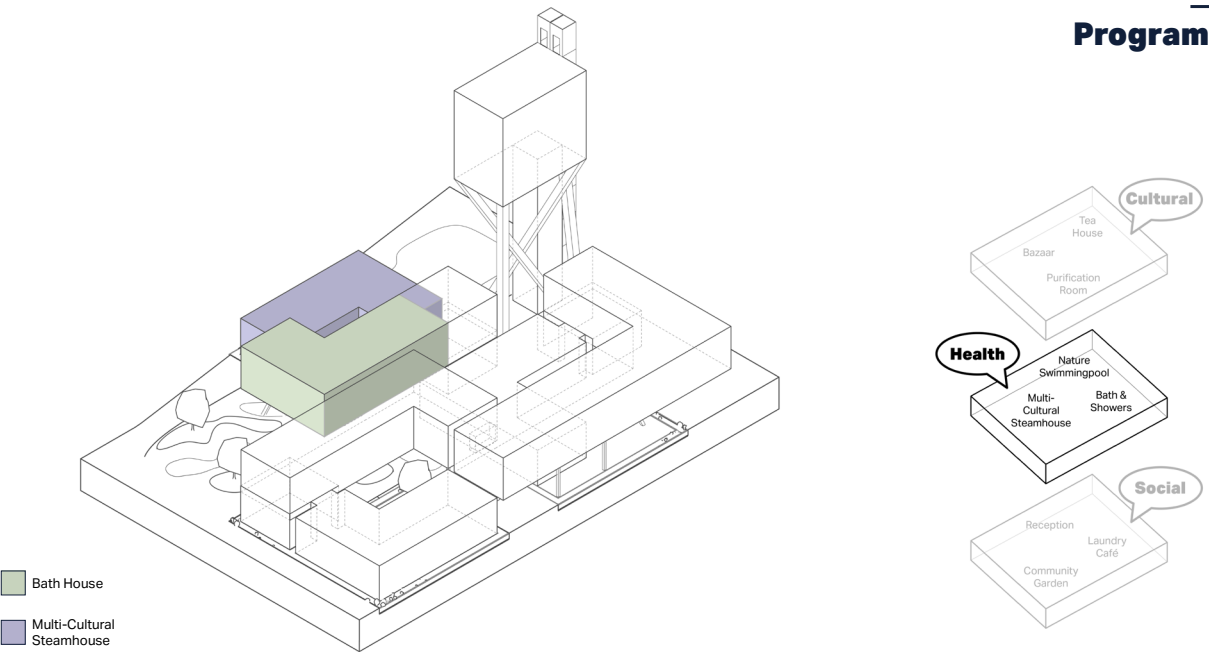
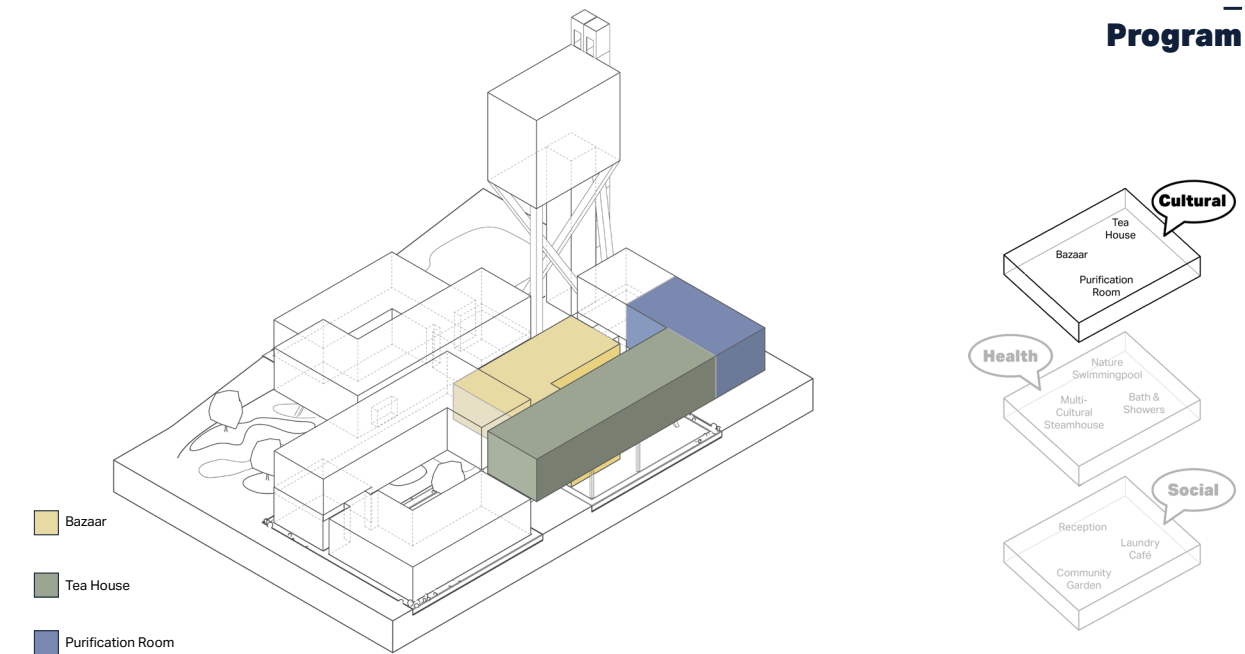
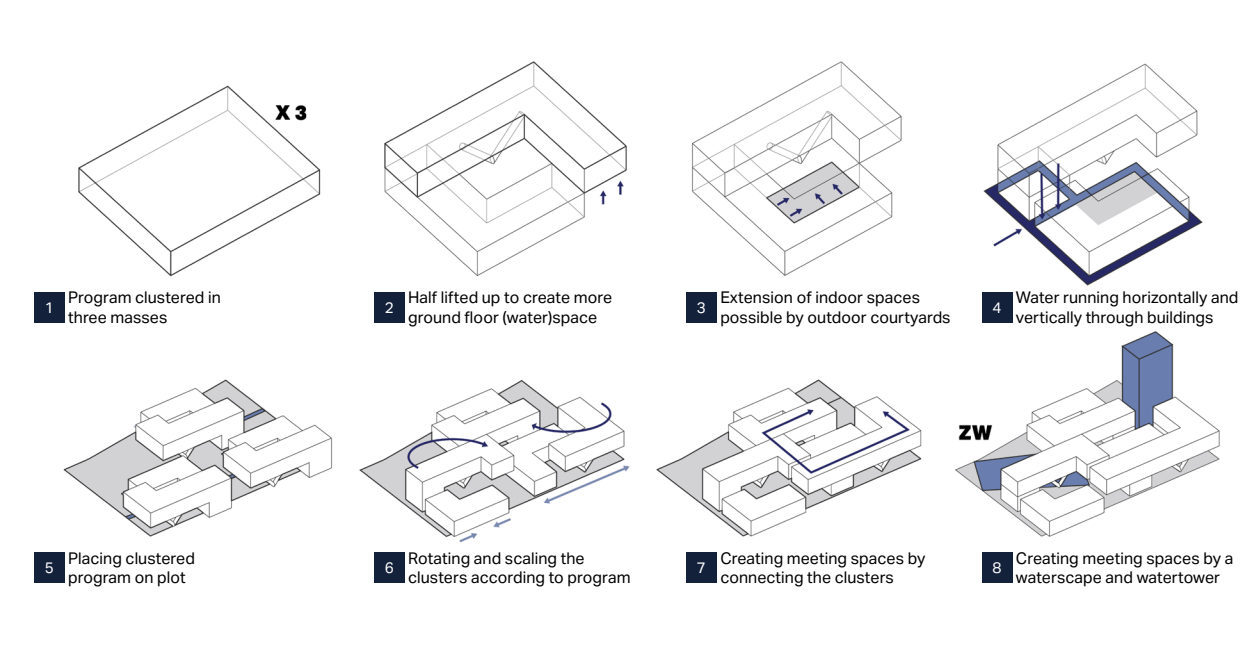
Collecting rainwater on roofs, transforming some into green blue roofs
- 5

Green Blue roofs also enhances insulation & Reduces Urban Heat Island effect
- 6

Bringing collected rainwater to the plot, bridging 400m in +3m elevation = 0.5 cm/m

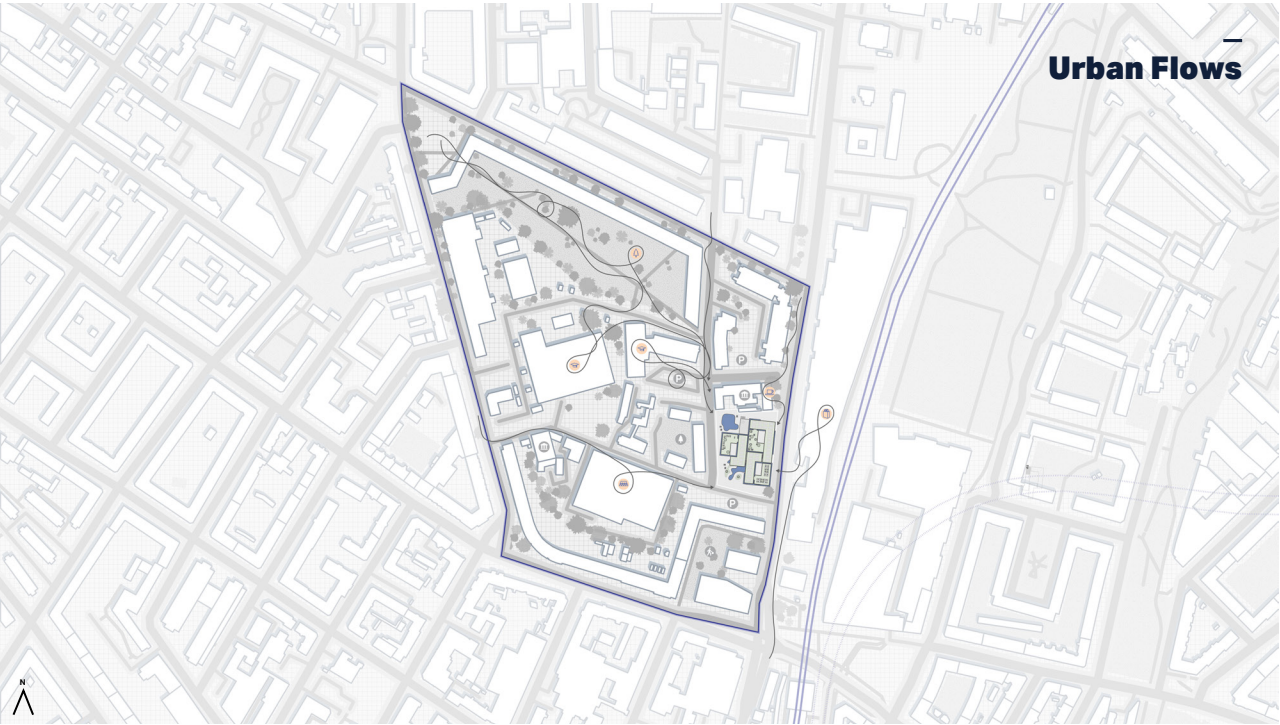
Final Design

Design Principles & Program



Final Design

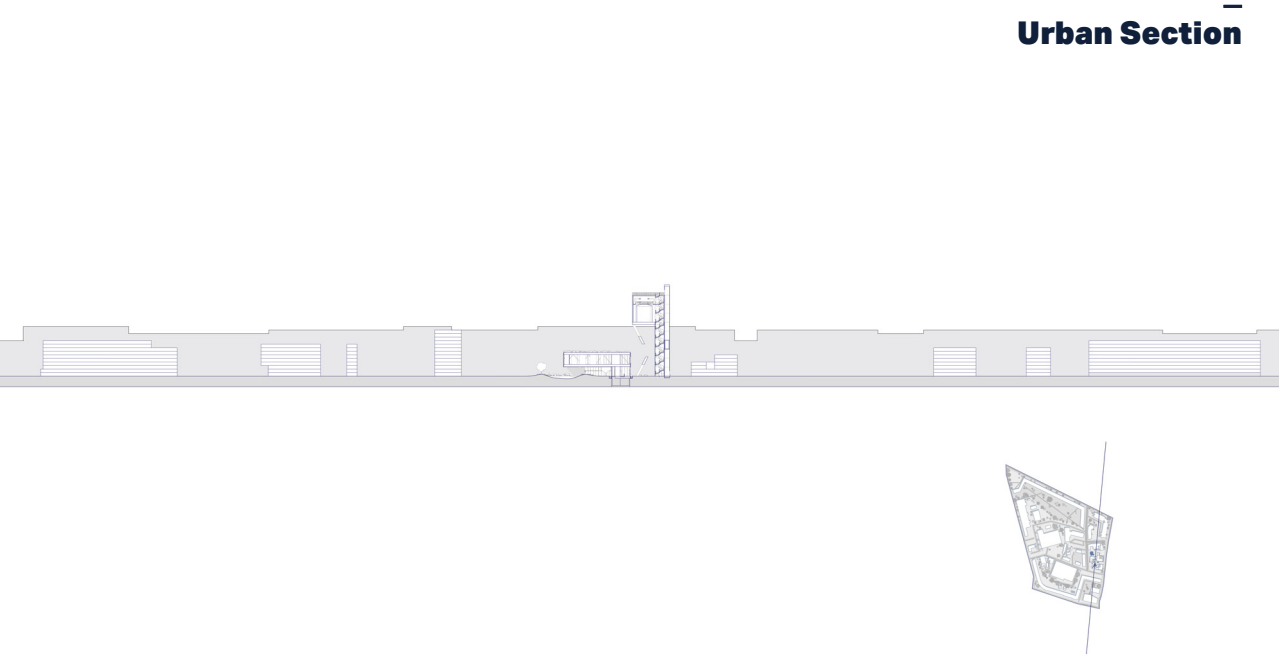
Urban Context & Accessibility



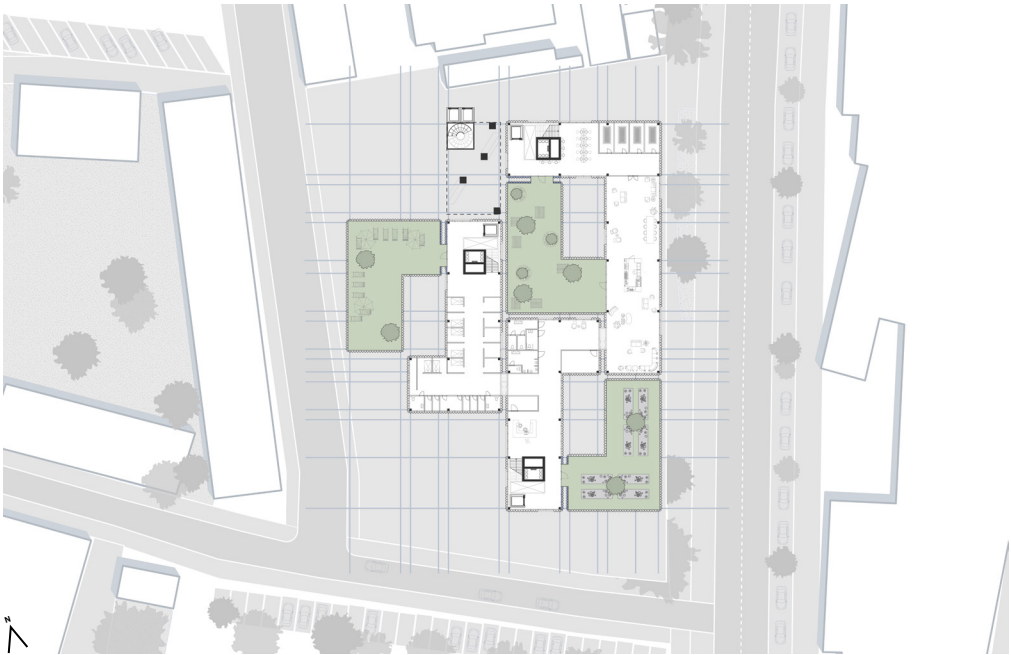
Urban Flows



Ground Floor



Urban Section



First Floor

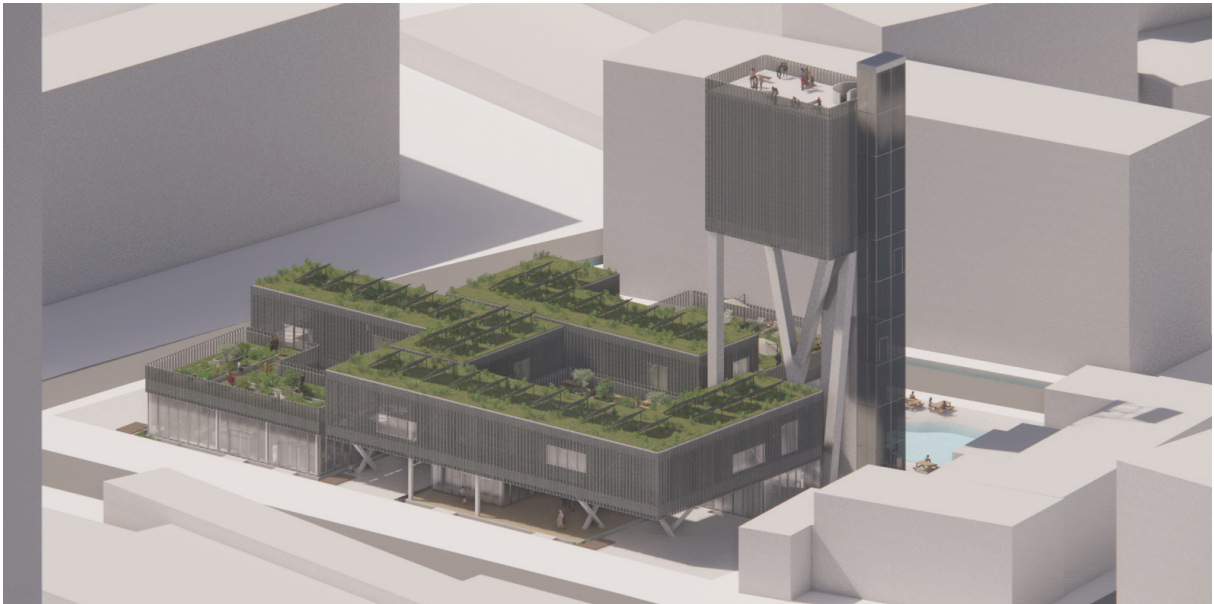
Final Design

Interior & Exterior

The Courtyard



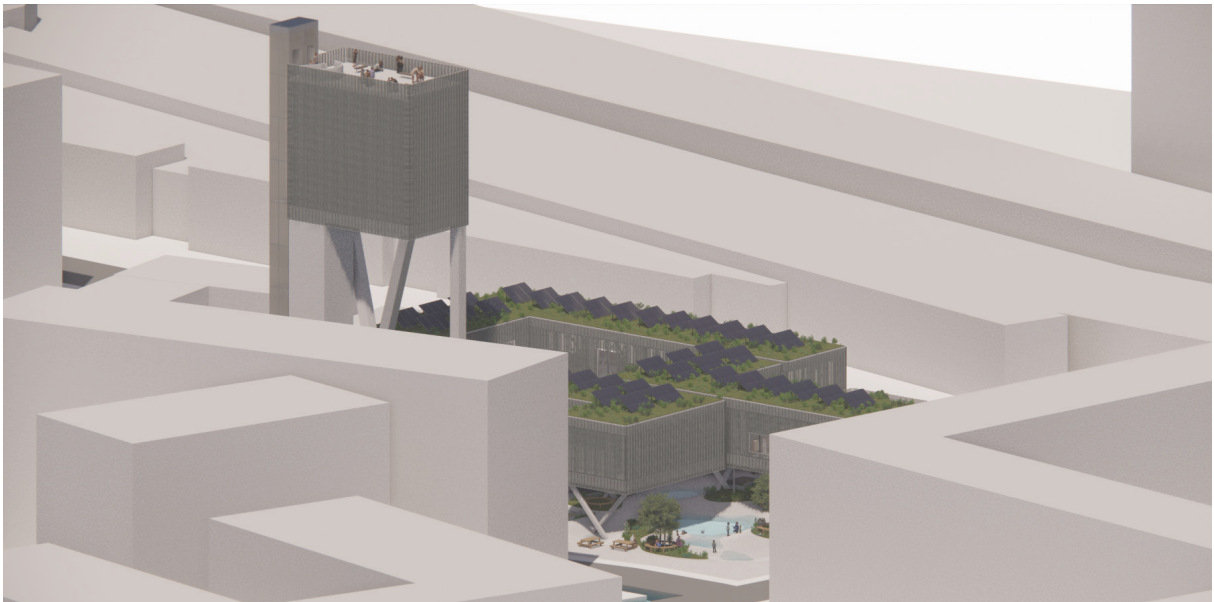
Main Street



The Laundry Café

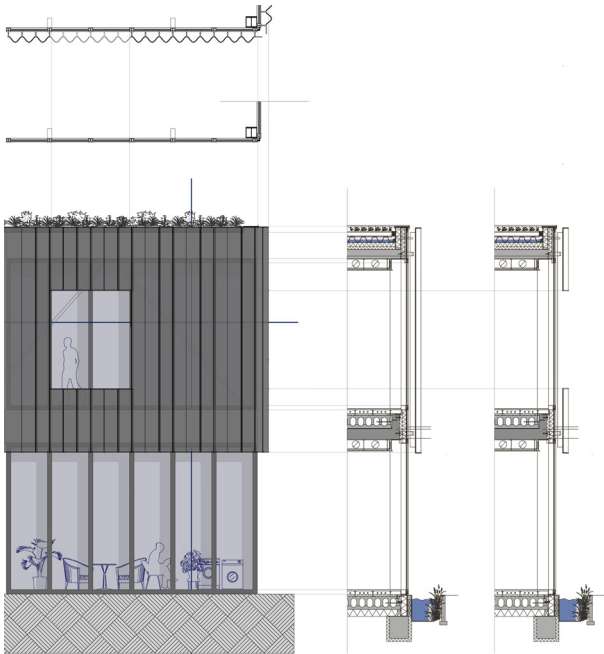


Green-Blue Roofs

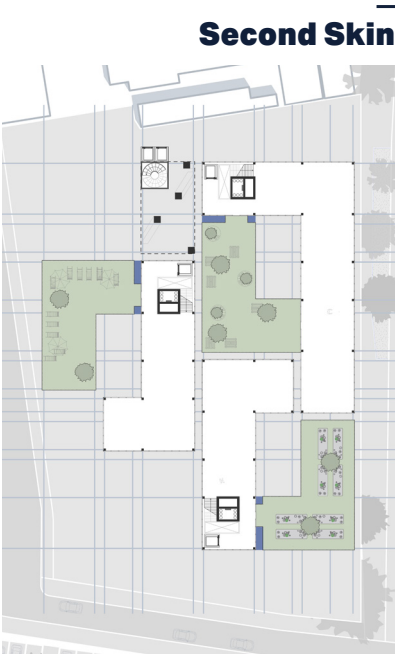


Final Design

Systems & Hybridity

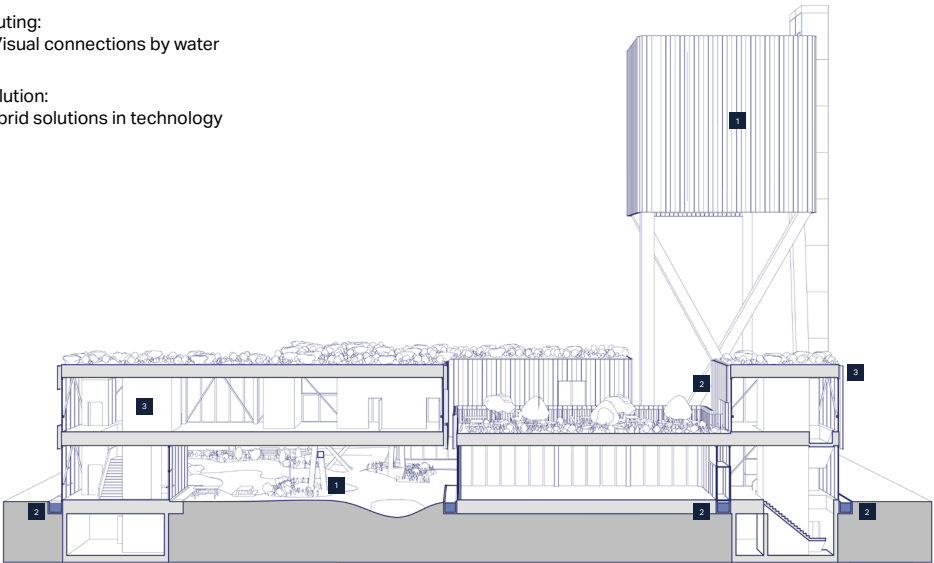


Second Skin

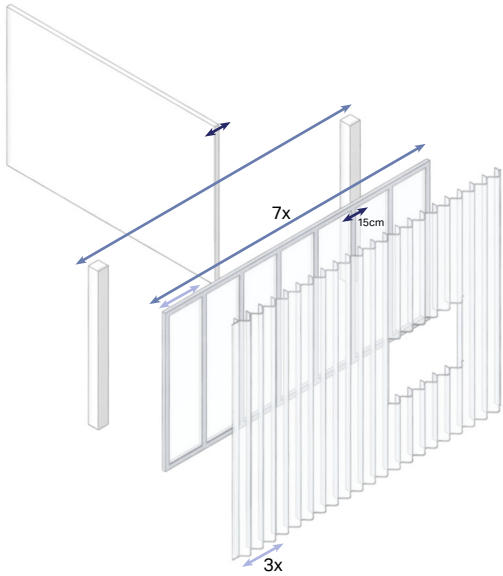


- 1 Water as function:
Merging functions by water
- 2 Water as routing:
Physical & Visual connections by water
- 3 Water as solution:
Creating hybrid solutions in technology

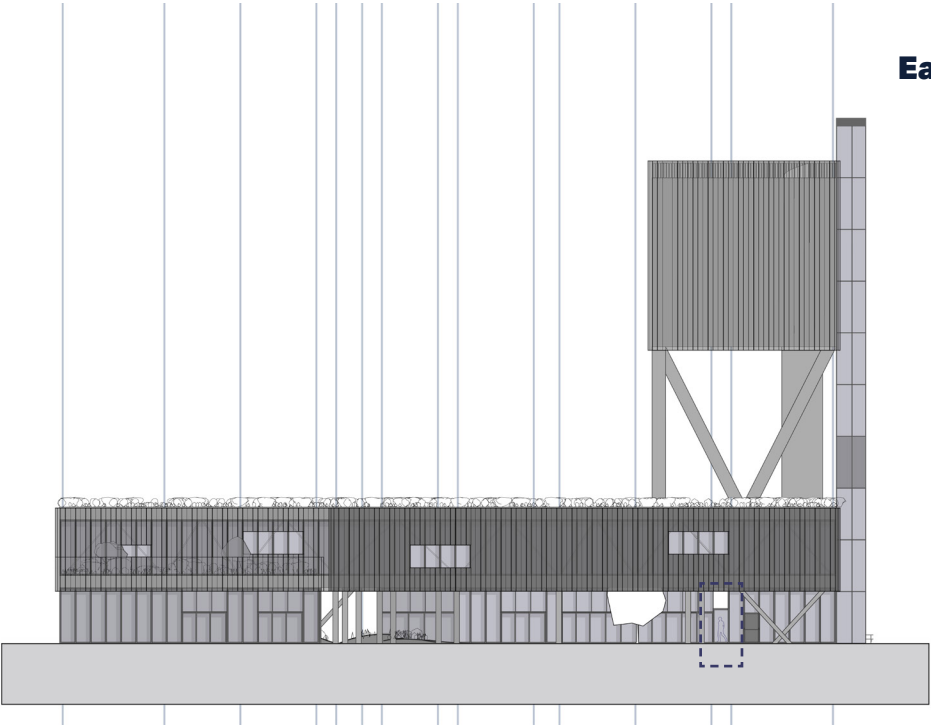
Hybridity



Facade System



East Facade

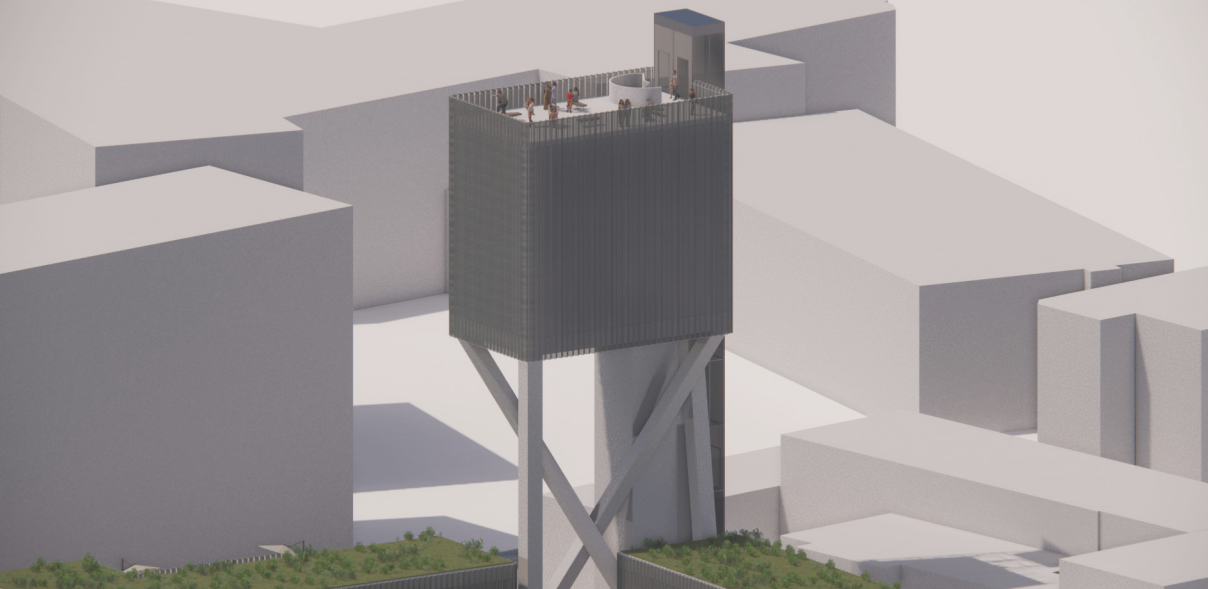


Final Design

Hybridity

1 Water as function:
Merging functions by water

Viewing & Storing



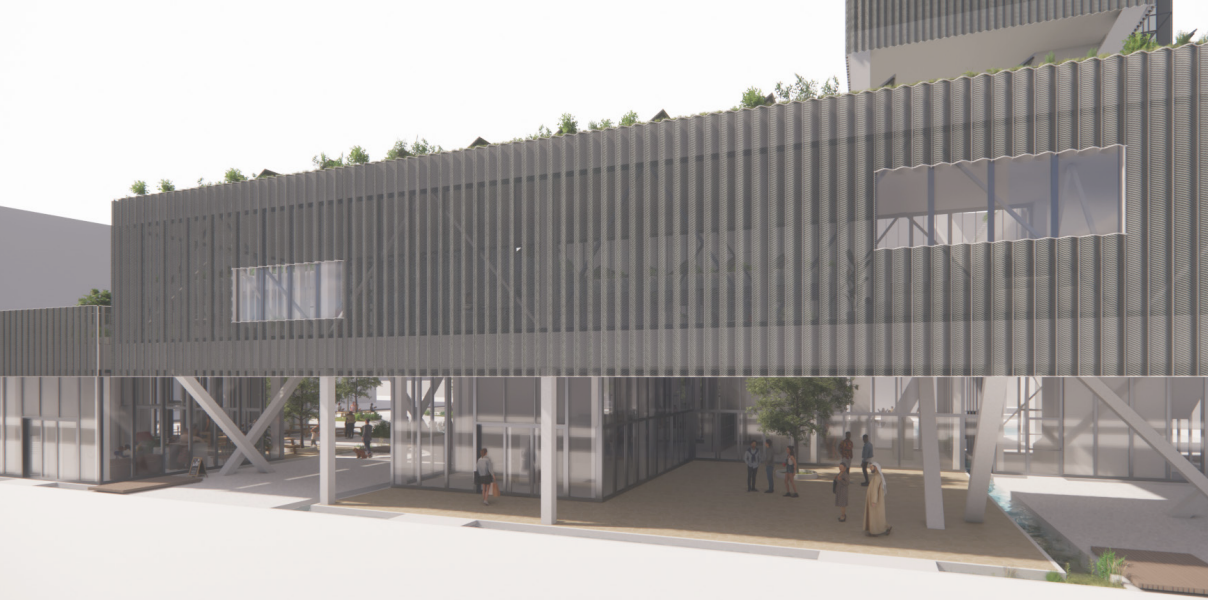
2 Water as routing:
Visual connections by water

Visual Connection



2 Water as routing:
Physical & Visual connections by water

Physical Connection



1 Water as function:
Merging functions by water

Recreation & Retention



Final Design

Water Journey

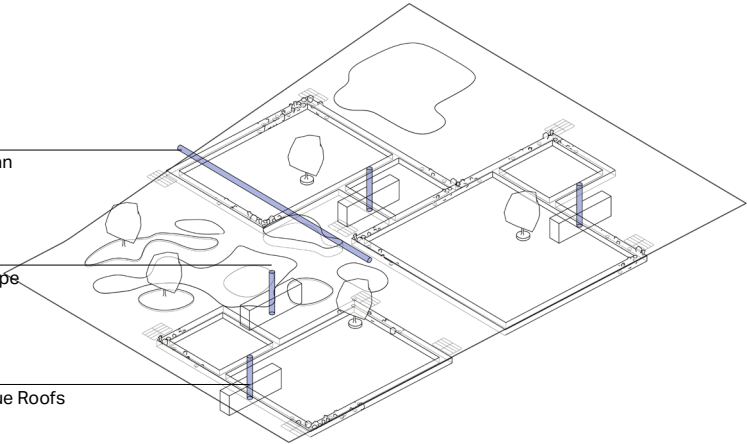
3 Water as solution:
Creating hybrid solutions in technology

Water Journey

1 Rainwater of Masterplan

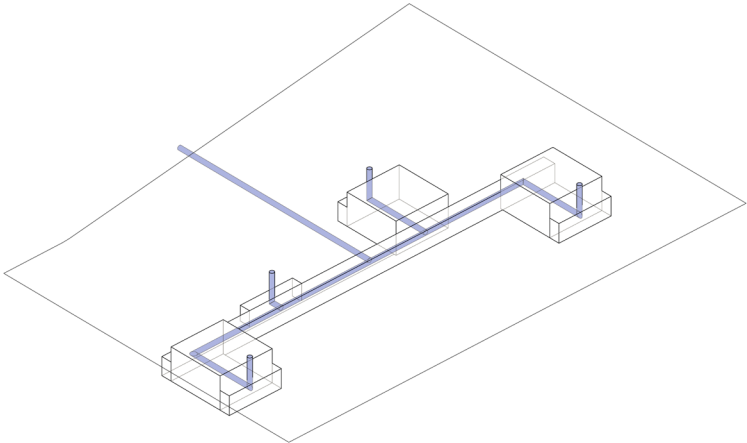
2 Rainwater of Waterscape

3 Rainwater of Green-Blue Roofs



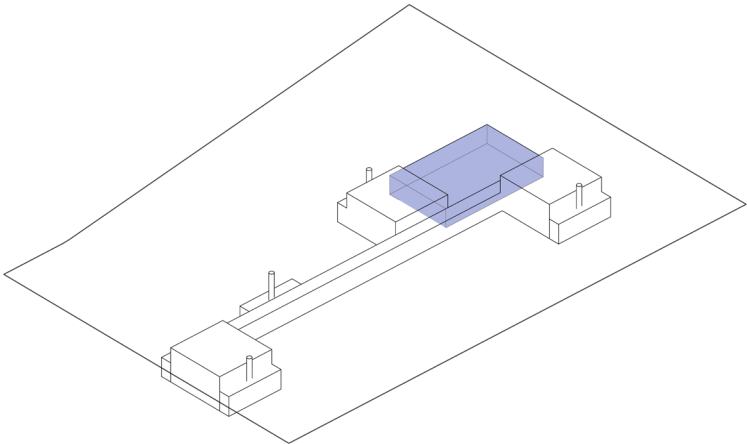
3 Water as solution:
Creating hybrid solutions in technology

Water Journey



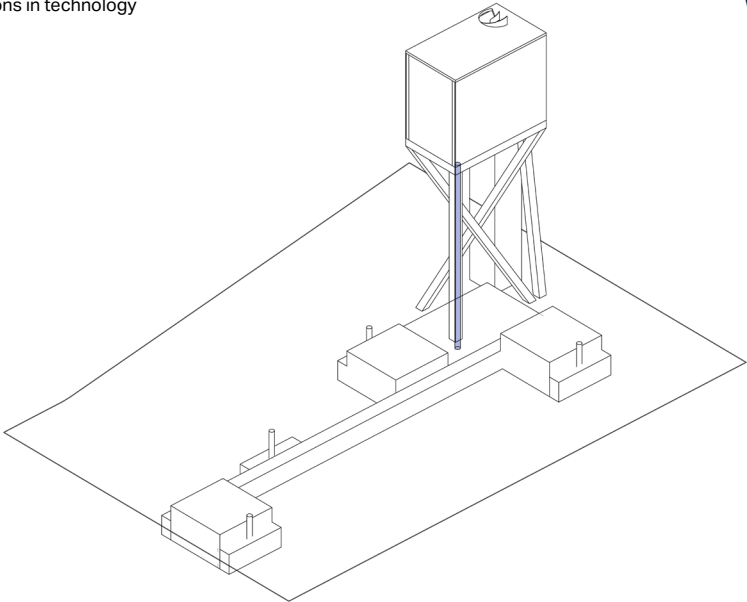
3 Water as solution:
Creating hybrid solutions in technology

Water Journey



3 Water as solution:
Creating hybrid solutions in technology

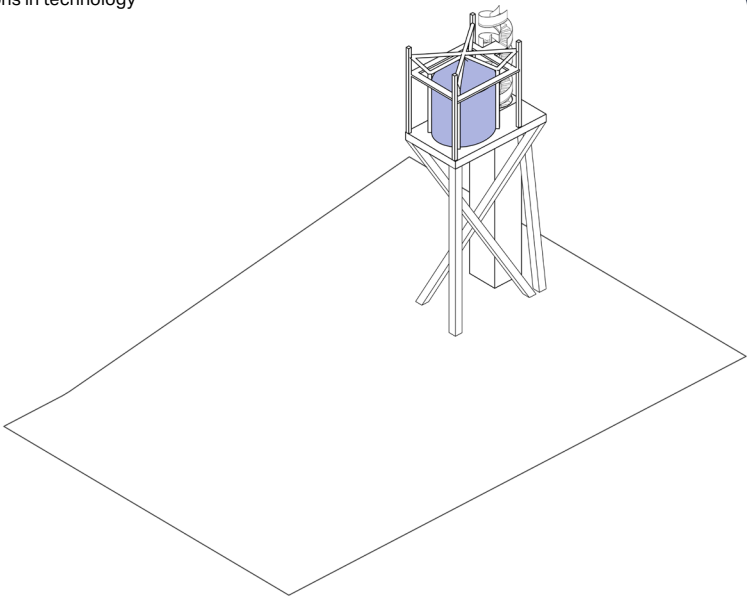
Water Journey



Final Design

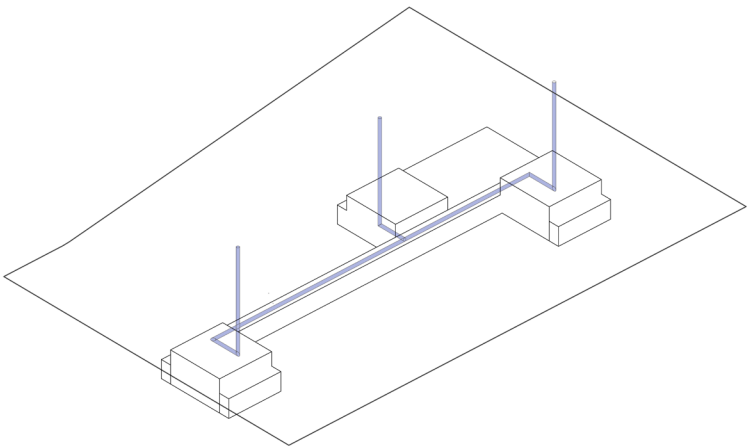
Water Journey

3 Water as solution:
Creating hybrid solutions in technology



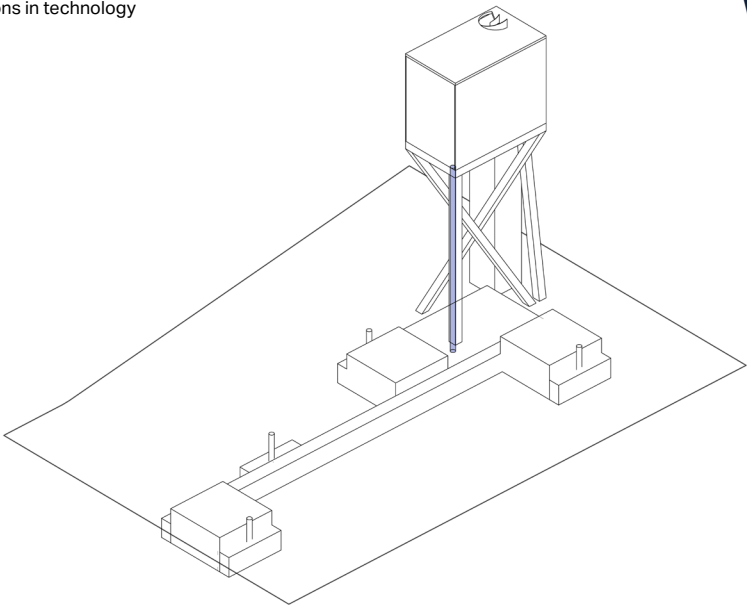
Water Journey

3 Water as solution:
Creating hybrid solutions in technology



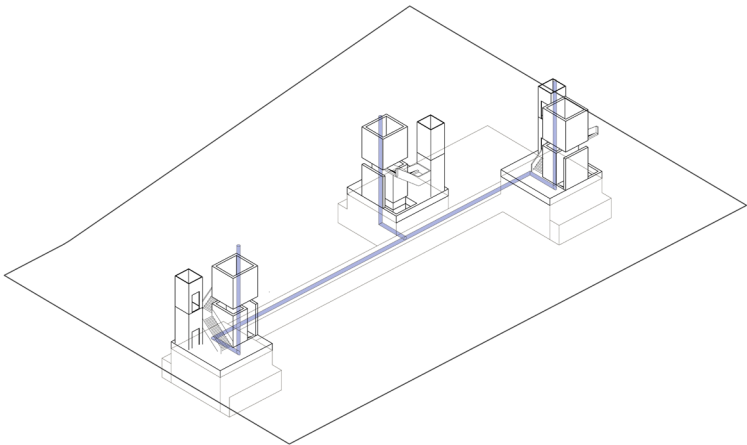
Water Journey

3 Water as solution:
Creating hybrid solutions in technology



Water Journey

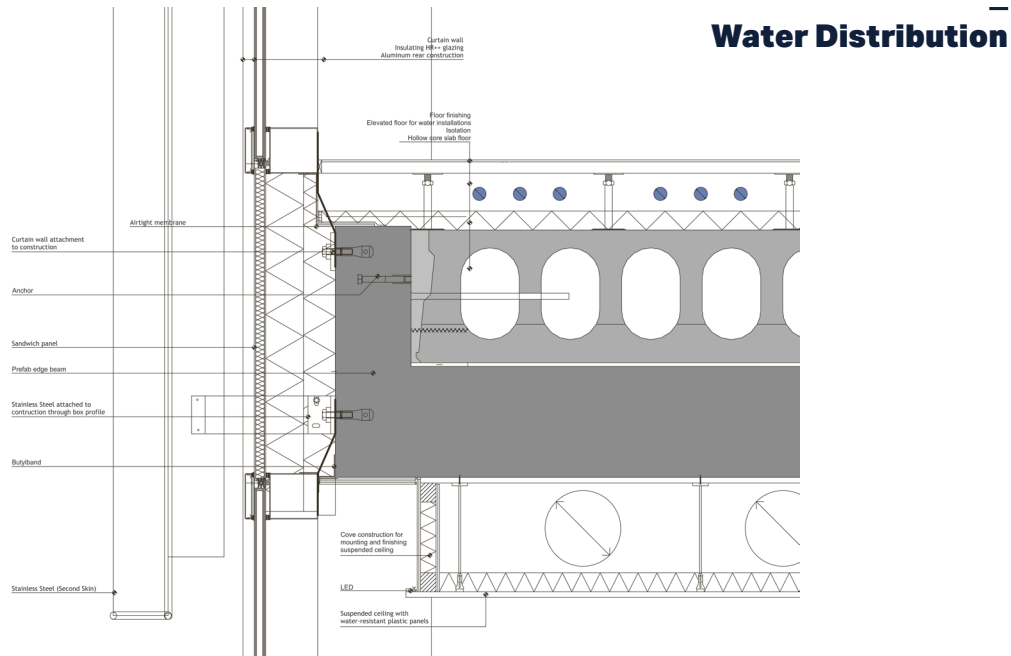
3 Water as solution:
Creating hybrid solutions in technology



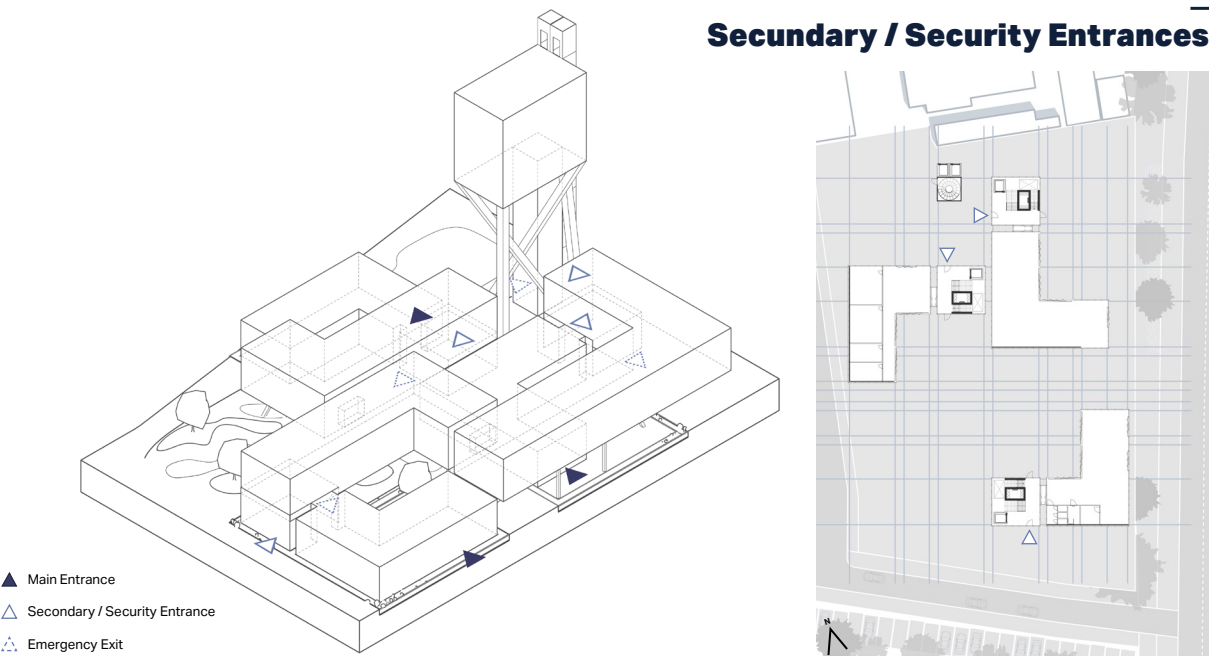
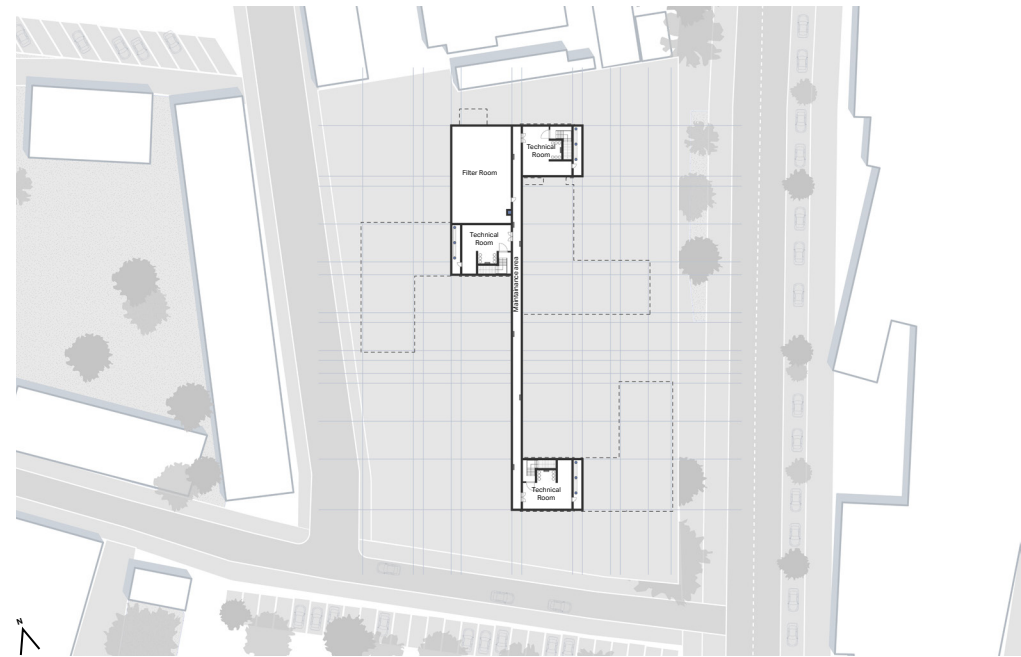
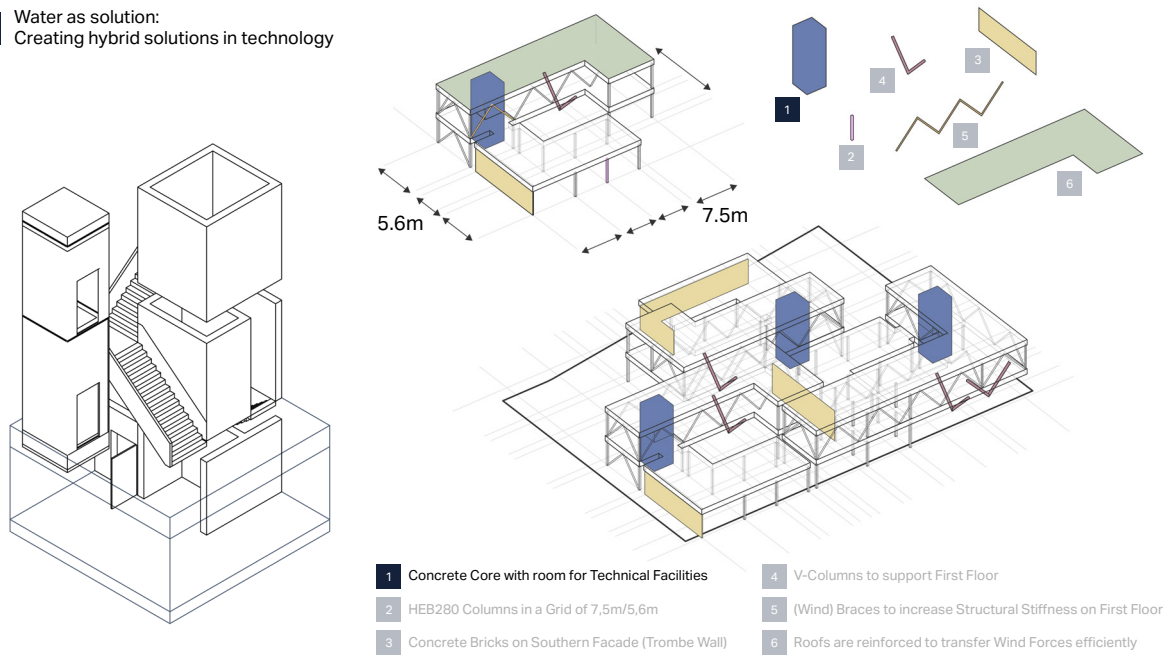
Water Journey

Final Design

Technical Solutions



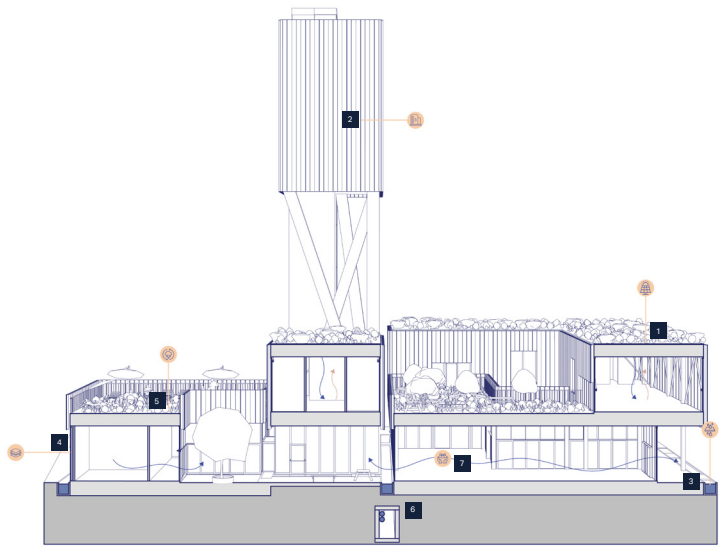
3 Water as solution:
Creating hybrid solutions in technology



Final Design

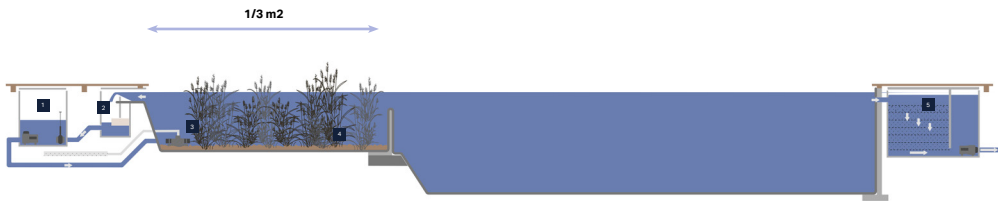
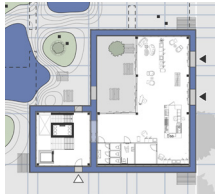
Sustainability

Sustainability

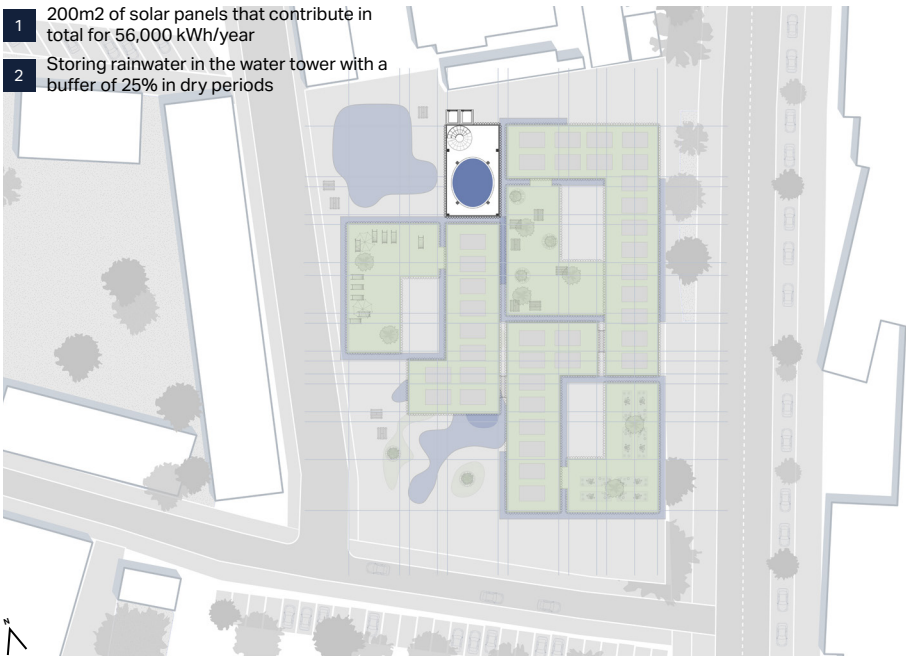


- 1 200m² of solar panels that contribute in total for 56,000 kWh/year
- 2 Storing rainwater in the water tower with a buffer of 25% in dry periods
- 3 Water is filtered naturally in water ponds by aquatic plants, microorganisms and soil
- 4 Trombe Wall absorbing solar heat through the glass and storing it in concrete bricks
- 5 A green-blue roof stores rainwater on the roof in order to slow down the process
- 6 Giving back the surplus of clean water to the local community
- 7 Addressing social sustainability by designing inclusive for the community

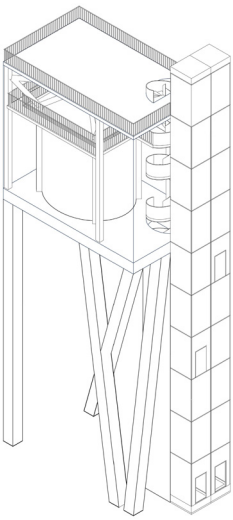
- 3 Water is filtered naturally in water ponds by aquatic plants, microorganisms and soil



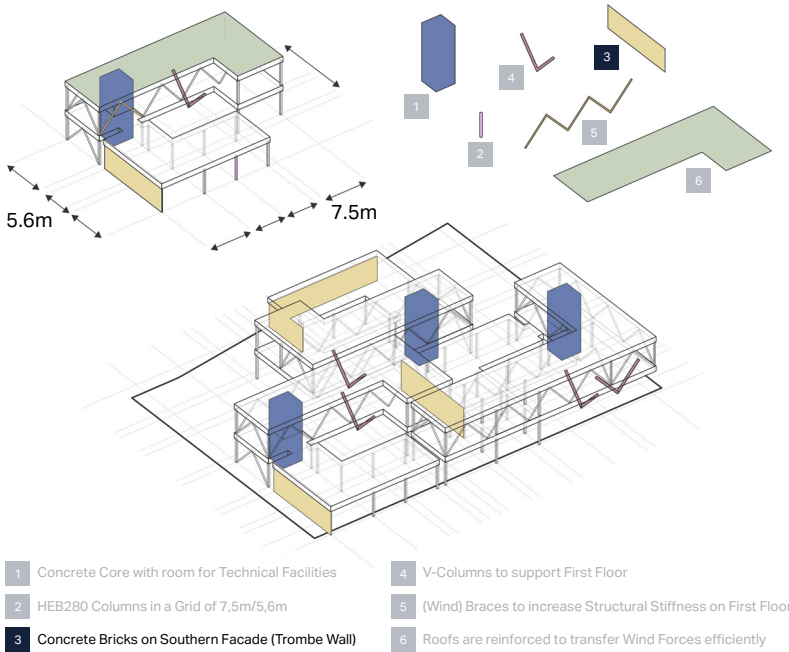
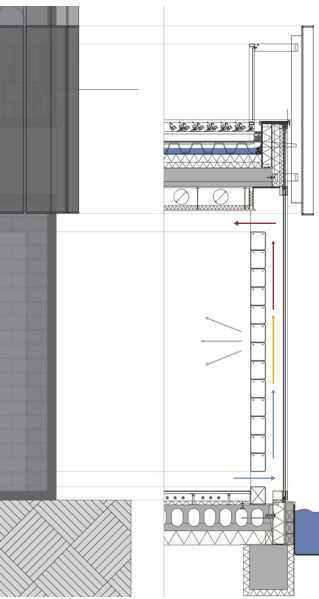
- 1 200m² of solar panels that contribute in total for 56,000 kWh/year
- 2 Storing rainwater in the water tower with a buffer of 25% in dry periods



Fourth Floor

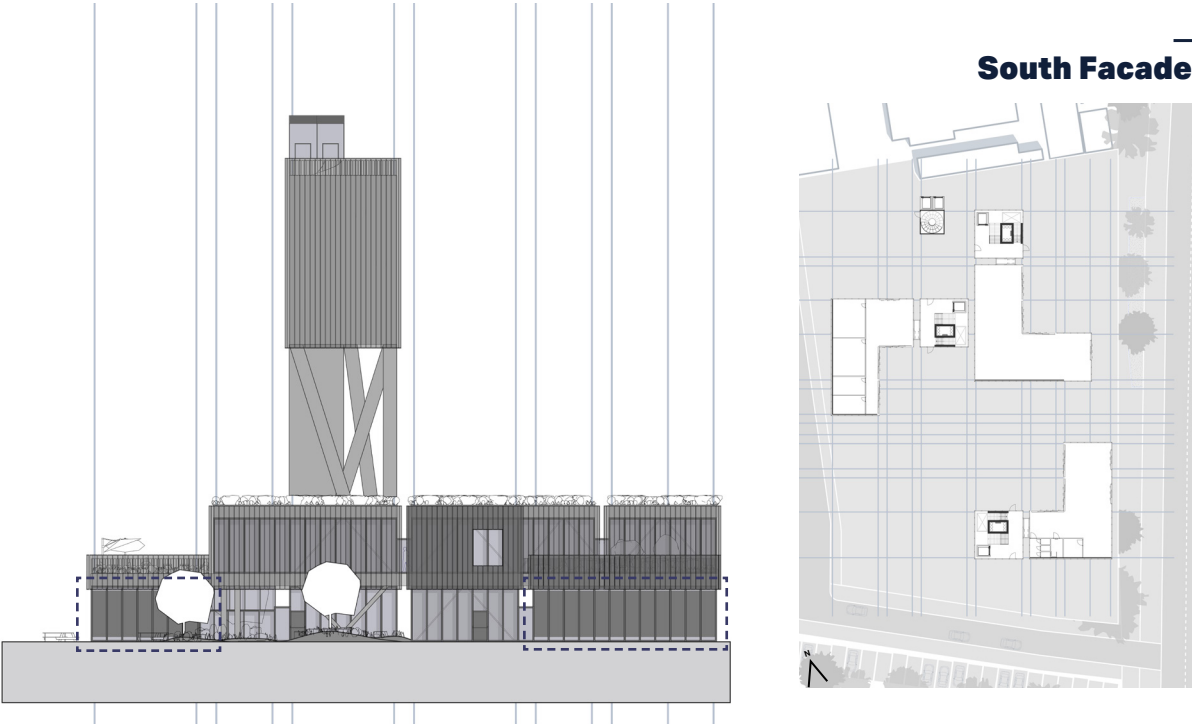


- 4 Trombe Wall absorbing solar heat through the glass and storing it in concrete bricks

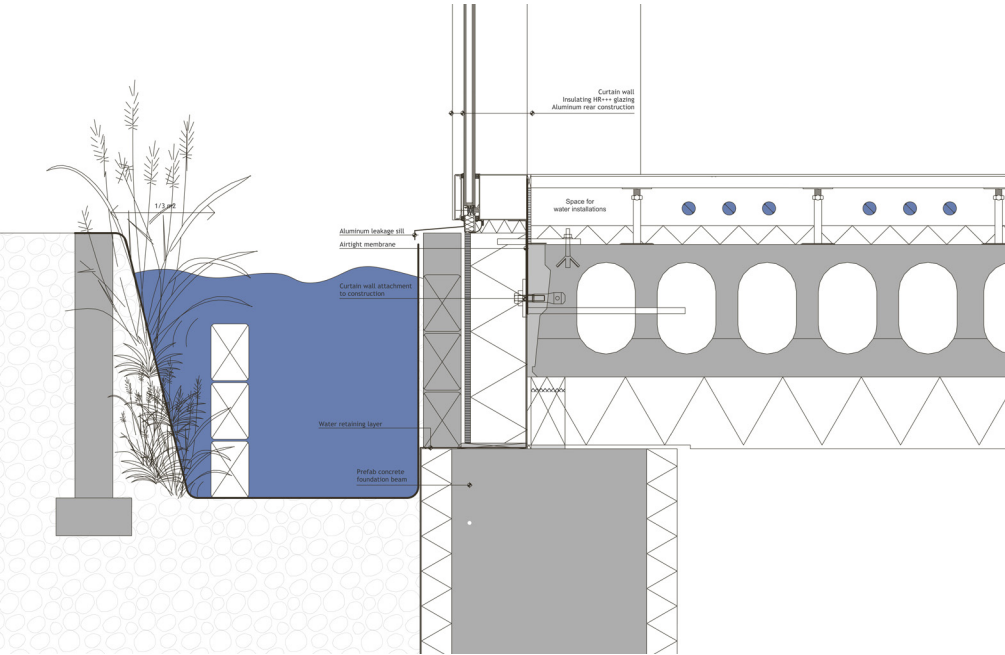
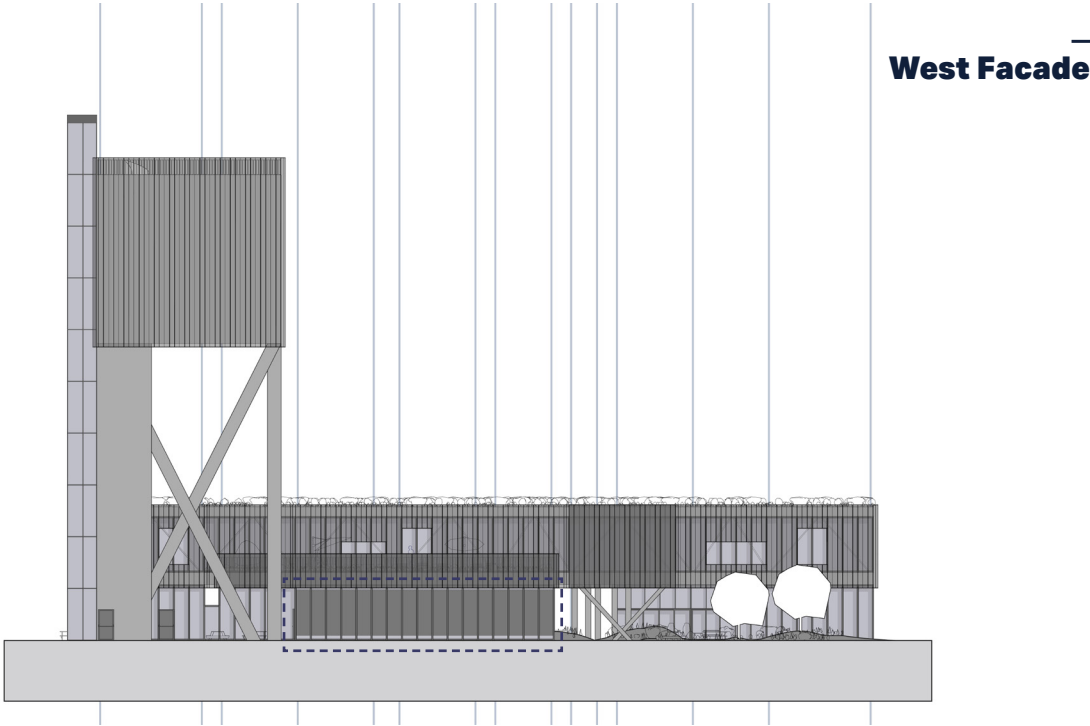
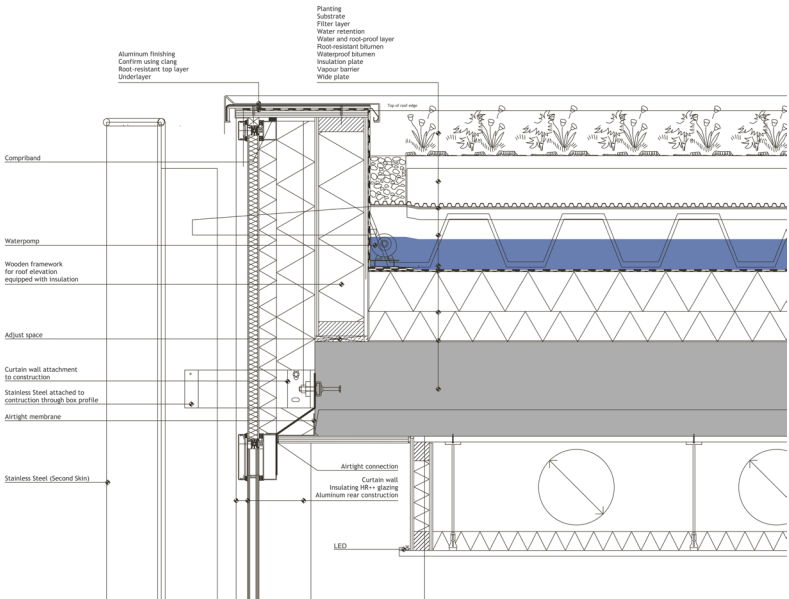


Final Design

Facades & Details

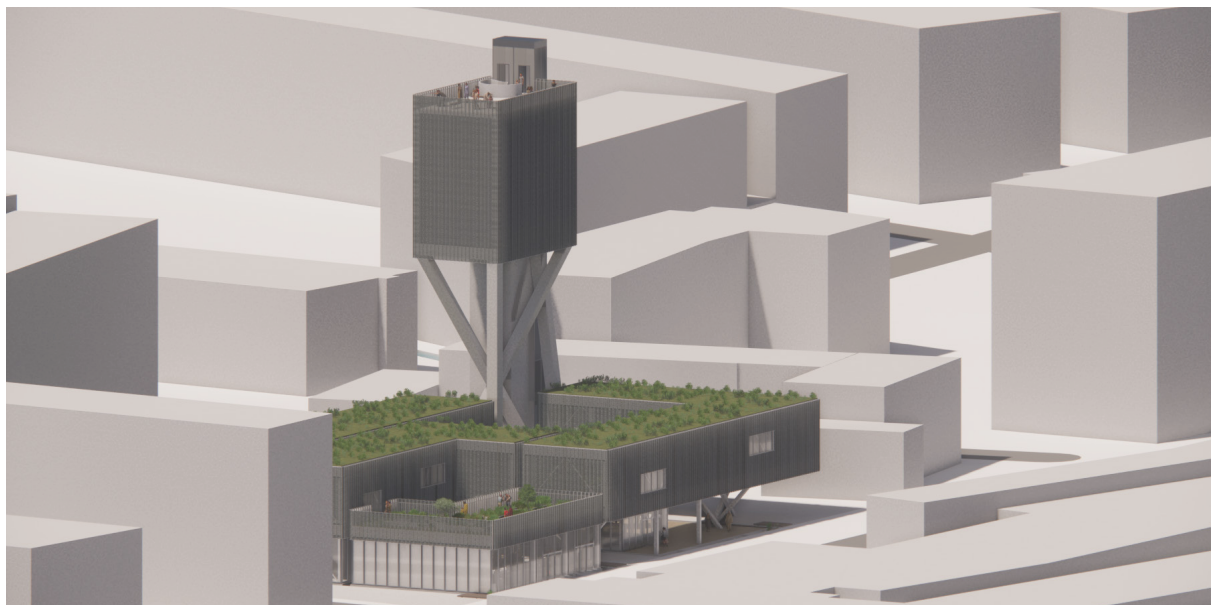
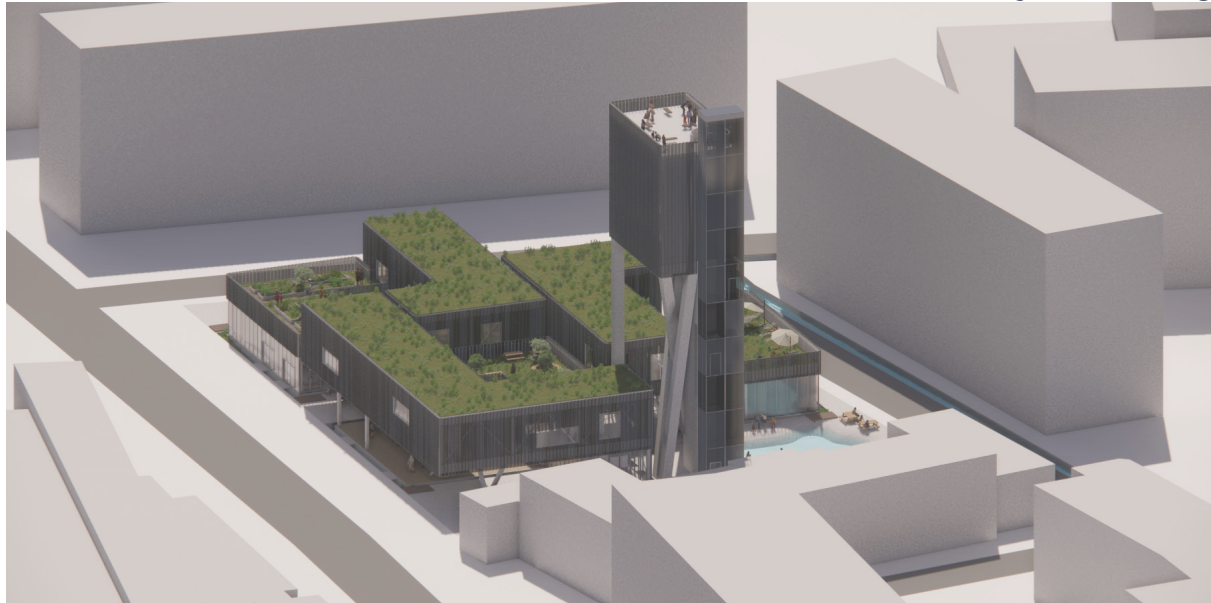


5 A green-blue roof stores rainwater on the roof in order to slow down the process



Final Design

The Water Hub



Final Design P5

Final Design

Design Brief & Location



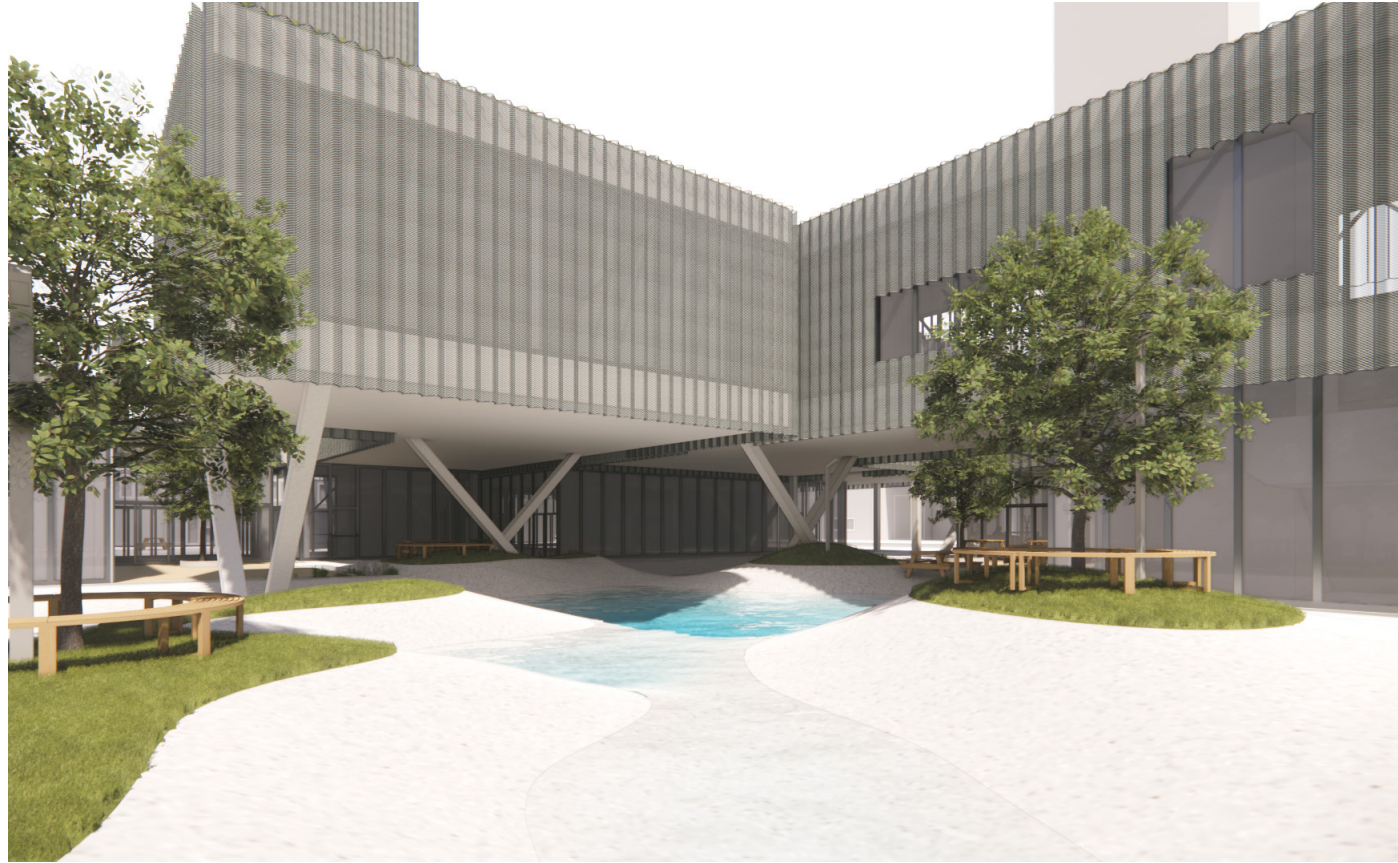
Final Design

Design Brief & Location



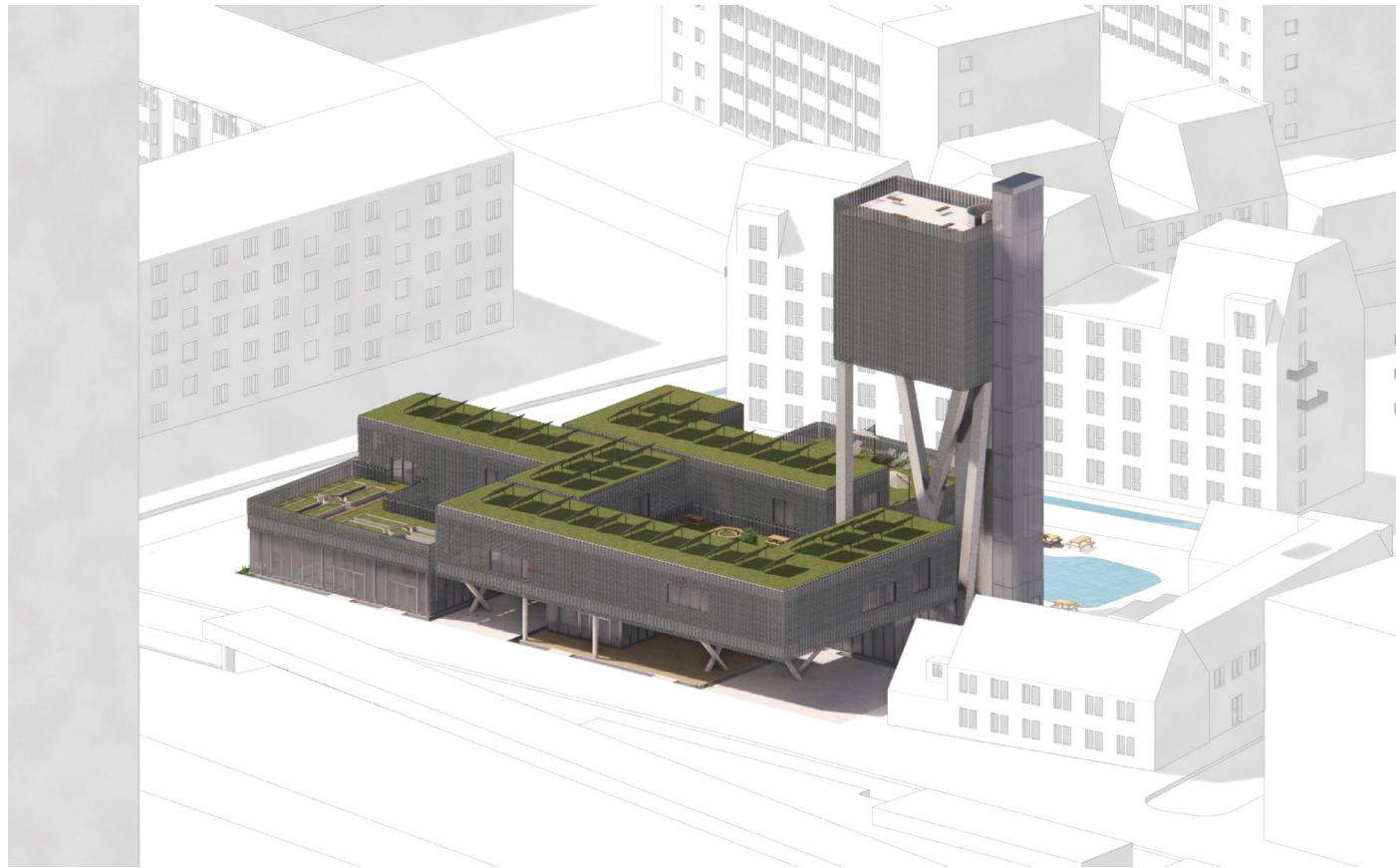
Final Design

Design Brief & Location



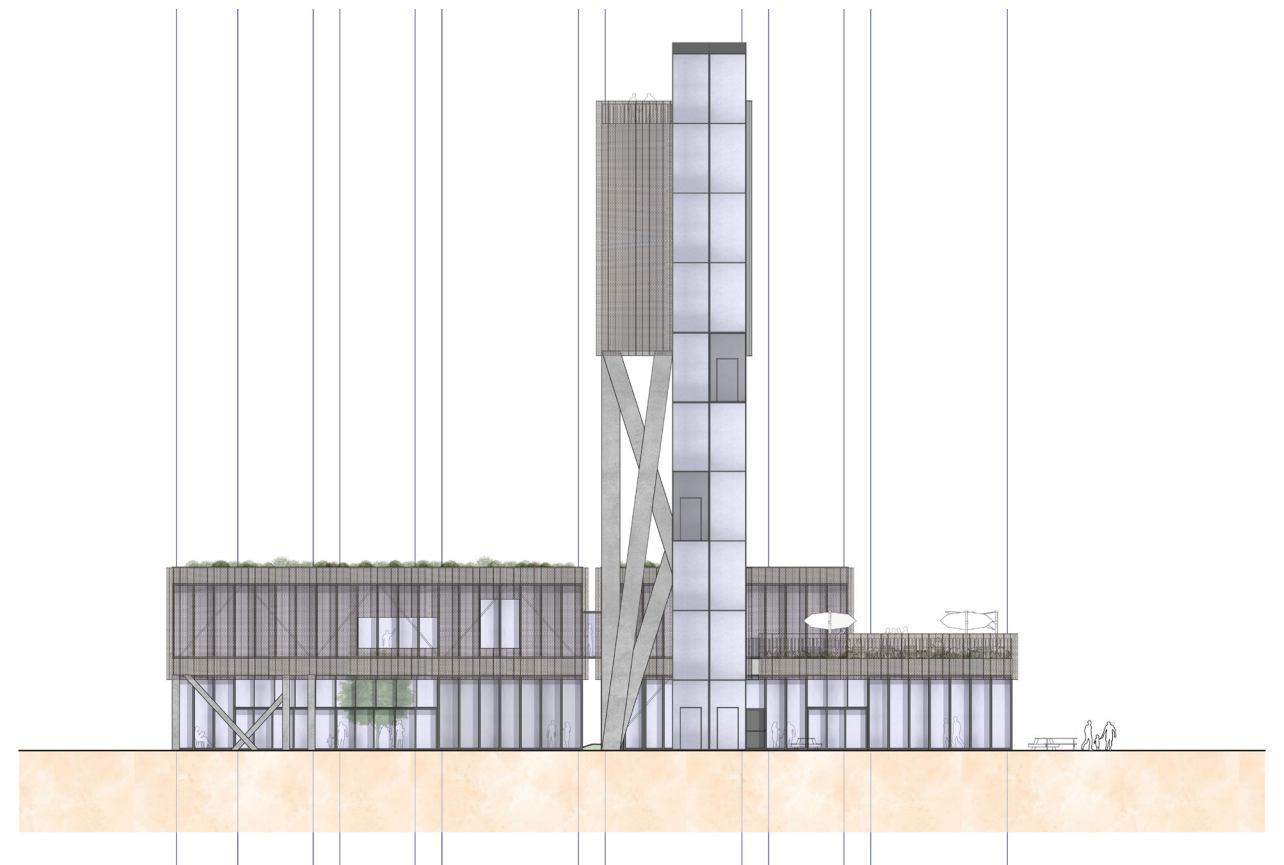
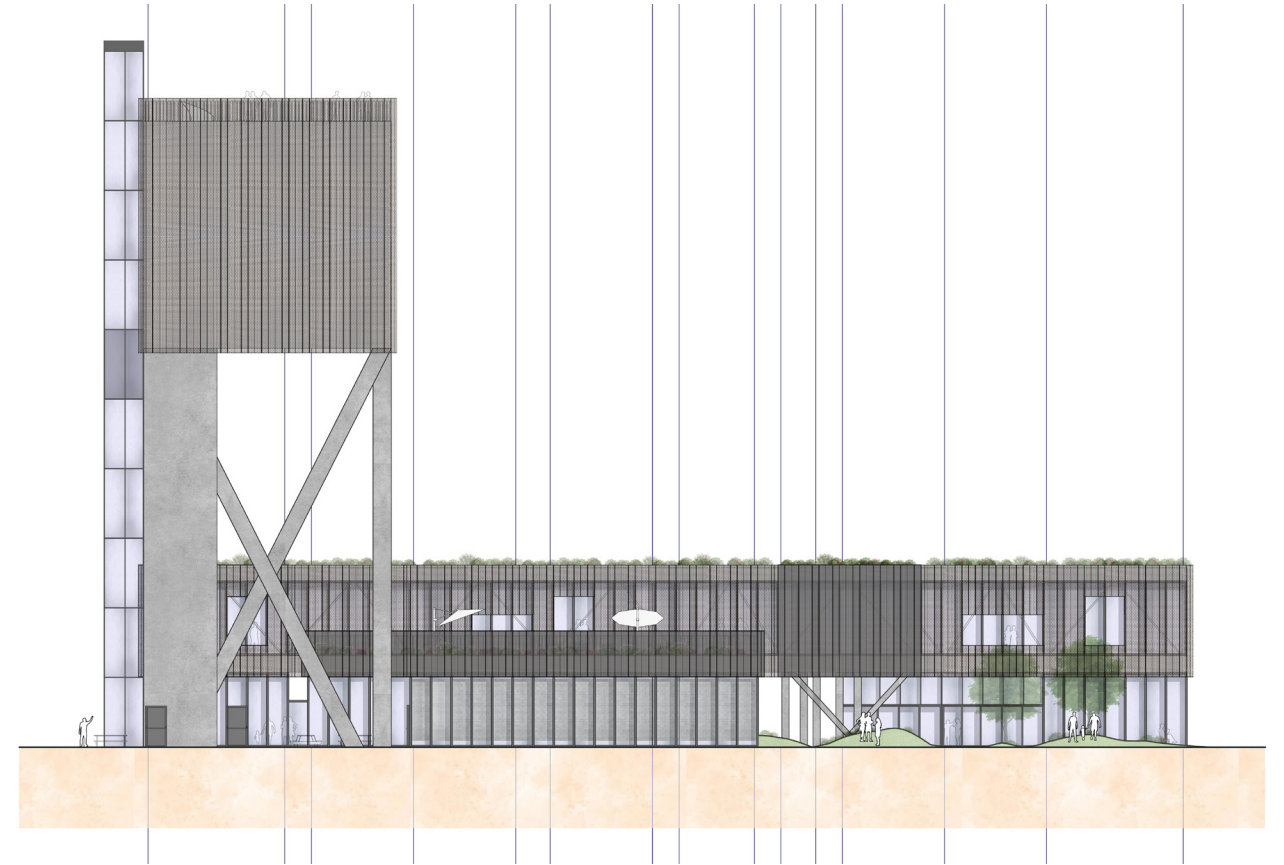
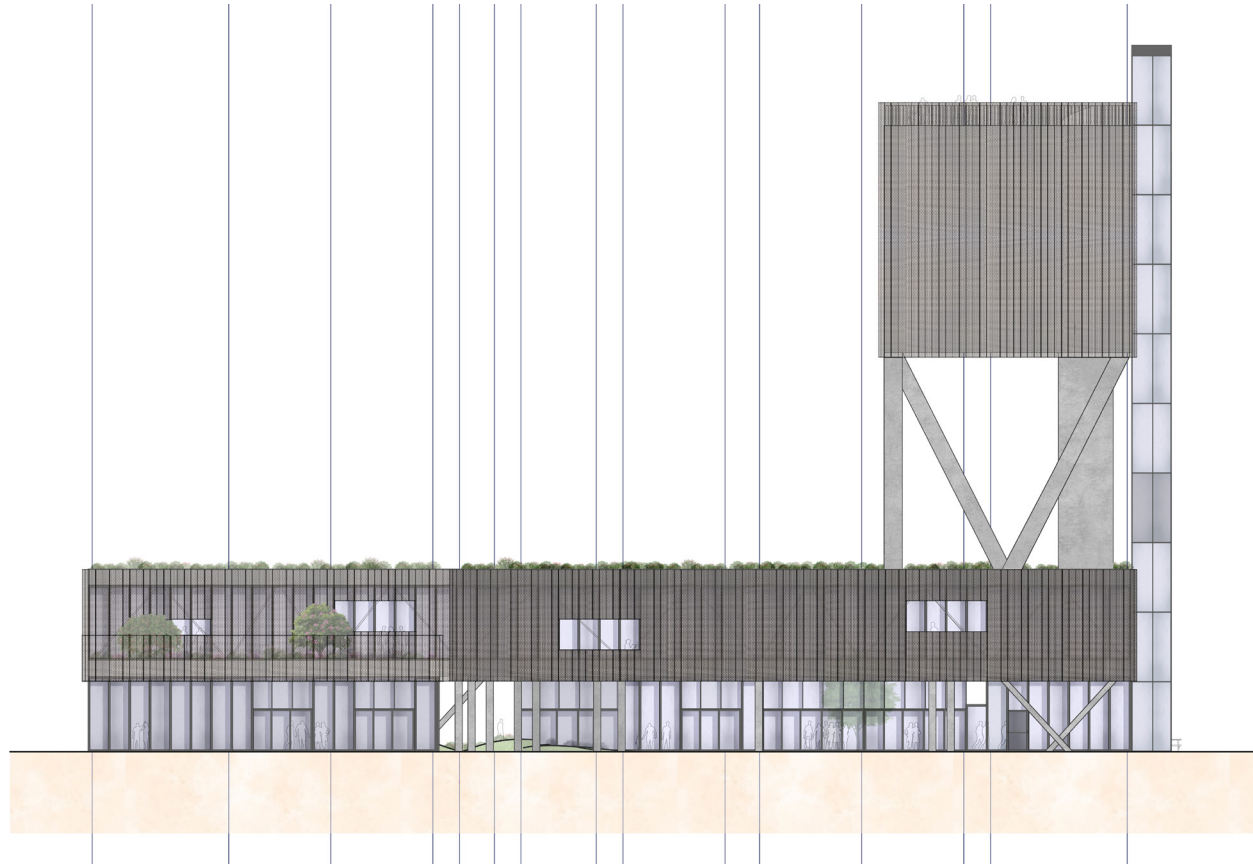
Final Design

Design Brief & Location



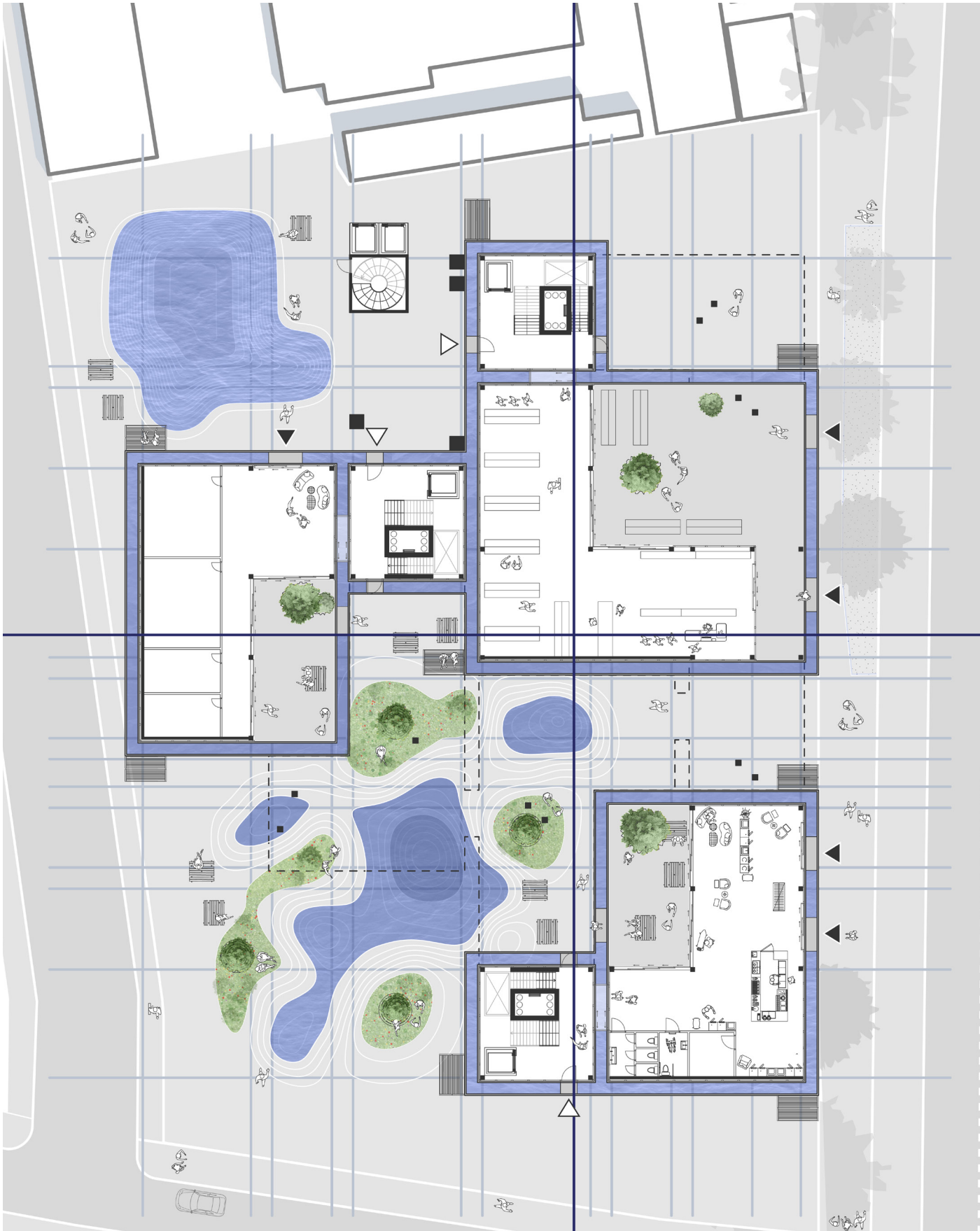
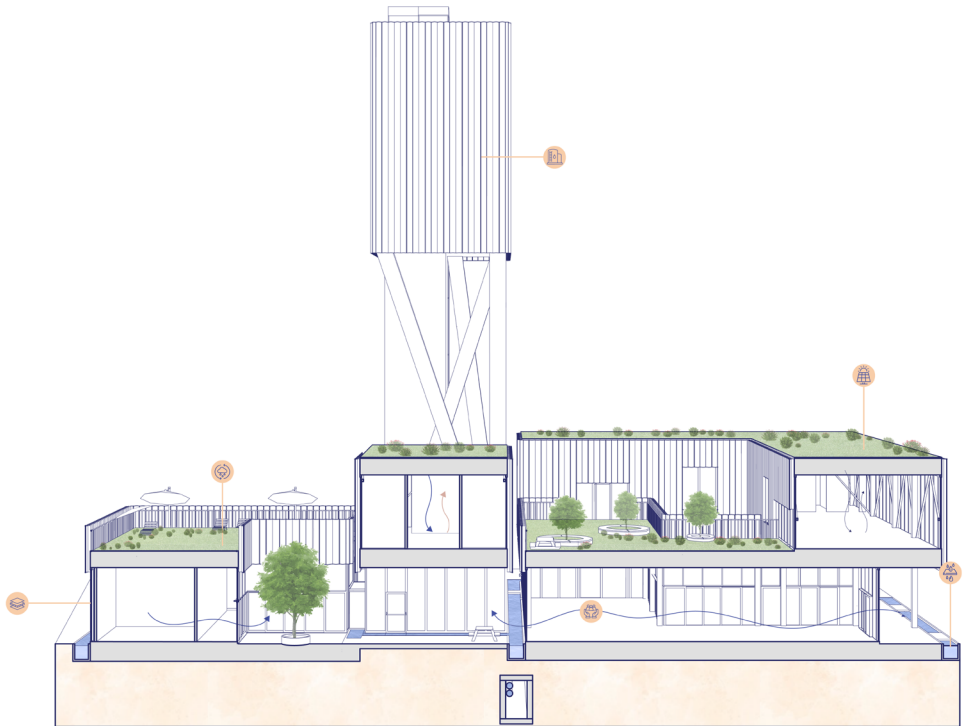
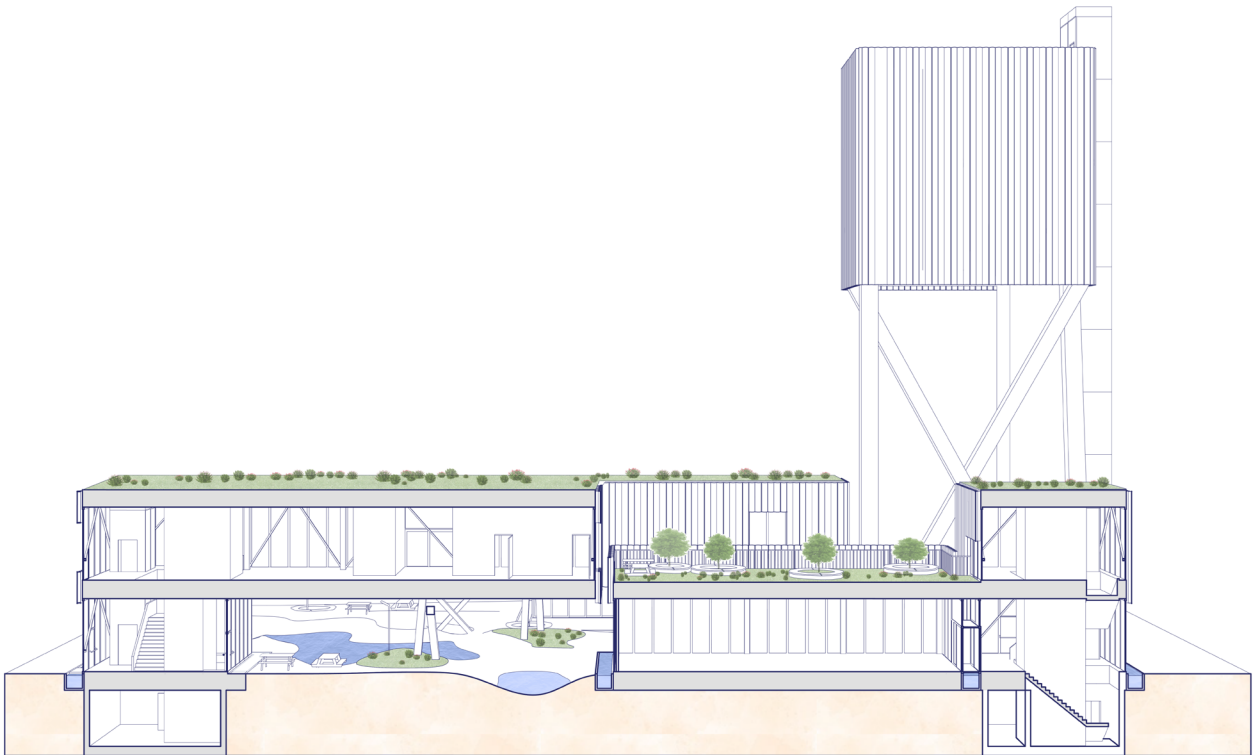
Final Design

Design Brief & Location



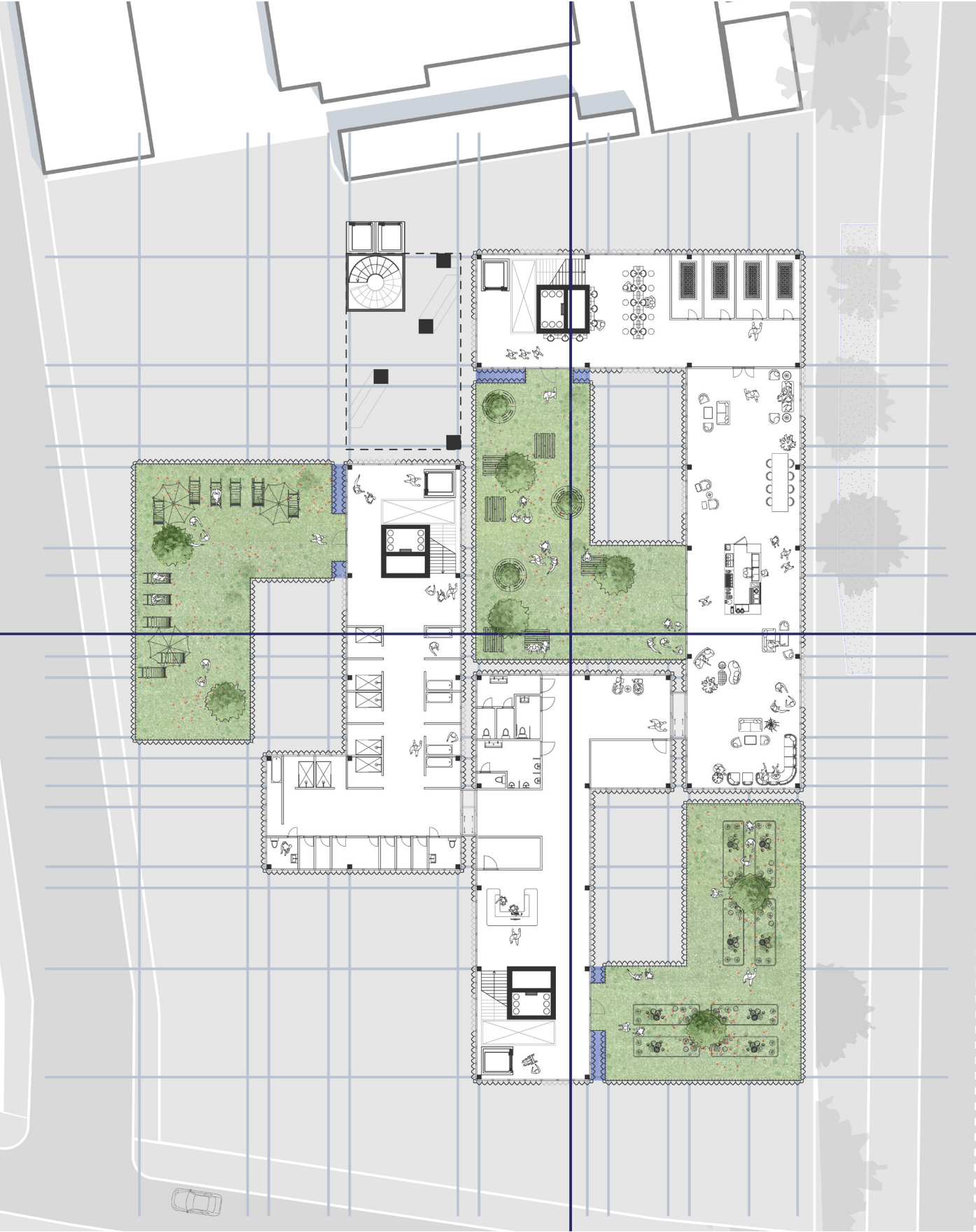
Final Design

Design Brief & Location



Final Design

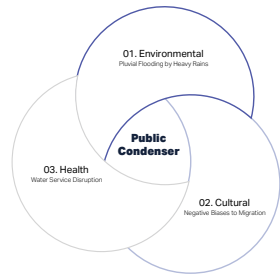
Design Brief & Location



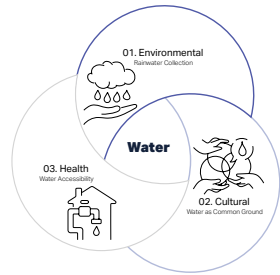
THE WATER HUB

Celebrating Diversity Through a Water Infrastructure

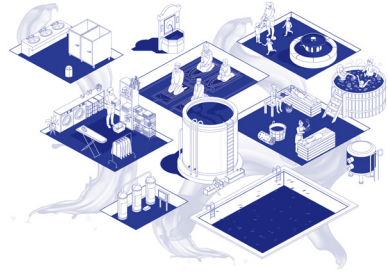
Problem Statement



Solution Statement



Concept

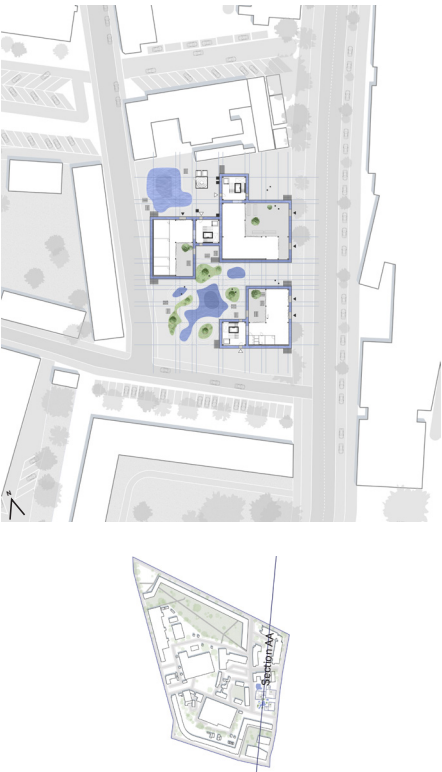


THE CONTEXT

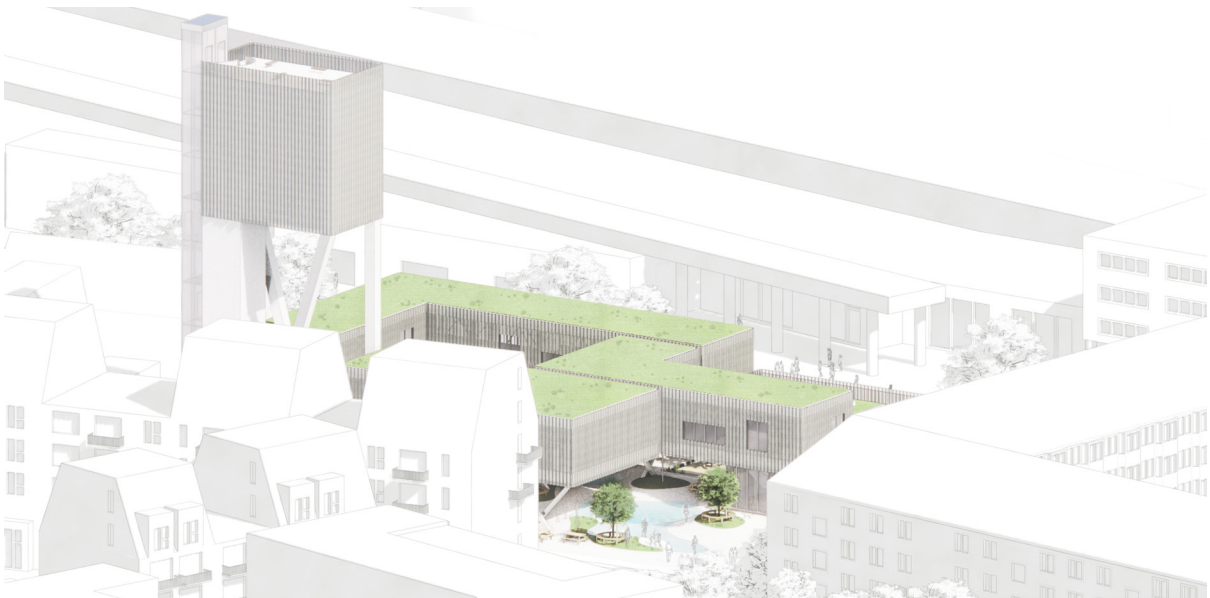
Urban Flows 1:1000



Accessibility 1:500

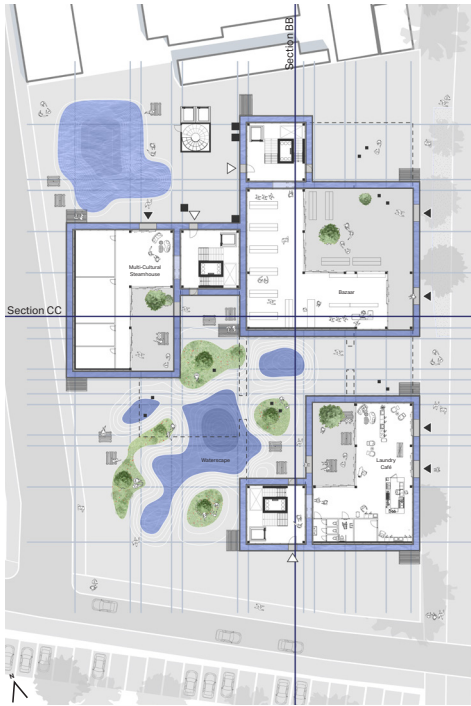


Site Profile AA 1:500



THE DESIGN

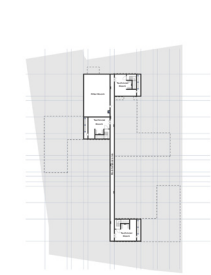
Ground Floor 1:200



First Floor 1:200



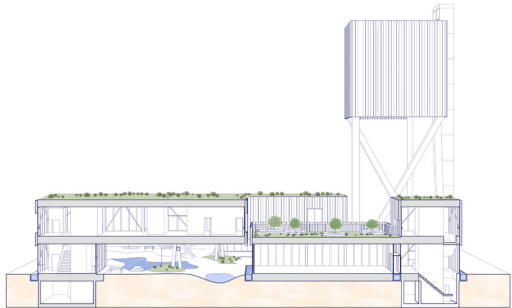
Basement 1:500



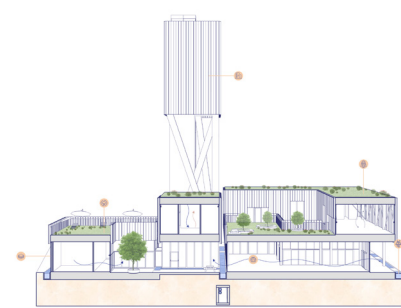
Fourth Floor 1:500



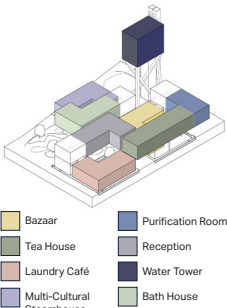
Section BB 1:200



Section CC 1:200

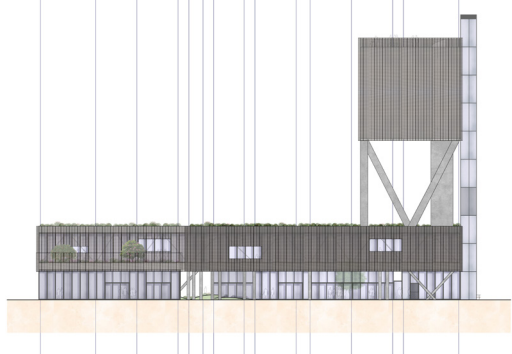


Program

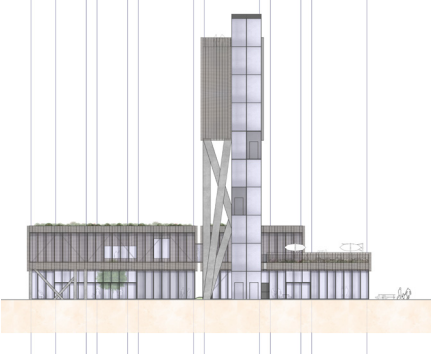


- Bazaar
- Tea House
- Laundry Café
- Multi-Cultural Steamhouse
- Purification Room
- Reception
- Water Tower
- Bath House

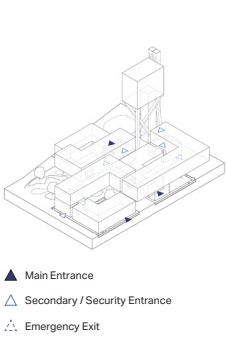
East Facade 1:200



North Facade 1:200



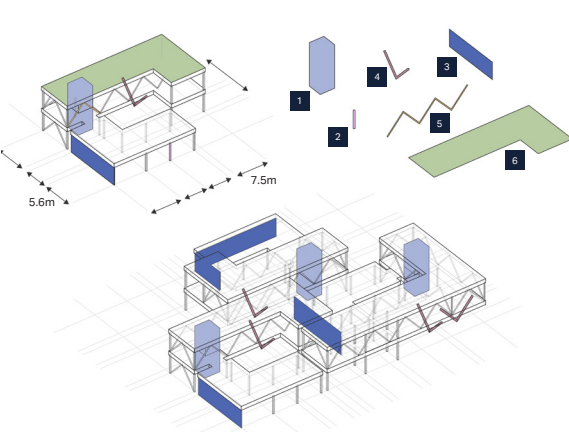
Entrances



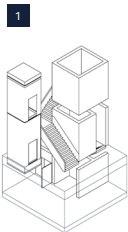
- Main Entrance
- Secondary / Security Entrance
- Emergency Exit

THE TECHNOLOGY

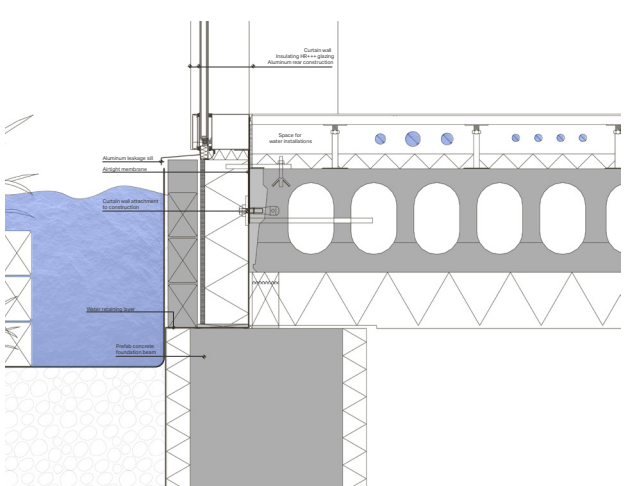
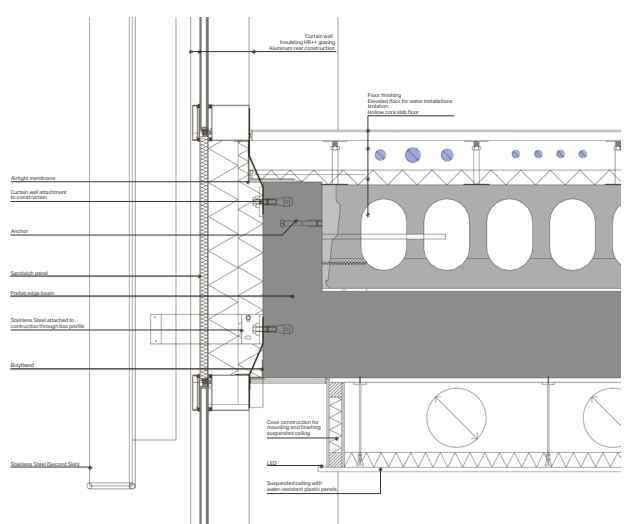
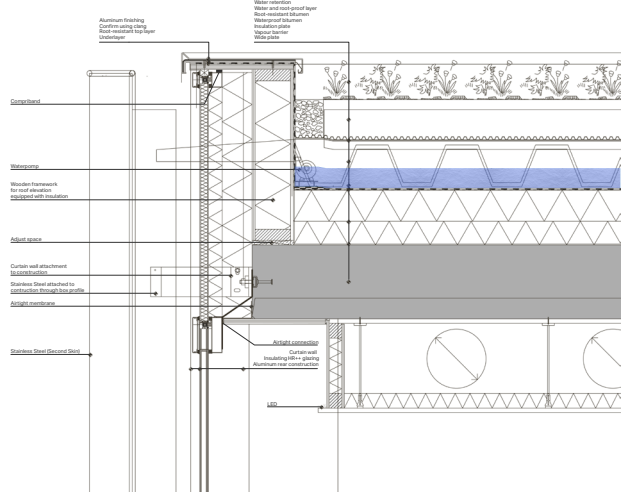
Structural Axo



- 1 Concrete Core with room for Technical Facilities
- 2 HEB280 Columns in a Grid of 7,5m/5,6m
- 3 Concrete Bricks on Southern/West Facade (Trombe Wall)
- 4 V-Columns to support First Floor
- 5 (Wind) Braces to increase Structural Stiffness on First Floor
- 6 Roofs are reinforced to transfer Wind Forces efficiently



Details 1:5



West Facade 1:200



South Facade 1:200

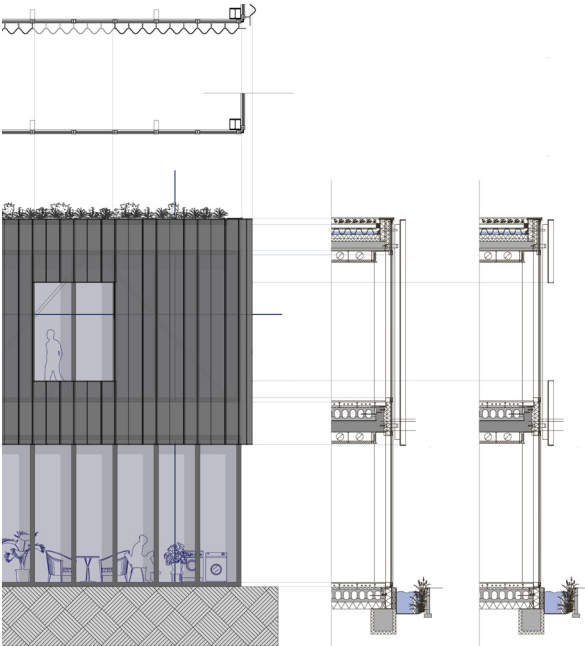


Final Design

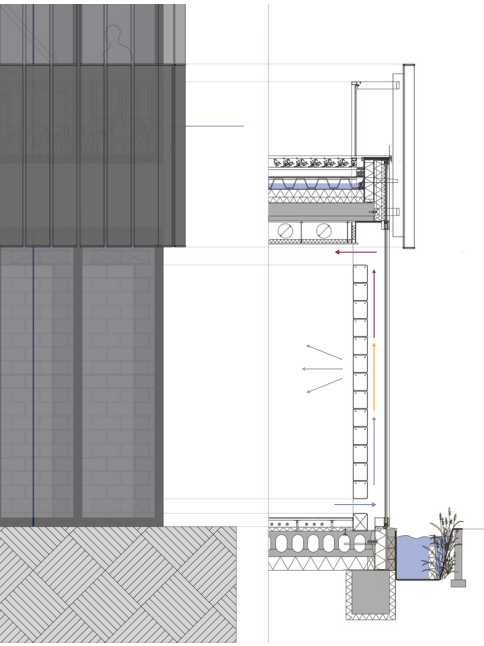
Design Principles & Program

THE SYSTEM

Fragment Facade System 1:40

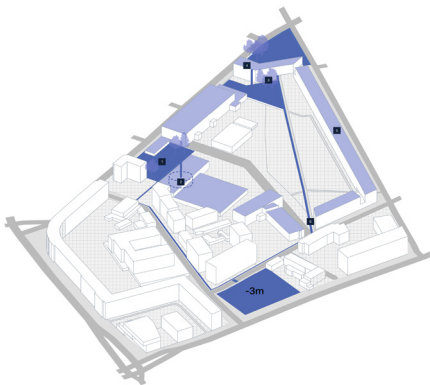


Fragment Trombe Wall 1:20

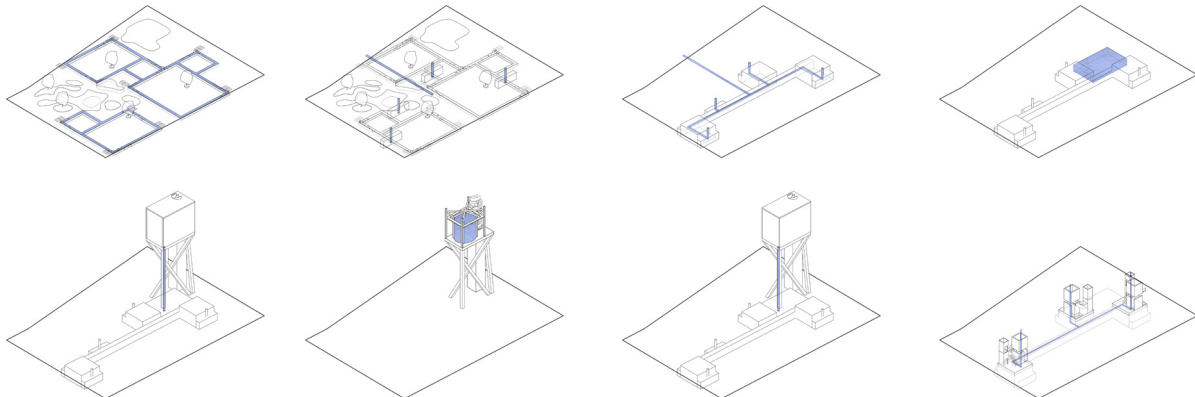
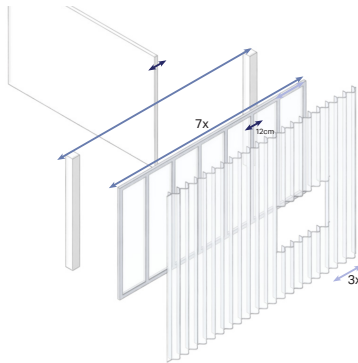


(Rain)Water Journey

- 1 Collecting rainwater on project surfaces with a public function
- 2 Surfaces having its own watertank in cases of extreme flooding
- 3 Surfaces containing 20% of new green spaces for bio-diversity and wellbeing
- 4 Collecting rainwater on roofs, transforming some into green blue roofs
- 5 Green Blue roofs enhances insulation & reduces Urban Heat Island effect
- 6 Bringing rainwater to the plot, bridging 400m in +3m elevation = 0.5 cm/m



Rule-based Measurements



Final Reflection

Paul Kuitenbrouwer
Stefano Corbo
Elina Karanastasi

Joyce de Louw
5326486



The Water Hub

Celebrating Diversity Through a Water Infrastructure

2024-25 Public Condenser, Copenhagen
Final Reflection

06/05/2025

Introduction

For the graduation studio, the assignment was to design a public condenser located in Bispebjerg, Copenhagen. In architecture, the term “public condenser” is a conceptual metaphor rather than a physical object. It typically refers to a building or space that concentrates and intensifies public activity, drawing people together to interact, engage, and coexist.

For this, the immediate surroundings and the needs of the local community were extremely important to take into consideration. The building did not only need to contribute to the well-being of the neighborhood, but also had the task to bring the community together.

This led to the immediate question: what are people’s needs at this specific location, and how can a community building play a role in this? Taking into consideration the new hybrids of today’s public buildings, a vision needed to be created. A personal position. After conducting research and analysing the location, I came to the conclusion that my taken position

was clear: connecting people by water as common theme.

When walking through the streets of Copenhagen in the end of September, it was pouring. This is the moment I also saw how many surface projects in Copenhagen were designed as a comprehensive strategy aimed at tackling the growing threat of extreme rainfall and urban flooding in the future. This led me to learning more about the Copenhagen’s Cloudburst Management Plan, introduced in 2012 as a result of the devastating cloudburst in the summer of 2011 that caused approximately 1,6 billion euros in damage.

Going to the site, I realised that Bispebjerg was not necessarily a neighborhood reflecting my stereotypical ideas of Copenhagen. It is a neighborhood that is ethnically diverse with over a quarter of the residents in the Bispeksvarteret having a non-Western background. This neighborhood was also experiencing increasing gentrification, leading to significant and often unnecessary cultural displacement. When talking to people on the streets, I found out about the so-called “Ghetto” plan that Non-Western residents felt as extremely discriminatory and potentially racist.

After researching the documents we obtained from talking to Rikke Lequick Larsen, the communal architect and the chief consultant at the Copenhagen city Council, I also found out that above this, Bispebjerg is an older urban area with several buildings that do not meet today’s standards. Some properties in the area are currently lacking either a bath or a toilet, or both. These properties are mapped in Figure 3.

After gathering all these insights after the excursion to the site, talking to people, researching literature and analysing the location, I found my own clear vision and personal standpoint.

These problems all share a unique relation with water. Architecture can tackle these three problems on environmental, cultural and health levels through water as common theme. With regard to pluvial flooding by heavy rains, rainwater can be collected and reused by a public condenser. With regard to negative biases to migration, it is important to celebrate water as the common ground between different cultural groups. And lastly, with regard to service disruption, providing an accessible water infrastructure can overcome health problems.

Figure 1: Percentage of Ethnical Diversity in Bispebjerg



Figure 2: Project Surfaces of the CMP in Bispebjerg

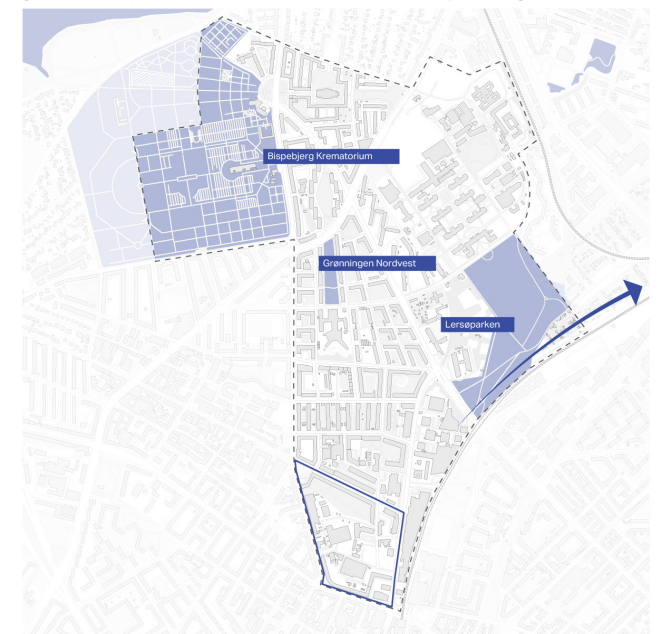
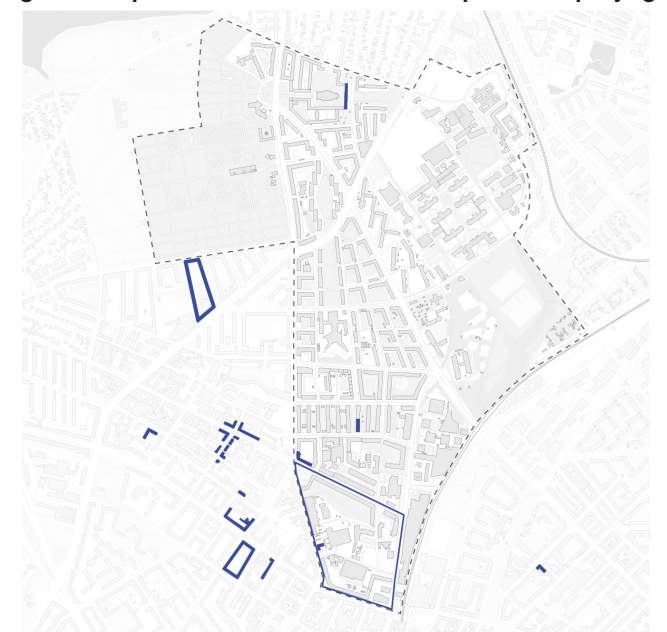


Figure 3: Properties with Water Service Disruption in Bispebjerg



Reflection

So, what is the relation between the graduation project topic, the master track and the master programme?

This year, the overall aim of the Public Building studio was to investigate how public architecture can improve the quality of living in city neighborhoods. More specifically and as mentioned before, the immediate surroundings and the needs of the local community were extremely important to take in consideration when designing a public condenser.

My chosen graduation (project) topic focuses on how water as a theme can connect the neighborhood, bring people together, but maybe most importantly - meet the current needs of the local community. During my graduation year I attempted to find answers to how a public condenser can celebrate cultural variety through water and at the same time provide a water infrastructure for the neighborhood in Bispebjerg, Copenhagen.

This research topic is a direct consequence of the Public Building master track's overall assignment. The vision behind my research topic was a result of all the insights I gained by the excursion to the site, talking to people, researching literature and analysing the location. Throughout this whole graduation year, I constanly searched for the best possible answers and valid arguments to design for actual societal, environmental and technical problems.

Research by Design is a methodology that goes hand-in-hand with my studio's approach. In this approach, the process of designing and creating is both a means of exploring research questions and a way to produce insights, rather than just a way to create a final product. This approach is commonly used in fields such as architecture. Also, because of this approach I am currently doing research by design through mapping, diagramming, using ArcGis, etc

Focusing on how public architecture can tackle these problems on environmental, cultural and health levels through water as common theme, created guidelines for me. Guidelines that were needed to investigate how architecture can improve the quality of living in the neighborhood of Bispebjerg, Copenhagen.

These guidelines in different domains were the following:

1. *Environmental*

With regard to pluvial flooding, rainwater can be collected and reused by a public condenser.

2. *Cultural*

With regard to negative biases to migration, it is important to celebrate water as the common ground between different cultural groups.

3. *Health*

With regard to service disruption, providing a new water infrastructure can encourage water accessibility.

The approach throughout my graduation year is also in line with overall master programme. Tackling problems in different domains - social, environmental, technical - and designing integral was a very important focus point that I experienced throughout this graduation studio. I was constantly encouraged to reflect on my own design decisions and to think critical when it comes to all these different domains.

Discussing these themes in a critical way with the different graduation tutors, helped me incorporating collaborative methods and tools to encourage and enable the different areas to work together to produce an integrated final design.

Improving the quality of living by public architecture touches different domains answering technical, social and spatial questions with regard to architecture. All of this is in close relation with the Architecture master track of the TU Delft, which teaches to develop creative and innovative building projects that use design as a means to deal with the technical, social and spatial challenges encountered in the built environment.

Reflection

So, what is the relevance of my graduation work in the larger social, professional and scientific framework?

With my project, I have designed a public condenser that is not only relevant for my graduation work, but also in the larger social, professional and scientific framework. This project is a result of focusing on solving problems of this specific site, but the findings may be applied at more locations within the future or create more insights into how to tackle these (future) problems elsewhere.

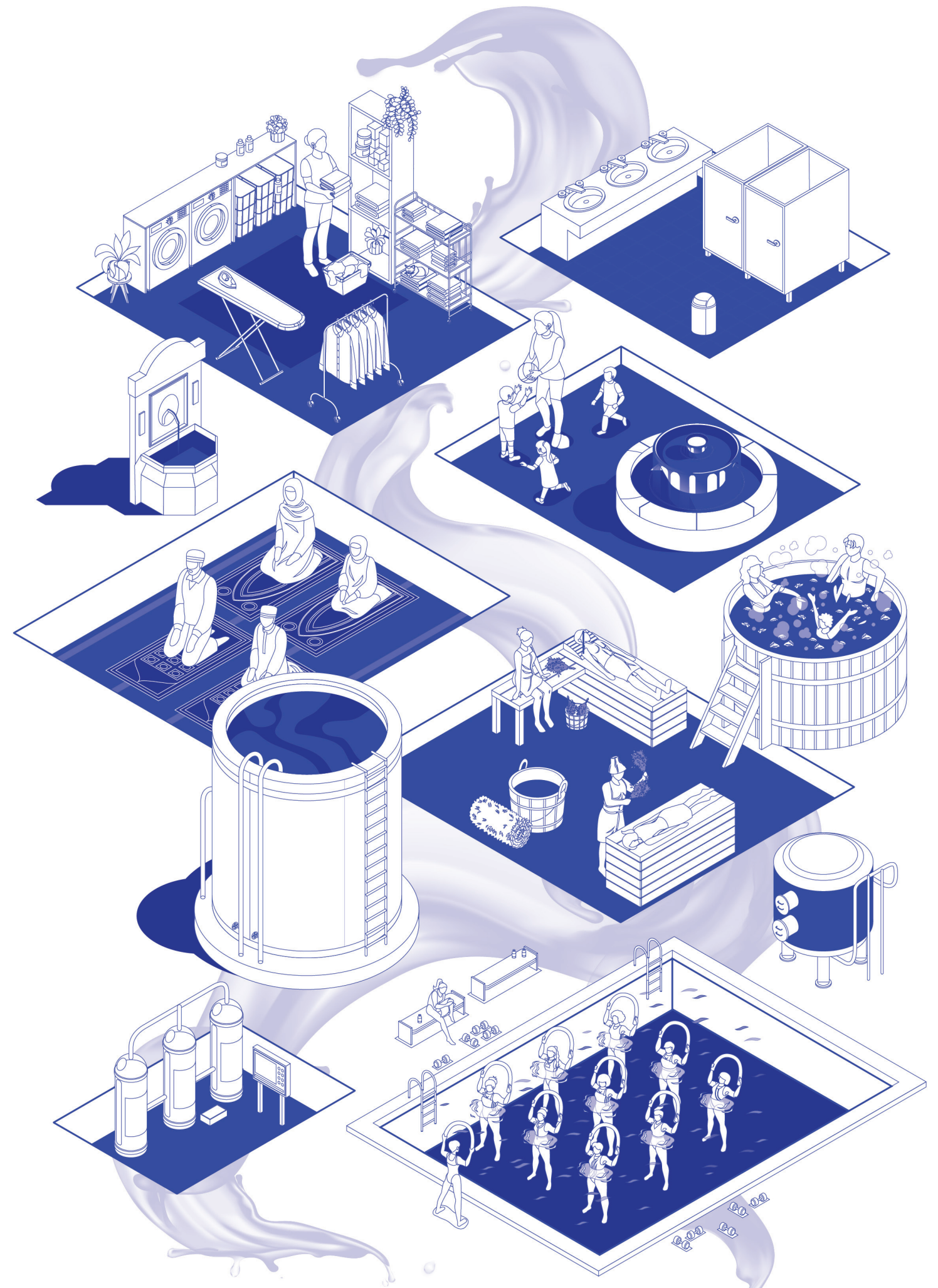
It can create a point of departure how to connect people and different cultures through water, while finding a common ground. But also, it gives more understanding in how pluvial flooding can be tackled within the future and how to reuse rainwater in a way that is beneficial for the whole local community. Creating opportunities and giving public services and a water infrastructure back to the neighborhood.

Also, looking at the future, a looming crisis threatens the health and livelihoods of billions: the scarcity of clean drinking water. Despite being fundamental to life, access to safe water is becoming an increasingly precarious privilege.

Experts warn that this challenge, driven by climate change, population growth, and mismanagement of resources, could define the global narrative for the decades to come. Thus, examining how rainwater management can provide a clean water infrastructure creates more insights for future social, professional and scientific research.

I think it is time to think about water differently, how we can re-use it, how we can celebrate it and how we can overcome mismanagement in the future. I hope that, despite it is only a departure point within the scientific framework, it brings a new conversation to light. It points out certain future problems and difficulties we are facing as a society, which has a potential to be tackled by architecture.

For now, I at least know that I learned a lot about a new and exciting topic. All as a result of the overall aim of the Public Building studio to investigate how public architecture can improve the quality of living in a city neighborhood.



Graduation Report

Joyce de Louw