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eco-minded landscapes

containment of urban anxiety through architecture

graduation report

when I think of **silence**
in **architecture**
it's always about the quality of **light**
that gives that contemplative **feeling**
you seek to **internalize**
a **connection**
with something **divine**

*Marina Tabassum, 2024
award-winning Bangladeshi architect*



acknowledgements

With this report I conclude the most valuable period of my studies, and thus my student days. On the one hand, by graduating I have broadened my knowledge of the built environment by also looking at disciplines outside the field of architecture, while on the other hand I have also deepened my knowledge within the field by studying and designing a public building.

I would like to take this opportunity to thank a few people who contributed to this.

First of all my supervisors of the Public Building Graduation Studio, for their expert guidance and valuable feedback during this process. Paul Kuitenbouwer, for your endless knowledge of reference projects; Stefano Corbo, for your pep talks that convinced me to think outside the box and step out of my comfort zone; Elina Karinastasi, for your loving compliments that gave me good mental support.

Many people inside and outside the faculty were open to sitting with me and helping me with issues that fell outside my discipline. Thank you, Anne-Bregje Snijders (Architectural Engineering) for your guidance regarding dome structures, René van der Velde, Fabiana Toni and Nico Tillie (Landscape Architecture) for your help regarding landscape design and planting, and also thanks to Peter Eigenraam and XXXXXX for the (very necessary) extra guidance regarding my special supporting structure.

In addition, I would like to thank my family and friends for their patience, encouragement and moral support in the past period. This is certainly reflected in the large numbers that are present at my graduation presentation today!

In particular, I would like to put my good friend and fellow graduation colleague Hester Baars in the spotlight. Thanks to you, graduation has become a lot more fun than it should be. I will miss our hours of chatter, shared annoyances and trips to the 'Smullers' terribly.

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Crowded Minds, Quiet Spaces

The Fusion of Eco-minded Design in Public Condensers



AR3A010 Research Proposal

MSc Architecture, Urbanism and Building Sciences, Delft University of Technology

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7th of November 2024

Words: c. 2000

Dr. Ir. S. (Stefano) Corbo

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Keywords

Urban Anxiety, Eco-minded Design, Hybridity, HIC's

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I have lived in the city my whole life, and I love it still. However, as feelings of anxiety started occurring when I moved abroad to another, bigger city, the city seemed to serve as an amplification of these anxieties. The fast-paced city life in combination with the dense urban landscape resulted in overstimulation and mental breakdowns.

Through the combination of my own actions, more physical activity and therapy, and the adaptation to different landscapes, urban forests and rural areas, my relationship with my home city got strengthened again. Now, I wish for city residents that struggle with anxiety, who do not have the means to travel to rural areas or engage in therapy, that they can escape the hustle and bustle within their own reach, closer to home.

I wish to create a public space that facilitates a seemingly city escape on the one hand, but can also reaffirm their relationship with the neighbourhood on the other; an eco-minded public condenser.

Urban Anxiety

The current contemporary time period is defined by two components. One, humans live predominantly in urban settings for the first time since their existence, accounting for more than 58% as of 2025 (United Nations, 2017), and two, the load of common mental disorders (CMD's) like anxiety, depression and bipolar disorders, has increased (Rehm & Shield, 2019). Van der Wal et al. (2021) found that CMD's are occurring more in high income countries (HIC's), and that anxiety is the most prevalent out of all CMD's in the urban areas. Urban dwellers have a 20% more chance of developing anxiety than rural dwellers (Adli, 2011), living in an urban environment and the risk of having mental disorders are thus interrelated. Building on this, this research coins the concept of 'urban anxiety' to investigate the relationship between the urban environment and anxiety.

Urban anxiety is related to many factors. On the one hand, there are meta factors, that are considered to have a more indirect effect on mental state of urban residencies (Van der Wal et al., 2021), and on the other hand, there are urban factors that show a more direct relationship with the urban surroundings (Lambert et al., 2015: Krabbendam et al., 2021).

Meta factors like city size, population growth, urbanization and economic development all have a profound effect on urban anxiety (Hubbard, 2003: Lefebvre, 2012: Vassos et al., 2006: Cristea et al., 2015: Olesen, 2022), especially (recent) economic development, as this is what separates cities in the HIC's from cities in the low or middle income countries (LMIC's) (Van der Wal, 2021). Hubbard (2003) and Lefebvre (2012) both argue that public space in Western capitalist cities is shaped to the needs of capital accumulation and consumption, often at the expense of social needs and collective well-being.

Urban factors are characterized according to the research by Van der Wall et al. (2021). The first factor entails the sensible environment, where aspects like noise and air pollution prove to have a significant effect on mental health and cause stress related symptoms (Vassos et al.: 2006: Adli, 2011). The second factor is the physical environment, where aspects like defined greenery and urban morphology play a key role in the urban health. Fathi et al. (2020) argue that the aesthetic and visual quality of urban space improve both the physical and mental health of its citizens. Simoes & Cerciello (2022) conclude in their article on 'emotional cities' that "urban built exposure (when compared to natural spaces) elicit activations in brain regions or networks strongly related to perceptual, attentional, and (spatial) cognitive demands." The third factor encompasses the social environment of the specific site area, where aspects such as crime, unemployment, discrimination and income are known to have a significant effect anxiety burden (Van der Wall et al, 2021: Hubbard, 2003).

Simultaneously tackling all these factors can help reduce anxiety in cities and more specifically city neighborhoods. Data analysis on the European city of Copenhagen proves this, and suggests therefor that urban anxiety is very dependent on the area one resides in (see chapter on Nordvest, Copenhagen).

Eco-minded Design

014 According to psychoanalyst Erich Fromm (1973) and biologist Edward O. Wilson (1984) humans share the inherited need to connect to nature and other biotic forms due to our evolutionary dependence on it for survival and personal fulfilment. As a result of growing urbanisation, humans have lost their connection with the natural environment (Kellert, Heerwagen & Mador, 2011: Fathi et al, 2020: Yin et al., 2019). The physical environment of a city can trigger anxiety, such as a fear of heights, enclosed spaces, darkness or being in an open field without cover (Heerwagen & Hase, 2001). Through incorporating the natural environment into the urban fabric, a certain sense of safety and de-stimulation of the stressed mind can be provided, i.e. through urban forests, organic materials or aesthetics, and natural daylight (Kellert, Heerwagen & Mador, 2011; Hoge & Wulf, 2023: Yin et al., 2019: Lehn & Benyus, 2012). By fusing the natural environment not only with the cobbled exterior public spaces, but concrete interior public spaces as well, the reducing effects on urban anxiety will prove to be most effective (Sandeve & Despot, 2023). Such a hybrid object can contribute to one's understanding of aesthetics, and may change one's perspective and therefor mental state of mind (Terzidis, 2003: Lehn & Benyus, 2012).

After an extensive literature review, there seem to be five dimensions adherent to the incorporation of a more natural environment into the cityscape that proved have a profound effect on anxiety and stress related complaints.

The first two of these dimensions are related to the visual senses; organizing the space through the concept prospect and refuge. The prospect-refuge theory (Appleton, 1984) suggests that environments offering both views (prospect) and a sense of enclosure (refuge) provide feelings of safety and pleasure. Urban environments that offer a balance of prospect (open views) and refuge (areas of concealment or protection) are generally perceived as safer and anxiety-inducing (Petherick, 2000). Yin et al. (2022) proved through virtual reality experiments that within buildings, outdoor views are more anxiety-inducing than indoor green. Implications of prospect includes, among others, long and distant views and natural daylight, and implications of refuge include, among others, a variation in height level experience and penetrable barriers for views out (Heerwagen & Hase, 2001).

The third dimension is called biomimicry, a term coined from the philosophical perspective by Lehn & Benyus (2012) that emphasizes that nature is beautiful, as it is a reflection of evolved solutions that have been tested over millions of years to fit perfectly within the earth's ecosystems. It's resonance with the surroundings is mainly related to the aesthetic and form of the building. David Gissen's 'Subnature' (2009) enriches Benyus's biomimicry through suggesting that beauty and value also exist in nature's untamed, transient, or messy elements.

Sensory variability is the fourth dimension and extends on the visual senses by stressing the importance of engaging all the senses in architecture (Zumthor, 2006: Pallasmaa, 1994). Changing variability in environmental color, texture and light over time and space all contribute to a building that will be perceived as less stressful (Heerwagen & Hase, 2001).

The last dimension addresses the biodiversity aspect of a building, which includes abundance of greenery, water bodies and even animalia. It has been adapted widely by several building evaluating systems (Yin et al., 2022) into practice across many kinds of utility buildings, as it is known to reduce not only mental stress, but shortened hospital stays as well (Bringslimark et al., 2009). It is a key dimension for this framework, but not the most important one that is related to urban anxiety.

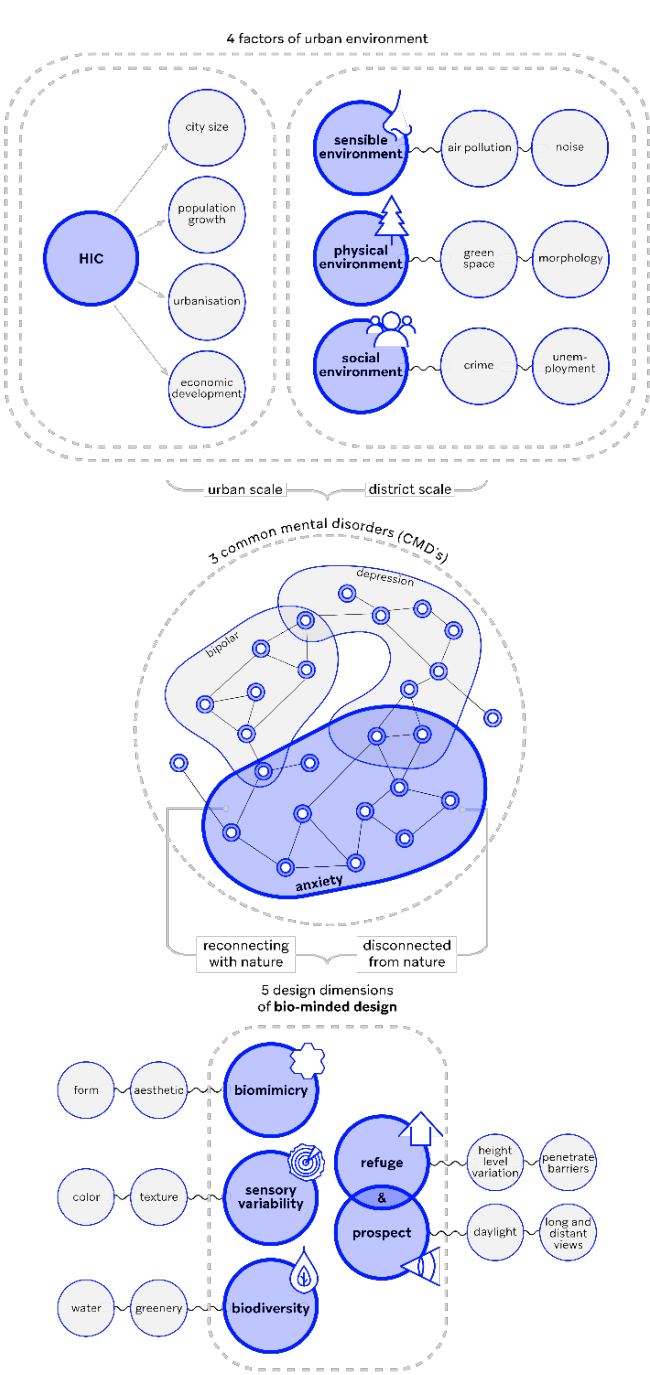
015 Designing methods for architecture and landscape that approach of solely tackling urban anxiety have not yet been made or tested. This research will do so, by coining the new term of eco-minded design. Eco-minded design integrates elements from nature with the sole purpose of creating environments that intuitively resonate with human needs for calmness, safety and tolerance.

Research Questions

How can eco-minded design inform public buildings to reduce urban anxiety in Western capitalist cities?

- 1. Which design aspects have a reducing effect on urban anxiety?
- 2. How is the concept of hybridity related to eco-minded design?
- 3. How can passive building design bridge the gap between sustainability and health?
- 4. How does context of Copenhagen, Nordvest and the NEXT area inform the design position?

Conceptual framework



Overall, this research aims to reduce anxiety burdens within the urban environments of Western capitalist cities, by exploring architectural interventions that incorporate eco-minded design principles. By integrating this method into the design of a public building through elements like prospect-refuge balance, biomimicry, sensory variability, and biodiversity, this study seeks to create spaces that inherently meet human needs for safety, calm, and sensory engagement. Adaptations of this in design can include usage of Danish natural materials like Eelgrass, a fusion of the building with the surrounding landscape, an inner garden, or materials that reflect natural lighting, all with the main goal of simulating the outside inside. Ultimately, the research aims to bridge urban design and mental health, positioning eco-minded design as a tool for reducing urban anxiety in particular.

Copenhagen

This research is executed in the Copenhagen, the capital of one of the richest countries in the world in terms of GDP; Denmark (IMF, 2024). Moreover, Copenhagen has been ranking top of the charts as the most liveable city in the world, and currently holds the title of World Capital of Architecture (EIU, 2024: UIA, 2023). These claims position Copenhagen as an ideal setting to engage in a broader discussion on contemporary urban ideals, as this city also has its own imperfections. A study done by Vassos et al. (2006) found higher incidence rates of CMDs for people born in urban areas than in rural areas ($n=2894640$), with neurotic topographical difference in stress-related disorders of 5%.

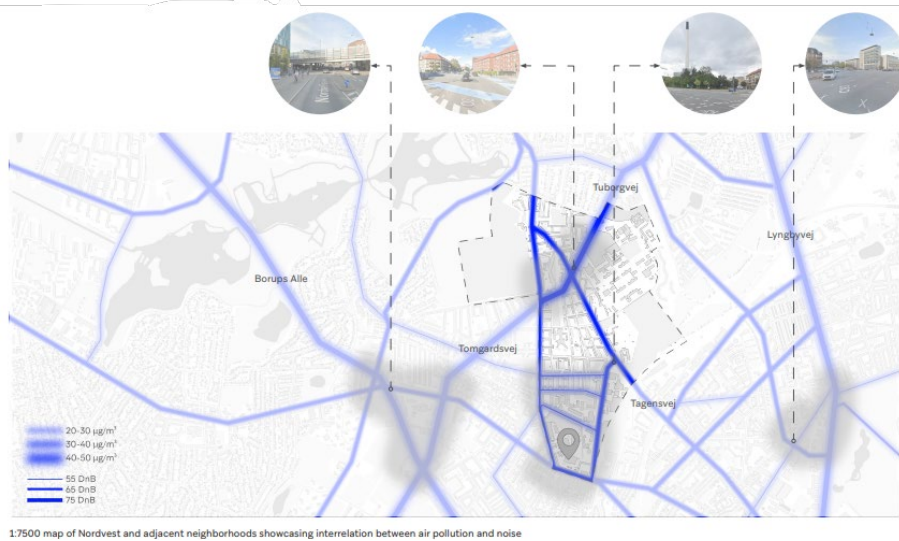
Contextualization of the city scale falls within the first factor of the conceptual framework: the high-income country. Copenhagen municipality covers an area of 180km^2 with 660.842 inhabitants. This makes its density around $7,298/\text{km}^2$, making it 1,5 times more dense than the Dutch capital of Amsterdam, a city with the same size and economic background (Danmarks Statistik, 2024: Statline, 2024). Copenhagen has been growing in population since the nineties with an average of 1.1% per year, which comes after a decline of twenty years in the seventies and eighties (Danmarks Statistik, 2024). Denmark experienced a sharper urbanization rate in the last decades, with now 88% of Danes living in urban areas, compared to 74% in 1960 (The Global Economy, 2023). In terms of politics and economics, Copenhagen transitioned from an industrial to service economy in line with other Western capitalist societies, specifically undergoing huge economic resurgence in the last two decades (Mouritsen & Olsen, 2013). Along with this new economic approach came a new, neoliberal form of government, that prioritized individual freedom over collective well-being (Mouritsen & Olsen, 2013). According to Hubbard (2003), these urban environments shaped by economic imperatives foster both visible and invisible barriers, consequently heightening collective anxiety and undermining social cohesion in this post-industrial city. In fact, 2024 Copenhagen holds six disadvantaged areas that stagnated in comparison to the overall city development, Nordvest being one of them (Larsen, 2024).

Nordvest

Nordvest is currently named a 'ghetto' because it has a high proportion of convicts, residents with only basic education and people with a non-Western background (Copenhagen Municipality, 2020). As a consequence, people are believed to suffer more from mental issues than in other areas (Larsen, 2024). How does this apply to the conceptual framework? Contextualization of the district scale falls within the second, third and fourth factor of the conceptual framework.

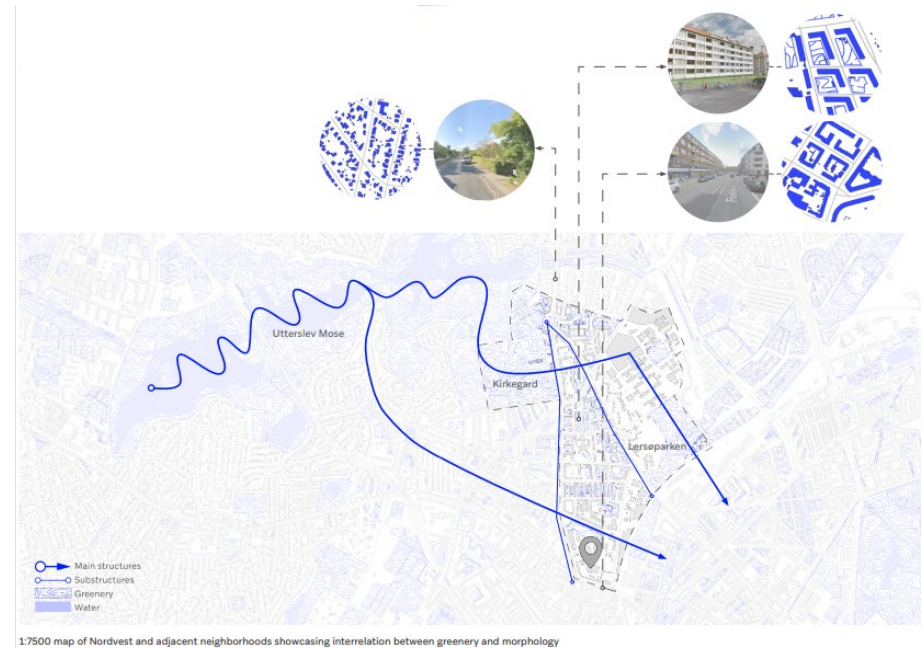
Considering the sensible environment, Nordvest doesn't qualify as a quiet and clean area, especially the highly industrialized southern part of the area. This district is generally more polluted than other districts that are also situated on the outskirts of the city centre (see map below). There are more roads with an amount of $30 (\mu\text{g}/\text{m}^3)$ of nitrogen dioxide present than neighbouring areas, such as Tuborgsvej and Frederikssundvej (Google, 2021). The

019 roads are intensively used by traffic, which does not only contribute to high pollution, but also noise. To exemplify, the noise load of the Frederiksborgvej and Lygten is over 75 dnb daily, comparable to a Boeing 737 airplane take off (Copenhagen Municipality, 2009).



Considering the physical environment, with factors such as morphology and greenery, Nordvest, especially the north, tells the story of interwar housing, where patches of green alternated high density housing blocks (de Vries et al., 2024). These undesignated, open patches between higher buildings hold a minor positive effect on mental health, and can even create an unsafe feeling (Hebbert, 2010). Urban forests and designed city parks, on the other hand, have the most positive effect on one's mental state (Davies et al., 2008). Contemporary vision of green space therefor seeks enclosure instead of openness, with active provision instead of passive pictorial quality (Hebbert, 2010). Moreover, semi-natural areas like Utterslev Mose north of Bispebjerg used to be more accessible due to the area being situated between the ring- and middle finger of Copenhagen's fingerplan from 1947. Parts of this area mostly adjacent to Søborg, however, densified after the second world war (Olesen, 2022). Taking into account the housing of Nordvest, inhabitants overall live 1.25 times more in small flats compared to city average (Larsen, 2024), 63% of people live alone (Copenhagen: 50%) (Copenhagen municipality, 2020), and the area holds a density 2.4 times higher than city average of 17274/km² (citypopulation.de, 2024). The interrelation between greenery and morphology is mapped down below.

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Finally, considering the social environment, crime in Nordvest is higher than city average, with three times as much convictions in relation to drugs and weaponry (Larsen, 2024). Additionally, residents overall are 1.25 times more likely to have a low income and distance to the labor market, with a low education being 1.5 times more likely (Copenhagen Municipality, 2022). Interestingly also, is that the largest age group of the area is in their twenties, making up 30% of Nordvest's inhabitants, also higher than city average (City of Copenhagen: stat bank, 2024). It is known anxiety among young adults is at its highest in decades, with a rapid increase still prevailing (Goodwin et al., 2020).

Nordvest and the adjacent Bispebjerg Bakke neighbourhood will undergo an integrated area renewal in the coming years, in which the area must be, among others, a green and attractive neighbourhood with vibrant institutions and good growing conditions for young people (Copenhagen Municipality, 2022). On a building scale, the area calls for a new generation of hybrid buildings called public condensers, that will act as magnets to generate new forms of interaction positively impacting, among others, residents mental health (de Vries et al., 2024).

The methodology for this research incorporates both qualitative and quantitative approaches to analyze eco-minded design's impact on urban anxiety.

The qualitative component involves examining reference projects of public condensers, such as Banana Park and Plads23 (public condensers), as well as case studies of Thorncrowne Chapel in Arkansas, US and Kikugetsu-tei in Takamatsu, Japan, which embody eco-minded principles. Additionally, semi-structured interviews will be conducted with five Nordvest residents, each in their twenties having lived in the area for over a year. These interviews will center around open-ended "why" and "how" questions without introducing the researcher's proposed design solution, allowing participants to offer their own ideas and solutions.

The quantitative approach includes a both comparative literature review and data analysis. The data analysis will cover both city and national development for Copenhagen and Denmark, as well as the Nordvest area, and will compare the data with other locations of interest, such as how the green spaces of Nordvest are approached differently than the greenery in the city center.

The research overall aligns with the studio's approach of the research-by-design framework, as the concept of a public condenser for Nordvest is a multifaceted one and does not have straightforward solutions. It is an approach in which the design process itself becomes a method of investigation. For the process, this means designing is used to pose questions, test hypotheses, and experiment with concepts. In practice, this involves iterative cycles of designing through different methods like mapping, diagramming, collage creation, sketching, modeling etc. with future phases extending to sketching and modeling.

Adli, M. (2011). Urban stress and mental health. *LSE Cities*, 1-3.

Appleton, J. (1984). Prospects and refuges re-visited. *Landscape journal*, 3(2), 91-103.

Bringslimark, T., Hartig, T., & Patil, G. G. (2009). The psychological benefits of indoor plants: A critical review of the experimental literature. *Journal of environmental psychology*, 29(4), 422-433.

Citypopulation.de (2024). *BISPEBJERG NORDVEST*. Retrieved on October 25th from https://www.citypopulation.de/en/denmark/copenhagen/admin/bispebjerg/21005_bispebjerg_nordvest/

Copenhagen Municipality (2009). *Traffic in Copenhagen*, 2009. Retrieved on October 25th from [file:///C:/Users/livia/Downloads/traffic-in-copenhagen-2009-746%20\(2\).pdf](file:///C:/Users/livia/Downloads/traffic-in-copenhagen-2009-746%20(2).pdf)

Copenhagen Municipality (2020). *BISPEKVARTERET Kommende områdefornyelse Kvarteranalyse* [internal document]. Retrieved on October 28th from <https://brightspace.tudelft.nl/d2l/le/content/679920/viewContent/4022607/View>

Copenhagen Municipality (2022). *Kvarterplan Områdefornyelse Bispebjerg Bakke 2022-2026* [internal document]. Retrieved on October 28th from <https://brightspace.tudelft.nl/d2l/le/content/679920/viewContent/4003968/View>

Cristea, C. V., Alexandru, D., Suleski, D., & Birsan, A. (2015). Copenhagen as a smart city. In *Proceedings of the International Management Conference* (Vol. 9, No. 1, pp. 622-632). Faculty of Management, Academy of Economic Studies, Bucharest, Romania.

EIU (2024). *Vienna secures its position as the world's most liveable city for third consecutive year*. Retrieved on 27th of October from <https://www.eiu.com/n/vienna-secures-its-position-as-the-worlds-most-liveable-city-for-third-consecutive-year/>

Fathi, S., Sajadzadeh, H., Mohammadi Sheshkal, F., Aram, F., Pinter, G., Felde, I., & Mosavi, A. (2020). The role of urban morphology design on enhancing physical activity and public health. *International journal of environmental research and public health*, 17(7), 2359.

Fromm, E. (1992). *The Anatomy of Human Destructiveness*. Henry Holt and Company.

Gissen, D. (2009). *Subnature: architecture's other environments*. Princeton Architectural Press.

Goodwin, R. D., Weinberger, A. H., Kim, J. H., Wu, M., & Galea, S. (2020). Trends in anxiety among adults in the United States, 2008–2018: Rapid increases among young adults. *Journal of psychiatric research*, 130, 441-446.

Google (2021). *Labs: Air Quality*. Retrieved on October 25th from <https://insights.sustainability.google/labs/airquality>

023 Heerwagen, J., & Hase, B. (2001). Building biophilia: Connecting people to nature in building design. *Environmental Design and Construction*, 3, 30-36.

Hoge & Wulf (2023). *The Case for Green Space: A Cost-Effective Mental Health Resource*. Retrieved on 26th of October from <https://adaa.org/learn-from-us/from-the-experts/blog-posts/consumer-professional/case-green-space-cost-effective>

Hubbard, P. (2003). Fear and loathing at the multiplex: everyday anxiety in the post-industrial city. *Capital & Class*, 27(2), 51-75.

IMF (2024). *GDP Per Capita, Current Prices*. Retrieved on 27th of October from <https://www.imf.org/external/datamapper/NGDPDPC@WEO/OEMDC/ADVEC/WEOWORLD>

Kellert, S. R., Heerwagen, J., & Mador, M. (2011). *Biophilic design: the theory, science and practice of bringing buildings to life*. John Wiley & Sons.

City of Copenhagen: statbank (2024). *KKBEFI: Population by district, sex, age and marital status*. Retrieved on October 24th from <https://kk.statistikbank.dk/statbank5a/default.asp?w=1536>

Krabbendam, L., van Vugt, M., Conus, P., Söderström, O., Empson, L. A., van Os, J., & Fett, A. K. J. (2021). Understanding urbanicity: how interdisciplinary methods help to unravel the effects of the city on mental health. *Psychological medicine*, 51(7), 1099-1110.

Lambert, K. G., Nelson, R. J., Jovanovic, T., & Cerdá, M. (2015). Brains in the city: neurobiological effects of urbanization. *Neuroscience & Biobehavioral Reviews*, 58, 107-122.

Larsen, R. L. (2024, September 25). *Integrated Urban Renewal Copenhagen* [PowerPoint slides]. Faculty of Architecture, TU Delft. <https://brightspace.tudelft.nl/d2l/le/content/679920/viewContent/4022609/View>

Lefebvre, H. (2012). From the production of space. In *Theatre and performance design* (pp. 81-84). Routledge.

Lehn, J. M., & Benyus, J. (2012). *Bioinspiration and biomimicry in chemistry: reverse-engineering nature*. John Wiley & Sons.

Mouritsen, P., & Olsen, T. V. (2013). Denmark between liberalism and nationalism. *Ethnic and Racial Studies*, 36(4), 691-710.

Olesen, K. (2022). Unsettling the Copenhagen Finger Plan: towards neoliberalization of a planning doctrine?. *International Planning Studies*, 27(1), 77-90.

Pallasmaa, J. (2005). *The eyes of the skin. Architecture and the Senses*. Chichester.

Petherick, N. (2000). Environmental design and fear: The prospect-refuge model and the university college of the Cariboo campus. *Western Geography*, 10(11), 89-112.

Rehm, J., & Shield, K. D. (2019). Global burden of disease and the impact of mental and addictive disorders. *Current psychiatry reports*, 21, 1-7.

Sandeva, V., & Despot, K. (2023). Biophilic design in landscape architecture and interior architecture. *Knowledge-International Journal*, 61(3).

Simoes, J., & Cerciello, A. (2022). Serving geospatial data using modern and legacy standards: a case study from the urban health domain. *The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences*, 48, 419-425.

Terzidis, K. (2003). Hybrid form. *Design Issues*, 19(1), 57-61.

The Global Economy (2023). Denmark: percent urban population. Retrieved on 27th of October from https://www.theglobaleconomy.com/Denmark/Percent_urban_population/

UIA (2024). *World Capital of Architecture*. Retrieved on 27th of October from <https://www.uia-architectes.org/en/architecture-events/world-capitals-of-architecture/>

United Nations (2017). 2018 revision of world urbanizing prospects. Retrieved on 26th of October 2024 from <https://population.un.org/wup/DataQuery/>

Vassos, E., Agerbo, E., Mors, O., & Pedersen, C. B. (2016). *Urban-rural differences in incidence rates of psychiatric disorders in Denmark*.

de Vries, N, Public Building Group (2024). *AR3AP100 Public Building Graduation Studio Syllabus 2024-25_240723_low res* [internal document]. Retrieved on September 4th from <https://brightspace.tudelft.nl/d2l/le/content/679920/viewContent/3997180/View>

van der Wal, J. M., van Borkulo, C. D., Deserno, M. K., Breedvelt, J. J., Lees, M., Lokman, J. C., ... & Wiers, R. W. (2021). Advancing urban mental health research: from complexity science to actionable targets for intervention. *The Lancet Psychiatry*, 8(11), 991-1000.

Wilson, E. O. (1986). *Biophilia*. Harvard university press.

Yin, J., Yuan, J., Arfaei, N., Catalano, P. J., Allen, J. G., & Spengler, J. D. (2020). Effects of biophilic indoor environment on stress and anxiety recovery: A between-subjects experiment in virtual reality. *Environment International*, 136, 105427.

Zumthor, P. (2006). Atmospheres: Architectural environments. surrounding objects. In *Atmospheres*. Birkhäuser.

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research plan, 009-024

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025-030, graduation plan

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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	Livia Wassink	
Student number	4716019	
Studio		
Name / Theme	AR3AP100 2024-25 Public Building Graduation Studio "Public Condenser, Copenhagen"	
Main mentor	Paul Kuitenbrouwer	Project Design
Second mentor	Eleni Karanastasi	Technical Building Design
Third mentor	Stefano Corbo	Theory and Delineation
Argumentation of choice of the studio	Originally, I have more of an urban development interest when it comes to the perception of a place. However, during my bachelor's degree in Civil Engineering, my interest in architecture came to the fore, with a specific focus on public buildings. It seems that I see the public buildings as a kind of small city or district in itself. A place that is accessible to (almost) everyone requires well thought-out design principles that are pleasant for all its users. The public building is therefore complex, challenging and therefore incredibly interesting! It requires social and qualitative research, something I already have a lot of experience with from my first bachelor's degree on urban planning. From my experience at Benthem Crouwel Architects, known for its many public works in the Netherlands like Rotterdam Central Station or Stedelijk Museum Amsterdam, I have acquired the design skills that come with designing a public building, such as routing, layout and functions.	
Graduation project		
Title of the graduation project	Eco-Minded Landscapes	
Goal		
Location:	Nordvest / Bispebjerg Bakke, Copenhagen, Denmark	
The posed problem,	The contemporary era is marked by over 58% of humanity living in urban areas (United Nations, 2017), alongside a rising prevalence of common mental disorders (CMDs) like anxiety, particularly in high-income	

	<p>countries (Rehm & Shield, 2019; Van der Wal et al., 2021). Urban dwellers face a 20% higher risk of anxiety than rural residents (Adli, 2011), driven by meta factors (e.g., city size, urbanization, economic development) and urban factors (e.g., noise, pollution, social stressors) (Hubbard, 2003; Lambert et al., 2015).</p> <p>The public condenser is designed for the residents of Nordvest, a Copenhagen neighborhood facing higher crime rates, socioeconomic challenges, and therefore elevated anxiety and stress levels (Larsen, 2024). Crime rates related to drugs and weaponry are three times higher than the city average (Larsen, 2024), while residents are 1.25 times more likely to experience low income and job instability, with low education being 1.5 times more prevalent (Copenhagen Municipality, 2022). Young adults prove to be most prone to anxiety disorders, and they make up 30% of the population of that area, higher than city average (Goodwin et al., 2020: City of Copenhagen: stat bank, 2024).</p>
research questions and	<p>How can eco-minded design inform public buildings to reduce urban anxiety in Western capitalist cities?</p> <ol style="list-style-type: none">1. Which design aspects have a reducing effect on urban anxiety?2. How does context of Copenhagen, Nordvest and the NEXT area inform the design position?3. How is the concept of hybridity related to eco-minded design?4. How does eco-minded design relate to sustainability?
design assignment in which these result.	<p>Qualitative brief: designing a public building that functions as the new urban living room. A public building that is accessible by all in the neighborhood, and adheres to the concepts of hybridity, multiplicity, sustainability and health; a public condenser. It will be designed within the context of Bispebjerg, Copenhagen. A city known for its successful publics, but is still dealing with areas of disproportion, like this one. (de Vries et al., 2024)</p> <p>I identified a problem of urban anxiety in the area, particularly amongst young adults which are overly represented. My public condenser will be designed according to the "eco-minded design" method, which fuses natural landscaping elements into urban spaces, offers a solution by addressing anxiety triggers such as sensory overstimulation and lack of green spaces. Drawing on theories like prospect-refuge (Appleton, 1984), biomimicry (Lehn & Benyus, 2012), biodiversity</p>

	<p>(Yin et al., 2022) and sensory variability (Crosby, 2024), this research explores how nature-inspired design can create urban environments that foster calmness, safety, and well-being.</p> <p>Concepts of the public condenser such as hybridity, multiplicity, sustainability and healthiness are integrated into the eco-minded design approach, and are therefore in line with the municipality's goals to improve the area's vibrancy and living conditions (Copenhagen Municipality, 2022; de Vries et al., 2024).</p>
<p>[This should be formulated in such a way that the graduation project can answer these questions. The definition of the problem has to be significant to a clearly defined area of research and design.]</p>	
Process	
Method description	
<p>This research employs a mixed-methods approach to explore the impact of eco-minded design on urban anxiety. The qualitative component includes analyzing reference projects that make use of themes light, sound and landscaping, and conducting semi-structured interviews, like those with five Nordvest residents in their twenties. The quantitative component involves a comparative literature review and data analysis of urban and national development trends, focusing on the development of public green spaces in Nordvest versus the rest of Copenhagen. Using a research-by-design framework, the process integrates iterative design methods—such as mapping, sketching, and modeling—as tools for inquiry and hypothesis testing.</p>	

<p>Literature and general practical references</p> <p>The list is very long, but here are my most important papers/articles:</p> <p>van der Wal, J. M., van Borkulo, C. D., Deserno, M. K., Breedvelt, J. J., Lees, M., Lokman, J. C., ... & Wiers, R. W. (2021). Advancing urban mental health research: from complexity science to actionable targets for intervention. <i>The Lancet Psychiatry</i>, 8(11), 991-1000.</p> <p>Goodwin, R. D., Weinberger, A. H., Kim, J. H., Wu, M., & Galea, S. (2020). Trends in anxiety among adults in the United States, 2008–2018: Rapid increases among young adults. <i>Journal of psychiatric research</i>, 130, 441-446.</p> <p>Yin, J., Yuan, J., Arfaei, N., Catalano, P. J., Allen, J. G., & Spengler, J. D. (2020). Effects of biophilic indoor environment on stress and anxiety recovery: A between-subjects experiment in virtual reality. <i>Environment International</i>, 136, 105427.</p> <p>Crosbi, M (2024). <i>Light, Empathy, and Silence: The Architecture of Marina Tabassum</i>. Retrieved on November 24th from https://www.archdaily.com/1017460/light-empathy-and-silence-the-architecture-of-marina-tabassum</p>	<p>Reflection</p> <ol style="list-style-type: none"> 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)? Increasing mental health issues is very much a contemporary problem, especially since Covid-19. Common mental disorders are often tackled from fields such that of medicine and psychology through treatment, but the preventative aspect is just as important, and often overlooked. Public architecture can play an important role in the prevention of those CMD's. As urban properties and public space have become more fragmented in the last decades, the public buildings serves as an important tool in restoring that connection. Through the creation of a public building that can serve as a preventative environment for (young) people suffering from CMD's (in my case; anxiety), it goes to show that architecture as well, can play a significant role in preventing CMD's in an urban environment. By integration of the architectural approach with the other fields of the master's programme, this problem can be tackled even more effectively. 2. What is the relevance of your graduation work in the larger social, professional and scientific framework. As said above, the tracks at our faculty can all relate to mental health issues, and provide both preventative and recovering aspects in tackling these issues. Zooming out on that, mental health is a complex problem, characterized by multiple interdependent factors. It often involves diverse stakeholders with differing perspectives from different scientific fields, and requires close cooperations innovative approaches.
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research

research plan, 009-024

journal, 031-108

reflection, 135-144

by

01

02

03

design

025-030, graduation plan

108-134, drawing set

content



Scandinavia's notable double windows against the cold, here at the Royal Danish Academy.

Q1

from position to plan excursion and research

In Q1, the studio consists of two parts: project design (PD) and theory&delination research (TD). Moreover, the Q1 semester focussed on developing a research plan that encourages you to develop your design position, with a trip to Copenhagen to get the student inspired.

1.1 studio introduction

I presented myself and my architectural experiences in the morning by means of a studio passport. After that, we formed groups and subgroups which we would work with through all of Q1. In the afternoon we had the theory introduction and first assignment for next week.

STUDIO PASSPORT

Livia Wassink
01.07.1998
Amsterdam

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 Student number: 4716019
 Mobile number: +31 6 39 57 49 74
 E-mail: lfjwassink@tudelft.nl
livia.wassink@gmail.com



Originally, I have more of an urban development interest when it comes to the perception of a place. However, during my bachelor's degree in Civil Engineering, my interest in architecture came to the fore, with a specific focus on public buildings. It seems that I see the public buildings as a kind of small city or district in itself. A place that is accessible to (almost) everyone requires well-thought-out design principles that are pleasant for all its users. The public building is therefore complex, challenging and therefore incredibly interesting in my opinion! It requires social and qualitative research, something I already have a lot of experience with from my first bachelor's degree. From my experience at Benthem Crouwel Architects, known for its many public works in the Netherlands like Rotterdam Central Station or Stedelijk museum Amsterdam, I have acquired the design skills that come with designing a public building, such as routing, layout and functions.

When we arrange the research groups on September 5th, I would like to position myself in researching the history of the area. During my Msc2 history thesis, I proved to be very skilled at this and enjoyed it very much. I can't make statements about the future, before having looked closely at the past. Moreover, I am skilled at mapping as well. Looking forward to seeing you all this Thursday!

Studies:

2017-2020	Bsc Future Planet Studies, track Urban Planning <i>University of Amsterdam</i>
2021-2023	Bsc Bouwkunde, 3 rd , 4 th and 6 th semester <i>TU Delft</i>
2023-2025	Msc Architecture, Extreme Architecture Studio and Van Gezel tot Meester Studio <i>TU Delft</i>

Internships:

Spring 2021	Intern Urban Exhibition <i>Van Eesteren Museum, Amsterdam</i>
Spring 2023	Intern Architecture <i>Benthem Crouwel Architects, Amsterdam</i>

Studio passport, presented at the start of the day.

1.2 borders & culture

This week existed of two group work exercises. Our group read and discussed two articles on borders and the public realm, and combined these two themes on the waterfront of Copenhagen. We learned that the borders of territories are very important in shaping the public space, as they fuse two environments therefore creating better public life. For the project design part, I got deviated in the culture group, and looked into the cuisine and crafts of Denmark/Copenhagen, all important for research regarding our trip to Copenhagen. Lastly, I held my first talk with Stefano regarding my first ideas on city overstimulation, a personal experience. He recommended three books regarding two themes, either the senses or biophilic design could be helpful for architectural solutions.

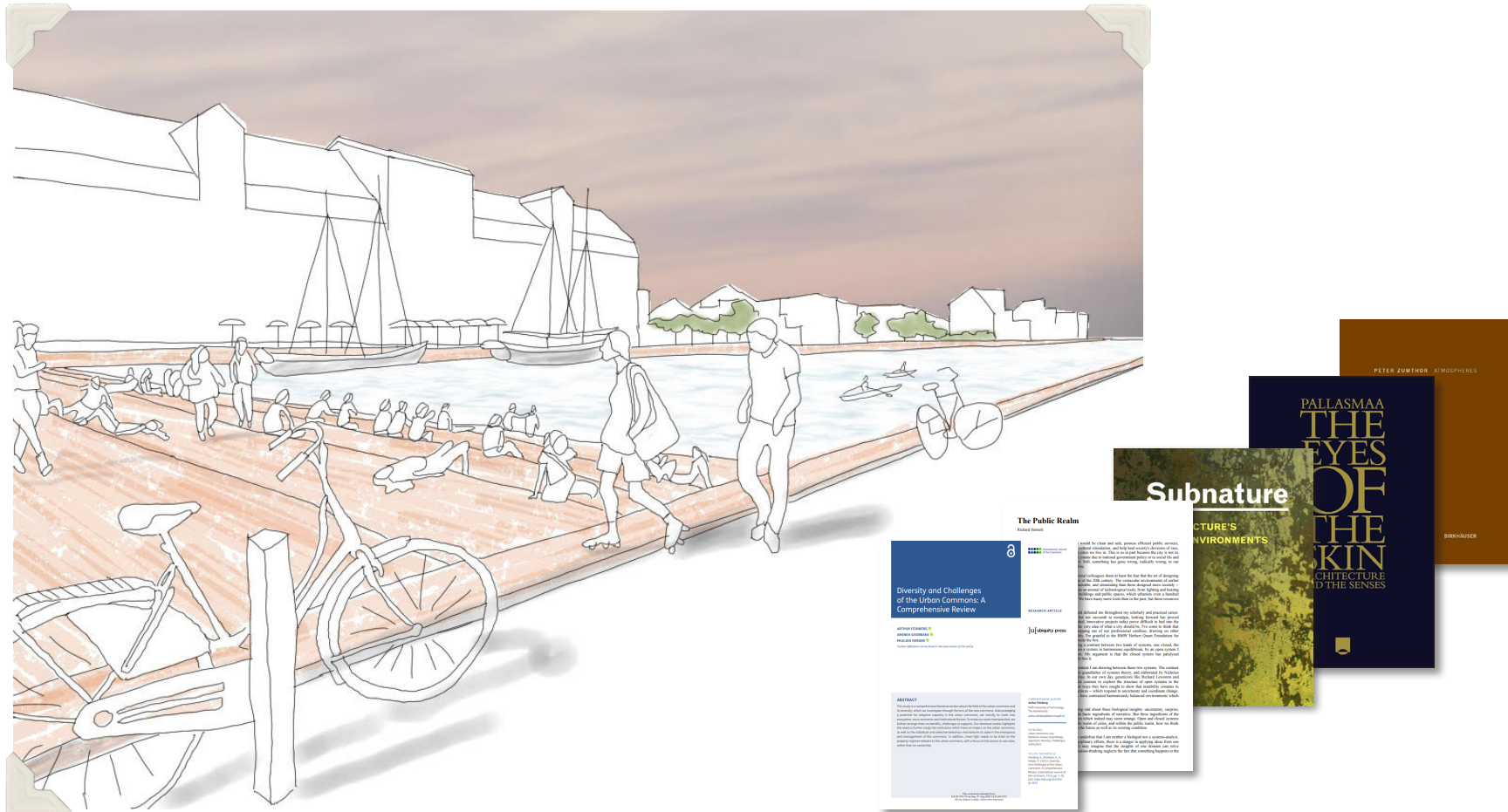


Illustration made for TD assignment 1 on borders and the public realm.

The two articles read, the three books recommended.

1.3 excursion preperation

I contributed to the excursion guide by writing our group work on the page, and by examining one case study that covered my interest. In my opinion, KU.BE house of movement was the perfect example of a public condenser because of it approached it through a health perspective and translated this in its space layout. (see picture on right)

Culture

Livia Wassink
Hidde Bartstra
Joyce de Louw
Maria Napieralska

Language & Religion

In Denmark, the dominant religion is the Evangelical Lutheran Church, known as the Church of Denmark, which is followed by around 75% of the population. However, Denmark is a highly secular society, and the Islam is the fastest growing religion nowadays due to rising immigration. Danish is the official language, spoken by the majority, with English being widely understood and spoken. The Danish language reflects the country's culture of openness and directness.

Cuisine & Crafts

Danish food culture is vibrant! They start their day either with a healthy yoghurt or at local bakery, ordering a cinnamon bun. 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 hygge! Traditionally, they 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. Its most famous example is Noma.

Danish culture combines tradition with innovation, and this is also what their crafts are known for. Crafts like woodworking, ceramics and cord weaving have been incorporated in modern design. Moreover, sustainable innovation is realised through data governance. It ensures the existence of smart cities through efficiently collecting (transparent) data in order to improve public services and quality of life.

Traditions & Values

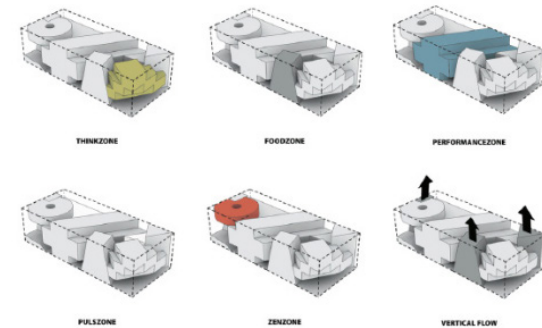
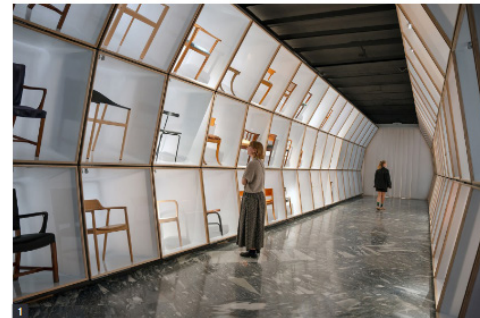
Danish traditions emphasize community, simplicity, and balance. A key aspect is hygge, the art of creating cozy, intimate moments often shared with loved ones. Another significant cultural concept is Jante Law, which promotes humility and equality, discouraging individuals from standing out too much.

Throughout the year, several celebrations bring people together. Sankt Hans on June 23rd marks the summer solstice with bonfires, while the Distortion music festival takes over the streets of Vesterbro, celebrating urban life and music. Over the summer many people join flea markets in the city, as well as take advantage of the renovated waterfront areas. The beginning of the winter season is marked with the J-Day in early November, with a release of a Christmas beer. St. Lucia's Day on December 13th brings candlelit processions symbolizing light in the winter's darkness, leading to Jul (Christmas), which focuses on family gatherings, Christmas lunches, and nisse, the mischievous elves.

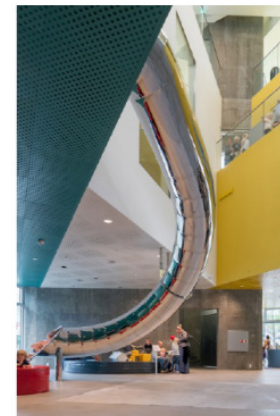
Danish Design

Danish design, or more specifically, Danish modern design, originated in the mid-20th century and was greatly influenced by the Bauhaus movement in Germany, specifically with regards to the minimalist and functionalist principles, such as 'form follows function', and 'less is more', turning away from the existing decorative and ornamental approaches to design. The longstanding tradition of woodworking and craftsmanship in Denmark, particularly with regards to furniture, was influential in the development of Danish design into something distinct from Bauhaus. While clearly sharing a mutual philosophy, a difference between the two styles is the preference for warm, natural, organic materials and forms seen in Danish design, as opposed to the colder, more industrial approach of Bauhaus.

The works of designers like Kaare Klint, Arne Jacobsen, Hans J. Wegner, have all contributed to the contemporary renew of Danish design, and the legacy of Danish modernism can be explored at the Designmuseum Danmark, but is also reflected in the architecture and interior design seen throughout the city.



1 Design Museum Denmark.
2 Sankt Hans Fest celebrated in Nyhavn.
3 Bike counting as a form of transparent data.



research themes 40

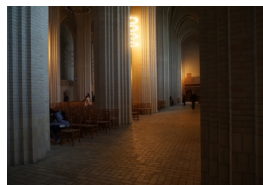
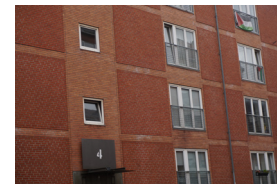
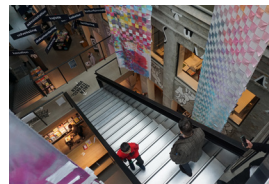
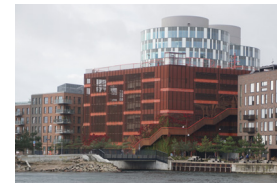
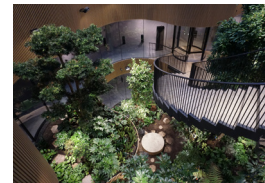
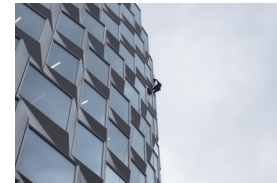
research themes 41

case studies 113

A collection of the pages I contributed to for the excursion booklet.

1.4 copenhagen trip

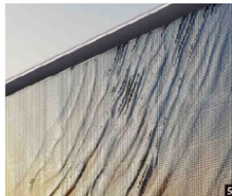
Pictures taken on our four day trip to Copenhagen. From the first three rows on the city centre, to the last three on the Nordvest and Bispebjerg area. For me, this still felt like a more diverse Copenhagen.



1.5 mapping & research

This week consisted of our revised assignment 2 of TD. Inspired by Tschumi, our group tried to understand the perspective of minority residents in the Nordvest area. It shows that the area is not made for everyone, and that it is perceived very differently depending on the person.

I looked into the perception of a disabled person, who could come across the following obstacles: a busexit not working, a sudden bump in the road, a long street going upward and stairs only at the local bakery.



Inspirations for design tools.



Assignment 2 on mapping, inspired by architect Bernard Tschumi.

1.6 poster & reading

Instead of handing in a solid abstract, I had to read much more on my topic, so my research was until this point very extended. Moreover, a presentation on culture in Copenhagen and Nordvest with a poster was presented that day.

Culture

Livia Joyce de Looze, Maria Napieralska, Hilde Barstra

Religion and Spirituality

Nordvest is a multicultural neighbourhood which is reflected in the diversity of religious buildings in the area. Notably, there are a relatively high number of mosques compared to the rest of Copenhagen.

Heritage and History

The industrial cultural heritage and brick housing is endangered by the increasing gentrification in the area. Existing buildings are being replaced by new development projects; homogenous, gray concrete buildings.

Community and Social Spaces

The perception of Nordvest is largely negative especially with regards to safety, both from outsiders as well as residents within the area, despite the fact that crime rates are not significantly different from the rest of Copenhagen.

Education and Institutions

The prominent libraries in the area are multifunctional and community oriented, as opposed to purely academic. There are many cultural houses compared to other neighbourhoods, yet few museums to attract visitors from outside.

Performance and Entertainment

Apart from the Grundtvig Church, most of the performance and entertainment venues in the area are locally oriented. There are not a lot of cultural attractors for people outside of Nordvest.

Exhibition and Convention

Murals and street art make up an important part of the Nordvest urban landscape. The art scene in Nordvest is becoming an important part of the local identity, and the area is home to the largest open air art gallery in Scandinavia.

1. Imam Ali Mosque

2. Demokrati Garage

3. Ungdomshuset Social Centre

4. Temestervej Biblioteket

5. Dansekapellet

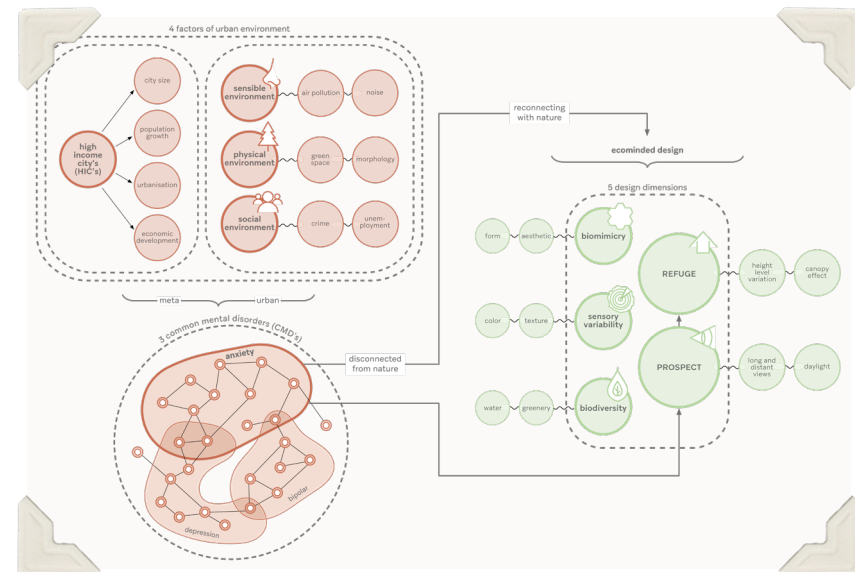
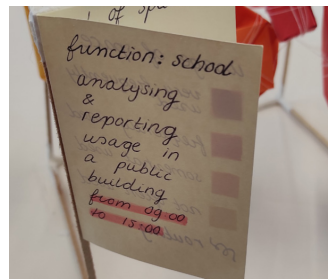
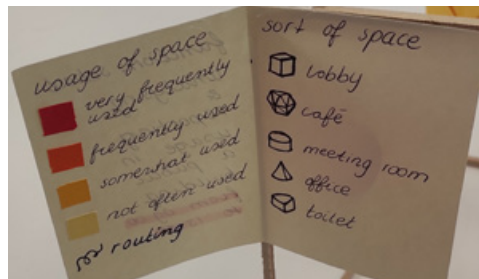
6. Open Air Gable Gallery Project

Further readings to extend research, with Van der Wal et al. as a primary source.

Group poster on cultural institutions in Nordvest, a form of mapping.

1.7 diagramming

After reading articles on diagramming in design, I came to realise how abstraction of complex problems can give more insight into how its connected. For TD assignment 3, we had to make a diagram from the literature read that had to do with public condensers. We thought of multiplicity in time and function, and through a 3D model, wanted to show that a building with many functions can be used a lot over time. Moreover, from all the literature I read, I tried to make clear for myself how my theoretical framework would work, also through diagramming.



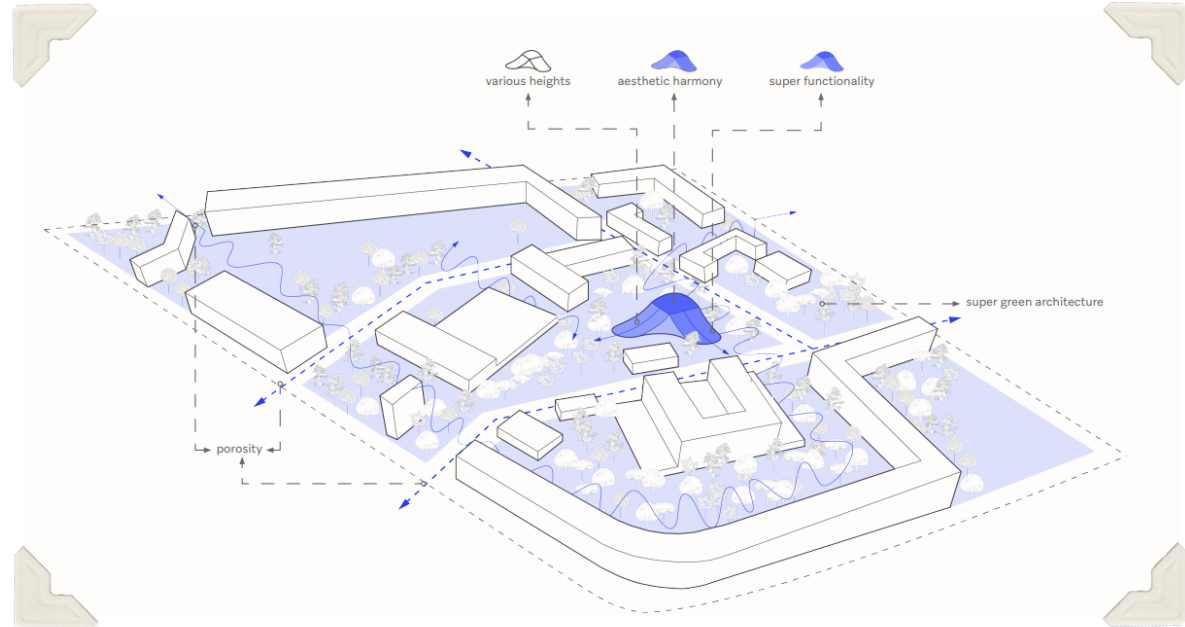
TD Assignment 3 on diagramming, showcasing multiplicity through temporality in design.

1.8 hybridity and pitch

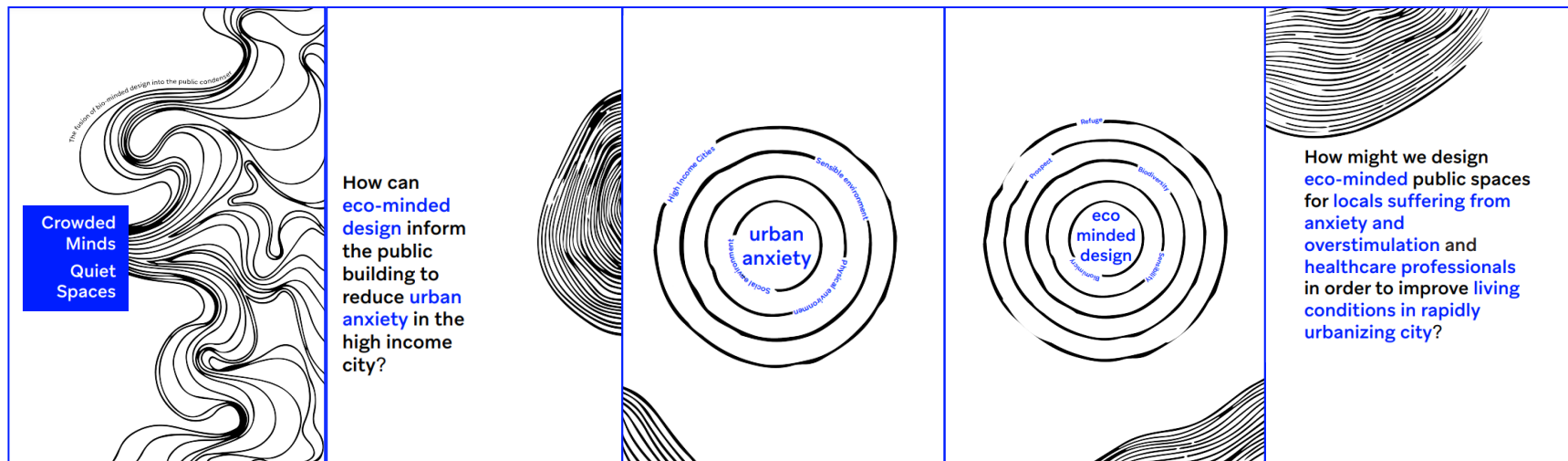
After reading the two articles on hybridity, I wanted my public condenser to adhere to five hybrid potentials. In general the condenser interpolates from the idea of blending the natural and social landscapes of the city. I also did a three minute pitch on design thinking.



Readings on hybridity for TD assignment 4.



Schematic axonometry of the hybrid condenser and its symbiotic relationship with surroundings.



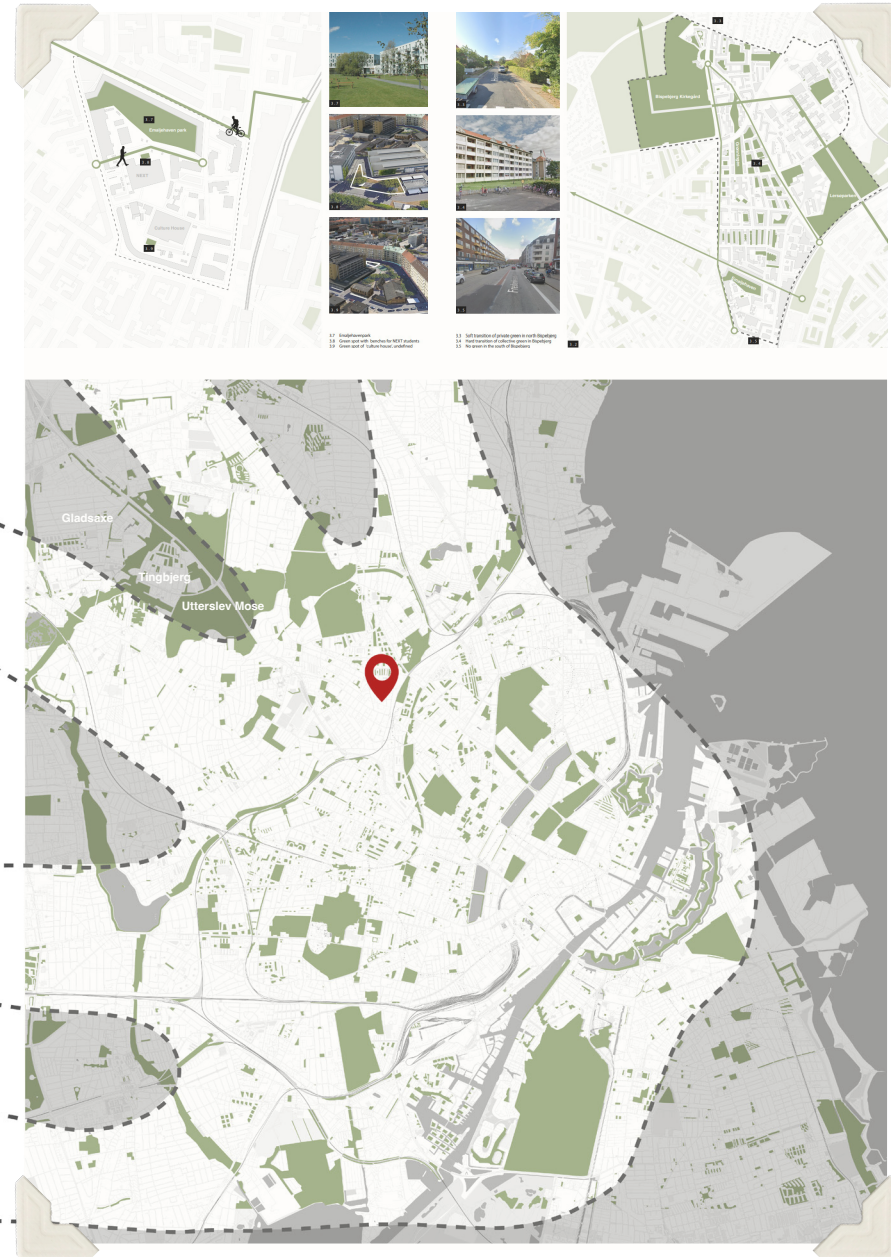
Presentation of one minute pitch on my topic and research groups involved.

1.9 p1 group & rp final

In this week, I worked on finalising my research proposal, in which I decided to pitch eco-minded design. I also looked more into the greenery of Copenhagen, and linked it to morphology through mapping. This is important for my positioning.

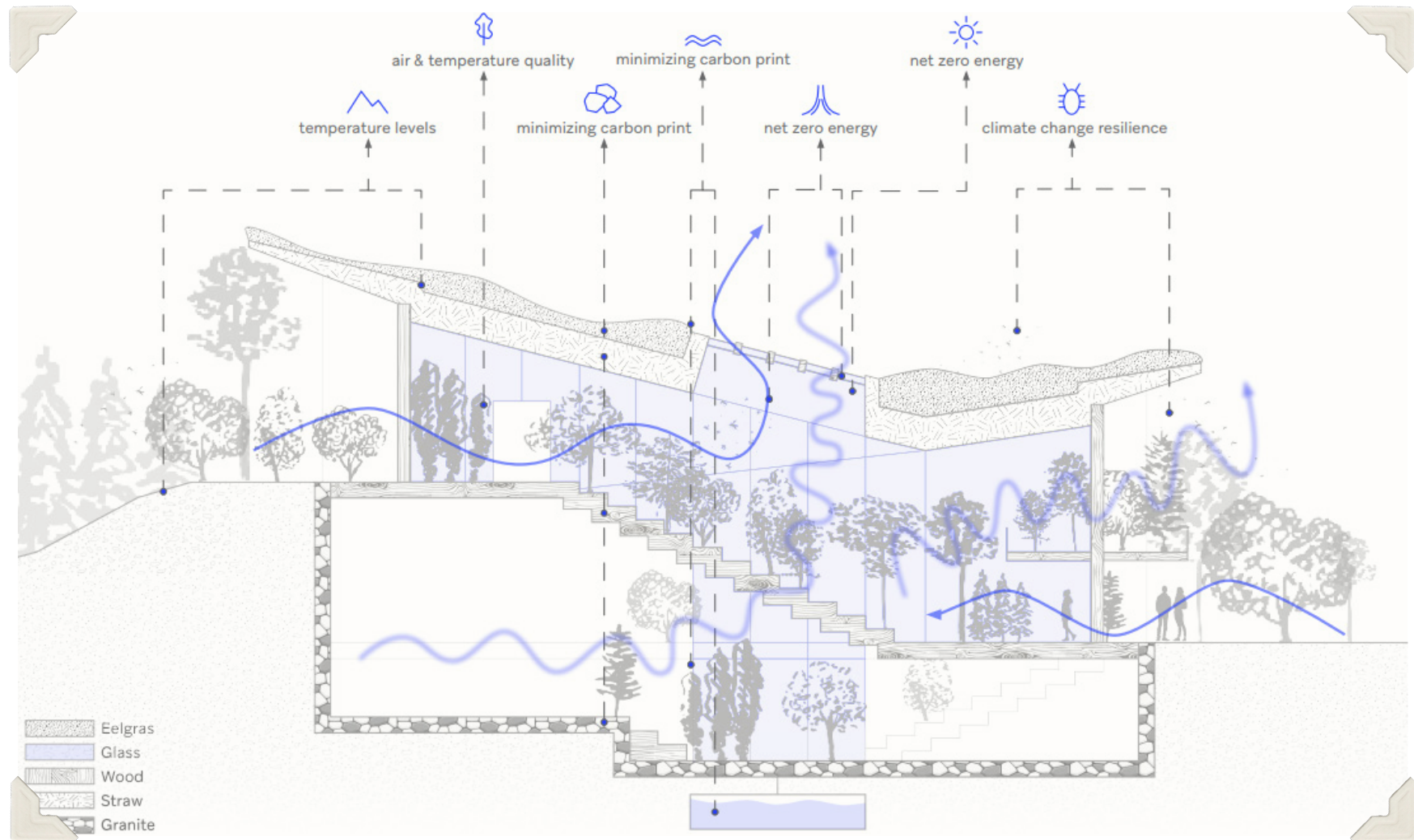


left: some pages from my final research proposal.
right: mappings for p1 group presentation.



1.10 p1 individual

P1 is received well in terms of research. It is however lacking site area research, and is in need of more solutions other than 'a hillside building'. Passive building design is not well argued. Come with more tests, design principles, and talk about SPACE.



Schematic section presented on final slides talks about a passive building, and how that makes the building and the humans healthy.



Working individually, yet still discussing and helping each other every thursday at our faculty studio.

Q2

from research to concept research and design

In Q2, the focus shifted from research only into the formation of your concept design, ultimately leading up to a go/no-go moment before Msc4 starts. It moreover included lectures on material awareness and sustainability, thereby providing theory on your TBD for Msc4.

2.1 research by design

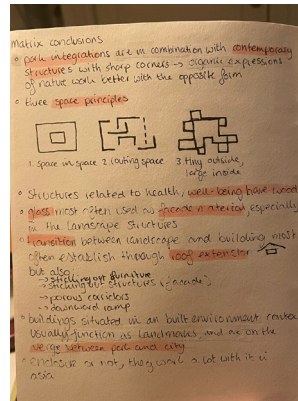
Before the first class that Thursday. I made the Q1 part of the Design Journal. This Q2 will be no different in layout, only the font changed from Aribau Grotesk to Adobe Clean. 2.10 will show the model, which was completed in week 2.9.

2.3 matrix & location

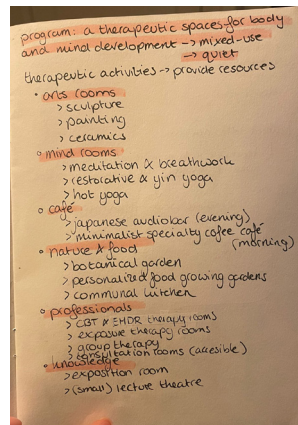
You have to put case studies together and measure the same aspects, a lot of them! I concluded that park integrated buildings work best on location and for eco-minded design and that these buildings are well transitioned between landscape and city. Moreover, I made a first attempt into the programming, and made an Pve in the booklet and Excel.



Three case studies embedden into landscape.



Conclusions from the matrix. Especially park integration is an important take out.



First program ideas.

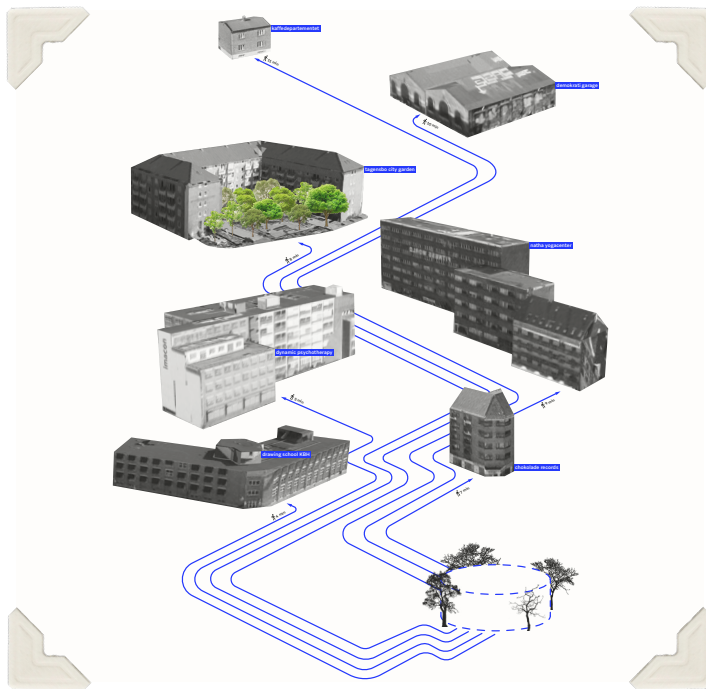
	scale	form	program	interior	materials	internal organization	con.
1 Passive Pavilion	1200						
2 Coastal Center	700						
3 Merya Sanitary	240						
4 Maggie's Center	1922						
5 Lion Park	150						
6 Dakpark Rotterdam	80.000						
7 Ehwa University	70.000						
8 Seattle Museum	36.000						
9 Botanic Garden	1850						
10 Novartis Center	1900						
11 Hedge House	560						
12 Longwood Gardens	3000						
13 Airbubble Restorative	50						
14 The Blue insight cave	460						
15 Agape Housing	230						
16 Student Services	13.000						
17 Farm Hotel	630						
18 Loop House	800						
19 Keystone Forest	1880						
20 Qingchen	1800						

Matrix showcasing 20 case studies over seven dimensions.

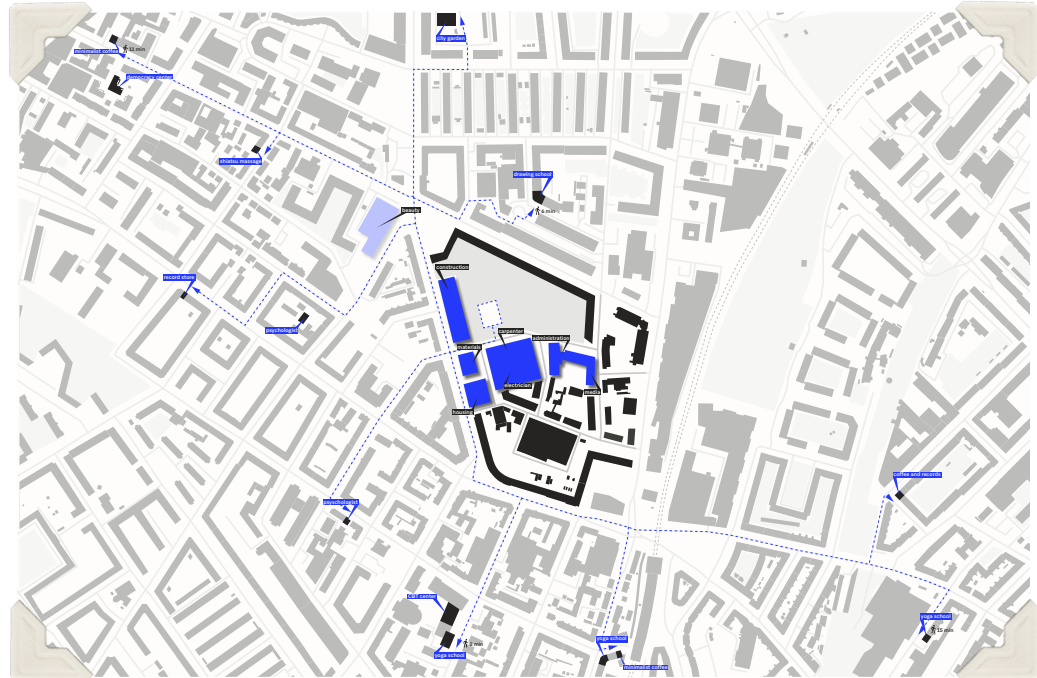
2.4 mapping the program

From mapping the program, I concluded that there is only one creative workshop in the area, yoga studios are there but not in natural surrounding, one small public garden, and psychologists are there but not very accessible. A lot is quite close, though, with the Demokrati Garage being the best example of a community center.

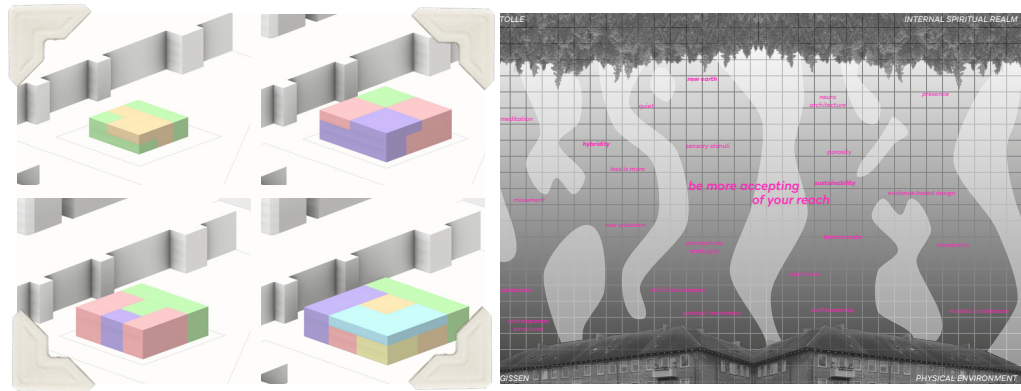
Zoom out from facts. What is truly needed? City life is not present life. How do you make a building that makes you consciously awake > exchange between physical environment and internal spiritual realm (Tolle). Minimise amount of external factors. Less is more. It must come from you. Around this the program will be shaped. All spaces are connected around one theme.



Scheme of routing for nearest program in Nordvest.



Map showcasing to what extend my proposed program is already present in the area.



4 versions of how programs are embedded in the building.

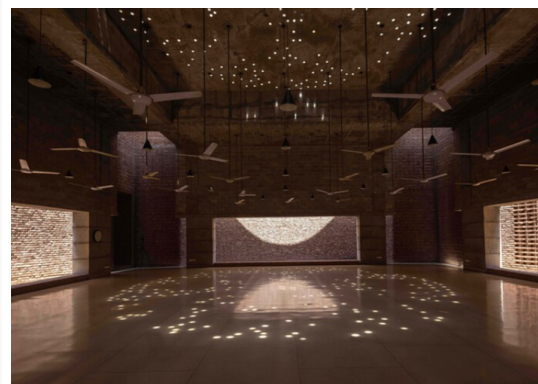
Wordcloud as a tool for concept clarification.

2.5 model massing & sound

Massing provided me the insight to engage the landscape in all kinds of directions and have the building stick out at certain points.

Conclusions after researching architects Liebeskind and Tabassum is that a public building and its spaces tell a story. A story that incites emotions made to self-reflect. Silence brings you the possibility to turn inward and get to that core. Daylight is tool that amplifies this journey of turning inward, giving atmosphere and emotion to a space. Are light and sound opposite tools? Can I create a journey where it gets darker and the sound gets louder, or where it gets lighter and the sound goes more quiet.

- **Anechoic chamber** – dark
 - Spending time in such a chamber can help treat stress, anxiety, and autism by providing a unique environment that can “reset the brain” reduce overall stress levels. (Towers, 2019) See also, Steven Orfield laboratories, describing it as ‘peaceful’ https://www.youtube.com/watch?v=Opn-G-OFbkM&t=25s&ab_channel=RyanTrahah
 - Participants with higher anxiety, negative affect, and noise sensitivity tend to report tinnitus-like sounds more often and perceive them as louder and more unpleasant. (Denys et al., 2022)
- **Muted silence** 20-30dNb: dampened soundscape where noise is significantly reduced
 - **Library** – abundance of natural lightning
 - Muted libraries reduce distractions, enhance **concentration** and promote comfort. (Manna & De Sarkar, 2022)
 - There would be no digital system in there and a no phone policy.
 - **Multifaith room** – slits or tiny holes of light through the roof/walls
 - Rooms where people of different religions and cultural backgrounds come to pray or meditate. It provides a moment of **solace** for individuals seeking emotional or spiritual calm. Light accentuates the divine.
- **Punctuated silence** 30-40dNb: silence occasionally interrupted by soft or periodic sounds, often natural, often man-made.
 - **Meditation/breathwork/yoga room** – direct natural light from windows
 - A multisensory space to enhance to encourage relaxation and presence i.e. through Tibetan singing bowl (Goldsby, 2017)
 - **Exhibition space** – curtain windows or slits of light through the roof/walls
 - Through interspersing silence with footsteps, whispers, or distant audio from exhibits. In this way, the visitor maintains focus while **subtly** guiding movement and interaction. (Yi & Abdullah, 2023)
- **Echoing silence** 30-40dNb: Spaces that reflect sound minimally but retain a resonance.
 - **Transitional spaces** – slits of light through the roof/walls
 - Empty halls can contain height, vaulted ceilings or mimic a canyon, whereby echoing sounds create a sense of **vastness** and introspection.
- **Transitional silence** 40-70dNb: transition from sounds of a dense neighborhood sounds of silence. Spaces outside of the building.
 - **Downward to entrance** – Shadow play from façade
 - Sloping underground dims external noise from the city through the entrance acting as a natural sound barrier. This space is **most emotional** (Bentzen et al., 2015)
 - **On hill** – direct sunlight
 - **Zen garden**: moving of gravel and introspective design creates **serenity**. Appeals to people in need of quiet and calm (George, 2020)
 - **Minimalistic landscape**: additional. Native plants and open views user a feeling of presence and **control**.



Kinds of spaces based on kind of silence.
A five page document

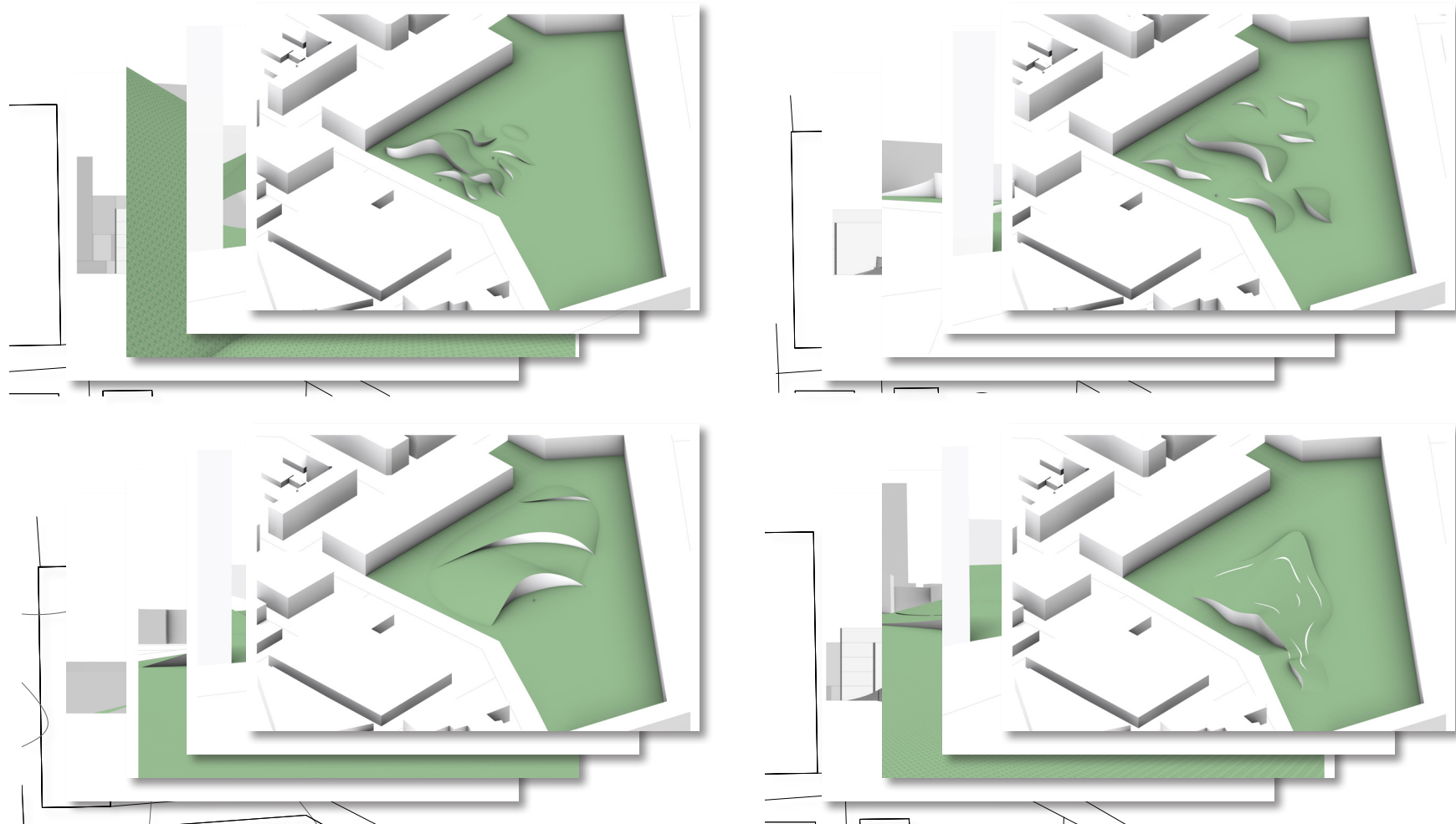
Marina Tabassum's view on light plays a huge role.



Three masses, five variations. Top one was best.

2.6 massing matrix

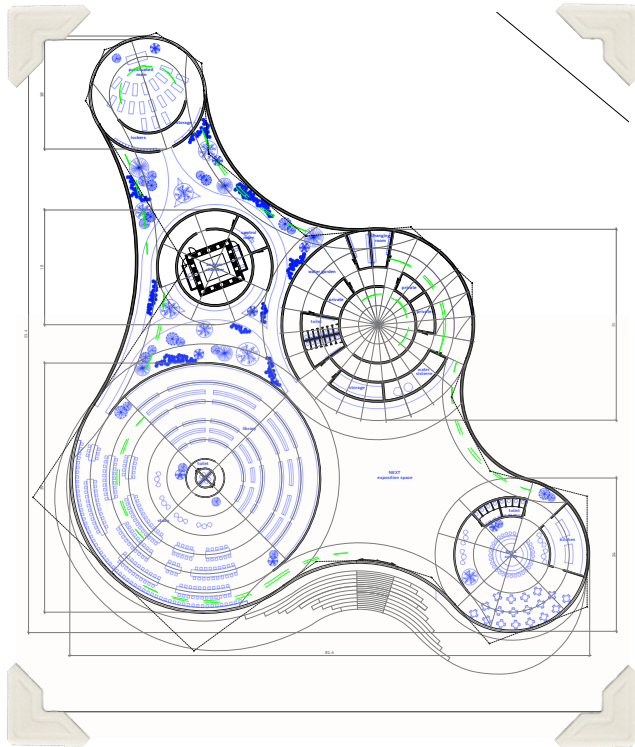
Program and form go hand in hand. I now know that my program is a continuation of flow of spaces, a journey. What massing applies to this? A massing embedded in the landscape that comes out at certain points, close to each other or far away? Does it follow the topographical lines of the landscape? In the end, I concluded I wanted one unified building sticking out of the soil, with parts of facades that stick out giving you a little bit of an inside from the outside. Slits could go in the roof to provide direction and skylight. How big do I want it to be now? It must not take up to much of the park. Remember from P1, landscape first > building second.



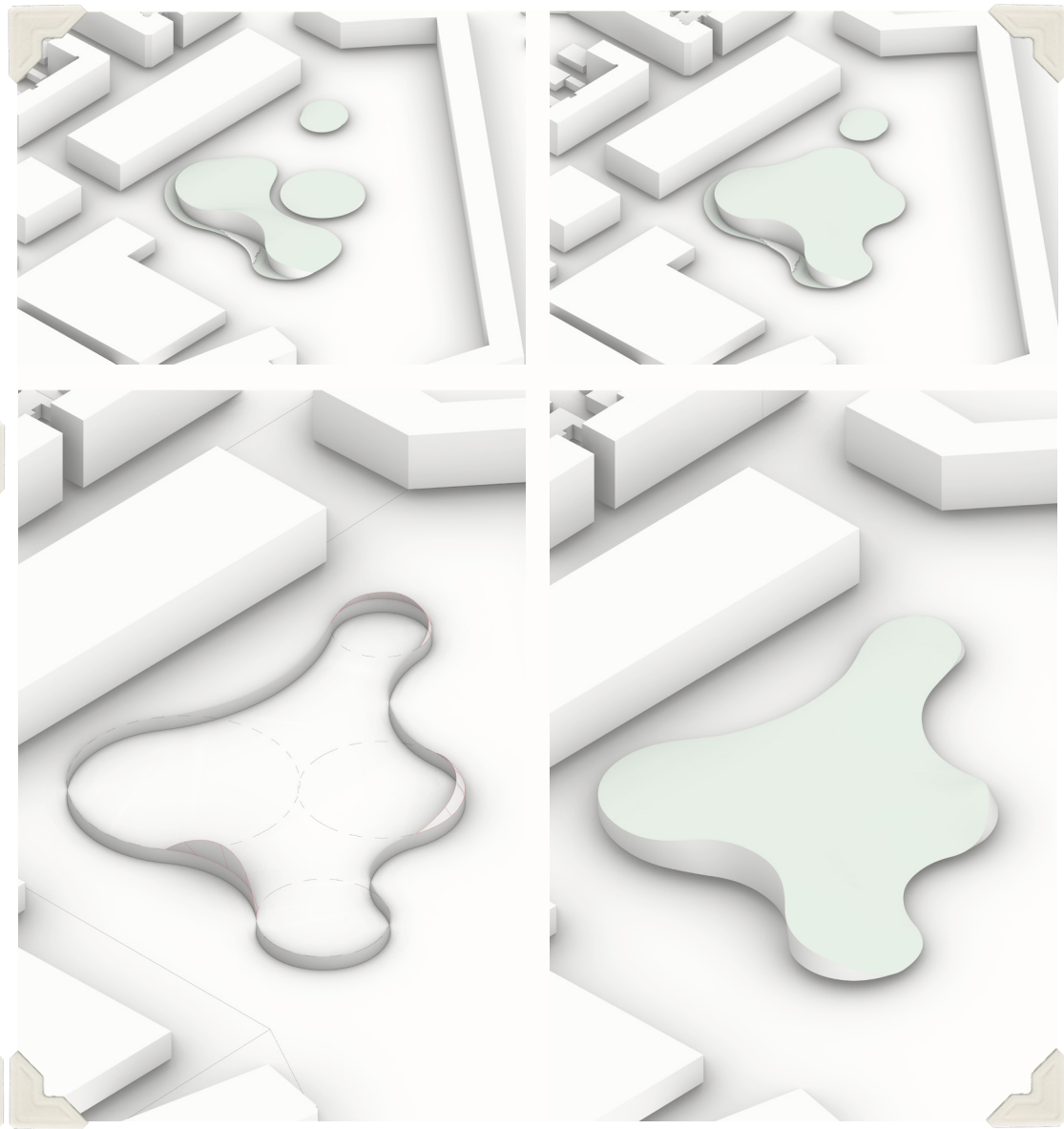
4 kinds of massing with landscape integration. Behind the birdseyeperspective are all two eyehight perspectives, a section and the top view/plan.

2.7 first plan & establishment

Shaping a organic form that is logical and predictable for construction is made up of cirkels that intersect into each other. Plan is made up of five cirkel compartments with inbetween flexible spaces or gardens. Building has two parts ; one open & one secretive. Roof shape was not yet sure. How high? Where flat and where not? One entity or do several still work? This can also make the landscape more variable and exiting. In the end one shaped worked the best, since the building below ground is quite fragmented, so this needed to be connected by one roof that is identifiable from the outside as one entity.



First plan. Not much needed to be altered.

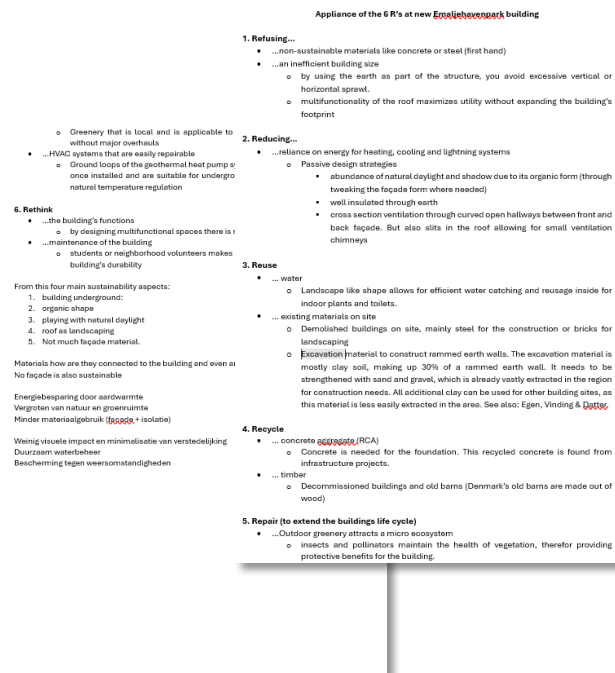


Another massing. The bottom one was the winner. Left shows space inside.

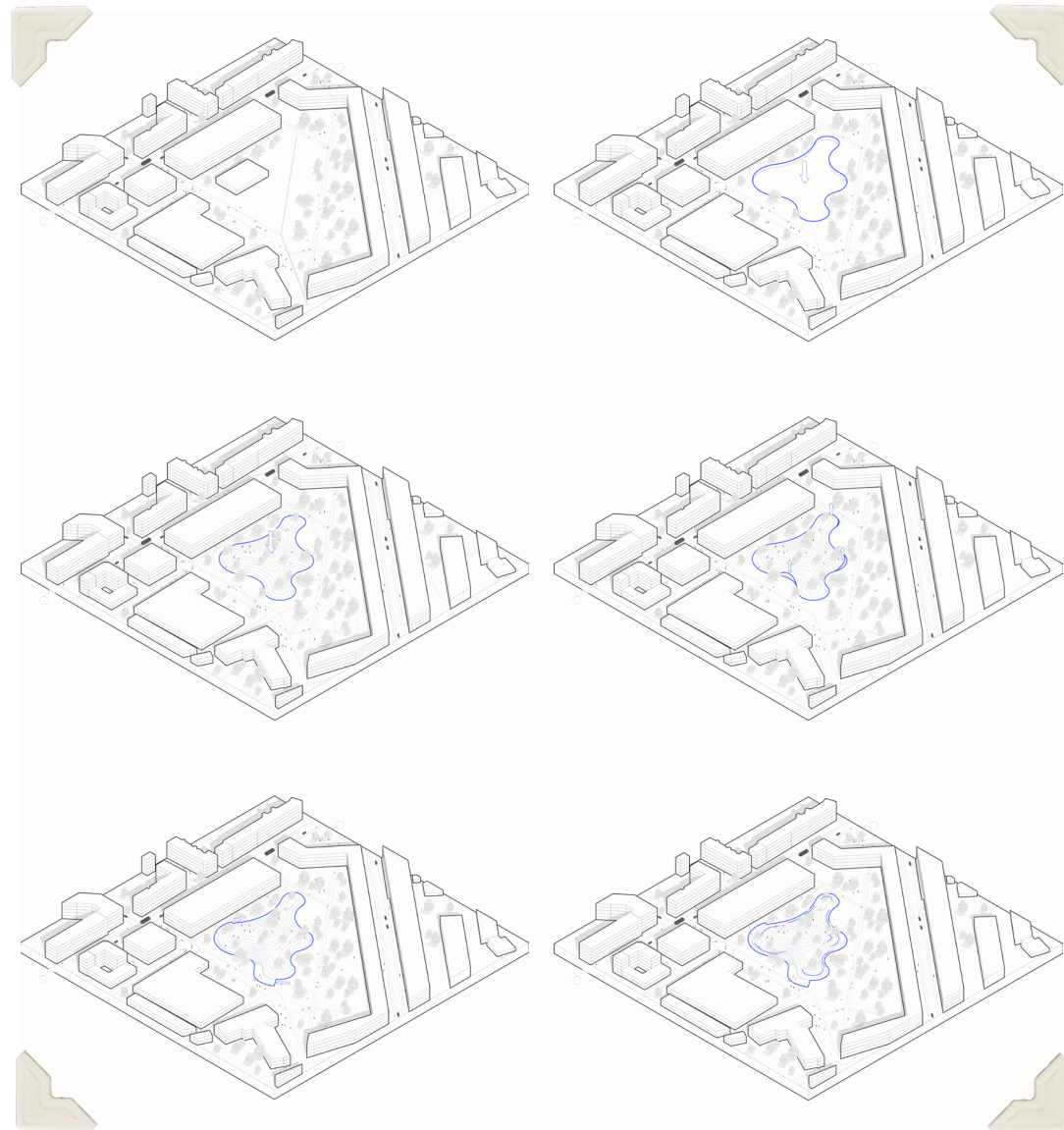
2.8 isonometry and the 6 r's

With the P2 already coming up one week later, I chose to first make the isonometric buildup as it is an important part of my story to explain how the shape works and how I got to it.

Next, I knew that sustainability needed to be thought off well before the P2 presentation. In first essence, my building is not sustainable as it is not build modular and is build underground which needs a lot of excavation. However I realised, underground buildings go a long way and give back to the city on the long term. They are landmarks. I came to the realisation as I tested my building along the 6 R's method.



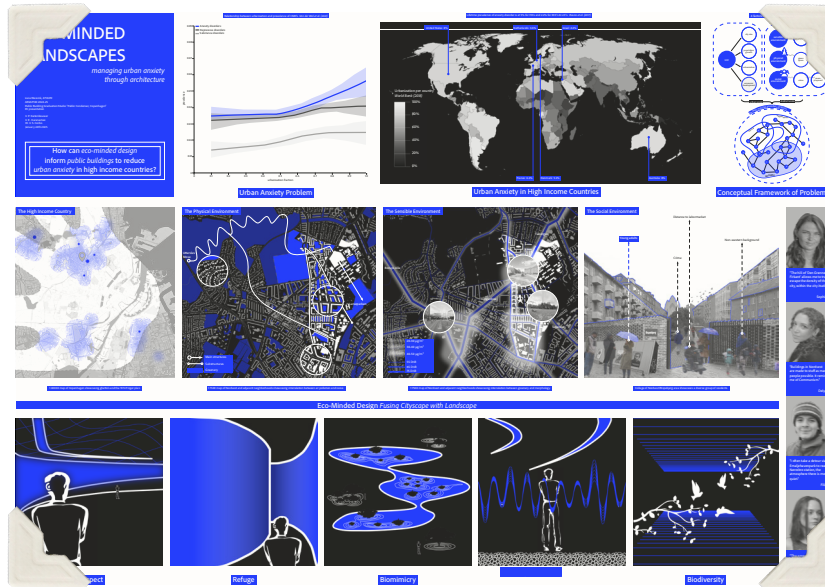
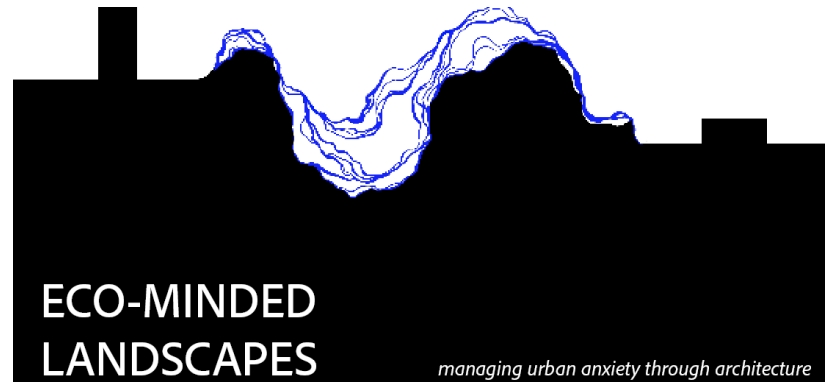
Sustainability of this building according to the 6 R's



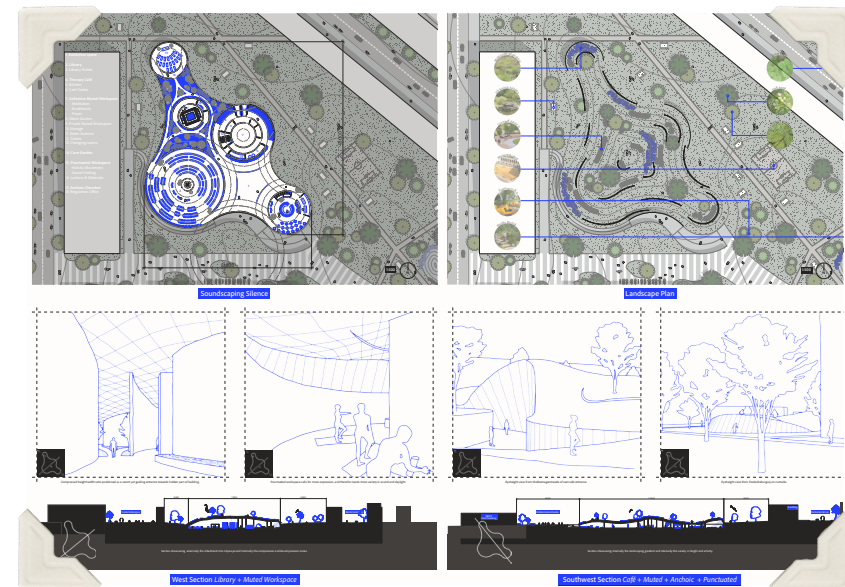
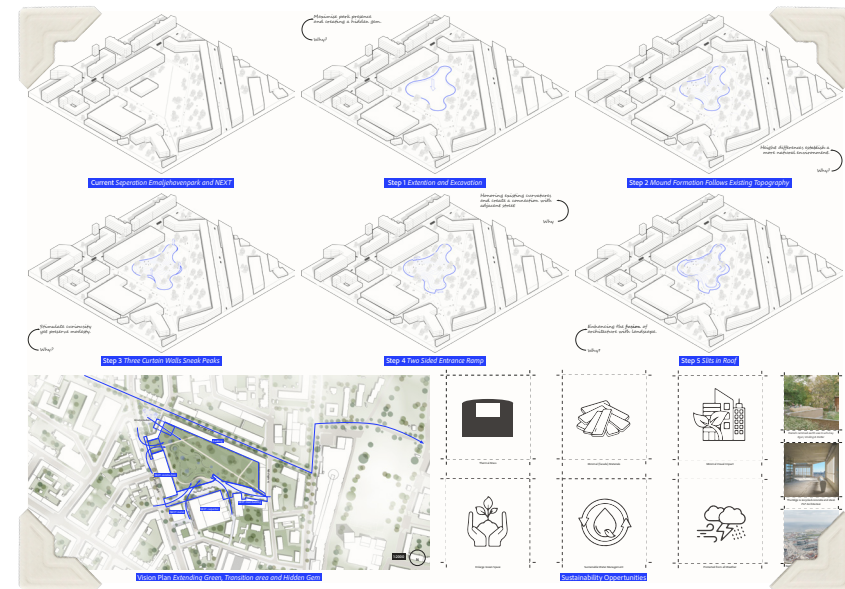
Isonometric buildup of the building starting with current situation and then steps one through five.

2.9 p2 and poster

The presentation is more than 52 slides, so I won't show that here. But here is a summary of it through 3 posters. The bottom one shows the research, and on the left are the remaining two parts of my presentation; the design. Under here you find the new front page and title.



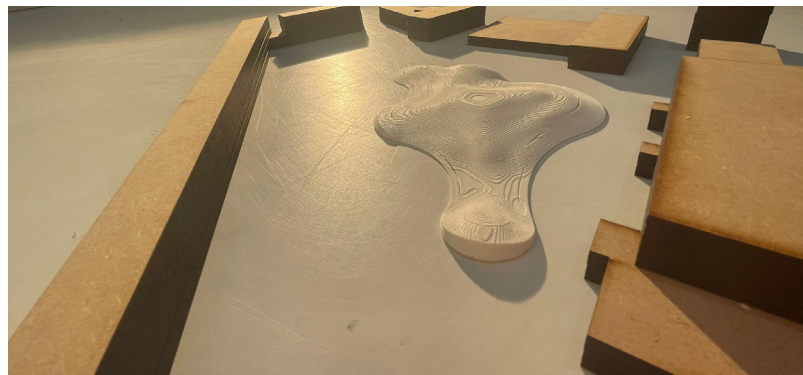
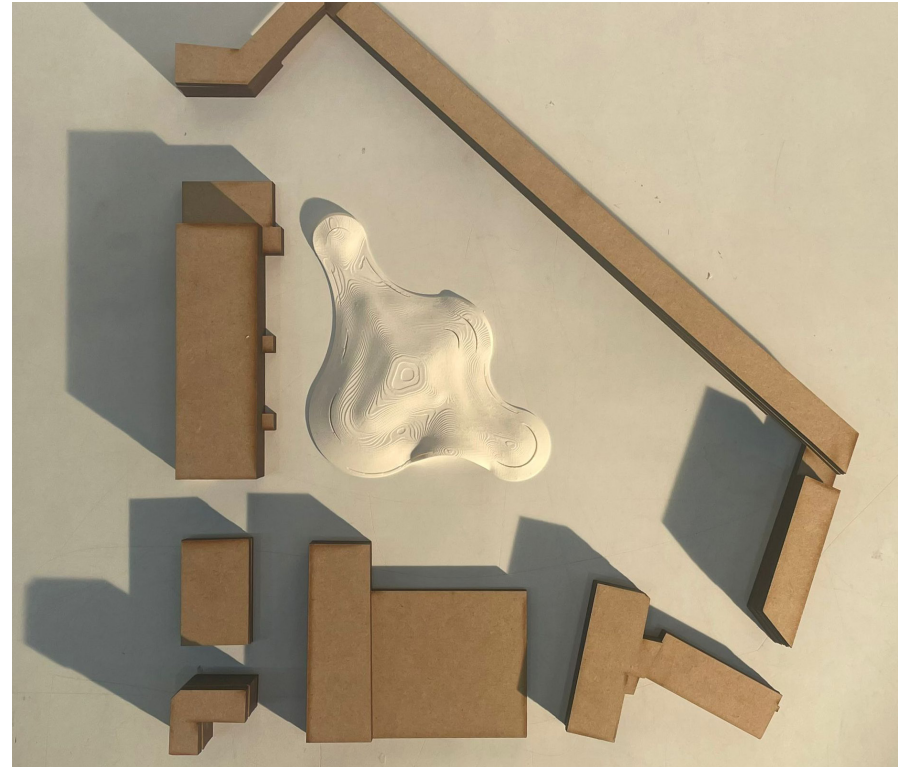
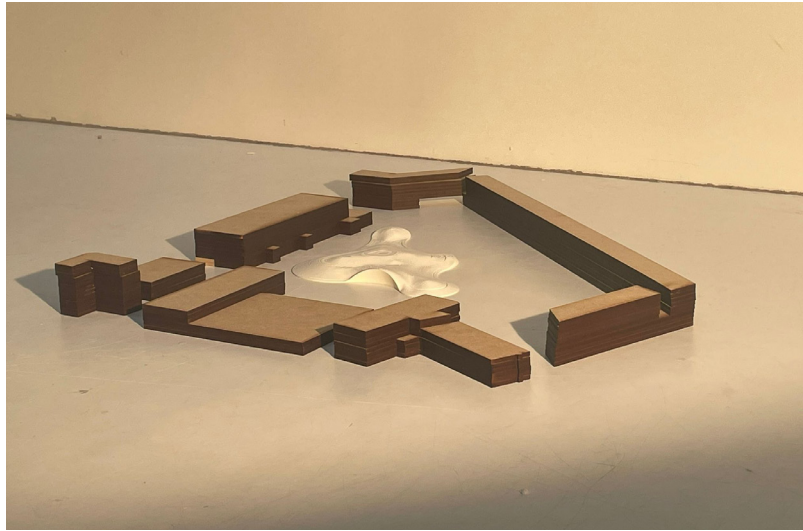
Research poster, showing a lot of info. Top: first slide of presentation.



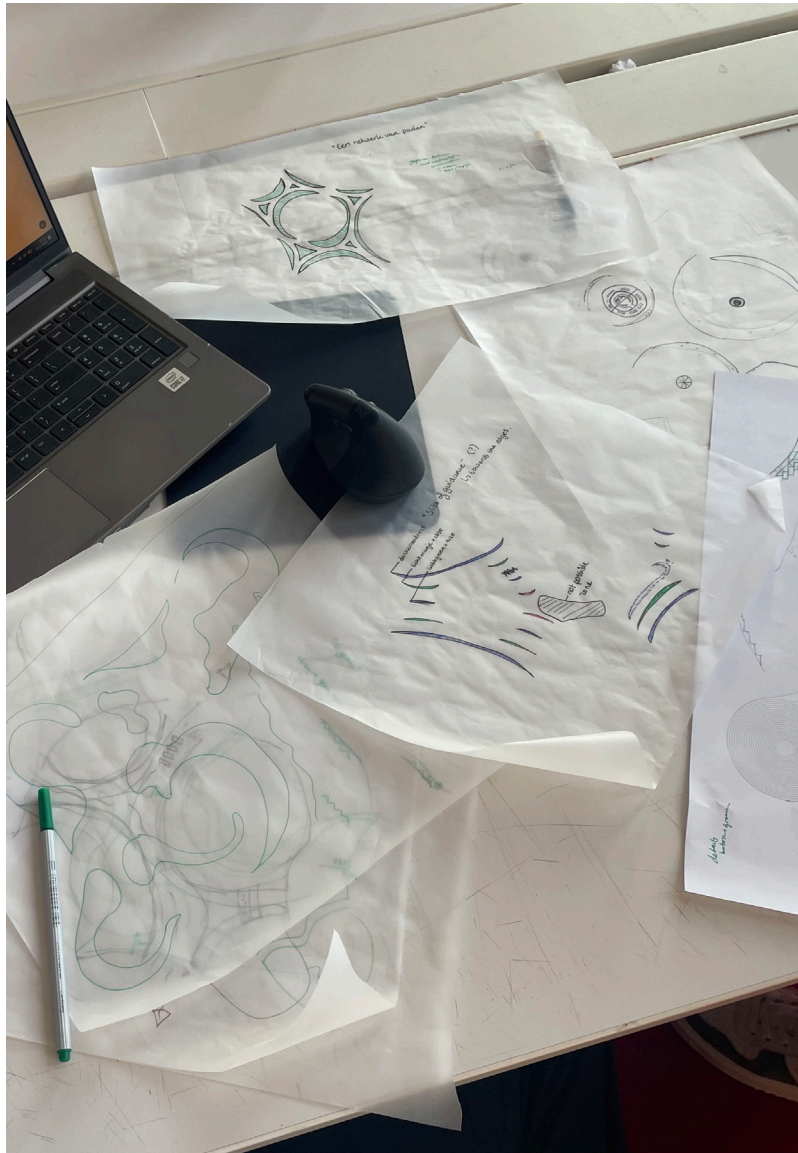
Design poster showing the concept of eco-minded design into practice

2.10 model for p2

Printed in CAM-LAB. I chose white and as it lays on a white ground to show the building is, from the outside, part of the landscape rather than the existing cityscape. Pictures are taken with the morning sun in effect (east). You can see the massing fits well within the surrounding park (i.e. not too high), and the building seems to be twinning with the NEXT one south.



Clockwise: southeast birdseye, topview, northwest birdseye, southwest eyeheight



A lot of drawing has been done to quickly test spatial relationships, lighting and circulation and how these influence each other.

Q3

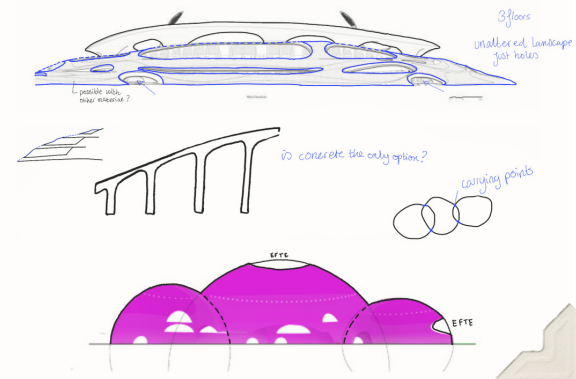
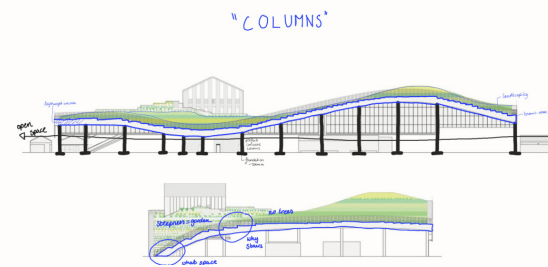
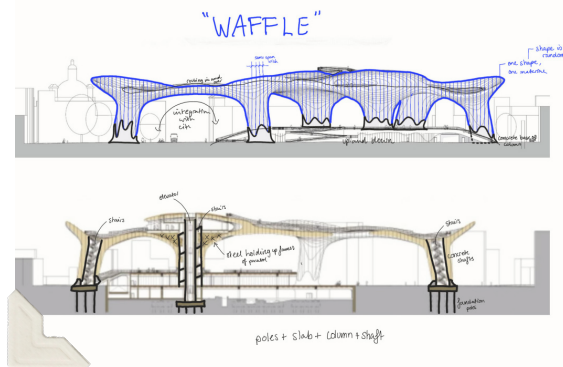
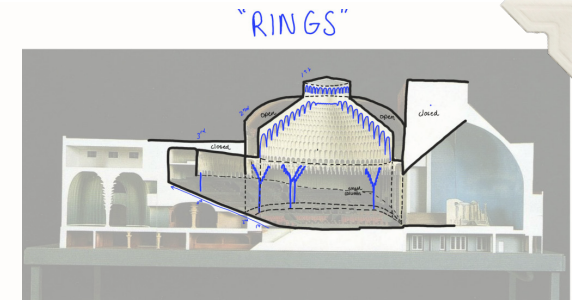
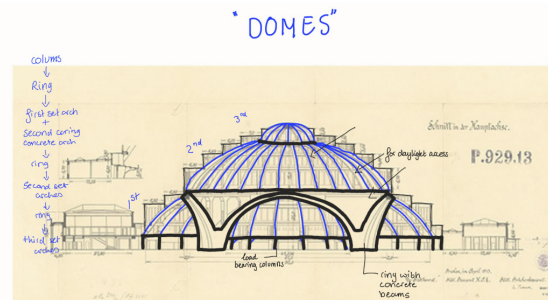
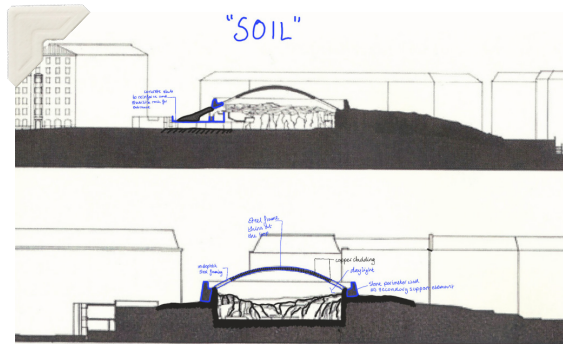
*from concept to
preliminary design
structural implementations*

In Q3, a lot of individual work has been done too deepen your understanding of the design. An actual building needs to be designed and you therefore need technical tutoring, whilst still dealing with the concept as well. Lecture series by TBD provided creative solutions to technical problems.

3.1 construction sections

Finding a construction principle was the next big step after P2, and definitely needed some research as my building could have many and they would all have big implications on its look and feel.

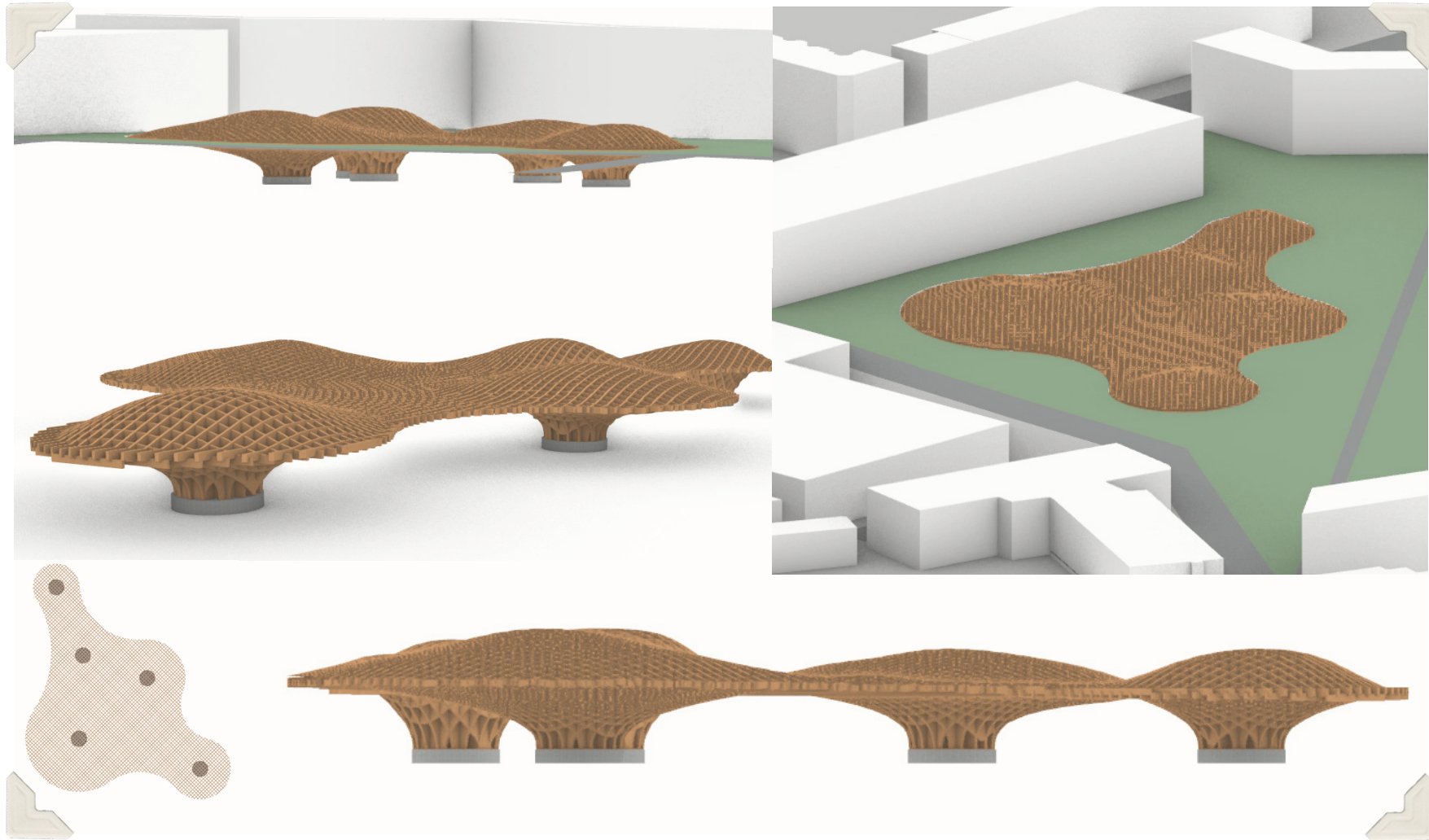
The waffle construction for now seemed to be the best construction fitting my building, as it was truly a landscape. The domes however, were also worth applying to my design, as they made the compartments central focal points of the building and allowed for a contrast with the inbetween spaces. I also looked at the embedment in landscape and how they applied zenithal lights into the building.



The six analysed sections with their main- and subconstructions. Above right: analysed case studies

3.2 waffle structure research

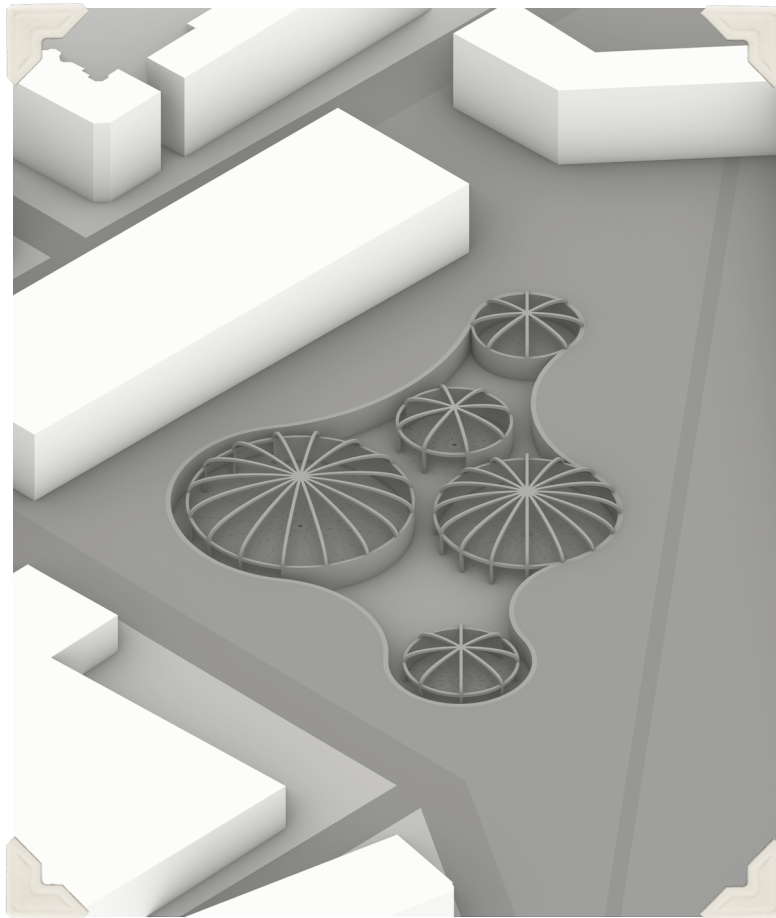
A waffle structure is part of parametric design strategie, allowing for non-geometrical shapes like a landscape to take place. Also it can be made of wood which is good for sustainability. Negative side effects are the extremely large columns in the middle and the the long, curved slits which can't be implemented.



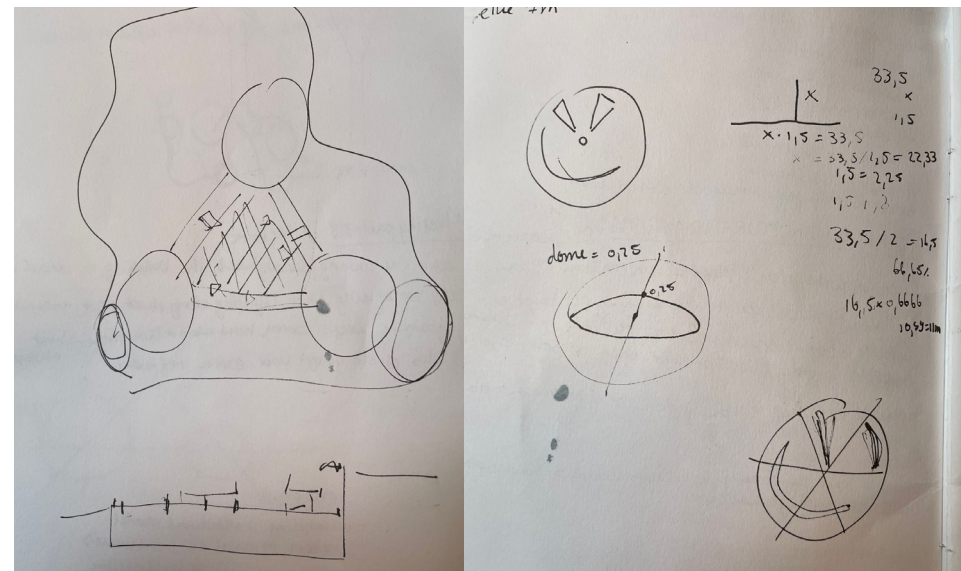
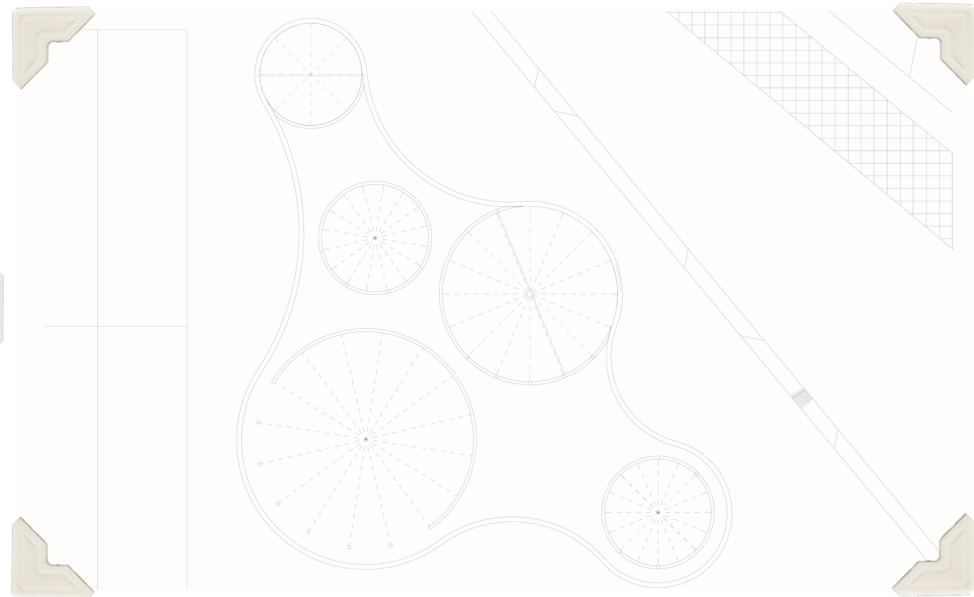
Waffle structure modeled in rhino 1x1m.

3.3 dome structure research

Dome construction is the most logical construction in terms of compartments that have all the attention. It creates differences in height as well. Inbetween the compartments many beams can be constructed, but they can't have a long span, so sometimes columns are needed. This doesn't feel like an uniform landscaping roof to me.



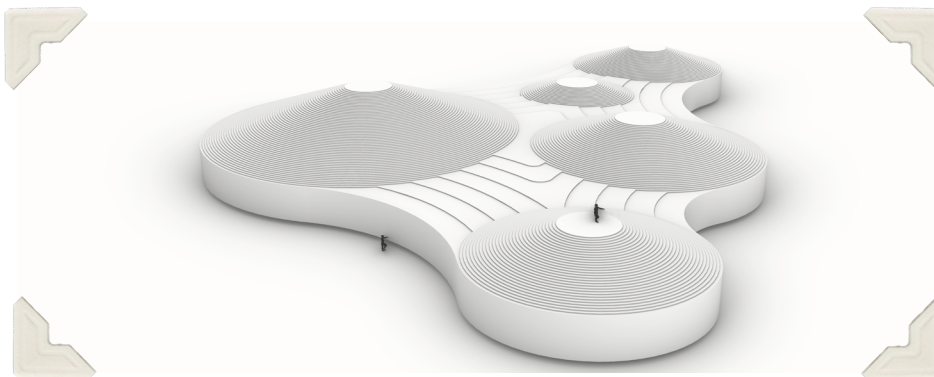
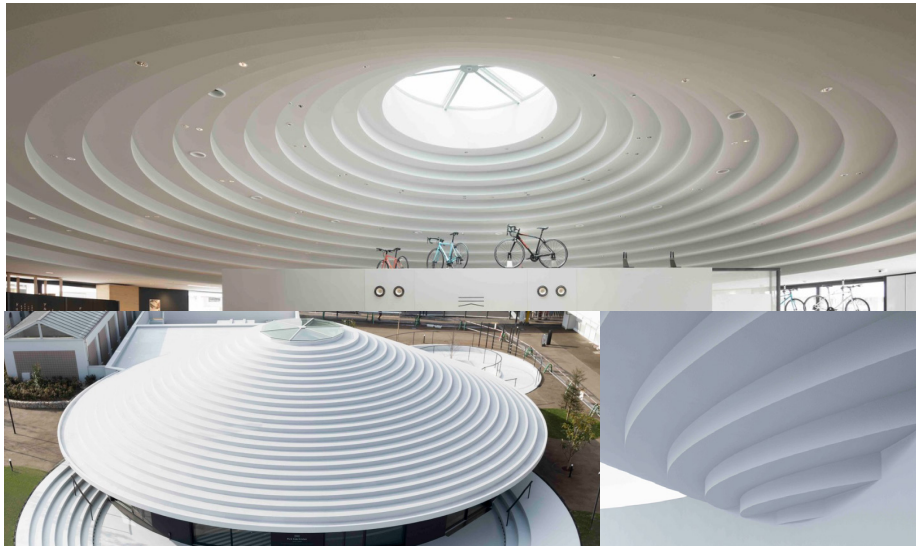
Domestructure applied to landscaping model.



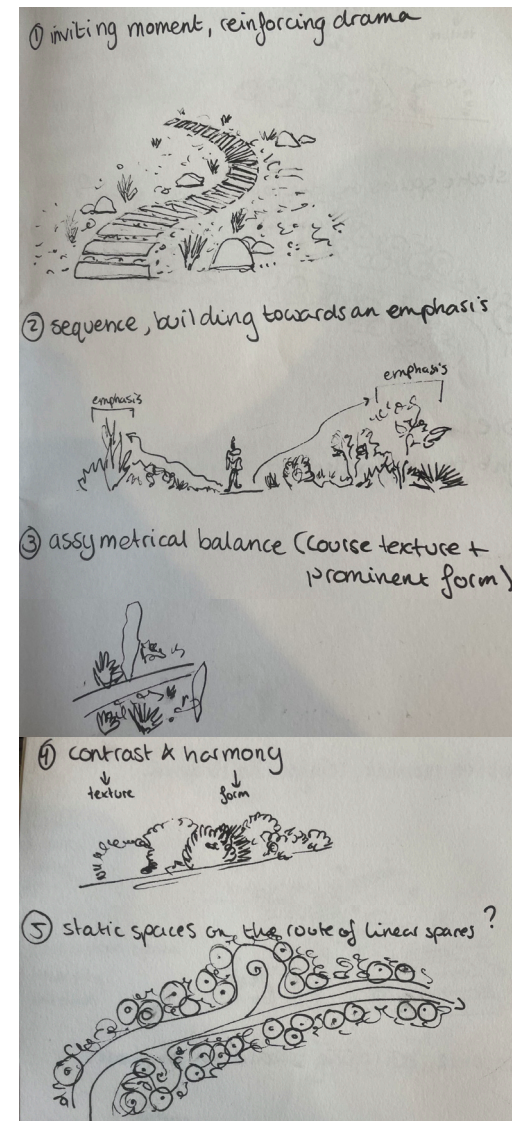
Top: construction plan principles. Bottom: Sketches from meeting with Annebregje.

3.4 stepped model and landscaping principles

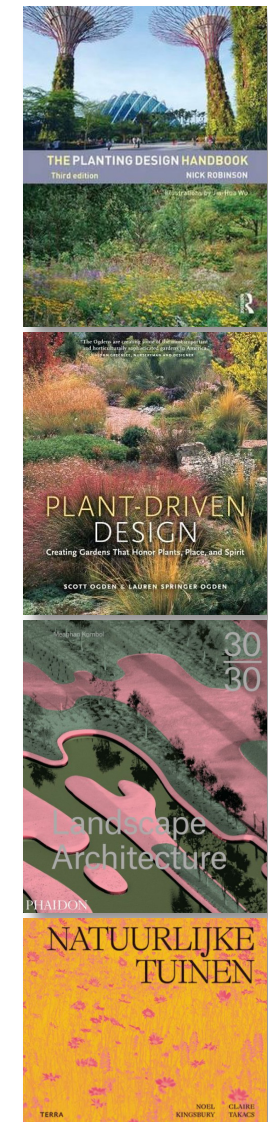
I wanted a unifying roof with curves that represented landscaping and found the reference of CoFuFun in Japan. They used precast concrete sandwichpanels. i applied it to my building and immediately saw solutions for lightning and inside mirrored structure principles. Moreover, I met with Fabiana Toni, and we both came up with landscape principles.



Translation of CoFuFun reference into roofing principle.



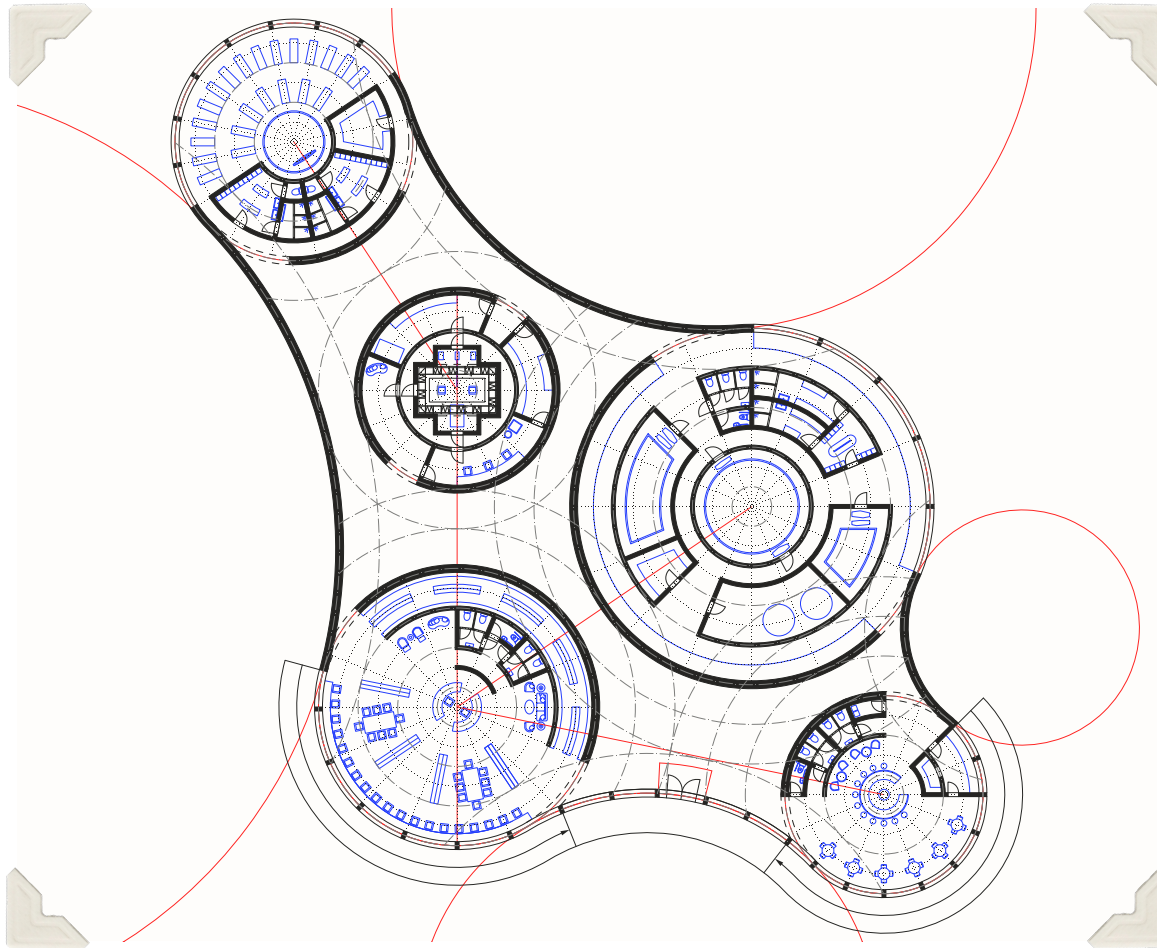
Landscaping principles of design.



Landscaping books.

3.5 technical research and plan update

The old plan got an update. In an effort to give a more human scale to the building, the building got 0.6x smaller. Especially the library. Moreover, all circles in the grid are now geometrically aligned, and finally, another option for the roofs within the compartments was drawn. Moreover, I did research on the soil of the area, detailing of a green roof with the existing park landscape, and discovered a good reference for my roofconstruction with prefabricated concrete slabs.

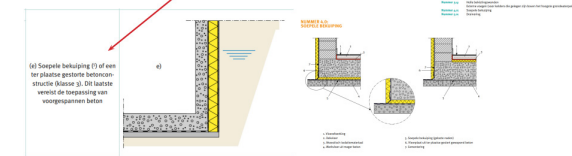


The updated plan aligns all the circles in a complete grid of 3m distance.

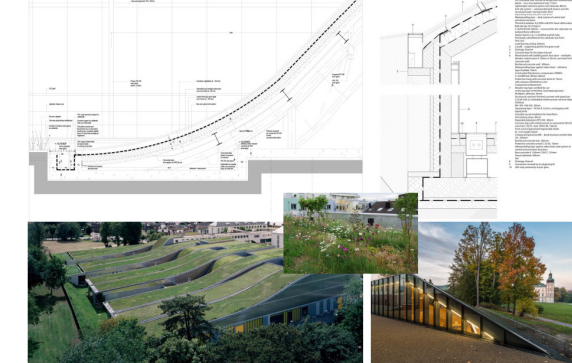
Structure: cellar

Geology		Groundwater		Water table (not operational)	
Prof.	Number	Prof.	Number	Water table	Water table
1	1.1	1.1	1.1	1.1	1.1
2	1.2	1.2	1.2	1.2	1.2
3	1.3	1.3	1.3	1.3	1.3
4	1.4	1.4	1.4	1.4	1.4
5	1.5	1.5	1.5	1.5	1.5
6	1.6	1.6	1.6	1.6	1.6
7	1.7	1.7	1.7	1.7	1.7
8	1.8	1.8	1.8	1.8	1.8
9	1.9	1.9	1.9	1.9	1.9
10	1.10	1.10	1.10	1.10	1.10
11	1.11	1.11	1.11	1.11	1.11
12	1.12	1.12	1.12	1.12	1.12

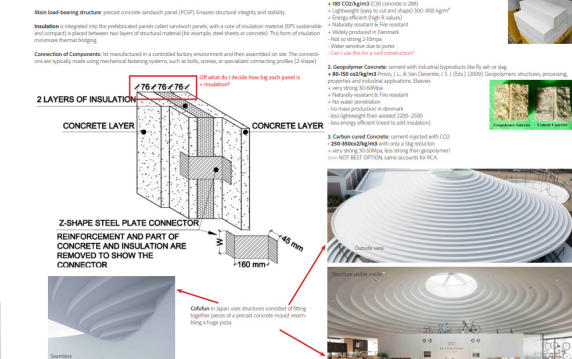
TV 201: REFERENTIEDELTALS VOOR INGEWASSEN CONSTRUCTIES
Het niveau van het grondwater is permanent lager dan de bodemwater > 3A
Geoteg: permeabel
Bijlage van het ontwerp: weg naar buiten en in de stad, de
Volgnummering bouwkosten: WAARSCHIJNLIJKE



Structure: green roof



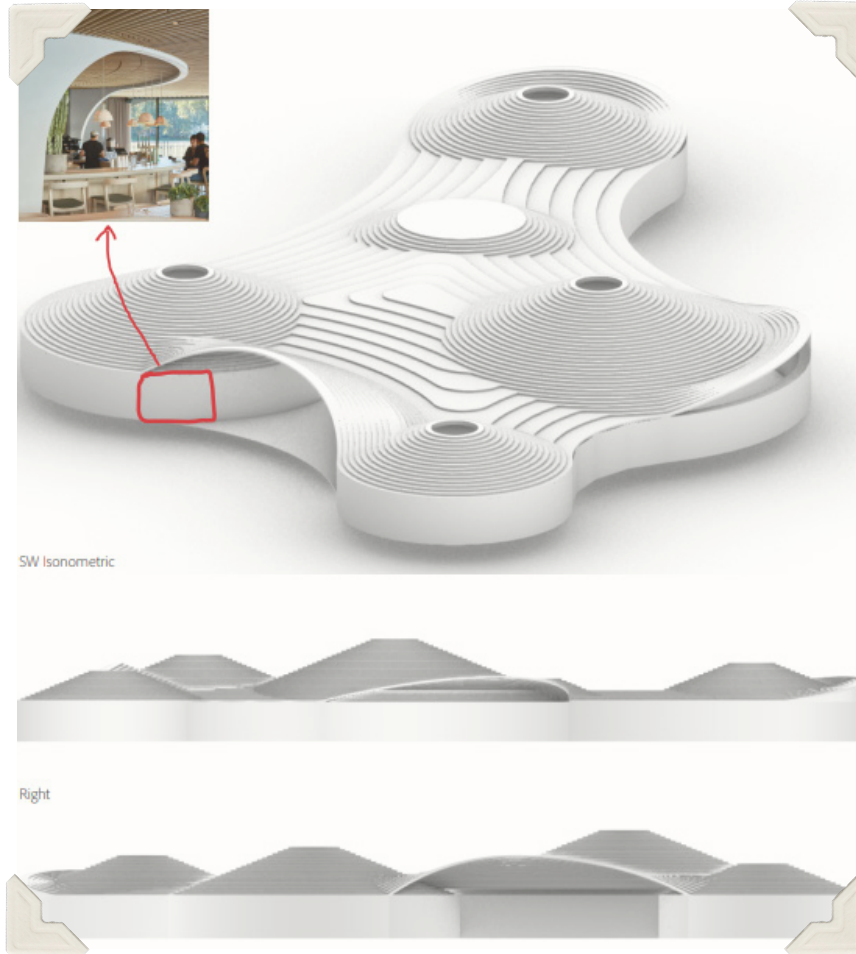
Structure: concrete roof



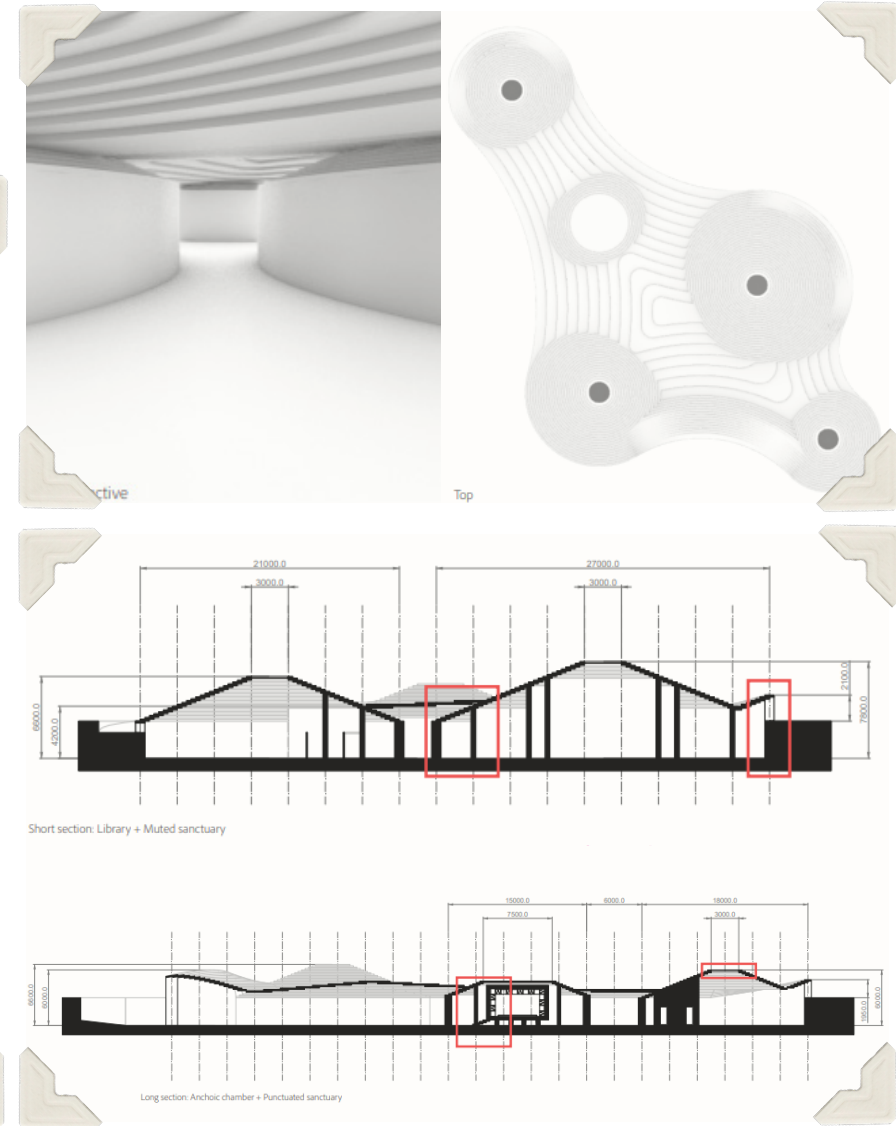
Research on construction components and materials.

3.6 model & section updates

As I had a meeting with Nathalie this week, I wanted to update the model, making the roof more of a landscape including the parts that would go up, analyse inside perspectives and making sections. Through the sections I concluded that I want to open up the domes more, with less walls. The model looked better, but needed more detailing with a thicker roof.

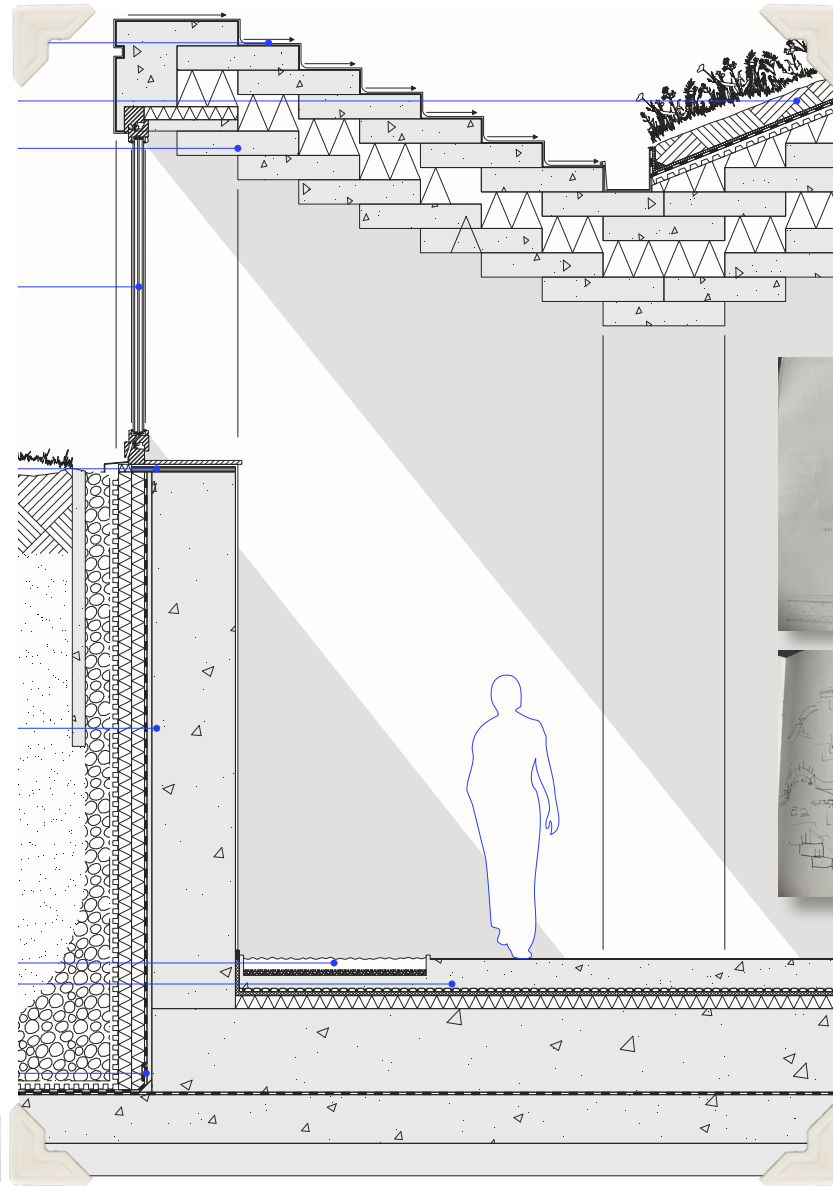
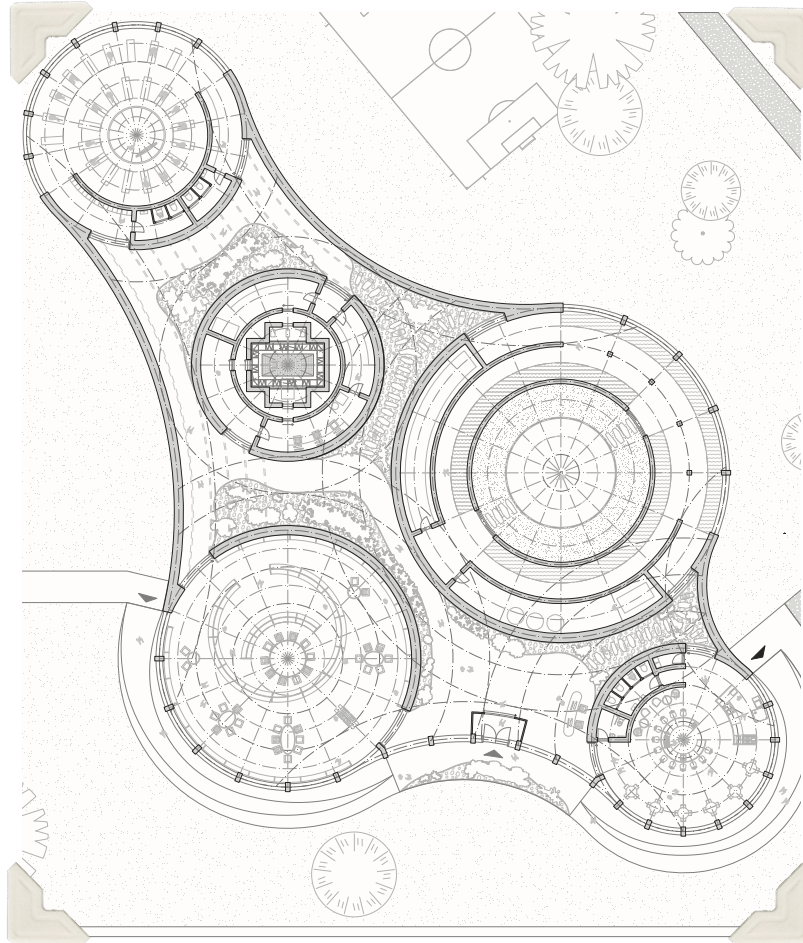


The model and sections presented to Nathalie and Paul



3.7 1:20 and new plans

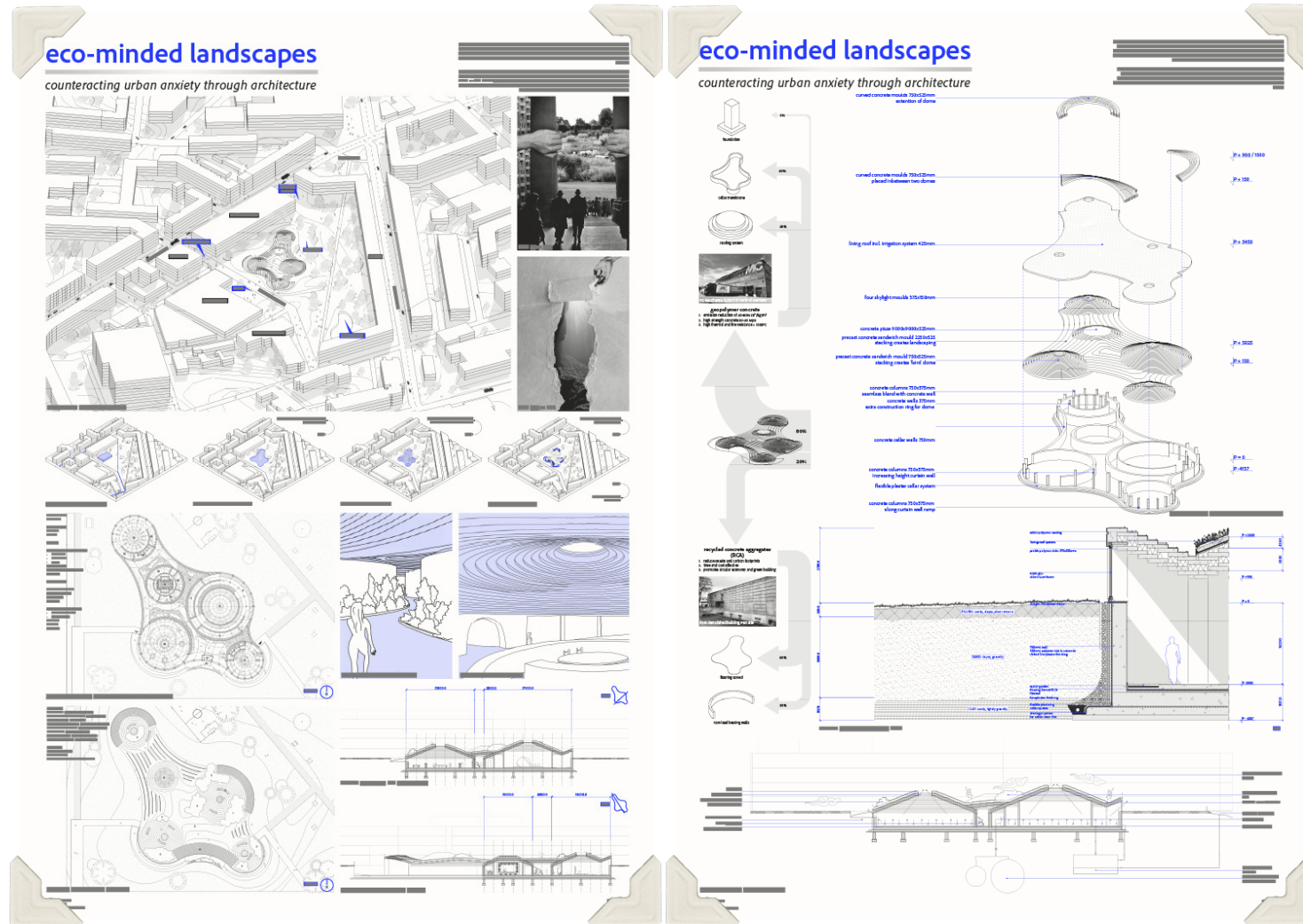
I updated the plan and provided more space for the dome compartments so that the viewing is perceived better inside. I also gave more detailing in the form of hatching. This week was also all about the detailing of the cellar and roof construction. After my meeting with Elina, we invented a sandwich concrete panel method and talked about water detailing.



Updated plan and 1:20 as presented later in P3, including a few sketches and references from the meeting.

3.8 p3 pin-up presentations

Current status presentation showing both further detailing of the design by means of plans and sections, but also elaborating on the technical concept. The second poster included an axonometric build-up, explanation of chosen material (concrete), a 1 on 20 facade detail, and also a first attempt to a climatic scheme.



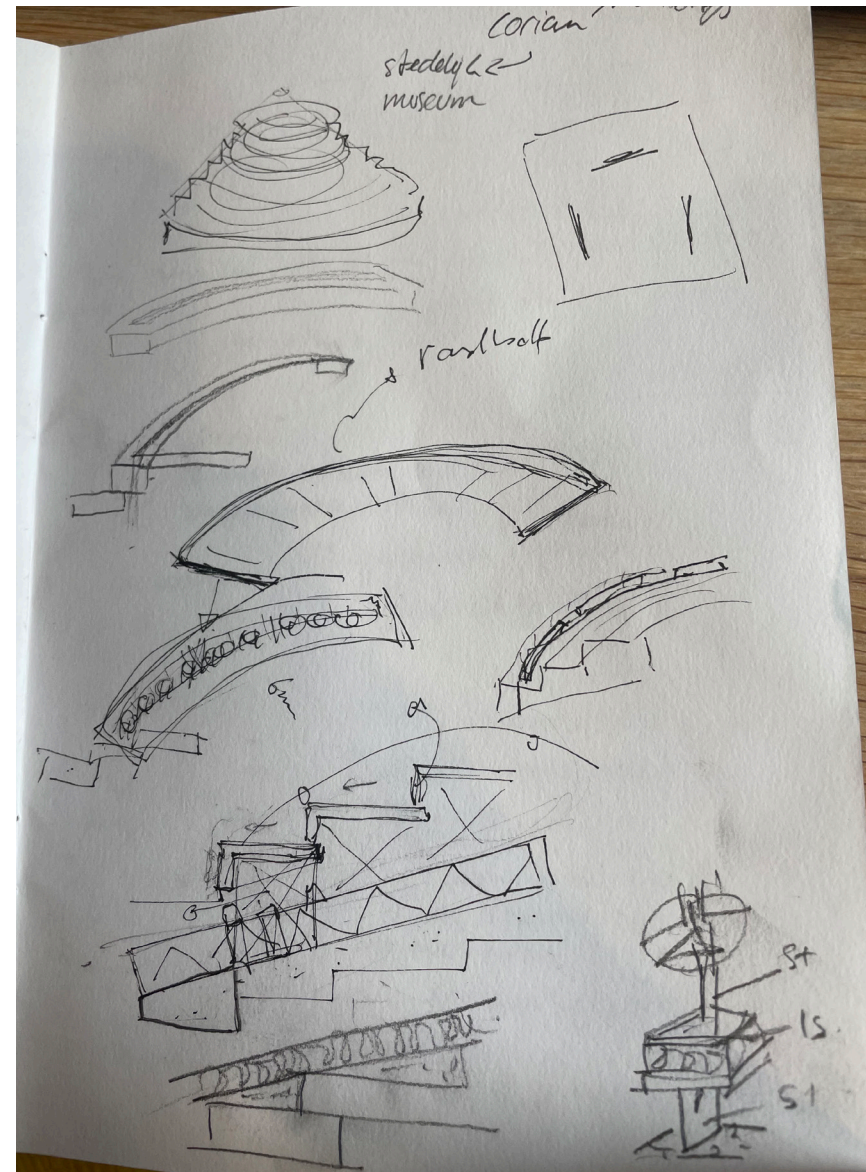
Two presented A0 posters.

3.9 botanical & structural meetings

The first week after P3, I had more meeting accros our faculty, which is very much needed for my project as it is not a standard building. I had the two interdisciplinary insights; 1) I want lightning inside underneath the planting for growth, orientation and a mistique effect. 2) More construction on certain places allowed my to plant trees on the roof as well.



Nico Tillie's suggestions of plants and landscaping elements inside and outside.

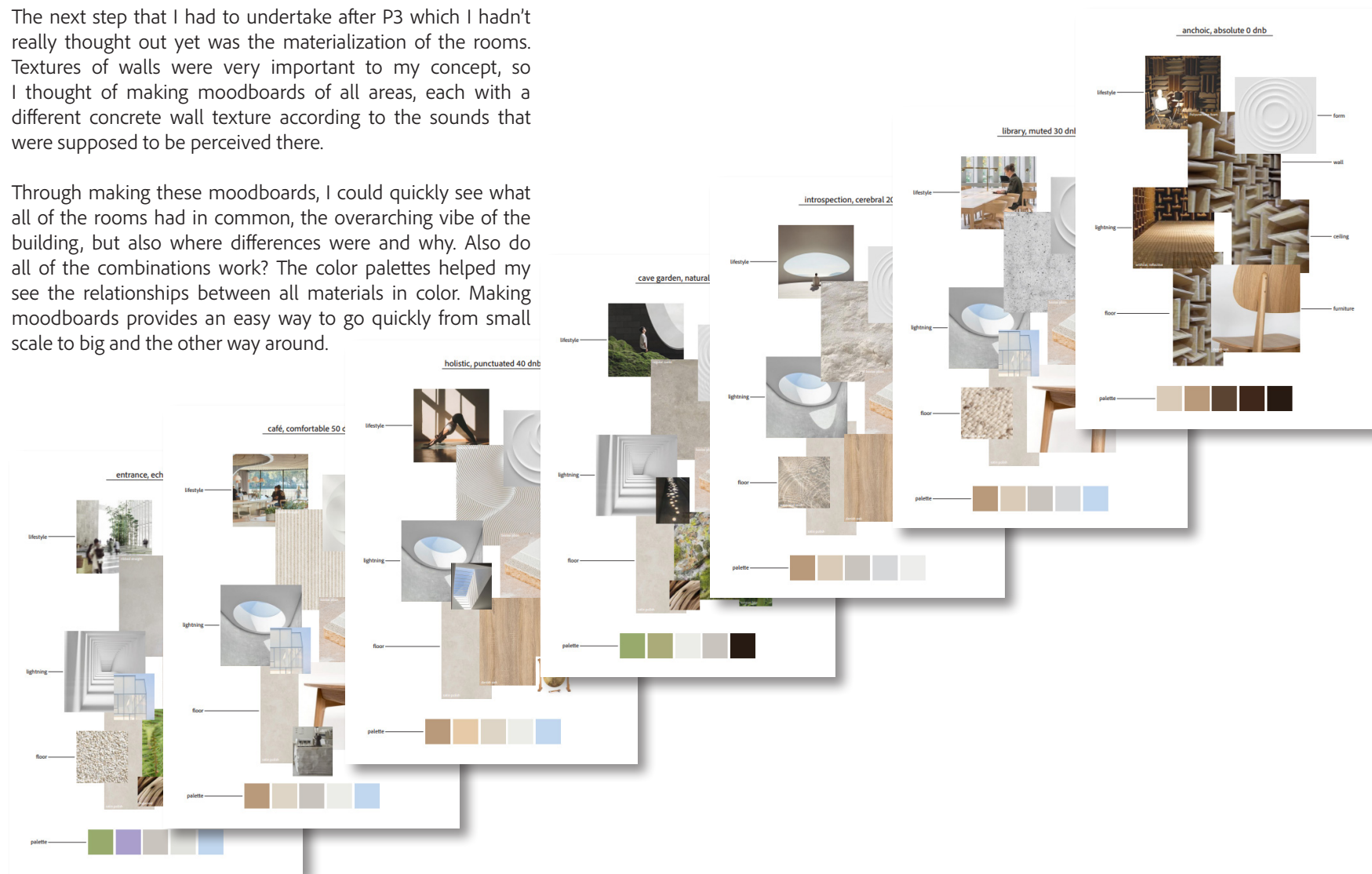


Peter Eigenraam suggested reducing concrete and providing more edge beams.

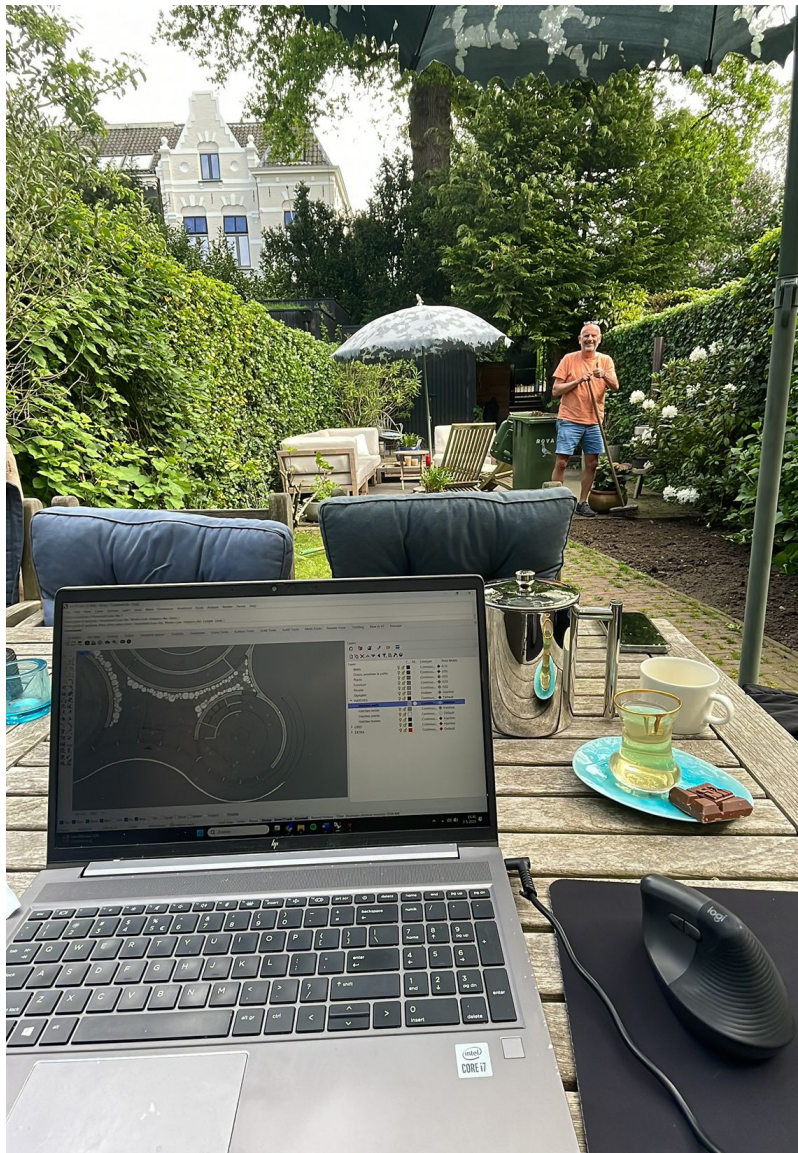
3.10 materialization

The next step that I had to undertake after P3 which I hadn't really thought out yet was the materialization of the rooms. Textures of walls were very important to my concept, so I thought of making moodboards of all areas, each with a different concrete wall texture according to the sounds that were supposed to be perceived there.

Through making these moodboards, I could quickly see what all of the rooms had in common, the overarching vibe of the building, but also where differences were and why. Also do all of the combinations work? The color palettes helped my see the relationships between all materials in color. Making moodboards provides an easy way to go quickly from small scale to big and the other way around.



Moodboards of 5 compartments and 2 inbetween areas.



A lot of studying, and a lot of sunny weather.

Q4

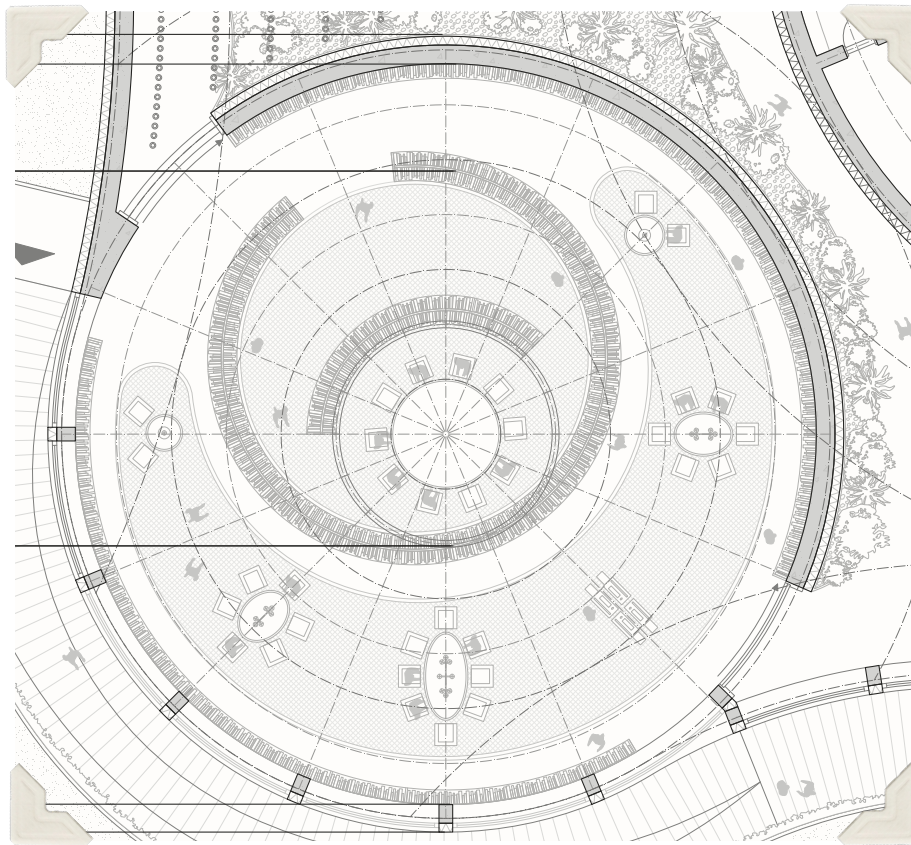
*final design states
and graduation
collect and clarify*

After P3, not many more sessions were planned, so hard work was expected to keep up and reach a good P4 presentation. I met with structural engineers twice, and worked further on details, whilst also adding more sections, renders and making an extended presentation of the whole concept.

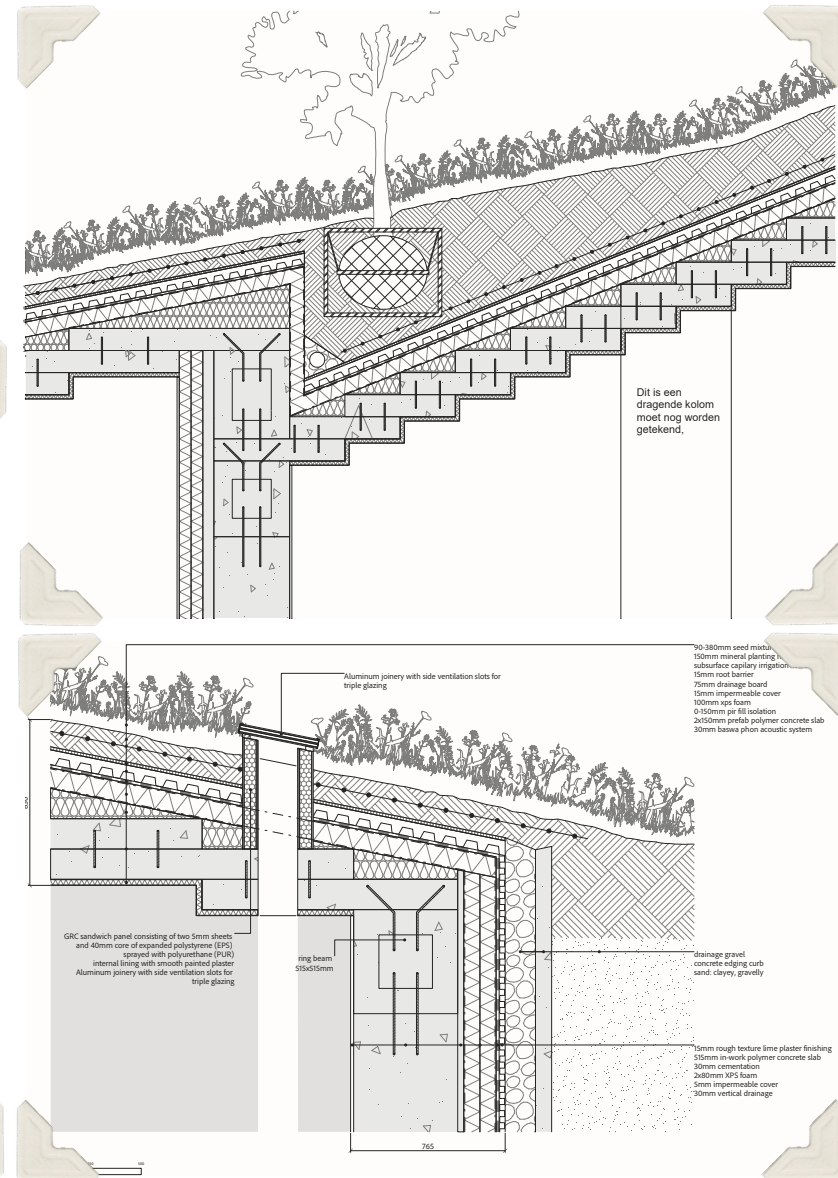
4.1 1:75 scale

I zoomed in on one compartment to better understand the structure, and that became the library, since it brought together the most types of structure. I also started thinking more about what kinds of furniture could be used and how these relate to each other.

I also made a detail that includes the ring beam, which creates space for planting a tree. This has helped my design in many ways, both structurally and in terms of landscape. I also worked on my skylight detail, for which I could find few references, but with the help of Elina and Paul I managed to resolve it!



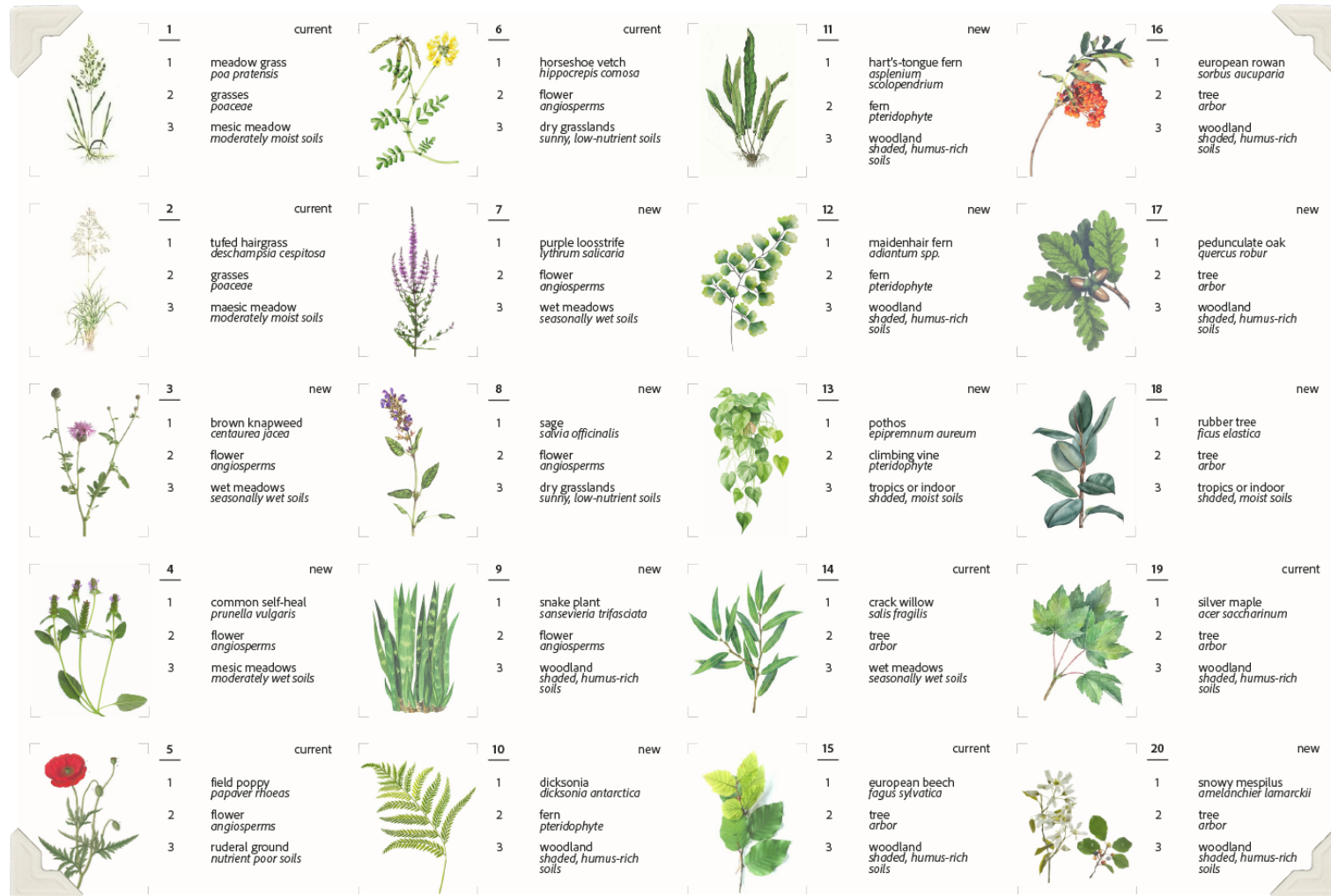
First version of 1:75 plan



First versions of details where two rhythms come together and the skylights.

4.2 botanical catalogue

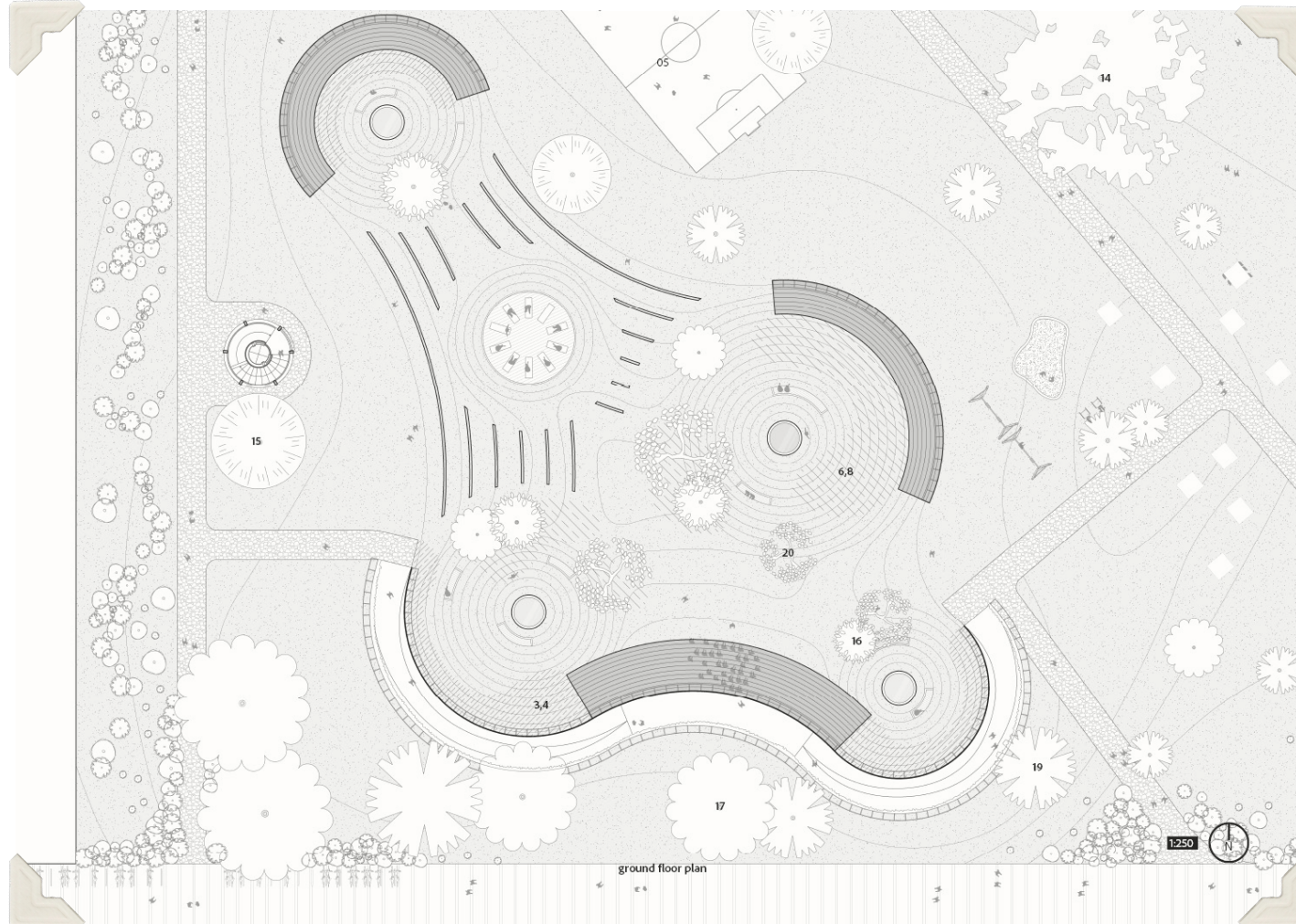
P4 was coming soon, and I was told many times that I need to invest the local nature, name its plants, and think about which I want to add, where and why. The botanical catalogue I made provided me with an overview of all its sorts and helped my understand their codependence. Truly understanding nature was very important for my design choices.



Botanical catalogue for P4 showcasing old and new plants.

4.3 botanical catalogue in landscape plan

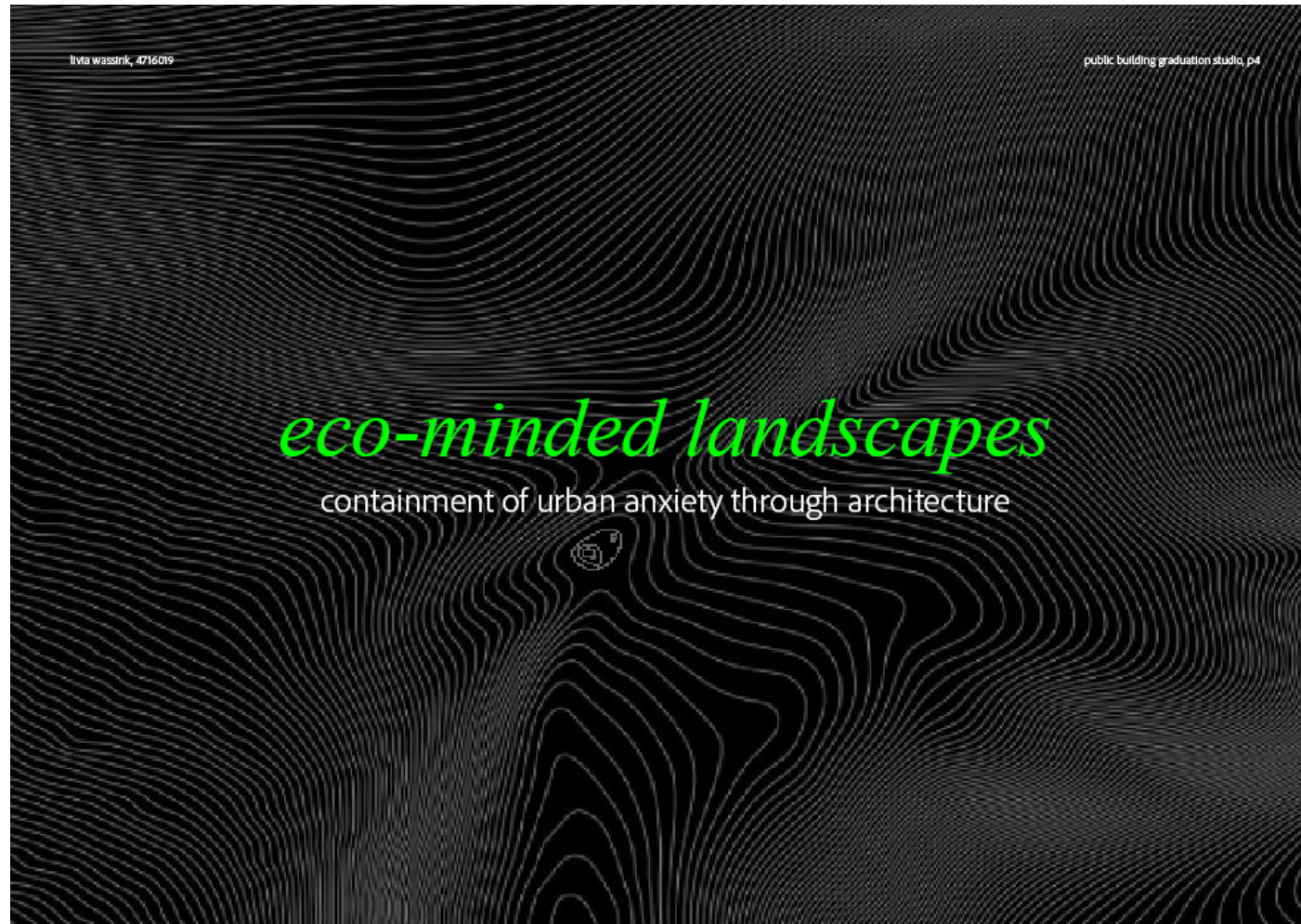
Although I was busy this week working on whole of the P4 presentation, the landscape plan was still very much unfinished and never looked at in detail because the catalogue was missing. Now that I had the catalogue, I could really design around it, providing a lot of specific information on the plan.



Final landscape plan, showing the numbers of the botanical catalogue on it.

4.4 p4

The presentation was over 90 slides and I had 30 seconds left before I was overtime, but it all went really well. As you can see in the impression below, I changed the looks. A new color, and use of darker backgrounds and black and white images to focus on shape. For p5, I have to focus on making more impressions, a model, another catalogue and a 1:10 detail.



First slide of p5 presentation.

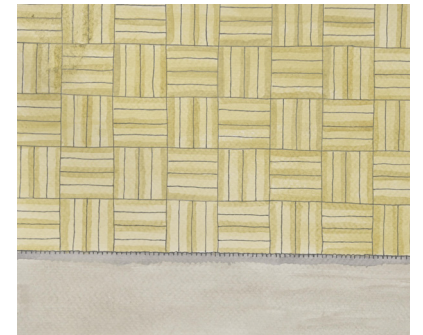
4.5 diorama

For my p5, I decided to produce a diorama that shows how the concept transitions from a cityscape, to a landscape and all the way to a cavescape. This fits the concept really well, as it illustrates urban anxiety environments and opposite environments that could tackle that. The pictures below are taken professionally at the photostudio of the faculty.



Each box represents a scape. the discs can be viewed and taken out accordingly.

4.5 diorama



each dia adds to the story of the journey going from the busy Rentemestervej all the way to the anchoic chamber.

research

research plan, 009-024

journal, 031-108

by

01

02

03

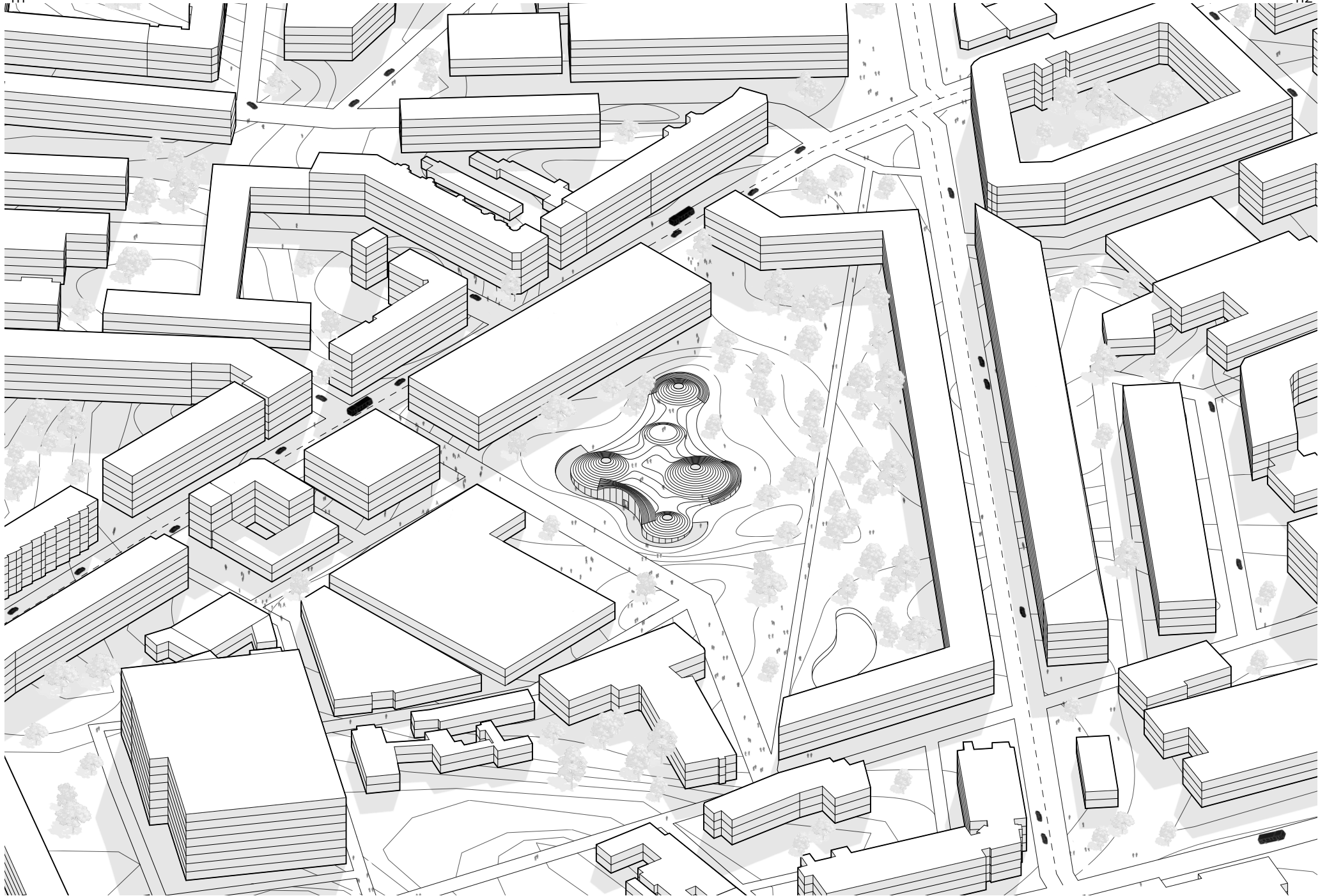
04

design

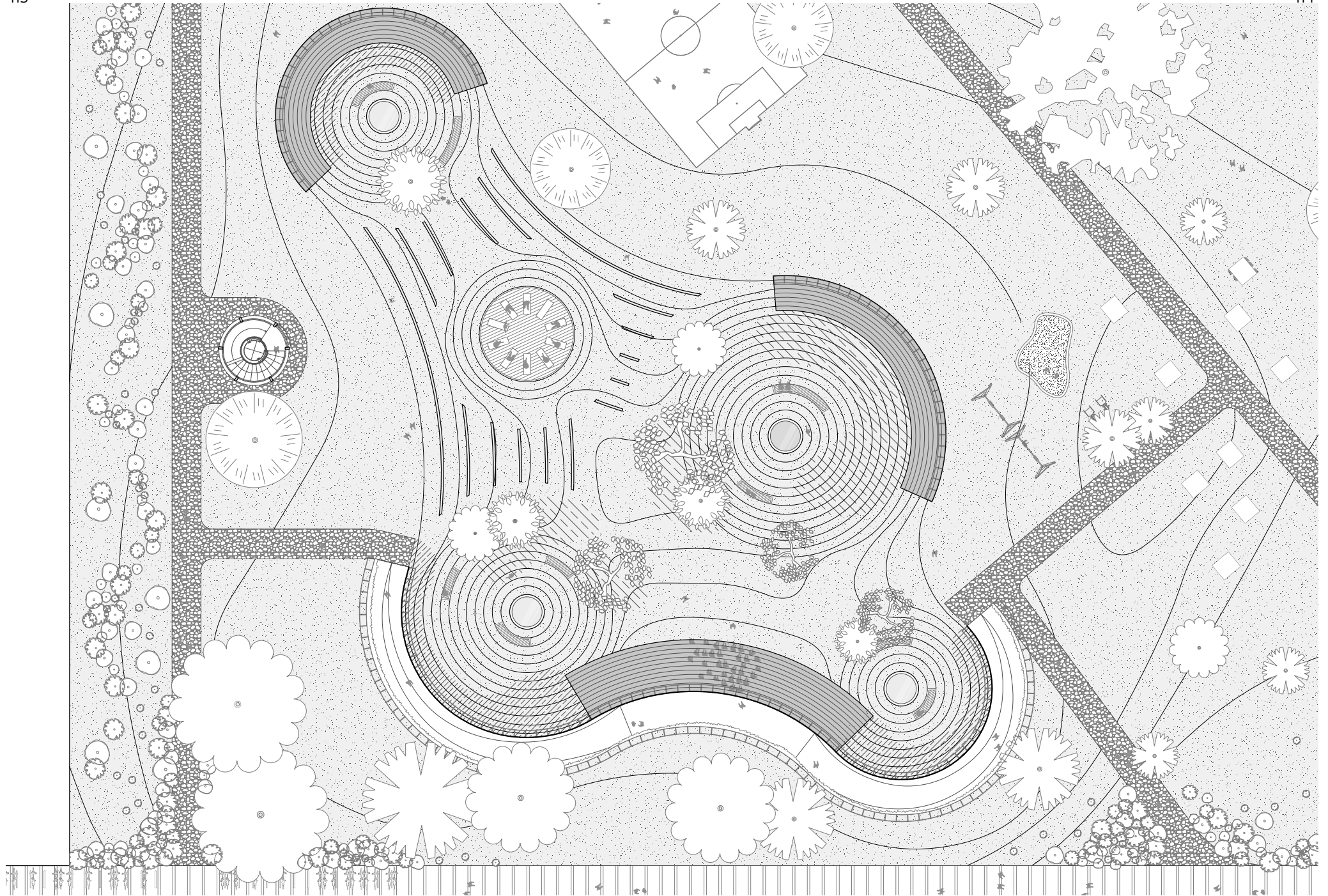
025-030, graduation plan

108-134, drawing set

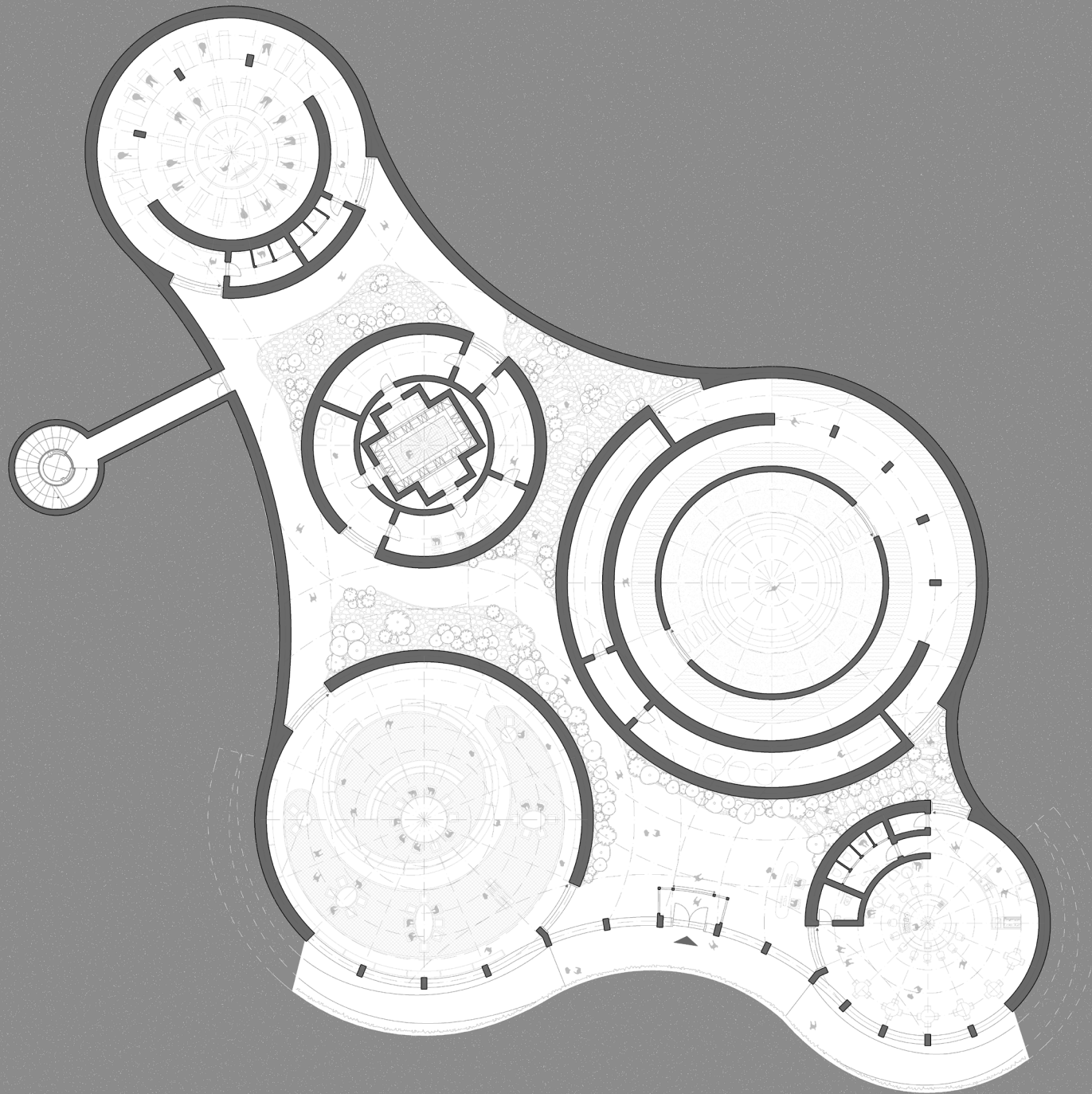
content



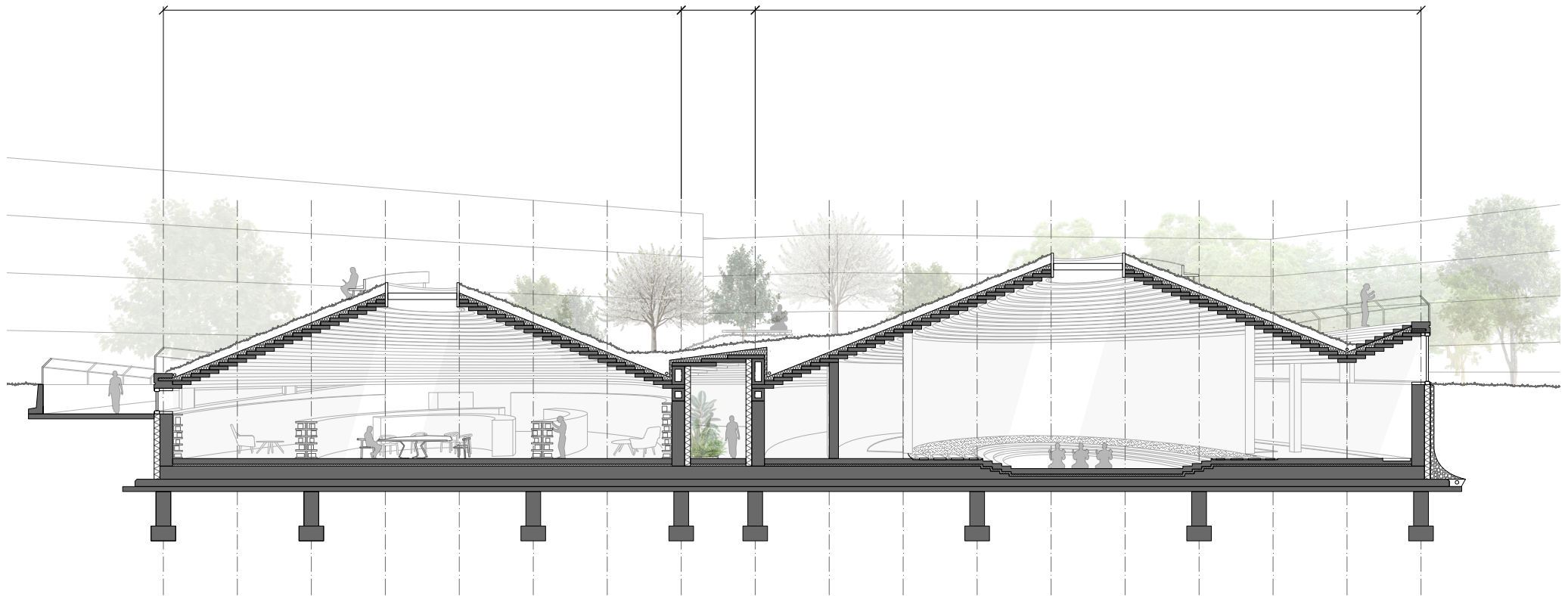
1. axonometric overview



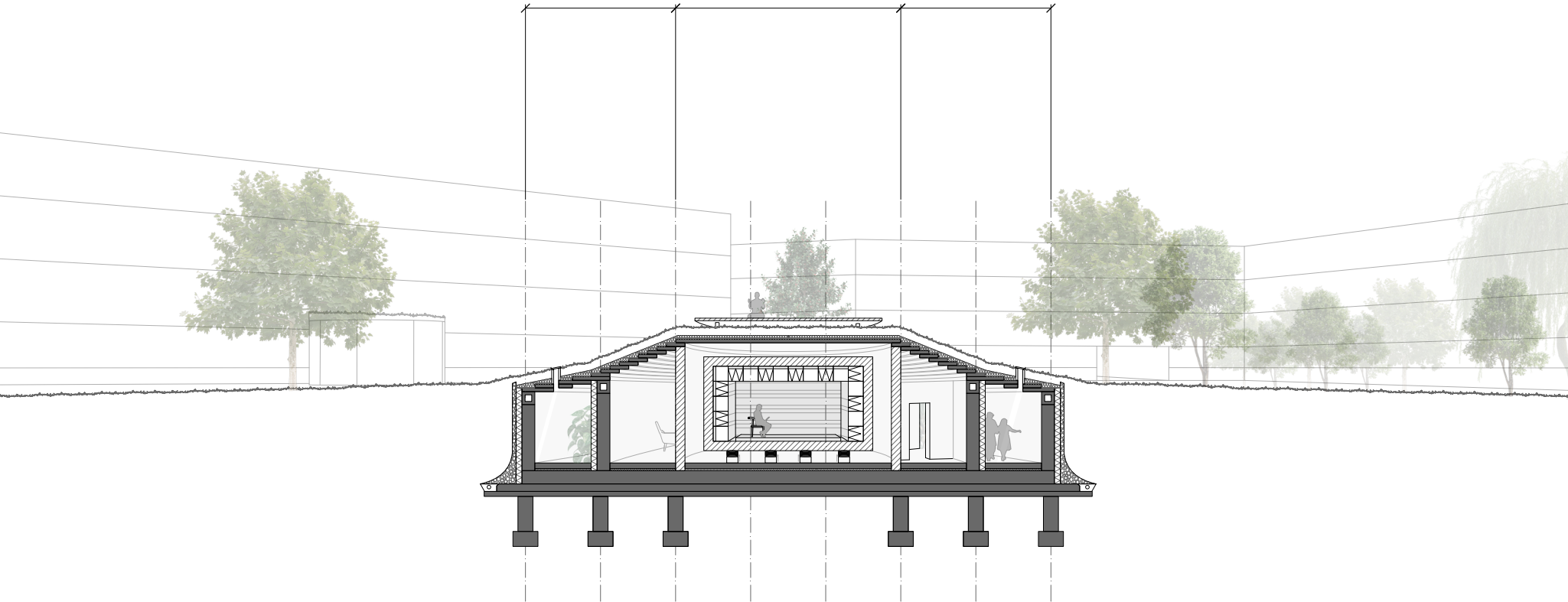
2. landscape plan



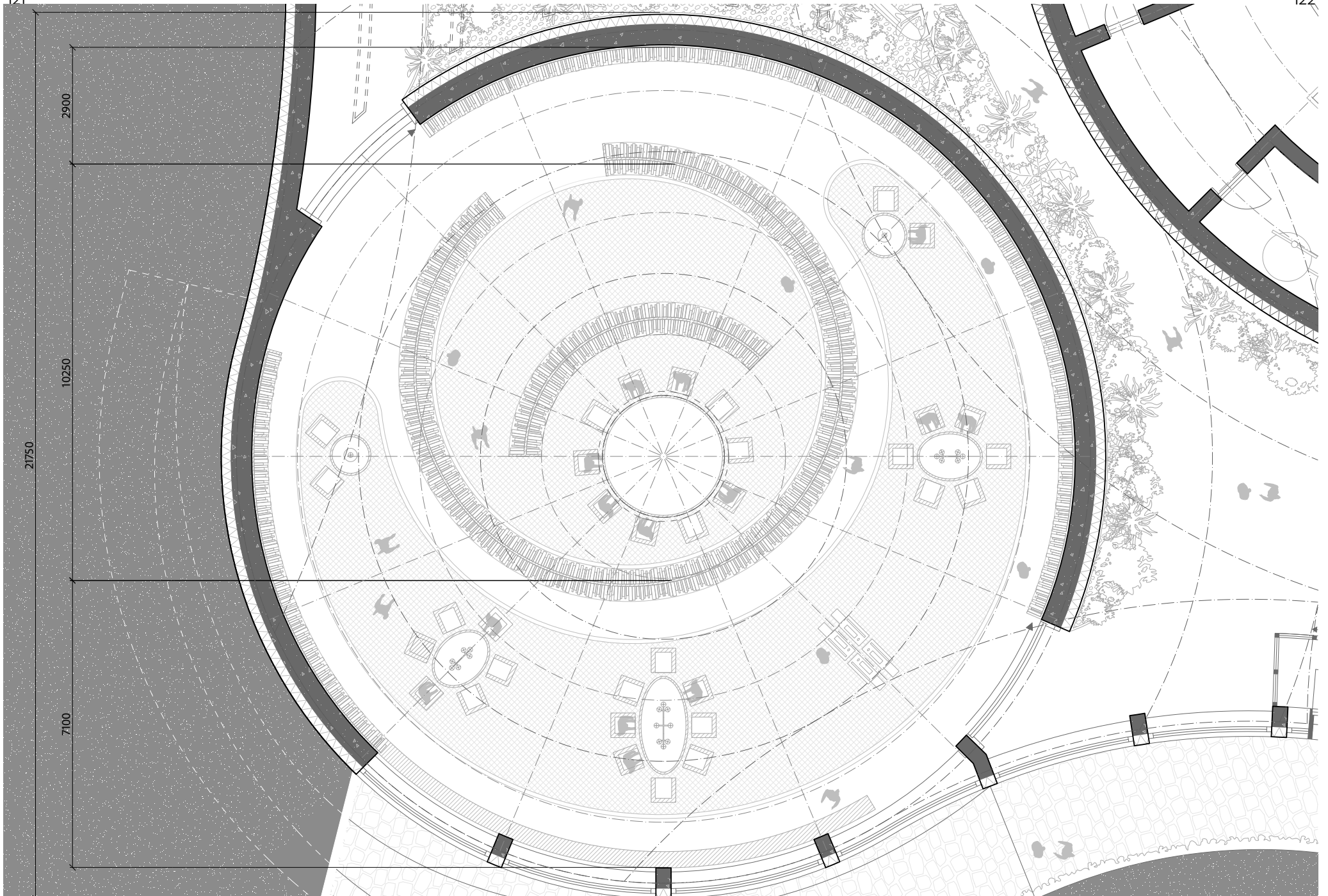
3. ground floor plan



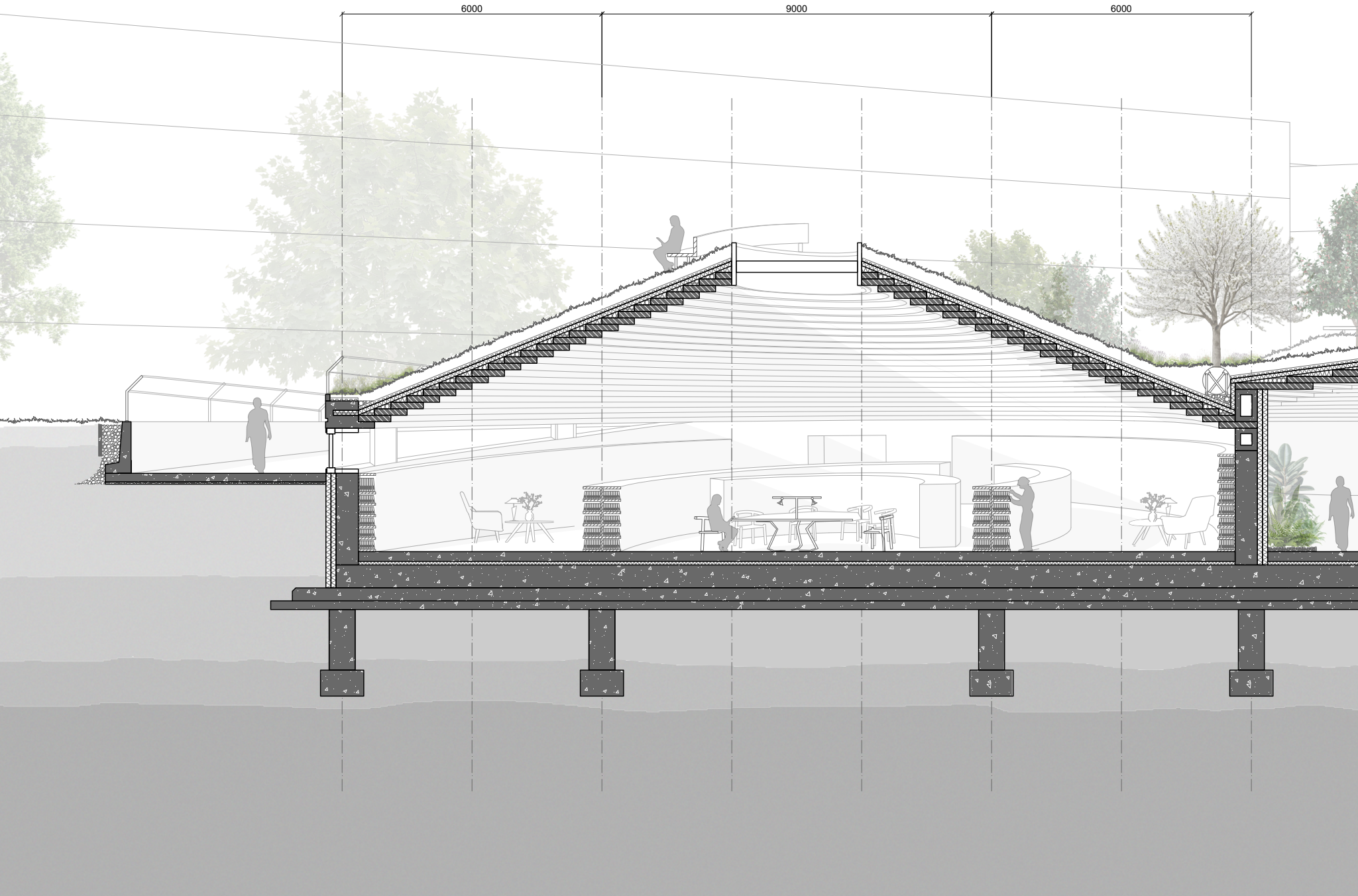
4. long section



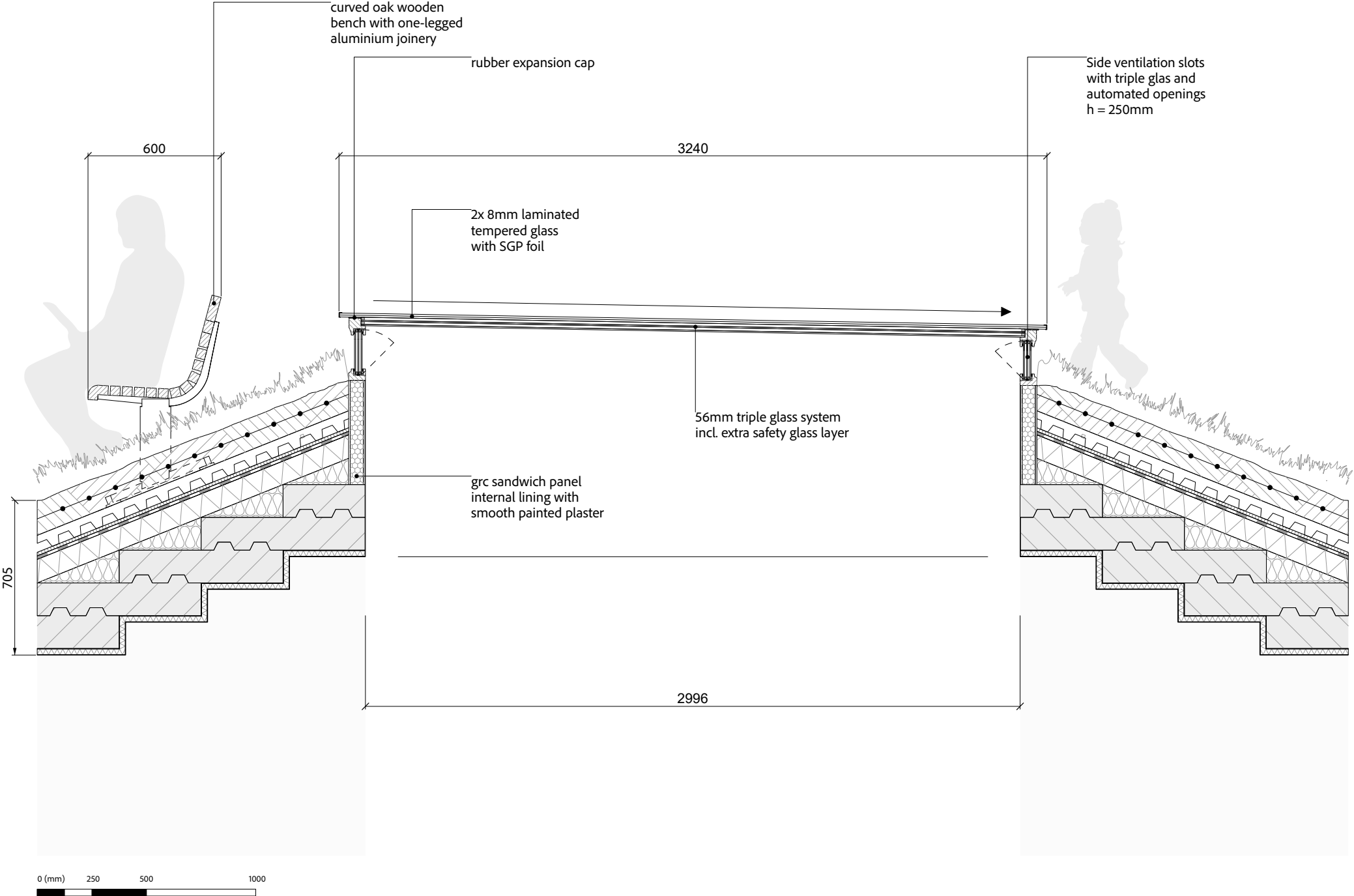
5. short section



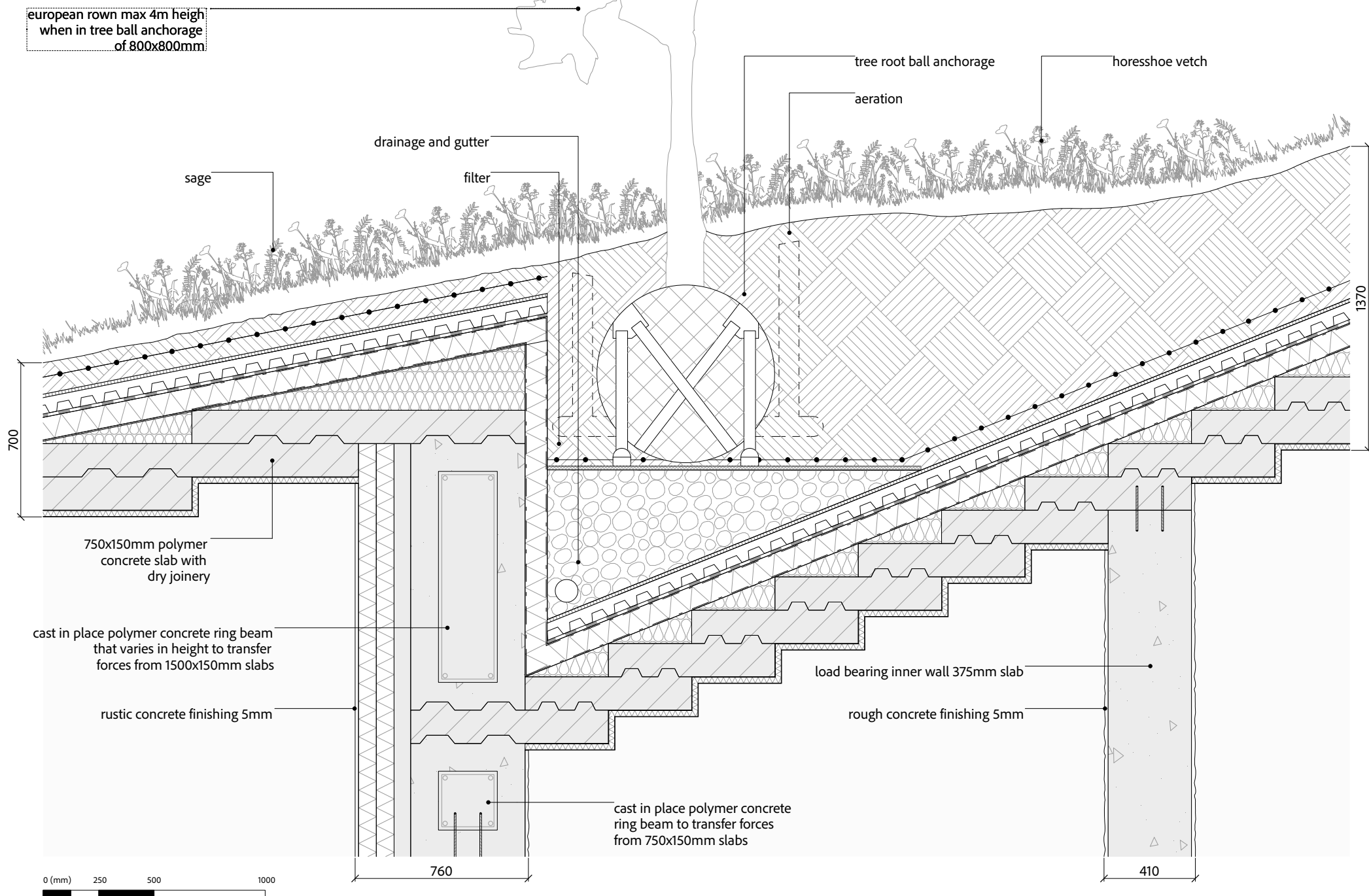
6.1 on 75 plan library



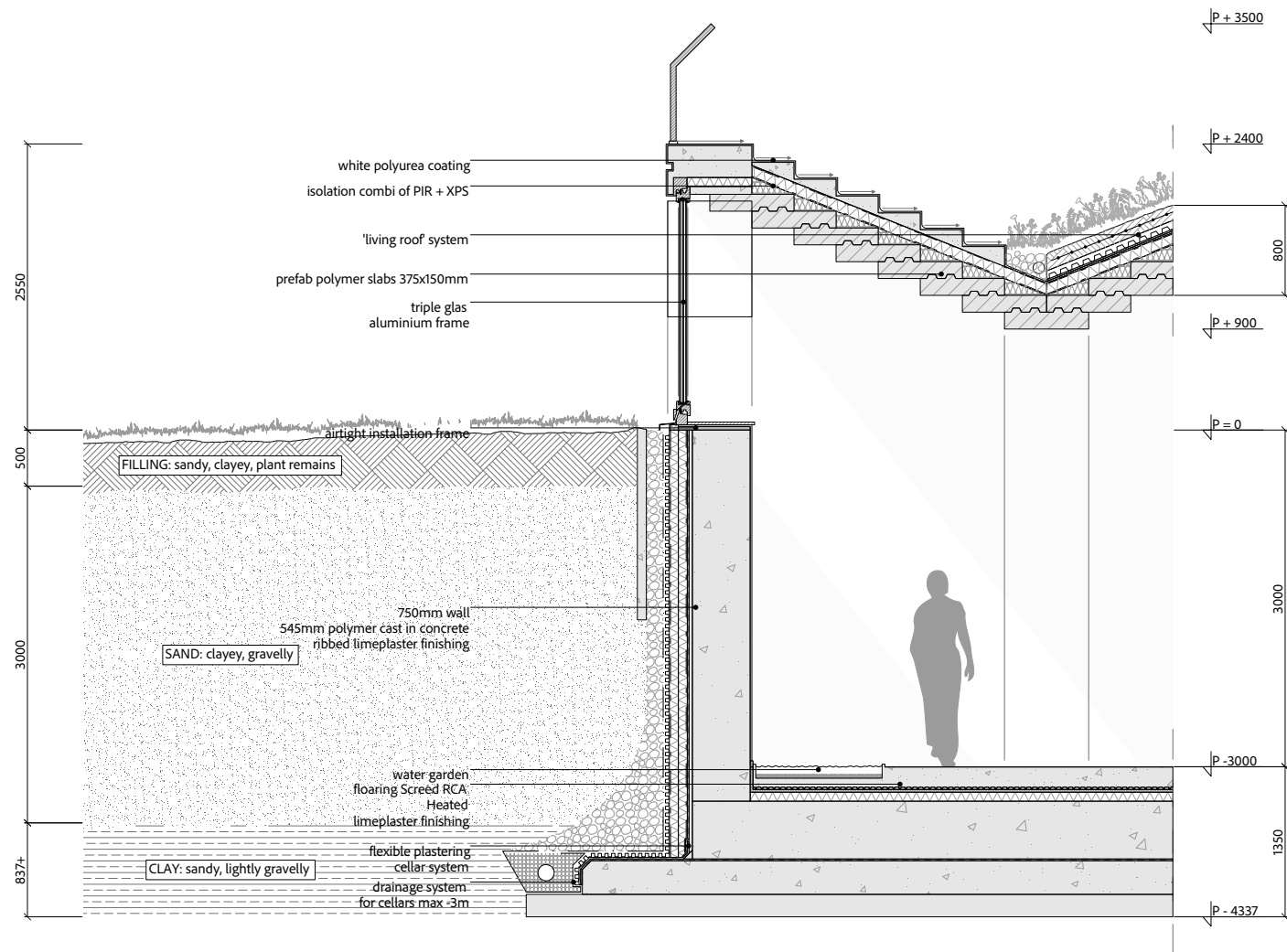
7.1 on 75 section library



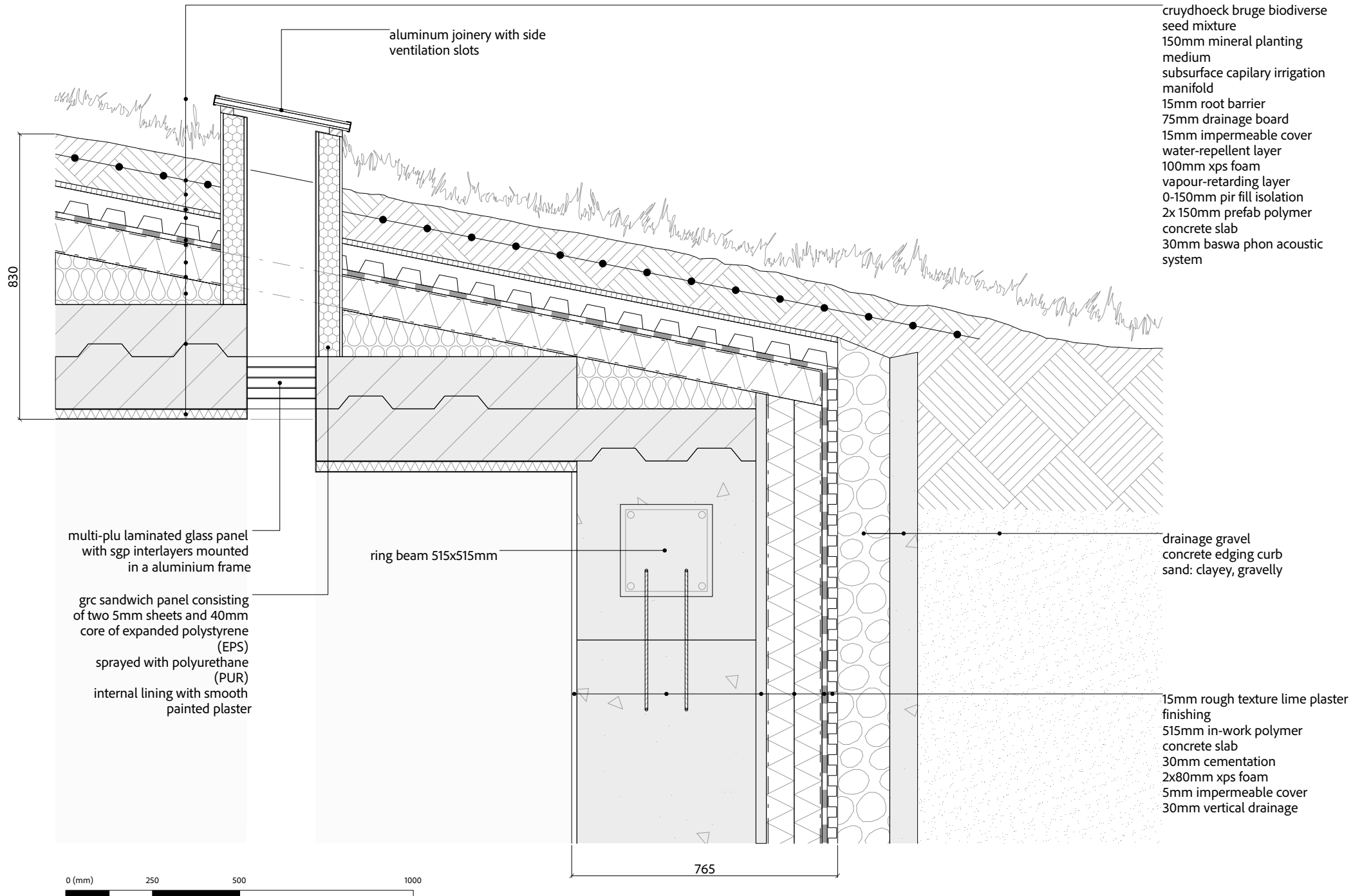
8. detail skylight dome



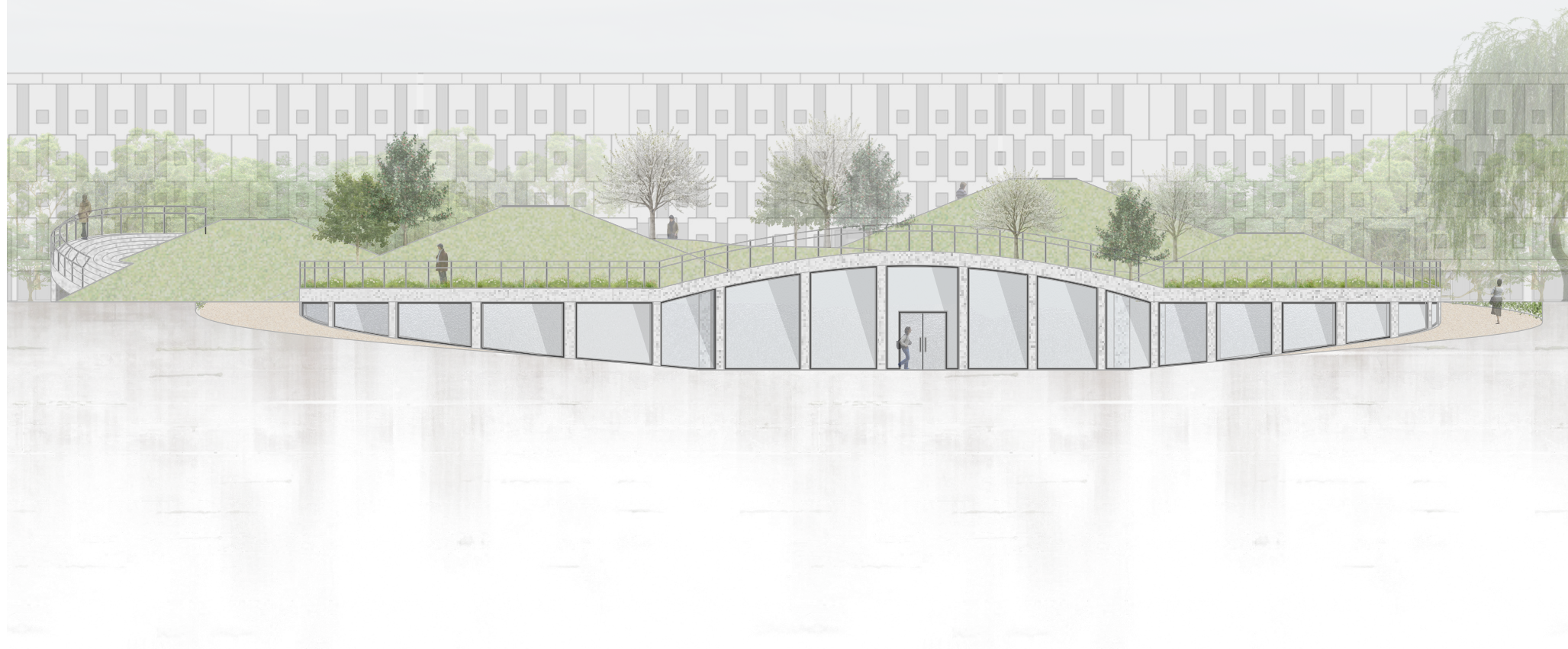
9. detail two rhythms



10. technical facade view



11. detail roof to field



12. elevation of entrance

research

research plan, 009-024

journal, 031-108

reflection, 135-144

by

01

02

03

04

05

design

025-030, graduation plan

108-134, drawing set

content

Eco-minded Landscapes

Reducing Urban Anxiety Through Architecture



'Levitated Mass' by Michael Heizer at the LA County Museum of Art, 2012

Reflection Paper

AR3AP100 Public Building Graduation Studio

MSc Architecture, Urbanism and Building Sciences, Delft University of Technology

Livia Wassink

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8th of May 2025

Ir. P.A.M. (Paul) Kuitenbrouwer

Dr. Ir. S. (Stefano) Corbo

Ir. E. (Elina) Karanastasi

Prof. Ir. N.A. (Nathalie) de Vries

1. Project Problem and Societal Relevance

The societal relevance of this project lies in its timely response to two interlinked developments: the global trend of urbanization and the rising incidence of common mental disorders (CMDs)—depression, anxiety, and bipolar disorder—with anxiety increasing most significantly. As of 2025, over 58% of the world's population lives in urban areas, a figure that continues to grow. At the same time, CMDs are becoming more prevalent, especially in high-income countries, where anxiety disorders are now the most common among urban populations (Rehm & Shield, 2019; Van der Wal et al., 2021). Urban dwellers face a 20% higher risk of developing anxiety than rural populations (Adli, 2011), highlighting the strong correlation between mental health and urban living.

This project builds on the concept of 'urban anxiety' to explore how urban characteristics—from large-scale factors like city size and density to direct elements such as noise, pollution, lack of green space, and built form—impact psychological well-being. Social stressors like crime, unemployment, income disparity, and discrimination are also examined. Together, these factors show that anxiety in cities is not only a medical issue but also a spatial one, shaped by urban structure and governance.

By addressing these drivers of urban anxiety, the project contributes to research promoting mental health-conscious urban planning. Findings from Copenhagen's Nordvest district show how neighborhood conditions affect mental health. The project offers actionable insights for policymakers, designers, and public health officials on reshaping cities to support psychological resilience, social equity, and urban well-being.

2. Rethinking Architectural Design

I proposed a new architectural approach to tackling urban anxiety through spatial interventions called *Eco-Minded Design*. Rooted in the idea that humans have an evolutionary need to connect with nature (Fromm, 1973; Wilson, 1984), this approach that integrates natural elements into both the interior and exterior urban environment with the specific goal of reducing urban anxiety. This approach goes beyond merely adding greenery; it is grounded in five key dimensions that are proven to impact anxiety spatially: **prospect**, **refuge**, **biomimicry**, **sensory variability**, and **biodiversity**. By designing environments that instinctively evoke calm, safety, and connection, eco-minded design directly addresses the triggers of urban anxiety, such as sensory overload, isolation, and lack of natural stimuli.

Buildings designed within this approach are called **eco-minded landscapes**. Eco-minded landscapes are a form of public condensers that are literally fused with existing urban landscape structures like parks, gardens or water bodies, simultaneously upholding to the five pillars of eco-minded design theory. Below, the table elaborates on the theory and its specific design tools.

Copenhagen, despite its reputation as one of the world’s most liveable cities, is not free from urban anxiety—particularly in disadvantaged districts like Nordvest. This neighborhood experiences higher levels of pollution, noise, social inequality, and mental health issues than the city average. Its young population, high density, and many small households increase the need for accessible, calming public spaces. Emaljehaven park, located in the heart of Nordvest and directly above a practical craftsman school (NEXT), is a highly relevant intervention site. Its current layout is monotonous and lacks stimulating green design. However, the park’s size and location make it ideal for an eco-minded intervention aimed at young people and local residents. By incorporating a public eco-building, the park becomes a more immersive, playful landscape that attracts visitors, while also offering a quieter space below to retreat from urban life—lowering the threshold to seek peace and silence in the city.



Figure 2: two conceptual collages showing the potential of the urban park and the turning-inward aspect of what lies underneath that moulded landscape. Illustrated in Q3.

4. Research Question and Subquestions

How can **eco-minded design** inform **public buildings** to reduce **urban anxiety** in high income countries?

- I. Which design aspects have a reducing effect on urban anxiety?
- II. How does context of Copenhagen, Nordvest and the NEXT area inform the design position?
- III. How are building hybridity and multiplicity related to eco-minded design?
- IV. How are building resilience and sustainability related to eco-minded design?

Pillar	Definition	Design tools
Prospect	Prospect & refuge theory suggests that indoor environments should alternate with vast views and more enclosed views to provide a sense of safety and guidance.	Zones of decompression, vast views, zenithal light, daylight.
Refuge	'Prospect & refuge theory suggests that indoor environments should alternate with vast views and more enclosed views to provide a sense of safety and guidance.	Zones of compression, circular hallways, planting
Biomimicry	Drawing aesthetic and structural inspiration from nature.	Fusing landscape with building, organic forms, messy elements inside.
Sensory Variability	Engaging all the senses into the experience through changes in light, texture and sound, with the goal to be more present.	Designing with different sounds in mind. Choosing materials based on textures. Seeing light as a material.
Biodiversity	Not only the mimicking of nature, but treating the building as an ecosystem in itself.	Presence of natural elements such as water gardens, green roofs an attracting local animals.

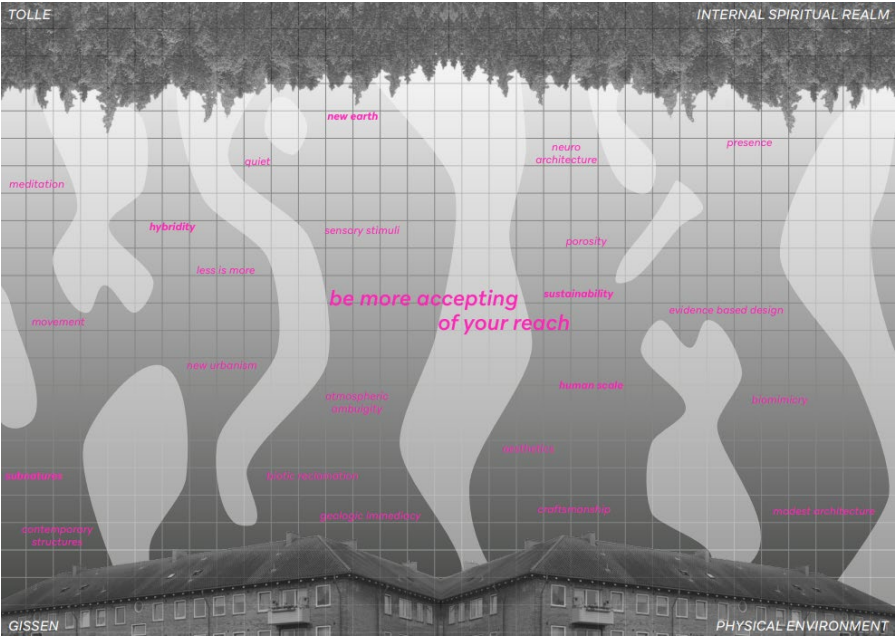


Figure 1: making a word cloud helped me visually identify and position the most important terms related to feelings of anxiety in an urban environment and the needs related to it. Illustrated in Q2.

141 project explores how buildings can become healing environments. To deepen my understanding, I consulted Public Building PhD student Sofia Souvatzoglou, who researches 'prescription architecture'.

7. Research by Design and Design by Research

Research by design is at the core of this studio's methodology, assuming the design process itself is used as a tool to investigate and generate new knowledge. Through spatial and material experimentation, complex societal challenges are explored. Design and research work in both directions, creating design loops and reiterations to reinvent.

In the first semester, there was more design as a consequence of research. A turning point for me was discovering the approaches of Daniel Libeskind and Marina Tabassum. I was struggling to build a program for a condenser shaped around tackling anxiety. My first attempts were based on general needs of people dealing with anxiety, resulting in a salad bowl of programs lacking correlation. This public condenser must be hybrid and reflect multiplicity, so the program had to center around the experience of the building as a whole. That week, there was an exhibition by Marina Tabassum in the Orange Hall, and I learned that programming a building around the theme of silence gives visitors the chance to turn inward and be present. Daylight is a material that supports this journey, giving emotion to space. Light and sound both made sense for my project, as my building is underground and in need of skylights, and many people I interviewed talked about noise problems in the neighborhood and how it related to their stress.

In the second semester, there was more research as a consequence of design. I knew I wanted an underground building covered by a landscaped roof that blends into the park. The most challenging and promising aspect was the roof, bridging technical and landscape design. It had two parts: circular stacking of prefab concrete panels in the compartments, and wider panels in between, creating gradients. Initially, their intersection wasn't structurally feasible. Adding a ring beam resolved this, creating leftover space. Nico Tillie was glad this allowed thicker soil for planting trees ('boomveer'), making the roof more diverse. Through detailed design and interdisciplinary input, I ended with a more integrated project.

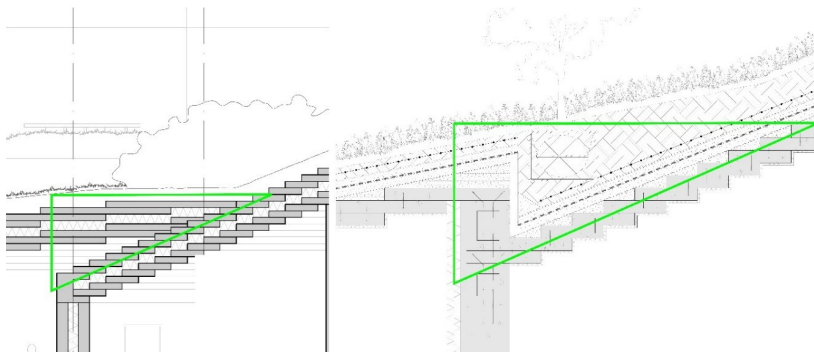


Figure 3: Left shows part of a section from p3 where it is visible that the forces of the wider panels can't be transferred down. Right shows 1:10 detailing from Q4 whereby the forces are transferred down and the left over space is used for trees. *Illustrated in Q3 and Q4*

5. Relation to studio objectives

The design brief of this studio is to create a public building that functions as the new urban living room. These next-generation community buildings, called **public condensers**, integrate diverse public functions in a single hybrid space to foster social interaction, urban vitality, and inclusive community life. The eco-minded public building reflects local needs by programming around silence—offering spaces to turn inward, such as a library, therapy café, and areas for meditation and holistic movement. It also serves as a sustainable, long-term intervention, using materials like polymer concrete and featuring a structured green roof.

All five pillars of the public condenser concept are manifested in the building. **Hybridity** is achieved through the layout: all spaces are accessible from two sides, sharing a unified material language while differing in texture and program. The building is **resilient**, integrated into the landscape, passively designed, and able to withstand environmental stressors. Its open-plan compartments, with minimal walls, are easily adaptable. **Multiplicity** is reflected in the layered architectural elements, especially in the soundscaped design. The building consists of five dome-like compartments, each centered on silence. Louder, public spaces like the café and library are near the entrance, while deeper parts of the building offer a quieter, more natural experience. Multiplicity is also expressed in the mirrored relationship between the landscaped roof above and the interior below, creating spatial awareness throughout. The building's **sustainability** lies in its long-term design. It is mainly constructed from prefabricated curved concrete elements stacked to mimic landscape lines. The form offers thermal mass, reduces facade materials, minimizes visual impact, supports sustainable water management, and shields from extreme weather. Finally, the pillar of **healthiness** is central to the project, as its core concept is to reduce urban anxiety.

6. Relation to master program and track

The issues described above, urban anxiety, lack of restorative green space, socio-spatial inequality, and the need for inclusive public buildings directly relate to the **Master of Architecture, Urbanism and Building Sciences** at TU Delft. This interdisciplinary program encourages students to approach urban and social challenges through spatial design, environmental integration, and public well-being. The rise in mental health problems in dense areas like Nordvest, Copenhagen, shows how environmental and social pressures converge in space and how they can be addressed through design. The program's focus on systemic thinking, evidence-based design, and interdisciplinary collaboration is essential to tackling urban anxiety not only at the building scale, but across the urban ecosystem. Eco-minded landscapes demand this approach, which is why I consulted experts from across the faculty Fabiana Toni, Nicco Tillie, René van der Velde (Landscape Architecture), Peter Eigenraam (Building Technology), and Anne-Bregje Snijders (Architectural Engineering).

Within the **Architecture track**, these themes intersect with the design of hybrid public buildings that act as agents in the urban fabric. The track stresses the role of form, program, and materiality in shaping human experience. Designing a public condenser, a building that combines social, cultural, and ecological roles, aligns with its mission to create architecture that is both expressive and impactful. By addressing mental health through architecture and integrating nature into dense urban settings, the

Overall, the initial design ambitions are largely fulfilled, with key goals realized and some aspects left for further development. The project began with the issue of urban anxiety, which shaped the entire process. Supported by research, a design method was developed to address this issue, resulting in a building that engages deeply with its context and proposes an innovative solution. The final proposal is unique to the urban landscape but conceptually replicable across high-income cities. It functions as a prototype, distinct in form, universal in intent. While not a “public condenser” in the compact sense, it meets local needs similarly. Its decondensed layout provides spatial and psychological relief in a dense, overstimulating environment, offering room for restoration and emotional decompression.

Some ambitions couldn't be fully achieved. For example, a deeper dive into parametric design could have strengthened both form and function, especially for the landscape, but this fell outside the studio's focus and lacked faculty support.

The process was enriching, combining guidance and creative freedom. The studio framed the assignment clearly but allowed freedom in site and approach, enabling a personal project. I learned the value of continuous development and feedback, not as rules, but insights to rethink from my own view. I especially appreciated how my tutors, particularly Stefano Corbo, encouraged bold steps. This support pushed me to explore original ideas and helped make the project a distinctive and meaningful conclusion to my architectural education.

9. Towards P5

For the final presentation, I aim to expand the project by adding two key elements, and perhaps a third as an expansion. First, I plan to include spatial impressions of all compartments within the building, not just a select few as I am intending for P4, to better convey its hybridity and multiplicity aspects to the public. Second, I will create a detailed 1:200 model where the green roof and its underlying structure are separate entities which one can take off, allowing viewers to understand the building's layered design. Lastly, I hope to succeed in translating the presentation into something even more exiting, and easier to be understood by family and friends who aren't common with the architectural profession.

