Pilgrimage to Tranquillity:

An Architectural Journey Toward a Centre for Calmness in Rotterdam South

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00. Abstract

This research explores the growing need for calm and restorative spaces within urban environments, with a specific focus on Rotterdam South. In today's fast-paced, hyper-connected world, cities are often marked by sensory overload, chronic stress, and heightened risks to mental health. The absence of tranquil spaces for reflection exacerbates these issues, prompting the search for places of escape. This study examines how architecture can address this challenge by designing environments that promote tranquillity and mental well-being.

Focusing on the concept of "pilgrimage," which are environments that integrate natural elements and psychological insights to foster calmness, the research investigates the role of environmental stressors and relaxants in urban settings. Rotterdam South, with its diverse population and urban challenges, serves as a case study to understand the imbalance between the vibrancy of city life and the need for peaceful environment. The ultimate goal is to restore harmony between vibrancy and tranquillity by creating a network of calming spaces, with a central focus on establishing a dedicated "centre for calmness."

01. Introduction

In an era marked by constant connectivity and a fast-paced metropolitan lifestyle, the pursuit of tranquillity has become more urgent. Cities throughout the world are thriving hives of activity, but for many people, this intensity can cause sensory overload, chronic stress, and a higher risk of mental health issues. The modern metropolitan environment, with its congested areas, noisy surroundings, and never-ending notifications, allows for limited tranquil moments of introspection. As a result, people are looking for places where they may escape the rush and slow down. According to studies, places favourable to relaxation and mental restoration are not only desirable but also necessary for sustaining good health nevertheless, many cities fail to provide such areas. Rotterdam South exemplifies this global challenge on a local scale.

1.1 Calmness as a necessity

In a hyper-stimulating world when intrusion is the norm, interruptions are referred to as "notifications," and our watches frequently alert us to the demands of others, the nervous system is constantly driven into arousal. Calmness no longer arrives unexpectedly; rather, it should be sought out. Spending time and effort on soothing activities is not only desirable but also required. Only when the nervous system is released from its 'fight-or-fly' state can inner processes engage in repair, recuperation, imagination, and social involvement, all of which are essential components of well-being (Psychology Today, 2021).

1.2 Targeted for development neighbourhoods in Rotterdam South

This specific area of Rotterdam South is a densely populated one, rich in diversity of both people and activities. However, it also features an agglomeration of deprived neighbourhoods coupled together around just a few smaller pocket green parks making the area extremely fragile considering its liveability and ability to adapt to crises (for example Covid-19). For those who live and work here, finding a space for peaceful retreat is a challenge. There appears to be a significant imbalance between the vibrancy and tranquillity of the environment, not only in Rotterdam South but in many big cities around the globe, which negatively impacts residents' daily lives. This ongoing pressure affects the psychological well-being of the community. By integrating architecture fousing on the sensation of calmness, we can create healing environments that offer mental relief, providing the much-needed balance within the area and a safety net for future crisis scenarios.

1.3 Pilgrimage concept

Pilgrimage

/ˈpɪlgrɪmɪdʒ/

Noun

- A journey to a holy place for religious reasons.
- A journey to a place that is connected with somebody/something that you admire or respect.

Pilgrim

/ˈpɪlgrəm/

Noun

- A person on a journey, a person who travels from place to place, a traveller, a wanderer, an itinerant. Also in early use: a foreigner, an alien, a stranger.
- A person who makes a journey (usually of a long distance) to a sacred place as an act of religious devotion.
- A person who makes a journey to visit a place of particular significance or interest.

Image 1- Pilgrimage and Pilgrim definition (Oxford Advanced Learner's Dictionary, 2024).

The definition of pilgrimage and pilgrim provided by the Oxford Advanced Learner's Dictionary (2024) reveals much about the terms' significance. While some pilgrims have historically wandered without a fixed destination, pilgrimage more commonly involves a purposeful journey toward a site sanctified by its association with a divinity or other sacred figure. In modern times, pilgrimage is often understood as a practice involving the search for divine favor and temporary escape from the routines of daily life (Britannica, 2018).

In the context of this research, the concept of pilgrimage retains its spiritual undertones, but it is reinterpreted through the lens of emotional well-being and inner peace rather than religious devotion. For the purposes of this thesis, pilgrimage is introduced as an overarching concept that frames the spatial experience of the users. Here, pilgrimage refers to a journey through spaces of contemplative and spiritual character, intended to guide individuals toward emotional clarity and a sustained sense of calmness. The pilgrim, understood as the user of the building, is envisioned as a wanderer, a seeker of mindfulness and presence in the moment.

In this sense, the proposed Centre for Calmness aspires to function as a series of 'temples' or spaces designed to foster psychological restoration, introspection, and cultivation of tranquillity.

02. Problem field

2.1 Motivation

My fascination with this project stems from the growing need for calm and peace that has become increasingly apparent over the past few years. Since COVID-19 shattered our world, we've become more aware of our need to escape and simply "take a breath." Although the world has since returned to its routine, the desire to find quiet restorative places has not diminished. In our busy, often stressful city lives, filled with artificial stimuli and noise that directly impact our mental well-being, we find ourselves seeking a healing environment to recharge and take a deep breath.

2.2 Focus of the research

Despite the vast research into what contributes to subjective well-being, a significant portion of its variety remains unexplained. In this thesis will examine the importance of tranquillity in the daily lives of urban dwellers. The primary goals here are psychological well-being, relaxation, and the development of a connection between tranquillity and architecture. This study tries to bridge the gap between psychology and architectural design while also proposing a more balanced urban environment.

03. Problem statement

Architecture can address the need for calmness and stress reduction by designing deliberate places that provide balance between the sensory overload and environmental stresses of urban life. Urban environments frequently exhibit a large imbalance between dynamic activity and locations for calmness and reflection, placing a constant strain on communities' mental health. By combining nature and architectural design, 'breathing spaces' would strive to encourage mindfulness, relaxation, and a sense of sanctuary from urban stresses. Such places not only improve individual well-being but also help metropolitan regions withstand crises. By focusing on Rotterdam South, this study seeks to uncover architectural methods that could turn urban settings into balanced spaces where individuals can find peace and repair their psychological health amidst the challenges of modern city life.

04. Research Questions

4.1 Main question

"How can architecture provide calmness and mitigate environmental stressors in urban settings, specifically in targeted for development neighbourhoods in Rotterdam South?"

The question tries to investigate how architectural design could produce spaces in metropolitan environments that promote peace while also relieving stress induced by noise, crowding, and other human activity. It specifically focuses on Rotterdam South, to identify design techniques that improve the experience in that area, making it more favourable for rest and serenity.

4.2 Research sub-questions:

1. What is the role of environmental stressors and relaxants in urban settings?

What are the urban environmental stressors and their impact of environmental stressors on the mental health of the public?

What are the urban environmental relaxants and their impact of environmental relaxants on mental and physical health?

2. What is the perception of targeted for development neighbourhoods in Rotterdam South and their restorative spaces?

What is the perception of the environmental stressors and relaxants in Rotterdam South?

What are the restorative spaces' typology and use in Rotterdam South?

3. What role does architecture play in addressing calmness?

How can architecture create calm spaces?

What are examples of calm architecture?

What design components does calm architecture incorporate?

4.3 Research aims

(A) Understanding the impact of architecture on mental health and well-being.
(B) Understand the different possible strategies to deal with stress.
(C) Understanding the relationship between urban stressors, relaxants and mental health.
(D) Getting a perception of pre-Second World War Rotterdam South and investigating the typology of its restorative spaces.

4.4 Goal and Objectives

Main Goal:

Restoring the balance between vibrancy and tranquillity in targeted for development neighbourhoods in Rotterdam South by enhancing the qualities of the existing urban environment through the provision of a centre for calmness.

Objectives:

(A) An expanded knowledge of the urban stressors and relaxants in Rotterdam South.

(B) An expanded knowledge of the combination of architectural design and psychology.

(C) Production of design patterns for creating spaces for calmness.

(D) A discussion of future crisis scenarios in which spaces for calmness play a vital role.

05. Theoretical framework and position

5.1 Production of space theory by Henri Lefebvre

Henri Lefebvre, a French sociologist and philosopher, provides a framework for producing environments in order to establish a more comprehensive understanding of sustainability within architectural studies. He contends that the space is the result of 'social superstructures' formed by societies' own individual behaviours (Lefebvre,1991).

Lefebvre's framework is important for this thesis since it establishes the physical-mental link, which is essentially the spine of the issue. The framework provides the idea that the special and mental realms are essential for the creation of the physical space.

According to Lefebvre, 'lived space', also known as 'representational space', is the imagined space in which the outer world interacts with the inner world of the individual (Lefebvre, 1991). As a result, this space is a mental space, which is very subjective based on how the physical space stimulates the individual's imagination and psychique.

'Conceived space' is a space also known as 'representations of space'. It is characterised as such because designers strive to provide a representation based on design principles and aims, resulting in a physical effect by imposing a certain concept and vision (Lefebvre, 1991). As a result, this thesis reinterprets the conceptualised environment as a physical place based on practitioners' knowledge, science, and ideology.

'Perceived space' is the environment in which activities, movement, and interactions occur to build networks (Lefebvre, 1991). As such, this space combines the 'others' (people, noises, movements) with the individual, blending personal daily routines with collective motions. As a result, in this thesis, space is viewed as a social space. It is stated that the space is based on 'what is seen'; nevertheless, regardless of whether we see the physical or social space, we must employ more than only our visual sense.

According to the original model, the social space is where the trinity of perceived, conceived, and lived comes together. As a result, in this thesis, space is defined as the total atmosphere of the everyday environment formed by the conceived, perceived, and lived environments.

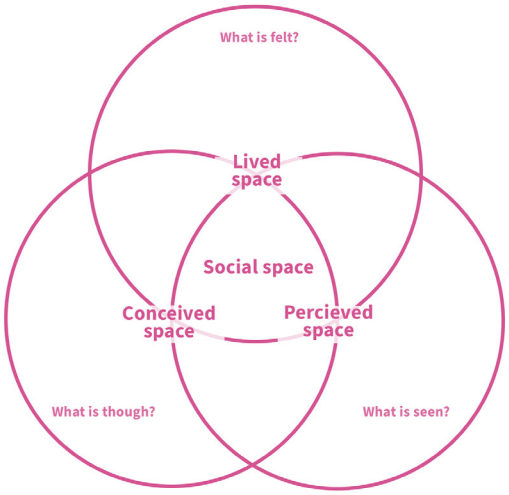


Figure 1. Production of space based on diagram original diagram (edited by the author).

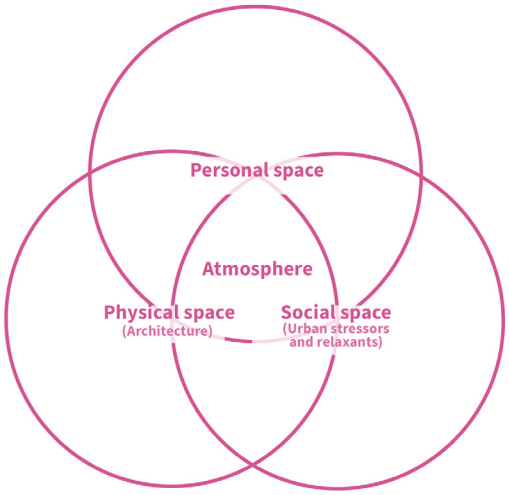


Figure 2. Interpretation of the original (created by the author).

5.2 Arousal theory by James Russell

The arousal theory is a psychological model established by James A. Russell that is particularly relevant to emotion and environmental psychology. This theory emphasises the role of arousal in shaping emotional experiences and proposes that emotions can be understood in two dimensions: valence (pleasure-displeasure), which ranges from positive emotions (e.g., happiness, joy) to negative emotions (e.g., sadness, anger), and arousal (activation-deactivation), which refers to the level of activation or energy associated with a given emotional state. It goes from low (calm, comfortable) to high (excited, anxious). These two dimensions combine to produce a circumplex model of effect, allowing distinct emotions to be plotted on a two-dimensional plane. In this concept, emotions exist on a continuum rather than as separate, independent categories. They can be organised along the valence and arousal axes, with different combinations indicating distinct emotional states (Stangor and Jennifer, 2014). This method is particularly important for this study because it gives a framework for understanding how people feel different emotions based on their surroundings, activity, or stimulus, rather than considering emotions as fixed categories such as "fear" or "happiness."

As previously stated in the interpretation of Lefebvre's theory of space production, physical, social, and individual spaces all work together to create an environmental atmosphere. For the sake of this thesis, the point of completion of these superstructures is referred to as the 'atmosphere', or the impression of space we have when the physical, personal, and social domains meet. However, as demonstrated by Russell's thesis, the environment elicits certain emotions. This work focuses on the emotion of 'calmness'.

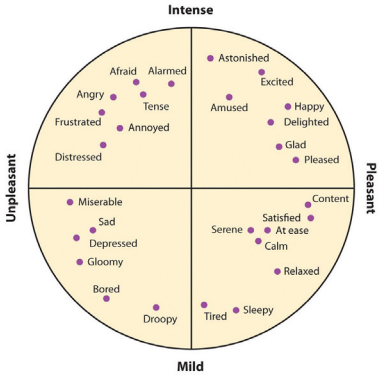


Figure 3. Russell's Arousal Theory (Mahmood, 2022)

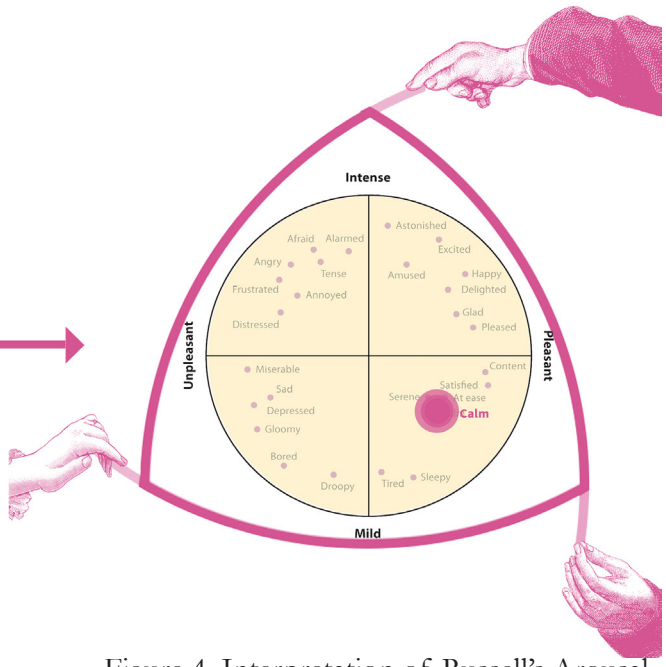


Figure 4. Interpretation of Russell's Arousal Theory (created by the author).

5.3 Position within existing frameworks

By merging Lefebvre's and Russell's theories, it becomes clear that there is a need to examine how to modify the superstructures to generate a sense of 'calm'. It is possible to manage the emotions evoked by the external world by defining how dynamic or static each superstructure can be. The physical domain is viewed as primarily static, which means it can be regulated by creating the environment with the purpose of being tranquil. However, social space is primarily dynamic in nature that combines the social network, the 'others', and external environmental stimuli. Nonetheless, designers can encourage specific behaviour to create a calm environment. By controlling these two dimensions (physical and social), the designer can influence the individual's perception of calmness.

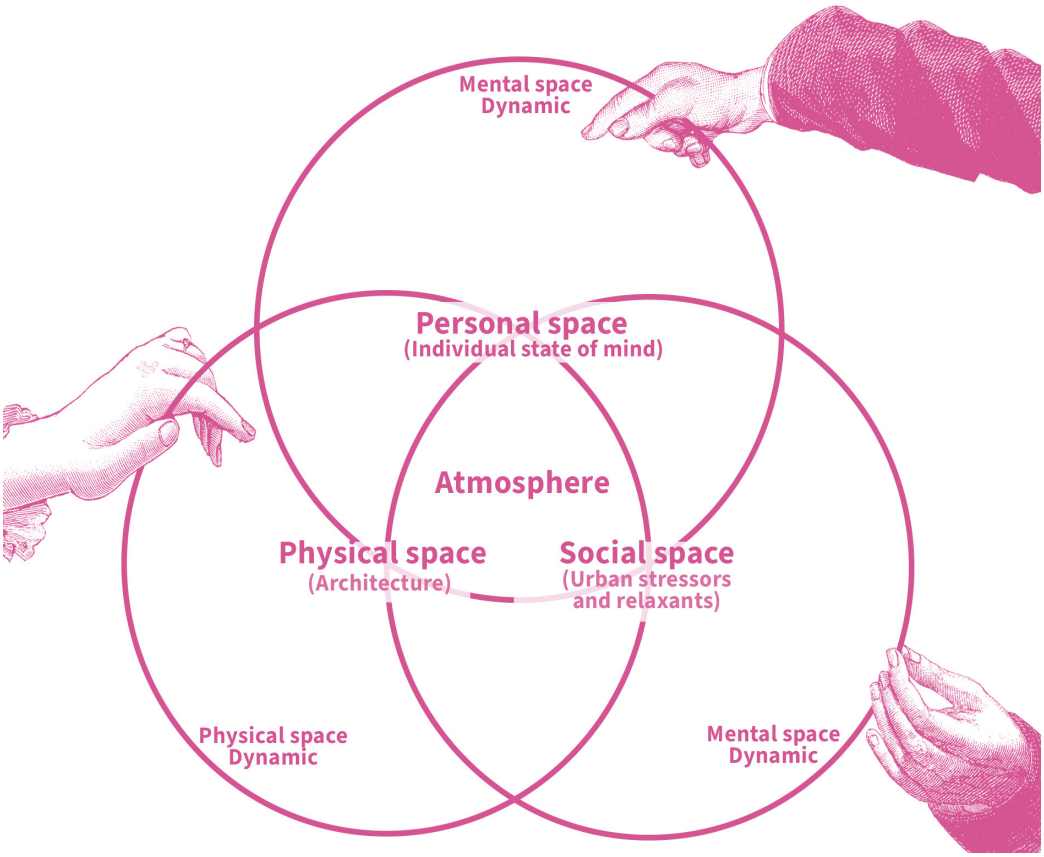


Figure 5. Controllability of the spheres to create calmness (created by the author).

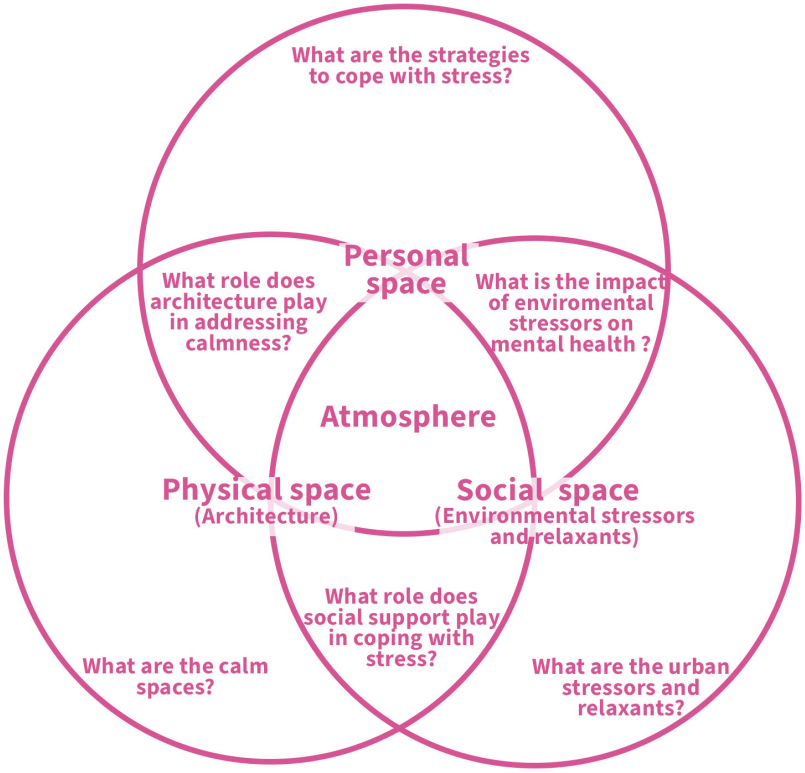


Figure 6. Integrating theory interpretations with sub-questions of the thesis (created by the author).

06. Methodology

To properly analyse the intricacy of the new typology that the thesis will attempt to introduce, a specific schematic technique must be implemented. As previously stated, the main question is divided into sub-questions. Research aims, goals, and objectives emerge as guiding directions for the research, allowing it to focus on answering the main question. Several methodologies will be used to conduct the inquiry, including quantitative and qualitative features. However, it is important to note that each method has limits. Nonetheless, by combining the various methods more knowledge is gathered, resulting in a more sober perspective. Outputs are the predicted findings of the research into the sub-questions.

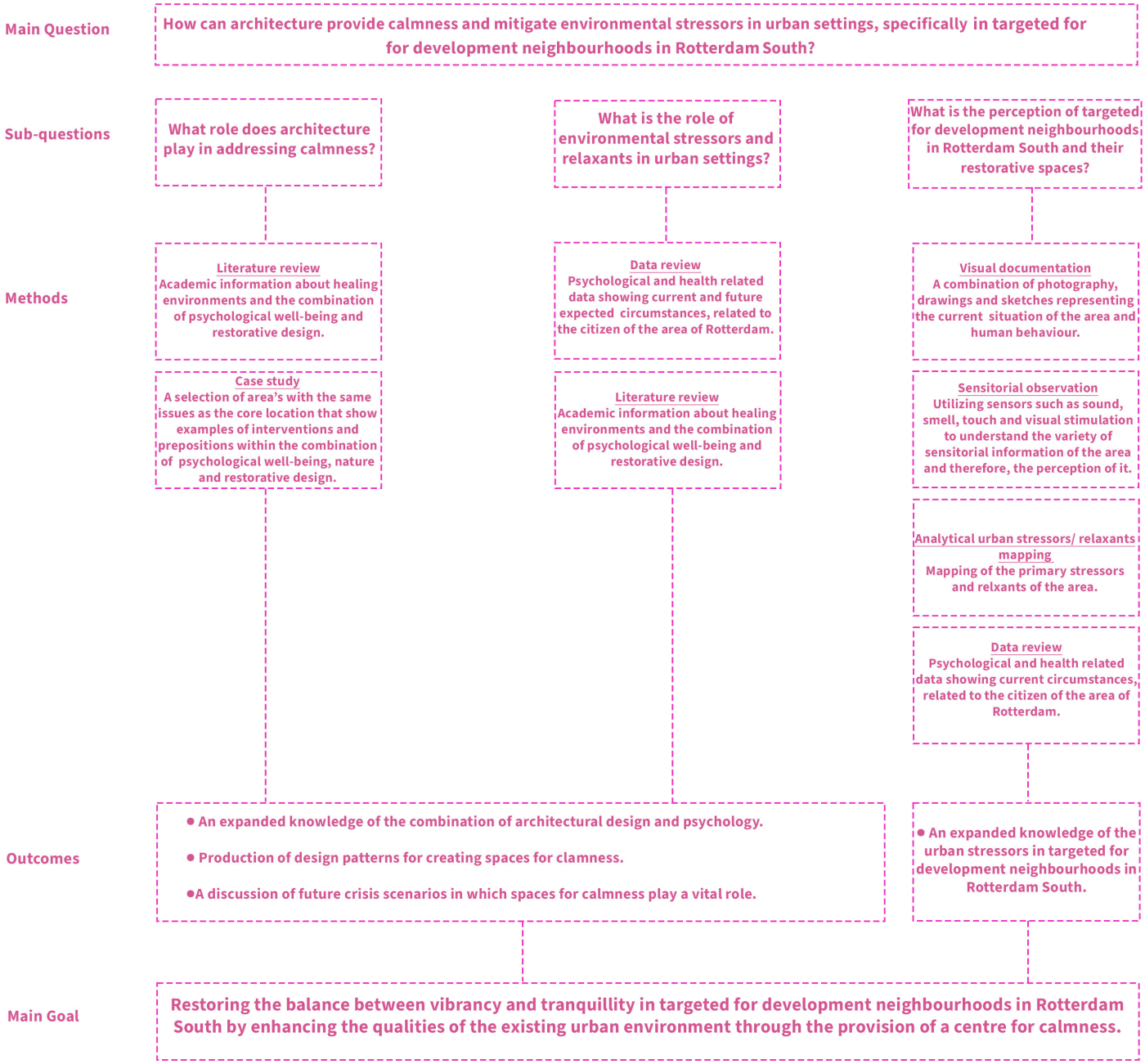


Figure 7. Schematic methodology approach (created by the author).

07. Conceptual framework

As previously introduced, the conceptual framework of this thesis would consist of three main domains – the physical space, the social space and the personal space. As illustration 1 shows, when the physical space is sustaining highly dynamic life and when the social space is consistently producing stressors, the personal space or the individual mind space is under pressure. However, through design, we can tweak the physical and social spaces to reduce the pressure put on the personal space.

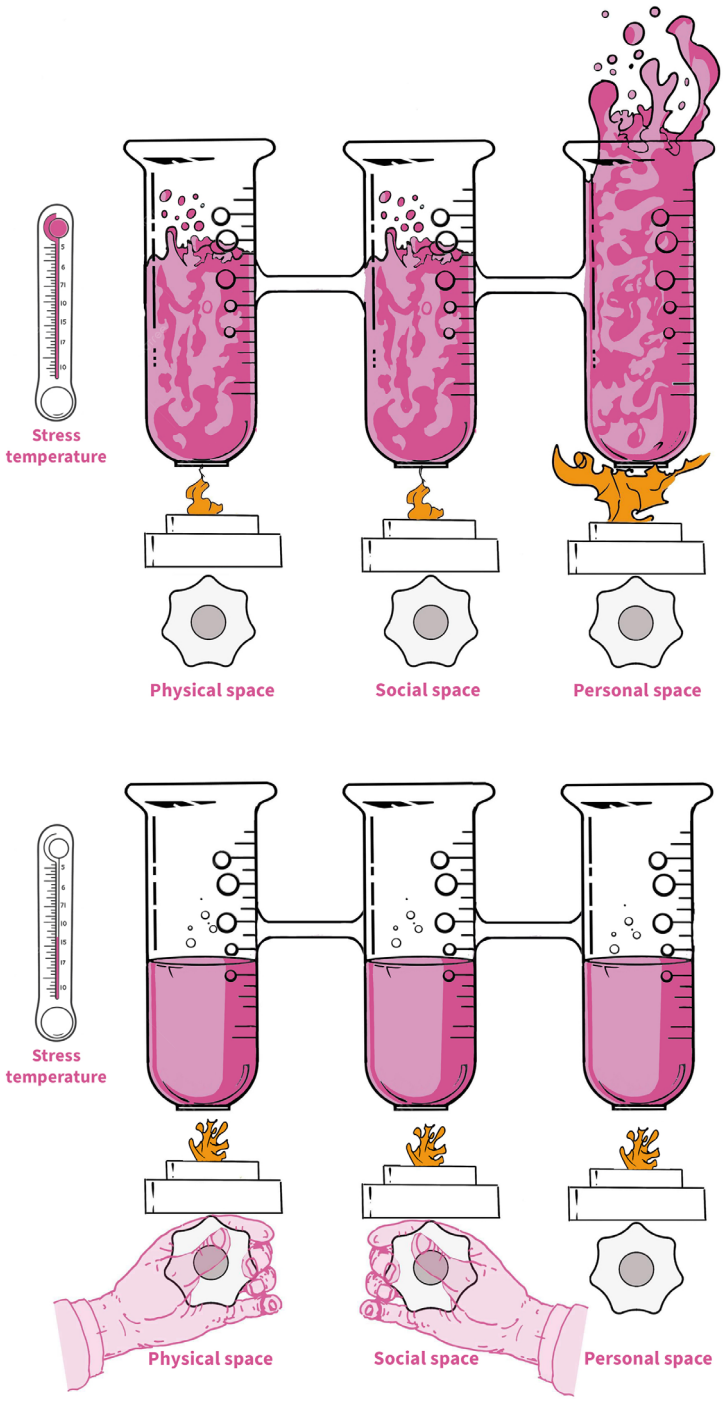


Illustration 1. Conceptual framework (created by the author).

08. What role do environmental stressors and relaxants play in urban settings?

Mental health has become a critical issue that demands immediate attention, particularly in urban areas. The rapid development and growth of cities has a substantial impact on residents' mental condition. Uncontrolled urbanisation is frequently linked to an increase in numerous mental health disorders, such as depression, anxiety, and post-traumatic stress disorder (Buttazzoni et al., 2022).

Although mental health illnesses are often associated with demographic and socioeconomic characteristics, there is limited quantitative data on the relationship between mental health and the urban environment. With increasing urbanisation, more people are exposed to environmental stressors, which may contribute to increased stress and poor mental health and less urban relaxants, which on their side could positively affect the mental health and provide a feeling of relaxation and calmness (Rautio N, et al., 2018).

8.1 What are the urban environmental stressors and what is their impact on the mental health of the public?

The discomfort that arises from living in an urban setting is known as urban stress. Air pollution, noise pollution, social inequity, isolation from nature, and overcrowding are some of the stressors associated with urban life (Hernandez et al., 2020).

Isolation from Nature

Urban surroundings frequently cut residents off from nature, which is firmly ingrained in our evolutionary past. Humans evolved in natural habitats, and a lack of green spaces and natural ecosystems in cities might result in residents having "nature deficit disorder." Research on anxiety disorders and the likelihood of developing schizophrenia found that rates were higher in cities than in rural areas (Benzar, 2024).

Overcrowding

High population density can cause feelings of claustrophobia, stress, and social isolation. Furthermore, urban environments with large population densities can overwhelm people with stimuli, resulting in sensory overload, increased stress, and poor cognitive performance. These elements can have a negative impact on mental health, particularly because humans are not evolutionary accustomed to such densely populated living settings (Benzar, 2024).

Air pollution

Air pollution can induce respiratory and cardiovascular problems, as well as mental health issues. Long-term exposure to polluted air has been linked to lower cognitive performance and an increased risk of developing mental health conditions such as depression, anxiety, and dementia. The World Health Organisation estimates that air pollution causes around 7 million premature deaths each year, with a large fraction of these being due to mental health repercussions (Benzar, 2024). Fine particle matter, a commonly used air pollution indicator, has been associated to depression and psychotic disorders. Furthermore, nitrogen dioxide contributes to the likelihood of psychotic diseases (Pelgrims et al., 2021).

Noise pollution

Noise is another typical feature of the urban environment. Recent research has demonstrated that transportation noise, such as road, aeroplane, and rail traffic, disrupts sleep and increases anxiety (Benzar, 2024). Several studies have supported the idea that noise is associated with neurocognitive functions, mood disorders, and neurodegenerative illness (Pelgrims et al., 2021).

Social injustice

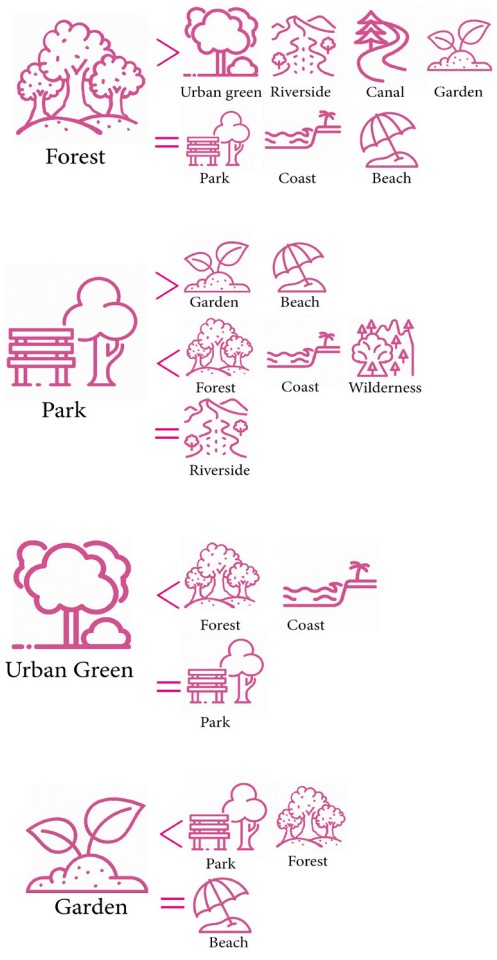
As urbanisation and densification continue, more people will be forced to live in residential areas with less green resources. This is especially true for lower socioeconomic categories lacking the resources to relocate to greener places outside of cities. This results in environmental injustice due to the allocation and access to public green places. A 2006 study found that people with a secondary education gain the most from green space indicating that lower-educated populations are more sensitive to physical environmental features (J, et al., 2006).

8.2 What are the urban environmental relaxants and what is their impact on public's mental health?

Squares, little pocket parks, and larger green and blue spaces are frequently linked with calming and recreational activities in urban settings. Blue spaces can help people manage their emotions and discomfort, provide opportunities for increased social involvement, and encourage rest and relaxation. Similarly, green spaces such as parks can alleviate stress, while gardens and gardening can reduce depressive symptoms and increase emotional well-being (Buttazzoni et al., 2021).

Green spaces

Globally, continuing urbanisation is exerting increasing strain on the availability of green spaces in metropolitan areas. The scarcity of urban green space, combined with the need to create liveable cities, necessitates additional research into various forms of green spaces and how they affect people's health (WHO, 2021).



Green space category	Description	Examples
Urban green space	Urban land covered by vegetation, which does not fall (solely) into one of the other categories such as parks or gardens	Urban forest, street trees, green vegetation cover in the city, informal green spaces
Park	A large area of land with grass and trees, usually surrounded by fences or walls, and specially arranged so that people can walk in it for pleasure	Urban park, district park, neighbourhood park
Garden	An area where plants and flowers are cultivated; this can be either a private garden (adjacent to the house) or a public garden	Backyard, botanical garden
Forest and woodland	An area mainly covered with trees and undergrowth cover	Deciduous, coniferous, mixed forest
Grassland and meadows	An area mainly covered with grass	Mowed lawn, improved grassland (used for grazing), semi-natural grassland
Trees and other plants	Plants, shrubs or vegetation cover	Tree canopy cover, vegetation cover, shrubs
Biodiversity	Diversity in plants and animals	Flora richness, fauna richness

Table 1. An overview of green space types and qualities (Source:WHO, 2021; edited by author)

Figure 8. Comparison of green space typologies and characteristics by mental health outcome (Source: WHO, 2021; edited by author)

Mental Health Outcomes

In a study conducted by WHO, findings showed a clear correlation between more trees, increased biodiversity, and better mental health. This is illustrated by people's preference for forests and parks. This could be related to biophilic beliefs about our natural preference for well-connected larger biological systems (such as parks and forests) over isolated green spaces (urban community gardens) (Kellert, 2018).

Implications for designing urban green spaces

A wider range of variety of green spaces, rather than a single type of green space, can better meet the needs of various sorts of green space users, especially in highly dynamic urban contexts. There will never be a reliable formula for determining the type of vegetation or planting density. However, vegetation selection and biodiversity levels must both be taken into mind. It is crucial to note that the appearance of green spaces varies dramatically between seasons, as well as in relation to changes in weather conditions and sunlight exposure, which may result in different activity patterns (WHO, 2021).

Figure 9. Implications for designing urban green spaces (created by the author).

Blue spaces

Blue spaces, like green spaces, are increasingly regarded as having a positive impact on mental health. "Blue spaces" refer to "outdoor environments - either natural or manmade - that prominently feature water and are easily accessible to humans". Examples include beaches, lakes, ponds, and canals. Together with green areas, they comprise the green-blue infrastructure (WHO, 2021).

Blue spaces outcomes

Studies that looked at seaside exposure rather than coastal availability discovered more consistent positive impacts on mental health. Positive associations with mental health were less noticeable in inland oceans compared to coastal blue space. Qualitative research highlighted specific beneficial aspects of blue spaces, such as the visual openness of the place and the fluidity and movement of the water, all of which have a positive impact on the public's mental health (WHO, 2021).

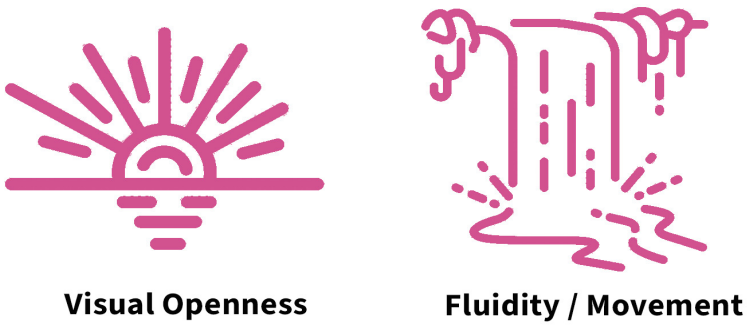


Figure 10. Water features (created by the author).

Coping with stress

Research has revealed a link between exposure to natural surroundings and recovery from physiological stress and mental exhaustion, supporting both Stress Recovery Theory (Ulrich, 1983) and Attention Restoration Theory (Kaplan, 1995). The former argues that because people evolved in natural areas, they are physiologically and psychologically acclimated to them, as opposed to urban situations. According to the latter, individuals are predisposed to pay attention to and respond positively to natural content (e.g., plants, water) (Berto, 2014).

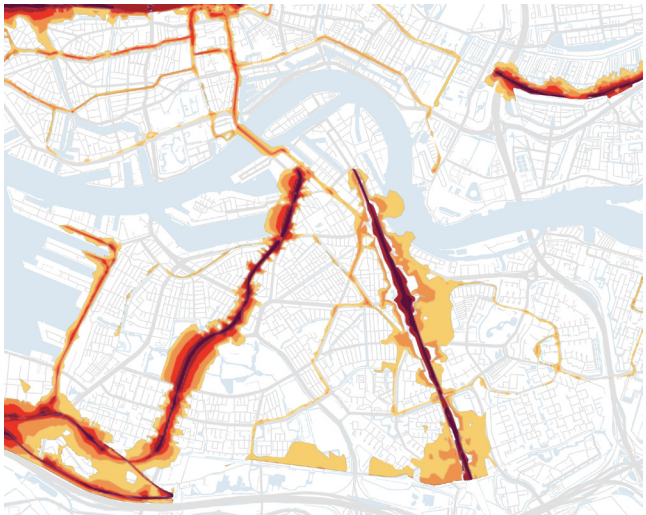
The restoration hypothesis distinguishes between two sorts of attention. One of these is attention that requires effort (for example, listening to a tough lecture, concentrating on a task, or balancing many requests). The second category requires no effort and includes activities and places that are fascinating and engaging, as well as times when one feels at ease in one's environment. Paying attention to a waterfall or an indoor aquarium is vastly different from paying attention to a boring speaker. Restoration requires engaging activities and environments that allow for concentrated attention and repose. The natural environment has a very strong healing effect on many people. A view of a single tree from a window can provide calming moments throughout the day. Participating in green activities may help you learn new skills and meet new people (Kaplan, 1989).

09. What is the perception of targeted for development Rotterdam South neighbourhoods and their restorative spaces?

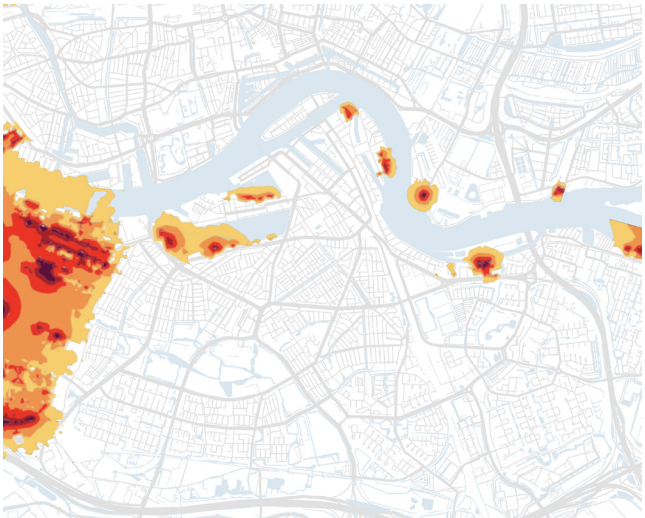
This section examines the factors that influence residents' perceptions of Rotterdam South. It includes various elements to provide a more comprehensive understanding of the stressors and relaxation factors observed in neighborhoods targeted for development. This analysis is crucial, as it will offer a clearer, more balanced perspective and be essential for context-specific design in later stages.

9.1. What is the perception of the environmental stressors in Rotterdam

Map 1. Traffic Noise Disturbance Map



Map 2. Railway Noise Disturbance Map



Map 3. Industry Noise Disturbance Map

Map 4. General Noise Disturbance Map

Legend:

- 55-59 dB
- 60-64 dB
- 65-69 dB
- 70-74 dB
- Greater than 75 dB

According to the National Institute on Deafness (NIDCD, 2020), sound below and up to 70 dB are considered save for our hearing and chronic exposure above this daily limit is believed to be to cause noise-induced hearing loss. According to the shown maps, all of the main traffic arteries reach higher sound levels than 70dB. The maps are created by the author based on DCMR resources (DCMR, 2021).

Veldacademie has been approached by the Municipality of Rotterdam for assistance for establishment of new 'Noise Plan' (Veldacademie, 2024). Noise pollution from road traffic seems to be a common problem in Rotterdam (Figure 11). Only 13% of respondents rarely or never experience this. More than a quarter of respondents (27%) always experience this and an even larger group (39%) regularly/often.

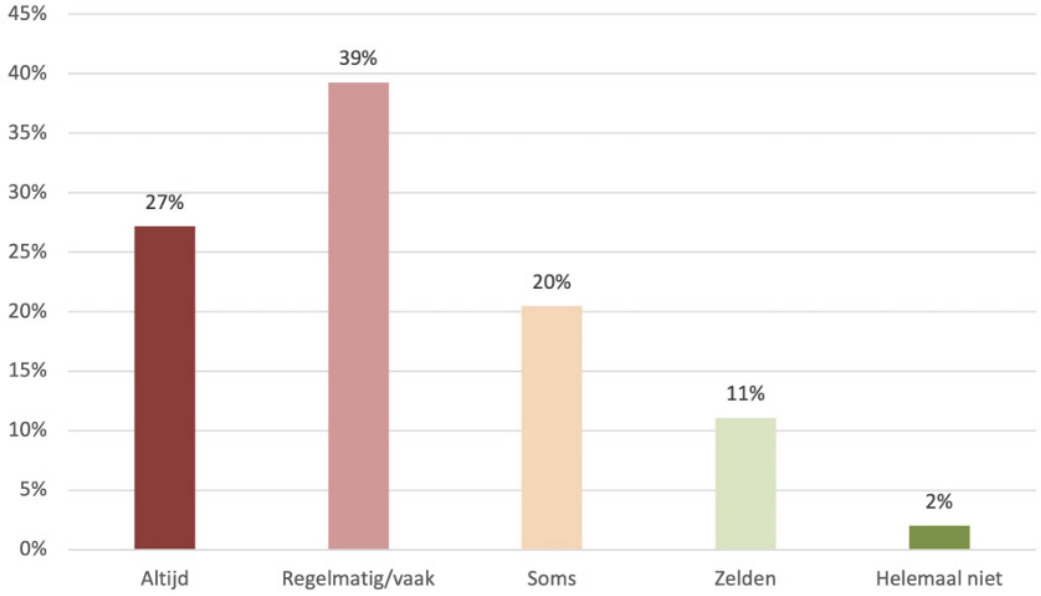
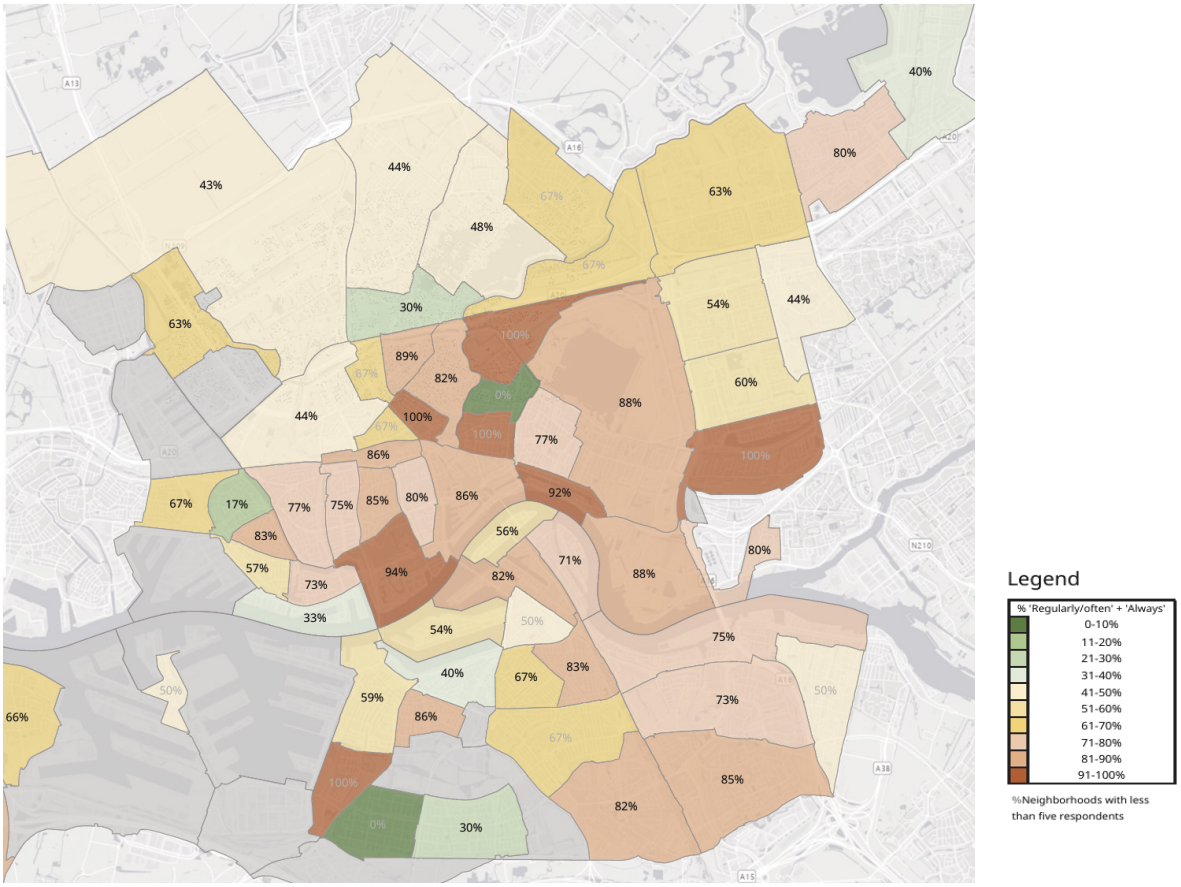


Figure 11. Experience of noise pollution from road traffic in residents' neighbourhoods (Veldacademie, 2024).



Map 5. Experience of noise pollution from road traffic in residents' neighbourhoods (Veldacademie, 2024).

Health outcomes

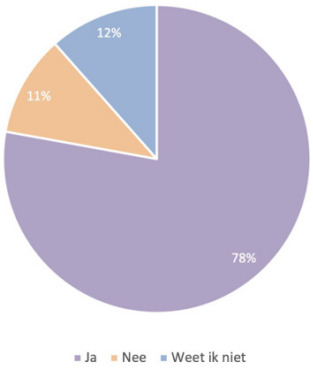


Figure 12. Preception of noise pollution on residents' health (Veldacademie,2024).

Related to the perception of noise as stressor, the negative health effects of noise pollution are clearly visible in Rotterdam. A convincing majority of respondents (78%) feel that noise pollution affects their health. Comments are sourced from the Velacademie report. These health effects can be divided into a number of categories:

• Poor sleep/disturbed sleep- Respondents experience worse sleep or are often woken up at night by sounds of traffic and neighbours. Poor sleep quality leads to fatigue, irritation and reduced concentration during the day

• Mental health- Nearly 100 respondents indicate that noise pollution affects their mental well-being, feeling of helplessness and frustration the inability to avoid noise pollution, which further aggravates stress.

• Concentration problems- Some respondents indicate that noise pollution affects their ability to concentrate, especially during work or study.

• Indirect consequences- People feel limited in their freedom to open windows or sit outside due to noise pollution. This leads to

"I have a neurological condition and the stimuli from sound have become enormous, also at night. When we moved here, the nuisance was not there."

Respondent, Greater IJsselmonde

"Traffic noise is now almost synonymous with nuisance because of all the additional sounds such as pounding bass, crackling exhausts and roaring engines. This is why I have classified road traffic as a "nuisance" while a few years ago I would have labelled it as "lively."

Respondent, Old IJsselmonde

"I work in healthcare and I can't find a balance because there is always noise pollution and gatherings of cars and motorcycles at 11 p.m. And racing in the neighborhood with cars and loud exhausts."

Respondent, Feijenoord

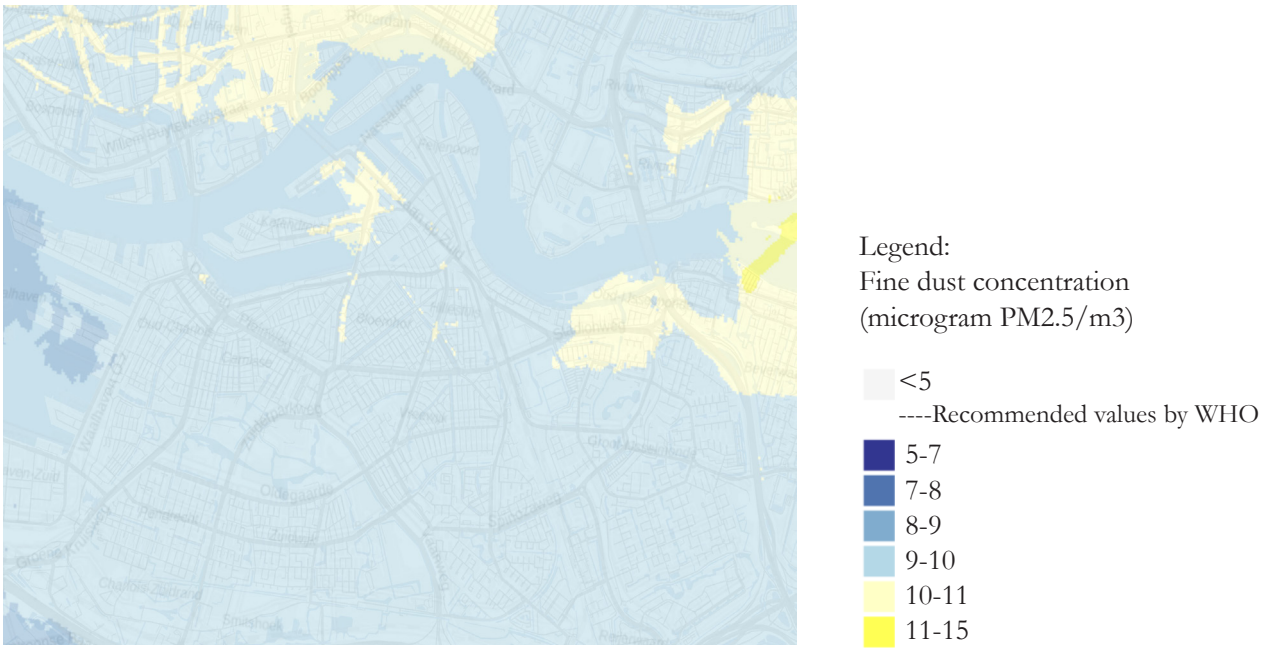
"Little peace, misanthropy, very irritable. I feel racism and intolerance because of all that human noise."

Respondent, Bloemhof

"I don't find it unpleasant to hear sounds that I know are part of the city. I only get uneasy about sounds that I can't place or that I know I don't 'belong' to, such as shouting at night or pretentious engine noises from vehicles that are stationary."

Respondent, Old West

Rotterdam Air Quality Map



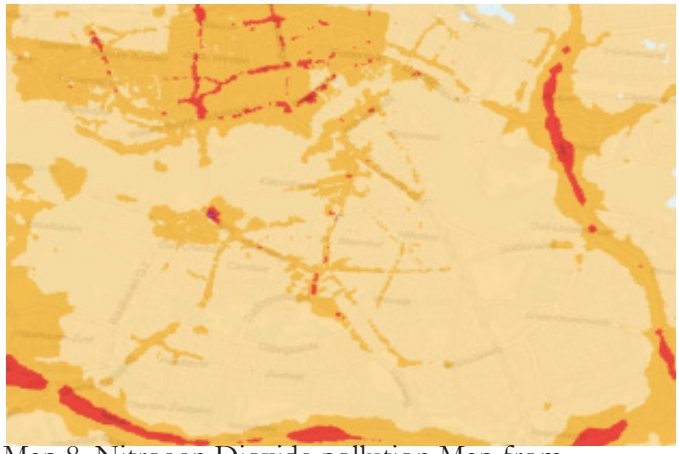
Map 6. Fine dust concentration in Rotterdam (Atlas Leefomgeving, n.d.).

As shown on the map the air quality in Rotterdam does not meet the recommendations by the World Health Organisation. Also, the limit values for nitrogen dioxide and particulate matter are exceeded in certain places in the Netherlands, especially along busy roads in urban areas (Gemeente Rotterdam, 2020).

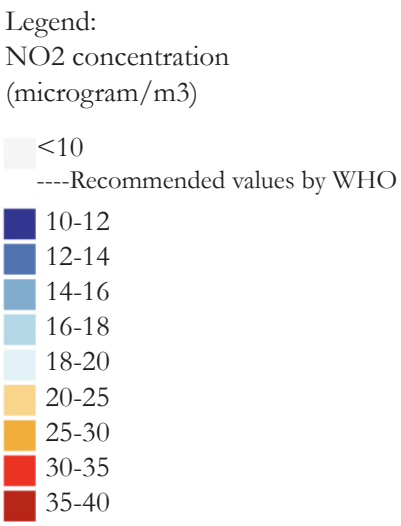
Map 7. Nitrogen Dioxide pollution Map from 2021 (Atlas Leefomgeving, n.d.).

Rotterdam Nitrogen Dioxide Map

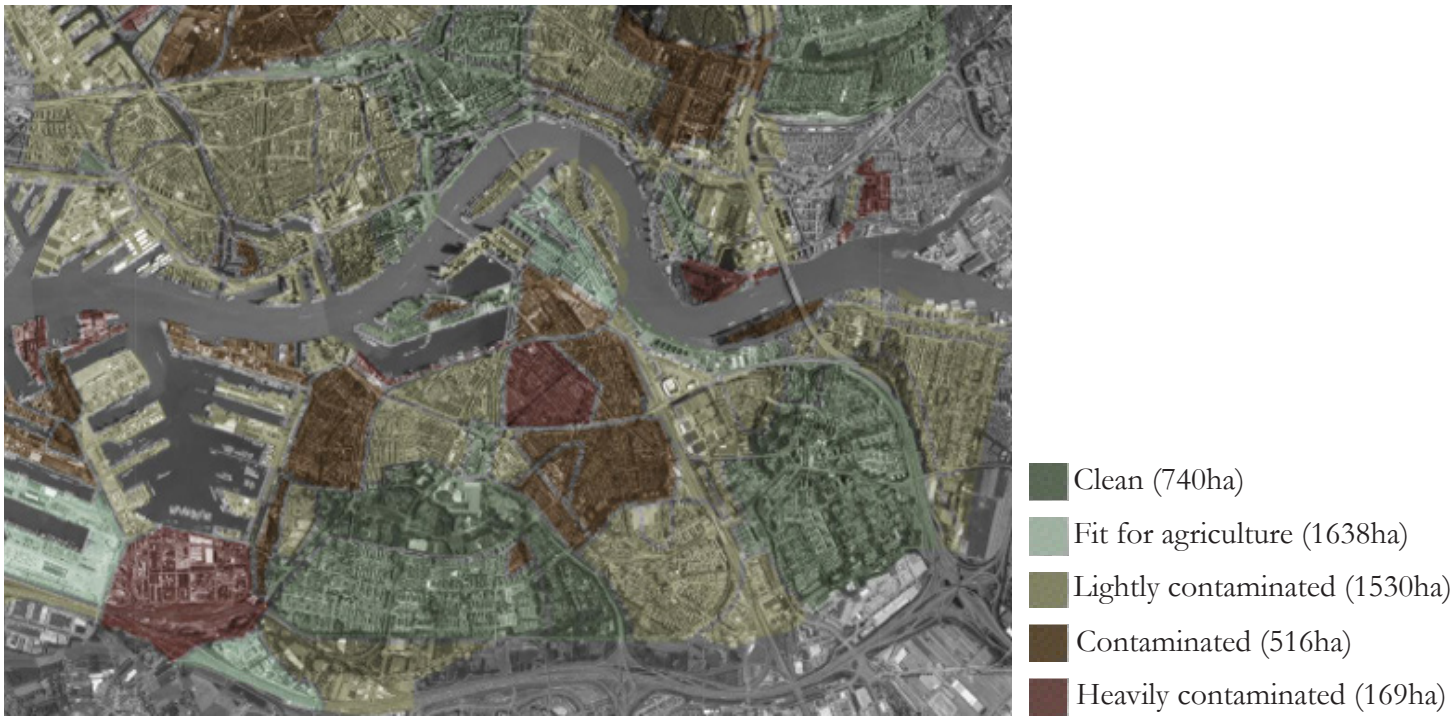
According to the maps from 2021 and 2022, there has been a significant decrease in the levels of Nitrogen dioxide in Rotterdam South. However, the levels are still much higher than the recommended ones by WHO.



Map 8. Nitrogen Dioxide pollution Map from 2022(Atlas Leefomgeving, n.d.).



Soil contamination and urban density

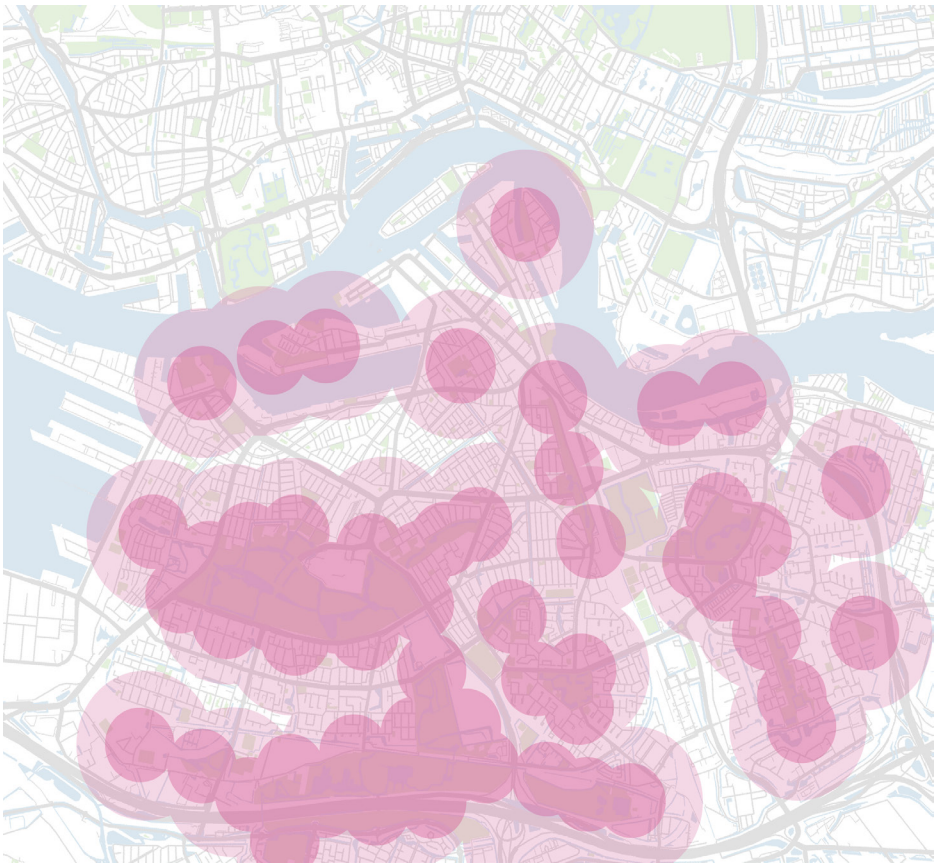


Map 9. Soil contamination (Lee, 2021).

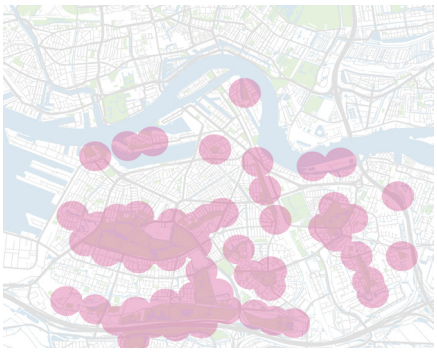
Map 10. Urban density (Groen, 2023).

According to maps there is also a good level of soil contamination present in the area, specifically in areas targeted for future development. In some of the same areas, the urban density is the highest.

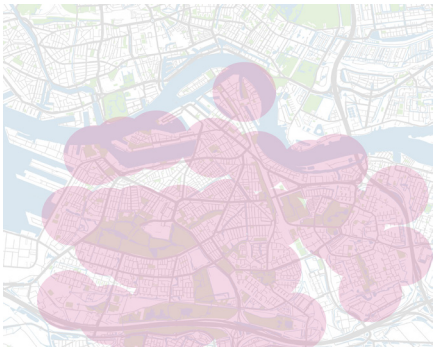
9.2. What are the typologies and uses of restorative spaces in Rotterdam South?



Map 11. Accessibility to recreational natural green areas (created by the author).



Map 12. Accessibility within 5 min. walk (created by the author).



Map 13. Accessibility within 10 min. walk (created by the author).

Accessibility within 10 min. walk (600m)

Accessibility within 5 min. walk (300m)

WHO recommends natural areas in urban zones to be reach within 5 to maximum 10 minutes of walk. As visible large amount of household can not reach natural spaces within just 5 minutes from their home, some can't do that even for 10 minutes walk.

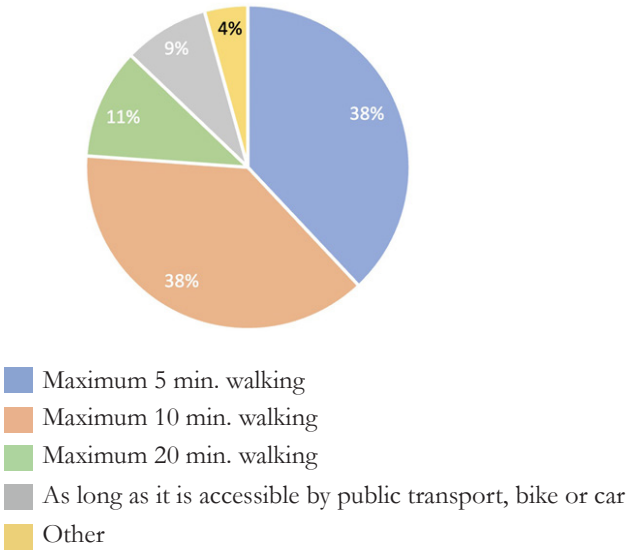


Figure 13.Desired walking distance to quite place (Veldacademie, 2024).

According to the investigation done by Veldacademie, a distance of 10 minutes walking to a quiet place seems to be the maximum desirable distance. Only 20% of the respondents find it acceptable if the distance is longer than 10 minutes. Among the respondents who chose the option (Veldacademie, 2024).

Green structure in Rotterdam South

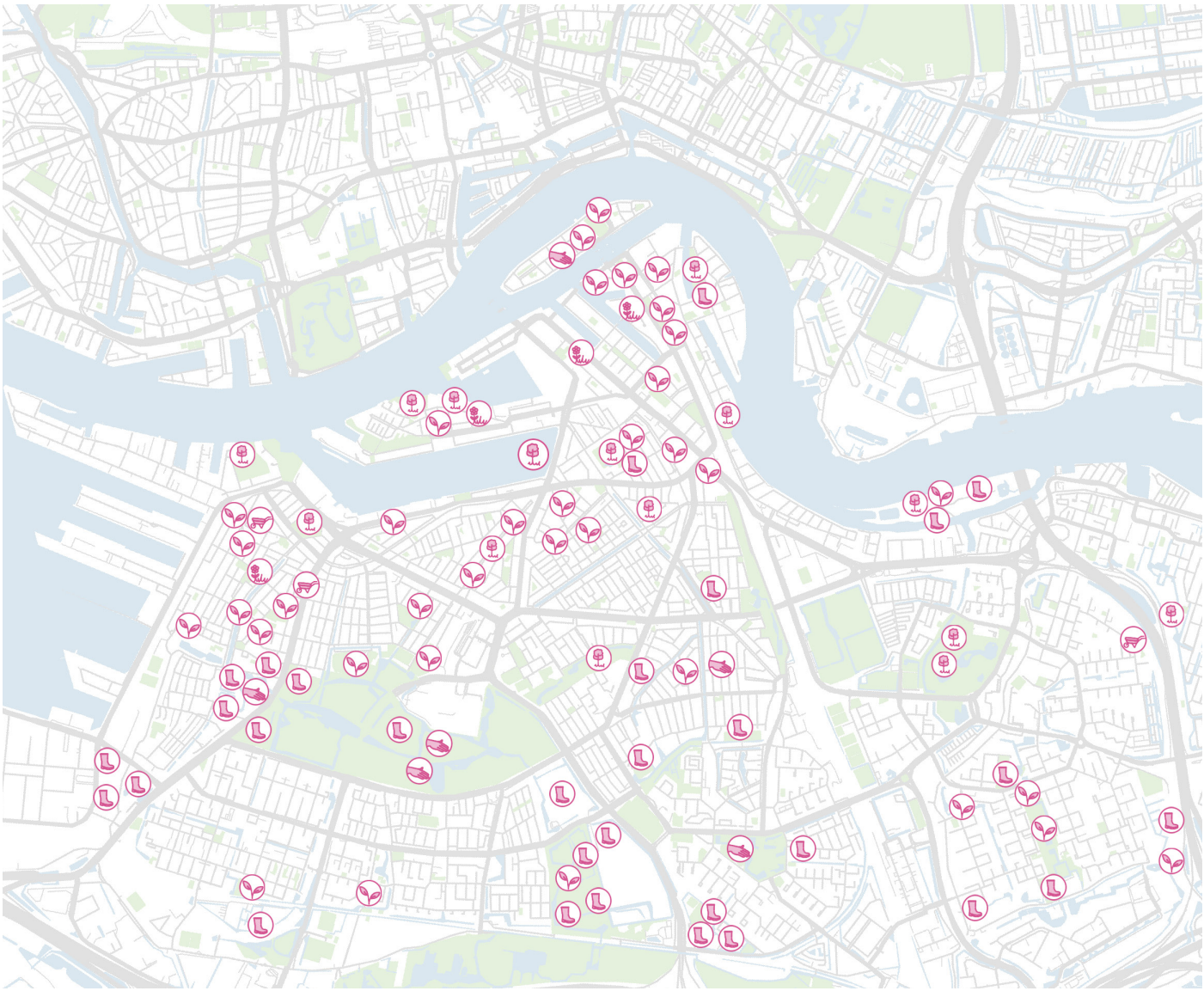
Map 14. Rotterdam South green structure (created by the author).

It can be said that although the South appears to look like there is a good natural balance, many of this green spaces are underused, and actually only a grass fields. Besides, the green is mostly made up of the Zuiderpark and a few smaller pieces of green, but towards the north, it become more and more scares.

Map 15. Walking in Rotterdam (Gemmente Rotterdam, 2020).

As visible on the map, the walking routes around the areas targeted for development are noted as 'less pleasant'.

Rotterdam South Green Initiatives



Map 16. Green opportunity card (Verbind Groen 010, 2024).

Legend:

- Place makers: green initiatives with their own place
- Street green: small but nice
- Mobile: always in a different place
- Networks: coalitions of initiatives or places
- Green Case: institutions with a green place and a green mission
- Parks: the parks of Rotterdam

Green efforts in the area are expanding, making the city greener, more social, and more climate resilient. The jointly managed urban green offers both geographical and social benefits. Such communities foster a social support network, which is essential for maintaining mental health. Furthermore, attaining and using competence reduces one's feelings of helplessness and worthlessness and increases one's sense of contribution to a broader purpose. Both the experience of competence and gaining respect are extremely essential sources of purposeful action (Kaplan, 1995).

Perception of quite places in Rotterdam South

According to Veldacademie's study, residents define quiet places usually in the form of a park (81%) or a canal/ waterfront (44%). They seem to associate quiet places with the presence of greenery or water. Quiet places present in the neighbourhood are used by almost all respondents. Respondents experience the quiet places in the city as pleasant (mentioned >300 times) or an oasis of relaxation (>200 times). Opportunities for meeting, recreation and relaxation and the presence of greenery contribute to this feeling. Unfortunately, traffic noise also penetrates the quiet places in some neighbourhoods (mentioned >35 times), which means that the potential of these places is not fully utilised. The need for quiet places in the neighbourhood among respondents who do not currently have them is great: 90% indicate that they want quiet places (Veldacademie, 2024).

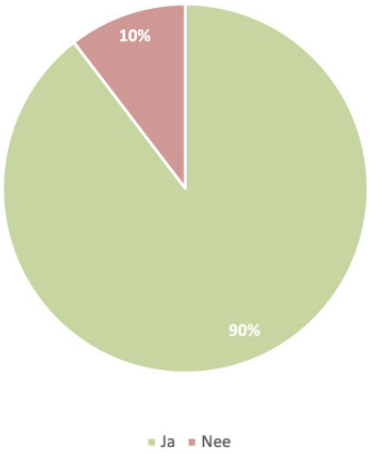


Figure 13. Use of quite places (Veldacademie, 2024).

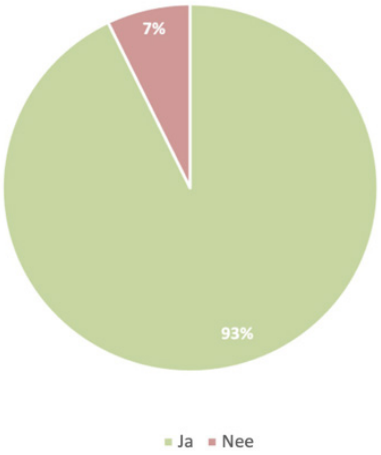


Figure 14. Need of quite places in residents' neighbourhood (Veldacademie, 2024).

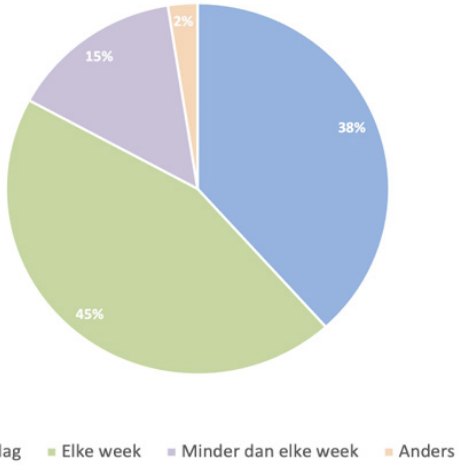
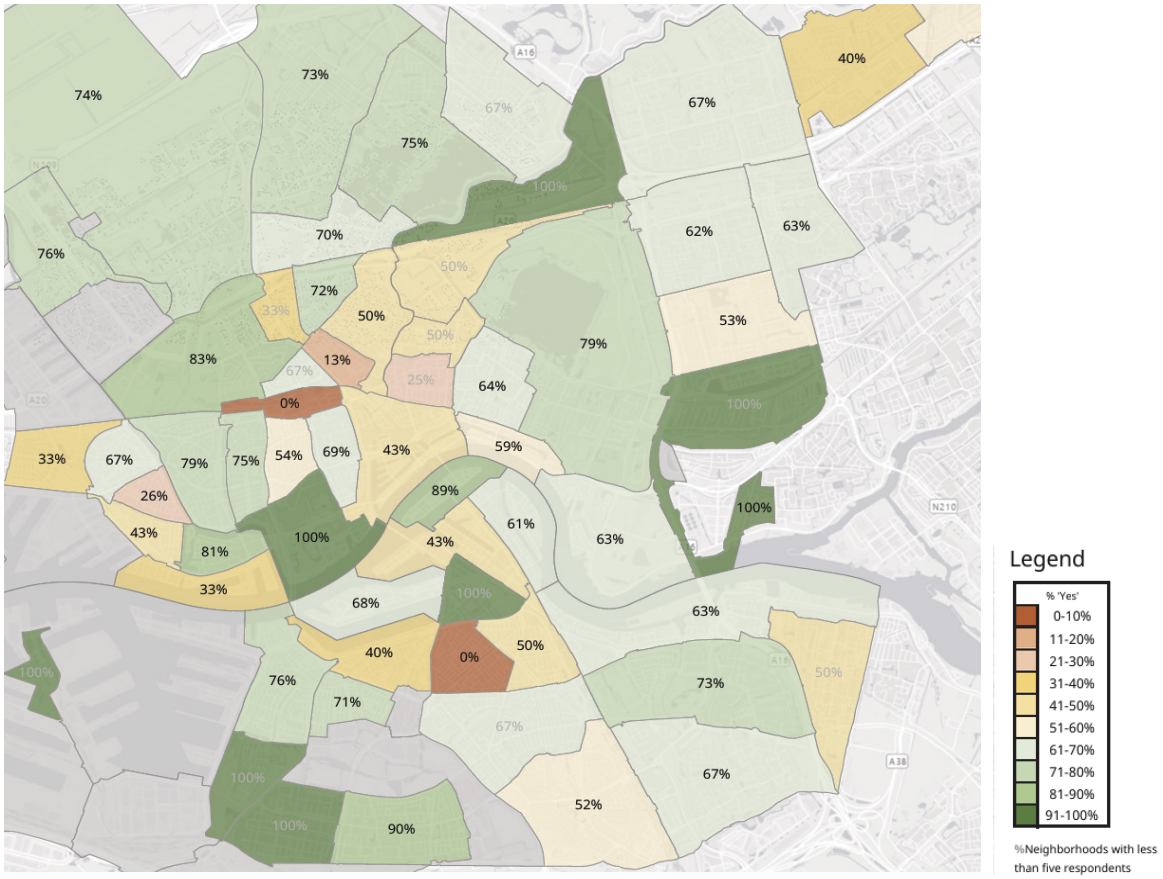


Figure 15. Use of quite spaces (Veldacademie, 2024).



Map 17. Quiet places in residents' street or neighbourhood (Veldacademie, 2024).

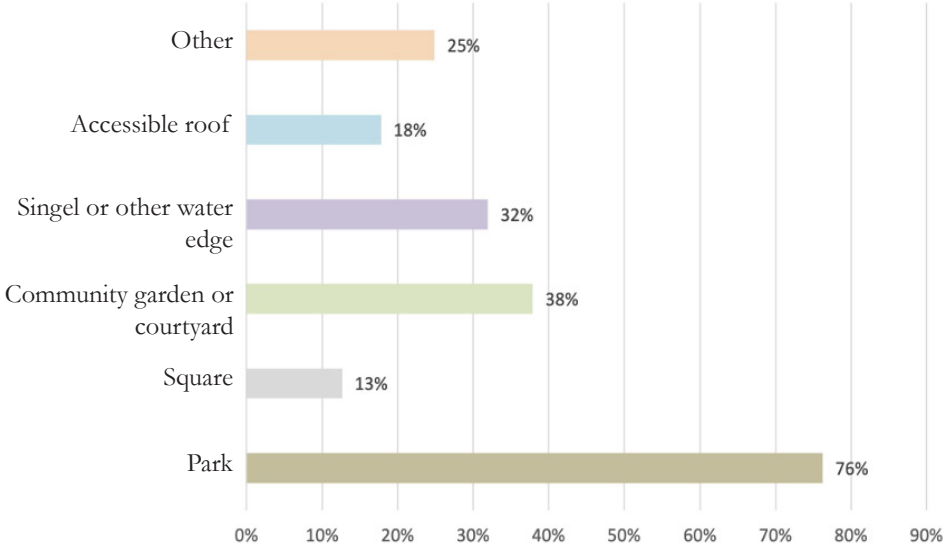


Figure 16. Type of quite places resident's want (Veldacademie, 2024).

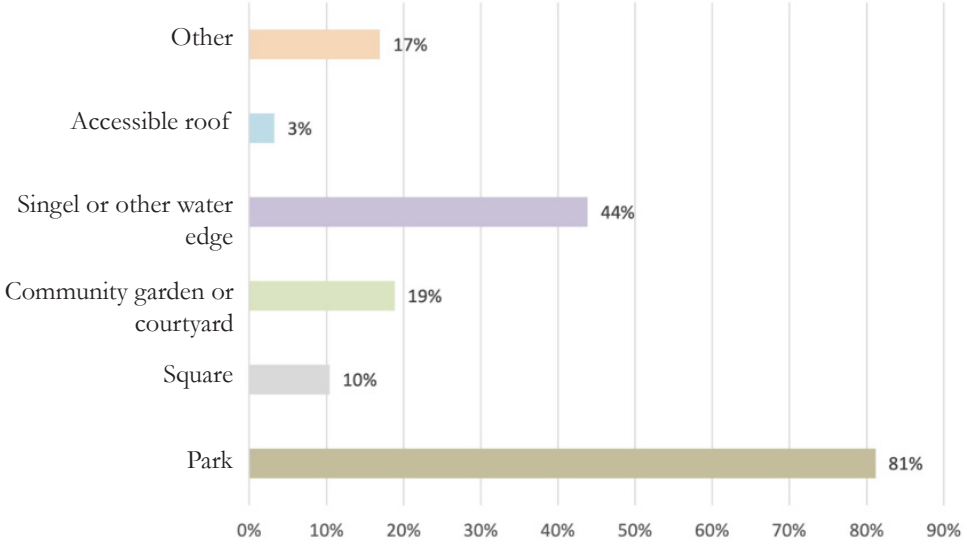
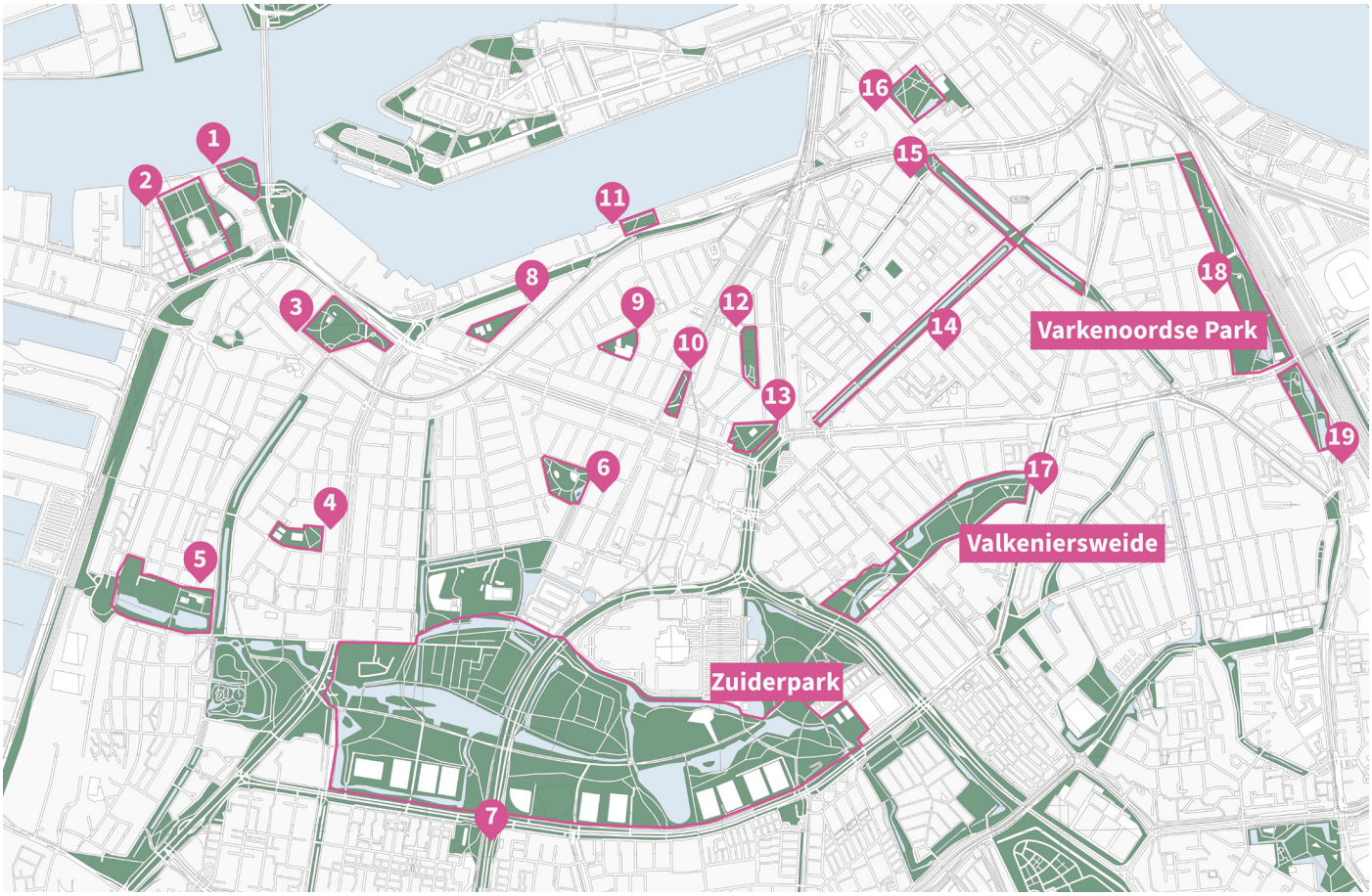


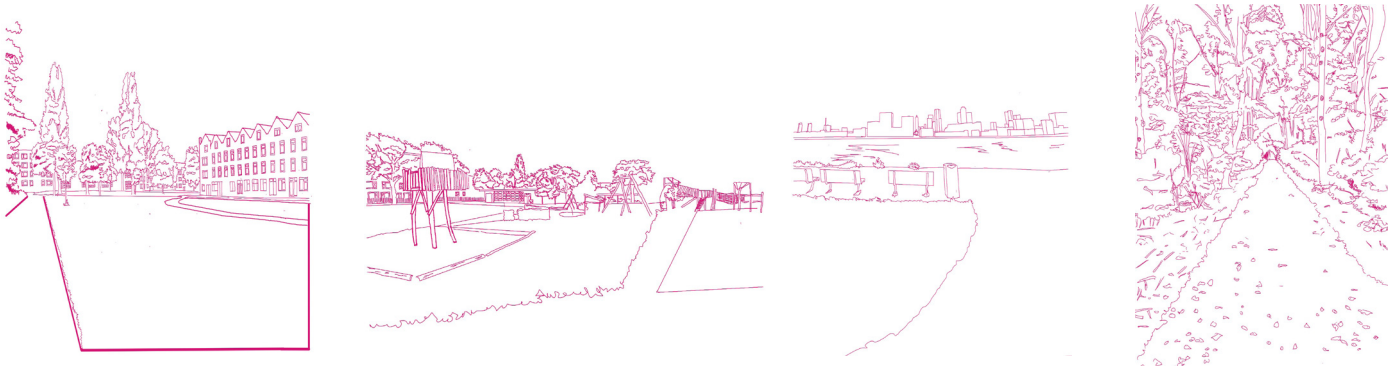
Figure 17. Type of quite places in residents' neighbourhood (Veldacademie, 2024).

Field work
Places of calmness in Rotterdam



Map 18. Green spaces in Rotterdam South (author's own).

As shown earlier in this chapter, residents associate greenery with space of relaxation and calmness. After delineating a certain area of interest, an investigation was conducted. This visit proofed to be valuable as certain typologies emerged.



Open green field | Playgrounds | River and canals | Parks

Illustration 2.Typologies of green spaces in Rotterdam South (author's own).

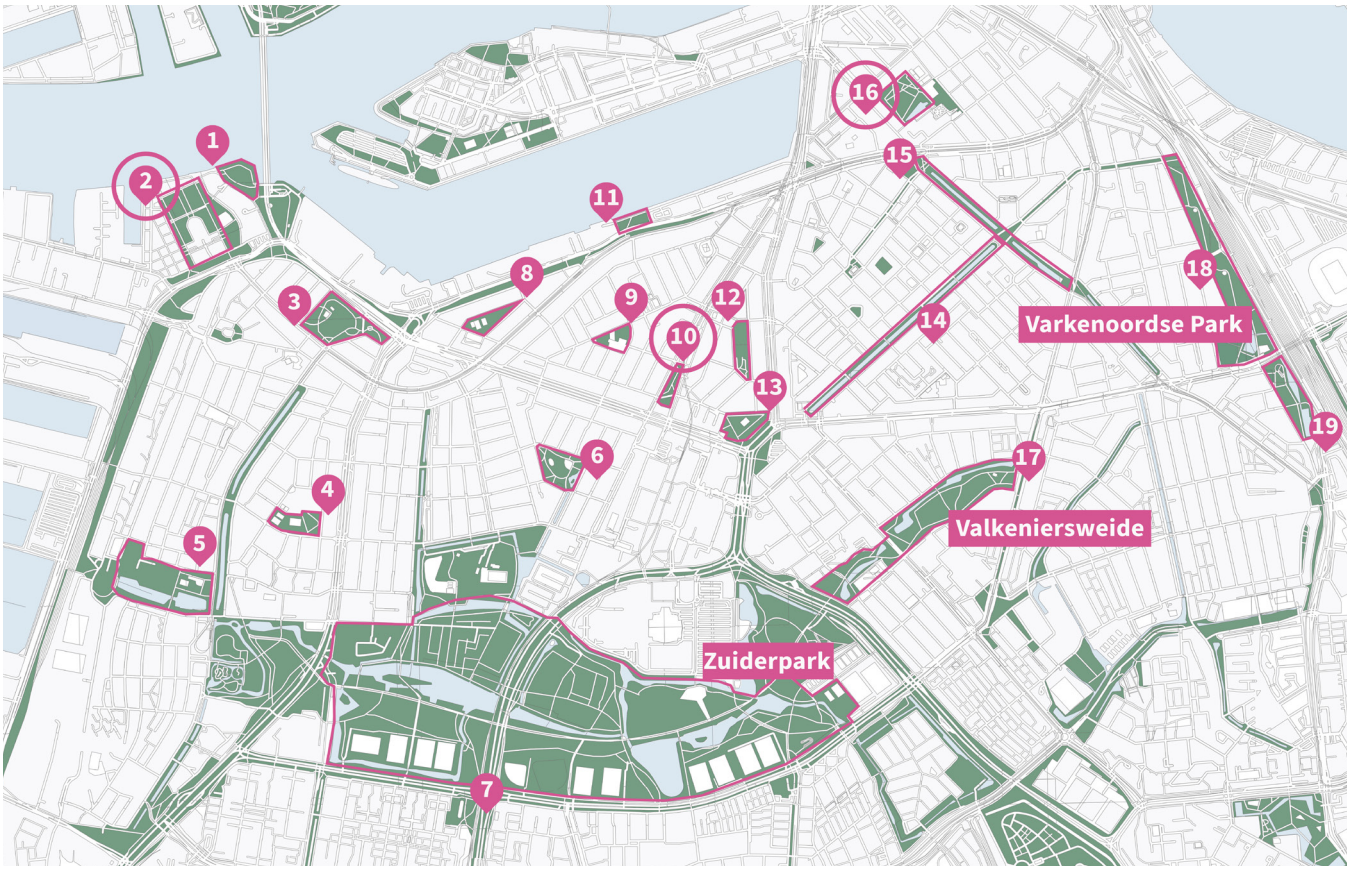
Open green fields

This typology of green space is important for residents as it provides with the opportunity for diverse activities such as picknick, barbecue and socializing. However, open green fields lack in the quality of connecting with nature, as they do not incorporate enough biodiversity

Image 2. Location 2.

Illustration 3. Open green fields (author's own).

Image 3. Location 16.



Map 19. Open green fields location (author's own).

Playgrounds

A good portion of the 'green' spaces in the selected area are consisted of playgrounds. As valuable as they are, this types of spaces are not associated by the residents (as shown earlier in the chapter) with quietness, relaxation and calmness.

Image 4. Location 9.

Image 5. Location 12.

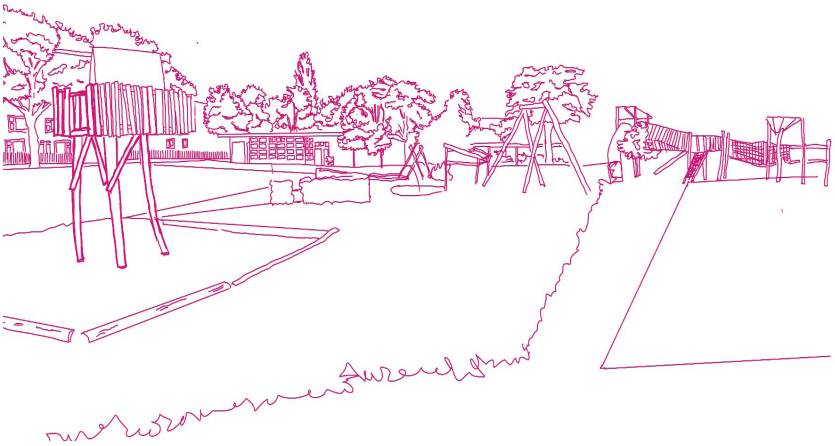
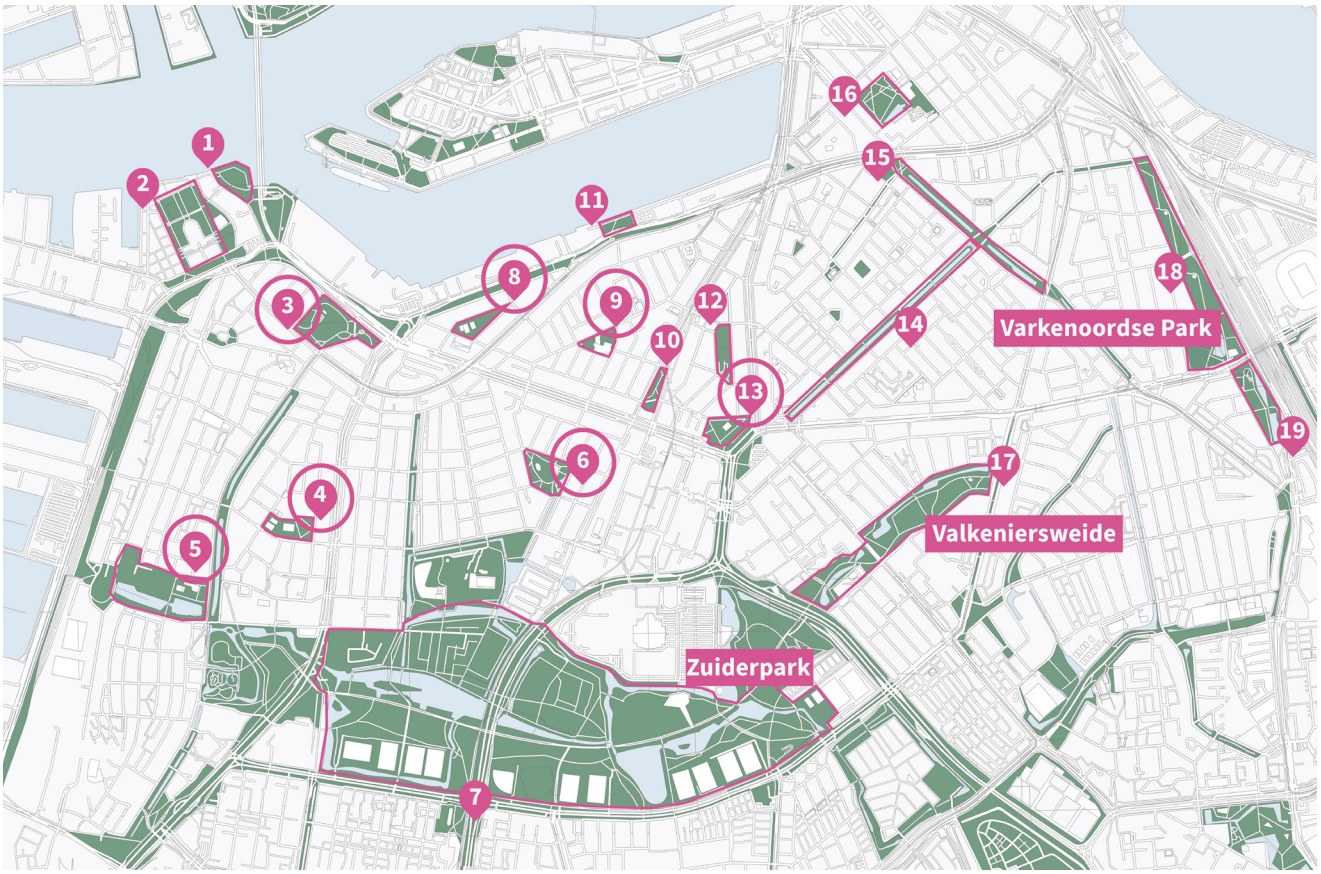


Illustration 4. Playgrounds (author's own).

Image 6. Location 4.



Map 20. Playgrounds location (author's own).

River and canals

A couple of places emerged under the category of river/ canals. They provide unobstructed views r contributing to the feeling of calmness. However, these spaces seem underused and inactivated, possibly because of their isolated location at the edge of the area.

Image 7. Location 1.

Image 8. Location 11.

Image 9. Location 15.

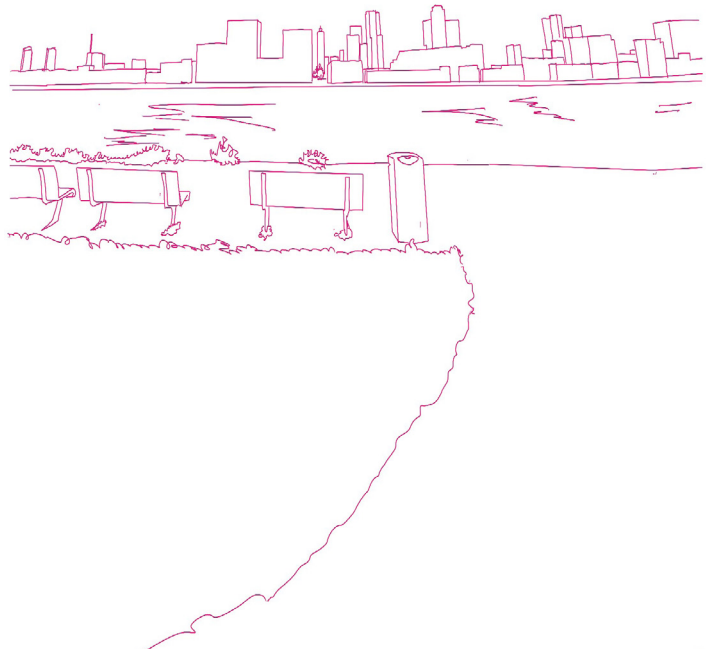
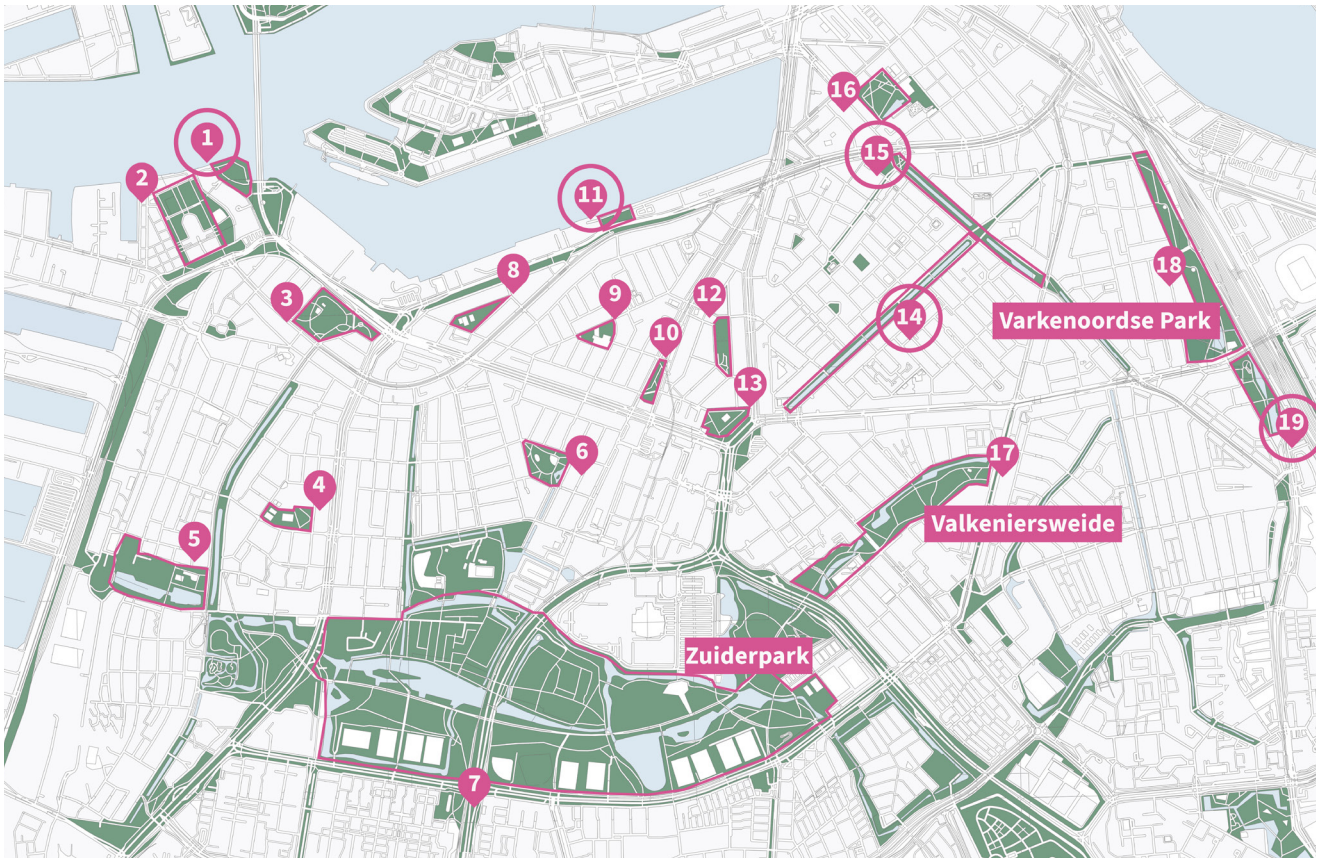


Illustration 5. River and canals (author's own).



Map 21. River and canals location (author's own).

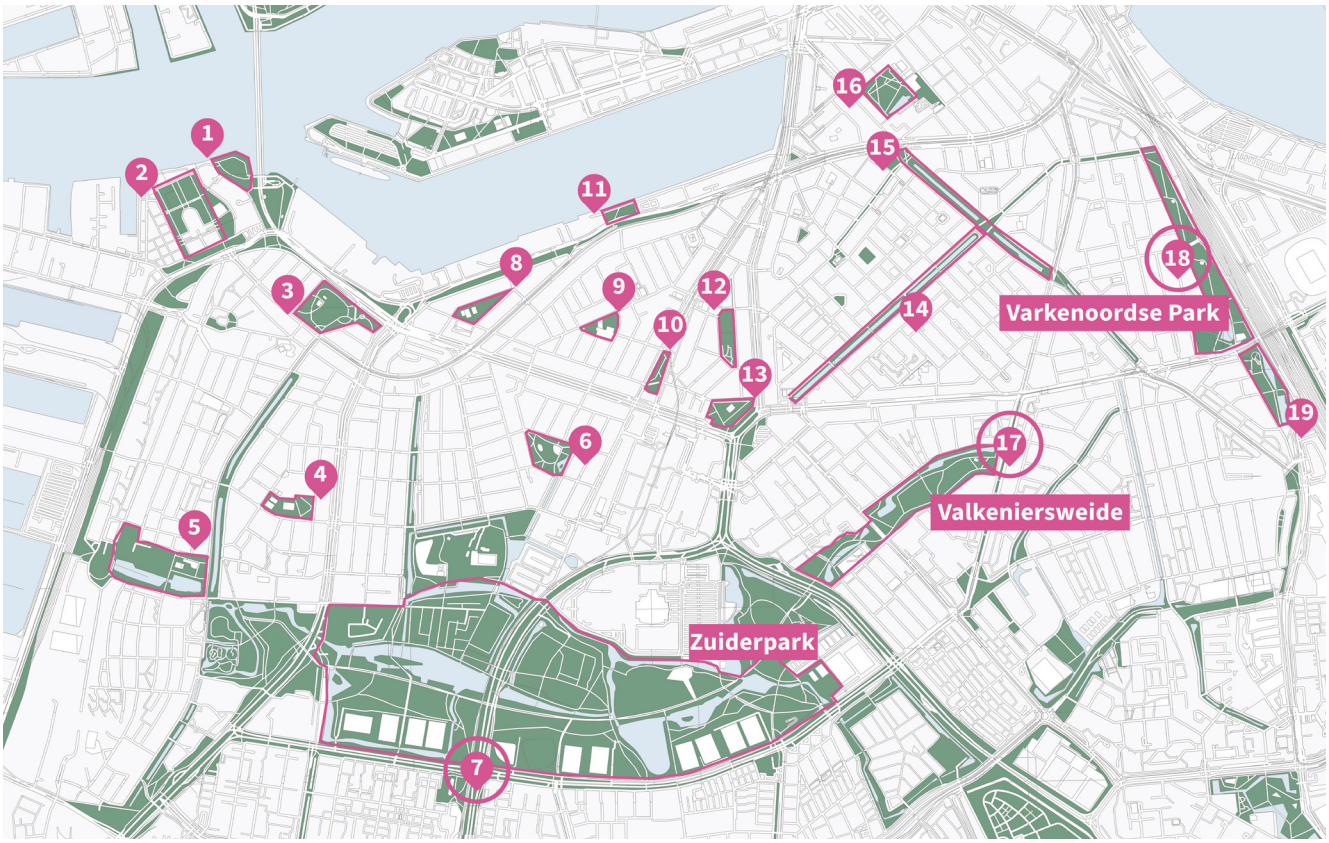
Parks

One of the most important aspects of green spaces is the opportunity for exploration. However the qualities of clear field of vision and refuge (places to hide) are vital for the perceived safety of any space (When green in not safe). The entrances of the Zuidpark, as shown in Illustration 4, evoke a feeling of unsafety which could possibly impact the desire of people to enter the park.

Illustration 6. Parks (author's own).

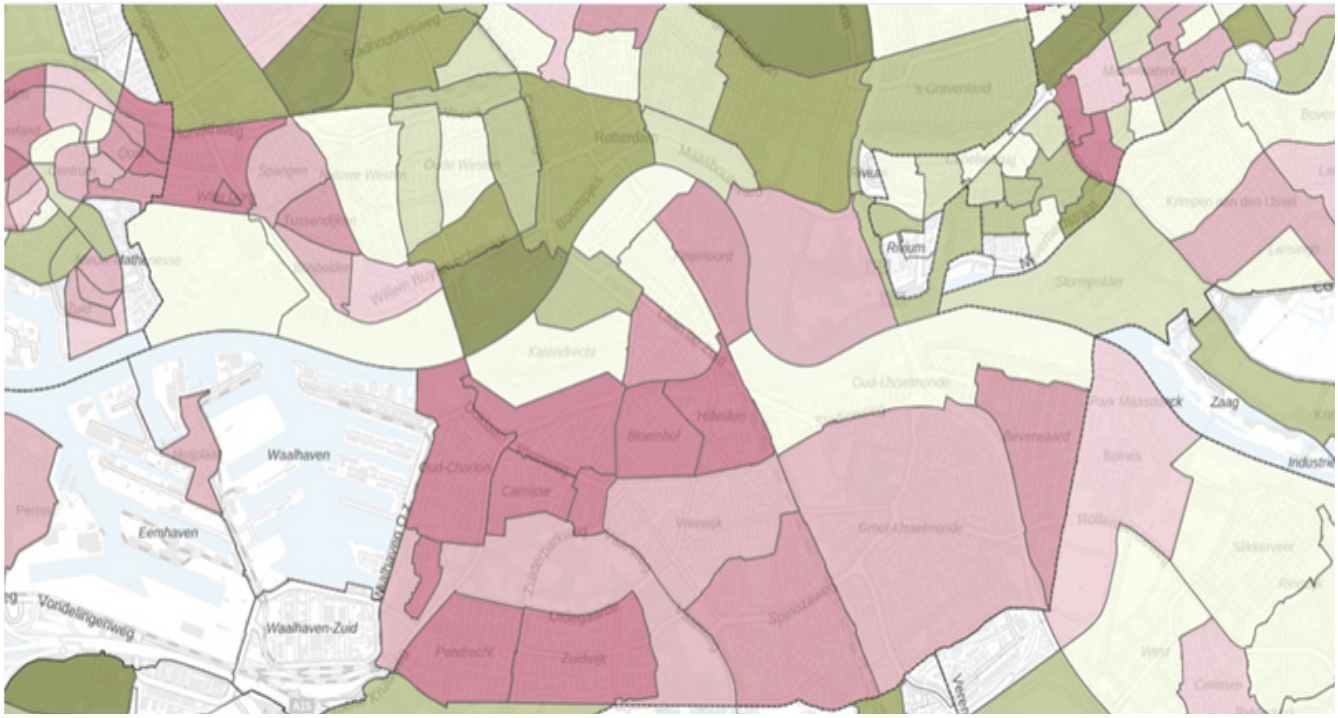
Image 10. Location 17.

Image 11. Location 7.

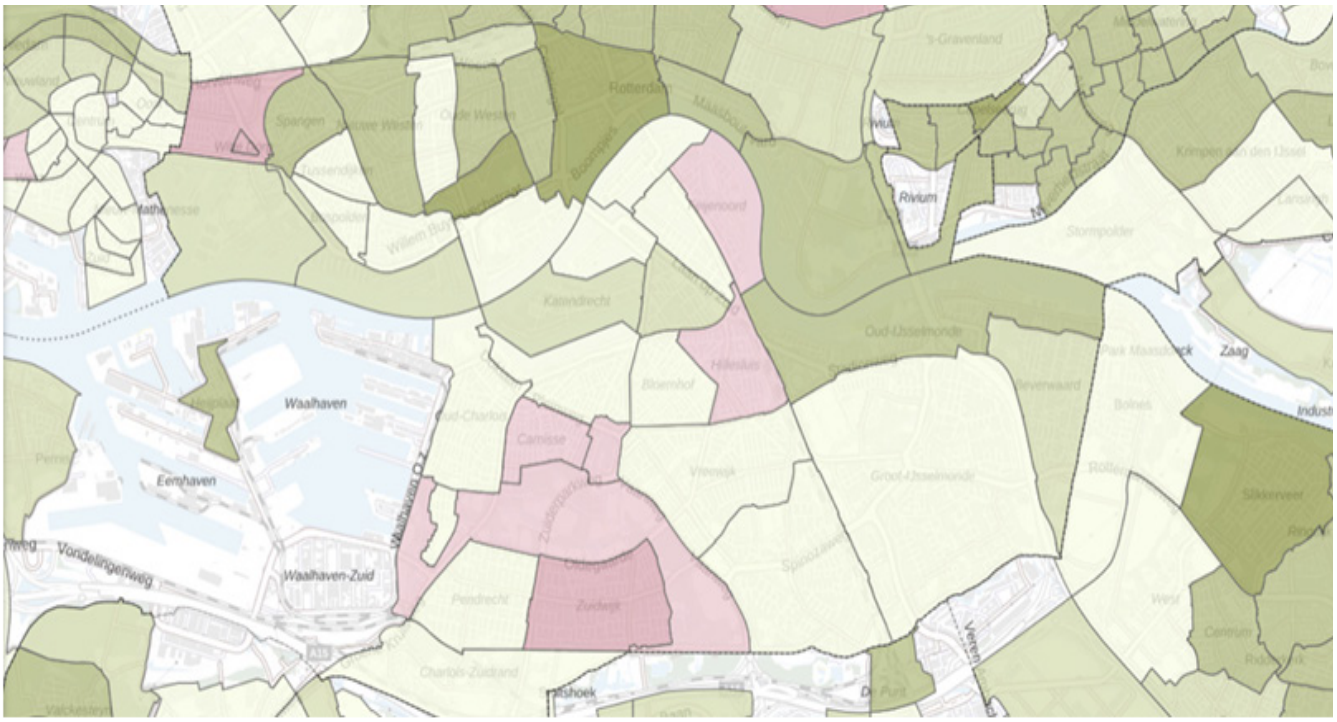


Map 22. Parks (Author's own).

Rotterdam South Demographics

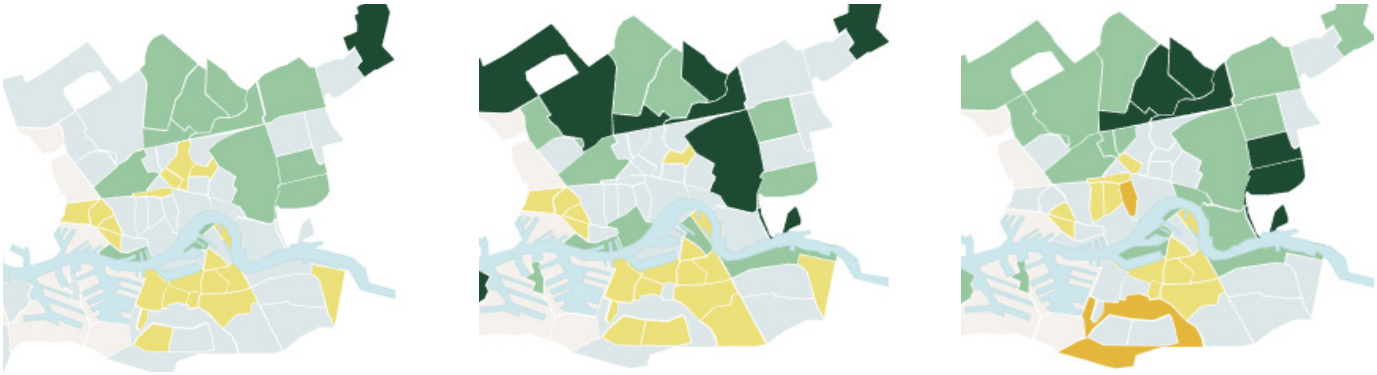


Map 23. Liveability through Rotterdam ,2012 (Gemeente Rotterdam, 2024).

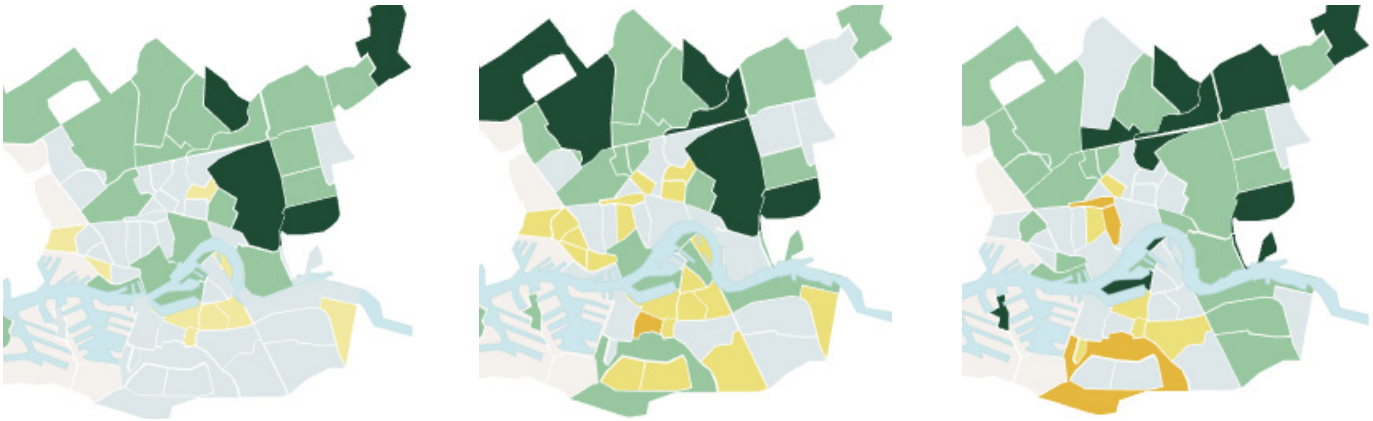


Map 24. Liveability development 2020 (Gemeente Rotterdam, 2024)

The liveability index in many neighbourhoods in Rotterdam South has rised but there is still need for improvements.



Physical index 2014 Social index 2014 Safety index 2014



Physical index 2024 Social index 2024 Safety index 2024

Map 25. Physical, social and safety index development (Gemeente Rotterdam, 2024).

Despite of the slight improvements over the past 10 years, the physical, social and safety index remain low in the south and the chosen design area has one of the lowest (Gemeente Rotterdam, 2024).

Feijenoord District Profile

Figure 19. Feijenoord District Profile (Gemeente Rotterdam, 2024).

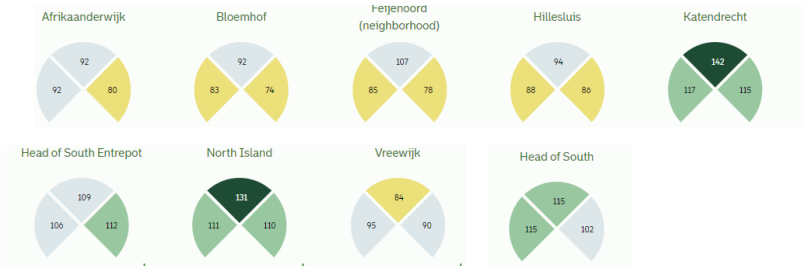
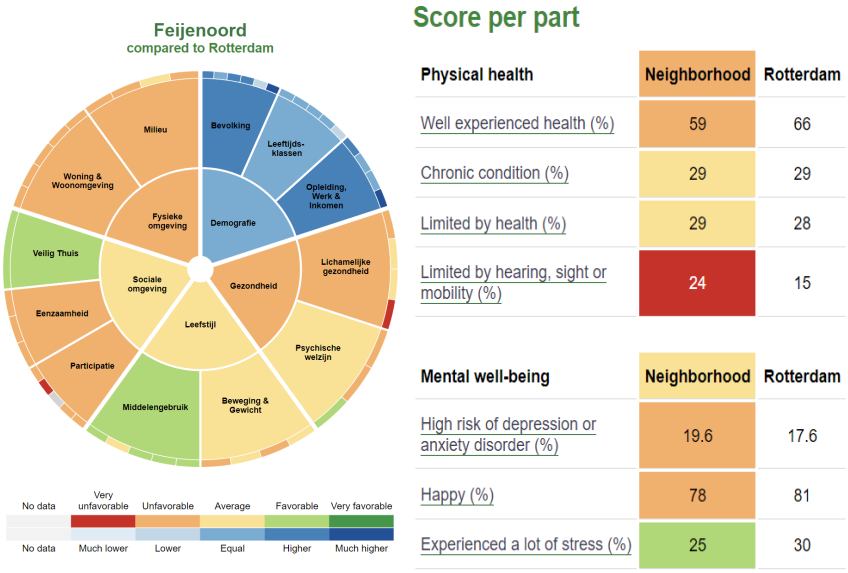


Figure 20. District Profile Comparison (Gemeente Rotterdam, 2024).

Feijenoord scores low on subjective perception of residents about its living conditions, however the objective score of the area seems to be much higher. There is a clear imbalanced between what is perceived compared to facts.



Score per part

Physical health	Neighborhood	Rotterdam
Well experienced health (%)	59	66
Chronic condition (%)	29	29
Limited by health (%)	29	28
Limited by hearing, sight or mobility (%)	24	15

Mental well-being	Neighborhood	Rotterdam
High risk of depression or anxiety disorder (%)	19.6	17.6
Happy (%)	78	81
Experienced a lot of stress (%)	25	30

Figure 21. Health profile of Charlois and Feijenoord (GGD Health Monitors, 2024).

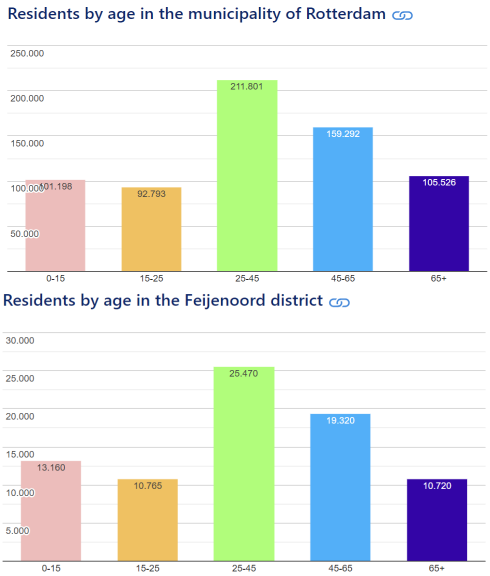


Figure 22. Residents by age in Rotterdam, Feijenoord and Charlois (CBS,2024).

According to the data, people between the ages of 20 and 45 need the most breathing space. This is the largest group of people represented among the locals in Rotterdam and Feijenoord (CBS,2024). It's interesting to note that citizens' experiences of anxiety or depression are not well predicted by their educational attainment, whether it be low, moderate, or high. However, those in the first and second income brackets have the highest rates of anxiety and despair (CBS,2024). It is evident from examining the health piecharts of Feijenoord and Charlois that a significant portion of the population—roughly 20–24%—has hearing, vision, and mobility impairments, which is greater than the average for Rotterdam (15%) (Figure 3). Both neighbourhoods have a higher-than-average rate of depression and anxiety disorders (17.6%), with Charlois at 23.9% and Feijenoord at 19.6% (GGD Health Monitors, 2024). Looking at the medical health inventory and comparing data from men and women, it becomes clear that women of all age experience higher levels of anxiety and depression than men (CBS,2024). Nonetheless, both males and females between the ages of 20 and 45 have the highest rates of anxiety and depression within their gender.

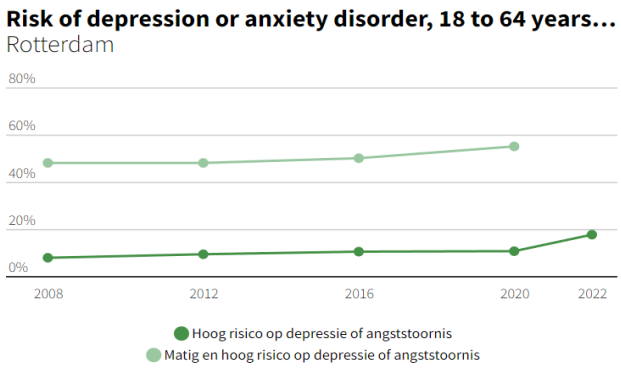


Figure 23. Risk of depression or anxiety disorder (Gemeente Rotterdam, 2024).

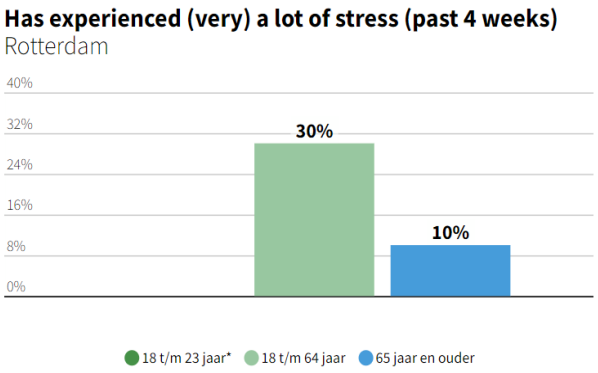


Figure 24. Experince of stress (Gemeente Rotterdam, 2024).

Fieldwork
Sensorial observation

As seen earlier the chapter, the area is exposed to a lot of urban stressors. However, that does immediately define residents emotions towards it. As the project is based around the concept of creating a feeling of calmness, the 'path' to and through Verkenoordse Park to the design site should be investigated to give an idea of how an observer experiences the different locations along the path and at what emotion does one arrive when reaches the design site. As this fieldwork is highly subjective, two observers where involved and their responses to question regarding their perception of the locations they go through were recorded. The questionnaire can be found in the Appendix section.

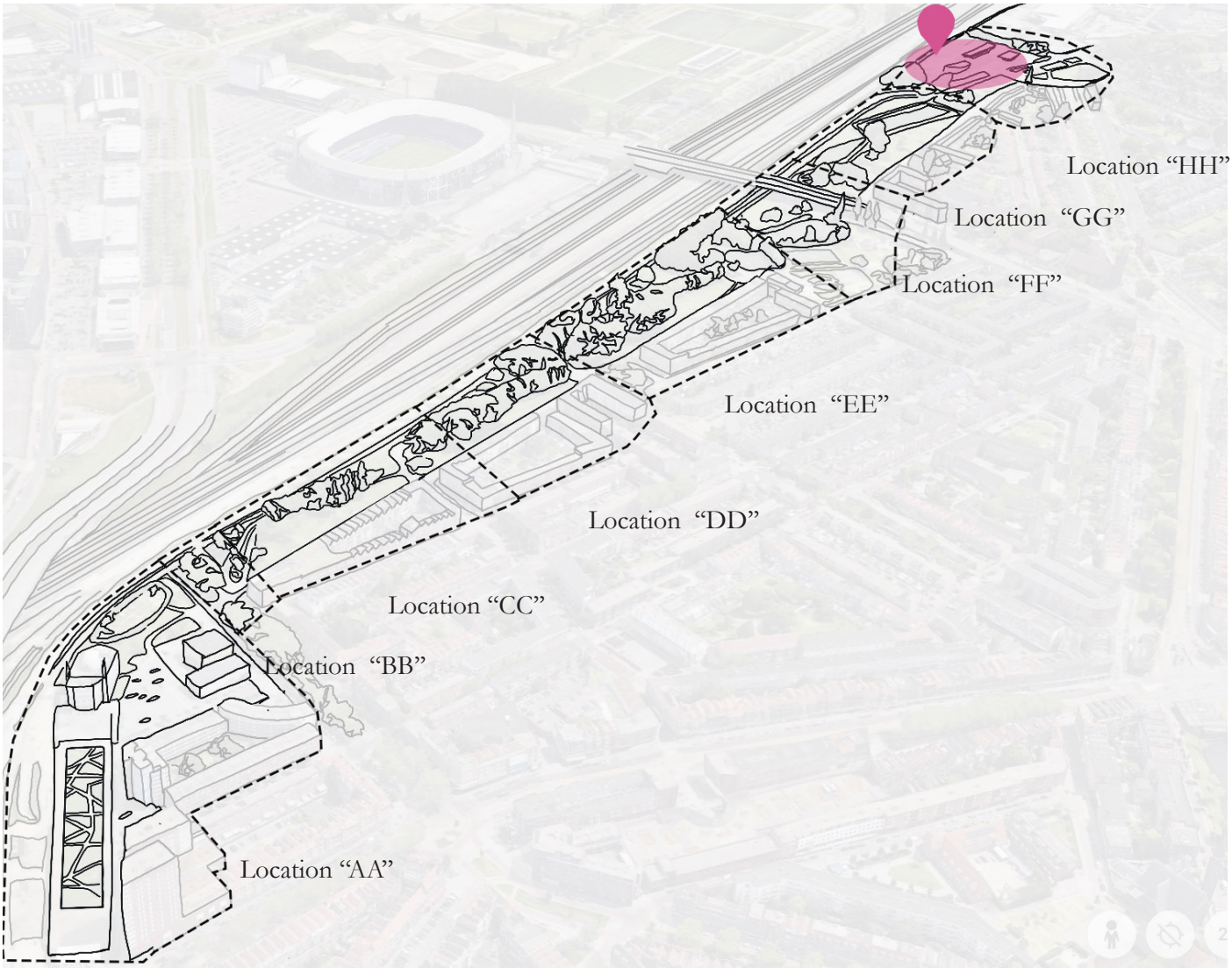


Illustration 7. Sensorial progression map (Author's own).

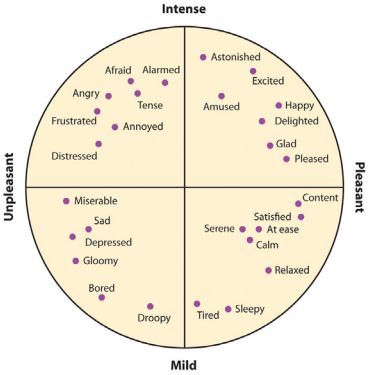
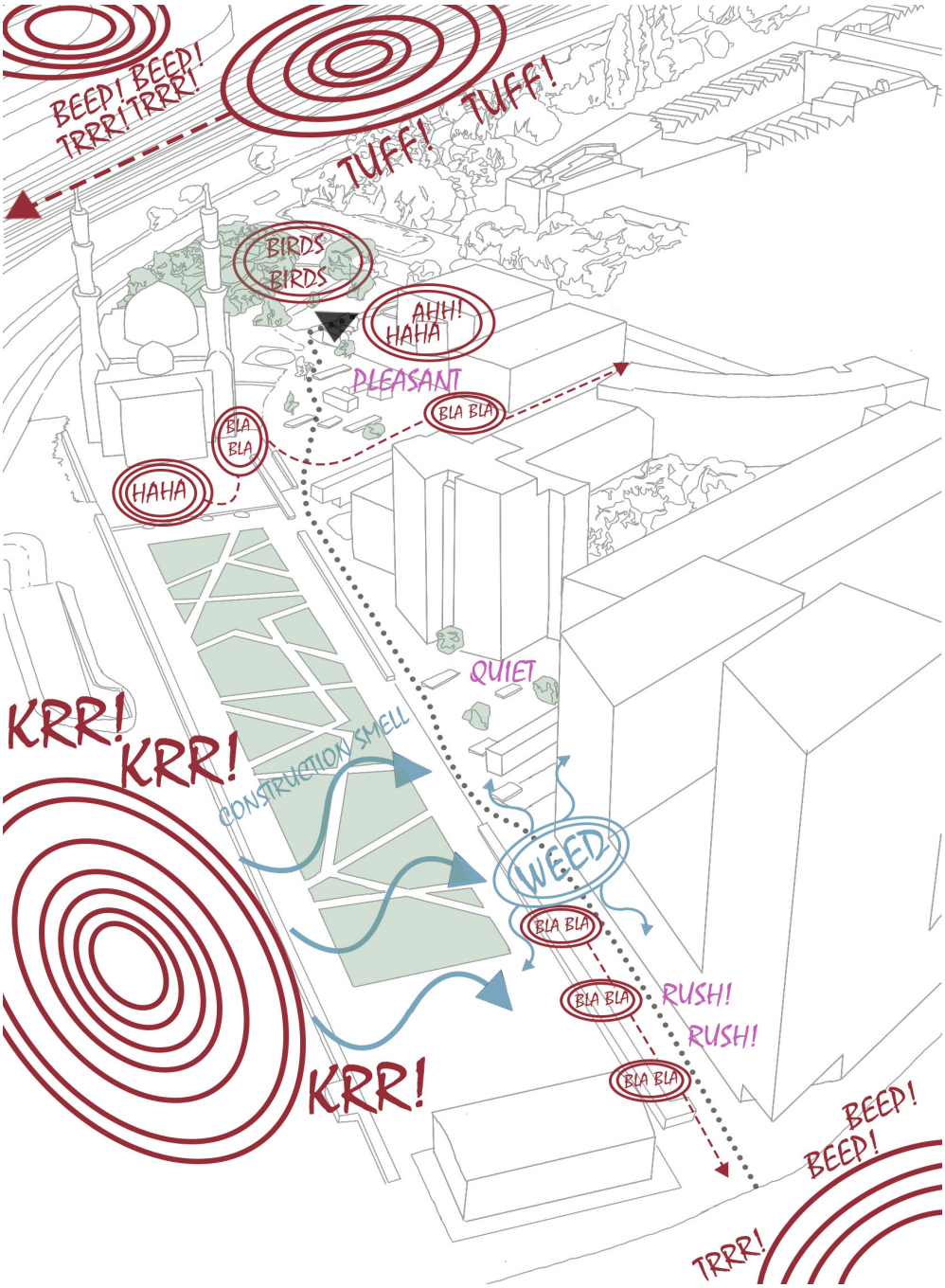


Figure 3. Russell's Arousal Theory (Mahmood, 2022)

Conducting the fieldwork

As this fieldwork is highly subjective, two observers where involved and their responses to question regarding their preceprion of the locations they go through were recorded. The questioneer can be found in the Appendix section. To 'measure' the emotional state of the observer regarding to each of the locations, the questioneer inegrates Russel's Arousal Theory diagram, previously shown in Chapter 5.



Location 'AA'

When entering the location, the path is narrow and long creating a feeling of being pressured, antisocial behaviour is observed there contributing to a sense of unsafety and rush to pass through the space as fast as possible. The location is highly influenced by the construction noise. The nearby highway and the car road contribute to the unpleasant noise and smell. Upon entering the piazza in front of the mosque, the area changes its character to more pleasant gathering place. As there is a kindergarten nearby, children could be heard, creating a feeling of liveliness.

- Path of walking
- Concentration of noise
- Concentration of smell
- Emotional response
- Greenery

Illustration 8. Sensitorial map of location 'AA' (Author's own).

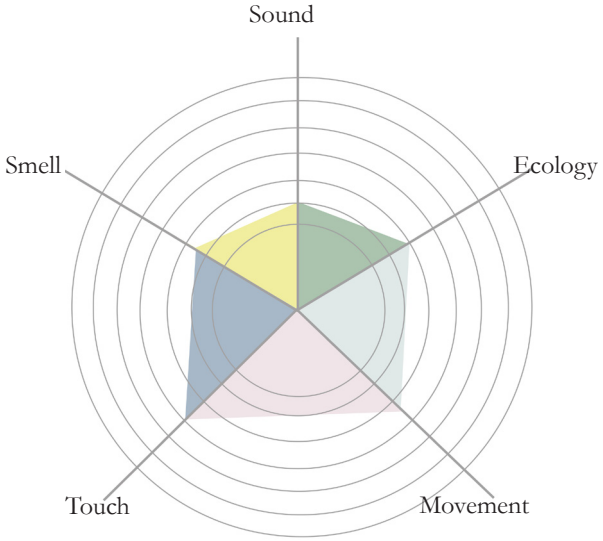


Figure 25. Average score of observers' for location 'AA' elements (Author's own).

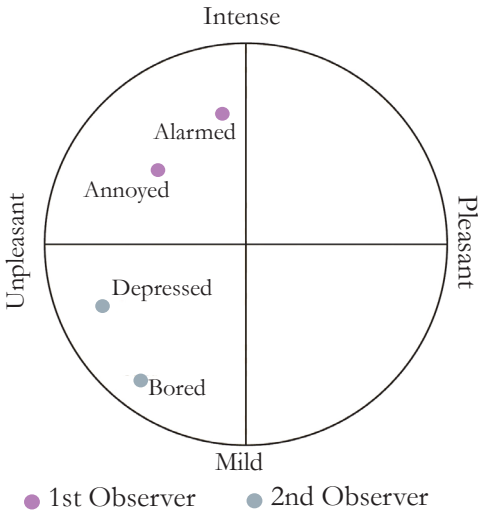


Figure 26. Observers' emotional response to location 'AA' (Author's own).

Location “BB”

Location “BB” is the smallest area along the path and yet one of the noisiest. The car intersection, together with the noise coming from the highway create a desire to pass through the area in a rush.

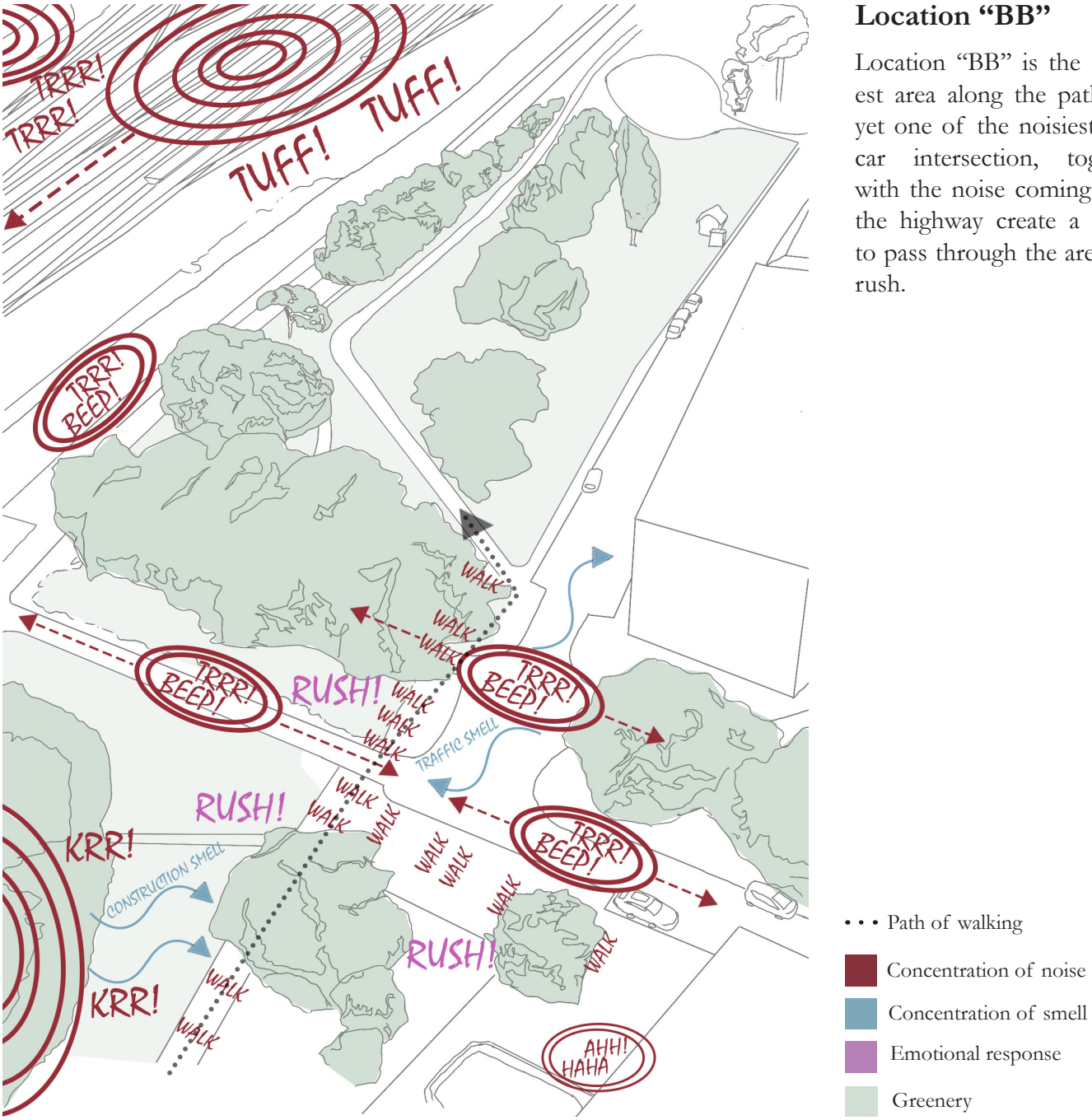


Illustration 9. Sensitorial map of location 'BB' (Author’s own).

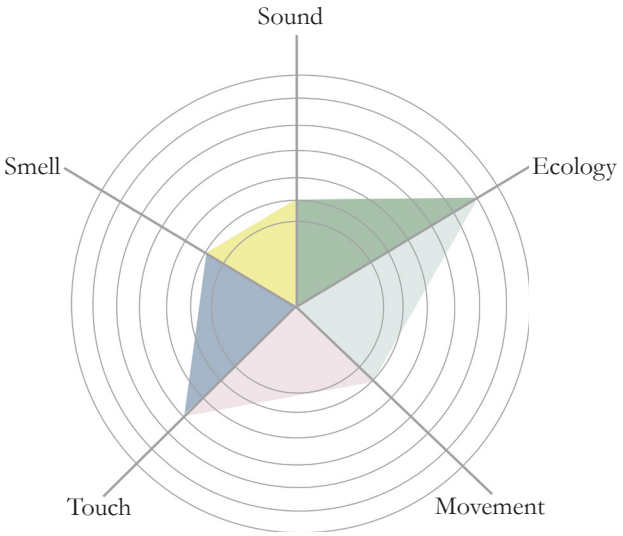


Figure 27. Average score of observers’ for location 'BB' elements (Author’s own).

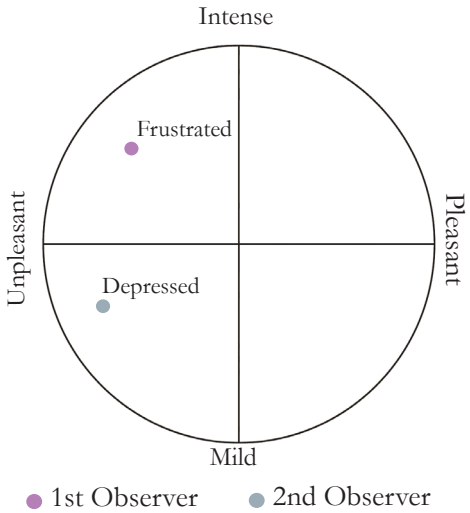


Figure 28. Observers’ emotional response to location 'BB' (Author’s own).

Location “CC”

Location “CC” is contrasting in terms of what is seen and what is heard. On one hand, the greenery and the views around the park are perceived as relaxing, on the other - the traffic road and the highway noise are perceived as unpleasant.

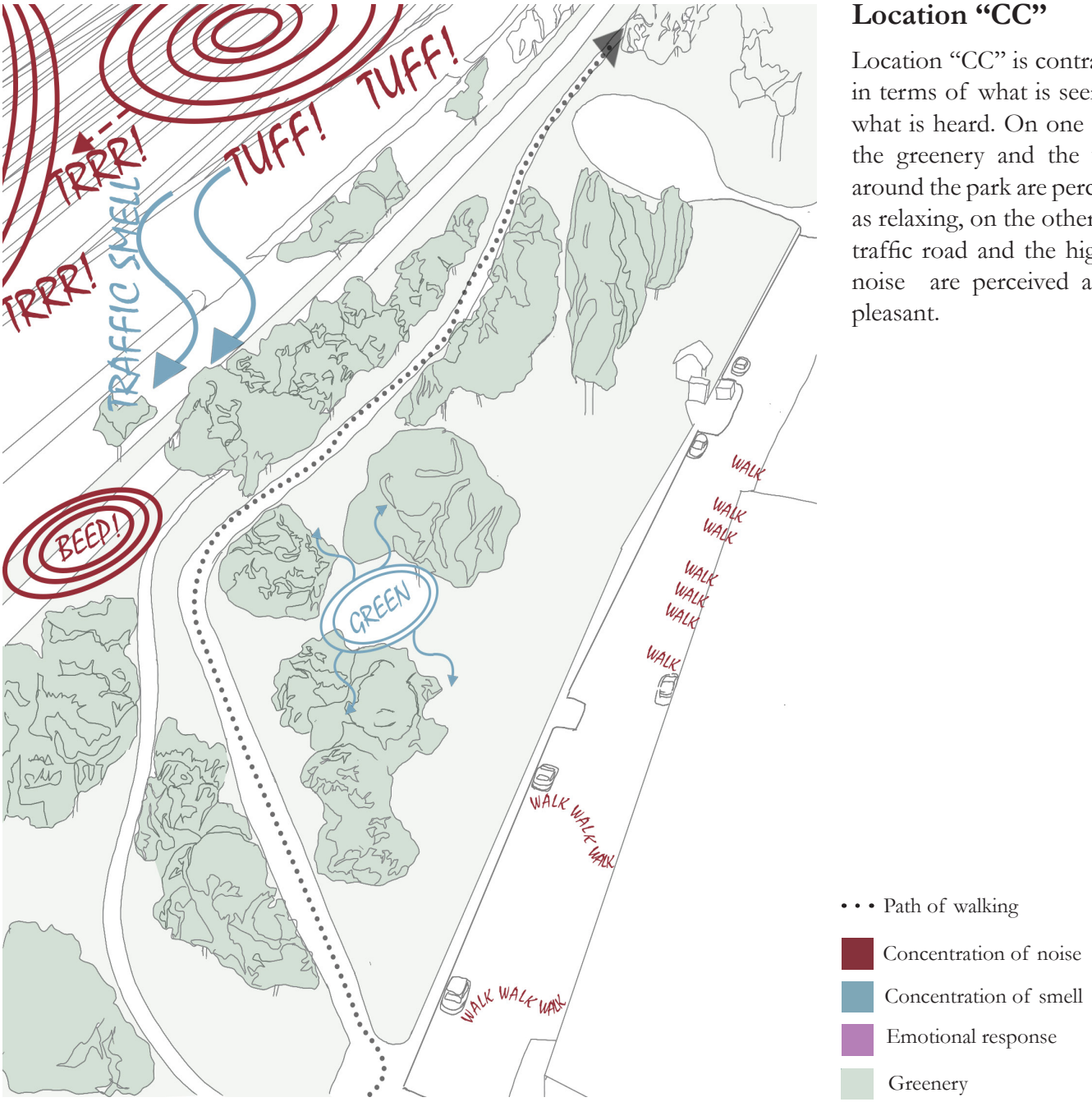


Illustration 10. Sensitorial map of location 'CC' (Author’s own).

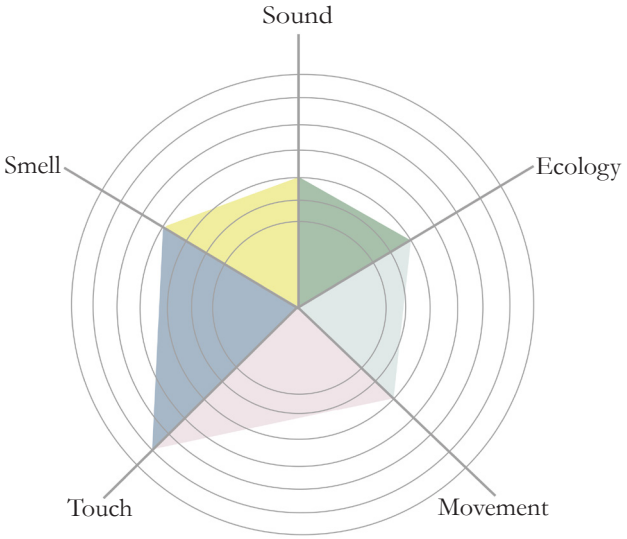


Figure 29. Average score of observers’ for location 'CC' elements (Author’s own).

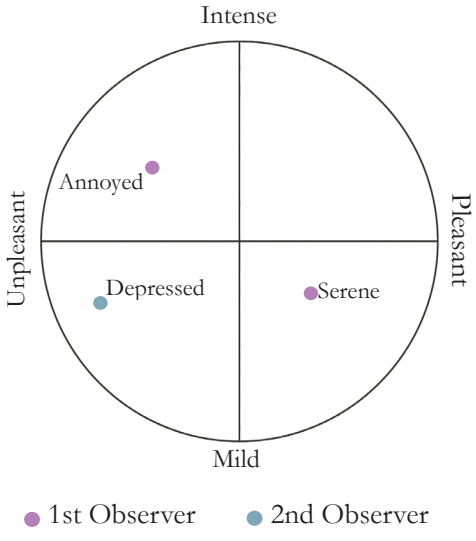


Figure 30. Observers’ emotional response to location 'CC' (Author’s own).

Location "DD"

For this location the car noise is reduced, but still present. Around this area, the visual sense of relaxation is higher, more people are present in the park walking their dogs, creating a feeling of liveliness.

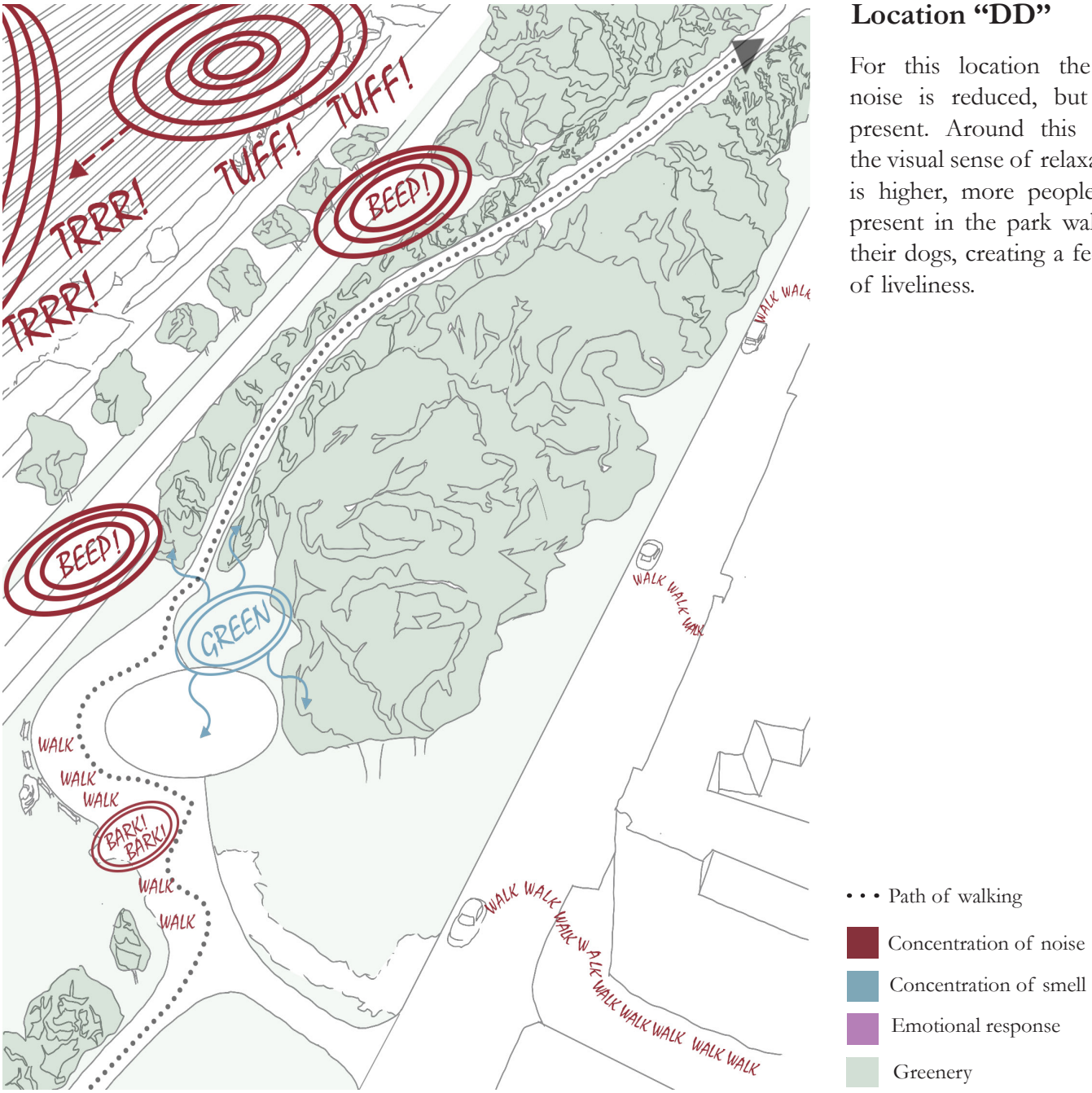


Illustration 11. Sensitorial map of location 'DD' (Author's own).

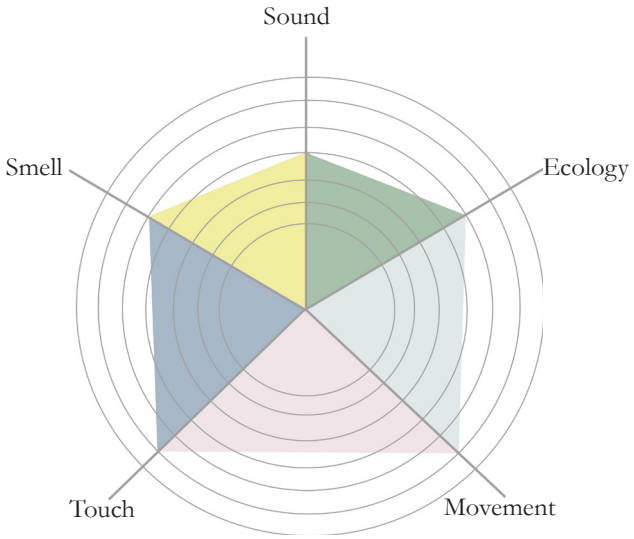


Figure 31. Average score of observers' for Location 'DD' elements (Author's own).

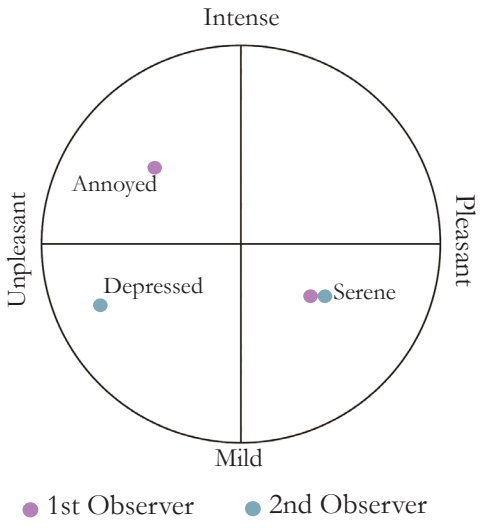


Figure 32. Observers' emotional response to location 'DD' (Author's own).

Location “EE”

Similar noice patterns are observed to this location as the previous one (Location 'DD'). However, another contributor to 'perception' noise reduction could possibly be the visual barrier created by the trees. The green and blue nature coupled with natural smell create feeling of relaxation. Here even more people are observed around the park.

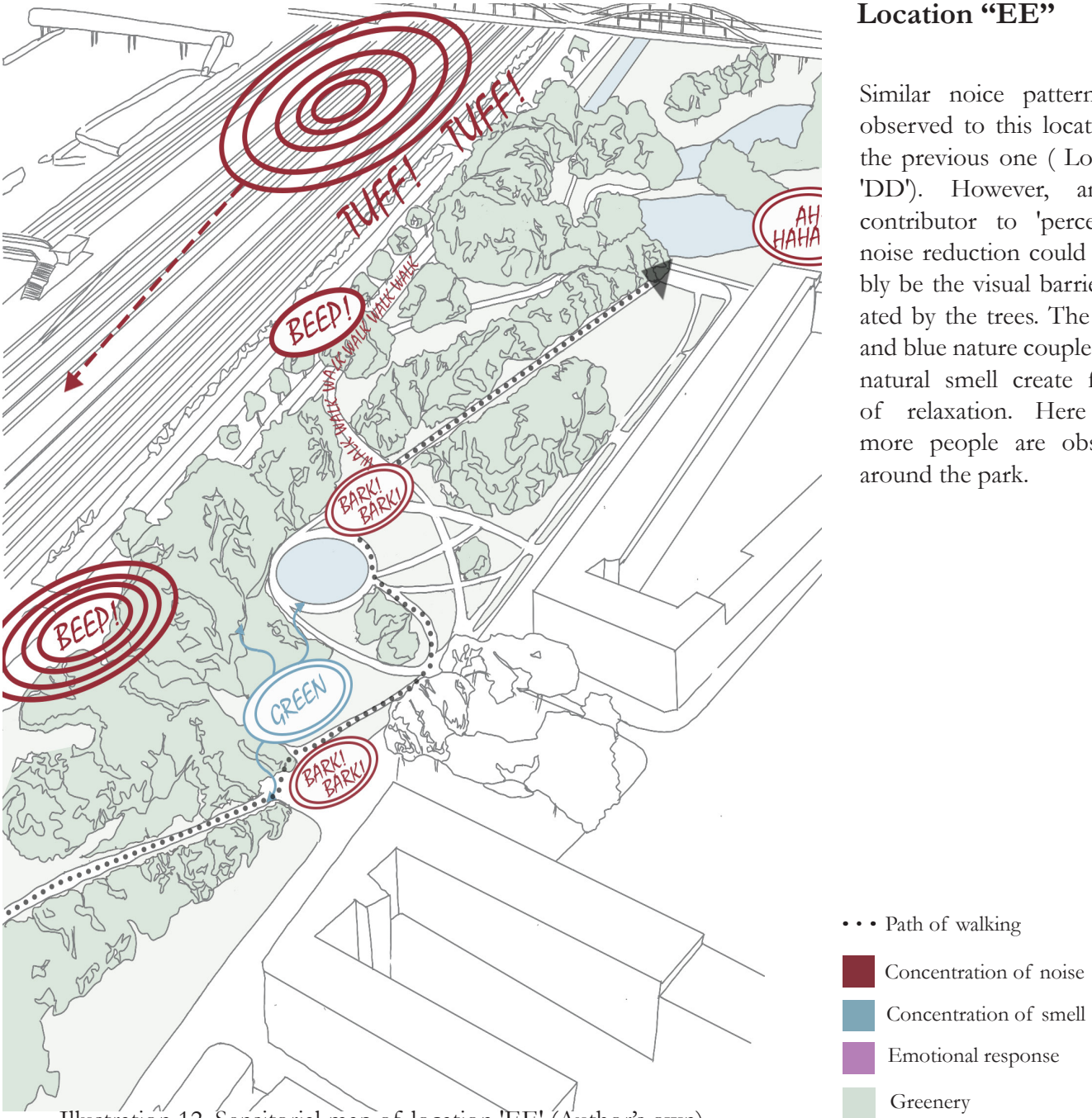


Illustration 12. Sensitorial map of location 'EE' (Author’s own).

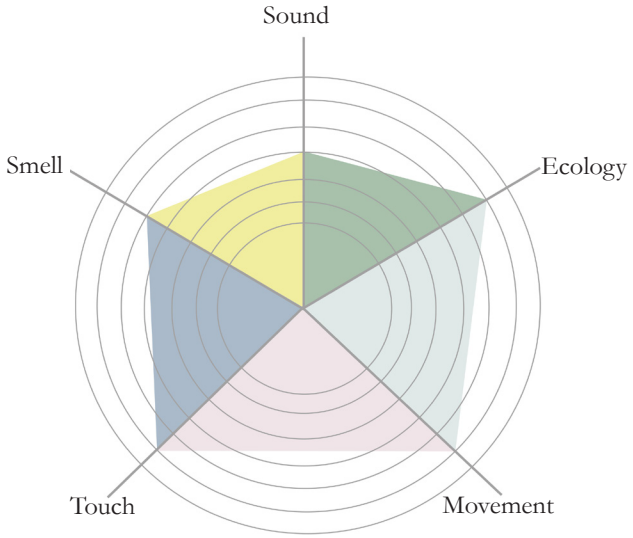


Figure 33. Average score of observers’ for location 'EE' elements (Author’s own).

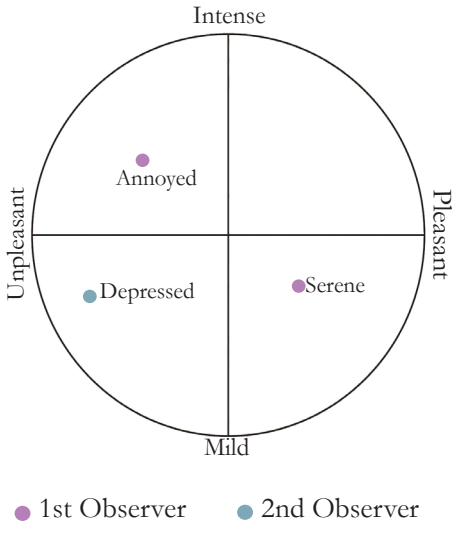


Figure 34. Observers’ emotional response to location 'EE' (Author’s own).

Location “FF”

The location differs from the rest in the park. Under the highway there is a skate park and sports space. This intervention contributes to the feeling of liveliness which usually would not be the case in areas under highways.

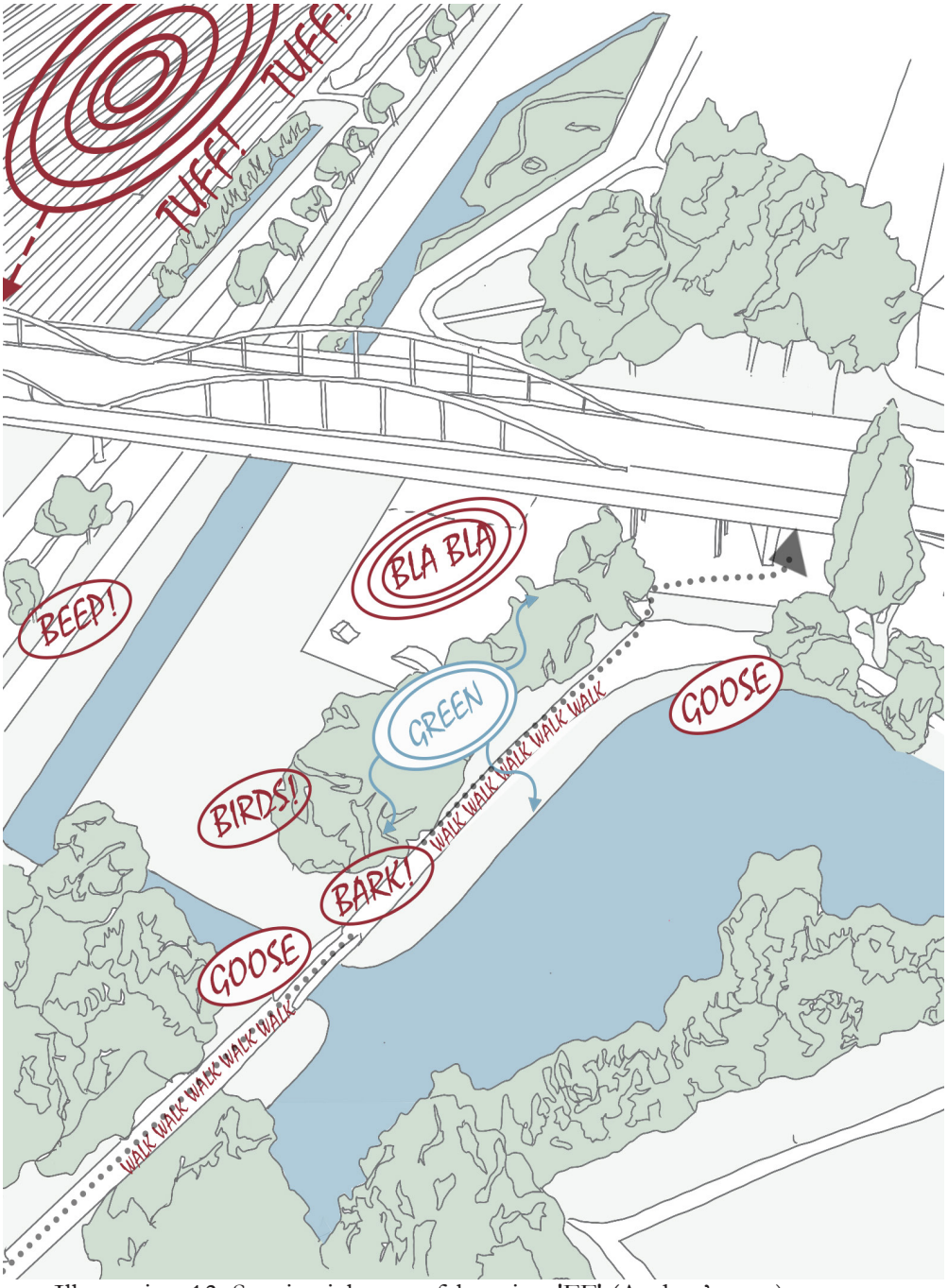


Illustration 13. Sensitorial map of location 'FF' (Author’s own).

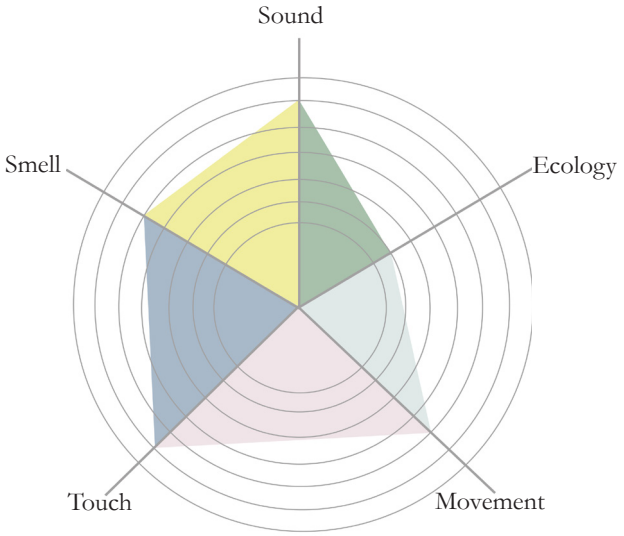


Figure 35. Average score of observers’ for location 'FF' elements (Author’s own).

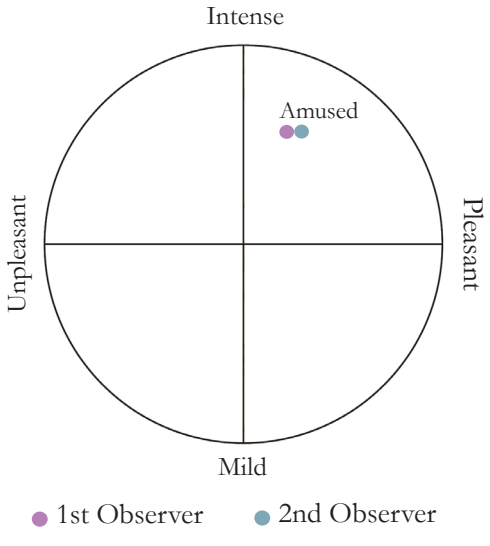


Figure 36. Observers’ emotional response to location 'FF' (Author’s own).

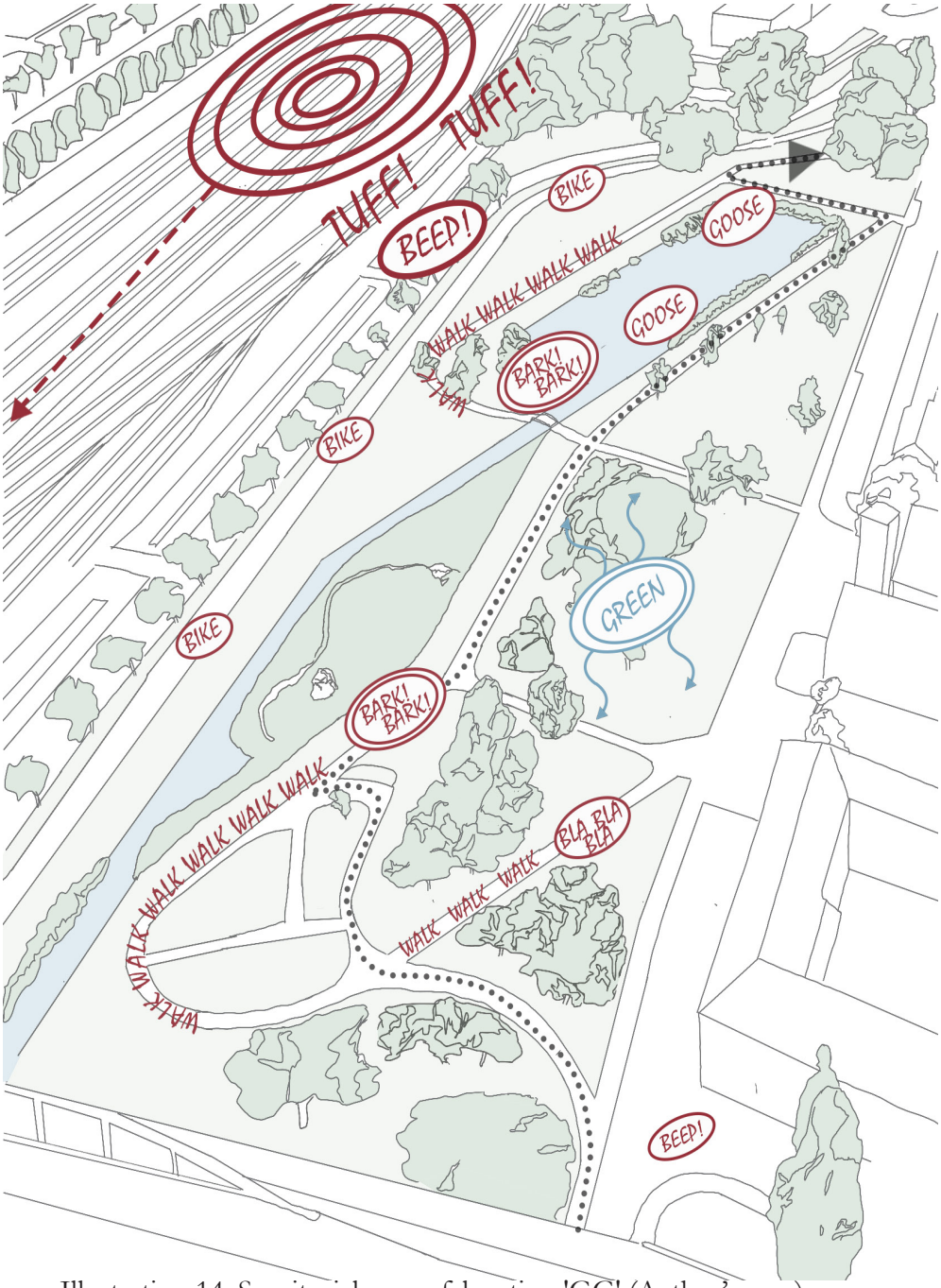


Illustration 14. Sensitorial map of location 'GG' (Author's own).

Location "GG"

This location comes through as the most relaxing along the path. Variety of green and blue elements are observed, natural sounds and smell are present. There are people walking their dogs and lingering creating a feeling of liveliness. Traffic noise could still be heard but not prevalent.

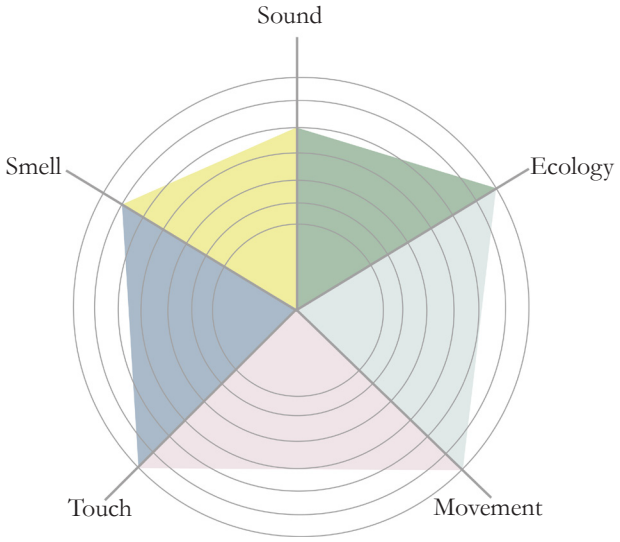


Figure 37. Average score of observers' for location 'GG' elements (Author's own).

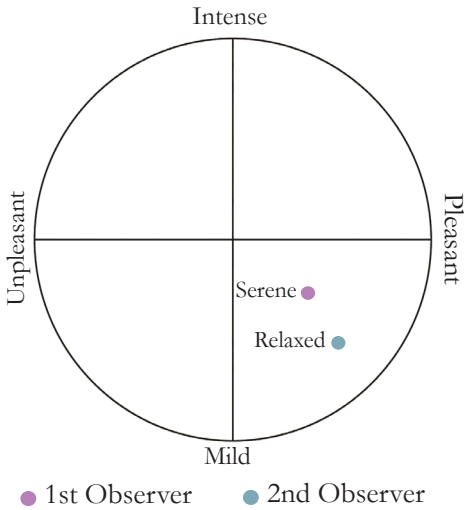


Figure 38. Observers' emotional response to location 'GG' (Author's own).

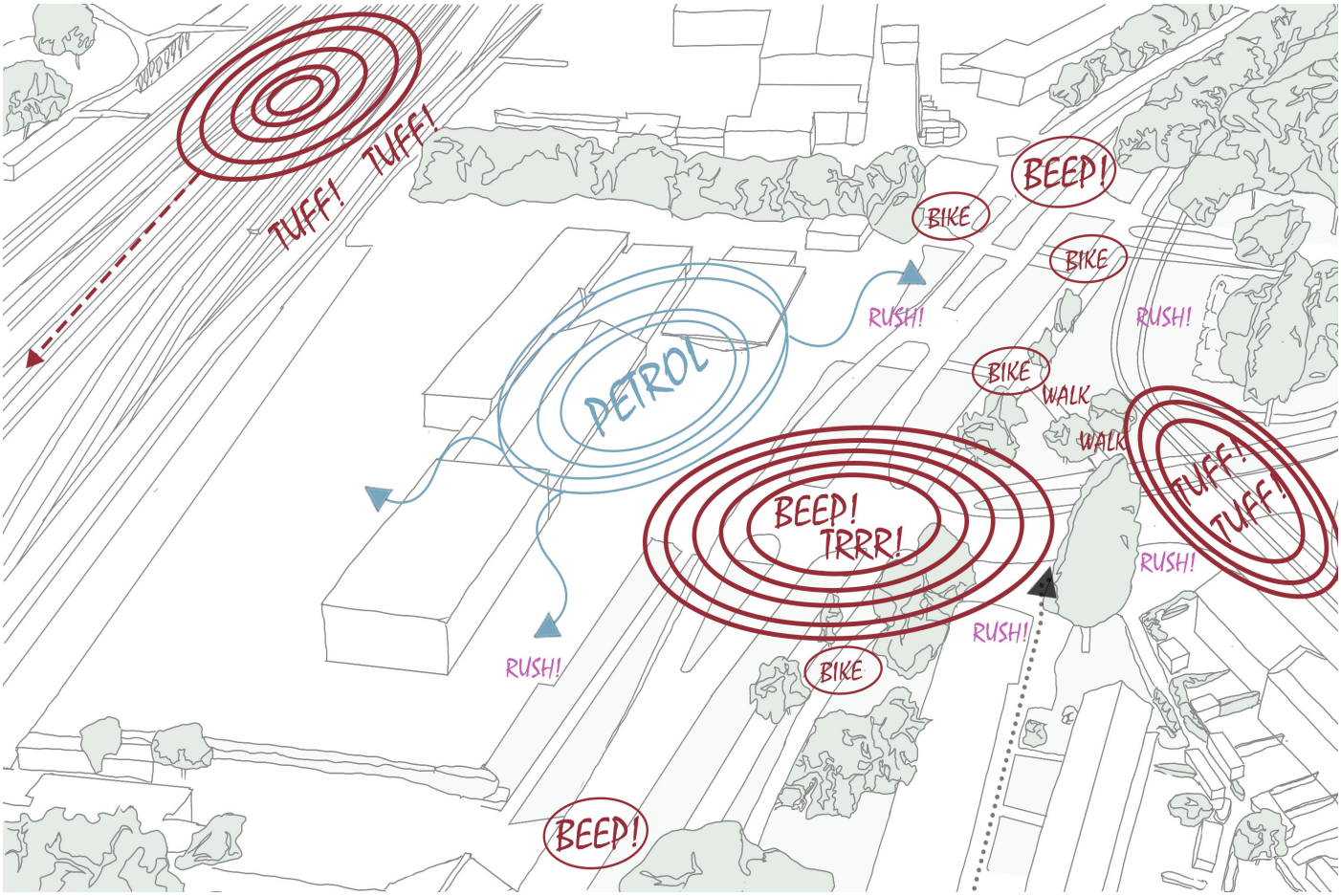


Illustration 15. Sensitorial map of location 'HH' (Author's own).

Legend:

• • • Path of walking

Concentration of noise

Concentration of smell

Emotional response

Greenery

Location "HH"

This location is in complete contrast to the previous. The moment one steps outside of the park, they are presented to a larger traffic intersection. The natural smell prevalent in the previous location now is replaced by smell of petrol from the gas station. The area is the most unpleasant along the observed path.

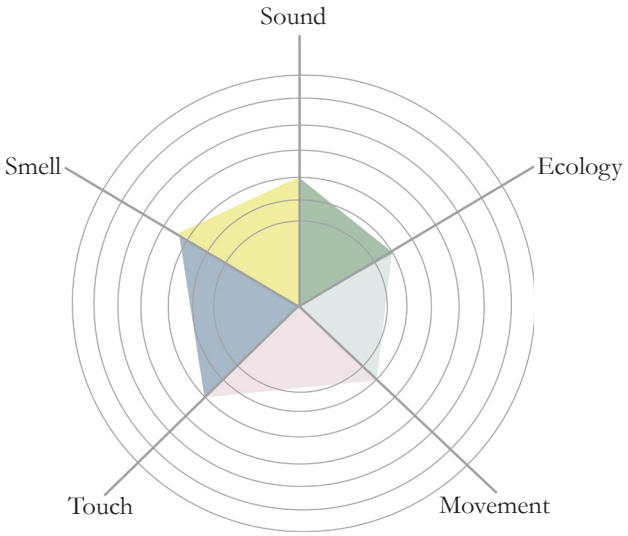


Figure 39.Average score of observers' for location 'HH' elements (Author's own).

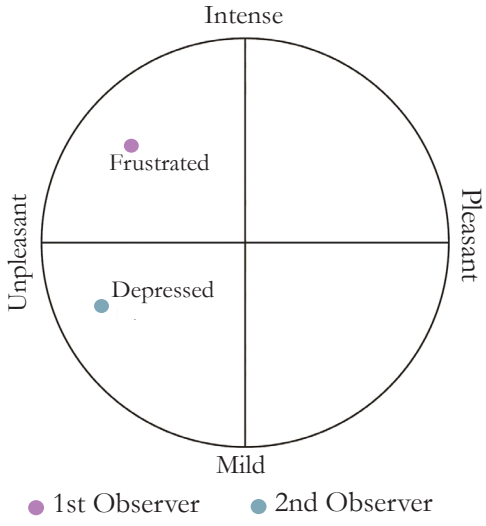


Figure 40. Observers' emotional response to location 'HH' (Author's own).

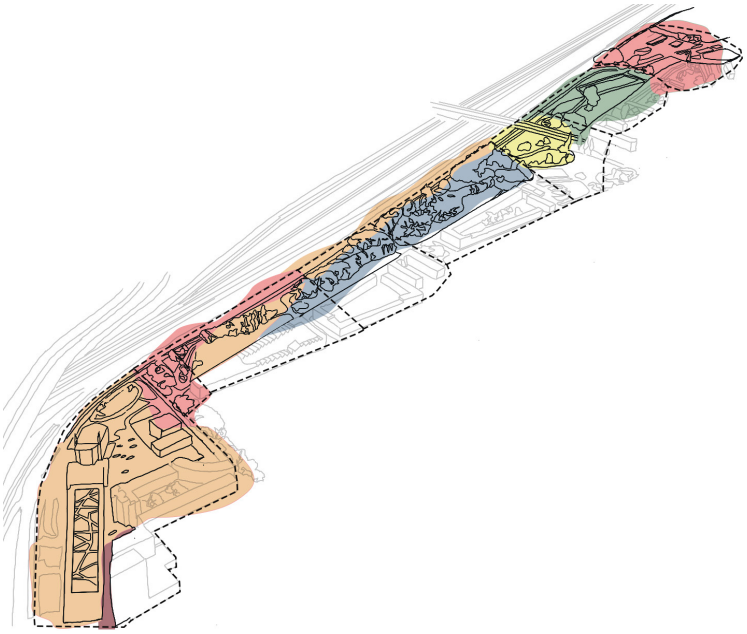


Illustration 16. Emotional response of the 1st observer (Author's own).

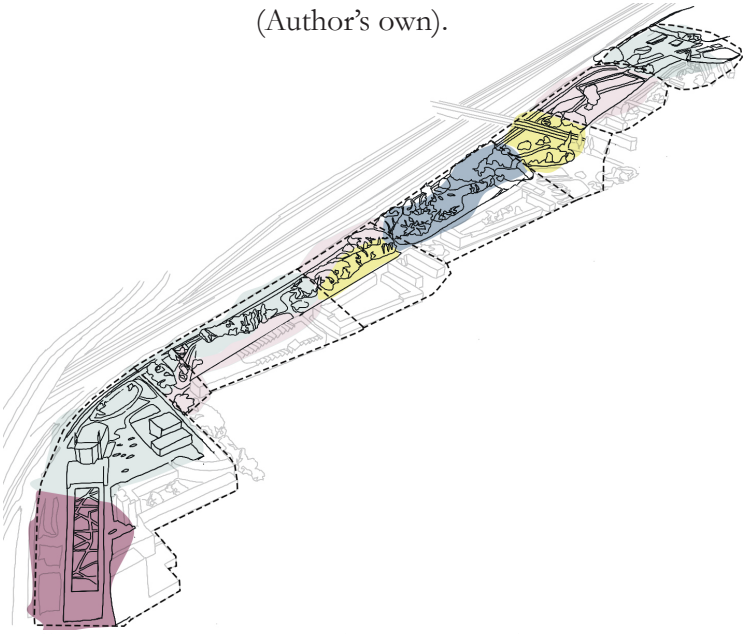


Illustration 17. Emotional response 2nd observer (Author's own).

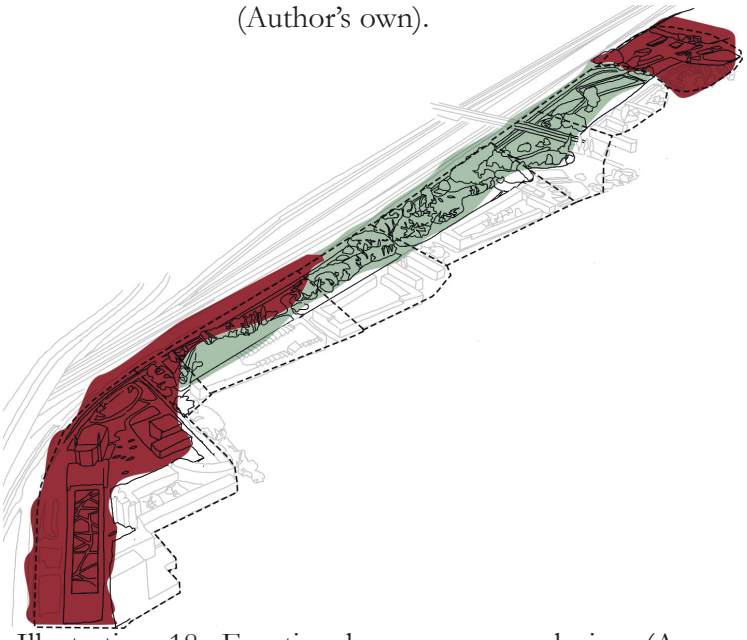


Illustration 18. Emotional response conclusion (Author's own).

Emotional response to observed path

The two diagrams on the left present a collected emotional response to each location. When compared, it becomes evident that the two observers use different emotions to describe the same perception of pleasant and unpleasant. The overall conclusion of their response is that the beginning of the observed path and the end of it are perceived as areas causing distress, whereas the middle areas (within the park) are perceived as relaxing.

Legend:

- Alarmed
- Frustrated
- Annoyed
- Depressed
- Bored
- Relaxed
- Amused
- Serene
- At ease

- Areas causing distress
- Areas causing relaxation

10. What role does architecture play in addressing calmness?

10.1. How can architecture create calm spaces?

To answer this question, this section is going to investigate four elements known to contribute to bringing a sense of peace and calmness through architecture.

Water

The bath and its aims have had diverse connotations throughout history. Bathing, in whatever shape it takes, is concerned with the health of the body and living in harmony with our organism. Bathing has been considered as part of a larger concept throughout different periods: total regeneration (Roman times) or mare ablution to be performed as quickly as possible (modern days) (Pearson, 2020).

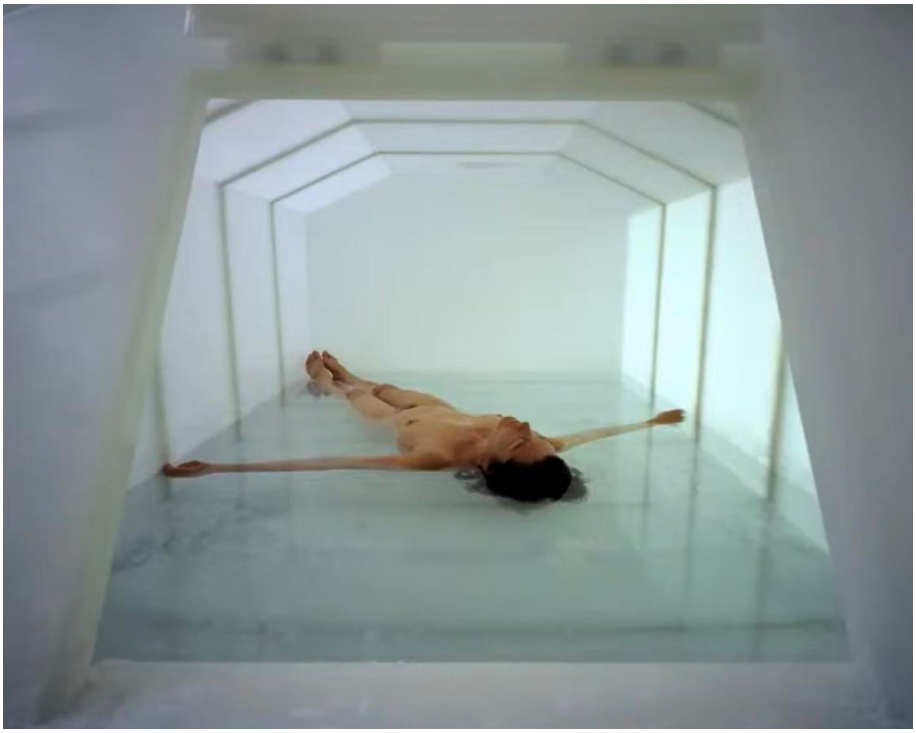


Image 12. Installation view: Carsten Holler. Psychotank. 1999. Curtesy of the artist Carstem Holler. Photo: Attillio Maranzano.

Roman Thermae baths

According to Lefebvre, the Romans had a strong sense of civic responsibility, and the most essential joys were experienced within a social context. The baths were a place of pleasure, possibly the most successful architectural space, where both the body and the mind prepared for sensuality. However, as the world's public and private spheres were increasingly segregated, bathing became a less immersive experience. Polymorphic and polyvalent architecture aspects faded away over time. Lefebre claims that there is no architecture or morphology of enjoyment, which he finds unfathomable (Pearson, 2020).

These facilities comprised huge exercise grounds, libraries, and hot and cold baths all housed in a single public edifice. Another essential characteristic of the thermae is contrast, which includes hot and cold baths, as well as contrasting atmospheres, light, and materials, to provide depth and richness of experience (Pearson, 2020).

A Roman bathhouse included at least a dressing room (apodyterium), a chamber with medium-temperature

baths, and a room with hot tubs (calidarium). Typically, these spaces were adjacent to one another, in strict order of use. In addition to an open-air swimming pool (natation), sweat rooms, sunrooms, cold baths (frigidarium), health treatment rooms, sports facilities, and a religious place for prayer (Pearson, 2020).

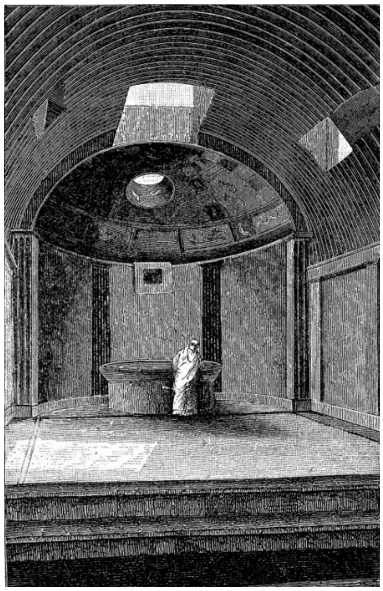


Illustration 19. Caldarium of the Old Baths at Pompeii by Overbeck (PICRYL, 2015).

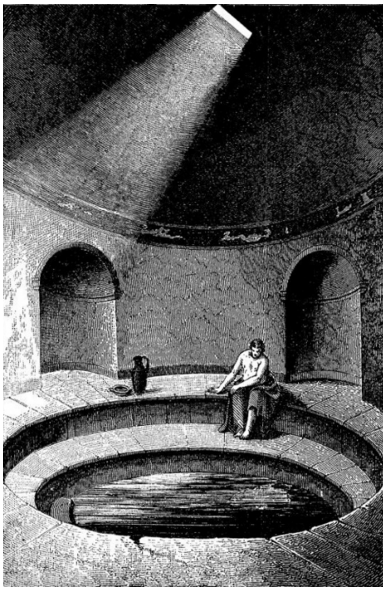


Illustration 20. Frigidarium of the Old Baths at Pompeii by Overbeck (PICRYL, 2015).

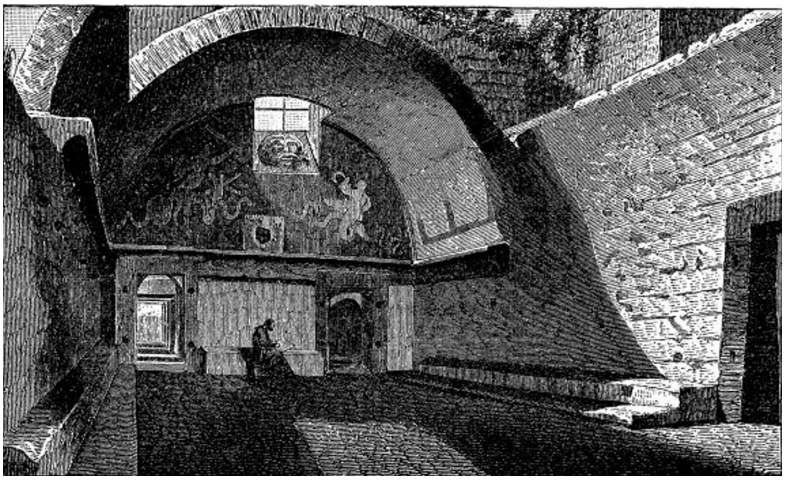


Illustration 21. Apodyterium of the Old Baths at Pompeii by Overbeck (PICRYL, 2015).

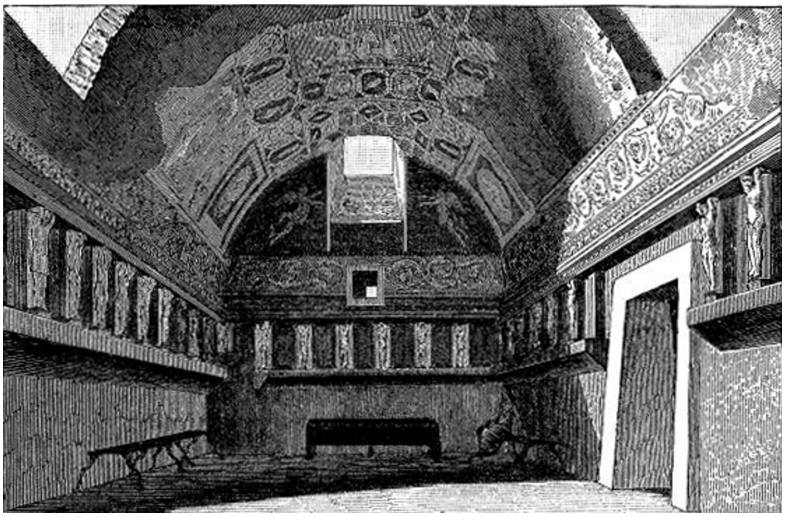


Illustration 22. Tepidarium of the Old Baths at Pompeii by Overbeck (PICRYL, 2015).

Microtherme by Matterdesin

Image 1 3. Microtherme (Matterdesign, 2025).

The project is a more contemporary vision, implementing some of the thermae's features. In the conception of the Roman bath complex, occupants move from extremity (caldarium) to extremity (frigidarium), managing their own thermal delight. The installation heats up different parts and areas making their own microclimate. This project creates a waterless thermae bathing environment (Matterdesign, 2025).

Natural water bathing

Portland's waterfalls are designed to elicit an instinctual memory of Victorians jumping into the fountain on a hot day. Bathing in nature, in untreated, chlorinated water, in an environment with a greater biodiversity, and immersing oneself in it. The idea of Princess of Wales Memorial Fontain incorporates the same to come, touch, and play in this environment. The city is a place to play that can be subtly re-appropriated for enjoyment (Pearson, 2020).

Image 14. Lawrence Halprin Keller Fountain Park 1970. Portland, USA. Photograph Haga66, 1995, Creative Commons.

Image 15. Giovanni Battista Piranesi, Fountain of Trevi, 1748-1778. Print. Architect Nicola Salvi, 1762, Rome, Italy. Public domain.

Image 16. Gustafson. Porter+Diana, Princess of Wales Menorial Fountain 2004. London, UK. Photograph CJP Creative Commons.

Connection to religion

Bathing, in the context of religion, becomes a ritual act of purification and cleaning, of shedding one's old 'identity' to be introduced to a 'renewed' version of the 'self'. Before entering the prayer chamber, one must purify themselves according to Islamic tradition. In Christianity, one is 'dropped' into the water to be baptised, with the belief that water will cleanse one's soul.

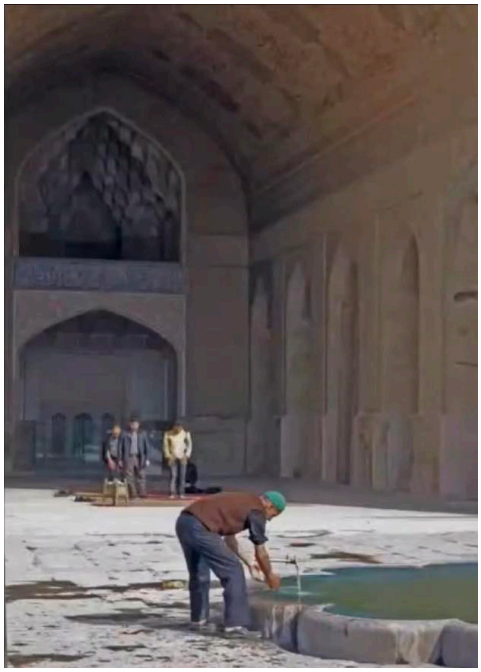


Image 17. Jameh Mosque, Isfahan, Iran. By Self, Creative Commons.

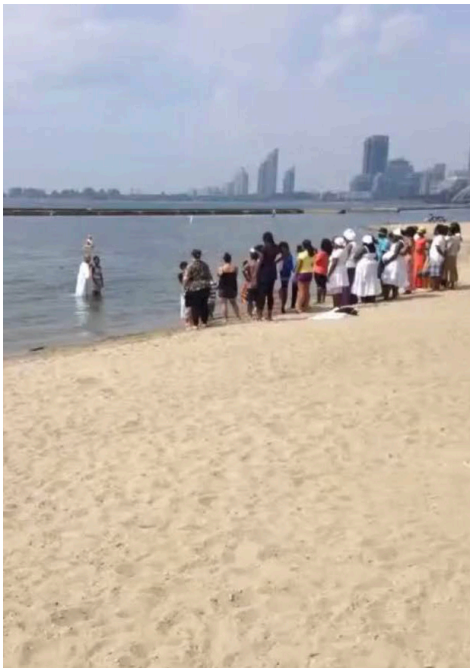
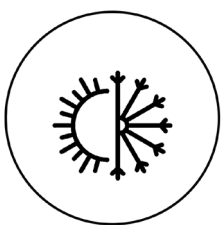
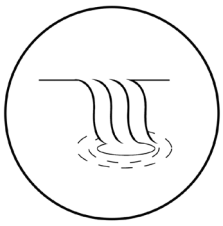


Image 18. Group baptism, Lake Ontario. Toronto, Canada. 2012.

Water Design Patterns



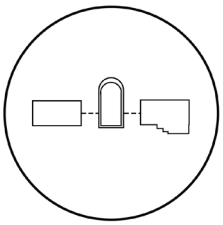
Seasonal change



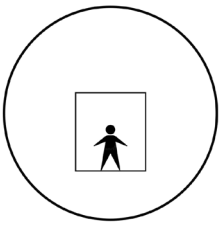
Flow of water

Ritual use of water

Floating on water

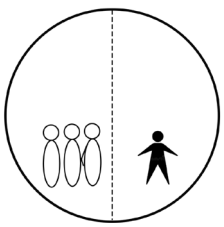


Organisation of variety of facilities



Small intimate scale

Instinctive use of water



Level of privacy and publicity

Garden

They can be classified according to two criteria: the degree of action or inaction and the type of emotions sought (de Wit S., 2014). The first group consists of three types of use: active, social, and passive. These three typologies are associated with mediaeval gardens to demonstrate their traits and differences.

Illustration 23. Cistercian working in the field, by Jorg Breu, 1500 (PICRYL, 2021).

The active gardens stimulate movement. Later in history, it was discovered that this type of action is generally favourable to feelings of self-esteem and sense fulfilment (Kaplan, 1995).

Illustration 24. The little garden of Paradise by Upper Rhenish Master, ca. 1410-20 (Artvee, 2024).

The social gardens are referred to as a 'garden for play' in which guests can dance and play, giving the impression of being removed from the outside world. It was a place where smells, noises, taste, and touch worked in tandem with the visual component, based to the presence of colourful foliage, perfumed flowers, water, and fruit trees (de Wit S., 2014).

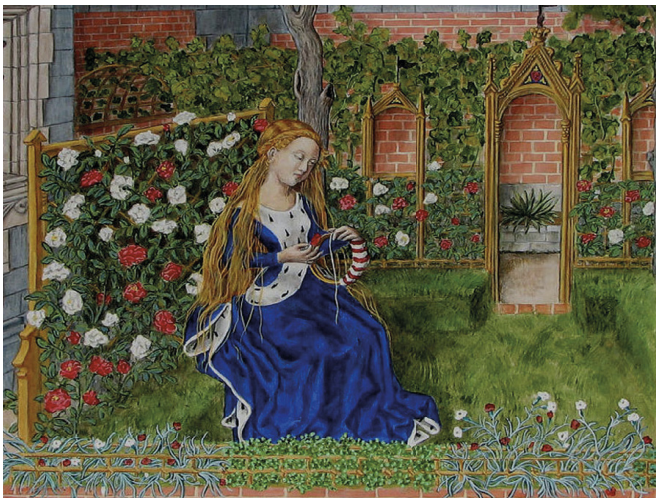
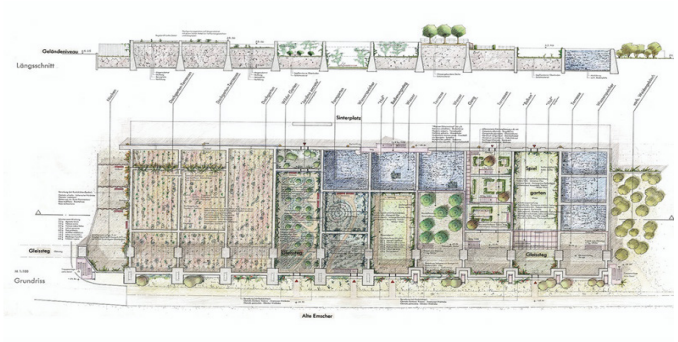


Illustration 25. Giovanni Boccaccio, ca. 1468. Emilia in her garden, Plate 22, from 'La Teseida' (Kunstkopie, 2025).

Passive gardens initially developed in monasteries. Because they were self-sufficient, the walls surrounded several gardens with various functions: vegetable, herb gardens, orchards, etc.; nonetheless, at the centre was a garden with no defined function, which was viewed as an oasis. In this scenario, the design is based on the associations that the garden conjures rather than the experience of the environment (de Wit S., 2014).

The second type of gardens focus emotional responses and include Restorative Gardens, Healing Gardens, and Therapeutic Gardens. They are similar in that they primarily focus on boosting socialisation, promoting relaxation and reflection for solitary visitors, or fostering a sense of belonging among inhabitants. These gardens soothe the body and mind, encouraging them to restore themselves (Gerlach-Spriggs, 1998).



Illustartion 26. Sinter park (Latz+Partner, n.d.).

Image 19 . Sinter park (Latz+Partner, n.d.).

Duisburg Nord Landscape Park

Because of the plant that was previously located on the site, the ground became extremely contaminated. Nonetheless, the industrial past of this neighbourhood is vividly reflected in its refurbishment; in fact, remembrance is the project's driving principle. Paths and steps connect the various zones of the old plant, allowing visitors to build their own experience (Latz+Partners, 1991).

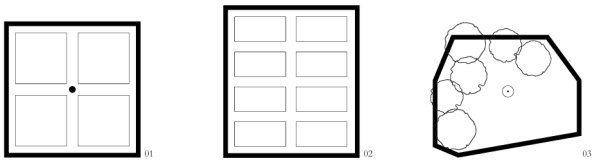


Illustration 27. Serpentine Gallery Pavilion (O'Brien, 2011).

Hortus conclusus

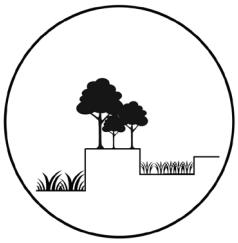
A contemporary interpretation of the hortus conclusus (passive gardens) was designed by Zumthor in the UK. Peter Zumthor designed a contemporary version of the 'passive gardens' in UK. According to the architect, the garden is the most initiate landscape, a laboratory for the mind and the body (yourgardenpartner, 2011).

Image 20. Serpentine Gallery Pavilion (O'Brien, 2011).

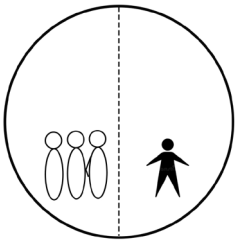
Gardens Design Patterns

Including all senses

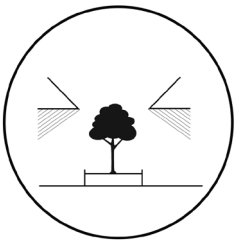
Contemplation



Levels of vegitation



Separation from daily life



One central element

Spiritual

According to the book "Sacred Spaces: Contemporary Religious Architecture" all spiritual spaces, regardless of their religion contain five central elements:

Congregation

Engaging in religious activities via a sense of community can a great deal of peace. Most religions prioritise the group meeting as part of their worship, even if many encourage private reflection. These places, regardless how big or tiny, official or informal, must be able to provide the community with something beyond the spiritual in addition to hosting worship (Pallister, 2015).

The Shire of the Virgin of Lo Antiguo is a building for the locals that preserves the old stone archway saved from demolition by the locals and has been kept intact ever since. This is another way to bring the community together by reminding them of their past.

Image 21. The Shire of the Virgin (Otxotorena Arquitectos, 2013).

Mass

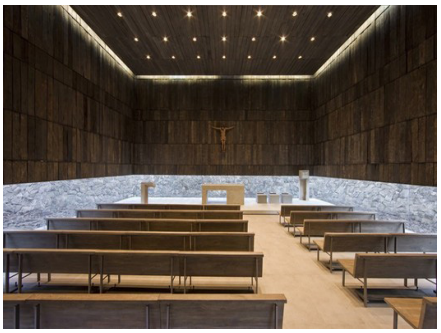
Religion has provided generations of believers with solidity, permanence, and stability, and these qualities are frequently expressed in the structures people erect for worship. It makes obvious that religious buildings, which were once thought to be the most significant structures, would use an intimidating presence of permanence to operate and communicate their authority (Pallister, 2015).

The Beth Sholom Synagogue by Stanley Saitowitz is a large, half-circle structure that is situated higher than street level and requires guests to ascend steps to access. The sanctuary's substantial size serves as a reminder of the real temple's significance to the Jewish faith.

Image 22. The Beth Sholom Synagogue (Natoma Architects, 2009).

Revelation

The idea of revelation is prevalent in many religious traditions. The Abrahamic faiths and Buddhist philosophy both hold that a set of truths or knowledge can be revealed to a person or group of people either gradually or unexpectedly (Pallister, 2015).



Undurraga Devés Arquitectos Auco Chapel in Los Andes has fins protruding from each of its four walls and has an entirely black front with no windows or doors visible whatsoever. The congregation sits underground, and the superstructure of the building sits above it. This is only visible as one approaches the chapel, which is where the entry of the building transports the visitor into the centre of the earth.

Image 23. The Beth Sholom Synagogue (Natoma Architects, 2009).

Clarity

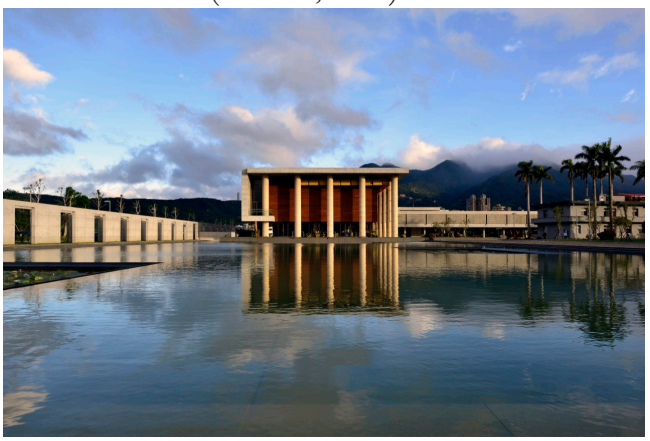
One of the obvious movements with Japanese roots is minimalism, a handy term for architecture that has been devoid of superfluous details. Japanese Zen philosophy is the cultural and spiritual foundation of Japanese minimalism, which emphasises simplicity and the basics (Pallister, 2015).

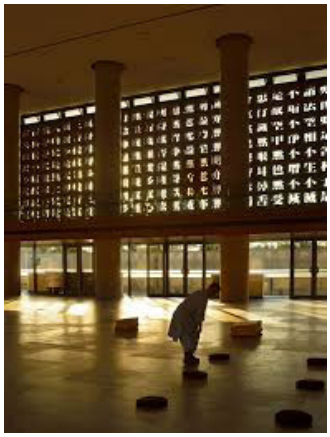
The Maise no Mori Municipal Funeral Hall was designed to provide a secular setting in a picturesque setting that would be suitable for saying farewell to loved ones for the last time. Here, it was important for the budding to enjoy its lovely surroundings without competing with them.

Image 24. The Maise no Mori Municipal Funeral Hall (Toyo Ito & Associates, 2013)

Reflection

Religious structures give many people the chance to escape their hectic, challenging life and enjoy a moment of peace. This period of time can be used for prayer, introspection, and reflection on one's place in the world as well as one's life (Pallister, 2015).

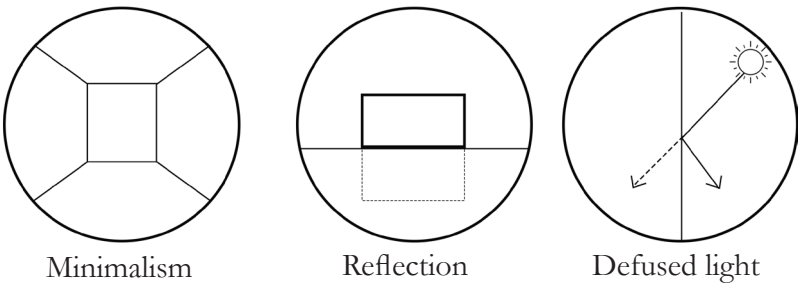


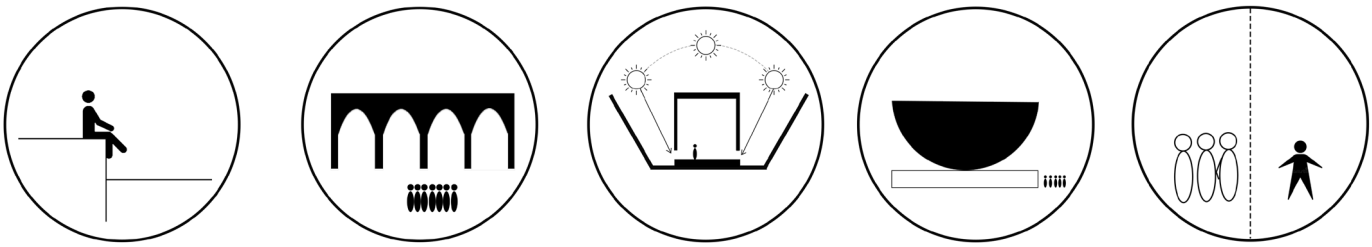


The Water-Moon Monastery's most prominent attribute is a large water feature a giant Lotin pool in which reflections of the temple facade and the surrounding colonnades play in the rippling water. Plays of light, reflection and shadows are also used to great effect in the main temple.

Image 25. Water-Moon Monastery (KRIS YAO, 2013).

Spiritual Spaces Design Patterns





Biophilia

Erich Fromm first established the concept of biophilia, which is based on humanity's intrinsic attraction for nature. Its origins can be traced back to ancient Greek, where "bios" signifies life and "philia" refers to love. Biophilic design integrates a variety of environmental psychology theories that emphasise people' innate connection to nature. Examples of these theories include Restorative environmental design (Kaplan, 1995), place attachment theory (Altman & Setha, 1992), attention restoration theory (Kaplan, 1995), stress reduction theory (Ulrich, 1983), and prospect-refuge theory (Appleton, 1975). Numerous studies have shown that biophilia has a positive impact, especially in healthcare settings where nature helps to restore and heal (Fromm, 1973). The enormous benefits of biophilia entail the preservation and repair of existing natural features, as well as the investigation of new ways to incorporate nature into the twenty-first century (Beatley, 2016).

Authors	Strategy	Benefits

Table 4. Order and ranking of component and indicator.

Component	Indicator	Very low	low	Moderate	High	Very high	Mean
Nature in the Space	1. Visual Connection with Nature	0	0	4	8	17	4.2
	2. Non-Visual Connection with Nature	1	1	6	7	14	4
	3. Non-Rhythmic Sensory Stimuli	6	6	3	5	7	2.8
	4. Presence of Water	0	0	5	7	15	4.1
	5. Thermal and Airflow Variability	5	5	7	5	9	3.2
	6. Dynamic and Diffuse Light	1	1	6	7	10	3.6
	7. Connection with Natural Systems	2	2	5	8	12	3.8
Natural Analogues	8. Biomorphic forms and patterns	9	10	3	4	4	2.4
	9. Material connection with Nature	8	9	4	2	7	2.7
	10. Complexity and Order	8	10	3	4	5	2.6
Nature of the Space	11. Prospect	9	11	3	2	5	2.4
	12. Refuge	8	11	6	2	3	2.3
	13. Mystery	11	10	4	3	2	2.1
	14. Risk / Peril	11	10	3	2	4	2.2

Edwards and Torcellini (2002)	modifing daylight mechanism, adjustable throughout the day	Artificially generated mood and enhance creativity for workplaces and habitats.
Van den berg et al. (2003)	Natural movement of water.	reduces Stress.
Diette (2003)	Incorporating natural sounds and murals inspired by nature	reduces the degree of pain experienced by patients during medical procedures

Table 2. The effect of biophilic design on people (Hassankhouei & Maryam, 2023).

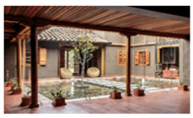
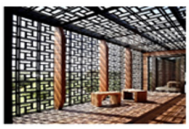
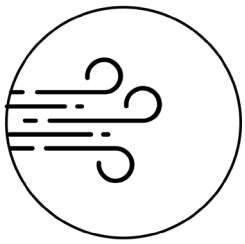
Indicators	Design strategy	Impact on well-being
Visual Connection with Nature	-Incorporate diverse natural habitats like constructed wetlands, grasslands, and forests into the design. -Provide opportunities for indoor and outdoor experiences through features like balconies, courtyards, and colonnades. -Opt for window views that showcase natural landscapes, changing plant seasons, and diverse natural scenes. -Establish a connection with the natural world through paintings, photographs, videos, and fabrics depicting nature. -Prioritize real nature over simulated nature. -Ensure views of seasonal changes in plants. -Emphasize biodiversity rather than just focusing on the area. -Proximity to green spaces and opportunities for physical activity should be considered. -Recognize the benefits of spending time daily in nature (Abdel-Aziz et al., 2023; Ryan et al., 2014; Van den berg et al., 2003; Biederman and Vessel, 2006; Fuller et al., 2007; Kahn et al., 2008; Fuller et al., 2007; Barton and Pretty, 2010; Tsunetsugu et al., 2013; Kellert, 2018; Schweitzer et al., 2004)	-Stress reduction -Higher preferences -More pleasure receptors in the brain -Positive impact on mood and self-esteem -Stimulated heart rate variability and parasympathetic activity - Restoration (Simarmata,2023; Brown et al, 2013; Tsunetsugu & Miyazaki, 2005; Van den Berg et al, 2007; Biederman & Vessel, 2006; Barton & Pretty, 2010)
Non-Rhythmic Sensory Stimuli	-Create a refreshing environment and energize individuals with non-rhythmic sensory stimuli like clouds, shadows, nature sounds, and water reflections. -Employ cast shadows to highlight the 3-dimensional form of objects and accentuate space. -Integrate clouds, through roof or wall openings, to offer restorative views from interior spaces. (Simarmata,2023; Ardiani et al.,2020; Peters & Verderber, 2022)	-Enhancing concentration and restoring memory. -Measurable improvements in attention and exploration behaviors. -Positive effects on heart rate, systolic blood pressure, and sympathetic nervous system activity. (Beauchamp et al, 2003; Li, 2010; Park et al, 2009; Ulrich et al, 1991; Windhager et al, 2011)
Peresence of water 	-Prioritize a multi-sensory water experience with features like fountains, constructed wetlands, ponds, and water walls. -Opt for naturally fluctuating water movement over predictable patterns. (Ardiani et al.,2020; Browning et al., 2014; Kellert, 2018, Özdemir, 2010)	-Reducing stress levels. Increasing feelings of tranquility. -Lowering heart rate and blood pressure. -Restoring skin conductance after exposure to water features. -Improving concentration and memory. -Enhancing perception and psychological and physiological responsiveness. -Eliciting positive emotional responses. (Alvarsson et al, 2010; Biederman & Vessel, 2006; Pheasant et al, 2010; Alvarsson et al, 2010; Biederman & Vessel, 2006; Alvarsson et al, 2010; Hunter et al, 2010; Barton & Pretty, 2010; Biederman & Vessel, 2006; Heerwagen & Orians, 1993; Karmanov & Hamel, 2008; Ruso & ; White et al, 2010; Windhager et al, 2011)
Dynamic and Diffuse Light 	-Maximize natural light through glass walls, clerestories, skylights, atria, and reflective colors/materials. -Replicate the spectral and ambient qualities of natural light by incorporating multiple low-glare electric light sources, diffused ambient lighting on walls and ceilings, and daylight-preserving window treatments (Madias et al, 2023 Sharifi & Sabernejad, 2016;Chang & Chen, 2005; Kellert, 2018)	-Promoting a flow of positive emotions. -Enhancing creativity. -Improving the accuracy of senses. -Increasing feelings of calmness. -Influencing circadian system functioning. (Choi & Park, 2020; Beckett & Roden, 2009; Figueiro et al, 2011; Kim & Kim, 2007)

Table 3. Design strategies for well-being (Hassankhouei & Maryam, 2023).

The study 'Biophilic Design in Architecture: Impacts on Well-Being' looked at how the qualities of Biophilic design evolved over time. The study attempts to categorise these features. The results show that the component of nature in the space has the most significant impact, and the indicators of visual connection with nature, presence of water, non-visual connection with nature, connection with natural systems, dynamic and diffuse light, thermal and airflow variability, and non-rhythmic sensory stimuli have been assigned the highest scores in that order. The impact of nature indicators in the Space component on well-being was examined using successful case studies to demonstrate how nature indicators in the Space component effect the improvement of inhabitants' well-being (Hassankhouei & Maryam, 2023).

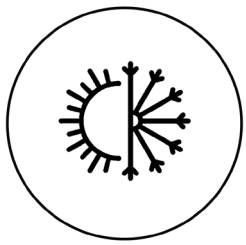
Biophilic Design Patterns

Including all senses

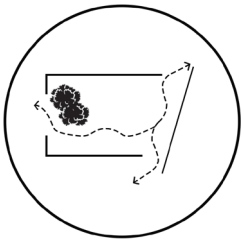


Natural air flow

Inlcusion of water



Seasonal change



Prospect and refuge

Reconnection with nature

As part of the 'Noise Plan' report created by the Veldacademie (Veldacademie, 2024), an intresting revelations were made about the preception and prefrences of sounds and/or noise in Rotterdam. They could further inform the design approach to be taken when thinking 'How can architecture address the need for calmness?'.

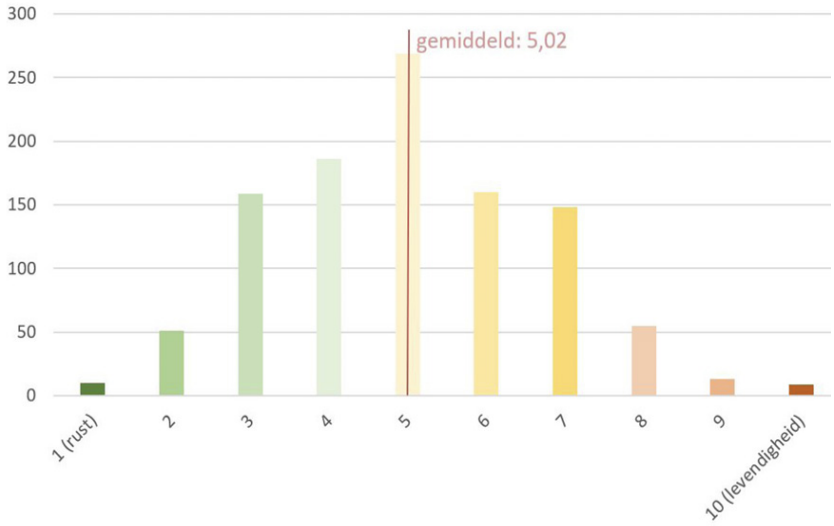


Figure 41. Balance between calm and liveliness (Veldacademie, 2024).

When asked if they prefer more lively or clamer enviroments, respondents tend slightly more towards calm than liveliness.

Respondents were asked which sounds contribute most to peace, liveliness and nuisance. They could choose from a number of suggested common sounds (Veldacademie, 2024).

Calming sounds

Based on Veldacademie's research the following sounds contribute most to peace in the experience:
1. Natural sounds, such as rustling leaves and birds (82.0%).
2. Splashing or rippling water (69.8%)
3. Passing cyclists (9.8%)
4. Port noise, such as moored and passing ships (9.4%)
5. People walking by (8.4%).

Many respondents (>80) mention sounds that can actually be classified as 'Nature sounds', such as birdsong, the rustling of the wind through trees, rain, crickets or frogs. According to them, not only sounds of nature but also the physical presence of nature in the form of green areas (parks, trees, etc.) contribute to a feeling of peace. It is further emphasized that it depends on the time of day whether a sound contributes to a feeling of peace or is disturbing (Veldacademie, 2024).

Figure 42. Calming sounds (Author's own).

"For me, the greenery in particular contributes to relaxation. Of course, with such places you have to find a balance between peace and quiet/ busyness, because these places (especially in the summer) are also very busy and people can make a lot of noise or play loud music."

Respondent, New Work/Dijkzigt

"Quiet places are extremely valuable in a hectic society. They deserve attention and protection."

Respondent, Feijenoord

Liveliness

"I've described a lot of things as liveliness. For me it's about balance. I don't need to hear the same sound every hour. It's about variety."

Respondent, Cool

Sounds that contribute most to liveliness in the experience:
1. Events, such as holidays, festivals and flea markets (59.1%)
2. Live music on the street (52.3%)
3. Children playing (51.0%)
4. Market noises (46.1%)
5. People walking by (38.4%)

Liveliness sounds should not be too loud, too frequent or at inappropriate times to be experienced as positive. Even traffic sounds, such as those from trams and buses are sometimes also mentioned as part of urban liveliness. Respondents refer to events such as neighborhood parties, sports matches and music festivals, among other things. The sounds of terraces are seen as a source of liveliness, especially in spring and summer. This involves the buzz of people, terrace music and the clinking of glasses. Daily living sounds such as children playing on the street, conversations between neighbours and people working in their gardens are also experienced as positive (Veldacademie, 2024).

Figure 43. Liveliness sounds (Author's own).

Nuisance
Sounds that contribute most to nuisance in the experience:
1. Road traffic, such as cars, trucks, mopeds and scooters (71.3%)
2. Air traffic (58.9%)
3. Construction activities (51.8%)
4. Sirens (35.7%)
5. Rail transport such as tram, metro and train (32.6%).

Regarding nuisance, respondents draw attention to road traffic, industry and the port. Among other things, loud music from cars, accelerating and racing cars and motorcycles, especially with loud exhausts, are mentioned. Sirens, honking cars and running engines of stationary vehicles are also mentioned. As far as industry and the port are concerned, it mainly concerns continuous noises and high tones, especially at night and originating from ships, container handling and industrial activities (Veldacademie, 2024).

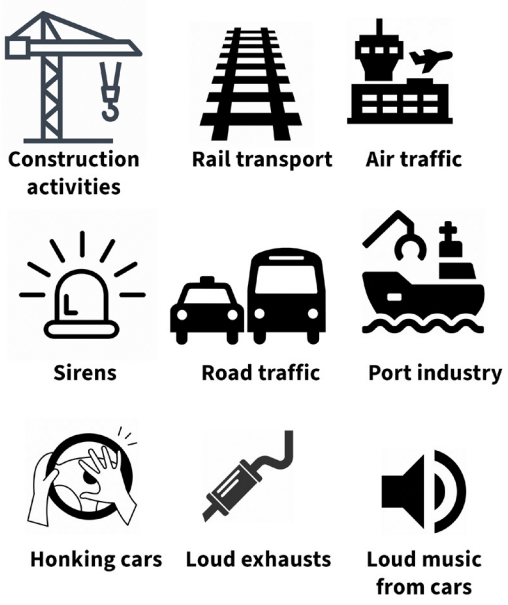


Figure 44. Nuisance sounds (Author's own).

10.2. What are examples of calm architecture and what makes it calm?

Peter Zumthor, Thermal Baths, Vals, Switzerland, 1996

INTEGRATION WITH THE LANDSCAPE
The cave-like structure, half-buried under the grass of the hill, seamlessly integrates into the natural surroundings, utilizing locally quarried Valser Quartzite to create a mass that seems to emerge organically from the landscape.

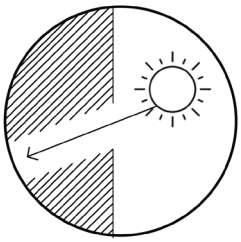
MATERIAL SENSIBILITY
The stone surfaces, meticulously hand crafted, invite tactile exploration, providing a sensorial experience that aligns with the spa's therapeutic purpose. This experience is further enhanced due to the thermal qualities of the stone.

PLAY OF LIGHT AND SHADOW
The meander acts as a negative space flowing between the stone building components, creating a rhythm that permeates the entire building.

SPATIAL SEQUENCING
Sequential movement through the spaces contributes to a sense of anticipation and contemplation. The informal layout guides bathers along a path of wonder, fostering discovery.

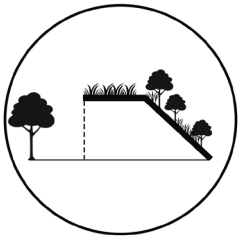
MYSTICALITY
The architecture transforms bathing into a ritualistic experience, where the visitor is invited on a journey of cleansing, as they become one with the water, the stone and the mountain.

Thermal Baths design pat-

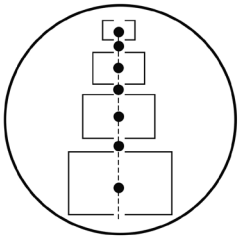


Play of light and shadow

Cleansing

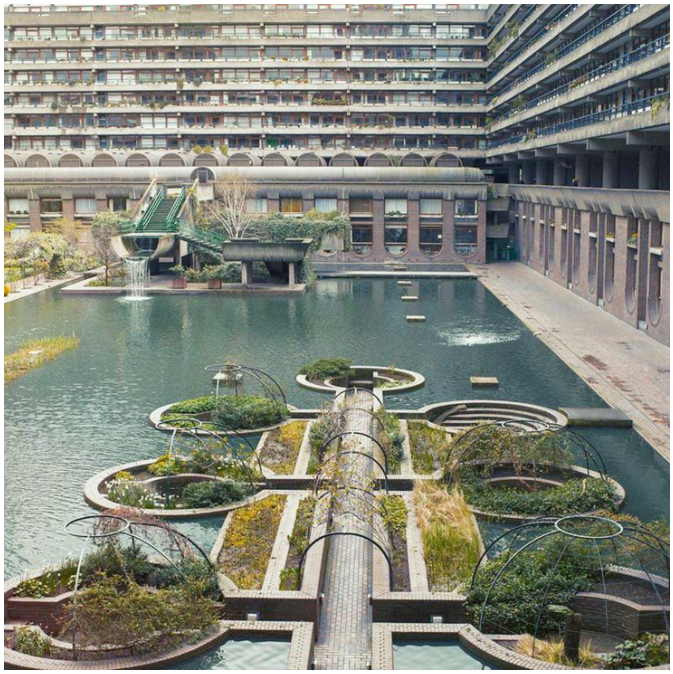


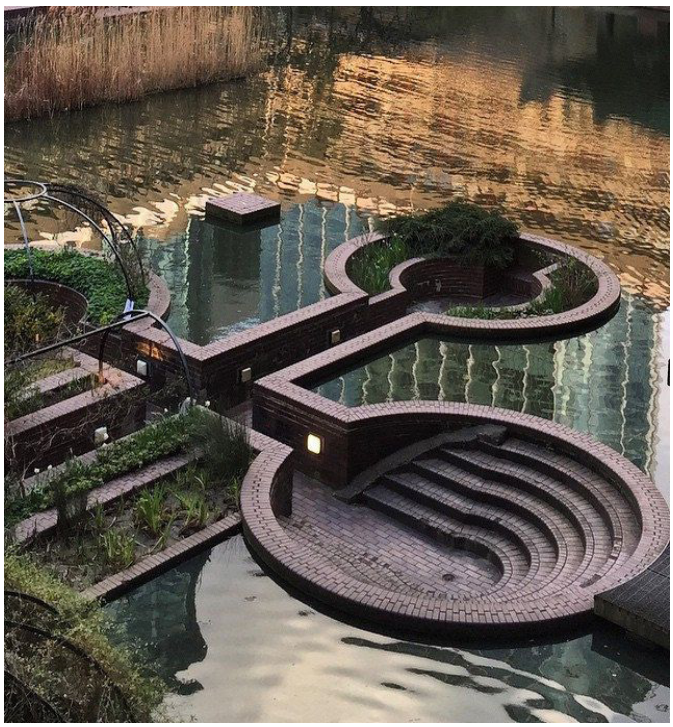
Integration of the structure in the nature



Sequental movement fostering wonder

Textured surfaces





Barbican Estate's water gardens, London, UK. Chamberlin, Powell and Bon

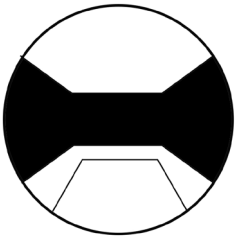
SEASONAL CHANGE
Woodland trees producing autumn beauty, maintain leaf in the winter, or display ornamental twigs or leaves were incorporated into the design.

CONTRAST
Water elements and plants were designed to provide a soothing visual contrast to the concrete. Large concrete planters loaded with vegetation adorned the walkways, while earth-toned brick pavers made outdoor floorscapes.

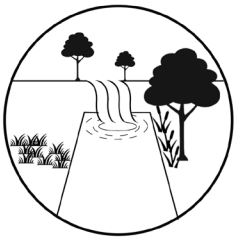
PRACTICAL APPROACH
The lake was intended to provide air conditioning for the Barbican Centre. That is why, historically, the Barbican Centre has kept the pumps operational. The pumps must deliver water for the waterfall, the weir, and the fountains.

BIODIVERSITY
A thriving, biodiverse ecosystem has been made possible by the establishment of these green areas within the estate. The large variety of species were included. Because of the combination of deciduous and evergreen, native and non-native plants, there will always be colour, intrigue, and biodiversity.

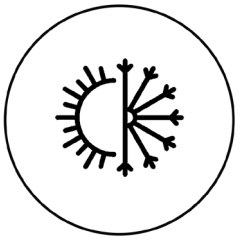
Barbican Estate's water gardens design



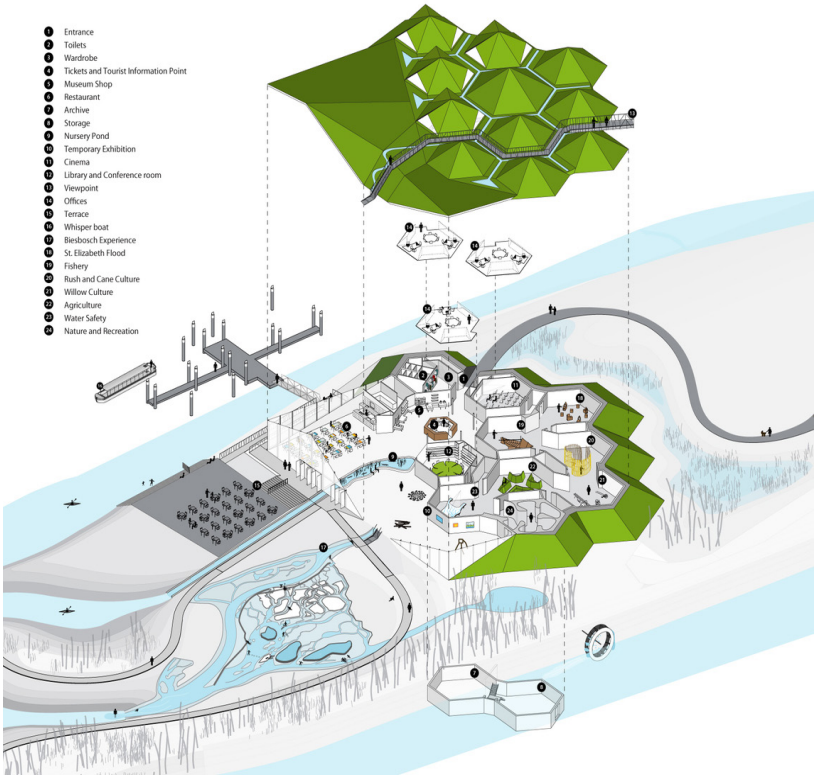
Contrast between built and natural enviroment

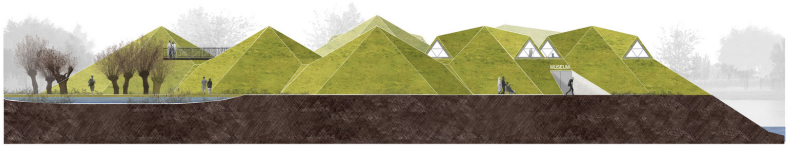


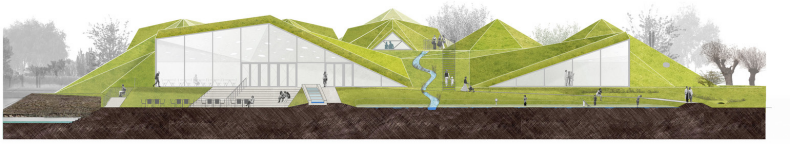
Integartion of multiple ecological systems

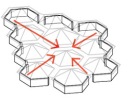


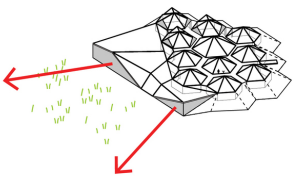
Seasonal change

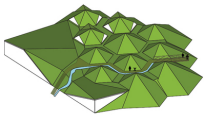








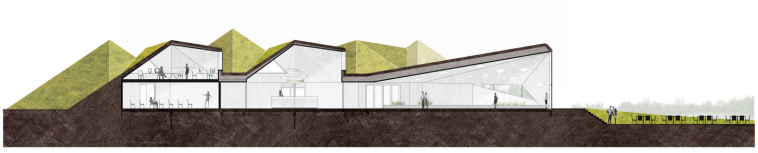




Existing Building
Introvert, no realation with the surroundings

Porposal: extending on the South West side
View on the surroundings + activation of the museum Island

Landscaping museum as landart
Roof as a common space with a view



Biesbosch Museum Island, Studio Marco Vermeulen

ORGANIC STRUCTURE
The museum's hexagonal construction opens up to the island's garden. The museum's addition includes room for temporary exhibitions as well as an organic café with views of the surrounding environment and lake.

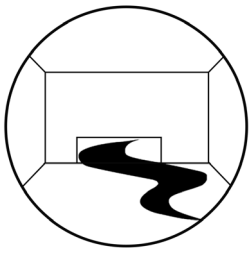
GREEN ROOF
In addition to adding ecological benefit, the roof creates a sculpture that both expresses in the surrounding landscape and reads as land art. A viewing tower and an exciting mountain track are accessible via a fold in the roof. Because of this environment, the architects decided to cover the existing building with grasses and herbs, turning it into a tiny version of a landscape complete with hills, walkways and streams.

ECOLOGY
From the museum garden, a tiny stream flows across the extension's floor and through one of the glass walls.

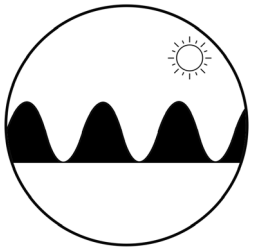
SUSTAINABILITY
The building's green roof and heat-resistant glass provide year-round insulation, while on chilly days, a biomass stove keeps the interior warm. On hot days, water is pumped through the same pipes to assist cool the structure.

SEASONAL CHANGE
A recently excavated creek supplies river water to the island's freshwater tidal park, known as Museum Island. Because the creek's banks slope gently, it is easy to see the tides and seasonal changes in water levels. Every trip to the island will be unique because of the enormous diversity of flora and wildlife that the slopes produce. The island, whose appearance is always changing due to fluctuating water levels, is accessible by a winding trail.

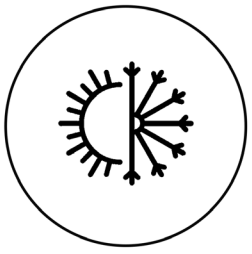
Biesbosch Museum Island design



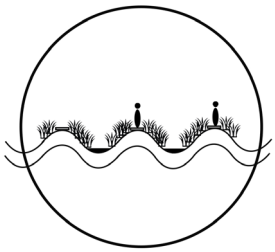
Including natural elements into the design



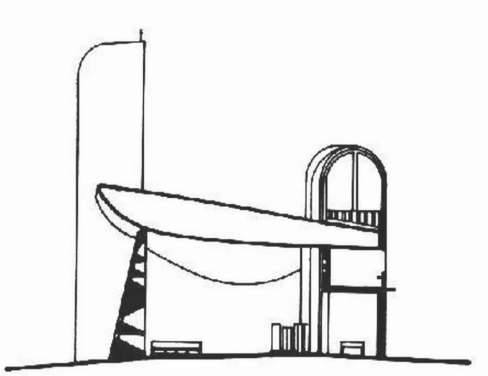
Organic structure

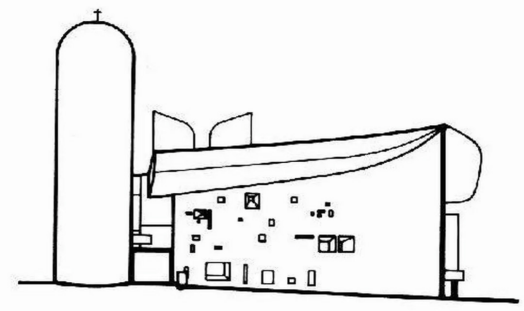


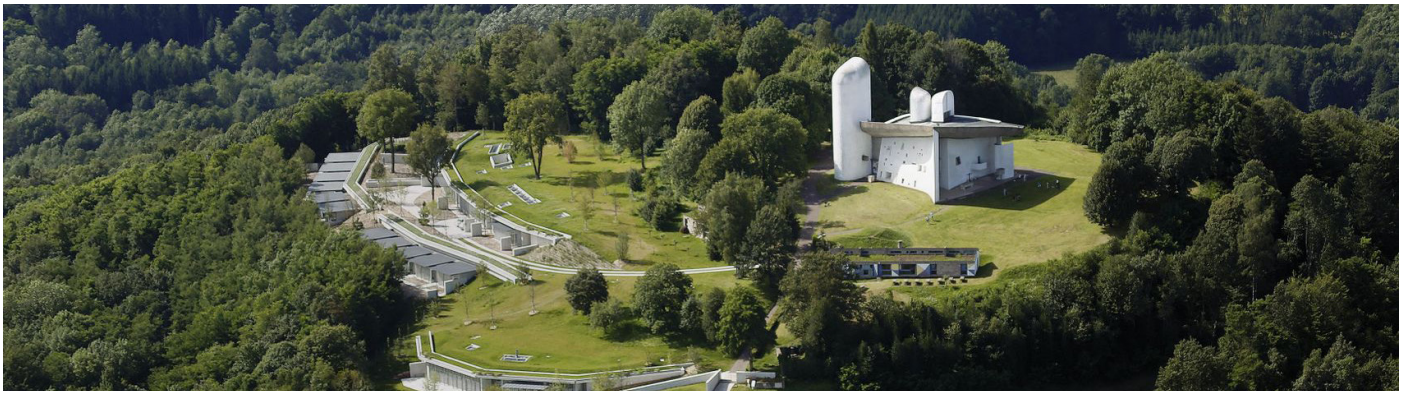
Seasonal change



The roof comes part of the 'new' land-scape







Notre dame du haut, Le Corbusier

MASS
The chapel's shape is a product of its interaction with the surrounding environment, and its roof highlights the concrete's ability to produce organic volume.

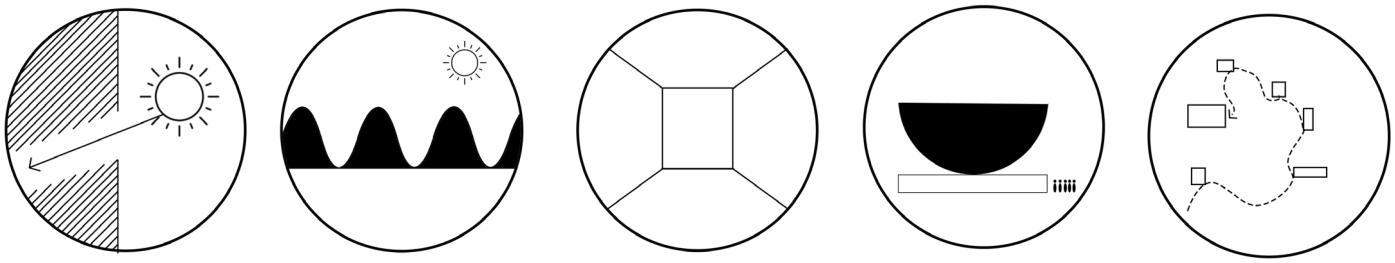
SIMPLICITY
The building genuinely functions as a sacred space because to its minimalistic, unadorned fundamental structure, which exemplifies the manner of life that visitors to the chapel were looking for.

MOVEMENT
The design maintains coherence, dynamism, and harmony while offering the spectator a distinct perspective of the structure from any angle. This feature adds a fourth physical component to the architectural composition—movement—by compelling visitors to explore the chapel in order to fully appreciate it.

LIGHT
The design produces a series of spatial dramas where lighting interacts with material and shape to produce various emotions throughout the day or season. In line with the religious activities occurring there, the influence of light created dramatic and emotional elements that resulted in heightened sensations. Additionally, the windows offer various "frames" that allow one to see the environment.

ORGANIC ROOF
Because the concave roof is supported by built-in columns in the walls, it appears to rise above the structure. Priestly light can pass through the 10 cm gap between the roof and the walls.

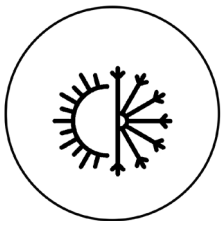
Notre dame du haut design patterns



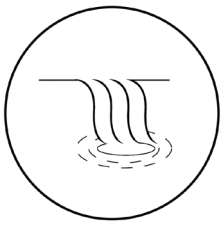
Play of light and shadow | Organic structure | Minimalism | Mass | Movement stimulated by light and views

10.3. What features does calm architecture incorporate?

Based on the investigation conducted earlier in this chaper it can be concluded that variety of elements and characteristics can contribute to the feeling of clamness. To creater a clearer vision of them, design patterns are used as possible guidelines extracter form literature review. These design patterns are still evolving, as the aim of the study is to initiate a new dialogue about architecture focused on calmness, rather than presenting a finalized or definitive guide to calm design. For a categorisation of the design patterns reffer to Appendix.

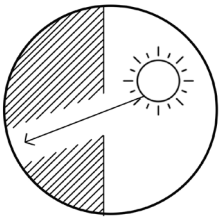


Seasonal change

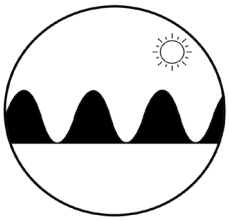


Flow of water

Ritual use of water

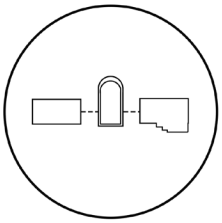


Play of light and shadow

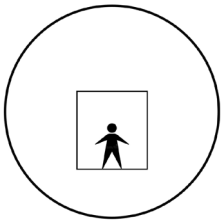


Organic structure

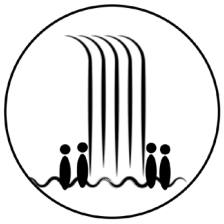
Floating on water



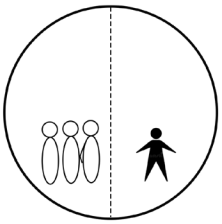
Organisation of variety of facilities



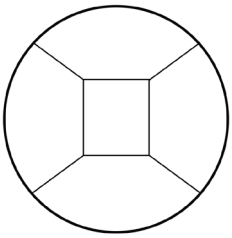
Small intimate scale



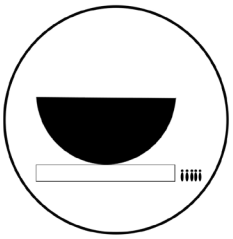
Instinctive use of water



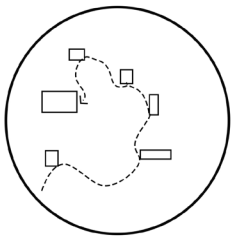
Level of privacy and publicity



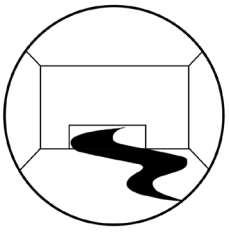
Minimalism



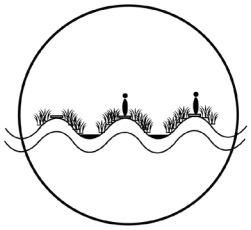
Mass



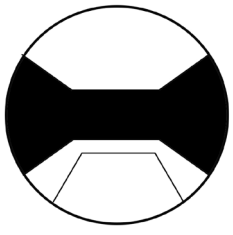
Movement stimulated by light and views



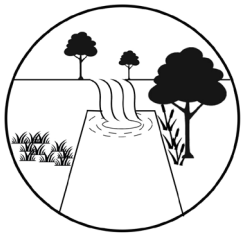
Including natural elements into the design



The roof comes part of the 'new' landscape

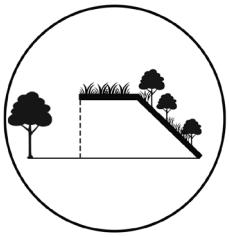


Contrast between built and natural enviroment

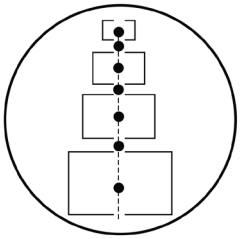


Integartion of multiple ecological systems

Cleansing



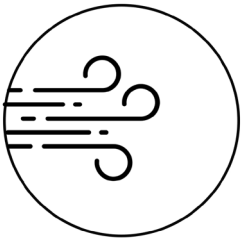
Integration of the structure in the nature



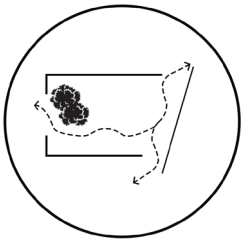
Sequental movement fostering wonder

Textured surfaces

Including all senses



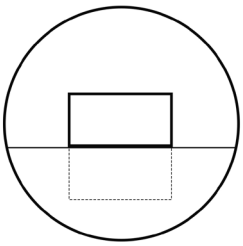
Natural air flow



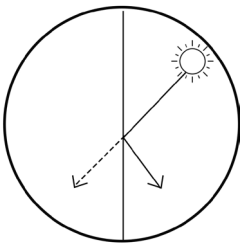
Prospect and refuge

Reconnection with nature

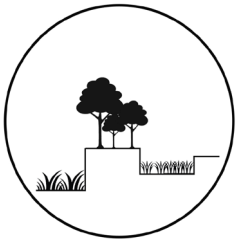
Contemplation



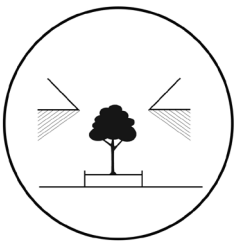
Reflection



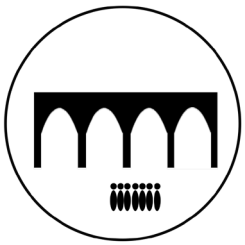
Defused light



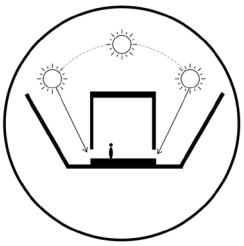
Levels of vegitation



One central element



Element of signif-icance



Alternative light directions

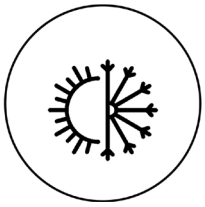
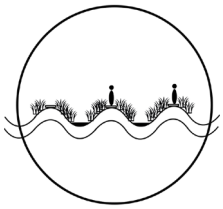
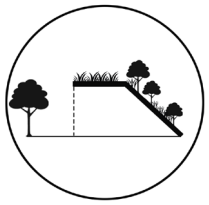
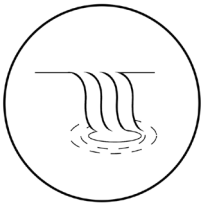
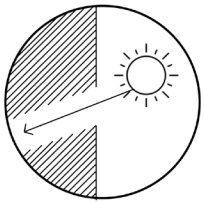
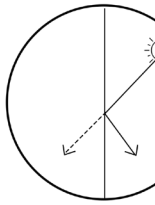
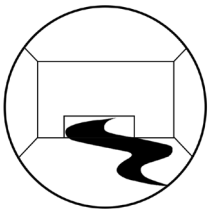
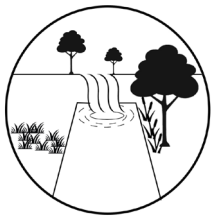
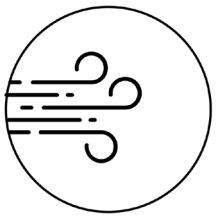
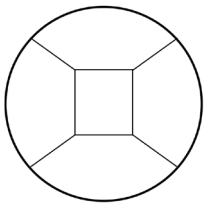
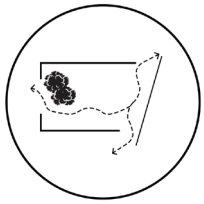
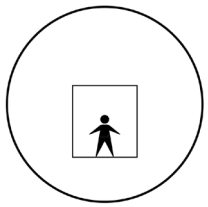
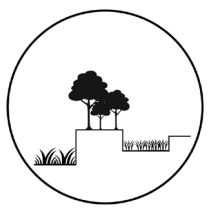
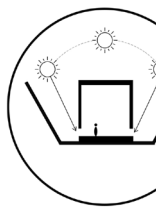
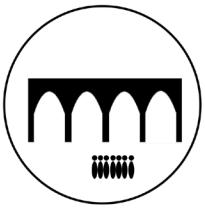
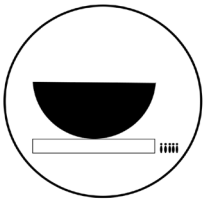
Scales	Related to calmness			
Urban impact	 Seasonal change	 The roof comes part of the 'new' landscape	 Integration of the structure in the nature	Organic struct
Architectural impact	 Flow of water	 Play of light and shadow	Instinctive use of water	 Defused lig
	 Including natural elements into the design	 Integration of multiple ecological systems	 Natural air flow	Reconnection w nature
	 Minimalism	 Prospect and refuge	 Small intimate scale	Contrast betw built and natu environmen
	Textured surfaces	Including all senses	 Levels of vegetation	 Alternative lig directions

Table 30. Pattern Classicifcation (author's own).

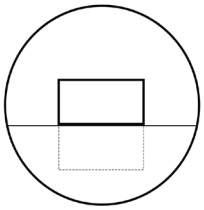
Related to spirituality



Element of significance



Mass

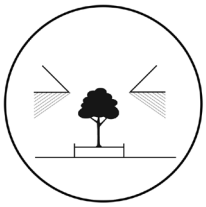


Reflection

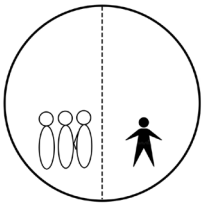
Floating on water

Contemplation

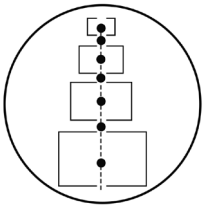
Cleansing



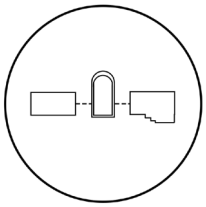
One central element



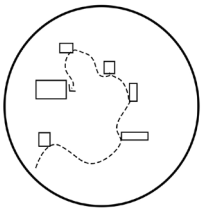
Level of privacy and publicity



Sequential movement fostering wonder



Organisation of variety of facilities



Movement stimulated by light and views

Ritual use of water

Classification of Design Patterns

To organise the patterns occurred and to structure them in clearer way, categories need to be created for ease of use. Each of the categories relate to different aspects of the design of calm spaces. By organizing them this way, these categories help integrate a sense of calmness when creating context-specific designs.

11. Conclusion and discussion

In conclusion, this research underscores the critical need for calm and restorative spaces within urban environments, particularly in areas like Rotterdam South, which faces significant challenges due to environmental stressors. As metropolitan cities become more dynamic, the imbalance between vibrant urban activity and the lack of spaces dedicated to peace and reflection is increasingly apparent, contributing to the decline of mental health.

Through this study, we explored the concept of 'breathing spaces'—designed environments that promote tranquillity and mental well-being by offering a respite from the sensory overload often found in urban life. By examining the role of environmental stressors and relaxants and their psychological and physical impacts, we established the importance of creating spaces that foster mindfulness, relaxation, and a sense of sanctuary. Furthermore, the research emphasizes the potential of architecture to address these needs by designing spaces that facilitate mental restoration.

Rotterdam South, with its diverse population and urban challenges, serves as an ideal case study for this inquiry. By investigating the environmental stressors and restorative spaces within the area, the study have gained valuable insights into the current state of the neighbourhood. The analysis highlight the potential to introduce a "calmness centre" and network for calmness (refer to appendix) to helping to balance the vibrancy of urban life with the serenity required for psychological well-being. The fieldwork conducted offers a detailed understanding of the site-specific challenges and provides a holistic perspective on the area's needs.

The concept of designing a centre for calmness is an innovative approach. While there is a wealth of literature on the importance of calmness and tranquillity, the available resources on design precedents and typologies for such spaces are limited. To address this gap, the research proactively combined various design types—such as water design, spiritual design, garden integration, and biophilic design—that are known to foster a sense of peace. These designs were thoroughly investigated to identify the specific design elements that contribute to a calming atmosphere. As a result, design patterns emerged that focus on creating spaces that not only integrate nature but also engage psychological insights, ensuring a restorative environment that promotes both mental and physical well-being.

In summary, this research provides a foundation for incorporating calmness, offering a comprehensive approach that combines architectural design with an understanding of psychological health.

Discussion

Despite the valuable findings and insights generated, there are several limitations to this research that must be acknowledged. One limitation is the scope of the case study, which focuses solely on Rotterdam South. While this localised approach allows for an in-depth analysis of the specific challenges faced by this neighbourhood, it limits the generalizability of the findings to other urban contexts. The complexities and diversity of other cities may require different design strategies and solutions that cannot be fully addressed by this study.

Additionally, while the research investigates various architectural types—such as water design, spiritual design, garden integration, and biophilic design—it primarily focuses on theoretical principles and case study examples. The lack of empirical data or real-world experiments within Rotterdam South means that the actual effectiveness of the proposed breathing spaces cannot be fully assessed. Future research would benefit from practical implementations or pilot projects that could provide tangible evidence of the benefits these design strategies offer in real urban environments.

Another limitation is the reliance on qualitative methods, including fieldwork and interviews, which provide subjective insights into the perceptions of urban stressors and restorative spaces. While these qualitative data are essential for understanding user experiences, they may not capture the full complexity of how different individuals respond to the built environment. Quantitative research, such as surveys or psychological assessments, could complement the qualitative findings by providing more measurable data on the impact of breathing spaces on mental health and well-being.

Furthermore, while this research emphasizes the importance of creating spaces for tranquillity, the influence of other external factors—such as socioeconomic conditions, political climate, and cultural values—was not thoroughly explored. These factors can significantly affect the demand for and success of calm spaces in urban areas. The research suggests that design alone cannot solve the challenges faced by Rotterdam South or other urban neighborhoods, and a more holistic approach, incorporating social, economic, and political considerations, is needed to create lasting impact.

Nevertheless, it is important to acknowledge that past events such as the COVID-19 pandemic revealed how rapidly our environment can change and how profound the psychological impacts can be. The pandemic underscored the critical need for a 'safety net', spaces that can provide restoration and calmness, even in times of crisis. As this thesis explores various aspects of designing spaces that promote tranquility, it lays the foundation for a future, in-depth investigation into the creation of a broader network of such spaces spread across Rotterdam South. This proposed network would aim to mitigate the psychological consequences of crisis scenarios similar to COVID-19 (Refrer to Appendix).

In conclusion, while this research provides a strong foundation for understanding the role of architecture in promoting calmness and mental well-being in urban environments, further studies and practical applications are necessary to fully assess the effectiveness of proposed solutions. The integration of more diverse methods, such as quantitative data and cross-cultural studies, as well as real-world testing, would enhance the robustness of future investigations and contribute to more comprehensive design strategies for urban tranquility.

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13. Appendix

The concept of a future network for calmness based on the issue under investigation is another result of this thesis. Exploration of previously planned developments in the area is done in order to establish the future context of this network. This would give an overview of how the network might be incorporated and suggest an urban vision for the future in relation to those planned developments. The network is intended to be made up of pavilions, and examples of these installations or pavilions are given.

Nelson Mandelapark /SWA Balsley/ Urban park (Gemeente Rotterdam, 2024).

Parkstad / LEVS/ Urban vison forParkstad and the eastern flank of the Afrikaanderwijk (Grozdanic, 2016).

A New Perspective for Rotterdam South / Mecanno/ Urban vison (Mecanoo, 2016).

Projects around the area

One of the majour challanges that Rotterdam South face is the disconnection from the rest of Rotterdam, making the South an isolated area from the opportunities and activities the rest fo Rotterdam proposes.There is a lot of investment through the national programme for Rotterdam Zuid and, more recently, a number of large area developments. Here are some main major points the presented projects bring forward:

Mobility
The proposal for Feyenoord masterplan tries to cover he enormous railway at De Kuip with a park. Their idea aims at better connection within Rotterdam and inrpoducting a new station for improving mobility. This way they mach the ambition for greener and sustainable transport supporter by Rotterdam municipality.

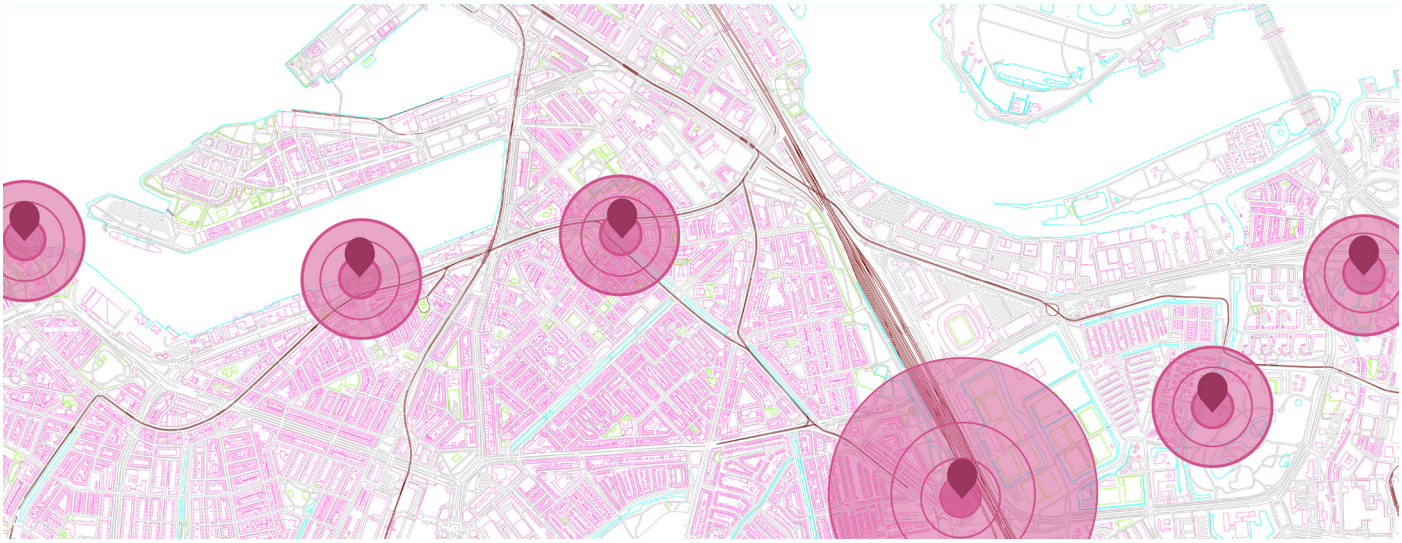
Green vison:
The proposed development for a Nelson Mandelapark as well as the vison of Mecanno to create a Dijkpark on the edge of the river aim at improving the well-being in the South. In this way, the targeted for developemnt neighbourhoods in the South, such as Oud-Charlois, the Tarwewijk, the Afrikaanderwijk, Bloemhof, Hillesluis, the Veranda and Feijenoord can be connected and form an attractive living environment. This projects permanently connect the port and urban areas with each other.

Education
The proposed masterplan by Mecanno suggests a richer range of education and knowledge in Rotterdam South and encourage universities such as EUR, Erasmus MC, and TU Delft to establish themselves in Zuid for education and research into the transformation of the delta, port and city.

New Feyenoord City Masterplan / LOLA, OMA, EFFEKT/ Urban vison (LOLA, 2024).

New Feyenoord City Masterplan / New station (LOLA, 2024).

Overlay of planned projects in the area (author's own)



Proposed clamness network (author's own).

By taking into account some of the previously investigated locations, a calmness network is proposed. It would aims at creating diverse calmness pavilions, enhancing the qualities of the green spaces as sources of relaxation. The main focus would be placed in the area under Varkenoodse Park, as this is going to be the central 'engine' for the concept.

Proposed calmness network in connection with planned projects (author's own).

Together with the already planned projects in the area, the network would create a wholesome calmness 'path' where one is given diverse opportunities for relaxation withing the natural context in Rotterdam South.

The primary focus of the design will be on the 'center for calmness,' which will serve as the central hub of the network, acting as the core of the entire system. However, the network itself plays a crucial role, as it will provide the necessary balance between vibrancy and tranquility within the urban environment—something that cannot be solely achieved through the calmness center. The highlighted pavilion locations on the maps will be integrated into the overall design strategy. These pavilions will be shaped by the design patterns developed in Chapter 10.

To further explore the potential of these pavilions/ installations, design precedents will be referenced.

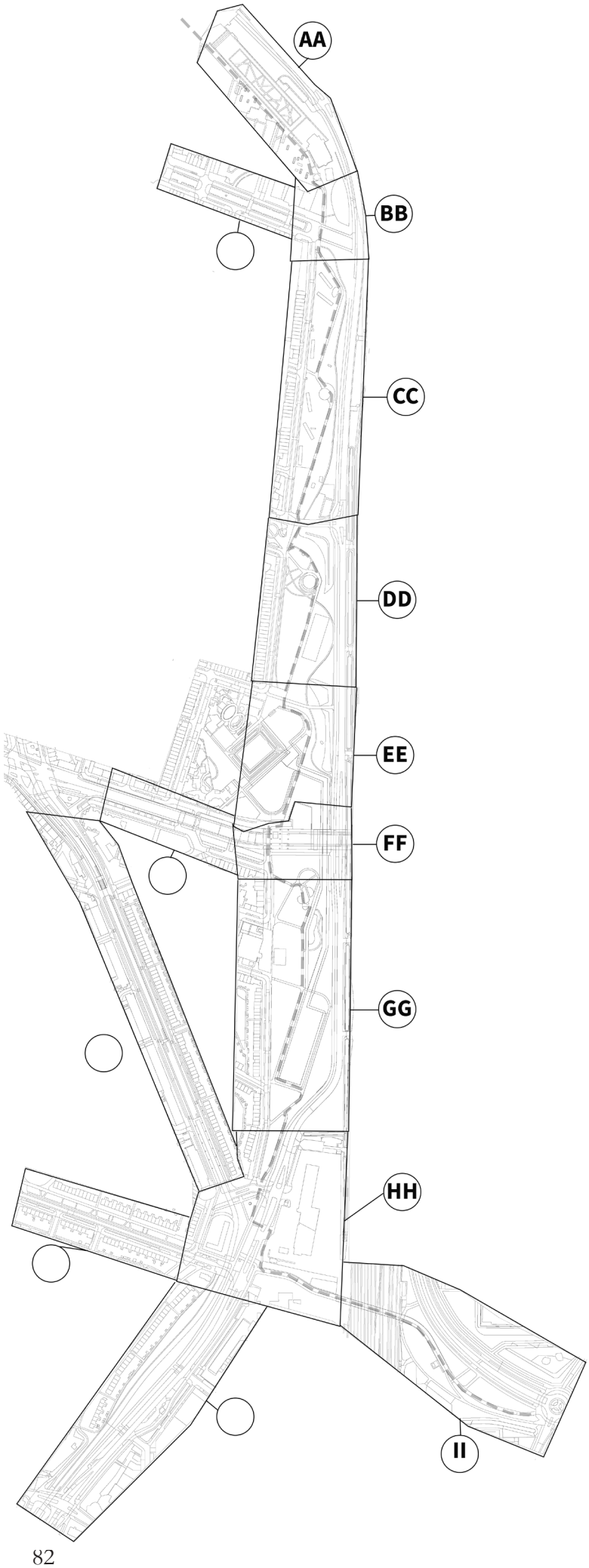
Image 43. 'Pavilion Let's Play!' (DREAM, 2022).

The "Pavilion Let's Play!" located in the gardens of Villa Medici is a sensory and interactive architectural experience that emphasizes the use of wood as a natural, tactile material. Its spiral shape guides visitors through a palisade of wooden poles, creating a visual and kinetic effect that blurs the boundary between the interior and exterior. The pavilion evokes a nascent forest, with gaps in the poles offering glimpses of the surrounding landscape. Inside, the scent of wood invites touch, and natural light filters through the central opening, casting changing shadows throughout the day. At night, the pavilion transforms into a sculptural lantern in the darkened garden.

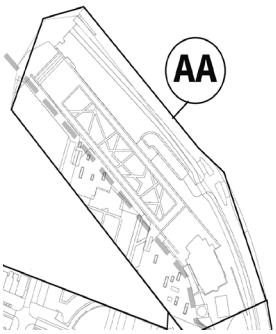
Image 44 and 45. Tea Leaves (Ledeboer, 2022)

Tea Leaves by Giuseppe Penone (2008) is an art installation featuring a simple room with dark brown walls, completed in 2008. Upon entering, visitors notice that the walls are lined with gabions filled with leaves. From a distance, the cages appear soft, resembling a room cushioned with pillows, evoking a sense of calm. As one moves further into the space, a subtle aroma of leaves fills the air, with the intensity of the scent changing based on proximity to the walls, creating a sensory gradient. In the center of the room, the smell is faint, offering just a hint of tea leaves, while getting closer to the walls reveals a more distinct and complex range of aromas, almost allowing one to imagine the taste. Overall, the experience is reminiscent of a serene autumn morning walk in the forest, where the scent of leaves and vegetation lingers in the foggy air.

Questionnaire



Sound



1 mechanical sound
2 society sound
3 human sound
4 nature sound

S direction

Locations of impressions

A B C D E

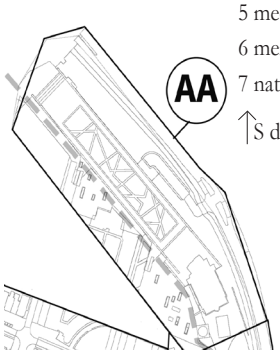
Silent — Busy

0 1 2 3 4 5 6 7

Pleasant — Unpleasant

0 1 2 3 4 5 6 7

Smell



5 mechanical smell
6 men produced
7 nature

S direction

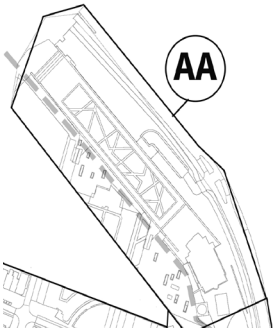
Locations of impressions

A B C D E

Pleasant — Unpleasant

0 1 2 3 4 5 6 7

Tactile



8 grass
9 hard pavement
10 leafs
11 gravel

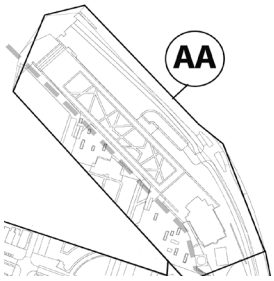
Locations of impressions

A B C D E

Pleasant — Unpleasant

0 1 2 3 4 5 6 7

Direction/ movement



12 mechanical
13 bikes
14 human

T direction

Slow — Fast

0 1 2 3 4 5 6 7

Not Busy — Busy

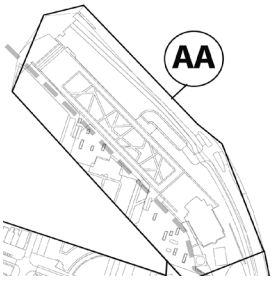
0 1 2 3 4 5 6 7

Pleasant — Unplesant

0 1 2 3 4 5 6 7

WHAT/ WHY?

Views



15
16
17
18
20

View N:

Pleasant — Unplesant

0 1 2 3 4 5 6 7

WHAT/ WHY?

View N:

Pleasant — Unplesant

0 1 2 3 4 5 6 7

WHAT/ WHY?

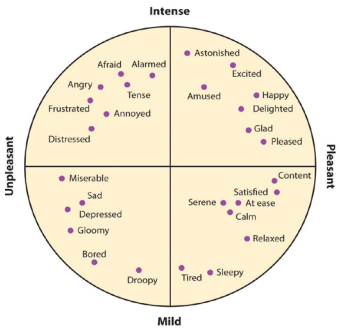
View N:

Pleasant — Unplesant

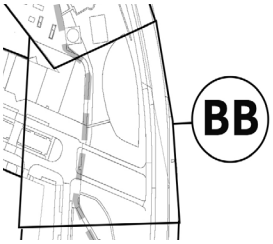
0 1 2 3 4 5 6 7

WHAT/ WHY?

Psychological preception. What and why?



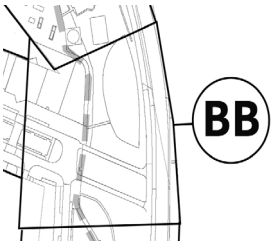
Sound



1 mechanical sound
2 society sound
3 human sound
4 nature sound

S direction

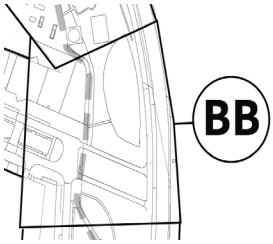
Smell



5 mechanical smell
6 men produced
7 nature

Sm direction

Tactile



8 grass
9 hard pavement
10 leafs
11 gravel

Locations of impressions

A B C D E

Locations of impressions

A B C D E

Locations of impressions

A B C D E

Silent — Busy

0 1 2 3 4 5 6 7

Pleasant — Unpleasant

0 1 2 3 4 5 6 7

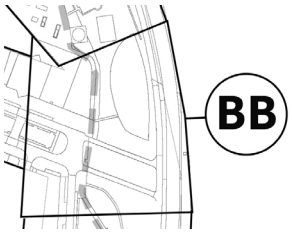
Pleasant — Unpleasant

0 1 2 3 4 5 6 7

Pleasant — Unpleasant

0 1 2 3 4 5 6 7

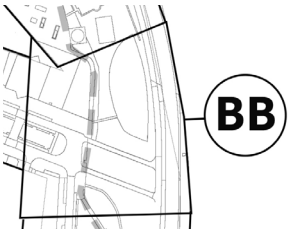
Direction/ movement



12 mechanical
13 bikes
14 human

T direction

Views



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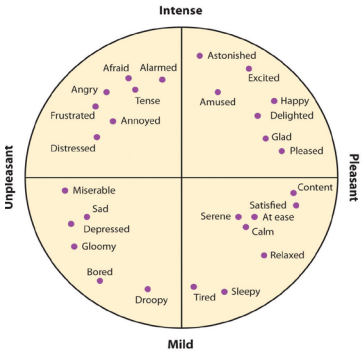
Psychological perception. What and why?



Locations of impressions

A B C D E

Slow — Fast

0 1 2 3 4 5 6 7

Not Busy — Busy

0 1 2 3 4 5 6 7

Pleasant — Unplesant

0 1 2 3 4 5 6 7

WHAT/ WHY?

View N:

Pleasant — Unplesant

0 1 2 3 4 5 6 7

WHAT/ WHY?

View N:

Pleasant — Unplesant

0 1 2 3 4 5 6 7

WHAT/ WHY?

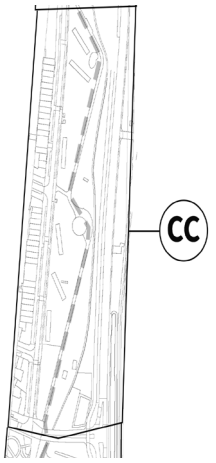
View N:

Pleasant — Unplesant

0 1 2 3 4 5 6 7

WHAT/ WHY?

Sound



1 mechanical sound
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3 human sound
4 nature sound

S direction

Locations of impressions

A B C D E

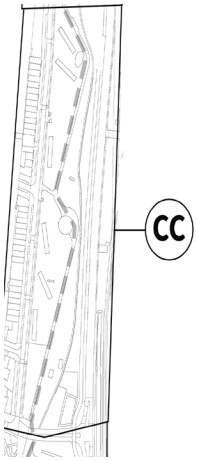
Silent — Busy

0 1 2 3 4 5 6 7

Pleasant — Unpleasant

0 1 2 3 4 5 6 7

Smell



5 mechanical smell
6 men produced
7 nature

Sm direction

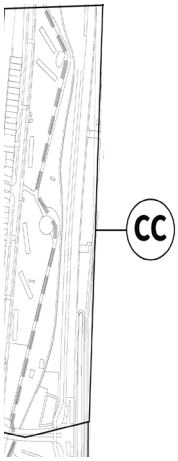
Locations of impressions

A B C D E

Pleasant — Unpleasant

0 1 2 3 4 5 6 7

Tactile



8 grass
9 hard pavement
10 leafs
11 garvel

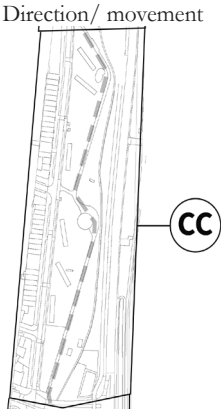
Locations of impressions

A B C D E

Pleasant — Unpleasant

0 1 2 3 4 5 6 7

Direction/ movement



12 mechanical
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T direction

Slow — Fast

0 1 2 3 4 5 6 7

Not Busy — Busy

0 1 2 3 4 5 6 7

Pleasant — Unpleasant

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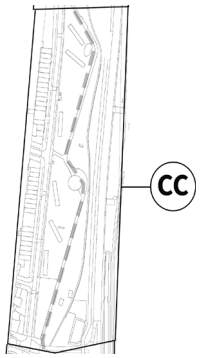
WHAT/ WHY?

Views



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View N:

Pleasant — Unpleasant

0 1 2 3 4 5 6 7

WHAT/ WHY?

View N:

Pleasant — Unpleasant

0 1 2 3 4 5 6 7

WHAT/ WHY?

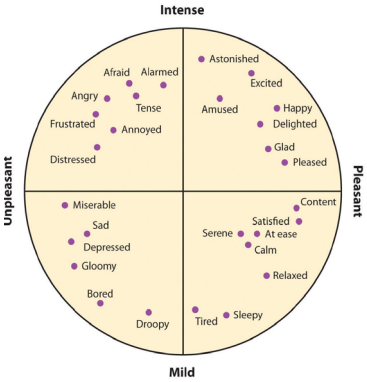
View N:

Pleasant — Unpleasant

0 1 2 3 4 5 6 7

WHAT/ WHY?

Psychological perception. What and why?



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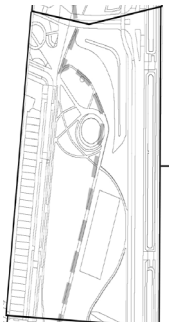
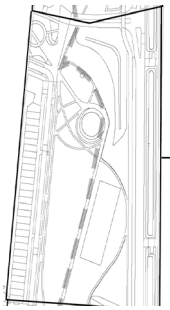


1 mechanical sound
2 society sound
3 human sound
4 nature sound

S direction

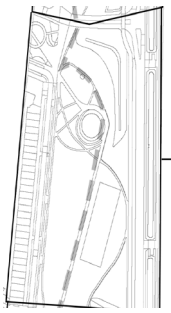
Smell



5 mechanical smell
6 men produced
7 nature

↑Sm direction

Tactile



8 grass
9 hard pavement
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Locations of impressions

A B C D E

Silent — Busy

0 1 2 3 4 5 6 7

Pleasant — Unpleasant

0 1 2 3 4 5 6 7

Locations of impressions

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Locations of impressions

A B C D E

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Pleasant — Unpleasant

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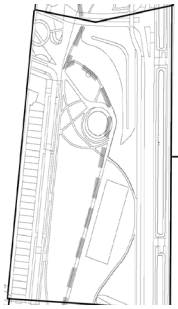
Direction/ movement



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13 bikes
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Not Busy — Busy

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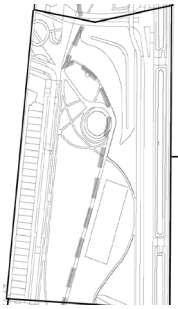
WHAT/ WHY?

Views



15
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View N:

Pleasant — Unpleasant

0 1 2 3 4 5 6 7

WHAT/ WHY?

View N:

Pleasant — Unpleasant

0 1 2 3 4 5 6 7

WHAT/ WHY?

View N:

Pleasant — Unpleasant

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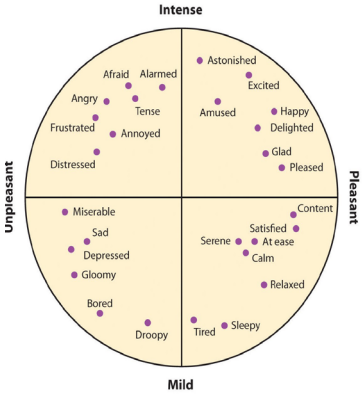
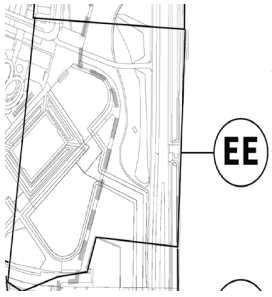
WHAT/ WHY?

Psychological perception. What and why?



WHAT/ WHY?

Sound



1 mechanical sound
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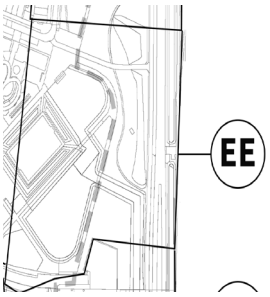
3 human sound
4 nature sound

S direction

Smell



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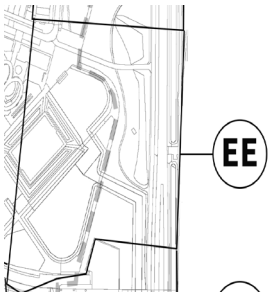
↑Sm direction

Tactile



8 grass
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11 garvel

A B C D E

Silent — Busy

0 1 2 3 4 5 6 7

A B C D E

Pleasant — Unplesant

0 1 2 3 4 5 6 7

A B C D E

Pleasant — Unplesant

0 1 2 3 4 5 6 7

Pleasant — Unplesant

0 1 2 3 4 5 6 7

Direction/ movement

12 mechanical
13 bikes
14 human

↑T direction

A B C D E

Slow — Fast

0 1 2 3 4 5 6 7

Not Busy — Busy

0 1 2 3 4 5 6 7

Pleasant — Unplesant

0 1 2 3 4 5 6 7

WHAT/ WHY?

Views

20
21
22
23
24
25
26
27

View N:

Pleasant — Unplesant

0 1 2 3 4 5 6 7

WHAT/ WHY?

View N:

Pleasant — Unplesant

0 1 2 3 4 5 6 7

WHAT/ WHY?

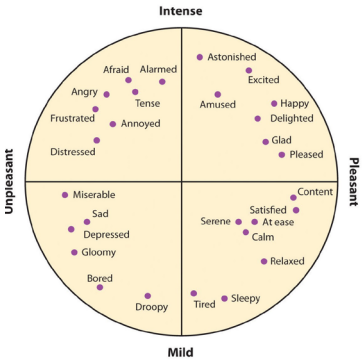
View N:

Pleasant — Unplesant

0 1 2 3 4 5 6 7

WHAT/ WHY?

Psychological preception



WHAT/ WHY?

Sound

1 mechanical sound
2 society sound
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S direction

Smell

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Sm direction

Tactile

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Silent Busy

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Pleasant Unplesant

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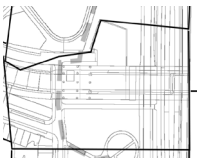
WHAT/ WHY?

Direction/ movement



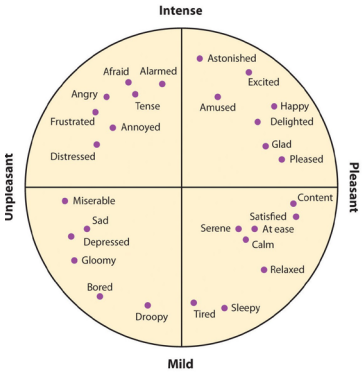
12 mechanical
13 bikes
14 human

T direction

Views

20
21
22
23
24
25
26
27

Psychological preception



WHAT/ WHY?

A B C D E

Slow Fast

0 1 2 3 4 5 6 7

Not Busy Busy

0 1 2 3 4 5 6 7

Pleasant Unplesant

0 1 2 3 4 5 6 7

WHAT/ WHY?

View N:

Pleasant Unplesant

0 1 2 3 4 5 6 7

WHAT/ WHY?

View N:

Pleasant Unplesant

0 1 2 3 4 5 6 7

WHAT/ WHY?

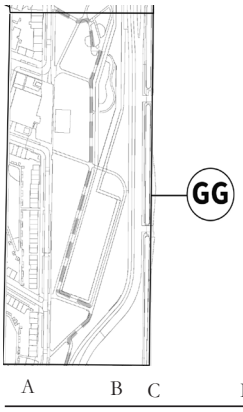
View N:

Pleasant Unplesant

0 1 2 3 4 5 6 7

WHAT/ WHY?

Sound



1 mechanical sound
2 society sound
3 human sound
4 nature sound

S direction

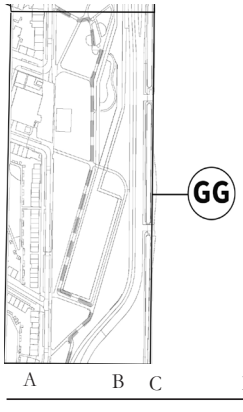
Silent — Busy

0 1 2 3 4 5 6 7

Pleasant — Unplesant

0 1 2 3 4 5 6 7

Smell



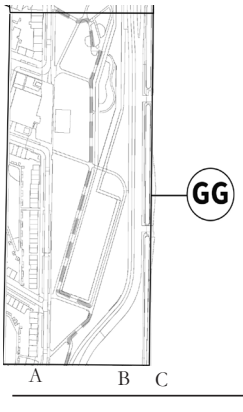
5 mechanical smell
6 men produced
7 nature

Sm direction

Pleasant — Unplesant

0 1 2 3 4 5 6 7

Tactile

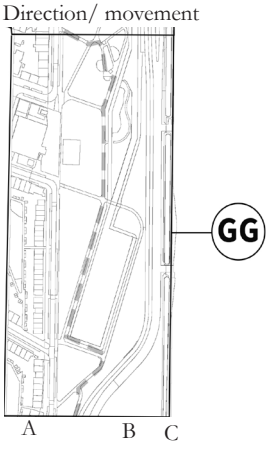


8 grass
9 hard pavement
10 leafs
11 garvel

Pleasant — Unplesant

0 1 2 3 4 5 6 7

Direction/ movement



12 mechanical
13 bikes
14 human

T direction

Slow — Fast

0 1 2 3 4 5 6 7

Not Busy — Busy

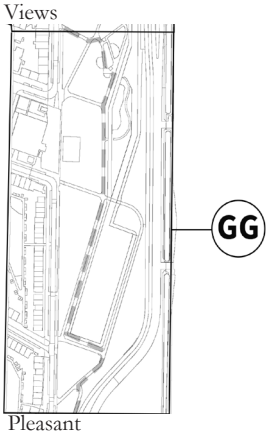
0 1 2 3 4 5 6 7

Pleasant — Unplesant

0 1 2 3 4 5 6 7

WHAT/ WHY?

Views



20
21
22
23
24
25
26
27

Pleasant — Unplesant

0 1 2 3 4 5 6 7

WHAT/ WHY?

View N:

Pleasant — Unplesant

0 1 2 3 4 5 6 7

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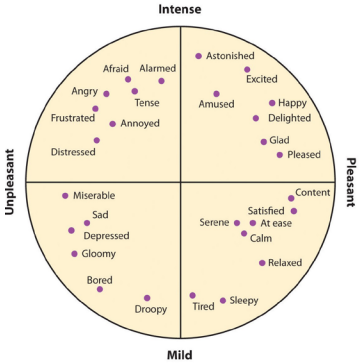
WHAT/ WHY?

Psychological preception



WHAT/ WHY?

Sound

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4 nature sound
S direction

Smell

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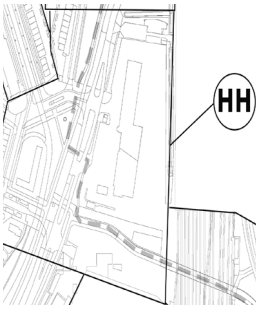
Sm direction

Tactile



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Pleasant — Unplesant

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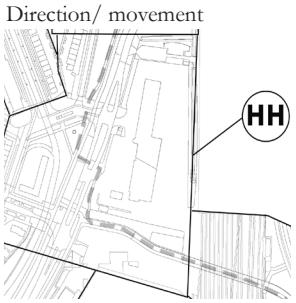
WHAT/ WHY?

WHAT/ WHY?

WHAT/ WHY?

Direction/ movement



12 mechanical
13 bikes
14 human
T direction

Views

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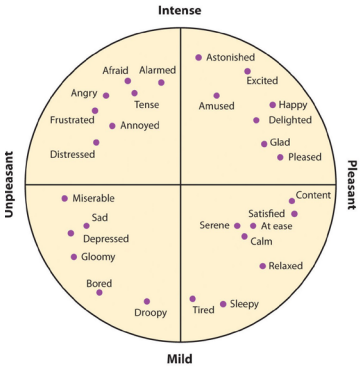
21
22
23
24
25
26
27

Psychological preception



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