

ICSS

The International Community 'Space' Station

Publicness and formation of a resilient and sustainable community
in a space habitat ○



Research: Quantifying factors of publicness in a city park in order
to recreate those in a habitat in outer space

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Abstract

The goal of this thesis is to propose a design for an orbital space station that incubates the future space civilization and is the base for space regulations and governance. A place that is democratizing access to space and resources, and allows for any interested individual to join and contribute to the world at large and their personal wellbeing. The goal is to design a place where a closely knitted community of makers, scientists, and artists is cultivated. They will be the decision-makers and the actors in space exploration.

To learn how to do that, initially, the thesis embarks on the research of some community aspects on Earth and the way public space contributes to their cultivation in our cities. Specifically, the focus of the study is to observe and analyze the function that Het Park in Rotterdam serves to people. It is a look into the congenial and human side of living in an industrialized world and the values this brings to the community. In space, that natural side will inevitably be different or non-existing and to maintain the values that nature and the park bring to our lives we need to develop a translated alternative. The goal is to add a playful and authentic element to a potentially very machine and virtual future in space.

After an introduction to the direction in which we have been heading since the industrial revolution, the research examines 4 major values taken from the park- social value, health, freedom, and engagement, to understand the importance of addressing the natural and human qualities. Those values are analyzed through park visits and sketches of people utilizing their environment and adapting it with simple means. Conclusively, the research highlights the importance of the presence of the public park in people's lives even if we forget it or do not notice it on a daily basis and it shows how such a place can strengthen the community and make people more caring and more respectful (Cohen, et. all 2006). It identifies which are the key elements that play a role in the value that the park brings to the citizens. Thus they can be taken and appropriated to the space environment and the space station design. This research is a continuation of a previous essay by the author - "Cohousing in 'Space' and Time".



Sketch of Het Park produced by the author as part of the research.

Relevance

The human in space - Why should we think about settling in space?

Our species has advanced from cavemen to a worldwide civilization for the past several hundred thousand years. We have gradually developed tools and methods to tame the wilderness in hot, dry, wet, and cold climates to make it safe and comfortable, as Gyorgy Kepes (1956, 18) phrased it - "In times of self-confidence, man was able to domesticate the world and gradually bring it into his human scale." Little did we know how our presence affects the environment. Once we felt sufficient confidence, as a result of industrialization and technological advancement, we took the next step and traveled beyond the atmosphere. A universe opened before our eyes and we saw more clearly than ever our place within it.

Since the beginning of the 20th-century, authors have dreamed of space settlements. Initially, a big part of the reasoning behind that was to strive for an ideal social structure; for example, 'The Red Star' by Alexander Bogdanov (Scharmen 2021). Some have sought expansionism and domination of the cosmos no matter the costs. During the Cold War, space was a place for military dominance. Many have seen it as a place to learn something and bring that knowledge to Earth and make it better. Now private companies want to monetize space resources. But also there is a large amount of scientific interest and a sense of adventure in space. Part of our curiosity is expressed in the desire for exploration, discovery, knowledge, and science. Earth is but a speck on a cosmic scale. Should we stay here forever?

As we bring space into our human scale, we will feel more comfortable going further. With increasingly larger and more complex space stations we are adapting to the way of life in outer space and we begin to grasp its vastness and hostility. It is the next continent to explore and settle. Gradually, the space habitat will become a settlement and people will stay for longer and they will define the future of how we live there. Based on this line of thinking this thesis assumes that the future of humanity is in space.

A cautionary tale - Why a creative community is desirable?

The industrial revolution brought forth endless expansion and innovation in all fields and sciences. Machine production for our machine-powered world has given ever more to us - more information, more tools, more medicine, more outreach, more understanding, more food, and more people. It was the key to completely dominating our planet. It does not stop now, we are excited about what the future might bring - space, metaverse, AI, and robots.

However, our welfare needs to have a source. Essentially, the planet is the food for our growth. The resources from under-, on-, and aboveground have been the lifeblood of industrialization. Their current exploitation is destroying habitats and whole ecosystems. We are depleting them at 1.7 times the rate that Earth can regenerate (Brooks 2021) and we would need 3.6 Earths if everyone lived like people in the Netherlands (Overshootday n.d.). Water and air become dangerous to humans due to wastage and contamination. Scores of forests and species disappear (fig.1). 'Non-renewable' resources will become scarce eventually (Brooks 2021).

As our planet begins to be not enough to capture our imagination and dreams, some begin to look to the vastness of space for the next step to expansion. On Earth we now strive to correct the impact we have had on the environment, but who do we want to be when we venture out there? Colonizers and an ever hungry for resources machine? This thesis argues that what should not happen on Earth also should not happen in space. There are many regulations protecting outer space ecosystems and



Figure 1 The Río Huaypetue gold mine in Peru damage to the environment (Butler 2014).

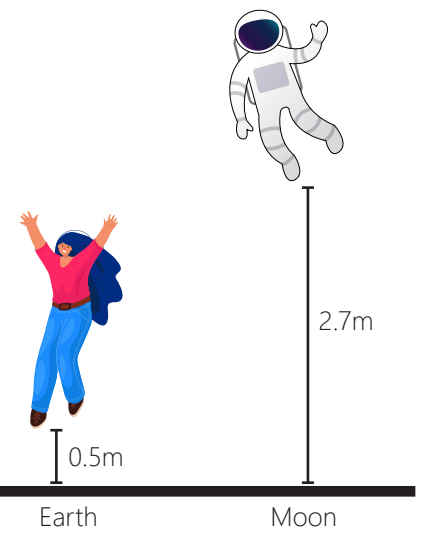


Figure 2 Comparison of the average height to which a person can jump on Earth and on the Moon. On Earth, a person can jump to 0.5m and on the Moon to 2.7m (Bright Side 2021). This shows that, for example, staircases in the two situations do not need to be the same.



Figure 3 Moon village design for the 2021 Venice Architecture Biennale by SOM (Ghinitoiu 2021). It features a spiral staircase with a riser same as on Earth, while the gravity on the Moon is significantly lower.



Figure 4 The three timeframes of space travel.

scientists are conscious of what impact we might have. Yet, as commercial interest grows, regulations are dropped to allow for opportunities and growth (Goguichvili, Linenberger, and Gillette 2021). If expansion is left to personal interest and the same mentality that led to the corrosion of Earth then the result will be the same (Hardin 2001). We need to provide an alternative model.

A creative multidisciplinary community is diverse and collaborative. It creates incentives for helping others and contributing to the greater good. Any specialty or level of education is appropriate and desirable in such a community as this increases the objectivity of the masses. For example, life in a cohousing often runs smoothly and people report a high level of support from other residents (McCamant, Durrett, and McKibben 2019). Today we see a tendency to cherish one's community whether it is online or physical. This thesis is based on the idea that a close community of artists, makers, and scientists is a functional and good place for self-regulation and a responsible attitude toward the outside world. Thus the regulation of how we expand into space has to come from the structure of how we coexist there in order for every individual to act sensibly.

The architect in space - What value can we add as architects to the current space station design?

Architects have already begun investigating designs of alien typologies beyond Earth. There are two challenges with those proposals. Firstly, the more thoroughly researched ones are based exclusively on planetary surfaces, either the Moon or Mars. This is practical because of the local soil's mass for protection against lethal radiation and the available in situ materials for construction and life support. However, it is more expensive and harder to escape their gravitational wells and there is no guarantee that the gravity is enough to keep the human body healthy (Jones 2021). Secondly, the proposals predominantly suggest an outer shell with an obscure volume and later populate the interior with a regular layout and program that is identical to those on Earth (fig.2, fig.3). This does not take into account human factors in relation to isolation, enclosure, and reduced gravity, or, at least, are not communicated explicitly in resources.

Outer space is a harsh environment, yet in its function, it is ultimately undefined. There are no established typologies or styles. This gives the opportunity for architects to begin thinking about space habitats with the human as the center of the design. The design process can be entirely from the inside out or as we would say on Earth - 'bottom-up'. This research proposes a design approach that has the human and their experience as a starting point. In an isolated and extreme environment, the need for social interactions and recreation become vital to the mental health of people. To learn how to do that, human experience on Earth is interrogated - the interaction with nature in a public park and the tools we use in that environment to rejuvenate and replenish our spirit.

The current space habitat where people coexist for a significant period (6 months at a time) is the International Space Station with a habitable volume of 388m³ (Garcia 2021) (fig. 5). We can classify space settlements according to three timeframes - short (10 days), medium (6 months), and long term (1 year and more). To imagine what that means, for the level of comfort we can picture a camping trip and the amount of stuff we will need to bring with us for each of these timeframes (MIT 2022) (fig.4). People can bare a certain amount of discomfort for a given amount of time - the longer they stay the more critical it is to address all annoyances. If we build a settlement for people to occupy for 5 years, it would have to feel like home (Connors, Harrison, and Akins 1985, 82-85). It would have to suit both the basic needs of residents and provide numerous leisure activities that will form communal life. What would those activities be and how might we begin to define the conditions required for them to occur in outer space? How would they differ from the ones on Earth, if they are not justified by culture or context?



Figure 6 The three levels of space station design.

When designing a space station for a long stay there are three levels of systems that need to exist (Hauptlik-Meusburger and Bannova 2016, 12-13; MIT 2022) (fig.6):

1. Life support systems - air, water, waste, and food.
2. Basic human needs - safety, hygiene, and a place to sleep.
3. Self-actualization - crew psychology, public and private, leisure, and comforts.

The International Space Station covers only the first two levels. It was designed and built by engineers to be compact and as easy as possible to assemble. A space station that is for long-term stay will have level three of those requirements equally important as the others (Connors, Harrison, and Akins 1985). This is where architects have to be involved in the process in the same way we are involved in constructing buildings on Earth. As architects, we grapple with big questions for the past, present, and future of humanity. We put people at the forefront of our thinking. Wherever people go architects follow to construct the environment to be inhabited.

There is more to be gained from architects designing for space. As we know, a new place with new constraints opens our minds to new ways of approaching a topic or problem. We might question norms and rules that are followed here on Earth. For example, if we do not walk in microgravity, why do we need floors? Simple situations in outer space might have many thought-provoking conundrums that will stretch our perception of what is vital to us, our values, and, ultimately, how we do architecture here on Earth. Space architecture perhaps could be of greatest interest to the research of two major streams of thought - the human-machine interaction and the human-environment interaction. On one hand, there is the space station's shell and services- a habitat machine, a living organism, built into the nothingness of space. It will be the epitome of smart living and the eventual consequence of our attempts to make our smart homes and cities here on Earth. On the other hand, is the human utilizing their environment created within the space station and the purposeful designing of that environment for positive affordance. The question of how the body occupies its setting in different gravity levels than the one on Earth is essential to designing an efficient habitat that supports a person's health and comfort. This research focuses on the second of the two major topics identified here although they are related.

Formation of a strong community in space.

In order to give form to an environment for people in outer space, where there is no context, we can begin by thinking about the personal experience of a resident of a future colony. What might they need if they live there for five years at a time apart from the essential life support systems? Probably that person would expect to be able to enjoy a similarly comfortable life as they did here on Earth. A balanced fulfillment of duties and relaxation is the way we normally spend our days. Daily habits and rituals are important to us. Atelier Bow-Wow has a particularly clear way of understanding everyday life in their book Behaviorology (Tsukamoto and Momoyo 2012, 9-10). Tracing back the fundamentals of human behavior is important when we try to create a place for living from nothing. In this study, we focus on public space and the public park in cities. This falls within the social and communal part of self-actualization. It is a place that is part of daily life and can bring people together to form tighter and stronger communities.

One of the main goals of this project is to propose a place for the development of a self-regulating and responsible community of makers, artists, and scientists. It is not an easy task to artificially design a place where a strong community can form. The HI-SEAS program in Hawaii which places six volunteers in a closed environment (two story dome with a diameter of 33 steps) for a year to simulate life on Mars

Figure 5 Astronaut on the International Space Station (n.d. 2020).

(fig. 7) reveals that people need more than basic life support to form a strong community. The podcast 'The Habitat', which documents the life of one crew over the whole year, reveals that with small living conditions and lack of diversity people begin to turn on each other (Levy 2018). They want to have a place to be alone sometimes, an opportunity to learn a new skill, or a change in their schedule. There needs to be more than a place to sleep and work if people are to live there for five years, which is the target for this project's space station design. Consequently, the qualities that make people want to stay for longer in space will also be the basis for the development of a responsible self-regulating community.

The public park is one of the first steps from a city to the wider environment at our disposal on Earth. It is outdoors and brings wildlife and biodiversity to the city. Communities evolve around it. It houses a vast range of activities and can be adapted to many uses. The park instills calmness that rejuvenates us by reducing anger, stress, and anxiety (The Trust for Public Land 2006). Our built environment is enriched by it. With so many positive aspects, what values could be translated from the park to a space station? The goal of this thesis is to study the human experience in a public park in order to create an artificial environment that yields similar benefits.



Figure 7 The dome where 6 people spend 1 year isolated from the world (HI-SEAS 2015).

Research question

What social values does the park as a public space bring to the community and how could those values be translated to outer space?

How does a public park strengthen the bond between people? How does it stimulate recreation? What value does the park bring to the social and communal life of people? What entities from the park cultivate those values? How do the park's features foster communal strengthening?

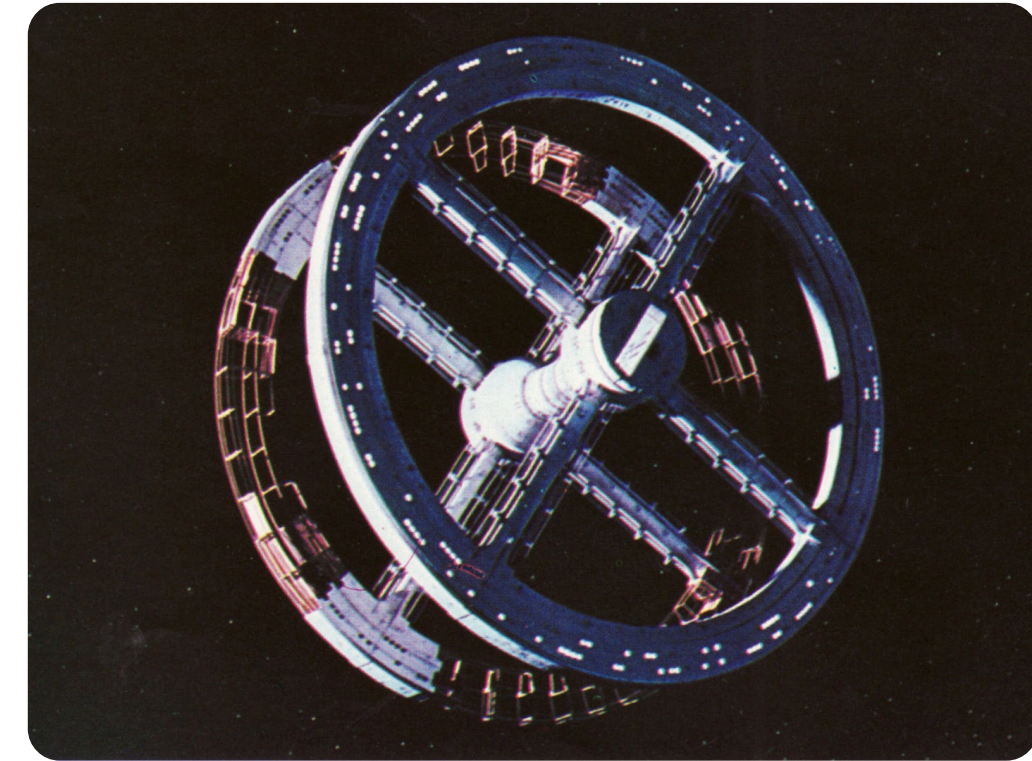


Figure 8 (Above) *Discovery One. Featured in the movie 2001: A Space Odyssey. (Kubrick 1968).*

Figure 9 (Below) *Het Park, Rotterdam. (by author)*

Frame and background

From machine to architecture

Differences in the design criteria from Earth make architecture in space a challenging task. There is no context, especially if designing an orbital space station, there is only nothingness, apart from the basic survival requirements. Once those are dealt with, it is similar to attempting to redesign life. Balancing between physical constraints and design ideology resembles what we do when designing on Earth but we are far less familiar with the space environment and the sources of inspiration are limited. Hardly anything is brought to mind intuitively. Where do we begin the process?

Historically, there is an example when architecture had to be reimagined based not on place or culture but on other criteria. 20th-century avant-garde art and architecture in the machine context of the Industrial revolution. The classical model for art and architecture became nonrepresentative of the change in the social and demographic conditions (Artists Network Staff, n.d.). At the time, art movements questioned and reimagined the aesthetics, scale, ornament, form, and function of architecture and art. After an initial nostalgic grip of the past, the arts slowly explored ways of expressing the spirit of the industry-oriented society (Artists Network Staff, n.d.). In that context, the human body was seen as part of the masses, as a unit. In the common everyday workers' life was what architecture should be about - clean and functional.

Mechanization of the world dominated all facets of life, changing norms and status quo. Designers slowly learned how to use the new methods for production and out of their work with new materials came a new look for our homes (Giedion 1969, 489-507). It was derived from the way factories manufactured products along an assembly line, instead of simply attempting to mimic old ornaments and forms. Since factories reproduce large quantities of the same objects, architecture everywhere could look the same. It only had to serve well the functions for which it was designed.

The human body was the focus of the study for functionality and efficiency (fig.13). Chairs, airplane cockpits, kitchens, and other spaces or objects were based on basic human ergonomics. The body was studied in motion as well as in rest. It was traced in its movements in order to map patterns and devise efficient user-oriented experiences. Étienne-Jules Marey's methods for photographing and mapping bodies in motion benefited our understanding of how to do that (fig.12). Studies of movements became what factories needed to optimize their production lines and increase output (Giedion 1969, 32).

The strive for functionality was implemented into every aspect of living. The 'Frankfurt kitchen' by Margarete Schütte-Lihotzky was an outcome of the analysis of the workflow in the kitchen (fig.10), which was then translated to an arrangement of the hardware and appliances to reduce the movements required (Bois 2020). Ernst Neufert and others in Bauhaus sought the human scale in all its typical activities in daily life and the use of furniture and architecture and devised the Architects' Data, which is used until today as a rule of thumb (fig.11) (Neufert 1936). This has become the standard for architecture throughout the world based on living in a mechanized society.

Interestingly, at that time there was also a focus on combining the skills and imagination of various specialties as in this project. Bauhaus represented a fundamental step toward the practice of architecture today. The collectivization of people was also the union between architects, artists, and craftsmen. With common thinking, they would be able to design the whole spectrum of modern life - imagery, objects, furniture, and architecture (Gropius 1919). That ambition led to the question of the place of people in their environment both physically and consciously. This project has several overlaps with Bauhaus and its goals. Today we strive to combine skills and empower anyone to be their own maker and creator.

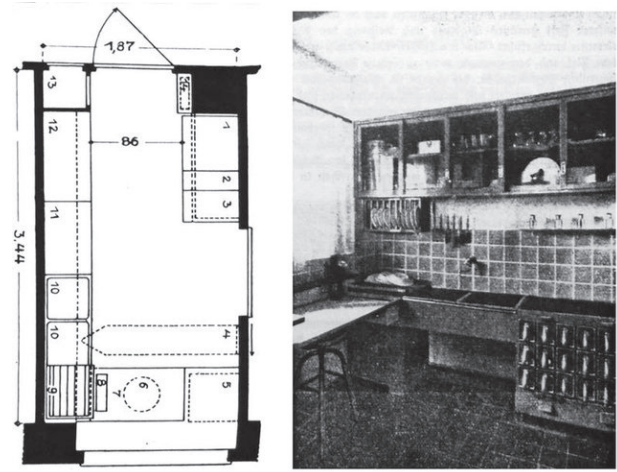


Figure 10 The Frankfurt kitchen (Schütte-Lihotzky 1926)

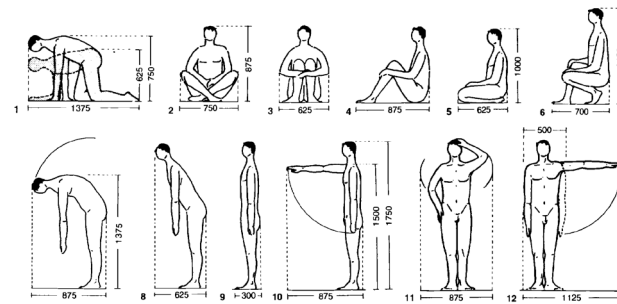


Figure 11 Body measurements (Neufert 1936, 9)

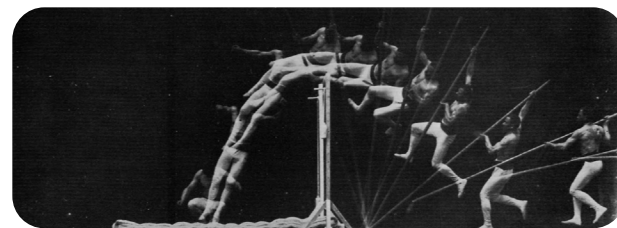


Figure 12 A man jumping over an obstacle (Marey 1890)

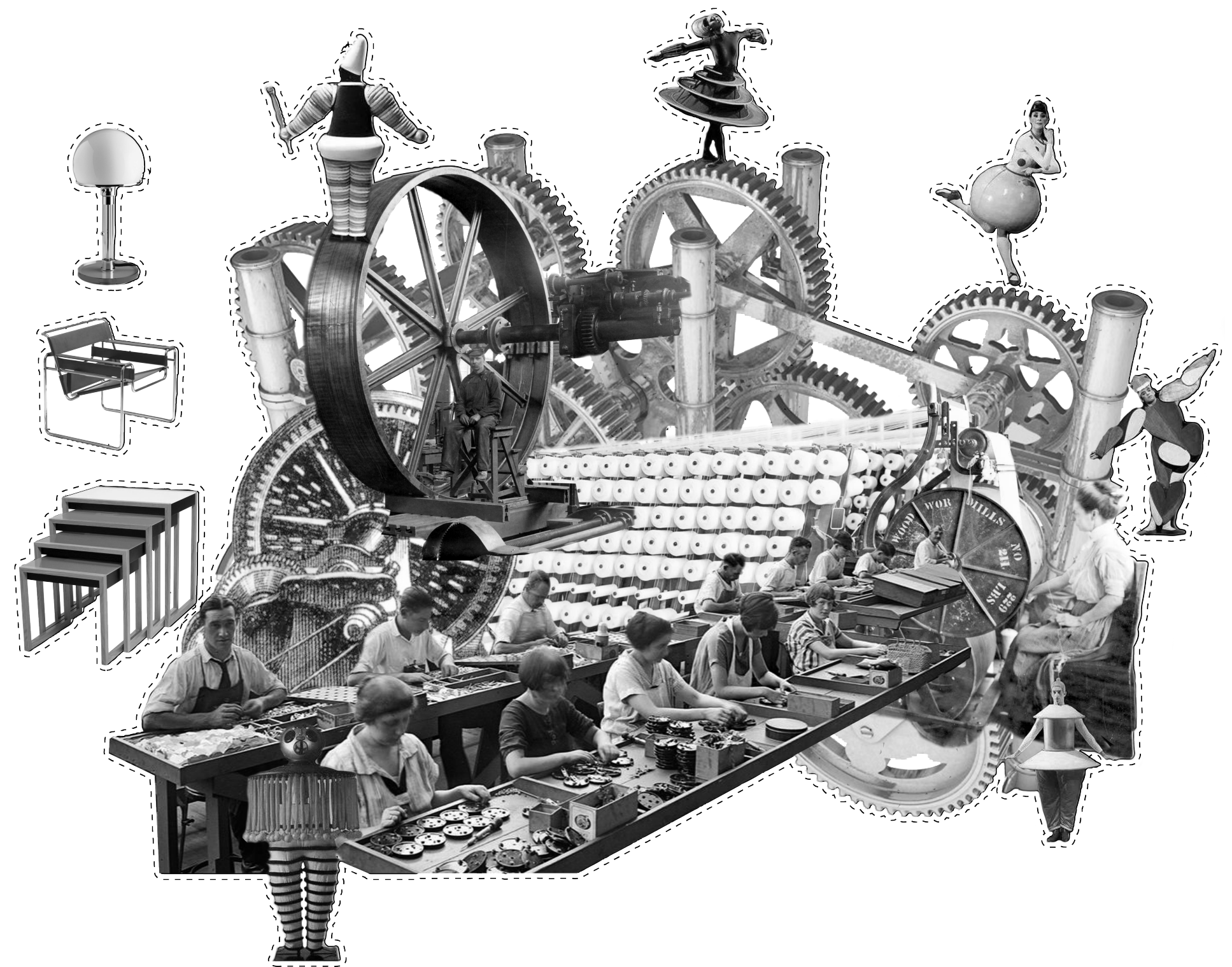


Figure 13 Collage showing the character of the Industrial Revolution and aspects of what the response of artists and architects was to the new worlds. (by author)

From rigid to free

However, here we try to distance ourselves from modernist architecture. The next stage of our development doesn't have to be rigid, clean, and impersonal. New forms of robotic manufacturing and smart cities allow us to be more natural, human, and flexible. Oskar Schlemmer's theatre work portrays robot- or doll-like masks and costumes that were inspired by the industrial period. The dances in the Triadic ballet were also inhuman (Triadisches Ballett von Oskar Schlemmer 2013). Schlemmer took these ideas as inspiration for his costume design. He abstracted the body in proportions, form, and movement to challenge the perception of how we inhabit our machine surroundings (Schlemmer et. all, 1961, 17-19). He used the cubical and oval forms to outline the different parts of the body (fig.14) and exhibit their proportions. Through these methods, Schlemmer expressed his view of people in the industrial age, the new look, and the style of regularity and repetition. From today's perspective, we see how the costumes and movements of the actors on stage are so inhuman and restrictive that they are devoid of life and excitement. This thesis aims to produce an approach to redesigning life in space that is more playful and more innate to human nature.

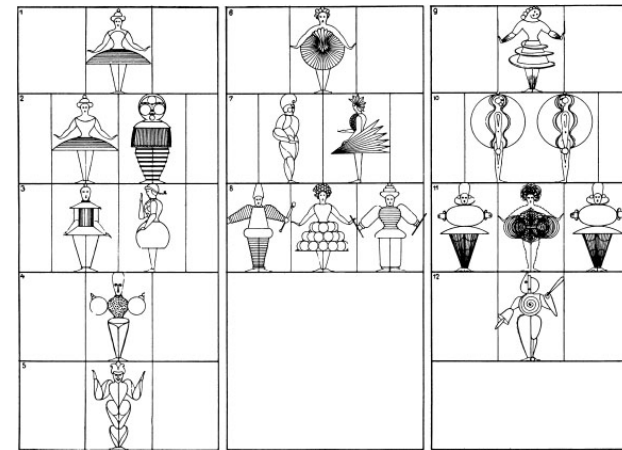


Figure 14 Abstract of the triadic ballet (Schlemmer 1961).

A field of research has been done using James Gibson's (1986) 'The Ecological Approach to Visual Perception' as a basis for affordance study of environments in which we operate. It sees the relationship of the person to its surroundings as inseparable. The study of the way people can take advantage of objects goes beyond the purely single purpose, 'perfect design', according to a single size measurement of the body (Souza 2020). Partly the argument stems from the fact that the standardized body type, used for measuring how tall a chair should be, does not communicate the variety of the body's shapes and sizes and because the human imagination can invent ways of using something that has no specific form. Environmental affordance focuses on the surroundings and the opportunities it can provide to us. Thus the design directive of the concept comes from a test and evaluation process, rather than perfect measurements (fig.15).

This research attempts to focus on a fundamental starting point for thinking about a new way of living not only in outer space but also on Earth. It explores the human body and its environment to extract spatial insights. Contrary to what has been the fascination of Étienne-Jules Marey, Ernst Neufert, and others from the end of the 19th and early 20th century, here the human experience is studied in the public park and the features that allow for that are extracted as concepts for design and not as specific objects. Our presence in our surroundings is what defines them for us and what gives them meaning. Thus we aim to satisfy the human condition because the human inside the machine is still a human and we ought to keep returning to the innate qualities of life.



Figure 15 A classical example of environmental affordance-inspired architecture (RAAF 2014).

Research methodology

The research focuses on a specific public park in the Netherlands - Het Park, Rotterdam. There, on several occasions, recordings were made of how people utilize the park. Thus, the role of the different entities in the park is analyzed.

To provide context for this research and the specificity of the place, the variables of each visit day will be noted down - temperature, weather, day of the week, and others (this information can be found in the appendix). Those are important because they influence the behavior of people in general; for example, if it rains, people would be avoiding sitting on benches that are in the rain. All activities that have been seen happening in the park at the time of the visit will also be listed, building a profile of the popularity of the park, which influences how comfortable one might be when sitting there; a place dominated by antisocial behavior is less of a relaxing environment for some.

In order to find out how the park helps the formation of a resilient community, examples of how the park in Rotterdam affects public life and the opportunities it provides to its residents are interrogated. This process is realized through four focus values that split the research into chapters:

1. Social value
2. Health and rejuvenation
3. Freedom
4. Engagement

Through sketches of people and the park, attention can be brought to the tools that a park harnesses to achieve those values. For example, if health, activity, and rejuvenation are helped by the aesthetics of the park, then those are pointed out as important aspects to be taken into account for that goal. Some of the types of tools are spatial arrangements, social concepts, objects, and holistic scenes. The entities for friendliness and community building are the cafe, the shared paths that criss-cross, and other aspects that provide opportunities for people to mingle.

The structure of the research has been divided into three steps for each identified chapter. On the first level, are highlighted the values that are sought. On the second, the action, events, or situations, in which these values can be observed, are depicted in sketches and annotated. On the third, the necessary entities from the park that empower those activities are explained. They are extracted as concepts and qualities rather than specific objects since in space architecture reproducing some physical subjects would be impractical with near-future technologies. The research is focused on observing and recording the moments people have with those 'tools'. The goal is to portray natural human habits and daily life.

Due to the chosen location for the research, there are several limitations. The geographical region presupposes that sunny days would be extremely popular in the park because of the otherwise frequent rainy weather. Other places with various climates might have significantly different ways of using a public park. Cultural and religious differences between countries would also create significant variety. This thesis is limited by the location which is available and convenient to be reached. Thus, the conclusions drawn in the end are specific to the Netherlands.

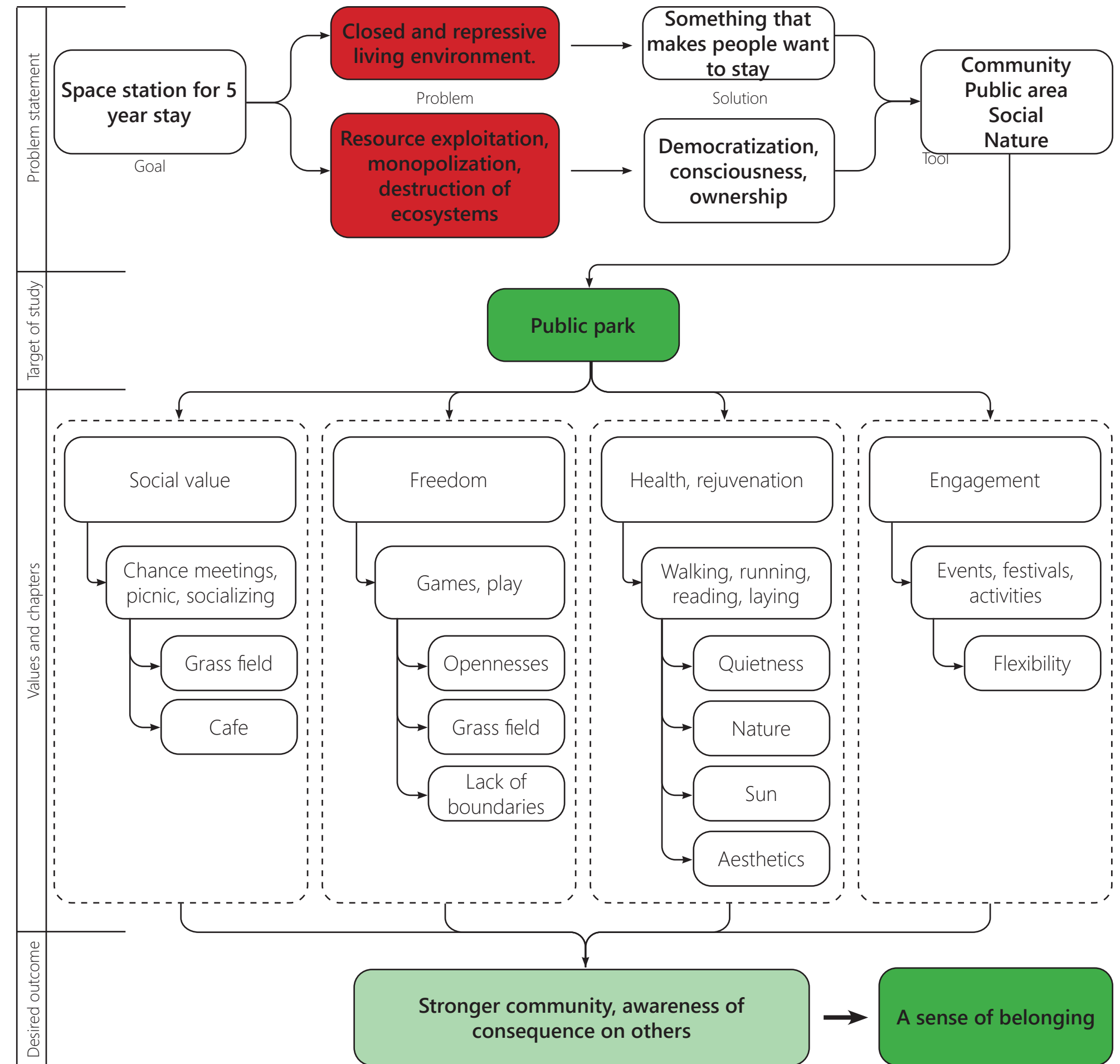
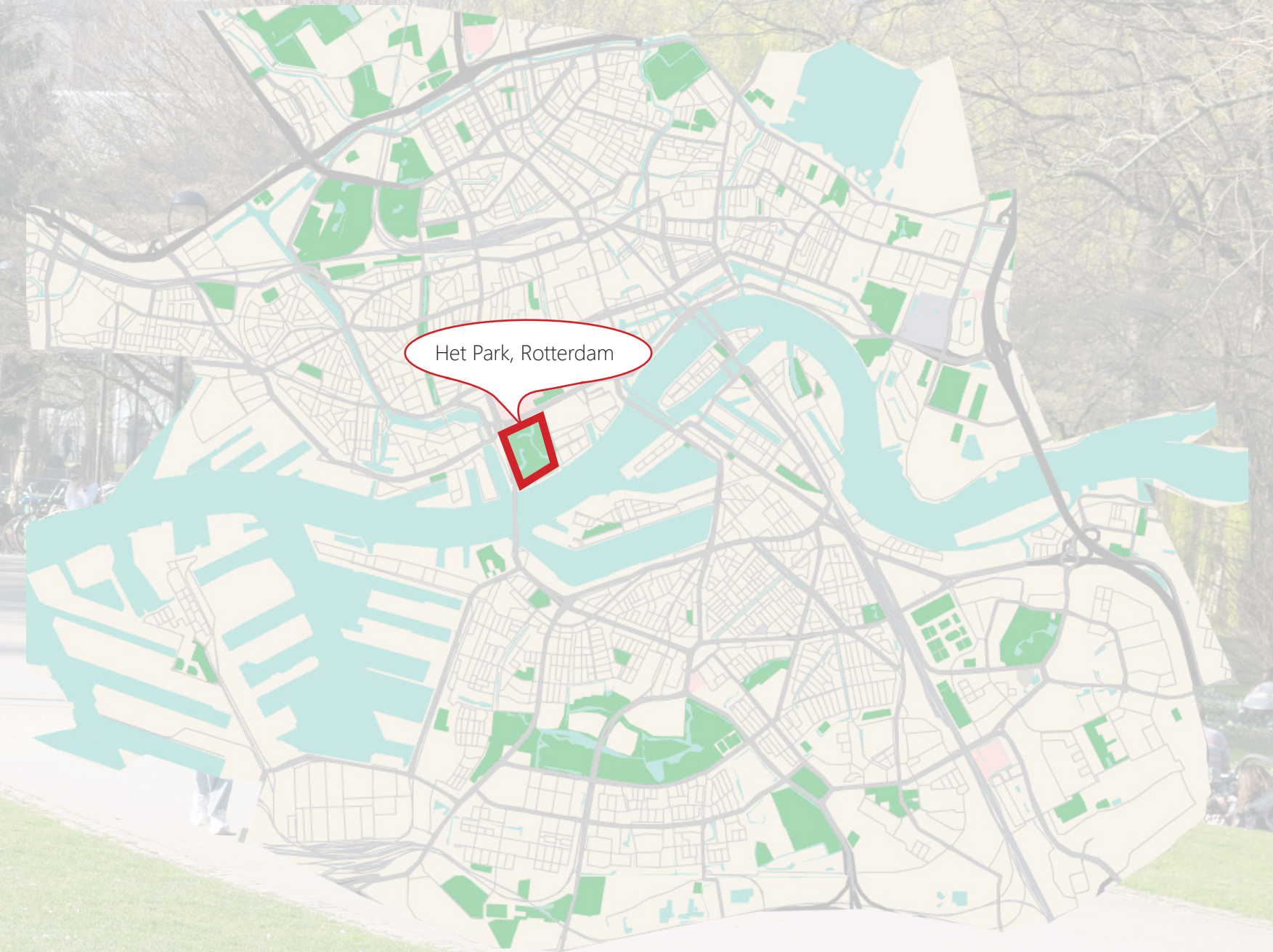


Diagram 1 Methodology

This diagram shows the process and goal of the methodology for the research. It is structured into four chapters that classify the values that we are looking for in the park. Each value has been broken down into what facilitates it in the specific example of Het Park, Rotterdam.

Het Park, Rotterdam

One of the main public parks in Rotterdam. Opposite Kunsthal and Erasmus hospital, it is in a central location and is an integral part of city life.





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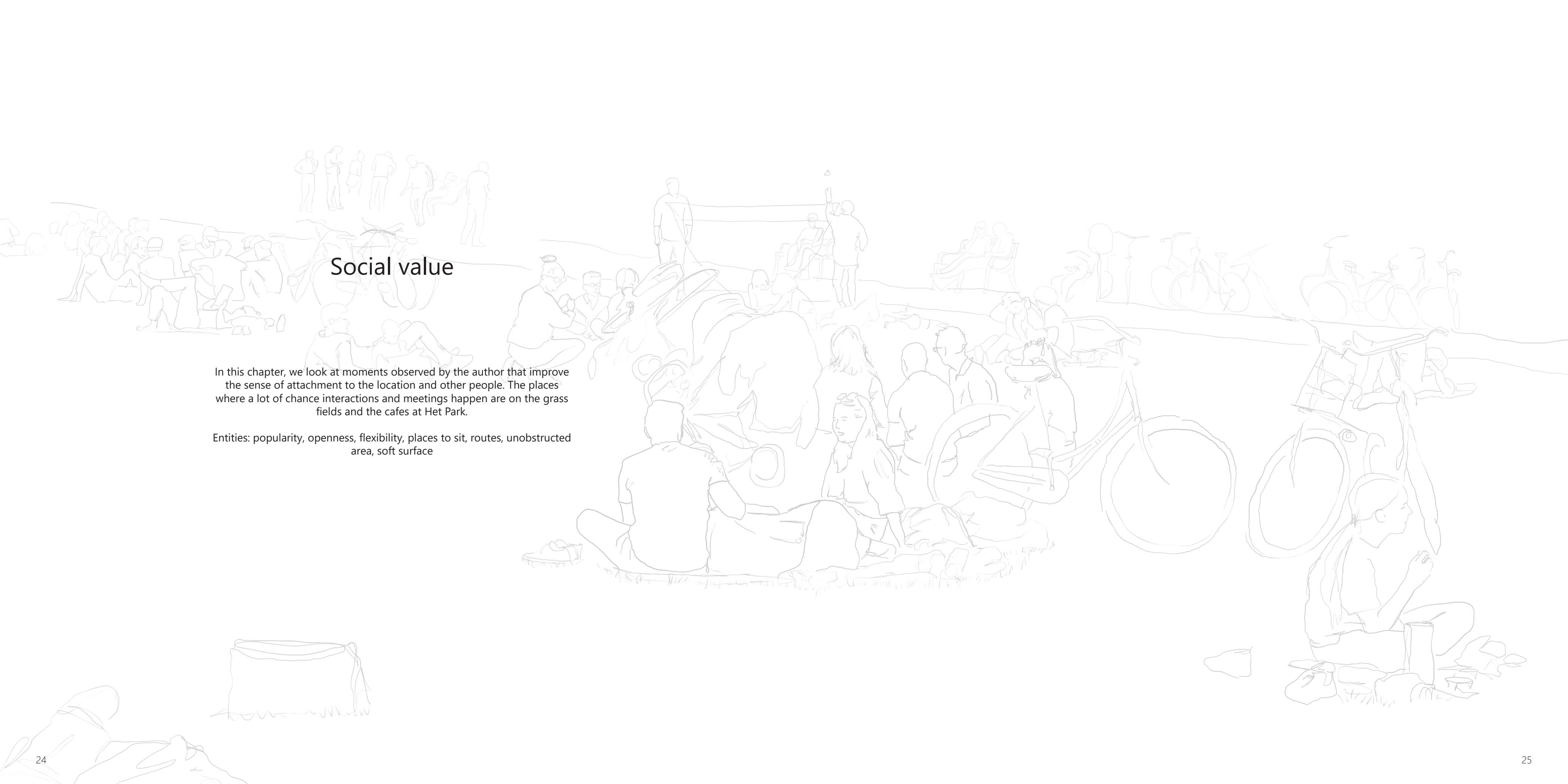
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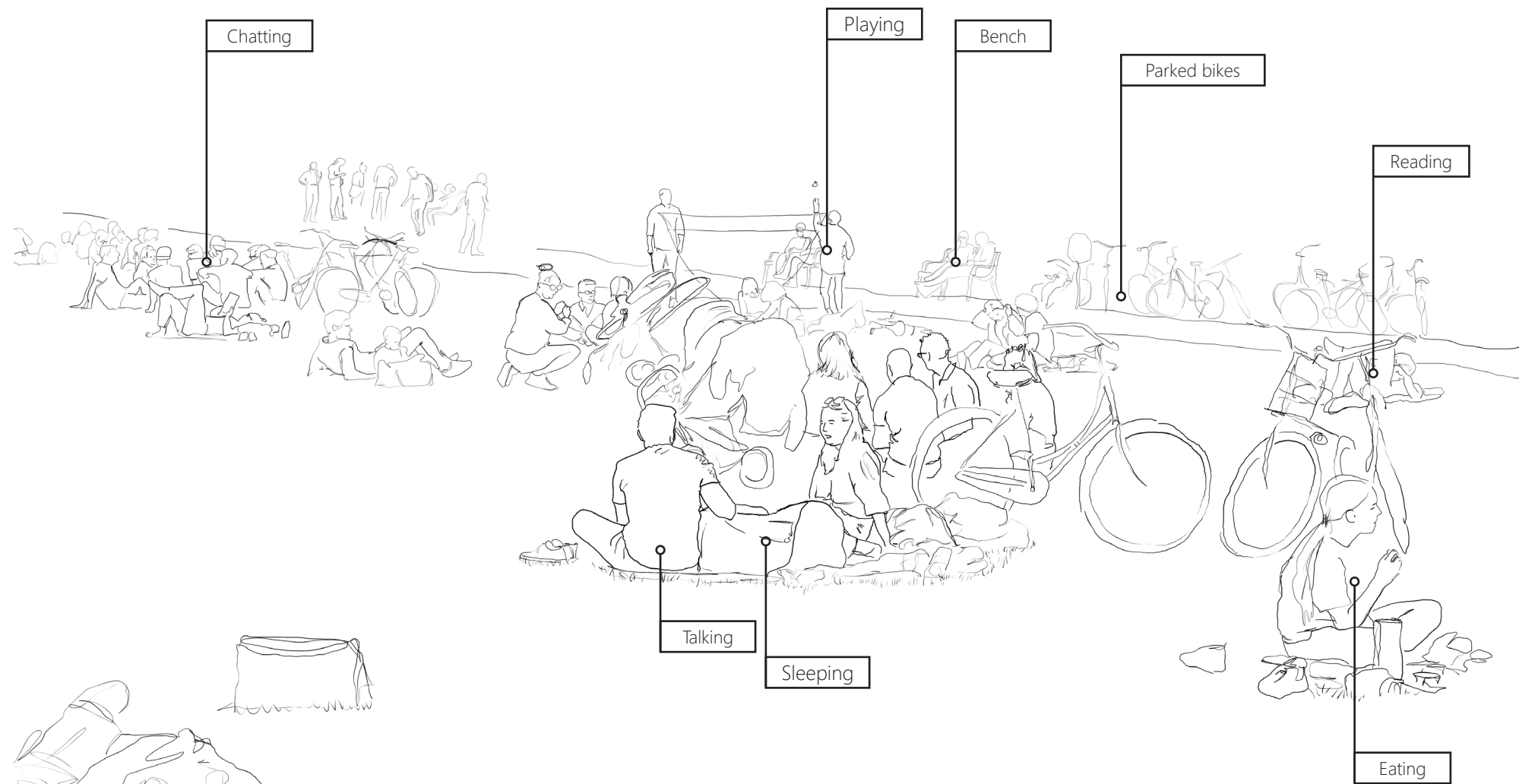
Social value

In this chapter, we look at moments observed by the author that improve the sense of attachment to the location and other people. The places where a lot of chance interactions and meetings happen are on the grass fields and the cafes at Het Park.

Entities: popularity, openness, flexibility, places to sit, routes, unobstructed area, soft surface

It has been found that public parks strengthen the bond that people have with the local communities. In spending time close to other people and doing similar activities, even without directly engaging in interactions, one begins to feel attached to their fellow citizens. It "fosters an appreciation for diversity" (Walker n.d.). The multitude of activities that can be done in open spaces are an indication of the value of the park. Without specifically designing for it, a field of grass can be used for sitting and laying down in various positions. Eating, conversing, playing games, and reading are only a few of the activities that can happen all at the same time. People's imagination is the creator of opportunities.

01. A view of one of the most central fields in Het Park. People can be seen engaging in many different activities within the same space.



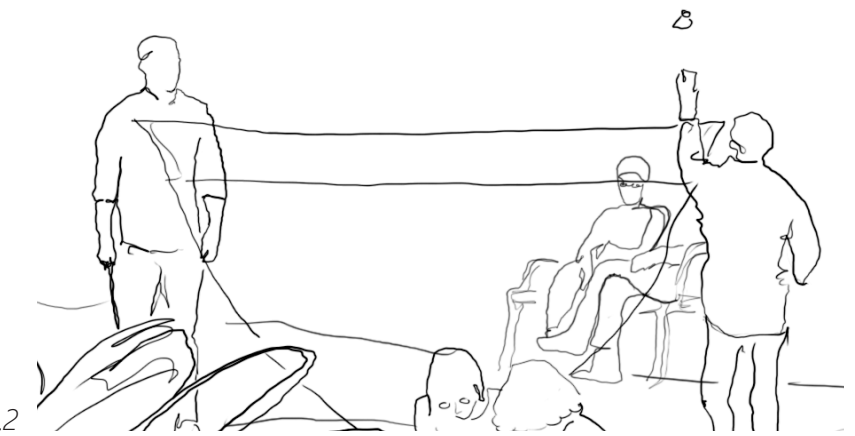
With this free and relaxed closeness among people, the park has strong advantages over other public spaces in the city. The constructed and hard paved areas come with their expectations of behavior. They presuppose a certain dynamic of social life. Contrary, the park has the ability to free our minds and make us comfortable to act in the way that suits us individually.

Even then, order and respect for the rest of the people are present even though it is unspoken. Citizens have said that they are likely to interact with others when they are in the park (Cohen, et. all 2006). One kind gesture begets another. One would collect diligently their trash without being told specifically by a sign or a guard. The opportunity that an empty field presents to people is an example of environmental affordance and how we interpret and adapt to utilize something from our environment.

For the park to be a popular place there needs to be more aspects than simply an open area. Pleasant and warm weather, preferably with sun, attracts the most people. Also being accessible and not too far from the residential areas and other functions of the city are important so that people do not have to travel far. Thus residents might stop by the park even if they do not have so much free time available. This ensures a larger number of visitors which creates a sense of popularity and this attracts even more people.



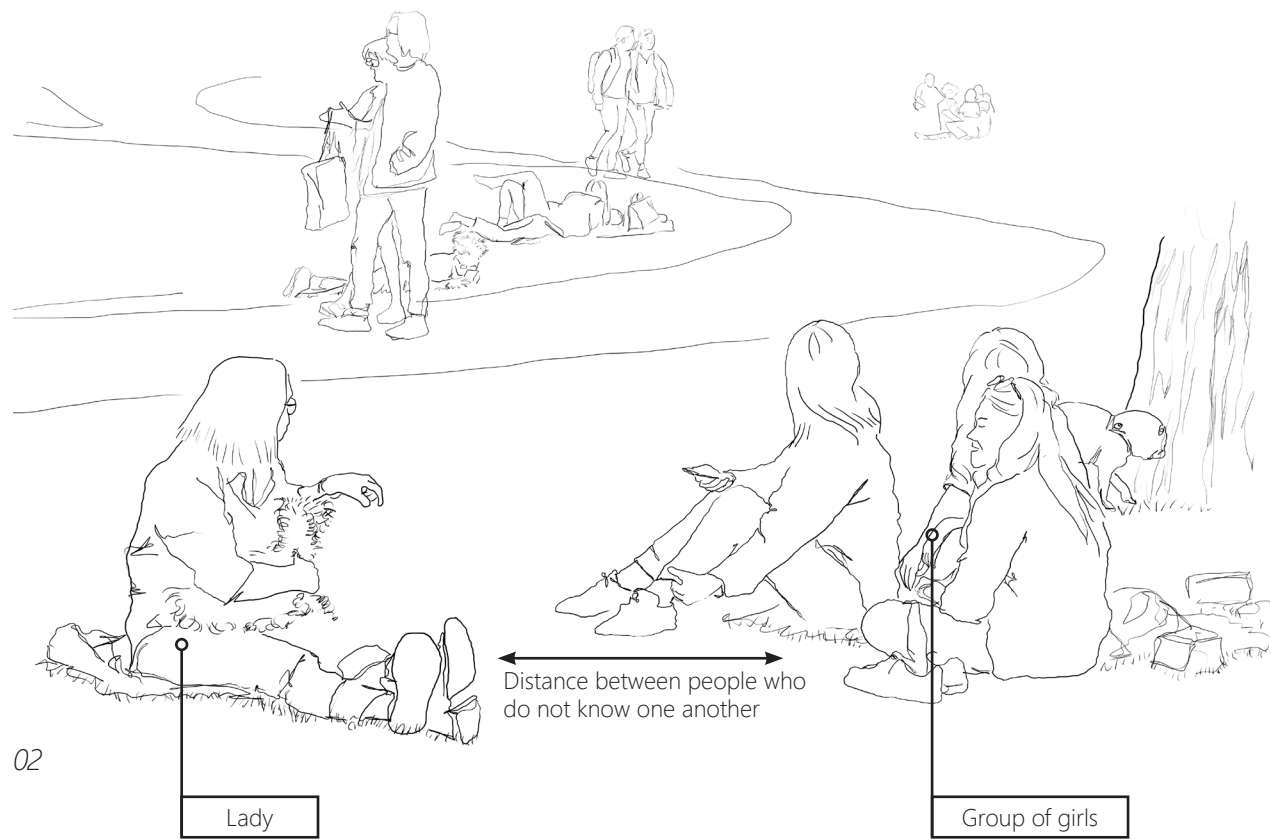
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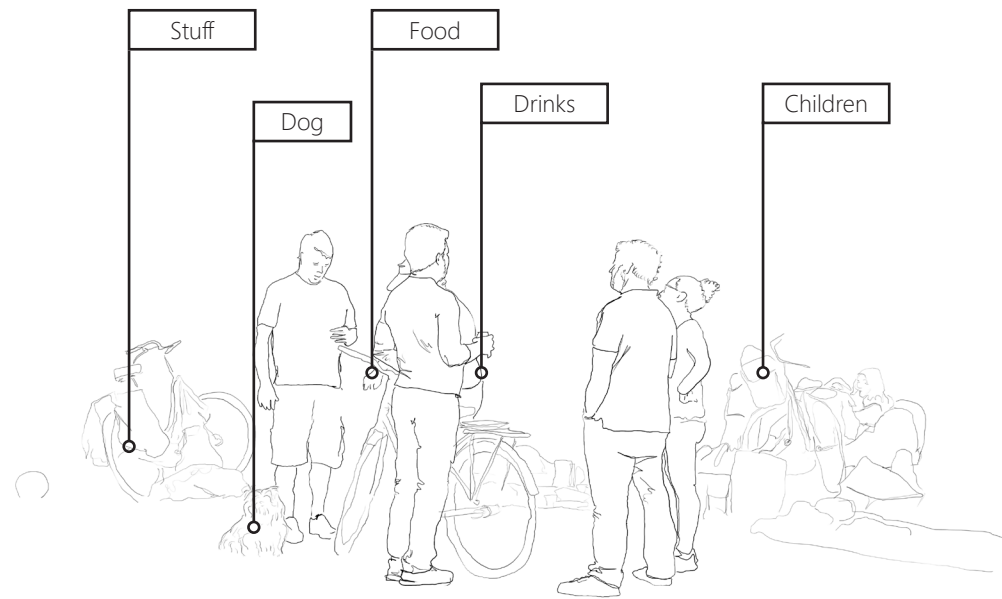


02. The lady on the left and the girls on the right do not know each other. Yet, they started talking and inquiring about the other's life. The place to sit without a structure or facing direction made it easier to begin a conversation. They were from different countries. The younger girls were students and the lady was of superior age. Nevertheless, they found it exciting and entertaining to talk and learn about each other.

One can tell they are not well acquainted because of the slightly larger distance between them. However, because there is no predefined places for sitting they could move closer when they to hear one another and they could pick the distance at which they felt most comfortable.

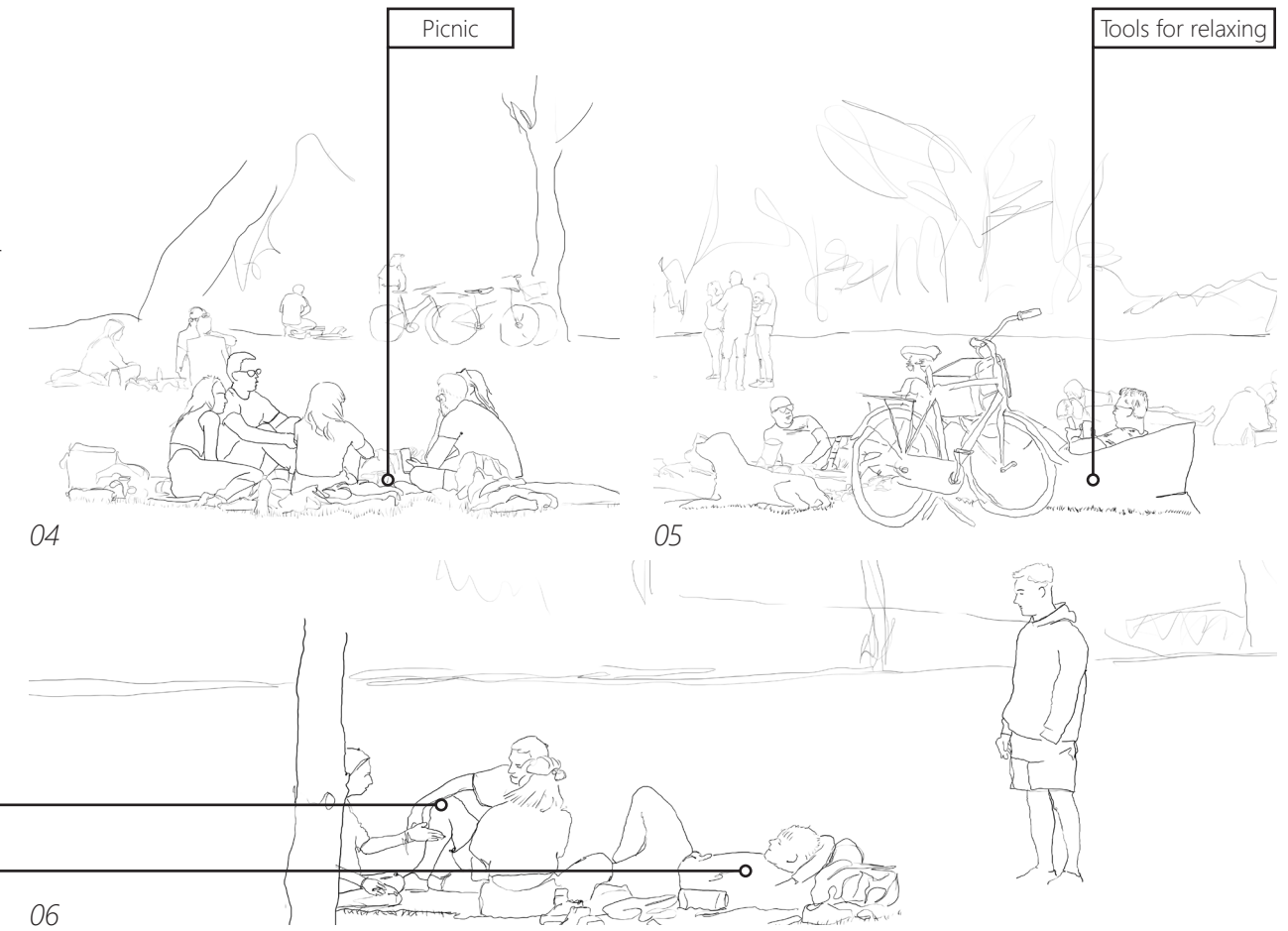
02

03. This group of people was foreigners. People from many different nationalities gathered in the park. Every group would act according to their culture and they all fit right into the context. There was no friction between one group and another because of differences.



03

04, 05, 06. The most popular activity seems to be the casual picnic with some light food and drinks. Not a lot is needed to make the stay in the park pleasant. And if there are a larger number of groups then they sit more densely and they are just as comfortable. There seems to be a natural equal distribution of people throughout a given open field so that it is covered. As more people come and settle down the field becomes more densely populated but still with equal distribution. The closer one group is to another the bigger the feeling that they are one and they are more likely to enter into an interaction. Maybe they will ask for a lighter and they might start talking. Thus the community is reaffirmed.



04

05

06



07

07. The barbecue in the park is an activity that has a few other places in the city where it can occur. It has the ability to give people something to talk about and do, while in reality, they are there simply to be together. The act of sharing food has always been a uniter of people and cultures. The park allows for the dynamics related to this activity to happen. In what other public space in the city can a barbecue be made? What if someone starts barbecuing in the middle of Schouwburgplein (Fig.16) in Rotterdam? Probably there will be no problem but there is not the same natural free-of-judgment environment for it.

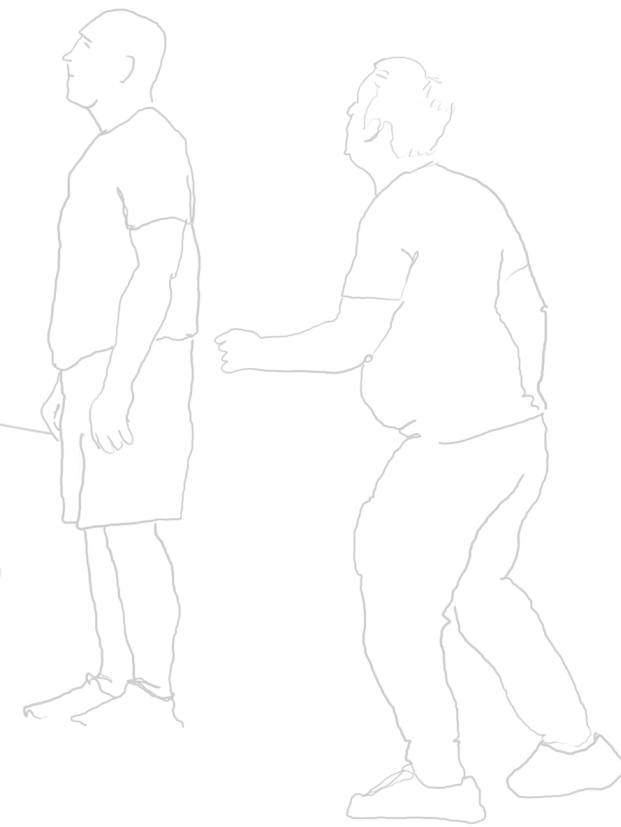
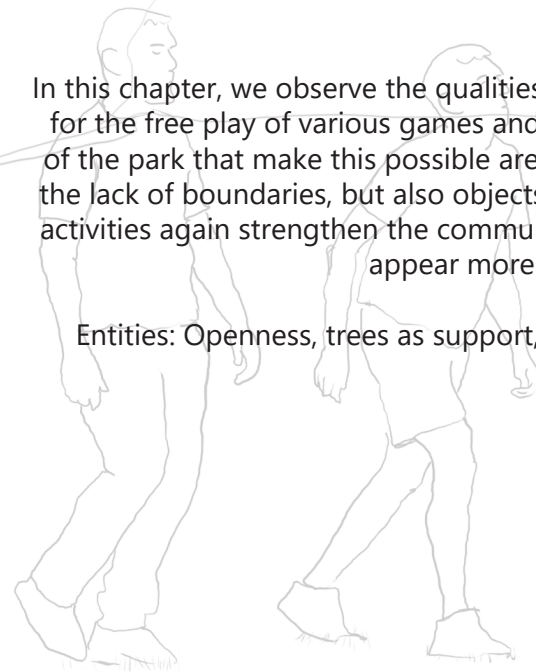


Figure 16

Freedom

In this chapter, we observe the qualities of the park that provide grounds for the free play of various games and sports for all ages. The qualities of the park that make this possible are the openesses, the grass fields, the lack of boundaries, but also objects like trees and benches. Here the activities again strengthen the community but they occur less often and appear more special.

Entities: Openness, trees as support, terrain, soft surface, obstacles



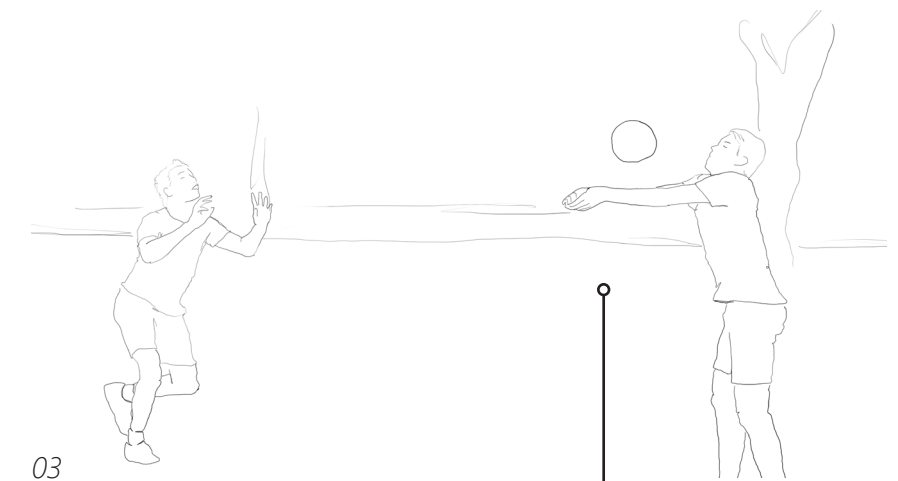
The park brings to the residents a valuable asset with its undefined and free atmosphere. The ability to play any sport or game there is something that is hardly found elsewhere in the city. People can interpret the terrain and objects as they please to create their own playing field. An area can at one moment be a volleyball court and in the next a place for playing kubb. The randomness of flat and uneven ground and places with more trees and those with less is what provides a richness of circumstances.

01. Someone had brought a volleyball net that can be stretched over flat ground thus defining the purpose of the field. A large number of people had gathered to play. With more than the usual number of players and with few rules they played extensively. The sunny and pleasant day in the park had made it possible for them to come outside and do something exciting. Even though they might not have that opportunity very often and maybe they would not book a special court to go and play, here they all came together to participate and share an enjoyable moment.



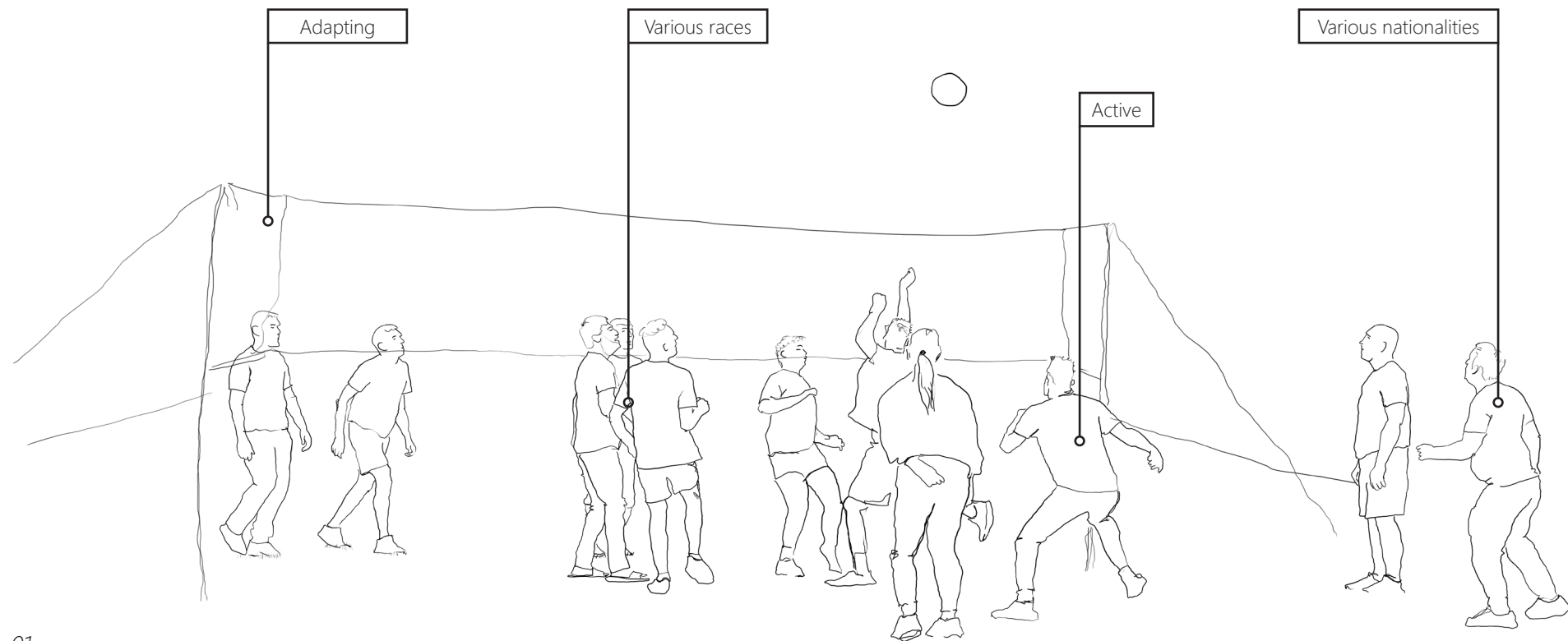
02

02, 03. All the kinds of games that can be played by two people are popular as they are not so demanding on the whole group and turns can be taken - one can alternate between relaxing and playing. The excitement of playing and doing an activity with someone else has a heightening effect on the person's spirit and brings the participants closer together.

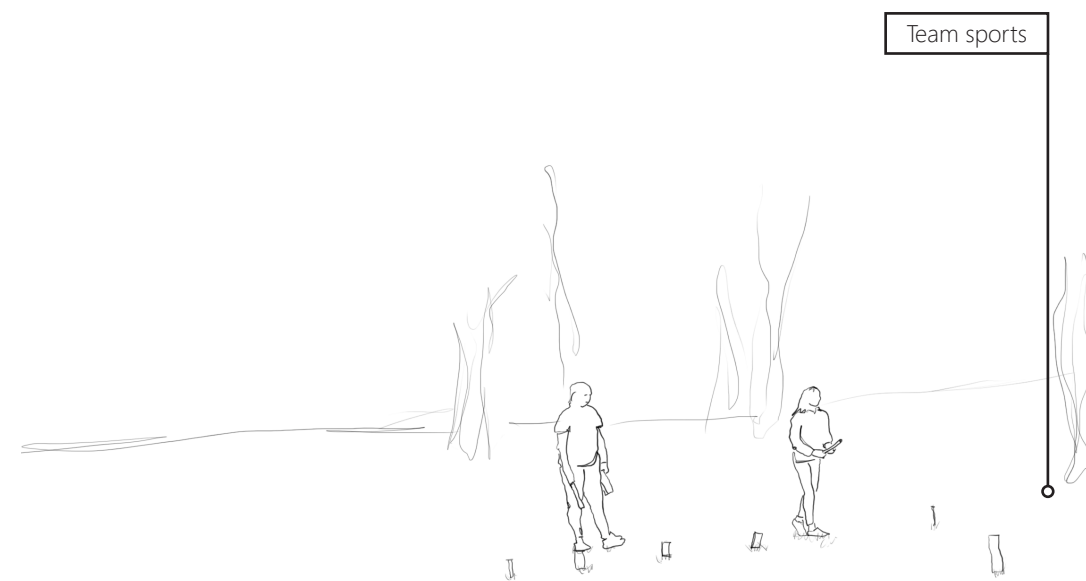


03

Two person sports



01
32



04

04. Kubb is a simple game and it does not require a lot except an area of flat ground. However, playing it in the public park can mean that one might play with someone they have just met. The games played in the open bring many spectators which makes it even more interesting.



33



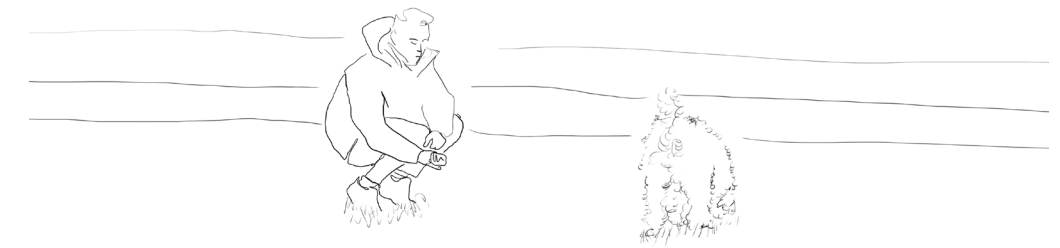
05. Objects in the park, for example, trees, are an asset to the environment. They provide opportunities for games that require support or something solid. In the case of the slackline, what makes it a good place is that there are two trees at the right distance from one another and the ground underneath is soft, which is a benefit when one lands in awkward positions. The fascinating aspect that is revealed through these observations, is how a place that is not fully designed and is to a large extent random in the relation between natural objects, is still so useful to people. The park was not designed for a slackline but a way has been found to utilize it for such a purpose.

05

07, 08, 09. The freedom to bring animals and let them play and entertain observers is also something that makes the park special.



07

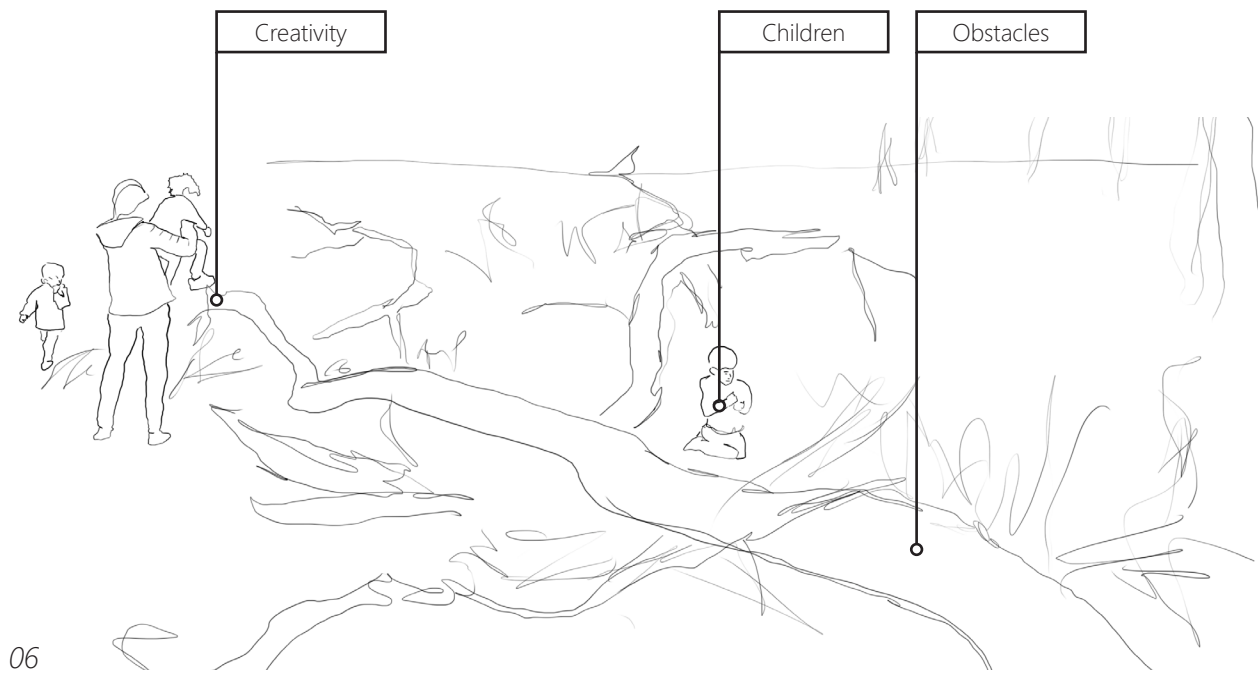


08



09

06. A branch had been cut down and was still on the ground. A group of children had thought that this is the perfect fortress and a treacherous challenge to inspire their games. The countless little branches formed shelters and the larger pieces of wood were obstacles to be conquered and climbed higher than the others. In these special moments of playfulness is revealed one of the true qualities that makes parks a unique place in the city.



06

Health and Rejuvenation

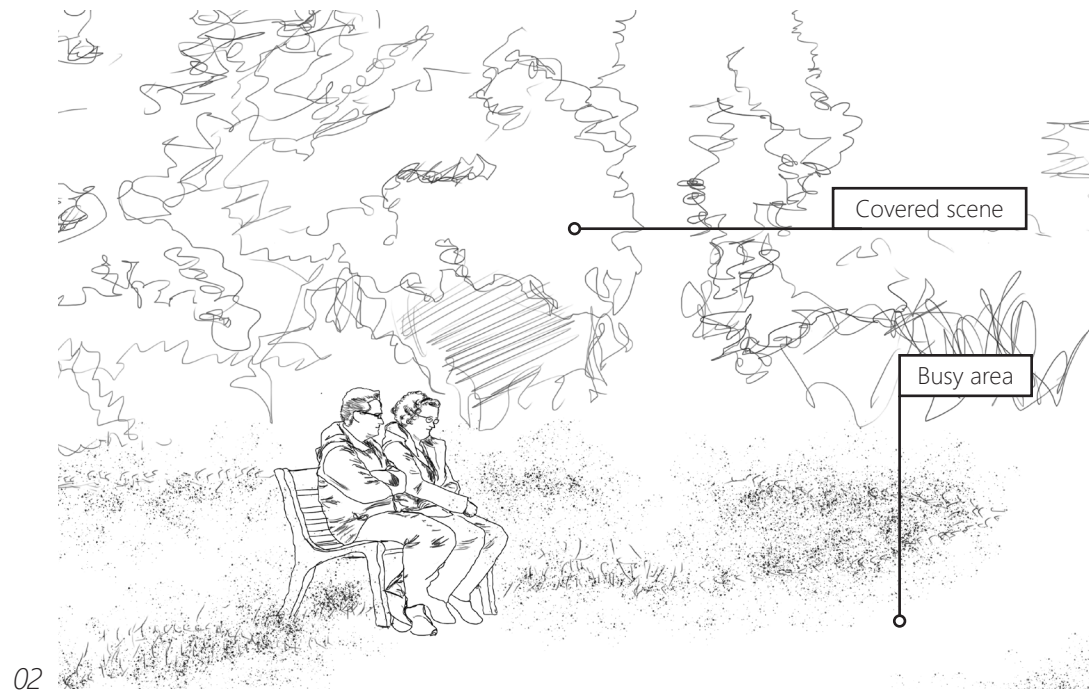
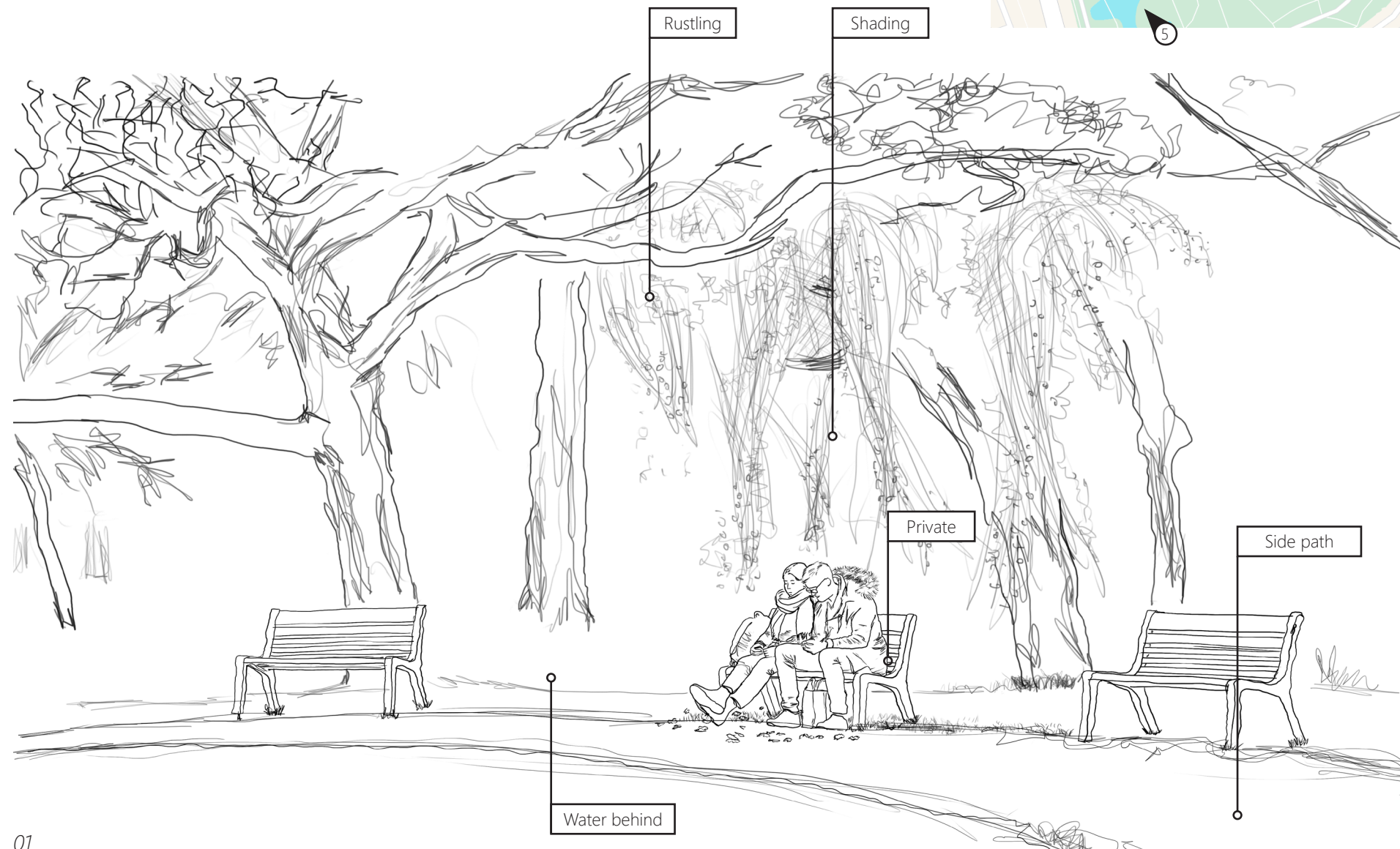
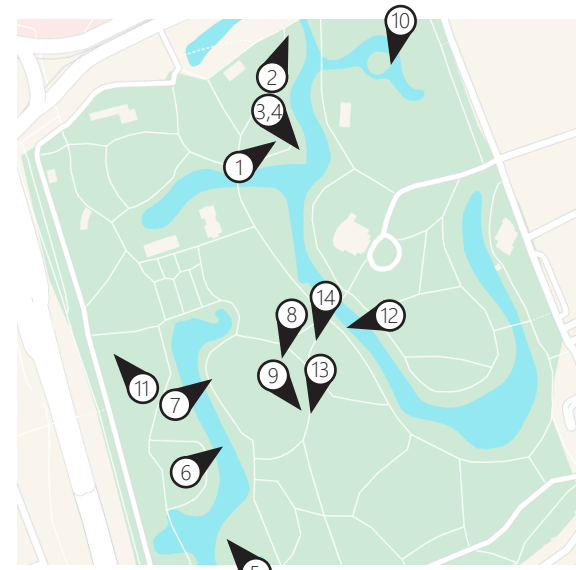
In this chapter, the focus is on the connection people have with nature how it attracts us and rejuvenates us in a way that cannot be achieved elsewhere in the city. The activities identified and observed are the ones where people seem to have a higher awareness of their surroundings and setting, for example simply sitting on a bench, reading, going for a walk, or jogging.

Entities: privacy, quietness, scenery, aesthetics, warmth, stillness, nature sounds



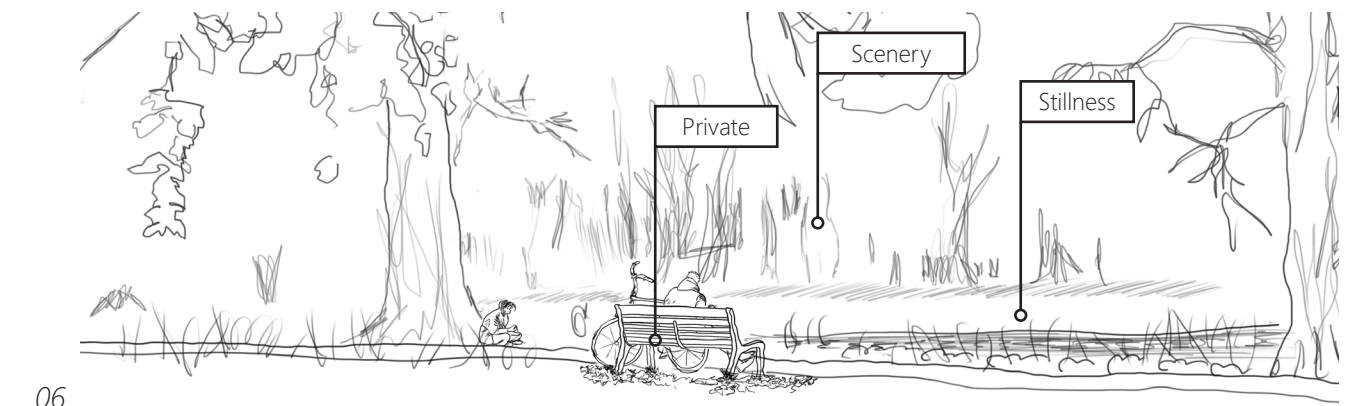
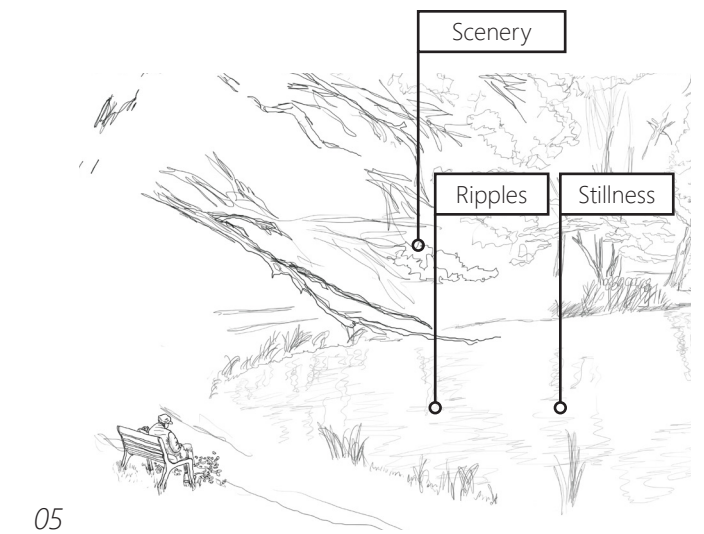
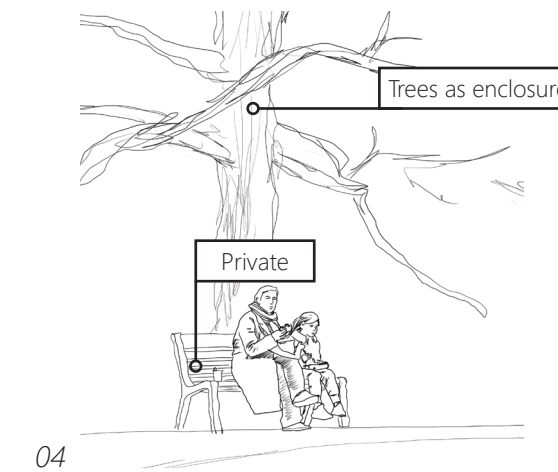
The bustling city life and daily routine can bring a strain on our body and spirit. A park brings to the people an opportunity for a refreshing change. A reboot of our spirit charges us with energy to meet challenges. The noise and speed of the cityscape is juxtaposed by the quietness and slowness of the nature scene. Time feels to have stopped as one has no rushing cars to disturb the gaze. Some people seem to find this change necessary for them to replenish their vigor.

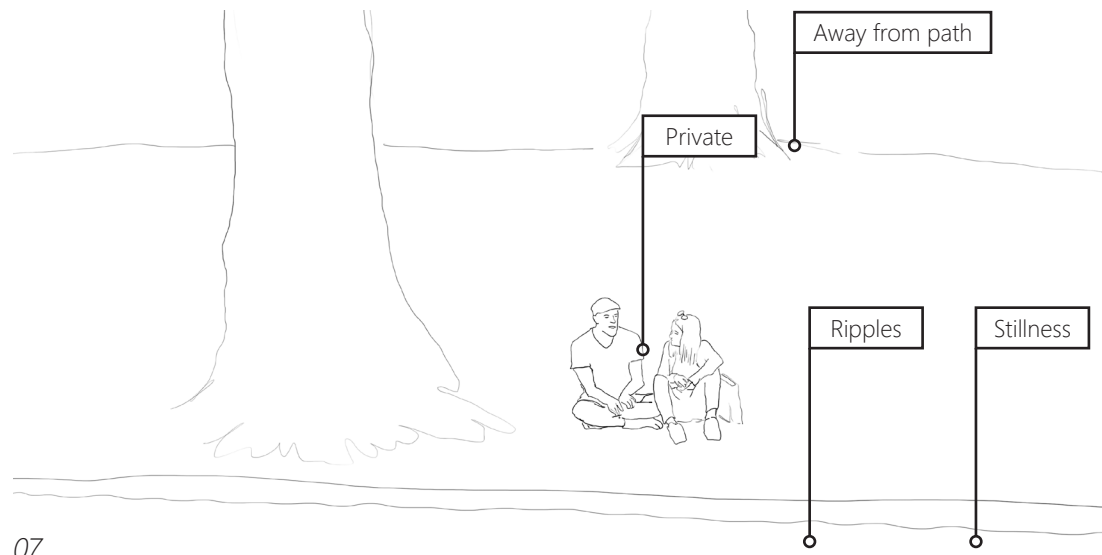
01. The pond is just behind and the water makes almost indistinguishable sounds. The trees are rustling. The light sun provides comfort. In the city, usually, any natural sound is lost in the roar of the cars. One of the major benefits of having Het Park in close proximity to residents is that its quietness and easiness can be accessed on-demand and anyone can take a break.



02, 03, 04, 05, 06. The days when these sketches were done were autumn (25.11.2021 and 07.12.2021) and the weather was cold with sun. This meant that people still wanted to go to the park but they would not go to have picnic on the wet grass while it is 9 °C. In those days visitors would spend less time and, usually, they sat on a bench to enjoy the nice weather and being in nature.

04. The lunch break is an especially popular activity in the park. It can be argued that the option to have lunch in the park and not on a bench on the street or somewhere else in the city is preferred because of the calmness and quietness.

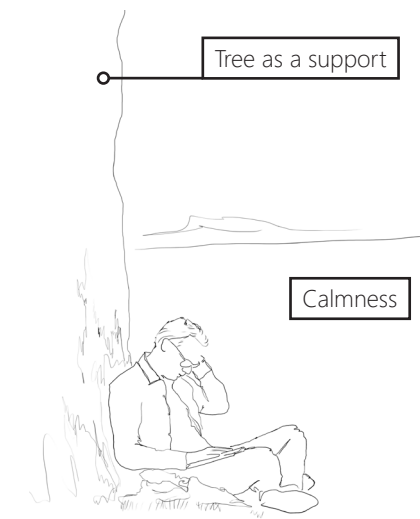




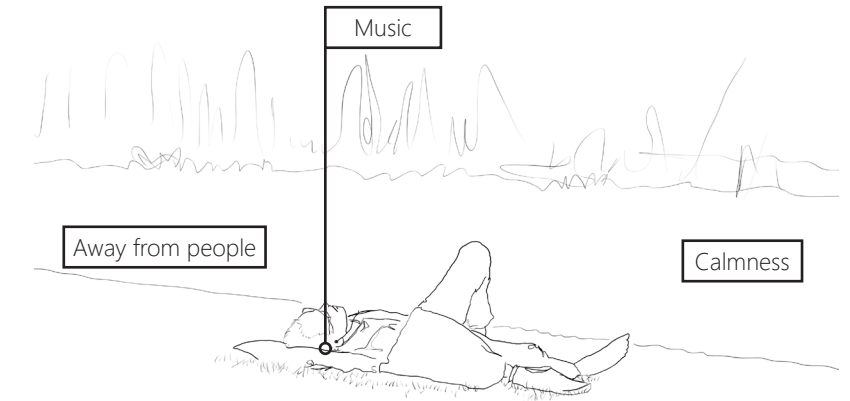
07

07. The nature and the landscape guide where people would sit or lay down. This couple sat by the bank of the pond facing downhill and away from the busy path and fields. They came to the park not to be amongst others but to be in a more serene environment. For them, at this moment the value of the park is nature and the settings it provides to have a private conversation.

09, 10. People often come on their own to the park when the weather is pleasant. They chose a place that is quieter and sunny, sometimes, also close to an object to support their back and to give them a sense of placement in the wide-open field. The tree in this case is the place of comfort for the person reading. The values for those activities are calmness, natural elements, warmth, and the chance to be slightly further away from others.

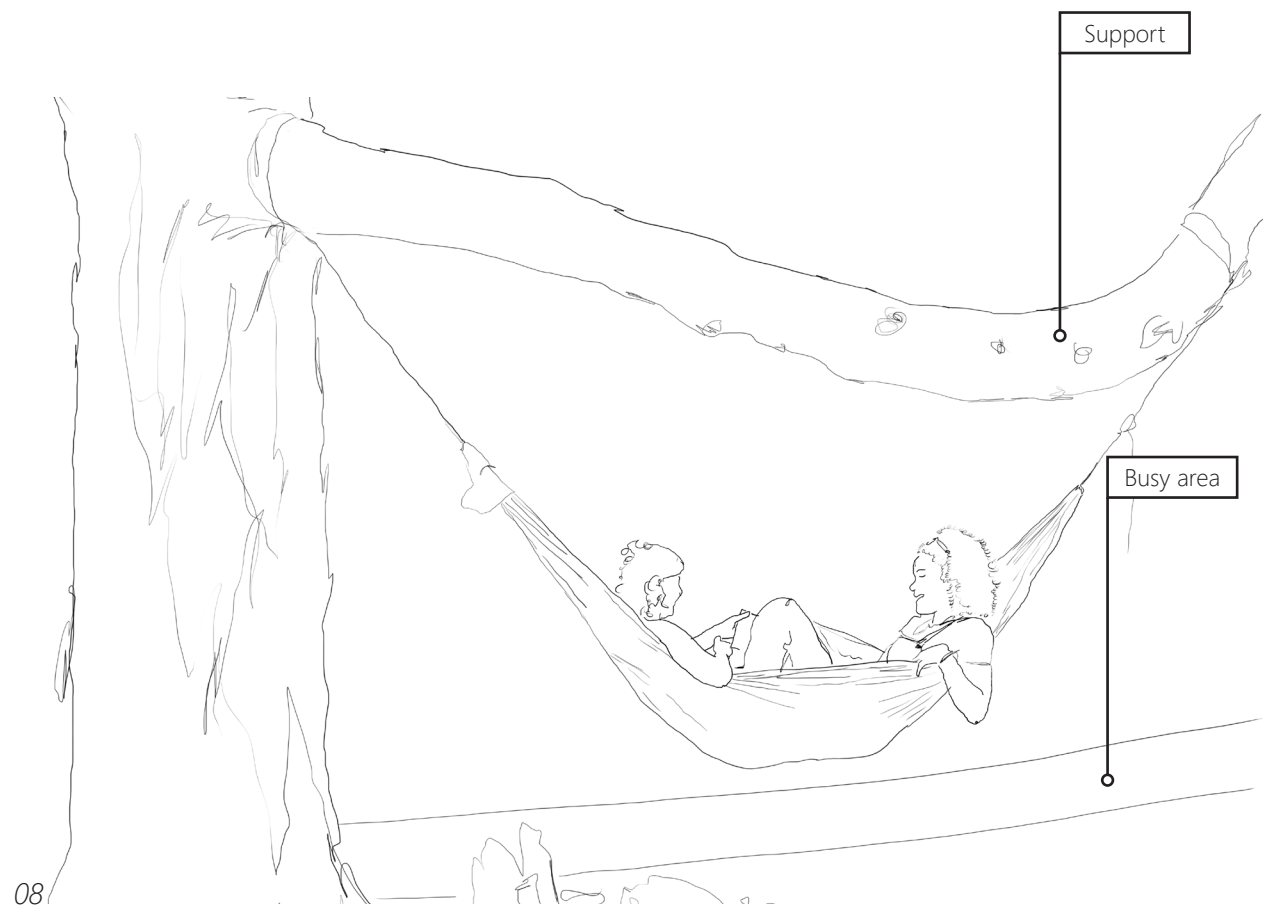


09

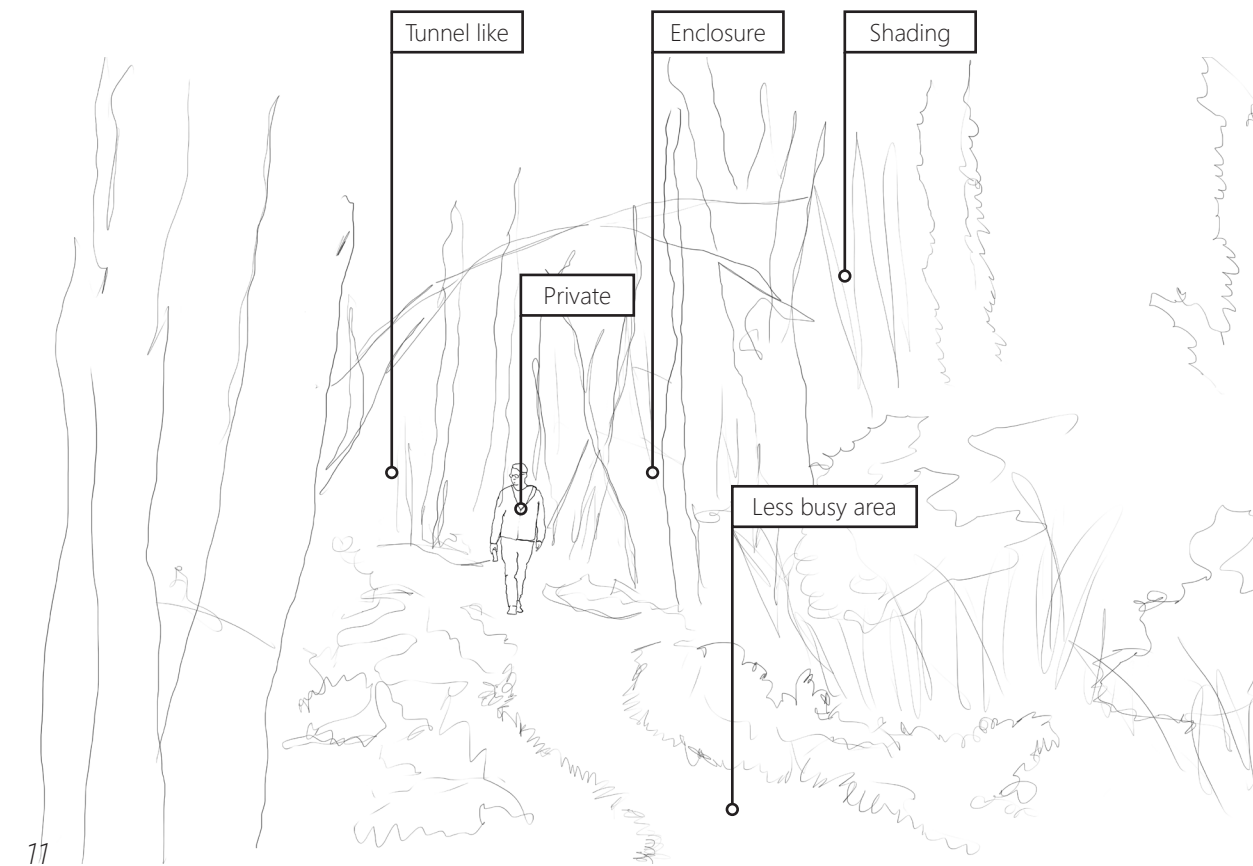


10

08. The hammock similarly to the slackline is a tool that takes advantage of the provided support by the trees. The girls sitting in the hammock spent a long time there, talking. They had chosen a place that is exceptionally busy, which indicates that they enjoyed being amongst others although they indulged in a solitary activity. For them, the main value of the park seemed to be the trees that gave them a place to stretch their hammock and the sun in which to bathe.



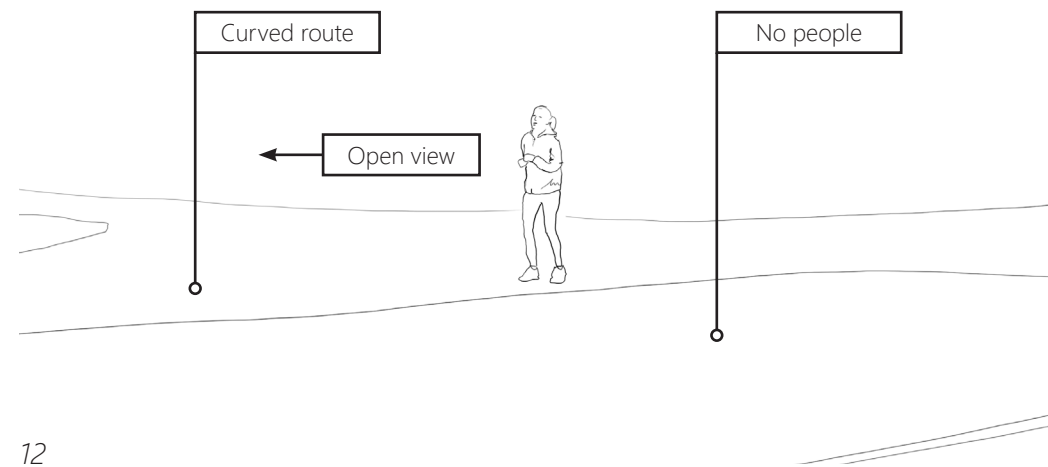
08



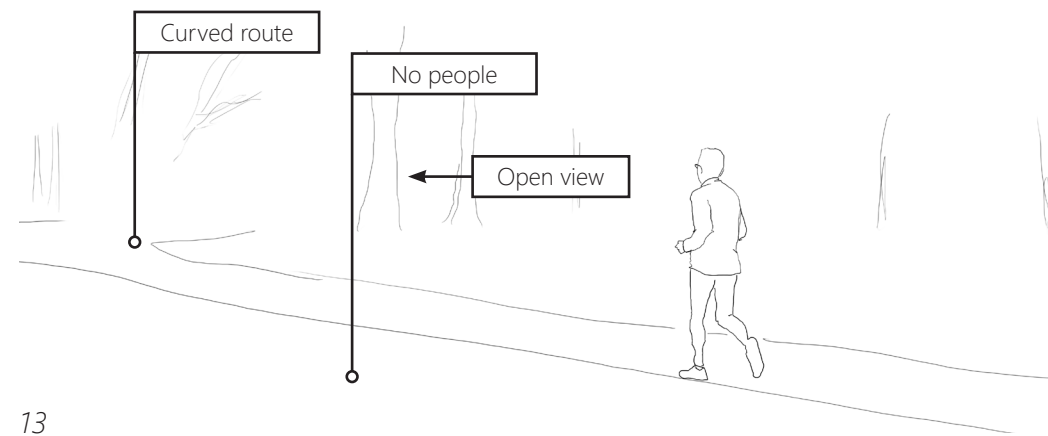
11

11. The peaceful walk through the small paths of Het Park is another example of a solitary activity where the focus is more on the place and the view than the community aspects. There are two identifiable areas in Het Park with different characters. The more busy open grass fields where there is more sun and fewer trees towards the North and the area with more dense vegetation and smaller paths towards the South. The latter is usually less busy and is chosen for solitary activities.

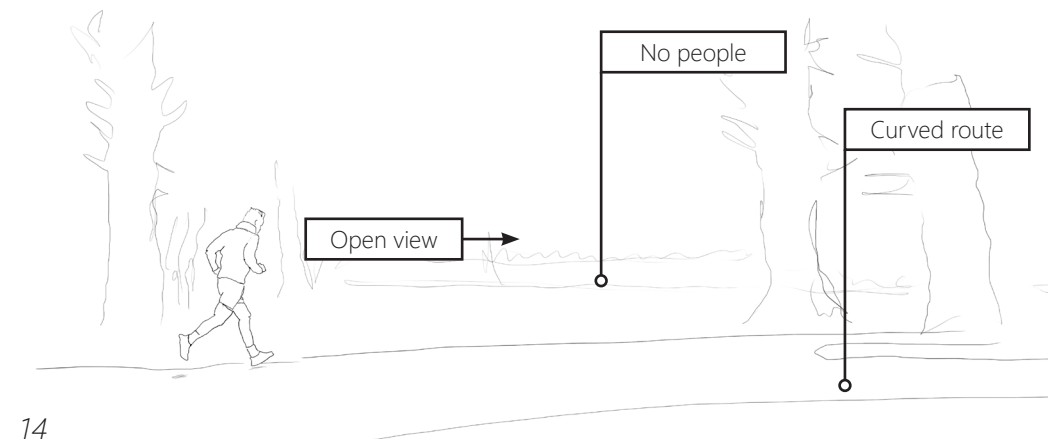
12, 13, 14. Unlike group sports like volleyball, jogging is more private. The person practicing it would be more aware of their surroundings and it would play a vital role in their experience. That is one of the reasons why people often chose to jog in the park. It is more replenishing to run in the calmness of the natural environment than in the busy city. Other benefits that attract joggers there are the continuous unobstructed paths, variety of terrain, and the open and clear views.



12



13



14

Engagement

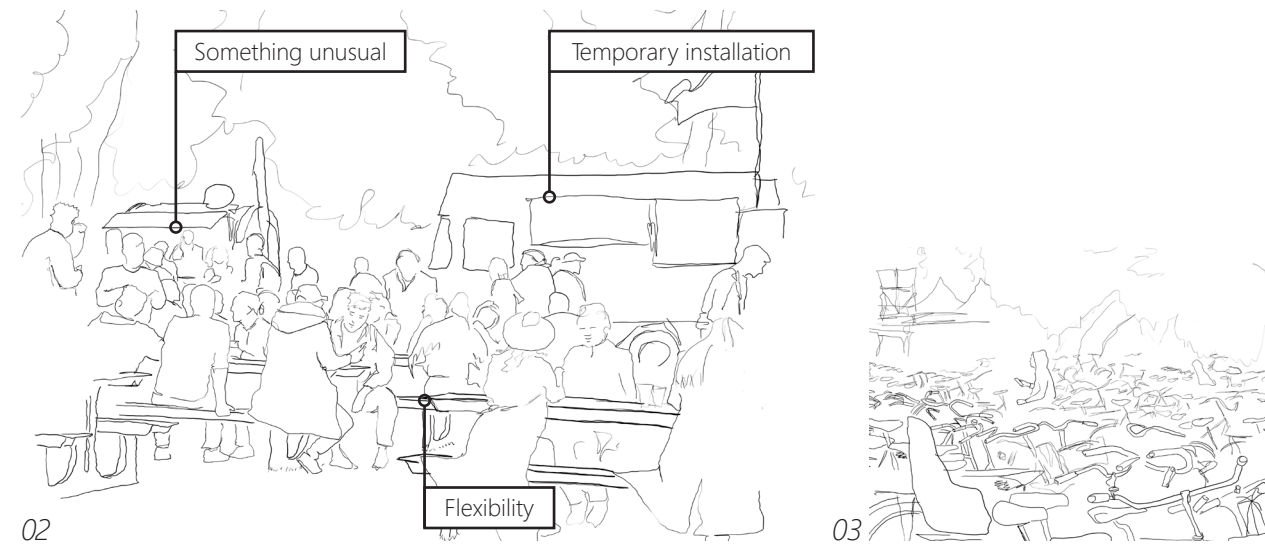
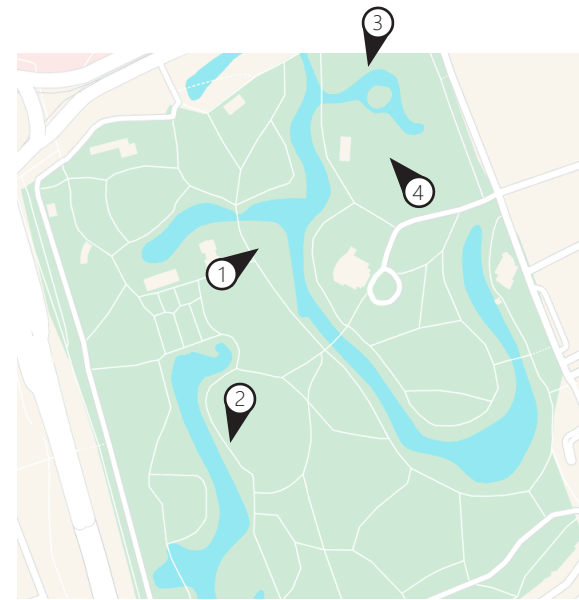
This chapter addresses the flexible nature of the park and the potential of large open space. Various temporary kiosks, installations, or events can produce surges in communal involvement. The only requirement for the park is to allow it to happen.

Entities: flexibility, openness

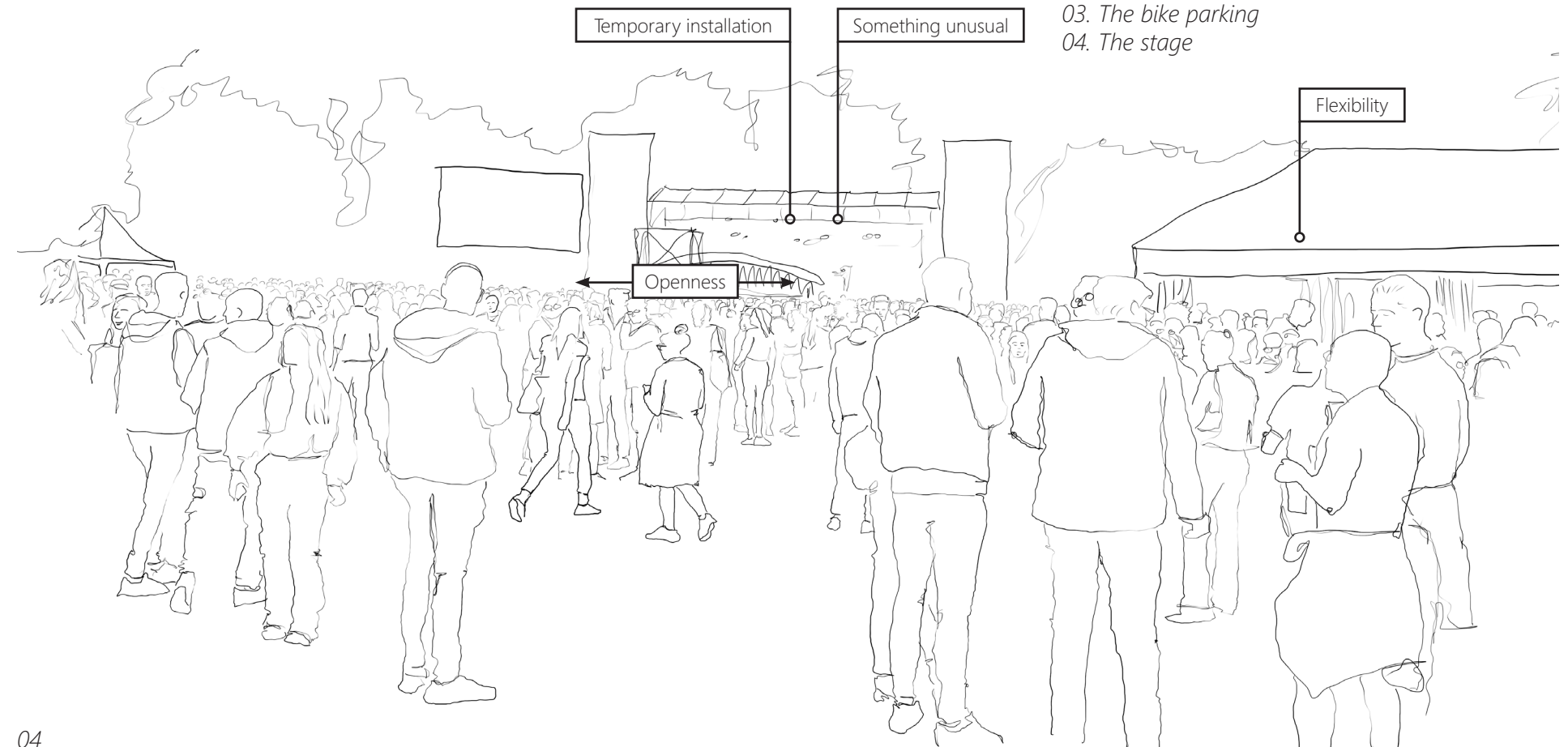
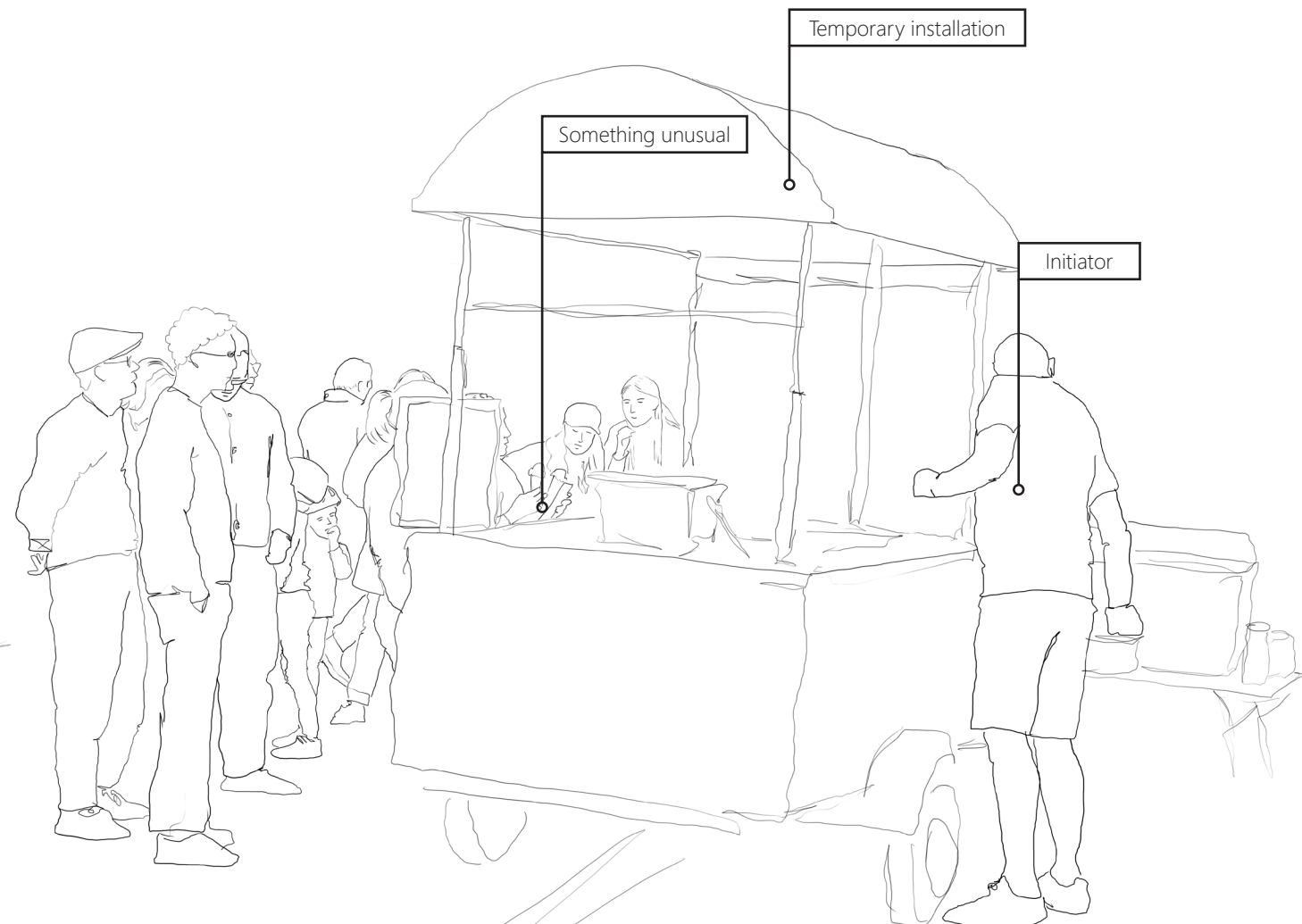


Occasions that bring a large number of people together can strengthen the community and instill a sense of familiarity with others who participate in the momentous happening. Periodic events, such as concerts, bring people from a wider area, sometimes from the whole country. Engaging a large number of people to participate with a singular purpose adds yet another benefit to the park's qualities. Thus the value of the park in people's lives is of great importance even though it might go unnoticed.

01. *Something as simple as an ice-cream truck concentrates a great amount of activity and engagement.*



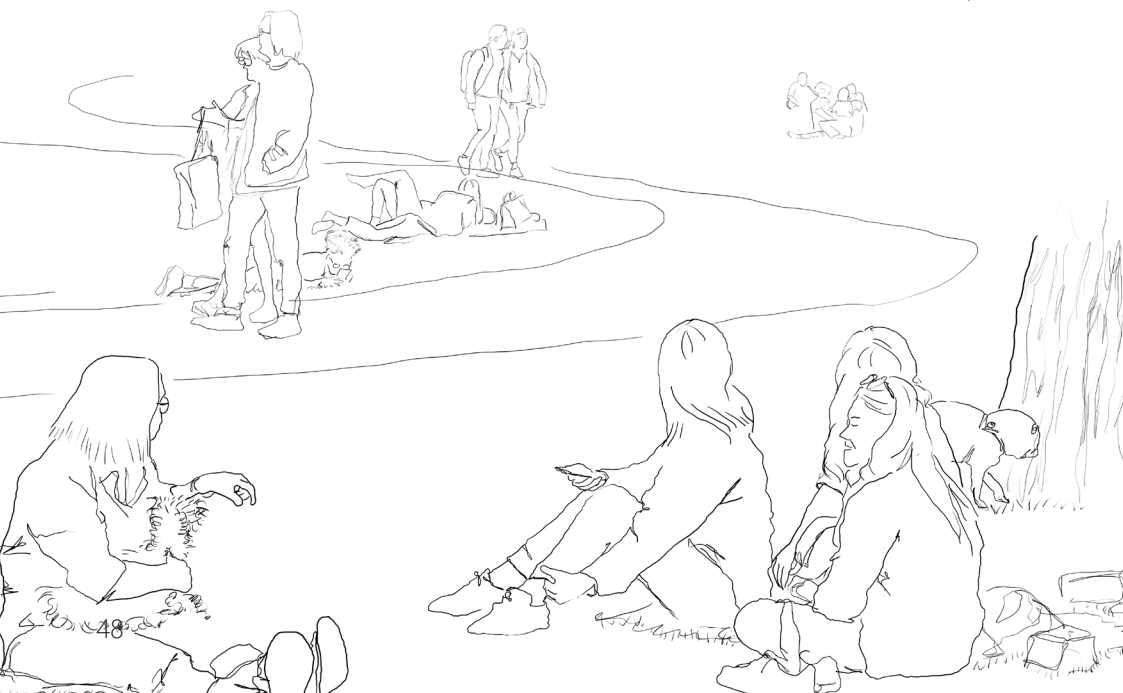
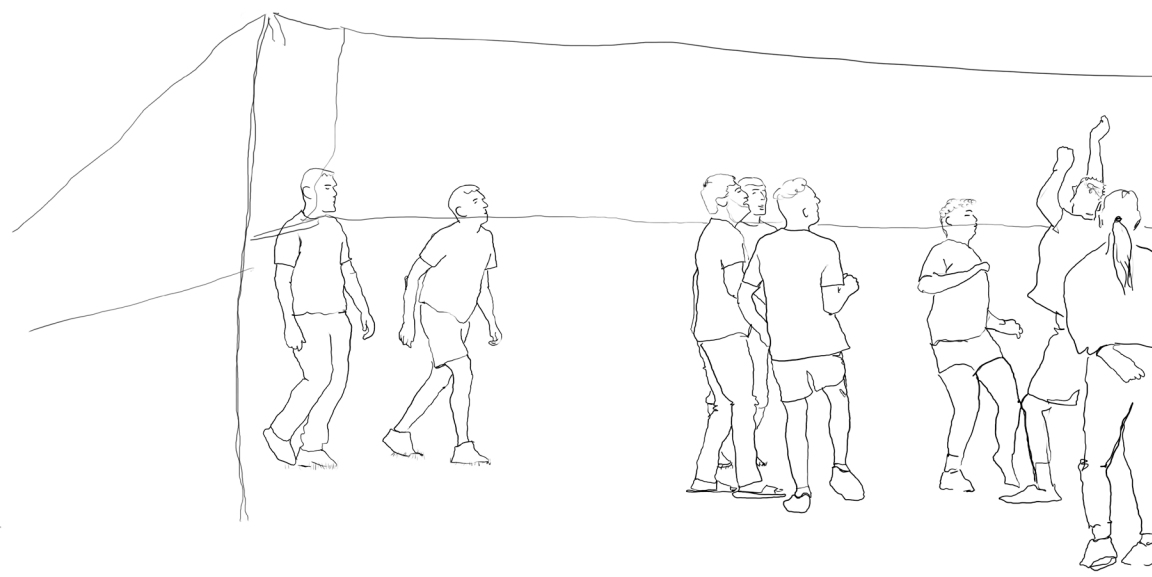
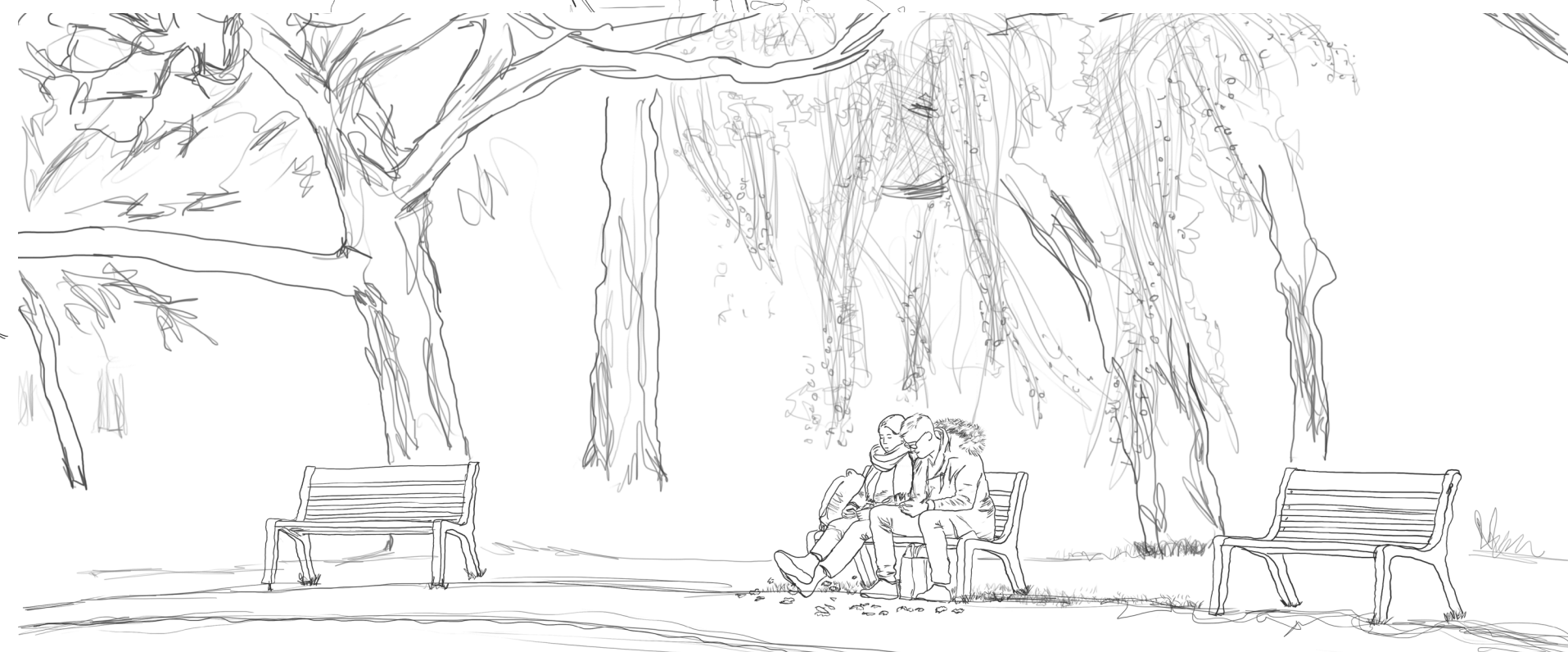
Festivals have the potential to amplify the social and playful values that have been identified until now. It forms an exponentially larger temporary community. It engages not only local citizens but also people from other cities. The park is completely transformed to the point where it is barely recognizable. In these events, there is an added appreciation of diversity. In this particular case, Bevrijdingsfestival was observed and recorded. There are a lot more less intense forms of engagement; for example - yoga classes and other organizations. They base their social success on an activity where people work together towards a similar goal.



02. *The food trucks*
 03. *The bike parking*
 04. *The stage*



Conclusion



The current direction in which private space exploration is going is unsustainable. Space is treated insufficient rigor of consideration. The private interest of a monopolized industry finds ways to exploit environments. It is important to venture into the unknown cautiously and respectfully until we fully understand the consequences of our actions. To achieve that initially everyday people from any field need to feel attracted and attached to the space station, in order to want to stay there for long. Providing a place that helps people live fulfilling communal life is key. Consequently, this will be the bedrock for a resilient community for the democratization of space and resources and cautious expansion further. There any person would be welcome to contribute and explore their personal interests in the unknown.



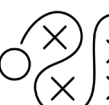
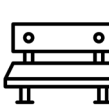



To find out how to design a place for such a community to have the chance of developing, we can learn from our experience in community building on Earth. There is a multitude of lessons that we can bring with us from our rich experience of living here. The values of something as simple as a park can make the difference between a disconnected body of individuals and closely knitted one.

From an exhaustive look into what people value in Het Park, Rotterdam, it can be concluded:

1. The public park in this particular part of the world is an integral part of human life in the city. Citizens cherish this place and maximize its potential.
2. Communities, friendliness, respect, diversity, and consideration are cultivated in the park.
3. The 4 main values of the park are social, health and rejuvenation, freedom, and engagement.
4. The value comes from a combination of peoples' creativity and the opportunities the park provides.
5. Those opportunities formulated as concepts are - openness, freedom, flexibility, places to sit, various routes, unobstructed area, soft surface, trees as support, terrain, obstacles, quietness, scenery, aesthetics, warmth, stillness, nature sounds (Diagram 2).

Further research that would contribute to the results is a series of interviews with the people to acquire a conclusive first-person view of how they use the park. Ideas about what a space habitat could benefit from the park could also be given by people. Spending more days in Het Park and collecting a more complete image of usage over the entire year would strengthen or eliminate some of the final arguments. In terms of further research in general for space architecture, delving into our interaction with AI and the machine would be important for understanding the challenges that we might face in space.

Chapter 1 - Social

	Popularity
	Openness
	Flexibility
	A place to sit
	Routes
	Unobstructed area
	Soft surface

Chapter 4 - Engagement

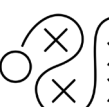






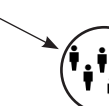





	Flexibility
	Openness

Diagram 2
The extracted concepts and entities that contribute to the values and will be translated to a space station.

Chapter 2 - Freedom

	Openness
	Tree as support
	Terrain
	Soft surface
	Obstacles

Chapter 3 - Health and rejuvenation

	Privacy
	Quietness
	Scenery
	Aesthetics
	Stillness
	Nature sounds

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Appendix

Park visit 1 - 19.11.2021

day: Friday
time: 14:15-15:00
weather: partly cloudy, sun
temp.: 14 °C
season: autumn
variables: workday, cold
number of visitors: low

Activities:

- walking dog
- taking a walk
- lunch
- sitting by the pond
- jogging
- cycling

Notes:

- mostly in groups of 2 people and walking
- two distinct parts of the park as a feeling
 - the first is the paths that are close to the restaurants and towards the Kunsthalle. More grassy areas and less trees. More light, more movement and people passing through
 - The second is on the other side of the park where there are more trees. Less light, less straight paths, less line of sight. Here people seem quieter, more people who sit alone, seem to enjoy the peace of the park. People sitting on the grass by the water next to a tree. A person sitting like that and reading.

Park visit 2 - 20.11.2021

day: Saturday
time: 15:00-16:00
weather: cloudy, gloomy, gray
temp.: 7 °C
season: autumn
variables: weekend, cold, gloomy
number of visitors: low

Activities:

- sitting on benches
- taking a rest
- sitting on phone
- lunch

- talking
- walking a baby
- walking a dog

Park visit 3 - 22.11.2021

day: Monday
time: 15:20-16:00
weather: sunny
temp.: 9 °C
season: autumn
variables: workday, cold, sunny
number of visitors: low

Activities in the park:

- cycling
- rollerskating
- walking a dog
- mothers with babies
- young families with 1 or 2 children
- children and parents from several families pass an American football
- jogging
- having coffee and tea
- old couples, old ladies
- a group of people on two-wheel stand-up electric scooters
- smoking
- pushing a bike
- young groups of friends
- passing through
- listening to music
- staying on the phone

Notes:

- people seek the sun
- people engage in random conversations

Park visit 4 - 25.11.2021

day: Thursday
time: 13:00-15:30
weather: cloudy with slight drizzle, at 14:45 little sun
temp.: 9 °C
season: autumn
variables: workday, cold, cloudy and wet
number of visitors: low

Activities:

- significantly less busy
- having lunch
- walking dogs
- walking with purpose
- walking a baby
- walking a dog
- taking a break
- enjoying the sun
- sitting on benches in pairs
- jogging
- sitting and smoking

Park visit 5 - 07.12.2021

day: Tuesday
time: 14:00-16:00
weather: partly cloudy, sunny
temp.: 6 °C
season: autumn
variables: workday, cold, sunny
number of visitors: low

Activities:

- cycling
- walking a dog
- mothers with babies
- old people taking a walk
- jogging
- walking
- young groups of friends
- passing through
- staying on the phone

Park visit 6 - 08.12.2021

day: Wednesday
time: 14:00-16:00
weather: partly cloudy, sunny
temp.: 8 °C
season: winter
variables: workday, cold, sunny
number of visitors: low

Activities:

- cycling
- walking a dog
- mothers with babies
- old people taking a walk

- walking
- passing through

Park visit 7 - 26.03.2022

day: Sunday
time: 14:00-16:00
weather: sunny
temp.: 17 °C
season: spring
variables: weekend, warm, sunny
number of visitors: high

Activities:

- volleyball
- kubb
- children playing
- slackline
- big group gatherings
- picnic
- sunbathing
- sleeping
- reading
- badminton
- tennis
- drinking
- smoking
- barbecue
- cycling
- walking a dog
- old people taking a walk
- walking
- passing through
- walking babies

Notes:

- the warm weather attracts significantly more people; the difference between autumn and spring is as if one is in another place
- people attract more people; popularity is important
- a complete research would encompass the visitors over a whole year

Park visit 8 - 05.05.2022

day: Monday
time: 17:00-19:00
weather: sunny
temp.: 15 °C
season: spring
variables: holiday, warm, sunny
number of visitors: high

Activities:

- eating
- drinking
- smoking
- dancing
- talking
- sitting on the grass
- shouting
- running
- sitting on temporary benches
- walking

Notes:

- festivities truly make the park very popular; there are people from all the near by cities
- the park looks completely different, it is hard to recognize it
- people feel even more relaxed and free when there is an event