ACTIVE AMSTERDAM

THE CITY AS A HEALTHY LIVING ENVIRONMENT

PREFACE

This research report is part of my graduation project on the Technical University Delft at the Faculty of Architecture. The project is part of the Dutch Housing Graduation Studio of the chair of Architecture & Dwelling that started in the spring of 2018. The name of the graduation studio is 'Between Standard and Ideals - The future of housing in the Netherlands' and the focus is 'Stronghold Amsterdam', the city that is constantly transforming due to changing ideals. The studio assumes that a study of Dutch residential architecture is also an investigation of changing political and societal views that developed and shaped the city. Right now, the Netherlands are, like other West-European countries, critically reflecting on the welfare state and have new concerns. The central question in the studio is: How do we want to live in cities in the future and what kind of buildings do we need to allow for that?

One of these new concerns is urban health. With more and more people living in the city ,and the aim to densify cities more instead of endless sprawl, the health and well-being of these people is a topic of growing importance. In this research report I investigate how the design of cities and buildings influence the health and well-being of the people living in it. In other words,: How can the city of the future be an healthy living environment and what kind of buildings do we need to allow for that? The ideal is a Healthy City for all, but at the same time the approach of the studio is realistic. The goal of this research is to use its results as a starting point for the design of a healthy residential building in Amsterdam on an existing location, for a relevant target group.

For this goal, the report is divided into different parts. It starts with an investigation of the assignment in which the assignment, the topic and the relevance are investigated. This is followed by research of literature on the topic, and includes historical as well as recent writings, to learn about the development of the topic over time. Next, different case studies of healthy buildings are analysed by using analytical drawings to formulate ingredients for healthy design. An analysis of the chosen site in Amsterdam is added to formulate ingredients that will allow the design of a building in a realistic context in the next step of the graduation process. The conclusions of the different parts of this report will be part of the Brief. In this brief I formulate my own assignment for the design of a healthy residential building on the chosen site, for the chosen target group. The brief includes ingredients to complete this task in the next semester.

The report is written during the spring semester of 2018 and was guided by research tutor Pierijn van der Putt. The feedback of the main tutor of the studio, Theo Kupers, has also been very helpful.
I hope that, after reading this research, you also will be convinced that the city of the future should be an healthy living environment and have formed an image about what a residential building in this Healthy City would look like.

June 15th, 2018
Josien Gankema

CONTENT

Figure 1. Architecture of Density by M. Wolf (n.d.)

INVESTIGATION OF THE ASSIGNMENT

Cities are booming. More and more people are moving to cities, which makes the subject of how to live in a city of growing importance for urban planners and architects. The Dwelling Graduation Studio asks students to investigate what is happening in cities right now, to formulate their ideal city of the future and to question what it will be like to live in this Utopia.

Stronghold Amsterdam

'A study of Dutch residential architecture over the centuries is not only a study into dwelling and building types, but also an investigation of the political and societal views that developed in subsequent epochs. '
- Dutch Housing Graduation Studio, 2018

For the assignment of the Dutch Housing Graduation Studio 'Stronghold Amsterdam' the city is seen as a place of constant transformation. As the city develops, so do our ideas on how to built it, use it and how to live in it. We are constantly re-thinking how we should live in cities as our ideals are constantly changing. We reflect on the past and present an aim to improve for the future. The buildings in a city can be seen as expressions of the ideals of the time they were built in and by that the city can be seen as a collection of frozen ideals.

Right now, the Netherlands are, like other West-European countries, critically reflecting on the welfare state while focussing on 'new' concerns. The first step of the Graduation Studio was to investigate what is happening in cities right now and what the current concerns and ideals are for living in the city of the future. After that we chose one of these ideals and asked ourselves: What consequences does it have? How can we design living environments within this ideal? What would this city look like?

Figure 2. The belt of former defence works that runs around the inner city of Amsterdam is the focus of the Dutch Housing Graduation Studio, (2018, Course guide).

The name of the graduation studio is 'Between Standard and Ideals - The future of housing in the Netherlands'. The graduation project will eventually include the design of a residential building based on an ideal vision on living in the city of the future. This building will be designed with an Utopian vision, but must at the same time be a realistic project in our current time. A real location in Amsterdam must be chosen, the target group must be relevant and the current building standards should be followed. The task is to find the variations possible within these boundaries. The project should bring us closer to the ideal living environment, while keeping the practicalities of everyday in mind.

'Stronghold Amsterdam' focusses on the part of Amsterdam that formerly held the fortification works that run around the inner city (Figure 2). This part of the city has been through many changes and transformations since the city walls were torn down. It lays just outside the Unesco World Heritage city centre which gives it more freedom to design for new ideals.

Living in the city

The worldwide trend is a that cities are growing rapidly. This is also the case in the Netherlands, where the population of the four biggest cities is expected to increase strongly in the coming decades. Amsterdam, Rotterdam, The Hague and Utrecht will together facilitate for one third of the Dutch population growth until 2030.[1]

Amsterdam is popular and grows with approximately 11.000 inhabitants every year.[2] This enormous growth can be compared to the growth during the 'Algemeen Uitbreidingsplan' when the city doubled in size.[3] Only this time, instead of expanding the city is size, the city is aiming for large scale densification within the existing boundaries. To accommodate the growth and ease the pressure on the housing market the ambition is to realize 50.000 dwellings within the city limits before 2025.[4]

1   CBS, 2016a.
2   Gemeente Amsterdam, 2016b.
3   Vermeulen & Langendijk, 2018.
4   Gemeente Amsterdam, 2016b.

Densification, accommodating more people on the same square meters, gives a lot of opportunities, but also brings up questions of quality of life, affordability and accessibility.[5] The Municipality of Amsterdam is very aware of these questions and acknowledges that by choosing for densification the pressure on public space will increase. Space in the city must be used more intensively and this demands special attention for the design of streets, squares, parcs and quays. Only then Amsterdam will remain attractive.[6]

This is where the 'new' concerns of living in cities touch the field of architecture. The design of the future, more dense, city is an important task for architects and the attractiveness of the city depends on their vision and decisions. We have to ask ourselves, will the approach of densification lead to good living environments? Does densification mean that every square meter of available space will be built to accommodate for all this extra people? Will the dense city become overcrowded like the 'Architecture of density' we see on the photographs M. Wolf made of Asian cities? How can the health and well-being of the people living in the compacting city be guaranteed? Can we find ways to make cities more dense while keeping space for people to breath, meet, move, play? To live? What would this city look like? Can we see the transformation and densification of existing cities as an opportunity to improve the health and well-being of its inhabitants?

Figure 3. Busy Amsterdam by Hollandse Hoogte (n.d.)

Topic & Relevance

The question of how the design of the city will make us *feel* while living in it builds upon the growing recognition of the way our environments affect our health and well-being. More and more insight is given into how spatial planning can have long-term impacts on quality of life and lifestyles. Evidence increasingly suggests that the wider environment can reduce stress, encourage exercise and promote good health. [7] To design for health and well-being, the designers of this built environment, Urban planners and architects, should become more aware of the implications of their work.

A lot of research has been done on the relation between the physical environment and the health and well-being of its users. For example the World Health Organization has done in depth research on this topic for years as part of its 'Healthy Cities Project'. They state that the links between urban planning and health have become increasingly undervalued. The planning systems have focused more and more on the built environment as a means to achieve a narrowly defined version of an efficient city, promoting short-term financial gain to the detriment of its inhabitants. They argue for health and quality of life as a priority for urban planners throughout Europe, not an afterthought or an peripheral activity. They state that this approach will truly put the needs of a city's people at the centre of urban planning.[8]

5   Vermeulen & Langendijk, 2018.
6   Gemeente Amsterdam, 2011.
7   CABE, 2009.
8   Barton & Tsourou, 2000..

The growing understanding of the value of the physical environment in promoting and improving public health has come with calls to support healthy lifestyles though the design of healthier cities an neighbourhoods.[9] Additionally, the advantages of healthy cities are becoming better known. Healthy urban planning is compatible with sustainable economic growth, as the health of citizens is an important stimulus to economic productivity.[10] Healthy cities with healthy citizens have maximum potential.[11] Seen is this way, investing in a populations health and well-being are vital elements in any well-functioning society.[12]

The topic of health in the city has been an issue for centuries, with modern town planning having its roots in the unhealthy industrial cities of the nineteenth century.[13] At that time, the biggest threats on health were poor water supply, sanitation, light and air that led to an living environment in which contagious diseases spread easily. In response urban planners designed better infrastructure and developed building codes to banish the unhealthy conditions. Today, the biggest threats on health are contemporary diseases of civilization that are not cured but caused by design. Unhealthy food choices are available everywhere, while at the same time physical activity as part of our daily routines is completely designed out of our life. Sedentary or robotised work has replaced physical labour, driving cars replaced cycling or walking and taking the stairs is unnecessary if there also is a elevator, playing outside is taken over by electronic entertainment.[14]

In the Netherlands chronic diseases are main cause of death. Our healthcare system is mainly focussed on the treatment of these diseases, while a lot of chronic diseases can be prevented by changing lifestyles. Research has shown that incorporating more physical activity in our daily lives will make a significant contribution to fight against chronic diseases.[15] We, as architects, have influence on the lifestyles of the people using our built environment. It is our responsibility to consider the implications of our design on the health and well-being of the users.

Figure 4. The Beuningenplein Playground is designed on top of a car park, Carve Landscape Architecture (n.d.).

9   CABE, 2009.
10   Barton & Tsourou, 2000.
11   Rydin et al., 2012.
12   CABE, 2009.
13   Bartonet al., 2009.
14   BETA Office for architecture and the city, 2016.
15   BETA Office for architecture and the city, 2016.

Problem statement & Research questions

My Ideal city sees the health and well-being of its citizens as a guiding design theme. But for the goal of the graduation studio, the design of a residential building on a chosen site in Amsterdam, I need to know what this city would look like, which target groups are especially relevant and *how* to design buildings that consider health and well-being.

This research has as a goal to formulate starting points for the design of a building that contributes to the ideal of Healthy Amsterdam. The research question is:

What are design guidelines for a residential building that takes the health and well-being of its users as a guiding design theme?

To answer this question the research I built this research to answer several sub-questions: What is health? What is the relationship between architecture and health? How can architecture influence the health of its users? What are the current issues on health in Amsterdam? Which target groups are especially relevant in the design of a healthy residential building in Amsterdam? How can the design of a building improve the health of its users?

Method

The research starts with a Utopian vision on the Healthy City of the future, in the shape of a manifesto. This manifesto is followed by an in depth research of literature and research on the Healthy City topic. In this chapter the definition of health is researched, followed by an investigation of the relation between architecture and health as it has been in history, is in the present and can be in the future. Continuing on the future of healthy cities the next subject of research is how architects can play a role by the design of healthy, active living environments. The city of focus is Amsterdam, to make the research on healthy cities more specific it is investigated what the vision of the City of Amsterdam is on a future as a healthy, active city and what subjects and target group ask for extra attention.

Next to written information on the topic there are several examples of buildings that are designed for the improvement of urban health. In chapter IV. Plan analysis six case studies are investigated on how they have incorporated theoretical ideas on how to improve health by stimulating physical activity into the design of a building.
The assignment of the Dwelling Graduation Studio asks students to choose a location in Amsterdam on the belt of former defence works that runs around the inner city. In chapter V. the chosen location is introduced and analysed to formulate starting points for the design of a healthy dwelling complex on this site.

Finally, using the research of the topic, case studies and the site a design brief is formulated. In this brief the boundary conditions for the design of a healthy building, for the chosen target group, on the chosen site in Amsterdam are given. The brief is the starting point for the design phase of the Graduation Studio.

MANIFESTO

An Utopian vision on city-life of the future, in a city that takes care
of its citizens.

Health and the City

The design of our cities is inextricably linked to health. Urbanism was born in the unhealthy industrial cities of the late eighteenth century, when so many people moved to cities that they became overcrowded, dangerous and very unhealthy places to live in. Cities, like Amsterdam, were horrible places to live in: complete families lived in one room apartments, canals were open sewer systems and emissions from stoves and factories coloured the city black. Under these circumstances, contagious diseases spread easily, life expectancy was low and mortality rates were high.

Cities were sick and urban design was the cure. By improving sanitation and regulating basic human needs like access to clean water, fresh air and daylight in building standards, the central goal of urbanism was to design healthier cities. And it worked. After many renovations, interventions and the introduction of new laws for public health and housing, Amsterdam overcame its reputation as sick city and became known as a city were workers lived in palaces.

Unfortunately, after overcoming the worst threats on health, the professions of healthcare and urbanism developed in separate directions. Encouraged by the modernist movement and their separation of functions healthcare became something that takes place in hospitals and the new ideal living environment was not in the city but was surrounded with space, green and fresh air. The profession of healthcare was seen as completely separate from urbanism and architecture.

It is not surprising that this split made cities less healthy. Instead of encouraging healthy choices, urbanism made unhealthy choices more attractive. As cities spread out travel distances became longer. People became more car dependent and moved less on a daily base. Their cars shaped the streets and polluted the air. Many American cities are a clear example of how the new biggest threat on health is obesity and diseases related to obesity, mainly caused by lack of movement on a daily basis.

Additionally, as contagious diseases are not our biggest threat on health anymore, we are redefining our definition of health. We now know that only 20% of how healthy we are is determined by our genes. The other 80% is based on our lifestyles. We widely acknowledge that health is not only physical, but has an important mental aspect and we agree that our well-being is closely related to our lifestyles and the communities we live in.

Again, cities of today are attracting large numbers of people. Again cities are becoming overcrowded. Again cities are in danger of becoming unhealthy living environments, although the contagious diseases have made place for chronic diseases and mental issues. Again, cities are sick. In today's cities, cars have taken over the streets, physical activity has been designed out of our lives, children can not play outside anymore and loneliness is an increasingly serious problem. And again, it is the responsibility of urban designers to find the cure.

Designers of the built environment need to be reminded what the origin of their profession is, so they can play an important role in solving the health issues in cities of this time again. If we study the unhealthy risks of living in the city, we can plan to fight them. We need to do what city planning is invented for and make the city of the future a Healthy City.

New laws change the way we built and make sure that every new building or piece of urban fabric is designed to encourage healthy city living. The city of the future encourages its inhabitants to make healthy choices in life. The city of the future encourages physical activity. The city of the future includes places to take a rest. The city of the future gives people the opportunity to eat healthy and grow greens. The city of the future is a community that brings people together to socialize and to keep an eye on each other.
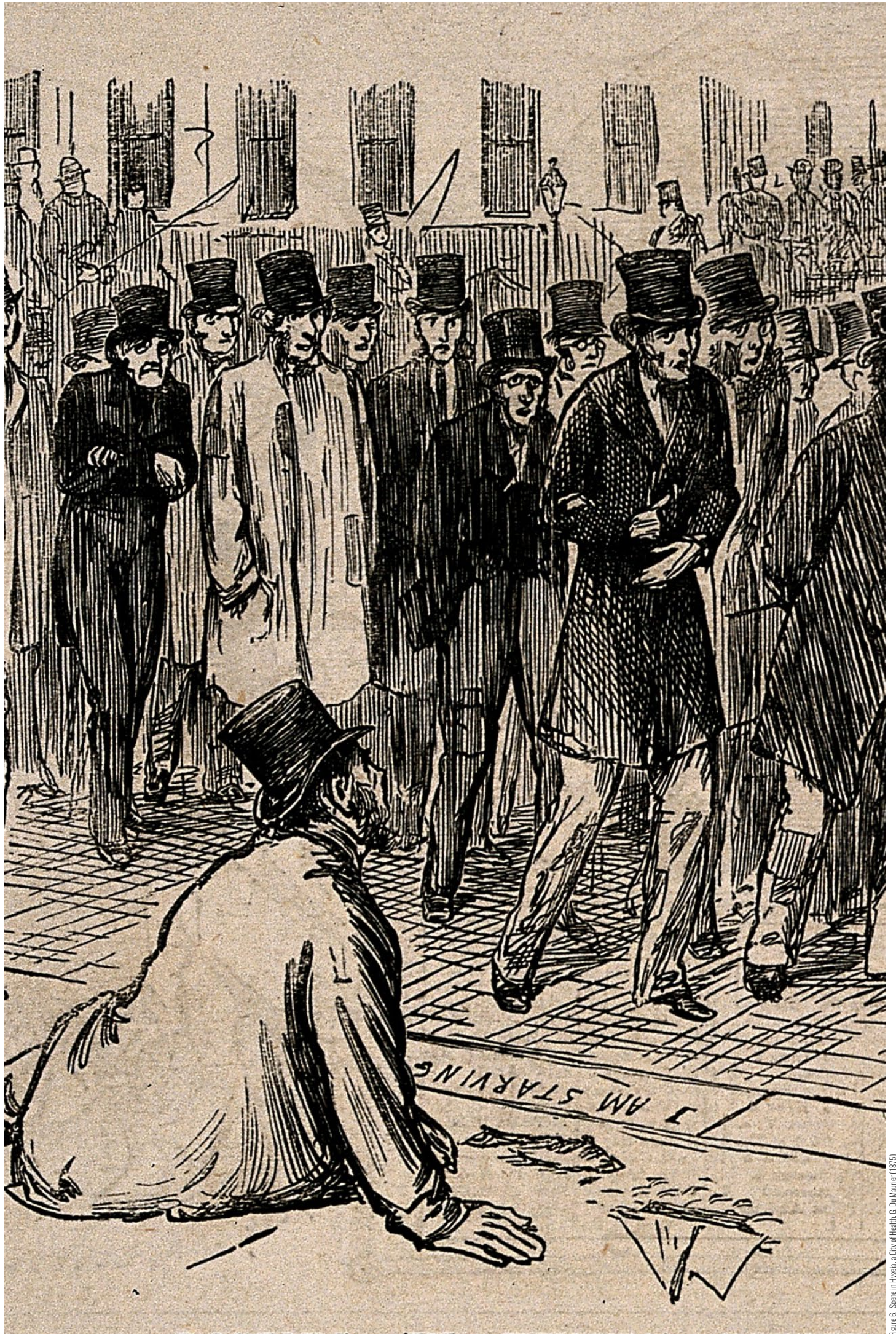The city of the future takes care of its citizens.

"I AM STARVING"

TOPIC ANALYSIS

The topic of health in the city is not new. To be able to formulate
how to design healthy living environments in depth research on the
definition of health and its relation with architecture in historic and
present perspective is needed. Complementary investigation of
opportunities to improve health and well-being through the design of
buildings is done. These insights are then projected onto the
location of the design assignment to find out what specific topics
and target-groups are relevant towards a Healthy Amsterdam.

Health

The definition of health has changed over time. As medical knowledge develops so does our definition of health. Today it is widely acknowledged that health is more than having a healthy body. Barton & Tsourou (2000) relate this modern concept of health to what the World Health Organization has defined as health in 1946:

'Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.'

In this definition it is very clear that health depends on multiple factors. Physical well-being is equally fundamental as mental and social well-being for being in good health. Defining health as depending on multiple factors suggests that health is not only the matter of health care professionals.

In modern healthcare prevention is as important as cure.[1] We have growing knowledge on how diseases can not only be treated in hospitals, but that many of the diseases we suffer from today are caused by unhealthy habits and can be prevented by changes in lifestyle. The Blue Zones Project states that only 20% of how long the average person lives is dedicated by genes, whereas the other 80% is dictated by our lifestyle.[2]

Health care is more and more considering the health of the population as a whole and focussing on improving conditions that make people ill in the first place, some of which are closely related to the quality of the physical environment.[3]

To take away:

Design for good health considering physical, mental and social factors.

Figure 7. Blue Zone Project (n.d.)

1   CABE, 2009.
2   Buettner & Skemp, 2016.
3   CABE, 2009.

Architecture & Health

The idea that health and urban planning are linked is not new. Since the earliest times people build their settlements in a way that protects them best from outside threats and so it can house their communities best. But especially in the cities of the nineteenth century, when the urban planning as we now know it originated, the design of the city was closely interconnected with public health.

The clean healthy city

In the nineteenth century cities were very unhealthy places to live in. In the second half of the nineteenth century the Industrial Revolution was changing European cities forever. People from rural areas moved to the cities in large numbers looking for work. The existing city fabric, often originating from medieval times, did not have enough space for all the newcomers. The cities became overcrowded, families lived in slums and one-room apartments. Every piece of empty space was built and the narrow streets did not let fresh air and daylight come into the houses. The now so popular Dutch canals were an open sewer network. Under these poor living circumstances diseases spread easily.

It was in this unsustainable situation that the field of urbanism was formulated for the first time. It was intended to mark the advent of an entirely new relationship between western man and the organization of his cities. [4] In the unhealthy industrial cities lie the roots of modern European urban planning, which had arisen to forever banish the dank houses and airless streets. [5]

From 1830 on medial science developed further. Its focus was on finding the causes of infectious diseases. This new science on health was called 'Hygiene'. Research was done on the benefits of heating, clean water and fresh air and the new insights led to the idea that Hygiene should lead the way in which cities, villages and houses were built. By definition Hygiene was multidisciplinary. [6] The driving ideology was the 'germ' theory which held that there are specific agents that cause infectious diseases that can be removed from society. The practice of public health was to clean up the 'bad dirt'. [7] The awareness of health increased, but the poor stayed behind. The new medical science was convinced that the poor and sick part of the inhabitants of the city had bad influence on the well-being of the whole society.[8] This lead to the rise of the idea of 'Social Hygiene' which aimed for healthy living circumstances for everybody. This idea resulted in, among other things, the development of the 'Gezondheidswet' and the 'Woningwet' that were published one day after each other 1901.[9] These new laws made health obligatory for all.

The primary concern of the rise of urban planning was to get back control over cities and to make them good living environments again. One of the ways in which this was done was by regularization - *that form of critical planning whose explicit purpose is to regularize the disordered city, to disclose its new order by means of a pure, schematic layout which will disentangle it from its dross, the sediment of past and present failures* [10] - such as Haussmann's model in Paris between 1852 and 1870. Under command of Napoleon he made interventions in the city of Paris, which was overcrowded, full of diseases, crime and unrest. The goal was to give the city air and open space, to add water and sewer systems and to connect and unify different parts. But on the other hand, their boulevards (Figure 8) received a lot of critique for disturbing social networks and display of power. [11]

Figure 8. Map of Paris with proposed new boulevards, Napoleon III (1852)

4   Choay, 1969.
5   Barton et al., 2009.
6   Woud, 2010.
7   Duhl & Sanchez, 1999.
8   Woud, 2010.
9   Roegholt, 1993.
10   Choay, 1969.
11   Saalman, 1971.

DOCTORS (IN HYGEIA) DIFFER (FROM THOSE IN LONDON.)
Scene in Dr. Richardson's City of Health.—Chorus of Medical Practitioners. "We have no Work to do!"

Figure 9. Scene in Hygeia, a City of Health. G. Du Maurier (1875)

Figure 10. Wijdegang, Beeldbank Amsterdam (around 1910)

Another approach to improving city life was not to intervene in existing cities, but to design completely new healthy cities. In 1876 B.W. Richardson described his Utopia in 'Hygeia - City of Health'. Richardson was not a fan of Haussmann's approach in Paris, who's work he calls a disgrace for modern civilization. He thinks of the diseases of modern life what a city could be if sanitary science was advanced further. He then describes his imaginary healthy city which is a place with the lowest mortality and no houses higher than four stories. One of his conclusions is that the ultimate healthy city would not need doctors anymore, as illustrated in the wood engraving in Figure 9.

Amsterdam at this time, had large amounts of slum houses. Especially the Jordaan was a complex network of narrow alleys and back streets in which crime and disease were common (Figure 10). The health of the public was not seen as a government task. But initiatives to better the living circumstances of the poor were taken by the elite, like the founding of the 'Vereeniging ten behoeve Arbeidersklasse te Amsterdam (VAK)' in 1852. Associations like these built social housing projects like the 200 meter long block with back-to-back dwellings on the Planciusstraat by architect Hamer in 1856 (Figure 11) and the workers housing on the Marnixstraat by 'Amsterdamse Vereeniging tot het bouwen van arbeiderswoningen' in 1878 (Figure 12). Next to housing, other initiatives for a healthier city life were private initiatives. For example schools, playgrounds and parks such as the Vondelpark designed by J.D. Zocher (1864, Figure 13) were realised.

The introduction of the 'Woningwet' 1901 as a tool of regularization had to ensure healthy living standards for everybody in the Netherlands. It provided good conditions for investments which resulted into a movement of collaborations for large scale social housing projects. Projects like the 'Woningwetwoningen', designed by Jan Ernst van der Pek in 1909 and initiated by Rochdale, (Figure 14) were called 'Arbeiderspaleizen' (worker's palaces) and included luxuries like cross-ventilation and private toilets. [12] Amsterdam became known as the 'Mekka of social housing' .[13]

12   Brinks, 2009.
13   Roegolt, 1993.

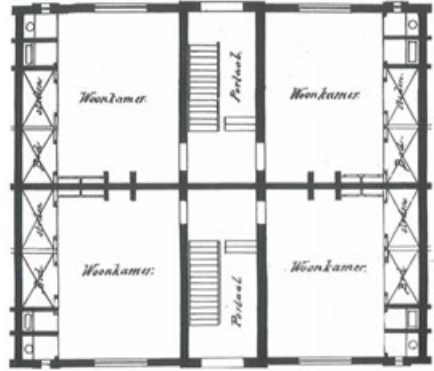Figure 11. VAK block on the Planciusstraat in Amsterdam, E. Draisma (2011)

Figure 12. Arbeidswoningen Marnixstraat, Amsterdamsche vereeniging tot het bouwen van arbeiderswoningen (1878)
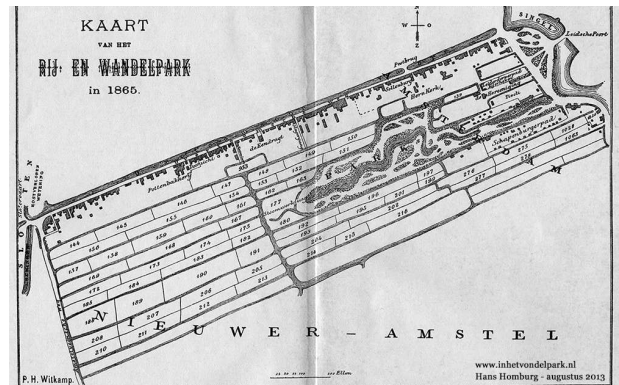

Figure 13. Map of the 'ride and walk park', P.H. Witkamp (1865)

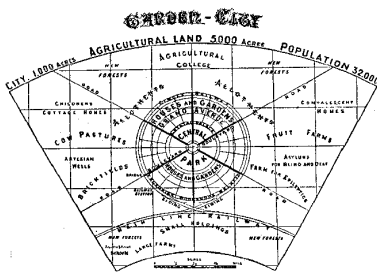Figure 14. Van Beuningenstraat, Stadsarchief Amsterdam (n.d.)

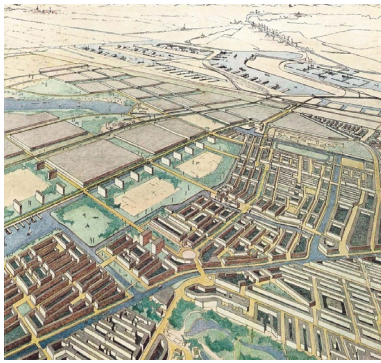Figure 15. Diagram from Garden Cities of Tomorrow, E. Howard (1902).

Figure 16. Bird's eye view of the Western Garden Cities by C. Van Eesteren (1934)

Figure 17. Nieuwmarktbuurt, photographer unknown (1974)
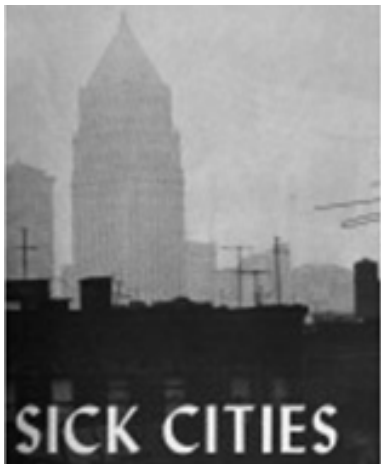
Figure 18.The cover of Sick Cities by M. Gorden (1963)

The spacious healthy city

The rise in the awareness of the importance of public health in the nineteenth century had been a reaction on the poor living circumstances in cities. Around the 1930's this approach emerged into a more active form of intervention. [14] Instead of controlling and sanitizing the environment, there was an increasing interest in immunizing the host. With a growing understanding of bacteria, infectious diseases and vaccinations, the disciplines of public health shifted away from the social model of community engineering and urban design towards a model based on medical principles. [15] Urban design and public health were seen as separate disciplines.

In urban design and architecture at that time, the functionalist model played an important role. The division of functions, yet linked them through networks, included ideas on increased efficiency, but also on social progress and improving hygiene. [16] New developments aimed to improve the lives of people living in cities by providing basic standards for all. An example are the Garden Cities based on the theories of Ebenezer Howard's who proposed to solve the problems of the Victorian city by moving people to new, self-containing towns in the open country-side. The Garden City movement saw more space, fresh air and nature as a better and healthier living environment for the workers (Figure 15).

In Amsterdam Arie Keppler, responsible for the supervision of building and housing in the city, was a true follower of Howard. [17] He saw solutions in decentralization and the realization of satellite-cities. These cities should give protection to live and work healthy and should be of a size that gives the possibility of having a fulfilling social life. Keppler was the founder of, among others, Buiksloterham, Oostzaan and Betondorp which were realized on short distances of the city and were designed to have an own character.

In the fifties and sixties, due to the large housing shortage after WWII, the Amsterdam Western Garden Cities were built at high speed. The ideals behind these plans were already initiated in the expansion plan 'Algemeen Uitbreidingsplan' of 1935 (Figure 16) and included designs with lots of green and open space. The new ideal was the open, instead of the closed, city. 'Light, air and space' became slogan of this new living environment.

City renewal meant city expansion and Amsterdam was changing rapidly. Although the health and well-being of the citizens was considered into the designs of the new areas, there was also a counter-movement. In the inner city a lot of old buildings were demolished which caused resistance of the citizens of Amsterdam. These people did not want to live in the spacious new areas but was looking for cities that where 'lively' and mixed-use. Figure 17 is a mural on which they wrote: 'We want a city with neighbourhoods were living, playing, working, learning and shopping is closeby and for young and older people'.[18]

The large expansions of cities had another disadvantage: much more transportation was needed. As the distance between the house and work became to long to walk, the amount of cars in cities increases enormously. Cars took over the cities changing the way streets and public spaces were used, causing dangerous situations in traffic, polluting the air and declining peoples daily physical activity. Or as Mitchell Gorden put it: Cars made cities sick (Figure 18).

14   Barton & Tsourou, 2000.
15   Duhl & Sanchez, 1999.
16   Duhl & Sanchez, 1999.
17   Roegholt, 1993.
18   Roegholt, 1993.

The future healthy city

In the cities of the past, the biggest threats on health were infectious diseases. Due to the improvement of our living conditions and the developments in medical care this is no longer the case. Leading causes of death today are for example violence, suicide due to mental issues and, the biggest threats on health in Western cities of the 21st century [19], chronic diseases which are all threats that can be influenced by how people live. Public health is swinging back to a social model that does not focus on the health of individuals and treatment of disease, but a model that sees health as an outcome of the effects of socioeconomic status, culture, environmental conditions, housing, employment and community influences.[20] There is a growing recognition of the way our environment affects ours health and well-being. [21] The disciplines of health and urban design are showing renewed interest and are rediscovering the connections of their fields.

In our concept of health nowadays, we acknowledge that personal lifestyle choices shape health. But these decisions are constrained by someone's opportunities. The quality of the environment experienced by a households members is one of the factors that influences the lifestyle of that household.[22] The designers of living environments can play a key role in creating opportunities for healthy lifestyles by encouraging its users to make healthy choices.

The field of planning is at a point of great change. Our cities are becoming more complex and as the traditional models are seen as inflexible, New Urbanism aims for sustainable cities that embrace organic developments. This calls for a multidisciplinary approach that can effectively work towards creating healthy, sustainable and economically vital cities. Community oriented neighbourhoods, which are mixed-use and have economic and social activities in walking distances are primary design characteristics. [23]

An example of this new approach on Healthy Cities are Walkable Cities. These cities exist out of high-dense, mixed-use neighbourhoods that have all daily needs on short distance from the dwellings. The inhabitants of these cities do not need cars, but can easily take a healthy walk to go to work or to meet their friends. One of the drivers of this idea is Jeff Speck. He links the way American cities are built for cars to the health problems of American citizens and advocates for the walkable city as a healthier way to live. He turns away from the idea of sprawl but wants to adjust the existing downtowns to make them more lively, make the users more physically active and so improve their health.
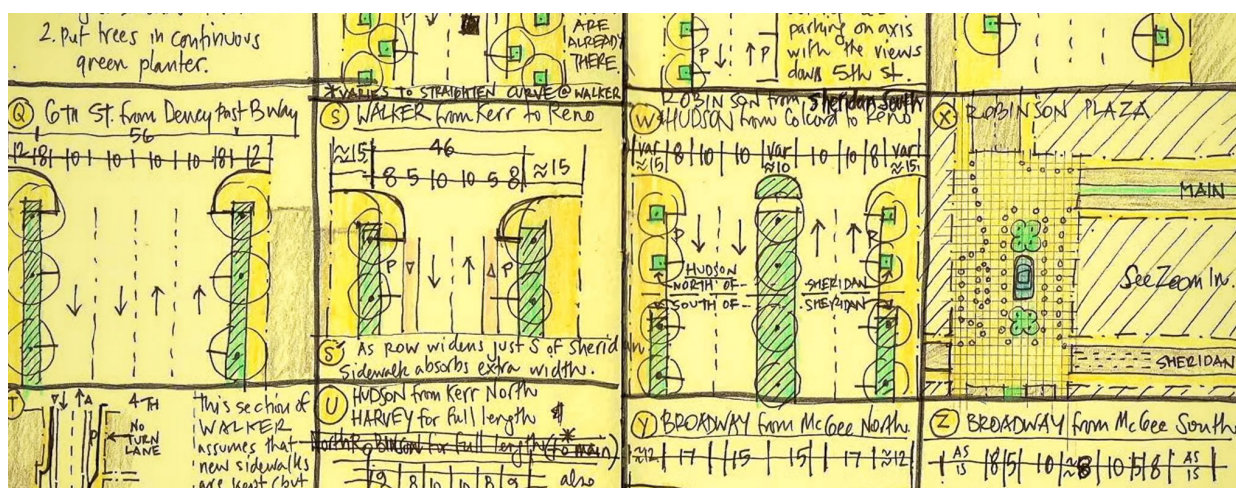
Figure 19. Still of a lecture by Jeff Specks on Walkable Cities, 2013.

19   City of New York, 2010.
20   Duhl & Sanchez, 1999.
21   CABE, 2009.
22   Barton & Tsourou, 2000.
23   Duhl & Sanchez, 2009.

Designing for a sustainable healthy city of the future is more than providing for basic needs. A healthy design gives opportunities for health in its broadest sense considering not only physical health, but also mental and social well-being. Social support and good relations make an important contribution to health. Belonging to a social network of communication and mutual obligation makes people feel cared for, loved, esteemed and valued. This has a powerful protective effect on health. Social isolation and exlusion are associated with increased rates of premature death and poorer chances of survival after a heart-attack. People who get less social and emotional support from others are more likely to experience less well-being, more depression, a greater risk of pregnancy complications and higher levels of disability from chronic diseases. In addition, supportive relationships may encourage healthier behaviour patterns. [24]

For the designers of healthy cities this means they do not only design for healthy individuals, but for healthy communities. This is especially true in the case of dwelling design, as dwelling types have been linked to feelings of loneliness and isolation. [25] When designing healthy housing, it is necessary to consider the balance between a diversity of needs. A repetition of healthy houses does not make a healthy city, an healthy design takes into account a diversity of needs on the scale of the individual, the family and the larger community.

To conclude on how the design of our cities can influence health, Barton & Tsourou (2000) have described two levels in their guide on 'Healthy Urban Planning':
- Individual behaviour and lifestyle
The physical environment can facilitate or deter a healthy lifestyle. The propensity of people to walk, cycle or play in the open air is affected by the convenience, quality and safety of pedestrian and cycling routes and by the availability of local open space.
- Social and community influences
Urban planning can act to destroy social networks in renewal schemes or conversely strengthen cultivate opportunities for a rich community life. Local networks are affected by the existence of common activities and meeting places and by that depend on long-term design strategies.

To take away:

Design environments that give opportunities for healthy behaviour to encourage healthy lifestyles.

Design for community feeling and social cohesion.

Design for a diversity of needs on the scale of the individual, the family and the larger community.

24   Wilkinson & Martmot, 2003.
25   Duhl & Sanchez, 1999.

Architecture & Activity

Recently many research has been done into the health benefits of physical activity. Physical activity once was naturally a part of our daily lives, but today it is completely designed out of our lives. [26] Dutch people are the most passive of Europe. We spend on average 8,7 hours a day sitting down. Our teenagers (age 12-20) are even worse, they spend 10,4 hours sitting at school, work, in transport and at home. [27] Next to that, we are getting heavier. In 1981 4,4 % of the population (age >4) was severe overweight, in 2012 this was 10,2 %. [28]

Lack of physical activity is a key factor the prevention of weight gain and chronic diseases but more and more research shows that exercise also has benefits for our mental and social well-being. It has proven to help avoid cognitive decline and to reduce mental illnesses like depression and Alzheimer, additionally people who are more physically active experience less feelings of loneliness and social exclusion. [29]

Physical activity contributes to a feeling of happiness and vitality on all stages of life. Active children do better at school. Teenagers who exercise regularly have a higher self-esteem, better social networks and less risk on mental problems like anxiety or aggression. Active employees have less absenteeism at work and being more active can be linked to a better quality of life at a higher age. [30]

In the Netherlands the Health Council has formulated the Dutch Physical Activity guidelines. [31] Which prescribe how much you should move to live a healthy life. In the same research they revealed that only 44 % of the Dutch adults meets the guidelines. Just over half of the young Dutch children are active enough. But an exception are the Dutch teenagers of which only 28 % moves enough to be healthy.

Most of us are moving too little, but luckily opportunities to be more active are hidden in small daily activities. If these opportunities can be identified and its frequency and intesity can be increased, physical activity can be stimulated significantly. The propensity of people to be physically active is affected by the convenience, quality and safety and availability of spaces in the living environment. Especially buildings, as we spend most of our time in them, are promising environments to stimulate physical activity. [32]

Active cities

These new insights in the health benefits of physical activity and the awareness that the design of the built environment has influence on how much people move is the origin of a new development called 'Active Cities'. This movement recognizes that architectural and urban design of today often support unhealthy rather than healthy choices and sedentary rather than active daily lifestyles. [33] Their goal is creating cities that are designed to improve public health by encouraging physical activity. The role of the designers of the built environment is again closely related to the defeat of the 21st century threats on health.

26   BETA Office for architecture and the city, 2016.
27   CBS, 2016b.
28   CBS, 2017a.
29   CABE, 2009.
30   BETA Office for architecture and the city, 2016.
31   Health Council of the Netherlands, 2017.
32   BETA Office for architecture and the city, 2016.
33   City of New York, 2010.

Figure 20. Physical activity guidelines, Health Council of the Netherlands (2017)

Figure 21. Physical activity guidelines, Health Council of the Netherlands (2017)

Next the goal of improving public health, Active Cities have also been linked to improve cities on different aspects. Active Cities are not only healthier but are experienced as more attractive, liveable and economically vital. Physical activity can been linked to strengthening peoples 'sense of belonging', as pedestrians and cyclists enjoy more social interaction with their surroundings than a car driver does. Being active is being interactive with others, for example children playing outdoors letting supervising parents get to know one another.[34]

Several initiatives are taken on how we can make physical activity again part of our daily life, using the design of our built environment. The City of New York is one of the first that translated the theory on the benefits of physical activity to guidelines for the design of the public space and buildings in 'Active Design Guidelines' (2010). This trend was continued by others, among which the Dutch 'Beweeglogica' by BETA Office for architecture and the city (2016) and The Active City by Urhahn (2017) initiated by the City of Amsterdam.
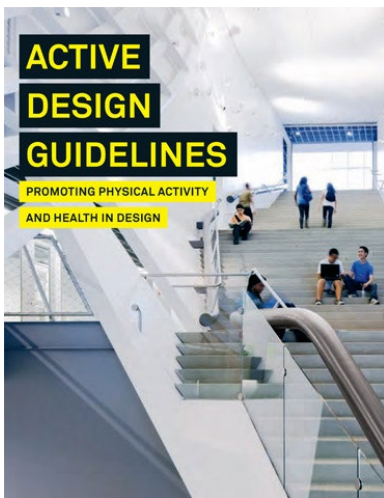
Figure 22. Active Design Guidelines, City of New York (2010)

Figure 23. Beweeglogica in Gebouwen, BETA Office for architecture and the city (2016)

Figure 24. The Active City, Urhahn (2017)

Activating architecture

The following investigation of design ingredients for a building that stimulates physical activity is based on the 'Beweeglogica voor gebouwen' by BETA Office for architecture and the city from 2016. The 'Beweeglogica' continues on the studies done by the City of New York in 2010 and the WELL Building Standards.

People can not be ordered to move more. But they can be tempted to be more physically active by making the active option more attractive. In 'Beweeglogica' several approaches that can make the users of a building choose for the active option are described:
- Discourage passive behaviour by making the unhealthy choice less attractive.
- Encourage active behaviour by making the healthy choice more attractive.

Discouraging passive behaviour can for example mean discouraging to take the elevators. Making attractive and strategically placed stairs while giving the elevator a less prominent location, or making taking the elevator a slower way to get to your destination than taking the stairs will make people consider taking the healthier option. Another way to discourage passive behaviour can be placing commonly used program on different places in the building. This will force people to move more on a daily basis. Discouraging passive behaviour can be very effective, but the risk of this approach is that it can be experienced as annoying.

34   Urhahn, 2017.

The second approach, encouraging active behaviour, can be interesting for architecture because interventions that stimulate physical activity can add spatial qualities to the design. Adding attractive destinations like roof terraces to the design can make people choose to move more in order to use them. Or making sport facilities attractive and visible can lead to increased use. Next to letting the users of the building make conscious decisions to be more active, architecture can influence users unconscious decisions. Research has shown that, for example, rhythmic music makes people walk faster and good lightning can serve attractively.

Based on the theory of influencing the choices people make, BETA formulated principles that can be used for the design of buildings that stimulate physical activity. These principles are divided into four domains: Routing, Goals, Active Program and Building & Context. For each domain different design principles that encourage physical activity are suggested.

Routes are the lines along which people move through a building, connecting the different spaces. Along these lines people already are physically active, but strategic design of stairs, corridors, elevators and ramps can increase the frequency and intensity.
Goals are attractive or useful building functions that people want to, or have to, move towards. Placing goals strategically can stimulate physical activity because users travel short distances more often. For this to be successful, distances between goals can not be too long and routes and goals need to be rewarding.
Active Program contains all spaces or elements that increase physical activity directly, like sport facilities, bicycle parking and activating furniture. Providing program like this makes higher intensity physical activity easily accessible and convenient.
A building influences, and is influenced by, its context. A variation in program, multiple entries and attention to human scale can increase physical movement in the buildings surroundings. The design of a building can also have a negative influence on activity in its context, for example by blocking the sun or views.

As an addition another domain can be added to this investigation of design ingredients that stimulate physical activity: nature. Using nature in design is another domain that is proven to have a positive influence on health and well-being.[35] Green spaces with trees and other plants improve air quality, provide shade and promote biodiversity. Access to a natural environment can reduce stress and relieve the sense of overcrowding in urban environments. But nature also has a potential to stimulate physical activity. Attractive outdoor spaces with green and water encourage outdoor exercise and active play for children and teenagers. Providing gardens can encourage healthy eating and active recreation.
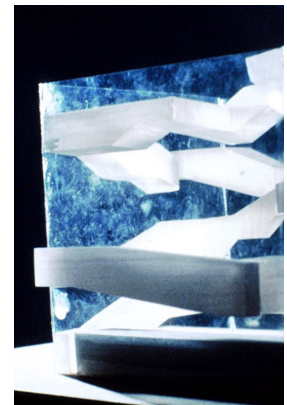
Figure 26. Renovation of the Oosterpark wading pool by Aldo van Eyck, Carve (2015)

35   CABE, 2009.
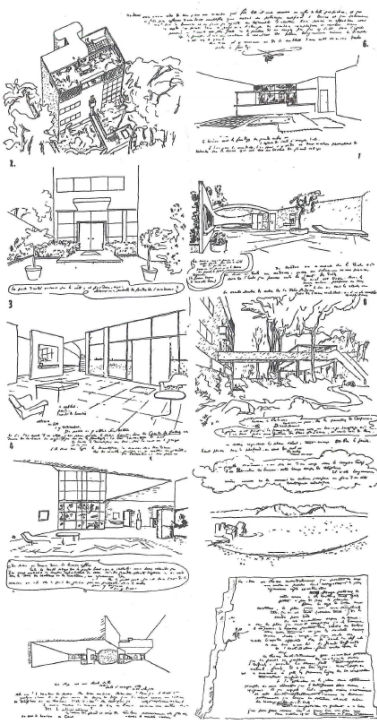
Figure 27. Letter to Madame Meyer, Le Corbusier (1925)

Movement in architecture

Guidelines like the Active Design Guidelines and the Beweeglogica consist out of a collection of building elements that encourage physical movement. But there are also examples of architects that see the movement through a building as a leading theme in their design process.

'The quality and viability of a design are not are not determined by the image, but by the way in which spacious connections and movements are triggered. The making of spacious connections and the design of movement through space are distinctive aspects of architecture. Architecture is a system of spaces and movements.'
- Dick van Gameren, 2005. [36]

In his book 'Revisies van de ruimte' or 'Revisions on space' van Gameren states that architecture is not about designing an image, but designing spacious connections and movements through space. His book shows a series of historical examples of buildings that inspired him and a collection of his own work based on this idea of architecture. Another example of how movement can be a leading theme in architecture is the well-known 'promenade architectural' in the designs of Le Corbusier:

'Architecture is experienced as one roams about it and walks through it.. So true is this that architectural works can be divided into dead and living ones depending on whether the law of 'roaming through' has not been observed or whether on the contrary it has been brilliantly obeyed.'
- Le Corbusier, 1942.

The promenade architectural is the observers pathway through the built space. It can be understood as a sequence of images that unfolds before the eyes of the observer moving through the design. *Architecture constitutes the space of processes of movement.* [37] Figure 27 shows the way Le Corbusier explained his design as a promenade architectural in a letter to Madame Meyer.

To take away:

Design routing strategically to increase physical activity.

Place goals strategically along the routes to stimulate movement.

Provide active program for high intensity physical activity.

Consider the way in which the design has influence on activity in the wider context.

Use nature to stimulate active recreation and to reduce stress.

Use the movement through the building as a design theme.

36   Translated from Dutch
37   Samuel, 2001.

Active Amsterdam

In Amsterdam, even though it is the world bike city, there is a lot attention for increasing the amount of physical activity of its citizens. Amsterdam is popular and public space is scarce. Spaces for walking, cycling, sports and playing are under pressure. An important point of attention is how to protect the liveable quality of the city providing sufficient room to move for everybody. The municipality sees the growth of the city, for which increasing urban density and transformations are needed, as an opportunity to make sports and physical movement a structural component of the city. [38]

Urhahn, commissioned by the City of Amsterdam, researched Amsterdam's opportunities for becoming an Active City. They formulated ambitions for Active Amsterdam that focus on three aspects:
- Cycling & Walking (active transport, intensive and mixed-use neighbourhoods, safe and attractive public space)
- Sports (open and easily accessible sport facilities, using the city as a gym, green areas and water are spaces for active opportunities)
- Play & Leisure (playing outdoors in a dense city, relaxing in the city, attractive greenery)

The municipality of Amsterdam has monitored the health and activity of its citizens in 'Beweegatlas' 2016. In general, people of Amsterdam are quite active, they move more than the National average. But there are multiple groups that need special attention. People with a lower social economical status are on average less active. Only 45 % of the people of Amsterdam of a lower social economical status are active enough, against 70 % of the people of a higher status that meet the Physical Activity Guidelines. This means they on average face health issues 20 years earlier and die 7 years earlier. [39]

Another important point of attention is the young people in Amsterdam. More than half of Amsterdam's five-year-olds and 80% of Amsterdam teenagers of the 2nd and 4th grade do not meet the standard of one active hour per day. Even 17 % of these teenagers does not have three active hours per week. [40] The municipality and the health authorities have several programs that aim to activate Amsterdam's youth.

In general is can be said that the further away from Amsterdam's city centre, the less healthy the citizens are. This is mainly related to the social economical status that is lower further away from the centre. Most of the people living in the central part of Amsterdam are active. They exercise, take the bike and walk more than the inhabitants of other city parts. [41] This can be related to the higher density of this living environments. A compact neighbourhood with a lot of local facilities is suitable for active transport like cycling or walking. A drawback from these high density living environments is busy traffic and lack of space for children to play. In the Beweegatlas (Figure 29) is visualized that in Amsterdam city centre children (age 10) are a group that needs special attention to meet the Physical Activity guidelines.

Figure 28. Choice for transportation per district in Amsterdam, Beweegatlas (2016)
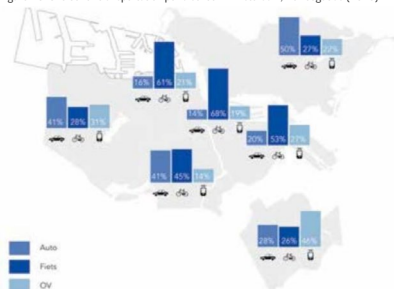
Figure 29. Focus areas in relation to the Dutch Physical Activity guidelines, Beweegatlas (2016)
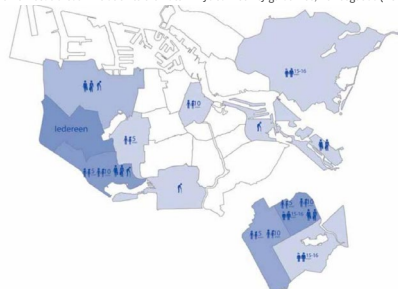
38   Urhahn, 2017.
39   Leenen & Woudenberg, 2017.
40   Leenen & Woudenberg, 2017.
41   Hakvoort & Holtmaat, 2017.
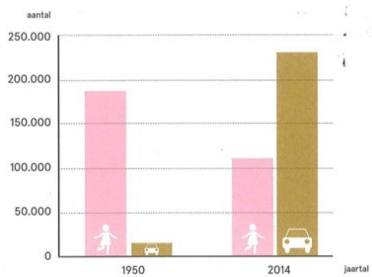
Figure 30. The relationship between cars and children. L. Karsten & N. Felder (2016).

Figure 31. Playground Boetzelaerplein by Aldo van Eyck,Kollariva & van Lingen (2016)
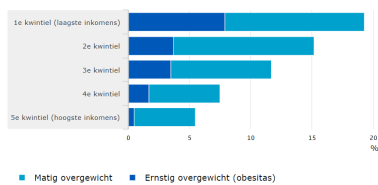
Figure 32. Overweight of children (age 4-12) by family income, 2014/2015, CBS (2016)
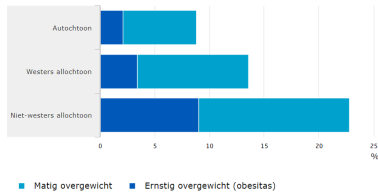
Figure 33. Overweight of children (age 4-12) by origin, 2014/2015, CBS (2016)

Target group

The first reason for the choice of city children and their families as a target group is the outcome of the Beweegatlas. On the location of the design assignment, children need special attention because they do not meet the Physical Activity guidelines. Even though in general, people living in this area live active and healthy lives, children are an exception. Hakvoort & Holtmaat (2017) state that this can be related to the density of their living environments.

'High density living environments are positive for the physical activity of adults but not for the physical activity of children. '
- L. Hakvoort & D. Holtmaat, 2017.

This raises questions. Amsterdam wants to get more dense and sees this as a opportunity to make physical activity a structural component of the city, but there seems to be an age limit to the health benefit of high dense living environments.

Children are loosing the battle for space, Karsten & Felder observe in their study on the new generation city children of 2016. The pressure on space is high as a growing number of people wants to use it. The changing ratio between children and cars in Amsterdam over the years (Figure 30) is illustrative of who is winning.

The question of how to give children space in the city is not new. After WWII there was almost no space available for children, neither inside or outside the house. Playground had private owners and were based on memberships for the fortunate few. Aldo van Eyck's playgrounds in Amsterdam, on unused plots of land, were a creative solution in a time of need. But they were more. Van Eyck turned away from top down organization and modernist functionalism and advocated for a bottom-up architecture with space for imagination, human activity and social interaction.[42] The playgrounds were not only meant for children, but for the whole society. Van Eyck followed Johan Huizinga's notion of play - a serious matter and a essential element of culture.

At the same time, over the whole country children are playing outside less. The amount of children that plays outside everyday is decreased from 20% five years ago to 14%, while children say they would like to play outside more.[43] Another national trend is the increase of the weight of children. Especially children from families with low income and children from a non-western migration background are more overweight (Figure 32 and Figure 33). This means that especially children in the four largest cities of the Netherlands, of which Amsterdam is one, are more overweight. In these municipalities 18% of the children is overweight, while the national average is 11 %.[44]

When a healthy lifestyle is developed at a young age, it is easier to maintain this for the rest of your life.[45] Also, encouraging children to life more healthy can positively influence their whole families. Seen in this way, Focussing on the improvement of children's health can have a larger effect on the long-term.

42   Oudenampsen, 2013.
43   NOS, 2018.
44   CBS, 2016c.
45   Karsten & Felder, 2016.

A final reason to choose city children as a target group has recently been in the news a lot. Families with young children are leaving cities. 40% of the young families in Amsterdam left the city within four years after the birth of their first child.[46] Partly, this is a natural movement of young people that came to study and now make room for new people. But there is also a group that wants to stay and is forced to leave due to the housing crisis. A risk of this movement of young families out the cities is a decrease in diversity. Families are in a way a measure of quality of life in cities. Their presence means a city is safe and child-friendly and in general families take good care of their surroundings, which increases the quality of city life.[47]

Figure 34. Headline of Het Parool: 'Families with young children leave Amsterdam', M. Couzy (2017)

Figure 35. Headline of NRC: "With families the quality of life disappears". D. Nagtegaal & S. de Voogt (2017)

Figure 36. Headline Nieuwsuur: 'Amsterdam wants to keep young families'. NOS (2017)

Child-friendly cities

A child-friendly city has places for play. Playing outside is healthy for all ages. Children develop motor, creative and social skills and spatial awareness. Playing outside for adults - or relaxation - makes their brain function better and offers opportunities for social interaction.[48] Karsten & Felder offer inspiration on how to design places for play that contribute to a child-friendly city:

Prioritize walking above cycling above driving a car.
Not all streets have to be a place for busy traffic and cars. It can also be a place for slow traffic, meeting and playing. Reverse the use of public space: from parking at your doorstep and playing around the corner, to playing at your doorstep and parking around the corner.

Make larger outdoor spaces, like school yards and playgrounds, accessible and usable for multiple functions.
Safe routing from and to these places and social control on these spaces are crucial for them to be used correctly.

Strengthen the neighbourhood.
People consider the space within a distance of 500-1000 meter as their neighbourhood. If there are enough facilities in this space, people will have stronger connections to their neighbourhood. These facilities can be: shops, places to play, green, restaurants, workplaces and other families.

Make sheltered spaces for play and relaxation in the city.
Conditions for good a successful space are: sheltered, central location, green or water, free entry, facilities to sit and play, accessible by bike.

Use space multifunctionally and temporary.
Squares can be playgrounds during the day and parking areas in the evening.

Connect dwellings to public space.
People will feel more connected and responsible. Let the inhabitants appropriate the public space and make it greener.

46   CBS, 2017b.
47   Nagtegaal & de Voogt in NRC, 2017.
48   Urhahn, 2017.

Family-friendly city apartments

Next to a child-friendly city, the dwelling has to fit the needs of a family. Cities do not have enough space to give all families free-standing houses and large gardens, but apartments can be good family homes as long as they take into account the wishes of families.

In 2013 the Alliance of Dutch Architects (BNA) did an extensive research on the housing requirements of families that want to live in cities called 'Nestling in the city' by Jolanda Keesom and Hilde de Haan. An important part of the research was conversations between architects and families using 'mental maps' in which wishes and experiences of the families were mapped. Keesom & de Haan define the city family as a new type: young parents who both work in the city, share the care of their children and have a busy social life. They strongly depend on a social network close to their house. These city families often live in houses that are too small for them and would like to move to a dwelling that better suits them. But these houses are scarce in cities.

Another research on this topic was done by Jager-Janssens and M. Bouwmans. In search of what this new dwelling type 'the family apartment' could look like, the Municipality of Rotterdam initiated a competition. Based on an analysis of the more than 150 submissions, Jager-Janssens and M. Boumans [49] investigated what the leading topics where in the designs. They translated the most named topics into 'essential ingredients' for the design of family apartments (Figure 37).

RUIMTELIJK

THEMA
FLEXIBELE PLATTEGRONDEN EN HOOGTES

THEMA
RUST EN PRIVACY

THEMA
COLLECTIEVE BUITENRUIMTE

THEMA
EXTRA BERGRUIMTE / ZOLDER

THEMA
ELK KIND ZIJN EIGEN PLEK, SPEELRUIMTE

THEMA
OVERMAAT

THEMA
FIETSENSTALLING

THEMA
ROYALE ENTREE

THEMA
DAKTUIN

THEMA
CASCO (=ESTHETIEK)

THEMA
VERTICALE STRAAT

CONTEXTUEEL

THEMA
ACTIERADIUS

THEMA
SCHAAL

THEMA
STADSNETWERK / STADSVOORZIENINGEN

THEMA
URBAN ESCAPE

Figure 37. Themes for the design of a family apartment, P. Berghout (2017)

Looking at these two researches, the following returning themes can be recognized:

Storage.
Families own a lot of stuff and efficient storage is crucial for good use of the living spaces. The challenge: clever storage for daily used items like bikes, shoes and longer-term storage for example for camping gear and skis.

Lifecycle.
Families change constantly and families are inventive if the dwelling allows for that. The layout of a children's bedroom changes when the child grows up. Extra rooms are needed when more children are born. When the children get older and leave the house, it can be adjusted to fit the lifestyle of the parents. Elements in the floor plan that are harder to change like the location

49   Jager-Janssens & Boumans, 2017

of the kitchen, toilet, bedrooms and windows determine the flexible use of the living spaces.

Privacy.
Both parents and growing up children need a place of their own. This place must be have the option to be closed off from spaces for joint use.
A dwelling contains both private, like bedrooms, and representative spaces like living rooms. The layout should prevent guest from passing through the private spaces.

Multifunctional floorplans.
An extra room that can be both office, playroom and bedroom for guests can make small dwellings very suitable for flexible use. Large circulation space like hallways can double as other spaces: like storage or a small office.

Playing outside.
Small children can only play outside on a sheltered terrace, balcony or verandah. Children from the age of 6 can play outside independently, as long as the parents can keep an eye on them. By designing circulation spaces, like stairwells and galleries, as transitional spaces for different sort of uses they can double as safe space for outdoor play close to the house. Sharing places like this with your neighbours will increase social control and cohesion.

Work from home.
Working (part-time) from home is getting more and more common. This can be done at the kitchen table, but preferably there is a space where work supplies do not have to be put away every day.

To take away:

Design child-friendly living environments by prioritizing slow traffic, by making public space accessible, sheltered and multifunctional and by connecting dwellings to public space.

Design family-friendly houses that have enough storage space, have places for play, give privacy and are multifunctional and flexible in use.
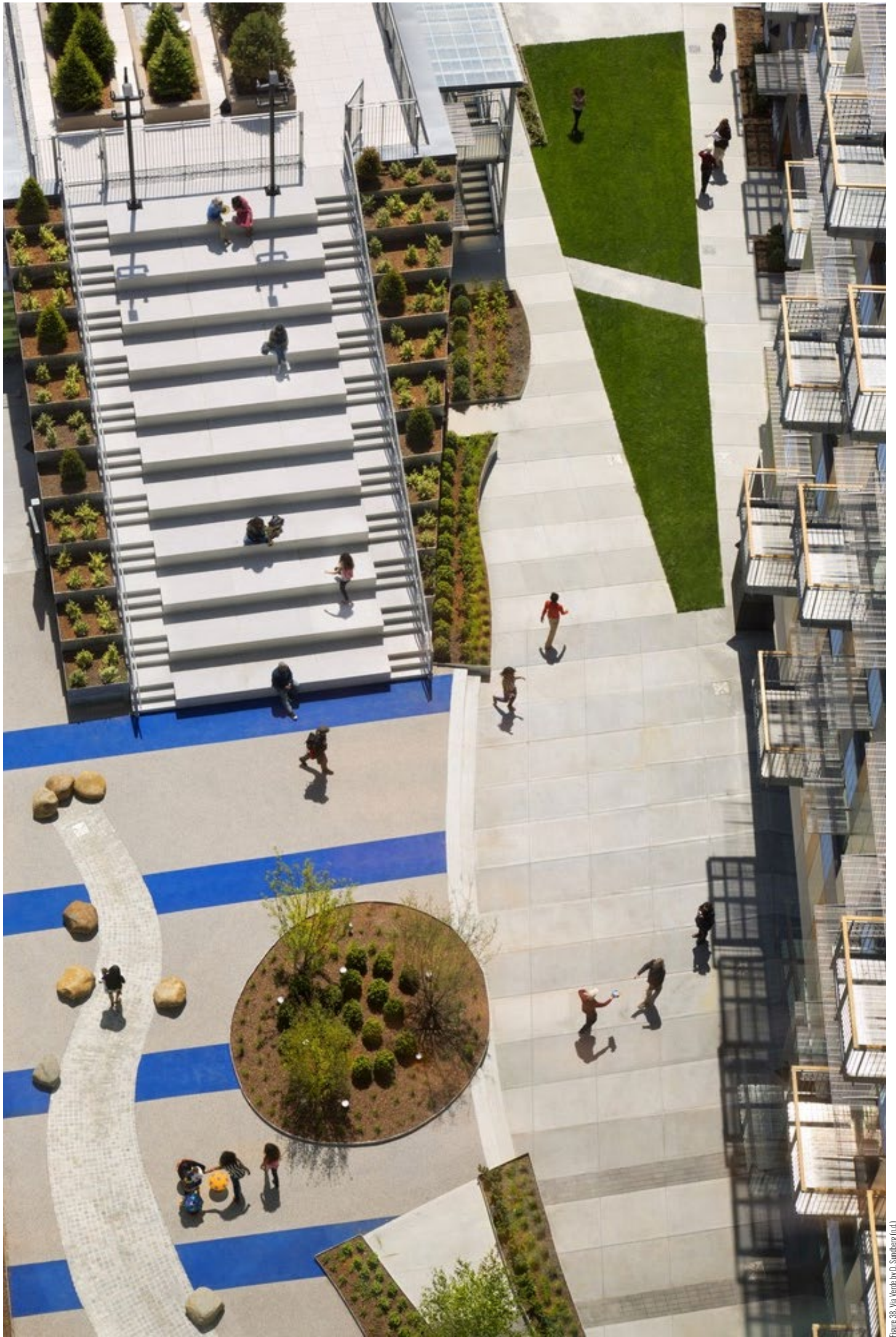
PLAN ANALYSIS

Active buildings are buildings that encourage physical movement. In theory a lot is written about how the design of buildings can encourage people to be more active. This chapter analyses case studies to find out how the theoretical ideas are applied in reality.

Topic

Design principles that encourage physical movement in urban buildings.

Relevance

The relevance of this research is giving designers tools to design buildings for an active lifestyle, by analysing principles that encourage physical movements in case studies

Research question

How are design principles that encourage physical movement integrated in the design of the case studies?

Hypothesis

Buildings that are designed to encourage physical movement are designed by a set of returning domains.Within these domains, design principles that encourage physical movement are integrated in different ways.

Method

In 'Beweeglogica in Gebouwen' by BETA office for architecture and the city four domains of movement are defined as principles that encourage physical movement in buildings. These four domains are: Routes, Goals, Active program and Building & Context.
To analyse how these principles are integrated in the case study an axonometric reduction drawing is made for each domain. After this these drawings are combined to form one concluding drawing where we can see how the design principles that encourage physical movement are integrated in the design of the case study.

Results

The results of the plananalysis are visible on the next pages. The analysis begins after a brief introduction of the chosen buildings.

Figure 39. Kalkbreite (n.d.)

Project: Kalkbreite
Architect: Müller Sigrist Architecten
Location: Zürich, Switserland
Completed: 2014
Dwellings: 88
Floor area: 22710 m2

Figure 40. Mirador by M. Vullings (n.d.)

Project: Mirador
Architect: MVRDV
Location: Madrid, Spain
Completed: 2005
Dwellings: 156
Floor area: 18300 m2

Figure 41. Oh Boy by Hauschild + Siegel Architecture (n.d.)

Project: Ohboy
Architect: Hauschild + Siegel Architecture
Location: Malmö, Sweden
Completed: 2017
Dwellings: 55 + 31 hotel rooms
Floor area: 3922 m2

Figure 42. Rotterdamse toren van Babel by L. Boodt (n.d.)

Project: Rotterdamse toren van Babel
Architect: Laurens Boodt Architect / AM / Bartels
Location: Rotterdam, Netherlands
Completed: 2018 (expectation)
Dwellings: 24
Floor area: 3800 m2

Figure 43. Medibank by E. Carter (n.d.)

Project: Medibank office
Architect: HASSELL
Location: Docklands, Melbourne, Australia
Completed: 2014
Dwellings: -
Floor area: 47750 m2

Figure 44. Via Verde by D. Sundberg (n.d.)

Project: Via Verde
Architect: Grimshaw + Dattner Architects
Location: New York, USA
Completed: 2012
Dwellings: 222
Floor area: 29400 m2

Routing
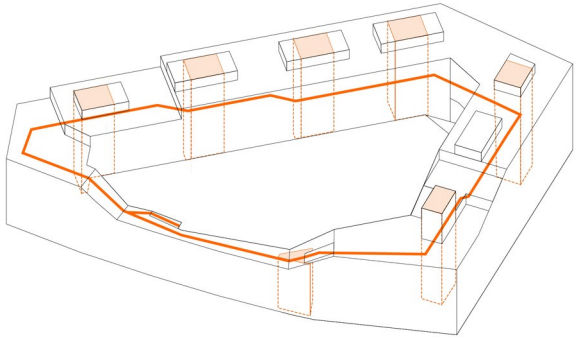
🔶 Contiguous route around the building

🔶 Stairs on the route

🔶 Route runs over the rooftop

Goals
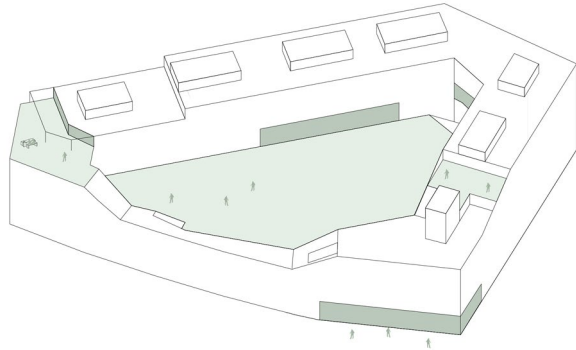
🟢 Playground on the roof

🟢 Café on the gourndfloor and second floor

🟢 Shops on the groundfloor
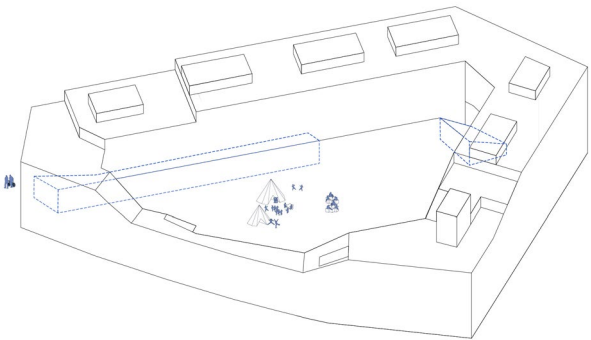
Active program

🔵 Bicycle storage on the groundfloor

🔵 Active program on the roof

Building & Context
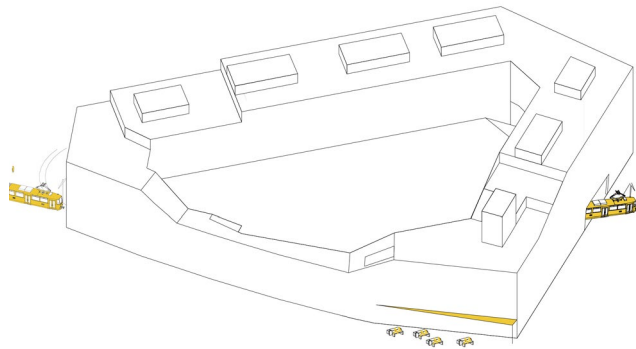
🟡 Public transport facility goes trough the building

🟡 Overhang to accentuate the goal
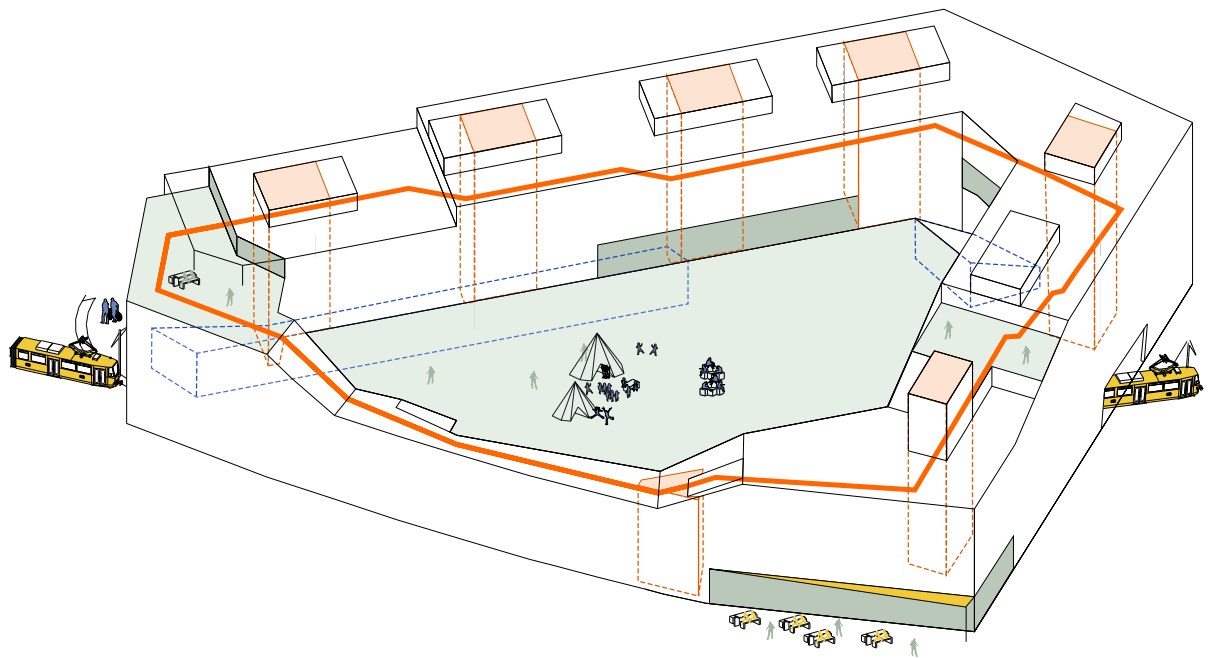
Kalkbreite by Müller Sigrist Architecten

The route runs aswell external as internal around the building and is interrupted with different goals. The route runs around the goal in the middle. The active program is located in the ground floor and under the staircase. The building is located on a former tram station and allows to run trough it. To accentuate a goal little interventions in the facade are made.

Routing
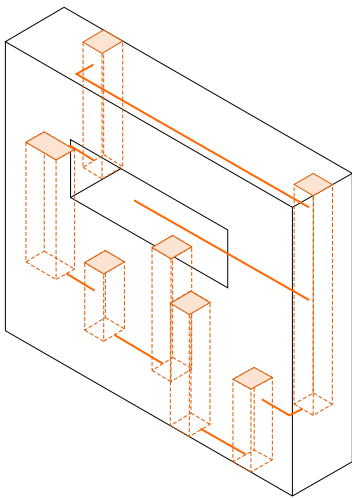
Contiguous route in the building

Route runs over the roof of the building

Goals
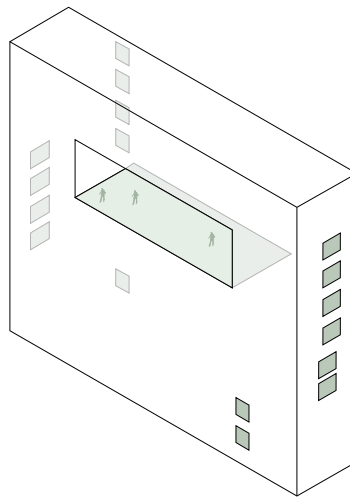
Roofterrace with a view

Collective space on platform in the middle

Active program
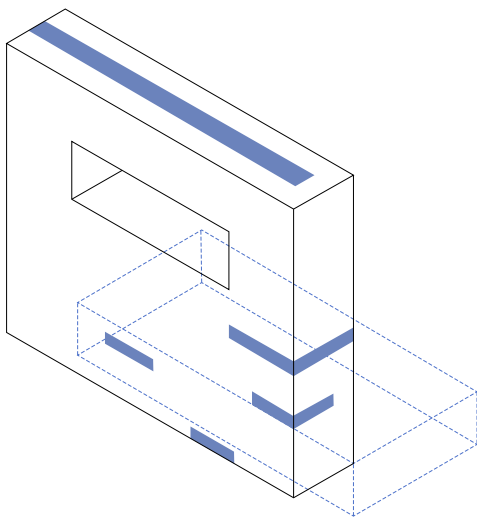
P Car parking under the building

Building & Context
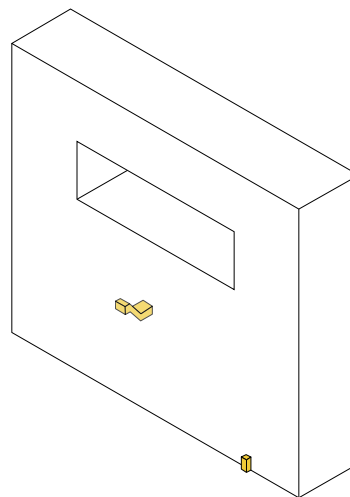
Sun orientated building
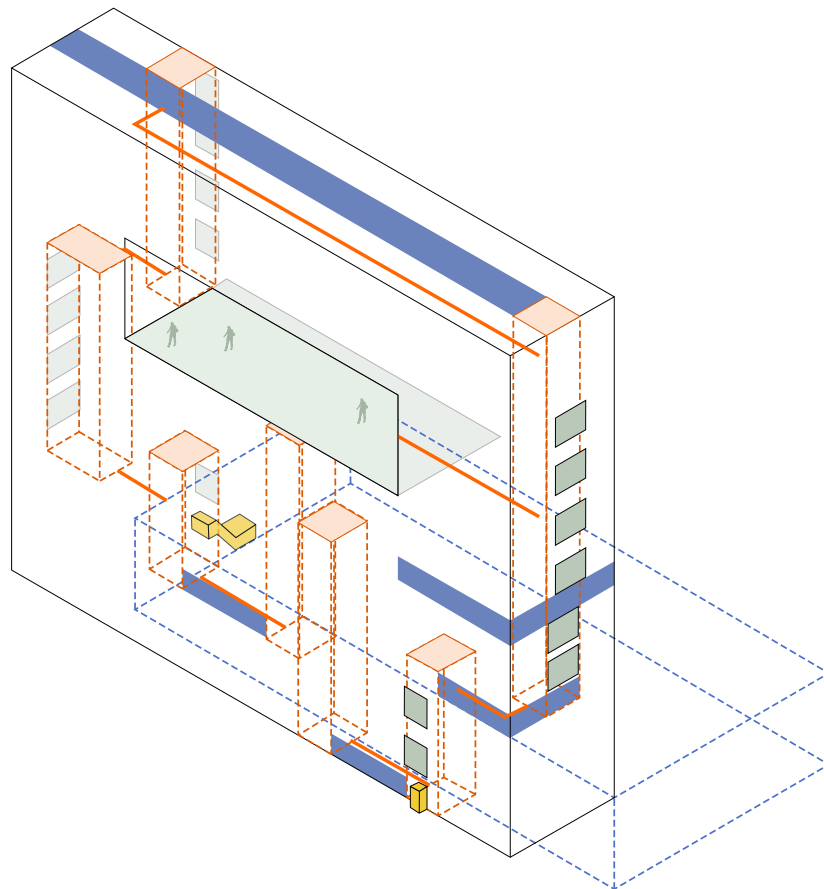
Mirador by MVRDV

A network of staircases and corridors results in a consecutive route inside this building. The route is only for people who live in the Mirador and is therefore not public. On the route different viewpoints are there to sitmulate the user.

Routing
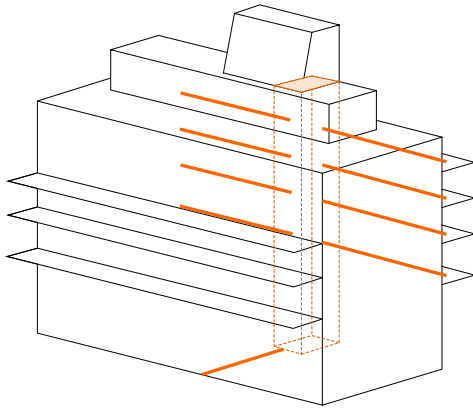
Goals
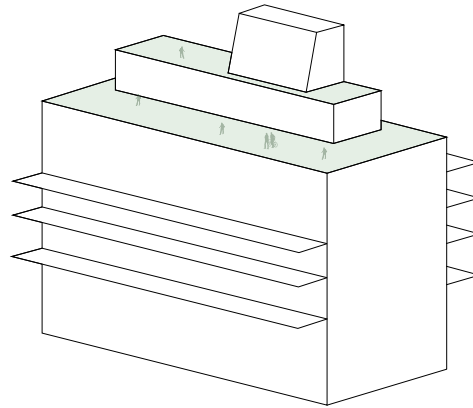
 Route with one central staircase and acces to appartments on gallery

 Roofterrace with a view

 Collective space on the ground floor

 Collective outdoor space on the rooftop

Active program
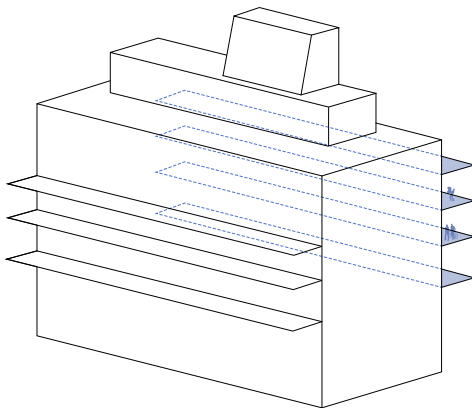
Building & Context
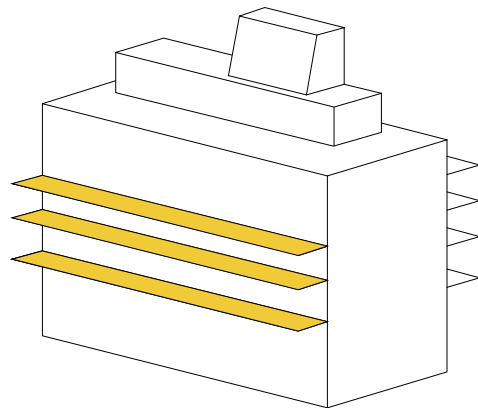
 Bicycle storage on the gallery

 Private outdoor spaces orientated on the sun

 Skatepark directly near the building
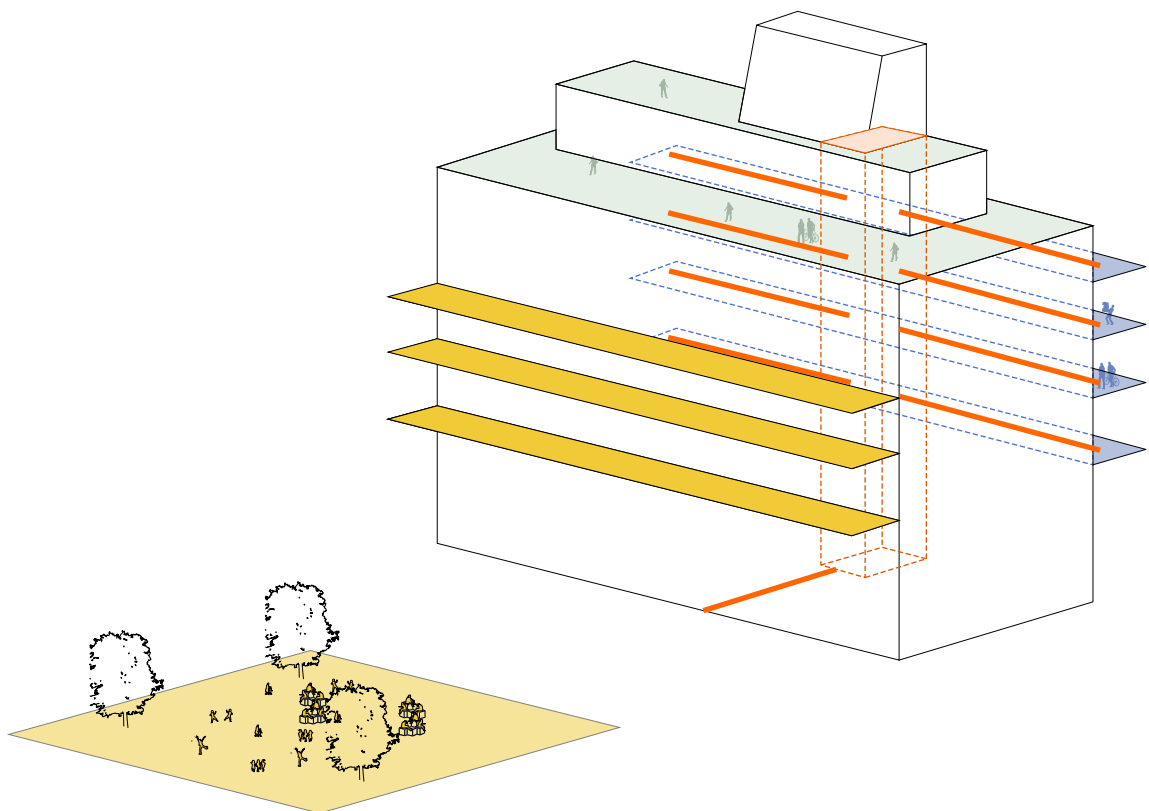
Ohboy by Hauschild + Siegel Architecture

The Ohboy hotel is situated next to a skatepark. If you enter the building a central staircase would lead you to one of the galleries on the north side of the building. You can park your bike on the gallery next to your front door. All the privet spaces of the appartments are orientated towards the sun. On the roof is a collective outdoorspace where people can chill.

Routing
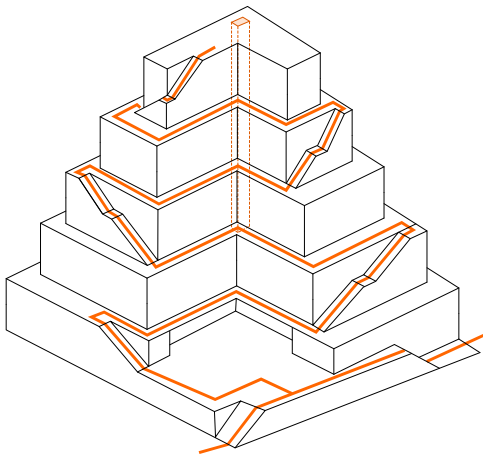
Goals

⬭	A linear routes leads over the building
⬯	The route includes stairs and climbs up the building
▦	The route ends on the top of the building
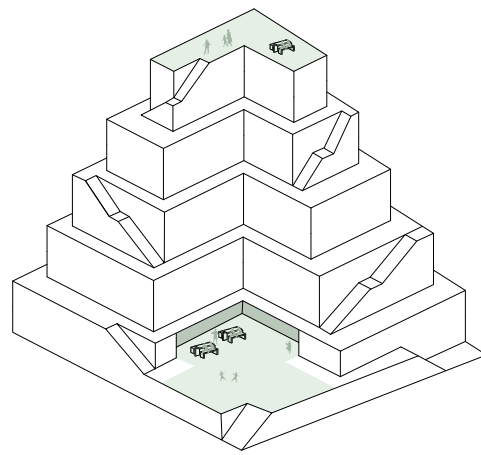
◁	Roofterrace with a view
⎯	Collective outdoor space
⚇	Collective living room and kitchen

Active program
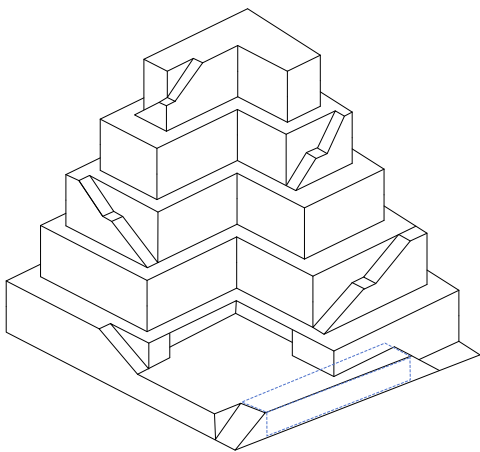
Building & Context

🚲	Space for bike storage is located on the ground floor
Ⓟ	Cars can be parked in the basement
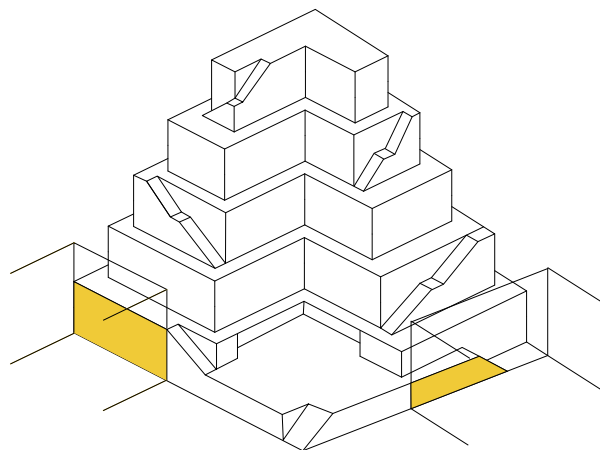
⬡	The building is connected to the adjacent buildings
☀	The collective outdoor space is oriented towards the sun
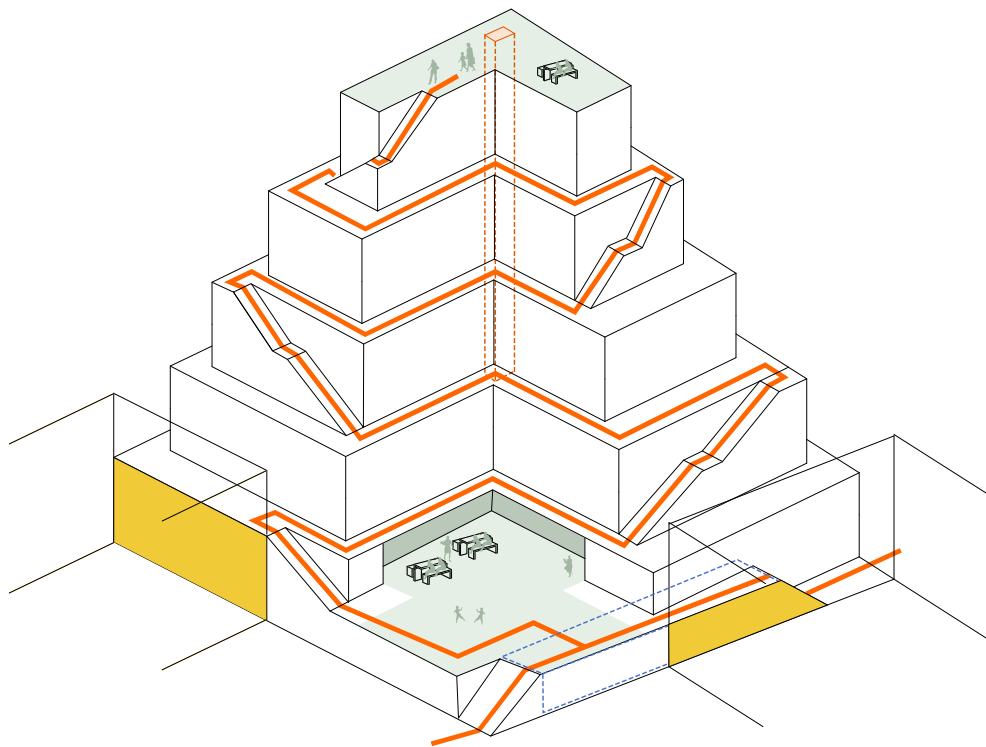
Rotterdamse toren van Babel by Laurens Boodt Architect / AM / Bartels

If you would follow the route up the building, you would first pass the collective outdoor space and then climb up to the roofterrace. The collective living room and kitchen is on the route, but you will not go through them. The parking places for bikes and cars are not connected to the route.

Routing
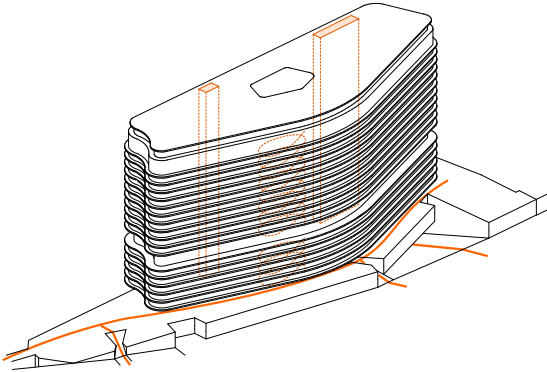
The route leads over the plinth of the building and connects to a core from which the different floors can be reached

Goals
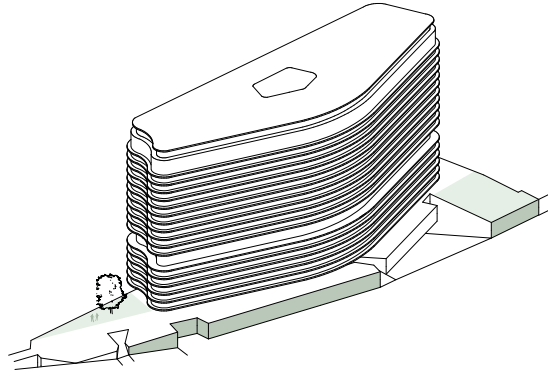
The plinth of the building contains public program

On top of the plinth a restaurant is located

On top of the plinth a green park is located

Active program
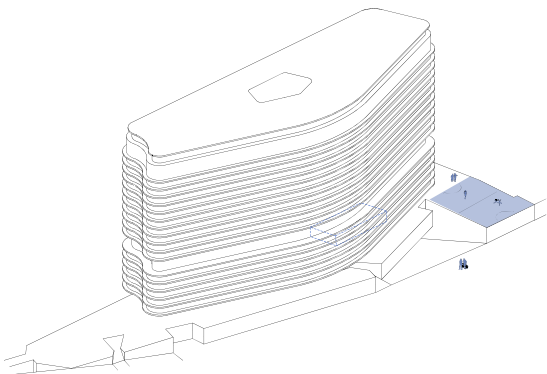
Space for bike storage is located in the basement

A sports field is part of the public program on the plinth

Building & Context
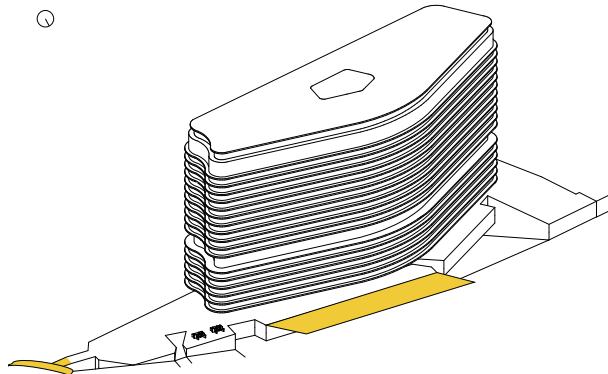
Part of the design is an overhang over the street
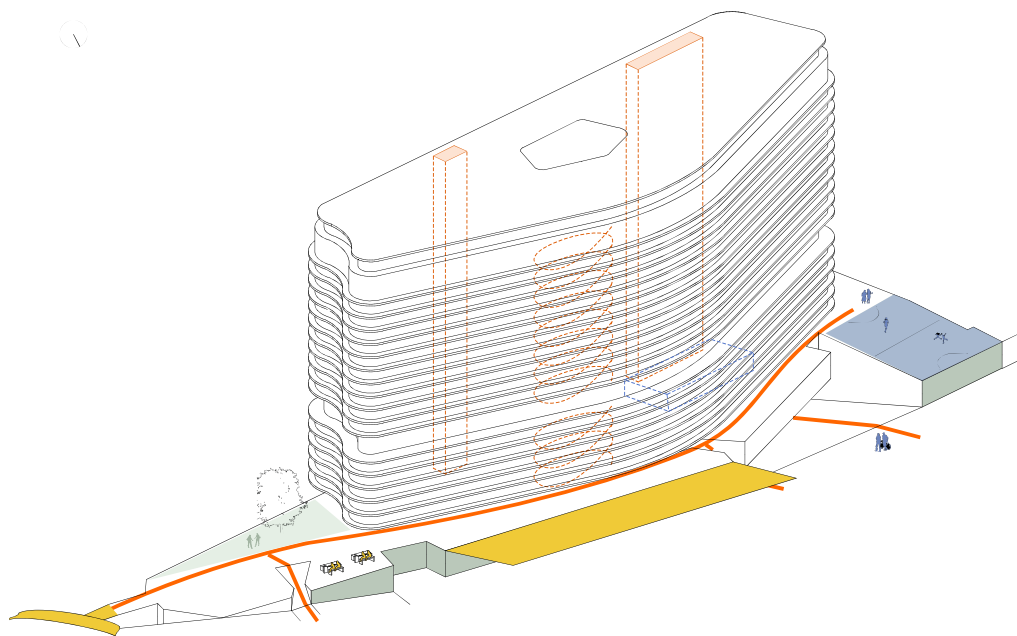
Medibank office by HASSELL

Most of the elements that encourage physical movement in this building are situated in the plinth. The route over the plinth connects the goals and active program to each other. The plinth is designed to connect to the context of the building, including a covered street and a connection the an existing pedestrian bridge.
On the office floors of the building the spiralling staircases in the atrium are the elements that encourage physical movement.
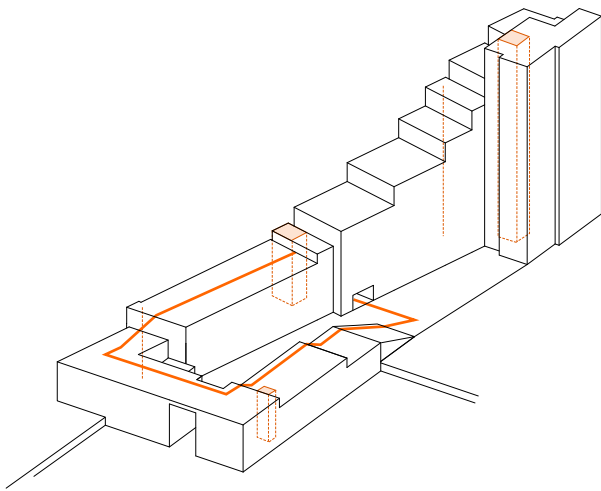
A route leads through the central courtyard and over the roof

The route includes stairs and leads up the building
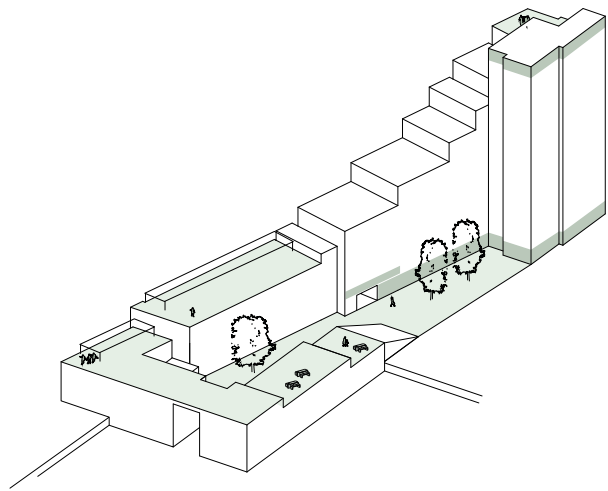
On the topfloor is a collective roofterrace with a view

Collective outdoor spaces in the central courtyard and on the roof

Collective spaces are located on the top- and ground floor

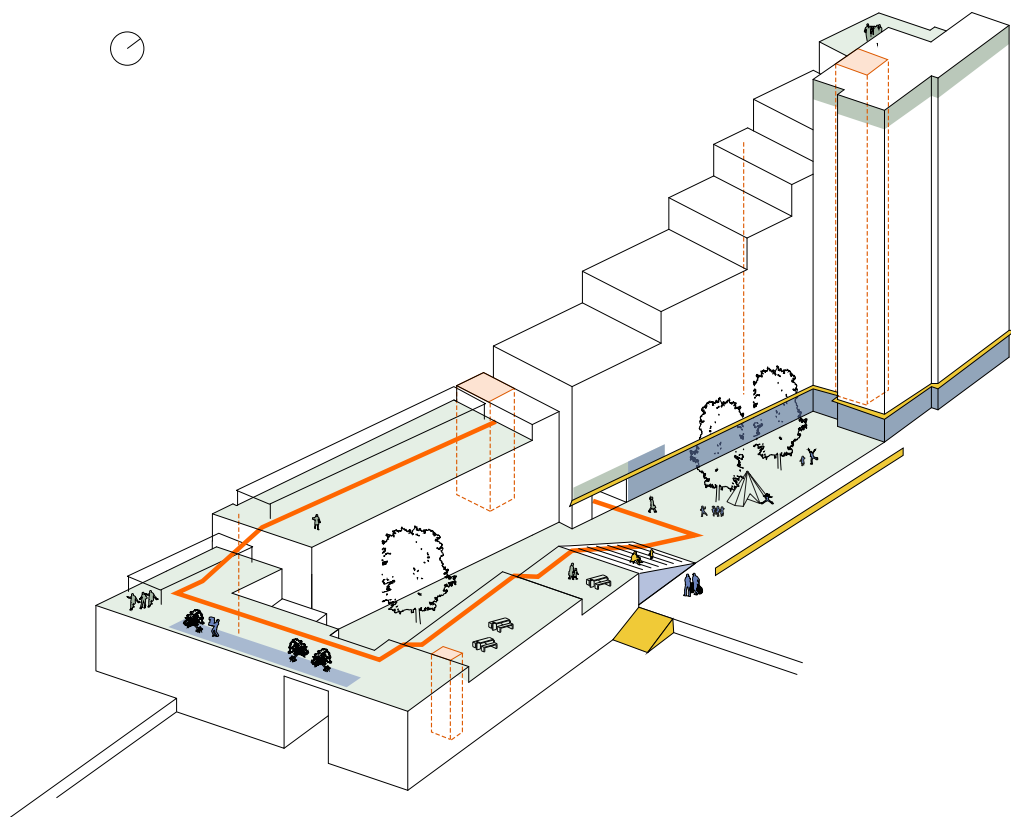Both in the central courtyard and the flat roofs are gardens

Active program
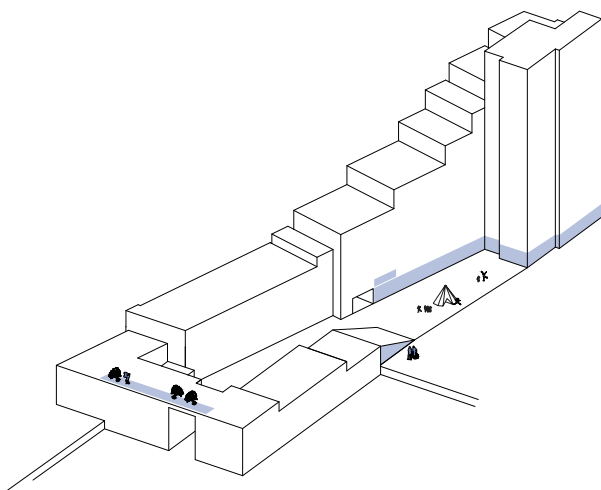
Building & Context

A health centre is located on the ground floor

Residents can grow their own food on the roof

In the central courtyard is a playground

Space for bike storage is underneath the stairs
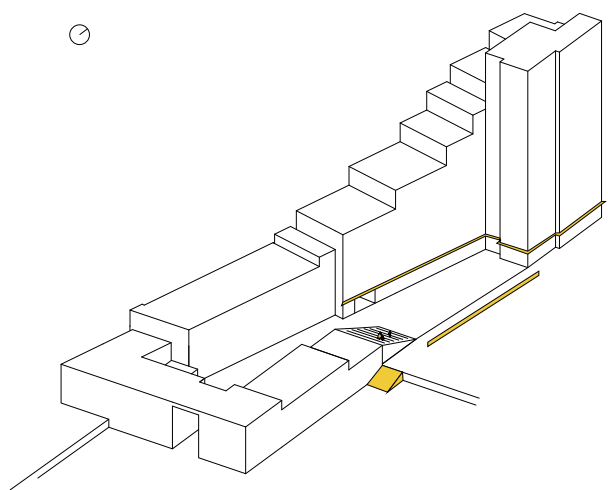
An overhang accentuates the program in the plinth

The courtyard and roof gardens are oriented towards the sun

Via Verde by Grimshaw + Dattner Architects

In Via Verde a route connects the plinth, the central courtyard and the roof gardens. In these parts of the building the most of the goals and the active program are situated. The roofterrace on the topfloor of the building is not connected to this route and can only be reached by using an elevator.

Routing Goals Active program Building & Context
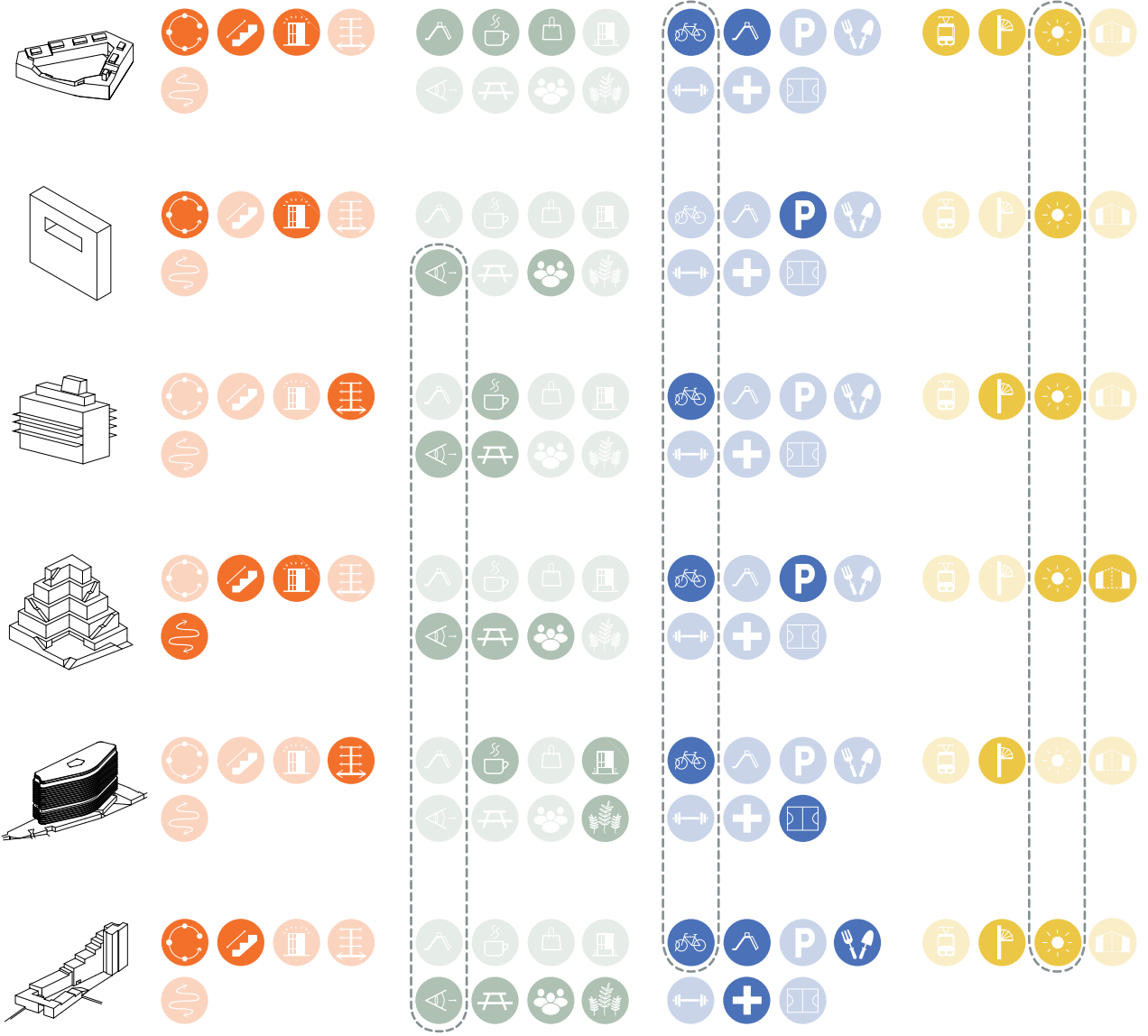
Conclusion

Routing

There are different types of routing available for an active residential building. Not one type of routing is dominant in this research, although a lot of the routs are ascending. The route is important because it connects the goals and the active program.

Goals

There are many goals, but some of them are applied remarkebly often. Among them are communal spaces and viewpoints.

Active program

There are a lot of facilities as active program. Almost all case studies of the research have facilities that encourage bicycle use, for example proper bicycle storage.

Building & Context

Almost all of the case studies are orientated towards the sun. This is mainly because lots of the active program and goals are outside or on the roof of the buildings.

Discussion

The results of this research are based on literature and pictures of the projects. If we would have visited the projects, this may have led to other insights. How the buildings are actually used by its user can not be researched from paper. Furthermore, the project that have been chosen for this analysis are a small selection of projects available. To give this research more depth the same method could be applied to other case studies. Finally, the axonometric drawings are an abstracted version of the case study, which can lead to small differences with reality.

CHAPTER V.

SITE ANALYSIS

To formulate starting points for the design of a healthy dwelling complex, a chosen location in Amsterdam is analysed. This chapter includes a introduction on the chosen site, an objective investigation of the characteristics of the site and a subjective analysis of my personal experience of the site.
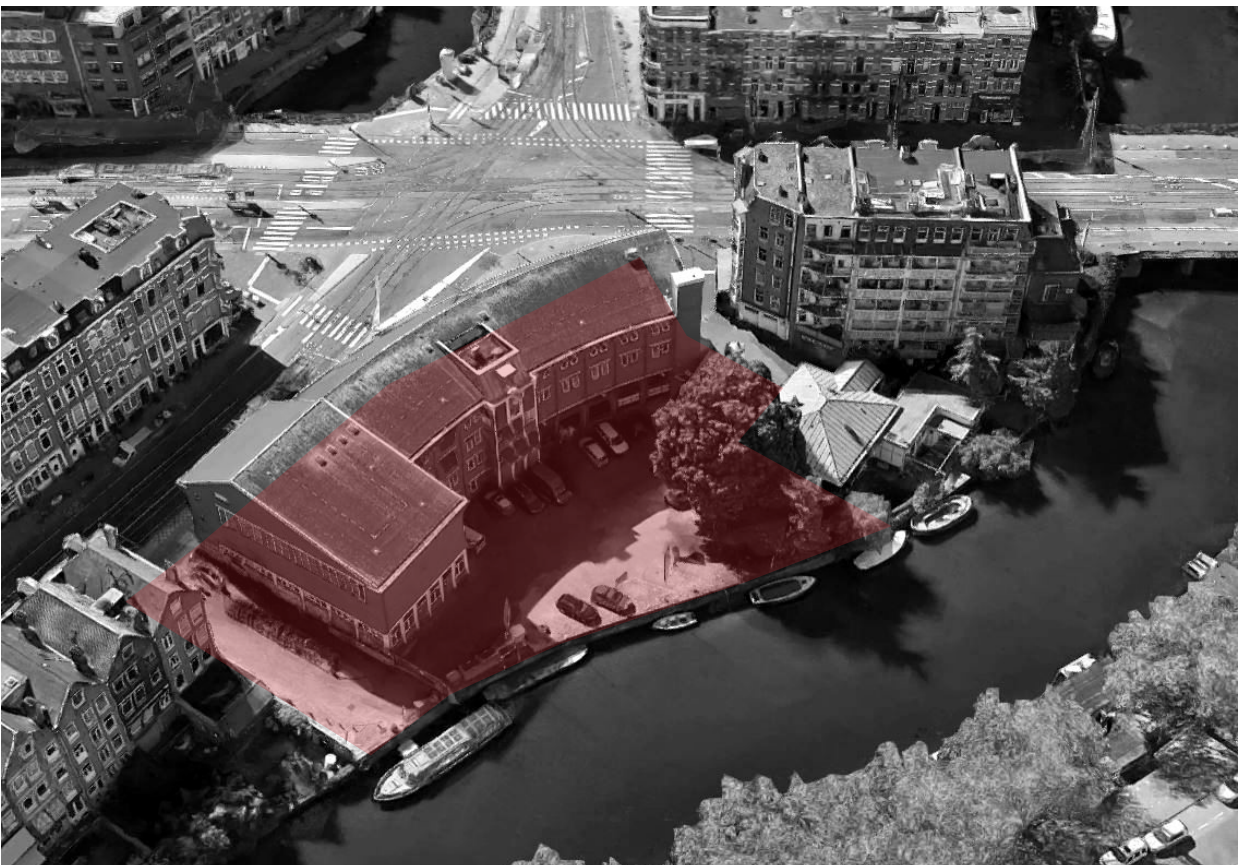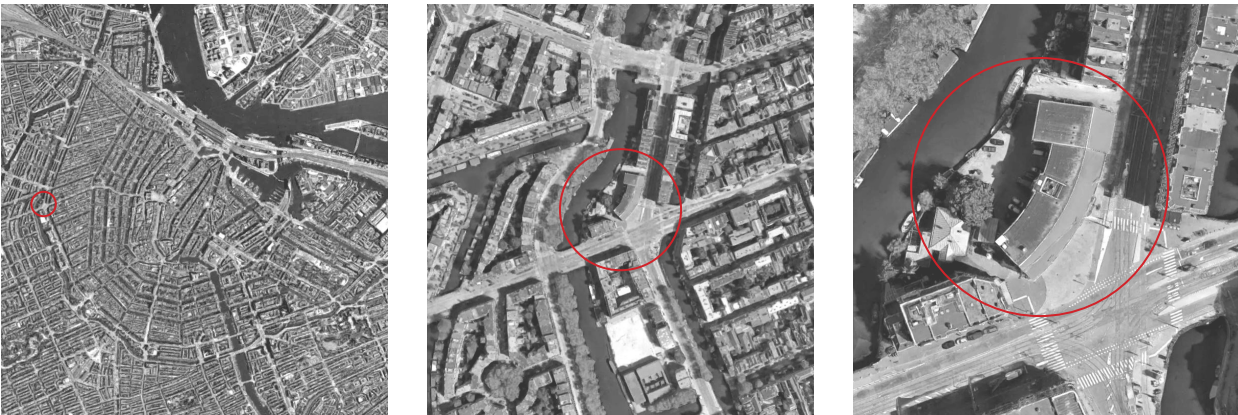
Figure 45. Marnixstraat 170, Amsterdam, Google Maps (2018) edited.

The site

The chosen project location lies on the belt of former defence works that runs around the inner city of Amsterdam. The location address is Marnixstraat 170 which is located West of Amsterdam's centre on the crossing of the Rozengracht and the Marnixstraat.

This location is chosen because it is on the outer border of the Jordaan. The Jordaan has a history of unhealthy living circumstances and when in the late nineteenth century this started to change, this part of the former defence works was used to built social housing, schools, parks and playgrounds to give the citizens a healthier living environment. A lot of the social housing blocks from that time are still intact, but the school that was on Marnixstraat 170 is now demolished and replaced by a fire station.

On the belt

As an introduction on the Graduations Studio's assignment the whole belt of former defence works was analysed. This 'soft map' of the belt was inspired by Jan Rothuizen's Soft Atlases. The map is based on what we experienced while walking through the area. We mapped what caught our attention, what happened while walking there and how we felt.
While walking from West to East over the belt we passed the chosen location. We walked out of an area with a lot of row-housing. We noticed that the fronts of the houses faced a busy street but that at the back people appropriated small parts of the public space to make gardens.
Just before we noticed the fire station we stopped at a small street that ended at the canal and saw fireman cleaning a tourist boat. As we continued on the Marnixstraat an angry guy thought we were tourists and bumped into us.
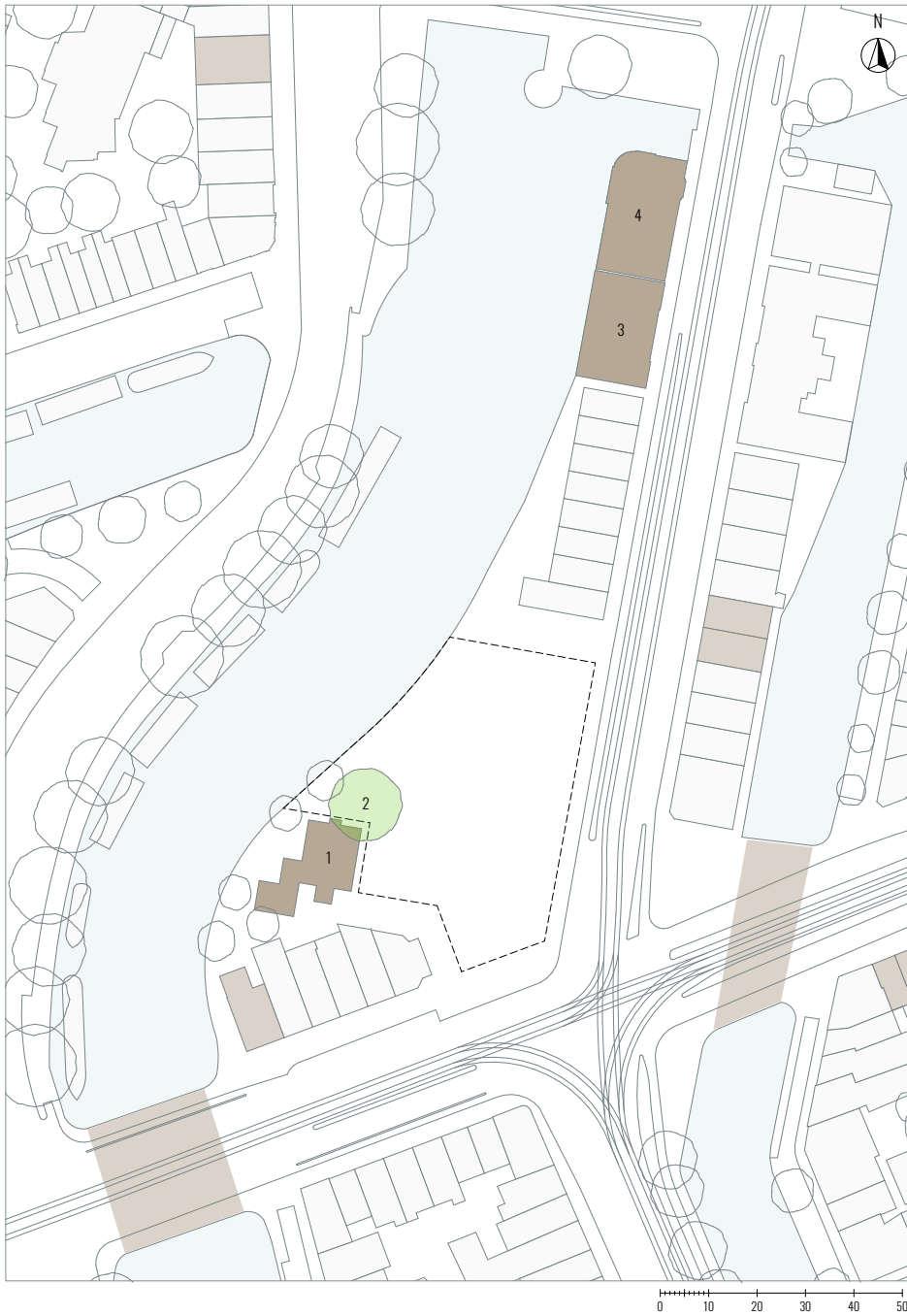
Figure 46. Rozengracht 226-226A,
J. van Broekhoven (1983)

Figure 47. Aesculus hippocastanum from 1940,
Gemeente Amsterdam (n.d.)

Figure 48. Marnixstraat 150 Toneelschool, I. Roël (1981)

Figure 49. Backside of police office Raampoort,
Beeldbank Amsterdam (n.d.)

Monuments

In the direct surrounding of the site are several monuments. A direct neighbour is the 'Voormalig Geneeskundige Armenverzorging' from 1888, which is now in use as a vet practice. On the site stands a monumental tree: a 'Witte Paardenkastanje' from 1940.
In the surroundings are several bridges and houses that are Municpal monuments and at the Northern end of the adjacent row are two National monuments. One is a drama school from 1877 and next to that is the Police office Raampoort from 1888.

Monumental tree

National monument

Municipal monument

Defence works
During the third expansion of Amsterdam (1610-1613) the a five meter high wall was built to protect the city. 26 Strong-holds with mills were added. In the nineteenth century the wall lost its function and was demolished.
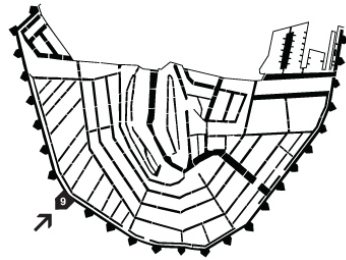
Figure 50. Rijk/Molen de Victor. Gemeente Amsterdam (n.d.)

Windmill
On the corner of the Marnix-straat and the Rozengracht. 'Molen de Victor' was built in 1685 to replace wooden wind-mill 'de Smeerpot'. In 1898 the mill had to make room for housing and a school was built on the project location.

Figure 52. Marnixstraat. Photographer unknown (between 1884 and 1898)

Corner
Marnixstraat-Rozengracht
A recent picture (2014) taken on the same location as the picture above. The building on the right is still there, although it is slightly altered. It used to be 'Cafe de Victor' and is now a Japanese restaurant.
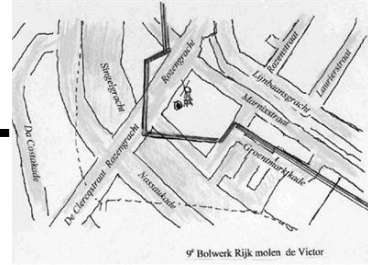
Figure 53. Marnixstraat. R. Koning (2014)

Bolwerk Rijk
The project location is on the spot where the ninth stronghold 'Bolwerk Rijk' was located. It was named after the neighbouring village Rijk which has disappeared in a 17th century storm.

Figure 51. 9e Bolwerk Rijk molen de Victor, Gemeente Amsterdam (n.d.)

Museum
The former 'Maerlantschool' re-opens in 1929 as 'Museum van den Arbeid', predecessor of NINT 'Nederlands Instituur voor Nijverheid en Techniek, now NEMO, Artist Herman Heijenbrock's private collection of paintings and machines was opened to enthuse people for new techniques (de Baar, 2014).

Figure 54. Marnixstraat. J.M. Arsath Ro'is (1971)

Demolition
In 1983 the museum moves out and the former school building is demolished to built a the new fire station 'Kazerne Hendrik'.

Figure 55. Rozengracht. J. van Broekhoven (1983)

Kazerne Hendrik
Firestation Hendrik has been put into use in 1985. The station is part of the fire department Amsterdam-Amstelland.

Historic development

In the timeline above the development of Marnixstraat 170 over time is shown. The site was first part of the belt of de-fence works and was neighbour of a windmill. In the late nine-teenth century a school was built on the site, which later came in use as a museum. When the museum moved out in 1983 the old school building was demolished and the fire station was built.

N

0   50   100   150   200   250
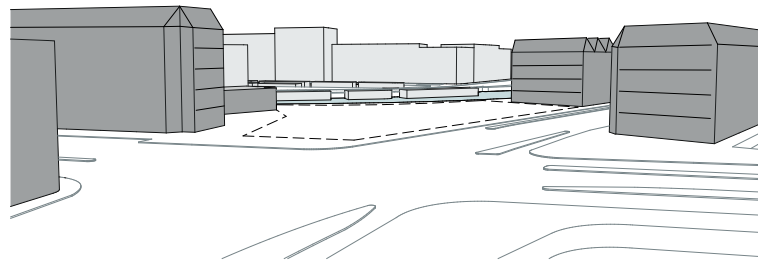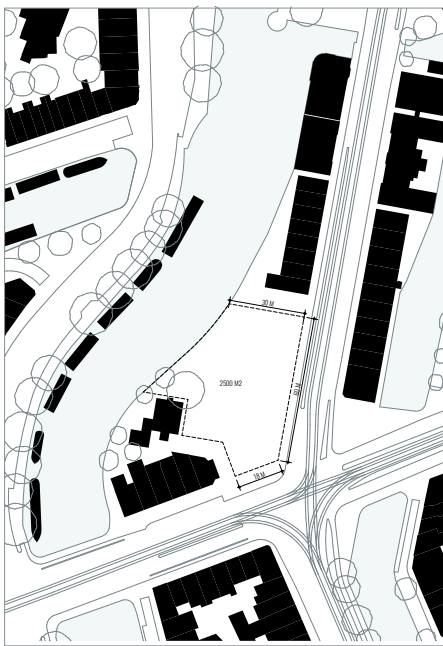
■ Built

□ Unbuilt

Water

0 10 20 30 40 50

Morphology & Heights

The morphology of the surroundings can be roughly separated into three zones. On the East-side of the site there are building blocks that are built up out of individual buildings. On the west-side the larger blocks of the city extensions have more repetition and unbuilt space. The site lays in the middle zone which exist not out of building blocks, but out of large buildings and rows of smaller buildings which stand free in the open space.

Zooming in on the site you can see its direct surroundings are rows of buildings with a straight building line on the street side and a more irregular shape on the back-side. These buildings are 4-5 stories high with pitched or hipped roofs. On the adjacent plot is a small free standing building volume of one story high with a hipped roof.

N

0   50   100   150   200   250

Private green (gardens)
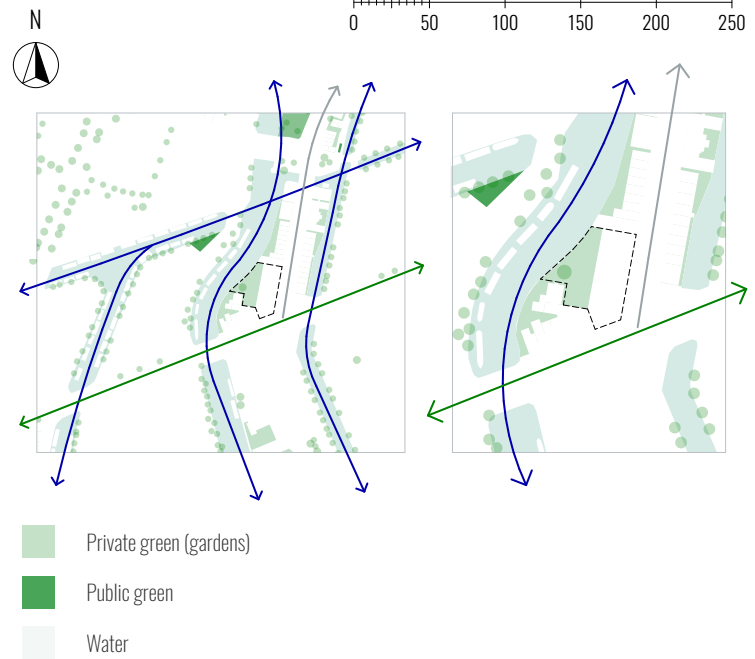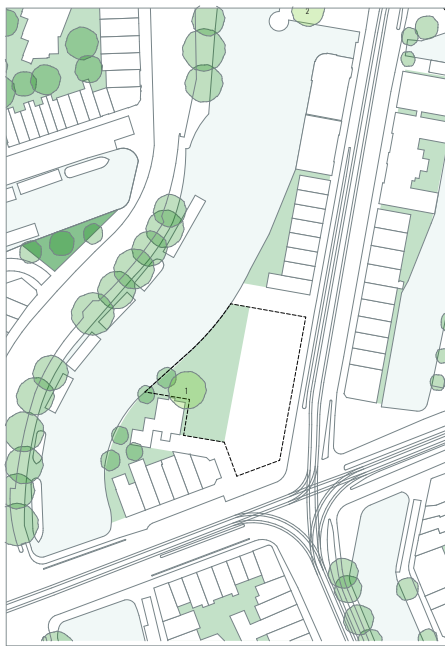
Public green

Water

Green & Water

The green in the surrounding of the location can be divided into two types: private green (gardens) and public green (parks). There are two larger parks close by: the 'Tweede Marnixplantsoen' in the North and the 'Bilderdijkpark' in the West. Gardens always lay in sheltered places, hidden in building blocks behind building rows. There is a lot of water in the area: the canal, which are all lined with trees. Gardens which are not hidden in a building block are often facing the canal.
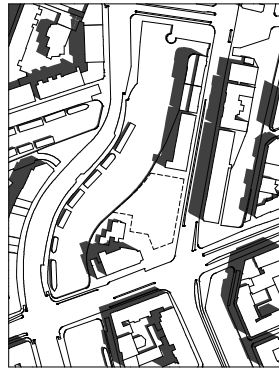
When zooming in on the site it becomes visible that it has three different sides: a waterfront side on the canal with trees and gardens, a side facing the Rozengracht which is lined with trees and a side facing the Marnixstraat which does not contain any green or water.
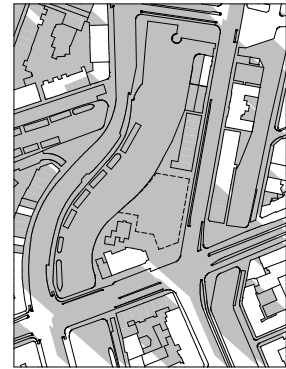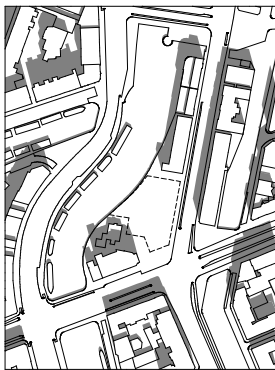
March 21	June 21	September 21	December 21
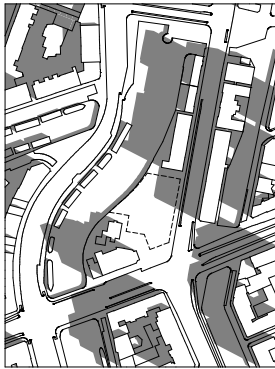
10:00   10:00   10:00   10:00
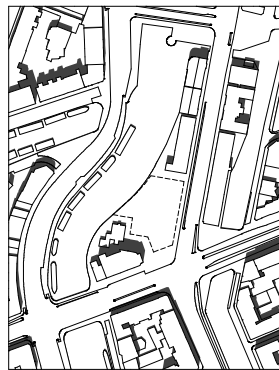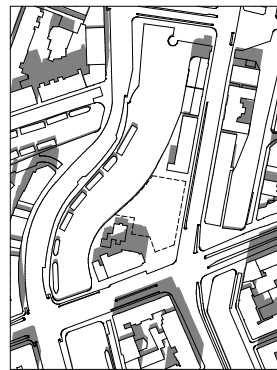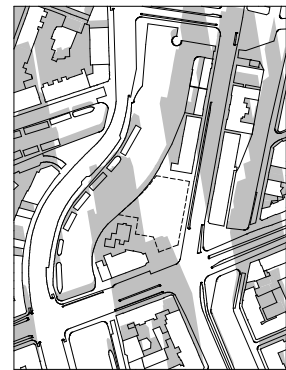
13:00   13:00   13:00   13:00
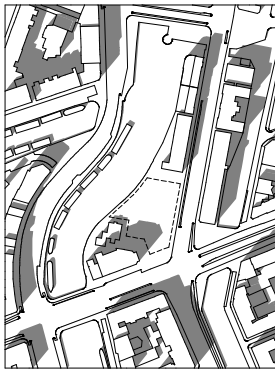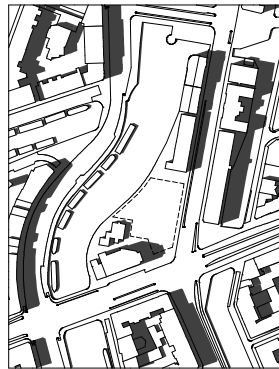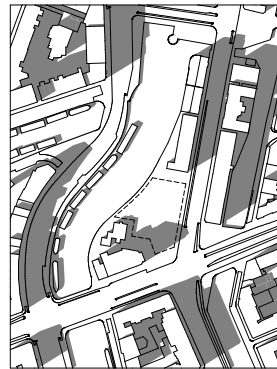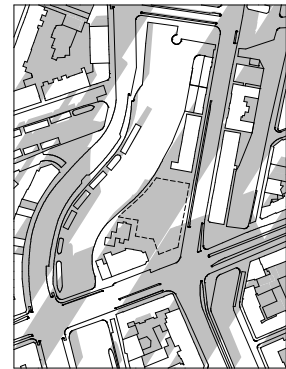
16:00   16:00   16:00   16:00

Sun & Shadow

The site lies close to a crossing of wide streets and, which ensures that the South-East facade is in de sun all year long, on all parts of the day with as only exception early mornings and late afternoons on the shortest day of the year.
The building at the South-side of the site gives some shade, especially later on the day. But only on a small part of the site. The West-side of the site faces a wide canal. This means that the West-facade has optimal afternoon sun.

The buildings on the North-side do not give shade on the site. But if a high building is going to be built on the site it could block the sun of these buildings and gardens.

N

Active recreation

With the healthy, active city in mind this map shows the possibilities for active rec-
reation within a walking distance (500 meter) from the site.
There is one spot that stands out: the Bilderdijkpark, where a school, facilities for
play and sports are located.
There are several gyms in walking distance from the site, especially on the East-side
close to Amsterdam's city centre. A few sports courts are closeby, mostly basketbal
courts. The only playgrounds in the area are on approximately 500 meter distance
from the site.

● Playground
● Schoolyard
● Gym
● Sports court
■ Parc
■ Square

N
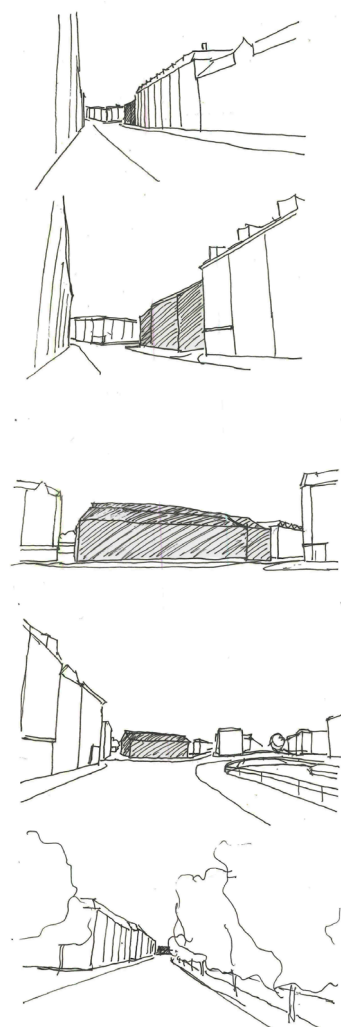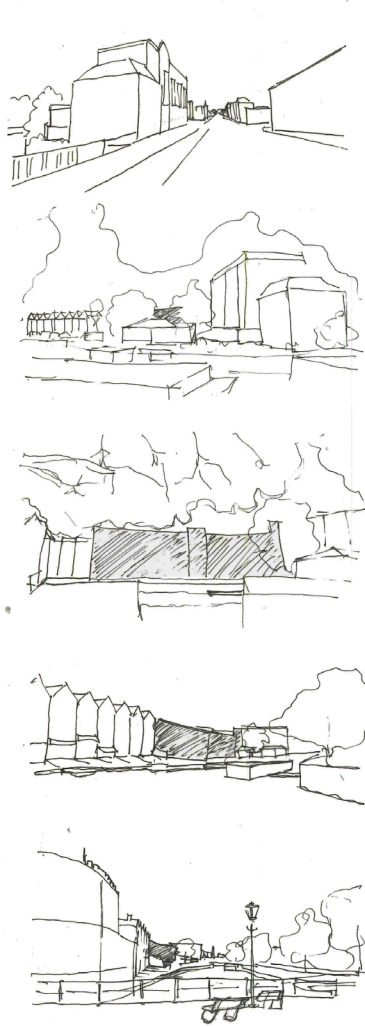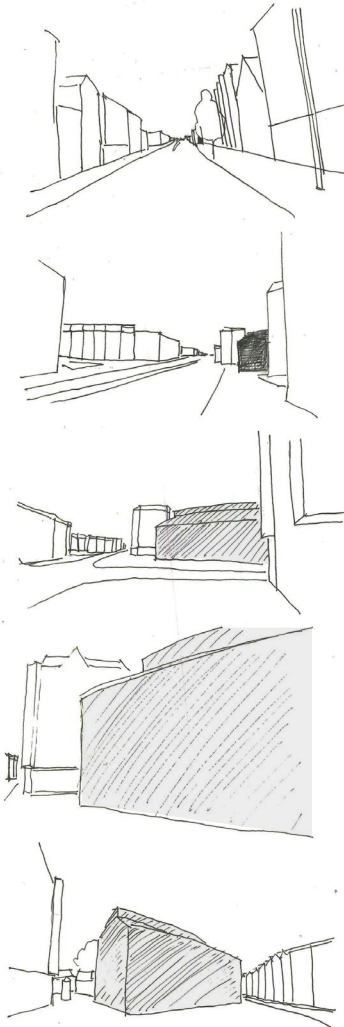
Serial vision

This analysis is inspired by Gordon Cullen's *serial vision* as described in The Consice Landscape in 1995. The sketches show the site as a series of relevations. They show how you experience the location as you walk past it, following three different routes.

The first route shows how the building reveals itself as you approach it coming from the Rozengracht. The building lays back from the streets, so from far way you can not see it. As you come closer the street widens and you can see the build-

ing. When you pass it, you can see it is free standing.

The second route shows the water-side of the building. As you walk pass it you see it revealing at the other side of the water from behind trees. The building stays visible as you continue on the Nassaukade.

At the start of the third route along the Marnixstraat the building seems to be part of a row. As you pass it you see the full facade of the building, which stays visible at the end of a long sight line from the Marnixstraat.
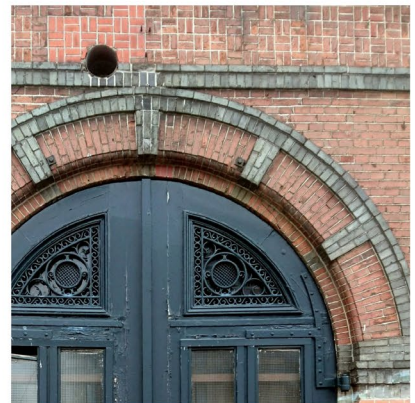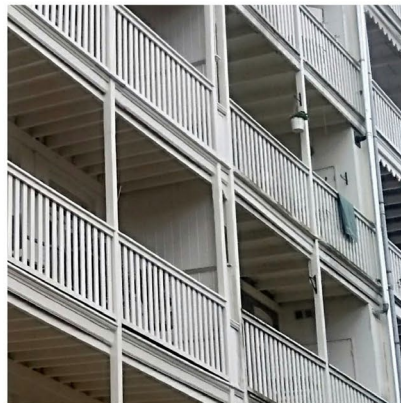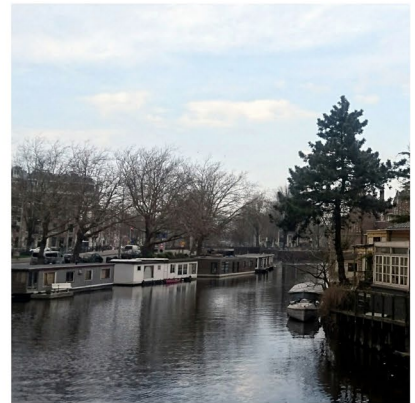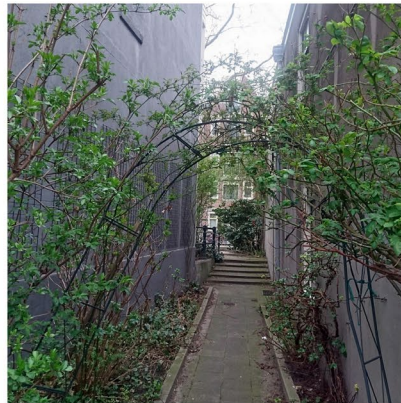
Materialization

CHAPTER VI.

BRIEF

In the brief the requirements for a healthy residential building in Amsterdam are formulated, based on the conclusions of the topic analysis, the plan analysis and the site analysis. Simultaneously an urban mass is defined. The design concept shows how the requirements are implemented in the building mass. This brief will serve as a starting point for the design assignment of the Graduation Studio.

The assignment is the design of a a residential building that takes the health and well-being of its users as a guiding design theme. The target group is city children and their families, especially families with parents that work in the city and strongly depend on a social network close to their house. These families wish to stay in the city, but can not find housing that suits them. The building should be designed for different family sizes and compositions: large families (parents + more than 2 children), middle size families (1-2 parents + 1-2 children) and small families (1 parent + 1 child). The site of the design assignment is Marnixstraat 170 in Amsterdam, a location along the Singelgracht at the crossing between the Marnixstraat and the Rozengracht.

Design guidelines

The following guidelines are taken from the research to serve as inspiration for the design of this healthy residential building:

Design for good health considering physical, mental and social factors.

Design environments that give opportunities for healthy behaviour to encourage healthy lifestyles.

Design for community feeling and social cohesion.

Design for a diversity of needs on the scale of the individual, the family and the larger community.

An healthy building encourages physical activity, this can be done by using the following design guidelines:
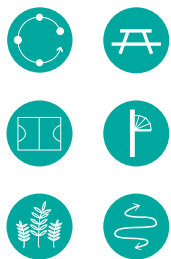
Design routing strategically to increase physical activity.

Place goals strategically along the routes to stimulate movement.

Provide active program for high intensity physical activity.

Consider the way in which the design has influence on activity in the wider context.

Use nature to stimulate active recreation and to reduce stress.

Use the movement through the building as a design theme.

For the design of a healthy residential building in Amsterdam for the chosen target group the following design guidelines are of importance:

Design child-friendly living environments by prioritizing slow traffic, by making public space accessible, sheltered and multifunctional and by connecting dwellings to public space.

Design family-friendly houses that have enough storage space, have places for play, give privacy and are multifunctional and flexible in use.

From the Plan analysis the following design guideline can be added:

Design active program outside with optimal sun orientation.

The Site analysis adds a guideline for the program of a healthy building on this specific location:

After investigation of facilities for active recreation on walking distance from the site it can be concluded that there is a lack of spaces for outside activities (especially play) close by.

Program

Using the design guidelines for a healthy residential building, the design should include the following program:

Public program

Watchtower:
  Active public route leading to a viewpoint
Public goals along the route:
  Activities for children (playground)
  Activities for adults (café, roof terrace or garden)

Collective program

Routing that encourages to take the stairs instead of the elevator
Active program:
  Bike storage
Collective outdoor space:
  Car-free
  Safe and sheltered
  Place for play
  Including nature (water or green)
  Sun orientation
Multifunctional collective spaces
Parking garage

Private program

57 family apartments varying in size for different and changing families:
  of which 24: Double height casco apartments (3 bedrooms, 80-110 m2)
  of which 18: Maisonettes (2-3 bedrooms, 75m2)
  of which 15: Split level apartments (1-2 bedrooms, 40-60 m2)
All dwellings have:
  Storage
  Private outdoor space
  Connection to collective outdoor space
  Multifunctional and flexible floor plans
  Privacy for each family member
  Height differences and stairs (split-level, maisonettes) for extra physical activity

Urban mass

The shaping of the building mass can be illustrated by a series of conceptual drawings:
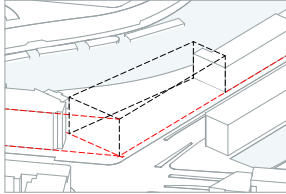
Lines from the surrounding buildings are taken over as a starting point
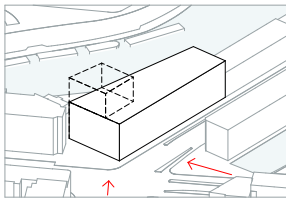
The corner is accentuated with a higher volume placed on the base volume with a set-back.
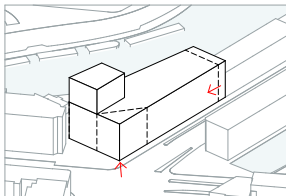
The corner of the base is pushed in to give the building a main entrance and to react on the busy crossing.
The building stays loose from the surrounding buildings.
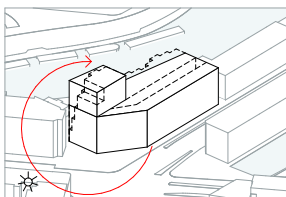
Reacting to the orientation of the sun the West-facade of the building is make stepped to give the dwellings outdoor spaces with afternoon sun. A long cut is made in the base volume to provide light for the lower floors and make space for access system to the dwellings.
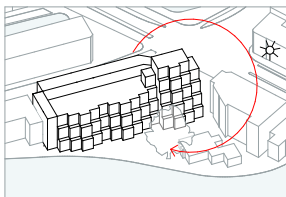
Seen from the West the stepped building steps down to a collective outdoor space at the waterfront. This outdoor space has afternoon and evening sun.
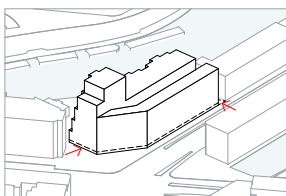
A parking garage is added. It gives the dwellings more distance to the street and shapes a deck at the waterfront. The entrance of the garage is in the alley at the North-end of the building. As second entrance for bike-storage is on the South-facade.
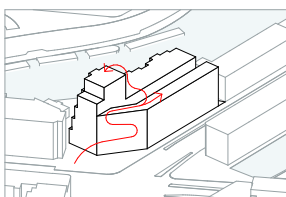
Finally, public active program is added. A ascending route climbs the building and leads to different public 'active goals' like a playground and a watchtower on the roof.

Design concept

Using the guidelines for active building design and the brief the following design concept is formulated:
The building gives opportunities for healthy lifestyles on different levels. On the corner of the building, next to a café, starts an active public route that leads you up the building, via an public playground on the roof, to a viewpoint with views over Amsterdam.
The residents of the building use the entrance underneath the public stairs, they can access their house by walking through the sheltered, collective backyard at the waterfront. From this backyard they use an active route over stairs and galleries to reach their front door. On these galleries are collective spaces that overlook the collective backyard and provide spaces to meet and play.
There are three different dwelling types, which all have height differences that unconsciously provide more daily activity.
The large double-height casco dwellings on the West-facade have flexible layouts and sections and private balconies overlooking the backyard. The maisonettes on the East-facade have a living area downstairs, a sleeping area upstairs and indoor balconies. The split-level apartments have double height living areas and balconies on the West-facade.

Watchtower

Public playground

Maisonnettes
75 m2

Active public route

Café

Collective spaces

Sunny outdoor spaces

Double height casco dwellings
80-110 m2

Split-level apartments
40-60 m2

Sheltered collective backyard
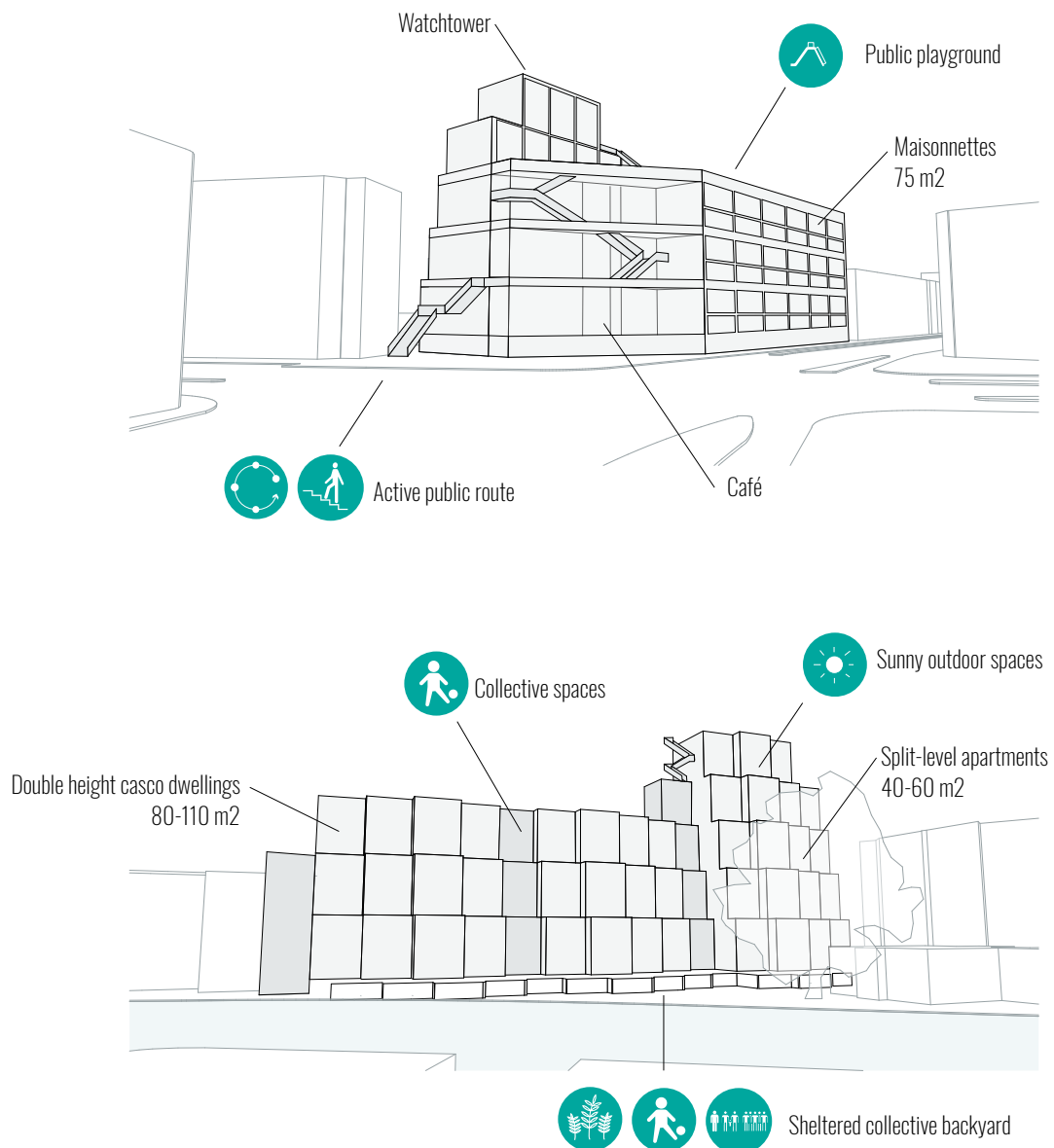
CHAPTER VII.
SUMMARY

Investigation of the assignment

For the assignment of the Dutch Housing Graduation Studio the city is seen as a place of constant transformation. The studio investigates the themes that cities are facing today and focusses on the question: How do we want to live in cities in the future and what kind of buildings do we need to allow for that? The belt of former defence works that runs around Amsterdam's inner centre is chosen as the location for the design of a residential building inspired by an ideal vision of living in the city of the future.

Amsterdam is growing and the goal of the city is to accommodate its growing number of inhabitants by densification of the existing city. This approach increases the pressure on space and questions rise on how it will influence the quality of city live. More and more insight in how the design of the built environment can affect the health and well-being of its users has lead to a new movement in urbanism and architecture: Healthy cities, in which the needs of the inhabitants are at the centre of urban planning. Healthy citizens make cities of maximum potential, so investing in their health is investing in the city.

Architects, as designers of the built environment, should take their responsibility and consider the implications of their ideas on the health and well-being of the users. This research report has as goal to formulate starting points for a the design of a building that contributes to the ideal Healthy Amsterdam. The research question is:

What are design guidelines for a residential building that takes the health and well-being of its users as a guiding design theme?

To answer this question the research is built up out of the following sub-questions: What is health? What is the relationships between architecture and health? How can architecture influence the health of its users? What are the current issues on health in Amsterdam? Which target groups are especially relevant for the design of a healthy residential building in Amsterdam?

The research starts with a Utopian vision on the Healthy City of the future, in the shape of a manifesto. This manifesto is followed by an in depth research of literature on the Healthy City topic. Next to this written information built examples are researched. Of six case studies is analysed how they have incorporated theoretical ideas on how to improve health by stimulating physical activity into the design of a building. Additionally, a location for the design assignment is chosen and analysed. Finally, the conclusions of the research are combined in the brief, formulating requirements and a conceptual design as a starting point for the next phase of the Dutch Housing Graduation Studio.

Manifesto

This manifesto is an Utopian vision on city life in the future.
Designers of the built environment have forgotten their origin and need to be reminded of their responsibilities for the health and well-being of people living in cities. The current biggest threats on health can all be related to and influenced by the quality of living environments. Urban planners and architects today can help to cure cities of its sicknesses by contributing to a city that takes care of its citizens.

Topic analysis

The definition of health has changed over time, in the modern concept of health we acknowledge that health is not only physical but also depends on social and mental well-being. Our health depends on our lifestyles and our lifestyles can be influenced by the design of our living environments.
The idea that health and urban design are linked is not new, it can even be stated that modern European urban planning has arisen from the need to improve public health. Architects and urban planners today seem to have forgotten the responsibilities they have for the well-being of the users of cities and buildings designed by them. While they can play an important role in addressing the biggest threats on health of our current time, which are related to individual behaviour and lifestyle and social and community influences.

Many of the chronic and mental diseases we face today can be linked to a lack of physical activity. The Active City movement aims to design cities that encourage physical movement and by that improve public health and well-being. Several researchers have formulated guidelines for *active building design,* for example on how the careful design of routing can encourage people to take the stairs more often. The movement through a building can also be seen as a guiding design theme, of which Le Corbusiers *promenade architectural* is an well known example.

Amsterdam wants to be an Active City. In Amsterdam's city centre citizens are more active than elsewhere, but their children are an exception and move way too little. With the city becoming more and more dense, children seem to loose the battle for space. To keep families in the city, the city needs to be child-friendly. Important characteristics of a child-friendly city are that they pedestrian-oriented, have sheltered spaces for multiple uses like play and relaxation and strong mixed-use neighbourhoods. Families of parents who are working in the city and strongly depend on their social network in the city are struggling to find a house that suits them. This is a known issue and several studies are done on what this new dwelling type 'the family-friendly apartment' should contain.

Plan analysis

Using BETA Office for architecture and the city's 'Beweeglogica' six 'healthy' case studies are tested on how the designs have implemented the theory on encouraging physical activities in buildings. Of every case study is investigated how they have implemented the four domains of movement: Route, Goals, Active program and Building & Context. A few elements stand out because they are implemented in a lot of the case studies. An ascending route that connects different goals and active program to each other is a popular way to increase physical activity in a building. Also, a lot of the case studies include active outdoor program which is designed with optimal sun orientation.

Site analysis

The chosen location on the Marnixstraat 170 has a history in improving living circumstances of Amsterdam's inhabitants. In the late nineteenth century a school for the children of the Jordaan was built, which is demolished in 1983 and replaces by a fire station. The site lays on the belt of former defence works of Amsterdam, which is now a varied strip of buildings in between the buildings blocks of the historic city centre and the blocks of the western expansions.

The site, on the crossing of the Marnixstraat with the Rozengracht can be seen as a location with three different sides: one facade feels like it is part of a row of the Marnixstraat, the site as seen from the Rozengracht feels like a free standing volume on a busy traffic junction and the side at the waterfront has a different character with more green, a large monumental tree and more irregular shapes.
The site is located in a part of the city with little space for active recreation. On walking distance from the site are a few gyms and sports courts, but playgrounds and parks are further away.

Brief

The brief is for the design of a residential building that takes the health and well-being of its users as a guiding design theme on the chosen site at the Marnixstraat 170 in Amsterdam. The target group is city children and their families, especially families with parents that work in the city and strongly depend on a social network close to their house. These families wish to stay in the city, but can not find housing that suits them. The building should be designed for different family sizes and compositions. The conclusions of the analysis of the topic, plans and site are translated into guidelines that can be used as inspiration for this design of a healthy residential building. Based on these guidelines a program is set up, which contains not only private (the dwellings) but also collective and public program.

Finally, using all the information collected in the research report, a mass study and a conceptual design are presented. This conceptual design is the base for the next phase of the Graduation Studio.

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