RESILIENT COMMUNITIES

MIGRATION OF SOCIAL ADAPTATION TO CLIMATE CHANGE

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ABSTRACT

Climate change(d), a problem that we are dealing with for several years, but it is expected to become more extreme in the future.

This research focusses on social adaptation towards climate change. The engineered structures that we now use to adapt to climate change will not cover all the adaptation needs in the dense urban areas in the future. That is why there is a need for a social infrastructure, a community that looks after each other in times of need. By combining both the climate adaptation on building level and on social level this paper will eventually react on the climate change by the design of a building that one the one hand on building level makes the adjacent neighbourhoods climate proof, and on the other hand creates a social infrastructure on the site decreasing the effects of climate change and creating an resilient community.

INTRODUCTION

'We can do better than simple sea walls and reservoirs' - Eric Klinenberg (Klinenberg, 2018).

'We can do better than simple sea walls and reservoirs'(Klinenberg, 2018). As Eric Klinenberg, an American sociologist, states in his quote we as humans are capable of more than only engineered structures to adapt to climate change.

This research will focus on social adaptation towards climate change because engineered structures only cannot fully adapt a city to climate change (Klinenberg, 2018). The research question which is appurtenant to this researched is 'How can both social- and hard infrastructure contribute to the creation of a resilient climate proof community?'.

By combining research on climate change and social infrastructure a solution, in the form of a building is expected to be found. The research on the climate change in the upcoming decades will be investigated through the databases of the Klimaateffectenadlas, a cooperation of the government of the Netherlands with experts. And through the Adaptatiestrategie of Rotterdam which is an strategy on future climate change adaptation composed by the municipality of Rotterdam. The second part of the research will be conducted by a literature research on the work of the American Sociologist Eric Klinenberg. In his books Palaces for the People, and Heat Wave: A social autopsy of disaster in Chicago he investigates the influence of social infrastructure on climate change.

The outcome of this research is expected to provide a clear understanding of the climate change problems that effect Rotterdam and the project site. And how to deal with this climate change with both social- and hard infrastructure. This will then be implemented into a design.

'HOW CAN BOTH SOCIAL- AND HARD INFRASTRUCTURE CONTRIBUTE TO THE CREATION OF A RESILIENT CLIMATE PROOF COMMUNITY?'

MIGRATION OF IDEAS

The migration of ideas, the main theme of the Complex Projects studio, is all about an idea developed in a certain time or place which then travelled through time or over the world to be implemented again. These ideas can adapt to the new needs of that place or time.

MIGRATION SOCIAL ADAPTATION TO CLIMATE CHANGE

High wind chill temperatures, draught, flooding, heat stress, high density. These are some of the climate factors that Rotterdam Zuid has to deal with in the future. These urban areas like the city of Rotterdam contain a high number of inhabitants which makes it more vulnerable to the effects of climate change. The effects of climate change disproportionally impacts the poorest and the most vulnerable in the society (Boeri, Longo, Gianfrate, & Lorenzo, 2017). To protect these people, the social cohesion of the neighbourhoods should be stimulated. This approach is called social infrastructure by the American sociologist Eric Klinenberg.

We can do better than simple sea walls and reservoirs – Eric Klinenberg (Klinenberg, 2018)

Klinenberg states that the engineered infrastructures that protect us against the climate change effects cannot fully climate proof densely populated city areas (Klinenberg, 2018). There is a need for a social infrastructure in these neighbourhoods, a place where people can meet and built a resilient community. A place that is accessible for everyone, where people can feel safe. These kinds of places are needed in a community to make it climate proof and resilient for the future.

Figure 1 shows a map of different social infrastructures through the world which help to reduce the impact of climate change. One of them is the Chicago heat wave of 1995 where 700 people died from an extreme heat wave that lasted 5 days. The heat wave mostly impacted the poorest districts of the city with the lowest living quality. Striking was that two of the most poor areas where impacted the least. The difference between these two areas and the rest of the poor areas were the communities, people looked after each other, they knew when someone was missing and they would check on them (Klinenberg, 2015). In Newport, people used a Baptist church as a safe haven during a hurricane. On the other side

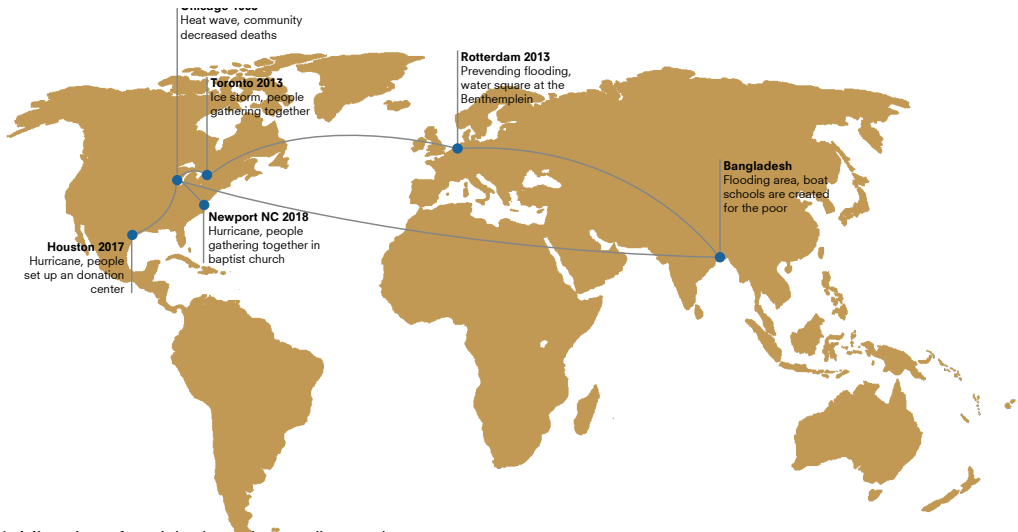

Figure 1: Migration of social adaptation to climate change
Author: Gerwin van den Boogaart

of the world in Bangladesh organisations are trying to help the poorest of the poorest in flood areas by creating school boats (Educate a child, n.d.). And even in Rotterdam a start is made, the Benthemplein watersquare is cultural meeting space with greenery and a skatepark but when the rainfall becomes to extensive, the park functions as a water reservoir. How can this social infrastructure be implemented in a building design, to not only have the hard infrastructure of the building that mitigates the effects of climate change but also adapt the people to climate change by this social infrastructure.

A RESILIENT COMMUNITY

This resilient community, that is needed to be prepared for future climate change effects is defined by the Red Cross as following: the ability of individuals, communities, organizations, or countries exposed to disasters and crises and underlying vulnerabilities to anticipate, reduce the impact of, cope with and recover from the effects of adversity without compromising their long term prospects. (Red Cross, 2014, pp. 1). This means that the people will be adapted to the changes in the climate and will be prepared for this change that is going to happen. The adaptation process would happen over a long period of time.

CLIMATE CHANGE IN ROTTERDAM

Rotterdam has to deal with a lot of climate change effects in the upcoming decades. These problems that they have to deal with are collected in the adaptatiestrategie, a document composed by the municipality of Rotterdam. In this document they not only discuss the problems to deal with but also possible solutions.

The most important problems the city has to deal with in the future are the overall rise of the sea level, which results in more water problems and the dikes would need to be heightened. Secondly, the more heavy rainfall that is expected in the future. The combination of heavy rainfall and the high amount of pavement in the city results in flooding because the water cannot get away. Then, high- and low water levels in the river, high water levels can result in the flooding of outer dike areas and low water levels can be a problem for shipping. Then longer hot and longer dry periods. Longer hot periods in combination with a highly paved area results in the public heat island effect. The most vulnerable group that gets affected by this problem are the elderly. The death rate among this target group rises significantly during long hot periods (Rotterdam.Climate.Initiative, 2013).

The heath also causes damage to the infrastructure of the city, for example during extreme heat bridges can get stuck and cannot open anymore. Lastly, the longer periods of draught cause the groundwater levels to descent. This can result in pole rot for many old houses in the city and this can also cause a low water level in the river. In the areas which are built on peat the long dry period can result in the settle in of the soil, the whole soil level can descent when this happens.

In terms of solutions the adaptatiestrategie talks about examples of solutions for the different climate change problems. But they are not bound to a particular region of the city which is more impacted by climate change but more a general approach for a solution.

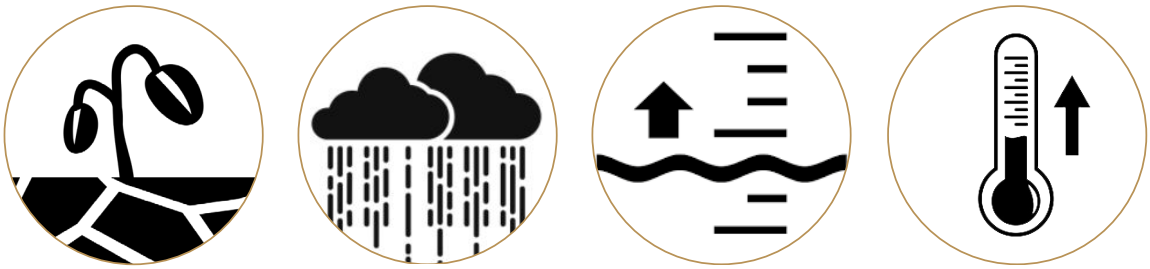

Figure 2: Climate change effects in Rotterdam
Author: Gerwin van den Boogaart

PROBLEM STATEMENT

The climate is changing and will keep changing in the upcoming decades. We cannot do nothing, we have to take action (Rotterdam.Climate.Initiative, 2013). We have to prepare our cities in particular for the climate change effects that keep getting more extreme in the upcoming decades. This can be done with engineered solutions, but Eric Klinenberg states that this will not be enough in highly densified areas (Klinenberg, 2018). The project area, located in between the Maashaven and Zuiderpark is already a densified area. In the upcoming years the city is planning Highrise in the center of the location, Zuidplein (Gemeente Rotterdam, 2019, pp. 9). By adding more Highrise this part of the neighbourhood will become more densified, and engineered solutions will have less effect. When looking at the project location from a more social point of view, the overall living quality in the neighbourhoods in the project location below to the lowest of the Netherlands (Ministerie van binnenlandse zaken en koninkrijksrelaties, n.d.). The development of a social infrastructure could be a solution for these problems, but how to implement this into the design of a building?

RESEARCH QUESTION

The research question appurtenant to this research would be the following: How can both social- and hard infrastructure contribute to the creation of a resilient climate proof community? The outcome of this research aims to develop guidelines to design a building which combines both the social infrastructure and the hard infrastructure to prepare the residents of Rotterdam Zuid for the changing climate.

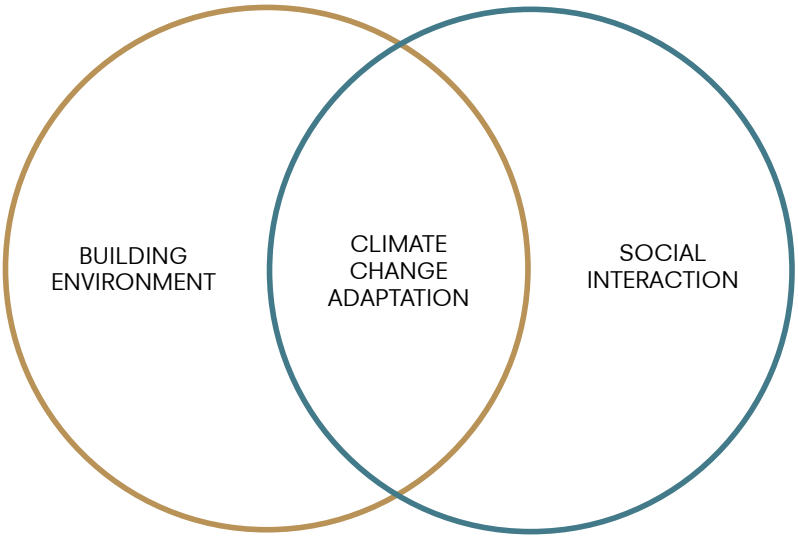

Figure 3: Combining the social- and the building aspect towards a solution for climate change
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METHODOLOGY

To get an answer on the research question, firstly a quantitative research has to be performed on the impact of climate change on Rotterdam. The collection of this data results in a schemes and maps to give an indication of the climate change effects in Rotterdam and in the project location. Then a qualitative research takes over when researching the social infrastructure by the books of Eric Klinenberg. Then, when most of the research is collected it becomes a kind of predictive research where predictions are being made for the upcoming decades is terms of climate change adaptation. Lastly an experimental research follows by implementing all these aspects into a design solution.

Method of data collection and sources	**Analysis of the data**	**Output and evaluations**
1. Quantitative research - Adaptatiestrategie municipality Rotterdam - Klimaateffectenadlas	Problem statement - Research about the impacts of climate change on Rotterdam: flooding, urban heat island effect, heat, draught, etc. - Adaptataion strategy of Rotterdam, how are they proposing to deal with the climate change?	Mapping - Mapping the climate change impacts for each neighbourhood of the project location - Finding relations between the different effects of climate change on a site. - Mapping proposal of climate change adaptation of the municipality.
2.Literature analysis - Book: Heat wave by Eric Klinenberg - Book: Palaces for the people by Eric Klinenberg. - Several articles about social infrastructure - klimaateffectenadlas - Adaptatiestrategie Rotterdam	Research goal - Research about the impact of social infrastructure on climate change - Research about the possible target groups for the site by looking at the existing social infrastructure.	Research question + goal - Research question - Research goal - First idea of the possible users of the intervention
3.Literature analysis - Book: Heat wave by Eric Klinenberg - Book: Palaces for the people by Eric Klinenberg. - Several articles about social infrastructure - klimaateffectenadlas - Adaptatiestrategie Rotterdam	Predicting analysis - Finding a way to reduce the climate change effects on the site for 2050. - Which location is most suitable, and has the most impact? - Research on how the existing community on the site can be made resilient. - What program can help the existing community becoming climate proof.	Program + location - Program for the intervention to stimulate the social infrastructure - ideal location for the intervention. - Creating an design brief for the building.
4. Experimental research - To be determined	Design - Finding a way to combine the climate change adaptation and social infrastructure into one building.	Building - Finally a building, and the public space around it stimulating the social interaction + contribute to a climate proof area.

SITE ANALYSIS

The research area in the south of Rotterdam is one of the worst areas of the Netherlands in terms of living quality. The whole area overall scores insufficient, some of the neighbourhoods even largely insufficient (Ministerie van binnenlandse zaken en koninkrijksrelaties, n.d.). The research of Eric Klinenberg states that the low income neighbourhoods, and the neighbourhoods with the lowest living quality are effected most by climate change (Klinenberg, 2015). The neighbourhoods of the research fit in these categories and something has to be done to protect and adapt the inhabitants to the climate change effects.

To determine the effects of climate change a chart is created where all effects of climate change are collected for the neighbourhoods and the seriousness of them. The data used for this comes from the klimaateffectenadlas, a database which maps climate change information for the Netherlands. The climate change effects that mostly affect the site in the future are the following. Firstly the urban heat island effect, which has a big impact on the neighbourhoods that have a high amount of pavement and a low amount of green. The urban heat island effect can become dangerous in summer for the elderly, the death rate of elderly rises by 12% in summer due to this effect and is expected to increase. Another climate change effect that will affect the site is the heavy rainfall that is expected in the future, especially in the area around Zuidplein the water depth can become more the 30 centimetres. In order to determine the location for the intervention by the degree of seriousness a number from one to five is given to every effect in every neighbourhood. For example if we are talking about the amount of pavement in a neighbourhood, a neighbourhood with 80% paved area would get one point and a neighbourhood with 20% paved area would get 5 points. Everything in between would be equally divided. By doing this an general score per neighbourhood can be created in terms of climate change, the lower the score the more it is effected by climate change and the more it must be adapted. On figure 2 the overall scores of the neighbourhoods are shown. Zuidplein (6,0) and Bloemhof (5,6) are the two areas most effected by climate change, so these neighbourhoods should be adapted first. The idea is to intervene in between the neighbourhoods with an building that would be a ten in terms of climate change. This building would then affect four neighbourhoods to become more climate resistant.

When the building will be placed on this location it has to deal with the following climate change effects that will affect this spot in the future. This particular spot has the most extreme impact of the urban heat island effect, the overall temperature can increase more than 2 degrees due to this effect. At the same time, in each of the four neighbourhoods there are living 30-100 lonely elderly, which can get sick or die due to this increase in temperature. One of the things causing this extreme urban heat island effect is the high amount of pavement, Zuidplein and Bloemhof are paved for 80% of the total area and do not contain a lot of green. In terms of rainwater this high amount of pavement also causes a low infiltration factor. And lastly, extreme rainfall can really affect this site in future, the amounts of rainwater can even pass the 30cm height.

If looking at this location in terms of social infrastructure, the location has the potential to connect the residents of the four neighbourhoods in this intervention. Now the neighbourhoods are separated by wide, busy roads which are not easy to cross.

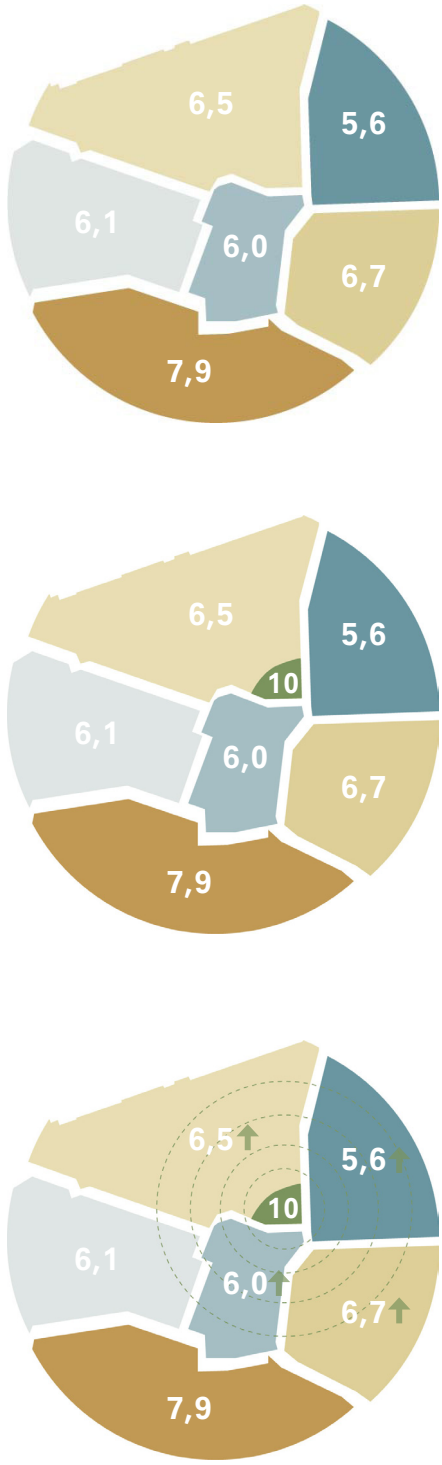

Figure 4: Neighbourhood scores and adaptation strategy.
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PROGRAM AND TARGET GROUPS

The program of the building will be determined by the idea of social infrastructure. But what is social infrastructure exactly? To determine the exact meaning and application of this terminology the book Palaces of the people by Eric Klinenberg is used (Klinenberg, 2020). Social infrastructure are the places that shape the way we interact with each other. It is a physical foundation that shapes our lives. In our current society the presence of social infrastructure is very scarce. The problem today is that instead of going to public places we go more to privatized spaces which are a part of a commercial enterprise. The border between these two can be really thin but commercial spaces after all just want your money. So we kind of pay to be a part of public life.

So what happens if we do not invest in social infrastructure? We will be more likely to end up hunkering down, staying home, being alone and getting our social interactions from our telephones, ipads and digital social platforms.

Investing in social infrastructure, if it is designed well we are far more likely to engage with other people around us, whether it is friends or family or neighbours or strangers who we encounter. If we will get used to this routine we will be doing it more frequently in pleasant conditions (Talks at google, 2019)

In terms of climate change the social infrastructure intents to welcome the people to get out of their houses. To change their habits from staying inside the whole day to going out more and being part of a community. When this habits are changed they are also more likely to go out and meet each other during a disaster, like a heat wave or flooding and this can save a lot of lives. So to prepare for climate change we do not only need hard infrastructure like dikes and water reservoirs we also need the community, the social infrastructure.

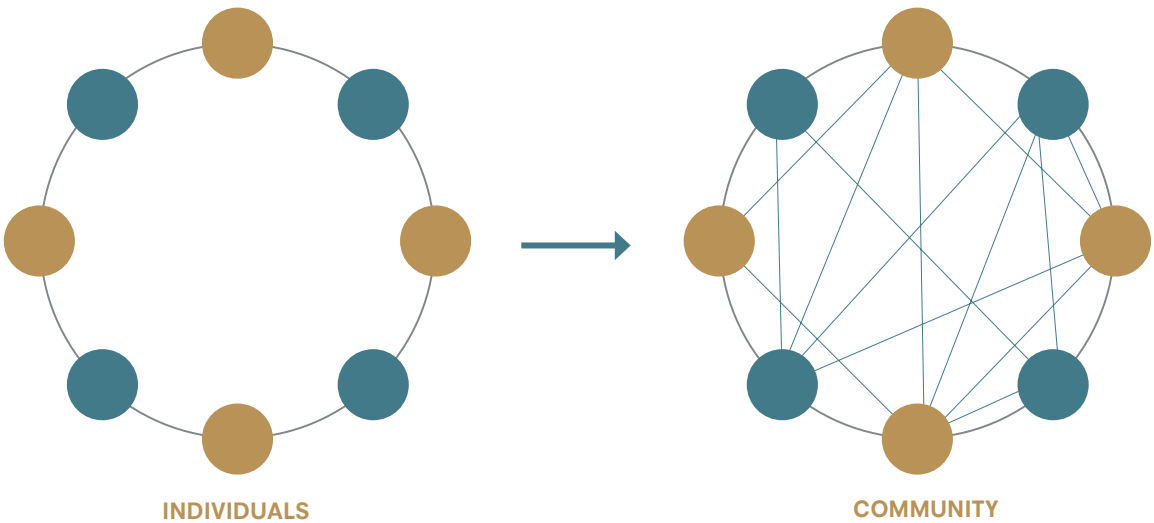

Figure 5: Social infrastructure, idividual to community
Author: Gerwin van den Boogaart

The target groups that are most effected by climate change in a site are the ones that are bound to the place they live in. These are very young children and elderly. The program would need a space that attract kids and a space for their caretakers. And for the elderly a space should be created where they can meet each other because a lot of them are living alone and risking getting isolated during the extreme heat, flooding and just the everyday life. These are the two most important target groups, the most central role of this function is helping people by creating social connections and unconsciously preparing them for climate change by changing their habits. The function of the building will be all about helping people, so this could also contain functions like a food bank, a homeless shelter, but also a multifunctional space that can be used during emergencies like an extra space for hospital beds for the Corona pandemic.

The main function should be a function according to Eric Klinenberg that is not after your money, peoples habits should be changed to form a community and to become prepared for climate change, a function where people could meet live instead of through the internet and use the social infrastructure to look after each other and safe lives. An aid organization would be the perfect fit for to create this social infrastructure because they are non-profit organizations, they look after other people and the people have the highest priority in their vision, and overall they are very welcoming. When looking at the different aid organizations in the Netherlands, the Red Cross took the attention. Most people only know the Red Cross from abroad but actually they do a lot in the Netherlands as well (Wolthekker, 2012). They give medical support in times of need, for example the Corona crisis. They look after the lonely elderly, volunteers of the Red Cross are stationed at the food banks in the Netherlands. They give lessons in first aid to people to prepare them for a crisis and they give support to the emergency organizations. The former chairman Inge Brakman had as a vision to enlarge the visibility of the Red Cross organization in the Netherlands (Wolthekker, 2012). And the present chairman of the Red Cross, Heleen Kersten states that she wants to enlarge the role of the Red Cross in the Netherlands, prepare the vulnerable for more extreme circumstances in the future and involve more youth and different backgrounds in the Red Cross (Fondsen.org, n.d.). The new intervention in Rotterdam Zuid could help to achieve these goals by designing a new Red Cross headquarters. The location is ideal for a headquarter because the people that the Red Cross is aiming to help in the Netherlands live in these neighbourhoods, so this could create direct lines with the people they are trying to help. The site contains various different backgrounds, and the location can offer an architecture that stimulates the visibility of the Red Cross in the Netherlands.

When you combine this Red Cross headquarters with the more social infrastructure, it seems that a headquarters only would not be sufficient to built this social infrastructure. Additional program should be added that attracts the target groups, elderly and children. This results in the following proposal, the Red Cross Social Center. A building that is all about connecting people and creating visibility for the Red Cross. It would contain a headquarters for the Red Cross. A Red Cross aid department with a foodbank and teaching spaces for first aid. And spaces where the elderly and children can meet each other. Overall it would become an extremely accessible building with an eye for the people.

GROUP VISION

As becomes clear from the analysis, Rotterdam does not exists of only one center. It is a polycentric city, of which each center consists of several districts with a different character. As a result, the composition of the city can be compared to a collage. Every intervention made within the city is an addition to this collage. Taking the new interventions of the municipality into consideration, the research group has created an ambitious vision for the site. The existing residential districts will be the base layer of the vision. On top of that, new districts with different central characters are added. Every districts uses the existing program and strengthens their character by emphasizing the valuable parts. Moreover, each intervention contributes to the character of the district in which they are place and works as a catalyst. In this way, the site will develop as one of the poly-centers of the city and becomes part of the collage.

INDIVIDUAL CONTRIBUTION

The Red Cross Social Center, located between the neighbourhoods Zuidplein, Tarwewijk, Bloemhof and Vreewijk has the potential to reconnect the neighbourhoods which are now divided by the wide and busy car roads. The project aims to be very accessible and to attract and connect as many residents of the neighbourhoods as possible. The project will become a part of the existing health and education district, located in Vreewijk where hospitals and schools are stationed. The Red Cross Social Center will become an extension of this neighbourhood to combine both the health, and the educational part in one building.

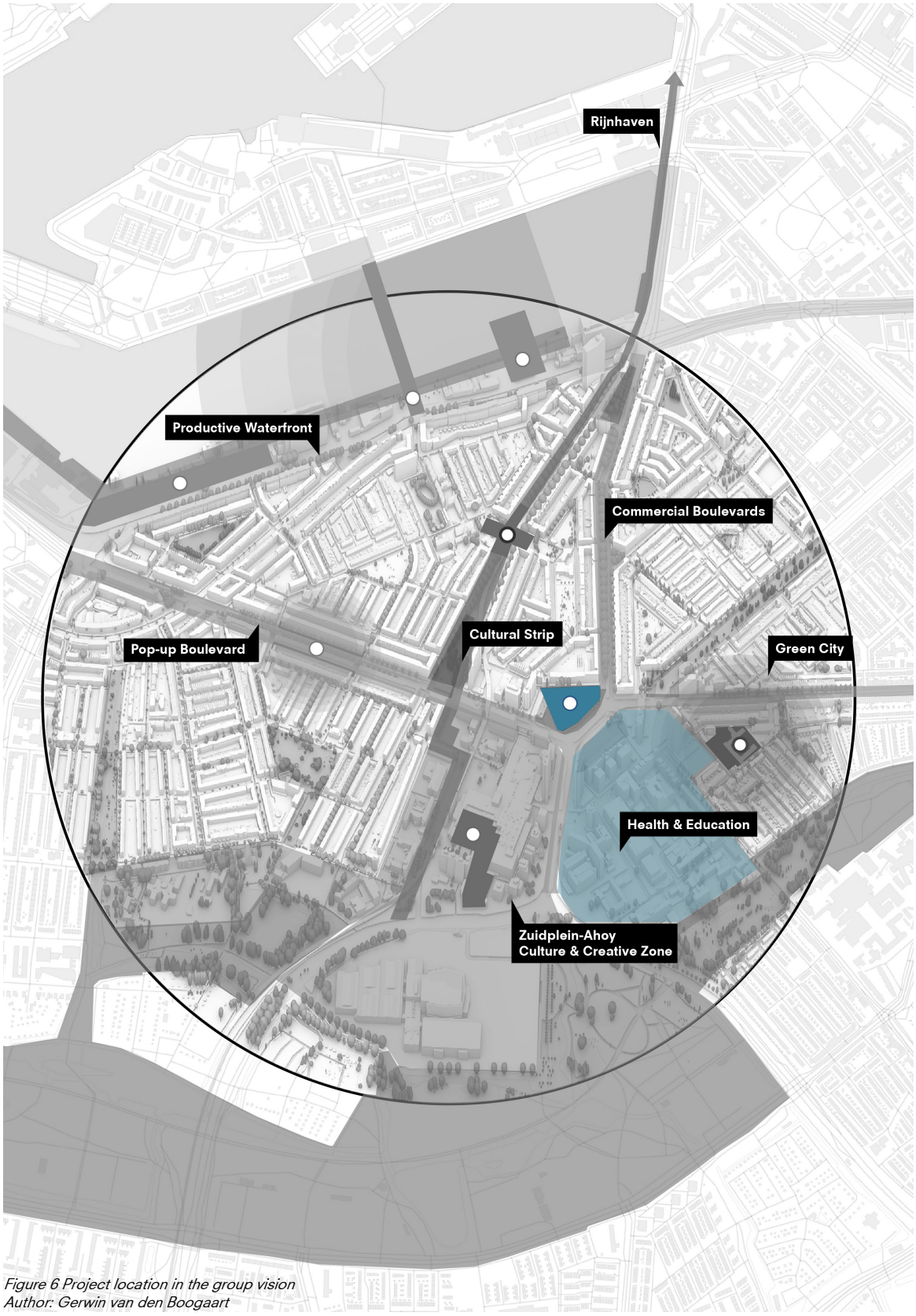

Figure 6 Project location in the group vision
Author: Gerwin van den Boogaart

CONCLUSIONS

This research aims to provide an answer for the following research question: How can both social- and hard infrastructure contribute to the creation of a resilient climate proof community?

The answer to this question can partly be given. Social infrastructure can contribute to the creation of a resilient climate proof society by connecting people in real life instead of through the internet. Because this social infrastructure changes their usual habits of staying home into the habit of going outside and meeting other people many lives can be saved during a disaster because people then tend to look after each other more. In terms of program the social infrastructure can contribute to the resilient community by housing a non-profit organization, like the Red Cross and to integrate functions in the design that make the building accessible for the residents of the neighbourhood and especially for the residents bound to the place they live in, the elderly and the children.

Hard infrastructure can contribute by dealing with the future climate change effects that will affect the project location. These are determined by research and the extreme effects on the site are the urban heat island effect which goes hand in hand with the amount of pavement and the amount of green in the neigbourhoods and the more extreme weather that is expected in the future.

Open for investigation is the combination of these two aspects in one building, in the next stage of the graduation period these two aspects will be combined into one building which will mitigate the effects of climate change on site and adapt and prepare the residents for the future changes in climate.

Figure 7: Collage, the building as an umbrella protecting all residents to the extreme weather and forming a community
Author: Gerwin van den Boogaart

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DESIGN BRIEF

The design brief for this project will set a clear framework for the MSc4 design project. It will define the project requirements divided into three subchapters: Ambition, Site, and Program. The building ambition will clarify the goal of the design, the users, the social aspects and the building ambitions. The site subchapter will dive into the site locations, with the qualities and potentials of the site and the urban rules. Lastly, the program. The program will explain the program statement, functions and their square meters, reference projects, and specific spatial requirements.

AMBITIONS

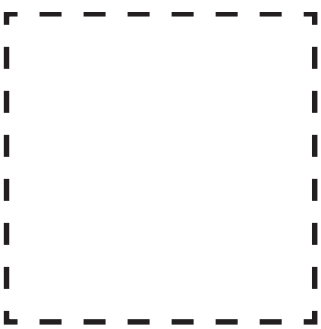
•Initial project ambition: A Red Cross Social Center, which is a headquarters for the Red Cross combined with accessible functions for the target groups. The ambition of this project is to use both hard- and social infrastructure to prepare and adapt the neighbourhoods and their residents for the climate change effect that we have to deal with in the future.

•Users: The most important target group of the building are the people of the neighbourhoods that are bound to the place they live in, which are the elderly and the children. Next to that the residents of the neighbourhood and the employees and the volunteers of the Red Cross are the target groups.

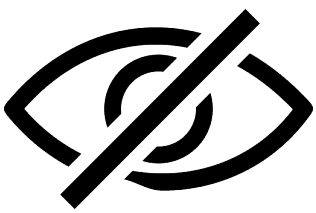
•Client: The project will be funded partly by the Dutch Red Cross because the building will house their new headquarters, foodbank, and teaching facility and create more visibility in the Netherlands for them. The other part will be funded by the municipality of Rotterdam because the building will mitigate the effects of climate change in its surroundings and it will act as a social catalysator to connect, adapt and protect the residents of the city.

•Urban ambition: The building should restore the connection between Zuidplein, Tarwewijk, Bloemhof and Vreewijk which is now divided by very wide and busy roads.

Figure 1: Guidelines to design an accessible building.
Author: Gerwin van den Boogaart



Hidden load bearing construction and moving walls
Spaces ere not defined anymore.

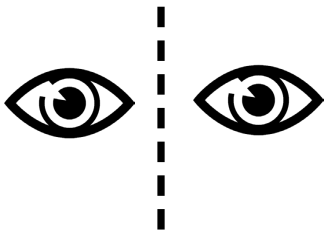


Minimalise border between outside and inside
Confront the user of the building with the outside world

•Program ambitions: The building should have a extremely accessible appearance, the work that the Red Cross does in the Netherlands should be made visible and there should be a connection between the offices of the Red Cross and the more practical functions like the food bank and the teaching rooms. In this way the office workers can directly see what the outcome is of the work they do each day in their office.

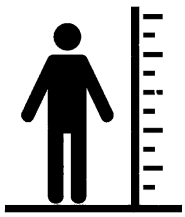
•Building ambitions: The building itself should be able to deal with the most extreme climate change effects that will impact the site, which are the urban heat island effect and the extreme rainfall. Overall the construction method of the building should be sustainable, and circular. The appearance of the building should be accessible, which means should take into account the human scale, it should be in connection with the outside world and it should create curiosity by the residents. The atmosphere of the building should minimalize the border between outside and inside, it should not make use of traditional building methods and the load bearing construction should be hidden to make the spaces more undefined (figure 1)

Conclusions: The building should be low, to refer to the human scale and make it more friendly. It should make the Red Cross visible in the Netherlands and restore the connection between the adjacent neighbourhoods.



Contact with the outside world

This can be done by transparant surfaces in the facade.



Human scale

Relate to the people you want to invite, if its pedestrians etc. you should relate to this scale.

Let go traditional building methods

Do not use traditional 90 degrees corners and flat surfaces

Create curiosity

Spaces ere not defined anymore.

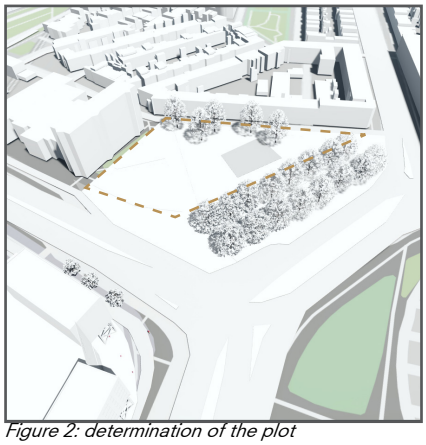


Figure 2: determination of the plot
source: Gerwin van den Boogaart

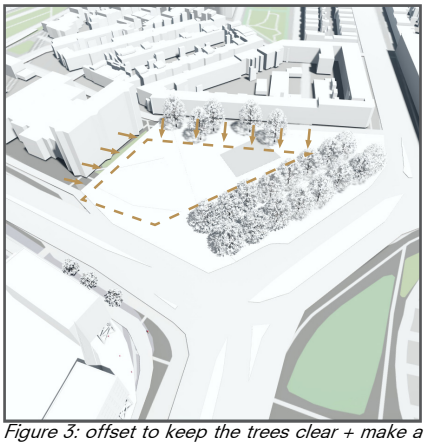


Figure 3: offset to keep the trees clear + make a more friendly street
source: Gerwin van den Boogaart

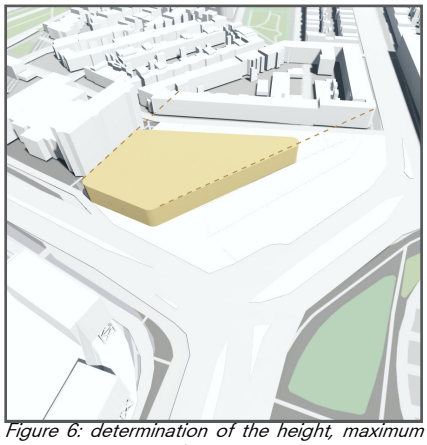


Figure 6: determination of the height, maximum heigh is similar to adjacent dwellings
source: Gerwin van den Boogaart

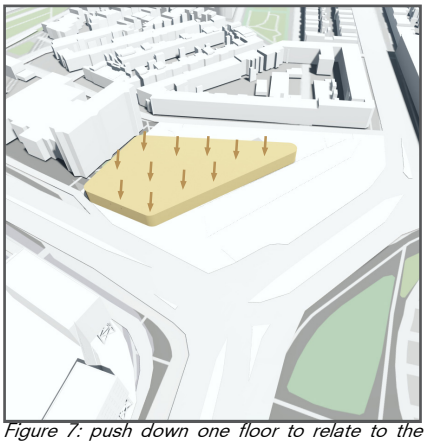


Figure 7: push down one floor to relate to the human scale
source: Gerwin van den Boogaart

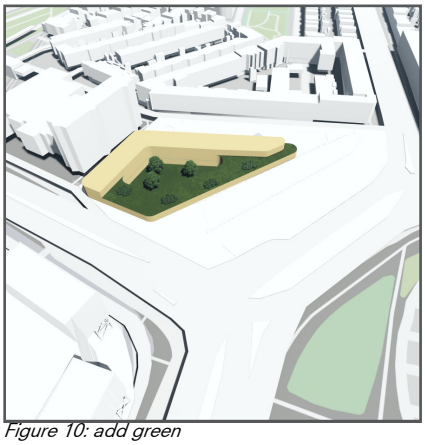


Figure 10: add green
source: Gerwin van den Boogaart

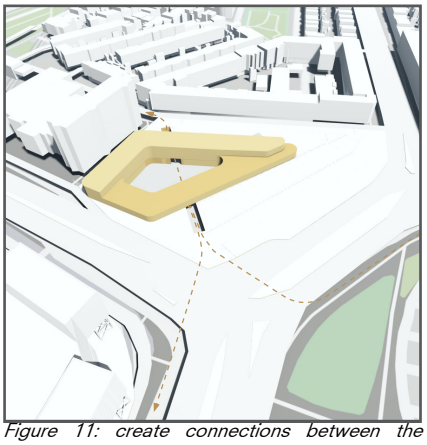


Figure 11: create connections between the neighbourhoods
source: Gerwin van den Boogaart

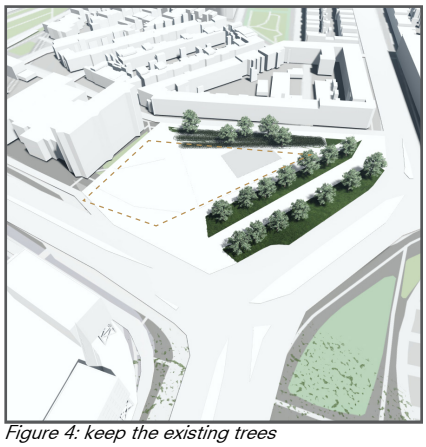


Figure 4: keep the existing trees
source: Gerwin van den Boogaart

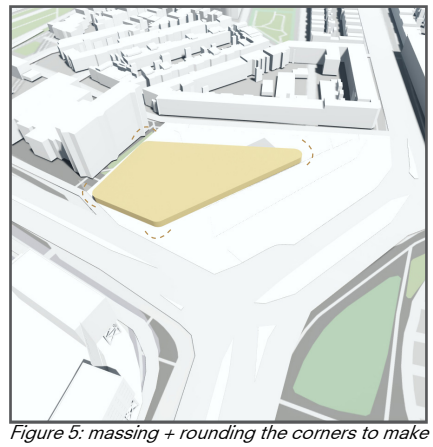


Figure 5: massing + rounding the corners to make it more friendly
source: Gerwin van den Boogaart

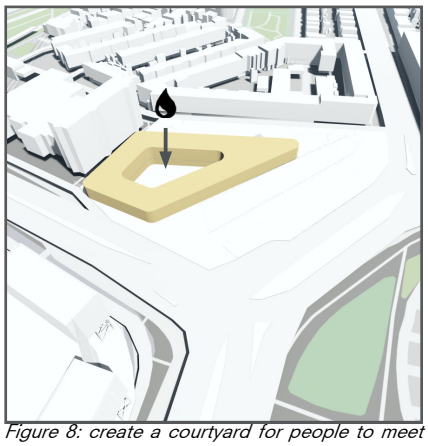


Figure 8: create a courtyard for people to meet and to collect and store rainwater
source: Gerwin van den Boogaart

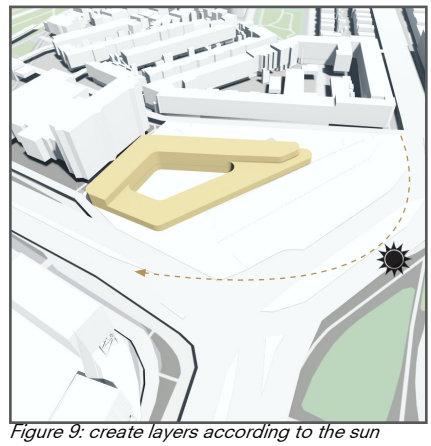


Figure 9: create layers according to the sun
source: Gerwin van den Boogaart

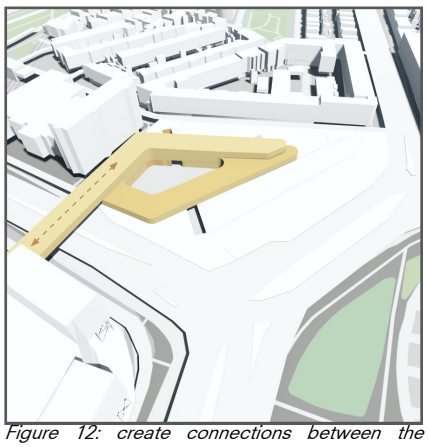


Figure 12: create connections between the building and Zuidplein shopping center
source: Gerwin van den Boogaart

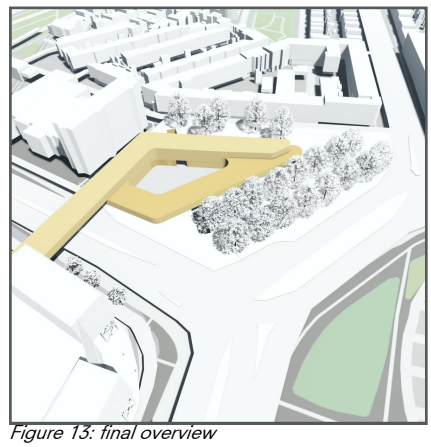


Figure 13: final overview
source: Gerwin van den Boogaart

SITE

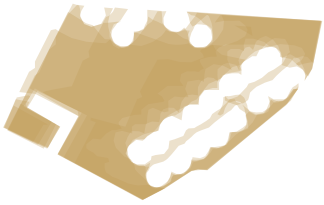
•Site location: The project site is located in between the four neighbourhoods Zuidplein, Tarwewijk, Bloemhof, and Vreewijk. This location is determined by a research to the climate change effects on the site and this location came out as the ideal location to intervene and place a building that can mitigate the effects of climate change that will affect the neighbourhoods in the future. Another reason for the location is the ability to connect the residents of the four different neighbourhoods.

•Site mapping: The project location is now an big grass field of approximately 7000m² with an sports field and a restaurant with on top a connecting bridge to Zuidplein shopping center. The approach is to demolish these objects and reimplement them in the new design of the building. The site is surrounded by two big main streets which form a barrier between the neighbourhoods, these streets will become car free in the future and a pedestrian boulevard will be built. On site some very big trees are situated, some next to the busy road and some on the field. These trees lower the effects of the urban heat island on the site, so the trees have to be preserved (figure 14).

•Site qualities: The site has the ideal location to connect the residents from the four neighbourhoods Zuidplein, Tarwewijk, Bloemhof and Vreewijk. And to become a meeting spot for everyone. In the future group vision on site there will be a new tram stop connected with Feijenoord city and there will be a micromobility node (figure 16).

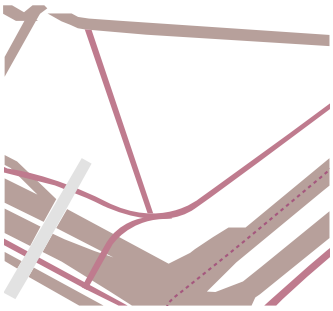
•Site approach: The building should be accessible from all four sides of the different neighbourhoods.

•Urban rules: The destination of the plot now is determined by the municipality as green. The destination has to be changed in order to be able to built there. There are no restriction by the municipality in terms of height and maximum built area. The building should look accessible from all sides and should keep in mind the human scale, the mass study will give more explanation about these new rules.



Where to build?

indicating the spots where most sun is during the summer, these spots have the highest chance of being affected by the urban heat island effect.

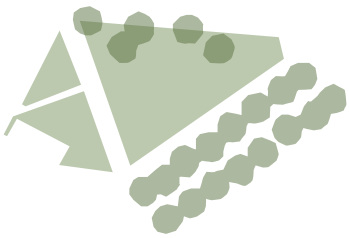


What to improve?

Improve the pedestrian and cyclist network by making crossing the street easier and less as a border.

What to replace?

Connection to shopping center zuidplein and the public sports facility.



What to keep?

The trees block a lot of sun, which is positive for the urban heat island effect, the existing trees have to be kept and the remaining green has to be kept as much as possible.

Figure 14: Urban layers on site
Author: Gerwin van den Boogaart

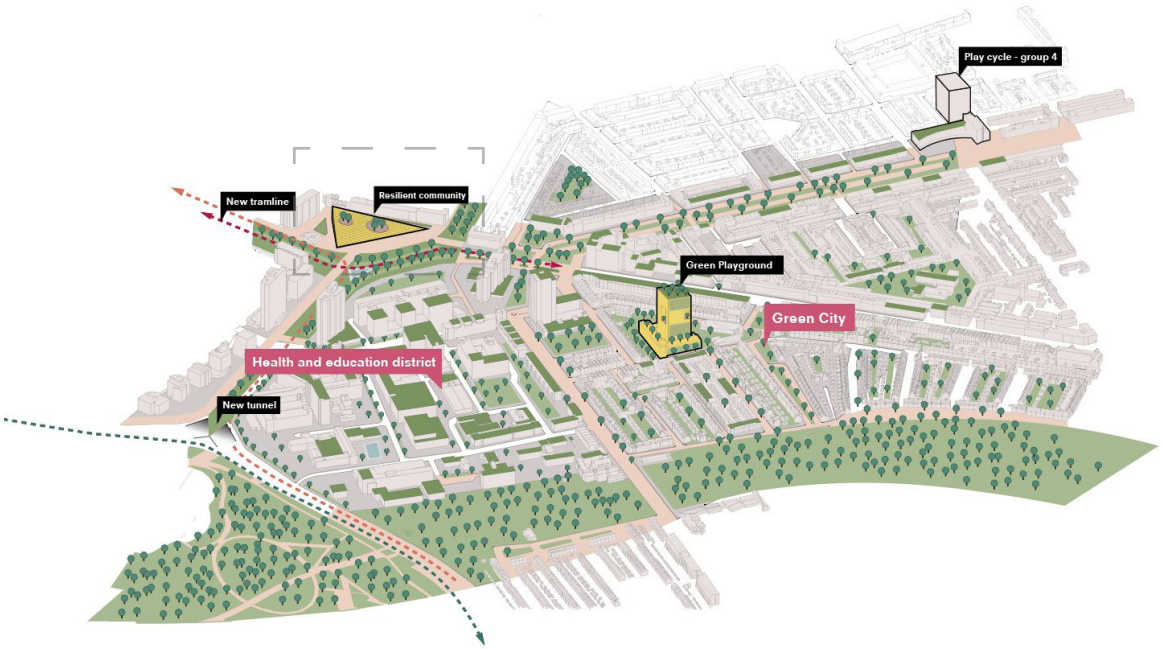


Figure 15: Health and education district
Author: Gerwin van den Boogaart

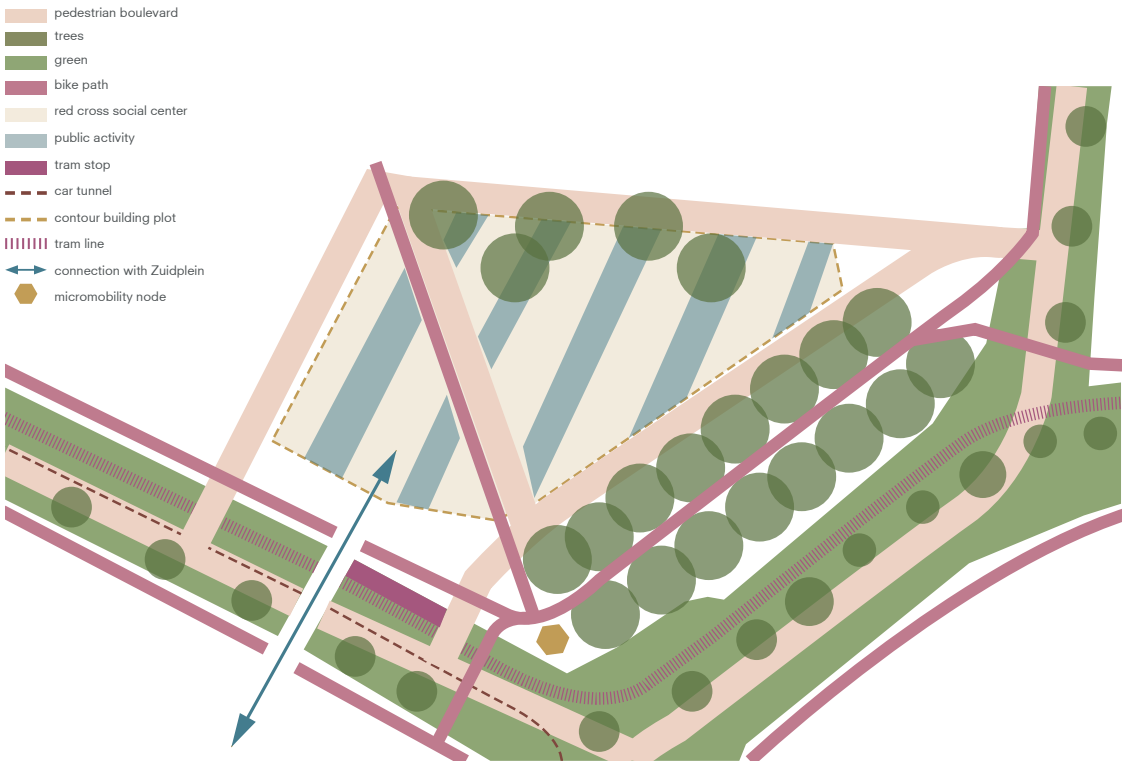


Figure 16: Future vision site
Author: Gerwin van den Boogaart

The site analysis shows different aspects which are now present on the site. One of them are the tress that are currently placed in the North and South of the site. Also the connection with the shopping center, the impact of the sun and the streams of traffic.

With this in mind the mass studies are created to finally come to an preliminary massing which can be found in the bottom right corner. This final mass is a combination of all the demands that came out of the site analysis and to built an accessible human scale building.

Note: all these mass studies are designed with a 12.000m² building in mind.

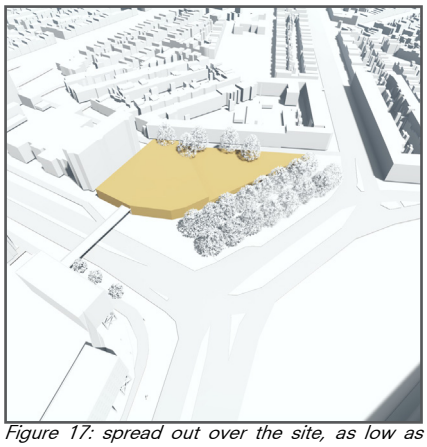


Figure 17: spread out over the site, as low as possible,
source: Gerwin van den Boogaart

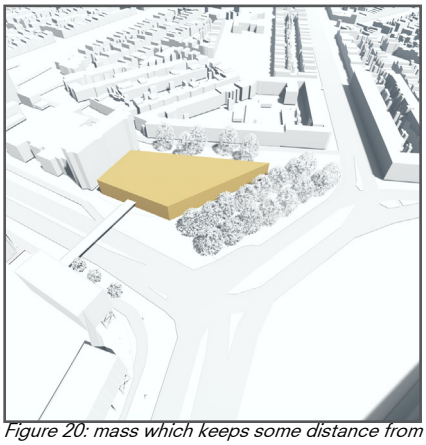


Figure 20: mass which keeps some distance from the trees.
source: Gerwin van den Boogaart

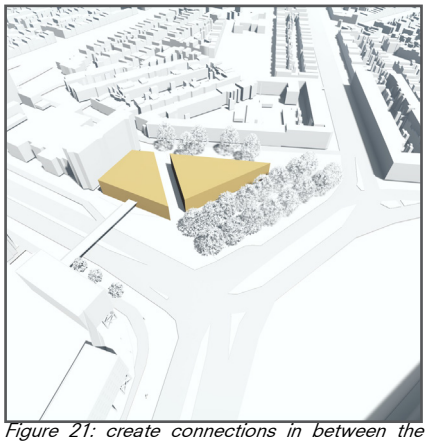


Figure 21: create connections in between the neighbourhoods.
source: Gerwin van den Boogaart

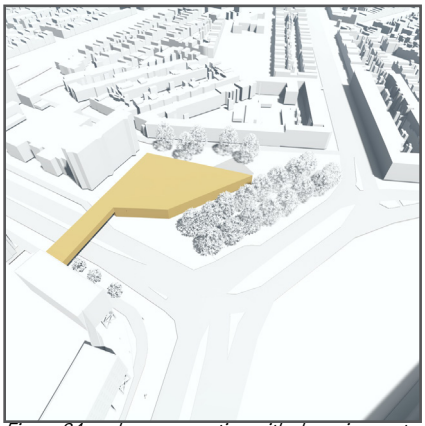


Figure 24: make a connection with shoppingcenter Zuidplein
source: Gerwin van den Boogaart

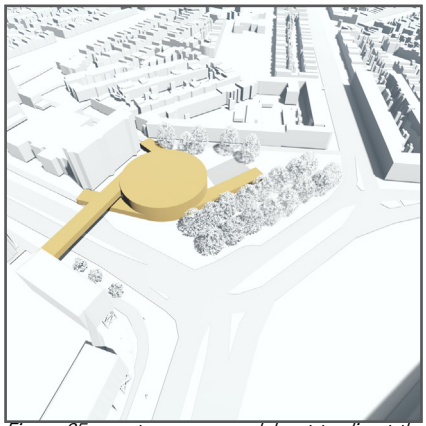


Figure 25: create some roundabout to direct the different streams of people.
source: Gerwin van den Boogaart

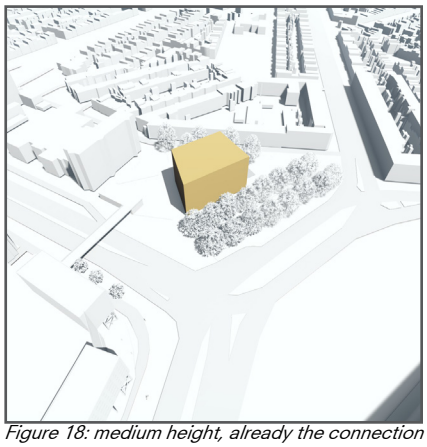


Figure 18: medium height, already the connection with the surroundings seems to fade away.
source: Gerwin van den Boogaart

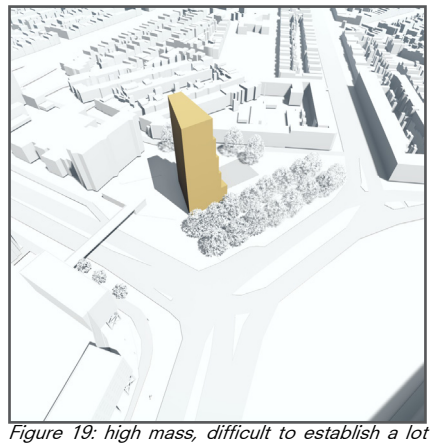


Figure 19: high mass, difficult to establish a lot of connections and does not seem to fit in the surroundings.
source: Gerwin van den Boogaart

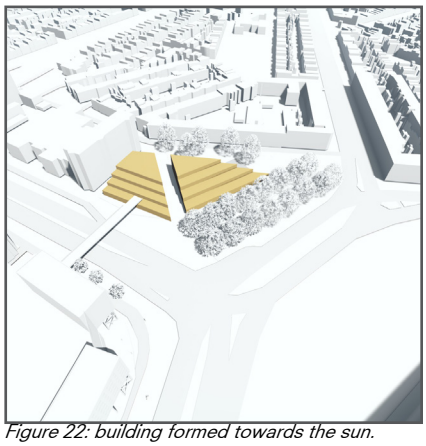


Figure 22: building formed towards the sun.
source: Gerwin van den Boogaart

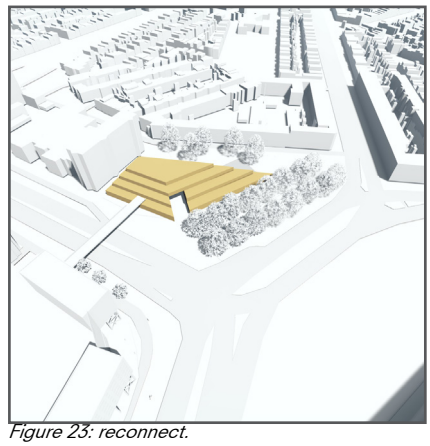


Figure 23: reconnect.
source: Gerwin van den Boogaart

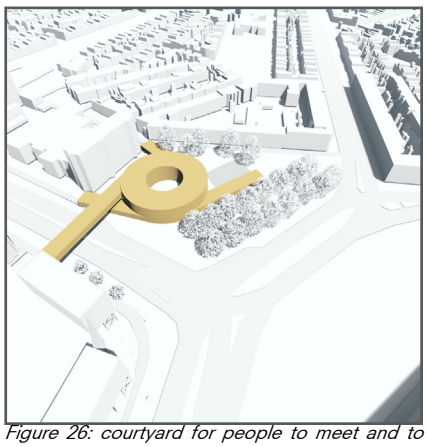


Figure 26: courtyard for people to meet and to store and collect rainwater.
source: Gerwin van den Boogaart

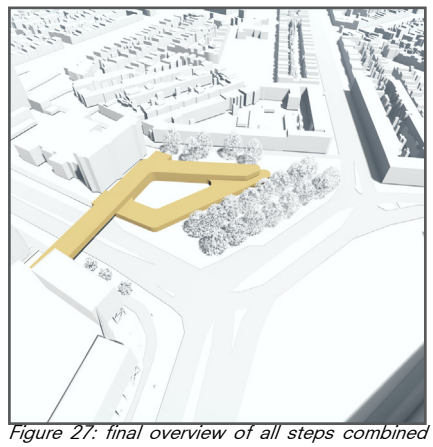


Figure 27: final overview of all steps combined and the preliminary massing.
source: Gerwin van den Boogaart

PROGRAM

•Program statement: Red Cross Social Center

•Reference research: The references that have been researched are divided into three categories. Red Cross headquarters, communal spaces, and food banks. The conclusions of these research still have to be mapped. The full reference research can be found in Appendix II.

•Benchmarking of the program: Based on the reference research the percentages in figure one have been determined. Partly consisting of the Red Cross headquarters with all their needed office types. Then Red Cross aid, the more practical side of the work of the Red Cross, where a food bank and teaching spaces are located. The entrance and the restaurant are general spaces, the restaurant is added to the program because an existing restaurant will be demolished. Then there is in blue the part for the elderly and the children, eventually it will be a combination between the two but for now its separated in a multifunctional space for the elderly and a playground for the children. Also sports are added, this is a great way to connect people and at the same time a replacement for the existing sports field. Lastly there are the general transport functions like the car and bike parking and the technical parts.

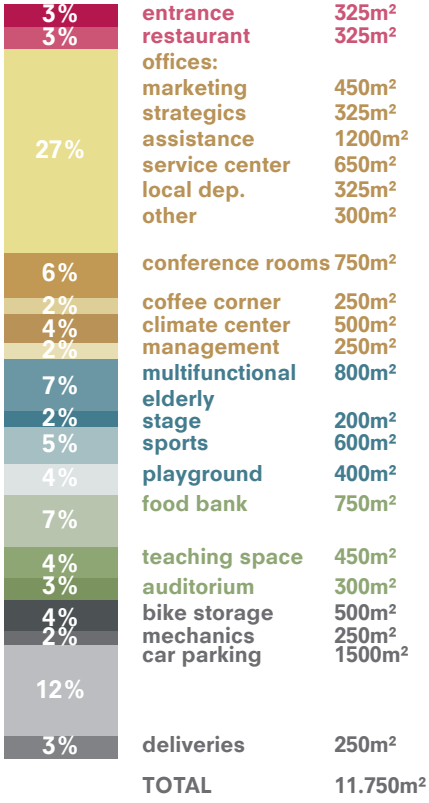


Figure 5: Program bar
Author: Gerwin van den Boogaart

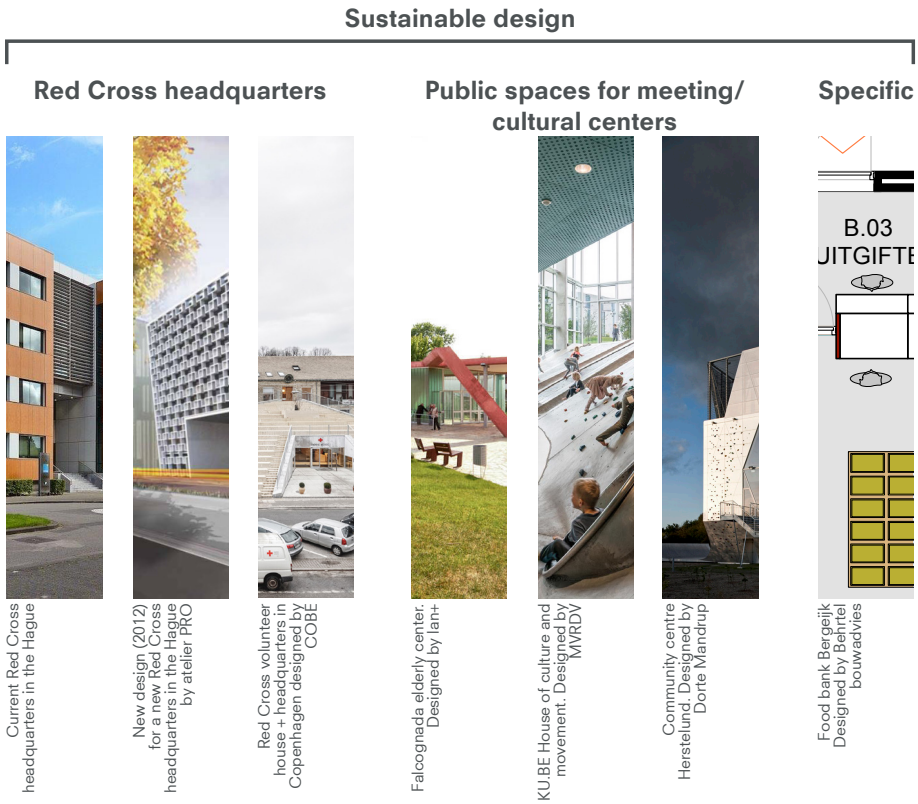


Figure 27: Reference projects
Author: Gerwin van den Boogaart

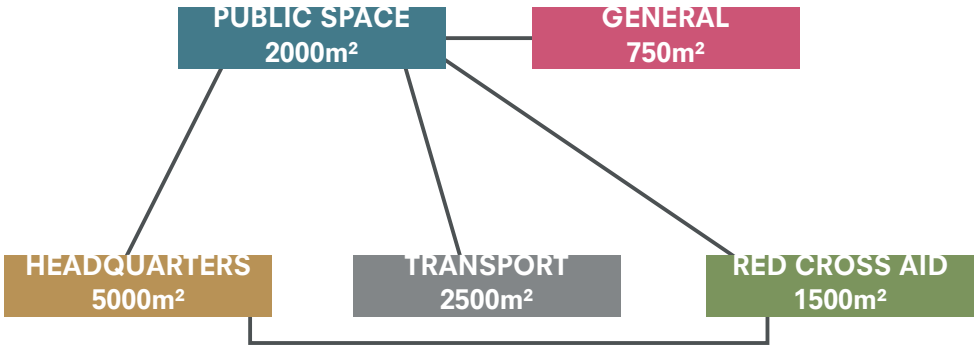
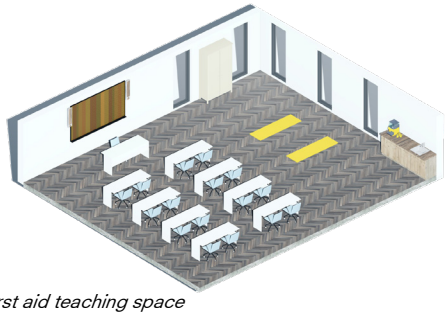


Figure 28: Preliminary relation scheme, will be more developed for P2
Author: Gerwin van den Boogaart

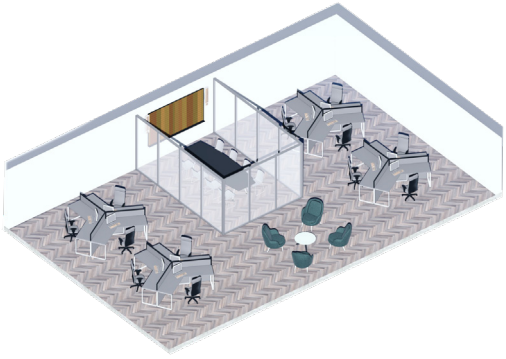
•Program relations: On figure 30, the relations of the program are being shown, visible is that half of the square meters is public, and the other half is private.

•Specific spatial requirements: On image 29 the different kinds of spaces of the building are shown. These are the most important spaces for the concept of social infrastructure, let people meet eachother.

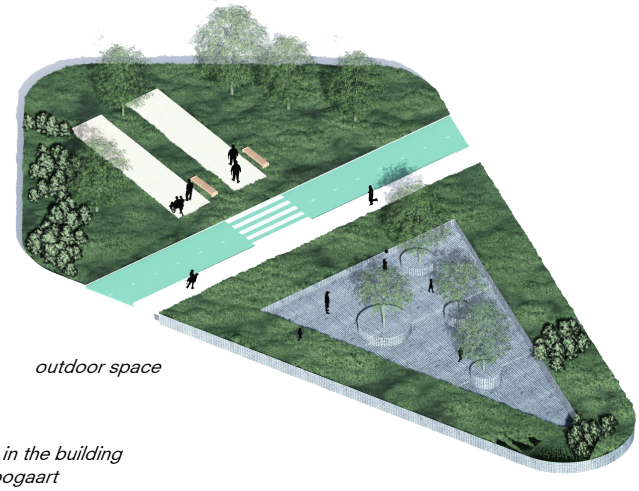
new concept food bank



first aid teaching space



office



outdoor space

Figure 29: Specific spaces in the building
Author: Gerwin van den Boogaart

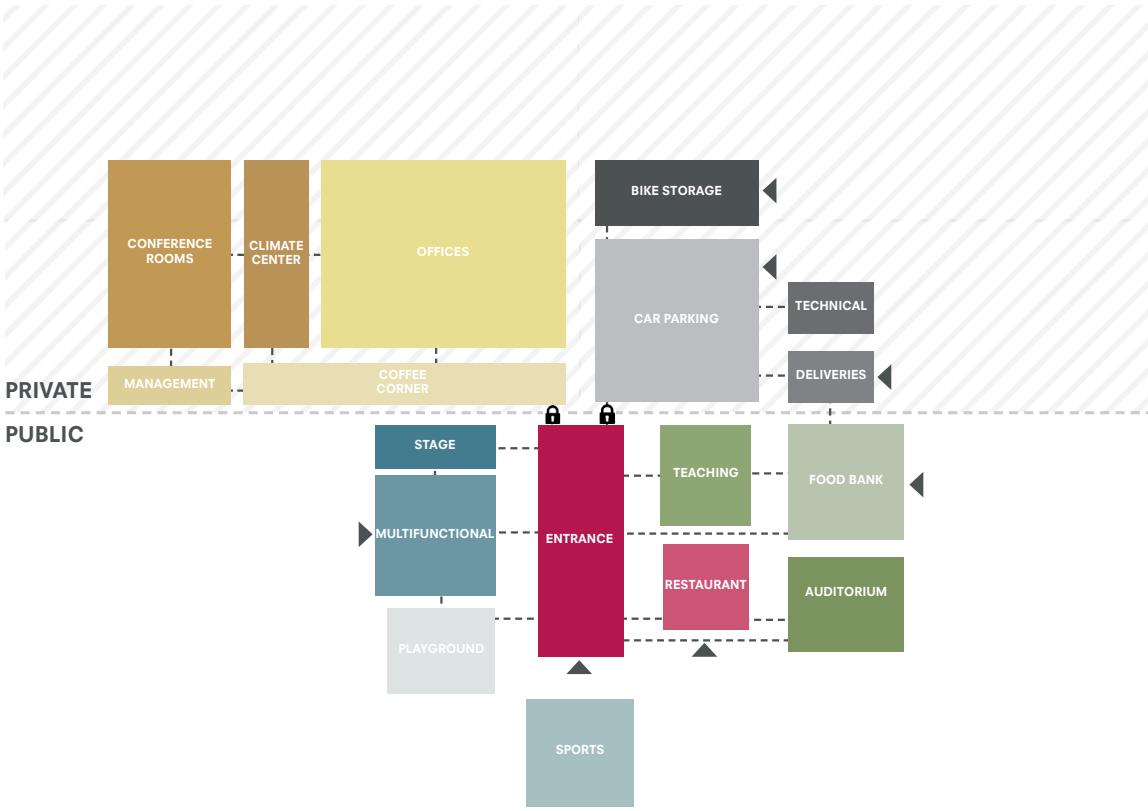


Figure 30: Spatial requirements
Author: Gerwin van den Boogaart

RED CROSS HEADQUARTERS

Design for a new Red Cross headquarter in the Hague by atelier PRO

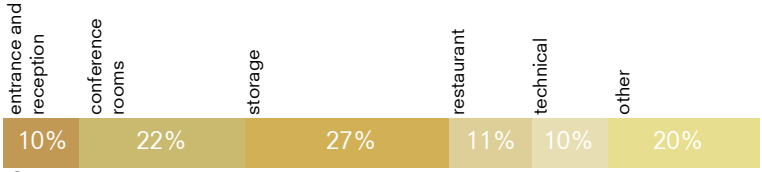
In November 2009 atelier PRO, an architecture firm in the Hague designed a new headquarters for the Red Cross in the Hague, next to the building they were housed at that time. Atelier PRO was asked at that time by the municipality to make a new urban plan for the area, and the building of the Red Cross stood in the way of the developments. So then the plan was born for a new headquarters next to the old one. Unfortunately in the end the plan was not executed due to unknown reasons.

Location:	Leeghwaterplein, The Hague
Architect:	Atelier PRO
Footprint:	1150m²

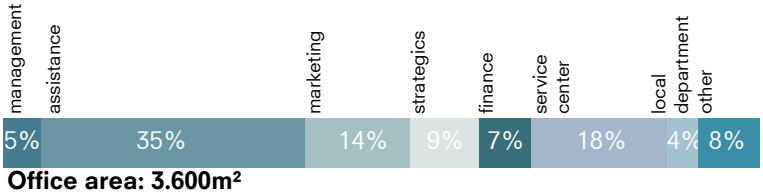
Project goals/ambitions

The aim of the design of atelier PRO was to creat a sustainable, inspiring and a transparant building which would become a meeting space for people. In terms of climate adaptation they used a angled facade to on the one hand keep out the sun and on the other hand keep the visibility to the outside. There would be a back entrance and a front entrance, the back entrance is designed as a continuation of the public space. The building would collect its own energy, it would be very transparent with big glass facades and it would have permanent ventilation.

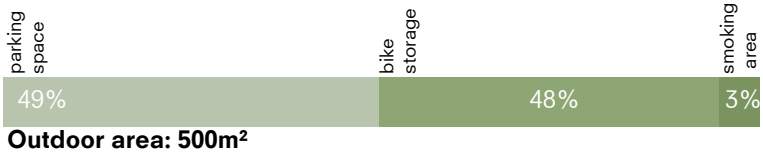
GFA:	5645m²
Floors:	6



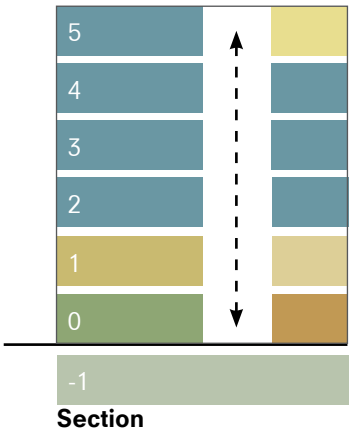
General area: 2.050m²



Office area: 3.600m²



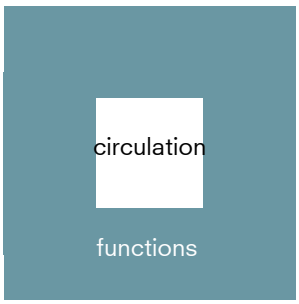
Outdoor area: 500m²



Section

Figure 8: Outside design
Source: Atelier PRO

Figure 9: Inside design
Source: Atelier PRO



Routing

Project analysis conclusions

The routing in the building is very clear, the main circulation area is located in the middle of the building and it is at the same time a meeting space. To make the effect of meeting eachother stronger, sightlines have been created between the offices. Unfortunately the building is not very inviting from the outside so strangers would not enter. To adapt to the climate, the southern facade of the building is angeled, and energy will be generated through the solar panels on the roof.

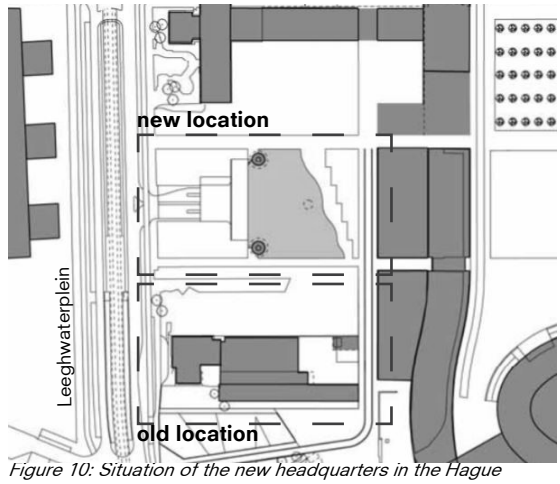
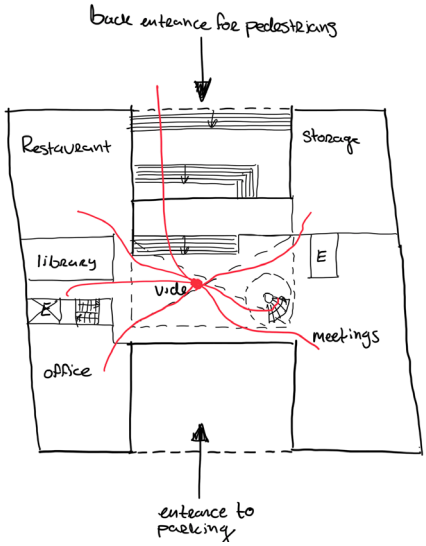
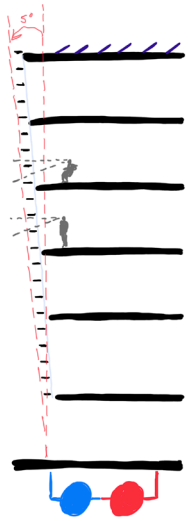


Figure 10: Situation of the new headquarters in the Hague
Source: Atelier PRO





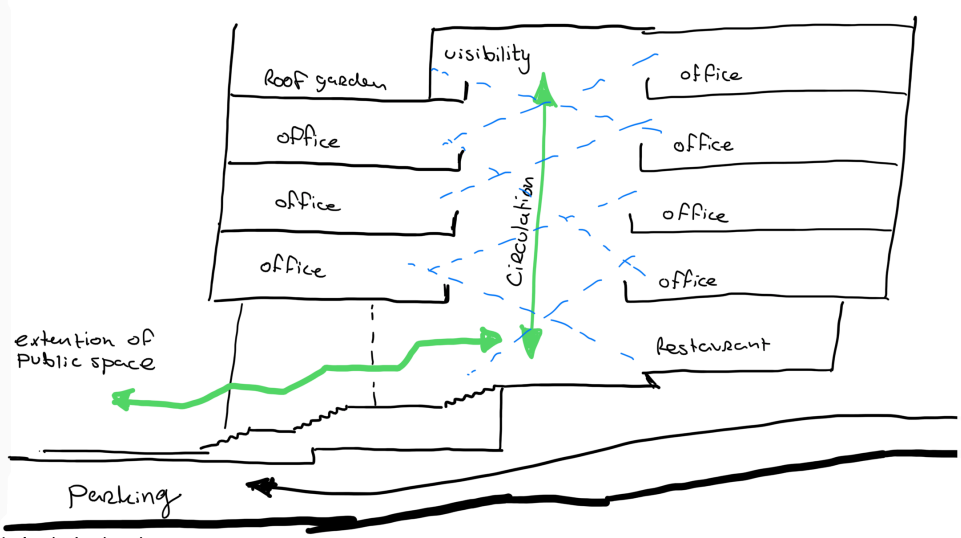


Figure 11: Analysis sketches
Source: Gerwin van den Boogaart

Current Dutch headquarters of the Red Cross

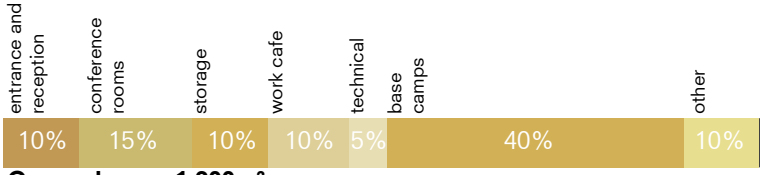
In 2018 the Red Cross headquarters moved from the Leeghwaterplein to the Anna van Saksenlaan in the Hague. The organization gave Zenber architects the assignment to restyle the building to fit this new function. The building contains different departments of the Red Cross, like all national staff members of the national and international aid assistance, the fundraising department, communications and staff divisions. Also an important function of the building is the international climate center of the red cross.

Project goals/ambitions

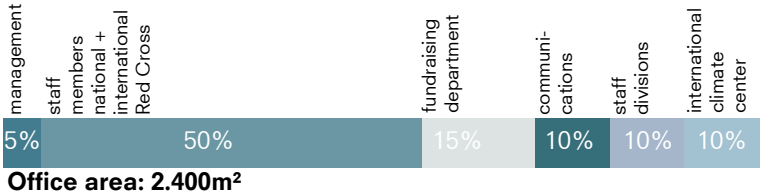
The architect tried to design a dynamic workplace. where working together, meeting eachother and the international character of the Red Cross assemble. On each floor they created a 'base camp' as the architects called it. This common space with a coffee machine, a work/reading table, tables to meet eachother. Around this basecamp, transparent meeting rooms are placed, this increases the visibility of empoyees and working together and meeting will be stimulated and facilitated. On the ground floor a multifunctional work café is placed for the employees and the visitors. The building should be sustainable.

Location: Anna van Saksenlaan, The Hague
Architect: Zenber architecten (inside)
Footprint: 900m²

GFA: 4500m²
Floors: 5

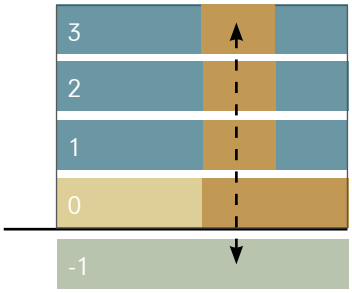


General area: 1.200m²



Office area: 2.400m²

Outdoor area: 900m²



Section

Figure 12: Outside design
Source: unknown

Figure 13: Inside design
Source: Zenber architecten

Routing

Project analysis conclusions

The idea of the base camp is very nice, a meeting space for all empoyees central on each floor. Less inviting is the appearance of the building on the outside, the building is not attracting at all and will not attract strangers. A nice program which is located in the headquarters of the Red Cross in the Netherlands is the international climate center. Which is a nice contribution to the climate change research in this article.

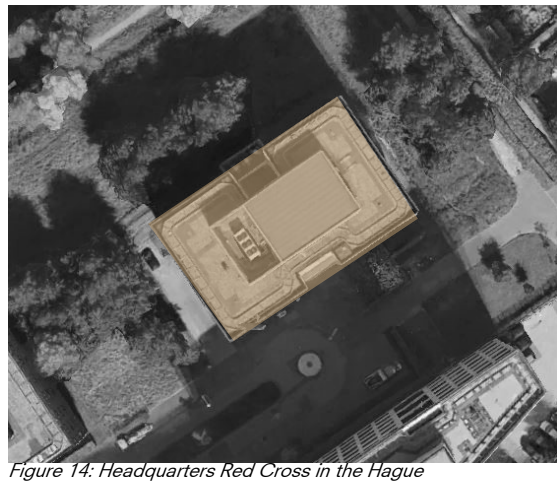


Figure 14: Headquarters Red Cross in the Hague
Source: Google earth

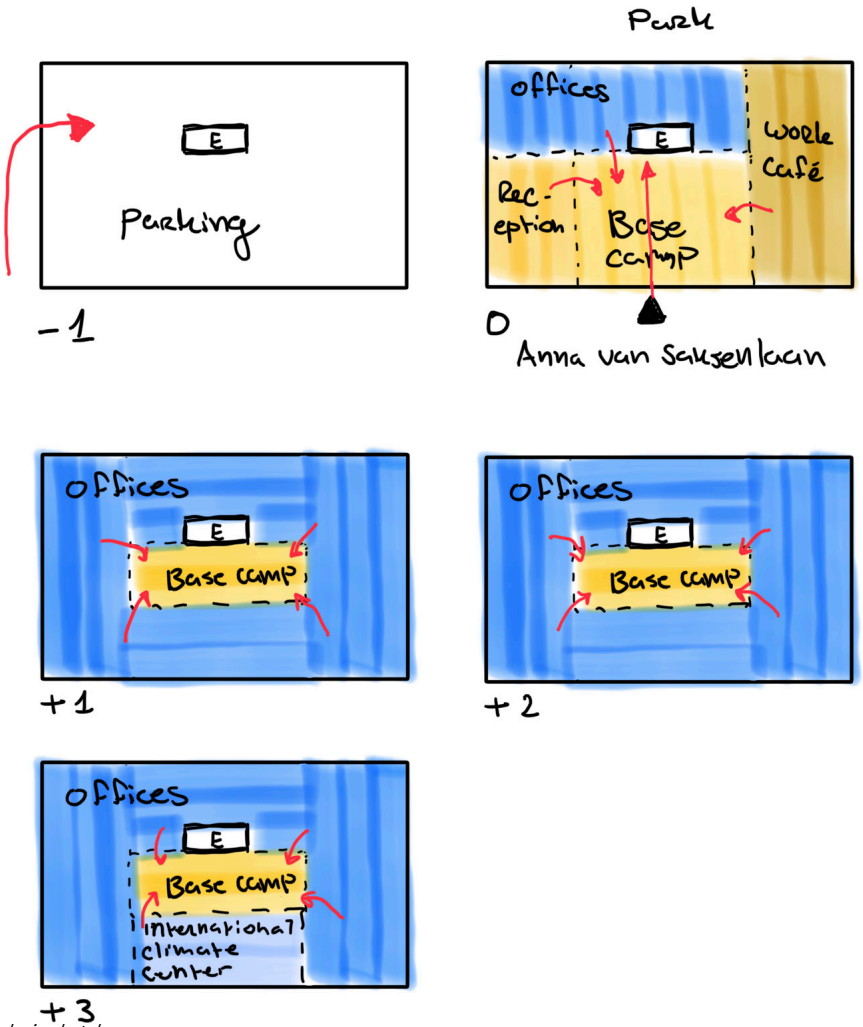


Figure 15: Analysis sketches
Source: Gerwin van den Boogaart

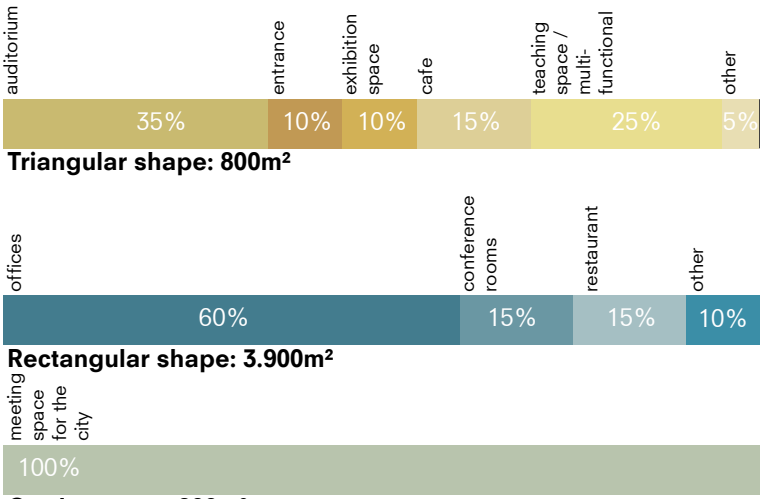
Design for a new Red Cross headquarter in Copenhagen by architecture studio COBE

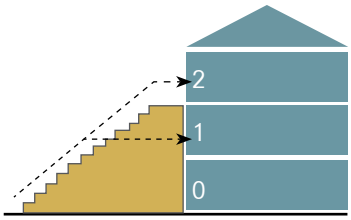
In 2017 the design for the addition of the Red Cross headquarters in Copenhagen was finished. The addition, designed by studio COBE has as a function a volunteer center. The new addition is a building for Red Cross volunteers where they can meet eachother and share knowledge, but also a public meeting space for the rest of the city. The shape of the building is designed with the help of a group of volunteers of the Red Cross (COBE, n.d.).

Project goals/ambitions

The design ambition of COBE was to create an open, generous and democratic building. The triangular shape makes it possible to access the public roof from the street level. The volunteer house had to be desinged to be inviting and to encourage passers-by to come in and explore the building. The shared end goal for everyone was to end up with a design that would give quality back to the street and add something extra (COBE, n.d.).

Location:	Copenhagen, Denmark		
Architect:	Studio COBE	GFA:	5500m²
Footprint:	2100m²	Floors:	1 (triangle), 3(rectangle)





Section


Figure 16: Inside design
Source: Studio COBE


Figure 17: Outside design
Source: Studio COBE

Project analysis conclusions

The public roof, inviting the passers-by from the street in is very nice. The triangular form of the building connecting to the ground floor level transforms the large rectangular building to a human scale which makes it more invitable. There is now a clear border between the public part in the building and the private part, maybe it would also work if these functions would be more mixed. There are two entrances to the rectangular building, one on the ground floor through the volunteer center and another one on top of the triangle, which connects with the third floor. In terms of climate change, the green parts on the roof are a good addition. Reducing the effects of the urban heat island effect.

Figure 18: Situation of the new headquarters in Copenhagen
Source: Google earth

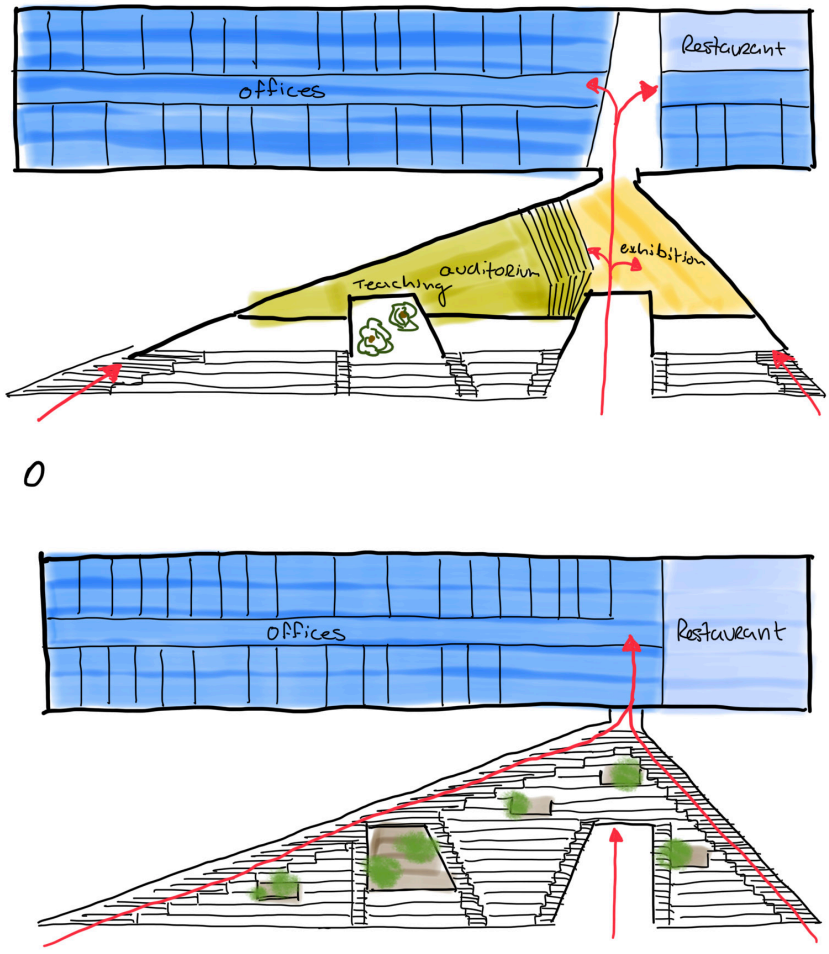


Figure 19: Analysis sketches
Source: Gerwin van den Boogaart

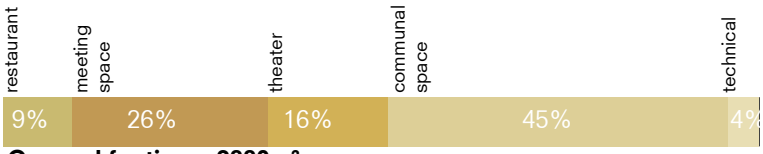
KU.BE House of Culture in Movement

In 2016 the KU.BE house was established. This building was designed for the municipality of Fredriksberg both for the community at the site as the community further away like the people in Copenhagen. The building is seen as a new typology, a building that would bring people together, MVRDV translated this in a blend of theatre, sport and learning. The space that they are in should activate body and mind, no matter the age, ability or interest.

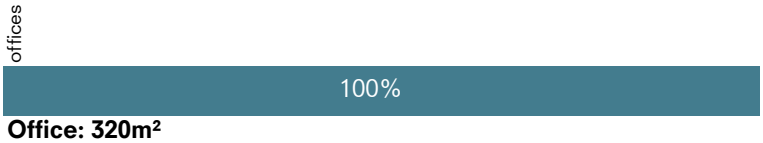
Project goals/ambitions

The ambition for the project was to bring people of the community together and to improve the quality of life. To catch all age groups they implemented different kinds of sports to connects all ages of people together. The building will become an extention of the urban landscape and it will become an indicator for further developments in the neighbourhoods around it.

Location:	Fredriksberg, Denmark		
Architect:	Adept & MVRDV	GFA:	3200m²
Footprint:	1400m²	Floors:	4



General funtions: 2880m²



Office: 320m²

Figure 20: Inside design
Source: MVRDV

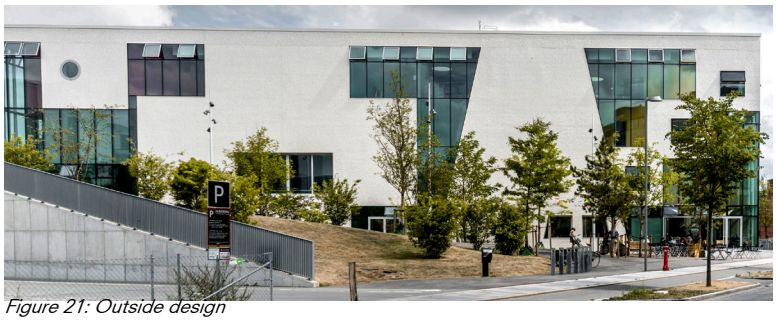


Figure 21: Outside design
Source: MVRDV

Project analysis conclusions

Interesting in the design are the different shapes that are implemented, the shapes are the optimal forms for the functions that it houses. Everything outside these forms are the play zones, so the social interaction will go through the whole building.

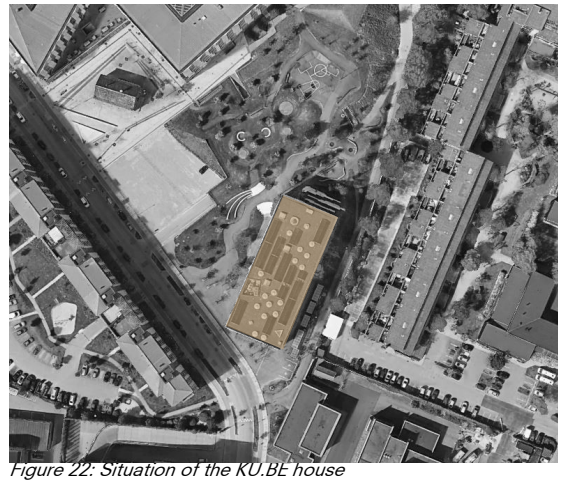


Figure 22: Situation of the KU.BE house
Source: Google earth

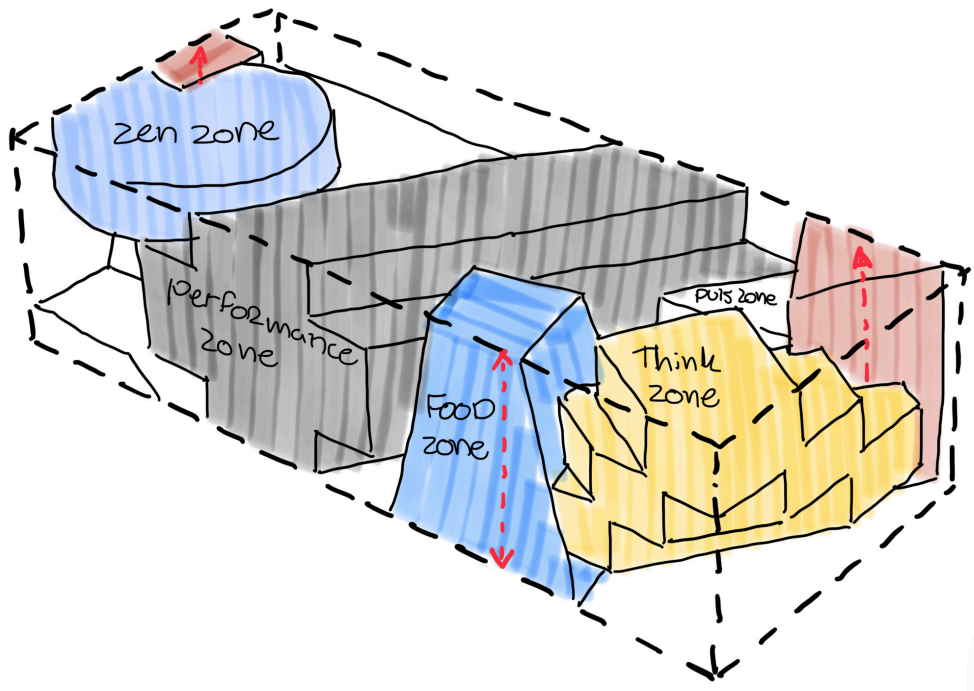


Figure 23: Analysis sketches
Source: Gerwin van den Boogaart

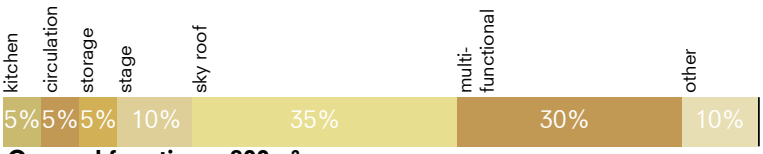
Community centre Herstelund

The community centre in Herstelund, Denmark, is designed by the architectural firm Dorte Mandrup. The building provides the space for joint activities for a residential neighbourhood of 600 families. The construction of the building is made in a way that can expand when the community expands, so grow along with the new inhabitants. The community center is surrounded by all kinds of outdoor activities like a skating ramp, a climbing wall and on the roof of the building a basketball court.

Project goals/ambitions

The aim of the design was to create an open and inviting building. Also one of the demands of the client was the ability to grow along with the increase of the inhabitants. The community centre should have functions for all age groups and interests. The building should be available at all times of the day.

Location:	Albertslund, Denmark		
Architect:	Dorte Mandrup	GFA:	875m²
Footprint:	200m²	Floors:	4



General functions: 800m²

Outdoor area: 150m²

Figure 24: Outside design
Source: Archdaily

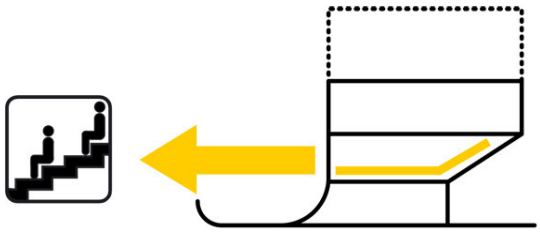


Figure 25: Section
Source: Archdaily

Project analysis conclusions

Interesting is the aim for the project, being open, inviting and for all ages and interests. I think this will work very well through this design. In terms of sustainability, the building gets its energy through solar panels on the roof, they use thermo active decks that cool the surfaces in summer and the building collects rainwater to flush the toilets.

Figure 26: Situation of the community centre
Source: Google earth

Figure 27: Analysis sketches
Source: Gerwin van den Boogaart

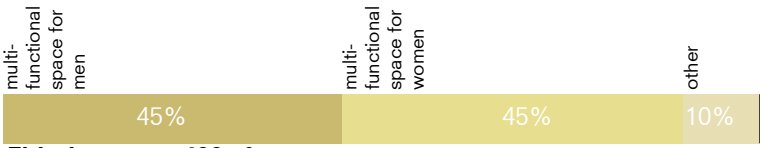
Falcognada Elderly center

The Falcognada elderly center, opened in 2010 was designed by laN+ architects and is located in one of the outskirts of Rome, Italy. The building is placed in a park, and surrounded with all kinds of activities like a childrens playground, sport facilities, green squares and micro gardens. The building is designed for the elderly of the neighbourhood to spend their free time together and this will strenghten their sense of community.

Project goals/ambitions

The goal of the design is to create an open building where the border between inside and outside dissapears. Creating some kind of safe space in a high density neighbourhood with lots of green.

Location:	Albertslund, Denmark		
Architect:	laN+	GFA:	400m²
Footprint:	400m²	Floors:	1



Elderly center: 400m²

Outdoor area: 26.500m²

Figure 28: Inside design
Source: Archdaily

Figure 29: Outside design
Source: Archdaily

Project analysis conclusions

A nice addition to the city, a green peacefull oasis. Interesting is the idea to try to erase the border between the outside and inside which creates a very open building where people would want to go. The inside of the building acts as a multifunctional space, I am not sure why there is a separate room for men and for women, maybe thats the culture. The building is constructed with matererial from the region. The outside construction is used to allow green to grow on it, so eventually the outside will have a roof of plants.

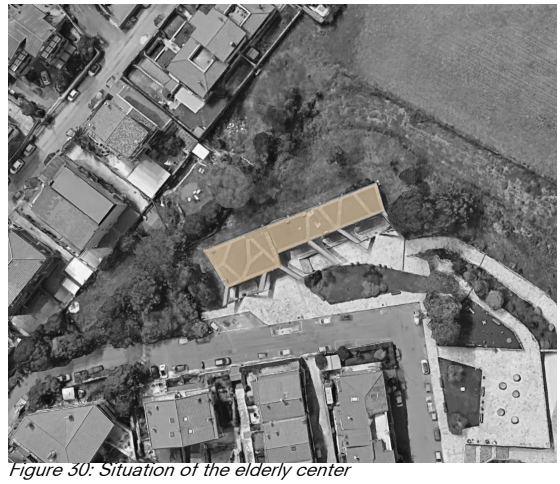


Figure 30: Situation of the elderly center
Source: Google earth

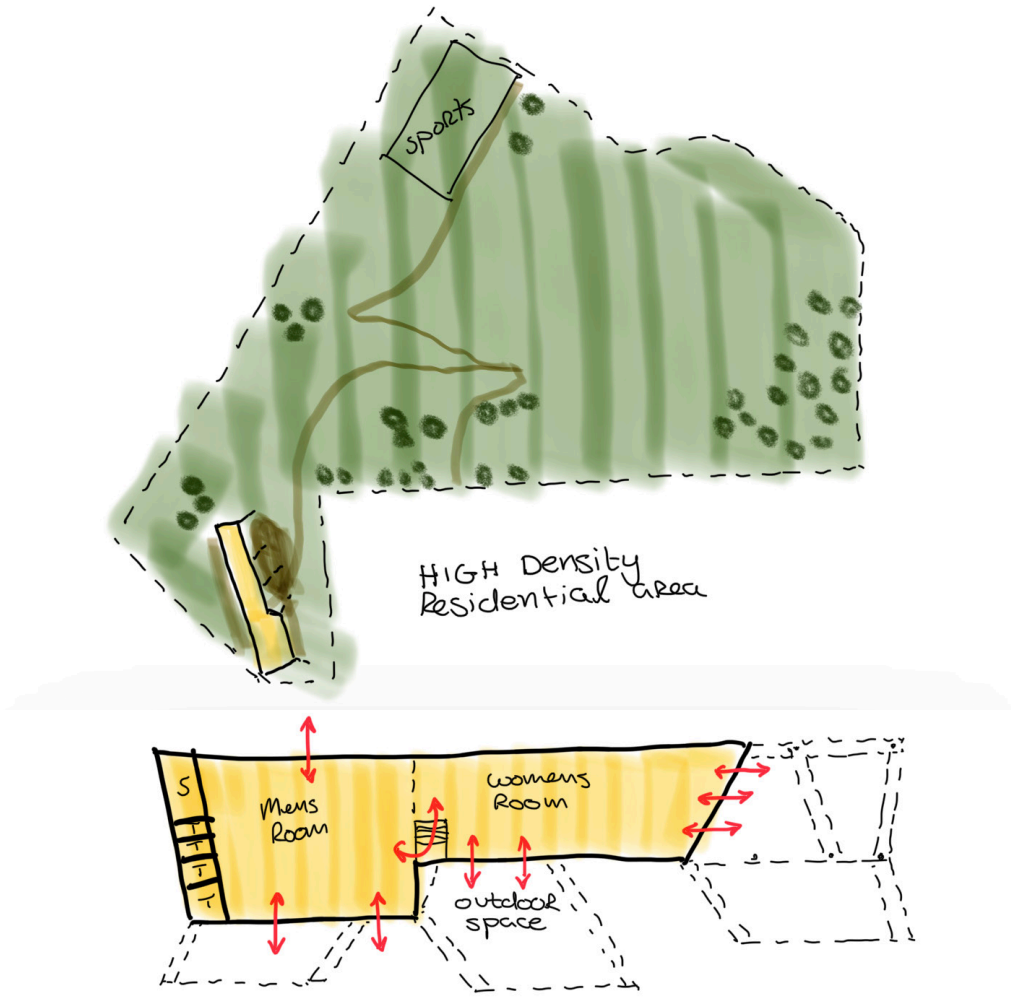


Figure 31: Analysis sketches
Source: Gerwin van den Boogaart

Food Bank Bergeijk

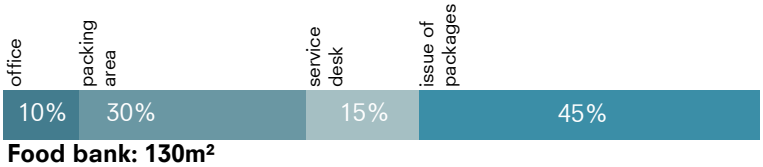
This part of the reference research is about designing a food bank, as you can see in this reference food banks mostly are build in abandoned buildings, almost no new designs are made for a food bank.

Project goals/ambitions

Fit the food bank in the existing building and create a good workflow.

Location:	Bergeijk, Netherlands		
Architect:	Roland Behrtel	GFA:	260m²
Footprint:	260m²	Floors:	1

General spaces: 130m²



Food bank: 130m²

Figure 32: Inside design
Source: Behrtel bouwadvies

Figure 33: Outside design
Source: Behrtel bouwadvies

Project analysis conclusions

There is a clear border between the public and the private part of the food bank. This reference makes it clear what program is needed in a food bank and how this should be positioned.

Figure 34: Situation of the food bank
Source: Google earth

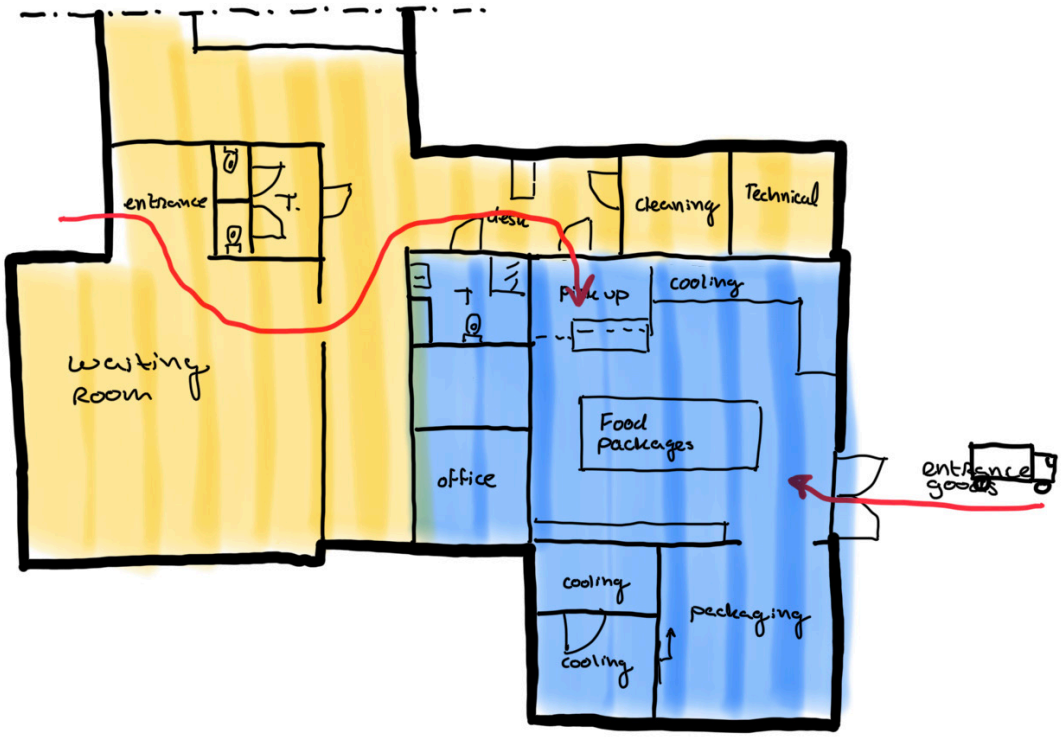


Figure 35: Analysis sketches
Source: Gerwin van den Boogaart

Sources:

atelier PRO (www.atelierPRO.nl). (2009). Hoofdkantoor Internationale Rode Kruis NL, Den Haag. Retrieved January 6, 2021, from https://www.atelierpro.nl/nl/projects/73/hoofdkantoor-internationale-rode-kruis-nederland

Behrtel ontwerp- & bouwadvies. (2016, October 9). voedselbank Bergeijk. Retrieved January 6, 2021, from https://behrtelbouwadvies.nl/project/voedselbank-bergeijk/

COBE. (n.d.). Cobe - Red Cross Volunteer House. Retrieved January 6, 2021, from https://www.cobe.dk/place/red-cross-volunteer-house

Dortemandrup. (n.d.). Herstedlund Community Centre, Denmark | Dorte Mandrup. Retrieved January 6, 2021, from https://www.dortemandrup.dk/work/herstedlund-community-centre-denmark

IaN+. (n.d.). IaN+. Retrieved January 6, 2021, from http://www.ianplus.it/

MVRDV. (n.d.). MVRDV - Ku.Be House of Culture and Movement. Retrieved January 6, 2021, from https://www.mvrdv.nl/projects/50/kube-house-of-culture-and-movement

Zenber architecten. (2019, August 1). HOOFDKANTOOR RODE KRUIS. Retrieved January 6, 2021, from https://zenber.nl/portfolio_page/hoofdkantoor-rode-kruis/

APPENDIX III PLAN OF APPROACH

		RESEARCH	DESIGN
WEEK 2.7	Jan 4th	accessible buildings	mass study
WEEK 2.8	Jan 11th.	P2 presentation	
WEEK 2.9	Jan 18th.	climate design	relations
WEEK 2.10	Jan 25th.	structure	structure
WEEK 3.1	Feb 8th.	site analysis	massing options
WEEK 3.2	Feb 15th.	programme analysis	programmatic options
WEEK 3.3	Feb 22th.	ambition analysis	design options
WEEK 3.4	Mar 1st.	analysis site vision	design vision
WEEK 3.5	Mar 8th.	P2.5 presentation	
WEEK 3.6	Mar 15th.	functional research	develop plans
WEEK 3.7	Mar 22th.	reference research	develop plans
WEEK 3.8	Mar 29th.	structure research	develop sections
WEEK 3.9	Apr 5th.	reference research	develop sections
WEEK 3.10	Apr. 12th.	P3 Presentation	
WEEK 4.1	Apr. 19th.	research on materials	develop materials
WEEK 4.2	Apr. 26th.	structural systems	develop form details
WEEK 4.3	May 3rd.	facades	develop facade
WEEK 4.4	May 10th.		integrate into vision

		RESEARCH	DESIGN
WEEK 4.5	May 17th.	P4 presentation	
WEEK 4.6	May 24th.	finalizing research	finalizing desing book
WEEK 4.7	May 31th.	finalizing research	finalizing design book
WEEK 4.8	Jun. 7th.	preparing presentation	
WEEK 4.9	Jun 14th.	preparing presentation	
WEEK 4.10	Jun 21th.	P5 Presentation	

Graduation Plan

Master of Science Architecture, Urbanism & Building Sciences

Graduation Plan: All tracks

Submit your Graduation Plan to the Board of Examiners (Examencommissie-BK@tudelft.nl), Mentors and Delegate of the Board of Examiners one week before P2 at the latest.

The graduation plan consists of at least the following data/segments:

Personal information	
Name	Gerwin van den Boogaart
Student number	5061806

Studio		
Name / Theme	Complex projects, migration of ideas	
Main mentor	Manuela Triggianese	Architecture
Second mentor	Eline Blom	Architecture
Argumentation of choice of the studio	I was interested in making a design in a bigger context. The complex projects studio offers this opportunity. First with a group a vision will be created for a site for the future and after that each student of the group will design its own intervention which contributes to the bigger vision. This concept was very appealing to me because it kind of imitates the reality of working together on a bigger plan.	

Graduation project	
Title of the graduation project	Resilient communities, By using both hard and social infrastructure, a resilient community will be established which will be prepared for future climate changes.
Goal	
Location:	On an open field North of Zuidplein shopping center in Rotterdam.
The posed problem,	In the upcoming years, the city of Rotterdam has to deal with different kinds of climate change like extreme weather, the urban heat island effect, draught and flooding. The city has to be adapted and prepared to deal with these changes. Only hard infrastructure like dikes and flood parks are not enough, the habits of the people have to be changed in order to prepare them for these changes. The new building will attempt to achieve this.

research questions and	How can both social- and hard infrastructure contribute to the creation of a resilient climate proof community?
design assignment in which these result.	After doing research it appeared that to create a social infrastructure, interaction between people has to be stimulated. To make the as accessible as possible a non – profit organization would be the perfect fit. A combination between a new headquarters for the Red Cross combined with meeting areas for the two target groups, the elderly and the children, would be the perfect fit for the building. Together this is called the Red Cross Social Center. The design guidelines for this building are to in the first place connect the people from the different adjacent neighbourhoods, now these are disconnected by wide busy roads. Second, to connect these people a very accessible building is needed, people have to enter without hesitating. Third, the building has to make the Red Cross visible again in the Netherlands. Most of the Dutch people this that the Red Cross only helps people abroad, the aim is to show that they also have a great impact in the Netherlands. And lastly, the building has to mitigate the effects of climate change that are impacting the site.

Process

Method description

First as a group, the whole site is analyzed in different layers: Historical, mobility, future vision, environment, buildings, economy, demographics and public space. With this knowledge and the future vision of the city for the site a group vision is created for the site. For the individual research, first a research is done to determine the way of how to deal with climate change. This is done by a literature research. This research resulted in two aspects of dealing with climate change. First the social infrastructure, which was researched through the books of the American sociologist Eric Klinenberg. The second part, the hard infrastructure was more oriented on the site. By using different sources of the government like the klimaateffectatlas the different aspects of climate change that have impact on the site are determined. After this a literature study will be done about accessible buildings and how to design

one, and on the different ways of dealing with the climate change aspects that impact the site. Lastly these researches will be combined into a building design.

Literature and general practical preference

Listed below are the most important sources which form the basis of this research:

- google. (2019, February 5). Palaces for the People | Eric Klinenberg | Talks at Google [Video file]. Retrieved from https://www.youtube.com/watch?v=HJIYhSA84Sc&ab_channel=TalksatGoogle
- Klinenberg, E. (2015). Heat Wave: A Social Autopsy of Disaster in Chicago (Second ed.). Chicago, USA: University of Chicago Press.
- Klinenberg, E. (2020). Palaces for the People: How To Build a More Equal and United Society. New York, New York: Vintage.
- Rotterdam.Climate.Initiative. (2013, October). Rotterdamse Adaptatiestrategie. Gemeente Rotterdam. Retrieved from https://www.010duurzamestad.nl/wat-wij-doen/lopende-projecten/rotterdamse-adaptatiestra/adaptatiestrategie.pdf
- Stichting Climate Adaptation Services. (n.d.). Viewer - Klimaateffectatlas. Retrieved from https://www.klimaateffectatlas.nl/nl/

Reflection

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

   The overall topic of the studio is the migration of ideas, which means that an idea exists in a particular space or time and then migrates to another space or time. The migration of ideas of this project is the migration of social climate change adaptation, this idea started in the United states in 1996 and then travelled through the world. The architectural part is the exercise to try and translate this idea into an design, a design of more then 10.000 sqaure meters. This huge amount of surface and the many different functions that it houses makes it into a complex project.

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

   The idea of creating a social infrastructure to change the habits of people and prepare them for future climate change is only applied in a theoretical way, never into a design. This project aims to combine both this idea of social infrastructure and the original hard infrastructure into a building in a neighbourhood with the lowest living quality in the Netherlands to deal with the climate change which is happening worldwide.