EVALUATION

RESULTS FOR BUIKSLOTERHAM

The design is tested with the plan developed by the municipality of Amsterdam. Since the area is currently under construction, with a lot of empty plots and construction sites, the current situation is not comparable to the design. The thesis is tested by the objectives.

The area has self-sufficiency in water use as one of the 3 main objectives. That is why the imported water amount is less than half in the thesis. Because it is not possible to fulfill the entire water need with rain water and re-used grey water, due to the quality, it is not possible to create complete self-sufficiency. In the future, this might change when cleansing methods get better and the quality of rain water and re-used grey water can meet the quality of tap water. Self-sufficiency has as a side effect that the area, because it stores all rain water that falls on hard surfaces, that it has no added stress to the sewage system.

The second main objective is to create a water identity for the area. All the parks and important public spaces in the thesis where designed with the water identity and visibility of the water in mind. This results in a strong relationship with the water in all of these places. Because this relationship comes from the most important structural elements, the street pattern, the waterfront visibility, the water system structure and the large water storage areas, the smaller elements can change in the future, but the main structure will stay intact and continue to give the neighborhood its water identity.

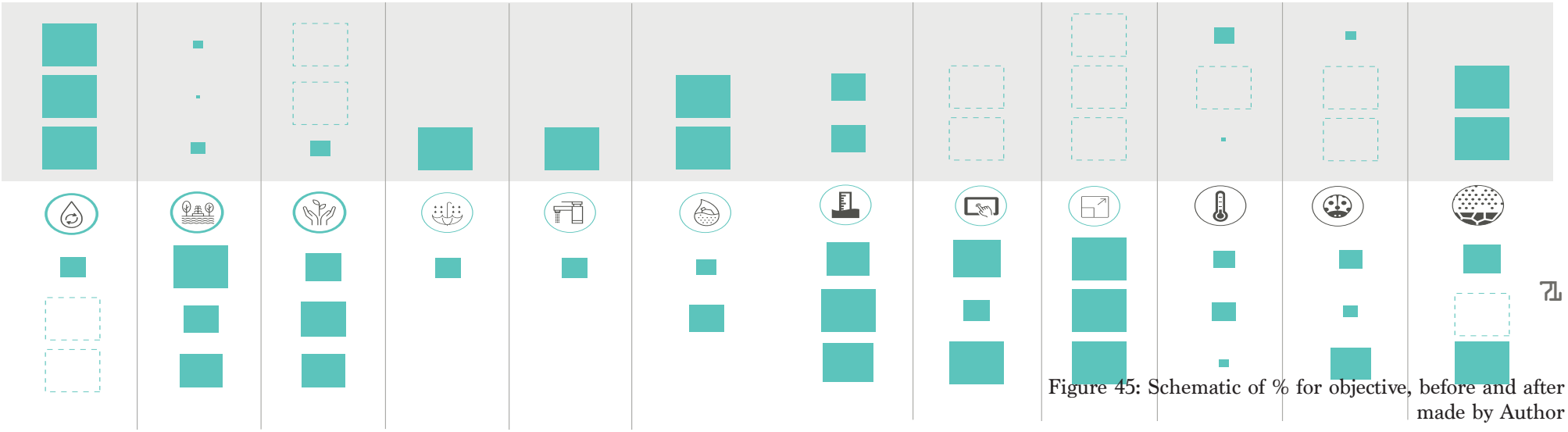

Figure 45: Schematic of % for objective, before and after made by Author

The 3rd main objective is to create a sustainable community. By creating integrated elements of sustainable design and allowing the inhabitants to participate, the thesis develops itself as a sustainable community. Water is, of course, the main goal in this sustainable community. But through a knowledge network, inhabitants are encouraged to add different elements of sustainability into the neighborhood.

When looking at the other objectives, it becomes visible that the need for imported water decreases with 53%. The other 47% comes from tab water, which needs to be mechanically treated. The water system created in the neighborhood focusses on using natural cleansing methods in order to better and maintain the water quality, so that indeed only the tap water needs to be mechanically treated. The water storage is made flexible and interactive on every scale, so that most of the water storage elements fit these objectives as well. Due to capacity, it is not possible to make every water storage element interactive.

The thesis has rougly the same HA for soft surface and open surface, but it adds green roofs to hold back the heat island effect. By using native plants, the thesis increases the biodiversity of Buiskloterham and creates possibilities for Amsterdam. Due to the nature of the soil pollution, the soil has to be cleansed before building starts, this cannot be done by natural cleansing methods. But, the thesis applies natural cleansing by plants in order to maintain the soil condition.

The self-sufficiency of the area does not just come from the capacity. Because of the social system, the interaction with the inhabitants and the flexibility of the system, the total area is capable to withstand change. The social system also inspires a knowledge infrastructure, set up by the inhabitants of the area and passed on to new generations. This creates a different form of self-sufficiency. The area can change, and the inhabitants will want it to change. They can keep educating themselves and adding more elements to the system. In the future, new water storage techniques can be integrated into the water storage system. Other ways of sustainable living can also be integrated to the neighborhood. By creating knowledge and passing on knowledge, the neighborhood stays flexible and can keep working towards achieving their ever-changing goals.

RESULTS FOR AMSTERDAM

The thesis shows results for Amsterdam in two different ways. The first comes from the fact that the thesis aims to create a water self-sufficient neighborhood in Amsterdam. This means that the area needs 53% less tap water every day then a generic neighborhood. Buiksloterham saves 1150000 L water every day. The water system of Buiksloterham also creates the possibility to store an excess of rain water from elsewhere in the area, since it has space to store a peak rainfall on the area + extra. There is 4.000 m2 = 12.000m3 = 12.000.000L extra room in the Buiksloterham area, where the municipality of Amsterdam could store excess rain water. Buiksloterham also relieves the stress on the sewage system, since the rain fall discharge is stored in the area itself and the grey- and black

water from the area is reused.

The second way comes from the ambition of the municipality of Amsterdam to use Buiksloterham as a test location for sustainable development. The city of Amsterdam could gain a lot of knowledge from the Buiksloterham area. Not just in (rain) water management, but also in how to create a sustainable community that educates and trains itself.

TRANSFERABILITY

The transferability of the project in its entirety is limited, it can only be applied in cities that have an excess amount of rain water and aim to create a sustainable city. But, when the thesis is broken down by its objectives, parts are transferable.

Self-sufficiency in water use is most transferable to cities with an excess of rain water, since the amount of rain fall should be enough to fulfill part of the daily need. A water identity is also best applied to cities with a lot of water, because then it enhances the natural relation with the environment. A sustainable community is, of course, applicable for every city that wishes to develop sustainably. Small scale projects can also be started in cities that do not have this goal, but when applied on a large city wide scale, it automatically creates the wish of a city to be sustainable. There a very few sustainable communities that do not aim to be sustainable.

Flexible water storage, interactive water storage and storage throughout the different scales can be easily applied in all cities that want to invest in sustainable development. Because it is an extra investment and knowledge is needed, this will not be a choice made for cities that don't reach towards sustainable development.

Re-using rain water is most transferable to cities with a lot of rain water, because it gets very hard to re-use rain water when there is very little. The ground water, soil condition and vegetation also use rain water, and when there is little rain water, using this rain water might result into other problems.

Re-using grey water, creating a good water quality, relieving heat stress, increasing biodiversity and improving on the soil conditions are objectives that can be applied in any location in the world. Of course, conditions may vary and the outcome might be different. But these are goals that can be achieved anywhere in the world.

Figure 46: Schematic of transferability made by Author

PEOPLE, PLANET, PROFIT

The thesis aims more towards the planet side of the triangle. It looks close to the environment of Amsterdam and the problems climate change creates for the area. From a planet perspective, the project also offers the possibility to add different elements to this design. This could be waste management, energy management or urban farming. The green structure in the design connects possible larger green structures through Amsterdam North. The native plants applied in the project also form opportunities for the surrounding areas. The seeds of these plants will travel to the surrounding area, possibly improving the biodiversity in those areas as well.

The sustainable community development of the thesis ties the plan to the people of the triangle. The thesis is highly connected with the inhabitants of the area by creating flexible and interactive stories. This gives the inhabitants the means to change their own environment. The design also promotes for people to work together on several aspects of the water system. But, because of the way the area is designed, it is a pleasing place to live for everyone. Even if sustainable living is not high on your priority list. The car streets make all the building blocks accessible by car, improving the accessibility of the neighborhood. There is a lot of public space, with different levels of privacy. The different street types also crease the possibility for children to play outside without the chance of them being interrupted by cars.

The profit part is relatively unexplored in the thesis. But looking at the project from a profit perspective, there are opportunities. The first opportunity comes from the possibility to store excess rain water. The demand in fresh water is increasing every year and the Netherlands is one of the few countries that has an excess of this resource (Koninklijk Nederlands Meteorologisch Instituut, 2012). By creating more storage for fresh water then the area needs, it creates the possibility for export. This can create business opportunities for Amsterdam and possibly the rest of the Netherlands. Economic opportunities for the inhabitants and business in the area also come from the amount of water they use. They use less tap water, so the costs will be lower. If they store enough water, they could even sell water back to the grid, earning money. The knowledge infrastructure that is promoted in the area could also form an economic opportunity for starting businesses. The area allows for those new businesses to test their theories in the area. For the city of Amsterdam, Buiksloterham could even grow to an international example of sustainable living, helping Amsterdam to create a new sustainable brand.

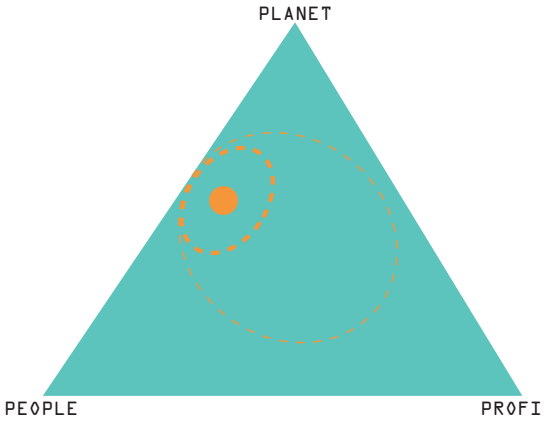

Figure 47: People, planet, profit
made by Author

REFLECTION

For my graduation thesis, I set out to create a more sustainable way of life. Water management, especially in terms of rain water and re-using water, was my main focus in this aspect. With the Delta Interventions studio, I think the subject fits very well. With climate change, the Netherlands will have continued and increasing stress from rain water and I believe it's very important to give this problem an integrated approach in our urban environment. The teachers from the studio all had vast amounts of knowledge and in that way, I am very happy that I chose Delta Interventions to graduate in.

However, I do feel like the approach of the Delta Interventions study was not my cup of tea. It is very studio based, I feel like the setup of the studio limited can limit you. In the first few weeks, there seems to be a very set way of doing this. This may help you get started, but when you like to find your own way through a project this can feel very constricting. The setup of the Delta Interventions studio was one of the reasons why I chose not to join the San Francisco group. The other reason was that I already had my basic subject, interactive rain water management, in mind when I started the graduation process. I felt, and still do, that the subject is better suited for the Netherlands then it is for San Francisco.

The choice to not pick San Francisco resulted in me not having much to do with the Delta Interventions studio. The lectures at the beginning of the year where helpful. But since so many students chose San Francisco, everything was very much applied to that location. I felt that in order to stay connected to the Delta Interventions group I had do to work that did not really relate well to what I was doing for my personal project. This is why I chose not to be part of the group work for the Delta Interventions studio, since the group work was based on San Francisco entirely, and resulted in my project losing the connection with most of the studio. I still feel like the subject fits in Delta Interventions, since it is about interventions in the urban fabric in a delta located area. I do however think it would be better for me to join a different research group, just because the setup of the project did not relate to my personal preference of working and because I felt like the group work of the studio held no added benefits for my project.

In my project, I think that there is a strong relationship between research and design. As a personal, I can be quite structural and straight to the point. That can sometimes result in a project which is only research based and from there directly translated to a design. My second mentor, Frits, pushed me out of my comfort zone in this area. He asked me to do design as well as research, allowing the design to become a form of research. This way, the project became an interactive process between the two. This is visible in the methodology. The research starts with setting research questions and objectives, to test the outcome of the design process by. Then one the one hand there is the more analytical approach to the objectives, which are tested by scenarios, and theoretical framework. And then there is the design approach on the other side, which looks at location specific problems and how to solve those in the location. These are related to each other and come together in a plan, that consists of a plan that explains how

to build the area, a plan of how the inhabitants interact with each other and examples on how to design key areas in the total plan.

The project has both a technical and a social approach. It fits in the ambition of the municipality of Amsterdam to develop Buiksloterham as an innovative sustainable neighbourhood. It also helps Amsterdam to set an example in sustainable water management. But the project not only creates a new way of using and re-using (rain) water, it also encourages inhabitants to participate. This participation creates a strong relationship between the neighbourhood and the inhabitants, giving them responsibilities and influence on what is happening in their surroundings. This creates a bigger drive for people to adjust their lifestyle to a more sustainable way of life. I feel that the project not only creates a more sustainable living environment in a high density urban area, but it also sets an example of how to live sustainably in a metropolitan area.

I do feel like, because the project approaches both a technical and a social aspect, that the technical aspect gained the upper hand at the end. This is, I think, because of my personal preference and the fact that an area has to first be created in a good way. After that, it becomes easier to dive into the way people live there. Ideally, this would be two different projects. The social part of the design deserved more attention, it has more options and possibilities that I was able to explore at this point. There are many things that can be added to what I have delivered for the social part of this design. I do however feel like the type of approach was right, because the social part has been integrated from the beginning. This makes it compliment the design. That being said, I do feel like somebody else can pick up where I left and improve on the social part of the plan.

In some ways, a year is too much. I got lost along the way, not knowing what to do next, now knowing what to expect of such a long process and feeling like I could endlessly go over every part of the thesis and it would still not be good enough for a year's worth of products. In other ways, a year is not nearly enough. Like I said, I feel like I got stuck on the technical part of the design too much, which leaves opportunities for the social part of the design that I did not investigate. I feel like the thesis is a first step to building sustainable cities, getting the technical right and knowing that it works better when it is balanced with people's daily life. But I hope this thesis will be an inspiration to others, and I challenge them to create a plan which greatly improves mine.

Figure 48: Rain
(Google, 2016)