



aba shawl_process
phase I_ sketch project

The process itself has been essential to us, as it is such an important part of the end product. The many meetings and new acquaintances have pointed out the direction the project has taken, so it is therefore valuable to document this in order to understand why the end result is what it is. This process has taught us a lot, and we will try to present the experiences and the lessons we have learned in these process reports. We also wish to show our work method and approach, as this can function as inspiration to the workers at DoI. We have split the report into three parts; before, under and after the second trip.

When starting with the project we did not know much about what we were actually going to do. Phase one started therefore with trying to understand the challenges and possibilities in Aba Shawl, and how we could shape a project around them. The result was a sketch project, which we presented and discussed in Asmara.

In phase two we went to Asmara. This phase was very exciting, and consisted of meetings with different people, site investigations and redefining our project every day. Especially the meetings with DoI were im-

portant, as we could discuss what we had so far and together look at the further development of the project.

Phase three was spent on developing the ideas and suggestions we had gotten in Asmara, and getting them in a proper system. Then, to illustrate how the new systems could work, we designed a proposal for the key parts of the area.

“It ain't what you do, but the way you do it”

five key questions

what are we going to do?

Our goal for the unplanned city is to improve the status of the area and to ease the inhabitants' daily life.

why is that important?

Today the area is given less priority because of its problems, and the access to shelter, water, sanitation, education and health services is difficult. We can contribute to these problems by making a project that inspires Dol and the inhabitants to take action.

how are we going to do it?

If we present solutions that they can carry out and understand the importance of, the project will be more valuable. We hope to achieve this by analysing the area and find important key areas to use as case studies, and to propose architectural and technical answers to them. We will present our sketch project to Dol in February and try to collaborate with them on our further development. This will be a significant period where we need to focus on giving them a feeling of ownership, so that they use the project in some way after we have finished it.

what do we expect to find?

We think our result and approach will be very different from what they found and did in the former unplanned city, which ended up as a tabula rasa project. We wish to show them the good qualities that exist there, and how they can be strengthened. We also hope to find ways of using their natural resources that they have not thought of, and to present technical solutions to their water and sewerage problems.

why is that important?

This again is important on two levels. First, because the area needs something to shake them out of the poverty circle they are in now, and to do this without making people move and leave their homes. Secondly, it is to give Dol the inspiration, knowledge and technical suggestions to start upgrading the area.

week 35

introduction to the project
by the faculty

week 42-43

meeting in Trondheim

planning the trip,
arranging visas and presen-
tations

week 44-45

Eritrea

see separate folder
study trip_01

week 46

meeting over skype.

dividing the different tasks/
projects:

bus area
unplanned city

meeting with Svein

start up 2010

week 47

meeting with Ole

discussing the chosen projects and the preliminary project

workshop in Trondheim

starting preliminary project

week 48

feed back on preliminary project

week 49

meeting with Ole

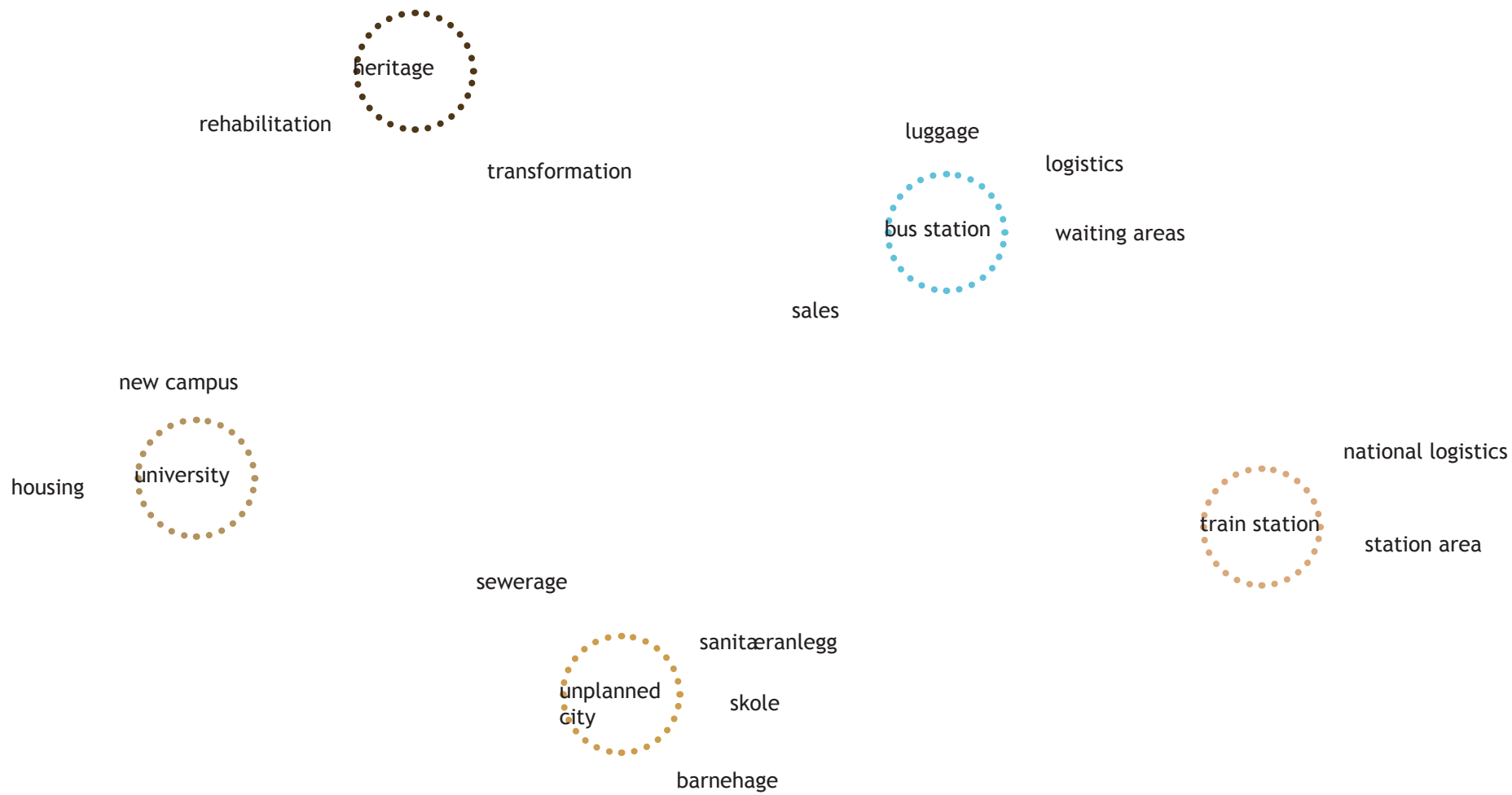
discussing progression of preliminary project

information that there had been changes in the staff at Department of Infrastructure

week 50

hand-in of preliminary project

see separate folder
study trip_01



start up 2010

this phase

After choosing to be a part of this project, we discussed several ideas. However, things change underway. The projects and ideas that we had in mind when we went to Eritrea, rapidly changed when we visited the sites and talked to the Department of Infrastructure.

Our initial idea to make a strategy plan for the city with selected key projects had to be revised. In this phase we have gone through the different possible projects presented to us by Dol and ideas from our trip.

challenges

The information that Eritros, former head of Dol, was no longer a part of the Dol-team, resulted in some changes in our schedule. Our trip to Asmara had to be rescheduled, and new contacts in Asmara had to be made. Luckily, the help that we are getting from the Norwegian Embassy in Eritrea is priceless, and it all seems to fall in to place. For now...

what's next?

We have divided the tasks, and chosen to focus on the unplanned city, and the bus area. Now we will try to come up with different alternatives to present to the Department of Infrastructure when we go to Asmara in February. Hopefully, this will give us a common foundation to have useful discussions with Dol.



phase one_schedule

week 01

- _finish the preliminary project
- _make a progression plan
- _arrange visas, tickets etc.
- _gather information, maps etc.

week 02

- _organize the seminar
- _define the tasks

week 03

- _seminar
- _start sketch projects

week 04

- _sketch projects

week 05

- _sketch projects
- _leave for Asmara



week one

goals

_finish the preliminary project, and make the necessary changes according to the new situation in Eritrea

_organize the interdisciplinary seminar

_arrange visas, tickets etc.

_gather information, maps etc.

monday

_christmas holiday

tuesday

_start up

wednesday

_preliminary project
_planning seminar
_maps
_visa

thursday

_preliminary project
_planning seminar
_maps
_meeting with Steffen W

friday

_preliminary project
_planning seminar
_maps

this week

This week we sorted out a lot of the practical things that needed to be worked out before starting the project. We had to make the finishing touches on the preliminary project. The changes in the staff at Dol changed our trip to Asmara. This had consequences for our progression plan, which we had to change. We also had to rewrite some unclear sentences, so that it is easier to understand what the project really deals with, both for architects and non-architects.

We also started organizing the seminar, which we plan to hold on the 18th of January. We want it to be a seminar where we gain information about the topics we are not so familiar with, and where we get the chance to discuss our approach with people with dif-

ferent backgrounds. Hopefully the participants will also find this interesting and see it as a chance to learn more. We think it is important to collaborate with the civil engineers when we are working in such a interdisciplinary field.

The maps we have are very limited and need to be compared and adjusted according to the aerial photos. We have also found an old map from 1913 with contour lines, which we will use as a base for the landscape. The Italians made this map, and we were happy to discover that they did a very accurate job.

We had a meeting with our tutor, Steffen, and discussed how to get a good start and what mistakes

we should avoid.

Since we have decided that we want to focus on ecological urbanism, we found books and reports that could be interesting to read.

comments and thoughts

The week has mainly gone by making the finishing touches on the preliminary project.

challenges

The political situation in Eritrea has given an extra dimension to the work with the preliminary project, and the rest of the thesis project. Every word has to be weighed and evaluated. This has made the process more extensive than it would otherwise have been. Our contact at the Norwegian Embassy in Eritrea has read the preliminary project and changed parts in order to help us avoid tense topics and dangerous formulations.

what's next?

Maps and such should be finished next week, so that we can start with the actual project. Planning the seminar is also going to demand a lot of time.



week two

goals

_get the desired people involved in the interdisciplinary seminar

_come up with alternatives for how to work with the unplanned city

_develop a map foundation

monday

_quick analysis
_planning seminar
_maps

tuesday

_approach alternatives
_meeting with Hans Skotte

wednesday

_possible functions
_planning seminar
_maps

thursday

_possible functions
_planning seminar
_maps

friday

_planning seminar
_maps
_process book

influential forces

the state

Corruption/honesty. Can they be trusted?

immigration

Will more poor people come to the area from the countryside if the political situation changes? Will Eritreans living abroad come back if the political situation changes?

economy

How will the gold mines affect the economy? Will they open up for more relief work?

climate

How will global climate changes affect Eritrea? Will there be more or less rain? Higher or lower temperatures?

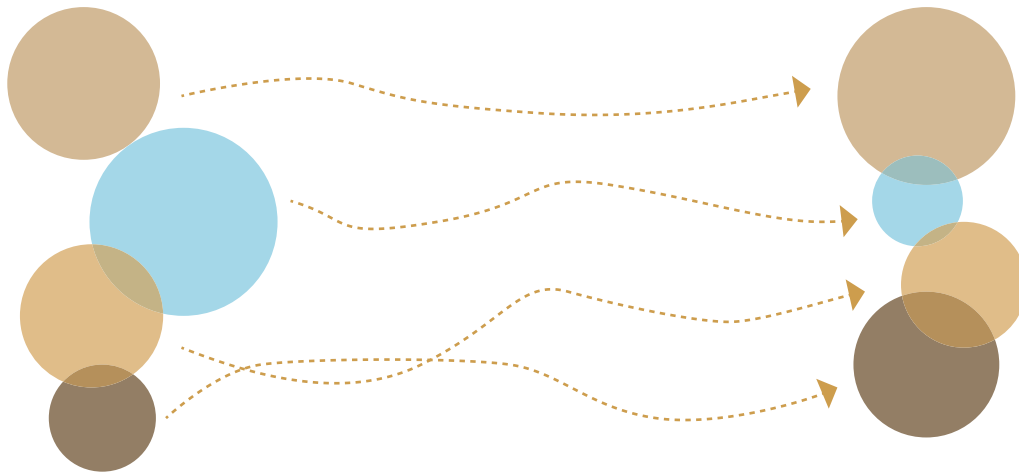
war/peace/military

What age group is living in the unplanned city? What resources do they have when all boys from 18 - 30 are in the army or studying at the university?

population growth

The birth rate will stay high. Better hygiene and health services make people live longer.

what do we know?



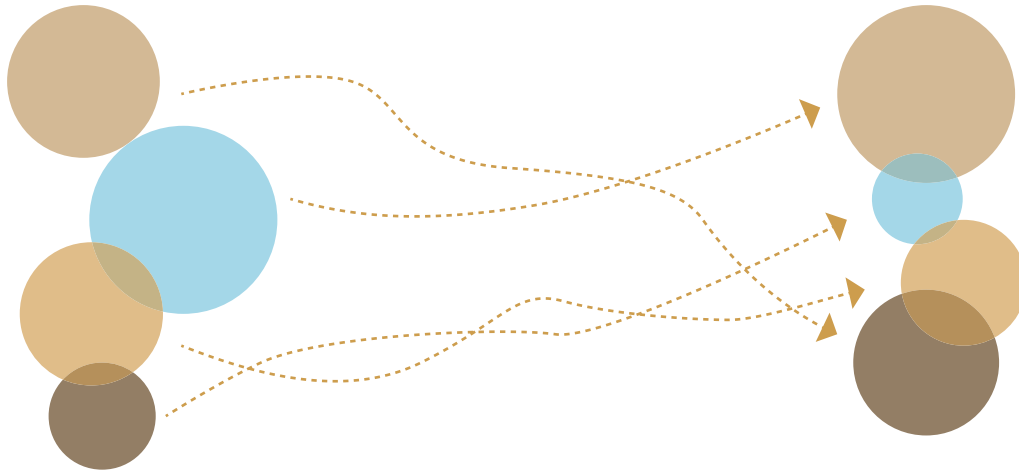
now

- _There is a big population density in the area (6-7 persons per 3m x 3m)
- _No one in the area is connected to water or sewage systems
- _Most streets are not broader than 1,5 m
- _People have high walls protecting their properties
- _The area has a kindergarten, a mosque and a sanitary station
- _The terrain is sloping
- _There are a few open and unoccupied places
- _Most people (if not all) own their own properties

future

- _The population density will increase, both from high birth rate and because better hygiene and health services makes people live longer
- _Using the system that DoI uses to introduce water and sewage systems means that we have to tear down large parts of the area

what don't we know?

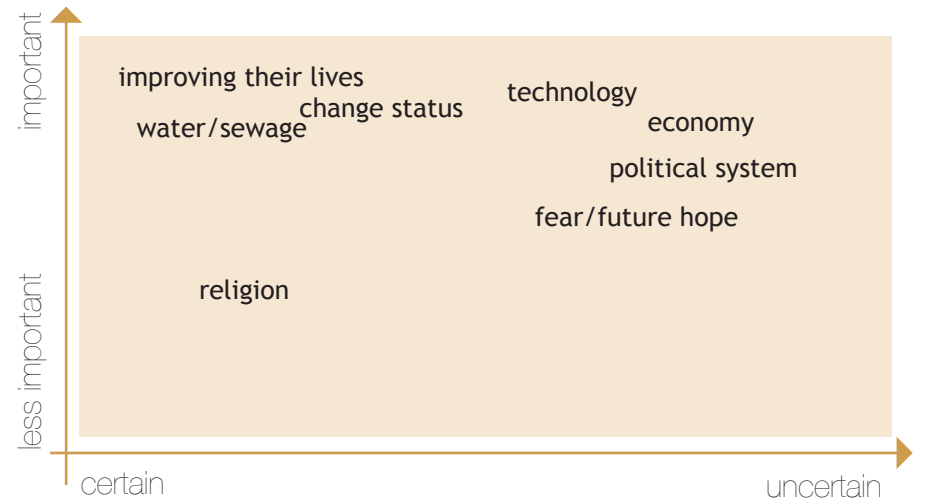
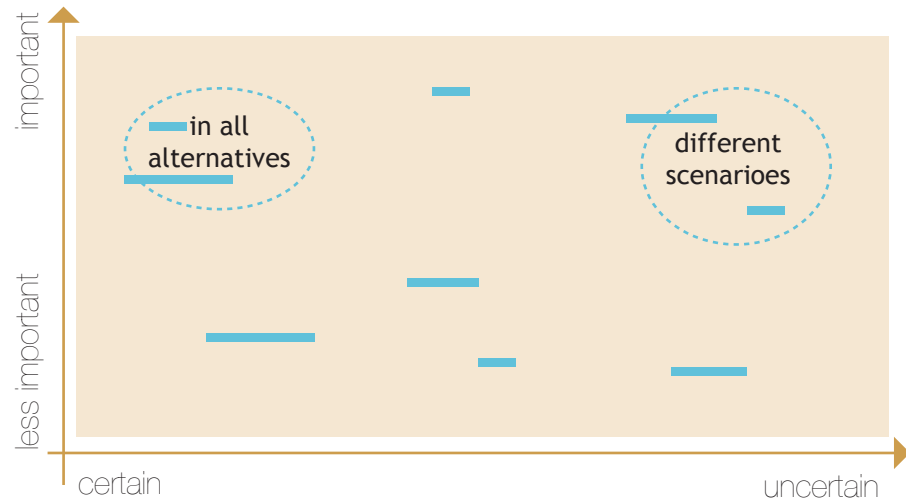


now

- _Exactly how many people are living in the unplanned city?
- _How does the area function socially for the inhabitants?
- _How does the area function in the every day life? (eg. Where do they collect water?)
- _What other functions exist there today?
- _What new functions do they need?
- _Who are the people living there?
- _Do they have any conflicts in the area?

future

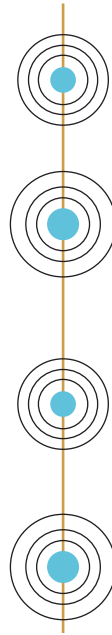
- _Is it possible to get water and sewage to all households?
- _Is it possible to use off-grid systems?
- _Exactly how much will the population increase?
- _What new functions will they need in the future?
- _How far ahead should we plan for?
- _Will the public let private operators contribute in the process of upgrading the area?



scenario based planning

comments and thoughts

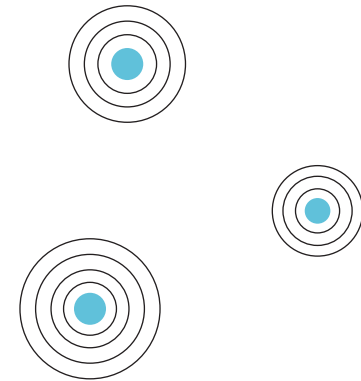
.....
: We tried to work with scenario based planning, but :
: had some trouble concluding. It is easy to see that im- :
: proving the daily life of the people in the unplanned :
: city will be an important aspect of our assignment. :
: We think that getting water and sewage can be a big :
: part of this, but how can we be certain before we :
: have been back in Asmara and talked to people living :
: there? A crucial aspect will also be what technical :
: solutions are available and what is possible to carry :
: out. We need to get more knowledge about technical :
: solutions concerning water management and what :
: other functions is lacking in the unplanned city be- :
: fore we do this exercise more thoroughly. :
:



01_on a string

First we tried to find three different methods to approaching the unplanned city, hoping that it could give us some variations that could be discussed. Then we tried to think of what functions they are lacking in the area and how they could be combined with the different approaches. Our aim was then to connect these to a specific site in the area.

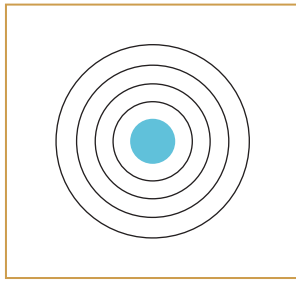
_Find strategic key projects connected by a continuous street.
_Get examples of both the general and the special



02_points

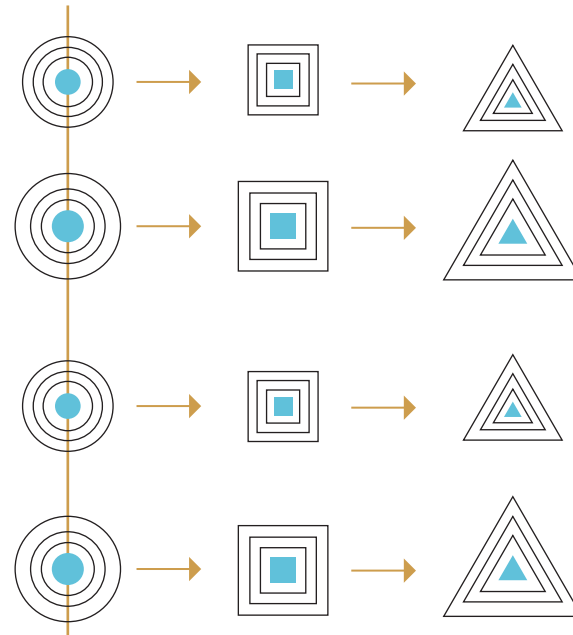
_Analyse the area and find strategic points for new projects
_Get examples of both the general and the special

site approach



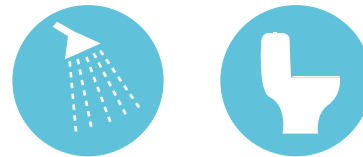
03_one point

_Select one area and look at the upgrading of the entire plot



phases

_Work with different time frames
_Focus on flexibility and transformation possibilities



XS_sanitary pods

- _Element system
- _Easy to put up and to take down
- _A quick and easy way to improve the lives of people living in the area

S_sanitary stations

- _Permanent
- _Can be transformed to other functions if the needs change
- _Improve the lives of people living in the area

M_health station

- _Permanent
- _Social arena
- _Improve the lives of people living in the area

site functions



M/L_school/kindergarten

_Permanent
_Educational



L_library/culture school/activity centre

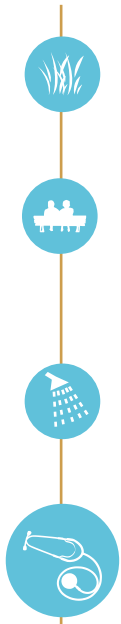
_Permanent
_Educational
_Social arena



XS/L_park/agriculture

_Long term
_Ecological urbanism / sustainable perspective
_Technical solutions for handling surface water
_Simple methods for growing vegetables on private properties

site combinations



01_on a string + XS/M

_Functions:

Sanitary pods
Agricultural areas
Public spaces
Park
Health station

_Small scale projects
_Different situations in the street section
_Technical solutions
_Sustainable solutions on private properties
_Phases



02_points + S/M/L

_Functions:

Park
Health station
Sanitary station
Cultural function
School/kindergarten

_Small and large scale projects
_Strategic points in the area:
green areas
meeting the city
hill top with overview of the city
_Phases



03_one point + L

_Function:

Learning and cultural activity centre
Park

_Use the hill top as a strategic point to generate activity and to use it as a social arena
_How do we look at technical solutions in this concept?

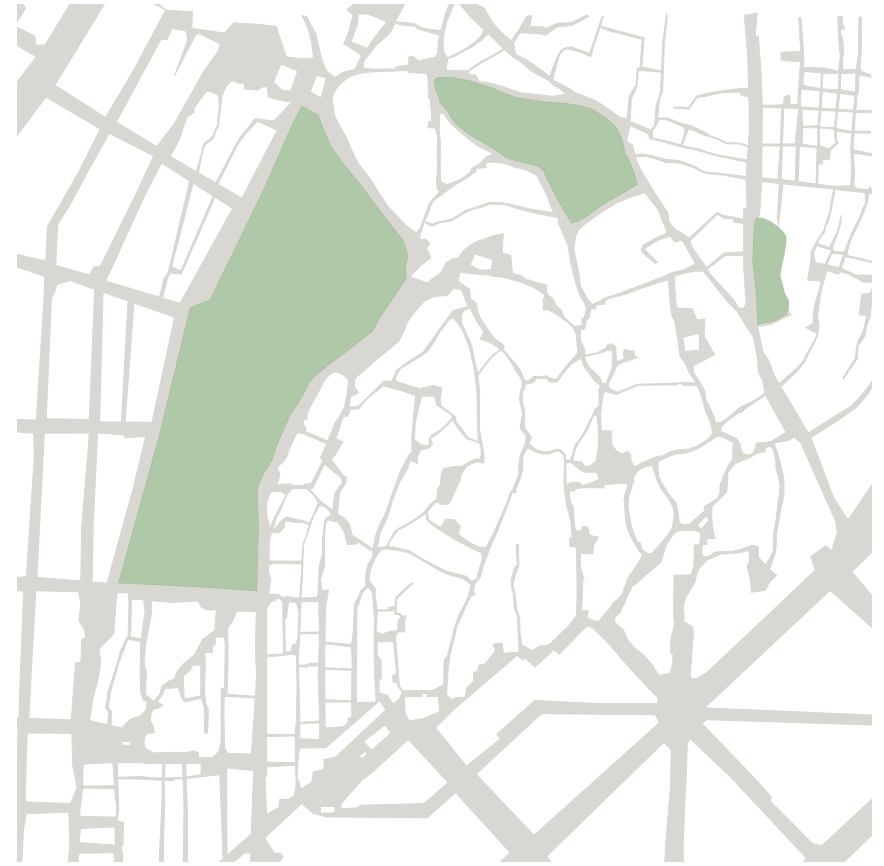
how to use this approach on site?



open spaces

First we need to look at the existing street network and where the possibilities to actually add elements are.

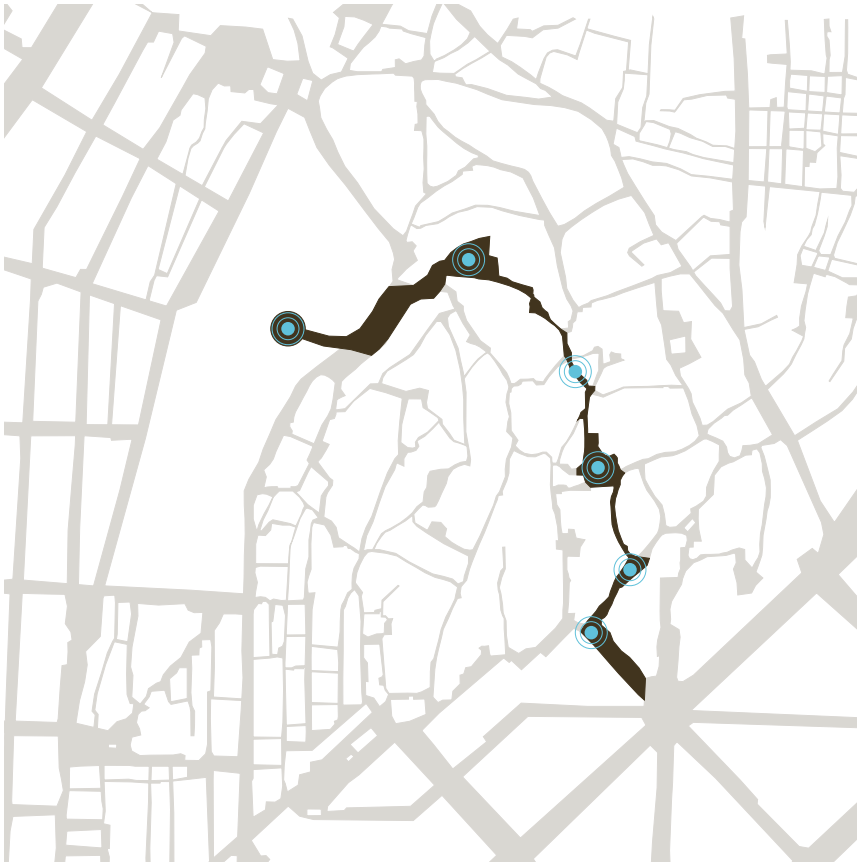
- _does any on these spaces have a function today?
- _are they of a private or a public character?



green spaces

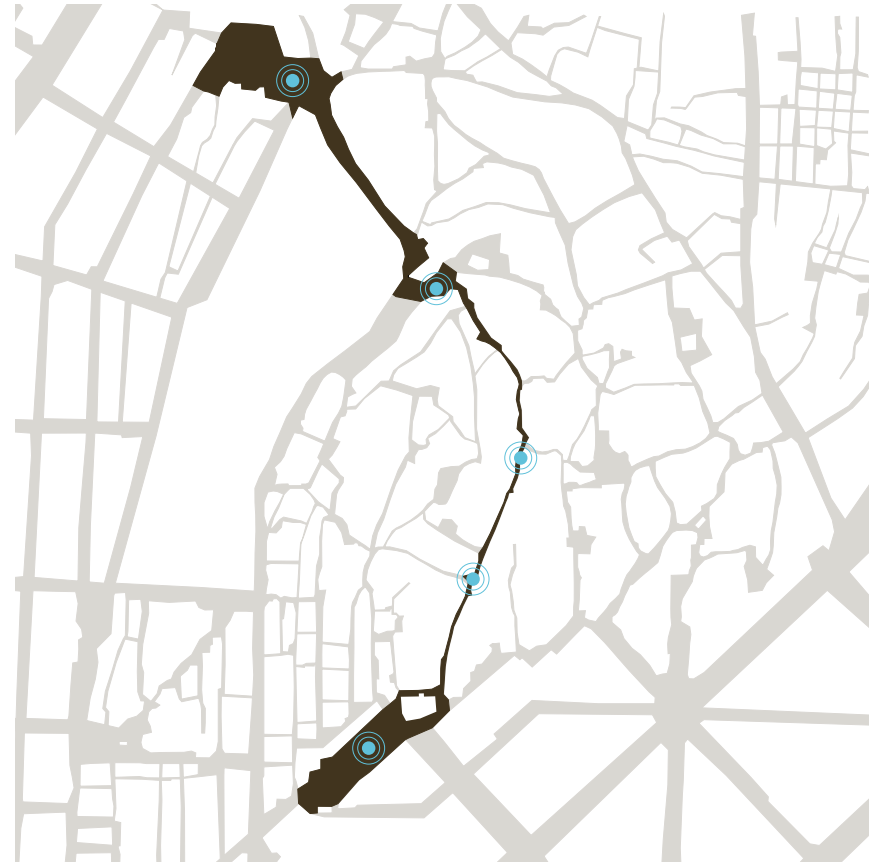
A big area of the unbuilt parts are more or less green spaces.

- _what is the function of these spaces today?
- _why are they unbuilt?



01a_on a string

We tried to connect these open spaces through an existing street without to many corners. This may make it easier to add water distribution pipes.



01b_on a string

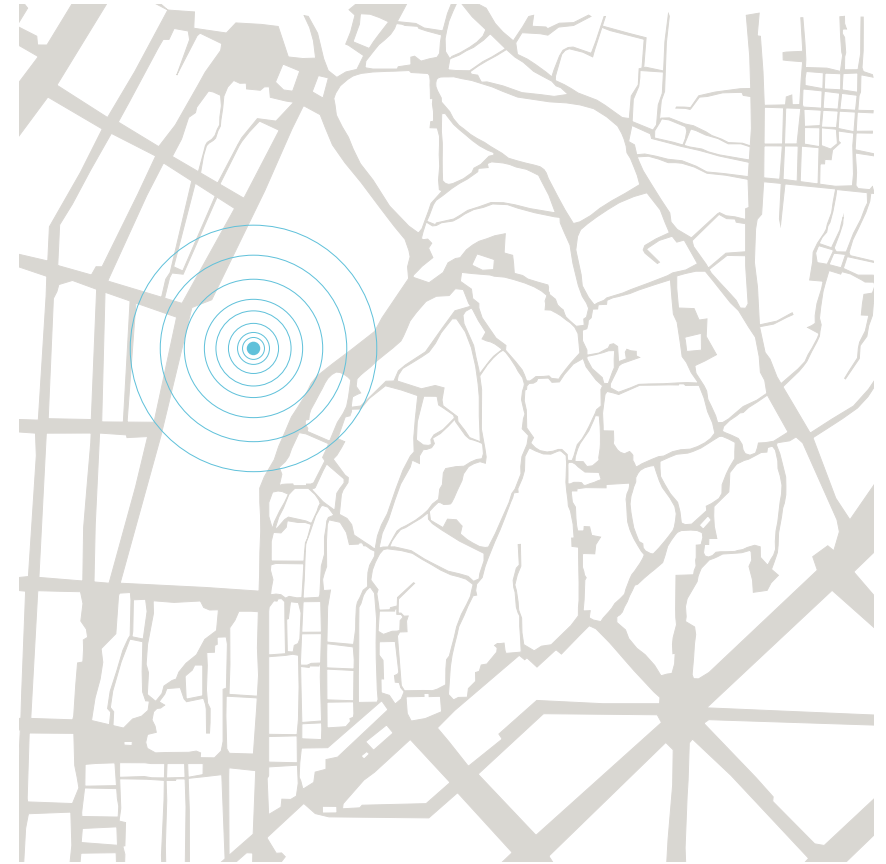
This alternatives can have more options, considering if we want to look at the meeting between unplanned and planned, the hill, the green areas etc. We will have to go there and find the spaces we feel will fit in our project.

site possibilities



02_points

Another approach is to choose points close to the planned city, the hill, the green area and intimate spaces, without finding a linking street. However, we will have to find which streets the main pipes can be put regardless of these points.



03_one point

The top of the hill will be a natural area to look at, because of its open space and strategic positioning. It could be an alternative to only look at this area, but then we completely ignore this area's most pressing problem, namely water access.

conclusion

comments and thoughts

After working with these three different approaches, we see that they are not that different, but to a great deal focuses on the same sites and the same functions. Approach 01_on a string is linking the functions together in a better way than the other two approaches and it can be easier to find a common concept when using this approach. We also need to sort out what functions we should work with and try to find a concept that can help us with these decisions.

this week

After a talk with Hans Skotte (one of NTNU's experts on projects done in Africa) we were left with a lot of questions we needed to find proper answers to, in order to make the project be able to carry weight. We talked a lot about the challenges by doing projects in different countries, and how we best can approach the tasks. The context can be overwhelming, and it can prove difficult to plan for the future, when we are unable to fully understand the present situation. The complexity of an unplanned settlement can take years to figure out, but we must try to use the tools and the people we know to help us in this process.

Our approach can not be bottom - top, it must include both Dol and the inhabitants' needs. It is not possible

to waltz in and tell people where to live and go, it must be done on other premises and should include them. The final result also needs to be adjusted, so that they see the importance of our work and do not just ignore it. How can we meet their expectations, and at the same time allow ourselves to think freely? We must find a presentation method that they recognize and value.

To help keep us on the right track, we were given five important questions:

- _What are you going to do?
- _Why is that important?
- _How are you going to do it?

- _What do you expect to find?
- _Why is that important?

These questions must be answered on different levels in our project, both in a larger scale and in our individual projects.

The rest of the week we tried to find different approaches for selecting sites in the unplanned city and put them together with suitable functions. We also looked at the influential forces that can be considered in our project, and we started to look at scenario based planning.

comments and thoughts

Still a lot of other things, such as making a map and planning the seminar, steals a lot of our time. However, we have managed to start with the background analysis and trying to define what our project can be.

challenges

We do not have a very defined project yet, with a clear program and site. This makes it challenging to plan ahead, and start with analysis, sketching and designing. We need a strong concept to be able to make good decisions and actually know what we are analysis and sketching for.

what's next?

The last changes to the seminar needs to be done and we want to finish the common booklets. This way it is possible to fully focus on the project afterwards.



week three

goals

- _carry through the seminar
- _find a clear concept
- _find alternatives within this concept that we would like to work with
- _several meetings
- _finish common booklets for seminar, essays and study trip 1

monday

- _planning seminar
- _tutorial with Ole Møystad

tuesday

- _seminar

wednesday

- _concept
- _common booklets
- _meeting with Mette U.
- _meeting with Svein B.

thursday

- _alternatives
- _common booklets

friday

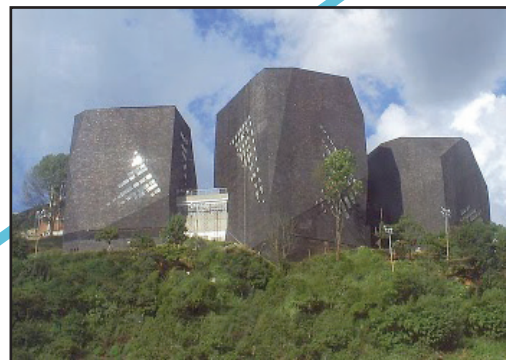
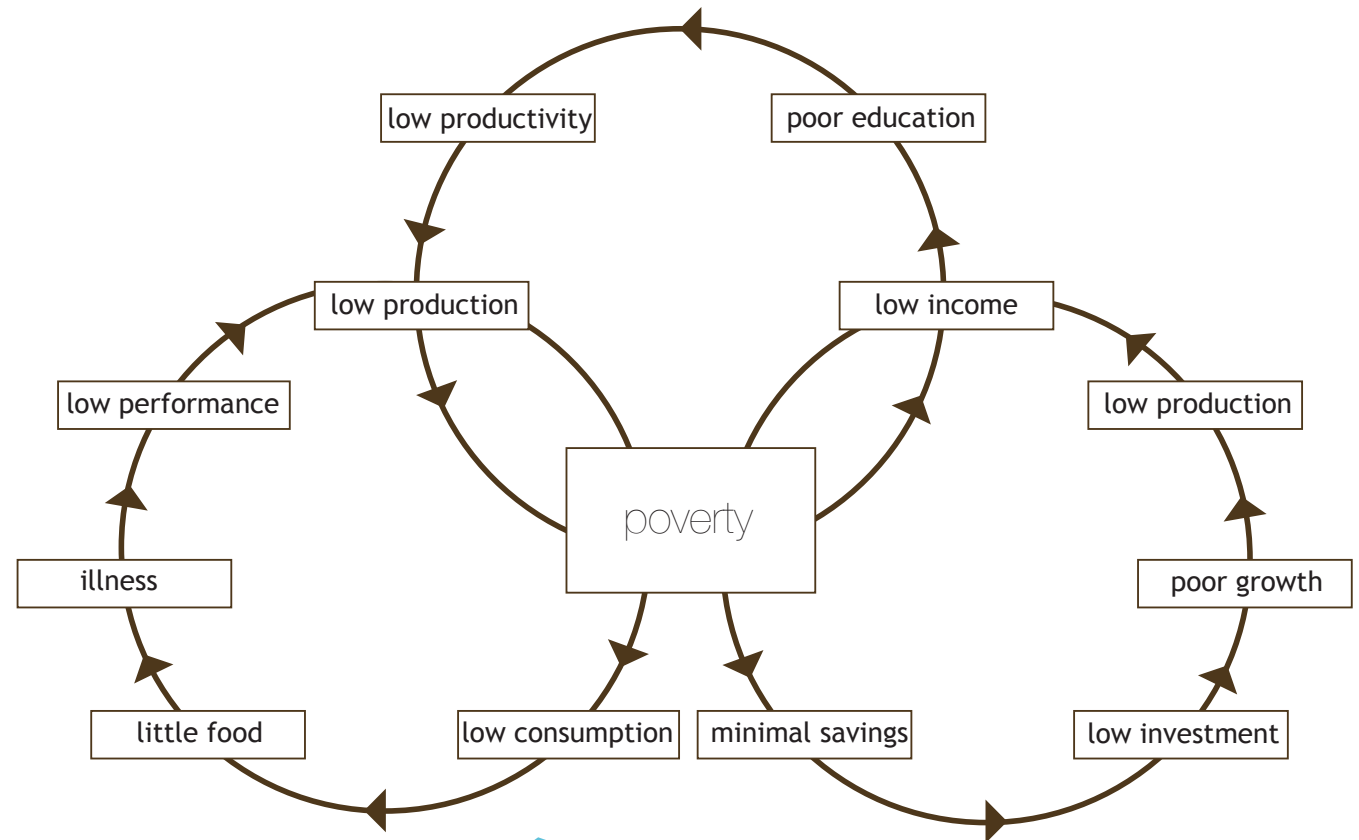
- _process book



comments and thoughts

The seminar is more closely described in a separate folder, but as a sum up it can be said that we absolutely feel that we have gained a lot by arranging this seminar, both in knowledge and by getting new contacts. Hopefully we will manage to take advantage of this in our projects, and make them even more robust and relevant.

To find a clear and robust concept, we need to address the issues we are certain of, and not the ones that are unclear. There is probably a need for a kindergarten or a health station in the area, but this is not their main problem and therefore not what we should be working with. What we do know about the area is that it is very poor. Poverty often goes in a circle, and it is therefore difficult to get out. For example when your parents have a low income, you don't get a proper education, which again means that you don't get a good job, and you end up with a low salary. This way the circle repeats itself for the next generation (Source: Andersen, U.: Der Nord-Sflikt. Informationen zur politischen Bildung No. 196 (1982)). So if a whole area is in this circle, it needs a boost to get out of it. We read a lot about similar areas and what has been done to give them this boost, and we found especially the Spanish Library in Medellin in Colombia interesting. The library is built in the middle of the slum, and appears as a landmark for the entire city. This has led to a new project in the same area, a botanical garden. The area doesn't change over night of course, but slowly the reputation of this areas change, which is a beginning to getting out of the poverty. This shows that architecture can be one of the methods to prevent the poverty circle keep going. If the area gets a proper upgrade, it will get extended effects beyond the upgrade itself. The areas status will improve and become more popular, which again means that the will for further improvements will be stronger. We need to find what type of project can give Aba Shawl the boost it needs to get out of the poverty circle.



“ The average person in developing countries use 10 liters water per day. The average person in Norway uses 140 liters per day.

Sveinung Sæggrov

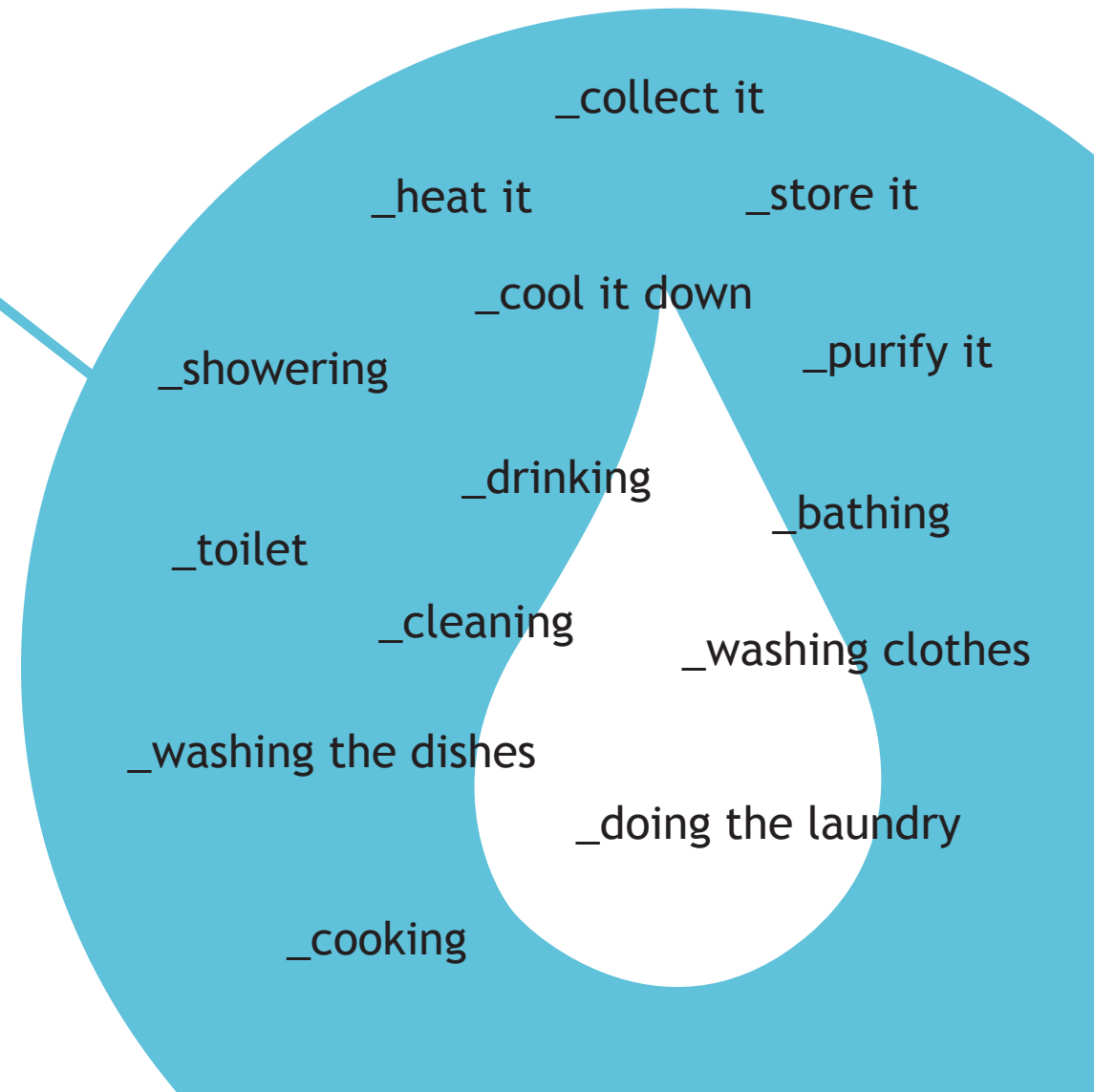
What are the main challenges in the area?

- poverty
- no connected water system to the houses
- no private toilets
- bad sanitary stations coverage
- dense neighbourhoods
- narrow and winding streets
- lack of meeting places and parks

The elements that would affect the inhabitants' life the most are a simpler access to clean water and to upgrade the sanitary conditions. Water connects these two elements. Maybe by upgrading these elements the area gets the status boost it needs? What design projects can be attached to water?



finding the main concept



water categories



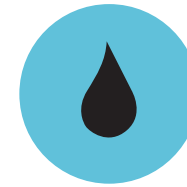
clean water in

_access to a water source



greywater out

_contains food waste, soap
left overs and such
_possible to recycle



blackwater

_water from toilet
_no recycling

When addressing the water theme, we need to look into how a water system works. There are three types of water in this system, namely clean water, greywater and blackwater.

Getting water into the houses should not be a big problem, as long as you have access to a water source. The rest of the city now has a water supply,

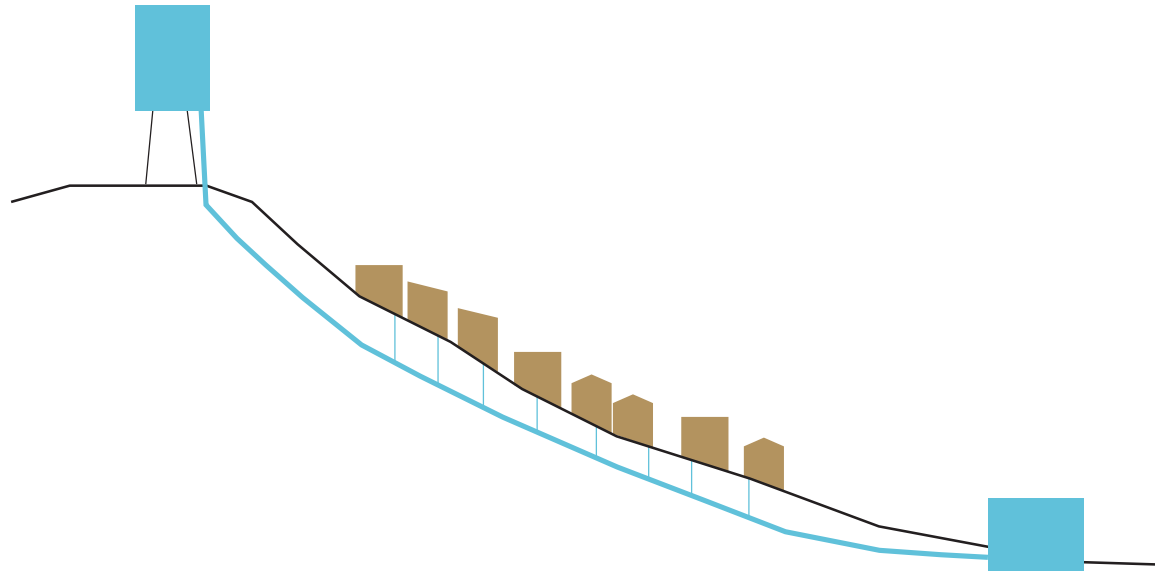
so we assume that this should be possible to solve.

So when you get water in, you also need to get it out. This is the greywater, and is the water from everything except the toilet. This water contains food waste, soap left overs and similar. This water is possible to recycle, if it goes through a cleaning process. Considering the difficult water conditions today, we

find this interesting.

The black water, which is the water from the toilets, is a completely different thing again, and very difficult to recycle. Considering the advanced technology needed to this, we exclude this option.

main water principle

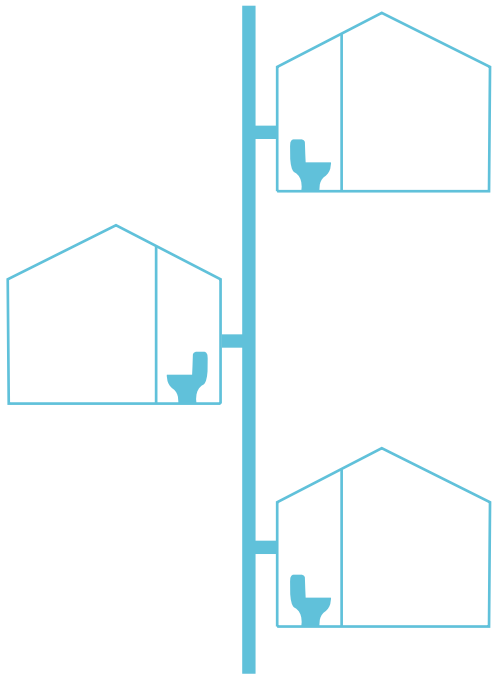


So what we are working with is how it is possible to connect the area to a water system. The area lies in a sloping terrain, so hopefully we can use this as an advantage in transporting the water both in and out. In order to get the water into the pipes, we need a water source of some sort at the top. Since one of our aims is to keep as much as possible of the existing structures in the area, the pipelines needs to be

put in the street network that is there today. This shouldn't be difficult, but we don't know what kind of equipment they have today or what technologies the process needs. We need to discuss this with Sveinung.

Since we wish to work with sustainable solutions, we wish to look at how one can treat the water going out

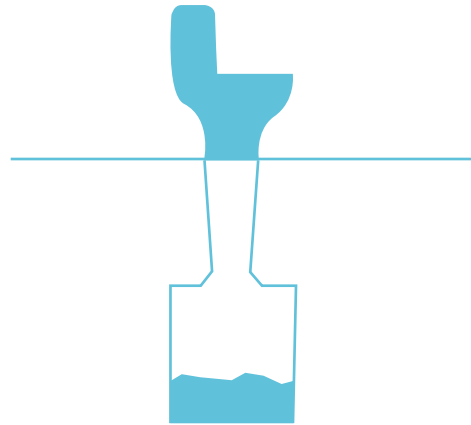
so that it can be reused. This means we have to separate the blackwater and the greywater, which again means that one need to solve the blackwater locally. This is because the blackwater hasn't enough speed to run down a pipe by itself, it needs the speed from the greywater to help it. So if we want to look at a water treatment plant at the bottom of the pipeline, we also need to solve the blackwater issue.



private water closet (on grid)

- _blackwater mixed with greywater
- _no realistic way to recycle the water
- _expensive
- _big interventions

There are three different approaches with the blackwater. The first is to have a private water closet in every unit. As explained, this solution makes it difficult to recycle the greywater, and it is not a realistic option for Aba Shawl. Even in the planned parts of Asmara, the water closets only sometimes function, so to add this here would be naive. This solution would also be very expensive, with a lot of big pipelines. On

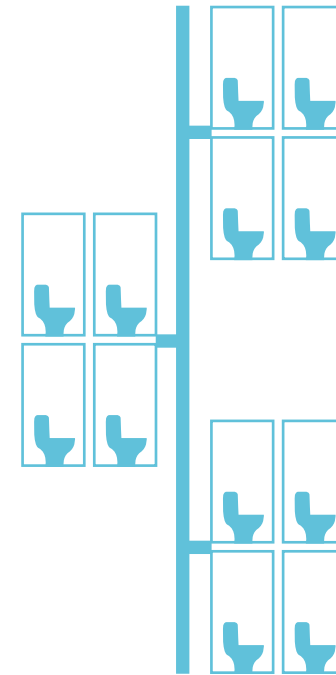


dry compost toilet (off-grid)

- _no interventions
- _easy
- _cheap
- _quick
- _sustainable

the other side, the Eritreans strive to have western standards, and it might be considered a disappointment not to have this.

Another solution is to have an off-grid dry compost toilet in every unit. It prevents big interventions and need for bigger pipelines, which make it an easy and cheap solution. It is also relatively quick to execute,



toilet clusters (on or off-grid)

- _within a certain range of everybody
- _unconvenient
- _some interventions

and very sustainable. This type of toilet is also used in Norway, most often in cottage buildings. But in Asmara the climate is much more suitable!

Another possible solution is to have toilet clusters, which can be both on or off-grid. Within a certain range there are clusters of toilets that everybody can use. If it proves too difficult to have private toilets,

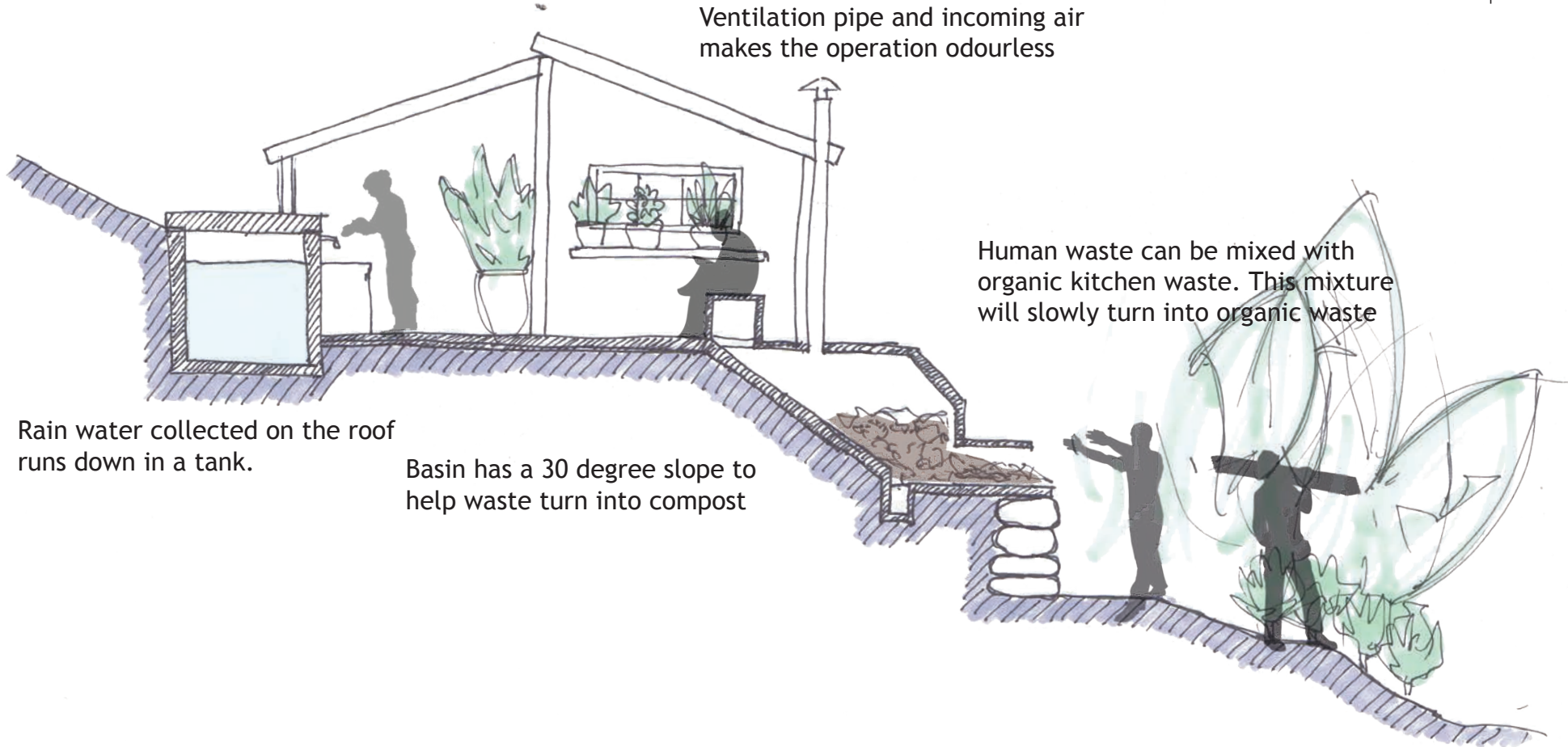
black water options

Ventilation pipe and incoming air makes the operation odourless

Human waste can be mixed with organic kitchen waste. This mixture will slowly turn into organic waste

Rain water collected on the roof runs down in a tank.

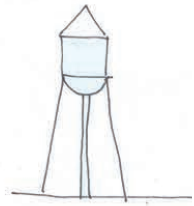
Basin has a 30 degree slope to help waste turn into compost



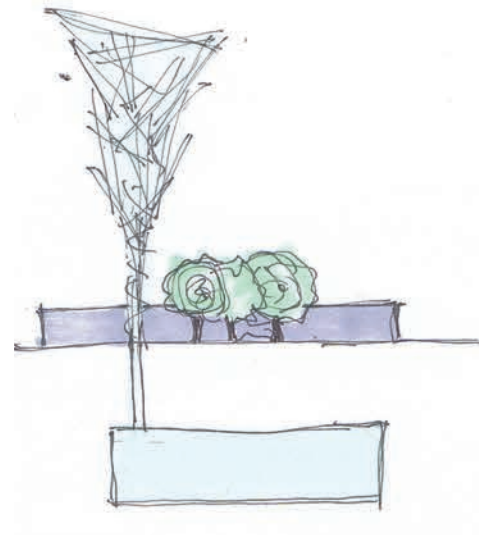
this solution would be the best, but of course it would be most comfortable to have a private toilet.

We don't know what exist in the area today, but there are some public toilets in the outskirts of the area. Whether these are functioning or if some people also have a private toilet we don't know. However, the easiest solutions would be the dry compost toilet that

has no need for pipelines. The challenge is how the waste is removed, and how exact it is being built. This alternative also makes it possible to make use of the greywater, which is a clear goal for us. Therefore we chose to focus on this solution for the blackwater.

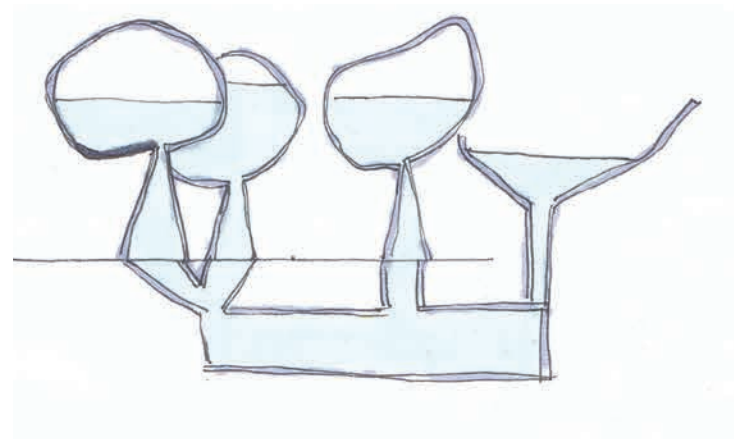
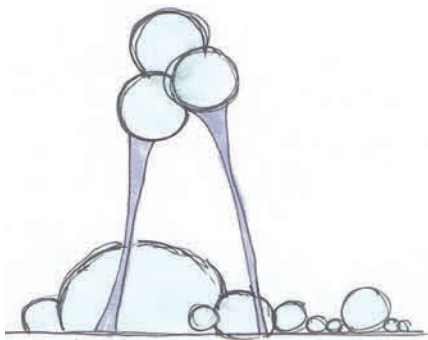


A water tower can have many appearances!



2:water reservoir

This water tower project done by Atelier Ramdam Architects really inspired us! It even makes it rain!



How about a water tower that looks like a peach??

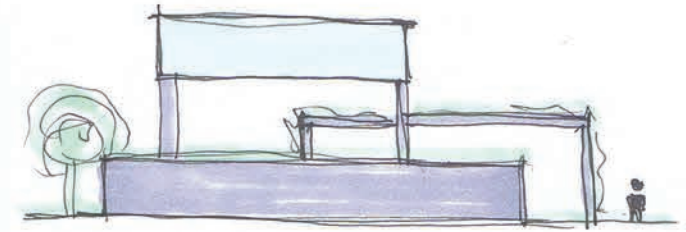


David l'Hôte's Rainpod

What is a water tower?

- a water tower is a large elevated water storage container constructed to hold a water supply at a height sufficient to pressurize a water distribution system
- pressurization occurs through the elevation of water; for every 10.20 centimeter of elevation, it produces 1 kilopascal of pressure. 30 m of elevation produces roughly 300 kPa, which is enough pressure to operate and provide for most domestic water pressure and distribution system requirements.
- many water towers were constructed during the Industrial Revolution, and some of these are now considered architectural landmarks and monuments, and may not be demolished. Some are converted to apartments or exclusive penthouses.
- a variety of materials can be used to construct a typical water tower; steel and reinforced or prestressed concrete are most often utilized (with wood, fiberglass, or brick also in use), incorporating an interior coating to protect the water from any effects from the lining material.

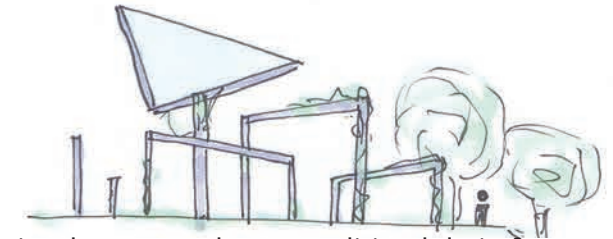
Source: Wikipedia



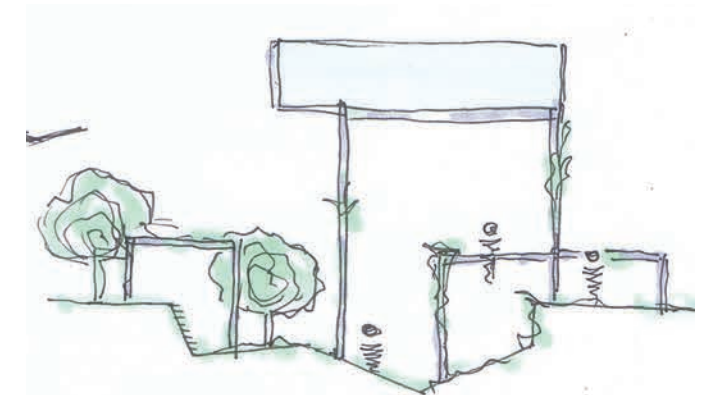
combination of watertanks and other building volumes?



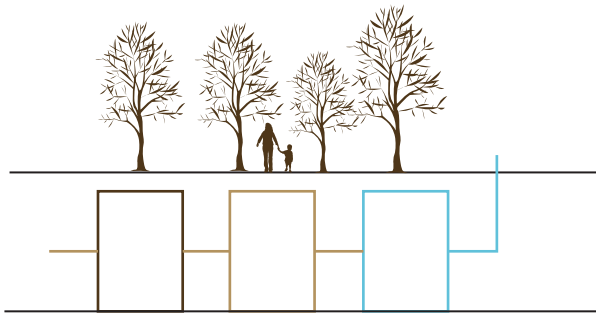
use the watertank as an element in a park?



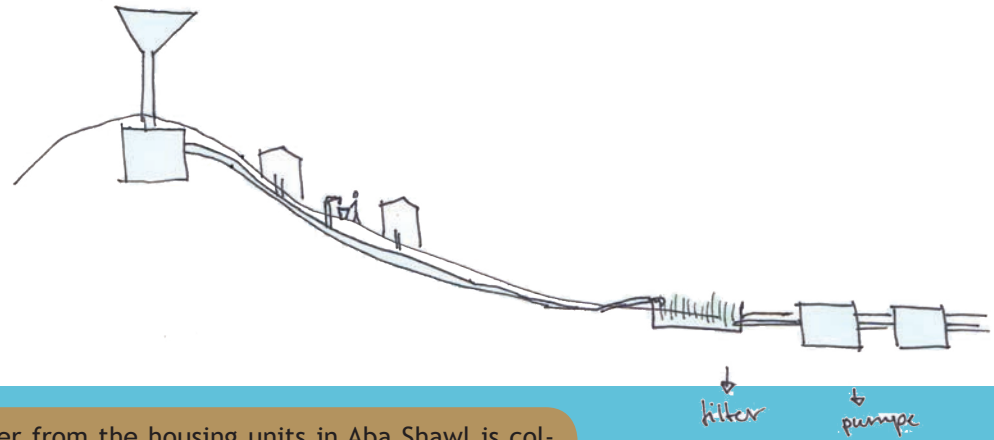
give the watertank an untraditional design?



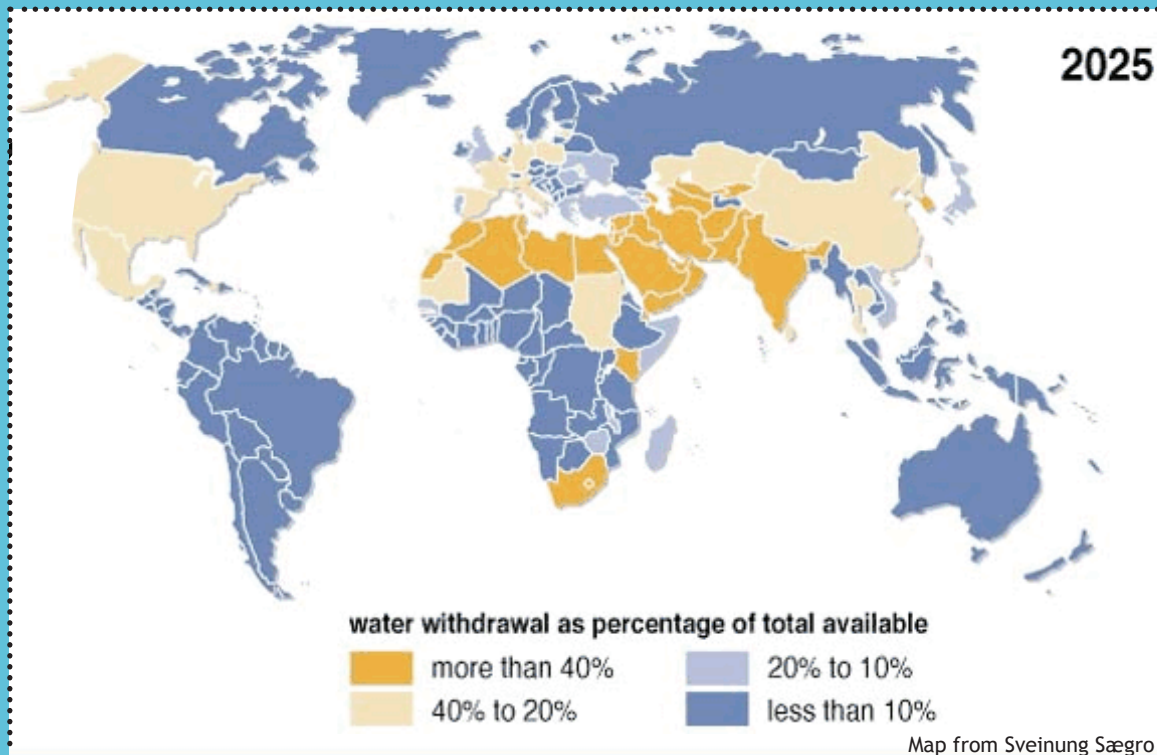
play with the outdoor floor to create different spaces?



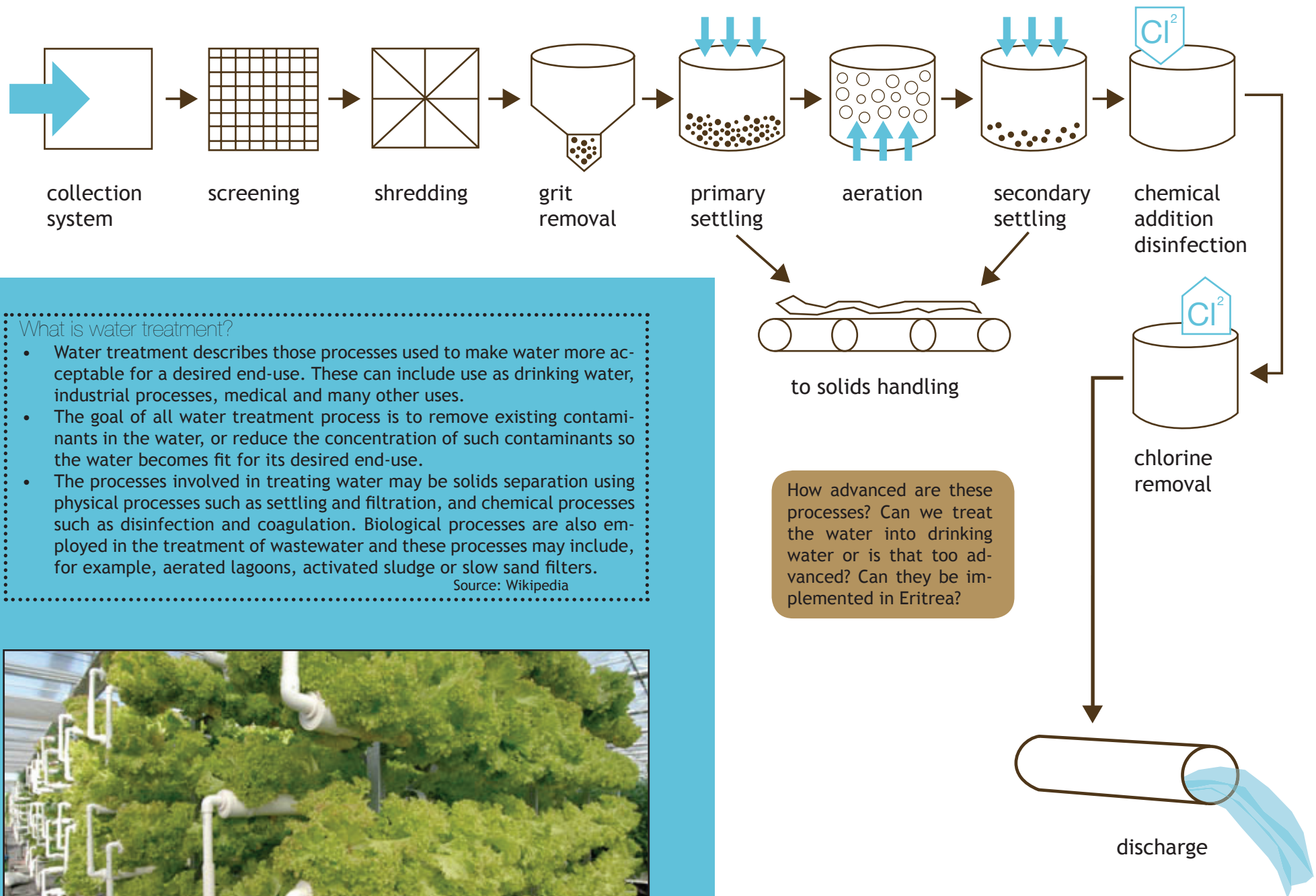
Can a park be put on top of the water treatment plant?



If the greywater from the housing units in Aba Shawl is collecting in a plant, maybe it can be recycled into drinking water again and return to the residents?



Map showing water use compared to water access. This means Eritrea has more water than it manages to save and use. We know there are heavy rain showers in the rainy season. Can that water also be led to the plant?



Source: Water and wastewater treatment

What is water treatment?

- Water treatment describes those processes used to make water more acceptable for a desired end-use. These can include use as drinking water, industrial processes, medical and many other uses.
- The goal of all water treatment process is to remove existing contaminants in the water, or reduce the concentration of such contaminants so the water becomes fit for its desired end-use.
- The processes involved in treating water may be solids separation using physical processes such as settling and filtration, and chemical processes such as disinfection and coagulation. Biological processes are also employed in the treatment of wastewater and these processes may include, for example, aerated lagoons, activated sludge or slow sand filters.

Source: Wikipedia



intelligent greenhouse in Xiqing District in Tianjin

this week

We started the week with a tutorial with Ole, who guided us to better define our project. He advised us to continue with the alternative that binds the different spaces together, because of its clearness.

We were quite unsure about how the seminar would turn out, but luckily we had no reason to worry. We got a lot of relevant information, inspiration and new contacts to use later in our projects.

Especially the lecture held by Sveinung Sægrov was important for our work this week. It has inspired us to connect our projects more closely to the issues concerning water management. He showed us how important these things are even in a bigger picture, and also easy ways of solving these problems by tak-

ing local measures. A summarize of the seminar can be found in a separate booklet; "Interdisciplinary seminar".

After the seminar we started collecting information about water and wastewater management. We decided to make water the most important element in our project and to try to connect all the functions to the use of water. We have contacted Sveinung to arrange a meeting with him next week.

We also had a meeting with Mette Undeland (civil engineering student). She is also planning to work with the unplanned city in her master thesis and it would be very fruitful for us to have some kind of cooperation. She has not yet decided specifically what she

wants to work with, but thinks that working with water management could be an engaging assignment. For us, it would be a great opportunity if she could help us with solving some of the technical installations.

Friday we had a meeting with Svein Bjørberg to discuss more practical issues concerning our trip to Asmara in February. We also talked about what projects are under development in Asmara at the moment and how we can gain experiences from how they are being realized. Also, we have to keep in mind that whatever the result of our projects are, we will still have contributed to the Dol with a lot of digitalizing of maps and analyses of Asmara.

comments and thoughts

A week with a lot of meetings and making new contacts. Hopefully they prove to be useful for us. Especially Mette can give us valuable information, if she decides to work together with us.

challenges

At this point we don't have that much knowlegde about the different water and sewerage systems available, which slows down the design process quite a lot. We don't know that much about sizes for example, which makes it dfficult to find a suitable site. We also don't have accurate info about how many inhabitants the area has, so we can't yet calculate the sizes of watertowers and the wastewater plant.

what's next?

Now when a lot of the practical things have been done, and the seminar is over, we can work more continuously on our sketch project! We need to get more knowlegde about water, and test different alternatives.



week four

goals

_meet with Sveinung Sægro to discuss different sewerage and water solutions

_tutorial with Steffen

_finish scenario and SWOT analysis (part of Start box)

_decide the alternatives we want to work with and continue with the sketch project

monday

_case studies:water systems
_analysis

tuesday

_tutorial with Steffen
_sketch project

wednesday

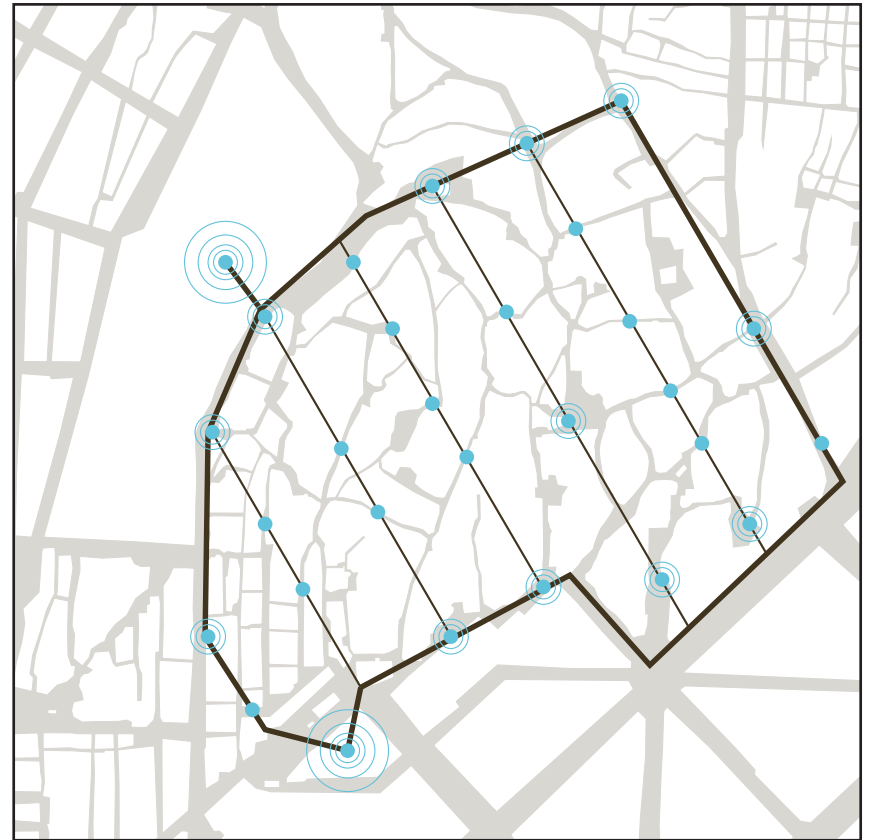
_sketch project
_analysis
_case studies:informal settlements

thursday

_sketch project
_analysis
_case studies:informal settlements

friday

_meeting with Sveinung S.
_sketch project



O1_aqueduct

So we know we want to implement water to the area, and preferably in a sustainable way. However we don't have the proper knowledge about how this would be executed. For the meeting with Sveinung we need to have some alternatives ready, in case the desired solution doesn't work. The desired situation is of course to have water in every house, but what if it isn't possible to put the pipelines in the narrow streets there? If the consequences are too big, it could be an alternative to look at a solution with sanitary solutions. Or maybe a system with pipes over the roofs?

_could be connected to a water tower at the top of the hill and a wastewater treatment plant at the bottom, or to the existing pipe network

_pipes going over the roofs, with water stations where they meet a street

_sanitary stations with toilet and bathing possibilities

alternative approaches



02_sanitary stations

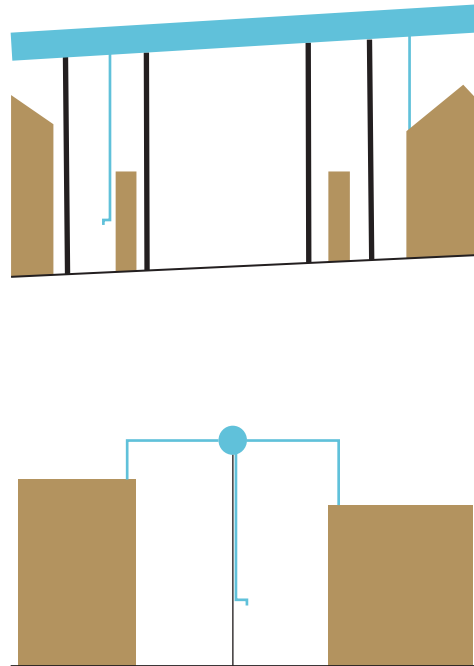
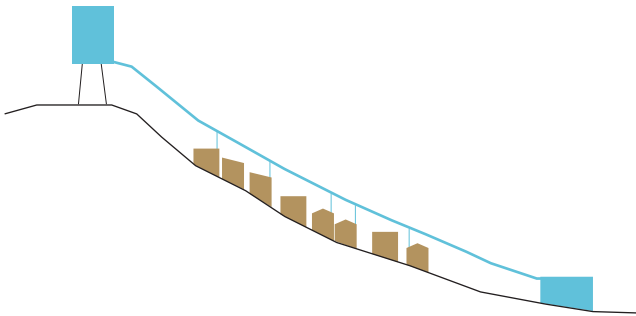
_if the costs of connecting this area to the water systems is too high or if it proves to be too complicated, it is a possibility to invest the money available in proper sanitary stations instead
_high standard stations with toilet and bathing possibilities, in addition to offering drinkable and household water
_needs to be attached to the existing water system
_should offer other necessary water functions, like laundry and cooking possibilities



03_water tower and wastewater treatment plant

_choose an example street and look at how the dwellings can be connected to the existing water grid
_design water tower, park and “learning centre” on the hill
_design wastewater treatment plant with connections to social functions at the bottom of the hill

01_aqueducts



aqueduct

_the aqueducts will transport the water in pipelines going over the existing houses.
_this can give interesting design possibilities
_by using this system you will limit the interventions in existing roads, but a system under ground is still necessary for handling wastewater

street sections

_top: when the aqueducts are placed in a straight grid over the unplanned city, the construction carrying the pipeline will sometimes land on private properties
_bottom: the aqueducts can give water supply to tap stations in the public streets, but there is also a possibility for leading water into private houses

example

_illustration of the aqueduct crossing over a street

02_sanitary stations & baths



coverage

_everybody must have a station in close range to themselves
_the size of the stations must be adapted to the number of users



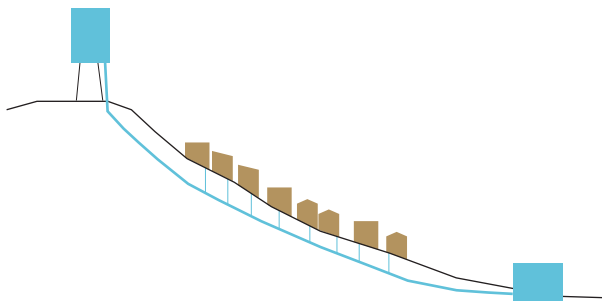
water system

_a pipeline can be added alongside the open area on the hill and also through the area where the big street crosses through
_the water stations must be added to these existing systems



possible cluster

_use parts of the top for many sanitary stations, so that it develops into a natural social meeting place
_could be a continuation of the beginning street structure at the top



water system

- _water tower at the top supplies the units with water
- _wastewater treatment plant at the bottom



reuse

- _by separating black water and grey water in different systems, it becomes possible to cleanse the grey water and reuse it
- _in areas where water resources are scarce, this recycled water can be very valuable
- _by adding a function like a green house to the plant, it can become a public function



pipelines

- _possible main pipe system

03_water tower and wastewater treatment plant



possible site_A

- + is situated well to give good slope conditions for the new pipelines
- + is close to the unplanned city and the plant and green house can become a part of a public space

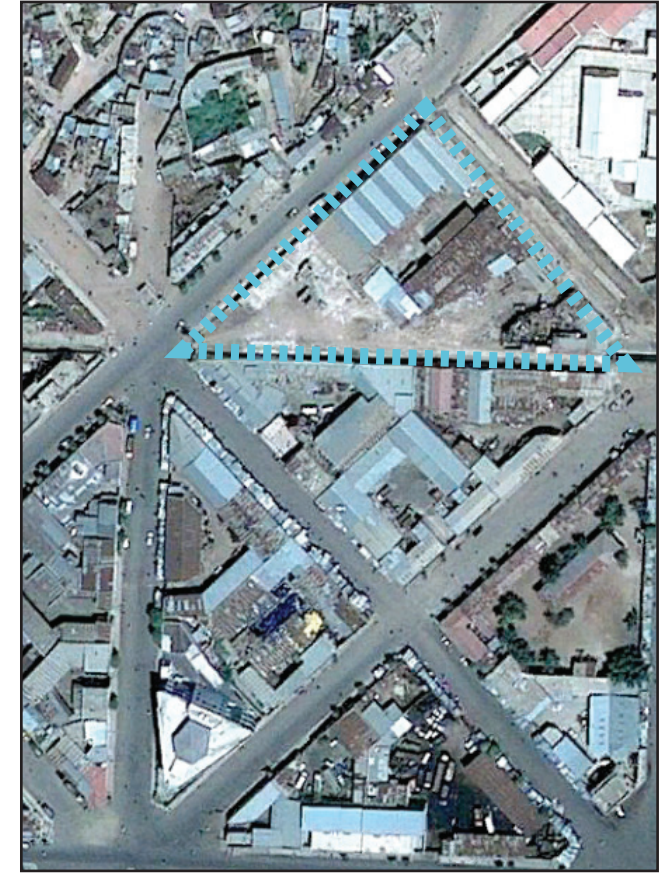
- existing houses at the site will have to be demolished



possible site_B

- + is situated well to give good slope conditions for the new pipelines
- + is close to the unplanned city and the plant and green house can become a part of a public space

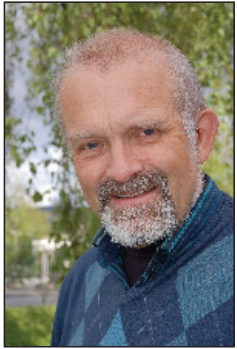
- existing houses at the site will have to be demolished



possible site_C

- + existing buildings at the site has potential for reuse and transformation
- + the plant can be a connection between the unplanned city and Medeber market

- slope conditions for the connected pipelines are not so good



- Sveinung Sægrov, born 1951
- professor in water and wastewater systems at Institute for Water and Environment, NTNU
- Teaches subjects “Urban Water Systems” and “Water and Wastewater Systems Specialisation”
- Mentor for students at project works and master thesis
- Previously senior researcher and research manager at SINTEF
- Participates with initiation and implementation of research projects, i.e. EU programs. Manager of EU projects CARE-W and CARE-S and EU network CityNet, plus researcher exchange program SafeWater (Marie Curie). Work area leader

EU IP project TECHNEAU (safe drinking water from source to tap) and central in development of EU IP project PREPARED (meeting impact of climate change with existing urban water systems). Now participant in development of new initiatives within urban water/energy nexus.

- Board member European Water Supply and Sanitation Technology Platform (WSSTP) 2006-2008, and initiator and leader of Norwegian branch of platform. Member of International Water Association (IWA) network “Leading Edge Sustainable Asset Management” (LESAM)
- Board member Breivoll Inspection Technology (Pipe Scanner)

Sveinung Sægrov held a lecture during our seminar, which left us very inspired. We managed to schedule a meeting with him to clear up all the things we were uncertain of. The following pages are a presentation of what we learned, which will be key terms for further work.

_water and sewage gives a push forward and increases the value of the properties. A tap station can be a step back if they have to walk longer to fetch water. The most important thing will be to get water into each house. (Examples Cape Town: stations in an unregulated slum and Beijing: common sanitary stations for each block)

_you need to look at the area of the roofs and how the rain is distributed over the rain period. The more intense the rain is, the more rainwater you can collect. If the intensity is low, more of the water will evaporate. Often as much as 50 % of the rainwater will evaporate. At the most intense cloudbursts you can collect 50 - 70 %. To calculate how much rainwater you can collect, you have to look at the most intense days of the rain period.

_it is difficult to cleanse the water enough to be able to drink it. It can be used for watering vegetables and for industrial purposes. The rest of the grey water can for example be transported out to farmland. We should try to find out if it is possible to get natural slope conditions to some kind of industry.

_leading the water into existing pipes will give this system a better speed, but it is unnatural to pollute the water again.

_the less you have to depend on pumps, the better. The best thing is to use gravity. As soon as you have systems like this it needs to be maintained and the people that operate the plant will need some sort of education.

_the cost of a treatment plant can be high compared to the income. Some advanced technologies get cheaper the bigger the plant is.

_ the minimum pressure in a water tower should be 20 meters.

_dimensions of water tank:
consumption per day x amount of people living there
 $50 \text{ l} \times \text{ca. } 15\,000 \text{ person} = 750\,000 \text{ l}$
A safety factor should be added.

_the requirements for the water depend on what you are going to use purified the water for.

_usually you only remove the waste from the toilets. You can also separate the water from the kitchen because this can contain a lot of organic material.

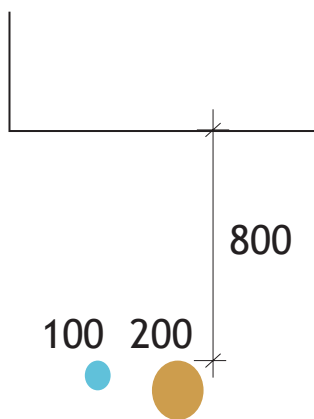
_when you separate the black water from the grey water, you can coordinate some of the households to cooperate on handling the black water.

In undeveloped countries, the sanitation is often based on biological systems, but the load must not be too big.

_Hareid Jets produces dry toilets. The waste goes to a tank that has to be emptied. You can build such septic tanks for several households together.

In Norway a person uses on average 250 l water. In third world countries the number is only 10 l. A realistic calculation in Aba Shawl is to dimension 50 l per person per day.

meeting with Sveinung Sægrov



pipes

_the pipes handling water supply and waste water have to be placed 800 mm under ground to avoid damage from loads in the street. These numbers applies for streets with vehicles. 500 mm could be enough in Aba Shawl.

_it is best to use pipes made of plastic.

_the dimensions should be:

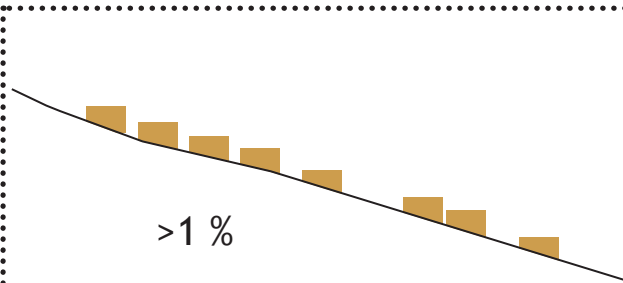
main pipes: 100 mm (PE-pipes)

drainage pipes: 200 mm (150 mm) (PVC-pipes)

in to the houses: d 30 mm

_the standard length of pipes is 6 meters.

_ the pipes leading to the houses can be placed along the walls of the house to avoid having to dig underneath the house. This will be cost saving.

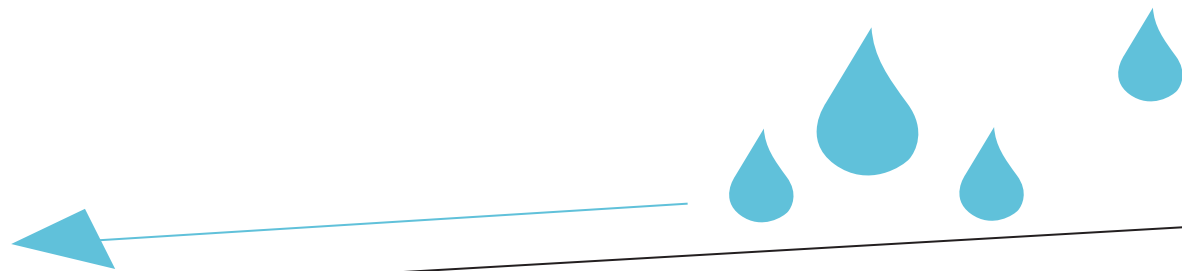


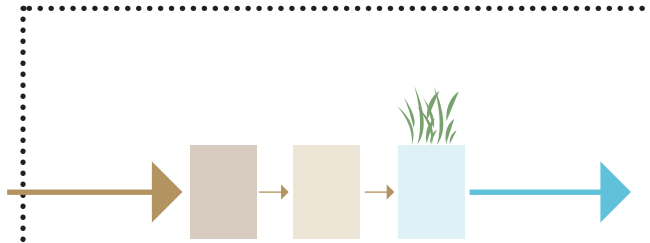
sloping terrain

_in order to add water pipes one depend on a minimum 1 % slope, at all times. Anything less would cause sedimentation in the pipes. Therefore we need to find the streets that fill this criteria. The ones that don't, will not be suitable for adding pipelines.



At the bottom, a reservoir for collecting rainwater could be made. This reservoir could also handle the grey water from the households. It is necessary to protect the reservoir with some kind of cover to prevent it from collecting dust and insects. It is necessary to install a spillway for flooding. The collected water can be led into the wastewater treatment plant to make it usable for irrigation and industrial purposes. To lead the water back into the area, a pump station is necessary.

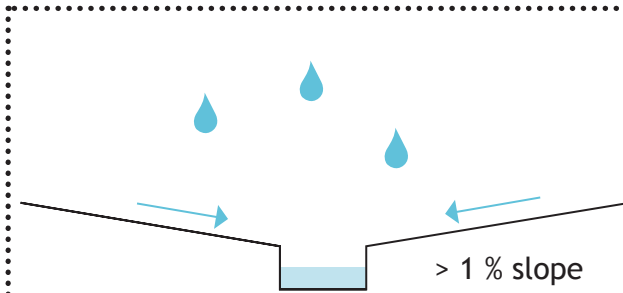




water treatment plant

_there are to ways of handling the water: You can either have a water tank and water treatment plant, or connect to the existing network of channels.

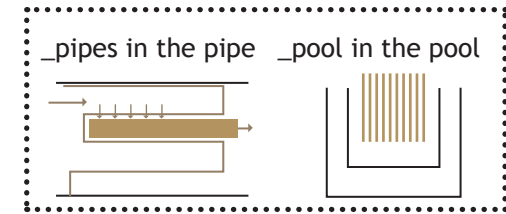
_for a water treatment plant in Aba Shawl, 200 - 300 sqm can be enough, but calculating the size of a treatment plant can be a doctors degree in it selves. We need to find the consumption of water, the load (m3).



street section

_the hard surface of the earth stops the water in filtrating into the ground. Streets therefore have to be designed to handle the rainwater. We need to find out how much water such a ditch has to be dimensioned for.

_by having two slopes leading down to a ditch in the middle, the water will be led into this ditch and not flood the street. The slope has to be more than 1 %, but not bigger than it is comfortable to walk in the street.



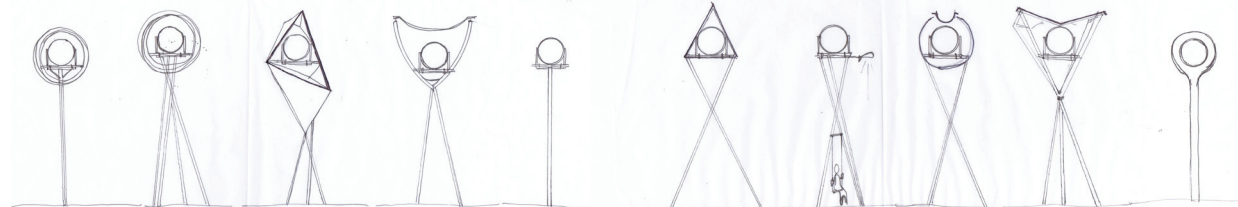
They need knowledge about water so maybe it could be a good idea to propose an information centre.

The most suitable pipes are PVC pipes. We need to find out if Eritrea produces these themselves or if it is possible to import them.

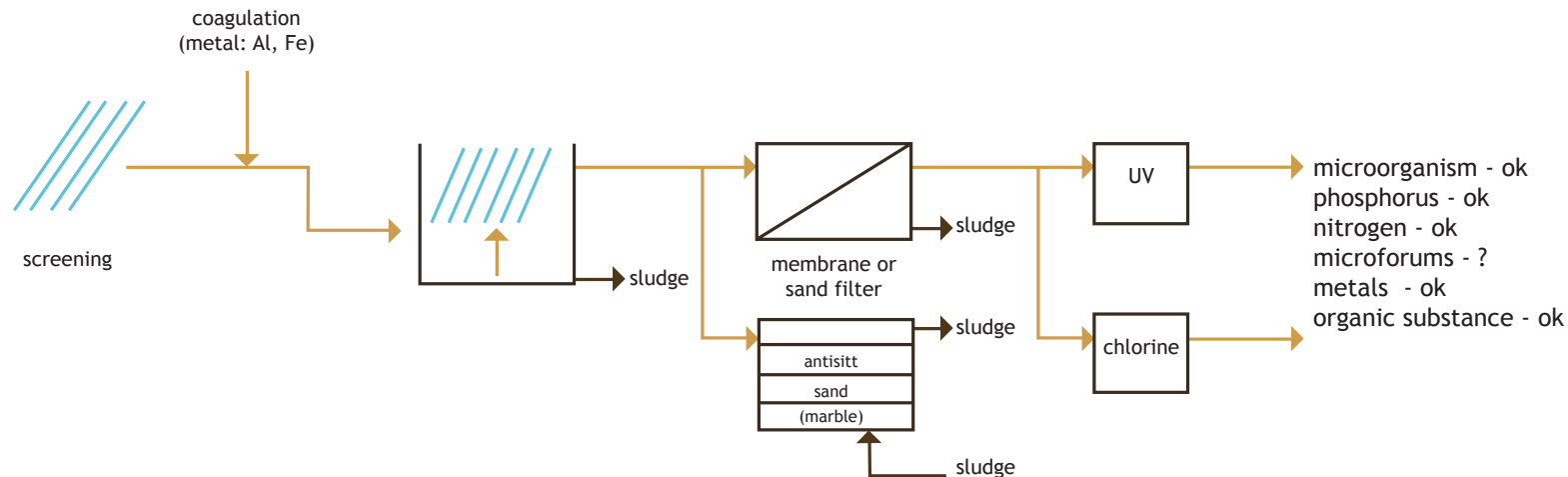
aqueduct

_Example: Spits Bergen

_you still have to dig into the ground to pipes for the sewage water. Everything that comes in, also has to get out! Also, the water will get heated with visible pipes.



cleansing process



_1. First you need an inlet cover - strainer (Sandnes strainer). This removes all the garbage from the water.

_2. Then there is a sedimentation phase with chemical precipitation. This removes much of the loose substance - microorganisms. You add a metal that will actuate particles. In this process you need a pool and a stop period. This phase can take up quite a bit of space.

_3. The next step is membrane polishing (membranepolering (Zenon)). A system of a “pool in the pool” or “pipes in the pipe” can be used. The membrane filter is an advanced technique, so it might not be the best thing to use in this example. You can also use a sand filter or a ceramic filter. The “Molde-process” is a filter with different types of sand. It removes particles and adds alkalinity. This phase purifies the water enough to use it for industrial purposes.

_4. The last step is disinfection by UV-light in pipes or with chlorine. UV-light removes the parasites, while chlorine does not.

What can we use the water for?
_ green house, vegetables, washing,
and industrial purposes.

In Windhoek, Namibia, some families have lost their houses because of debt to the utility company. It is important that we remember the social aspects.

this week

For the tutorial with Steffen we presented our water concept, and were advised not to focus strictly on the combination of the water tower and the water treatment plant, but also look on alternative strategies, in case this one isn't realistic. The solutions we started working with were the aqueduct idea and the sanitary/bath stations. The latter we pictured as high standard baths, that people would enjoy coming to and be statement buildings to the rest of the city.

However, after talking to Sveinung we understood that the alternative we had from the start was the most realistic and practical. We will therefore only develop this towards our trip to Asmara, and look at

how the water tower and treatment plant can be. The meeting with Sveinung cleared up a lot of issues for us, and we now understand what our assignment can be. We got a lot of numbers that can guide us, and also some themes that should be studied. The idea of attaching an information center to the water tower was appreciated, because of the lack of knowledge there is in such areas. If this can be improved, not only will Aba Shawl gain from it, but the entire city.

It is also easier to involve Mette when we are dealing with such technical things. She can look at the technical aspect, how it should be run and the side

effects of these two projects. Surely, it wouldn't be so interesting for her to look at how the area could evolve if we chose to look at sanitary stations. When leaving for Asmara we will discuss how to split the work more closely, so that both groups get the most out of it.

comments and thoughts

We are closing in on a more defined project, which feels very good. Of course this will change a bit when we start discussing the topics with Dol, but for now we enjoy having more control.

challenges

After the meeting with Sveinung we have a lot of new information, so now we need to try and implement this information into our project!

what's next?

The dead-line for the sketch project is getting closer, and now that we have a more defined project we just need to put everything together.

[illegible]

week five

goals

_meetings

_travelling

_prepare presentation for Dol

monday

_prepare presentation

tuesday

_presentation for Ole

wednesday

_organize the trip
_meeting with Jon Smidt

thursday

_leave for Oslo

friday

_leave for Asmara



the hill: water tower

possible functions



water collector

- _Can be combined with a visitors centre, educational functions, water towers, parks, public places++
- _Educational
- _Social arena
- _Permanent



Solys water collector by Fabrice Gordon

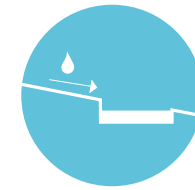


watertower

- _Can be combined with a visitors centre, educational functions, water collectors, parks, public places++
- _Educational
- _Social arena
- _Permanent



Hyllie water tower

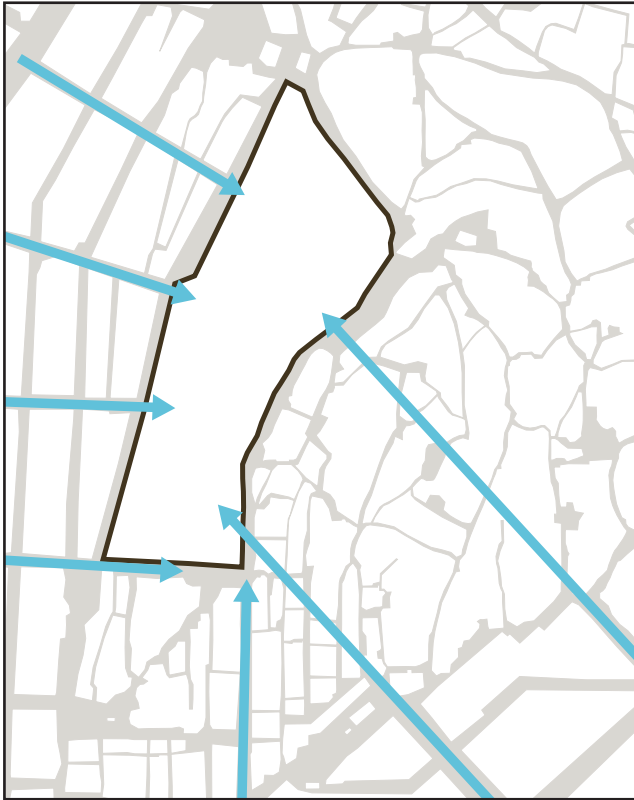


infiltration plant

- _Can be combined with water towers, water collectors and parks/agriculture
- _Stores water underground (no loss of water)
- _Improves water quality
- _Permanent



Hoppergarten Berlin, by H. Sieker



view

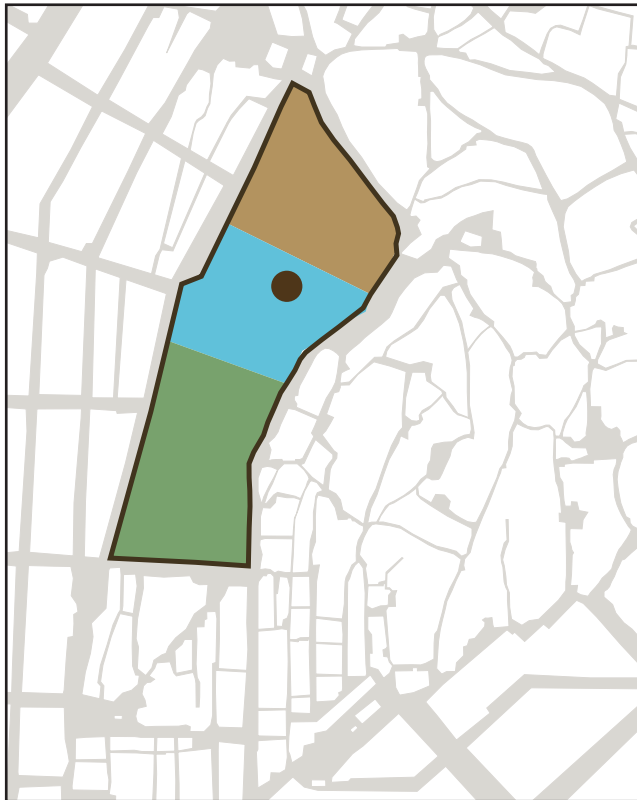
_there are many bigger streets leading to the top of the hill, which gives it a natural focus from the street

_a water tower or a different type of high building would emphasize this



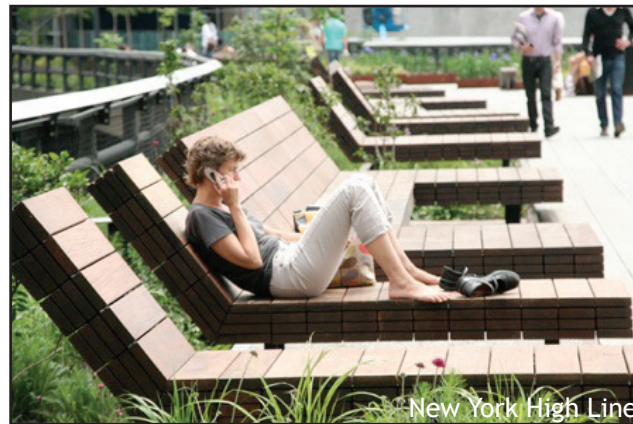
the hill: water tower

analysis



three main parts

_the north part of the top already has a kindergarten. It would be natural to look at how more educational buildings could be located around this area.
_the water tower should be placed at the highest point, with an information center close to it. This could also be linked to the school buildings
_the south part could be transformed into a park, with possibilities for the school kids to play and for the inhabitants to have access to a green area.



the hill: water tower

sketch project plan



sanitary station





sanitary pods

- _Element system
- _Easy to put up and to take down
- _A quick and easy way to improve the lives of people living in the area
- _Temporary

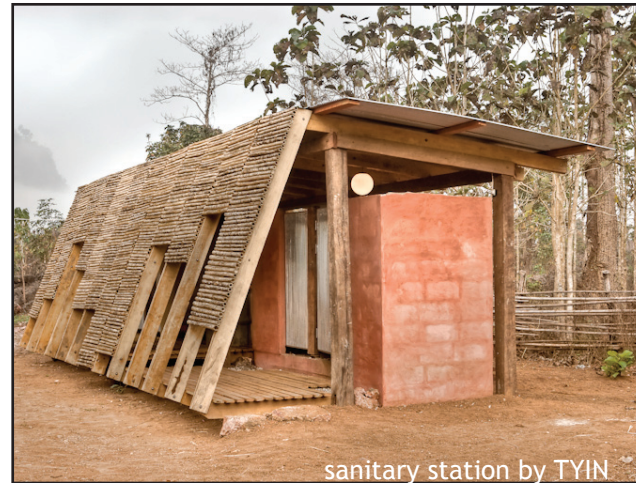


school project by Sheffield school of Architecture



sanitary stations

- _Can be combined with household stations and other similar functions
- _Can be transformed to other functions if the needs change
- _Improve the lives of people living in the area
- _Permanent



sanitary station by TYIN

sanitary station

possible functions



household station

- _Can be combined with sanitary stations, water towers, water collectors++
- _Social arena
- _Permanent or temporary



water tap

- _Easy access to water
- _Social arena
- _Improve the lives of people living in the area
- _Permanent





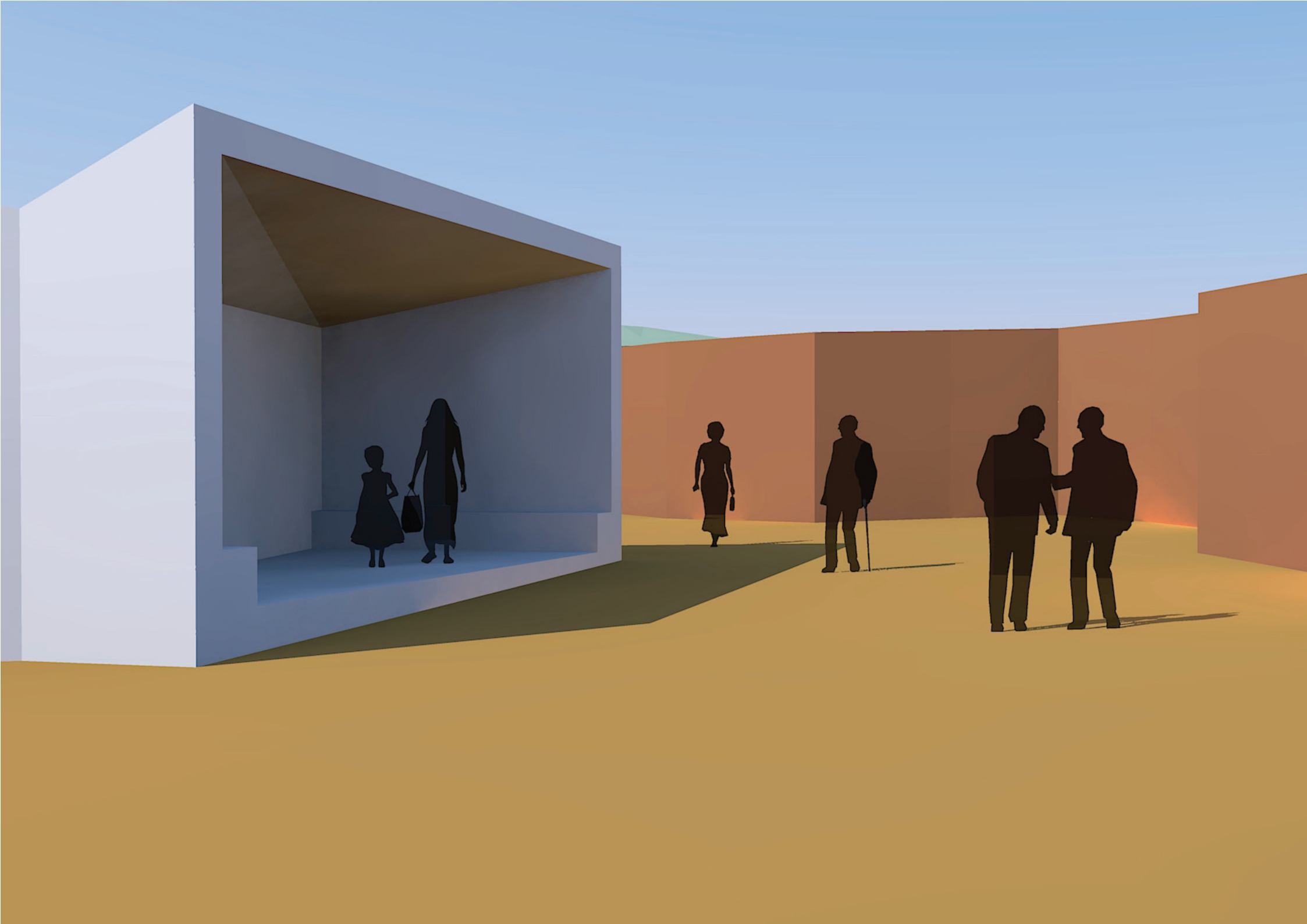
sanitary station

possible design



We chose the open square in the middle of our street as site for the sanitary station. It is actually a big cross section, so when designing it was important to keep the most important sight lines, and to have an easy access across. It was also important to make the entrances private.

The tradition in Asmara is to have these stations on big open squares as a main attraction, but this feels a bit uncomfortable for us. Is this function not of a very private character? Do you want to be seen of everybody on the square when you go into to the toilet? How can we keep it private, but at the same time accessible for for as many as possible?



sanitary station

possible design







greenhouse/park/agriculture

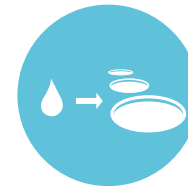
- _Ecological urbanism / sustainable perspective
- _Technical solutions for handling surface water
- _Simple methods for growing vegetables on private properties
- _Long term



vegetable growing

wastewater treatment plant

possible functions



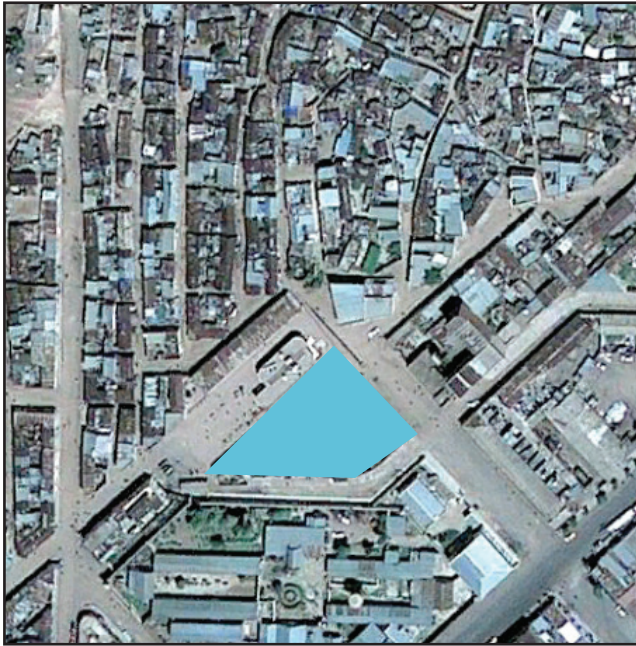
wastewater treatment plant

- _Can be combined with a greenhouse, parks, public places++
- _Educational
- _Social arena
- _Permanent



Kingsport water filtration plant

wastewater treatment plant



possible site

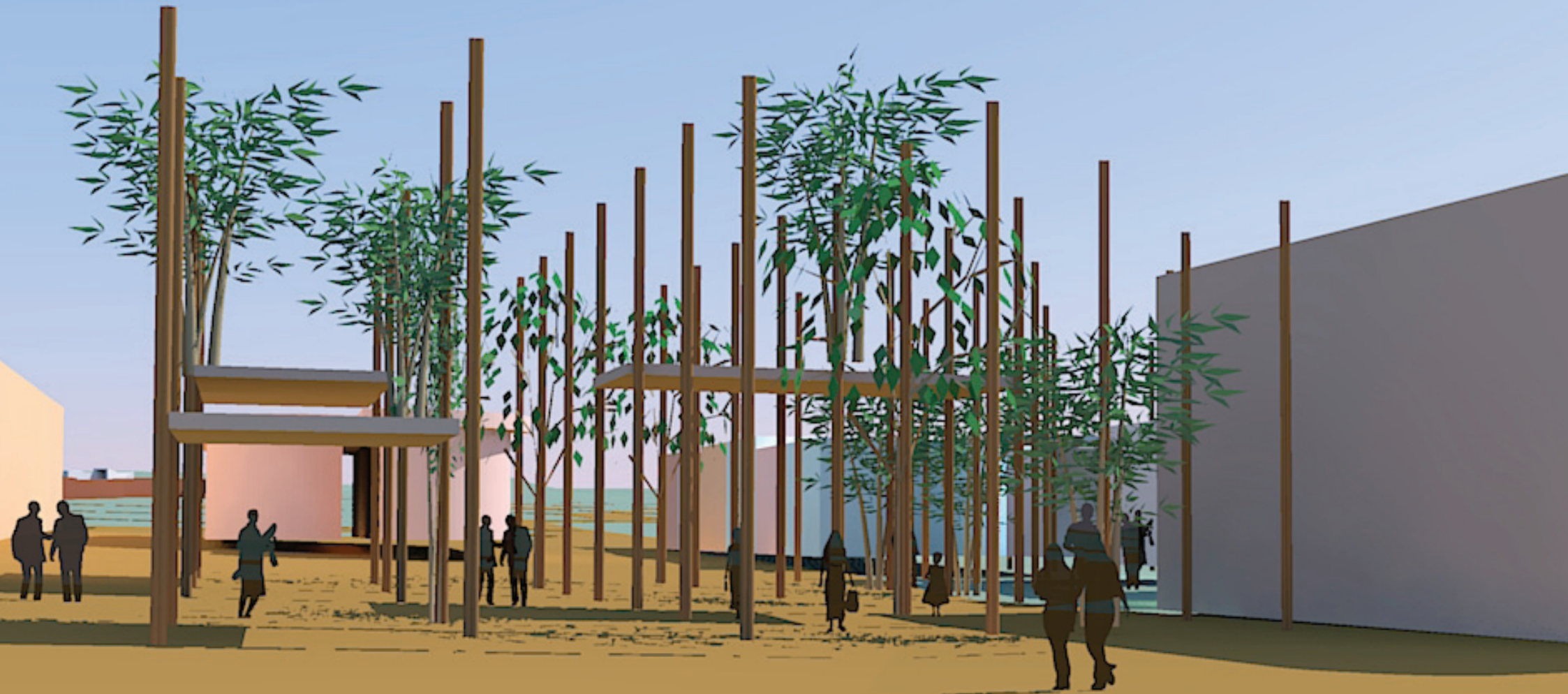
_the wastewater treatment plant has to be situated on a site that all new new pipes can reach and still have a slope of at least 1 %

_the plant has to be at least 200 - 300 sqm, depending on the load

_ is close to the unplanned city and the plant and green house can become a part of a public space

_ existing houses at the site will have to be demolished





Bamboo is a material they have in Eritrea, which can be used to make the public square around the wastewater treatment plant green. It can be used as both a building material and the tree itself.

this week

This week has been used for travel preparations, meetings and sketch project work. Our biggest concern has been if we were able to actually leave for Asmara, because of the stressed situation in Cairo, where we have a stopover. The news have been full of stories of no food or drinks on the airport, and that the waiting time would be at least a few days. Luckily we were redirected to Jeddah, and in the end we had a much quicker and more comfortable flight than planned.

In between the Cairo chaos we had a tutorial with Ole, where we talked about what we wanted to present in Asmara. It is important to be clear about what we want to work with and the potential we see in the different tasks. The feedback from Ole was the

need to have more sketches and illustrations of what we are talking about, because it is easier for them to discuss pictures than pictograms. How we communicate our project is crucial to get a productive debate. Therefore we focused even more on how to make the proposal clearer, and how to tell a story with our sketches.

The day before departure we also had a meeting with Jon Smidt. Keren in Eritrea is a friendship city to Trondheim, and he has been part of that collaboration since 1992. This collaboration involves planning, building, conferences and exchange of students. He has been several times in Keren, and is going back in March with some school pupils to participate in a peace conference. We presented our project to-

gether with the bus group, and discussed the challenges of working in Eritrea right now. He was very interested in our projects, and hoped he could come and see the exhibition when we finished. He had a lot to tell about the Eritrean people and their culture, and advised us to be open-minded and not to discuss politic questions.

comments and thoughts

A busy week with a mix of interesting discussions, stressful packing and nervous phone calls to Cairo.

challenges

Cairo!

what's next?

Next stop is Asmara, where we will have our presentation for Dol. Exiting!

