

uppleva Fixfabriken!

Göteborg | Sweden



final booklet
Aqua Terra Urban Design
Janneke van der Leer | 4079779
4 July 2014

mapping	3
location	4
soil types	6
archeology	7
contamination	8
cables and pipes	9
safety distances	10
existing qualities	11
research	12
stakeholders	13
SEES	14
theoretical framework	15
theory	16
Hammerby	17
concept	18
concept	19
Fixfabriken model	20
design	21
design	22
phasing	23
phase A	24
phase B	25
phase C	26
phace D	27
cables and pipes	28
sections	29
collage	31
references	32

'Uppleva Fixfabriken!' means 'Experience the Fixfabriken!'
picture frontpage: <http://www.gp.se/nyheter/goteborg/1.619205-fabrik-i-majorna-tar-ner-skylten-efter-62-ar?m=print>

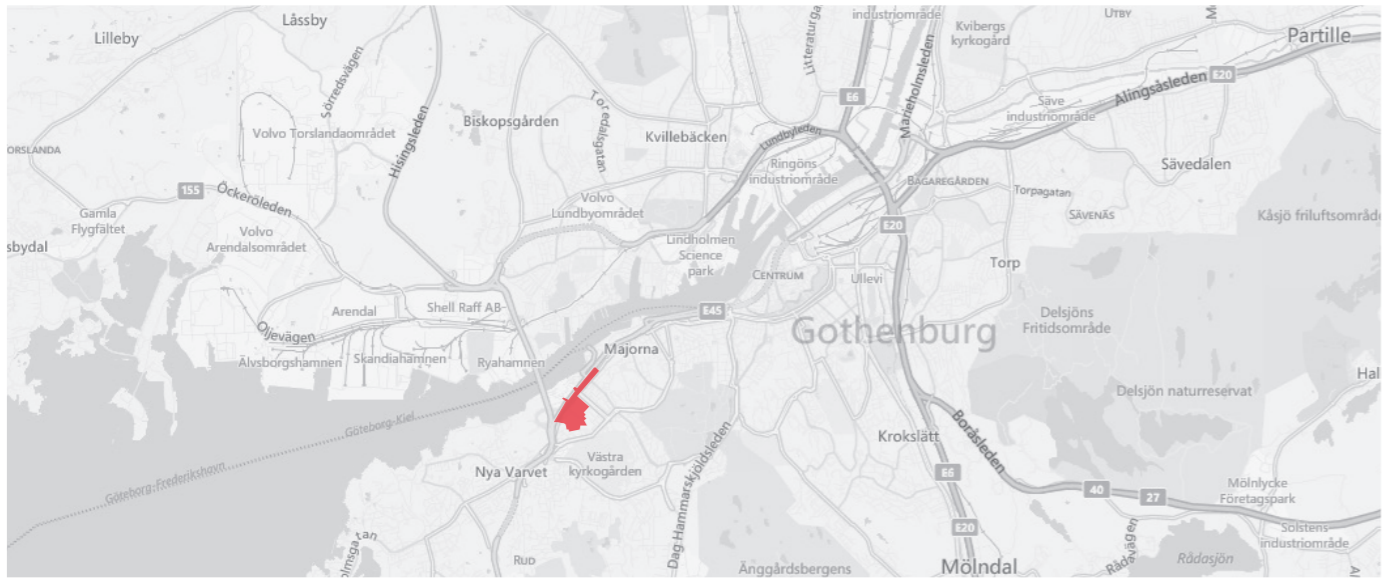
mapping

Fixfabriken | Göteborg

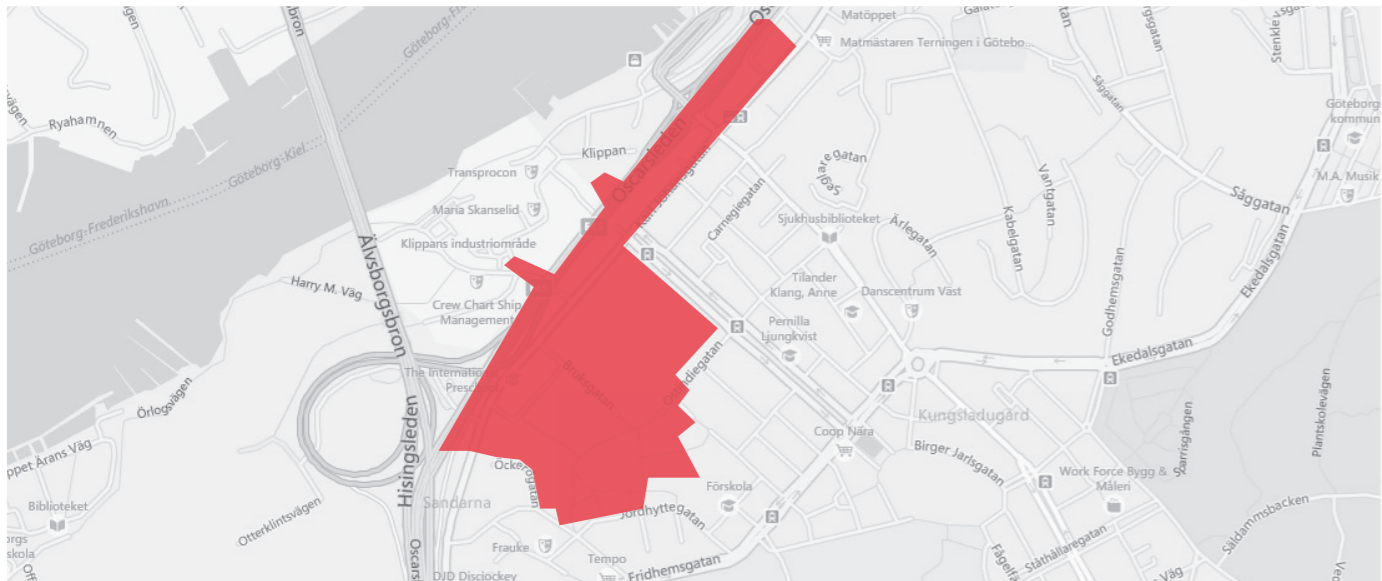
location



The project area is situated in Göteborg, the second largest city in Sweden.



The Fixfabriken area is located south of the river Göta Älv, near the The Älvsborg Bridge, four kilometres from the city centre of Göteborg.



The Fixfabriken area is surrounded by different neighborhoods and by a highway (E45) in the north.



Älvsborg Bridge

city centre

Fixfabriken

busgarage

vagnhallen (tram depot)

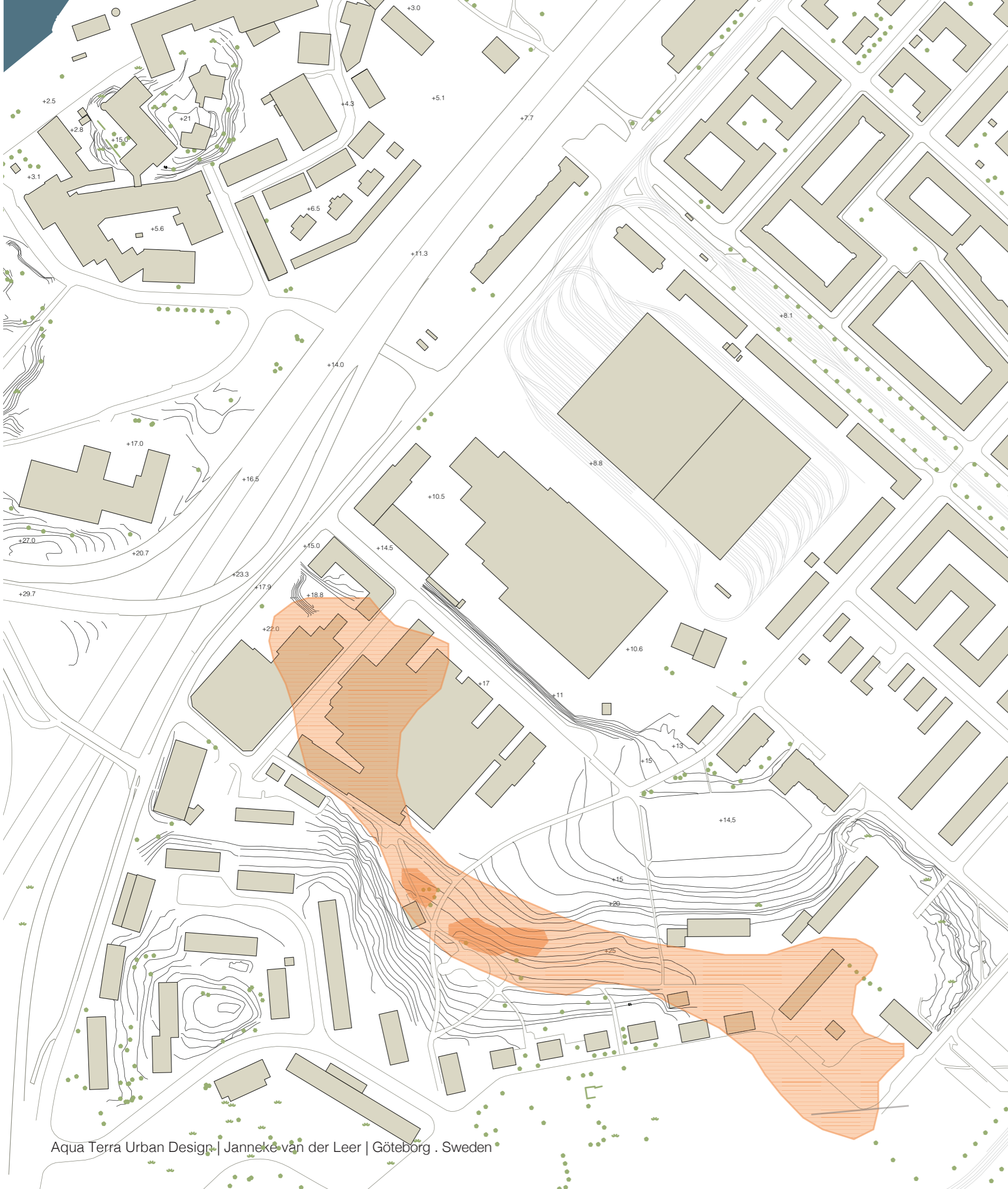


soil types

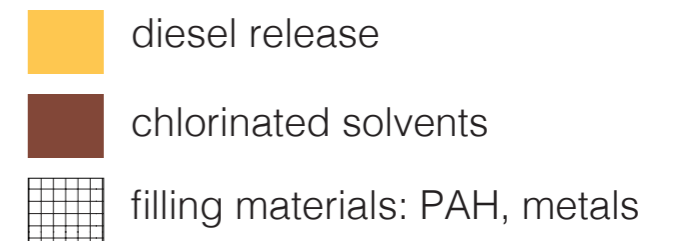
- rock
- clay
- sand | gravel

The soil types are related to the differences in height in the area. On the highest points you can find most of the time rock.





contamination



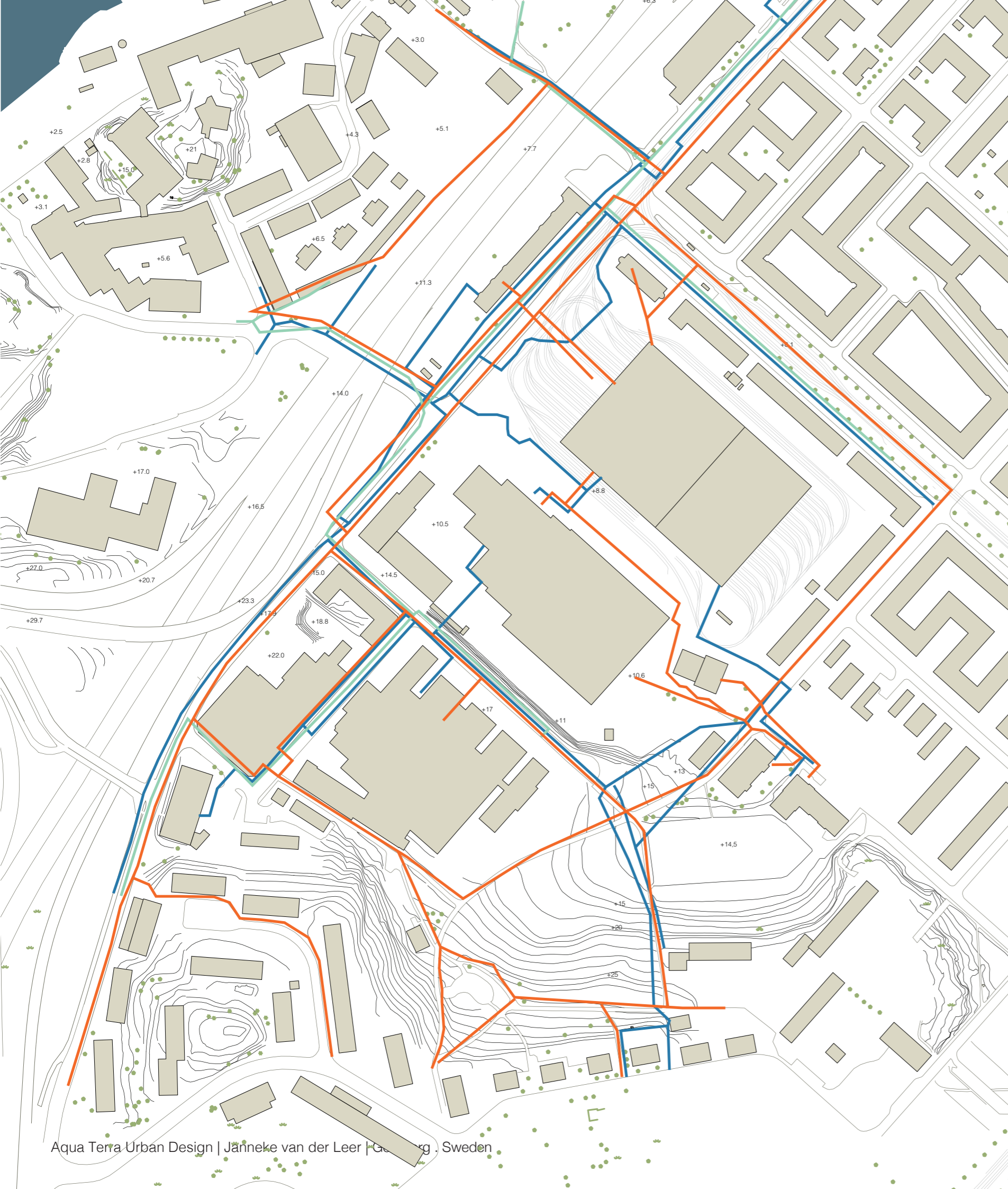
From 'FIXFABRIKEN AREA. Notes regarding archaeological and soil conditions aspects' by Chalmers students:

At the Fixfabriken factory, several products have been manufactured over the years, e.g. fittings for doors and windows. In the factory there are both workshop and surface treatment works (Carlsson, 2014).

The bus garage was constructed in the late 70s and includes several on-site activities that are likely to cause soil contamination. There are or have been e.g. garages, car washes, truck service, temporary boiler house.

The existing tram hall was built in the 40s and entails risk of contamination due to the present and past activities e.g.: garages and workshops, boilers systems, laundry and electric transformers (Carlsson, 2014). Along the street Karl Johansgatan which forms the northeast boundary of the area, and in the neighbouring areas, several activities have been conducted that can pose risks of soil contamination: petrol stations, cleaning operations, warehouses, a former bus garage and traffic.

cables and pipes



- water
- electric
- gas

safety distances



This map shows the safety distances from highway E45 for new buildings, according to the law in Sweden.

existing qualities



This map shows the existing qualities of the site above the ground. The existing qualities in the Fixfabriken area are the green strips, the park, the front part of the tram hall, some nice buildings with or without interesting functions and in pink the visual lines to the surroundings.

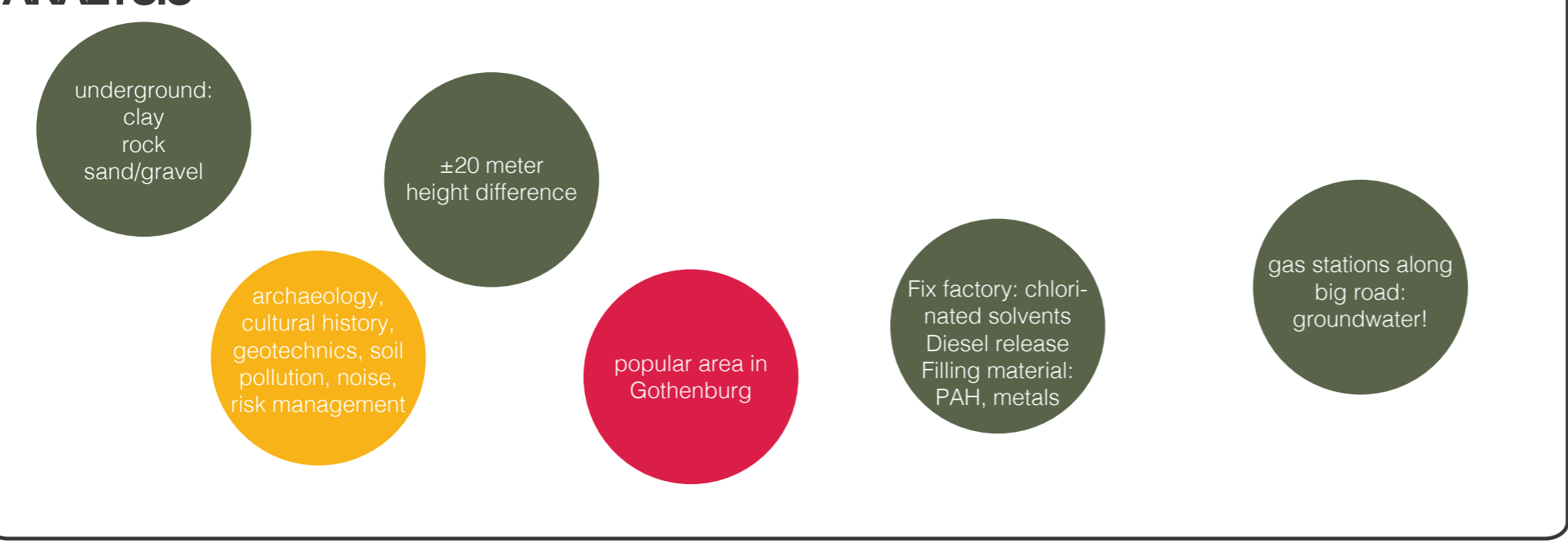
research

Fixfabriken | Göteborg

GOAL

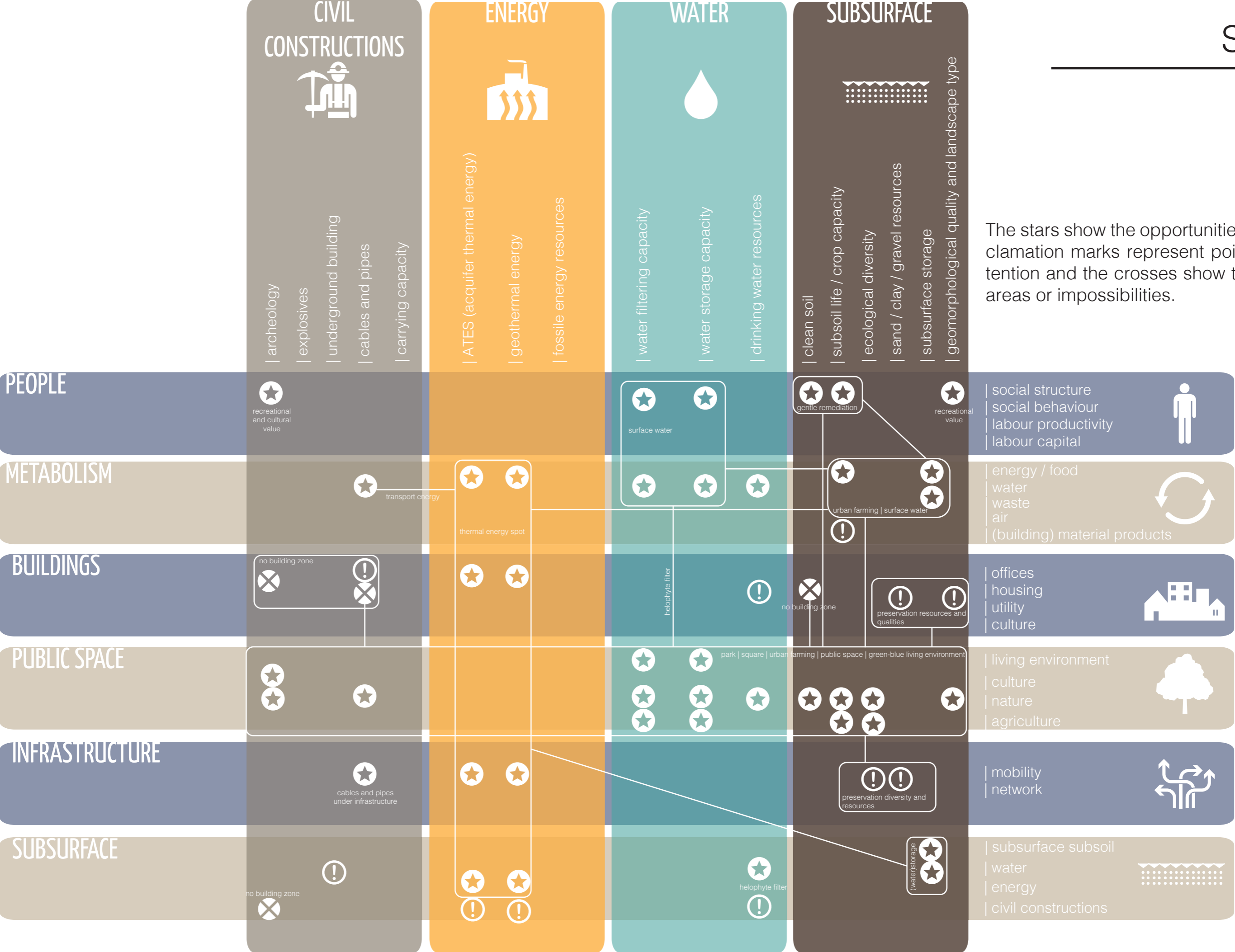


ANALYSIS



STAKEHOLDERS

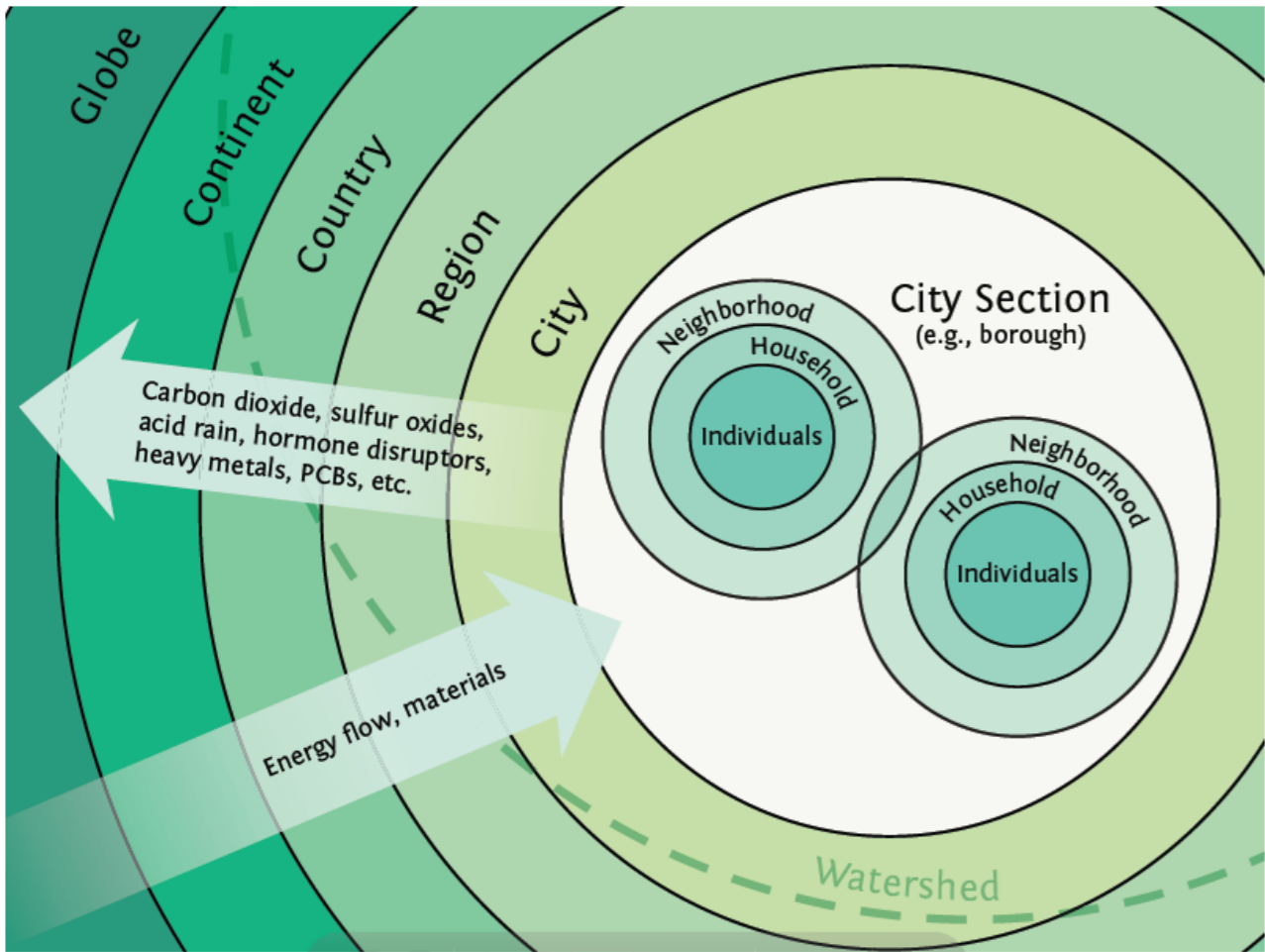
-  **Project manager**
Elisabeth Jansson Forsberg
(Majornas Projektutveckling AB)
-  **City planner municipality**
Hanna Kaplan
City Planning Office (Göteborg municipality)
-  **Subsurface expert**
Christian Carlsson
Real Estate Office



The stars show the opportunities, the exclamation marks represent points of attention and the crosses show the no-go areas or impossibilities.

theoretical framework

Fixfabriken | Göteborg



The Nested Scales of Urban Impacts on the Biosphere: the interconnectivity of the world from the largest scale to the scale of the individual (Sassen, 2012)

The scheme of Saskia Sassen pointed out the interconnectivity between large and small scales and the flows of the city. This is an interesting starting point to look at the city and the area. Because this project is situated in Sweden this project is also framed by an article about ecosystem services. ‘Ecosystem services’ refers to the benefits human populations derive from ecosystems. They conclude that the locally generated ecosystem services, like air filtration and cultural values, have a substantial impact on the quality-of-life in urban areas and should be addressed in land-use planning.



Ecological Economics 29 (1999) 293–301

ECOLOGICAL ECONOMICS

ANALYSIS

Ecosystem services in urban areas

Per Bolund ^a, Sven Hunhammar ^{a,b,*}

^a Environmental Strategies Research Group, Natural Resource Management, Department of Systems Ecology, Stockholm University, Stockholm, Sweden
^b Stockholm Environment Institute, Stockholm, Sweden

Abstract

Humanity is increasingly urban, but continues to depend on Nature for its survival. Cities are dependent on the ecosystems beyond the city limits, but also benefit from internal urban ecosystems. The aim of this paper is to analyze the ecosystem services generated by ecosystems within the urban area. ‘Ecosystem services’ refers to the benefits human populations derive from ecosystems. Seven different urban ecosystems have been identified: street trees; lawns/parks; urban forests; cultivated land; wetlands; lakes/sea; and streams. These systems generate a range of ecosystem services. In this paper, six local and direct services relevant for Stockholm are addressed: air filtration, micro climate regulation, noise reduction, rainwater drainage, sewage treatment, and recreational and cultural values. It is concluded that the locally generated ecosystem services have a substantial impact on the quality-of-life in urban areas and should be addressed in land-use planning. © 1999 Elsevier Science B.V. All rights reserved.

Keywords: Ecosystem; Ecosystem services; Urban areas

1. Introduction

Humanity is rapidly urbanizing, and by 2030 more than 60% of the world population is ex-

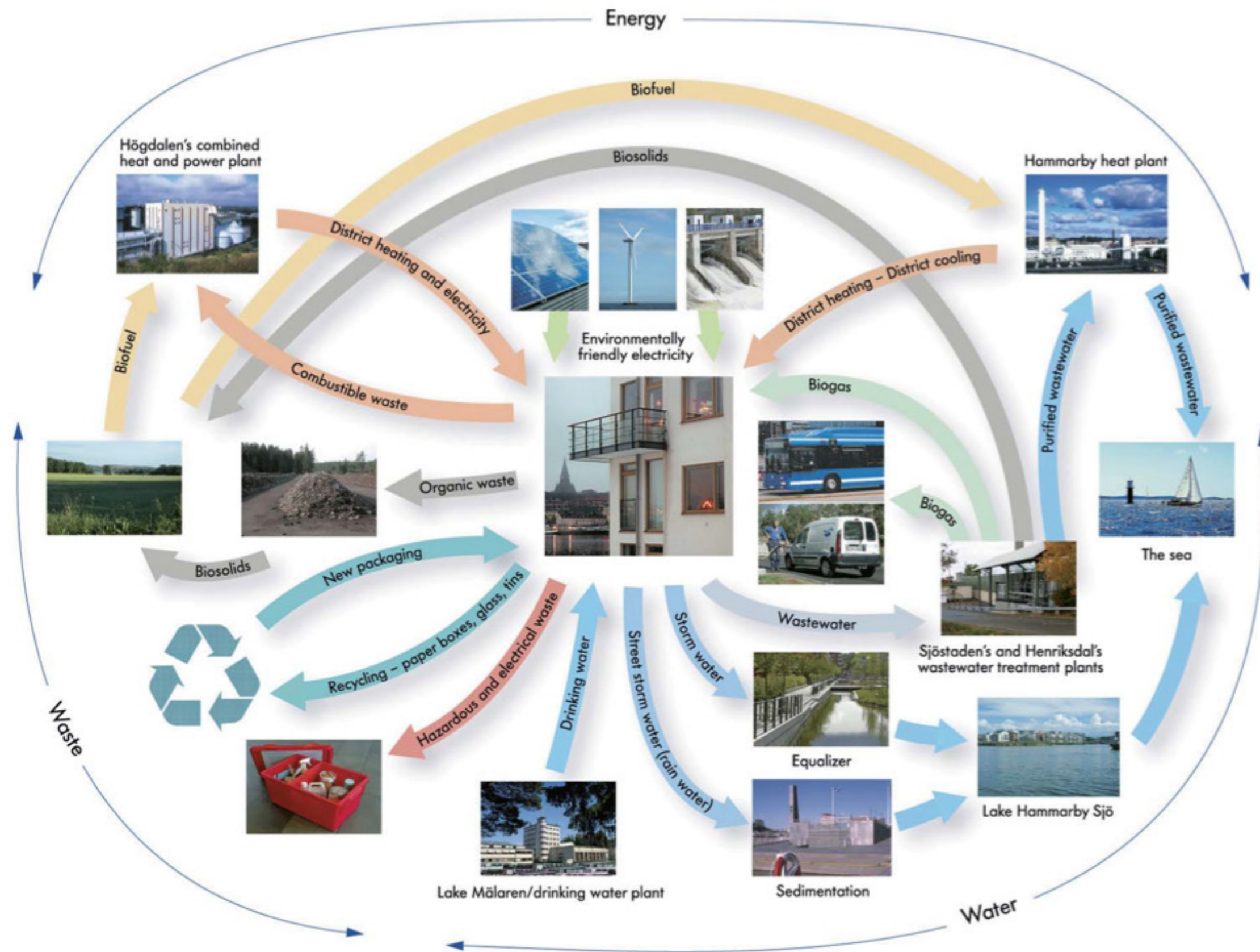
pected to live in cities (UN, 1997). But even if humanity is increasingly urban, we are still as dependent on Nature as before. Cities are, for example, dependent on the large hinterlands needed to provide input and take care of output from the city. In a study of the 29 largest cities in the Baltic Sea region, it was estimated that the cities claimed ecosystem support areas at least 500–1000 times larger than the area of the cities themselves (Folke et al., 1997).

* Corresponding author. fms, Box 2142, 103 14 Stockholm, Sweden. Tel.: +46-8-4023808; fax: +46-8-4023801.
E-mail address: hunhammar@fms.ecology.su.se (S. Hunhammar)

Table 1
Urban ecosystems generating local and direct services, relevant for Stockholm.

	Street tree	Lawns/parks	Urban forest	Cultivated land	Wetland	Stream	Lakes/sea
Air filtering	X	X	X	X	X		
Micro climate regulation	X	X	X	X	X	X	X
Noise reduction	X	X	X	X	X		
Rainwater drainage		X	X	X	X		
Sewage treatment					X		
Recreation/cultural values	X	X	X	X	X	X	X

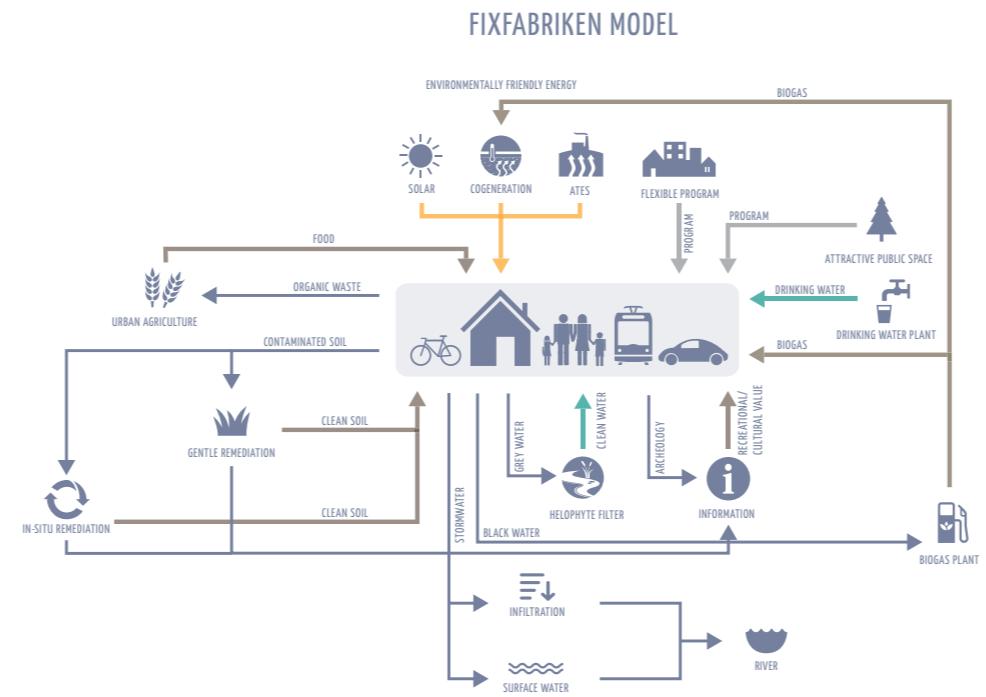
Boland and Hunhammar, Ecosystem services in urban areas (1999)



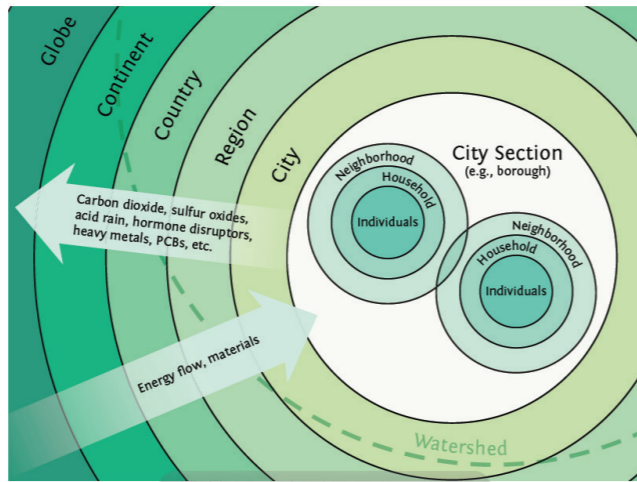
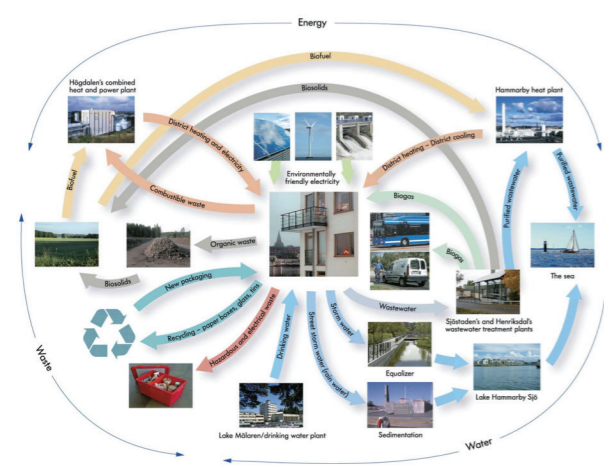
This model is used for the Hammerby project in Stockholm, a environmental redevelopment project of a former industrial and harbour area. This project is a showcase for sustainable development in Sweden. They approach this project with an integral energy, waste and water system. An important recommendation: 'a new centre for environmental information and communication should be established in new districts, with the view to support a systematic marketing of knowledge of system technology, environmental technology and urban district planning. The centre should also inform and support the residents influencing their environmental behaviour.'

concept

Fixfabriken | Göteborg



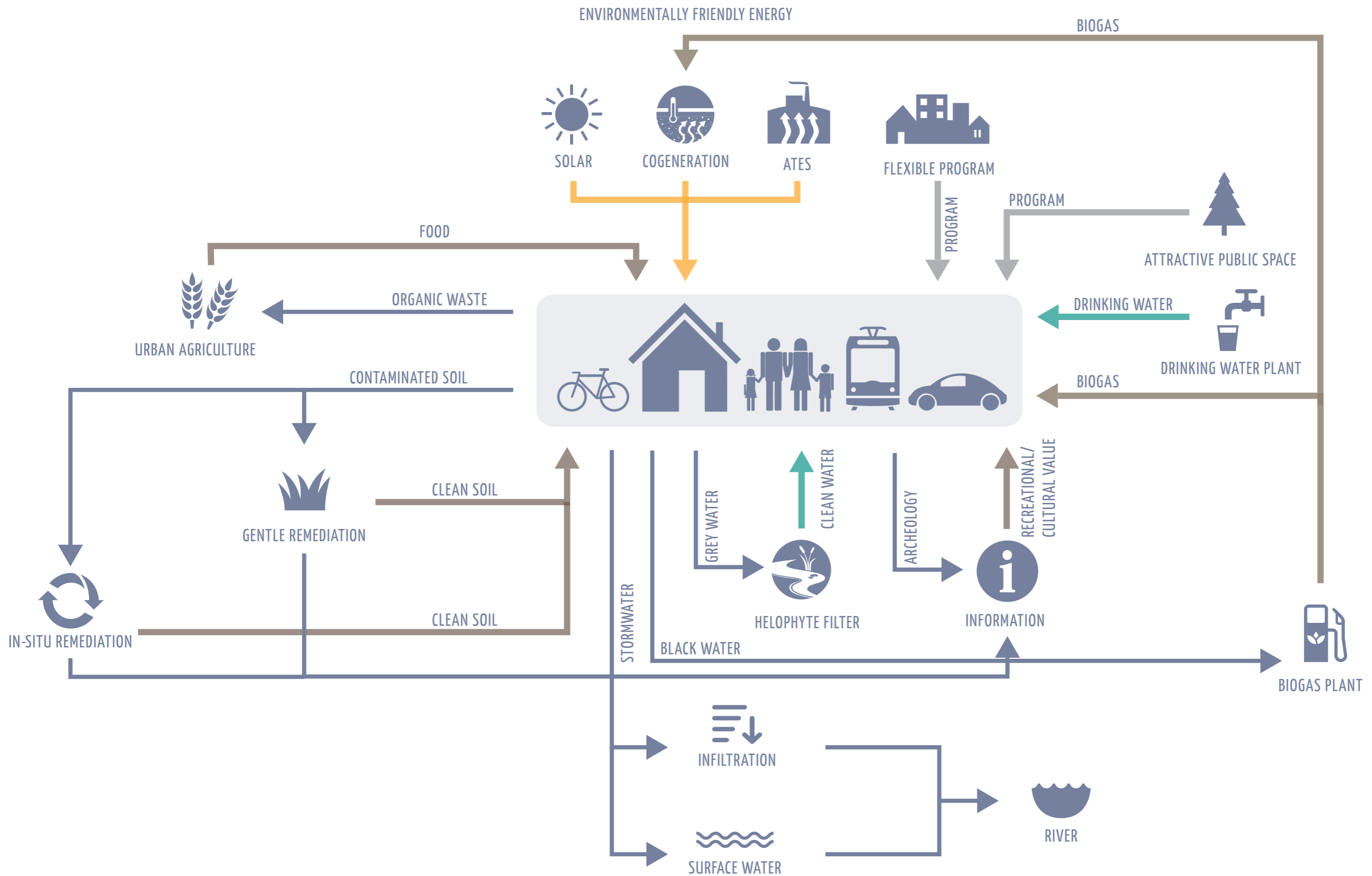
Combination of the scheme of Sassen with the Hammerby model (the more above ground system) with the system exploration for the subsoil system. This combination has led to the Fixfabriken model based on these ideas.



	CIVIL CONSTRUCTIONS	ENERGY	WATER	SUBSURFACE
PEOPLE	archaeology explosives underground building cables and pipes carrying capacity	ATES (aquifer thermal energy) geothermal energy fossil energy resources	water filtering capacity water storage capacity drinking water resources	clean soil subsoil life / crop capacity ecological diversity sand / clay / gravel resources subsurface storage geomorphological quality and landscape type
METABOLISM	no ecological and cultural value	no ecological value	surface water	urban farming (surface water)
BUILDINGS	preexisting zone	no ecological value	landmark floor	no ecological value
PUBLIC SPACE	no ecological value	no ecological value	park (nature) / urban farming (public space) / green-blue living environment	no ecological value
INFRASTRUCTURE	no ecological value	no ecological value	no ecological value	no ecological value
SUBSURFACE	no ecological value	no ecological value	no ecological value	subsurface subsoil water energy civil constructions

FIXFABRIKEN MODEL

Fixfabriken model



symbols designed by multiple designers from the thenounproject.com

design

Fixfabriken | Göteborg

The 'uppleva Fixfabriken!' project is divided in four phases because of the subsoil contamination and the existing contracts with landowners. In the beginning of the development the people are made aware of the future developments on the Fixfabriken site. A square in front of the tramhall, new functions in the tramhall (an information center, a hotel and cultural functions) and a watchtower are therefor the first interventions. The tram line will be extended to the south and there will be started with the green buffer boulevard along the highway. On the crossing of most of the cables and pipes (near the existing park) there will be build a biogas plant and cogeneration system for energy and biogas for cars and buses. To start quickly with the development of dwellings on the Fixfabriken area, this site will be remediate by electro reclamation in 2-4 years. Also the tram hall site will be remediated in this way. After 2-5 years the Fixfabriken dwellings can be build. The urban fabric is designed taking into account the most efficient way of cables and pipes for the entire area. In this phase the development of the cleaning park (gentle remediation of the busgarage) can start. In this cleaning park people can experience the helophyte filter and the gentle remediation process by elevated paths. In the east elevated small offices can be developed, because living is restricted above gentle remediation. Because of the helophyte filter a seperate sewer system will be implemented. Another 5 years later the dwellings in the backside of the Vagnhallen (tram hall) can be build and the upplevelse route (experience route) along all interesting points in the area can be created. This upplevelse route start at the Vagnhallen, where there is an information center and where people can have a view from the watchtower. Along the route there are red arches on interesting points (archeology, biogas and cogenar-tion system, helophyte filter etc.) where people can get information by using their smartphone.

After 20/30 years when the busgarage site is remediated (the cleaning park) and there is demand, dwellings or other buildings can be developed on this site.

phase A 0-2 years

developments

extend tram line to the south

development of green buffer
boulevard

development Vagnhallen: mul-
tifunctional building, hotel and
square with watchtower

biogas plant and cogeneration
system

remediation

(enhanced) natural attenuation
park

electro reclamation backside
tram hall and Fixfabriken site

phase B 2-5 years

developments

Fixfabriken dwellings

elevated paths cleaning park

elevated experiemental offices
in cleaning park

helophyte filter in cleaning park

remediation

gentle remediation busgarage
(cleaning park)

continue electro reclamation
backside tram hall

phase C 5-10 years

developments

Vagnhallen dwellings

improvement sports park

upplevelse route (experience
route)

remediation

gentle remediation busgarage
(cleaning park)

phase D 10-... years

developments

when there is demand -
dwellings cleaning park

phase A



developments

extend tram line to the south

development of green buffer boulevard

development Vagnhallen: multifuntional building, hotel and square with watchtower

biogas plant and cogeneration system

remediation

(enhanced) natural attenuation park

electro reclamation backside tram hall and Fixfabriken site

phase B

developments

Fixfabriken dwellings

elevated paths cleaning park

elevated experiemental offices
in cleaning park

helophyte filter in cleaning park

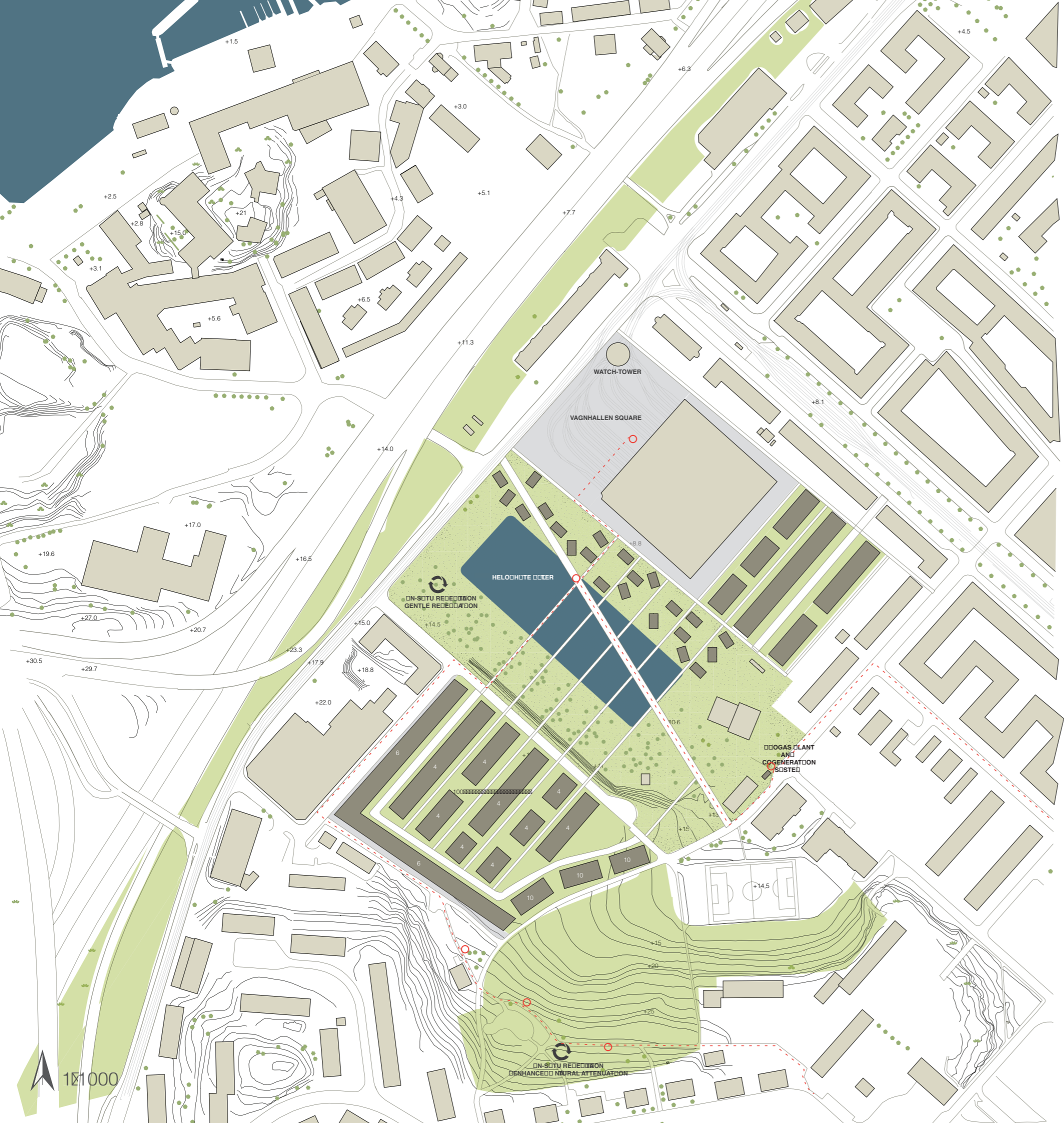
remediation

gentle remediation busgarage
(cleaning park)

continue electro reclamation
backside tram hall



phase C



developments

Vagnhallen dwellings

improvement sports park

upplevelse route (experience route)

remediation

gentle remediation busgarage (cleaning park)

phase D

developments

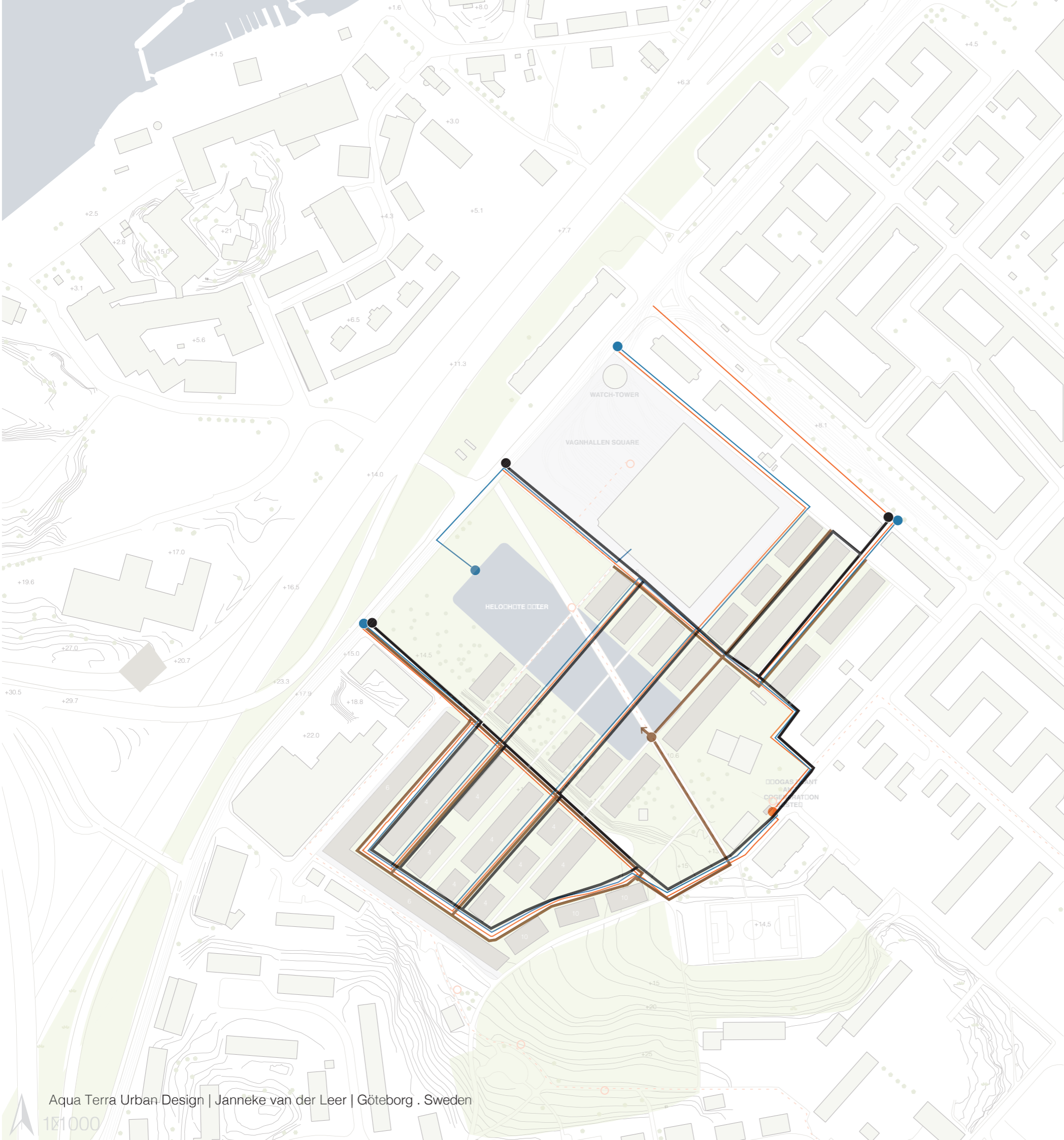
when there is demand -
dwellings cleaning park



cables and pipes

- water
- electric
- black water (seperated sewer)
- grey water (seperated sewer)

This map shows the new situation cables and pipes with the helophyte filter (grey water, seperated sewer system) and bio-gas plant and cogeneration system on the place where most of the cables and pipes come together

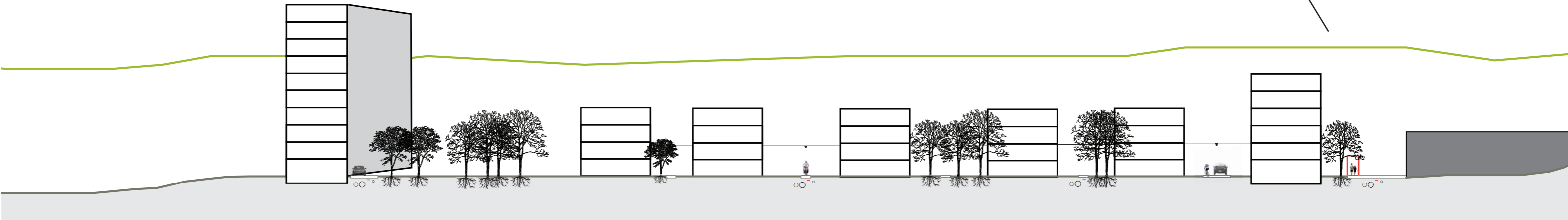
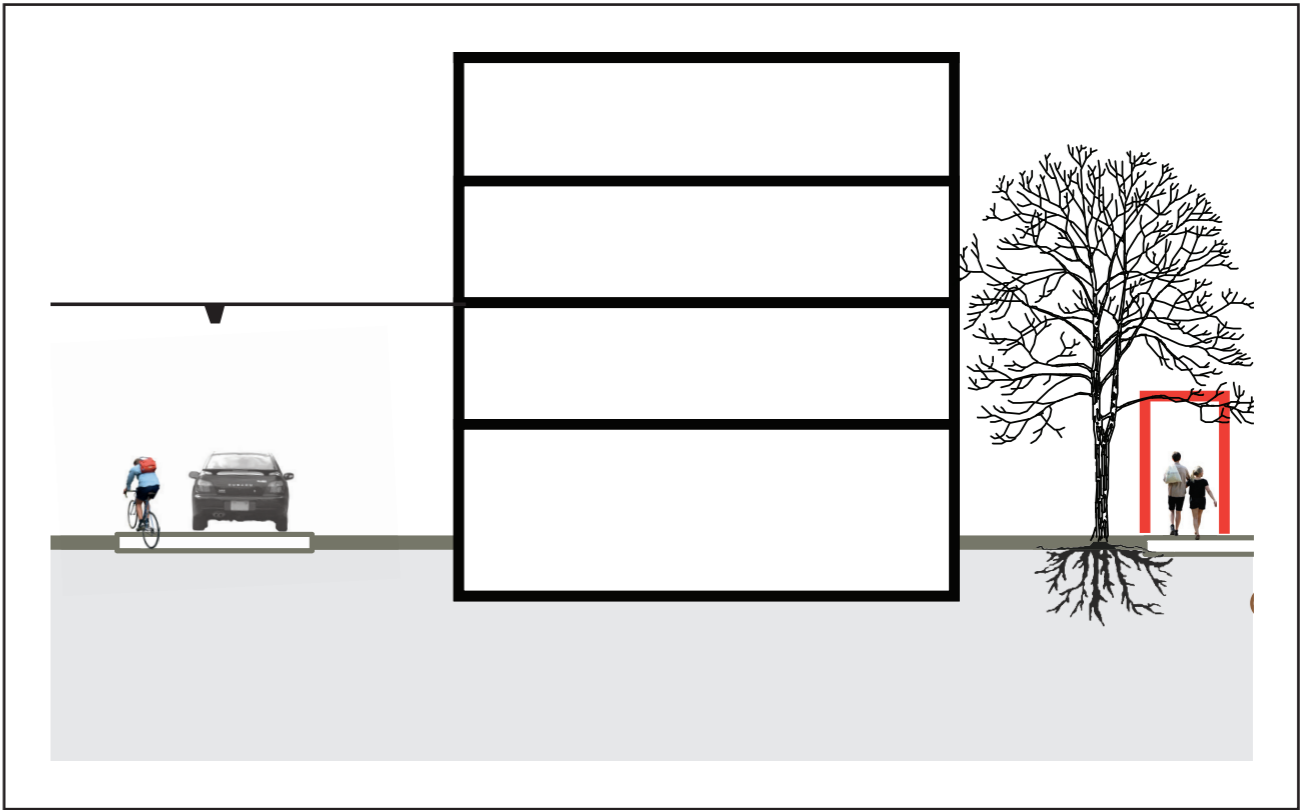
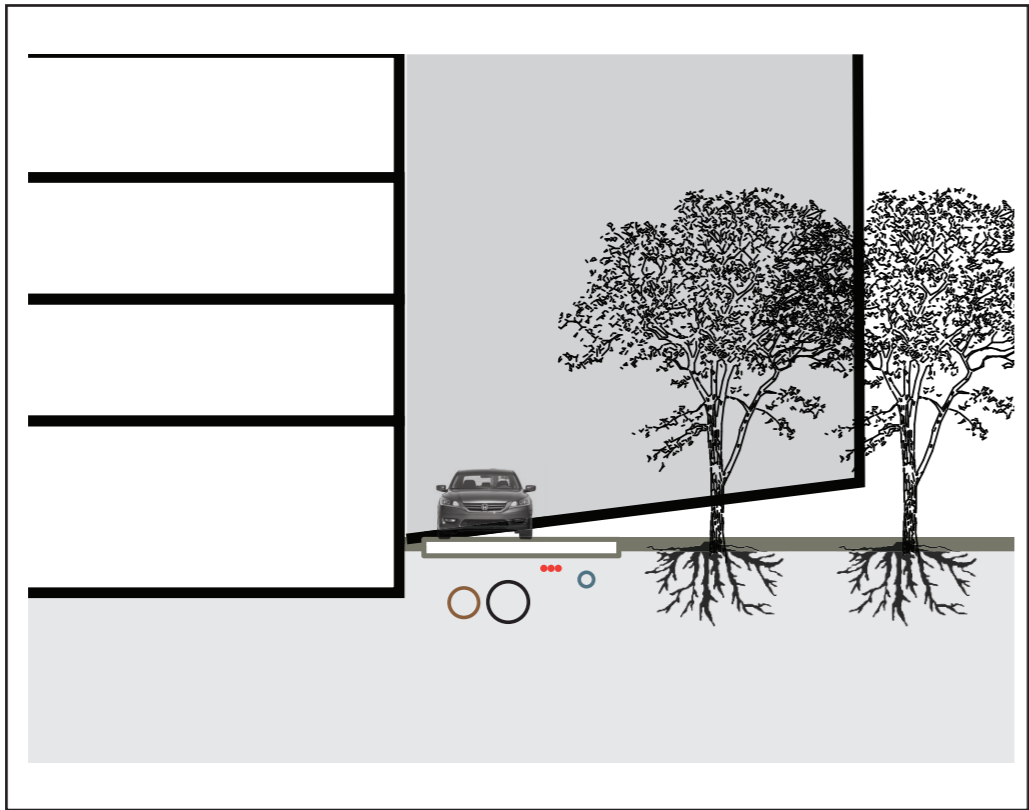




cleaning park

elevated offices

Vagnhallen dwellings



Fixfabriken dwellings

Upplevelse route

uppleva Fixfabriken!

Göteborg | Sweden



<http://www.gp.se/nyheter/goteborg/1.619205-fabrik-i-majorna-tar-ner-skylten-efter-62-ar?m=print>

Boland and Hunhammar (1999), Ecosystem services in urban areas

Hammerby Sjostad, Stockholm
Integral energy, waste and water system (scheme by Bumpling AB)

SEES, Deltares, TUD, TNO, het Ministerie van IenM, de gemeente Rotterdam and SKB

thenounproject.com

FIXFABRIKEN AREA. Notes regarding archaeological and soil conditions aspects by Chalmers students