
WASTE-UPCYCLING CENTER
Meng Yitang
Complex Project

CP

Future is an amazing thing that nobody know but everyone expects. What will Amsterdam looks like in 2050?As an international metropolitan city, Amsterdam will also experience a population explosion and urban expansion in the future. Resources and raw materials will be in highly demand. In addition, with the population growing, a larger amount of waste will be generated, however, the land for waste treatment will become less. In order to live on a healthy plane in the future, building a new system of managing raw materials becomes necessary and crucial.

Complex Project	AMS MID-CITY
MSc3	P2 Presentation
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Date	23-01-2018

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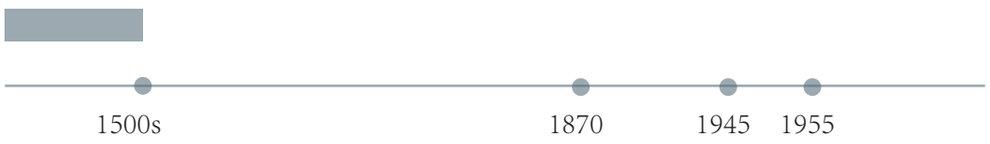
PREFACE

STARTING FROM WASTE

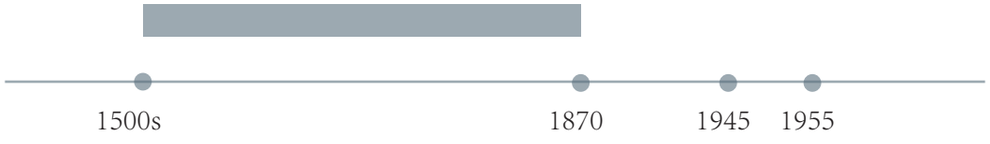
WASTE BEFORE 15TH CENTURY

Before 15th century, there is no recycling and municipal waste collection service in the Netherlands. People threw away all the trash on the streets, canels and other open spaces, which led to environmental pollution.



URBANIZATION AND INDUSTRILISATION IN 17TH

During the period from 1500 to 1870, the population kept growing and villages were transformed into cities. More than 60% of Dutch people lived in the cities, compared to 10% in most other European countries at the end of the 17th century. The epidemics raised public awareness of hygiene. The urban waste was increasingly collected and dumped into dumpsites. It was a good start. Streets, canels and other open spaces became clean.



A REDUCTION OF CONSUMPTION BY WWII

During WWII, the increase in the number of unemployment people led to reuse behaviour. Since many people could not afford new stuff, there was almost nothing discarded. For example, broken clothes were repaired. That is the reason why the amount of waste decrease during that period.

A BOOMING PERIOD OF WASTE GENERATION

During the period between 1945 to 1955, the plastic package and electrical appliances are booming. The arrival of the TV and TV advertising provided an additional increase in comsumption. Due to the increase of the welfare, the amount of waste also increased.

TIMELINE OF WASTE TREATMENT IN THE NETHERLANDS

Towards a more sustainable way

Dump

Since 1927
Volgermmer were filled with household and urban waste

Landfill

Since 1969
Landfill areaon the North IJpolder

Open-air Incineration

1971
Incineration of chemical waste Diemerzeedijk

Waste to energy

Current
AEB power plant

Recycle

Around 2030
Seperation rate almost 90%
More waste will be recycled

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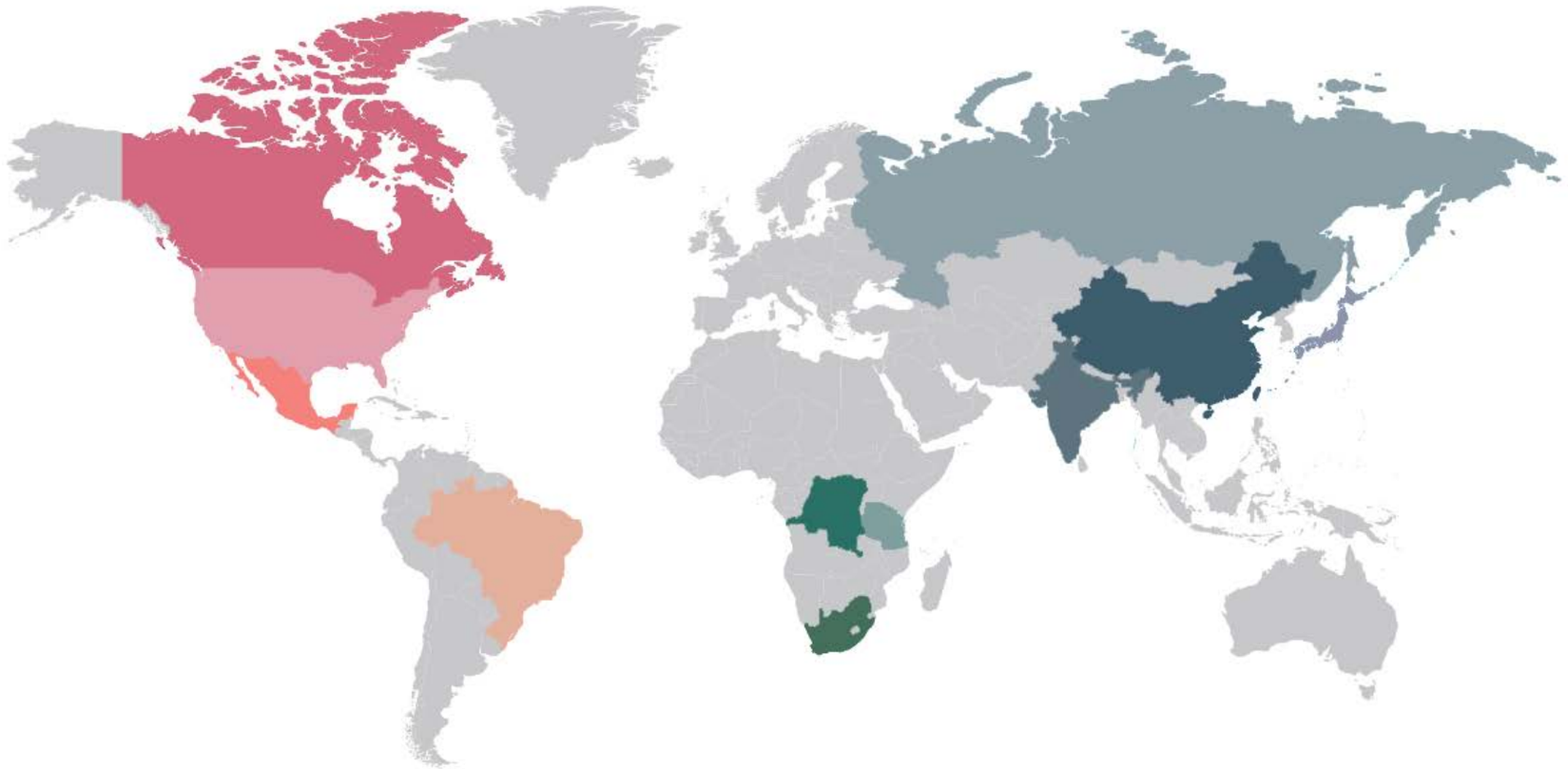
WASTE IN THE NETHERLAND

PRODUCTION CONCENTRATION OF CRITICAL MATERIALS

Europe is dependent on other coutries



Canada
Cobalt

United States
Beryllium

Mexico
Fluorspar

Brazil
Niobium
Tantalum

South Africa
Platinum group metals

Democratic Republic of Congo
Cobalt
Tantalum

Rwanda
Tantalum

Russia
Platinum group metals

India
Graphite

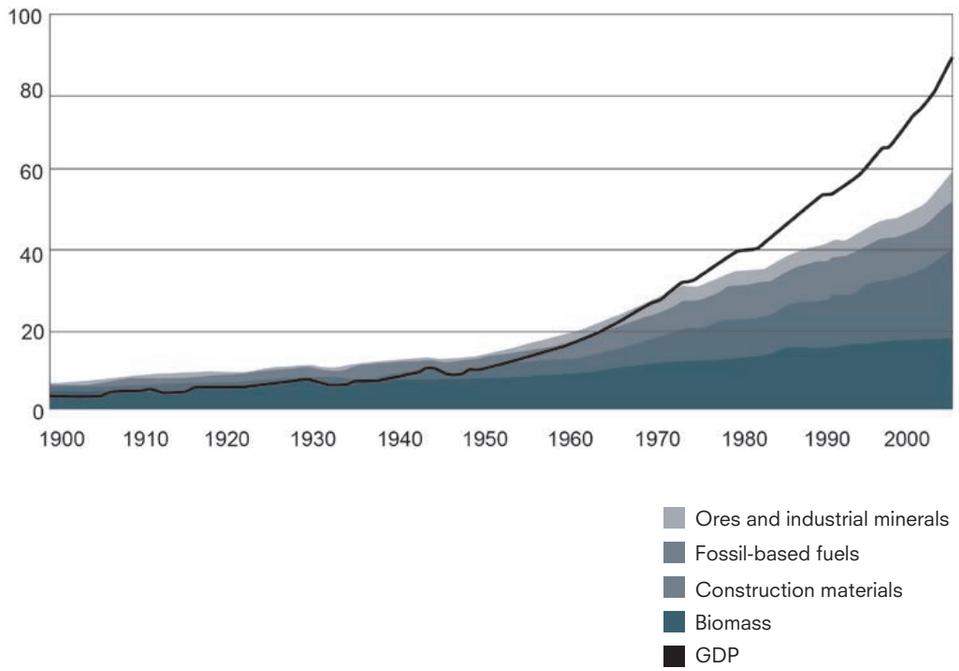
Japan
Indium

China
Antimony
Beryllium
Gallium
Germanium
Indium
Magnesiu
Rare earth minerals
Tungsten

The Netherlands and Europe are dependent on third countries to a high degree for raw materials. Of the 54 materials that are critical for Europe, **90%** must be imported, primarily from China. The Netherlands import **68%** of its raw materials from abroad. The relatively limited availability of these raw materials will lead to more geopolitical tension. That, in turn, will impact on the price of raw materials and security of supplies, and thus on the stability of the Dutch and European economies. This development can also lead to an increasing in access to raw materials, whereby the poorest population groups will have the greatest disadvantages.

WORDWIDE RESOURCE EXTRACTION
The rapidly growing demand for raw materials

Worldwide resource extraction in billions of tonnes



The most significant global issue is the explosive rise in the demand for raw materials during the last century: the Earth's population started using **34 times** more materials, **27 times** more minerals, **12 times** more fossil fuels and **3.6 times** more biomass. The demand for raw materials will further imcrease as a result of global population growth, the rapidly growing middle class in emerging economies, and the application of new technologies that require specific raw materials.

SOLUTION
Accelerate the circular economy and end the throwaway society

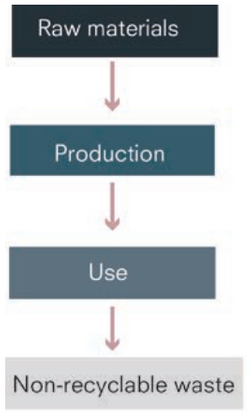
Waste will disappear in this circular economy. Waste will be a new raw meterial. Soon, virtually everything will later be reused repeatedly in the Netherlands. This means that in a circular economy the linear make, take, waste approach will be instead by circular approach. In fact, the circular future started long ago in the Netherlands.

WASTE MANAGEMENT IN THE AMSTERDAM

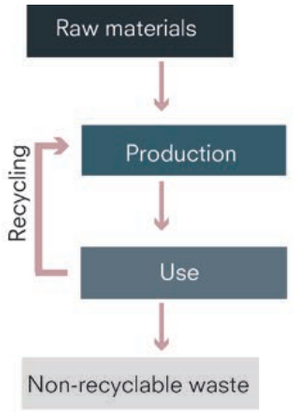
The waste industry will undoubtelly play a pivotal role in working towards a circular economy. In the future, the population in Amsterdam will keep increasing, making the urban density higher. Although the Netherlands is a frontrunner in waste management, the higher urban density and high-rise building make the waste seperation and recycling more difficult than other regions.

FROM A LINEAR TO A CIRCULAR ECONOMY

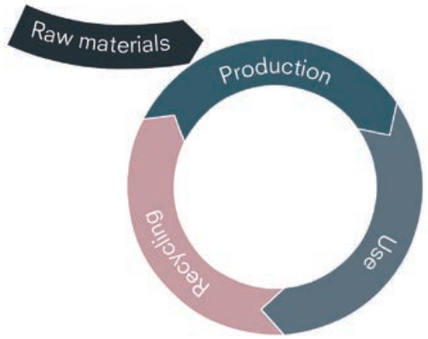
Linear economy



Reuse economy



Circular economy



54,000 jobs
created by cirular economy

100,000 kilotons
of raw materials can be reduced

6.9 billion
euro growth in GDP

The linear way of producing and consuming is under pressure. The world's population will grow to nine billion people by 2050, and, as the city of Amsterdam urbanises and grows by 10 thousand inhabitants per year, the demand on resources rises. This demand, combined with the finite supply of resources, will lead to scarcity and strong price fluctuations. More and more companies are, therefore, opting for the transition to a circular economy, which offers opportunities for innovation and export of new production techniques and business models, while reducing dependency on imports. For citizens, a more circular city will improve their quality of life, create new jobs and form new business models for entrepreneurs.

The Netherlands Organisation for Applied Scientific Research (TNO) has made an initial estimate of the benefits that a circular economy would bring to the Netherlands. Among other things, it states that each year, within the sectors involved in the circular economy, an extra turnover of € 7.3 billion can be generated, which will account for 54,000 jobs in the Netherlands.17 The use of raw materials can be reduced by approximately 100,000 kilotons (one-fourth of the total annual import of raw materials in the Netherlands).18 In an exploratory scenario study19, the Rabobank has estimated that a circular economy can lead to extra growth in GDP ranging from 1.5 billion euros (in a business-as-usual scenario) to 8.4 billion euros (in the most circular economic scenario).

CIRCULAR ECONOMY IN AMSTERDAM

Ambition and goal

2020 — 2030 — 2040 — 2050

- **65%** seperation rate of waste
- **40%** less CO_2
- **50%** reduction in the use of primary raw materials (minerals, fossil and metals)
- **90%** seperation rate of waste
- **75%** less CO_2
- nearly CO_2 emission free

The Government-wide programme for a Circular Economy is aimed at developing a circular economy in the Netherlans by 2050. The Amsterdam region is in a good position to take advantage of a circular economy. The region has many entrepreneurial and innovative citizens, as well as start-ups, organisations, research institutions and companies that are already working on the circular economy. The ambition of the Cabinet is to realise, together with a variety of stakeholders, an objective of 50% reduction in the use of primary raw materials by 2030.

Amsterdam is building a circular economy based on the following seven principles:

- There is no waste in a circular economy. All materials will end up in an infinite technological or organic cycle.
- Natural resources will be used to generate new financial or non-financial gains.
- All energy will be derived from renewable sources.
- Modular and flexible product design and supply chains will increase the adaptability of systems.
- Transition from possession to use of services; this will require new business models for production, distribution and consumption.
- Different logistics; more region-oriented services and return logistics.
- Human activities contribute to eco-systems and eco-system services, and to the reguilding of "natural capital".

CIRCULAR ECONOMY IN THE FUTURE

Sustainable Amsterdam Agenda 2015

RENEWALBE ENERGY

Regarding the production of renewable energy, the ambition is to generate, per citizen, 20% more energy compared to 2013. The Municipality can accelerate the process by enabling the construction of new wind turbines, by facilitationg a strong growth in solar energy systems by expanding the city's heating grid. The ambition is to use 20% less energy per inhabitant in 2020, compared to 2013. The municipality sees opportunities to accelerate progress by enhancing the sustainability of the existing housing stock, and by implementing energy-saving measures within homes, businesses and social real estate.

CLEAN AIR

The current measures regarding air quality mainly aim to comply with national and European standard. The Municipality will push the bar higher, shifting the focus from "standards" to "health". The Municipality and urban partners will be planting a flag in 2025: from then on, motorised traffic should be as clean or emission-free as possible. Everyone will have time to adjust their vehicles accordingly, with the municipality eargе to lend a hand. The city will remain a front runner in terms of electric transport by increasing the number of public eletric charging points to 4,000.

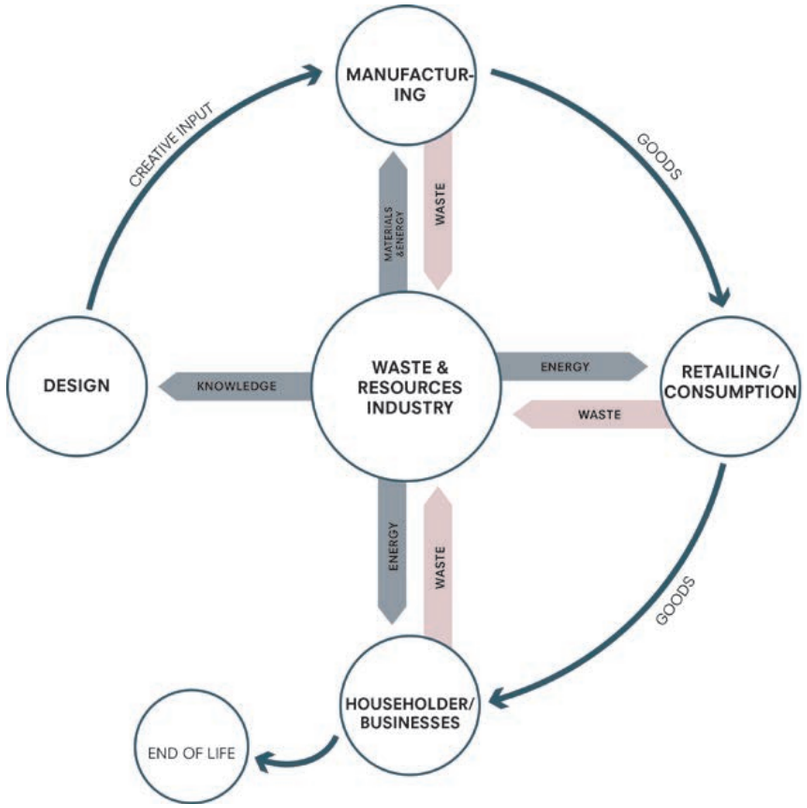
CIRCULAR ECONOMY

Several pilot schemes have been conducted in the Amsterdam region exploring the transition to a circular economy. In the coming period, the Municipality will embark upon a real transition. This requires the stimulation of industriousness, research and innovation. It is important for the municipality to have a clear view of the system. It is urgent to make significant improvements in terms of running **separate waste collection systems** and **waste recycling**. The ambition is to separate 65% of domestic waste for reuse by 2020. This requires a strong effort from the **waste management chain**, and from **Amsterdam's inhabitants**.

CLIMATE-RESILIENT CITY

Climate adaptation is very much a collaborative challenge. The Municipality begin to adapt the city to greater volumes of water now, as well as preparing for drier periods. In the coming Municipal Executive period, the Municipality will determine what is takes to make Amsterdam climate resilient, what working arrangements this entails. In its Amsterdam Structural Vision 2040, the City of Amsterdam established that it would cooperate in making the urban area more resistant in the future to flooding from extreme rainfall and longer periods of heat and drought.

WASTE IS THE HEART OF CIRCULAR ECONOMY



The waste and resources industry will play a key role in the transition of circular economy. It provides the infrastructure and logistics to collect materials at the end of use and to process and return them to the economy as secondary resources. These secondary resources will heat our homes, power our businesses, fuel our vehicles, and provide valuable raw materials for our industries.

AMSTERDAM IS THE HOTSPOT OF CIRCULAR ECONOMY

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Amsterdam July 13, 2015 - The Netherlands is an international leader in the field of circular economy. That ambition was officially announced on July 8 at Schiphol by 25 organisations. They thereby launched the program to position the Netherlands as circular hotspot during the Dutch presidency of the European Union in 2016.

In the presence of Prince Carlos de Bourbon de Parme, founder of Netherlands Circular Hotspot, 25 leading organisations, including DSM, KPMG, Rabobank, the Association of Water and the City of Amsterdam signed for their ambassadorship. They want the Netherlands to be internationally recognised as the place where the most relevant knowledge and experience in the field of circular business is located. This knowledge is fully deployed here, applied by multinationals, SMEs and (local) governments and could be used around the world as best practice.

Taking a first step towards putting big ideas into practice, the second signing of the day was the agreement between Delta Development Group (and its partners), Schiphol Group and the Municipality of Haarlemmermeer. They work together on the development of the circular subarea within Schiphol Trade Park: The Valley. Coert Zachariasse, owner of Delta Development Group, is among the top 25 eco-innovators named by Fortune. He has high ambitions for the Schiphol Trade Park and indicates that this area is developed in a completely circular way, and will become the Silicon Valley of circular economy.

Coinitiator and Circle Economy's lead for this program Guido Braam: "The Netherlands has everything to position itself as a global hotspot for the circular economy. Many inspiring circular things are already happening in the Netherlands that all could and should be proud of. Together with a strong coalition Circle Economy is now leading the way to put our country on the international map as a circular hotspot. Delta Development Group is an ideal partner on this trajectory, making the circular economy concept very tangible and proving Netherlands Circular Hotspot with a physical landing place.

Amongst over 200 attendees Prince Carlos de Bourbon de Parme launched this ambitious program, which includes an incoming press- and trade mission, an exhibition of circular icon projects and -during the Dutch presidency of the EU- the presentation of a broadly supported circular vision to European officials. After visionary and artist Daan Roosegaarde recalled the creativity and entrepreneurship of the Dutch, by showing inspiring visuals, the 25 organisations signed for their ambassadorship.

Inspired by this exciting launch, Prince Carlos together with Circle Economy and a core team of partners such as the SER (Dutch Social-Economic Council), Nyenrode Business University and FrieslandCampina, will host and organise several round tables and interviews in order to achieve a shared vision, as a basis for the EU presidency year.

The ambassadors of the program are: Accenture, Akzo Nobel, Allen & Overy, Black Bear Carbon, Corporate Facility Partners, Delta Development Group, Deltares, Desko, DSM, FrieslandCampina, City of Amsterdam, Ivanhoe, Interface, KPMG, PGGM, Philips, Powered by Meaning, Rabobank, Rockwool, Royal Haskoning DHV, Schiphol, Siemens, VAN, Van Gansewinkel, Xirubo

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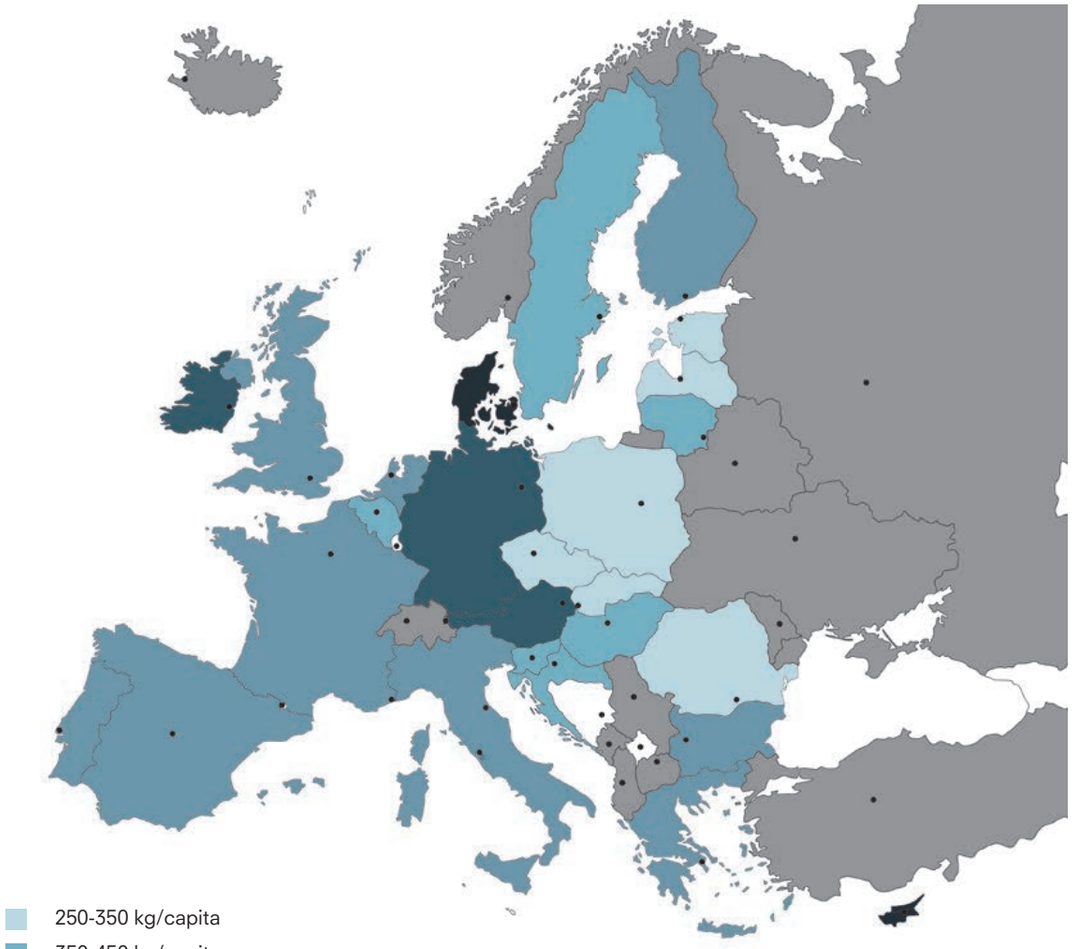
CURRENT STATUS OF WASTE MANAGEMENT IN EUROPE

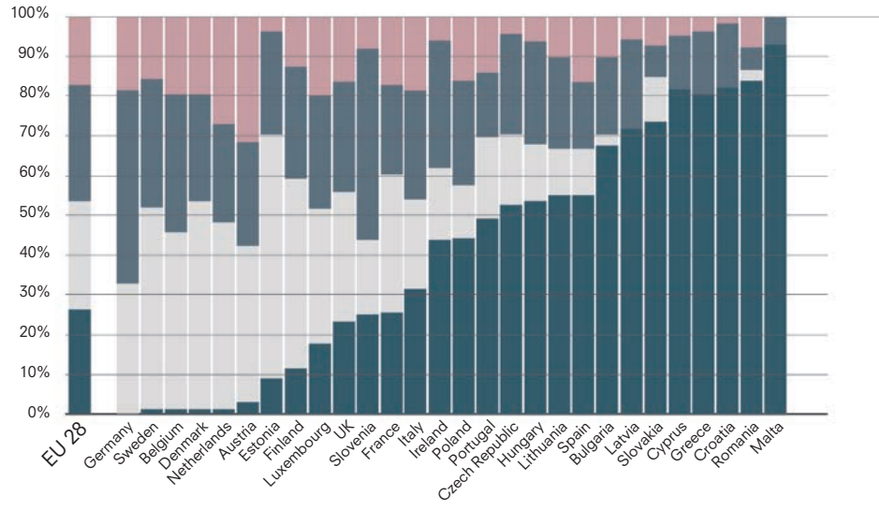
Municipal waste generation per capita in 2012



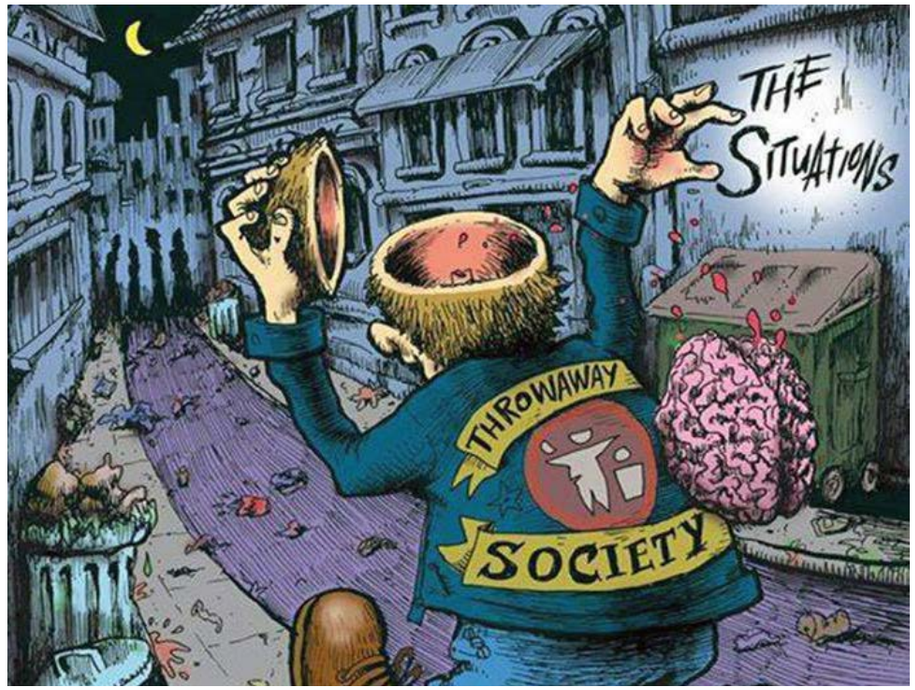
On average, Europeans generated 486 kg/capita in 2012. Denmark has the highest level of per capita waste generation in the EU (791 kg per capita). In general, EU Member States with higher GDP produce significantly more waste per capita than those with lower GDP. In the Netherlands, each person generate 495 kg waste which is a little bit higher than the average number in EU.

CURRENT STATUS OF WASTE MANAGEMENT IN EUROPE

Waste treatment in European Countries



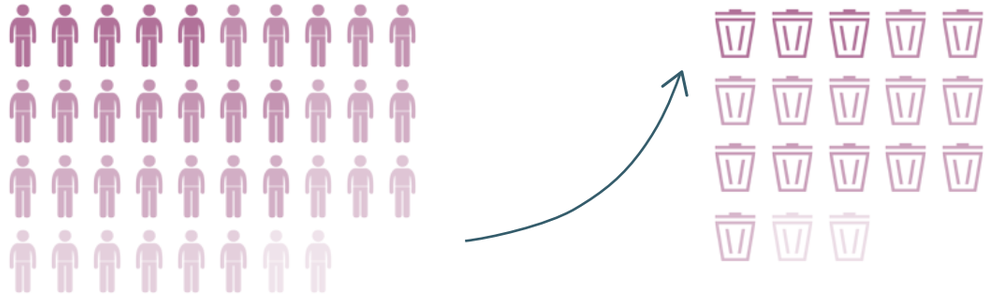
According to the EU statistics, the Netherlands are among the frontrunners in waste management. 99% of Municipal Solide Waste is recovered with either energy recovery or a treatment that is located higher on the waste hierarchy. However, the goal of 60-65% MSW recycling could not be reached yet. Biowaste, the largest proportion in MSW, is collected commingled with the residual waste for practicality reasons. This results in half of the biowaste still being incinerated.



1 × = 497 kg of waste each year in Netherlands

1 × = Dutch throw away more than 400,000 loaves of bread per day

Population growth



10,000 population growth in Amsterda per year

9 Billion population in the world in 2050

Food waste is a huge issue in Amsterdam and around the world.In the Netherlands, people throw away €2.5bn worth of edible food a year – but it doesn't have to be this way. The Dutch alone throw away more than 400,000 loaves of bread per day. Dutch use waste as a source of fuel, they might be less likely to separate out recyclable material, burning it instead. The incinerator also receives British household waste: Britain doesn't have enough incinerators, and Amsterdam has surplus capacity.

CURRENT STATUS OF WASTE IN THE NETHERLANDS

Waste catagory

Construction and demolition waste is debris from infrastructure maintenance work and building renovation. The main waste components are therefore building materials like concrete,brick,wood,metals,insulating and roofing but also soil and granular materials from excavation works.

Industrial waste is the excess materials that arise from industrial production processes. Most industrial residue comes in form of coal ash from power plants,furnace slag from iron and steel industry, red mud and tailings, lime, fertilizer and gymsum.

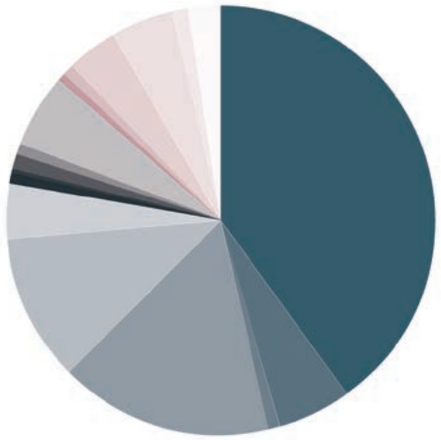
Municipal solid waste falls residue from private households and gardens, commercial waste from shops and restaurants and industitutional waste from schools,prisons and public bodies. It is all solid waste that is collected by the municipality.

WASTE GENERATED IN DIFFERENT FIELDES

Total waste arising in the Netherlands in 2014 (59,235 kilotonnes)

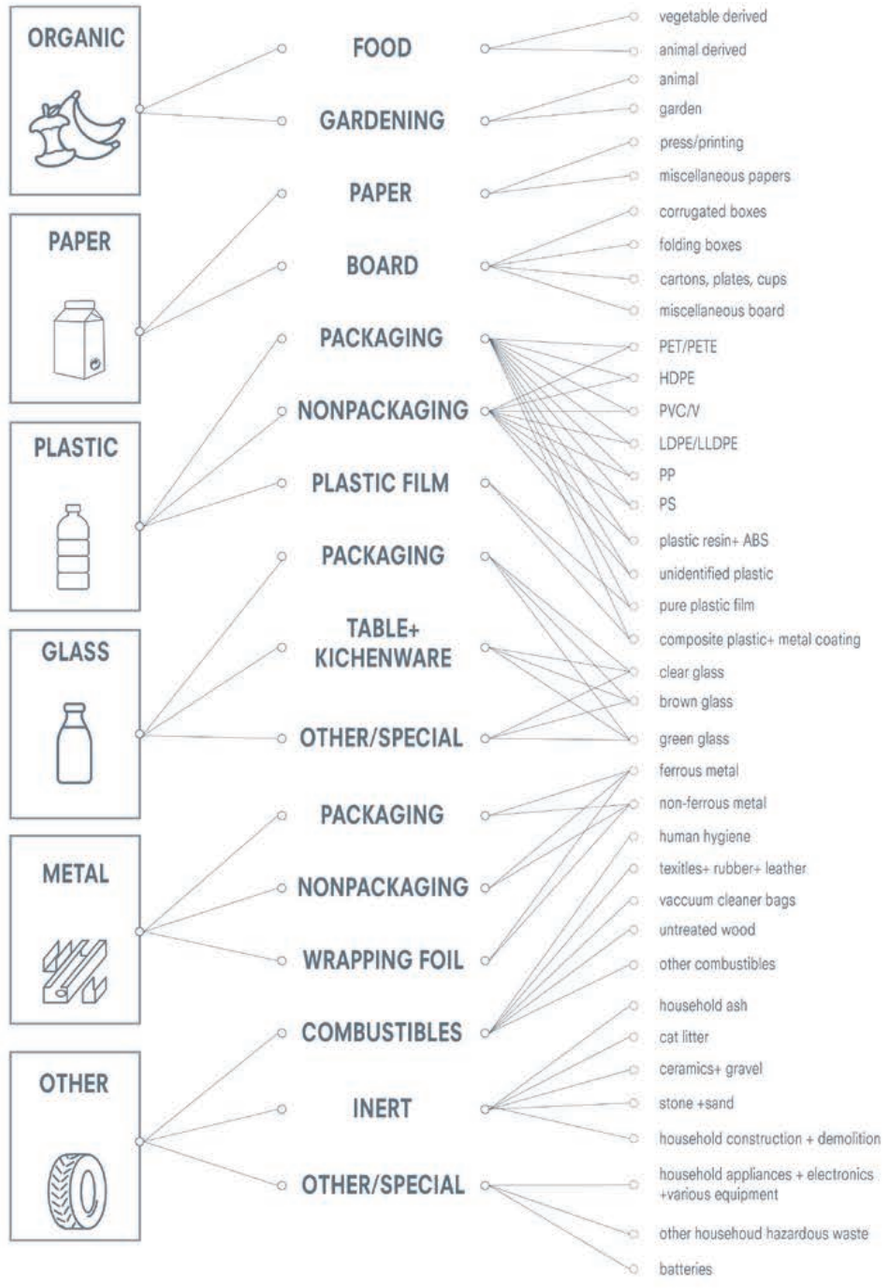
The construction waste account the largest amount of the total waste. However, it is well suitable for recycling as it mostly contains clean wood and drywall. Industrial waste account second largest amount of the total waste. The production stream of same material are consistent in same composition, which makes it easier to identify and seperate. As a consequence, the construction waste and industrial waste have a higher rate for reuse and recycling.

Domestic waste generated in the Netherlands in 2015



- Household redidual waste
- Bulky household residual
- Household building waste
- VGF waste
- Paper/board
- Glass packaging
- Textiles
- Household chemical waste
- Plastic packaging
- White and brown goods
- Bulky garden waste
- Reusable household
- Metals
- Wood waste
- Clean rubble
- Clean soil
- Other

In 2015, the 7.7 million households in the Netherlands produced 8.4 million tonnes of waste. Although Municipal Solide waste only account a small amount of the total waste generation, it gains a higher political attention, as its mixed composition requires extensive treatment effort.

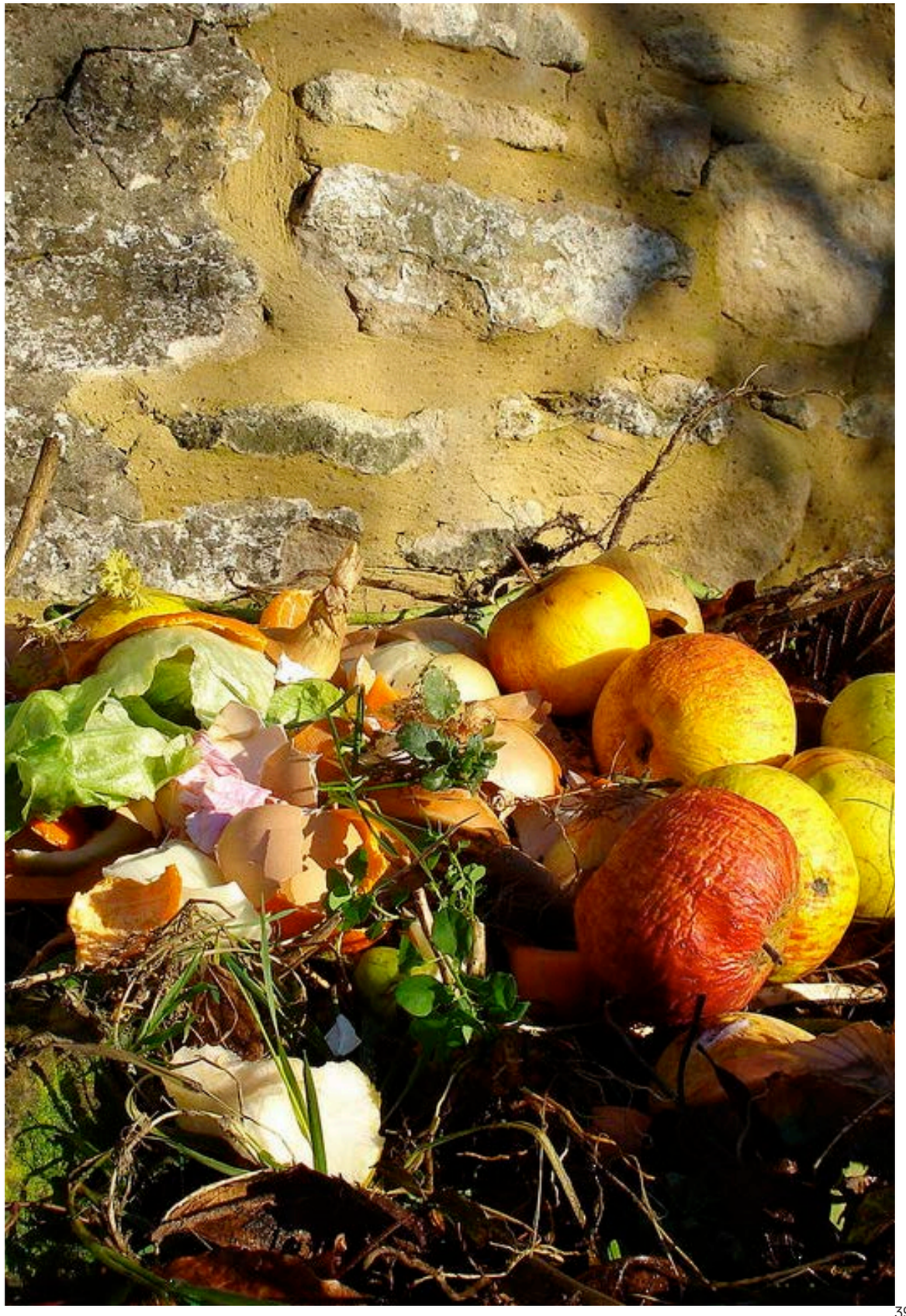


ORGANIC WASTE IN CIRCULAR ECONOMY

Likely role in achieving circular economy objectives:

Composting (domestic and industrial) and anaerobic digestion are not new technologies. However they are seen as playing a critical role in diverting bio-waste from landfill and in improving the circularity of biological nutrients. Composting and anaerobic digestion rely on the segregation of organic waste and their degradation to a stabilised material, digestate, that can be used as a fertilizer or soil improver. In the anaerobic process, a methane and carbon dioxide rich biogas is produced that can be used for combustion in transport or energy production.

60 million tonnes of bio-waste generated across Europe could be potentially recycled through Anaerobic digestion and composting. This would reprensent a saving of 1 million tonnes of nitrogen and 20 million tonnes of organic carbon, currently lost as a result of landfilling organic waste. Currently, the EU recycles only 5 per cent of its bio-waste. It is estimated that if more were recycled it could replace up to 30% of the non-organic fertiliser used. The EU imports approximately 6 million tonnes of phosphates per year, so a 30% reduction equates to 1.8 million tonnes.



COMPOSTING FACILITIES IN THE NETHERLANDS

12 industrial-scale digesters in the Netherlands

nearly 50% of vegetable, fruits and garden waste are seperated

250,000 tons of compost are generated from organic waste

Composting facilities in the Netherlands are ranging from small machine in communities to large composting tunners in factories. Nowadays, the latest technology can make the composting process automatic. The waste transformer which is a smaller composting machine is already be applied in a urban park in Amsterdam. The Municipal has the target to compost half of the food waste in the next few years instead of burning them as the biogas after composting is a new clean energy.

composting tunnel

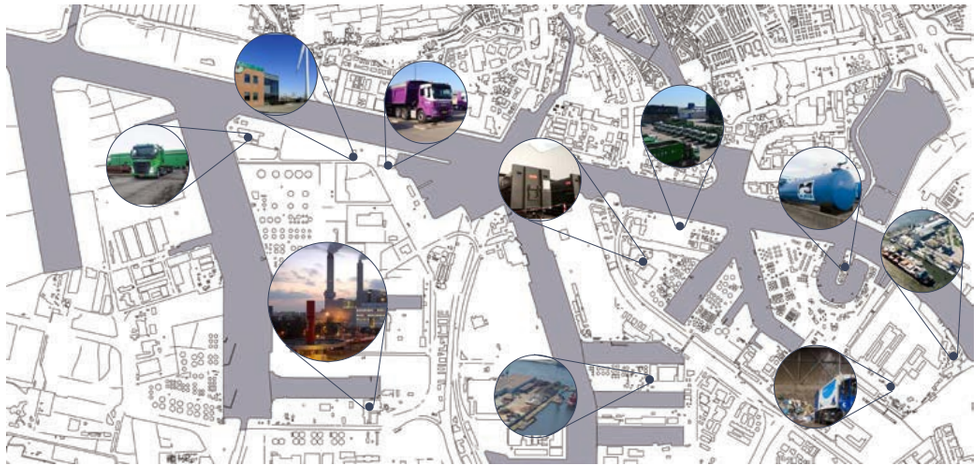
waste transformer


low tech

WASTE COLLECTION POINTS IN AMSTERDAM

The Wastepoints of the city of Amsterdam's Waste and Energy Company are intended for waste that it is illegal to place in a bin bag or is oversized, including construction and demolition waste, broken furniture and chemical waste such as batteries and paint. This waste undergoes the processing method that results in the highest possible recycling. The Wastepoints therefore serve as an important link between the citizen and the recycling industry. There are six Wastepoints serving in Amsterdam. Most of them are located around A10 ring road which makes the transport of waste by trucks more convenient.

WASTE IS THE BASE MATERIAL IN THE PORT OF AMSTERDAM



Because of the convenient location, the Port of Amsterdam plays an important role in collecting waste from both city and outside of the Netherlands. Recycling is an important sector in the port of Amsterdam region. This concerns the recycling of metal, scrap metal, rubble, e-waste and other waste and biobased recycling. This is a first-rate base for the circular economy, based on the reuse of material. Port of Amsterdam reserves space and invests in collaborative ventures with customers and start-ups in order to further develop these kinds of innovative activities in the port

Beelen is one of the most sustainable demolition contracotors and has gained a solid reputation in integral waste manage

MAIN has over 20 years's experience in the collection and processing of ship-generated waste products

Icova is a originated Amsterdam company leading international sustainable waste management business.

Granuband is the largest collector and processor of tires and rubber products in the Netherlands. It converts 30.000 tonnes of rubber

HKS specializes in the recycling of ferrous and non-ferrous metals and scrap to produce high-quality raw materials

Paro is a sustainable service in waste logistics and waste management, and a reliable manufacturer and supplier of primary and secondary build-

ICL Fertilizers is one of the largest fertilizer producers in the world. They are working on closing the phosphate cycle.

AEB Amsterdam is the waste to energy company that produces electricity, heat and steam. It is working to develop biobased products and

02

PROBLEM STATEMENT

PROBLEM STATEMENT

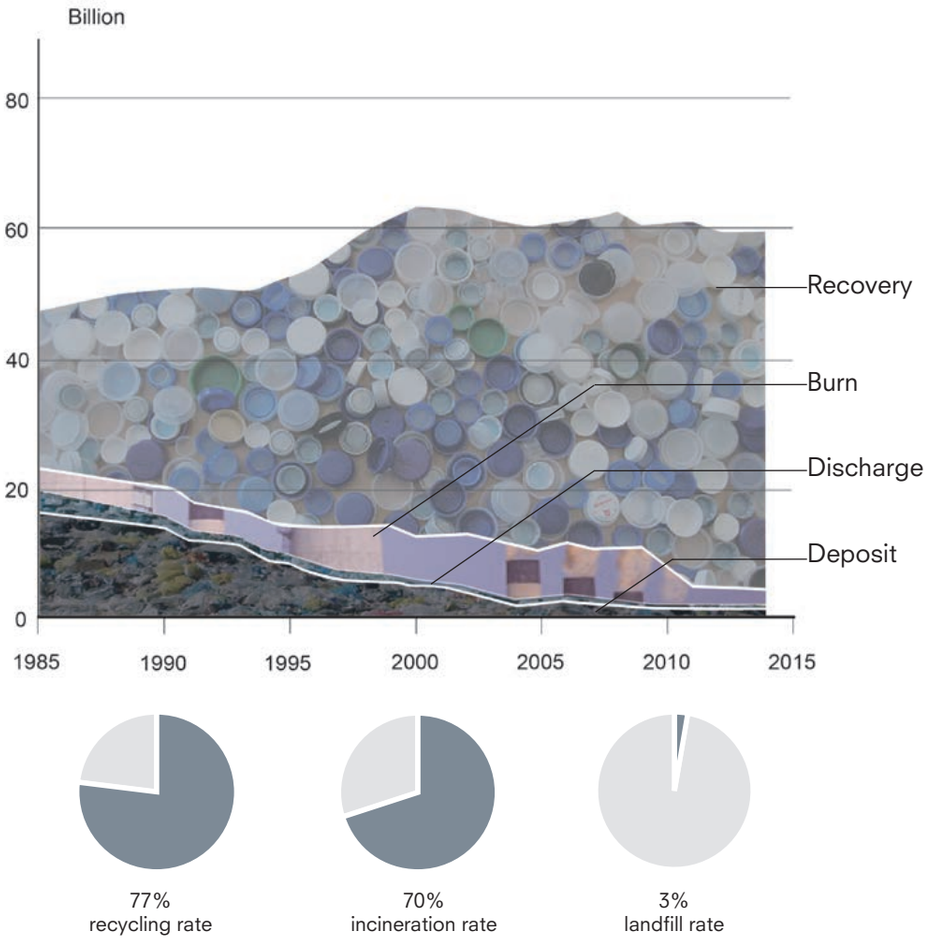
Waste industry is isolated from the city center

The waste industry is regarded as a negetive element for cities because of pollution and the penetrating smell. Most of the waste treatment plants are located at the suburban space and isolated from urban life.

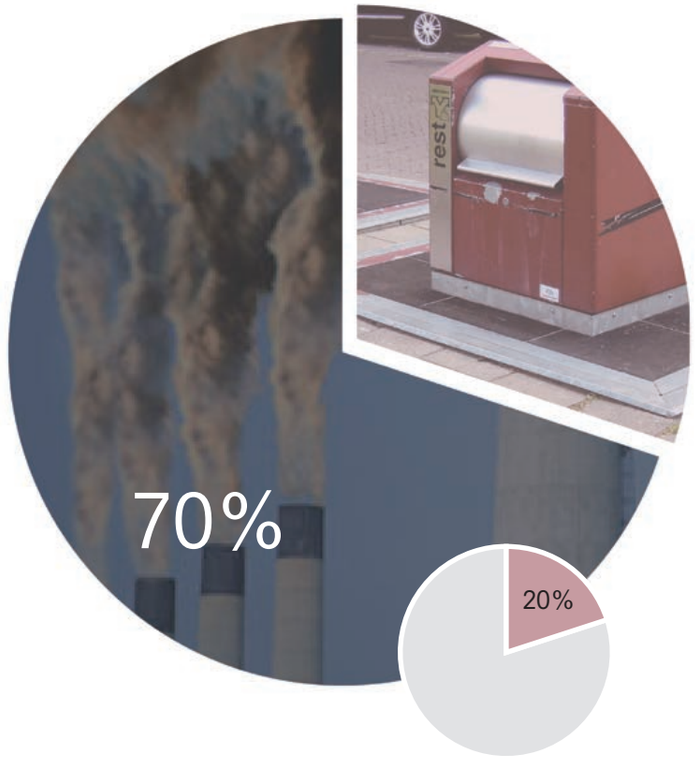
Westpoort is a busy harbor area where many industries located on. Because of the A10 ring road, this area is seperated from Amsterdam Center. Lacking of convenient transport system and attractive public infrustructure, this area miss the link with urban life.

PROBLEM STATEMENT

Most waste are not treated in a more efficient way



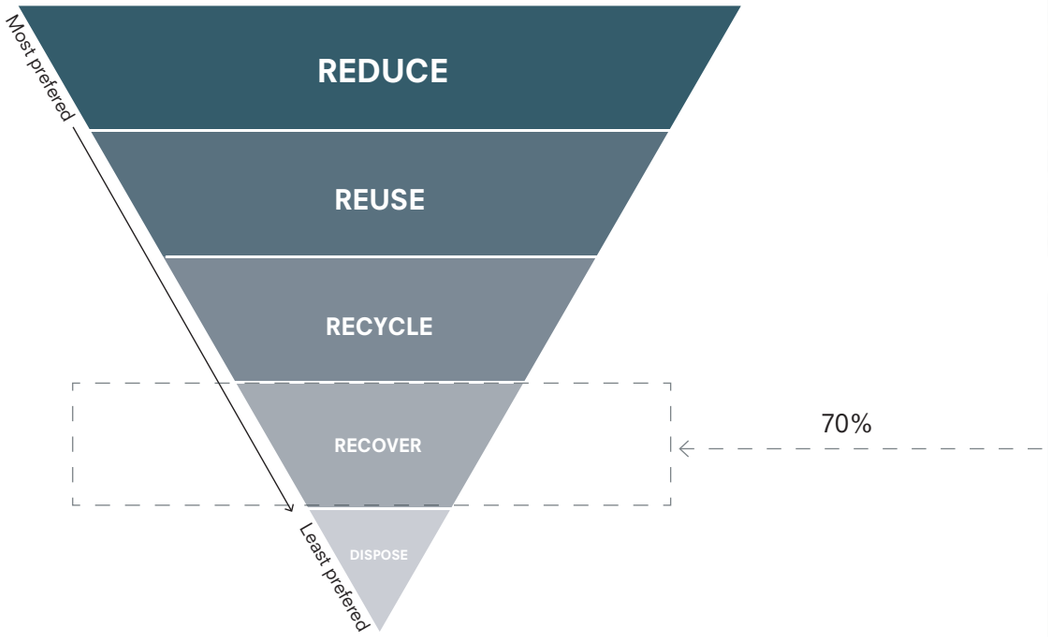
The amount of waste had an increase until 2008. As a result of the economic crisis, this amount is then decrease to stabilize in 2015 at around 60 million tonnes. Recovery has increased significantly since 2010. The reason is that now all incinerators have been granted the status of recovery. The amount of landfill waste over the last years steadily declined to about 1.3 million tonnes of primary waste per year.



Energy from waste VS all the sustainable energy produced in the Netherlands

Currently, the Netherlands regards waste as a kind of fuel. 70% of the waste are burned to generate energy, only 30% of the waste are seperated and recycled for material recovery. Because of the complex composition, organic waste are collected to waste-to-energy plant instead of composting. Actually, according to the hierarchy of waste management, energy recover is only at the forth place. Most waste is not treated in the most efficient way.

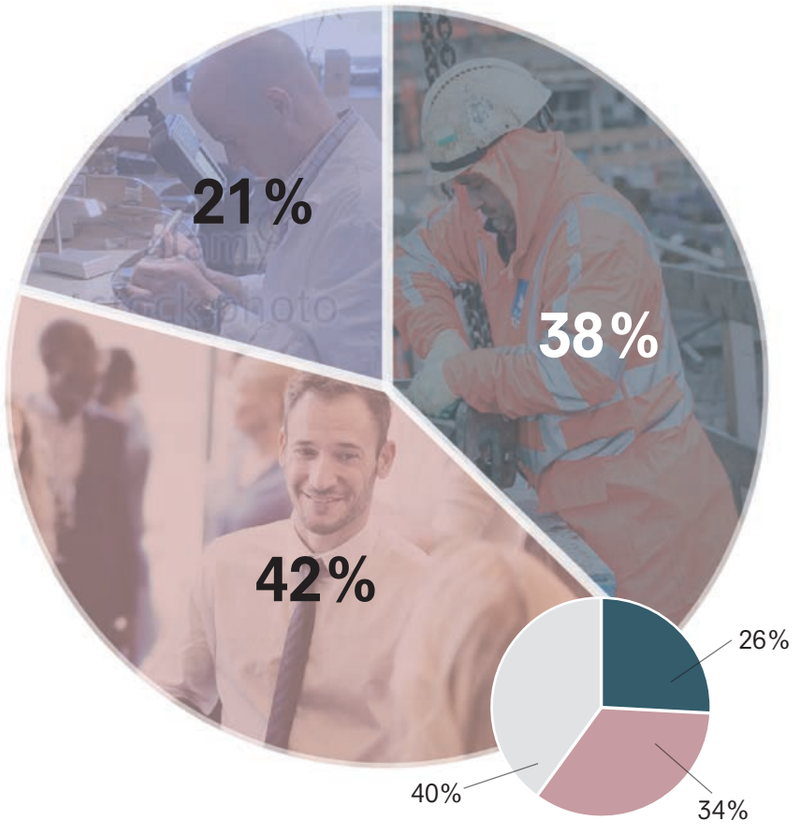
The hierachy of waste treatment



The most preferred management, reduction and reuse, is that products do not enter the waste status at all. If this is not possible, waste should be reprocessed into any new material or substance with recycling. The generation of fuels and energy from waste is marked off from recycling as recovery. Disposal is regarded as the last resort if no higher treatment is possible. Nowadays, the Netherlands treat waste as fuels and burn most of them to generate energy. However, recovery is not the best way, a new model for waste management should be proposed.

PROBLEM STATEMENT

People working for waste industry have a lower education level



Education level in Amsterdam

PROBLEM STATEMENT

A higher demand for the market of recycled products

"A higher recycling target means more recycled products, but there have to be markets for these products.....We need market for recycled products in Sweden, and in the rest of the world too, otherwise we will be left with products we can do nothing with." Product design should also be improved so that products can be recycled more easily. For example, at the moment many plastic products cannot be recycled. We collect them, but we can't do much with them. This undermines the public's trust in the recycling industry and people begin to wonder why they should separate their waste".

Wiquist

RESEARCH QUESTION

Core research question:

What is the new dimention for waste management in a high-density urban context and how to improve the value of waste in the framework of circular economy.

The question can be deconstructed into the following sub-questions:

How to stimulate the behavior of recycling through an architecture intervention

How to build a linkage between waste treatment facilities and urban life.

How to encourage more citizens to take participate in the recycling process and raise public awareness of circular economy.

What kind of thing should be defined as “waste” in the future.

By what means the waste can be regarded as raw material and create more profits.

How to make the life of products longer.

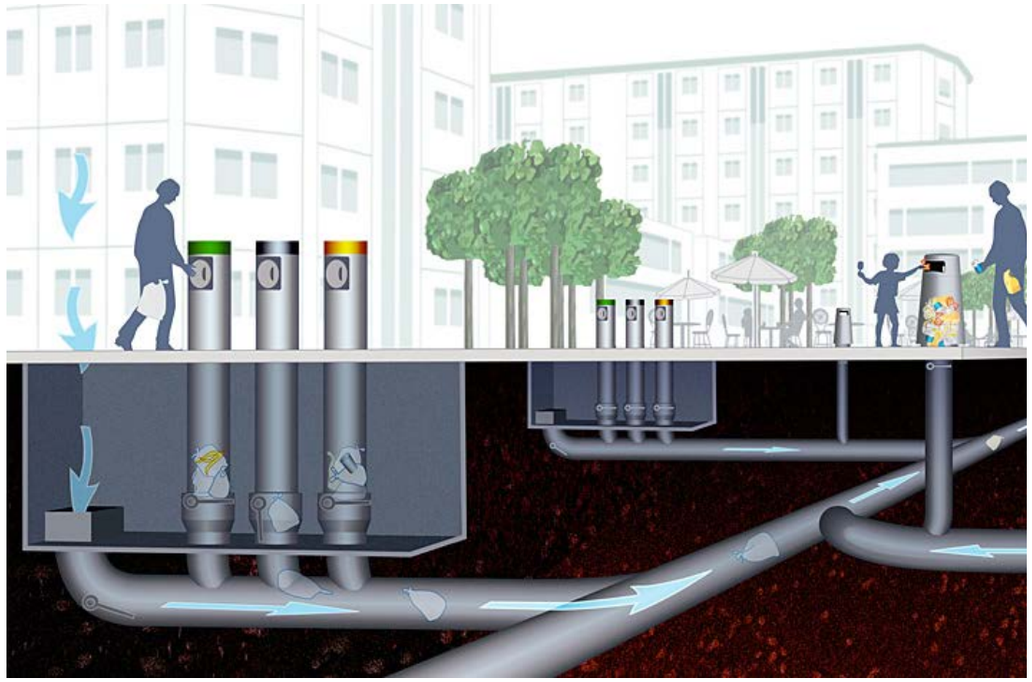
03

WASTE POTENTIAL IN THE FUTURE

POTENTIAL IN THE FUTURE

Technology is the gate to the circular economy

An automated vacuum waste collection system, also known as pneumatic refuse collection, or automated vacuum collection (AVAC), transports waste at high speed through underground pneumatic tubes to a collection station where it is compacted and sealed in containers. When the container is full, it is transported away and emptied. The system helps facilitate separation and recycling of waste. The first system was created for hospital in Sweden in the 1960s, designed by the Swedish corporation Envac AB. The first vacuum system for household waste, was installed in the new residential district in Sweden in 1965.



Currently, there are close to a thousnd systems in operation all over the world. A typical waste collection station can now be integrated with a Materials Recovery Facility (MRF) that separates co-mingled dry recyclables into different material streams such as paper, plastics and metals. In the newly founded city of Almere, the automatic waste collection system is applied.

POTENTIAL IN THE FUTURE

Higher value of upcycled products after design

64 euro

47 euro

25 euro

Upcycling, sometimes referred to as “creative reuse,” is the process of creating new value using discarded materials by applying new design concepts to them or reusing them in creative ways. The process of upcycling involves thinking of the environment and nature when products are first made, considering what will happen to the products after they are no longer considered useful, and creating meaningful products that can be used for a long time. It is a new way of conserving the environment and practicing resource circulation.

One of the innovative design companis is working on upcycling used materials. After design, the used skate boards can be upcycled as jeweleries, which can be sold with a much higher price than the original material. The design company also upcycle belts from old bicycle tires, sail bags from boats or bags and wallets in advertising tarpaulins. In addition, they also provide DIY course to encourage people make their own upcycled products.

Many waste have the potential to be designed into a more valuable products instead of treated as fuell for energy generation. In the future, Amsterdam need to change their waste management system to stimulate innovative activities for improving the value of waste.

"By arranging 750 different-coloured and differentsized bottle caps in a particular pattern in the mould, we created beautiful and unique WasteBoards. It is not only cool to watch these boards being made; it is also a very good way to raise awareness among the festival crowd:

waste can be a valuable resource for beautiful products."

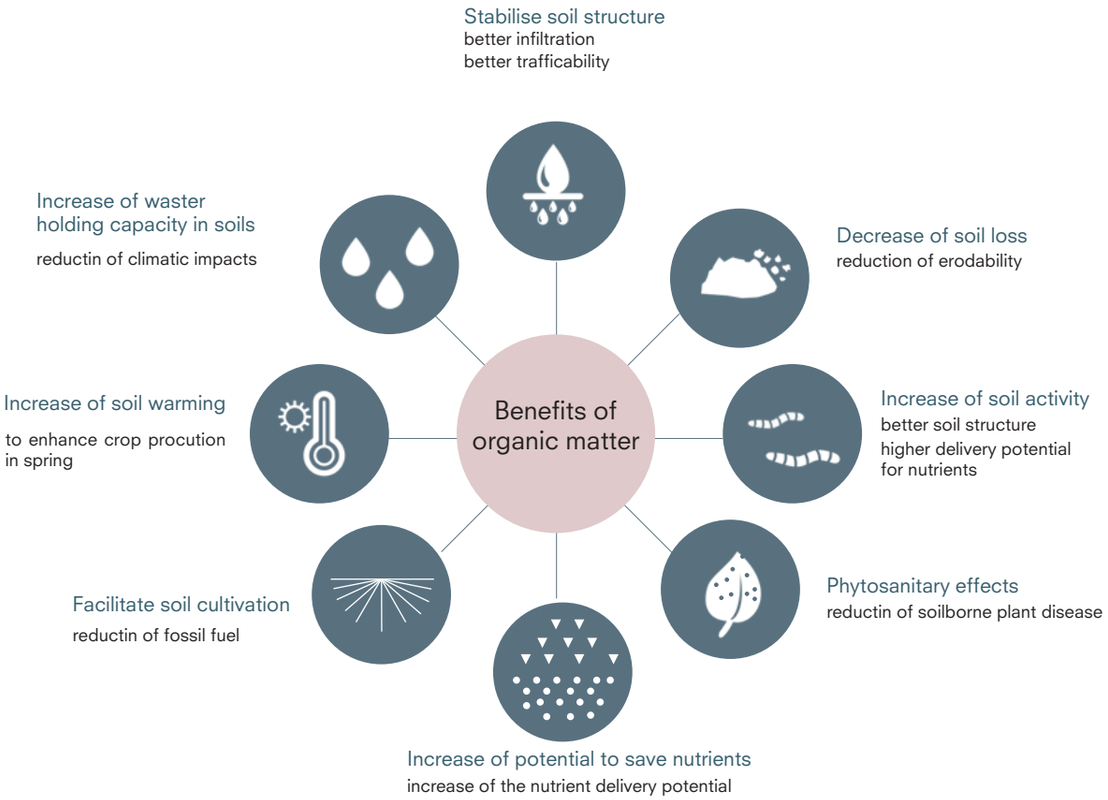
Jonathan Morrison says.

POTENTIAL IN THE FUTURE

Upcycled products

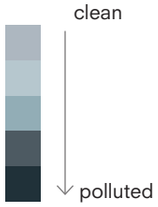
POTENTIAL IN THE FUTURE

Organic waste as soil quality improver



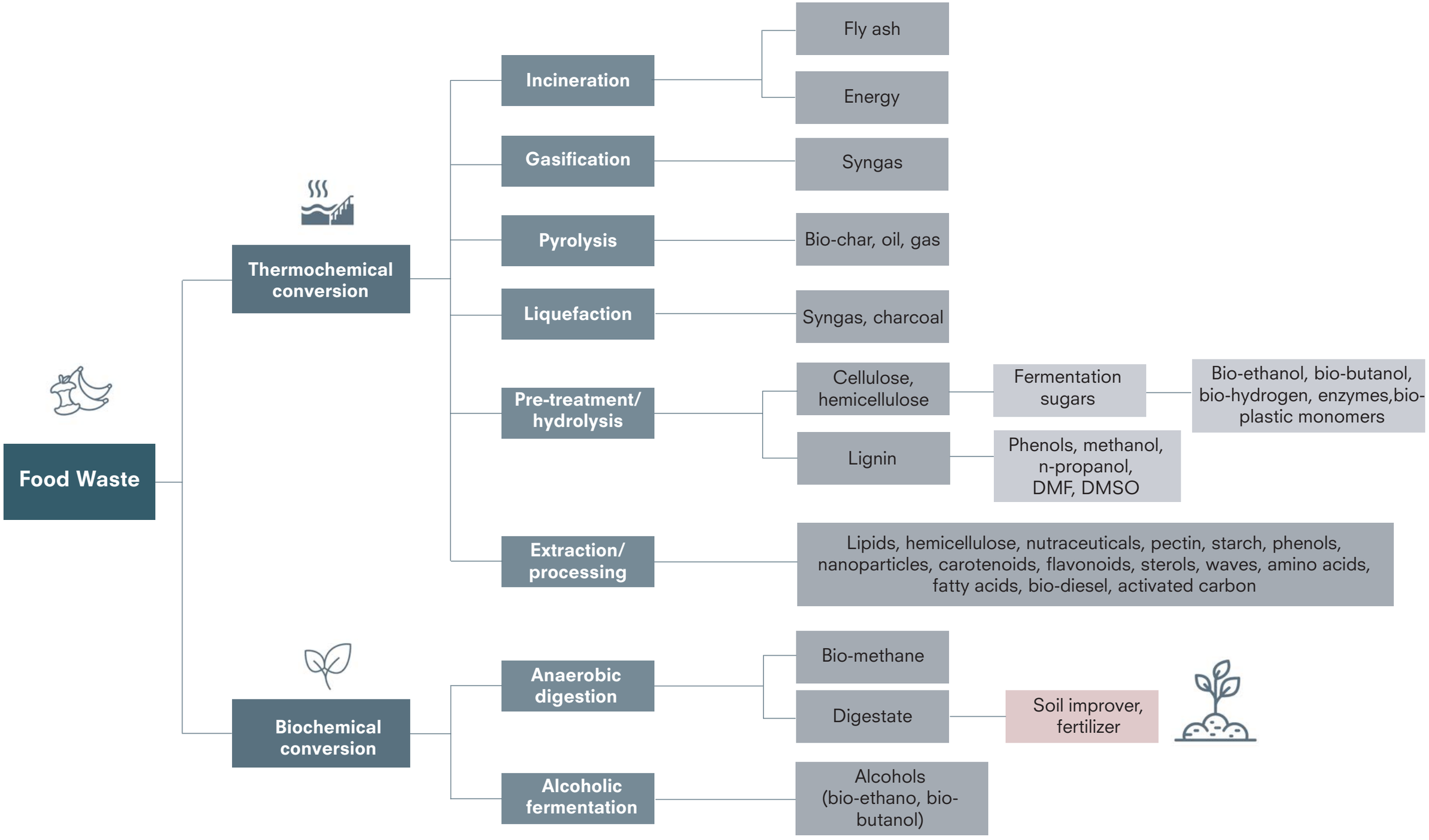
Because the waste collecting and processing company MAIN B.V is located on the heart of the petroleumhaven, the soil is polluted. Although with the urban extending, most heavy industrial factories will move out. The polluted soil is still cannot be used for residential buildings. The organics like nitrogen, phosphorus and sulfur produced from the composting of organic waste can be used or land restoration.

Soil quality



POTENTIAL IN THE FUTURE

Organic waste as soil quality improver

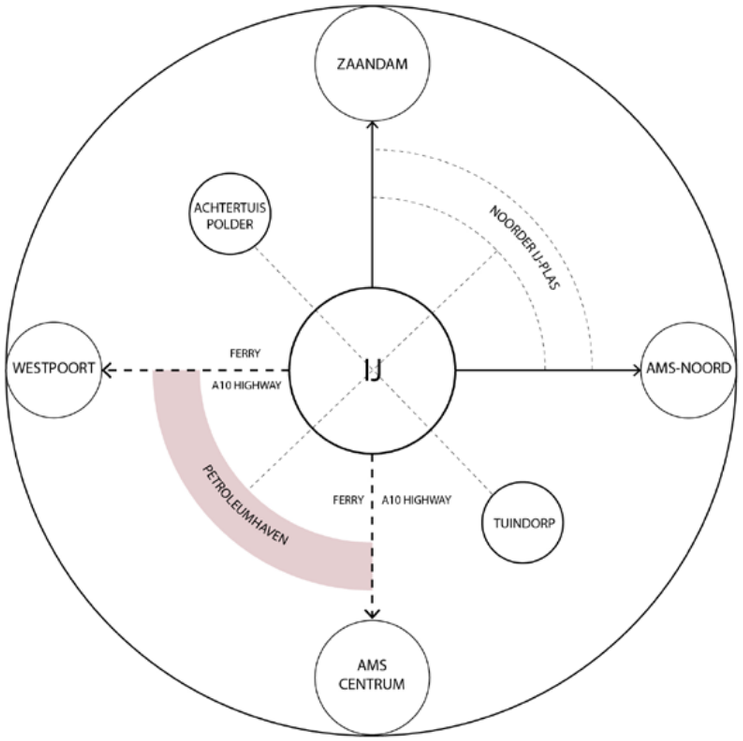


04

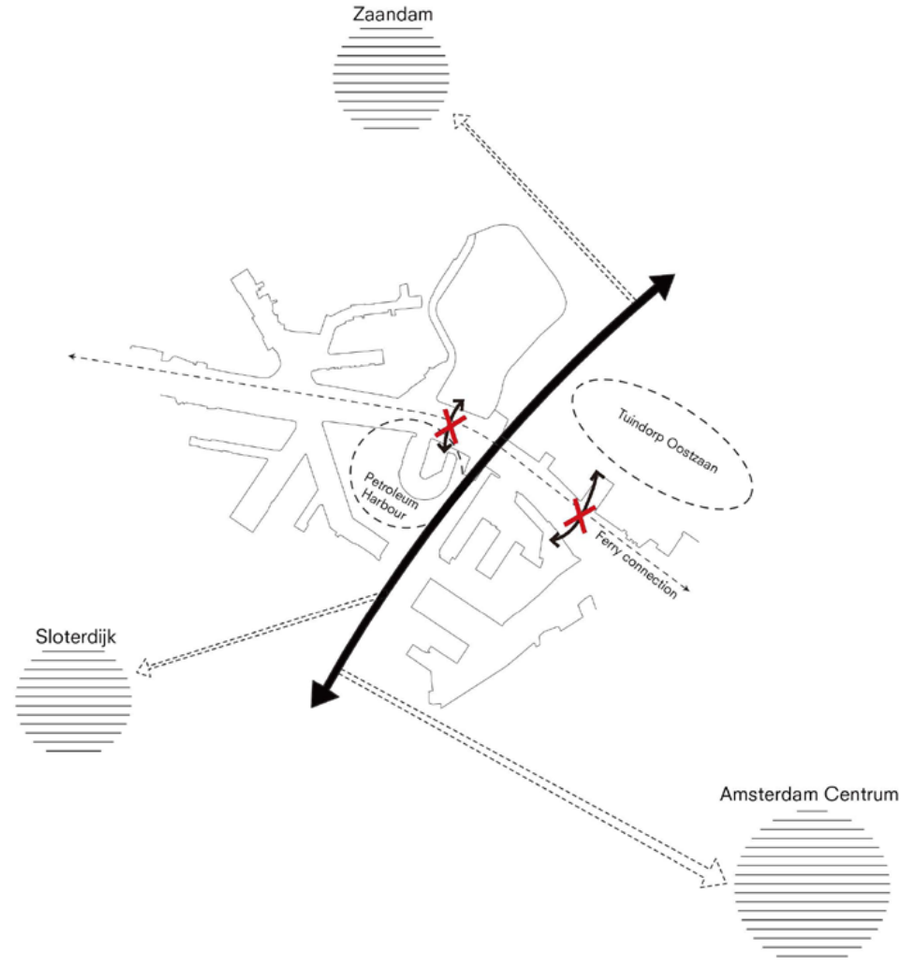
STRATEGY GENERATION

DESIGN AMBITION

- Create a new typology of waste management to bring waste back to the citizens
  - combine waste treatment by leisure time, art and culture
  - combine waste treatment facility with urban park
- Reduce the pressure of waste limits
  - creating a new business model, in order to improve the value of waste and the efficiency of waste treatment
  - raise people's awareness

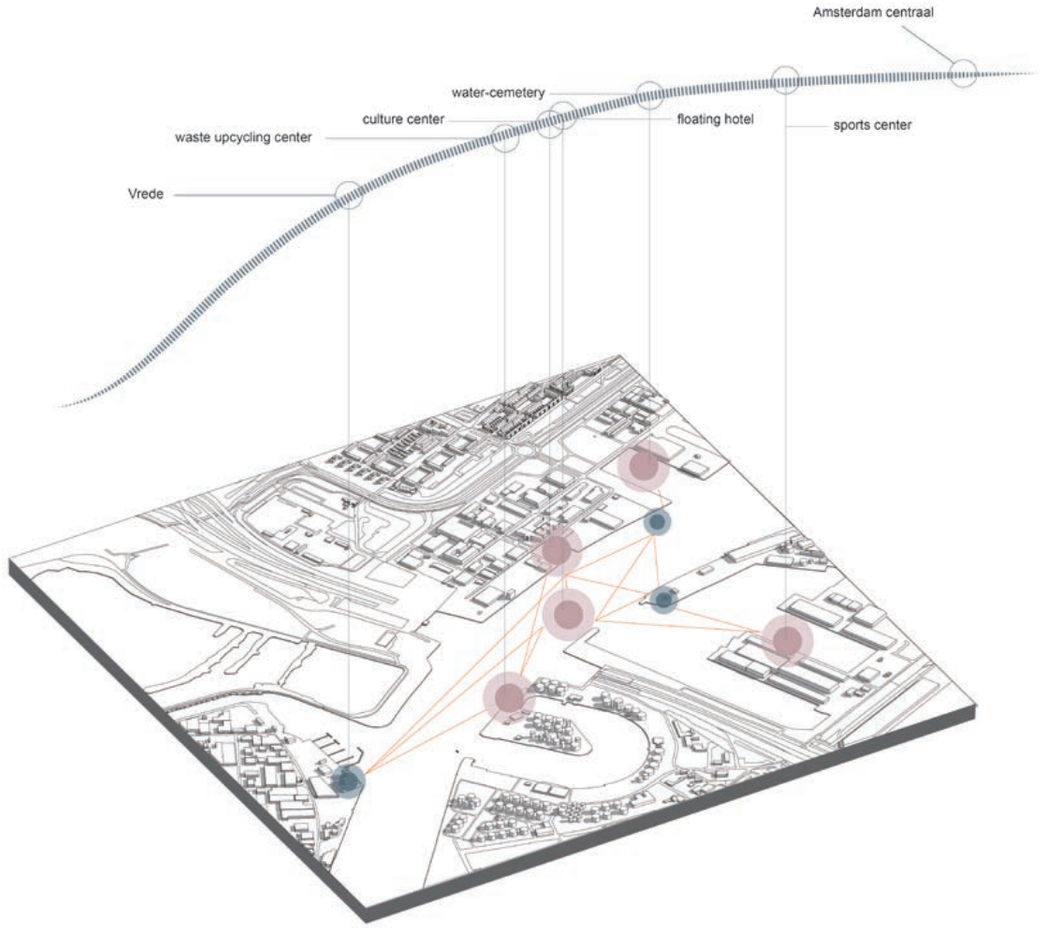


Our site in located at the joint point between Amsterdam and Zaandam. It contains both banks of the IJriver. The transport system on the site is not developed well.

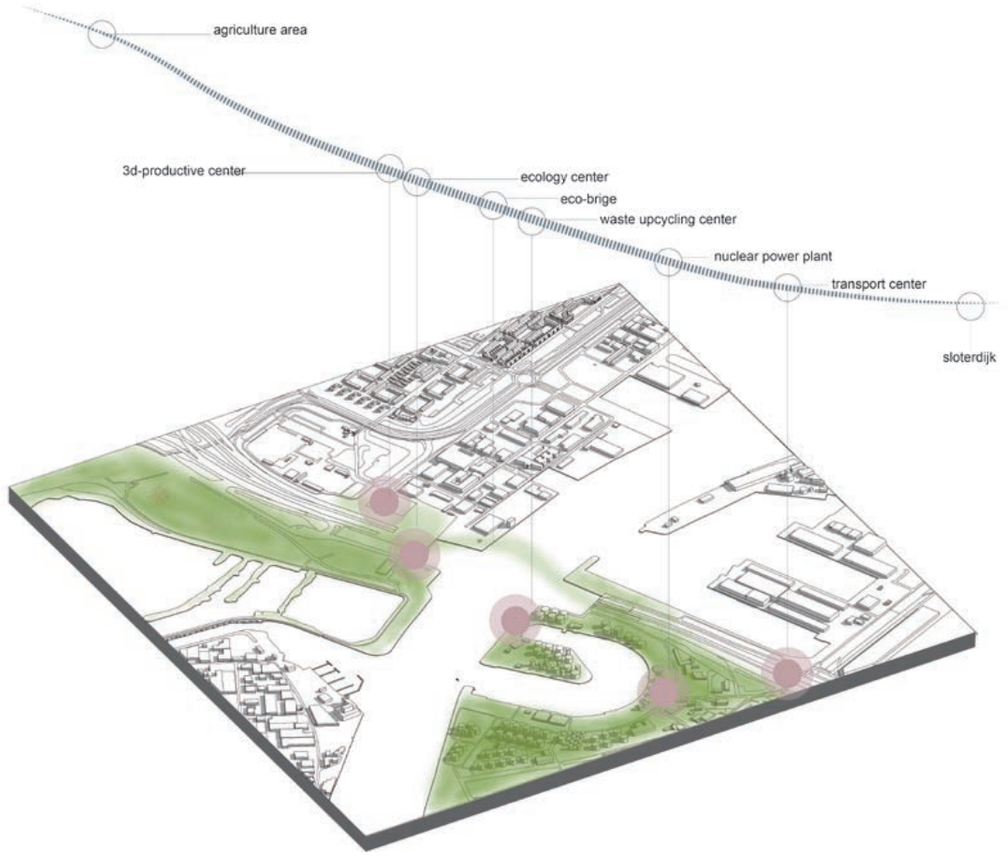


A10 ring road and Ij river seperated our site into four pieces which are lack of links between each other. A10 as a connection for cars cannot serve bicyle and pedestrians. Those who want to go across the river need to take a ferry .

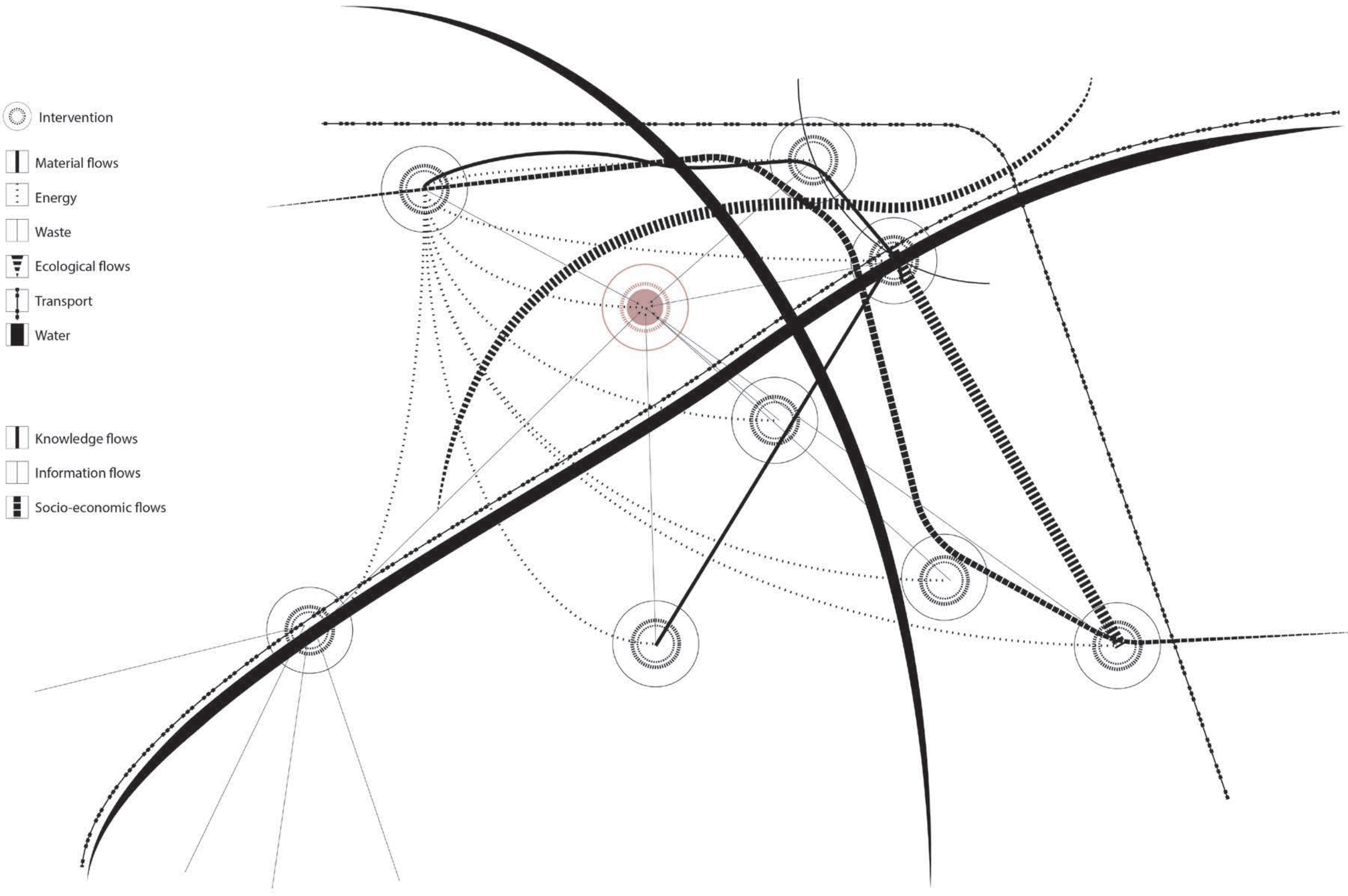
GROUP STRATEGY

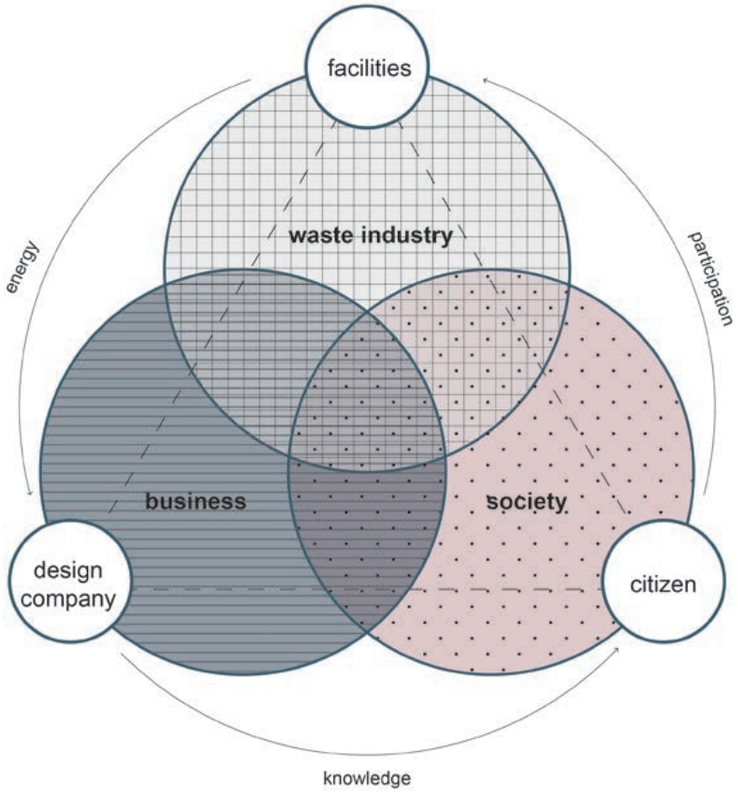


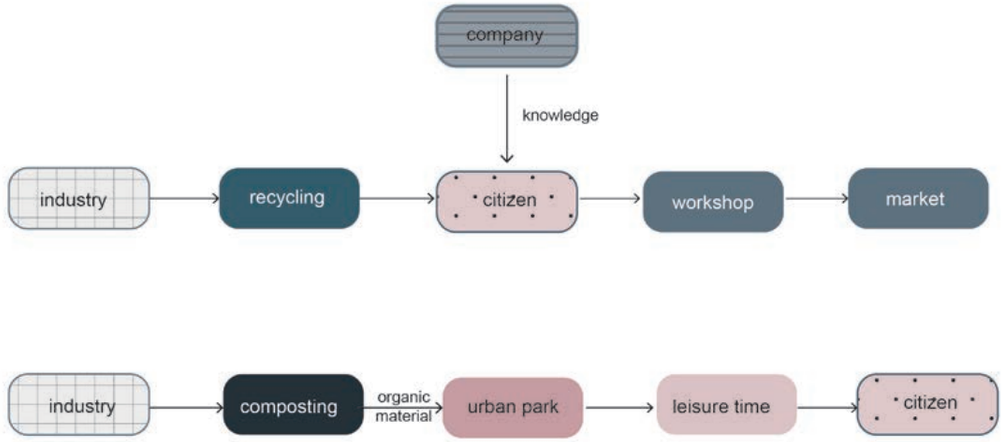
As "water" is an importent element on our site, we need to rethink the role of IJ river on our site. In our group strategy, IJ river is supposed to refreshed to serve the city in the future. Transportation on the river is going to be improved and attraction points along the river will form a system to make the IJ river become dynamic



Another system is formed across the IJ river. Since industries on the Petroleumhaven will move out, this area is supposed to be transformed into an urban park. Along with IJ polder and the argriculturel space on the north, the green spaces are going to form an ecologic urban park serving both Amsterdam and Zaandam.


Intervention
Material flows
Energy
Waste
Ecological flows
Transport
Water
Knowledge flows
Information flows
Socio-economic flows



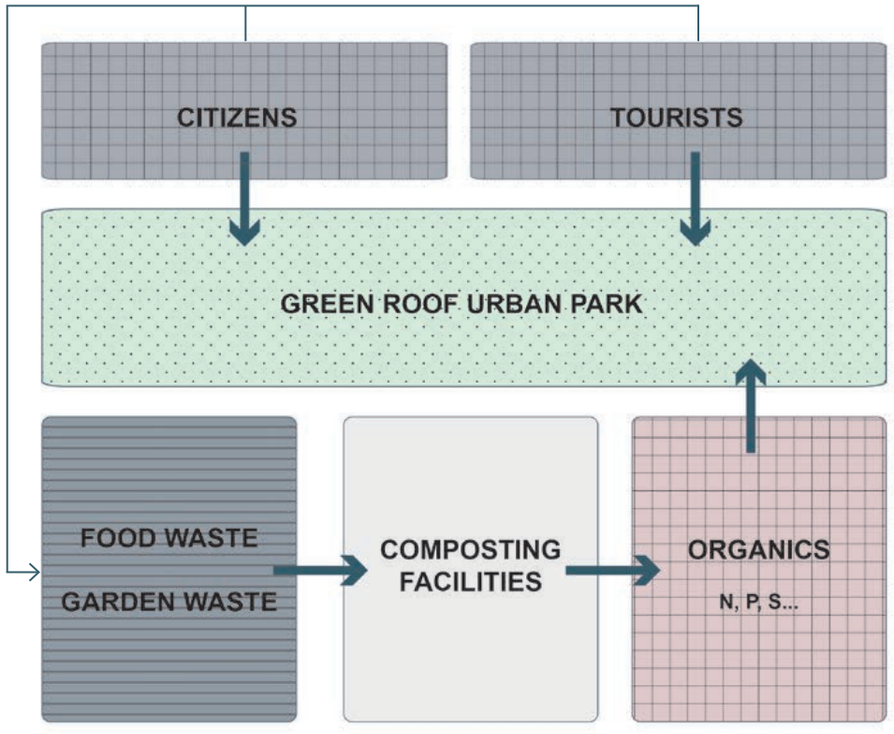


The ambition of my project is to build connections among waste industry, innovative business and society. The limited raw material and high-density urban context in the future will make a higher requirement for the efficiency of waste management. With the number of population growing and urban extending, there will be less and less land for central waste treatment facility. Waste need to be collected and processed locally.

On the other hand, waste as valuable raw material, it should be treated in a smarter and more innovative way. A new business model for waste will be necessary in the future. Bringing waste back to citizens by combine waste treatment with public leisure time and increasing the value of waste by cooperating with innovitive business will make the connetion among these three aspects become stronger.

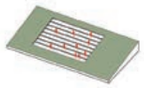
STRATEGY GENERATION

Combine waste treatment with public leisure time

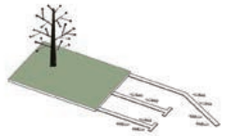


Because of the organic products from the composting process of biowaste as a soil quality improver, a green space can be created on the roof top of the projects which can not only serve citizens and tourists

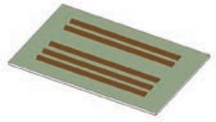
urban park



platform



ship dock



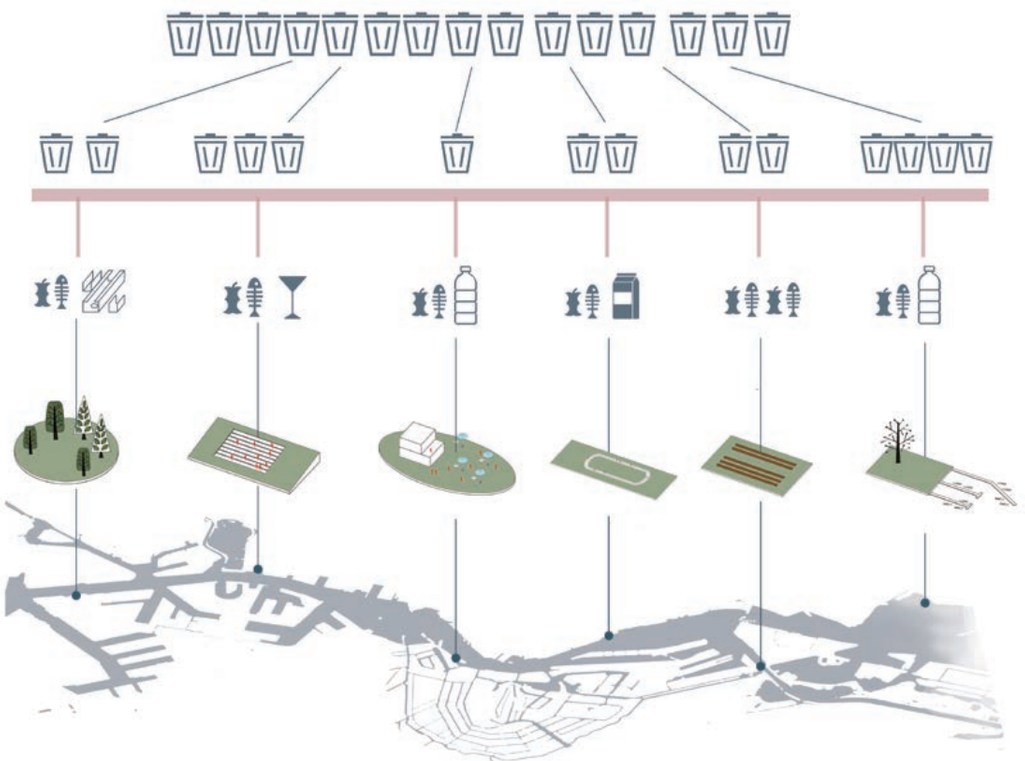
urban agriculture field

cafe

playground

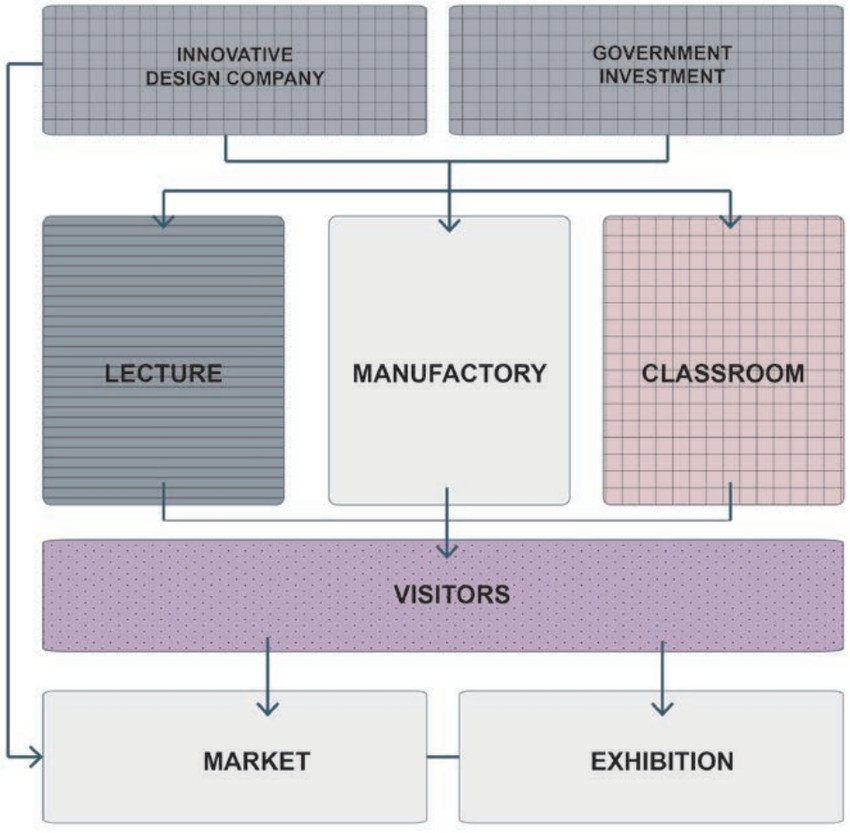
The green roof park can combine a variety of public activities in according to the local context. It acts as a link between society and waste industry, which not only serve the residents nearby or visitors to the waste upcycling center, but also the citezens from the whole city and tourists.

STRATEGY GENERATION
Process waste in community scale



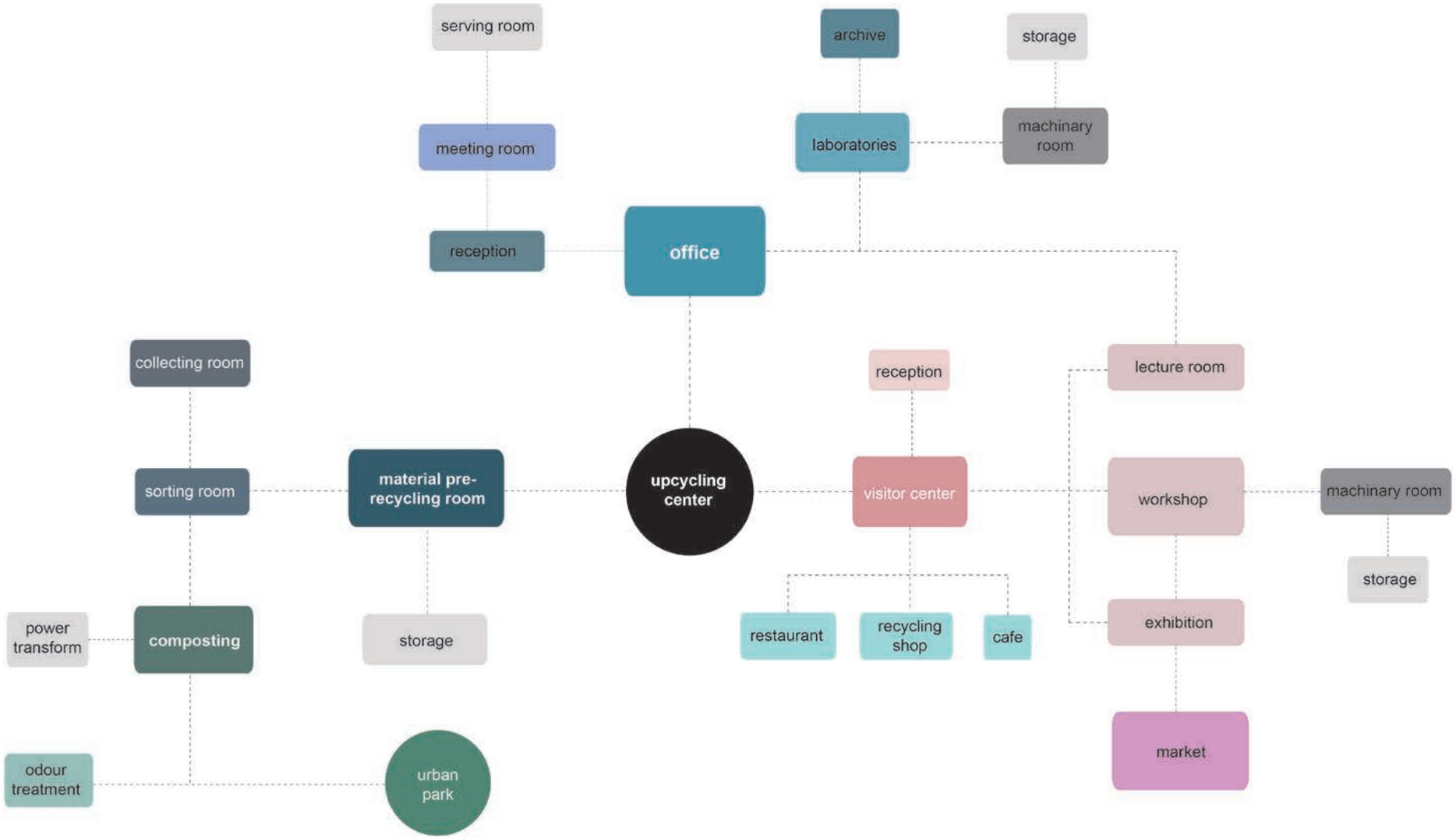
The municipal appeal to deal with the waste locally in order to reduce the cost of transport and sorting. In the future, domestic waste will be collected and processed in community scale instead of urban scale. As a consequence, a number of recycling and composing islands will be located along the IJ river and spread through the whole city.

STRATEGY GENERATION
Cooperation with innovative design company



On the one hand, the value of used materials can be improved after designing. Cooperating with innovative design companies, people will get the knowledge on how to upcycling their waste in a more efficient way. The public awarenes of waste recycling will be raised in this way. On the other hand, the market for recycled and upcycled products will stimulate the small companies to start up their business.

STRATEGY GENERATION
Functional scheme

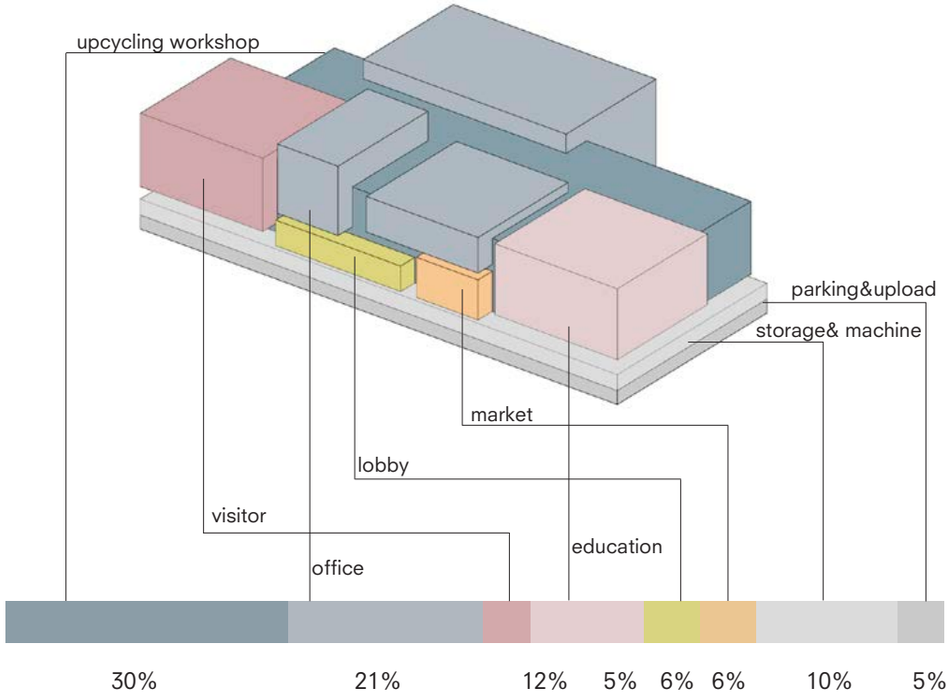


CASE STUDY

Upcycling center worldwide

Seoul Upcycling Plaza

Architect: Samoo Architects & Engineers
Location: Seoul, Kerea
Floor: 5 storeys+2 storey basements
Project Area: 16,500 m^2
Project Year: 2017



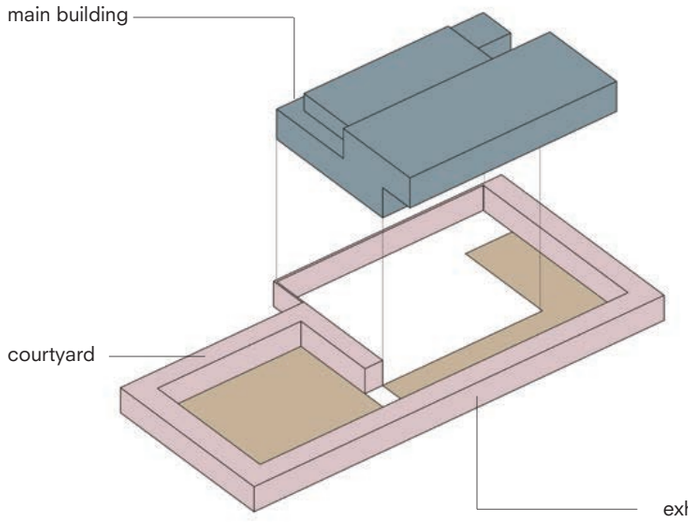
Known as ‘Story Box’, the Seoul Recycle Plaza is a complex facility combining manufacturing, exhibition, and education, where visitors can experience the entire recycling process in an exciting space that encourages participation.

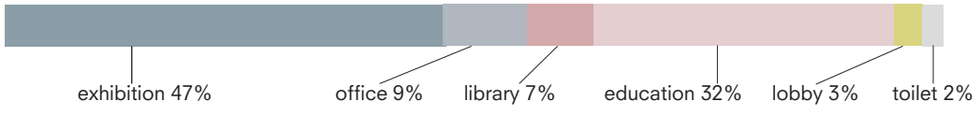
The southern park is connected with the front yard to create an expansive outdoor area. The circulation path, or “experience path” encompasses both the inside and outside of the facilities. Workspaces, stores, art studios, cafes, meeting and educational programs are grouped in clusters. Amidst the clusters is a centrally-located outdoor area that brings diversity to the spaces. Various materials were repurposed in the design, resulting in a new destination that celebrates the recycling industry and symbolizing a new paradigm in the recycling culture.

Cultural Center

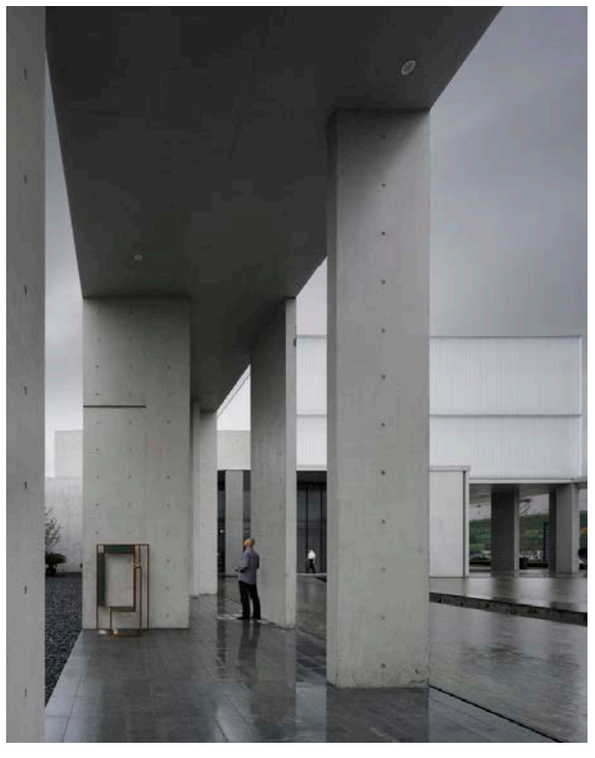
Cultural Center of Beicheng Central Park

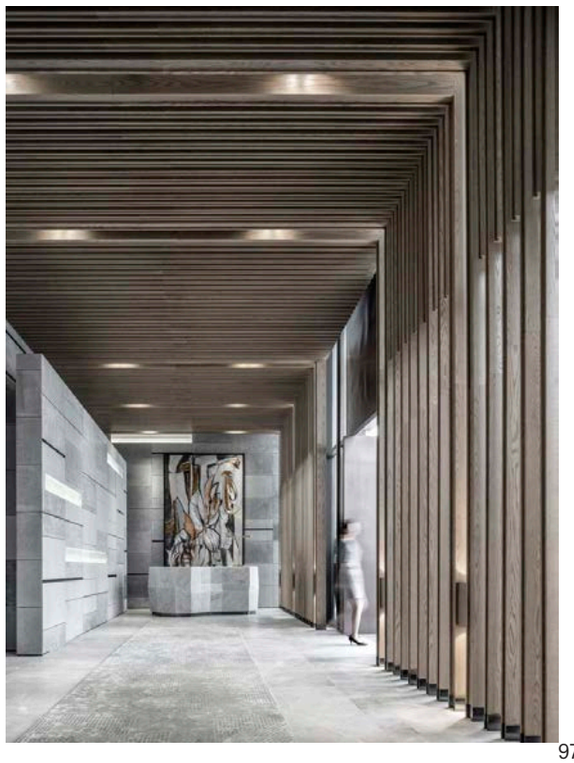
Architect: Shenzhen Huahui Design Co. Ltd
Location: Anhui, China
Floor: 4 storeys+ linear exhibition corridor
Project Area: 3400 m^2
Project Year: 2017





The project is part of cultural and educational facilities for the nearly 1 million square meters Central Park residential area. From this project, I was ispired how to form a distinctive and powerful city interface to correspond with the huge city park. The project created a visual display space at the interface to stimulate people's willingness to explore and participate.

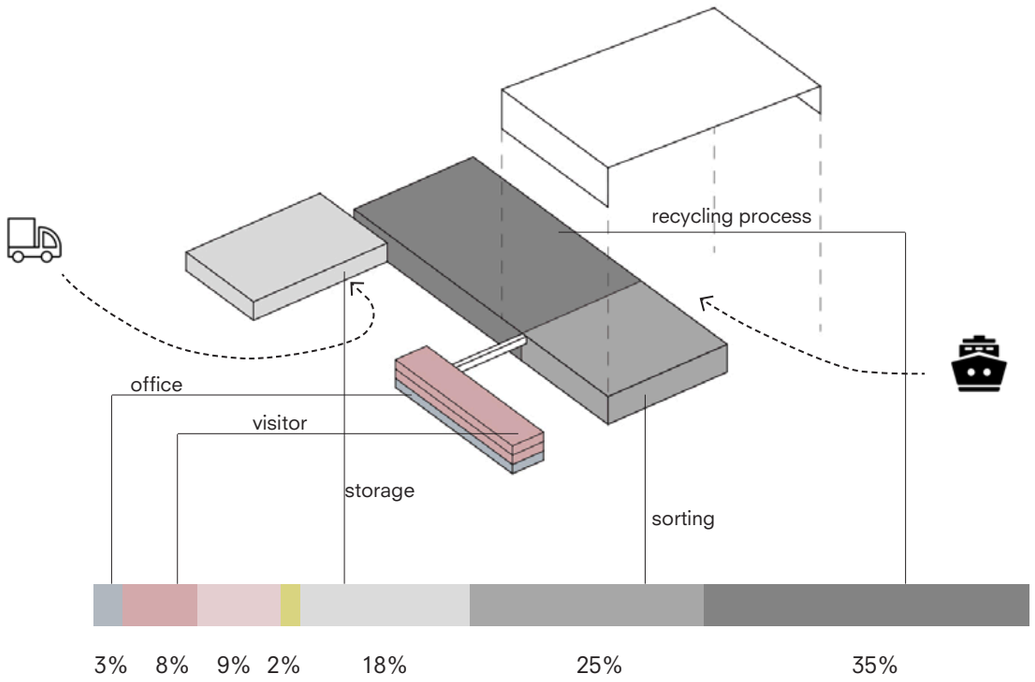




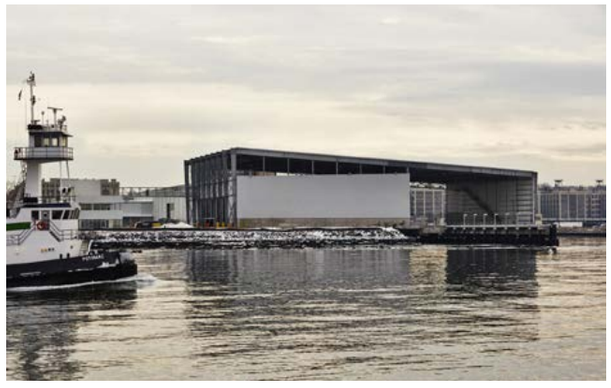
Material recovery center worldwide

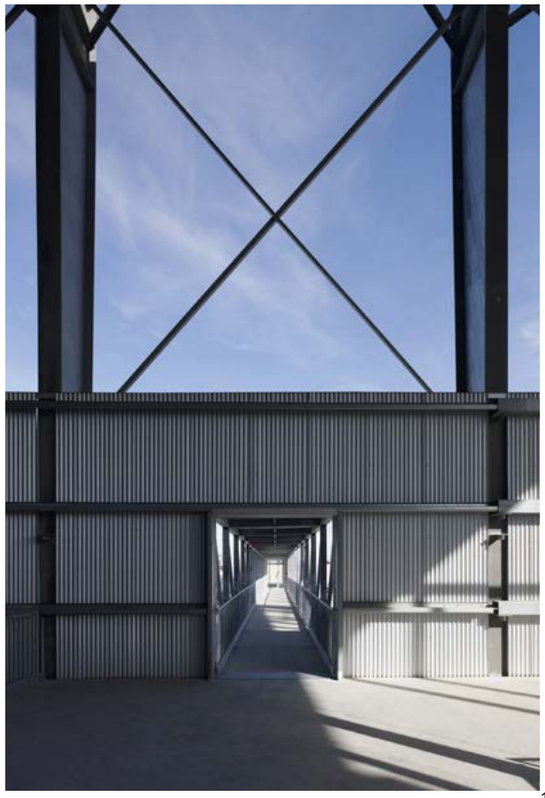
Sunset Park Material Recovery Facility

Architect: Selldorf Architects
Location: Brooklyn, NY, USA
Project Area: 13,000 m^2
Project Year: 2014



The Sunset Park Material Recovery Facility is a processing center for New York City's curbsidd metal, glass, and plastic recyclables. The materplan organizes buildings to support functionality, creates distinct circulation systems to safely seperate visitiors from operations, and add two acres of native plantings. The Education Center is one of the project's most unique features. The structure contains program for school children and the public including classromms, exhibitions, and interactive demostration displays. A key element of the design is a steel bridge which connects the Education Center to a viewing platform inside the Processing Facility. The View platform allows students and visitors to see the recycling process in a action.

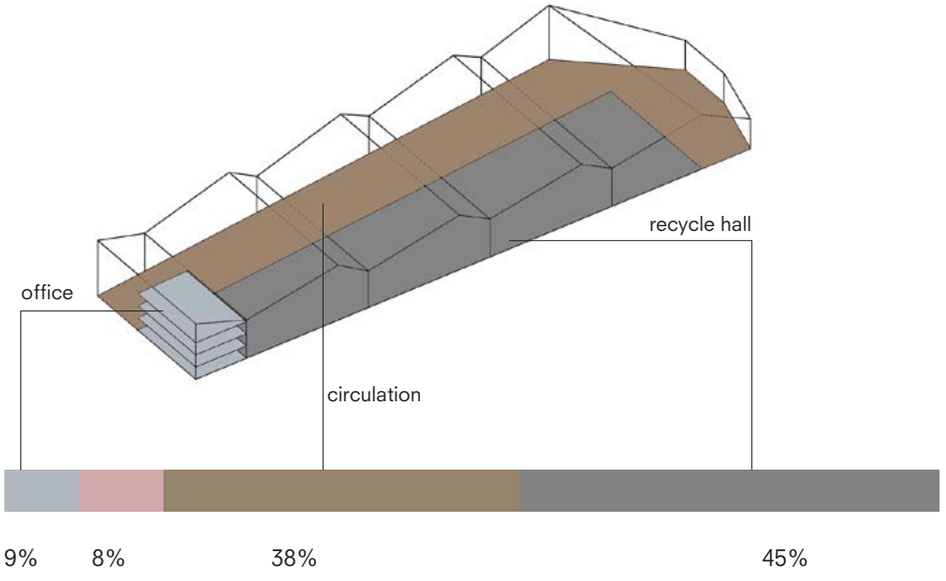




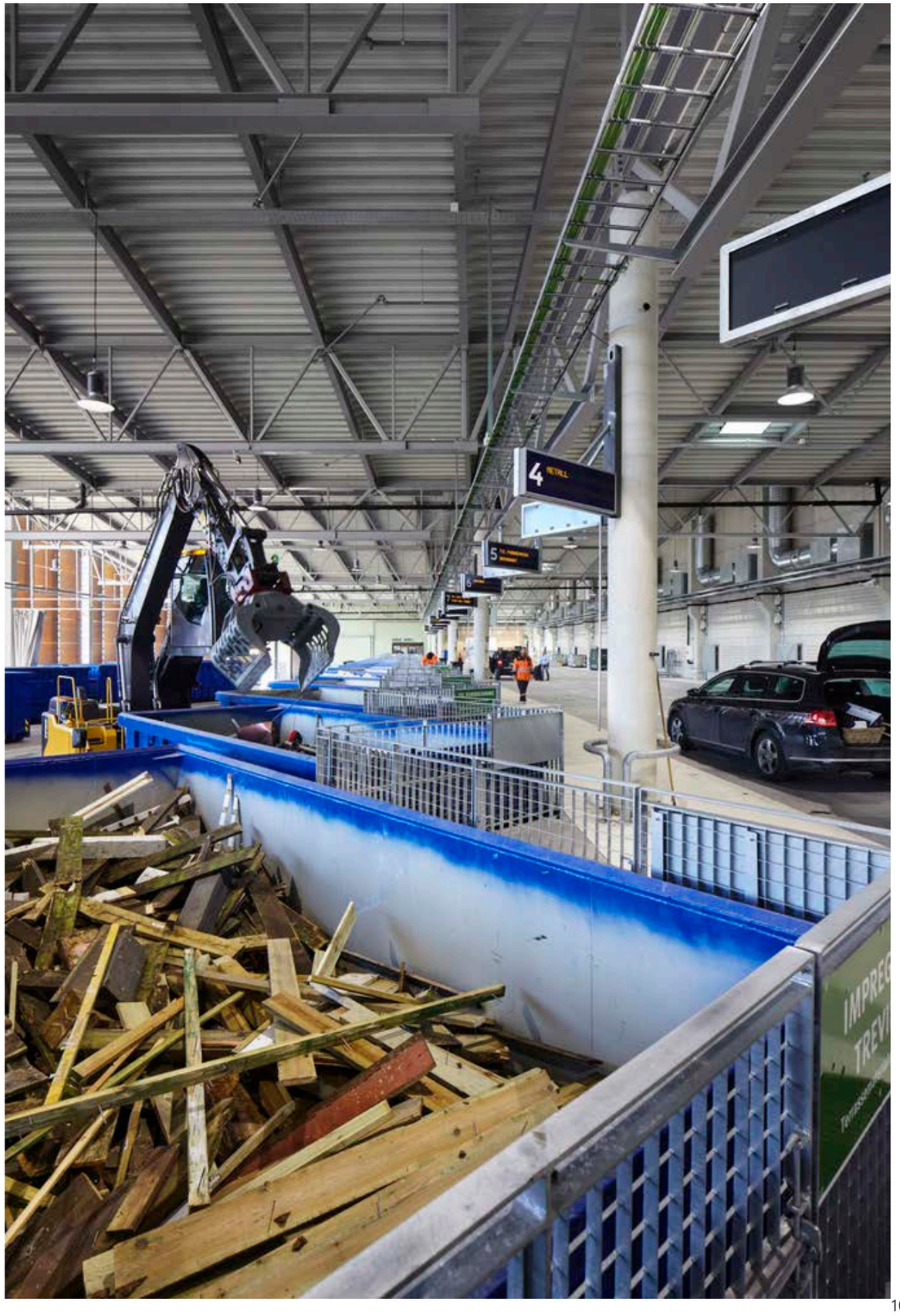
Material recovery center worldwide

Smestad Recycling Center

Architect: Longva Arkitekter
Location: Oslo, Norway
Project Area: 6000 m^2
Project Year: 2015

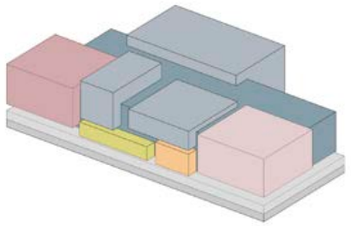


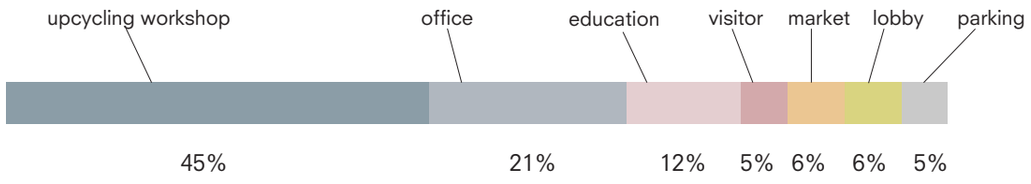
Smestad Recycling Centre represents a new building typology. It is a facility for the public where all waste handling takes place indoors. The recycling centre is a robust, unclimatised open hall with two distinct areas: one for the public and one for operations. There is an integrated, climatised service and management building at one end, with areas for hazardous waste and maintenance, changing rooms and cafeteria for employees, as well as offices and technical rooms. The operational logistics were an important design criteria. The local authority's master plan gave strict limits to the buildings placement and size. It has been important to maximise traffic flow and parking for the public, to ensure sufficient slots for the waste fractions, and to give adequate maneuvering area for operations.



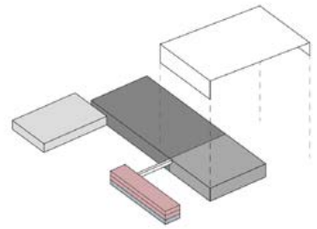
SPACIAL ARRANGEMENT

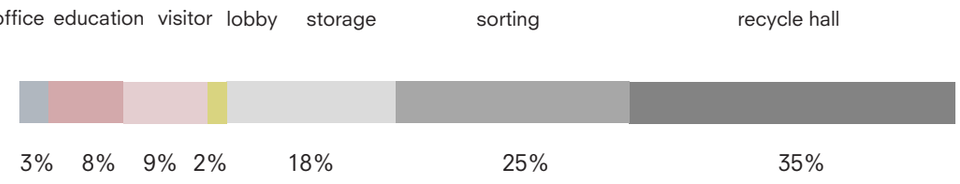
Cultural and educatioanal building

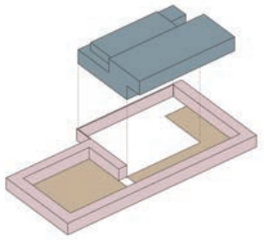


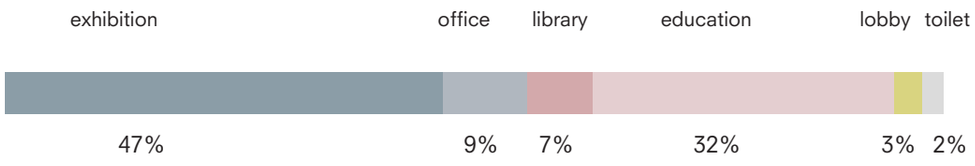


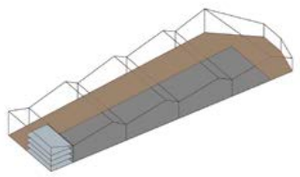
Collecting and recycling building

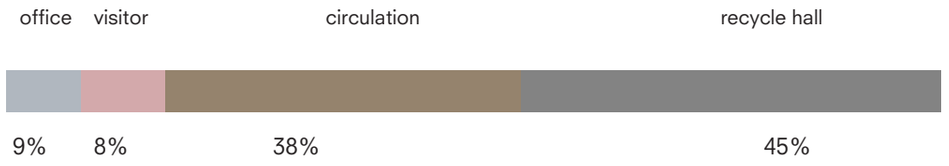


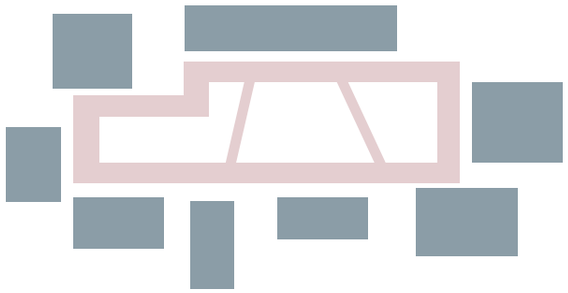


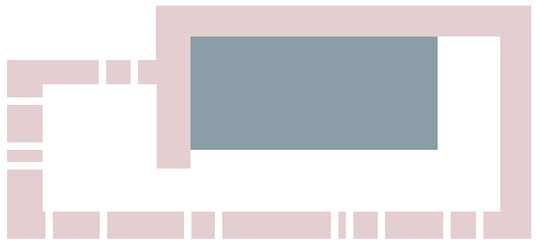








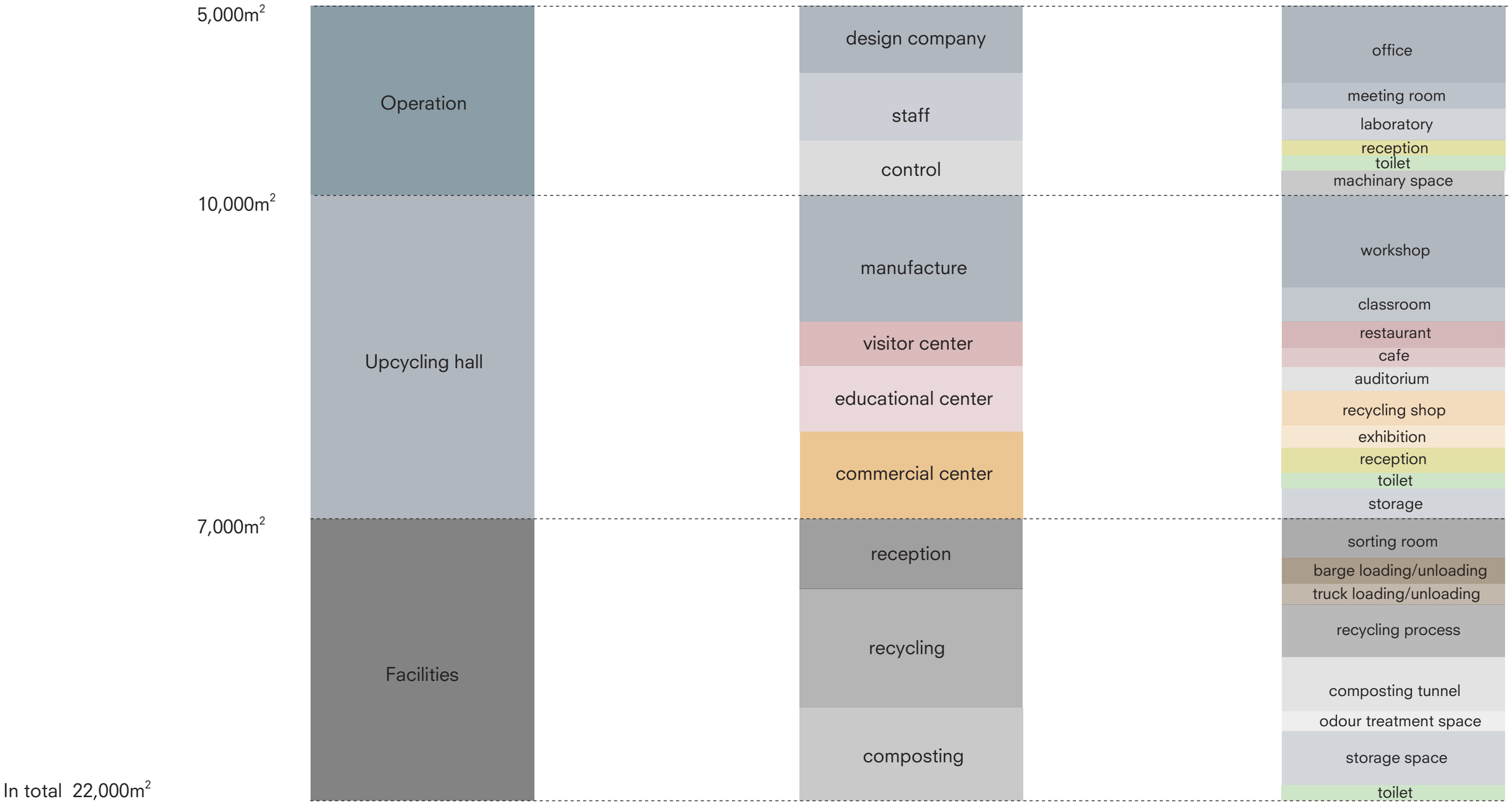




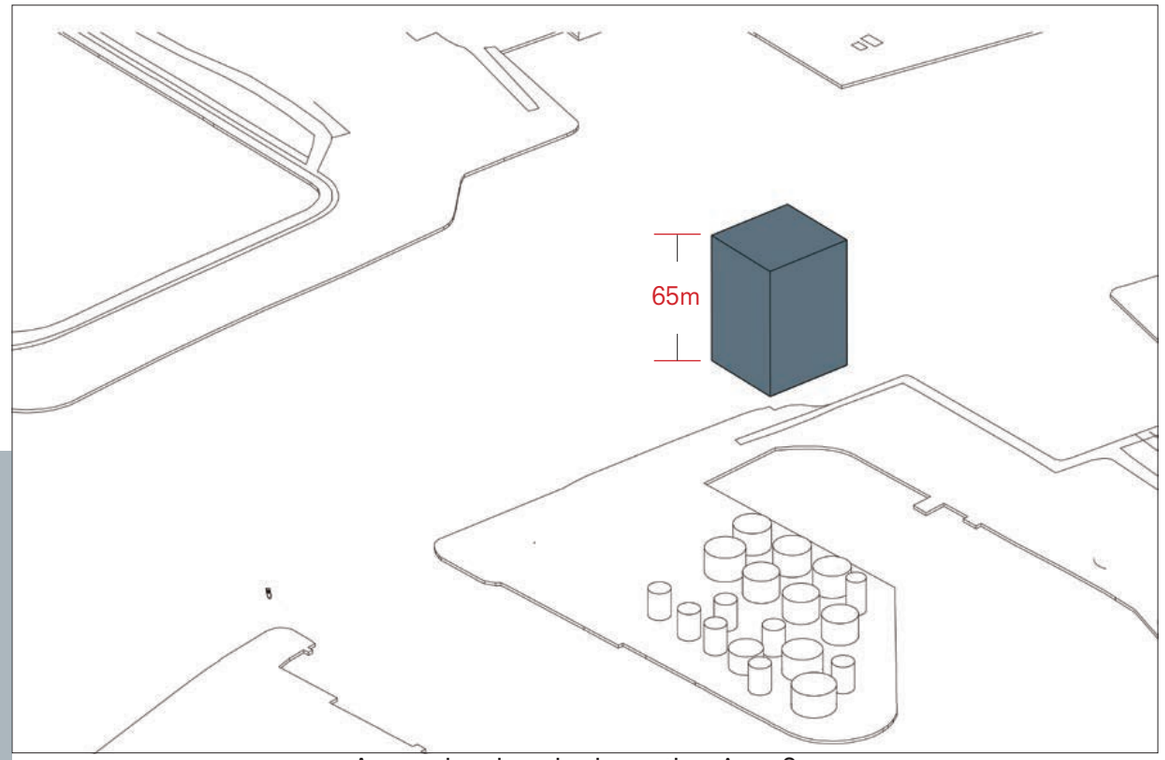
Because of the public function, cultural and educational architecture are usually designed to open to the city. The boundary between buildings and urban context is more ambiguous. For the interior space, small classrooms or offices are located around to form a large space in the center which is usually used for more public space, like exhibition. This kind of space arrangement stimulate the communication among people and also the link between the building and urban context.

Waste industrial facilities are much more insolated from the urban context. Almost all spaces of the factory are closed without public's participation. Logistic space takes a large area of the factory since waste management has a higher demand for storage space and transport space. As for the public space like education or visitor center, they are seperated with the main processing room. Usually, these functions are located at another building which is connected with the main factory by corridors.

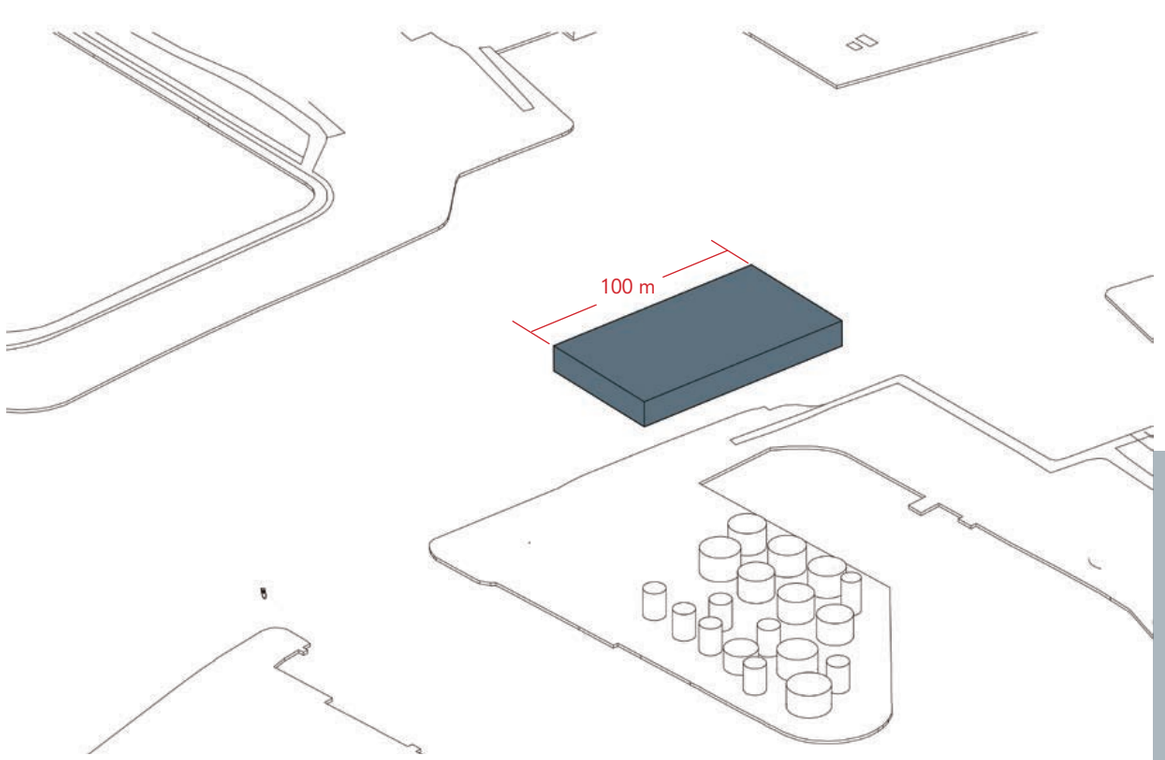
FUNCTIONAL BAR



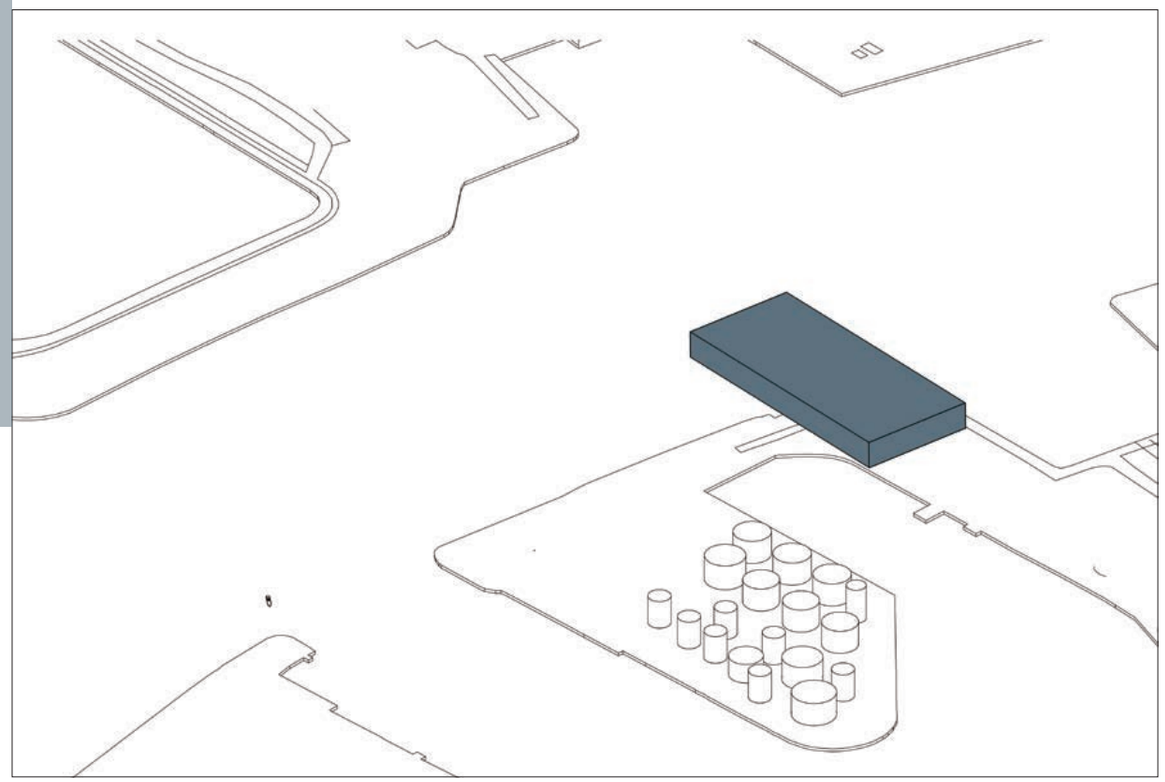
MASS STUDY



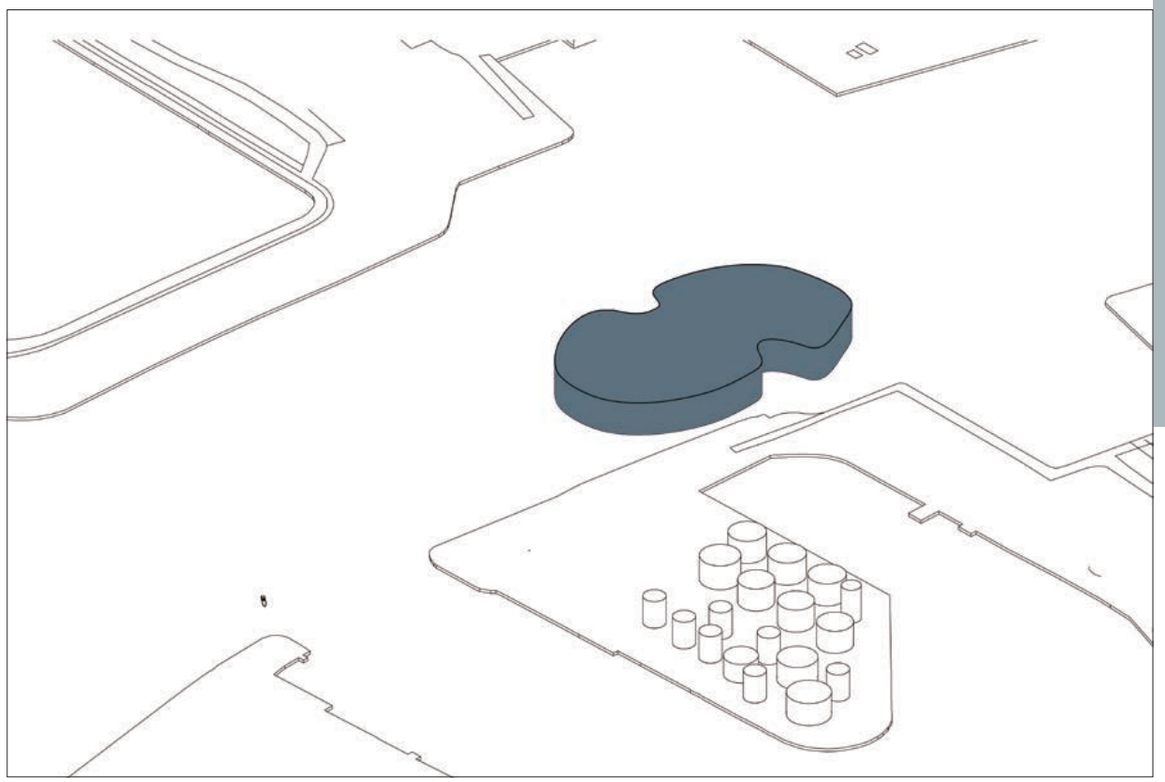
A new landmark along the river ?



As a part of the landscape ?

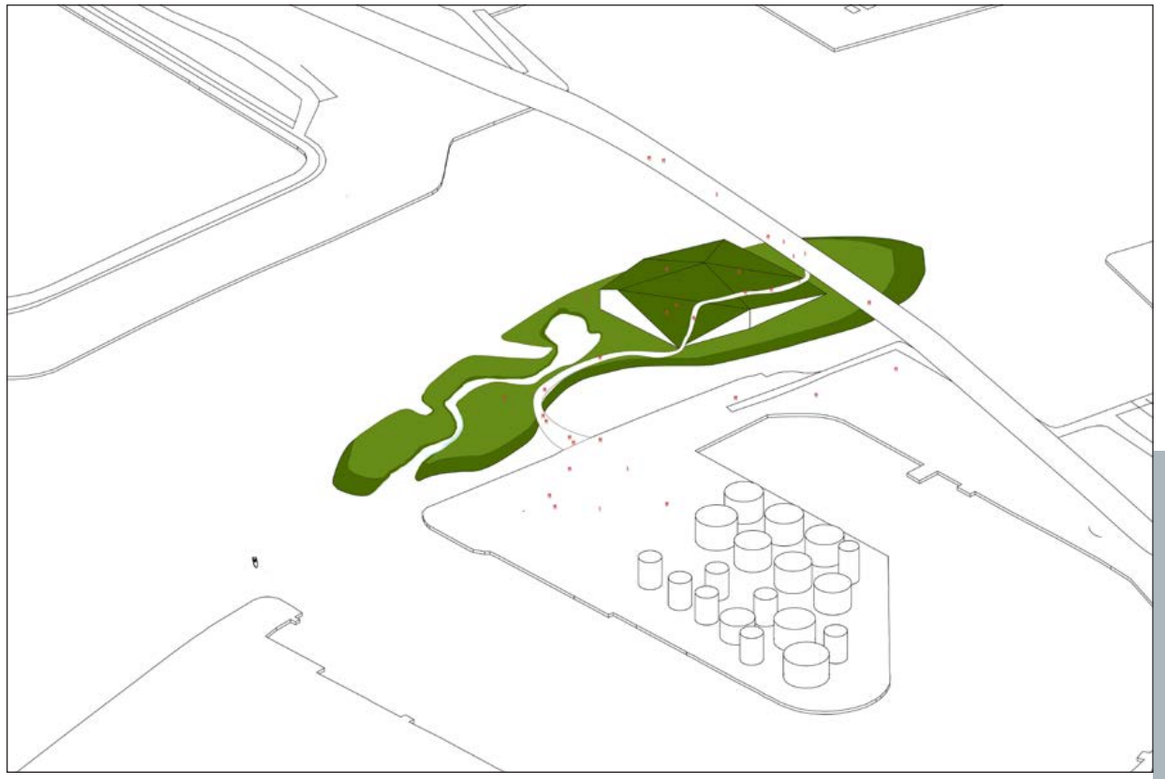


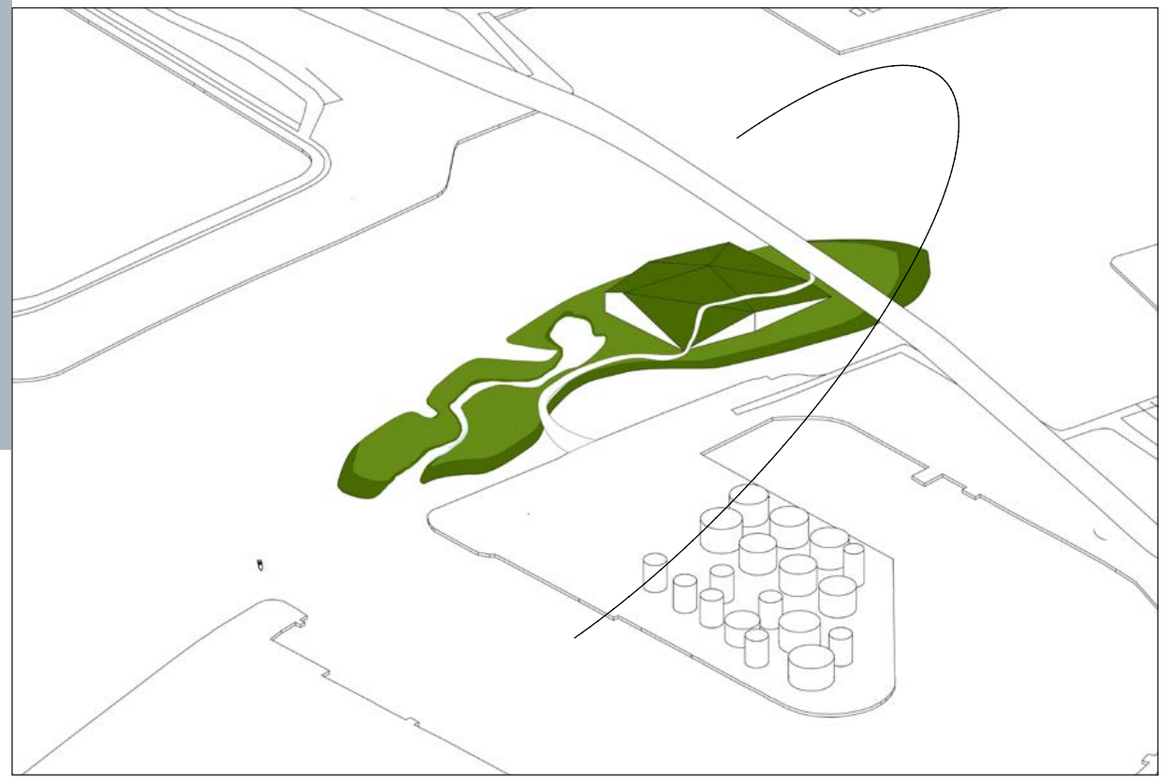
As the extension of land?

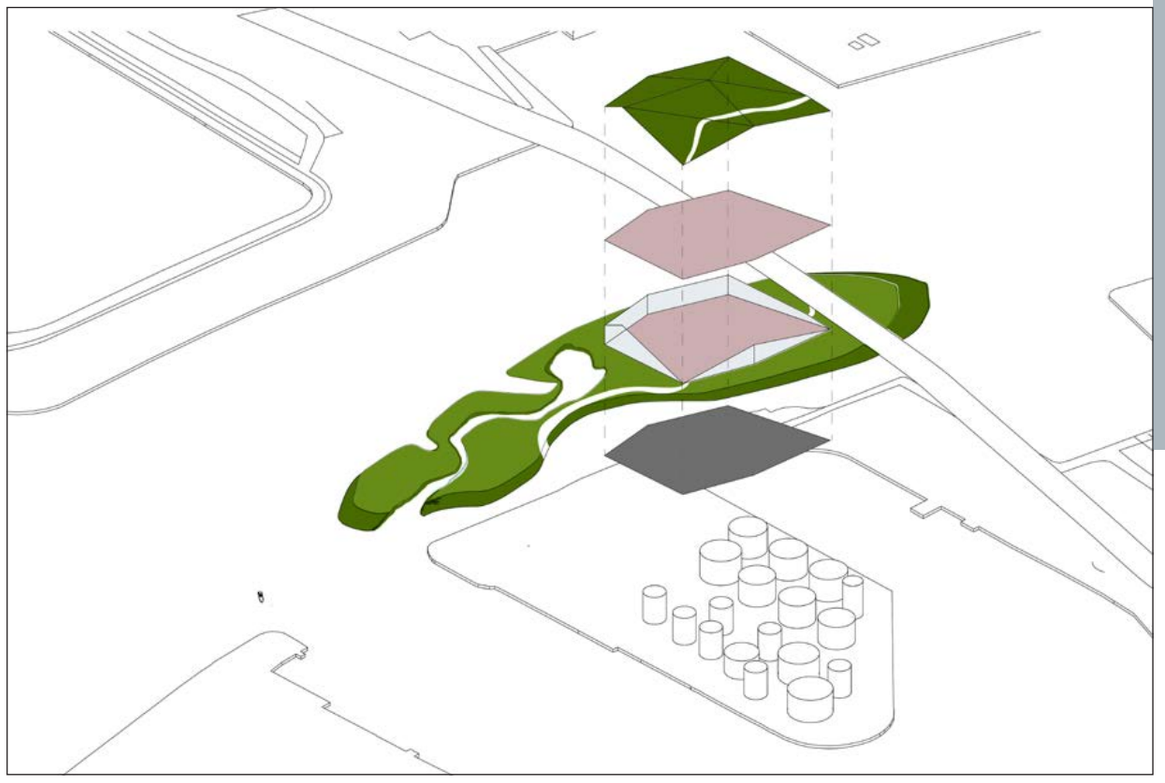


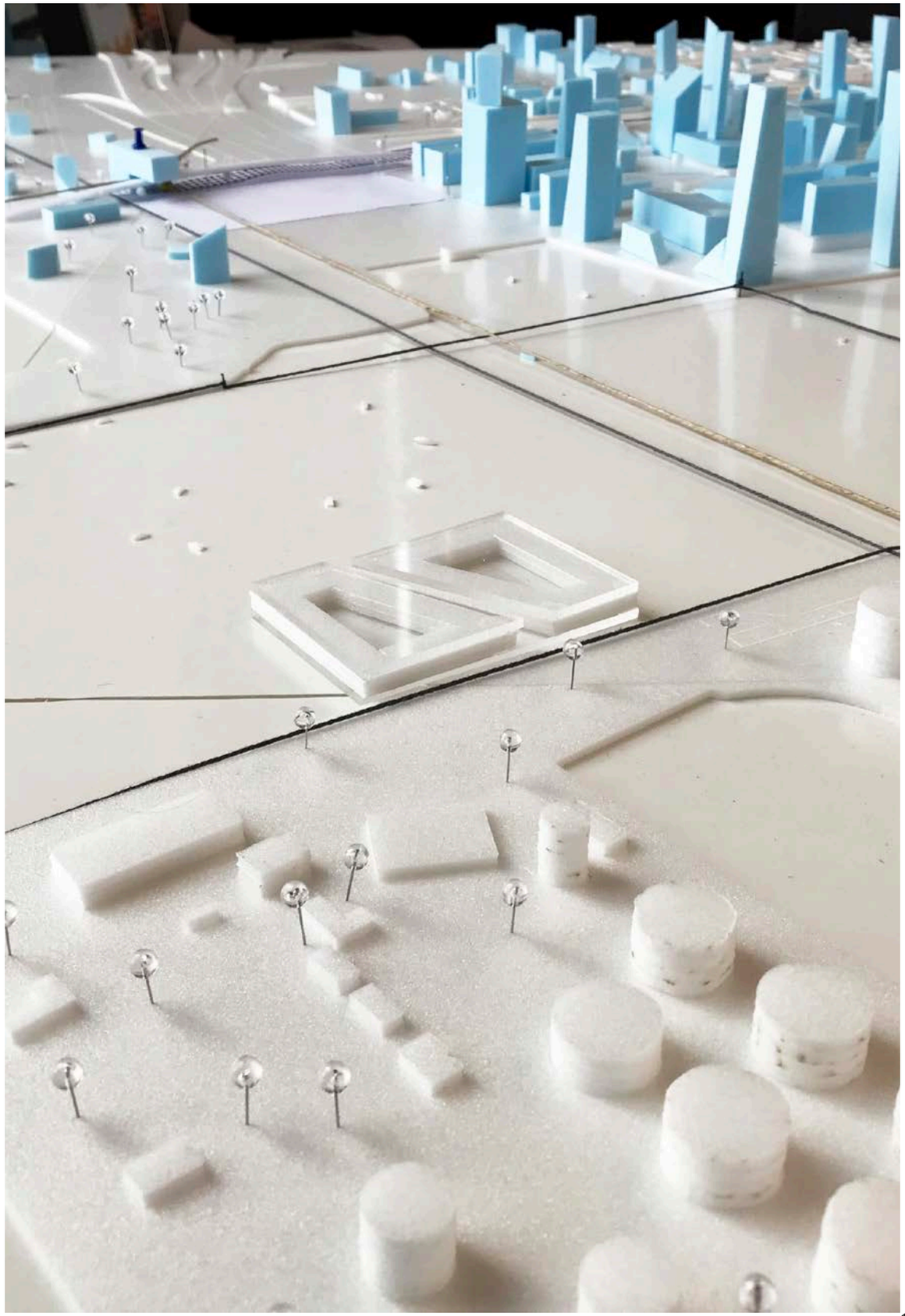
More irregular shape?

The project is supposed to be a part of the landscape in the ecological urban park. It has an organic shape which indicate the charateristic of "urban island". A pedestrians connect the eco-brideg to the green roof of the project. People from the bridge can easily access the upcycling center. This composting island become a gate when people go throuth the bridge.



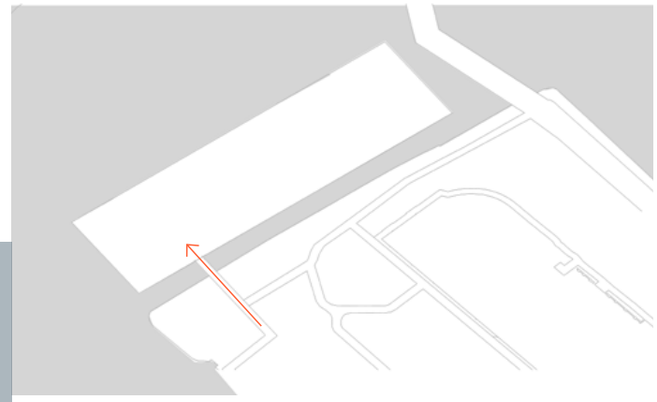






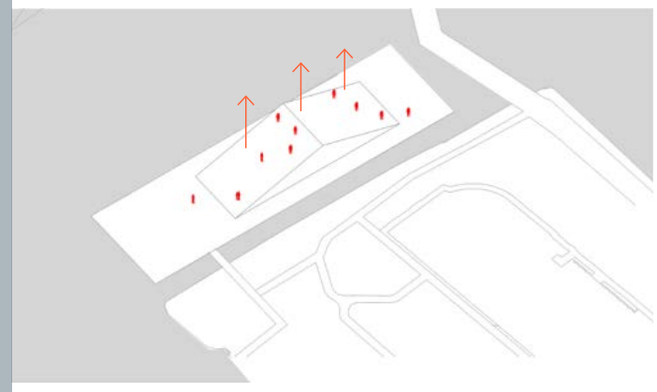
THE PROJECT

MASS



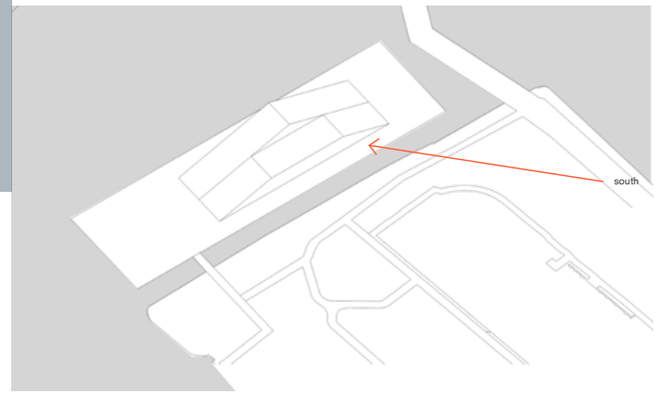
Step one:

The project acts as an extension of land



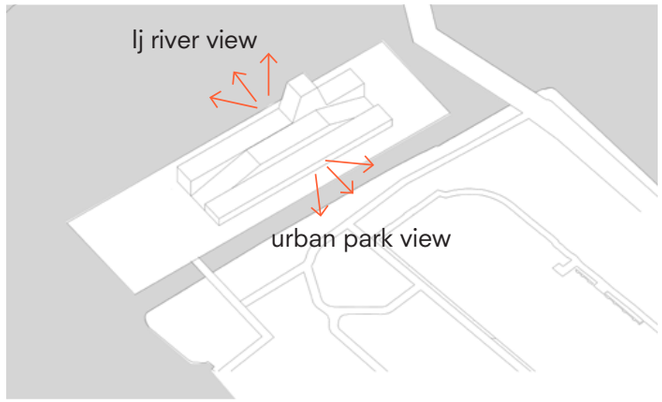
Step two:

A part of the platform is lifted up, creating a mountain on the water.



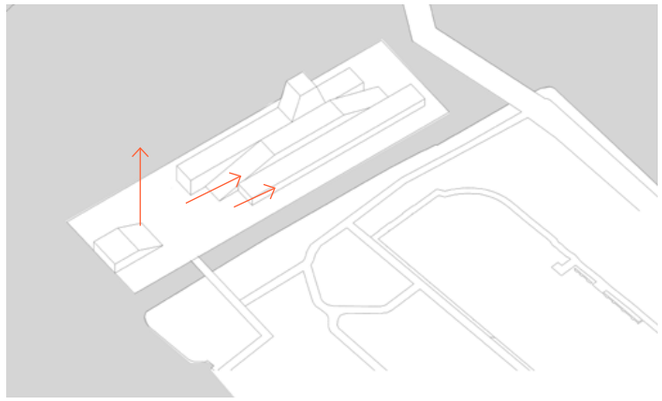
Step three:

South part become lower so that more sunlight can go inside the building.



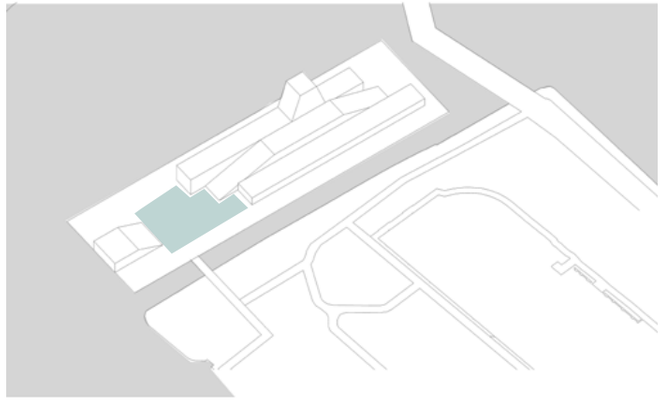
Step four:

Because of the great natural land on both side. The volume is divided into three strips.



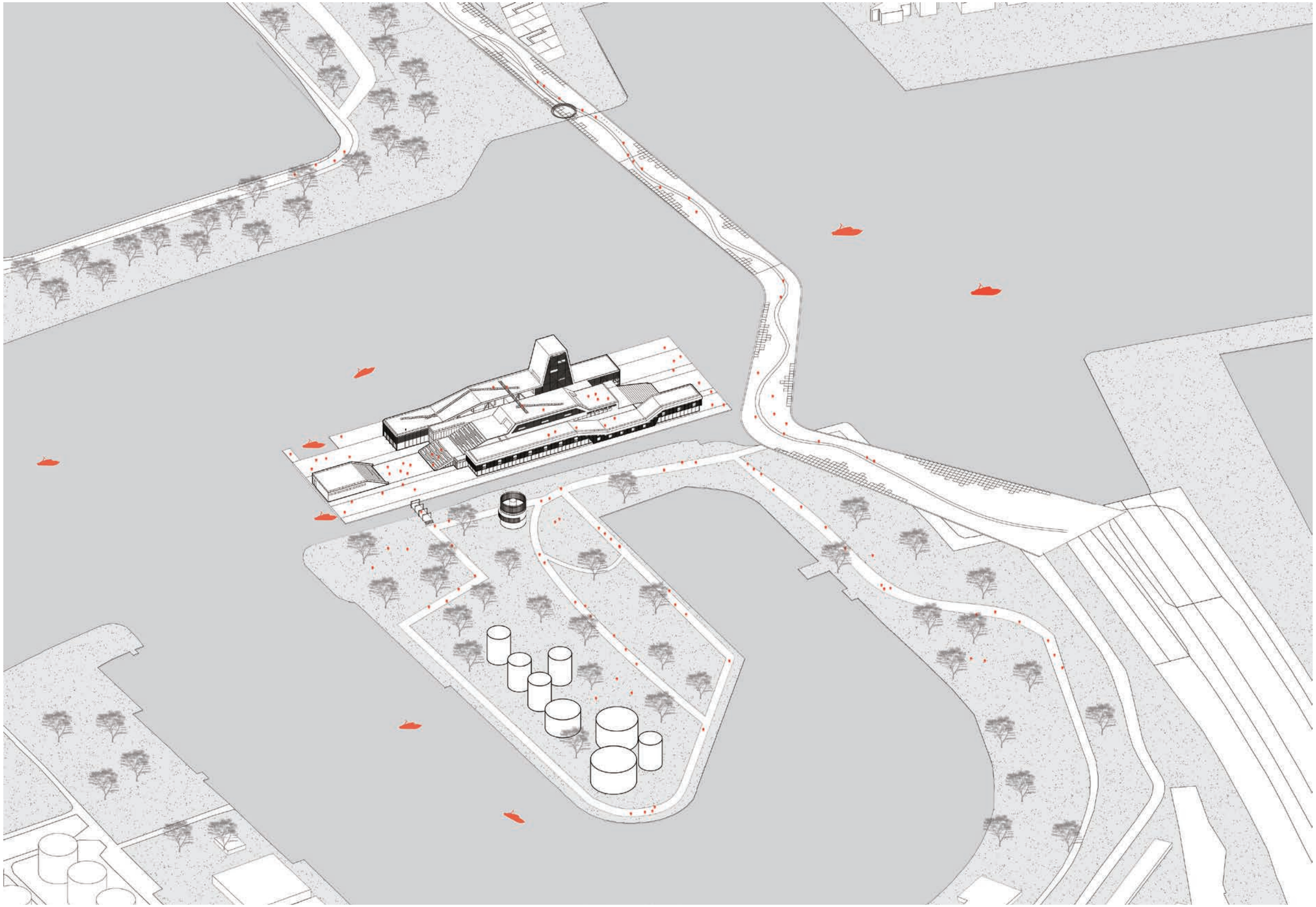
Step five:

Two strips are set back to form a square at the main entrance.



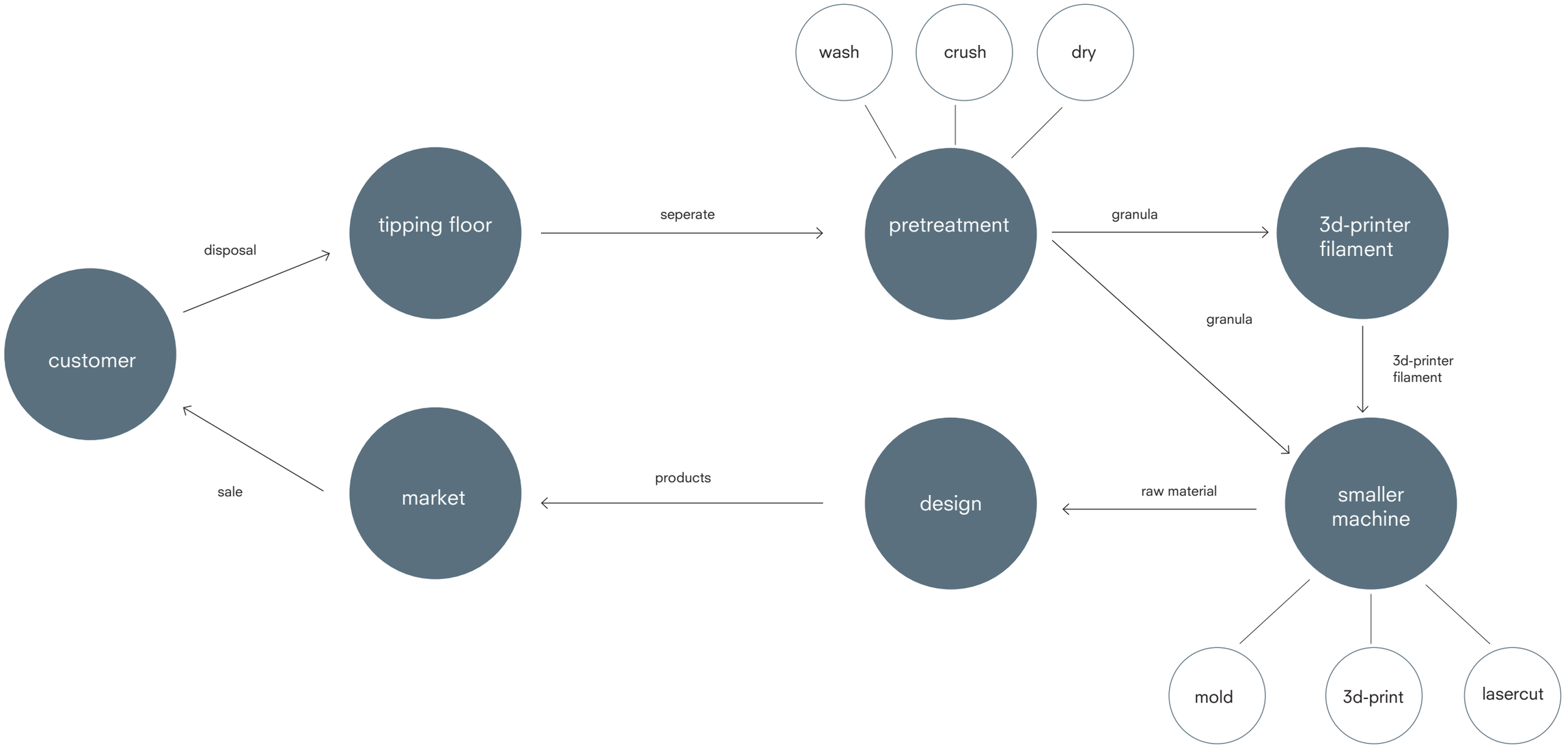
Step six:

Two strips are set back to form a square at the main entrance.

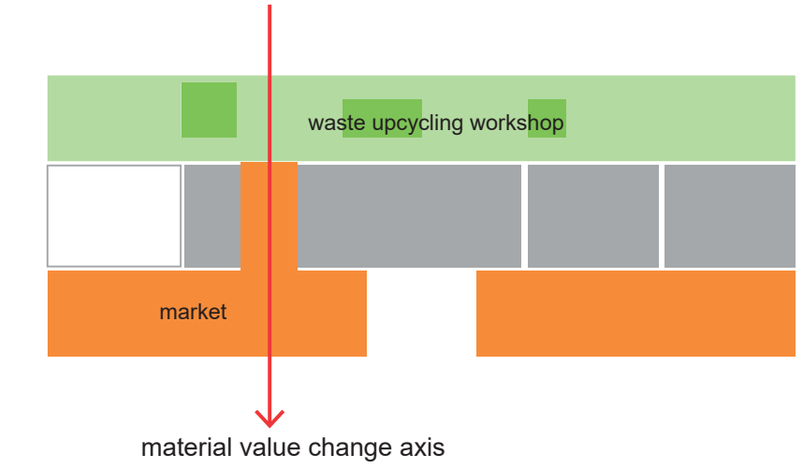


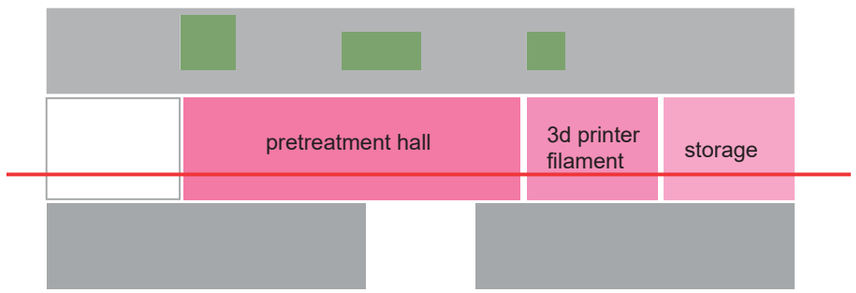
SPACIAL ARRANGEMENT

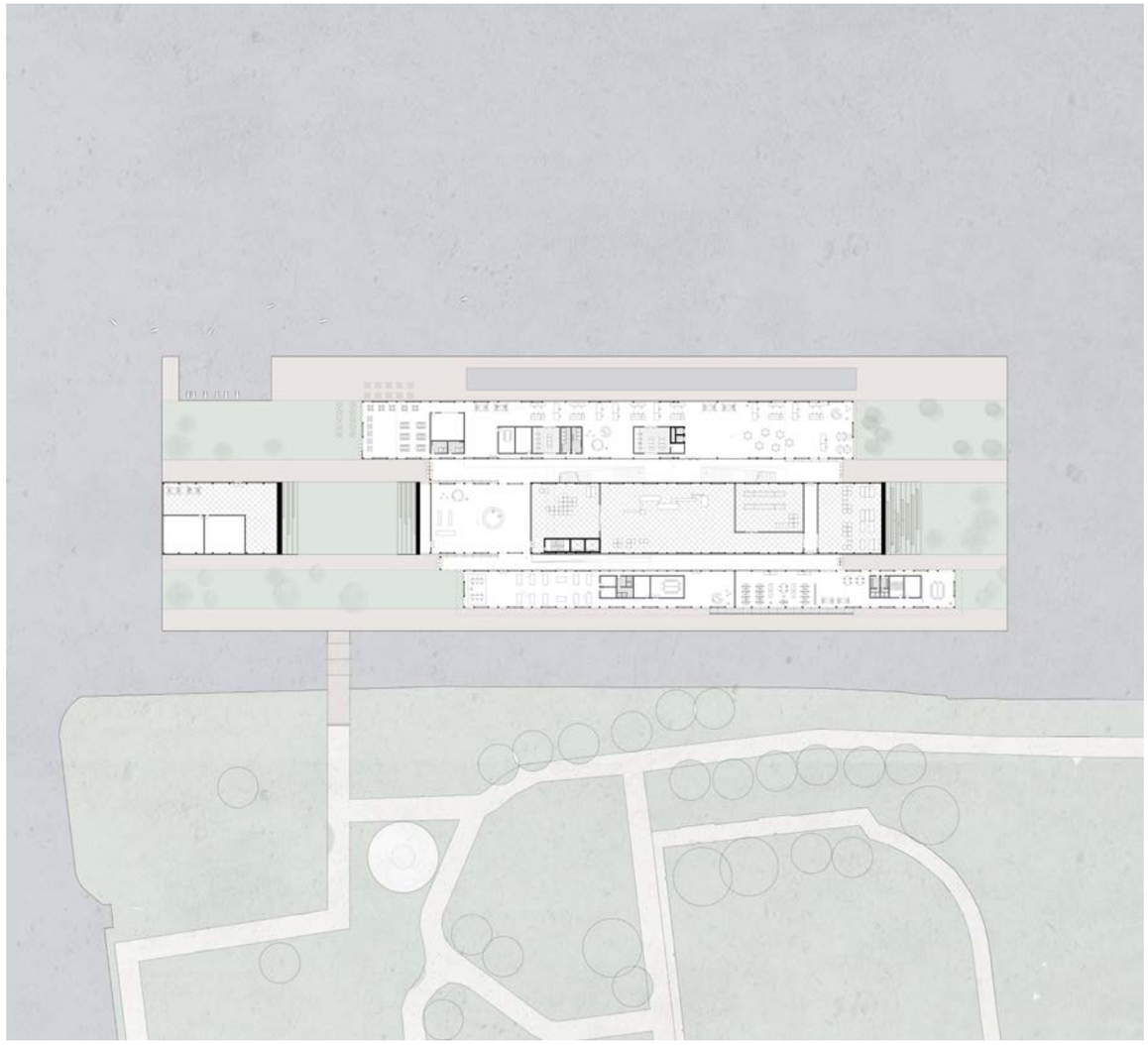
According to the upcycling process of wasted plastic



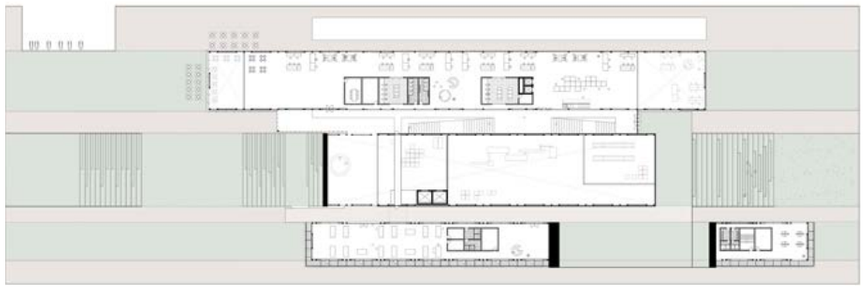
SPACIAL ARRANGEMENT



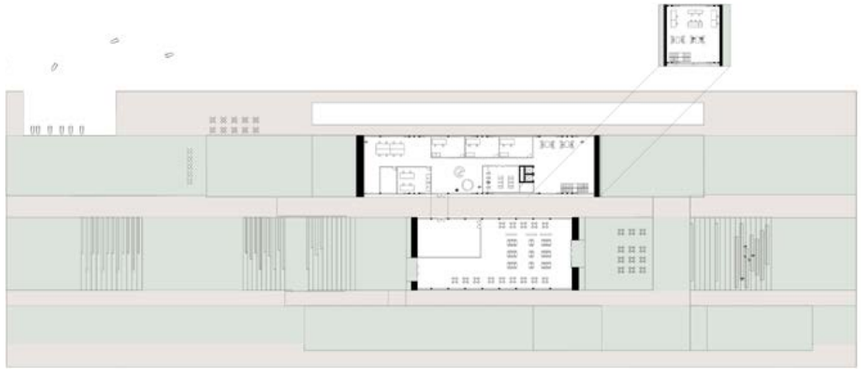




Ground floor plan



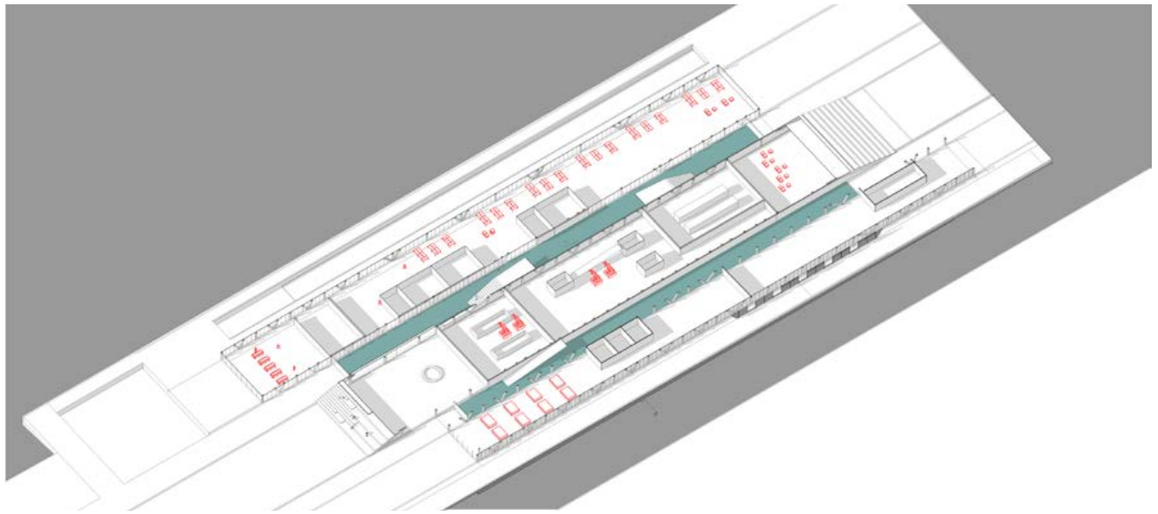
First floor plan



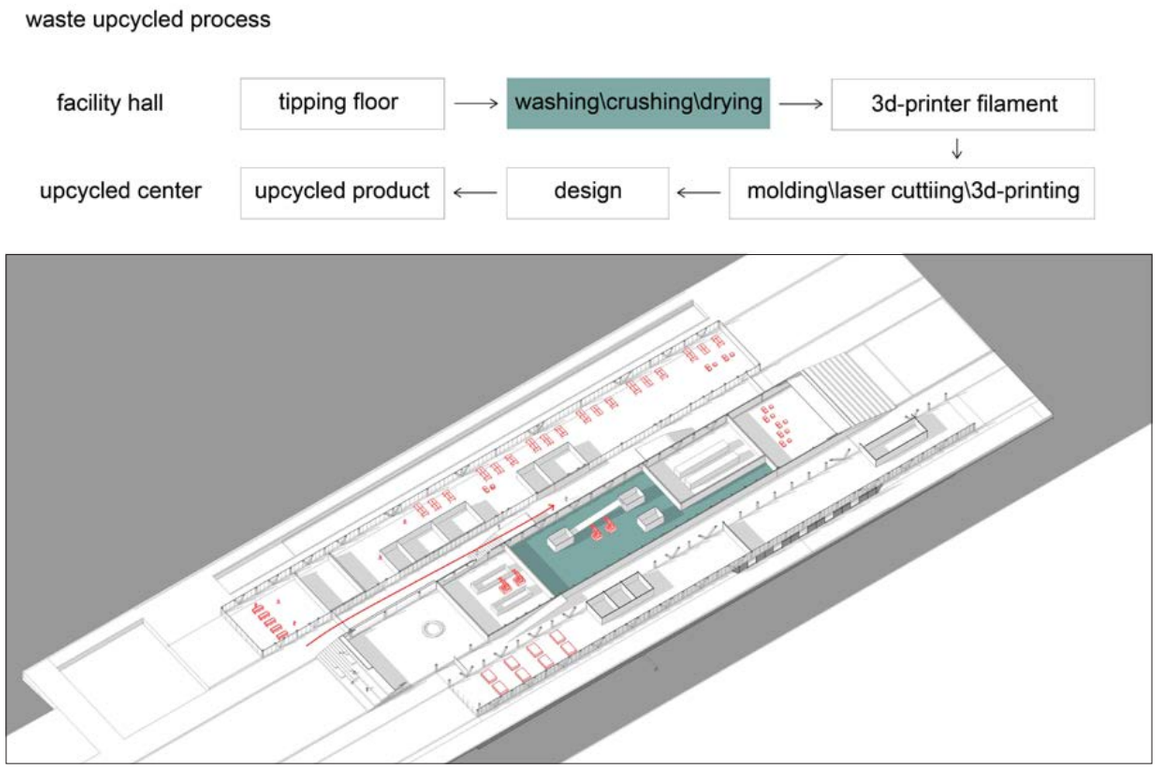
Second floor plan

SPACIAL EXPERIENCE

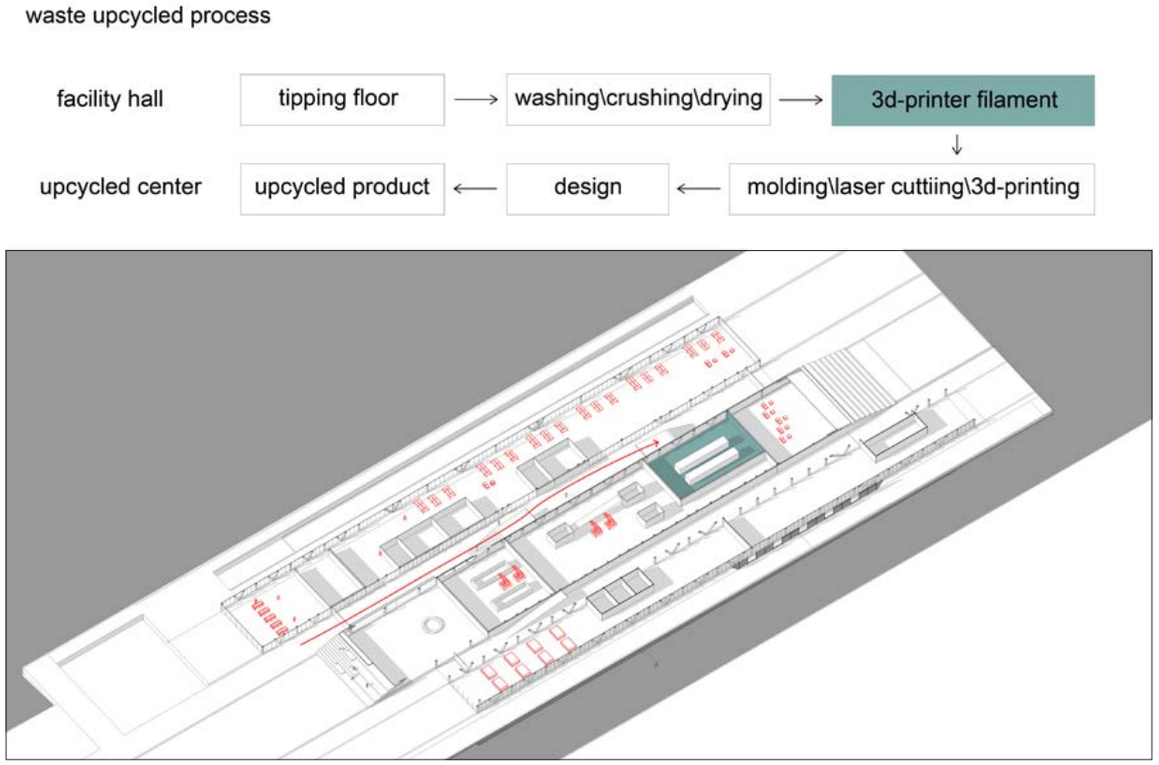
Observation corridor



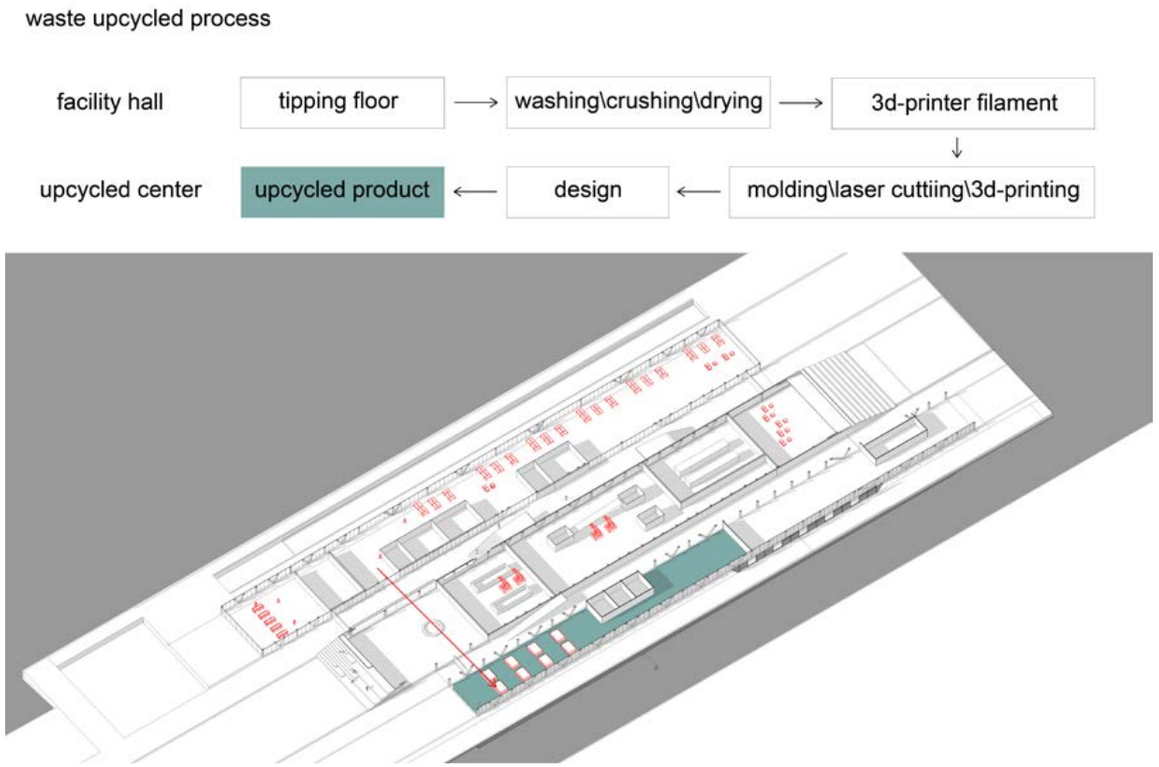
SPACIAL EXPERIENCE



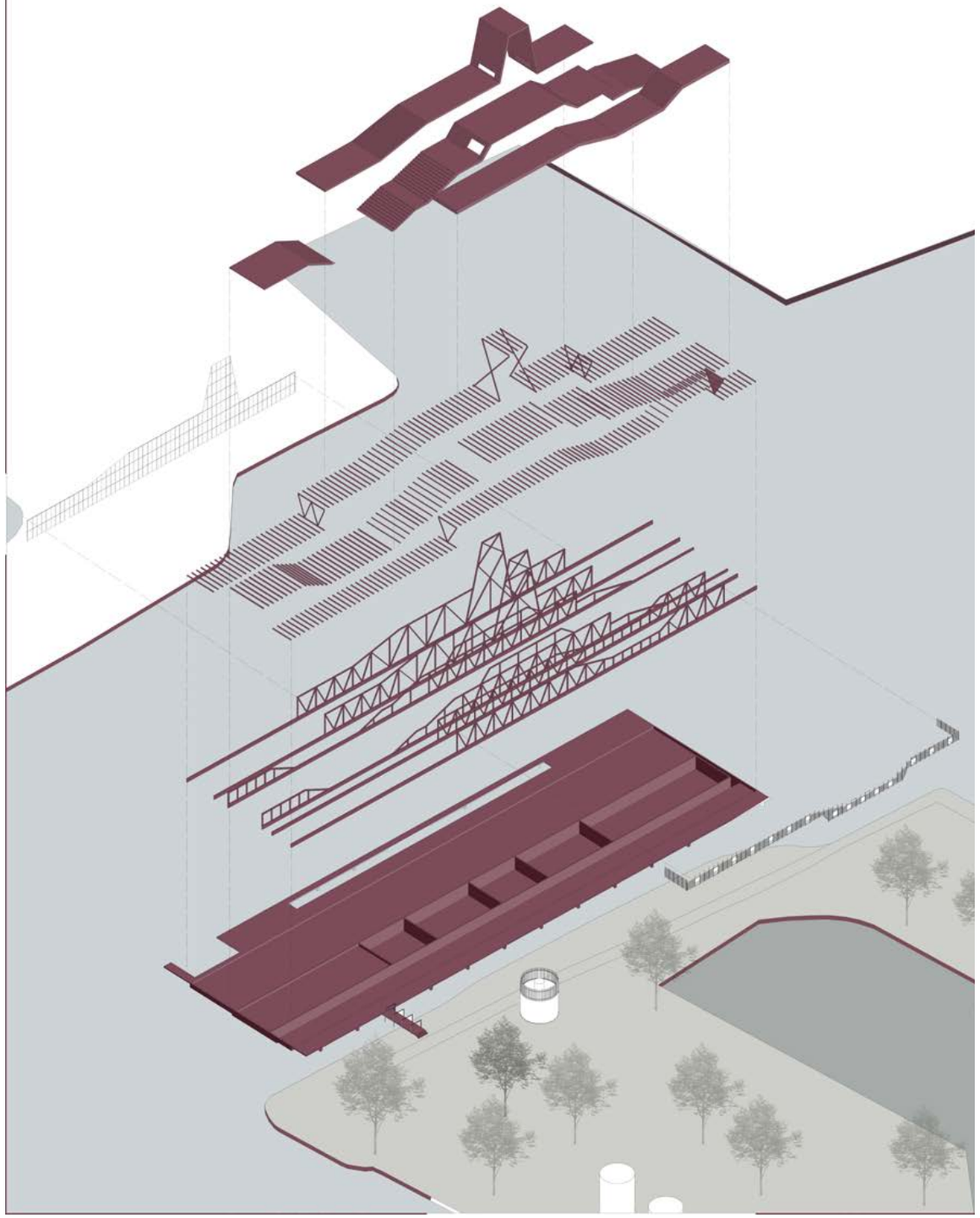
SPACIAL EXPERIENCE

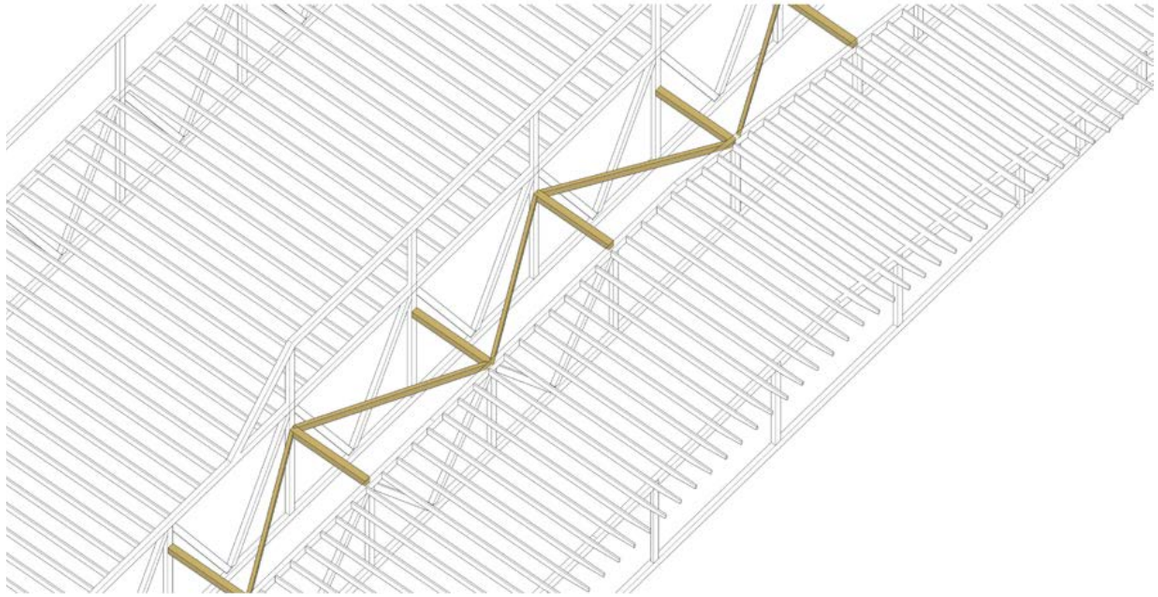


SPACIAL EXPERIENCE

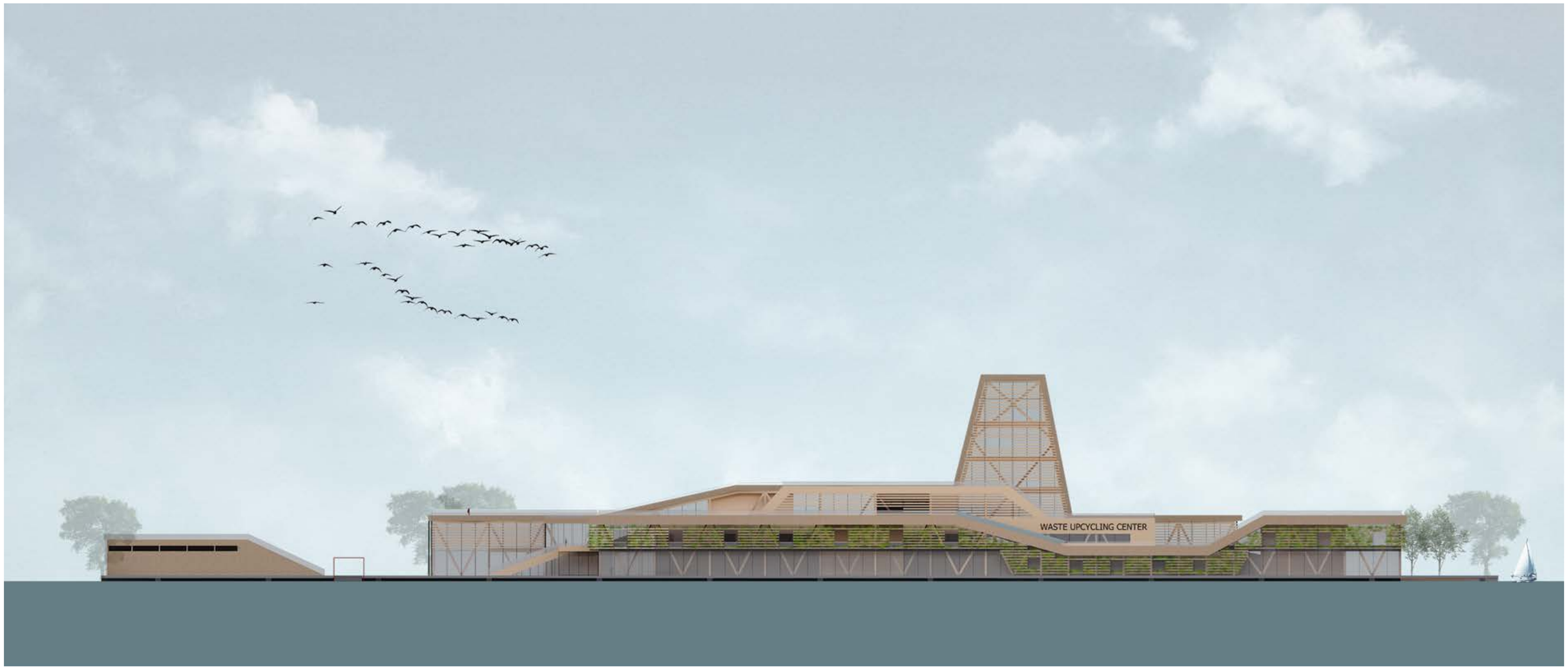


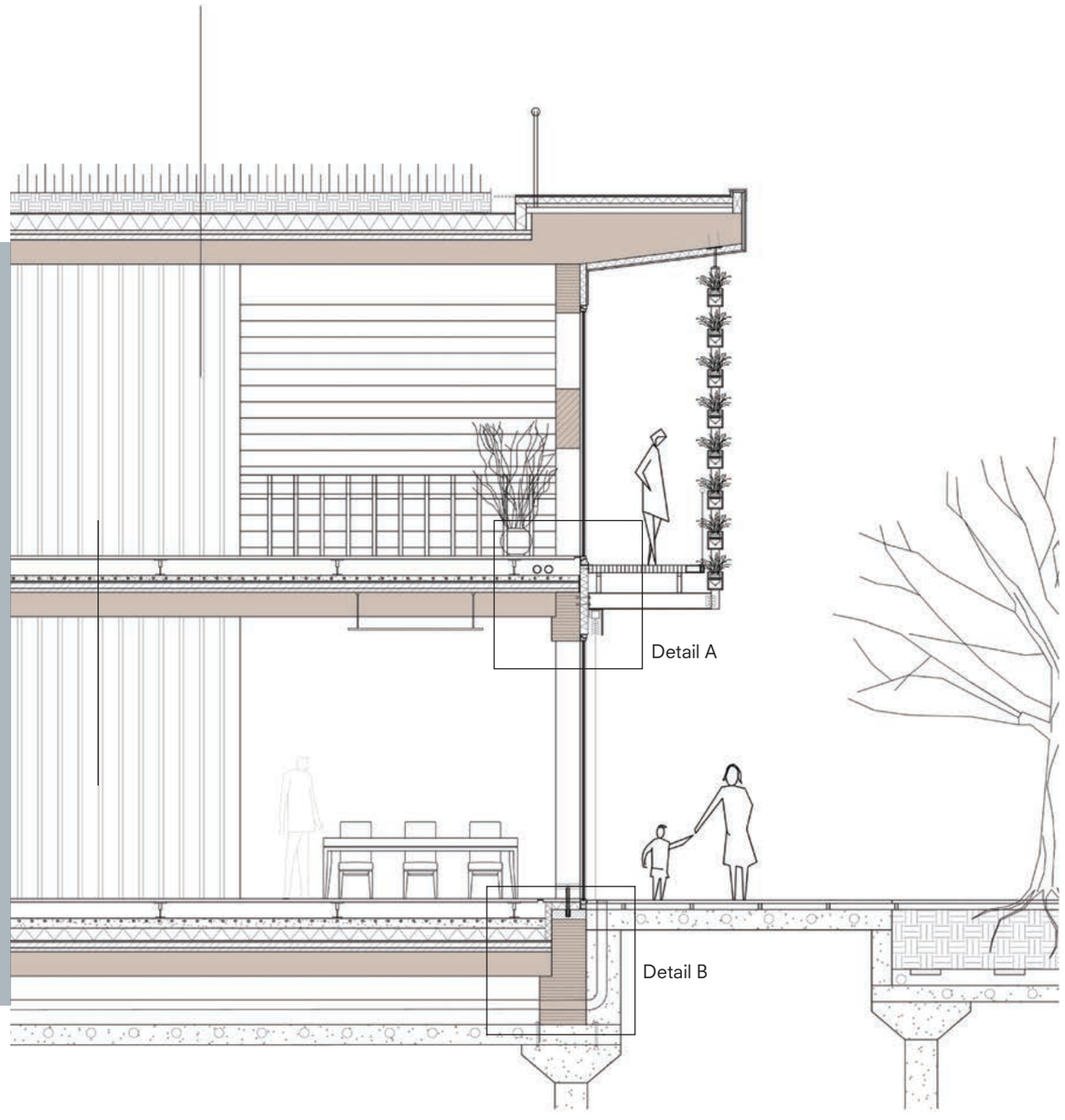
STRUCTURE SYSTEM





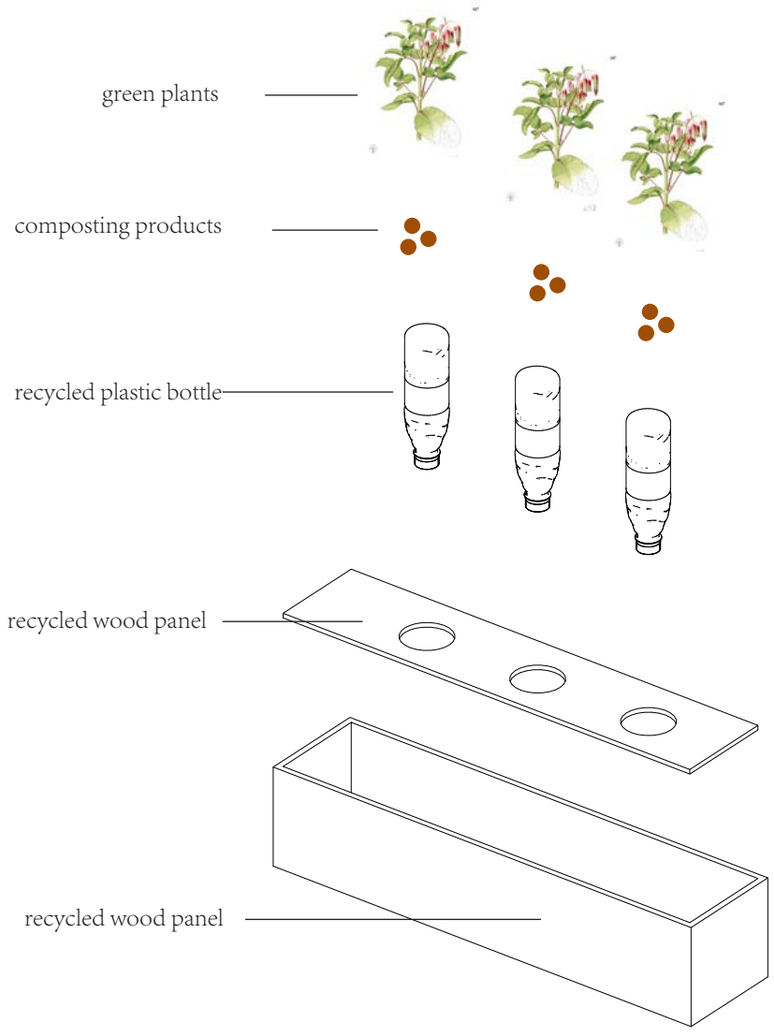
connection between two strips

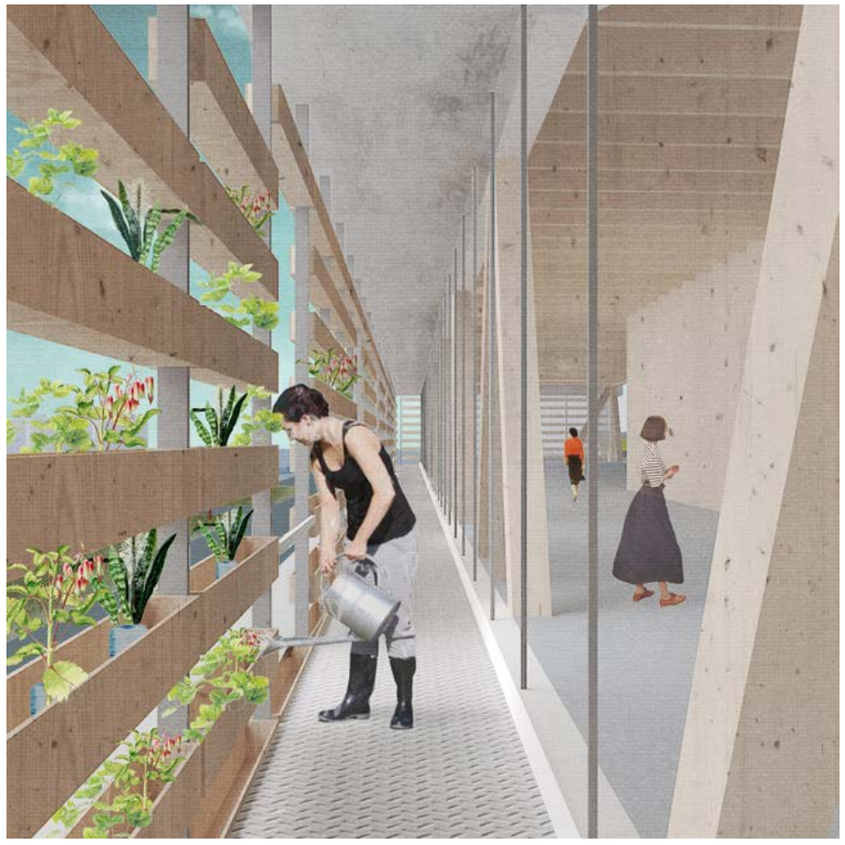

WASTE UPCYCLING CENTER

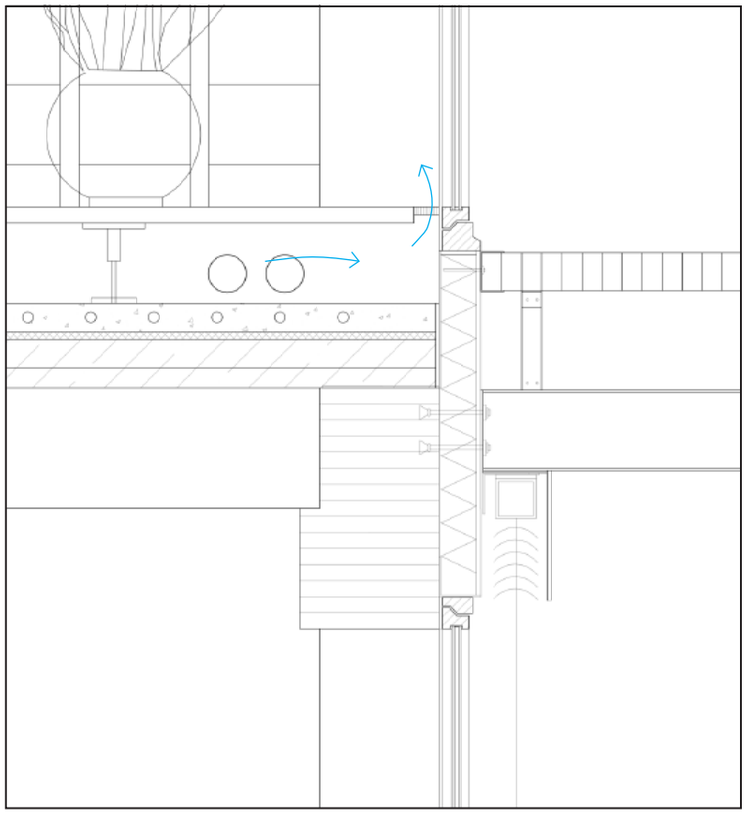


Roof:
250mm cultivated soil from organic composting
12.5mm drainage mat
200 thermal insulation layer
vapou barrier
68mm plywood

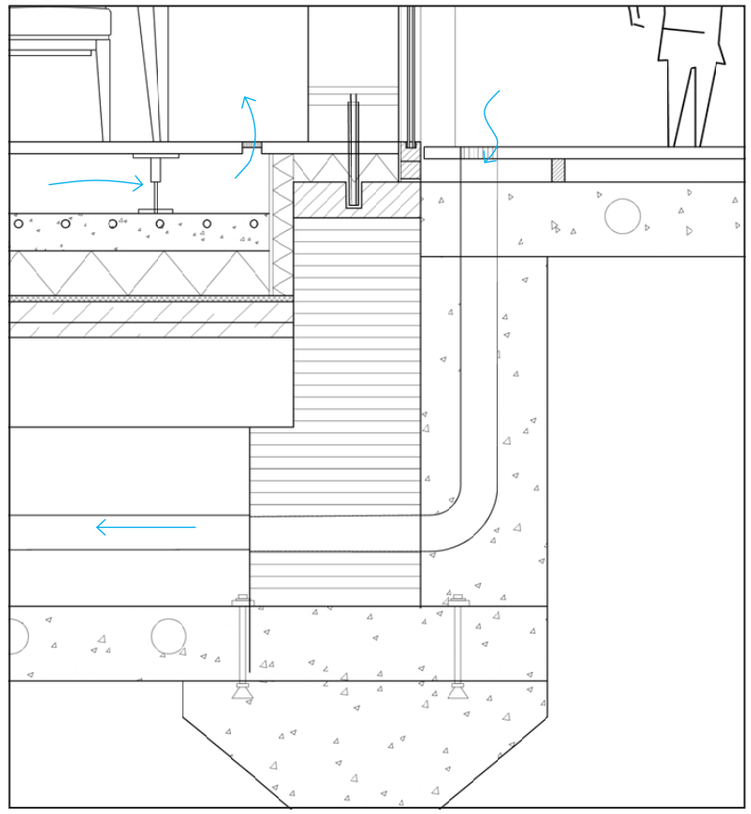
Floor:
prefabricated polished concrete floor raised on steel brackets
200mm cavity for cables and ventilation
70mm concrete floor slab with inlaid underfloor heating pipes
20mm inpact-sound insulation
68mm plywood
300mm glulam beam


green plants
composting products
recycled plastic bottle
recycled wood panel
recycled wood panel

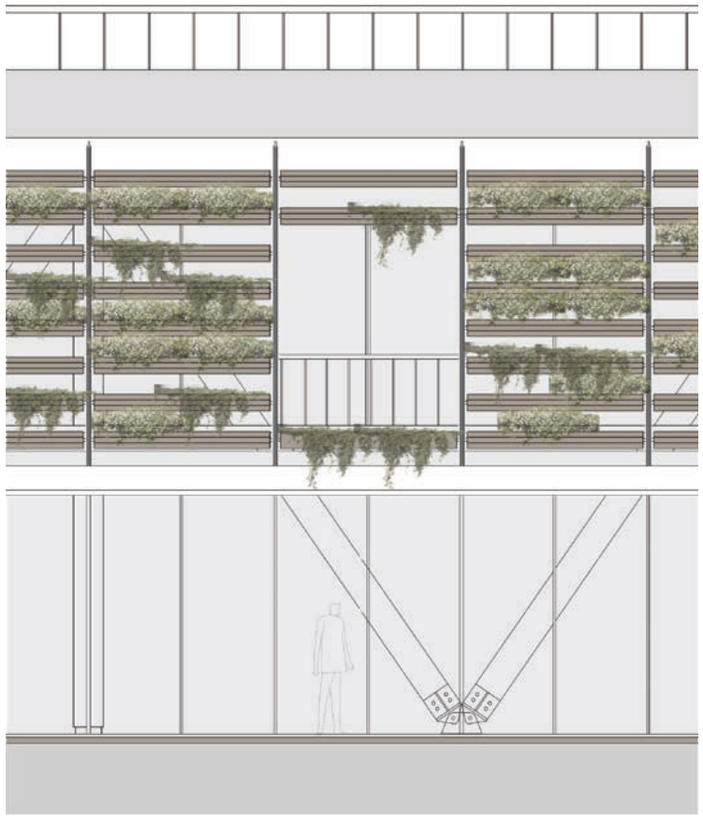




Detail A



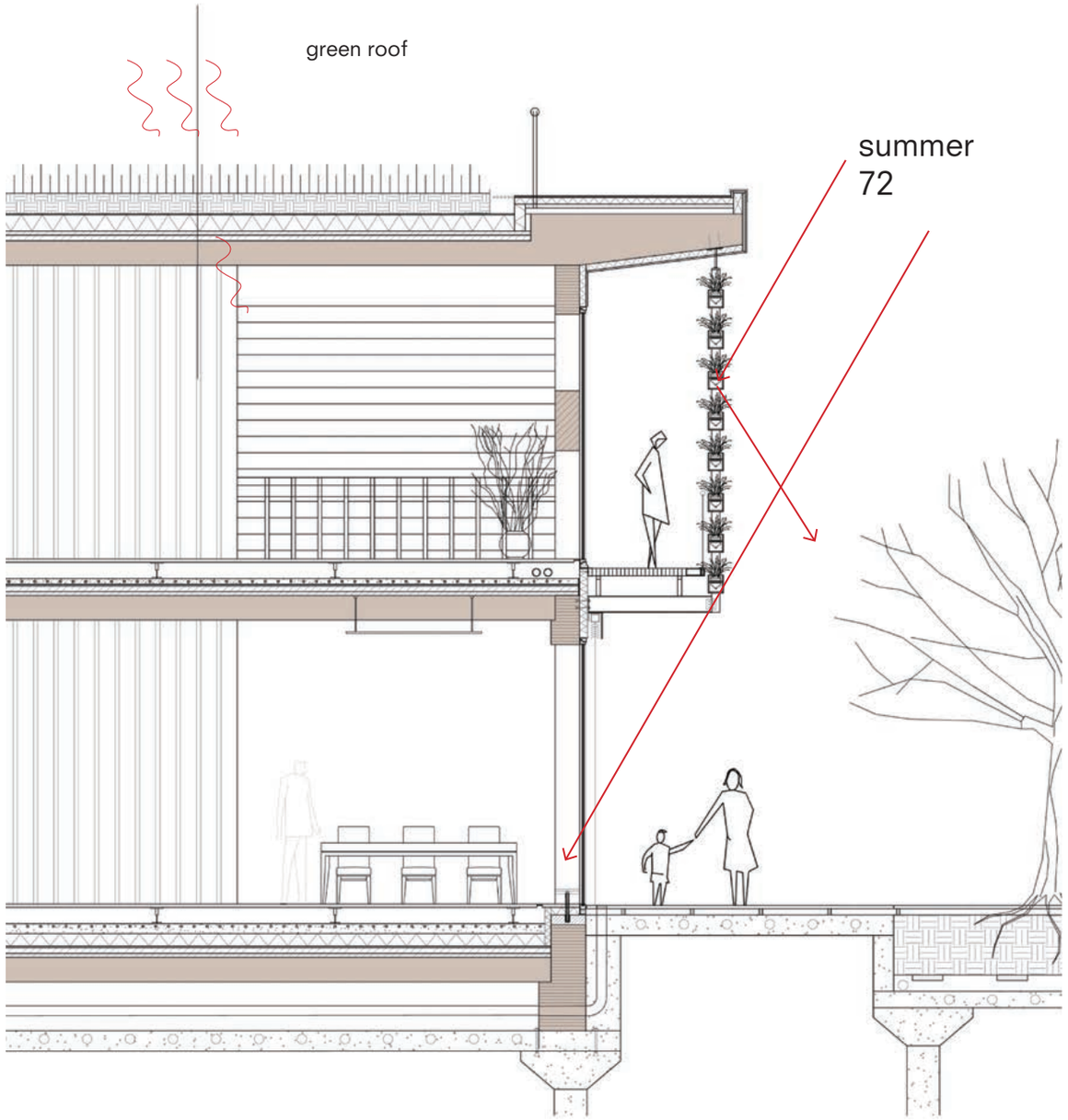
Detail B

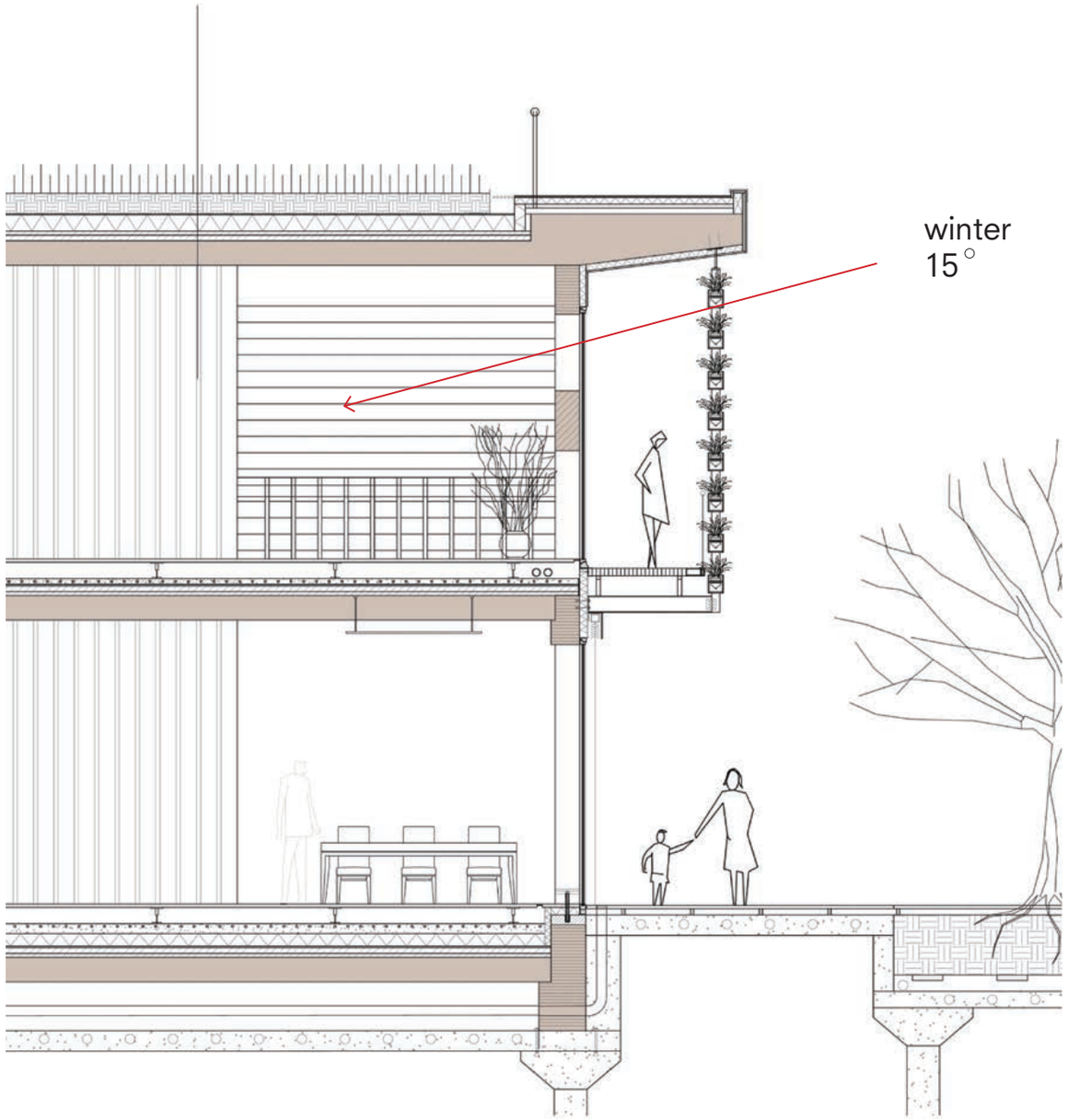


South facade in summer

South facade in winter

CLIMATE CONTROL

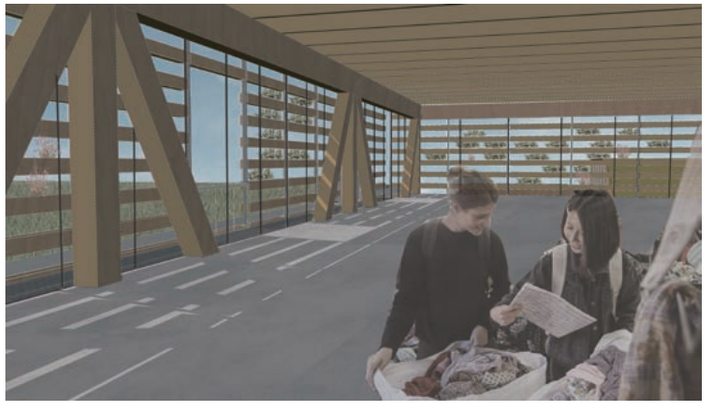




CLIMATE CONTROL

Spring

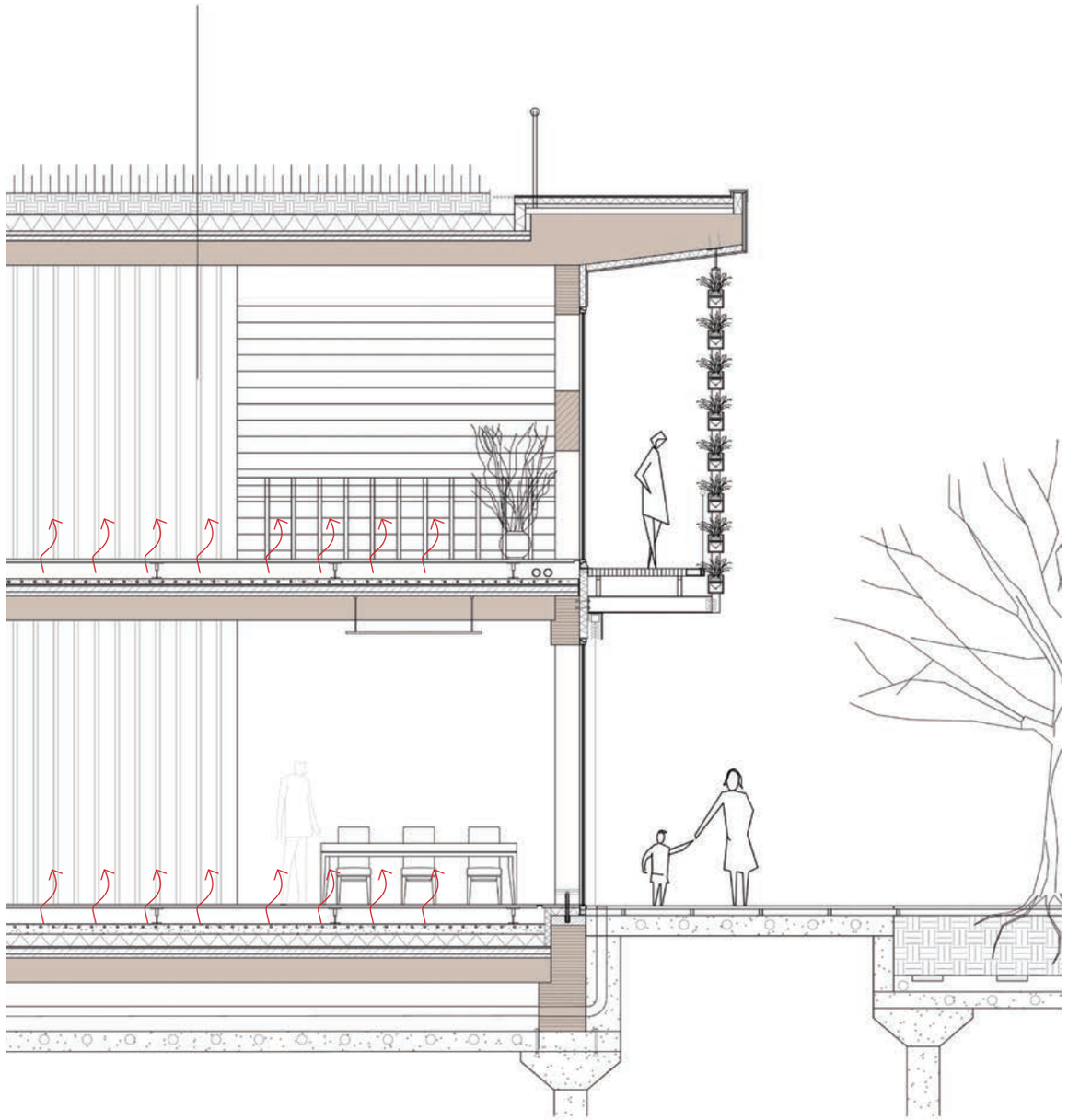
summer



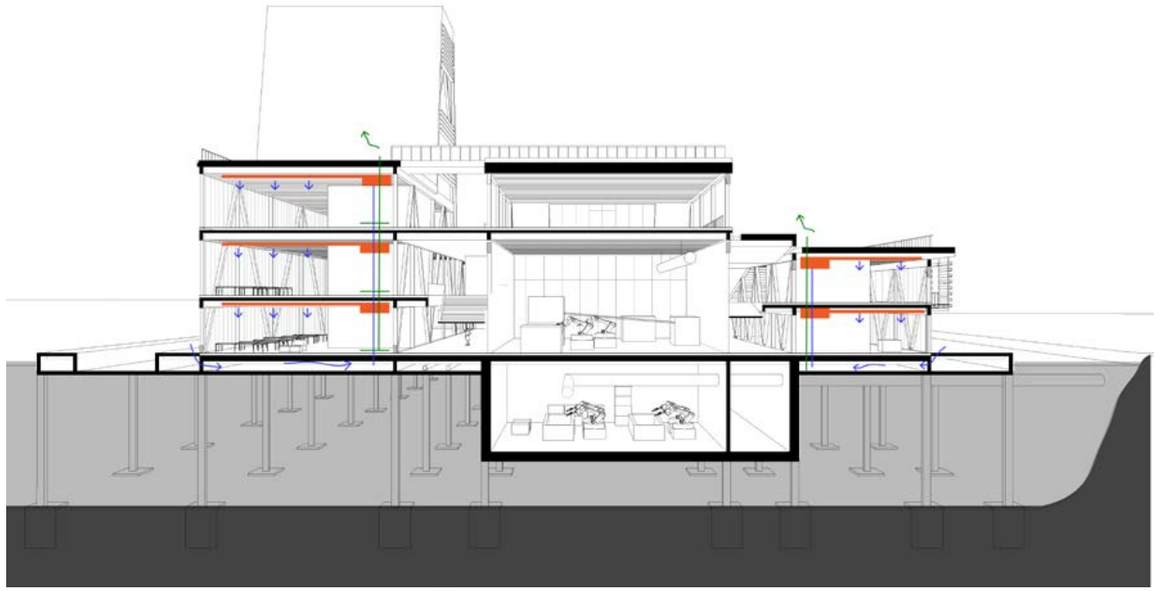
fall

winter

HEATING SYSTEM



VENTILATION




WASTE UPCYCLING CENTER