A REFLECTION ON TRENDY MIX

Designing sustainable mix in urban industrial areas, using M4H, Rotterdam as an example

P2 Report
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ABSTRACT

Urban mixed-use development has been a popular subject in both research and practice. In recent years, stimulated by sustainable development and land shortage, Trendy Mix has emerged widely in Europe, especially in the Netherlands. Trendy Mix is a type of urban design with special form and function. It often adopts the architectural form of Plinth+Tower, where light manufacture and logistics are placed inside the plinth, while the tower is used as living and office.
Though having technical advantages like renewable water, energy and transportation systems, Trendy Mix is not socially sustainable for two reasons. First, its architectural form determines its expensive construction cost, which increases the cost of living and working here. That is, only groups that have received higher education or have more money can establish life there. Second, the traditional noisy industries are pushed towards the city boundary when working and living are combined. This increases the living cost of factory workers as they now have to spend more money and time on their daily commute.
Starting with reflecting Trendy Mix, this project aims to design a socially inclusive urban mix that integrates living and working in a creative and diverse way. The site is Merwe-Vierhavens (M4H), Rotterdam. M4H is a port and manufacturing area, part of which has been transformed into makerspaces for innovative industries in recent years. It will become a Trendy Mix according to the local municipality's plan, therefore, this location is selected for the project.

The methodology of this project is research-and-design synergy. This project conducted multiple designs, each having a different focus. For example, the first design aims to list all possible working and living mix models; the second design focuses on testing feasible mix models in terms of living-working ratio and connectivity. From the third design onwards, the project focuses on maximizing social sustainability through public space and programmes. Research is distributed before, during, and after each design. The research has two purposes. One is to provide the theoretical basis and suggest potential design directions. The other is to analyze and evaluate whether the result has achieved the design goals. This alternating design & research approach produced the results and findings of this project.

The conclusion of this research is two-fold.
1) The project provides a sustainable mix design for M4H, including masterplan, section, zoom-in, and rendering. The main spatial measurements are a combination of living and working typologies, public space network, and a gradient landscape.
2) Through design, this project summarizes three values essential for a socially inclusive mix development: creating beautiful neighbourhoods, enhancing connectivity among communities, and providing diverse work, live, and amenities to everyone. Furthermore, the project concludes six vital principles for the values to be realized in design. These include mixing living and working horizontally, introducing nature into urban districts, and a gradient transition from public to private, etc.

KEYWORDS

Mixed-use development,
Separation of work and living,
Urban industry,
Merwe-Vierhavens (M4H).

1 INTRODUCTION

1.1 TRENDY MIX - IS THERE SOMETHING WRONG?

1.1.1 From mix-use development to trendy mix: a brief history

Urban mixed-use area is not a new term. There has been a mixing of different functions since the 1900s. Scales also determine whether an urban area is a mix or not. A city can be called a mix because there are living, working and amenities in it, and they are mixing. Therefore, a precise definition of the research objective is required to prevent chaos in the research. This project will research on trendy mix, a new type of urban mix development that has appeared since 2005 and evolved over the years. To define trendy mix, this chapter will briefly reviewed the history of urban mixed-use development.

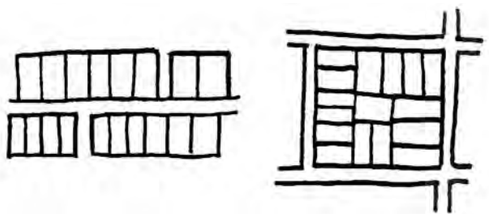
Mix-use development is commonly defined as mixing living, working and amenities. They are often constructed at building, neighbourhood, street, block, and the whole city scale (Rowley, 1996). They can also be found in different contexts, such as traditional neighbourhoods, newly developed suburban districts, declined industrial areas, and bombed areas after WWII.

To start off, mix-use development was first constructed in city centres around 1900. Early projects are often summarized as the traditional European City centre, where living and other programmes that are necessary for daily life are compacted in buildings and streets. They can be as simple as buildings that have shops on the ground floor and living on the upper floors. Their morphology is often rows of houses arrayed into streets or enclosed into a square (Coupland, 2005).

Being able to promote sustainability and livability, mix-use has become an essential urban design principle in cities (Coupland et al., 1997; Rowley, 1996; Hirt, 2015) Why can they have such effects? Academia had intense debates about it, and the generally accepted conclusions are as follows: Mix-use development can increase social sustainability by providing jobs and amenities to various groups of people. It minimizes vehicle traveling by encouraging walking and biking. Because programmes in the mix make eyes available on the street all day, it makes the city safer. (Hirt, 2015)

To start off, mix-use development was first constructed in city centres around 1900. Early projects are often summarized as the traditional European City centre, where living and other programmes that are necessary for daily life are compacted in buildings and streets. They can be as simple as buildings that have shops on the ground floor and living on the upper floors. Their morphology is often rows of houses arrayed into streets or enclosed into a square (Coupland, 2005).

London Peabody Housing
Source: https://www.nationalarchives.gov.uk/

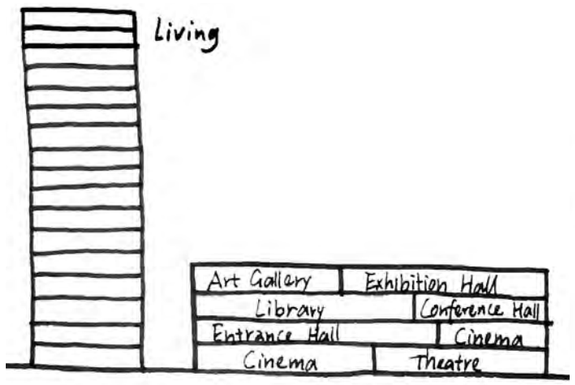


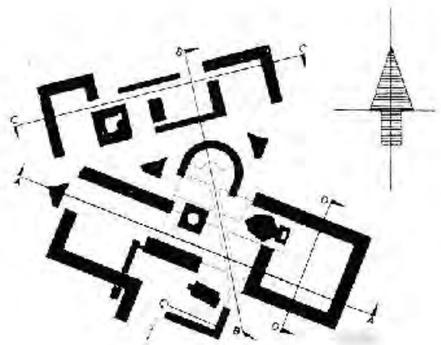
From 1940 to 1960, cities attempted to add more components to mix-use projects. Infrastructure/production facilities are added to existing mixed-use streets and squares. Continuing to support daily lives, they started to stimulate economic activities (Hirt, 2015). For example, Groot Handelsgebouw, built in 1953, has warehouses, showrooms and offices for wholesaler business, and also prepared with a courtyard, restaurants and shops.

Groot Handelsgebouw, Rotterdam
Photograph by A.J van der Wal

In the 1980s, modernist architects joined this design process. They developed new combinations of mix-use, which provides state-of-art cultural and social services. For example, in 1982, the Barbican Centre, a mix of living, art and exhibition was open to the public. In 1989, Lingotto Fiat Building, a complex of art centre, shopping mall and hotel was constructed and put into use.

London Barbican centre
Source: https://www.barbican.org.uk/

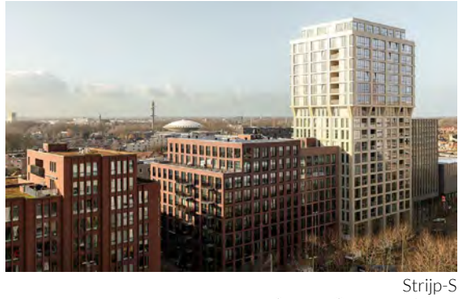




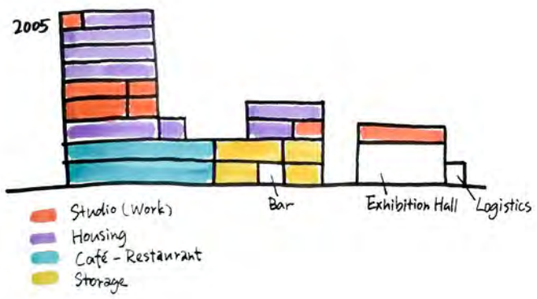
Plan of Barbican centre
Source: https://www.barbican.org.uk/

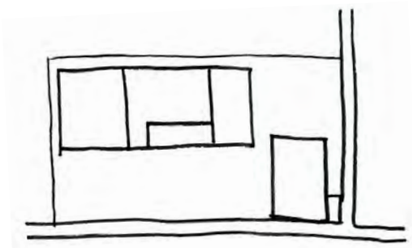
So far, we can conclude that mix-use development that appeared in the last century is mostly about adding, subtracting and combining functions to the traditional blocks or modernist buildings. The purpose of these mix-use developments is always to improve the economic and public life benefits.

From 2005 on, a revolution of mixed-use development has begun. Designers focused on a new type of urban neighborhood where increasing economy is the goal, and mixing living and working is the main strategy. The way designers mixed functions also has made progress, as shown in the drawing. Hence, a new model of mixed-use emerged. Famous projects of this phase are Strijp-S and Hamerkwartier. They will undergo renovations around 2019, their original designs follow the mixed-use model described above. From 2005 to 2014, this phase then concluded as the developing phase of trendy mix.



Strijp-S
Source: Orange architect





From 2014, the trend of Urban Mix is further developed to a new phase: Increasing economy is no longer the focus. Sustainability (of environment, energy, and ecology), livability of the community, and development in innovative/ technological industry are the new values. There are huge amounts of urban mix projects emerged worldwide. They follow the same values, choose similar locations, and use some same spatial patterns. These projects have become so fashionable that they can be concluded as a new category of mixed-use development. My research object is these projects, and I named them as trendy mix. This phase can be called as the developing phase of trendy mix. From 2014 to today is defined as the maturity phase. The maturity phase has diverse and flexible ways to mix functions, which I will analyse in the next section.

1.1.2 A Brief Overview of Trendy Mix

In brief, trendy mix is a type of popular mixed-use urban design that first appeared around 2005 and became fashionable after 2014. The value of these projects is threefold: sustainability, livability of the community, and development in industry (innovation/technology/design/urban manufacture). To reach these goals, designers mix the industries mentioned above with high-quality housing and amenities.

Why has trendy mix suddenly become fashionable everywhere? There are several reasons.
Firstly, after decades of zoning-based planning, cities lose their livability as different functions are grouped in their own area of land (Grant, 2002). The need for reconnecting living, working, and recreational uses was in high demand. This need pushed designers to make livable, vibrant and sustainable urban areas (Lane et al., 2020). Mix use is once again welcomed.
Second is the reintroduction of production space in cities. In metropolitan urban centres, industrial gentrification has happened in recent years. Land pricing is high. Therefore, industrial sites that occupied urban centres are relocated to city outskirts where land price is lower. expensive housing is rebuilt on the industrial sites. Yet the loss of urban industry has reduced economic diversity as there are fewer salary-class jobs. Therefore, urbanists and policymakers started to reintroduce production space back into the city, but with new names and schemes like 'makerspace', 'vertical factory' and 'innovation district' (Lane et al., 2020), exploring the future of urban production.
Third is the increasing urgency of sustainability. If urban development keeps racing at its current speed, we might break through the planetary boundary and destroy our future (Steffen et al., 2015). Therefore, urban development needs to balance social, economic and environmental sustainability (Crane et al., 2021). It doesn't mean that none-mix use designs behave worse in promoting sustainability. Yet mix-use development has certain benefits on sustainability, as discussed in 1.1.1. Hence mix-use becomes an essential design strategy for urbanists.

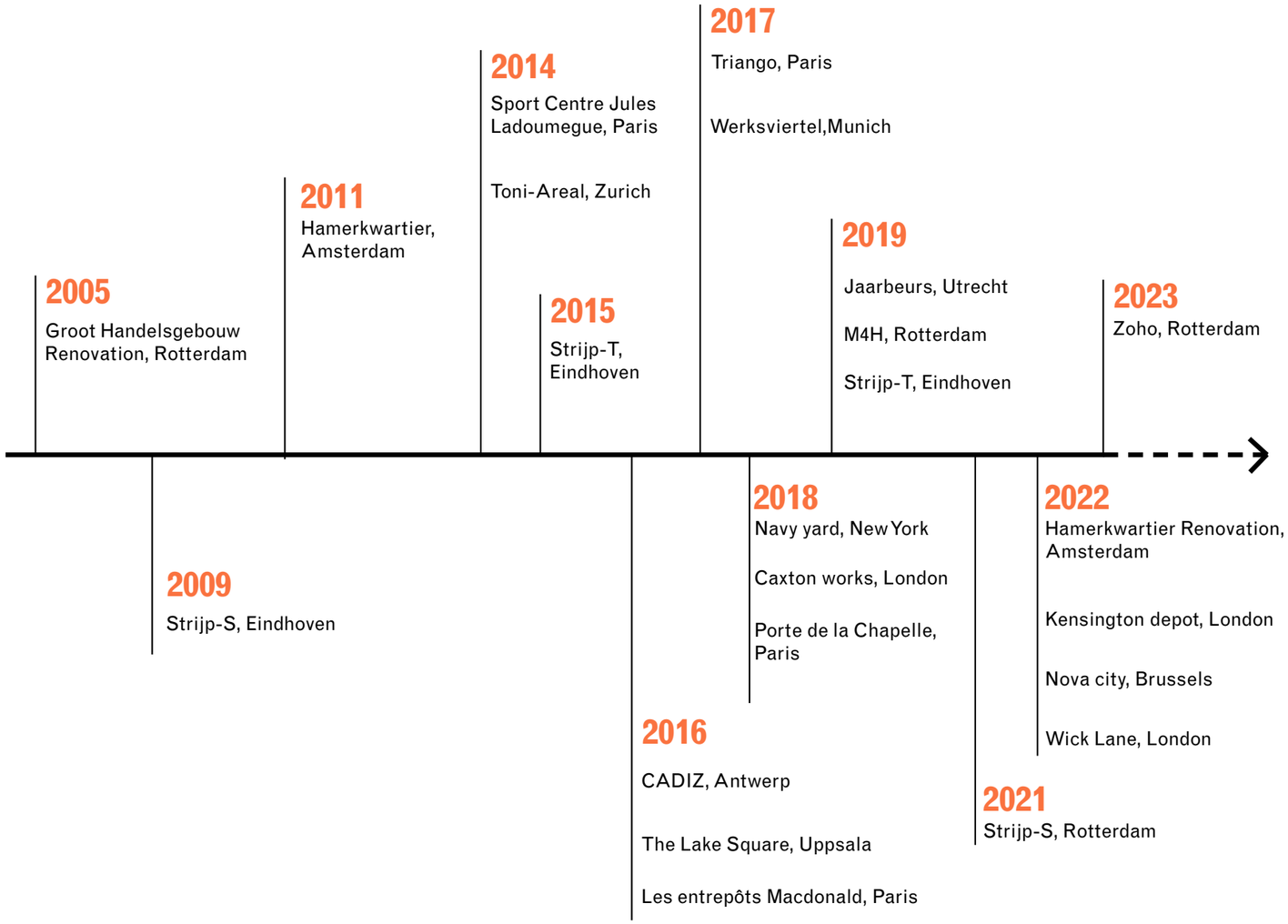
To respond to these requirements, a large amount of trendy mixes were designed and constructed. I will first discuss the common features of these projects.

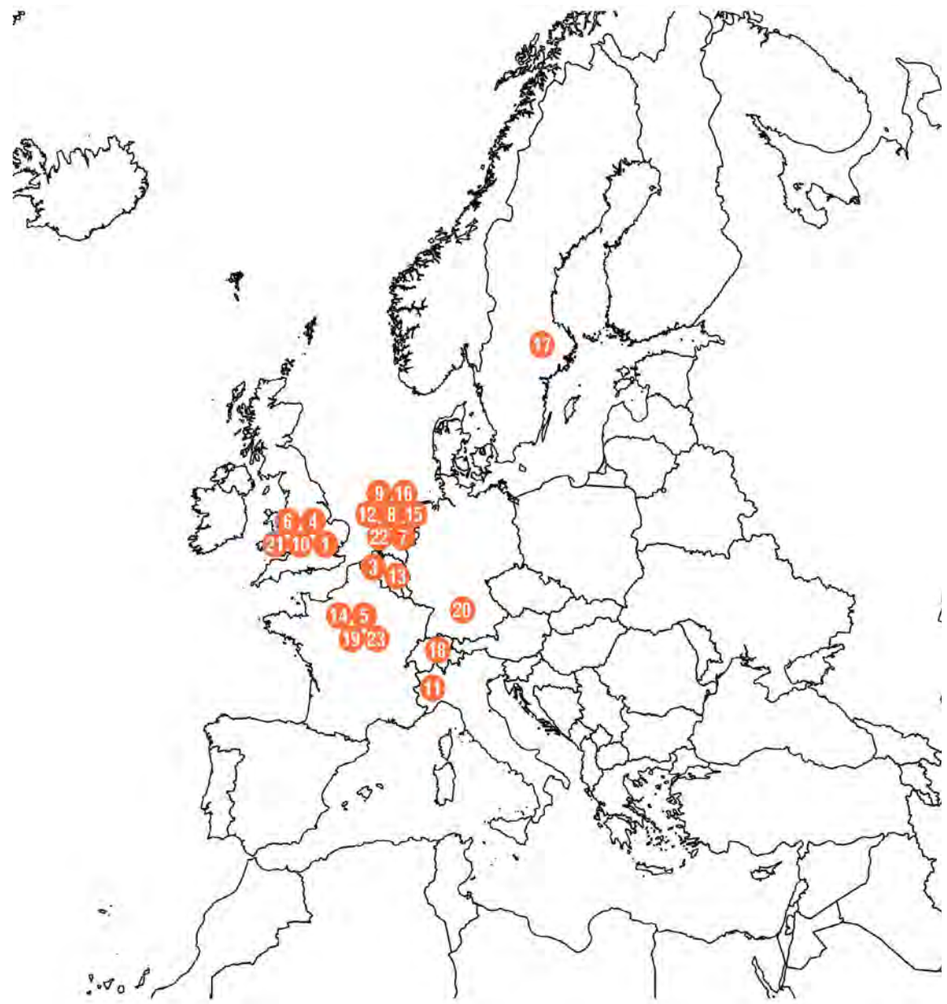
A typical Trendy Mix - Werksviertel
Source: https://werksviertel-mitte.de/

Timeline and geographical distribution
As shown in the diagram, Trendy Mix emerged around 2000s, refined around 2014, and became fashionable since 2018. Geographically speaking, trendy mix first appeared in major metropolitans in Europe and the US, like London, Paris, and New York.

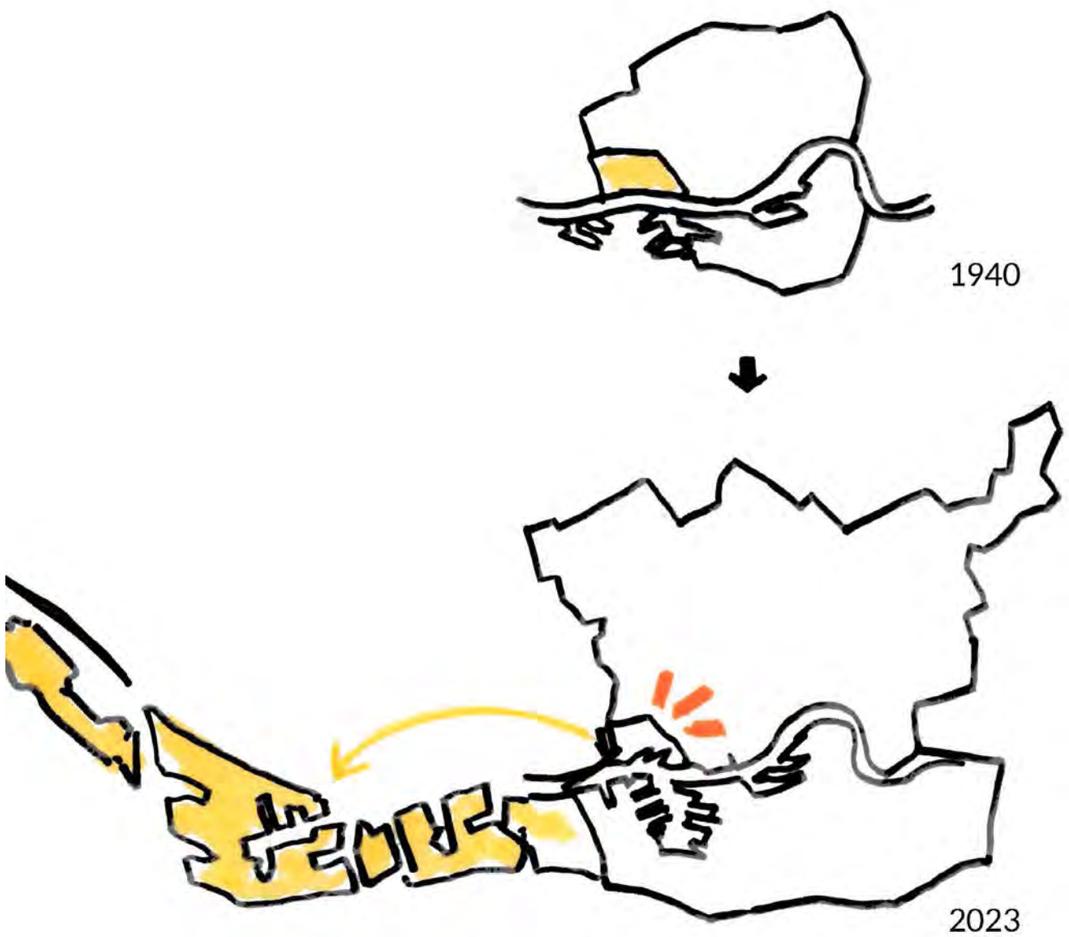
However its development in the Us is not as extensive as in Europe, that might be because of the urban sprawl and land separation in the US (Hirt, 2015).

No.	Name
1	Barbican centre, London
2	Brooklyn Navy yard, New york
3	CADIZ, Antwerp
4	Caxton works, London
5	Centre Sportif Jules Ladoumègue, Paris
6	Faraday works, London
7	Groot Handelsgebouw, Rotterdam
8	Hamerkwartier, Amsterdam
9	Jaarbeurs, Utrecht
10	Kensington depot, London
11	Lingotto Fiat Building, Turin, Italy
12	M4H, Rotterdam
13	Novacity, Brussel
14	Porte de la Chapelle, Paris
15	Strijp-S, Eindhoven
16	Strijp-T, Eindhoven
17	The Lake Square, Uppsala
18	Toni-Areal, Zurich
19	Triango, Paris
20	Werksviertel,Munich
21	Wick Lane, London
22	Zoho, Rotterdam
23	Les entrepôts Macdonald, Paris

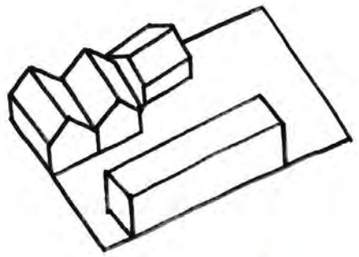




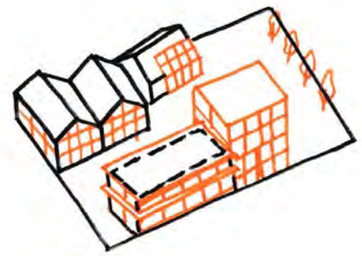
Location
In the 1940s, cities were not as humongous as it is today. Industry areas are often placed near railways and/or canals for convenient transportation. At that time, industrial areas are often at the edge of the city. As the city expanded, industrial areas on the edge were devoured into the city, and in some cases like London, became urban central areas. Meanwhile, industries often move to the new edge of cities, suburbs, or even to less developed small cities. Then, the old industrial sites become either empty land or are occupied by local small-scale industries.
In these locations, new designs emerge – Trendy Mix. Although not all trendy mixes are built upon old industrial sites, most of them do choose industrial sites as the location.

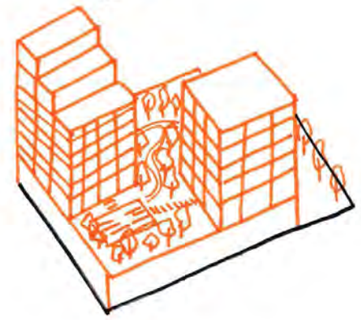


Spatial pattern
Treny Mix has several spatial patterns as described in the diagram, i.e., densification, courtyard for housing, residential and office towers with plinths, and a large variety & quantity of service programs in buildings. It is the result of the original (industrial) typology and the design/renovation strategy.


An industry area

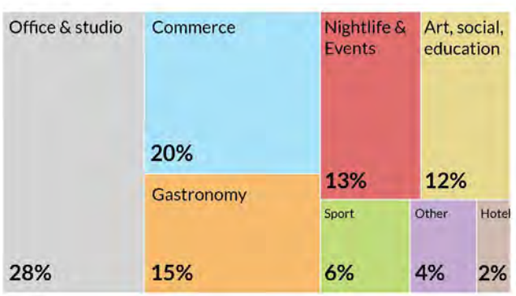

Add new programme but keep buildings the same


Renovate building and partially expand

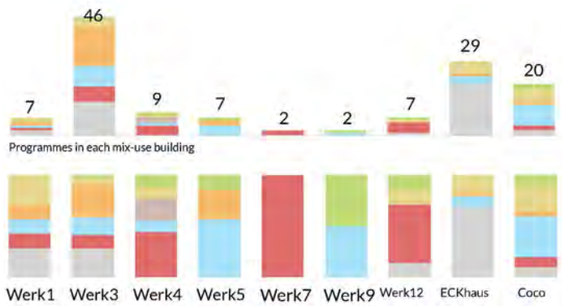

Demolish and build new ones, often towers with plinth

Programme
Unlike the early mix where functions are loosely combined, Trendy Mix usually has a uniform combination of working, living and service. In terms of working, many of them specifically have small-scale manufacture, business start-off, and makerspace in addition to regular offices (Ryckewaert et al., 2021).

In one Trendy Mix, living, work, and recreation sometimes are mixed by 'zoning', sometimes mixed more organically. This is the programme analysis of Werksviertel, Munich. In the diagram, you see that many times the three functions are also mixed in one building.
And the statistics down below show that the recreational programmes are very diverse. And most buildings have more than one recreation programme. This is a vibrant, energetic, successful city image.



Programme in Werksviertel

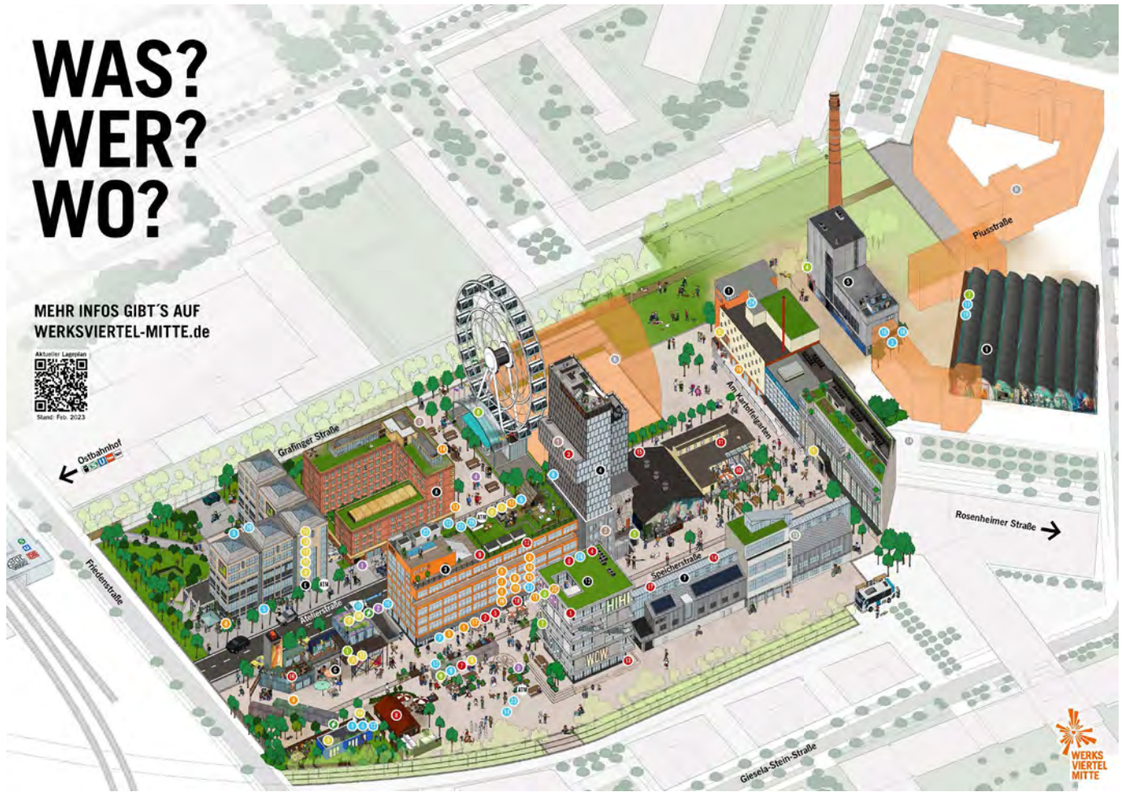


Porportion of programmes that are mixed in buildings

Why should we rethink about it?
In design brochures, speeches and exhibitions, trendy mixes are analysed to be more sustainable and livable, compared with the zoning urban areas and traditional communities. I have worked on a Trendy Mix project with a design office and very much enjoying it. But when I found out a lot of offices are designing similar Trendy Mix here and there, I started to think about whether it is an ideal solution for all the sites.
Looking at my work and relevant cases, here is my first thought: Most of the Trendy Mixes only mix highly educated people with relatively high incomes. Immigrants, the elderly, and children are less considered in the design. Less thought is given to what will happen to the target group after one or two decades - when they get older, have families, get promoted, fail, or struggle in their careers. Housing and amenities in Trendy Mix are often expensive, and not open to all groups of people. You might think, housing and amenities in the urban centre are also expensive. But the street and square typology, and the social atmosphere in general is totally open to the public. But the typology and atmosphere of Trendy Mix is somehow enclosed. In addition, only a limited category of works are mixed. Due to the presence of residents, it is not possible to place heavy industries and large-scale logistics. In general, Trendy Mix mostly has innovative technical & design industries, sometimes with light industries like furniture manufacturing or food packaging.

Although they are called a mix, they are not mixed enough. And the societal sustainability of these sites is not enhanced.

With further research, I found that there are even more contradictions between the design of the trendy mix and the goals they aim to achieve. In the next chapter, I will reflect on it in detail.



Source: werksviertel-mitte.de

1.2 A REFLECTION ON TRENDY MIX

As a design-oriented project, the purpose of reflection is not to trace the problem's origins but to recognise that there is something wrong with Trendy Mix. The purpose of research in this section is to make better designs, rather than provide an academic justification for why the current situation is bad.

First, they are not socially sustainable because only certain work (highly educated jobs) and people are mixed. Second, they decrease a city's stableness and resilience. Trendy mixes are often built on urban industrial sites. They force out necessary industrial functions that are vital to the running of a city, such as food manufacturing and waste management, to either disappear or relocate to suburban areas. Third, there is a risk that designers blindly fall for trendy mix, especially when there is strong publicity behind it. PR package trendy mix in a way that highlights its advantages while hiding away its drawbacks.

If designers cannot make objective decisions, we might produce an excessive number of trendy mixes that later turn into problems.

1.2.1 Reflection on sustainability

Trendy Mix is not socially sustainable. This can be seen from three aspects: work, living, and amenity.
Most of the works in Trendy Mix are shown in the diagram. A significant portion of them are small-scale business start-offs.
The industry involved (manufacture, technology application/innovation, and design & art) requires highly educated people. It does need some people to be janitors, cook, waiters, and truck drivers to support the running of this mix. But no matter what you do to the site, they always have these job vacations. So the increment jobs are still highly educated ones. This is not inclusive.

Work

Manufacture
- Prototyping
- Early-stage manufacture
- Furniture manufacturing
- Metalware Fabrication
- Construction Material Production
- Car repairing
- Food processing & packaging
- Recycled material products

Technology Application and Innovation
- Interdisciplinary application of tech, biology & design (wearable technology, rototics..)
- Life science (medical tech)
- Climate adaption business
- Product research and design

Design and Art
- Fashon
- Interior design
- Graphic design
- Architecture & urban design
- Artist studio
- Musician studio
- Exhbition & theatre space
- Media & film production

Summary of Trendy Mix work types

The diagram shows the number and percentage of different types of companies. 64% of the companies are Trendy Mix work type summarized on the previous page. In regular office companies, the third are businesses that provide a trendy mix of business services environment, such as insurance, security, and contractors. The regular ones that are not that publicized are surprisingly more socially sustainable, because they provide jobs to various groups of people.

Manufacture
4, 16%

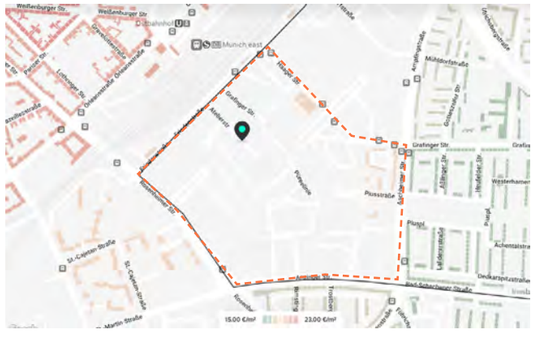
Technology application and innovation
5, 20%

Design and art
7, 28%

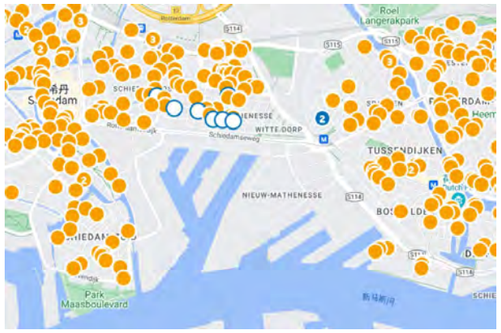
Regular office company
9, 36%

Living

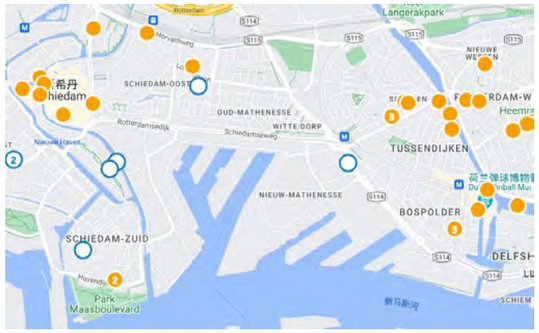
As shown in the maps. Werksviertel has medium, cheap, and expensive housing options. This is socially inclusive. But looking at the housing inside Werksviertel, There are only medium housing type (a bit monogeneous), and there is not much housing. This means many people live outside and work inside. The housing needs are dependent on the areas around them, In Werksviertel, it is not a problem, but in areas that don't have a healthy housing market around like the Netherlands, this might become a problem.



Housing price
Source: https://www.immobilienscout24.de/



Housing to buy
Source: https://www.funda.nl/

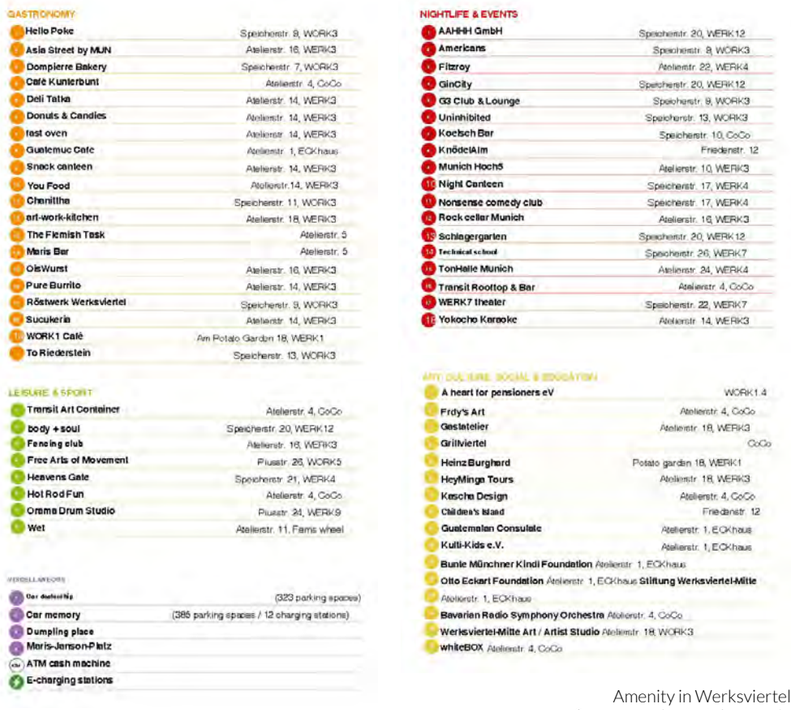


Housing to rent
Source: https://www.funda.nl/

Amenity

If you look closely at the amenity programmes, you can find that they focus on the recreational activities of a few groups of people at one stage of life (European middle-class ?). I, for example, don't think these entertainments are attractive to me. In addition, as the target group grows older, starts a family, or moves up the career ladder, their needs change, and these recreational activities may not necessarily match their needs. The long-term sustainability of amenities may not be very good.

Projects like Strijp-S have fewer recreational activities, or activities with fewer options. There is adequate leisure in the workplace, such as gym, catering, walking, sports, and café. But the point is to make the workplace in Trendy Mix comfortable, rather than making Trendy Mix a livable community.



Amenity in Werksviertel
Source: werksviertel-mitte.de

1.2.2 Reflection on urban production space

Urban production is back, but the type has changed, which can decrease the stability and resilience of a city. Trendy mixed are often built on urban industrial sites. They force essential industrial functions that are vital to the functioning of the city, such as food manufacturing and waste management, to disappear or move to the suburbs. Of course, there is a certain amount of manufacture in Trendy Mix. However, according to Croxford et al. (2020), manufacturing falls into two categories, fundamental products that support people's daily lives (food, bikes, clothing, furniture) and specialist markets (electronic, software, customized products). Trendy Mix mostly produces the latter.

Types of work in urban production space

Job type	Job description	Recruited group of people	Industry site	Trendy Mix
Low-skilled manual labour	Assemblage for products, warehouse labour, food processing, waste management, repair	Always have demand, often informal, generally low paid, recent immigrants, long-term unemployed, disabled people	+++	+
Technical skilled labour	Electricians, Plumbers, Machine operation	Technical college and training institution, Some are affected by automation and some evolve with it	+++	++
Knowledge-intensive labour	Chemical, civil engineering, electronic, mechanical, and design	High education Replace the first two types of jobs or Get replaced by automation	++	++++
Management and public-facing	Process management, Human resources, communication	Know the basic of the industry Career is not related to one industry	+	+
Supporting services	Cleaning, logistics, catering	Low-paid, low-skill	+	+

* This table is generated from research of Croxford et al (2020).

When work and life mix, some functions are lost or contradict with each other. Logistics and some manufacturing industries are too noisy to mix there. Some manufacturing (especially highly automated ones) can't be associated with living there because they are dangerous for kids. When you mix a neighbourhood with industry, you get a neighourbood alone in the darkness because factories do not have activities and lighting at night. It is not the optimal surrounding for a neighbourhood.

These reflections comes from design tests, and will be more in the future.

1.2.3 Reflection on PR

There are two main aspects to reflect in this section.
One is marketing in urban design. We can say that PR is human nature. But packaging things prettier than it looks so people will buy them is not honest. It makes people lose sight of the real things, as these renderings and real street photos show.

Trendy Mix is also such a packaged product. Urbanists are impressed by the marketing. So they must be very careful about it, not get confused but to see what is actually happening in M4H. Looking at the PR material, you feel that you are designing a future mix, a vibrant work and living community. But going to the site, you see there are much fewer things going on, and basically I'm still handling an industrial site.

PR | Reality

Waterfront street

Harbour

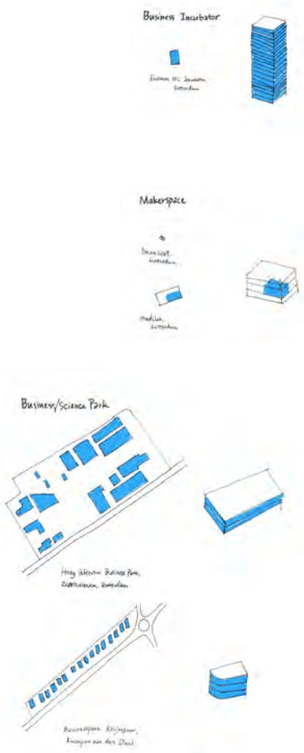
Makerspace

Factory and warehouse

Source: Delva

Photograph by author

Here's a case study to illustrate how PR affects designers. We all know these marketing words like business incubator, makerspace, business park, and innovation district. We also know they present in one way or another in Trendy Mix's workings, and sometimes are an important part. But what typology they are and what they actually do, we are not so sure.
First looking at the masterplan, we can see that the marketing designs occupies a small part of urban industrial areas. Their publicity is disproportionate to their actual size.



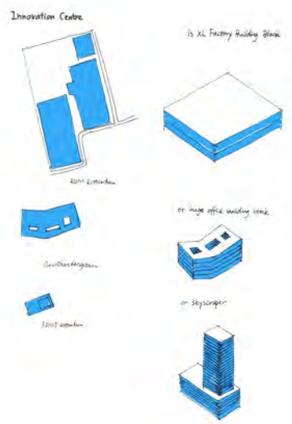
Then I placed all the designs at the same scale and wrote a short summary of their spatial features and functions. All cases are found in Rotterdam.

Business incubator is some cheap-rent office buildings that targets start-ups and small to medium companies. Some of them are regular office buildings, and others are specialized buildings with laboratory equipment. They are scattered in both the ordinary urban fabric and industry areas.

Makerspace is a non-profiting place for learning knowledge. Sometimes people produce products in it, but the point is to learn from making. It looks like a factory or a workshop. It is often found in community spaces like PreK-12 classrooms, universities, public and academic libraries, and museums.

Business park is an urban area for established companies. They look like rows or clusters of office buildings near main roads or highways. They come in different typologies like office buildings and factory blocks.
centre and industrial areas.

Innovation district is urban design that is especially for technological innovative companies. They have two types of designs, either giant factory building blocks or high-res towers with plinths. They can be found in city



Putting incubators and all with Trendy Mix plan – M4H, you see that PR materials are quite small. Looking at the function, you see they are mostly office buildings. In terms of urban design, there are not much innovation.
But PR attract too much attention. As shown in the analysis drawing, many more space needs to be carefully designed, including public space, road, and factories. Designers are less motivated to design these space.

1.3 CONTEXT: M4H

This site had vibrant port and fruit industry in the 1950s. These industries decreased hugely from 1980.

Right now there are some business start-offs, some ports and some manufacturers.

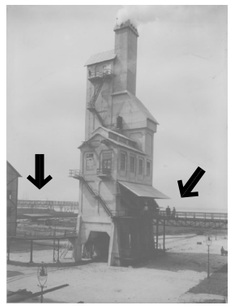
The municipality has designed M4H into a Trendy Mix.

Port and manufacture will be moved away, industrial buildings will be demolished. New typology will towers with plinths.
History and existing industries are very interesting. And its existing port and manufacturing industries provide me with a foundation of alternative possibilities to play with. Because M4H has a Trendy Mix masterplan, it means I can compare it with my alternative design proposals. Therefore, it's a perfect site for this project.

History of M4H

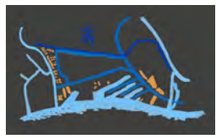
1910

Industry building & empty land



1927

Port are in use, typical structure of piers on port appears

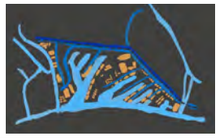


1959

Well structured urban tissue, a repetition of industry and port pier

1971

Vibrant port, Residential housing opposite M4H was finished



2023

Industry tissue still exists but get fragmented during transformation toward innovative industy. A large portion of port crane disappeared,leaving pier tissue with only warehouses.

2035

The living-working Maker Space masterplan by Gementee Rotterdam. The plan completely redo the urban tissue.

1920 From polder to port

Construction of railway to Delfshaven
Construction of four ports, and beginning gas production.

1960 Starting industry

Construction of Merwehaven and the railway along (for transporting goods from port to hinterland)
Start electricity factory, and manufacture. Gas factory closed.

2000 Industry prosperity

Many port business disappear due to international competition
Businesses settle in the Merwe-vierhaven

2023 A transformation point

Now the transformation is happening in M4H. A part of it remains as manufacture and port yard. Some parts already turned into innovative office and maker space, such as Science Tower, Sound Poort, and Ferro Dome. Some part are empty land on which new labs and start-ups will be built.

Different use throughout time

1960 Port-Railway & Port-industry logistic infrastructure

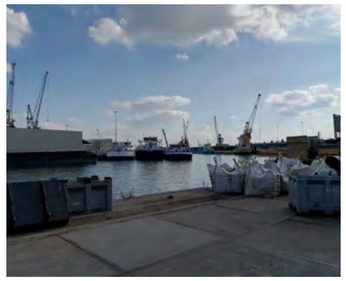
No more railway here, this port branch is no longer used as cargo termination.

Demolish and rebuild into a design and innovation building

Old building renovates into a regular office building

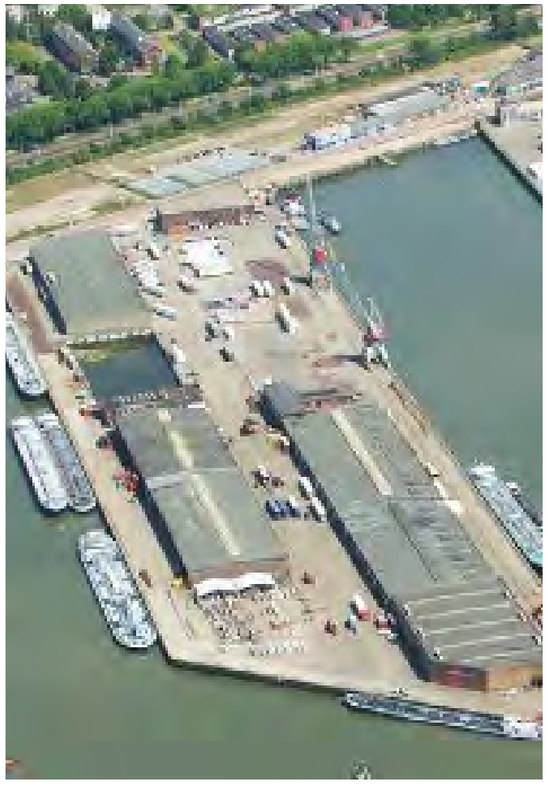
1970 Port full of cranes

Large part of cranes disappear



1970 Port aerial view

2023 port with less shipping volume



1.3 PROBLEM STATEMENT

Trendy mix is a type of popular mixed-use urban design that first appeared around 2005 and became fashionable after 2014. In these projects, to reach sustainability, designers mix innovative technology & design industries with high-quality housing and amenities.

These projects have many problems. First, they are not socially sustainable because only certain work (highly educated jobs) and people are mixed. Second, they decrease a city's stableness and resilience. Trendy mixes are often built on urban industrial sites. They force out necessary industrial functions that are vital to the running of a city, such as food manufacturing and waste management, to either disappear or relocate to suburban areas. Third, there is a risk that designers blindly fall for trendy mix, especially when there is strong publicity behind it. PR package trendy mix in a way that highlights its advantages while hiding away its drawbacks. If designers cannot make objective decisions, we might produce an excessive number of trendy mixes that later turn into problems.

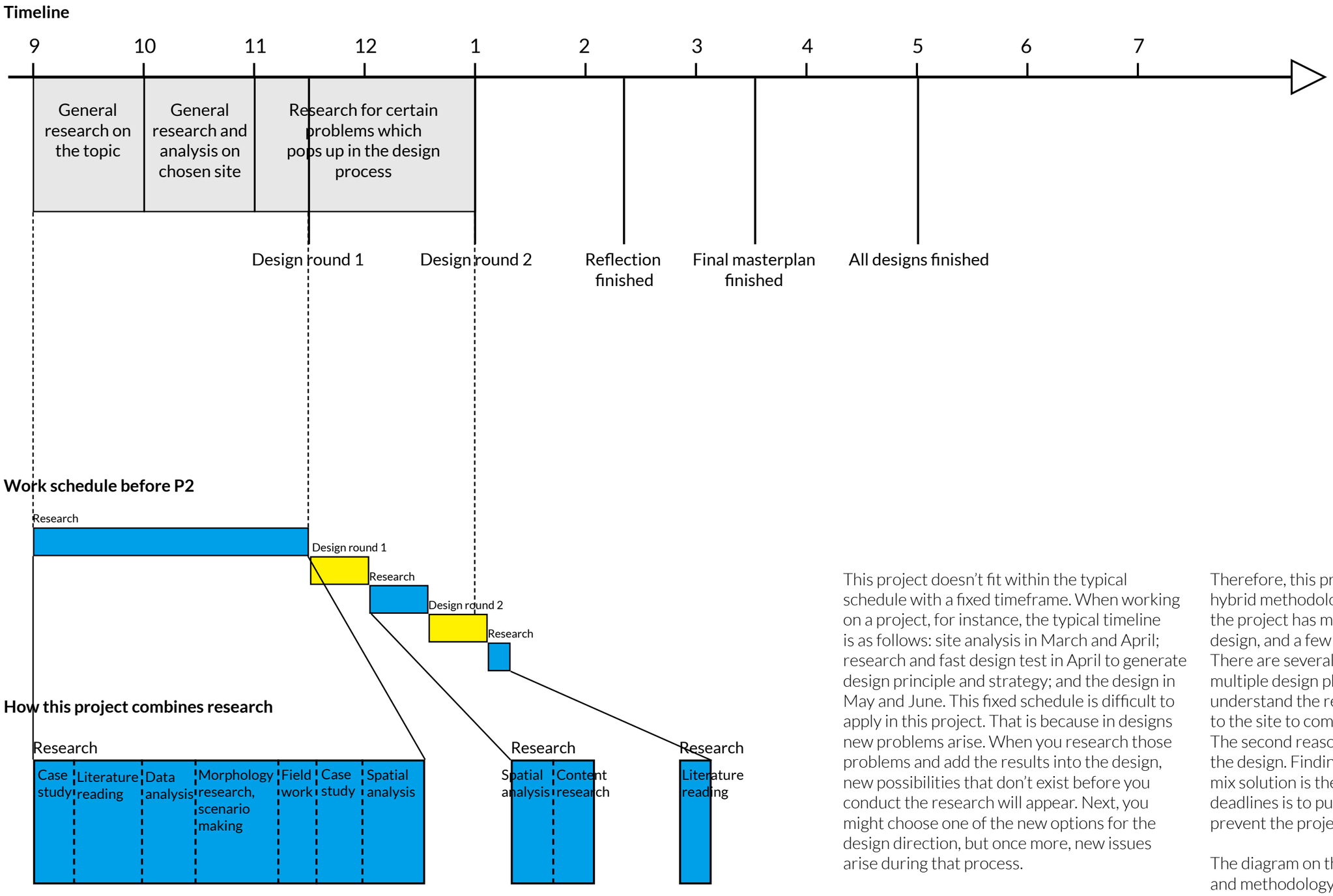
2 METHOD

2.1 RESEARCH QUESTION

What could a sustainable urban mix area look like in the context of M4H, Rotterdam?

	Subquestion	Method	Intended outcomes
Theory and concept	There are some trendy mix designs. What are their advantages and disadvantages?	**Case study**. **Literature review**.	An overview of trendy mix, and a reflection of the disadvantages of it.
	What do trendy urban design concepts like 'makerspace', 'innovation district', 'science park', 'business incubator' actually mean?	**Case study**. Draw out the spatial pattern behind all the marketing words, and list out the difference between these concepts and an ordinary urban area.	A graphic collection of spatial patterns, and a reflection on the urban reality versus marketing.
Industrial typology and programme	What industries are there in the Rotterdam Ring now?	**Spatial analysis**. **field work**.	Analytical map, and a list of industry/company names.
	What types of urban and non-urban industries exist in a metropolisis, and how are they spatially arranged?	**Case study.** (London and more)	A physical model (typology of neighbourhood, block, and building) combined with industry flow mappings.
Inclusiveness and sustainability	What types of work and living should an inclusive mix include?	**Case study**, **literature review**, and **research by design**	A list of the inclusive components that the design should include. And some design tests, the conclusion of which will be several mix templates.
	How can future M4H become a economic successful area?	**Case study**, and test design solutions by quantitive method (**research by design**)	A formula/form to balance working and living numbers in M4H. For example, if people who work there increases, to make ends meet, the number of residents should at least be ...
	How can future M4H become an environmentally sustainable urban area?	**Case study**, and **research by design**	Strategic layers of a masterplan - green, blue and energy networks
Design solutions	How to mix things into an inclusive urban district?	**Research by design**	A final design solution in the context of M4H

2.2 METHODOLOGY



This project doesn't fit within the typical schedule with a fixed timeframe. When working on a project, for instance, the typical timeline is as follows: site analysis in March and April; research and fast design test in April to generate design principle and strategy; and the design in May and June. This fixed schedule is difficult to apply in this project. That is because in designs new problems arise. When you research those problems and add the results into the design, new possibilities that don't exist before you conduct the research will appear. Next, you might choose one of the new options for the design direction, but once more, new issues arise during that process.

Therefore, this project applies a research-design hybrid methodology. As shown in the diagram, the project has multiple phases of research & design, and a few fixed deadlines.
There are several reasons why there are multiple design phases. Firstly, to properly understand the research results' relationship to the site to combine and apply them in design. The second reason is to quickly test and refine the design. Finding a workable sustainable urban mix solution is the third reason. The purpose of deadlines is to push the progress forward, and prevent the project from expanding disorderly

The diagram on this page shows the schedule and methodology of this project.

2.2 METHODOLOGY

This table lists the research and design process before P2.

Time		Method	Goal/Content
September	Early	**Case study** of trendy mix	to study the basics of trendy mix, including timeline and geographical distribution, sustainability value, spatial pattern, programmes in the buildings. The goal of this research is to understand the general features of trendy mix and to find a good site.
	Mid	General **literature reading**	to study the concepts related to trendy mix. Ideal city image(Lijnbaan is an earlier ideal city image, whereas trendy mix is a present one), technology transformation, and industrial revolution (when designing trendy mix, designers more or less consider the future or frontiers of work, which specifically related to technology)
	Late	**Data analysis** via Gis	to learn the general existing situation of the site, and that of the larger Rotterdam area.
October	Early	-	-
	Mid	**Morphological research**, **scenario making**	Studio essential. Study how M4H forms today's morphology (change in industry, urban tissue, different use of building, street, and public space), space in use, and drosscape. Scenario-making combines literature, concepts, and morphological research to make a first-design direction exploration.
	Late	**Field work**	Ethnographical mapping. Provisional understanding of how prople use the site, and the environmental quality of it.
November	Early	**Spatial analysis** through **Geo-urbanism approach**	Analysing M4H from a geo-graphic approach. Understand the context from regional and territory aspects, forming a more than human and more than city landscape perspective.
	Mid	**Case study** of London modern mixes	Research London's modern urban mixes. London has some interesting cases because there are mixes designed after 2005, but doesn't belong to the trendy mix category. Yet those mixes achieved some of the goals that trendy mixes want to have. This research aims to find alternatives for trendy mix.
	Late	**Design by research** & **research by design** Round 1	Combine all the research and analysis to design future M4H. This aims to discuss what could be mixed into M4H. Okay, I don't want trendy mix, then what are you going to mix? Round 1 discuss that. Also through round 1, I form some design principles, which will be refined through further design and research. Design in round 1 is many quickly drawn options of mixes, then develop/ discard based on arguments of each option. Finding one possible option, I quickly made a detailed design with road network, land use (what is mixed), and axis diagram.
December	Early	**Spatial analysis** of the context: industrial areas in Rotterdam Ring	Research the industrial areas in the Rotterdam Ring. How many are there, where are they located, and what industries and companies are there. The result is a mapping, a company list, and a categorization of industries in Rotterdam, from which I further get which industries will be in M4H, and which will be out.
	Mid	PR Reflection through **content research**	I gradually noticed that there is a PR pushing trendy mix to get more and more attention. Therefore, I research the PR material of some cases to understand which part of a trendy mix is the dazzling PR, and which part is the actual design. Two goals: first is to understand the real design part of the trendy mix to form a deeper reflection on it; second is to find an objective position as a designer, not fall into the trap of trendy mix.
	Late	**Design by research & research by design** Round 2	Based on new research results, I again drew 20 or so conceptual options of sustainable mix. The drawings show possible ways to mix work and living. After arguing and debating the feasibility of the options, I narrow them down to five good options. Then I sketched these schemes into road network and detailed landuses to debate which option works best. In the end, I chose one optimal option, and drew its axis diagram, from which I learned that there are several places in M4H that could be positioned as central areas. I picked one place and did some detailed design of that central area. Two goals: first is to form some logical and sustainable way of mixing living and work; second is to use detailed design to understand the site better for future fieldwork and site analysis.
January	Early	Christmas break	-
	Mid	**Literature reading**	on the history of urban mix, and the historical development of trendy mix, academic analysis of trendy mix (both compliments and critics)
	Late	Preparing P2	-

3 THEORY

3.1 CONCEPTUAL FRAMEWORK

1 socially not sustainable
According to the author's research in the previous year, social sustainability is divided into four aspects, safety, equity, eco-prosumption, and sustainable urban form. Although in publicity and design strategy, trendy mixes claim to be socially sustainable, comparing them with academic assessing indicators, we can find that they are not sustainable, especially in terms of equity and eco-prosumption. Details on criteria and assessment can be found in the appendix.

Key literature:
Bibri, S. E., Krogstie, J., & Kärrholm, M. (2020). Compact city planning and development: Emerging practices and strategies for achieving the goals of sustainability. Developments in the built environment, 4, 100021.
Dempsey, N., Bramley, G., Power, S., & Brown, C. (2011). The social dimension of sustainable development: Defining urban social sustainability. Sustainable development, 19(5), 289-300.
Eizenberg, E., & Jabareen, Y. (2017). Social sustainability: A new conceptual framework. Sustainability, 9(1), 68.

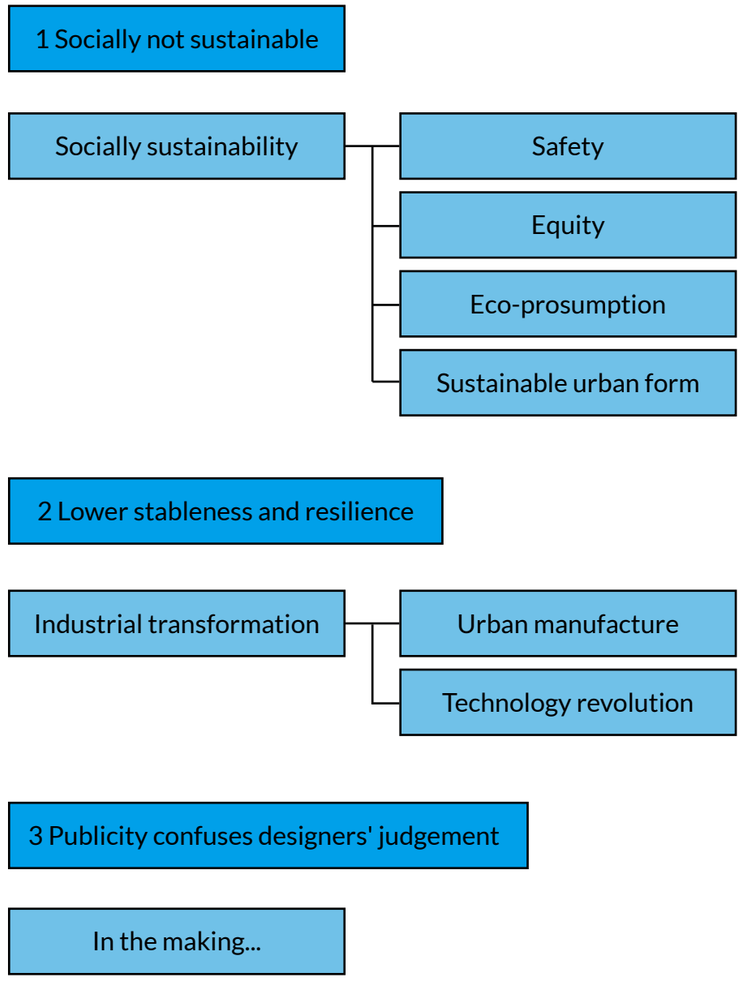
2 Lower the stableness and resilience of the city
Trendy mix decreases a city's stableness and resilience. Trendy mixes are often built on urban industrial sites. The land price of industrial areas in cities increases, therefore, investment in trendy mix forces out the original industrial functions to find places with lower land prices, often suburban areas or smaller cities. Many of these industrial functions are vital to the running of a city, such as food manufacturing and waste management. Relocating them means the city needs longer transportation lines to maintain these flows, or money to buy the services and products from other cities. When there is an economic fluctuation or geological disruption, it will be more difficult to fulfill the city's basic needs. Therefore, the de-localization of necessary industrial functions (caused by trendy mix to a certain degree) lowers the stableness and resilience of the city.

Key literature:
Croxford, B., Domenech, T., Hausleitner, B., Hill, A. V., Meyer, H., Orban, A., ... & Warden, J. (2020). Foundries of the future: A guide for 21st century cities of making.
Lane, R. N., & Rappaport, N. (Eds.). (2020). The design of urban manufacturing. Routledge.
Xu, M., David, J. M., & Kim, S. H. (2018). The fourth industrial revolution: Opportunities and challenges. International journal of financial research, 9(2), 90-95.

3 Dazzling pubility confuses designers' judgement
There is a risk that designers blindly fall for trendy mix, especially when there is strong publicity behind it. PR package trendy mix in a way that highlights its advantages while hiding away its drawbacks. If designers cannot make objective decisions, we might produce an excessive number of trendy mixes that later turn into problems.

Key literature:
I started this part in January, therefore, literature list is still in the making.

Conceptual framework



3.2 ANALYTICAL FRAMEWORK

There are many ways to analysing city, even though we narrow the scope down to Design of the Urban Fabric. From the static Dutch layering method to the new emerging flow analysis, various methods are utilized in this project. Of course the project could still work itself out without an analytical framework. But this would lead to lots of mappings with varying scales, purposes, and visual expressions scattering here and there, confusing people unless I spend two hours explaining why each map is included in the report. Therefore, I designed the analytical framework as follows.

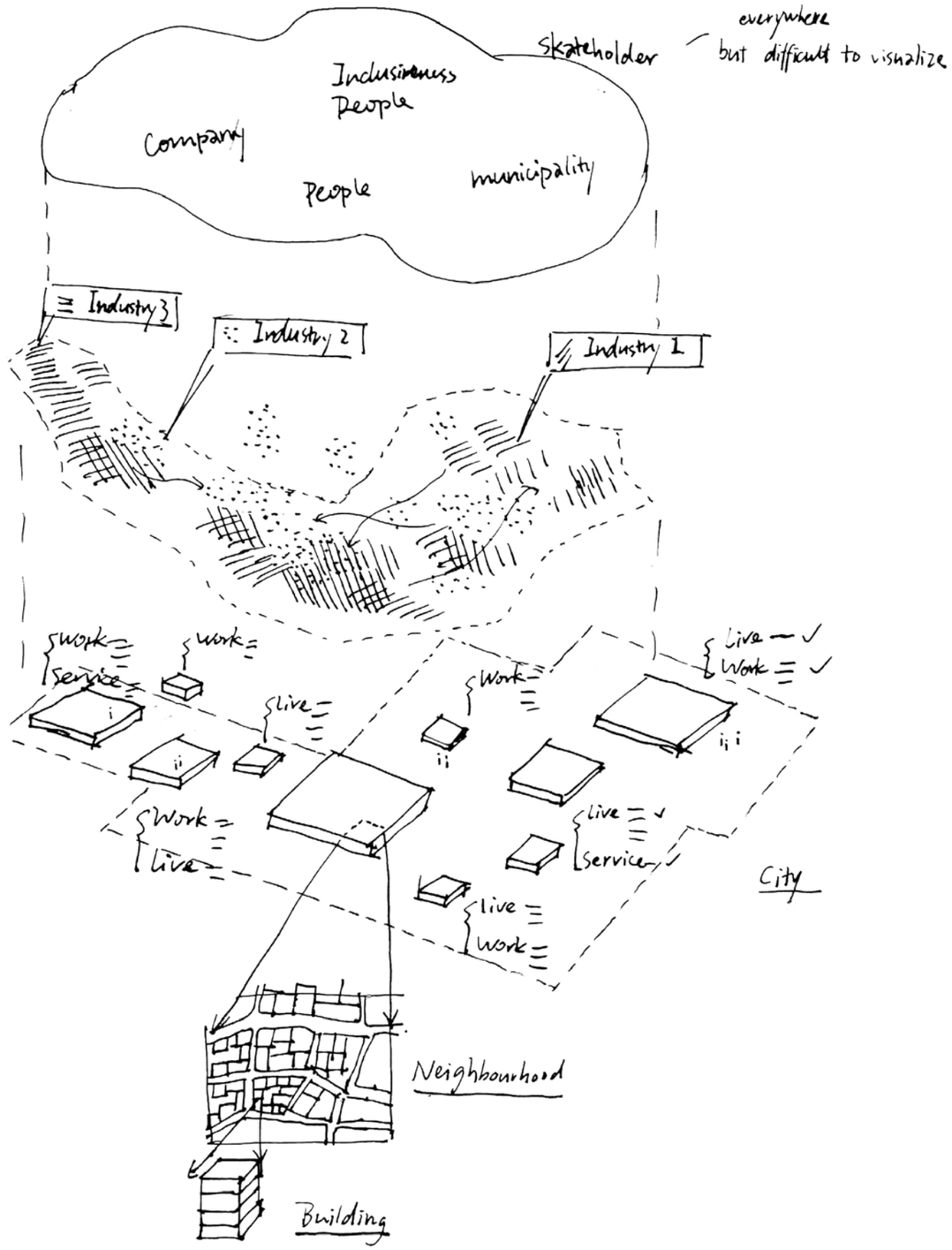
The lowest layer is the 'mesh' layer. All the physical elements that people can see, walk and stay belong to this layer. Cubes on this layer symbolize different typologies. If you look at the neighbourhood plan below, you will see this layer is directly related to smaller scales and detailed design. The project uses this tier of the framework in the London case study and Rotterdam content analysis.

On top of it is the 'flow' layer. This layer shows industries, that cannot be directly seen but exists and influences the city. Industrial land use and the flow of materials belong to this layer. Industry is not a factory, nor a truck transporting line. But the industry is composed of factories, trucks and other producing-consuming activities. When they are extracted and placed on maps as colours and arrows, we can understand their mechanism, and their relation to other layers. Most of the time, designers influence it by changing the 'mesh' layer and cooperating with the 'stakeholder' layer.

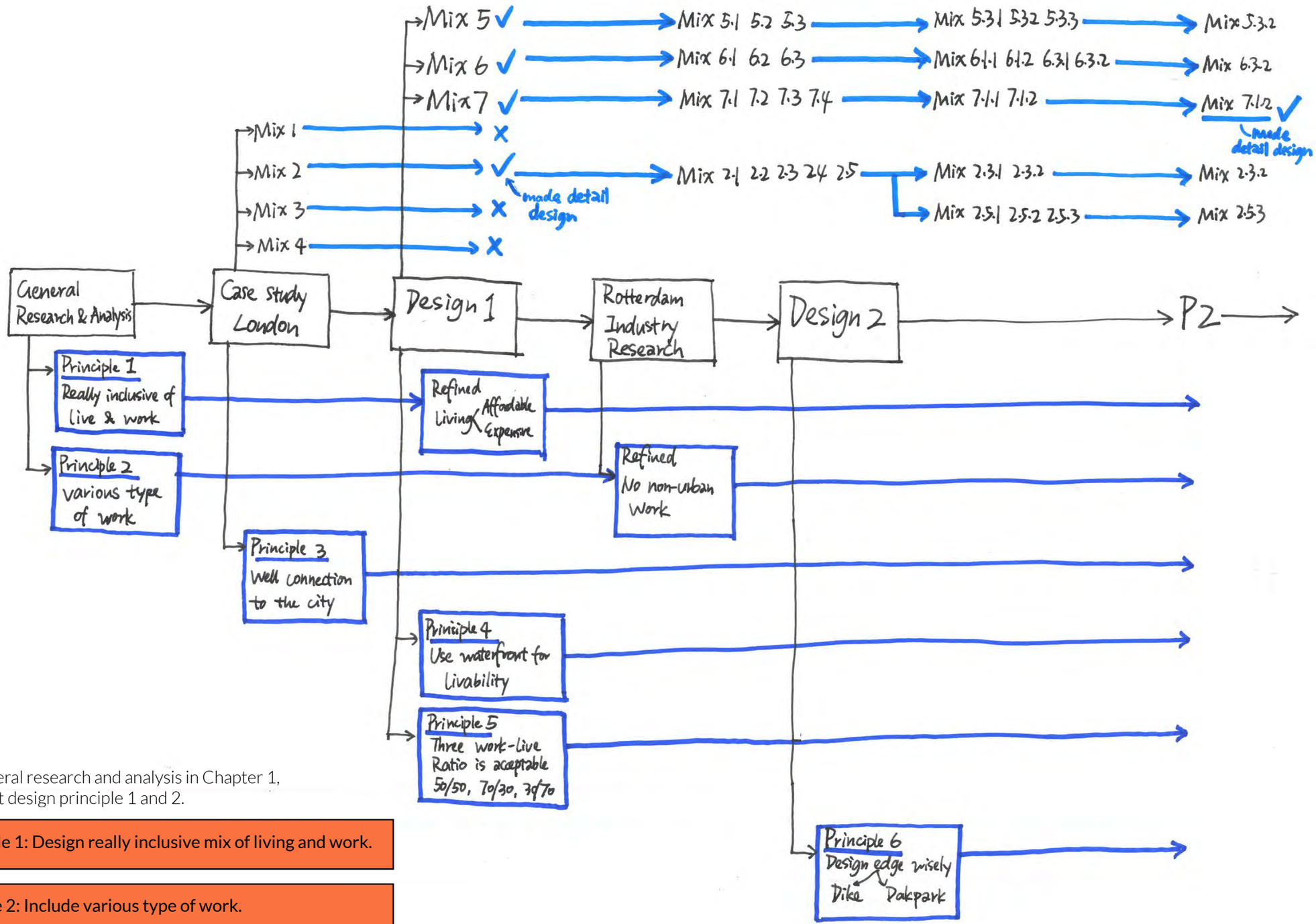
Separating the 'flow' layer out, this framework allows the reader to see how industry and urban fabric interact with each other. This project uses the 'flow' layer in analysing Rotterdam content.

The 'Stakeholder' layer is at the top. It's difficult to identify who is which stakeholder, and they aren't distributed according to urban geology! Therefore, this layer is a bubble that contains names and labels. The primary stakeholders are citizens, company and municipality. Each category can be further split into small groups. For instance, citizens can be divided into people who received high education, people who have low education, elderly and children, immigrants, etc.

Analytical framework



4 R&D 1.0: PROVISIONAL MODEL OF LIVING AND WORKING MIX

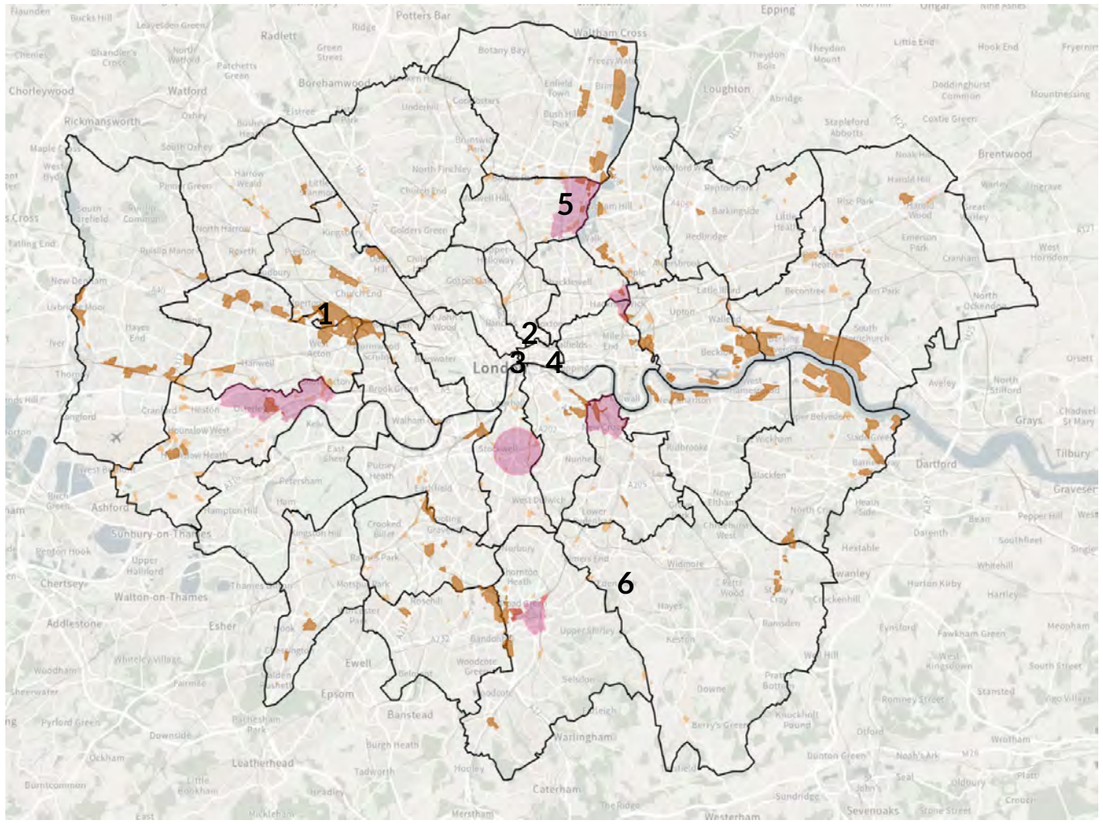


From general research and analysis in Chapter 1, we can get design principle 1 and 2.

Principle 1: Design really inclusive mix of living and work.

Principle 2: Include various type of work.

4.1 CASE STUDY: ALTERNATIVE MIXES IN LONDON



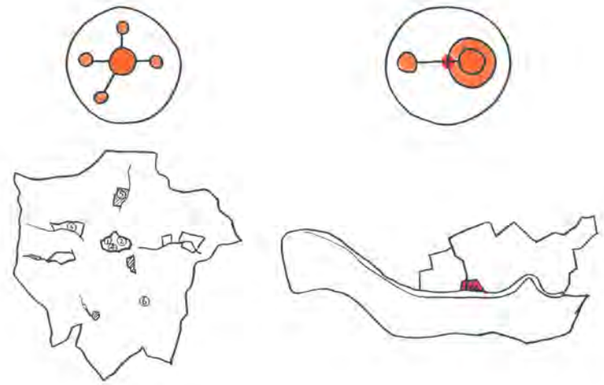
Source: https://apps.london.gov.uk/planning/

Strategic industrial locations
Locally significant industrial sites
Creative enterprise zones

London has some interesting cases because there are mixes designed after 2005, but doesn't belong to the trendy mix category. Yet those mixes achieved some of the goals that trendy mixes want to have. Case study aims to find alternatives for trendy mix.

This is a city pattern study of London and Rotterdam. The cases are located in different structures, and this diagram will assist in determining whether or not they are appropriate for M4H design.

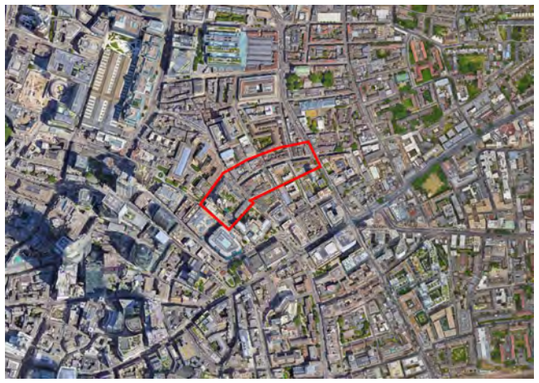
Case 5 and 6 is industry in town and village, which doesn't fit M4H. Therefore, this section doesn't include them.



City centre
Sub-central area
M4H

1 Modest and everyday use mix
Location: Park Royale

2 Central area mix
Location: Smithfield meat market, Morley House 26-30, 10 Fleet Place



3 Design industry merged with life
Location: Petticoat square

4 Technology upgradation in neighbourhood blockLocation: Victoria House bio tech centre

1 Moedest and everyday use

Location	Park Royale
What is mixed	Living
	Working: Design & art (Recording, animation studio) + Manufacture (glass factory, furniture maker, car repairing, express logistics)
	Amenities: Laundry, bakery, restaurant, store, cinema, gym, college
How they are mixed	Original industrial typology mixed with suburban housing. Work and amenity are arranged in a industrial buildings. Residence is placed next to the industrial area and is separated by greenery.

2 Central area mix

There are several ways to mix functions in city centre. All types are high cost and high ended.

a

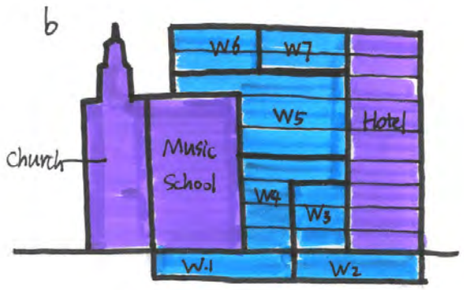
a. Giant factory block in city centre

Meat manufacture, this necessity of city is placed right in the middle of urban centre surrounded by commercial, living, recreational and administrative functions. Most times they are relocated to city outskirts. But this case shows holding it at its historical place works (transporting, storaging and selling goods in the densest urban area works), and it can bring people fresh meat and a sense of livability.

Location	Smithfield meat market
What is mixed	Living: only expensive market housing is mixed in urban centre
	Working: Food manufacture (transporting, storaging and selling)
	Amenities: It has amenity function
How they are mixed	Among blocks in the urban centre. Typically, these blocks are enclosed by multiple buildings. But in this mix approach, one huge industry building alone occupies a single block. it is surrounded by other urban blocks. Urban blocks are often a mix of commercial, living, recreational and administrative, and one of these functions tends to dominate the block (occupy area >50%).

2 Central area mix

b. Single building complex
In this mix, regular office, makerspace and design&art studio is mixed with social services. We don't often see this design approach in the Netherlands



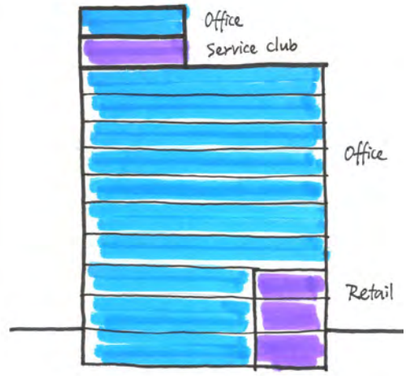
Location	Morley House 26-30
What is mixed	No living
	Working: design and art studio (photographer, fashion design, and web design), makerspace (professional training provider), office for regular company (lawyer) and a conference centre.
	Amenities: Music school, city church, hotel and restaurant
How they are mixed	Old church, office building and renovation are merged into one building block. Old church, music school and hotel each use a formal piece of vertical space. Other offices are interspersed throughout the building.

b. Juxtaposition of buildings
This mix is very interesting. This mix happens in one urban block. Residential housing and contemporary office estates is juxpositioned to each other. The office estates have more than 90% work, embellished with a little recreation. Residential building has amenity and studio workspace on ground floor, and housing on the upper floor.

Location	Morley House 26-30
What is mixed	Expensive living
	Working: Giant commercial companies occupy the office estate, and a small amount of designer studios and small businesses (on the ground floor of housing)
	Amenities: In the office estate, there are a few cafés. In the residential building, there are clothes/jewelry shop, restaurant, supermarket.
How they are mixed	This mix happens in one urban block. Residential housing and contemporary office estates are juxtapositioned to each other.

3 Technology upgradation in neighbourhoods

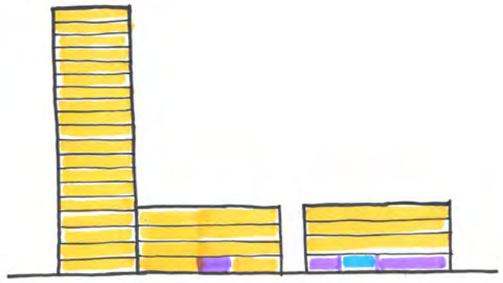
This typology is right in the middle of the working and residence 'zone'. It looks like a buffer zone as working and living to reach out from their zones and get mixed here. The typology is a lane market, and the end of which is a residential area. The market space is a street, formed by small-volume commercial buildings.



Location	Petticoat square
What is mixed	Affordable living zone
	Working: Commercial work zone. In the buffer zone, there are design and art studios.
	Amenities: modest daily life ones (shops, restaurant, café, supermarket, fabric market each week) and an art gallery
How they are mixed	Market is squeezed into a linear shape by blocks on both sides. Those blocks are mix: the side facing the market consists of design studios and shops; the other side is residential. The residential area at the end of the market only has a small amount of mix. There is one art studio, one art gallery and several restaurants on the ground floor. The upper floor is all housing.

4 Design industry merged with life

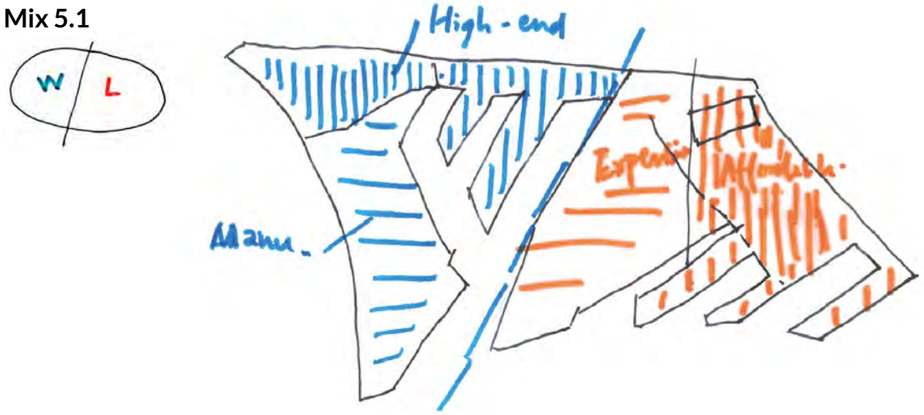
This case shows one office complex can be the only major working in one neighbourhood. Technology can work its revolution out in this office building complex, while outside is still a high-quality livable neighbourhood.
This case shows you don't need to change the whole area into a Trendy Mix rendering to make industry upgradation work, which is a valuable inspiration for M4H.



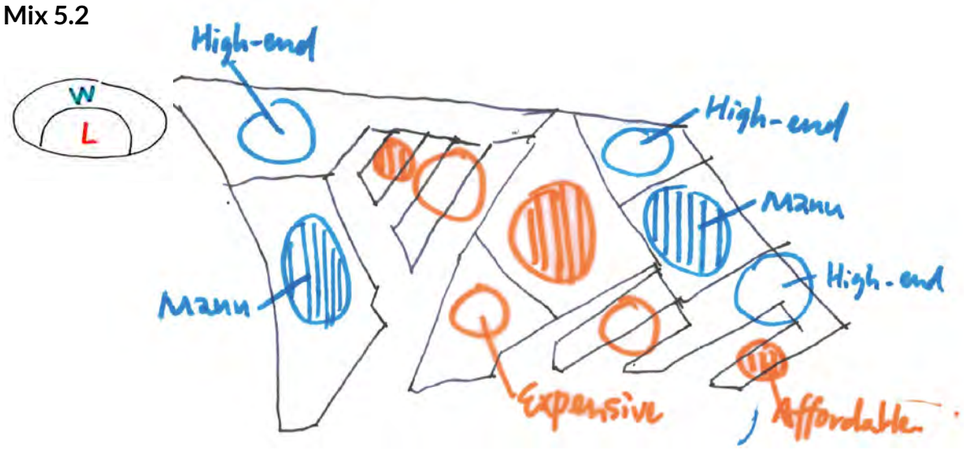
Location	Victoria House Bio-Tech Centre
What is mixed	Expensive and affordable living
	Working: technology company in one building, and a few small businesses on the ground floor of housings.
	Amenities: cultural and social public service: museum, hospital, hotel. Also, there are many daily life amenities like supermarket, café and restaurant.
How they are mixed	As shown in the drawing, most of this urban area is the residential block with a bit of work or recreation mixed in it. These residential blocks are then mixed with a musuem, office complex, and greenery. In Bio-Tech office complex, retail is mixed on the ground floor since it faces the street, and forms a vibrant street section. And on the roof terrace and sub-roof floor, there are services for employees.

4.2 DESIGN TEST 1

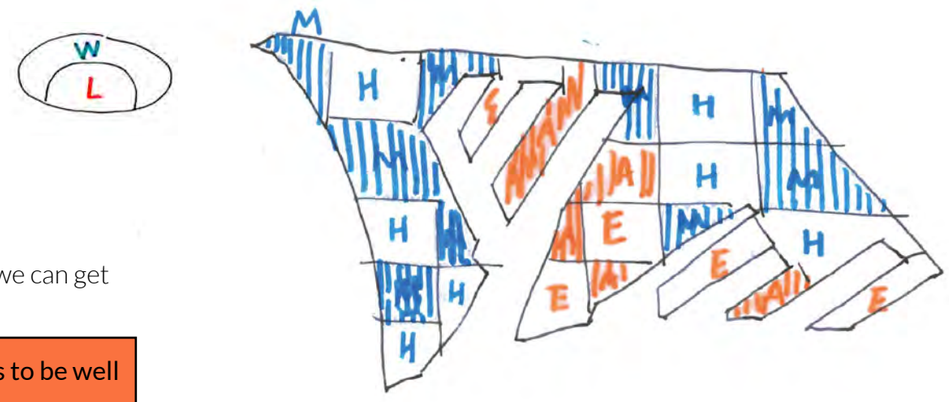
Firstly, I made some mix schemes.
Live : Work = 50% : 50%
Mix 5.1



Mix 5.2



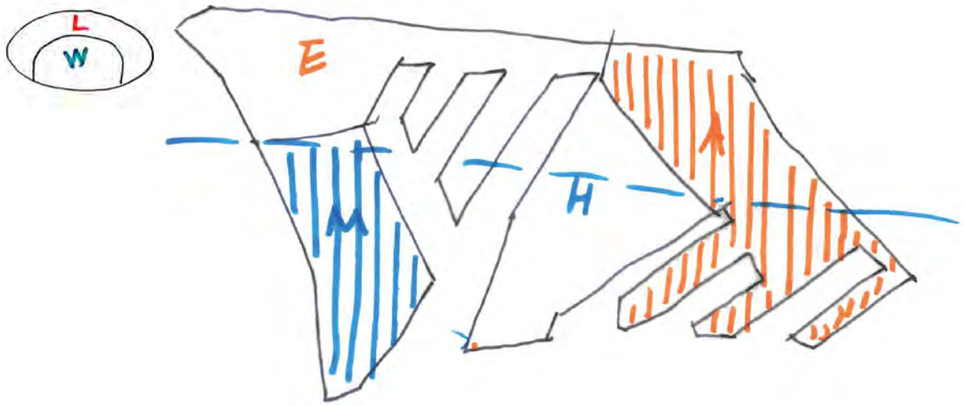
Mix 5.3



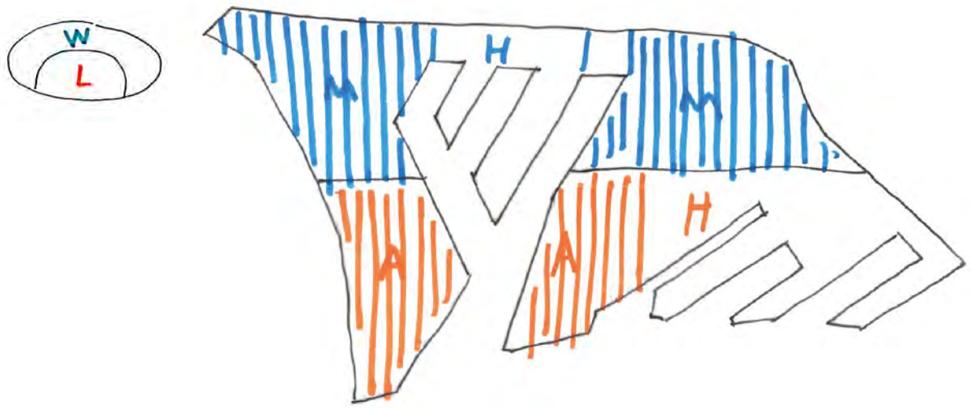
From London case study, we can get design principle 3.

Principle 3: M4H needs to be well connected to the city.

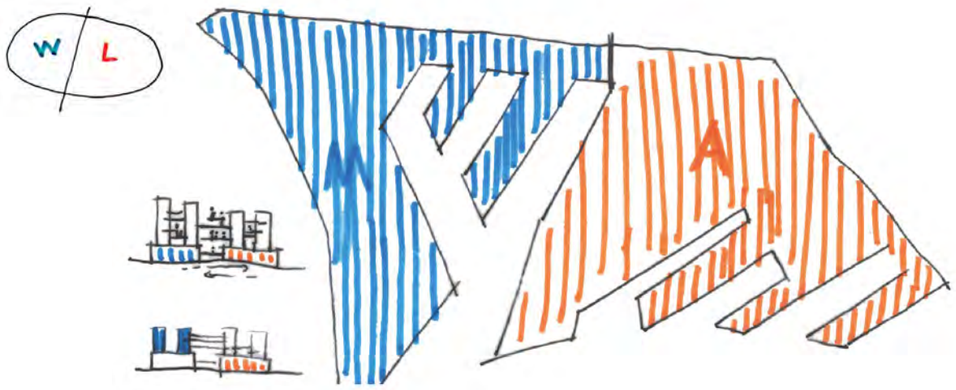
Mix 5.4



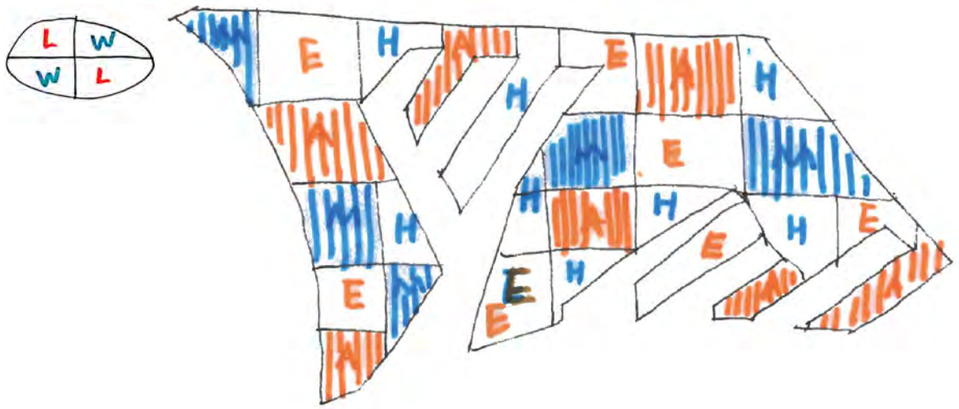
Mix 5.5



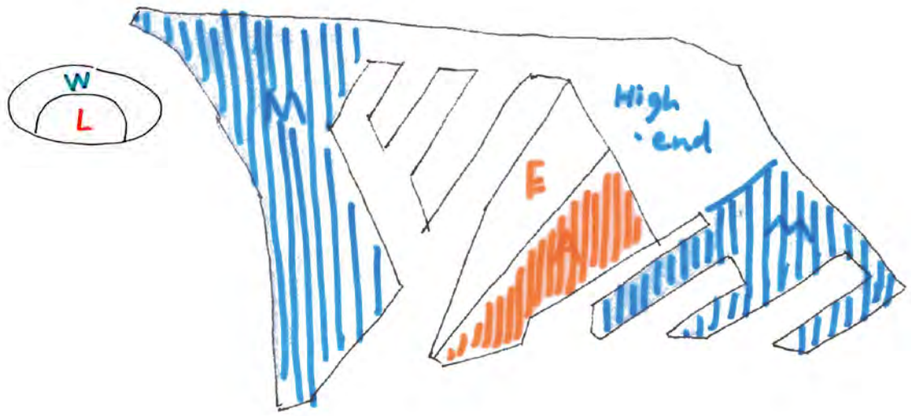
Mix 5.6



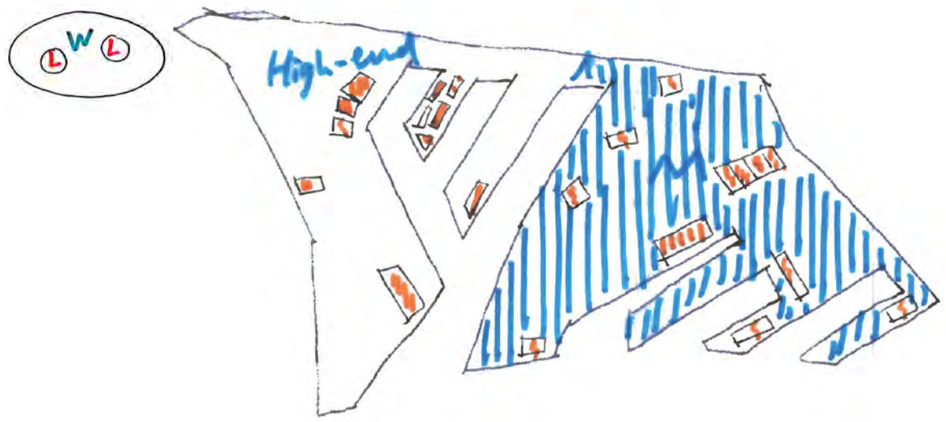
Mix 5.7



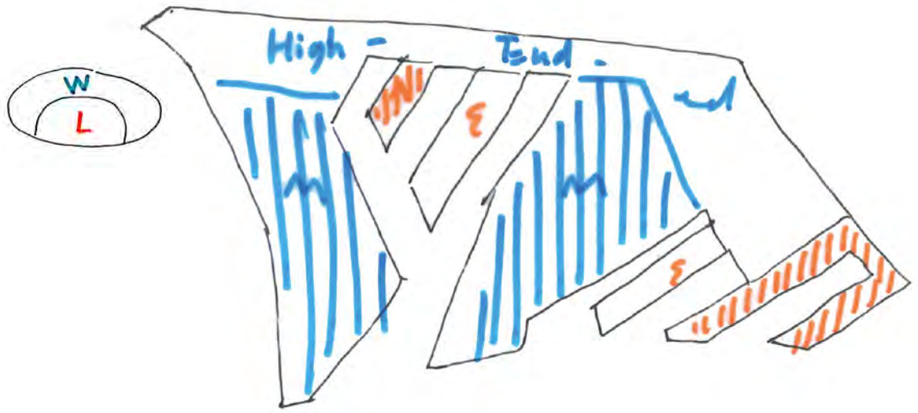
Live : Work = 30% : 70%
Mix 6.1



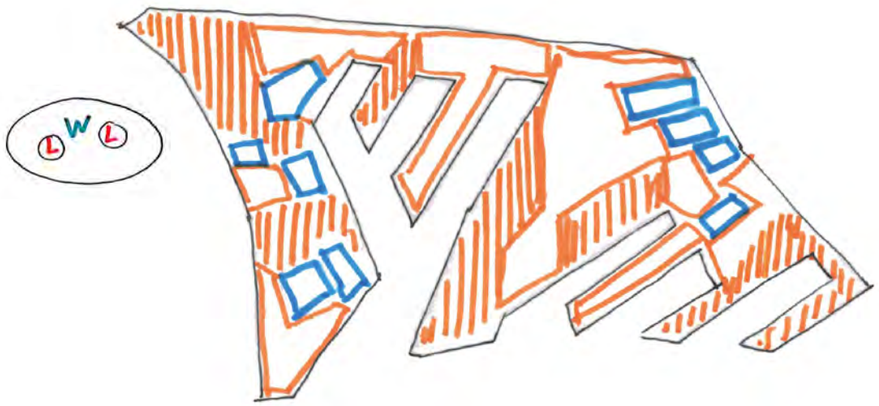
Mix 6.2



Mix 6.3



Live : Work = 70% : 30%
Mix 7.1



From Design test 1, we can get more design principles.

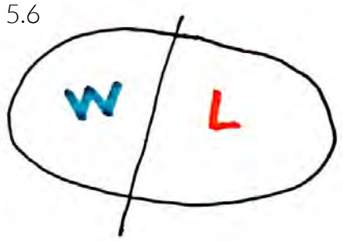
Principle 1: + Inclusive living means the design has affordable housing and commercial housing.

Principle 4: Use waterfront to improve livability

Principle 5: Three living-work ratio is acceptable: 50 : 50 , 30 : 70 or 70 : 30.

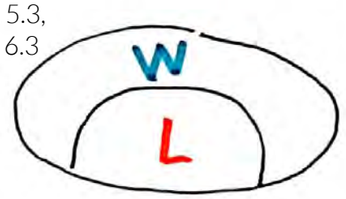
Firstly, I made some mix schemes.
These scheme drawings can be summarized into these mix models. Then I list out the pros and cons of the models, which is good enough as a first design test.

Mix 5.1, 5.6



This is the most common way to mix living and work. This model is seen in the London case study.

Mix 5.2, 5.3, 5.5, 6.1, 6.3

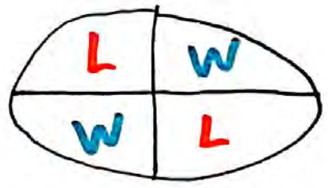


The advantage of this model is that living makes good use of the waterfront. But the bad side is living is separated from the whole city by a stripe of work. It will be difficult for people who live there to go across the work stripe. Also at night, work stops, living will be out there alone, surrounded by dark, silent working stripe.

If we reverse the previous model, living will be well connected with the city. From left to right, the living stripe is connected to Schiedam centrum, Oud-Mathenesse community, and Dakpark (a massive linear building with roofpark where the building provides amenities).
There will be two issues if M4H applies this model. Although isolated by living, work needs to transport the goods in and out of M4H. Second, almost all waterfronts with good views are occupied by work.

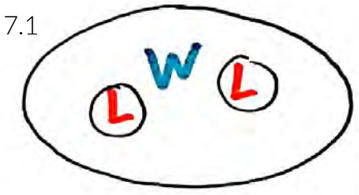
Mix 5.4

Mix 5.7



This way living and working have equal connection to the road and waterfront. But chopping large land into small pieces doen't make much sense.

Mix 6.2, 7.1



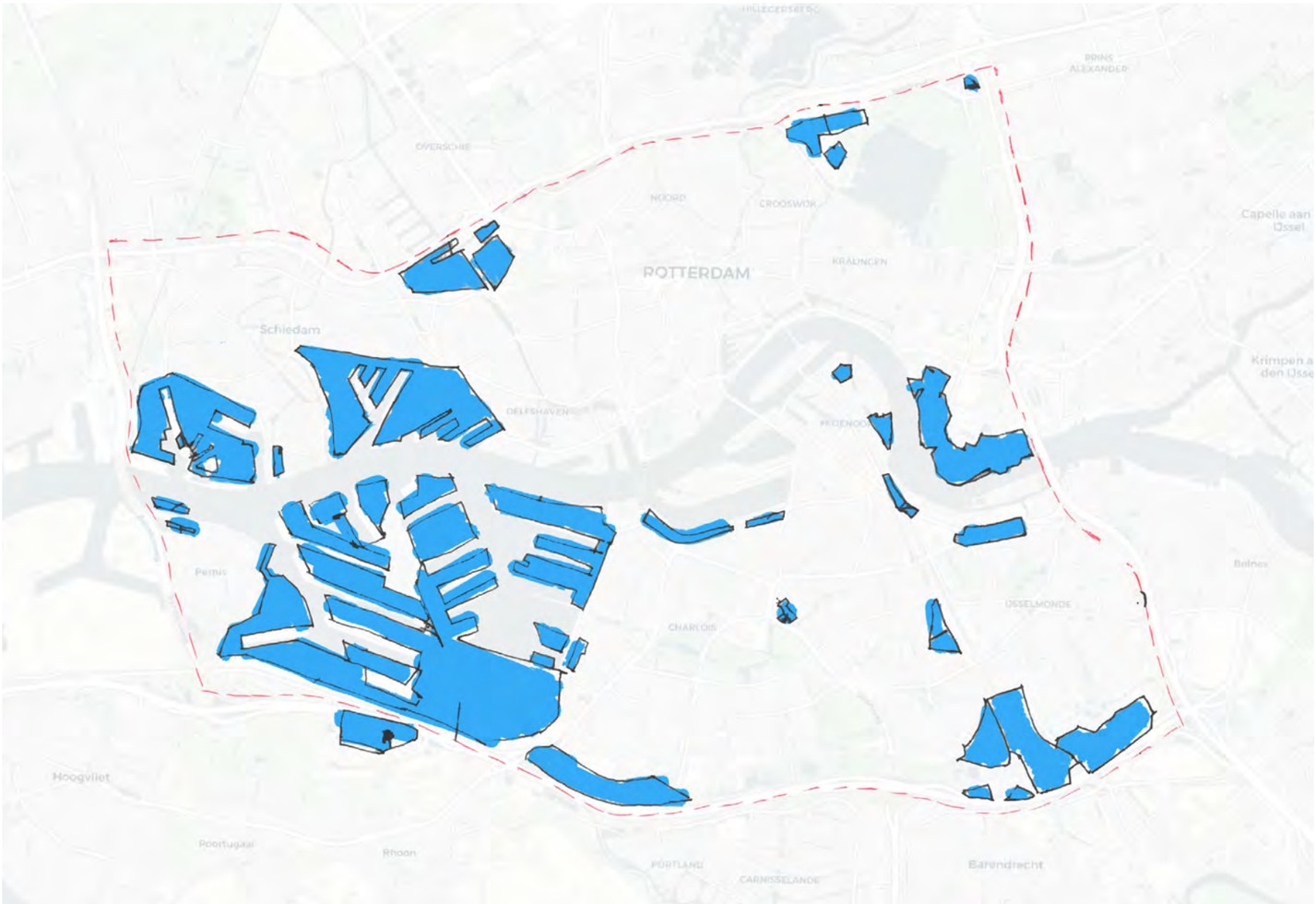
At night, living will become a little island with light. On days, they will be surrounded by noisy and busy industries. It is not friendly to people who live there. But if we reverse it, a few work scattered in a big community, this might work. But if work is randomly put into the community, another problem arises – transportation.

4.3 CONTEXT STUDY: INDUSTRIES IN ROTTERDAM

I categorized industries in the Rotterdam Ring into Non-urban and urban industries, each of which consists of two groups. Non-urban industry means that they do not need the urban fabric, environment and infrastructure to work. They can function perfectly in non-urban areas like urban outskirts and hinterland. Urban industry means that it needs the urban environment to function properly.

From the research result, we can easily find that trendy mix designs are quite narrow in terms of industries. They often have a lot of high-end specialized work and a bit of light manufacture. This leads to the low inclusiveness of those projects.

Industry distribution map of Rotterdam Ring

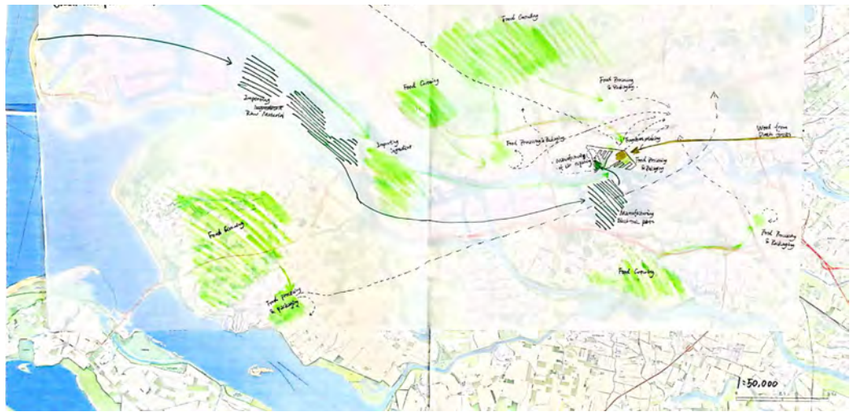


Non-urban industry	Heavy industry
	Logistics
Urban industry	Light manufacture
	High-ended specialized work

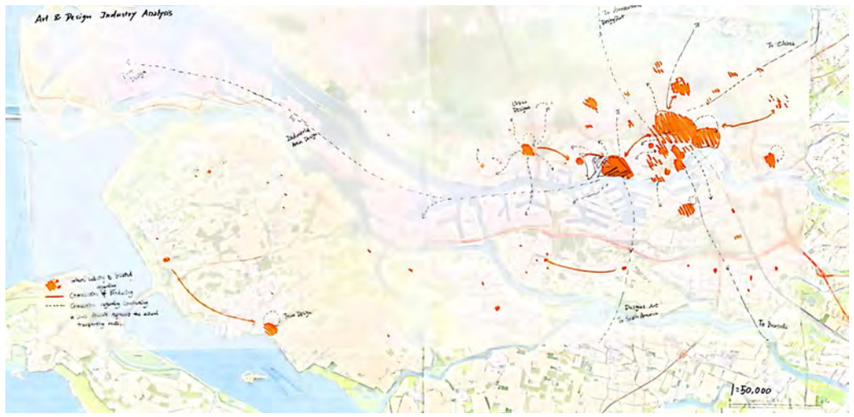
Heavy industry	Large machin rental (Crane, hydraulic press, forklift)
	Mass production (of peat, gas, metalware and plastic)
	Automation system design, construct, and repair service
Logistics	Cargo Logistics (with warehouses and parkinglot)
	Shipping Logistics (with loading/unloading space, storaging, port and ship-repair)
	Logistics management (company in offices)
Light manufacture	Couries
	Car repair, sale, and rent
	Urban infrastructure manufacture (waterplant, waste recyclement)
	Building service (building material supplier, contractor, and plumber)
	Food manufacture
	Furniture making
	Printing
	Wholesaler
	Moving company (office, storaging and parkinglot)
High-end specialized work	Internet company
	Design and art studio
	Climate adaptation business (damage repair, flooding defense, and energy transition)
	Science appliance company (wearable technology, medicine and robotics)

Preliminary industry flow analysis

Manufacture industry

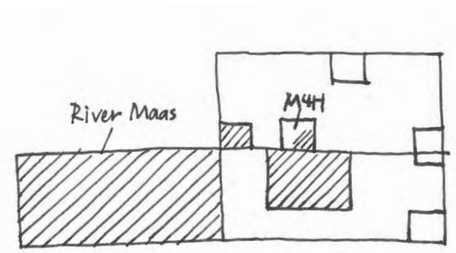


Design industry

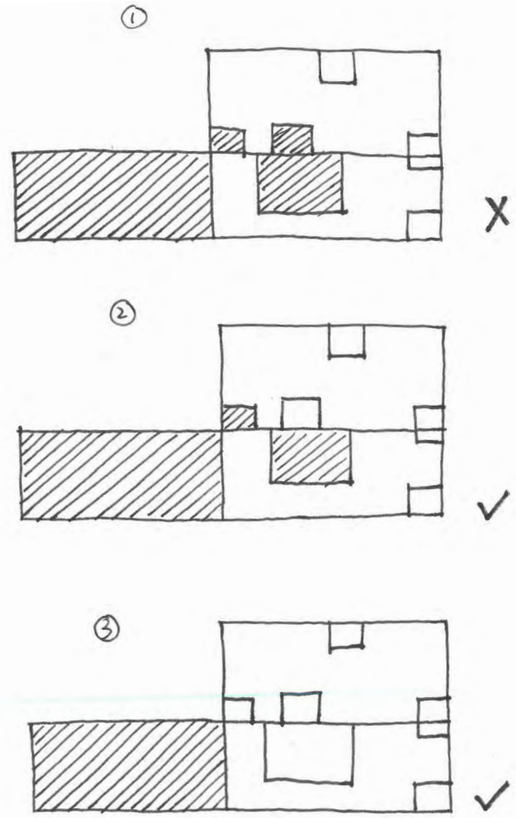


Technology appliance and innovation industry

Existing urban and non-urban industry



Three future industry proposal



Existing urban and non-urban industry diagram in the Rotterdam Ring. Currently, there are a few non-urban industries in M4H.

(1) If M4H is a totally non-urban industry, the scheme will look like this.
1) A huge industrial area in central area doesn't make sense. Because they are noisy and sometimes environmental not-friendly.
2) There are some non-urban industry in the Rotterdam Ring to fulfill its needs. If the city needs more non-urban industry, the best location would be in city outskirts, not M4H.

3) If the city wants to do something with non-urban industry, it would be moving more outside, rather than introducing more inside.
(2) If M4H has urban industry only, other industries in the Ring remain the same.
(3) If the Rotterdam Ring only has urban industry.
These two could both work.

The result of this study is twofold. One is the categorization of urban and non-urban industry. The other is the industry recommendation of M4H: non-urban out, urban in.

After this research, Principle 2 is refined:

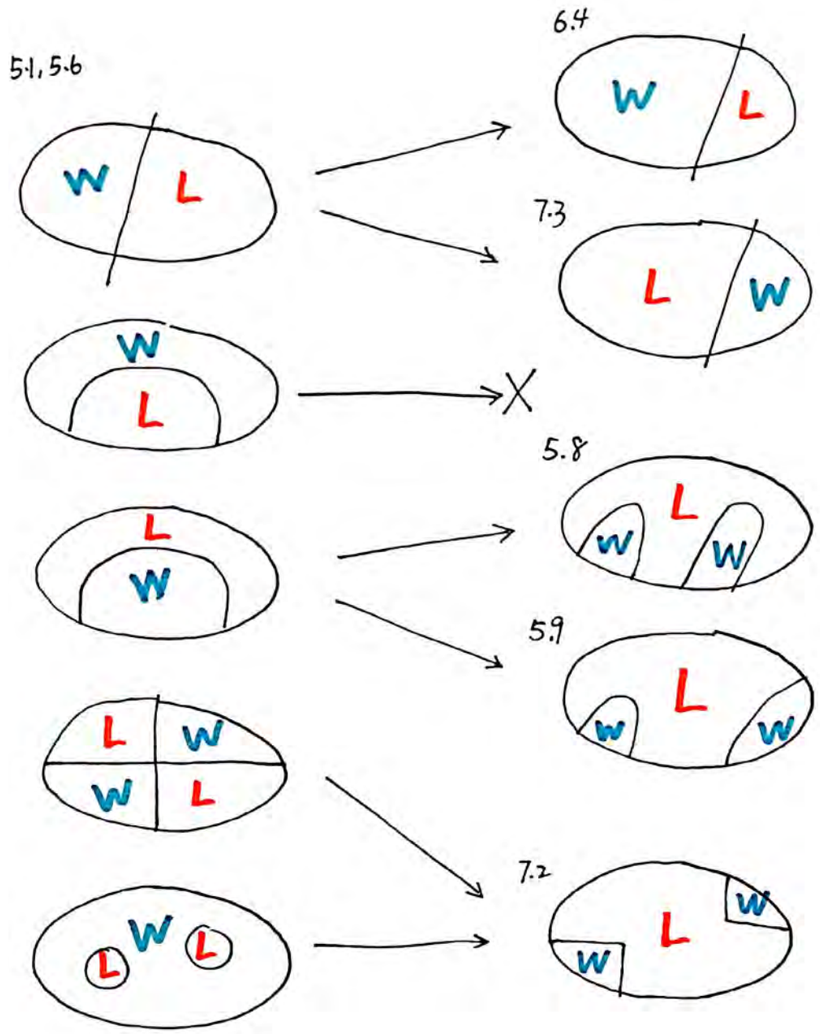
Principle 2 refined as various types of urban industry work.

4.3 DESIGN TEST 2

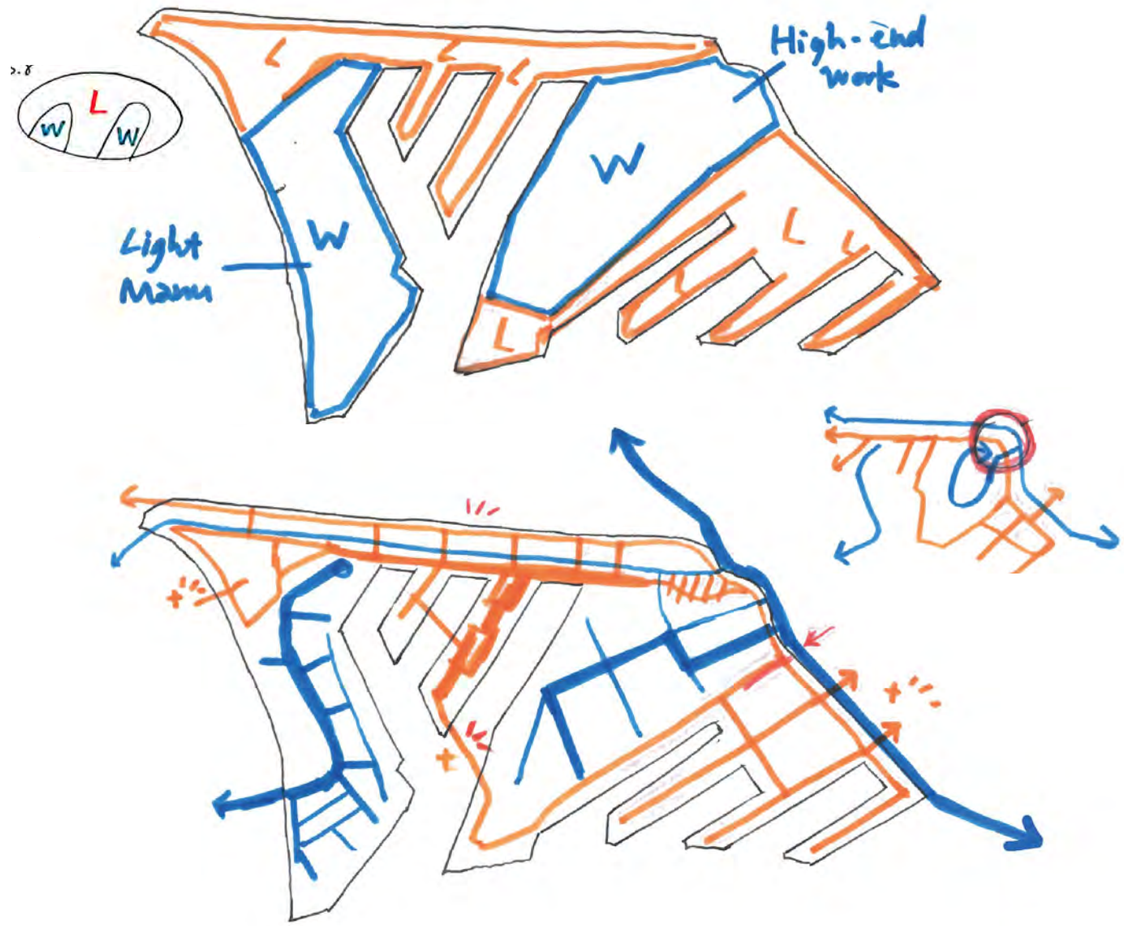
In Test 2, I did more mix designs. As you can see, some unreasonable designs from Test 1 have been removed, such as surrounding living with work. Some new designs were also added. These designs are deeper than the first time around, as I did landuse and road network sketches and upgraded the mix model. In other words, the drawings in Design test are the most reasonable layouts under the mix ratio.

In Test 2, I combined more of M4H's current conditions. I combined the dike on the northern edge and the Dakpark on the western edge. The left part is now light manufacturing work (car repair and furniture), and the upper right corner has some high-ended specialized work, and three towers have been built.

As shown in the diagram, I made some adjustments on mix models after Test 2.



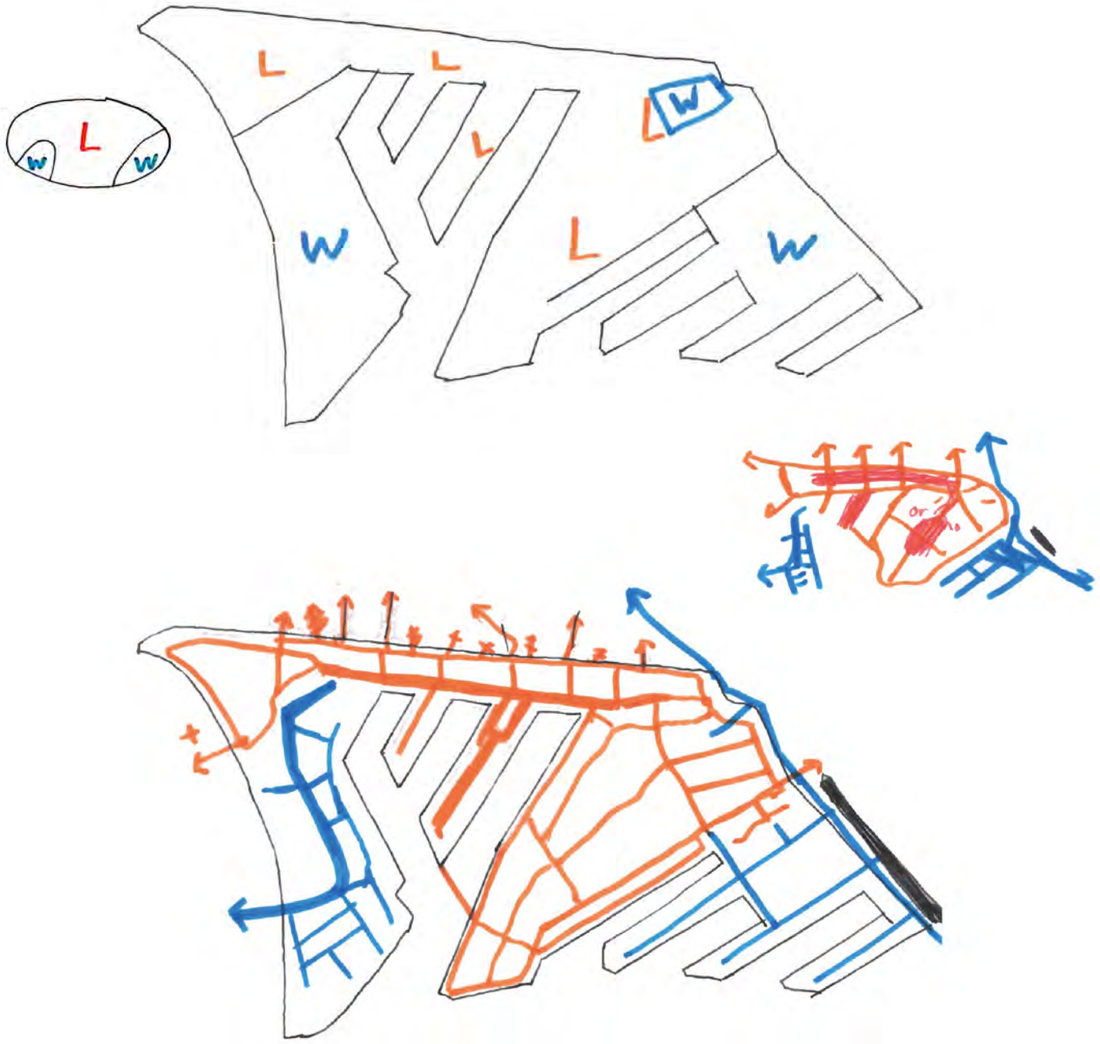
Live : Work = 50% : 50%
Mix 5.8



Pros
• Design living in the upper left corner, it can merge with the schiedam centrum to form a centre.
• The lower left part utilizes the existing manufacturing industry, which doesn't require any additional construction.
• Waterfront is living, which promotes livability.
• There are people walking across the dike everyday. Mainly are workers who work at M4H and buy lunch at Oud-Mathenesse. Make the stripe living promotes the livability for people.

Cons
• Transportation in light manu blob and high-end work blob is quite clear. But it is not clear how private cars and trucks move from light manu and high-end work blob is unclear. In other words, how vehicles drive from Schiedam to Rotterdam via the M4H is not clear. There should be more reasonings on this traffic issue in the future. than the first time around, as I did landuse and road network sketches and upgraded the mix model. In other words, the drawings in Design test are the most reasonable layouts under the mix ratio.

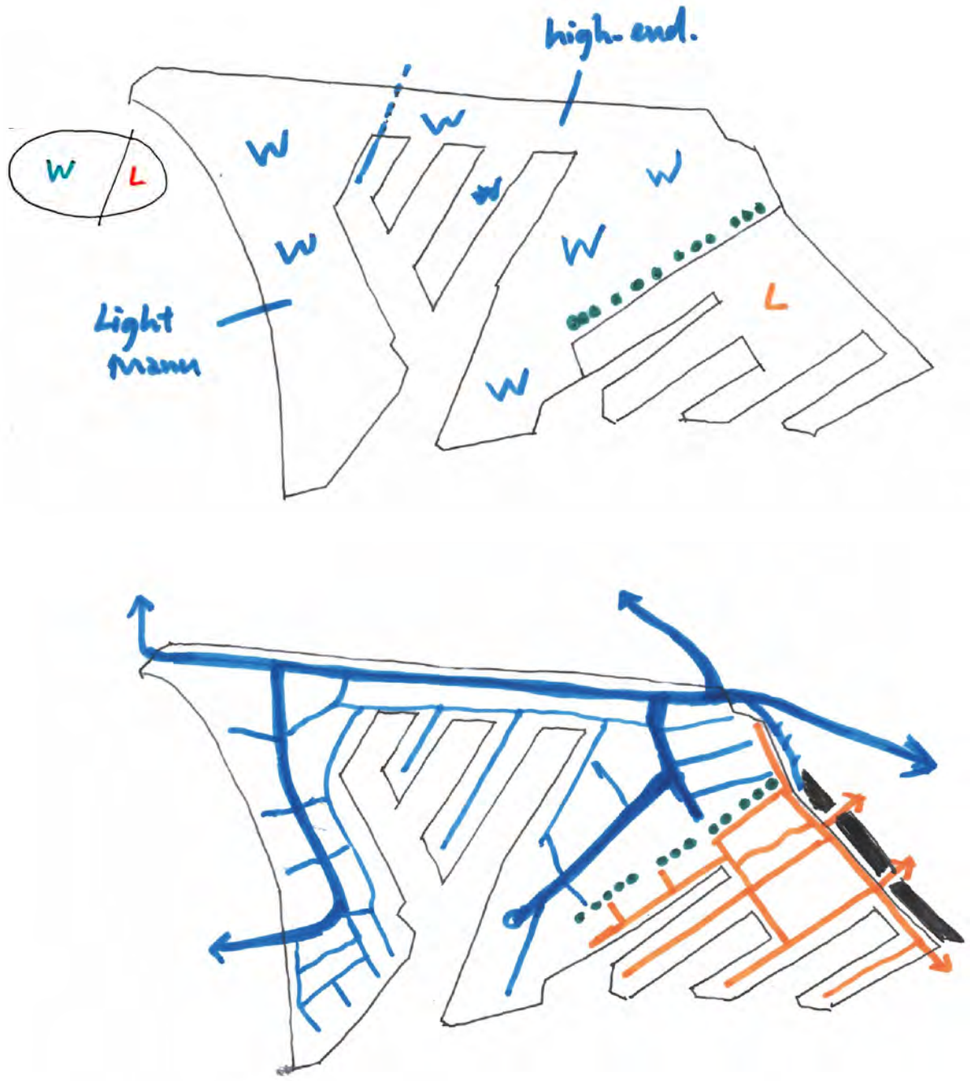
Live : Work = 50% : 50%
Mix 5.9



Pros
• In this option, living is merged into one huge block. Working is on both ends of the site. As the small analysis drawing shows, this option makes M4H a relatively independent neighourhood with a big core.
• If there is a huge neighbourhood, connecting two port branches with a bridge makes sense.
• There will be good connectivity between M4H and Schiedam central, and Oud-Mathenesse.

Cons
• This makes Dakpark isolated. Because directly opposite Dakpark will be factories instead of housings.

Live : Work = 30% : 70%
Mix 6.4

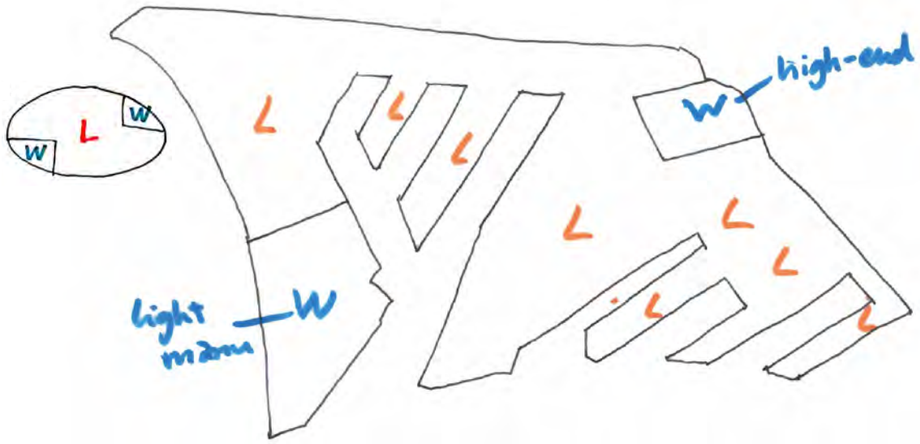


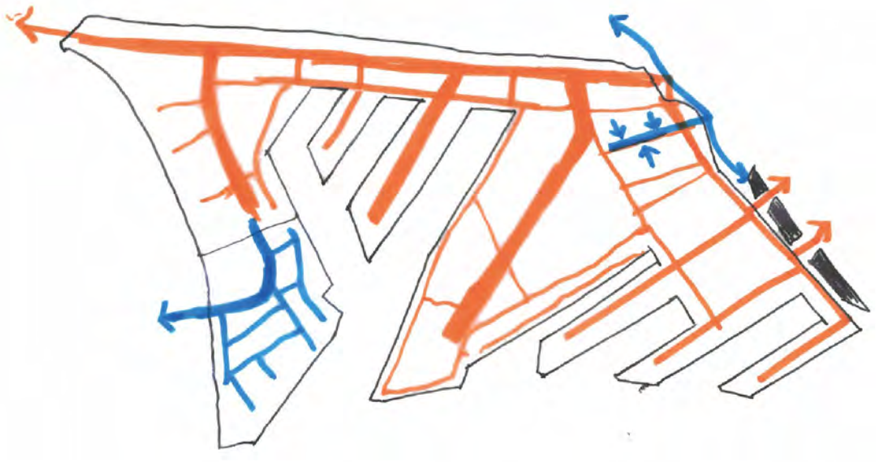
This option is a huge work area with a bit of living. First, if we want to do this mix, we need a greenery buffer between living and work. Second, if work already is 70%, what is the justification for keeping 30% living instead of 100% work? 30% of living might not be the most economic way. Therefore, although it is feasible, I don't think it is the best solution.

Pros: This option creates a good connection between living and Dakpark, which provides qualified amenities.

Con: A huge blob of living couldn't directly connect with the outside, because there is work in the way. This might limit the accessibility of living.

Live : Work = 70% : 30%
Mix 7.2



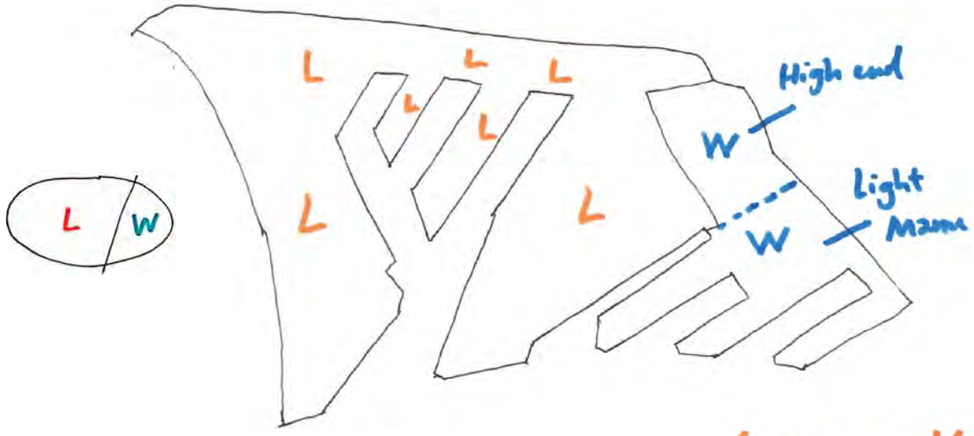


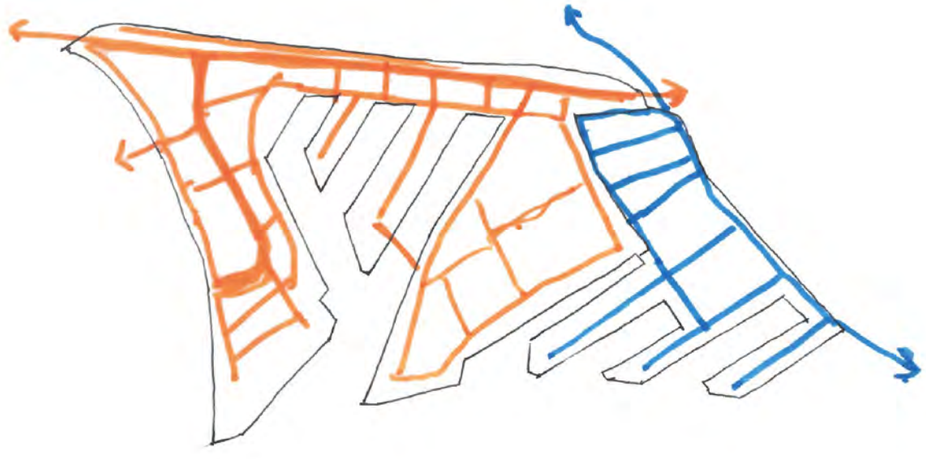
This option turns M4H into a huge residential area with a bit of work. It can help solve the housing crisis in the Netherlands.

This option has the same problem. You cannot prove that 70% living is better than 50% living.

Live : Work = 70% : 30%
Mix 7.3

+ Principle 6: Two edges (dike and dakpark) need to be designed wisely.





This option is similar to 7.2. But the problem here is it demolishes all the manufactures on the left, which is an important car repairing centre in Schiedam. Where will people repair their cars? This option causes another problem.

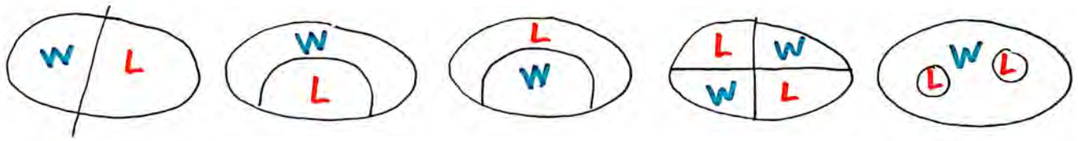
Now, you see that there are five options that have some good justifications. It is difficult to choose one and further develop it without further research and reasoning. In the next step, I will conduct site analysis, interview, statistics analysis, and more to make a final decision.

CONCLUSION

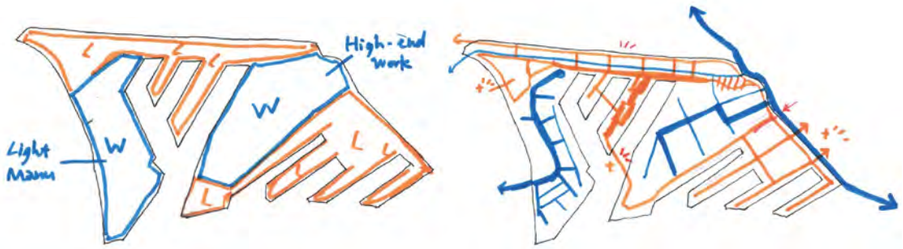
Preliminary design principles

Principle 1: Design really inclusive mix of living and work. Inclusive living means the design has affordable housing and commercial housing.
Principle 2: Include various type of urban industry work.
Principle 3: M4H needs to be well connected to the city.
Principle 4: Use waterfront to improve livability
Principle 5: Three living-work ratio is acceptable: 50:50, 30:70, or 70:30.
Principle 6: Two edges (dike and dakpark) need to be designed wisely.

Possible mix model



Mix designs that can be further developed



All the options are also possible for further development. Here is the optimal option.

What comes next?
1. Improve the design principle in further research and design.
2. The mix model is now restricted to the entire M4H region. Mix models on street and block scale needs to be developed through research and design.
3. Further develop the mix design to produce a masterplan.

What will the researched? Site analysis, interview, statistics (if I make this option, how many people will live/work there, what is the total amount of work area...) and more.

5 R&D 2.0: CREATE A LIVABLE ENVIRONMENT

The fastest way to learn about design princinples regarding to livable environment is to check municipality's requirement. Even though sometimes they are not aligned perfectly with the sustainability goals, they mostly reflects true needs of the site and its citizens. This provides a solid foundations for designer to begin the work.

From the Rotterdam municipality, I obtained M4H's livability requirements:

- A living and working mix;
- Sustainable community;
- Living includes social housing and marketing housing. Young adults, core family, and elderly needs take into consideration;
- Livability that fulfil people's need to walk, bike and run;
- Good connectivity, both for biking/walking, and for cars;
- Greenery for people and ecology.
-

The existing amenity is shown in the mapping. There is supermarket, shopping malls, furniture stores and other amenities in Dakpark, the east edge of M4H. There are cafés, bars, and restaurants scattered in the area.
Overall, M4H doesn't have sufficient amenities and the variety of them is low. It also needs effective transportation connections to link scattered residential areas, amenities, and neighbouring communities together, both from cars and bike/walk.

Therefore, through research and design, I propose a concept in this chapter: Fuzziness. The main spirit of fuzziness is to create a gradation from public to private where various amenities, public space and greenery can be included. Based on this concept, I design a livable environment across three scales: the public space network, fuzzy streets, and cohousing.

Existing amenity and greenery in M4H

5.1 STUDY: MIX STREET & DUTCH PERSONALITY

5.1.1 M4H doesn't fit well with typical Dutch streetscape

It is quite challenging to meet the livability goal in M4H if we apply the typical Dutch streetscape, or to say, a modern blocked-consisted streetscape.

Why typical Dutch streetscape is not good enough? First, we need to understand how a typical Dutch streetscape is formed.
As shown in the photos, an urban building is often composed of apartments or offices. These cubes stack one by one to form a building, and buildings are enclosed to shape a block. Then multiple blocks consist of a neighborhood, in which two façade lines together form a street. In one neighborhood, most blocks are residential, and a small number of blocks have public services, commerce, greening and sports functions.

How are the neighbourhoods juxtapositioned? In many cases, they are divided by physical barriers such as roads, canals, and fences, which serves as the boundaries of the neighbourhoods. Within each neighborhood, residents can access public spaces and essential amenities like bakeries, supermarkets, primary schools, healthcare facilities, and more. While residents can fulfill many of their daily needs within their own neighborhood, they may sometimes choose to visit other neighbourhoods for additional services. For instance, they may travel to other neighborhoods for amenities like high schools, libraries, and theaters. Or they simply want to explore other neighborhoods to find a special shop or bar.

Typology of apartment and office

Typology of a building facade

Typical Dutch streetscape

Dwellers crossing boudnary of a neighbourhood

The typical Dutch streetscape can be simplified into a pattern diagram. If we apply this model to the living area of M4H, we'll discover that it's not suitable. Why? There are two main reasons.

First of all, this typology does not suit M4H. Typical Dutch streetscape often requires a relatively large area to ensure the diversity of amenities. This is because it is formed by stamping blocks repeatedly, with some blocks designed into amenities. As shown in the diagram, the residential part of M4H is a long stripe that follows the waterfront and main roads (Schiedamseweg and Vierhavensstraat). Adopting the typical Dutch streetscape cannot provide a livable environment for residents. If some blocks are directly converted into amenities, the linear shape cannot guarantee the accessibility of residents who live far away from the public space block.

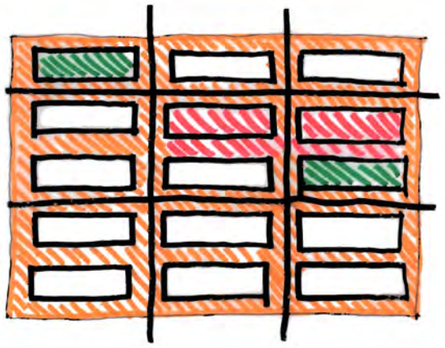
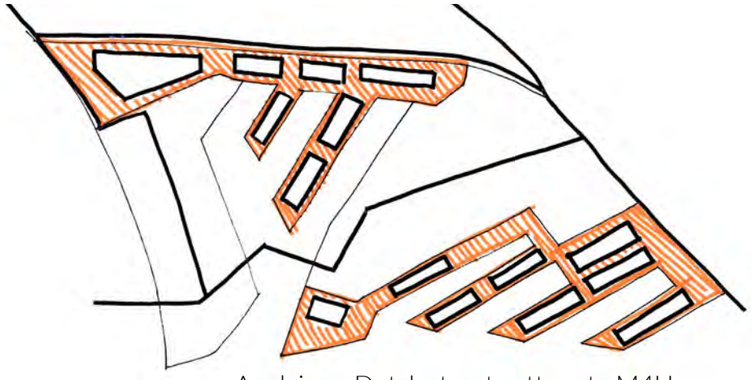


Diagram of a typical Dutch street pattern

Secondly, while this typology often functions effectively, it somehow divides people's life into 'blocks'. This block is where I live, this space is for fitness and social interaction, and that block is for greenery. As a dweller in this neighbourhood, I do certain things in this block and other things outside the block.
There is nothing flawed with this approach, and it works perfectly in many cases. However, from a macro-location perspective, M4H is between Rotterdam and Schiedam. From a neighbourhood level, the surrounding communities are all connected to the waterfront through M4H. The typical Dutch streetscape is more 'introverted' and cannot well meet the openness and connectivity demands that came with M4H's location. Additionally, the surrounding neighborhoods mostly use typical Dutch typology. It is more reasonable for M4H to adopt another spatial structure that has high openness and connectivity. Therefore, other streetscapes need to be researched.



Applying a Dutch street pattern to M4H

5.1.2 Case study: streets that activate the neighbourhoods

Through researching two streets that have vibrant public spaces and amenities, I summarized effective design strategies for livable environment. It is threefold: Principle of Typology, Principle of Programme, and Principle of a Livable Street. These serve as the inspiration for the design later in this chapter.

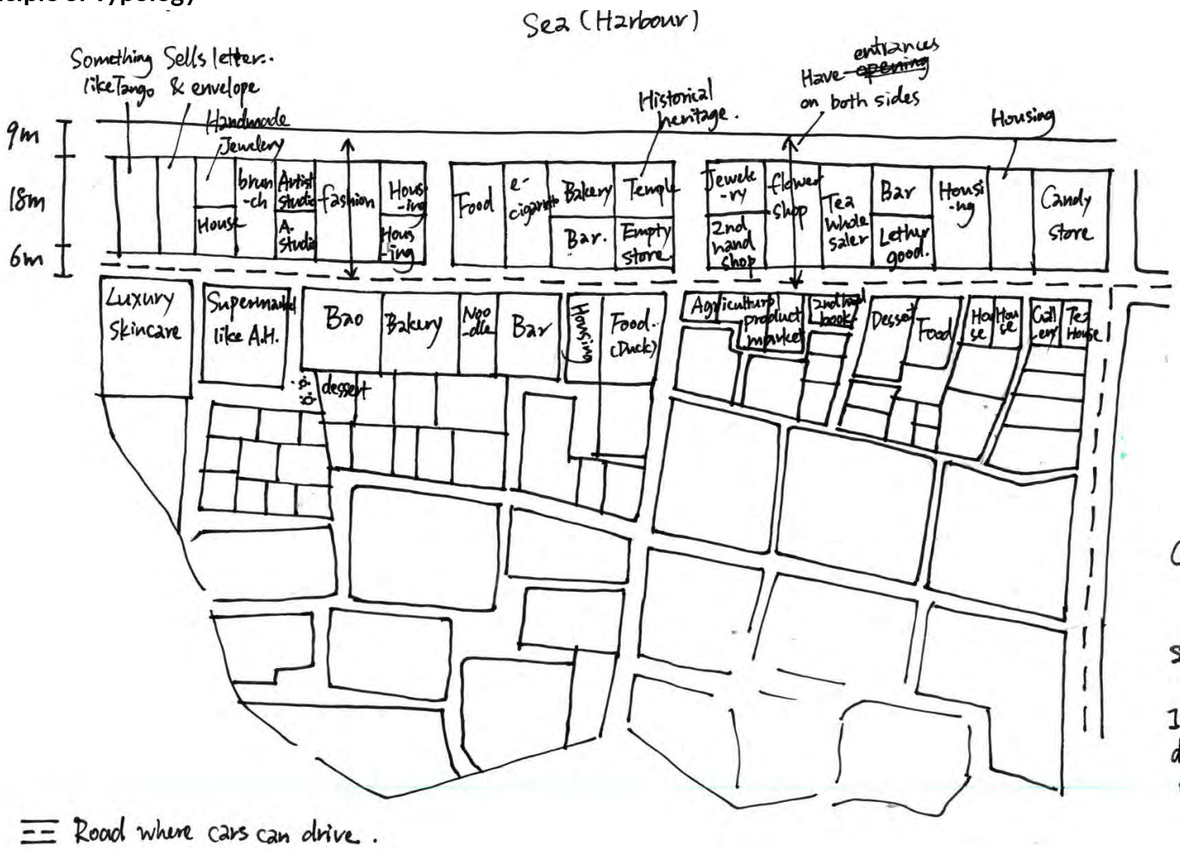
Shapowei street in Xiamen, China

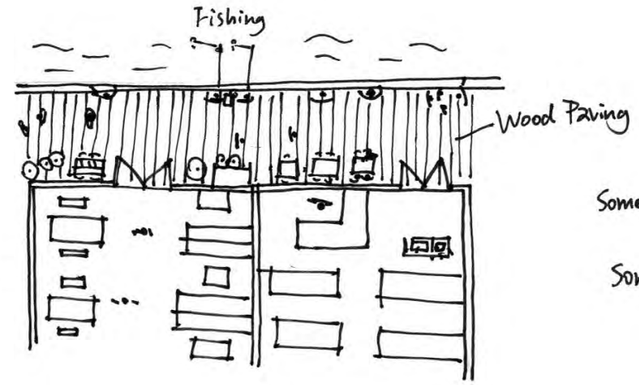
This is the Shapowei street in Xiamen, China. Located near harbour, the street is on the edge of a neighbourhood. The programmes of the street is shown in the drawing. They are used by both residents and visitors, to provide daily public services and recreation like art, music, fashion etc.

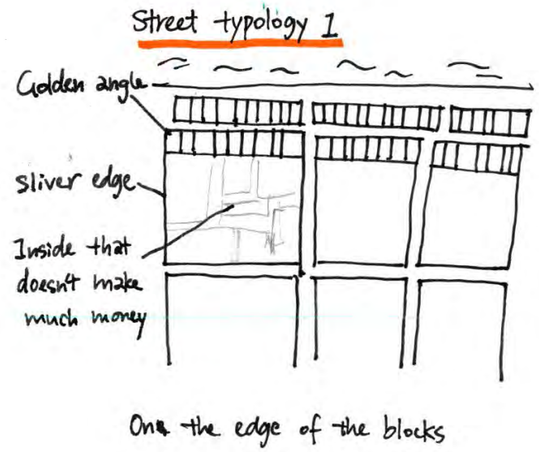
Why can this street give such a rich variety of senses and functions in just 400m?

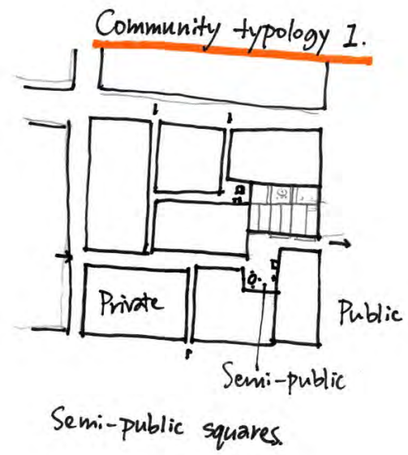
- The first reason is the small scale of each building, with a width around 10m. Smaller space provides a greater number of services.
- Second, in terms of typology, the design approach for each building is totally dependent on each owner. The number of floors, façade, ornament of each building is decided by the owner, therefore, it looks very organic and dynamic.
- Third, there is a fuzziness between public and private. A building can be public on the ground floor and first floor, but private on the second floor. The space in front of a house can be shared by the dweller and some visitors. This gives the street more layers, where amenities that need different openness can be inserted.

Principle of Typology









Principle of Programme

'Chopped-up Mixing. Amenity · Work · Housing
70% 10% 20%

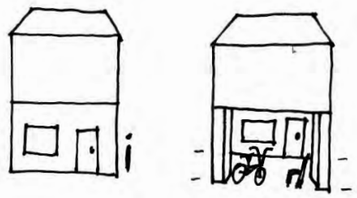
Mix amenity, work, housing to mix:

Different Age group, (student/young adult, 40~60, 60+)
Spending power,
zoom, 3| programmes Gender,
Food type,
Daily/Monthly/Seasonly activities,
Different options for one need, (3 supermarkets, 4 bakeries...)
People (Local, tourist, citizens don't live nearby)

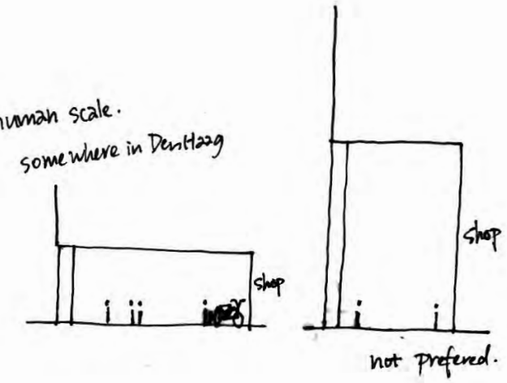
Streetscape of the harbour side

Typology Formula

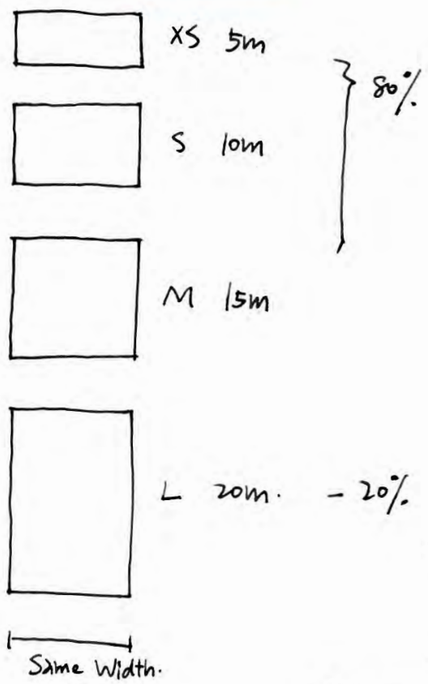
① Variation on ground floor



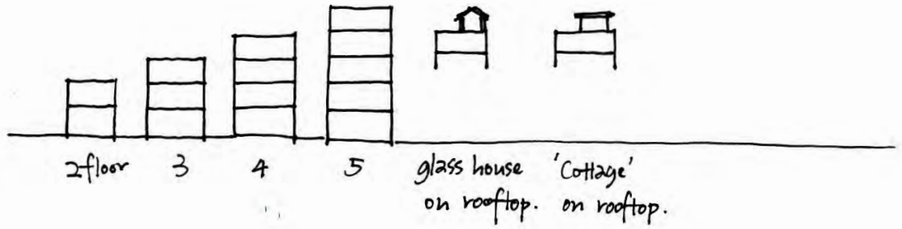
* human scale.
somewhere in Den Haag



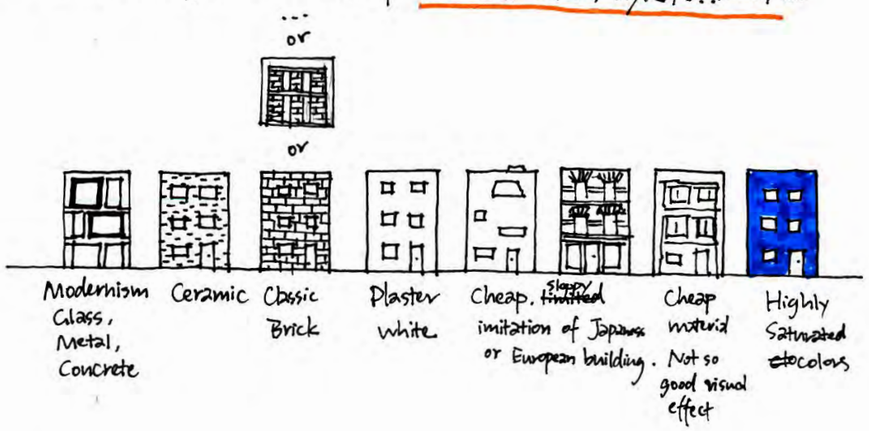
② Various surface Area



③ Height difference.

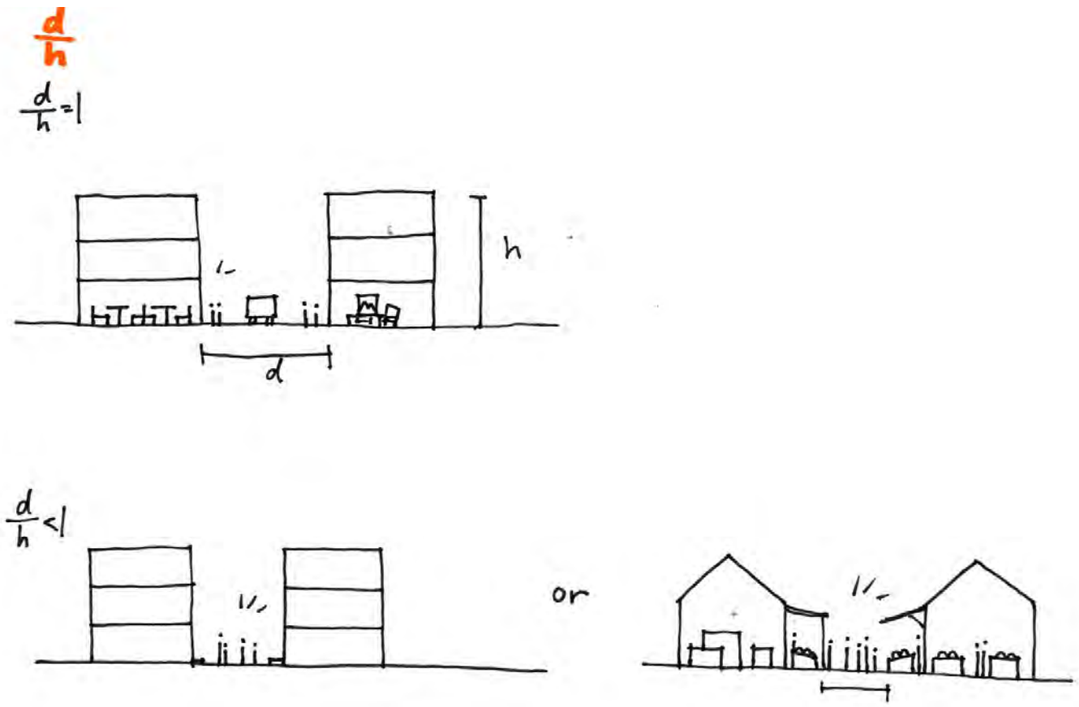


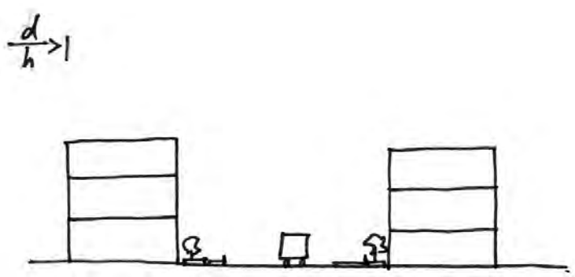
④ Facade differs in terms of material, color, style, texture, ..



⑤ Ornament.

Principle of a Livable Street

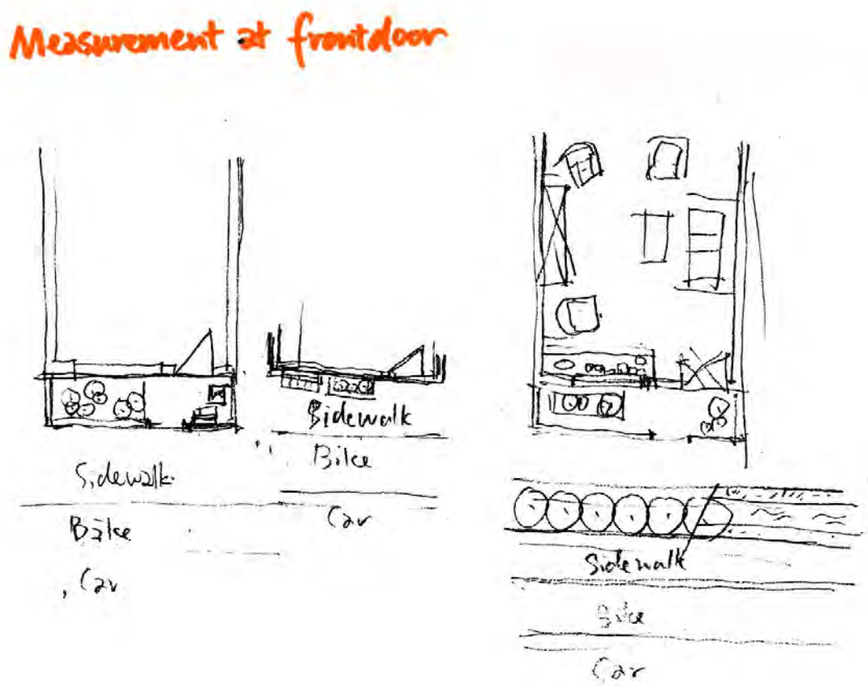


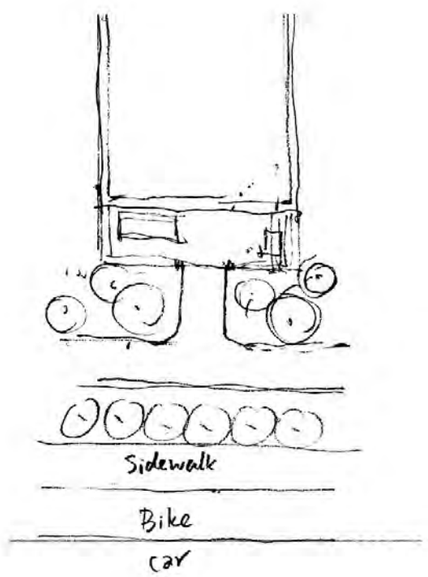


combine $\frac{d}{h}>1$ & $\frac{d}{h}<1$

Car/no car/Restrict car

Street furniture/Installation ...





Front yard of each building is carefully designed with water to form a quality public space.

Kuanzhai Alley, Chengdu

A typical courtyard in the traditional building

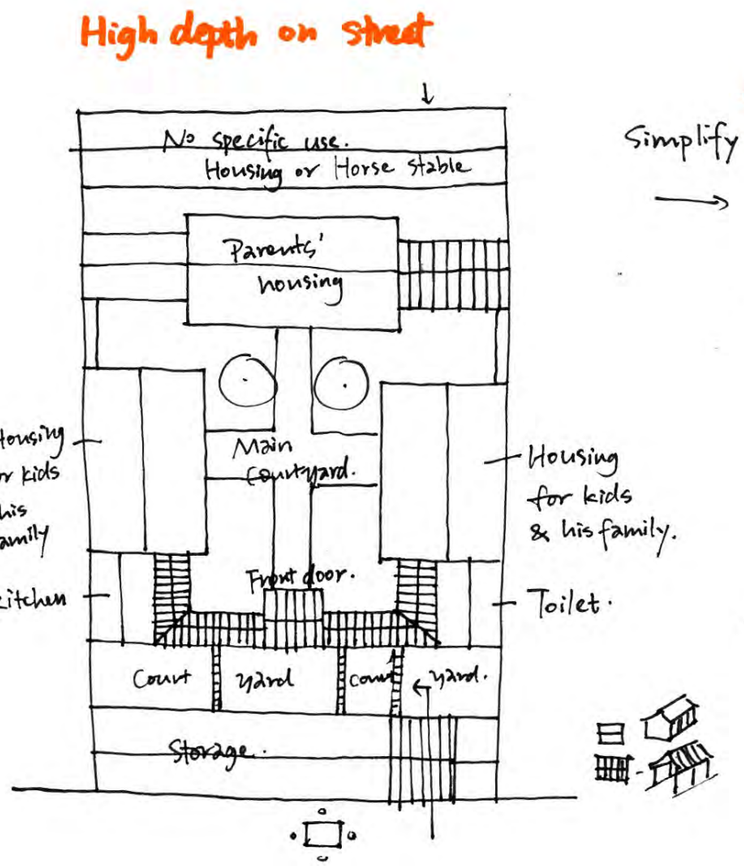
Birdview of the street

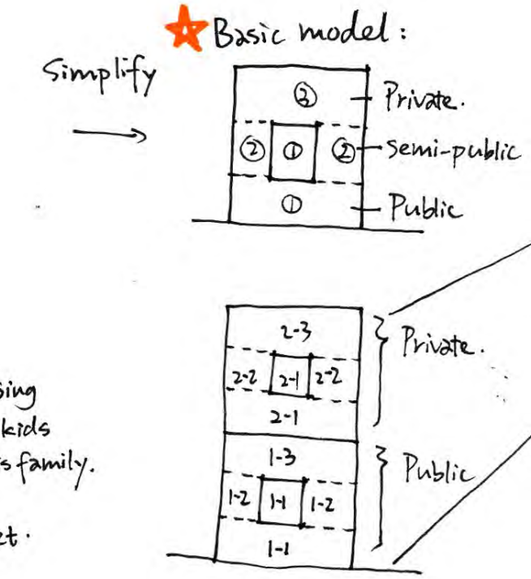
This is Kuanzhai Alley in Chengdu, Sichuan. This street is a cultural heritage, a food hub, home to unique shops, and a living representation of traditional lifestyle. There are a few standouts of this street.

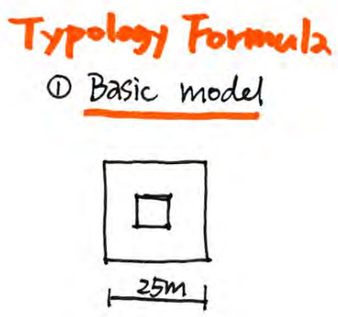
- First, the traditional typology divides buildings into sectors with different levels of privacy. In the old times, it ensured a family had a courtyard that welcomes colleagues, a garden that are open for friends and relatives, and private rooms for every family member. In modern times, this typology breaks down the solid boundary of a street, allowing the sense of street leaking into the first row of rooms and courtyards. People's public life can happen in the house!

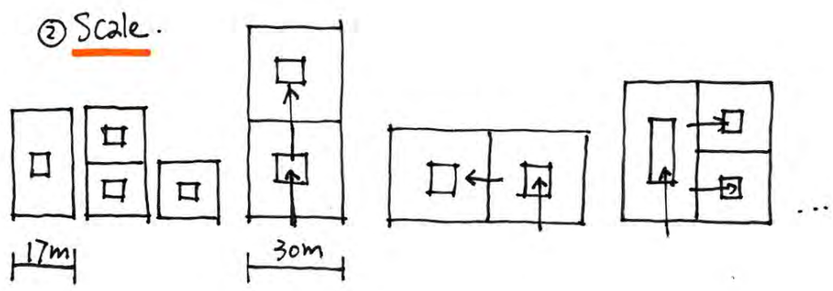
- Second, this square-shaped typology can be arranged and combined to create more spatial possibilities. For example, you can stack two squares horizontally or vertically to create more gradual layers of public space.

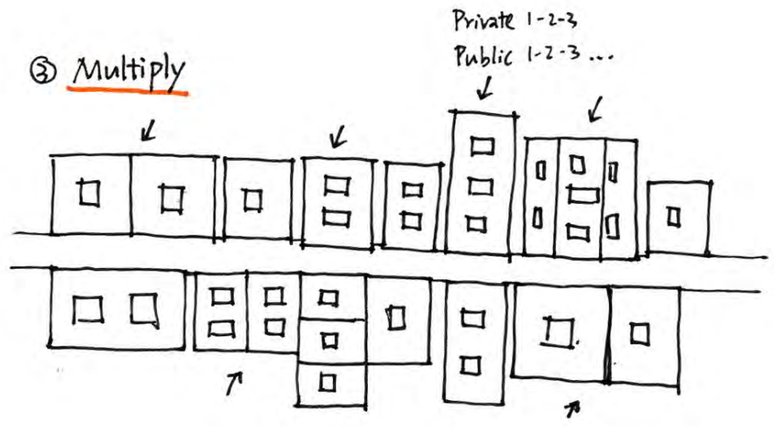
Principle of Typology











5.1.3 Dutch architectural personality

I research two Asian cases, which are massively different from the Dutch context that I work on. Obviously, the Dutch architectural personality must also be taken into consideration.

From traditional housing, I learned that here, people value privacy in housing very very much. Though the trend of densified housing goes on everywhere in urban areas, a considerable amount of people still aspire to have a 'house with a front yard and a private garden in the back' as their dream home. But big windows that everyone can look into are very much appreciated.

Through interviews and site visits, I got a preference of densified housing in the Dutch context. Even though it is densified, people still want their apartments to be identified. For example, a person might want to point at an apartment in a multi-storey building and say 'The one with a red door and flower is my home'. In other cases, row apartments have different façade materials, balcony arrangements, or plants to show the identities of dwellers to the public.

A Vristandhuis(detached house), in Den Haag

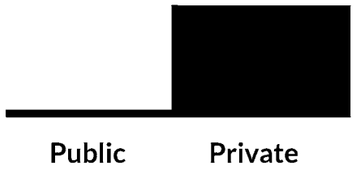
5.2 DESIGN A LIVABLE ENVIRONMENT - FUZZINESS

5.2.1 Concept of fuzziness

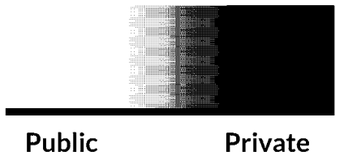
From the above, we can conclude that regular street is like a clean cut between public and private.

But street doesn't have to look like black and white. There can be a gradation from public and private.

Scheme of a regular street



My proposal: Fuzziness in street



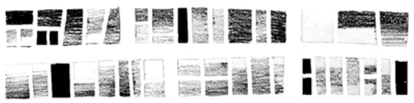
Under this scheme, public space is the street itself, and some space in the buildings that mainly function as amenities.

Public space of a regular street

Public space of a fuzzy street

Private space of a regular street

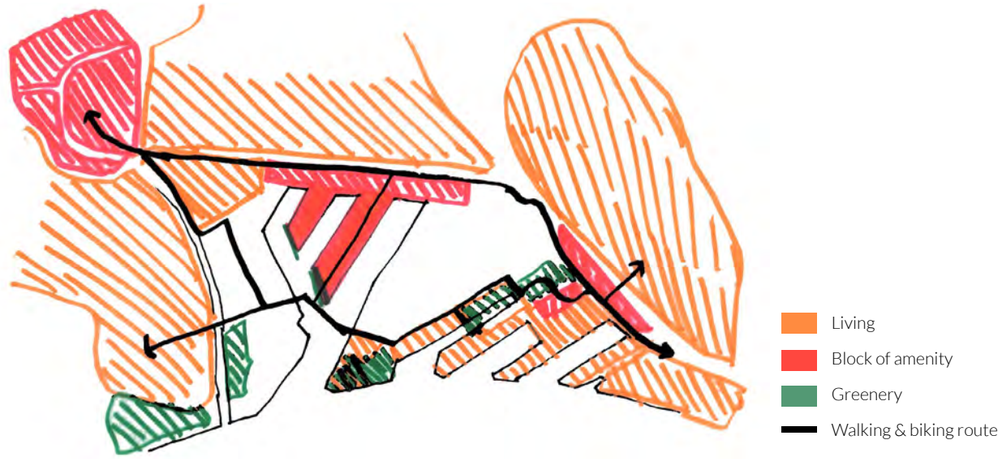
Private space of a fuzzy street



Fuzziness can be applied to more than just a street. A gradual transition from public to private can be implemented across three scales: the entire M4H area, streetscape, and housing. Also, at the first two scales, fuzziness serves not only amenity facilities but also interventions that improve livability, such as greenery, squares, and biking/walking routes.

5.2.2 Fuzziness in the entire M4H area

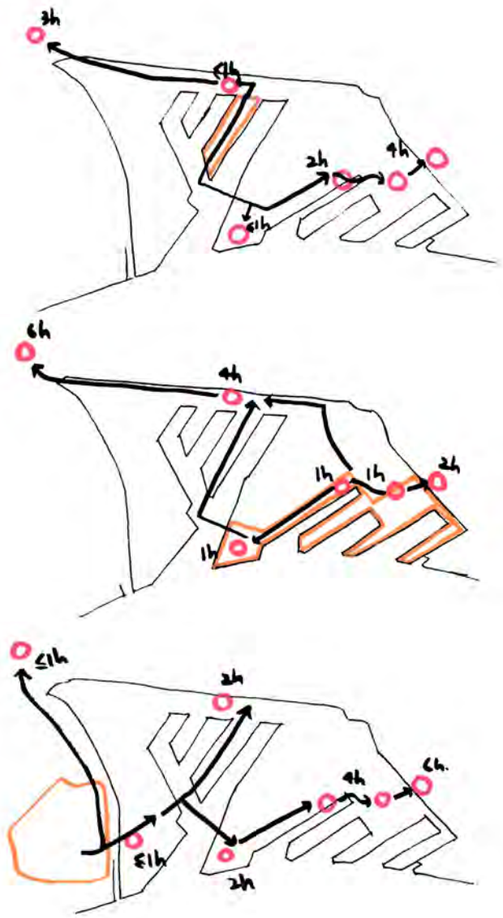
My proposal: Public Space Network



I designed a Public Space Network that connects the existing amenities and recreation centres (Schiedam Centrum and Dakpark) and the newly designed public services. It also connects the residential areas within and outside of the M4H, and connects the left and right parcels of the site. As shown in the drawings, residents of M4H and the surrounding neighbourhoods have an abundance of choices for outdoor public life. Whether one plans to spend 1, 2, 4, or 6 hours outside their housing, and whether one prefers street, square or green space, there are multiple options.

It is worth noting that the network went through several revisions from the first sketch to the final design. For example, I designed the network first. Later when I designed the working areas, I added a few public spaces in the right parcel of land because it can activate the makerspace and connect working with living. Another example is after I designed the Landscape Special (in chapter 7) in a later period of the project, I found that greenery in the living area was lacking, then made another revision. This working-back-and-forth process has been closely related to the design of working, living and transportation. Therefore, It is unecessary to extract it separately and put it into the report, so it has been omitted.

Outdoor activity option diagram



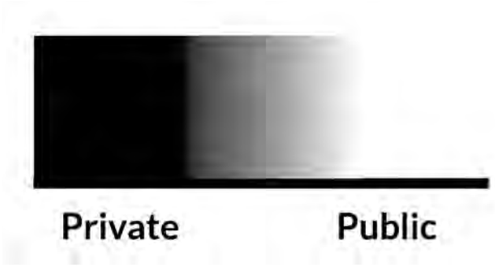
5.2.3 Fuzzy street

Design of Fuzzy Street

The spatial form of Fuzzy street is shown in 5.2.1, and it is located at the junction of two parcels of land, with a total length of about 5 00 metres. In terms of location, this is the best position for the accessibility of residents within and outside M4H. The projected number of residents in M4H is not high enough to support a larger Fuzzy street, while a smaller one would fail to the diverse needs of dwellers. (analysed in detail in 5.3)

5.2.4 Fuzziness in housing

Fuzziness in multiple housing typologies



The fuzziness of a house is the opposite of the street. Here it means that houses also have public spaces. Traditional typology brought this possibility, and in practice some European collective housing projects use similar courtyards typos. Based on the research I designed fuzziness in housing shown in the illustration above (see 7.1 for more details).

5.3 POPULATION AND AMENITY FORECASTING

For the design in general and for justify the Fuzzy street, I need to predict the population of M4H. Here I predicted the population by density.
The density of Rotterdam is 3040/km2
The density of Schiedam is 4593/km2
And the total land area of M4H is 165Ha.
(right now the population density of M4H is 898/km2)

Here is some Reference value for predicting future density:
Density of Den Haag 6861/km2
Density of Amsterdam 4965/km2
Density of Utrecht 3990/km2
Density of Amersfoort 2584/km2
Density of Harleem 826/km2
Density of Paris, 2021 20,200/km2

Result:
If future density is 10,000/km2 (severely densified), then there will be16,500 inhabitants in total.
If future density is 5,000/km2 (density of schiedam), then there will be 8250 inhabitants in total.
If future density is 3000/km2 (density of Rotterdam), there will be 4950 inhabitants in total.

(City faces a future of densification, so I choose 10,000/km2 as the high extremety. Then to have a sense of close future where things don't change too drastically from reality, I choose 500/km2 and 3000/km2, roughly the density of Rotterdam and schiedam.)

The amenity categories and quantities needed for M4H are shown in the table on the next page. These categories and the calculation indicators are provided by my colleague Charoltte, sourced from Dutch government and design standards. According to calculation, the total number of **amenities needed in M4H is between 14 and 41**, depending on the residential density. The 500m Fuzzy street has two rows of houses each measures 12 metres wide, and three entrances that at 10 metres wide. The street can accommodate a total of 60 buildings. This ensures enough space for the required amenity, while providing sufficient buildings to be used as studios and housings. The mixed programmes on the street provide a sense of fuzziness from public and private.

It's important to note that not all amenities need to be situated within the M4H site, such as hospitals and sports halls. And the predicted number of amenity is only based on M4H itself. But in reality M4H is shared by the surrounding communities and even by people from Rotterdam and Schiedam. So the final number of amenity could be higher than predicted here. In conclusion, the Fuzzy street is justified its purpose and diverse needs.

Amenity overview

	10000/km2, inhabitants in total:	5000/km2, inhabitants in total:	3000/km2, inhabitants intotal:
	16500	8250	4950
EDUCATION			
Primary school	8	4	2
Secundary school	3	2	1
Daycare 1/1km circle	1	≤1	≤1
HEALTH & WELLBEING			
General practitioner	8	4	2
Dentist	8	4	2
Pharmacy	3	1	1
Physiotherapist	15	8	5
Obstetrician	3	2	1
Hospital 1/2.2km circle	1	≤1	≤1
Centrum Jeugd en Gezin	1	0	0
Buurthuis 1/neighbourhood			
Wijkcentrum	1	0	0
ART & CULTURE			
Cultuuranker 1/3km circle	1	0	0
Library	1	0	0
Podium arts	0.5	0	0
Pop podium	0	0	0
Cinema	0	0	0
Sauna	0	0	0
Attractie (theme park?)	0	0	0
SPORT			
Sport hall	0.75	0	0
Swimming pool	0.2	0	0
Scouting 1/3km circle	1	0	0
Outdoor sport fields r0.9km	1	0	0
Play sport fields			
Sport in public space 1/neighbourhood			
PUBLIC GREEN & PLAY			
Playgrounds			
0-6 y/o	3	2	1
7-12 y/o	2	1	1
13-18 y/o	2	1	1
Public green 16000m2/1000	0.26km2	0.13km2	0.08km2
Park or platsoen	3.3	3.3	3.3
Day recreation terrain	0	0	0
Forrest	0	0	0
Nature terrain	0	0	0
Semi-public green			
Allotment gardens	1	0	0
Verblijfsrecreatief terrein	0	0	0
Cementary	0	0	0
Recreatief binnenwater	0	0	0
RETAIL			
Large supermarket	1.8-2.1		
Other daily supply	3.3-13.9		
Warehouse	0.1-0.2		
HORECA			
Café	1.5-8.4		
Cafetaria	3.3-7.1		
Restaurant	3.3-8.2		
Hotel	0.2-0.6		
In total	**14-41 amenities**		

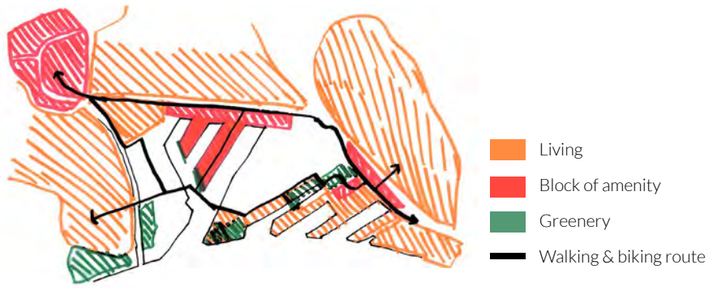
CONCLUSION

Concept - Fuzziness

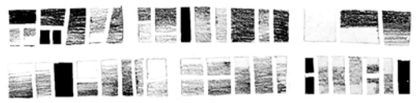
Grey is a gradation from public to private, the main function of which is mainly amenity, but also living.

Public **Private**

1) Fuzziness in the entire M4H - public space network



2) Fuzzy street



3) Fuzziness in housing

Fuzziness in housing means houses have public space like courtyard or shared activity hall.

Private **Public**

6 R&D 3.0: WORKING AREA

6.1 DESIGN BY RESEARCH: 6 PROTOTYPES

Most functions within the M4H now are Working. There are three types of working as shown in the table. The first step of the design is to remove all Ports and Logistics from the site. The reasons are as follows:

- When mixing living with working, it is important to consider the impact of noise and safety by heavy machine and container ship. Therefore, I remove the port.
- The huge port district of Rotterdam ouside city boundary is a better location for the port, as it has been designed to function as an efficient and sustainable port area.
- Within city boundary, it is not necessary to keep port in M4H. Because right now there are a few ports in the south riverbank of Maas that meet the demands of port activity.
- Policy documents of Rotterdam states that relocating port ouside city boundary is a part of the future plan.

Previous research indicates that having urban industry to M4H would enhance industry upgrading and sustainability. Therefore, I kept the manufacturing and makerspaces.

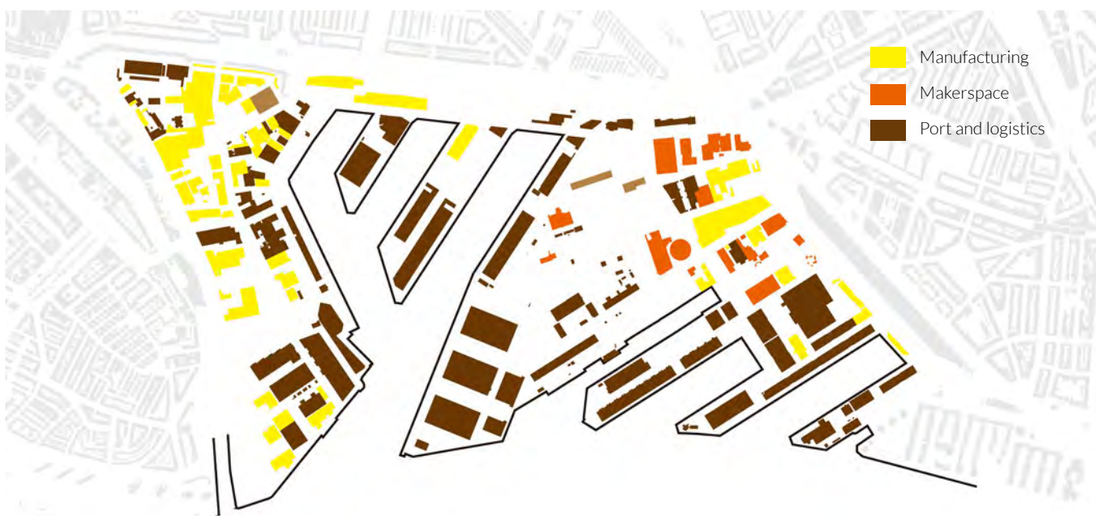
After I removed port and logistics, there is a blank working area in the right parcel, and that is where I start the design.

First, I researched on working districts that at least have one highlight. I apply their design strategies directly to the blank working area, creating 6 prototypes. Then based on their strength and weakness, I integrate the prototypes into one Working design.

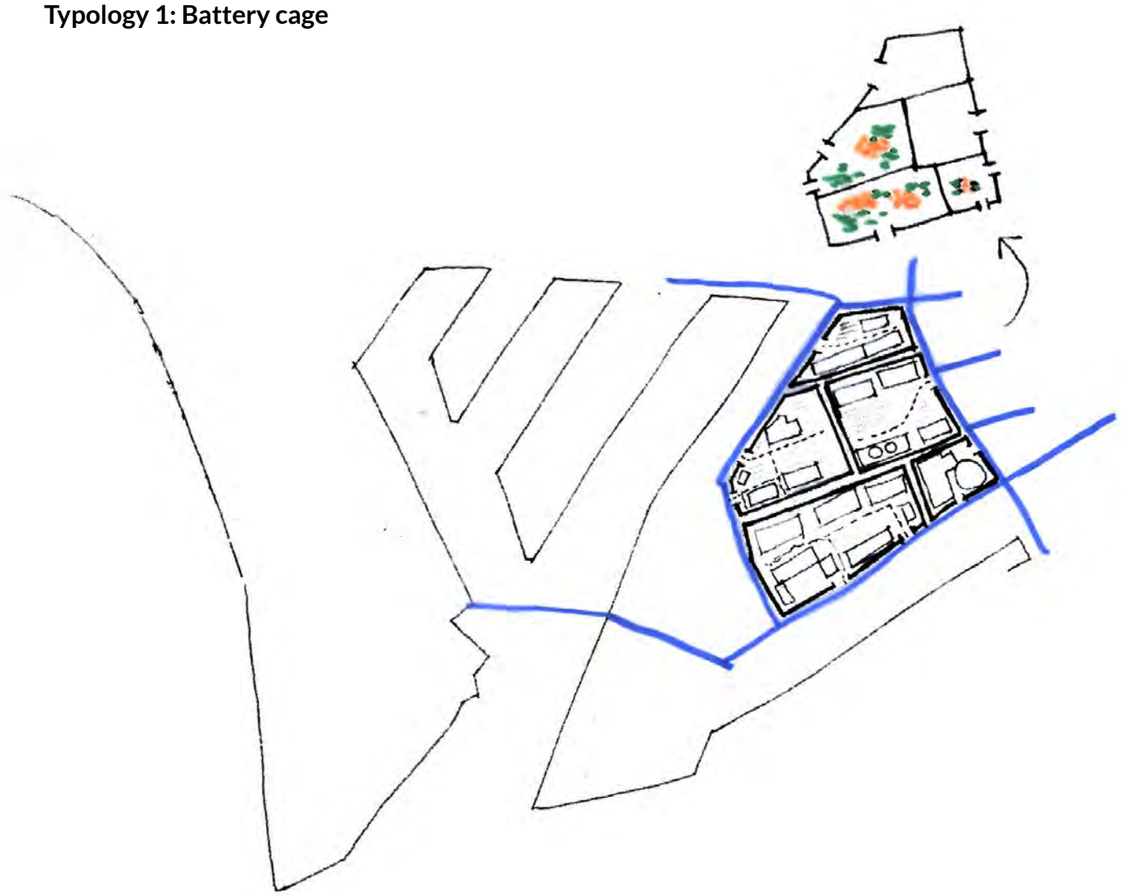
Status quo in M4H

Work		Employee	%	Gloss floor area (ha)	%
Urban	Manufacture	623	30%	8	25%
	Makerdistrict	811	39%	4	13%
	Urban	**1434**	**69%**	**12**	**38%**
Non-urban	Port & logistics	647	31%	20	63%
In total		**2081**	**100%**	**32**	**100%**

Existing working programmes in M4H



Typology 1: Battery cage

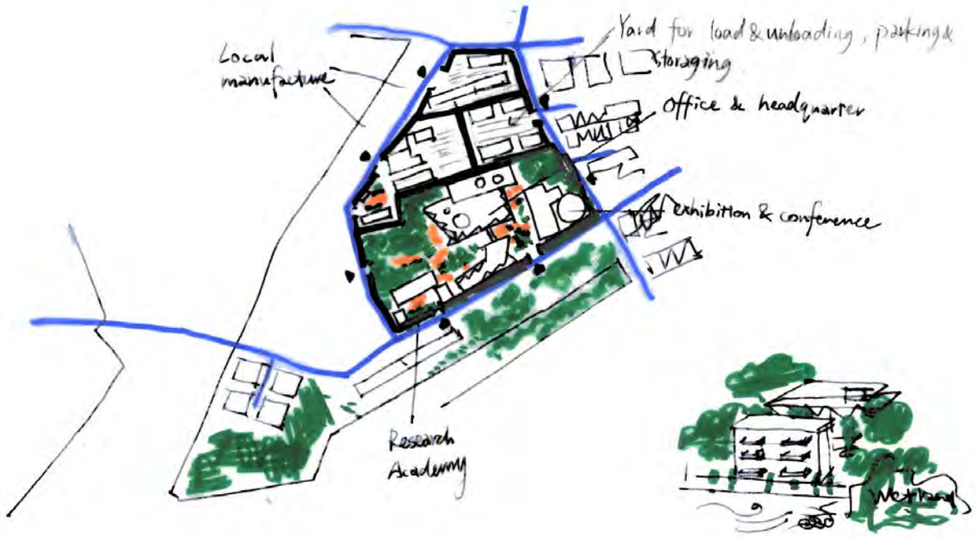


Case study: common working districts in developing countries.

Advantages:
- Easy to manage,
- Cheap to construct
- High efficiency in terms of production

Drawbacks:
- Neglect the wellbeing of workers
- Only consider the profit of capital

Typology 2: One headquarter

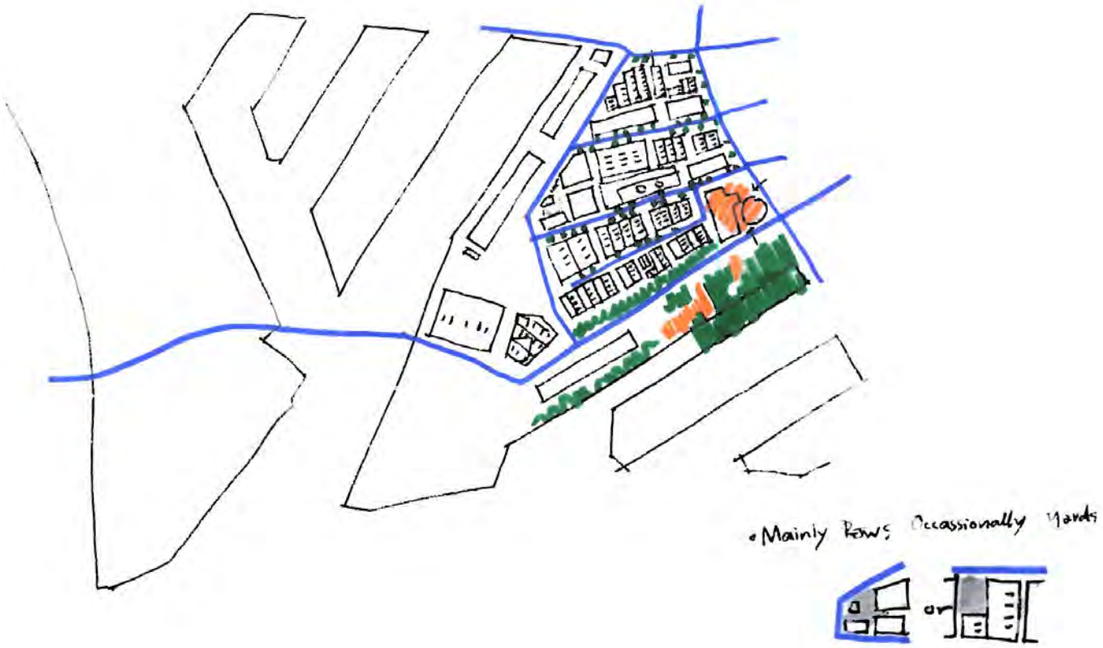


Case study: Royal HaskoningDHV headquarter, Amersfoort

Advantages:
• All the working in M4H can support such headquarter of a huge corporation. It can establish an economic model where makerspace handle research and innovation, while headquarter implement these innovations into the industry. Manufacture then mass-produce the products. The industrial chain can produce considerable profit and have good resilience.
• Beautiful work envrionment.
• Use green to create a good transformation from living to working.

Drawbacks:
• Housing diversity will be challenged by the rising land and housing prices brough by the economic benefits of large corporations.
• Once this scheme is established, start-ups and small offices that are not related to the headquarter might have to move to other places with lower rent.

Typology 3: Row factory



Case study: Park royale, London

Advantages:
• Cheap to construct
• Low rent, which is good for manufacture and start-ups
• High efficiency in terms of production
• Manufacture can provide people's with some amenity like furniture, hardware and food sale.

Drawbacks:
• factory typology lacks diversity.
• Pure manufacture could lead to heavy traffic, which might impact the quality of living
• People may choose amenity on Public Space Network over those within Working area. In this case, constructing a large number of factories may not be necessary

Typology 4: Densified work

Case study: Brooklyn tech triangle, New York

Advantages:
• Beautiful modern working block with adequate amount of recreation in working area
• Greenery are inside the district (not like manufacture, where green often uses as a buffer between working and living)

Drawbacks:
• High density means there are more people working in the area. Only have beautiful green is not enough, there should be good public space
• Expensive to build

Overall, this typology suits M4H quite well.

Typology 5: Even denser work

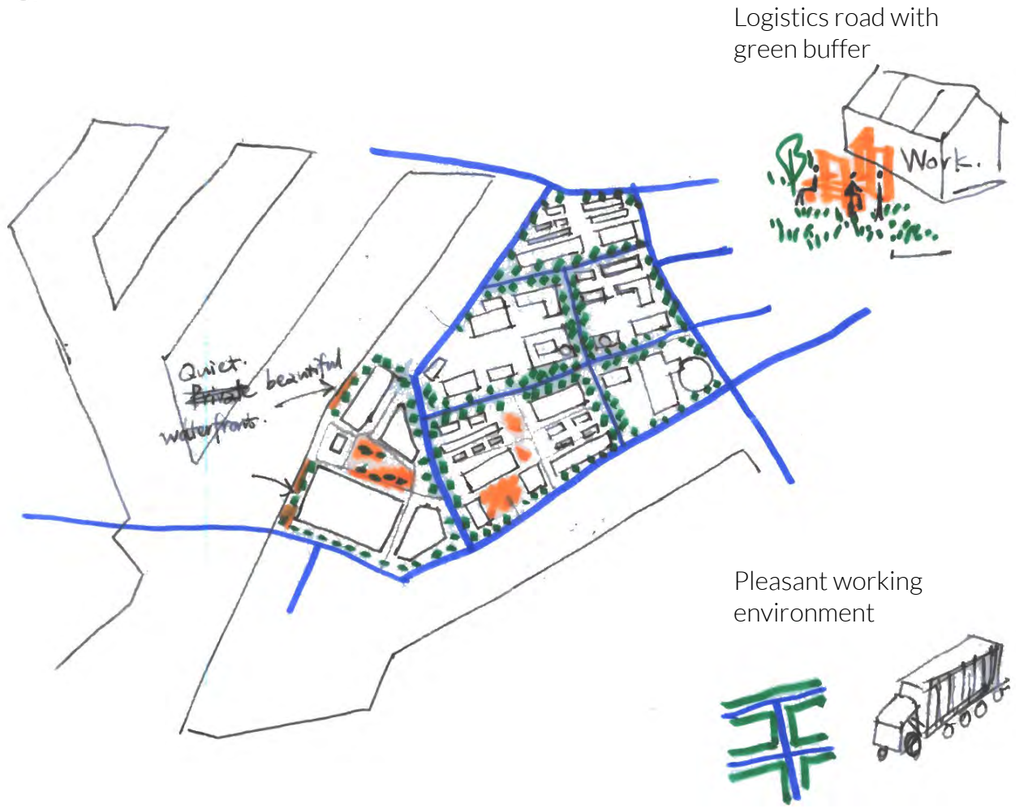
Case study: Brooklyn tech triangle, New York; Jurong, Singapore

Advantages:
• High density ensures a economic successful district.

Drawbacks:
• The public space and greenery in working area is difficult to access.
• There is no justification that such a dense working area suits the Dutch context, considering the population, economic strategy, culture of Rotterdam is so different from those extremely densified metropolises.
• Density is too high to the extent that it might affect living area in two aspects: visual pressure and daily commute of employees who live outside.

This typology doesn't fit well with M4H.

Typology 5: Even denser work

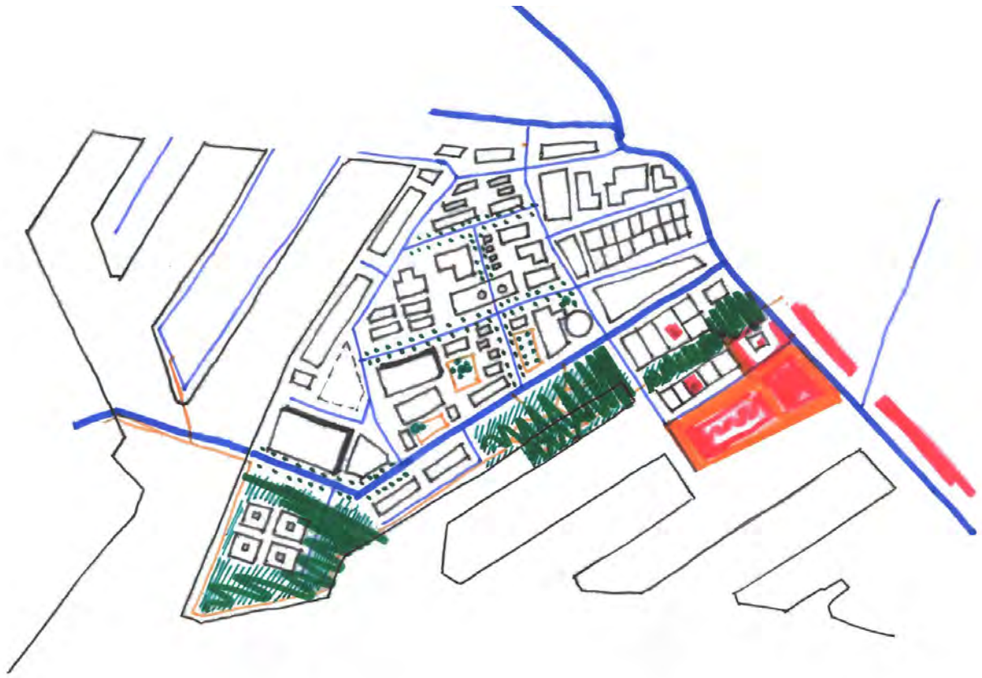


Typology 6: Open work district
Case study: London; Trendy mix like Strijp-S, Strijp-T
Advantages:
• Open to the neighbourhood, with beautiful environment and public spaces that citizens can also use.
• Space that it offers suit the working market of Rotterdam.

Drawbacks:
• Typology is not very systematic as there is no clear categorization.
• Logistics from left part of the island will inevitably use the bridge and the road that separates living and working. The living quality might be affected.

This typology also fits well with M4H.

1st design of Working area



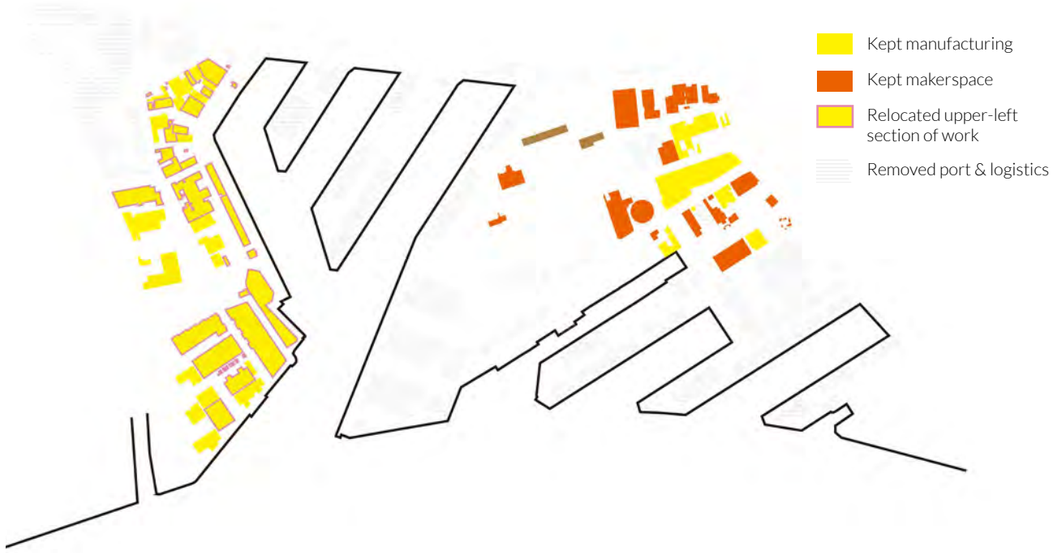
This is the first version of working area design. Here I combine the advantages of several typologies.
The most important thing to notice is that this design combines a good number of typologies to create diverse working options for firms. It is mainly great blocks and small flexible cubes, accommodating big offices, small workshops, start-ups, and art studios. Also, there are roadside trees for health and buffer reason, and good public space.

6.2 ORGANIZING THE WORK AREA

6.2.1 Organizing the existing work

Port in the left parcel is removed, manufacture that now designated into living will be relocated into the empty factories.
The makerspace and a few manufacture units on the right part of the island will remain unchanged. This is because they are well built and run well. And the working types fits with the design goal.

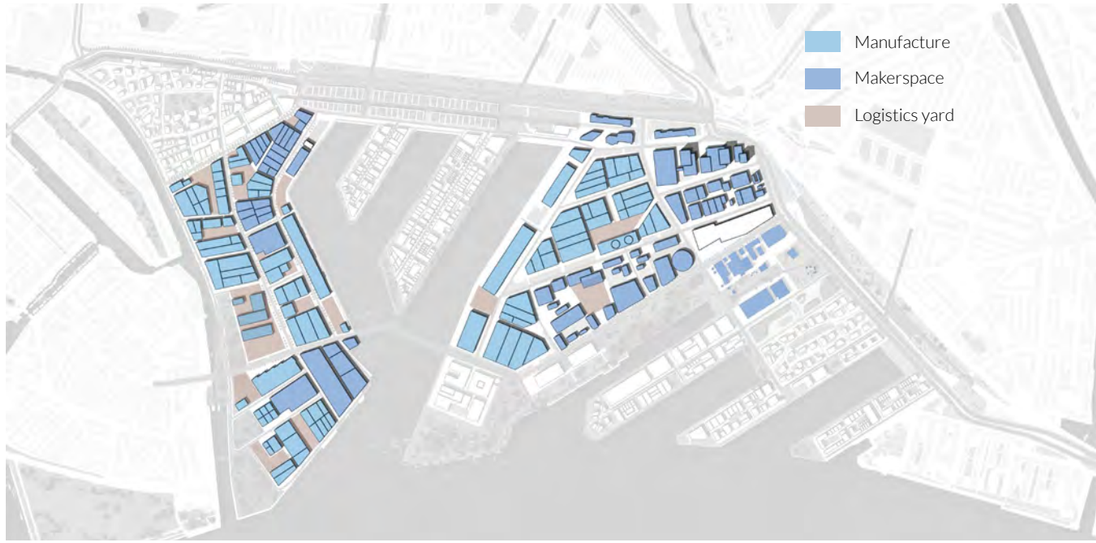
Design the existing work area



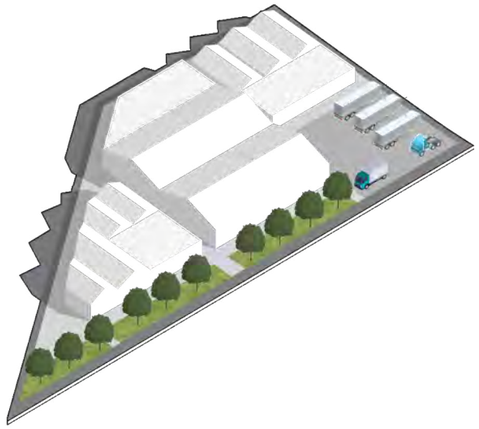
6.2.2 How I change the research-inspired design into a good pragmatic masterplan

In later design I simplified and systemized working typology. The typology can be varied and unrestrained during the research phase. But in the masterplan, the work don't need unnecessary details that fragment the typology. Therefore, I divided all the Work into Manufacturing and Makerspace. The typologies of Working buildings fall into the following categories: Huge block, Mix building, and Small blocks that enclose a courtyard. (result on the coming page)

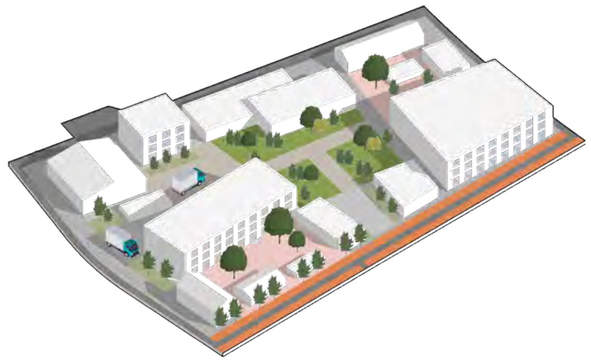
Final design of Working



Typology 1: Manufacture



Typology2: Makerspace



• The Headquarter is integrated into a large mix building that exists in both the Manufacturing and Makerspace Block.
• Small buildings are integrated into a clean makerspace.
• The location of the Manufacture and makerspace is slightly different from the first versio. The main road connecting the left and right sides of the site has two options, one is to pass between the makerspace and the living, and the other is to pass between the makerspace and the manufacturing. Obviously the second option made more sense, so when the road was decided, it is more reasonable to have the makerspace next to the living.

6.3 TESTING THE DESIGN WITH INDICATORS

Before the design M4H can accommodate 2081 jobs across a 32-hectare gloss floor area. It now supports 3630 jobs within a 26-hectare gloss floor area. The gloss floor area is evenly split between makerspace and manufacturing.

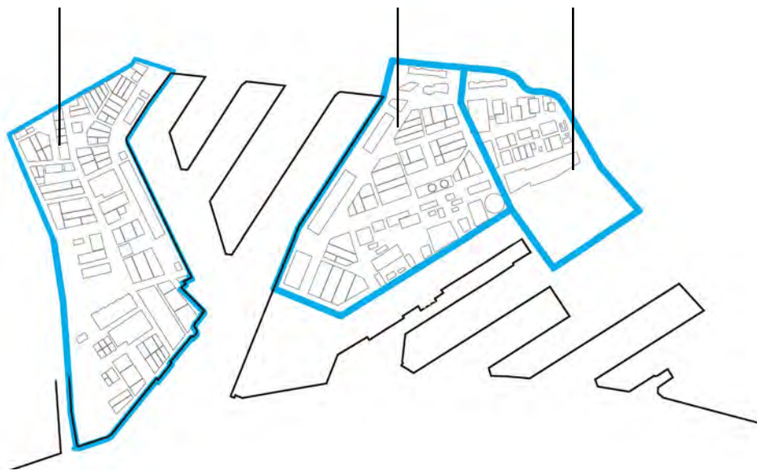
This indicates that my design improves the efficiency of land utilizing Working land. In conclusion, the design successfully meets the requirement.

Jobs and surface are of each Working plot

Employee amount: 700
Total building area: 9 Ha
Plot area: 32 Ha

Employee amount: 2000
Total building area: 11 Ha
Plot area: 31 Ha

Employee amount: 950
Total building area: 6 Ha
Plot area: 18 Ha



Status quo in M4H

Work		Employee	%	Gloss floor area (ha)	%
Urban	Manufacture	623	30%	8	25%
	Makerdistrict	811	39%	4	13%
	Urban	**1434**	**69%**	**12**	**38%**
Non-urban	Port & logistics	647	31%	20	63%
In total		**2081**	**100%**	**32**	**100%**

Proposal

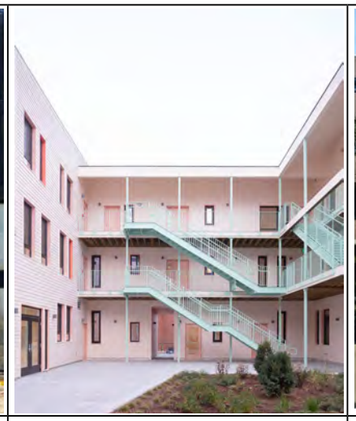
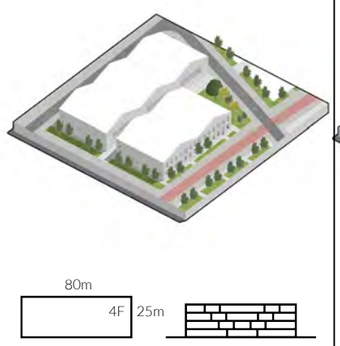
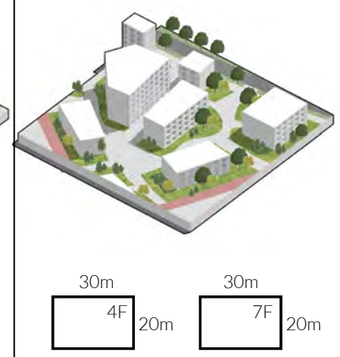
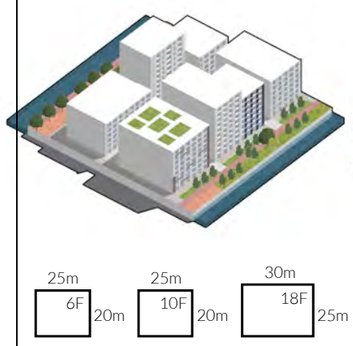
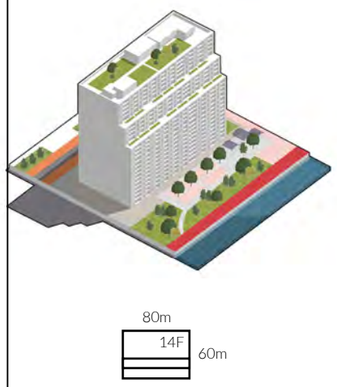
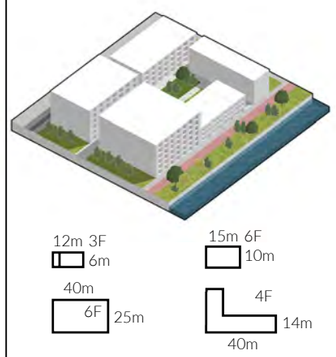
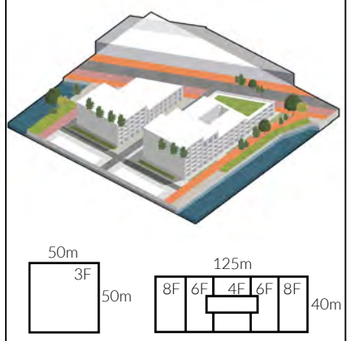
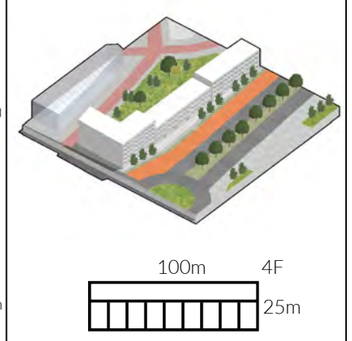
Work		Employee	%	Gloss floor area (ha)	%
Urban	Manufacture	1090	30%	11	42%
	Makerdistrict	2540	70%	15	58%
	Urban	**3630**	**100%**	**26**	**100%**
Non-urban	Port & logistics	0	0%	0	0%
In total		**3630**	**100%**	**26**	**100%**

7 R&D 4.0: MASTERPLAN

7.1 LIVING TYPOLOGY

Through case studies and rsearch by design, I identified 7 living typologies that are used in this project. The research results are shown in the table below.

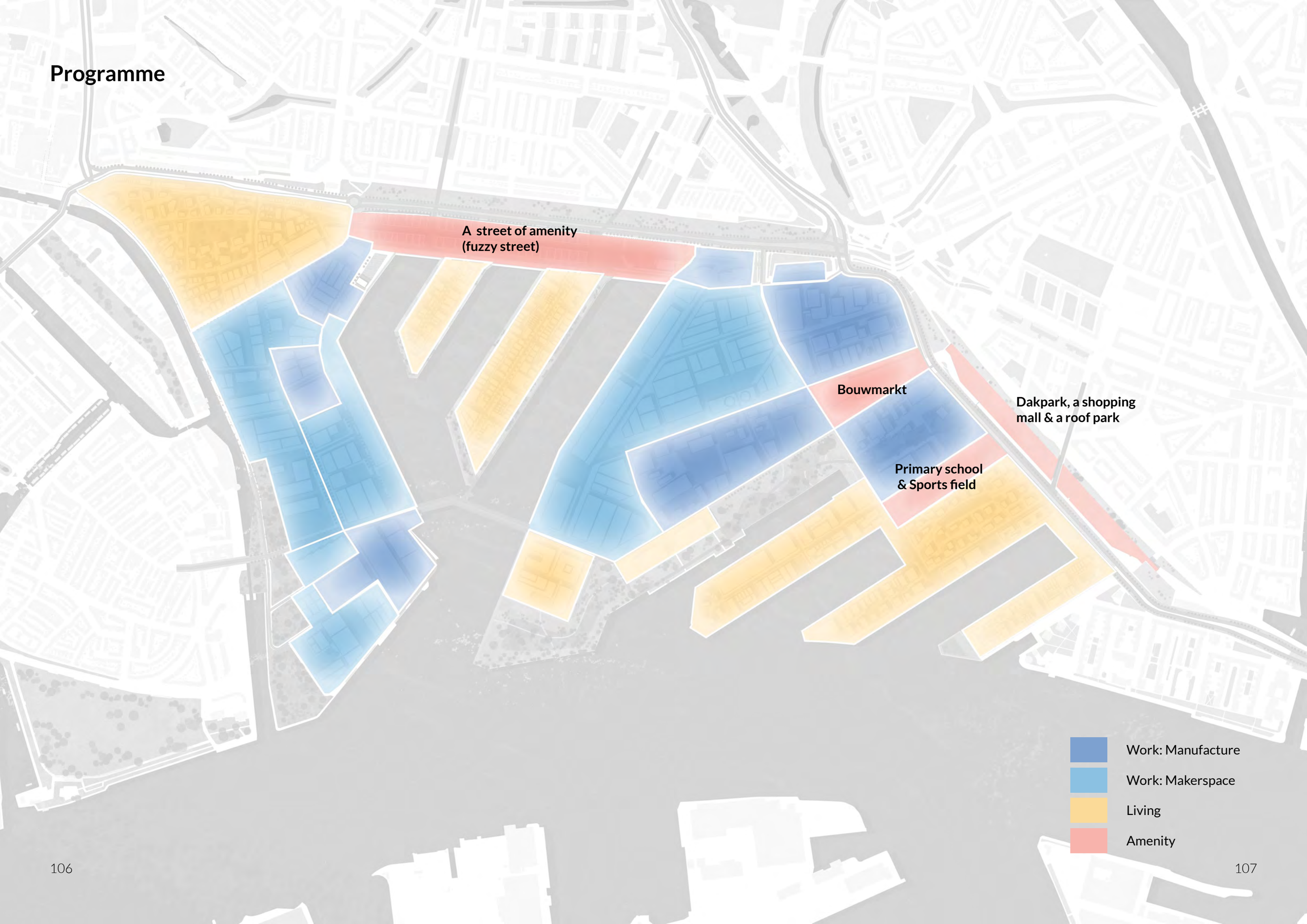
Living typology distribution map

1 From factory to housing	2 'the noise map'	3 Modern block	4 Tower	5 Blender	6 Cohousing	7 Row housing
						
						
Unit amount: 46 apartments per buiilding **Housing type:** Housing for young adult/students, & housing for temporal stay **Dweller:** 60 persons per building **Indicator: Person/Ha** **150 persons per Ha** **Ref:** Old industrial complex of Fabra & Costs, Barcelona, Spain	**Unit amount:** 189 apartments per Ha **Housing type:** 70% market housing, 30% social housing **Dweller:** N/A **Indicator: Person/Ha** **310 persons per Ha** **Ref:** Funenpark, Amsterdam; Cruquiuseiland, Amsterdam	**Unit amount:** 300 apartments per Ha **Housing type:** Family housing, Housing for family that move back to city from suburban area **Dweller:** N/A **Indicator: Person/Ha** **600 persons per Ha** **Ref:** Oostenburg, Amsterdam	**Unit amount:** 264 apartments per building **Housing type:** market housing with various room area **Dweller:** 500 persons per building **Indicator: Person/Ha** **500 persons per Ha** **Ref:** Bajes kwartier, Amsterdam	**Unit amount:** 179 apartments per Ha **Housing type:** Family home, detached house, and housing for singles, young couples, 30% of which is social housing **Dweller:** 500 persons per building **Indicator: Person/Ha** **350 persons per Ha** **Ref:** Centrumeiland, Amsterdam	**Unit amount:** N/A **Housing type:** Family home, housing for singles, young couples, 40% of which is social housing **Dweller:** N/A **Indicator: Person/Ha** **100 to 500 persons per Ha** **Ref:** Bay State cohousing, Malden, MA, US	**Unit amount:** 67 apartments per building **Housing type:** 50% market housing 50% social housing **Dweller:** 170 persons per building **Indicator: Person/Ha** **250 persons per Ha** **Ref:** Couwenhovenstraat, Rotterdam

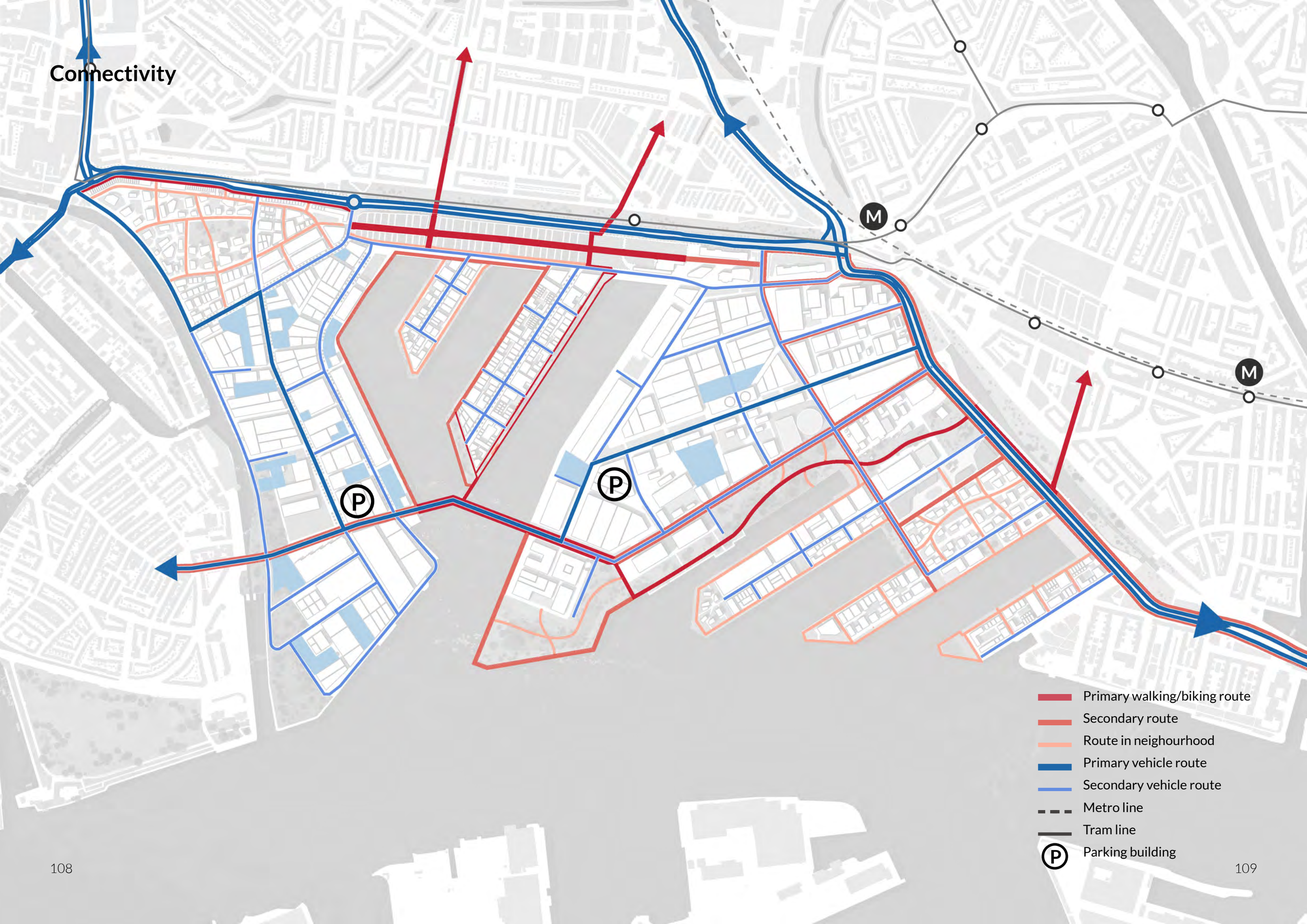
7.2 MERGING RESULTS INTO MASTERPLAN

Impression: a mix of living, manufacture and makerspace

Programme

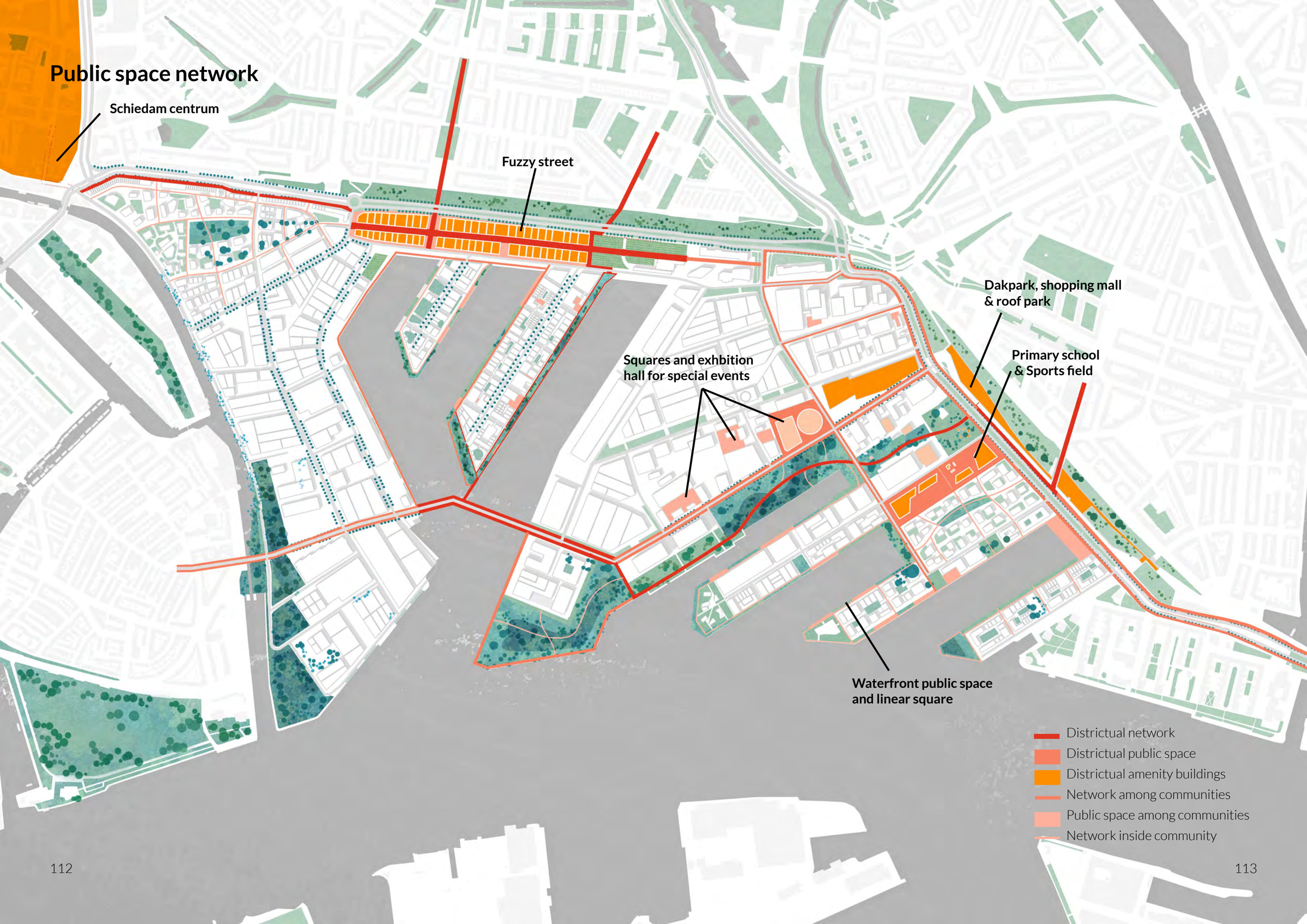

A street of amenity
(fuzzy street)
Bouwmarkt
Dakpark, a shopping
mall & a roof park
Primary school
& Sports field
Work: Manufacture
Work: Makerspace
Living
Amenity

Connectivity

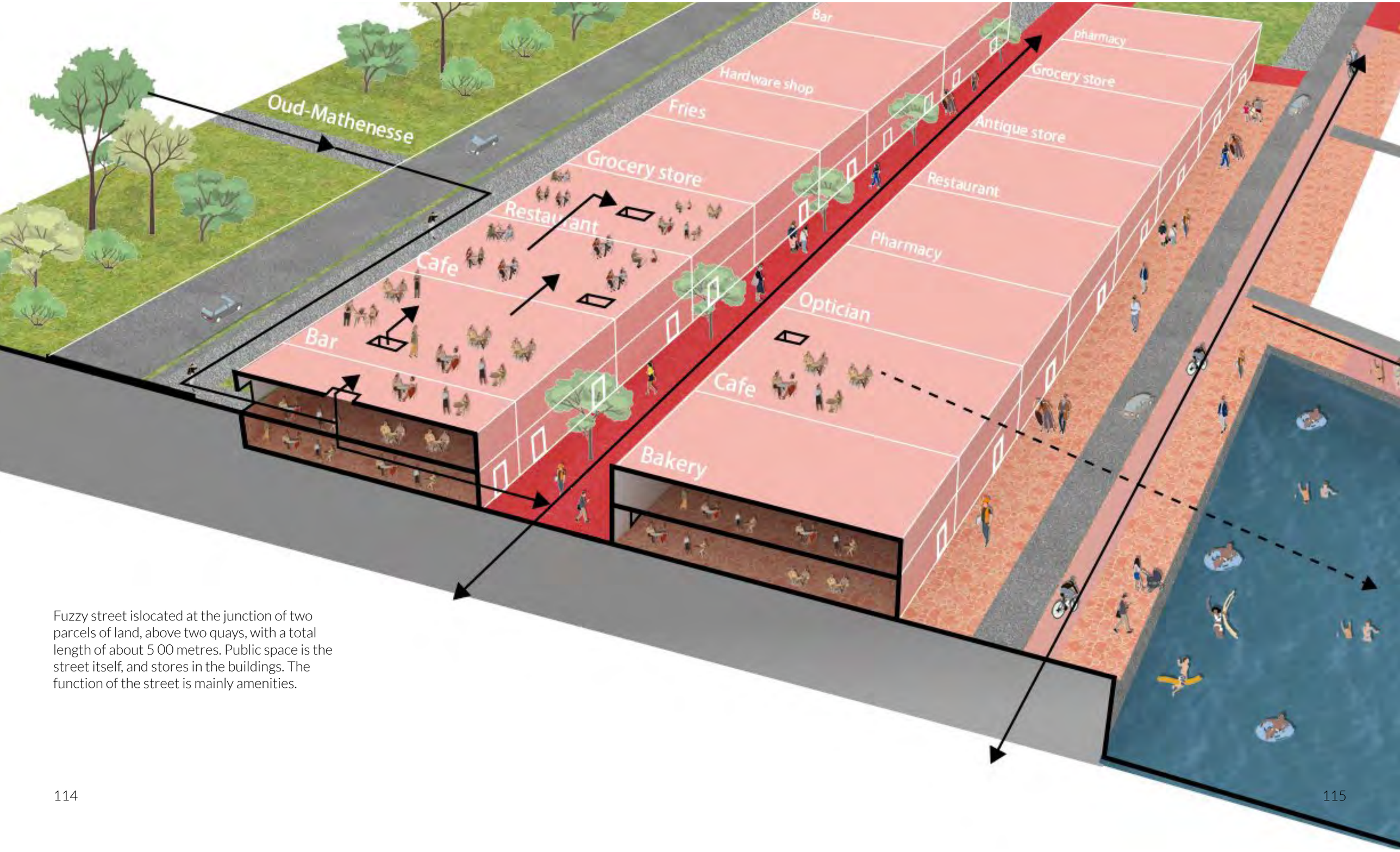


Architecture footprint

Public space network



Fuzzy street



Fuzzy street islocated at the junction of two parcels of land, above two quays, with a total length of about 5 00 metres. Public space is the street itself, and stores in the buildings. The function of the street is mainly amenities.

Landscape

The purpose of landscape in M4H is to provide a sustainable environment that benefits both people and ecology.

Landscape 0 is roadside trees, roof gardens and courtyards in housing. They are designed, planted, and maintained by people.
Landscape 1 is the greenery with a combination of grassland, bush, and trees. People can walk on the grassland, and sitting under the trees to enjoy outdoor life. The landscape is designed by people, and maintained frequently so that it has a domestic lawn.
Landscape 2 is landscape 1 after 2-5 years. In the landscape 2 areas, some places are wilder, without maintainence. But there are still many areas maintained for convenient usage of people. In landscape 2, nature will spontaneously grow into certain vegetation combination, and the dominating species will change over time.

Landscpae 3 is landscape 1 after 10 years. Greenery will recover to a natural situation at places that are assigned to landscape 3. Vegetation will not be maintained by people, only trimed for safety concern. Branches and leaves are left on the ground to fertile the soil. People can still access the landscape and enjoy the regrowth of forest, but they are more difficult to access.

Landscape 3

Landscape 2

Landscape 1

Landscape 0

Landscape

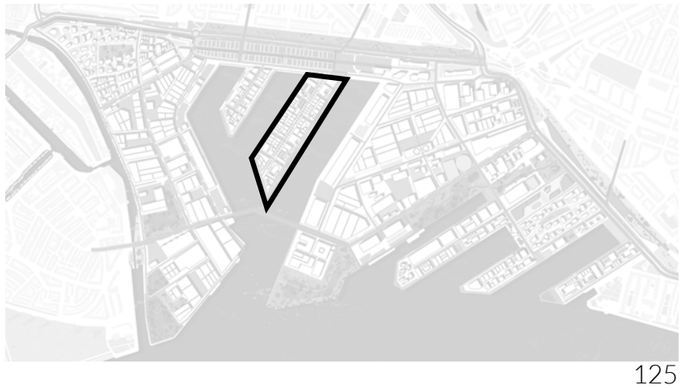
There are three main green corridors (dark green arrows) in the site, each is composed of a good combination of 4 landscapes. The corridors, together with minor green connections connect Maas, M4H, and green networks in the city.

Courtyard and housing of Typo 5 'Blender'

Diverse working of M4H

7.3 ZOOM-IN

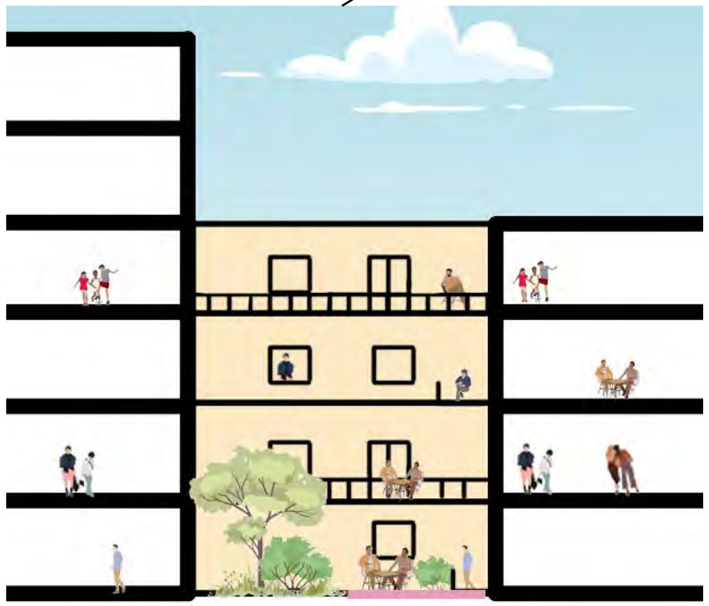
Zoom-in location

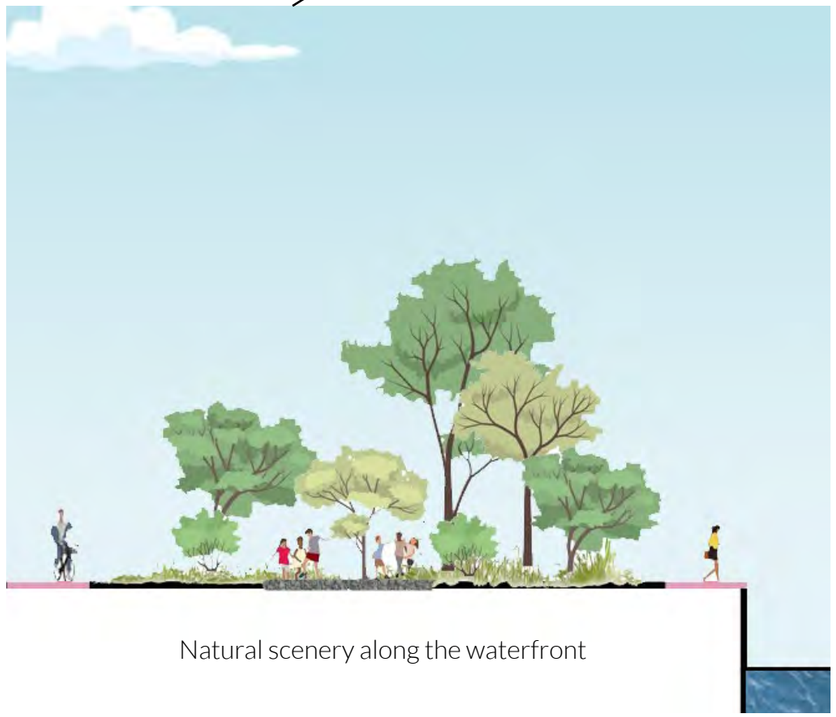


Section


Modern block
Cohousing


Community farmland


Cohousing courtyard


Natural scenery along the waterfront

Public space alongside the waterfront

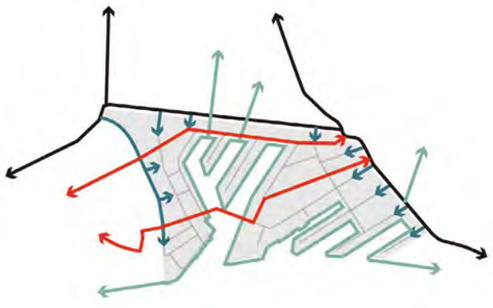
8 CONCLUSION

8.1 VALUES AND PRINCIPLES OF A SUSTAINABLE MIX

From this design, we can derive a sustainable mix approach that differs from Trendy Mix. The most important values of a sustainable mix is:

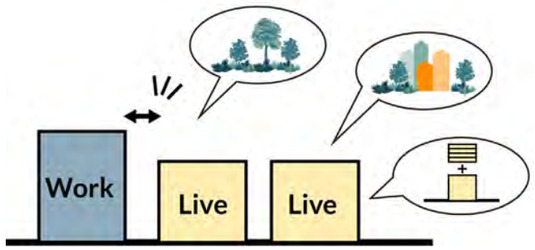
1 Provide diverse work, live, and amenity for everyone

2 Enhance connectivity among communities

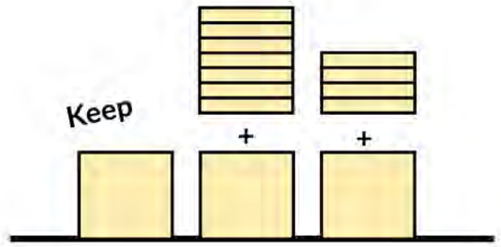


3 Create sustainable living envrionment

To ensure the values will be realized in the design, certain principles are required:



1 Mix living and working horizontally
This approach gives designers great freedom to design, while mixing them vertically limit them with one or two typologies to work with. Put buffers around light industry, connecting living and working with pedestrian pathways, mixing different types of living in one block, then put work in the block nearby, or maybe 10 metres away... All of the sudden, you are equiped with numerous possibilities to achieve the values.

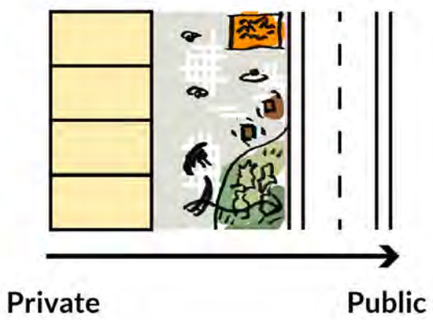


3 Properly densified housing
To maintain the population density of M4H at the level of Rotterdam, you only need a density of 150-400 people per hectare in its living area. Typically, 20-storey high-rise housings tend to accommodate 500 people in one hectare. Therefore, appropriately densified housing can fill the housing crisis and ensure a beautiful living environment at the same time.

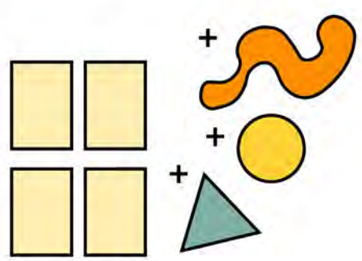
2 Create a robust and diverse economic environment
Providing infrastructure and manufacture like car services within city boundary is crucial for the robustness. Additionally, having high-ended speciality jobs like technology appliance industry and art&design studios is important. They create a vertical structure within industry, and a horizontal diveristy across industry categories.

w

4 Nature in Urban district
Divide landscape into at least two parts: one part is for recreation and relaxation, the other is given back to nature, creating a untouched natural appearance. It is beneficial to both people, ecology and climate adaptation.



5 A gradient transition from public to private
When the boundary between public and private is a line, it seems like you can only choose between housing and public space. But when that boundary becomes a linear space, you have an extra layer, a 3~5 metre wide stripe at the edge of every community to work with. With a good public space / landscape design, the livability and inclusiveness can be significantly enhanced.



6 Secret of diversity: dare to combine different elements
Of course, designing it this way would become a failure in most cases. But the willingness to think outside the box, and put spatial elements together in a way that residents are not used to can sometimes lead to surprisingly pleasant outcomes. For example, I combined the most traditional Dutch house (with a small front yard and private garden in the back) with some seven-storey modern housings, resulting to a living typology that exhibits good diversity.

8.2 DISCUSSION

This project has made contributions in two aspects: integrating Research and Design, and integrating an east philosophical view into urban design.

8.2.1 Projects's contribution in integrating Research and Design
This project is both a design project and a research project. The project has two goals: to design M4H into a sustainable mix, and to obtain the values and design principles of a sustainable mix as references for other mixed development projects.
In terms of design, this project has produced a design solution that suits the location, economic need, and inclusive demands of M4H. The final product includes a masterplan and a zoom-in with emphasis on diverse living and working typologies, public space network and landscape system. Rather than developing in a linear process, the project starts with a rough framework and progresses through a mix of research, analysis, and design. A part of this back-and-forth working process is documented in the report for the readers to review.

From a research perspective, this project reveals that Trendy Mix has shortcomings in terms of economic resilience and inclusiveness. The vertically mix model limits the possibilities of Trendy Mix, making it difficult to break out of the existing spatial structure. Therefore, this project chooses to produce an alternative model. Through research and design, this project responds to the drawbacks of Trendy Mix by summerizing the values of a sustainable mix, which is (1) creating beautiful neighbourhoods; (2) enhancing connectivity among communities; and (3) providing diverse work, living, and amenities for everyone. When a mixed development project delivers these values, it effectively aligns the urban sustainable development goals. How to deliver the objectives? Through the design, this project summarizes six principles such as Mix living and working horizontally, Create a robust and diverse economic environment and, each offering strategies to achieve the values. By reading the design outcome, scholars can gain detailed design references and examples, understanding how values and principles are applied in the design.

8.2.2 Contribution in integrating an east philosophical view into urban design
In short, I have another way of perceiving the design, on that runs parallel to conventional modern urban design methods. This viewpoint is shaped by various philosophies, multiple cultural influences, and sociological factors. It is not easy to label this apptoach, here I refer it to as 'East Philosophy' for simplicity.

Why I start the project with doubting Trendy Mix not being sustainable? A philosophical way of thinking inspired me. Generally speaking, people construct 'filters' composed of concepts and habitual thoughts, which often remain unchanged. When I observe Trendy Mix, I adopted filters of others (employee, truck driver, elderly, childern), then finding that there are lots of drawbacks in Trendy Mix. For example, the catering are fine for a employee, but might be to expensive for a truch driver.

We always want to generate adaptive designs. But how can you make a truly adaptive design when you label every item with fixed concepts? In some Asian myths, a character might have a scarf that turns into a ladder when he needs to climb a roof. Or when he wants a drink of water, the scarf turns into a bottle. Without 'a production label' sticking on every object you see or use (in your mind), you start to feel the fluiditiy and the space you can work with. You start to question design elements we otherwise take for granted. Then you might consider place a housing where it conventionally seems inappropriate.

Finally, east philosophy helped me a lot when designing building blocks. I realized that many residents have a somewhat neurotic attatchment to their property. There are two mindset of having something as ones own: one is like looking at a bird flying freely in the nature. You appreciate its beauty, amuzing jumps and chirps, without the need to own the bird as your property. Another mindset is to keep the bird as yours, occupy it, own it as a pet. It is the same with housing. When someone goes across the front lawn without a permit, residents could get so mad. They seem to not aware that his/her house is a temporal thing. No matter how hard you maintain it, decorate it, clean it, one day it will fall apart. There is no use cling it that hard, it only ties your happiness to an object that will eventually fall apart. Thinking like that, I designed some housing from the first watching-bird prespective. I proposed that, if, I can think about my house as a temporal stay, then I can invite people to enjoy this property. I will not only care about MY Housing, but also consider the street, neighbourhood garden, playground as 'the bird that I enjoy watching'. Thus, your mind is free from cling the house and then, you can truly enjoy the neighbourhood. From this viewpoint, I decided to design a public space network, allowing people share lives with others, and enjoy this impernanent beautiful neighbourhood.

In summary, this project adopts an eastern philosophical approach at certain stages for contemplating and refining the design. The integration of philosophical perspective and design results in a professional design that are fresh and humane, with a profound sense of care for people's wellbeing. This design style also shows potential for further development.

9 REFLECTION

Here are the things that I harvest from graduation project, and will keep working on in the future career:

How to make a good design

• Simplify is the important method.

• Make dozens of options, then shrink to one or two. Expand more options from it, then again choose one or two from them. In this process, try to consider as many aspects as possible (traffic, greenery, building blocks, employee/kids/visitor's poin of view...)

• This may only apply to me or a certain group of people. I found that design inspiration doesn't always come from case study, research, analysis, or fancy architecure magazine. It often comes from life experience outside design, or conversations with people. Being keen on observing and reflecting helped me a lot in design.

How to talk about your design

Considering inviting people on the street to your presentation. They know nothing about the professional design, but each of them have lived, used, experienced the city. How to present in a way that they understand? What do they care about? For example, spending 10 minutes talking about the economic resilience and robustness might not move a citizen. But to say if you need to make furniture, you can make it yourself or get it customised at a nearby makerspace. Or to say your neighbourhood is able to produce its own food, furniture, as well as providing car repair and home hardware stores. I think talking about the impact design brings to their lives can interest most people.

Then it leads to another problem. I think due to customised media, people are more and more enclose into their own bubble. And people in this bubble don't know much about what happens in other bubble, or they assume that others will think like this or that. As a designer, I need to visit bubbles here and there, to understand the needs, preferences and hatred of each bubble.

Reflecting TU Delft's teaching method

Going to a certain depth of both research and practice design, I gradually notice that they are two different field that require different skills, and have different focus. Of course they both need good presentation skill, but what the audience expect to hear is totally different. In an academic presentation, you are expected to show how you have gained new knowledge and filled in research gap through design. In a presentation in practive, you talk about how you have solved a looming problem and enhanced people's lives through design.

I did an internship last year, the first task I got is to conduct a case study. I did it in the way TU Delft taught. I frequently question why I want to include this case, what is the justification of this typology, and what contribution it makes to my research question. However, after one or two weeks, I realised that in practice it doesn't work this way. In practice a case study is to quickly extract similar design strategies and generate your own design principles. You don't need to work in accordance with the research criteria. Design tends to be more pragmatic and focused on real-world application, and concen less about the idealised content & process that often appears in research environment.

In summary, TU Delft Urbanism need to have either more bridging work between academic and practice, or offer additional options for future designers. Right now I think even in Design of Urban Fabrics studio, the academic ways takes too much part of the curriculum. Another reflection is that TU Delft doesn' t have a diverse environment of viewpoints, whether for training researchers or designers. When people with different perspective work together, both sides are challenged by each other, leading them to reflect their own research and design. They have to argue and discuss, settling down with a consensus view, instead of sitting in their own bubbles and drifting further and further away, only working with people who share the same bubble with you.

What kind of designer I aspire to be

It is a common sense that eveyone radiates energy, and people around them can sense it. As a designer, I think our design kind of influence people in a similar way. If you give other people support, lovem and care, people can sense it from your visuals, your presentation, or even when they sit with you and chatting. In such way whether our designs win the award or not, it has a positive impact on people. I think that is something very very important but rarely talk about in Delft.

I think the best designer is those who genuinely care about others. With a noble heart and the design skills I learn from mentors and colleagues, I can benefit others through my design. I think when I design in this mindset, I have no regrets at the end of the day, because I've given away my most cherished possession.

BIBLIOGRAPHY

Coupland, A. (2005). Reclaiming the city: Mixed use development. Routledge.

Croxford, B., Domenech, T., Hausleitner, B., Hill, A. V., Meyer, H., Orban, A., ... & Warden, J. (2020). Foundries of the future: A guide for 21st century cities of making.

Grant, J. (2002). Mixed use in theory and practice: Canadian experience with implementing a planning principle. Journal of the American planning association, 68(1), 71-84.

Hirt, S. A. (2016). Rooting out mixed use: Revisiting the original rationales. Land Use Policy, 50, 134-147.

Lane, R. N., & Rappaport, N. (Eds.). (2020). The design of urban manufacturing. Routledge.

Rowley, A. (1996). Mixed-use development: ambiguous concept, simplistic analysis and wishful thinking?. Planning Practice & Research, 11(1), 85-98.

Ryckewaert, M., Zaman, J., & De Boeck, S. (2021). Variable arrangements between residential and productive activities: conceiving mixed-use for urban development in brussels. Urban Planning, 6(3), 334-349.

Shall, S. (2009). Design Like You Give a Damn: Architectural Responses to Humanitarian Crises Architecture for Humanity and Expanding Architecture: Design as Activism Edited by Bryan Bell and Katie Wakeford.

Steffen, W., Richardson, K., Rockström, J., Cornell, S. E., Fetzer, I., Bennett, E. M., ... & Sörlin, S. (2015). Planetary boundaries: Guiding human development on a changing planet. Science, 347(6223), 1259855.

Wickersham, J. (2000). Jane Jacob's critique of zoning: From Euclid to Portland and beyond. BC Envtl. Aff. L. Rev., 28, 547.