

Migration of mobility as public space

# TARWIJK HUB

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Fig 1: Tarwewijk mobility hub (phase 01)

From carriages to cars, from steam engine trains to HS trains, the modes of mobility has been changing through the time. Mobility as become more and more relevant to people's daily life and also plays an important role in city planning. With the rapid development of mobility modes, more facilities are also needed to fulfill a complete transportation network.

Nowadays, more and more infrastructures such as highways, railways, are built to connect different districts. These infrastructures are usually built elevated from the ground and create a large amount of leftover spaces underneath. Various problems such as low-quality space, divisions in urban planning, and safety issues will arise because of these leftover spaces. Therefore, my research question becomes:

### **How to activate the leftover spaces caused by infrastructures in public places?**

The research methodology can be divided into two parts, theoretical research and typology research. The theoretical research is mainly based on the book "Redefining leftover space: value and potentiality for the city", written by Ela Alanyali Aral, while using other relative references for exploring broader field. The typology researches are targeting the projects which are aiming to renovate leftover space caused by infrastructure to have test the theoretical outcomes. From the researches, to activate leftover space, four aspects need to be paid extra attention to. The primary aspect is accessibility, which is the capability and opportunity of leftover spaces to be reached and entered. The second aspect is diversity, the fact of many different types of atmosphere, activities, people can be included into the leftover space. This aspect could attract users to these spaces while allowing them to stay. Thirdly, inclusivity, which is the capability of including people from all groups, especially vulnerable groups such as children, elderly people, and disabled people, and treat them all fairly and equally. By improving inclusivity, it could allow leftover space to be used by people from different groups. The final aspect

is reconnection, which is to link the leftover spaces together and reconnect with the city and become part of the urban planning.

The selected site, Rotterdam Zuid, also has the leftover space problem. Constructed in 1968, Noord-Zuidlijn metro line created many undefined leftover spaces underneath and leads to many low-quality spaces used only for car parking and also a sharp division inside the Tarwewijk neighborhood.

From the analysis of the site, an additional metro station between the Maashaven subway station and Zuidplein subway station will be the answer for activating the leftover spaces in Tarwewijk neighborhood. By allowing more people to gather and stop by, the metro station provides opportunities for more people to pass by the leftover spaces and further increase accessibility. It could also attract other functions like Post NL, commercial functions like cafe, retail shop, and social functions such as daycare in the Tarwewijk to located nearby and further improve the diversity of the leftover space. As a mobility node, the metro station has escalators and lift to help the vulnerable group easily approach the leftover space which increases the inclusivity. As a part of the Rotterdam public transportation facility, the metro station could also function as the gateway for the neighborhood and help to connect not only the leftover space but also the neighborhood back to the city.



Fig 2: Tarwewijk hub as a part of culture strip in Collage city  
(Own illustration)

# PROJECT DESCRIPTION

The design of this project are mainly aiming to solve the leftover space problem in Tarwewijk neighborhood by improving the four aspects from the research outcomes, the accessibility, diversity and inclusivity of leftover space, and the connection between the leftover space and urban environment.

## Site ambition

The site ambitions are retrieved from the analysis of the specific site conditions and mainly aiming to reconnect the leftover space back to the city and create a coherent atmosphere with its surrounding. From the analysis, three site ambitions need to be carefully considered in future designs:

### 1. Culture Strip

The project needs to express the diverse culture inside the Tarwewijk neighborhood. Together with Maasilo, the Rotterdam Art Ride, Hart van Zuid, and Rotterdam Ahoy, it will create a continuing culture strip inside Collage City and link the Tarwewijk district back to Productive Waterfront and Hart van Zuid.

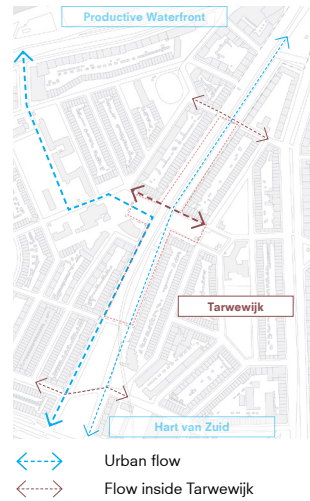
### 2. Reconnect the leftover space to neighborhood

In the Tarwewijk neighborhood, the infrastructure has divided the district into two half. By constructing the Tarwewijk hub project, it will guide both the visitors and local residents to the leftover space and reconnect Tarwewijk neighborhood together while also keeping the visual connection in the central area.

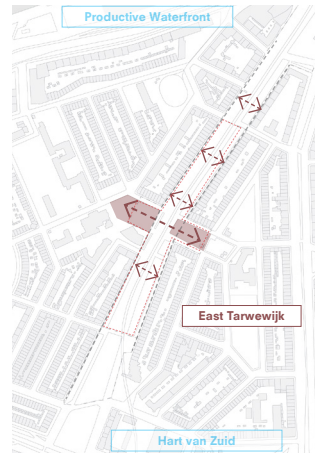
### 3. Minimum impact to neighborhood

Tarwewijk mobility hub will be located inside the residential area of Tarwewijk neighborhood. Therefore, the project needs to create a coherent atmosphere with the surrounding and have minimum impact on the local residents by limiting the height and using similar languages of the residential blocks to design the volumns along with infrastructure.

### 1. Culture strip: connection between Productive Waterfront and Hart van Zuid



### 2. Reconnect the leftover space to neighborhood



### 3. Minimum impact to neighborhood

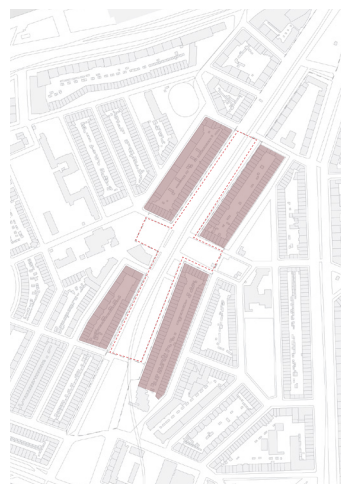


Fig 3: Design ambition

## Program

The programs in this project can be divided into different categories, mobility functions, social functions, commercial functions, office, and finally the culture functions. The mobility function will be mainly used to increase the accessibility of leftover space, the social functions, commercial functions, and office will be used to increase the diversity and inclusivity of the space and finally, the culture functions will be used to connect the leftover space back to the city and create a Culture strip together with Productive Waterfront and Hart van Zuid.

This project is an architectural experiment. The adding functions are highly related to the future development of Tarwewijk neighborhood while the future development of Tarwewijk will also affect the use of the project. Therefore, the entire project will be designed and constructed in three phases with different functions. This graduation project is mainly focusing on the first phase with suggestions of future development, but the future development needs to be adjusted depending on the development of Tarwewijk neighborhood.

The first phase is to design a metro station as a central hub in Tarwewijk neighborhood. A corridor will also be constructed as the extension of the metro station to provide opportunities for adding volumes in the future. Therefore, the programs will mainly be the mobility functions such as metro station, bicycle and E-scooter storage and also functions that could serve people using the station, such as a retail shop, cafe, bicycle store, Post NL, bike renting office, and also the office for the future development of Tarwewijk neighborhood with exhibition place to express the culture inside the district.

The second phase will be the volumes that are added to the corridor, the location of these programs will be divided into two locations according to the different users. The north part of the leftover space will be

mainly used for the social functions used by the local residents because of the close distance to the residential block. The south part of the leftover space will be mainly used for commercial and office functions due to the close distance to the developed zone, Hart van Zuid, and also it is the place that visitors will pass by.

The third phase depends on the future development of Tarwewijk neighborhood, if the residential blocks along the infrastructure will be developed with other functions like office buildings or commercial functions, some of the functions in the metro station and also volumes along the infrastructure will need to be changed, for instance, the day care center will be changed into the exhibition area, and other social functions might need to be changed into commercial functions like restaurants or retail shops.

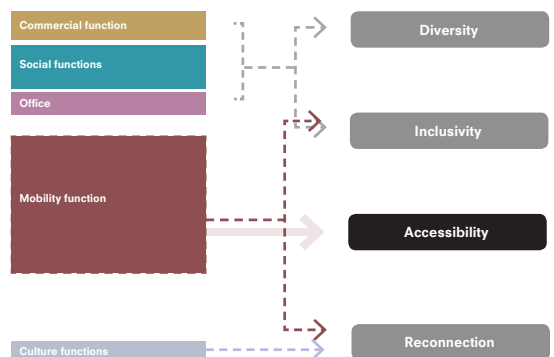


Fig 4: Program ambition

# PROJECT DESCRIPTION

## Design Concept

The Tarwewijk mobility hub project is aiming to activate the leftover space caused by infrastructure in Tarwewijk and change it into a hub for the district, therefore the project is trying to find a way to create a contrasting way to guide people into the leftover space but also a coherent design so it could be linked inside the neighborhood.

According to the analysis of the program, the key element to increase the accessibility of leftover space will be the mobility functions, and the primary function to achieve that will be the metro station. Other programs (non-mobility functions) will mainly be used to create the atmosphere at the leftover space to increase the diversity and inclusivity there. Therefore, the metro station inside Tarwewijk neighborhood needs to become a landmark in this district while also follow a similar language from the Rotterdam metro network. By combing the new languages of the metro stations in Rotterdam with languages of existing metro stations (Maahaven metro station, Zuidplein Metro station...) The Tarwewijk station will be designed into an arch steel bridge shape to reduce the impact to the residential block while offering a unique character in the neighborhood. Except for the fact that the design of the metro station will become an attraction, the metro station will also have direct entrances from both sides of the leftover space to force people to enter the leftover spaces. Together with the guiding effect of the curved shape of the station, it will highly increase the accessibility of the leftover space and provide opportunities for people to pass and stay.

Moreover, the elegant steel structure of the metro station will continue along the infrastructure to create a steel corridor as the connections for all the future functional volumes for the leftover spaces. By using the same architectural language as the metro station, this corridor will be seen as the extension of the metro station and has the same effect to guide people further to the leftover spaces while also offering a new architecture language contrasting from

the concrete infrastructure. In this way, the accessibility and the diversity of the leftover space could all be increased. The culture function, exhibition, will also be combined with this corridor, the supporting structures of the corridor will be used for the explanation of the cultural value of the Tarwewijk neighborhood around it. In this way, the steel corridor will connect the Productive Waterfront culture zone with the Hart van Zuid and Rotterdam Ahoy and create a continuous culture strip in Collage City.

The other programs will be used to increase the diversity and inclusivity of the leftover space. For the inclusivity of the leftover spaces, the programs adding in the leftover space has various targeting groups, aged activity center will be used for elderly, the gym could be used for young people and adults, the classroom and playground could be used by teenagers, the office functions like start-ups and commercial function could be used both for local residents and visitors. As for the diversity of the leftover space, except the different activities that will happen in the leftover spaces, the architectural design of these leftover volumes will use similar but different languages as the residential block, for instance, the blocks will use timber material with a similar color with residential brick blocks, the windows and openings will have the same languages as the openings in Tarwewijk as well, but they will design according to the specific functions in the volumes instead of all of them will be the same size.

Therefore, the corridor and the leftover volumes will have two different architectural languages. However, they do work together to activate leftover spaces. The corridor will divide the leftover space into severe different public zones with different functions, and for each leftover volumes they will have an entrance area as a "hub" for the different functions inside the volumes and those "hub" will have a direct connection to the different public zones along with the infrastructure. In this way, the public space, the corridor, and leftover volumes will activate the leftover spaces into public space for people, both

local users and also visitors by increasing the accessibility, diversity, inclusivity and also reconnect it back to the urban environment.

The structure materials of this project are also chosen according to the specific characters of different elements, the metro station, and corridor will be constructed with elegant steel structure as the new languages to have a catalyst effect inside the neighborhood, while the timber material will be chosen for both the facade and the structure of the leftover volumes due to the contrast to the man-made material (steel and concrete) and also the similar language with the residential block. The construction of them needs to be flexible and also simple, therefore, they will use the column and beam structure to achieve flexible division inside.

Because of the specialty of the design, no large-scale building will be constructed, therefore the climate system of a household could be used for the leftover volumes. Different leftover space volumes will be insulated from outside and have a heat pump inside with heat generated from the ground as the heat resource. Each volume will also have its own air handling unit for mechanical ventilation. The metro station as an outside area has the heat problem and ventilation problem, however, the overheat from the sun and rain protection will be needed here. Therefore the roof of the metro station will slightly be angled towards two sides and reduce the overheating from the sun, while the transparent rain-protected panel will be added to the steel structure and also functions as the seating area for the users.

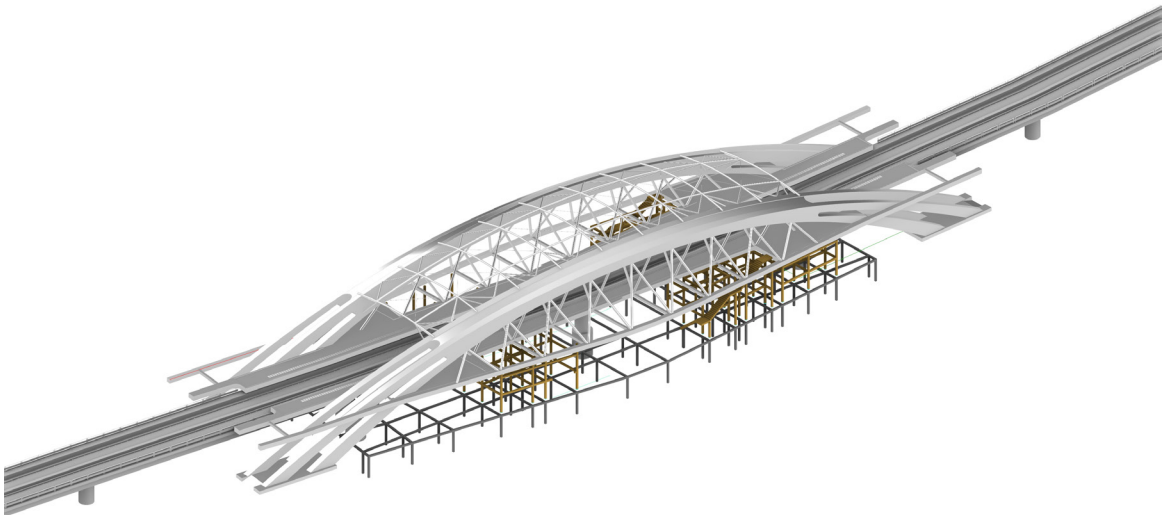


Fig 5: Structure overview



Fig 6: Atmosphere on the platform



Fig 7: Atmosphere at leftover space

## REFLECTION

### **Aspect 01: The relationship between research and design.**

In the Complex Project graduation studio, half of the time has been spent on the researches, and another half is on the design period. In this way, it allows us to have a deep and thorough study on our research topic and have time to create a strong connection between the research and design: the researches provided new perspectives for the design, and the design will use the research output as the base and solved the research question practically. In this project, the entire design is trying to solve the research question, leftover space, by increasing the four aspects from the research output. All the design choices are made after considering its contribution to the research problem and that leads to a clear storyline for how the design could be developed and which decision is right or wrong. In this case, the design output becomes a practical but solid answer for the research question and further contributes to the architecture field.

### **Aspect 02: The relationship between my graduation topic and studio topic.**

The topic in the Complex Project graduation studio this year is "Migration of ideas". From the topic, each student needs to have their understanding and find out their interests through the topic. During my visit to the site, I was attracted by the infrastructure line and the problem it created for the Tarwewijk neighborhood. The infrastructure of the metro line created a harsh cut and divide the neighborhood into two parts and lead to a low-quality space underneath. Focusing on this problem, I began to research the migration of mobility and how the infrastructure could create the problem, and what kinds of solutions it may have. During my research, I realized that although the migration of mobility creates the leftover space problem, it actually offers a possibility to solve it during the migration process. During the migration, the mobility node has gradually become a place that people gather and stop by while offering opportunities for all kinds of activities to happen around it,

and those all provide opportunities to solve the leftover space it creates. Therefore, both my research question and design solution are coming from the research of the studio topic, it is unexpected, but also quite exciting.

### **Aspect 03: Research method and approach chosen by the student in relation to the graduation studio**

In the Complex Project graduation studio, the researches are usually beginning from city scale, and focusing on an urban problem, but the output of design is usually an architecture intervention. Therefore, research parts need to both cover the background from a large field and also specific interventions that solve this problem in reality. In this year, I chose theoretical researches and typology researches as my research methodologies. From the theoretical researches, I mainly used "Redefining leftover space: value and potentiality for the city" written by Ela Alanyali Aral as the base, while using other relative references to make the theory more thorough. For the typology researches, I searched all kinds of interventions of the leftover spaces and comparing them with the theoretical output I had from the research to understand how to solve my research question in reality. Therefore, although the final design is more like an architecture experiment for solving leftover space problem, it actually used the same theory as the other interventions and lead to a practical design in the end.

### **Aspect 04: Relation between the graduation project and the wider social, professional and scientific relevance.**

Tarwewijk neighborhood is a place full of culture, with the lifted infrastructure, the entire district also becomes a leftover space apart from the Hart van Zuid and Maahaven area. By constructing this project, the metro station will open the gateway of the Tarwewijk neighborhood, and it will be connected to the Productive Waterfront and Hart van Zuid to create a continuing culture strip and finally become an important district for Collage City.

Moreover, this project will also contribute

to not only the Rotterdam but also many developing cities around the world. With the rapid development in the urban context, more and more infrastructures will be constructed to maintain the connection between different districts, therefore more leftover spaces might be appearing in the future. Although all types of interventions have been designed globally, this project actually provides a new methodology of how to activate these spaces by using the research outcomes at the base. This would provide a universal methodology for activating the leftover spaces around the world as long as the design could increase the accessibility, diversity, inclusivity and reconnect the leftover spaces together and back to the city.

### **Aspect 05: Ethical issues and dilemmas I encountered during graduation.**

The main dilemma I encountered in this project is the conflicts between setting a clear route to the design or redirecting it towards leftover spaces. Normally, the spaces under the infrastructure are been seen as unsafe, unpleasant spaces to be. In this project, when I tried to redirect a route to the leftover space, it will usually lead to a longer walking distance and also a less pleasant experience than having a clear entrance at the public spaces. However, if the entrances of the metro station are located at public squares, it will allow people to enter the platform more easily, but at the same time, the leftover space under the infrastructure will lose accessibility and will be hard to use by people. Therefore, to activate the leftover space, I decided to redirect to route for the users and try to use architectural language to make the users' experience more pleasant.