

## **Flooding Noordereiland**

*A systematic approach to alter the performance of the urban block responding to the extreme circumstances of flooding*

## **Project Report**



## **Flooding Noordereiland**

*A Systematic Approach to alter the Performance of the Urban Block responding to the Extreme Circumstances of Flooding*

## **Project Report**

*Philipp Wenzl*

*Transitional Territories Graduation Studio  
North Sea Landscapes of Coexistence  
Altered Natures and the Architecture of Extremes*

*09/07/2019*

*Under Supervision of:*

*dr. ir. Nicola Marzot*

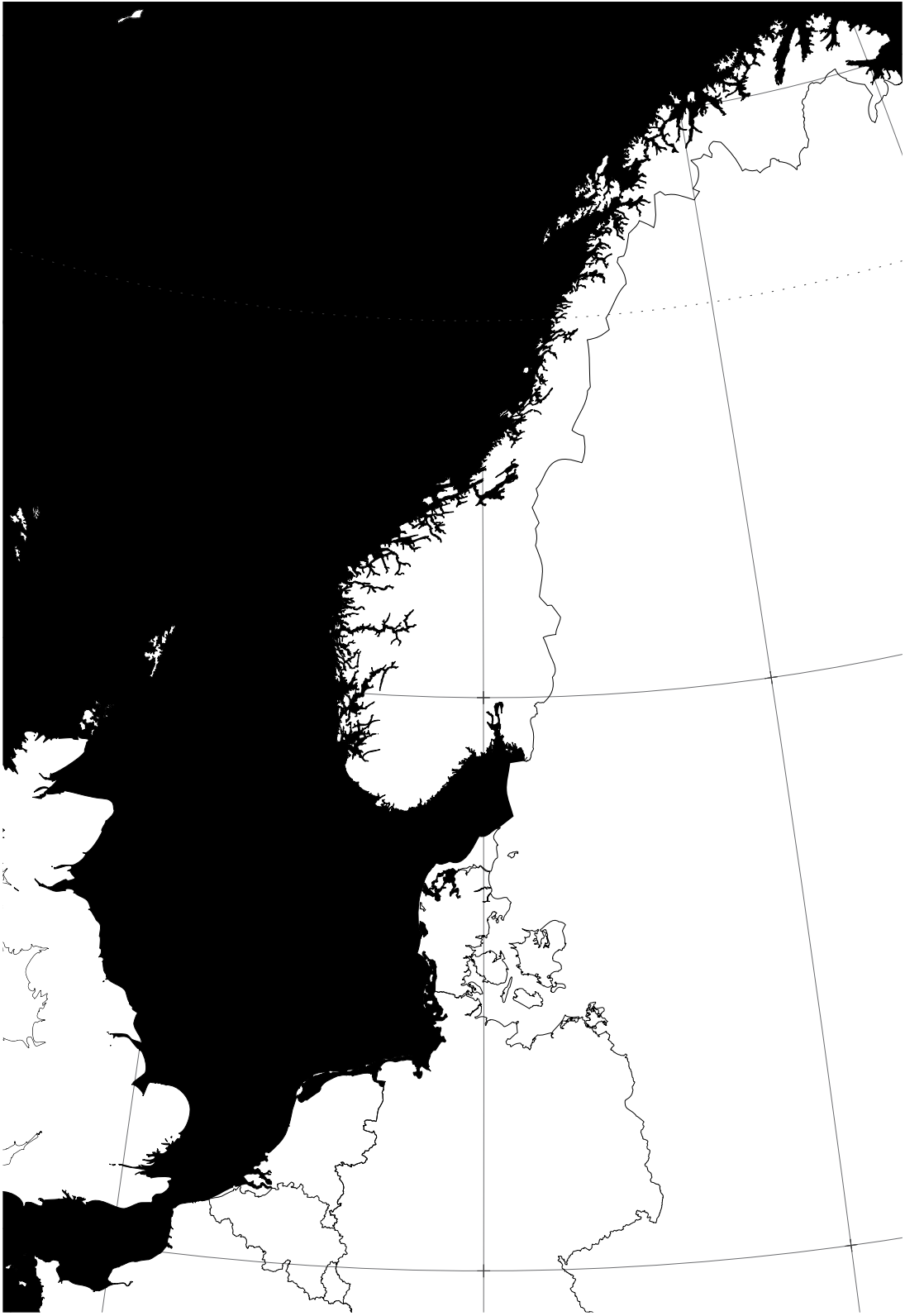
*ir. Sjaap Holst*

*ir. Stefano Milani*

*dr. ir. Taneha Kuzniecowa Bacchin*



*The Studio Focus: The North Sea Landscapes of Co-Existence*





**Index**

Abstract  
Introduction  
Syntax  
Semantics  
Reflection





## Abstract



## Abstract

Climate is changing. Weather conditions are becoming more extreme; we are expecting fiercer storm surges, more intense seasonal precipitation patterns and, in some calculations, up to three meters relative sea level rise.

Especially the south coast of the North Sea will be affected the most. Particularly in the Netherlands, the coastal topography is shallow and the densely populated hinterland is just above or even under current sea level.

Rotterdam and its harbour (the biggest in Europe) is one of the lowest areas along the south coast and it is here where changes will be most apparent. The city is built in a natural river delta, which has been altered extensively in the last millennia to facilitate a desirable and safe living environment for its inhabitants. It is here, where floods would cause economic loss through damage to property and social disruption to the population.

Therefore, how to deal with rising water levels and therefore temporal floods in the urban context of Rotterdam? How is it possible to showcase the feasibility of living and creating a desirable environment in a flooded city?

Through history, Rotterdam and its relationship with water has been mainly influenced by the development of its harbour. Since the harbour has been moved out of the centre to accommodate bigger ships and therefore a demand for more space, the residential areas of the city could expand in these vacant industrial districts.

The role of Noordereiland to the city has been greatly compromised by three different strands of developments: the infrastructural negation, the social negation and the flood risk. The city island has therefore evolved from acting as a part of the city harbour and as the connector, being the southern gate to Rotterdam, to turning into

a space in the transition zone between the old and the new districts.

Initially, the area of Noordereiland was a piece of land, belonging to the peninsula Feyenoord, located opposite of the historic city centre and shipping docks on the southern embankment of the Maas. Only a ferry connected the two sides. Due to an increasing harbour activity and a growing population, the expansion of Rotterdam towards the South seemed logical. With the excavation of the Noorderhaven (now: Koningshaven), the peninsula was divided into the remaining Feyenoord and Noordereiland to facilitate ship docks. Following, the two embankments were connected by permanent bridges. The Italian novelist Edmondo de Amicis stated in his travel-guide of the Netherlands "Holland and its People" beautifully described the perception of Rotterdam from the train, arriving from the South, crossing Noordereiland. It seemed as the gate to Rotterdam.

However, with recent infrastructural changes (re-locating the train into the Spoortunnel, crossing the island below; the digging of a Metro tunnel and the Maastunnel, which moved the main traffic axes away from the island; the construction of the Erasmusbridge, which then became the main connection between the North and the South; and finally the de-commissioning of the old bridges and the construction of a new one). These developments shifted all the traffic from going over the island, to going around. It became an infrastructural roundabout.

This phenomenon also found parallels in the city development, which followed the newly imposed axis of the Erasmusbridge. Leading also towards a social negation of the space. The newspaper "Het Vrije Volk" already fore-saw in 1961 the turn towards the negative, naming the lead article: "Island without future...".

Additionally, the apparent climate change, resulting in a relative sea level rise and more frequent flooding on particularly this exposed piece of land. This would lead to a loss in economic value, as parts of the district would



## Abstract

be destroyed. Furthermore, the inaccessibility would affect the social acceptance, tolerating the compromised circumstances.

Thus, these findings have motivated me to shift perspective on the island. Rather than seeing it as an object functioning as an infrastructural roundabout, it could be seen as an ideal urban test lab to assess possibilities of how to deal with increased flooding in an urban environment. Contrary to the modernist approach, where architectural experimentation was executed outside the urban, I want to re-introduce the experimentation back into the city.

For that, I want to draw a parallel to Coney Island, famously named “the laboratory of the Technology of the Fantastic”, by Rem Koolhaas in *Delirious New York*. With the shift in perspective, Noordereiland can potentially become the urban laboratory for the technology of flooding.

In the course of the research I limited myself to the scale of the urban block, a generic building element, defining the Dutch city. As in most of the parts of Rotterdam and other cities in the Netherlands (and Europe for that matter), Noordereiland is also put together by a number of blocks, which form the conglomerate of the district. From the initial urban concept for the island in the 1880s, the division into blocks has remained unchanged.

Therefore, aim of Noordereiland as an experimental laboratory was for me to find a correlation between the morphology of the urban block and the exterior influence of flooding. The question arose:

**How to transform the existing systematic of the Dutch block into a new generation block, which is able to cope with flooding? How is it able to maintain the block under those circumstances?**

In that, the process of analysing precedents demonstrated itself as most valuable, understanding their systematics and what aspects could aid the block as a whole to be transformed. Important to me was not the single unit, but the whole system of the block.

I divided my precedents into three categories according to axes: site specific (Dutch) - non site specific and coherent (flooding) and non coherent. My categories were as follows: site specific - coherent, non site specific - coherent, non site specific - non coherent.

As stated, the accessibility of the block system became the most pressing question to answer. To escape the flooding danger, the gaining of distance to the building structure became essential. Therefore, I aimed my quest into finding possibilities of how to convert the now planar street level into a vertical one.



## **Introduction**

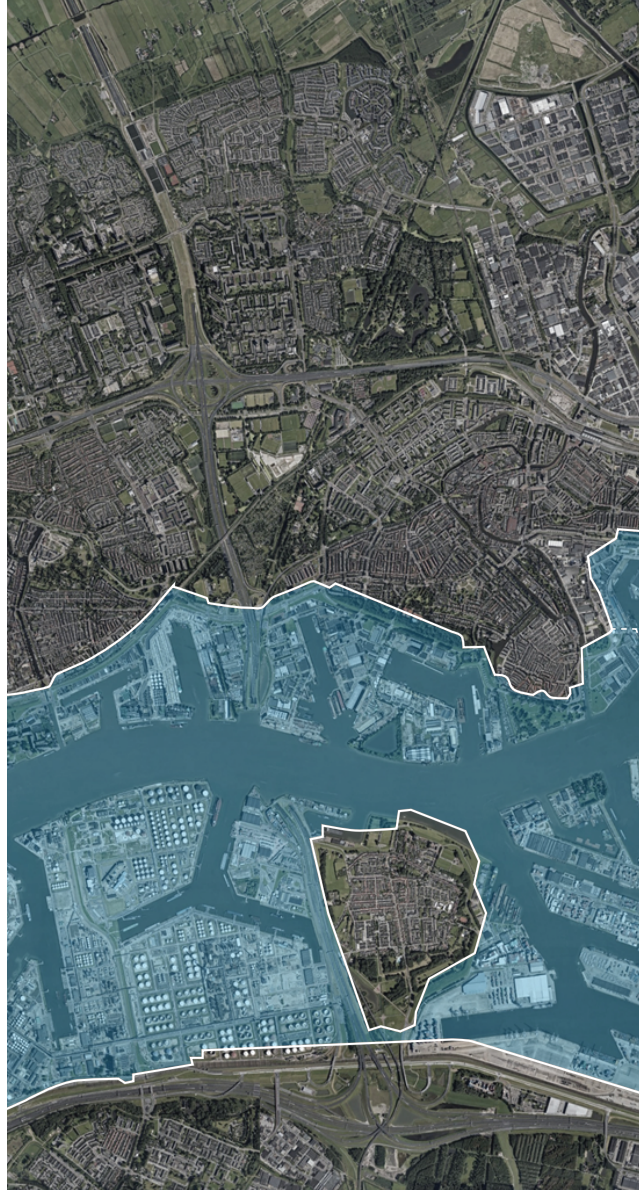
*Noordereiland*

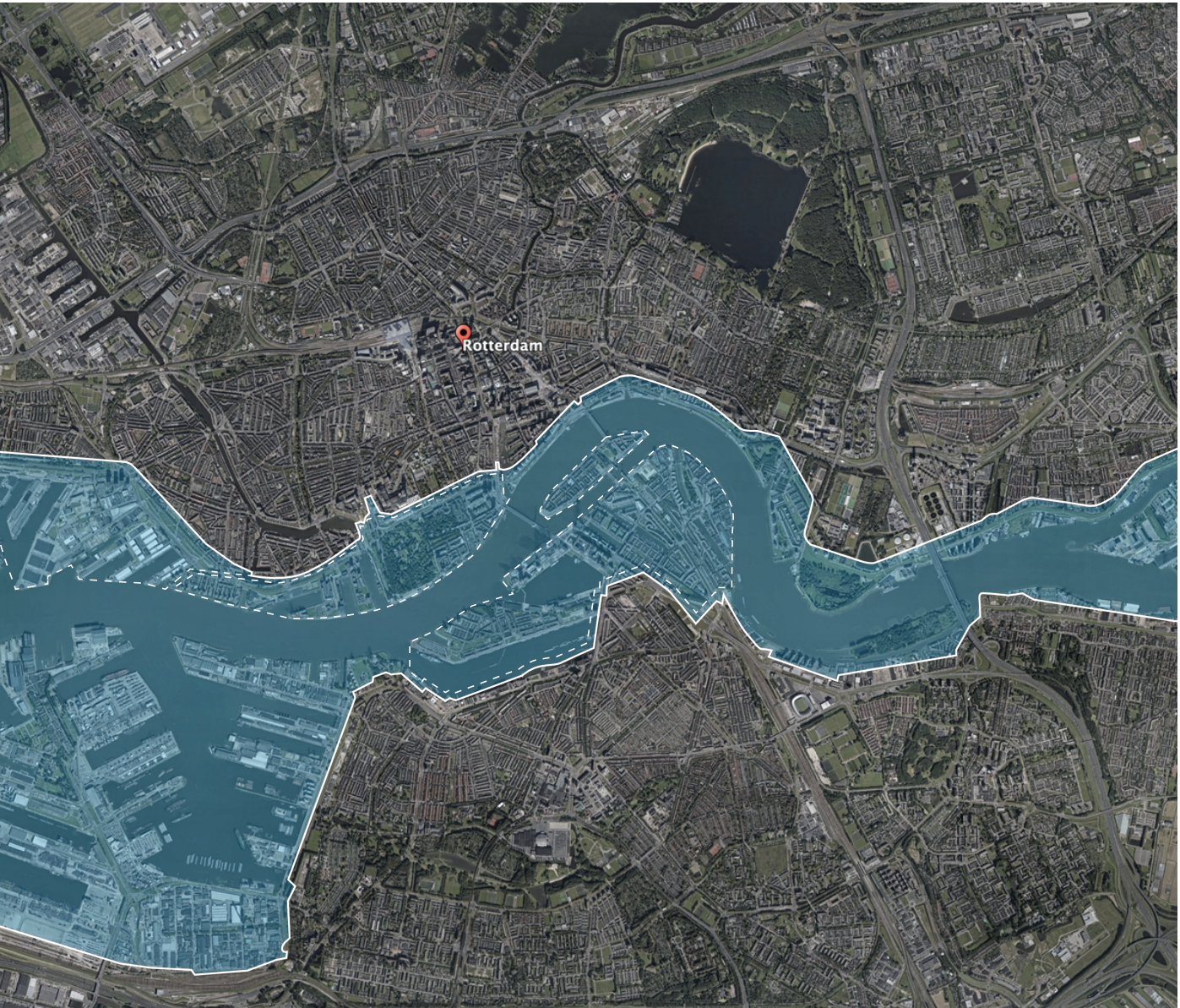






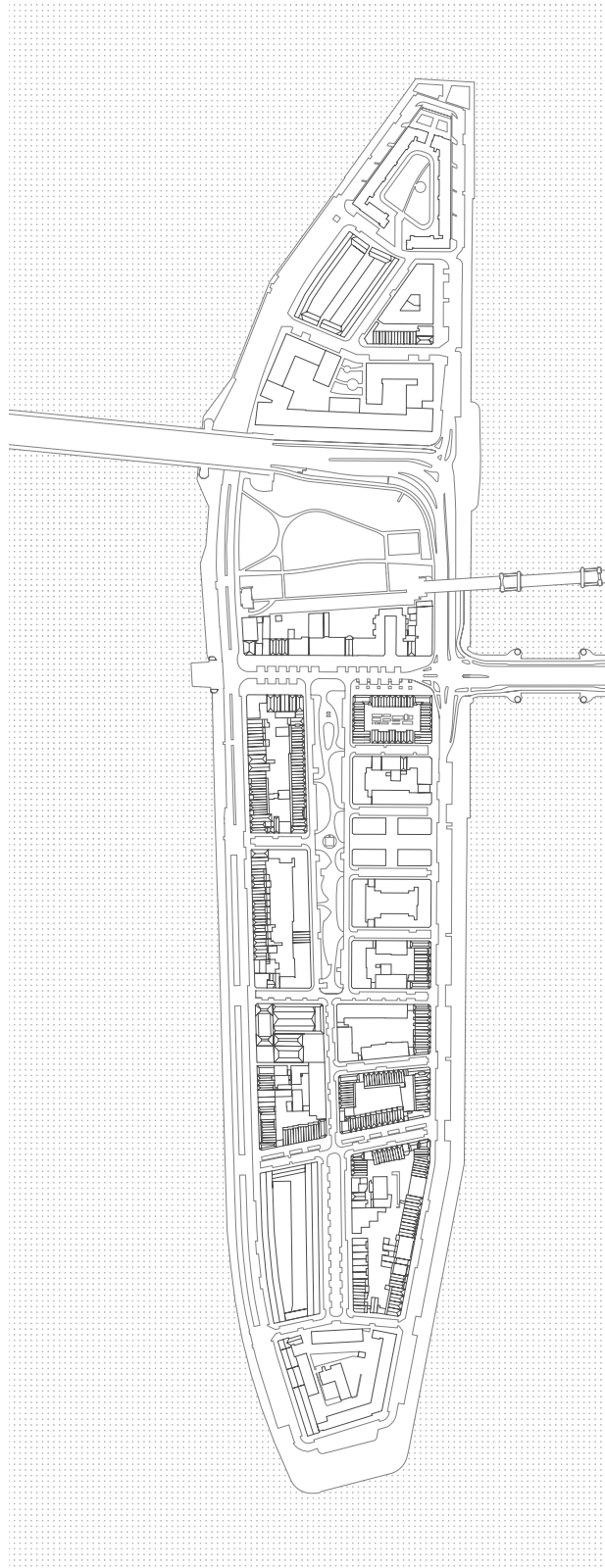
*Outer Dike Residential Urban Areas*







*Noordereiland Site Plan*





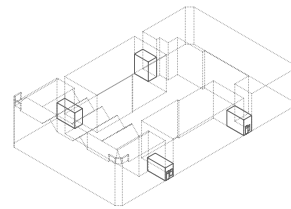
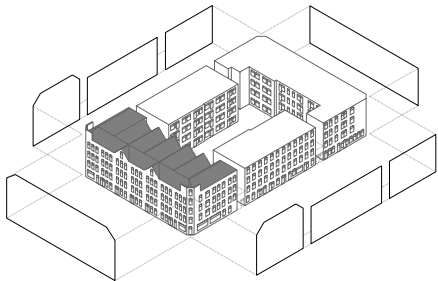
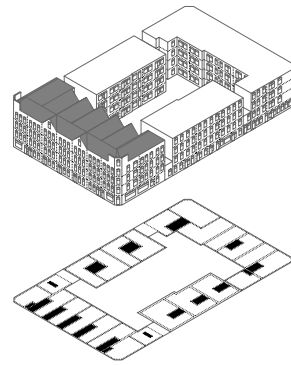
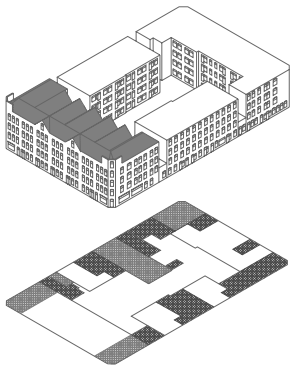
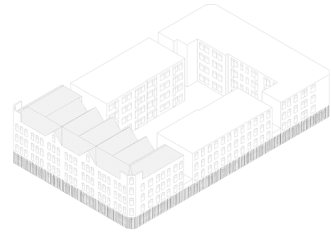
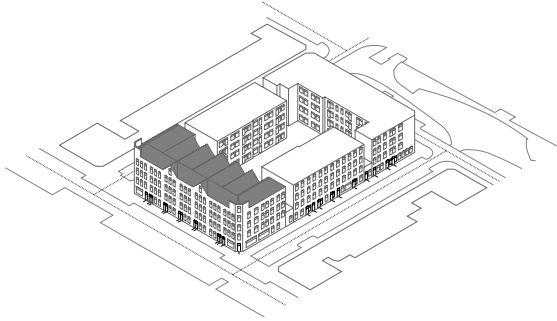
*Noordereiland Site Plan*



## **Existing Systematics of the Block**

1. Street Network
2. Compromised Ground Floor
3. Program of Ground Floor
4. Circulation
5. Discontinuity of the Block
6. Identified Weak Spots

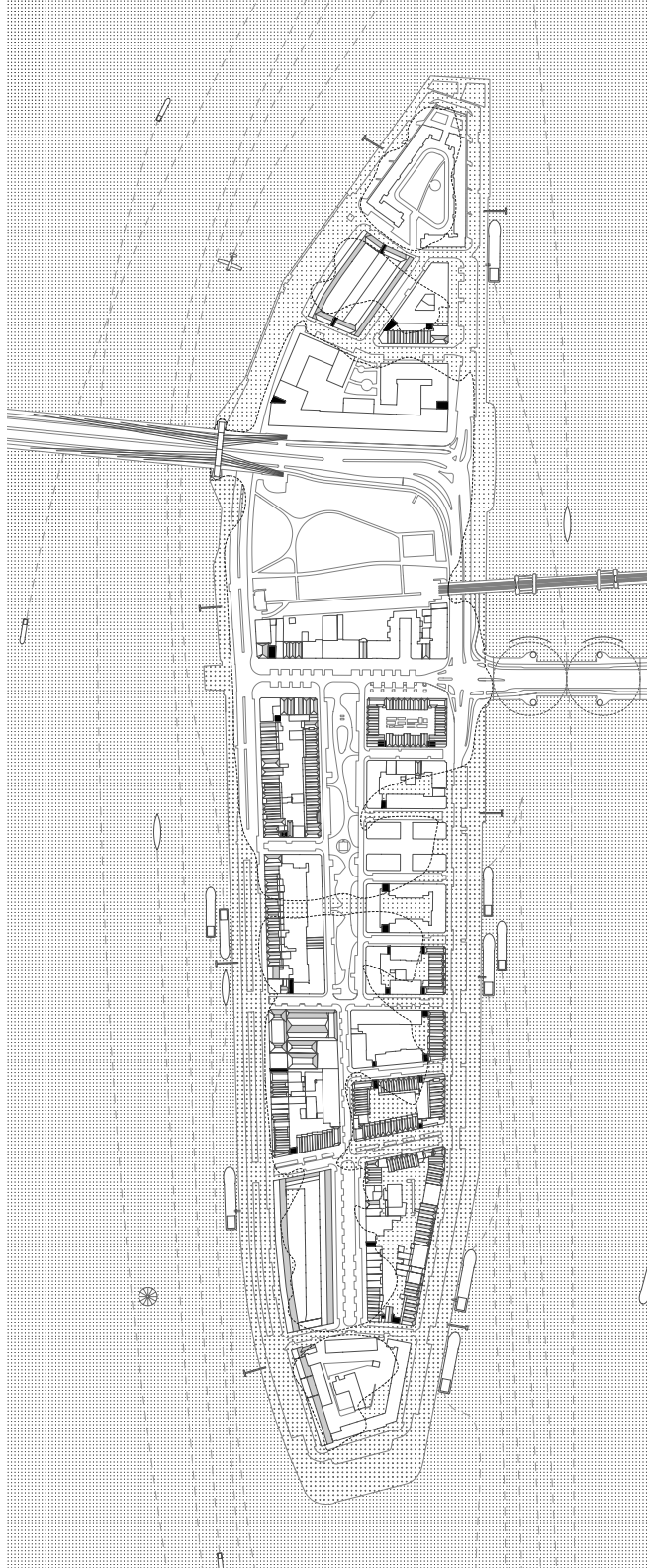






**Weak Spots across Noordereiland**

*Noordereiland Site Plan*

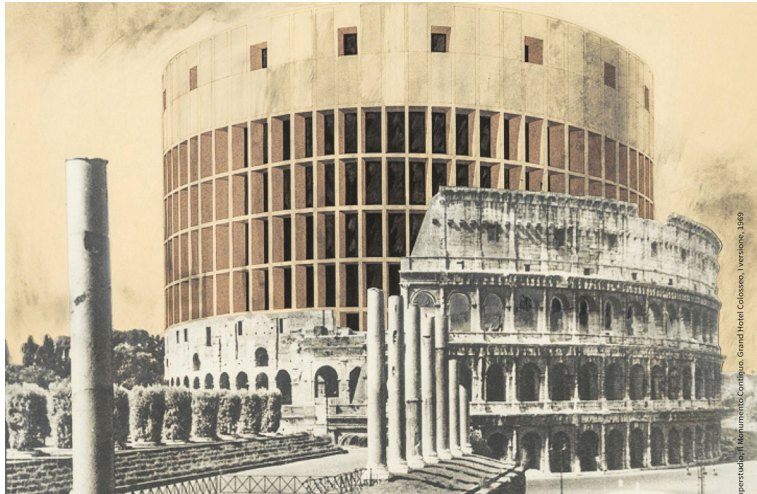




## **The Syntax**

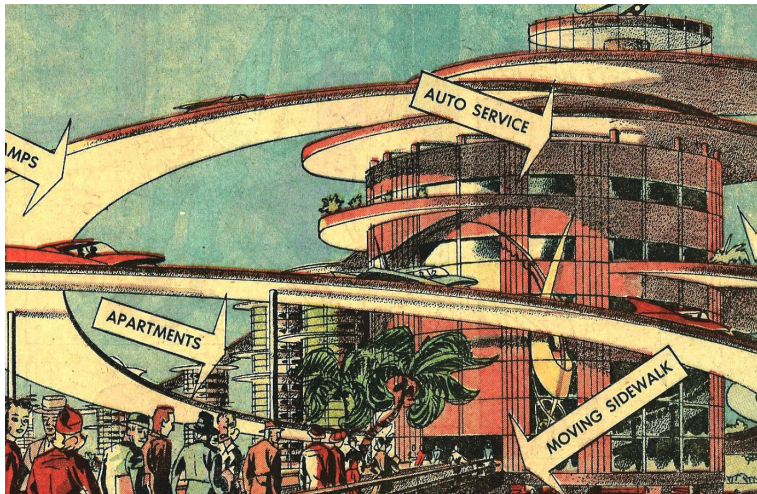
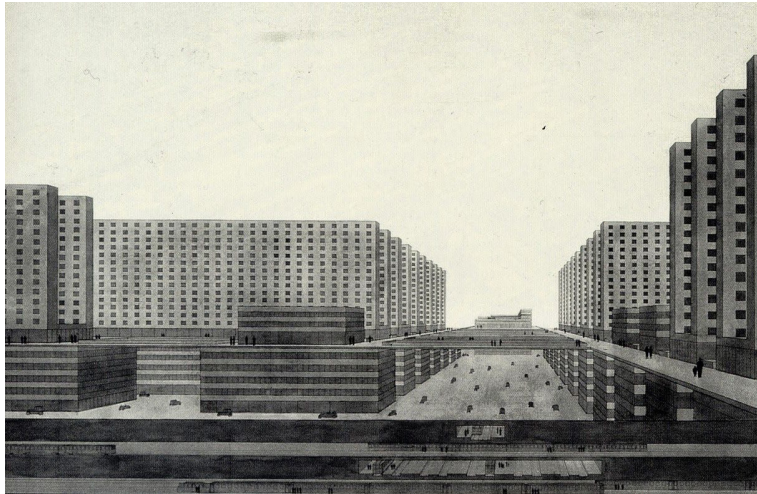
*The Systematics of the  
Project*

**Precedents: Superimposition**

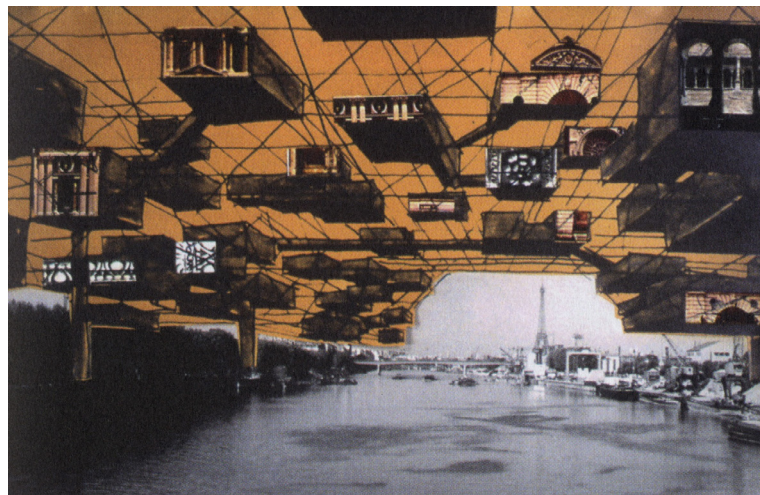
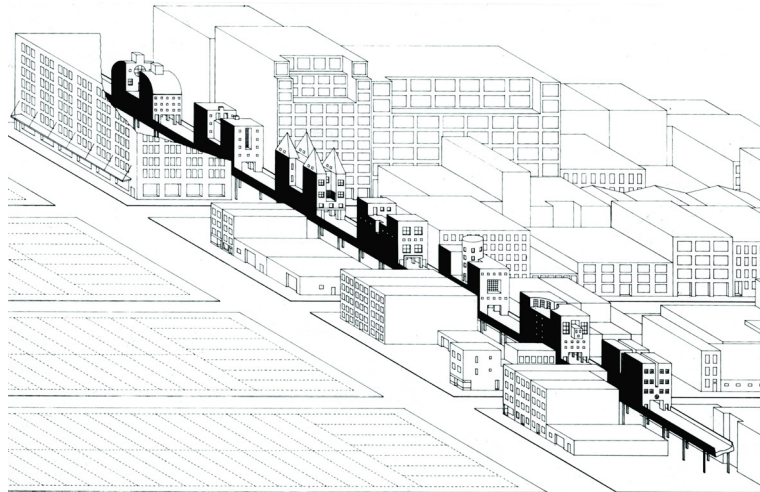


**Precedents: Layer**

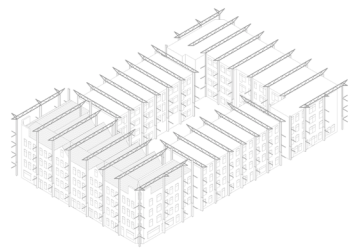
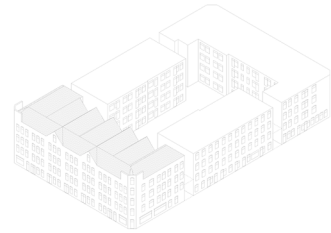
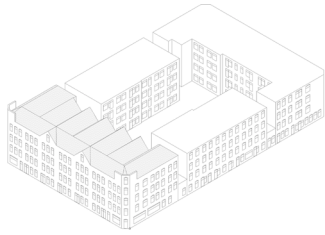




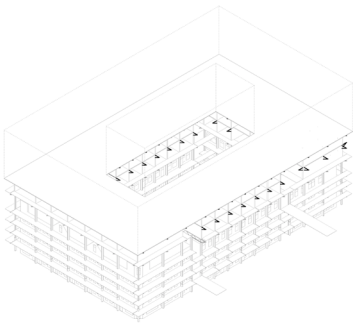
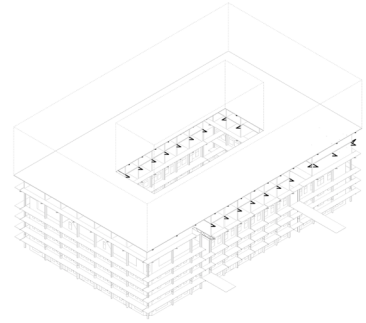
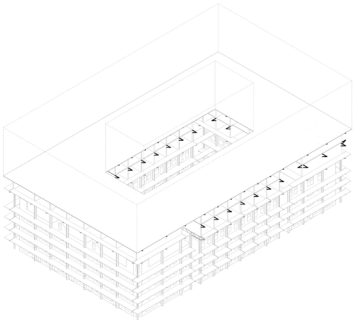
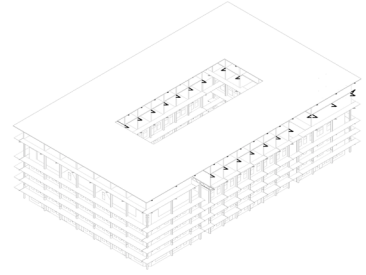
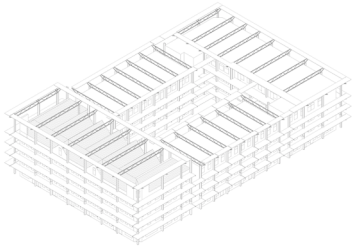
**Precedents: Strata**



**Steps of Operation to transform  
the traditional Block in a new  
Generation One**

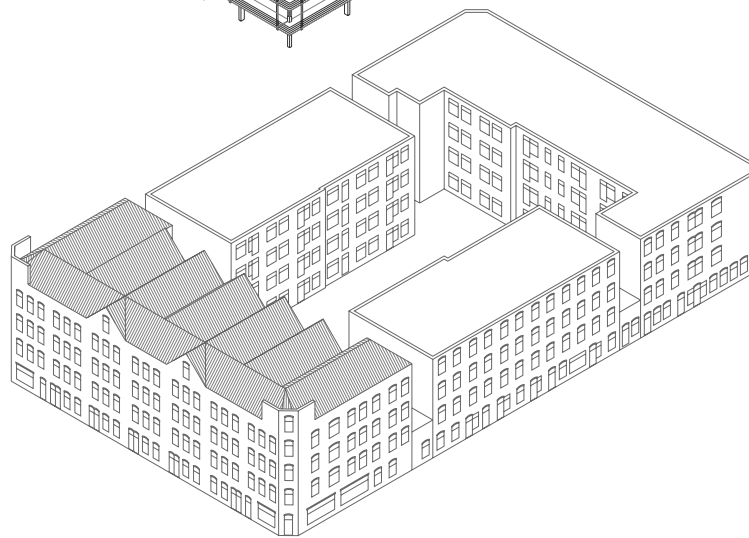
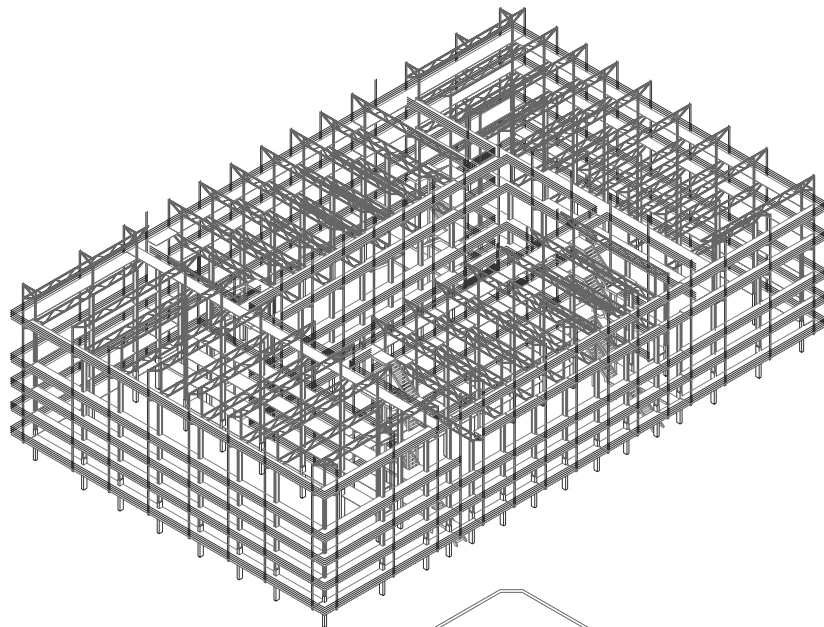


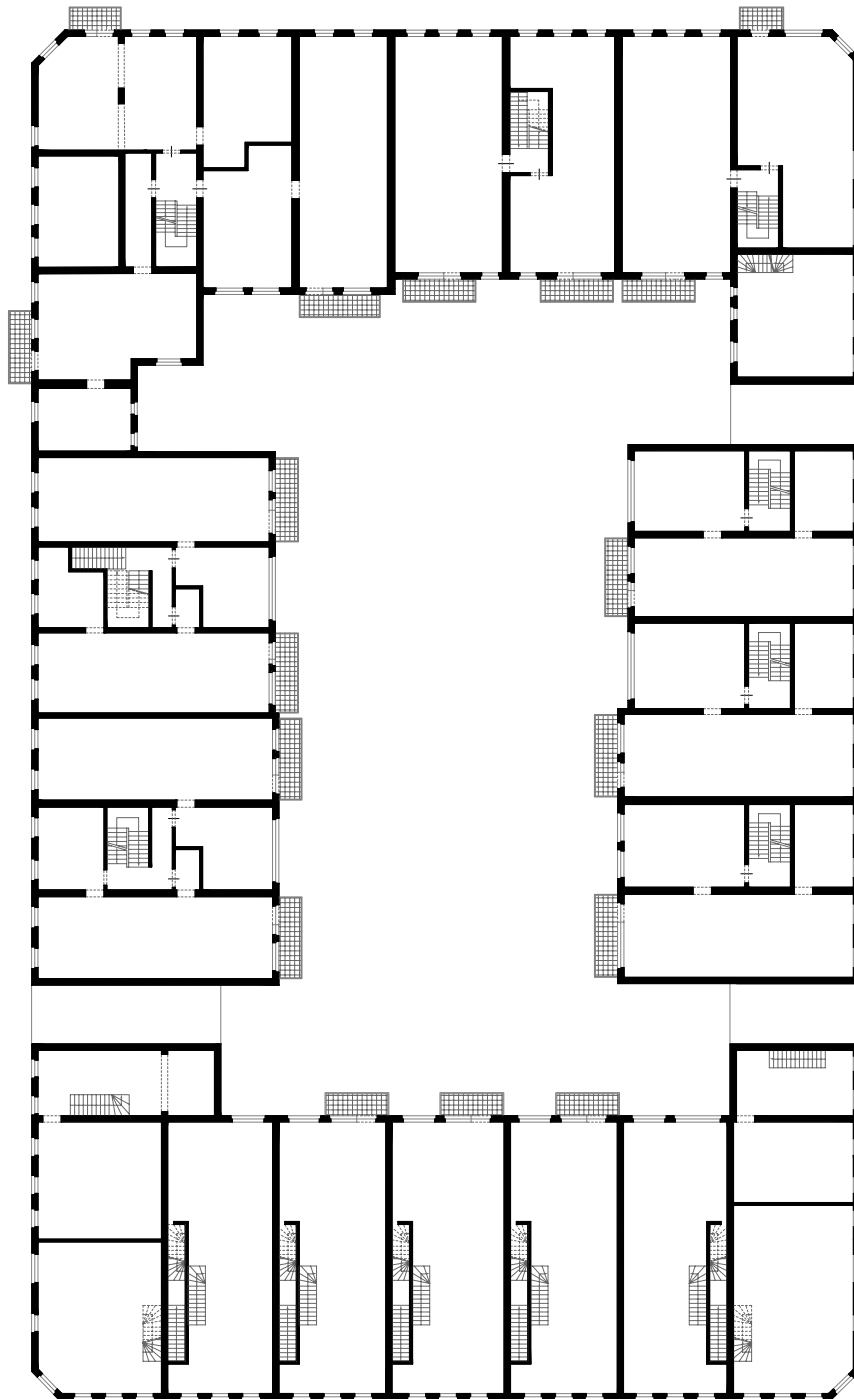




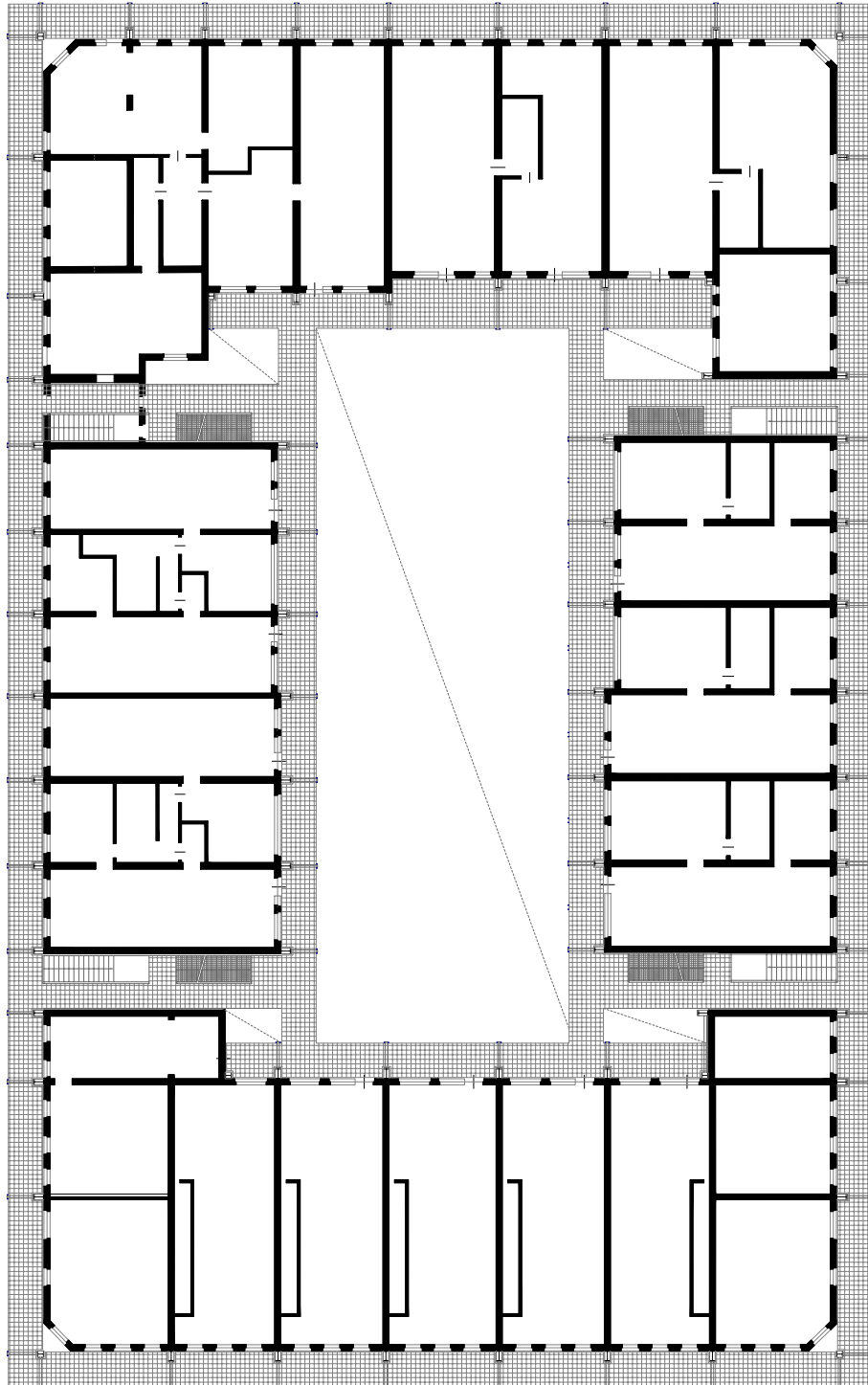
## **The Grafted Structural System**



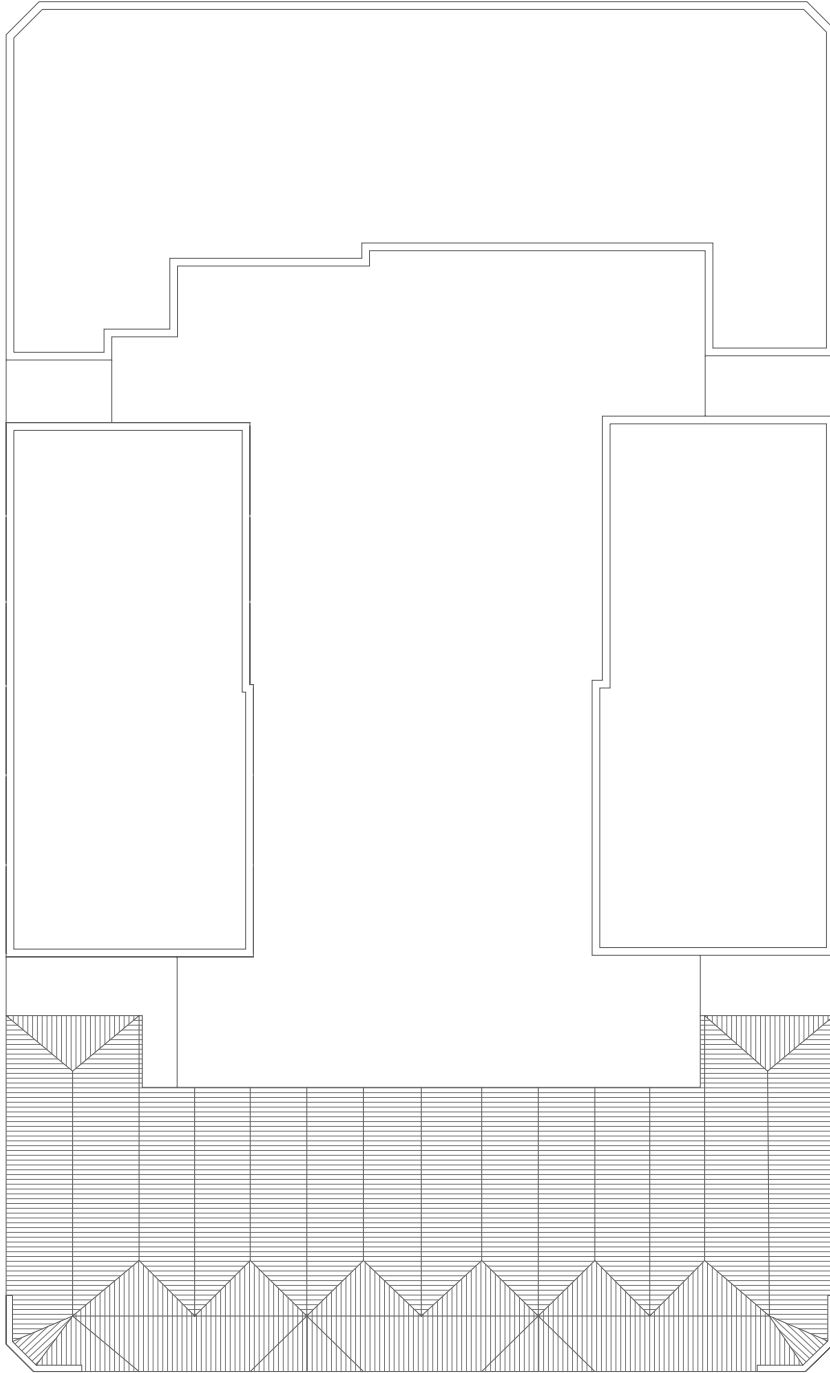




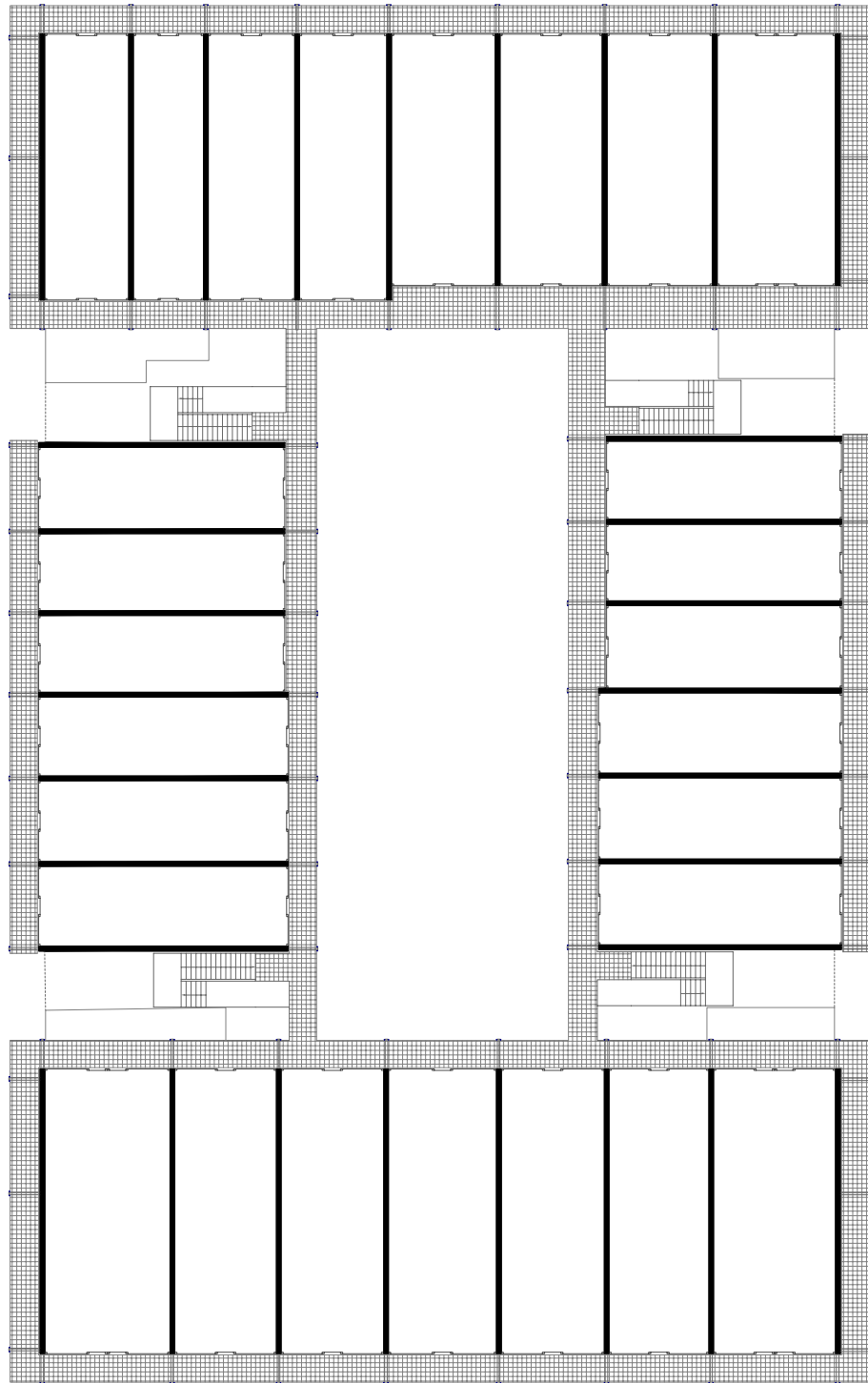
Typical Floor Old



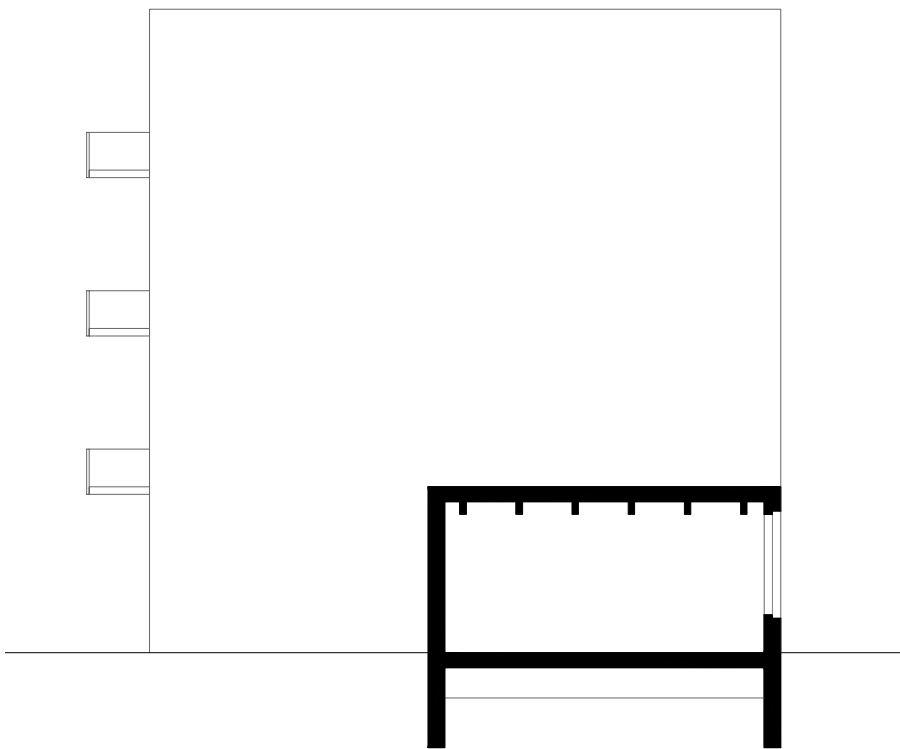
Typical Floor New



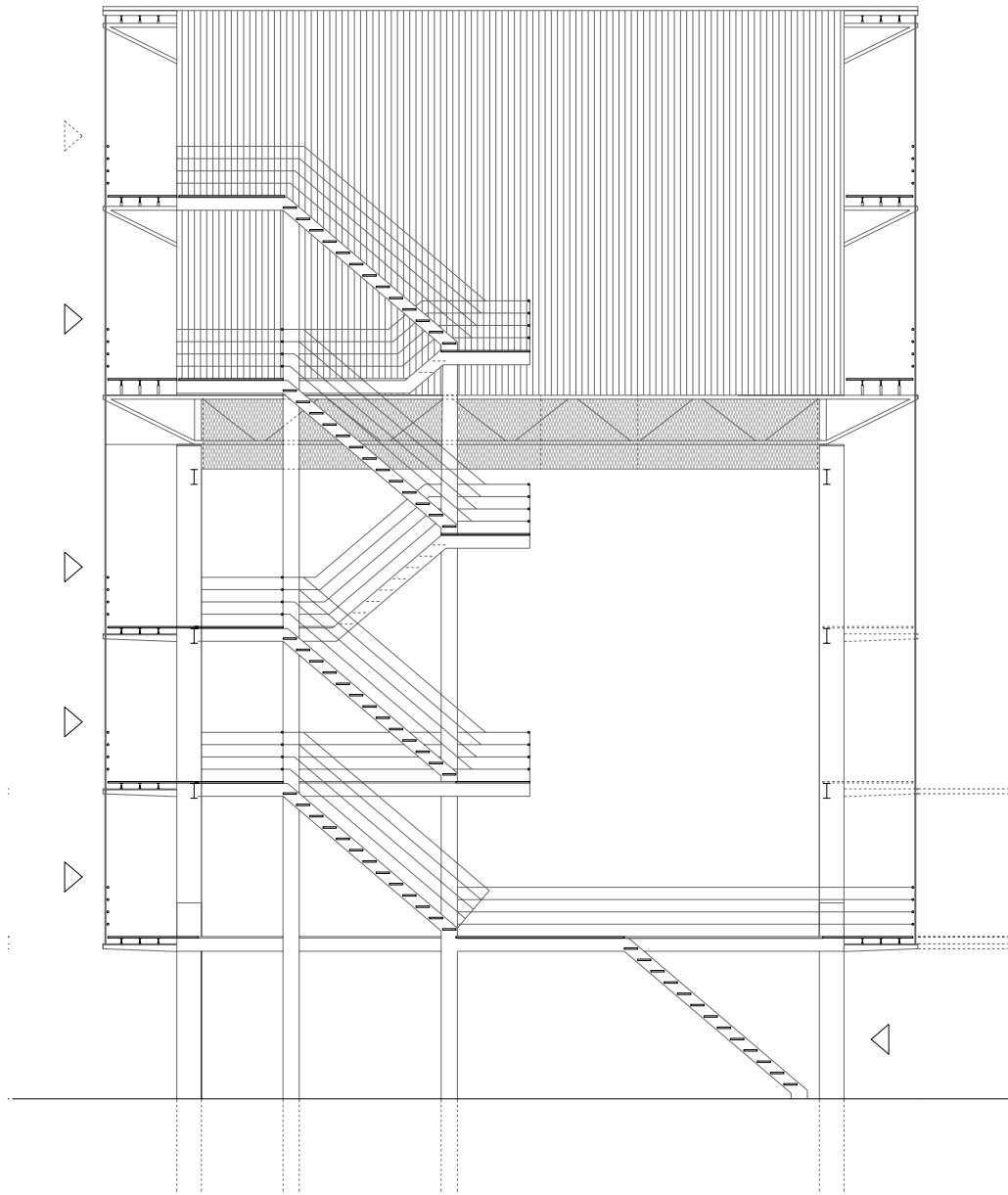
**Rooftop Old**



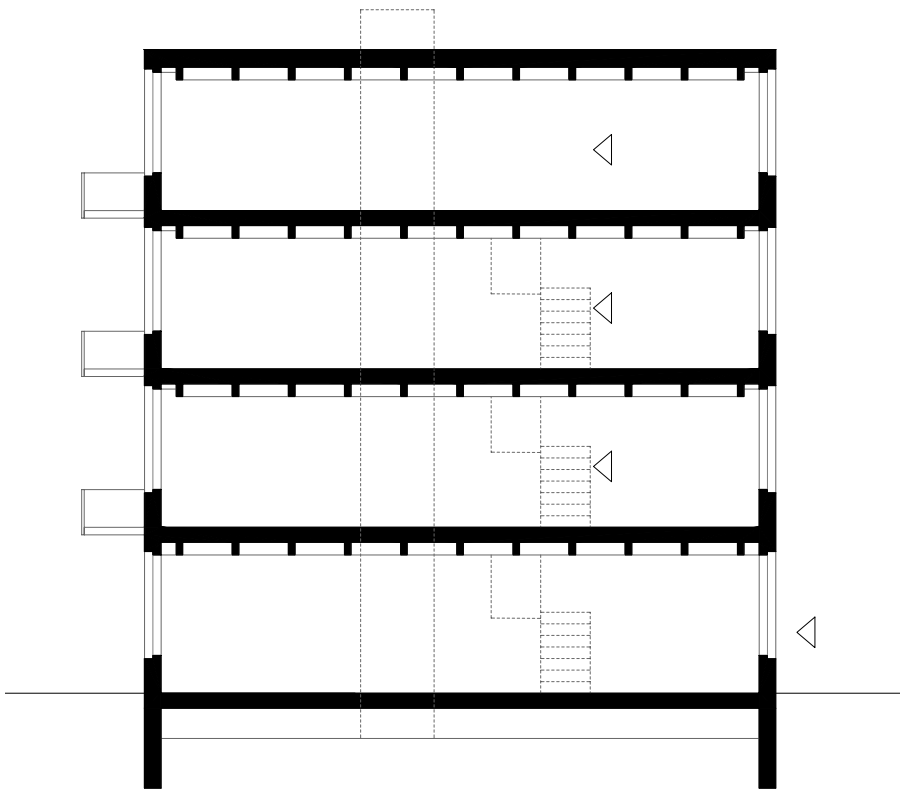
Grafted Floors New



**Weak Spot Section Old**

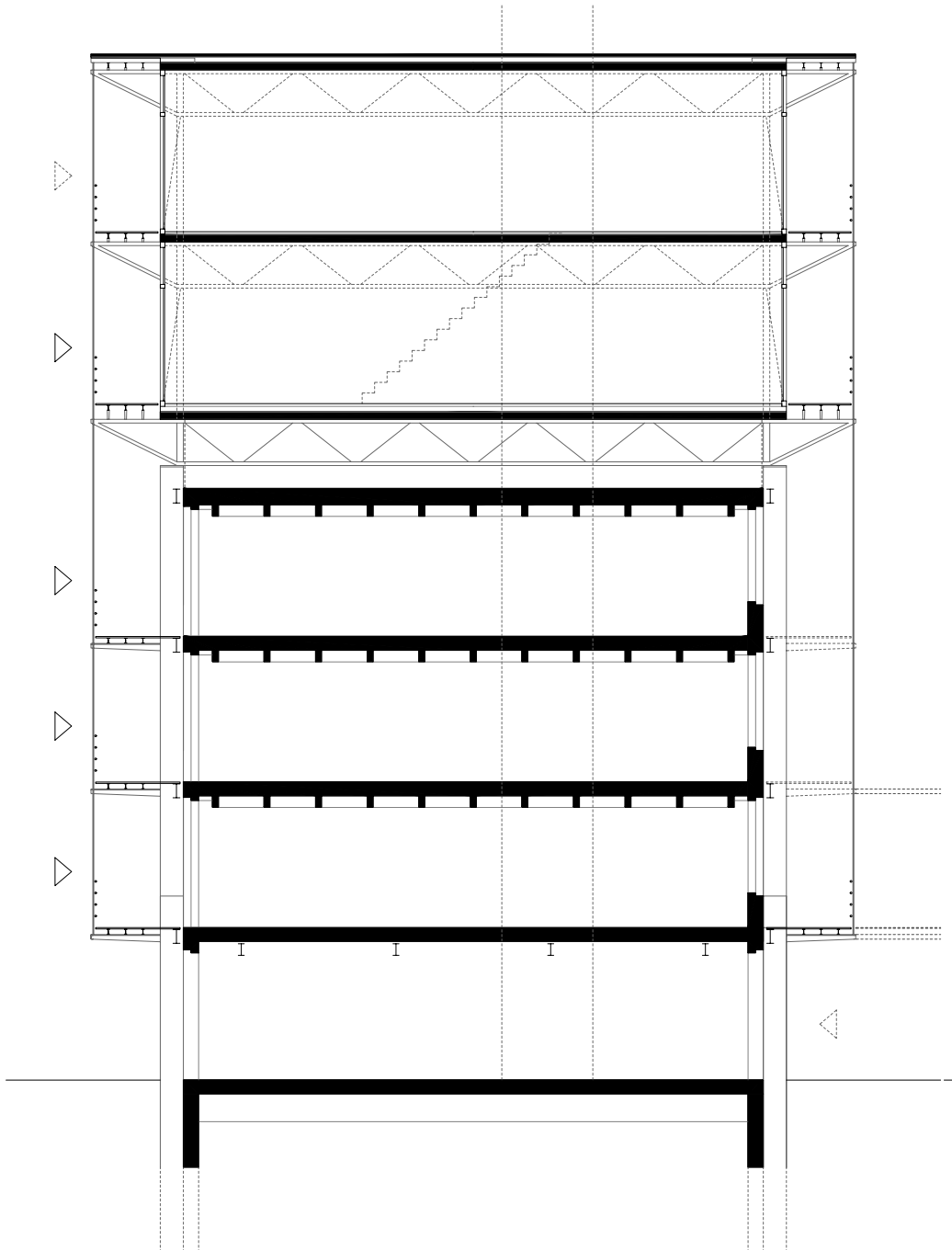


Interface Section New

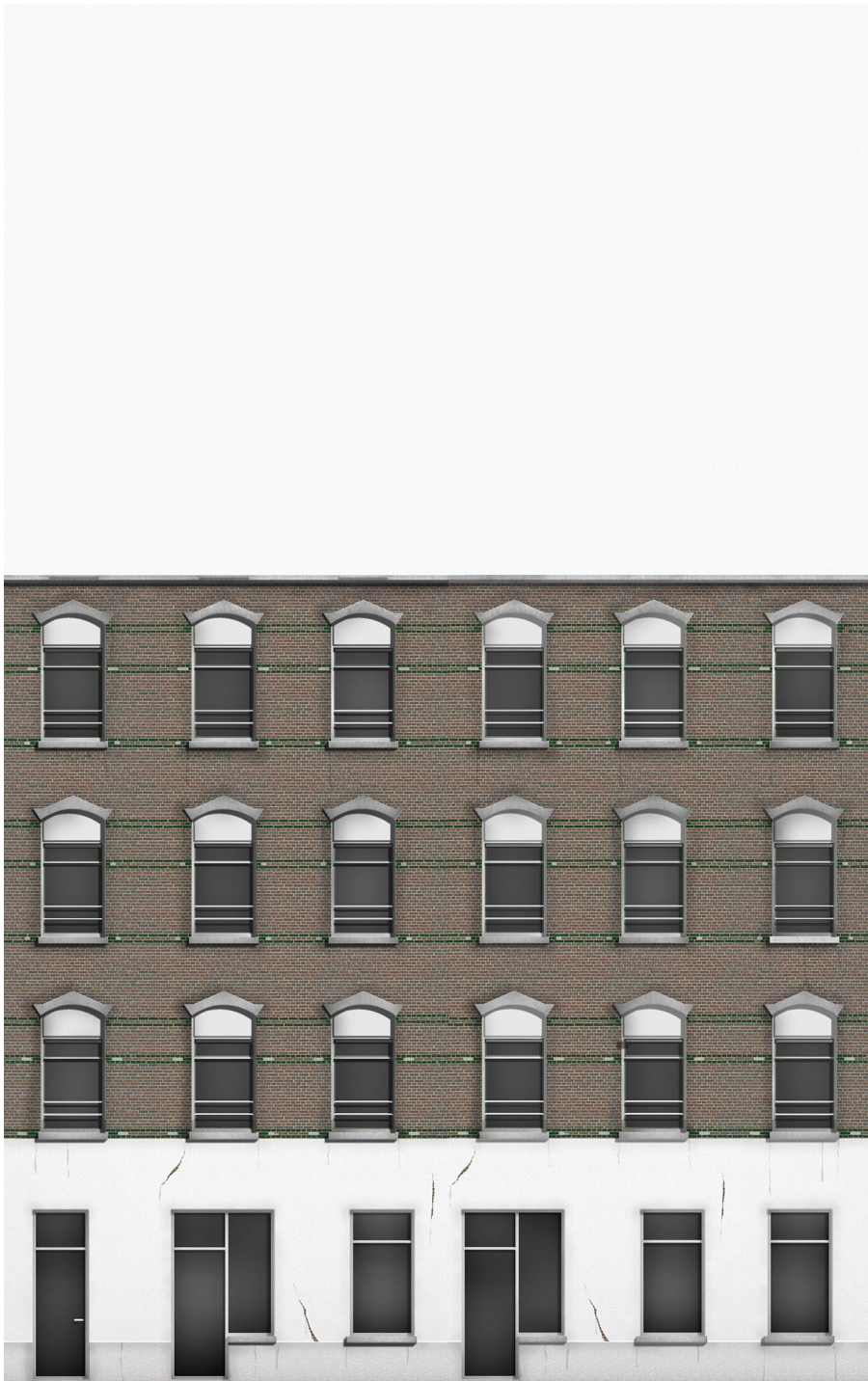


Typical Section Old





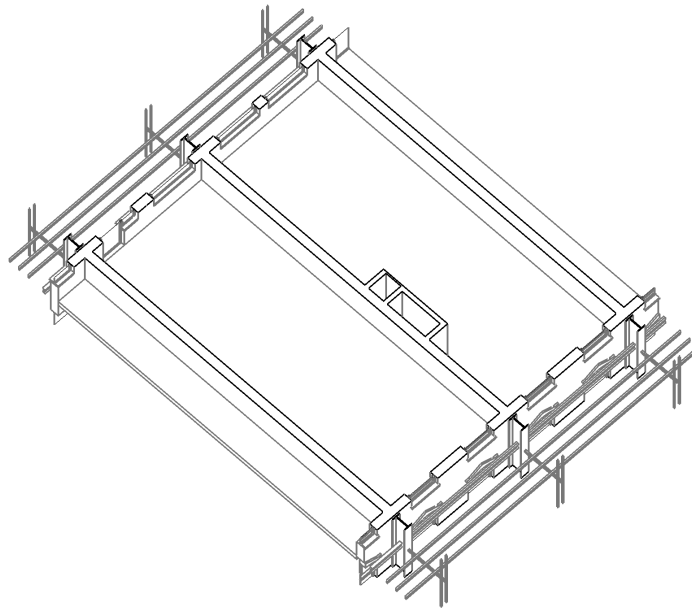
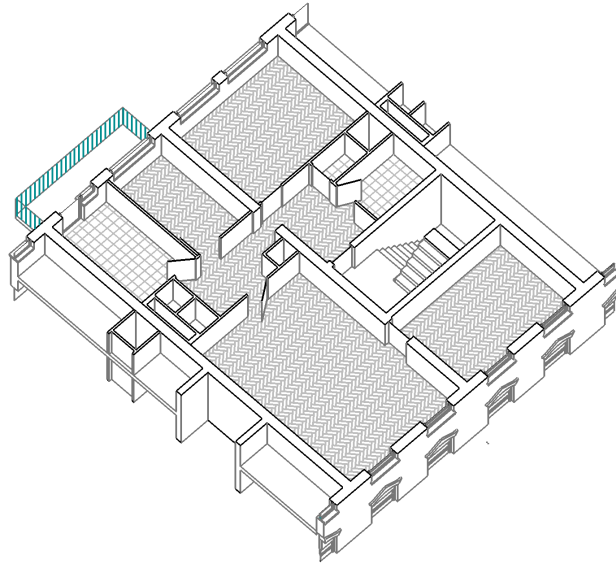
Typical Section New



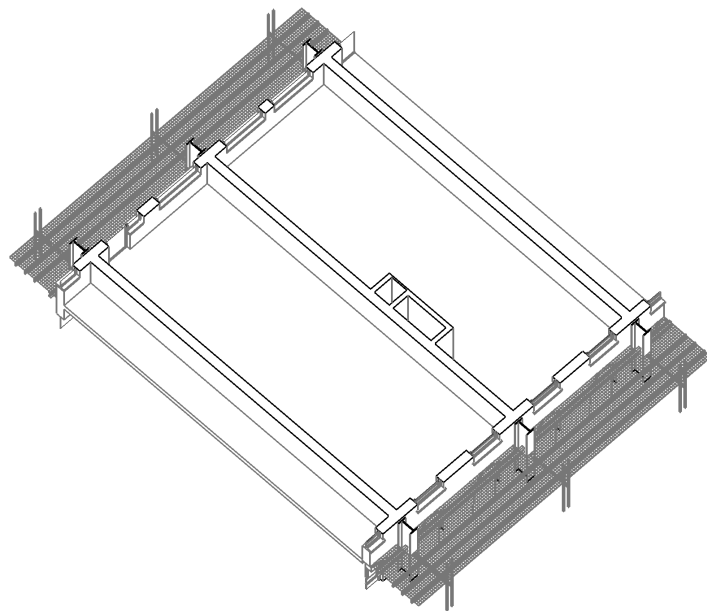
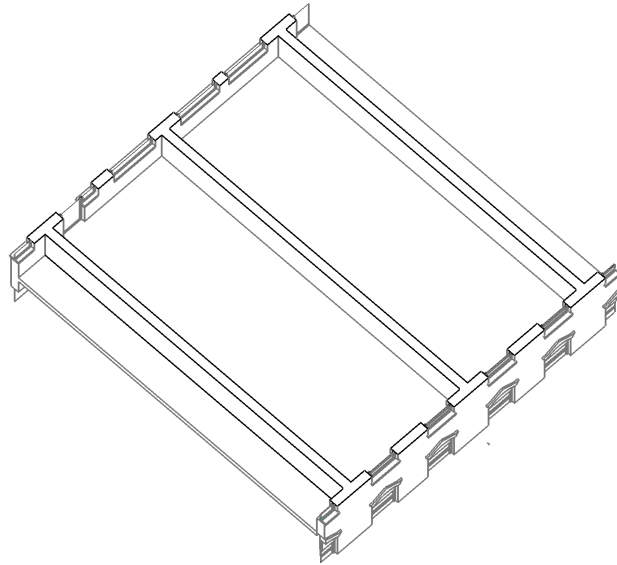
Exemplary Elevation Old



Exemplary Elevation New



**Conversion of the Existing  
Structures**



## System View

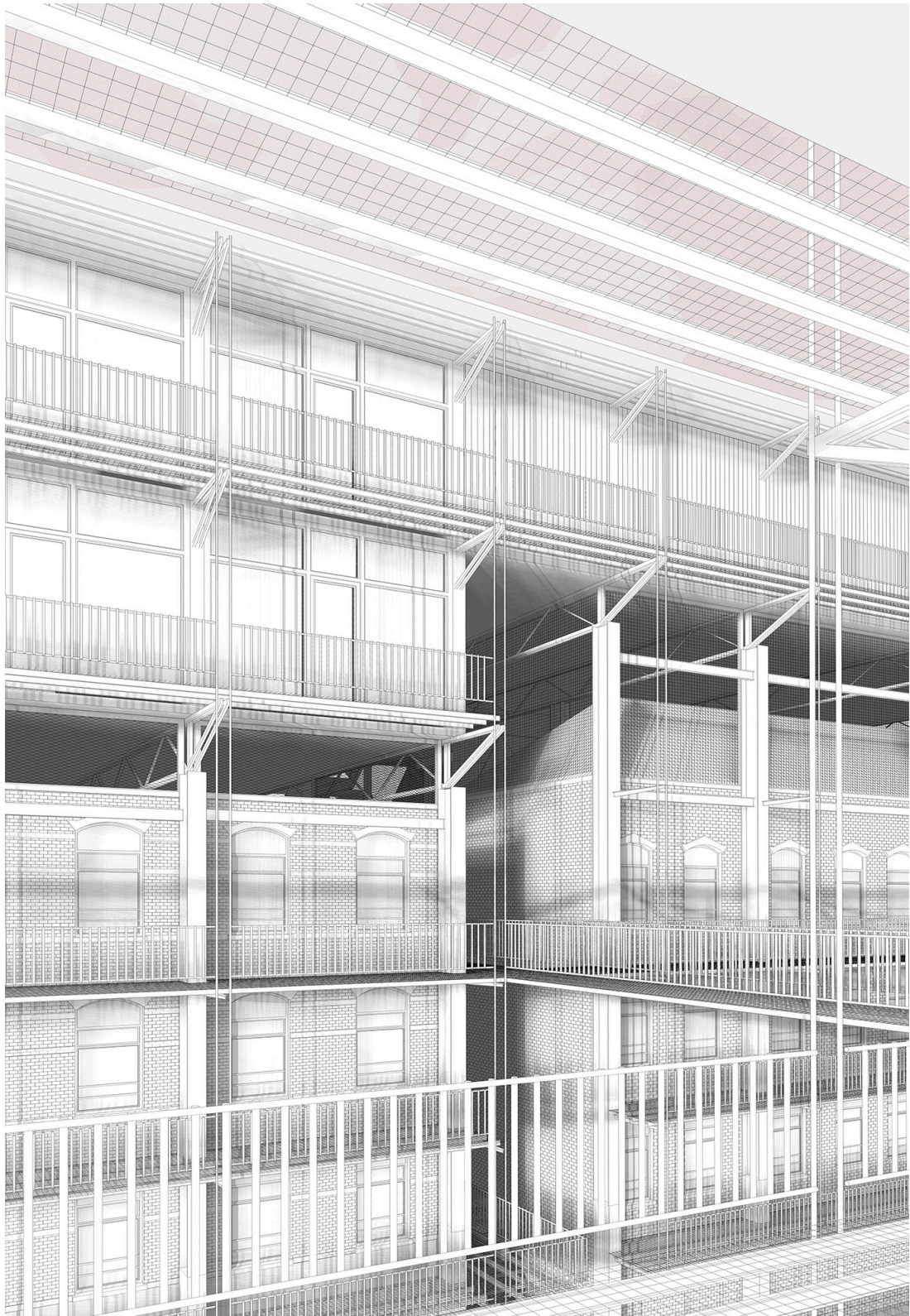








## System View



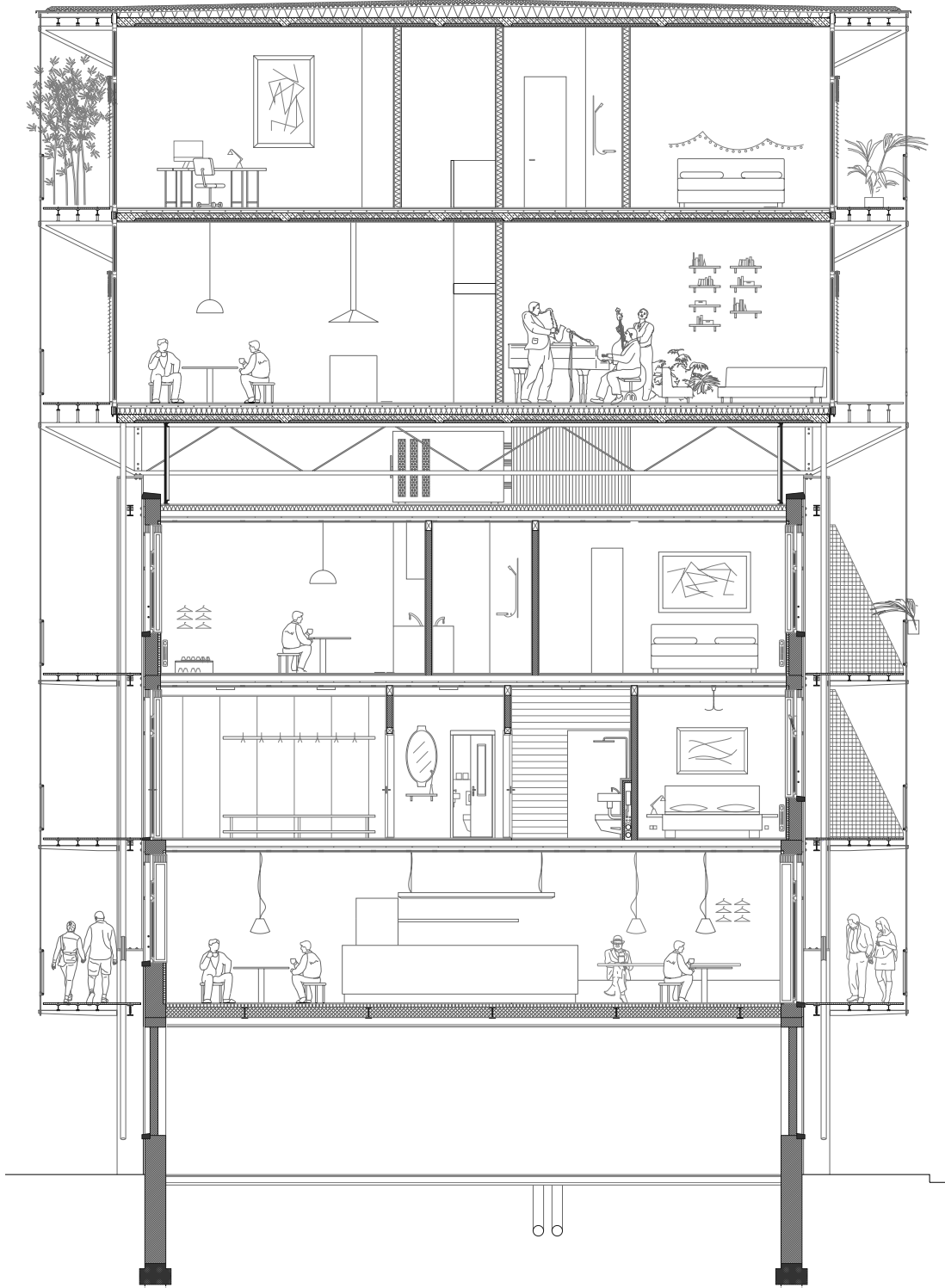


## **Semantics**

*The Articulation*

*The Morphological Influence of the System*

**Scenario Section**





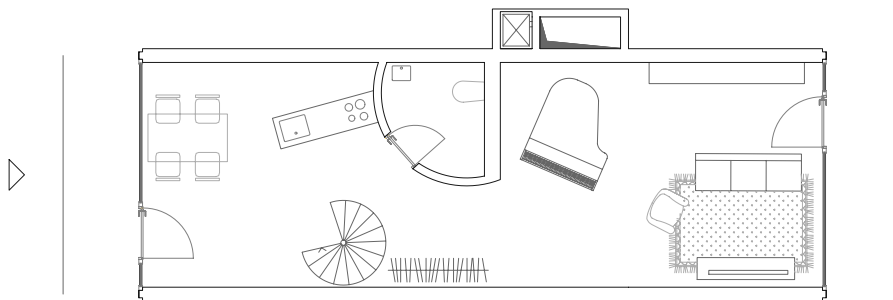
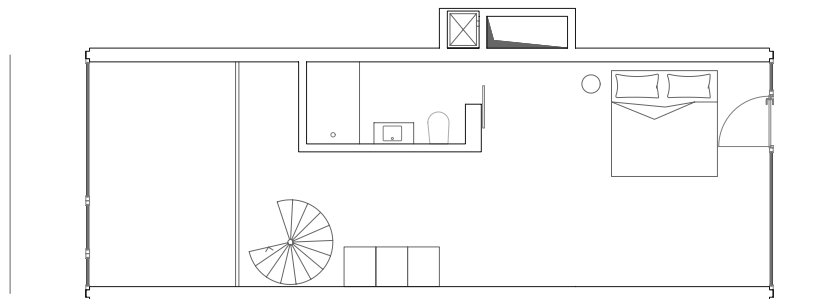
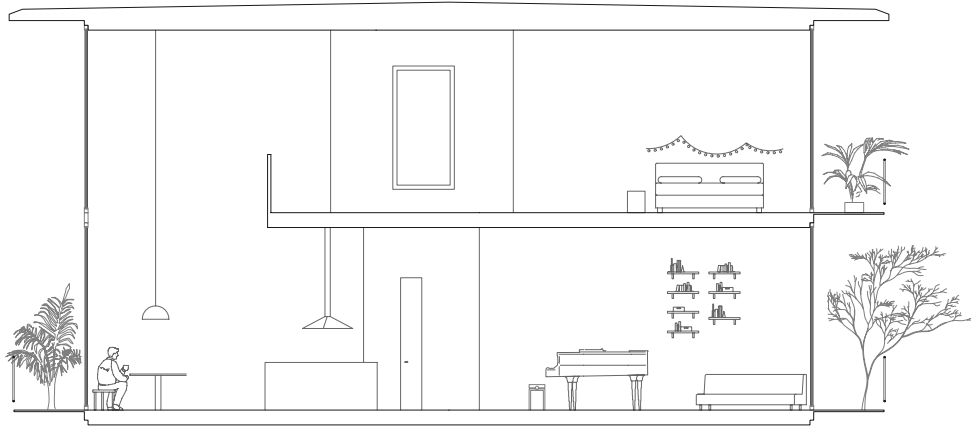
Scenario Axonometric



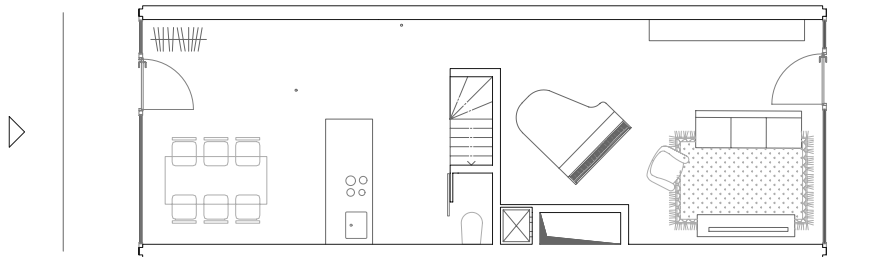
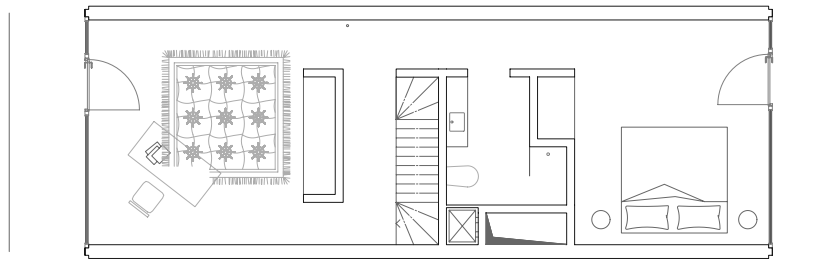
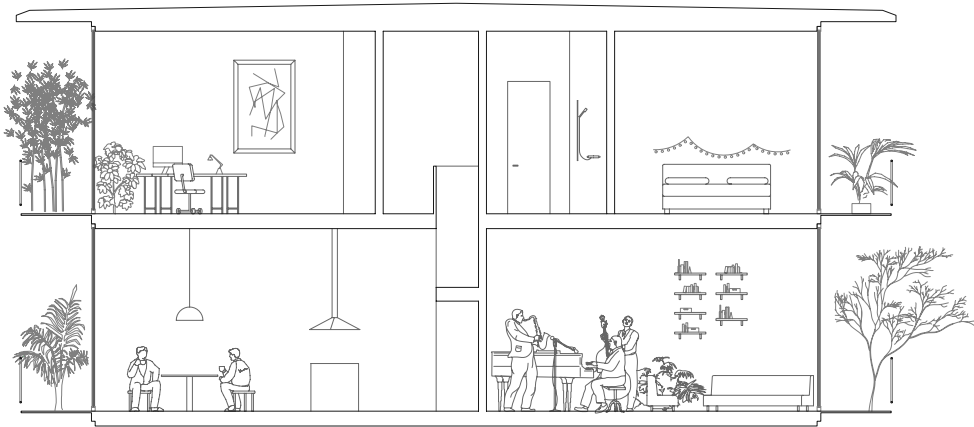


Scenario Axonometric

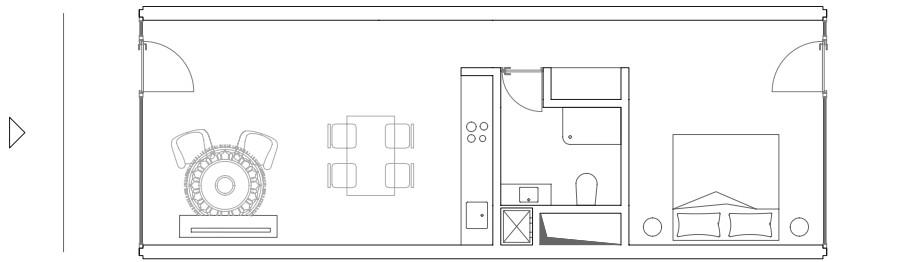
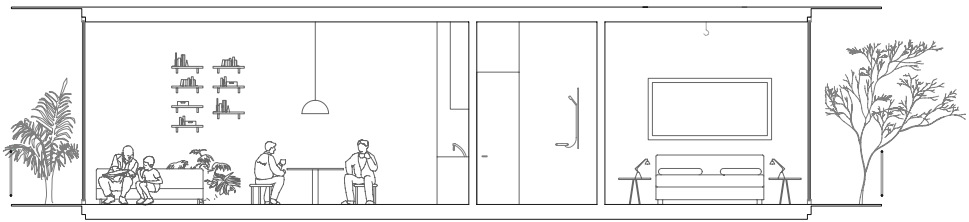




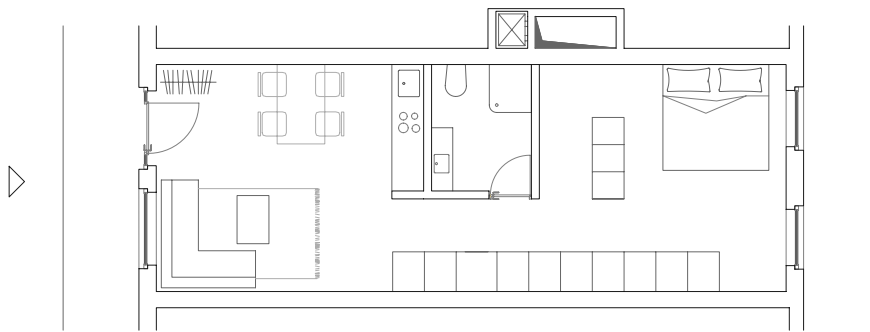
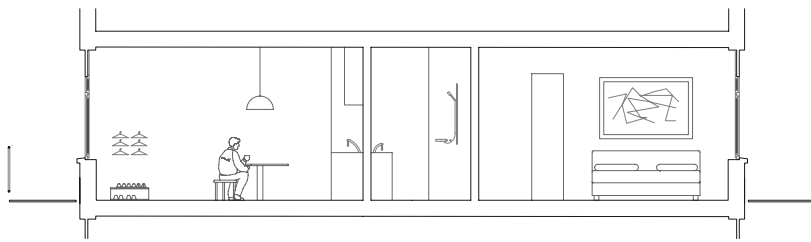
Module 1: Duplex Variation 1



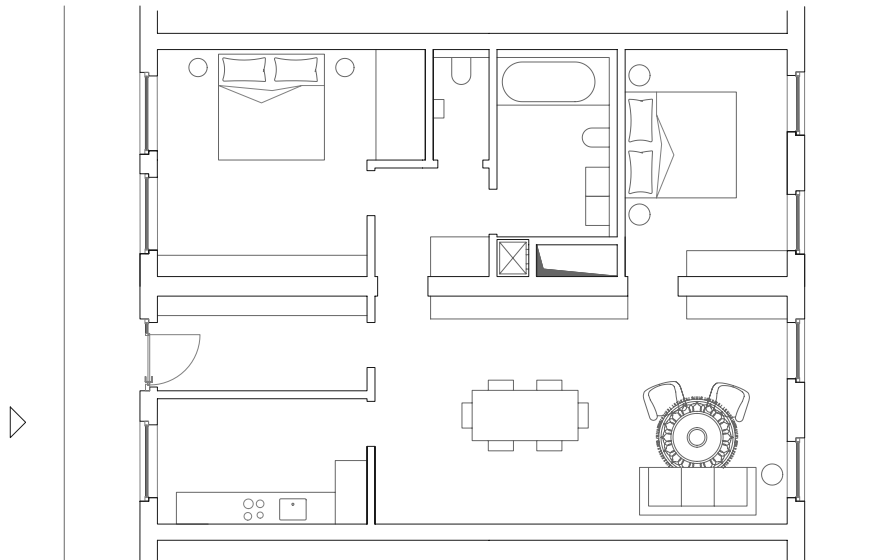
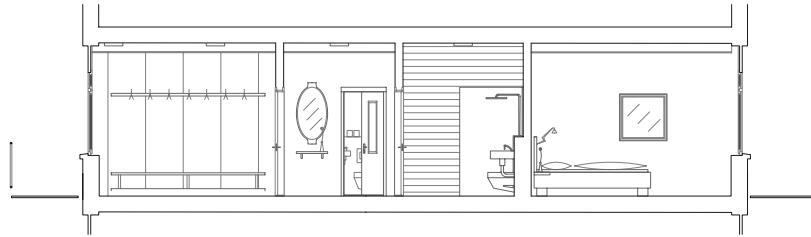
Module 2: Duplex Variation 2



Module 3: Single Unit Variation 1



Module 4: Single Unit Variation 2



Module 5: Double Unit Variation 1



**Steps of Individualisation**





TOKO NOORDEREILAND  
WINKELWINKEL  
NIJSS PASTRY EN GASTRONOMIE  
LUNCH PIZZA  
EN MEER...





















## Reflection



## Reflection

### *Looking back Relevance*

Transitional Territories is a particular graduation studio in its nature, as it intends a multi-disciplinary approach, accommodating students from both Master of Architecture and Urbanism tracks. This year, for the second time, the course has been dealing with the vast territory of the North Sea. We, collectively as a studio group, were researching into the relationship this body of water has with its surrounding land masses under social, geo-political, economical and environmental aspects. The goal was to understand these processes to then conclude in possible conflicts in an altered future state to draw on a specific spatial problem, which can in turn be solved with the theoretical thinking process of an architectural research project.

In the first half of the winter semester, we were divided according to those four fields. This fostered the exchange of knowledge between the different master programmes, which was doubtlessly profitable to this part of the research. The aim was to find a personal fascination, forming the foundation for the individual research topic. Looking back, I personally drew great benefit from the collective gathering of data, as it meant a head start for the individual research. Grasping the nature and processes of the “fourfold of the North Sea” helped me to discuss a specific spatial conflict to then formulate a problem statement, which I would consequently attempt to solve by the tool of architectural design.

The goal of the initial phase of the studio gradually emerged to myself as the zooming in to a manageable scale, as the transnational enormosity of the North Sea offered a starting point, however, was too big to address architecturally. Thus, the method of mapping, which was partly influenced by extensive literature review, partly by scenario-building, proved itself as the most helpful to grasp the holistic dynamics of this area and graphically document those, focussing on one hot spot area.

Soon it became clear to me, that the threat of a rising sea level is becoming more apparent, forcing areas of shallow coasts to think of possible solutions. As the most important urban regions of the North Sea are located in low-lying lands of the south coast, conflicts between urbanity and water arise. This resulted in the question I asked myself from then on and made it my personal design and research premise for this academic year: How to, from an architectural point of view, deal with flooding in an urban environment.

The choice of Rotterdam as a larger area to investigate, seemed therefore logical to me: Here, urbanity has always clashed with the threats of incoming water. On the one hand, the city was able to evolve because of its beneficial location in proximity to the North Sea. On the other, the area has always struggled to control the water to create a safe environment for its inhabitants. In the future, the rising sea levels will challenge the accomplished safety. If breached, this will lead to economic loss because of building damage and social disruption due to inaccessibility.

For my graduation project, I went right down to the heart of the matter, choosing the most threatened hot spot: After investigating the systems of flood protection in Rotterdam and around the Maas, I found out that the bordering embankments of the Maas are not protected by dykes, becoming the first areas to flood in the eventuality. Especially Noordereiland, the sole river island of Rotterdam, was not only the most exposed (as it was fully enclosed by water; an island by nature), but also one of the areas with the lowest embankment walls. This historic district therefore made perfect sense to me to choose as my site.

After the the location for my intervention was



## Reflection

### *Looking back Relevance*

chosen, I investigated into the characteristics of the island itself and the spatial and social connection to the city. The aim of this part of the research was to define the approach needed for such a project. I observed, that Noordereiland once possessed major significance to the city, though being separated by the river. The island was well integrated into the urban fabric, with the main infrastructural connection from north to south bridging over it, and standing as the southern gate to Rotterdam. However, with the more recent city expansions of Rotterdam, colonising also the southern embankment of the Maas, the importance of the island is slowly disappearing. At the time of infrastructural development, also the Newspaper “Het Vrije Volk” stated already in the 1960s, that the island seems to lose its future prospect. Combined with the current expected danger of flooding, therefore expected economical demise and social disruption, I seized the opportunity to change my perspective on the island, seeing it as a possible place of experimentation. Under those circumstances, Noordereiland offers ideal premises to be seen as an urban test lab, an environment to assay my project to the flooding danger, creating a possible example under those aspects.

As the island’s layout is put together by a number of urban blocks, I decided to limit myself to the scale of one of them and look into the relation between its morphology, how and what to change under the extreme circumstances of flooding to maintain a functioning systematic

by the method of research by design. My goal was to set a convertible precedent. The systematic analysis of the existing structures under the light of a general flooding-danger has directly informed my design mentality of my project. I therefore challenged myself to make it my research goal to create a defined rule-set, conceptually and architecturally, which can in turn be applied to other existing blocks; on the island itself, but also somewhere else.

The premises are clear: With my graduation project I am aiming to articulate one chosen possibility of how to alter the morphology of the urban block threatened by an increased flooding danger.

The extreme scenario of flooding will directly threaten the substance of our built environment and challenge the architectural approach, leading ultimately to re-defined ways of living. For that reason I consider my conceptual approach as a pressing issue, which demands a theoretical and experimental approach. With the current layout, the life of inhabitants of low-lying coastal cities will be tremendously be compromised, if not endangered. With the systematic approach I opted for, I am thinking of possibilities of resolving this problem spatially.