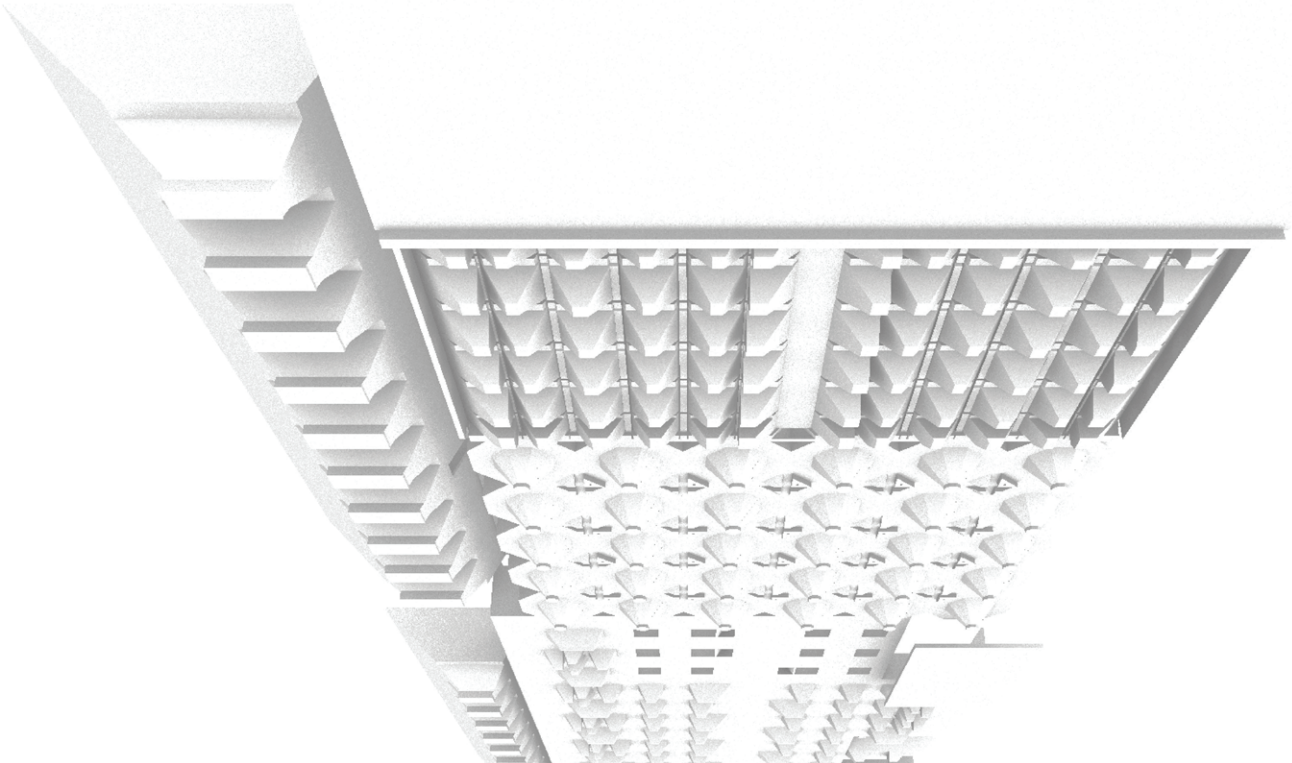
THE MAASSILO
'A CONCRETE EXCAVATION'



PREFACE

Everybody knows concrete.... the building material that ones meant the future. Imagine it's most extreme forms. I'm thinking of Sovjet concrete sculptures! Brutalist Architecture! And then think about what it would take to break parts of these adement concrete structures down. That is what this project is all about. Welcome to 'A Concrete Excavation'.

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Introduction

In the course of industrial advancements, new production processes in the nineteenth and twentieth century demanded new types of buildings; starting from the 1960s those industrial objects became outdated and are currently known as industrial heritage[1]. Industrial sites that were originally located on the outskirts of (port) cities were suddenly 'misplaced' as the city grew around them. Though separated from their original context, some industrial objects have escaped demolition and the need to redesign these buildings continues to increase. The city of Rotterdam is an example of such a port city that drastically changed during the 20th century. In this context I want to talk about the Maassilo building situated in the old harbor area on the south side of the city *(figure 1)*.

The Maassilo building is a factory that was designed to store, treat and distribute large amounts of grain, operating from 1910 to 2003. While 20% of the building volume is temporarily repurposed as a club venue and start-up studios, 80% is still inaccessible. Due to this insufficient use of space, the ad-hoc and low-budget nature of the temporary interventions and the fact that the club venue causes nuisance to the surrounding neighborhoods, the municipality of Rotterdam and the commission for monuments (Rotterdam) is looking for an overall redesign.

In this statement I will give my perspective on the Maassilo building and its redesign. To do this I will use research carried out by a team of five students, including myself, at the faculty of architecture and the built environment of the TU-Delft. This thorough research includes an architectural analysis, technological analysis and an assessment of the cultural values in the Maassilo. The conclusions from this research formed the starting point for my individual research on a possible program for the Maassilo building. Ultimately my redesign proposal is a result of these two researches and my personal interests in architecture and the Maassilo building in particular. These elements together form the basis of this reflection.

To comprehend the complexity of this assignment I want to start by briefly illustrating the theoretical framework that I used to value architectural heritage, referring to the Maassilo complex. This will then help to better understand the character of the Maassilo itself and to determine how to intervene in the building. Finally I will demonstrate how my design responds to these cultural values.

1. (De Boer, 1995, p3)

figure 1.
Maassilo as seen from Katendrecht
(Own photo, 2017)

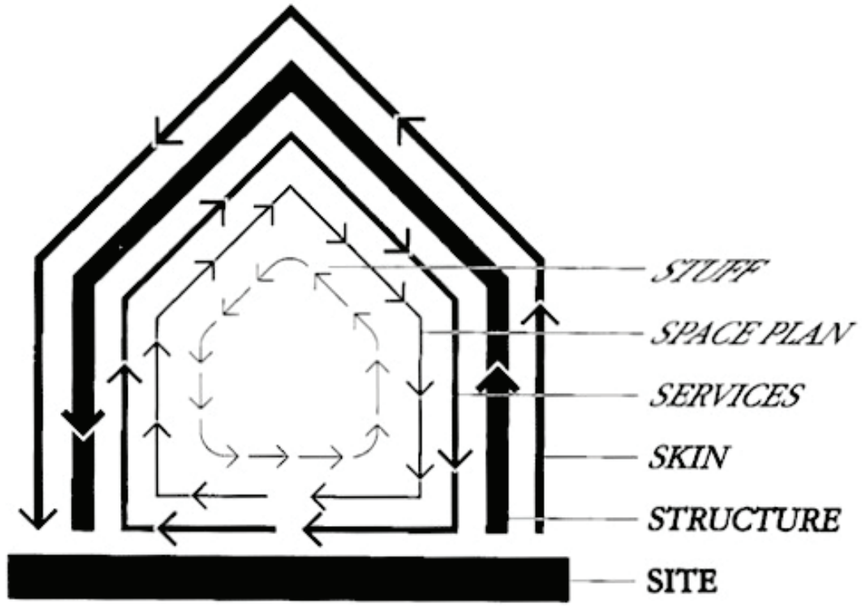


figure 2. Images of shearing layers, (Brand, 1994)

Cultural value

In order to come to a thorough understanding of architectural heritage - in this case the Maassilo - an analysis should value this heritage in all its multiplicity. Therefore, the first part of this analysis is carried out by interpreting the building through different layers. The structure that is used is given by Steward Brand, who defines architecture as a culmination of 'shearing layers'. Brand defines the following layers [2]: *(figure 2)*

• Site: The geographical setting of the building, including the urban context and the building site itself.
• Structure: All the load-bearing elements of the building. • Skin: The surfaces of the exterior, e.g. the facades and the roof.
• Services: All the service systems used for heating, plumbing, ventilation and electrical systems.
• Space plan: The elements that define the internal layout, like interior walls, doors, floors and ceilings.
• Stuff: All the things that are placed in the building but can be moved freely, like furniture and appliances.

In the particular case of the Maassilo, some additions were necessary to make clear distinctions between certain values. Hence, the layers used to structure this analysis are:

2. *(Brand, 1994)*

• Surroundings: The urban context of the Maassilo, which is Rotterdam, with an accent on the area south of the Maas river.
• Site: The direct surroundings of the building, the Maashaven, the quays, elevator towers, and the public space adjacent to the building.
• Spatial composition: The main volumes the building is comprised of.
• Skin: The exterior surface of the building; the facades. • Structure: The loadbearing logic and tectonics of the building.
• Space plan: The spatial logic of the interior.
• Surfaces: The skin of the interior spaces.
• Services/stuff: The remaining machinery and services, which are mostly out of order.

Each layer is placed in a historical context in order to clarify its present state. Consequently, meaning is ascribed to the architectural and cultural findings in each layer. It is important to mention that architecture and cultural value are not separated here, as the one is always present in the other.

After exploring the meaning of the different layers in the building, the next step is to try to objectively address value to them. Since the ascribed values are impossible to put under one common denominator, they are devided into multiple categories. The division in categories is provided by a widely appreciated art historian named Aloïs Riegl, who's ideas on these divisions have been present in many previous conservation charters. In his 'The modern cult of monuments: its essence and its development', the following cultural values can be found[3] :

• Age value: The extent to which existence through time, and therefore physical decay, is made visible. This value is perceived immediately by both laymen and experts.
• Historical value: The extent to which valuable information about the past is provided. This information is mostly valued by experts and in most cases has to be explained to laymen.
• Intentional commemorative value: Value in the human endeavor to keep certain memories alive in the consciousness of the public.
• Unintentional commemorative value: Appreciation of the readability of unintended events in history that became part of the public consciousness.
• Newness value: The extent to which the triumph over the test of time is visibly present. This is the exact opposite of age value.
• Art value: The value of artistic meaning in historic artifacts.
• Use value: The extent to which certain aspects in the current situation are directly adaptable for new usage.

Again, in order to capture the essence of the Maassilo, different values had to be added to the set of values provided by Riegl. The values that have been added are:
• Aesthetic value. This value does not merely concentrate on the visual perception of the building, it rather involves everything that contributes to the current experience of space.
• Rarity value: Focuses on the uniqueness of certain elements.

After thorough contemplation, the unintentional commemorative value is left out of this analysis because there are no significant elements that are not accounted for in the context of historical value already.

Finally, Marieke Kuipers puts the layers as described by Brand and the values that are described by Riegl on a y- and x-axis to create a matrix that brings all values in perspective[4] *(figure 3)*.

3. (Riegl, 1903)
4. (Kuipers & Halbertsma, 2014)

VALUE MATRIX	Age Value	Historical Value	Intentional Commemorative Value	Newness Value	Art Value	Rarity Value	Use Value	Aesthetic Value
Surroundings								
Site								
Spatial Composition								
Skin								
Structure								
Space Plan								
Surfaces								
Services/Stuff								

figure 3.
Cultural Value matrix as given by Marieke Kuipers
(Own illustration, 2017)

Narrative

As a historic ensemble of grain silos, office spaces and grain elevators built in different phases between 1910 and 1964, the Maassilo complex in Rotterdam Zuid carries a multilayered historical value. Directly linked to the rapid growth of the harbor in the early 20th century as well as the creation of the Maashaven, the complex stands as a key actor in the socioeconomic development of the city. Located in the infrastructural heart of the harbor area, the building also played a catalyst role for the creation of the southern (working class) neighborhoods of Tarwewijk and Bloemhof (Charlois, Rotterdam Zuid).

Within a span of almost 50 years of its construction, taking place in 4 different phases, the building also stands as a physical record of evolving typologies, construction methods and technological possibilities in the context of silo buildings. Providing by definition a clear (uncompromising) functional context, the building directly reflects the climaxing functionalist approach in architecture which accompanied the expansion of the harbor, as seen in the oeuvre of its architects: J.P. Stock, J.A. Brinkman & L.C. Van der Vlugt, A.G. & J.D. Postma and H. Haan.

The Maassilo complex also provides a record of the evolving construction processes and building technology of silo making. Furthermore, in the context of a historical revolution in the use of reinforced concrete, the building marked one of the largest in situ constructions in Europe.

As an originally uncompromising functional environment, the Maassilo's present situation is characterized by the stripping-off of its initial activity. Today the building stands as a weathered, decayed mass, concealing the empty cells of the silos. After 2003, when the Maassilo N.V. left the building due to its lack of capacity to expand, a cultural initiative triggered by the Dutch office Transformers lead to reuse of a part of the complex. These ad-hoc and low-budget modifications where not always done in line with the character of the building. The involvement of the music venue NOW&WOW (2003) in the space remains the most consistent act of interaction and possible re-programming of the building so far. The re-shaping of the ground level and partial replacing of the central columns were an attempt to take advantage of the orthogonal nature of the space plan. But also regarding the Creative Factory and 010 factory (2008) several silos and funnels where modified. To prevent further dilapidation of the Maassilo complex, a proper concept and proposal for a total redesign is required.

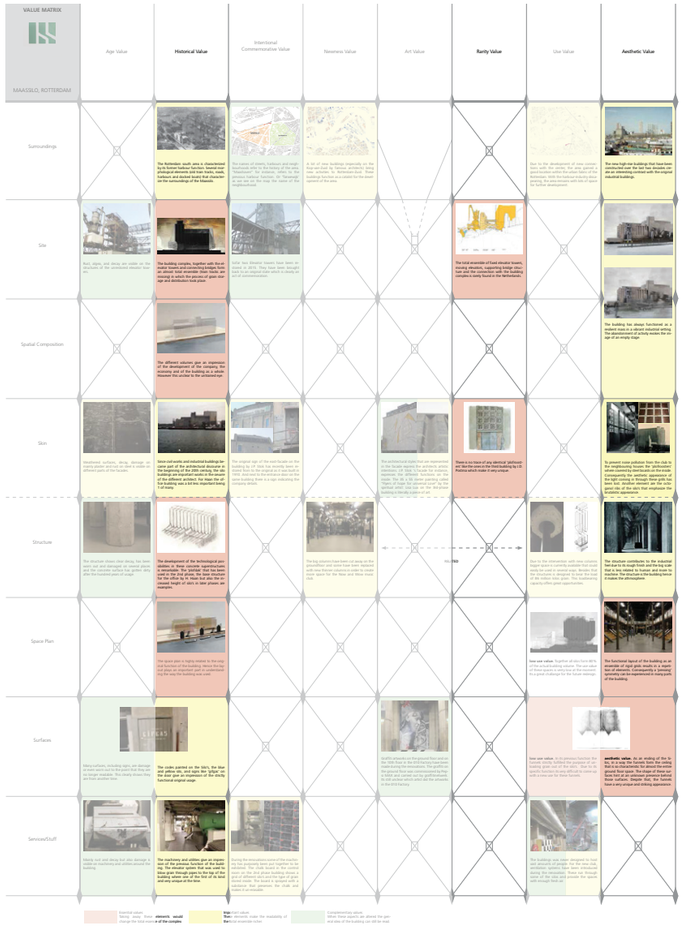


figure 4.
Cultural Value Matrix for the Maassilo
(Own illustration, 2017)

Main values

Having said this and considering the value matrix by Marieke Kuipers that has been used as a framework; three main values for the Maassilo complex can be depicted from this.
These values are: Historical Value, Easthetic Value & Rarity Value. This is show in fugure 4, the Elements that are valued highest are marked with red, middle important with yellow and least important with green. (see appendix for bigger image)

Contrast & contradiction
As previously described, the cultural value matrix is intended to be used as a tool to establish an objective view on the different values a certain building posesses. I am also interested in the less concrete facts and the more intangible values a building contains. Valueing heritage is very much defined by its time and the culture of preservation. Our group had vivid discussions on the Maassilo and the oppositional nature of some of its characteristics. Here, I use four oppositions to present the Maassilo as a building of contrast and contradiction *(figure 5)*.

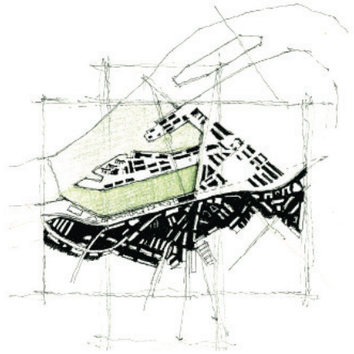
North/South
The Maassilo stands on the border between two contrasting areas. This border is spatially defined by a heavy traffic line (Brielselaan), to which the Maassilo is historically bound. The Maassilo could be treated as a gate, mediating between these two different stages.

Public/Private
The Maassilo is, in heart and soul, not a public building, this can be observed in the original small entrance door and the enormous closed concrete surfaces. Consequently, with the will to create a public building, natural light becomes an important aspect. A solution for the silos would lie in a meaningful public program that doesn't require natural light or bringing light into the building through partly opening the roof.

Static/Dynamic
The Maassilo in its historic setting can be seen as a heavy static mass in a highly dynamic environment. The silo is a place where the grain waits: it is in temporal rest, stored securely, protected from external forces, until it is set into motion again by workers, conveyer belts, elevators, trains and boats. The Maassilo accommodated both rest and movement of grain. The flexible character of the ground floor and attics can be of advantage for a redesign.

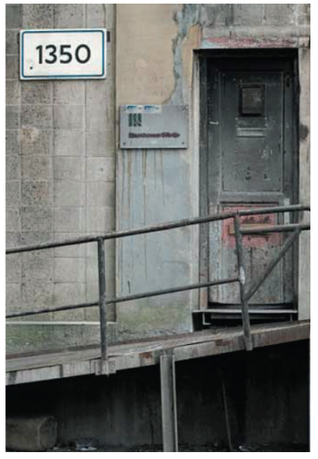
Readability/Concealment
The Maassilo knows a strong contrast and interplay between readability and concealment. This tension field is played out on multiple scales. On a large scale it is clearly visible from the exterior that the building was built in multiple phases. On the other hand, without further knowledge, the order and logic behind it remains unclear. The skin of the building has the same structure as the internal silo walls, and in that sense it does not mask its interior. However, the skin completely hides the internal spatial logic of the building. In the ceiling, the signage on the funnels gives a direct indication of historical use,

North/South



Static/Dynamic

Public/Private



Readability/Concealment

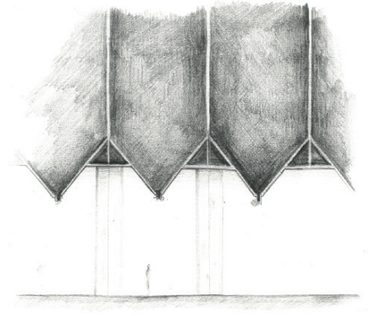
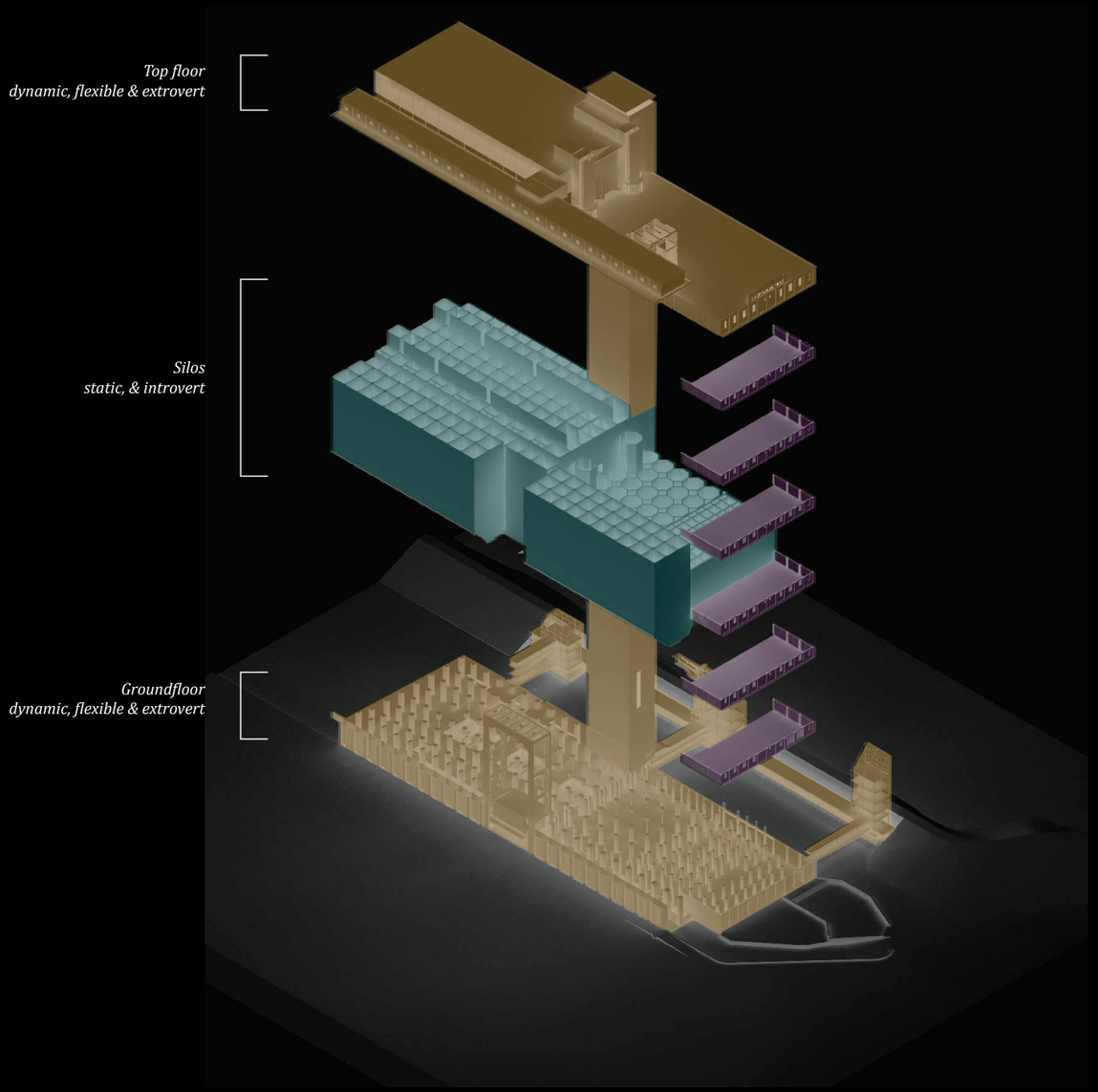


figure 5.
illustration of contrasts & contradicitons
(Kostis Vatanidis & David van Weeghel
, 2017)



while the enormous void above remains hidden from any visual or physical experience. The interplay between hiding and revealing could be enhanced by partly revealing the formerly unseen or to some extent opening up the formerly inaccessible.

Character of the Maassilo

As we have now established the Maassilo's character of contrast and contradiction it becomes easier to point out which of the values really define its character, and what the (spatial) challenge is for the architect.

I am now convinced that the contrasts and contradictions are most evident in the space plan of the building *(figure 6)*.
The interior logic of the building is shaped by its functionality. The processing and storing of grain is a contrast in itself. The silos, hidden from the outside, dark and static, are the place of storage. The upper and ground floor on the other hand are where the grain used to be transported, a place of flexibility and movement with connections to the outside.

In my redesign I therefore focus on the elements that contribute to the experience of the contrast between the different interior spaces.

figure 7. explode view, expressing the typical spatial contrast between ground-floor and top-floor and Silo tructure (Own illustration, 2017)

A concrete excavation

The challenge for Maassilo lies in exploring the silo structure, bringing light into the building, making the relation between these contrasting spaces (between the three building volumes as well as between top floor, silos and ground floor) understandable *(figure 7)*. This assignment is about creating spaces in the silos by carefully demolishing parts of the structure. Technically we can build as many times as we like, demolition however can only be done once. The 'excavated' new spaces become the main added value to the Maassilo.

Future program

Re-industrialization

Looking at the Maassilo through a lens that considers the landscape as an interrelated web, we can re-establish its potential meaning to the surroundings. Even though the building initially played a catalyst role for the creation of the southern (working class) neighborhoods, the departure of harbor industry had a major influence on the unemployment rate in Rotterdam Zuid. Opposed to previous off-shoring[5], nowadays re-shoring creates possibilities to re-introduce (clean) industry to the city which challenges new ways to connect work to our daily lives. By combining craftsmanship and technology of the new make-industry[6] and connecting that to consumption in one building, the Maassilo will become part of a new movement along the Maasboulevard that will catalyze economic growth in Rotterdam (Zuid), see figure 8.

A place for the people

For me the exploring of the silos is an exciting challenge that I like to compare with the excavation of an ancient temple. The carving out of concrete to me resembles the discovery of a completely new world. I want the new function for the silos to be one without daylight requirements. It should be a public function that can be enjoyed by many people. I consider a bathhouse to be a great program, in which light and space can be explored well. Moreover, the main challenge in this studio raises the question of the relation between the industrial heritage and its waterfront. In a bathhouse, water - as spiritual, hygienic, therapeutic and social means – is the thread that binds everything together and hence creates both a literal and a figurative relation to the Maashaven.

5. See Rappaport, Aureli, economist, (other news sources), IABR Metaboislm of the city (2014)

6. See Rappaport, IABR Metabolism of the city (2014)

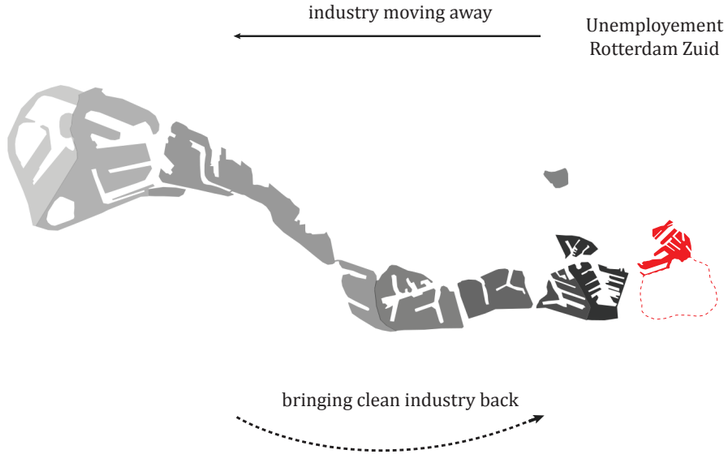
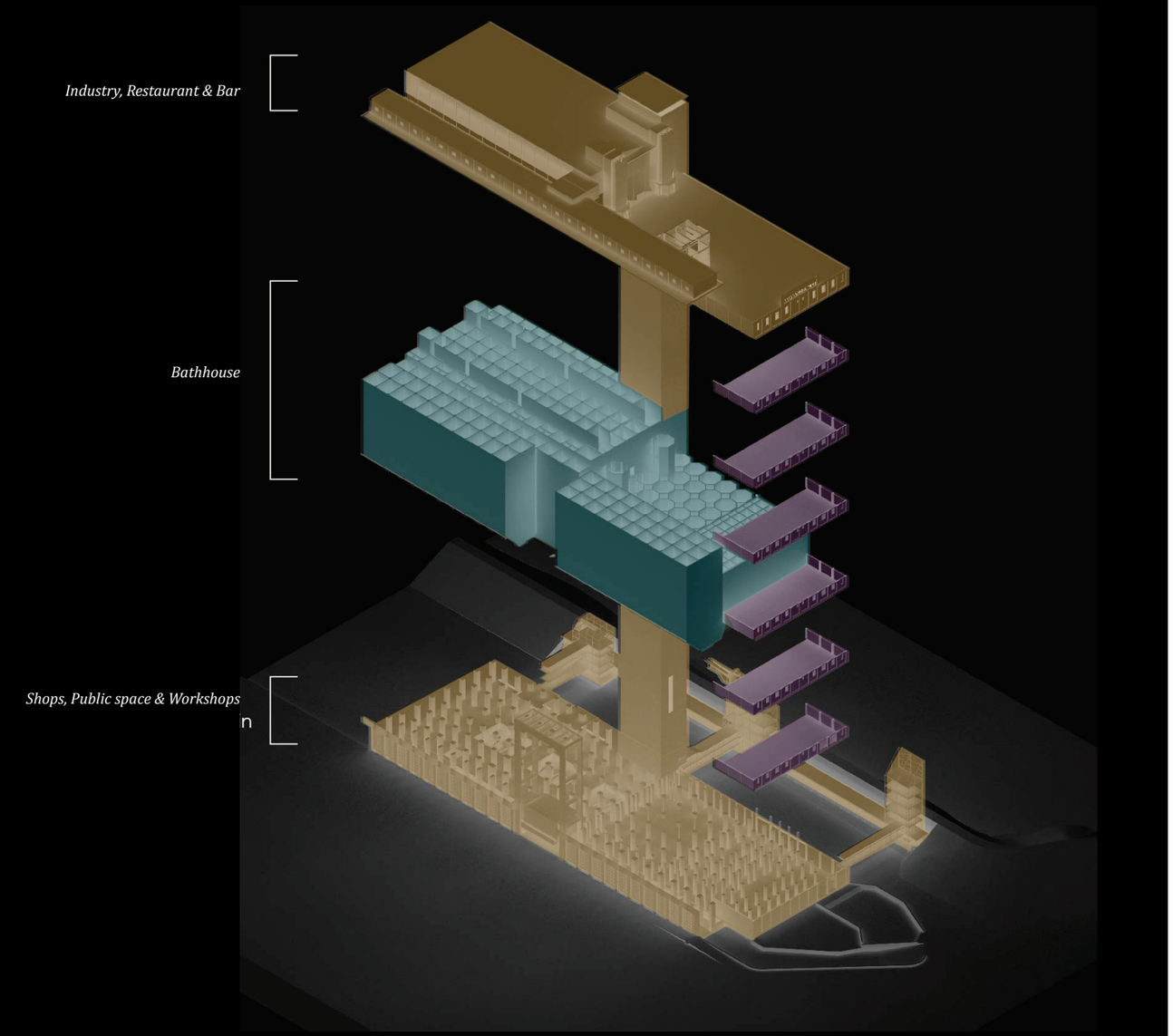


figure 8.
development of the industry
(own illustration, 2017)



Dual character – dual function

The duality between static and dynamic can be observed in several ways. Historically, a division between work activity and grain storage characterizes the building's space plan. The former being bright, flexible and open to the exterior, the latter being dark, fixed an closed-off from its surroundings. On multiple levels, I believe that programwise, this duality of make industry and leisure suit the existing building well. Where for decades grain had been processed by hard-working men, now a new make industry will use the attic to produce customized goods for consumption on the ground floor. And where grain was stored, in a structure closed-off from its surroundings, a new world - the bathhouse - will be open for exploration and the tubes through which grain was pumped will hold and distribute its water *(figure 9)*.

figure 10. design for tidal park along Maashaven.
(de Urbanisten)

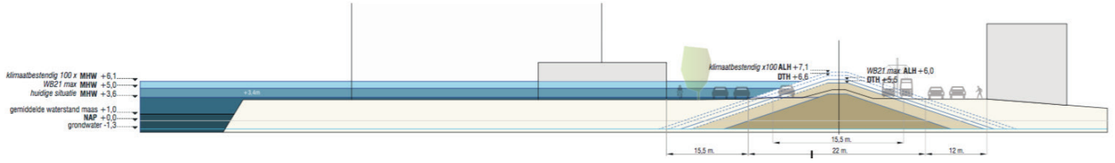


figure 11. typical section illustrating the need to rise the embankments
(kvk, 2010)

Design

In this last chapter I will present the new redesign, referring to the cultural values. Starting with the surroundings and site, I will continue to look at the building itself, first its exterior and finally the interior.

Surroundings

I believe that the redesign of the Maassilo has to take into account the future plans for the area. Two important plans specifically influence my redesign:

The first focuses on recreation and the relation between the water and the city. The idea is to create a tidal park along many parts of the Maas river banks including the Maashaven where the Maassilo is located *(figure 10)*.

The second is about our delta country being a place where we always have to cope with the water. As sea levels are rising, future plans for the Maashaven are to raise the embankments to seven meters above sea levels *(figure 11)*.

Evidently, the way we experience the Maassilo will change due to these interventions. Yet, I believe that by combining the two plans, the Maassilo will still be able to strike out of its context as a monolith concrete structure. In this way it will continue to contribute to the fragmented appearance of the city, keeping both its aesthetic and its historical value *(figure 12, page 19)*.

Site

The elevator towers that stand along the water front would be incorporated into the newly-formed embankment. The route that will run across it will draw more people to the building and allow visitors to experience the building from a new perspective. Through the elevator towers, the connection to the waterfront that is historically significant will be maintained. Repurposing the towers with docking stations for both water taxis and inland shipping to unload recycled materials for production will both emphasize this historical relation and add something new to the site *(figure 13, page 20)*.

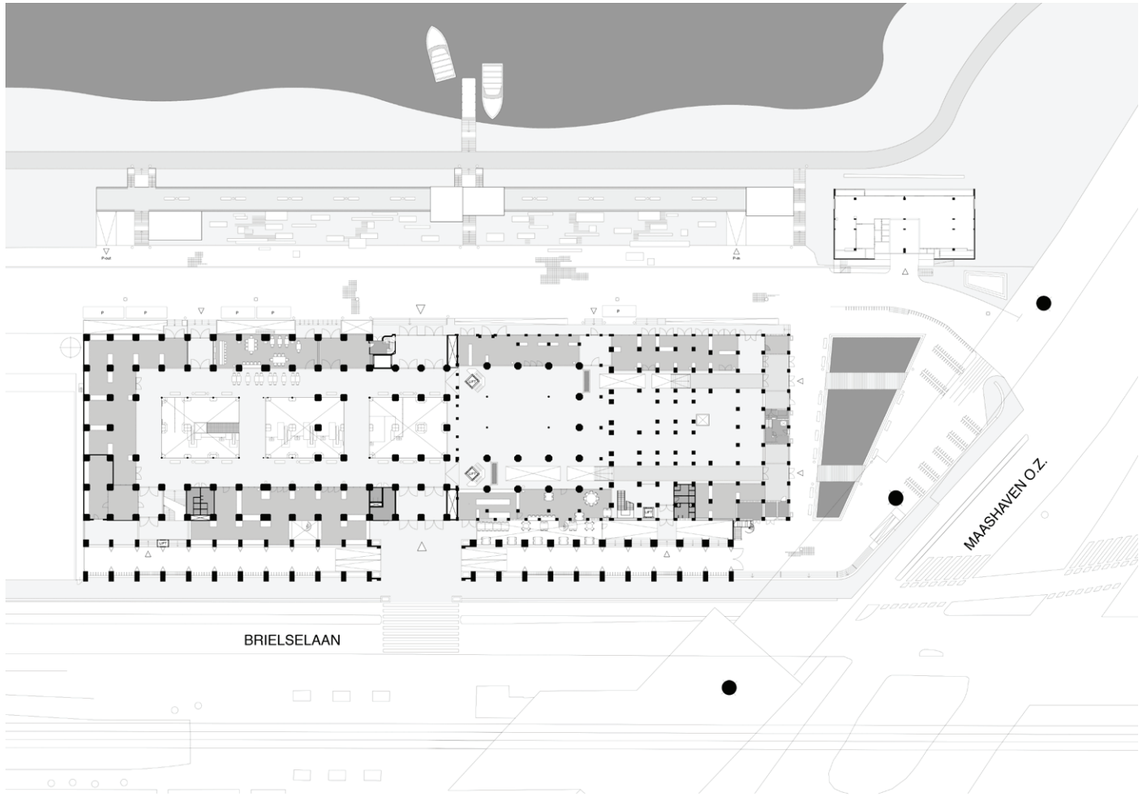


figure 13.
impression of elevator towers
incorporated into embankment
(own illustration, 2017)

figure 12. fragmented appearance of
the city illustrated in a plan that shows
buildings by age.
(Own illustration, 2017)

figure 14.
two-faced character of the building
(David van Weeghel, 2017)

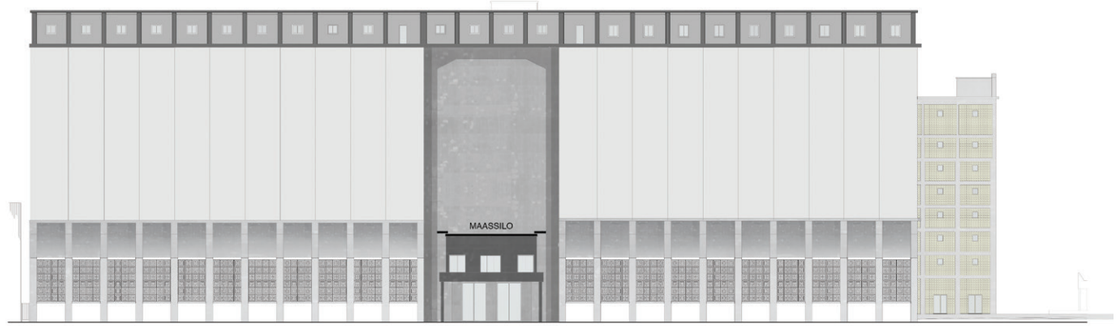


figure 15.
illustrations showing the result of opening op the south-facade while maintaining its monolith character.
(own illustration, 2017)

Building

The design warrants a preservation of the total ensemble of building phases and grain elevators as well as its physical connections. Looking at the building from its direct surroundings, the total ensemble of grain elevators and different building phases is best experienced from the side of the water. It is my intention to maintain this facade concerning the closed of appearance of the silo-body. The south facade that is oriented towards the working class neighbourhood will be partly renewed. This approach will emphasize this two-faced character of the building as it appeares on the border of two different areas *(figure 14)*.

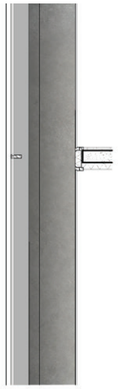
Monolithic transparency

I propose to maintain the closed-off character of the building, specifically the hidden silos, that gives the building a monolith and impenetrable appearance. The west and south facade however were modified over time and can be opened up without breaching the original character of the building. I suggest to do this with a translucent material that allows sunlight to come inside but prevents seeing through, hence keeping the building's monolithic character. Only when light is shining from inside at night, the internal structure of the silo will be revealed to the exterior *(figure 15)*.

These two approaches require different strategies. After demolishing the south facade it will be reconstructed with a double curtainwall system which is then covered by an external system that holds the masking translucent textile *(figure 16, page 23)*. The first row of silos on the North facade will function as bufferzone with a double layer of insulation on its interior wall. *(figure 17, paged 24).*

For the ground floor and attic spaces I propose to reopen the windows that were closed up for the club venue. That way, the specific character of the spaceplan will be readable in the facade again. The rooftop has huge potential to bring extra light into the building, to harvest energy and create an outdoor space to enjoy the city without compromising the character of the building.

As the total facade is severely damaged on many places ,it will be recovered where nassecary. The corrodet rebar and damaged concrete will be cut out and replaced with a special glassfibre concrete specimen. In this process it is the intention to make the new concrete appear similar to the existing giving it a homogenous appearance. The whole facade will then be covered with an extra transparant layer.



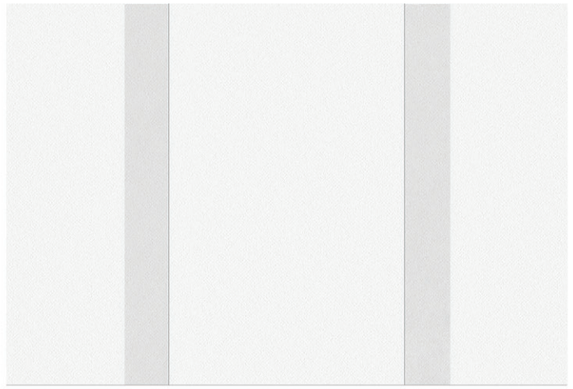


figure 16.
detailing of south facade, explaining its monolithic transparency
rescaled from 1:50
(own illustration, 2017)

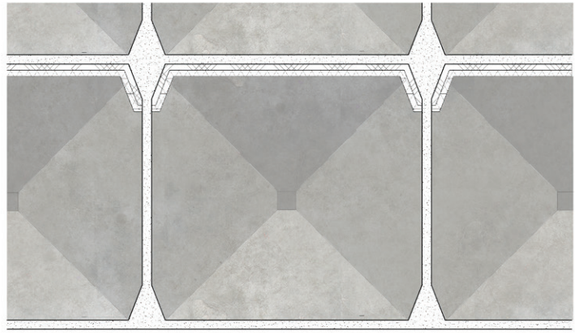


figure 17.
detailing of north facade, explaining buffer and insulation line
rescaled from 1:50
(own illustration, 2017)

Industry & Consumption

The building is entered on the ground floor. The flexibility and dynamic of the space plan is emphasized here by its multipurpose, consumption-oriented character. A main axis runs through the middle of the ground floor creating a clear entrance to the building and from the neighborhood to the water. By creating several secondary entrances, the open and dynamic character of the building is reintroduced. The workshops, cafés and shops are positioned on the outer ring of the basement and ground floor. This way they enjoy the day light and views. The interior becomes a public space that connects the different functions, and becomes a place to meet, interact or visit temporary art exhibitions. Opening up parts of the ground floor visually and physically connects the ground floor and basement. Big voids are left to experience the old machinery in the basement from above, again to make the threshold between different spaces clear to the spectator. The old basement in the first phase in which the conveyer belts used to run to move grain from one side of the building to the other will be partly opened up, creating a descending path to the rest of the basement *(figure 18)*.

Finally this vertical connection is not only made to the basement but most importantly to the top floor. By opening up funnels that hang from the ceiling at the exhibition space in the first phase, the silo structure is revealed and becomes accessible. Elevators in two particular silos, one in the first phase and one in the second, transport the products that are produced in the attic to the shops below. The central axis offers views that even go up until the attic of the building. Lift shafts and staircases carved into the silos take us up to the upper space. The building's transparent roof allows sunlight to penetrate the building and shine all the way through it onto the concrete floor of the basement *(figure 19, page 27)*.

Looking at the the detail of these interior spaces it is much about the roughness of the existing concrete and the signs that have been painted on originally. The new interior that will be added is focused on a transparant appearance using glass and thin wooden frameworks. Referring to the building as an accumulation of mainly three building volumes over time, the new frames will appear slightly different in each building phase by using three different types of wood: Larch, Oak & Birch *(figure 20, page 28)*.

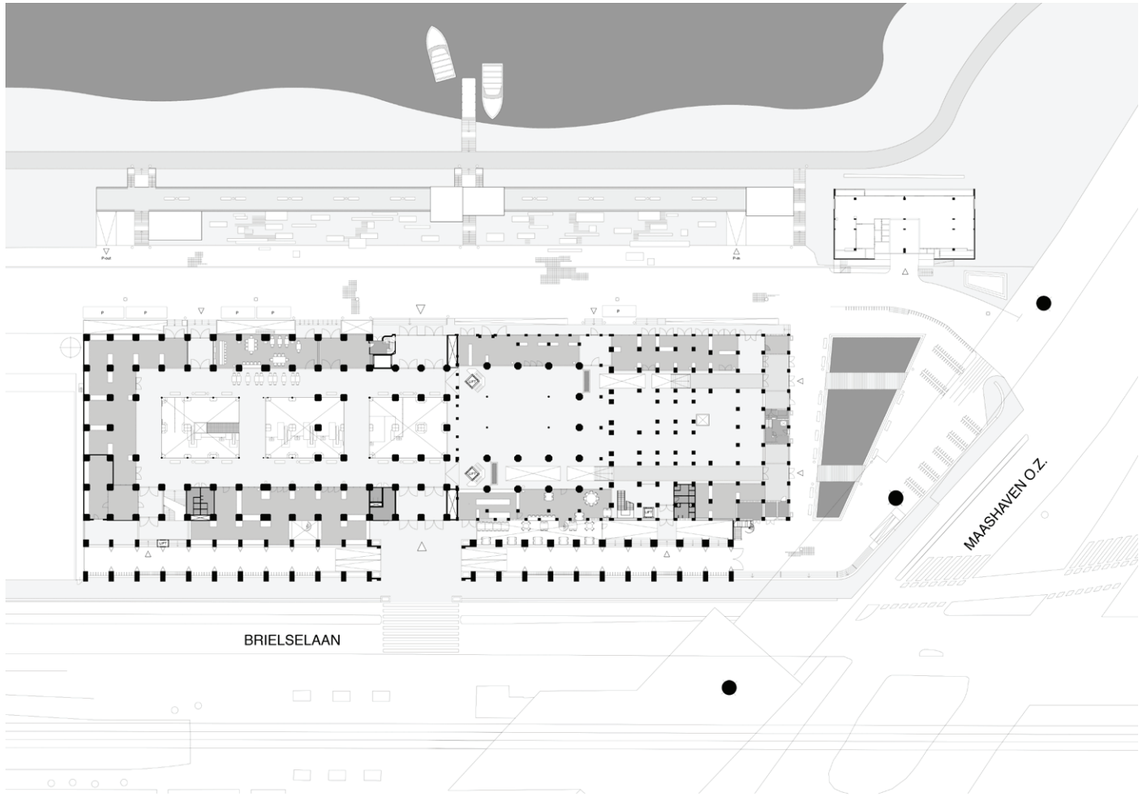


figure 18.
floorplan with surroundings
rescaled from 1:500
(own illustration, 2017)

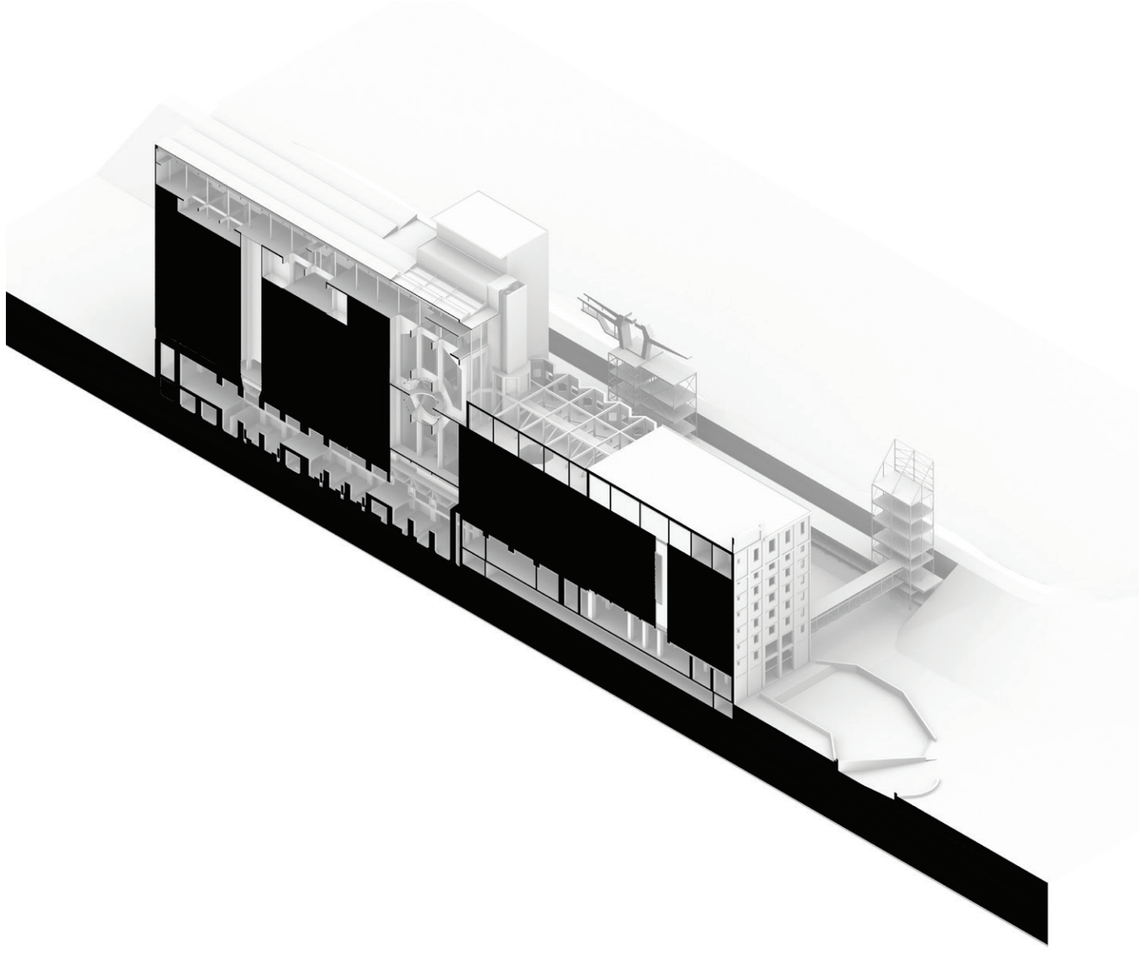


figure 19.
long section through the building showing vertical connections
(own illustration, 2017)

figure 20.
from left to right, Larch, Oak & Birch wood for the different detailing
(own illustration, 2017)

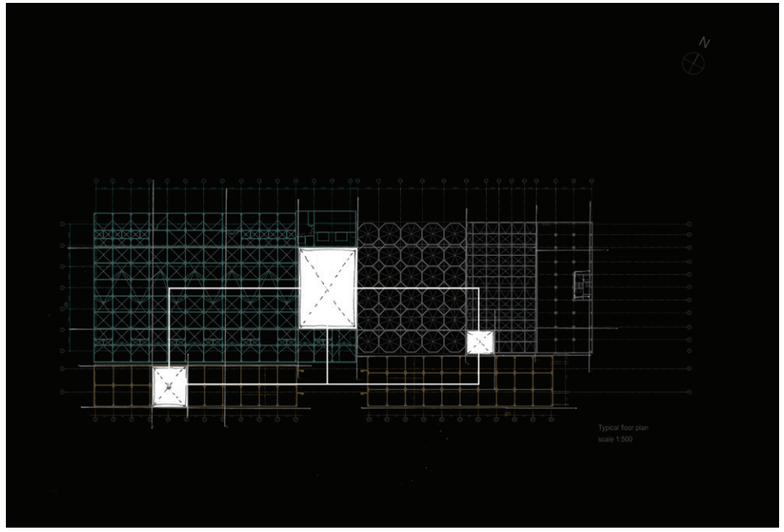


figure 21.
vertical shafts illustrated in plans
rescaled from 1:500
(own illustration, 2017)

There are two more vertical connections that are provided for workers in the makerspaces. These three vertical axes are strategically positioned to allow multiple ways to move around the building *(figure 21)*. It is in these places that different building phases connect with each other. By introducing these vertical shafts, the connections and hidden facades will be partly exposed. These interventions result in small extensions to the building, also visible from the outside. They form another addition to the building volumes that accumulated over time *(figure 22)*.

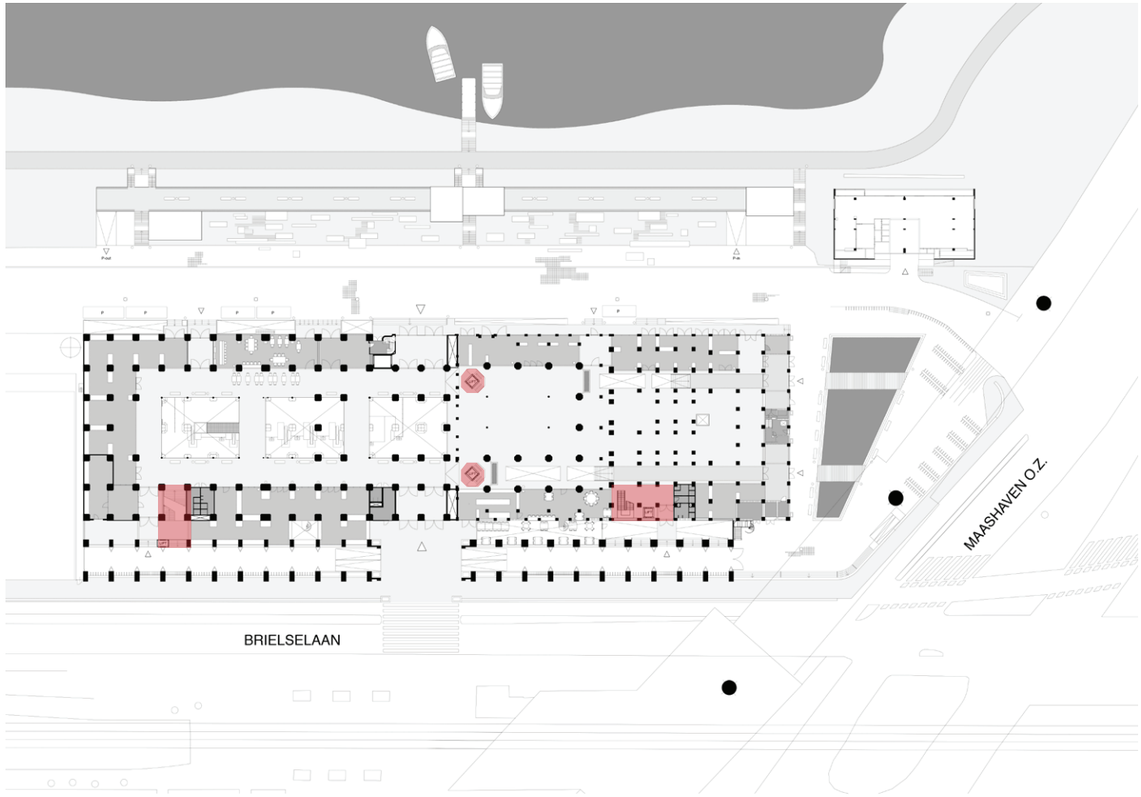


figure 22.
impression of building extentions and transparancy
(own illustration, 2017)

Bathhouse

The Maassilo building, as a direct result of technological advancements, is a highly functional building. The constant repetition of elements creates an almost 'pressing' symmetry that is really specific for this building *(figure 23)*. Yet, also due to the specificity of the grain process, many exceptions occur within this structure of repeating elements. It is the contrast between symmetry and exception that form the guiding theme for the carving out of bathhouse spaces within the silo structure.

A careful selection of different spaces makes this contrast clear *(figure 24)*. Playing with different heights, daylight and connections to the exterior will emphasize the contrast *(figure 25, page 33)*. By connecting the different spaces, a path is created. I would like to see it as a hike up the mountain in which the final destination becomes the climax of the experience after which you then slowly return to the valley. Thermas Geometricas in South America explains this quite well *(figure 26, page 34)*. However, instead of finding yourself surrounded by nature, it is more like walking through an industrial concrete landscape.

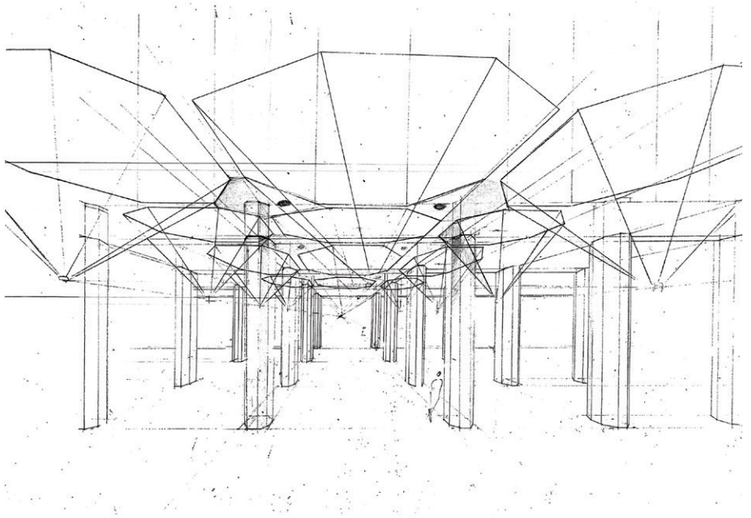


figure 23.
symmetry
(Illustration by K. Vatanidis, 2017)

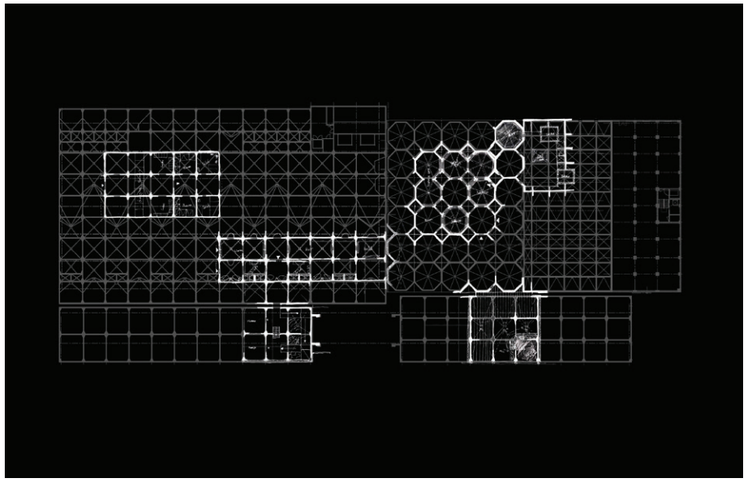


figure 24.
selecting different spaces
(own illustration, 2017)

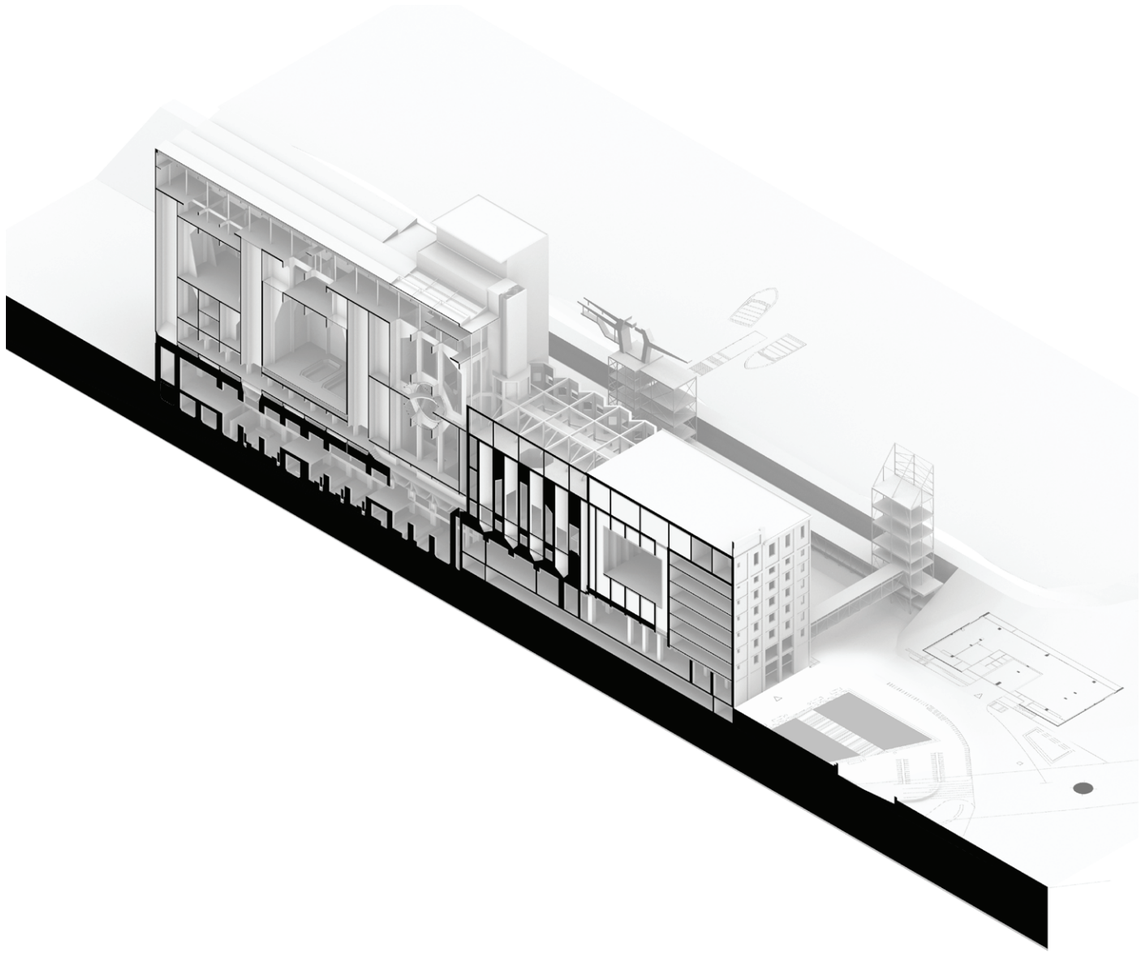


figure 25.
long section through the building showing bathhouse spaces
(own illustration, 2017)

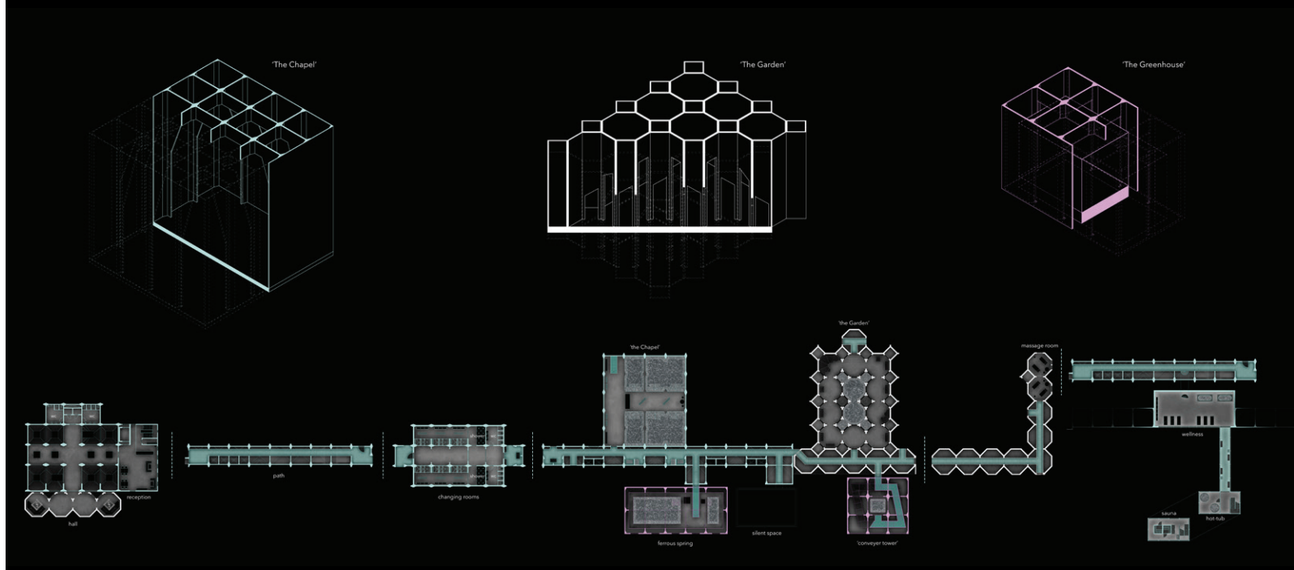


figure 26.
bathhouse plan
(2015)

On a small scale this bathhouse route is about playing with light, introducing natural materials, warmth and a constant flow of water which will give a pleasant touch to this experience. As the different spaces that are carved out of the silo structure become characteristic for the redesign, as well do the openings from one space to another. Ornamentation seems to appear kitsch nowadays, but I believe that this case is different, and here it can really contribute to a strong appearance, both on the small and big scale. As an example the door openings have extra cuts in the wall to place lighting and purely for decoration. The Terrazo floor follows the line of the funnels to refer to to what is sitting underneath. Finally, existing machinery will be positioned in a new context, repurposed to distribute water instead of grain *(figure 27 + 28)*.

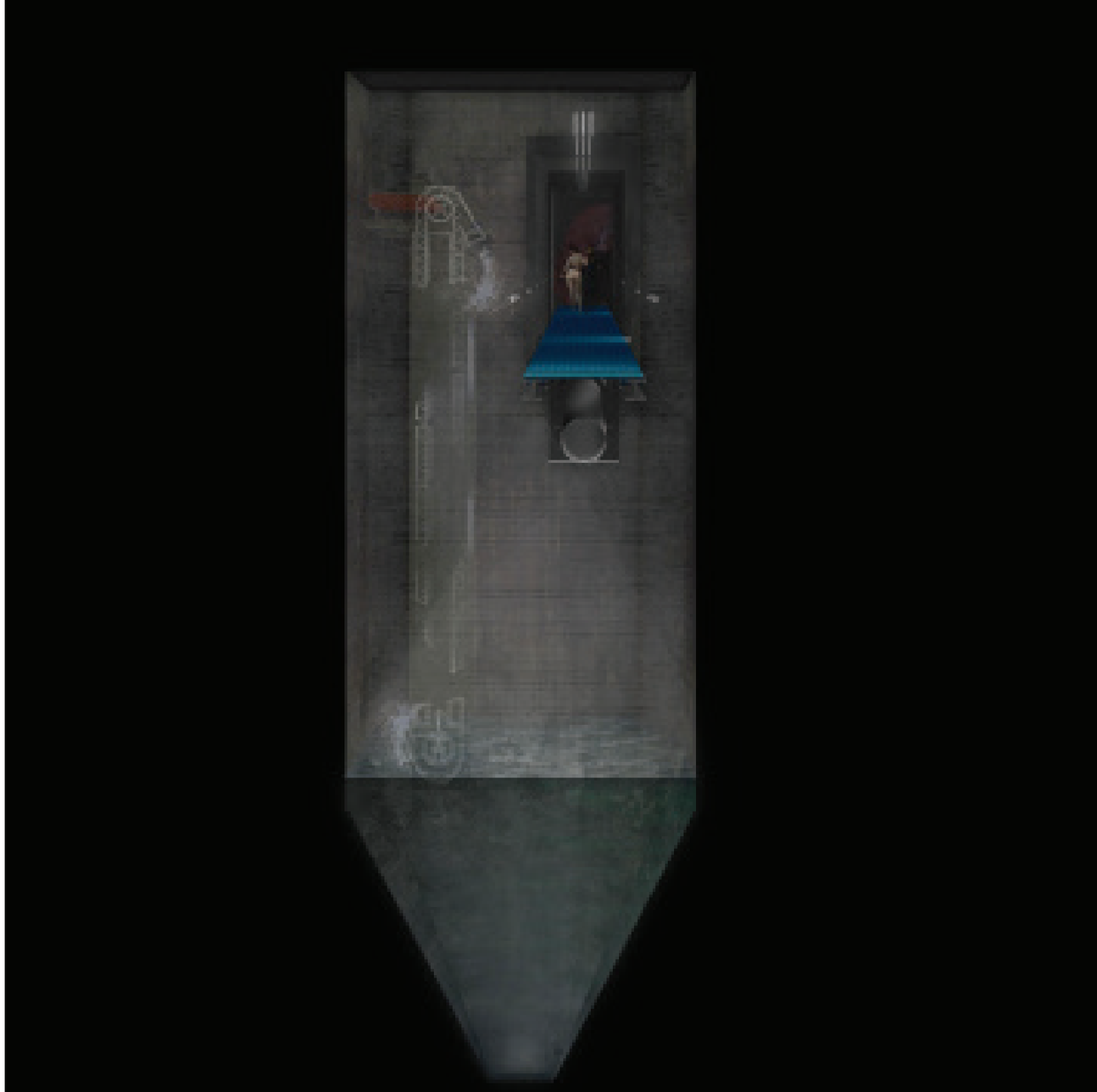


figure 27.
floorplan of fragment
rescaled from 1:50
(own illustration, 2017)

Maassilo as a machine
The Maassilo is a building that was constantly developed by the means of industrial advancements. In fact, the whole building is a result of industrial advancement.

If not for that, than also for the sake of sustainability this redesign should be an example of technological advancement as well.

I would like to think about the building as a machine. A machine that processes water, energy, people and products. Hence the building should also function as a machine.
On a structural, climatic, sustainable and spacial level the building follows a simple princple. The outer sides of the building are used as: structural loadbearing, climatic buffer, traffic zone and the placement of machinery *(figure 29)*.

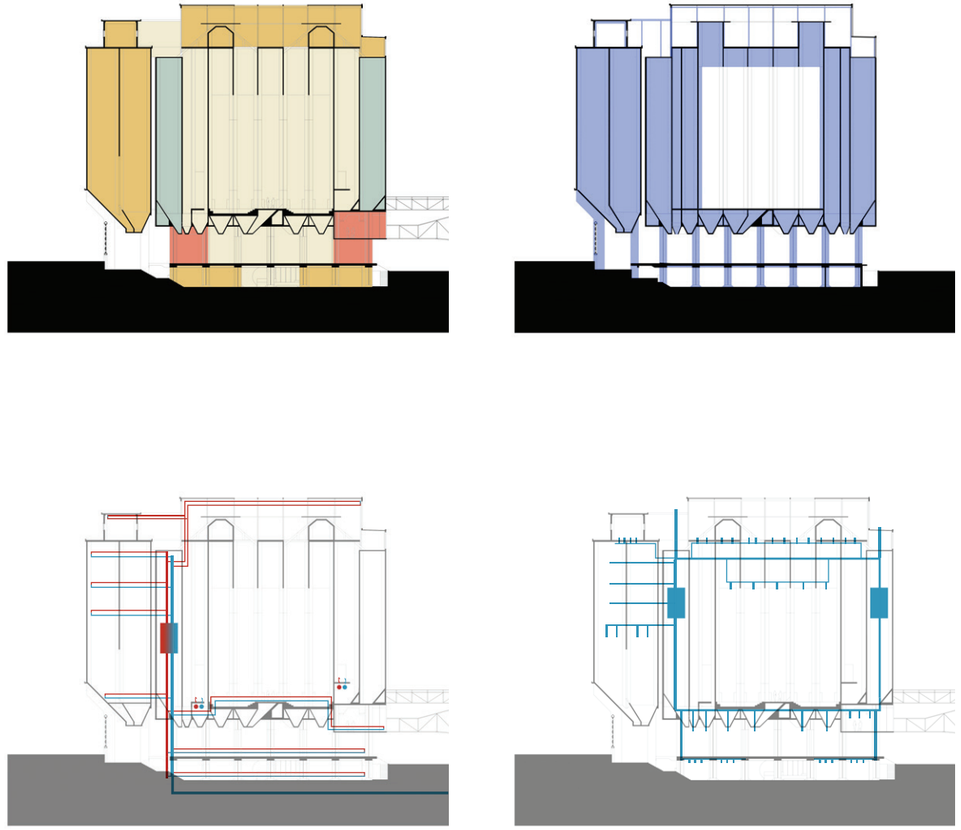


figure 29.
Maassilo as a machine
(own illustration, 2017)

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