HEMBRUG
Changeover zone

Niels Steverink
4626559
Neeladri Sarkar
4739337

19-05-2019
Heritage and Architecture
Delft Faculty of the build environment
Retake

TU Delft

Colofon

Students:
N. Steverink 4626559
N. Sarkar 4739337

Tutors:
Architecture:
Ir. W.L.E.C. Meijers
Ir. A. Marx

Building Technology:
Ir. F.W.A. Koopman
Ir. G. Warries

Cultural Value:
Dr.ir. C.I.C. van Emstede

Graduation Studio
Heritage and architecture
Revitalising Heritage
(2018/19 Q3)
Delft University of Technology

Index:

Introduction

In the Heritage and Architecture graduation studio, the old military industrial area of Hembrug will be renewed. The Hembrug complex is located on a peninsula in between the North Sea Canal and Zijkanaal G, a historically important position in the "Stelling van Amsterdam". To defend Amsterdam, the Stelling van Amsterdam was built around it. Many forts were constructed and defensive positions were reinforced. The Hembrug area was part of this large scale plan.

To ensure the defensive capabilities of the Stelling van Amsterdam could last for a long time without outside support, a military ammunition production site was required to create the products for the defence. This led to the search for a suitable area in which to build such a complex. With its great location and connections to the water, the Hembrug peninsula was the designated spot. Construction of the military complex, known as Artillerie Inrichtingen, started in 1897. The production of ammunition and artillery weaponry started in 1899 and lasted all the way up to 1944.

For the Heritage and Architecture graduation studio, the Hembrug area was divided into several ensembles based on the research report of the area made by Palmbout. After initial research and site visits, all student had to pick and ensemble they felt the strongest connection to. For us this was the Changeover zone Ensemble.

Ensemble choice:
In discussing why the both of us chose the Changeover zone as the ensemble we wanted to work on, we both stated a great interest in the diversity of buildings which are present. Although the ensemble is nearly all connected, several distinct buildings can still be recognised in the ensemble while the entire ensemble still makes a coherent whole. It also peaked our interest in how and why this diversity came to be. This led us to research the ensemble guided by the following question:

How and why did the Hembrug Changeover zone become such an architecturally diverse building ensemble?

Approach:
This question will be studied by researching several aspects of the ensemble. By looking at the history of the site and the buildings themselves, a clearer image of the physical evolution of the site will become apparent. By studying the functions, building physics and interbuilding connections, we can establish the reasons behind the evolution of the site.

Furthermore, we will research what is in the ensemble now. What buildings remain, how do they compare to each other, and what aspects of the original architecture and function remain? Based on the answers to these question, an architectural and cultural value assessment will be made to serve as a guide during the design phase.

1. Stelling van Amsterdam

After 1815, the Netherlands took a position of neutrality in Europe. Surrounded by powerful countries like Germany and France, the Dutch wanted to be independent. Part of that was a strong defense line and their own production of weaponry and ammunition. The New Dutch Waterline built in 1815 was part of the main defensive strategy of the country. This line protected the main western cities from enemy attacks from the south or east. De Stelling van Amsterdam was a part of this strategy and was meant to act as a last defensive line, to protect the capital and industrial centers.

The enemy was kept at a distance by putting the forecourt underwater, the so-called inundation. For a proper inundation, the water should be around 50 centimeters deep. This way it was too shallow for boats to cross, but too deep for soldiers to cross on foot. Fortifications were built along points where the soldiers could cross easier, such as dykes or railroads. These fortifications are indicated on the map in yellow. During the construction years, the amount of fortifications increased, however, not all planned forts were eventually built. The army assumed that with the Stelling as protection, they would be able to last for 6 months without support from the outside. The transfer of the Artillery Establishment to a location within the Stelling was sped up by the decision in 1889 to start using a new riffle, the M95. Because this type of riffle required a new type of cartridge, a new factory was needed. In Delft there was not enough space, so the military decided to build a new factory in Amsterdam and to move the Artillery Establishment there. The army had to choose between Hembrug, Delft and Oudekerk as the new location. Eventually the choice was for Hembrug because it was the only location within the Stelling van Amsterdam. This way the supply could not be cut off. At the same time Hembrug was far enough from the city of Amsterdam and Zaandam to be safe in case of any explosions related to the production.

After the use of airplanes during wartimes became more mainstream, the Stelling lost its original function. Nowadays, the old fortifications are mainly preserved and serve as tourist attractions or have been repurposed. The inundation planes have however been strongly affected by the further urbanization of the 'Randstad'. In 1995 the 'The New Dutch Waterline' was added to the Unesco World Heritage list and is an essential part of the Dutch military history. The history of the Stelling therefore lays the roots for the artillery establishment in Hembrug and the Changeover zone.

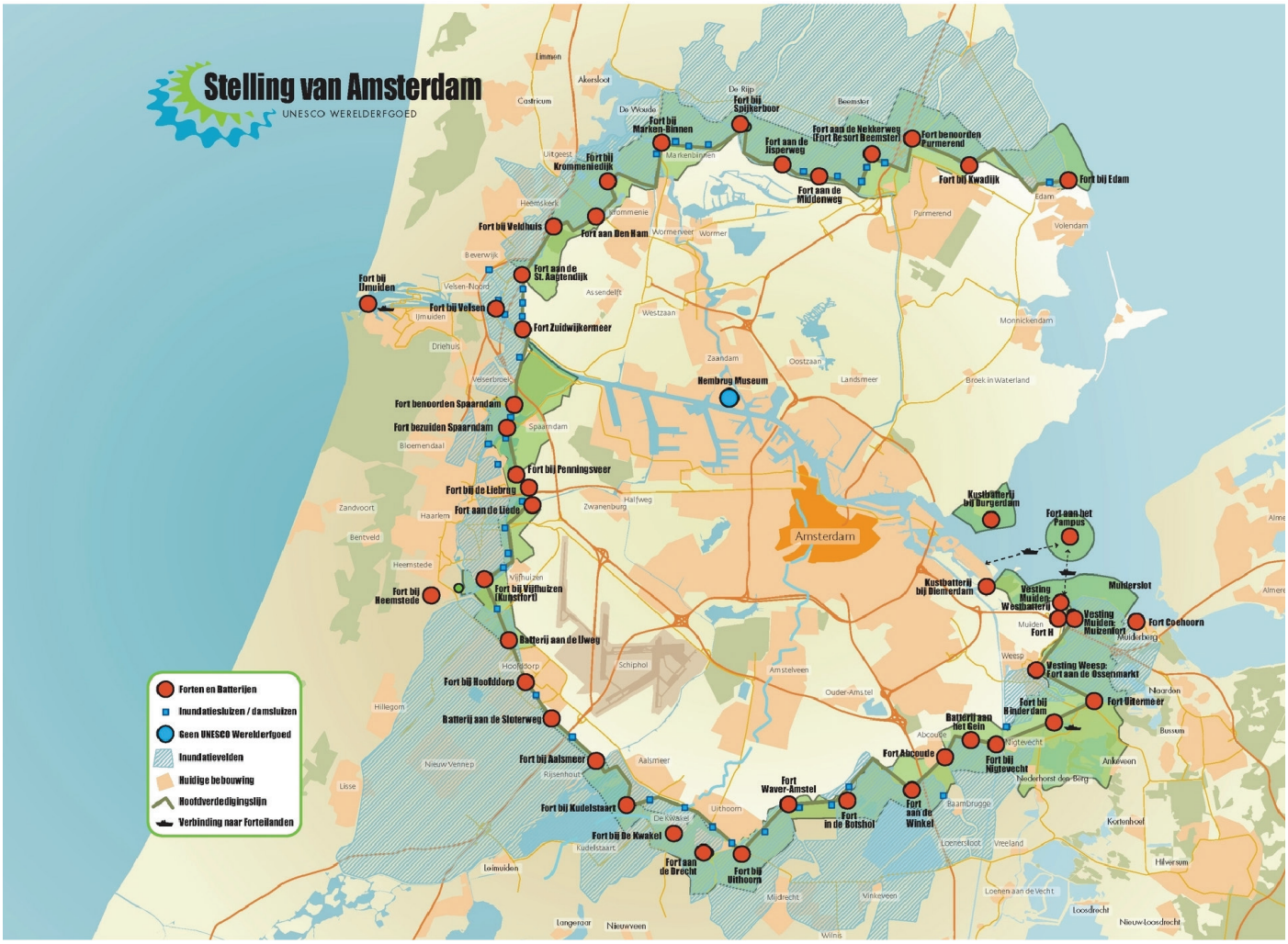


Figure 1: Stelling van Amsterdam
Image source: https://www.stellingvanamsterdam.nl/nl/meer-weten/stelling-van-amsterdam

2. Hembrug

What is relation of Hembrug to the diversity of the Change-over zone? To understand the diversity of the changeover zone it is important to first study the Hembrug area and what it was and what it is today and what is planned for it for the future. The Hembrug site is an area of 42.5 hectares on the border between Amsterdam and Zaandam. The name Hembrug refers to the former railway bridge across the North Sea Canal between Zaandam and Amsterdam. HEM is the historical name for land outside the dykes, in this case in the former IJ. After the construction of the North Sea Canal, this headland was raised and became available for use.

From 1895, behind high fences and strict security, the Artillery Establishment which had moved from Delft earlier, started producing firearms, artillery and ammunition for the Dutch army from 1895 onwards. The site had been carefully chosen within the 'Stelling of Amsterdam', and became the heart of this defense line with the factory providing the army with weapons and ammunition.

Over the years, a lot of extra buildings have been added and demolished on the site due to increase in production, decrease in production and a change in the goods being produced. Due to the function of the factory and the danger of explosions, the site has characteristic buildings such as those with the curved roofs that had to withstand a possible blast shockwave. The position of the buildings and the design of the outdoor space, such as the earthen embankments and the forest, were also aimed at limiting the damage in the event of an explosion. The result was a factory site that was quite unique in the Netherlands at the time.
The Hembrug site has a turbulent history. From workplace for 8500 people after the outbreak of the first world war to the occupation and almost destruction during the second. Production started again with the help of the Marshall Plan. The government then sold the site to two different companies in the 1970s with most of it going to Eurometaal. The company however closed its doors in 2003. Soon after due to the abandonment of the site, nature took over the unused site and the buildings fell into disrepair. Except for a couple of creative entrepreneurs who had found a temporary place there, the site was closed off from the outside world for years.

The first initiative to develop the abandoned site was taken in 2011 when 3 monumental buildings were renovated. The Central Government Real Estate Agency, which is the owner of the site, subsequently signed a cooperative agreement in 2012 with the Province of Noord-Holland and the municipality of Zaanstad. The aim was to give the site a fresh coat of life as a business park for creative and innovative entrepreneurs. The biggest change took place in January of 2014 when the gates opened to the public for the first time in history. As a result, various entrepreneurs now work in the renovated, industrial buildings and there are various events and festivals that take place every year. Since the opening in 2014, more and more of the area has been cleared for use and an aggressive future plan has been drawn of developing 1000 new homes and a creating a self-sustaining neighborhood in the Zaanstad to rejuvenate the site for the future which will eventually be part of the proposed Amsterdam extension.

2.1 Photo impressions

When visiting the Hembrug area, we experienced a lot of different atmospheres. Whereas the exterior in the build area is rough looking with its displaced concrete road structure, the Plofbos is a quiet, more serene setting. The interiors of the bunkers were dark and humid while some buildings were very light and airy. The architecture went from very large, modern, steel plain looking buildings to brickwork buildings with intricate details. From wooden frame structures to cast iron riveted constructions. This selection of photos is to introduce the area and the atmospheric diversity within the Hembrug area.

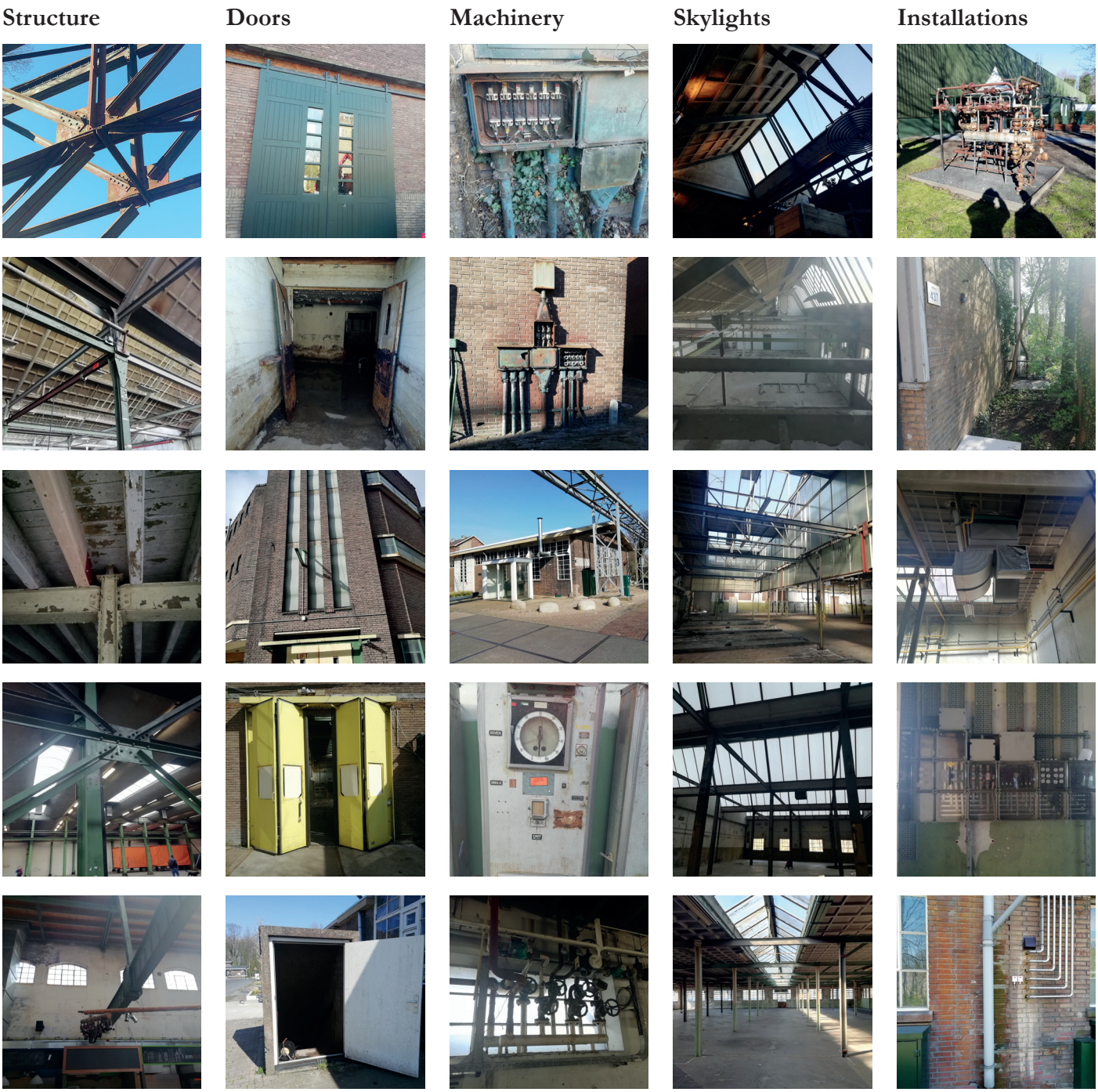


Figure 2: Impressions Hembrug
Image by: Niels Steverink

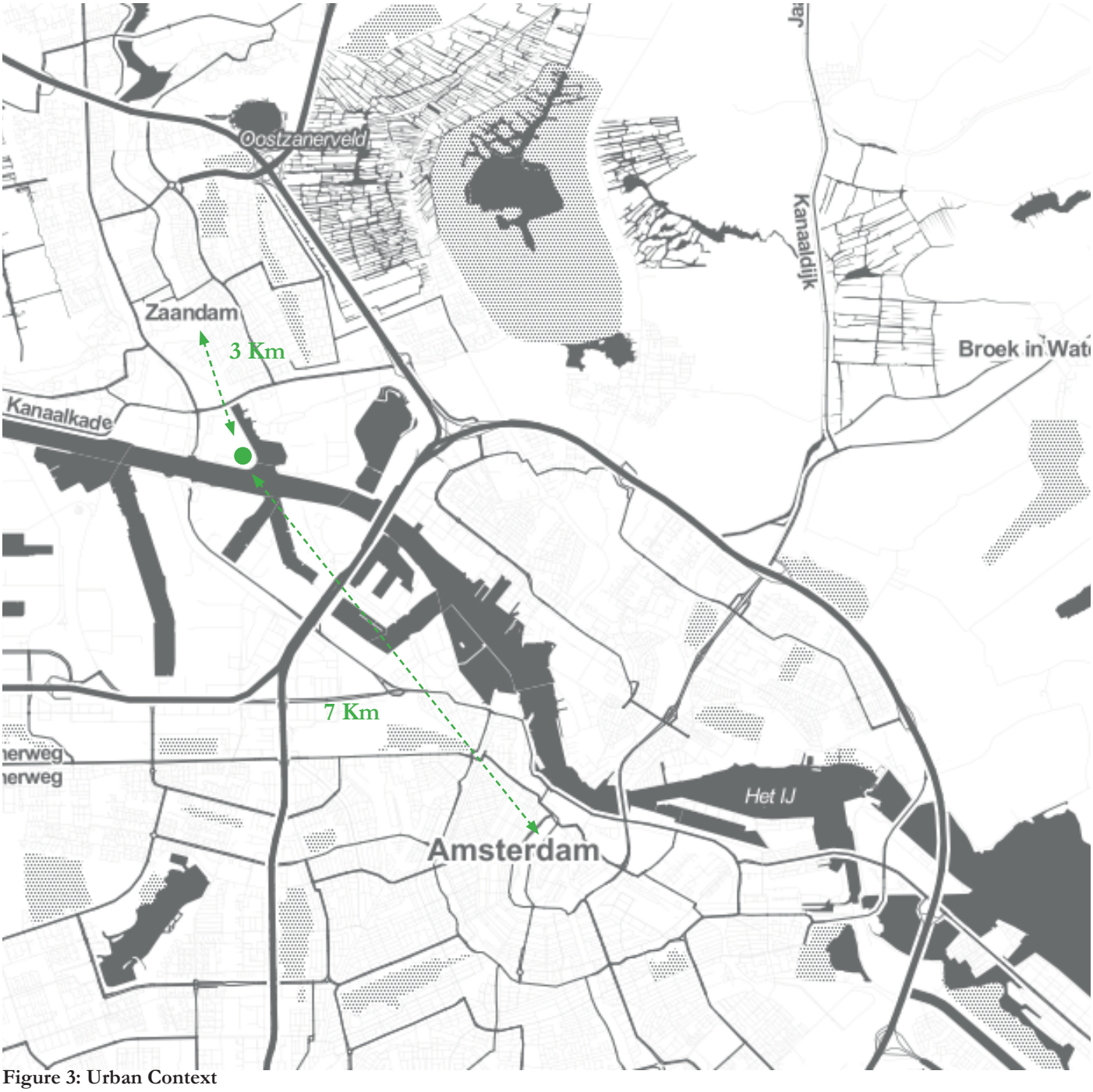


Figure 3: Urban Context
Image source: http://mapstack.stamen.com/

2.2 Urban Context

The Hembrug area is located on a peninsula between two canals. It lies in between the cities of Zaandam and Amsterdam, but if officially part of the Zaandam city area. The Zaandam city centre is located three kilometres away. The Amsterdam city centre is located seven kilometres away. Despite being so close to the two city centres, the area around Hembrug is very industrial and not currently a place with a lot of habitation. With the growing cities surrounding them, the industrial area will likely move and the area as a whole will also be redeveloped into urban areas. Hembrug is the first of such projects in this area.

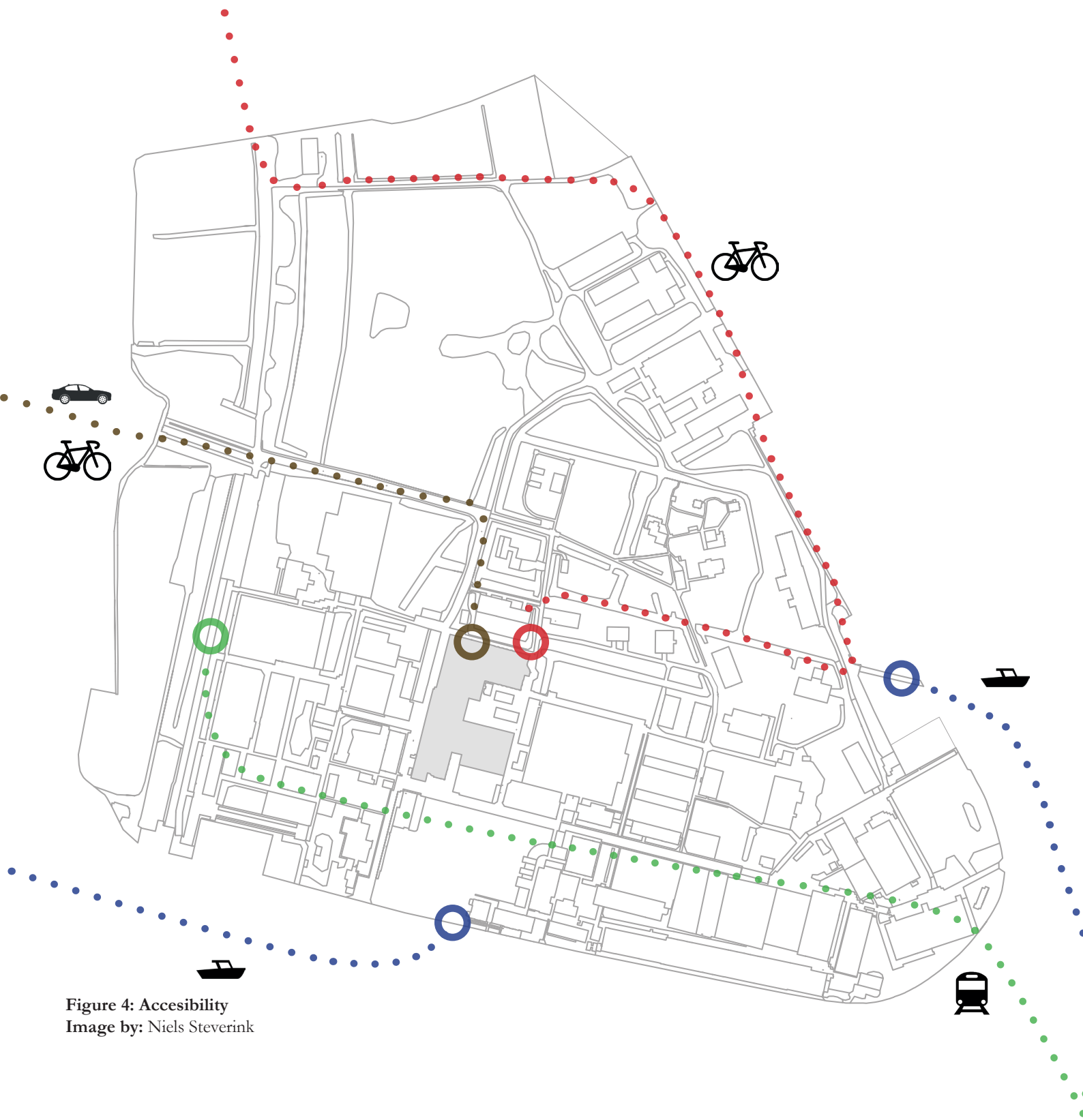


Figure 4: Accesibility
Image by: Niels Steverink

2.3 Accesibility

To reach Hembrug by public transportation, there is a bus station at Zaandam station with buses 65 and 67 connecting the Hembrug terrain every 30 minutes. A train connection also exists between Amsterdam central and Zaandam, passing through Sloterdijk. This railway is uses the Hemspoort tunnel to reach Zaandam. In terms of accessibility by car from the airport, Hembrug is well connected to Schiphol, by car; with 24-minute travel time by car. Connection also exists by water with the ferry coming from the other side (Amsterdam). There is a new connection to Hembrug proposed by road with het Twiske. New bike routes are also coming up from the North through the forest. The highlight of new proposed connections is the metro line from Amsterdam with a station in Hembrug.

2.4 Historical organisation of the Hembrug area

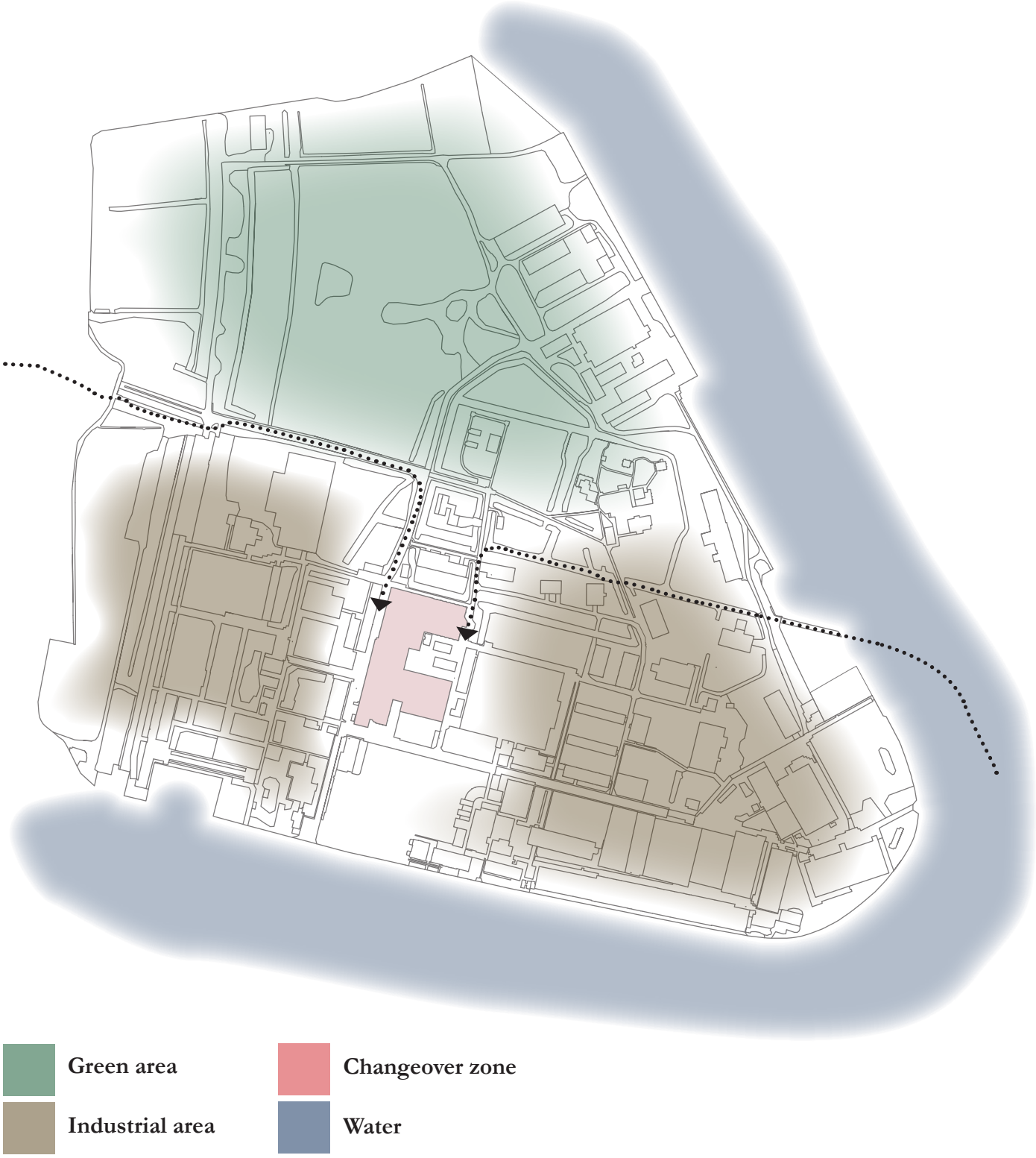


Figure 5: Historical organisation
Image by: Niels Steverink

The Changeover zone is located centrally within the Hembrug peninsula. The ensemble does not border either the water or a main road so one always has to enter the Hembrug area before being able to access the ensemble. The main entrance for cars, cyclists and pedestrians is located on the west side of the Hembrug area. The main entrance for people coming by boat is on the east side of the Hembrug area. Neither of these entrances has a direct road leading to the Changeover zone ensemble.

To the north of the Changeover zone is the Plofbos, the old storage and testing site of the former artillery base. This forest is now closed due to dangerous materials still being present and is therefore inaccessible.

To the east of the ensemble is the former ammunition factory of the military complex. The buildings of this area are some of the largest buildings within Hembrug. To the west of the ensemble is the former weapons factory. These buildings are comparatively sized to the buildings of the Changeover zone. South of the ensemble is a large parking lot and almost no buildings. From this side, one can see the water and the modern industrial area located on the other side of the river.

3. Changeover zone within Hembrug

In this report we will analyse the Changeover zone ensemble, which will be referred to simply as: The ensemble. The name of Changeover zone refers to the historic function of the ensemble.

This chapter will be made under guidance of the following question: **How does and did the Changeover zone fit within the Hembrug area?**

To research how the Changeover zone came to be, a study has been made into the timeline of the ensemble and the ways in which it used to function. Seeing the growth of the ensemble will provide information on the order in which the buildings were made, which is critical in determining how future connections between the buildings came to be. Within the timeline, the why behind the expansion and shrinking of the ensemble will be studied to get an understanding of each building's place in time, which will be critical in valueing both the individual buildings and the ensemble as a whole.

3.1 First impressions Niels Steverink

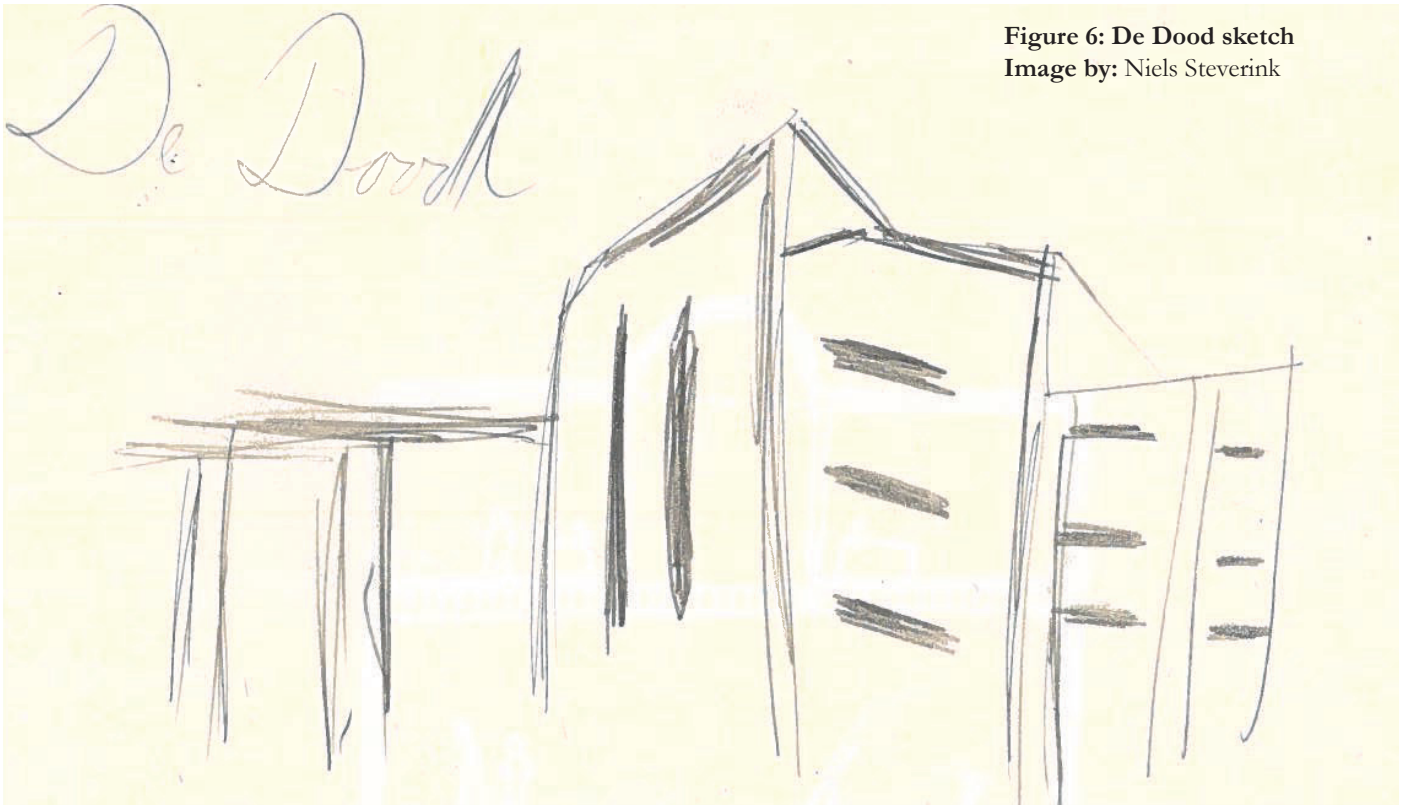


Figure 6: De Dood sketch
Image by: Niels Steverink

De Dood, when first visiting the Hembrug Ensemble, was the building which had the most impact on me. Especially the authotative tower at the front of the building is the style of architecture I enjoy making and visiting.

Another element I found to be very interesting when first visiting the site, was the wear and patina every building had which can only be achieved by being abandoned for a long time.

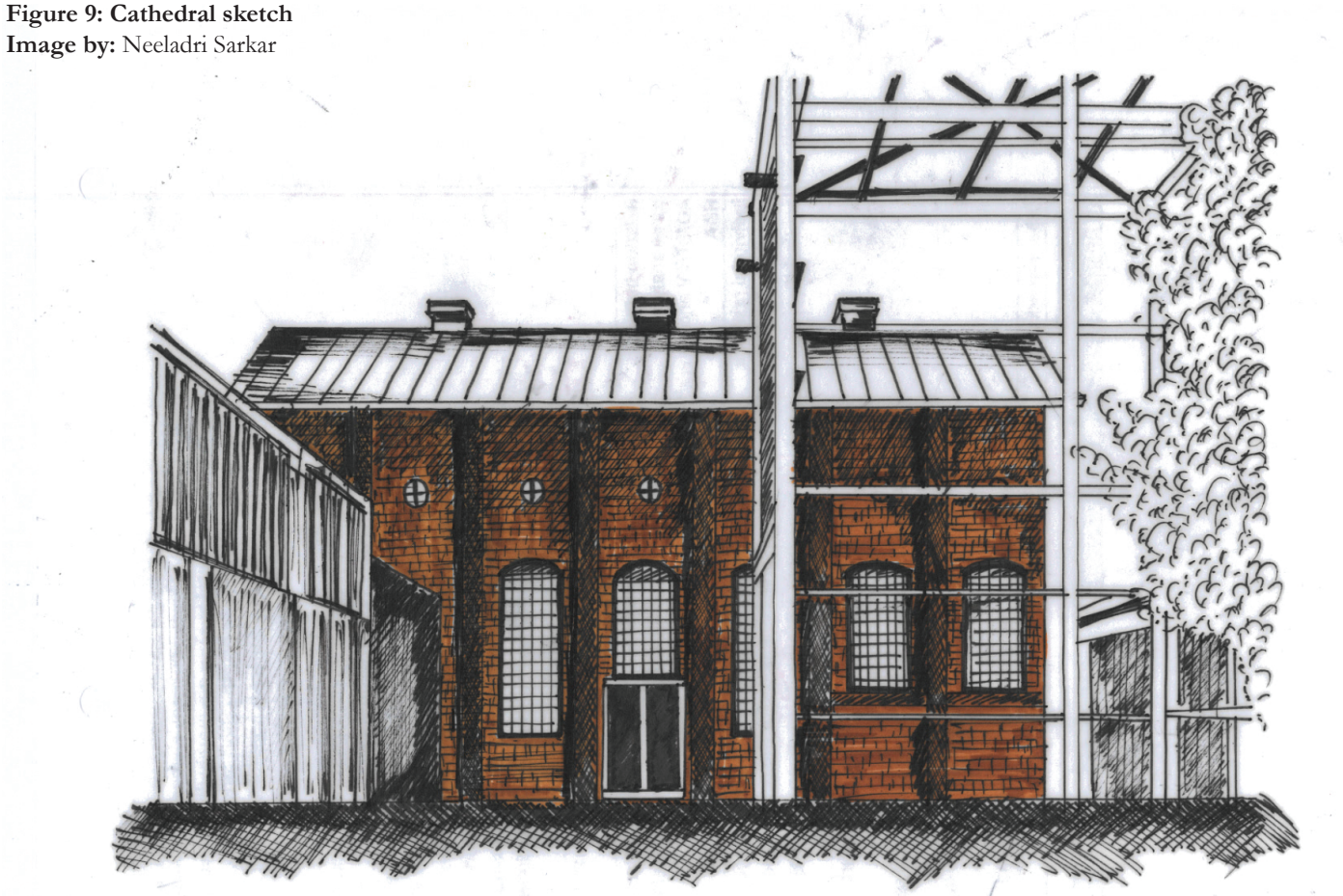
Figure 7: Doorhandel
Image by: Niels Steverink

The very visible, strong industrial constructions were my favourite element during the first visit. They show that the buildings were made to be highly functional and strong.

Figure 8: Connections
Image by: Niels Steverink

3.2 First impressions Neeladri Sarkar

Figure 9: Cathedral sketch
Image by: Neeladri Sarkar



The first thing that caught my mind was the façade of the cathedral building. Not just its open plan and high ceiling that make it feel like a 'cathedral' but also the tall windows and very beautiful rhythm on the façade make it the most attractive building in the ensemble.

Another distinct element that is hard to miss are the old steam line supporting structure that runs along the historic East-West axis. It is a municipal monument and remind us of the past function of Hembrug.

Figure 10: Cathedral cieling
Image by: Neeladri Sarkar

Going back to the Cathedral, the moving crane structure is hard to miss as it is so massive and is supported by the protruding buttresses on the inside of the façade and this structure also enriches the spirit of the place for the Cathedral building.

Figure 11: Exterior
Image by: Neeladri Sarkar

3.3 Buildings in the ensemble

The ensemble used to house the cartridge factory. With its central location between the ammunition and the weapons factory, a lot of the transport used to run through this area and was to be "changed over" to the other parties or storage as all three production sections worked independently of each other. This was due to the high importance of security and secrecy surrounding the production of weaponry.

The ensemble consist of a large array of buildings and some open areas between them. Within the area, we identify ten buildings as numbered in the image. Each building has been given a name based on the currently known name or the former function of the building.

29 "Clean 2 Antartica"
294 "Yada Yada"
91 "Water treatment"
322 "Art Zaanstad"
112 "The Cathedral"
330 "Draaierij"
269 "Dood"
407 "Gloeierij"
437 "Werkplaats"

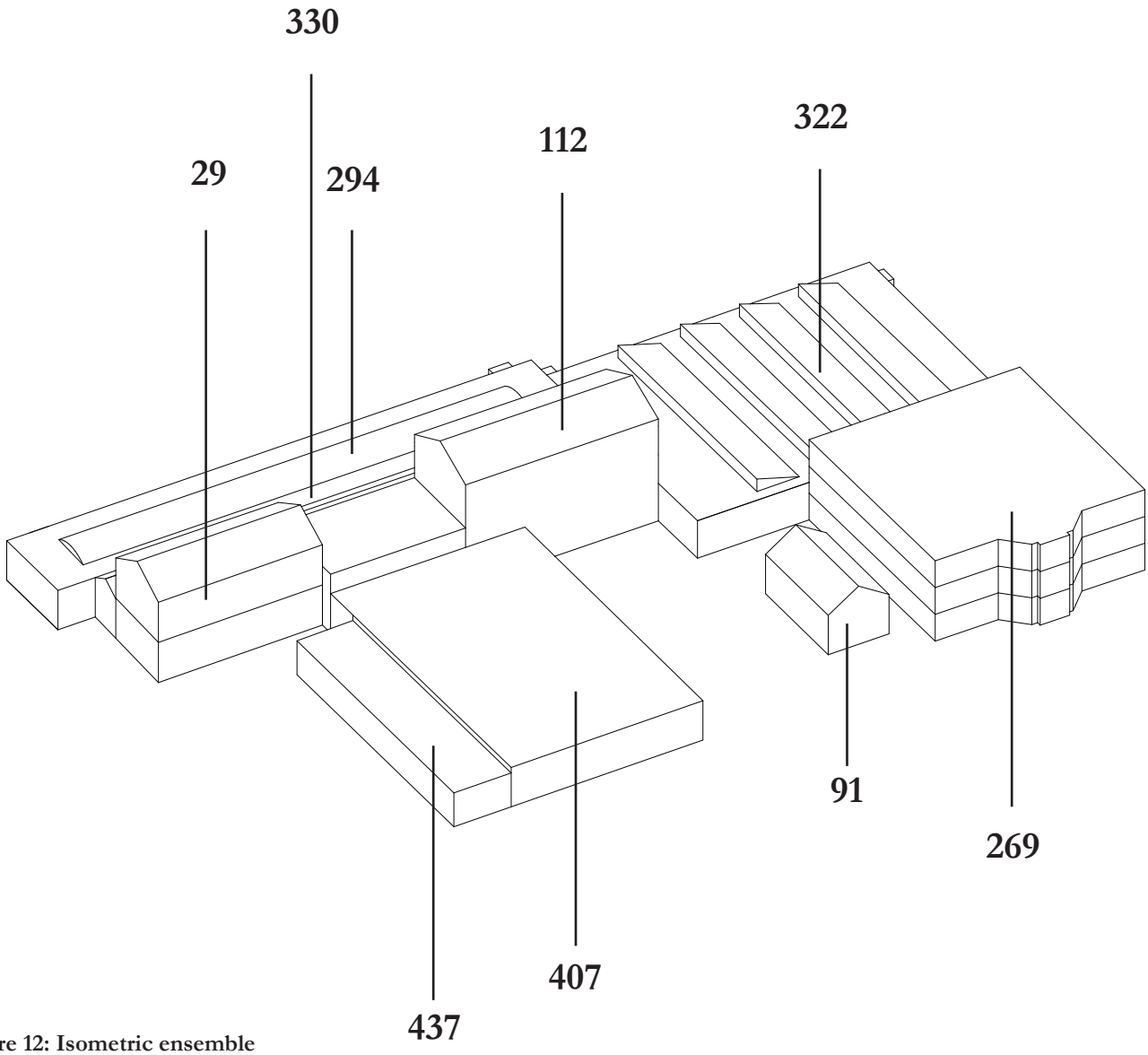
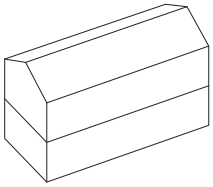
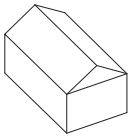


Figure 12: Isometric ensemble
Image by: Neeladri Sarkar

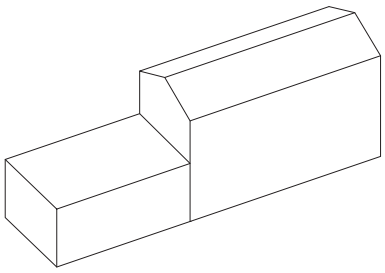
29 “Clean 2 Antartica”



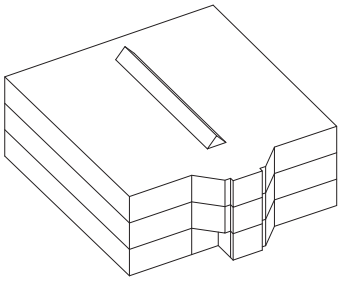
91 “Water treatment”



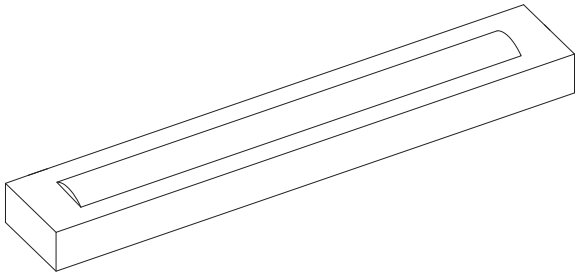
112 “The Cathedral”



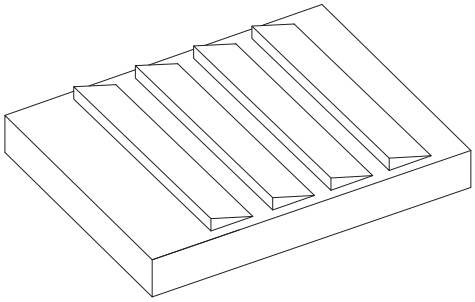
269 “Dood”



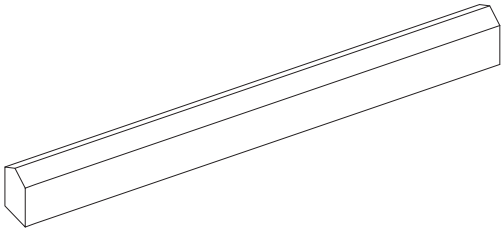
294 “Yada Yada”



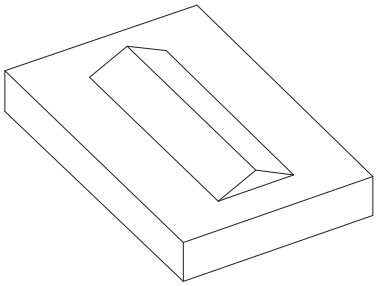
322 “Art Zaanstad”



330



407 “Gloeierij”



437

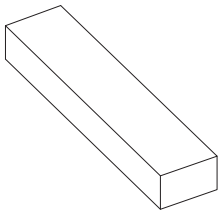
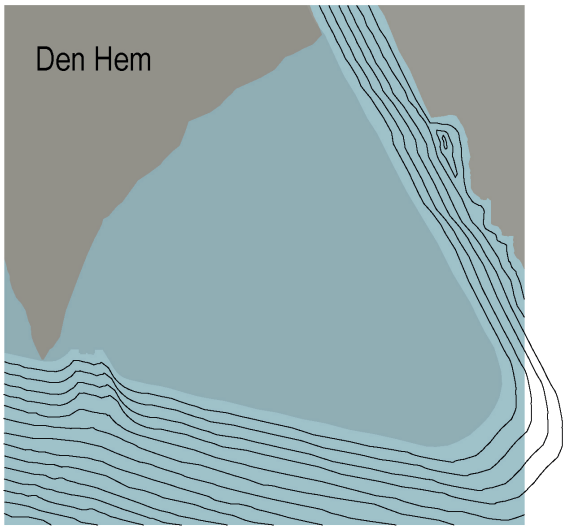


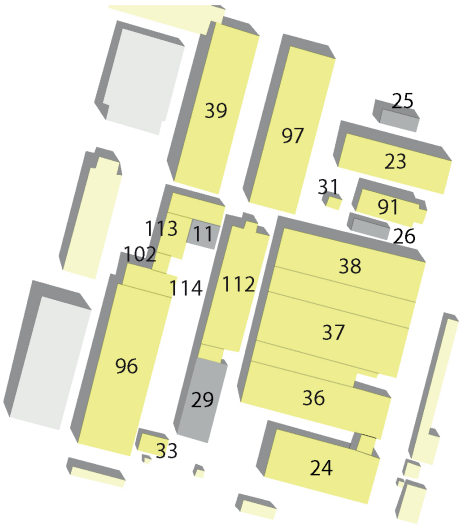
Figure 13: Isometric ensemble individual
Image by: Niels Steverink

3.4 Timeline

1882: The site was originally part of the Den Hem neighborhood and was reclaimed from the North sea canal in the 1880's for storage purposes.



1924: Fresh after WW1, the site was growing extensively with the maximum number of buildings made and the maximum number of people to have ever worked on the site. A lot of the buildings were relocated to this site and new warehouses came up as well as shooting ranges.



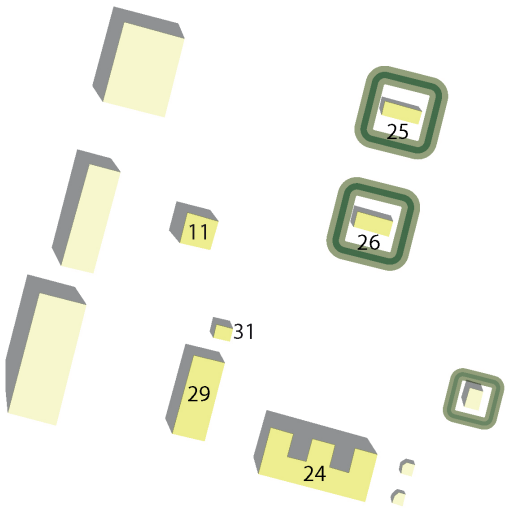
1882

1901

1924

New Buildings

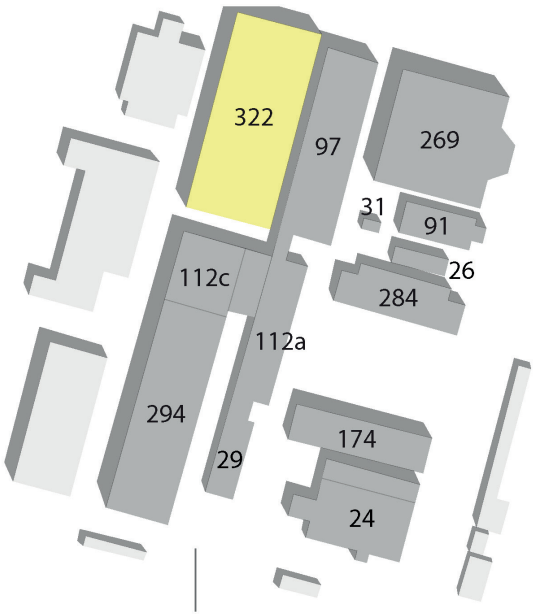
Existing Buildings



1901: When the area had just started functioning as the artillery establishment, most of the buildings in the Changeover zone were either warehouses for ammunition or a production building.

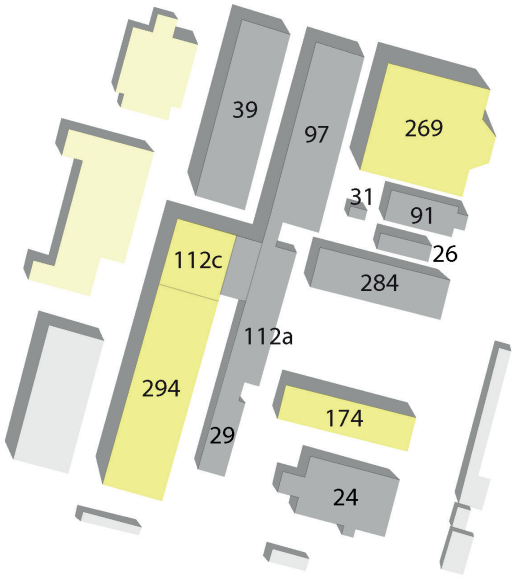
Figure 14: Timeline
Image by: Neeladri Sarkar

1936: Production had gone down after WW1 and the facilities were not used as much, hence expansion had stopped and more of the existing buildings and warehouses were upgraded or rebuilt.



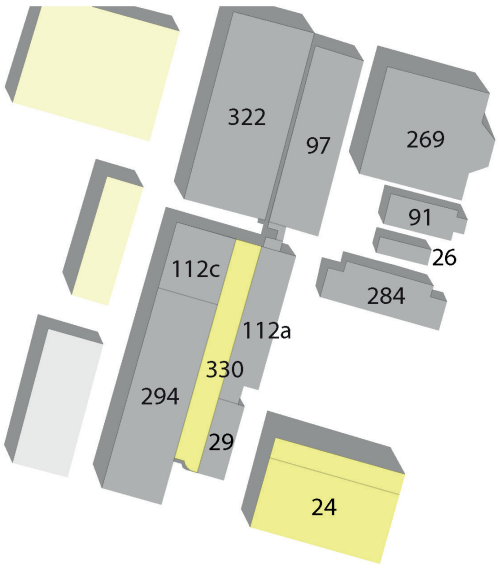
1936

1931



1931: As more weapons and ammunitions were being developed and manufactured here during the 1920s and 1930s, more storage was required and as a result more warehouses came up on this site.

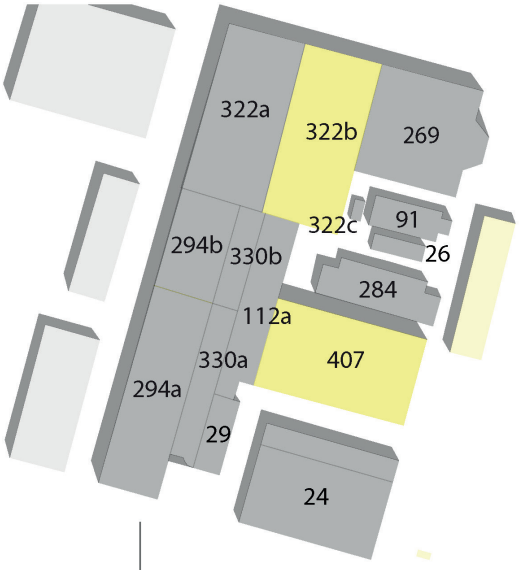
1941

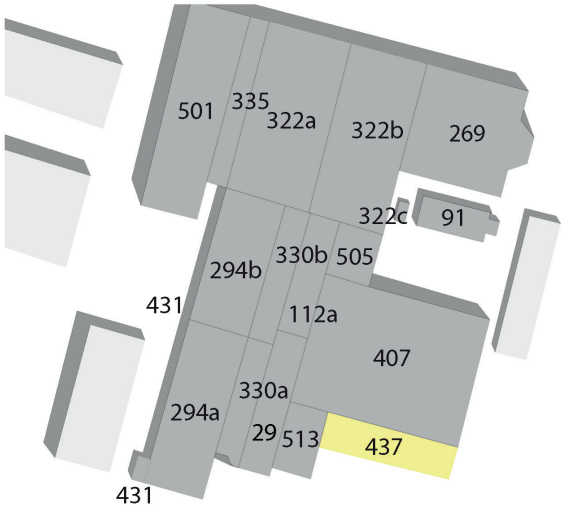


1941: During WW2, the Netherlands were under German ccupation and weapons and supplies were made for the Germans. Hence a few new buildings were built on site for more storage purposes.

1963: During the Post War era, the establishment was still in use as it served to produce weapons and ammunitions for various wars, especially the cold war.

2010: In 2010 the government decided to redevelop it to give it a new function and sell it to a company to preserve its historic characteristics but give it a new identity.



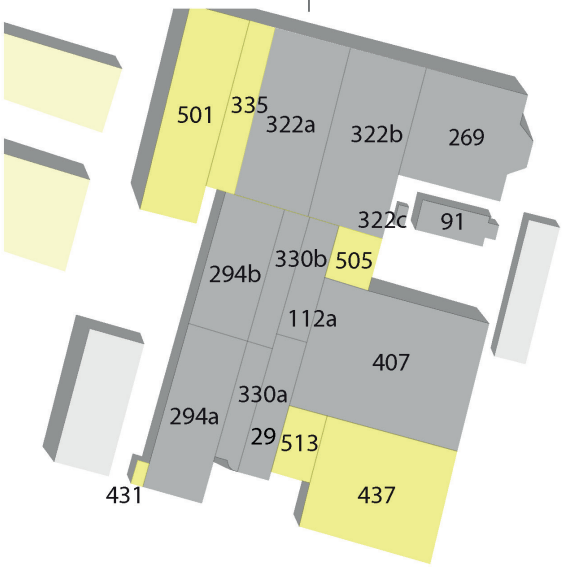


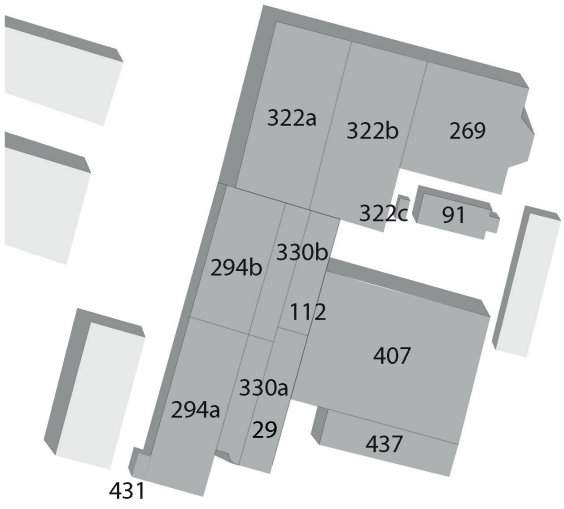
1963

2010

1996

Present





1996: After the site was divided into two in the 1970s, Eurometaal continued its production of weaponry in small scale and the other company made agricultural machines on the site.

Present: Many buildings that were of no value to the government were demolished and the site was cleaned after 2010 to make it more attractive to potential developers.

The timeline showing the development of the spatial characteristics of the Changeover zone ensemble is a key to understanding how this ensemble became so diverse over time. The constant addition of new buildings in the early 1900s, the densification of the area due to a lack of space in 1930s, the removal of buildings not needed functionally anymore in the 1990s and then finally the removal of buildings to increase the cultural value of the ensemble in 2010 all were important in shaping the ensemble like it is today.

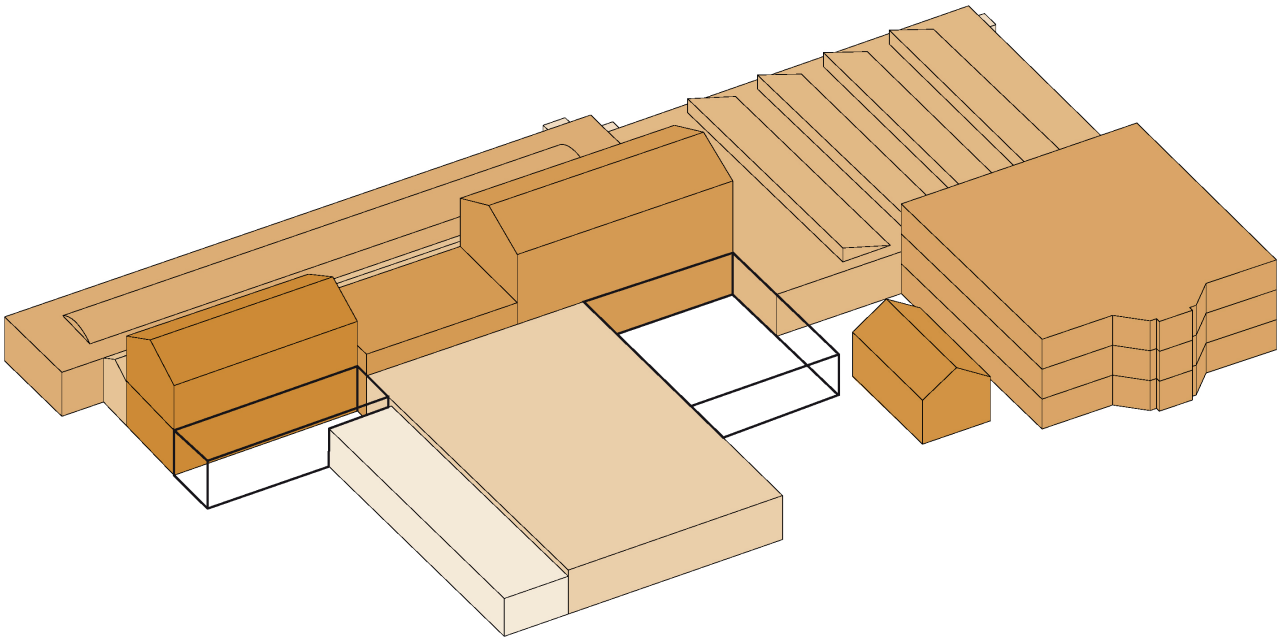


Figure 15: Chronomap timeline
Image by: Neeladri Sarkar

Looking at the building ages, we can see that a couple of buildings from every major development phase has survived in the ensemble and help in adding multiple historical time layers to this area. Remnants from past building which have been removed also enrich the ensemble. A lot of the diversity in the building ensemble comes from the fact that each building was built for a specific function in the cartridge production process. Since each of those functions were different, the buildings that were built also differed adding the diverse characteristic of this ensemble.

- Building 29 (1900s)
- Building 91 (1920s)
- Building 112 (1920s)
- Building 269 (early 1930s)
- Building 294 (early 1930s)
- Building 322A/B (mid 1930s)
- Building 330 (1940s)
- Building 407 (1960s)
- Building 431 (1990s)
- Building 437 (1990s)
- Demolished Buildings

3.5 Position of the Ensemble

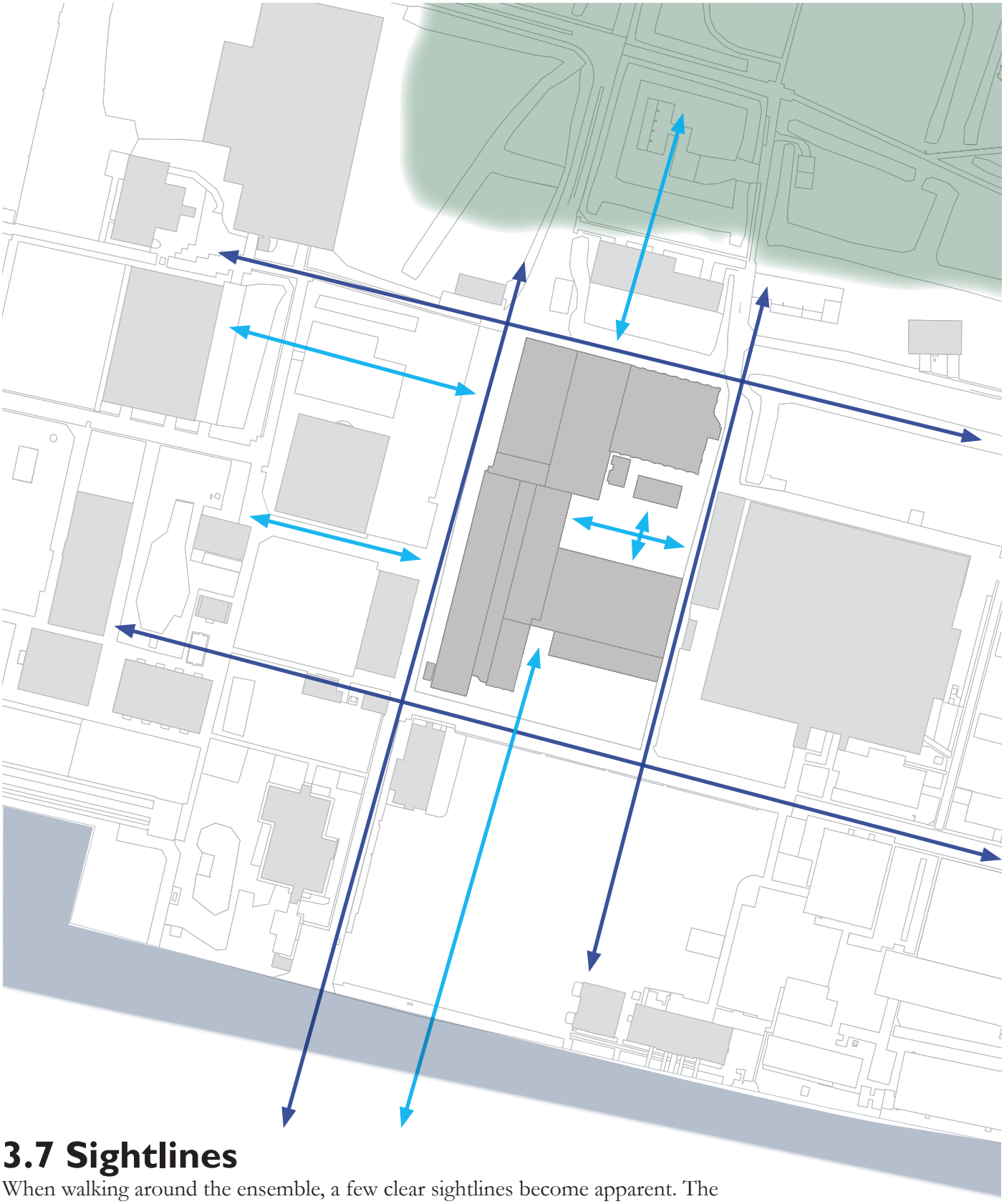
The ensemble is very centrally located within the Hembrug area. Geographically it is on the south side of Hembrug but strategically it is very centred. The ensemble forms the bridge between the Plofbos and the canal from north to south and forms the connection between the former weapons and munition factory's from west to east.

Figure 16: Position
Image by: Niels Steverink

3.6 Place in composition

The composition of Hembrug is a crude grid. Perpendicular and parallel roads are everywhere, with the exception of the bicycle path on the North east side. The Changeover zone facades follow this grid structure. The ensemble almost fills one square of the grid.

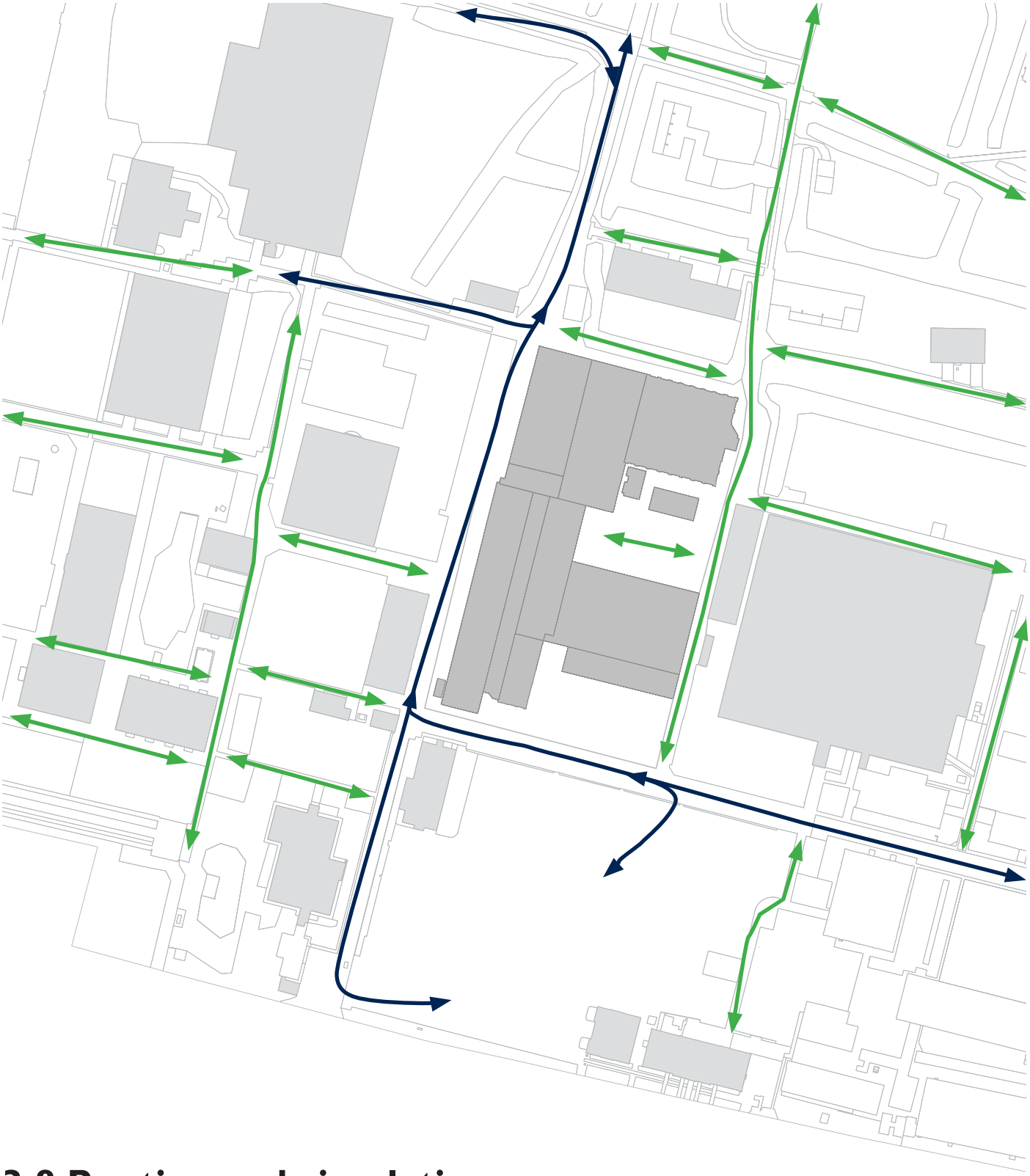
Figure 17: Composition
Image by: Niels Steverink



3.7 Sightlines

When walking around the ensemble, a few clear sightlines become apparent. The sightlines along the facades follow the grid structure of the roads around the ensemble. On the east sides, most views are blocked by the large building on the side. The long sightlines along the entire ensemble add to the feeling of its scale. These 4 sightlines are the main sightlines along the ensemble. There are also sightlines towards the water from the south side of the façade and towards the forest on the north side. The openness on the south of course gives a more open an free feeling than the sightline towards the dense Plofbos, which can make the ensemble feel more enclosed and protected. On the west, a gradual connection to the other structures are made by the sightlines again following the road structure.

Figure 18: Sightlines
Image by: Niels Steverink



3.8 Routing and circulation

The ensemble is accessible by vehicles and on foot on the south and the west side. This is the vehicle route leading from the entrance to the tip of the peninsula. The north and east side are only accessible on foot. All routes do pass by the ensemble, none go through. The only direct connection to the routing without entering a building within the ensemble is on the east side, where pedestrians can access the little square between the buildings.

Figure 19: Circulation
Image by: Niels Steverink

4. Architecture and technology of the Changeover zone

As became visible trough the historic analysis, the Changeover zone ensemble is a multi-decade, grown together building cluster. The ensemble is almost fully connected to each other, and therefore forms a single mass. While the individual buildings remain visible within the larger scale, this section will analyse the entire ensemble as a unit and research how it fits within Hembrug on the ensemble scale. This will provide insight into the impact of the ensemble on its surroundings and vice versa. Important characteristics of the entire ensemble might not be specific to one building and care has to be taken to not remove or alter such larger elements. Also, the spaces between buildings have great architectural value, but are not linked to any of the buildings within the ensemble specifically.

Throughout the years, the buildings have been connected not only architecturally, but also technologically. Systems and installation have been joined and in some places even constructions have been stuck to each other. How and why these connections of technical elements have been made creates and important oversight of the way the ensemble has been build.

This chapter will search for an answer to the question: **What is the current architecture of the ensemble and does this fit within Hembrug?**

4.1 Entrances and interior circulation

All the buildings in the Ensemble are connected to each other in one way or another. They have direct access to each other from within or they touch each other, or they have a technical element which connects them.

In buildings 294 and 330 for example, an open connection can be seen, with their mutual load-bearing structure. The connection between the Cathedral and building 322 is present but closed. The 'dood' (269) is also connected with building 322.

The diversity of the buildings in the ensemble not only lies in the different types of buildings and their details but also lies in the varied kinds of connections between the buildings.

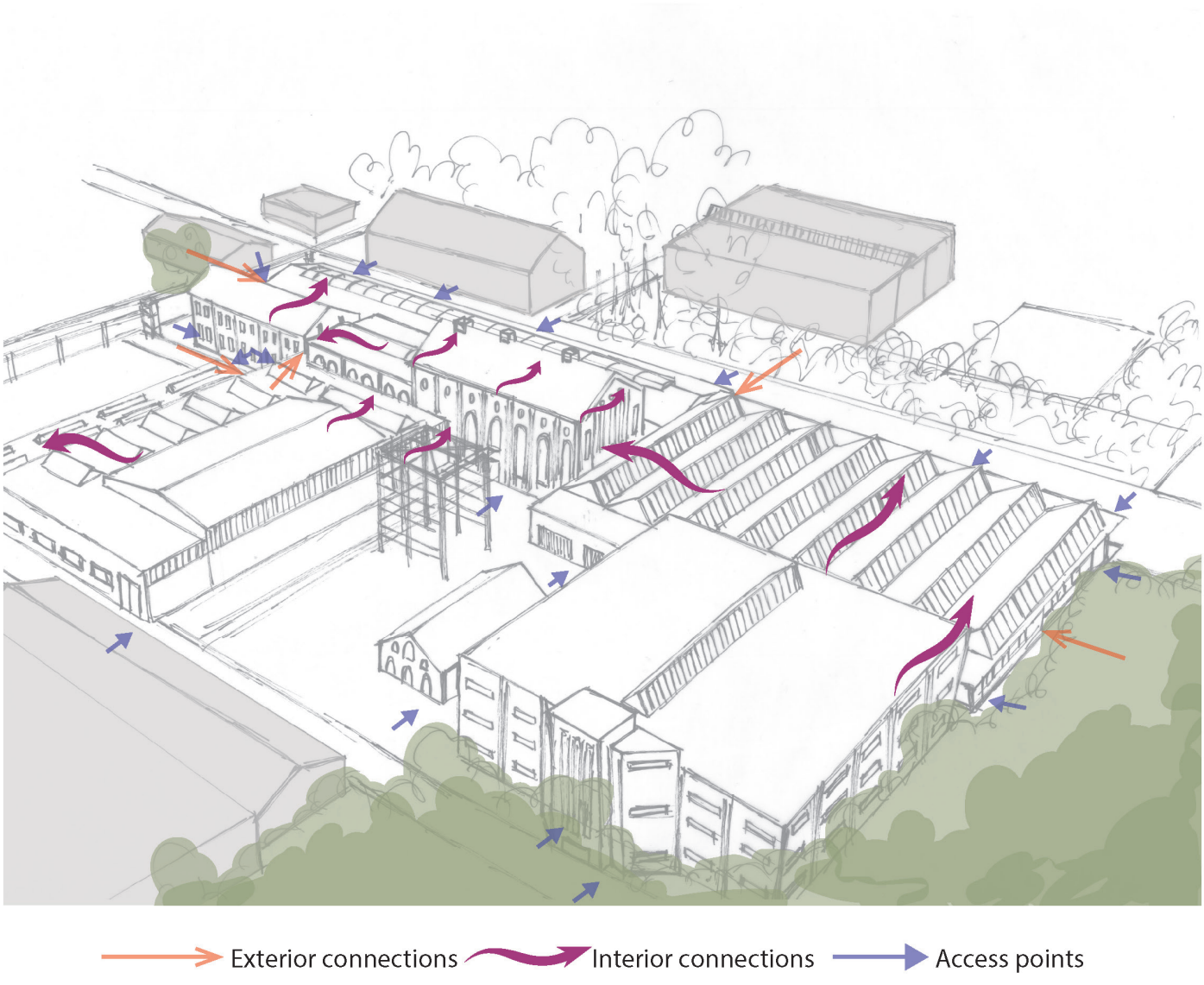


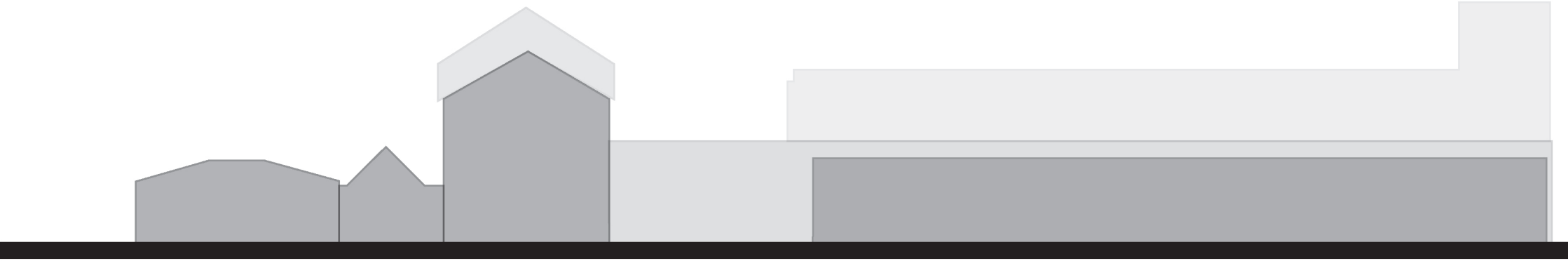
Figure 19: Entrances and interior circulation
Image by: Neeladri Sarkar

4.2 Mass and scale of the ensemble

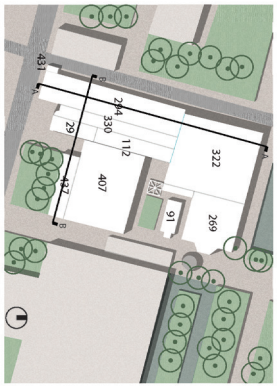
The ensemble is relatively large compared to its neighbours. North of the ensemble is the plofbof. While quite dense, it does not form a solid mass and only small building can be see within. This is very different to the all building no green, large Changeover zone. East of the ensemble is the large modern hall. The most massive building by far in the Hembrug peninsula. However, it is still one building. It is slightly smaller than the entirety of the Changeover zone, but when visiting the site it does feel massive and has a much more individual presence than the buildings in the Changeover zone. To the south of the ensemble is a massive parking lot. This is the most "free" side the ensemble has. On the west side of the ensemble, many large buildings can be found. They are however nearly all free standing in large open spaces and therefore form less of a relative mass compared to the ensemble.

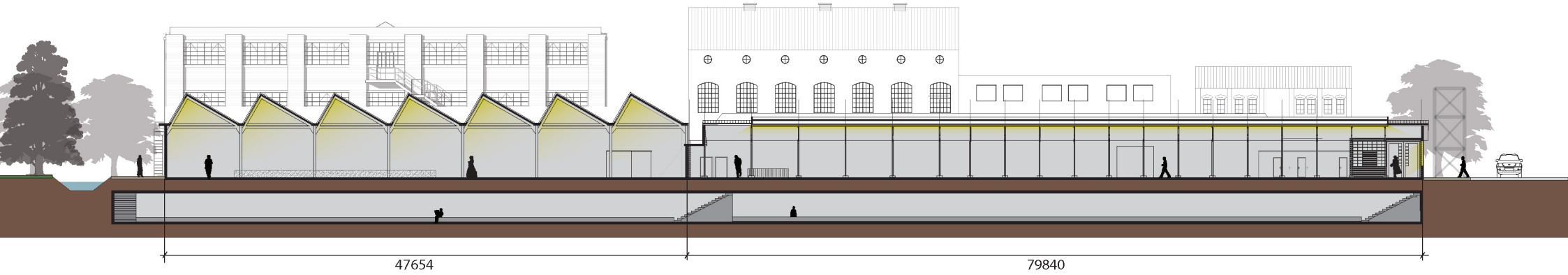
Figure 20: Mass and scale
Image by: Niels Steverink

B. North Section
Scale 1:200



Massing from the South





A. East Section
Scale 1:200

Massing from the West

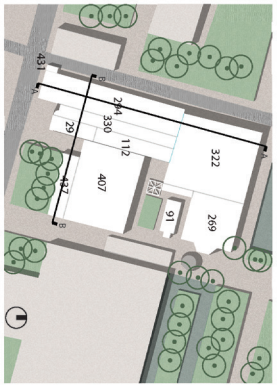


Figure 21: Section entire ensemble
Image by: Neeladri Sarkar

4.3 Border analysis

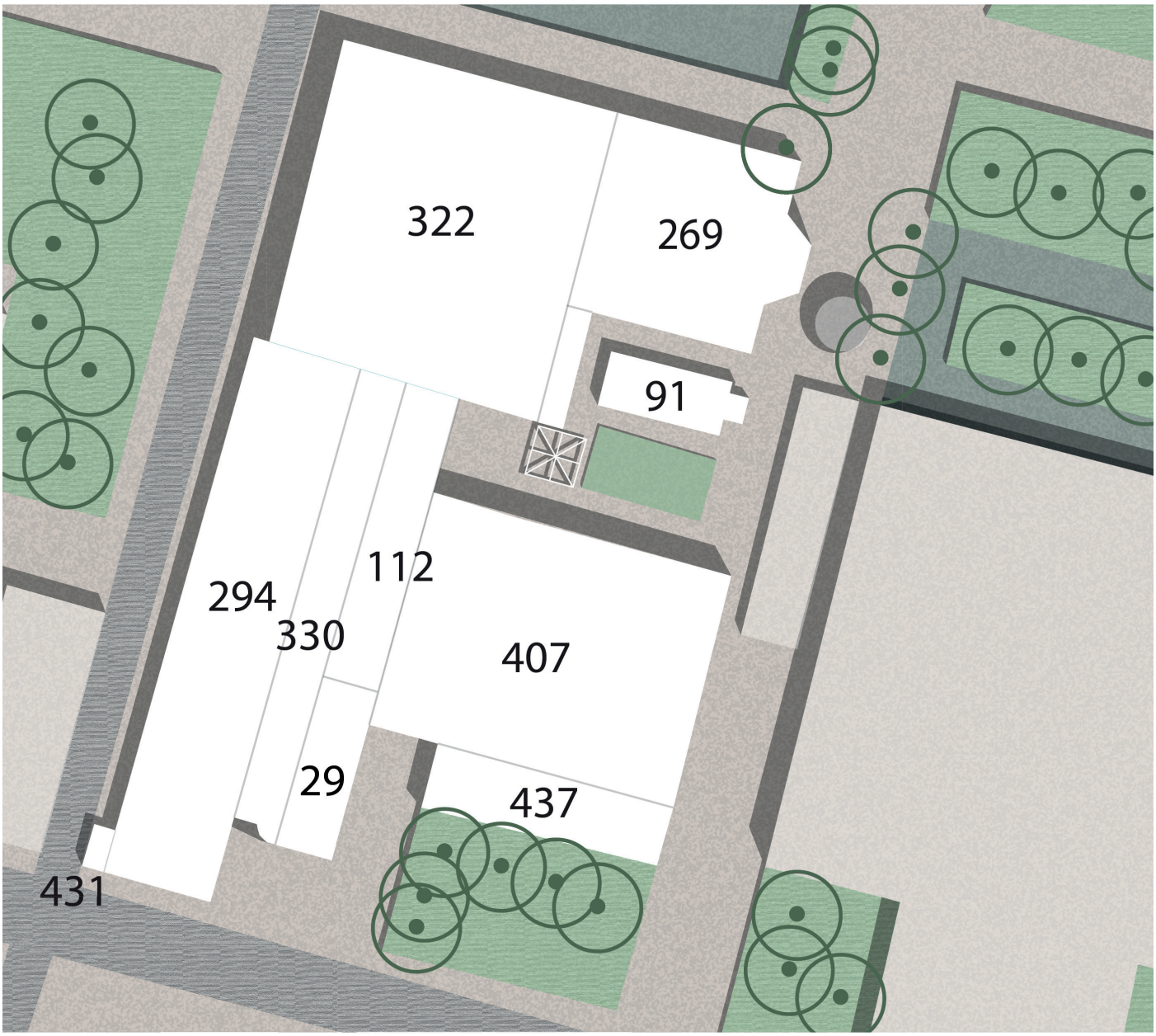


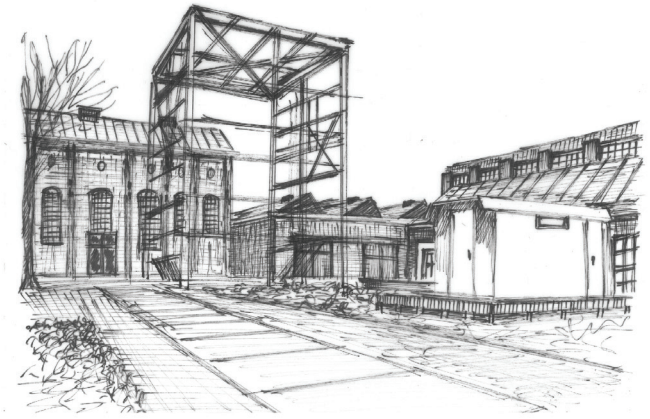
Figure 22: Border analysis
Image by: Neeladri Sarkar

North
The north side of the ensemble borders the Plots in the Wood ensemble and therefore has a green view. Next to the facade is a small path with water next to that. After the water, which serves as a boundry between the ensemble and the area behind, the Plofbos is located.

The north facade is flat and has no official entrances, only emergency exits. The two buildings that face this side re both oriented to the facde at its side.

East
The east facade is largely blocked by a large event hall. Only the street is in between the ensemble and the blind facade of the events venue. 269, De Dood, has views towards the Plots in the wood ensemble.

The east facade of the ensemble is very scattered and has many different depths relative to the street. The two protruding facades create a kind of square in the middle of the ensemble, making this side inviting. All building can be clearly individually identified based on their outlines, which helps in breaking up the size of the ensemble.



South
The south facade faces the large parking lot for the events venue. This open square borders the water on the other side. This makes this direction the only in our ensemble direction with a direct sightline to the water.

The south facade has several entrances and is quite scattered which helps in allowing the identification of the different buildings and helps in breaking up the size of the facade.

West
The west facade faces several buildings and greenery. This is much more open and accessible than the space in front of the other facades and has room for new ideas and projects. It also is the direction of the current entrance to the Hembrug terrain.

The west facade is relatively flat and has few distinct features to identify the different buildings. Is it the largest of the 4 facades, which combined with the flatness increases the feeling of large size.

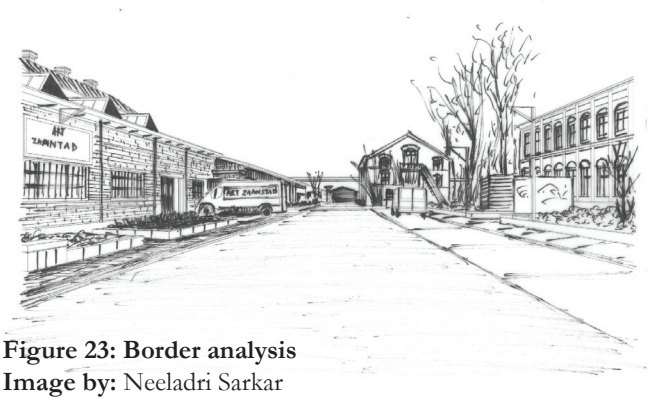


Figure 23: Border analysis
Image by: Neeladri Sarkar

4.4 Walking along the ensemble

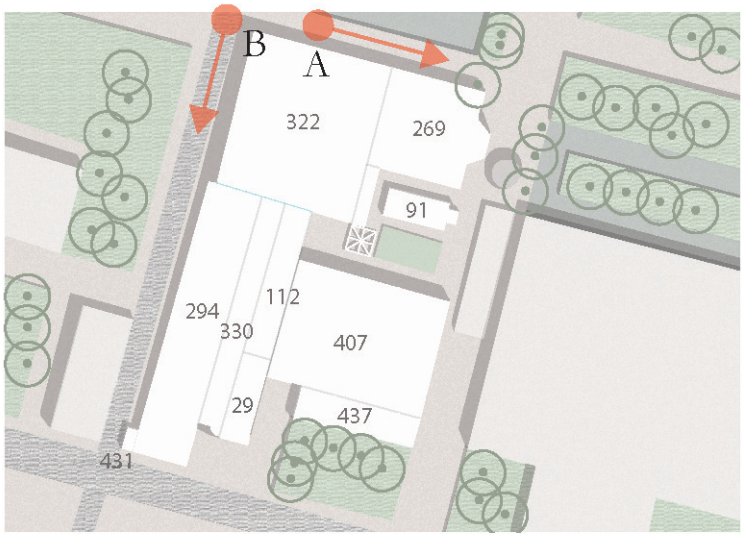


Figure 23: Walking map
Image by: Neeladri Sarkar

This image shows the alley (for pedestrians) that is situated on the North of the ensemble shows the biodiversity and greenery on this side which enhances the connection between the ensemble and nature.

A

Figure 24: Sighline A
Image by: Neeladri Sarkar

This image shows the street (for Car and Cycle) that is connected to the main entrance. The wide street has a very horizontal character and is open due to the low-rise and longitudinal character of the former Yada-Yada market.

B

Figure 25: Sighline B
Image by: Neeladri Sarkar

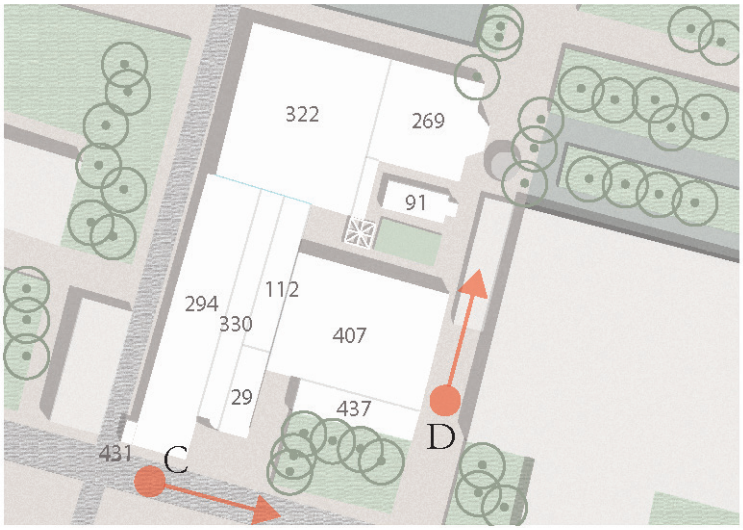


Figure 26: Walking map
Image by: Neeladri Sarkar

This image shows the street (for cars and pedestrians) that is situated on the South of the ensemble shows the open character of this street and with a huge open parking space on the south of the ensemble and the green open spaces within the ensemble.

C

Figure 27: Sighline A
Image by: Neeladri Sarkar

This image shows the street (Car and Cycle) that is connected to the main East-West axis street. The narrow street is mostly shadowed by the new larger Taets building and therefore on this side daylighting is scarce on most days.

D

Figure 28: Sighline B
Image by: Neeladri Sarkar

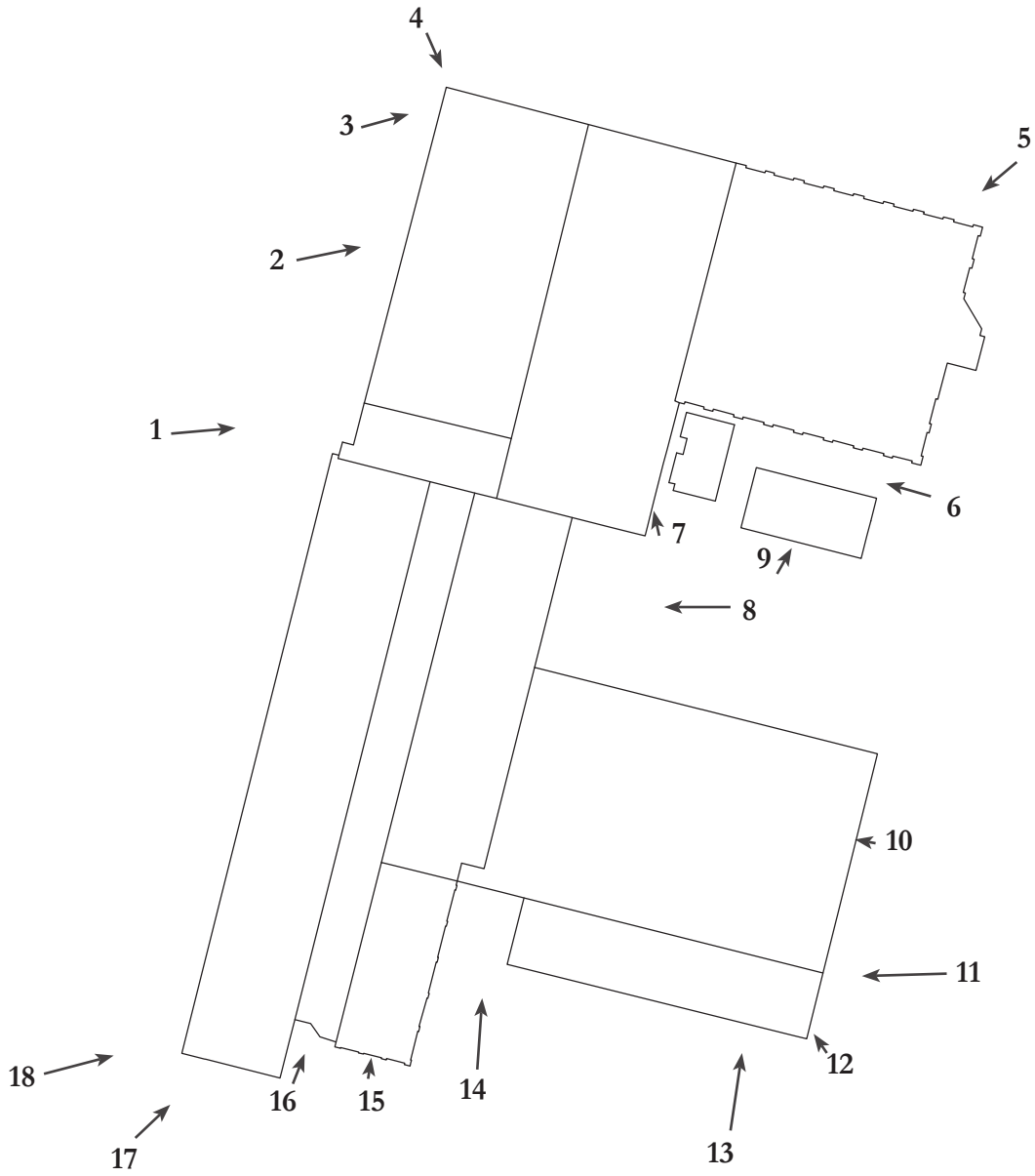


Figure 29: Facade overview
Image by: Niels Steverink

4.5 Facade overview

These photos of the different facades the Changeover zone ensemble show a great amount of diversity in architectural styles. The spaces in front of the facades also show a great diversity.

In these photographs, one can see the Cathedral building, 112, towering over the other buildings and having a great presence in the ensemble. Other buildings, such as building 330 are hidden among its larger colleagues.

The facades are all made of brickwork, giving the entire ensemble a connection to each other, making it feel it belongs together. The difference in styles reflect the ages in which they were build. The earlier buildings show classic types, such as arched brickwork lintels above the windows. The newer buildings show their age through the windows as well, with concrete and steel lintels being used in them.

Within these photos, a distinction in brickwork patterns can also be made. Older building such as building 29 use multiple colours of brickwork and have decorative elements in the patterns. Building 269, Dood, has a monotone facade when only looking at brickwork colours and patterns.


1


2


3


4


5


6


7


8


9


10


11


12


13


14


15

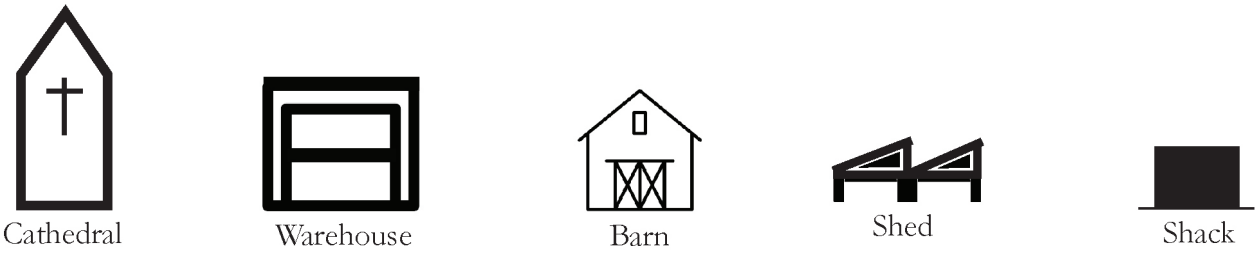

16


17


18

Figure 30: Facade overview
Image by: Niels Steverink

4.6 Typologies



There are 5 different typologies in the changing zone: the cathedral, the warehouse, the barn, the shed, and the shack. The shack is an elongated box with roof lights. The shed has repeated roof lights. The barn is the most common typology in the ensemble. It also has roof lights and can be found here with varying sizes and details. These typologies are not strictly tied to a function and often had multiple functions in the ensemble over time. The Cathedral is the tallest building in the complex and has long arched windows. The warehouse is a massive brick building in with multiple floors.

The shed typology of building 322, was widely used in the past of the Hembrug terrain. An example of that can be seen near the North Sea Canal (building 20 and 40), which were former large factory buildings that produced cartridges and ammunition. Both had this typology with the iconic shed roofs. These shed roofs are located in the art Zaanstad building near the north to provide enough daylight into the building, without heating the place up too much. Identifying and studying these various typologies present in the ensemble also helps us understand the architectural diversity of the Changeover zone

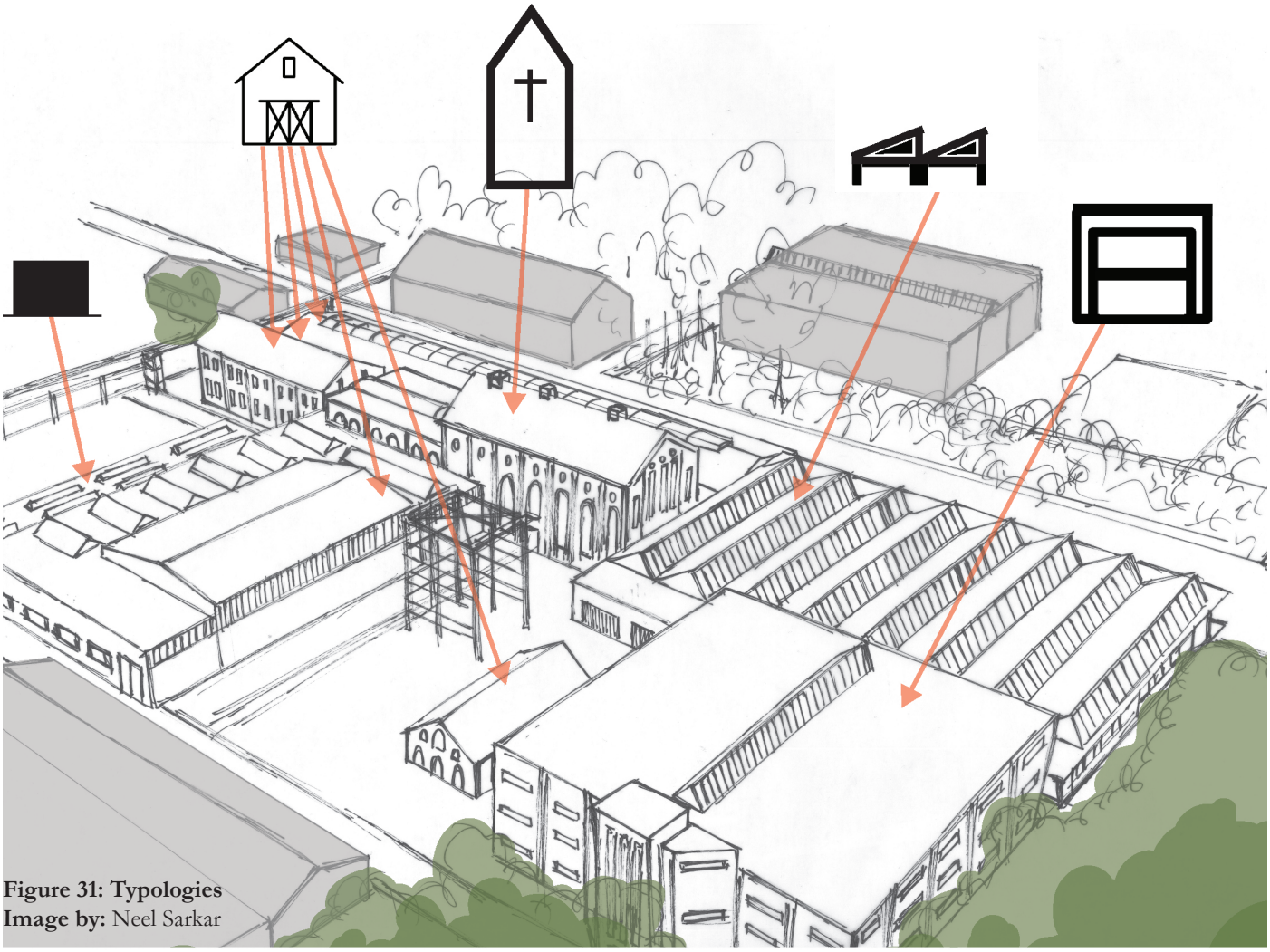


Figure 31: Typologies
Image by: Neel Sarkar

4.7 Connections between buildings

112+322A

12+330+294

112+330

112+407

322A+269

29+112

29+112

294+322A

294+330

322A+322B

407+437

These images show the connections between the buildings. From these connections, it becomes clear they have not been greatly thought out and and buildings were stuck together where necessary and where there was space. The many blocked windows and doorways show there no preconstruction design thoughts about later expansions to the buildings.

Figure 32: Connections
Image by: Neel Sarkar

4.8 Open Spaces

East: The courtyard space between the cathedral, water treatment building and the big industrial 407 building is quite unique with visible remnants of older demolished buildings.

South: The open space in front of the Taets food service building (437) has remnants of older, now demolished buildings visible if looked closely. The space is also significant as it has the standing structures of the old power and steam lines that powered the site still visible today.

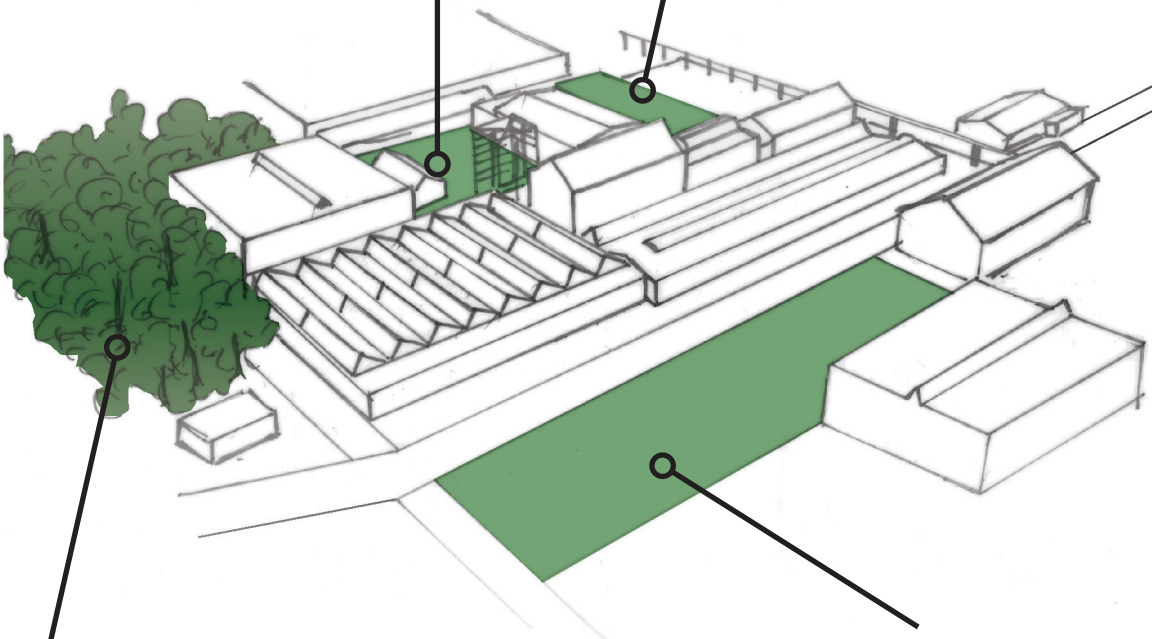


Figure 33: Open spaces
Image by: Neel Sarkar

North: A significant open area near the ensemble is the forest area just North of the Changeover zone. The densely forested area with the ditches and a lot of biodiversity is a major connection of our ensemble to nature and quite different from the otherwise industrial character of the site.

West: The area opposite the Art Zaanstad building is another open space which lies in the Campus North region and is a welcome open space right near the entrance of the Changeover ensemble and also has remnants and traces of older, now demolished buildings.

4.9 Sounds

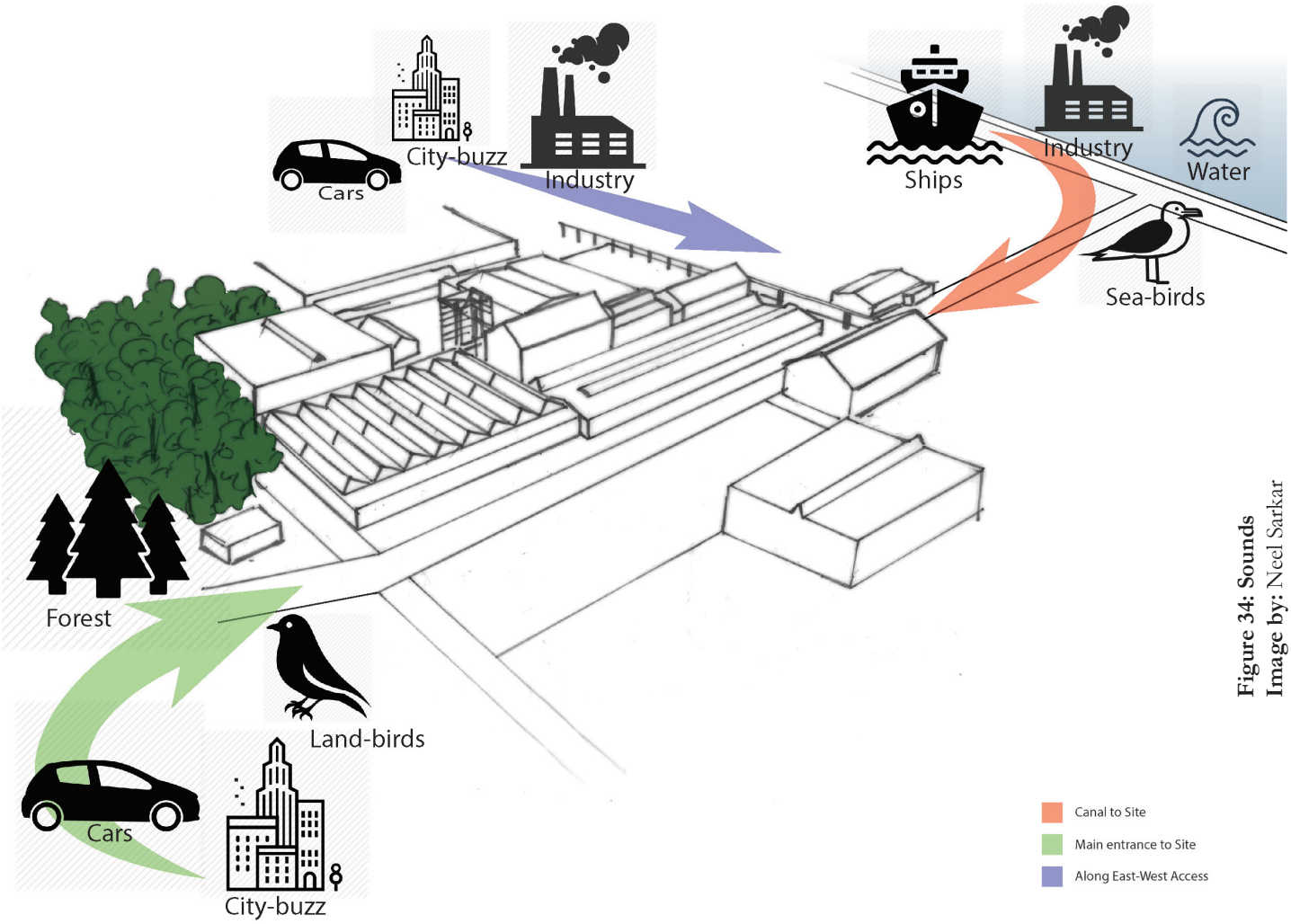


Figure 34: Sounds
Image by: Neel Sarkar

We took a walk along the different routes that one could take to approach the Changeover Zone ensemble and recorded some of the sounds that one could hear along those routes. The 3 routes taken were from the canal to the ensemble from the South, the entrance to the ensemble from the North and the East towards the ensemble along the historical East-West access.

Red: We took a walk along the canal and then entered the site from that entrance. We then walked towards the ensemble and recorded the sounds all along. The sounds near the canal were mostly that of the industry on the other side of the water, the water slashing against the shore, ships passing by and seagulls chirping away.

Green: We then took another route and entered the site from the main entrance on the west side and immediately noticed the difference this time with the cars and the city buzz dominant near the start and more trees hustling and land birds chirping as we approached the ensemble.

Blue: The third way to access the ensemble is from the East through that entrance. So, we took that route and walked along the historic East-West access. At the start of the walk we noticed the sound of the industry and the city-buzz quite significant, which slowly turned into the hustling of the trees and land birds from the forest near the plots in the wood as we neared the ensemble

4.10 Ensemble Essence Neel Sarkar

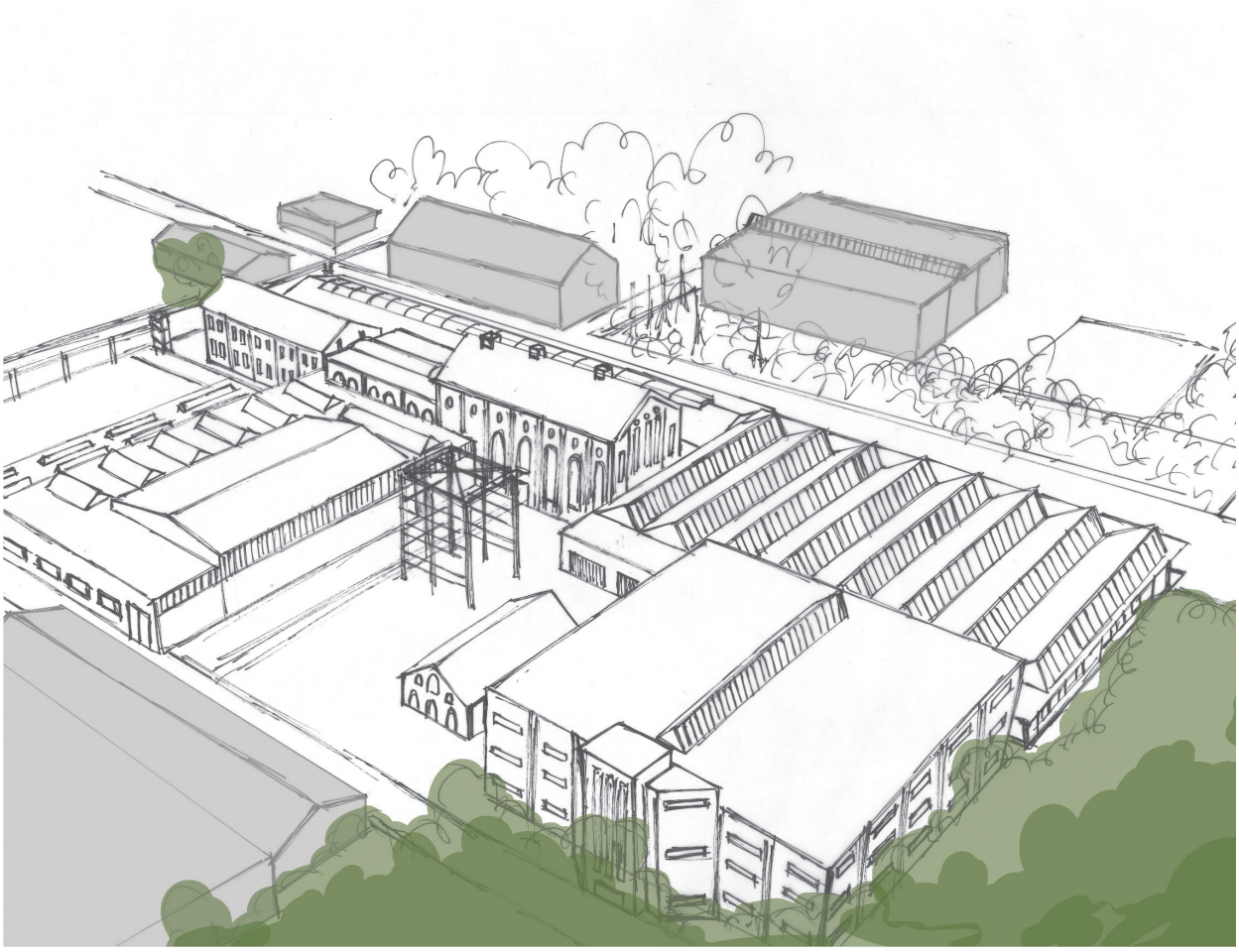


Figure 35: Ensemble essence
Image by: Neel Sarkar

The ensemble is quite unique in the sense that it is different than the other ensembles in Hembrug. Starting from the ensemble as a whole, the borders are distinct on all 4 sides. The one to the North is very green with a dense forest and less busy. The one to the West on the other hand, is very busy with a major street passing through it which comes from the main entrance. There are commercial shops such as the Art Zaanstad as well on this side. The South is a little open with a huge parking lot and views of the North Canal and a green area with old steam lines passing over it. The East is the quietest and quite private with the enclosed and intimate courtyard in front of the cathedral.

When you study the buildings individually you also see the diversity in typologies and their past functions which is important to note for future developments. The open plan and high roof qualities of a lot of the buildings on the site is a special characteristic of this ensemble and the intricately ornamented buildings like the Clean 2 Antarctica and the former water treatment buildings had a touch of rich heritage to the ensemble as well.

Analyzing the ensemble from an outside in approach from the neighborhood scale to each individual building, one could comprehensively answer the question of how and why the ensemble developed over time to be so diverse.

4.11 Ensemble Essence Niels Steverink

Figure 36: Connections
Image by: Niels Steverink

Figure 37: Visible construction
Image by: Niels Steverink

Figure 38: Visible construction
Image by: Niels Steverink

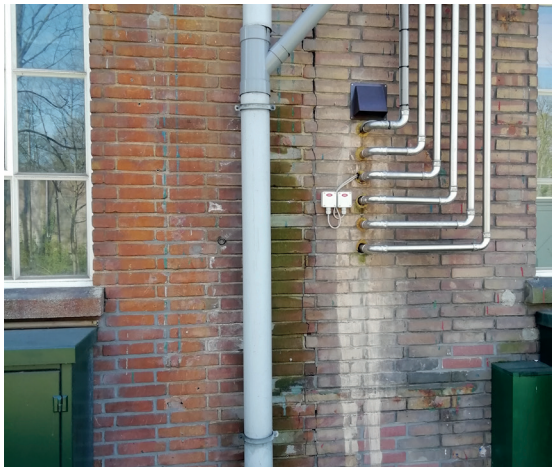


Figure 39: Installations
Image by: Niels Steverink

Overall, the ensemble is a chaotic thing. Buildings are grown together in different styles and methods of construction. For me, this is the essence of the ensemble. This combined with the very large scale of the ensemble, built by the smaller masses of the individual buildings and an diverse centrepiece to Hembrug is what is now the Changeover zone.

Many contrast are found within the ensemble. From a more quiet, Plofbos overlooking northern façade to a main road facing south façade. The flat western façade in contrast to the diverse eastern façade. Huge buildings such as 322 are combined with smaller buildings such as 29 and very long and narrow buildings are combined with almost perfectly square buildings.

The very visible constructions and rough elements such as all installations in view are also a essential element of the changeover zone. They makes the area even more diverse, but they are also both physically and architecturally the connecting elements between all the buildings.

5. Buildings

In this chapter, an analysis of separate buildings within the Changeover zone will be made. This analysis will be led by the following question: **How is each individual building constructed and what architectural elements are important within the buildings?**

To structure the analysis and be able to delve further into certain buildings, the buildings have been clustered. In this analysis, the buildings will be introduced, after which an architectural assessment will be made. Afterwards, the building technological elements will be discussed which consist of, the construction of the building, how stability is guaranteed, how the façade is constructed, the arrangement and types ow windows, the floor and foundation structure, the roof structure and installations. Details that fall outside of this scope will be discussed in a details of note section. The elements will be analysed by current structures and historical data such as drawings. Of each building, one critical detail has been technically elaborated upon. These details have been chosen by their presence and visibility of their construction method.

5.1 Remaining buildings

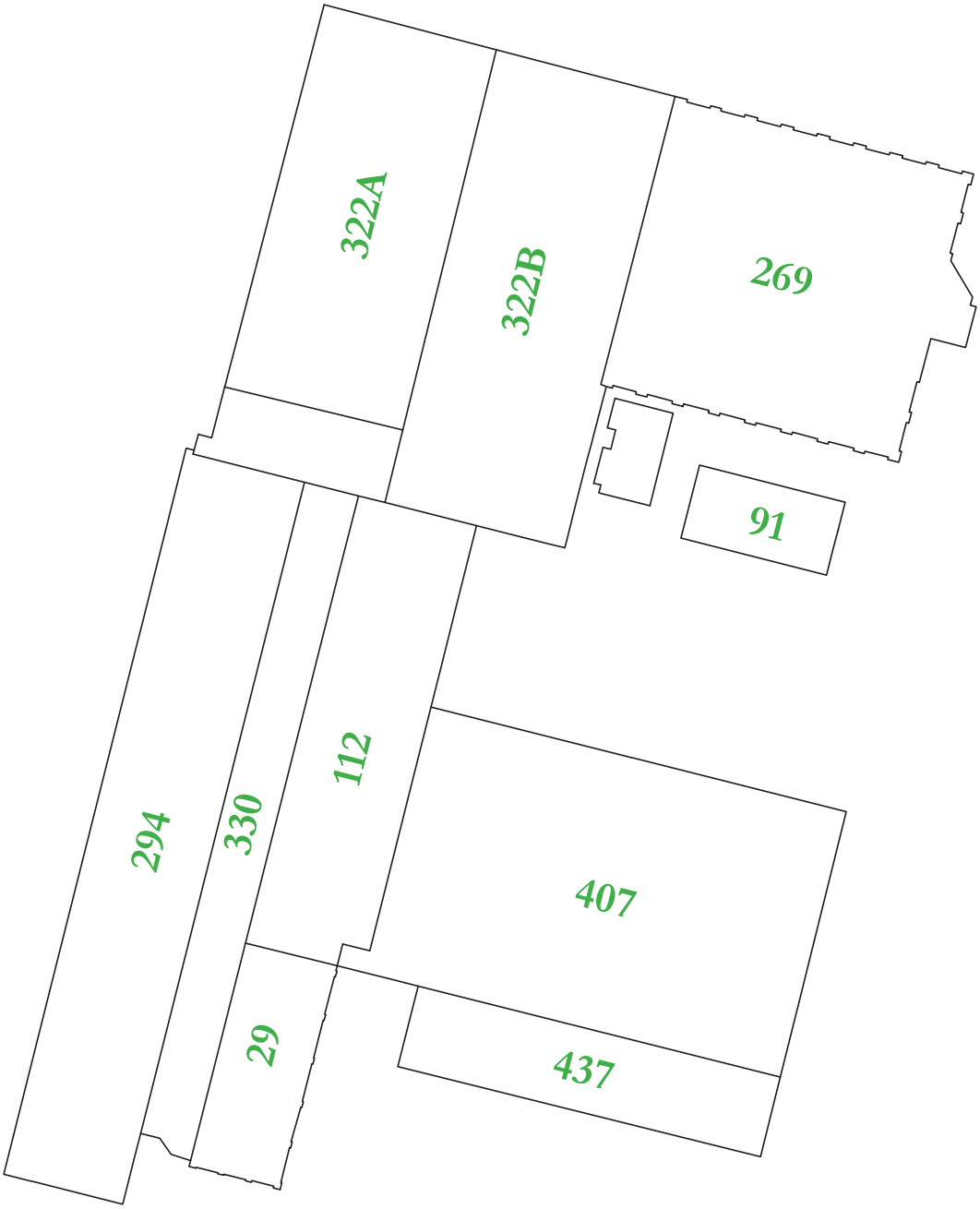
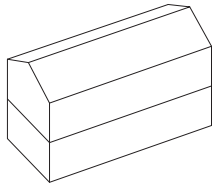


Figure 39: Remaining Buildings
Image by: Niels Steverink

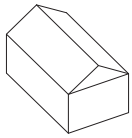
These are the buildings remaining in the Changeover zone. Through these drawing the differences in size and shape of the buildings of the ensemble becomes clearly visible. Whereas some buildings are very stretched (330), some are almost perfectly square (269). Some buildings have floors (112 + 269), the others are single story. The relative scale of the buildings also becomes clear. Building 407 and 322 are large, building 29 and 91 are less than 1/4 their size. This diversity in shape, size and scale makes for a complex ensemble. The orientation of the buildings in the ensemble also becomes clear. Whereas the west side is parallel to the road, the east side is perpendicular to it.

29 “Clean 2 Antartica”



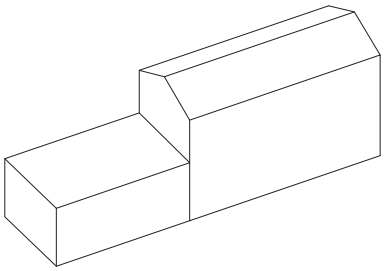
Relatively small
Two stories
Pitched roof
“Flat” facades
Rectangular floorplan

91 “Water treatment”



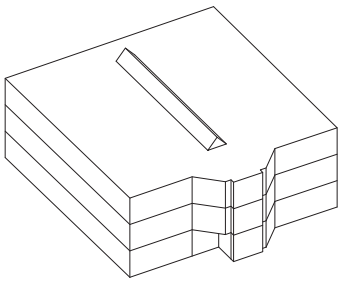
Smallest building in ensemble
Single story
Pitched roof
“Flat” facades
Rectangular floorplan

112 “The Cathedral”



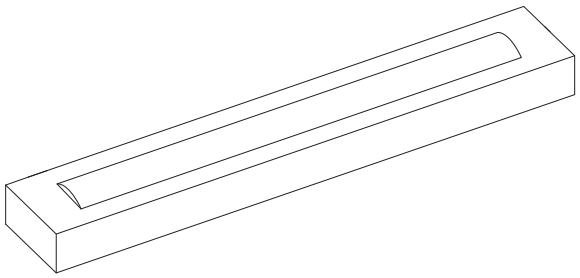
Medium sized
Single story
Pitched roof and flat roof
Two parts
Rectangular floorplan
Tallest building in ensemble

269 “Dood”



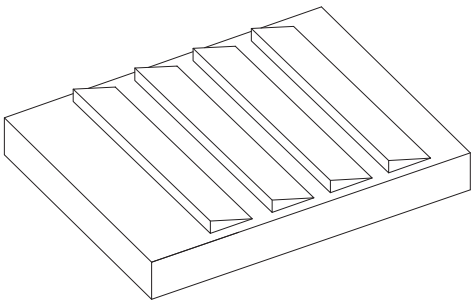
Relatively large
Three stories
Flat roof
Two parts
Square floorplan
Extending facade

294 "Yada Yada"



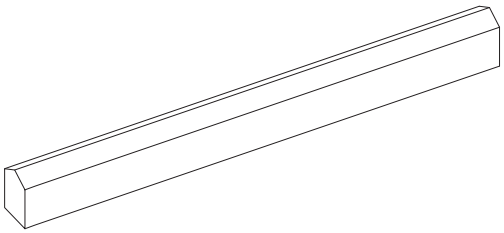
Medium sized
Single story
Flat roof
"Flat" facades
Rectangular floorplan

322 "Art Zaanstad"



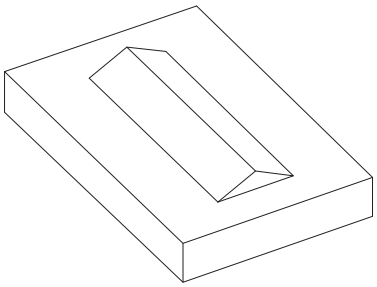
Largest building
in ground
floor area
Single story
Flat roof
"Flat" facades

330



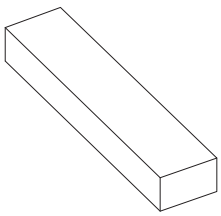
Single story
Flat roof
"Flat" facades
Very stretched floorplan

407 "Gloeierij"



Single story
Flat roof
"Flat" facades
Stretched floorplan

437



Relatively small
"Flat" facades
Rectangular floorplan

Figure 40: Remaining Buildings
Image by: Niels Steverink And Neel Sarkar

5.2 Building clusters

To get a better grasp on the ensemble, we have divided the complex into 5 clusters. These 5 clusters have been made based on their physical features and the era in which they were constructed. These clusters will help in ordering the research into materiality, style and construction. Of each cluster, one building will be analysed for building technology.

Cluster 1900-1930

29

112

91

Distinct features

Decorative brickwork
Sloped roofs
Rectangular windows
Arches above windows
Butresses protruding
Red/orange colour

Cluster 1930

269

Non decorative brickwork
Straight lines
Dark brown colour
Protruding concrete windows
Multiple floors

Cluster 1930-1940

294

322

330

Skylights
Steel window frames
Light sand colour
Single floor
Stretched floorplan
Non decorative brickwork

Cluster 1940+

407

437

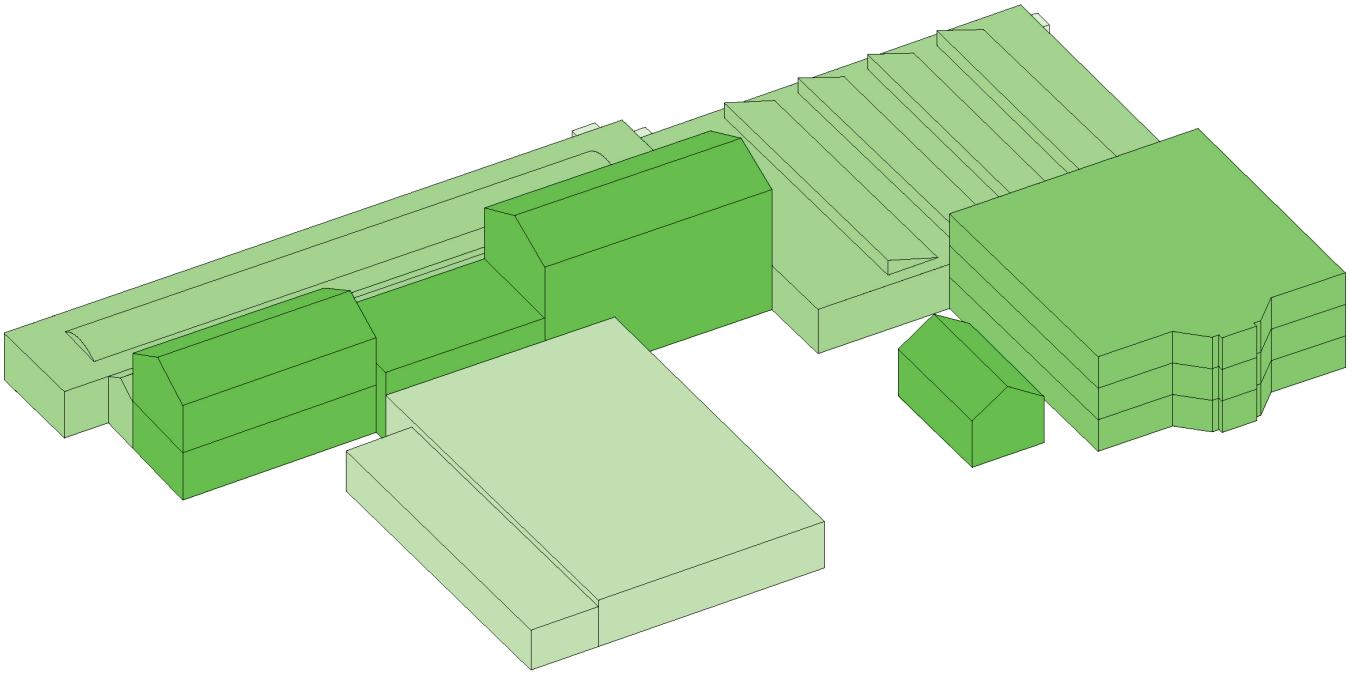
Steel panelling
Non decorative brickwork
Flat roofs

Bunker

431

Concrete
Underground

Figure 41: Clustering
Image by: Niels Steverink



Cluster 1900-1930
(Building 29, Building 112, Building 91)

Cluster 1930 (269)

Cluster 1930-1940
(Building 294, Building 322, Building 330)

Cluster 1940+ (Building 407, 437)

Bunker (Building 431)

Figure 41: Clustering
Image by: Neel Sarkar

112

De Kathedraal

Information

Year of build: 1917
Original function: Press building

Short description

The tallest building in the Changeover zone ensemble. The building used to house large presses to press large artilery shells. These were incredibily heavy machines and were one of the most important aspects of being able to produce full, working artilery.

The building was build in two phases. The first four bays were build in 1917 with the last three beiing added in 1951 deu to the original design being too small.

Dimensions

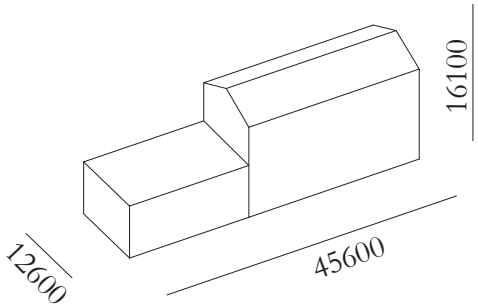


Figure 42: Dimensions Cathedral
Image by: Niels Steverink

Archival drawing

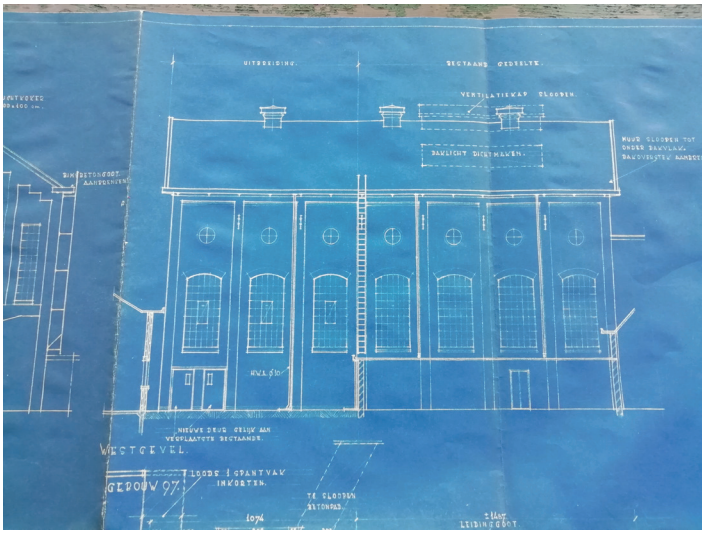
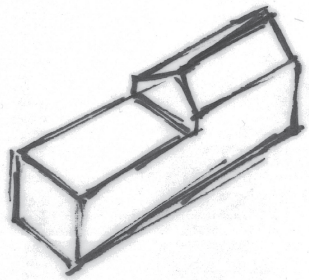


Figure 43: Original drawing
Image by: Hembrug Archival data

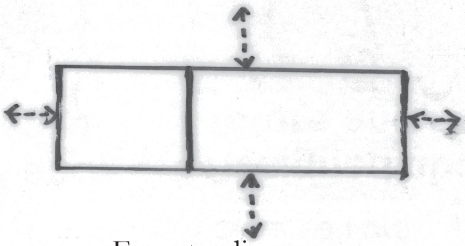
Figure 44: De Kathedraal
Image by: Niels Steverink

Architectural qualities

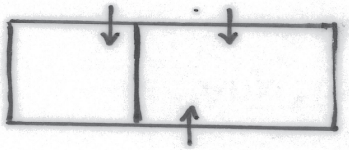
Figure 45: Architectural qualities
Image by: Neel Sarkar



Shape

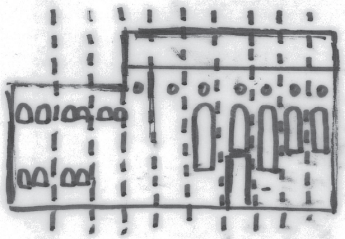


Free standing

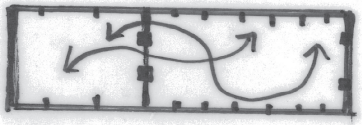


Entrances

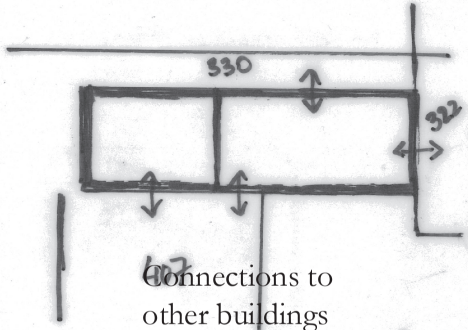
Daylight quality



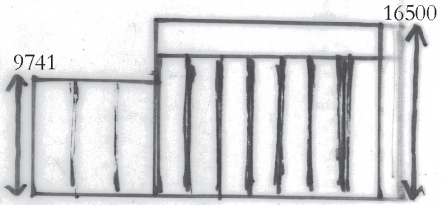
Rhythm



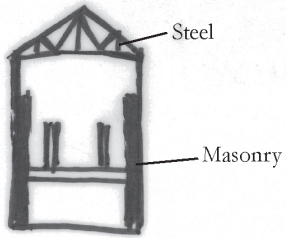
Open plan



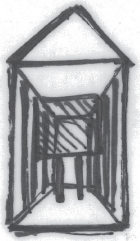
Connections to other buildings



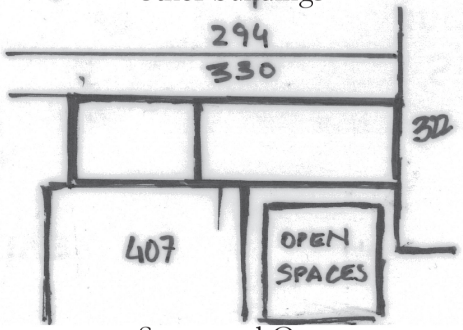
Heights



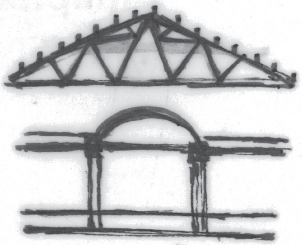
Steel structure of the roof vs masonry wall



Continuous column character



Street and Open spaces



Roof Characteristics

Architectural characteristics

Remains of the old skycrane are still visible and reflect the former industrial function

Two huge cast iron beams determine the look and feel of the lower section of the cathedral.

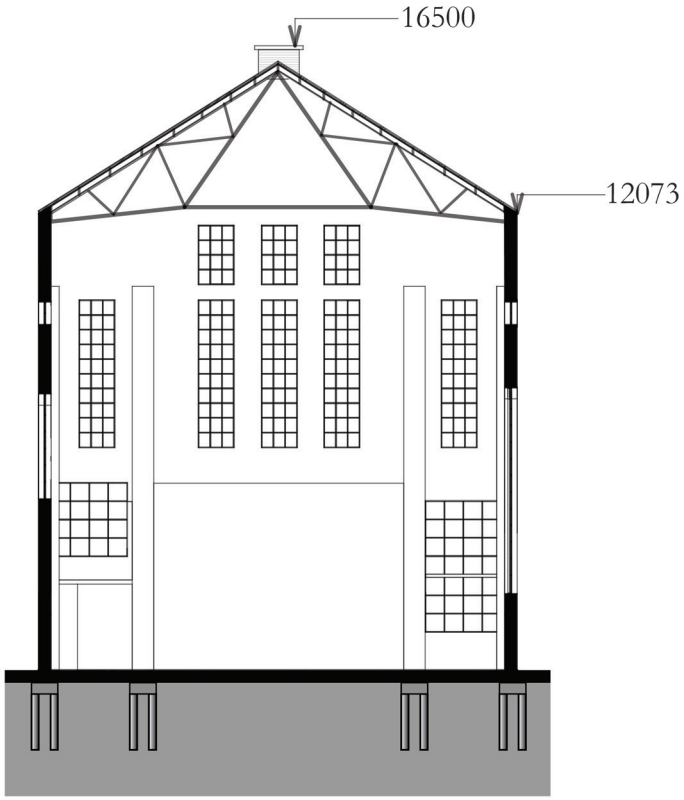
New openings with modern steel lintels run along the side connecting the Cathedral to the rest of the ensemble.

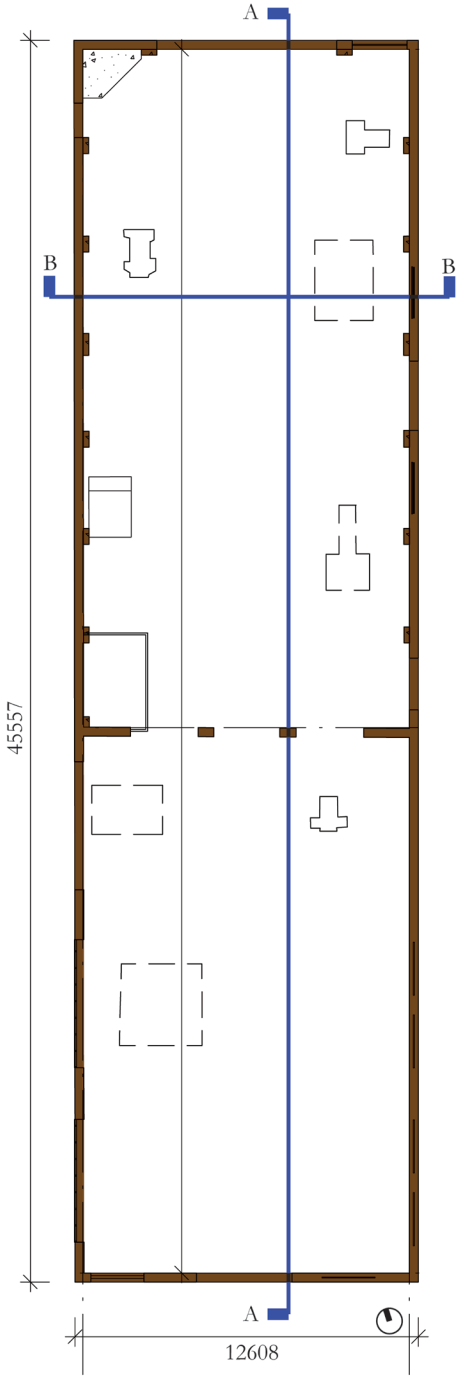
New openings with modern steel lintels run along the side connecting the Cathedral to the rest of the ensemble.

The cathedral towers over the rest of the ensemble.

Figure 46: Architectural Characteristics
Image by: Niels Steverink

Construction





Structural dimensions:

Wall thickness:	310mm
Buttress thickness	260mm
Total wall thickness at location of buttresses:	570mm
Column dimensions:	570 x 570mm
Beam height:	800mm

The large cast iron beams located in the lower part of the façade served as a base for a second floor which used to be present in the building.

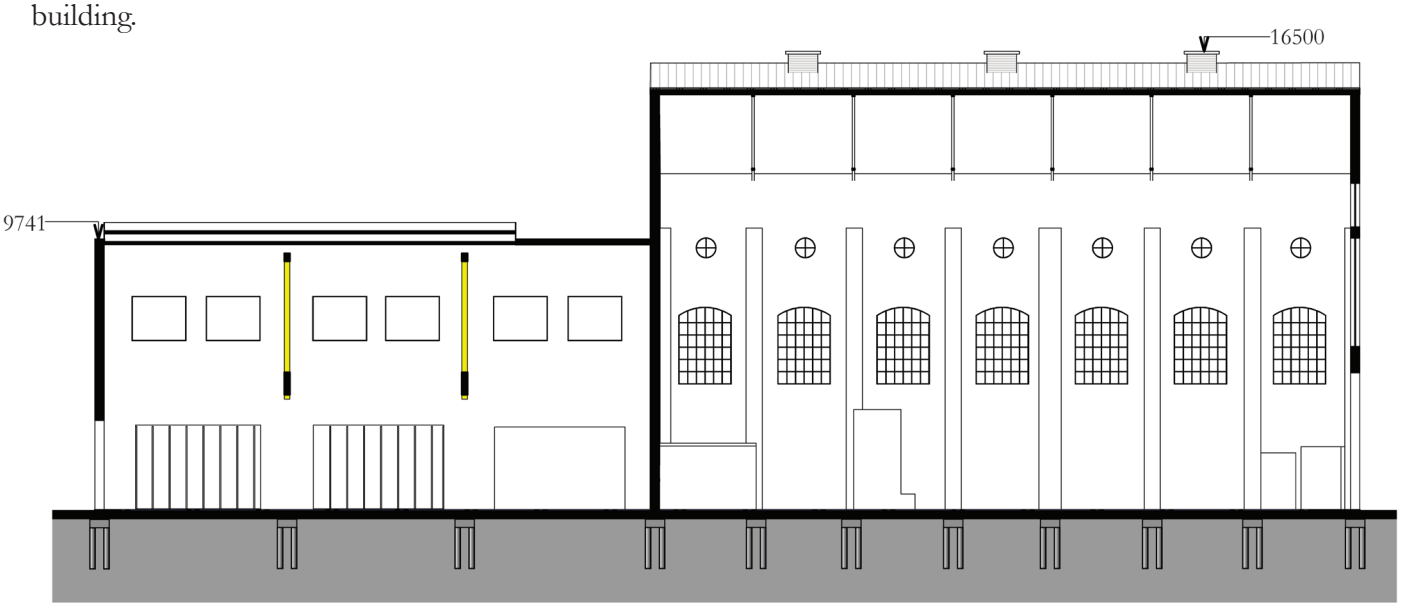
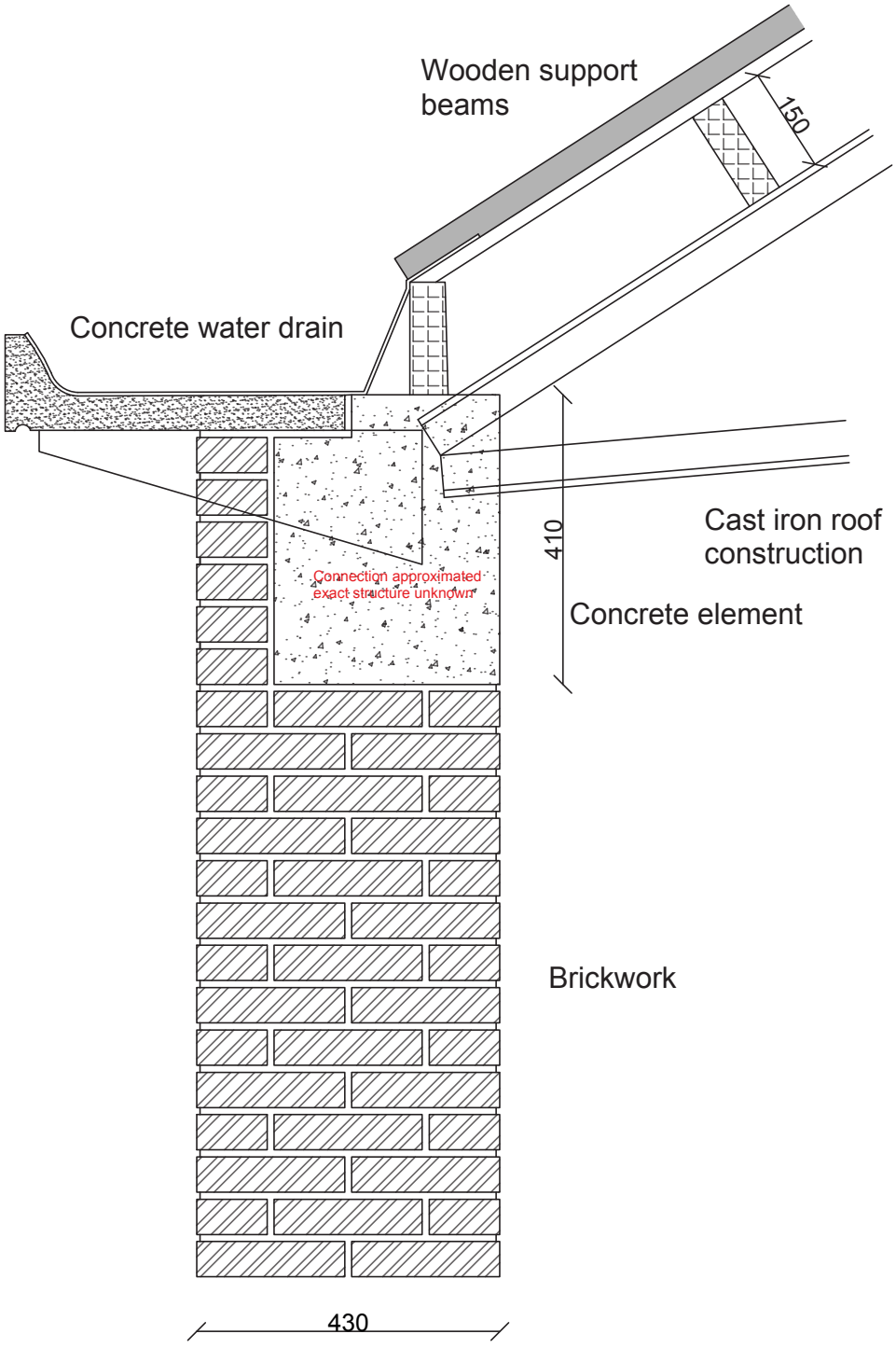


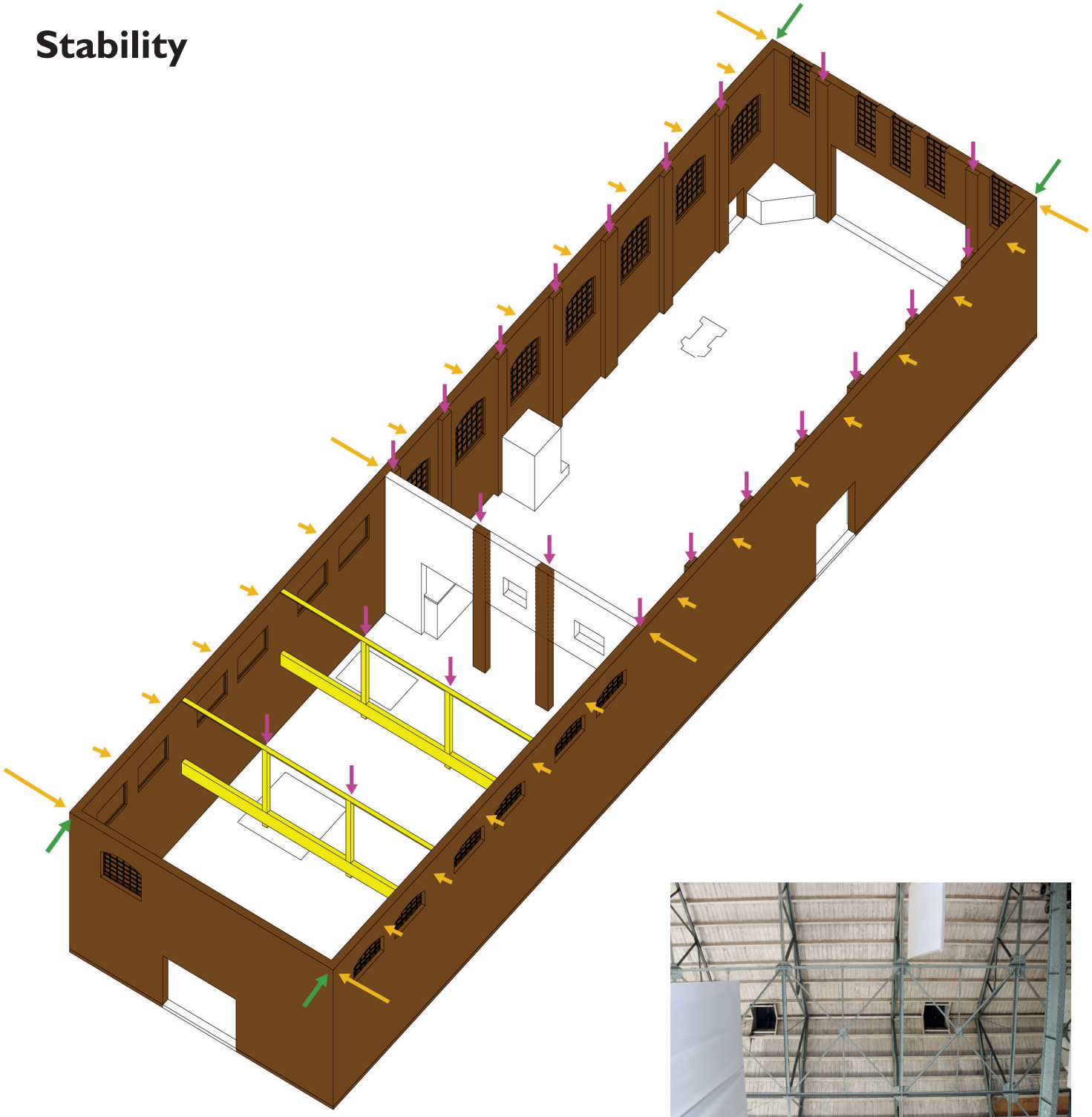
Figure 47: Architectural Plans
Image by: Hembrug Archival Data



Roof connection detail
Scale 1:10
Shown here is the connection of the wall to the roof construction. A concrete element is placed upon the brickwork and blended into the wall. The concrete is cast around the roof construction, making a solid joint between the elements.

Figure 48: Critical detail 1:10
Image by: Niels Steverink

Stability



Vertical forces resting on the building move down from the roof trusses to the walls. Where the trusses rest on the walls, buttresses are added to combat bending due to the high compressive force. The walls and buttresses are made from bricks. The buttresses and walls are the same thickness at the top as they are at the bottom. This is an architectural choice as lower thickness would be required structurally at the top. The horizontal and lateral forces applied to the building are carried by the box shape of the building and the interior wall. Twist stability is provided by X shaped tension rods in the roof structure.

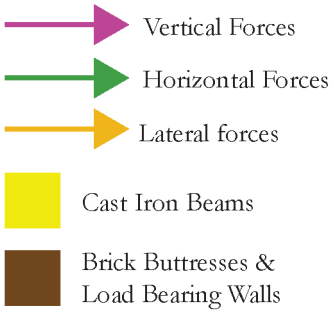


Figure 49: Stability
Image by: Hembrug Archival Data
Processing: Neel Sarkar

Facade

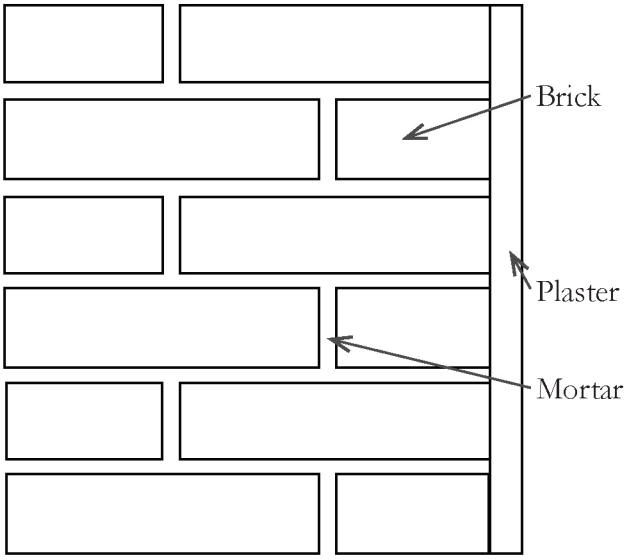
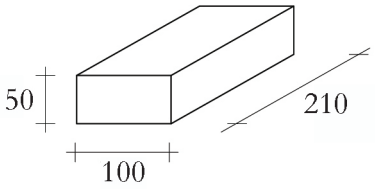


Figure 50: Wall
Image by: Neel Sarkar

Brickwork:

Size:	Waalformaat
Bond:	English bond
Colour:	Brown red



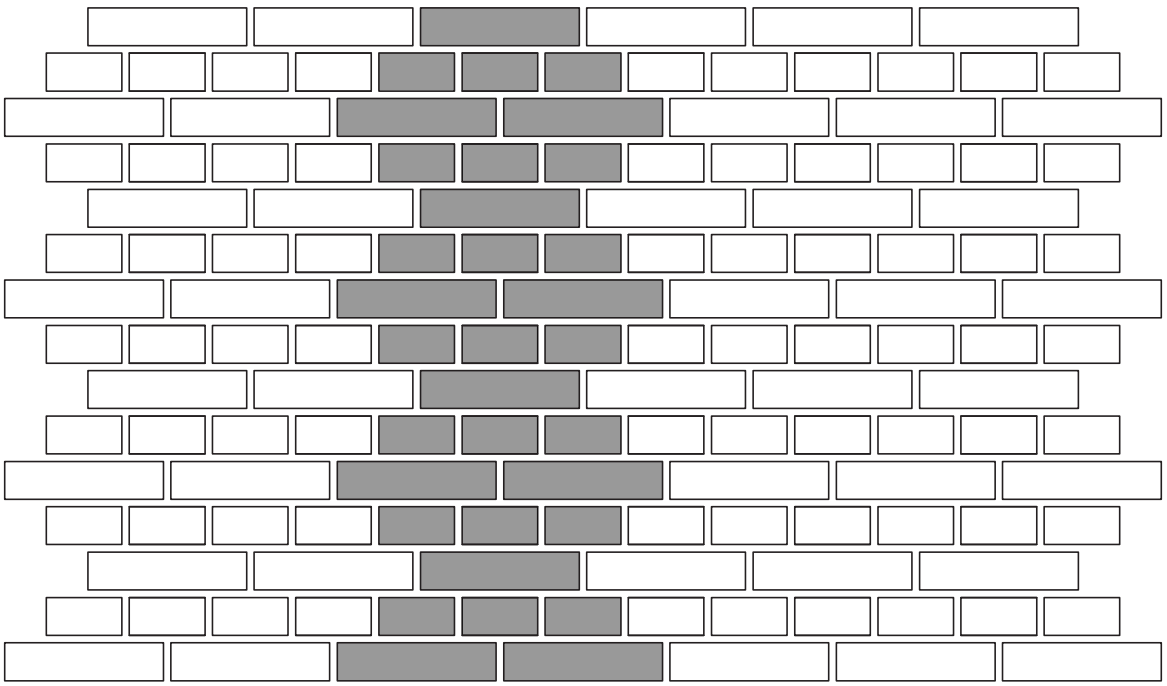
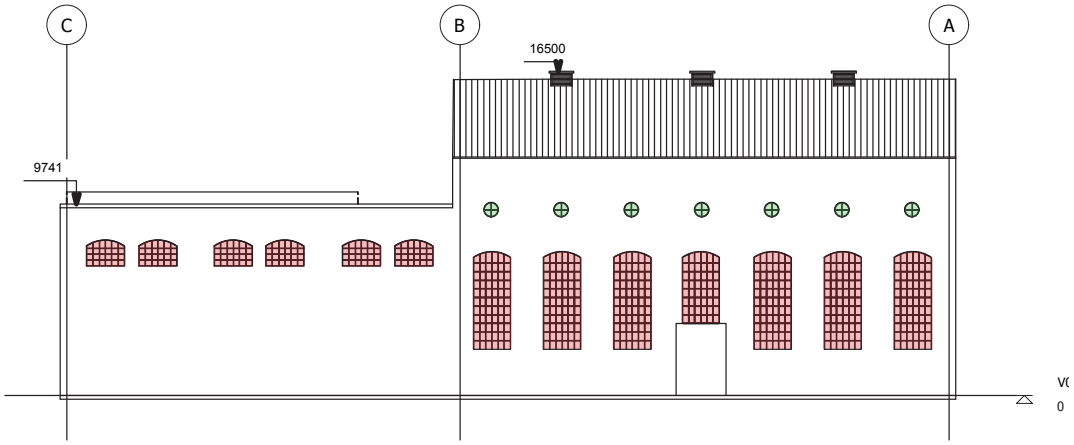
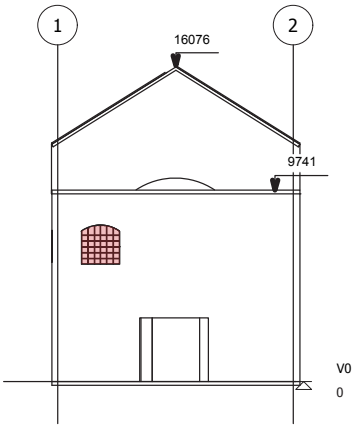
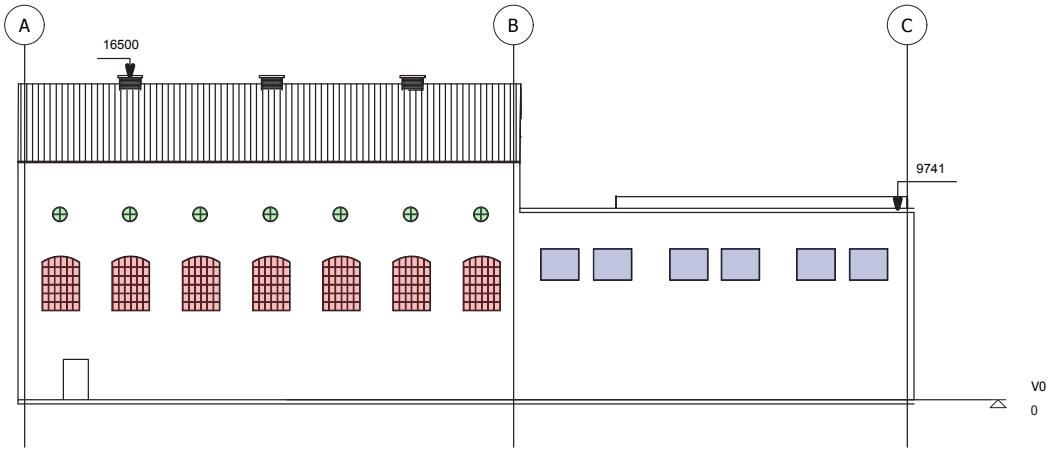


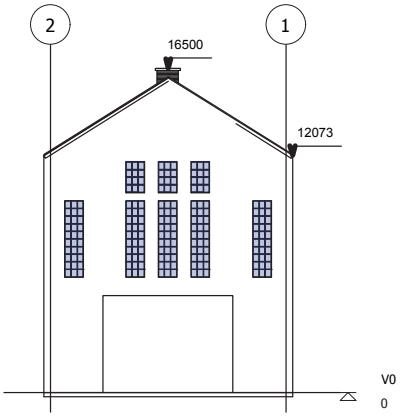
Figure 51: Brickwork Bond
Image by: Niels Steverink

Windows







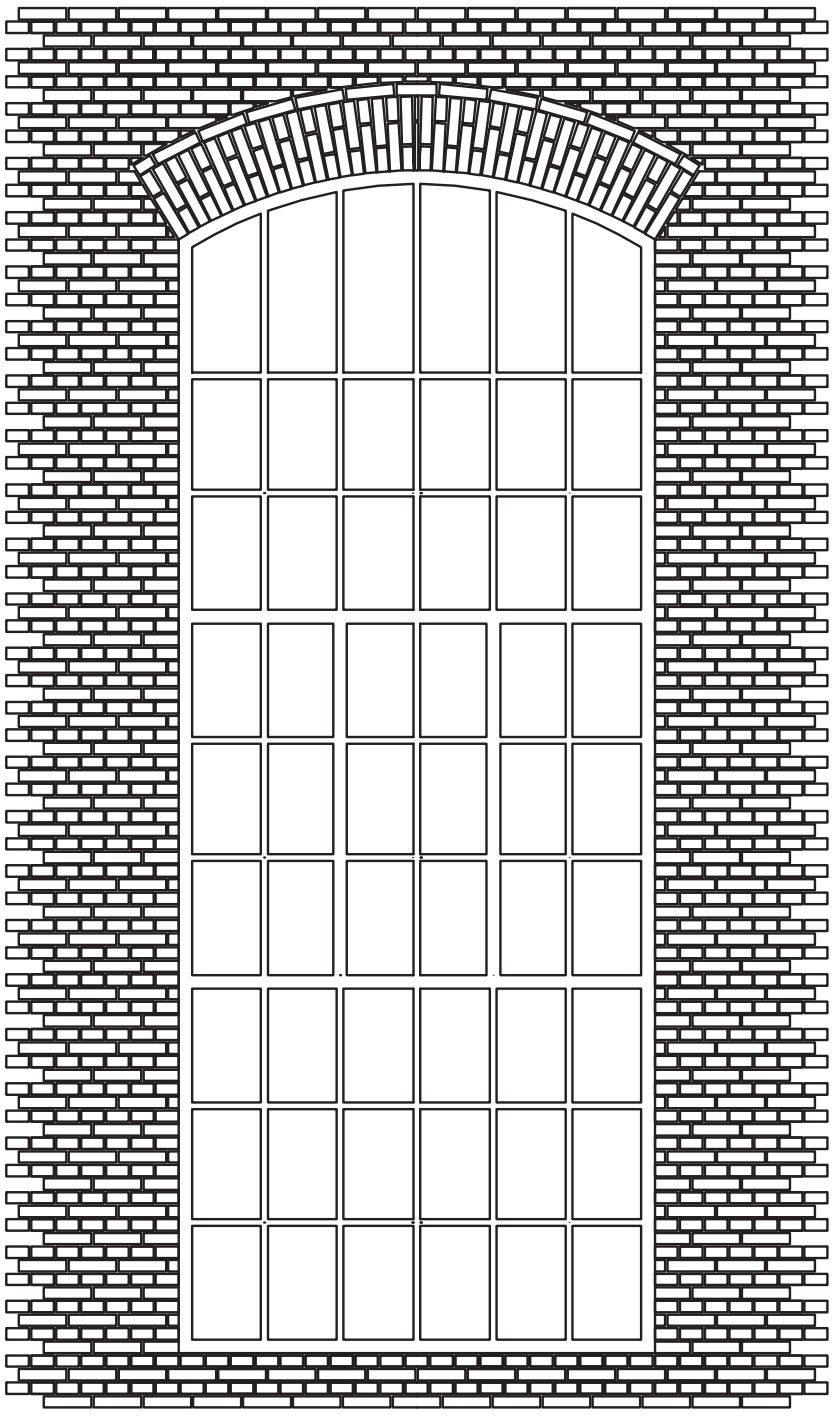


Type 1 Window
Steel frame windows with single glazing. Structurally covered by an brick arch.

Type 2 Window
Steel frame windows with single glazing. Structurally covered by an straight lintel.

Type 3 Window
Circulair windows. Steel window frames. Structurally covered by an brickwork cirkel all around the window.

Figure 51: Windows
Image by: Hembrug Archival Data
Processing: Niels Steverink



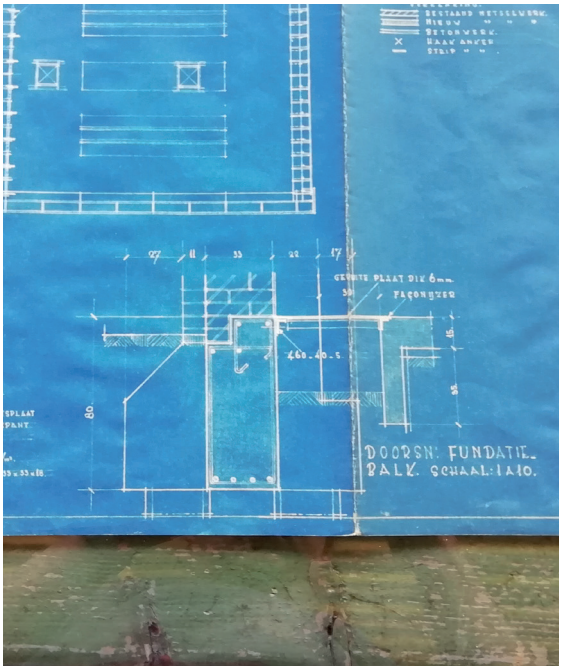
Type 1 Window
Scale 1:10

Figure 52: Windows
Image by: Niels Steverink

Floor and foundation

Figure 53: Floor
Image by: Niels Steverink

The floor of the cathedral is made of concrete and has recently been recast when the building was renewed for the Yada Yada market.



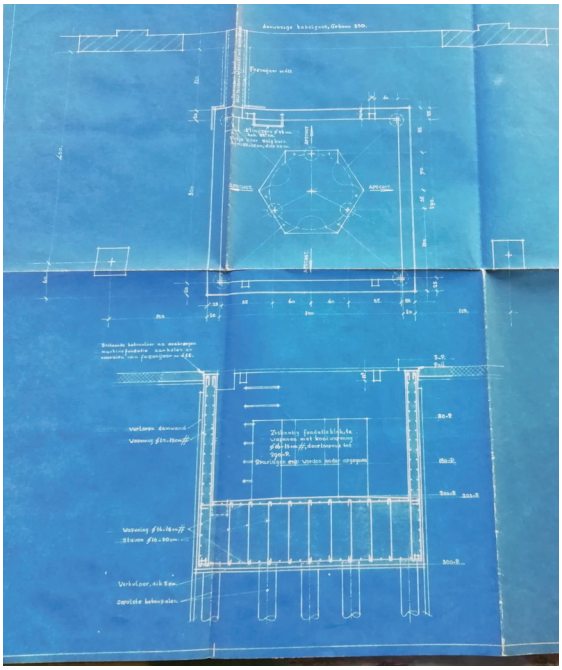


Figure 54: Foundation
Image by: Hembrug archival Data

This is an original blue print for the foundation of the catherdals walls. It clearly shows the brickwork is placed cold upon concrete foundation beams. The foundation beams rest upon foundation pillars, also made from concrete.

Some sections of the foundation have been reinforced to cope with the pressure created by the presses which used to be in the building. This blueprint shows one of those large reinforcements made.

Roof

Figure 55: Roof
Image by: Niels Steverink

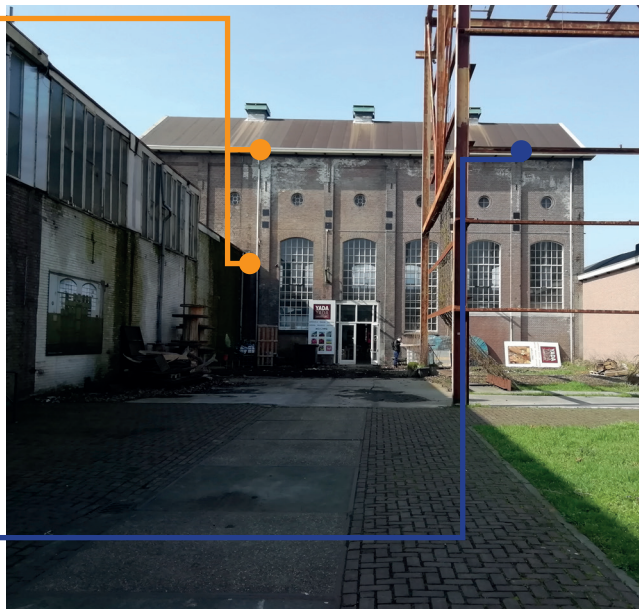
The roof of the cathedral is a wooden roof supported by a cast iron, riveted lattice girder. This materialisation of such a construction is nearly never used nowadays and becomes rarer as time goes on.

Figure 55: Roof
Image by: Niels Steverink

The roof of the cathedral is a wooden roof supported by a cast iron, riveted lattice girder. This materialisation of such a construction is nearly never used nowadays and becomes rarer as time goes on.

Installations and climate control

Water management



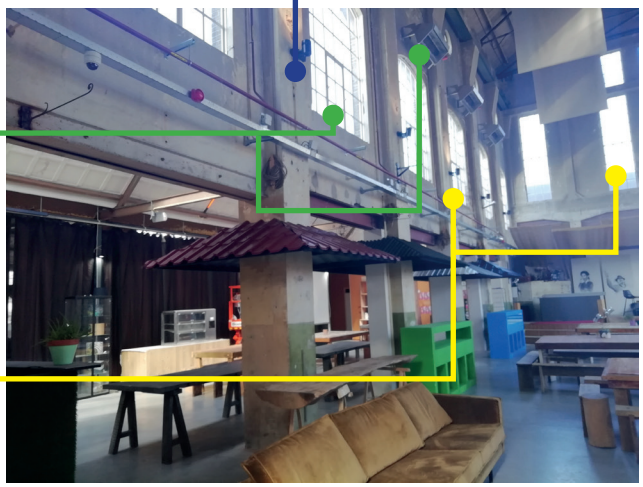
Rainwater is collected in a precast concrete gutter along the roof edge. This water is then disposed of via rainpipes placed along the facade.

Air circulation

Air circulation in the building can be achieved by opening the rooftop vents and/or opening windows.

Power

Climate control



Newly installed heaters provide warmth during colder periods. Cooling the building can be done by opening the rooftop vents and/or windows.

Daylighting

Daylight is provided via large windows on all sides of the cathedral.

Other

In the cathedral is the original crane from when is was a factory building. This is the largest and most eyecatching piece of original building services equipment.

Figure 56: Installations
Image by: Niels Steverink

Details of note

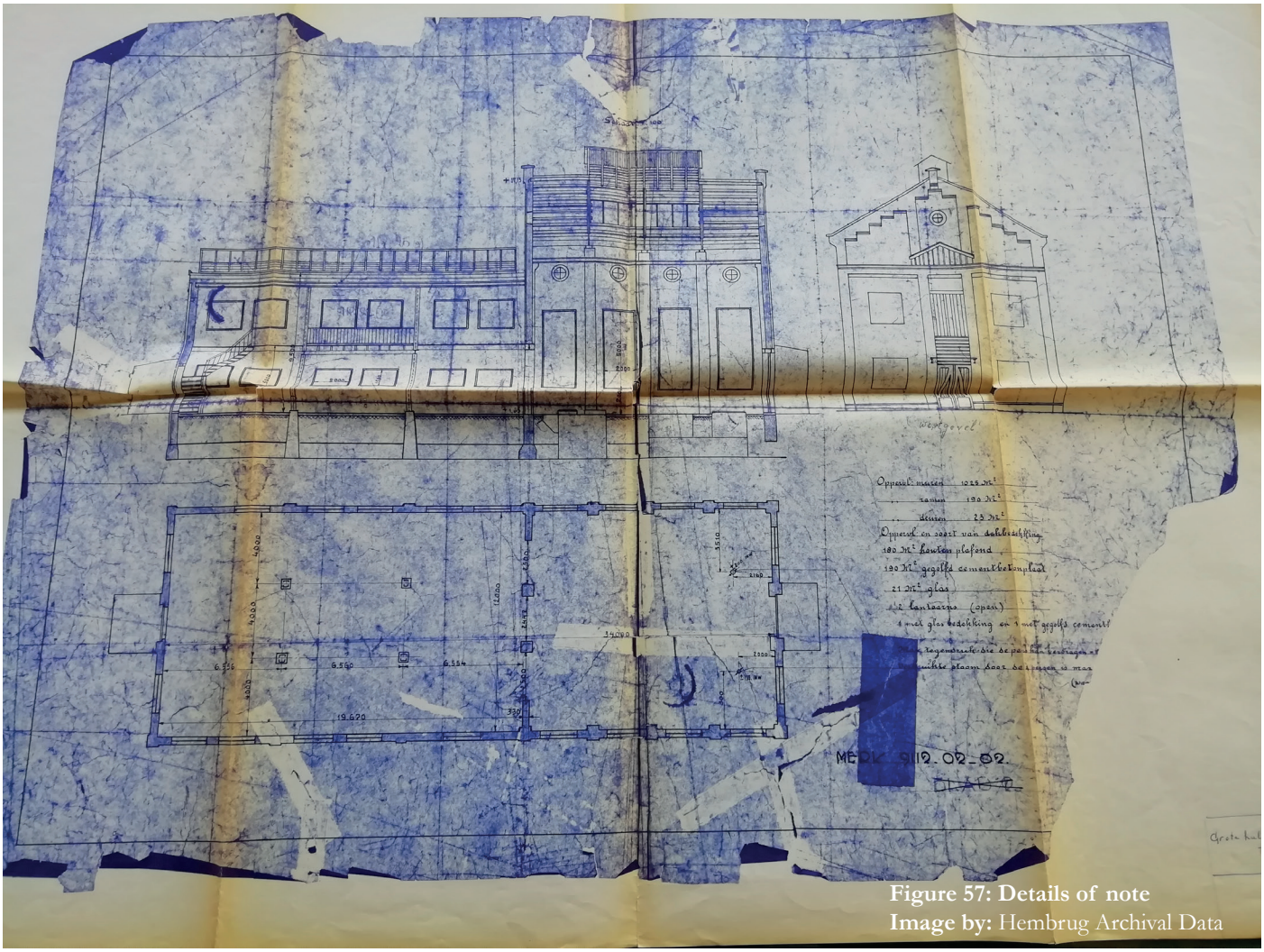


Figure 57: Details of note
Image by: Hembrug Archival Data

This is the oldest drawing we have been able to find about the cathedral. These drawings show how the original size of the cathedral used to be and a different roof structure. There used to be an extra structure on top to allow for more ventilation and daylight to enter the building. This was later replaced during the expansion of the cathedral by three ventilation chimneys. This drawing also shows the second floor which was present in the lower part of the building and the original columns which used to support this floor.

New doorways have been made to connect the cathedral to the rest of the ensemble. This has been done during the last transformation into the Yada Yada and was not present before. The opening are supported by modern steel lintels.

Curtains are now hanging in the Yada Yada market which suggest a problem with sound as these sort of things are usually made to provide sound dampening. This might become an issue in a new redevelopment.

Figure 58: Details of note
Image by: Niels Steverink

269

De Dood

Information

Year of build: 1928
Original function: Storage building

Short description

De Dood is an outlier in the ensemble due to the building having three floors. All the other buildings, with the exeption of 29, are single story building.

De Dood has housed multiple function over its lifetimes with the floors lending themselves to many function deu to beiing strong and open. The main function has however always been a storage function as it was orignally build for.

Dimensions

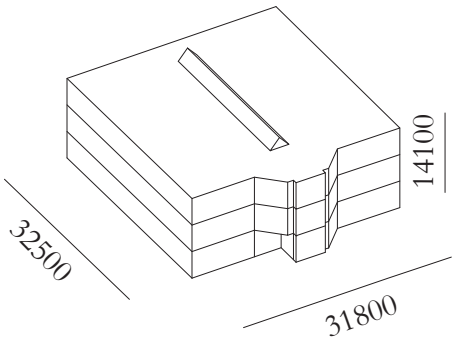


Figure 59: Dimensions
Image by: Niels Steverink

Archival drawing

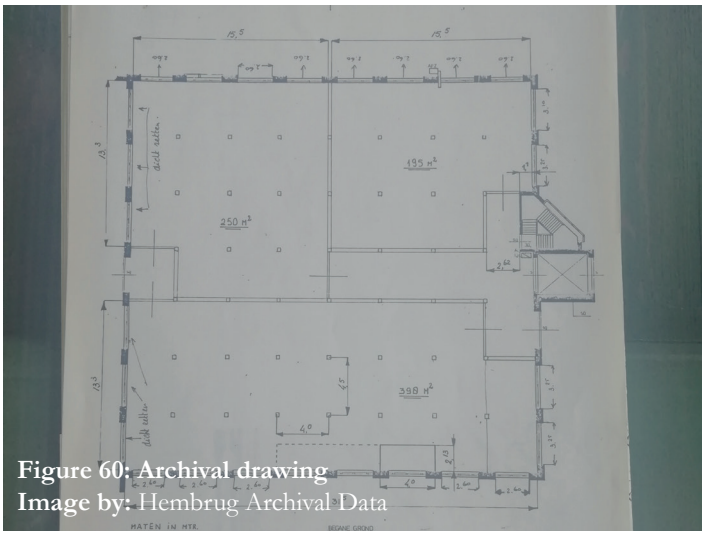
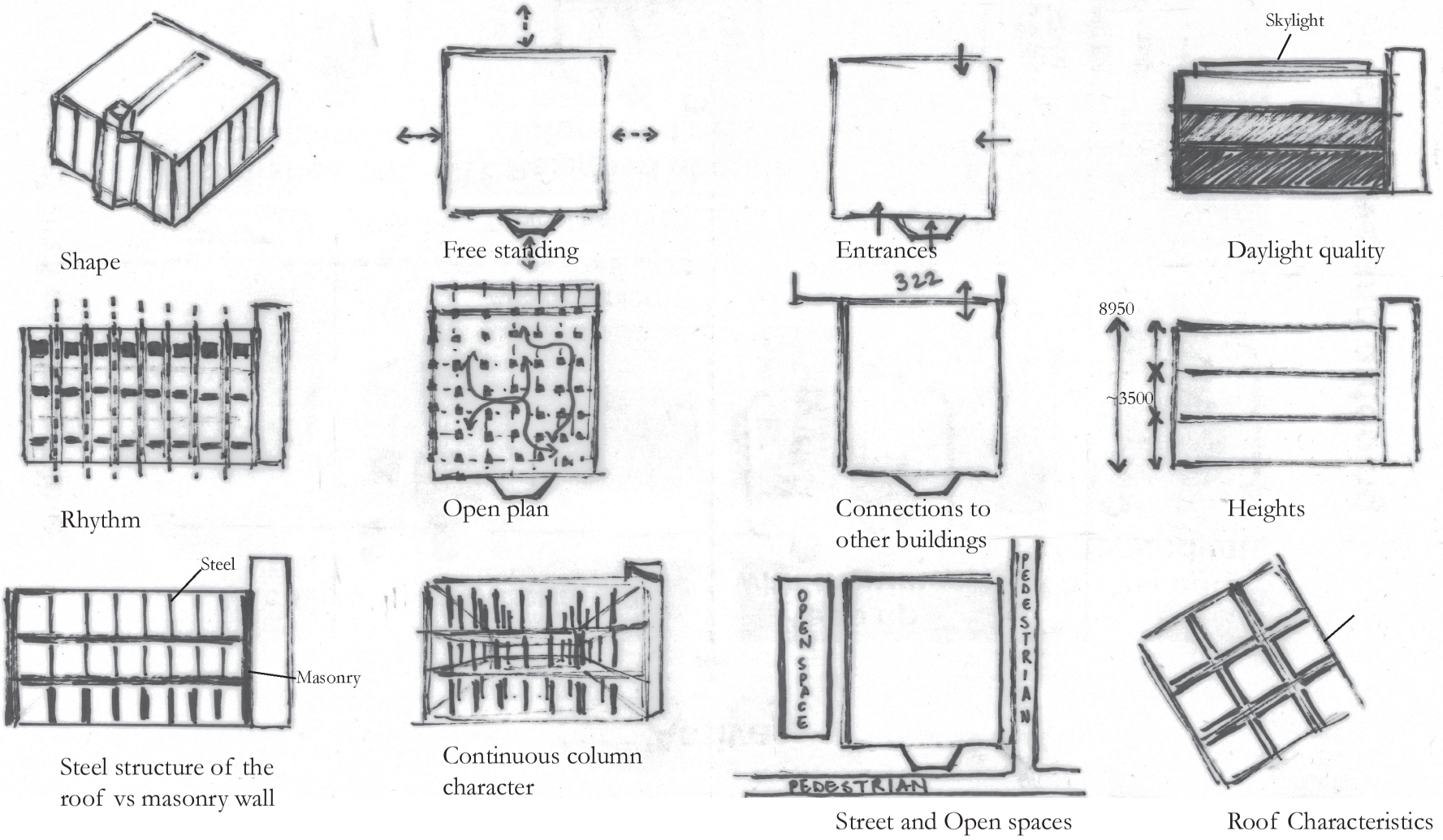


Figure 60: Archival drawing
Image by: Hembrug Archival Data

Figure 61: De Dood
Image by: Niels Steverink

Architectural qualities

Figure 62: Architectural qualities
Image by: Neel Sarkar



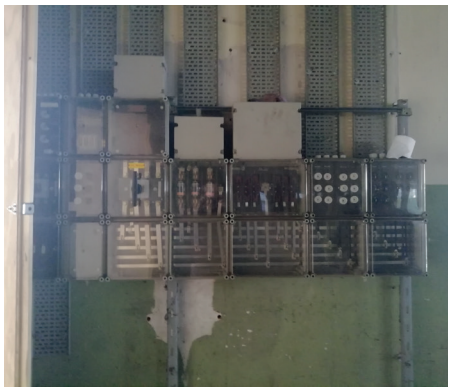
Architectural characteristics

A large imposing tower makes for a very impressive and overwhelming entrance.

Very square basic shapes make up the facade of "De Dood". This again makes for an imposing, large building.

Solid materials are used. Concrete, brickwork and steel make up the largest part of the building.

Heavy industrial cast iron columns with tough rivets are a clear reflection of the strength of the building needed for the storage function.

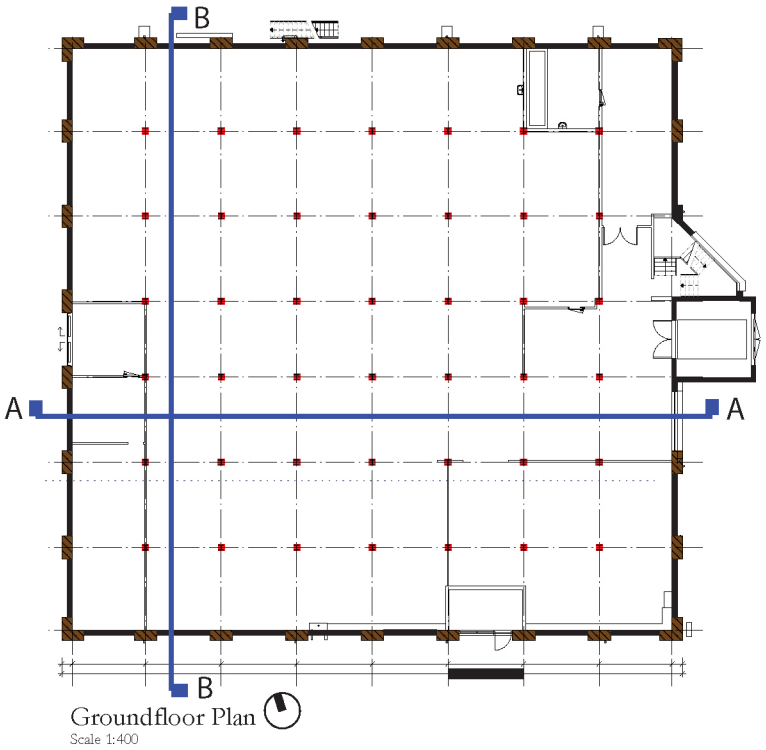


Large scale non-hidden or decorative installations are present throughout the building.

On top of the very heavy mother beams are very strong cast iron daughter beams. As they are placed on top, the construction is very well visible and easy to understand.

Figure 64: Architectural Characteristics
Image by: Niels Steverink

Construction

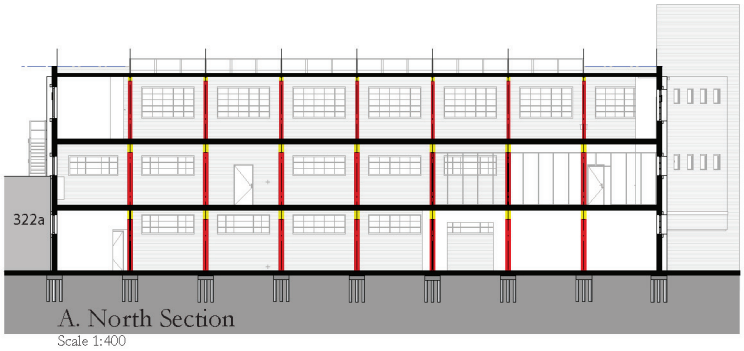


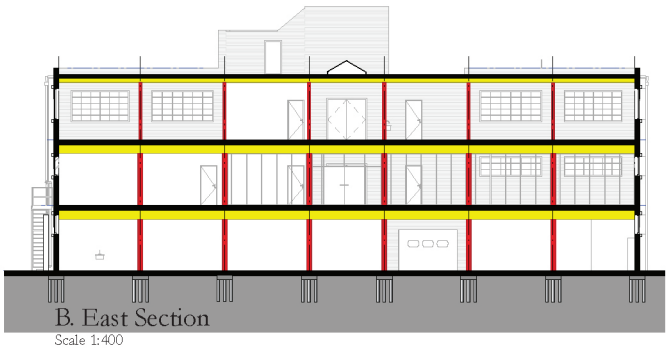
Structural Dimensions:
Ground Floor Dimensions
Column: HEA 250
Beam: IPE 450

First Floor Dimensions
Column: HEA 250
Beam: IPE 450

Second Floor Dimensions
Column: HEA 150
Beam: IPE 220

Since the structure needs to withstand greater loads at the lower floors, the columns and beams are larger as we go down a floor





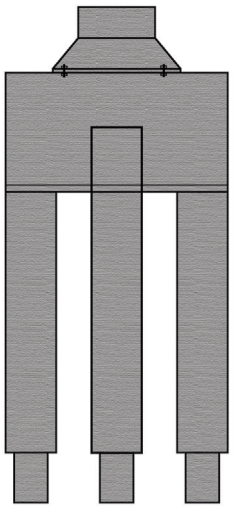
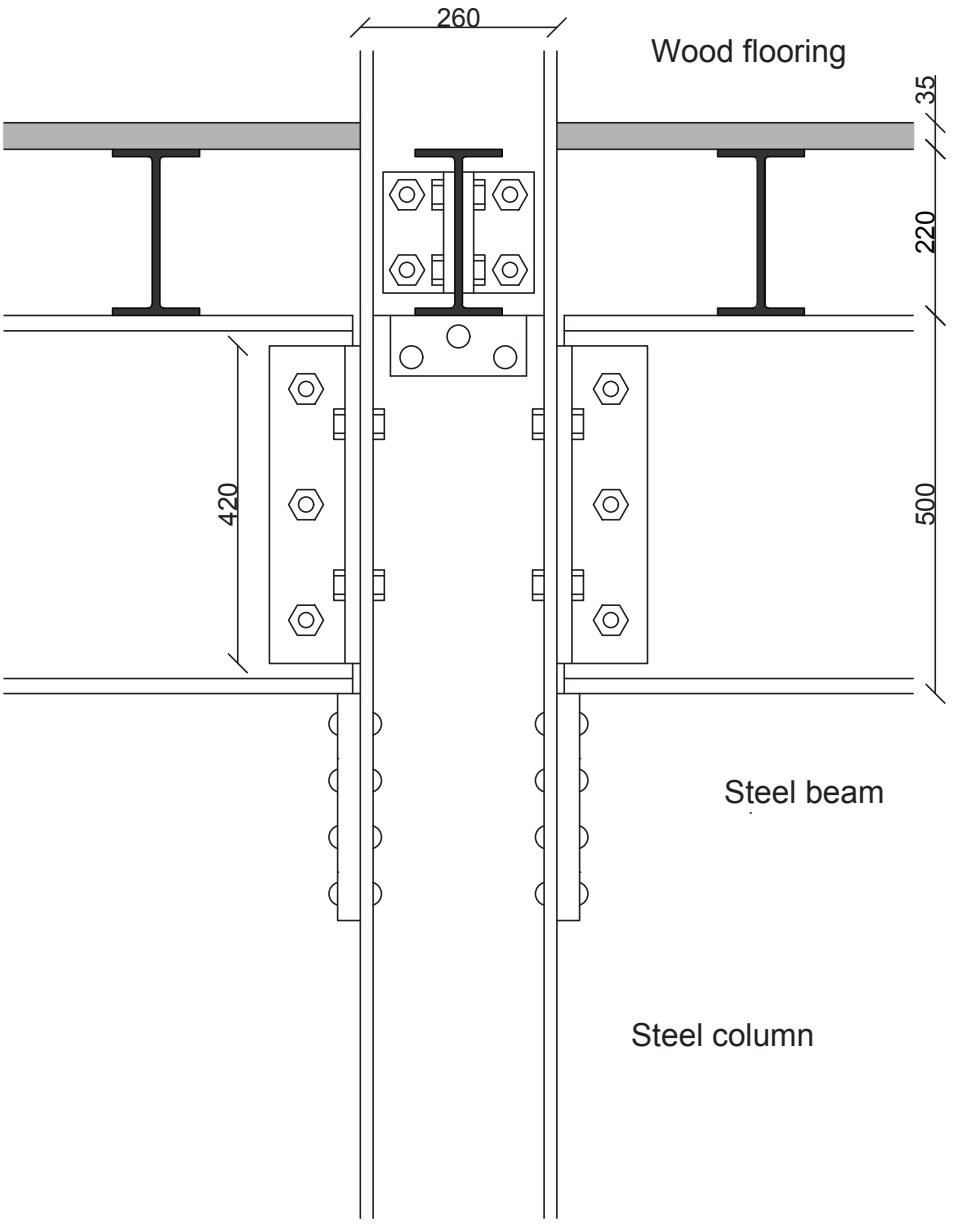


Figure 65: Construction
Image by: Hembrug Archival Data
Processing: Neel Sarkar



First floor to second floor column connection
Scale 1:10

This is a detail of the ground to first floor connection. One can see that is very sturdy. Many rivets and bolts combined with thick steel elements make this construction very strong, which matches with its previous function of warehouse. The entire construction is visible in the building. The methods of bolting and riveting are combined.

Figure 66: Critical detail 1:10
Image by: Niels Steverink

Stability

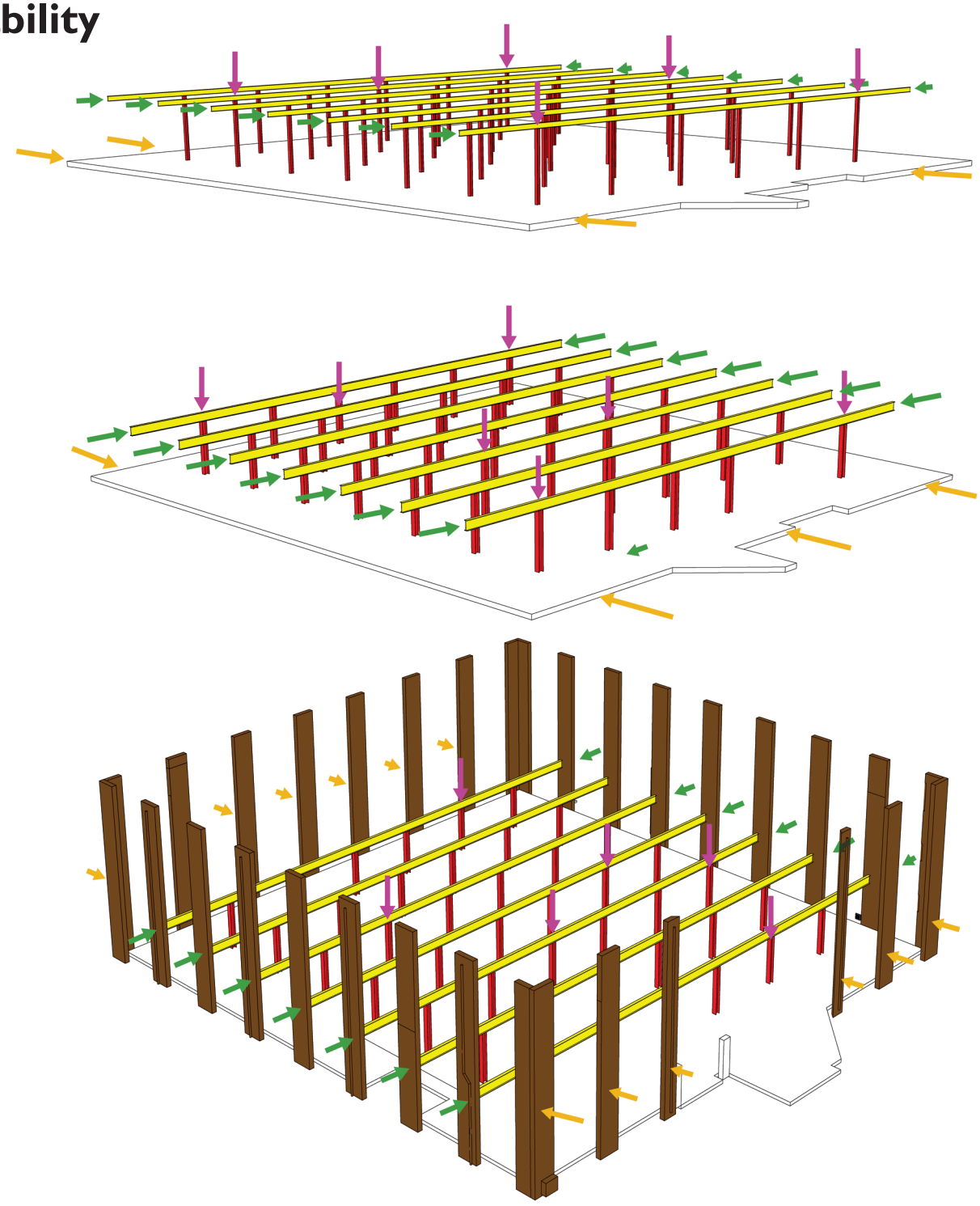
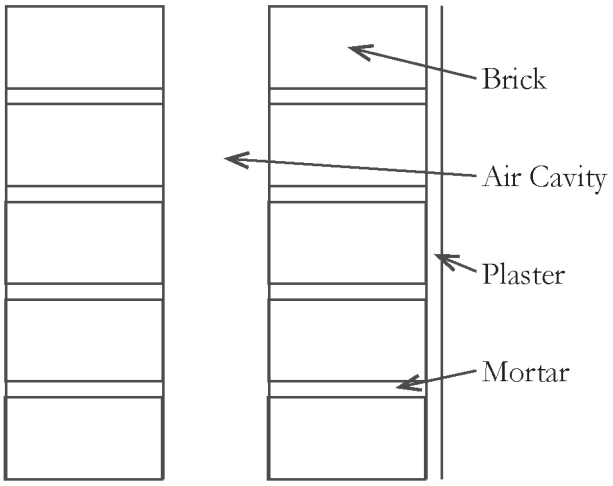


Figure 67: Construction
Image by: Hembrug Archival Data
Processing: Neel Sarkar

The vertical forces move down from the roof to the foundation through the columns which become bigger in size on the lower floor, as shown above. The buttresses made of brick on the exterior wall carry the vertical forces of the massive brick exteriror facade, as shown above. The Horizontal forces are carried by the beams in one direction and the lateral forces are counteracted by the floors and facade walls in the other direction, as shown above. The foundation is made of piles and helps in the stability due to the nature of the soil the buildings is built on (the soil has historically been that of a polder), as shown in the structure section.

Facade



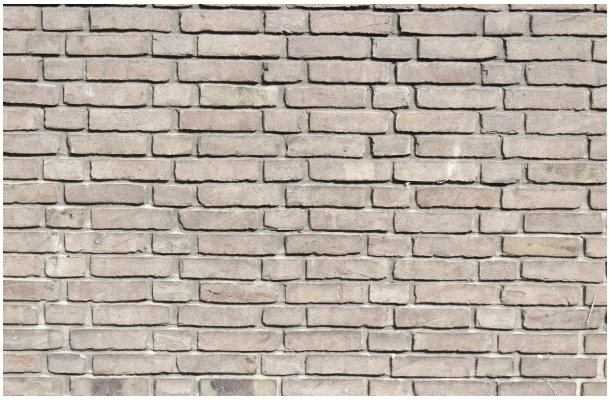
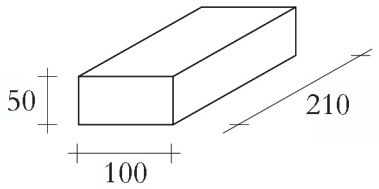


Figure 68: Wall
Image by: Neel Sarkar

Brickwork:

Size:	Waalformaat
Bond:	Monk Bond
Colour:	Dark brown



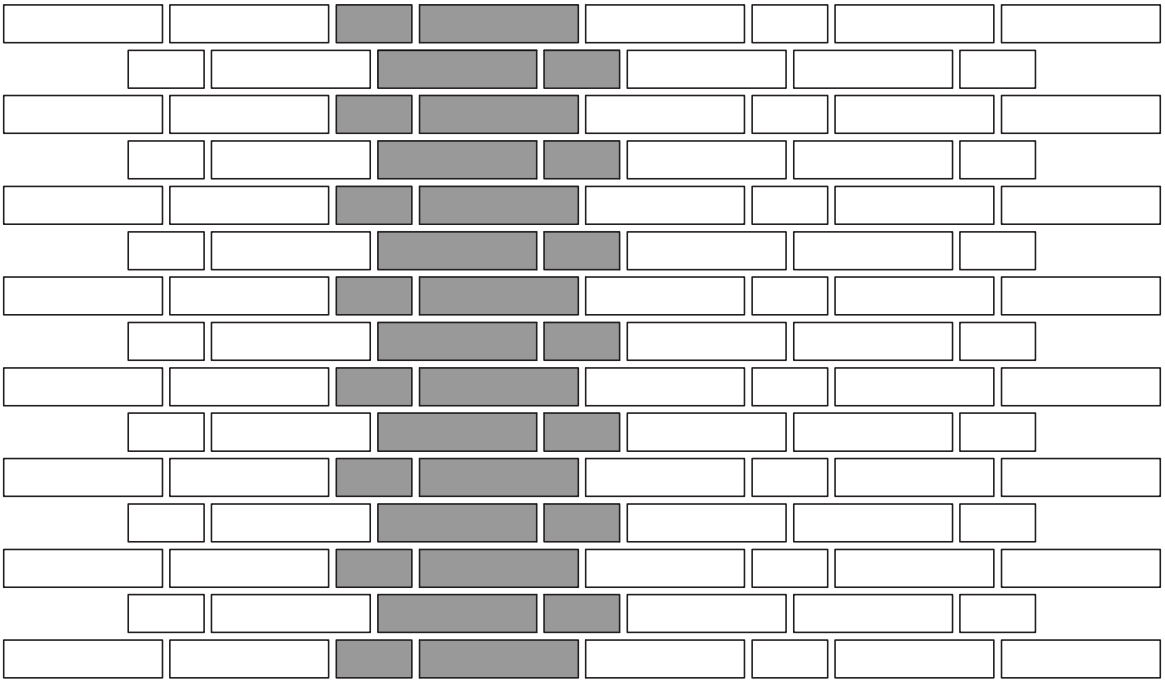
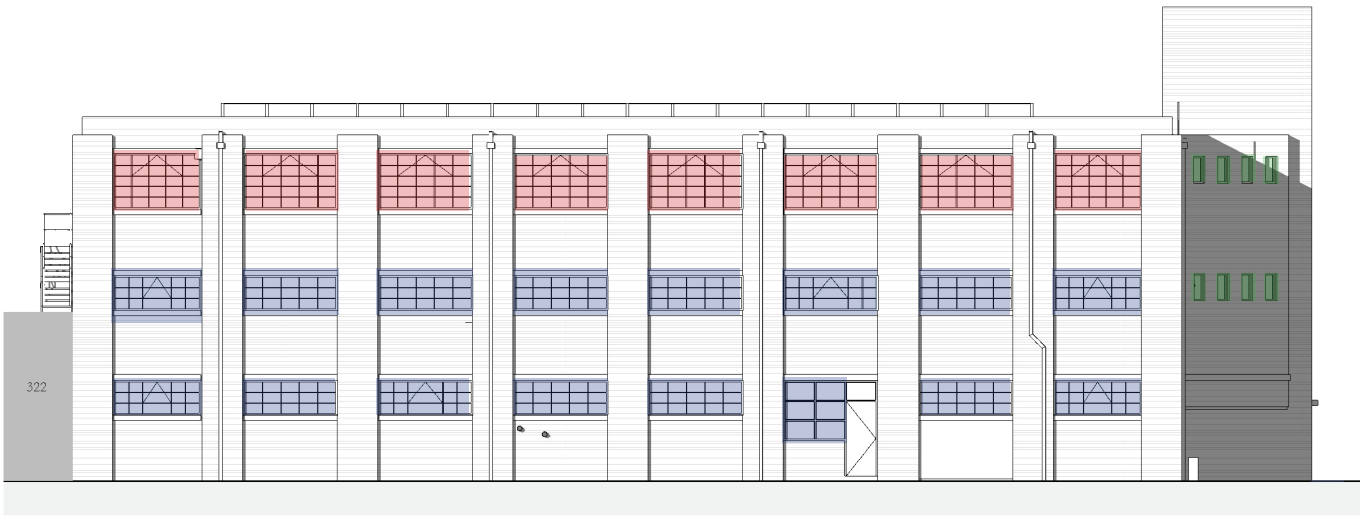


Figure 69: Brickwork Bond
Image by: Niels Steverink

Windows



Type 1 Window
Steel frame windows with single glazing.
Structurally covered by a brick lintel.
Concrete parapet

Type 2 Window
Steel frame windows with single glazing.
Structurally covered by brick lintel.
Concrete parapet

Type 3 Window
Other, less common windows

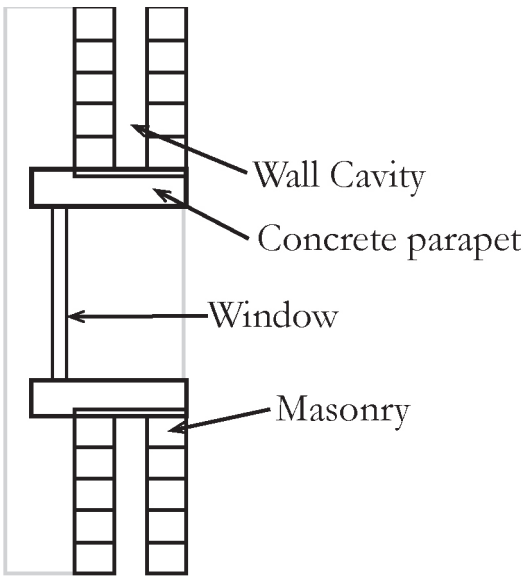
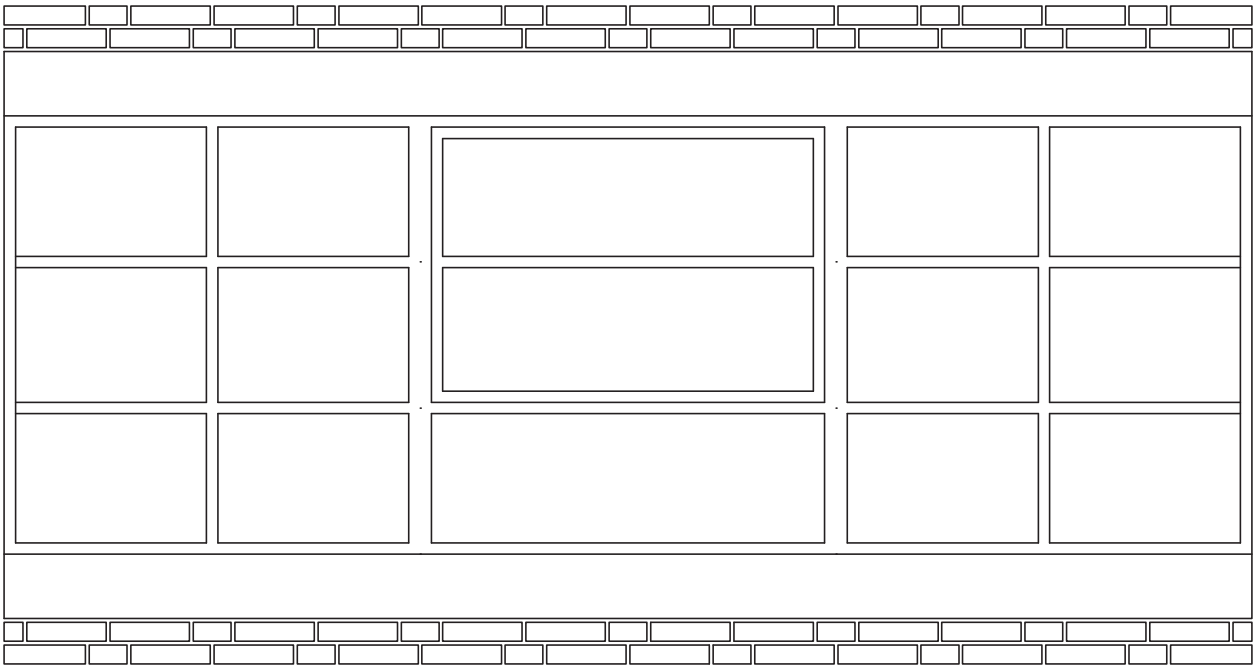


Figure 70: Windows
Image by: Hembrug Archival Data And Neel Sarkar
Processing: Neel Sarkar



Type 1 Window
Scale 1:10

Figure 71: Windows
Image by: Niels Steverink

Floor and foundation

Figure 73: Floor
Image by: Neel Sarkar

The ground floor is made from concrete and the plates under which the foundations are placed can easily be distinguished. The first and second floor is made out of 3.6 cm thick wood and have a width 13 cm. There are two layers of wood panels, primary and finish floor. The floors are supported by the larger and smaller steel beams placed above each other. The wood panels have a different pattern in certain places probably showing the difference in the function of that area. The panels are placed in a diagonal direction to counteract the wind loads.

Figure 72: Floor
Image by: Neel Sarkar

Roof

Figure 75: Floor
Image by: Neel Sarkar

The roof of this building is like almost every other building in the ensemble and is made of a lightweight concrete cassette shaped material. These cassette panels are 50 cm wide and 8 cm thick. They are probably dense and have good strength and a decent amount of sound proofing. The roofs also have a bitumen layer on the outer surface for water proofing.

The top floor of this building has a skylight making this floor quite different and much brighter than the other floors. The skylight is made of glass and a supporting steel structure which is in turn supported by the steel beams and columns of this floor.

Figure 74: Floor
Image by: Neel Sarkar

Installations and climate control

Water Management

Water Management: The rainwater is drained from the roof and runs down the facade of the building along the buttresses through a series of steel rain pipes, as show to the left

Climate Control/ Air Circulation

Climate control/ Air circulation: The only form of climate control was from the operable window panel on the steel frame and glass windows on the facade. The windows got bigger on the top floor and natural ventilation was the only source of cooling.

Power

Power: Electricity was the main power source and was distributed throughout the building through these intricately worked meter system, as shown to the left.

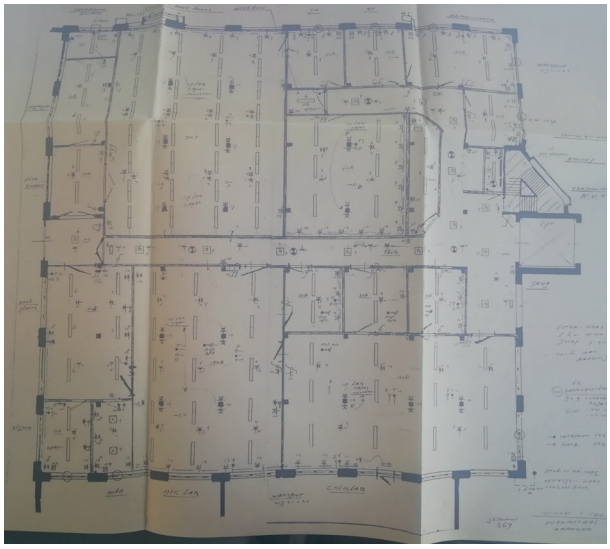
Daylighting

Daylighting: The source of daylighting again was from the windows placed around the building with the ground floor receiving the least and the top floor getting the most from the additional skylight and bigger windows on the top floor, as shown to the left.

Figure 75: Installations
Image by: Neel Sarkar

Details of note

Toilets: There were toilets on the top floor which were quite unique and new to us. The doors of the stalls were made of heavy cast iron with massive bolts and windows on them. The urinals were quite modern and were finished with ceramic tiles.



The first floor used to house several internal walls. Almost all these wall have been removed and are no longer present, with the exception of some offices in the corners of the floors.

Connections: The connection to the next building 322 was quite big in the past but mostly covered up with just a small door access. Even the windows of this building were covered to disconnect this building to the from the next.

Steam valves: There were remnants of the past such as these steam control levers (probably) which were used to control the steam supply to and from the building.

Figure 75: Details of note:
Image by: Neel Sarkar

6. Cultural Value

What is the significance of cultural value in the architectural diversity of the Changeover zone?

When we think of cultural valuation in the changeover zone, the diversity of the ensemble creates a lot of different and unique points of valuation. But the more diversity in valued aspects, the more complexities in clashes between the values. This poses several dilemmas because of the complexities, but ultimately if the valuation is done in a ordered and logical manner, the opportunities for the future can be identified and the interventions become interesting and challenging as well as culturally sound.

For the cultural valuation of this ensemble, we first look at the ages of each building and go deeper a little and look at when certain parts of buildings were made as a couple of buildings in the ensemble had extensions done later. Looking at the building ages will be important, because age value is non replacable. Something is only original once. Older architectural and technical elements are of higher value as they are things of the past andare not made today. We then identify the designated municipal monuments, because any and all interventions to them must be minimal and done with utmost care. We then drew a map of the level of significance with the ground floor plans as well as surrounding elements and valued them in three categories, high, medium and low value. The valuation is done in these 3 categories to help with decisions related to future interventions. Where high value points are touched upon the least and restored, low value elements could have more drastic interventions or can even be demolished if the reasoning is logical. The elements that are not visible on the map are shown in the site elevations and valued similarly. The valued points are described in detail after that and finally we end with a CV matrix based on the aspects and values mentioned by Brand and Reigl respectively. The CV matrix values are also elaborated on after that and we finally summarize our findings in the conclusion and move onto our own personal statements which are our reflections of the conclusion. Subsequent dilemmas, obligations and opportunities are also mentioned.

6.1 Chronomap of building age

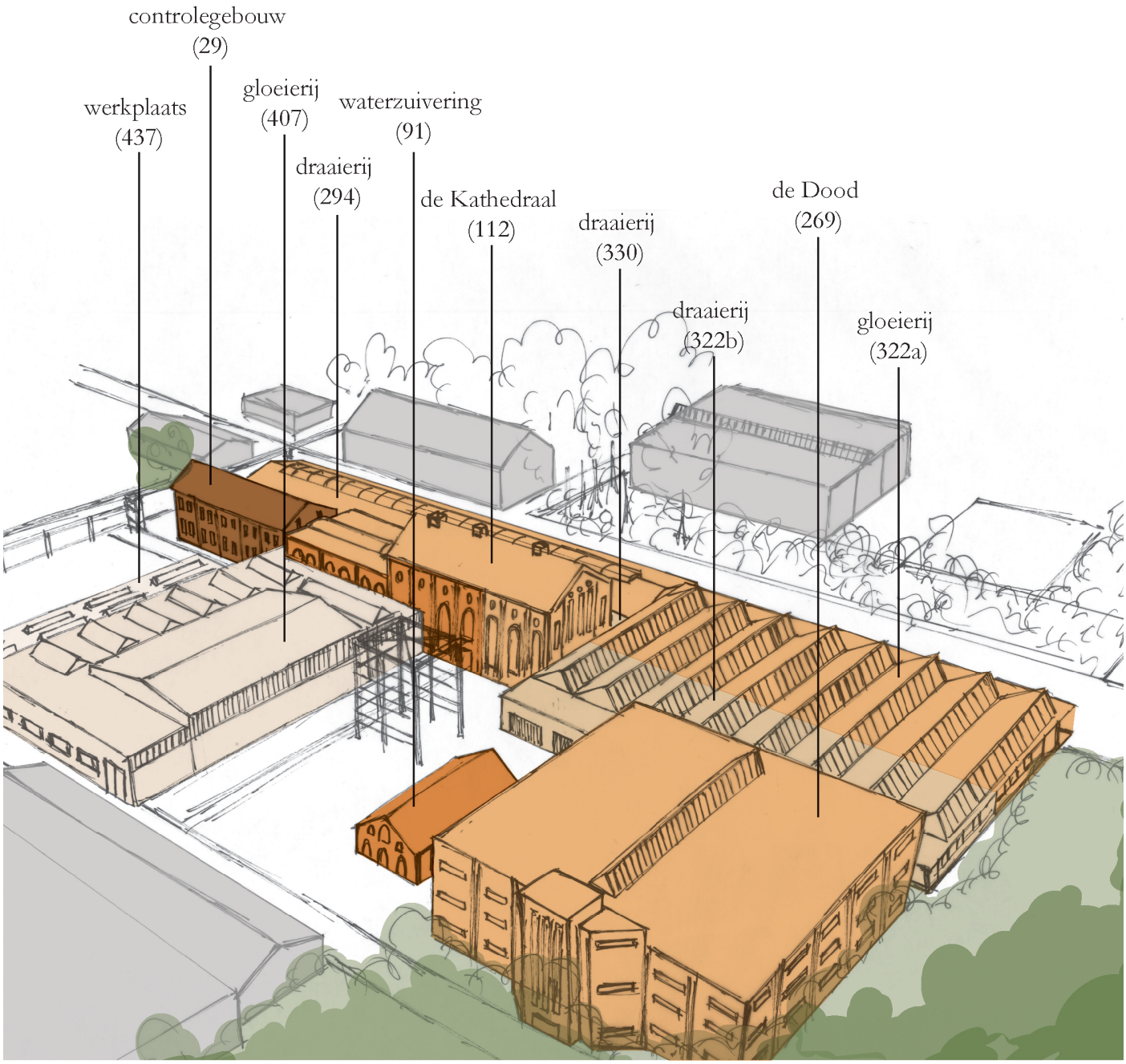
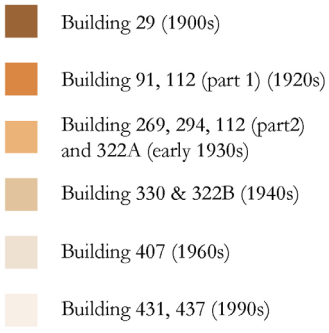


Figure 76: Chronomap
Image by: Neel Sarkar

Earlier we saw a chronological map of the entire ensemble and now going a scale down we will look at the chronological map of the buildings in the ensemble. Right away we can see the former 'controlegebouw' building is the oldest one to have survived in the ensemble followed by the former 'waterzuivering' and the 'kathedraal'. But what is interesting is that only the left part of the building was built in the 1920s. The 'dood' was built next in the early 1930s and then in the late 1930s the last 3 sections on the right of the 'kathedraal' were built, including the roofs for both the higher and lower parts. The yada-yada which was a former 'draaierij' was also built around the early 1930s time as well as the first part of building 322 which is now houses Art Zaanstad. The long corridor like building between the 'Kathedraal' and 294 was then built as an extension of the 'draaierij' in building 294. The second part of the 322 was also built around the same time. Just before the site was about tot close down the new 'gloeierij' was built in building 407 which covered almost half of the façade of the 'kathedraal'. Finally, the 'werkplaats' was built when Eurometaal owned the site in the 1990s.



6.2 Monuments

Figure 77: Monuments
Image by: Neel Sarkar

Municipal Monuments

To understand the significance of the cultural value of the architectural diversity of the Changeover zone, we ust first look start by looking at the monuments currently existing in the ensemble. By studying the different elements (architectural and technical) of these buildings, we can start valuing them accordingly and give them different levels of significance.

There are 4 buildings in the ensemble that are given the 'municipal monument' status. The first one is building 29 (Clean 2 Antarctica) and is the oldest building which still exists today. Then the next one is the famous 112 (Cathedral). It is the tallest in the ensemble and is situated in the middle surrounded by and connected to other buildings. Next, we have the small former water treatment building in front of the cathedral with its ornamented façade and gabled roof. Finally, the last one is not very visible to the human eye right away as it is under the ensemble as it is a bunker running parallel to the Yada-Yada market and connecting several buildings. Other elements that are also are a monument are the structures of the former steam lines that once supplied steam for various purposes to the Artillery establishment.

6.3 Levels of significance mapping

Figure 78: Levels of significance
Image by: Neel Sarkar

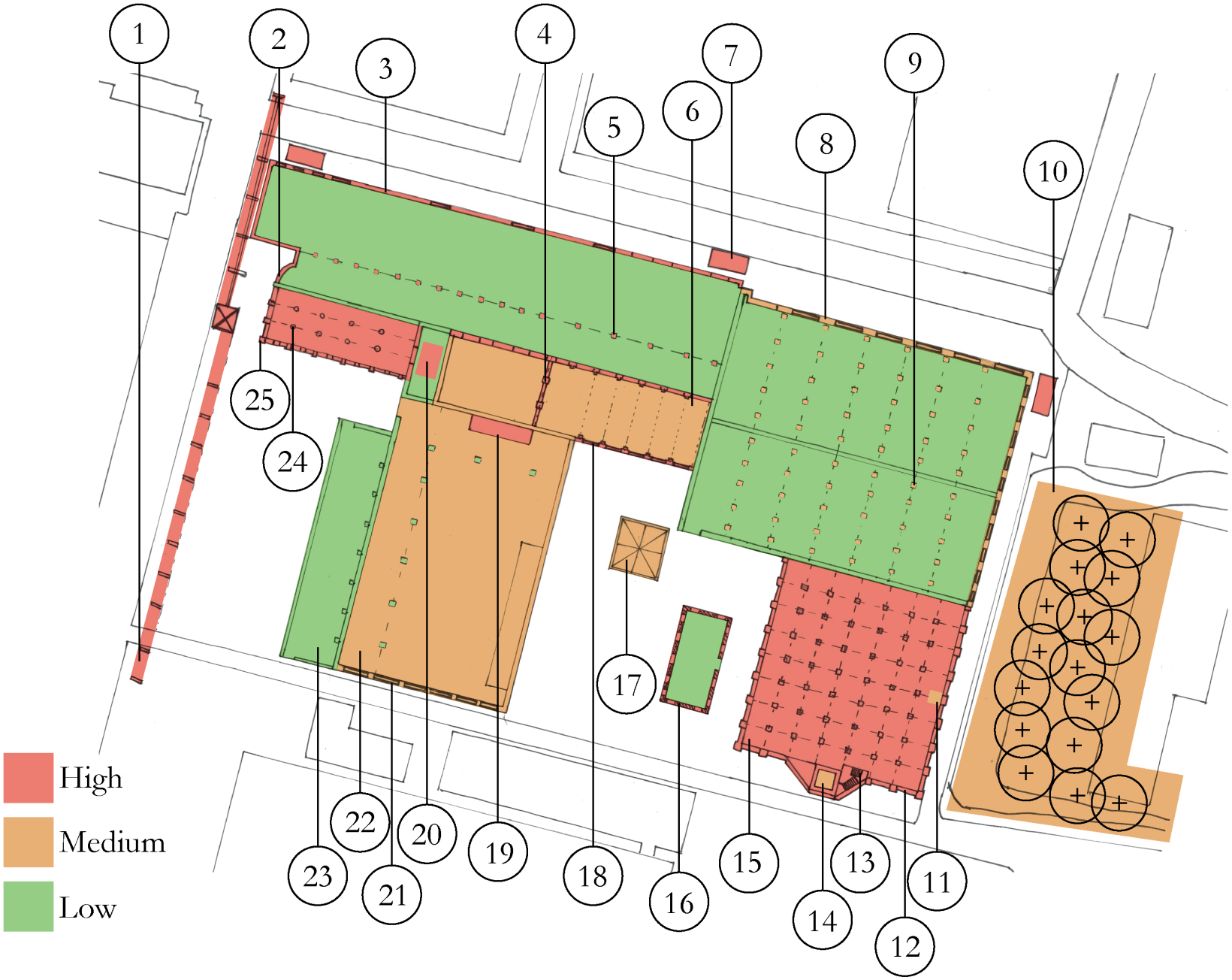
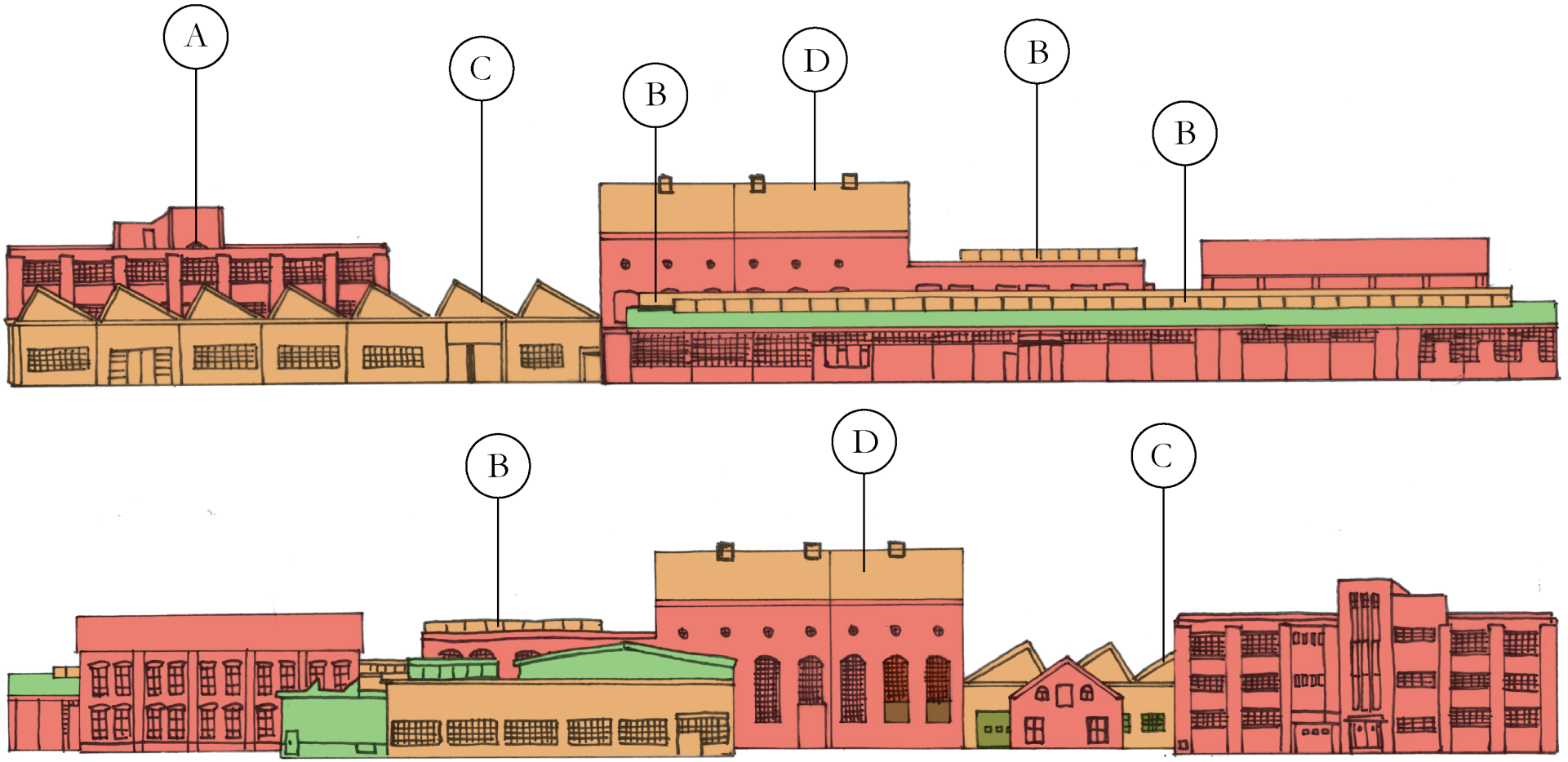


Figure 79: Levels of significance
Image by: Neel Sarkar



Looking at the ensemble from its elevation is also important because then you can identify the values that cannot be seen from a plan; such as the values of the roofs and skylights.

6.4 Description of significance levels

The remaining structure of the old steam pipes is given the status of a municipal monument therefore it is of high value and it also acts as a reminder of what this site's past function was.

1

The curved window of building 330 with glass and a steel frame and brickwork at the bottom acted as a lookout for the man standing guard to this building back in the day so that he could keep an eye on everything going in and out. It is of high value because of its uniqueness.

2

The façade of the former yada-yada market is also of high value as it is valuable element adding a layer in time with its old school window construction made of glass and steel frame and the columns on the façade also can be seen on the façade itself.

3

The internal brick columns of the cathedral building are of high value due to its historic construction technique.

4

The steel columns that are shared by building 294 and 330 are highly valuable as they are integral to the stability o both buildings and carry age value.

5

The open floor plan of the cathedral is of medium value as it gives this building its airy breathable characteristic. It is integral to the spirit of the place.

6

The underground bunkers are municipal monuments and exist as testaments of the past function of this site.

7

The façade of the Art Zaanstad building are of medium value as it is a good example of old versus new and retains the masonry façade characteristic which defines this ensemble and site.

8

The columns of both buildings 322 A and B are of medium value as it is integral to the support of the roof of this building which is also valuable, and the columns also carry age value.

9

The forest on the north side of the ensemble is of medium value as it defines the character of this side of the ensemble and gives this side a very intimate and green feeling.

10

What appears to be old remaining valves that probably controlled the steam supply to building 269 re of medium value as they are a testament of the past.

11

The façade of the 'death' building is of high value because of its brickwork, rhythm and very modern look for its time.

12

The staircase is quite and had a strange shape and carries uniqueness value.

13

The elevator is of medium value because it carries age value and use value.

14

The floor of the 'death' building is of high value for its historic construction technique. The difference in design of the wood finish also tells us the difference in the purpose of its use.

15

The former water treatment building is a municipal monument and has quite an ornamented façade typical of its time. Thus, it is of high value.

16

The remaining structure from the demolished 505 building again adds a layer of time to the ensemble reminds of the building it used to be part of.

17

The façade of the cathedral building has multiple values related to it. It has age value, architectural value for being very rhythmic and having large cathedral like windows. It also has historic value for the brickwork on it and is one of the reasons the cathedral is a monument.

18

The remaining controls and valves of the annealing building (407) remind us of the past function of the building and is therefore of high value.

19

There is a unique elevator system situated between building 29 and 112 which was used to raise or lower goods. It would be interesting to integrate it to the new function and therefore is of medium value.

20

The façade of building 407, is not special but the fact that is a masonry façade with glass and steel frame windows makes it typical of the architectural character of this site and therefore is given a medium value.

21

The floor of the 407 building is again given a medium value as it still contains traces from the past and has old rails and lines which were used during the production process.

22

The 'werkplaats' building (437) is of low value. It was not built until recently (1990s) and was not a very important part of the original production line. It does not have any windows and is quite dark and cold inside. Demolishing it would be ideal.

23

The construction style of the oldest building in the ensemble is historic and has age and rarity value because it has cast iron columns with similar beams and a wood floor construction. Thus, it is of high value.

24

The façade of building 29 is like the cathedral and has a very rhythmic character with ornamentation. The brick work is historic, and all these qualities make it of high value.

25

Top floor of the 'death' building is unique from its other floor and has a very open and bright character due to the larger windows on this floor and the large skylight giving it medium value.

A

The skylight is an element that is very common on almost all the buildings in this ensemble and should be restored or brought back wherever possible giving it a high value.

B

The skylights of the Art Zaanstad building and it neighboring building are quite unique because the production process inside produced a lot of heat and so south oriented skylights would create more heat. Therefore, the openings were oriented towards the north and the windows were made of a translucent plastic. This is the only building in with such a system exists in the ensemble and so is valued highly.

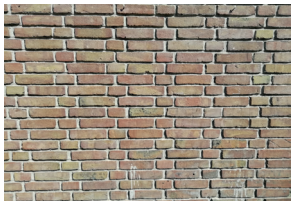
C

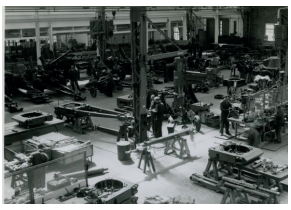
The old roof construction of buildings such as the cathedral and building 29 has skylights. Bringing back this element in these buildings would enhance the roof light characteristic of this ensemble.

D

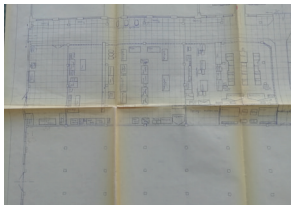
Figure 80: DOSL
Image by: Neel Sarkar

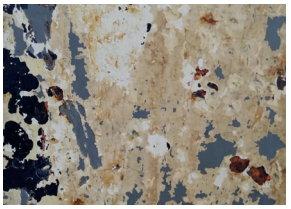
6.5 Cultural value matrix

	Age value	Historical value	Intentional commemorative value	Non intentional commemorative value
Surrounding/ setting		Plofbos The plofbos is an unique thing in the west of the Netherlands as bomb sites are unwanted in the busy Randstad		Industrial machinery leftovers Many tools and machinery are left over from the industrial production. They show the former function of the building.
				
Site	Polder landscape As the Dutch are famous for, the Hembrug area is built on reclaimed land	Only artillery production site of The Netherlands. Hembrug was the only point of national safety in regards to self-sufficiency.		Earth walls Earth wall are in the area to ward of blast. This gives the area a fortified feeling.
				
Skin	Basic brickwork Very basic brickwork patterns were used in the later buildings which reflect the change in thinking of warfare construction.	Historic building method The buildings have dense brickwork facades which now would have been built from lighter materials such as steel.		
				

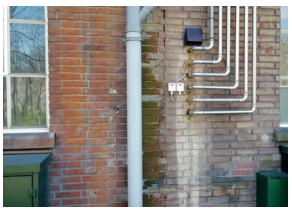
Use value	New-ness value	Relative art value	Rarity value	Other relevant values
Privacy of the terrain Surrounded by water, only a few entry points are present. This ensured high privacy levels during the production phase.				
				
Privacy of the terrain The terrain is covered by green to limit sightlines and increase privacy for workers.			**Only artillery production site of The Netherlands** Hembrug was the only artillery production site in the Netherlands making it a key part of self-sufficiency.	
				
		Brickwork patterns Sophisticated and simple brickwork patterns are visible on different age buildings. They reflect the change in thought about combat architecture and therefore reflect change in societal views		**Similair window style** Despite the differences in age, nearly all windows are steel framed, partitioned windows.
				
				

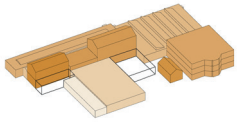
	Age value	Historical value	Intentional commemorative value	Non intentional commemorative value
Structure		Historic building methods Very old and early examples of steel and iron works are present in the buildings. These methods led the way to current day methods of building and are therefore of historical significance.		
Space plan		Production line The large, open spaces were made to house large production lines. If the buildings were made for other functions than industrial, they would have looked different in space plan.		
Surfaces	Brickwork All buildings have brickwork facades. Brickwork is the binding element between all buildings.			



Use value	New-ness value	Relative art value	Rarity value	Other relevant values
Very strong for heavy loads in 269 The large loads of industrial structure lead to large columns and floor. These still show the strength of the buildings.		Construction very visible All buildings have a very open and visible construction. This is important as a lot of other buildings try to hide this and therefore it is rare for buildings this age.	Cast iron riveted construction A very labour intensive and expensive construction method almost never used in modern day. Allot of early industrial examples have been demolished.	
				
112 Height for presses 269 floor strength The height of 112 without any floors is a great signifier that very large machinery was housed here.				
				
				
Concrete reinforced shelter The large reinforced bunker show the safety concerns taken in to account when building with and building for warfare.				Wear and tear Little maintenance has led to the different layers of paint and therefore years have become visible. It shows the history of the buildings on a small scale.
				

	Age value	Historical value	Intentional commemorative value	Non intentional commemorative value
Services		Old machinery Many tools and machinery are left over from the industrial production. They show the former function of the building.		External service structures Services had to be easily accessible and are therefore on show. They add another element of depth to the buildings usually hidden from view.
Stuff	Damage Very often used spots show more damage. The intensity of used can be seen though the wear and damage to the buildings.			
Spirit of place		"Grown Together" The grown together feel of the place is very important as reflection on the growth and approach to expansion.		





Use value	New-ness value	Relative art value	Rarity value	Other relevant values
		Patterns and lines created by services The patterns created by the services heavily influence the look and feel of the architecture.		
Crane structure The crane structured used for hoisting shells is still present.				
Open space plans The large, open spaces were made to house large production lines. If the buildings were made for other functions than industrial, they would have looked different in space plan.				Greenery Lots of green is around for safety, security and privacy. This private feel plays an important role for the mood when visiting the site.

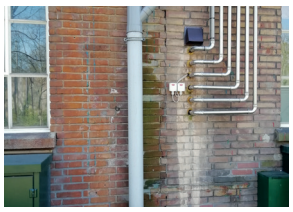


Figure 81: CV Matrix
Image by: Niels Steverink

6.6 Cultural Value Analysis Conclusion

The significance of cultural value on the diversity of the change-over zone is very closely related to the timeline of the development of the overall ensemble. Age value is definitely a key factor while valuing buildings and older buildings are valued more than the ones that were built in recent times. As newer buildings were added or extended, new connections were made with the existing buildings and these connections became important values as well because even though many buildings were made free standing at the time they were built, the connections that came later inherently became an integral characteristic of the both the old and the new (e.g. cathedral + former yada-yada). The ensemble works as a whole because of the uniqueness of each of the buildings but also because of the connections it has with each other.

The chronological mapping in the building scale also revealed how certain parts of the buildings were valued more than others due to later extensions (e.g. cathedral). The value matrix based on the Reigl & Brand was used as a tool to help value the ensemble and individual buildings on different aspects and scales in a framework that is logical. The levels of significance mapping is a tool that was used to visualize the identified values and to also give them a gradation of high, medium and low which helps with decision making while designing.

This method of cultural valuation not only helps identify and value the diversity of the ensemble but also gives us a starting point towards the design process where a set guideline and a framework could be drawn based on the valuation which can help give the design a good direction and potential.

6.7 Personal statement Niels Steverink

The research for the Changeover zone was quite challenging. Many different buildings, many different architectural styles and all cobbled together into one huge ensemble. We therefore worked from the large scale down to the small scale, which helped in getting a grip on the ensemble. A key element to me on the urban scale is its position between the cities of Zaandam and Amsterdam. With both cities getting more and more busy, this secluded, undiscovered spot is a spot worth keeping in its seclusion. I therefore do not want to look for extremely loud and busy public functions.

On the Hembrug scale, the ensemble fits very nicely into the grid of Hembrug. It has a busy side on the south and a more quiet side on the north. These differences should be taken into account when designing public and private functions within the ensemble. These two sides also have nice views towards the canal and the forest, two distinct natural features within the industrial area.

The building scale offers the most diversity. Buildings range from early 1900 to late 1900s and are built in a variety of building methods, styles and materials. All of them are still built to serve as industrial buildings for the military. This age range and different styles make the ensemble a nice reflection of industrial building in the last century. Keeping this on show by allowing the constructions and building methods to still be visible after renovations is key in keeping the cultural value of the ensemble. The height of the cathedral compared to the rest of the ensemble and even Hembrug is also of great importance to me. As one of the oldest buildings it has been a determining feature around which the rest of the ensemble has been build and serves as a middle point bringing the whole ensemble together.
On an even smaller scale, the industrial services, installations and infrastructure visible within the building play a key role in the look and feel of the buildings. This visibility of services is very rare and is an important element worth keeping.

Obligations:
As stated, the first obligation is to keep the ensemble, and the whole of Hembrug, secluded from the busy city life. The second obligation is to keep the ensemble complete and keep all building to maintain the architectural diversity which makes the ensemble special. Therefore, no buildings are to be demolished. The final obligation is to keep the essence of the visible installation alive by either keeping the current ones or making new ones in similar style to serve the new functions. Maintaining the brickwork is also very important as it binds the ensemble on a material level.

Dilemmas:
Several dilemmas unfold when attempting to keep a lot of originality to these deteriorating, aged buildings. Changed have to be made in order to serve a new function as best as possible so a suitable level of change needs to be found to allow the originality and the new function to coexist within the changeover zone.
With the seclusion being of high importance, the rest of Hembrug has to follow the same principles of limited public functions. Otherwise, problems might arise between the ensemble and its neighbours.

Opportunities:
Huge open floorplans will allow for relatively great architectural design freedom on both a functional and on a physical level. The large floorplans combined with all the skylights makes for many, well lit, comfortable spaces ready for redevelopment.
As the ensemble shows many different decades of building infrastructure already, making something new in the current style will only create a next generation of the same growth which has been going on for more than a century.
The "square" located on the east side of the ensemble creates opportunities to blend interior and exterior functions within the programme to be designed for the ensemble.

6.8 Personal statement Neel Sarkar

Valuation for the Changeover zone ensemble was challenging as there was a lot going on in the area both historically and at present. Studying the ensemble in different scales and relating them to the larger urban context and into the context of Hembrug was key. Right away it was evident that functionality was the driving force for the layout and design of not just this ensemble but for almost the entire site of Hembrug. There was a definite logic in the way the buildings were made, and they followed the North-South and the East-West direction strictly. The change-over zone is very unique in the sense that it was part of the smallest section of the Artillery Establishment, namely the cartridge factory and hence due to the lack of space, several buildings were made next to each other in a compact way, which can be seen in the ensemble where there are 10 buildings present in an area of about 10,000 sqm whereas there are about 2 or 3 present in the same size of area in other parts of Hembrug. Therefore, the diversity of this ensemble starts with the fact that they had to fit in as many buildings as possible which were needed for the production in a efficient way and anything that was not needed anymore was removed or replaced. And that was the way the Change-over zone changed for the most part of its military life.

The architectural diversity of the ensemble also comes from the fact that it is quite unique compared to other areas because starting from the ensemble as a whole, if we look at the borders, they are quite different on all 4 sides. The one to the North is very green with a dense forest and less busy. The one to the West on the other hand, is very busy with a major street passing through it which comes from the main entrance. There are commercial shops such as the Art Zaanstad as well on this side. The South is a little open with a huge parking lot and views of the North Canal and a green area with old steam lines passing over it.

The East is the quietest and quite private with the enclosed and intimate courtyard in front of the cathedral.
When you study the buildings individually you also see the diversity in typologies and their past functions which is important to note for future developments. The open plan and high roof qualities of a lot of the buildings on the site is a special characteristic of this ensemble and the intricately ornamented buildings like the Clean 2 Antarctica (29) and the former water treatment buildings (91) add a touch of rich heritage to the ensemble as well.
Analyzing the ensemble from an outside in approach from the neighborhood scale to each individual building, one could comprehensively answer the question of how and why the ensemble developed over time to be so diverse. The constant change and build up of several time layers due to the existence of several buildings or elements over several different eras from the 20th century has created an amalgamation of unique buildings and styles that eventually according to me work well together as one.

Obligations:

The first obligation that comes to mind is that we must identify the designated monuments on the site and give them special attention. They have to be worked on with utmost care and interventions have to be kept to a minimum with a focus on restoration.
The orientation of the buildings not just in this ensemble but in the whole of Hembrug follow a certain logic of being either parallel or perpendicular to the North Sea canal and that must be respected to follow the layout pattern of Hembrug.
Function was the driving force of the architectural, spatial and technical qualities of the buildings and that needs to be kept in mind while designing or designating new programs and interventions.
The open floor plans of the buildings are a spatial quality of the buildings on this site and keeping true to that to a certain extent and designing programs accordingly would be interesting.
The building heights are an important aspect as the cathedral at about 16m is the tallest and other buildings built in the future should be lower at about 12m which is seen from the massing study.
In terms of materiality, brickwork is something that is common for all the buildings in the ensemble and this also connects the ensemble to the rest of the site since almost all the buildings in Hembrug have a brick façade. Skylights were or are a common element in all the visible buildings in this ensemble and bringing them back to some of the buildings would be important.
The individuality of the borders of this ensemble and the very distinct and different atmosphere they create on the 4 sides needs to be preserved because the 4 borders also define this ensemble.
In general, the 'genius loci' of the ensemble and of each building needs to be preserved because the spirit of a place is one of those intangible things which is quite important in heritage sites and which is easy to identify but could be equally challenging to preserve.

Dilemmas:

One of the first dilemmas I could think of was how to preserve the certain valuable elements of building 407 such as the existing meter boxes and traces from the past which can still be seen in the floor, but at the same time, demolish it to reveal the old façade of the cathedral to enhance the value of the building?
The demolition of building 407 and 437 is important because after studying the site, they did not appear to be of cultural significance and the valuation on the facades, technical elements, structure and architecture is quite low and the building also shows a considerable amount of wear and tear and it would not be worth the effort required to restore it as new interventions would be hard to fit into the existing conditions. Building 437 on the other hand was the last building to be made on the ensemble and was an unimportant workplace with no windows and an architectural style like the now demolished building 505.

Therefore, demolishing it would be a good idea but the dilemma that comes to mind is that the demolition of the above-mentioned buildings would drastically change the Eastern border of the ensemble as well as the spatial qualities of the open spaces. Whether that would be favorable/ideal or not is something to wonder about.
For the current design, I have an idea to design a community for the elderly with a culinary school as the center of the programmatic design. The culinary school would be housed in the cathedral building and would continue into the extensions in front of the cathedral. Another dilemma I had in mind was that a culinary school would need a considerable amount of climate control and ventilation systems as a lot of exhaust is produced while cooking which could affect the air quality of the building and in turn affect certain historical elements in the building. Designing a climate system inside this big hall with not a lot of existing ventilation installations would be challenging as well. New installations must be carefully thought out so that it does not change the interior character of the cathedral.

Opportunities:

The demolition of buildings 407 and 437 also creates several opportunities. After the demolition of building 407, the east-facade of the Cathedral becomes visible again. This facade would to be restored to its original state that it was in before building 407 was built against it. Restoration of this facade to its original state would be important for many reasons. The first one being the restoration of the rhythm because it is a defining character of this building architecturally. Next, several of the cathedral's connections/openings are closed off and reopening them would also reintroduce the historical connections it had with other spaces and buildings. Bringing back the roof lights to the cathedral which it once had would also be an opportunity to bring back an old missing characteristic to this building.
Roof lights were also present in building 29, which could also be brought back. Interventions to this ensemble could be seen as opportunities to make it more sustainable by retrofitting efficient installations and also improving the climate control of these building because most of them lack that today.
Removal of certain building also pose the opportunity to better the outdoor qualities of this ensemble as it could free the ensemble from its high density a little and improve the atmosphere of this ensemble as a whole.
The continuos change over time and the multiple typologies present also gives us an oppotunity to add newer typologies which would stay true to the trend of this ensemble.
Finally, designing new interventions and restoring the old industrial heritage on this ensemble gives us an opportunity to make it truly a good sustainable center of attraction not just geographically but programmatically as well because new metro routes, bike routes and the fact that it is close to the main entrance already gives this ensemble a head start which could be continued by me.

7.0 Bibliography

Kuipers, M. and Jonge, W. (2017) Analytical Mapping, Designing from Heritage, pp.72-97, Retrieved on 10 April 2019

Kuipers, M., & De Jonge, W. (2017). Designing from Heritage: Strategies for Conservation and Conversion. Delft, Nederland:
TU Delft.

Palmbout. (2015). Hembrug-Terrein Zaanstad. Ruimtelijke visie en ontwikkelingsstrategie voor een voormalig militair productieterrein.. Retrieved from https://brightspace.tudelft.nl/d2l/le/content/124973/viewContent/1214346/View

Projectbureau Hembrug (2018). Hembrug: Portfolio Hembrug Zaandam - Factsheets. Retrieved from www.hembrugontwikkelt.nl

SteenhuisMeurs BV. (2010). Hembrugterrein - Zaanstad CULTUURHISTORISCHE ANALYSE. Retrieved from http://www.hembrugterrein.com/wp-content/uploads/2016/04/Historie-Hembrugterrein-web.pdf
SteenhuisMeurs BV (2). (2016). Hembrugterrein Zaanstad Gebiedspaspoorten en omgevingsplan. Schiedam, Nederland.

Het Legermuseum (n.d.). Nederlandse tijd-, schok- en nabijheidsbuizen in de collectie van het Legermuseum. Retrieved March 20, 2019 from http://www.militairmagazijn.nl/wapens/armamentaria/artikel/wapens_armas_xml_e72e8230-163f-427b-a40a-5f2a267d32a8/

Ecologisch Adviesbureau B. Kruisen. (2004) Natuuronderzoek Hembrugterrein in 2003 toetsing Flora en Faunawet.Zaanstad, Nederland.

Hembrugterrein.com. (n.d.). Retrieved April 15, 2019, from http://www.hembrugterrein.com/jouw-event/evenementenlocaties/blackbox/

Brethouwer, D. H. G. (1937). Constructie van Brisantgranaten. Retrieved from https://www.militairespectator.nl/sites/default/files/bestanden/uitgaven/1937/1937-0352-01-0110.PDF

Koen, D. T., & Visser, A. R. (2003). Cultuurhistorische inventarisatie en beschrijving van de monumentale waarden van de gebouwen op liet fabrieksterrein van Eurometaal NV. Zeist, Nederland: Rijksdienst voor de Monumentenzorg. Kruit, P. (2019). Artillery Establishments Hembrug, Retrieved on March 25, 2019 from https://artillerieinrichtingenhembrug.wordpress.com/

Projectbureau Hembrug (2018). Hembrug: Portfolio Hembrug Zaandam - Factsheets. Retrieved from www.hembrugontwikkelt.nl

Gemeentearchief. (n.d.). Retrieved from https://archief.zaanstad.nl/zoeken-door-alles?trefwoord=hembrug

Figure 82: Hemburg employee with M95 Rifle
Image by: Zaandam Archive