HEMBRUG

Research & Analysis

Image front page: Photo by Barbara de Groot

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MSc 3 Heritage & Architecture

HEMBRUG

Research & Analysis

Image: Photo by Barbara de Groot

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INTRODUCTION

In this analysis, the MSc 3 students of the Heritage and Architecture studio investigate the site of Hembrug, its development from its origin until now and towards the future. For a proper understanding of Hembrug, this research incorporates Hembrug and its surroundings on a larger scale, the provence of North Holland and the cities of Amsterdam and Zaandam.

Due to the complex nature of the site, the research is split into nine topics. These topics are of course related to each other and will to some extent have some overlap. The analysis deals with the following topics:

- Water
- Defense line of Amsterdam
- Setup of the site
- Function
- Production
- Infrastructure
- Green
- Demographics
- Future

The goal of the analysis is to provide a proper understanding of the site and how it came to be. It forms the starting point for the more in depth analysis of the ensembles present on Hembrug and the further individual design of the students.

Text: Barbara de Groot & Lucas Pol

Image: Photo by Barbara de Groot

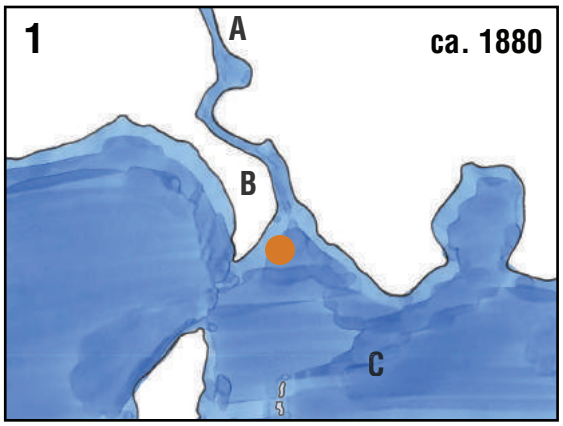
WATER

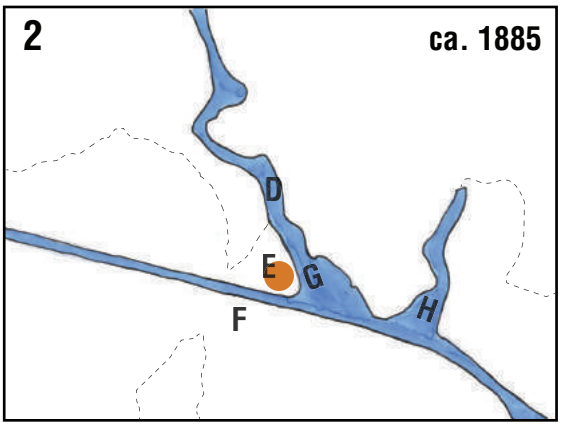
BRAM HULSHOF / SOUMAYA BOUJAMAA

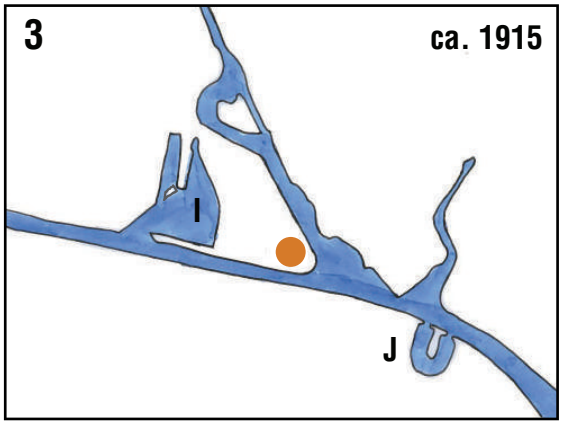
Until the end of the 19th century most of the Hembrug site was not existing (image 1), it was part of the IJ [C]. Most of the former site came into existence with the construction of the North Sea Canal [F]. This canal was completely dug by hand in 1865-1876 in order to create a better main sailing route from the North Sea to the IJ in Amsterdam. Next to the main canal, nine side canals were dug to connect existing water ways (like the Zaan [A]) to the North Sea Canal.

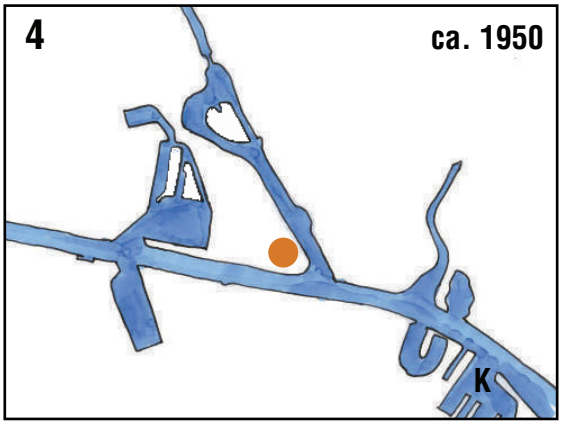
Simultaneously with the construction of the North Sea Canal and the side canals, several polders were created and sold in order to finance the canal. Within the armpit of the North Sea Canal and side canal G polder VII [E] was created as a continuation of split " De Hem" [B]. After considering a navy shipyard to be build at this location it was eventually decided to place the 'Artillerie Inrichtingen' there. Image 2 shows the North Sea Canal, side canals G and H and the new polders.

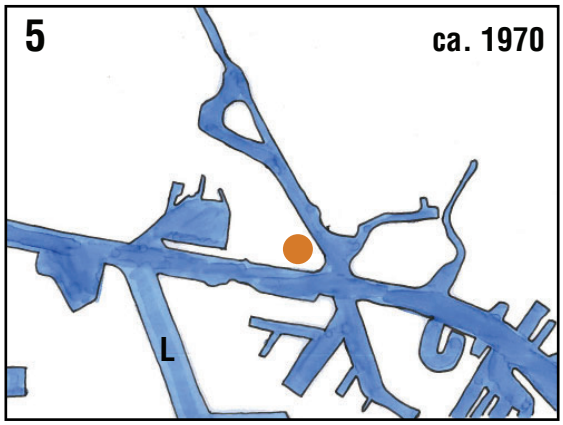
Over time several harbours alongside the North Sea

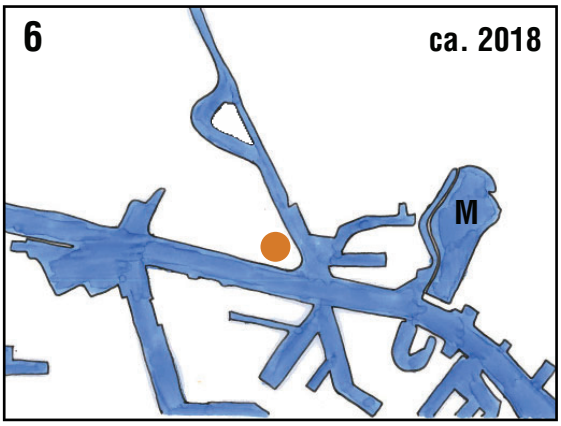












Source: own illustrations

Canal came into existence like the Petroleum Harbour [J], 1887-1889 and the "New Sea Harbour" [I], 1911. Gradually the shores of the North Sea Canal became industrial areas (see image 3).
From the 50's this really took off by the construction of big industrial harbours like the Coen Harbour [K] and the West Harbour[L] (see image 4). From the 60's these harbours were enlarged and new harbours in between were added (see image 5).
Over time more and more of the reclaimed land was transformed again into water. A good example is the Noorder IJplas [M], this former polder was used in the 70's and 80's as a sand extraction location, with a lake as a result (now a nature reserve).

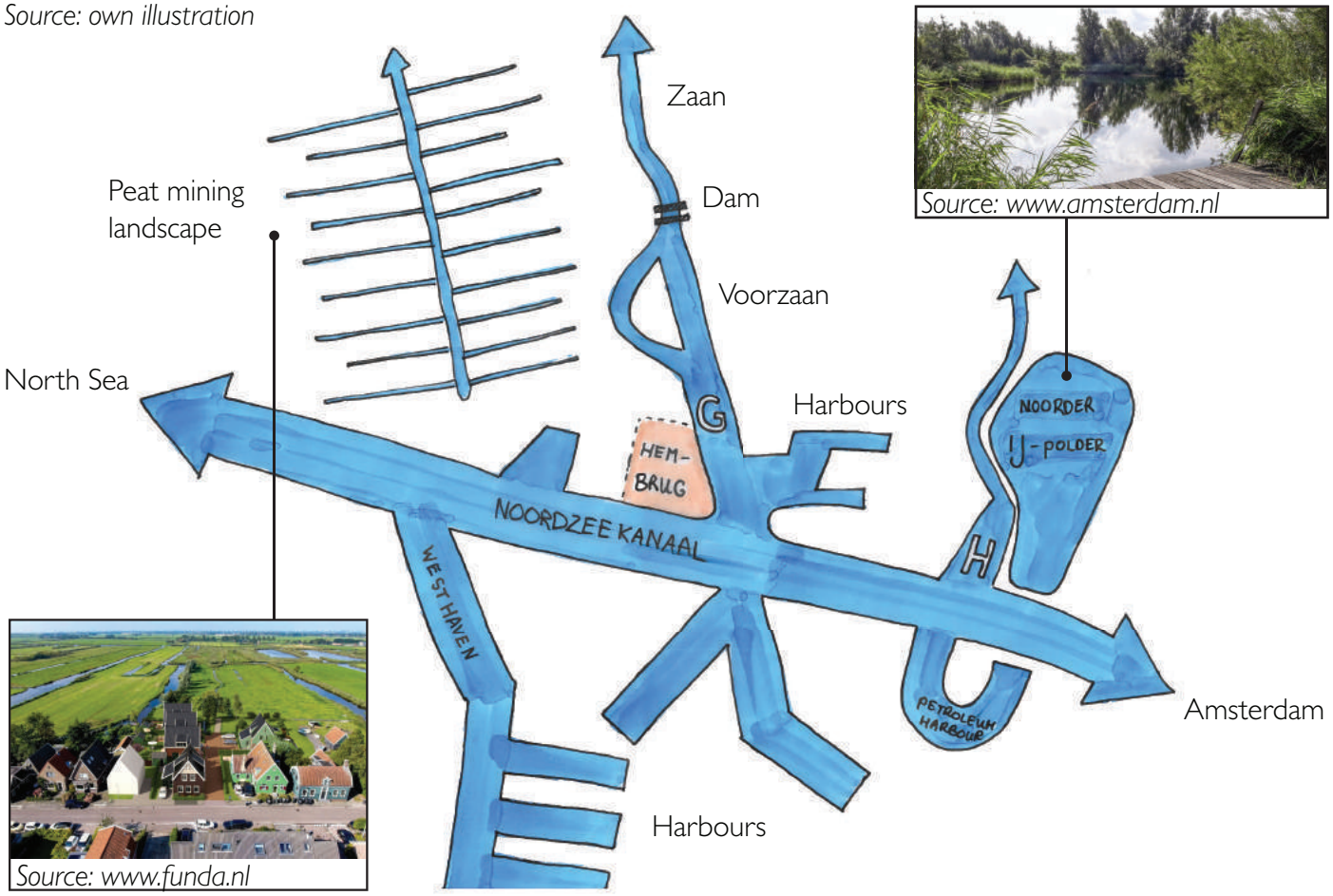
Within this quickly developing and changing shores of the North Sea Canal, the Petroleum Harbour and polder VII (with th e Hembrug site) were not that much altered since their completion.

SOURCES:

- SteenhuisMeurs (2010) Hembrugterrein-Zaanstad, cultuurhistorische analyse
- www.rijkswaterstaat.nl
- www.onh.nl
- www.zaanwiki.nl
- www.entoen.nu
- www.amsterdam.nl

Overview of current situation

Source: own illustration



Source: www.amsterdam.nl

Source: www.funda.nl

Legend

●	Hembrug site
[A]	The 'Zaan'
[B]	Split 'De Hem'
[C]	The IJ
[D]	The 'Voorzaan'
[E]	Polder VII
[F]	North Sea Canal
[G]	Side canal G
[H]	Side canal H
[I]	The 'Nieuwe Zeehaven' (1911)
[J]	The Petroleum Harbour (1887-1889)
[K]	The 'Coenhaven'
[L]	The 'Westhaven'
[M]	The 'Noorder IJplas' (70's-80's)

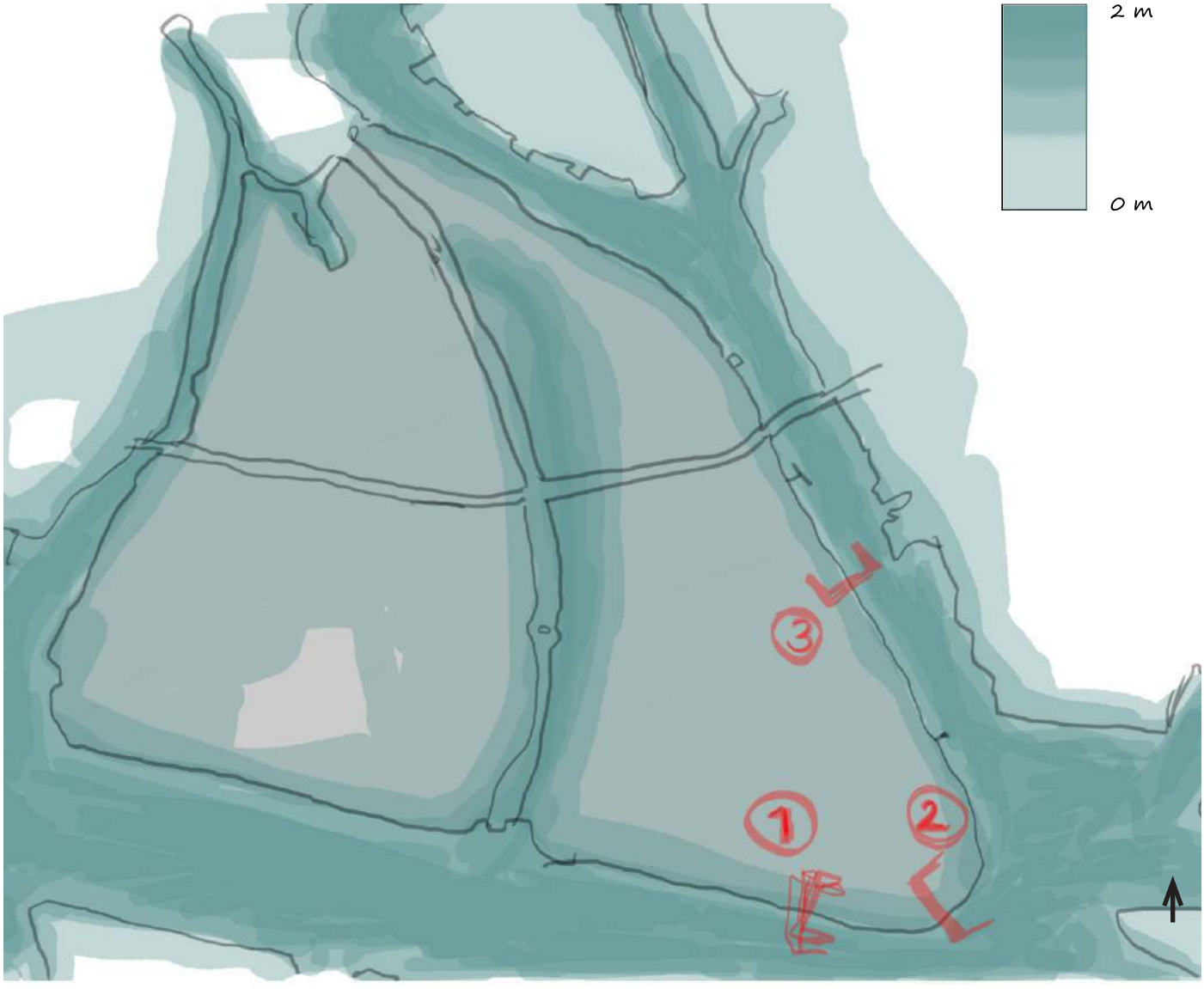
Most of the land in the Netherlands is situated below sea level. Dykes prevent the land from flooding. However, if a dyke is broken due to heavy weather or other circumstances, a flood might happen. The maximum depth of water on land is portrayed in the drawing shown below. Hembrug will be flooded with a maximum of 0,5 m water. On some parts even more; especially along the water.

The drawings on the next page are sections of three spots on the Hembrug site. These show the different transitions from land to water. The houses in the third section are placed higher and further away from the water. This is most likely done because of the risk of a flood. A flood for the industrial military production seems not as big of an issue compared to the residential area.

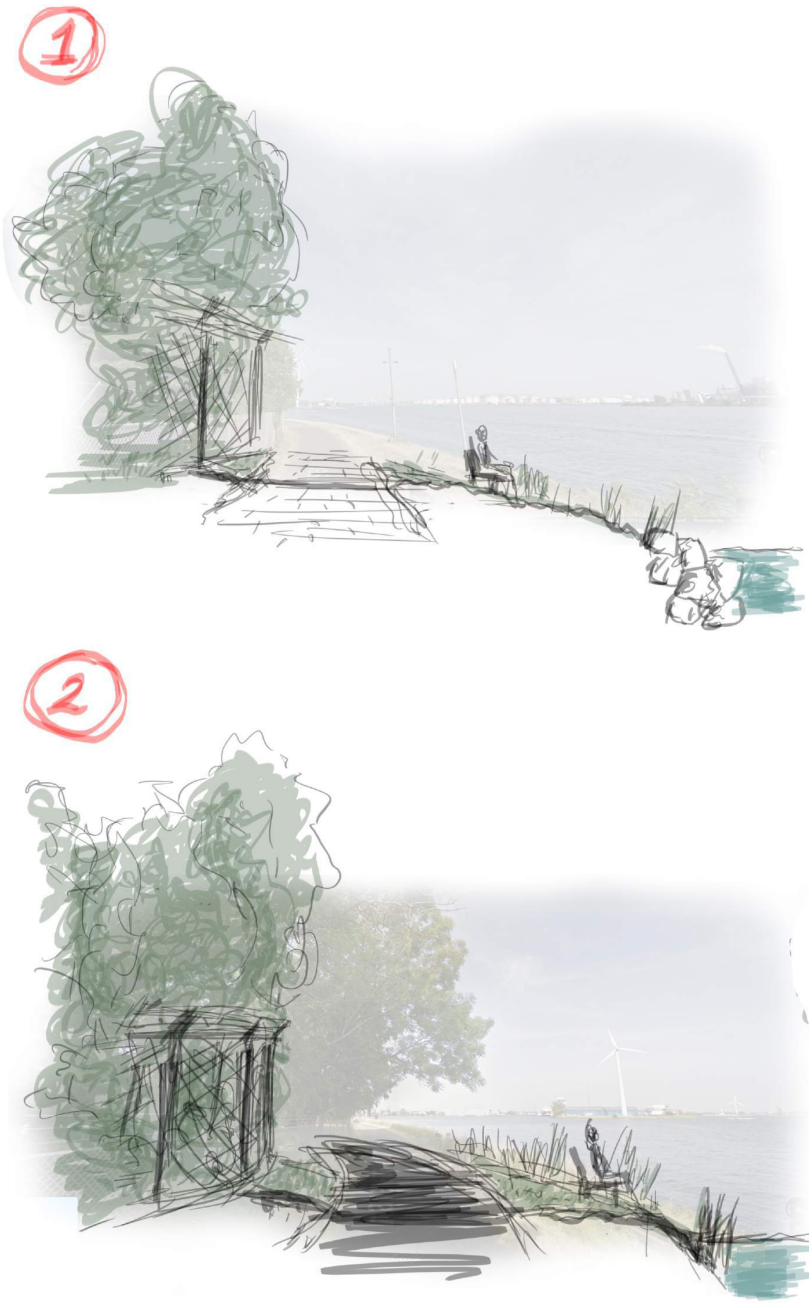
SOURCES:

www.google.nl/maps
http://ahn.arcgisonline.nl/ahnviewer/
https://www.atlasleefomgeving.nl/kaarten

Flooding



Source: Soumaya Boujamaa



Source: Soumaya Boujamaa

Shown in the map of 1901 Hembrug used to have a polder landscape. For the function of weapon and ammuniton industry they dug ditches. Most of them were dug consciously but some of them belonged to the original landscape.This, in case of a casualty, to prevent fire from going to other parts on the terrain. In this way small islands arose. It was also used as a sewage system and in case of fire, men would use this water to put it out.
With every expansion of the terrain, the amount of ditches grew. Especially between 1901 and 1924 with the expension of the Hembrug terrain itself, the amount of ditches grew and were "replaced" to the north instead of then staying in the middle of the terrain if it would be situated at the exact same spot as it was in 1901.

SOURCES:

www.topotijdreis.nl
Steenhuismeurs, (2010), HEMBRUGTERREIN - ZAANSTAD cultuurhistorische analyse
www.google.nl/maps

Ditches on the terrain

1901

1924

1996

2019

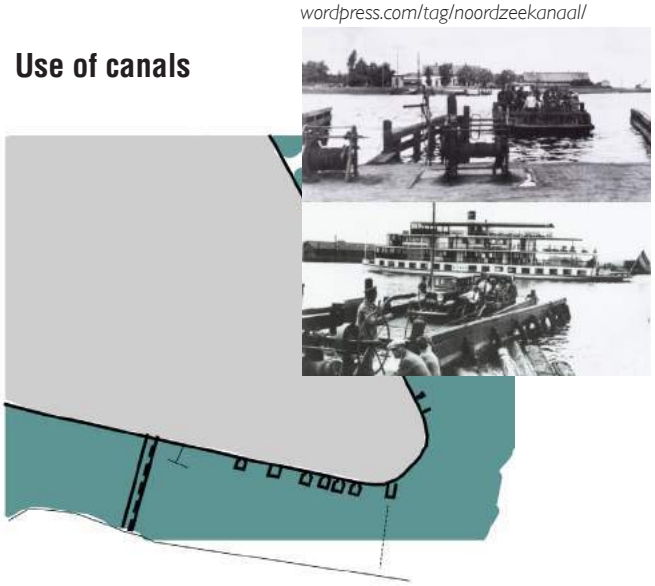
Source: Soumaya Boujamaa

The canals around Hembrug used to have two functions, transport of materials which are used for the production at Hembrug and transport of people via ferries. The materials came in at the north-east side of the terrain. The ferries came in at the south side. First, this was in the corner of Hembrug. Later on this was moved to where the former Hembrug II was situated. Until today the ferries cross the canal from that same place. After Eurometaal closed its doors in 2003, the dock at north-east side wasn't in use anymore. Since 2018 the Zaanferry stops at this dock. This ferry is a connection between Amsterdam Central and the Zaanse Schans.

SOURCES:

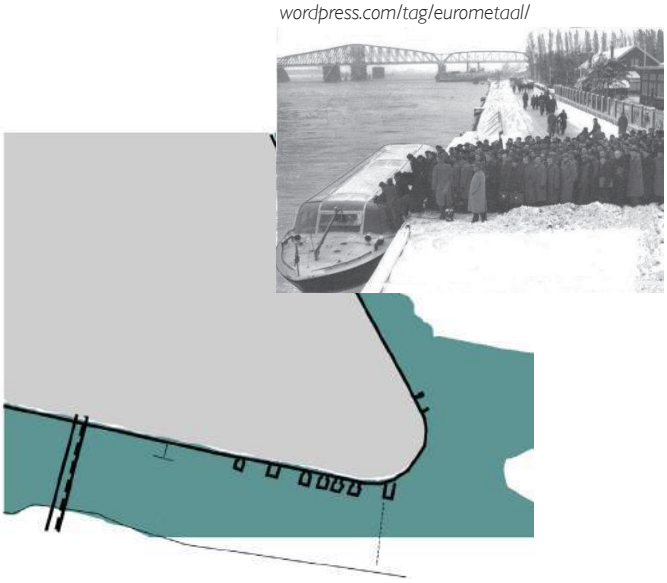
Steenhuismeurs, (2010), HEMBRUGTERREIN - ZAAN-STAD cultuurhistorische analyse
https://www.zaanferry.com/
https://www.zaanwiki.nl/encyclopedie/
https://artillerieinrichtingenhembrug.wordpress.com/

Use of canals



Source: https://artillerieinrichtingenhembrug.wordpress.com/tag/noordzeekanaal/

1901 - Cable ferry from 1876 until 1935. Hembrug I, which was built in 1875 is still in use.

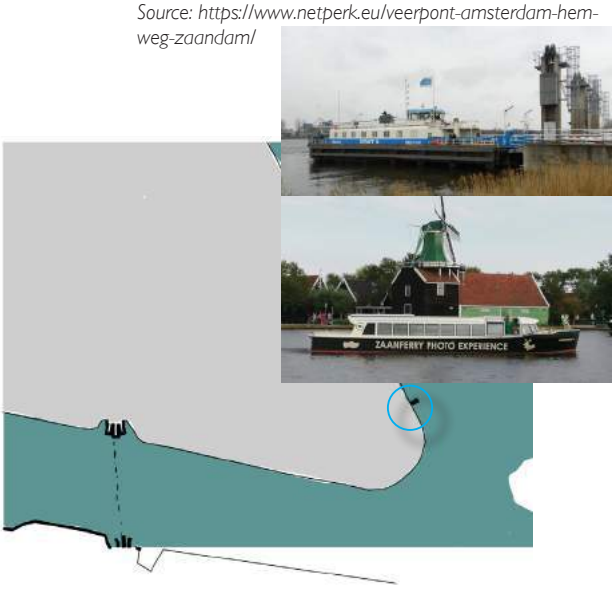


Source: https://artillerieinrichtingenhembrug.wordpress.com/tag/eurometaal/

1907 - Hembrug I is replaced by Hembrug II. Many workers could come by train but many of them also came via a ferry.

Source: https://artillerieinrichtingenhembrug.wordpress.com/tag/eurometaal/

1941 - Since 1933 steam ferries were in use because the cable ferries were not efficient in use and also after the widening of the Noordzeekanaal in 1925 the crossing became too long. Each crossing would take so long that people could wait for at least an hour to get on a ferry.



Source: https://www.zaanferry.com/rondvaart/
Source: https://www.netperk.eu/veerpont-amsterdam-hem-weg-zaandam/

1985 - Since 1953 the steam ferries were replaced by diesel engine driven ferries (vrij varende pont / Donaupont).

Source: Soumaya Boujamaa

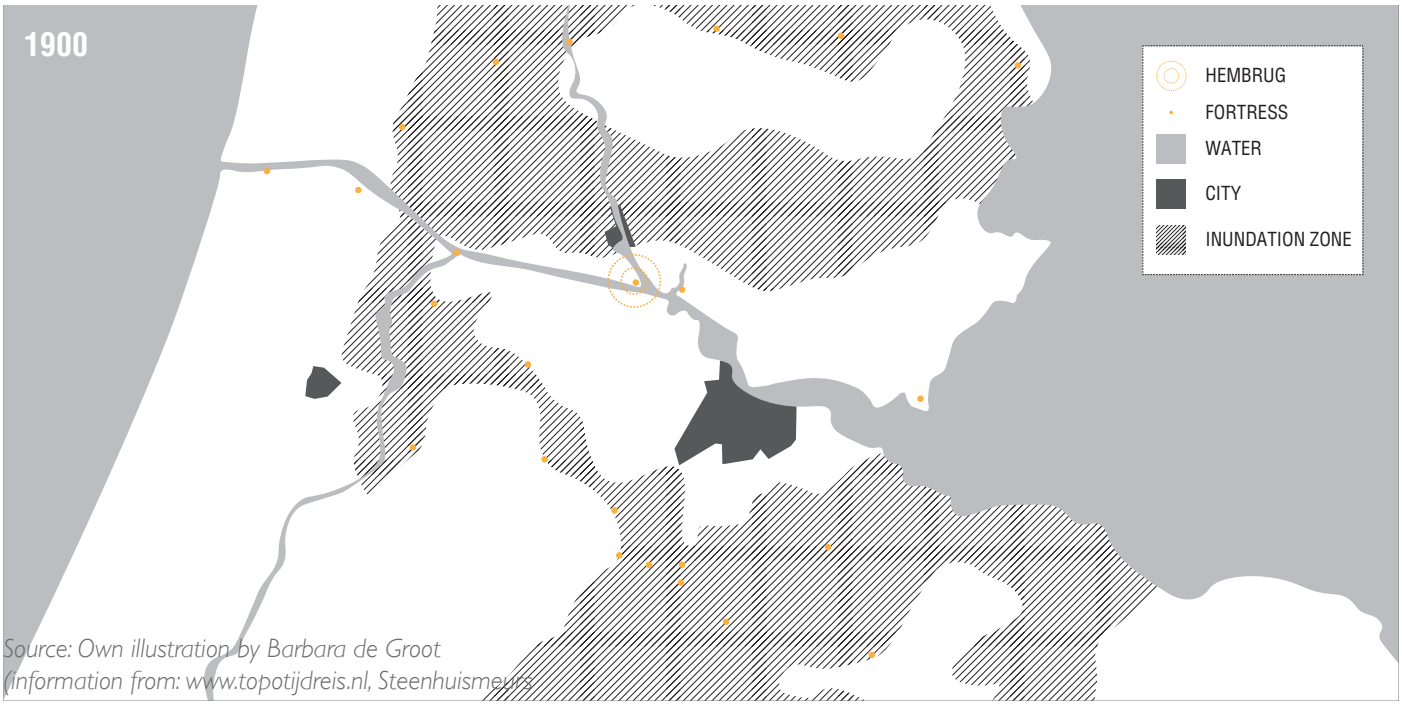
STELLING VAN AMSTERDAM

BARBARA DE GROOT / SINAN AYDIN

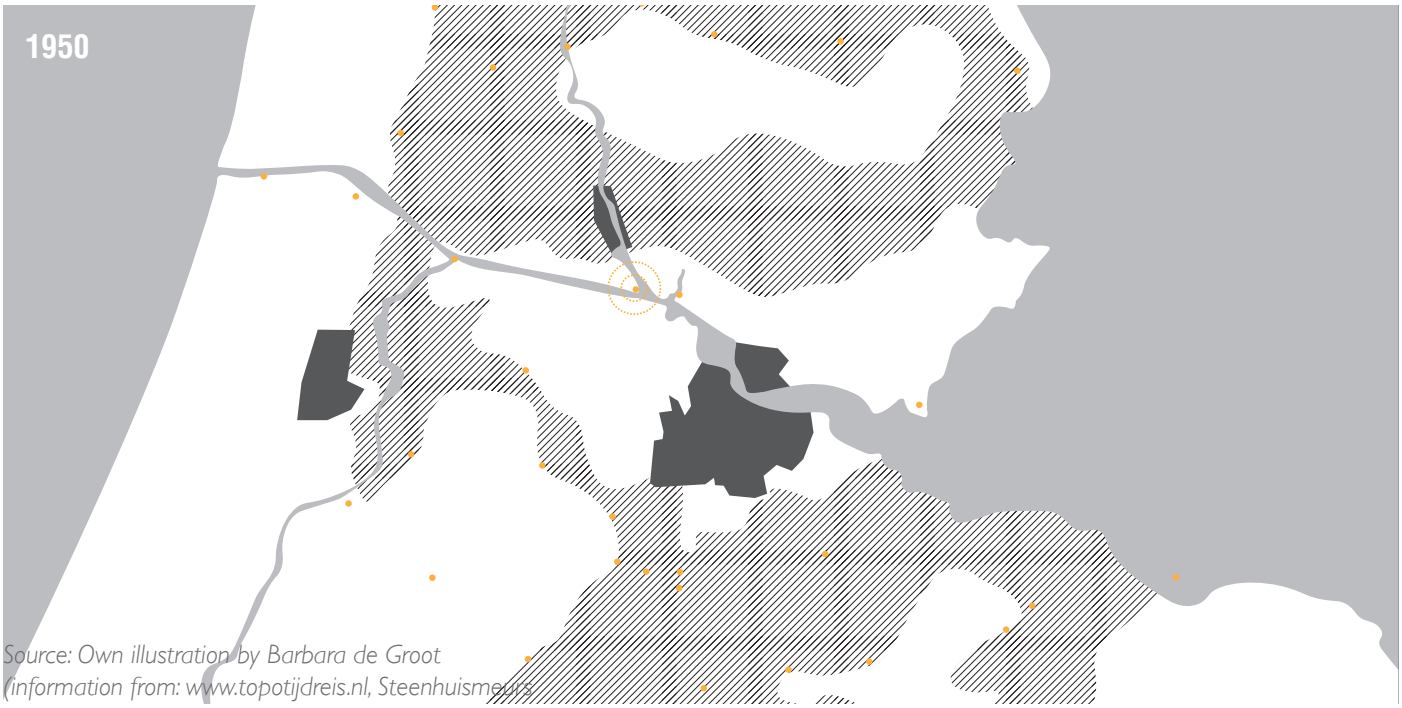
After 1815, the Netherlands took a position of neutrality in Europe. Surrounded by powerful countries like Germany and France, the Dutch wanted to be independent. Part of that was a strong defense line and their own production of weaponry and ammunition. De Nieuw Hollandse Waterlinie, built from 1815 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.

Location Hembrug in Stelling van Amsterdam



Source: Own illustration by Barbara de Groot (information from: www.topotijdreis.nl, Steenhuismeurs



Source: Own illustration by Barbara de Groot (information from: www.topotijdreis.nl, Steenhuismeurs

These fortifications are indicated on the map in yellow. During the construction years, the amount of fortifications increased, however, not all plannend 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 Artillerie Inrichtingen 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 Artillerie Inrichtingen there. The army had to choose between Hembrug, Delft, Oudekerk as 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 'Nieuw Hollandse Waterlinie' was added to the Unesco World Heritage list and is an essential part of the Dutch military history.

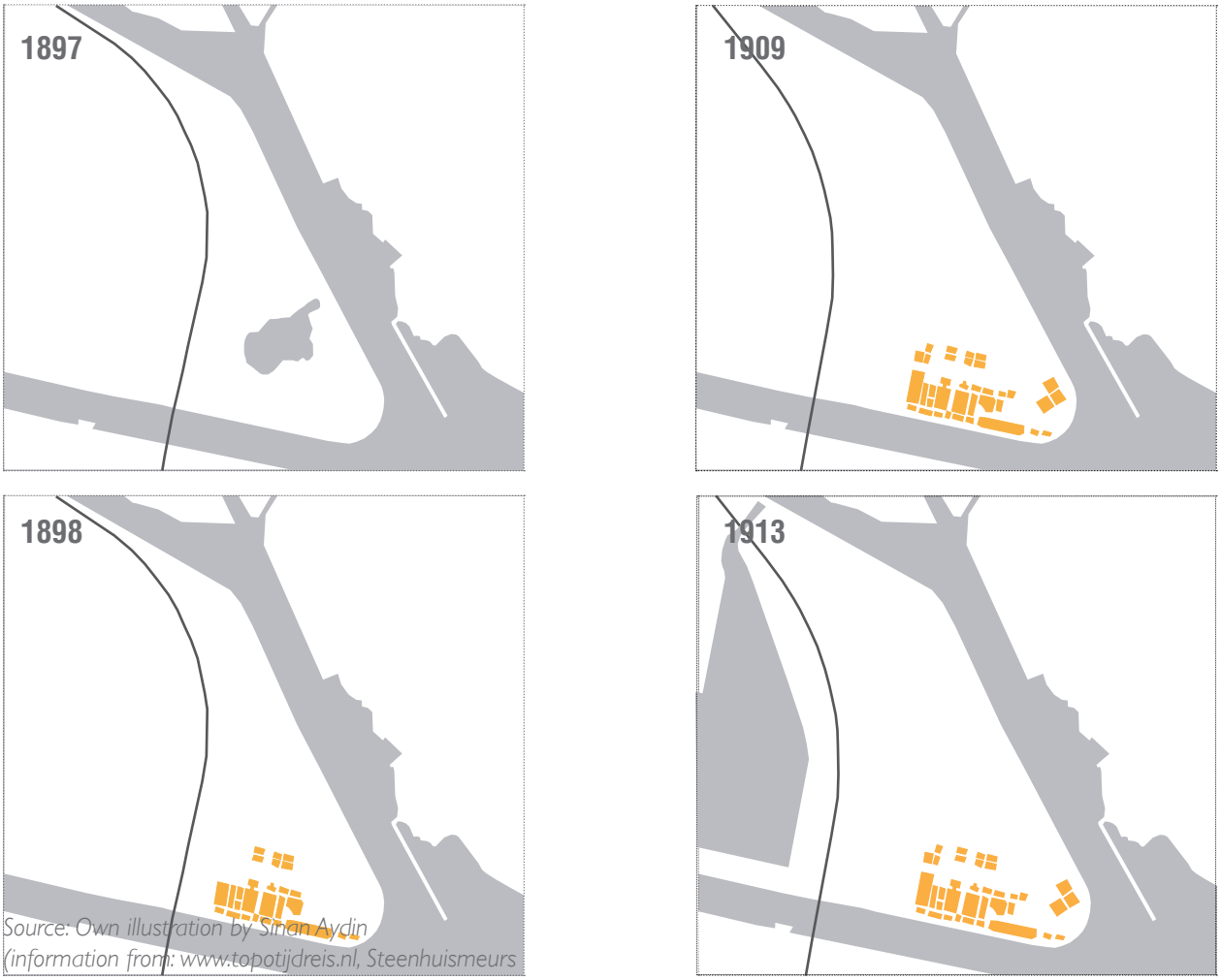
Text: Barbara de Groot & Sinan Aydin

SOURCES:

- *https://zaansmuseum.nl/hembrug-museum/stelling-van-amsterdam/*
- *https://www.topotijdreis.nl/*
- *Hembrugterrein - Zaanstad Cultuurhistorische Analyse, Steenhuismeurs (2010)*text

Source: Own illustration by Barbara de Groot

The expansion of Hembrug during the construction of the Stelling of Amsterdam.



Source: Own illustration by Sinan Aydin (information from: www.topotijdreis.nl, Steenhuismeurs

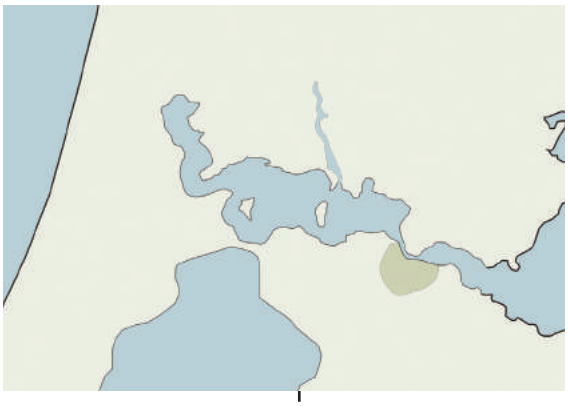
SETUP of the HEMBRUG

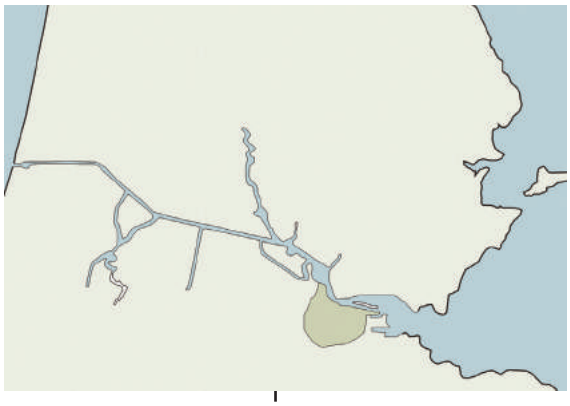
AMELIE DE GUERRE
JUNYI ZUO

NORTH HOLLAND

By the 19th century, however, access to the IJ became difficult due to sand bars across its mouth, and ships becoming bigger, and it was nearly impossible for seafaring vessels to reach the city of Amsterdam. At the same time, the bay gnawed away at the surrounding farmlands, almost connecting with the Haarlemmermeer (Lake Haarlem) and seriously threatening the cities of Haarlem and Amsterdam.

Reclaim both the Haarlemmermeer and the IJ and turn them into polders, the Haarlemmermeer was first, falling dry in 1852, and the largest part of the IJ followed suit between 1865 and 1876, with only a small lake remaining at Amsterdam that was closed off from the Zuiderzee by the Oranje locks. At the same time, the North Sea Canal was constructed in the former IJ basin to provide Amsterdam with access to the sea again.





1850

1900

1850

1910

AMSTERDAM — ZAANDAM

Zaandam is located on both sides of the Zaan. The core is formed by two parallel dikes on either side of the Zaan: East side and West side. Later they started building paths at right angles, into the field where the mills stood. Some center formation has taken place, especially in the neighborhood of the Oostzijderkerk. In the 19th century, further center formation took place along the Gedempte Gracht and a few streets running parallel to it. This center has since been provided with structure through the Inverdan plan, a project within which the center and the station area have been given a makeover.

The North Sea Canal (opened in 1876) connects the Afsluit-IJ with the Sluizen van IJmuiden and the also newly constructed port of IJmuiden. The Buiten-IJ is located on the east of the Oranjesluizen and connects to the IJmeer and Markermeer. Nine side channels were laid for drainage and shipping of, among others, the Spaarne, Zaan and Nauernasche canal (Side channel A to I).

Southern Flevoland (Zuidelijk Flevoland) was the fourth polder of the Zuiderzee Works, built adjacent to its larger sibling, Eastern Flevoland. Since its northeastern dike, the aforementioned Knardijk, already existed, only 70 km of the dike remained to be built. Starting in early 1959, this was finished in October 1967.

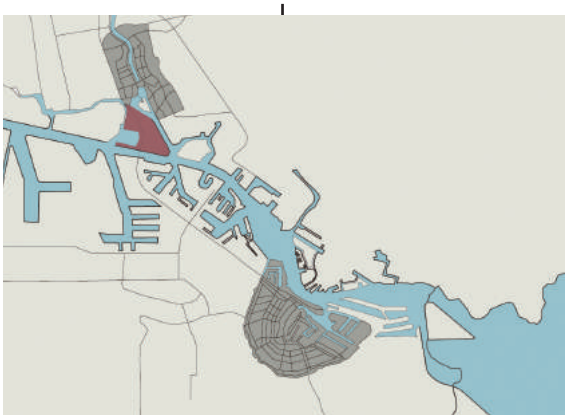
Now, North Holland is a broad peninsula for the most part, located between the North Sea, the Wadden Sea, the IJsselmeer, and the Markermeer. More than half of the province consists of reclaimed polder land situated below sea level.

1970

2019

1940

1990



During the construction of the North Sea Canal, between 1870 and 1880, three islands in the IJ were pumped in at the height of the former Amstelmond, with sand coming from the dunes at IJmuiden, which had been released during the digging of the locks of IJmuiden. The Central Station was built on these islands (opened in 1889). The Stationseiland separated the old city center of Amsterdam from the IJ, causing the port function to relocate elsewhere.

SOURCES:

Ir W.H.J. Hol Weg en Waterbouwkunde, deel A, blz. 143, Uitgeverij Kosmos, 1963, blz. 143

Historical maps acquired from:

www.topotijdreis.nl

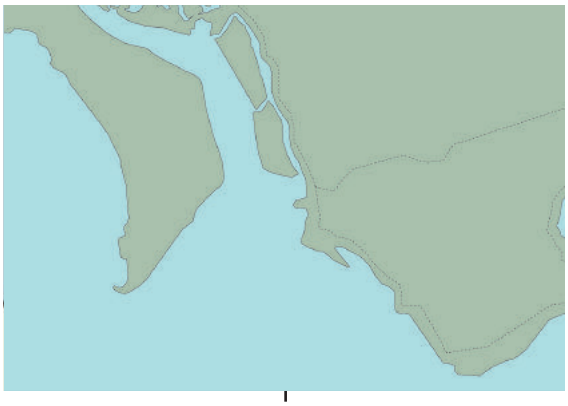
https://noord-hollandsarchief.nl/

HEMBRUG AREA

The origins of Hembrug derive from the peninsula area called Den Hem, which was surrounded by the Zaandammerpolder and the Voorzaan canal, an extension of the IJ-River.

Digging of the Noordzeekanaal has been completed between 1862-1874. Huge amounts of land were claimed from the water by dredging.

Military production precautions of WW environment concer Noordzeekanaal due t the main form of logi time.



1850

1882

1905

1901

HEMBRUG SITE

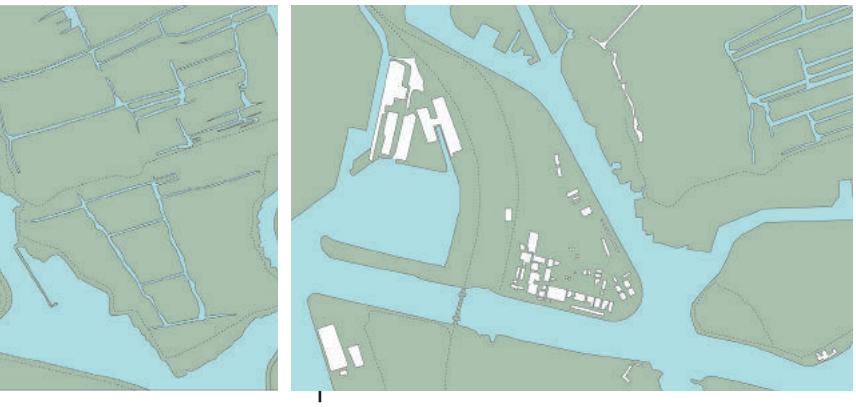
SOURCES:
Historical maps acquired from www.topotijdreis.nl
Photography: F. Palmbout presentatie
Steenhuis Meurs, 2010, Cultuurhistorische Analyse Hembrug terrein

Dense and compact industrial layout, all optimized for production of the "Hembrugkarabijn" (M95-rifle).

In 1924, there is an expansion of the industrial zone. Addition of the Sectorpark and mobilisation complex in the far north, intensive use of the forest as test site.

expanded due to
W1. The industrial
ntrated along the
o sea transport being
istic transport at that

Maps show the digging of the Nieuwe Zeehaven. The official maps of the Hembrug terrain differ from the real plans, due to military secrecy. Military industry concentrated along the west now due to the first railroad access being granted in 1914.



1925

1941

1996

2019

Occupation of Hembrug area by the German army. Addition of bunkers in the Cape South and the forest, small changes in industrial layout.

Production shifted towards industrial machinery after WWII, resulting in a small dilution of the industrial built environment.

Production has been halted in the beginning of the 21st Century when Eurometaal left the site.
The setup of the current Hembrug area. Not much has changed for the layout, only a couple of minor structures have been removed and most of the other buildings are in a rebuilding fase.

Present-day functions

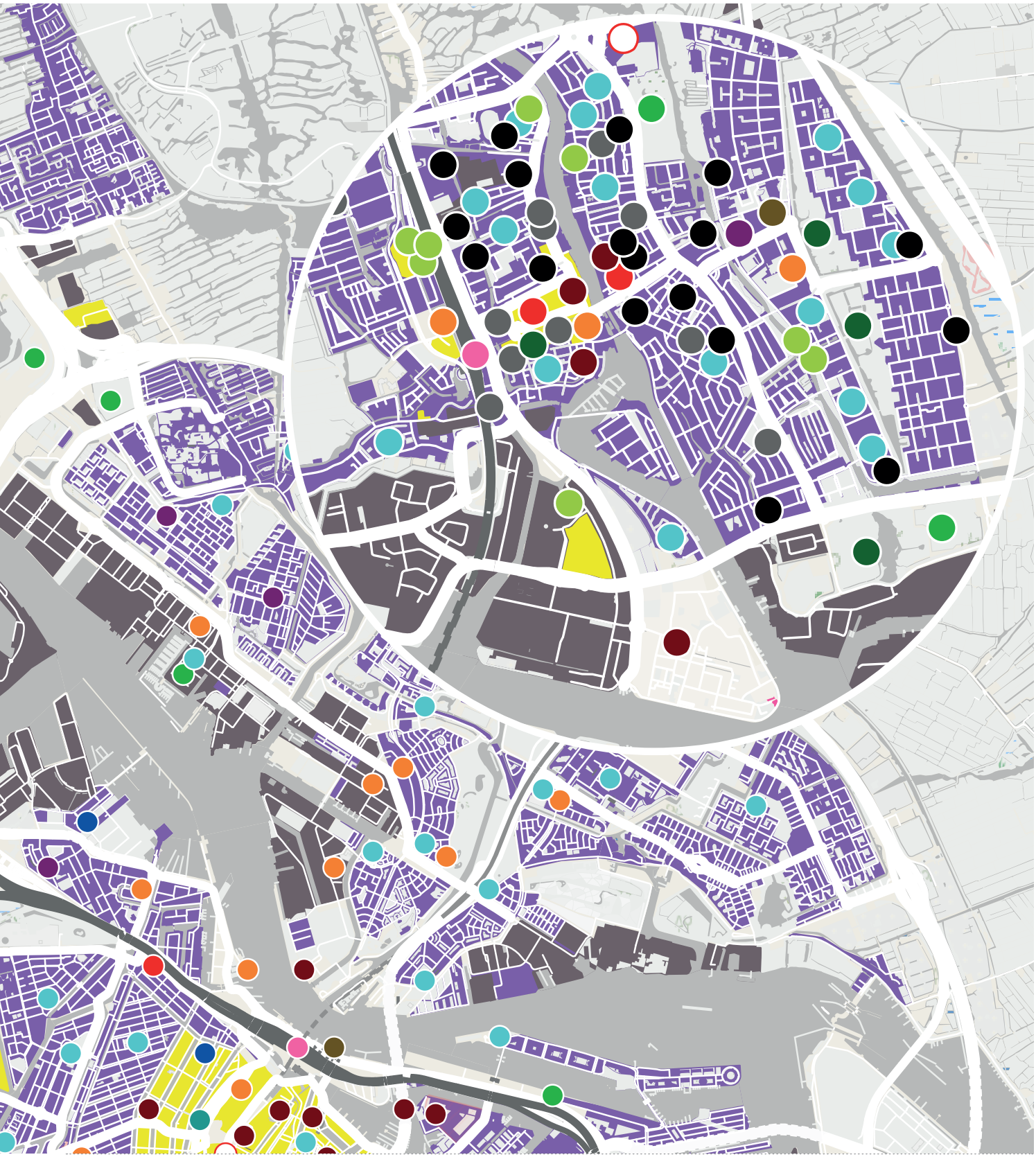
MAYS AL-KORANY / SJOERD DE ROIJ

The Hembrug area nowadays is located between the cities of Zaandam and Amsterdam, and will probably in the future be part of the ever-expanding metropolis that is the Dutch capital. The following map illustrates the present-day functions of the area in which Zaandam and Amsterdam find themselves.

LEGEND

Industrial (zone)
Commercial / Catering (zone)
Universities (spot)
Bachelor Universities (Hogeschool) (spot)
Primary / High schools
Governmental (spot)
Residential (zone)
Train stations (spot)

Hospitals
Museums (spot)
Swimming pools (spot)
Bowling / Lasergaming / Racing (spot)
Sporting fields (spot)
Gyms (spot)
Supermarket (spot)
Religious buildings (spot)
Public parks / playgrounds (spot)

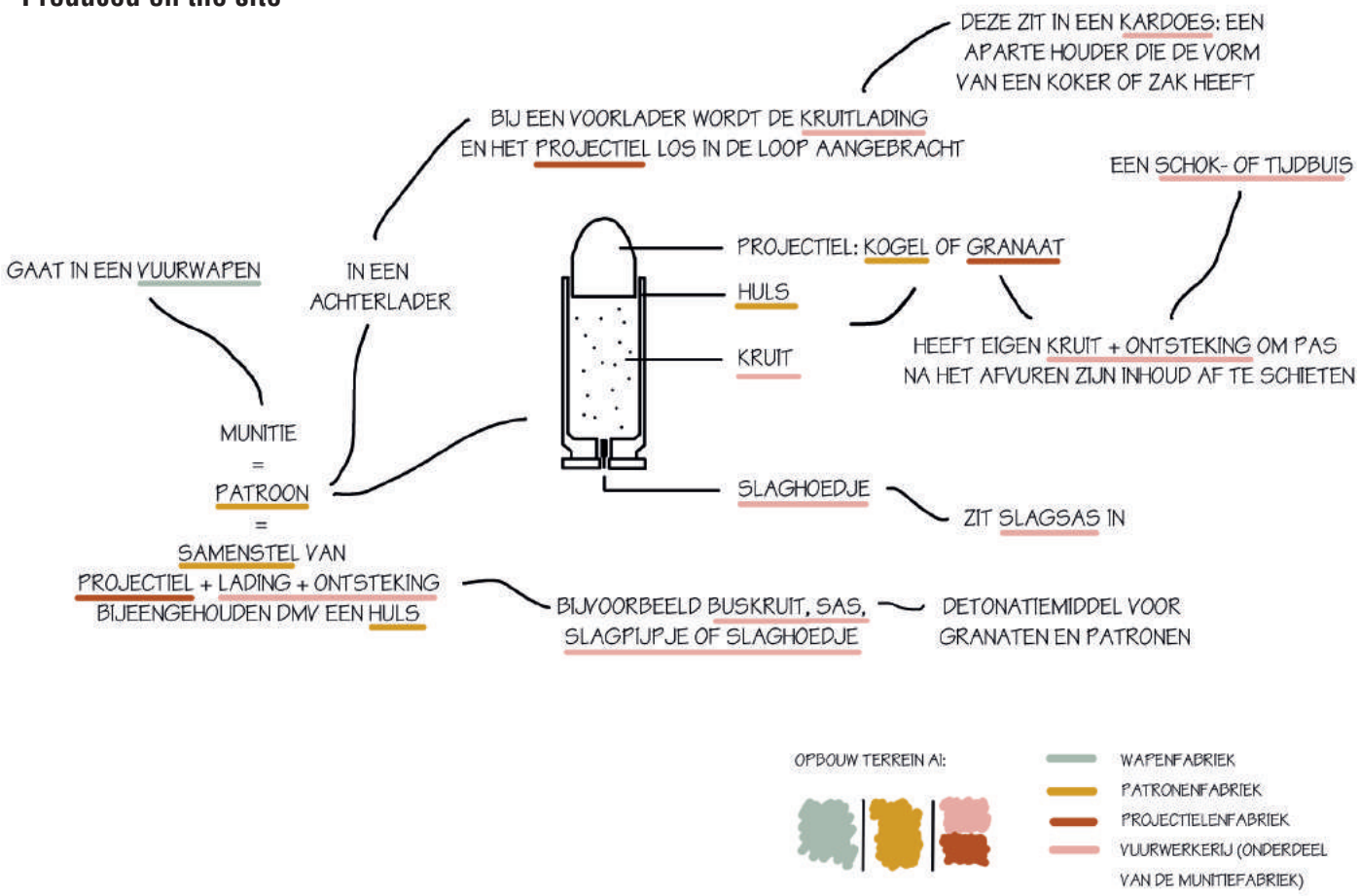


Functional Analysis
Hembrug

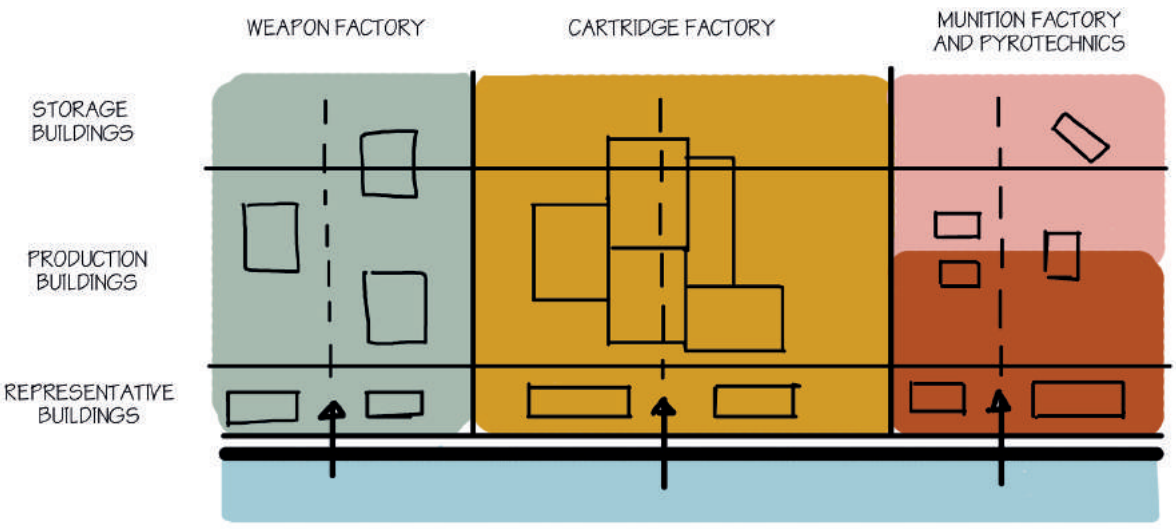
VALERIE ARNTZ / CHENNA TABELING / AMANDA VERSCHUUR

The Artillery Establishments (Artillerie Inrichtingen) produced all parts weapons consist of on the Hembrug site themselves. From the gun powder, the shock tubes and grenades till a completely assembled weapon. How this exactly works and how the site was set up according to that is visible in the images below.

Produced on the site



Schematic setup of the site



Images: Valerie Arntz

1901

The factory complex, part of the Artillery Establishments (Artillerie Inrichtingen), was divided into three individual factories, which were the core of the complex: the Weapon factory (14 buildings), the Cartridge factory (12 buildings) and the Ammunition factory. These factories and associated buildings were set up in the following way: along the North Sea Canal (Noordzeekanaal) were the representative direction and office buildings placed together with the canteens for the staff (in blue). Behind this line of buildings were the three big production halls (in red) followed with a bigger distance by the buildings for experimenting (yellow) and storage (brown). The storages from the ammunition factories were enclosed by earthen embankments to reduce the explosion risk. The terrains of the three individual factories were separated from each other by iron gates.

Detailed setup of the site

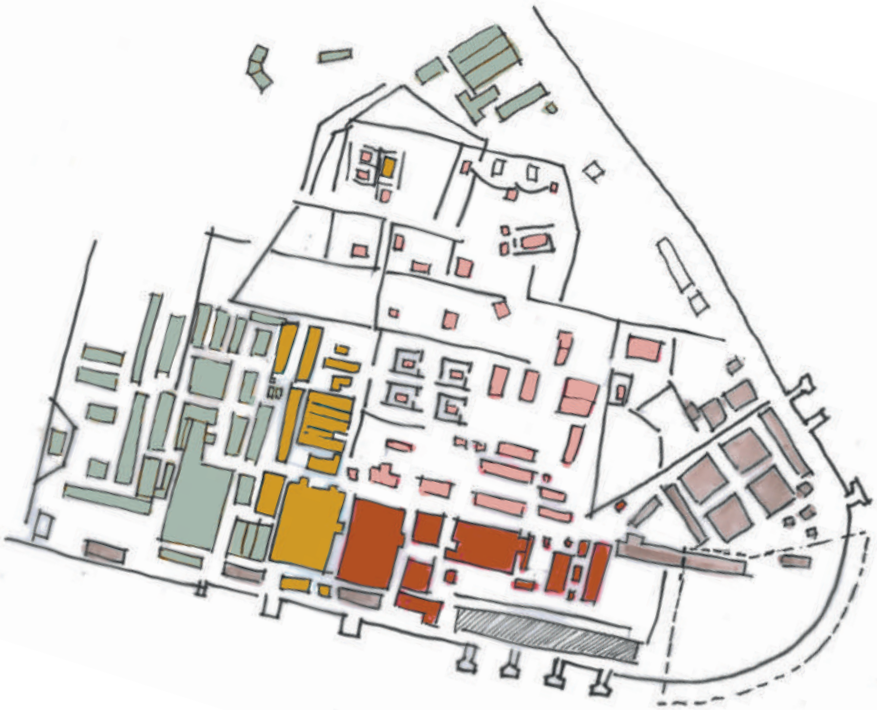


Image: Chenna Tabeling

Image: Valerie Arntz

1924

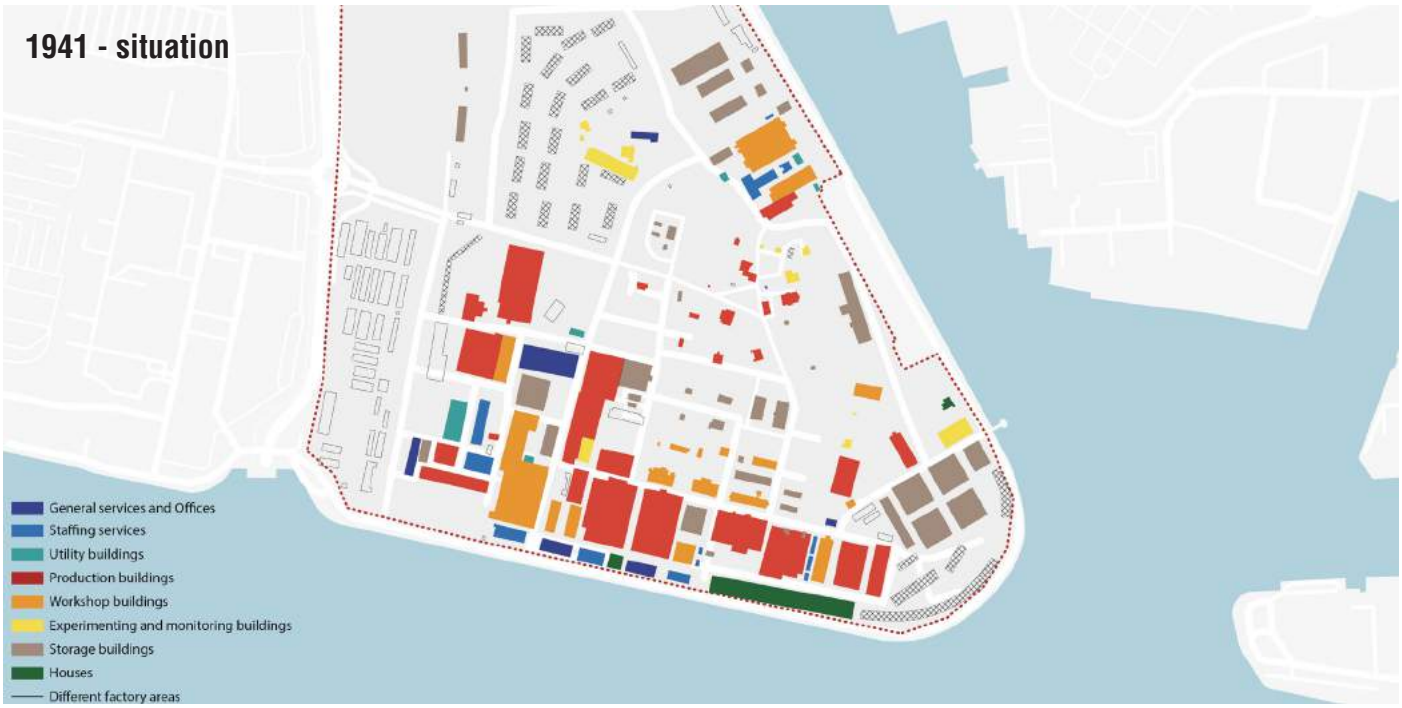
In 1924 the move from the factories in Delft to Hembrug was complete and Hembrug had further developed as an industrial city with the first World War as an important accelerator. The production of new weapons and ammunition asked for new buildings which were placed between the existing structures while maintaining the division from the three individual factories. This led to three zones with their own characteristics. The zone of the weapon factory is compact with individual buildings which function as individual factories. The zone of the cartridge factory had limited space for expansion, being situated in the middle. And besides there was a strong link between the different production processes resulting in a chain of buildings in this zone. In the third zone was the ammunition factory located, because of the explosion danger the buildings needed a buffer zone around them, resulting in a zone with an open structure and a lot of greenery. In the northern part of the site emerged a military terrain existing out of the General Defense park (Algemeen Verdedigingspark) functioning as central magazine for the entire Defense line of Amsterdam (Stelling van Amsterdam) with workshops and storage; the sector park Zaandam with mainly storage (Sectorpark Zaandam) and the explosion forest (Plofbos) with experimenting and monitoring buildings and secured storage.

Images: Valerie Arntz

1941

After the first World War the international aversion of armament grew and the only orders came from the Dutch colonies. Followed by the big crisis in the 30s the production demand reduced even more and a big part of the weapon factory was reassigned to civil production of agriculture and machine tools. In consequence some of the fabrics were built in a civil architectural style, which was more modern than the military building style which referred to more classical building styles. The low level of armament orders continued until Germany started the rearmament and as almost hundred different products were produced on Hembrug just before result the second World War.

In order to achieve this, a lot of older buildings were replaced by bigger buildings with a different function. This scale enlargement of the buildings had the biggest influence on the zone of the weapon factory. In the northern part the amount of experimental buildings was enlarged and with the treat of the second World War various shelters were built some of them under the existing buildings.



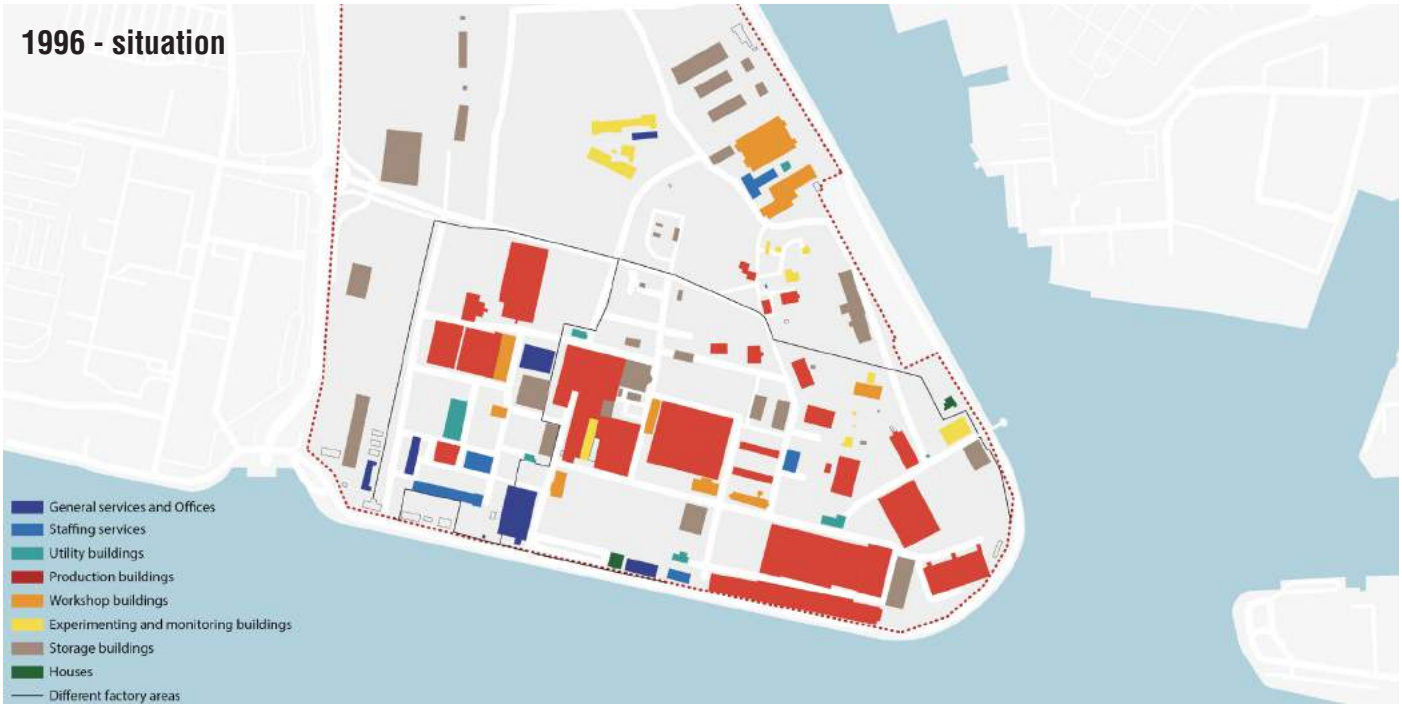
Images: Valerie Arntz

1996

After the Second World War were the reconstruction of the Dutch military and their activities in the Dutch East Indies the reasons behind the scale enlargement and modernisation of the weapon and ammunition factory. The biggest expansion is the production building along the North Sea Canal (Noordzeekanaal) with a shooting range/ shelter underneath it. The civil production continued as well and in 1973 the Artillery Establishments (Artillerie Inrichtingen) was split into two independent companies: Eurometaal and NV 'Hembrug'. Eurometaal was located in the eastern part and many buildings were demolished to create space for a big production hall. But after the demolition was finished, the location changed and the production hall was placed almost in the middle of the terrain. On the western part, the terrain of NV 'Hembrug', as well buildings where torn down and replaced by newer buildings. But during this actions the existing structure was not a leading factor, resulting in the loss of the factory structure.

Text: Amanda Verschuur

Sources:
- Het Legermuseum (??). *Multiple articles*. Retrieved March 20, 2019 from http://www.militairmagazijn.nl/
- SteenhuisMeurs BV. (2010). *Hembrugterrein - Zaanstad Cultuurhistorische analyse*. Retrieved from http://www.hembrugterrein.com/wp-content/uploads/2016/04/Historie-Hembrugterrein-web.pdf



Images: Valerie Arntz

Current functions

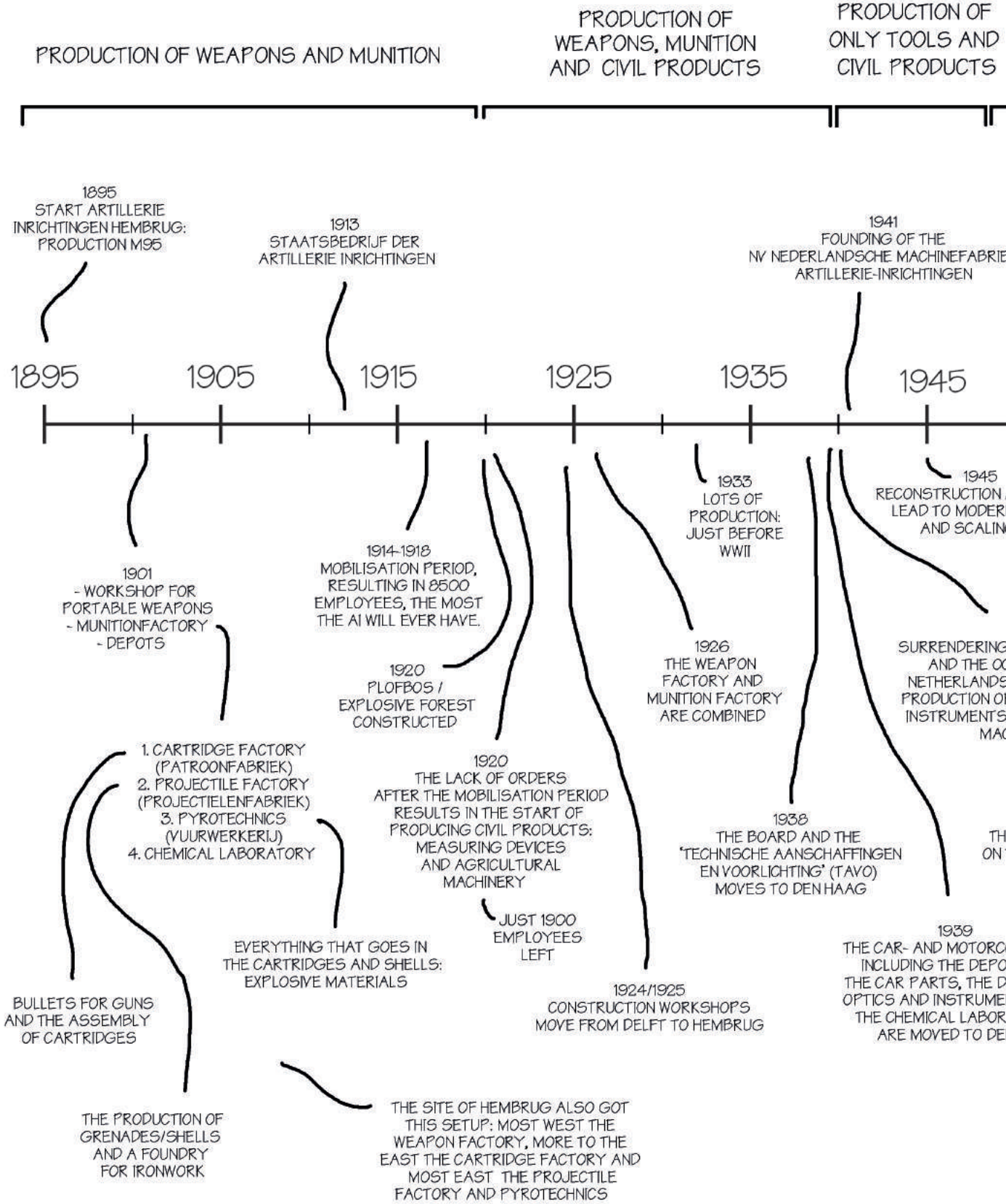
Nowadays a lot of creative entrepreneurs have established their company on the site, since there are a lot of empty buildings that offer cheap space. Some catering businesses, cultural functions and stores are located on the site. Also some buildings are rented out for temporary events.

Source: www.hembrugterrein.com

Image: Chenna Tabeling

Functional timeline of the site

Sources:
- SteenhuisMeurs BV. (2010). *Hembrugterrein - Zaanstad Cultuurhistorische Analyse*. Retrieved from http://www.hembrugterrein.com/wp-content/uploads/2016/04/Historie-Hembrugterrein-web.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.



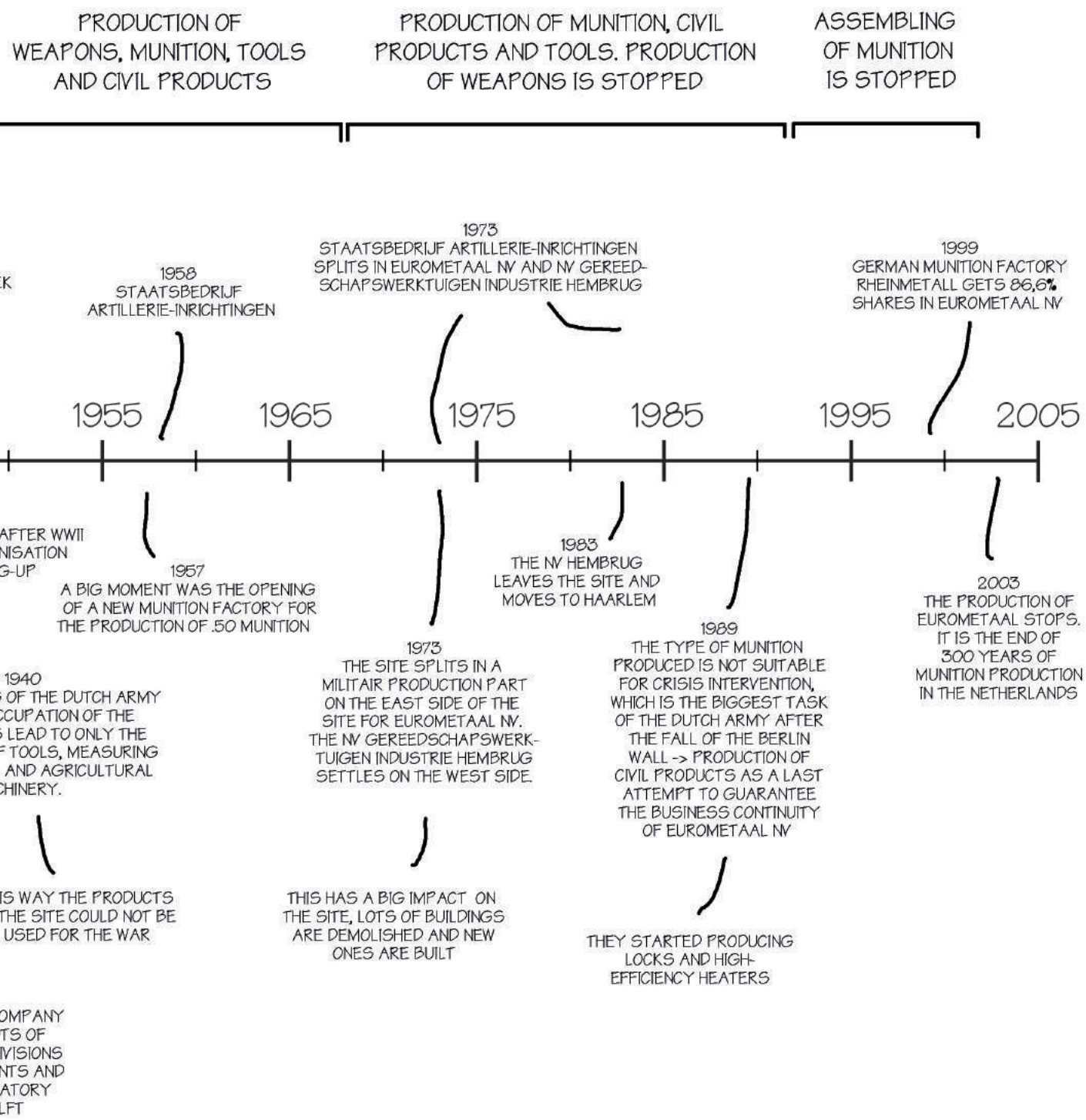


Image: Valerie Arntz

TIMELINE PRODUCTION PROCESS

NEEL SARKAR / MELANIE KWAKS

THE BEGINNING, 1901

The Hembrug area started in 1901 as a factory of the production of the M95 rifle together with the production of matching 6,5mm bullets and it was known as the AI (Artillerie Inrichtingen). The AI didn't function as one big factory but existed out of 3 factories that were separated with low iron fences. From east to west there was the weapon factory, the cartridge factory and the ammunition factory. Each factory had its own entrance at the side of the North Sea Canal, an own administration building and an own installation services. Due to the collaborative production process between the weapon and cartridge factory they were placed next to each other.

In the weapon factory all the parts of the M95 rifle were made, assembled and stored. The weapon factory existed out of 14 buildings. There were workshop, production and storage buildings but also buildings that were used to test the produced rifle.
The cartridge factory existed out of 12 buildings and here the 6,5mm cartridges of the bullets were produced. The cartridges were filled and tested within this factory. The filled cartridges were stored on the terrain within high earth walls in the north of the area to be safe from explosions.

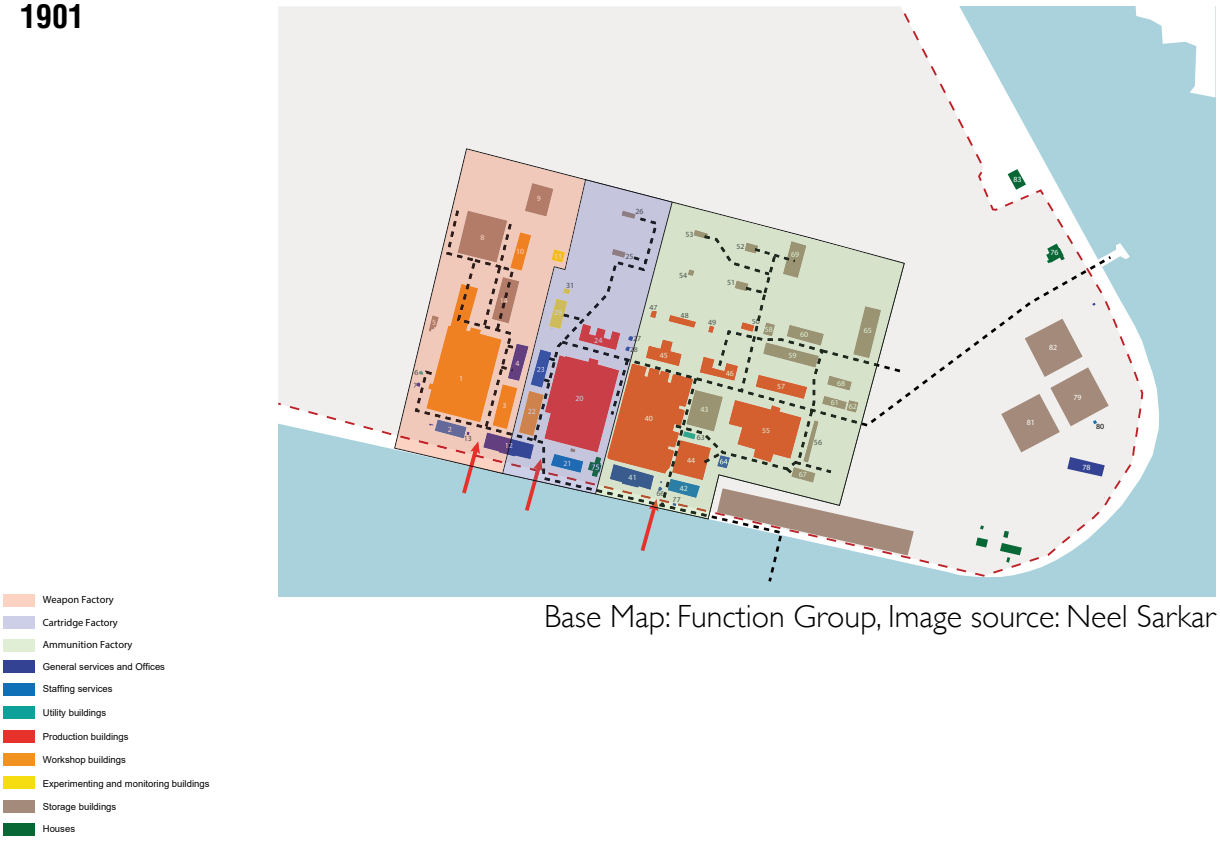
The biggest factory in this area was the ammunition factory. Here they worked on heavy explosives and flammable substances that were known as 'sassen'. The storage spaces for these substances were also surrounded with high earth walls in the north.

In the far east of the area were 3 large squared halls that were used to storage peat for the whole Stelling of Amsterdam. This is also the place where all the materials for the factories were shipped in. From the docks the small railway are going into the area.

The binding factor between the factories is the road that has a strong east-west axis and the small railway. This railway was the supply line for the different materials between the factories, storage spaces and ships.

written by: Melanie Kwaks
SOURCE: Steenhuis Meurs Cultuurhistorische analyse

1901



Base Map: Function Group, Image source: Neel Sarkar

In the years between 1901 and 1924 the compact factory developed into a factory city. The new developments within the weapon industry happened quickly and because the AI just expanded the existing buildings they were able to keep up with the new developments. Until 1914 the expansion of the building were kept within the borders of the existing area. In addition to the workshops and production factories there were more test and research buildings placed in the area.

Due to the First World War in 1914 there was a huge growth in the Hembrug area. The Netherlands was neutral during the war but it had to be able to defend if needed. The Dutch army ordered huge amounts of weapons and ammunition and they were in need of new techniques and weapons. Besides the M95 rifle, the AI started to make canons, grenades, heavy mortars and explosives. In 1914 the railroad was constructed, this made it possible that the products could be distributed faster. All these developments also resulted in a growth of workers, in 1917 there worked 8500 people on the area.

The introduction of new weapons and ammunition was mainly the reason to build an extra factory hall or storage space on the Hembrug area, but the layout of the weapon, cartridge and ammunitions factory remained. For the weapon factory and the ammunition factory this was easy because there was enough space on the east and west side of the area. For the cartridge factory there was limited space available and this is still visible due to the connected buildings that were built in different times. This was convenient because the production process of the cartridges needed a close connection of the buildings. The weapon factory came to exist out of individual factory halls. The ammunition factory needed an open layout because of the danger of explosions.

written by: Melanie Kwaks
SOURCE: Steenhuis Meurs Cultuurhistorische analyse

1924

Weapon Factory
Cartridge Factory
Ammunition Factory
General services and Offices
Staffing services
Utility buildings
Production buildings
Workshop buildings
Experimenting and monitoring buildings
Storage buildings
Houses

Base Map: Function Group, Image source: Neel Sarkar

1924-1941

After the First World War there was an aversion of weapons and this resulted in difficult times for the weapon industry. The funding of weapons was very low and therefore there were not enough supplies to manufacture enough ammunition for the army. At the AI a lot of orders were canceled and around 1920 there were only 1900 workers left. The reason why there was still work to do came forth out of the colonial regions where local wars were the source for producing weapons and ammunition.

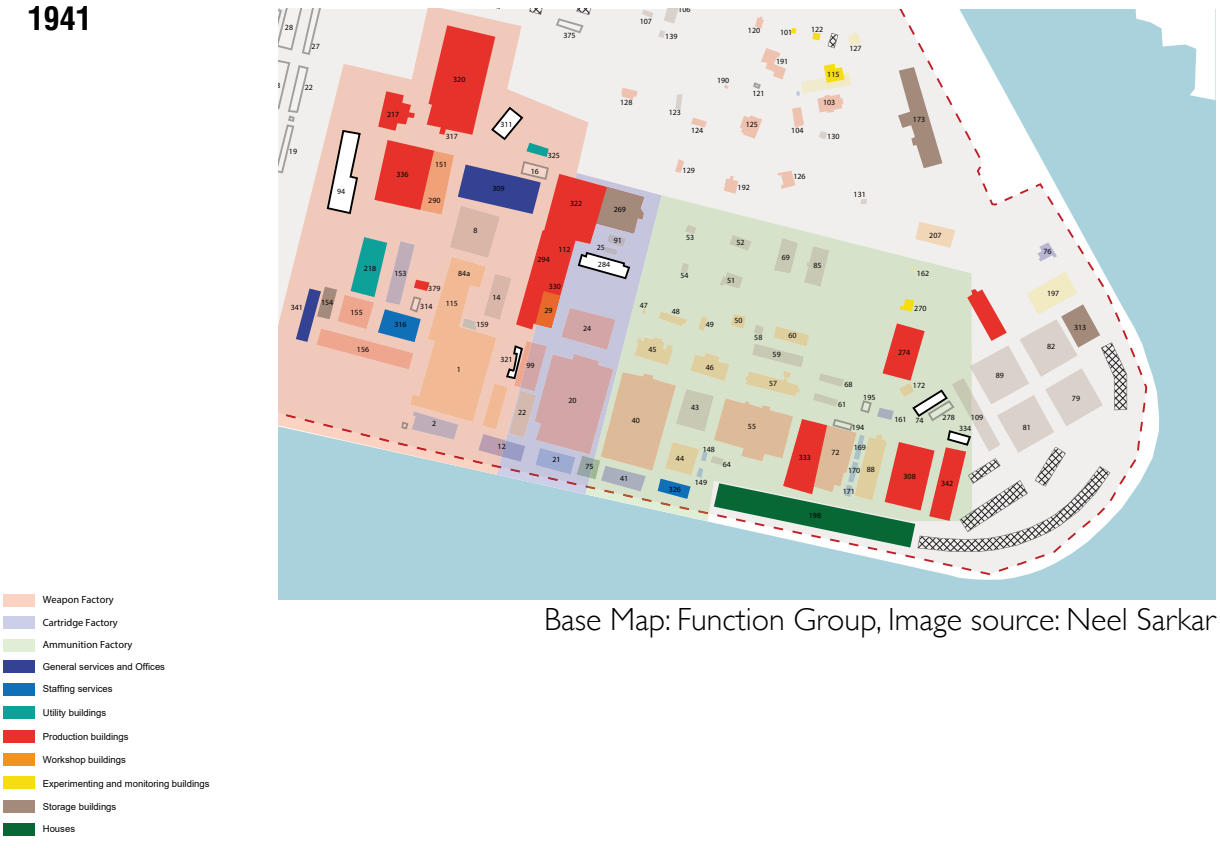
In 1930 the AI focused more on civil production. Bicycles, flatirons and optical instruments were produced. With the production of civil products the use of civil architecture started instead of factory architecture. When Hitler became the new chancellor in Germany in 1933 the remilitarization started in The Netherlands. The AI started to produce 100 different kinds of guns, weapons, automatic guns, heavy mortars, anti-tank guns, landmines, sea mines, grenades and other explosives.

The diversity of products that were produced in the AI is notable in the layout of the area. Older buildings were demolished and replaced by bigger buildings with a different function because every product was in need of its own production line. The construction of bigger buildings is mainly notable in the west part of the factory but the layout of the weapon, cartridge and ammunitions factory remained.

When The Netherlands was occupied by Germany between 1939 and 1945 the AI focused mainly on agricultural machinery to prevent that the German occupiers used the weapons and ammunition of the AI. There was still a demand for agricultural machinery. In this period there were also seeding machines, fertilizer spreaders, weeding machines, potato sorting machines and hay rakes put into production. During the war there was no expansion taking place in the area.

written by: Melanie Kwaks
SOURCE: Steenhuis Meurs Cultuurhistorische analyse

1941



Base Map: Function Group, Image source: Neel Sarkar

1941-1996

After 1945 the actions of the Dutch army in the former Dutch East Indies and the reconstruction of the Dutch army within the NAVO asked for scaling up and modernize the weapon and ammunition factories. The biggest expansion during this period was the big white production building situated along the North Sea Canal where .50" –munitions were manufactured and tested. In the east there were concrete buildings built with curved roofs due to the danger of explosions.

In 1950 the western part of the area became a so called mobilization complex due to the cold war with the Soviet Union. A mobilization complex is a place where military vehicles, weapons and ammunition were stored so that when an attack occurred there could be a quick response to mobilize the army. For this mobilization plan new warehouses were built and a few older buildings were demolished. Along the railroad a crane was installed to carry heavy loads on the trains. As was common for a Dutch mobilization complex there was a lot of greenery as a camouflage.

During all of this, the civil production of the AI went on. The 'Hembrugdraaibank' (Hembrug turning lathe) became a household name in the metal industry and in 1969 specialized the machine factory itself in turning lathes. In 1973 the AI was separated in 2 independent companies: Eurometaal and NV Gereedschapswerktuigenindustrie ' Hembrug'. This separation had influence on the layout of the former AI terrain. Eurometaal was established in the east of the terrain and demolished a few buildings in the 80's and placed a big production hall (number 01). On the east where NV Gereedschapswerktuigenindustrie Hembrug was established and they made also changes to the area. With these changes the functional logic of the terrain disappeared.

written by: Melanie Kwaks
SOURCE: Steenhuis Meurs Cultuurhistorische analyse

1996

Base Map: Function Group, Image source: Neel Sarkar

INFRASTRUCTURE

URBAN CONNECTION

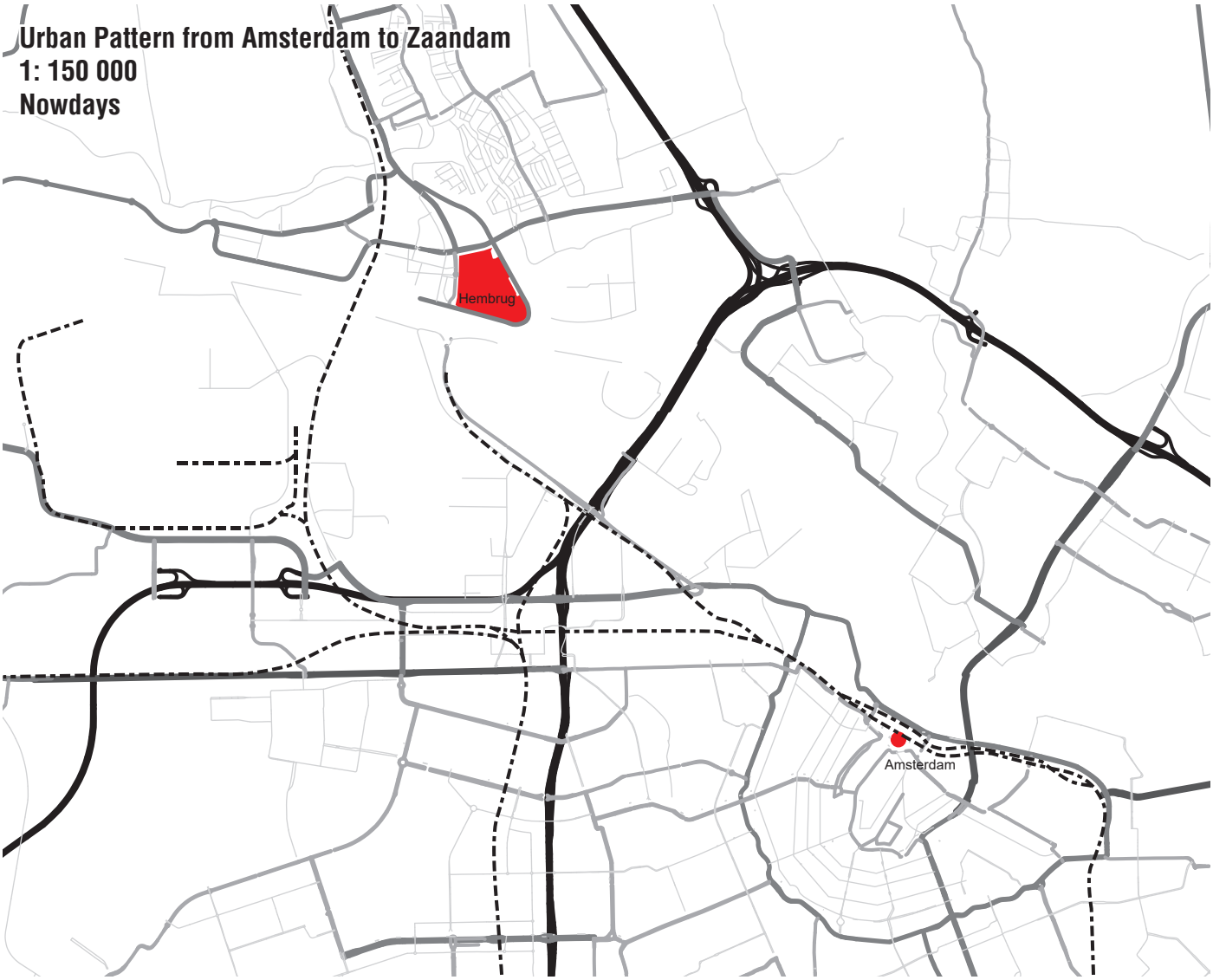
MINGKE ZHU

URBAN PATTERN

The diagram below shows different hierarchy of the roads and the railways (doted lines). Hembrug is located in the edge of Zaandam facing Amsterdam with a river across. It can be accessed easily by cars, trains and bike.

There are two different urban patterns between Amsterdam and Zaandam. Since Amsterdam has a very special and intended pattern, Zaandam is more organic. Amsterdam is more developed, while Zaandam has more natural landscape. Different characters are concluded at the bottom of this page.

Four hierarchy of the ways can be found on the diagram. They are highway (long-distance, speed-movement, designed conjunction with naturalistic landscaping), drive (along boundary between urbanized and natural condition, one side nature and one side urban), road (local, slow-movement, frontage for low-



Hierachy with diagonals for through traffic; even dispersal of traffic from the web and the city is spatially well-defined.

Amsterdam

Hierarchy with long routes for through traffic; responsive to terrain; follow traces of landscaape

Zaandam

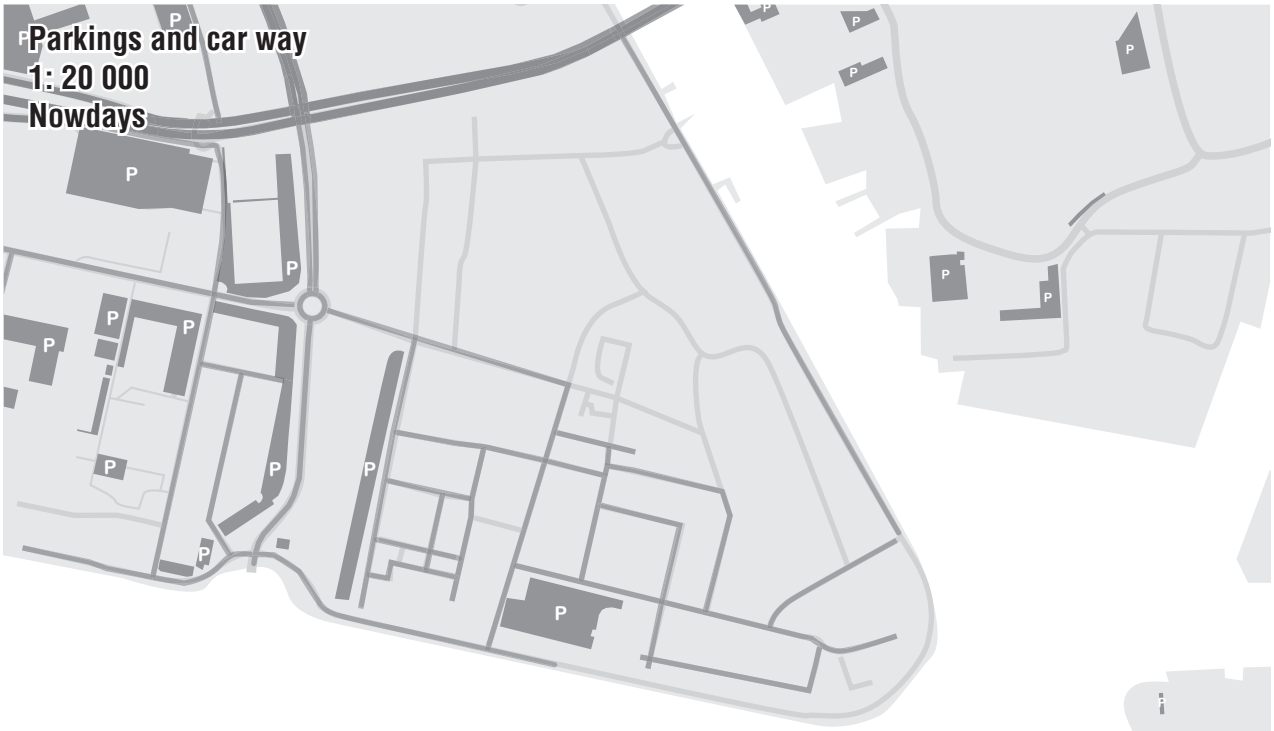
density buildings) and street (frontage for higher-density buildings). In Zaandam, the natural landscape of those wetlands can be seen along the highway. Natural elements are preserved. Hembrug is just in between drives and roads. It is a space easy to be accessed. Besides, hidden in the forests, people will see the greenery along the drives first before they find something happens in the terrain.

CONNECTIONS

Few stops are around the terrain. Bus 64 and 67 provides connection from the Zaandam station. However the frequency of each bus is not very often.

In this case, driving is a more convenient way to get to the site. Hembrug is in a location with opportunities but still border to the center. Better accessibility of public transportation should be considered for the future plan. (Metro from Amsterdam is going to extended to Zaandam in the future.)

SOURCES: *Duany, A. Plater-zyberk, E. and Alminana, R., 2003, Infrastructure, The New Civic Art, New York, pp.104,105*



Zhu, M.

INFRASTRUCTURE

URBAN CONNECTION

MARJAN SADEGHI

The North Sea Canal (Dutch: Noordzeekanaal) is a canal from Amsterdam to the North Sea , it was constructed between 1865 and 1876 to enable seafaring vessels to reach the port of Amsterdam. [fig.1] This man-made channel terminates at Amsterdam in the closed-off IJ Bay, which in turn connects to the Amsterdam-Rhine Canal. The first swing bridge was put into use at the same time as the opening of the railway line between denhelder and Amsterdam in 1878. This bridge had a width of 19 meters and a clearance height of 4 meters [fig 5] The increase in shipping traffic made widening the canal necessary, and with it a new, larger and higher swing bridge. This bridge was built between 1903 and 1907. A long run-up to a dyke was necessary to overcome the height difference with a not too large slope. This new swing bridge was built by German companies. The clearance height in closed position was 11 meters. The bridge could be fully opened in 2 minutes. [fig 6]

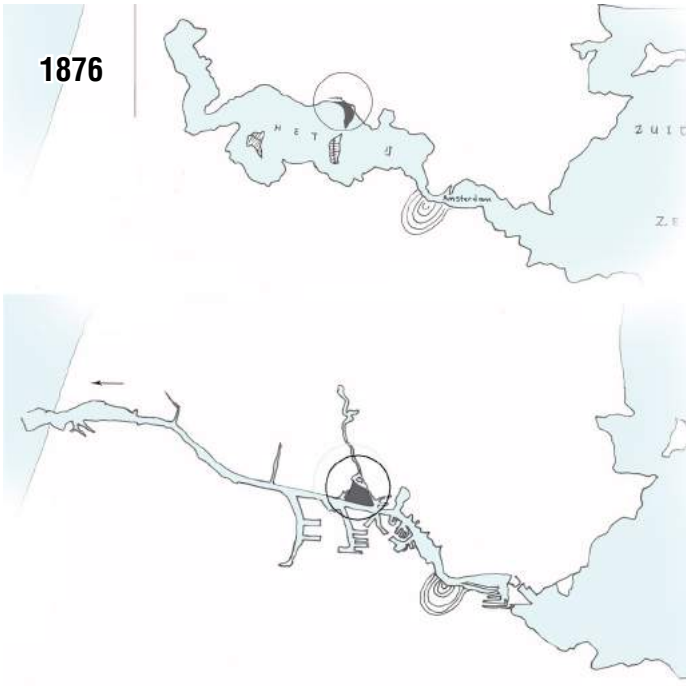


Fig 2- 1876, Sadeghi, M.

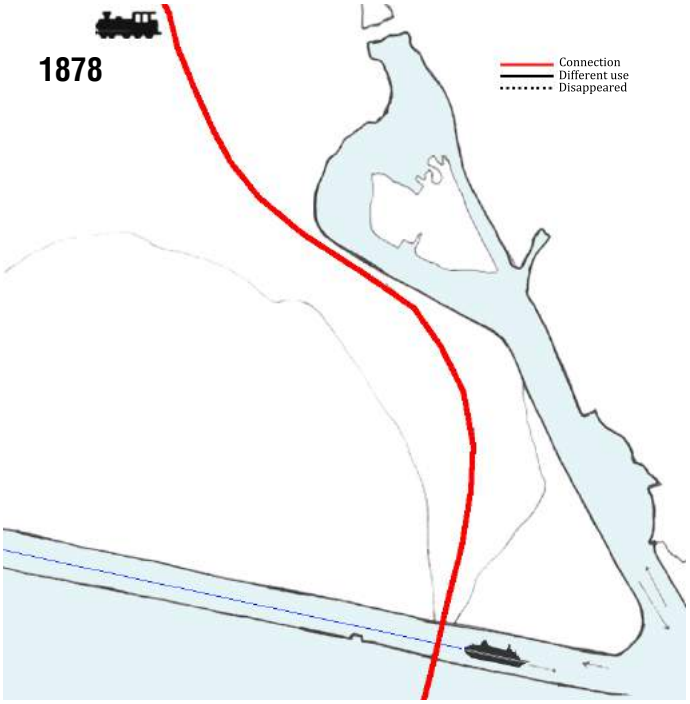


Fig 2- 1878, Sadeghi, M.

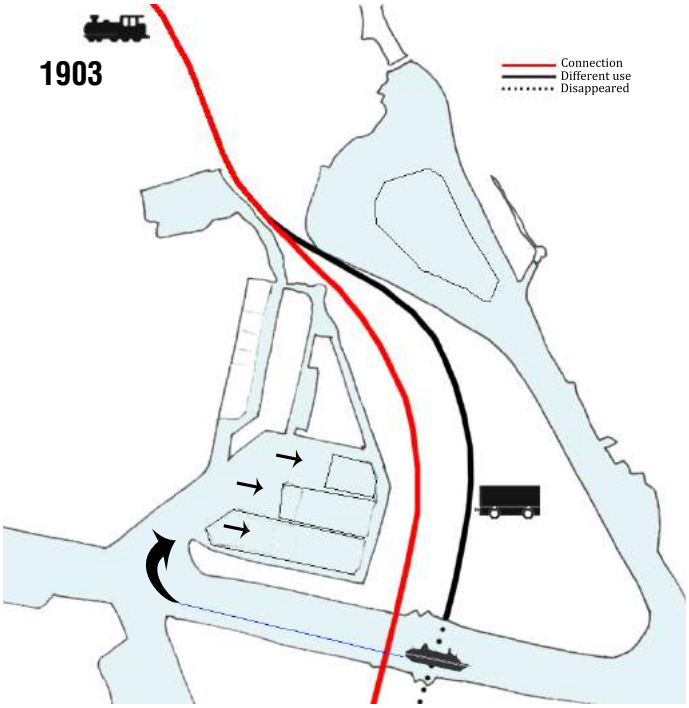


Fig 3 -1903, adeghi, M.

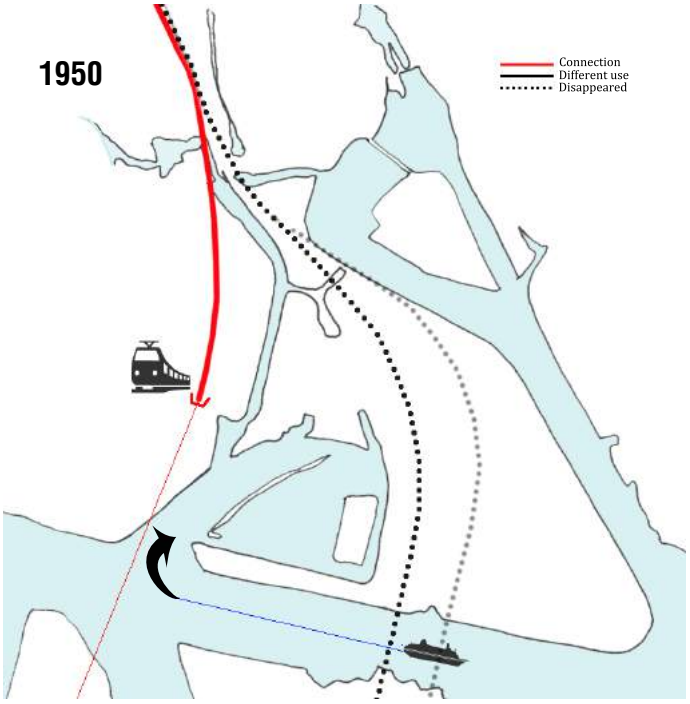


Fig 4 -1950, Sadeghi, M.

CONNECTION AMSTERDAM HEMBRUG

The map below [fig.7] shows the connection between Amsterdam and Hembrug:

The car accessibility is provided by both roads and highways (A10 and A8). The combination of the road and ferry can be used to access the area by bike.

In order to reach Hembrug by public transportation, there is a bus station at Zandaam station. Also, there is a train connection between Amsterdam central and Zandaam, passing Sloterdijk. This railway is partially underground, using the Hemspoort tunnel.

fig 5 - 1875 Testing of the newly completed 1st Hembrug, retrieved from https://artillerieinrichtingenhembrug.wordpress.com/tag/hembrug/

Fig 6 - 1905 Construction of a new 2nd Hembrug, retrieved from https://artillerieinrichtingenhembrug.wordpress.com/tag/hembrug/

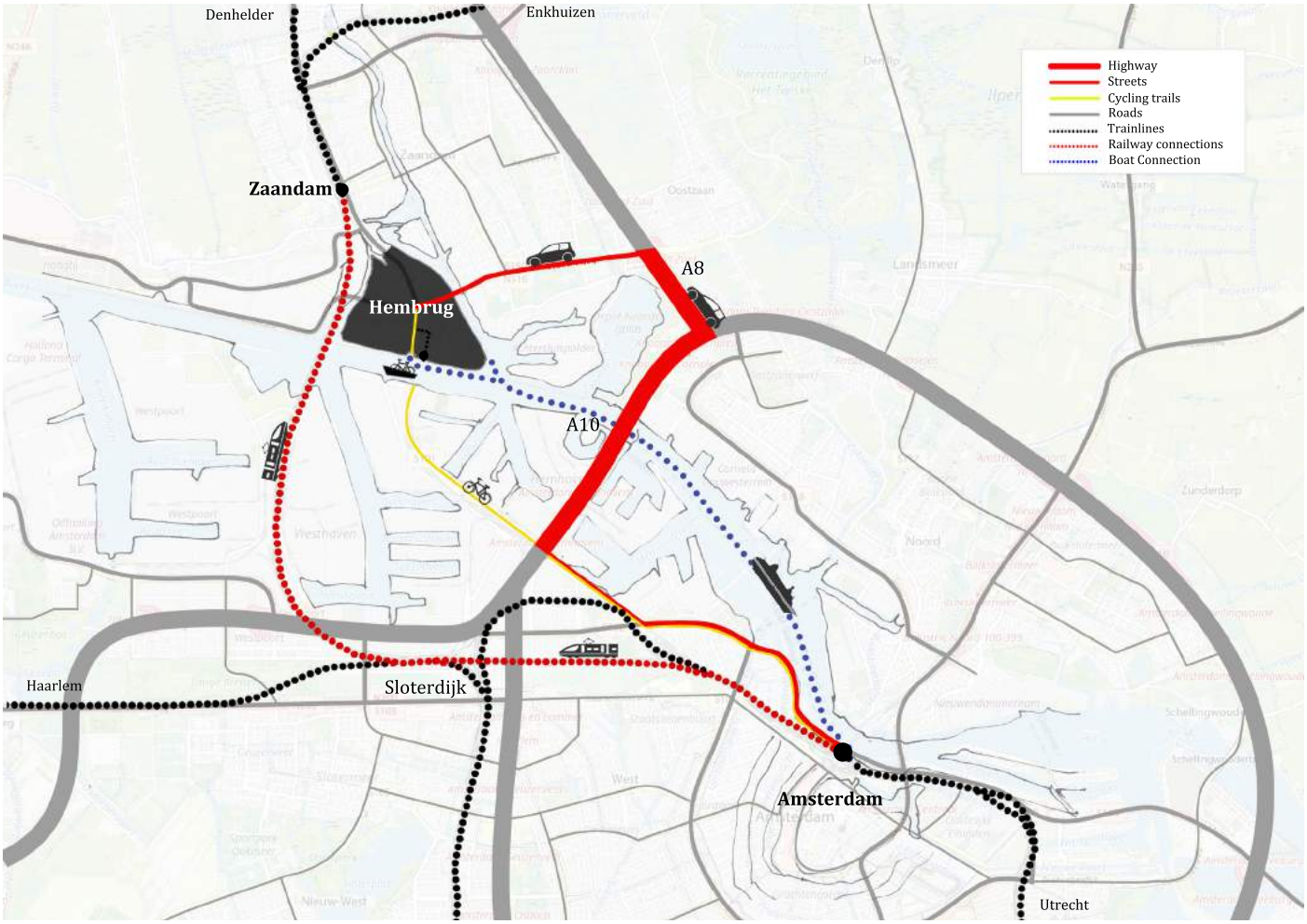


Fig 7 - Sadeghi, M.

CONNECTIONS FROM SCHIPHOL TO HEMBRUG

Schiphol airport, is the 11th largest airport in the world (internatonal airport review, 2019), with both cargo and human transport traffic:

- 105 intercontinental destination
- 144 European destination
- Direct flights to 28 North American cities
- Every week 49 direct flight to New York
- Daily 21 flights to London and 16 flights to Paris

In terms of accessibility, Hembrug is well connected to Schiphol, both by train and car roads; with 24 minutes travel time by train and car. This accessibility is a strengh point a this area, for future possible functions. [fig.8 and 9]

SOURCES:

1930 plane "Popular. (2019). Retrieved April 3, 2019, from https://books.google.nl/books?id=UigDAAAAMBAJ&pg=PA29&dq=1930+plane+%22Popular&hl=en&ei=bfiPTs-NGlnE0AHC_4k_&sa=X&oi=book_result&ct=result&redir_esc=y#v=onepage&q=1930%20plane%20%22Popular&f=true

International-airport-review. (2019). Retrieved April 15, 2019, from https://www.internationalairportreview.com/article/81753/international-airport-review-issue-1-2019/

Fig 8 Schiphol, retrieved from https://www.citizenm.com/content/amsterdam-

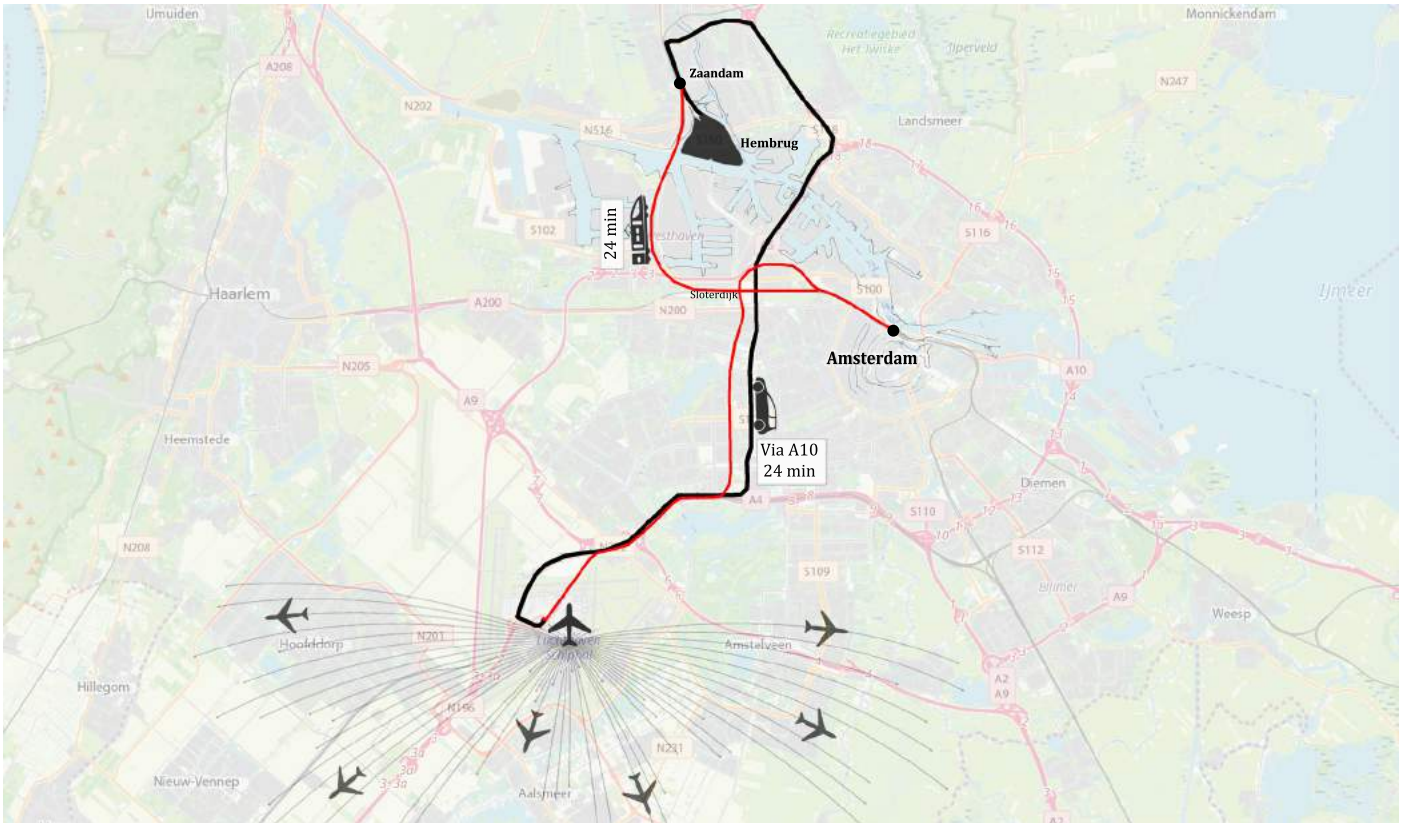
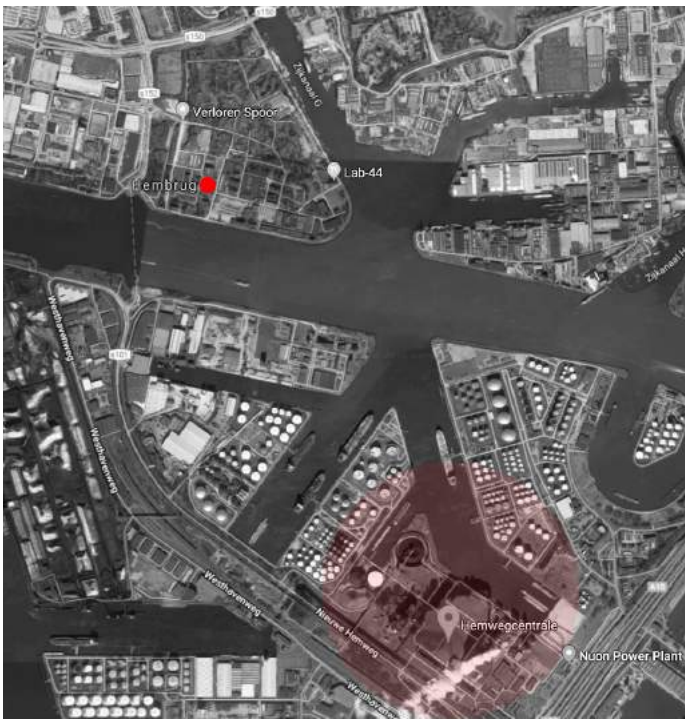


Fig 9 Sadeghi, M.

INFRASTRUCTURE
ENERGY

MINGKE ZHU

Nowadays, the electricity on site is from the power station
Hemwegcentrale on the other side of the North sea canal. It can be seen clearly in the Cape South. The tall chimney produce a large amount of smoke everyday. It was started to use in the year of 1952. It provides power to the North-Holland and Utrecht. However, due to the large production of CO2, Dutch government has decided to close the power station Hemwegcentrale in 2020. Instead, the government is going to find new place for wind power on the sea. 200 workers facing the unemployment. The close of the power station will not affect the power supply. So there is no worry about the use of energy in Hembrug. There will no longer see the tall chimney with smoke rising on the other side of the bank. Another ending of industrial factory comes to the end on the other site of the canal. Hembrug, with its neighbor will become a better place for living and working in the future.



Location of the power station Hemwegcentrale, adapted from google maps

SOURCES: *Bart Van Zoelen. (2017) Closure of Hemwegcentrale saves 1.4 billion, Het Parool, accessed from: https://www.parool.nl/amsterdam/-sluiting-hemwegcentrale-spaart-1-4-miljard-uit~a4480492/*
Bart Van Zoelen. (2019) Hemweg power station will close at the end of this year, Het Parool, accessed from: https://www.parool.nl/amsterdam/hemwegcentrale-gaat-eind-dit-jaar-al-dicht~a4624229/

View from the Cape South, Zhu, M.

INFRASTRUCTURE
SOUND

JOB VAN DEN BERG

Although Hembrug looks like a quiet and peaceful environment, the fact that it was a former industrial area still has an influence on the sound pollution. For the transition of an industrial area to a residential area, more restrictions are made for the sound pollution. Basically, the norm for the sound pollution is 55 dB(A), but is preferred to be under 50 dB(A).

There are three types of sound sources, which can be noticed in the area. The sound coming from the two industrial areas around Hembrug, the Westpoort on the South side and the Achtersluispolder and Westerspoor-Zuid on the North side, the sound coming from the main roads around Hembrug, the N203 (Provincialeweg) and the N516 (Dr. J. M. den Uylweg) and the sound coming from Schiphol, which reaches the area because of the orientation of the runways. (fig 1)
The biggest sound source is the Westpoort, but because of the Zeehavennorm the norm for the pollution of Westpoort can be increased to a maximum of 60 dB(A), otherwise it is not possible to build in the Hembrug area because almost the whole area has a

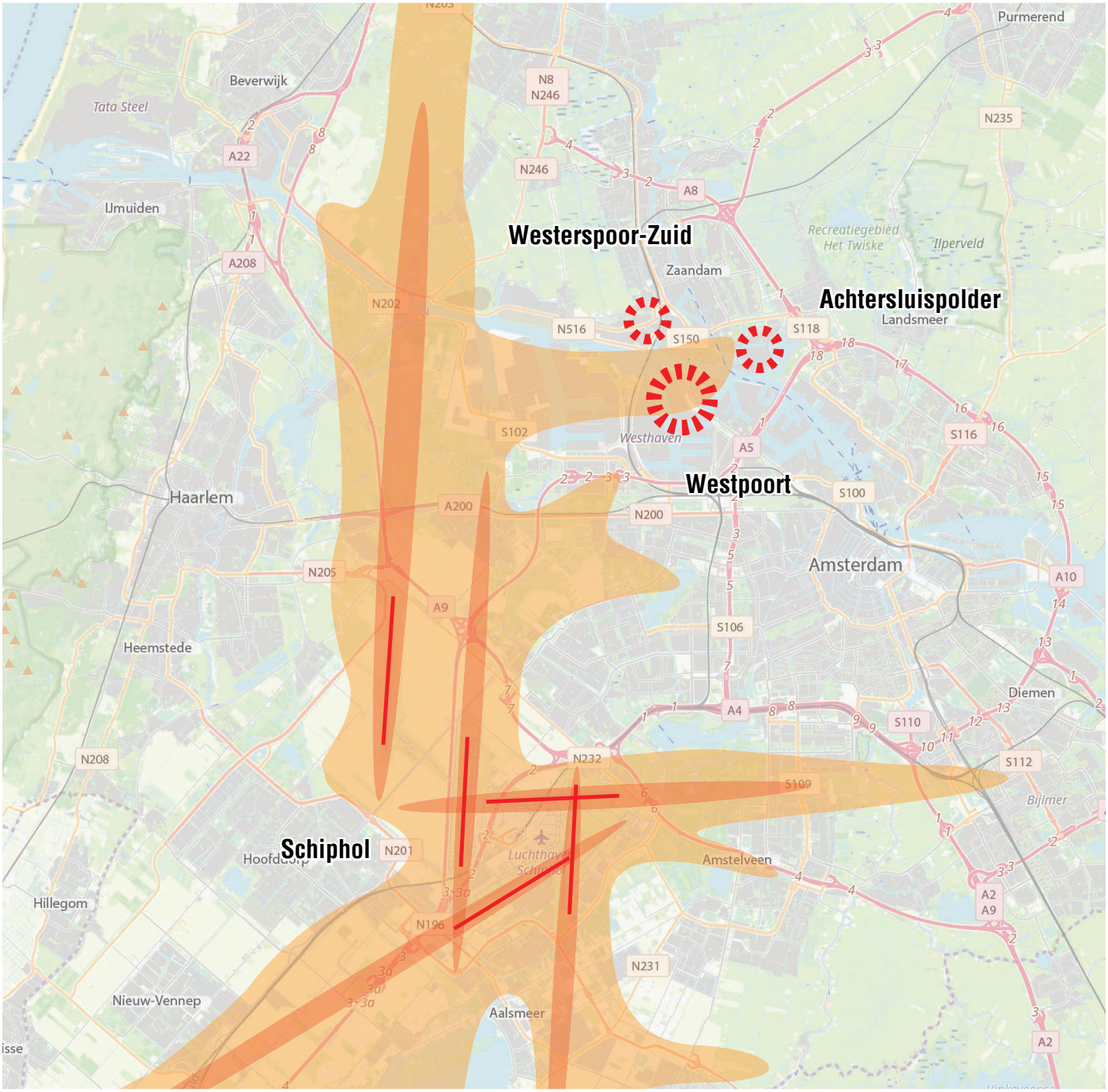


fig 1 sound pollution sources and the 20 Ke-countour of Schiphol, Van den Berg, J. adapted from Actieplan Schiphol 2018-2023, Ministerie van Infrastructuur en Mileu. 2019

sound pollution of 55 – 60 dB(a) what is normally to high. (fig 2)
This increase is not possible for the industrial areas Achtersluispolder and Westerspoor-Zuid, therefore the sound pollution in the East and West borders of the Hembrug area is too high. (fig 3)
The two main roads N203 and N516 have a lot of traffic with a maximum speed of 70km/h. For the sound pollution of traffic, the maximum is 63dB, but it is preferred to be below 48 dB for residential areas. A large area of Hemburg is between 45 and 63 dB and only on a small strip, directly next tot the N516, the sound pollution is above 63dB (fig 4)
The Hembrug area is inside the 20 Ke-contour of Schiphol, so building is this area is not preferred but it is possible if there is a justification. However, the sound pollution of Schiphol subordinates to the sound pollution of the industry because the amount of produced decibel is lower. (fig 5)

SOURCES: *Ministerie van Infrastructuur en Mileu. (2019). Actieplan Schiphol 2018-2023, The Netheralands, Den Haag*
Antea Group. (2018). Omgevingsplan Hembrug e.o., The Netheralands, Almere

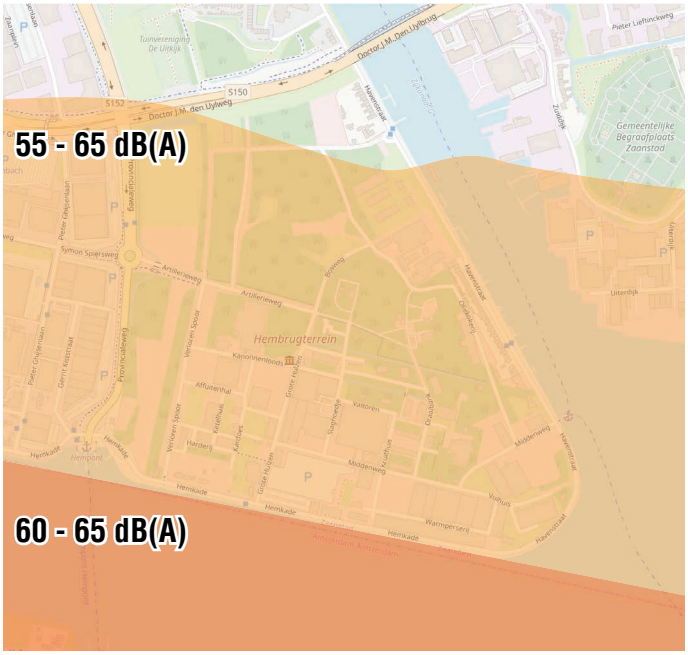


fig 2 sound pollution of Westerspoor, Van den Berg, J. adapted from Omgevingsplan Hembrug e.o., Antea Group.. 2018

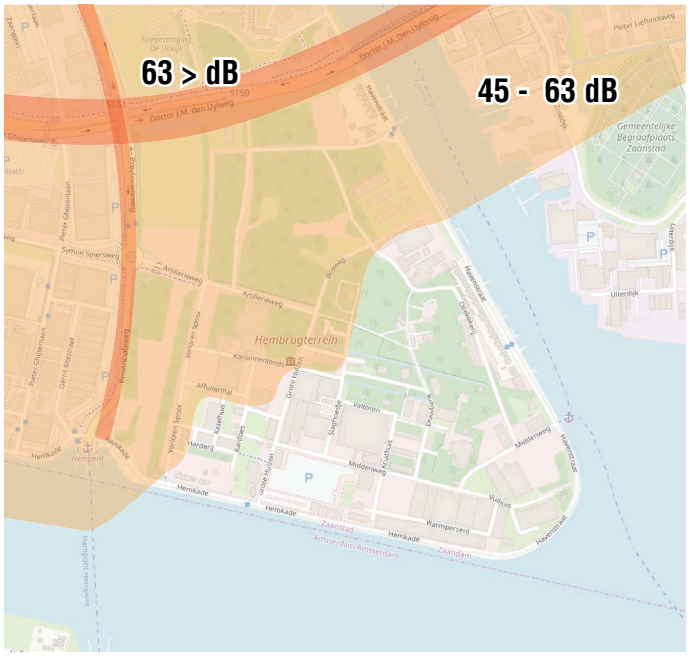


fig 4 sound pollution of the N203 and N516, Van den Berg, J. adapted from Omgevingsplan Hembrug e.o., Antea Group.. 2018

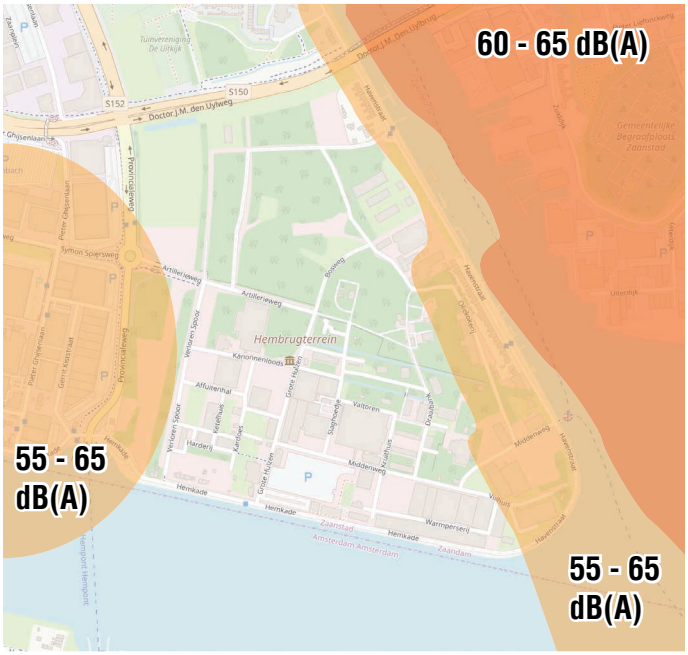


fig 3 sound pollution of Achtersluispolder and Westerspoor-Zuid, Van den Berg, J. adapted from Omgevingsplan Hembrug e.o., Antea Group.. 2018

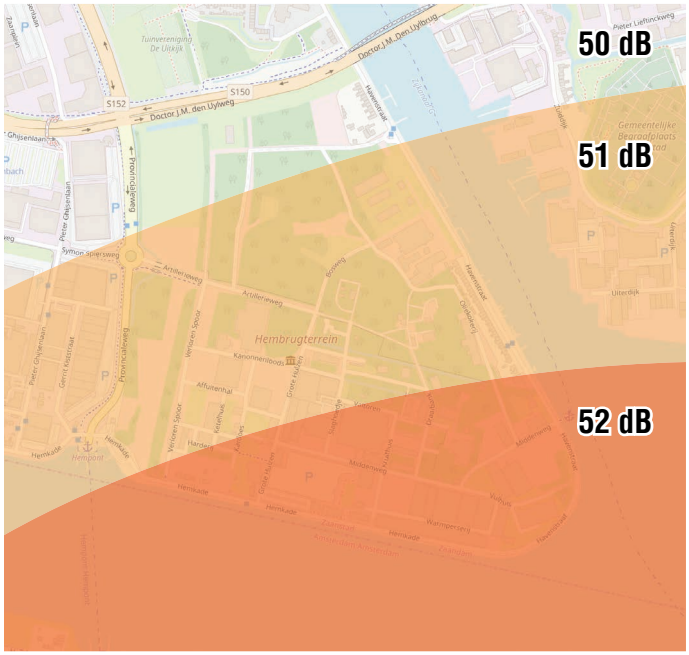


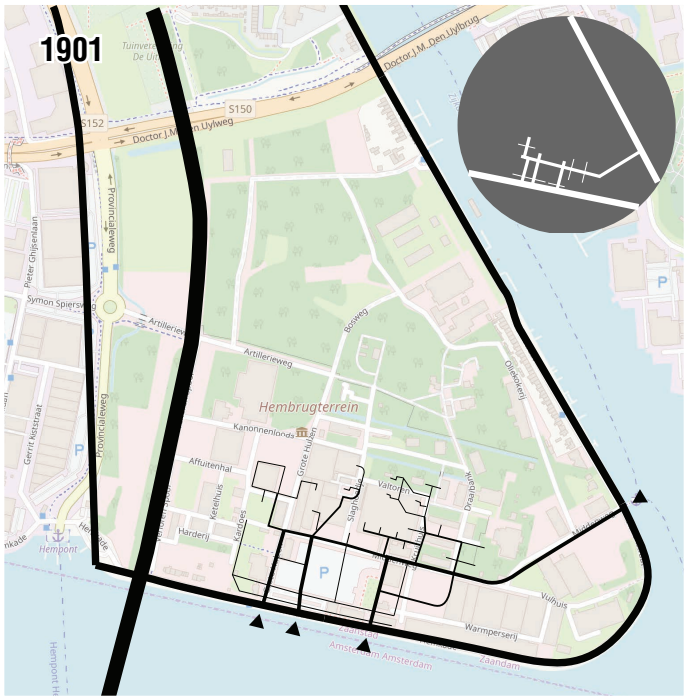
fig 5 sound pollution of Schiphol, Van den Berg, J. adapted from Omgevingsplan Hembrug e.o., Antea Group.. 2018

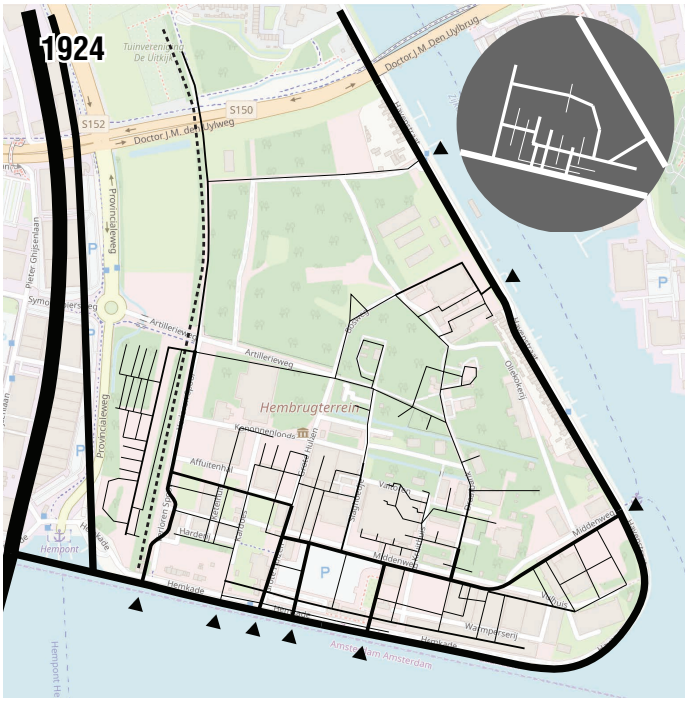
INFRASTRUCTURE

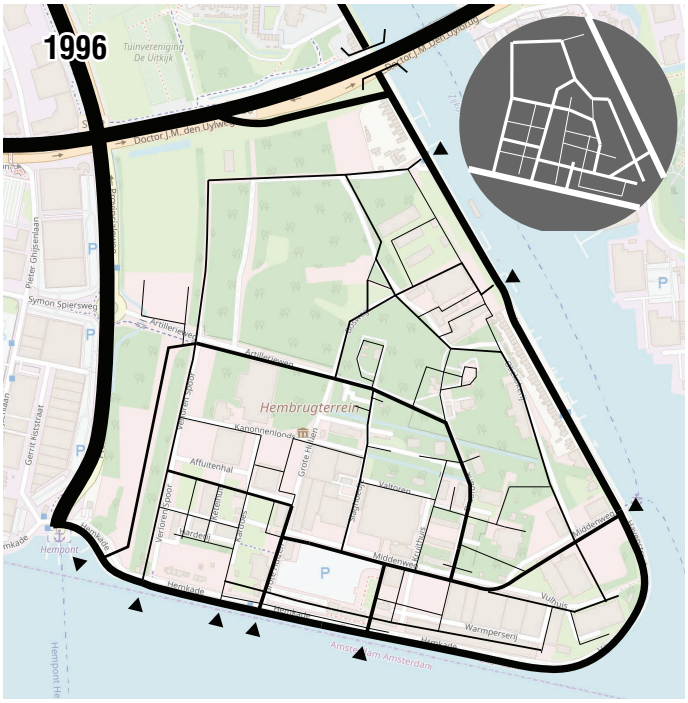
ROAD STRUCTURE

JOB VAN DEN BERG

In the beginning the Hembrug area was only accessible by the entrances on the South side of the waterfront. The main axes where in line with these entrances and there was one horizontal axis that was connecting all parts with the pier on the East side for transport of goods. (1901) With the introduction of the railway to Zaandam, the structure extended towards the railway in the West part of the area. In this time the East-West structure became more prominent with a smaller structure perpendicular to this axis. (1924) When the East-West structure was fully built, the area expanded to the North towards the plofbos. The present North-South structure was extended and the current structure was compacted. (1941) With the introduction of the Dr. J.M. den Uylweg, the North-South structure was blocked in the top part. Also smaller buildings were replaced by lager buildings so the overall structure became more organised. (1996) After the area became vacant a new entrance was created on the West side so you entered the area from inside out. A new infrastructure was designed with the use of Stelcon plates. They were organised in a one, two and



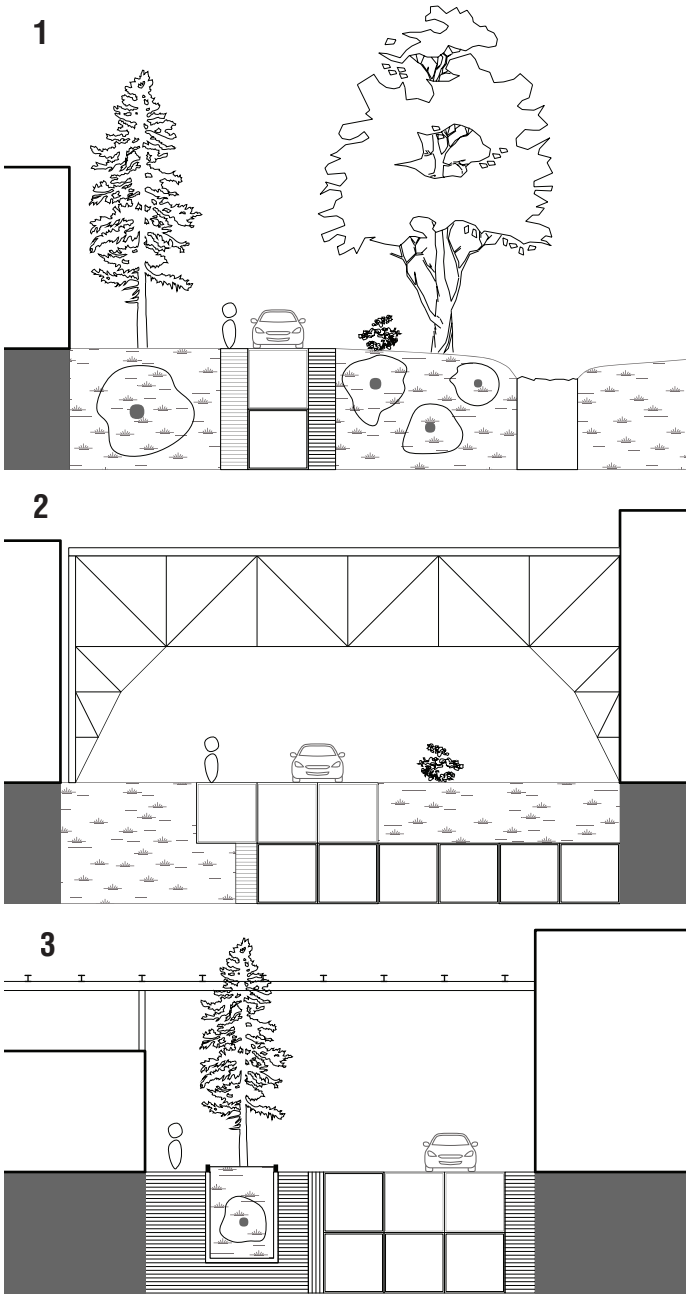


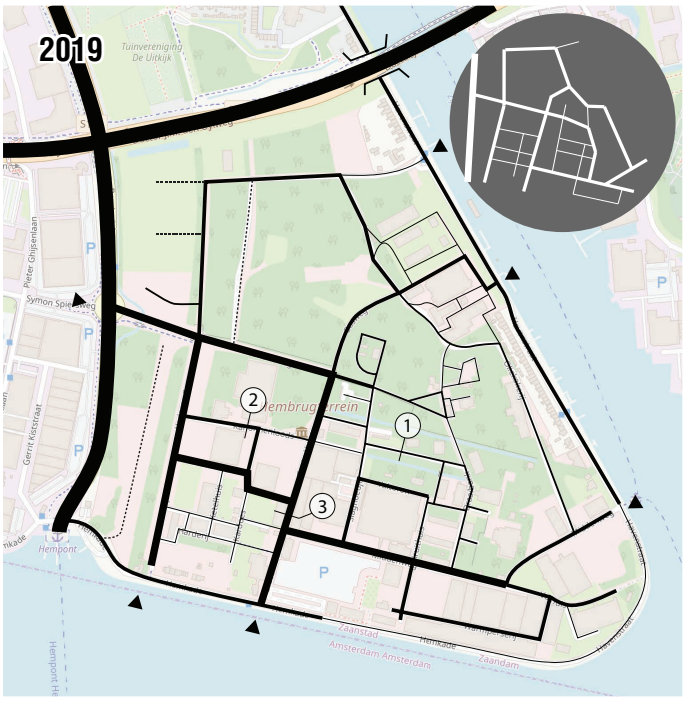


Van den Berg, J. adapted from Hembrugterrein - Zaandam, Cultuurhistorische analyse, SteenhuisMeurs 2010

three plate structure. (2019) On the right 3 sections are made that show the use of the different amount of stelconplates that are used. At the current situation, only the South side of the area can ben entered. The fast traffic follows the old main axes combined with the new added road to the West. The area can still be entered through the old main entrance but this is slowed down. The slow traffic has more freedom. They can still make use of all the old entrances and the secondary structure can also be used.

SOURCES: *SteenhuisMeurs. (2010). Hembrugterrein - Zaandam, Cultuurhistorische analyse. The Netherlands, Schiedam*





Van den Berg, J.

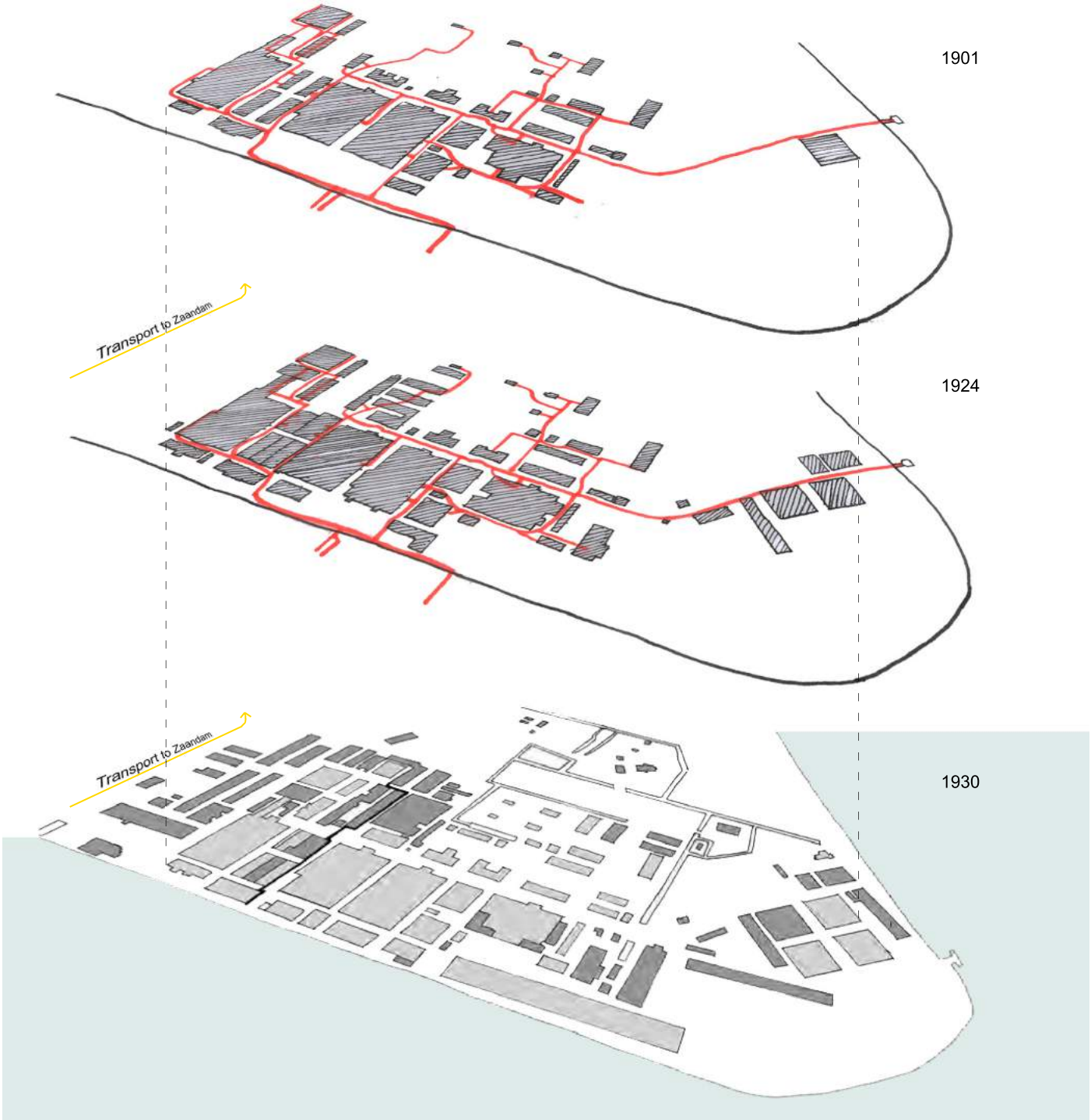
Van den Berg, J. adapted from Hembrugterrein - Zaandam, Cultuurhistorische analyse, SteenhuisMeurs 2010

INFRASTRUCTURE

SMALL TRACK

MAAIKE LENGTON

The small track was built along with the construction of the first factories. It was built to assure a safe transport of heavy amunition and products. The tracks ran through buildings and were connected to the docks of side canal G and the Northsea canal. In the year 1903 the small tracks were extended and in the 1920's it was modernised by using electric lorries. This reduced the risk of explosions and made the transport easier and faster. The image below shows the buildings that made use of the small track over time. In 1901, the factories and warehouses were connected to the small track and ran to the side canal. In the map of 1924 it can be seen that more buildings were added and especially at Cape North and the Changeover Zone. In this situation, the small track ran through the buildings of the Changeover Zone. The connection to the railway line of Zaandam to Amsterdam is also present in this situation as it went into service in 1912. This track served as the old railway line between Amsterdam and Zaandam, but was put out of service when the second bridge and with that



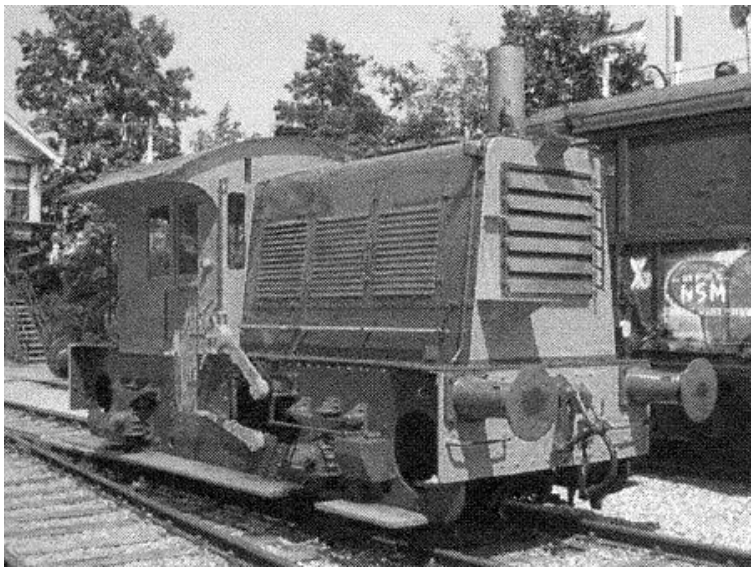
Lengton, M. adapted from Beeldkwaliteitsplan Hembrug-terrein, Palmbout 2011

bridge and with that the new railway line was built. In the 1930's the Provincional road from Castricum aan Zee to Hembrug was built. For this road, a large amount of sand was needed, so it was brought in by ship at Hembrug. From here it was transported with small dump carts on the specially placed small track. The Hembrug site was accesible by boat, train and the roads of the Hemkade and the Havenstraat, but now also accesible by the Provincional road. After the 1930's all the small tracks on the Hembrug terrain were not used anymore and dissapeared. It is unknown why and when exactly this happened. A picture of a soldier on a bike, taken between 1936 and 1941, shows the small track in front of a warehouse, so it would have been removed sometime after this picture was taken. The bottom right image shows the engine locomotive that was used for the transport of goods on the railway line to Zaandam. The locomotive's serie number 225 dates from the serie built between 1934-1940.

SOURCES:
SteenhuisMeurs. (2010). Hembrugterrein - Zaandam, Cultuurhistorische analyse. The Netherlands, Schiedam
Palmbout. (2011). Beeldkwaliteitsplan Hembrug-terrein. The Netherlands, Rotterdam
https://artillerieinrichtingenhembrug.wordpress.com/tag/provinciale-weg/ & tag/smalspoor/

Artillerie Inrichtingen Hembrug, retrieved from https://artillerieinrichtingenhembrug.wordpress.com/tag/smalspoor/

AI Hembrug, retrieved from https://artillerieinrichtingenhembrug.wordpress.com/tag/smalspoor/



AI Hembrug, retrieved from https://artillerieinrichtingenhembrug.wordpress.com/tag/provinciale-weg/

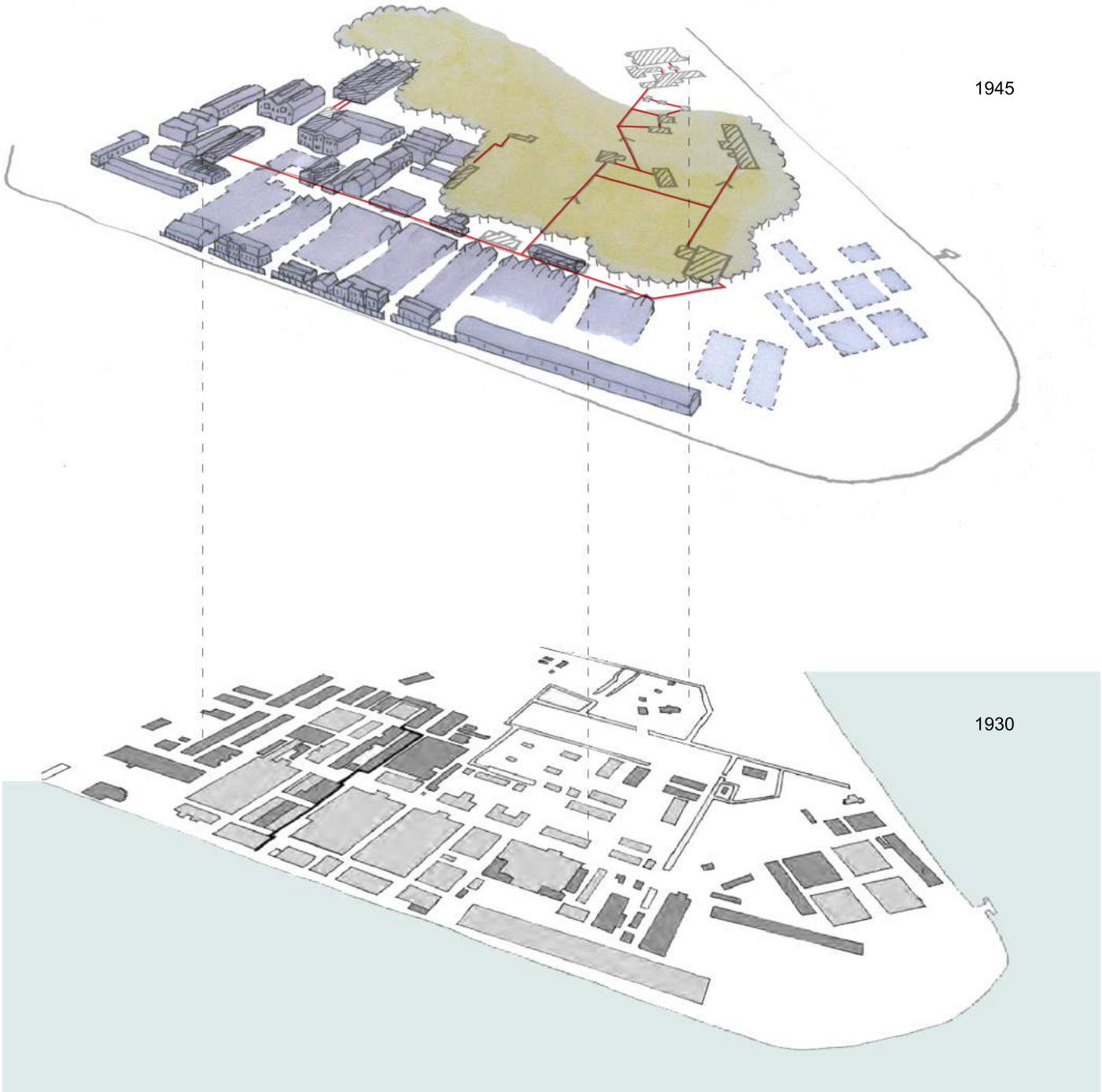
INFRASTRUCTURE

OVERHEAD LINES

MAAIKE LENGTON

The factories of the Hembrug terrain needed steam to power the machines, so a structure of overhead pipelines was built at the end of the 19th century. The overhead lines were carried by a framework structure and ran along the East-West axis with branches to the three factory buildings and the 'plofbos' buildings.

Besides powering the machines, the steam was used to heat the buildings in which people worked with explosives. By using steam instead of open fires or gas, the risk of explosions and/or fires was tremendously reduced. To supply the steam, boiler building nr. 218 was built on the West side of the central axis aroun 1930. It produced steam for all the buildings and continued to do so until the closure of the site. Before 1930, another boiler building must have produced the steam, but this building was never recorded in a map. It can be assumed that this building was situated on the central axis as well. The image below shows the network of overhead lines in 1945. It shows the West-East axis and the branches to the 'plofbos' and the Sectorpark.

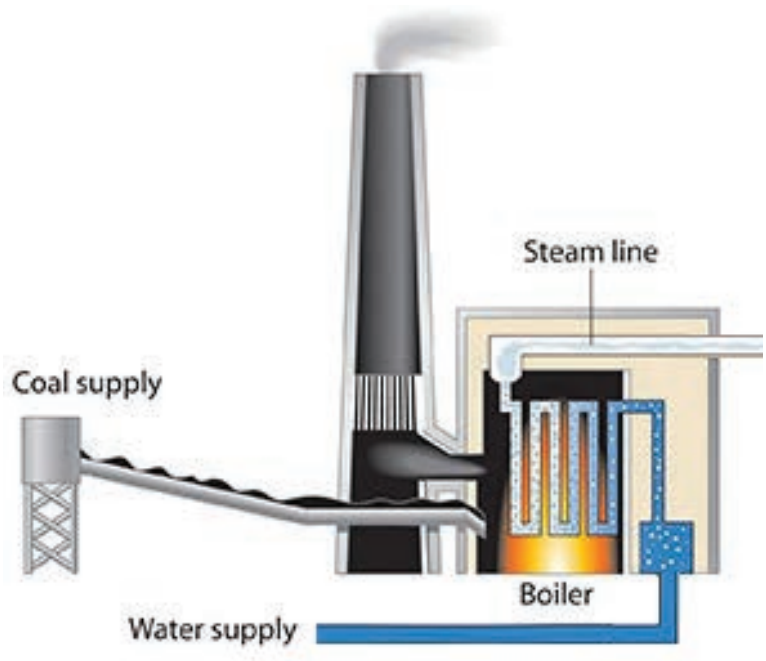


Lengton, M. adapted from Beeldkwaliteitsplan Hembrug-terrein, Palmbout 2011

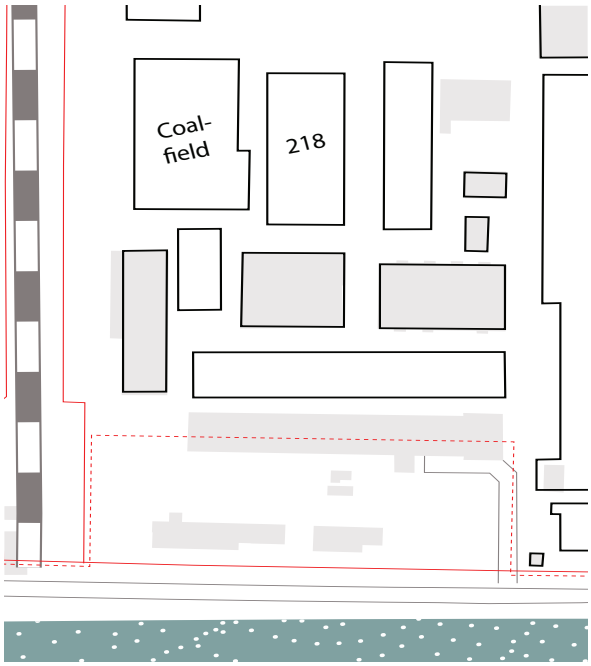
The overhead structures between the buildings on Campus North and next to the Changeover Zone were not used for steam, but for transport of goods. The overhead structure is preserved over time and is still one of the most characteristic elements of the site. The picture below shows the overhead lines in the plots in the wood.

The production of steam:
Next to building nr. 218, a coalfield was situated. This field provided the coal for the boiler building and can be seen in the map below, dating from 1941. The coal was used to heat the boiler which was filled with water. The boiling water generated steam which was lead through pipes to the factories and workshops. This process is visualised in the top left image.

SOURCES:
Palmbout. (2011). Beeldkwaliteitsplan Hembrug-terrein. The Netherlands, Rotterdam
SteenhuisMeurs. (2010). Hembrugterrein - Zaandam, Cultuurhistorische analyse. The Netherlands, Schiedam



Lengton, M. adapted from https://www.e-education.psu.edu/egee439/node/584



Lengton, M. adapted from Hembrugterrein, SteenhuisMeurs 2010

Steden in Transitie, retrieved from https://stedenintransitie.nl/stadbericht/hembrug-creatief-met-oude-barakken

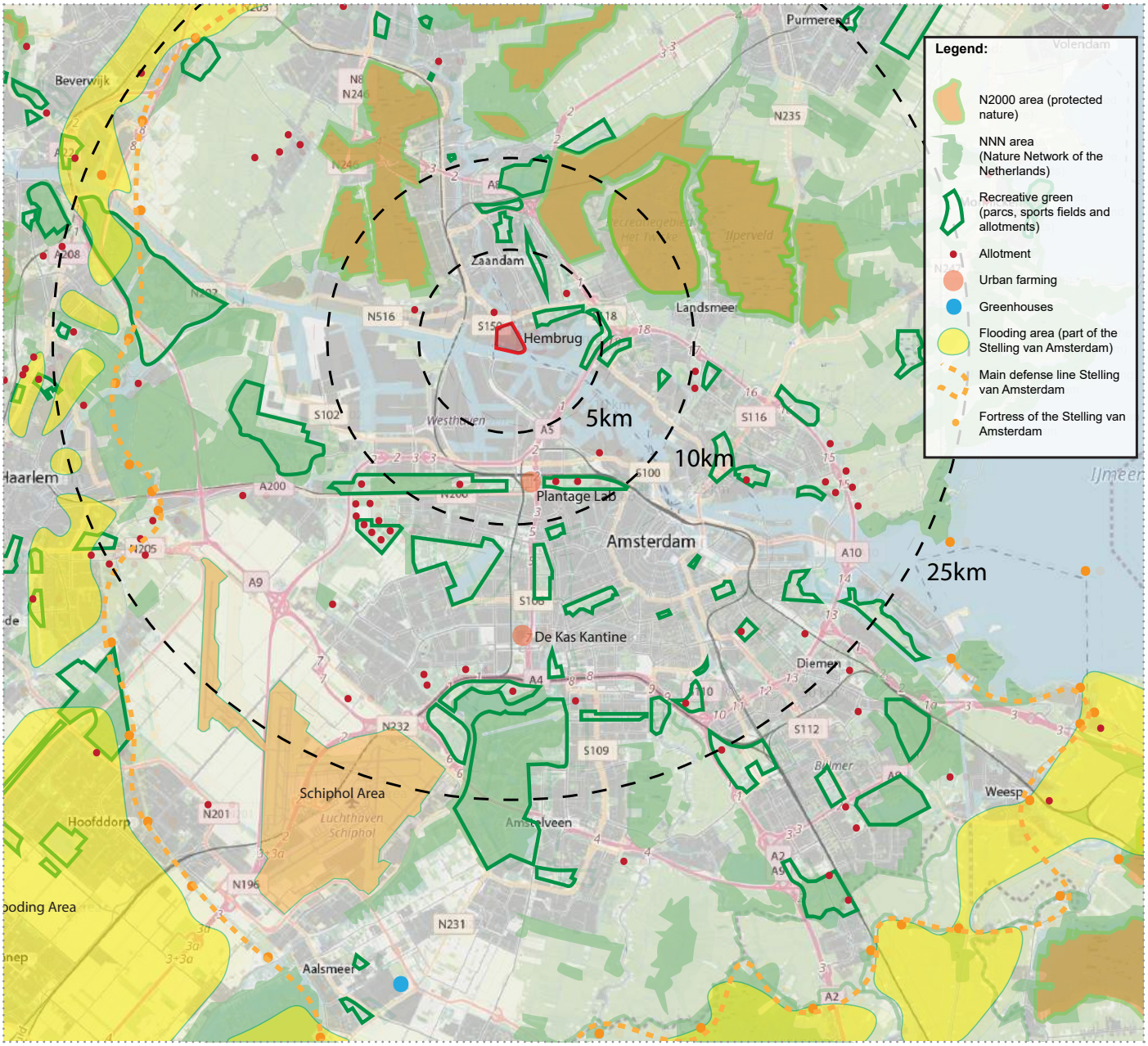
GREEN

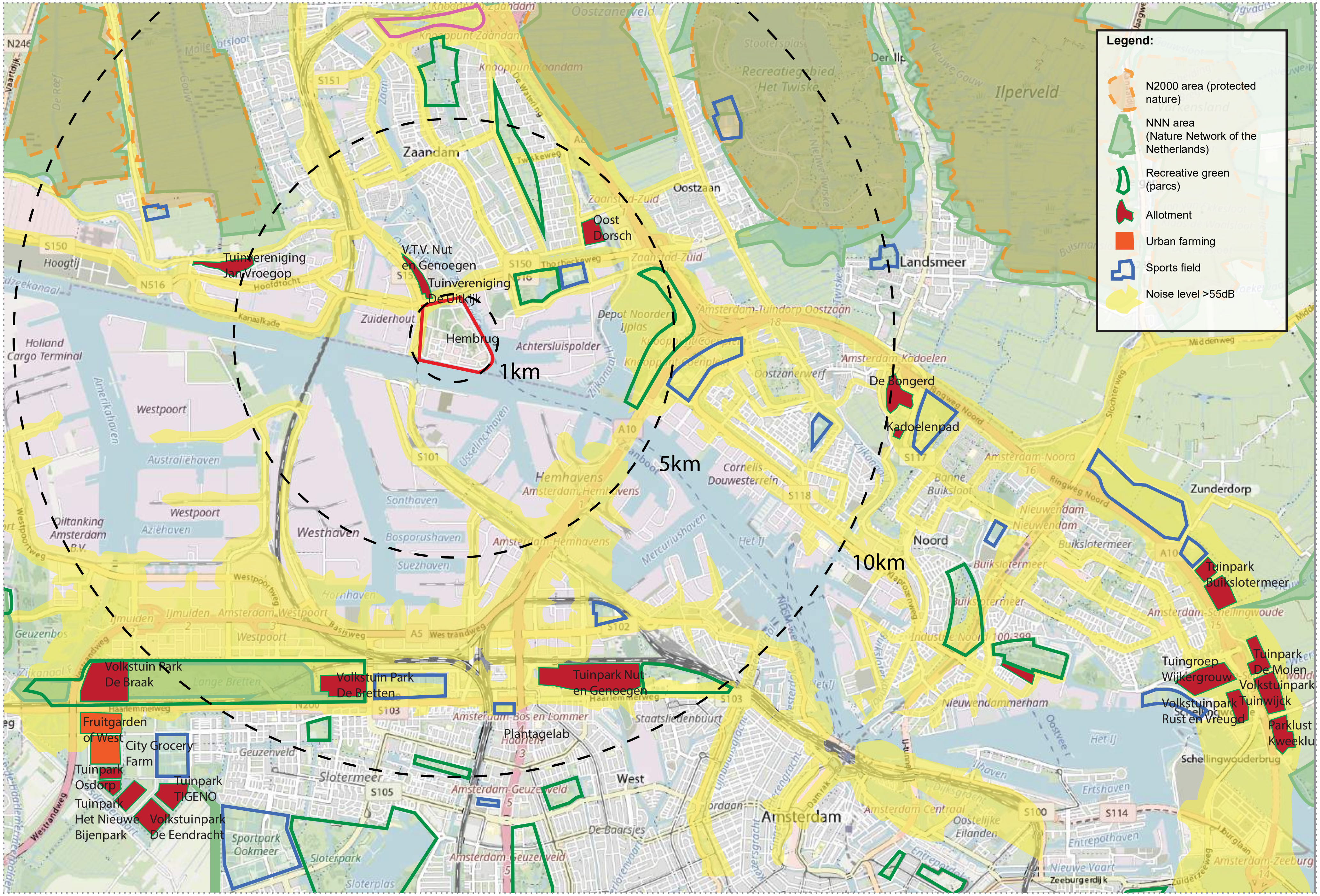
KILIAN MOL / LUCAS POL

GREEN SURROUNDING AREA'S (by Kilian Mol)

For the analysis of the greenery of the existing situation, different types of green areas around Hembrug area have been mapped. At a regional level, a distinction has been made between protected green areas which are called the N2000 areas, recreational green, allotments where people can grow their own vegetables, urban farming and green houses. The province of North Holland has designated some parts of the existing greenery as the Nature Network of the Netherlands (the NNN areas) which are shown in the drawing underneath as green surfaces.

The historical border of "De Stelling van Amsterdam" (The Defense Line of Amsterdam) has been added to the map on a regional scale as well, as is shown underneath. The orange dotted line represents the defensive border, together with the orange dots that indicate the fortresses and the flooding areas in yellow that were part of this defense line. The black dotted circles give an impression of the distance between the several green areas and Hembrug. As you can see Hembrug is located within an industrial area with a poor amount of greenery within a close distance to the site, except for the greenery present on the site itself. Therefore, in the current situation there is no clear connection with the National Nature Network. The drawing on the right shows a more detailed mapping of the context that surrounds Hembrug. In this drawing the recreational green areas are shown, they are divided into parcs and sports fields. The yellow areas in this map represent the noise levels above 55 dB.

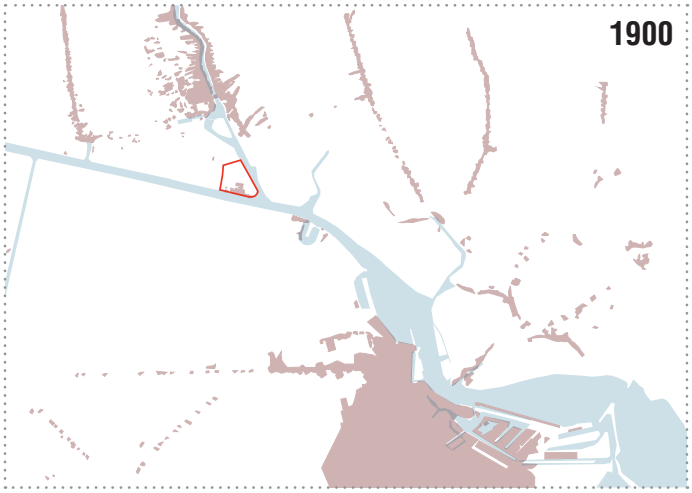


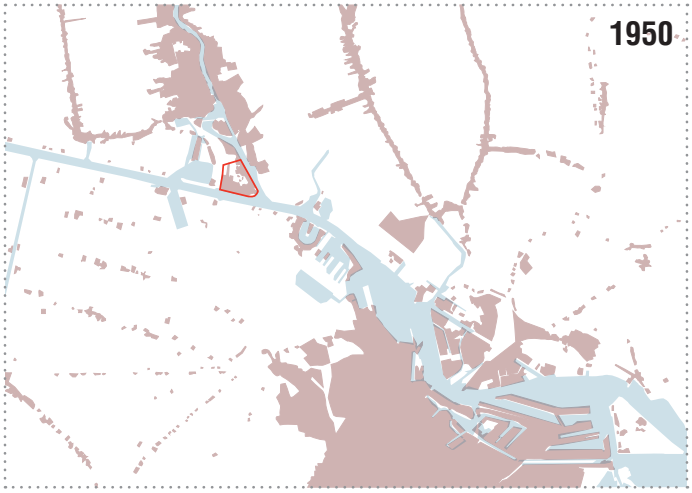


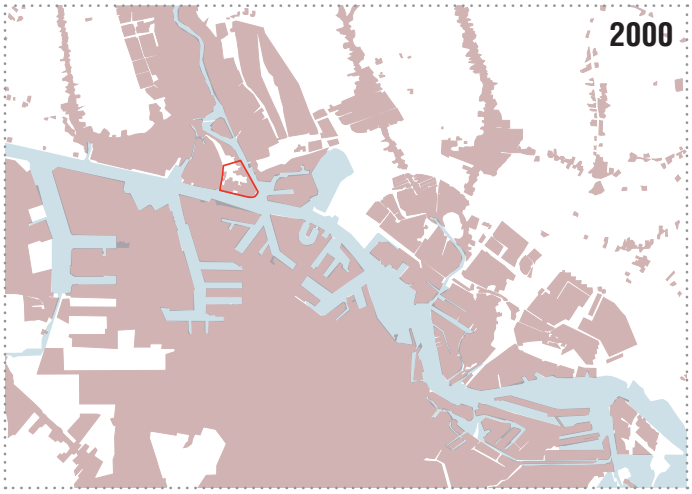
Legend:
N2000 area (protected nature)
NNN area (Nature Network of the Netherlands)
Recreative green (parcs)
Allotment
Urban farming
Sports field
Noise level >55dB
1km
5km
10km
Tuinvereniging Jan Vroegop
V.T.V. Nut en Genoegen
Tuinvereniging De Uitkijk
Hembrug
Oost Dorsch
De Bongerd
Kadoelenpad
Tuinpark Buikslotermeer
Tuingroep Wijkergrouw
Volkstuinpark Rust en Vreugd
Tuinpark De Molen
Volkstuinpark Tuinwijck
Parklust
Kweeklu
Volkstuin Park De Braak
Volkstuin Park De Bretten
Tuinpark Nut en Genoegen
Fruitgarden of West
City Grocery Farm
Tuinpark Osdorp
Tuinpark TIGENO
Tuinpark Het Nieuwe Bijenpark
Volkstuinpark De Eendracht
Plantagelab

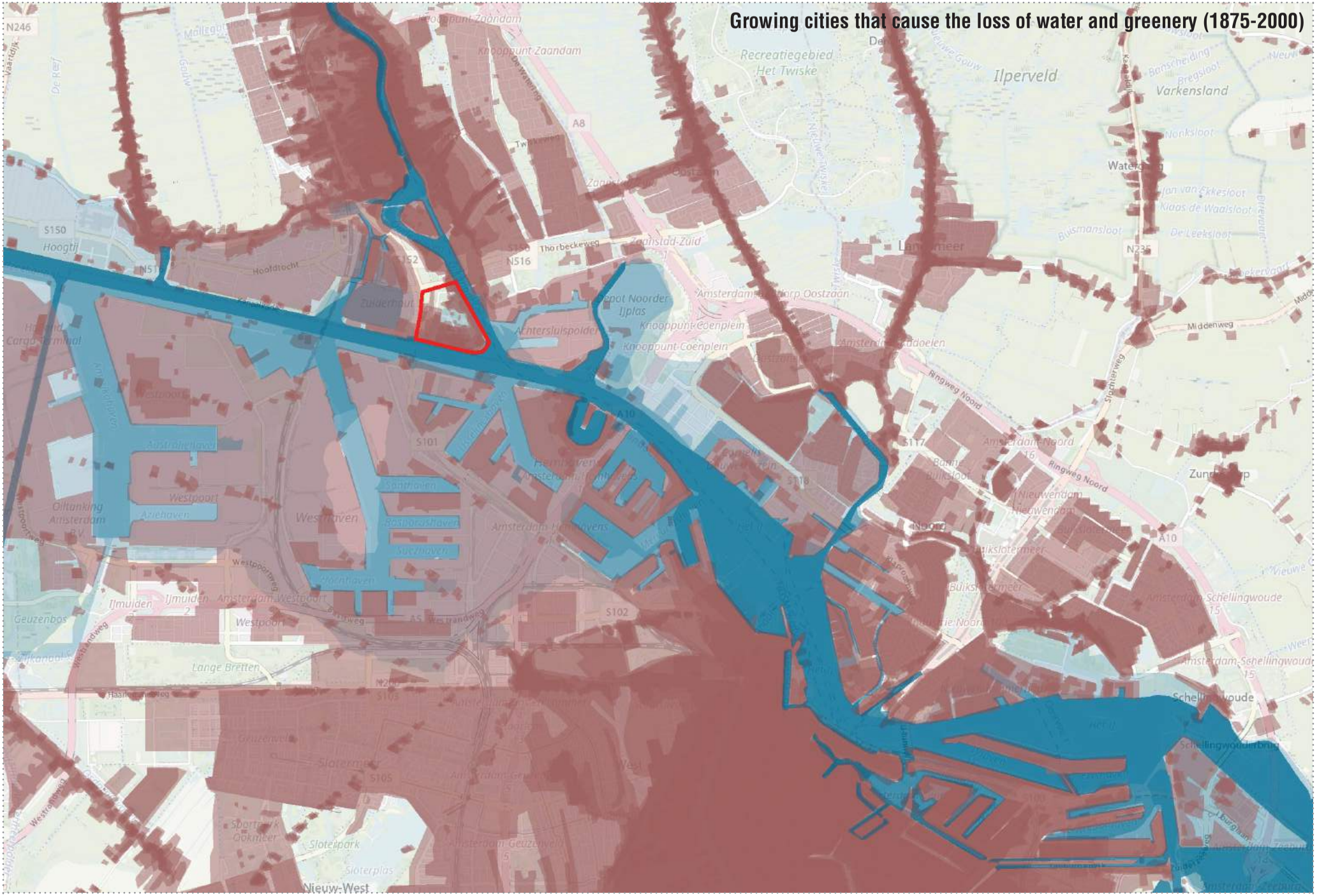
TIMELINE (by Kilian Mol)

The maps below and on the right create a better understanding on how much the cities have expanded over time. The most important water is mapped in blue and the built environment in brown. The Hembrug area is marked by the red line. By mapping the built environment of six different periods in history we made an overview of the expansion of the cities around Hembrug. This overview shows the artificially created land within the lake "het IJ" that was constructed and redesigned over time. Moreover, it shows that a lot of green open space has disappeared because of the expanding cities. The image on the right shows a combination of the built environment and the water of all the different periods over time. The darkest areas show the oldest areas in the built environment.








Growing cities that cause the loss of water and greenery (1875-2000)

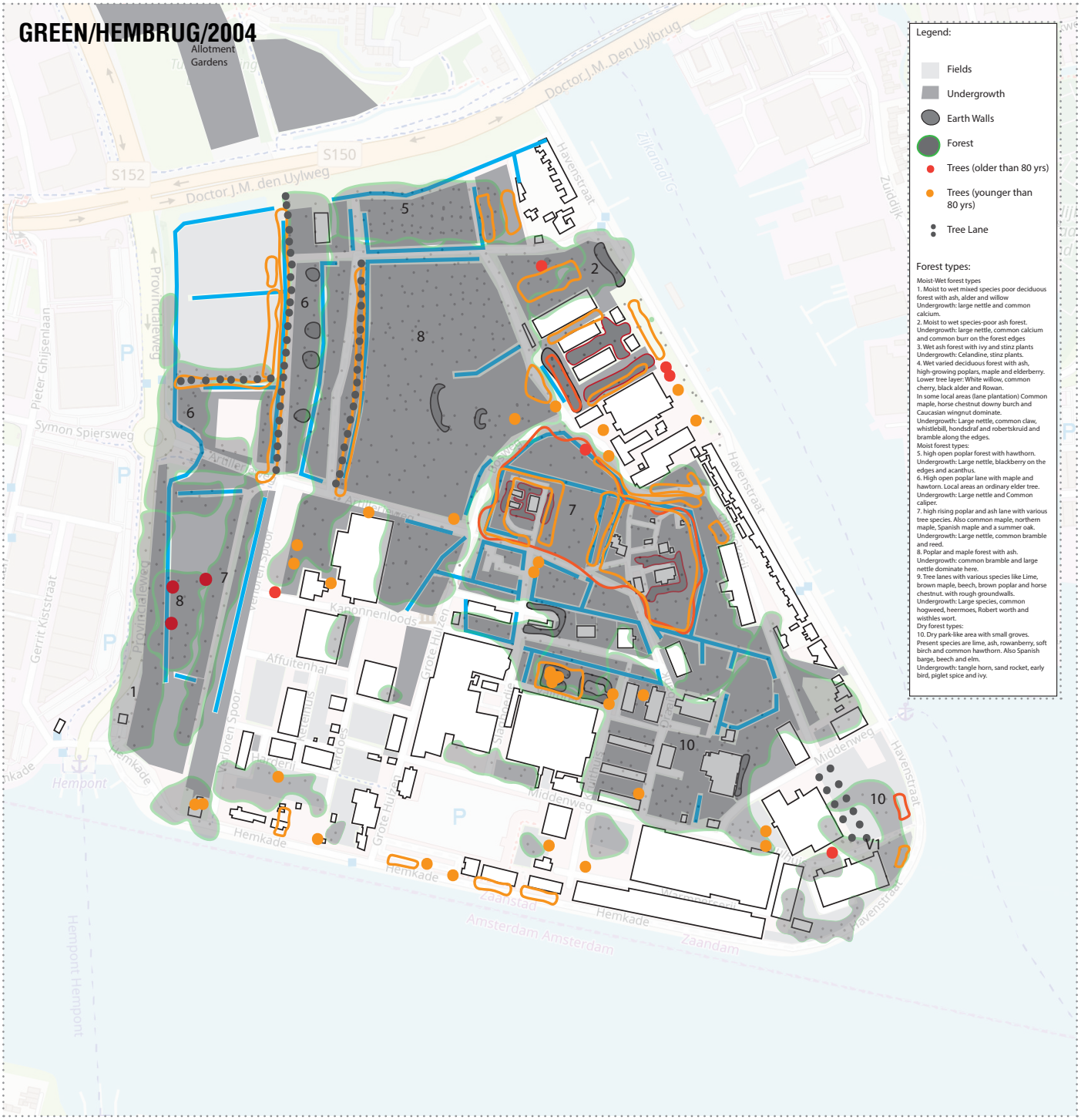
BIODEVIRSITY OF PLANTS (by Lucas Pol)

The Hembrug location has a lot of uncontrolled growth due overplanting and neglect. This makes that the area has potential for biodiversity. In origin the plants were purely functional with some exceptions. In this analysis the earth walls have been considered as well. These are an important part of the topography, just like the ditches around the "islands".

There are three main kinds of green: 1. Fields, 2. Bushes and undergrowth and 3. Trees. The fields are mostly on empty terrains and plots. They were not maintained so have several different grasses and are high enough to attract small mammals.

The undergrowth is in a lot of cases mostly because of absence of maintenance and makes that the site seems quite wild. The bushes are placed, just like the trees, around buildings and earth walls for protective and shading purposes.

Finally, the trees have several functions. Just like the bushes they are placed around buildings for shading and protective purposes. Secondly the trees are placed in rows along some of the roads or paths to guide the pedestrian along these paths. These are an essential part of the Plofbos or testing forest. Also are they placed along some other paths possibly for aesthetic reasons. They are however hard to keep apart from



the trees that have been placed around the building in earlier periods.

ANIMALS

There are several species of animals like birds, bats, insects and more. As can be seen the map below, hey are spread in specific areas, on the site. The number possibly increased in the years the site wasn't touched by humans.

PLOFBOS

The testing forest is the central and most important green area on the Hembrug site. The forest consists of testing islands surrounded by ditches. On these Island testing bunkers were built with earth walls and trees and bushes around for ensuring security. Along the roads strict rows of trees are placed to make sure the pedestrian does not stray from the path.

SANITATION

The soil is highly polluted due to the industrial activities. and contains possible explosives or remains as well. So, the soil is being cleaned now, according to planning until October 2019. This makes that a lot of the biological properties will disappear or be disturbed.

TIMELINE HEMBRUG (by Lucas Pol)

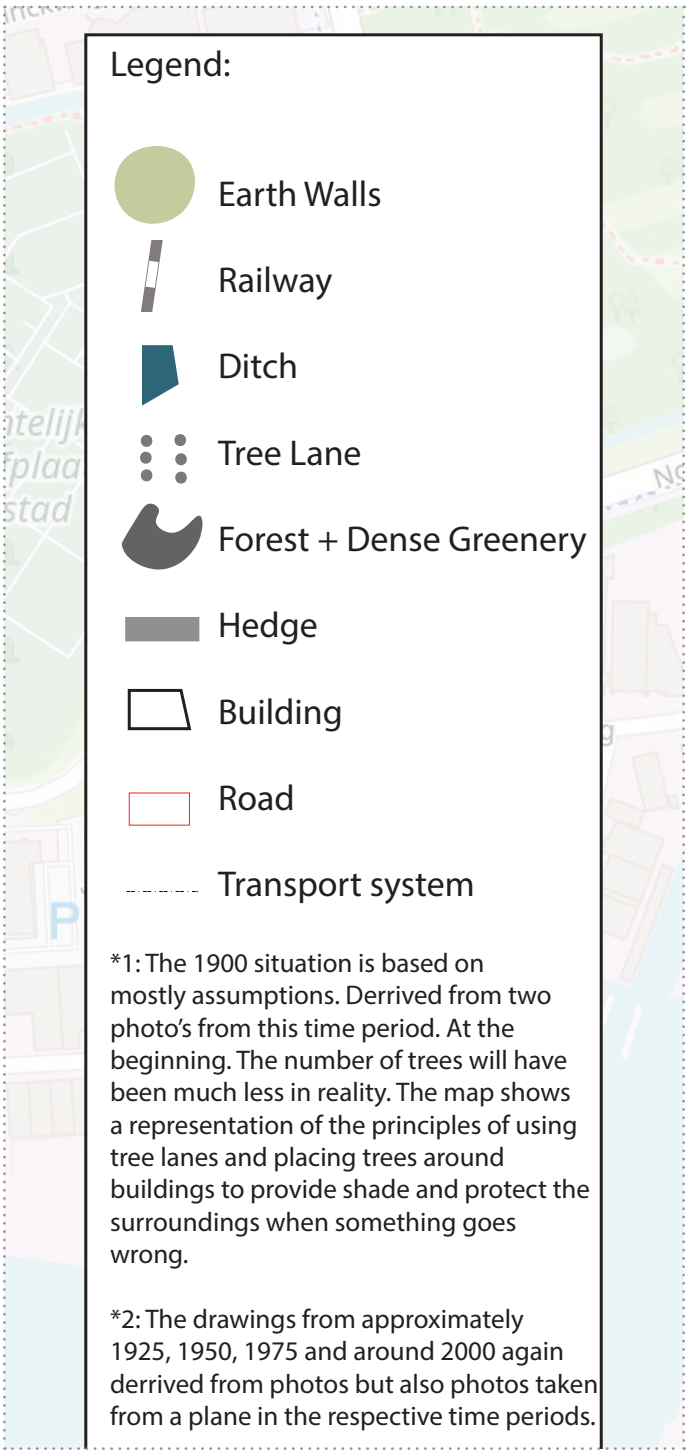
As mentioned earlier the green and other topographical features have changed quite drastically the last 100 years.

The first period discussed here is around 1900. The site was still mostly unused and there was minimal green. Green was placed near the entrances of the factories, like hedges and trees.

Earth Walls, surrounding some storage buildings, were accompanied by bushes and trees that make sure the buildings are sufficiently shaded and creates another layer of protection for the people as well.

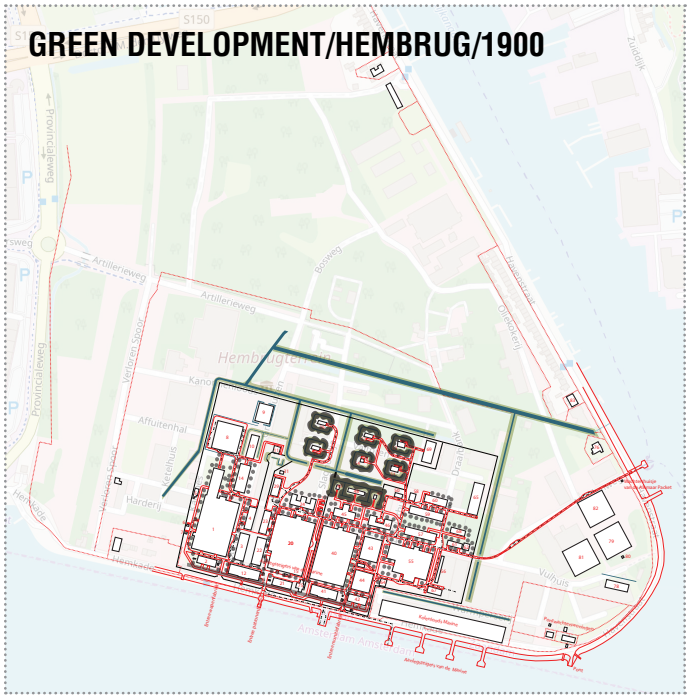
In 1925 the Plofbos was added to the complex and several other buildings were added the last 25 years as well. The Plofbos consisted of islands with storage and testing buildings with protective earth walls, trees and bushes. Around each island there was a ditch to stop spreading fires for example. At the same time, it functioned as a barrier. Along the paths tree strict tree-lanes were places. These created a clear visual path for pedestrians and users. Every time a new testing site was needed a new island would be created to accommodate.

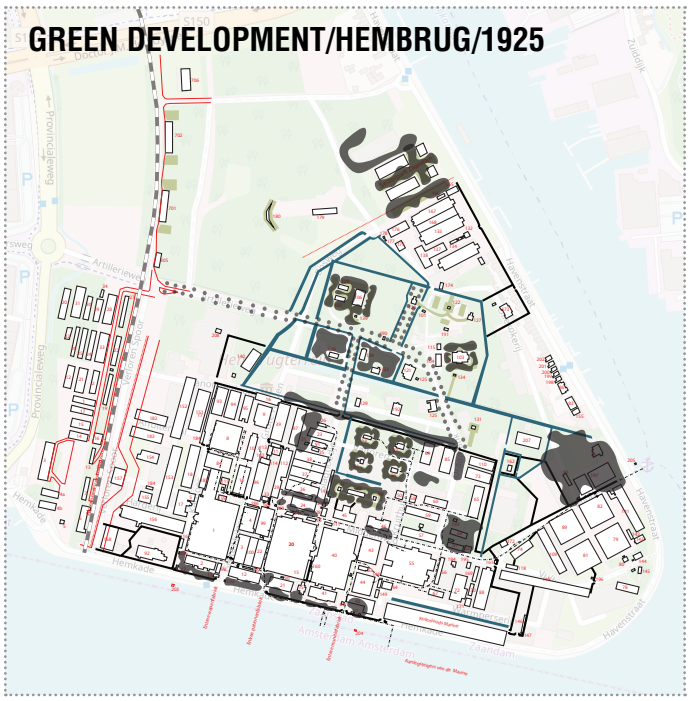
During World War II and the German occupation, a lot of things clearly changed on the Hembrug site. By the



*1: The 1900 situation is based on mostly assumptions. Derrived from two photo's from this time period. At the beginning. The number of trees will have been much less in reality. The map shows a representation of the principles of using tree lanes and placing trees around buildings to provide shade and protect the surroundings when something goes wrong.

*2: The drawings from approximately 1925, 1950, 1975 and around 2000 again derrived from photos but also photos taken from a plane in the respective time periods.





1950's the Plofbos had densified a lot, this was on the one hand through the green maturing and the trees getting bigger. On the other hand, the Germans planted more trees to hide the buildings and to prevent them and the bunkers from being bombed.

These bunkers were built in the field in between the shooting ranges and the Plofbos. The bunkers were removed after the war.

In 1975 the green on the area had densified again but not only through design. The bunkers were removed but the area left untouched so the trees and bushed started growing in this area.

New buildings were added, they are small and were surrounded by trees as to be as invisible as possible. This again to remain invisible for airplanes and stay out of danger. The trees most probably were used for shading and another barrier in most places as well.

Finally, in the 2000's the area is completely densified and overrun by green. All the previous designed structures and intentions are literally blurred through the sheer amount of green that now has grown together.

The structure is becoming a bit clearer now through more knowledge and the sanitation of the soil. The latter is necessary so the site can be re-occupied again.

SOURCES:

SteenhuisMeurs. (2010). *Hembrugterrein-Zaanstad Cultuurhistorische analyse* (1st ed.). Schiedam, Nederland.

SteenhuisMeurs (2). (2016). *Hembrugterrein Zaanstad Gebiedspaspoorten en omgevingsplan*. Schiedam, Nederland.

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Department of Basic Information of the City of Amsterdam. (2019). Interactive Maps. Accessed on 24 March 2019, from https://maps.amsterdam.nl/

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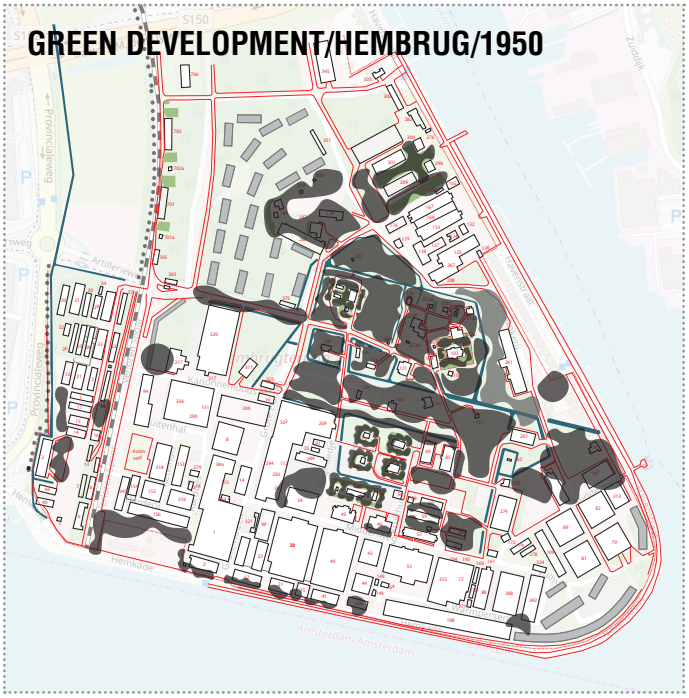
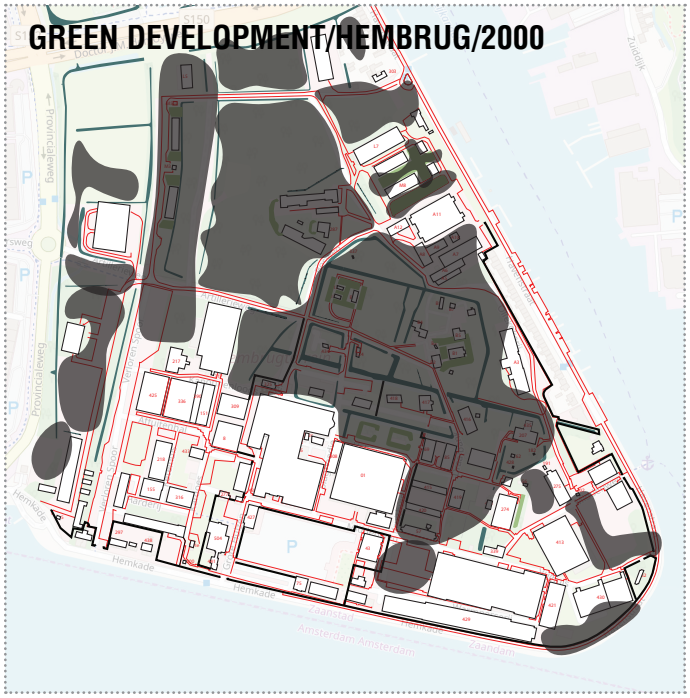
Provincie Noord Holland. Kaart en Data. Retrieved March 23, 2019, from https://maps.noord-holland.nl/kaarten/interactieve_kaarten.htm



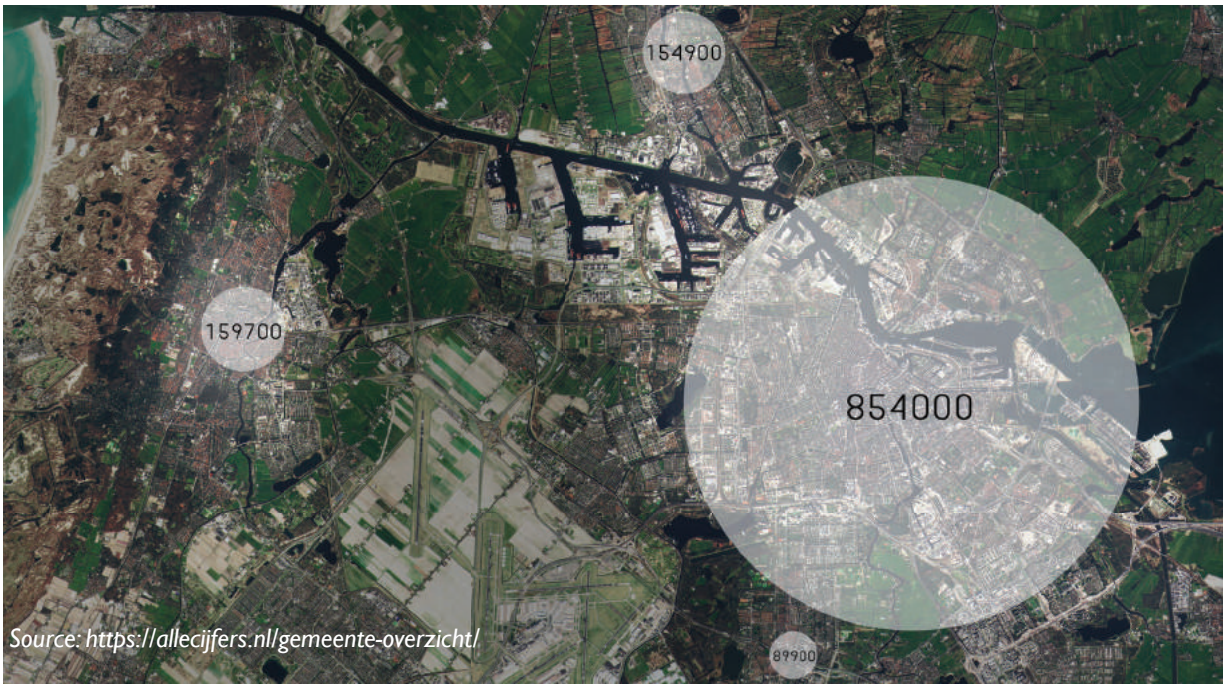


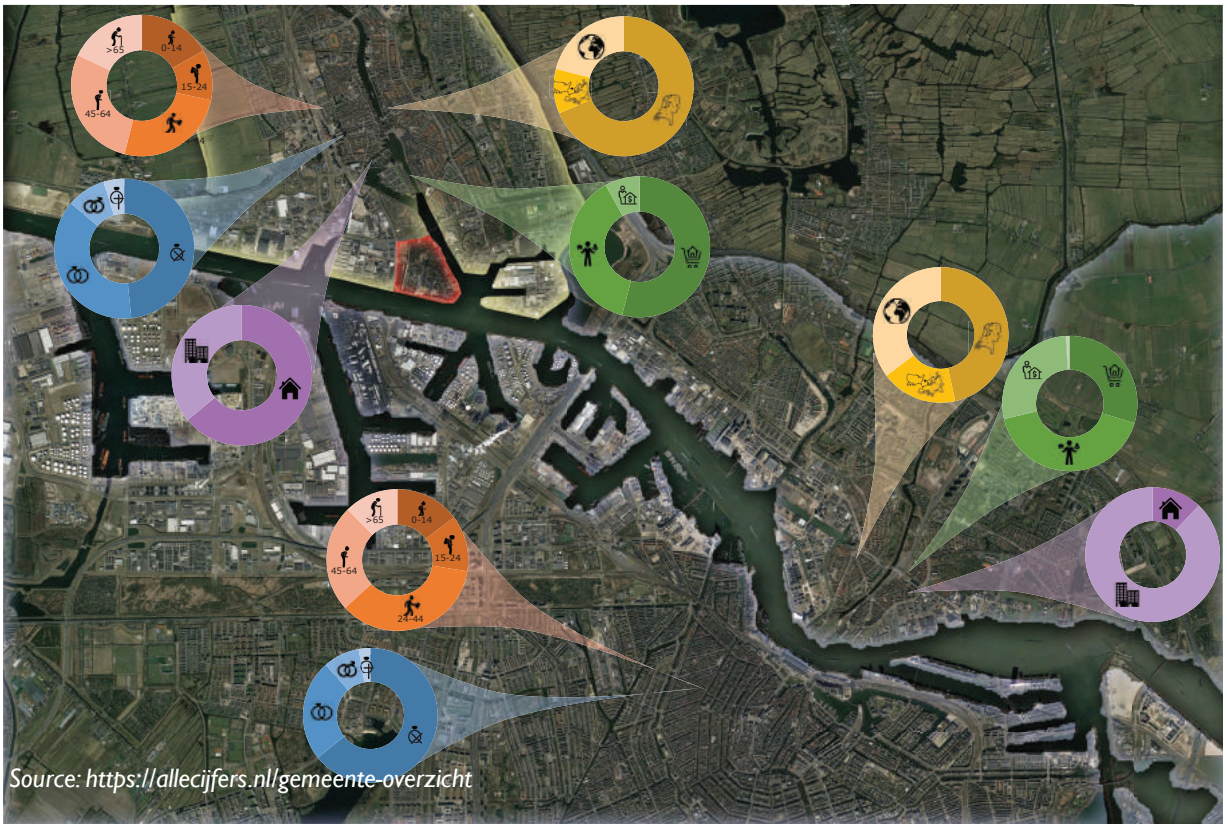
DEMOGRAPHICS

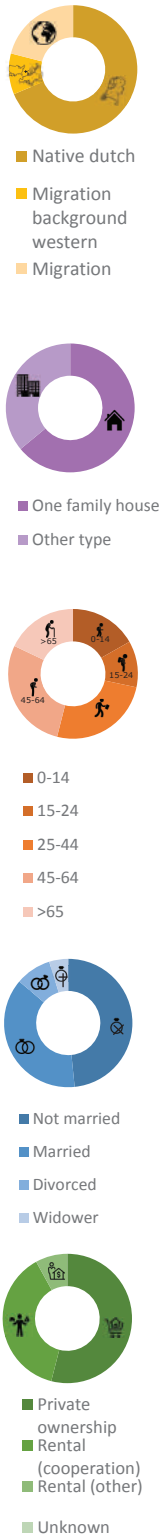
NIELS STEVERINK / JAN-WILLEM SPEK

In this study, the demographics of the area surrounding Hembrug have been researched in two parts. One for the close proximity neighbourhoods and one study into Hembrug and its position in South Holland. On the largest scale only the number of inhabitants was taken into account.

This map visualizes these numbers in their relative circle size, to easily show the largest influences of inhabitants in the area. On the scale of Zaandam and Amsterdam five demographic factors are shown. This being age, ethnicity, marital status, dwelling type and ownership of housing. These are visualized below based on their relative size, not absolute size.





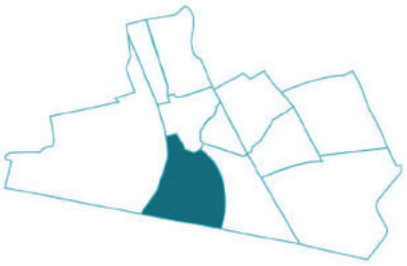


The neigbourhoods surrounding Hembrug have been studied for amount of residents, the amount of housing and the average income. These three factors will give an insight into density and the income will provide statistic on the wealth of an area.

SOURCES:

- *https://allecijfers.nl/gemeente-overzicht*
- *https://allecijfers.nl/gemeente-overzicht/zaanstad/#kaart-buurten-aantal-inwoners*

Zuiderhout



N/A

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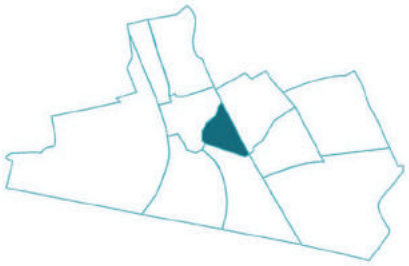
Het Eiland

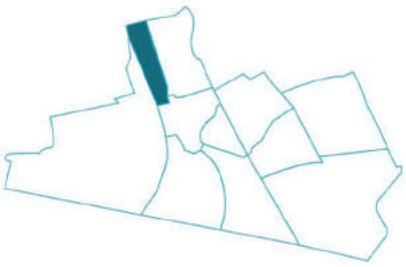


531

1325

€ 31.600

Spoorbuurt

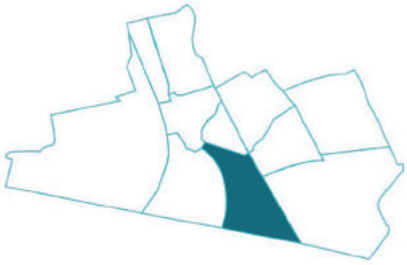


331

705

€ 24.700

Havenbuurt

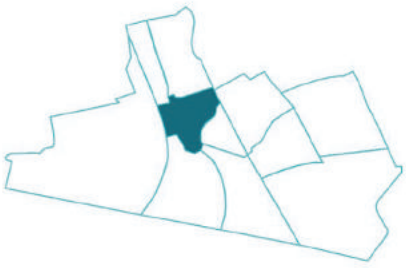


379

860

€ 22.900

Russische buurt

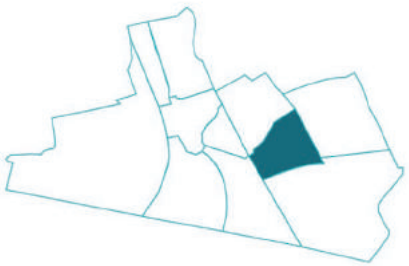


1287

2530

€ 25.200

Bomenbuurt

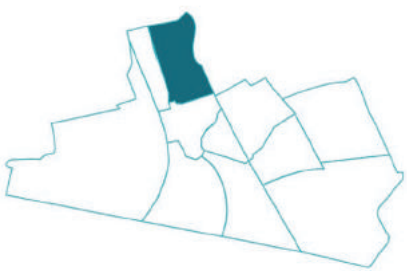


2722

6370

€ 20.300

Oud west

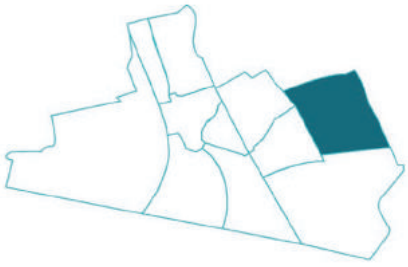


2067

4205

€ 25.200

Poelenburg



3243

8560

€ 17.000

TOURISM

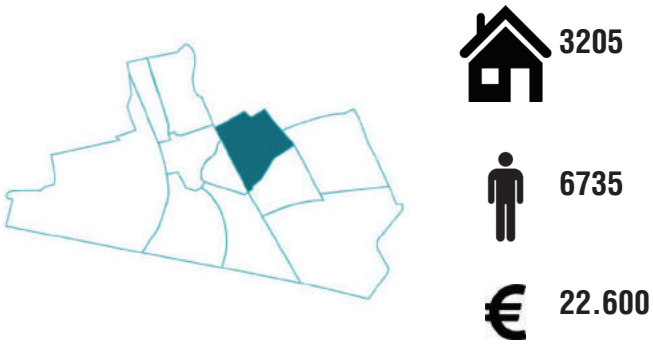
In 2018, the province of Noord-Holland attracted nearly 13 million of the total 30,096 milion of foreign tourists in the Netherlands (CBS, 2019). 8,7 million of these 13 million tourists went to Amsterdam.
The number of tourists to Zaanstad is not known explicit for 2018, however in 2017 the number of tourists here grew with 20% (zaandamsdagblad, 2018). The 'Zaanse Schans' grew to the touristic site with the highest amount of visiters in 2017 in the Netherlands, with a growth of about 400.000 visitors (zaandamsdagblad, 2018).

The municipality of Zaanstad, through marketing firm 'Marketing Zaanstreek', tries to focus on what they call 'quality tourists' (zaandamsdagblad, 2018). With this they mean 'tourists that are genuinely interested in the story/history of the Zaanstreek'. For their focus on this touristic group, they assigned the Hembrug terrain as one of their four 'hot spots', as can be seen in the image underneath of their promotional website www.zaans.nl.

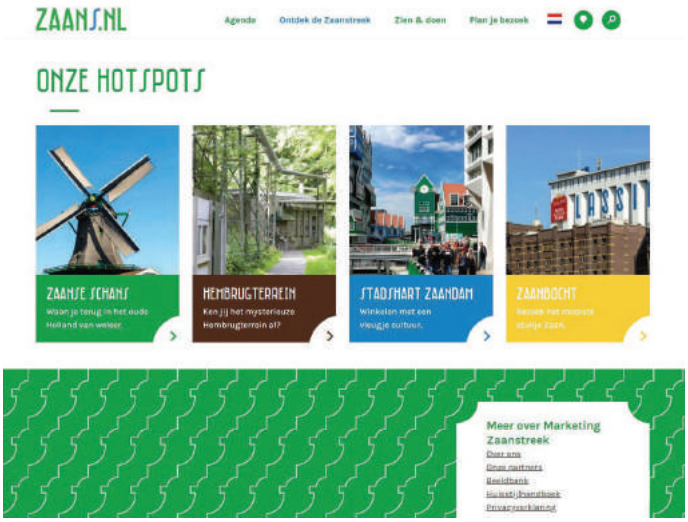
Achtersluispolder

Westerspoor

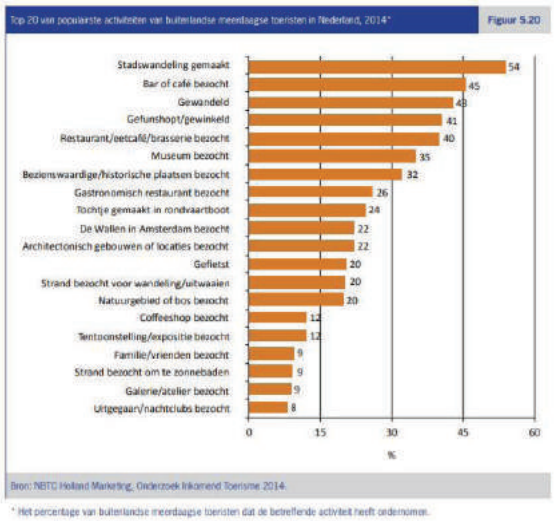
Burgemeestersbuurt



Tourism statistics



Source: https://www.zaans.nl/ondek-de-zaanstreek



Source: CBS (2018) Deel 2 van het Trendrapport toerisme, recreatie en vrije tijd 2018.

Previous information gives an idea of the amount of tourists the municipality of Zaanstad can account on and that they plan to use the Hembrug site for touristic purposes as well.
The table underneath indicates the main activities of tourists when visiting the Netherlands. This might help to get an idea of what specific functions might help to accommodate more tourists within the Hembrug site.

SOURCES:

- *Zaandamsdagblad (2018) Zaanstad profiteert van groei toerisme. Retrieved on April 12, 2019 from https://www.zaandamsdagblad.nl/regio/zaanstad-profiteert-van-groei-toerisme*
Zaandamsdagblad (2018) Zaanstad profiteert van groei toerisme. Retrieved on April 12, 2019 from https://www.zaandamsdagblad.nl/regio/zaanstad-profiteert-van-groei-toerisme

- *Centraal planbureau voor Statistiek (2019) Hotels; gasten, overnachtingen, woonland, regio. Retrieved on April 12, 2019*

FUTURE HEMBRUG

SOPHIE LUYCKX/ NA HU

Hembrug is a jewel in the Amsterdam Metropolitan Area and will be part of the strive for high densities around high quality public transport facilities. Because different strategies are developed in different scale levels we chose to order the analysis into the following four scales: the strategy of Haven-Stad, future vision ZaanIJ 2040, Zaanstad and Hembrug.

HAVEN-STAD:

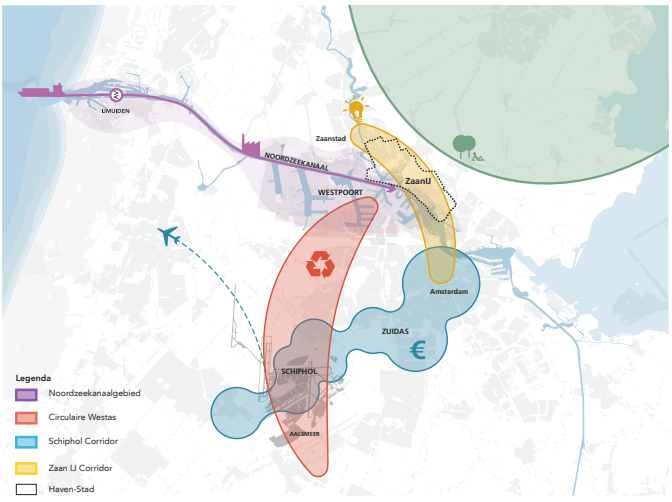
The pressure on the housing market is increasing. There is a great need for living and working space. With Haven-Stad the municipality offers a solution: they are able to realise in between 40.000 and 70.000 houses and 45.000 - 58.000 workplaces in Haven-Stad (including Coen- and Vlothaven). Hereby is used: - An average building density of floor space index (fsi) 2. - An average house of 80m^2 gross floor area. -An average of 30m^2 gross floor area per workplace.

At Hembrug creative and innovative entrepeneurs, visitors and tourists, residents of Zaanstad and other users can meet work, recreate and live in a pleasant and inspired way.

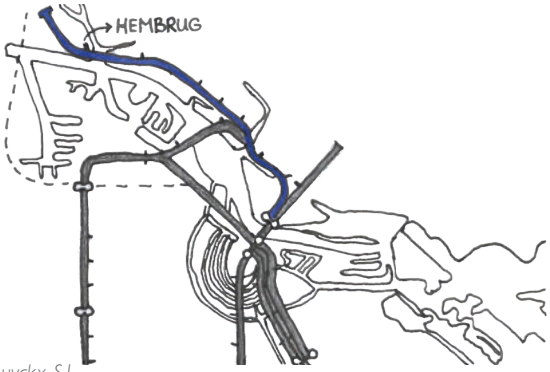
SOURCES:

Ontwikkelingsstrategie_haven_stad_20_juni_2017_transformatie_12_gebieden https://www.amsterdam.nl/projecten/haven-stad/nieuws-haven-stad/ontwikkelstrategie/

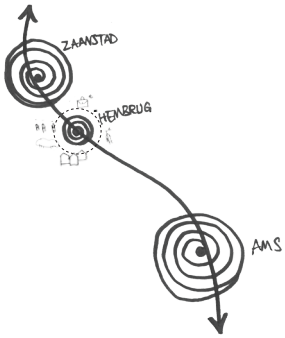
Source: Hu. N.



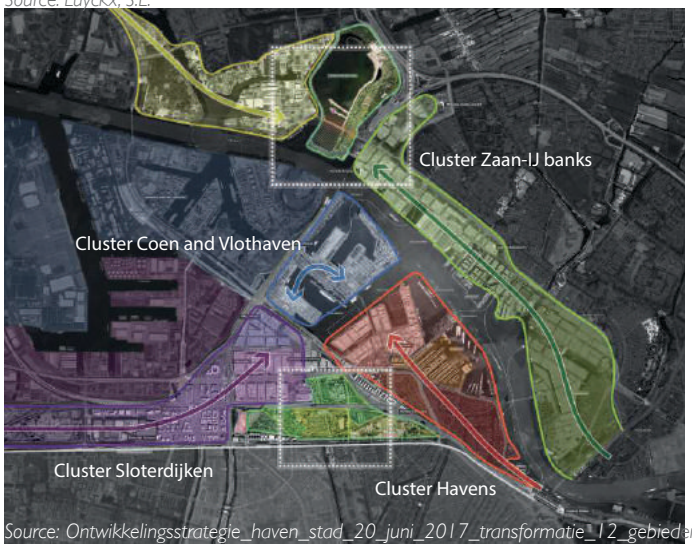
Source: Ontwikkelingsstrategie_haven_stad_20_juni_2017_transformatie_12_gebieden



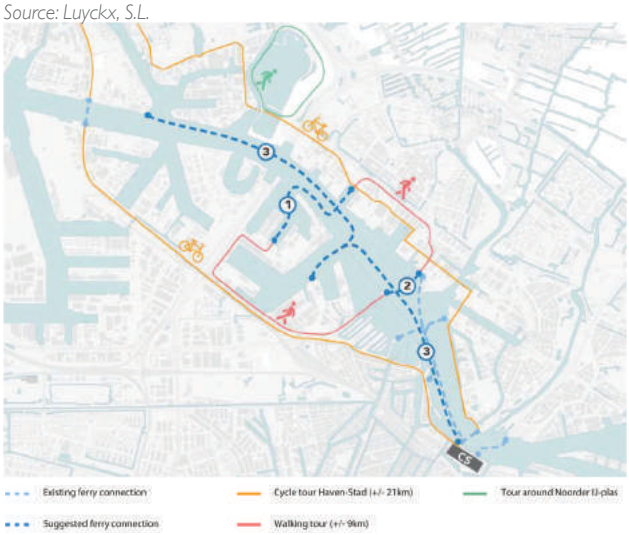
Source: Luyckx, S.L.



Source: Luyckx, S.L.



Source: Ontwikkelingsstrategie_haven_stad_20_juni_2017_transformatie_12_gebieden



Source: Ontwikkelingsstrategie_haven_stad_20_juni_2017_transformatie_12_gebieden

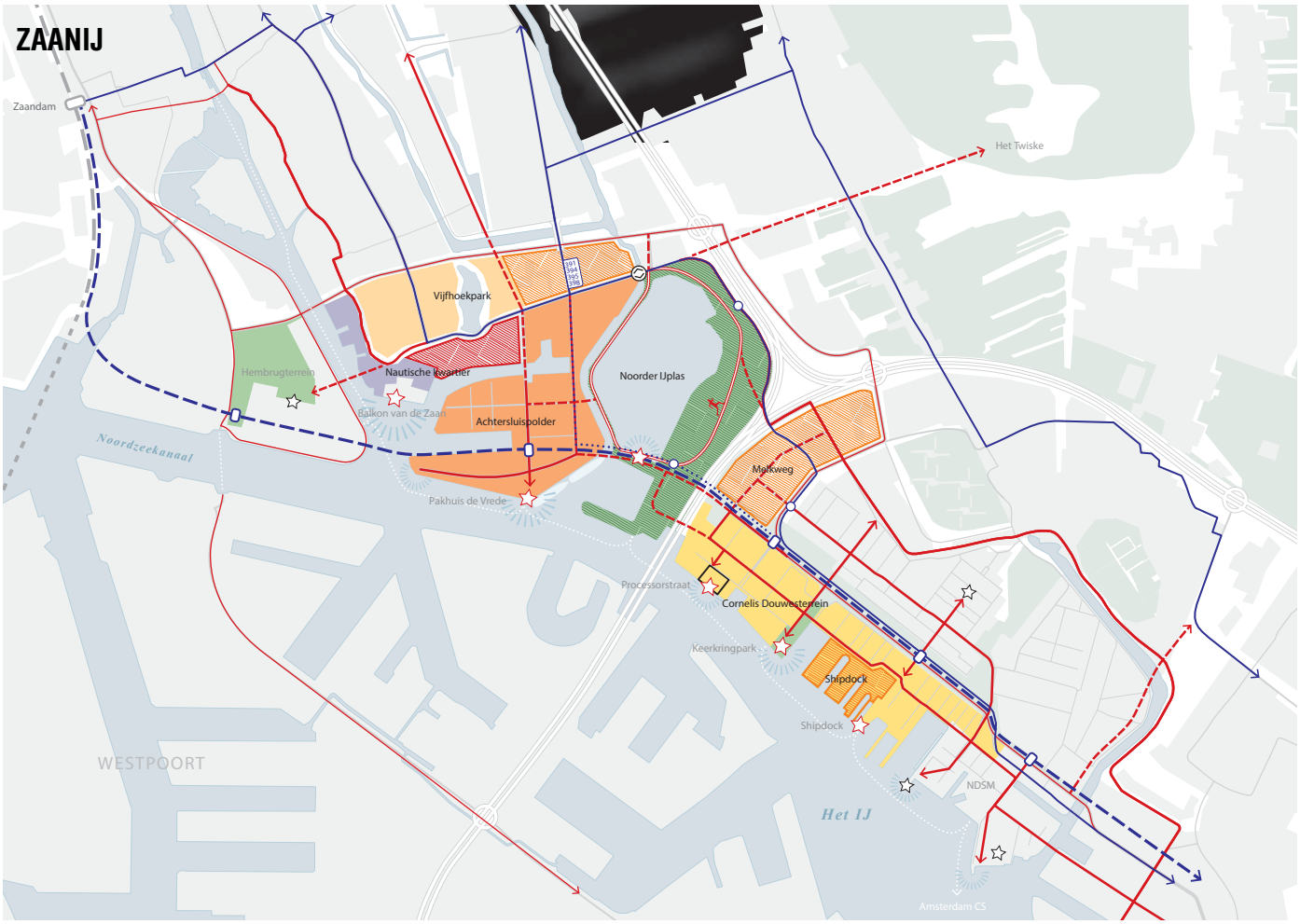
FUTURE VISION ZAANIJ 2040:

The Northern IJ banks are regarded as the driving force for creative industries within the Metropolitan Area. New Hembrug is directly in line with this, but wants to be complementary and distinguish itself from other developments in the creative sector. The industrial history of the Zaanstreek and the economic structure with traditionally strong clusters in the food,'manufacturing' and craft industries provide good starting points for developing a recognizable profile. Innovative knowledge and research companies are also welcome. The area lends itself to (craft) workshops, studios and office activities (in creative and knowledge and research sectors). Various creative companies from within, but also from outside the Zaanstreek, have come forward with plans for establishment on New-Hembrug.

Good accessibility is a precondition for a successful transformation. ZaanIJ is easily accessible from the centers of Amsterdam and Zaandam in 2040. Characteristic of ZaanIJ is that priority is given to slow traffic and HOV (high priority public transport) over car traffic. As well as attractive routes that invite cycling and walking, and that freight traffic can enter and leave the area smoothly and separately. The presence of the water (IJ / North Sea Canal) offers potential for ferry connections between the plan area and Amsterdam and Zaanstad.

SOURCES:

Gemeente Amsterdam en Zaanstad (2017) Economisch-ruimtelijke verkenning Noordelijke ZaanIJ-oevers.

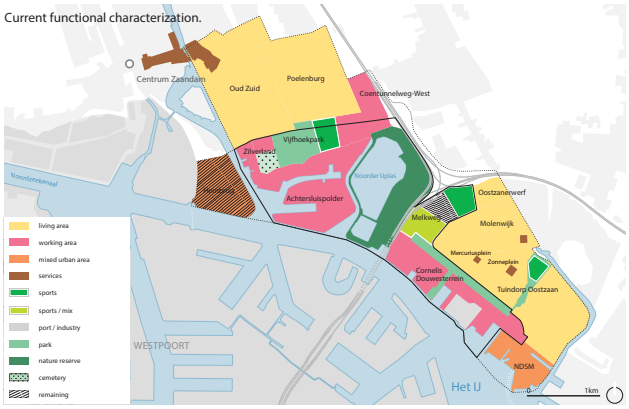


Total map proposed transformation strategy ZaanIJ.

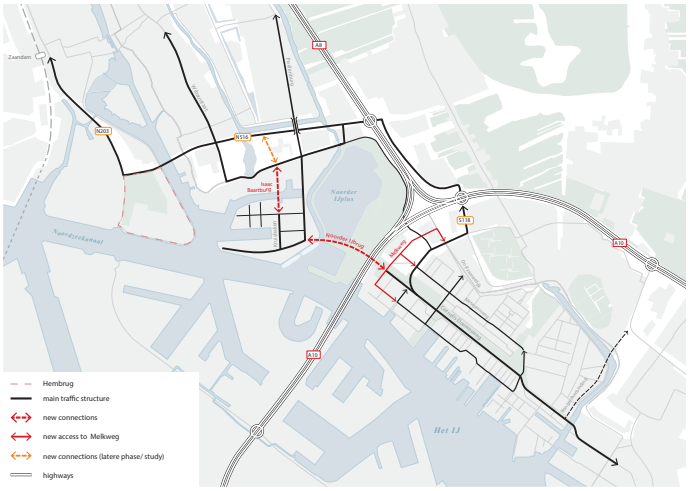
0 500m

activation and programming places on the IJ
connect existing places with the network
existing busnetwork + new R-net stops
new busconnection
extension metro / HOV network (study)
existing connections (bicycle + car)
new connections (bicycle + car)
Tour around Noorder IJ-plas
develop as a mixed work and living area from 2020
Pentagon Park / Zilverland: studies adding residential function from 2020 (preservation of greenery and cemetery)
field of study: promising for developments
CDT: from 2029 transformation into a mixed work and living area
study area, possibly living
zone for high environmental categories (4-5)
park, recreation and sport
Noorder IJ-plas: scenario study
reserve for a temporary program
new Barndegatslock
ferry connections
HOV: high quality Public Transport

Current functional characterization.

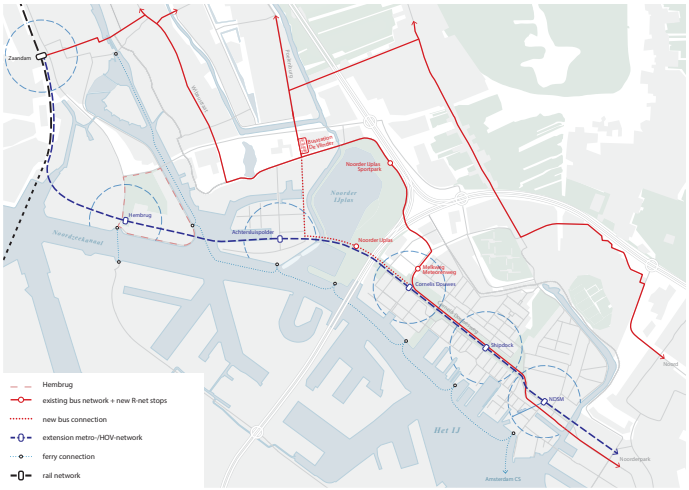


Source: Gemeente Amsterdam en Zaanstad (2017) Economisch-ruimtelijke verkenning Noordelijke ZaanIJ-oevers. Translated by Luyckx, S.L.

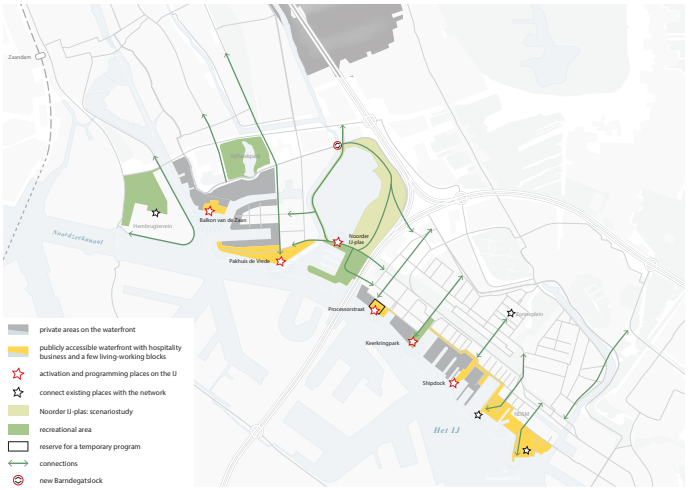


Proposed transformation strategy ZaanIJ: main traffic structure (multimodal, incl. car).

Proposed transformation strategy ZaanIJ: slow traffic structure.

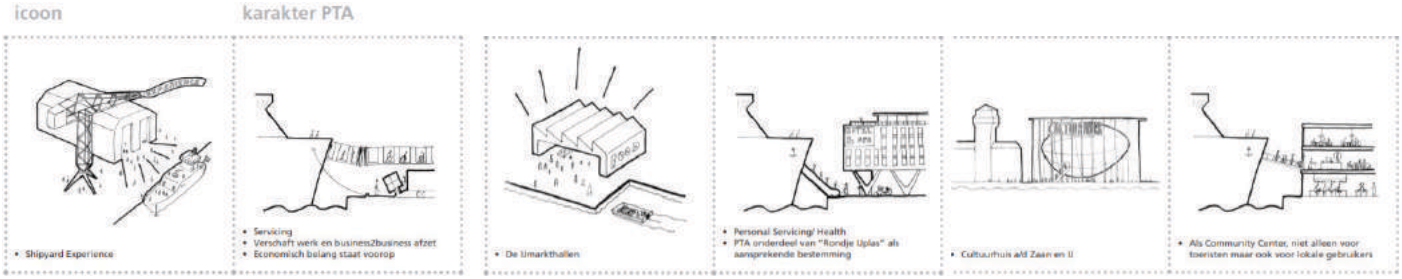


ZaanIJ transformation strategy proposed: public transport.



Proposed transformation strategy ZaanIJ: activation and connection of public places.

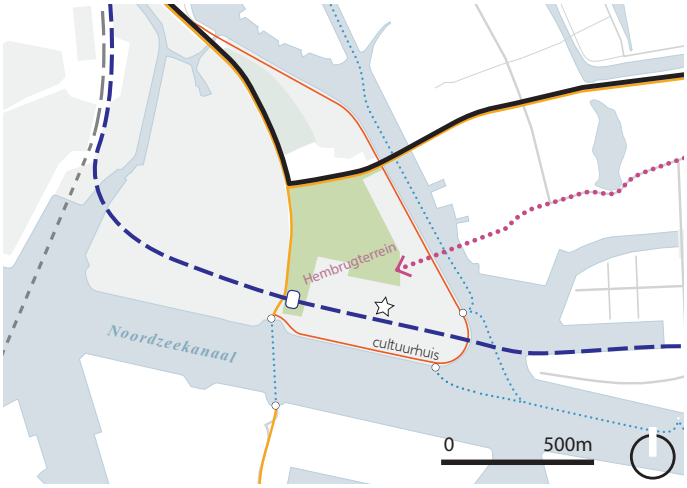
Source: Gemeente Amsterdam en Zaanstad (2017) Economisch-ruimtelijke verkenning Noordelijke ZaanIJ-oevers. Translated by Luyckx, S.L.



Source: Gemeente Amsterdam en Zaanstad (2017) Economisch-ruimtelijke verkenning Noordelijke ZaanIJ-oevers.

CONCLUSION ZAANIJ VISION ON HEMBRUG

- slow traffic structure
- main traffic structure
- connection Hembrugterrein - Het Twiske
- existing bicycle routes
- connect existing places with the network
- recreation and sports area
- extension metro-/HOV-network
- ferry connection
- railway network



Source: Luyckx, S.L.

ZAANSTAD:

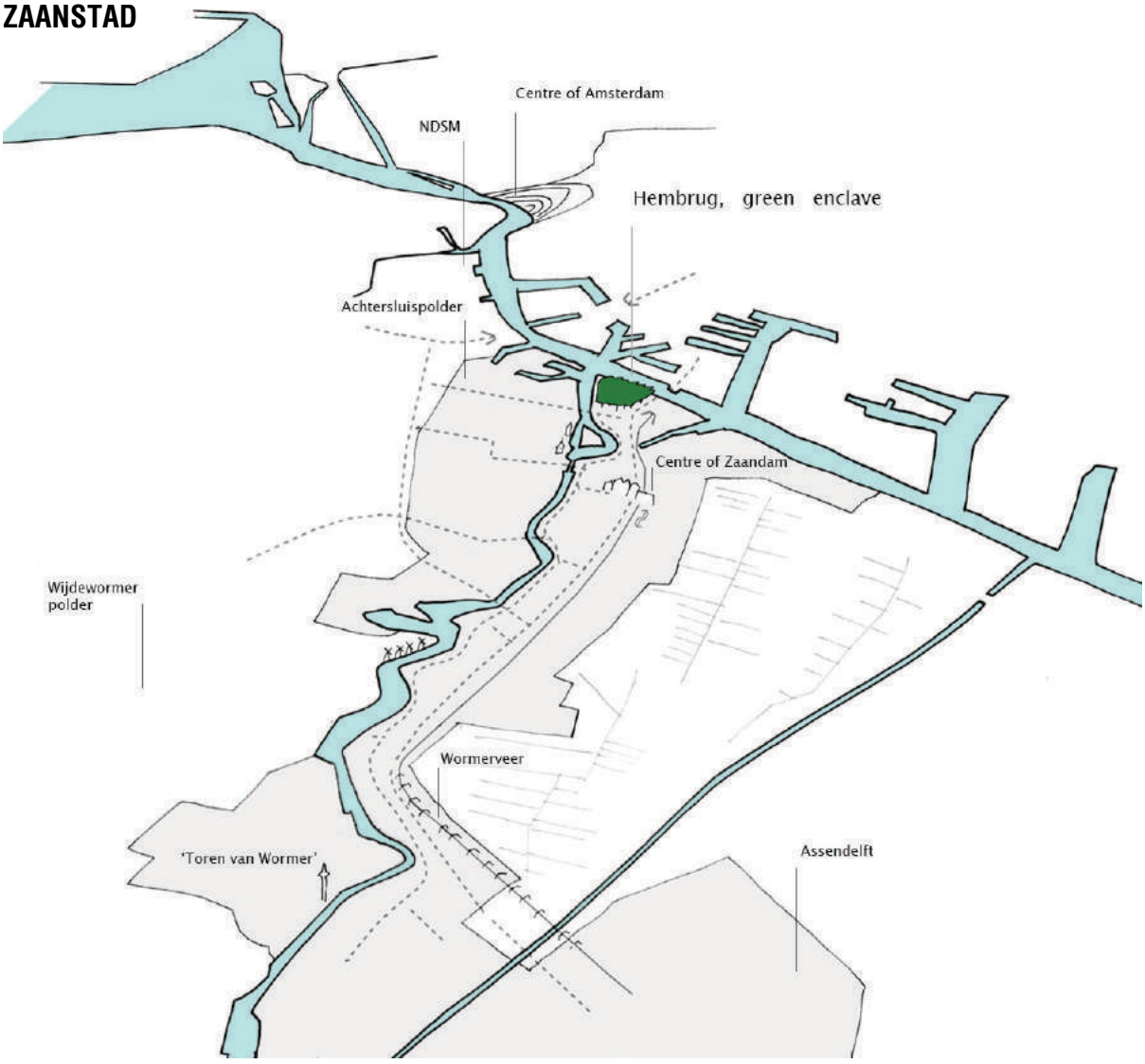
"The three green edges make the Hembrug site a unique green enclave in the middle of the industrialized areas on the North Sea Canal and the Zaan. The enclave protrudes into the water like an advanced green "cape". The enclave is characterized by the presence of image-defining and valuable trees. The enclave character is also reflected in the fences from the site. Traditionally, the entrances were only on the south side and the other sides were closed for unauthorized persons. Now that the site is being redeveloped, physical inaccessibility will be lifted. However, the mystery that arises from the green character and the delimited terrain boundaries also support the estate character. This is also of value for the future" (Palmbout, 2011).

New-Hembrug plays an important key role in the spatial, economic and environmental policy of the municipality of Zaanstad. The site is interpreted as a development location for creative activity, leisure and tourism. The spatial vision positions the Hembrug site as a strategic link between the development along the Zaan and IJ banks and as a unique area with a high cultural-historical and natural value. Zaanstad has a high environmental ambition to be among the Top 10 of climate-friendly and sustainably developed cities in the Netherlands.

SOURCES:

Palmbout (2011). Beeldkwaliteitsplan Hembrug-terrein. p. 17.
Ontwikkelkader-NieuwHembrug-definitief 2011.

ZAANSTAD



Source: Luyckx, S.L. adapted from Palmbout (2011). Beeldkwaliteitsplan Hembrug-terrein.

"HEMbrug is a very special place for our city. The area is important from an urban development point of view, because it is the connection to the south in the direction of Amsterdam. It is as well a characteristic area, with a forest, with monuments, with a creative manufacturing industry, and we want to preserve that character. The making public and further development of HEMbrug as a mixed area is important for Zaanstad."

Dennis Street | Alderman for Spatial Development Municipality of Zaanstad
source: Rijksvastgoedbedrijf (n.d.) Hembrug, verkoop brochure. p.28

HEMBRUG:

Palmbout

Palmbout Urban Landscapes made a strategy for the development of the Hembrug site, commissioned by the Government Real Estate and Development Company. The cultural-historical framework and the spatial properties of the terrain together form the basis for the Development Framework, which is leading for the redevelopment of the area.

SOURCES:

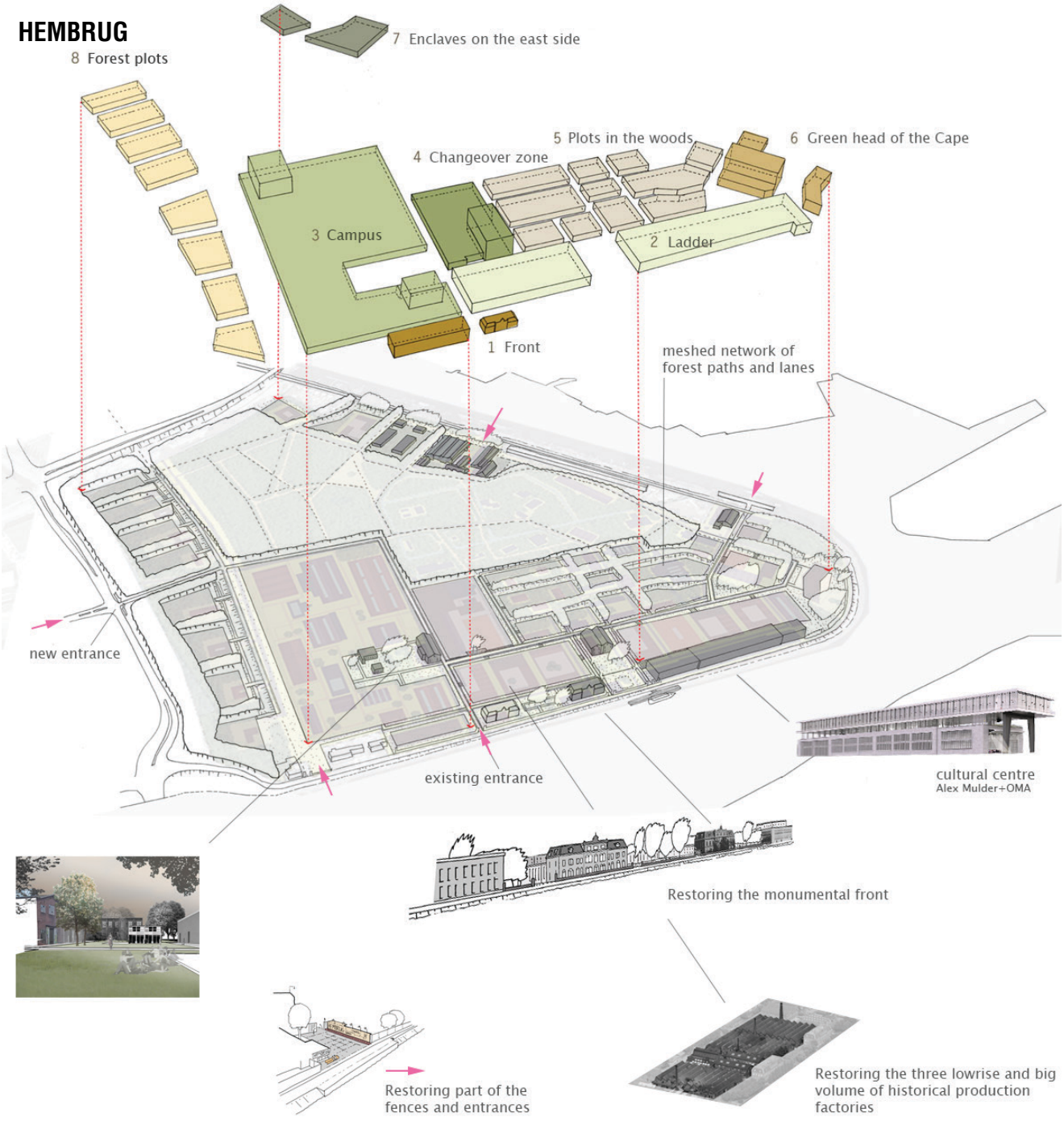
Palmbout (2011). Beeldkwaliteitsplan Hembrug-terrein.

The Cultural Centre

The old coal warehouse of the navy on the Hembrug site will be transformed into a cultural center that must be open 24 hours a day. With exhibition rooms, a (film) theater, a restaurant and a 160-room hotel that will be built on top of the cultural center. Alex Mulder is the investor of the building, who involved OMA for the renovation and the necessary new construction.

SOURCES:

http://www.hembrugterrein.com/na-soldaat-van-oranje-investeert-al-ex-mulder-nu-in-een-tate-modern-aan-het-noordzeekanaal/



Source: Luyckx, S.L.

The strategy of Palmbout is to get a feeling for the potential future. It is a continious base for all following strategies, it gives orientation to all parties involved.

They came up with 10 themes that summarize the area. 1Peninsula position (green enclave), 2 Traces of historical episodes, 3 Monumentality in the front, 4 Contrast buildings &forest as guiding theme, 5 Informal character & composition, 6 Framework & consituent parts, 7 Restauration and new icons, 8 Architectural families, 9 refined rythms and 10 Pavilions.

The Hembrug site was a closed off area, so Palmbout wants to regulate the accessibility. The area will be accessible in different directions by ferry, car, bicyle or public transport.

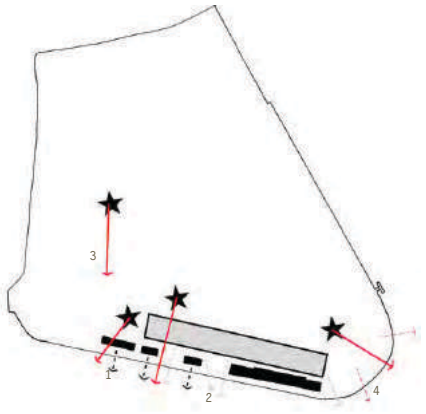
The priority of the circulation is slow traffic, making use of the existing road structure because of its cultural value.

New development is permitted, limited to a specific building height. Contrast, character, rhythm and different scales are part of Zaandam, and appreciated in Hembrug.

SOURCES:

Palmboom, F. (2019). Hembrug. Redesign a military - industrial estate. Lecture, TU Delft, Delft.

RELATION WITH THE WATER

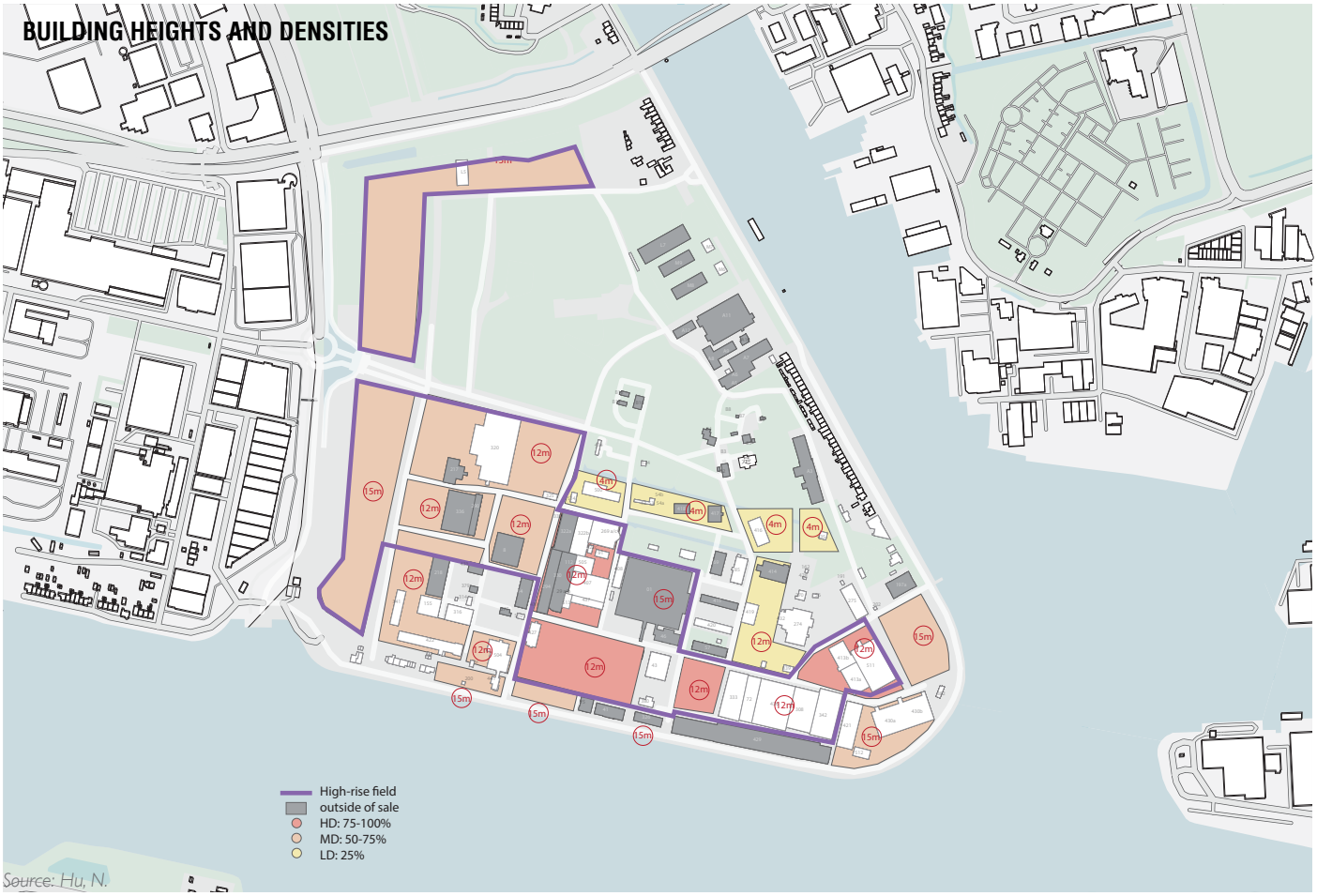


Source: Palmbout (2011). Beeldkwaliteitsplan Hembrug-terrein.

COHERENCE IN CIRCULATION

Source: Palmbout (2011). Beeldkwaliteitsplan Hembrug-terrein.

BUILDING HEIGHTS AND DENSITIES



Source: Hu, N.

Besides the maximum building heights there are some more preconditions for the site.

Parking:
Palmbout proposes a relaxed and intensive parking variant. For each variant, two parking standards are calculated that come from the CROW;
Parking standard for the existing buildings with 0.5 pp / m2.
Parking standards for new buildings with 1.5 pp / m2.
These standards apply to offices and companies. For special programs such as hotel, restaurant and housing, higher standards apply. For further details, reference is made to the Parking Note of the municipality of Zaanstad.

Campus (north and south):
New buildings have a maximum of two floors and must have a gable roof. Multiple volumes may be placed on a construction site. The existing small electrical houses in the central area will have a catering function with a terrace on the grassfield. Small kiosks can be added if required.

PARKING

parking standard when retained 1/100

parking norm for development 1/50

			GFA	PP	comments
1	front	To keep	9618	96,2	
		Development	8890	177,8	
2	ladder	To keep	1450	14,5	
		Development	88388	1767,8	
3	campus	total GFA	91956		GFA incl. buildings to be preserved
		To keep	12737	127,4	
		Development	79219	1584,4	
4	wisselzone	total GFA	40983		GFA incl. buildings to be preserved
		To keep	3797	38,0	
		Development	37186	743,7	
5	paviljoens				
5	a	Development	1474	29,5	
5	b	total GFA	1142		
		To keep	390	3,9	
		Development	752	15,0	parking possible expandable GFA's on plot
5	c	total GFA	1796		
		To keep	855	8,6	
		Development	941	18,8	parking possible expandable GFA's on plot
5	d	Development	2316	46,3	
5	e	Development	3560	71,2	
5	f	totale GFA	930		
		To keep	393	3,9	
		Development	537	10,7	parking possible expandable GFA's on plot
5	g	Development	3443	68,9	
5	h	Development	2630	52,6	
5	i	totale GFA	1138		
		To keep	2122	21,2	
		Development	-984		No space for development, so no parking for development
5	j	Development	1237	24,7	
5	k	Development	1310	26,2	
6	kop	To keep	614	6,1	
		Development	46505	930,1	
7	enclaves	To keep	4606	46,1	
		Development	13497	269,9	
8	boskavels	Development	15119	302,4	
loose buildings		To keep	5942	59,4	
total				6565,3	

Indication of the parking balance associated with the quantitative conditions

Source: Palmbout (2011). Beeldkwaliteitsplan Hembrug-terrein. Translated by Luyckx, S.L.

Plots in the woods:
Development is not allowed in a zone of 6 meters from the edges of the profiles. Existing buildings that are closer than 6 meters to the path may remain.
Pavilions with a variety of densities are being built on the plots. In the relaxed variant, the plot may be built up to a maximum of 20% (the footprint) and the buildings are 4 meters high with a low roof. In the intensive variant, 30% can be developed with a maximum height of 6 meters, with a low roof.

Green head of the Cape:
The existing halls within this volume can remain or be replaced by new ones. The ensemble is an excellent place for the realisation of a public function.

Forest plots:
The following rules apply to the established plots:
The plots are 20 meters from 'Boslaan' and 30 meters from the border of the estate. A zone of 20 meters has been kept clear on both sides from the entrance. The building line of the buildings is 5 meters from the plot boundary. A building line of 10 meters from the plot boundary applies between the plots. On 40% of the lot can be built (footprint). In this way a green appearance of the Forest plots guaranteed. Parking is on private property. Parking on ground level goes along with one floor level and a hood, with the intensive variant of three floors and a roof parking is realized underground.

Hembrug is expected to be a self-sufficient area that can run well independently. That's one of the reason why it is planned as a mixed-use area. At the same time, it is proposed as a strategic link that attract people from Amsterdam and Zaanstad.

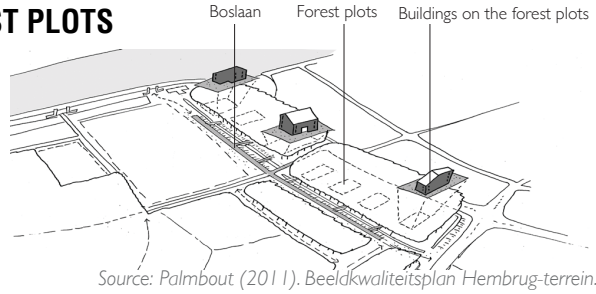
SOURCES:

Palmbout (2011). Beeldkwaliteitsplan Hembrug-terrein.

Numbers associated with the parking table.

Hu, N. Source: Palmbout (2011). Beeldkwaliteitsplan Hembrug-terrein.

FOREST PLOTS



Source: Palmbout (2011). Beeldkwaliteitsplan Hembrug-terrein.

Image: Photo by Barbara de Groot

CONCLUSION

The site of Hembrug has undergone various developments, from its origin as a peat landscape to the man-made military complex it came to be. Within this contextual analysis, each student has gained a general understanding of the site of Hembrug and the way it developed over time. Before proceeding to the more in-depth analysis of the individual ensembles and continuing with the design process, it is important to state the most important conclusions derived from this analysis. Each group has identified which possibilities and limitations originated from the context and which must be dealt with during the transformation of Hembrug.

So, what are the key points that can be taken into the future re-design of Hembrug?

One of the most defining context elements surrounding Hembrug is the water. The water can be a limiting factor and a positive factor at the same time. The North Sea Canal was used for transportation, but it also formed a boundary. This caused the Hembrug site to be a closed system. In the future though it could add up to be an important recreational aspect.
The possibility of recreational and creative businesses are promoted in Hembrug, as it offers cheap spaces and Hembrug is designated as one of the driving forces for creative industries in the region. Hembrug is also located between the expanding cities of Amsterdam and Zaandam. The Hembrug area will be included in the growth of these two cities in future plans. Here lies an opportunity to attract the public to the area. However, the area has some restrictions such as building height and a maximum development space per building site that should be considered.

The Hembrug area is located in a very infrastructural intensive area but nowadays it is not very well connected to these expanding cities. Hembrug has always been equipped with a clear logistic structure as this can be seen in the railroad structures, the roads, the small track and the overhead lines. Every building was placed in way that it was connected to the distributing structures and this can be utilized whenever Hembrug will be getting a new function. Also, the improvement of the connection of Hembrug to its surroundings, which is part of the transformation along ZaanIJ, can be used to increase the potential of Hembrug. However, the intense infrastructure surrounding the site also means that the sound pollution must be considered, because currently the sound pollution produced by the industrial areas next to Hembrug exceeds the norm.

The sound nuisance is in contrast with the abundance of green on site. The green area on Hembrug is a unique green environment with a high biodiversity of plants and animals. Hembrug as an isolated green area of high value should form an ecological connection with the protected green environments nearby in future uses. With its unique green character, the Hembrug area can also play into the wish of the city of Zaandam to become part of the top 10 of climate-friendly and sustainably developed cities in the Netherlands.

This green character is a way to attract target group into the area as well. One of the most important factors to consider when selecting target groups for the redevelopment of Hembrug, are the big differences between Zaandam and Amsterdam concerning ethnicity, house ownership and dwelling type. Furthermore, the relatively low average income of current residents of the neighbourhoods around Hembrug might be a limitation in attracting a diverse range of target groups to the site. However, the region of Zaandam is part of the trend to spread the tourists that visit the capital from a broader area. Former military elements, such as the fortifications for the Stelling already attract tourists, so Hembrug could also be included in this trend. This would bring significant a financial boost to the site.

In conclusion there are a lot of things to be considered when one is doing a design project in the Hembrug area located within the periphery of the cities of Amsterdam and Zaandam. The importance of its historical character becomes apparent through the developments of its former functions throughout the past hundred years. The site, abandoned in 2003, provides a rich context embedded in the center of a urban area with many different future ambitions.

Text: Barbara de Groot & Lucas Pol, information from all groups