



HET PLOFBOS

THE UNINTENTIONAL BEAUTY OF DEALING WITH EXPLOSIVES

Tutors

Annette Marx
Frank Koopman
Ivan Nevzgodin
Lidy Meijers

Team

Carin Toren
Marijn Luijmes
Nino Schoonen

Address

Hembrug Terrein
Hemkade 18
1506 PR Zaanstad



Table of Contents

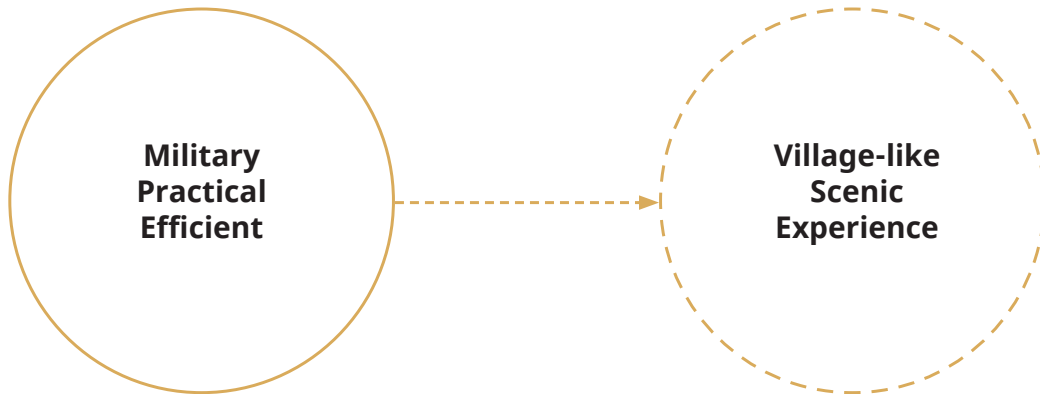
INTRODUCTION	5
1 HEMBRUG	7
1.1 Location	12
1.2 Timeline Hembrug	14
1.3 Topographical History Hembrug	16
1.4 Hembrug zones	18
1.5 Hembrug structures	20
1.6 Timeline Buildings	22
Conclusion	25
2 PLOFBOS	27
2.1 Timeline Plofbos	30
2.2 Building overview	32
2.3 Typological relations	34
2.4 Urban development Plofbos	36
2.5 The functional assests	38
2.6 Historically valuable elements	40
2.7 Diversity of space	46
2.8 Sequences through the route	48
2.9 Relocating the Taets Art and Event Park	50
2.10 Tree analysis	52
2.11 Timeline Green	54
2.12 Structures of trees	56
Conclusion	
3 BUILDINGS	61
3.1 'Boerderij'	64
3.2 Construction 'Boerderij'	66
3.3 Differents between the 'Boerderijen'	68
3.4 Materials 'Boerderijen'	70
3.5 Lightstudies 'Boerderijen'	72
3.6 'Shell Roof'	74
3.7 Construction 'Shell Roof'	76
3.8 Differents between the 'Shell Roofs'	78
3.9 Materials 'Shell Roofs'	80
3.10 Lightstudies 'Shell Roofs'	84
3.11 Comparison 'Shell Roofs' and 'Boerderijen'	86
3.12 Taets building	88
Conclusion	101
4 MASTERPLAN	95
4.1 Design starting points	96
4.2 Process	98
4.3 Starting points	100
4.4 Border strategies	101
4.5 Nature patterns	102
4.6 Building areas	103
4.7 Taets building	104
4.8 Floor space studies	106
4.9 Ground space studies	108
4.10 Height studies	110
4.11 Masterplan idea 1	112
4.12 Masterplan idea 2	114
4.13 Masterplan idea 3	116
4.14 Masterplan strategies	118
4.15 Masterplan impressions	120

What was...

What is...

Intended design

Unintended design



INTRODUCTION

OBSERVING THE CHARACTER OF PLOFBOS

On the first visit to the Hembrug Terrein, we did not know what part we would be transforming. We walked around with an open mind to gain a first impression of the site. Free from knowing the assignment, we were allowed to purely rely on our gut feeling and obtain an unbiased observation of what *is*.

When we first stumbled into the Plofbos we were not yet aware of the name, nor the function of the area. For all three of us, the first impression was reminiscent of that of a village. It was the small scale of things, the scenic diversity, the small workshops and the abundance of shielding greenery that triggered these associations. It was surprising to suddenly transition from the organized Hembrug factories to a green, charming, somewhat untidy and almost innocent scene.

The untidiness of the Plofbos zone seems to defy the military pragmatism of the Hembrug Terrein as a whole. This unexpected dichotomy sparked our curiosity in the area; how could such a village-like scene emerge from the practical, military design approach? There seems to be a contrast between the intended and unintended design. It is phrased in the main research question which forms the focus point of this research, in order to better understand the qualities as well as the cultural-historical values of the Plofbos.

How did practical military design yield unintended qualities of a forest-village in Plofbos?

This question contains two main components that are opposing each other: The practical military design, by which is meant the orderly, pragmatic and efficient as was intended. On the other hand the unintended scenic, disorganized and charming 'village' traits that we observed. The outcome of this question will sharply determine the character of Plofbos and thus deals with the general question:

--> *What defines the character of Plofbos?*

To better understand what is meant with *military design* in the case of Hembrug, it is necessary to first investigate Hembrug Terrein as a whole, which will be done so in the first chapter. Including the history of Hembrug, it investigates from a *what was-perspective*. Although the chapter includes in-breadth research and covers other curiosities we had during the research process, it primarily aims is to identify the general (presumably military) design attitude behind the planning of the Hembrug.

--> *What was the design approach behind the planning of Hembrug?*

The second and third chapter zoom in on *what is*: Plofbos and its buildings. It questions the as-found traits of the initial 'village' impression. The aim here is to discover what elements stir the associations of the 'village' typology, and how they relate to the history of the site.

--> *What are the character traits of Plofbos and how did they come into existence?*

By contrasting these two outcomes, the main research question can be answered. This conclusion is paired with a prioritization of the qualities of Plofbos in a value assessment scheme. This forms the foundation of the design question, which through design research leads to our proposal for the Plofbos master plan: what the site *wants to be*.



Source: Vastgoedmarkt 'Ruimte voor 1.000 woningen op Hembrugterrein Zaanstad' (20 februari 2017)

1 HEMBRUG

THE SECRETS OF THE HEMBRUG AREA

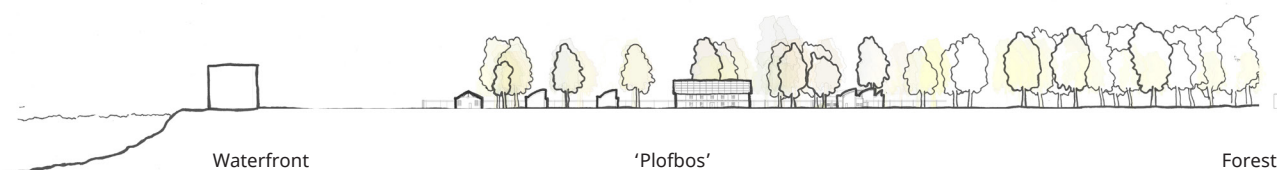
Sited in the transition between Amsterdam and Zaanstad, the Hembrug Terrein is a former ammunition factory of the Royal Dutch Army, which has actively been in service since 1895 until it closed its doors in 2002. Its position has been carefully chosen in the heart of the so-called 'Stelling van Amsterdam', to make sure that in a war situation the ammunition supply could continue. Due to its military function, the area has always been cloaked in secrecy and little was known about the activities that took place. When Hembrug opened its doors in 2002, its secrets could be revealed.¹

It is precisely this feeling of discreteness and hidden treasures that is so appealing. It invites to wander, explore and discover. It makes one wonder about the activities that took place in the dark, isolated spaces of Hembrug. The rawness of the textures and materials found on the area strengthen this quality and make the layers history touchable.

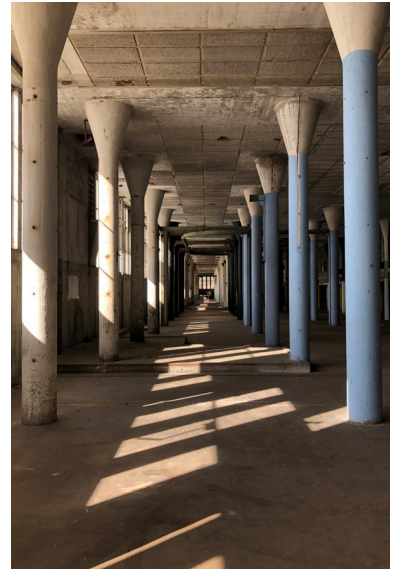
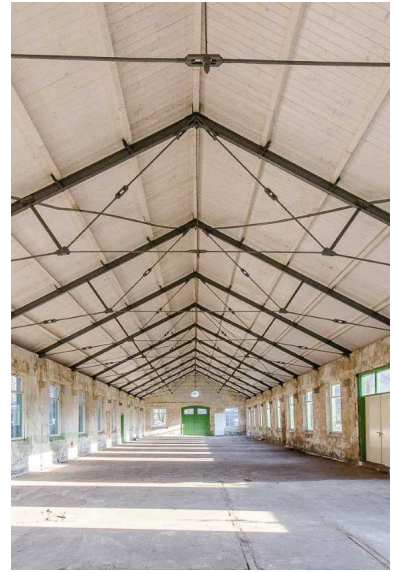
But through this secrecy a clear and logic layout is perceivable. One of pragmatism, logistics, safety and efficiency that is so typical for both military and general industry. This is researched with the following subresearch question:

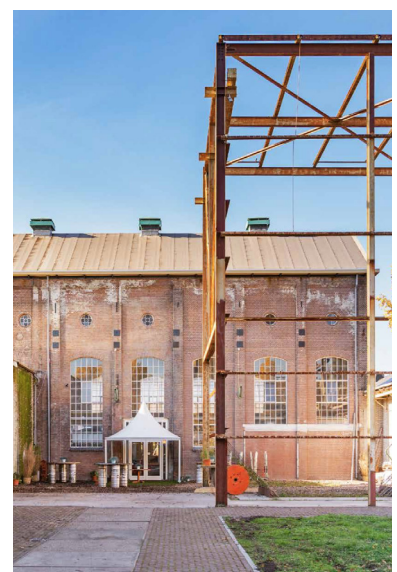
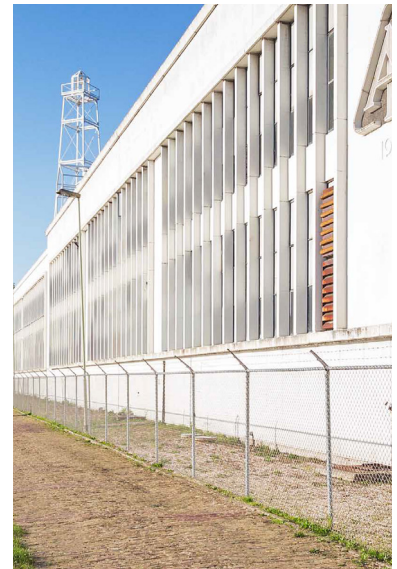
What was the design approach behind the planning of Hembrug?

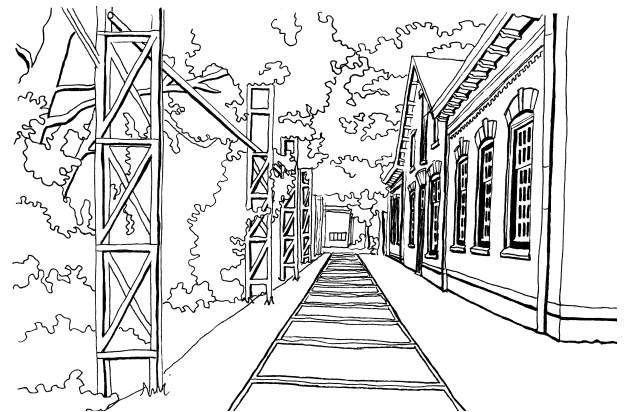
This chapter investigates the elements and considerations that define this approach, offering an understanding of the overall planning of Hembrug. This can not be seen apart from its time and zeitgeist. Therefore relevant political and societal precedents are touched upon and chronologically ordered in a timeline overview.

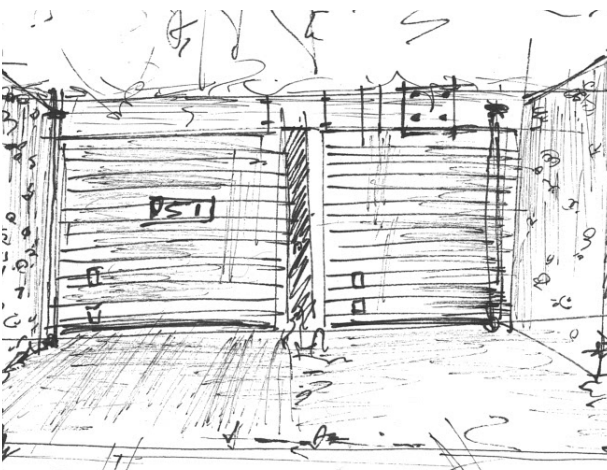
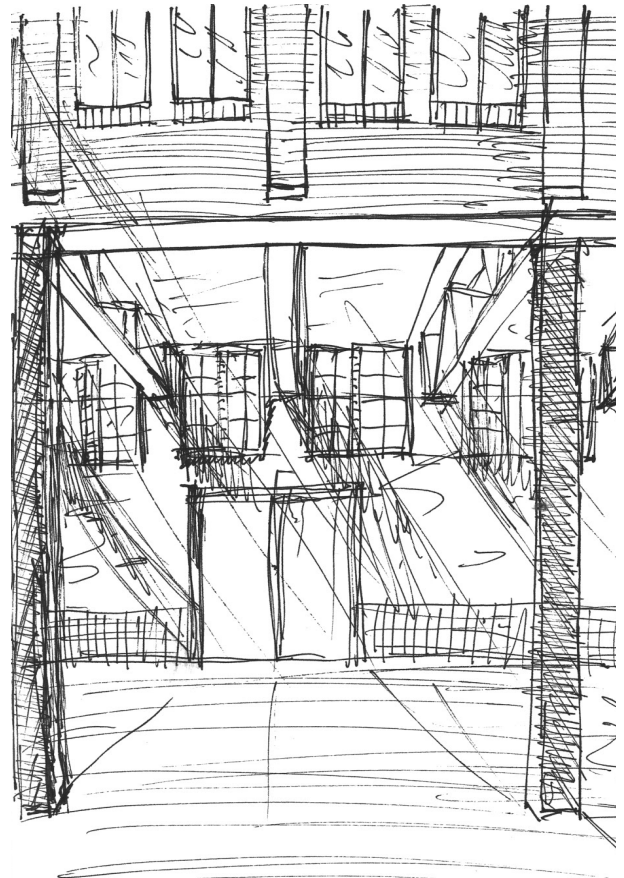
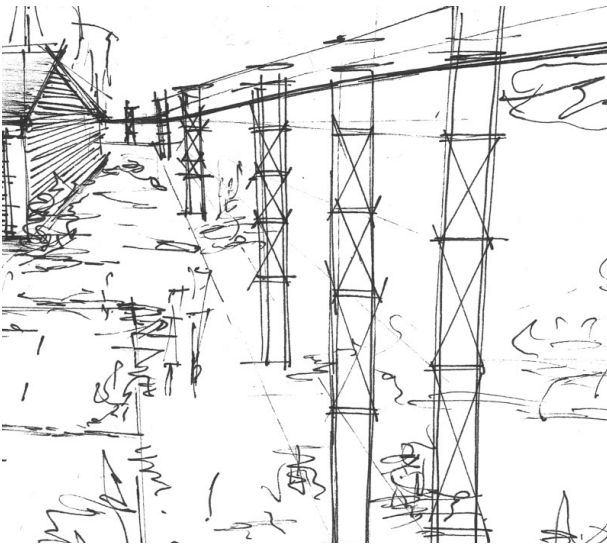
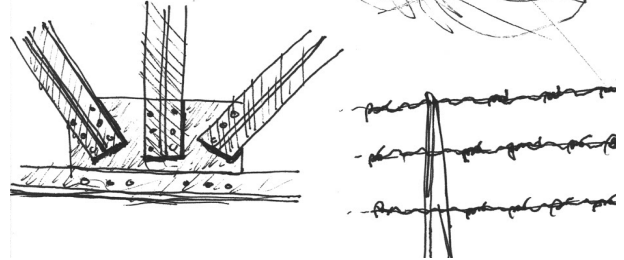
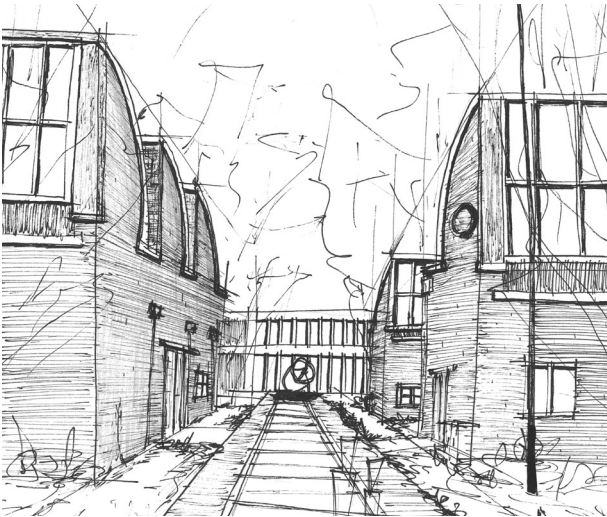


¹ Steenhuis Meurs, 2010, *Cultuurhistorische Analyse Hembrug terrein*, p. 12 - 13









1.1 Location



Fig.: Location of the Hembrug area

In between cities

Situated between Amsterdam and Zaanstad, the Hembrug area acts as a “green enclave” in between those cities.² The name is derived from (dense woods on) the peninsula, that surround to industrial complex along the Waterfront. Positioned between the crossing of the Noordzeekanaal and the Zijkanaal G, as well as it was strategically located within the Stelling van Amsterdam. The Stelling van Amsterdam is a 20th century military defence network which has been built as a consequence from the Neutrality policy from the 1860's, which in its turn was a reaction the political tensions in Europe. The former military production took place in Delft but lacked space for expansion, which initiated the relocation from Delft to Hembrug.³

² Hembrug Terrein Zaanstad: Ruimtelijke visie en ontwikkelingsstrategie voor een voormalig militair productieterrein, Palmhout, 2013, p. 2

³ Steenhuis Meurs, 2010, Cultuurhistorische Analyse Hembrug terrein, p. 6, 10, 20 & 32



Fig.: The present site of the Hembrug area

Hembrug location

The map above shows the current urban layout of the former military complex. Recognizable is the vast amount of green space compared to the compact industrial area, mainly on the southern side of the peninsula along the Noordzeekanaal. Both the industrial complex and the woods serve their military purpose. Through history, all buildings were positioned efficiently close to each other in order to optimize production of military assets as much as possible. A famous product was the “M-95 Hembrugkarabijn”⁴, a military rifle produced here in Hembrug. The woods served as military test grounds, as well as the storage of highly flammable goods that were sheltered under the trees.⁵

⁴ *Het verleden, heden, toekomst*, E. Holleman, R. Reijke, 2006

⁵ Steenhuis Meurs, 2010, *Cultuurhistorische Analyse Hembrug terrein*, p. 5 & 27

1.2 Timeline Hembrug



The Hem area used to be a dredging depot of the 'Rijkswaterstaat' for Public Works and Water Management for the storage of peat, clay and sand from the North Sea Canal. Before that a big coalwarehouse was built for the Dutch Marine.

Origin



Digging of the Northsea canal.

1865 - 1872



A Dutch law called the 'Vestingswet' (1874) prioritized the completion of the new Dutch waterline, a defense network built around Amsterdam.

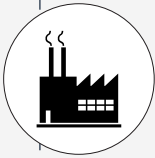
1874

Mid-19th Ct.

Risk of armed conflicts increased in Europe, giving an impulse to the war- and weapon industry in Delft.

1860

The Neutraliteitspolitiek. Making the Netherlands independant on import of weapon and ammunition, forcing them to set up their own military industry.



Broadening of the North-Sea canal. Construction of the second Hembrug.

1906

Netherlands neutral during WWI, but military production expanded. Hembrug performing now as a well functioning munition- and weapon factory and containing researches and test departments for military purposes.

Pre-WWI



Plantation of the Plofbos, north of the ammunition and bullet factories.

1920



The 'Stelling van Amsterdam's ground force lost its relevance because of the new air forces flying right over it.

1914

First railroad access.

1917

8500 employees worked at Hembrug at its peak. Employees worked in bad conditions, making 60-hour work weeks.

1921

After WWI the number of employees dropped to less than 2000 in 1921 and even closure was considered.



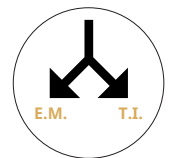
Set up of the Mobilization Complex on the western part of Hembrug.

1950

The production of lathes led to numerous innovations. The CNC machine was introduced and from 1969 the company specialized in precision lathes that were sold under the name Mikrotorn.



1969



Artillerie Inrichtingen split into Eurometaal and N.V. Gereedschapwerktuigen industrie Hembrug.

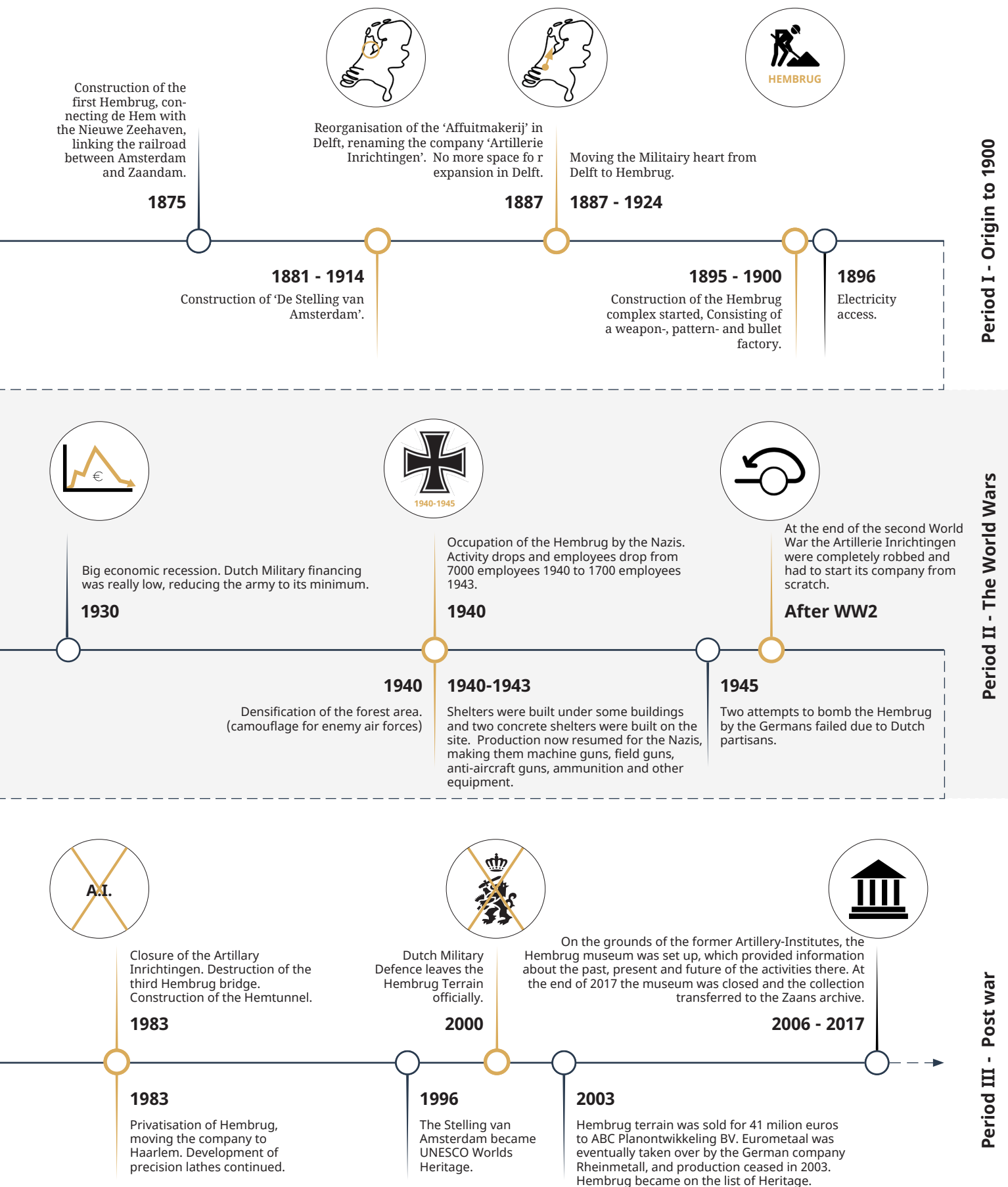
1973

1959

Artillerie Inrichtingen becomes a limited company (N.V.)

1973

Eurometaal manufactured parts for cars, forklifts, milking robots, high-quality precision tools, illuminated signs, sailing boats, and sustainable locks.



1.3 Topographical History Hembrug



Fig.: Map of Den Hem, ca. 1850

1850

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.



Fig.: Dredging of Hembrug, ca. 1882

1882

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

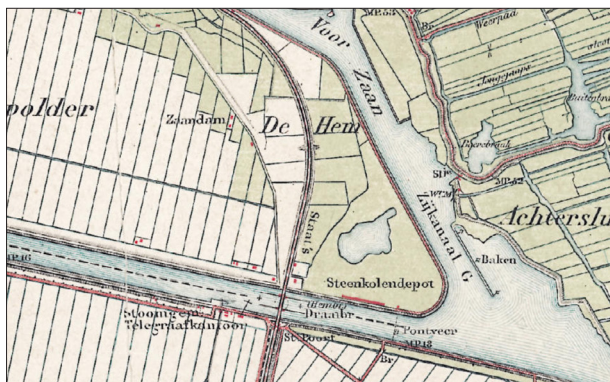


Fig.: Hembrug 1895

1895

Construction of the Artillery Inrichtingen started on the site of Hembrug. Before construction the area acted as a depot of the Rijkswaterstaat, storing peat, clay and sand from the North Sea Canal. Also, a large coal shed of the navy had been built on the site a few years earlier.



Fig.: Hembrug 1905

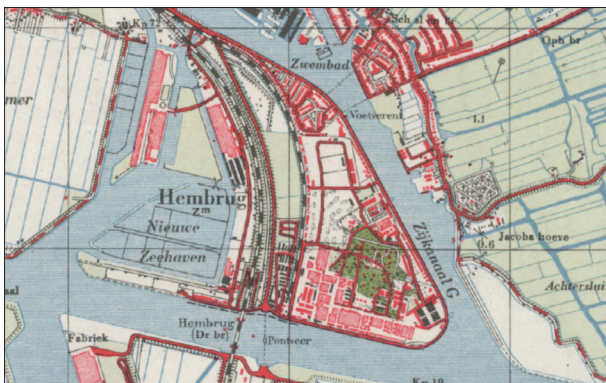
1905

Military production started due to pre-cautions of the First World War, increasing the industrial zone intensively. The industrial environment concentrated along the Noordzeekanaal due to sea transport being the main form of logistic transport at that time.



1925

Maps show the digging of the Nieuwe Zeehaven west of the Hembrug district. Interesting fact is that official maps of the Hembrug terrain differ from the real plans as industrial densification occurred intensively which can't be recognized in this official plan of 1925, due to military secrecy. Concentration of military industry concentrated along the west now due to the first railroad access to the Hembrug area being granted in 1914.



1950

Expansion was limited during the Second World War. One can recognize the plantation of the Plofbois, acting as a test- and storage site for explosives. The trees camouflaged this activity for the enemy.



1975

Official closure of the Artillery Inrichtingen in 1983. Recognizable is the disappearance of the polders which are making place for huge urban expansion of Zaandam and Amsterdam.



2018

Intense densification of the geographical area. Even the western land of the Balkenhaven was reclaimed to make space for built environment. The military defence left Hembrug officially in 2000. Nature slowly starts to take over the site of Hembrug. Many military heritage still remains, but serve no purpose as of today and some are in a very poor condition.

1.4 Hembrug zones

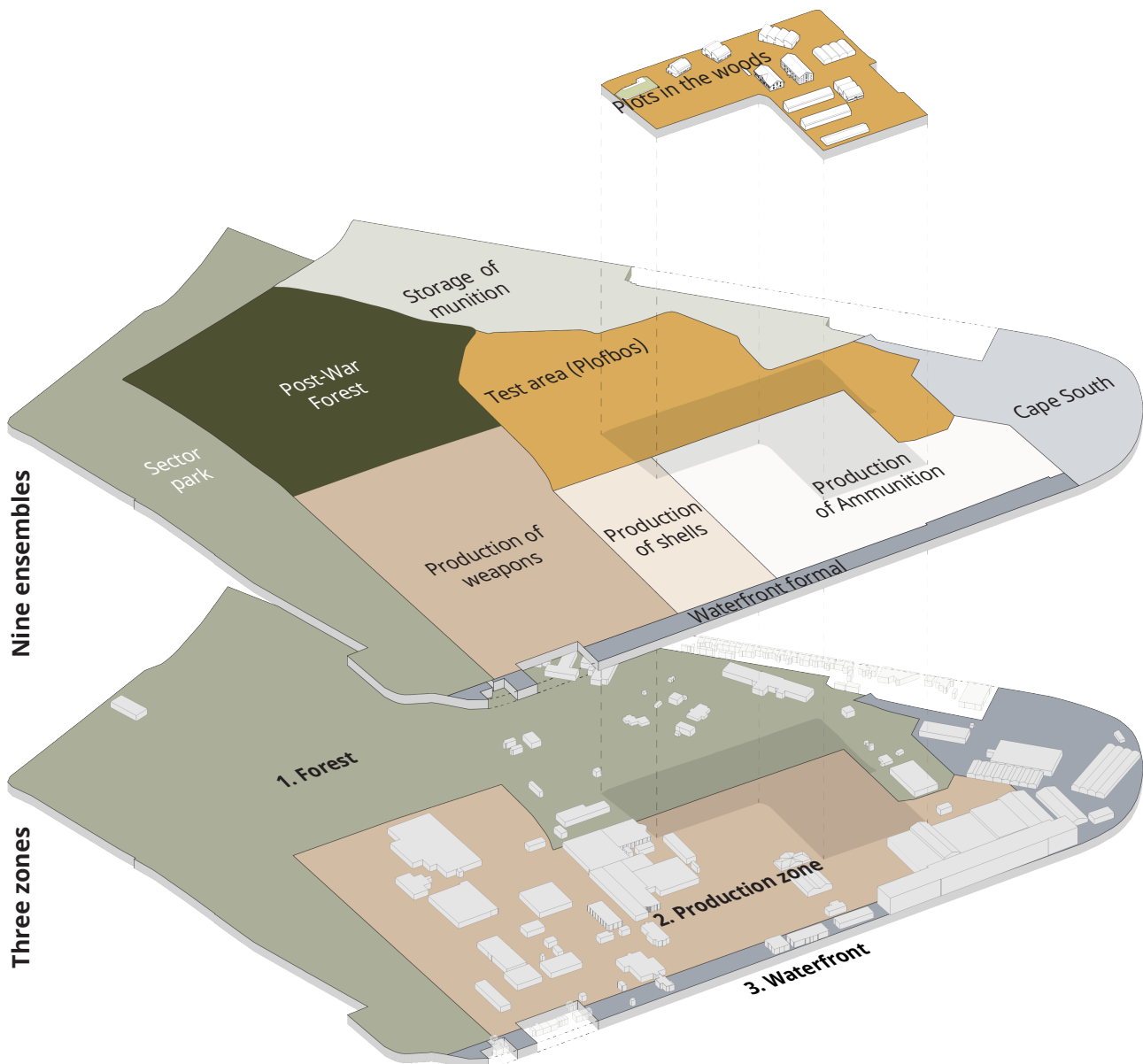


Fig.: Zones of Hembrug in 2018, based on Steenhuis Meurs, 2010, *Cultuurhistorische Analyse Hembrug terrein*, p. 5 - 7, 36 & 37

Zones of Hembrug

The Hembrug area is divided in three different zones: the Waterfront, the Production Zone and the Forest. Zooming in, these areas can be distinguished even further into nine different ensembles. Interesting is the fact that the Plofbos ensemble situates itself on both the shell production area and the test area, because it is the transition zone between both and has shifted over time.⁶

Initially, up until the 1920's, the southern part of the ensemble acted as a shell production area, and the northern part as a test site of ammunition and explosives (hence the name "Plofbos"). This remained up until the 1950's, when the test site shifted up more north, making place for storage more buildings of explosive materials.

Both zones have different considerations in their design. The production zone is compact for optimal logistics and space usage, whereas the testing zone is spacious, fragmented and isolated due to safety measures. Interesting is the two different outputs of practical military design in which our site mediates as a transition zone.

⁶ Steenhuis Meurs, 2010, *Cultuurhistorische Analyse Hembrug terrein*, p. 5 - 7, 36 & 37



Fig.: Hembrug terrain



Hembrug



Unique area and military heritage



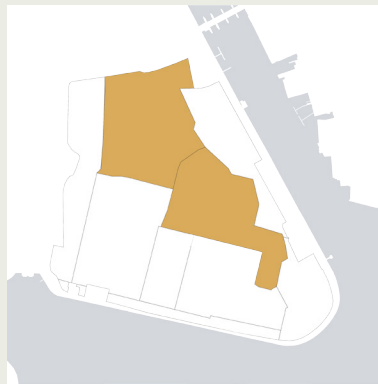
Made public in 2003



Situated between zaandam and Amsterdam



Fig.: Plofbos



1. Forest Zone



Green environment



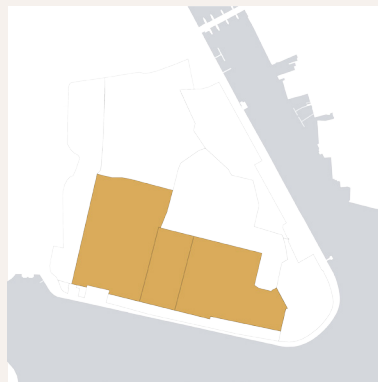
Contrast/transition



Small scale



Fig.: Production zone



2. Production Zone



High diversity



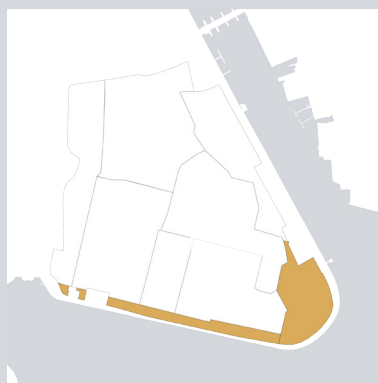
Clustering of buildings



Presence of the main structures/sight lines



Fig.: Waterfront



3. Waterfront



- Monumental / iconic



Greenery along quay



Parallel to the Noordzee Kanaal

1.5 Hembrug structures



Fig.: Main structures

Structures

The industrial area was concentrated along the Noordzee-kanaal in order to optimize logistic efficiency. Goods arrived by sea transport around 1900, and later through railroad transport when Hembrug gained access to a railroad network in 1914. Both forms of logistic resulted in construction of an accessible main road, first along the southern border, and later also to the west. Now these main structures create one of Hembrug's most important sight lines.⁷

Current arrows display the current entrances of the site. What has to be mentioned is that the area didn't contain this many entrances before, as this was a highly secured military area, un-accessible for the public. The former main entrance was in the west and only eligible soldiers or employees could access the area, while they had to sign a contract not to tell what happened inside the area.¹

⁷ *Het verleden, heden, toekomst*, E. Holleman, R. Reijke, 2006

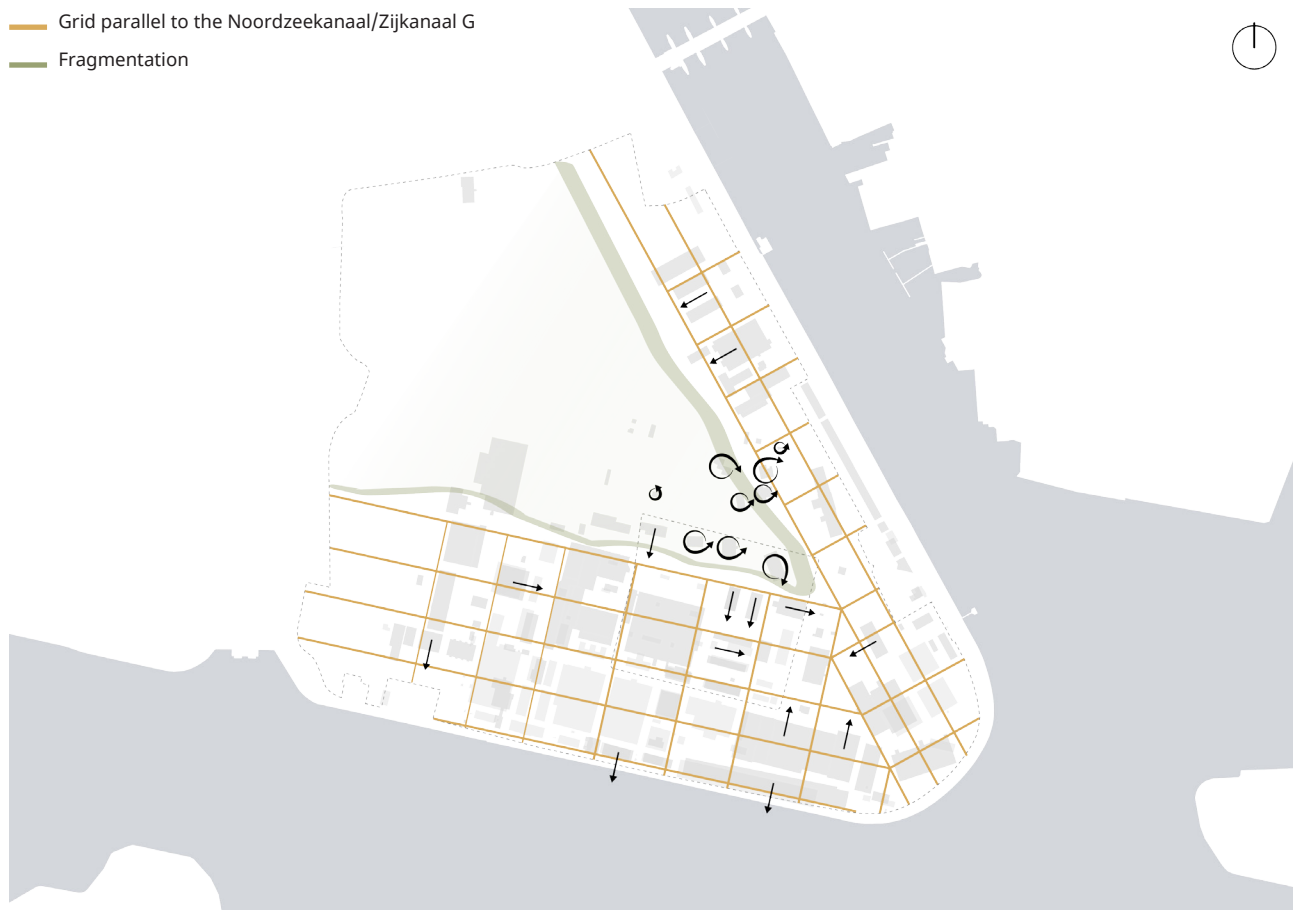


Fig.: Orthogonal design versus fragmentation

Grid

All buildings would follow an orthogonal positioning system, parallel to the Noordzee-kanaal and later also the northern Sectorpark, parallel along the Zijkanaal G. Through military zoning, the Genie's thought of a smart way of organizing dangerous production and storage. Naturally, activities without production risk could become large in size, and collective units could be positioned in a compact manner along each other in order to increase logistic efficiency. However, as the risk of production increased (ammunition and explosive production), you can see that they positioned the buildings separate from each other with a minimum distance in between. This would prevent a building hitting the surrounding ones in case of an emergency. Also, the scale of the structures was smaller than e.g. The Ladder, which is why this area has become a more diluted area compared to the rest of Hembrug. Where the danger of military production was at its highest (the storage of explosives), a more fragmented building positioning can be recognized. Buildings didn't follow the orthogonal grid anymore, but were rotated in such a manner that in case of a blast impact, explosives would shoot into the forest, steered by the shape of the roof of the shell-shaped storage buildings.⁸

⁸ *Het verleden, heden, toekomst*, E. Holleman, R. Reijke, 2006

1.6 Timeline Buildings



1901

Dense and compact industrial layout, all optimized for production of the “Hembrugkarabijn” (M95-rifle), patrons, munition and storage.



1924

Expansion of the industrial zone. Addition of the Sectorpark and mobilisation complex in the far north, intensive use of the forest as test site.



1941

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



1996

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



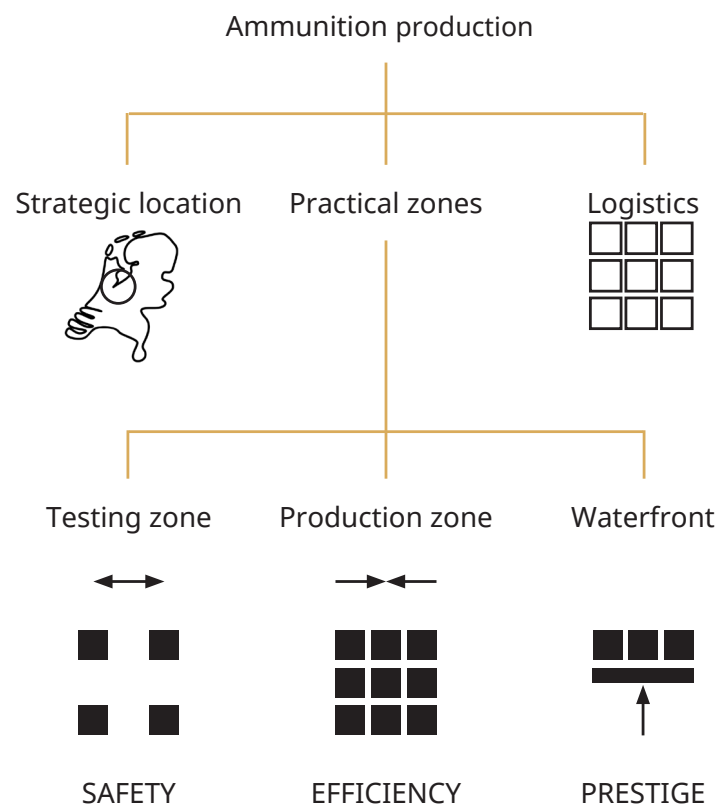
Fig.: Buildings and pipelines with their corresponding generation, current situation.

Generations

The built environment of Hembrug has seen many transformations over the years. Every time new technology introduced their way, the production line and therefore its corresponding buildings had to be adapted. This occurrence has resulted in a vast collection of structures built in different epochs between 1895 and 2000. Nowadays, the remaining buildings are a translation of ever-increasing political circumstances, technology, and architectural mindsets, which sometimes shifted during the years.

In order to optimize logistics for military production, densification of the industrial area occurred along the main transport systems of that time, which was the Noordzee-kanaal in 1901, and later shifted towards the west along the Hembrug railroad, built in 1914. With the fast development of military equipment, initially, the Hembrug Karabijn and later improved weaponry, ammunition, and overall technology drove the Hembrug district to adapt its urban layout many times over the years.

MILITARY PRAGMATISM



CONCLUSION

DEFINING MILITARY PRAGMATISM

As presumed, the Hembrug terrain has primarily been designed with what is labelled in this research as the 'military pragmatic' approach. This approach highly values strategy and efficiency. The terrain has from its dredging already been intended to be a military perimeter. It is nested in between de Zaan en and Noordzee-kanaal and the connecting railway between Amsterdam. This is strategic as it lies safely behind the defence lines of the 'Stelling of Amsterdam' and thus could supply its ammunition from inside out, which we discovered to be the very motive to create the Hembrug complex. Logistically efficient as it directly snaps to a branch of the railway, enabling direct supply from both water and land.

On the perimeter a grid is projected which is still recognizable. This underlying grid served as an efficient infrastructure to optimize logistics and production, and to maintain the flexibility that was needed to meet the changing technology of weapon production. This is visible throughout historical documents and photo's as buildings constantly changed, rarely altering the underlying grid.

Within the grid itself zones emerged, each with different purposes that resulted from the practical separation of sub functions. For the production this meant optimizing efficiency, resulting in compact, orthogonal design. The testing and storage zone however focusses on safety which manifests in spreading out the building volumes. Thus a slight difference in function bears quite impacting consequences for the design. Finally, the Waterfront zone is designed with quays to meet the logistic demands of loading and unloading docked ships, but additionally focusses on the military prestige of Hembrug. As the waterfront used to be the only zone that was actually publicly visible, it required the rigid architectural image of the military and boasting its prestige. This is seen in the long volumes parallel to the Noordzee-kanaal, that largely are built in a monumental architecture.

With this approach can be concluded that the design attitude behind the planning of Hembrug, that we refer to as Military Pragmatism, focusses on strategy (geographic location, safety) and efficiency. These manifest itself in the plan in the way the complex is situated, its layout, and the zones with different spatial layouts. Finally it does take account aesthetics to the degree of reinforcing the military reputation and prestige through architectural design and ornament. Where needed, buildings and surroundings required extra attention for safety.



2 PLOFBOS

THE UNINTENDED BEAUTY OF DEALING WITH EXPLOSIVES

The Military Pragmatism as explained in the previous chapter resulted in the spacious layout that is present in the Testing Zone, of which Plofbos is a part. Plofbos in particular is a crucial zone of the Hembrug Ammunition factory as it was the area in which explosives and munition was tested. It is named 'Plofbos', which is a charming way to say explosion forest in Dutch. This name perfectly comprises the identity of this key-zone; it is the only area on Hembrug where everything was designed wild and planned to store, produce and test explosives. It is remarkable that all the key-qualities of the Plofbos - the open spaces, the small canals and the shapes of the buildings with their lighting and views, the trees and in fact the very existence of the forest itself – are all just consequences of strictly practical safety-measures that were devised from a functional military approach. And today, its identity is anchored in these elements which individually remind of the original function, but together strengthen the unique experience value. It is the unintended beauty of dealing with explosives.

This chapter further investigates these elements that make up the character traits of the area. As a conclusion, it thus generates an answer to the sub research question:

What are the characteristic traits of Plofbos and how did they come into existence?



Fig.: Section through Plofbos (west - east)

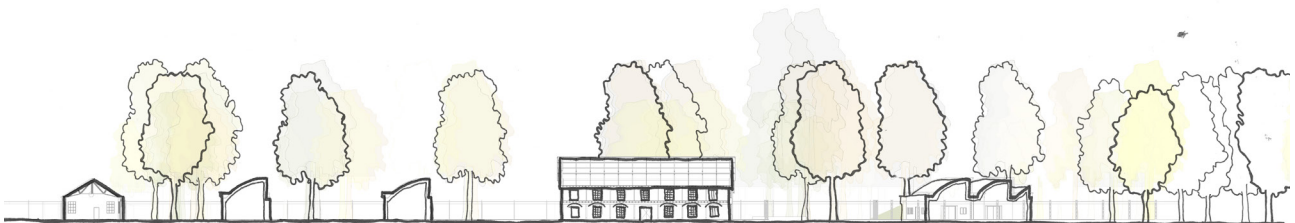
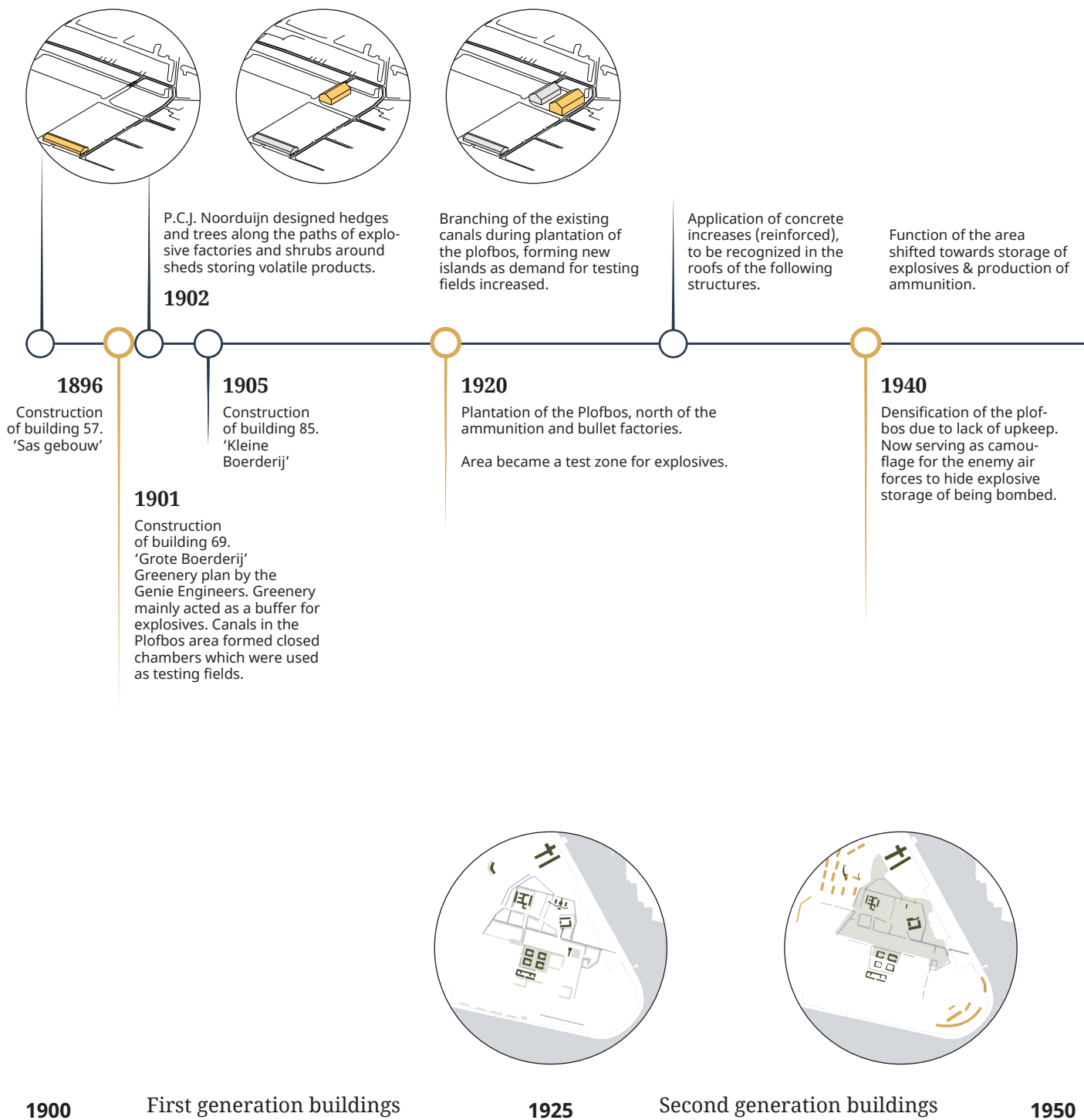


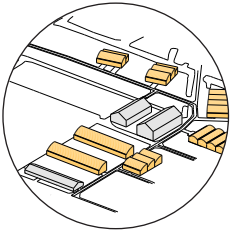
Fig.: Section through Plofbos (south - north)





2.1 Timeline Plofbos



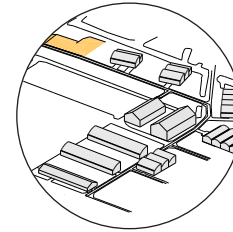


Construction of buildings 414, 416, 417, 418, 419, 420

1952

Pipelines constructed between 1961-1973, transporting steam to heat up the buildings (safer than gas or petroleum due to risk of explosives).

1961



Construction of building 52 / 53 / 54a-b

1991

1956

Underground shooting ranges built north of the plofbos under building 429. Consisting of three shooting ranges of 50, 100 and 200m. Also acted as a basement cellar.

End of the 70's

Northern forest area remained an open field until the end of the 70's, excluding some shooting ranges surrounded by broad tree-lanes. Lack of maintenance, densifying the area.

1983

Closure of the Artillery Inrichtingen, completely abandoning all military activities.

After WWII

Military production and testing demand reduces significantly after World War II.



1950

Third generation buildings

1975

Fourth generation buildings

2000

2.2 Building overview



Building 52 / 53 / 54 a-b

- 1991
- Detonating building
- Storage of munition
- Fourth generation
- Test area (6)



Earth walls

- 1901
- Storage of munition
- First generation
- Test area (6)



Building 69

- 'Kleine Boerderij'
- 1905
- National monument
- Storage of munition
- First generation
- Production zone (3)



Building 420

- 1952
- Municipal monument
- Production of munition
- Third generation
- Production zone (3)



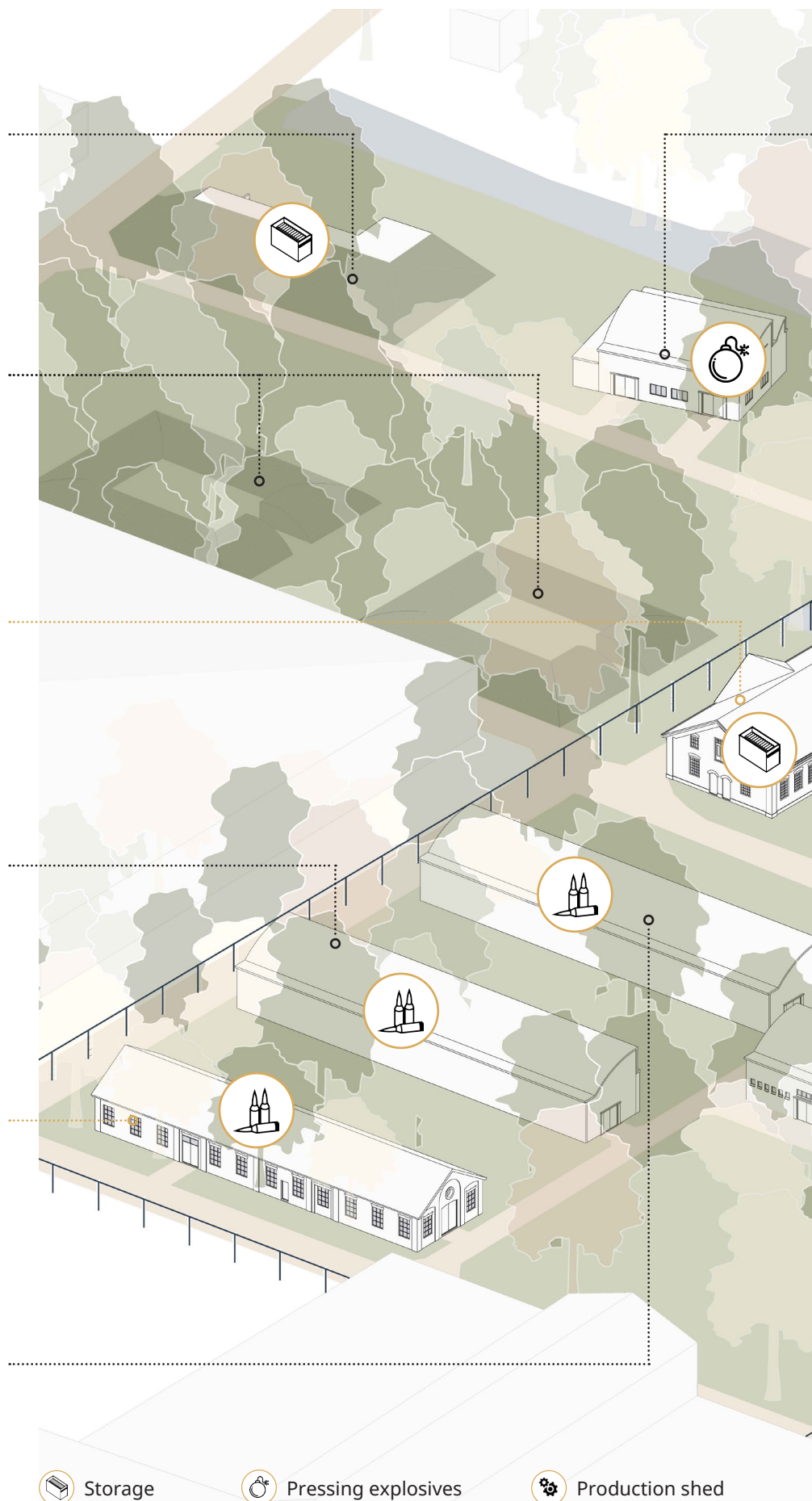
Building 57

- 1896
- Municipal monument
- Production of munition
- SAS-Building
- First generation
- Production zone (3)



Building 415

- 1951
- Municipal monument
- Production of munition
- Third generation
- Production zone (3)



Storage

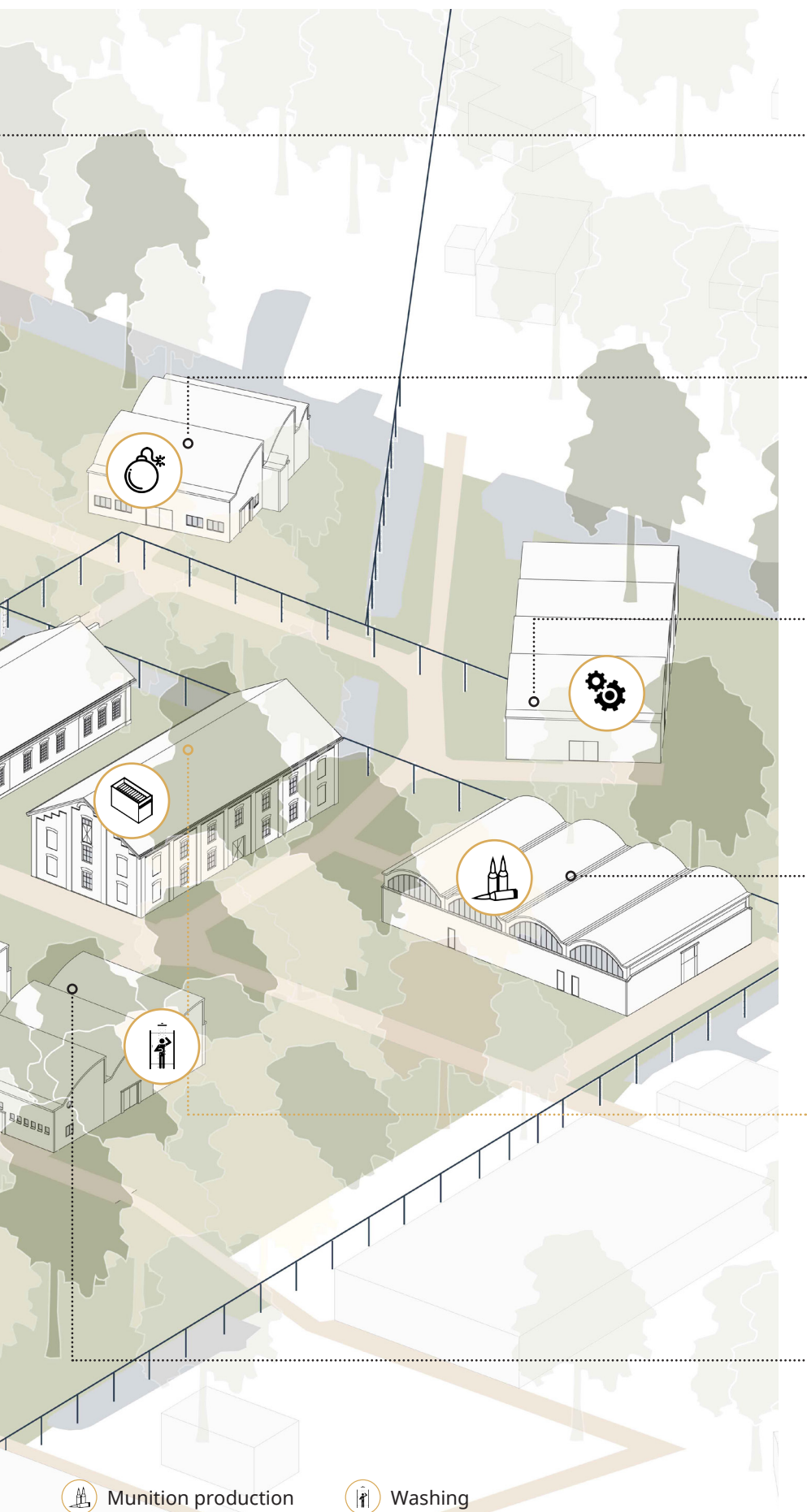


Pressing explosives



Production shed

Source: Steenhuis Meurs, 2016, *Gebiedspaspoorten Omgevingsplan Hembrug terrein*, p. 53 & 61



Building 418

- 1952
- Pressing of explosives
- Third generation
- Test area (6)



Building 417

- 1952
- Pressing of explosives
- Third generation
- Test area (6)



Building 416

- 1952
- Filling and patterning workshop
- Third generation
- Test area (6)



Building 414

- 1952
- Production of munition
- Third generation
- Test area (6)



Building 85

- 1905
- 'Grote Boerderij'
- National monument
- Storage of munition
- First generation
- Production zone (3)



Building 419

- 1952
- Washing shed
- Third generation
- Production zone (3)

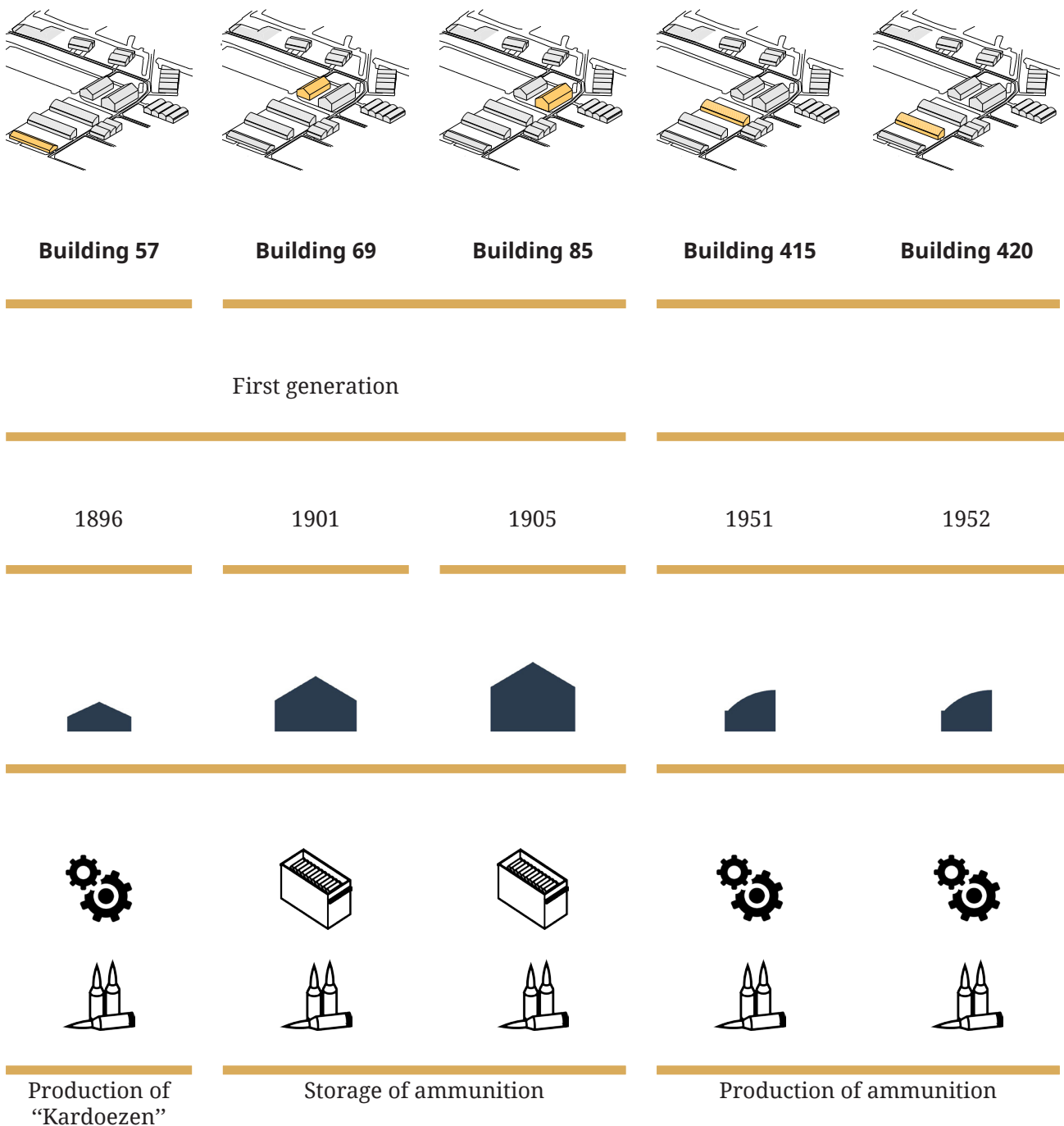


Munition production



Washing

2.3 Typological relations

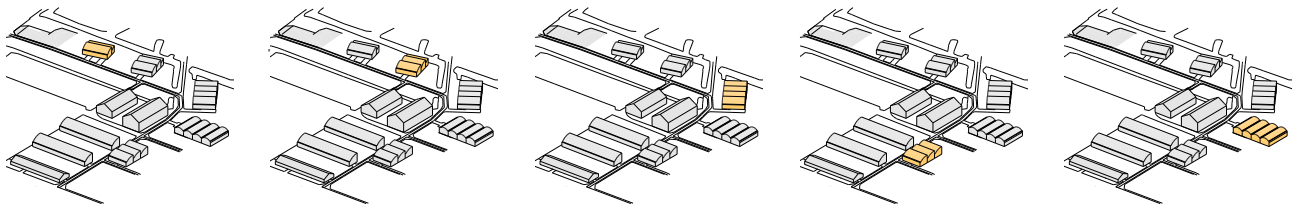


Location and Years

At the beginning of the Plofbos, the Genie has built building 57 as part of a other structure. Behind the building, further on the plot, the Genie has built two other buildings. And in the third generation, between the buildings and behind the buildings, towards the forest, they have built more buildings. So you can see a kind of structure, with open space in between.

Generation and Typology

In the first generation three saddle roofed buildings were constructed, each with highly ornamented façades. First with just one storey, and later two storeys high. With increased technology and a different mindset about architecture, the third generation consists of a new typology: Concrete shell roofed structures, in order to decrease the risk of explosions and shock-waves.



Building 418

Building 417

Building 416

Building 419

Building 414

Third generation

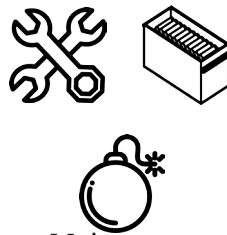
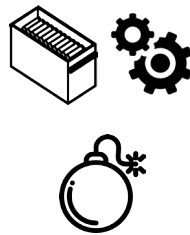
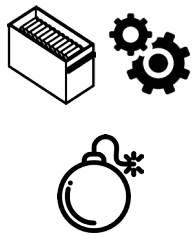
1952

1952

1952

1952

1952



+ Maintenance



Storage and pressing of explosives

Washing room

Production of
ammunition

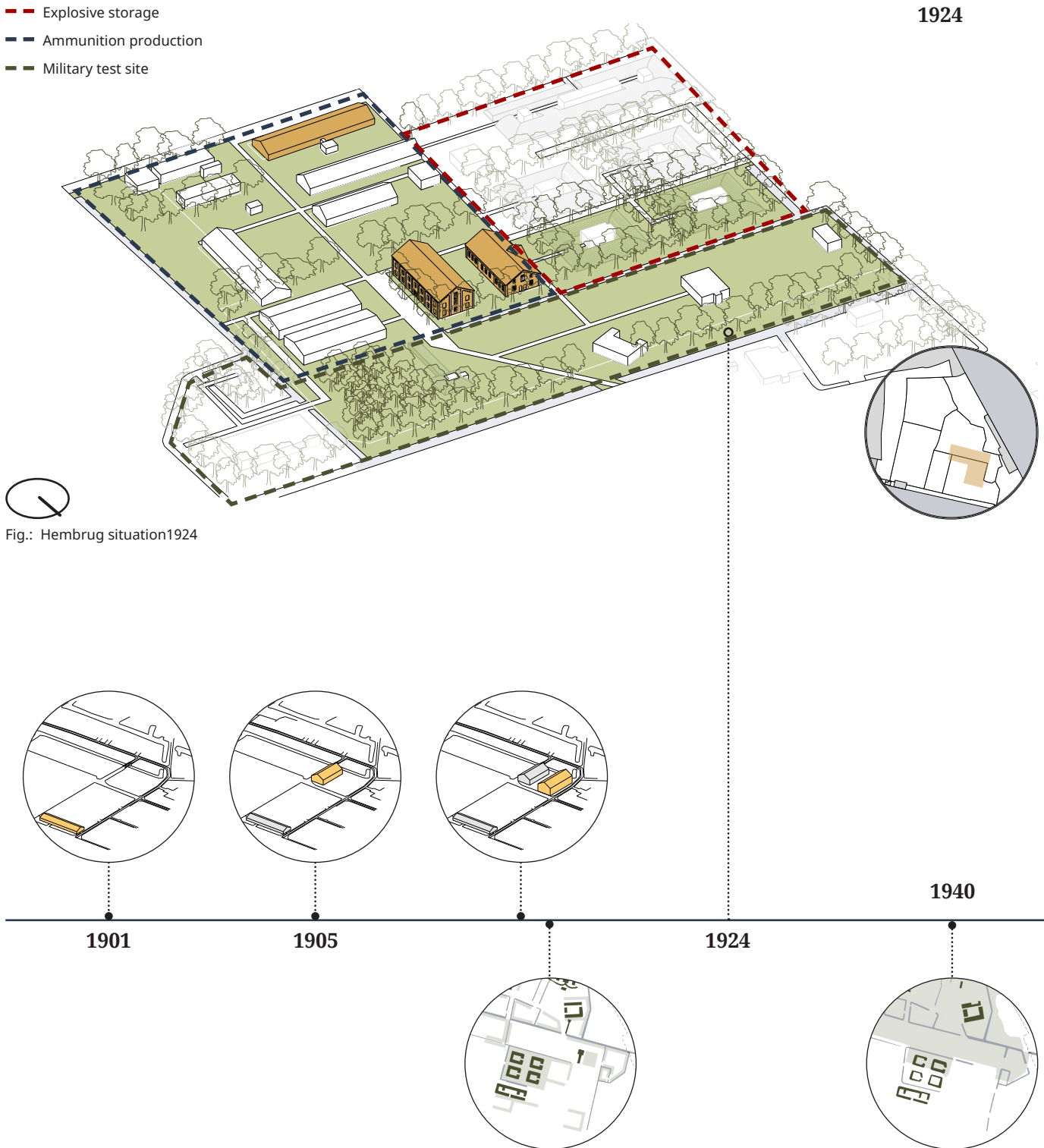
Location and Function

Considering the location and the function of the buildings, you can see that the production of ammunition activities are located in the southern part of the area. Meanwhile, the storage of explosives is located more north, so if something goes wrong, explosives would shoot into the woods. The high of danger does not occur with the ammunition production and is therefore safer.

Typology and Function

There is no direct connection between typology and the specific function or use of the building. The only recognizable connection is the building typology and the generation it was constructed in. They have probably built by 'need of space' and therefore you can not see the differences between the located typologies and functions. Also the washing shed is the same as the storage and working sheds.

2.4 Development Plofbos



Development

In order to understand the historical situation and its development, the historical maps of 1924 and 2018 are showing the differences. As you can see in the map from 1924, the area was assigned to three activities. The production of ammunition zone, the storage of more explosive material zone, and more north the test site for military trainings. Storage of highly explosive material was located along the military test site, which

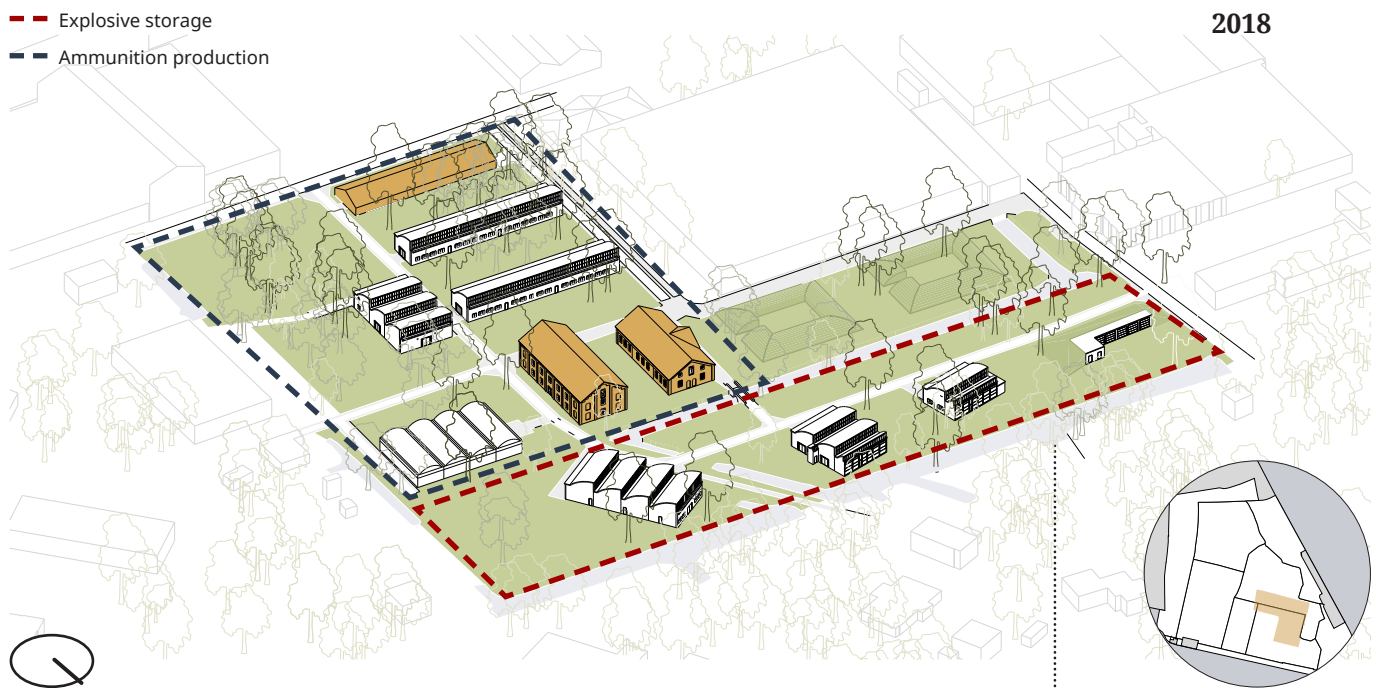
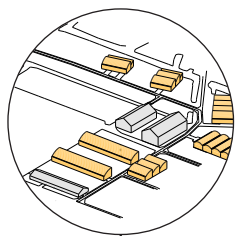
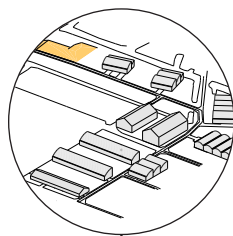


Fig.: Present day Hembrug situation



1952



1991

2018



was an area where grenades and other military material occasionally fired off. Over the years a shift of this zoning took place, so explosive storage was situated more north, and the military tests would take place in the northern forest called the name of Plofbos. This also explains why our plot spans itself over the site of the Production of Ammunition Zone, and the Test Area.

2.5 The functional assets

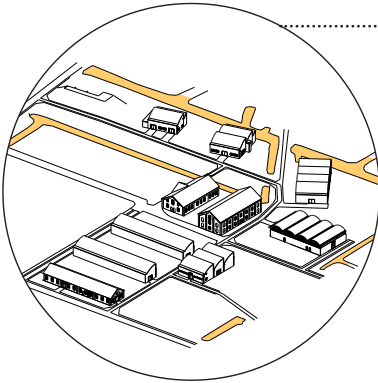


Fig.: Canal system as fire compartments

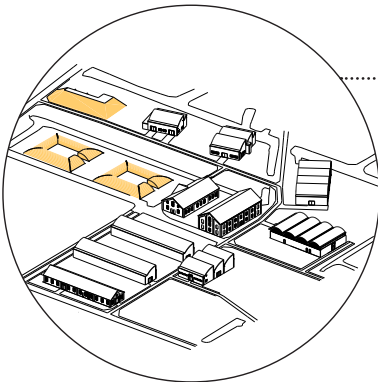


Fig.: Earth walls to sustain blast impact

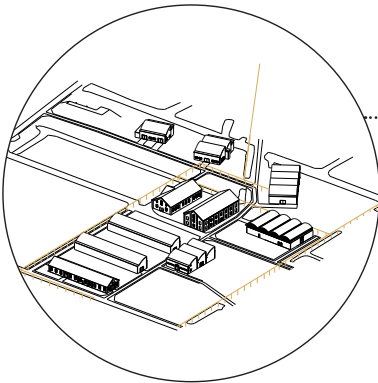
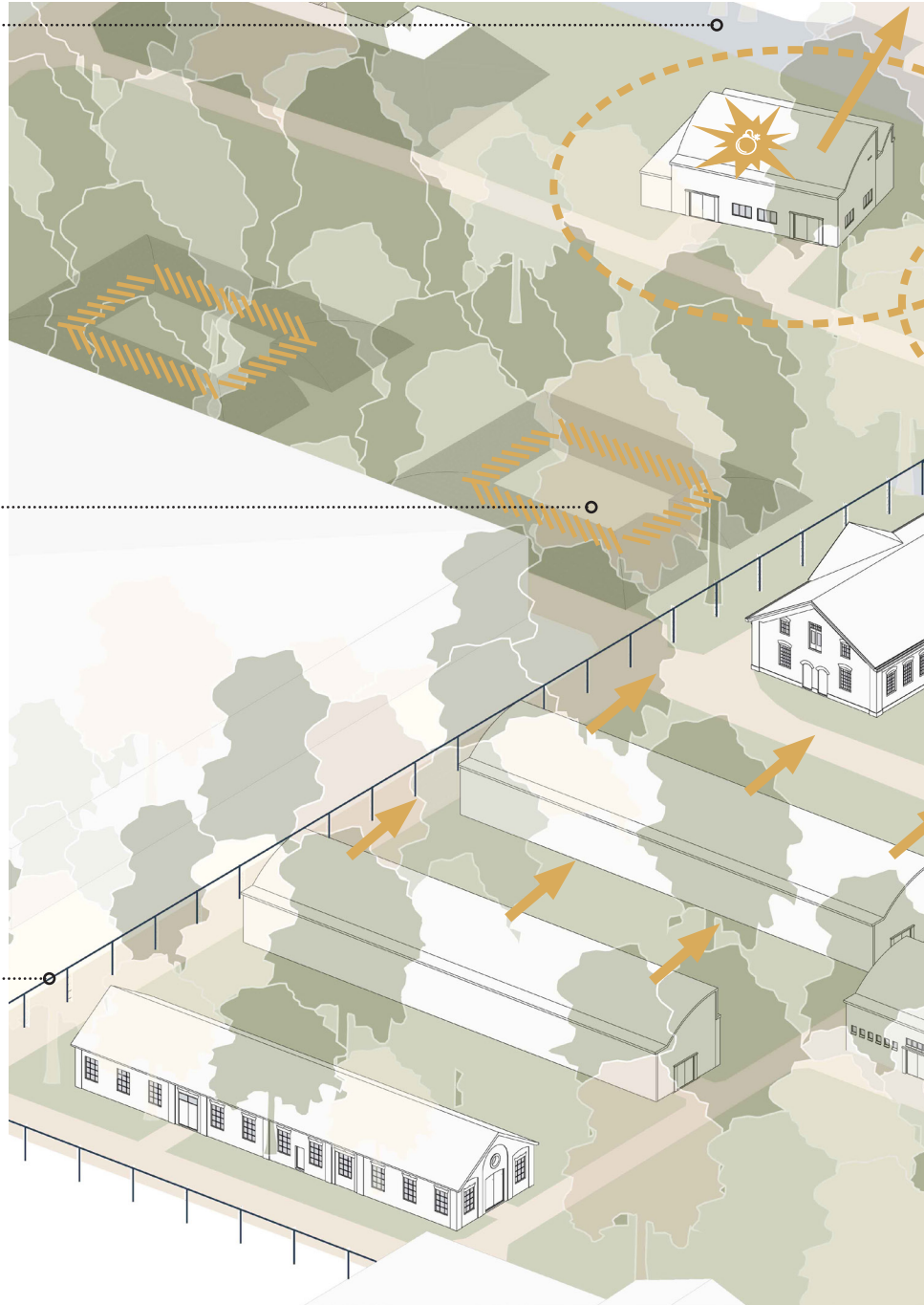


Fig.: Pipelines providing steam to heat the buildings, instead of flammable gas



Elements

As too many explosives in one building would be hazardous, buildings were never large and therefore have a quite consistent size that has been used through four generations of buildings, although each generation has a distinct architecture. The rhythm and pattern of the building volumes and the open space in between, are a result of a mandatory safety radius in the case of accidental explosions, minimizing potential damage and risk of spreading fire. For the same reason, a system of small canals was implemented to act as outdoor fire compartments and additionally provided instant extinguishing water. The trees were deliberately planted to absorb shock waves, cooling the storage units and simultaneously

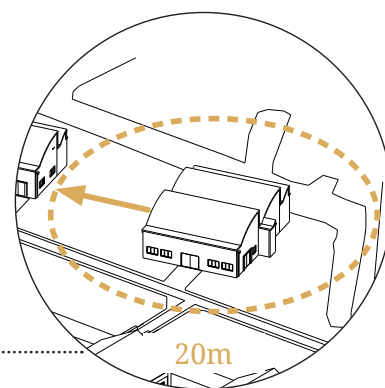


Fig.: Blast radius

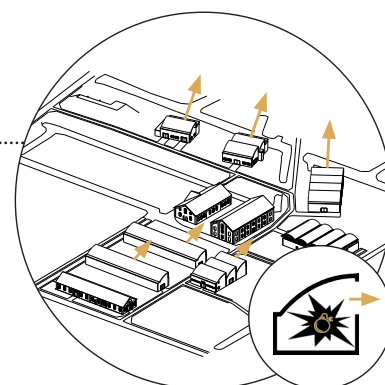


Fig.: Directing potential explosions

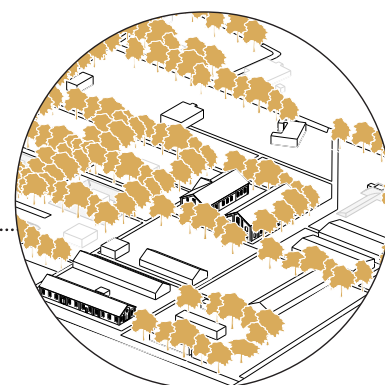


Fig.: Treelanes for camouflage

provided aerial camouflage. The buildings themselves (except from the first generation buildings) were designed to withstand explosions in the interior; shell-like roofs of thick reinforced concrete are directed towards the forest, away from the rest of the factory. With a chimney-like method they would make sure that explosions and fires would not 'backfire' to other significant buildings. There are also some remnants of earth walls that covered some storage bunkers, also to absorb explosives. Finally, infrastructural elements such as the overhead piping system and lightning decoy system connect the Plofbos to the surrounding Hembrug area and show the industrial character of the area.

2.6 Historically valuable elements



Fig.: 11 lightning catchers spanning the former ammunition factory

Lightning catchers

Origin

The lightning catchers were built around the storage buildings in order to protect the dangerous flammable contents which were stored in there.

In total, 96 lightning catchers are built around the former storage buildings. A much higher number than you would expect after visiting the site for a few times. While containing a story, preserving a few of them at strategic locations would do the job just as much as preserving all 96 of these. Think of positions near the main routes where visitors would notice the element, or not hindering open space.

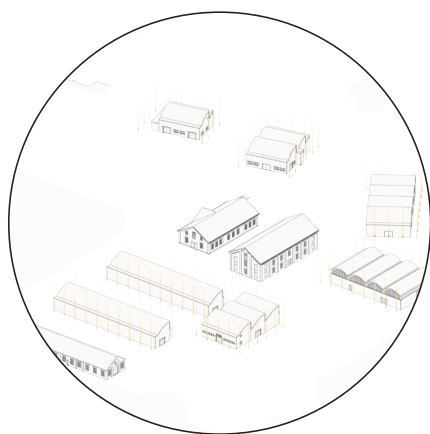


Fig.: Lightning catchers elements



Fig.: Overground pipelines

Overground pipelines

Origin

The pipelines were built between 1961 and 1973 and span between building 415 and 420, in order to provide the buildings of gas and steam. Steam was used to heat up the explosives warehouses as it is less dangerous as gas (risk of flammable disasters). The pipelines were built above the ground because malfunctions could be spotted and repair now didn't require digging in the ground.

Older overground pipelines can be found on the Hembrug terrain as well, following the main structure from west to east. The Plofbos pipelines cross the former axis of the industrial zone and span all the way -through the Plofbos- towards the sectorpark complex in the north. Overground pipelines are rare because only two long lines remain, one of them in the Plofbos.

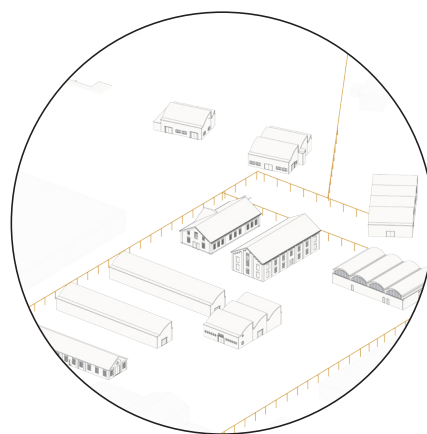


Fig.: Pipeline elements



Fig.: An artificial creek separating the zones

Creeks

Origin

When expanding the military zone around 1920, the area of the Plofbos gained a military testing and storage function. Storage of explosive contents also brought the risk of wildfires in the worst case scenario. Therefore, as a risk reduction artificial creeks were created around some of those storage rooms, acting as a wall of water. They were also used as a water source to extinguish a fire.

While derived from a pure military safety measure, the creeks now contribute to the character of the forest atmosphere. Creeks are a physical barrier of the space, limiting expansion.

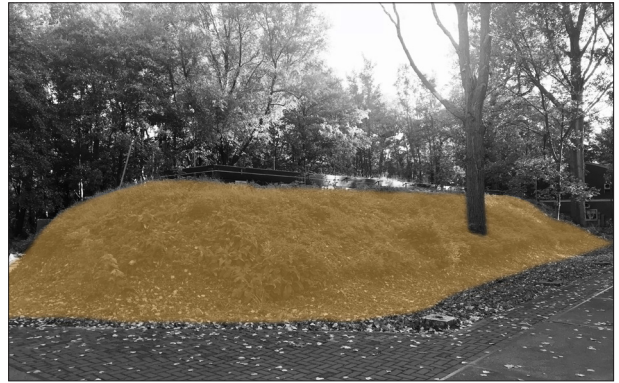


Fig.: An earthen wall embracing the storage bunker (51)

Earthen walls

Origin

In order to protect buildings from damage of accidental explosions. Therefore, certain buildings were surrounded by earthen walls.

The earthen walls are part of the military history of the site. Therefore we want to preserve one or two, although they can also be integrated in a new design, removing the old ones. Earthen walls fit into the character of the green forest and can fit well into ecological design. Old earthen walls do not necessarily have to be preserved, new designs can also fit this notion.

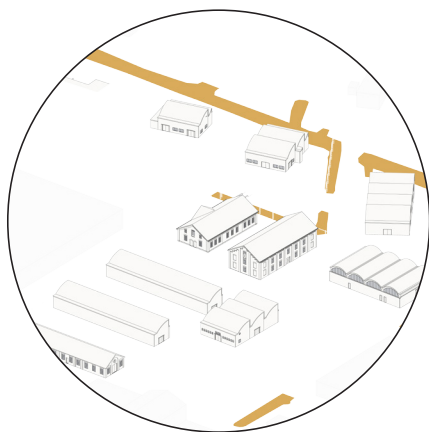


Fig.: Creeks as element

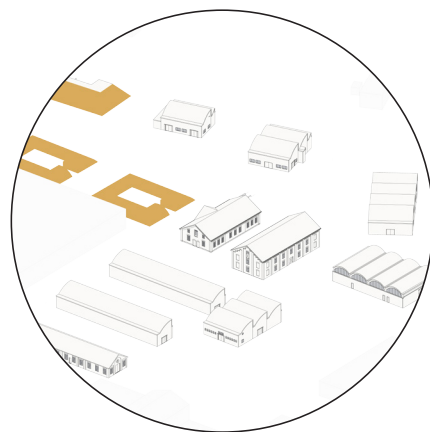


Fig.: Earth walls as elements



Fig.: 11 Built environment versus open space

Open space

Origin

Storage safety requirements demanded the buildings to have a distance between each other, in order to reduce the risk of a chain reaction (in case of a fire or explosion).

Unintentionally, the functional military design now results in an enhancement of the green character in the area. All buildings now have a certain distance from each other (averagely 20 meter). This is a strong contrast compared to the densely packed industrial zones and therefore distinguishing itself from the other zones. From a spatial perspective, the low density, scale and rhythm of building volumes very much remind of a village.



Fig.: Perspective view on the former ammunition factory

Trees

Origin

Trees were artificially planted in the Plofbos according to the landscape design by P.C.J. Noorduijn in 1902. Test site compartments were surrounded by lanes of trees, reducing the impact of shock waves (tests with explosions). They also functioned as camouflaging the buildings from above as well as natural cooling of the storage.

A few trees still remain and are over 80 years old, containing the monumental status. Due to lack of maintenance around the 1940's the woods have overgrown, now resulting in two structures of trees, which caused the area to be filled with wild growth trees as well, apart from the functional growth (original lines of trees).

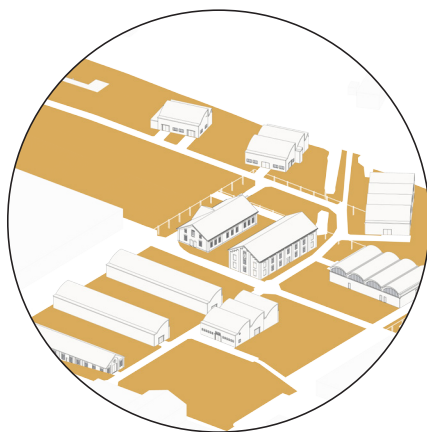


Fig.: Element as open space

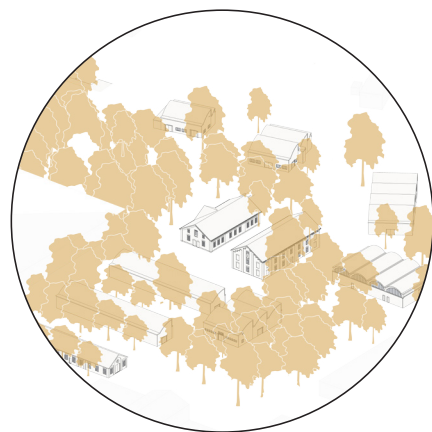


Fig.: Element as trees



Fig.: Paths as concrete slabs and brickwork

Paths/sight lines

Origin

The most important sight lines follow the main structures that are laid out parallel to the Noordzeekanaal or crossing this axis towards the Sectorpark in the north. Initially the paths were laid out with earth or brickwork. Currently the paths are built out of concrete slabs with a broadened line of brickwork.

Although the materialisation of the paths now reflects less to the past, they are more practical. What is more important is that the sight lines from east to west, and the sight lines from the Plofbos towards the Waterfront and Ladder are a crucial aspect of this area, contributing to the transition from industrial zones to the forest. The concrete slabs are recently replaced and therefore don't contain any historical relevance. Instead, the sight lines and sequences you experience are of great importance. New sight-lines could potentially be unlocked or reclaimed.

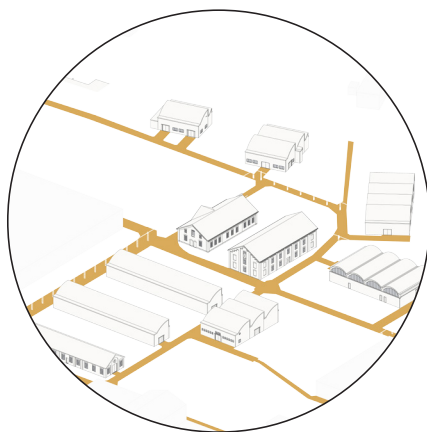


Fig.: Paths as an element



Fig.: Front facade of building 85

Bridge

Origin

The creek compartments were functional but also created physical barriers. Therefore a bridge was created over one of the most important sight lines along building 69.

Although being a practical brickwork bridge, the sight (picture above) unintentionally created a beautiful view, summarizing the character of the area, along with the 'oude boederijen' in the background, the creek, the 'oude boederijen', the pipeline and the depth.

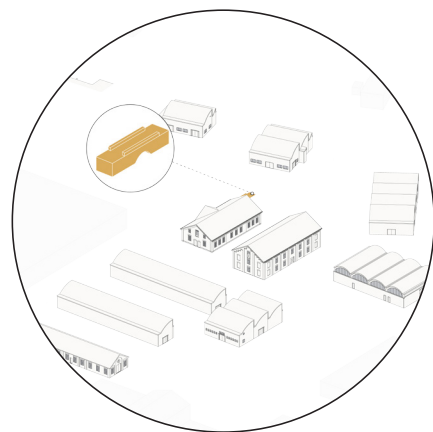


Fig.: Bridge element



Fig.: 11 Built environment versus open space

Shell roofs

Origin

Ammunition and explosive storage buildings contain this shell-like roof due to military safety measures. The buildings were designed to withstand explosions in the interior; shell-like roofs of thick reinforced concrete are directed towards the forest, away from the rest of the factories. With a chimney-like method they would make sure that explosions and fires would not 'backfire' to other significant buildings.

The form of the typology is quite unique, but also present a lot on the site of Hembrug. The concrete structure is of importance but the brick walls are less defining for the architecture. The interior space gives many opportunities for expansions, such as a various types of voids. Also, the (diffusive) light entering the building is a very strong addition as a remnant of the former function of the shell-roofs. An unintentional design benefit is that the trees can be seen through the windows, becoming an extension of the forest, inside.

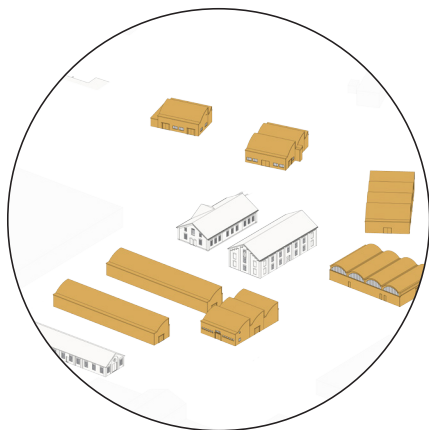


Fig.: 'Shell Roofs'



Fig.: Front facade of building 85

Facade 'Boerderijen'

Origin

The pair of old farms, built in 1905 contain strongly ornamented façades which were designed in Neo-Renaissance style. Even though they only acted as a storage space, the farms have been given much attention towards the architecture.

Strong value in the Plofbos is the contrast between the post-war architecture and the more historical farms with highly ornamented façades. Valuable is the sequence in architecture which can be recognized due to this contrast. Therefore we feel that the original façades should remain untouched, or only allow small space for building extensions. What is inside of the building (columns, wooden floors) are considered much less valuable and should allow for transformation of the building.

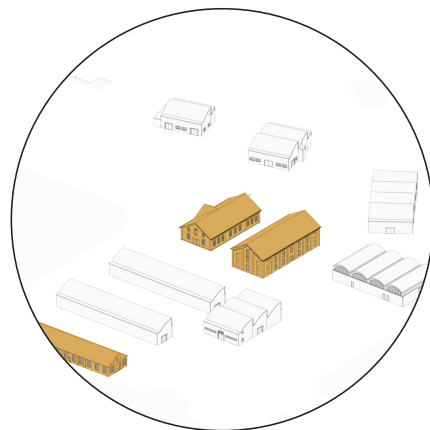


Fig.: 'Boerderijen'

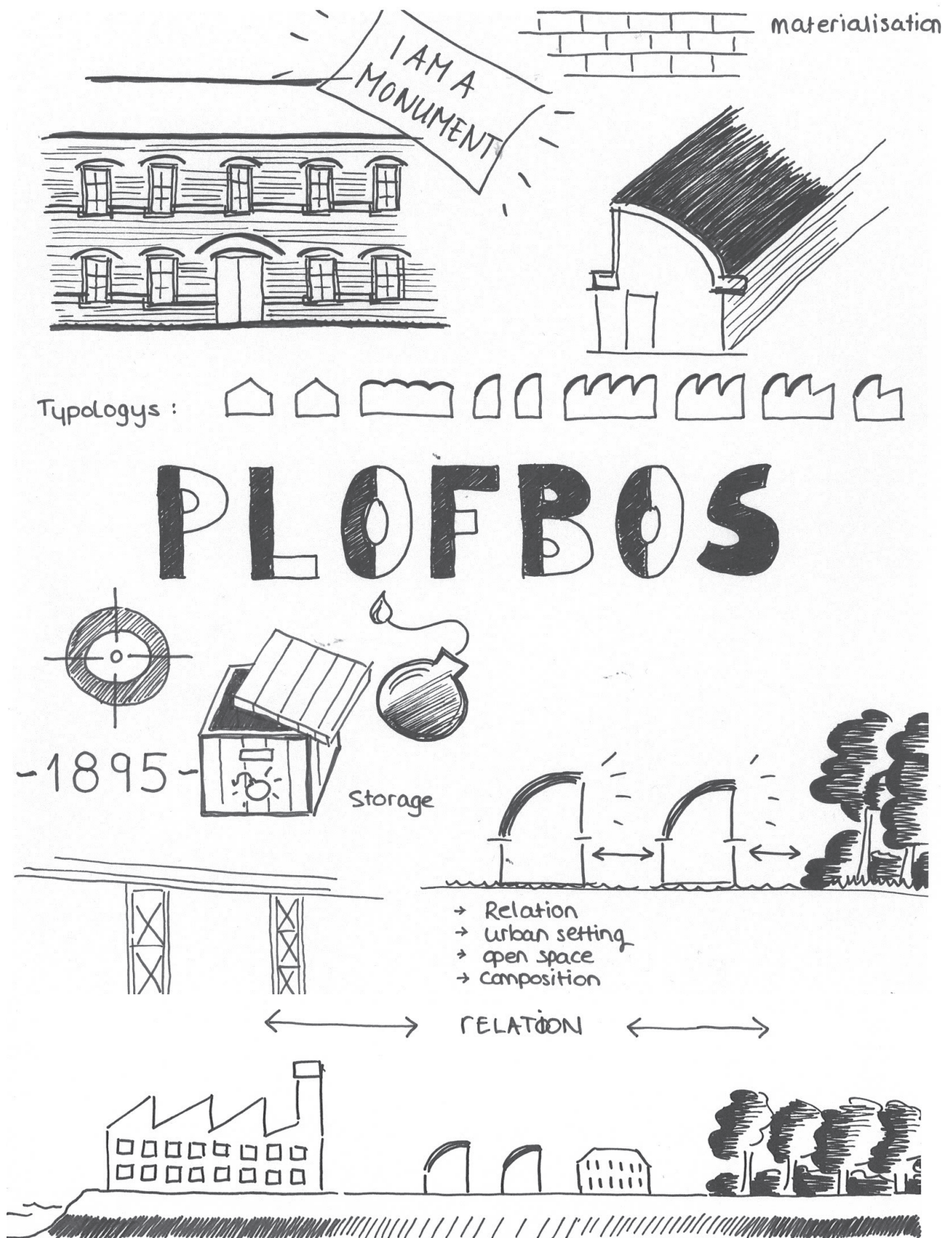


Fig.: Mindmap

2.7 Diversity of space

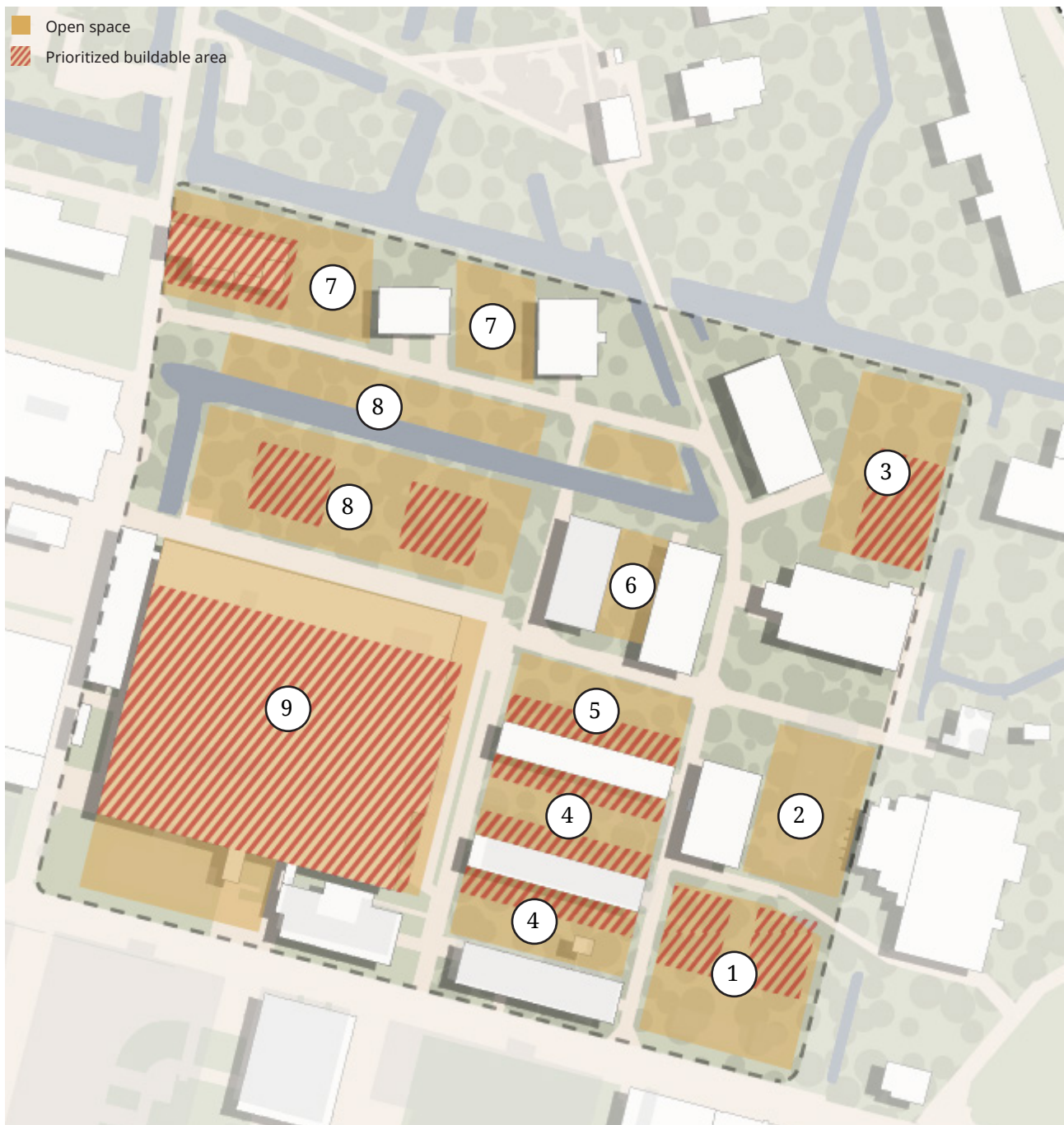


Fig.: Diversity of spaces of the plots in the woods

Diversity

The character of the Plofbos is not just defined by the contrast of industry and forest. In fact, it is a collection of various types of spaces, that collectively create a unique area within Hembrug. Also, it is exactly this diversity of spaces that creates the character of the area; which is articulated through the different atmospheres when walking through the area. However, open space will have to make place for expansion. It is therefore of importance to define and evaluate how each plot contributes to its individual and overall character of the Plofbos which results in a priority of plots to fill, as is translated in the map above.



1

Transition zone - 2400m²

The plot between the Ladder and the Plofbos, as well as the western entrance north of the Cathedral. Exclude the border of new built structures and allow a greenery to fill the border in order to enhance the contrast between industry and stepping into a forest, when approaching from the Ladder zone.



2

Plot behind building 419 - 1500m²

Still within the former ammunition production area, we think it is viable to have more density in this area than in other particular zones. However, an open space in between the buildings will have to be maintained, which can be more compact than for example the northern border.



3

Intimate plot north in the woods - 2000m²

This particular plot creates a unique ambience; hidden, a combination of trees and open space with the dense forest laying behind it. Could become a secret hidden plot, open and light. This way, all buildings and additional new construction will have sight towards greenery.



4

Lanes of trees - 1100m²

This long open space in itself bears historical evidence. Lanes of trees were designed to reduce the impact of shock waves and cool the underlying buildings, which means planted according to a military design thought and are therefore unique. Minimal building extensions could fill this open space.



5

Main square - 1000m²

Small open field in front of two monumental farms in the centre of the plot. Heart of the area, which contains less growth and therefore more light. Could suit a perfect space for public gathering or creative activities. The pair of Neo-Renaissance farms could be the “face of the village”.



6

Idyllic scene - 350m²

What makes this space idyllic is that it is under the trees, with a composition of two farms behind a little canal along a small bridge that also looks deep into the Waterfront. This is being enforced with the former steam pipeline element, compassing the area in one scene. Preserve this unique natural spot and sight line at all costs and therefore exclude this plot from new construction.



7

Plots along the forest - 1500m²

The open space in between the explosive storage buildings was designed highly intentionally. Trees in between are grown wildly on the plot, unintentionally. Plots should remain open to respect this historical design thought and could provide a sight into the forest for a new construction on plot (8). The western path of the area leads to nowhere -just the exit-. Could become more interesting when finishing the route.



8

Plots in the dense forest - 3000m²

Trees were intentionally planted around canal compartments, but have grown wild during the Second World War, creating this unique dense forest. The western part of this plot contains trees of almost 80 years old, so don't build on there. Proper architectural design that has respect to this density could find a way into adding new structures on this site.

2.8 Routing



Routing

The area is accessible from two sides, with two different routes. The sense of transition can be felt here, from the industrial part of Hembrug to the forest richer area, with buildings for storage. Here you see the alternation of buildings on one side, with green on the other side.



2.9 Taets building

Name: Black Box (building 1)

Date of construction: 1991

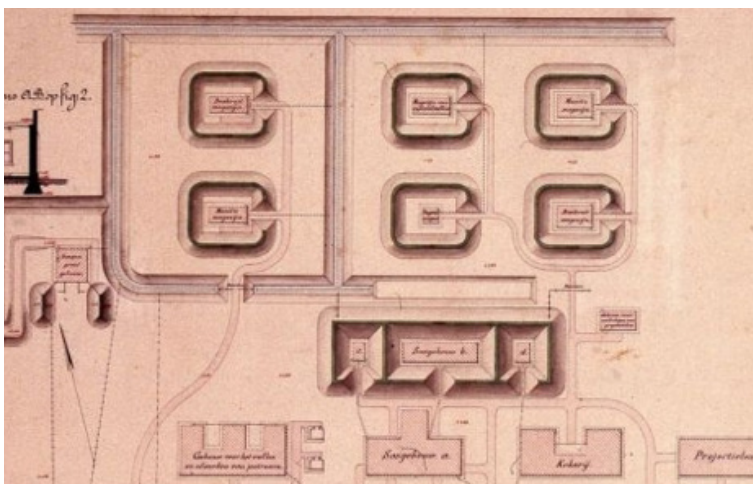
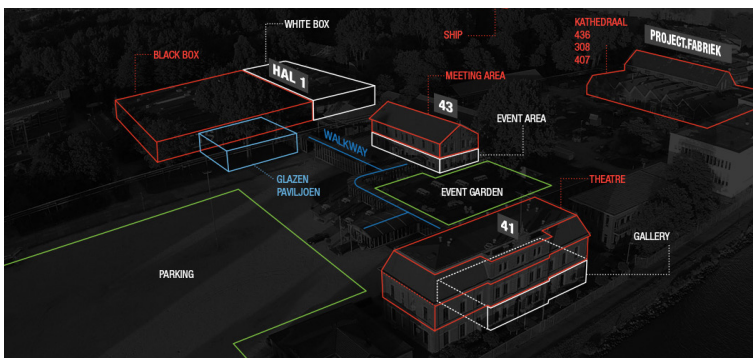
Former function: Production Hall

Total surface area: 6000m²

Building height: 8000mm

History

A site that initially acted as a production zone of explosive material and military test location, now houses a large Black box in the hearth of the Hembrug terrain. During the construction in 1991, earthen walls, canals and trees were replaced for a practical production hall. However, the activity in this building only operated until 2003, when the Hembrug terrain closed its operations. The building has not been in use until January 2014 when a variety of project developers transformed the former production hall into an Art and Event Hall. Up to today the building facilitates the most diverse events, from design fairs, multi-day company events, product presentations, car shows, conferences, fashion shows, and staff parties, to intimate get-togethers, atmospheric dinners, meetings, lunches, concerts and television recordings. Divided over three unique buildings that are connected through a glazed walkway, the Taets Art and Event park totally combine 10.000 square meters of floor space area. Combined with the open space in between the three units, Taets offers the opportunity to provide event space for up to 7.000 to 12.000 persons.



Observations Taets Black Box (building 1).

- Spacious interior, therefore highly practical for event based activities.
- Steel load bearing structure and metallic façades material potentially re-useable.
- The Black Box disturbs the structure of the northern part of Hembrug (free standing buildings at a distance from each other, surrounded by forest and sometimes earthen walls).
- Both scale and architecture do not fit in with the context.
- Architectural layering of the Black Box is incoherent with the surrounding ensembles.
- Low cultural historical significance.

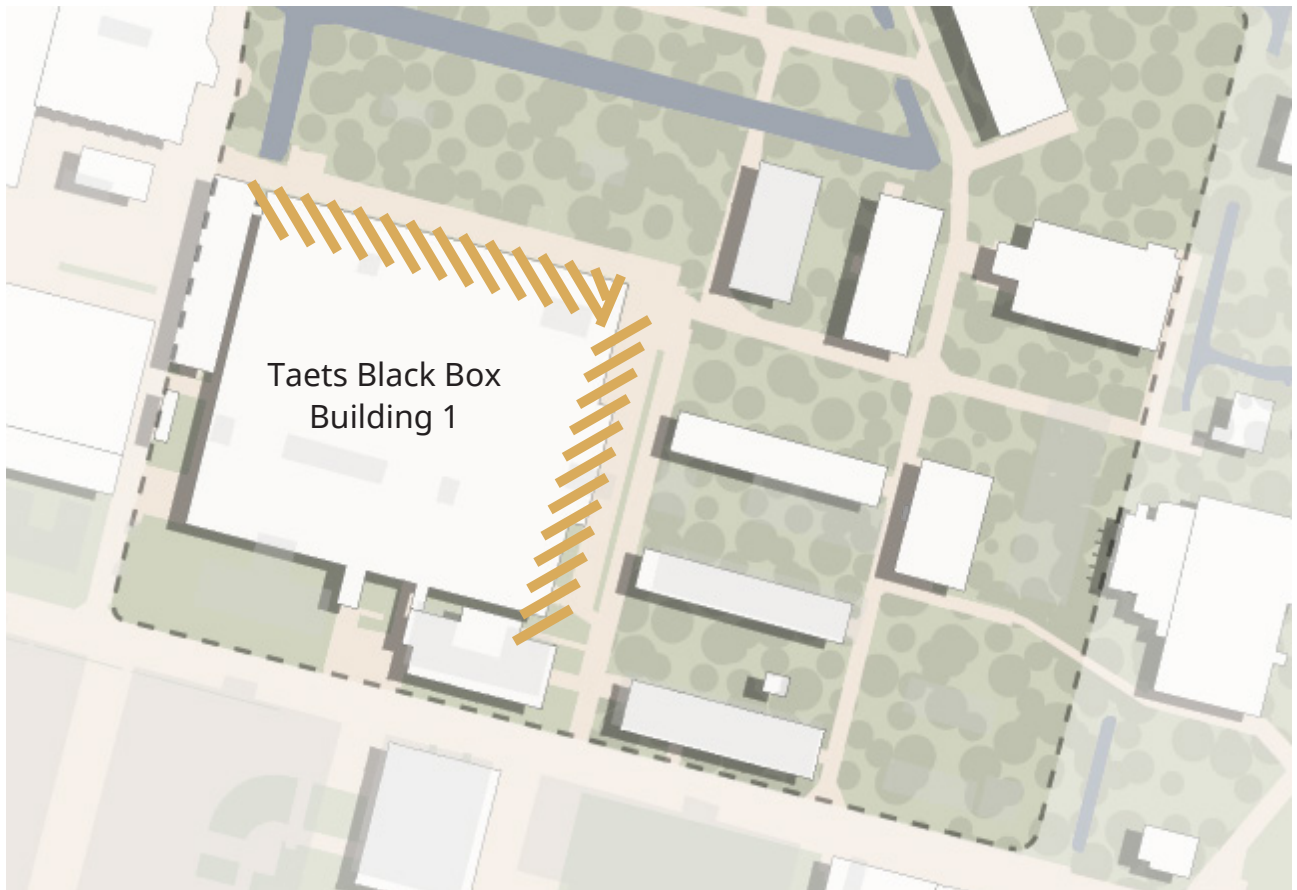


Fig.: Façades of the event shed conflicting with the surrounding environment.



Fig.: Façades of the event shed conflicting with the surrounding environment.

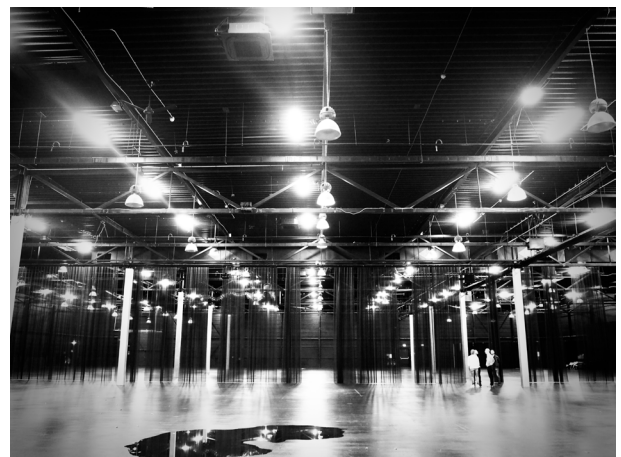


Fig.: Façades of the event shed conflicting with the surrounding environment.

2.10 Tree analysis



Fig.: Birch (Betulaceae), 15-25m



Fig.: Poplar (Salicaceae), max. 40m



Fig.: Birch (Betulaceae)



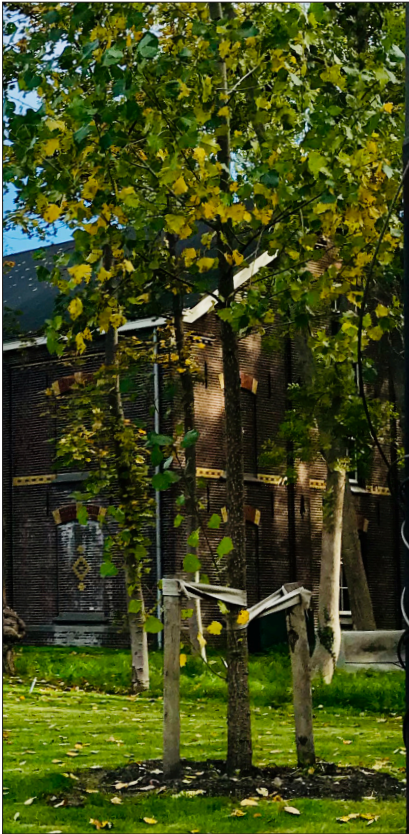


Fig.: Unknown



Fig.: Regular Ash (Oleaceae), 20-30m.

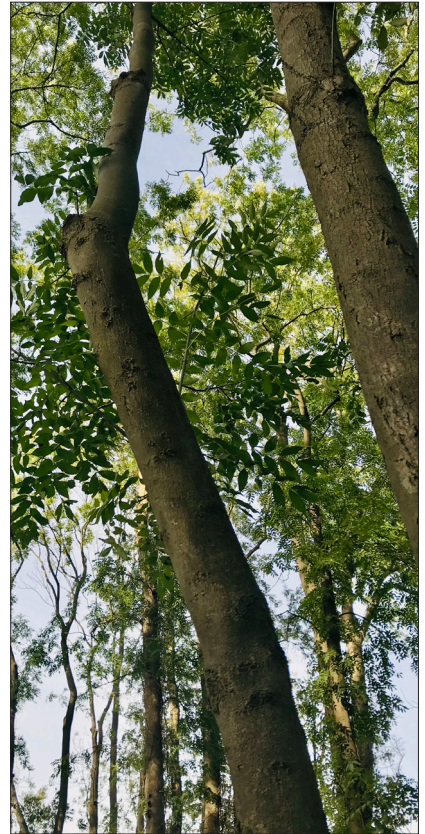


Fig.: Unknown



2.11 Timeline Green & Water

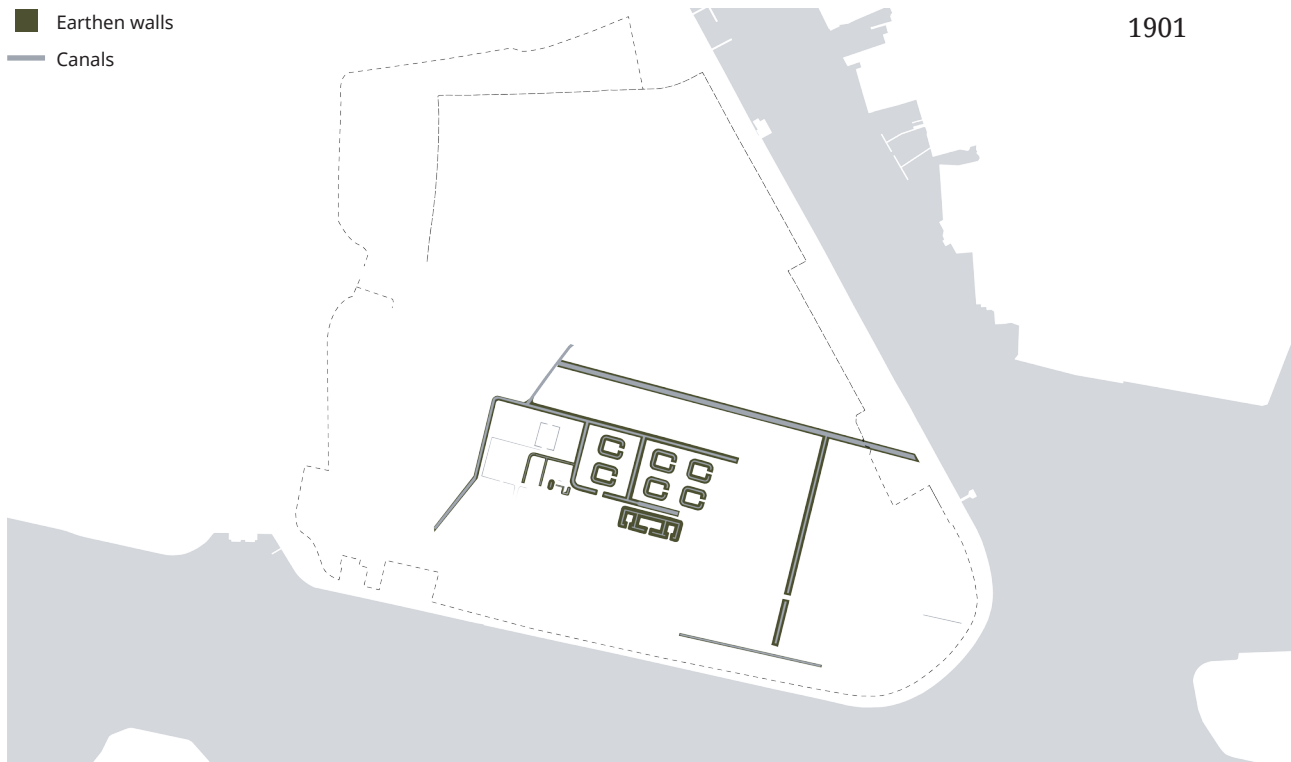


Fig.: Greenery 1901

A collection of earthen walls surrounded by compartments of creeks without too much plantation yet (dredging of Hembrug), just north of the industrial zone.



Fig.: Greenery 1924

Expansion of the test zone towards the north, more compartments, functional lanes of trees by the design of P.C.J. Noorduijn, reducing the impact of shock waves.

Source: Steenhuis Meurs, 2010, *Cultuurhistorische Analyse Hembrug terrein*, p. 35, 39, 43, 47



Fig.: Greenery 1941

Poor maintenance of greenery resulted in densification of the woods, unintentionally becoming beneficial, camouflaging flammable storage underneath the trees. Occupation of the German army during WWII caused concrete bunkers to emerge.



Fig.: Greenery 1996

Further densification and expansion of the woods with certain open plots within, acting as shooting ranges. Bunkers north remain, single remnant left on Cape South.

2.12 Structures of trees



Fig.: Valuable trees in the area. Indication made by Inventarisatie Grontmij in 2007.

Functional growth versus wild growth

In essence, the Plofbos contains two structures of flora: straight planted lines of trees and randomly located, dense plots of trees. The former derive from a functional military design by P.C.J. Noorduijn in 1902.⁹ Trees were planted around test site compartments, which would reduce the impact of the shock-waves, resulting in a strong linear placement of trees. The wild growth is a result of poor maintenance since the 1940's, but (unintentionally) have had their function as well. A densely grown site acted as camouflage against air forces for the risky explosive filled buildings underneath, as well that it was beneficial for natural cooling the buildings below the trees. For this matter, both types of growth bear their historical importance. But maybe more interesting is the way the trees contribute to the character of what the site wants to become. What do we maintain or enhance, and what suits place for new building locations? This question can be interpreted very subjectively, because for the one it is the density of the woods that creates this place, while for others it could be the structures lines of trees and its sight lines that should be preserved. The map above marks the valuable trees and densely filled plots of trees.

Source: ⁹ Steenhuis Meurs, 2010, *Cultuurhistorische Analyse Hembrug terrein*, p. 62 - 64



Fig.: Two old trees across building 65, expressing the wild growth behind it.



Fig.: Lanes of maple trees between the ammunition factories.

Nature

Forest



Earth walls



Canals



Trees



Spatial plan

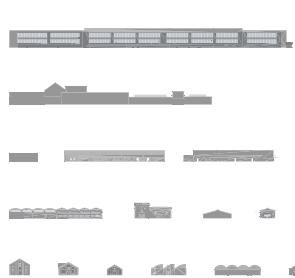
Open space



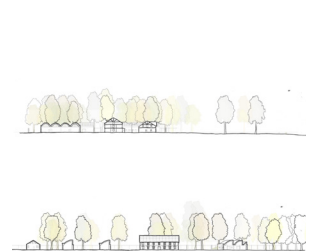
Rhythm



Scale



Transition



CONCLUSION

CHARACTERISTICS PLOFBOS

All the pragmatic elements that came forward in this chapter are more than evidence of the history and purpose of the Plofbos. Together they contribute to the genius loci of the Plofbos, which has unintentionally yielded tremendous experience value. From a spatial perspective, the low density, scale and rhythm of building volumes very much remind of a village. This village experience presently echoes in the current activities that take place. Some creative pioneers have settled in the area, benefiting from the lack of rules. They generate a gentle hustle and bustle of the small-scaled creative industry, sparking the area to life. Zaandam's city major recognizes this as a quality, and advocates for 'niet aanharken!' (don't rake!).¹⁰ Again, the qualities of the Plofbos lie in the unintentional. The forest has great nature value. Its colours and smells tell you the time of the year. One can hear the wind rustling its leaves, light is constantly diffused differently due to the swaying of its branches and birds celebrate the coming and going of the seasons. The site is constantly in motion, but at the slow and steady pace of nature. The buildings themselves are the tangible reminders of the former military purposes of the site and take the visitor on a small time-travel as they are a layered collection of four building generations, each testaments to their own time spirit. All of these time layers are harmonious due to their similar size, scale and rhythm. But within this harmony one can discover the time-layers from the different types. The first generation buildings display relatively rich ornamented façades, whereas the third generation buildings resemble the sober, functional attitude of the 1950's. But their functional shell-like designs unintentionally generated qualities too; the diffuse lighting that results from the roof shape, the abundant lighting that falls through the large roof lights and the tranquilizing views on the forest. Again, these views on the forest have never been intended for aesthetic or experience value, but instead derive from the safety measure of directing explosions or fire away from other buildings and into the forest.

A lot of the elements bear a functional military value in them, and remind us of the military activities in the past. Some in higher contents than others. To make this study applicable, we translated this collection into clear aims towards redesigning the Plofbos. For this matter all the objectives derived from the valuable elements are summarized underneath. These objectives partially form the foundation of the master plan proposal, which will be elaborated on in chapter four.

- Preserve the open space in between the buildings as much as possible.
- Follow the existing rhythm and structures/sight lines.
- Pay attention to the building scale, deriving too much from this reduces the ambience of the place.
- Preserve and/or enhance the transition experience (from industrial through trees into the Plofbos).
- Enhance connection between the other zones at the borders.



3 BUILDINGS

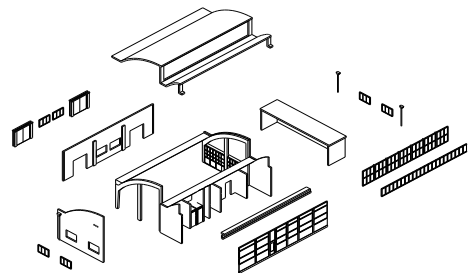
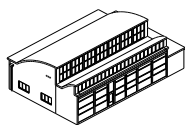
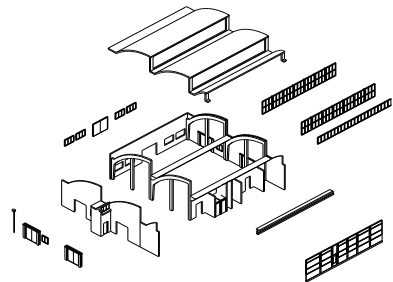
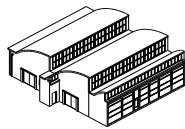
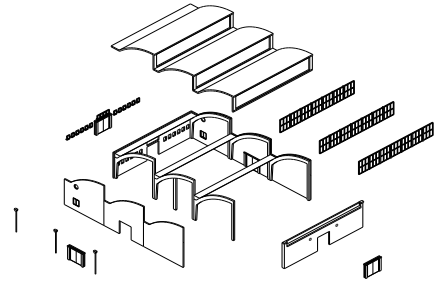
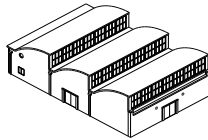
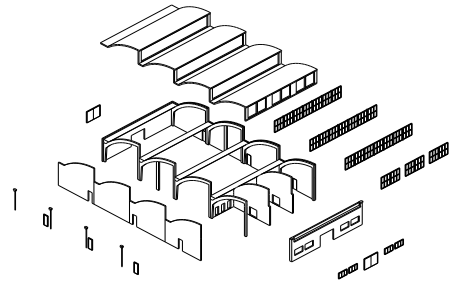
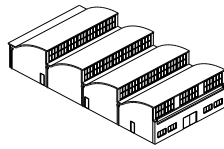
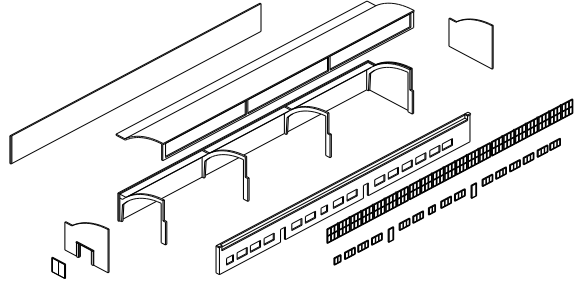
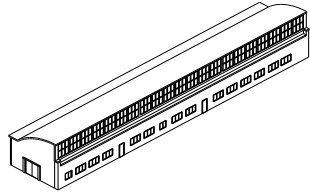
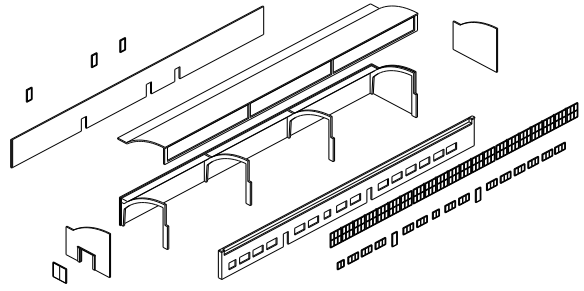
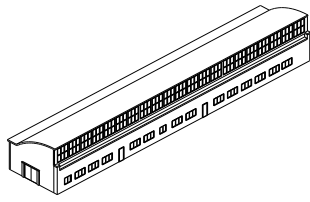
LAYERED EVIDENCE OF TIME

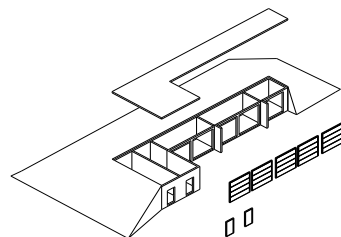
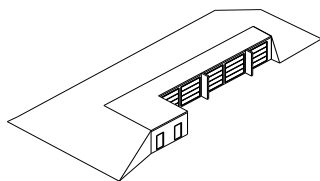
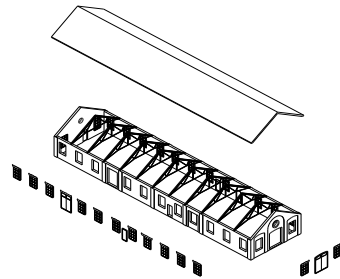
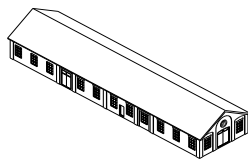
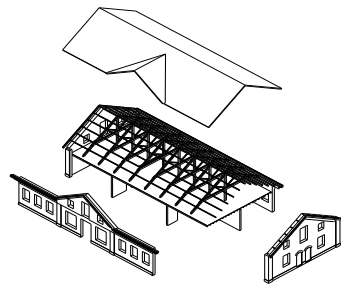
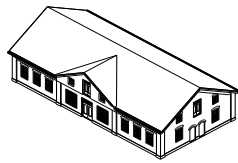
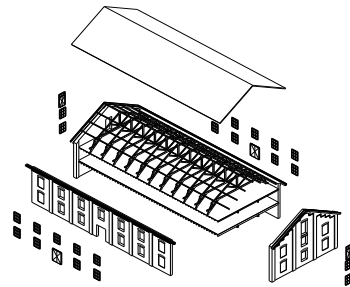
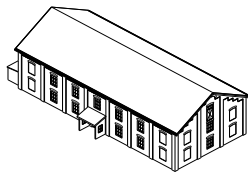
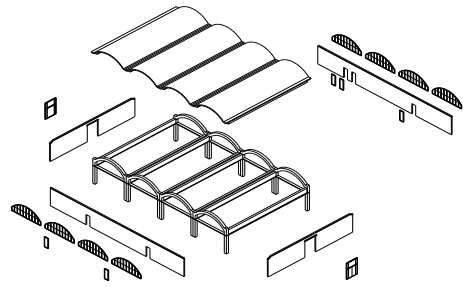
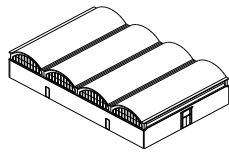
The existing buildings are the most physical evidence of the site's former history. They remind of their former use and the activity that occurred in that place. They may be interpreted as a translation of former technology through their architecture, especially interesting as they are remnants of different times. In short, the buildings are intrinsically connected to the character and history of Plofbos and therefore valuable. This chapter narrows down what elements precisely are important and how the buildings can adapt to design interventions. Ultimately it concludes to what degree an intervention can be conducted without compromising the genius loci.

So what can we do with these buildings? Are the buildings capable of assigning a modern function to them? What are the technical limits of the structure and what chances do these buildings offer? For this research it is essential to consider technical possibilities while maintaining and preserving their historical quality. These questions can be answered with one overall research question:

How adaptable are the buildings on the Plofbos site, and to what degree can they change without loss of character?

For this research we are going to focus on the two most ubiquitous structures from the first and third generation. These structures are the three Neo-Renaissance designed farms built around 1900, and the post-war Shell-roofed structures, built around 1950. In this research they will be called "Boerderij-typology" and "Shell-roofed typology", due to the form of their shape.





3.1 'Boerderij'

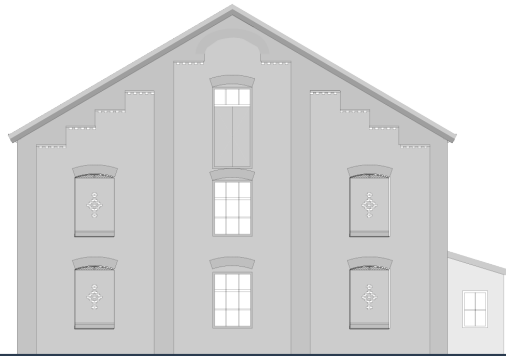


Fig.: Northern facade



Fig.: Eastern facade

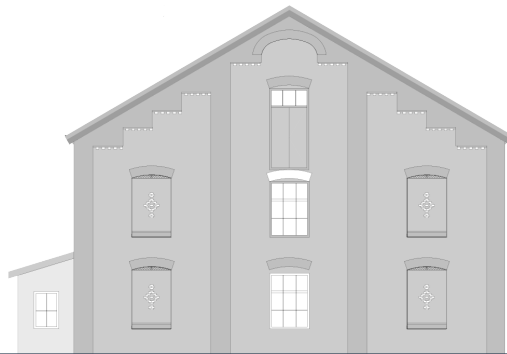


Fig.: Southern facade



Fig.: Western facade

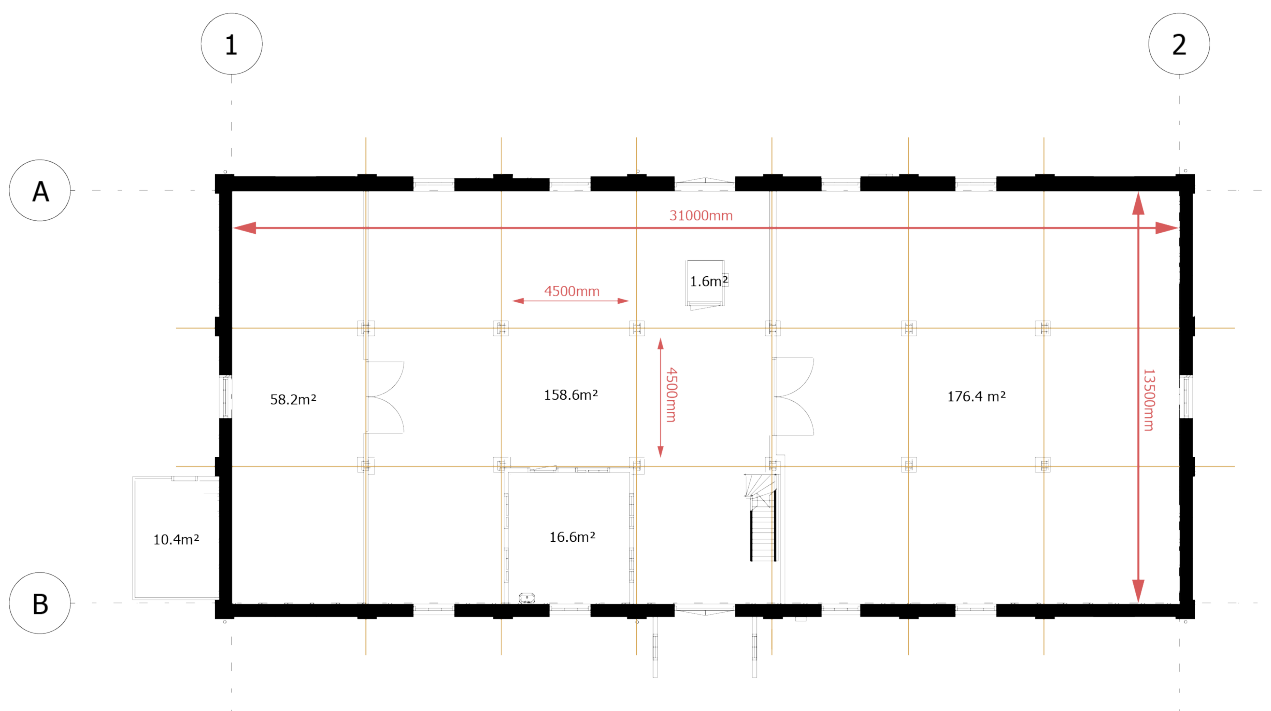


Fig.: Ground floor plan of building 85.

Square meters:

Ground floor (420m²)
First floor (420m²)
Attic (420m²)

Facade:

Load bearing exterior brick
410mm thick

Grid:

4500x4500mm
Columns hearth to hearth

Technical characteristics of building 85:

- The attic is of a very low height due to the roof construction
Only 2000mm free height between floor and wooden beam
- The attic has a lack of daylight because there are only two windows positioned on the north and southern facade.
- The wooden roof construction might allow constructive strength for additional roof light.
- The grand open floor plan is made possible by a structure of steel columns, forming a grid of 4500x4500mm.
- Floors are over dimensioned because of the former storage demands, which enables the capacity to bear a new function.
- The load bearing construction shows no signs of deterioration.

3.2 Construction 'Boerderij'

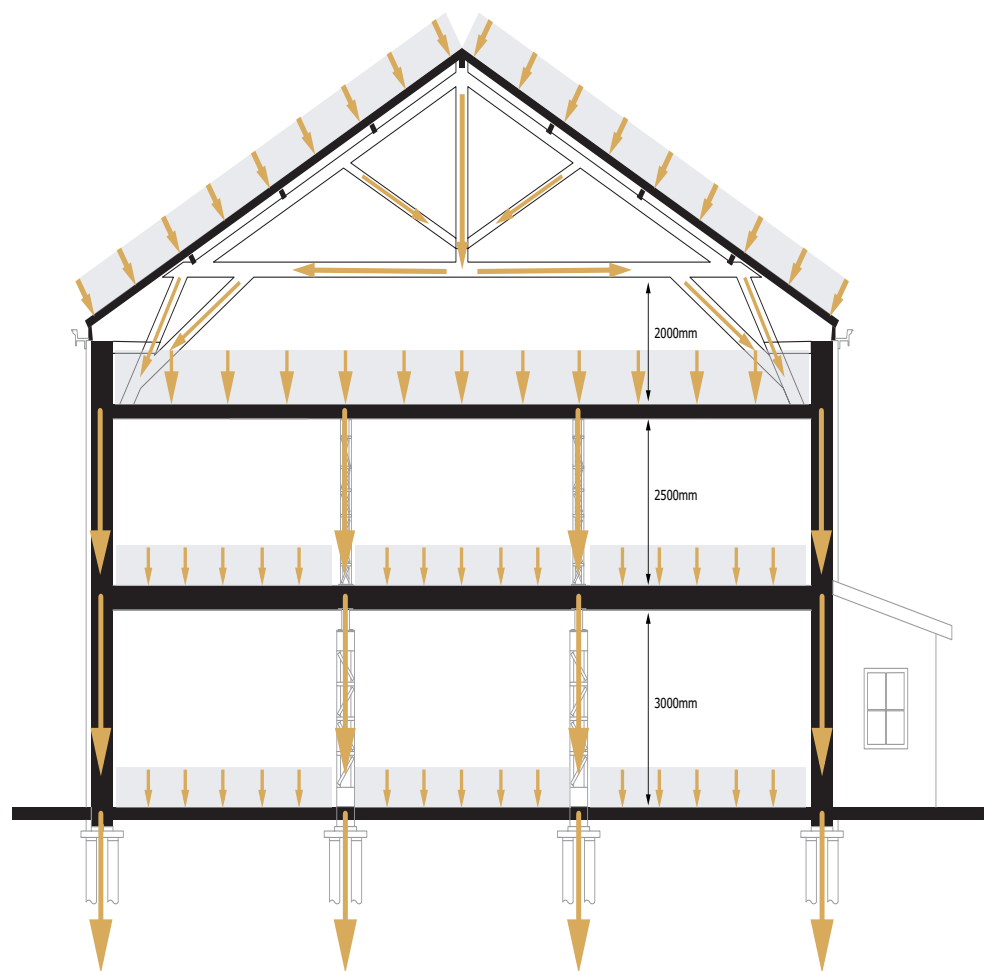


Fig.: Vertical forces translated in the steel columns and foundation

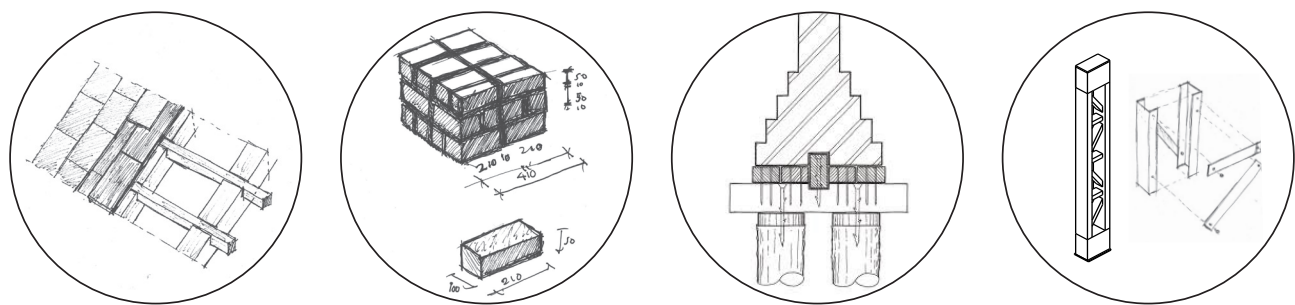


Fig.: Roof principle: slated roof (580mm h.o.h.)

Fig.: Structural wall thickness (410mm)

Fig.: 'Amsterdamse paalfundering'

Fig.: Truss column composition: Two steel U-profiles riveted together by steel bars.

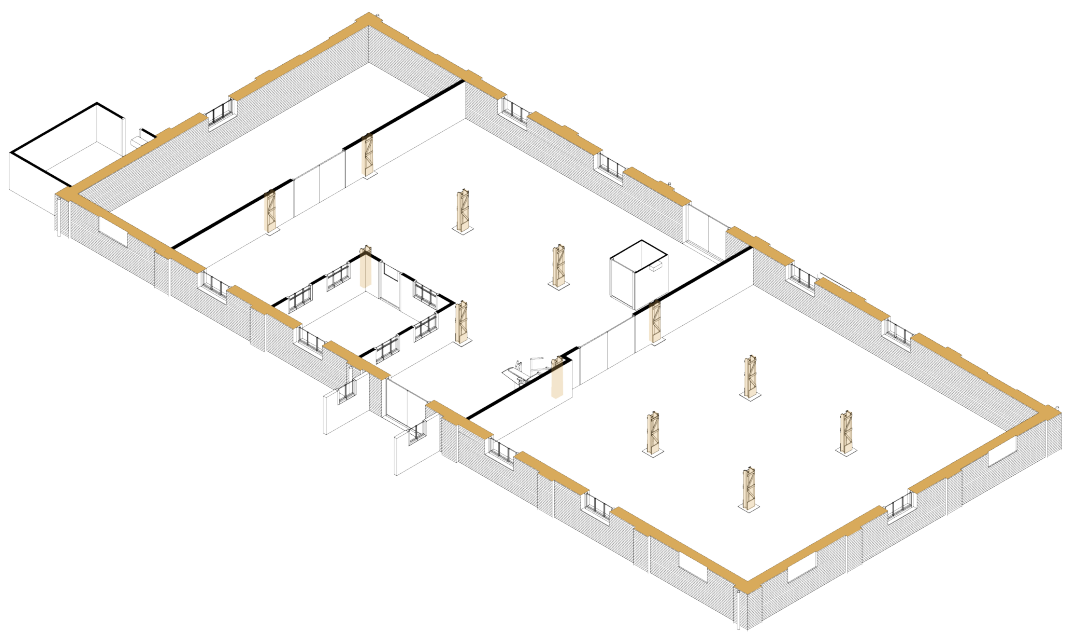


Fig.: Horizontal forces translated in the exterior brick facade

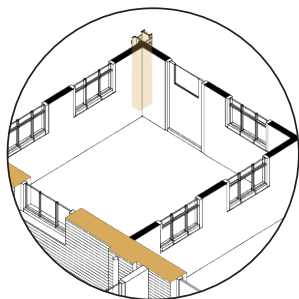


Fig.: Wooden interior wal (non constuctive) 100 mm thick

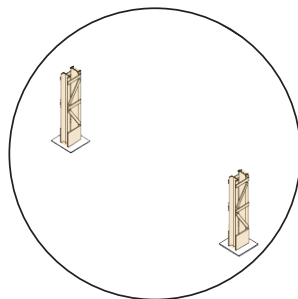


Fig.: Steel coloumn
342 x 214 x 2700 mm

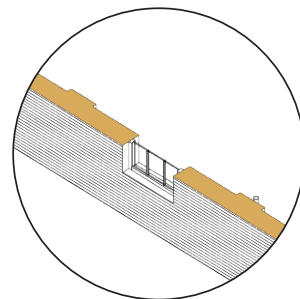
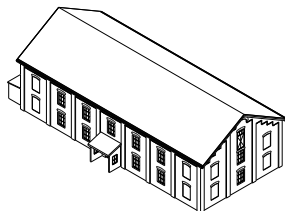


Fig.: Brick composite wall 410 mm thick

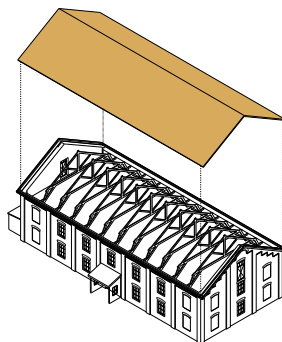
3.3 Differents between the 'Boerderijen'

'GROTE BOERDERIJ'



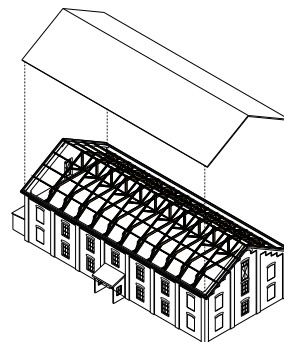
Main

Fig.: Building 85



Roof

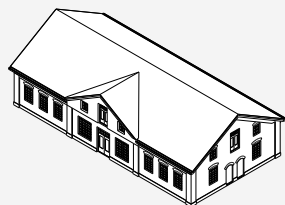
Fig.: Slated roof.



Trusses

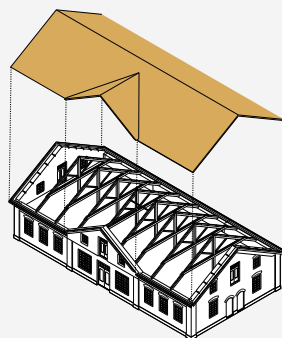
Fig.: Roof trusses (11x), off grid, 2600mm h.t.h.

'KLEINE BOERDERIJ'



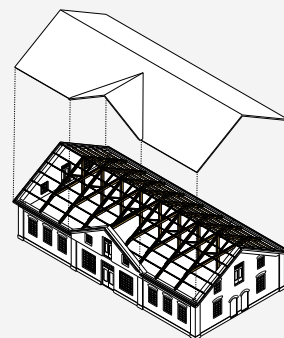
Main

Fig.: Building 69



Roof

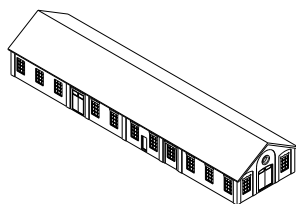
Fig.: Slated roof.



Trusses

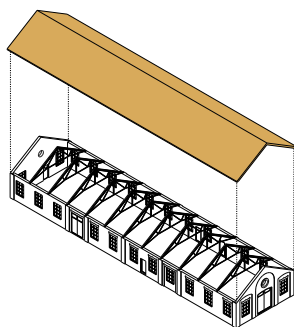
Fig.: Roof trusses (8x), off grid, 3000mm h.t.h.

'SAS GEBOUW'



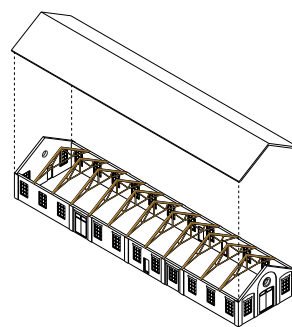
Main

Fig.: Building 57



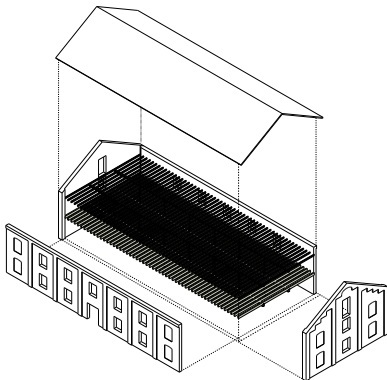
Roof

Fig.: Slated roof.



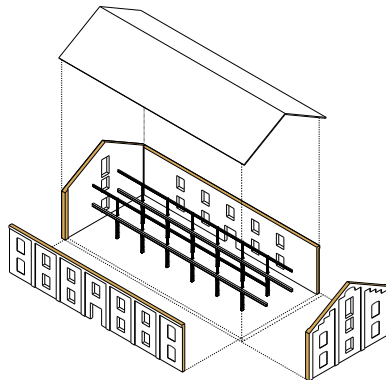
Trusses

Fig.: Steel roof trusses (11x), off grid, 3500mm h.t.h.



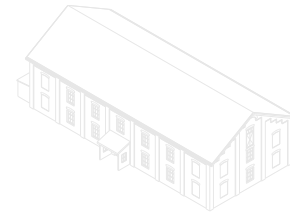
Beams

Fig.: Wooden beams, 580mm h.t.h.
First floor: 80x190mm, Attic: 140x350mm



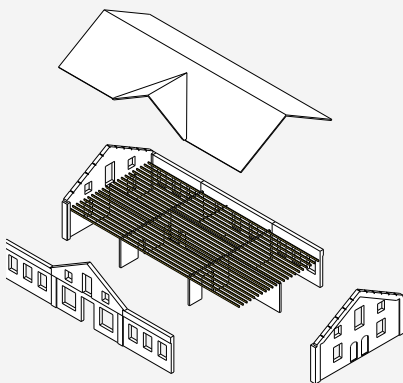
Structure

Fig.: Steel columns and load bearing brick walls



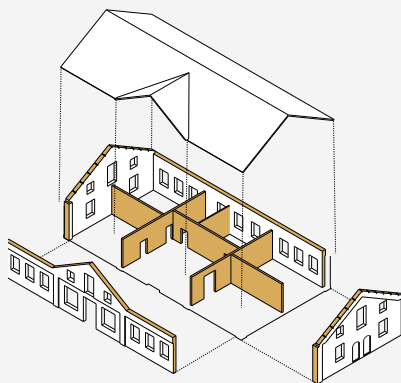
Foundation

Fig.: Yet to be modelled.



Beams

Fig.: Wooden beams, 600mm h.t.h.
First floor: 75x200mm



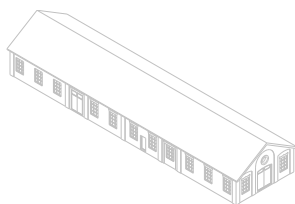
Structure

Fig.: Brick interior walls, load bearing.



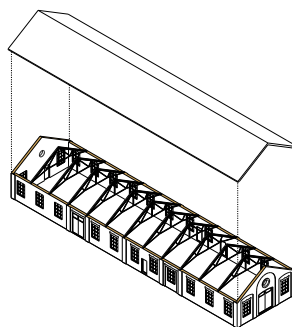
Foundation

Fig.: Yet to be modelled.



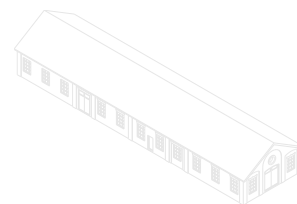
Beams

Fig.: No second storey.



Structure

Fig.: Composed brick facade (360mm), load bearing.



Foundation

Fig.: Yet to be modelled.

3.4 Materials 'Boerderijen'



Fig.: 'Grote Boerderij'



Fig.: 'Kleine Boerderij'



Fig.: Brickwork from the 'Grote Boerderij'



Fig.: Brickwork from the 'Kleine Boerderij'

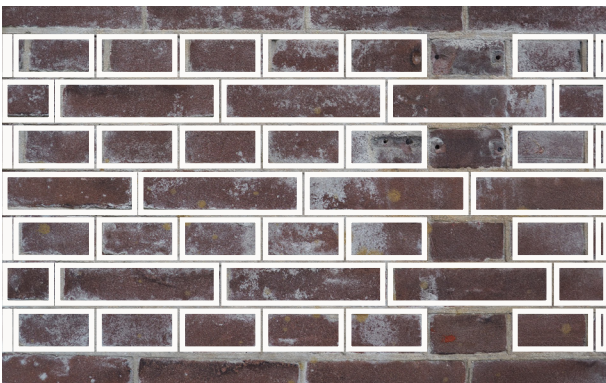


Fig.: Brickwork from the 'Grote Boerderij'

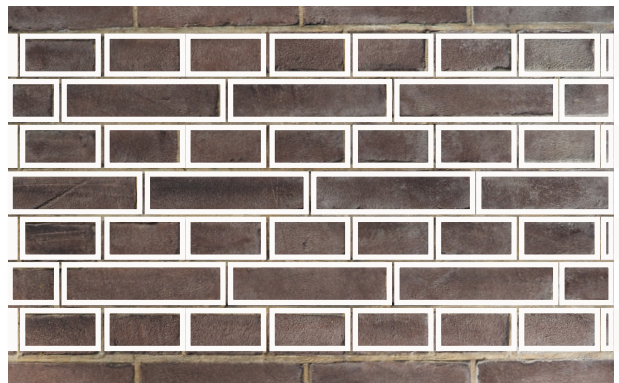


Fig.: Brickwork from the 'Kleine Boerderij'

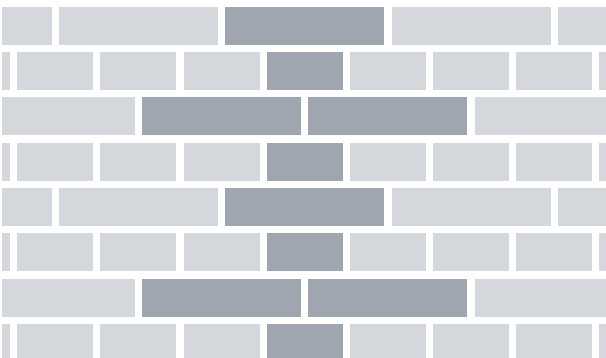


Fig.: Pattern

Brick information

- Waal format brick (210 x 100 x 50 mm)
- Cross bandage pattern (kruisverband)
- 'Lagenmaten': 5,9 cm ($23,5 / 4 = 5,9$) = (59 mm)
- 'Koppenmaten': unknown



Fig.: Front facade 'Kleine Boerderij'

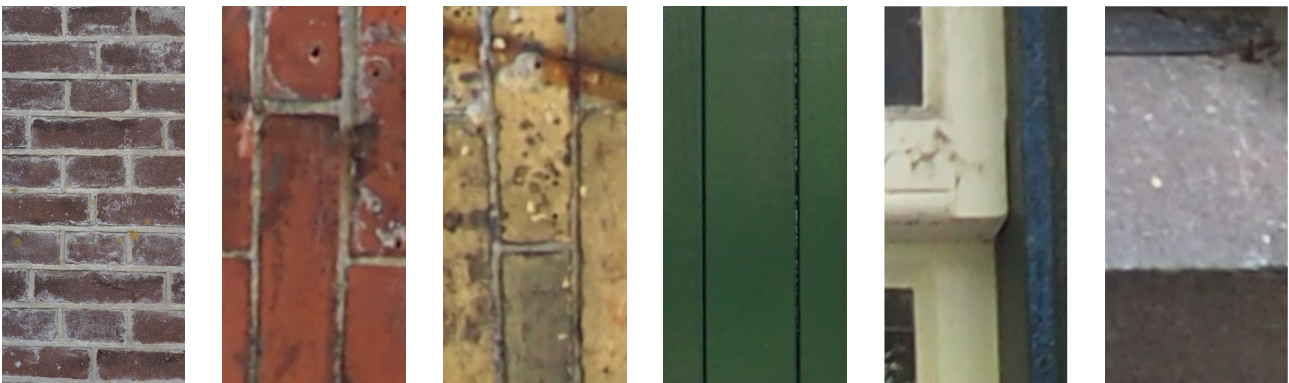


Fig.: Textures



Fig.: Colours and Materials

3.5 Lightstudies 'Boerderijen'



Fig.: Ground floor of building 69



Fig.: Second floor of building 85



Fig.: Section of building 85



Fig.: Section of building 69



Fig.: Small window 'Kleine Boerderij'



Fig.: Big window 'Kleine Boerderij'



Fig.: Door 'Kleine Boerderij'



Fig.: Blind window frame 'Grote Boerderij'



Fig.: Window 'Grote Boerderij'

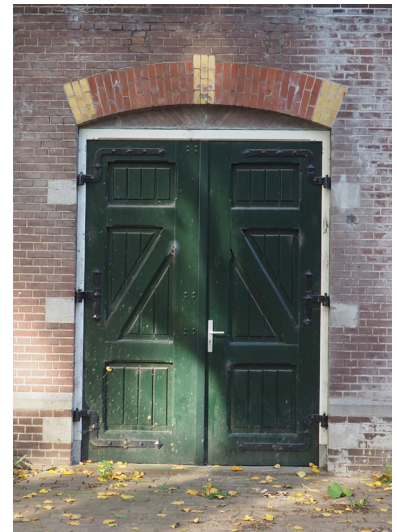


Fig.: Door 'Grote Boerderij'

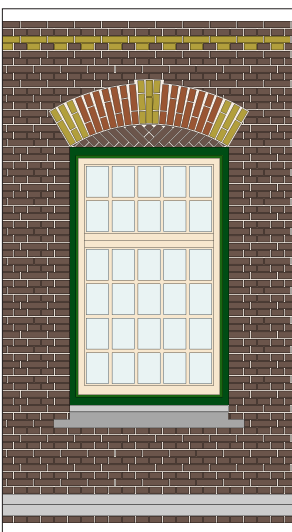


Fig.: Facade element

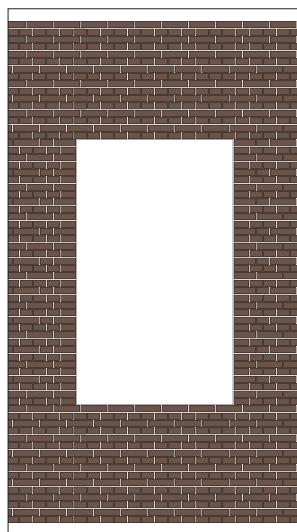


Fig.: Brickwork

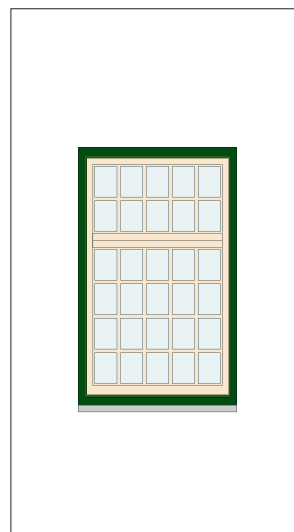


Fig.: Window

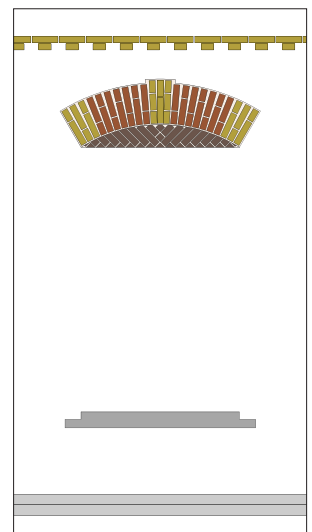


Fig.: Details

3.6 'Shell Roof'

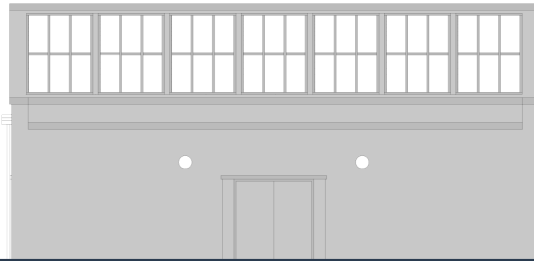


Fig.: Northern facade



Fig.: Eastern facade

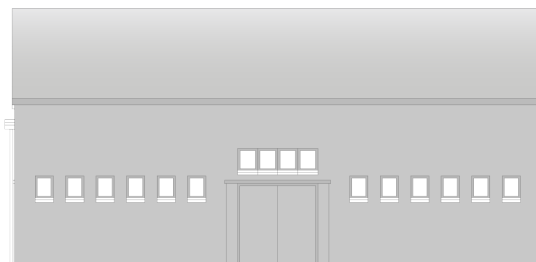


Fig.: Southern facade



Fig.: Western facade

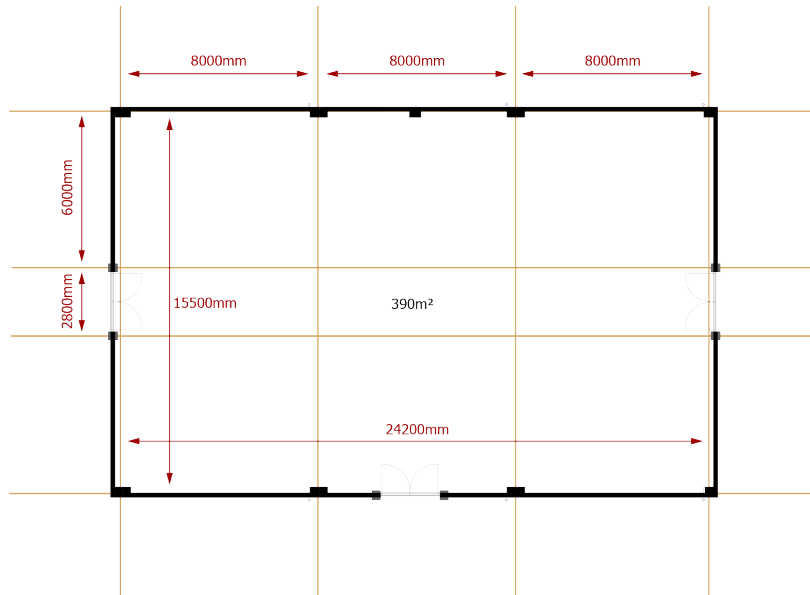


Fig.: Ground floor plan of building 85.

Square meters:

Ground floor (381m²)

Facade:

Brick curtain wall
180mm thick

Span:

8 meters x 15.5 meters

Technical characteristics of building 419:

- Repetitive module in structure
- Structural skeleton of reinforced concrete
- Open floor plan due to wide spans
- Abundant lighting from the roof windows
- No insulation, poor RC of only a brick curtain wall
- Same detailing as 415, 416, 417, 418, 419 and 420.
- HWA situated above beams

3.7 Construction 'Shell Roof'

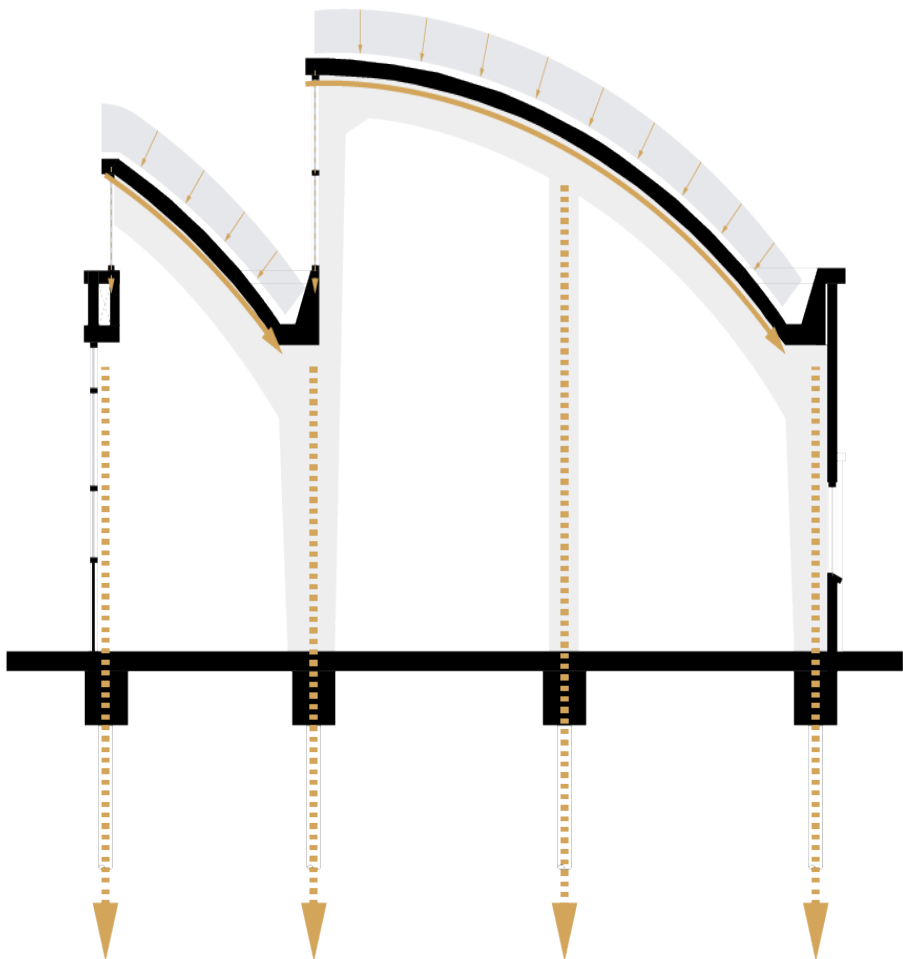


Fig.: Vertical forces translated in the steel columns and foundation

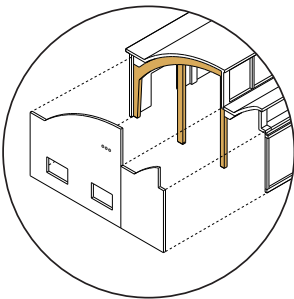


Fig.: Brick curtain wall

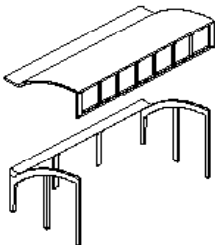


Fig.: Truss column composition

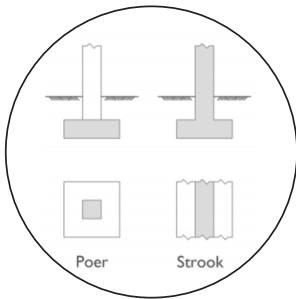


Fig.: Concrete foundation

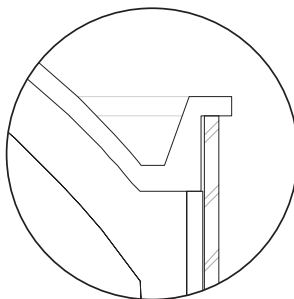


Fig.: Roof ending

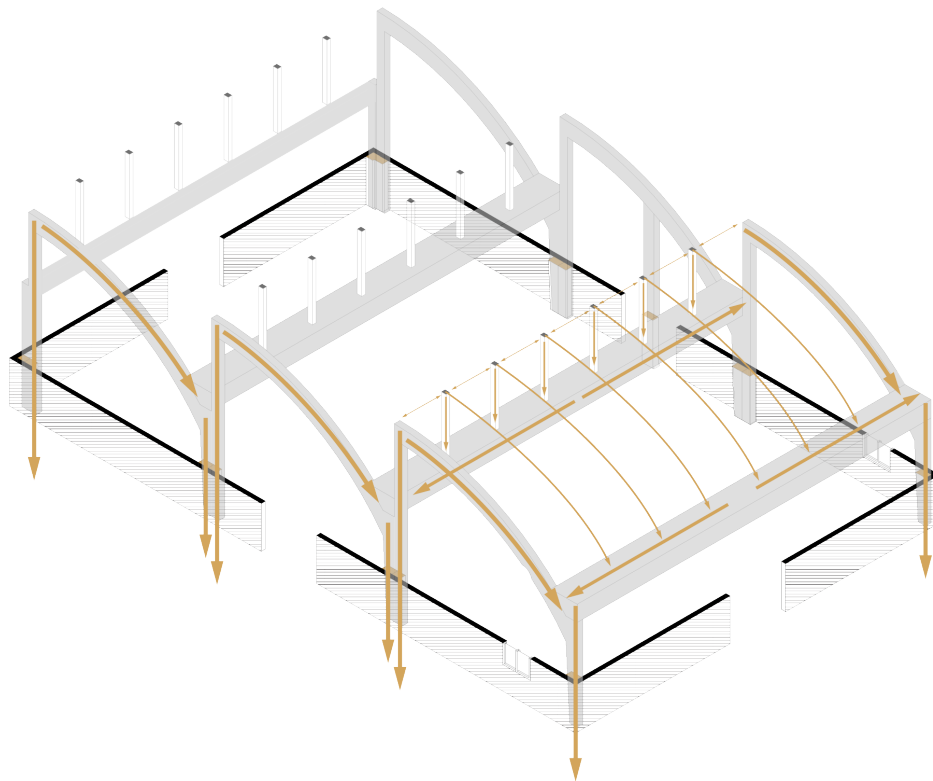


Fig.: Horizontal forces translated in the exterior brick facade

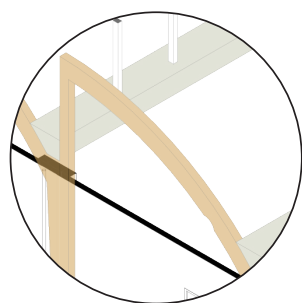


Fig.: Concrete shell construction

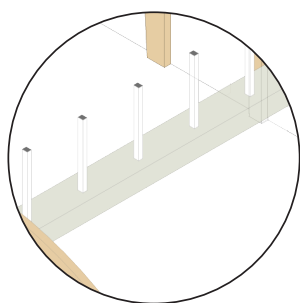


Fig.: Steel column
342 x 214 x 2700 mm

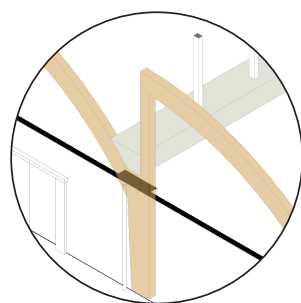
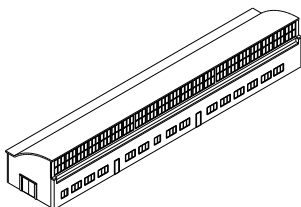


Fig.: Brick composite wall (non constructive)

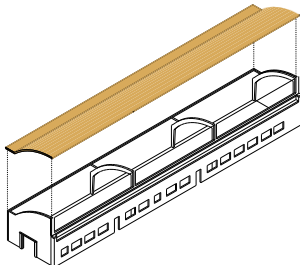
3.8 Differents between the 'Shell Roofs'

AMMUNITION PRODUCTION



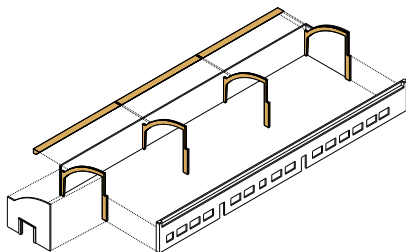
Main

Fig.: Building 415



Roof

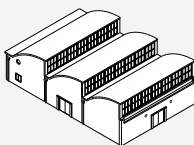
Fig.: Reinforced concrete roofing (formwork, 200mm)



Trusses

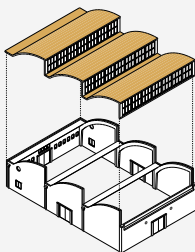
Fig.: Modules 8000x16000mm

LAUNDRY AND CHANGING HALL



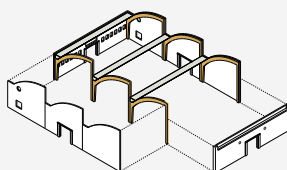
Main

Fig.: Building 419



Roof

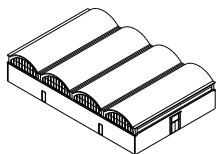
Fig.: Reinforced concrete roofing (formwork, 200mm)



Trusses

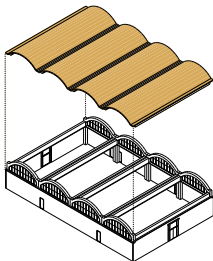
Fig.: Modules 8000x16000mm

AMMUNITION PRODUCTION



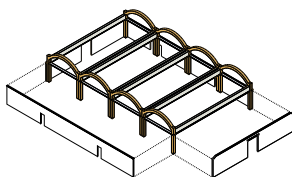
Main

Fig.: Building 414



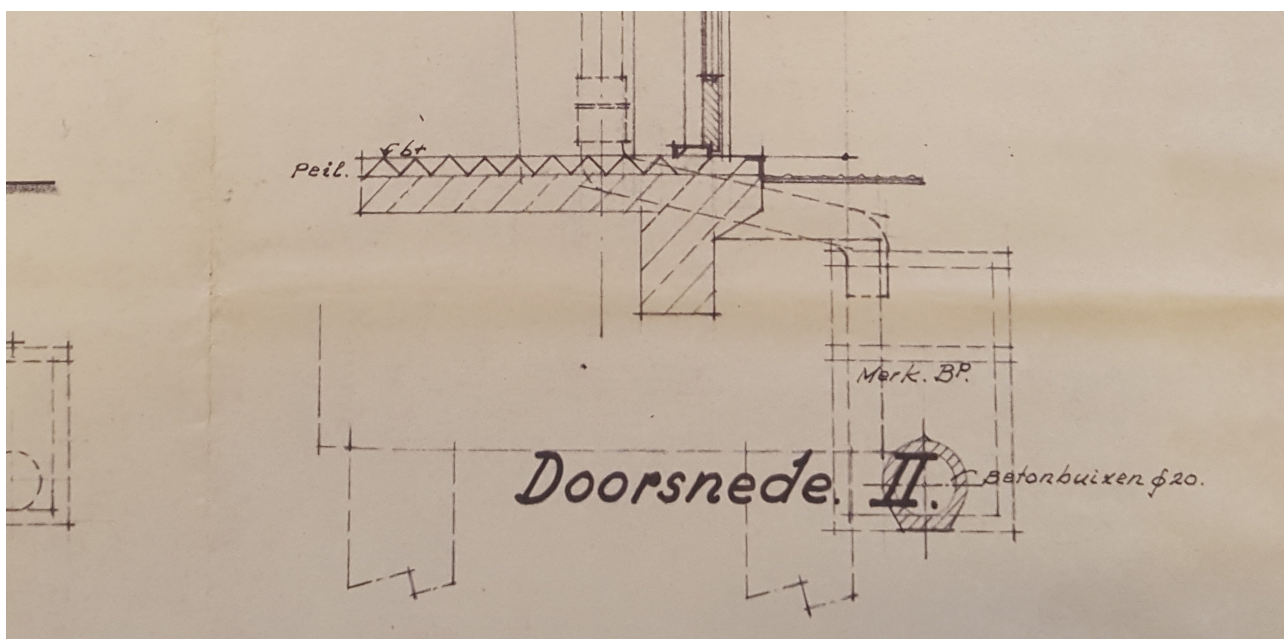
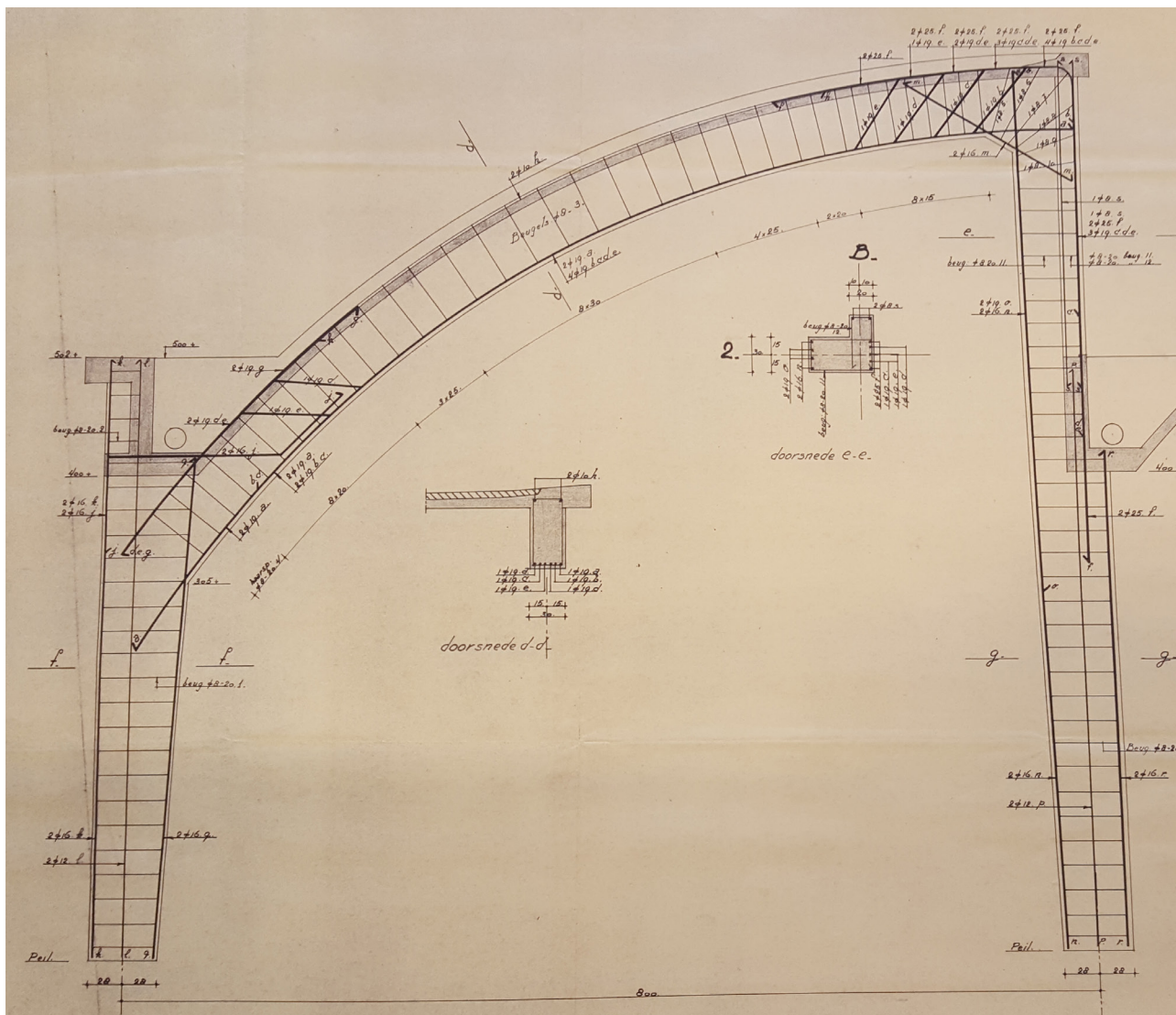
Roof

Fig.: Reinforced concrete roofing (formwork, 200mm)



Trusses

Fig.: Modules 8000x16000mm



3.9 Materials 'Shell Roofs'



Fig.: Building 419



Fig.: Building 415



Fig.: Brickwork from building 419



Fig.: Brickwork from building 420

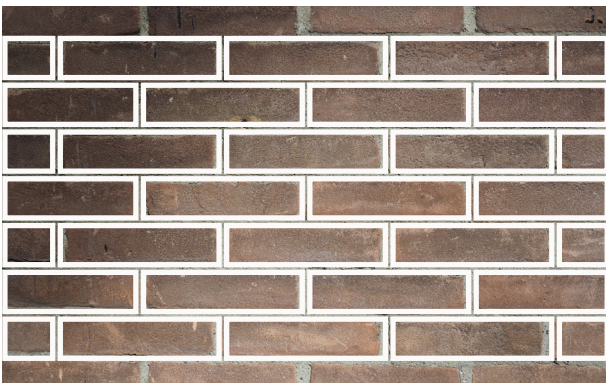


Fig.: Brickwork from building 419

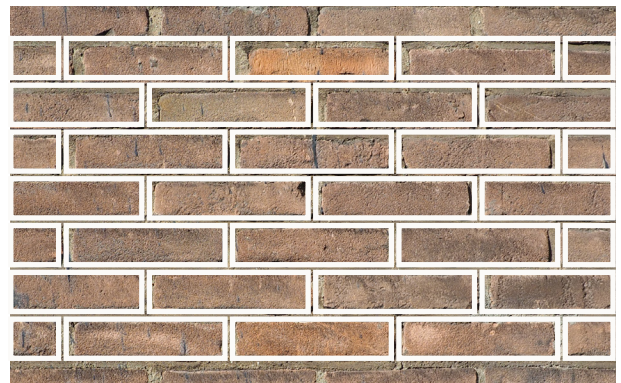


Fig.: Brickwork from building 420

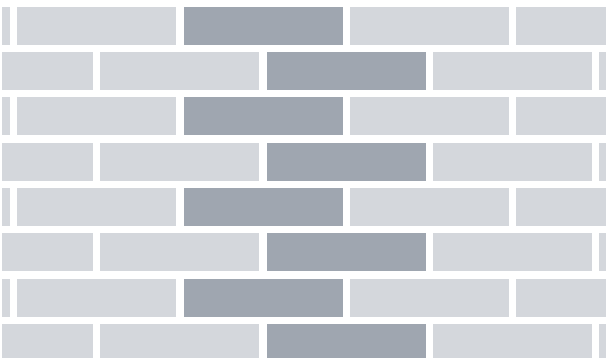


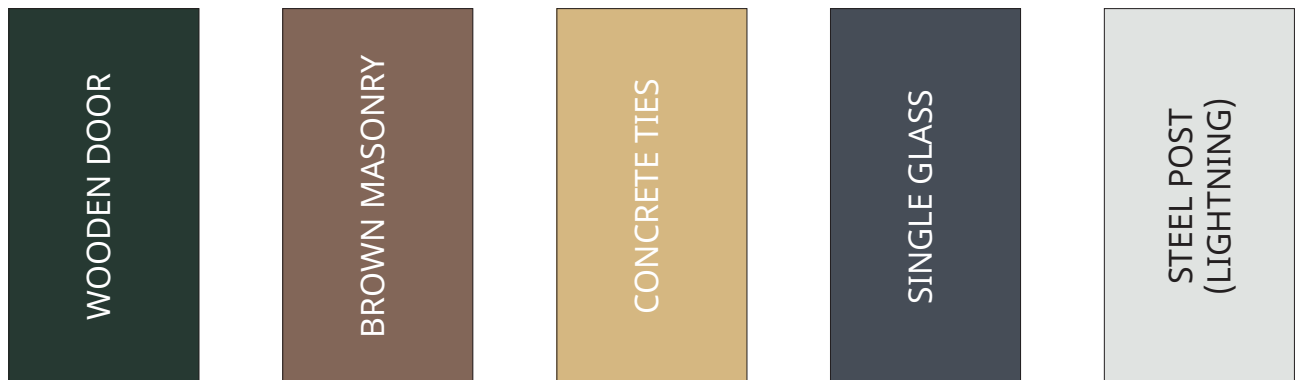
Fig.: Pattern

Brick information

- Waal format brick (210 x 100 x 50 mm)
- Half brick bonding (halfsteensverband)
- 'Lagenmaten': 6 cm ($30 / 5 = 6$) = (60 mm)
- 'Koppenmaten': unknown



Fig.: Perspective view of one of the former ammunition factories (building 417), constructed in 1952.



Colour characteristics of the 3rd generation buildings

- Clear main structure with fillings of masonry (brown), glass and concrete.
- Frames made of wood or steel in white or dark green shades.
- Doors in grey or green shades.



Fig.: Perspective view of the (building 85), constructed in 1905.

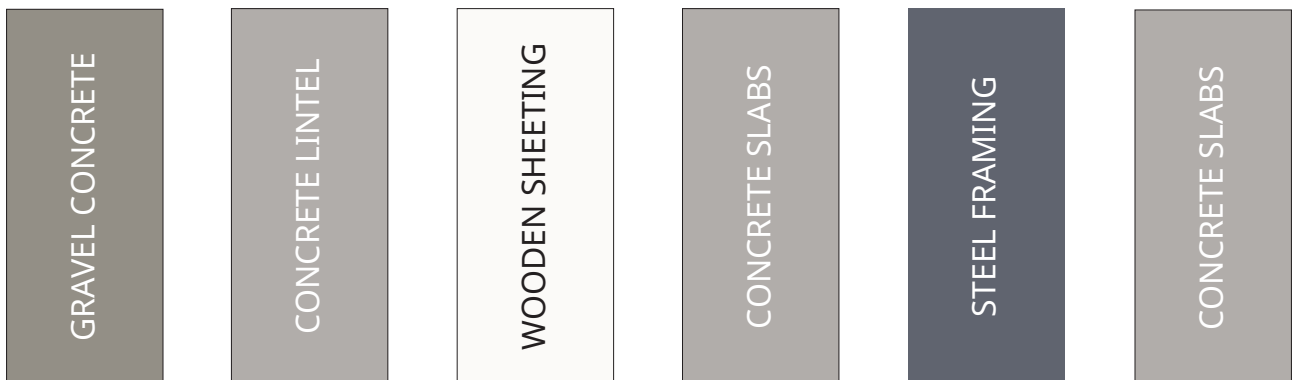


Colour characteristics of the 3rd generation buildings

- Clear main structure with fillings of masonry (brown), glass and concrete.
- Frames made of wood or steel in white or dark green shades.
- Doors in grey or green shades.



Fig.: Frontal view of the former ammunition bunker, constructed in 1991.



Colour characteristics of the 4th generation buildings

- Gravel concrete (light brown),
- Masonry (red / brown)
- Sheet material (green, white and grey)

3.10 Lightstudies 'Shell Roofs'



Fig.: Light entering building 418



Fig.: Light entering the building 414

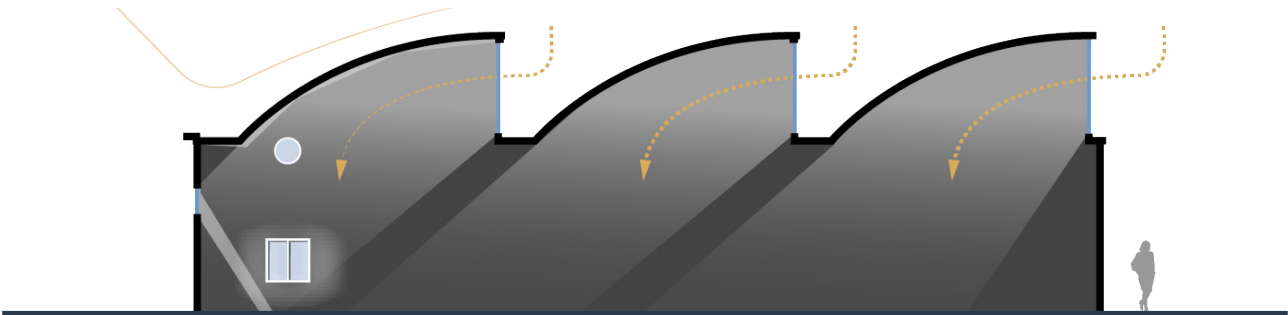


Fig.: Section of building 418

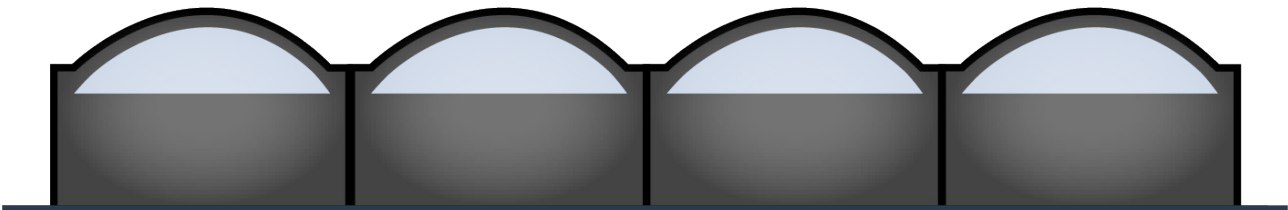


Fig.: Section of building 414

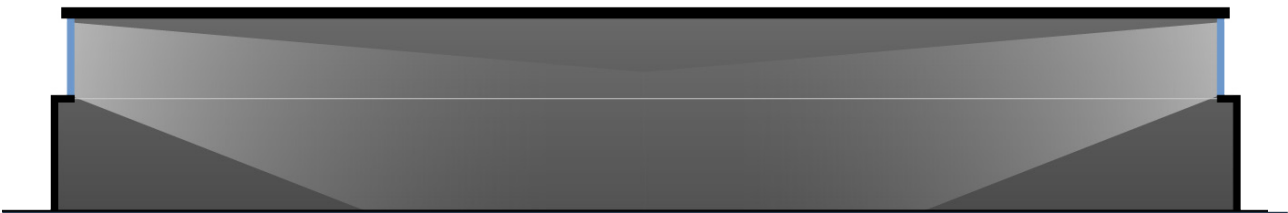


Fig.: Section of building 414



Fig.: Big window



Fig.: Small window



Fig.: Shell Roof Window



Fig.: Door

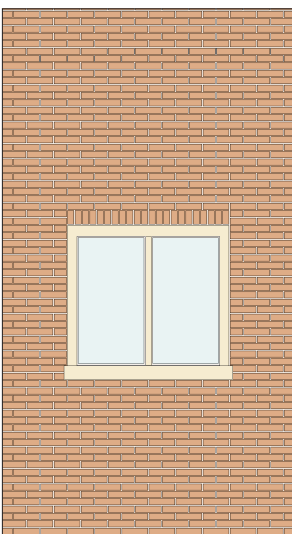


Fig.: Facade element

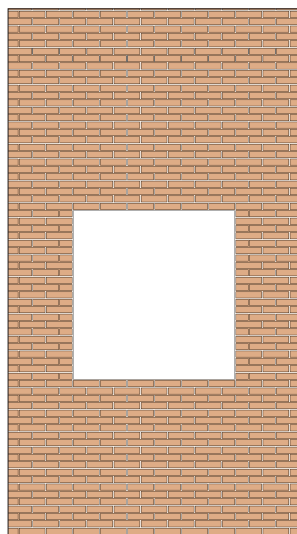


Fig.: Brickwork

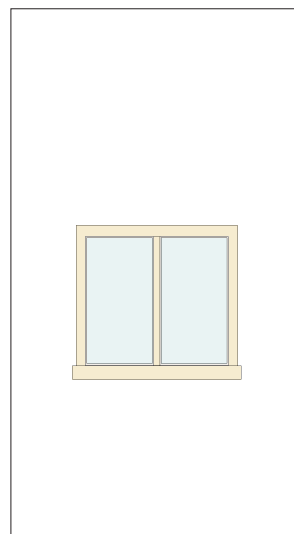


Fig.: Window

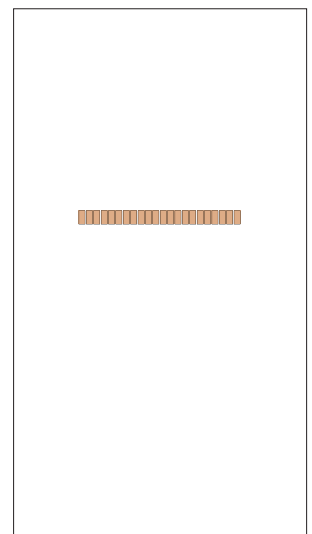


Fig.: Details

3.11 Comparison 'Shell Roofs' and 'Boerderijen'



Fig.: Brickwork from building 419



Fig.: Brickwork from building 419

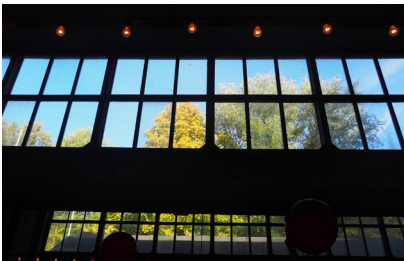


Fig.: Brickwork from building 419



Fig.: Brickwork from building 419



Fig.: Brickwork from building 419

'Shell Roofs'

Skeleton structure of reinforced concrete

- Makes for a large space
- Flexible
- Strong enough to support added floors or stories

Roof

- Defines characteristic shape
- Crucial for building identity
- Historical evidence

Façades

- Blind façades, no interaction ground floor
- Brick infill not valuable in itself, no ornaments
- Creates unity with the 'Boerderij-typology'

Proportions: Module system 8x16m

- Repetitive
- Diversity within unity, different configurations of the same module

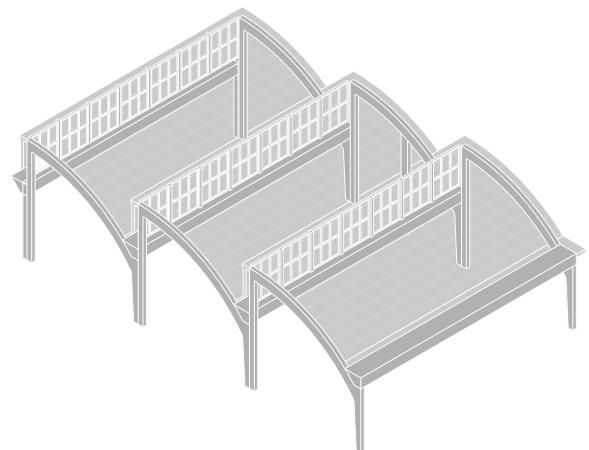




Fig.: Brickwork from building 419



Fig.: Brickwork from building 419



Fig.: Brickwork from building 419



Fig.: Brickwork from building 419



Fig.: Brickwork from building 419



Fig.: Brickwork from building 419



Fig.: Brickwork from building 419



Fig.: Brickwork from building 419

'Boerderijen'

Ornamented exterior walls

- Define shape
- Both constructively and architecturally crucial
- Inflexible, hard to adapt

Inner structure

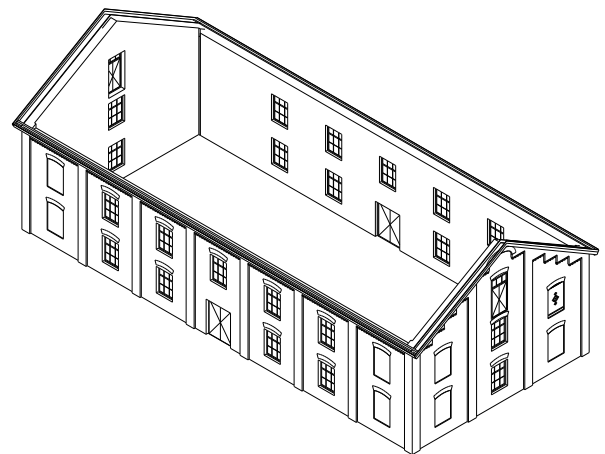
- Limiting due to floor height
- Not contributing to for the identity
- Over dimensioned

Roof

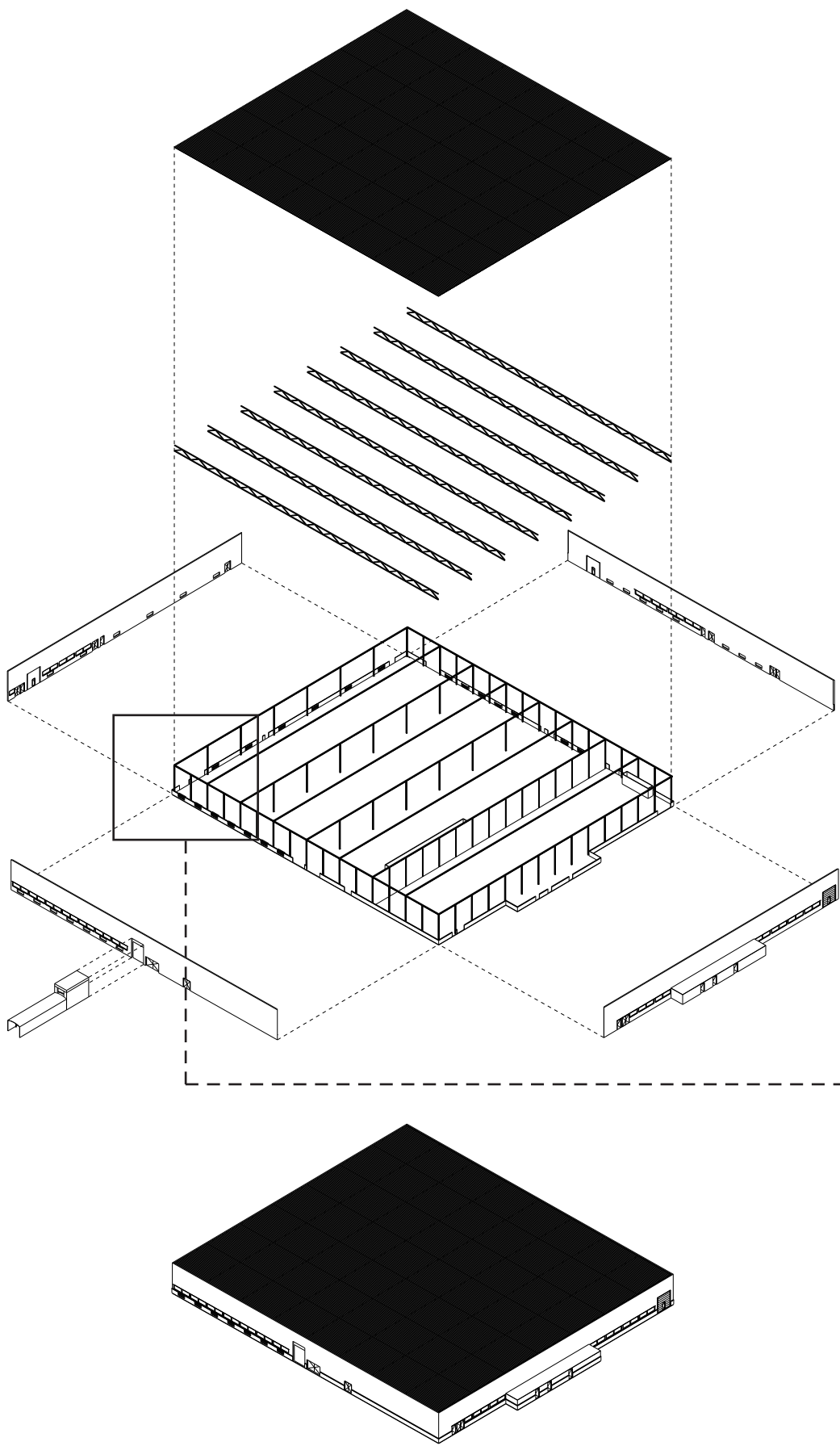
- Architecturally less important than facades
- Roof trusses are aesthetic for the interior
- Lack of light in the attic

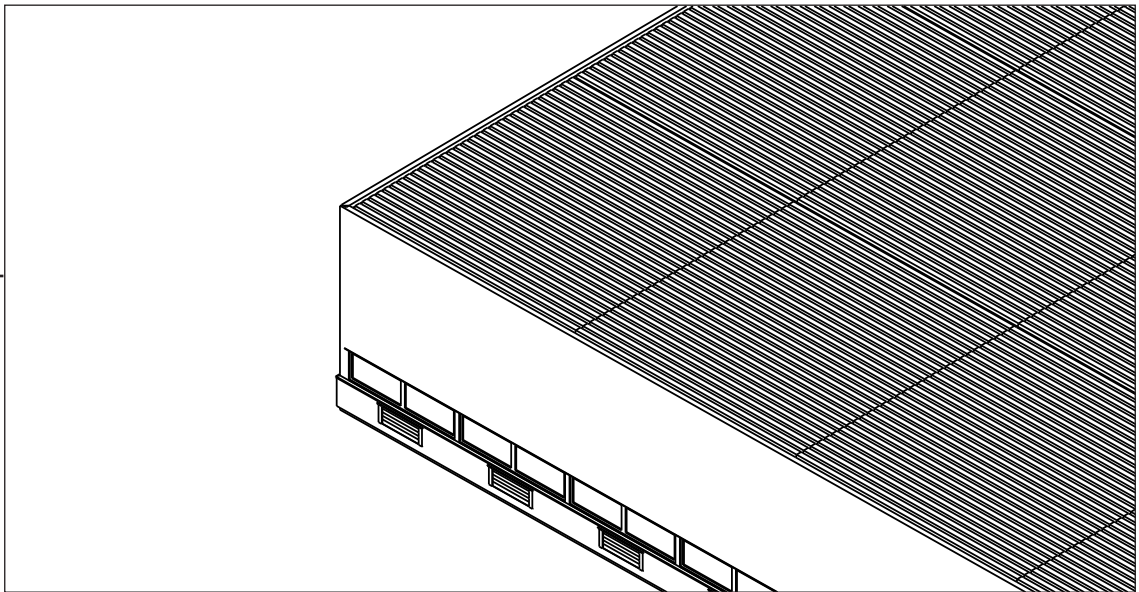
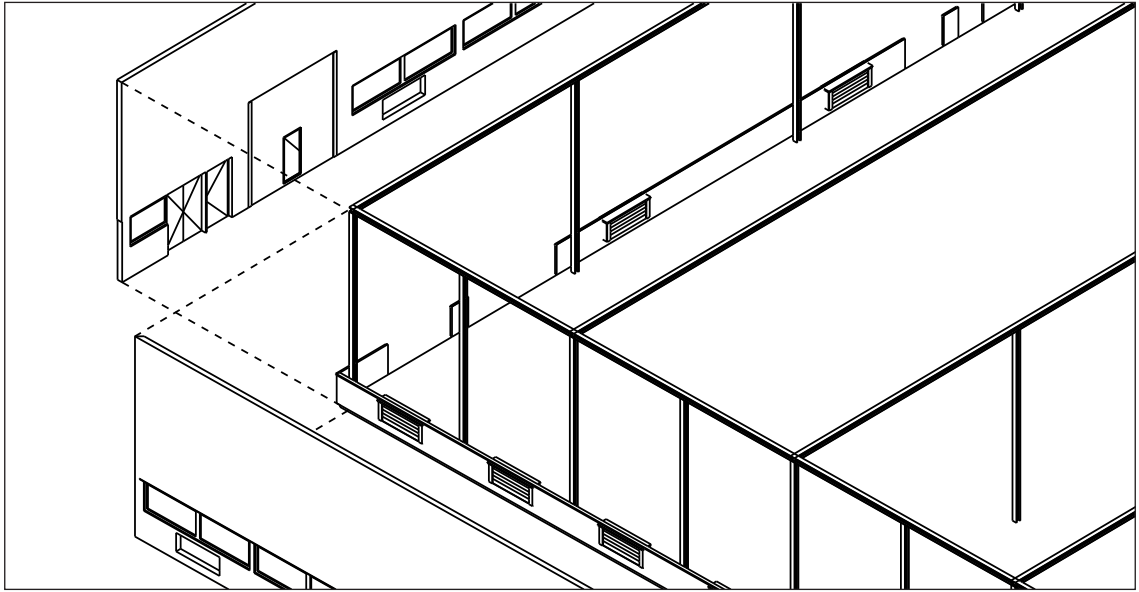
Proportions

- Comparable beech size
- Different heights



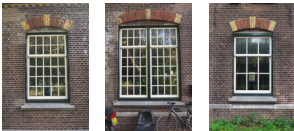
3.11 Taets building



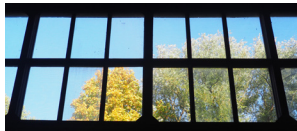


Buildings

Ornamented facades



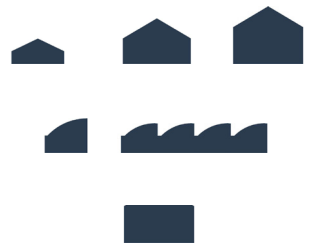
Shell roofs



Elements



Generations




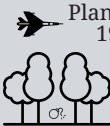
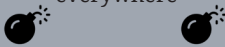










CONCLUSION




BUILDINGS

This chapter has investigated the buildings from mainly a technical perspective. It reveals the building methods, structural composition, , details, foundation, important measures and repeating elements of the two main building typologies that are present on the site: The 'Boerderij-typology' and the 'Shell-roofed typology'. The findings are produced in an in-breath method, and provides applicable information during the design process. Additionally, a value assessment can be made of these two main typologies, which is done so with a comparison.

This list represents the elements that make up the building typologies and shows which ones are most crucial to preserve. The diagram shows these crucial parts, and although not all of it is untouchable, it should be regarded as important in the design stage and keep the overall resemblance intact.

Cultural Value

	Age value	Historical value	Intentional commemorative value	Non intentional commemorative value	
Hembrug terrain	Dutch 20th' century military base	Former Military zone and production factory, within the Stelling van Amsterdam, WWI + WWII	Highly functional design. Replacing buildings where necessary	Collection of unique military architecture 	
The Plofbos	Planted in 1920 	Rare activity: Ammunition production, storage and explosive testing	Purely functional, no commemorative intentions	Idyllic, spacious setting under the trees	
Spirit of place		Military activity now put to rest, remnants of design choices still everywhere 		High contrast between the rest of Hembrug 	
Skin (exterior)	First gen. 	Third gen. 	Ornamented facade Brick infill	Attention to the exterior was the standard  Purely functional, cheap, fast	Facade nowadays more rare Brickwork infill still doesn't add much value
Structure	First gen. 	Third gen. 	Load bearing brick and steel columns exist for longer Concrete reinforcement developments high and new	Load bearing brick and steel columns exist for longer Concrete reinforcement developments high and new	Load bearing brick and steel columns exist for longer Concrete reinforcement developments were still new
Space plan	First gen. 	Third gen. 	Ammunition storage Explosive/ammunition storage and production		Ammunition storage Explosive/ammunition storage and production
Surfaces (interior)	Original elements 	Original elements 			

Use value		New-Ness value		(relative) Art value	Rarity value	Other values	
Geographic location interesting for commercial and residential value		Green enclave containing Military architecture 		Hembrug consists of many rare building typologies	Unique military zone of the 20th' Ct. in the Netherlands		
Space and buildings now allows for creative start-ups to settle there temporarily		Space for new life, maintain contrast between other zones and enforce genius loci		Design purely functional for military purposes	Unique architecture, setting and context 		
Green atmosphere suits place for residential or commercial zoning		Spirit of the place needs to be understood thoroughly in order to enforce it.		- Natural environment - Contrast - Transition - Small scale - Spaciousness / individualism	Probably only place in the world with this setting, context and military history		
Preserve ornamented facades	No need to preserve brick infill	High cultural value limits adaptation (touchability)	No cultural value in the brick-work infill allows for adaptation	Order, rhythm, based on neo-styles	Cheap, fast, functional, facade contains no art	Same detailing and ornament found in important buildings	Not rare in the Netherlands nor Hembrug
		Brick facade and steel column can't bear much more	Strong concrete structure allows to build voids		Form and material allow for huge space	Steel column/ wooden floor structure is not rare	Concrete shell structure present a lot in the Hembrug
Large space, low height	Large open space with high ceiling through concrete structure	Adapting structure allows for great space within brick walls	Expansion of space is possible by taking down brick infill		Forest extension of the space 		
Medium value		High value					



4 MASTERPLAN

DESIGN QUESTION

In the research we discovered that the core qualities of the plofbos lie in the unexpected results of explosive precautions: small building volumes, with a rhythm of open space filled with trees, water and nature. Naturally we, the designers, seek to amplify these qualities while keeping the history of the site visible. This leads us to the design question:

How can the spatial relation between buildings and nature be amplified while acknowledging the underlying military design?

From the research question and analysis came forth two main components that define the character of Plofbos. Namely the military design approach behind the planning of the terrain, which concerns *what was*. The other being the ‘village traits’ that emerged over the years, concerning *what is*. If you interpret both as *states of being*, a tendency can be perceived, which is explained with the diagram below. This tendency may offer a glimpse of what the site wants to be, and *will be*.

Originally designed as a storage and testing ground for explosives with the military pragmatic attitude, the original state was one of organization and precaution. Over the decades, lack of maintenance and the wild growth of trees, and divergences from the orthogonal building system resulted in a new state. A state of disorganisation and untidiness, which caused us to initially perceive the area as village-like.

These two states represent decay, a tendency of crumbling of the original military plan. Intended versus unintended. We discovered that this ‘crumbling’ is the process which yielded the unintended spatial and nature qualities present today, as described in the research. A continuation of the ‘crumbling’ process is therefore a method the qualities that it generated. The original military plan however, best represents what was, the historical purpose of the site and is therefore equally important to consider with the design. The challenge is to balance between the two: directing the ‘crumbling’ process through design, while maintaining proof of the underlying plan, which represents the historical evidence of the site.

A continuation also means adding a new layer of time, that of our own. Like the building generations that are already present at the site, our intervention is done with new building volumes that have their own interpretation of the spatial rules and have their own architectural language that reveals the timespirit of 2018. These spatial rules are further described on the next page.

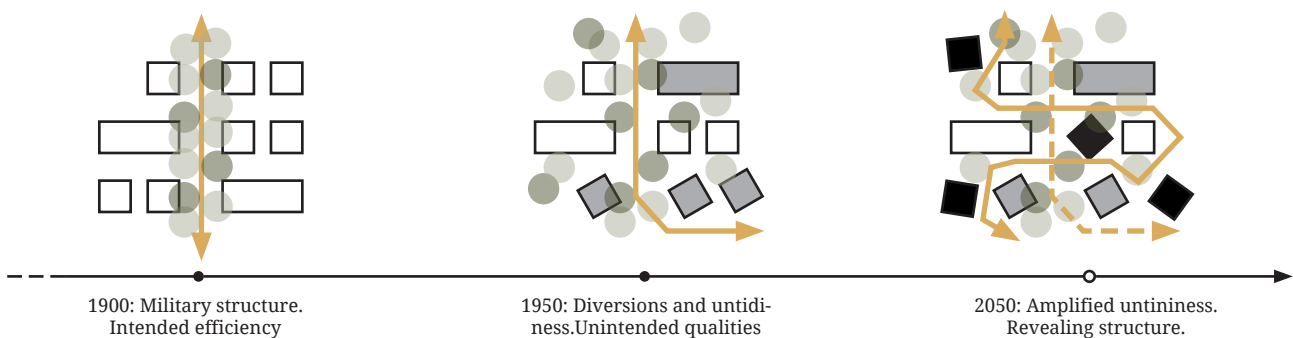


Fig.: The ‘crumbling’ process

4.1 Design starting points

Nature

Forest



Earth walls



Canals



Trees



Spatial plan

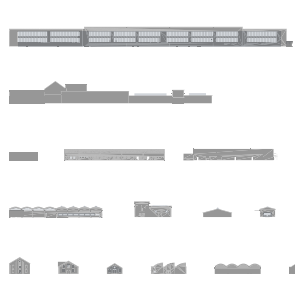
Open space



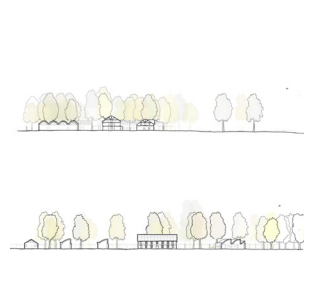
Rhythm



Scale



Transition



Buildings

Ornamented facades



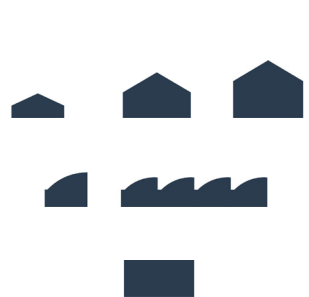
Shell roofs



Elements



Generations



dense
enclosing
border



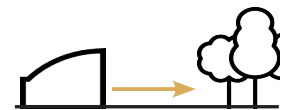
hidden
evidence



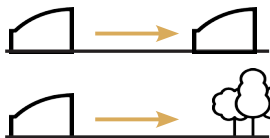
evidence
idyllic



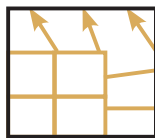
patterns
diversity
monumental



diversity
relation



repetition
open space



module
unity
small



contrast
hidden



exterior
details
roofshape



structure
light + space
roofshape



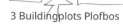
military
history
evidence



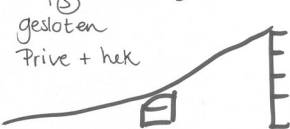
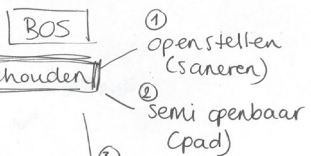
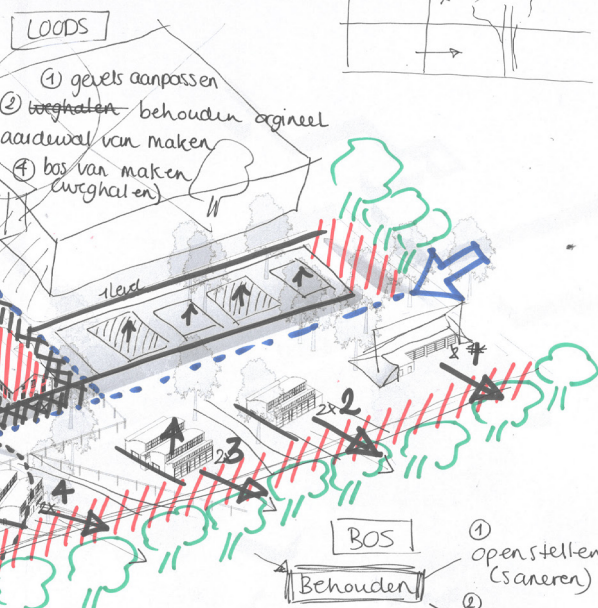
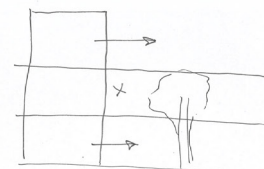
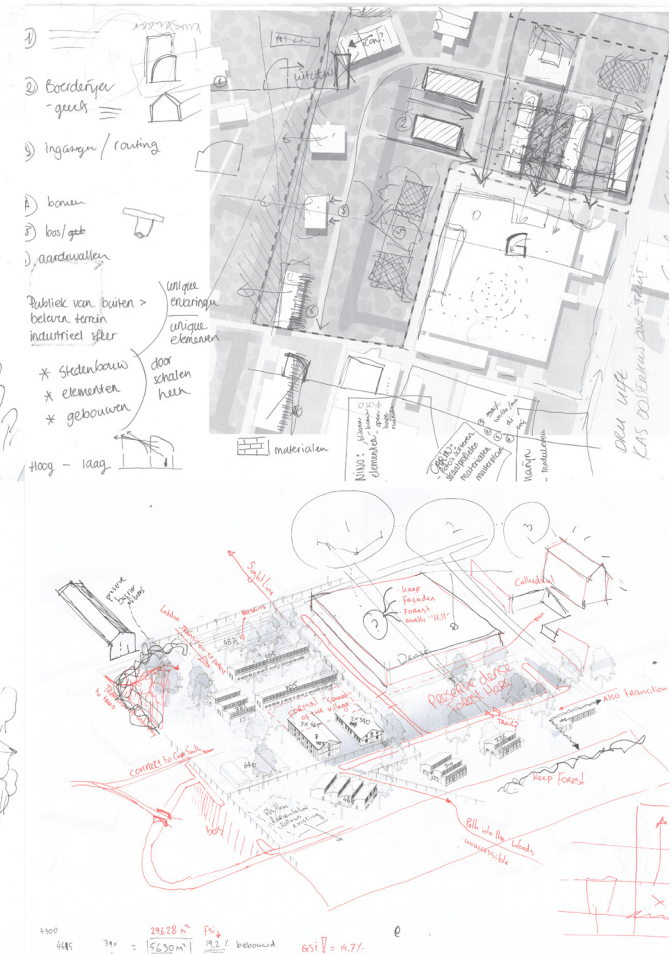
continuity
typology
architecture



4 Buildingplots Plofbos



- # VERBOGENHEID



Edges Plofbos

Legend: Trees, Forest

Interventions: Original, Facades, Earth wall, Forest

Event shed

Cape South

Forest

Open with entrance, Closed with forest, Open space (public), Path along (semi public), Closed (private)

Buildingplots Plofbois

- Blue square: Free choice
- Red square: Building plot
- Orange square: Best choice
- Green square: Nature
- Yellow square: Trees
- Orange line: Light/light structure
- Blue line: Light/light building

The diagram shows a 3D isometric view of a building plot layout. It features a large central orange building, several smaller red buildings, and a blue building. The plot is surrounded by green areas (Nature) and yellow areas (Trees). Orange arrows indicate the flow of light/light structure, and blue arrows indicate the flow of light/light building. The layout is divided into sections by orange lines, and the entire plot is enclosed by a blue line.

/// eventueel bouwen
 /// bouwen
 — structuur
 ## niet bouwen
 /// bewaren
 [] openbaar en centraal = "plein"
 [] bomen bewaren en beeld versterken

1 Starting points Plofbo's

■ Square
■ Water
■ Central located and a connecting point
■ Highly permeable
■ Highly impermeable

Square of the village
Central located and a connecting point

Sightline to Waterfront Transition zone

Sightline to the Ladder Transition zone

To the Cathedral

To the Exit Transition zone

To the Park

Forest view
It is not allowed to build in front of the buildings





Rhythm buildings
Preserve the rhythm of buildings towards the forest

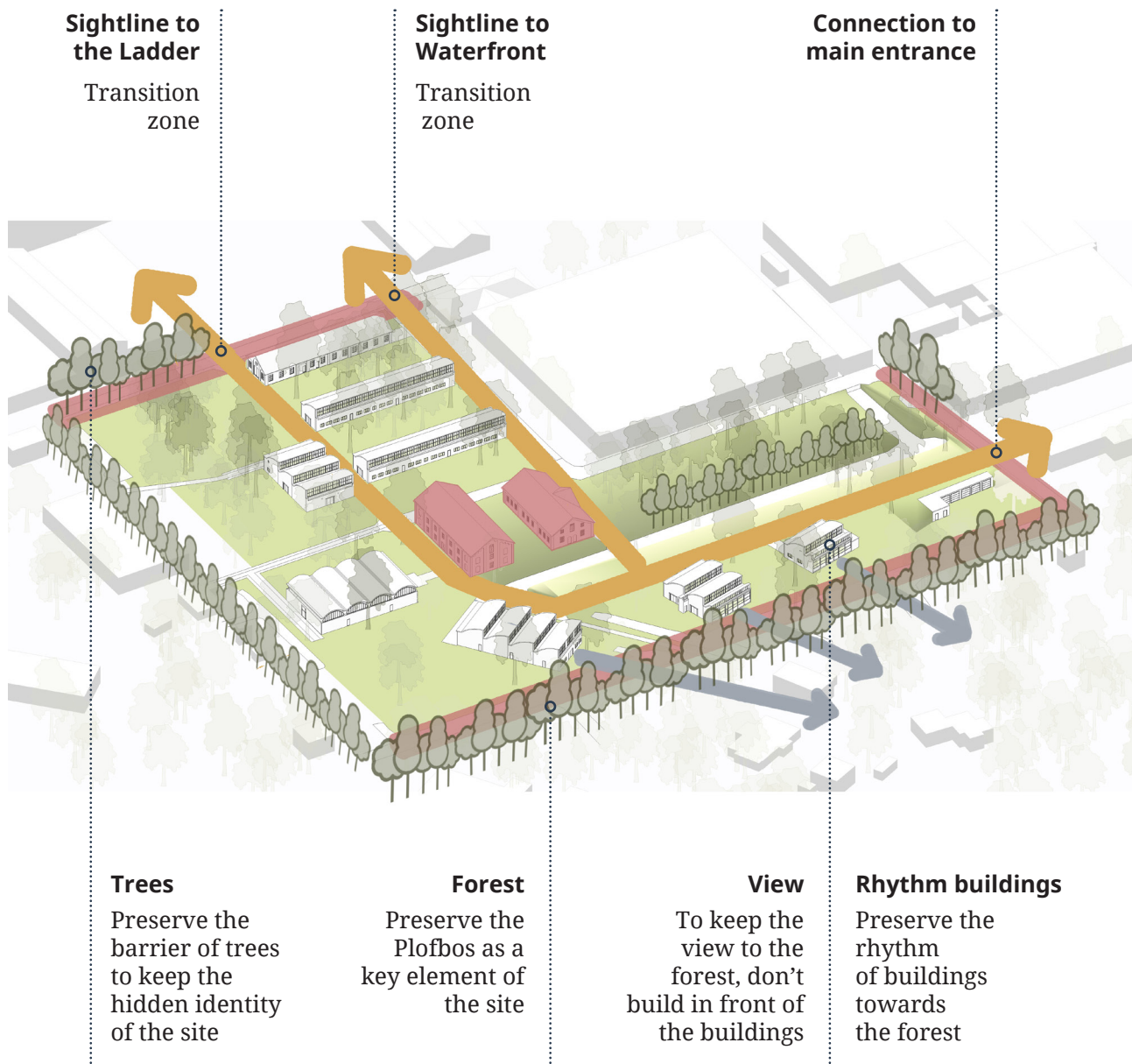
Preserve the barrier of trees to keep the identity of the plot

Preserve the Plofbo's as an key element of our ensemble

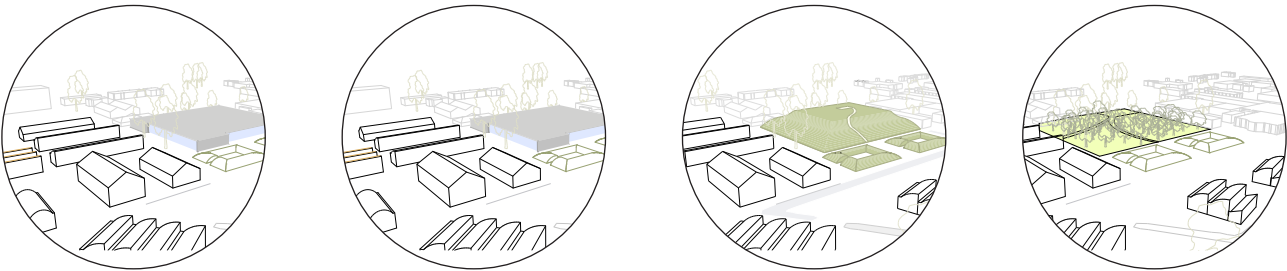
[illegible]

4.3 Starting points

-  Trees
-  Don't Touch!
-  Sightlijnes/Structures
-  Sightlijnes buildings



4.4 Border strategies

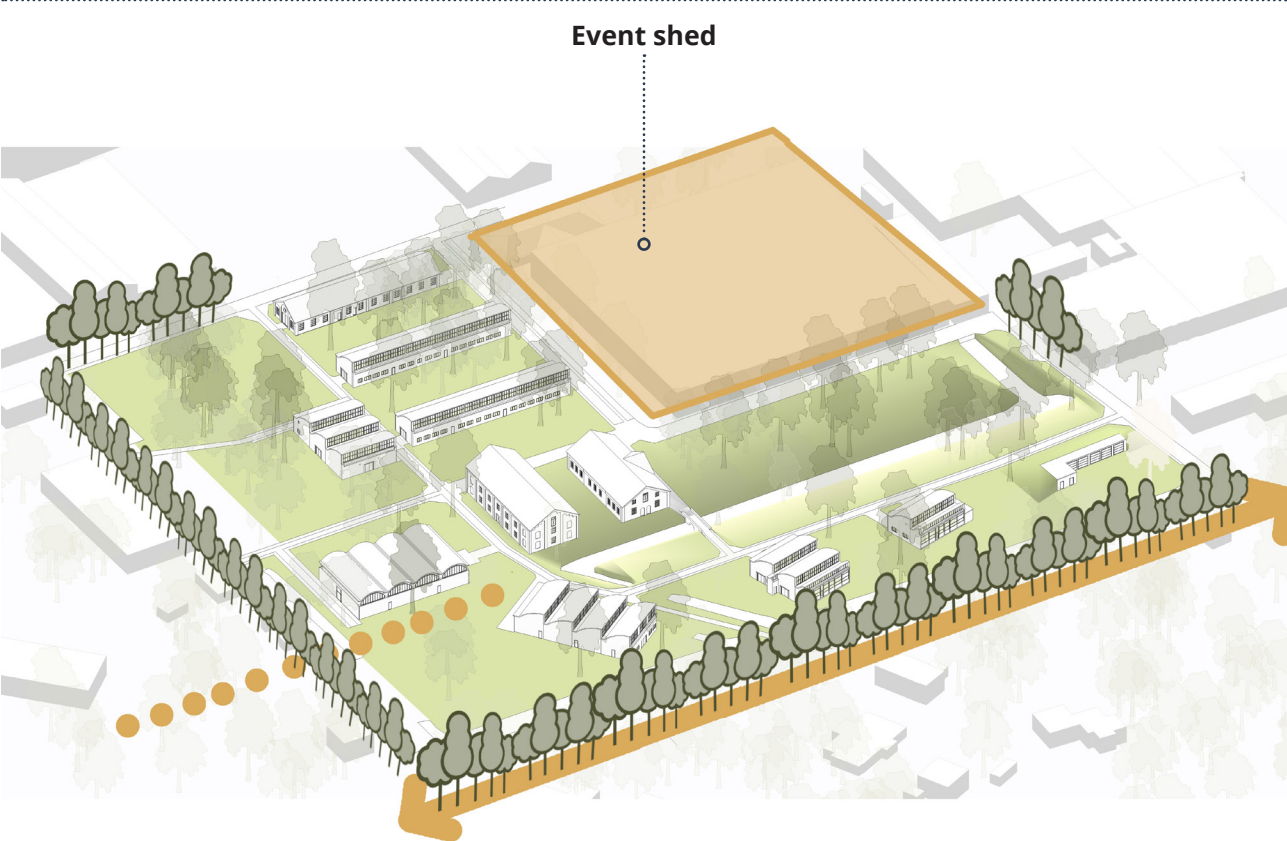


Original

Re-designing

Earth wall

Forest



Cape South

Forest

Open
(entrance)

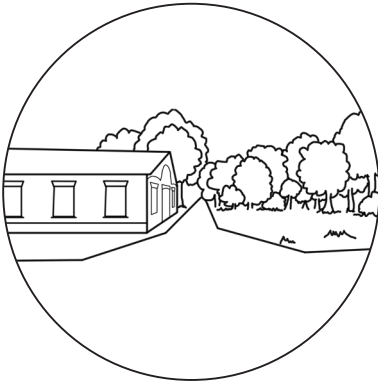
Closed
(forest)

Open space
(public)

Path along
(semi public)

Closed
(private)

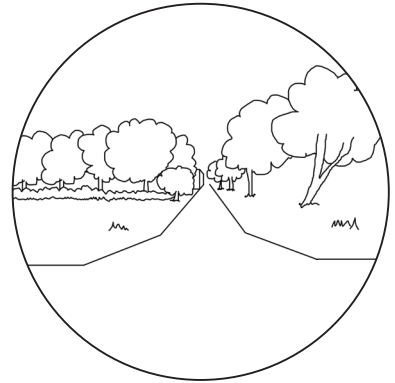
4.5 Nature patterns



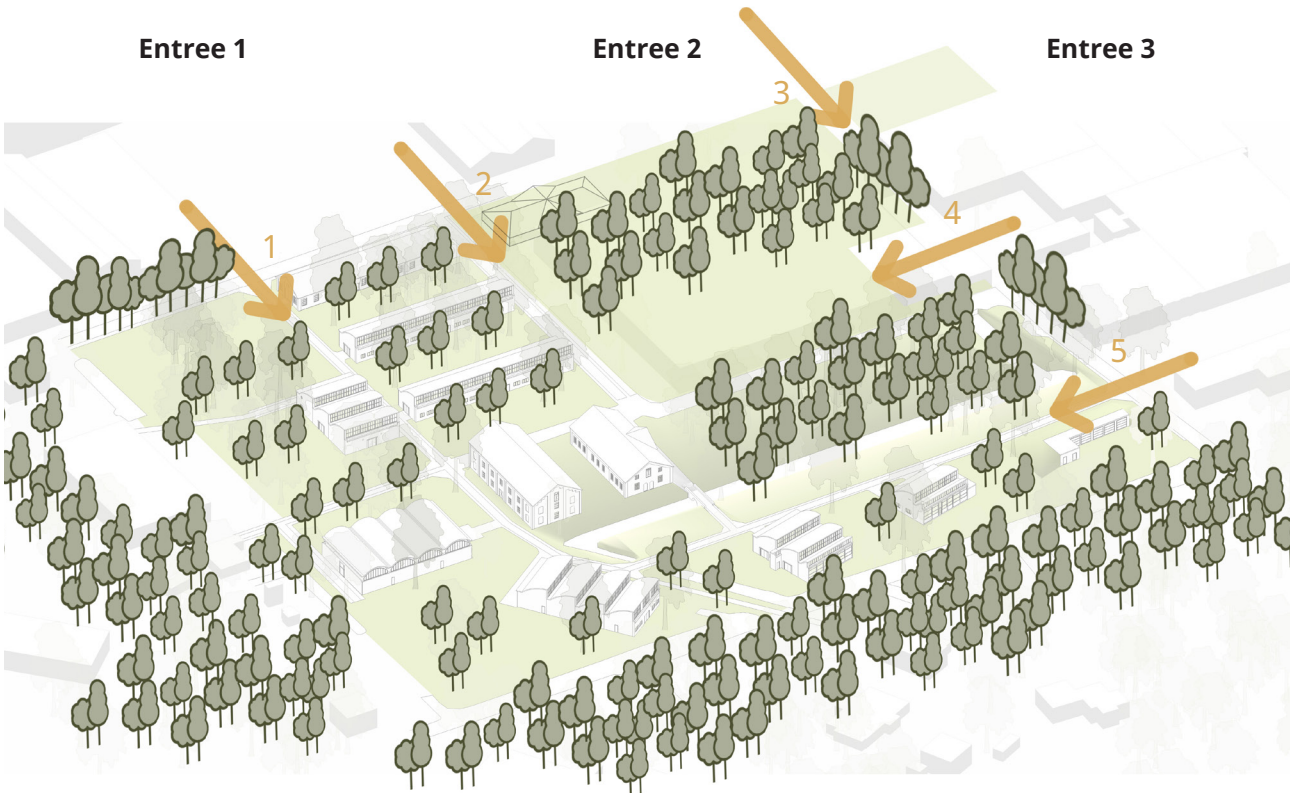
Entree 1



Entree 2

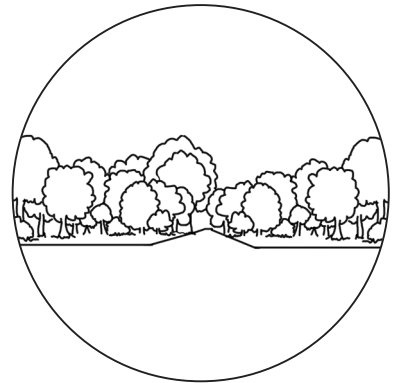
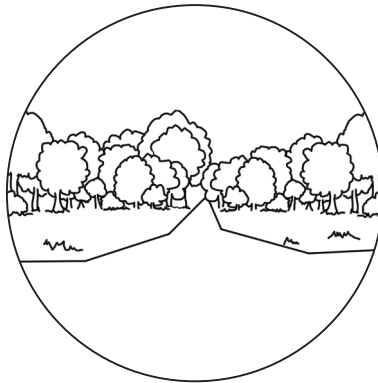


Entree 3



Entree 4

Entree 5



In the analysis we discovered two types of characteristic tree patterns. The structured lanes, which are still visible between building 415 - 420, derive from the original design by P.C.J. Noorduijn. Secondly the 'wild growth' that gave the site its forest like experience. Both are important as they contribute to both the story and character of Plofbos.

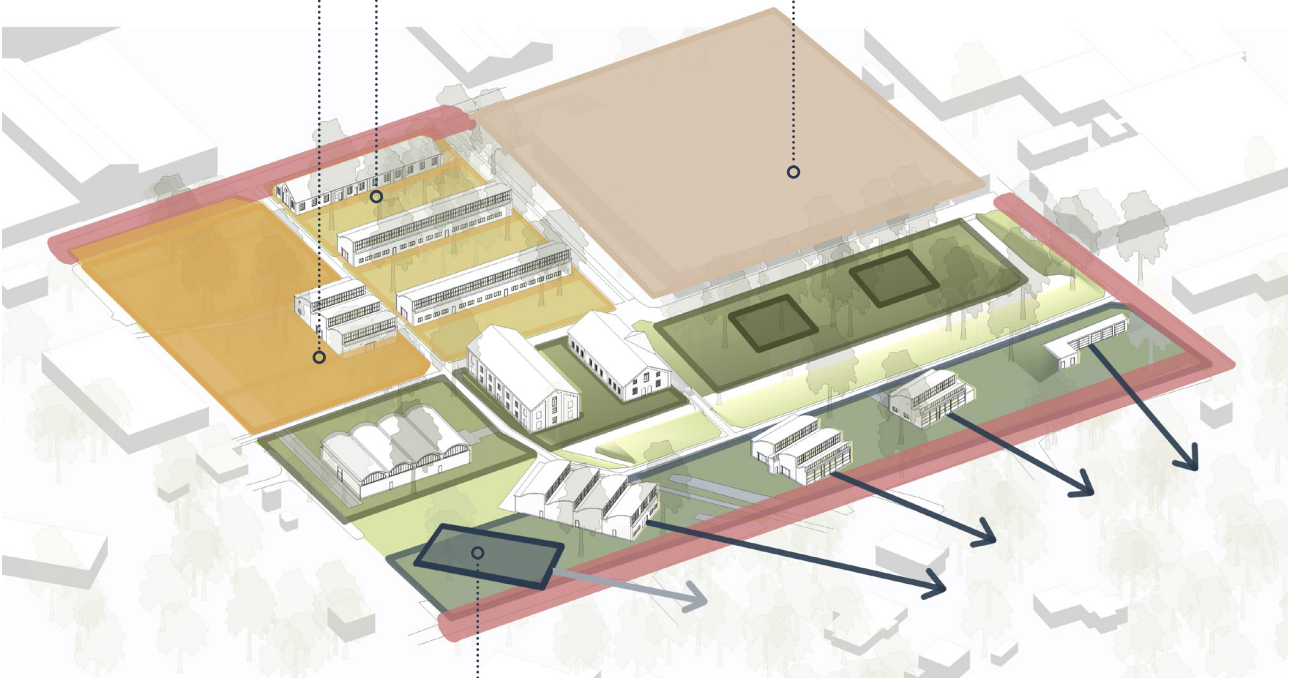
4.6 Building areas

- Zone 1 - Long Shell Roofs
- Zone 2 - Cape South / Farms / Earth walls
- Zone 3 - Plots along the Forest
- Zone 4 - New
- Don't Touch!

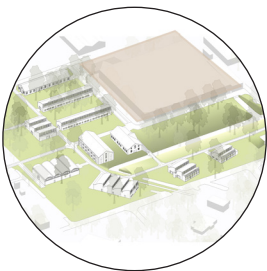
Structure
Following the structure and open spaces in between

Existing
Showing the structure of the military background

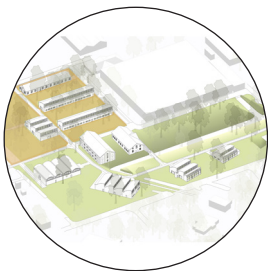
New area
By demolishing the event shed, space is useable for new plots (in an forest environment)



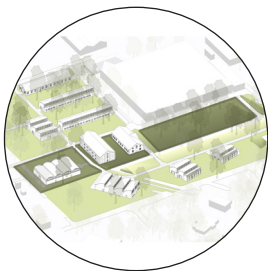
Rhythm
Following the rhythm of the buildings



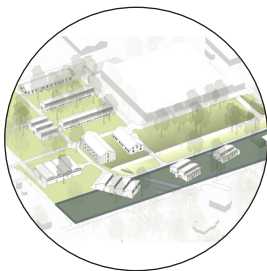
New area



Structure zone

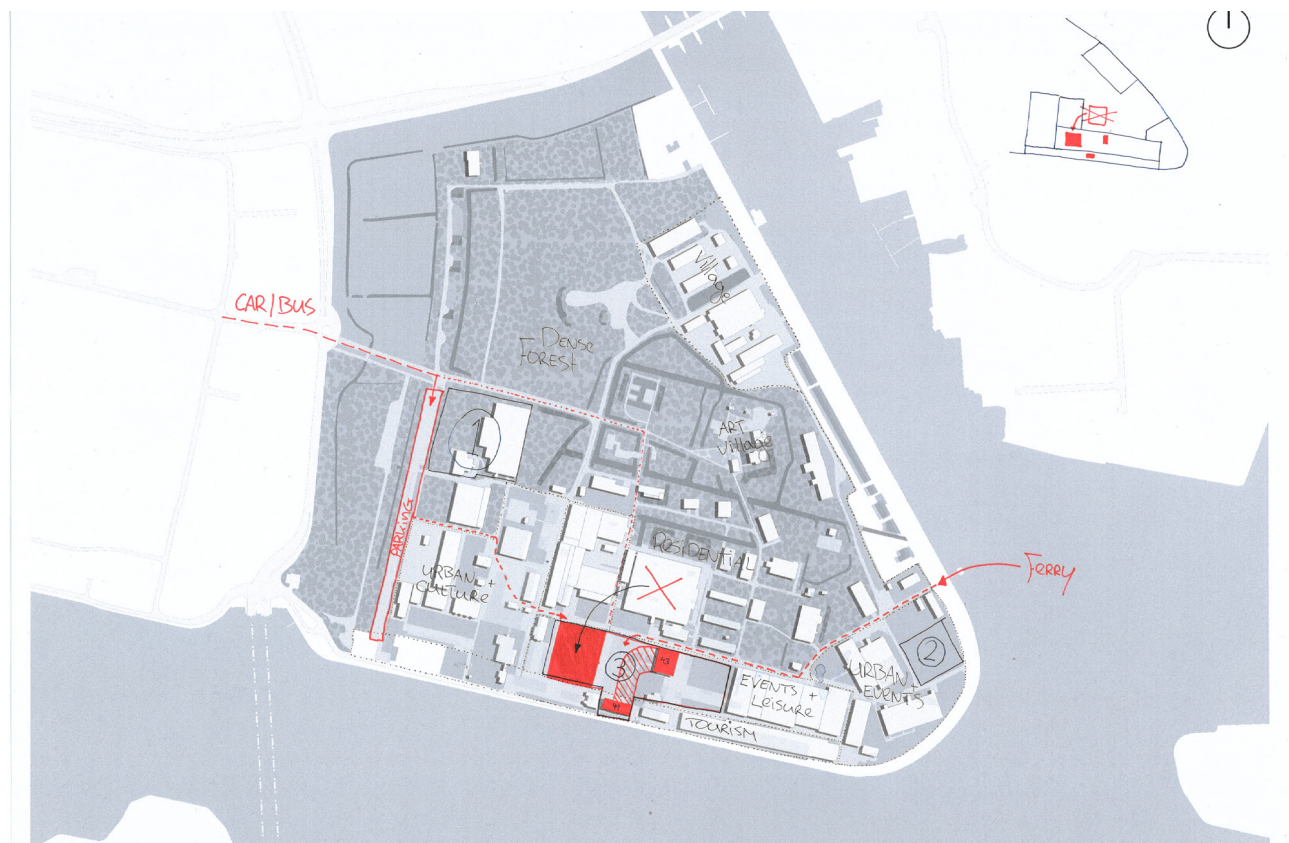


Middle zone



Forest plots

4.7 Taets building



Right of existence for Building 01

When considering the borders of the Plofbos, Building 01 does not fit within its surrounding context. It is a high, long and monotone metallic façade without any relation to nature or its context. Instead of enhancing the character and atmosphere of the Plofbos, it acts as a physical barrier that does not correspond to the relating architecture, small-scaleness and historical layering of the Plofbos itself.

However, it is the youngest building of the area and also one of the most practical in present day due to its vast space and flexibility. Together with building 41 and 43, the Taets Arts and Event space can facilitate up to 12.000 visitors at its peak.

Therefore we investigated the relocation Building 01, in order to restore the harmony of the Plofbos as well as respecting the current event program of the Taets. After all, the Hembrug district is to be transformed which allows for beneficial redesign reclaimed land allows to form a green transition zone with added buildings that respect the architectural language of the zone. This language includes historical layering, scale, architecture, materiality, generation.

For the relocation aspects were considered such as accessibility of the visitor, zoning logic and relating programs of the surrounding ensembles. Another approach that has been considered is the re-useability of materiality of Building 01, so that it could be de-mounted and built up again on another location (perhaps in a renewed design).

A large amount of residential area will be assigned to the Hembrug district in the future, so it is important to consider the long term development of Hembrug as a whole. Events will bring a lot of noise and crowd to the area, which conflicts with the assigned surrounding residential plans. The question that raises now is how viable the enormous events are in the future setting of Hembrug. Perhaps, this event based program will have to phase itself out of the area and find a more suitable location. This process might take years, perhaps more than ten. But considering the long-term vision of Hembrug raises the right of existence for large scale events, which have suited as an ideal short-term solution in the vacant district of Hembrug.

4.8 Floor space studies

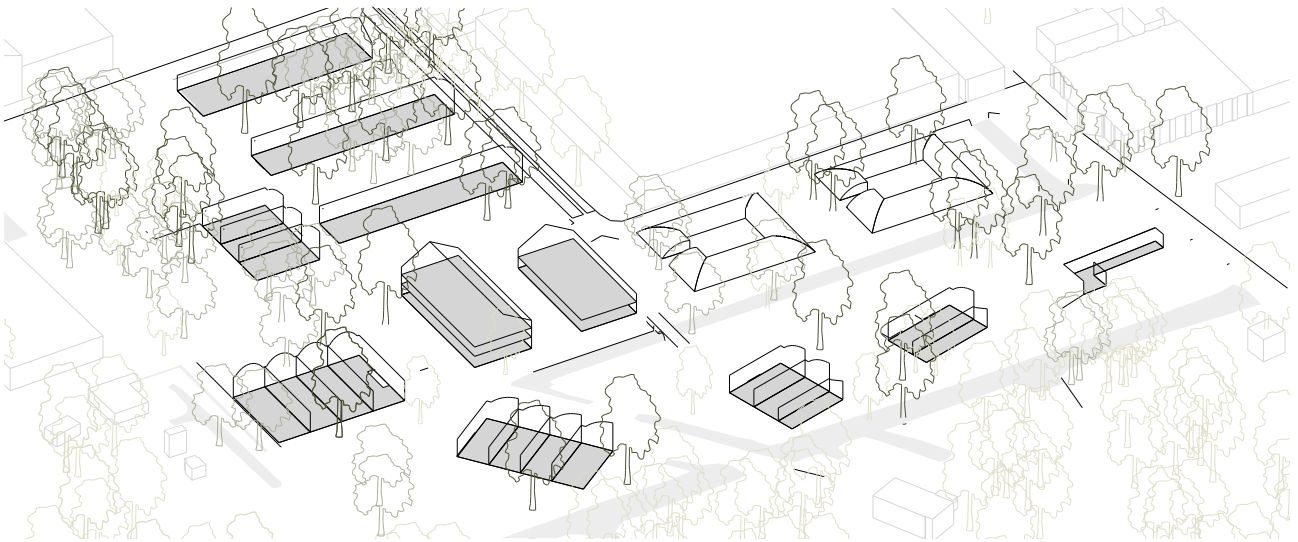


Fig.: Floor space on 100% - Absolute preservation

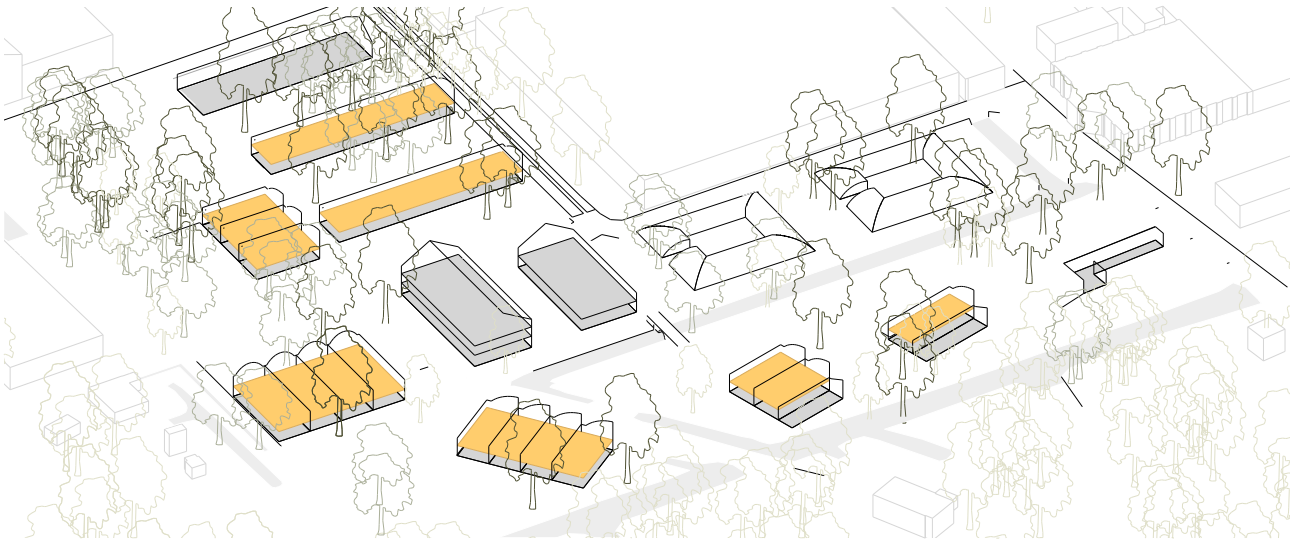


Fig.: Floor space on 150% - Preservation of open space

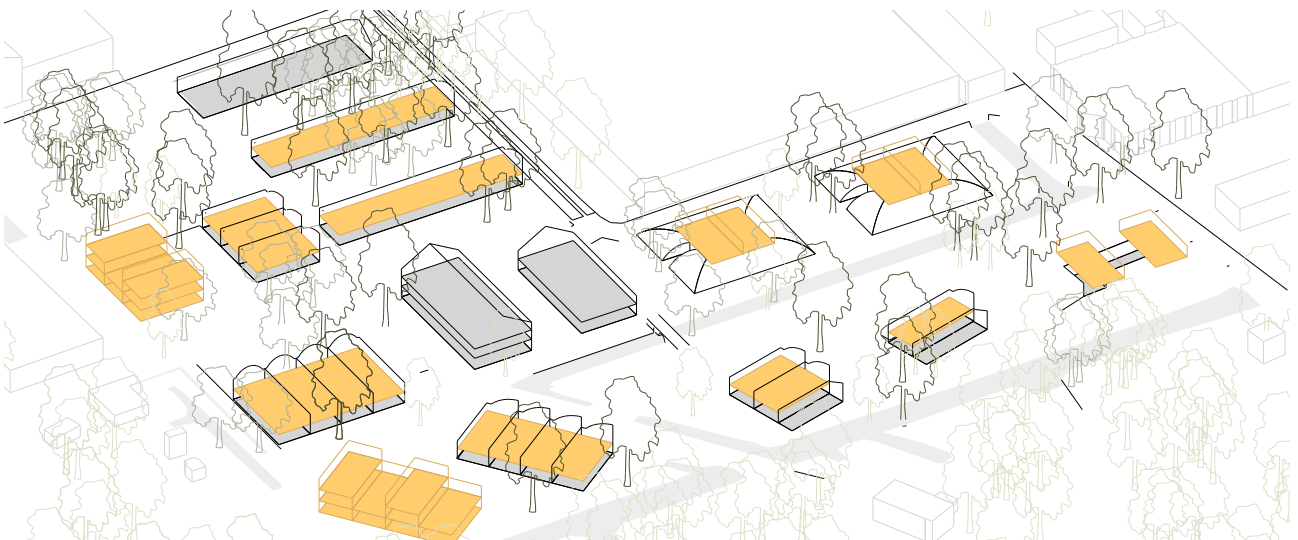


Fig.: Floor space on 200% - Subtle continuation of volume, rhythm and inbetween space.

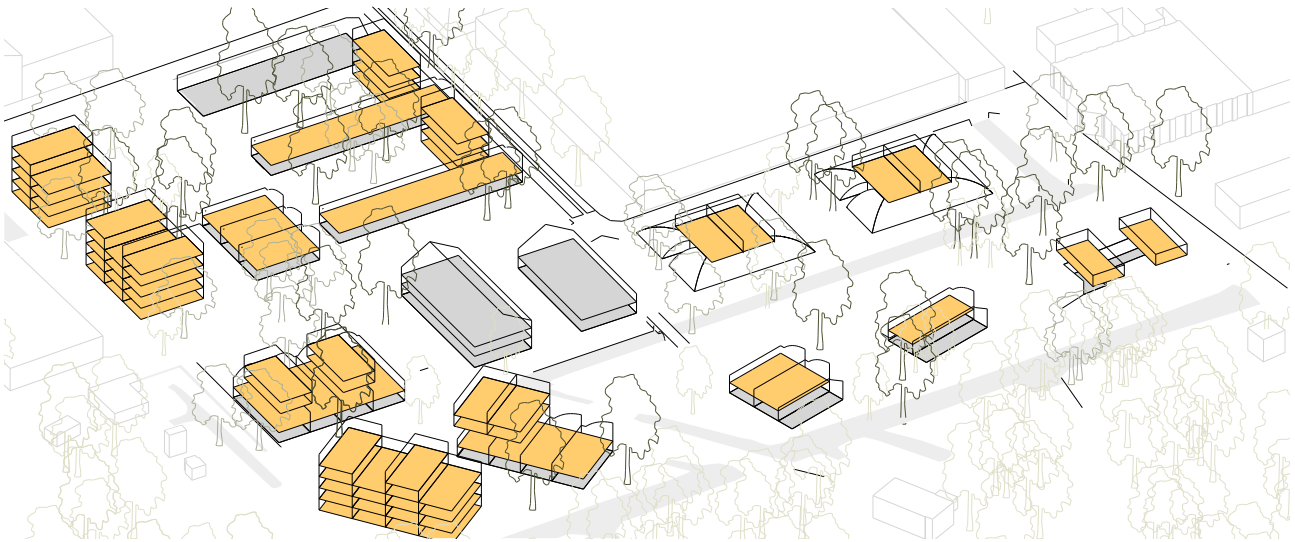


Fig.: Floor space on 300% - Concessions with the shielding green areas.

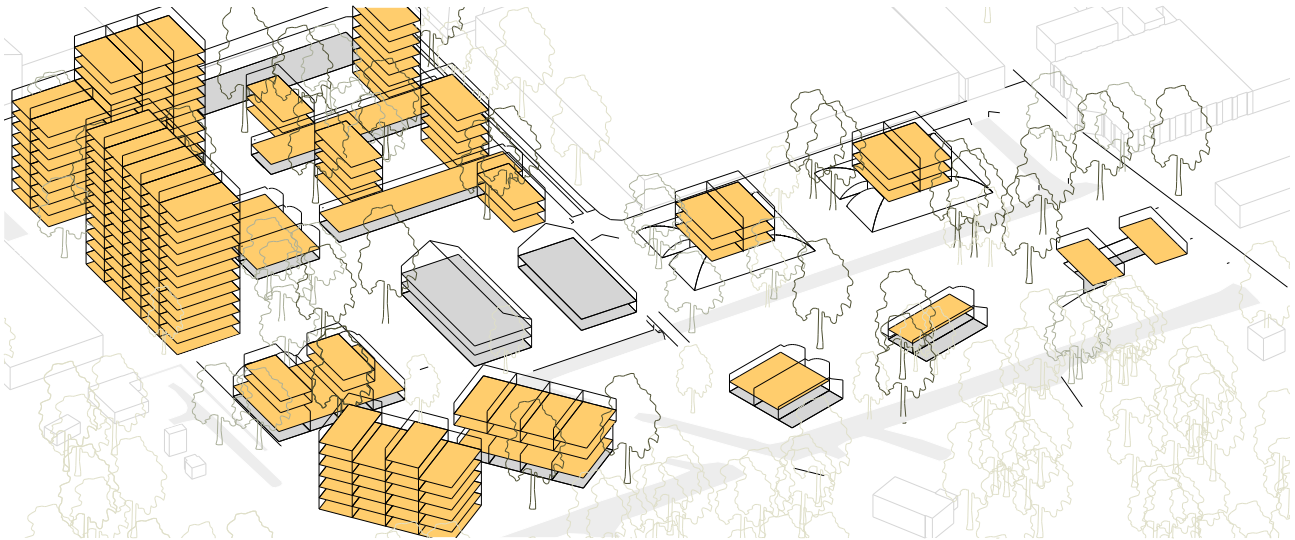


Fig.: Floor space on 600% - Density primarily placed in one zone.

Conclusion

The first study for the master plan proposal was a study of density. Five scenario's and densities of adding floorspace are explored, ranging from 100% to 600%. With the values that came out of the analysis and the design question in mind, the study subtly attempts to establish a continuation on the original qualities that balance between the 'military organization' and the untidy village'. Thus volumes and floors are placed carefully following the rhythm, composition, scale of the original plan. The study partially rested on intuition. Interesting to see is the prioritizing of spaces that resulted from it. 100% in which no floors are added in case of absolute preservation; 150% which only uses interior volume and preserves in between space; 200% which adds small volumes in the in between spaces that follow the original scale and thus form a continuity; 300% where concessions have to be made and volumes are placed within the 'shielding green zones' which are so important for the transitioning; and finally the 600% where vital concessions have to be made and a part of the Plofbus loses its sense of scale and character. But by concentrating the density in one zone, the other zones can maintain the scale and character. This study however does not yet question if original buildings can be (partially) demolished in order to focus on the relation between density and amplifying existing qualities.

4.9 Ground space studies

Leave open space untouched

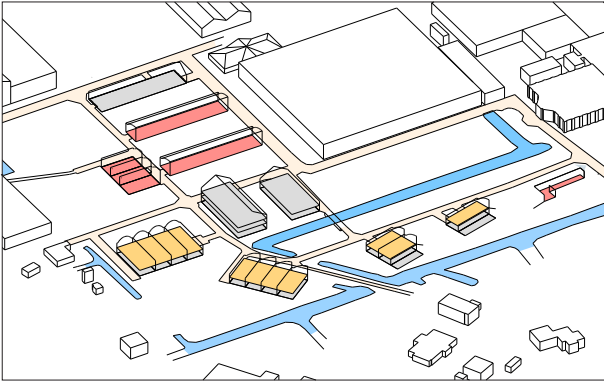


Fig.: 100% (adding floors into the remaining existing buildings bears the loss of destruction of duplicates)

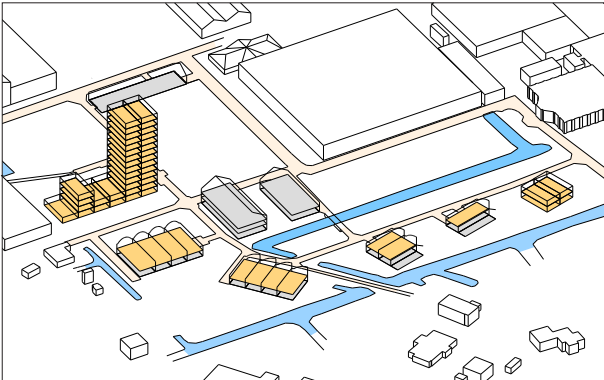


Fig.: 200% (pushing the added floor space into the air, leaving open space untouched as much as possible)

The first scenario studied the effect of leaving the open space untouched as much as possible. To acquire this I have tried to double the floor space into the air, resulting in a single height accent on the site. The old buildings have gained a void which helped doubling the floor plan.

Demolition of duplicate shell-roofs

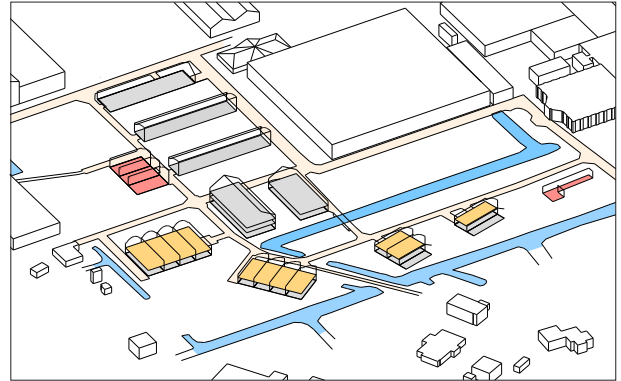


Fig.: 100% (removing less interesting duplicates and detonating bunker)

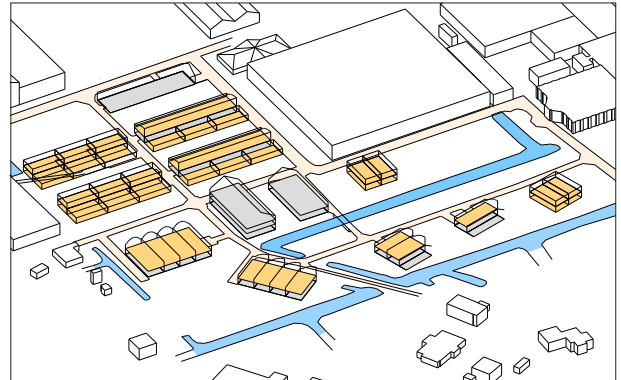


Fig.: 200% (extending following the longitudinal grid of the former ammunition factories)

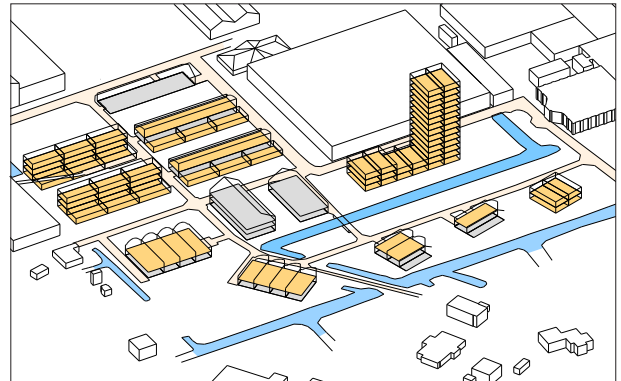


Fig.: 300% (adding onto former extensions and going in air)

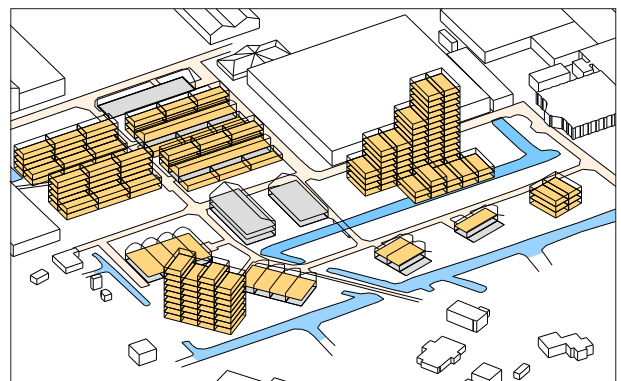


Fig.: 600%

The second scenario involves the demolition of a duplicate shell-roof building. Chosen for this scenario is that this typology exists seven times already, and the former function of this particular building is not distinguishable from the other, more important shell-roof buildings. By demolition of this building a vast open space is acquired that holds new place for single standing building plots.

Densify, low rise expansion

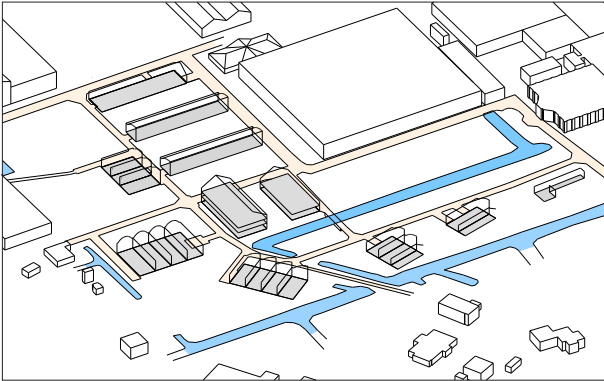


Fig.: 100%

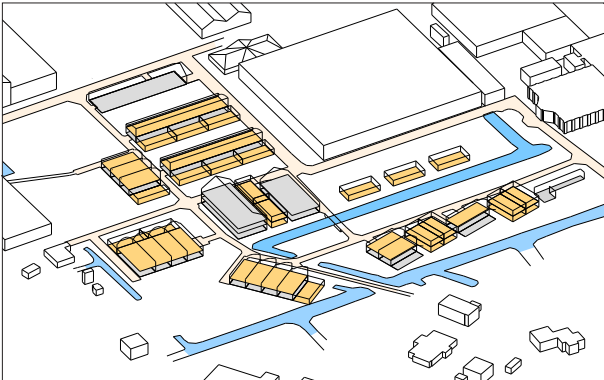


Fig.: 200%

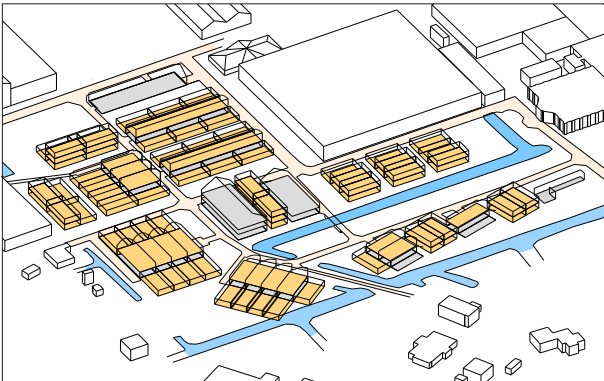


Fig.: 300%

Third scenario was the concept of densifying the interrelated open spaces between the buildings, and filling exactly those plot (so taking away the individuality). Effect of this idea should be more open space left over as a result, but only seemed to had effect when trying to double the floor space (tripling the floor space resulted in a densification of all the free space anyway).

Demolition of the detonating shed

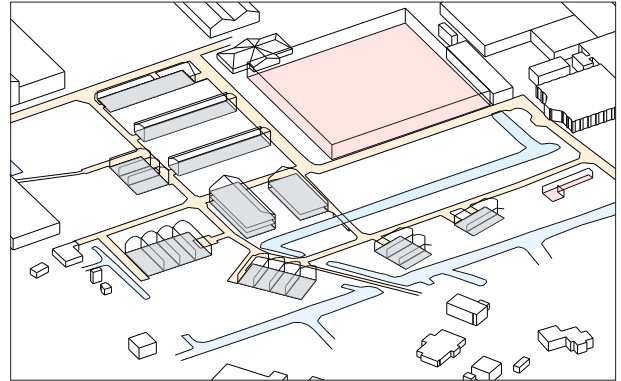


Fig.: 100 %

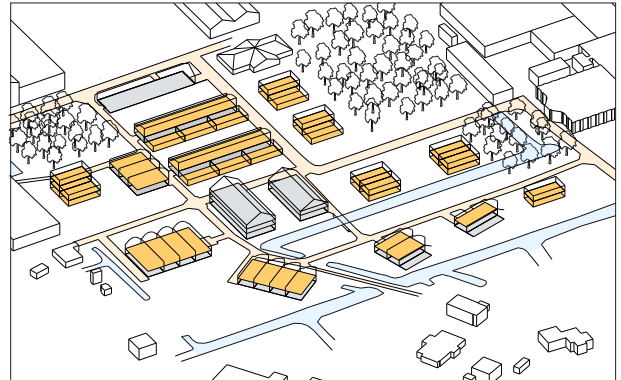


Fig.: 200 %

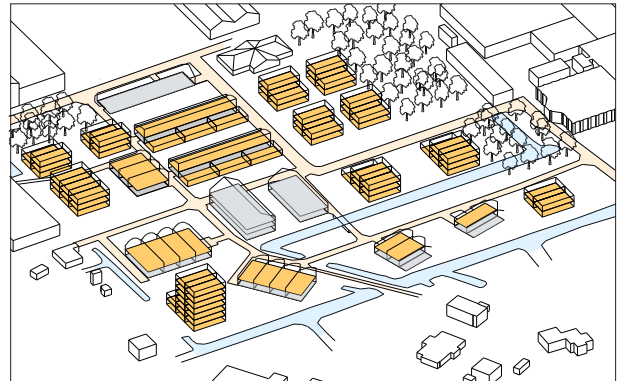


Fig.: 300%

Lastly, the scenario of demolishing the large square shed (building 1) was studied. Arguments for removing this building were that it does not fit in the surrounding context. Also, because The Ladder is being redeveloped it could be very beneficial to relocate the current activities (events) to the Ladder, which also contains the required similarity (open floor plan, large surface, etc.) New mass can be added, it would enforce the transition, it would connect the Cathedral with the Plofbos and enhance the forest atmosphere.

4.10 Height studies



Fig.: Height accent option 1

Option 1: Along the production zone

High volume is placed within the former Taets Eventhall boundaries and thus does not touch nor invade the village feeling of plofbos. It recedes from the forest and forms a dominant bordering element between the forest and the adjacent plaza, to which it situates. This way, traffic and activity are guided around the plots in the woods.

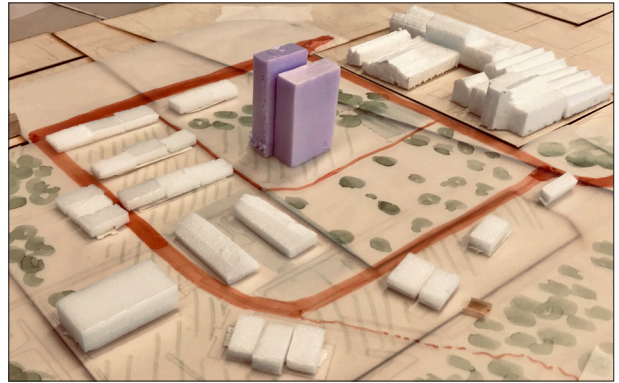


Fig.: Height accent option 2

Option 2: On the reclaimed plot

Central of the plots in the woods. No historical element is touched as old terrain is reclaimed. Accessibility is troublesome (logistically) or could demand for activity through the whole plot, as many new inhabitants would need to walk through the site now.



Fig.: Height accent option 3

Option 3: Deep in the woods

Could dictate activity when inhabitants have to park their car next to the Ladder plot, forcing them to walk through the plots in the woods. Alternative is parking underground the building but that results in a lot of car traffic which is harmful for the forest atmosphere.

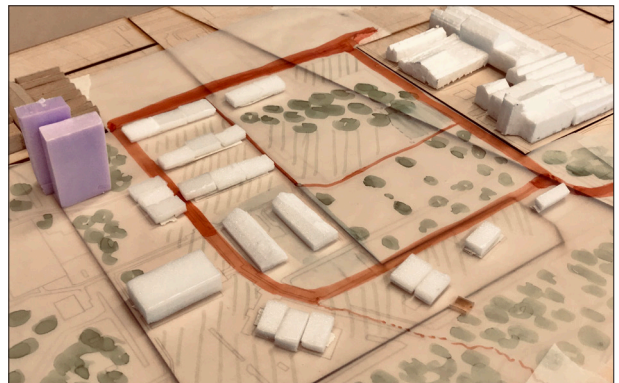


Fig.: Height accent option 4

Option 4: Open field along the Ladder

Logistically connected to the main road of Hembrug. Would reduce the transition experience when entering the plots in the woods from the Ladder zone. (A barrier of greenery before building structures enhances this experience).

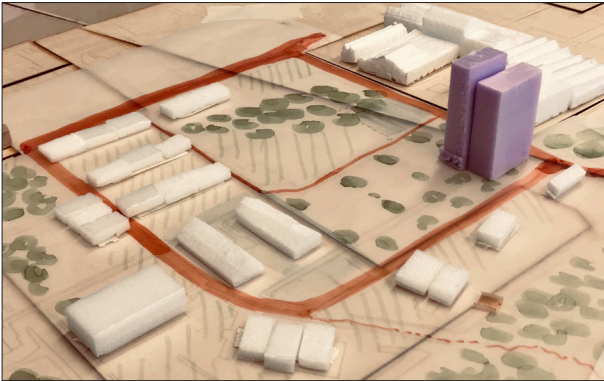


Fig.: Height accent option 5

Option 5: Edge of the dense woods

Logistically close to the exit of Hembrug. Harms the dense old forest plot. Could act as a “cherry on the cake” because currently the main path leads to nothing, just the exit road of Hembrug.

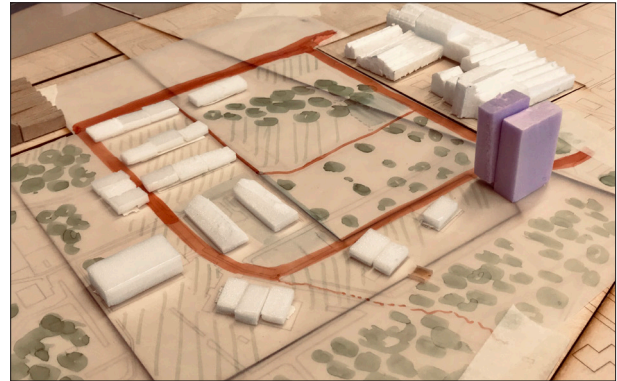


Fig.: Height accent option 6

Option 6: On the detonating bunker

Destruction of a detonating concrete storage bunker (1991) is required, which is not too harmful. Earthen wall and embraced space is lost, but design can bring back this notion. Logistically very interesting, directly towards the exit road that leaves Hembrug. Underground parking would allow for less car traffic in the industrial area.

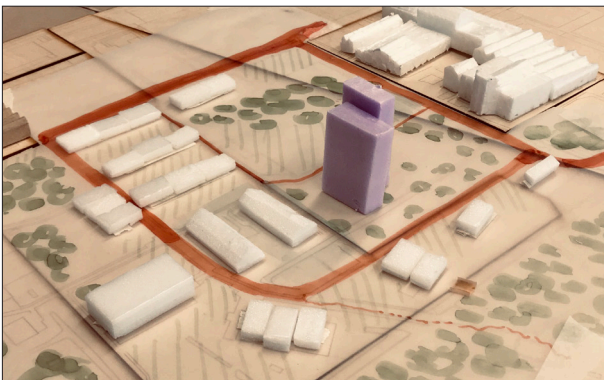


Fig.: Height accent option 7

Option 7: Central in the dense woods

To reach a triplication of floor space, it can be beneficial to choose for one concentrated addition of volume, in order to reduce the pressure on the space and character of the forest. Therefore a height accent is a viable option to strive for.

Option 1, 5 and 6 are in our opinion the most viable locations to place a height accent, because a tower brings in a lot of activity with it. People who will have to access their apartment every day. This was a huge design factor that took place. Do we want a lot of activity in the forest, or do we want to lay the accent on the restful ambience of the woods? And place the density on the sides of the forest. In our opinion the latter was the most valuable option to go for.

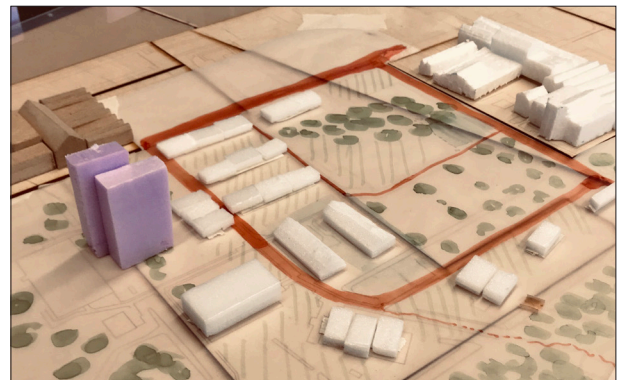


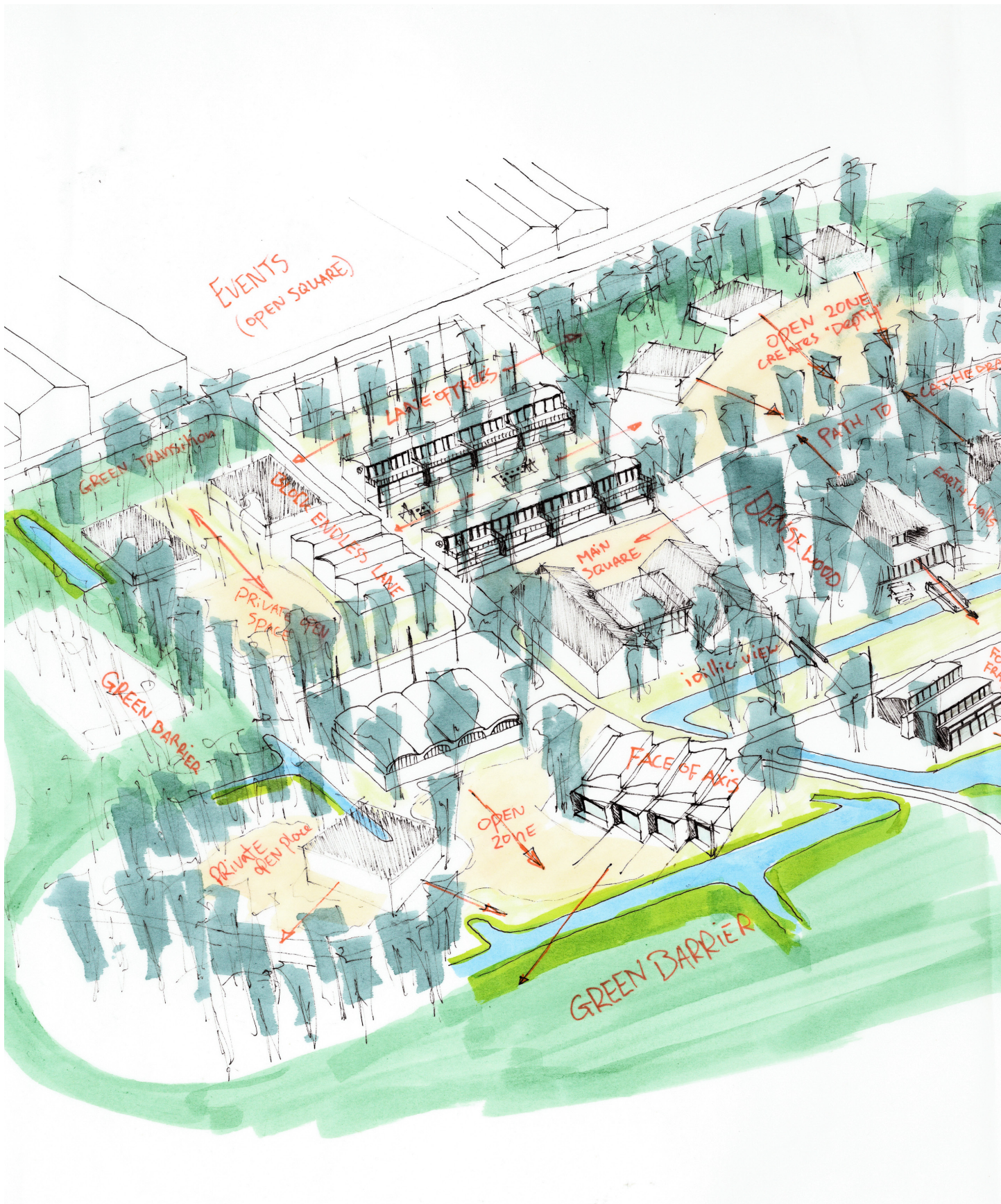
Fig.: Height accent option 8

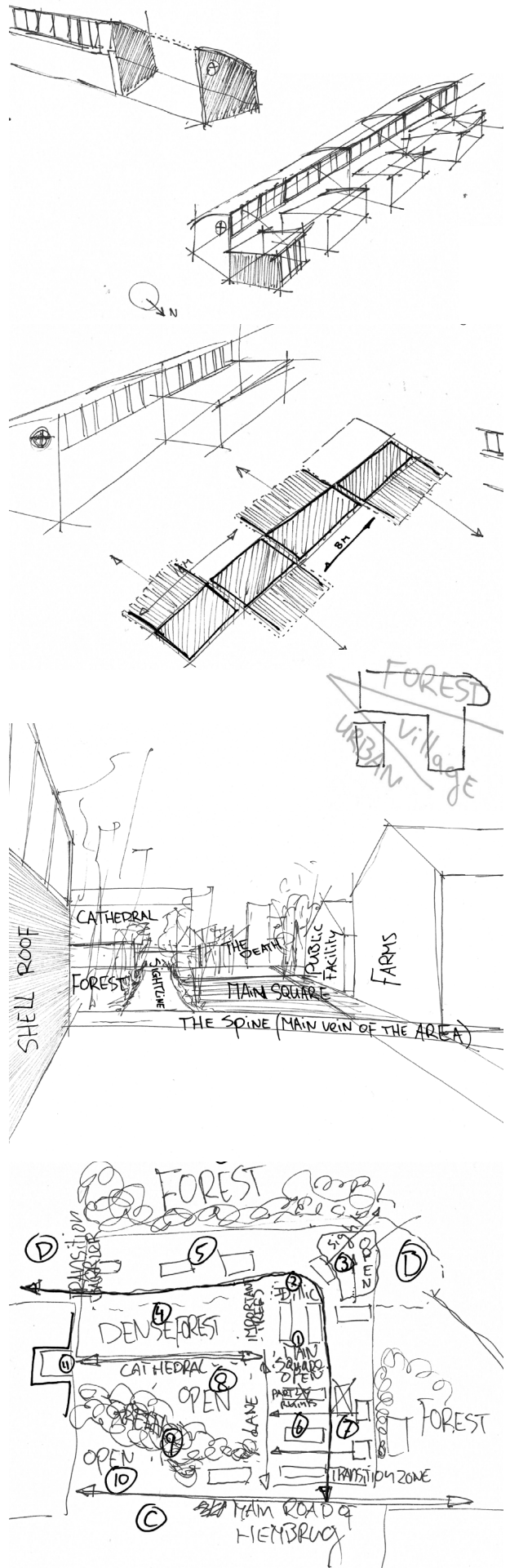
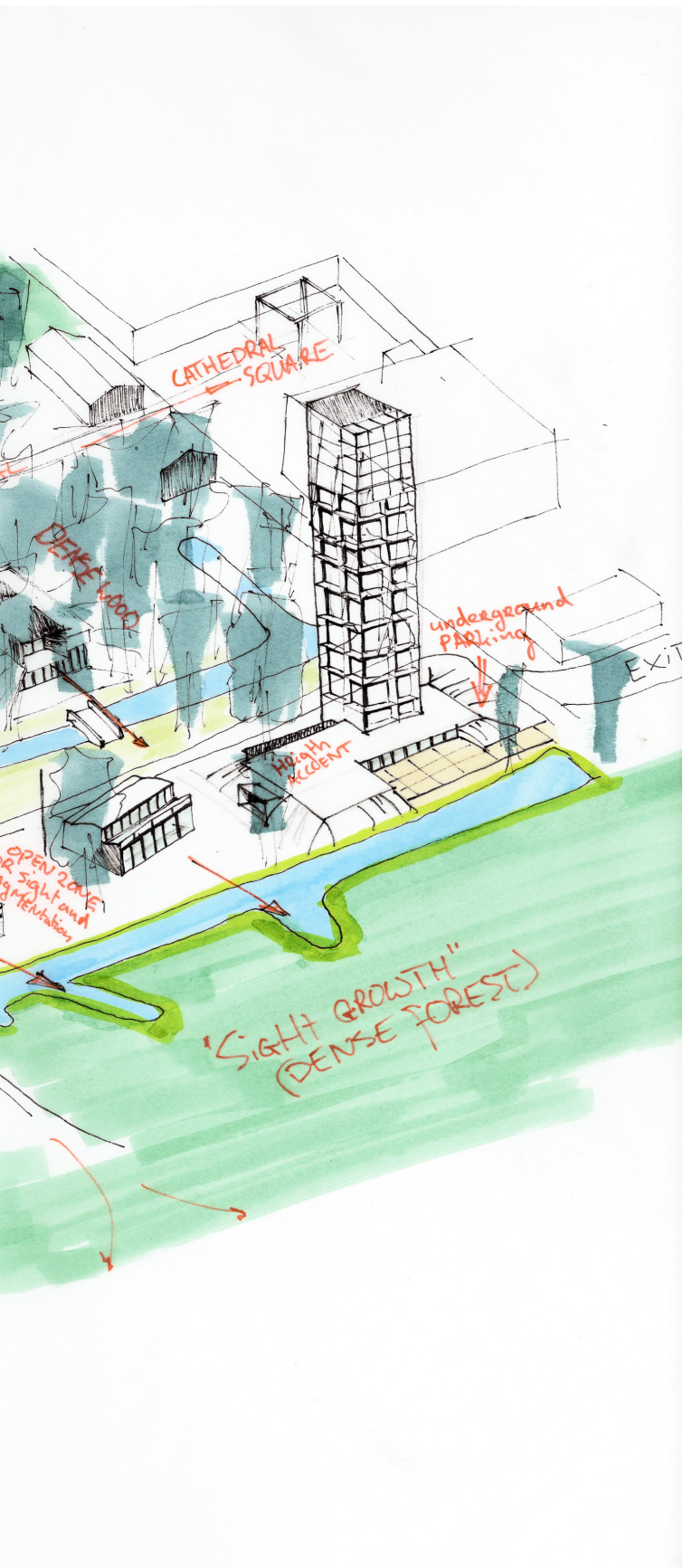
Option 8: Behind building 419

With this study it is possible to formulate the following design starting point:

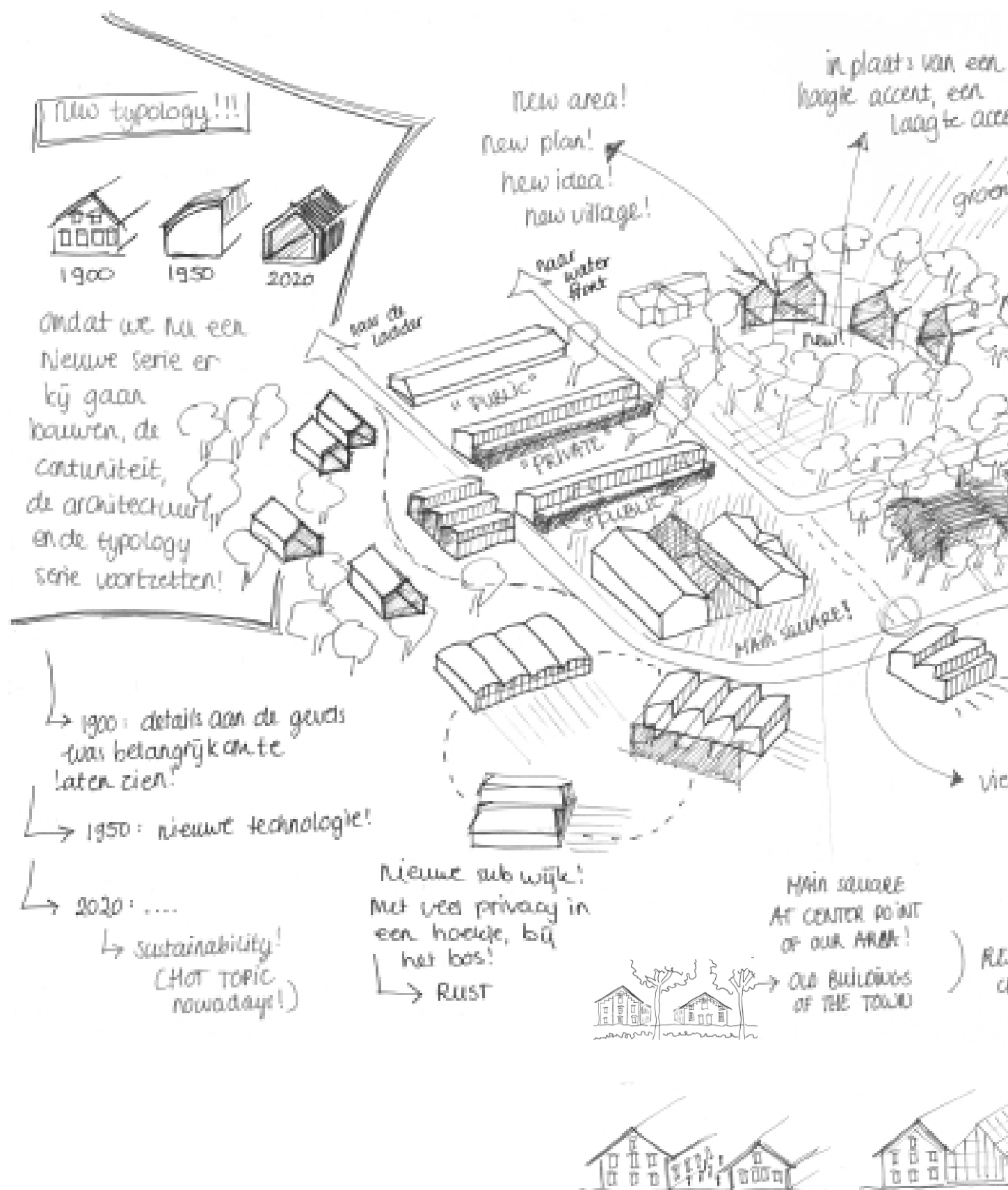
“Positioning a height accent along the border connected to the main structure is the most viable location to process density, mainly in order to maintain the restful ambience in the woods itself.”

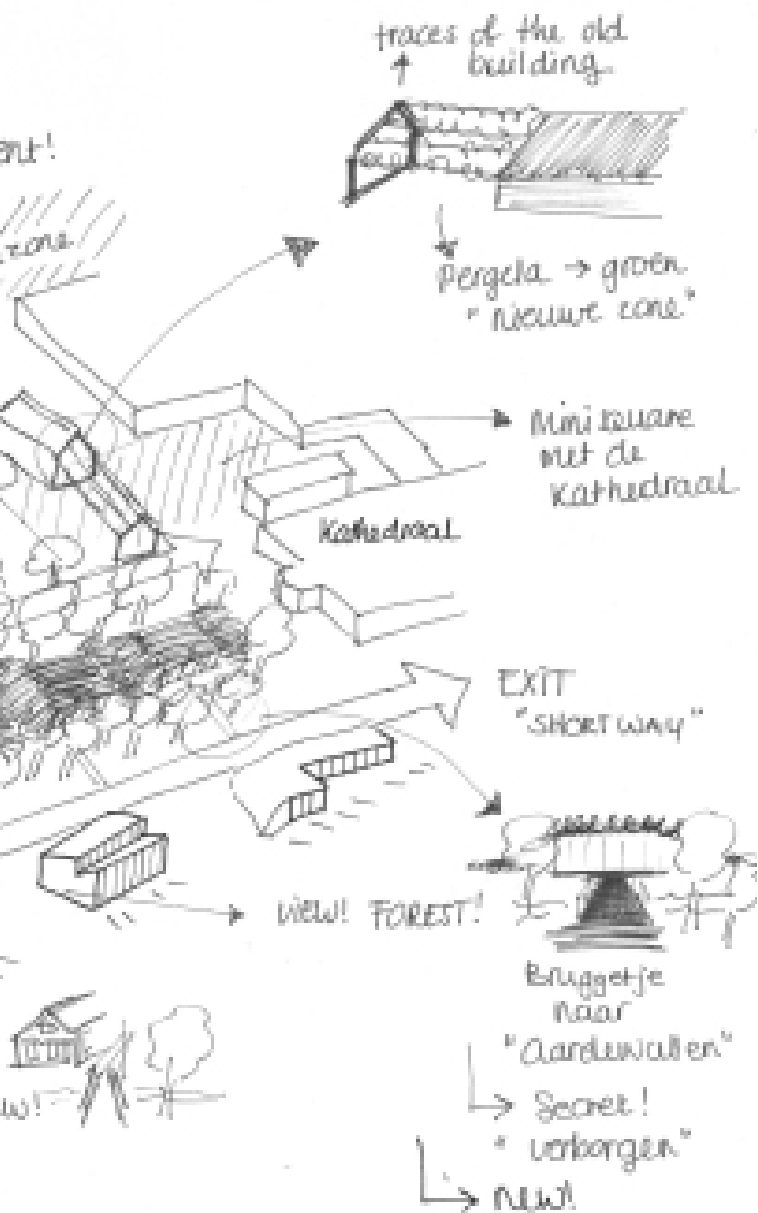
4.11 Master idea 1





4.12 Master idea 2

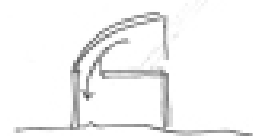
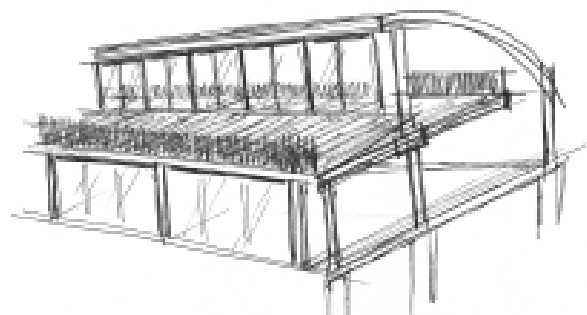
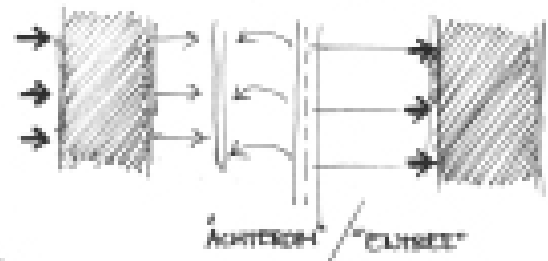
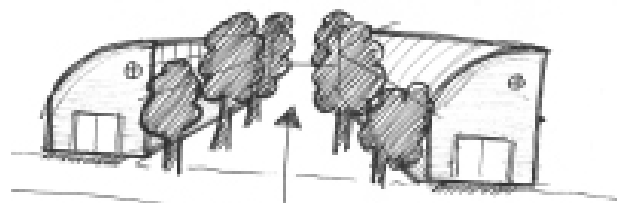
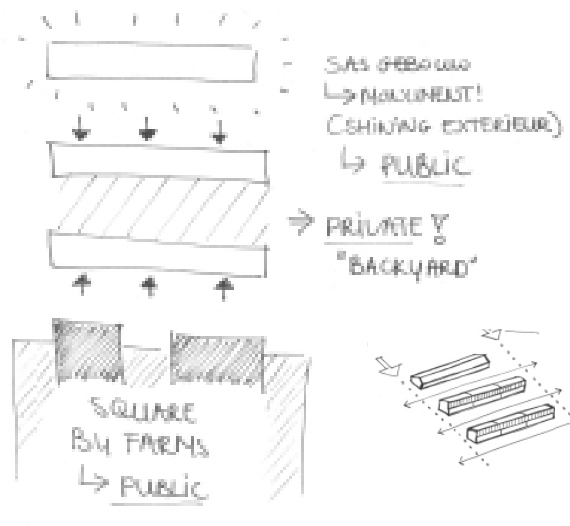




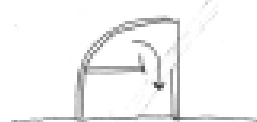
RESTAURANT
OR CAFE

MEETING POINT!

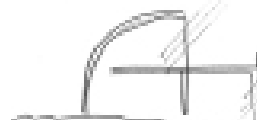
PUBLIC !!!



LOZE RUIMTE VIA HOOGTE
DOOR VIDE TE PLAATSEN
100% FLOORSACE



LOZE RUIMTE MET HOOGTE &
WEL ERIN BELEVING, MET
LICHT WAAR BELEVING
150% FLOORSACE



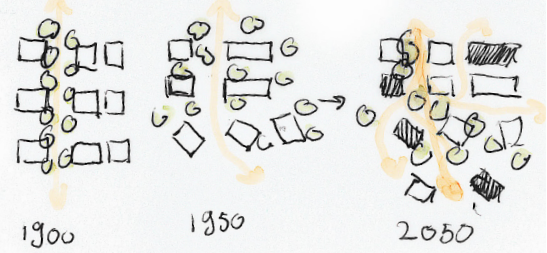
BALEON + AARD-BOLWU
200% FLOORSACE

4.13 Master idea 3

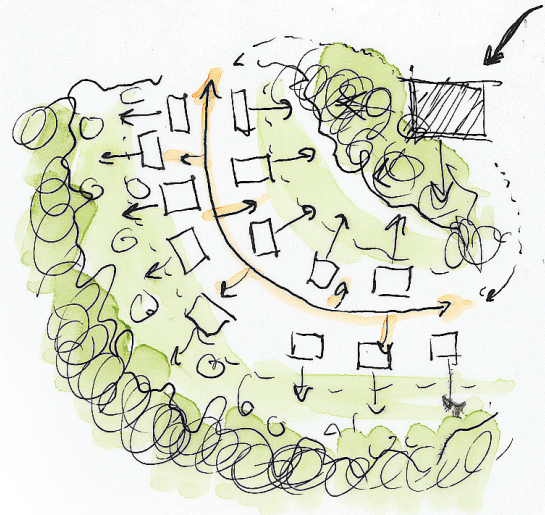




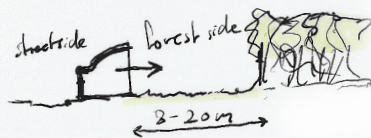
Concept: ruinification of military structure



"Route as spine with branches"



- preserve forest-foot and greenery
- preserve scale, rhythm and in-between space
- preserve characteristic parts of buildings
- open blind facades tactically
- All houses get a view on green.
↳ "A house in the forest"



- One 'big' intervention in order to allow the forest area to be intervened in a small manner.

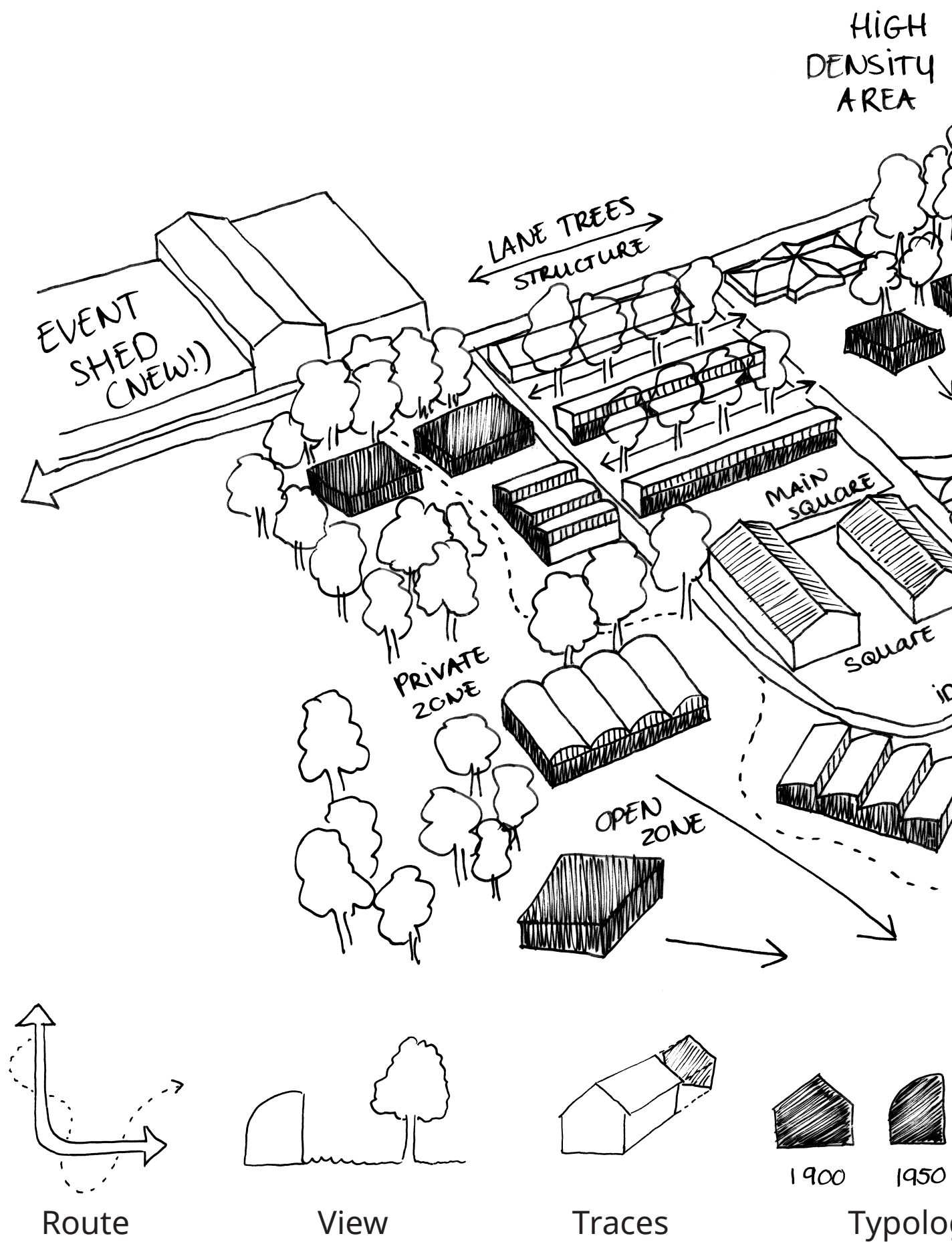
- Language of adding volumes:

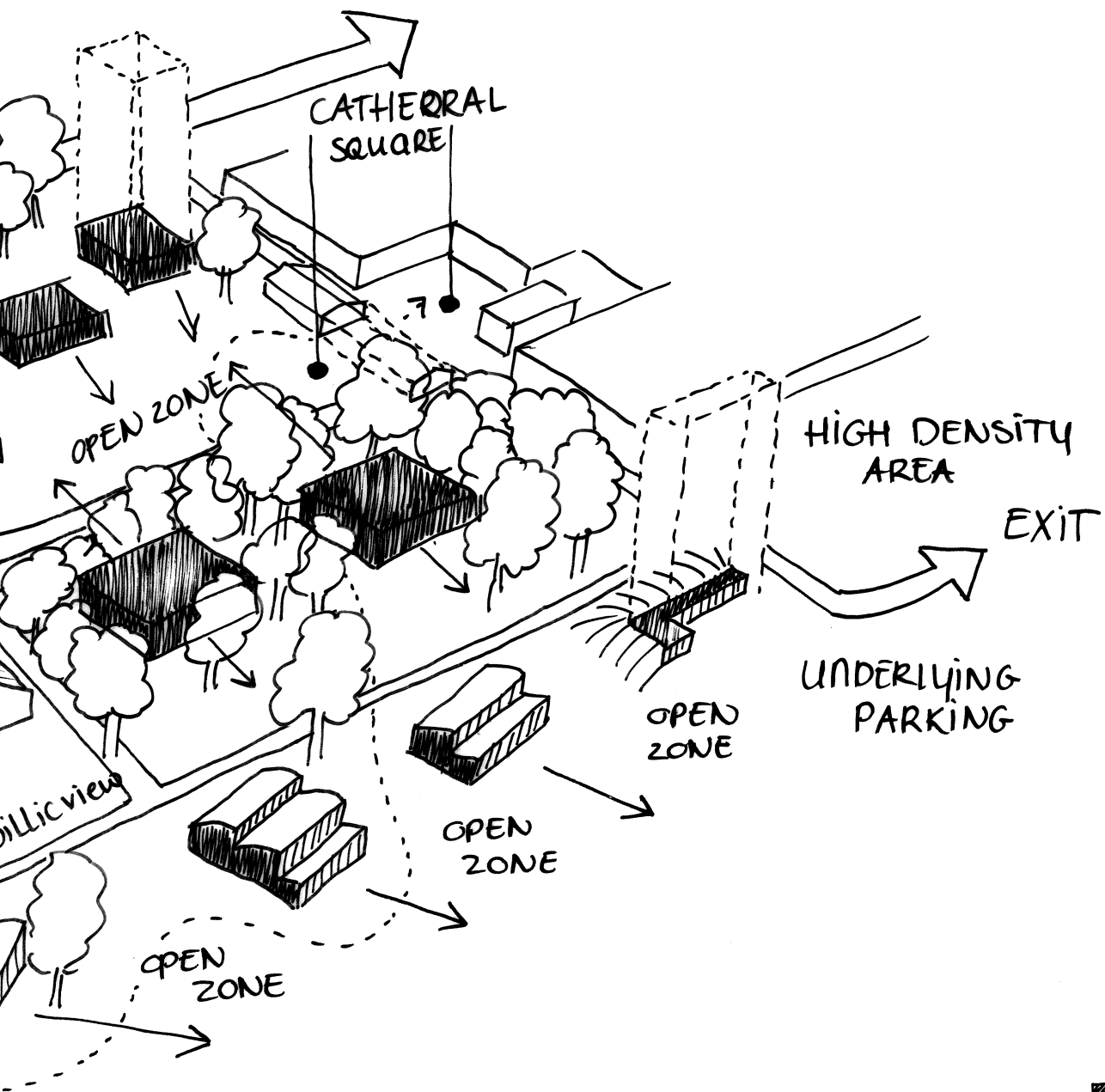


- Language of taking away volumes:

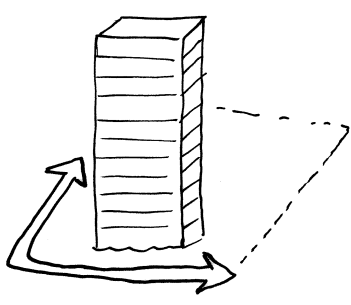


4.14 Masterplan strategies

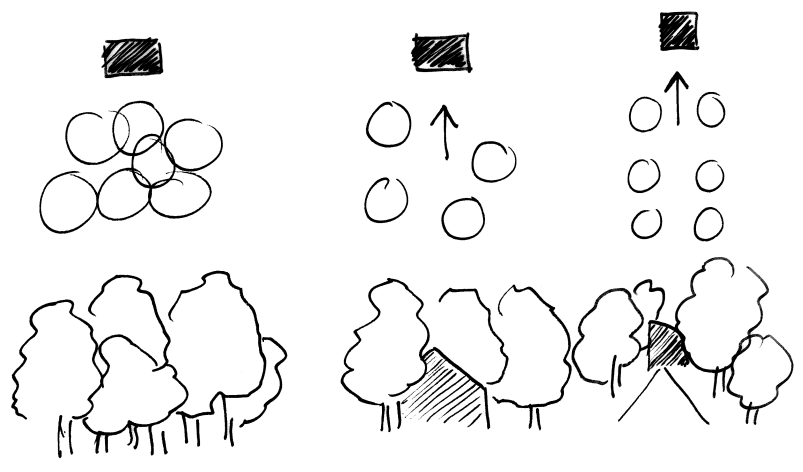




2020

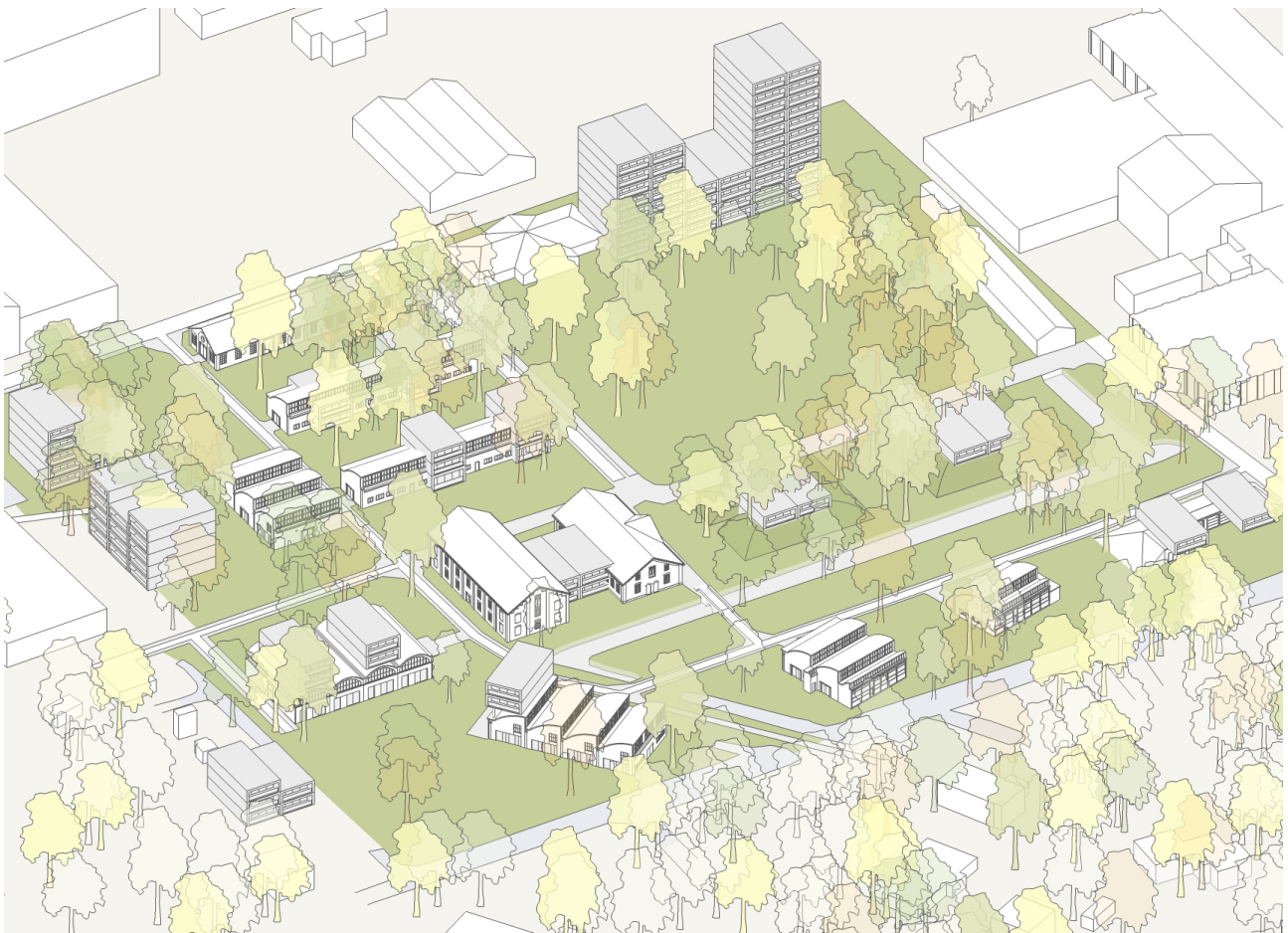


High density



Forest sights

4.15 Masterplan impressions





List of sources

Chapter 1

¹ Steenhuis Meurs, 2010, <i>Cultuurhistorische Analyse Hembrug terrein</i> , p. 12 - 13	7
<i>Hembrug Verkoopbrochure</i> , Rijksvastgoedbedrijf Ministerie van Binnenlandse Zaken, 2018, p 7 - 23	9
² <i>Hembrug Terrein Zaanstad: Ruimtelijke visie en ontwikkelingsstrategie voor een voormalig militair productieterrein</i> , Palmbout, 2013, p. 2	12
³ Steenhuis Meurs, 2010, <i>Cultuurhistorische Analyse Hembrug terrein</i> , p. 6, 10, 20 & 32	12
⁴ <i>Het verleden, heden, toekomst</i> , E. Holleman, R. Reijke, 2006	13
⁵ Steenhuis Meurs, 2010, <i>Cultuurhistorische Analyse Hembrug terrein</i> , p. 5 & 27	13
Steenhuis Meurs, 2010, <i>Cultuurhistorische Analyse Hembrug terrein</i> , p. 66 / <i>Het verleden, heden, toekomst</i> , E. Holleman, R. Reijke, 2006	14
<i>Historical maps acquired from www.topotijdreis.nl</i>	16
⁶ Steenhuis Meurs, 2010, <i>Cultuurhistorische Analyse Hembrug terrein</i> , p. 5 - 7, 36 & 37	18
⁷ <i>Het verleden, heden, toekomst</i> , E. Holleman, R. Reijke, 2006	20
⁸ <i>Het verleden, heden, toekomst</i> , E. Holleman, R. Reijke, 2006	21
Steenhuis Meurs, 2010, <i>Cultuurhistorische Analyse Hembrug terrein</i> , p. 35, 39, 43 & 47	22

Chapter 2

Steenhuis Meurs, 2010, <i>Cultuurhistorische Analyse Hembrug terrein</i> , p. 61 - 66	30
Steenhuis Meurs, 2016, <i>Gebiedspaspoorten Omgevingsplan Hembrug terrein</i> , p. 53 & 61	32
Steenhuis Meurs, 2010, <i>Cultuurhistorische Analyse Hembrug terrein</i> , p. 62	36
Steenhuis Meurs, 2010, <i>Cultuurhistorische Analyse Hembrug terrein</i> , p. 27, 31 - 34 & 77	40
Steenhuis Meurs, 2010, <i>Cultuurhistorische Analyse Hembrug terrein</i> , p. 63 - 65	42
Steenhuis Meurs, 2010, <i>Cultuurhistorische Analyse Hembrug terrein</i> , p. 44	44
Steenhuis Meurs, 2010, <i>Cultuurhistorische Analyse Hembrug terrein</i> , p. 35, 39, 43, 47	54
⁹ Steenhuis Meurs, 2010, <i>Cultuurhistorische Analyse Hembrug terrein</i> , p. 62 - 64	56
¹⁰ <i>Heden, verleden, toekomst. Hembrugterrein</i> , p. 8	59