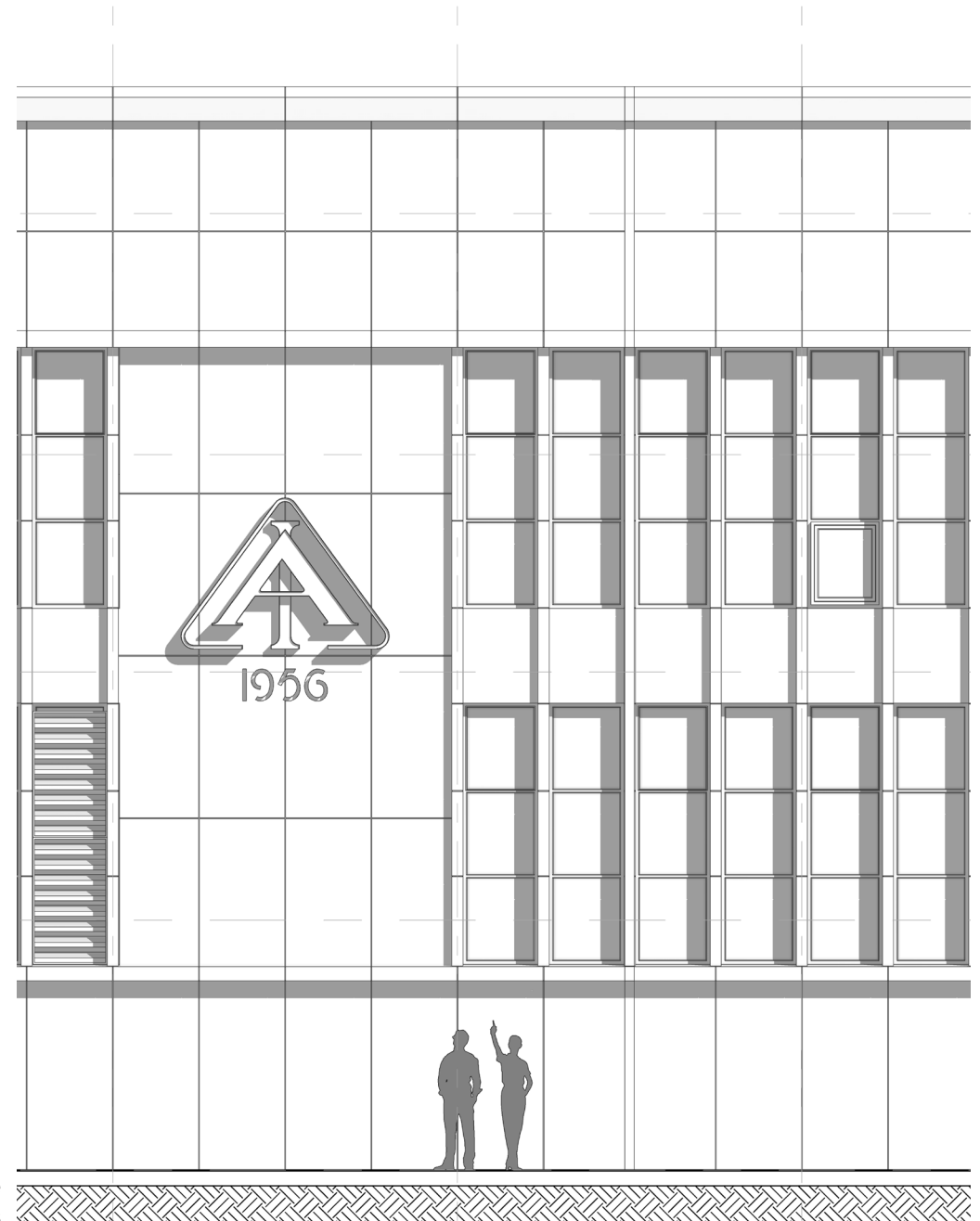




AR3AH110 - HEMBRUG
ANALYSIS OF BUILDING 429
by Bill Iliopoulos

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Cover photograph © Zaandam Archive
Elevation callout © Bill Iliopoulos



Aerial photograph of Hembrug. © Zaanij

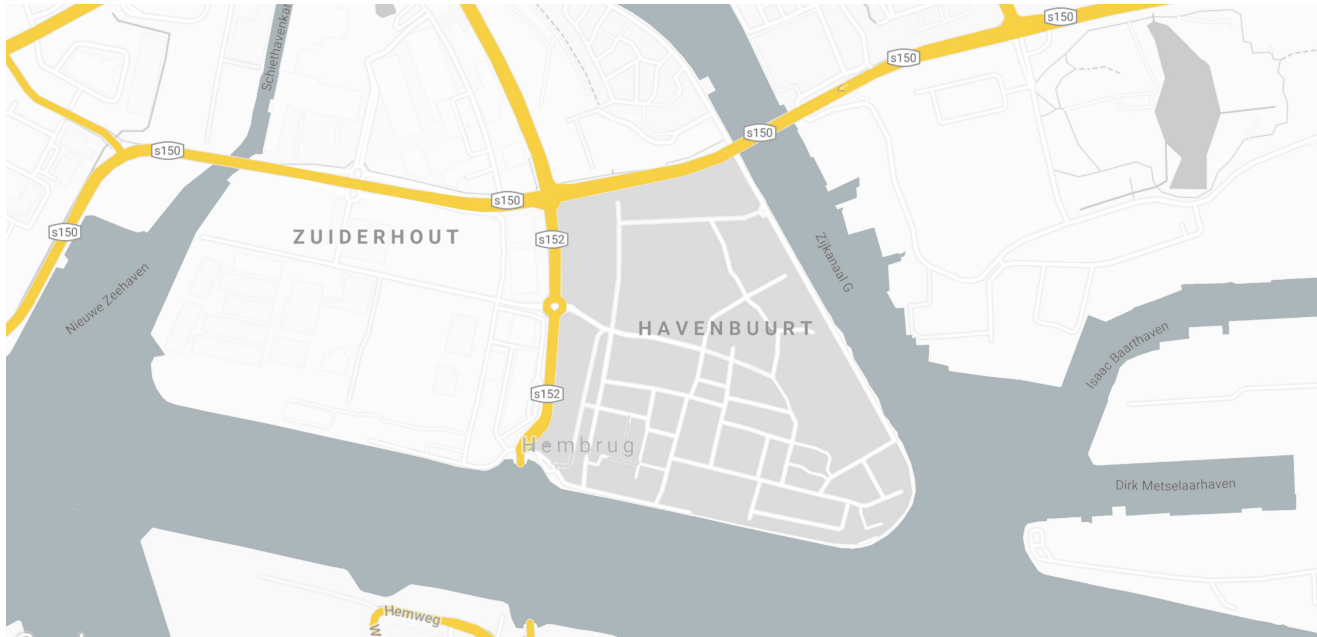


Hebrug's position in Europe. © Bill Iliopoulos



Hebrug's position in relation to the North Sea Canal. © Bill Iliopoulos

The Hembrug site is a former military complex in Zaandam, North Holland, approximately 8 km North-west from the centre of Amsterdam. The overall surface of the site is approximately 42 hectares, at an average elevation of approximately +1m.



The main roads defining Hembrug. © Bill Iliopoulos



The local road network. © Bill Iliopoulos

The site is roughly defined between the North Sea Canal (*Noordzeekanaal*, South), Side Canal G (*Zijkaanal G*, North-east), Provincial Road S150 (*Provincialeweg S150*, North) and Provincial Road S152 (*Provincialeweg S152*, West).

Due to the strict and logical urban planning implemented in the design of Hembrug by the Corps of Genius engineers (*Korps der Genie*, i.e. military engineers trained by the Royal Military Academy-KMA), lines of sight have been created throughout the site. While today they are merely seen as an important element to be preserved, their existence served a purpose. This purpose was the smooth production process throughout the entire site, as well as the logical and safe distribution of buildings. These lines of sight, such as the Middenweg, used to accommodate light railways for the internal transportation of materials, as well as pipelines for the steam delivery system.



Dominant lines of sight. © Bill Iliopoulos



Building 429 as a disruption to views in and out of the site. © Bill Iliopoulos

Building 429, highlighted in dark grey, and as an extent, the entire Waterfront Zone (along the North Sea Canal, on Hemkade), has been called the “Face of Hembrug”. As seen in top photograph, taken from the southern bank of the North Sea Canal, that name is justified; not only are the building north of the Waterfront Zone barely visible, but Building 429 (due to its white colour and large scale) is the most noticeable. It is logical that this effect works in reverse as well, with Building 429 disrupting views out of the site (effect illustrated in red).

The same strict urban-scale planning which resulted to the lines of sight, in combination with multiple demolitions of buildings over time, has also created plaza-like areas. The most important ones in the close proximity of Building 429 (dark grey) are highlighted in the map to the right in yellow. In this case, the westernmost space is a result of demolition (the space was occupied by Building 55)



Plazas close to Building 429. © Bill Iliopoulos



The Hembrug site has been divided in ensembles by SteenhuisMeurs; the names of which provide useful information on the formal functions of their buildings. Zone 1, the Waterfront (Formal), which includes Building 429, is highlighted in the map to the left in yellow.

Zones:

1. Waterfront (Formal)
2. Waterfront (Informal)
3. Munition Production Zone
4. Cartridge Production Zone
5. Weaponry Production Zone
6. Testing Zone (*Plofbos*)
7. Zaandam Sector Park

Zones 8 & 9 have been omitted as they are not directly relevant to the scope of this report.

The zones of Hembrug; highlighted the Waterfront Ensemble. © Bill Iliopoulos



Sketch on Draaibank, Hembrug. © Bill Iliopoulos

The former military site of Hembrug is called Hembrugterrein. The area was originally named the **Hem**. The railway swing bridge (Dutch: **brug**) over the North Sea Canal, in existence between 1878-1985, was thus called Hembrug. The name's last component, **terrein**, is Dutch for area or site. Thus, a literal translation of the term would be "Site of the Hem Bridge". A large portion of the site was reclaimed during the construction of the North Sea Canal.



Aerial view of the Hembrug, circa 1978. © Afdeling Multimedia Rijkswaterstaat



The site in 1941. © Aviodrome

By WWI, the Hembrug site had become the centre of the Dutch military industry, benefiting from the idea of the Netherlands being independent in terms of defense, as dictated by law, ca. 1870.

The site currently occupied by Building 429 used to house a Naval coal storage shed (Building 198), since before 1895. The shed is highlighted in the photograph to the left, circa 1941.



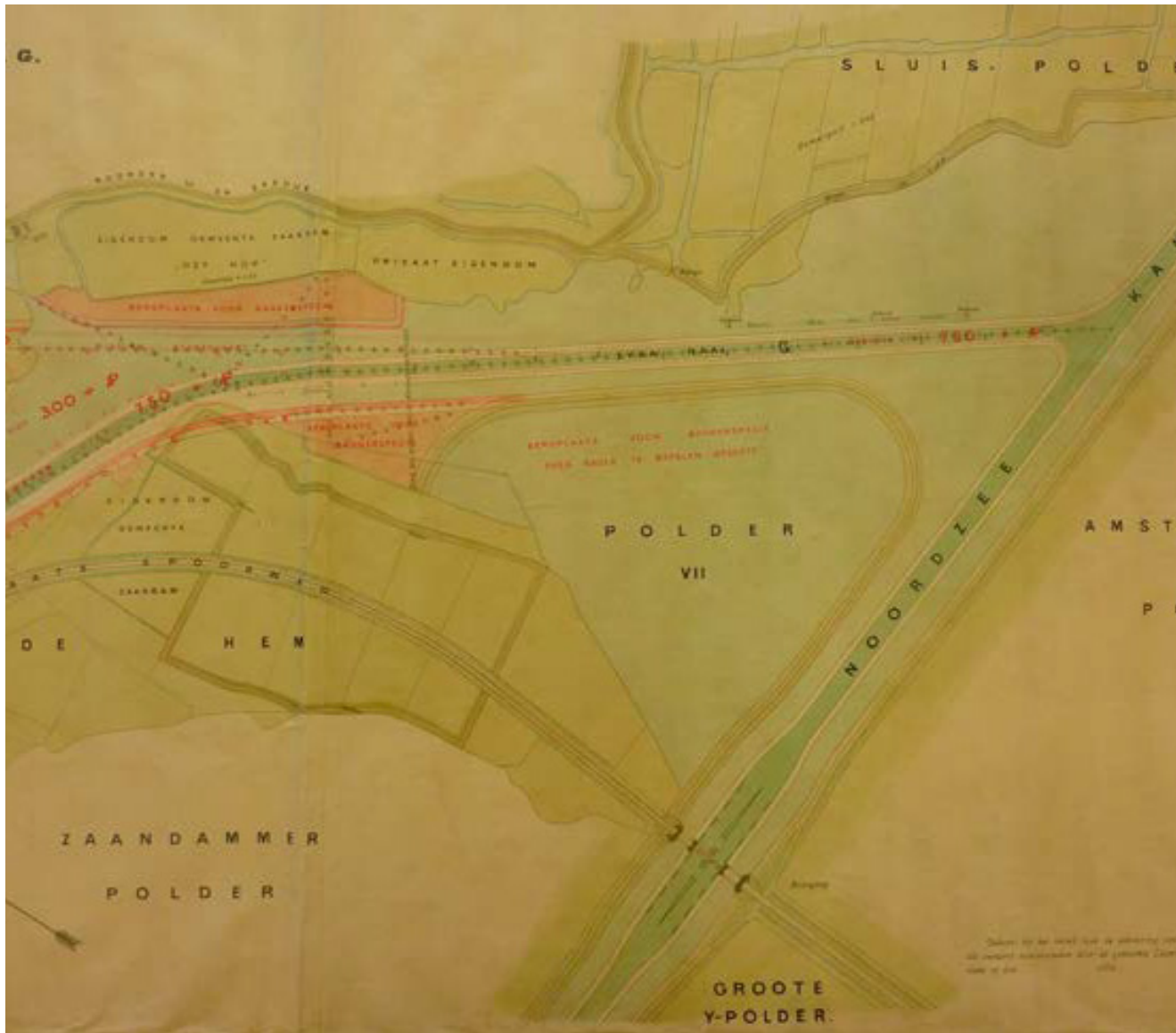
Specialising in military production, an area developing rapidly in the 20th century, the site has been developed and adapted various times throughout its history. Its planning, on an urban scale, has always been dictated by the balance between safety and efficiency. The aspect of safety can be seen in elements on both a site scale (e.g. the orientation of buildings and the existence of extended wooded areas to diffuse possible explosions) and a building scale (e.g. the shape of roofs and the technical characteristics of the buildings). The aspect of efficiency was some times opposing to that of safety; in order to reduce transportation times, loss of energy through long steam pipelines etc., the complex needed to be as dense as possible.

After a long course of 108 years, the site permanently closed its doors in 2003. During that first part of its current life, the site witnessed times of prosperity and hardship, two World Wars, the Cold War, the fall of the Eastern Bloc. All these events can be read in Hembrug, through the elements of the buildings from each era.

In its current state, the complex is composed of 112 buildings, 50 of which have a monumental status (on a municipal or national level).



Above: Hembrug site in its current state. © SENS Real Estate
Upper left: part of the steam pipeline network, on Middenweg.



The future Hembrug site in 1882. © Zaandam Municipal Archives

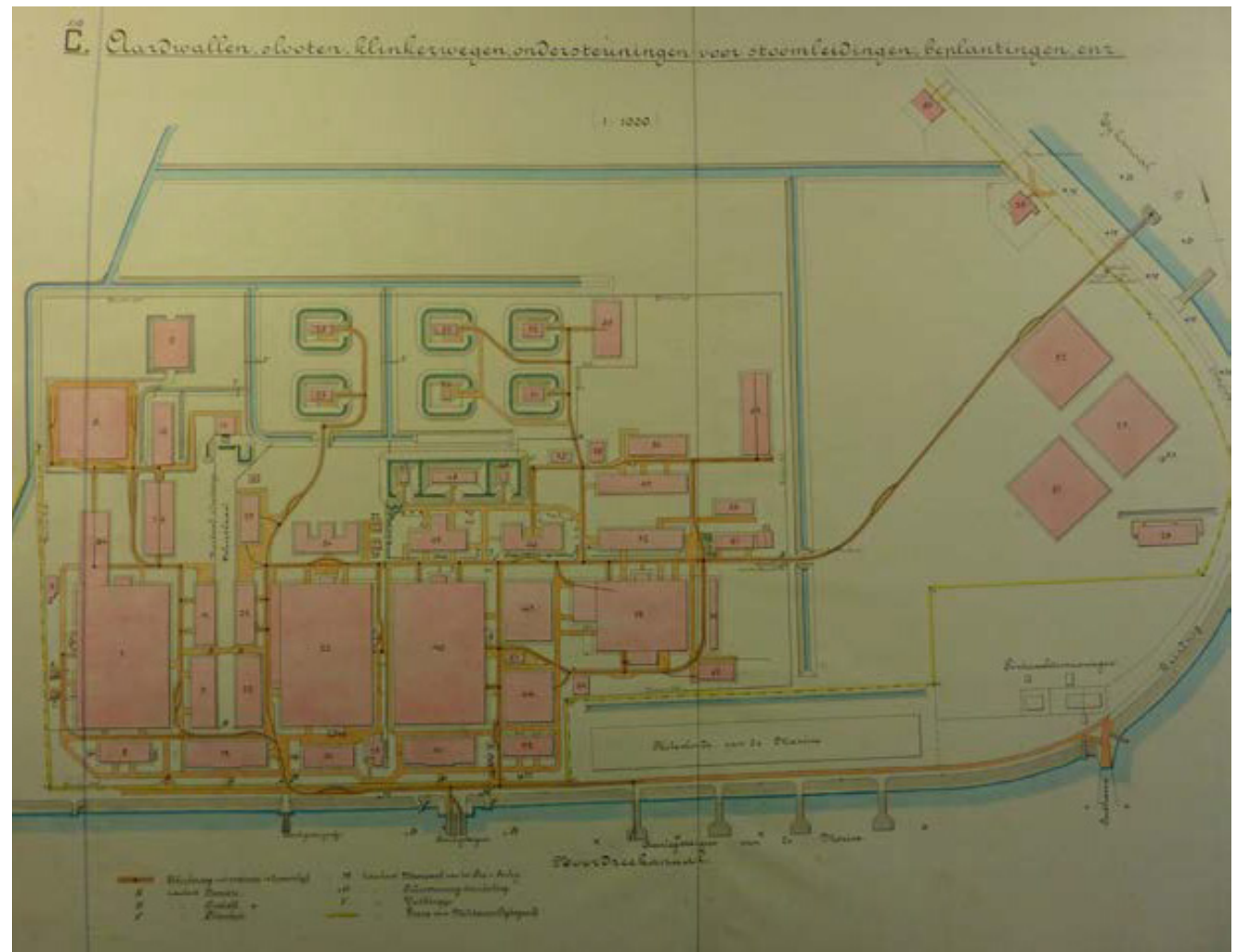
It can be said that the site's history began in 1895, when the Dutch, state-owned firearms maker *Artillerie-Inrichtingen* (literally translated as *Artillery Institutions*, commonly abbreviated "AI") moved their factories from Delft, South Holland. The main reason for this move was the lack of space in the area of Delft, as well as accidents in similar productions area, which affected Dutch population centres. Of the three possible sites, the one in Zaandam was chosen as it is strategically situated within the Defense Line of Amsterdam (*Stelling van Amsterdam*), while, at the same time, at a safe distance from the city.

2.1 FIRST DEVELOPMENT PHASE: 1895-1901

The first development phase commenced with the relocation of Artillerie-Inrichtingen from Delft, in 1895. These first 62 buildings share some common characteristics, such as their formality, classical character (e.g. symmetry, a clear hierarchy of elevations, a facade articulated in plinth-shaft-crowning) and materiality (mostly brick walls featuring bands of natural stone and timber frame openings).

On an urban scale, the site was developed on a rectangular manner, with many symmetrical features.

The construction of the new munition factory, designed by engineers of the Korps Ingenieurs der Genie (translated as *Corps of Genius Engineers*) was completed in 1901. A focal point of their design, on an urban scale, is the density of the complex. The Artillerie-Inrichtingen factories were placed in close proximity to each other, some surrounded by ditches. The composition as a whole followed strict rectangular patterns, and showed symmetrical elements. The production plant was designed to produce the M95 rifle, introduced in 1895, and its 6.5mm ammunition. Thus, the masterplan of Hembrug follows the flow of these productions. The three distinct production zones; from the west and eastwards: weapons production (14 buildings), cartridge production (12 buildings) & other production also followed the same logic. These three zones along the west-east axis resulted to the design of many urban-scale elements (e.g. main roads), and subsequently buildings, along the north-south axis.



Hembrug in 1903. While the drawing shows the light railway network (in red), the logic in the urban structure of the entire site is evident. © North Holland Archive

2.2 SECOND DEVELOPMENT PHASE: 1902-1924



Hembrug in 1924. © Netherlands Institute for Military History

Hembrug developed from the smaller-scale complex it was by the end of 1901, to a factory city, within two decades. Due to regulatory changes, *Artillerie-Inrichtingen* had to comply to new standards; this pushed the management to modernise and expand. By 1914, Hembrug was a full-size military production factory. The outbreak of World War I meant brought orders by the Dutch government, aimed to protect the country's independence. This led to further expansion, both in terms of production volume, building stock and human capital.

In terms of masterplanning, new buildings were placed between the existing ones, retaining a safe distance. The ammunition production required a safe distance between buildings. The firearms production zone was an ensemble of autonomous buildings, and thus developed to its current state. The production line of the cartridges dictated for the buildings to be connected. Perhaps the most important addition of this phase was the military-controlled area in the northern side of the site, in 1905. Manned only by military personnel, it housed the central warehouses supplying the Defense Line of Amsterdam. A focal element of this zone was the deciduous tree forest (approximately 1920).

By the end of this phase, Hembrug had three distinct zones. The munitions production zone was open and included greenery, the firearm production zone was a dense network of individual buildings, and the cartridge production zone was an ensemble of buildings. The military area, in the forest, was a cluster of independent buildings.

2.3 THIRD DEVELOPMENT PHASE: 1925-1944

The establishment of the League of Nations, after the end of WWI, changed the landscape in the armament industry. This affected Artillerie Inrichtingen, halting research and attempts to expand & modernise. When the Great Depression hit Europe, the Dutch army was reduced to a minimum. This led the company to re-purpose a part of Hembrug for civilian production. This production included agricultural equipment, bicycles, etc.

The increasing armament by the Third Reich was a contributing reason for the establishment of the Defense Fund (*Defensiefonds*), re-igniting military production in the Netherlands. The production was diversified, which was showcased in the building stock; some of the older buildings were demolished to make room for newer, larger ones. The larger scale was mainly evident in the western part (e.g. Building 320), as well as in the military section in the north. Characteristic of these buildings was the thick, reinforced concrete which surrounded them.

Hembrug was guarded by the military between 1939-1940, through the use of, amongst others, anti-aircraft guns. After the Nazi invasion, all production was restricted to civilian products, to avoid strengthening the Reich's war efforts.

The site was not expanded during the War. The only expansions took place in the northern part, where the occupation forces built shelters.

Before the War was over, the production equipment was transported to Germany.



Carte postale showing Hembrug in the later 1920s. © North Holland Archive

After WWII, small-scale military units were housed in buildings in the northern part of Hembrug, including the Ammunition Investigation Service (*Munitie Onderzoeks Dienst*). In 1950, another military zone was established in the western part of the site. This also led to the demolition of older building, to accommodate new functions. These units were camouflaged.

Artillerie Inrichtingen continued the production of civilian goods after the War as well. For example, the company's lathes had become standard in many households. Thus, older factory buildings were re-purposed to accommodate these productions.

The Prague Spring, in 1968, caused political turmoil and tensions, resulting to increased ammunition orders. Five years later, in 1973, the landscape had changed dramatically. Artillerie Inrichtingen was no longer profitable, and was thus split in two companies: Eurometaal NV, which continued the military production, and NV Hembrug, specialising in machining tools. Eurometaal settled in the eastern part of Hembrug and demolished a number of older buildings, especially during the 1980s. In combination with interventions by NV Hembrug, the character of the site was altered.

Finally, NV Hembrug moved to Haarlem in 1983, while Eurometaal ceased operations in 2003.



The Waterfront in the 1970s. © Ellen Holleman & Remco Reijke



View of Building 429, along Hemkade. © nul20.nl

Research question:
Building 429 could be approached as a catalogue of building elements; which of these elements essentially define its character?

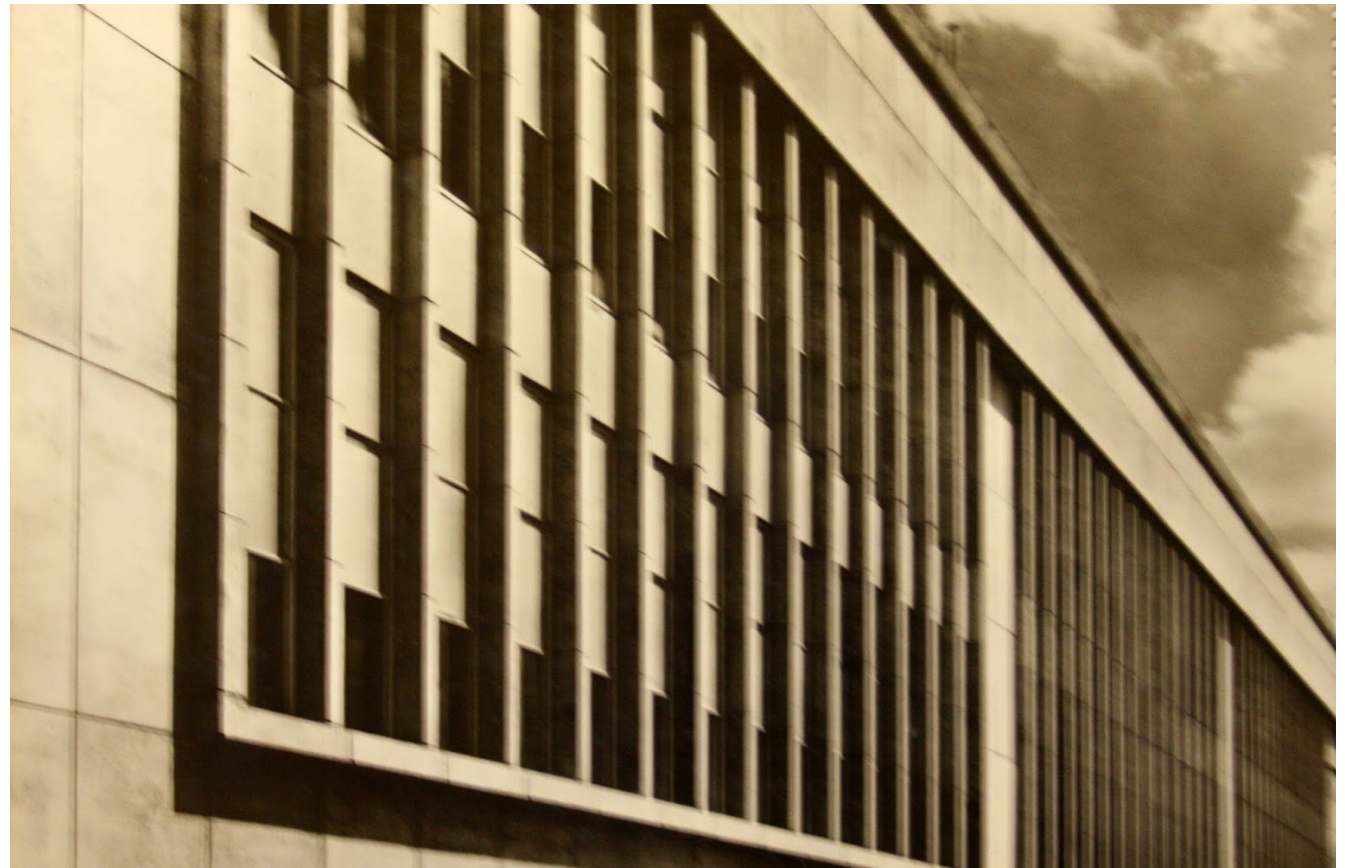
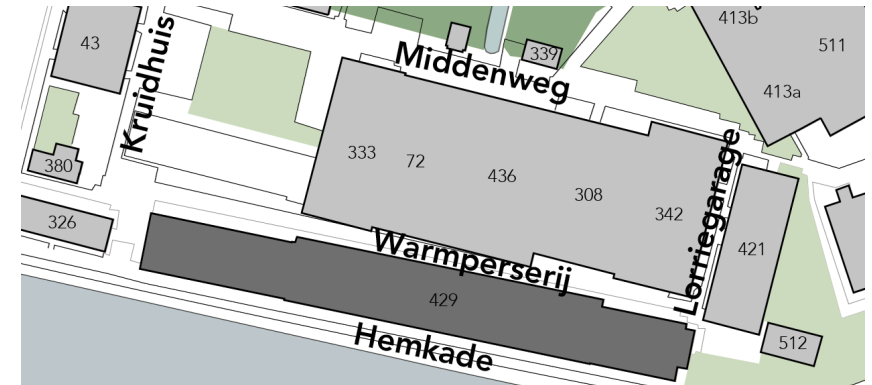
3.1 BUILDING LOCATION

In order to deliver on the order for 36 million .50" calibre bullets, AI commissioned a new building, designed in 1955 and built in the following year: Building 429, aka ".50 Kogelfabriek". That building was the largest development of that development phase. A weaponry renewal was being discussed in many countries. This led AI to acquire a five-year license to produce the AR-10 rifle, from the US producer ArmaLite, in 1957. An order for 40mm rounds from West Germany

Building 429 was designed in 1955. The name of the designer has not been traced, but it appears that the design was carried out by the firm NV Wernink's Beton Maatschappij (translated as *Wernink's Beton Company*) of Leiden. The firm was founded in 1906 and was merged with another corporation in 1970. It eventually went bankrupt a decade later

With a total floor area of 14,000 m², Gebouw 429 (G429) was the largest expansion in Hembrug of its time. It occupies the building block defined by (north and clockwise): Warmperserij (Warm Press), Lorriegarage (Lorry Garage), Hemkade (Hem Quay) and Kruithuis (Gunpowder House); the street names by themselves can show the context's former functions. Before its construction, the site was occupied by a coal storage shed (Building 198), owned by the Navy. That coal storage shed was present when AI relocated to Hembrug in 1895, and was demolished some time between 1941-1956. The footprint of the two buildings is almost identical, something that can explain the proportions of G429's floor plans.

The building was unveiled on June 2nd, 1957 and officially inaugurated on July 18th of the same year by HRH Prince Bernhard.



Top: Street names in the locality of Building 429.

Bottom: The building's facade, as seen in the photo-book (photographs by Jan Schiet) produced by AI for its inauguration. © K. de Bree



Photograph & key-map © Bill Iliopoulos

One of the main approaches to Building 429, as seen from Draaibank. This major line of sight is interrupted by the building.



This secondary route, as one approaches from Middenweg, on the corner with Kruidhuis. While there is a visual connection to the sea, the building is dominant.



Photograph & key-map © Bill Iliopoulos



Photograph & key-map © Bill Iliopoulos

The corner of the building, as seen from the opposite side of Kruithuis.



The building as it is experienced from the west end of Warmperserij.



Photograph & key-map © Bill Iliopoulos



A closer approach to the building, where its function as a 'wall' for the Hembrug site can be seen.



Photograph & key-map © Bill Iliopoulos

Experiencing Building 429 as a site 'wall', but this time from the opposite side, along Hemkade. The openness and light are much different than on the building's north side.



Photograph & key-map © Bill Iliopoulos



Photograph & key-map © Bill Iliopoulos

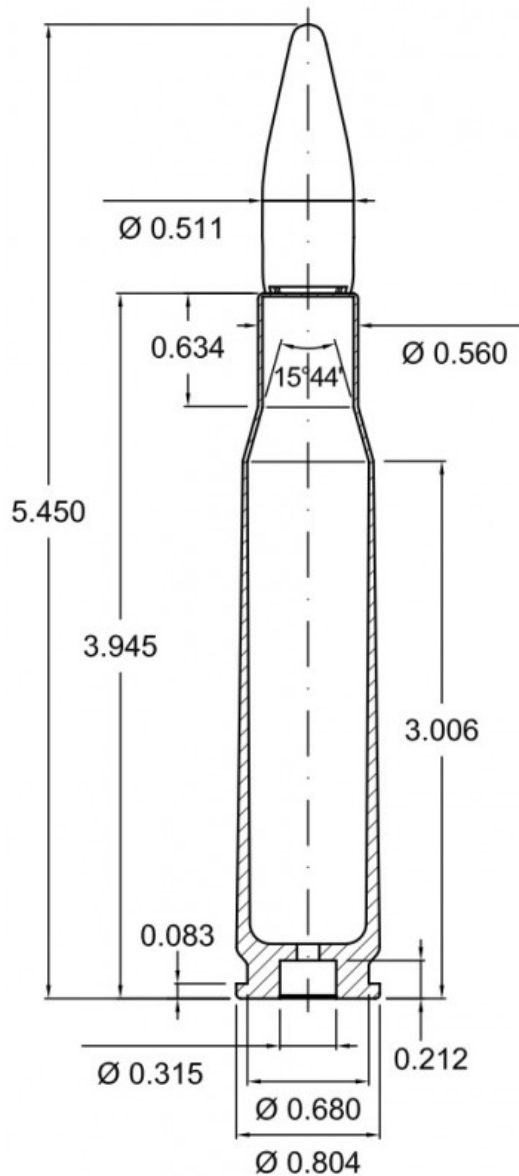
In contrast with the narrow and dramatic, in terms of perspective, Wamperserij, the approach from Lorrie-garage is much more subtle.



Returning to Warmperserij from the opposite side, visitors have yet another experience, with the building appearing to be creating its own urban scale, in complete contrast with the experience on Hemkade.



Photograph & key-map © Bill Iliopoulos



After the end of WWII, Artillerie-Inrichtingen replaced the equipment stolen by the occupation forces by using funds from the European Recovery Program (the Marshall Plan).

Later, in 1949, the Netherlands co-founded NATO. This meant an expansion and modernisation of the Dutch military. .50" cal rounds were standard among NATO members. In 1955, Artillerie-Inrichtingen received an order, by the Dutch state, to produce 36 million of these rounds. These cartridges are used by the M2 Browning Machine Gun (BMG). Even though the order was not significant (all these rounds could be stored in a 7.2x7.2x7.2m volume), Artillerie-Inrichtingen saw an opportunity in it, thus commissioning Building 429. The building was designed to be flexible, in order to accommodate the production of other types of ammunition in the future.

Section through a .50" calibre bullet (Scale 1:1 on A4 paper). Measurements in inches (5.45" = 13cm) © guntap.com

Scale comparison of .50" calibre bullet (left). © Richard C. Wysong

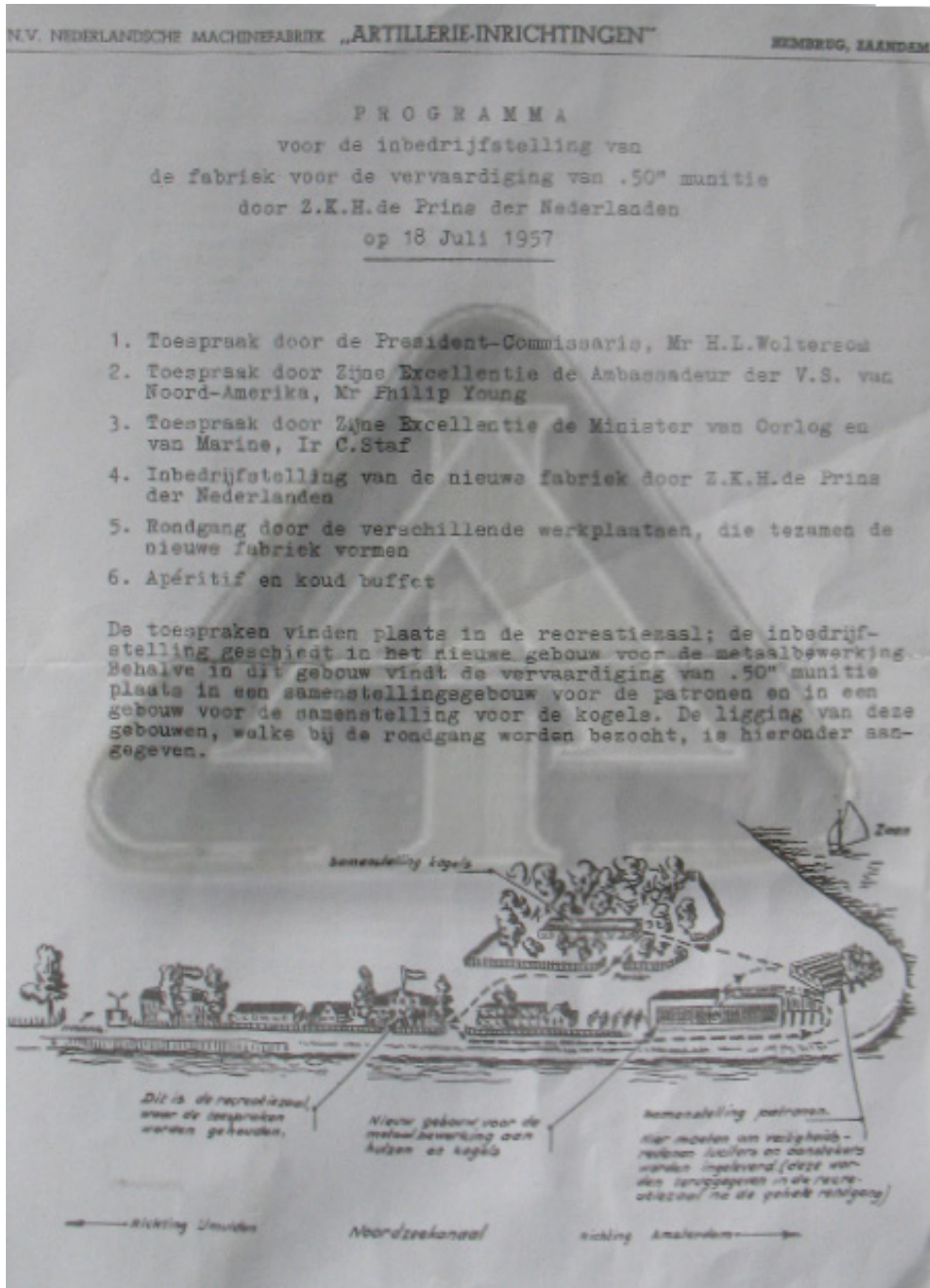
© Vasileios Iliopoulos, 2018 (unless stated otherwise)

3.4 BUILDING 429 - HISTORICAL REVIEW

The photograph to the left seems to have been taken from the east end of Warmperserij, during the last stages of the construction of the west wing. The chimneys visible along the northern wall are not shown in later photographs, suggesting they were temporarily placed for the purposes of the construction.

The photograph to the right shows the unveiling of the AI logo in the middle of the central wing's southern elevation. This theatrical ceremony shows the importance of that element.





The photograph to the left shows the official programme for the building's inauguration day. Amongst the guests, we see the AI President, the US Ambassador, the Minister of War & Navy, HRH Prince Bernhard. This showcases the national, as well as international, importance of this building and the partnership it represents. In addition to this, the programme also seems to inform us of the building's construction phases, on July 18, 1957: the central wing was finished, while the load-bearing structure of the east wing appears completed. Last, the west wing only seems to have the ground floor columns. While not confirmed by the bibliography, it can be assumed that the two most prominent reasons for this construction in phases were a. technical, concerning weight distribution; b. financial, i.e. finishing a part of the building first in order to commence operations. The photograph to the right shows HRH Prince Bernhard receiving a commemorative medal, with a higher-ranking military official in the background.



Left: Programme of the inauguration day. The building's central wing is depicted as finished. In contrast, the east wing seems to have a finished structure but no facades, while the west wing only seems to have the lower level columns. © PDKAIH2017



Inauguration day. © Zaans Museum

The upper level's interior in 1960. The organisation and linear flow of the space confirms the hypotheses for the building's proportions. © Heirs of Peter Marcuse

The Aaldis in process, 2018 (unless stated otherwise). The temporary chimneys on the north elevation have been removed. © Zaans Museum



Building 429:

Information:

Address:

Hemkade 18 (original drawings)/ Warmperserij 13
(current postal address)

1505 RL, Zaandam, Netherlands

Construction: 1956-1958

Client: Artillerie-Inrichtingen

Contractor: Wernink's Beton Maatschappij, Leiden

Function: Armament production

Status: Decommissioned

Technical data:

Footprint: 4423.82m²

Floor area:

2000m² (Basement)

4160m² (Ground Floor)

1130m² (Mezzanine)

4160m² (Upper Level)

11450m² (Interior) + 4160m² (Roof) = 15610m²

Volume:

5400m³ (Basement)

49920m³ (Superstructure)

55320m³ (Total)

Concrete: 6121m³ (load-bearing elements, approximate)

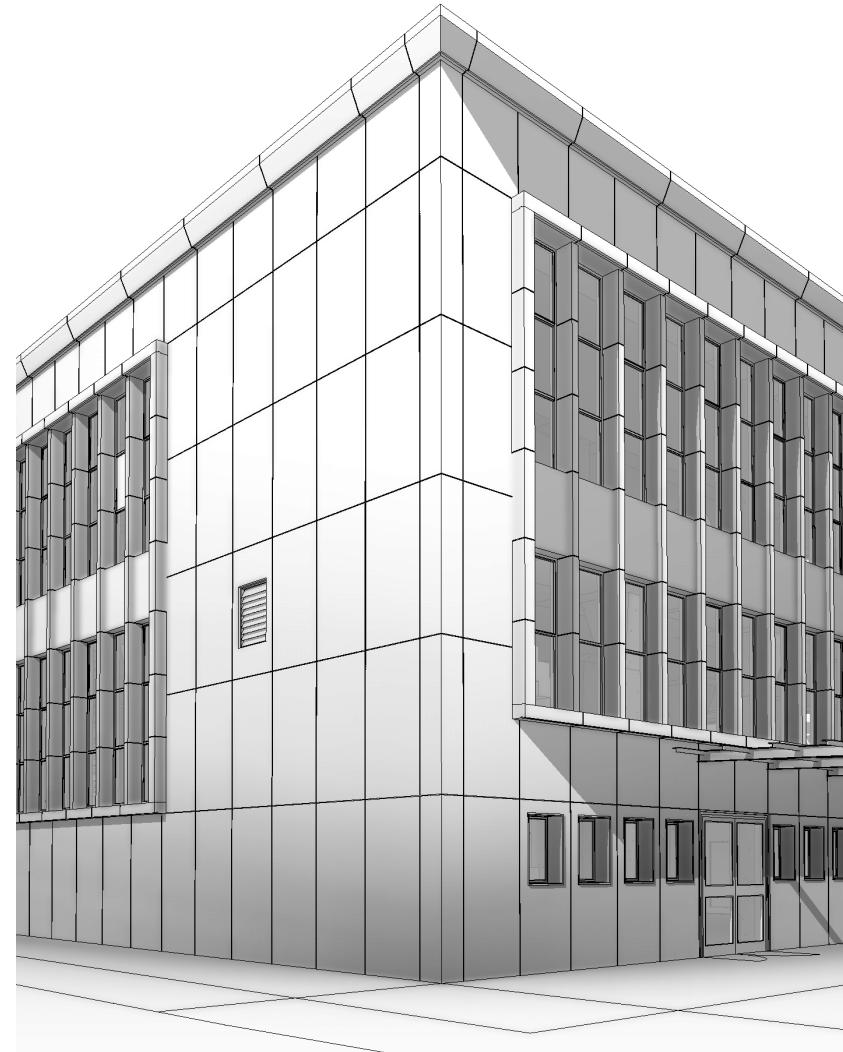
Glass: 2286m² (approximate)

The AI logo, on the building's southern facade, as seen in the photo-book (photographs by Jan Schiet) produced by AI for its inauguration. © K. de Bree

4.1 ARCHITECTURAL LANGUAGE



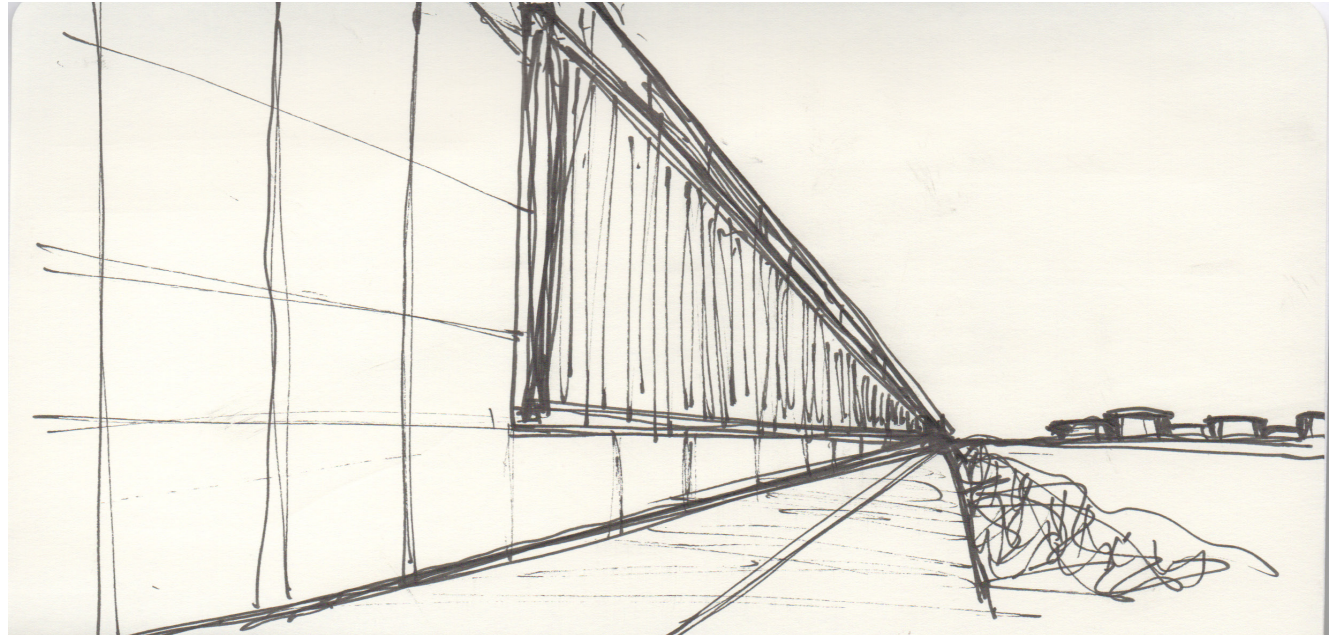
The Wainwright Building, in St. Louis (USA) by Adler & Sullivan (1891). © Archdaily



View of Building 429 © Bill Iliopoulos

The Wainwright Building, built in 1891 and designed by Adler & Sullivan, is considered to be the first skyscraper. The designers have re-interpreted and incorporated many aspects to this breakthrough design. First of all, the composition follows the logic of a classical column in its vertical articulation: solid plinth, boldly vertical shaft resembling a classical column (each of the vertical groups of windows resembling a flute) and the crowning, in this case resembling the capital. The building's corners are very thick, re-interpreting the antae.

Due to the linearity of the modern production line, as well as for practical reasons, most industrial buildings are horizontal compositions. In some cases, architects opted for much more forward-thinking, as was the case with Takis Zenetos' design for the FIX Factory in Athens (1957). His composition is much more dynamic as its horizontal axis much dominant. The façade of the ground level of the FIX Factory is entirely open throughout its length, allowing the general public to witness the production process; this is a great contrast to the blind (for obvious reasons) southern façade of Building 429. A lesser, but still interesting, similarity is that both buildings appear to feature vertically-hung pivot operable windows. Some of the most important aspects of Building 429's exterior are the repetitive elements on its facade (the lintels, columns and vertical windows), as well as the pattern created by the joints of the facade panels. These elements are enhanced by the length of the composition. Additionally, the classical character is highlighted by the clear organisation of plinth-shaft-crowning.



Sketch of Building 429's southern facade. © Bill Iliopoulos

View of the FIX Factory in Athens, Greece, designed by Takis Zenetos in 1957. © citybranding37

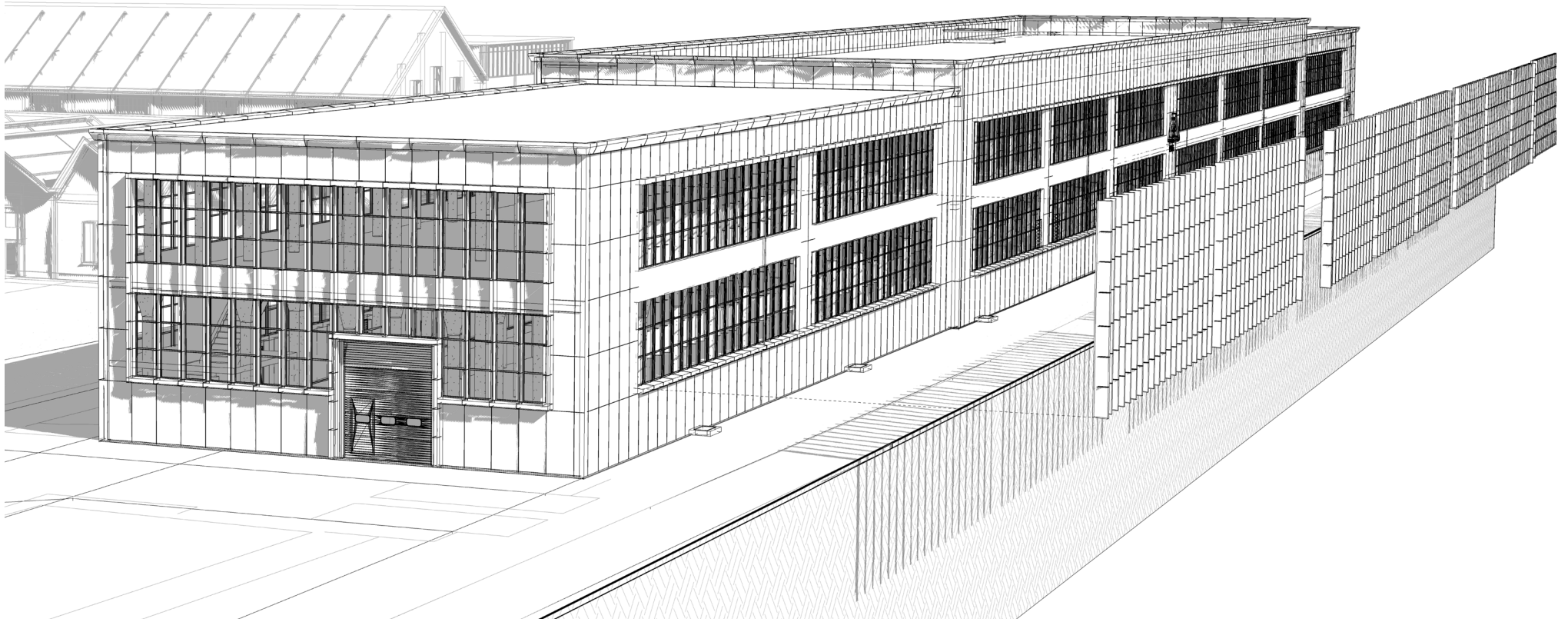


Temple of Khnum at Esna, Egypt. © touregypt.net



View of Building 429. © Bill Iliopoulos

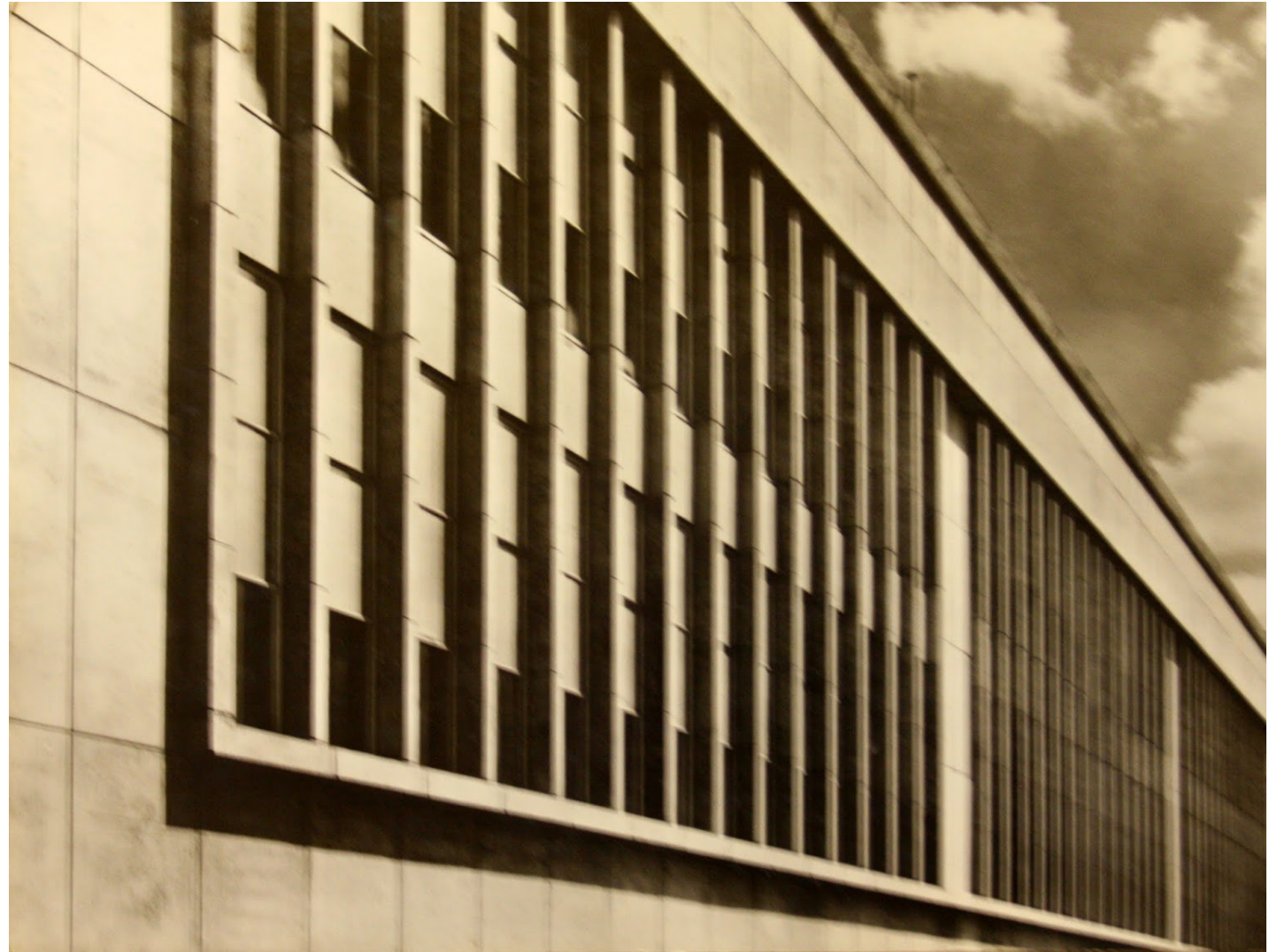
The previously mentioned concepts are not new, as seen from the similarity of Building 429 with the Temple of Khnum at Esna, Egypt (180BCE – 252CE). The solid plinth, thick corners, and simple cornice, as well as a row of grouped openings divided by columns are elements of both buildings.



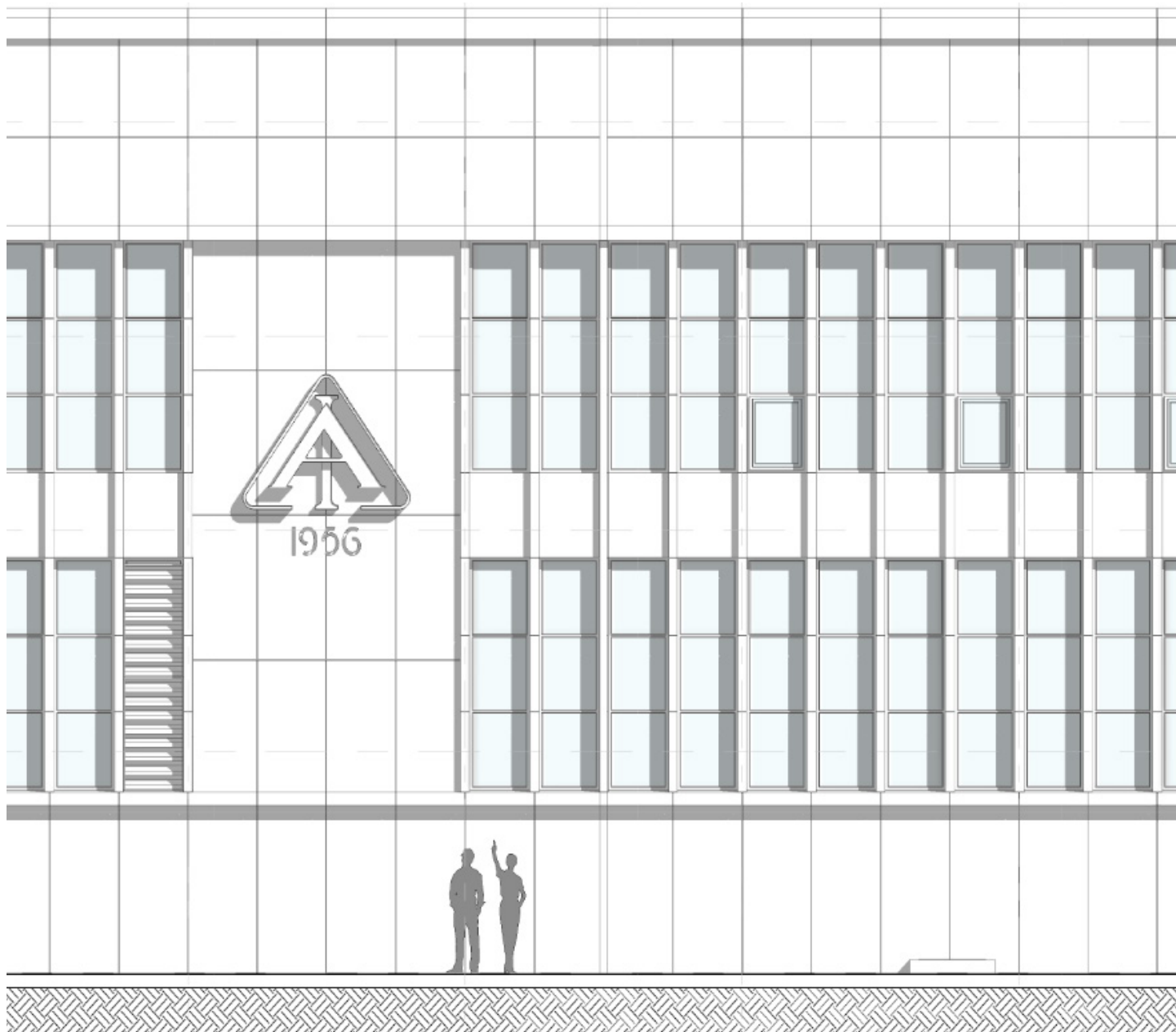
In accordance to the oversizing of several building elements, it could be argued that the 'standard' window has also been re-interpreted at a super-human scale. Louis Sullivan grouped the windows of each elevation of the Wainwright Building (1891) within a single frame, creating a single visual entity, aiming to reference the classical temple, with strong, thick corners (an interpretation of antae) and a perforated bay between them. In Building 429, each of the long elevations features more than one groups, or blocks, of windows. Even in the southern elevation of the central wing, the grandest of the composition, which features a single frame containing all its windows, the windows are divided in six subgroups by vertical strips of solid wall within that frame. This handling is repeated on some elevations, while others feature more than one frames. This progresses from Sullivan's ideas, arguably oversizing the 'window' itself: within a single group frame of Building 429, the frame plays the -visual- role of the jamb, while the pilasters dividing the windows play the -visual- role of mullions. This oversizing of a common element like the window further enhances the scale of the building.

Though appearing symmetric at a first glance, the composition as a whole is actually not symmetric. This false perception possibly occurs due to the perspective given by its length, and the highly repetitive elements of which its facades are composed. In addition, some symmetry does exist in certain aspects within the same wing, leading to the false extrapolation that this is a general fact for the building.

Building 429, built in 1956, is a Reconstruction-era building. This characterisation does not only stem from its place in time, as it encapsulates much of the era's ideas and values. First of all, its aesthetics: the very dramatic long axis, the oversized elements, the classical-esque features (i.e. the hierarchy of volumes, the cornice, etc) previously mentioned, but also some clear modern(-ist) elements, are reminiscent of the architecture for buildings of status during approximately the two decades before it was built. Being a military building, it could be argued that its monotonous rhythm, given by the width of its facade panels, is very fitting, and could be paralleled to the rhythm of a military parade. As such, it inevitably shares qualities with other military buildings. Many examples come to mind, some of which unfortunate, like elements in the architectures of Albert Speer or Ernst May. In any case, similarities can be found on many such buildings, even in the grouped windows, divided by pilasters, in centre of the elevations of the Pentagon (1943). While related to such styles, Building 429 is much less solid and much closer to its contemporary architecture, signifying a new era. Its standardised, vastly pre-fabricated construction was aiming for speed and efficiency, keeping up with its era's principles: fast, efficient and inexpensive construction. Its few ornaments, mainly the cornice and the AI logotype, are simplified and showcase its utilitarian purpose. Last, its intended function is a symbol or the rebuilding in the continent, and arguably, of the new status quo for the Dutch military.



The building's facade, as seen in the photo-book (photographs by Jan Schiet) produced by AI for its inauguration. © K. de Bree



The southern elevation of Building 429 is the most formal. The only entirely symmetric part of the building is also found in it, in the segment of the central wing. On the central wing's centreline, the façade panels have been modified to accommodate the AI logotype above the year 1956, inscribed in the concrete itself.

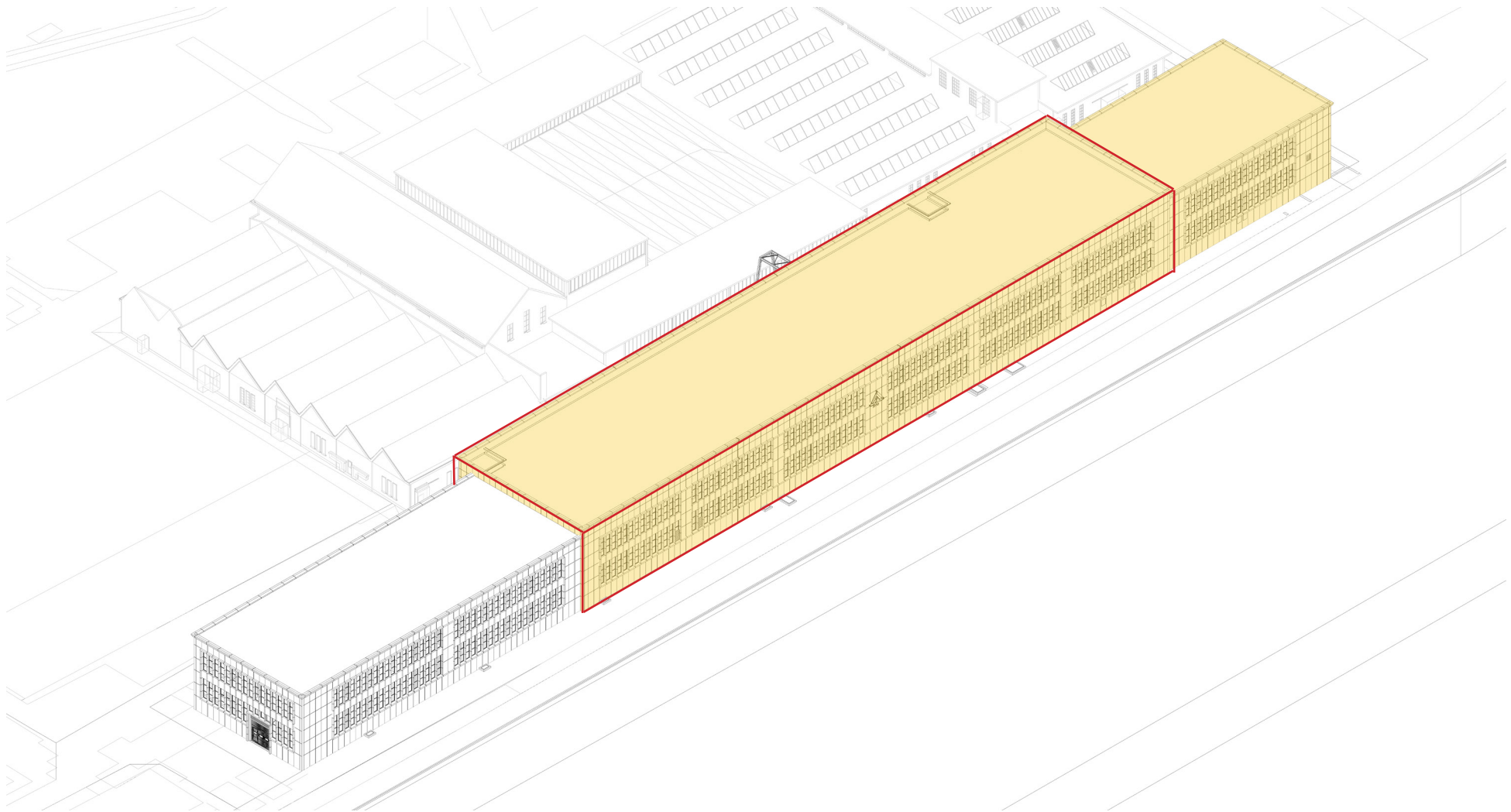
In its function as a wall of the Hembrug site, the southern elevation of Building 429 does not feature any doors or other openings on ground floor level. That is the reason why it was originally not fenced. On the other hand, most pedestrian entrances to the building are located on the north elevation, along Warmperserij, which could be called the "back" of the building. This poses a paradox, as the building's main elevation usually features its main entrance.



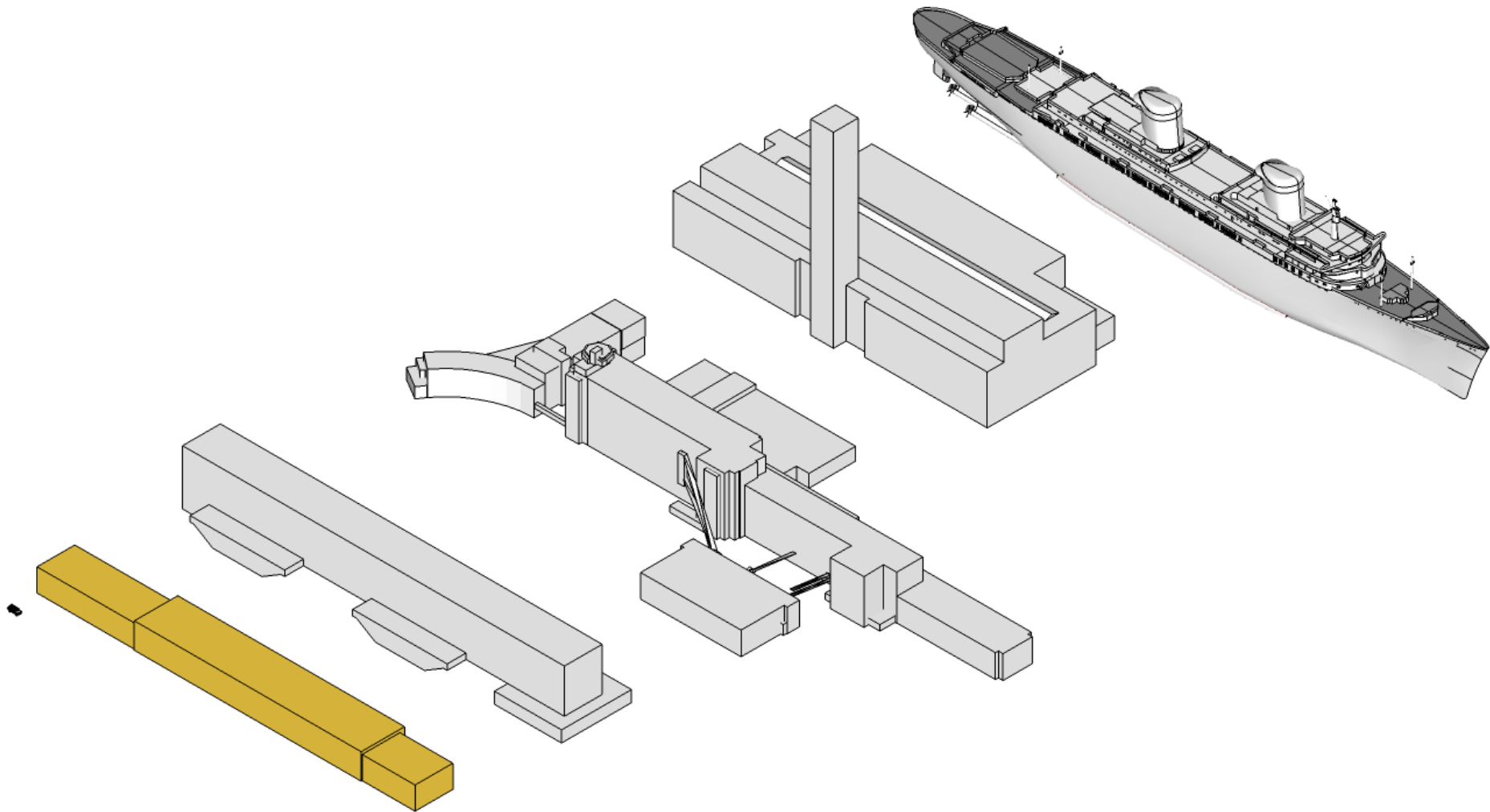


Building 429 is composed of three volumes: a pronounced central wing, with an additional wing of slightly smaller dimensions on either side. This massing gesture articulates the building, 'softening' the -perhaps graceless- effect that a monolithic approach could have in a building of such proportions. As a general idea, that pronounced central wing with the smaller adjacent wings could be paralleled to the principles of Neoclassicism and Palladian precedents. In the case of Building 429, the central wing (acting as a corps de logis) is much longer than either adjacent wing, enhancing the composition's horizontality. This handling of the volumes could be misleading, had this been a civil building, as to where the main entrance is located.

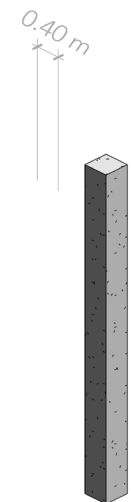
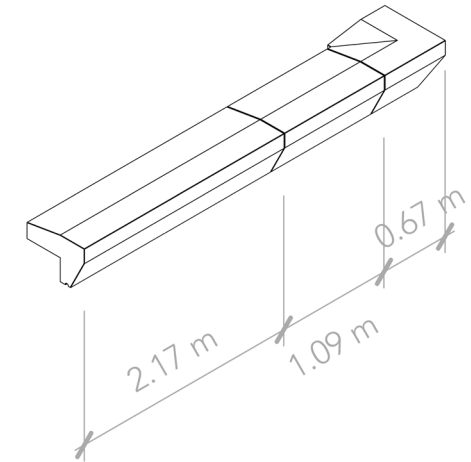
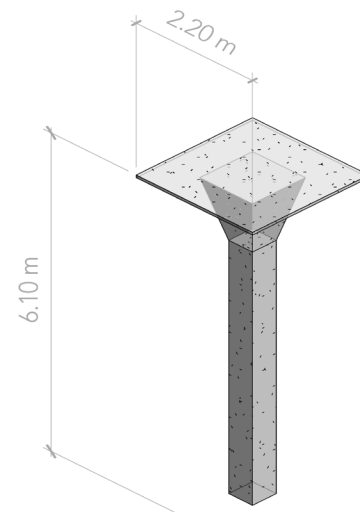
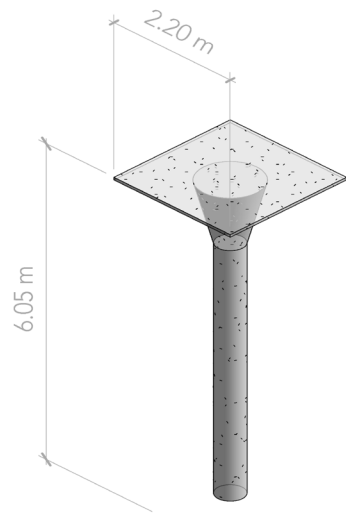
Note: all drawings from this page onwards © Bill Iliopoulos. See caption for the source of other media.



The part of the building highlighted in yellow was constructed first: initially the central wing (red border) in 1956, followed by the eastern wing in 1957. The west wing followed, being completed within 1958. Regardless, all parts were designed in 1955. The buildings designer is not named on any of the traced documents (from two archives) or any publications about the building. The signatures on the drawings are not legible and hardly appear to be writing rather than a continuous line, but the title blocks indicate Wernink's Beton Maatschappij of Leiden as the contractor.



The size and proportions of Building 429 are not always easy to grasp, especially when observing from a small distance, due to obstacles and perspective. Its dimensions can be rounded to give the proportions of 1 x 2 x 20 (height x width x length). It is interesting to compare its size with other structures, current or of its time. With Building 429 highlighted in yellow, and progressing rightwards, the following graphic compares it to the Faculty Of Civil Engineering and Geosciences at TU Delft (1970s), the Van Nelle Factory in Rotterdam (1931), Tate Modern in London (after its 2000 redevelopment) and the SS United States (1952), largest passenger ship in the world until 1962. As we have now moved very far from the human scale, a full-size SUV is -barely- seen to the left of Building 429, as a scale reference.

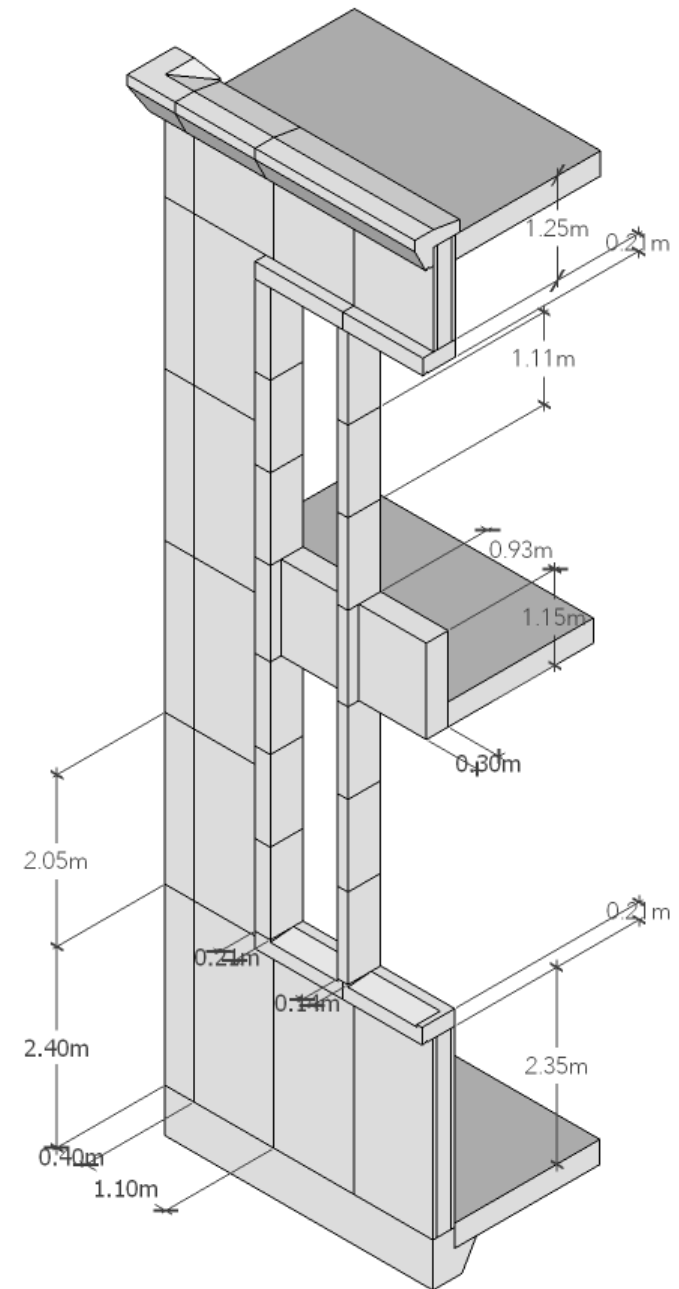


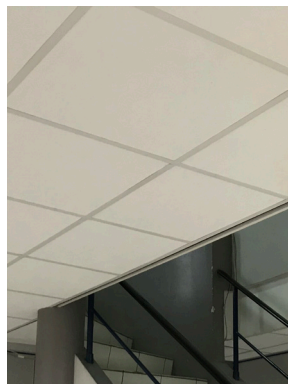
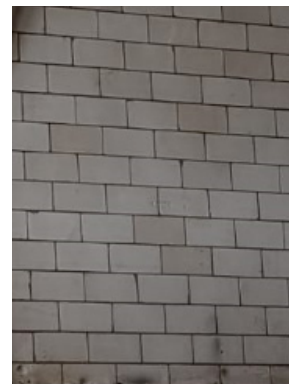
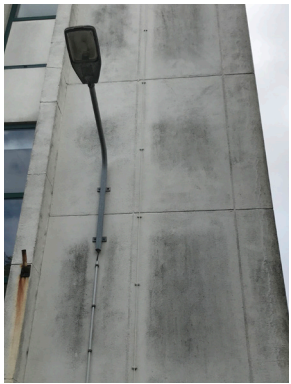
As stated in the research question, Building 429 can be approached as a catalogue of repetitive elements. Starting from the outside and progressing inwards, the façade is the first and most important aspect of this statement, where the modular character is most evident. In broad terms, the façades are composed of four categories of elements: the façade blocks, the horizontal elements (including exposed lintels and cornices), the vertical elements (the pilasters dividing the grouped windows and the adjacent windows within their groups) and the windows. All these elements are pre-fabricated and were only assembled on site. Moving to the interior, the building features four standardised types of columns and two types of beams, all made of steel-reinforced in-situ poured concrete. Shown above the four types of structural columns and the three types of cornices.

The pre-fabricated façade panels of Building 429 are not all identical. The most common type measures 2.40x1.10m (height x length) (all façade panels feature the same width of 30cm). The visible joints between them attribute a classical character, similar in appearance with the masonry construction of a significant building. Unfortunately, after several layers of paint, it is now unclear whether the joint sealant was intended to result in raked or concave joints, although this is negligible to the overall effect. The two main differences with a classical-esque masonry construction are that in our case the blocks are vertical and that the corner blocks are much slimmer (length of 40cm).

The pre-fabricated panels are not the only façade elements with classical references. Starting from the top and moving downwards, the first element is the cornice crowning the entire composition. While much simpler and smaller than its classical counterparts, this is a clearly classical element. Moving on to the frame around the grouped windows, the dripstone is re-interpreted as a simple, rectangular block, of the same length as the façade panels above it. Its only 'sculptural' element is the anti-capillary groove on its underside.

The frame continues, with its edges defined by pilasters. Their section is rectangular and they fully penetrate the wall. There are smaller pilasters between adjacent windows. The pilasters rest on the bottom part of the frame, which could be paralleled to a stone water table. While their section's shape is an irregular five-sided polygon with three right angles, the water tables, much like the dripstones, are not ornate and only feature an anti-capillary groove on their underside. Their length is the equal to that of the dripstone above them. Their tailing measures 15cm. Last, the frame presents another trait close to classical architecture: an (almost araeostyle) intercolumniation.





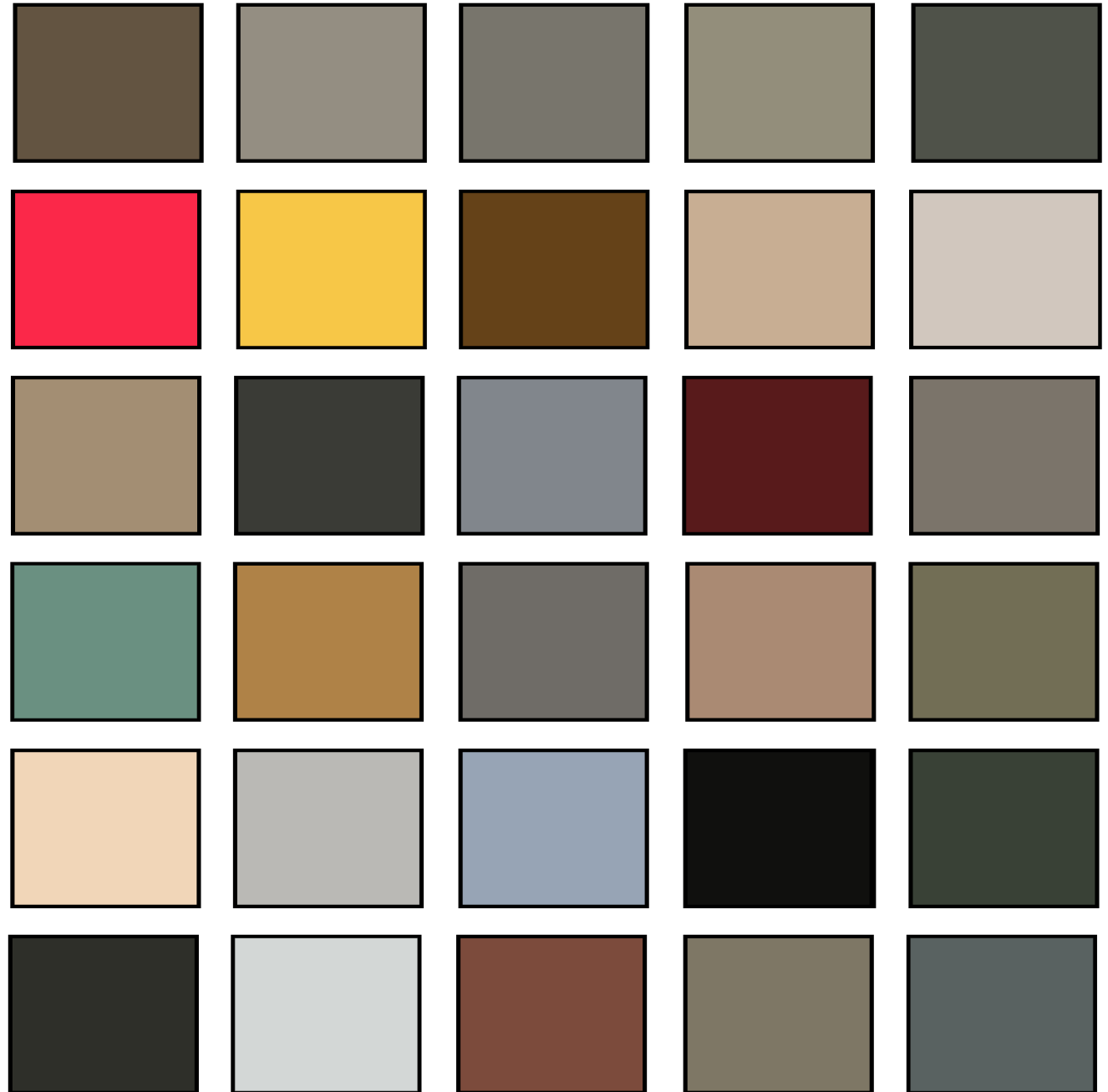
After half a century in service, Building 429 has accumulated various material. Some of them are indicatively catalogued here.

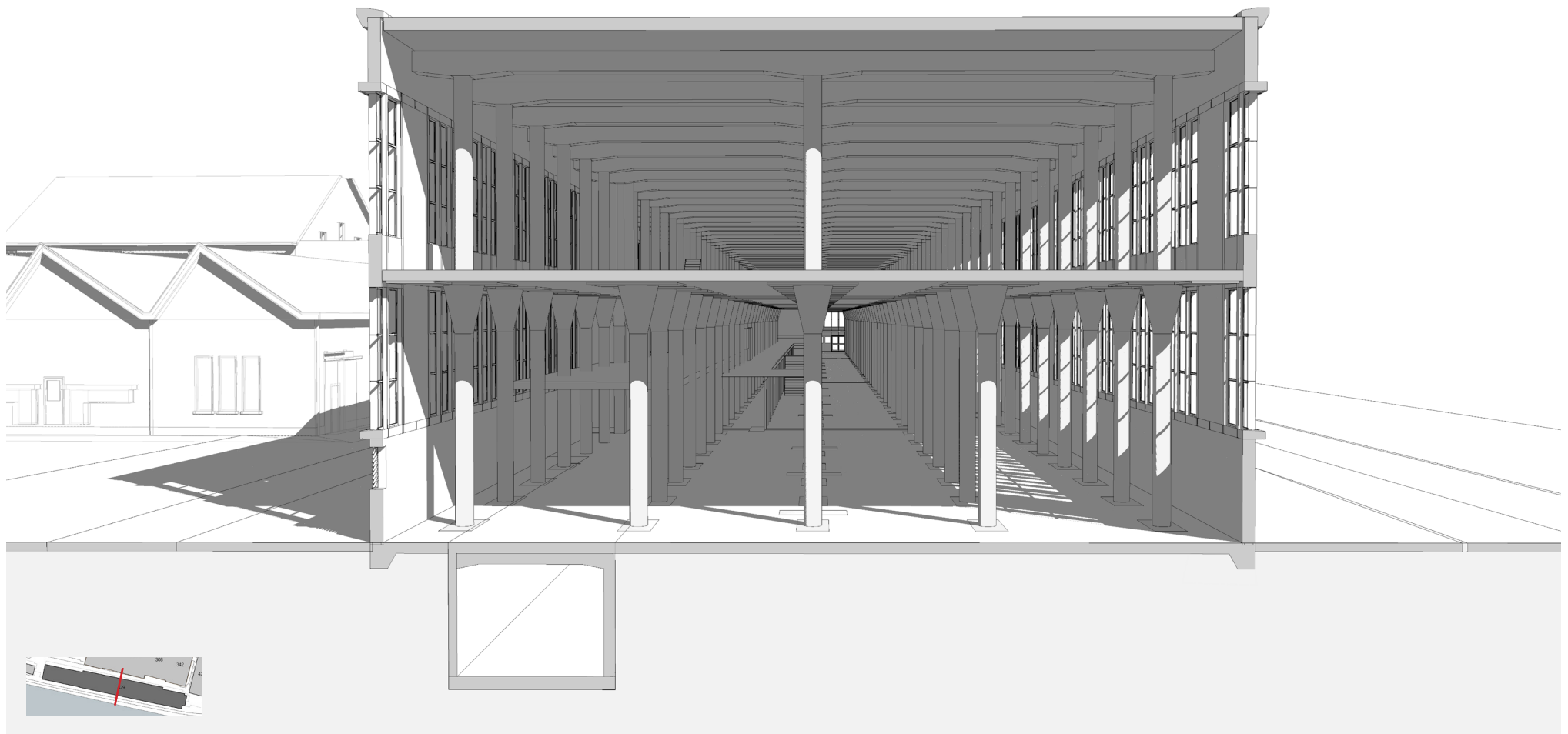
Top and rightwards:
Painted facade panels, painted and plastered facade panels, reinforced in-situ concrete, slab core sample (slab leveller, concrete, acoustic tile), acoustic tiles.

Middle and rightwards:
Linoleum floor tiles, metal railings, metal window frames and glass, cement building blocks, metal frame partition.

Bottom and rightwards:
Timber partition (temporary), plasterboard, ceiling tiles, wooden furnishings, combustion products (unidentified, found in the shooting ranges).

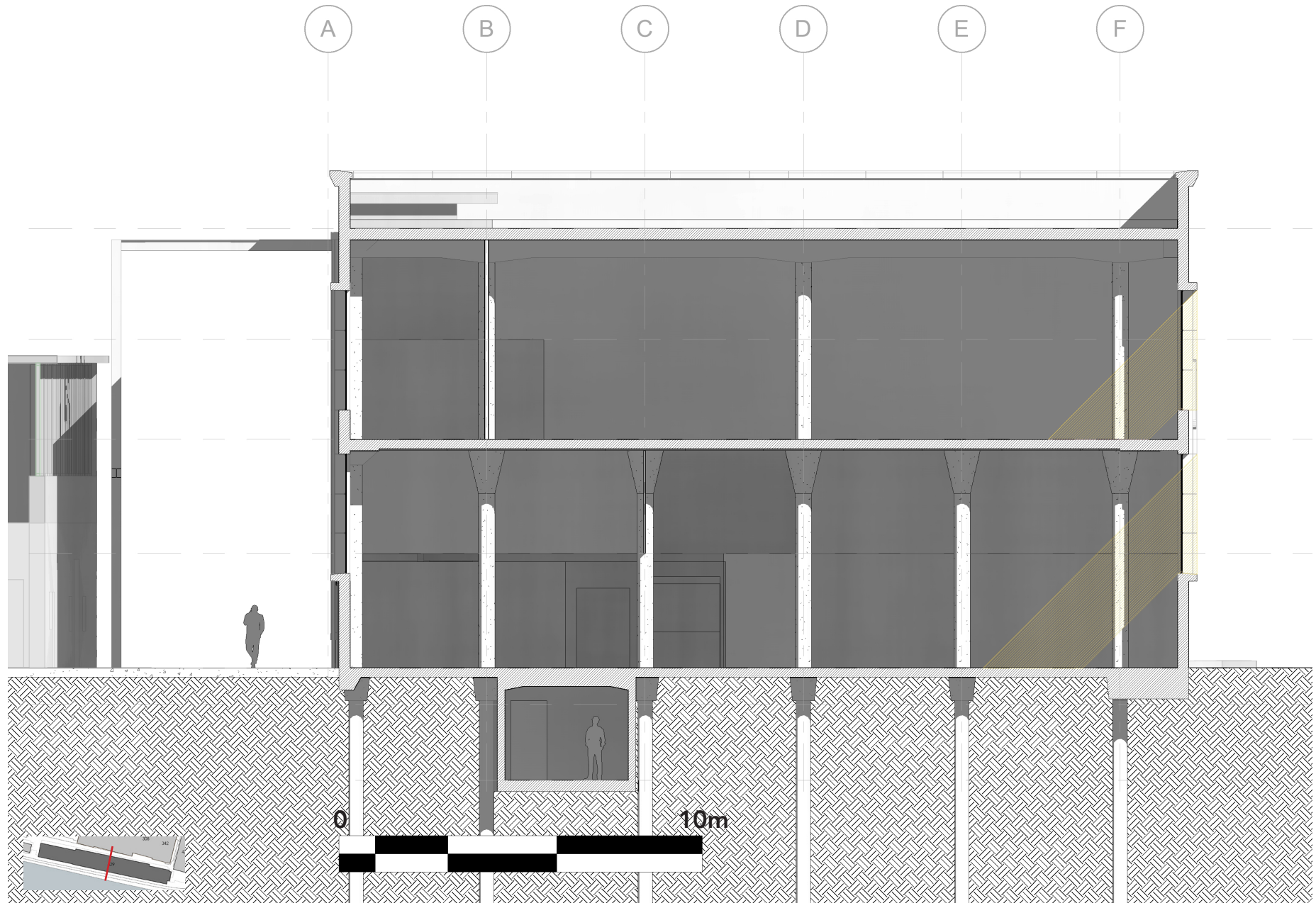
The building's colour palette is heavily connected to its materiality. Initially, the main colours of the composition were grey (exposed concrete floor finish), white (on almost all walls) and pine green (for the doors and window frames). During its service life, but especially after its decommission, the building has undergone numerous alternations. In recent years, it has housed training facilities, exhibitions, and events. This can explain the variety of colours now found almost splattered in its interior, signifying the additional layers of accumulating uses. The colours in the provided palette are found, amongst others, splattered on columns, walls and floors, on the few traces of overhead crane rails, on doors, rusting metal features and deteriorating facades.



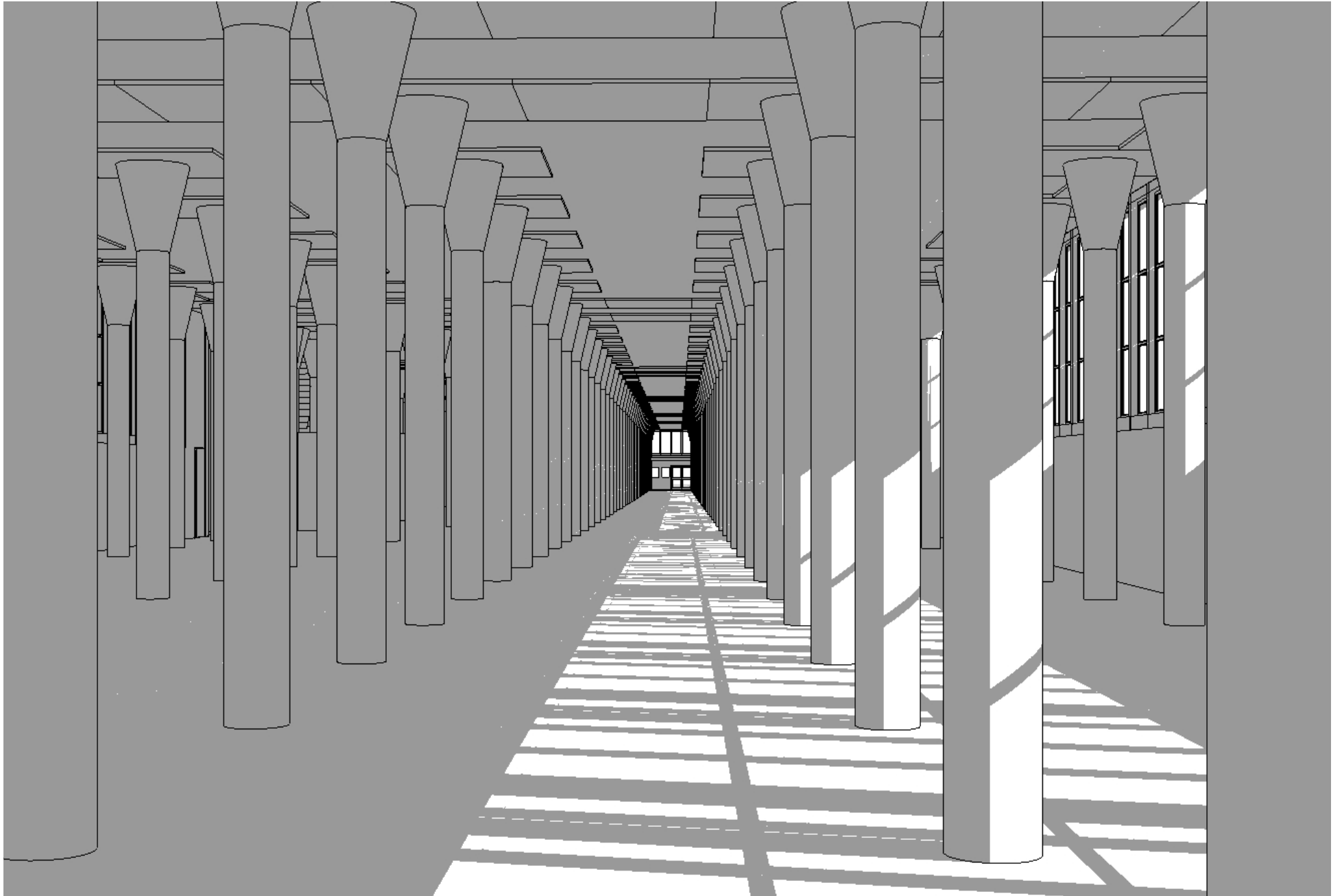


Building 429 is a very transparent composition, glass being one of the main materials. The most open elevation is the east, with a void/solid ratio of 1:1.94, with the west elevation achieving the lowest ratio, 1:0.74. The southern elevation scored 1:1.54, while the north elevation 1:1.19. Overall, the void/solid ratio for all facades is 1:1.34, confirming that this is a very open composition. In addition, its windows are only obstructed by a tall tree on the west and partly by the Ladder on the north. The southern elevation is completely unobstructed, while Building 326 on the east is not close enough or tall enough to produce shadows which would affect Building 429. These conditions allow plenty of natural light the building's interior, and, subsequently, plenty views out of the building.

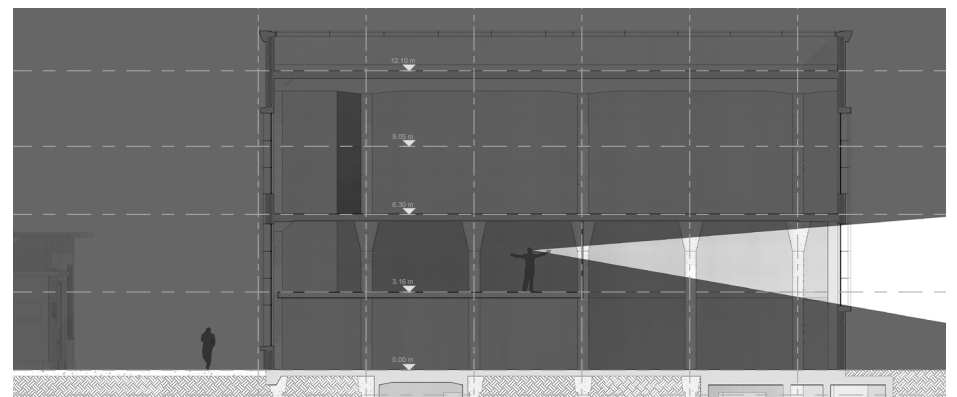
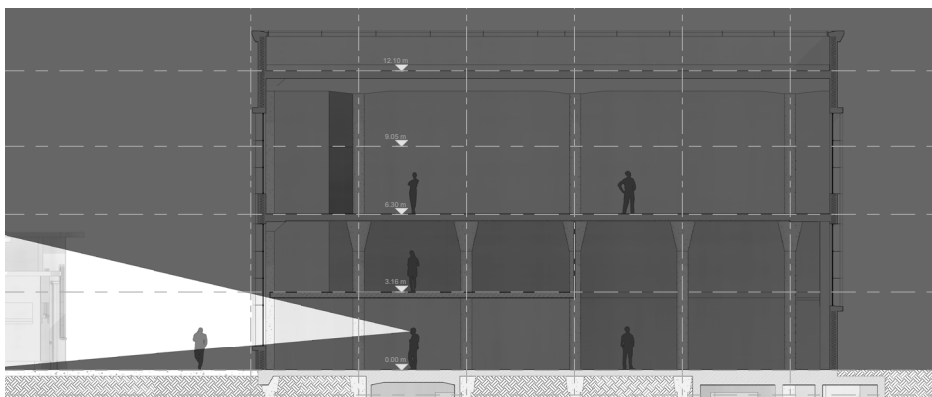
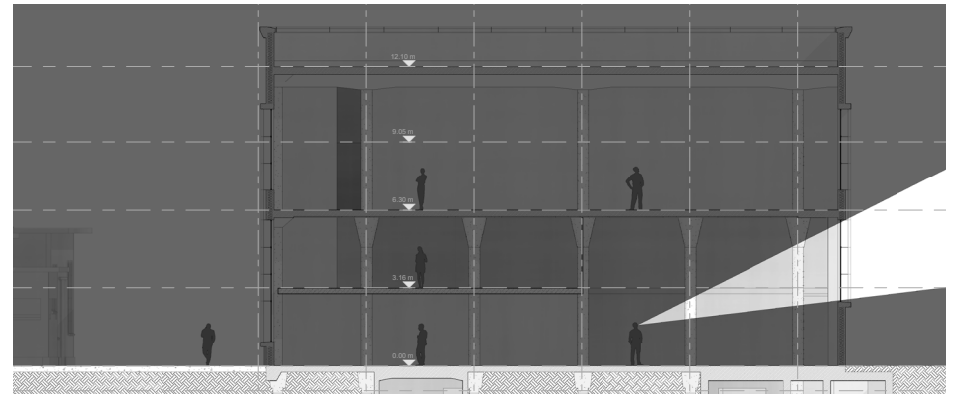
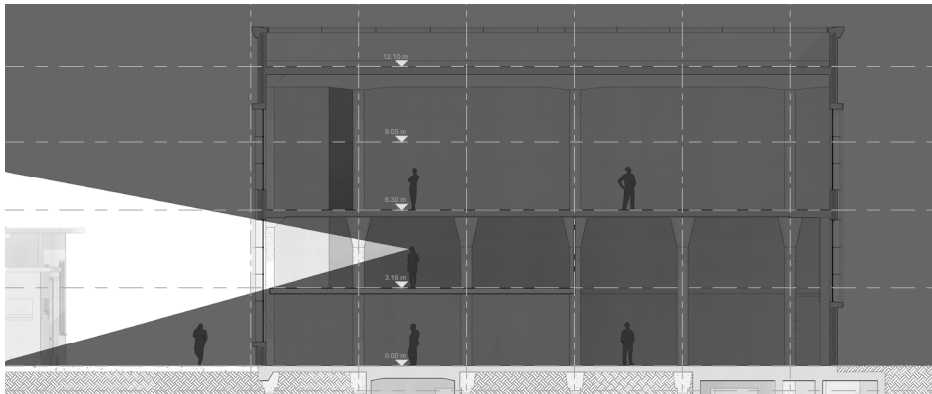
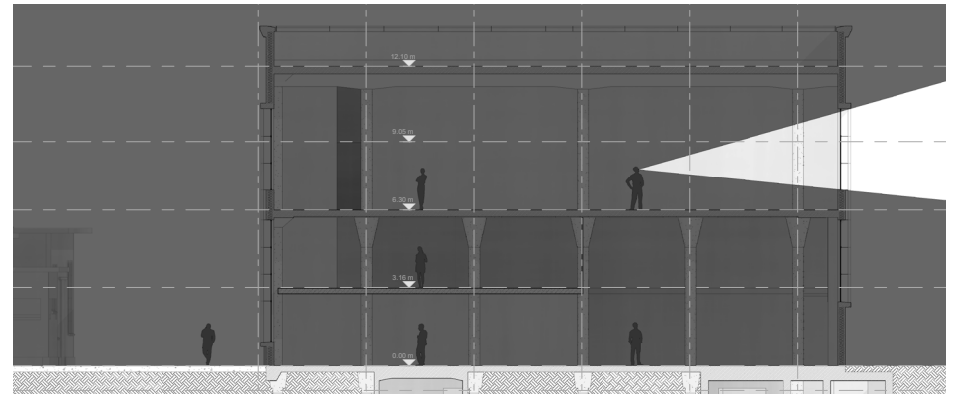
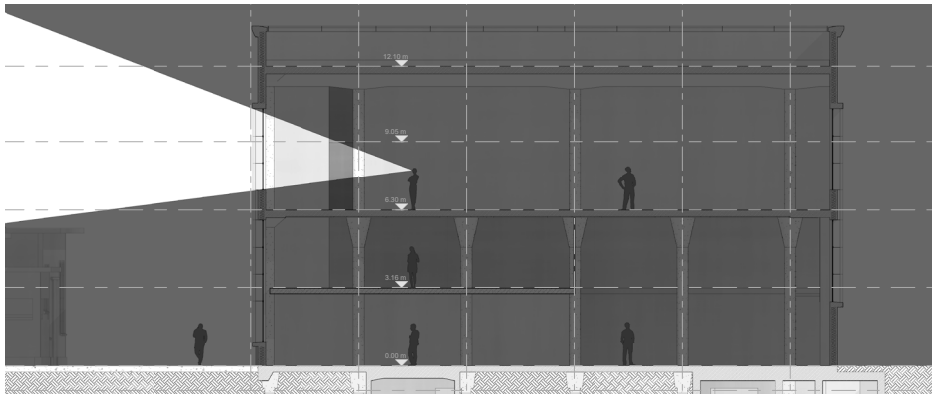
The amount of natural light entering the building, in combination with its largely-open interior, minimizes the need to for artificial light. Especially in the lower level, where the columns are almost twice as dense as on the upper level, the direct sunlight entering the space creates very dramatic effects with shadows.



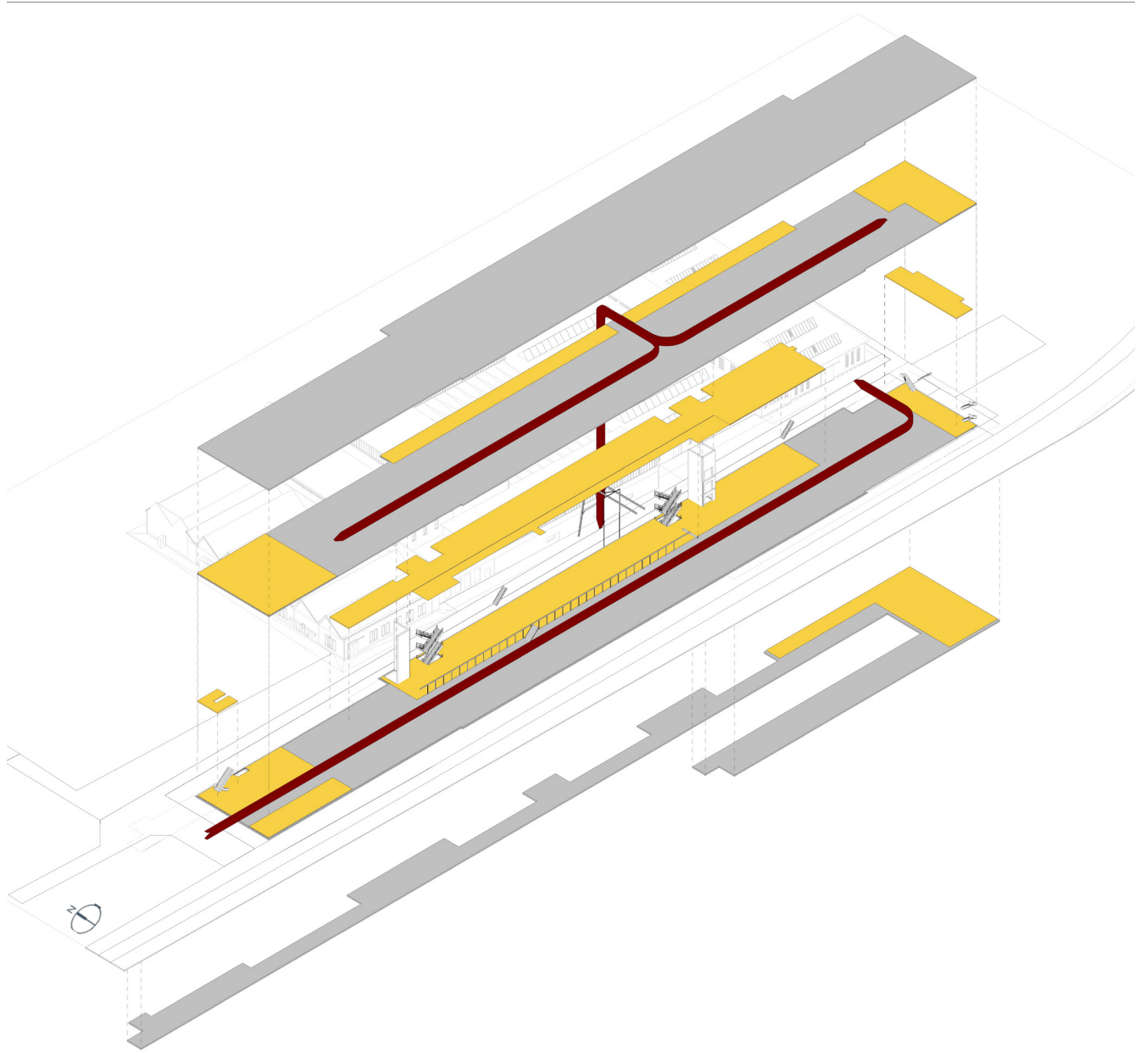
Cross section showing the direct southern sunlight.



Shadow study of the lower level.



As the southern wall of Building 429 acted as a wall for the Hembrug site, that elevation has no openings on ground level. While this does, indeed, obstruct views to the south from the level, the views from the mezzanine level and from the upper level, especially towards the North Sea Canal, are very open and theatrical.

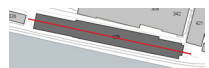
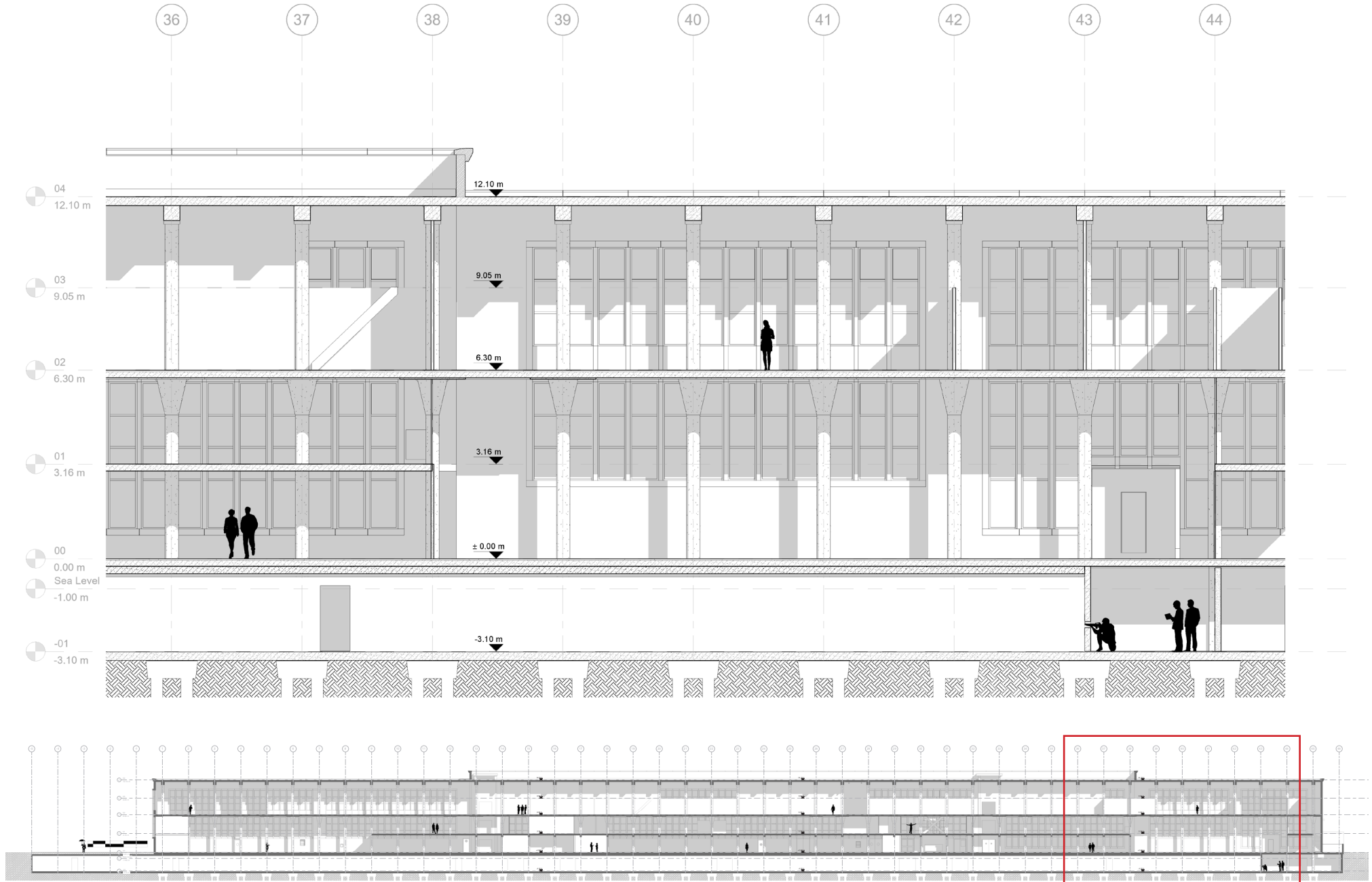


The building's layout can be broken down to two general function zones: production & ancillary. In broad terms, the ancillary spaces (yellow) take up each edge of the building, along the east-west axis. Additionally, one more ancillary function zone is created against the northern wall of the central wing. The main civilian entrances of the building are on its north facade, which poses a contradiction, as its main elevation is the southern one.

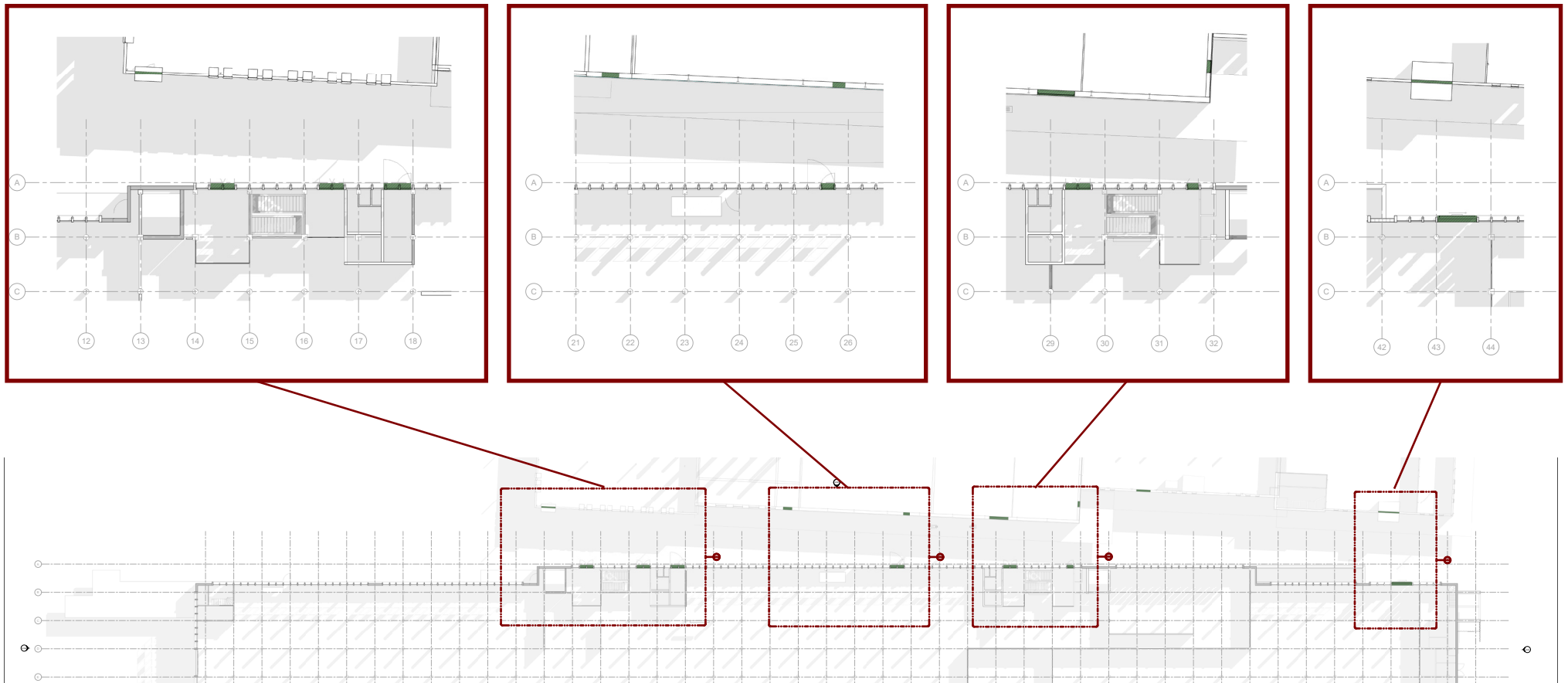
The building's flow, highlighted in red, is linear, following the production process and the building's proportions. Highlighted in red, the flow in the lower level runs between the large doors on the eastern and northern elevations.

On the upper level, the large crane in approximately the middle of the northern facade, allows materials to be loaded/unloaded and then distributed towards either end of the production floor.

4.5 ORGANISATION ALONG THE DOMINANT AXIS



Longitudinal section.



The Ladder (the ensemble on the northern side of Warmperserij) has no direct connections to Building 429, as illustrated above.



In addition to the ground floor, a significant mode of connection can be found for the first floor level, on Wamperserij: the large crane. This crane appears to be intended for loading and unloading from flatbeds to the upper level.



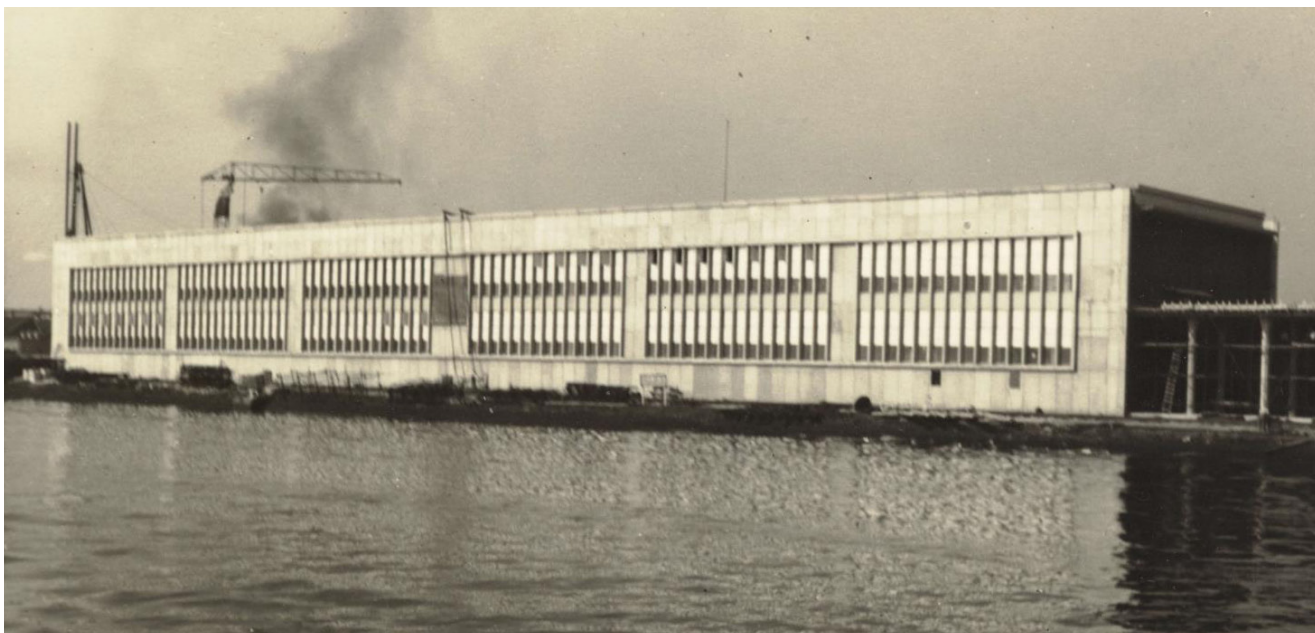
The door closing the opening for the crane opens downwards, most probably utilizing a pulley and cable system, embedded in the two rails..



The two twin staircases are some of the most distinguishing elements of Building 429. It could be assumed that they were aimed to separate the traffic of male and female employees.

Secondly in the stairwells, we find another interesting feature: the coloured glazing in some of the window panes. These panes are some of the very few coloured elements of the building. They could be seen as a reference to the similar panes found in the stairwell windows of Building 326, immediately to the west of Building 429 (seen above).





The North Sea Canal is a major shipping route for ships to reach the port of Amsterdam. As these vessels became larger, the canal was gradually widened and 'obstructions' like the Hembrug were removed to accommodate that traffic. As Building 429 is built within a very short distance from the water, and its proportions are such, it could be argued that it resembles a ship itself. Of course, modern-day ships are much larger, but the analogy can still stand: the ground is its waterline, followed by its solid plinth, resembling a hull, on top of which lies the superstructure, with the groups of windows resembling the large openings in a hull which often accommodate the lifeboat decks. Much like a ship, it is also reflected on the water. These visual connections to the water are in contrast with the lack of any physical connections, as mentioned previously.

Upper: The 294m long MSC Magnifica in front of Building 429. © erik_esteie/photobucket

Lower: Construction of the east wing, late 1950s. © Zaans Museum
© Vasileios Iliopoulos, 2018 (unless stated otherwise)

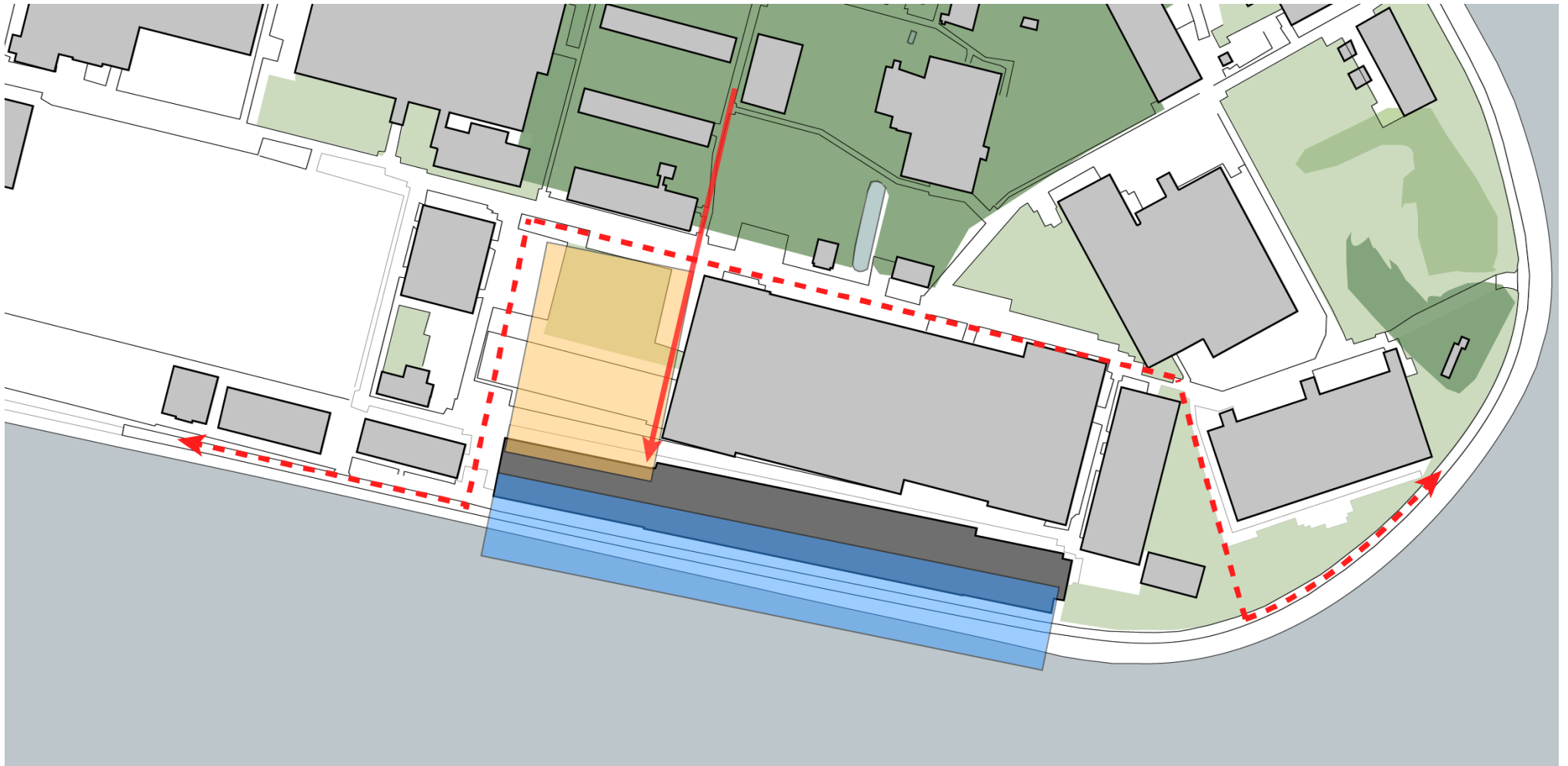


The building is in an overall good condition. Its structure is pristine, and except from some deterioration of the façade panels, the only issue could be the additional layers of paint in the interior, as well as some alternations after the series of temporary functions is housed. Overall, though, no permanent or irreparable damages have been found.



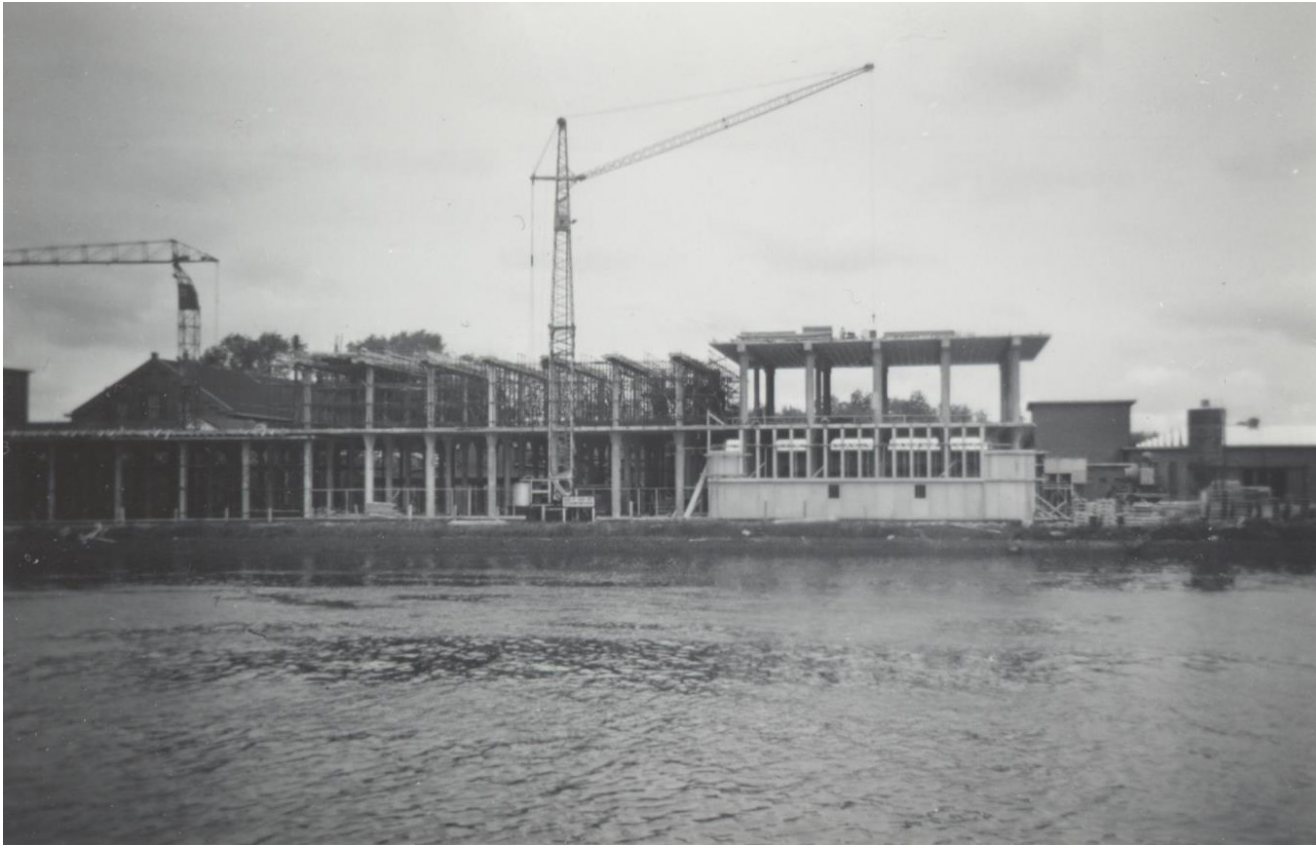
Unveiling of the AI logo; June 2nd, 1957. © Zaans Museum

Reviewing its history, construction and service history, we can confirm the initial statement that Building 429 can, indeed, be approached as a catalogue of repeating elements. While this is true for all buildings, it seldom defines the character of a structure as it is much less evident than in the case of Building 429. Its repetition is certainly one of the most important traits which define this building, and greatly contributes to its character. The strict grid, zoning and open interior (which can accommodate a plethora of arrangements), elements owed to its intended function as an armament factory, render the building highly adaptable. This adaptability will most likely be a key aspect in allowing this remarkable building to continue its life.



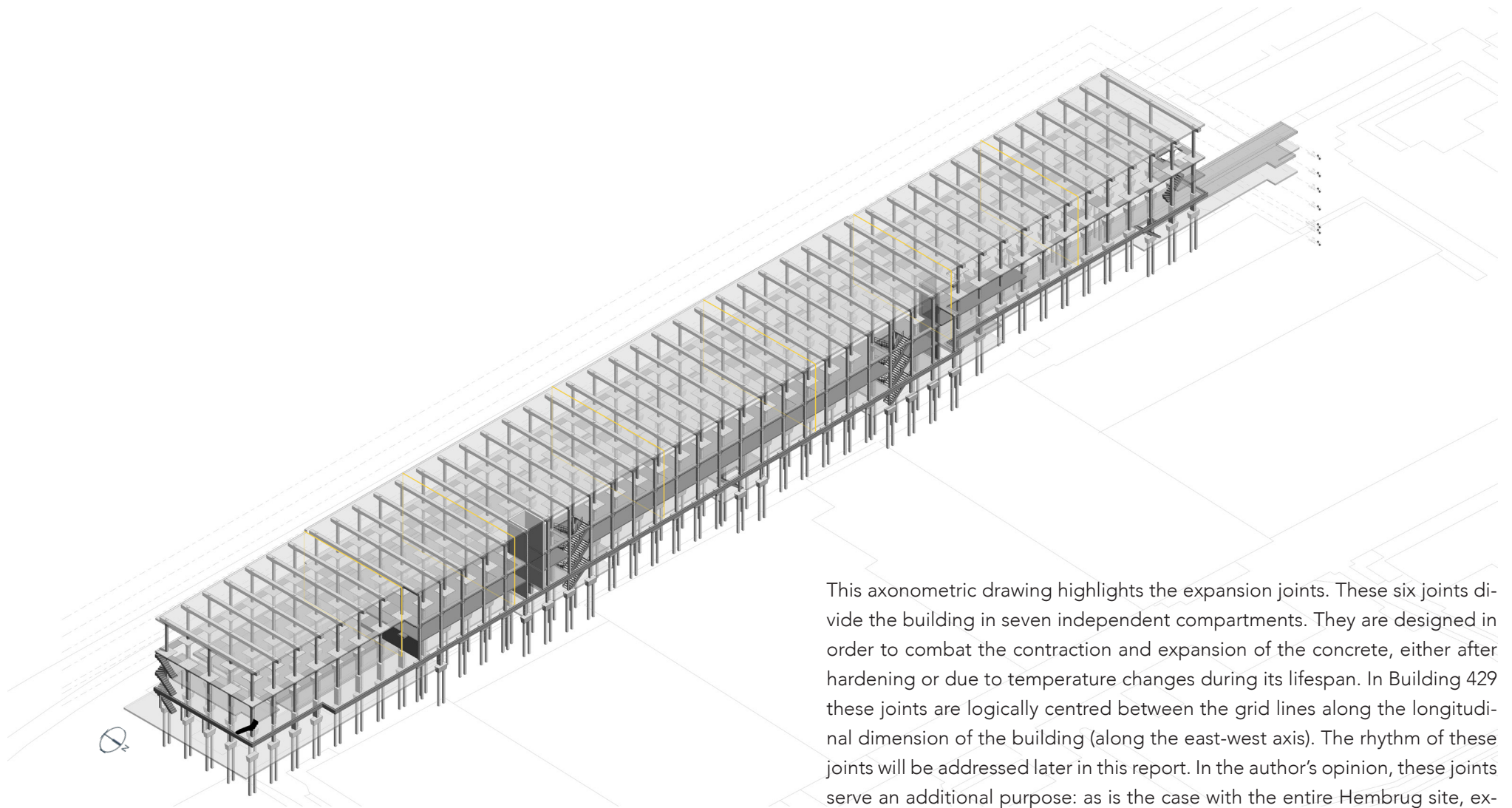
The proposed masterplan for Building 429 could be centred on three main principles:

1. The use of the plaza north of the building as a buffer zone to the building;
2. The utilisation of the waterfront;
3. Re-direction of Hemkade through the site, to allow for the realisation of point 2 and benefit the entire site by additional traffic.

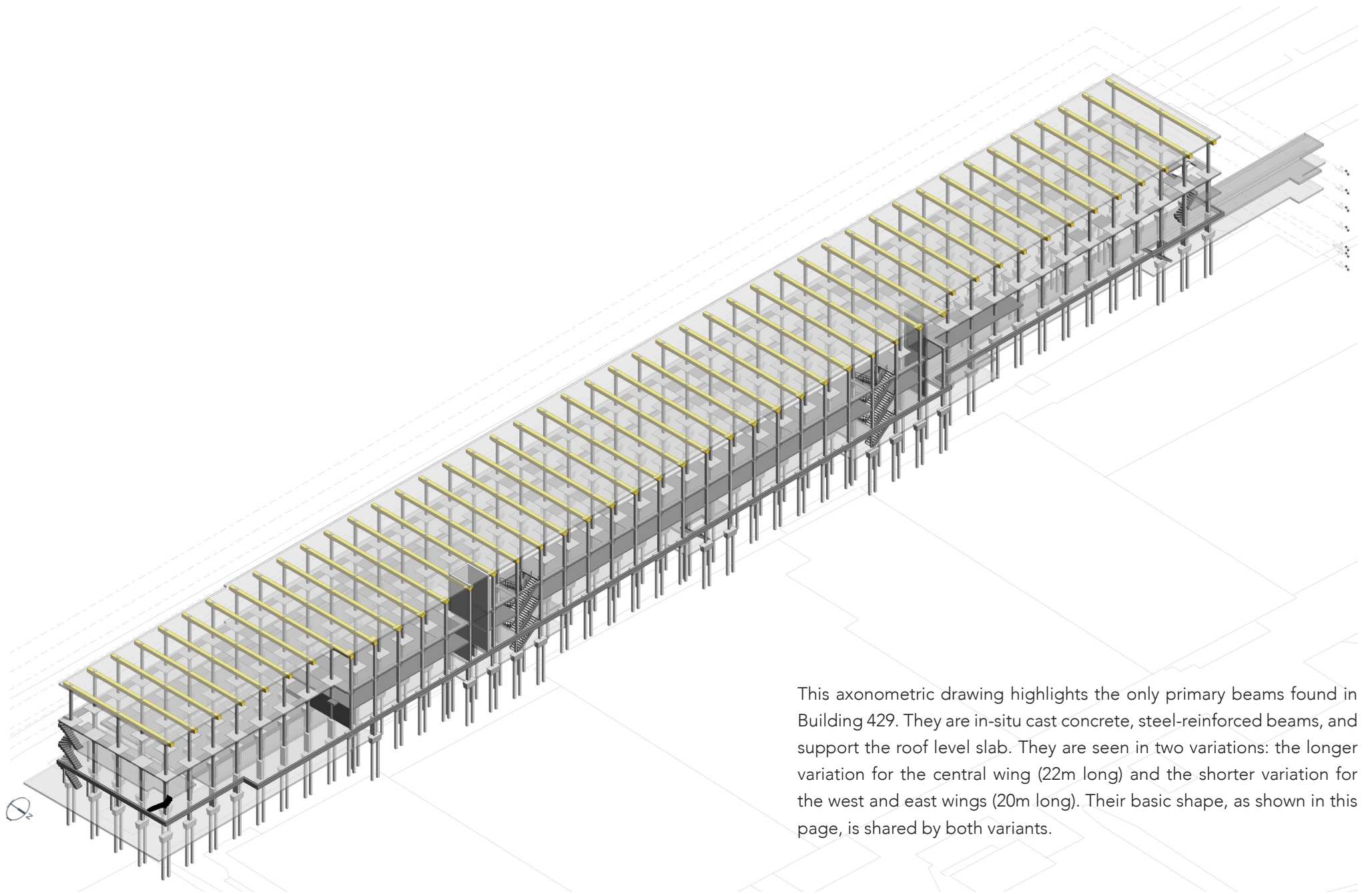


Photograph of the building's construction. © Zaans Museum

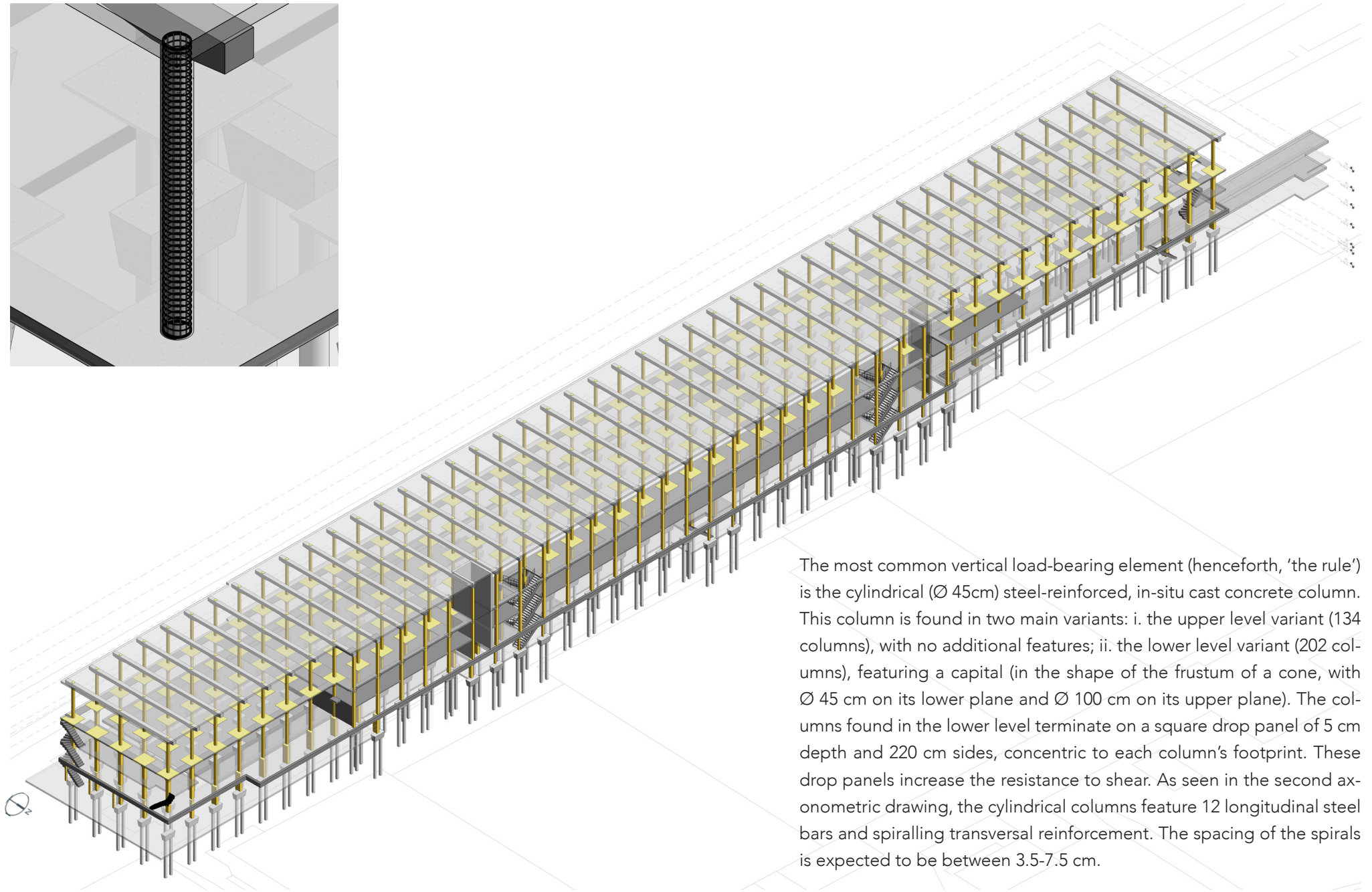
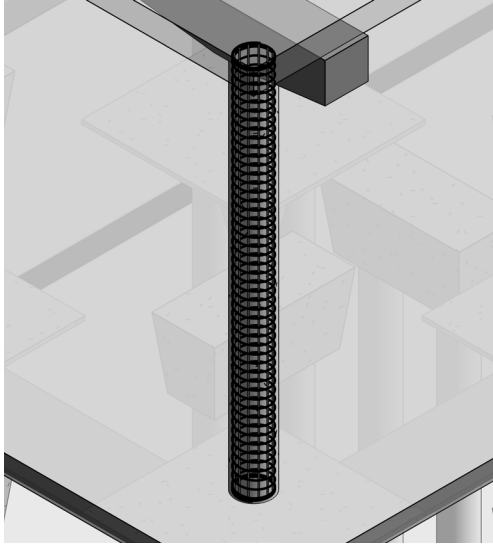
Building 429 is a steel-reinforced, in-situ poured concrete frame building. Its lateral stability is ensured by the rigid connections of the steel reinforcement. The following axonometric drawings showcase its composition, focused on the superstructure. The orientation of these drawings was selected as it displays the most exceptions in the load-bearing structure. Due to the existence of mezzanine levels without significance to the main structure, the building is described in three parts, for clarity: the basement, the lower level (± 0.00 to $+6.30\text{m}$) and the upper level ($+6.30\text{m}$ to $+12.10\text{m}$). On plan, the building is arranged on a $4.4\text{m} \times 4.4\text{m}$ grid.



This axonometric drawing highlights the expansion joints. These six joints divide the building in seven independent compartments. They are designed in order to combat the contraction and expansion of the concrete, either after hardening or due to temperature changes during its lifespan. In Building 429 these joints are logically centred between the grid lines along the longitudinal dimension of the building (along the east-west axis). The rhythm of these joints will be addressed later in this report. In the author's opinion, these joints serve an additional purpose: as is the case with the entire Hembrug site, explosion was always a risk. These joints would also ensure that should an explosion occur in Building 429, it would only damage the immediately involved structure and would not allow for a possible collapse to compromise the remaining compartments. The locations of these joints are visible on the façade, as they are covered by metal strip covers.



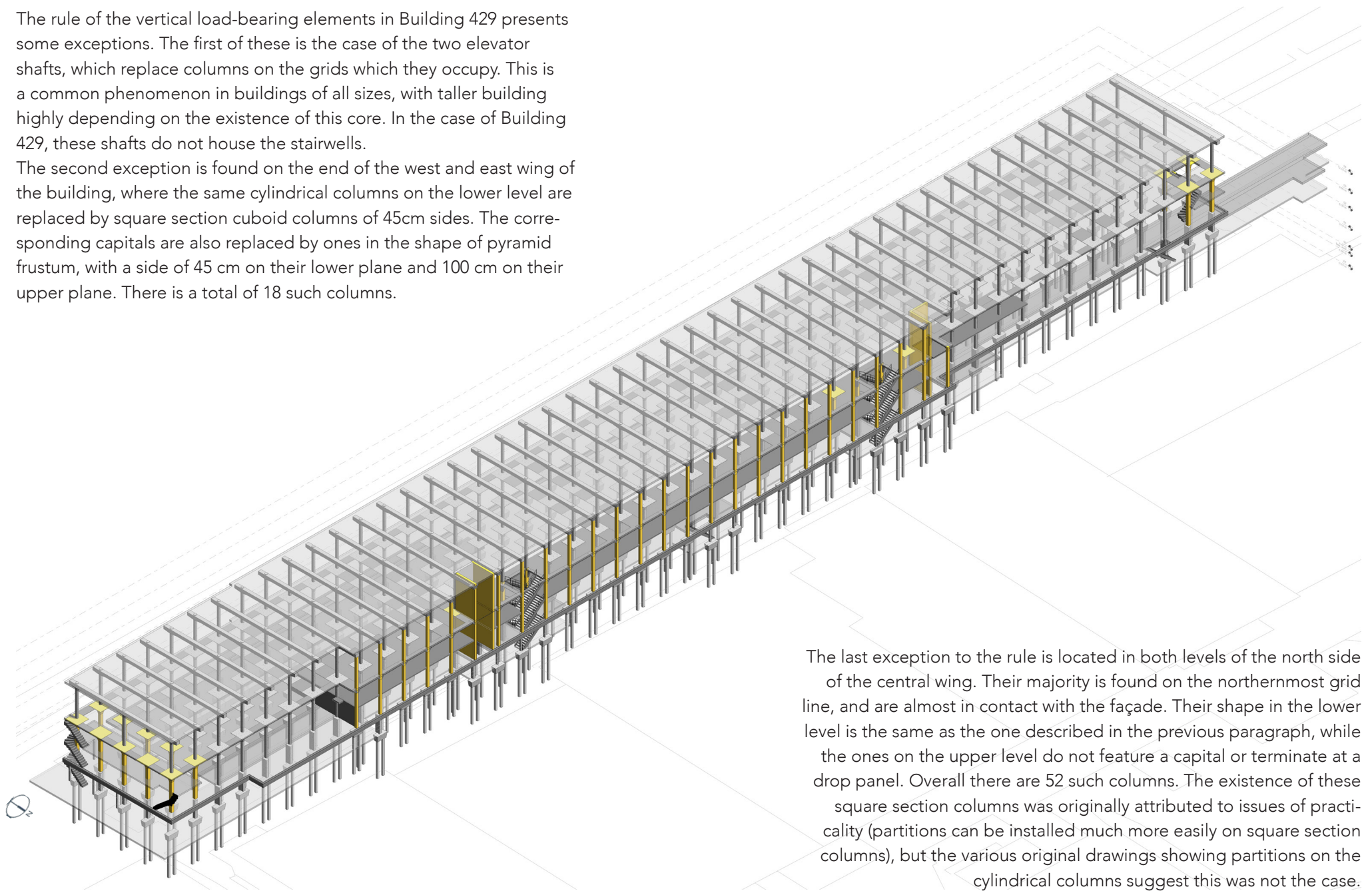
This axonometric drawing highlights the only primary beams found in Building 429. They are in-situ cast concrete, steel-reinforced beams, and support the roof level slab. They are seen in two variations: the longer variation for the central wing (22m long) and the shorter variation for the west and east wings (20m long). Their basic shape, as shown in this page, is shared by both variants.



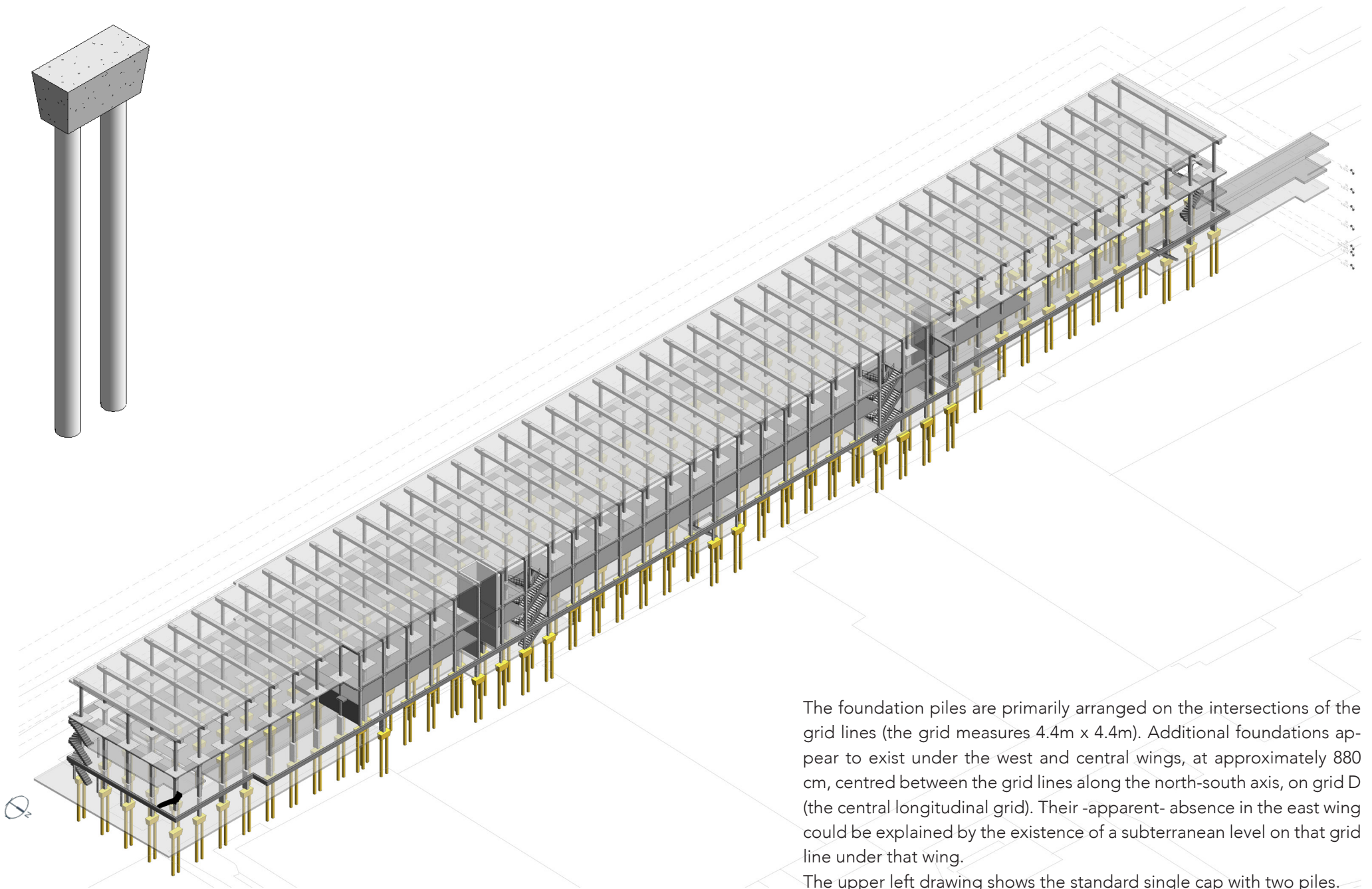
The most common vertical load-bearing element (henceforth, 'the rule') is the cylindrical ($\text{\O} 45\text{cm}$) steel-reinforced, in-situ cast concrete column. This column is found in two main variants: i. the upper level variant (134 columns), with no additional features; ii. the lower level variant (202 columns), featuring a capital (in the shape of the frustum of a cone, with $\text{\O} 45\text{ cm}$ on its lower plane and $\text{\O} 100\text{ cm}$ on its upper plane). The columns found in the lower level terminate on a square drop panel of 5 cm depth and 220 cm sides, concentric to each column's footprint. These drop panels increase the resistance to shear. As seen in the second axonometric drawing, the cylindrical columns feature 12 longitudinal steel bars and spiralling transversal reinforcement. The spacing of the spirals is expected to be between 3.5-7.5 cm.

The rule of the vertical load-bearing elements in Building 429 presents some exceptions. The first of these is the case of the two elevator shafts, which replace columns on the grids which they occupy. This is a common phenomenon in buildings of all sizes, with taller building highly depending on the existence of this core. In the case of Building 429, these shafts do not house the stairwells.

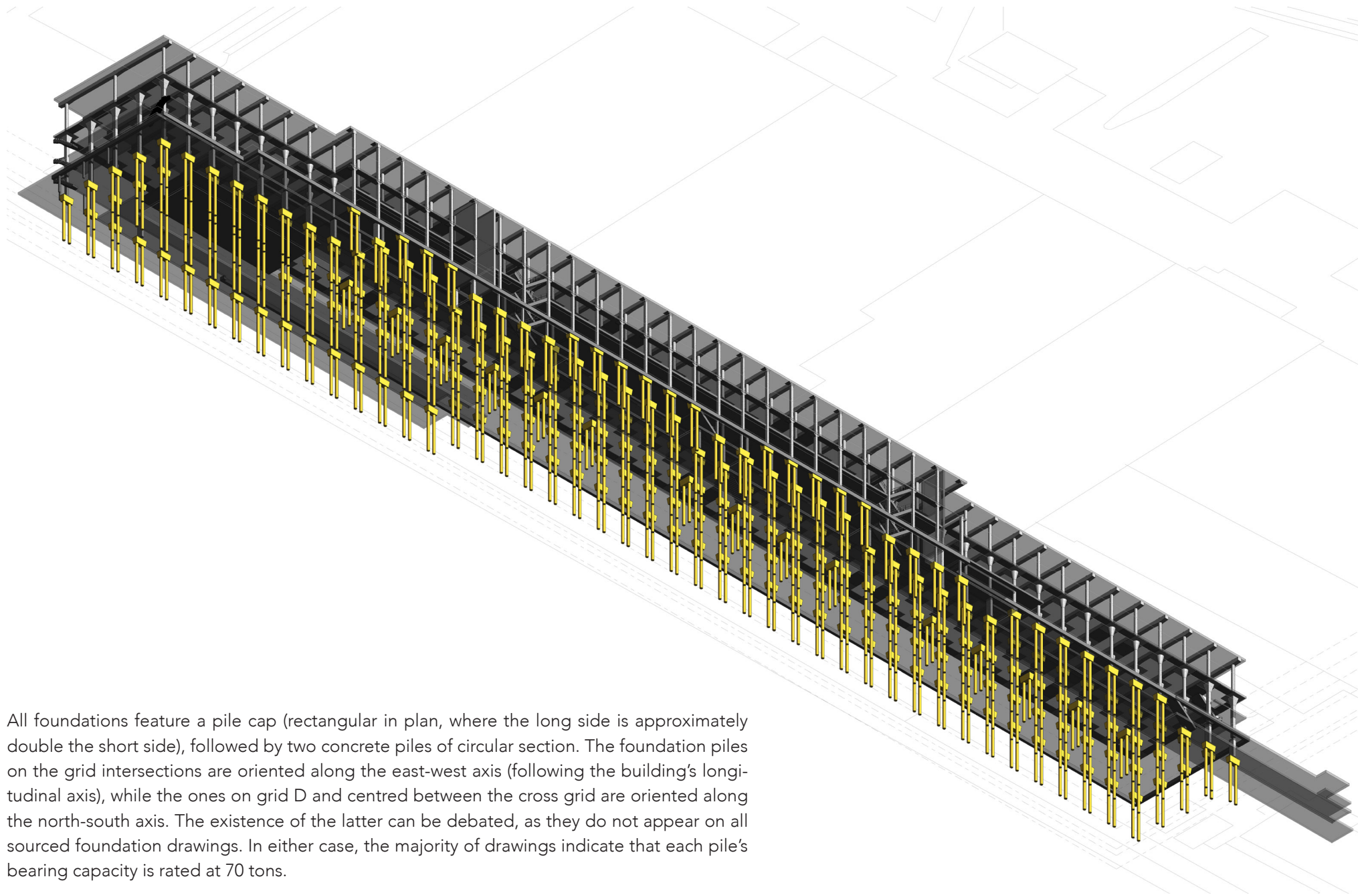
The second exception is found on the end of the west and east wing of the building, where the same cylindrical columns on the lower level are replaced by square section cuboid columns of 45cm sides. The corresponding capitals are also replaced by ones in the shape of pyramid frustum, with a side of 45 cm on their lower plane and 100 cm on their upper plane. There is a total of 18 such columns.



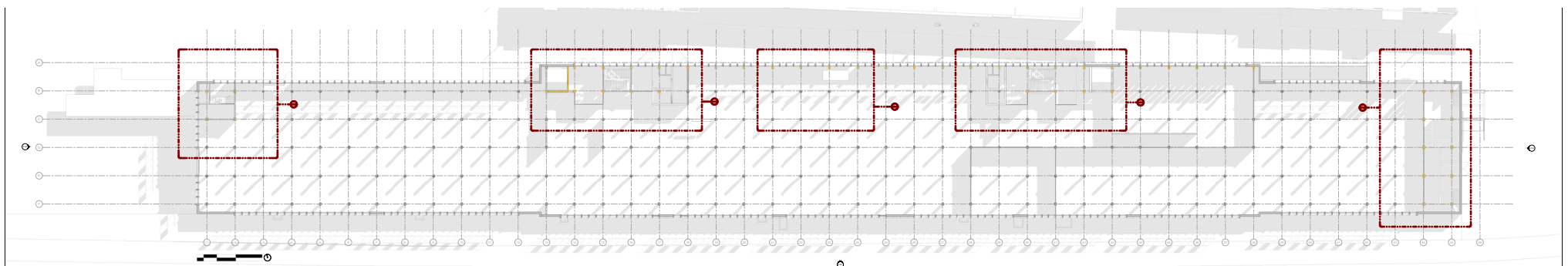
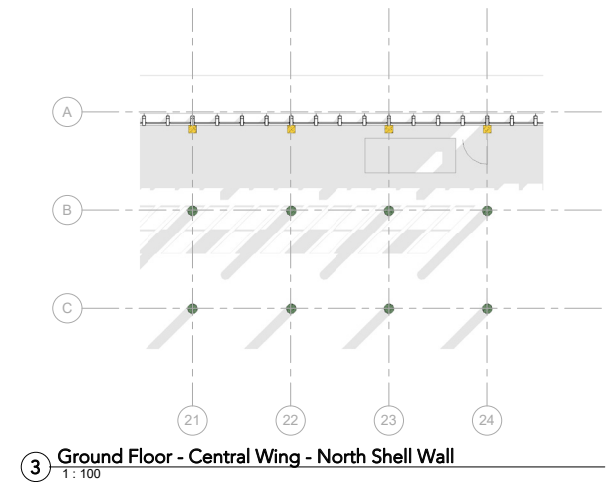
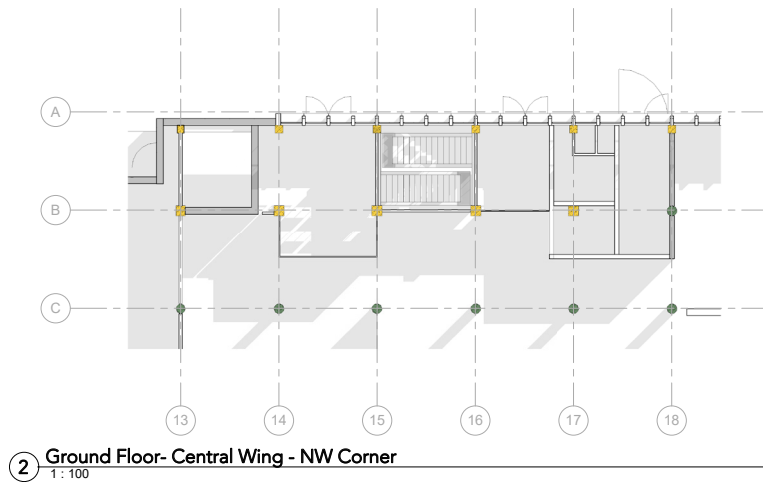
The last exception to the rule is located in both levels of the north side of the central wing. Their majority is found on the northernmost grid line, and are almost in contact with the façade. Their shape in the lower level is the same as the one described in the previous paragraph, while the ones on the upper level do not feature a capital or terminate at a drop panel. Overall there are 52 such columns. The existence of these square section columns was originally attributed to issues of practicality (partitions can be installed much more easily on square section columns), but the various original drawings showing partitions on the cylindrical columns suggest this was not the case.



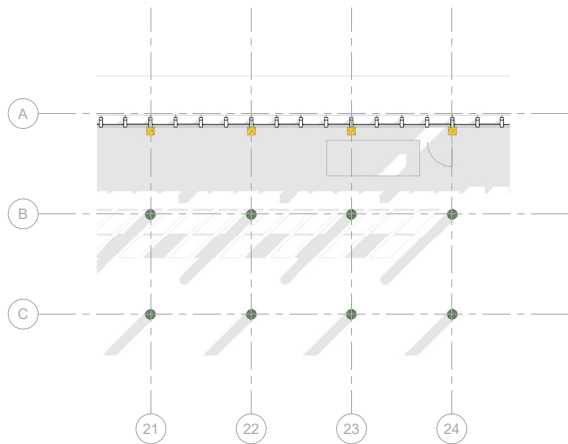
The foundation piles are primarily arranged on the intersections of the grid lines (the grid measures 4.4m x 4.4m). Additional foundations appear to exist under the west and central wings, at approximately 880 cm, centred between the grid lines along the north-south axis, on grid D (the central longitudinal grid). Their -apparent- absence in the east wing could be explained by the existence of a subterranean level on that grid line under that wing. The upper left drawing shows the standard single cap with two piles.



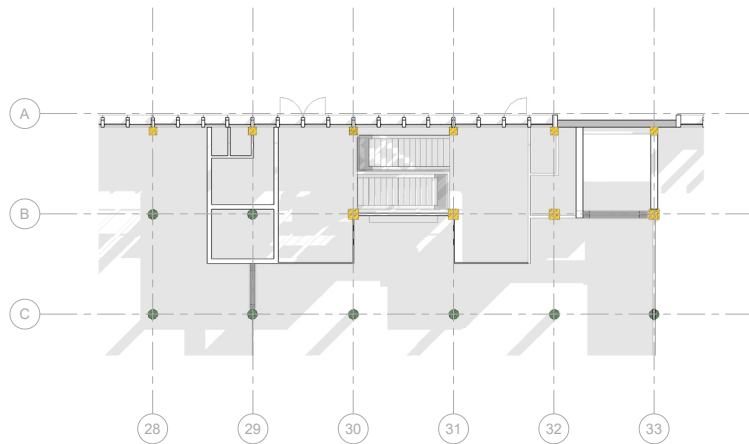
All foundations feature a pile cap (rectangular in plan, where the long side is approximately double the short side), followed by two concrete piles of circular section. The foundation piles on the grid intersections are oriented along the east-west axis (following the building's longitudinal axis), while the ones on grid D and centred between the cross grid are oriented along the north-south axis. The existence of the latter can be debated, as they do not appear on all sourced foundation drawings. In either case, the majority of drawings indicate that each pile's bearing capacity is rated at 70 tons.



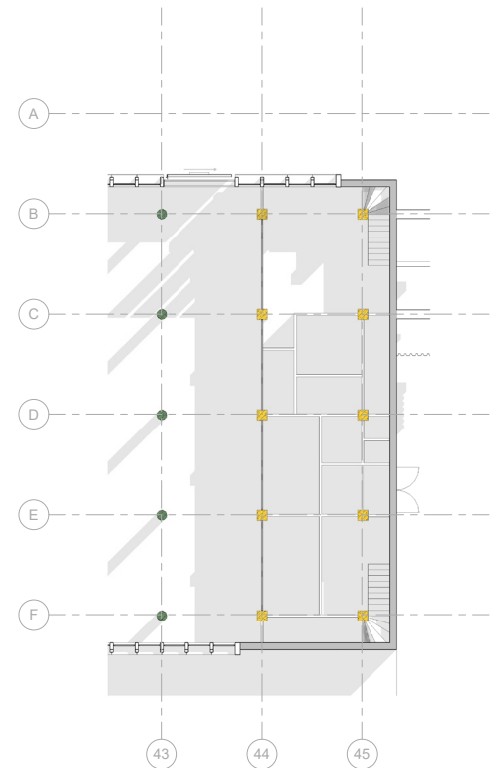
As previously analysed, the most common structural column in the ground floor level of the building is the tubular reinforced concrete column, with a capital and drop panel. While there are 202 of these columns in this level (out of 282 columns in total), there are some exceptions to the rule. These exceptions are highlighted above, and in the next page.



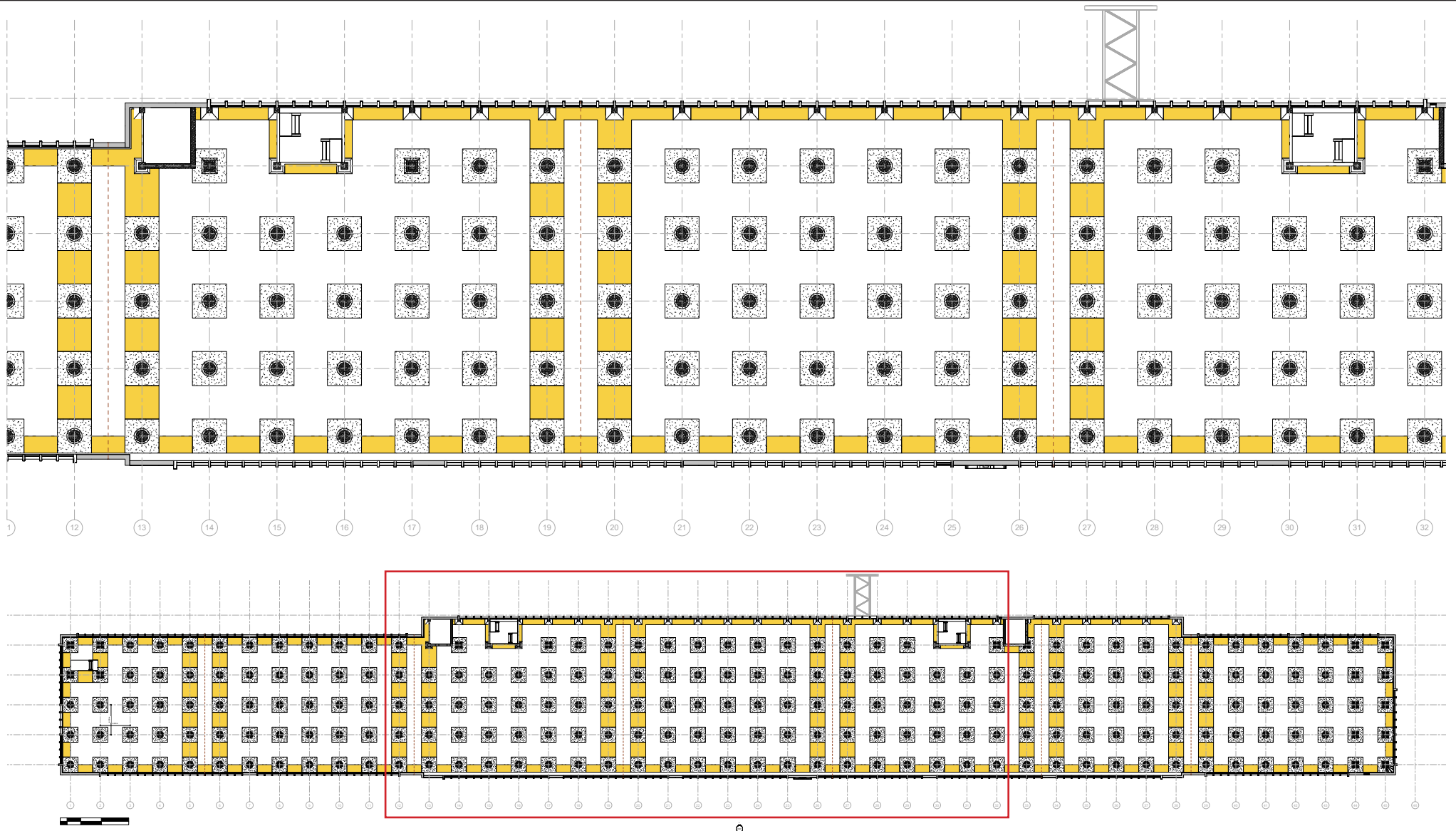
3 Ground Floor - Central Wing - North Shell Wall
1:100



4 Ground Floor - Central Wing - North Shell Wall
1:100



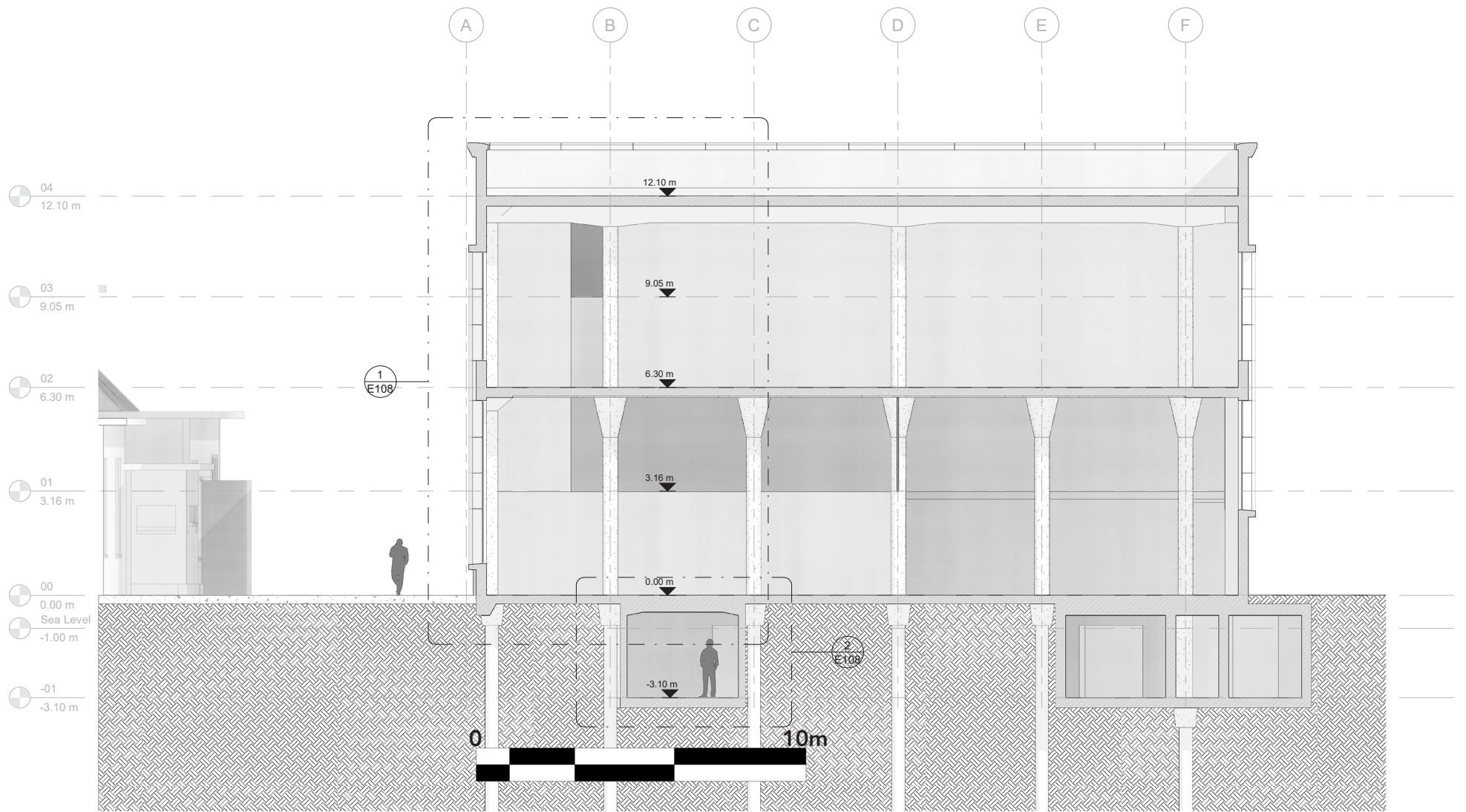
5 Ground Floor - East Wing - East Shell Wall
1:100



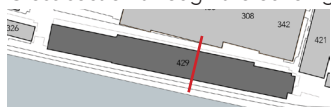
As seen on the reflected ceiling plan of the lower level, above, the drop panels are not only specific to the cylindrical columns; additional drop panels (highlighted in yellow) of the same 5 cm depth are found forming bands on the perimeter of each of the 7 compartments of the building, as divided by the structural joints. These bands ensure the rigidity of the perimeter of each compartment. The structural joints are seen between them, highlighted as dashed red lines.

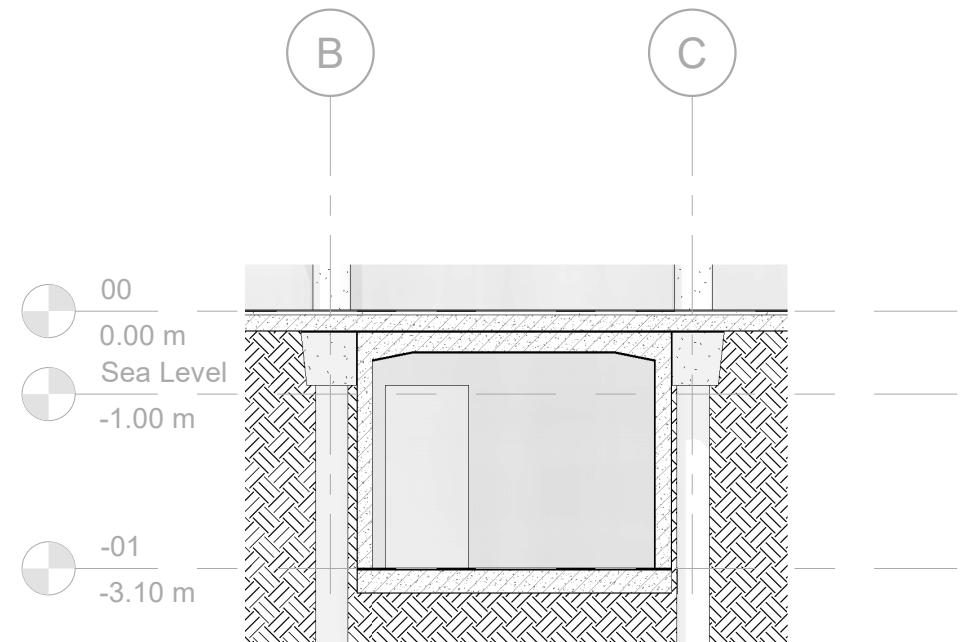
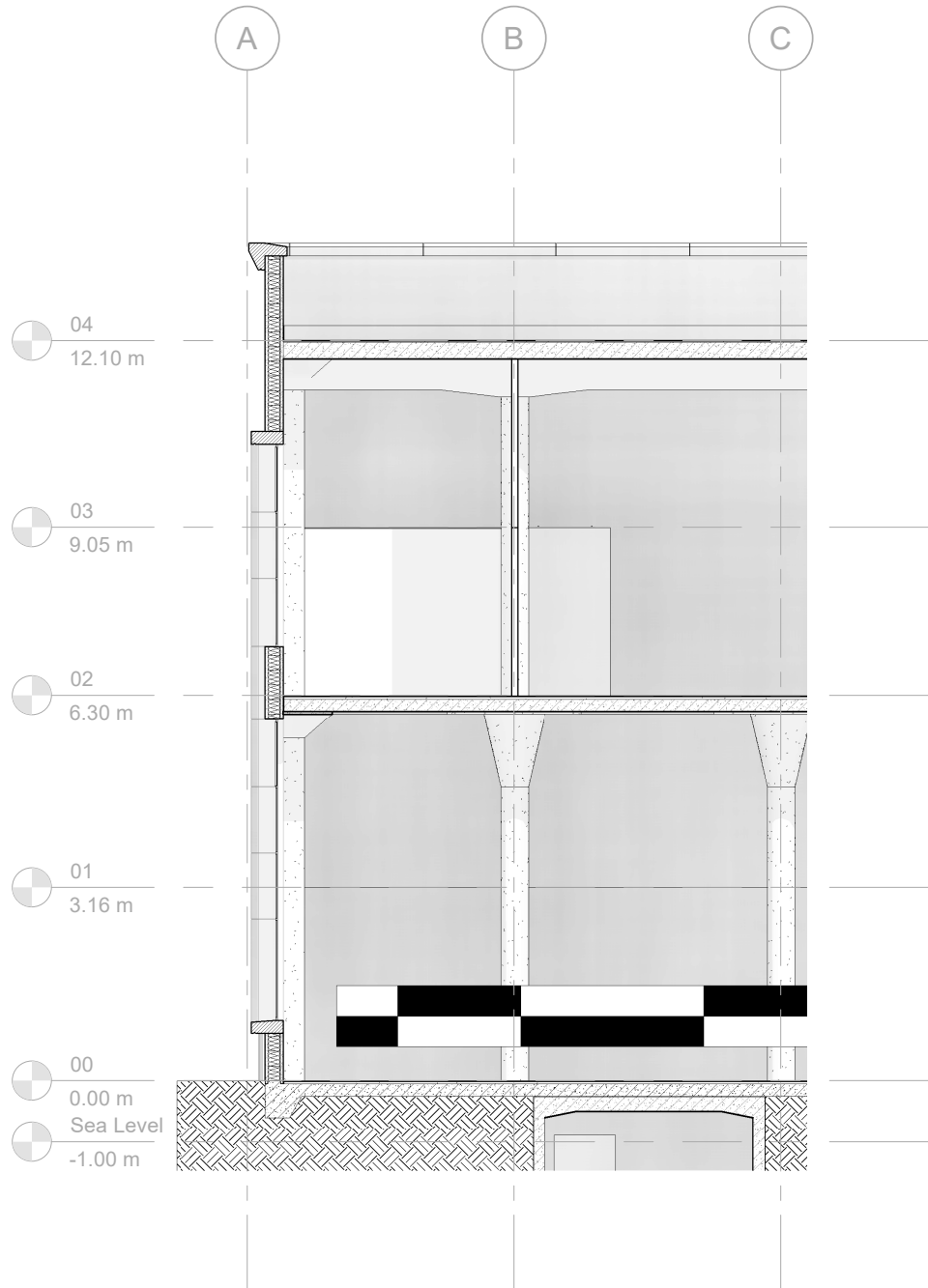
The rhythm of the joints is irregular, but seems to be following a rule of compartments with a width of 7 grid lines: the eastern wing is not divided, and thus takes up 7 grid lines (along the north-south axis). The west wing is longer, and after allowing for 7 grid lines, the remaining 5 make up their own compartment (7-5). In the central wing, beginning to create compartments of 7 grid lines from the west and progressing eastwards, there are five 7-grid compartments and on 5-grid compartment (7-7-7-5). The reasoning, i.e. the 'rule' of 7-grid wide compartments with additional compartments for the remaining length is evident. What is not evident is why the design

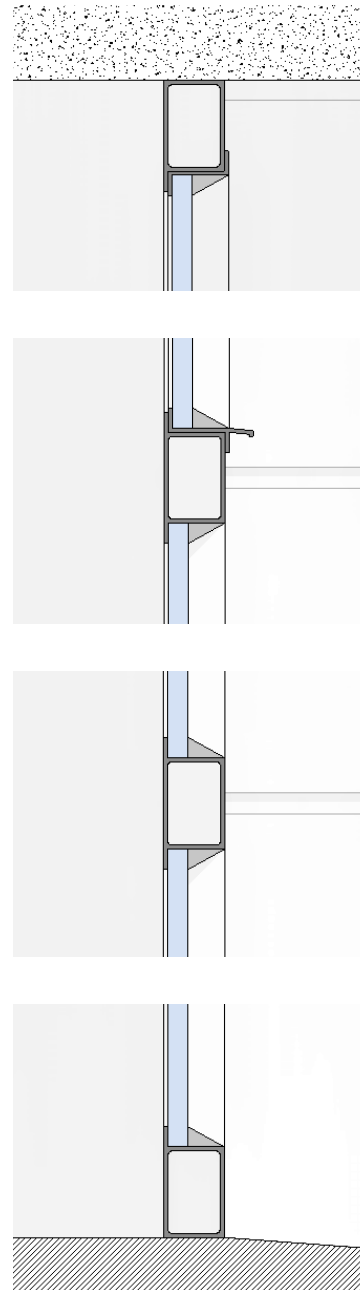
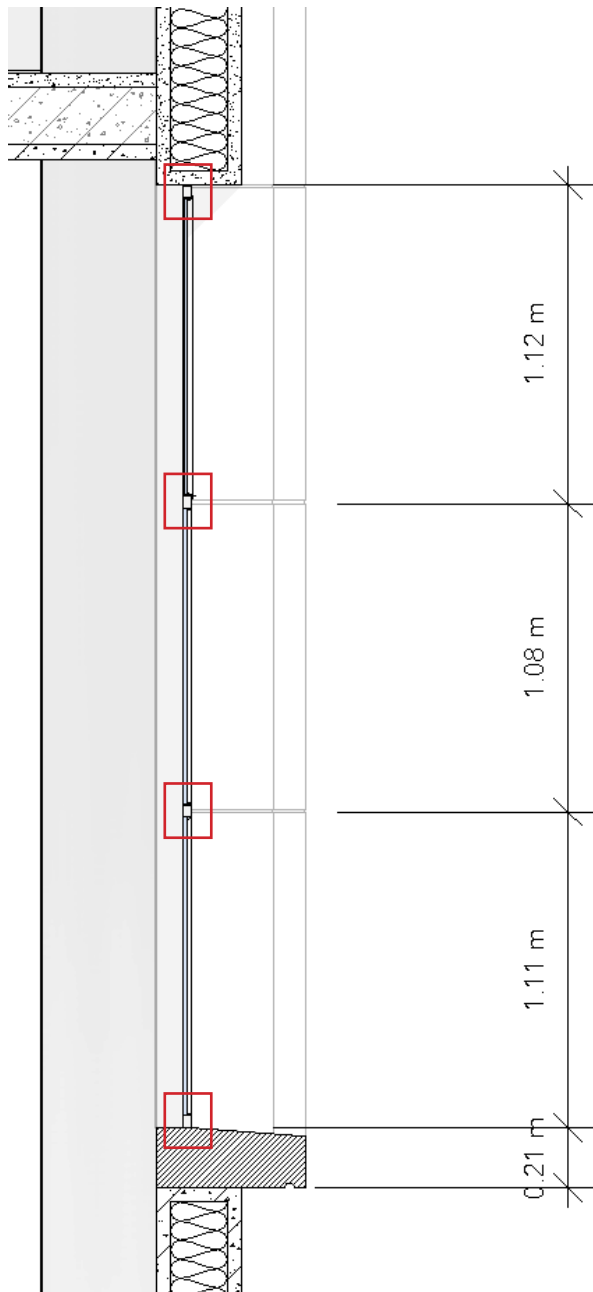
72 was not symmetric, e.g. the central wing not following a rhythm of 7-6-6-7 or the eastern wing a rhythm of 6-6.



Cross section through the building's central wing.



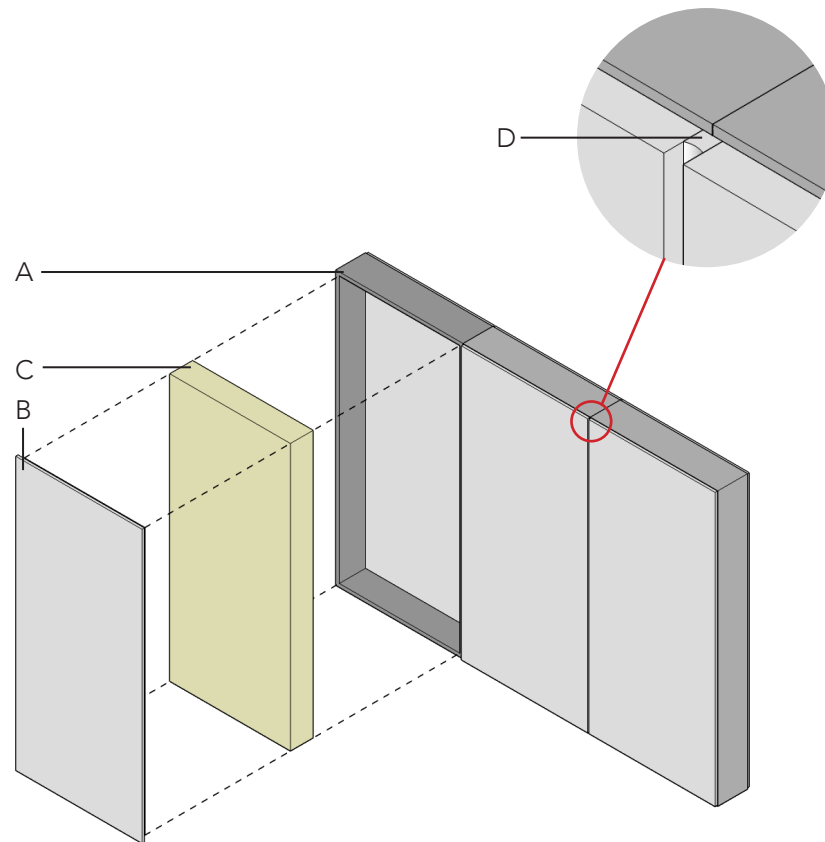




Building 429 features a total of 638 windows. Of these, the most common type is the 95x330 cm (width x height) window, divided in 3 square segments along its vertical axis. This type is found in two variants: i. fixed, where the three planes are divided by two muntins (total of 291 windows); ii. operable top, where the top muntin is replaced by an operating sash, allowing the top plane to open outwards (total of 297 windows). These top parts are operable through a mechanical system, manually operable with cranks. All window frames are constructed of steel and feature single-plane glazing. The glazing is secured in place by mastic. The remaining types are based of these two variants, and differ only as per the number of square sections on each window's vertical axis, ranging from single section to five sections. The last window type, only found on the eastern façade of the eastern wing, is a square window measuring 75 x 100 cm (width x height). The window frames do not feature thermal breaks which, combined with the single glazing, and their concrete lintels (which fully penetrate the walls) render these openings thermal bridges.

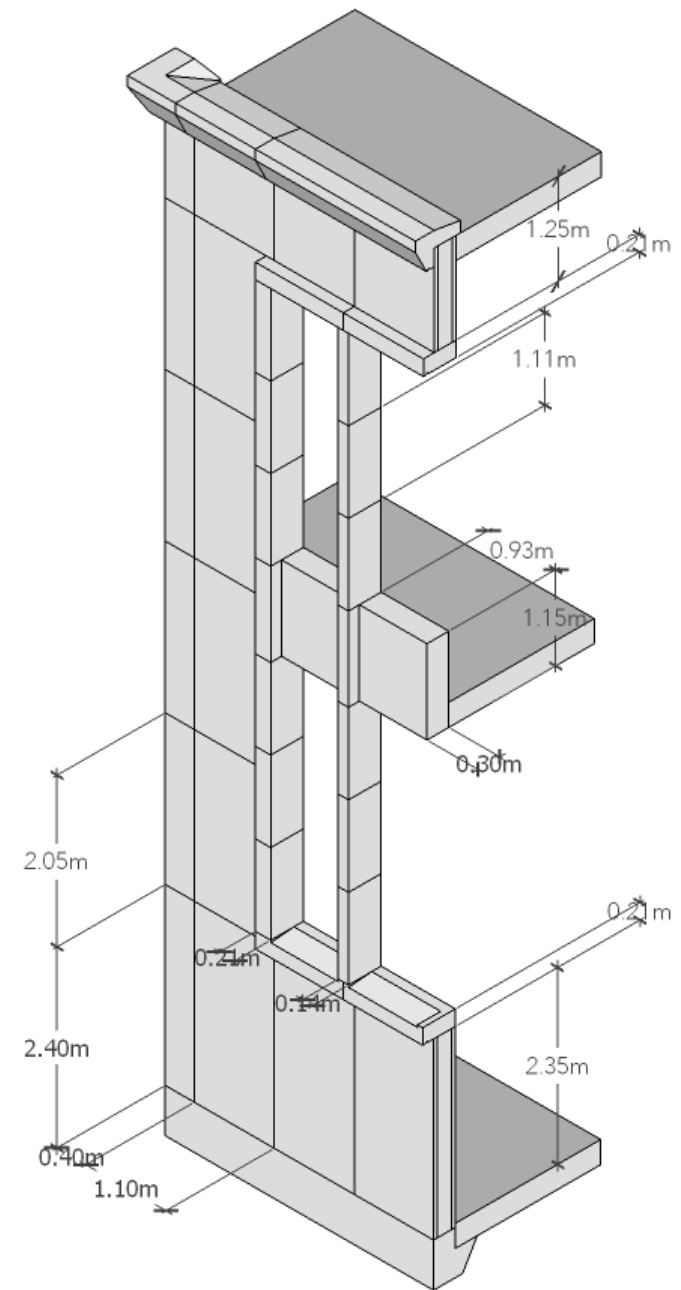
- A: Metal frame
- B: Concrete Shell (5cm)
- C: Insulation (20cm)
- D: Joint Sealant

The panels are joined by welding the metal frames on each other. The weld is protected by a sealant.



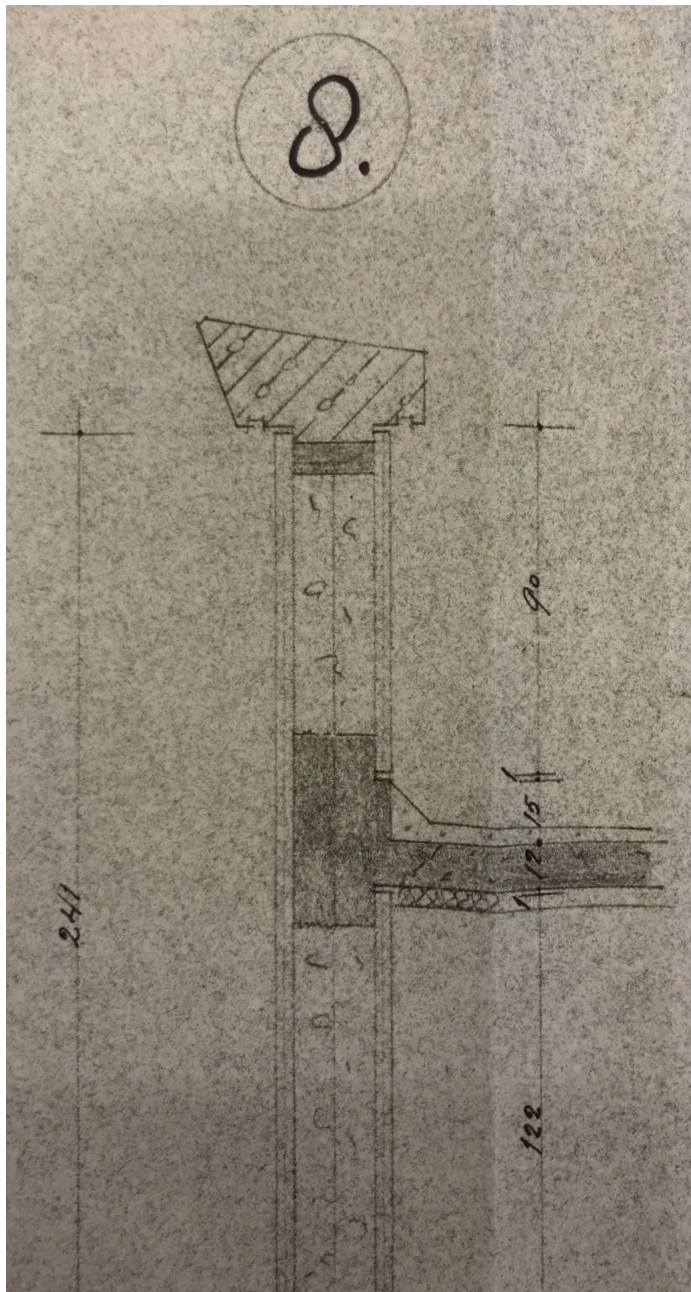
The façade of Building 429 is composed of pre-fabricated elements. The main elements are the façade panels; these sandwich panels are composed of a layer of insulation (20 cm thick) embedded in concrete (5 cm on either side). These panels can be expected to have a U-value of approximately 0.17 W/(m²K) and an R-value of 5.88 (m²K)/W. The existence of insulation in these panels is confirmed both by their visible deterioration on the exterior of the building (moisture marks in their centre indicating a cavity), the sourced detail drawings, but even more by the available core samples.

The window groups are defined by a pre-fabricated concrete cornice running their perimeter. These elements are visible on the inside of the building and are thus confirmed to be fully penetrating the façade walls. Further, the windows themselves are divided by narrower vertical elements of the same material. These penetrating concrete elements, along with the edges of the façade panels, are the main thermal bridges identified in the external wall construction.



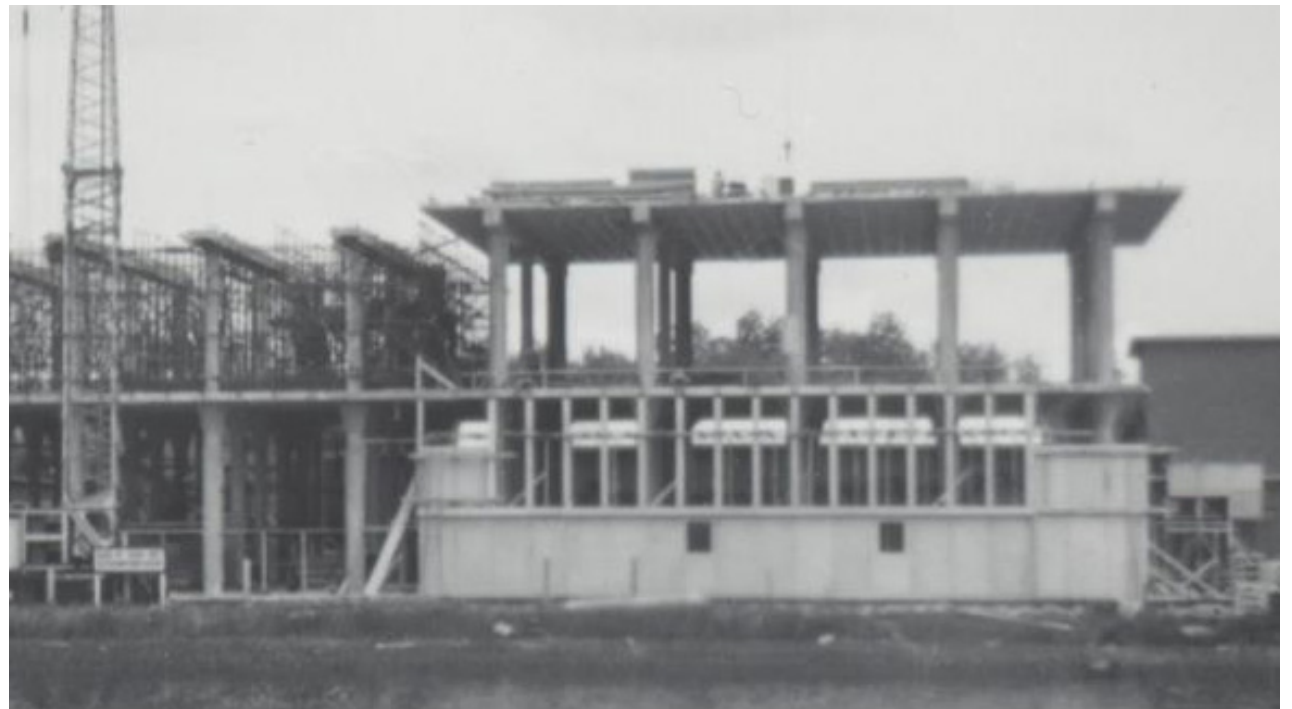


The standard floor slab of building 429, that of the upper level, is composed of 2 structural layers. The main and deepest of these is the in-situ cast, steel-reinforced concrete layer, measuring from 20 to 15 cm in depth (in the presence or absence of a drop panel, respectively). This layer is topped by a 5 cm thick, slab leveller layer. This self-levelling material is poured to ensure the levelling of the final floor surface. In the vast majority of cases, the cavity left by the absence of a 5cm thick drop panel was filled by rectangular wood-wool cement (WWC) panels measuring 55 x 110 cm. These panels were most likely added to absorb the sound emitted by the production process. Due to their thickness, these panels would be expected to have a density of approximately 390kg/m³. Extrapolating, we could expect these panels to provide a Sound Absorption Average (SAA) of approximately 0.4 (an average result, as research showed SAA between approx. 0.3 – 0.5 for WWC panels) (“Modelling and optimization of the sound absorption of wood-wool cement boards”).

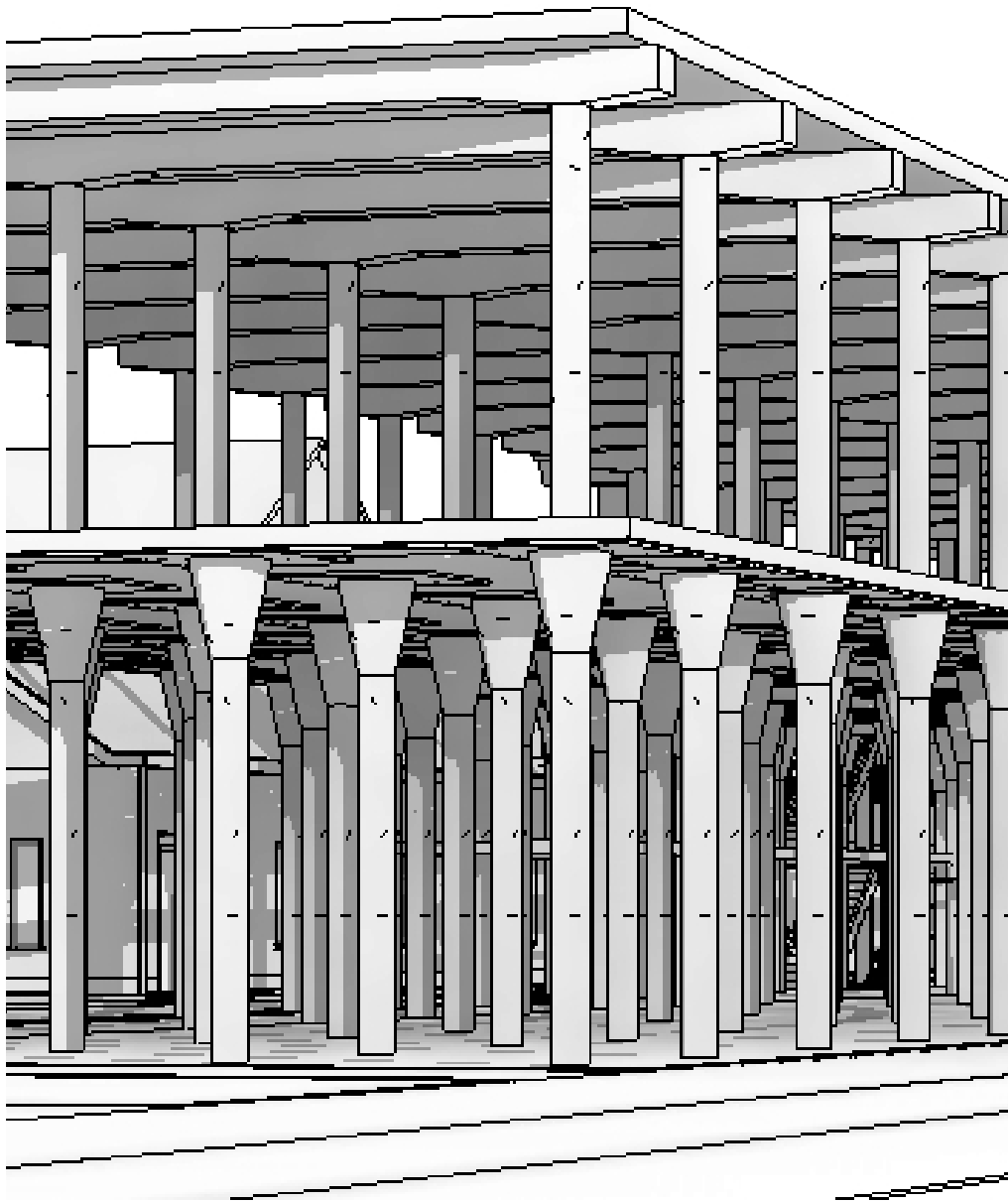


Left: Wall detail. © Zaandam Municipal Archives

Right: Blowup of a construction picture. © Zaans Museum
© Vasileios Iliopoulos, 2018 (unless stated otherwise)



The details recovered from the Zaandam Municipal Archives feature elements such as what appears to be inverted beams running along the periphery of the upper level slab. These beams, terminating 35 cm above the slab level, are shown as being covered by 5 cm thick concrete façade elements. From the traced construction photographs we know that this is not the case, as these beams were never constructed.



Building 429 was designed to house heavy industry, specifically that of armament production. Because of that fact, it was designed to accommodate considerable loads. The sizing and density of the load-bearing elements certainly confirm that. Overall, the building is in pristine condition; most of the identified damage was caused by drilling for core samples and does not compromise its integrity. Some mechanical damage was identified on one of the façade panels, but it is very possible that this was intentional as well. Last, there is noticeable staining on the centre of each of the façade panels, due to moisture. Whether this is a serious issue heavily depends on the type of insulation used, which is not known. Most likely, allowing for the panel cavities to dry and coating the façade with a sealant would be sufficient and not alter Building 429's aesthetics. The condition of the building is very encouraging and can easily accommodate for a wide range of functions. Last, the thermal bridges are an issue which need to be addressed. While the window frames themselves should remain as is, due to their cultural value, they might be able to accommodate double glazing. In addition, the thermal bridges present in the exterior walls can easily be countered by additional thermal insulation on the interior of the wall. As the floor slabs and the façade do not touch directly, thermally insulating the floor slabs might not be necessary.



Shooting booth of the 200m long range. © Zaandam Municipal Archive

According to the Cultural Agency of the Netherlands, the Dutch government has designated five points as the most important aspects of cultural heritage in the country. These are 'World Heritage', 'Flood defences', 'redevelopment', 'living landscape' and 'Reconstruction era'. It is very interesting that the Reconstruction era is the only period mentioned explicitly amongst these five themes. Specifically, "The period 1940-1965 must remain a visible feature of the Netherlands. Many innovations came about in that period – large-scale housing developments, standardisation of the construction process, separation of functions – all of which now require care and protection". Building 429 was never intended to be a part of Cultural Heritage, let alone a monument. Designed in 1955 and built in 1956, its purpose was to quickly facilitate an order for ammunition, and in its way, contribute to the Reconstruction. And while it has been etched to the memory of both passers-by and more than two generations of the local community, it was only registered as a municipal monument in late 2006.

6.1 EVALUATION PRINCIPLES

Overall, my personal opinion on the issue of built heritage, or at least of modern built heritage, does not align with the 'puristic' conservation ideas such as those by John Ruskin. On the other hand, the restoration ideas by Eugène Viollet-le-Duc, and the expansive creative licence they require to create a faux image of the past, does not align with my ideas on heritage either. Due to the subject of this report, I shall confine my thinking to pieces of modern built heritage, such as Building 429. Hence the following ideas do not apply to buildings of other eras, e.g. classical-age monuments.

A major first differentiation presents itself through scarcity: in my opinion, the more scarce the object in question is, the stricter the rules governing its use should be. This is also applied, in broad terms and not as a single criterion, on all scales of the composition. On a building level, if there is a plethora of similar building available, designers should be less confined when approaching them. On the other hand, if such samples are very rare, extreme caution should guide any intervention, as the stakes for this "kind's" preservation are much higher. On an object level, the fact that one of the building's elements, for example old pipes, is not commonly found anymore and has age value does not necessarily imply that they would be worth preserving, in useable condition or safe to utilise. These ideas show just the beginning of the very hard process of evaluating built heritage, and the many considerations one must keep in mind. Additionally, this is only the broad idea behind my personal approach, and is expected that not all individuals agree completely.

Some theories suggest stripping the composition of 'disturbing' elements, in order to arrive to its purest

(or original) form. These so-called 'disturbing' elements are usually later alternations. The issue with these theories is their disregard for a holistic evaluation of the built environment. For example, who is to judge which time layer is the most important? In the same terms, why is the 'original' state most highly valued? Could it not be the case that some later alternation, brought one by a new function, is more representative of the building's character and history? The previous differentiation was necessary in order to distance my personal approach from these described above. While 'originality' is a major factor in my evaluation of Building 429, it is not for reasons of 'historical purity'. In this case, while 'originality' is certainly a goal, it is not a goal for 'purity's' sake, but because it happens to coincide with the most socioculturally significant state of the building. While it served this function for approximately 40 years, only the first state is representative of the Reconstruction era, and thus significant on a higher level.

Building 429 was designed to serve a specific purpose, within a complex which served a similar function: armament production. Its function was known to the community, and in combination with the fact that Al was a major employer in the area, it is highly remembered as such. Additionally, armament production is representative of approximately 80% of the building's lifetime, with all temporary functions accounting for the remaining 20%, perhaps even less if one considers they were not continuous. Further, even during these functions, the building was known as the '.50"' or the 'Kogelfabriek'.

With this in mind, my intervention does not aim at restoring the 'original' situation; it aims at preserving the situation which is truest to the essence and value

of the building, in this case its intended function. Using this situation as a platform, future interventions will be able to incorporate Building 429 to our common future. Building 429 is not rare enough to justify a "do-not-touch" approach, which would place it upon a metaphorical podium to be exhibited, becoming the exhibit by itself. Rather, it is crucial for the future of this building that it accommodates a function that can pay for a large part of the cost of its existence, in order for it to continue its life without being a burden to society.

During its decommission, the previous owners stripped the building of most of its fixtures and fittings. What remains can be divided in two categories: i. immovable elements, such as partition walls; ii. moveable elements, like equipment.



The elements of the first category do not all carry the same cultural value, as it is not known which were original and which not, after the numerous alternations to the building's interior. Thus, their value is related with their adequacy in communicating original intentions, i.e. the zoning of the building's functions.

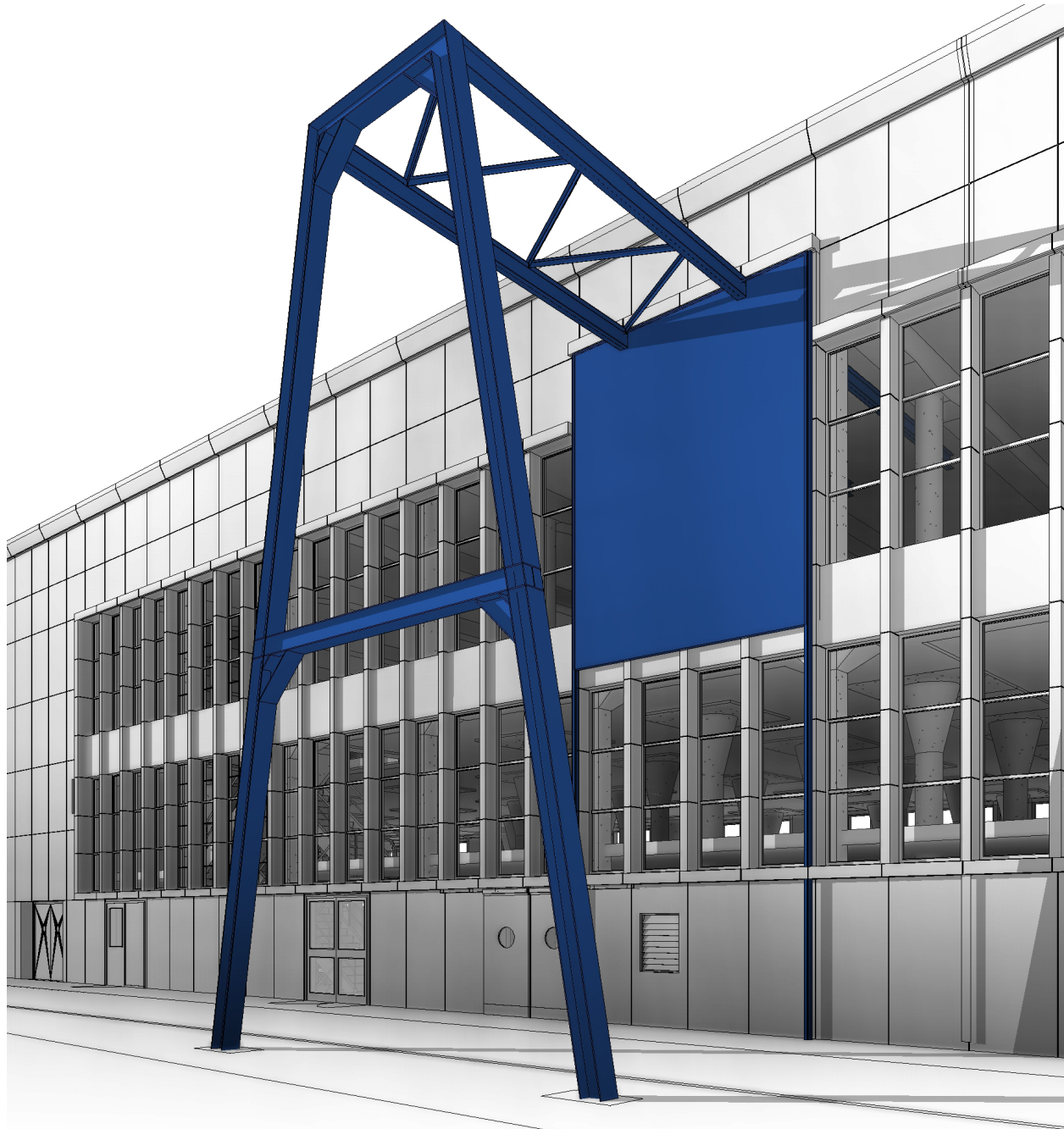
The photograph on the left shows metal frame partition walls, which are likely to be original. Even if they are not, they are in harmony with the rest of the composition. On the other hand, the photograph on the right shows a -probably temporary- plasterboard partition, which is very unlikely to be original. Even if it was not very recent, it is not in place with the composition's character, and is thus of low value.






The moveable elements do not carry the same cultural value either, for the aforementioned reasons. For example, the electrical fuse boxes can no longer be used as they are not up to code, but are in fairly good condition and are interesting objects to retain, even if not in their original locations. On the other hand, the few parts of crane rails left in the interior of the building (some of them dating to the late 20th century) do not contribute to the preservation of the building's spirit as they are too few and too fragmented. Specifically, they are too limited to provide an insight to how the building operated.



The few pieces of equipment left behind have some cultural value. For example, the mechanical systems for the operable windows (which utilise a manual crank and a cable system), could be preserved, although they were not rare or novel for the time, as they enhance the building's spirit. Following that logic, retaining the system and bypassing the manual cranks (while also retaining these as well) with electronic actuators would improve efficiency without overly affecting the aesthetics.



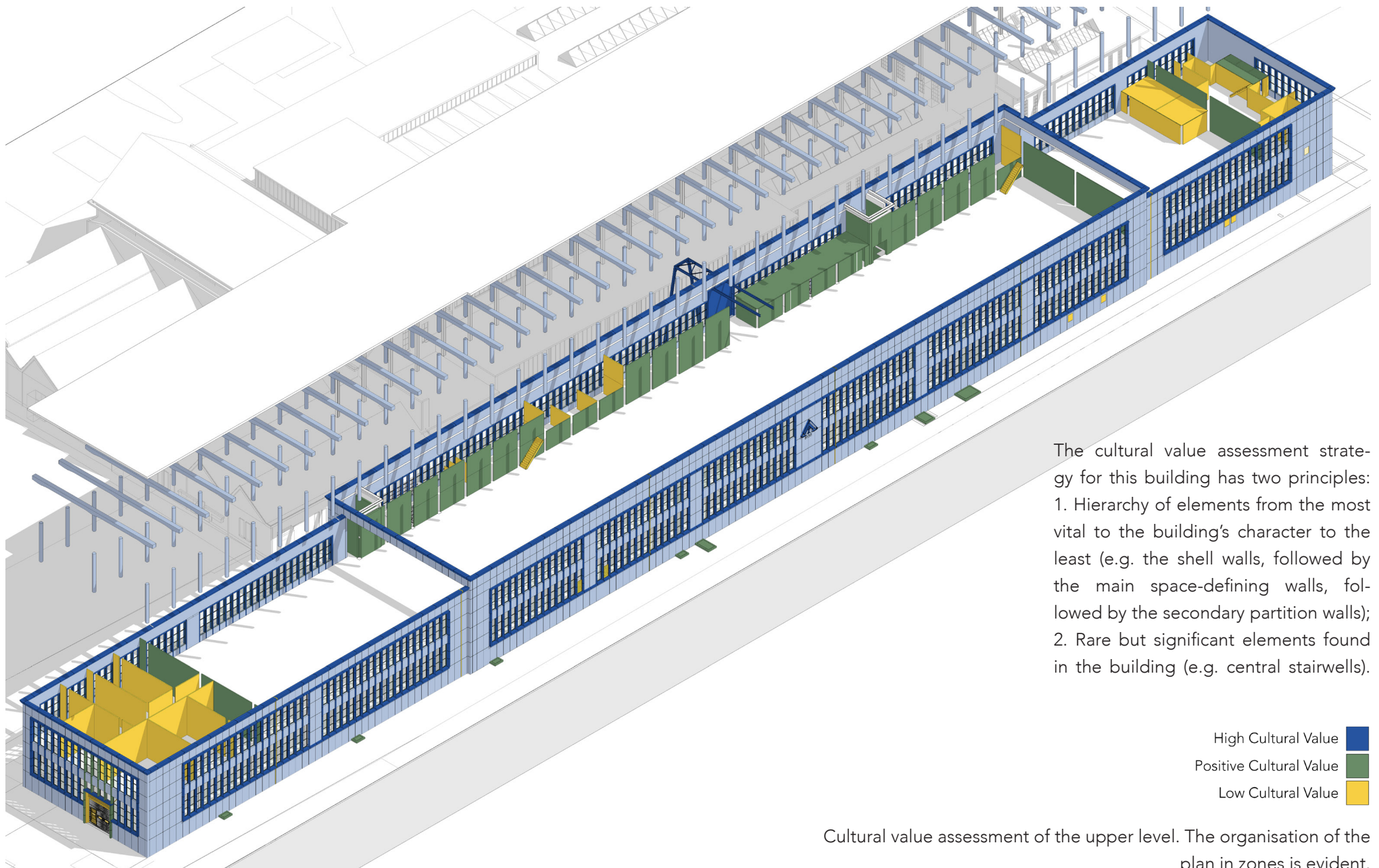
- High Cultural Value 
- Positive Cultural Value 
- Low Cultural Value 

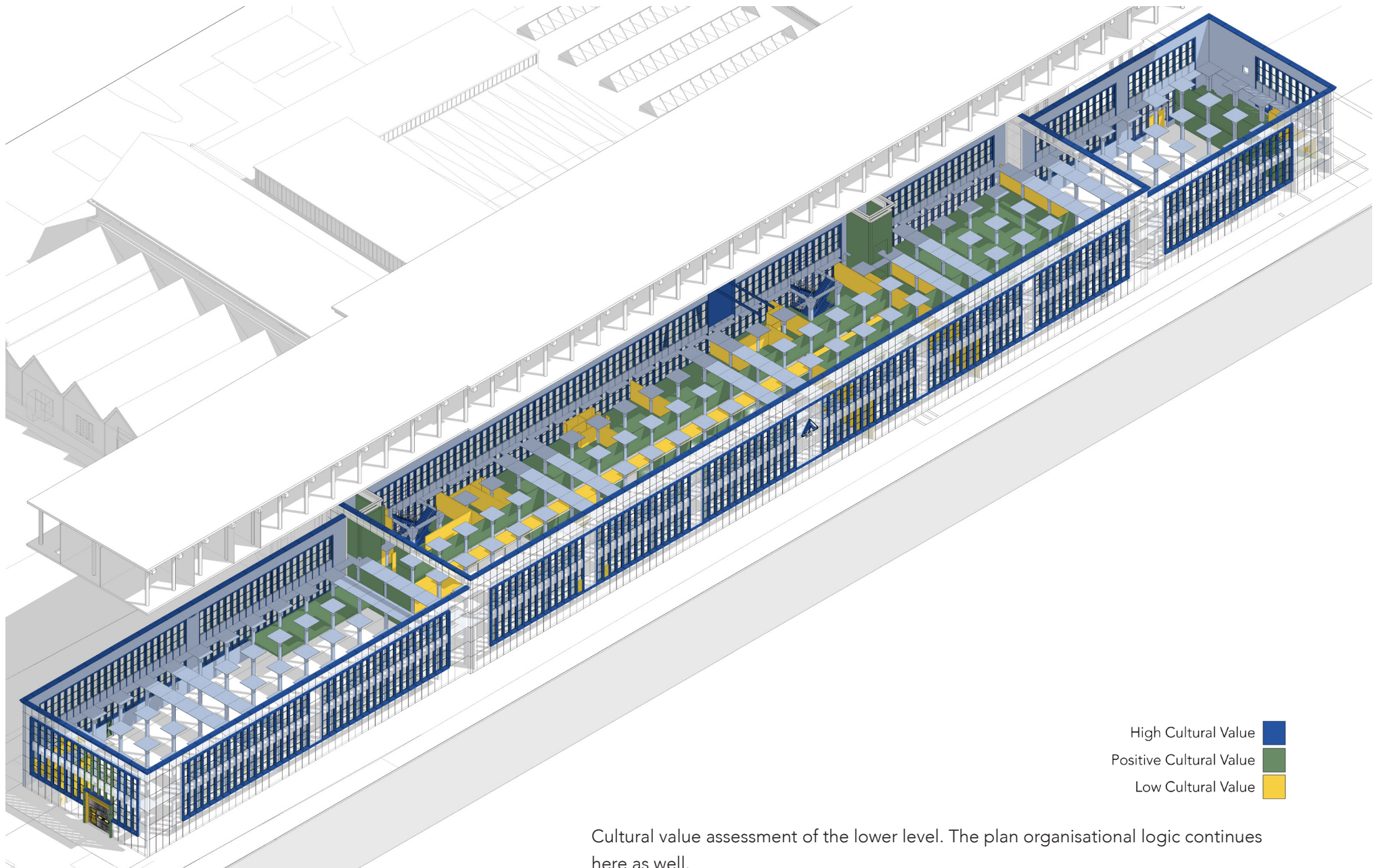
On the other hand, the large crane and its door on the north façade of the building (on Warmperserij) are very highly valued. Not only are they an insight to this rare kind of equipment, but they are also important in showcasing the building's operational flow.



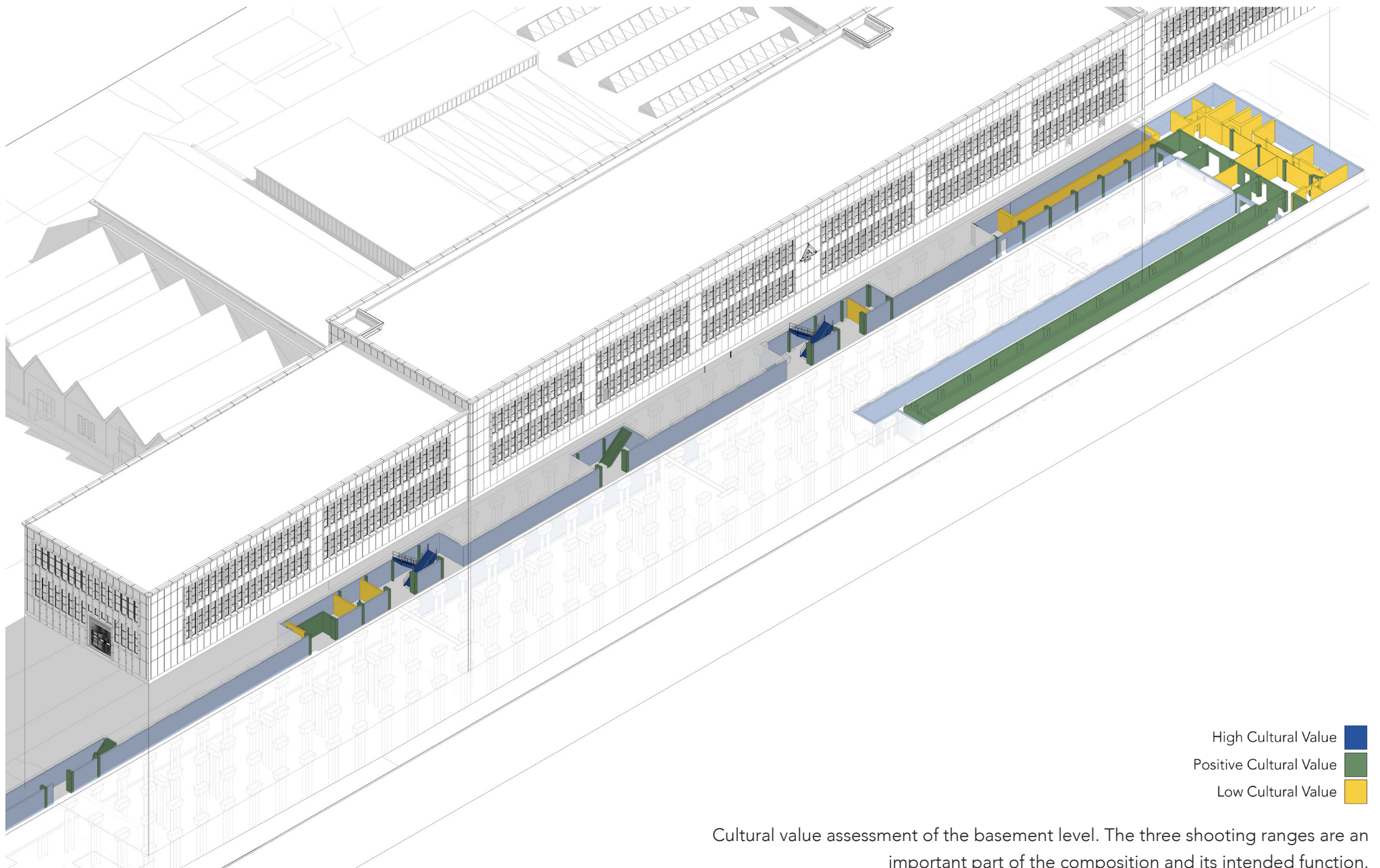
As expected, some of the most valuable elements of Building 429 are the subterranean shooting ranges. Not only are they preserved very close to their original state, but they are also very rare and indicative of the original function. Elements such as the small, bunker-like adjacent rooms, as well as the large steel doors, are very highly valued. In addition, immaterial aspects, such as the 'maze-like' feeling of the basement, are highly valued. The feelings that the basement evokes, due to its darkness, dense air, the smell of burned smokeless powder (or any other ammunition propellant), the disorientation and loss of scale due to the 'seemingly endless' 200m range, are very unique to this space. While not ideal for future functions, there are a number of uses which could benefit from retaining -some of- them.

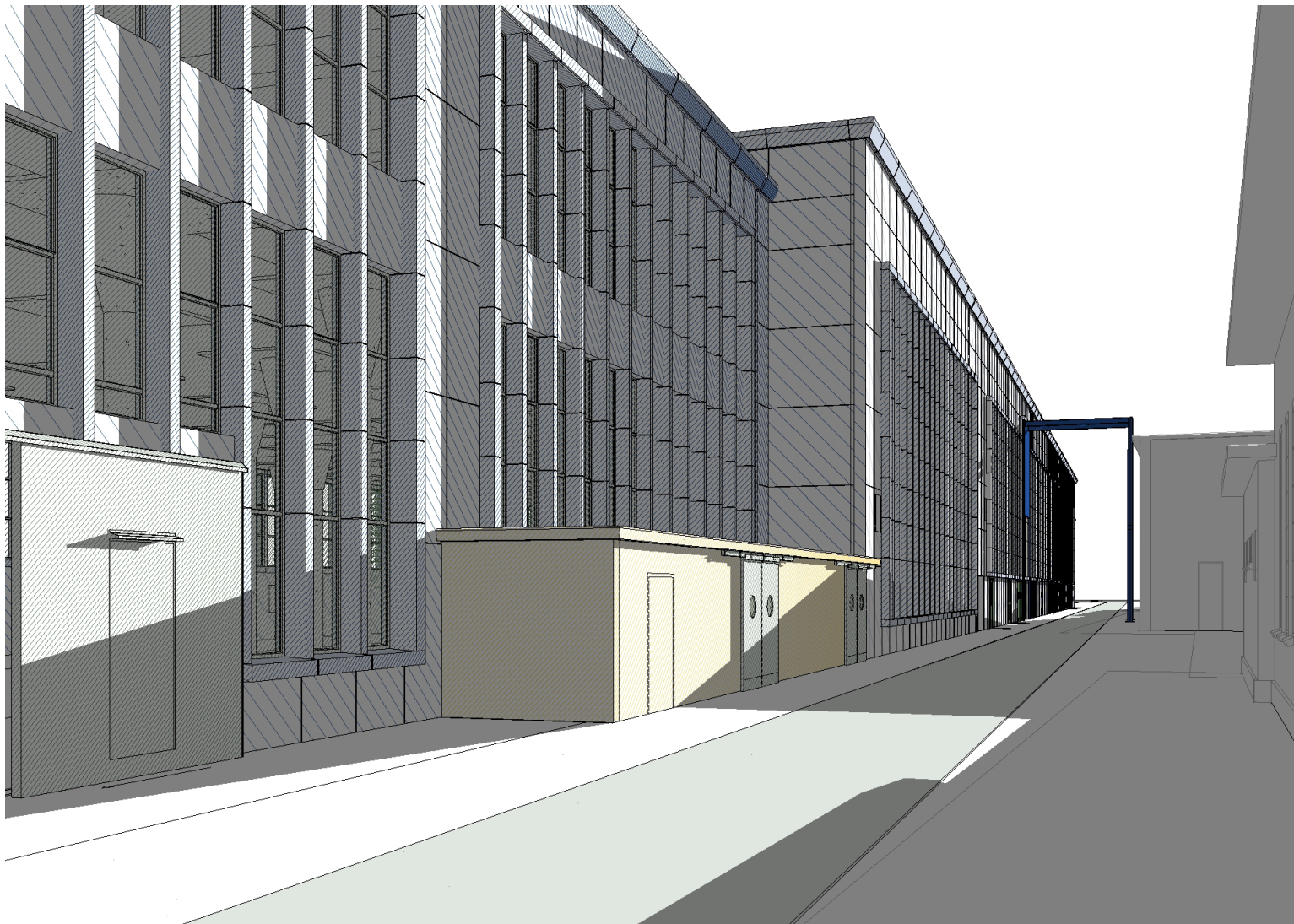
6.3 OVERALL CULTURAL EVALUATION





Cultural value assessment of the lower level. The plan organisational logic continues here as well.

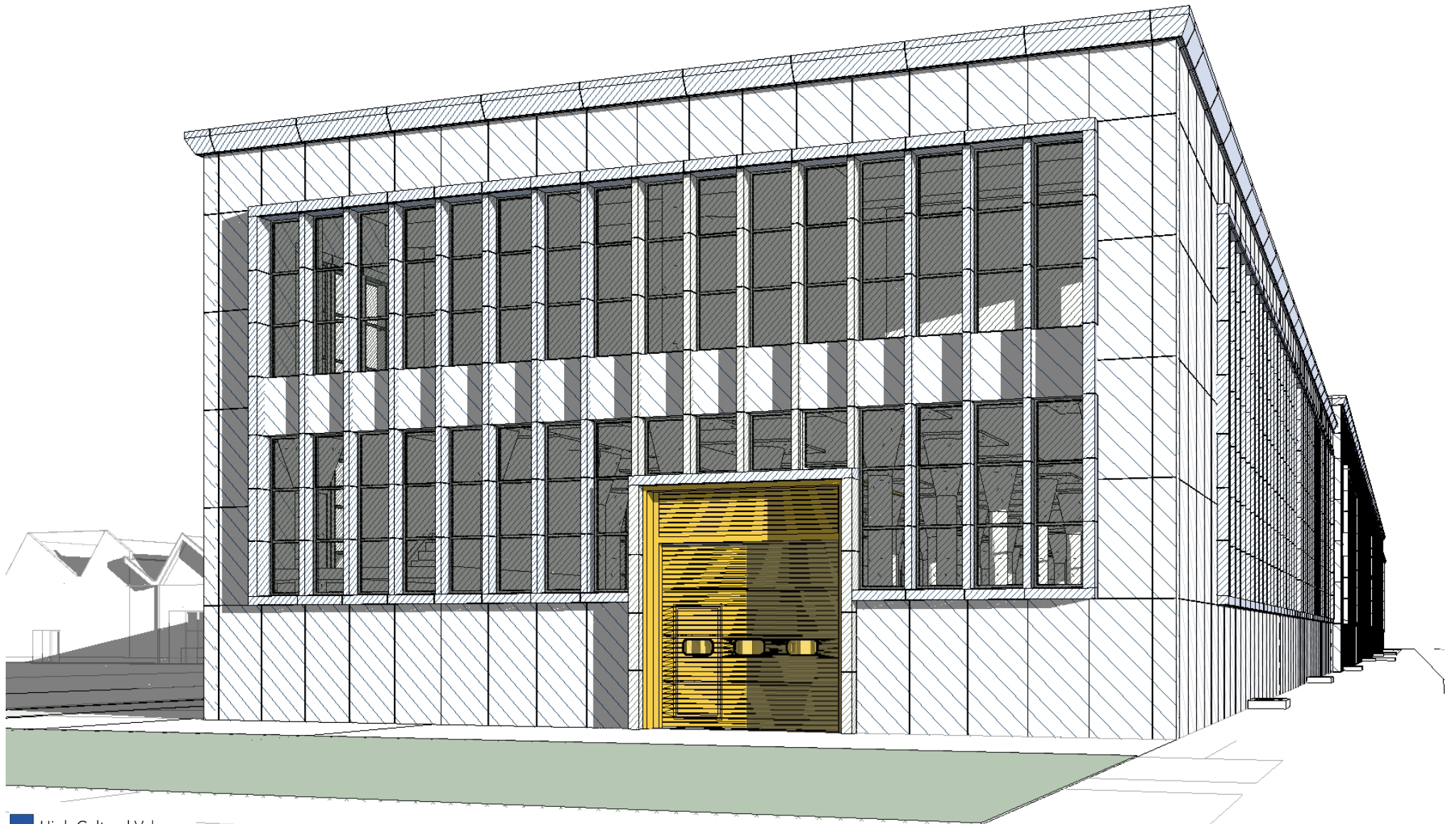




- High Cultural Value
- Positive Cultural Value
- Low Cultural Value

Cultural value assessment of the elevation on Warmperserij.

As most people experienced Building 429 from the outside, its façade is one of its most valued elements. It could be argued that the pre-fabricated panels themselves are less important than the visible joints between them, which give the building rhythm and an almost classical appearance. On the other hand, elements such as the concrete lintels and columns defining the groups of windows are also highly valued, only this time for their direct aesthetic effects. The cornice crowning the composition, as well as the parapet of the central wing, are also highly valuable elements, and important for the building’s spirit. That being said, these elements are not scarce in the building itself. For example, the façade has a running length of approximately 440m, so a part of it could be removed or altered without affecting the composition.



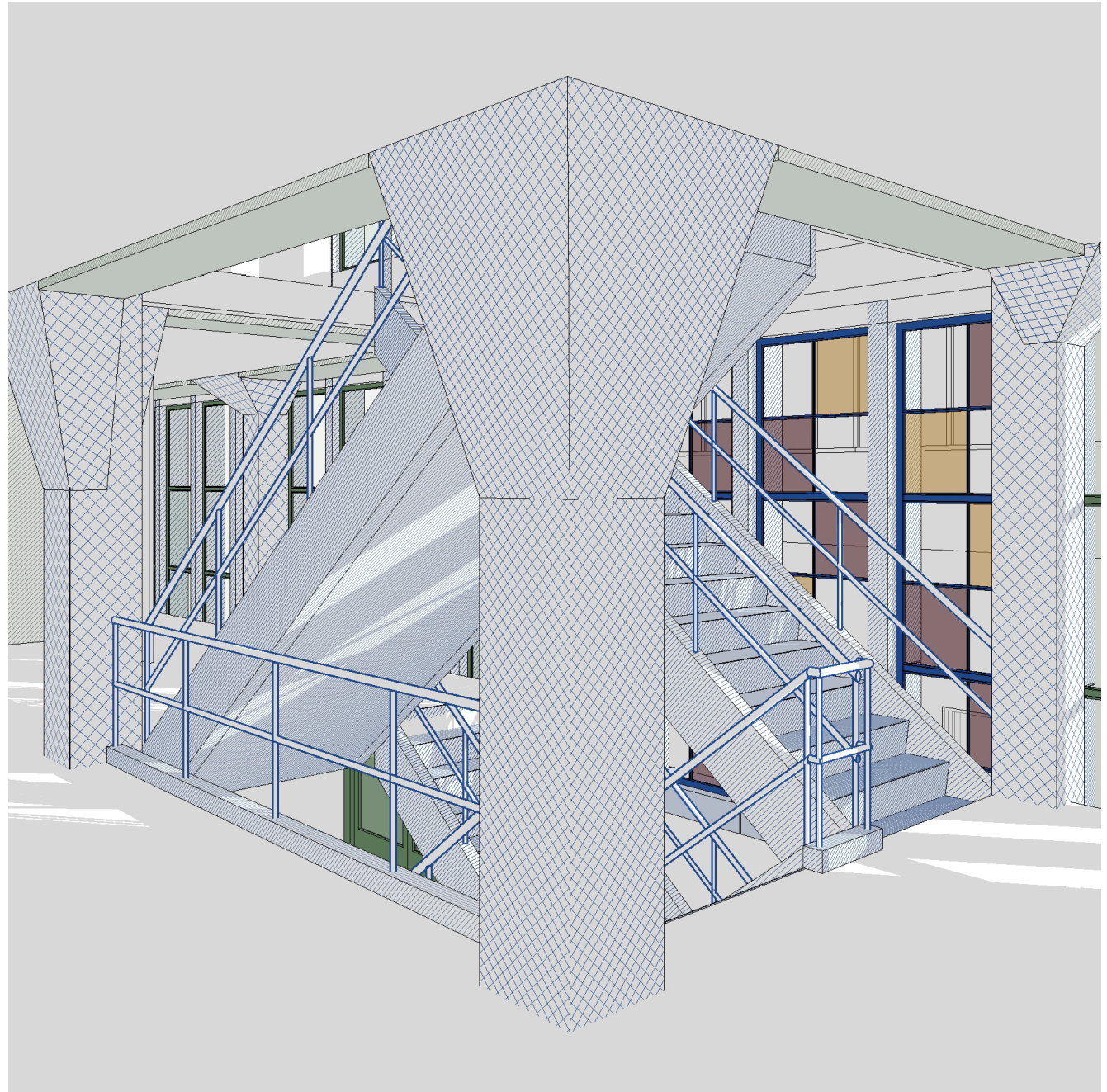
- High Cultural Value
- Positive Cultural Value
- Low Cultural Value

Cultural value assessment of the western elevation.

- High Cultural Value
- Positive Cultural Value
- Low Cultural Value

The many colours in the interior of the building are indicative of its many temporary interventions, but lessen the overall clean and strict effect of the composition. Its original character, plain yet imposing, was much more fitting of its original function. Additionally, the very limited -original- colour palette of the building makes elements such as the coloured glass windows of the stairwells even more unique. These windows could be a reference to the coloured glass windows of the stairwells of building 326, west of Building 429. As such, and as some of the most unique features of this building, the windows are highly valued.

The window frames of the building are highly valued, given that they could accommodate double glazing. The glazing itself is not valued except for the coloured planes in the stairwell windows. They are some of the few elements of the building featuring colour, being painted pine green. The mechanical systems to manually operate some of the windows are, as said, of high value.



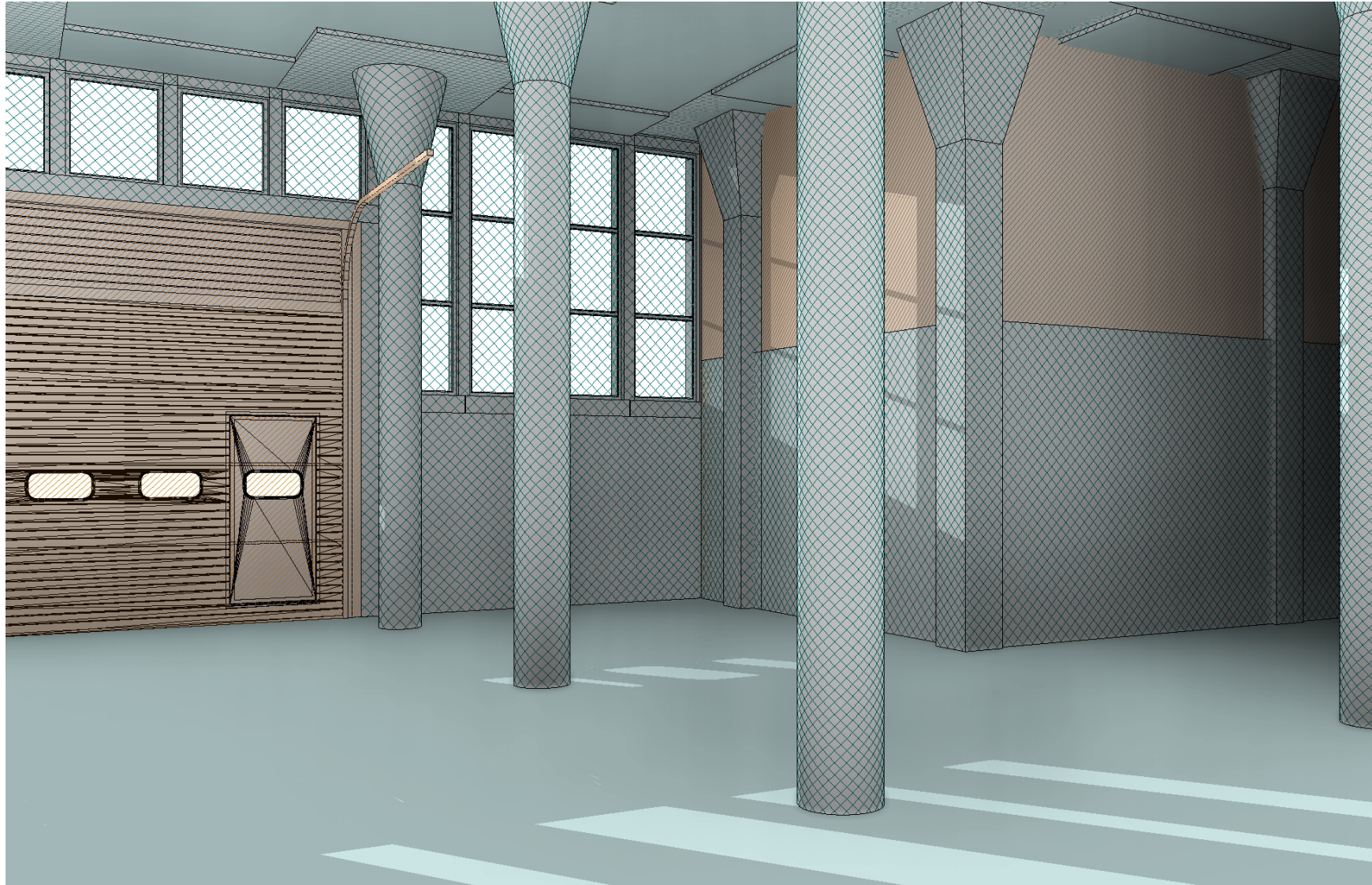
6.4 CHRONO-MAPS



Cultural value assessment of the lower level.

Another very highly valued element of the building, and especially of the façade, is the repetition. On elevation it enhances the building's dimensions, making it even more imposing and grand. On the interior, especially in the lower level, the densely placed columns give an air of monumentality, which is also very highly valued. In these cases, the elements themselves are less important individually than their array as a whole. For example, the most valuable element of a single column is its effect on space and within its group. In that sense, replacing one or a small number of columns with other elements of similar properties would not break this continuity. On the other hand, simply removing one of them could even enhance the repetition of the whole.

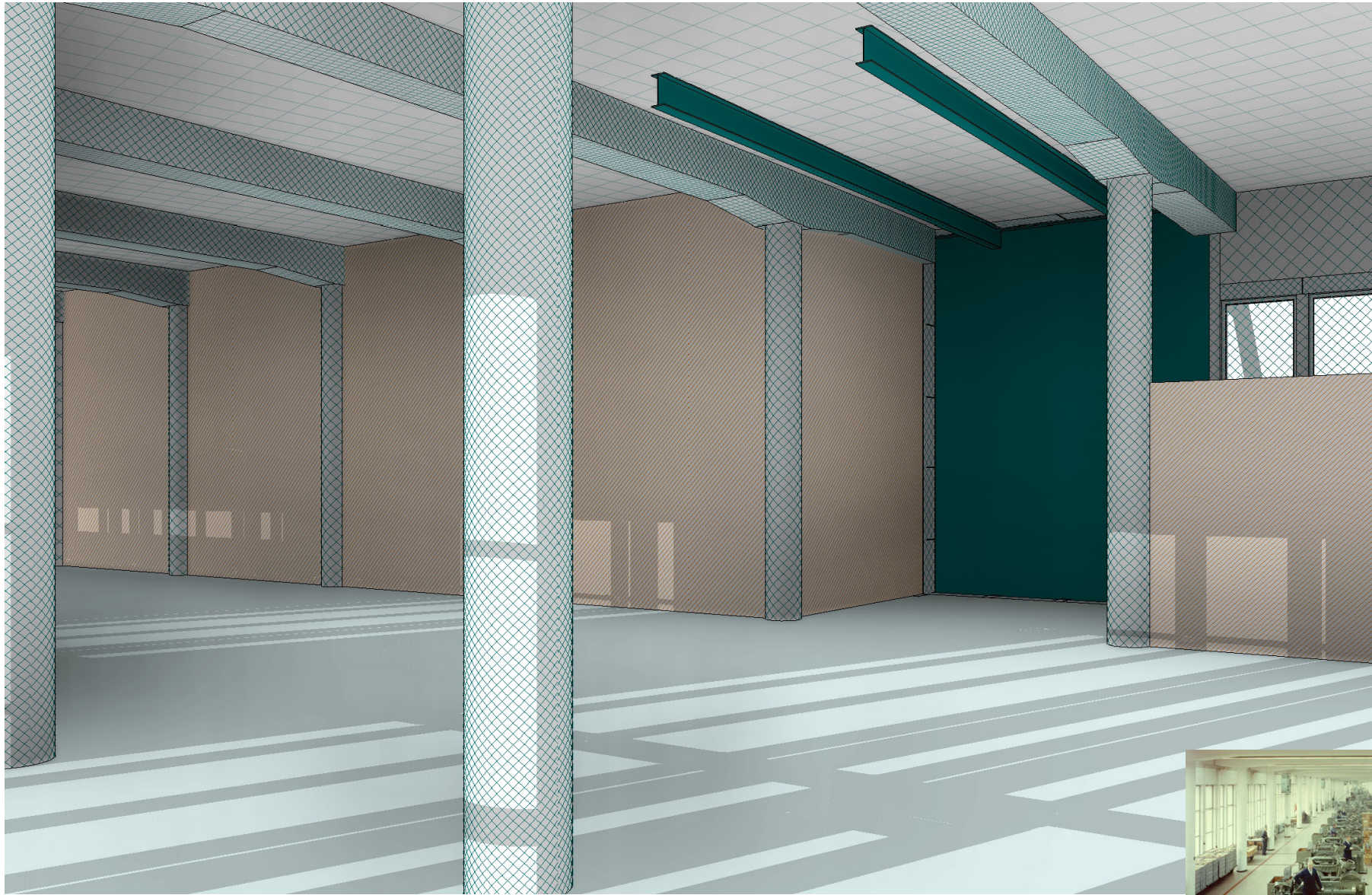
- High Cultural Value
- Positive Cultural Value
- Low Cultural Value



1956-1958

Most likely after
the 1970s

As said previously in the report, the available information on Building 429 is very scarce. To make matters worse (for this evaluation), its interior was designed to accommodate multiple functions, and as such, has undergone many alternations. In addition, the building was stripped from almost all its interiors after being decommissioned. As a result of the previous facts, categorising the building chronologically, based on facts, is not always possible, limiting the room for beneficial chrono-mapping. The drawing above shows the NW corner, ground level. From various sources it is known that the large door on the left was originally hinged and double. In addition, the mezzanine level visible on the right was not originally walled off.











- 1956-1958
- Most likely after the 1970s



There are instances where more relevant material is available. In the case of the upper level central wing, we know that the northern wall (seen above) did not have a secondary function zone. Thus, the walls existing in that space must have been installed after 1960, when the photograph was taken.

6.5 VALUE MATRIX

	AGE VALUE	HISTORICAL VALUE	COMMEMORATIVE VALUE	FUNCTIONAL VALUE	NOVELTY VALUE	AESTHETIC VALUE	RARITY VALUE
WIDER CONTEXT	THE HEMBRUG SITE DATES BACK TO 1895		NOT PUBLICALLY ACCESSIBLE	LAYOUT AND BUILDINGS PROVIDE OPPORTUNITIES FOR FUTURE USE	THE COMPLEX FOLLOWED ESTABLISHED DESIGN PRINCIPLES		WHILE SUCH COMPLEXES ARE NOT COMMON, THEY ARE NOT RARE
SITE	(G429'S IMMEDIATE CONTEXT IS RESTRICTED TO ITS FOOTPRINT)					(EXCLUDING G429, THE SITE IS PRACTICALLY EMPTY)	
EXTERIOR	THE BUILDING WAS BUILT IN 1956	THE BUILDING'S EXTERIOR IS REPRESENTATIVE OF ITS ERA	G429 IS CONSIDERED TO BE "HEMBRUG'S FACE"		PRE-FABRICATED ELEMENTS WERE CHARACTERISTIC OR RECONSTRUCTION-ERA ARCHITECTURE		THE EXTERIOR ELEMENTS ARE NOT RARE IN RECONSTRUCTION-ERA ARCHITECTURE
INTERIOR	THE BUILDING WAS BUILT IN 1956	THE INTERIOR HAS BEEN STRIPPED OF MOST ITS CONTENTS	THE INTERIOR WAS NOT PUBLICALLY ACCESSIBLE	THE OPEN-PLAN LAYOUT ALLOWS FOR A VARIETY OF FUNCTIONS	OPEN-PLAN LAYOUTS ARE STANDARD FOR INDUSTRIAL BUILDINGS		THE INTERIOR IS COMMON FOR INDUSTRIAL BUILDINGS
STRUCTURE	THE BUILDING WAS BUILT IN 1956	THE STRUCTURE IS COMMON			THE STRUCTURE IS COMMON	THE STRUCTURE GIVES THE BUILDING'S INTERIOR MUCH OF ITS CHARACTER	THE STRUCTURE IS COMMON
PLAN		OPEN-PLAN LAYOUTS ARE STANDARD FOR INDUSTRIAL BUILDINGS	THE INTERIOR WAS NOT PUBLICALLY ACCESSIBLE	THE OPEN-PLAN LAYOUT ALLOWS FOR A VARIETY OF FUNCTIONS	OPEN-PLAN LAYOUTS ARE STANDARD FOR INDUSTRIAL BUILDINGS	THE FLOOR PLAN LAYOUT GIVES THE BUILDING A MONUMENTAL CHARACTER	OPEN-PLAN LAYOUTS ARE STANDARD FOR INDUSTRIAL BUILDINGS
SERVICES & INSTALLATIONS	NO ELEMENTS DATE BEFORE 1956	NO ELEMENTS DATE BEFORE 1956	THE REMAINING ELEMENTS CAN GIVE CLUES FOR THE BUILDING'S ORIGINAL FUNCTION	THE REMAINING ELEMENTS ARE OUTDATED AND NON-OPERATIONAL	THE REMAINING ELEMENTS ARE NOT INNOVATIVE FOR THEIR TIME		ELEMENTS WERE MASS-PRODUCED AND ARE MOSTLY STILL AVAILABLE
FIXTURES & FITTINGS	NO ELEMENTS DATE BEFORE 1956	NO ELEMENTS DATE BEFORE 1956	THE REMAINING ELEMENTS CAN GIVE CLUES FOR THE BUILDING'S ORIGINAL FUNCTION	THE FEW REMAINING ELEMENTS ARE NOT INTACT	THE REMAINING ELEMENTS ARE NOT INNOVATIVE FOR THEIR TIME		ELEMENTS WERE MASS-PRODUCED AND ARE MOSTLY STILL AVAILABLE
SPATIAL ESSENCE	EVEN THOUGH ALTERED, THE ORIGINAL SPACE DATES BACK TO 1956	THE SPACE AS A WHOLE CAN PROVIDE INSIGHTS TO THE BUILDING'S ERA	WHILE NOT PUBLICALLY ACCESSIBLE, IT CAN PROVIDE FUTURE GENERATIONS WITH INSIGHTS				SPACES OF THAT SCALE ARE NOT COMMONLY FOUND



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SteenhuisMeurs, Hembrugterrein - Zaanstad, Gebiedspaspoorten Omgevingsplan

Archives:

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National Archives, Hague

Organisations:

Cultural Heritage Agency of the Netherlands website