GRADUATION PROJECT 2021-2022

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UNKNOWN MAKES UNLOVED

This report contains most of the analyses, research and design I've conducted as part of the redesign of the police station at Achter de Houttuinen in Middelburg. A part of it will be discussed during my final presentation but more in-depth information can be found in the upcoming chapters.
The past year I have worked with great pleasure on this project. The time given by a year-long graduation project allowed me to dive into the field of built heritage and work on my most complex and research-based design project so far.

This endeavor would not have been possible without the help of my three teachers:
Joana Dos Santos Gonçalves, whose ability to find the logic in your train of thought before you find it yourself was of great help.
Wido Quist for his help in understanding the field of heritage and the preservation of materials.
Frank Koopman, whose technical knowledge seems endless while he never loses sight of the architectural intentions.

INDEX

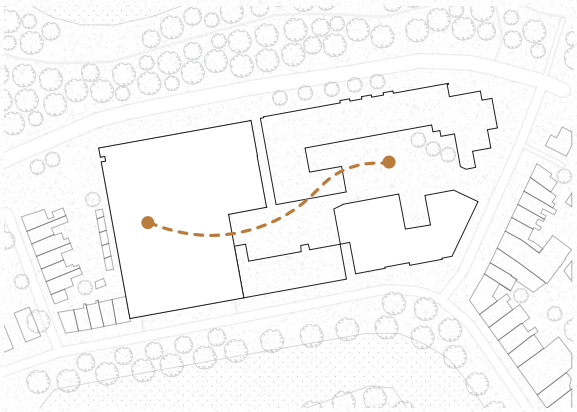
ANALYSES
BUILDING & SITE HISTORY 5
BUILDING & SITE ANALYSIS 17
REDEVELOPMENT PROGRAM 63

RESEARCH
UNDERSTANDING BERGHOEF 75
VALUE ASSESSMENT 121
REDESIGN STRATEGIES 127

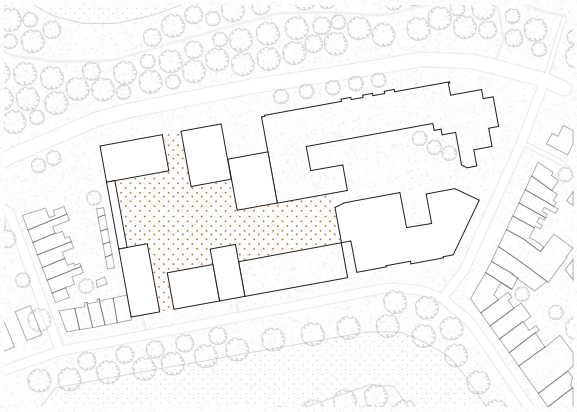
DESIGN
DESIGN EXPERIMENTS 159
DESIGN EXPLANATION 177

PAPER
THE QUALITY OF MODEST VALUED BUILDINGS 303

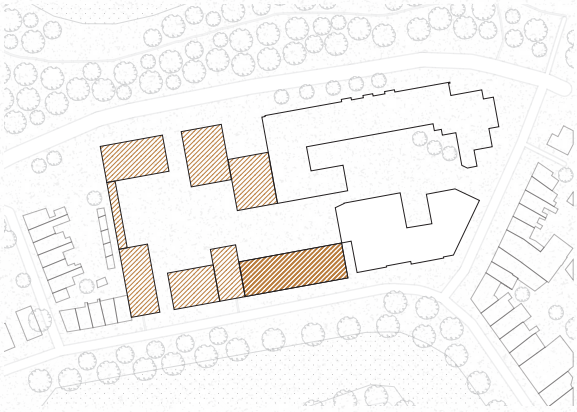
REFLECTION 315
SUMMARY 320
RECOMMENDATIONS 321



Added value by creating meaningful interrelations in the city block



A small scale inner-city campus



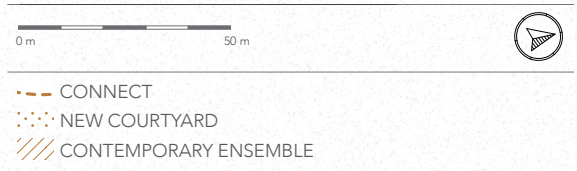
A recognizable ensemble

Design intentions

Soon the vacant supermarket and police station will transform into a brand new campus, with housing and faculty buildings. The aim of the design is to create a city block where the different functions actually profit from each others proximity, creating one of the best possible study environments. In the end the value of the city block is greater than the sum of its parts.

The way I intend to do this is by creating a small scale inner city campus, where students live and study, and teachers and professionals work and lecture in a set of buildings which are centered around a new courtyard.

Design intentions



BUILDING & SITE HISTORY

To understand the police station and its context, an overview of the history of Middelburg and the police station are provided. The chapter starts with a brief history of the town Middelburg. The second part focusses on the history of the police station and its site.

HISTORY

The city of Middelburg was founded in the nineth century when Vikings traveled through Europe on a conquest. As protection against the invaders a ring of defensive walls was raised around the town, making Middelburg the 'Middelste Burcht' ('Center Fortress') of the area of Walcheren. Later, Middelburg profits the riverside location and develops into a trading center. During the twelfth century a second growth period follows the establishment of an abbey[1].

When, after de capitulation of Antwerp, many merchants moved to Middelburg, new city expansions became necessary. Due to the political circumstances fortifications were built around the new parts of the city. The thirteen bastions are still clearly recognizable in the city plan. The large extension of the city made it possible that until the end of the nineteenth century, all urban functions could be housed within the city walls.

In the zone between the new and older fortifications many craft- and industry related activities took place, which were banned from the inner-city because of the noise and smell disturbance. Current street names, like 'Looijerssingel' and 'Houttuinen' still retell these industrial purposes. During the sixteenth century this area, where the police station is located now, only had buildings around bridges across the canal and around entrance roads. Over the next 150 years the area becomes denser until Middelburg reaches the milestone of 30.000 inhabitants[2].

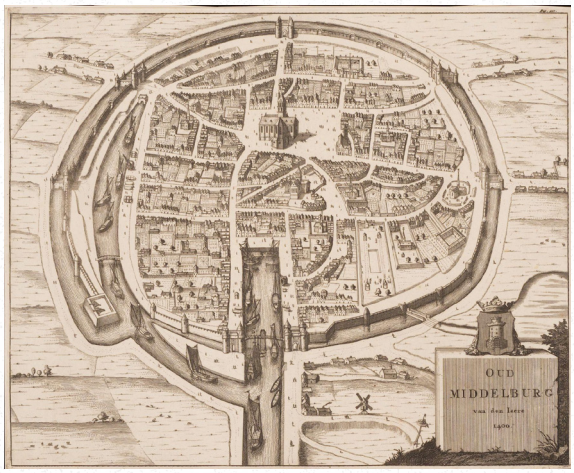


FIGURE 2. MIDDELBURG - 1400



FIGURE 3. MIDDELBURG - 1688



FIGURE 1. MIDDELBURG - 1247

During the seventeenth- and eighteenth-century Middelburg becomes – after Amsterdam - the second important city of the Netherlands due to its major role in the VOC. In two centuries, three hundred new ships are built which, together with the import and export of fabrics, tea and spices, contribute to the wealth of Middelburg. After the bankruptcy of the VOC, these prosperous years end. They are followed by two decades of French rule which causes neglection and impoverishment of the city and the destruction of many historic buildings[1]. The milestone of 30.000 inhabitants is only reached again far after the second World War. Partially due to this slow development, the current street patterns shows great similarity with the map of Cornelis Goliat, which shows Middelburg in 1688. Attempts to diminish the economic downfall by the construction of a new canal in 1815 did change the south side of the city significantly. As the new canal mostly crossed the plots of the bankrupt VOC and WIC, there was little protest. With the construction of a railway north of the new canal, a new harbor front emerged.

Due to the bombardments of 17 may 1940, a large part of the historic inner-city was damaged. Many monuments were restored after the war, but an important change to the city plan was made. Partially because of traffic planning and partially because of a desired spatial relation between the Abbey and the city, the former straight Lange and Korte Burg were not restored but shifted[3].

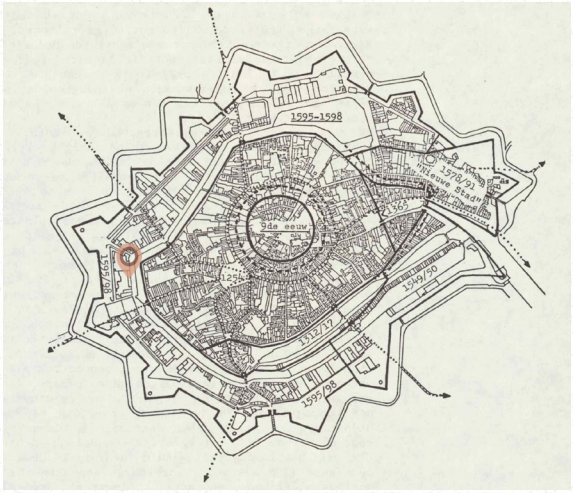


FIGURE 4. EXPENSIONS OF MIDDELBURG



FIGURE 5. TRACÉ OF THE NEW CHANNEL



FIGURE 6. MIDDELBURG PRIOR TO BOMBARDMENTS



FIGURE 7. MIDDELBURG AFTER RESTORATION

A THRIVING WOODTRADE

During the nineteenth century the industrial development of Middelburg is marginal, yet at the end of the century a company specialized in timber trade thrives at the edge of the city center. Located at Achter de Houttuinen (Behind the Woodgardens) - the former Houttuinen (Woodgardens, places in the city where wood was dried)- Houthandel Alberts (Woodshop Alberts) lives up to the name of the street.[7] In a new sawing mill tree trunks were processed into building products. Located amid other contractors[3] the company rapidly expanded and soon tree trunks started dominating the city scape. When new tree trunks arrived, they were unloaded and left in the water of the canal to 'water' a process which causes less ruptures and cracks in the wood during the drying process. The drying process which took place alongside the canals took months.[7]

From 1873 until 1958 'Houthandel Alberts' continued its business activities at Achter de Houttuinen. During this time the company opened branch stores in surrounding cities. In 1958 the sawing mill in Middelburg moved to an industrial area nearby.[4] The plot remained vacant until the construction of the police station started.[8] Before the founding of 'Houthandel Alberts' some smaller constructers and carpenters were located at Achter de Houttuinen. Besides the production facilities, there stood a house which belonged to a doctor who had lived there for all his adult live. Alberts bought it; the doctor mysteriously died five days later.[5]

After 'Houthandel Alberts' left the city, the entire block became vacant. On the backside of the plot a fire station was constructed between 1963 and 1966. Underneath this fire station a nuclear bunker was built, to serve as command post of the 'Dienst Bescherming Bevolking' (Service for Citizenry Protection) in case of war. On the plot on the left of the police station an office building was built

Soon after 'Houthandel Alberts' left the city in 1958, the council of Mayors and Aldermen of Middelburg proposed to build a new police station at the former sawing mill location.[9]



FIGURE 8. POSTER WOODTRADE ALBERTS



FIGURE 9. WOODTRADE ALBERTS 1873 - 1958



FIGURE 10. FIRE STATION & HARDWARE STORE 1962

THE NEW POLICE STATION

The planning of a new police station started two years before, when the current police station was deemed one of the worst of the country by the Ministry of Internal Affairs. Yet the architect P. Götzen concluded that it was most difficult to create a representative building at the chosen site, where now a gymnasium was located. Furthermore, the construction of the new police station would have to wait for the demolition of the gymnasium.[9] At the location of 'Houthandel Alberts' the construction could start sooner which was a great advantage seen the state of the current police station. A local newspaper article quoted policeman who would fear to be hit by pieces of sealing and who had difficulties keeping their uniform clean in the old station. Furthermore, the detainees' cells were declared worse than dog houses and multiple suspects had to be interrogated at the same time, in the same room.[10]

For the design of the new station a new architectural firm was hired. Berghoef, Hondius & Lamers, were asked to design a station which would fit in the monumental surroundings of 'Achter de Houttuinen'.[11] Therefore a more traditional and 'calm' façade was designed instead of 'a glass box' which was popular at the time.[12] Even though the preliminary design was finished in 1962, the construction would not start until October 1967.[13] Most likely the tight budget of the municipality, leading to the need for financial support from the central government were the main cause of the delay.[11] At the thirteenth of October in 1967 the first foundation pile was driven by the former chief commissioner of the police force. The construction was expected to take 65 labor weeks, but it was already finished in February 1969.[14]

From this moment the police station housed around 65 police officers from the uniformed police, criminal investigators, administration, traffic police and child police. The station was equipped with a state-of-the-art control desk which enabled communication through telephone, mobile phone and telex. Furthermore, facilities for dactyloscopic (finger prints) and photographic investigation and a traffic scale model for education on traffic safety are included in the station.[12] The shooting range planned on the second floor was switched for a canteen and will be realized behind the police station. Police vehicles could be stored underneath the building at the backside.



MIDDELBURGS KORPS HEEFT NIEUW GEBOUW HARD NODIG

Politie schaamt zich diep voor aanblik bureau

Bij de foto: een kijkje in de 'kantine' van het politiebureau. (Foto PZC)

Einde van ellende is nu in zicht

'Ik ontvang nog liever de burgemeester bij me thuis in het berghok dan hier op het bureau. Dat berghok ziet er veel netter uit'. Deze uitspraak van een Middelburgse politieman laat aan duidelijkheid niets te wensen over. Het is een opmerking, die onverbloemd weergeeft, dat het besluit van de

Er komt misschien een nieuw bureau, dus is het zonde om daar geld aan te spenderen, zo luidde steeds het argument. En zo kon het gebeuren dat de politiemannen zich nu wanneer bezoekers aan het bureau een voet over de drempel zetten al beginnen te verontschuldigen voor de deplorabele toestand waarin het gebouw verkeert. Zo af en toe krijgen de vertrekken eens een sopje, maar veel eer is er niet aan te behalen.

In de wacht brand dag en nacht licht, zo donker is het er. Trouwens

FIGURE 11. POLICE ASHAMED OF OWN STATION



FIGURE 12. POLICE STATION 1969

After the opening of the new police station, an exhibition was held where citizens could experience different aspects of the work of the police and were allowed to explore the entire station. Uniforms and weapons of different time periods were at display, just as new police motorcycles. Additionally, the head commissioner explained the dangers in boosting mopeds and traffic police showed what kind of technical failures can cause car accidents. The exhibition was meant to improve the contact between the police and citizens of Middelburg and was the first of his kind in the Netherlands.[15] In the years following the exhibition the police hosted different traffic safety courses[16] and many afternoons where citizens could check if lost items or stolen bikes were returned to the police.[17]



ZATERDAG 1 FEBRUARI 1969 PROVINCIALE ZEEUWSE C

POLITIE MIDDELBURG VERHUIST

MIDDELBURG — Vanaf aanstaande maandag is de Middelburgse politie niet meer te vinden in de Giststraat. De politionele activiteiten vinden vanaf die dag plaats vanuit het nieuwe bureau Achter de Huittuinen telefonisch bereikbaar op een nieuw nummer: 7251. Het oude alarmnummer 5800 blijft echter gehandhaafd. De overgang van oud naar nieuw betekent, zo schrijft de redacteur van het contactorgaan van het Middelburgse politiekorps een vooruitgang van vijfhonderd procent.

Even het borelje „politie' wegdenken en men krijgt het idee of men een voornaam hotel komt binnen stappen. Alleen die deuren met gewapend glas — moest van de brandweer — doen weer afbreuk aan het geheel.

„Het was eigenlijk een beschamende en bedrieuwde zaak zoals het politiekorps in een provinciale hoofdstad en toeristisch centrum als Middelburg is was gehuisvest', zo zegt commissaris van politie D. van Ooijen over wat nu snel verleden tijd zal zijn. Belangrijkste punt van de nieuwbouw vindt de commissaris dat het politiekorps nu voor het eerst in bureau een normaal aanzien te geven met een ontvangsthal en een receptie waar de bezoeker met wensen of klachten terecht kan. Met een blik voor de wachtenden en een bloemetje en een muurschildering als plezierige entourage. En dat maakt wel een wat andere indruk dat het vroeger het geval was in de oude stulpen, waar de bezoeker zich tot voor kort aan de Giststraat moest vervoegen. De mensen moeten niet het gevoel krijgen dat ze in een kaal overheidsgebouw zitten. Daarom heb ik bijvoorbeeld met opzet de kruislatten vallen op goedkeuren in plaats van op een aluminium zonwering. (Dat geeft uiteindelijk een wat huiselijker sfeer.)

In het souterrain van het gebouw bevinden zich de cellen. Krachtig vertrekken, uiteraard met stevige deuren maar met een luchtdig die helmlsbreed verschilt met de onmenselijke hokken in het oude bureau. Er zijn twee dronkemanscellen waar men zich nergens aan kan bezeren, drie gewone cellen en twee passantenverblijven voor mensen die aangehouden zijn, voor weggelopen minderjarigen enz. Aan de achterzijde bevindt zich een garage voor het „rolmaterieel' van de politie. Even het borelje „politie' wegdenken.

Meldtafel

De wachtcommandant krijgt op de begane grond een plaats bij een inrijkwekkende meldtafel. Daar zit het brein met contacten met portofoon, mobilofoon, telefoon, lobie, er zal straks een magelijkheid bestaan om telefoongesprekken op een band vast te leggen en de alarmsignalen van de verschillende objecten in de omtrek op aangeleten. Een grote plattegrond van Middelburg bedekt een gehele wand.

In de vleugel van het gebouw waar de verkeersafdeling dienst gaat gedeelte is een verkeersmaquette-kamer ingericht. Daarbij zal voor het eerst in Nederland worden gebruik gemaakt van bewegende voertuigen. De maquette kan worden bezet voor het praktisch verkeersonderwijs.

Ook staat deze ten dienste bij de opleiding van verkeersbegeleidertjes. Het opleidingsapparaat zal er in het nieuwe bureau royaal bij. Hiermee bedoelt de commissaris een lesruimte. Er zijn speciale verbeeldingsmiddelen, die evenwel kunnen worden bezet door de politiemannen die nieuwsmen moeten horen in verband met plaats gevonden aanrijdingen. In het oude gebouw gebeurde dat meestal in de kantine van de politiemannen, een behelpelijk woord voor een ronduit slecht geventileerd hok waarin nog extra de personeelfoto uitgehangen was. Ook de representatieve zetel van het korps Achter de Houttuinen.

(Foto PZC)

ting anno zoveel voed opgehangen. Op de bovenverdieping is een ruime lesruimte met bureau voor het lesgeven. Hondius en Lamers uit Aalsmeer de lekening maakte, is nu een echte kantine te vinden, deels te benutten als instructieruimte. De verschillende diensten hebben in het gebouw een ruime plaats gekregen. Wel is opmerkelijk dat de wachtruimte voor het surveillerend personeel niet zo groot is. „Dat is ook niet nodig', acht commissaris Van Ooijen. Het is niet meer zoals vroeger toen de politie vlucht zat. We werken nu preventief door de mensen op pad te sturen'.

FIGURE 13. OPENING OF NEW POLICE STATION



FIGURE 14. EXHIBITION IN NEW POLICE STATION



FIGURE 15. THE POLICE STATION JUST AFTER COMPLETION

SITE DEVELOPMENT

During the time the police housed the building at Achter de Houttuinen 10 the surroundings changed considerably. The plot north of the police station held the last offices of Woodtrade Alberts. After the construction of the police station, these offices where replaced with a new office building. The courtyard between the office building and the fire station used to be the starting point of traffic exams for primary school students.
The office building is recently transformed into a hotel. The hotel, called Wood, used the history of 'Houthandel Alberts' as inspiration for its interior design.

In 1999 the 'Provinciaal Archeologisch Centrum Zeeland' (Provincial Archeological Center Zeeland) settled in the fire stations' gym, which was fallen into disuse. The bunker, which was already vacated in 1989 became a depot. In 2005 the fire brigade moved to a new station and the building was left vacant until it was transformed and extended to serve as headquarters of the SZEC which is now called 'Erfgoed Zeeland' ('Heritage Zeeland').

In 1995 the major of Middelburg announced that the police station will be closed as a new station between Middelburg and Vlissingen will become the new headquarters for the area of Walcheren and will combine the police force from Achter de Houttuinen with the officers from other stations.[18] These plans are not realized until twenty-four years later, in 2019 when it is announced that the construction of a new police station between Middelburg and Vlissingen will mean the end of police activities at Achter de Houttuinen. The new station, which will welcome the first officers in 2022, will enable cooperation in bigger teams to deal with bigger cases and it is expected that the contemporary building will attract more young police officers.[19]



FIGURE 16. OFFICE BUILDING ~ 1970



FIGURE 17. EXTENSION TO OFFICE BUILDING ~ 1990



FIGURE 17. EXTENSION SZEC - 2003

ACHTER DE HOUTTUINEN 12-18

The plot next to the police station, Achter de Houttuinen 12-18, is currently not in use. Therefore it will be redesigned together with the police station. It has an eventful history and before adding to this, a summary of its history is described.

After Woodtrade Alberts left the city, the plot did not remain empty for long. In 1960 the municipality of Middelburg decided to build a new warehouse for foodstuffs wholesaler Maljers at Achter de Houttuinen 12-18. Maljers was located at the Vlissingsestraat but its loading and unloading traffic caused to much traffic congestion. At the insistence of the municipality, Maljers moved to the larger plot at the edge of the historic center.[20]

The building of Maljers consisted of 560 m2 offices spread over two floors, at the side of Achter de Houttuinen. Behind the office a large warehouse of 2500 m2 was build in 1962. The warehouse could be reached by trucks from the backside using the Looierssingel. [21] The building rested on 200 wooden foundation piles of 17 meters long with a 3 meter long concrete top. The building was designed by city architect H. Mooibroek.[22] The east façade of the office building had a repetitive traditional appearance (figure X).

Wholesaler Maljers thrived and in 1976, fourteen years after the completion of their new building at Achter de Houttuinen, it had become too small. Therefore they moved in a new building, twice as large, which was constructed in an industrial area outside the city.[23]

The office and warehouse at Achter de Houttuinen became the new address of hardware store De Jager. After a renovation by Rothuizen and 't Hooft architects, the building was made suitable for both wholesales as private sale purposes.[24]

In 1999 the warehouse of hardware store De Jager was demolished after it had been vacant for a couple years. The municipality made plans for realizing the city theatre at Achter de Houttuinen 12-18. Yet in the meantime the plot was bought by project developer Vinium Investment. Commissioned by Vinium, De Jonge architects designed a shopping center with underground parking garage. The offices of De Jager were reused to accommodate smaller shops, and the front façade was partially preserved.[25]

The construction of the shopping mall was characterized by conflicts and payment defaults. As a result the opening of the shopping mall was delayed a couple months.[26]

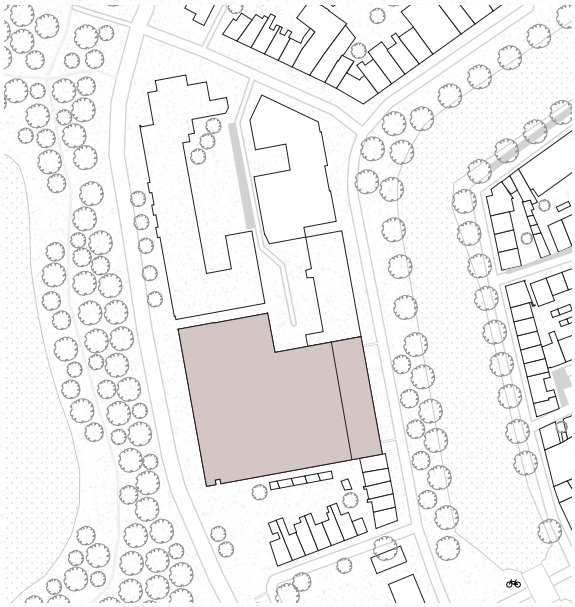


FIGURE 18. ACHTER DE HOUTTUINEN 12-18



FIGURE 19. DESIGN BY H.MOOIBROEK 1967



FIGURE 20. RENOVATION BY ROTHUIZEN & 'T HOOFT 1976



FIGURE 21. CONSTRUCTION OF SHOPPING MALL



FIGURE 22. DESIGN BY DE JONGE 1999

CULTURAL SIGNIFICANCE

Based on the history of the buildings it is possible to make an estimation of their cultural significance. Especially regarding the redesign opportunities and limitations. The buildings of Woodtrade Alberts have all been demolished, thereby leaving no material to preserve or redesign. The warehouse of foodstuffs wholesaler Maljers is demolished in 1999 and replaced by the shopping mall. The office of Maljers, designed by H. Mooibroek is still partially intact. The only visible façade had a straightforward, traditional appearance. The symmetric composition consists of seven window sections on both sides of a large entrance.

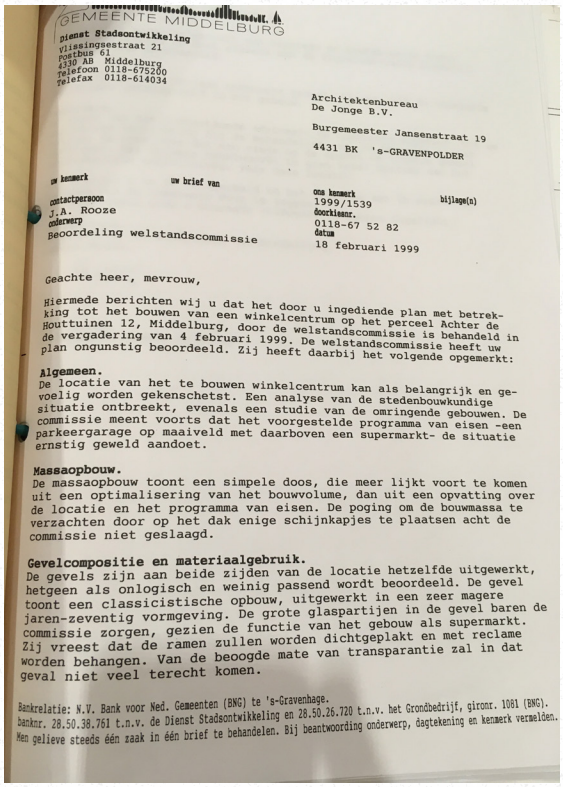
H. Mooibroek was the city architect of Middelburg from 1959 till 1972. During this time, he was involved in the very last parts of the reconstruction of the historic city center of Middelburg which was damaged during the Second World War. After the reconstruction he spend most of his time at maintaining the historic city. In an interview with a local newspaper, he expresses his preference of historic inner cities over the modern urban planning. For historic cities like Middelburg, he predicts a future as 'walking-cities'. Meaning that the upcoming traffic should be banned from the city center.[27] Unfortunately, no further information on H. Mooibroek could be found.

During the renovation in 1976, designed by Rothuizen and 'T Hooft architects, some inner walls in the office of Maljers were demolished to accommodate a shop. An extra entrance between the shop and the warehouse was constructed. Finally, they changed the sign above the entrance so it displayed the new owner: hardware store De Jager.

Rothuizen architects was founded in 1930 by Arend Rothuizen in Middelburg. In 1942 a collaboration with Piet 't Hooft was the start of Rothuizen and 'T Hooft architects. Currently the firm is known under the name Rothuizen and is one of the largest architectural firms in the South-West of the Netherlands. (website rothuzien).

During the construction of the shopping mall, the office designed by Mooibroek was partially preserved. The design by De Jonge architects from Goes provided was not well received. Large entrances for the underground parking garage were made at both sides of the building. Just as two entrances for the smaller shops located in the former office building. The masonry façade was painted in a grey color. In front of the main entrance an entrance portal is added which is designed in a classicist fashion with details which refer to Greek temples. The design was strongly advised against, multiple times, by the beauty committee. The criticism regarded the poor classicist design with seventies appearance and the limited refinement in choice of building material. According to the beauty committee the new entrance portal degrades the entrance to a decor piece. The building in general was criticized for its large volume which seemed to come forward from an optimization of usable space instead of a site analysis. The other facades were seemingly designed without concerning their surroundings. On the advice of the beauty committee, De Jonge architects received help from architect Kodde. Kodde later declared to a local newspaper that it became his job to convince the beauty committee and secure a building permit.[26] How he succeeded remains unclear.

It can be concluded that the original design by H.Mooibroek had a certain, yet modest, cultural significance as part of the oeuvre of city architect H.Mooibroek. The renovation by Rothuizen and 'T Hooft architects entailed to little changes to the building to add any cultural value. The last renovation by De Jonge architects showed little attention to any existing design intention and violeted to the designof Mooibroek. The shopping mall in its current state is a large concrete volume, stripped from any cultural significance.



GEMEENTE MIDDELBURG

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uw kenmerk | uw brief van | ons kenmerk 1999/1539 | bijlage(n)

contactpersoon J.A. Rooze
onderwerp Beoordeling welstandscommissie
doorkiesnr. 0118-67 52 82
datum 18 februari 1999

Geachte heer, mevrouw,

Hiermede berichten wij u dat het door u ingediende plan met betrekking tot het bouwen van een winkelcentrum op het perceel Achter de Houttuinen 12, Middelburg, door de welstandscommissie is behandeld in de vergadering van 4 februari 1999. De welstandscommissie heeft uw plan ongunstig beoordeeld. Zij heeft daarbij het volgende opgemerkt:

Algemeen.
De locatie van het te bouwen winkelcentrum kan als belangrijk en gevoelig worden gekenschetst. Een analyse van de stedenbouwkundige situatie ontbreekt, evenals een studie van de omringende gebouwen. De commissie meent voorts dat het voorgestelde programma van eisen -een parkeergarage op maaiveld met daarboven een supermarkt- de situatie ernstig geweld aandoet.

Massaopbouw.
De massaopbouw toont een simpele doos, die meer lijkt voort te komen uit een optimalisering van het bouwvolume, dan uit een opvatting over de locatie en het programma van eisen. De poging om de bouwmassa te verzachten door op het dak enige schijnkapjes te plaatsen acht de commissie niet geslaagd.

Gevelcompositie en materiaalgebruik.
De gevels zijn aan beide zijden van de locatie hetzelfde uitgewerkt, hetgeen als onlogisch en weinig passend wordt beoordeeld. De gevel toont een classicistische opbouw, uitgewerkt in een zeer magere jaren-zeventig vormgeving. De grote glaspartijen in de gevel baren de commissie zorgen, gezien de functie van het gebouw als supermarkt. Zij vreest dat de ramen zullen worden dichtgeplakt en met reclame worden behangen. Van de beoogde mate van transparantie zal in dat geval niet veel terecht komen.

Bankrelatie: N.V. Bank voor Ned. Gemeenten (BNG) te 's-Gravenhage.
Banknr. 28.50.38.761 t.n.v. de Dienst Stadsontwikkeling en 28.50.26.720 t.n.v. het Grondbedrijf, gironr. 1061 (BNG).
Men gelieve steeds één zaak in één brief te behandelen. Bij beantwoording onderwerp, dagtekening en kenmerk vermelden.

FIGURE 23. JUDGEMENT OF BEAUTY COMMITTEE

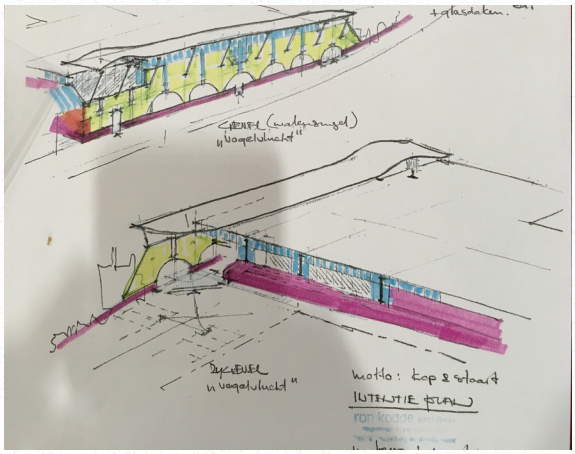

FIGURE 24. DESIGN DRAWINGS ARCHITECT KODDE

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3. Berghoef, J.F. (1946): Wederopbouw van Middelburg. In: Forum 1, p. 3-14

4. ZB Krantenbank Zeeland, Middelburgse Courant July 19, 1873

5. ZB Krantenbank Zeeland, Middelburgse Courant July 24, 1873

6. ZB Krantenbank Zeeland Middelburgse Courant December 24, 1868

7. Zeeuwse Ankers (n.d.) Houthandel Alberts in Middelburg

8. Zeeuwse Ankers (n.d.) Het Schuitvlot

9. ZB Krantenbank Zeeland, Het Zeeuws Dagblad, December 6, 1958, p.5

10. ZB Krantenbank Zeeland, Provinciale Zeeuwse Courant February 10, 1966, p.2

11. ZB Krantenbank Zeeland, Provinciale Zeeuwse Courant, November 28, 1962, p.2

12. ZB Krantenbank Zeeland, Dagblad de Stem, December 8, 1965, p.3

13. ZB Krantenbank Zeeland, Provinciale Zeeuwse Courant October 5, 1967, p.2

14. ZB Krantenbank Zeeland, Provinciale Zeeuwse Courant February 1, 1969, p.7

15. ZB Krantenbank Zeeland, Provinciale Zeeuwse Courant February 28, 1969, p.4

16. ZB Krantenbank Zeeland, Provinciale Zeeuwse Courant February 24, 1978, p.2

17. ZB Krantenbank Zeeland, Provinciale Zeeuwse Courant May 16, 1986

18. ZB Krantenbank Zeeland, De Vlissinger. April 24, 1995, p.5

19. ZB Krantenbank Zeeland, Provinciale Zeeuwse Courant June 29, 2019, p.4

20. ZB Krantenbank Zeeland, Dagblad de Stem, March 22, 1960, p.2

21. ZB Krantenbank Zeeland, Zeeuws Dagblad, June 2, 1961, p.2

22. ZB Krantenbank Zeeland, Provinciale Zeeuwse Courant, May 17, 1962, p.7

23. ZB Krantenbank Zeeland, Provinciale Zeeuwse Courant, August 31, 1976, p.7

24. ZB Krantenbank Zeeland, De Faam en de Vlissinger, June 8, 1977, p.2

25. ZB Krantenbank Zeeland, Provinciale Zeeuwse Courant, August 19, 2000, p.15

26. ZB Krantenbank Zeeland, Provinciale Zeeuwse Courant, Februari 21, 2001, p.17

27. ZB Krantenbank Zeeland, Dagblad de Stem, December 9, 1967, p.3

FIGURES

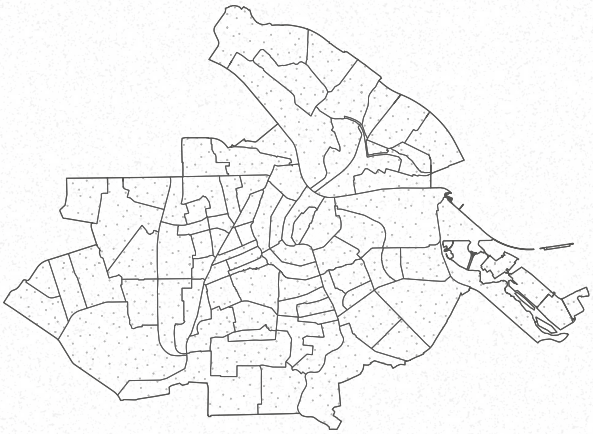
1. Zeeuws Archief, Zeeuws Genootschap, Zelandia Illustrata, Deel I, nr 49
2. Zeeuws Archief, Zeeuws Genootschap, Zelandia Illustrata, Deel I
3. Zeeuws Archief, Zeeuws Genootschap, Zelandia Illustrata, Deel I
4. Gemeente Middelburg (1984) Toelichting op het besluit tot aanwijzing van Middelburg als beschermd stadsgezicht. p. 9
5. Gemeente Middelburg (1984) Toelichting op het besluit tot aanwijzing van Middelburg als beschermd stadsgezicht. p. 11
6. Berghoef, J.F. (1946): Wederopbouw van Middelburg. In: Forum 1, p. 10
7. Berghoef, J.F. (1946): Wederopbouw van Middelburg. In: Forum 1, p. 11
8. Zeeuws Archief, Zeeuws Genootschap, Zelandia Illustrata, deel II, nr 795
9. Image by author
10. Image by author
11. Krantenbank Zeeland, Provinciale Zeeuwse Courant, February 10, 1966, p. 2
12. Image by author
13. Krantenbank Zeeland, Provinciale Zeeuwse Courant, February 1, 1969, p. 7
14. Zeeuws Archief, Gemeente Middelburg, Afdeling Communicatie, nr 50
15. Zeeuws Archief, Gemeente Middelburg, Afdeling Communicatie, nr 50
16. Image by author
17. Image by author
18. Image by author
19. Zeeuws Archief, Construction drawings Achter de Houttuinen 12-18. Middelburg, The Netherlands.
20. Zeeuws Archief, Construction drawings Achter de Houttuinen 12-18. Middelburg, The Netherlands.
21. ZB Krantenbank Zeeland, Provinciale Zeeuwse Courant, August 19, 2000, p.15
22. Municipality Middelburg, Construction drawings Achter de Houttuinen 12-18. Middelburg, The Netherlands.
23. Municipality Middelburg, Construction drawings Achter de Houttuinen 12-18. Middelburg, The Netherlands.
24. Municipality Middelburg, Construction drawings Achter de Houttuinen 12-18. Middelburg, The Netherlands.

BUILDING & SITE ANALYSIS

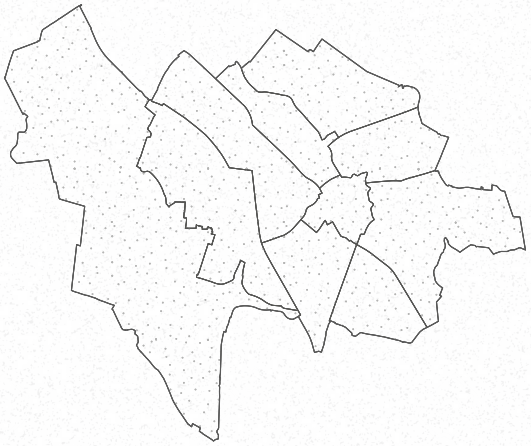
In preparation for the redesign of the police station at Achter de Houttuinen, a thorough site analysis has been carried out. The aim of the analysis is to provide insight in all characteristics of the city which could influence a redesign. Furthermore, the site analysis is an important tool in the search for a new function of the police station.

The city is analyzed on various aspects which range from demography till building heights, while gradually zooming in on the police station. The chapter starts on the scale of the city, followed by the neighbourhoods which surround the police station.

The last part of the chapter is dedicated to an analysis of the building itself.



AMSTERDAM



UTRECHT



GOES



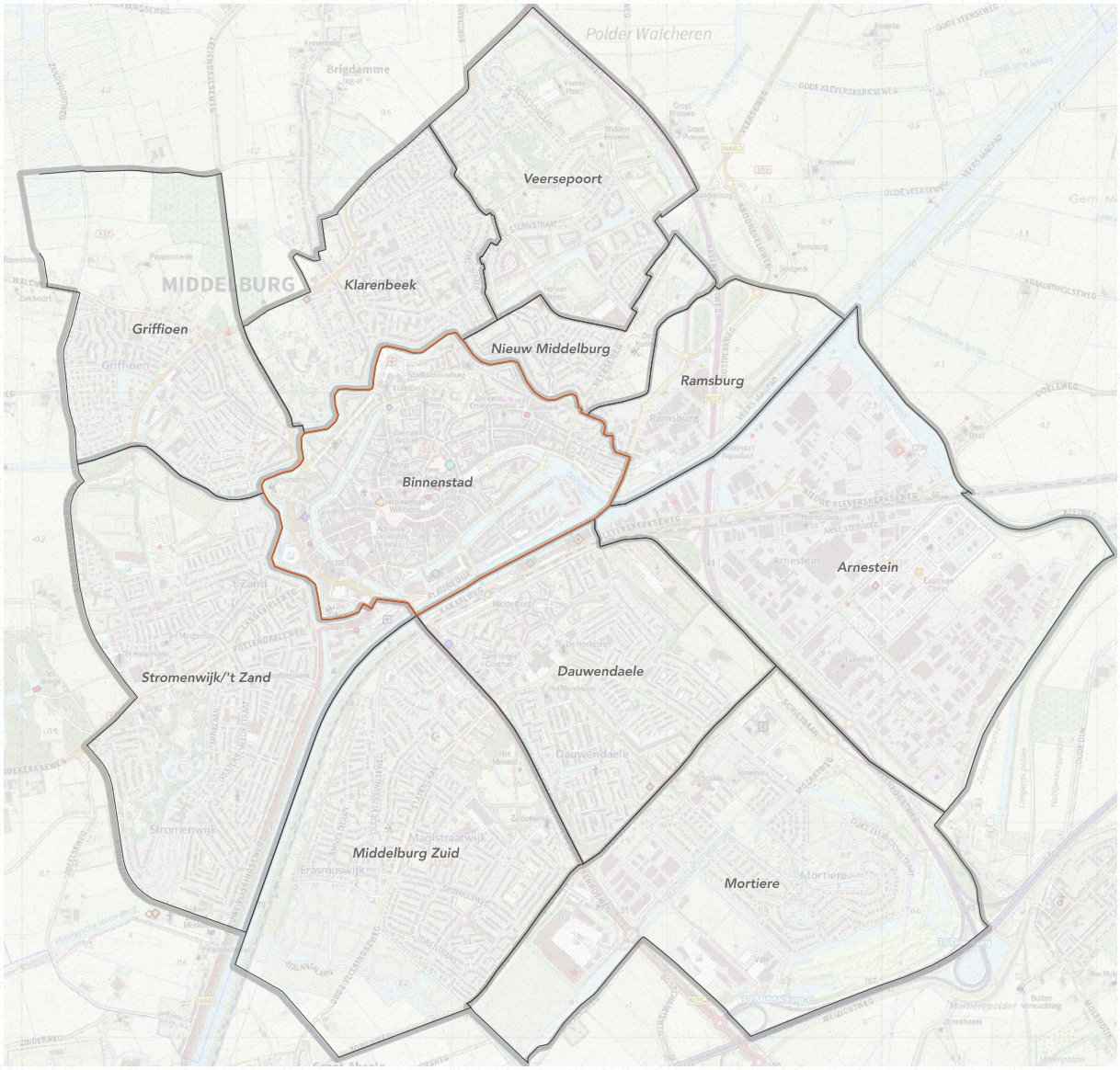
VLISSINGEN



MIDDELBURG

CITY OF MIDDELBURG

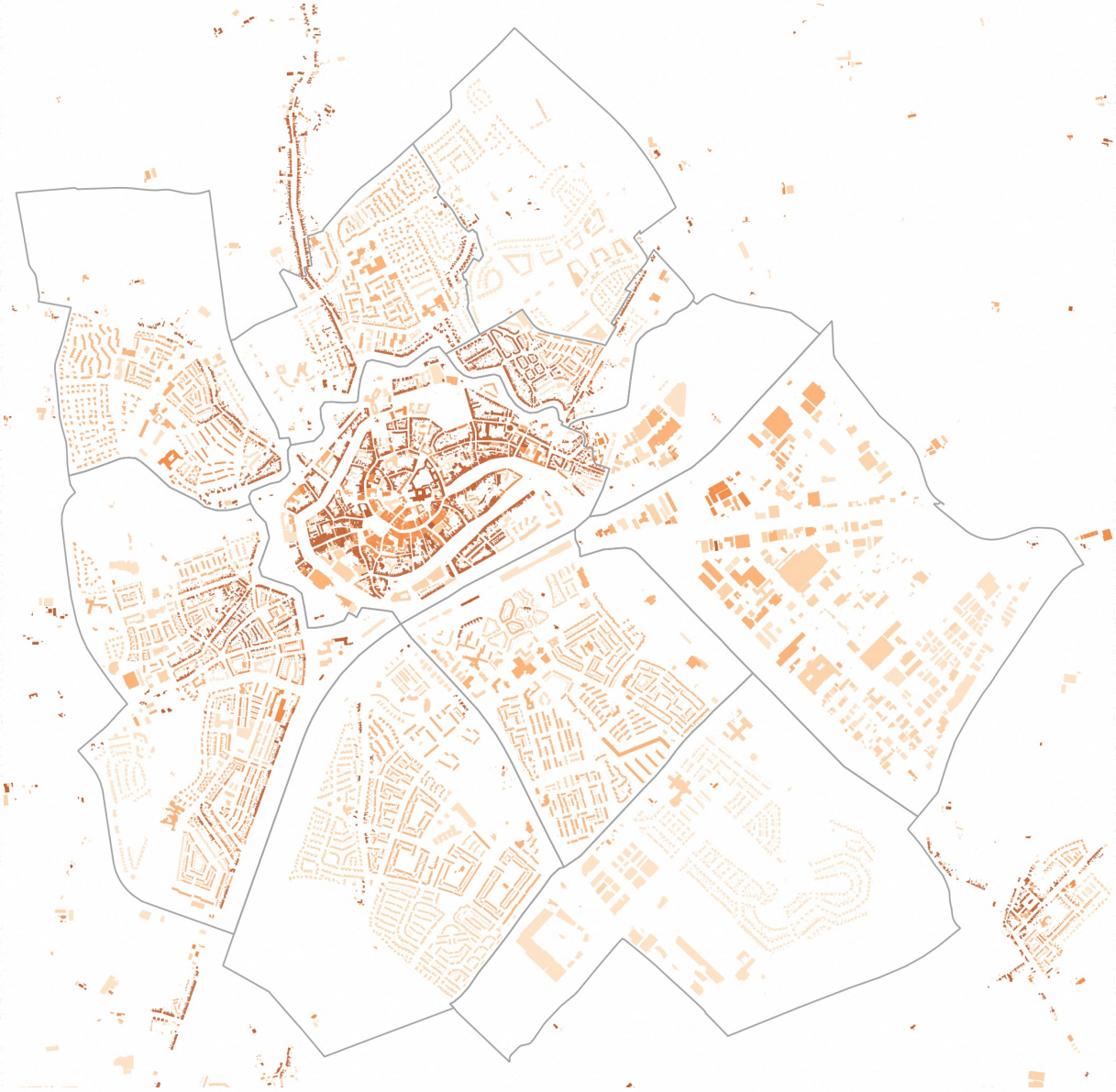
Even though the city of Middelburg once was the second most important city of the Netherlands, it is currently a rather small city. With approximately 48.000 inhabitants, Middelburg is comparable in size to neighboring towns Goes and Vlissingen.



AREAS IN MIDDELBURG
The city of Middelburg consists of eleven areas. They center around the historic inner city (Binnenstad).

0 m 1000 m

SOURCES
- OpenStreetMap

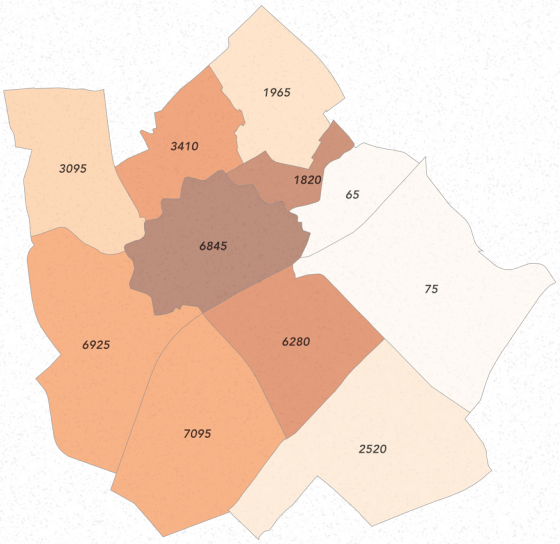


YEAR OF CONSTRUCTION

As is visible in figure X, most of the pre-war buildings are located within the historic city center. Other older buildings are located along important roads which lead into the hinterland. The areas around city center are gradually younger as the distance to the historic center increases.

SOURCES

- OpenStreetMap
- Centraal Bureau voor de Statistiek (2021) Basisregistratie Adressen en Gebouwen. Retrieved from: Nationaal Georegister

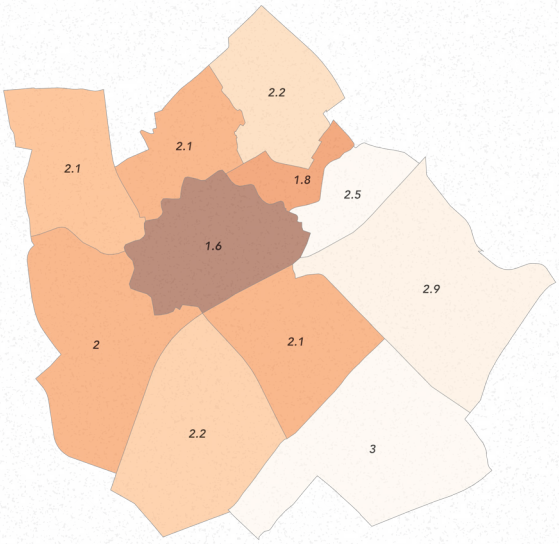


POPULATION

Most of the municipality's habitants live in the area's south of the historic city center, as can be seen from the numbers. The colors indicate the population density which ranges from 33 to 5563 inhabitants per square kilometer.

33 — 5563

Inhabitants [number - persons]
Density [color - persons/km^2]

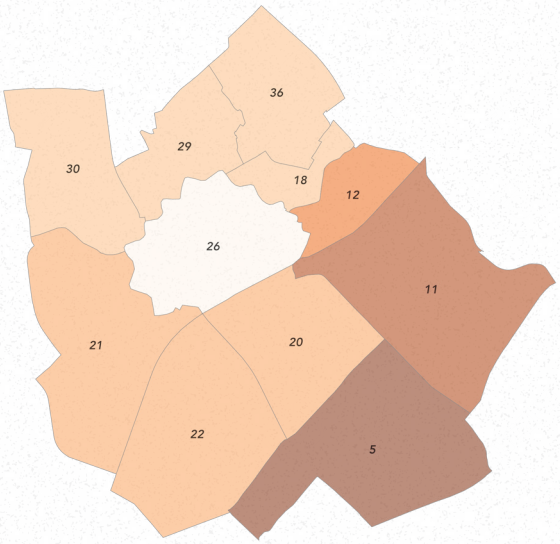


HOUSEHOLDS

The inner-city of Middelburg has the lowest average household size and 63 % of the households are single-person. The households in the suburban neighbourhoods around the innercity are larger and there are less single-person households.

12 % — 60 %

Household size [number - persons]
Single-person households [color - % of total]



POPULATION AGE

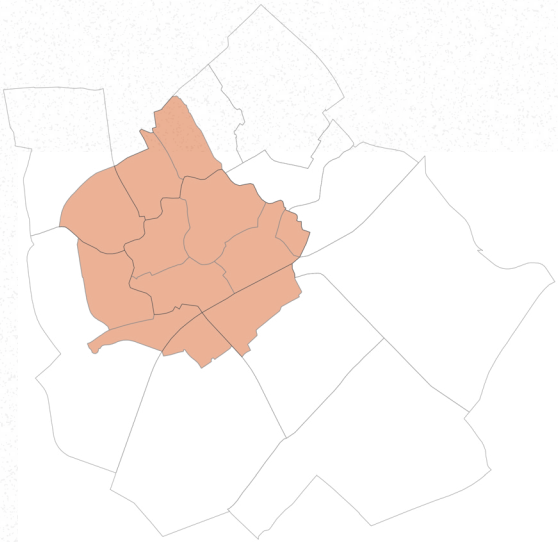
The historic city center has by far the lowest amount of households with resident children, only 14 %. The areas north of the city centre have a higher percentage of senior residents.

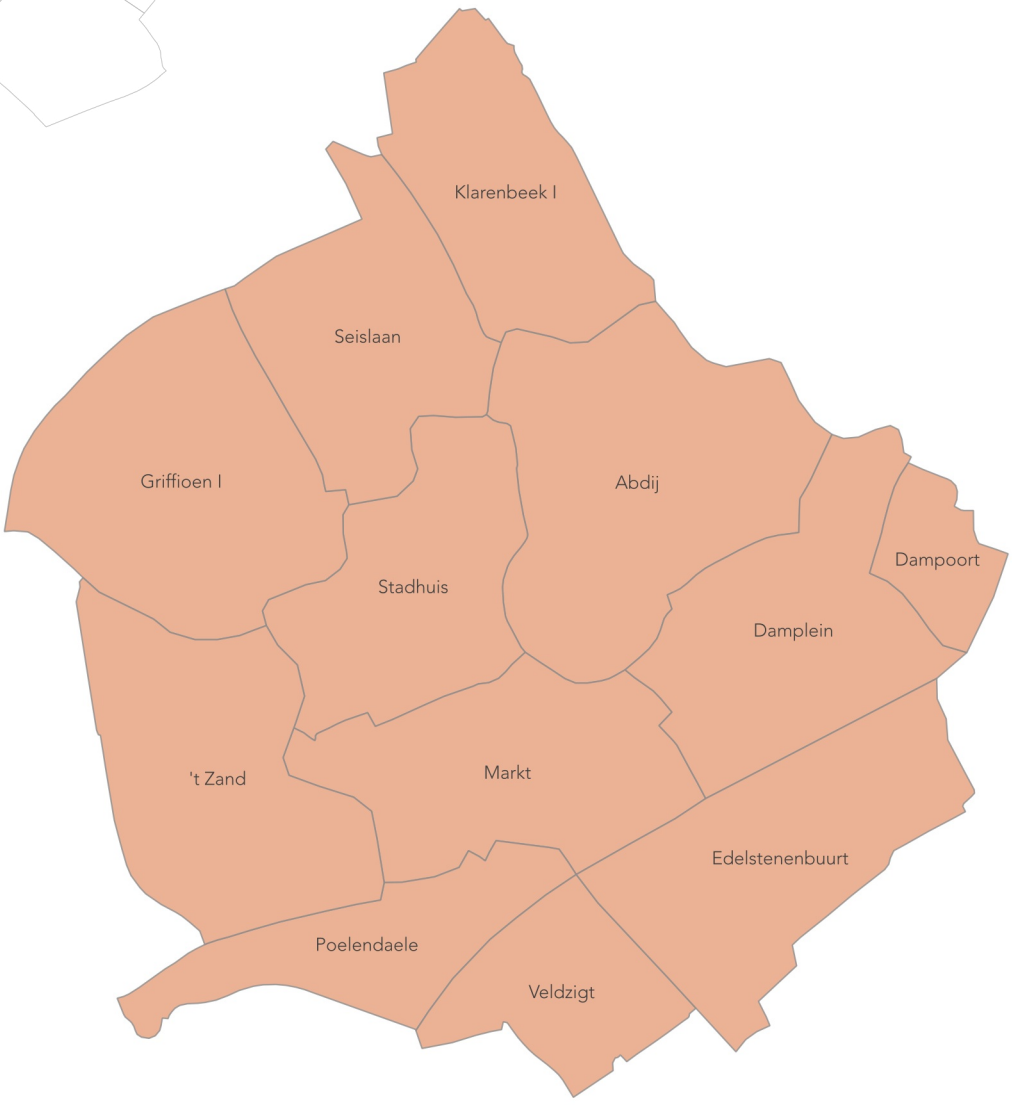
14 % — 59 %

Elderly [number - % 65+ residents]
Children [color - % households with children]

Data: CBS (2021) Wijk- en buurtkaart 2021.

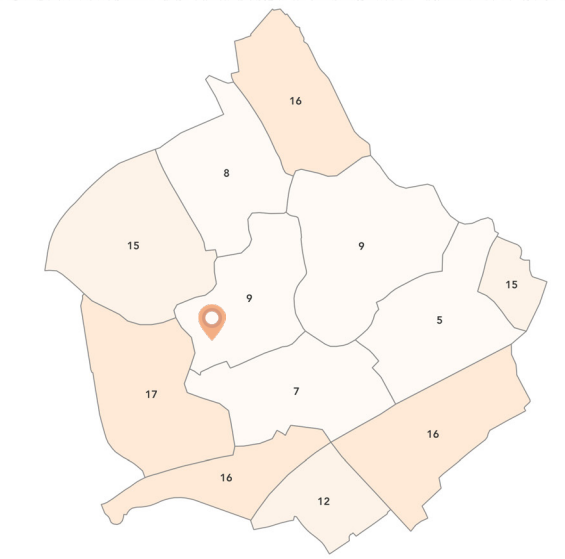
0 m — 2500 m



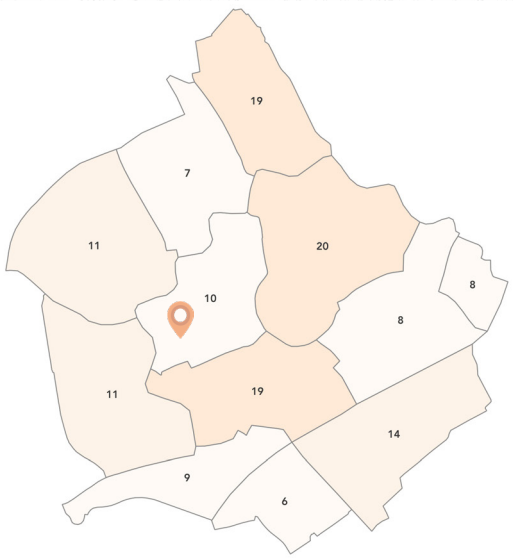


MIDDELBURG NEIGHBOURHOODS

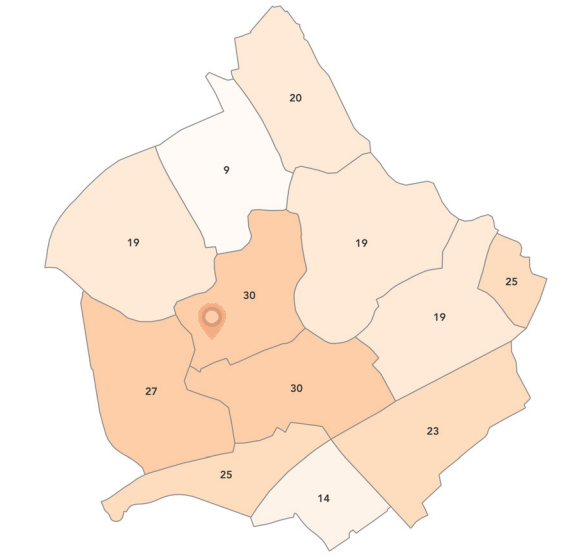
Each of the different areas consists of several neighborhoods. For each of them the Centraal Bureau voor de Statistiek (CBS) gathers demographic information. To understand the surroundings of the police station, its adjacent neighborhoods are analyzed. The information is helpful in assessing possible future uses for the vacant police station.



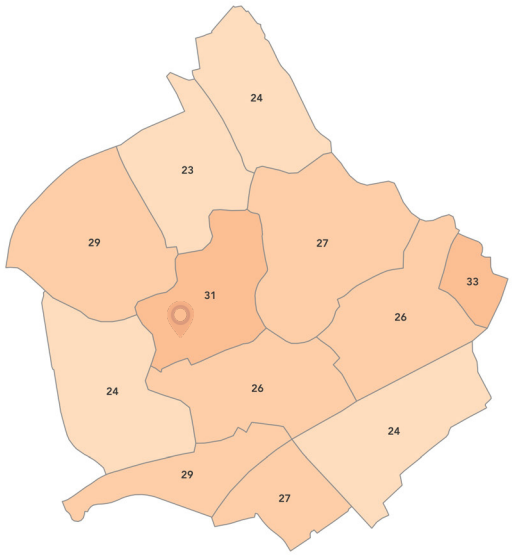
0-15 YEAR OLDS [% OF TOTAL POPULATION]



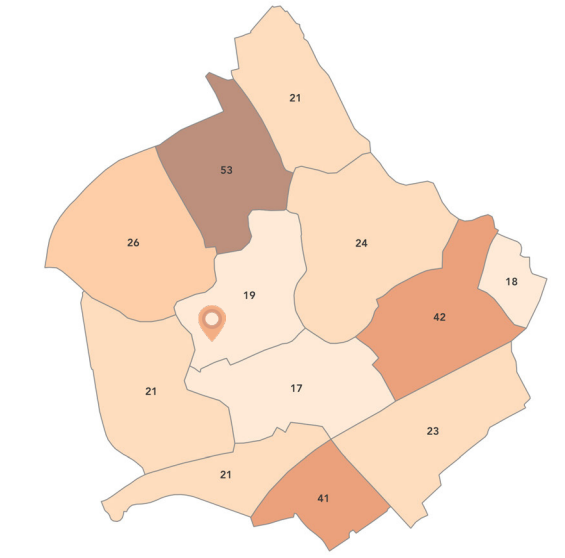
15-25 YEAR OLDS [% OF TOTAL POPULATION]



. 25-45 YEAR OLDS [% OF TOTAL POPULATION]



45-65 YEAR OLDS [% OF TOTAL POPULATION]



65+ YEAR OLDS [% OF TOTAL POPULATION]

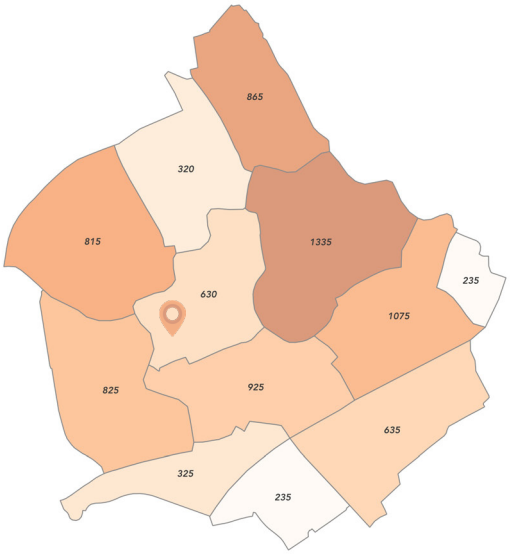
DEMOGRAPHY

Most of Middelburg's youngest inhabitants live in the neighbourhoods surrounding the city center. Young adults are concentrated northern and center parts of the city. In the area's surrounding the police station, people with an age of 25 to 65 years old are most represented.

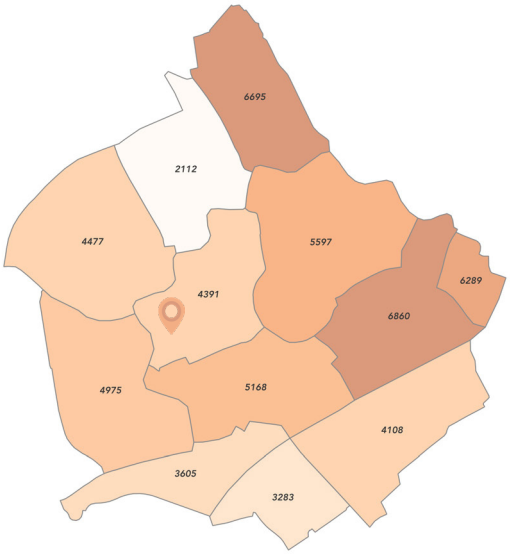
% Inhabitants age
- 0 - 10
- 10 - 15
- 15 - 20
- 20 - 25
- 25 - 30
- 30 - 35
- 35 - 40
- 40 - 45
- 45 - 50
- 50 - 100

Data: CBS (2021) Wijk- en buurtkaart 2021.

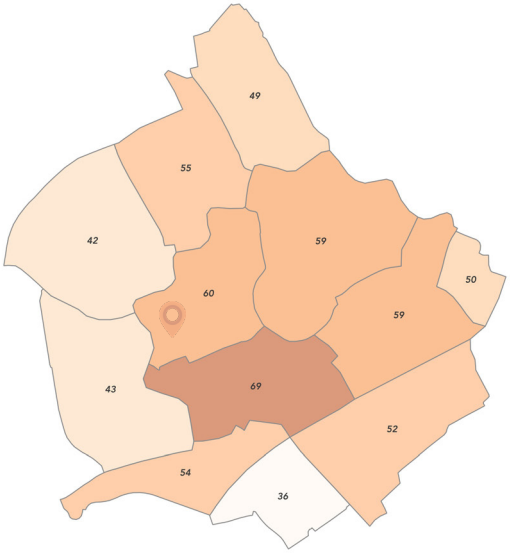
0 m — 2500 m



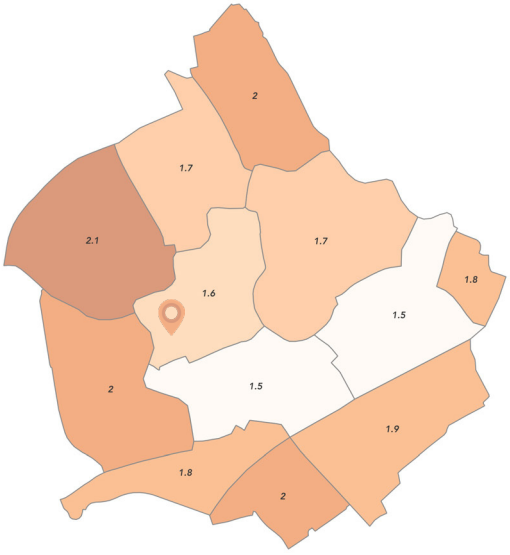
NUMBER OF HOUSEHOLDS [HOUSEHOLDS]



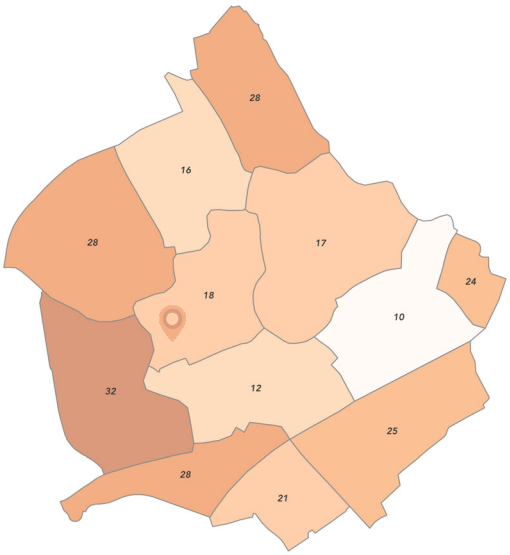
POPULATION DENSITY [INHABITANTS/KM²]



SINGLE PERSON HOUSEHOLDS [%]



AVERAGE HOUSEHOLD SIZE [PERSONS]



HOUSEHOLDS WITH KIDS [%]

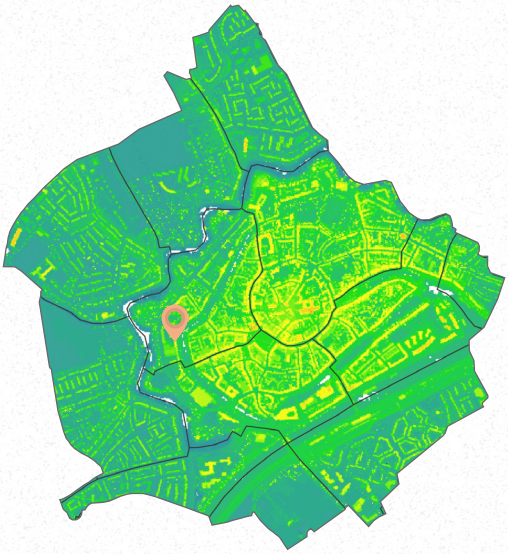
DEMOGRAPHY

Most households live in the northern part of the city. Yet, most single-person households inhabit the inner-city. Most households with kids live in the neighbourhoods outside the historic defense lines. In these neighbourhoods the average household size is highest.

\- +

Data: CBS (2021) Wijk- en buurtkaart 2021.

0 m 2500 m

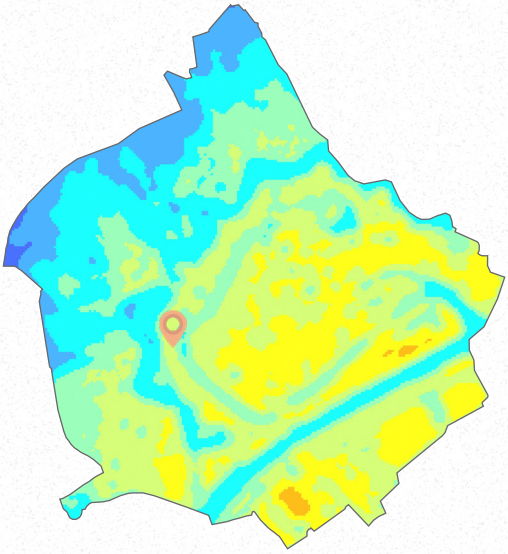


HEIGHT

The heightmap of Middelburg clearly shows the height of the buildings, and the contrasting blue of the water. Most of the land in Middelburg is located around one meter above NAP. The risk of flooding in the city center is estimated as low, whereas flooding of the hinterland is 'likely'.

0 m 2500 m

SOURCES
Data: Nationaal Hoogtebestand



URBAN HEAT ISLAND EFFECT

The urban heat island (UHI) effect is a current threat which decreases the livability of cities. It emerges by replacing natural land with manmade surfaces which absorb heat, leading to higher temperatures in cities. Near the police station the UHI is estimated at 1,2 degrees Celsius. Even though this is relatively low for an inner city, it stresses the need for interventions which mitigate this effect.

0 m 2500 m

- < 0,2
- 0,2 - 0,4
- 0,4 - 0,6
- 0,6 - 0,8
- 0,8 - 1,0
- 1,0 - 1,2
- 1,2 - 1,4
- 1,4 - 1,6
- 1,6 - 1,8
- 1,8 - 2,0

SOURCES
Data: RIVM (2017) Stedelijk hitte-eiland effect in Nederland



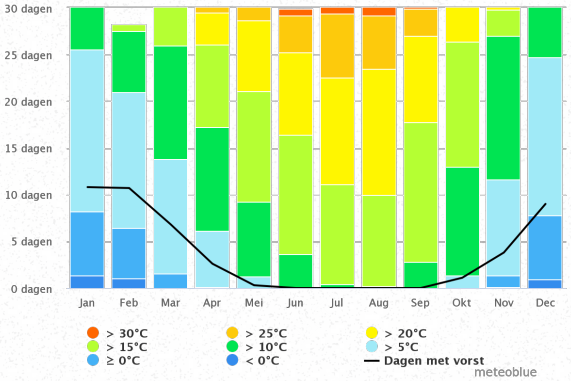
NOICE DISTURBANCE

From the sound map can be concluded that the surroundings of the police station have a high noise exposure. The main cause is the road which runs west of the station. Depending on the new function, measures to mitigate the noise exposure are necessary.

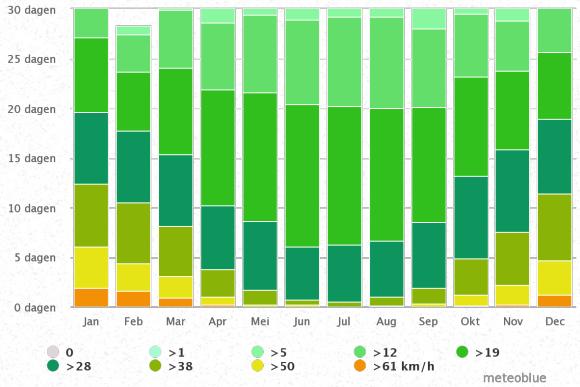
0 m 2500 m

- < 50 [dB]
- 50 - 55
- 55 - 60
- 60 - 65
- 65 - 70
- 70 - 75
- 75 >

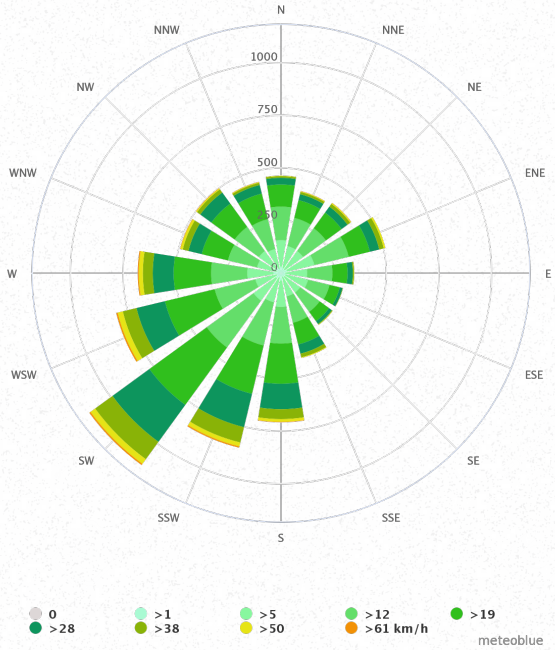
SOURCES
Data: Rijksoverheid (2016) Lden 2016



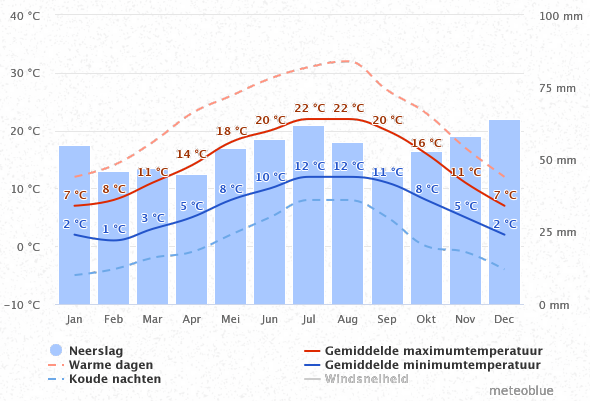
DAYTEMPERATURES



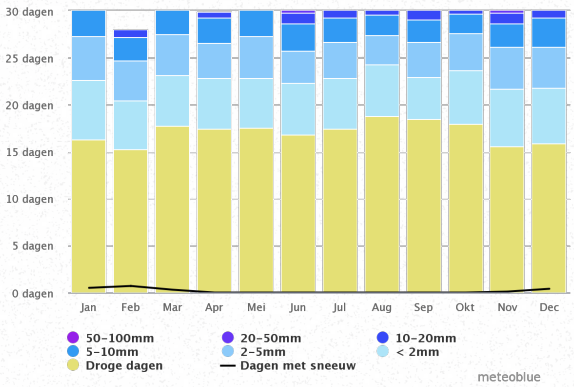
WIND VELOCITY



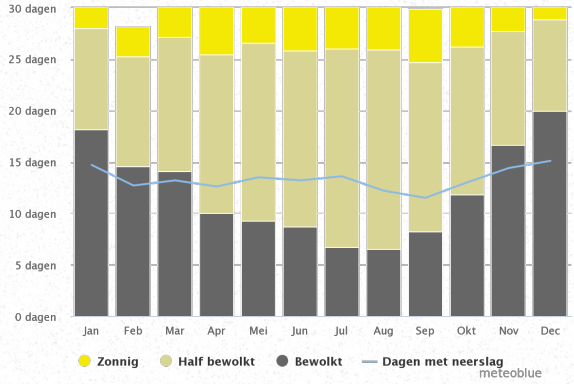
WIND VELOCITY AND DIRECTION



PRECIPITATION & TEMPERATURE



DAYS WITH AND WITHOUT PRECIPITATION



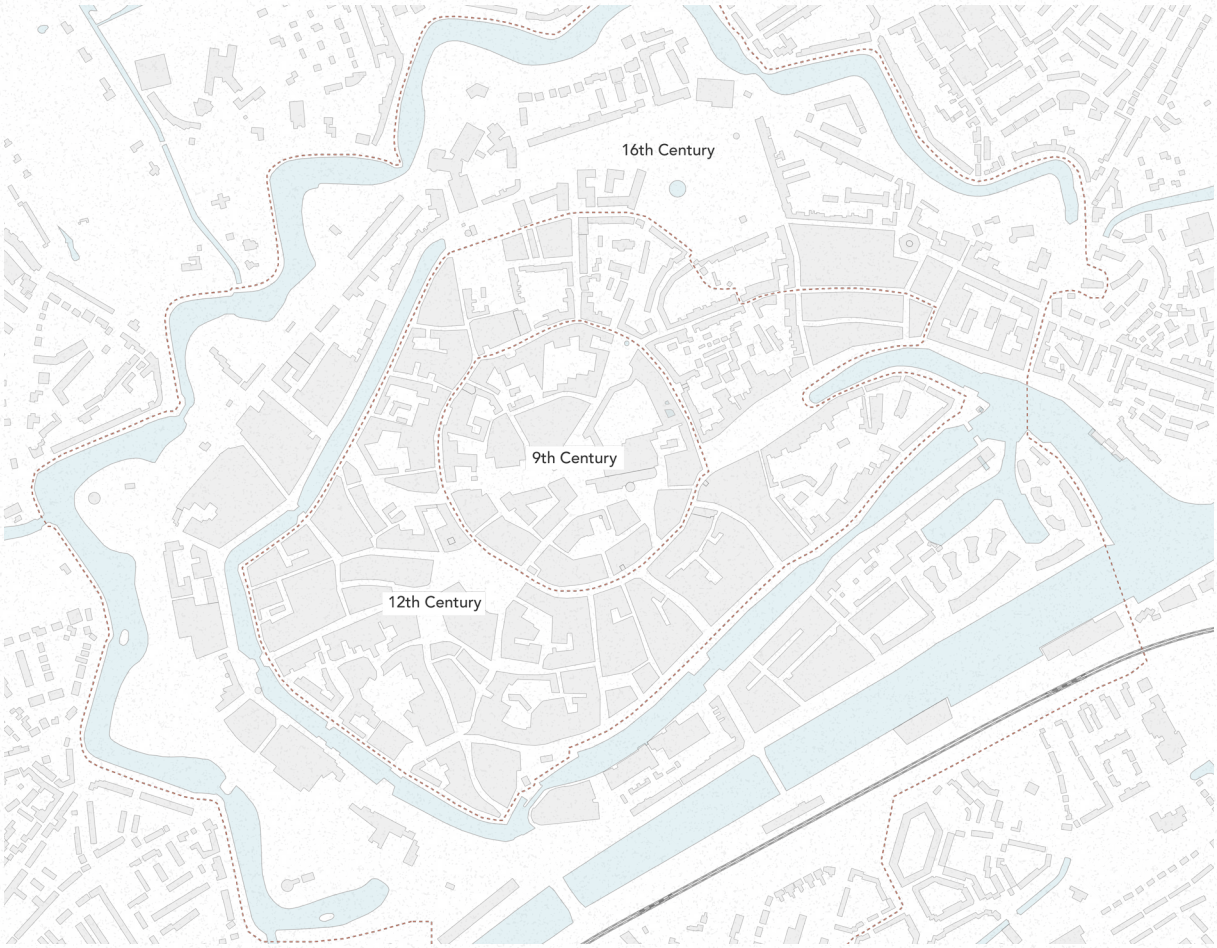
SUN

CLIMATE

The city of Middelburg has a temperate maritime climate. In the months June July and august, temperatures above 30 degrees Celsius occur. These hot days have to be taken into account while redesigning the police station. During winter, frost occurs a small number of days. Large amounts of precipitation are most likely to occur during summer, whilst most days with strong winds occur in winter. Most often the direction of the wind is southeast. Just as strong winds, cloudy days are most likely during winter.

SOURCES

- Meteoblue



HISTORY

The city of Middelburg was founded in the nineth century when Vikings traveled through Europe on a conquest. As protection against the invaders a ring of defensive walls was raised around the town, making Middelburg the 'Middelste Burcht' ('Center Fortress') of the area of Walcheren. Later, Middelburg profits the riverside location and develops into a trading center. During the twelfth century a second growth period follows the establishment of an abbey[1].

When, after de capitulation of Antwerp, many merchants moved to Middelburg, new city expansions became necessary. Due to the political circumstances fortifications were built around the new parts of the city. The thirteen bastions are still clearly recognizable in the city plan. The large extension of the city made it possible that until the end of the nineteenth century, all urban functions could be housed within the city walls.

In the zone between the new and older fortifications many craft- and industry related activities took place, which were banned from the inner-city because of the noise and smell disturbance. Current street names, like 'Looijerssingel' and 'Houttuinen' still retell these industrial purposes.

1.10000

0 m 250 m

SOURCES

- OpenStreetMap



WATER

The city plan of Middelburg is characterized by three main waterbodies. The 'Canal through Walcheren' south of the inner-city, dates back to 1815 when it was constructed in an attempt to improve the economic position of the city. The older two canals are reminders of the second and third expansion of the inner city of Middelburg and used to function as defense lines. They mouth into the canal through Walcheren just outside the scope of the map. Through the canal the water can reach the North sea.

1.10000

0 m 250 m

WATER

SOURCES

- OpenStreetMap



GREEN
The façade is built up out of masonry and precast concrete elements. The wall consists of two planes of brick separated by a cavity of 50 mm. The masonry has an English cross bond, made out of Waal-format bricks. The concrete functions both as sill and lintel and used to be painted in an off-white color but is repainted in a grey-purple taint.

1.10000

0 m 250 m

GRASS
TREES
PARK

SOURCES
- OpenStreetMap



YEAR OF CONSTRUCTION

The map above displays for each building its year of construction according to the Basisregistratie Adressen en Gebouwen (BAG). The oldest (darkest) buildings on this map are the city hall and the 'Onze Lieve Vrouwe Abbey'. The further away from these oldest buildings the cityscape gradually becomes younger. East of the city Hall there is a remarkably young part of city fabric. During the second World War, this area was severely damaged due to bombardments. Afterwards it was reconstructed, explaining its relative low age.

1.10000

0 m 250 m

- 1005 - 1940
- 1940 - 1960
- 1960 - 1980
- 1980 - 2000
- 2000 - 2021

SOURCES

- OpenStreetMap
- Centraal Bureau voor de Statistiek (2021) Basisregistratie Adressen en Gebouwen. Retrieved from: Nationaal Georegister



HEIGHT

The historic center of Middelburg consists of mainly low-rise buildings. The highest point is the tower of the church. Near the station, the larger parcels house several multistorey office buildings.

1.10000

0 m 250 m

- 0 - 3 m
- 3 - 4 m
- 4 - 5 m
- 5 - 6 m
- 6 - 7 m
- 7 - 8 m
- 8 - 10 m
- 10 -13 m
- 13 - 15 m
- 15 - 87 m

SOURCES

- OpenStreetMap
- TU Delft3D (2021) 3D BAG



MONUMENTS

The city of Middelburg is rich in both National as municipal monuments. During the Second World War, the center of the town was bombed, meaning many monuments were lost.

The entire historic city is recognized as protected cityscape. Changes are allowed, but have to comply with municipal regulations.

1.10000

0 m 250 m

NATIONAL MONUMENT
MUNICIPAL MONUMENT
PROTECTED CITY SCAPE

SOURCES

- OpenStreetMap
- Provincie Zeeland (2018) Cultuur Historische Monumenten. Retrieved from: Nationaal Georegister
- Rijksdienst Cultureel Erfgoed (2020) Archeologische monumentenkaart. Retrieved from: Nationaal Georegister



FUNCTIONS

The map above indicates the functions of buildings based on their registered purpose known in the Basisregistratie Adressen en Gebouwen (BAG). The darker colors represent more public functions. It becomes clear that most public buildings are located in the south-west part of the inner-city, whereas the northern part is mostly residential. Combined with the maps of pedestrian streets and paths, this map clearly indicates the location of the touristic core of the city center. Achter de Houttuinen is located just outside of this core area.

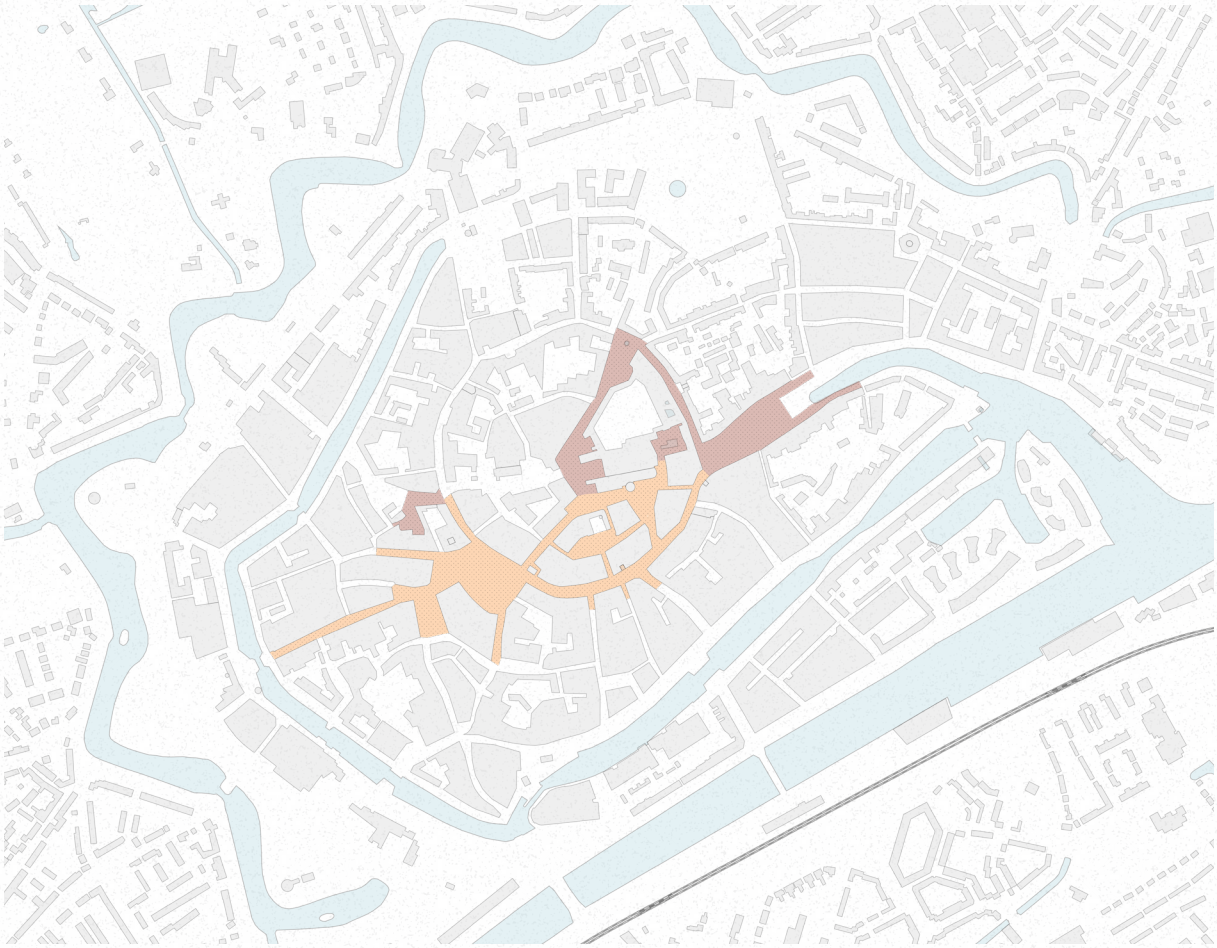
1.10000

0 m 250 m

- GATHERING
- INDUSTRY
- OFFICE
- HOSPITALITY
- HEALTH
- EDUCATION
- MIXED-USE
- RETAIL
- RESIDENTIAL

SOURCES

- OpenStreetMap
- Centraal Bureau voor de Statistiek (2021) Basisregistratie Adressen en Gebouwen. Retrieved from: Nationaal Georegister



PUBLIC SPACES

In the report 'Actieplan Binnenstad', the municipality expresses their intention to centralize most cultural and retail facilities. By clustering the municipality aims for an increased diversity and quality of the restaurants. The cluster areas are marked on the map above.

They are located near the two main squares of Middelburg, the market square and Plein 1940. Numerous events are hosted on these squares every year.

1.10000

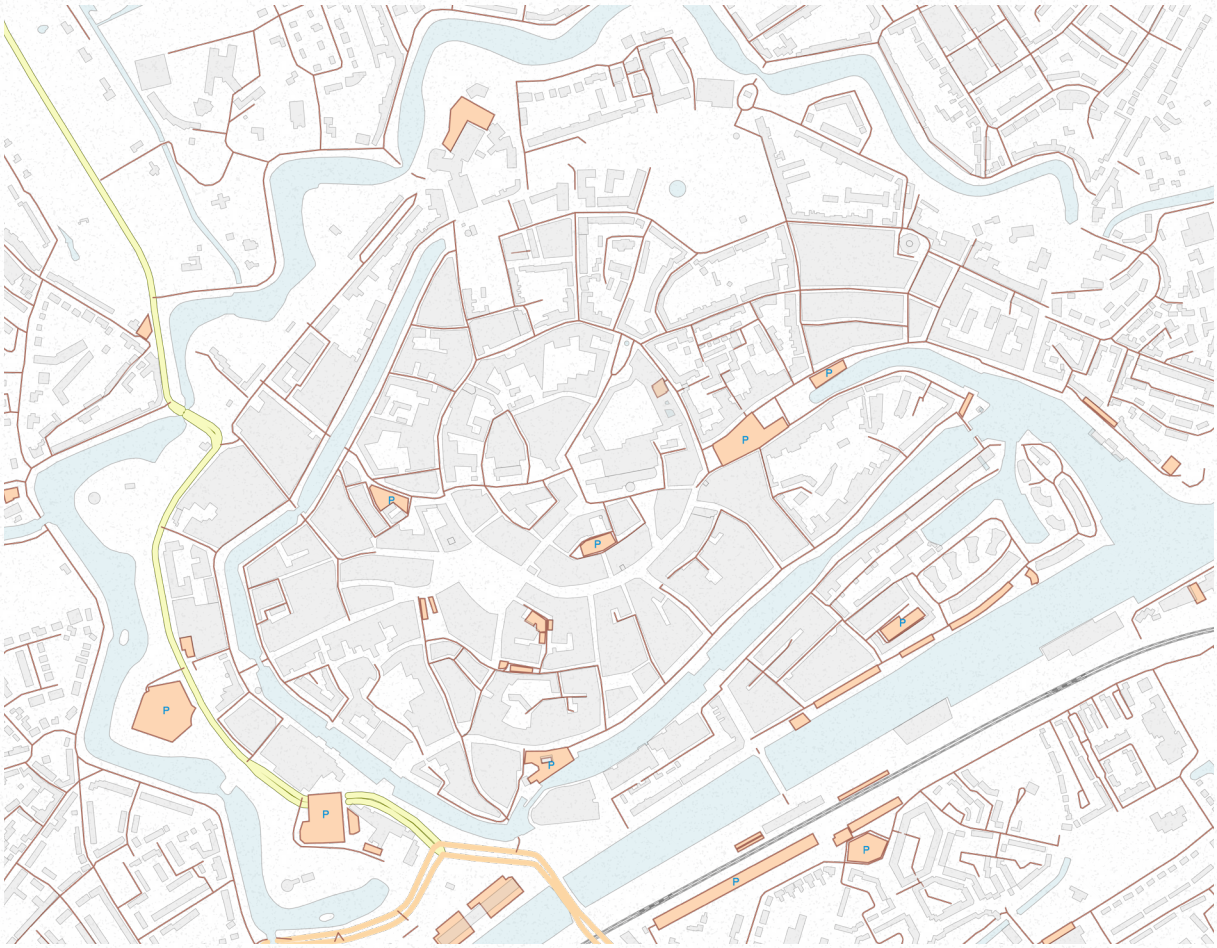
0 m 250 m

RETAIL CLUSTER

CULTURAL CLUSTER

SOURCES

- OpenStreetMap
- Gemeente Middelburg, BRO. (2015). Middelburg, Positionering en Actieplan binnenstad



CAR TRAFFIC

Middelburg is connected to the highway network just outside the scope of this map.

Within the city center the main road is the connection 'Het Groene Woud – Looierssingel – Walensingel' which is marked yellow on the map. Some parts of the city are car-free to ensure a pleasant pedestrian environment. Parking is facilitated at larger parking spots around the inner-city combined with some smaller parking facilities close to the touristic city core.

1.10000

250 m

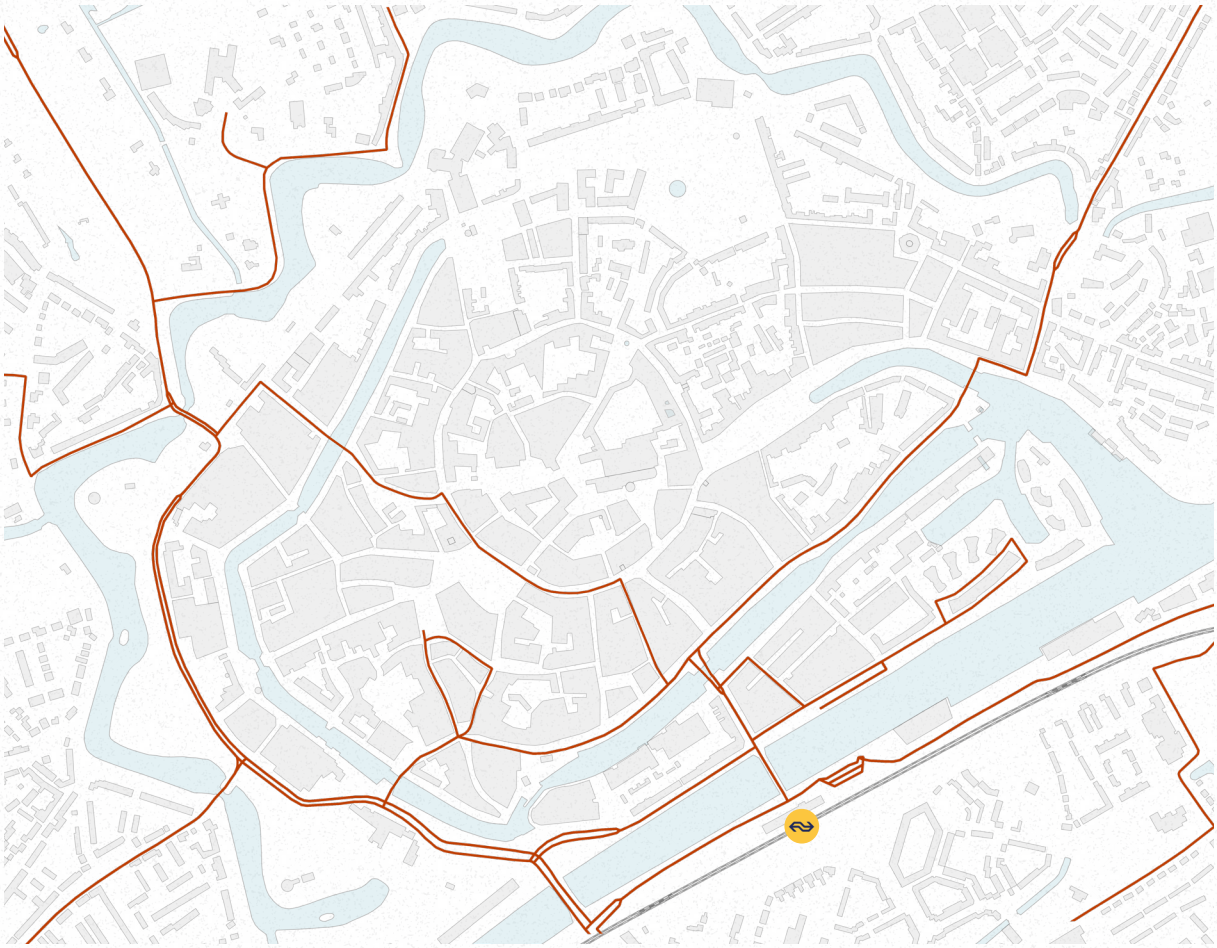
MAIN ROAD

ROAD ACCESIBLE FOR CARS

PARKING

SOURCES

- OpenStreetMap



PUBLIC TRANSPORTATION

Along the banks of the Canal through Walcheren, a train station with mainline train connections is located. Throughout the city center multiple bus lines are available. From the train station one can take bus 133 which takes 5 minutes to drive to the bus stop 'Hof van Tange' which is two minutes walking from the police station. By foot the journey is 1,1 kilometer, which usually takes less than 15 minutes.

1.10000

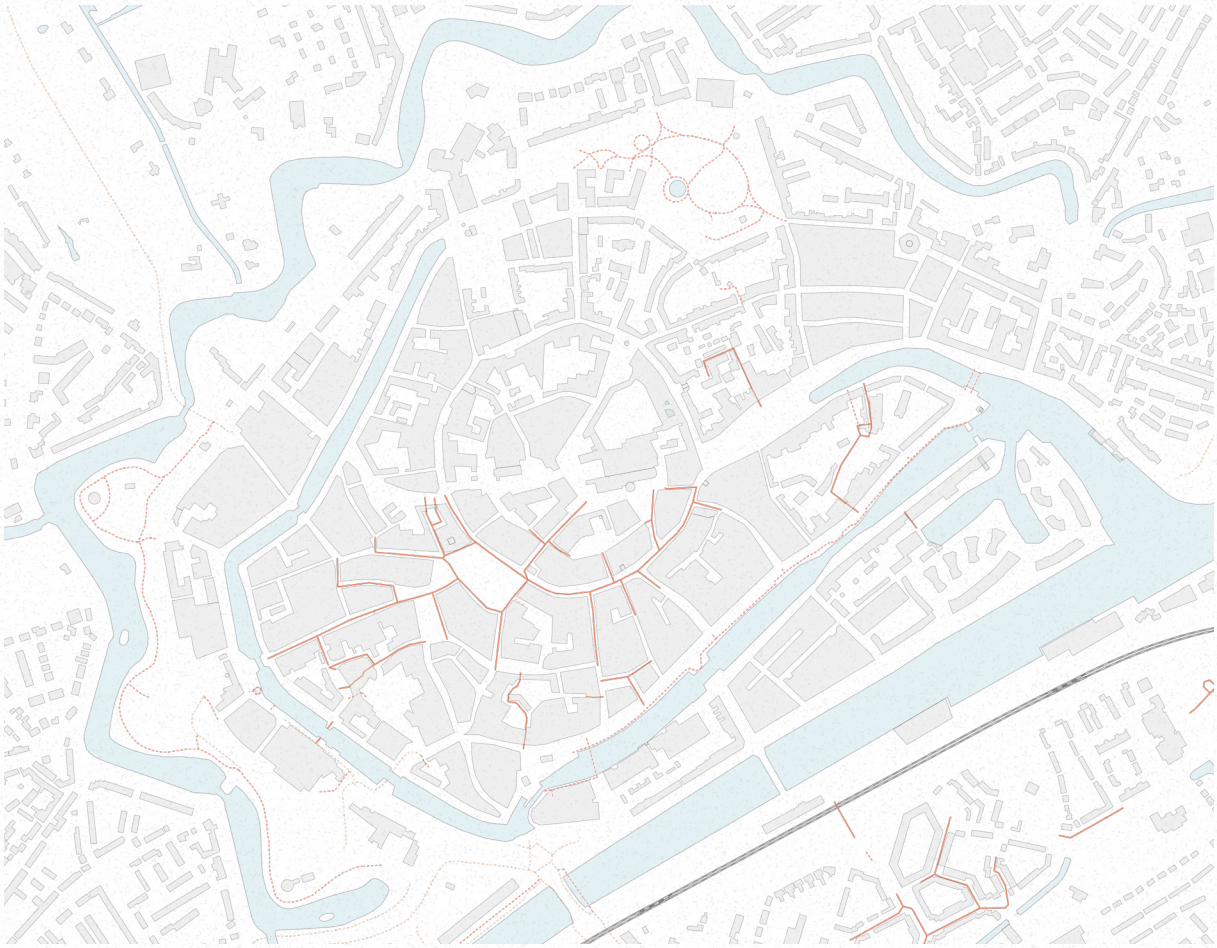
0 m 250 m

TRAIN STATION

BUSLINES

SOURCES

- OpenStreetMap
- Buslijnen in Zeeland (2019) Provincie Zeeland. Retrieved from: Nationaal Georegister
- Nationale Spoorwegen (2021) Reisplanner.



WALKING

The area in Middelburg where most of the retail and tourist attractions are located is car-free. The streets around 'Plein 1940' and the market square are no longer accessible for cars, which results in a pleasant experience for pedestrians. Footpaths enable a walk through the green zones on the former bastions and the Molenwater Park.

1.10000

0 m 250 m

CAR-FREE STREET

FOOTPATHS

SOURCES

- OpenStreetMap



PROXIMITY - 5 MINUTES

To further access the location of the police station a network analysis is performed. This proximity of various facilities can influence the suitability of the police station for new purposes. The map above indicates the area which can be reached within a five-minute (500 m) walk starting at the police station. Important facilities within this area are the Plein 1940, the market square, supermarkets, and numerous restaurants.

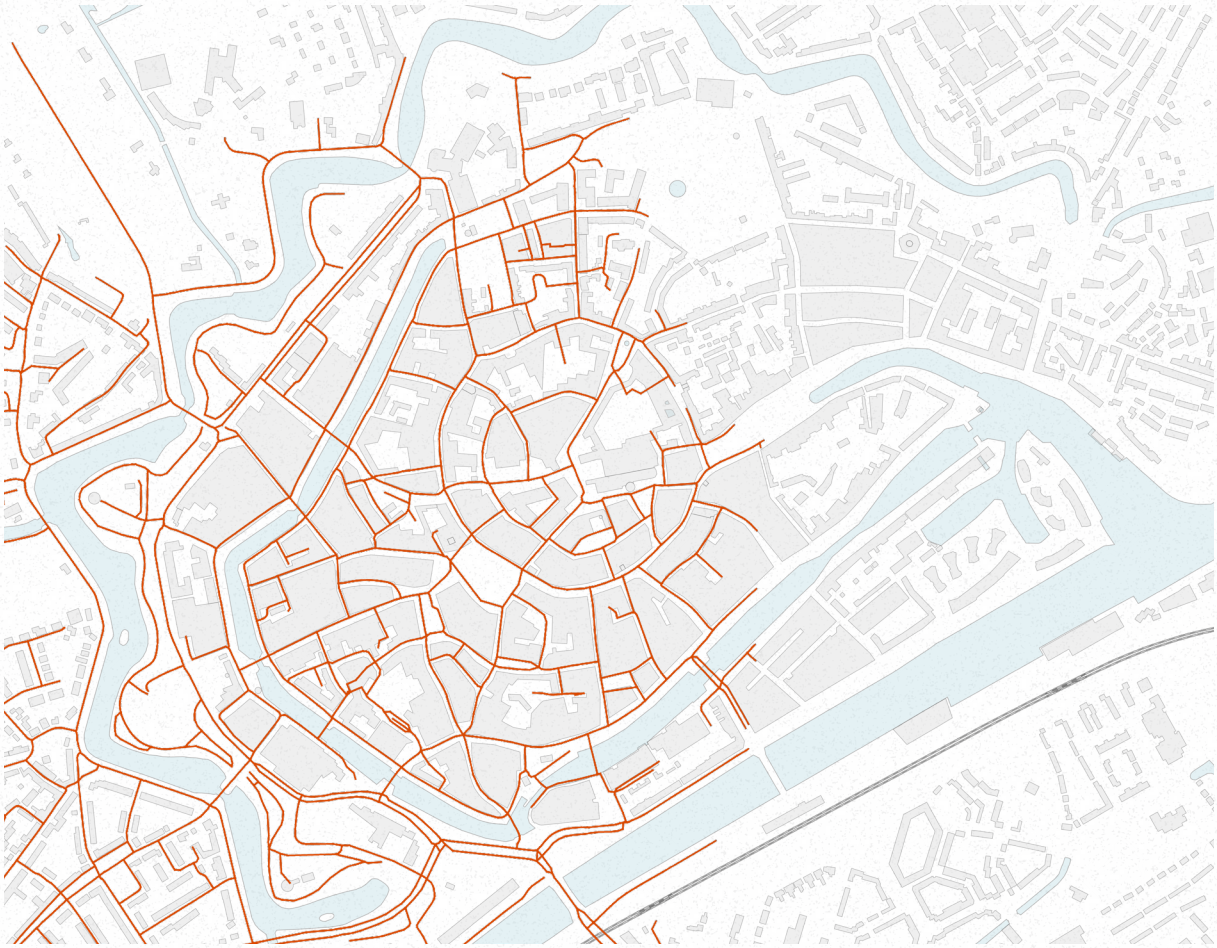
1.10000

0 m 250 m

STREET ACCESIBLE WITHIN 5 MIN WALKING

SOURCES

- OpenStreetMap
- Rijkswaterstaat (2021) Nationaal Wegen Bestand. Retrieved from www.pdok.nl



PROXIMITY - 1 KM

Similar to the previous proximity analyses, the map above indicates the area one could reach within a ten-minute walk (1 km). As can be concluded, almost the entire city center is within reach. Especially the area with most public functions.

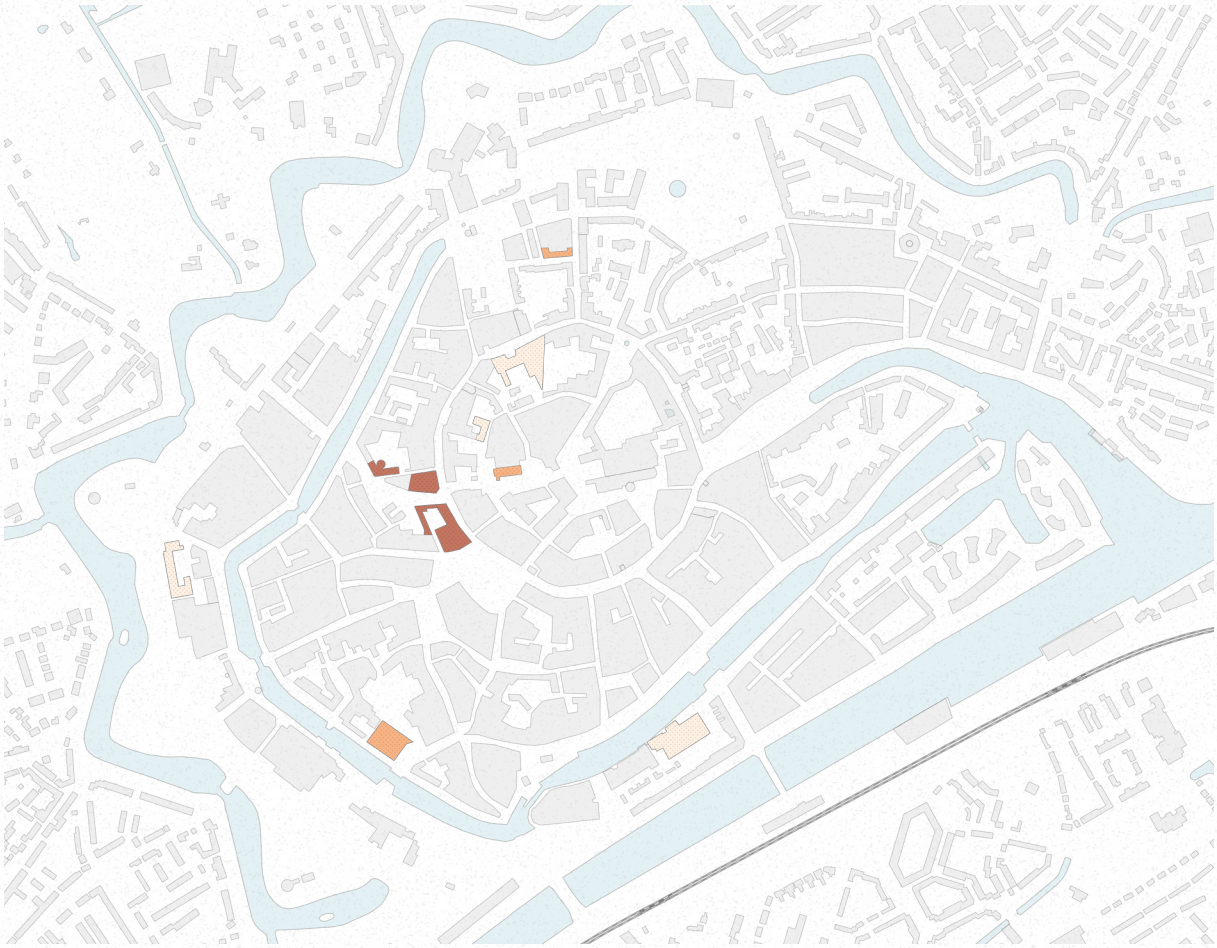
1.10000

0 m 250 m

STREET ACCESIBLE WITHIN 10 MIN WALKING

SOURCES

- OpenStreetMap
- Rijkswaterstaat (2021) Nationaal Wegen Bestand. Retrieved from www.pdok.nl



UCR

Middelburg houses the University College Roosevelt (UCR). Throughout the city center the university college has multiple buildings. The faculty buildings are concentrated near the city hall. UCR provides housing for all its students in three buildings which are located nearby the faculty buildings. Furthermore, UCR students often use public study facilities like the Zeeland Library, the Zeeuws Archief and possibly Erfgoed Zeeland. Additionally, the students have their own pub in the city center where they can meet and participate in different events.

1.10000

0 m 250 m

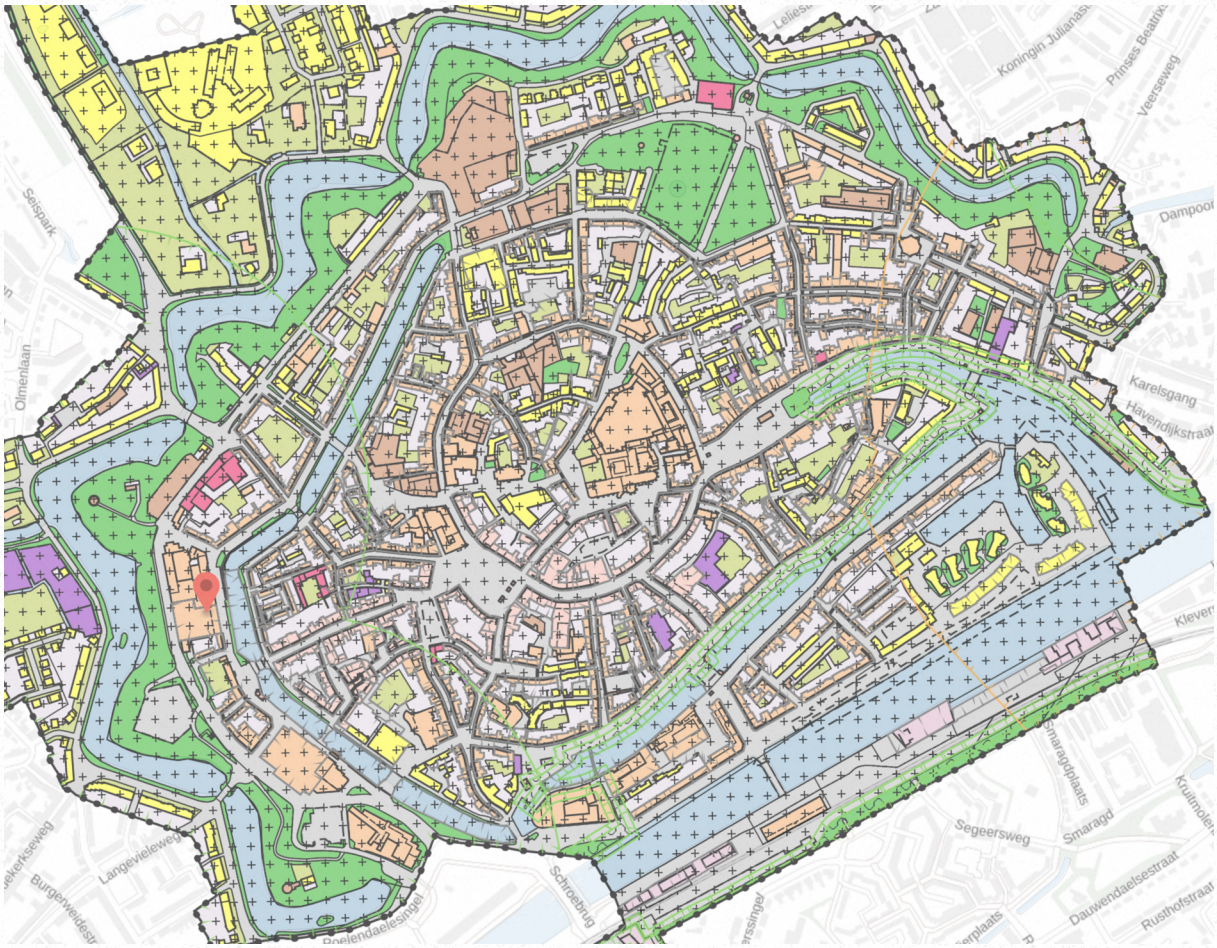
FACULTY BUILDINGS

STUDENT HOUSING

EXTERNAL RESEARCH OR EDUCATIONAL FACILITIES

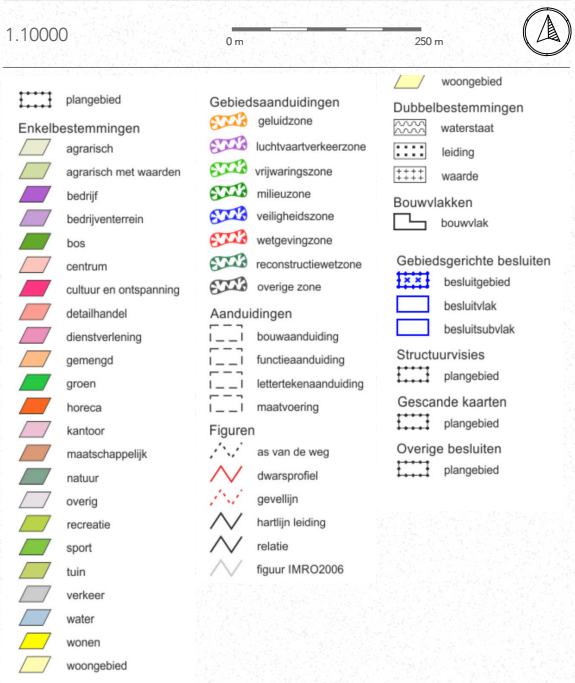
SOURCES

- OpenStreetMap
- University College Roosevelt. (n.d.) Campus locations. https://www.ucr.nl/life-ucr/living-at-ucr/campus-locations/



ZONING PLAN

Most buildings in Middelburg have a 'mixed' function according to the zoning plan. This means that multiple programs are allowed in the same building. Especially in the northern part of the city center, a lot of buildings are meant for housing. The police station now has a mixed purpose. In the zoning plan, a difference is made between different levels of 'mixed' function. Meaning that the police station is now meant for office and underground parking.



SOURCES

- OpenStreetMap
- Gemeente Middelburg (n.d.) Bestemmingsplan Binnenstad. Retrieved from: www.ruimtelijkeplannen.nl

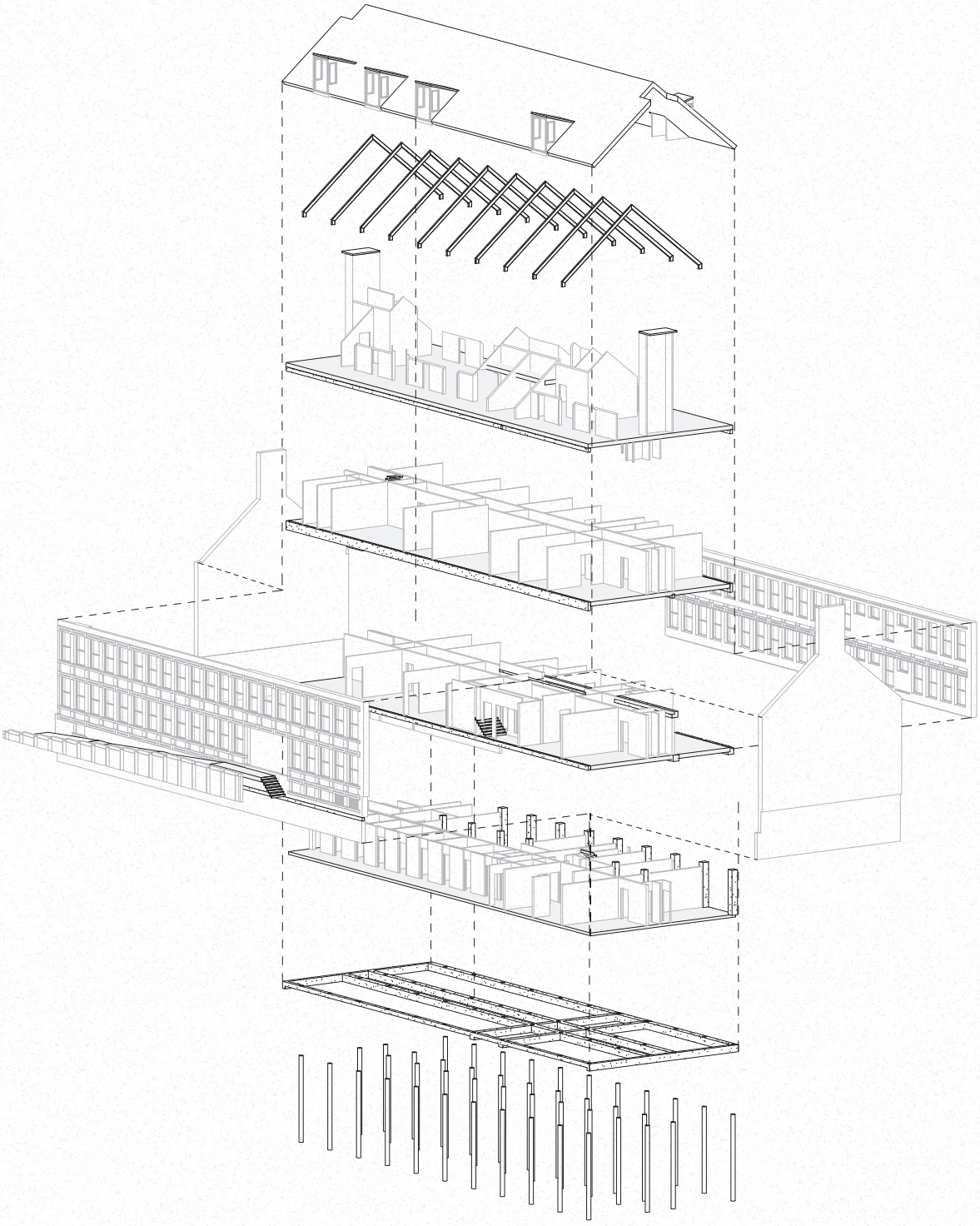


FIGURE 1. EXPLODED VIEW POLICE STATION

BUILDING ANALYSES

In preparation for the redesign of the police station at Achter de Houttuinen, a thorough building analysis has been carried out. The aim of the analysis is to provide insight in the capacity and strengths of the building, as well as to gain insight in how it is constructed. The final parts of this chapter regard the façade condition and insulation possibilities of the police station. Various solutions are studied and examined on both technical suitability and coherence with the design intentions.

1.100 0 m 5 m

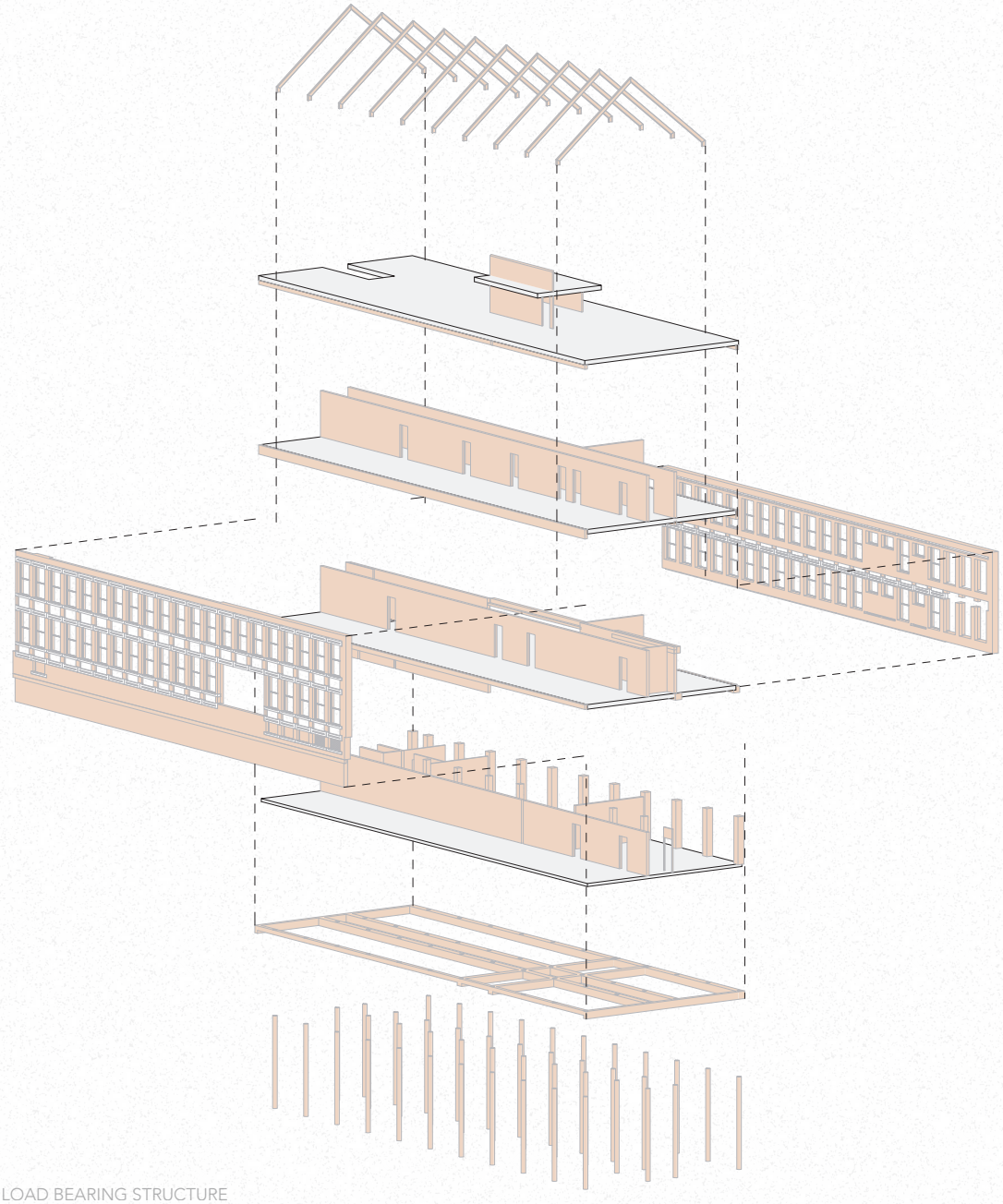


FIGURE 1. LOAD BEARING STRUCTURE

LOAD BEARING STRUCTURE

Load bearing structure overview

The main roof structure consists of steel IPE240 beams which hold the weight of the roof calculated at 90 kg/m2 and potential snow, 50 kg/m2. The framing is placed at gridlines 2, 4, 6, 8, 10, 12, 14, 16, 18 & 20, resulting in a center distance of 3520 mm.

The structural framing transfers its load onto the longitudinal beams in gridlines A and D. These beams also carry a part of the load of the second floor – 727 kg/m2 - and spreads the load over the masonry of the inner plane of the wall. The load of the first floor – 577 kg/m2 - is partially transferred to another two concrete beams on gridlines A and D. The beams spread the load along the load bearing wall.

The load of the ground floor – 577 kg/m2 – is added to the total load which on the front side of the building carried by a concrete floor and on the backside carried by a concrete beam which transfers the load onto concrete columns. The concrete columns are placed at the same gridlines as the steel framing of the roof. The souterrain wall and columns transfer the load to the foundation.

The calculations show that the second floor is strong enough to carry a high live-load. It complies with the current load class C1 and C2 meaning it can accommodate public use with seated purposes.

The souterrain, originally used as parking, can carry a live-load of 700 kg/m2. This high strength of the floor means it can be used for parking of heavy vehicles and any of the prescribed human uses in Dutch building regulations. The ground and first floor are calculated to carry a live load of 250 kg/m2 and are therefore only suitable for residential and office-purposes.[1]

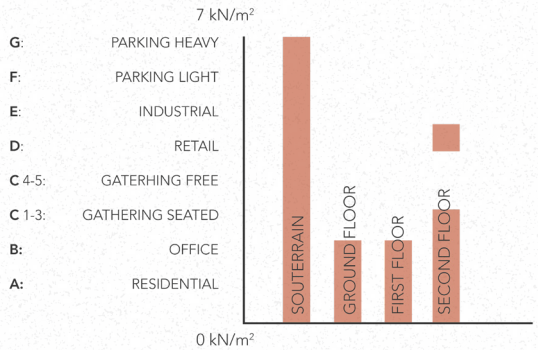


FIGURE 2. ALLOWED FLOOR USES

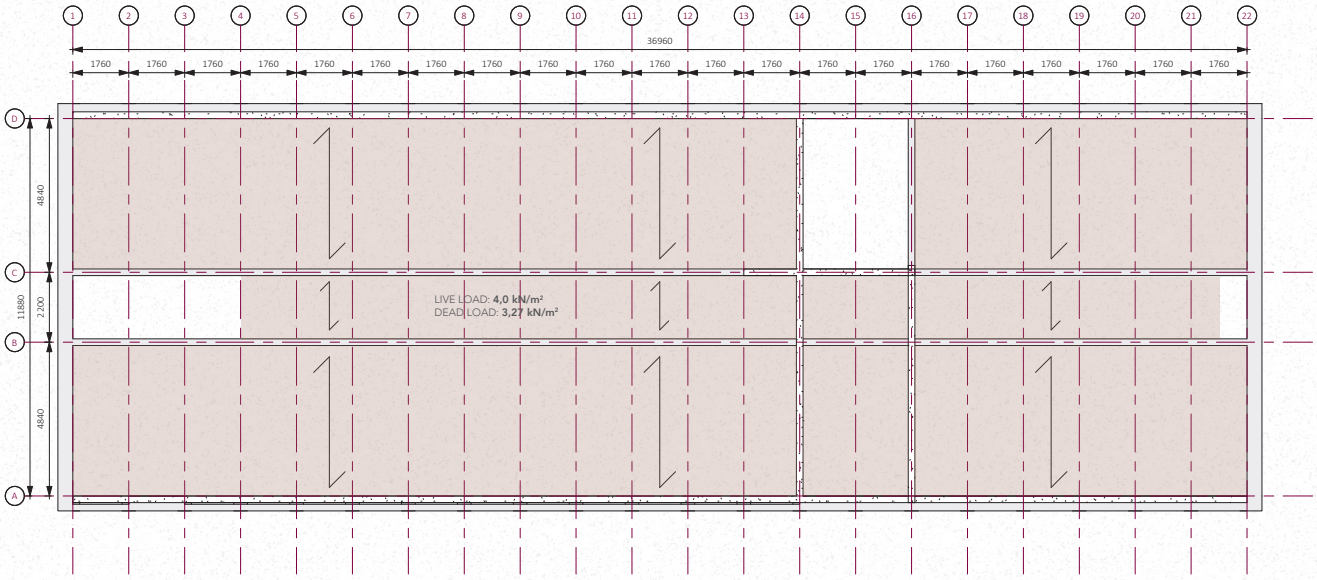


FIGURE 3. LOAD PLAN SECOND FLOOR

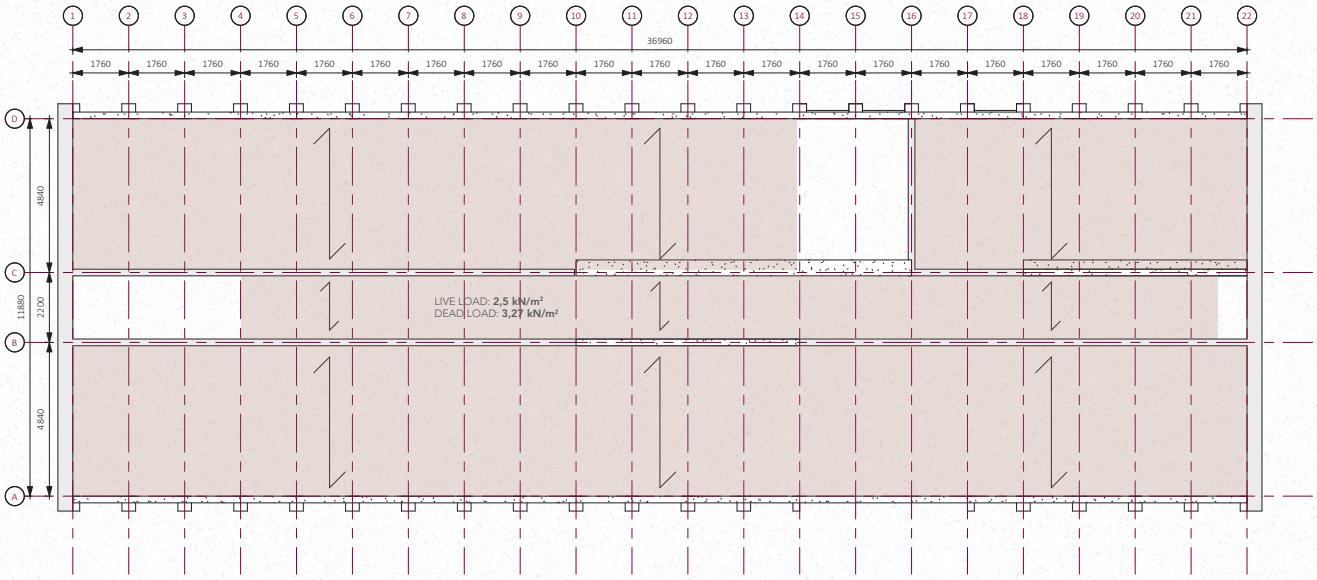


FIGURE 4. LOAD PLAN FIRST FLOOR

LOAD PLAN

The plans above illustrate the load on the floors and their span direction. Even though the second is designed for a higer live load, the weight of the floor is similar to the weight of the first floor. Therefore the question rises: can the first floor take more load?

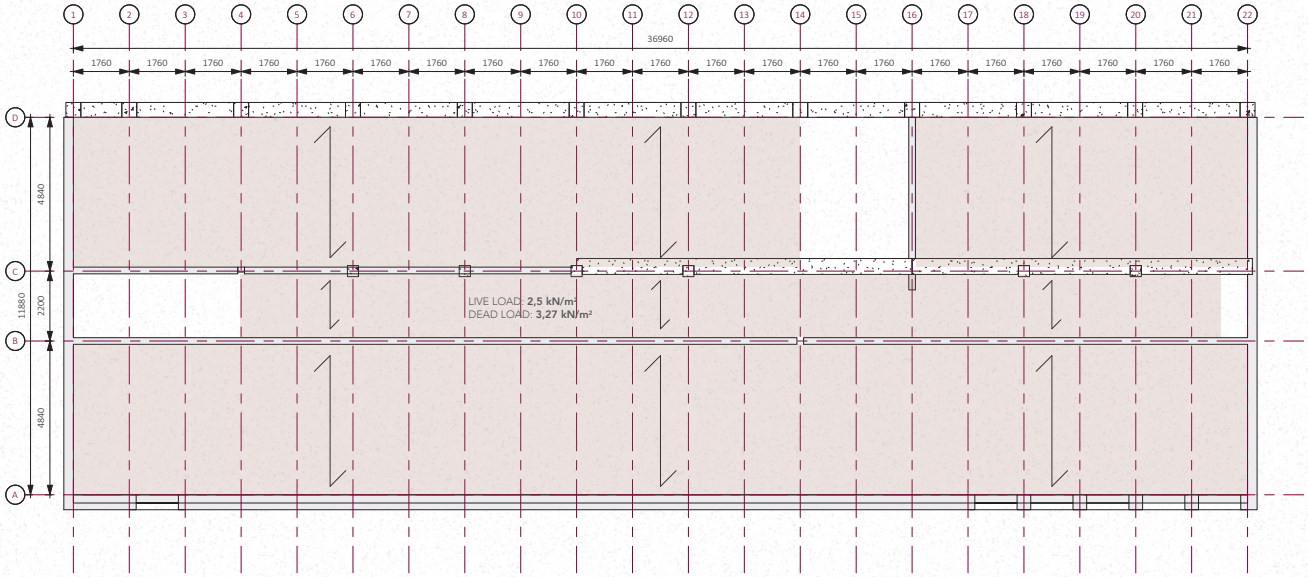


FIGURE 5. LOAD PLAN GROUND FLOOR

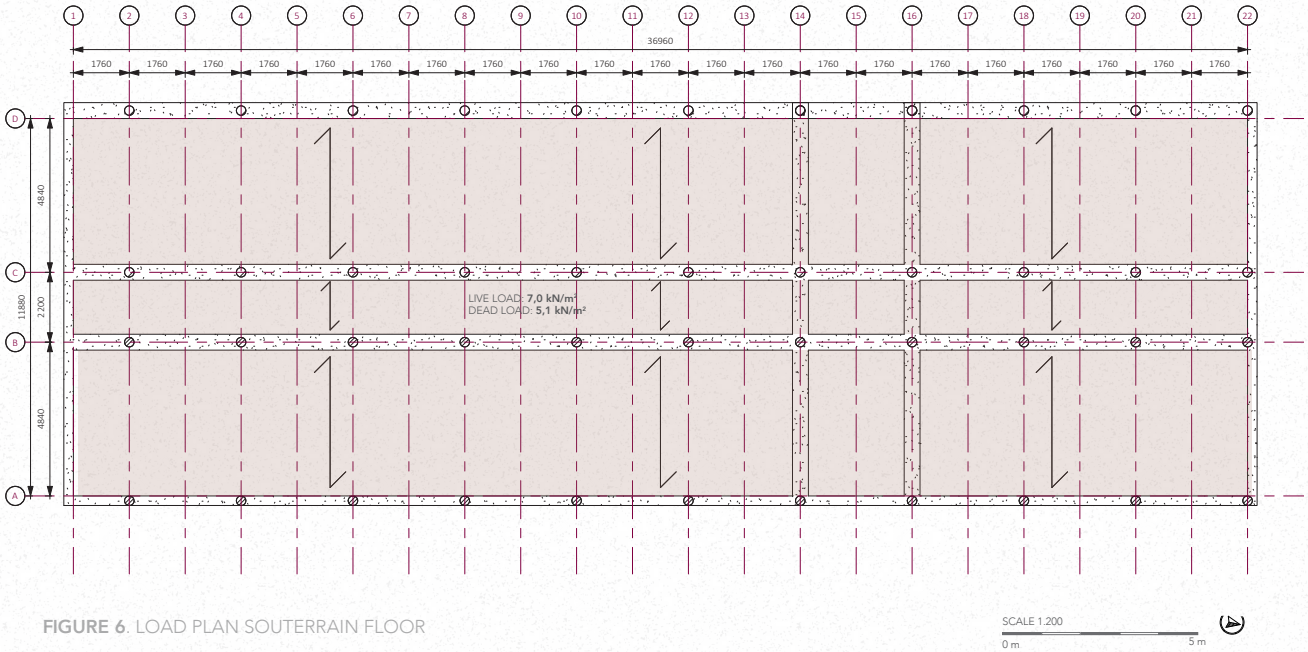


FIGURE 6. LOAD PLAN SOUTERRAIN FLOOR

LOAD PLAN

Just as the first floor, the groundfloor has a dead load of 3,27 kN/m^2. It is designed for a live load of 2,5 kN/m^2. The souterrain floor, originally designed as police vehicle parking, can take heavy loads up till 7,0 kN/m^2.

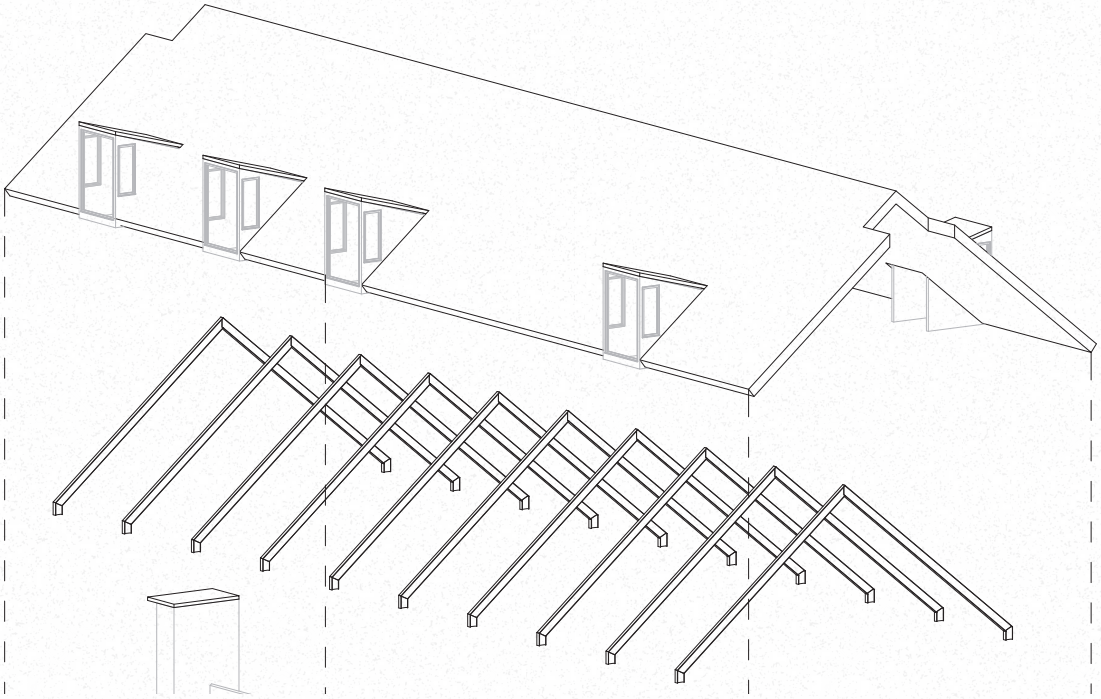


FIGURE 7. CONSTRUCTION OF STEEL FRAMING

ROOF STRUCTURE

The main roof structure consists of steel IPE240 beams. The framing is placed every other gridline resulting in a center distance of 3520 mm. They are calculated to hold the weight of the roof 90 kg/m^2 and the weight of snow 50 kg/m^2.

Each of the steel rafters is equipped with nine premounted attachment points for the wooden beams. The wooden beams each carry six wooden rafters. To these rafters the interior finish of white painted wooden slats is attached. On the outside the wooden beams are covered with wooden plating. On this plating wooden slats are screwed to which the rooftiles are attached. The space between the interior finish and wooden plating is filled with a layer of rock wool blanket.

The walls of the dormers are constructed out of brick, but covered in white painted multiplex plating. The roof is made up of wooden plating which rests on wooden beams. The front of the dormer is closed by a large wooden window frame which is painted red.



FIGURE 8. CONSTRUCTION OF DORMERS



FIGURE 9. CONSTRUCTION OF STEEL FRAMING



FIGURE 10. ROOF CONSTRUCTION INSIDE



FIGURE 11. ROOF CONSTRUCTION OUTSIDE

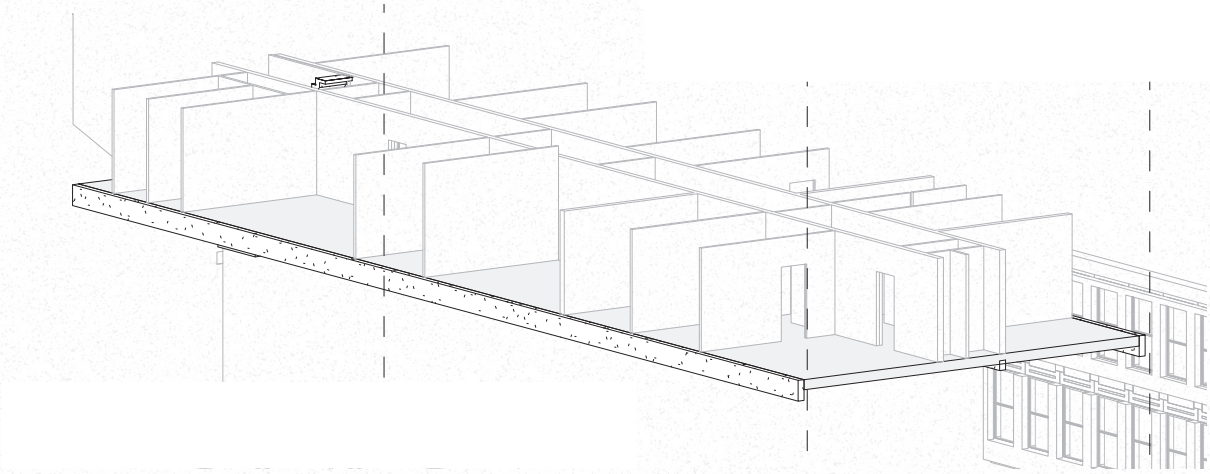


FIGURE 12. CONSTRUCTION OF STEEL FRAMING

FLOORS

The floor system is produced by the firm DATO. The systems consist of small concrete beams which are placed either 510 or 630 mm apart. Between these beams a lightweight infill material is placed. Concrete is poured on top of these elements to obtain a lightweight stiff floorplate. The small, prefabricated elements the system consists of, enabled fast construction, and required lower-skilled workers. Because of the high construction demand many similar systems were developed in the years before the completion of the police station. The floors rest upon the load bearing walls or beams which subsequently divide the load onto the

DATO floors, also known as 'Kwaaitaalvloeren', are known for their concrete rot. Two main causes are: The addition of chloride in the concrete mixture which leads to corrosion of the reinforcement. Or corrosion of the reinforcement due to carbonation (diminishing the protection of the reinforcement by the alkalic properties of concrete) which is caused by a limited concrete cover around the reinforcement. A short visual inspection proved that no corrosion spots or concrete spalling is currently present, this indicates of the absence of these harmful processes.

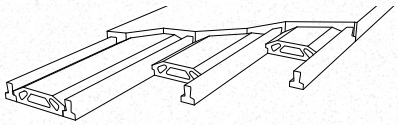


FIGURE 13. DATO FLOOR SYSTEM



FIGURE 14 CONSTRUCTION OF DATO FLOOR SYSTEM



FIGURE 15. CURRENT STATE OF DATO FLOOR SYSTEM

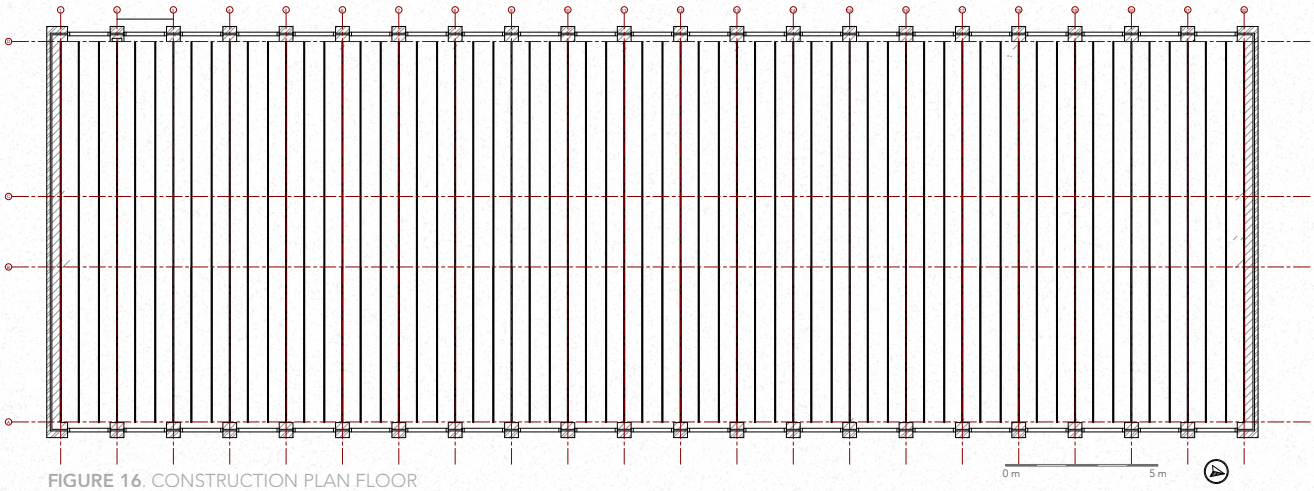


FIGURE 16. CONSTRUCTION PLAN FLOOR

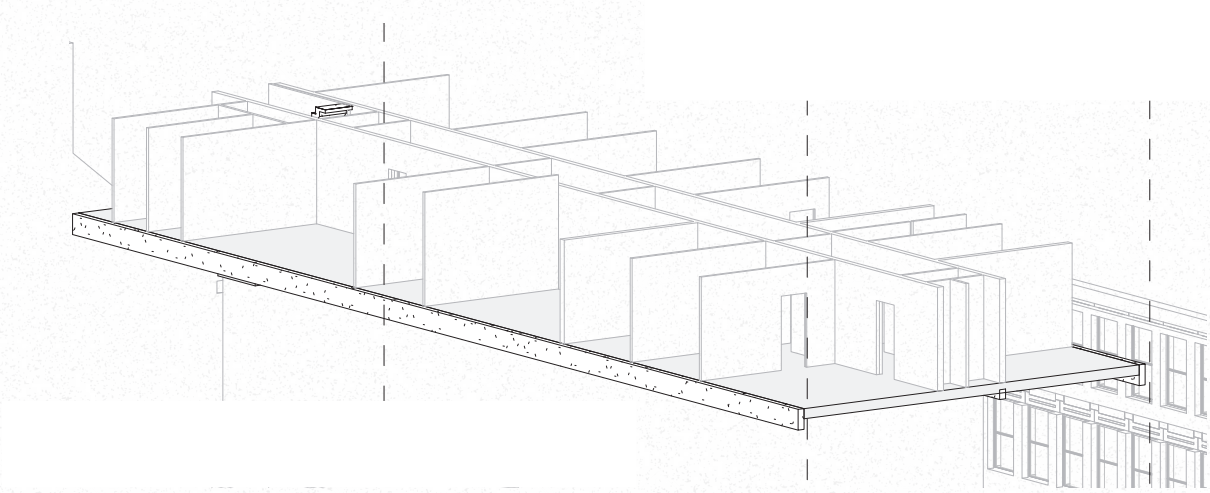


FIGURE 17. FIRST FLOOR

WALLS

The longitudinal inner walls are an important element of the load bearing structure. The two walls at gridlines B and C are made of 210 mm thick masonry. Originally, they were left bare, later they were painted white. The transversal walls, except the wall at gridline 16 from C till D, do not have a loadbearing function, but merely are room separators. They are either 110 mm or 150 mm thick. A small number of them is constructed out of Molersteen, a porous, lightweight brick.

A wall of the former entrance hall was enriched with a wall painting of an abstract version of the cityscape of Middelburg. The wall painting has not stood the test of time, and is not there anymore.



FIGURE 19. BRICKLAYING OF INTERIOR WALLS



FIGURE 18. CITY SCAPE OF MIDDELBURG, WALL PAINTING



FIGURE 20. PLASTERING OF INTERIOR WALLS

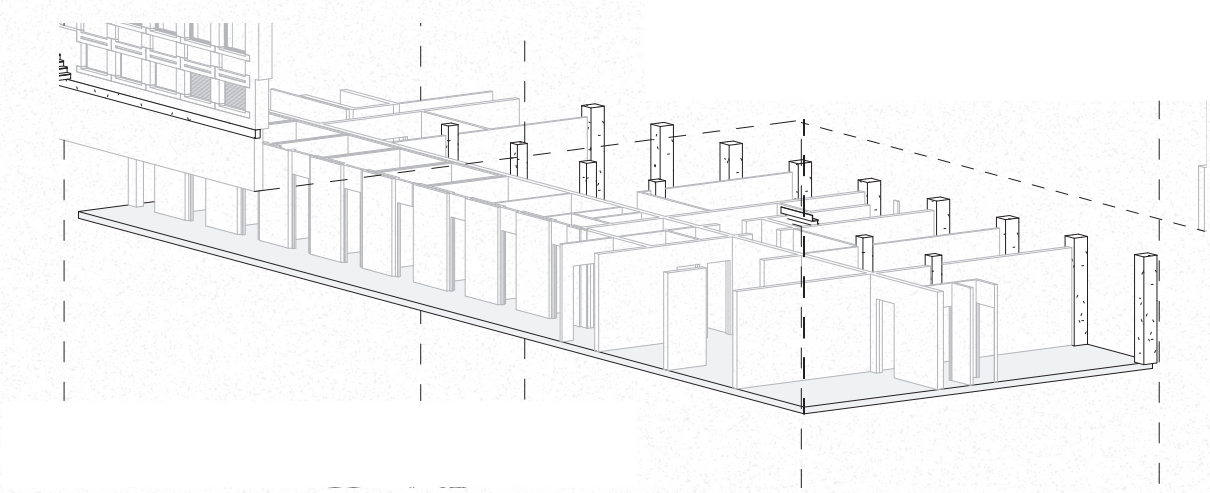


FIGURE 21. SOUTERRAIN

SOUTERRAIN

Contrary to the rest of the walls, the souterrain walls are made of reinforced concrete. The ground level at the front of the police station is more than two meters higher than the ground level at the backside. As the souterrain levels with the ground level at the backside, this creates the need of a watertight souterrain wall at the front side of the building. The wall was cast in place, as can be seen in figure 22.

After completion in 1969 the middle part of the souterrain served as a covered parking lot for police vehicles. This meant the back façade had a large open part, leading to the application of a large concrete beam which spread the load of the façade and floors above across nine concrete columns. The square columns measure 430 x 430 mm and were cast in place.



FIGURE 22. CONSTRUCTION OF SOUTERRAIN WALL



FIGURE 23. CONSTRUCTION OF CONCRETE COLUMNS

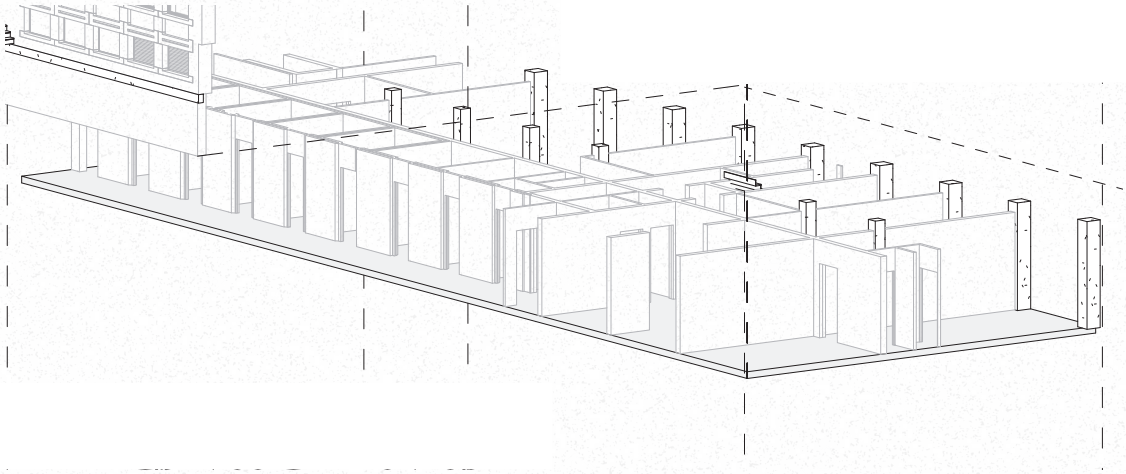


FIGURE 24. DETAINEE CELLS

DETAINEE CELLS

The detainee cells are located in the basement. The cells are separated by a cavity wall which consists of 110 mm brick, 110 mm cavity and another 110 mm brick. The brickwork is plastered. Even though they have a robust structure, the cells do not have a load-bearing role. On the picture in figure 25, it is visible that they were built after the floor above was constructed. The backwall of the cells is separated from the load bearing wall with a 110 mm cavity. The left three cells have a build in seat. All edges are rounded so that detainees cannot hurt themselves. Due to their resilient and heavy structure the cells could prove as excellent storage spaces or spaces which need a soundproof environment.



FIGURE 25. CONSTRUCTION OF DETAINEE CELLS

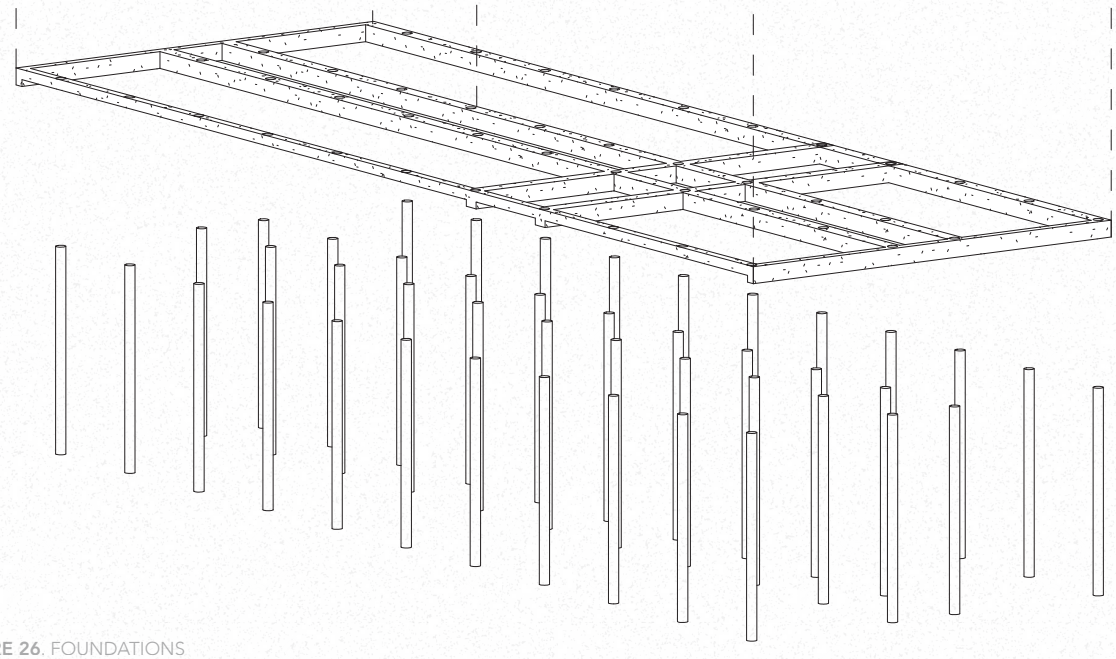


FIGURE 26. FOUNDATIONS

FOUNDATION

The police station rests on eight foundation beams made of reinforced concrete. The picture of the pile driving indicates that the foundation rests on piles, yet their location is not indicated on the construction drawings. Their placement is an assumption based on logic transfer of the loads. The walls of the basement were presumably poured on top of the foundation making them work as one constructive element.

The concrete mixture of the foundation and souterrain walls consists of 50 kg cement, 60 liters of sand and 100 liters of gravel. For the other floors, which are not in contact with water the mixture consists of 50 kg cement, 80 liters of sand and 120 liters of gravel. The compressive strength of the concrete is 225 kg/cm^2 or 22,5 N/mm^2. This corresponds to current strength class C16/20.

The concrete cover of the reinforcement is prescribed on the construction drawings. It varies between 10 and 35 mm depending on the type of element (floor/wall/column) and if the element is in contact with water. All values are noted in the table in figure 28.



FIGURE 27. PILE DRIVING



BETONDEKKING OP DUITENSTE WAPENING				
	Vloeren	wanden	Balken	Kolommen
Controle onmogelijk	2 cm	2 1/2 cm	3 cm	3 1/2 cm
Buitenwerk	1 1/2 cm	2 cm	2 1/2 cm	3 cm
Binnenwerk	1 cm	1 1/2 cm	2 cm	2 1/2 cm

FIGURE 28. CONCRETE COVER ON REINFORCEMENT

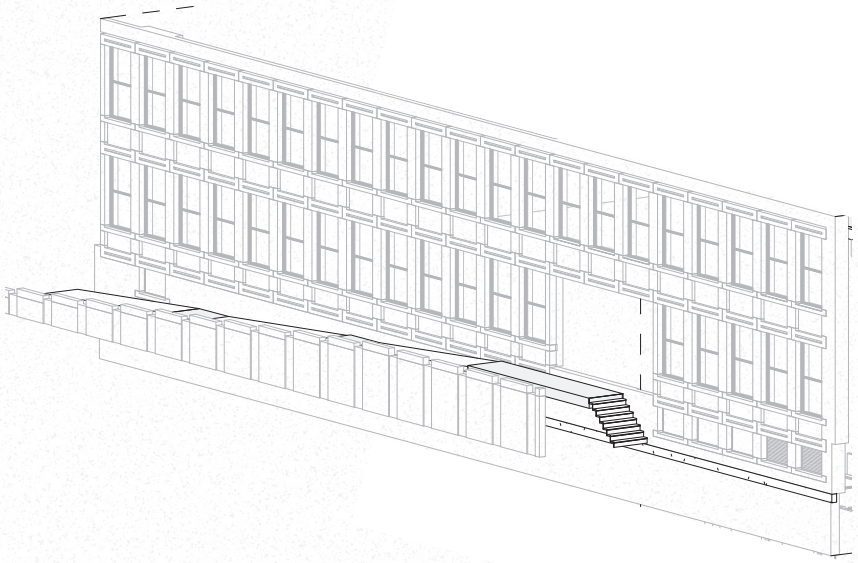


FIGURE 29. EAST FACADE

FACADE

The façade is built up out of masonry and precast concrete elements. The wall consists of two planes of brick separated by a cavity of 50 mm. The masonry has an English cross bond, made out of Waal-format bricks. The concrete functions both as sill and lintel and used to be painted in an off-white color but is repainted in a grey-purple taint.

By setting the windows back 210 mm in the façade deep 'negges' are created. The masonry clearly partitions the façade in twenty-one vertical parts of 1760 mm wide. Masonry between the negges is set back 110 mm to strengthen the vertical articulation. The concrete elements create horizontal lines but hardly interfere with the vertical articulation as they are segmented according to the vertical rhythm. The concrete elements are precast and connected to the concrete beams which support the floor with steel pins.

The ramp and wall which now lead to the entrance of the building have been added in 1985. The wall follows the rhythm of the façade by varying its thickness in accordance with the negges of the façade.



FIGURE 30. PLACEMENT OF CONCRETE LINTEL



FIGURE 31. PAINTING OF THE CONCRETE LINTELS

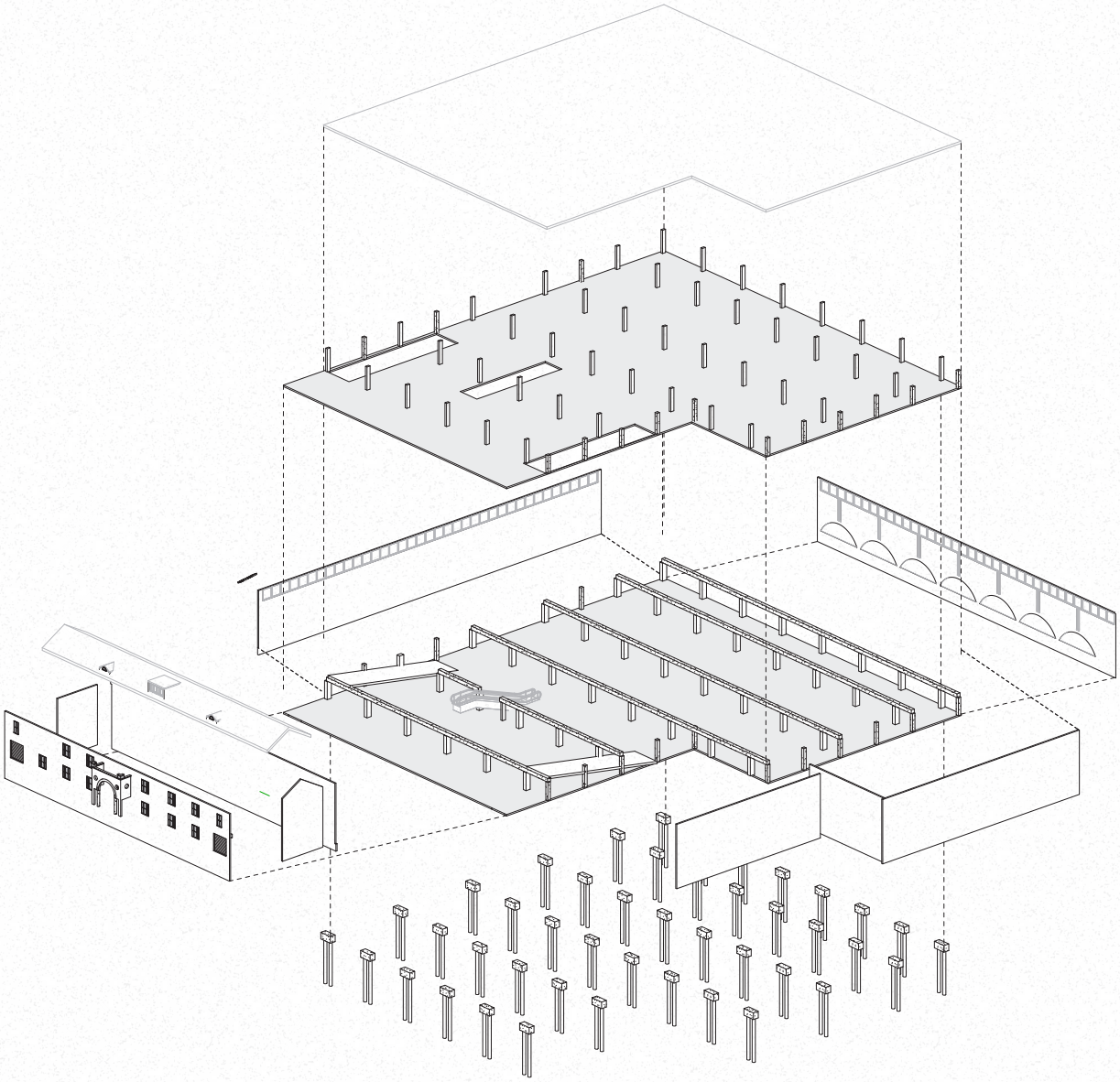


FIGURE 32. EXPLODED VIEW ACHTER DE HOUTTUINEN 12-18

ACHTER DE HOUTTUINEN 12-18

As the design includes the vacant supermarket next to the police building. This complex is also studied. With the new use in mind, the load bearing capacities are calculated.

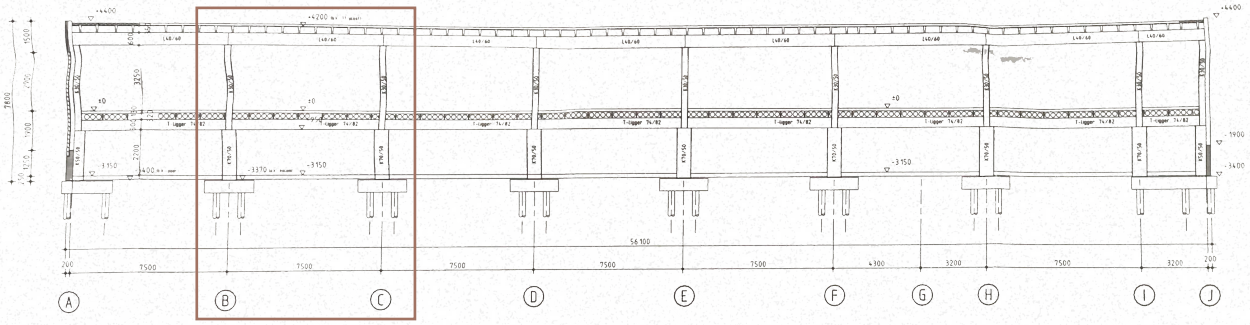


FIGURE 33. SECTION STRUCTURE PARKING GARAGE

CAPACITY CALCULATION

To calculate the capacity of the existing load bearing structure, the existing loads are taken as starting point. To simplify the calculation, the weight of columns and beams is neglected.

The span from gridline B to C and 5 to 7 is the standard situation which is used for the garage. The floors span 12000 mm from grid 5 till 7 and 7500 mm from B to C.

The roof consist of TT-beams which have a weight of 176 kg/m^2. They are meant to carry standard roof loads like snow.

The ground floor, a hollow core floor slab with a 60 mm cover layer, was used as supermarket, and therefore is calculated to take 4,0 kN/m^2. It has a weight of 4,0 kN/m2 exclusive any finishing layers.
The souterrain floor is used as parking garage and calculated to take 5,0 kN/m^2. Its own weight is 6,25 kN/m^2. According to the drawings it has no finish.

The parking garage and supermarket are public buildings meaning they belong in safety class CC2 according to Dutch regulations. Therefore partial factors of 1,2 for deadloads and 1,5 for live loads should be calculated.
Next, the loads in three points in the construction are calculated.

Roof											
Live Load =	1	x	12	x	7,5	⟶		90	x	1	= 90
Load construction =	1,76	x	12	x	7,5	=	158,4				
Finish load =	0,5	x	12	x	7,5	=	45	+			
							⟶	203,4			
Ground floor											
Live load =	4	x	12	x	7,5	⟶		360	x	1	= 360
Load construction =	4	x	12	x	7,5	=	360				
Finish load =	1	x	12	x	7,5	=	90	+			
							⟶	450			
Souterrain											
Live load =	2	x	12	x	7,5	⟶		180	x	1	= 180
Load construction. =	6,25	x	12	x	7,5	=	562,5				
Finish load =	0	x	12	x	7,5	=	0	+			
							⟶	562,5			
Total in kN =						Dead load, G:		1215,9	Live load, Q:		630

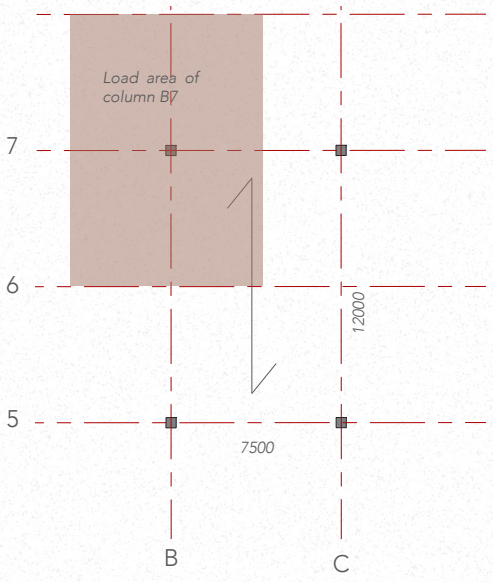


FIGURE 34. STANDARD SITUATION PLAN VIEW

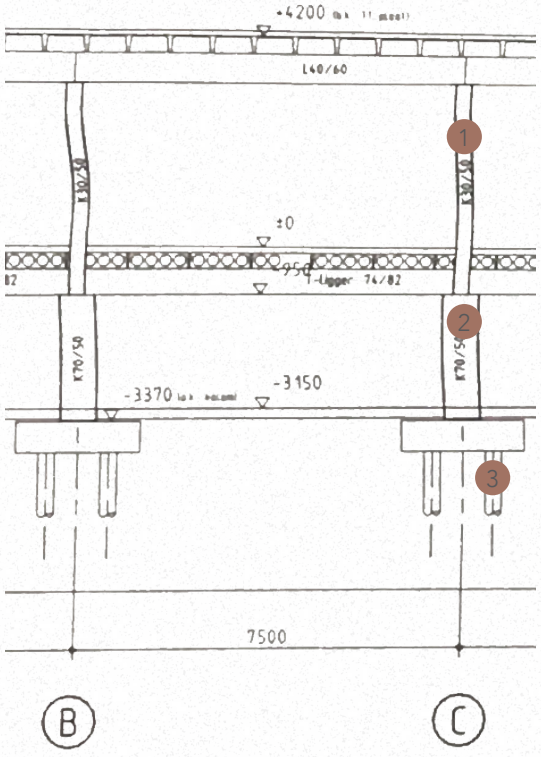


FIGURE 35. STANDARD SITUATION SECTION

The load in point one is 1,2 * 203,4 + 1,5 * 90 = 379 kN.
The concrete column has an area of 300 x 500 = 150.000 mm^2.

$$\sigma = \frac{379 \cdot 10^3}{150000} = 2{,}52$$

The compressive stress of 2,52 is far below the minimum capacity of the lowest concrete strength class.
The kink length of the column is 3100 mm. Its kink force is:

$$F_{cr} = \frac{\pi^2 \cdot 27500 \cdot \frac{1}{12} \cdot 500 \cdot 300^3}{3100^2} = 31.773.245\ N$$

$$F_{cr}/F_{cd} = \frac{31.773.245}{379000} = 83$$

The kink force is 83 times larger than the actual load. According to Dutch regulations this should be at least 5 times.

Both calculations show the column is over dimensioned. Meaning it is not the weakest point in the construction.

The load in point two is 1,2 * (203,4+ 360) + 1,5 * (90 +360) = 1351 kN.
The concrete column has an area of 700 x 500 = 350.000 mm^2.

$$\sigma = \frac{1351 \cdot 10^3}{350000} = 3{,}86$$

The compressive stress of 3,86 is far below the minimum capacity of the lowest concrete strength class.
The kink length of the column is 2460 mm. Its kink force is:

$$F_{cr} = \frac{\pi^2 \cdot 27500 \cdot \frac{1}{12} \cdot 700 \cdot 500^3}{2460^2} = 327.031.082\ N$$

$$F_{cr}/F_{cd} = \frac{327.031.082}{1351000} = 242$$

The kink force is 242 times larger than the actual load. According to Dutch regulations this should be at least 5 times. Both calculations show the column is over dimensioned. Meaning it is not the weakest point in the construction.

For the calculation of the foundation an extra rule applies. By the Dutch regulations it is deemed most unlikely that all floors are loaded maximum at the same time. Therefore a reduction factor 'psi' applies for the floor with the lowest live load, in this case the roof. Depending on the type of live load the factor differs. For roofs it is 0. Therefore the load in point three is: 1,2 * (203,4+ 360 + 562,5) + 1,5 * (360 + 180) = 2161 kN.

To prevent damage to surrounding buildings, vibration free foundation poles were used. These poles, from Fundex, are screwed into the ground and can carry - depending on their diameter - 1000 till 1250 kN.
Each column is supported by two piles. Therefore each pile carries 2161/2 - 1080,5 kN.
Consequently, the foundation is the limiting element in the load bearing structure.

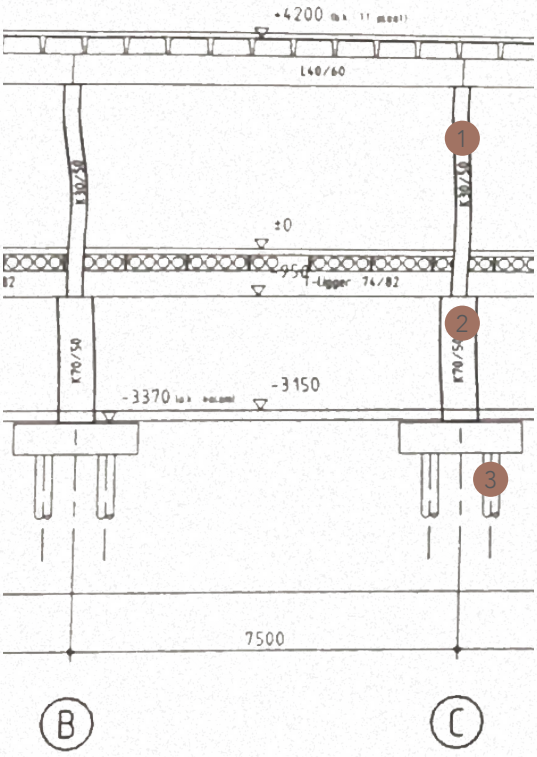


FIGURE 36. STANDARD SITUATION SECTION

■ **Trillingsvrij,** en grondverdringend (geen ontspanning van de grond of teruggang van de conusweerstand), geen gevaar voor schade aan belendende percelen tijdens het vervaardigen van de paal.
■ Mede door **grondverdringing** hechte aansluiting tussen grond en beton door de geprofileerde buitenkant van de paal. Uitermate geschikt als trekpaal. Door verdringing en verdichting is een hoge paalpuntspanning en kleef, en een groot draagvermogen toelaatbaar.
■ **Geen grondafvoer.** Deze wordt zijdelings weggedrukt.
■ Wapening naar keuze en desgewenst tot aan de paalvoet uit te voeren.
■ Via de manometerdruk is het verloop van de grondweerstand nauwkeurig te volgen.
■ Geen geluidshinder zoals bij heien. Het enige geluid is de motor van de boormachine.
■ De machine is snel bedrijfsklaar en op het werk gemakkelijk te verplaatsen, mede daardoor is een hoge produktie mogelijk.
■ Geen overbodige paallengten.
■ Afhankelijk van de sondeerweerstand en toe te passen paalafmeting bedraagt het draagvermogen 1000 tot 1250 kN.

FIGURE 37. FOLDER ON FUNDEX PILES

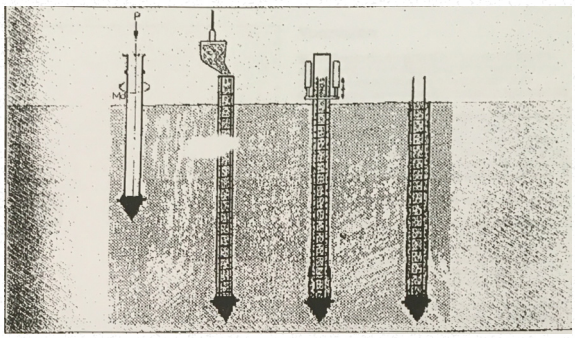


FIGURE 38. FUNDEX PILE SYSTEM

CONSEQUENCES

In the new design, the roof will be demolished. Furthermore the use as supermarket will disappear. Instead housing will be the new use. To calculate the capacity for new buildings on top of the existing load bearing structure the sum of the disappearing load is calculated.

The roof's dead load is: 1,2 x 203,4 = 244 kN. The supermarket floor will remain, so its dead load cannot be subtracted. As the function changes it live load can be subtracted. This means a subtraction of 1,5 x 360 = 540 kN.

The disappearing load equals what can be added. This means a total of 244 + 540 = 784 kN can be added per column. This comes down to 784 / (7,5 x 12) = 8,7 kN/m^2.

The new volume is meant for housing and therefore has a live load of 1,75 kN/m^2. According to Dutch legislation these can be multiplied by reduction factor psi of 0,4. 0,4 * 1,75 = 0,7 kN/m^2 Combined with the deadload of an average floor and some finishes this results in a total load of ± 4 kN/m^2. Therefore the capacity of 8,7 kN/m^2 could be enough for building two storeys of apartments when using a lightweight structure. It is not enough to enable the planned three or four storeys.

Additional foundations will be necessary to allow the planned housing buildings as shown in figure 39. The new foundations are discussed within the design chapter.

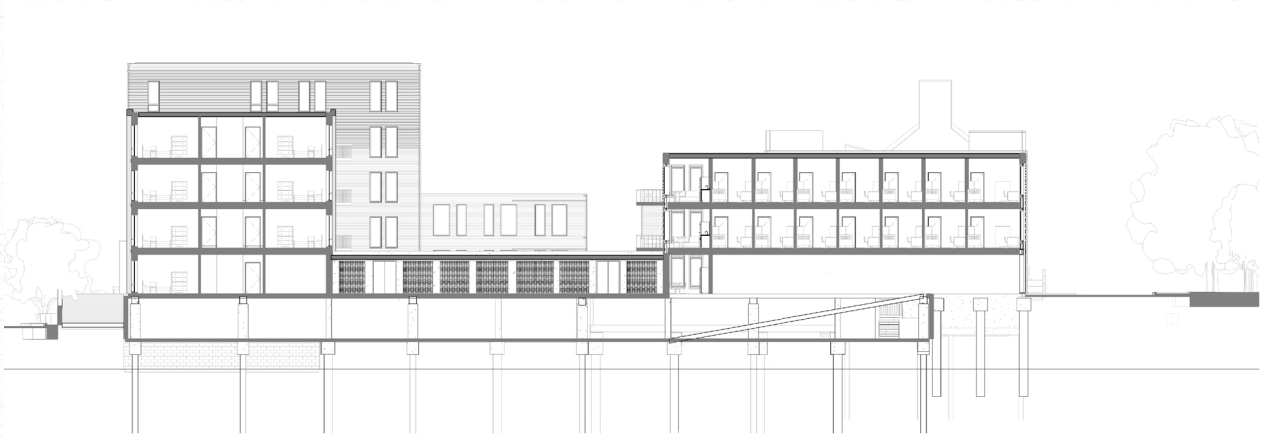


FIGURE 39. NEW SITUATION

FAÇADE CONDITION

After 55 years the façade of the police station shows various types of surfaces changes and damages. They are identified to ensure the right cleaning and renovation methods can be applied. When deciding on interventions in the façade, the heritage value of the building is considered. Not only aesthetical reasons play a role. Technical considerations regarding the preservation of the materials and criteria like veracity and the appreciation of natural traces of aging or 'patina' are taken in mind.



FIGURE 40. PATTERN OF WHITE EFFLORESCENCE



FIGURE 41. SALT EFFLORESCENCE



FIGURE 42. WHITE DEPOSIT - SALT EFFLORESCENCE

WHITE EFFLORESCENCE

The wall in front of the building which was built in 1985 shows a white deposit of salt efflorescence (figure 40 & 41). Seen the pattern in which the white efflorescence appears, the moisture source is presumably rising damp from the soil. The hypothesis can be tested by taking powder samples from the masonry on different heights and determine the moisture content and hygroscopic moister content by gravimetric determination. If rising damp is the cause of the efflorescence a clear pattern will be visible where the moister content is lower near the drying front (in this case the higher parts of the wall) whereas the hydroscopic moister content – which indicates the presence of salts – is higher near the drying front[2].

At the left side of the front façade, rising damp causes efflorescence and moist spots on the masonry. The adjacent building has similar symptoms and shows biological growth (figure 42).

Intervention

The salt efflorescence can be cleaned but will return if the moisture source is not removed. Mechanical and chemical interventions which aim to block the rising of the damp exist but are expensive and seem not worthwhile for the wall in front of the police station as we are dealing with an exterior wall. The rising damp at the left side of the front façade should be stopped. An effective intervention would be to create a mechanical interruption[1]. A course of masonry can be removed and replaced by an impermeable layer (metal slab) to stop the damp from rising. After the wall has dried the deposit can be cleaned.

BLACK DEPOSIT

At various places in the façade a black soiling is visible. This soiling is due to the deposition of dirt coming from the environment[3]. A moist wall facilitates the adhesion of soiling to the surface. The soiling is most observed at places which dry slowly. The soiling in figure 43 is located underneath a seam between the concrete elements which guides rainwater along the masonry.

Intervention

The soiling can be cleaned from the façade by brushing, washing or steaming.[4] Abrasive cleaning is possible, but this might damage the top layer of the brick and is therefore considered the last resort. As the air quality in cities is improving, new soiling will be minimum.

WHITE DEPOSIT

In many places the mortar between the bricks shows a white deposit (figure 44). This could be the result of the transport of alkali sulfates or lime from within the mortar to surface.

Intervention

If the hypothesis is correct, the deposits can be cleaned by brushing, washing, steaming and abrasive cleaning.



FIGURE 43. BLACK DEPOSIT



FIGURE 44. WHITE DEPOSIT

PAINT IRREGULARITIES

The concrete façade elements are painted in a purple color. Archival images show that the original paint had a white color (figure 46) The current paint layer shows irregularities which can be the result of air bubbles or the incomplete removal of previous paint layers (figure 45).

Intervention

To achieve the best result, all previous paint layers must be removed before a new layer is applied. Leaving the concrete unpainted is possible but the surface might be damaged by adhesive paint or more aggressive cleaning.



FIGURE 45. BLACK DEPOSIT



FIGURE 46. THE POLICE STATION SHORTLY BEFORE COMPLETION

BIBLIOGRAPHY

Most information in this chapter is derived from the construction drawings. These are stored in the 'Zeeuws Archief' located at Hofplein 16, Middelburg. With permission of the National Police, the construction drawings, submitted together with the application for a building permit, for the police station at Achter de Houttuinen 10 were studied and photographed.

1. Arends, J. (2018) Handleiding ontwerpen draagconstructies. (p.58). Delft, The Netherlands.

2. Lubelli, B. Van Hees, R.P.J. (2020) Dealing with rising damp. TU Delft

3. Monumen Diagnosis and Conservation System (2022) Damage atlas > Brick. Retrieved on March 18, 2022

4. Lubelli, B. (2020) Cleaning of facades. TU Delft

FIGURES

1. Image by author

2. Author – based on Arends, J. (2018) Handleiding ontwerpen draagconstructies. (p.58). Delft, The Netherlands.

3. Image by author
4. Image by author
5. Image by author
6. Image by author
7.. Image by author
8. Zeeuws Archief, Historisch-Topografische Atlas Middelburg (HTAM), B-1097XXXV Middelburg, The Netherlands.

9. Zeeuws Archief, Historisch-Topografische Atlas Middelburg (HTAM), B-1097XVII. Middelburg, The Netherlands.

10. Zeeuws Archief, Historisch-Topografische Atlas Middelburg (HTAM), A-1368XIV. Middelburg, The Netherlands.

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21. Image by author
22. Zeeuws Archief, Historisch-Topografische Atlas Middelburg (HTAM), A-1368IV. Middelburg, The Netherlands.

23. Zeeuws Archief, Historisch-Topografische Atlas Middelburg (HTAM), A-1368XVI. Middelburg, The Netherlands.

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32. Image by author
33. Image by author
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35. Image by author
36. Image by author
37. Zeeuws Archief, Construction drawings Achter de Houttuinen 12-18. Middelburg, The Netherlands.

38. Zeeuws Archief, Construction drawings Achter de Houttuinen 12-18. Middelburg, The Netherlands.

39. Image by author
40. Image by author
41. Image by author
42. Image by author
43. Image by author
44. Image by author
45. Image by author
46. Zeeuws Archief, Historisch-Topografische Atlas Middelburg (HTAM), A-1368VIII. Middelburg, The Netherlands.

REDEVELOPMENT PROGRAMME

As a new station is built south of Middelburg, the station at Achter de Houttuinen is in need of a new purpose. To find a suitable program, different possible future used are examined in the upcoming paragraphs. Important assessment criteria are the spatial requirements for a program and the demand for this new program within the city.

In general it is advised that the new function is close to the former use and suits the main characteristics of the original building.[1]

Based on the current zoning regulation offices, social facilities and underground parking are allowed at Achter de Houttuinen 10.[2] The municipality of Middelburg stresses in many publications the importance of preservation of the historic inner-city because of its cultural and historical significance and its attraction on locals and visitors.

RETAIL

In a report on the future of the inner-city is clearly stated that there is no future for retail facilities in the area of Achter de Houttuinen.[3] The long vacancy of the former shopping center at Achter de Houttuinen 12-18 seems to confirm this statement. Currently the retail portfolio of Middelburg is above average compared to reference locations. In 2014, 12,4 % of the available retail real-estate was vacant. Therefore, the current policy aims to increase the density and quality of retail facilities by grouping them near current retail zones.[4] This zone is colored yellow in figure X.

The half storey elevation above ground level of the ground floor increases the distance to shopping public, reducing the suitability for retail purposes of the police station. Furthermore for a sole retail purpose, a four storey building is unusual and perhaps undesirable.

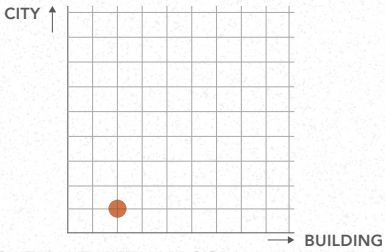

FIGURE 1. SUITABILITY RETAIL PROGRAM

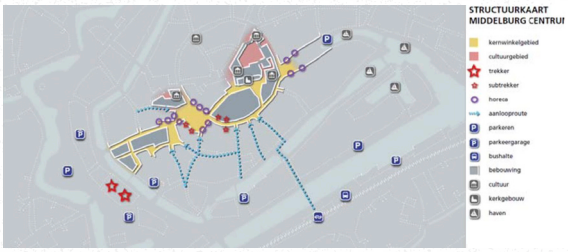

FIGURE 2. CORE RETAIL AREA IN MIDDELBURG

OFFICE

The former program for as police station already included many offices. This indicates the suitability of Achter de Houttuinen 10 for a new office function. Most -although mostly larger- offices in Middelburg are located near the train station. Yet for a company of approximately 50 employees, the former police station could prove suitable. As Middelburg aims to attract employment for higher educated employees, a (shared) office for knowledge intense business would fit the city planning.[5] The high standards for social and cultural facilities which well-educated professionals demand from their work and living environment are met in the inner-city of Middelburg.[6]

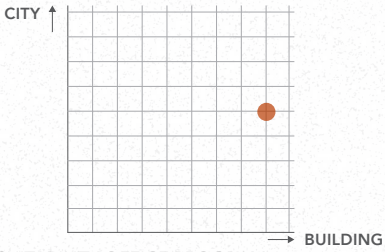

FIGURE 3. SUITABILITY OFFICE PROGRAM

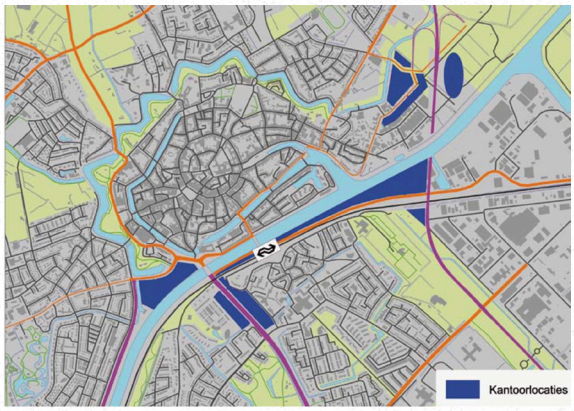

FIGURE 4. OFFICE LOCATIONS IN MIDDELBURG

EDUCATION

An educational program would suit the building well seen the large overlap in spatial requirements compared to office demands.

The municipality aims to expand the educational activities in the city with a master's program at the University College Roosevelt.[7] The former police station could be the new faculty for this study if existing housing proofs insufficient. The University College Roosevelt already houses in some heritage buildings in the inner-city of Middelburg. The educational buildings are grouped together which would make the location at Achter de Houttuinen feel isolated. Yet when also the residential buildings for the Roosevelt students are taken into account, Achter de Houttuinen is not isolated at all.

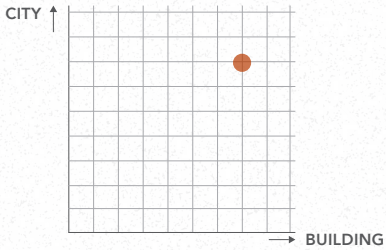

FIGURE 5. SUITABILITY EDUCATIONAL PROGRAM

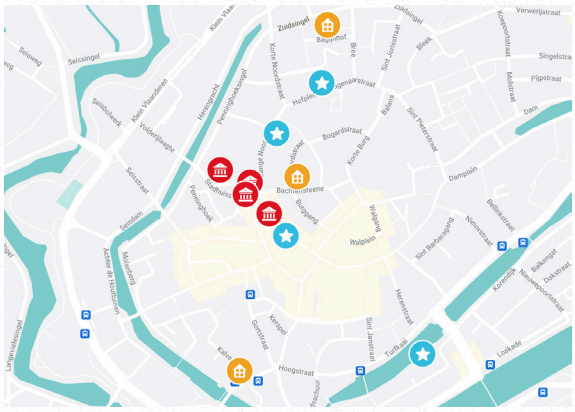

FIGURE 6. ROOSEVELT COLLEGE CAMPUS IN MIDDELBURG

GOVERNMENTAL ORGANISATIONS

As the capital of Zeeland, Middelburg is rich in governmental organizations, regional boards and intuitions. Middelburg aims to enhance this supraregional importance by facilitating business locations for these institutions.[8] The reasonable accessibility of the site, and its spatial qualities facilitate a new governmental organization as program.

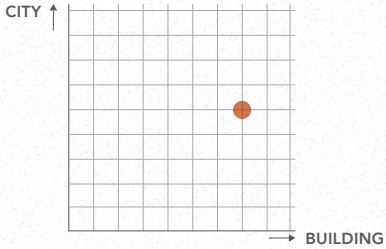

FIGURE 7. SUITABILITY GOVERNMENTAL ORGANISATIONS

RESIDENTIAL PROGRAM

According to the 'Actieplan binnenstad' the area of Achter de Houttuinen is most suitable for residential purposes. The over 12 meters deep building plan enables a transformation into (small) apartments only if they are located at either the front or back façade. This means the apartments would have only one façade where daylight can enter. This is usually considered to be undesirable. However locating the apartments at only one façade would result in shallow apartment plans which typically has a luxurious feeling due to the close relation with the outer façade.

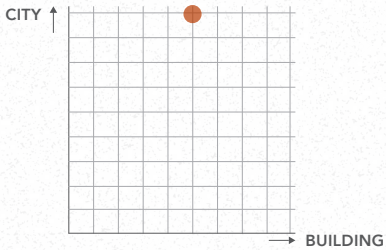

FIGURE 8. SUITABILITY RESIDENTIAL PROGRAM



FIGURE 9. HOUSING NEAR ACHTER DE HOUTTUINEN

HOSPITALITY

In 2010 the municipality declared that there was a need for more hotels in Middelburg to foster tourism.[9] Since then, multiple hotels have been realized, for example Cityhotel Wood at Achter de Houttuinen 8. Based on the spatial aspects of the former police station, a transformation to a small hotel seems possible. Nevertheless, the presence of multiple hotels nearby might already meet the demand.

Transformation to a restaurant seems feasible considering the spatial aspects of the building. Bearing in mind the transformation of the Kloveniersdoelen in 2013 to a restaurant might overshadow the presence of another restaurant in a heritage building. Especially seen the more prominent location and greater volume of the Kloveniersdoelen. In their vision on hospitality, the municipality express their wish to concentrate restaurants around the squares 'Markt' and '1940' which is around three hundred meters from Achter de Houttuinen. Outside this area the policy aims to consolidate the current catering industry.

Even though the policy of the municipality does not encourage a new program related to the hospitality industry, the large parking garage underneath the adjacent building ensures plenty of day trippers passing the building.

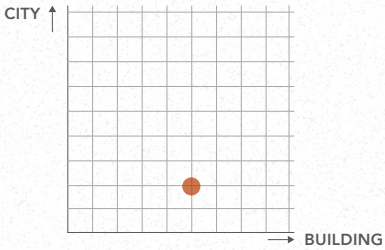

FIGURE 10. SUITABILITY HOSPITALITY INDUSTRY



FIGURE 11. NEARBY RESTAURANT THE KLOVENIERSDOELEN

OVERVIEW

The brief study into suitable programs for the police station at Achter de Houttuinen indicates that retail and hospitality program would not be a suitable new program as they are not in line with the demands of the city nor is the building particularly suitable to house these functions. Bearing in mind the spatial characteristics of the police station, a new use as office or governmental organization would fit the station. However, most offices are located near the train station and the building is only large enough to fit smaller organizations.

Another possible new function would be an educational institution. An expansion of the University College Roosevelt could make an interesting redesign assignment, especially seen their ambition to offer a master's degree in Middelburg.

A transformation into housing is socially desirable, and apartments could reasonably fit into the building. Furthermore, the municipality has deemed the area of Achter de Houttuinen most suitable for housing, making it a suitable transformation program. Combined with the current nationwide housing shortage, a residential function is probably the most suitable redesign program. Nevertheless, in my opinion the complexity of an educational program is preferable for a graduation project. Therefore, the police station will be transformed into a faculty building facilitating a new master's degree at University College Roosevelt.

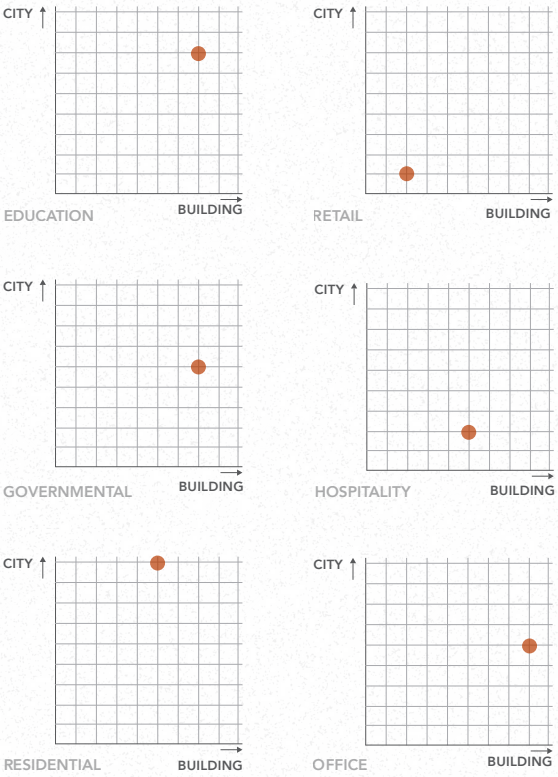

FIGURE 12. OVERVIEW SUITABILITY

UNIVERSITY COLLEGE ROOSEVELT

University College Roosevelt (UCR) is a small, international, honors undergraduate, liberal arts and science college of Utrecht University. It offers an undergraduate program where students according to liberal principles compile a three-year bachelor program from approximately 200 courses in Arts and Humanities, Science, Social Science, and Engineering. The institution was founded in 2004 and named after the Roosevelt family as their ancestry originates in the province of Zeeland.[10]

Education

Due to the liberal nature of the education, students are encouraged to enroll in a diverse program. A limited number of courses is mandatory, making students familiar with academic research and writing. The classes have a maximum of 25 students, ensuring thorough feedback and supervision. Two make this possible, tuition fees are higher than public universities. After exploring many different fields in the first year, the students pick a major in the second year. The major fields are: Arts and Humanities, Science, Social Science, and Engineering.

Faculty

The education of UCR is divided over four buildings in close proximity of the former city hall of Middelburg. This ancient building is now the headquarters of the UCR and provides the UCR with an elitist flagship. During later expansions the university college moved into less prominent buildings at int Stadhuisstraat 2 and Sebastiaanstraat 12.

For additional facilities, like extra study spaces, the university uses public buildings such as the library and archive of Middelburg.[11]

Housing

As the UCR believes that learning does not only takes place within the classroom but also in day-to-day conversations with fellow students. Living on the campus is therefore mandatory. UCR guarantees housing in one of the four student buildings for the entire period of education.

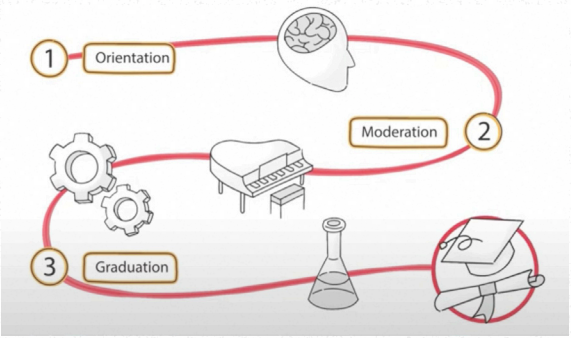

FIGURE 13. THREE YEAR PROGRAM AT UCR

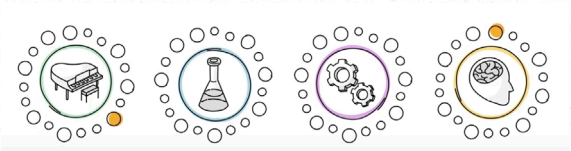

FIGURE 14. FOUR MAJOR FIELDS



FIGURE 15. HEADQUARTERS OF UCR; THE FORMER CITY HALL



FIGURE 16. EDUCATIONAL BUILDING ANNE



FIGURE 17. STUDENT HOUSING AT BAGIJNHOF

DESIGN BRIEF

According to Den Heijer (2016)[1] the average campus size (GFA) per student is 16,3 m^2.
The focus on on-campus education at UCR and the fact that students live nearby leads to more intensive use of facilities. Furthermore, campus facilities are increasingly important in students' university choices.[1] Therefore at least 20 m^2 gross floor area of campus per student is planned for the new campus of UCR.

The bachelor education has 500 students in total. Each year around 175 students are admitted. In the Netherlands in general, there are 1,5 times more bachelor students as master students. Translated towards the UCR this would mean 175/1,5 = 117 master students. Depending on the length of the masters (1, 2 or 3 years) this would result in a student body of ± 200 master student.

At 200 students, calculating 20 m^2 per student, there would be a need of 4000 m^2, doubling the current size of the police station.

Furthermore, 200 students need housing. At 20 -25 m^2 this means ±4500 m^2 housing.

To make an estimation of the needed spaces, the average space use for activities in universities (Den Heijer, 2016) is used to make an estimation. It results in the following space requirements.

- Total 8500 m^2
- Housing: 4500 m^2
- Classrooms: 600 m^2
- Study spaces/labs etc: 840 m^2
- Offices for staff: 1320 m^2
- Storage: 440 m^2
- Cafeteria 160 m^2
- Sanitair: 120 m^2
- Facilities: 320 m^2
- Bikestorage: 160 m^2

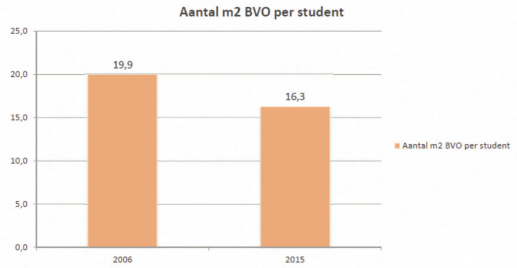

FIGURE 18. GROSS CAMPUS AREA PER STUDENT

		RUIMTEGEBRUIK VOOR ACTIVITEITEN		
	Totaal	Onderwijs	Onderzoek	Ondersteunend
RUIMTETYPES	100%	33%	35%	32%
A: Sanitair	3%	0%	0%	3%
B: Stalling	4%	0%	0%	4%
C: Opslag	9%	0%	0%	9%
D: Specifieke opslag	2%	0%	2%	0%
E: Kantoor	33%	3%	17%	13%
F: Ondersteunend	8%	4%	4%	0%
G: Restauratief	4%	1%	1%	2%
H: Onderwijszalen	15%	15%	0%	0%
I: Specifiek (incl. labs)	21%	10%	11%	0%
W: Woon	0%	0%	0%	0%
N: Server	0%	0%	0%	0%

FIGURE 19. SPACE USE

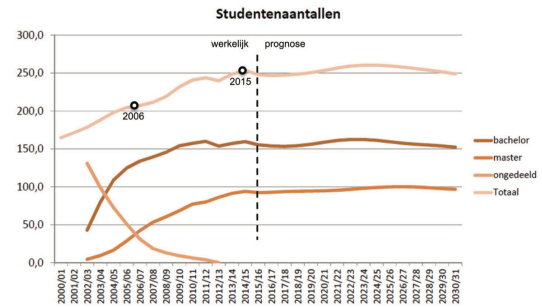

FIGURE 20. BACHELOR/MASTER STUDENT RATIO

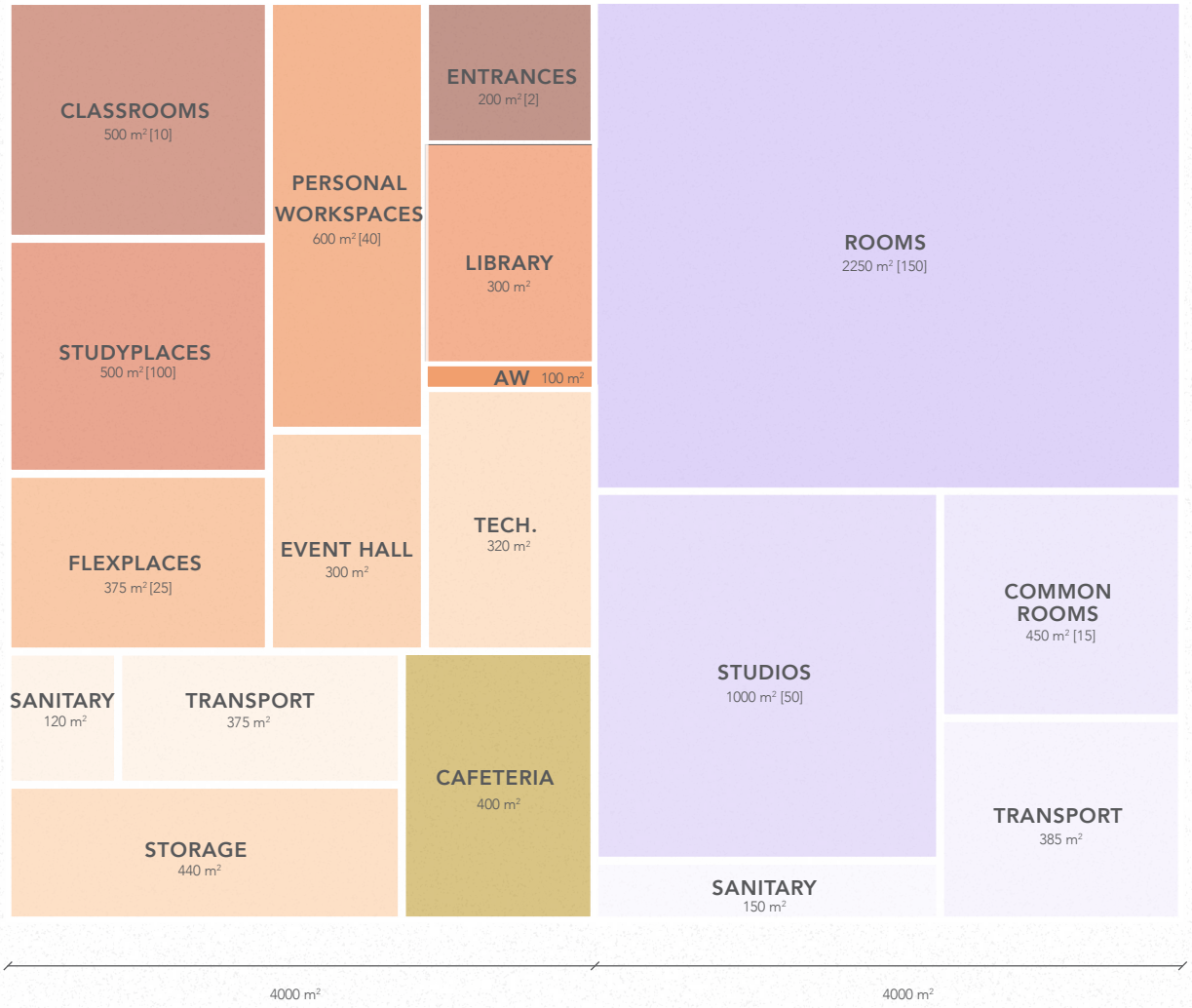

FIGURE 21. GROSS CAMPUS AREA PER STUDENT

EDUCATION
HOUSING
CAFETERIA

DESIGN BRIEF

Based on the average space use of universities as described in the report Campus NL[1] an estimation of the needed facilities and corresponding square meters is made. The estimation is adapted to fit the small scale and personal contact which characterizes the education at university colleges. Each category is provided with an explanation of the estimated square meters and a describtion of the demanded functionality or atmosphere. The total needed square meters per functions is indicated in the table. The number between [x] expresses the area of one unit.

CURRENT
POLICE STATION
2000 m²

FUNCTION	NUMBER	M²	EXPLANATION
Entrance hall	2	200 [~100]	Both sides of the complex need a representative entry from which a clear routing leads to all functions.
Classrooms	10	500 [~50]	An average classsize of 20 students (UCR Bachelor), and a student body of 200 students result in 10 classrooms. The fact that not all classrooms will be continuesly occupied provides an excess in case master classes are smaller.
Studyspaces Workplaces	100	100 [~5]	The intensive, on campus education at UCR creates the need for sufficient on campus study places. For at least half of the students a workplace needs to be available. If extra studyspaces are necessary, vacant classrooms can be used.
Library	1	300	The multidisciplinary academic program at UCR requires literature on a wide variety of topics. A large library is therefore prerequisite for the new faculty. Workplaces and the library can be integrated.
Archeological workshop	1	100	To enable students to safely study the archeological collection at Erfgoed Zeeland, a special workshop is needed. The facility can be shared with the staff of Erfgoed Zeeland.
Event hall	1	300	Two important aspects of the education at UCR are the multidisciplinarity and community-feeling. Both require a space where the entire student body can come together to get lectures or engage in academic traditions. Therefore the event hall should be able to accomodate 200 students and 50 staff members. Furthermore the hall should enable use for events with external partners. To increase occupation, the event hall should allow different uses, when no events take place.
Offices Personal workplaces Flexible workplaces	 40 25	 600 [~15] 375 [~15]	On average, universities in the Netherlands have one staff member for 4,5 students or one fte staff per 5,5 students.[1] The intensive education at UCR requires more staff, estimated at 1 staff member per 4 students or 1 fte staff for 3 students. According to Den Heijer (date) [1]the traditional approach at UCR requires personal offices for full-time staffmembers. Part-time staff can use flexible workplaces.
Cafeteria Seats Kitchen	 ~150 1	 300 100	The on campus education means an intensive use of on campus food facilities. Seen the inner-city location, with many restaurants and supermarkets close by, the cafeteria should be able to facilitate half of the students and staff at the same time. The cafeteria will also provide supper for nearby living students. It is expected that 50 students will use this service daily.
Storage	?	440	Like any organisation, the UCR needs sufficient storage.
Facilities (technical)	?	320	To enable all processes within the faculty, several technical or climatic installations and facilities are needed.
Sanitary	8	120 [~15]	Sanitary should be available on each storey in all buildings.
Vertical and horizontal transportation	10%	375	
EDUCATION TOTAL		**4130**	
Housing Studio's Rooms Common rooms Sanitary	 50 150 15 15	 1000 [~20] 2250 [~15] 450 [~20] 150 [~10]	Living on campus is mandatory for all UCR students, as students will not only learn within the classroom but just as well from living toghether. Therefore most students will share facilities like kitchen and bathroom. Furthermore there are some studio's.
Vertical and horizontal transportation	10%	385	
HOUSING TOTAL		**4235**	
TOTAL		**8365**	

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FIGURES

1. Image by author

2. Gemeente Middelburg. (2015). Structuurkaart Middelburg Centrum. In: Gemeente Middelburg, BRO. (2015). Middelburg, Positionering en Actieplan binnenstad (p.39). Middelburg, The Netherlands.

3. Image by author

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21. Image by author

UNDERSTANDING BERGHOEF

In preparation of the redesign of the police station in Middelburg, the work of Berghoef is studied. A thorough understanding of his work allows a proper heritage value assessment of the police station.
The upcoming chapter outlines an architectural history context after which Berghoef's vision will be discussed and specified in five themes. Next, a translation from this theoretical description to material is made, by analysing four public buildngs designed by Berghoef.

THE MATTER OF STYLE

The word 'style' finds its way in the terminology of architecture in the beginning of the nineteenth century. Its meaning developed from 'a building designed in harmony with its context' towards a systematic classification of buildings which share similar characteristics and are built around the same time.[1] Prior to the notion of style, most architectural designers aimed to work in direct link with tradition by treading the path of their direct predecessors. This manner of working slowly changed at the end of the eighteenth century and gave way to greater freedom of idealistic choice, simultaneously creating the opportunity to break with tradition.[2]

The newfound freedom meant the loss of clear historical motives and forced architects to profile themselves more. With the emergence of professional civil engineers who could design practical buildings stripped of any artistic pretentions, architects needed to prove the worth of designs based on artistic quality or social engagement.[2] Throughout the twentieth century multiple attempts were made to prove this added value by designing in a new style that would reflect the current time at its best. Probably the best-known attempt to formulate a new contemporary style is modernism (functionalism), in the Netherlands mainly known as 'Het Nieuwe Bouwen'.

MODERNISM

Modernism takes the function of a building as starting point for its form and from an optimistic view on society focusses on social equality and improvement of living conditions. Theorists supporting the modern movement, Gideon and Pevsner among others, attempted to conclude the ongoing discussion on what should be the new contemporary style by writing an account of history which seemingly logically led to the emergence of modernism, thereby legitimizing its domination. Events and people disrupting the homogeneity of the ideas were less represented leading to a simplified version of architectural history.[3] The apparent self-evidence of modernism led Gideon to state it should not be referred to as a style anymore. As the word style reminds of the pluralism which was present before the emergence of modernism and therefore does not promote that modernism is the only possible future of architecture.

Despite the attempt of modernist, artistic unity was not revived and other architectural movements continued to exist alongside the modernists. Even though the modernist realized little actual building volume they continued to be the dominant movement in architectural historiography. This position was maintained by disqualifying other movements like traditionalism as 'conservative' or 'reactive', thereby simplifying the pluralistic landscape of styles. Recent attempts by Bosch-Meyer (2016) and Colenbrander (1993) to map architectural styles in the Netherlands have debunked this simplicity and present a complex web of sub movements and personal signatures which are still underexposed or simplified.

TRADITIONALISM SIMPLIFIED

As historiography was dominated by key figures of the modernist movement, the historical sources from that day usually describe the traditionalism through the lens of modernism. In fact the term 'Delftse School' which became synonym to traditionalists was coined by J.J.P. Oud – a former protagonist in the modernist movement- in 1946. The 'Delftse School' referred to group of architects led by Granpré Molière, who was a professor at the Technical University in Delft. In the following decennia the 'Delftse School' often has been equated with traditionalism or rural architecture (plattelandsarchitectuur) which is characterized by an emphasis on craftsmanship in construction and the rejection of industrial production and innovative building materials. Instead, buildings were constructed out of brick, natural stone and wood, simply ornamented and provided with gable roofs.[2] This simplified description of the 'Delftse School' remained prevalent over the next decades as historians related to the traditionalists seemed unable to specify a coherent definition.[3] The lack of a well-developed definition enabled modernist to dismiss traditionalism as conservative, or ill-considered copying of tradition.

The controverse between the modernist and traditionalists tends to be displayed in literature as seemingly irreconcilable. Nevertheless, cooperation between architects of both movements did exist. For example at the faculty of architecture at the TU Delft where Van den Broek, Friedhoff and Kuipers -protagonists of the modern movement- worked with Granpré Molière and Berghoef. Through this cooperation both parties discovered that they had a similar social engagement and love for architecture, yet their solutions differed.
The protagonist of both movements had collegial and even friendly ties, contrary to what polemic historiography has led us to believe. In his inaugural speech Berghoef shows to be aware of this discrepancy[4], but it seems that the polemic image has prevailed throughout history.[3]

At this moment the polemic view of two opposite camps seems untenable: Closer inspection by Bosch-Meyer (2016) and Colenbrander (1993) of the motives of the supposed members of the modernists and traditionalists reveals a complex architectural historic field with a large group of more nuanced players. Berghoef was one of them. His view on architecture will be described in the next chapters.

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1. Colenbrander, 1993, p.25
2. Colenbrander, 1993, p.27
3. Bosch-Meyer, 2016, p 93
4. Berghoef, 1947. p.19

Prior to the analysis of Berghoefs view on architecture, this chapter contains a brief biographic account of his life. The aim of the account is to enable placement of Berghoefs views and opinions in a social-economical timeframe and describe events which influenced his ideas on architecture.

IN LIFE YOU MUST FIND YOUR OWN WAY

Johannes Fake Berghoef was born on the fourteenth of March 1903 in the, at that time, small village of Aalsmeer. As he describes in the manuscript of his autobiography he grew up in 'a small world with a hardworking, dedicated to their craft and socially interdependent community'.[5] Together with the flower export, the town of Aalsmeer grew, meaning that there were always buildings under construction.

During his years at high school, Berghoef commuted along the sands where Amsterdam (oud) Zuid was being constructed and over time his fascination for the emergence of the new city grew. In 1920, at the age of seventeen, Berghoef visited a work of J.J.P. Oud which was recently constructed near Aalsmeer. The building, heavily inspired by Frank Lloyd Wright, made a great contrast with the other houses in the town and intrigued Berghoef. In conversation with his uncle he enthusiastically drew a plan of the stairs to which his uncle replied: 'Why do you want to study shipbuilding and why not architecture?'. After a summer of overthinking, before the start of his last year of high school, Berghoef told his father he wanted to be an architect. According to Berghoef, his father replied with: 'In life you must find your own way'[5].

THE ETERNAL STUDENT

After four years of study in Delft Berghoef returned to Aalsmeer for two years, where he realized multiple smaller buildings. An attempt to graduate architecture in 1927, and start with a study urbanism, stranded when he was called back to Aalsmeer again to design an extension to the flower auction. Afterwards, Berghoef settled as practicing architect in Aalsmeer but kept in contact with the faculty in Delft and the 'Bouwkunde Studie Kring' ('Architecture study group') B.S.K.[6] After a few years of small assignments due to the economic downturn of the thirties, Berghoef combined his work as architect with a job as assistant at the TU Delft and teacher of the course for Secondary and Higher Architecture Education at the Academy of Amsterdam. Before becoming a teacher at the TU Delft in 1947, Berghoef officially graduated architecture school, twenty-five years after he started.[7]

BOUWKUNDE STUDIE KRING

During his periods of absence at the TU Delft, Berghoef remained in contact with fellow students and professors mainly through his membership of the B.S.K. The B.S.K. was founded in 1925 by Samuel van Emden and Hans van der Laan.[8] It consisted out of twelve students each representing a different sector of the building industry. Contrary what was customary, members of the group represented a diverse spectrum of religions or worldviews. Meetings of the B.S.K. had a contemplative character. Discussions mainly regarded architecture although other forms of cultural expression were sometimes reviewed.

Even though the B.S.K. started as a student initiative, it became clear that a chairman was preferable. After several failed attempts to elect one of the members as chairman, professor Granpré Molière - who was inaugurated two years before - agreed to chair the meetings provided that the meetings were held at his home. Besides the substantive conversations, the B.S.K. became a source of friendly relations. It was common for members to cancel their membership after graduation, yet Berghoef succeeded Granpré Molière as chairman of the group.[8]

The B.S.K. continued to exist as place to exchange thoughts in an undogmatic atmosphere until polarization of the architectural debate also reached this informal company. By jeopardizing the free exchange of ideas, polarization led to the downfall of the B.S.K.[9]

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5. Berghoef, [Herinneringen]. p.47
6. Mertens, 1982. p.4
7. Bosch-Meyer, 2016 p
8. Unknown, [Speech on the occasion of BNA kubus ceremony Berghoef] 1982. p.1
9. Unknown, [Speech on the occasion of BNA kubus ceremony Berghoef] 1982. p.2

RELATION WITH GRANPRÉ MOLIÈRE

The B.S.K. meetings proved influential on the formation of ideas on architecture by Berghoef. Not least because these meetings meant one of the earliest contacts between Berghoef and Granpré Molière. Jan Marinus Granpré Molière would become known for his outspoken ideas about architecture in the coming years and is usually considered to be the theoretical founder of the delft school. To describe their relation as student-teacher would be short sighted and besides that largely inaccurate as Berghoef had finished most of his studies under the guidance of professor Evers and professor Klinkhamer, before the inauguration of Granpré Molière. Nevertheless, the influence of Granpré Molière on Berghoef is considerable.[10]

The appointment of Granpré Molière as professor did not pass unnoticed by the students. His philosophical tinged inaugural address with an unusually long section dedicated to the students already hinted at the new wind Granpré Molière brought to the institution.[11] Even though they were not required to finish his study in Delft, Berghoef decided - on the advice of Hans van der Laan - to follow courses given by Granpré Molière. The reason for this was, among other things, that Berghoef missed more intensive supervision from his current professors during the last part of his study. The course by Granpré Molière differed from its contemporaries in terms of its general validity, simplicity and serenity, according to Berghoef.[12] Whereas the teaching of architectural design used to be based on historical form theory and architecture criticism which was depended on the ideas of the respective lecturer. According to his autobiography, the aesthetics seminars from Granpré Molière helped Berghoef to find his way through the chaos of the concepts of culture, art and beauty.[13] It was during this year that Berghoef visited the settlement in Vreewijk, designed by Granpré Molière, Verhagen & Kok. The peaceful village character, the intimacy and the mild humanity of this residential area, left a lasting impression on him.[14] Even during the years that Berghoef did not spend much time in Delft due to his activities for his architectural practice in Aalsmeer, he continued to attend speeches of Granpré Molière as his ideas on design deeply interested him.[15]

From 1935 till 1938, Berghoef held the position of assistant of Granpré Molière. In this function he prepared lecture materials and together with Granpré Molière he assisted students in the drawing room.[16] They developed a friendly relation certainly when Berghoef himself was appointed professor in 1947 and they could relate as colleagues. Starting from one of the first meetings between the two architects - when Granpré Molière (then forty years old) mentioned the similarity he saw between his work and Berghoefs (age twenty-two) bachelor graduation project – and increasingly over time, the influence of the two architects can be called mutual. Nevertheless, the image of it Granpré Molière as the great ideologist is justified. But it was Berghoef who knew how to combine theoretical views with current social tendencies and to put them into practice.[19]

FOREIGN INFLUENCES

Another way Granpré Molière influenced Berghoef during his studies, is by initiating a study trip to Italy. Together with Van Embden and Granpré Molière, Berghoef visited Verona, Venice, Ravenna and Bologna. On his own he continued to Florence, San Gimignano and Siena. The latter city, known for its brick architecture, became his favorite.[15] The fascination for Italian architecture remained an important theme in the life and work of Berghoef. During his time as teacher at the TU Delft he himself guided several study trips to Italy and characteristics of the architecture of Siena are reflected in several of his works.

During the nineteen thirties Berghoef wrote a number of articles on Scandinavian architecture. For example on the National museum of Copenhagen (Morgens Clemmensen) and the headquarters of the Building society of Stockholm (Sven Markelius).[16 &17]
In preparation for the competition entry for the city hall of Amsterdam Berghoef made a comparative analysis of the relationship between floor plan, building mass, hall or inner courtyard and hall composition of many Scandinavian city halls. The Scandinavian architecture continued to inspire Berghoef. He even invited the major of Hengelo to Sweden to study the city hall of Stockholm, as source of inspiration for the townhall of Hengelo.

Besides his fascination for Italian and Scandinavian architecture, Berghoef was influenced by the work of German architects Paul Schmitthenner and Heinrich Tessenow. During a visit with Jo Vegter to the family house of Schmitthenner, Berghoef was impressed by the jovial homeliness Schmitthenner had captured with his choices for form and construction.

The architects kept up correspondence and even during the war Berghoef collected publications of Schmitthenner, whose architecture he admired for his purity and clarity. Tessenows work appealed to Berghoef as it was an example of simple and adequate residential architecture. It proved to Berghoef that residential architecture is characterized by a wide undertow of architects who aim for a timeless design which is hardly influenced by contemporary fashions.[18]

In his course on residential architecture (1962),[18] Berghoef used the architecture of Tessenow and Schmitthenner as inspirational example. In this way these architects did not only influence the work of Berghoef, but might have enthused many students.

10: Granpré Molière, 1924.
11. Bosch-Meyer, 2016. p.79
12. Berghoef, BERX s174 (0577)
13. Berghoef, BERX s174 (0577)
14. Bosch-Meyer, 2016. p.80
15. Unknown, [Speech on the occasion of BNA kubus ceremony Berghoef] 1982. p.?
16. Berghoef, 1938 b
17. Berghoef, 1938 c
18. Berghoef college: Seminar Het woonhuis (1962/63). BERX s145 (0573)
19. Buijtenen, 1994. p.12

COOPERATION

Besides the influential relationship with Granpré Molière and foreign inspiration, Berghoef worked together with many architects during his career. These cooperation's have to a greater or lesser extent influenced his work. Already during his first years in Aalsmeer he cooperated with his fellow student Frédéric H. H. Moquette during different housing projects and together with fellow B.S.K. member Van Embden he designed an extension for the flower auction in Aalsmeer.

In 1930 Berghoef submitted a competition entry together with Johannes Vegter for the new city hall of Amsterdam. Due to many delays, some caused by the second World War, the competition took over thirty years and many redesigns.[20] In a speech at the awarding of the BNA Kubus to Berghoef, an unknown speaker recalls a lecture by Vegter and Berghoef at the Haagse Hogeschool. At the Haagse hogeschool architecture was taught according to the principles of The Stijl. The guest lecture by Berghoef and Vegter on the value of materials and the relation between construction and form was according to the speaker very well received by the students.[21]

Besides the occasional cooperation during the first years of his career, Berghoef formed an architectural firm together with Hein Klarenbeek (1915-1997) from 1949 till 1962. Afterwards two younger architects, Jacobus Hondius and J. Lamers filled the position of Klarenbeek until the retirement of Berghoef in 1970.[22]

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20. Unknown, [Speech on the occasion of BNA kubus ceremony Berghoef] 1982. p.3
21. Unknown, [Speech on the occasion of BNA kubus ceremony Berghoef] 1982. p.5
22. Bosch-Meyer, 2016. p.74

BERGHOEFS VISION ON ARCHITECTURE

On the basis of the articles, lectures and speeches Berghoef wrote and gave during his life, a reconstruction of his view on architecture can be made. To start, Berghoefs view on the function of architecture in general is analyzed. Then the way in which this vision is reflected in the work of Berghoef is formulated, before specifying the consequences for the aspect of materiality.

"Grosso modo kan men stellen dat architectuur en stedebouw op redelijke wijze dienen te voorzien in menselijke en maatschappelijke behoeften aan onderdak, maar tegelijk geven zij daarmee een concreet beeld van de samenleving in haar structuren, strevingen en potenties." ~Berghoef, 1981[23]

Translation: "In general one could state that architecture and urban design should reasonably provide the human and social need of shelter, yet simultaneously they provide an image of society and its structures, ambitions and potentials."

As evidenced by this statement from Berghoef, he sees the function of architecture as not merely to provide mankind with shelter but also to provide an account of society's structure and aspirations. Architecture can express social hierarchy, influences of religion and ideology, the level of prosperity and technical progress.[25] The self-evidence of this relation, according to Berghoef, is challenged by industrial expansion and advances in science as they contribute to the depersonalization of the build environment by neglecting tradition.[26]

From Berghoefs writings comes forward that he considers architecture not only to be representative but to have a circular relation with society: Architecture functions as the mirror of society, yet at the same time architecture is the basis for the further development of society.[24] The role of the architect is to be an interpreter of the social order and human coexistence and create architectural cultural space as a framework for the further development of society.[27]

This view on architecture might be explained most illustrative by Berghoef during his speech 'Het onzienlijke in de bouwkunst' [28] which he gave in honor of the 110th anniversary of the University in Delft. According to Berghoef, similar to the way the purpose of a meal can vary from satisfying hunger to a delicate culinary experience, the meaning of a house can differ from providing shelter to creating ones own world. Within this world one can arrange his life according to his desires, set his own rules and appropriate the space accordingly. Resulting in the particular situation where one feels free within an enclosed space. The wall enclosing the space is not merely meant to exclude others, but is also a sign of the togetherness of the ones enclosed.

As for public events or gatherings we desire a building which not only provides enough space, but also is representative of the ongoing processes inside, in a similar way as the house shelters and represents the family. By their design, theaters represent the cultural significance of the plays inside, governmental buildings represent governance and churches represent faith. To achieve this recognizability, we seek for more in a building than usability. We seek beauty and character. Beauty is determined by the buildings condition, its relation with the surroundings, if it is properly positioned and if it is pleasingly materialized. The character exists of two factors: on the one hand what makes the building a symbol of its social significance, on the other, that which lends individuality to a building6. Berghoef mentions the city hall of Delft as example: the building is unique, yet recognizable as city hall even to somebody visiting Delft for the first time.

In summary, Berghoef understands the relation between architecture and society as closely linked whereby buildings should be built not only for practical use, but shaped in accordance with the nature and meaning of their purpose.[29]

This process of shaping a building is described by Berghoef as a matter of searching, questioning and testing until a main structure is derived from the design brief. This phase is followed by a period of adjusting and improving until in the last stage the aesthetic properties can be critically assessed and adjusted.[30]

"Omzichtig, geleidelijk vaart hij aldus weg uit het vage en duistere, dat hem aanvankelijk omringt en bedrukt en uit het on- volledige en wankelbare dat hij pijnlijk aanvoelt met de hoop het bepaalde, het heldere, het volle, het reële, het onwrikbare te bereiken". ~Berghoef, 1947

Translation: "Cautius, gradual he sails away from the vague and dark which initially surrounds him and from the incomplete and faltering which he painfully senses with the hope to reach the certain, the clear, the full, the real, the unflinching."

As stated by Berghoef, the main structure of the building is derived from the function. Yet the finalization of the design is a more intuitive matter which Berghoef approached in an undogmatic way. He qualified the use of principles in this phase as precarious as they are often thought of afterwards or evaporate during the process.[31] Nevertheless, it is certainly possible to identify themes in the work of Berghoef, through studying his lectures, articles and designs.

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23. Berghoef, 1981 p.74
24. Bosch-Meyer, 2016. p.89
25. Berghoef, 1980. p.58 Cited in Bosch-Meyer, 2016. p.87
26. Bosch-Meyer, 2016. p.87
27. Berghoef, 1958 p.513
28. Berghoef, 1952
29. Berghoef, 1952 p.9
30. Berghoef, 1947 p.14
31. Berghoef, BERX s174 (0577)

CONTINUITY AND INNOVATION

Starting from the idea that architecture should represent society, Berghoef regards design as place and time dependent. Therefore each design starts with a thorough study of the current situation and local society. Local traditions can function as useful inspiration for the architect and establish a connection between the new building and its context.[32] The design should build from these traditions as 'tradition holds the best that previous generations have achieved'.[33] Yet as society is changing, architecture should reflect these developments and innovate correspondingly. This vision materializes in Berghoefs work by adapting local or historical building characteristics and applying them in a contemporary way.[34] Thereby connecting continuity with innovation.

The presence of traditional elements in his work could be criticized as to arise from 'the will to form'. However, Berghoef did not classify his architecture as the materialized concept of an ideal architecture. He distinguished two ways of shaping architecture: the beautiful compositional form and the practical human dimension. He used the latter as in his view the usability and functionality of buildings is essential.[35]

DIFFERENCE WITH DELFTSE SCHOOL

Seen Berghoefs careful use of the notion of principles and his rejection of the idea of an ideal architecture we can conclude he did not like the idea of prescribing one type of architecture. Yet he is often considered a key member of the dogmatic architecture movement the 'Delftse School'. It is certainly true that the work of Berghoef resembles many of the characteristics of the movement led by Granpré Molière, nevertheless there are some important differences mainly in the underlying philosophy.

The 'Delftse School' is generally conceived as a reaction to functionalism and emerges during the third decennium of the twentieth century. The movement is part of a larger traditional movement in the Netherlands but is often mentioned separately due to its clear roots at the University in Delft. The movement which is headed by the ideas of professor Granpré Molière is characterized by the use of brick and wood, the application of high gable roofs and relatively closed buildings.[36] As explained by Bosch-Meyer (2016) and Colenbrander (2013) a precise description of the Delftse School remains difficult since the generally known image of the Delftse school seems to be a historiographic construct which the movement did not improve by a self-formulated manifesto.[38]

The application of traditional elements is inspired by the unpretentious rural architecture from the eighteenth century when farms and towns were designed and build using local craftsmanship.[41] Leader of the movement Granpré Molière spend the complete first decade of his professoriate studying the fundamental and aesthetical aspects of architecture in aim to find a design language which would proof timeless.[37] Whereas some fear the restrictions of a prescribed form language, Granpré Molière feared the opposite: to not help forward art by studying generally valid principles of shape.[42] As Berghoef did not aim for time-less but timebound architecture, this is where the Delftse School and Berghoef part ways.

Remarkable is that Berghoef did not contribute to the debate around the movement of the Delftse school - nor his alleged participation - until he was 78 years old. Informal correspondence with Jan P. Kloos and old study friend Samuel van Embden, encouraged Berghoef to pore upon the phenomena of the Delftse School. He wrote: "What the Delftse School was accused of was that it was traditional and anti-progressive: in terms of design, construction technology and choice of materials, both mentally and politically. ideological. The latter sometimes resulted in the suspicion that the Delftse School was 'wrong'; but even without this it was already a heap of accusations.[39] Berghoef did not agree with the definition of the Delftse school he found in literature, nor did he consider himself a representative of the Delftse School.[40]

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32. Berghoef, 1934 p.135
33. Bosch-Meyer, 2016. p.98
34. Bosch-Meyer, 2016. p.92
35. Bosch-Meyer, 2016. p.91
36. Blijdenstijn & Stenvert, 2004.
37. Berghoef, 1958 p.516
38. Bosch-Meyer, 2016. p.68; Colenbrander, 1993. p.
39. Berghoef, BERX s174 (0577) Brief aan Samual van Embden
40. Berghoef, BERX s174 (0577)
41. Blijdenstijn & Stenvert, 2004.
42. Granpré Molière, 1953 p.13

TRANSLATION TO MATERIAL

In the previous paragraphs a theoretical description of Berghoefs vision on architecture has been set out. In the upcoming chapters the relation between this theoretical vision and the practical issue of material use and composition is studied. A thorough understanding of this aspect of the work of Berghoef contributes to a precise valuation of the police station in Middelburg. Furthermore, this knowledge is important to make a redesign which respects the original work of Berghoef.

HISTORIC ELEMENTS

Motivated by the idea that architecture should build from tradition, Berghoef aimed to find connection with the historic context of his buildings. He did not groundlessly copy historic elements but selectively chose to which traditions he referred by applying elements that symbolize the preservation of a tradition. This materializes in the application of shapes or elements both in façade and in plan which Berghoef felt represented certain building types.[43]

In case of townhalls this is the presence of a large central hall which symbolizes the meeting of citizens and government. The publicly accessible high central halls in Berghoefs townhalls are flanked by the boardrooms and in this way diminish the boundary between government and society.
Second, Berghoef stresses the continuity of the function of townhall as landmark by providing his townhalls with a tower. The inspiration for the tower, especially clear in his design for the townhall of Hengelo, is derived from Italian townhalls (figure 1). Italian brick architecture has fascinated Berghoef throughout his career. The townhalls of Aalsmeer and Hengelo resemble this architecture in a reduced manner (figure 2).[46]

The application of shapes which are associated with historic townhalls grant the building its cultural significance according to Berghoef. An abstraction and anonymization, prescribed by modernism, do not comply with the cultural function of this building type.[47]

A similar tactic was applied by Berghoef in the design of large-scale housingprojects in the polder of Wieringermeer. As a compromise between the need of mass-production and the aspect of historic craftsmanship he valued in the architecture of rural villages, Berghoef sought for an essential reproduction of rural architecture characteristics. For the Wieringermeerpolder he designed five farm types which had a reduced expression of various features of rural architecture.[48] By designing an abstract interpretation of historic characteristic Berghoef provides continuity while still aiming for innovation by mass-production.



FIGURE 1. PALAZZO PUBBLICCO SIENA



FIGURE 2. CITY HALL HENGELO

43. Bosch-Meyer, 2016. p.97
46. Bosch-Meyer, 2016. p.344
47. Bosch-Meyer, 2016. p.197
48. Colenbrander, 1993. p.61

IDENTITY OF COMMUNITY

As a result of Berghoefs opinion that architecture should reflect society, he often aimed to represent the identity of the local community into his buildings. This is especially the case with townhalls, which he sees as the culmination point of urban life. To achieve a connection with citizens and enhance the position of the townhall as representor of local society, he cooperated with artists which would enrich the buildings with site-specific works of art.[44]

For example the central hall of the townhall of Wieringermeer depicts several scenes from the drainage of the Wieringermeerpolder, agriculture, tragic incidents of the Second World War and the reconstruction. The artworks serve to elevate the townhall above a normal office building. In the police station in Middelburg an abstract wall drawing of the cityscape of Middelburg had a similar function (figure 3).

"If a town hall wants to be more than just a useful office space for an administrative apparatus, then it has to reflect something of the nature of the community, which is always more than an arbitrary collection of individuals. " Berghoef [45]

SIMPLICITY

In many publications Berghoef stresses his preference for simplicity in architecture.[47] Subsequently more or less all Berghoefs work is imbued with a straightforwardness which derives from his intention to represent society and tradition in its most essential form.

Representation in its most essential form does not mean a rejection of ornamentation. For his public buildings Berghoef applies simplified forms of ornamentation, inspired by Italian municipal brick architecture and local traditions to enhance the public image of a building. For housing projects, Berghoef seeks a connection with rural architecture. Characteristic elements, originally developed to meet a functional need, are guidelines in his designs.

In the article 'Bouwen op het land en in de dorpen' ('Building in rural areas and villages') Berghoef formulates his view on the relation between the simplicity of life in the countryside and the associated architecture. According to Berghoef the close relation with nature enables the villager to think in a clear way. Due to life in small communities all inhabitants understand the interdependency of their labor and the necessity of the cohesion of their society. These essential values are best represented in an architecture which is rational, clear and simple in construction, structure and shape. Beauty is to be found in those elements which radiate truth.[49]

"Het werk van den plattelandsarchitect is dus nederig, waarin besloten ligt, dat een excessief individualisme hem niet past. Hij hoeft zich niet te vermeten om van voren af te beginnen bij het vormgeven, de traditie zal hem een groote steun zijn, want daarin ligt het beste, dat de geslachten voor hem bereikt hebben. (…) Zijn werk zal rationeel moeten zijn, eenvoudig en klaar in aanleg, in opbouw en in vorm, zijn werk zal natuurlijk moeten zijn, als het buitenleven zelf. Hij zal het wezen der dingen zoeken, ook in zijn werk en hij zal de schoonheid dienen, die de 'straling van de waarheid' is." ~Berghoef 1934[49]



FIGURE 3. CITY SCAPE OF MIDDELBURG, WALL PAINTING

Translation: "The work of the rural architect is humble, in which lies that an excessive individualism doesn't suit him. He doesn't have to pretend that in designing he has to start from scratch, as tradition will be a great support to him, because in tradition lies the best that the generations before him have accomplished. (…) His work shall be rational, simple and clear in structure, organization and form, his work shall be natural as rural live itself. He shall search for the essence of things, also in his work and he shall serve the beauty which is the radiation of truth."

The housing projects Berghoef worked on during his first years as practicing architect in Aalsmeer have a similar artisanal refinement and archetypal simplicity.[50]

Besides the simplicity which typifies the form of Berghoef work, his choices in material palette, finishing and color represent a similar minimalism. The number of materials is often limited and often they are applied without a finish or paint. Due to his unfinished exemplary material palette of brick, natural stone and wood, the work of Berghoef usually has a modest color palette. This approach doesn't just mark Berghoefs style, but at the same time proofs suitable for projects with a limited budget. [51]

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44. Bosch-Meyer, 2016. p.97
45. Berghoef, BERX 356 Cited in: Bosch-Meyer, 2016. p.97
47. Bosch-Meyer, 2016. p.197
49. Berghoef, 1934
50. Ibelings, 1994 p.1
51. Berghoef, 1968. p.337

CRAFTSMANSHIP

Berghoef was a great advocate of the use of craftsmanship in the building process. Firstly, because the craft would be passed on from generation to generation and therefore is a carrier of many local traditions.[52] These traditions would mark the building and connect it to its context, which is of great importance in the view of Berghoef.

Second, Berghoef appreciates the work of craftsman as it is a remnant of the historic building process. Before the emergence of the position of architect, 'master builders' were in charge of large building projects. These master builders designed a building on outlines. They determined the general lay-out and place and size of most elements. Yet the detailing was left to the craftsmen of which personal initiative was desired. In this way, many contributed to the appearance of a building.

As craftsmen designed the detailing, the relation between material and shape was strong. The material was shaped and applied according to its nature and the construction and shape would profit from the properties of the material, most clearly visible in medieval churches. During the renaissance, a new type of architect emerged: sculpturers and painters which turned their attention to the build environment but did not have a background in crafts. According to Berghoef this led to a looser cohesion between shape and construction.

"De bouwstof moet zich voegen naar de luimen van de vormwil of wordt terwille van de bizarre effecten op bijzondere wijze bewerkt en toegepast, zonder dat van vormgeving eigenlijk sprake is."
~Berghoef 1947 [53]

Translation: The building material has to conform to the whims of the will to form or is processed and applied in a special way for the sake of the bizarre effects, without there really being any question of design.

Another result of the loose relation between form and construction was that the responsibility of the craftsman was diminished to the quality of his work, his initiative and creativity was no longer required. In contemporary architecture the construction is drawn into the finest details, parts are premanufactured and work is divided in many specializations which require little thinking.[54] Berghoef describes this as not only deplorable for the quality of architecture but for society as a whole, as many workers gain fulfillment from creating high quality work.[55]

As a twentieth century architect Berghoef could not avoid making detailed drawings of his work. Yet his stance on the richness of craftsmanship comes forward for example in an article on the construction of a youth center. He expressed great joy when the contractor had of own accord found an elegant way to conceal power lines in the limestone walls.[56] Despite the limited available budget, the detailing of the gallery of the youth centre testify to Berghoefs affinity for craftsmanship (figure 4)

During the construction of his own house, Berghoef most approached the position of master builder. For the house no specification drawings were made. With the general outlines on paper, many decisions were taken during construction.[57]

Seen the limited number of schooled craftsmen after the Second World War, Berghoef endorsed the need of mass-production and prefabrication to meet the housing need. Nevertheless he believes that restorations and public buildings deserve to be built by craftsmen. Prefabrication should be a temporary phenomenon which should become obsolete again when the number of craftsmen is back up to standard.[54]



FIGURE 4. Detailling gallery youth centre

52. Berghoef, 1947. p.9
53. Berghoef, 1947. p.11
54. Berghoef, 1947. p.12
55. Berghoef, 1950.
56. Berghoef, 1962.
57. Berghoef, 1938.

INNOVATION

Despite his preference for architecture constructed by craftsman, Berghoef saw the necessity of prefabricated housing projects to meet the great post-war housing need.

To foster the reconstruction, the Ministry of Housing set up a joint venture with investors, contractors and industrial facilities, the NEMAVO. The director of NEMAVO was H. Van Saane, who had worked with Berghoef before in Amsterdam. After a search for residential construction systems, Van Saane selected a building system designed by Edward Airey and asked Berghoef and H.T. Zwiers to adapt the system for serial production of Dutch houses.[58] The main advantage of the Airey system is that it demanded little trade skills and parts of it could be done by unskilled laborer's although it was advised that they were guided by a bricklayer.

The facades of the Dutch Airey system consist of precast concrete columns and cladding panels which are arranged on a grid. Windows were set flush with the façade panels, leading to a flat appearance. To contest the limited plasticity or the 'cut out of cardboard appearance' as Berghoef named it, he worked with offsets from the building line, (recessed) balconies and tried to enliven the composition with the placement of street furniture, bushes and trees.[58]

Besides the prefabricated housing projects Berghoef realized in the NEMAVO Airey system – which he to some extent considered a necessary evil – he expressed great admiration for the inventive use of new materials as concrete and steel. This admiration was limited to constructions which use the material according to its nature. As an example, Berghoef mentions the concrete shell structures of Nervi in which form and structure synergize. The importance of the relation between form and construction which Berghoef stresses for innovative building materials is of similar nature as his appreciation for the work of medieval craftsman, where construction and shape are similarly linked.

Even though Berghoef expresses in 1947 that prefabricated construction is less suitable for public buildings due to its lack of cultural expression, prefabricated systems do make their entry in his designs for public buildings in the sixties. For example the precast concrete shells which make the roof of the office for the ANWB. Similar, the police station in Middelburg uses an innovative floor system consisting of beams and lighter infill elements, produced by the firm Dato.

Besides innovation in material use, Berghoefs work represents changes in society on a social and cultural aspect. The serial production of the farmhouses Berghoef designed provide a clear example. The houses had several features, like electricity and small kitchens to foster living in a living room, which were not common in most rural houses at the time. Seen the aim for affordable, serial produced, comfortable houses these farmhouses can be considered as a traditional variant of the Wohnung für das Existenzminimum.[59]

BERGHOEFS INFLUENCE ON ARCHITECTURE

In the previous paragraphs Berghoefs vision on architecture is explained. All that remains is to clarify his influence on the field of architecture.

To start, Berghoef aimed to pass on his appreciation of Italian and Scandinavian architecture to the next generation by guiding study trips and showing foreign examples in his lectures. But even before Berghoef accepted the position as professor, he managed to put his mark on the education in Delft. During the closure of the university due to the war, Berghoef played an essential role in the formulation of a report by the BNA on the future of architectural education. The report uitzoeken

Later he appended changes in the curriculum of the form theory. Instead of focusing on historic classical shapes, Berghoef sought affiliation with the course 'Construction of buildings' to enhance the student's awareness of the relation between form and construction.[61]

Together with van Tijen, Merkelbach and van Embden Berghoef founded the 'Studiekring voor de Woningbouw' (Study group for residential architecture). The results of several studies of the group supported Dutch architects in designing social housing in the reconstruction period.

Lastly, he is praised at the awarding of the BNA Kubus for unremitting effort to stress the great importance of historic values and how these can be of meaning in the architectural field.[60] His work continuously balances between tradition and renewal and is often maligned for that reason. Yet in recent decades this attitude is valued again and proves inspirational, as what this research also bears witness to.

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58. Spoormans, Zijlstra & Quist, 2018. p.6
59. Colenbrander, 1993
60. Mertens, 1982. p.4
61. Berghoef, 1948. p.1&2

SUMMARY

The past chapter describes Berghoefs view on architecture based on the written works about and by Berghoef. In short it can be concluded that Berghoefs ideas were shaped through his long period at the university in Delft, by receiving and giving education and discussing within de B.S.K. As well as his study trips to Italy and Scandinavia and cooperation with other architects. Throughout his career Berghoef combined the theoretical exchange of ideas in Delft with being a practicing architect.

This practical work is characterized by a traditional appearance. Berghoefs way of building from tradition is derived from a motivation to represent society in architecture, as traditions hold the essence of (local) society. Thereby his approach differs from many of his contemporaries, for example Granpré Molière. Whereas Granpré Molière searched for a timeless appearance, Berghoef worked in dialogue with the zeitgeist by using simplified, more contemporary, variants of traditional references. Later in his career, even industrialized or prefabricated building methods entered Berghoefs work. Resulting in architecture which balances between continuity and innovation. Besides society, buildings should represent their function. Therefore, Berghoef aimed to shape his buildings in such a way that one could recognize the function without knowing it. Especially public buildings should be shaped in accordance with the meaning of their purpose.

This slightly general description is further specified by identifying five characteristics of the work of Berghoef. To start Berghoefs work is usually provided with elements or shapes which are historically associated with specific functions. This contributes to the recognizability of the function and relation between form and function. Second, his work aims to expresses the identity of the community by including local customs or techniques and art displaying important local historic events. In the third place, Berghoefs oeuvre is characterized by straightforwardness and simplicity, both in composition and the use of unfinished materials. This uncomplicated approach aims to create beauty, without frills. The fourth character is the application of craftsmanship in the building process. This is derived from an appreciation for the local traits which are often conveyed through craftsmanship. Furthermore Berghoef admired architecture where the contribution of a craftsman is demanded and becomes part of the architecture. Last, especially Berghoef later works, often combine a more traditional appearance with innovative building systems or load bearing structures.

In the next chapter, four projects of Berghoef are studied in depth to see how the vision of Berghoef materializes in specific assignments.

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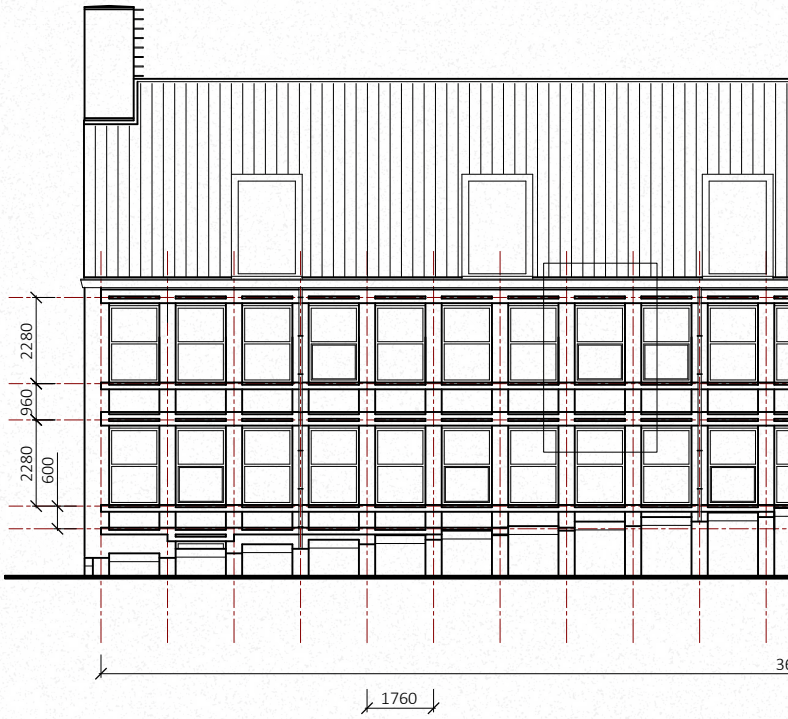
2280
960
2280
600
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FRONT (EAST) FACADE POLICE STATION MIDDELBURG

1.200

0 m 5 m

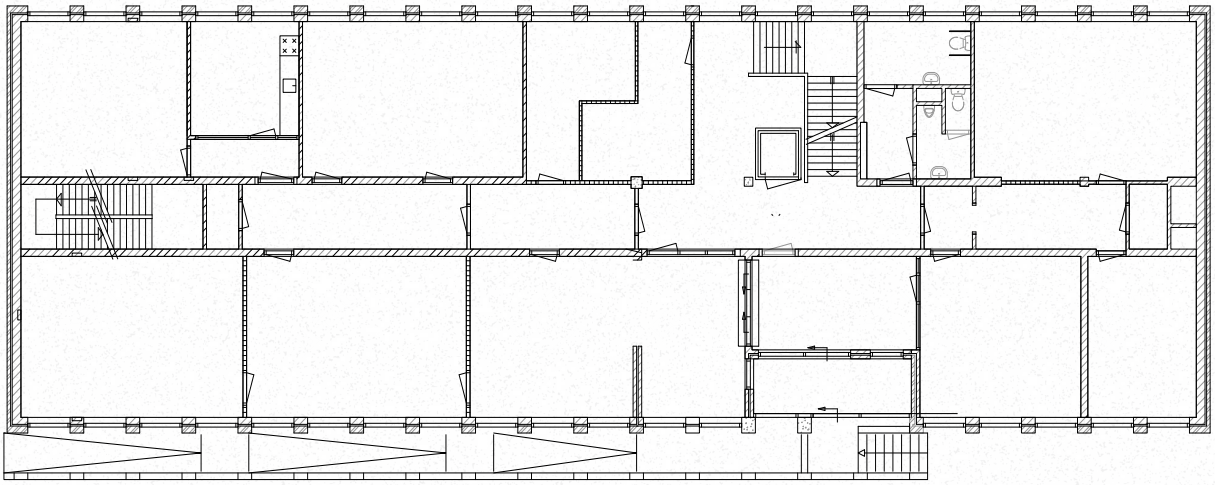


FIGURE 1. PLAN FIRST FLOOR

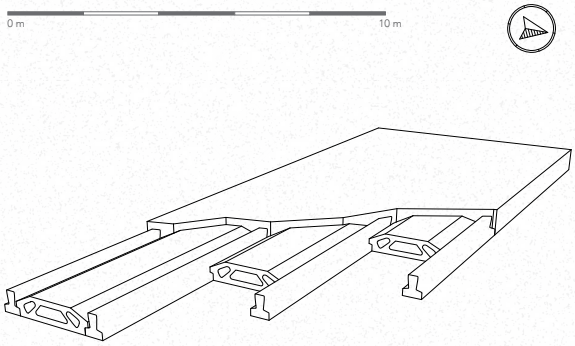


FIGURE 2. DATO FLOOR SYSTEM

The police station at Achter de Houttuinen 10 in Middelburg is designed by the architectural firm: Berghoef, Hondius & Lamers. The main architect of this firm was Johannes Fake Berghoef. The police station was completed in 1969, at a site which was formerly used by the sawing mill and woodshop Alberts. It was designed to house 65 police officers from different departments and was equipped with facilities for dactyloscopic (finger prints) and photographic investigation and a traffic scale model for education on traffic safety[1]. College

PLAN

The organization of the floors is simple. A central hallway connects all offices and serving spaces. Three stairwells, one located central in the building and two near the south facade connect the different floors. The second floor provides a large open space which is used to be the canteen and is now used for meetings. The souterrain houses detainee cells and dressing rooms. The dressing rooms were constructed during a renovation in 1990. Before this renovation, police vehicles could park underneath the building.

In 1985 a ramp and stair were constructed in front of the building to improve the accessibility. The entrance doors were moved forward and aligned with the façade at the former location of the stairs.

During a later renovation the open space south of the stairwell at the ground floor was transformed into an office.

CONSTRUCTION

The load bearing structure of the building consist of concrete and brick walls, concrete beams and a combination floor system. The roof is constructed using inclined steel I-profiles with wooden lattices. The combination floor system is produced by the firm DATO . The systems consist of small beams which are placed approximately every 600 mm. Between these beams a lightweight infill material is placed. Concrete is poured on top of these elements to obtain a lightweight stiff floorplate. The small, prefabricated elements the system consists of, enables fast construction and required lower-skilled workers. Because of the high construction demand many similar systems were developed in the years before the completion of the police station[2]. As explained in the previous chapter, the use of prefabricated building elements is an important characteristic of the work of Berghoef.



FIGURE 3. FACADE COMPOSITION

0 m 10 m

COMPOSITION

By setting the windows back 210 mm in the façade deep 'negges' are created. The masonry clearly partitions the façade in twenty-one vertical parts of 1760 mm wide. Masonry between the negges is set back 110 mm to strengthen the vertical articulation. The concrete elements create horizontal lines but hardly interfere with the vertical articulation as they are segmented according to the vertical rhythm. Together the masonry and concrete elements create a very articulated façade.

The building is almost symmetrical, but the entrance and positioning of the dormers pull the focus point slightly to the right. As stated in the local newspaper in 1962, extra care and consultation with the municipality preceded the design of the façade, seen the inner-city location of the building[3]. The nearly symmetrical composition, together with the vertical and horizontal articulation, give the building some contemporary monumental traits. It should be seen as Berghoefs way to relate the police station to the monumental buildings in its surroundings.

MATERIAL OF SURROUNDINGS

Most of the buildings surrounding the police station have facades which are made of brick combined with some natural stone elements. Some houses are plastered white and have red or blue-grey roof tiling. As the diagram in figure 4 illustrates most of the materials in the surroundings can also be found in the façade of the police station. The brown-grey tones of the masonry and cobblestones and the natural stone elements find their representation in the façade of the police station as masonry and concrete elements. After completion the concrete elements were painted in an off-white color which could have made the building match the surrounding white houses better. Most parts of the dormers are white as well, just as most dormers in Middelburg. The use of materials present in the surroundings characterizes Berghoefs work.



FIGURE 4. SURROUNDING MATERIALS

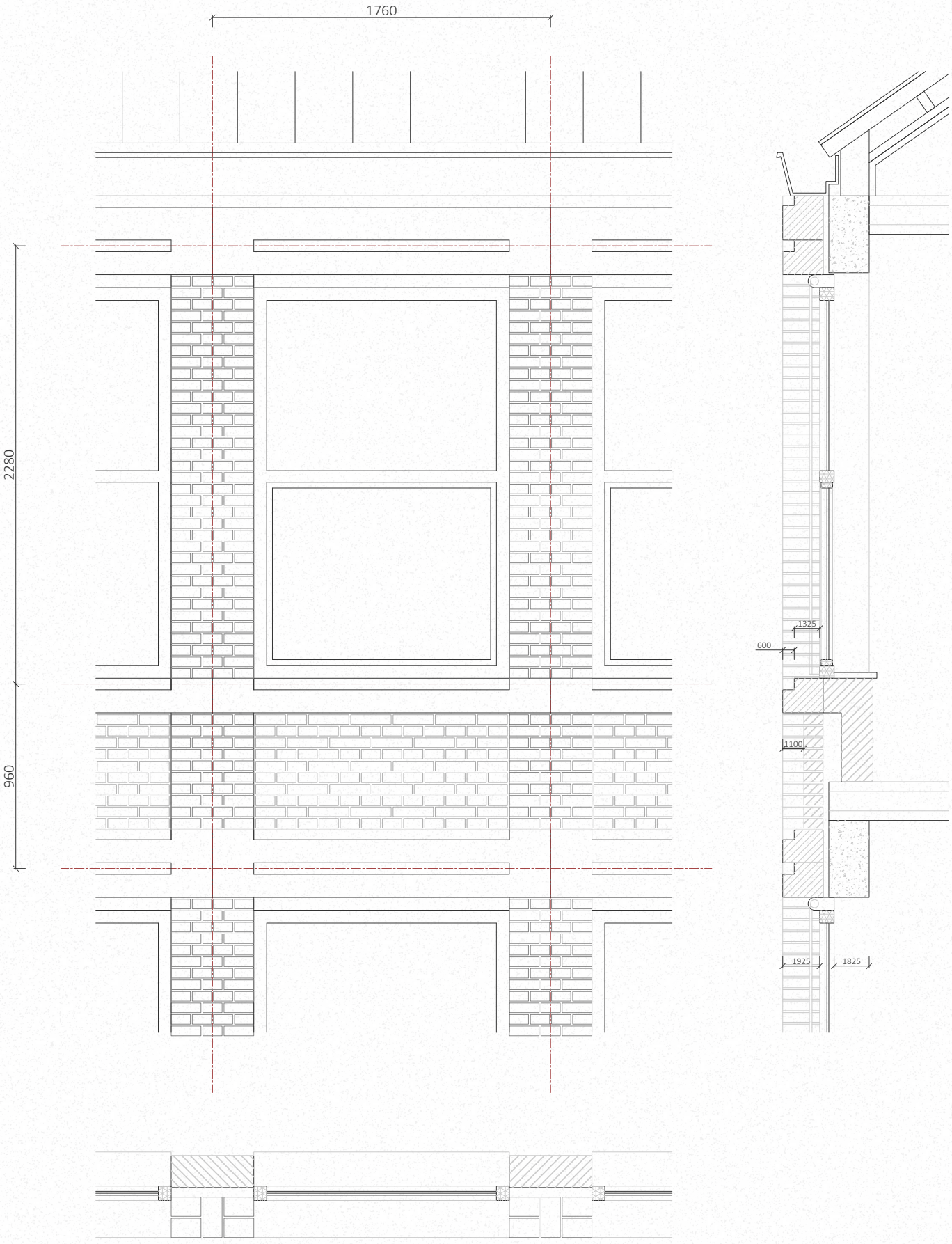


FIGURE 5. FACADE FRAGMENT

COMPOSITION
The façade is built up out of masonry and precast concrete elements. The masonry has an English cross bond. The concrete functions both as sill and lintel and used to be painted in an off-white color but is repainted in a grey-purple taint.

MATERIAL
The roof is clad with blue-grey glazed tiles. The dormers are made from brick and wood which is painted white. The window frames are painted in a bright red color. The façade close-up indicates the most used materials in the building.

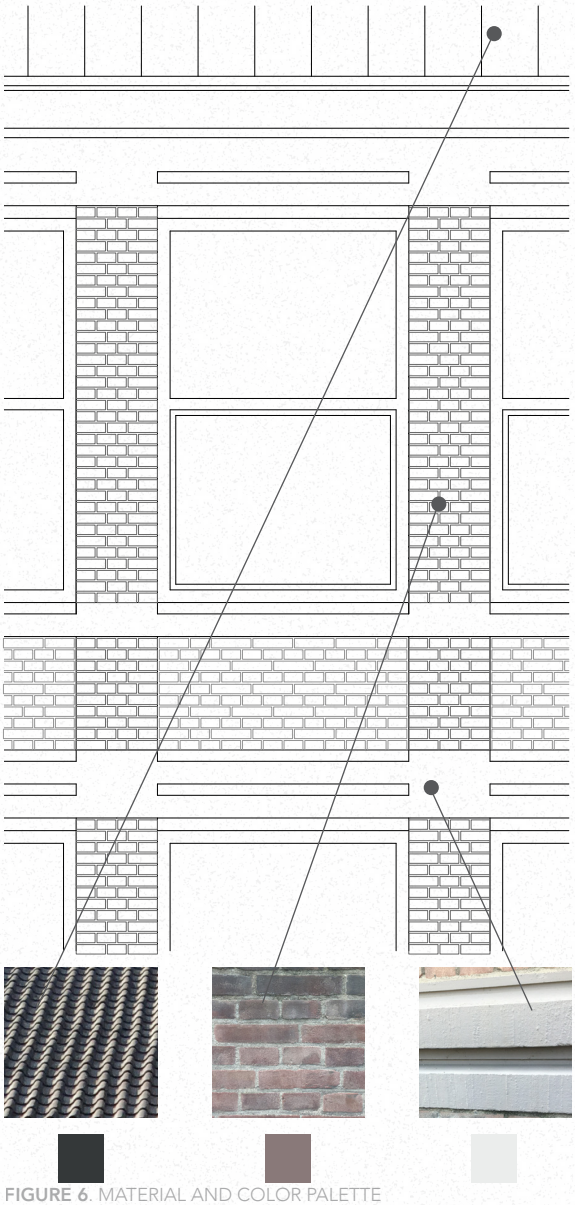


FIGURE 6. MATERIAL AND COLOR PALETTE

DEPTH
The façade of the police station has a variety of depths. The thickest elements are the masonry negge's together with the concrete lintels. 60 mm deep Inkepingen in the concrete lintels add complexity to the façade appearance. In between the negge's the masonry is setback 110 mm. The third depth-layer are the window frames. They are setback 210 mm.
The various depths in the façade create a complexity which is unseen in the other case study buildings.

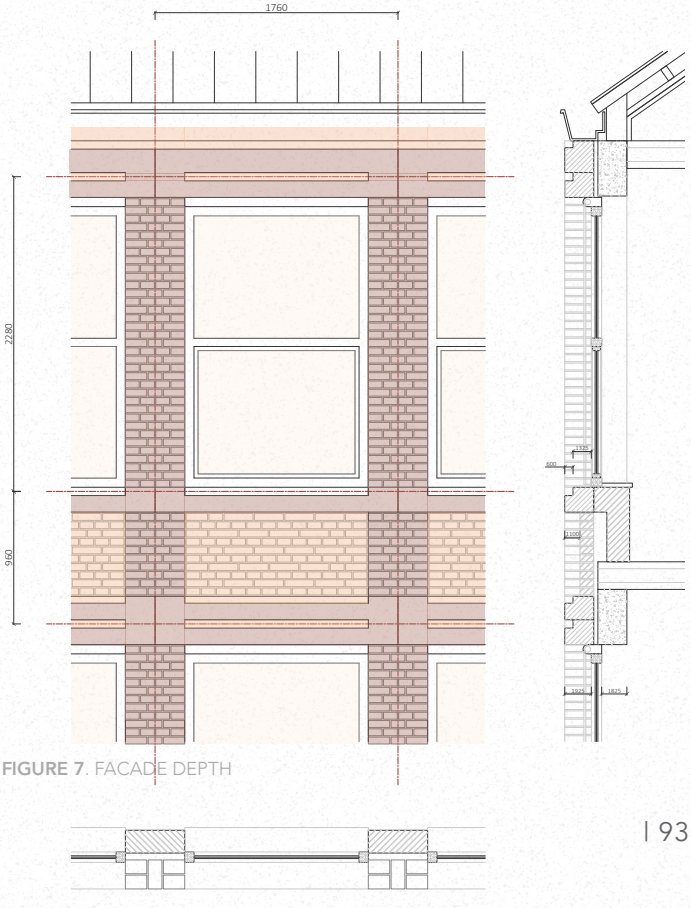


FIGURE 7. FACADE DEPTH





FRONT FACADE CITY HALL HENGELO

1.200

0 m 5 m

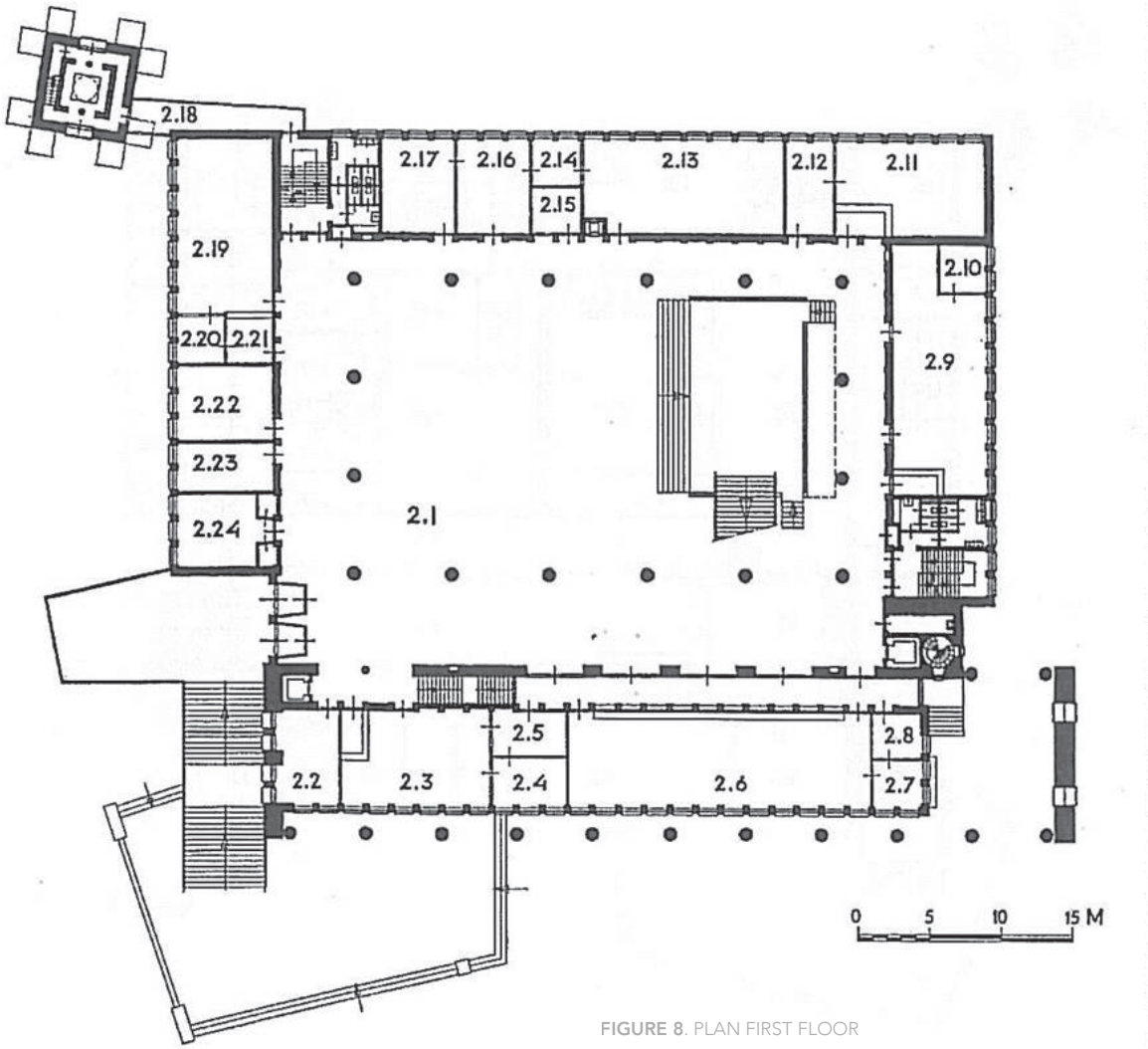


FIGURE 8. PLAN FIRST FLOOR

The city hall of Hengelo is designed after a long period of growth of the city of Hengelo. The increasing number of citizens led to expansion of the civil service and the need of a new city hall. The new city hall, designed by Berghoef and Hondius, was completed in 1963. It is planned in a slightly impoverished area of the city, to which it can function as a positive impulse.[4]

PLAN

The building consists of a tower and the city hall. As the tower was meant as a tower 'for the city' instead as part of the city hall it was constructed detached from the other building.

The city hall is built around a central covered courtyard, which functions as main hall. In the hall, public events or concerts can take place. Around it, all secretary rooms and public desks are located. On the second and third floor, the boardrooms, wedding hall and offices of mayors and aldermen are situated. The ground floor is meant for several offices, healthcare facilities and the cafeteria. By locating all functions around the central hall, Berghoef aimed to reduce the distance between the government and those who are governed. The city hall was meant as culmination point of city life for all citizens.[1]

CONSTRUCTION

The core of the construction of the city hall is a concrete skeleton, which is carefully concealed. All floors consist of prefabricated concrete beams and floorplates. The central hall is carried by a 6.8 by 6.8 meter grid. In the hall itself only the outer row of columns is used to carry the roof construction.

The buildings around the central hall use loadbearing walls constructed in brick. Outdoor walls are bricked with an orange/grey 'Brabantse' brick. The columns in the front façade and the sills are made of Muschel-limestone.

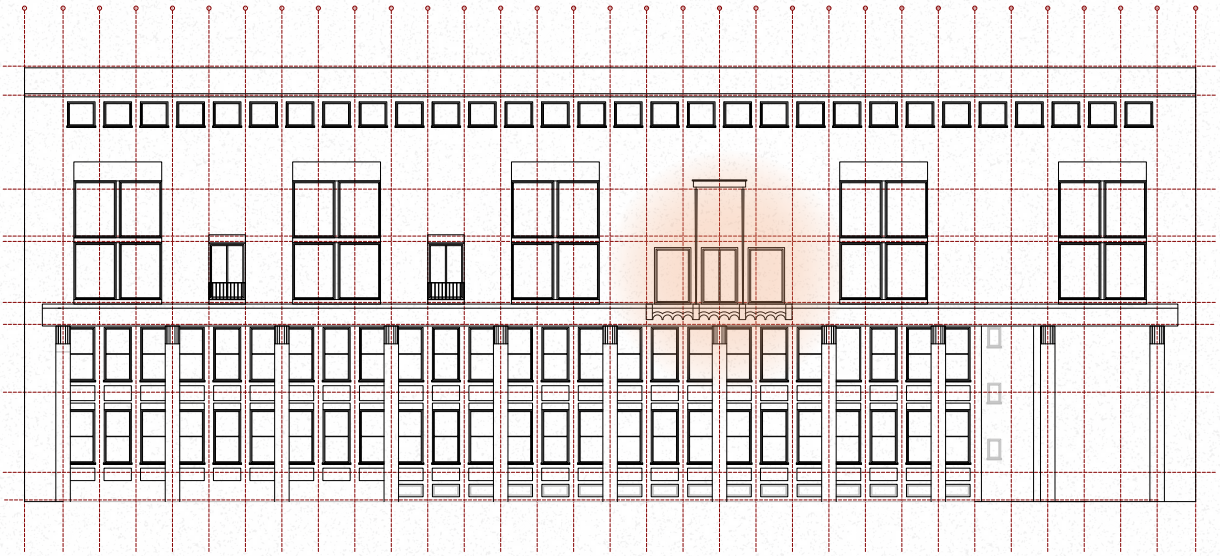


FIGURE 9. FRONT FACADE COMPOSITION

COMPOSITION

The front façade of the city hall borders on a square. The upper part is partitioned by five large window sections, with French balconies in between. Similar to the police station in Middelburg the façade has a symmetrical set-up, with an asymmetrical accent just right of the center. This accent, a covered balcony, becomes the focus point of the composition. Behind these large window sections the double height boardroom and civic chamber are located.

The bottom two floors have a façade with a smaller grain. The windows partition the façade in 1760 mm wide sections, exactly the same size as the police station in Middelburg. The window frames are set flush with the masonry, creating a flat façade image. Underneath the windows a rectangular artistic relief pattern of bricks adorns the building. Every three sections, a limestone column in front of the façade carries the load of the cantilevered boardrooms. The columns give depth to the flush façade.



FIGURE 10. POSITION IN HENGELO

MATERIAL SURROUNDINGS

Like the majority of the oeuvre of Berghoef, the city hall has masonry facades. Most of the surrounding buildings, which were there at the time the city hall was constructed, are also constructed in brick. Especially the church opposite of the city hall could have been a source of inspiration, with its masonry ornamentation. Nevertheless, the resemblance with surrounding materials is less apparent than at the police station in Middelburg.



FIGURE 11. SURROUNDING MATERIALS

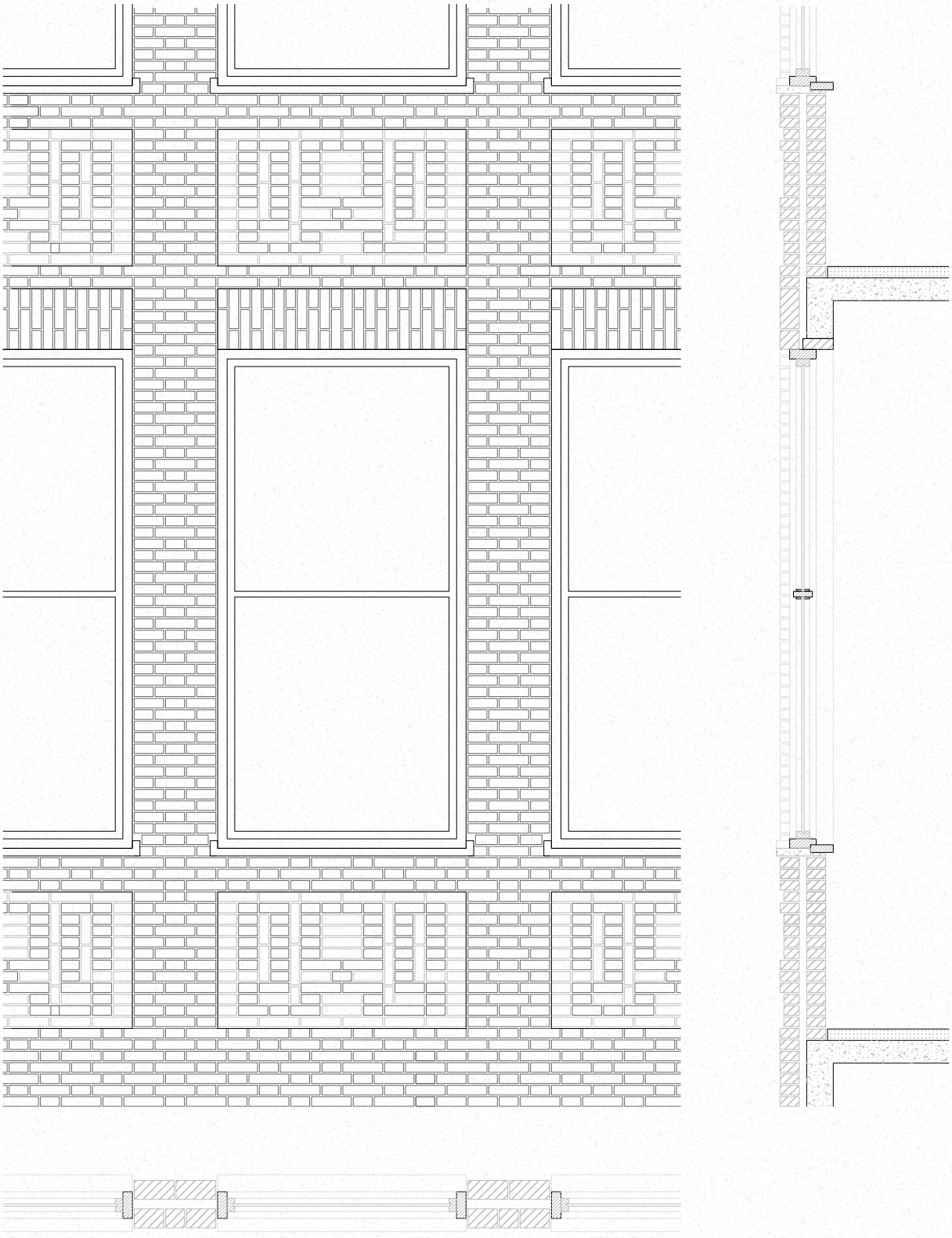


FIGURE 12. FACADE FRAGMENT

COMPOSITION
The façade of the lower two floors, shows quite some similarities with the police station in Middelburg, mainly due to the 1760 mm wide partitioning with 430 mm 'negge's'. Instead of concrete elements, all windows have a soldier-course (rollaag) above.

The façade of the lower two floors has smaller windows and partitioning then the façade of the upper two floors. The smallest module of the façade is the brick. The 'Brabantse' 180 by 88 by 53 mm brick is thicker than the common waalformaat used in the police station.

MATERIAL
The façade of the city hall is made of a rather thick, 180 x 88 x 53 mm, brick. Its surface has a relative smooth texture and an orange-grey color. The limestone lintels and columns are grey and have a smooth feel.

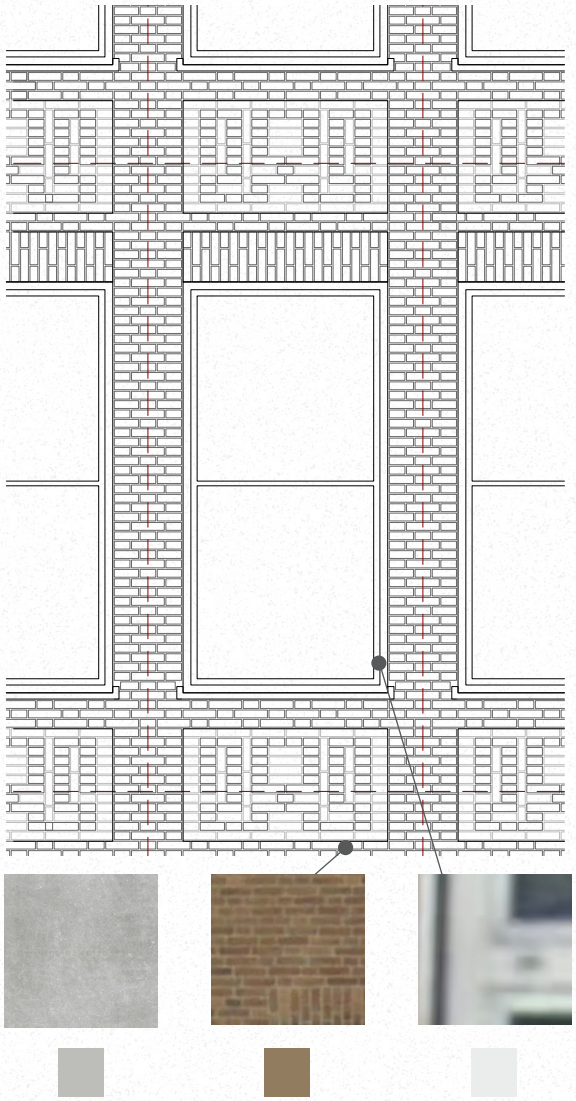


FIGURE 13. MATERIAL AND COLOR PALETTE

DEPTH
Contrary to the police station, the city hall has limited depth in the façade as the aluminum window frames are set flush with the masonry

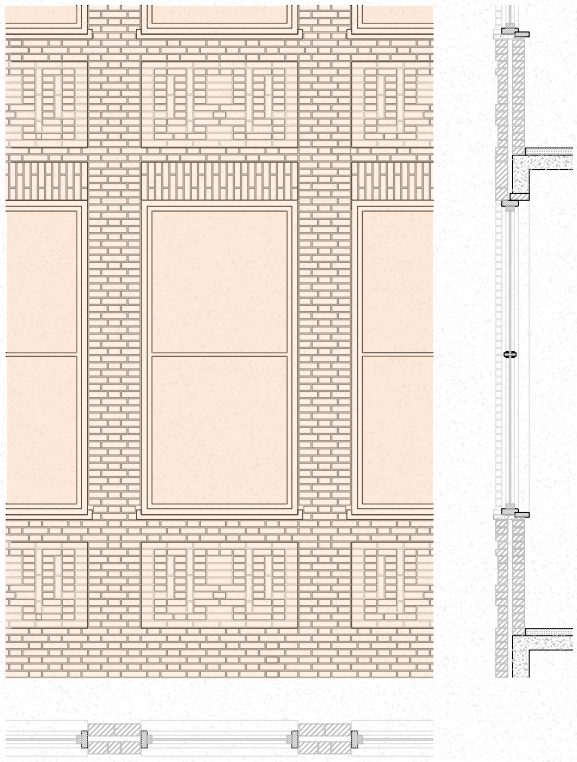
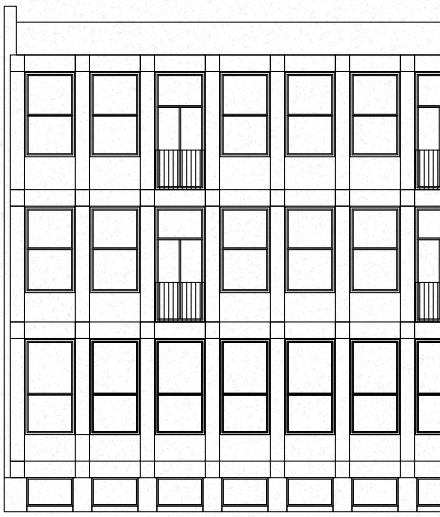
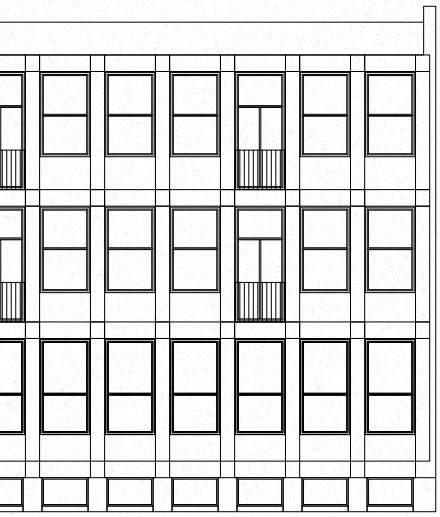


FIGURE 14. FACADE DEPTH





FRONT FACADE CITY HALL HENGELO

1.200

0 m 5 m

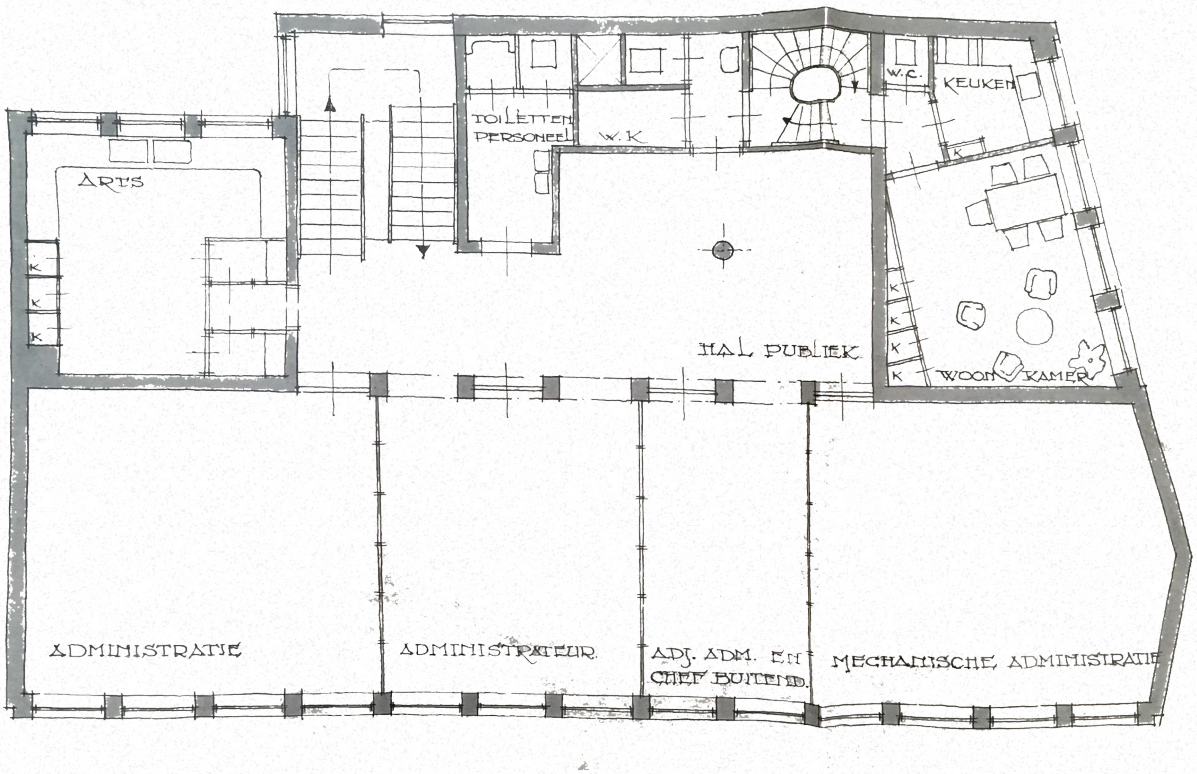


FIGURE 15. PLAN FIRST FLOOR

In 1949 Berghoef designed the new office for a health insurance company. It is located in a residential area in Alkmaar. After fifty years, the building was transformed into an apartment building. Originally the building had a service house for the janitor next to it. It is not in use as such anymore.

PLAN

In the souterrain a wardrobe and bike storage are located. The ground floor houses a large open office space and the main entrance. The first and second floor also house offices which are located near the north façade whilst the southside of the building is mostly closed and used for stairwells and facilitating spaces.

CONSTRUCTION

The three storey building with souterrain is constructed in brick. The concrete floors distribute their load on concrete beams which spread the load over the masonry facades and one inner wall. These three parallel walls stand approximately five meters apart. The sloped roof is carried by a wooden construction.
The stairs are cast in concrete but have specially made railing with a snake (health-care symbol) as finishing detail.
On the west-façade a statue is present, displaying a father, mother and child.



FIGURE 16. FRONT FACADE COMPOSITION



FIGURE 17. IMPRESSION NORTH AND WEST FACADE

COMPOSITION

The north façade of the office building houses most of the windows. It consist of 13 modules of 1720 mm wide. Three of the modules are enriched with a balcony. The composition shows great similarity to those of the city halls in Hengelo and Aalsmeer. Probably due to its modest size the composition does not have an asymmetrical focal point like both city halls. This results in a pragmatic composition with a clear rhythm which is stressed by the set-back of the windows. A similar pragmatic structure partitions the west façade in four modules.

MATERIAL

The office is located in a residential area with many traditionally designed brick houses. Most houses have red bricks and white window frames and eaves. The health insurance office has similar white wooden windows frames but a less bright color masonry.



FIGURE 18. SURROUNDING MATERIALS

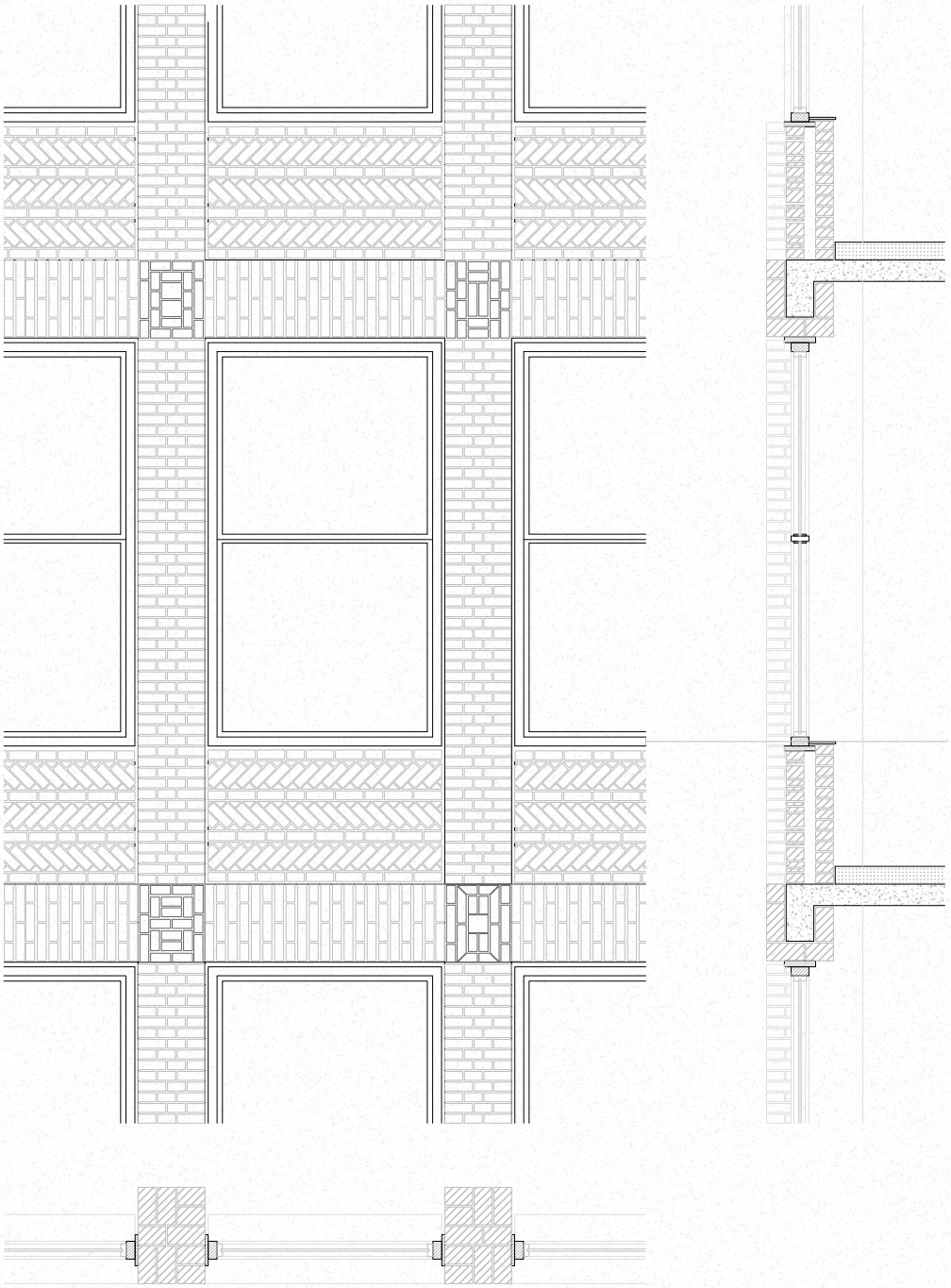


FIGURE 19. FACADE FRAGMENT

COMPOSITION
The windows are alternating with masonry penanten which are two half bricks and a 3/4 brick wide. Each corner point is enriched with a small rectangular composition of bricks. The remaining rectangle underneath the windows is filled with three rows of bricks placed at an angle, alternating with rows of half bricks.

MATERIAL
The façade masonry has different tones of brown. The window frames are white. Some detail elements like lanterns and railings are made of black painted steel.

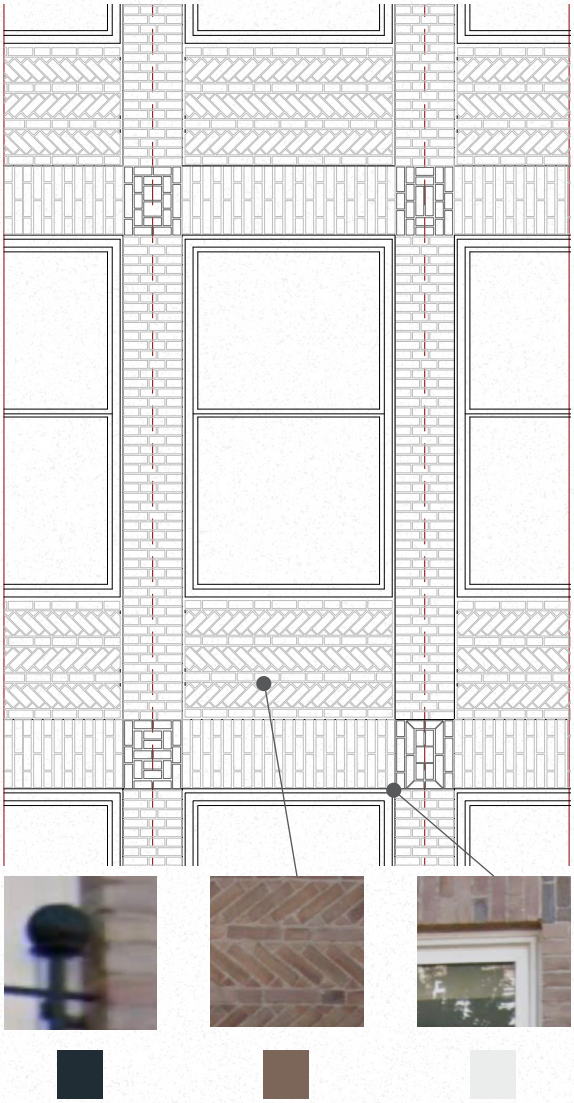


FIGURE 20. MATERIAL AND COLOR PALETTE

DEPTH
The rhythm of the façade is enhanced by the 110 mm setback of the windows and parapet underneath.

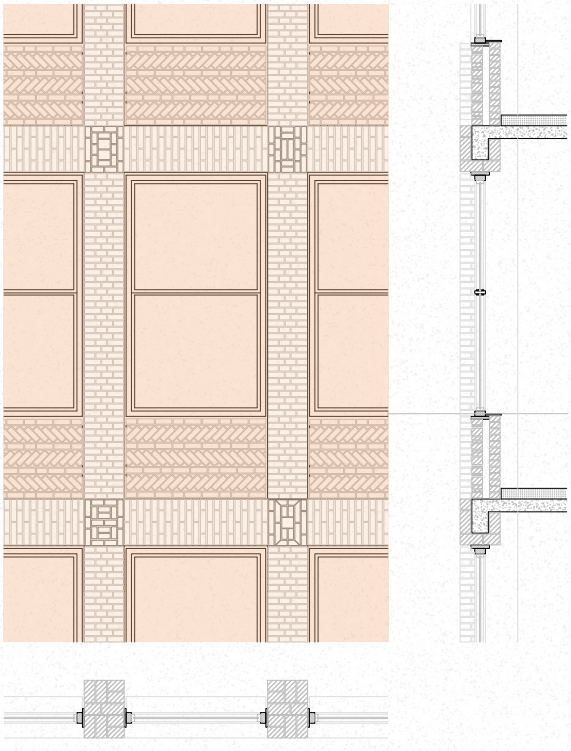
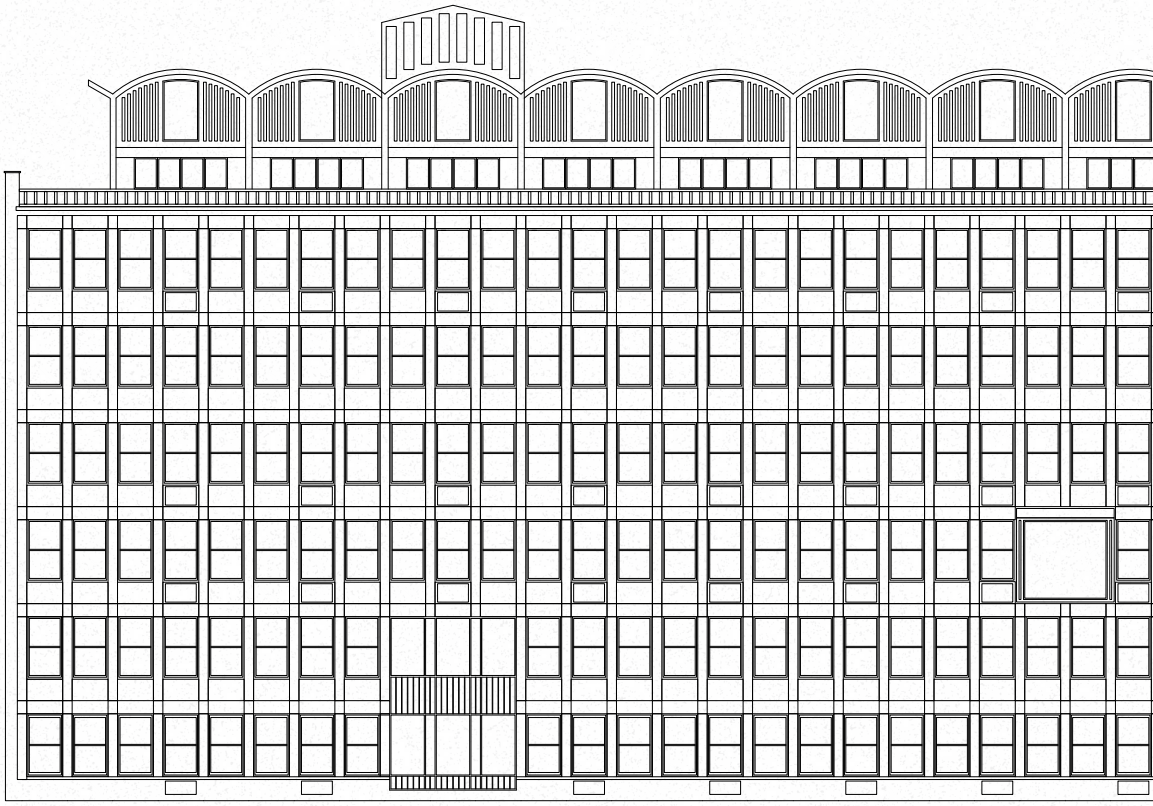
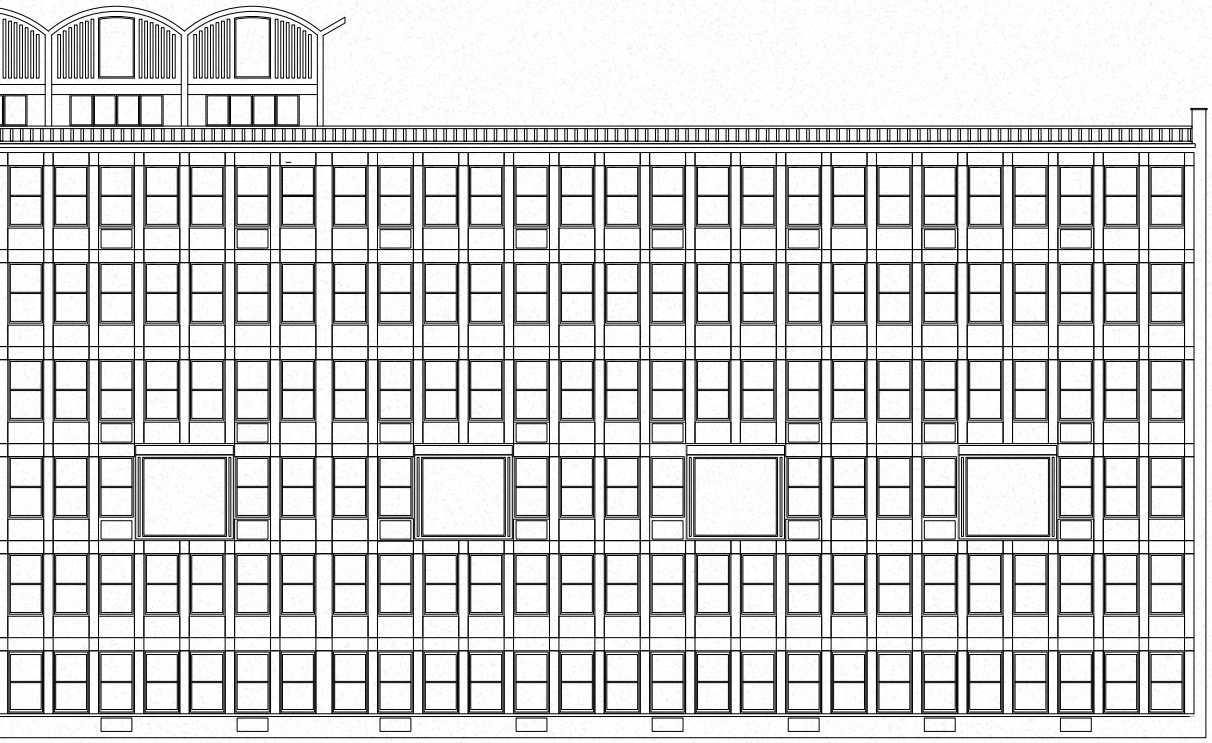


FIGURE 21. FACADE DEPTH





FRONT FACADE OFFICE ANWB

1.400

0 m 10 m

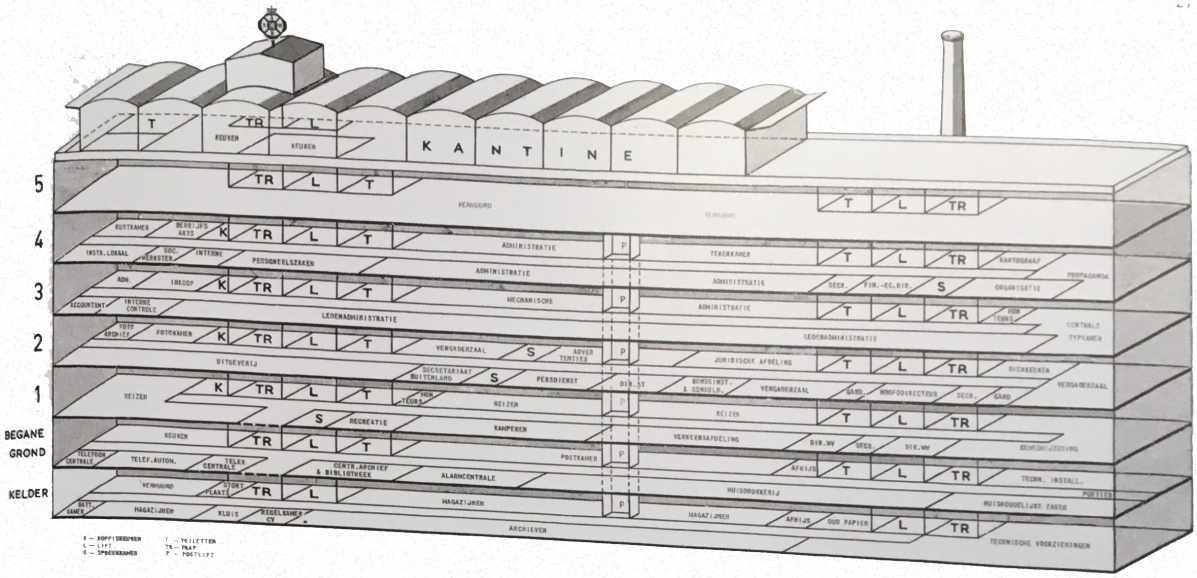


FIGURE 22. AXONOMETRIC VIEW

In 1957 Berghoef designed the new head office for the ANWB near The Haque. The ANWB is the Dutch national tourism association, In the brief they ask for an office which is 'made out of brick with a typically Dutch character'.[5] It should not be exotic in lay out or appearance and without expensive marble. Instead it should represent the association and its focus on leisure and the dynamic modern traffic.
The complex originally consisted of two buildings but has later been extend further. The rectangular volume housed the offices of ANWB employees. The cylindrical building in front, with the nickname roundabout, is used as visitor hall. The round plan and expressive concrete roof panels are meant to make the hallway a pleasant environment matching the focus on leisure.

PLAN
The six storey building has rational and open plan. All floors are connected by two stairwells and two elevators. In the basement, the archive and technical facilities are located.The ground floor is used for some central services like a post office and wardrobe. Floors one till five are all in use as office floors. Their lay out is flexible as all internal walls are easily movable. The top floor houses the kitchen and canteen and a large roof terrace to be used during lunch breaks.

CONSTRUCTION
The structure of the office in The Haque is based on a stiff concrete skeleton. Against this skeleton the rest of the offices are constructed using precast elements. The roof of the canteen on the top floor is constructed out of prefabricated concrete shells. The third floor will be a sprung floor as it houses the mechanical administration where lots of vibrations are produced. The floors span from the masonry 6,37 m towards two rows of columns in the center of the building

The facades are built with a grey orange brick. The parapets are places as one element. They are built in a hall on the building site by placing cut bricks in a mall and casting it with concrete. After their construction they were transported within reach of one of the two large building cranes which constructed the building.
In the interior, movable walls separate the different offices. By applying acoustic floor and roof finishing, a pleasant interior acoustic climate is achieved. The windows have steel frames and are placed in unpainted hardwood frames.

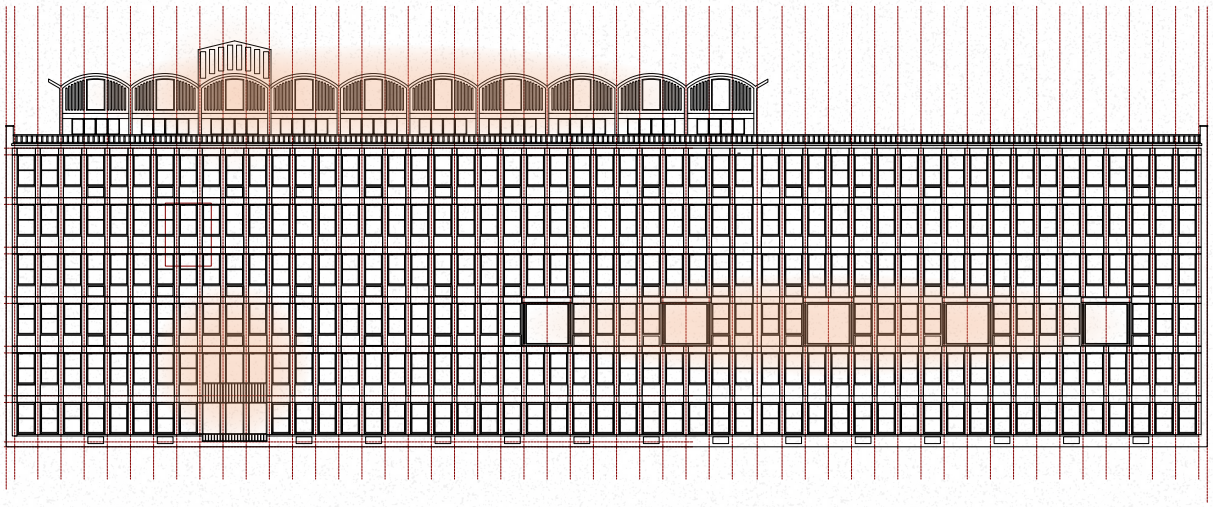


FIGURE 23. FRONT FACADE COMPOSITION

COMPOSITION

The front façade of the ANWB office consist of 51 modules in horizontal axes and 6 modules on the vertical axes. When observing the composition of the façade as a whole, it seems there are three enrichments to the repetitive façade which draw focus. To start the extra floor with its curved shell roofs. Second, the five larger windows at the right side of the building which form a counterpart of the extra storey in the composition. The third accent is the extra fences which enrich the windows on the bottom left, vertically aligned with the large logo placed on top of the building.

MATERIAL OF SURROUNDINGS

The office is located in a green area with some residential streets nearby. In these streets there are mainly traditionally designed brick houses. Most of them have dark red bricks and white window frames and eaves. The ANWB office has more of an orange/grey masonry tone which is lighter than its surroundings.



FIGURE 24. SURROUNDING MATERIALS

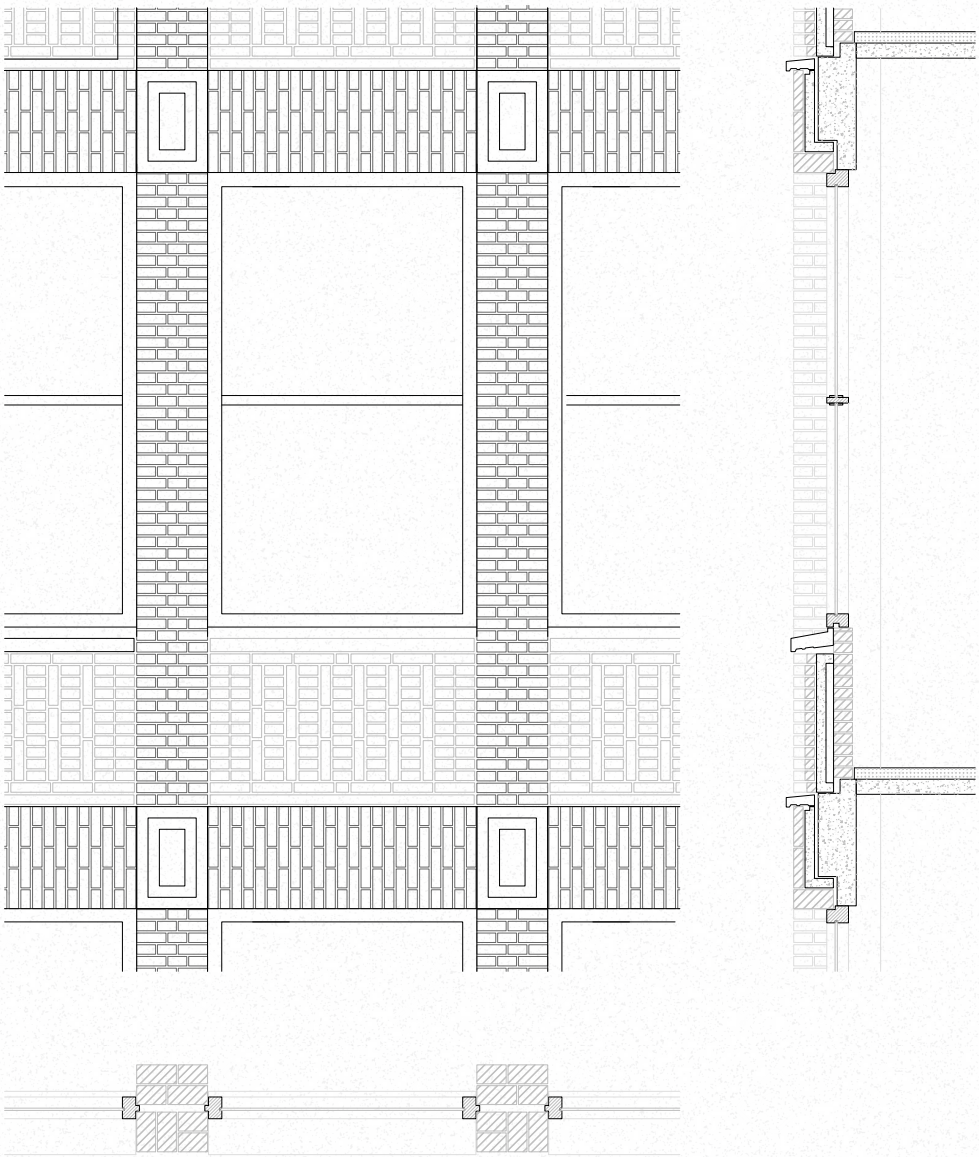


FIGURE 25. FACADE FRAGMENT

COMPOSITION
The façade modules which together create the strictly partitioned façade consist of 1420 mm wide windows alternated with 375 mm wide pilasters. Each corner point is decorated with a precast element. The prefabricated parapets distribute their weight on the ends of the concrete floors. The soldier course is attached to a concrete element which hangs from the floor. The thick floor ends spread the load over the masonry of the wall below.

MATERAL
Like for the office in Alkmaar, Berghoef uses bricks of different tones. Together with the window frames and eaves they form a modest color palette.

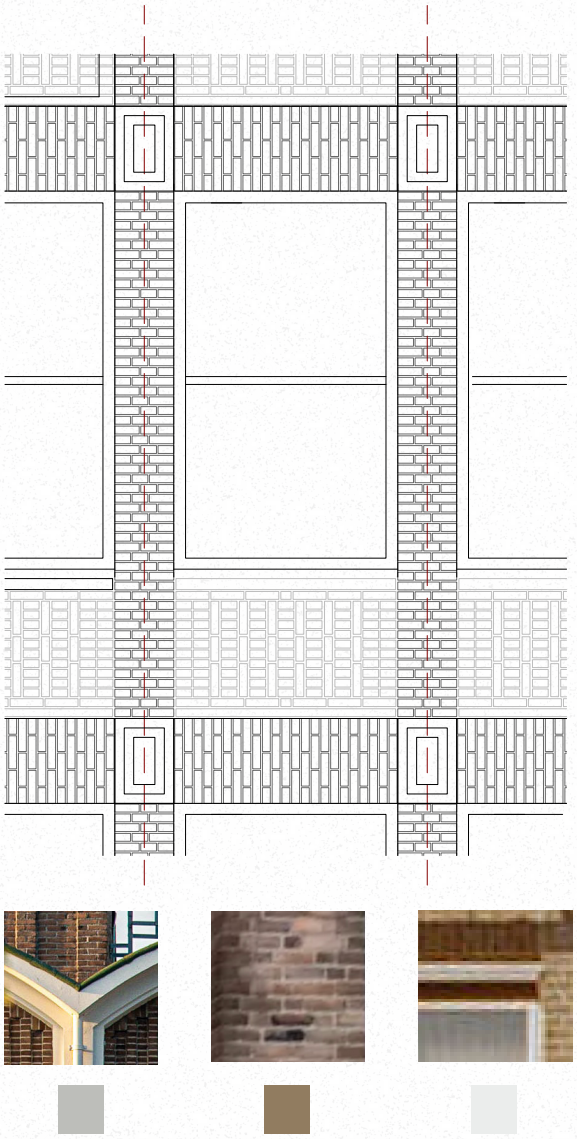


FIGURE 26. MATERIAL AND COLOR PALETTE

DEPTH
Like the other case study buildings, the windows are set back relative to the masonry of the façade. This depth stresses the repeating partitioning of the façade. As the parapet is set back only 55 mm and the windows 165 mm this creates another depth accent.

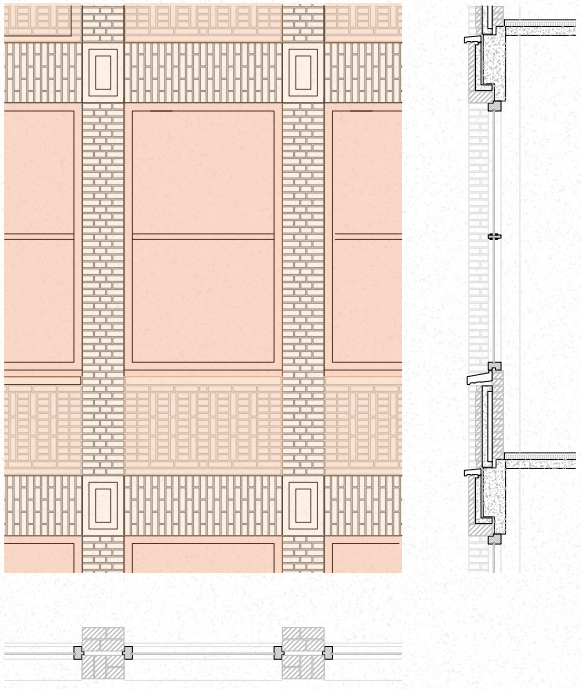
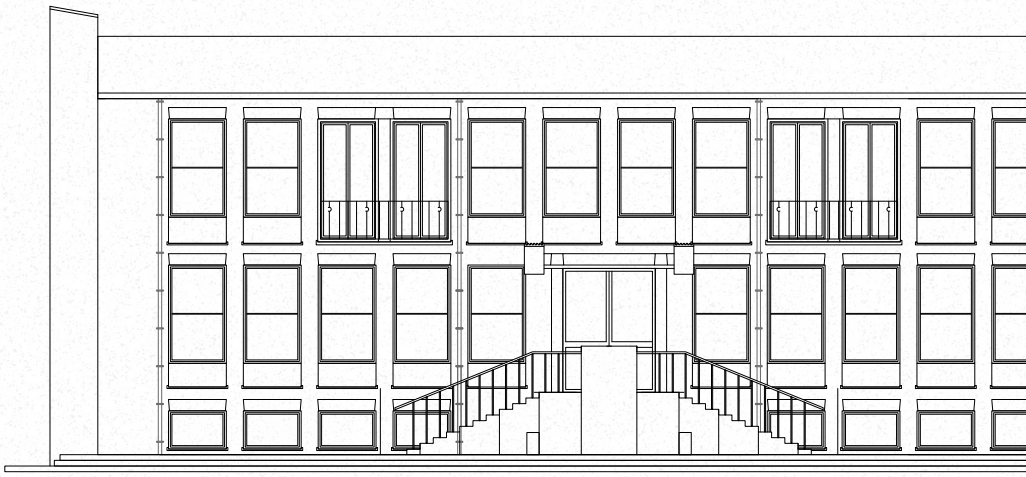
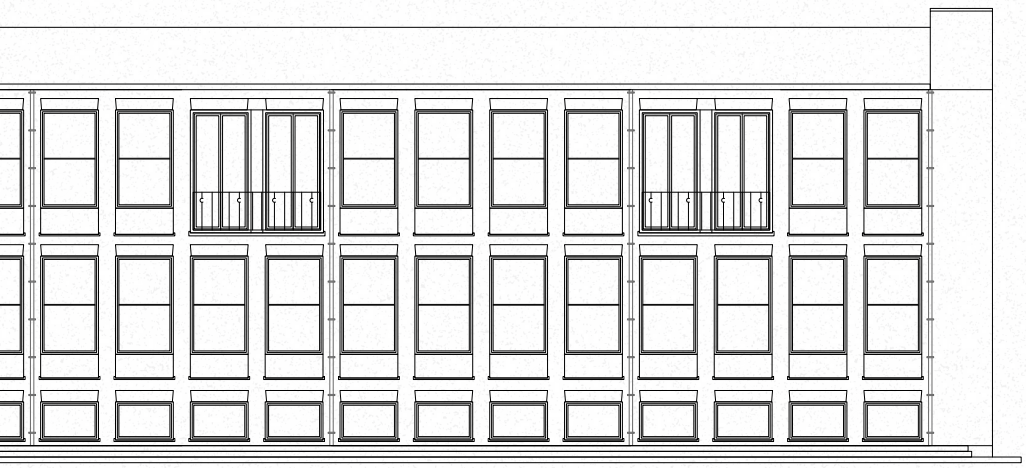


FIGURE 27. FACADE DEPTH





FRONT FACADE CITY HALL AALSMEER

1.200

0 m 2,5m

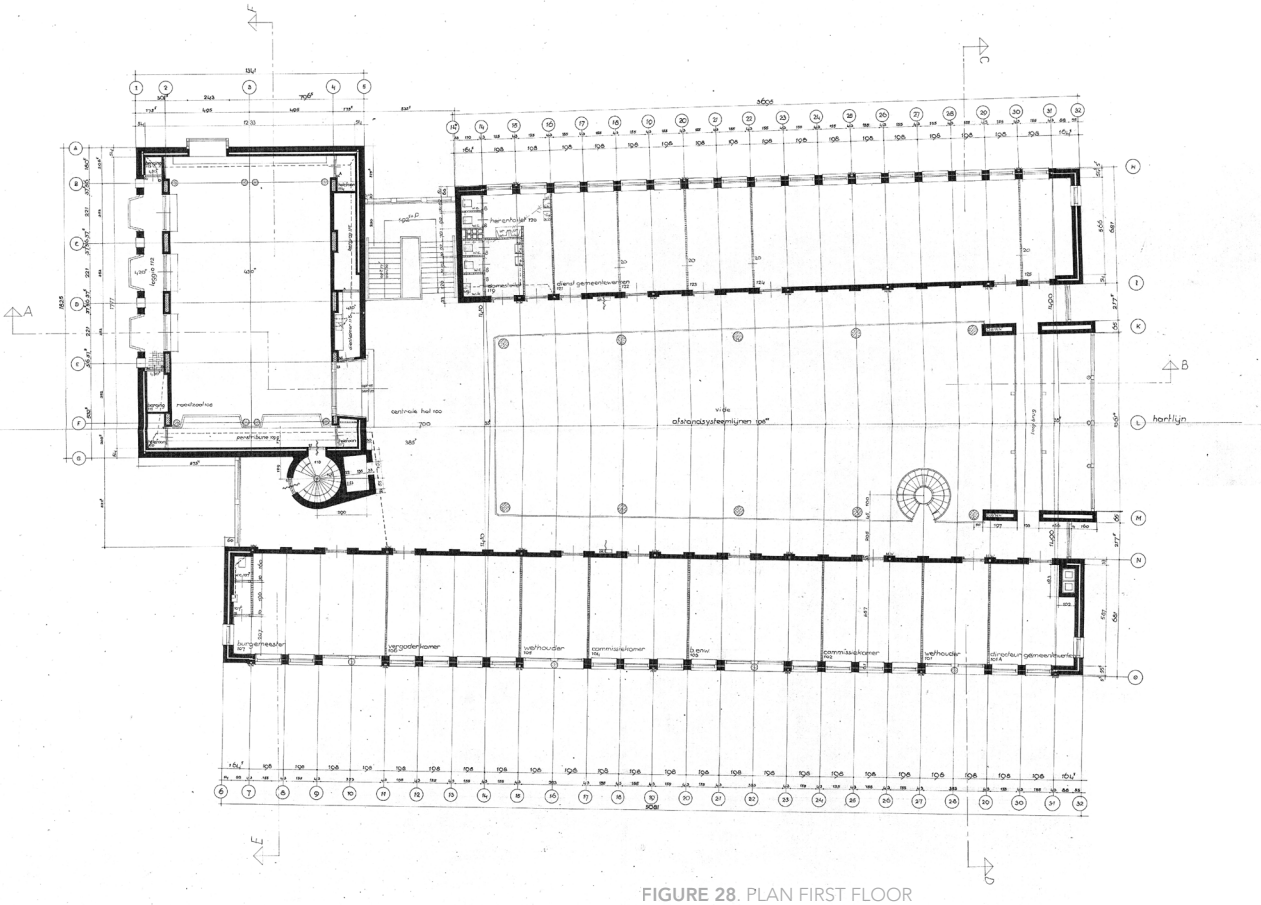


FIGURE 28. PLAN FIRST FLOOR

The city hall of Aalsmeer is designed by J.F.Berghoef after he was initially asked to study the best position in town for a new city hall. In his text which explained the design of the building, Berghoef stresses the need for a new city hall for Aalsmeer.[6] The town had grown exponentially after the rapid development of the flower export. The housing of the municipality did not grow accordingly leading to a situation where the civil servants were spread across many buildings throughout the town.

The first sketches for the city hall show two buildings. A representative part for the major and alderman and a work part for the civil servants. Yet the emergence of a larger social and democratic awareness lead to the conviction that the buildings should be united. If the city hall should be the new culmination point for public life, all should be able to grasp the meaning of the society for which the building was build, according to Berghoef.[1]

In between the drawings for the city hall of Aalsmeer, there were many study drawings of comparable townhalls. It seems that Berghoef studied the townhalls of Gilze-Rijen, Alphen aan de Rijn, Naaldwijk, Katwijk, Maassluis and Uithoorn as preparation for the design of Aalsmeer.

PLAN

This democratic conviction has materialized in the presence of a large central hall which symbolizes the meeting of citizens and government. The publicly accessible high central hall, present in all Berghoefs city halls, is flanked on the first floor by the offices for the major and alderman and in this way diminishes the boundary between government and society. On the ground floor, all offices for civic services are located. The tower, designed as freestanding volume, houses the boardroom and wedding hall. In the souterrain, several offices, storage, a garderobe, and the city archive are located.

CONSTRUCTION

The city hall is constructed as if it consists of two buildings and a tower with a square in between. The buildings and tower use loadbearing brick walls to carry the floor loads. The concrete floors span from wall to wall. To spread the load of the floor across the wall a concrete beam is poured together with the floor.
The roof over the central hall is carried by two rows of concrete columns which guide the loads towards the foundations.

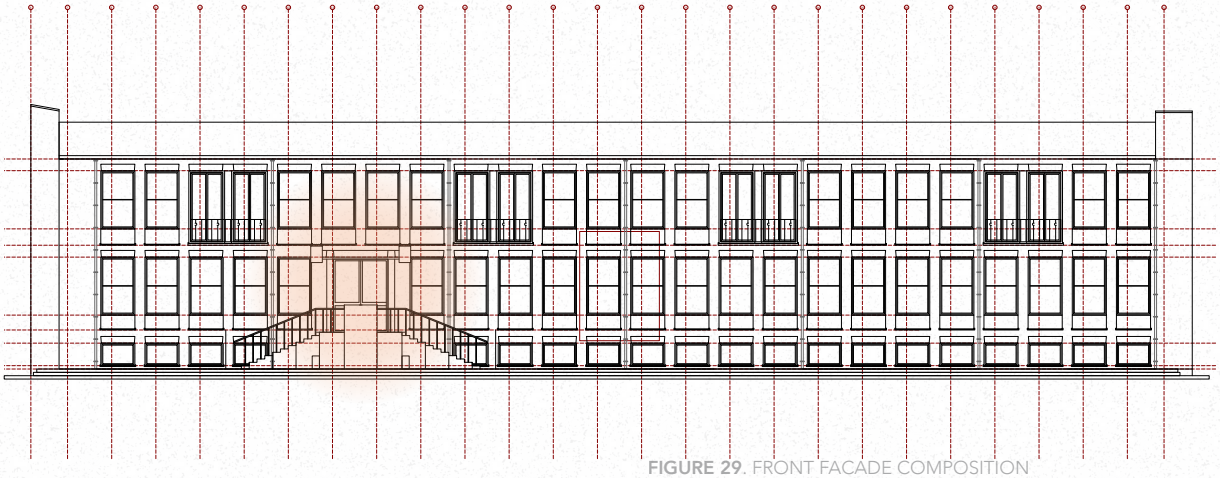


FIGURE 29. FRONT FACADE COMPOSITION

COMPOSITION

The front façade of the city hall has a clear composition. The windows partition the building in 25 segments. Every four segments a balcony takes the place of two windows. Just like the city hall in Hengelo and the police station in Middelburg the symmetrical façade has one asymmetrical element. In this case the entrance with to stairs and a memorial stone. In front. By placing it asymmetrical, the entrance pulls the focus of the composition to the left. Unlike the city hall in Hengelo, the front façade has a pitched roof, covered with a dark grey tiling. The front façade of the city hall borders on a square, which can be used for large gatherings.

A remarkable feature of most of Berghoefs buildings is the to what great detail they are designed. In case of Aalsmeer the ornamentation above window frames and the lanterns above the entrance were designed by Berghoef himself and specially made for the city hall. Archival drawings also show a selection of furniture designed for the building.

Just as Berghoefs other city halls, the building in Aalsmeer has masonry facades. Most of the buildings near the city hall, which were there at the time the city hall was constructed, are also constructed in brick. As the square in front of the city hall is made of similar bricks, the building and the square fit their surroundings harmoniously.

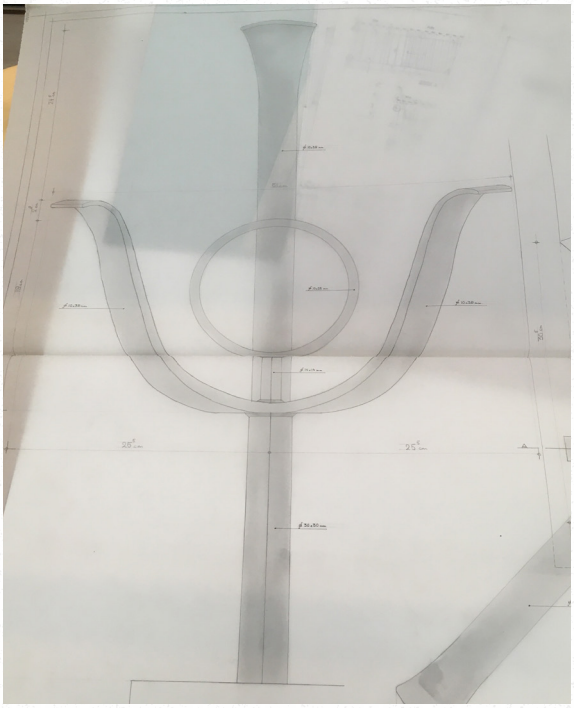


FIGURE 30. DETAILED DRAWING OF ORNAMENTATION



FIGURE 31. MATERIALS OF SURROUNDINGS

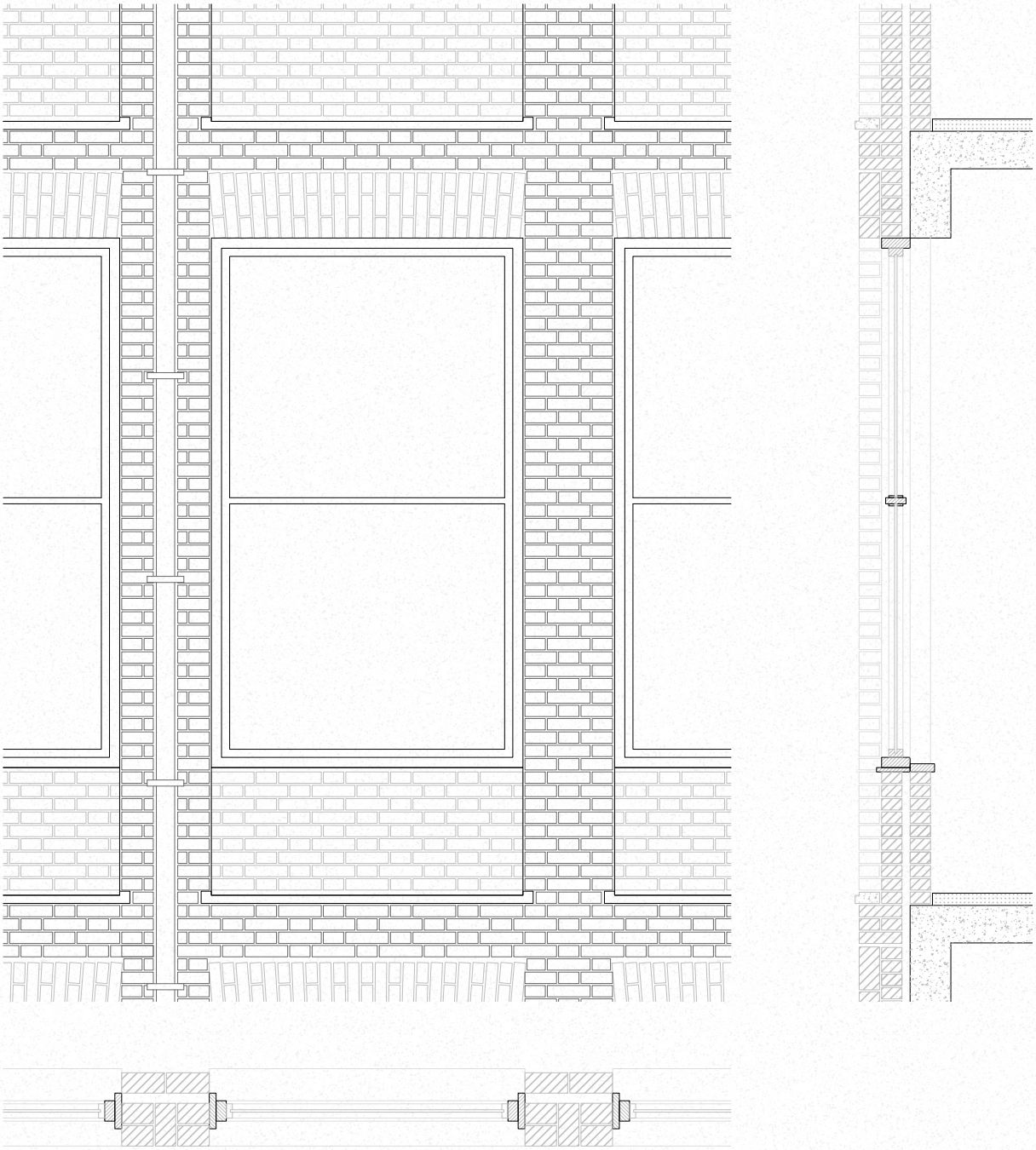


FIGURE 32. FACADE FRAGMENT

COMPOSITION
The 25 partitions of the city hall all consist of a large window which originally had wooden windows frames. The 430 mm wide 'negge' around it enables a two times a 2/3 brick and a half or two half and one whole brick. The copper rain-downpipes are carefully integrated within the masonry and strengthen the vertical articulation of the façade. All windows have a soldier-course (dutch: rollaag) above.

MATERIAL
The masonry has variegated colors ranging from orange till light brown. The stone windowsill has a light grey color. The metal window frames have a dark brown color which completes the orange/grey color pallette of the city hall.

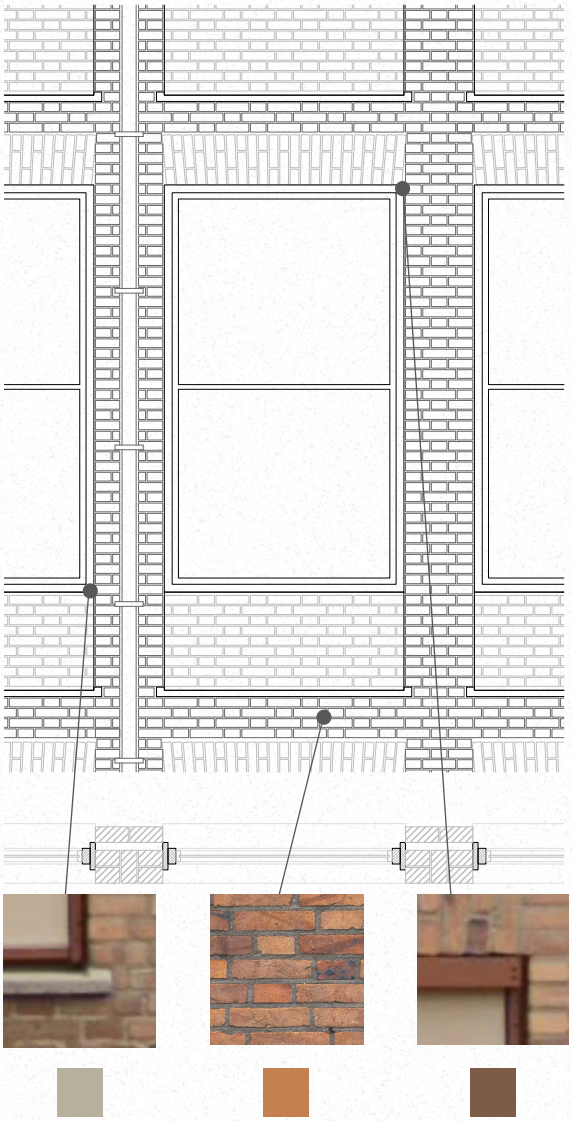


FIGURE 33. MATERIAL AND COLOR PALETTE

DEPTH
The window frames and the brickwork underneath are set back half a brick + a seam (110 mm) stressing both the vertical and horizontal partitioning.

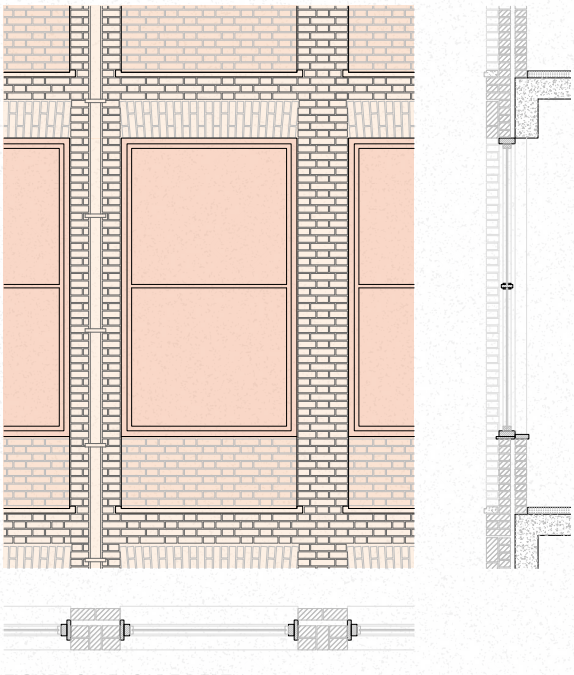


FIGURE 34. FACADE DEPTH

CONCLUSION

The insights from the four case-study buildings combined with the theoretical analysis allow for a characterization of Berghoefs buildings.

To start, Berghoef constructs his buildings using load bearing masonry walls and facades. These walls support concrete floors. When large open spaces are needed, Berghoef often used concrete columns.
For the lay-out of a building, Berghoef often refers to historically associated building shapes which have a clear relation with the function the building. This is especially visible when comparing the city halls of Aalsmeer and Hengelo. Both have a similar lay out and a tower which functions as landmark for the center of the town, a historic function of the city hall.

The four case studies have one obvious similarity, their repetitive façade partitioning. As the size of the building increases, Berghoef adds asymmetrically placed enrichments to the repeating rhythm. Thereby enlivening the composition.

The partitioning of the façade has a rather similar size in all case studies. Every time it consists of a window and a masonry parapet. The width of the window is in all studied cases approximately 1350 mm and a height of around 2000 mm. They are surrounded by masonry 'negge's' which are usually 375 mm wide fitting exactly two half bricks (kop: 100 mm) and one ¾ brick (drieklezoor: 165 mm). The depth of the negge's is usually 110 mm (half a brick). In some cases the window is set back 50 mm more then the masonry parapet.

The masonry in the different parapets used in the case studies show two important characteristics of Berghoef. The decorative masonry in the parapet in the city hall of Hengelo and office in Alkmaar is built by hand. The difficult patterns are an example of the appreciation Berghoef had for the work of craftsman. The parapet in the ANWB office in the Haque shows another facet of Berghoef. These were prefabricated and placed as one element with the help of a concrete backside. It is an example of how Berghoef aimed for innovation while combining this with a more traditional appearance.

All four buildings are finished with masonry with a variety of tones in the colors: orange grey and brown. Combined with unpainted or white painted window frames and some stone elements, all buildings have a limited color and material palette. The color of the brick is usually slightly lighter than the color of masonry in their surroundings.

Finally, most facades have some ornamentation or specially designed lanterns. Berghoef designed them himself. The sometimes complicated designs again show Berghoefs love for working with material and craft. Most buildings have custom made stair railings as well. In case of the health insurance office, Berghoef incorporated a snake into the design. The snake is the symbol of health care and is used by Berghoef to create a connection between the function and appearance of his buildings.

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FIGURES

1. Image by author

2. Image by author, based on: Bot, P. (2009). Vademecum : historische bouwmaterialen, installaties en infrastructuur. Veerhuis.

3-7. Image by author

8. Berghoef, J.F. (n.d.) Plattegrond stadhuis Hengelo, Het Nieuwe Instituut, Rotterdam, Berghoef, J.F. (Johannes Fake)/ BERX394.1

9. Image by author

10. Berghoef, J.F. (n.d.) Stadsplattegrond Hengelo, Berghoef, J.F. (Johannes Fake)/ BERX394.1

11-14. Image by author

15. Berghoef, J.F. (n.d.) Plattegrond ziekenfonds Alkmaar, Het Nieuwe Instituut, Rotterdam, Berghoef, J.F. (Johannes Fake)/ BERX261

16. Image by author

17. Berghoef, J.F. (n.d.) Impressieschets ziekenfonds Alkmaar, Het Nieuwe Instituut, Rotterdam, Berghoef, J.F. (Johannes Fake)/ BERX261

18-21. Image by author

22. De Jonge, E. (2014) Hoofdkantoor ANWB

23-27. Image by author

28. Berghoef, J.F. (n.d.) Plattegrond raadhuis Aalsmeer, Het Nieuwe Instituut, Rotterdam, Berghoef, J.F. (Johannes Fake)/ BERX823

29-34. Image by author

VALUE ASSESSMENT

In preparation of the redesign of the police station in Middelburg, a value assessment is performed. The aim of the assessment is to get an understanding of the heritage values the police station conveys, and what attributes are specifically important to preserve. To determine the heritage values the framework of Silva & Roders (2012, p.6) is used.

For the value assessment of the police station I chose to focus on specific values which are attributed to the building by experts in the field of the build environment. These are: its value because it is part of a protected cityscape and its value because it is part of the oeuvre of an architect – in this case J.F. Berghoef as he was the main architect of Berghoef, Hondius & Lamers.
For the value as part of the protected cityscape of Middelburg, the statement of significance was consulted and coded according to the method and classification of Silva and Roders.[1] Furthermore, current policy documents were studied to learn how the characteristic cityscape is protected.

To identify the value the building has as part of the oeuvre of Berghoef, the importance of the work of Berghoef is determined by literature study. In addition, lectures and articles of Berghoef himself and about him were consulted to identify what he values in architecture and what are important characteristics of his work.
To conclude the value assessment, I studied the police station to find out which of the found values - either cityscape or Berghoef related - are represented in the building.

CITYSCAPE
The statement of significance of the cityscape of Middelburg included a map[2] indicating for each street why it is valued. From this map it can be concluded that the building is only valued for its consistency with the historic alignment.

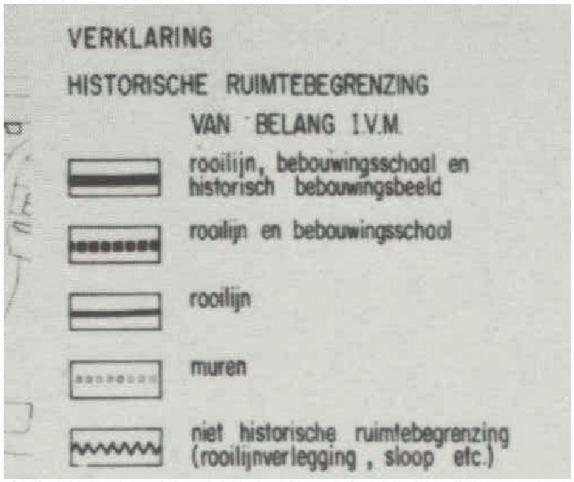

FIGURE 2. CLOSE UP LEGEND FIGURE 1


FIGURE 3. CLOSE UP OF FIGURE 1



FIGURE 1. Value map statement of significance of the cityscape of Middelburg

BERGHOEF

The characteristics and relevance of the work of Berghoef are described in the previous chapter 'Understanding Berghoef' The diagram in figure 5 summarizes these characteristics and highlights which of them are represented in the police station in Middelburg. The same process is done for the values of the city scape of Middelburg. The color coding is related to the heritage value classification of Silva and Roders (figure 4).[1]



FIGURE 4. Heritage value classification of Silva and Roders[1]

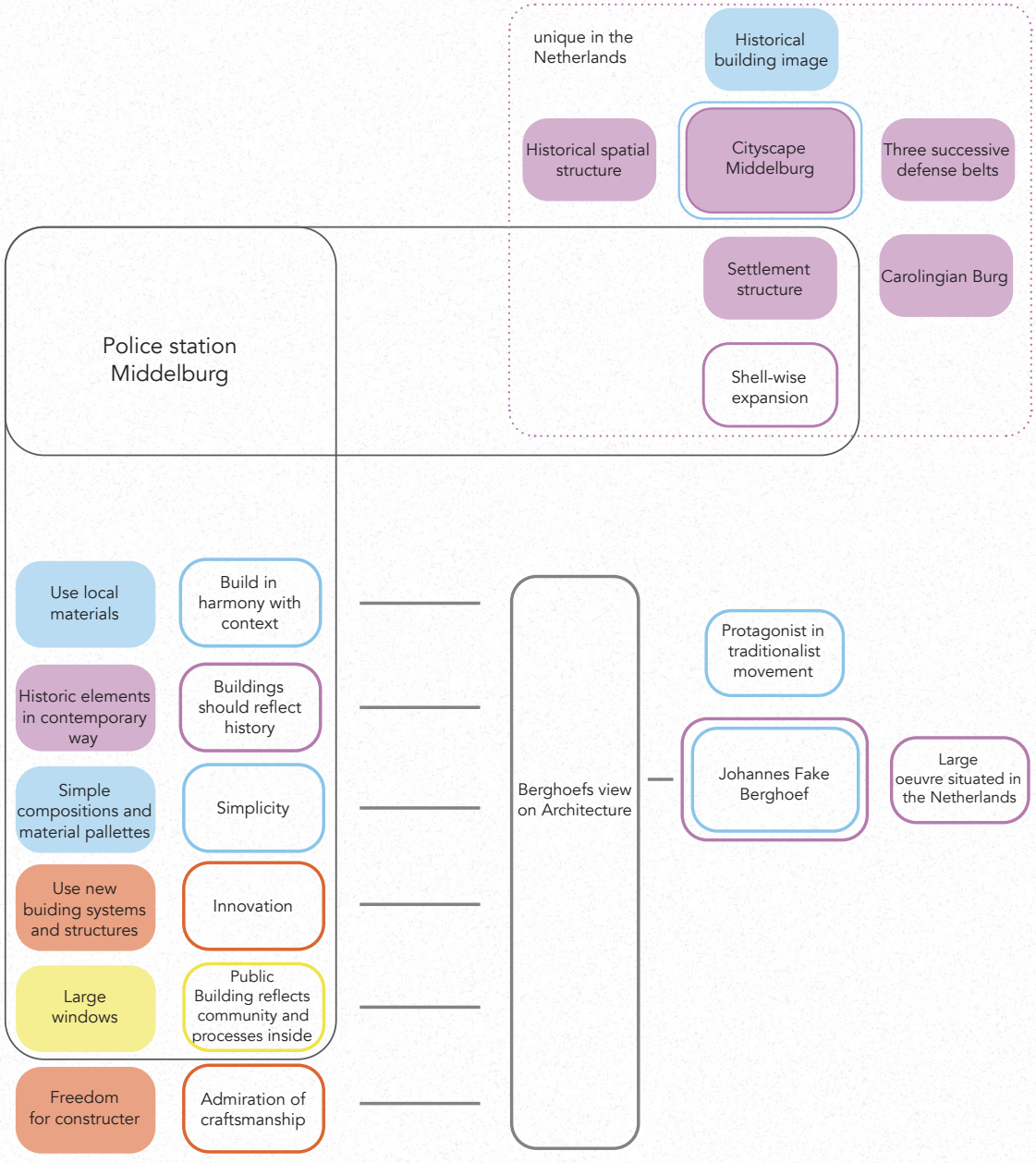

FIGURE 5. Values and attributes mindmap



FIGURE 6. Attributes representing values. Left: Berghoef related; Right: Cityscape related

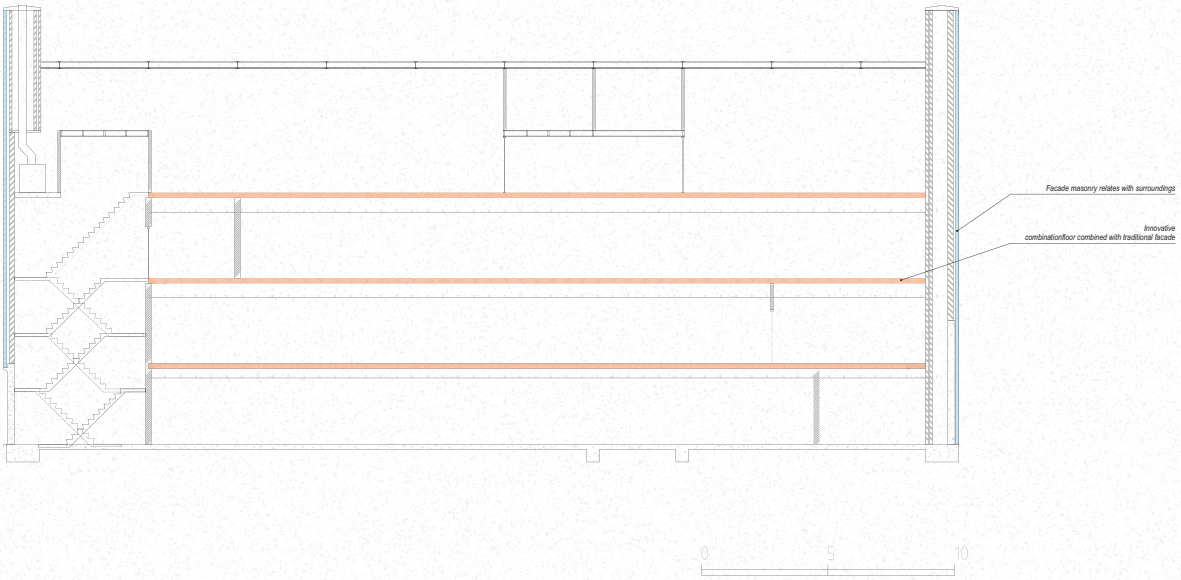

FIGURE 7. Attributes representing Berghoefs values in section

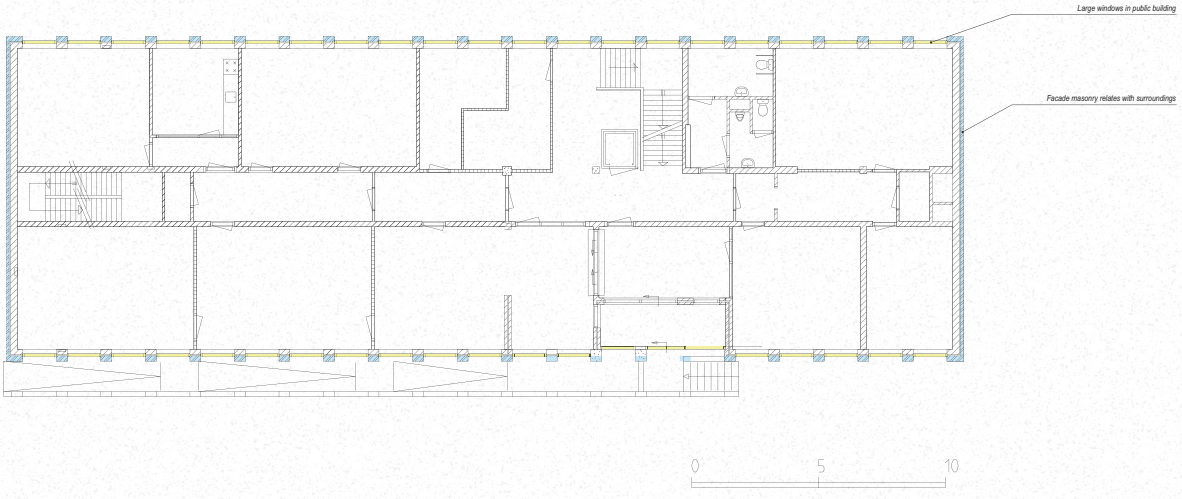

FIGURE 8. Attributes representing Berghoefs values in plan

POLICE STATION

The police station clearly shows the ideas of Berghoef, as well as some important city scape characteristics, as is visualised in figures 6, 7, 8 & 9.

The façade is constructed out of the simple materials brick and concrete and shows a clear composition with monumental traits, resembling the surrounding buildings. Large windows provide insight in the interior. A DATO floor illustrates the innovative aspect of Berghoefs work as it was only developed a few years before the construction of the police station.

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[2.] Rijksdienst voor de monumentenzorg RDMZ (1984) Toelichting op het besluit tot aanwijzing van Middelburg als beschermd stadsgezicht. P. 33

FIGURES

1-3. Rijksdienst voor de monumentenzorg RDMZ (1984) Toelichting op het besluit tot aanwijzing van Middelburg als beschermd stadsgezicht. P. 33
4-9. Image by author

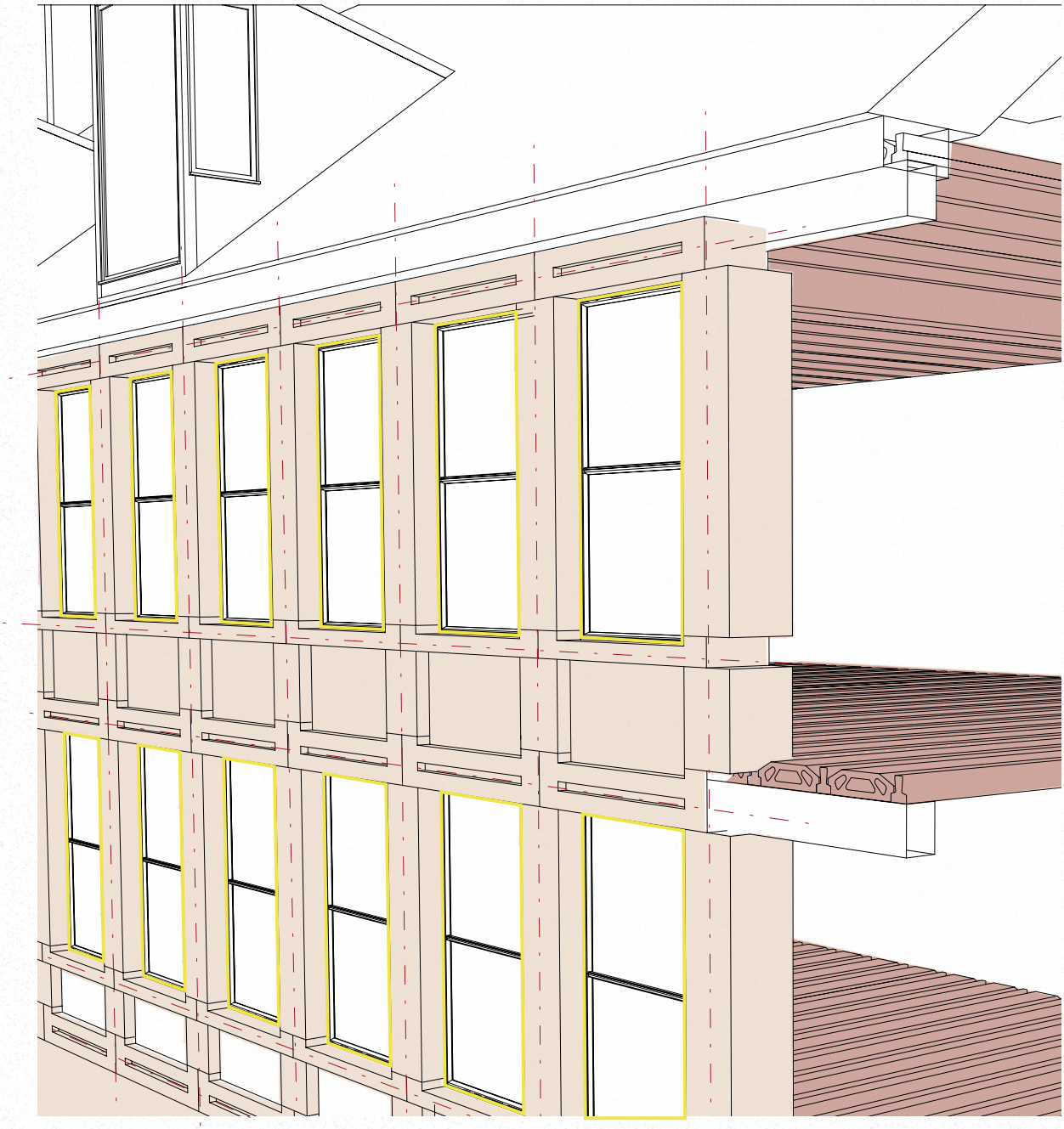


FIGURE 9. 3D fragment of the police station showing the facade composition in combination with the innovative floor system as essence of the building.

REDESIGN STRATEGIES

As stated in the research question, the aim of this research is to find out how the role of material in the work of Berghoef can influence a redesign. The four buildings which were studied in the previous chapter have all been renovated or transformed during their history. In this chapter a closer look is taken at these renovations to uncover how the architects in charge of the renovations related themselves to the work of Berghoef.

To be able to place the renovations of Berghoefs buildings within the large field of heritage redevelopment, this chapter starts with a brief overview of redesign strategies formulated in literature.

REDESIGN STRATEGIES

Vandenbroucke & Janssen[1] state that there are four ways an intervention can relate to the existing building. It can form a contrast, make contact, make a connection or be a copy.
Working with contrast is usually applied when new additions are made. By creating contrast, competition with the original is avoided and thereby the original building is respected. A risk with a contrasting element is that it breaks the coherence of the existing composition. When seeking for more rapprochement, new and old can make contact by creating similarity in a limited number of aspects. The third option, a connection, implies a relation between new and old like brother and sister. The two look alike, but clearly have an own identity. The connection can be enhanced by resembling material choices, or façade rhythm and detailing. Lastly a new addition can be a copy of the existing building. Making a replica usually raises questions on truthfulness and is generally only applied for building elements instead of entire buildings

Bie Plevoets, Koenraad Van Cleempoel[2] made a similar classification of redesign strategies. They draw inspiration from the much-valued learning method in other art forms of: translatio, imitatio and aemulatio. This classification orders the progression in learning from precedents. The first step aims at similarity, the second equality and the third improvement of the original precedent. Plevoets and Cleempoel translate this method to a classification for redesign strategies. The first option, translatio, comes down to restauration of the original in tangible or intangible aspects. The second step, imitatio, is a more selective restoration of historic aspects to enable a new function of the building. The third step, aemulatio, attempts to exceed the original quality. Interventions aim to strengthen existing qualities or spatial experiences. Besides these three strategies, Plevoets and Van Cleempoel distinguish to other methods for redesigning heritage. The first, facadism, is a strategy where the relation between façade and functions on the interior is broken. Transformation projects either preserve nothing but the façade and house a new function, or a just a new façade is designed for a building and function which remain the same. The second targets specifically the redevelopment of ruins. They are classified in a separate category as their unfinished character provides unique qualities. Interventions to ruins usually are meant to remind of historic events or create places of total freedom where creativity and experiment take place unimpeded.

Alkemade et al. [3] distinguish eleven ways value can be added to an existing situation. The approaches differ from eliminating, to reconfiguring and from copying to densifying. Contrary to Plevoets & Van Cleempoel and Vandenbroucke & Janssen they are not ordered on a more or less linear scale, rather they are the most essential description of various interventions.

Lastly, De Jonge (Lecture, 14 September 2021) distinguishes four categories of adapting heritage[4], based on how severe the alterations of the heritage object are. Ordered from conservative to progressive these are: conservation, adaptation, intervention and transformation. In this spectrum conservation means the preservation of the existing building and perhaps restoring important aspects. Adaptation and intervention are comparable but differ in the limits of acceptable change to the original building fabric and original design intentions. In case of transformation, the interventions focus on facilitating new use while preserving enough of the original to convey the buildings most essential values.

Except from the eleven strategies of Alkemade et al., all discussed authors rate their strategies on a scale of resemblance to the original building. When this factor is graphed against the sheer extent of the redesign a coordinate system of possible redesign options is constructed, as is done in figure 1. In this chapter, the redesigns of the four selected case studies are examined and placed within the coordinate system. It will function as a frame of reference to which my redesign of the police station in Middelburg can be related.

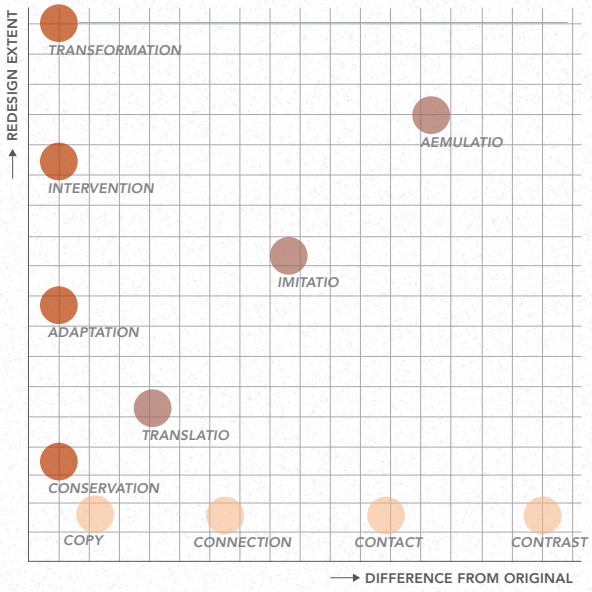


FIGURE 1. STRATEGY GRID

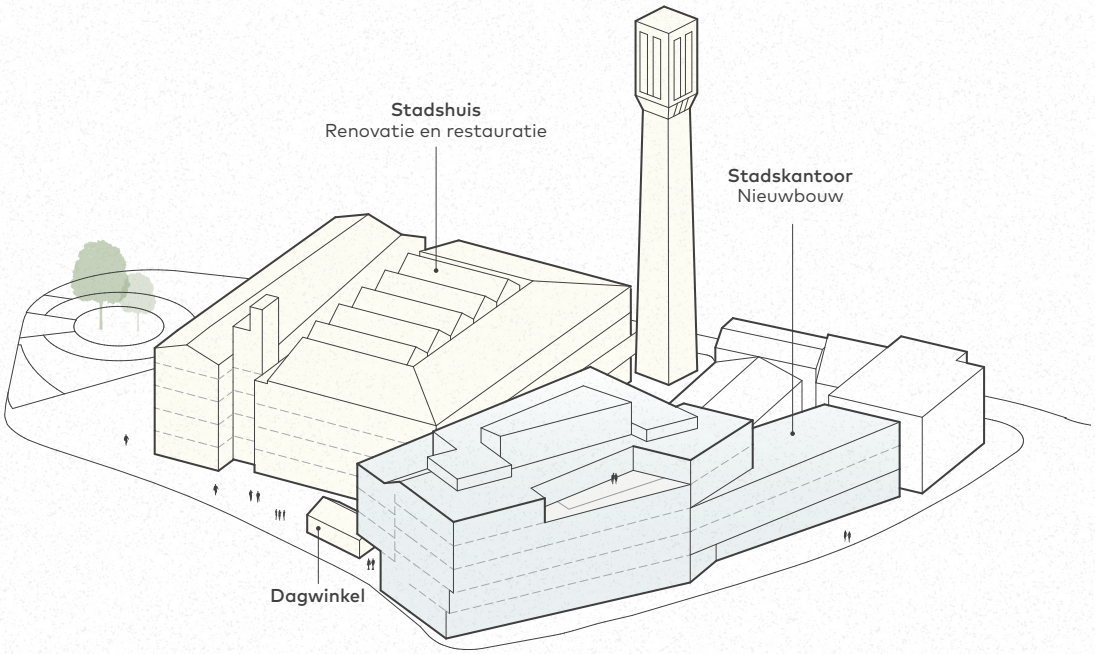


FIGURE 2. EXTENSION AND RENOVATION CITY HALL HENGELO

EXTENSION AND RENOVATION OF CITY HALL HENGELO

In 2020 the extension of the city hall of Hengelo was completed. The new building is designed by EGM architects, while HVE and BERNS architects renovated the existing monumental building. The city hall program is spread across the two buildings, which are connected with an air bridge. The ground floor of the new building is publicly accessible and houses all desks for civil services, which were formerly housed in the monumental building (figure 3). The remaining seven floors of the new building are used as office spaces. The monumental building remains the democratic heart as it houses the council and civic chamber and wedding hall.

The motto for the renovation of the existing building was 'Conservation of a lively heart'. The desks for civil services would move from the monumental central hall to the new extension, an opportunity for informal contact between civilians and government is lost. As the contact between government and civilians was one of the key design aspirations of Berghoef, HVE and BERNS architects were keen on re-establishing a meaningful function of the central hall (figure 4). This is attempted by creating a direct connection with the new building and adding a coffee corner to the central hall. [5]

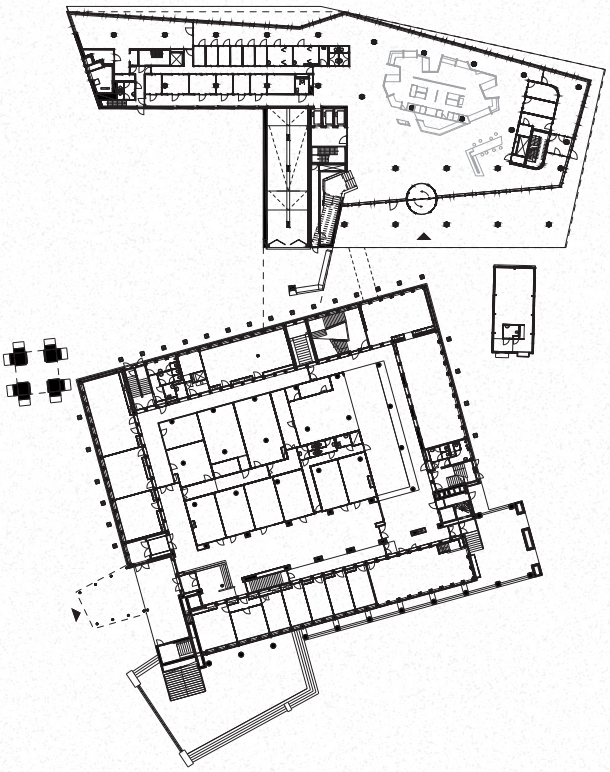


FIGURE 3. GROUND FLOOR CITY HALL HENGELO



FIGURE 4. MAIN HALL AFTER RENOVATION

COMPOSITION

New building

As described by EGM, the buildings form an ensemble, but both have distinct character.[2] Indeed the new building seems to contrast with the existing building – as can be seen in figure 5- especially on the north façade due to the diagonal masonry lines in the façade. The other facades, seek more resemblance with the national monument by having a more rectangular façade partitioning (figure 6). Yet the larger window dimensions, limited depth in the façade and the fact that the floor heights do not align creates a significant contrast.

Renovation

The renovation of the monumental building did not entail any changes to the existing façade composition, only some minor restorations. Window frames were replaced with new ones, but the window frame profile is very similar to the original. The façade is not insulated as the risk of damage was considered too high. Even though the sustainability ambitions of the municipality are high, the main aim is described as improving comfort while ensuring that the new measures fit the monument. New HVAC-systems are deliberately concealed with the aim that laymen will not notice something has changed.[6]

The connections with the new building are finished with a white plaster, stairs without ornaments and contemporary light fixtures. The choice of neutral materials ensures the addition is recognized as new, but does not compete with the monument. The clear distinction from the original building fabric serves as a proof of its later addition (figure 8). Nevertheless, the additions do comply with the unwritten rule of the city hall that all connections with the surroundings (the positioning of the tower and main outdoor stairwell) were placed at a sharp angle, while the main building is orthogonal.[7]



FIGURE 5. NORTH FACADE



FIGURE 6. EAST FACADE

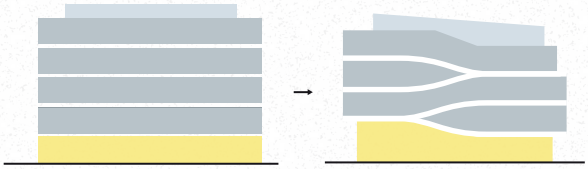


FIGURE 7. TRANSITION IN COMPESITION



FIGURE 8. CONNECTION BETWEEN NEW BUILDING AND MONUMENT

MATERIAL

New building

EGM presents the new building as sustainable and healthy. The use of recycled materials, bright colors and lots of entering daylight should give the building a 'high-tech' feeling.[2] By doing so the new building deliberately becomes the brisk counterpart of its monumental neighbor. The façade stones similarly relate to the monumental building: They are both stone but the new building is more dynamic as the bricks are colored lighter, have a squarer shape and rougher texture (figure 9 and 10).

Connection with the monument and the city of Hengelo is sought by designing many references to city characteristics. Examples are the salt mills perforated in façade panels and the use of 'typically Hengelose' wood joints in the furniture (figure 11).[8] In the monumental building similar references to the city of Hengelo were designed by Berghoef. For example the octagonal columns which refer to the eight neighborhoods of which Hengelo consisted at the time.

Renovation

The renovation strategy formulated by BERNS and HVE architects formulates the aim to repair and preserve most of the original building materials and finishes. Repairs or replacements are made of the original materials to ensure the preservation of heritage value.[1] It is deduced that the renovation strategy highly values material integrity even though architect Camiel Berns expressed that twentieth century heritage renovations should focus on preserving design intentions instead of 'every brick'.[4] In this case the exceptional attention that Berghoef gave to materials in his design could have led to the conservative approach regarding building materials. In this way the material integrity ensures the integrity of design intentions.



FIGURE 9. COLOR MASONRY OLD AND NEW BUILDING

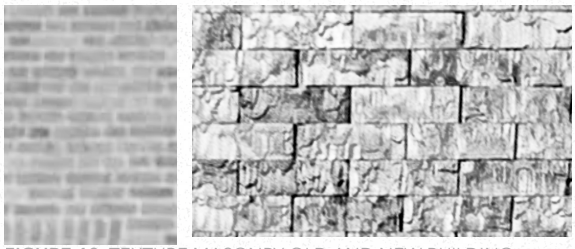


FIGURE 10. TEXTURE MASONRY OLD AND NEW BUILDING



FIGURE 11. LOCAL WOOD JOINT

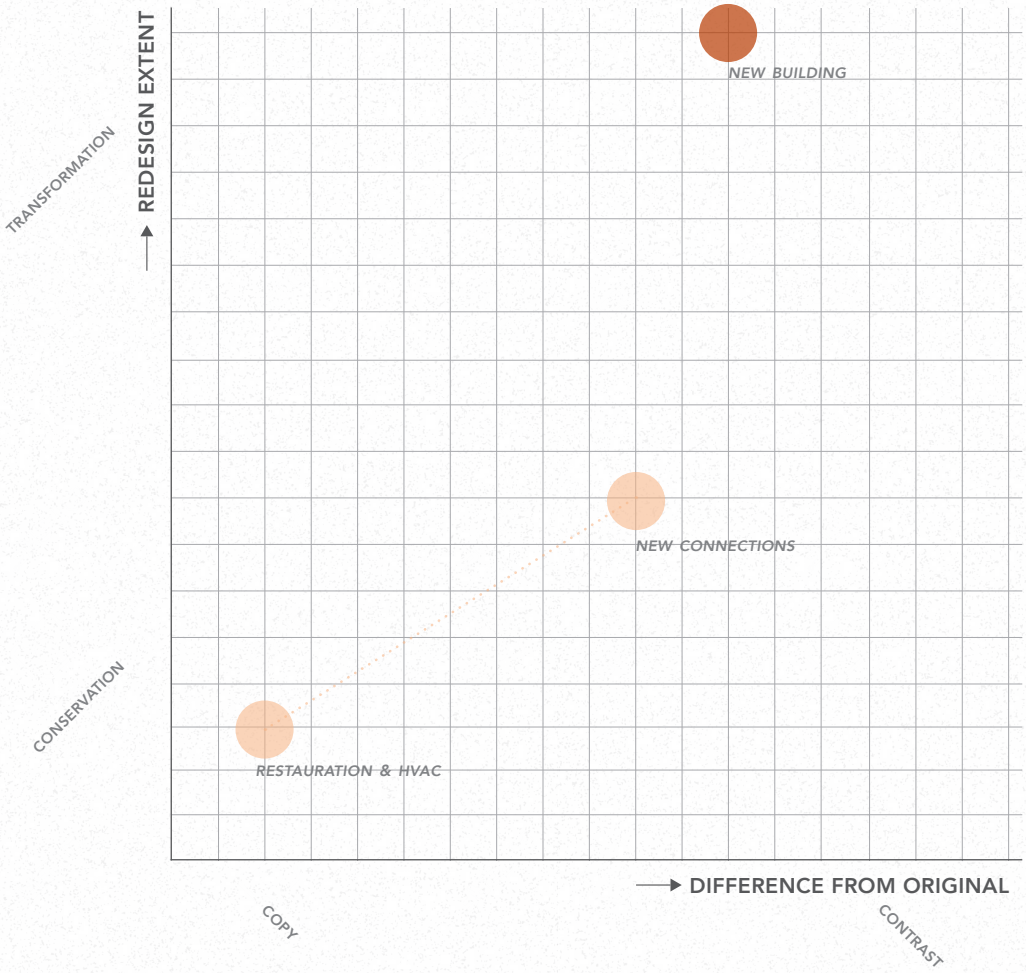


FIGURE 12. STRATEGY GRID

CLASSIFICATION

The renovation strategy, as formulated by HVE and BERNS, focusses on the preservation of existing materials and finishes and the recognizable contemporary addition of two new connections. It has a conservative nature and aims to preserve existing values of the monument. Remarkably the extensive measures which are taken to meet current day energy performance standards are not described in the 'key-points' section of their strategy but have their own paragraph.[1] This separation enhances the previous finding that the merely technical interventions, needed to create a sustainable building, are treated different then interventions which serve a spatial purpose. Whereas spatial interventions can easily be distinguished by a contemporary material palette, for technical interventions the term 'inpassen' is used which is meant as synonym of concealing. Due to the different approach chosen for the spatial and technical interventions, they are positioned separately on the grid (figure 12).

For the new building EGM employs a twofold strategy. On the one hand it copies the use of many references to the surrounding city, a clear trade of Berghoef. On the other hand, the new building clearly profiles itself as new, with a more dynamic composition then the monumental building. The choice of material stresses the contemporary character of the building, yet maximalization of a contrast was clearly not the aim. This results in a position on the grid slightly towards the contrasts side (figure 12).



FIGURE 13. RENOVATION AND ADDITION CITY HALL AALSMEER

RENOVATION AND ADDITION CITY HALL AALSMEER

The city hall in Aalsmeer has been renovated and 'revitalized' in two phases by Brandjes and Van Baalen architects. The first phase included a redesign of the square in front of the building and the placement of a temporary platform lift to make the city hall accessible for disabled.

In the second phase, the accessibility of the building was improved by adding an exterior elevator at the side of the main volume. The public- and office spaces have been reorganized and maintenance has been done. Lastly the energetic performance of the building is improved by insulating the building, renewing the window frames and installations, and adding solar panels on the roof.

Architect Van Baalen describes the redesign as follows: With the minimalist design and materialization, a harmonious contemporary connection has been sought with the monumental complex while retaining a representative appearance.[9]



FIGURE 14. NEW ADDITION WITH ELEVATOR



FIGURE 15. MAIN HALL AFTER RENOVATION



FIGURE 16. RENOVATED OFFICE SPACES WITH NEW HVAC

COMPOSITION

The largest spatial intervention, the new added entrance and elevator hall, have been designed as freestanding elements. To stress the fact that they are added later, the hallway and elevator hall keep their distance from the building and only touch were necessary. By designing it as freestanding volumes, the tower and main building from the city hall also remain freestanding. Thereby leaving the original design intact.

To strengthen the connection between the new parts and the original building, the new corten steel gate has the exact same dimensions as the memorial stone in front of the entrance (figure 17).

At the other side of the building, the addition on the roof which houses the new HVAC installations has been set-back approximately a meter from the edge of the roof. Thereby creating a similar idea of a freestanding new added layer (figure 18 & 19).

As not all public is allowed to enter the second floor, a separation was needed. To minimalize the interference with the spatial qualities of the original design, a minimal white room divider is implemented. By using only glass, steel cables and a white frame, the separation distances itself from the rest of the building and aims to remain unnoticed (figure 20). It can be concluded that the spatial interventions are designed with a certain distancing from the original as a way to stress their later addition.

While the spatial interventions clearly aim to be a different layer, this separation is less clear concerning the new installations for heating, ventilation and cooling. Just as in the renovation of the city hall of Hengelo, these installations seem to be concealed or 'mixed-in' with the existing building, as is visible in the ceiling in figure 16. Even the added solar panels on the roof are hardly visible. One of the most clearly recognizable energetic measures is the implementation of solar panels, which double as sun shading, in the glass of the boardrooms.

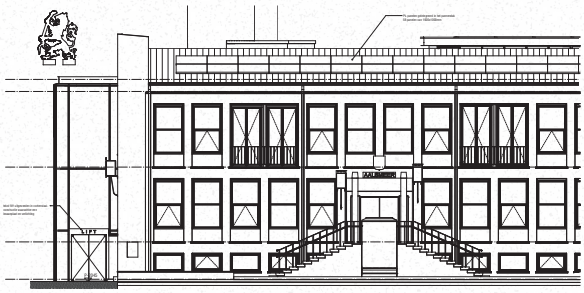


FIGURE 17. NEW PORTAL AND MEMORIAL STONE



FIGURE 18. OLD SITUATION



FIGURE 19. NEW SITUATION WITH ADDED VOLUME ON ROOF



FIGURE 20. SEPARATION ELEMENT

MATERIAL

The main material used for the spatial interventions is glass. Due to its transparency and minimal framing it relates to the city hall both contrasting and serving. It is a clear later addition which does not distract from the original building. The portal of the new entrance is clad in corten steel, because the steel "relates pleasant" to the masonry according to Van Baalen[9]. As is visible in figure 21, the color of the corten steel is similar to the color of the masonry. Yet the smooth and seamless texture give it a more contemporary appearance. Contrary to the glass and masonry, the corten steel and brick have a relative similar appearance. This adds a dualistic touch to the new entrance.

The square in front of the city hall was redesigned during the first phase of the renovation (figure 24). Contrary to the additions to the building, the low new walls are materialized very similar to the original square and building. The fact that they are added later is unrecognizable.



FIGURE 21. COLOR EXISTING MASONRY AND NEW STEEL

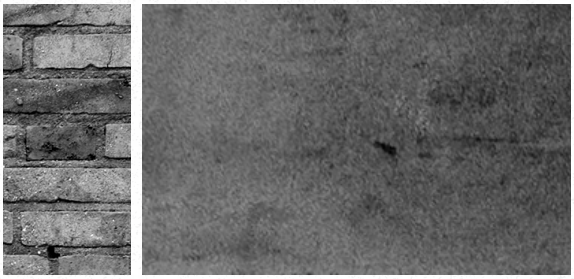


FIGURE 22. TEXTURE EXISTING MASONRY AND NEW STEEL



FIGURE 23. NEW GLASS ENTRANCE



FIGURE 24. NEW WALLS ON SQUARE

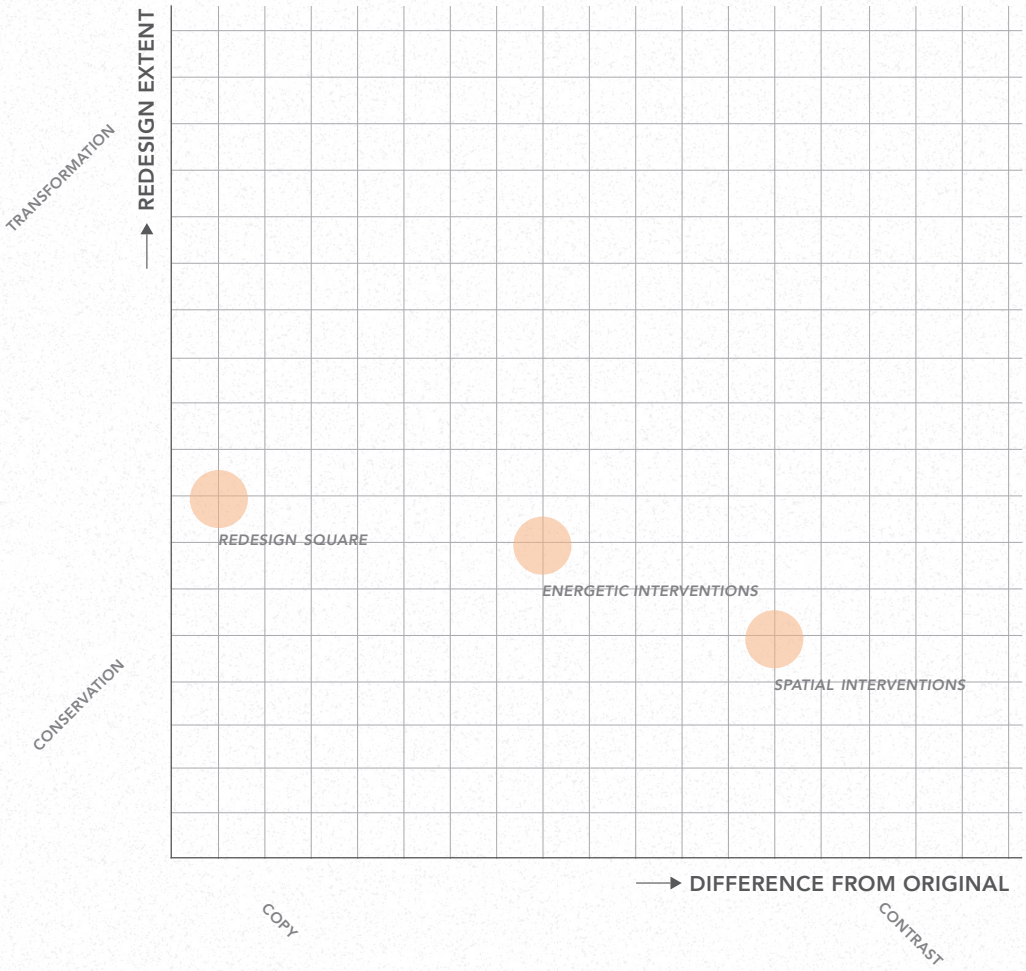


FIGURE 25. STRATEGY GRID

CLASSIFICATION

The "minimalist design and materialization" as described by architect Van Baalen[9], are the result of a redesign strategy where new spatial additions are distance themselves from the building both in composition as in material choice. The choice for corten steel as accent-material in the added volumes is meant to create the "harmonious connection" with the monumental building. By designing the interventions as volumes 'loose' from the building, their contemporary character is enhanced.

However, the entire renovation cannot be described within this one strategy. The new layout of the square and the implementation of new installations is done in such a way that they are almost indistinguishable from the original. By using similar materials and a careful integration, a harmonious solution is found. Yet the proof of later addition hereby is lost.

It seems the chosen redesign strategy can best be described as situation dependent. For each intervention a suitable approach is chosen, instead of working with one predominant strategy. This redesign strategy is therefore difficult to categorize as a whole. Instead, the spatial interventions, redesign of the square and improvement of the energetic performance are separated. The spatial interventions have a more contrasting nature which explains there position right on the grid. The redesign of the square in front of the building very much resembles the original and is therefore places left on x-axis. The energetic measures take a position in between the two other aspects.



FIGURE 26. REDESIGN OFFICE ALKMAAR

RENOVATION AND ADDITION OFFICE ALKMAAR

The former office for a health insurance company in Alkmaar was constructed in 1949. Half a century later (1999) it is transformed into an apartment building, designed by Van Hoeken and Thoes architects. The building has never been listed as a monument.

To accommodate the change in function from office to residential, the entire lay-out of the plans changed significantly. Merely the load-bearing elements were maintained. Another important intervention of the new design is the addition of a fourth floor. The existing sloped roof was demolished and replaced by rectangular lightweight structure. A preliminary design shows nine planned apartments, of which two in the souterrain. The final drawings (figure 29) show that the nine apartments have changed into four large apartments and a parking in the souterrain.

Aside from the spatial interventions, the transformation meant an opportunity for energy saving measures. New window frames have been placed and extra insulation was added.

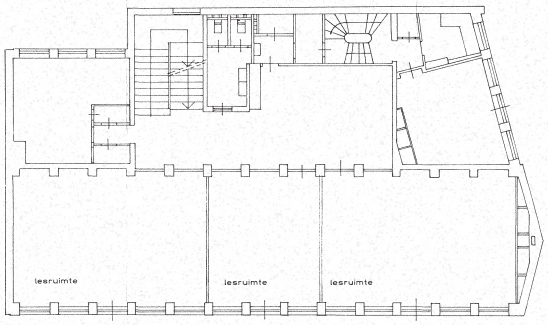


FIGURE 27. FIRST FLOOR ORIGINAL DESIGN

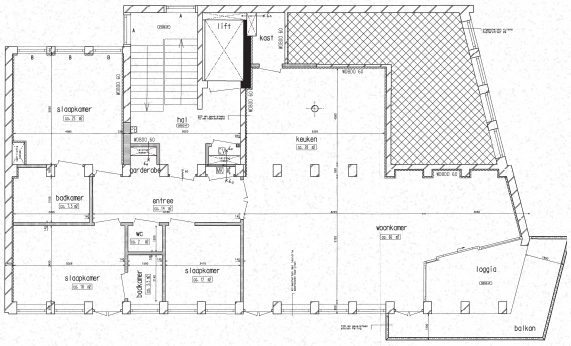


FIGURE 28. FIRST FLOOR REDESIGN

COMPOSITION

The original façade shows a repeating rhythmic with a module width of 1720 mm, topped with a sloped roof. The preliminary design shows a conservation of the façade rhythmic combined with an addition of four balconies (figure 31). The balconies are three modules wide, which makes them contrast with the vertically partitioned façade. The sloped roof is replaced by an extra storey with a partially sloped roof on the west side of the building. Due to its size and asymmetrical position the roof becomes a dominant element of the composition. The width of three windows of the top storey matches the width of two modules of the existing façade.

In the final design (figure 32), the added storey has conformed more to the existing composition. The notable sloped new roof has been changed into a flat roof which aligns with the top of the original roof. In the west façade the outline of the original sloped roof is preserved by maintaining the original wall. The top floor windows continue the rhythm of the original façade, thereby making the link more obvious than in the preliminary design.

The added storey draws the eye slightly to the east side of the façade. On the west side of the façade the new balconies create a course counterpart of the added storey. The addition of balconies meant the statue which hung from the west façade had to be removed. The added car entrance to the souterrain hides a number of souterrain windows from view.



FIGURE 29 ORIGINAL FACADE



FIGURE 30. FACADE PRELIMINARY DESIGN

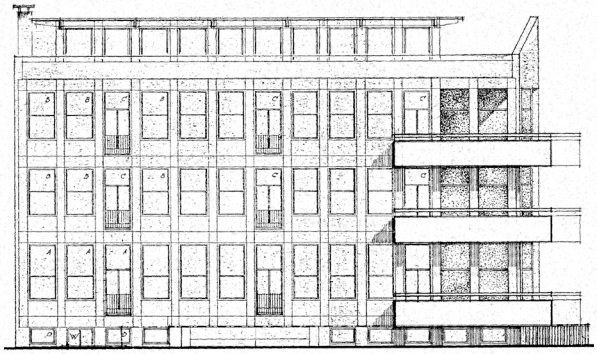


FIGURE 31. FACADE FINAL DESIGN

MATERIAL

The materialization of most interventions shows great resemblance of the original building. The new balconies are constructed in a similar brick and the new fences are inspired by fences of the neighborhood. The combination of brick walls and metal sheets is a contemporary reference to the past according to the only brief explanation of the architect.

The added storey clearly deviates from this conservative approach. The character of the new storey is much more open. The used materials are lightweight and minimally dimensioned. Instead of brick pilasters the floor to ceiling windows span most of the façades. Instead of brick the balustrades are finished with zinc plating. The thin roof edge, supported by slim steel cantilevers do match the white color of the other window frames.

In existing floors, the original windows stiles are replaced with new aluminum frames. They are placed within the original wooden framework (figure 35). To improve the energetic performance, insulation has been placed around the inside of most of the existing walls and on top of the new balconies.



FIGURE 32. COLOR EXISTING MASONRY AND NEW PLATING

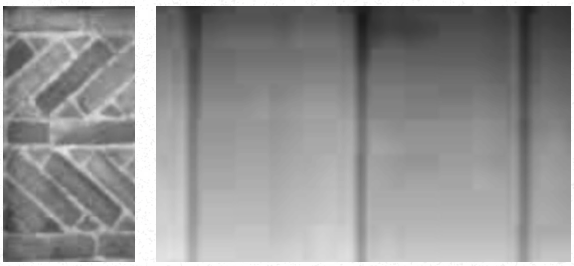


FIGURE 33. TEXTURE EXISTING MASONRY AND NEW PLATING

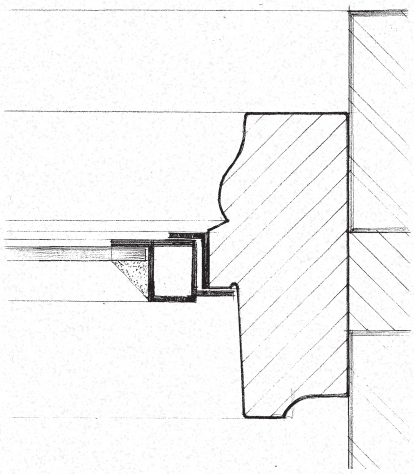


FIGURE 34. OLD WINDOWFRAMES

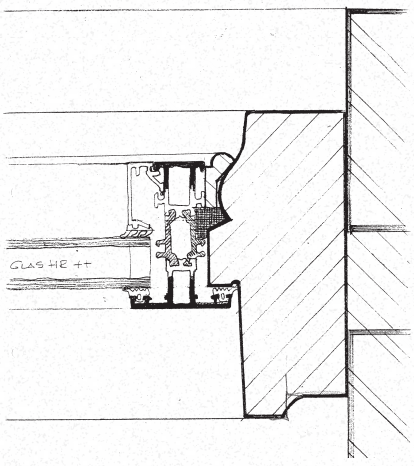


FIGURE 35. NEW WINDOWFRAMES

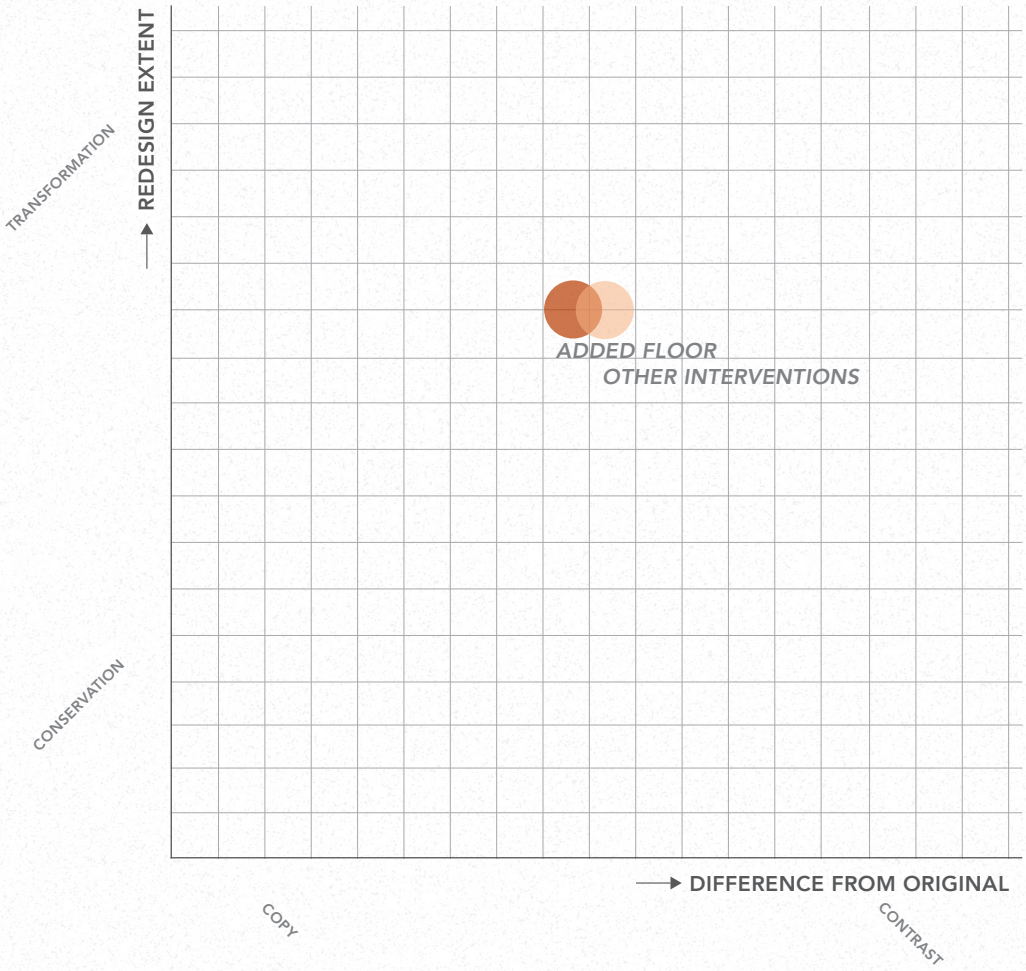


FIGURE 36. STRATEGY GRID

CLASSIFICATION

Considering the entire transformation, two different approaches or strategies are distinguishable. The addition of an extra storey is designed in different materials, yet it conforms to existing rhythm of the façade. The other interventions – like the new balconies or new entrance to the parking garage – are constructed in materials similar to the existing building. Yet their scale is more course than the original building. They become the exceptions on the repeating partitioning of the façade.

Compared to the transformations of the City Halls of Hengelo and Aalsmeer the changes to the building are extensive. The fact that the office in Alkmaar is unlisted allows for these more invasive interventions. This results in a high position on the grid for the extent of the redesign. Whereas the top storey and the rest of the building show different redesign strategies, they are indicated as two different elements on the redesign strategy grid. Because both strategies seek connection as well as contrast their position on the grid is rather similar, despite their different nature.









FIGURE 37. OPTIONS FOR RESIDENCES NEAR THE ANWB OFFICE

OPTIONS FOR RESIDENCES NEAR THE ANWB OFFICE

The large office designed by Berghoef soon proofed to small for the rapidly expanding ANWB. In 1973, 1993 and 2003 multiple new buildings were built around the original building of Berghoef. At this moment there are plans to demolish all but the two original buildings and build large apartment buildings instead (figure 38). The original buildings will serve a new function, but remain intact as they are protected by their listing as national monuments.

The new buildings will be designed by MLA+ architects. To allow for local residents to participate in the design process they developed three concepts for the new apartments. The first concept, 'Garden ensemble' is inspired by the monumental buildings of Berghoef.[10] The concept consist of ten different buildings which are grouped around collective gardens. The use of brick and the colors similar to the monuments ensure a clear resemblance. To enhance the relation the horizontal and vertical partitioning of the monuments is also present in the new buildings.
The 'Parkforest' consists of three layers.[10] The bottom layer is materialized rather similar as the monumental buildings. The middle layer seeks for a relation with the forest and the top layer is meant to stick out. This concept seeks for some connections with the monument by having a similar height as the monumental building for most volumes, and a similar materialization.
The 'dune landscape' seeks for unity within the apartment buildings but a clear contrast with the monument. The fluid shapes are meant to resemble its green environment.[10]
All three concepts will be further analyzed based on the documentation which was available.

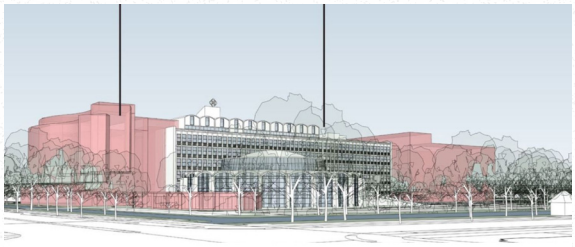


FIGURE 38. DEMOLITION OF EXTENSIONS

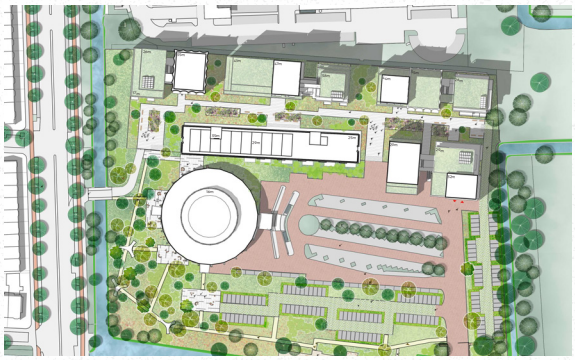


FIGURE 39. PLAN VIEW 'GARDEN ENSEMBLE'

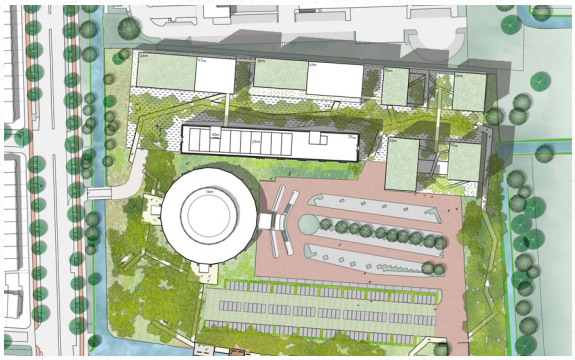


FIGURE 40. PLAN VIEW 'PARK FOREST'

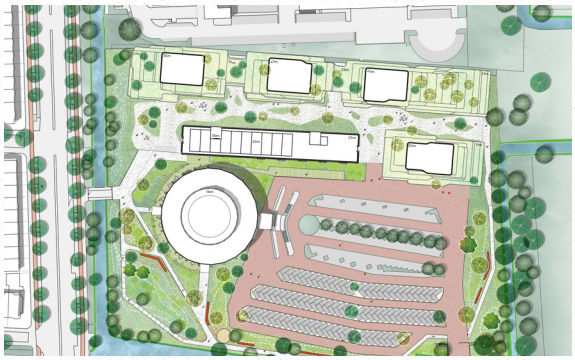


FIGURE 41. PLAN VIEW 'DUNE LANDSCAPE'

COMPOSITION

As stated by the architects, the 'Garden Ensemble' clearly aims for resemblance of the monumental building. A similar vertical and horizontal partitioning is present in both facades. By placing the windows asymmetrically in relation to the negge's a larger area of masonry surrounds the windows. This contributes to the contemporary appearance of the façade.

The 'Park Forest' concept maintains the vertical partitioning of the façade. By using different height-width ratios the similarity with the monumental building is reduced. The wide windows and the diagonally cut negge's work as proof that the building is a contemporary version of a partitioned façade. The balconies comply to the vertical rhythm of the façade.

The 'Dune Landscape' makes a clear contrast with the monuments. Instead of a vertically partitioned façade, the wide ties continue all along the façade. They create a strong horizontal segmentation, stressing the presence of the floors. The windows and walls alternate in an irregular rhythm, contrary to the office of the ANWB.

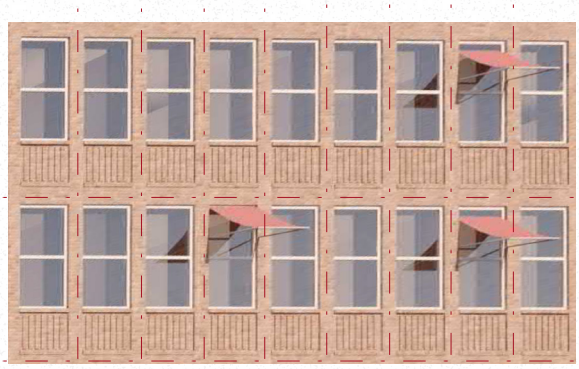


FIGURE 42. FACADEFRAGMENT ANWB OFFICE

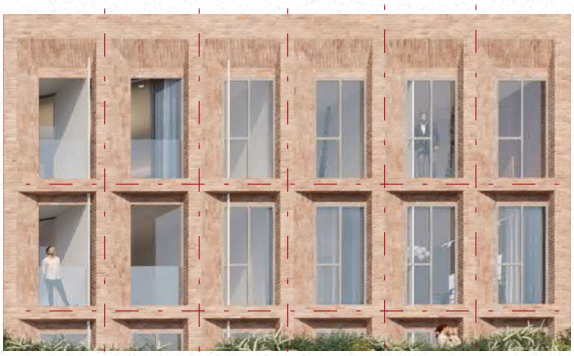


FIGURE 43. FACADEFRAGMENT 'GARDEN ENSEMBLE'



FIGURE 44. FACADEFRAGMENT 'PARK FOREST'



FIGURE 45. FACADEFRAGMENT 'DUNE LANDSCAPE'

MATERIAL

Similar to the compositions, the three concepts move from resembling to contrasting with the monumental buildings.

The 'Garden Ensemble' solely has masonry facades. The color is rather similar to the orange-grey masonry of Berghoefs buildings, just as the texture.

The 'Park Forest' concept has timber slats as façade finish. They have a natural wood color as they are not painted. The slats do have joints but far less than a masonry finish has. Combined with a less rough material surface this ensures a smoother texture compared to the monuments.

The 'Dune Landscape' again clearly contrasts with the monument. The plating has a smooth surface, has no visible joints and folds along the façade. Its light color also counterparts the darker masonry of the buildings by Berghoef.



FIGURE 46. COLOR EXISTING AND 'GARDEN ENSEMBLE'



FIGURE 47. TEXTURE EXISTING AND 'GARDEN ENSEMBLE'



FIGURE 48. COLOR EXISTING AND 'PARK FOREST'

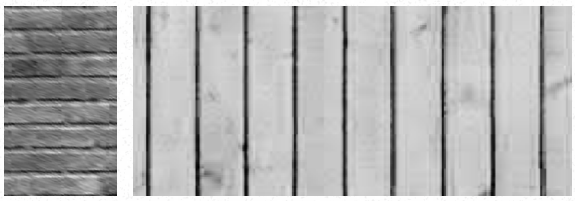


FIGURE 49. TEXTURE EXISTING AND 'PARK FOREST'

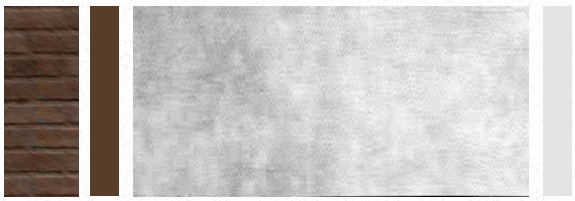


FIGURE 50. COLOR EXISTING AND 'DUNE LANDSCAPE'

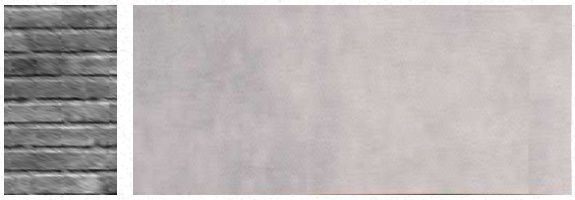


FIGURE 51. TEXTURE EXISTING AND 'DUNE LANDSCAPE'

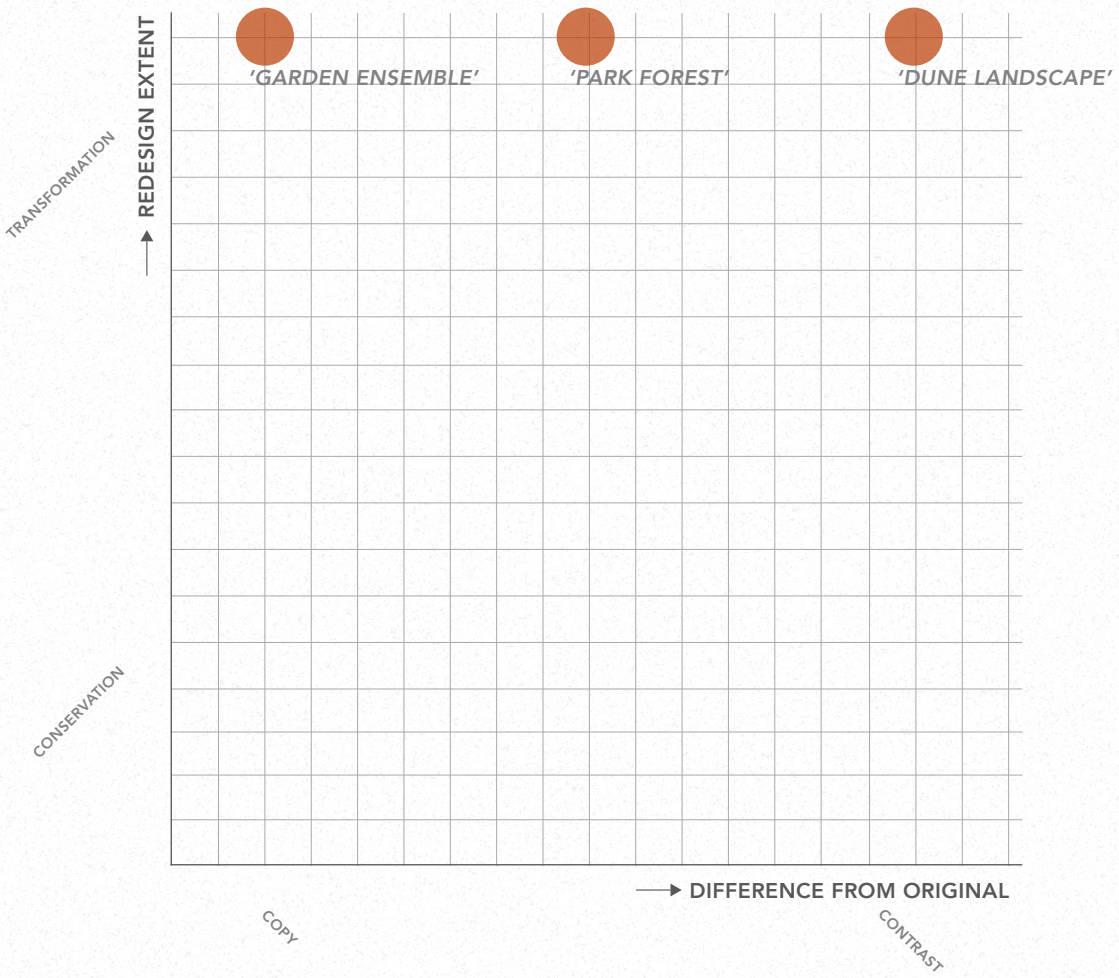
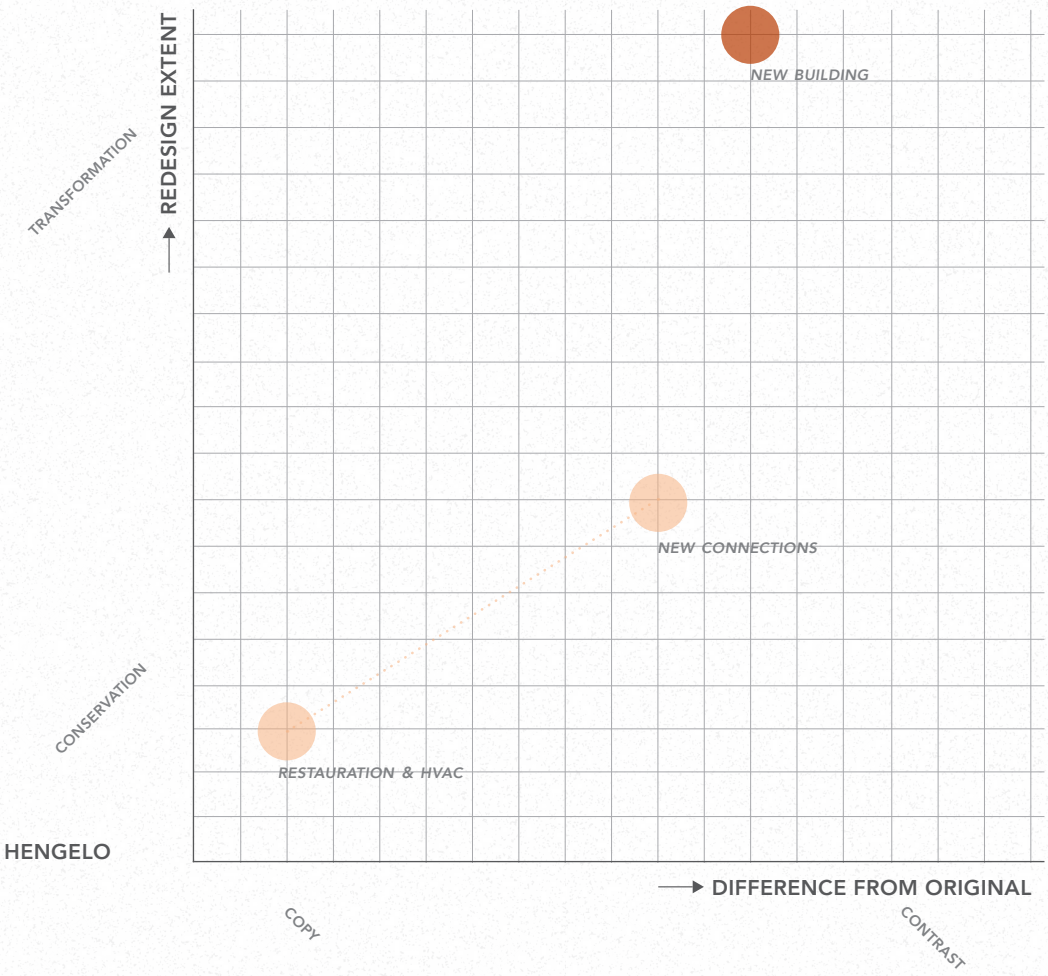


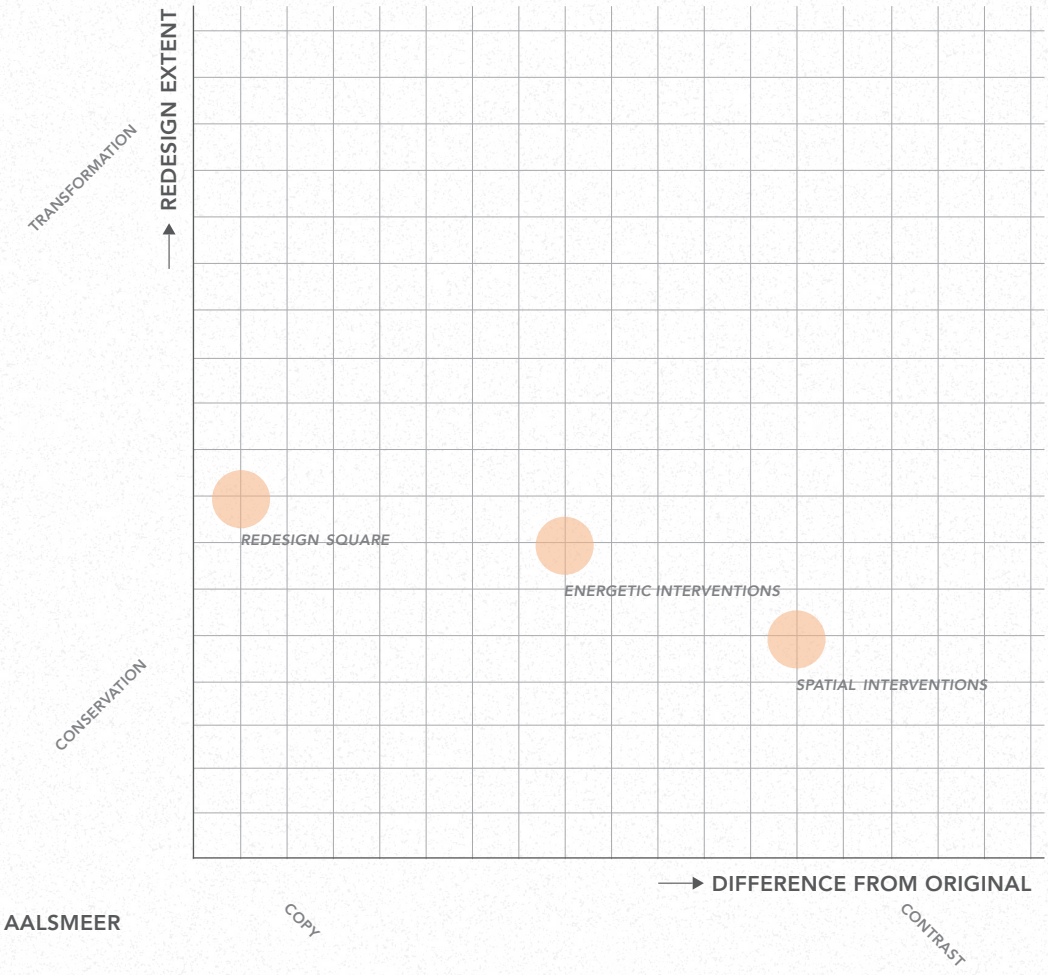
FIGURE 52. STRATEGY GRID

CLASSIFICATION

The applied strategies are clearly distinguishable. Their relation to the monumental buildings differs from mimicking the partitioned composition and material choice of Berghoef till seeking contrast in both material and composition by designing a large, fluidly shaped apartment block. These three strategies translate into three distinct positions on the strategy grid. The 'Garden Ensemble' very near 'copying' and the 'Dune Landscape' to the far rights of contrast.

As all concepts entail an entire new building, their redesign extent is similarly and has a high position on the 'redesign extent'- axis.


REDESIGN EXTENT
TRANSFORMATION
CONSERVATION
NEW BUILDING
NEW CONNECTIONS
RESTAURATION & HVAC
HENGELO
DIFFERENCE FROM ORIGINAL
COPY
CONTRAST


REDESIGN EXTENT
TRANSFORMATION
CONSERVATION
REDESIGN SQUARE
ENERGETIC INTERVENTIONS
SPATIAL INTERVENTIONS
AALSMEER
DIFFERENCE FROM ORIGINAL
COPY
CONTRAST

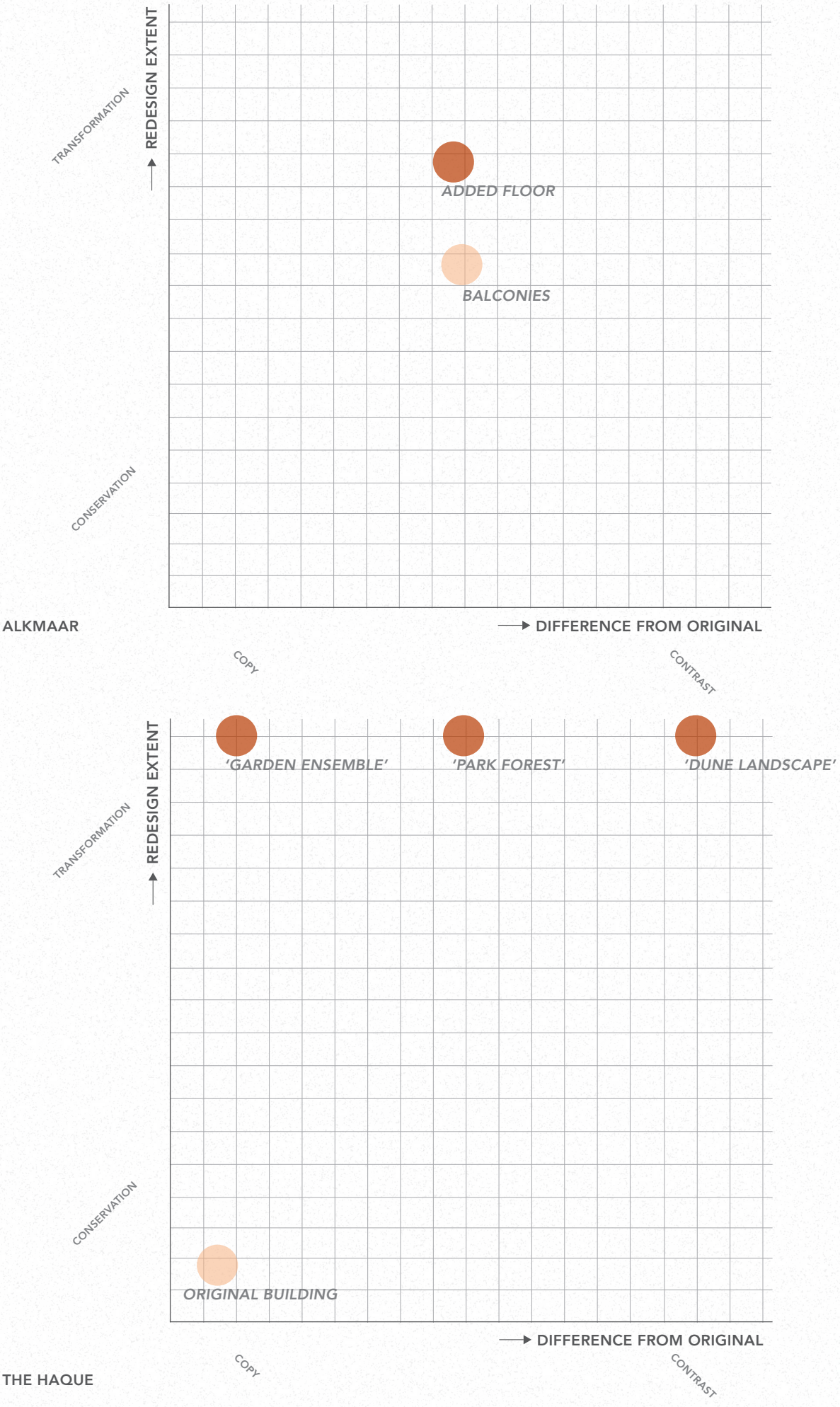


FIGURE 53. OVERVIEW REDESIGN STRATEGY GRIDS

CONCLUSION

Redesign extent

When the strategy grids of the four case study buildings are compared, it comes forward that a heritage listing of the buildings influences the extend of the redesign. Both of the national monuments (The Haque and Hengelo) have endured little changes in their redesigns. New program is housed in new buildings which are positioned separate from the monument thereby allowing some contrast with the original building. The transformation of the City Hall in Aalsmeer, a municipal monument, had a slightly larger extent. Aside from renovation it also entailed a new entrance. The unlisted office building in Alkmaar underwent a more invasive transformation. A new storey was built on top and the façade changed significantly to accommodate a new housing function. It seems the greater design freedom which exists when working with unlisted buildings allows for major function changes which are more difficult in listed heritage.

Different strategies in one project

A reoccurring strategy found in the case studies is the aim for recognizable contemporality of the spatial interventions. New entrances, hallways and other elements which influence the spatial experience of the monument are often designed in different materials than the original building. The materials contrast with the original because they are clearly newer. Extreme contrasts were not the aim. The interventions usually distance themselves from the original building by creating actual physical distance between new and old and connecting only at a limited number of points.

In case of smaller interventions, usually with a more technical nature, the aim for recognizable contemporality seems to drop. It resulted in a separation between the spatial and technical interventions on the strategy grid.
In the studied examples, technical installations - like ventilation ducts – are often fit in the existing or partially hidden. The proof of their later addition is hereby often lost. The concept of reversibility – not making changes to monuments which cannot be undone – is often compromised in these situations.

To copy or to contrast

The great advantage of the strategy grid is the simplified overview of it provides. It is a useful tool to discus and relate different strategies. At the same time, the simplification means that some of the complexity and nuances in different strategies were unexposed.

This became especially clear when studying the relation between existing buildings and later additions. Instead of having 'copying' or 'contrasting' as overarching strategy, architects used varying tactics on the different building elements. Within the four studied redesigns I found three different strategies to relate the new additions to the existing buildings. The new buildings seek connection with the existing monument by resembling its material, resembling its composition or by reinterpreting its design intentions.

In case of the office in Alkmaar, the curtain wall of the added storey complies to the existing partitioning of the brick façade. The balconies on the other hand are also added later but designed in the same material as the original building. As they do not comply with the existing façade partitioning, they draw focus, but the proof of their later addition is lost.
The new building next to the city hall of Hengelo reinterprets the references to local characteristics of the original building by having an image of a local salt tower perforated in the façade cladding

As more than one strategy can be applied within the same project, a uniform label, categorizing the entire redesign strategy, seems misplaced. The simplified 'dot' on the strategy grid can be specified per intervention. Figure 54 shows the initial and specified categorization of the redesign of the office in Alkmaar. The added storey and balconies are now categorized as two separate interventions which each apply different strategies to relate the intervention to the existing building.

The specified categorization does justice to the complexity of redesign assignments, yet thereby loses its clarifying function.

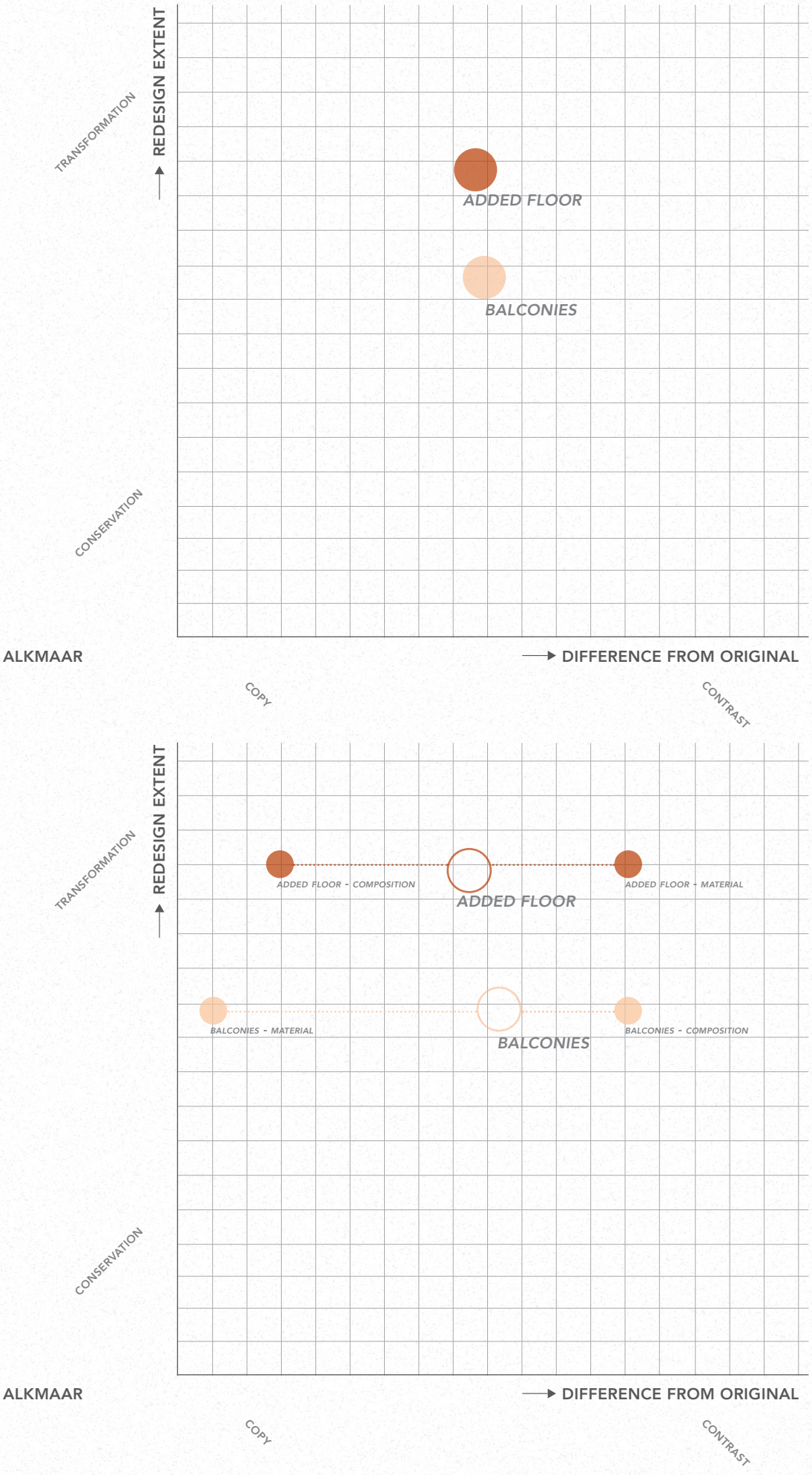


FIGURE 54. DETAILLED STRATEGY GRID

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6. Berns, C. (n.d.) Inside momo: De renovatie van het raadhuis van Hengelo

7. Berns, C. (2021) Interview by author

8. EGM (2020) Projectmagazine Stadhuis Hengelo

9. Van Baalen (2021) Interview by author

10. MLA+ (n.d.) Three scenarios ANWB Headquarters The Haque

FIGURES

1. Image by author

2. EGM (2020) Projectmagazine Stadhuis Hengelo

3. EGM (2020) Projectmagazine Stadhuis Hengelo

4. HVE (n.d.) Renovatie Stadhuis Hengelo

5 -8. EGM (2020) Projectmagazine Stadhuis Hengelo

9-10. Image by author

11. EGM (2020) Projectmagazine Stadhuis Hengelo

12. Image by author

13. Brandjes van Baalen Architecten (2018) Verbeteren toegankelijkheid gemeentehuis Aalsmeer

14-16. Brandjes van Baalen Architecten (n.d.) Monumentaal Raadhuis Aalsmeer

17-20. Brandjes van Baalen Architecten (2018) Verbeteren toegankelijkheid gemeentehuis Aalsmeer

21-22. Image by author

23-24. Brandjes van Baalen Architecten (n.d.) Monumentaal Raadhuis Aalsmeer

28. Image by author

29. Van der Borden (n.d) Costerstraat 34 te Alkmaar

30-34. Van Hoeken Thoes Architecten (1999) Plantekeningen Costerstraat 24-28, Archief Gemeente Alkmaar

35-36 Image by author

37-38. Van Hoeken Thoes Architecten (1999) Plantekeningen Costerstraat 24-28, Archief Gemeente Alkmaar

39. Image by author

40-48 MLA+ (n.d.) Three scenarios ANWB Headquarters The Haque

49-54 Image by author

DESIGN EXPERIMENTS

The third part of the research consists of design experiments. The theoretical redesign strategy inventory and the case studies created a body of knowledge which I can draw from. The design experiments are meant to find out which strategies are suitable for the police station in Middelburg.

Designing is an activity which requires constant decision making. Not all these decisions are rationally substantiated as creativity is a factor within the design process. It makes designing an implicit activity (Van Dooren, 2014). During the redesign of the police station I had to take many decisions and to do so I have experimented with many different options per problem. In the upcoming chapter I've selected the most essential design decisions and tried to make explicit what led me to my decisions.

INTERIOR DESIGN

The original interior design of the police station is sober and practical (figure X). The brick walls are left unfinished, as are the doorframes. The steel doors break the length of the hall. With Berghoefs view on architecture in mind, the beauty of the hallway should be seen in its simplicity and unfinished material palette.

During a renovation – visible in figure X - all elements in the hallway have been painted white. Most likely this was an attempt to make the hall a lighter place. Due to the width to length ratio and the absence of windows the hallway was indeed a poorly lit place. By painting all elements white, the renovation has reduced this problem to some extent. The drawback of this solution was that it covered all material colors and textures which from which the hallway derived its beauty.



FIGURE X. ORIGINAL DESIGN



FIGURE X. CURRENT SITUATION

A solution which would solve the inadequate lighting and revive the original beauty of the hallway is to remove the paint and allow more daylight to enter the hallway. To do so, the light which enters the adjacent rooms should reach the hallway.

The most straightforward option is to remove large parts of the walls. It results in a large open space; the perception of a hallway has nearly disappeared (figure X). Just as the materials from which the hallway derived its beauty. Therefore, this solution seems too radical. The contrast with the original situation is too sharp. Besides, the functionality of the different rooms is jeopardized by removing the audiovisual boundaries between them.



FIGURE X. ALL WALLS REMOVED

A second option would be to place glass walls between the rooms and hallway. This way the rooms can function separately from the hallway. The solution is functional and improves the inadequate lighting, yet the original hallway is unrecognizable (figure X).



FIGURE X. GLASS WALLS

The third solution, shown in figure X, is to shorten the darker parts of the hallway. By creating an open space at the end of the hallway, the length of the hallway is reduced. Therefore the light which enters on the short sides of the hallway makes a greater contribution to entire lighting of the hall. The functions in adjacent rooms and the large open space at the end will have to allow for this change.

Because more light enters the hallway from the short sides, the white paint can be removed to uncover the original material textures which belong to the original design. The hallway can still be preserved as hallway, although shorter.



FIGURE X. SHORTENED HALLWAY

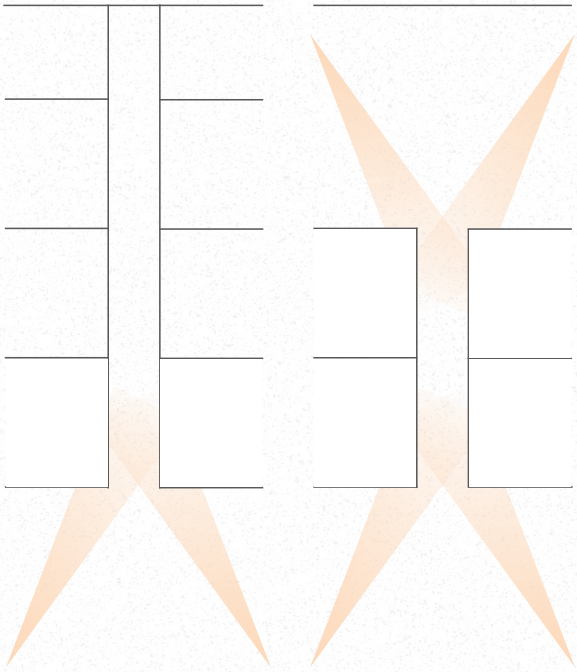
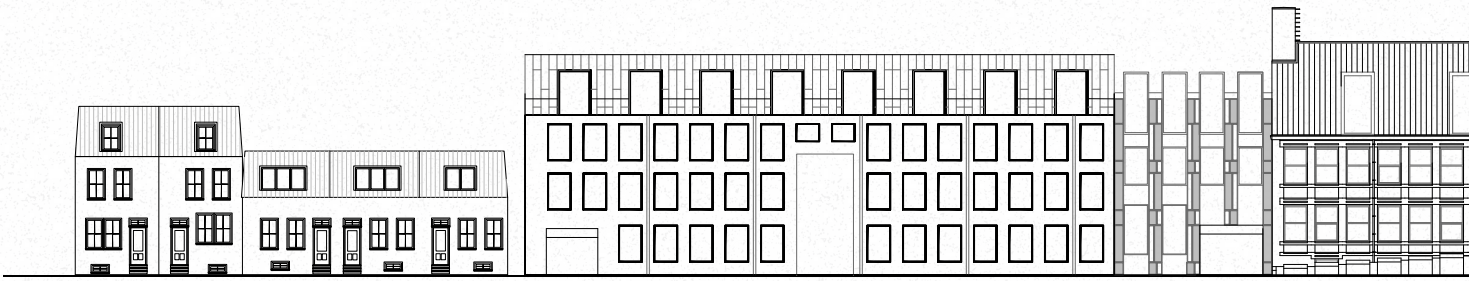


FIGURE X. SHORTENED HALLWAY PRINCIPLE

CONCLUSION

The renovation in which the hallways were painted white did not consider the qualities of the original design when searching for a solution. The white paint did improve the lighting of the hallway but simultaneously diminished the beauty of the hallway by covering its material palette. A solution which both brings back the original material textures and solves the inadequate lighting is found in shortening the hallway. This solution has a clear effect on the organization of the floorplan. Fortunately, this diversification of spaces is beneficial for the new use as faculty building.



FIRST DESIGN



FINAL DESIGN

FACADE - EAST

The appearance of the façade is an essential element within the design for multiple reasons. To start, the buildings will be part of the protected historic city scape of Middelburg and therefore need to fit with their surroundings. Furthermore it is the intention to create an ensemble of buildings which are clearly related to the police station. From my research into renovations of other buildings of Berghoef came forward that strong visual relations are created by resembling the composition of the monumental building.

Resembling is distinctly different than copying. The new buildings serve different functions and are constructed 55 years later. In order to maintain a certain veracity, this should be perceivable as such.

To achieve the visual relation, I have designed many variants of the facades. I will discuss a selection of them to provide insight in the design process and to draw lessons from it.

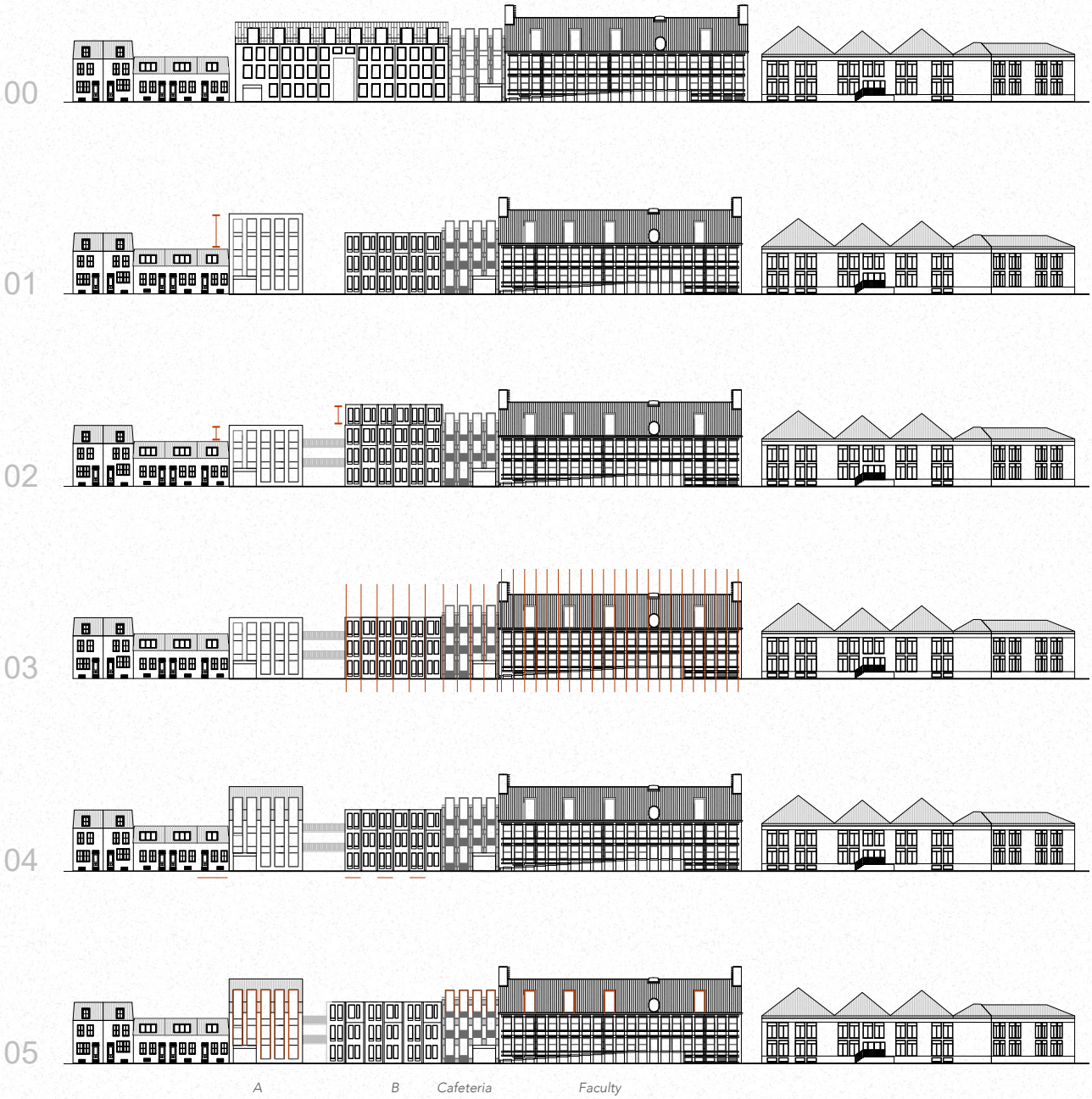




At the start of the project I envisioned the student housing and faculty building as two worlds which were connected by the cafeteria. As a result, the housing building is of similar scale and height as the former police station. The scale of both buildings matches the scale of the hotel on the right side, but they are especially large compared to the houses on the left side.

The façade of the cafeteria is meant as contemporary variant of the police station. The roof and windows align with the window height and dormer height of the police station. The 'negge's' are materialized in glass. The framing aligns with the windows of housing building two. By doing so the cafeteria forms the link between faculty and housing.

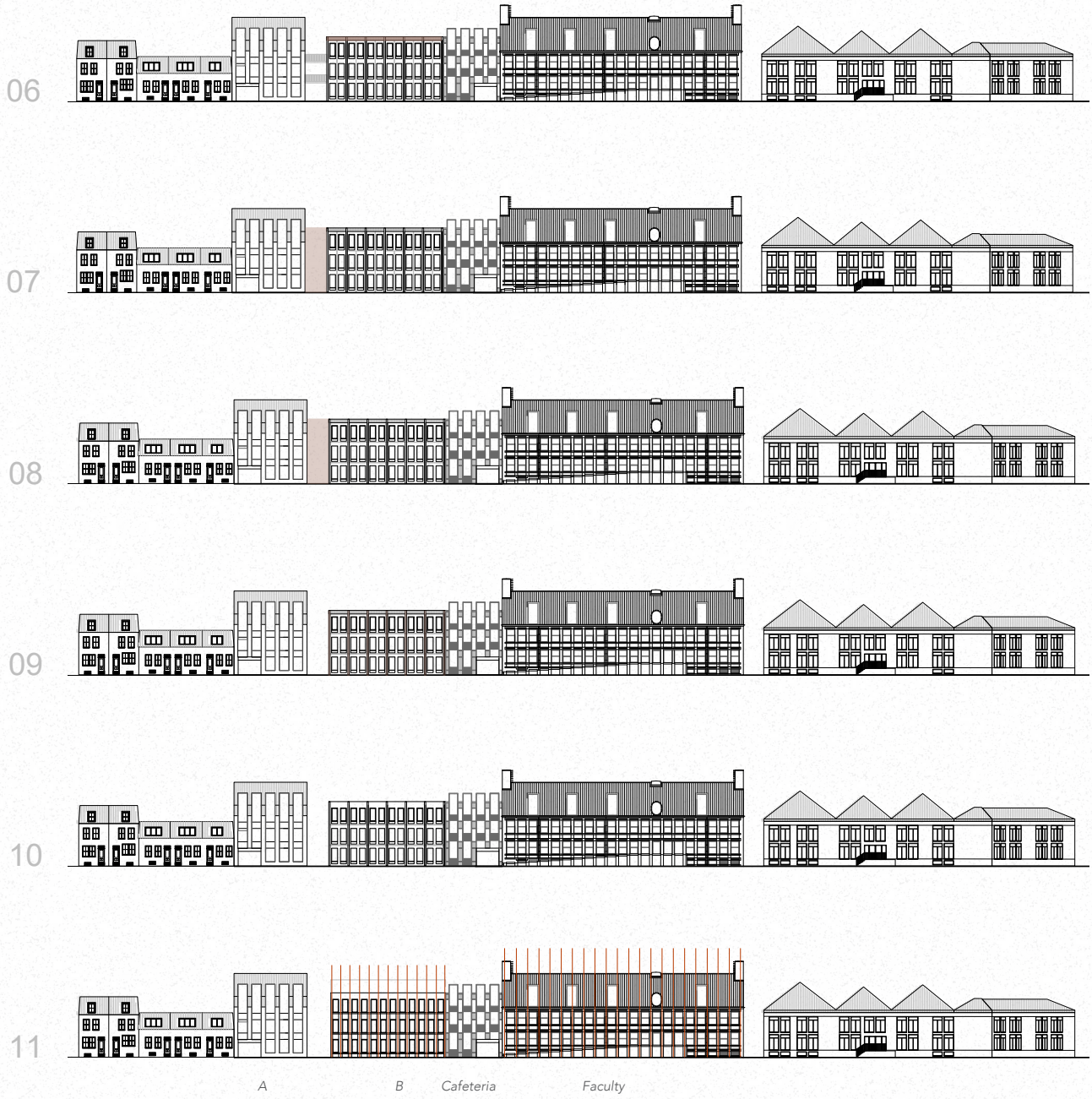
Later the relation between the buildings changed. They were no longer meant as one building complex but as a group of buildings which forms an inner-city campus. This meant the faculty buildings, cafeteria and housing buildings should all be perceived as separate buildings. It allowed for the housing buildings to be separated in smaller volumes which better fit the position in the protected cityscape.



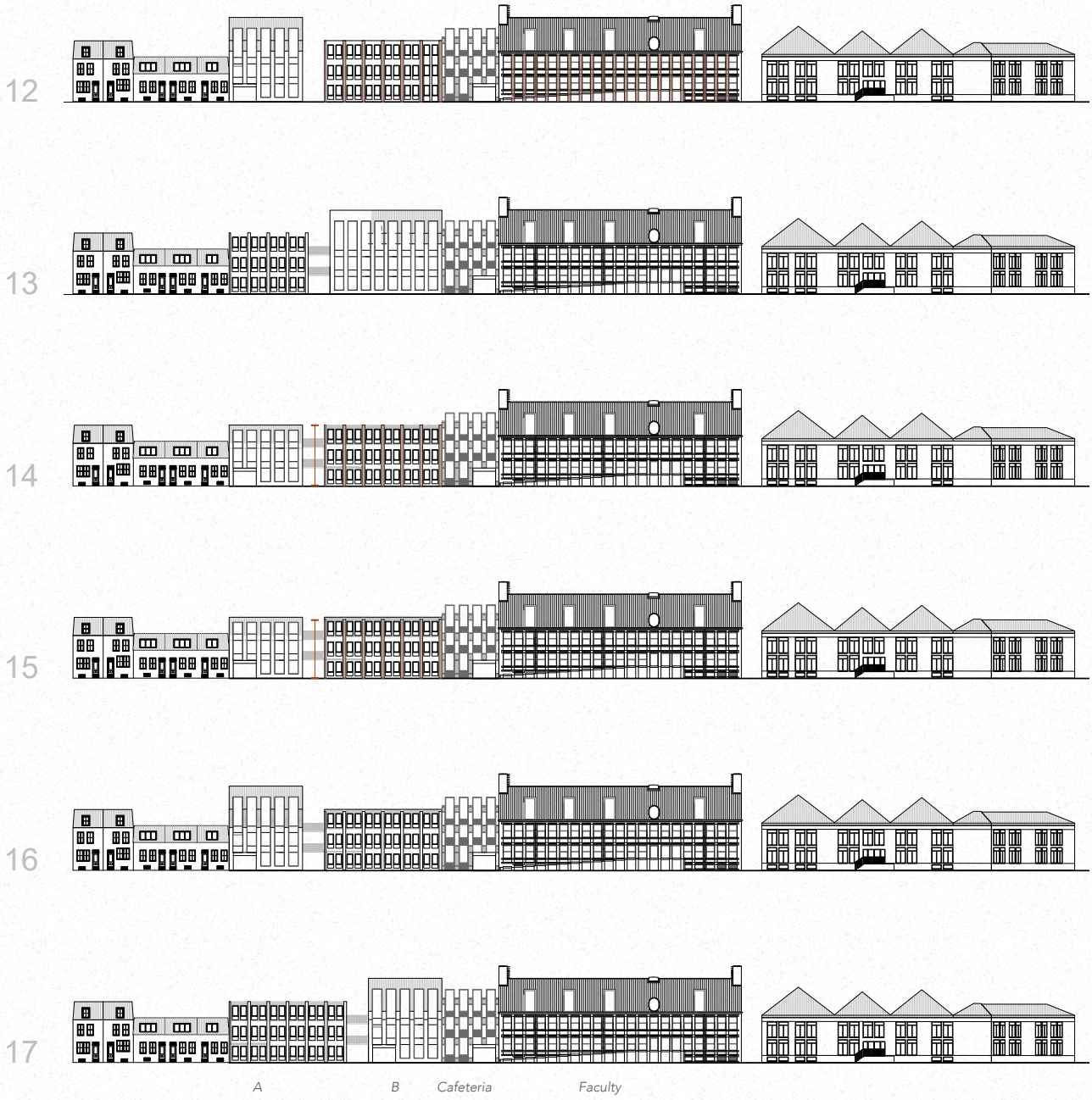
After several variants I concluded that the height of the buildings should be three storeys or around ten meters. This ensures an acceptable height difference with the houses on the left side.

The main idea behind the façade of housing building two is to resemble the vertical partitioning which characterizes the police station and combine this with a more residential module width. Therefore the vertical accents are placed so they create modules of two windows wide. This double wide module width approaches the width of the houses on the left. As the vertical partitioning has a different width then the partitioning of the police station the relation is not clear at first sight.

To link the buildings, I created similar design elements which link all buildings. They are highlighted in variant 5.



In variant 6, 7 and 8 the effect of the presence of the balconies in the facade is tested. I concluded that the balconies can strengthen the link between the buildings.
In variant 11, the relation between housing building two and the police station is created by designing the housing building as a typical Berghoef façade. The characteristics of this façade are derived from the research. It is based on repeating modules which consists of a window and parapet underneath, separated by 430 mm wide negge's. The typical Berghoef façade is applied in public buildings and seems to monotonous to be suitable for housing buildings.



By increasing the size of the negge's for housing building B in variant 12, the negge's can be more clearly understood as meant similar to the police station.

In variants 13 till 17 I've experimented with variations in building height. Variant 14 and 15 show how the vertical partitioning elements of housing building B are lowered. By not extending the elements completely till the roof, the composition relates more clearly to the composition of the cafeteria.



In variants 18 and 20, a composition with two similar buildings is drawn. As these are not coherent with the concept of 'a campus as a group of different buildings', I did not continue on this line of thought.
Variants 19-23 show various attempt to create more continuity along the different facades by applying masonry with relief to imitate the rooftiles of the adjacent houses.



FIRST DESIGN



FINAL DESIGN

FACADES - WEST

Like the buildings directly adjacent to the police station, the buildings at the north side of the campus should be part of the recognizable ensemble of the campus buildings. To create a clear visual relation, the aim is to resemble the composition of the police station in the new buildings. The most present characteristic of the police station is its vertical partitioning of the façade. The design for the new buildings takes this as starting point.







1. The first variant creates vertical partitioning for the faculty building and housing building D by placing masonry bands 110 mm outwards. The masonry bands provide room for the downspout. The masonry bands are placed every other window to match a more residential module width. In housing building C, the vertical partitioning is stressed by varying the depth of the glazing. Glazing deep in the masonry is alternated with glazing set flush with the masonry. This is not visible in this drawing.

2. The wall and ramp in front of the parking garage is partitioned in the same rhythm as the facades above. Two reasons substantiate this decision: the long ramp is visually split, making it more interesting to look at and the partitioning is a continuation of the columns in the façade of Erfgoed Zeeland. By continuing the columns, consistency is added to the appearance of the entire backside of the city block. This contributes to the understanding of the campus as an ensemble of buildings.

3. Housing building D is not only vertically partitioned but also horizontally. The advantage is the more complete appearance of the eave. The horizontal partitioning seems to stress the construction of the building out of prefabricated modules. This is not the aim. The horizontal partitioning will not be realized.

04



05



06



4. In accordance with the facades of housing building A and B, relieved masonry enriches the top two storeys of housing building D. By applying an import characteristic of housing building A and B on building D as well, the relation between the east and west buildings is strengthened.
5. The relieved masonry is also applied on housing building C. This improves the visual connection with building D.
6. A new composition for housing building C is tested. To match the grain size of the historic city surrounding the campus, the new façade composition visually splits the housing building in five parts. By adding masonry bands of 210 mm thick on the left, right and topside of two adjacent modules, a 6-meter-wide segment is created

07



08



09



7. The next variant changed the number of windows per room from three to two. The two separate windows show more resemblance to the facades of the other housing buildings and the former police station. Thereby this variant has a stronger relation with the ensemble.
8. Two create a more diverse façade image, and easier openable windows the frame layout of variant 8 changed. By making a bottom and top window the openable part is smaller and more easy to use.
9. To match the complexity of the façade of the former police station, which has both a vertical as a horizontal partitioning, variant 9 is also designed with horizontal accents. A slim steel profile in front of the floorslab segments the building.

10



11



12



10. The tenth variant is an attempt to make refine the appearance of the facades of buildings C and D and create a stronger link with the facades of buildings A and B. The first step is to introduce cornices to the top of housing building D, which resemble the characteristic dormers of the cafeteria and police station. Housing building C maintains its partitioning in 5 segments, but the manner in which they are partitioned is more refined. By not extending the partitioning masonry cornices until the roof, just like in housing building A, a stronger relation with the ensemble is obtained.

11. Compared to variant 10, variant 11 introduces more masonry in the façade of housing building C. In variant 10 these parts were envisioned in metal sheeting. The masonry provides a more residential appearance.

12. In the last variant, relieved masonry is added to housing building D underneath the windows. The masonry detail enriches the façade composition and is meant to resemble the concrete lintels of the façade of the former police station. The horizontal metal elements in the facade of housing building C is split into two seperate elements. It refines the composition and allows more masonry in the facade. The added masonry enhances the relation with the other brick buildings in the ensemble, while the dark metal links the housing building with the cafeteria.

DESIGN

As came forward from the research paper, three main factors are at play when redesigning modest valued buildings like the police station: meeting contemporary demands, contributing to the mitigation of climate change and heritage value preservation. The redesign of the police station serves as design experiment to answer the question: *How to redesign the vast late-twentieth century building stock in a way that does justice to its modest cultural value while still enabling a practical and sustainable future use?*

The contemporary demands are described in detail in the paragraph on program. In short, the police station needs to form the perfect study environment for approximately 200 master students of University College Roosevelt. Second it has to meet this demand in a sustainable way. Lastly, while the station has to endure many changes to meet the contemporary demands, it is the aim to preserve the heritage value it conveys as representation of the combination between traditional appearance and innovative structure which characterizes Berghoef. The heritage value of the police station and the work of Berghoef are described in the Research chapter.

The design of the police station is explained in the upcoming chapter, starting with how it meets new demands, then how it does so sustainably. Finally it is explained how the design preserve the heritage values of the police station even though it has to endure many changes.

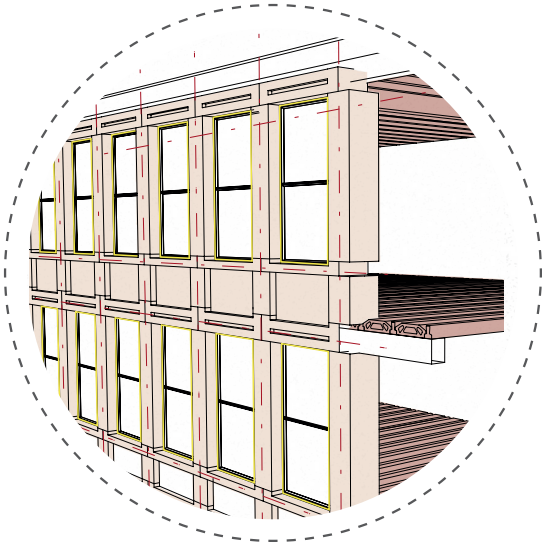
MEETING NEW DEMANDS



SUSTAINABILITY



HERITAGE VALUE PRESERVATION

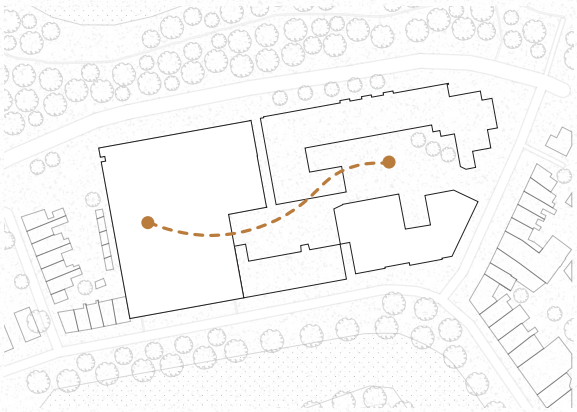


MEETING NEW DEMANDS

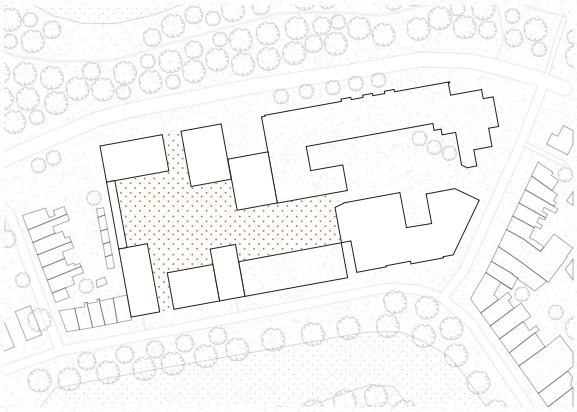
Soon the vacant supermarket and police station will transform into a brand new campus, with housing and faculty buildings. The aim of the design is to create a city block where the different functions actually profit from each others proximity, creating one of the best possible study environments. In the end the value of the city block is greater than the sum of its parts.

The way I intend to do this is by creating a small scale inner city campus, where students live and study, and teachers and professionals work and lecture in a set of buildings which are centered around a new courtyard.

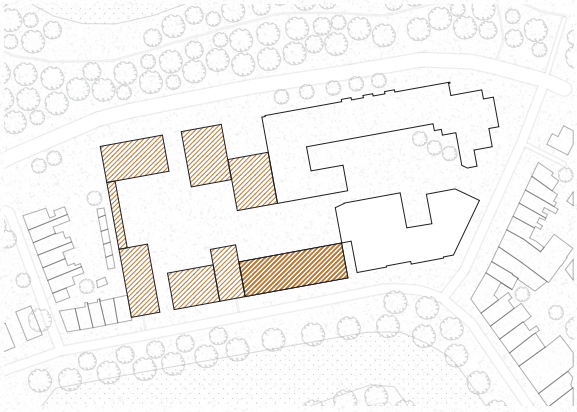
The appearance of all these buildings is inspired by the building who started this entire transformation, the police station.



Added value by creating meaningful interrelations in the city block

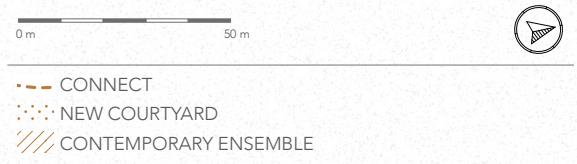


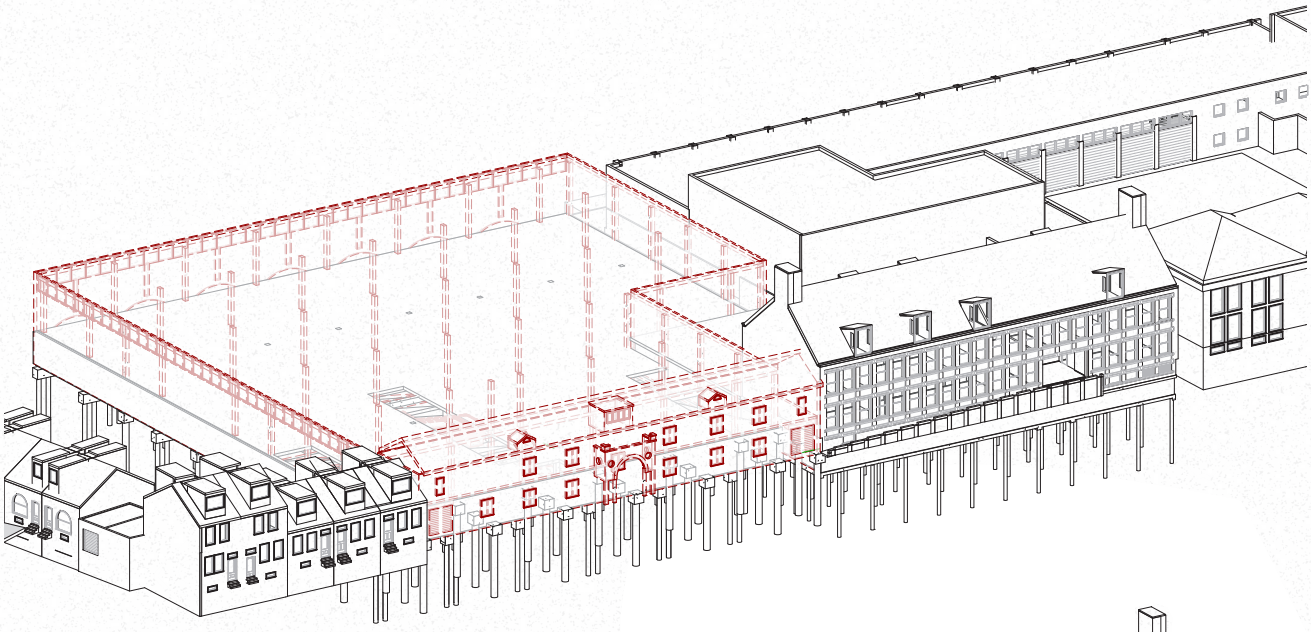
A small scale inner-city campus



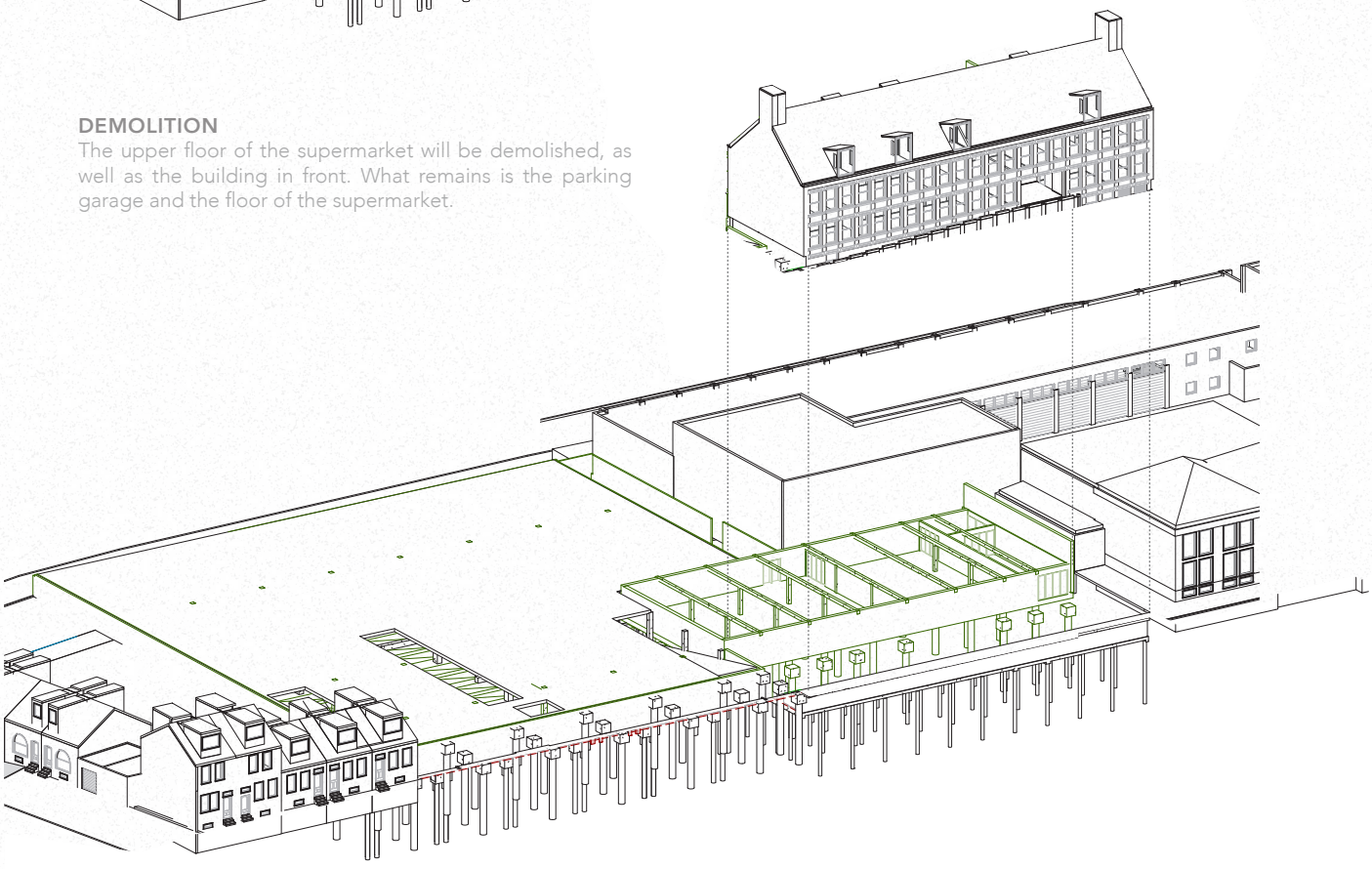
A recognizable ensemble

DESIGN INTENTIONS





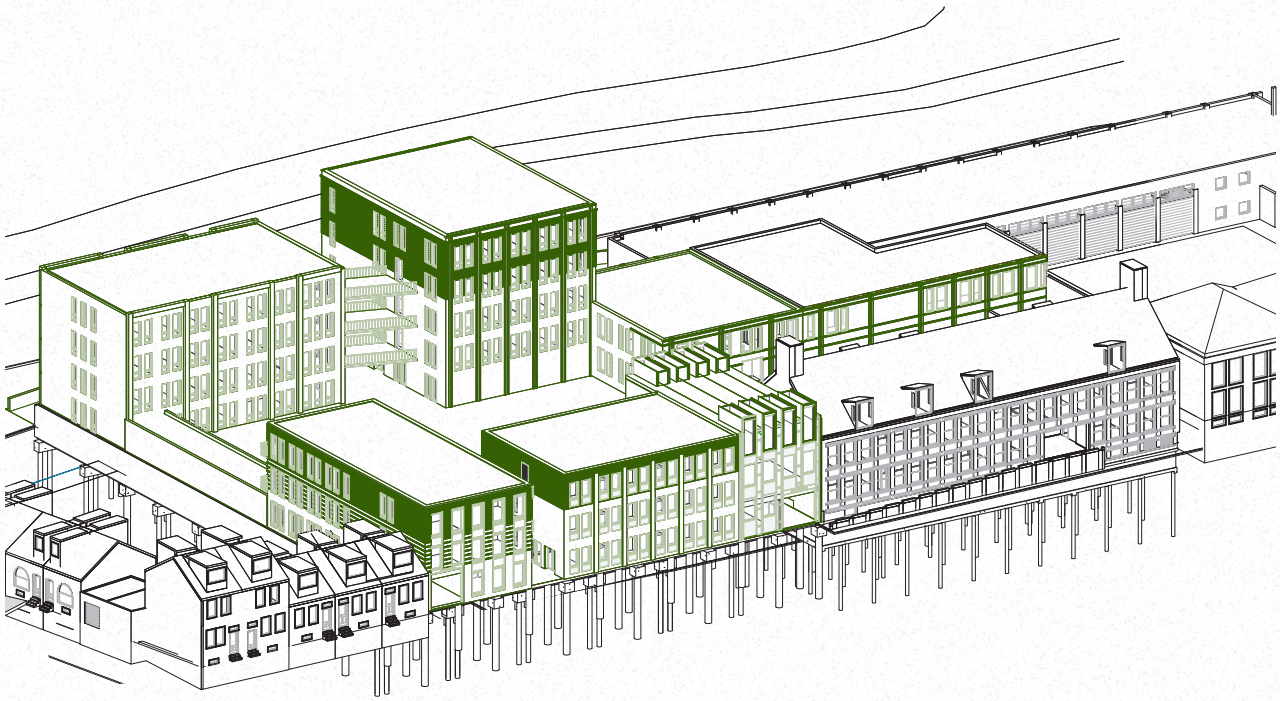
DEMOLITION
The upper floor of the supermarket will be demolished, as well as the building in front. What remains is the parking garage and the floor of the supermarket.



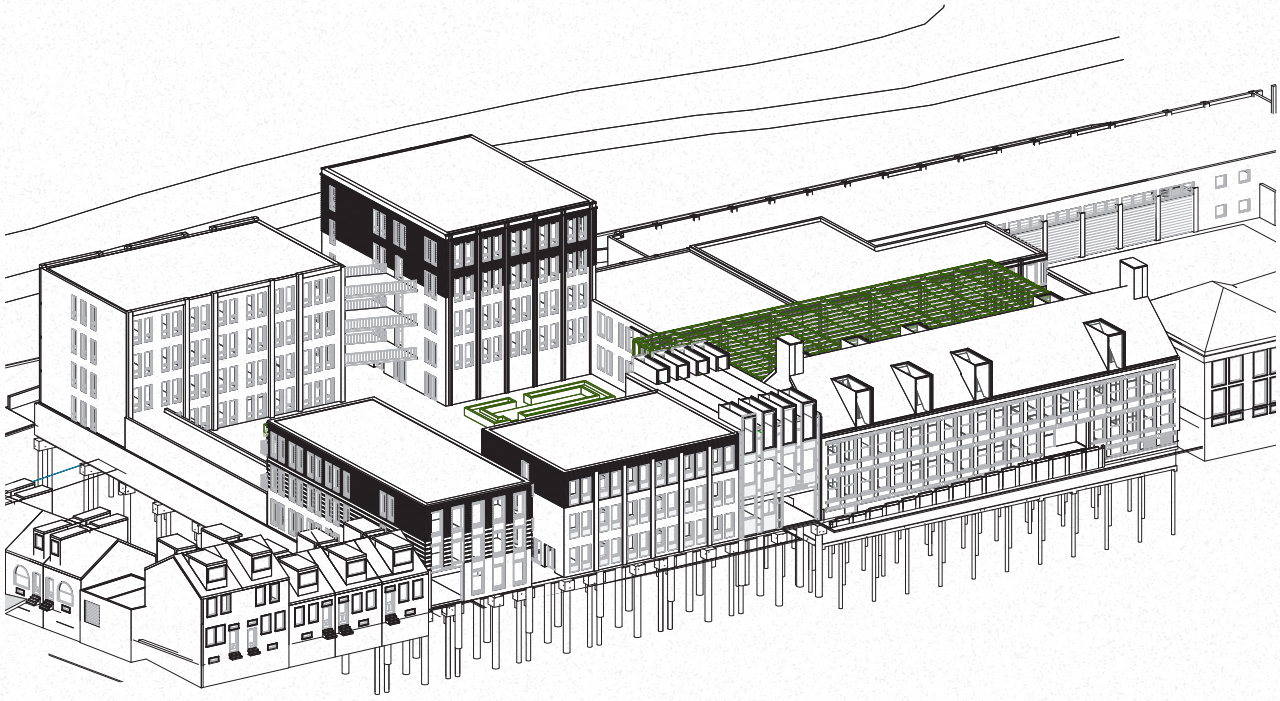
EXTENSION ARCHIVE
The archive of Erfgoed Zeeland is extended into the backyard of the police station by means of a large concrete basement.

BUILDING PROCESS

0 m 25 m



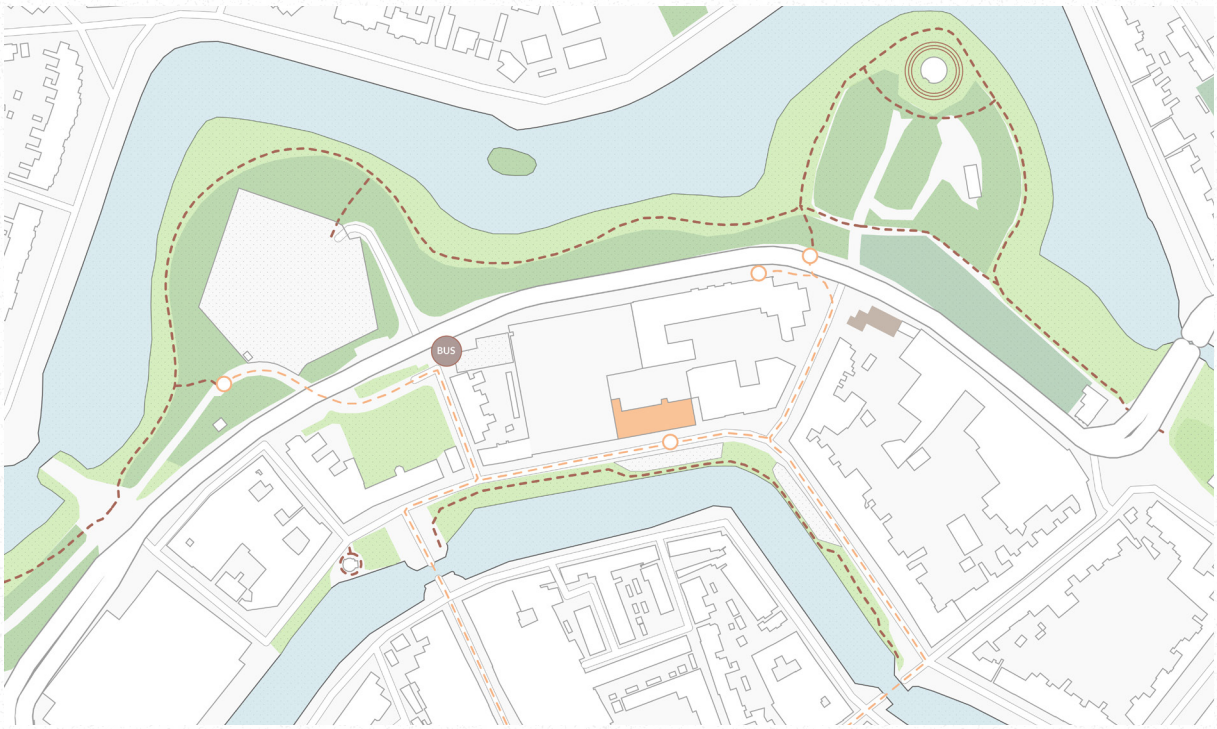
NEW CONSTRUCTION
On top of the parking garage, four new housing buildings, a cafeteria and a new faculty building are realized.



RENOVATION & MAIN HALL
Finally, the police station is renovated into a faculty building. The courtyard between the two faculty buildings is covered and will function as main hall of the complex.

BUILDING PROCESS

0 m 25 m



EXISTING SITUATION

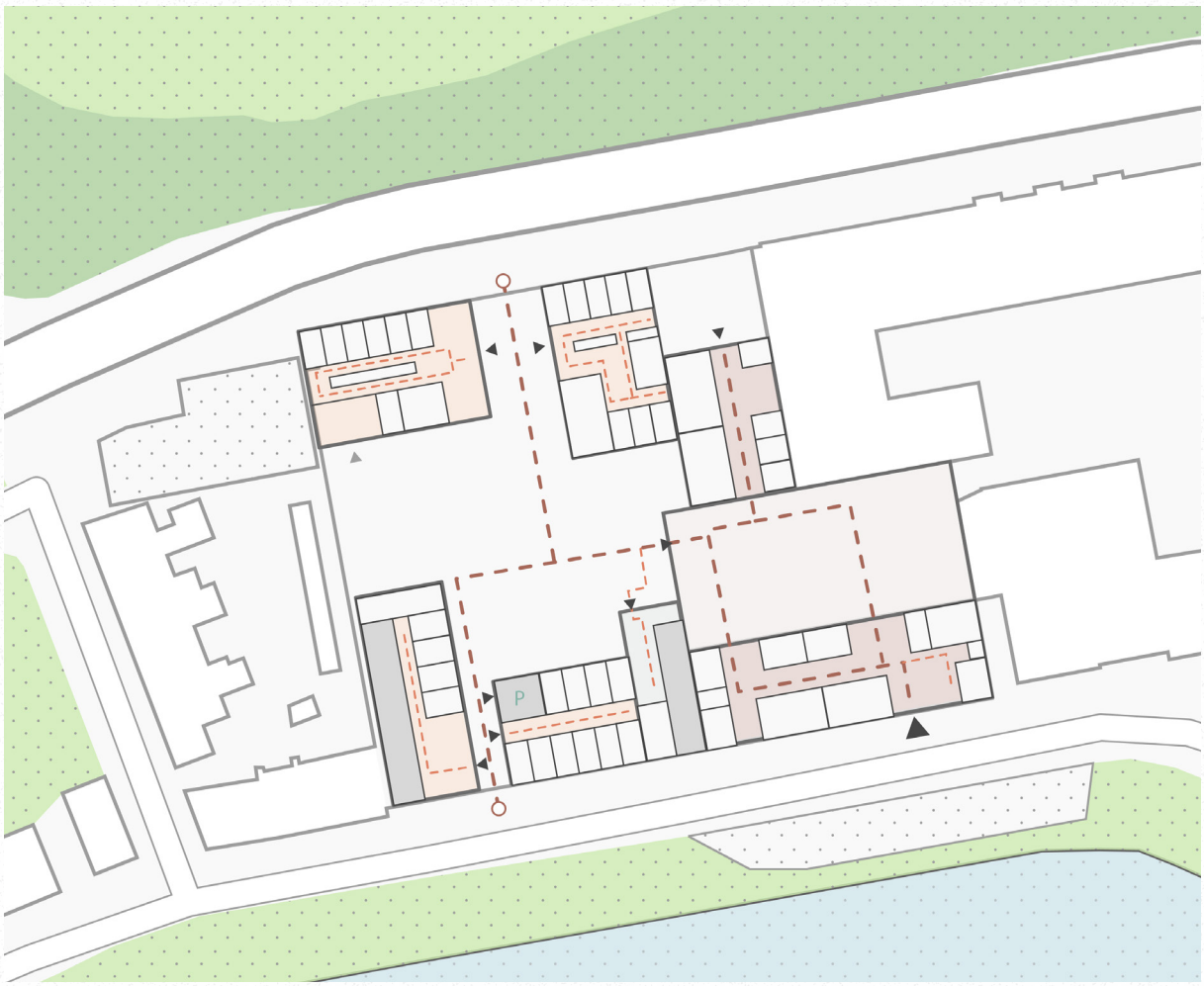


NEW SITUATION

Compared to the existing situation where the supermarket meant a dead part in the city, the new situation adds an extra part of city by creating a new route through the publicly accessible courtyard and a new street which leads from the bus stop to the entrances of the new buildings and the entrance of Erfgoed Zeeland.

SITE





ROUTING

The former police station acts as main faculty building. It has the main entrance and is connected to the middle axis which connects police, main hall and new building, from main hall you can reach the courtyard and restaurant.

SITEPLAN

0 m 150m

MAIN ROUTE
SUBROUTE
ENTRANCE

FACULTY DESIGN

Currently the UCR only offers a bachelor program. There are ambitions to start with a master's program as well. The police station will be the new accommodation for this.

The high-quality education at UCR requires a state-of-the-art accommodation. Like any building, the requirements of faculty buildings are constantly changing. Nevertheless, some important developments can be identified.

DEVELOPMENTS IN FACULTY DESIGN

To start, studying does not only take place just at the faculty anymore; students work on and off campus. It means that when designing a faculty building, one should consider the entire 'learning landscape'. It ranges from the classroom, to the building, to the campus and in the end the city (figure X). The diverse curriculum of UCR requires various spaces. By designing in relation with the 'learning landscape' a diverse and efficient study environment can be realized.

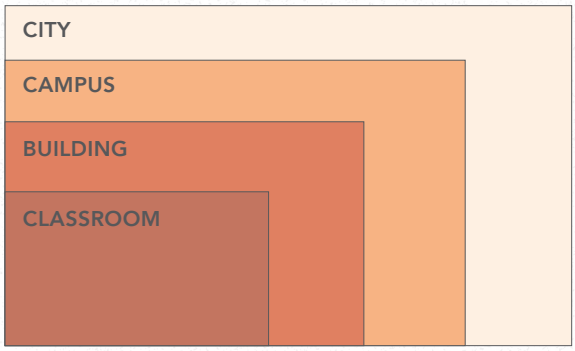
Second, studying does not only take place in a classroom anymore. A diversification of didactic methods means a diversity of needed spaces. Recent years have shown a shift from individual-based learning to more collaborative learning models. Mainly due to the recognition of the benefits of social interaction on learning outcomes and student-wellbeing.
It results in a new study culture where learning takes place in different groups, rooms and buildings throughout the day.

The result is that contemporary faculty buildings need more than just classrooms. In 'Future Campus' 3 four types of learning spaces are distinguished. The categorization is not based on their spatial properties, but on the activities they enable. The categories are: specialist, teaching, collaborative and personal. Many new buildings, like the new Echo building at the TU Delft, are designed with large spaces which enable multiple of these four categories.[2]

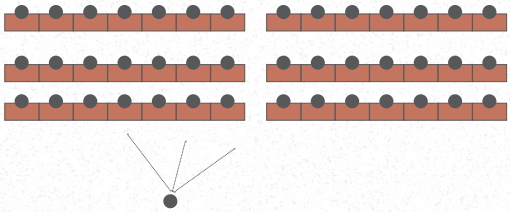
Third is the increasing demands for varied catering at universities. Among others, the TU Delft is redeveloping its catering. They transition from a traditional canteen to modern horeca. Some listed benefits are: diverse menu, possibilities for different budgets, and more cosey small scale meeting places.[4] Aside from a diverse and healthy menu, varied recreational spaces are also desired. Different spaces where one can take a break from studying add to the desired daily diversity in study culture Therefore, a fifth activity is added: recreation.

Fourth, the social engagement and broad development of students which is strived for at UCR is also noticeable at other universities. Extracurricular activities and personal development are ever more important.[1] It results in blurring boundaries between learning and social spaces.[3] Meaning that a faculty building should allow for social interaction and gatherings just as well as focused individual learning. In new faculty buildings, this social aspect is often translated in highly transparent buildings. It follows from the idea that mutual visibility stimulates social interaction.

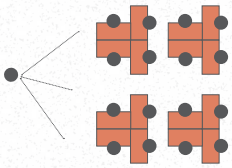
The trends above result in five key activities of contemporary study culture. They are summarized in a legend which is used to explain the design strategy on the next page.



LEARNING LANDSCAPE ACCORDING TO 'FUTURE CAMPUS'[3]



SPECIALIST
Spaces with very specific use: lecture halls, laboratories, theaters



TEACHING
Spaces for the exchange of ideas, one way communication mostly



COLLABORATIVE
Setting which fosters dialogue between students and teachers, informal engagement



PERSONAL
Spaces for individual, focussed learning



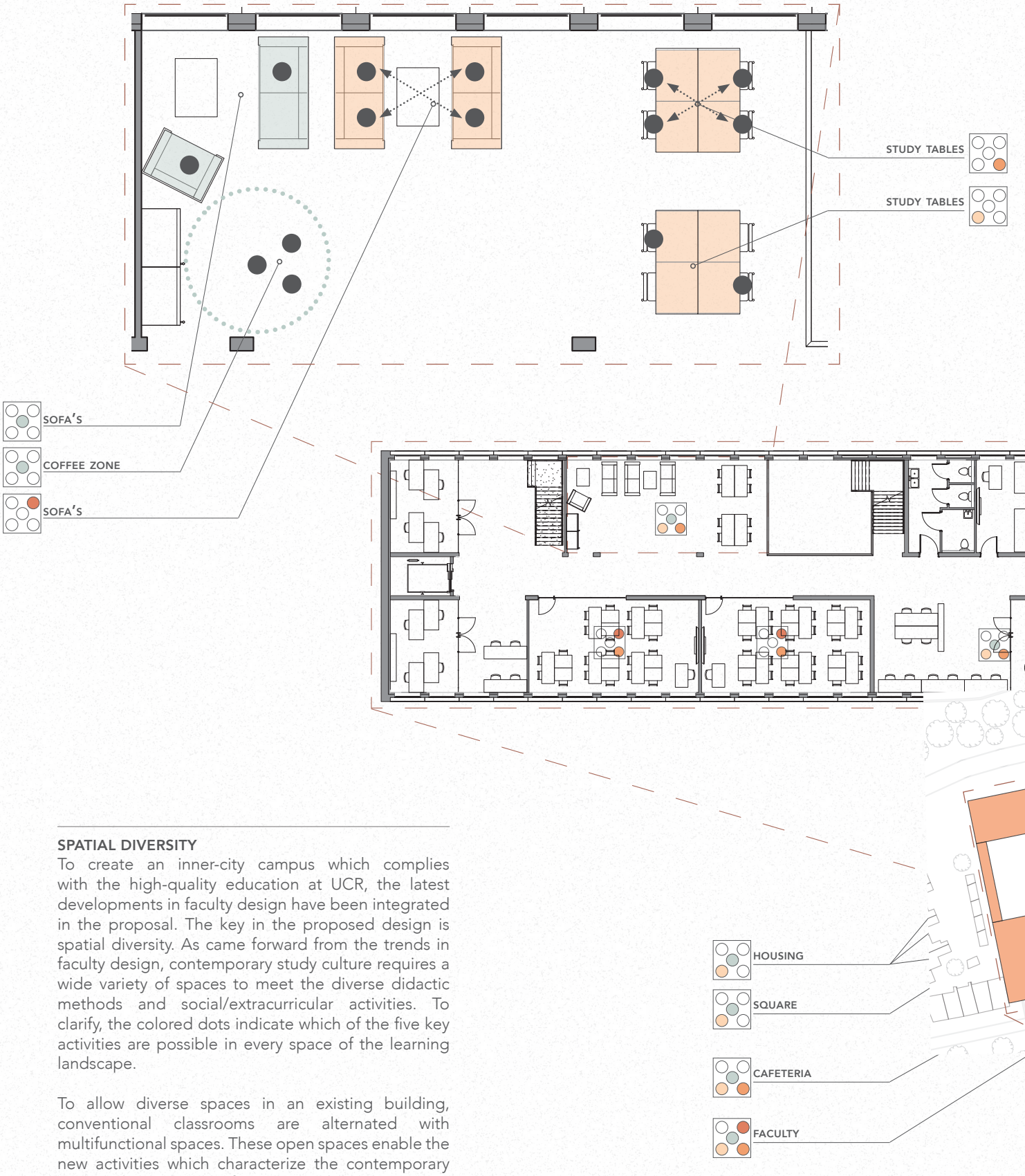
RECREATION
Spaces to take a break from learning or engage in social activities

FIVE KEY ACTIVITIES OF CONTEMPORARY STUDY CULTURE



LEGEND

1. University College Roosevelt (2022) Our Vision. Retrieved from: https://www.ucr.nl/about-ucr/discover/our-vision/
2. Debaere, J. (2022) Flexibele zalen maken interfacultair onderwijsgebouw geschikt voor diverse onderwijsvormen.
3. RIBA Enterprises, & Higher Education Design Quality Forum sponsoring body. (2016). Future campus: design quality in university buildings. (I. Taylor, Ed.). RIBA Publishing
4. Sense facility management (2018) Horeca-visie TU Delft krijgt vorm. Retrieved from: https://www.sensefm.nl/nl/horeca-visie-tu-delft-krijgt-vorm/



SPATIAL DIVERSITY

To create an inner-city campus which complies with the high-quality education at UCR, the latest developments in faculty design have been integrated in the proposal. The key in the proposed design is spatial diversity. As came forward from the trends in faculty design, contemporary study culture requires a wide variety of spaces to meet the diverse didactic methods and social/extracurricular activities. To clarify, the colored dots indicate which of the five key activities are possible in every space of the learning landscape.

To allow diverse spaces in an existing building, conventional classrooms are alternated with multifunctional spaces. These open spaces enable the new activities which characterize the contemporary study culture. Diverse furniture in the open spaces supports various activities. As is shown in the plan of the first floor, the multifunctional spaces have a direct visual and spatial connection with the hallway to stimulate mutual visibility and thereby social interaction. Several recreational/coffee corners throughout the buildings, combined with a main cafeteria, offer diverse recreational opportunities within the limitations of a small faculty.

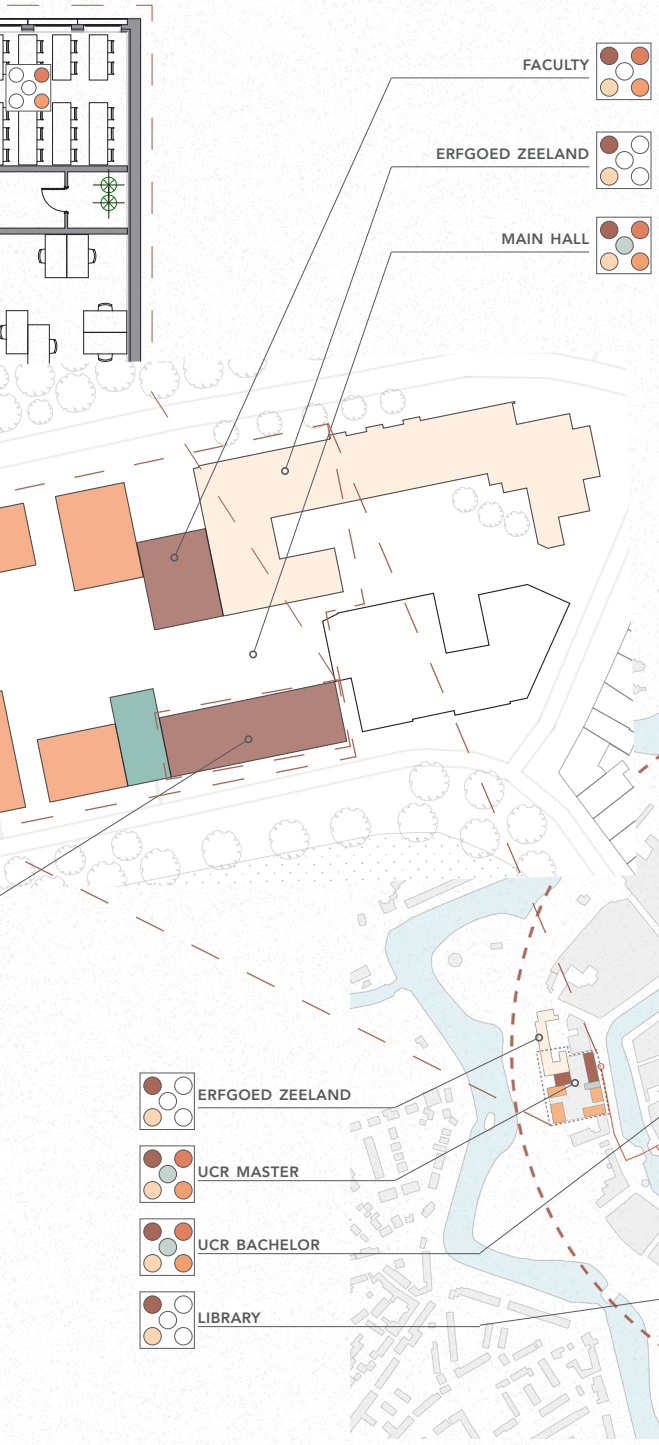
THE LEARNING LANDSCAPE

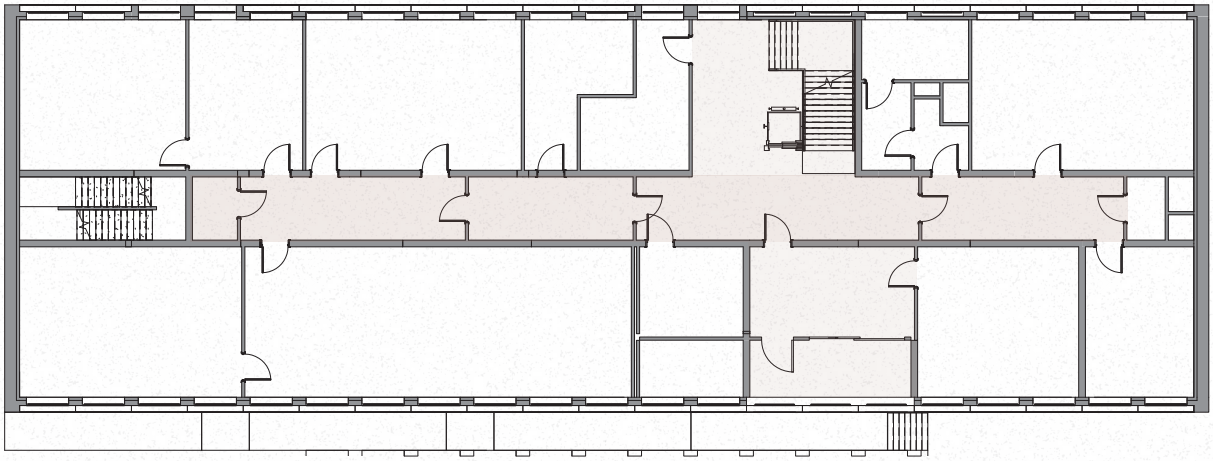
The 'spatial diversity' strategy does not comply to singular spaces only, the faculty is designed as part of the learning landscape of students and teachers in Middelburg.

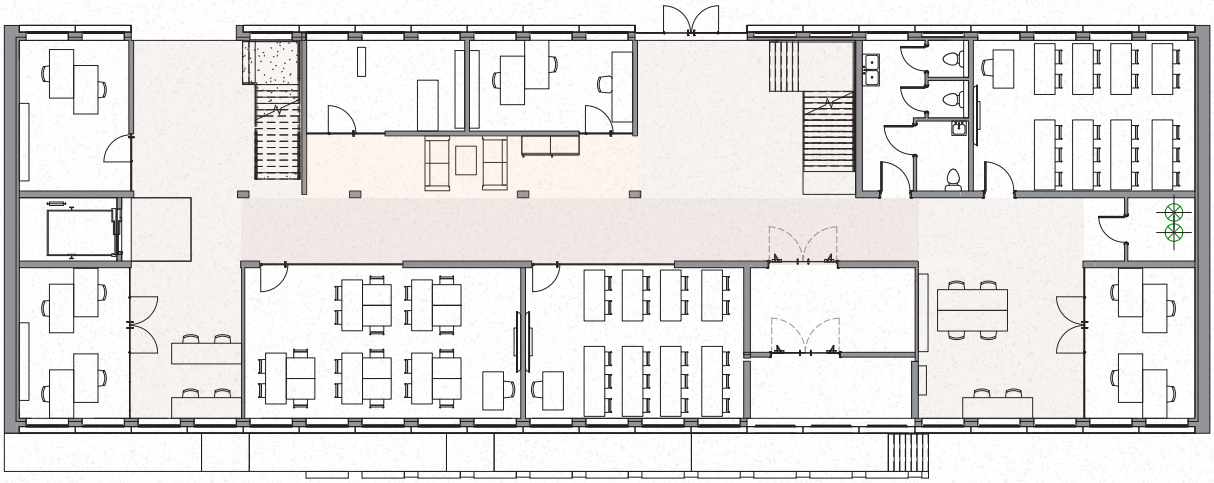
The master campus is designed to allow all five activities to take place on campus. Yet facilities in the city like the library, archive, other UCR campus and various work cafés vary the offer. This way, the master campus offers a basis level of spatial diversity, in close proximity, which can be supplemented with the city facilities.

1.10000 0 m 250 m

FACULTY BUILDINGS
STUDENT HOUSING
EXTERNAL RESEARCH OR EDUCATIONAL FACILITIES







SPATIAL INTERVENTION

The current plan of the police station is characterized by a long hallway with adjacent monofunctional (office) spaces. This layout is aligned with the load-bearing structure which consist of load bearing walls on each side of the hallway and load bearing facades.

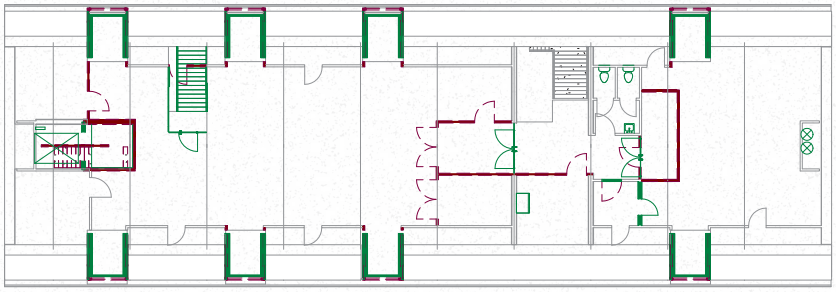
To create a faculty which meets the contemporary needs regarding diverse use of spaces, social interaction and recreation, several spatial interventions are needed. At the same time, the original design was meant as effective and sober. Making the strict plan a quality of the original design. Aside from this, a sparingly approach towards the use of material means large interventions in the load bearing structure should be well considered.

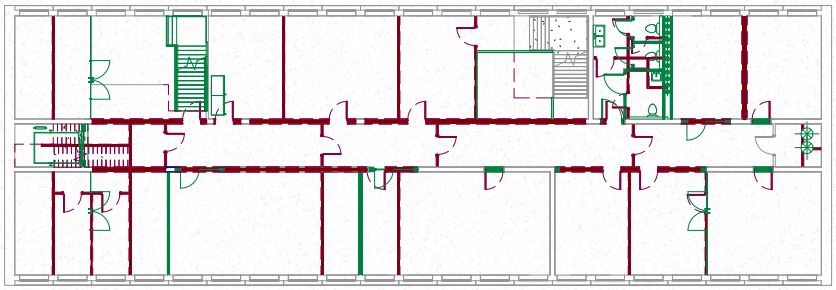
PLAN GROUND FLOOR

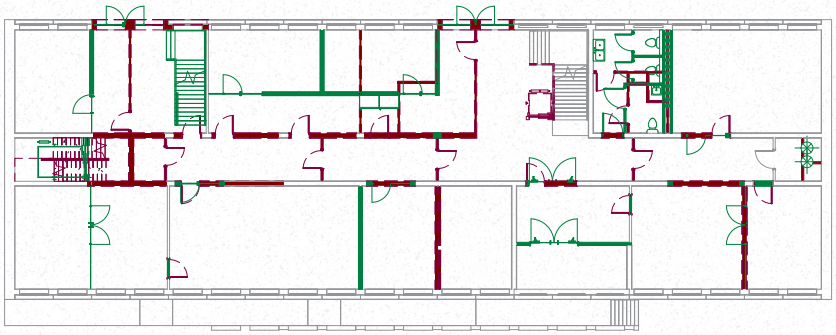


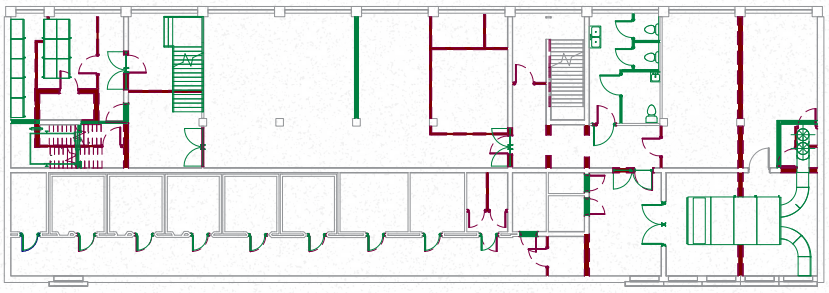


The chosen approach focusses on shortening the long hallway and creating multifunctional spaces adjacent and at the ends of it. The load bearing walls which are removed will be replaced by beams resting on columns. As these columns separate the hallway only spatially from its adjacent spaces and not visually the hallway is experienced as wider and shorter. By removing the visual barrier between adjacent spaces and hallway, the intervention enhances the mutual visibility and thereby stimulates social interaction.







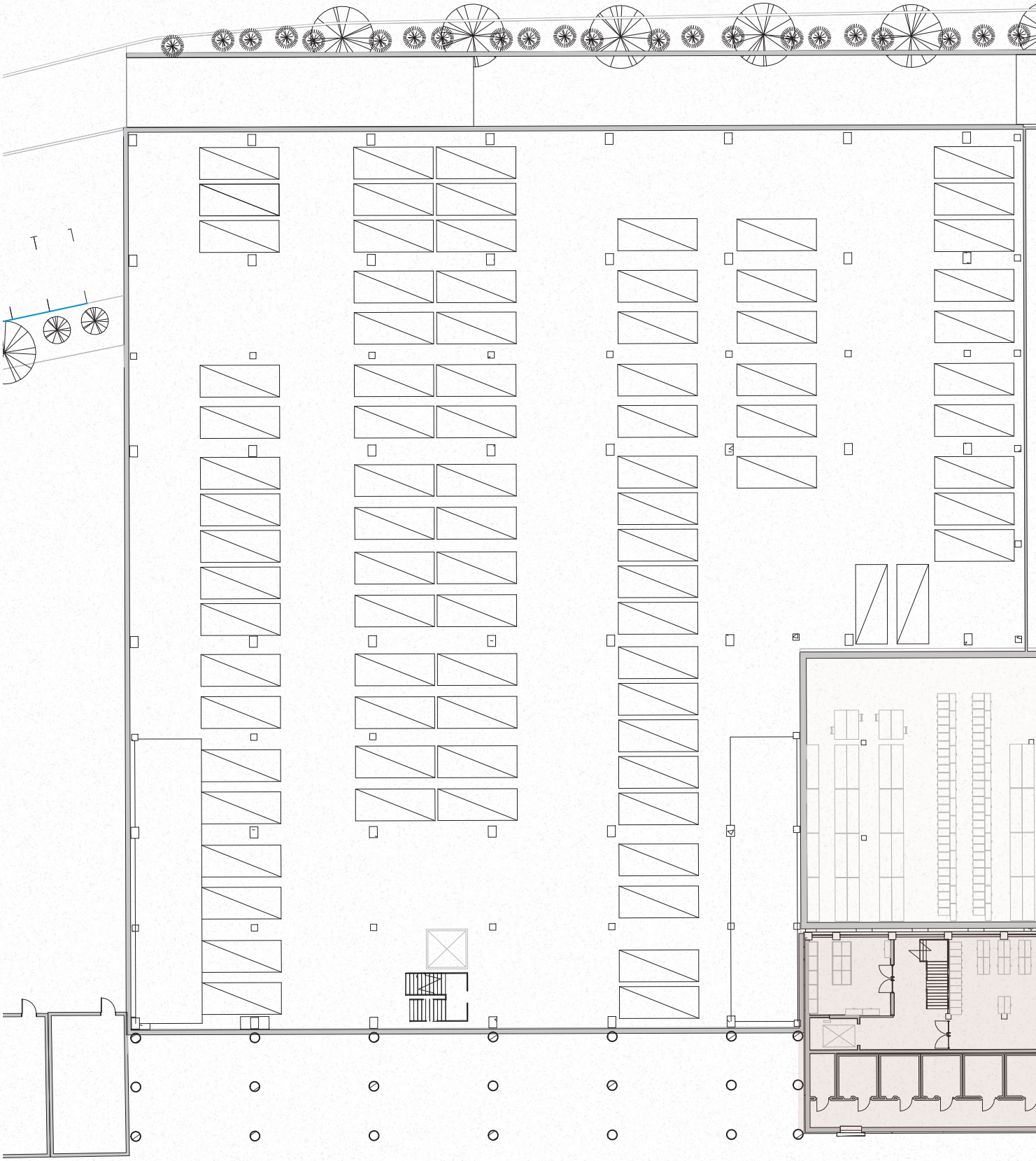


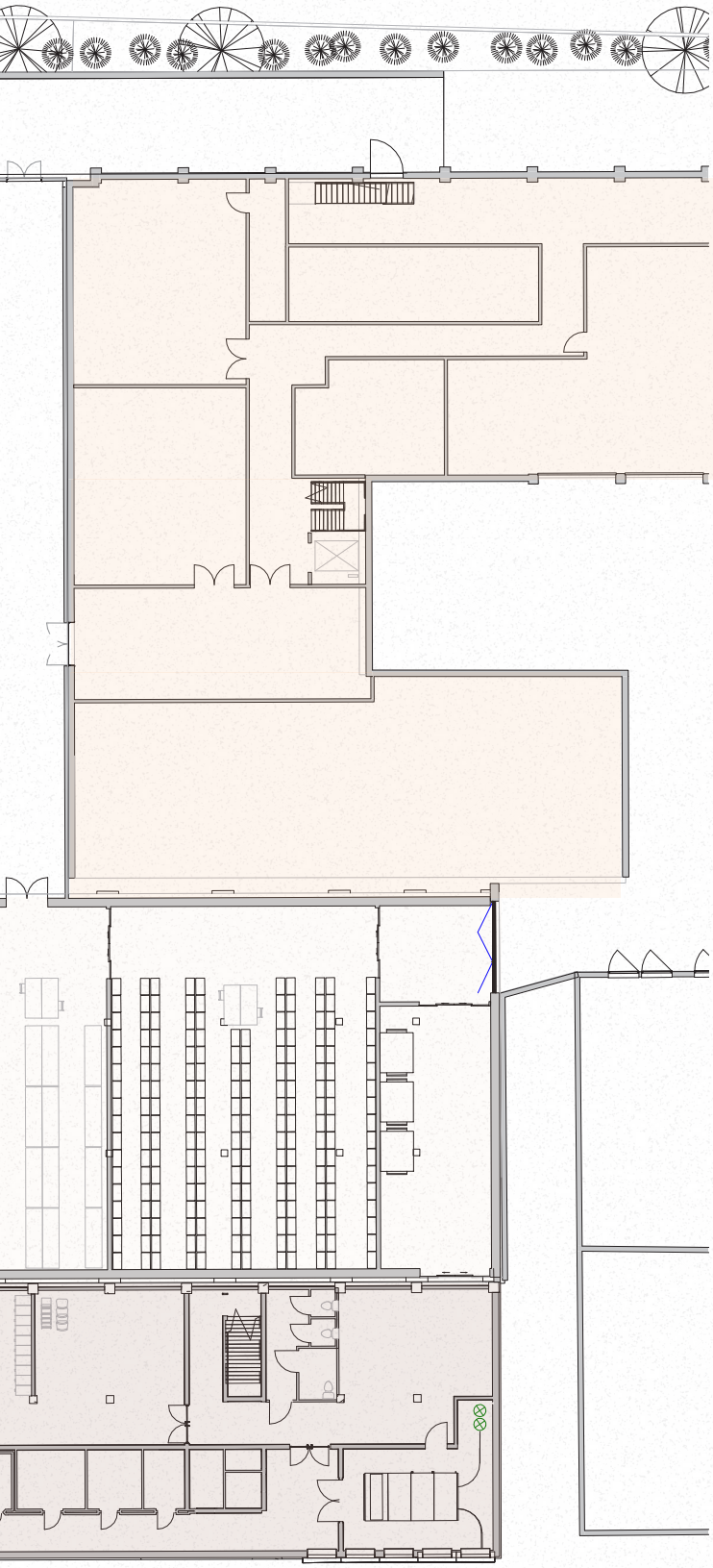
INTERVENTIONS

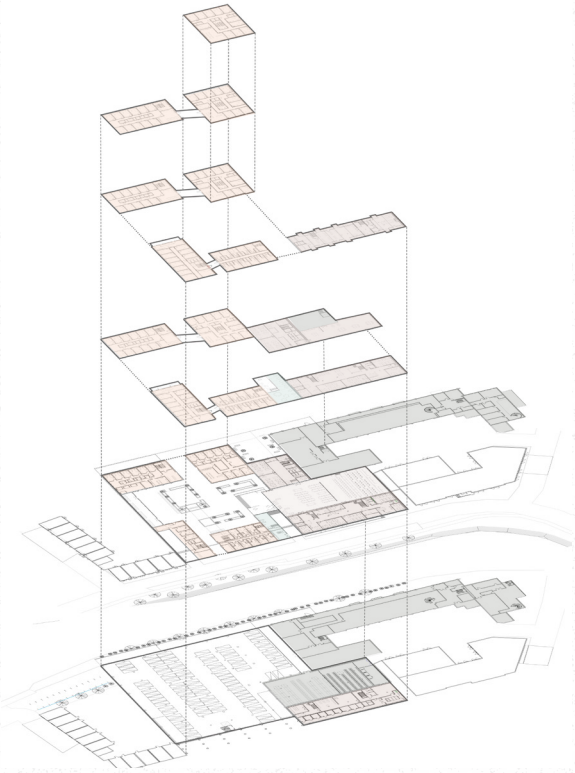
0 m — 15 m

DEMOLITION

NEW CONSTRUCTION







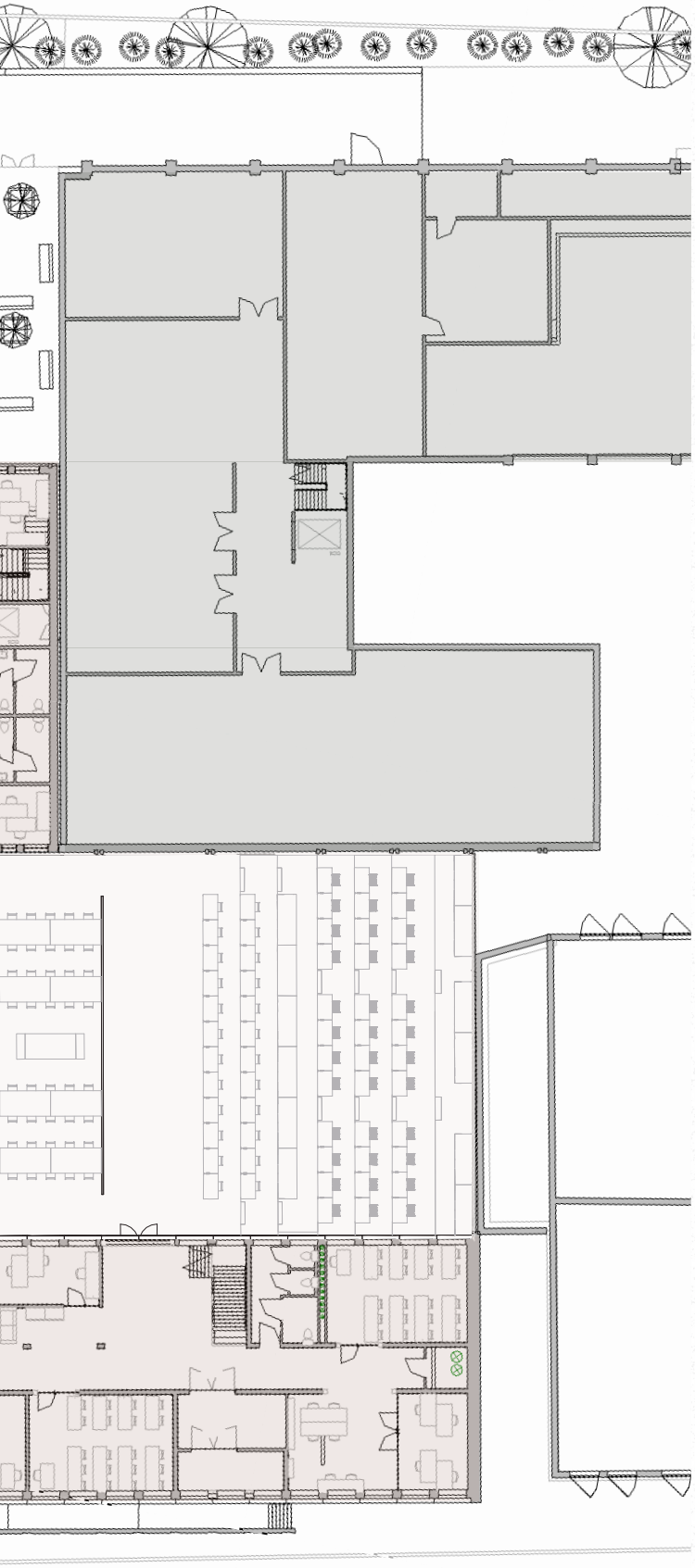
SOUTERRAIN

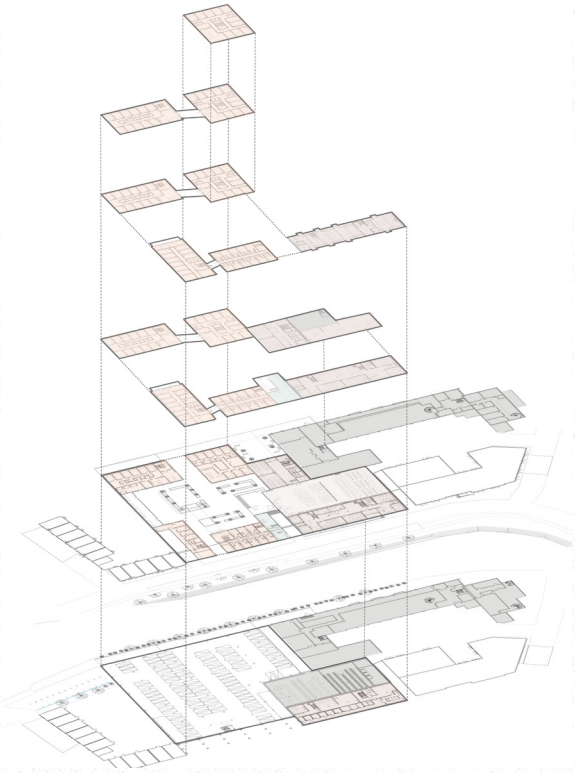
The current parking garage is maintained, but provided with a new entrance in housing building A. The souterrain of the police station is used for various supporting functions like server spaces and facility management. The existing detainee cells are reused as storage spaces. The archive of Erfgoed Zeeland is extended into the backyard of the police station. Via the archive, the former paolice station has a service entrance.

0 m 15 m

FACULTY BUILDINGS
HOUSING BUILDINGS
CAFETERIA
ERFGOED ZEELAND





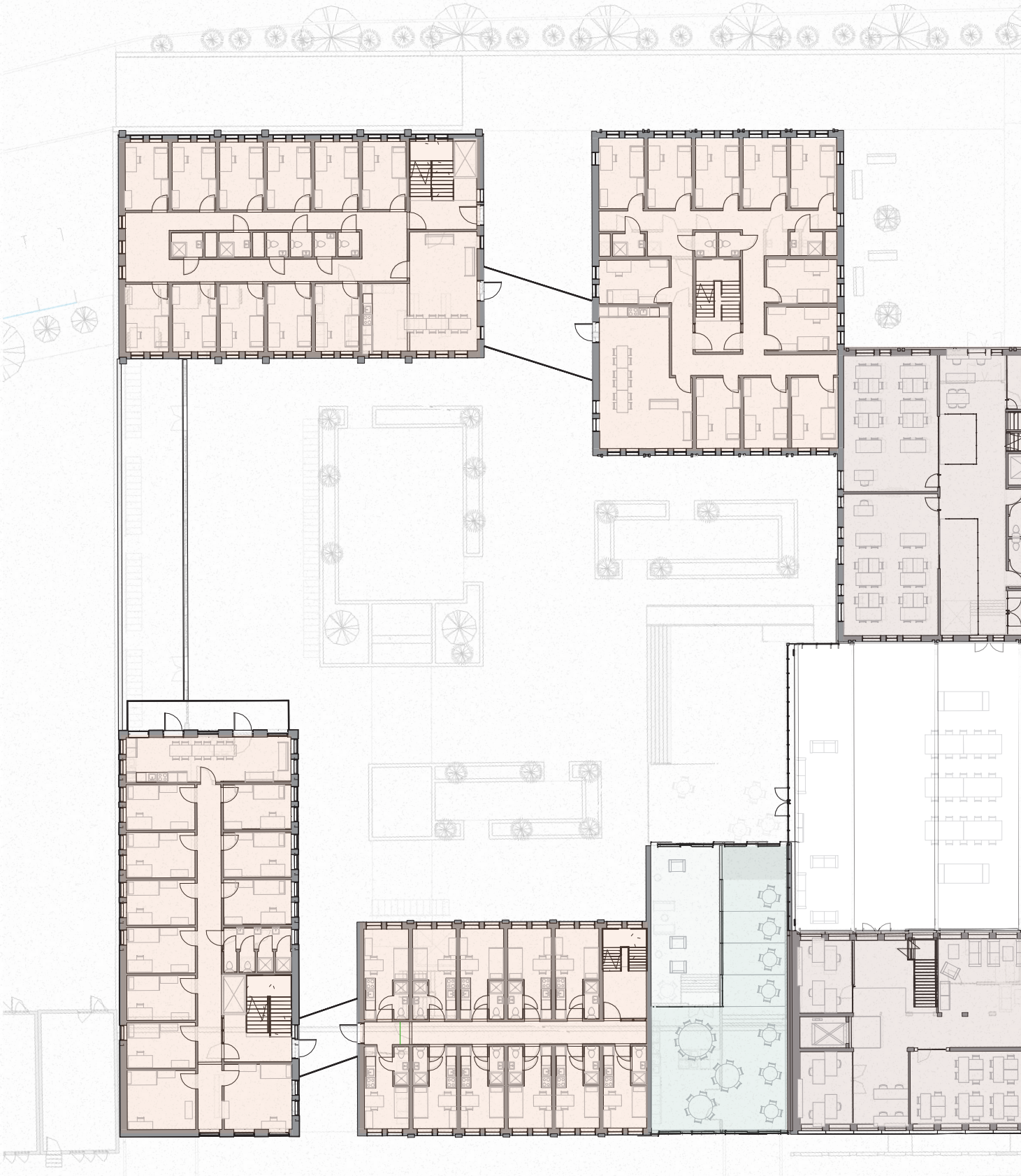


GROUND FLOOR

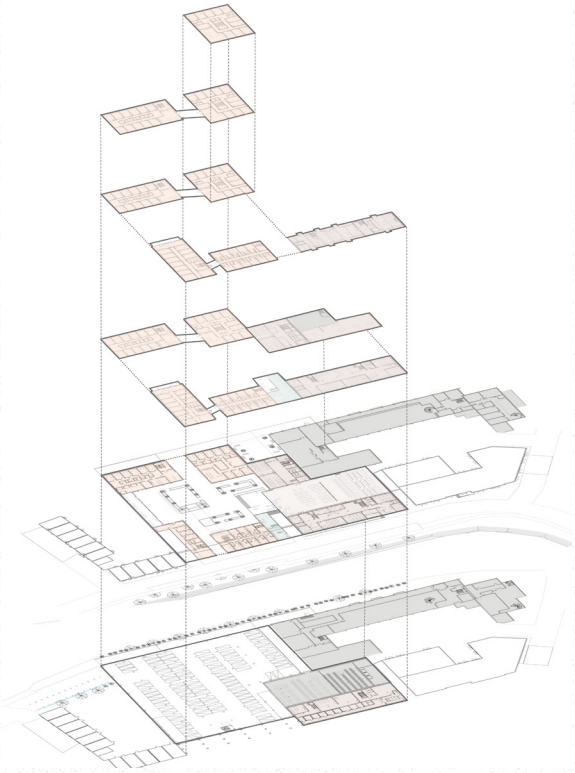
The previous described principle of spatial variaty is implemented in the entire design. It results in the following plan: If you are a visitor or a teacher you enter from the main entrance and walk towards the classroom where you are supposed to teach, or you give tutoring at one of the large tables in the main hall. As a student you will probably enter via the main hall and look for an individual place here, or in one of the buildings if there is a lecture going on in the main hall. On the ground floor all housing buildings have their entrances, communal spaces like a laundry room, garbage room, spaces for mailboxes and a large indoor bicycle storage. Housing building A provides a new entrance to the underground parking garage. The car-entrance and exit are located in housing building B and the cafeteria.

0 m 15 m

FACULTY BUILDINGS
HOUSING BUILDINGS
CAFETERIA
ERFGOED ZEELAND







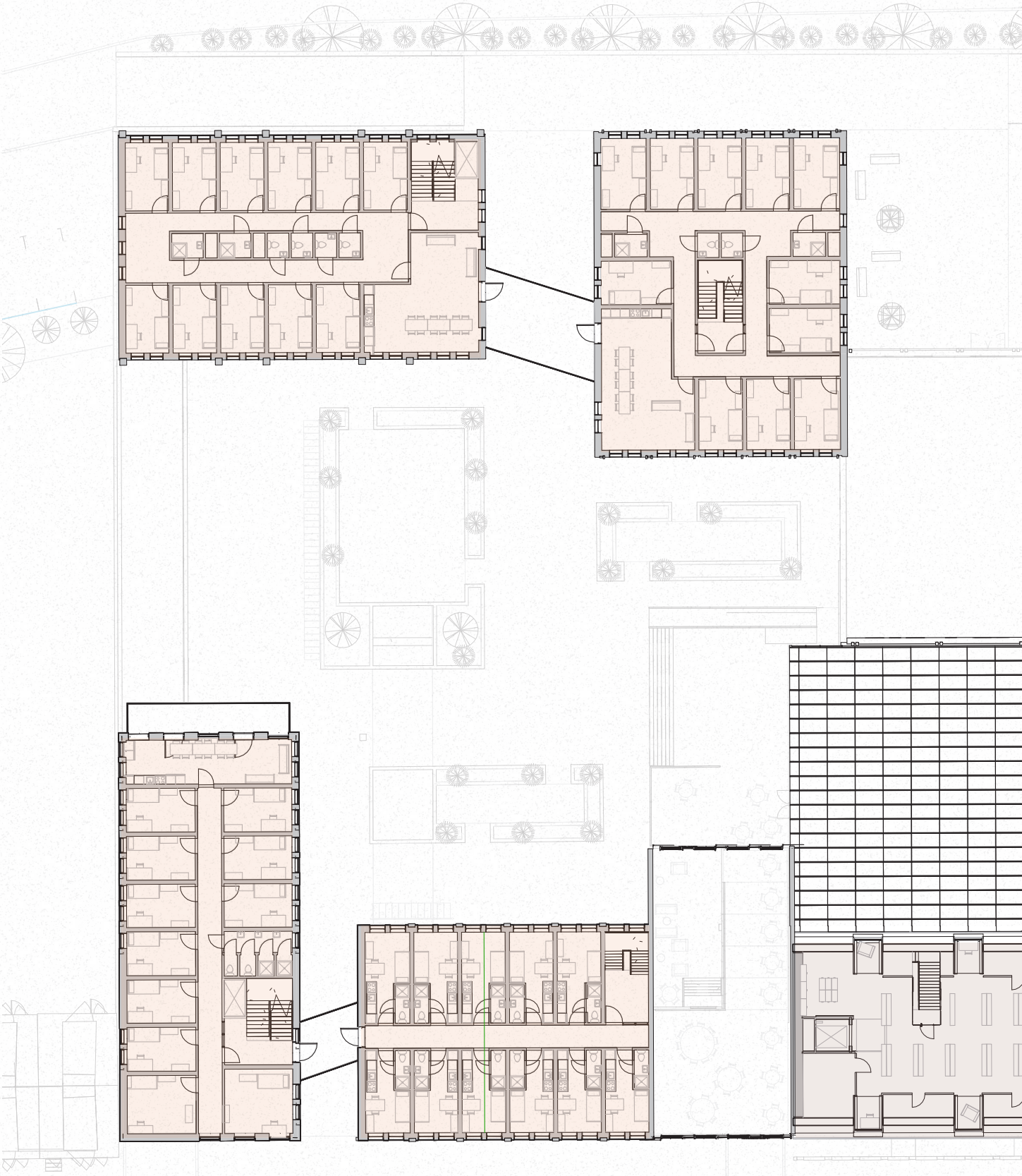
FIRST FLOOR

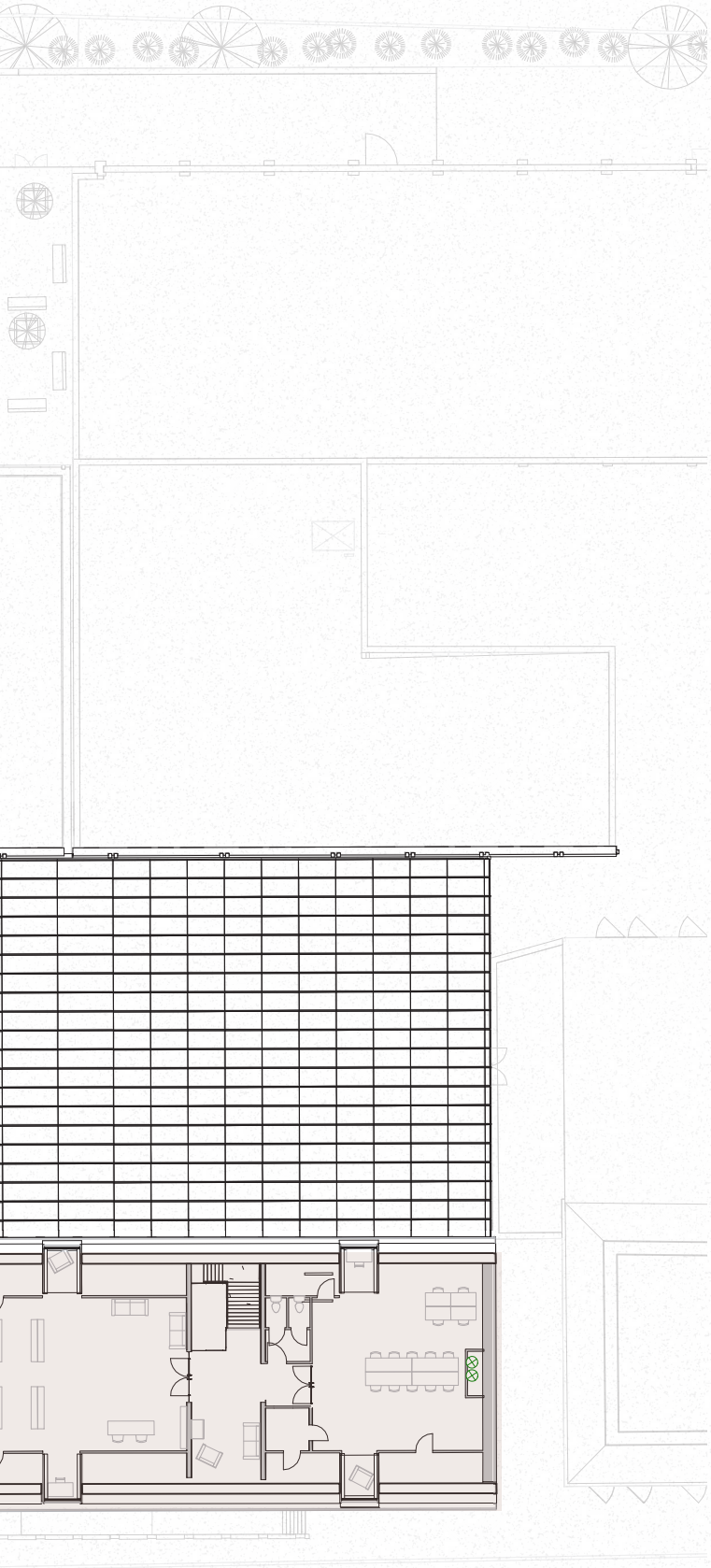
On the first floor the faculty buildings house various classrooms and workplaces, and there is the connection with Erfgoed Zeeland: a large classroom where the collection can be studied by both the students and the professionals.

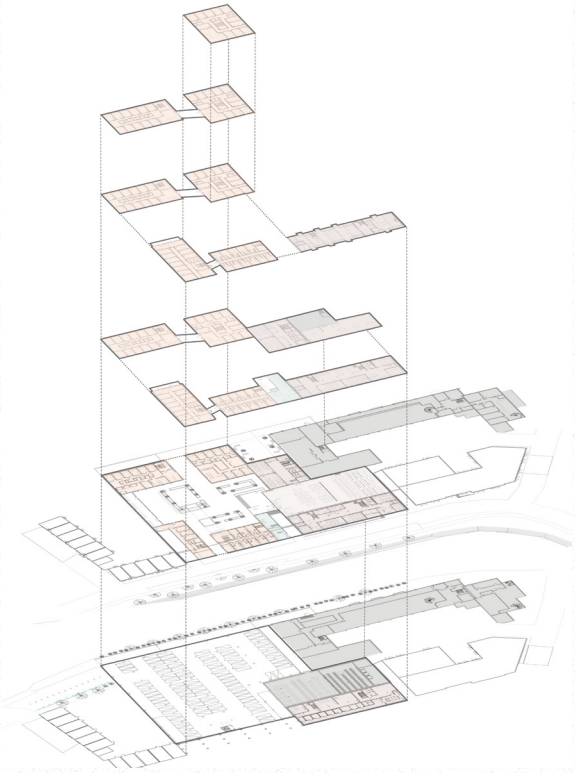
The housing is focused on living in a student community. This is in accordance with the standpoints of UCR. Living together enhances learning from each other. Therefore not only group housing is provided, but interaction between different houses and buildings is fostered by creating shared balconies and access routes. Which also allow for more efficient routing in small buildings.

0 m 15 m

FACULTY BUILDINGS
HOUSING BUILDINGS
CAFETERIA
ERFGOED ZEELAND





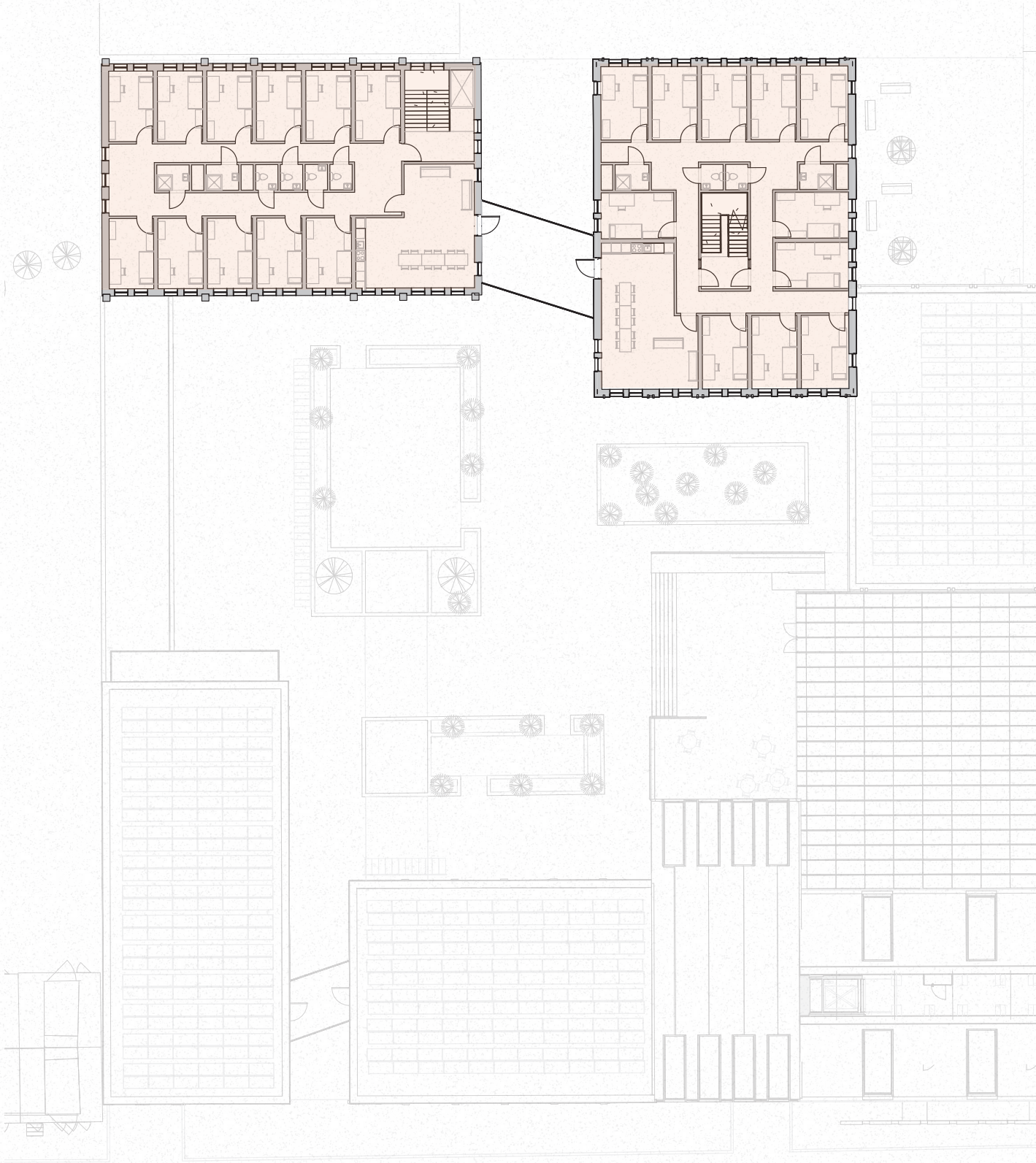


SECOND FLOOR

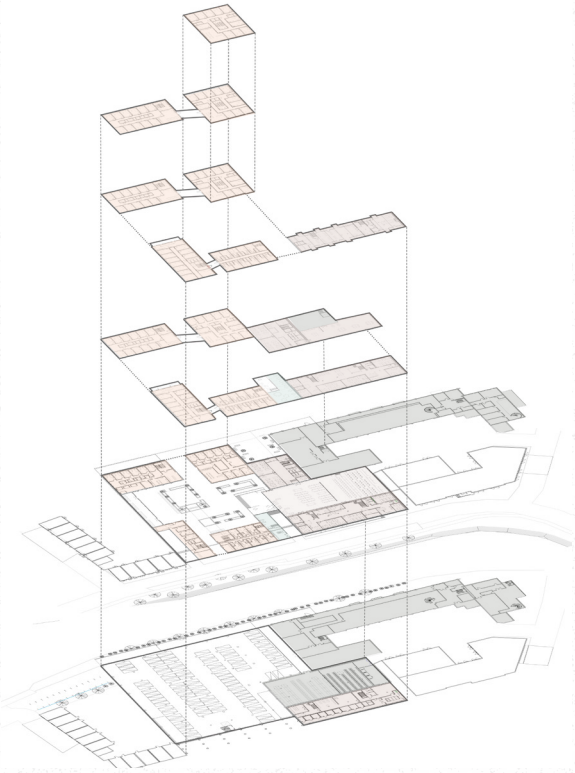
The second floor houses a library with study spaces in the new dormers and a meeting room which can be reserved by both students and teachers.

0 m 15 m

FACULTY BUILDINGS
HOUSING BUILDINGS
CAFETERIA
ERFGOED ZEELAND





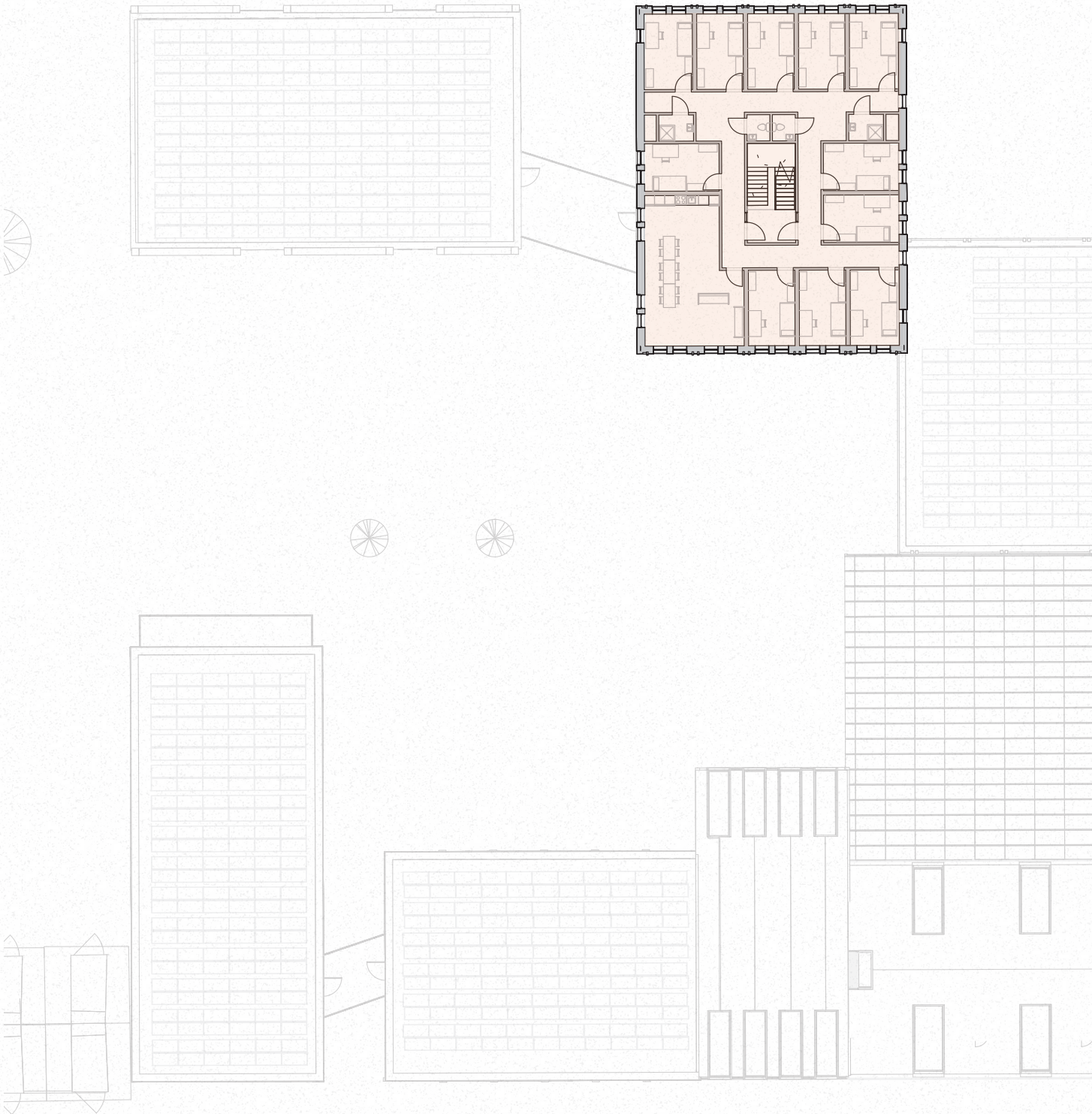


THIRD FLOOR

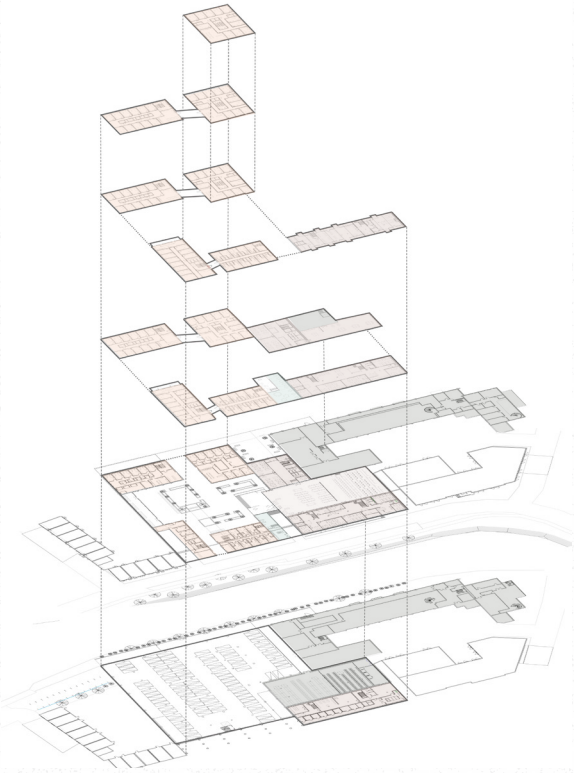
Only housing building C and D have a third storey, twenty-two students can live in these houses.

0 m 15 m

FACULTY BUILDINGS
HOUSING BUILDINGS
CAFETERIA
ERFGOED ZEELAND





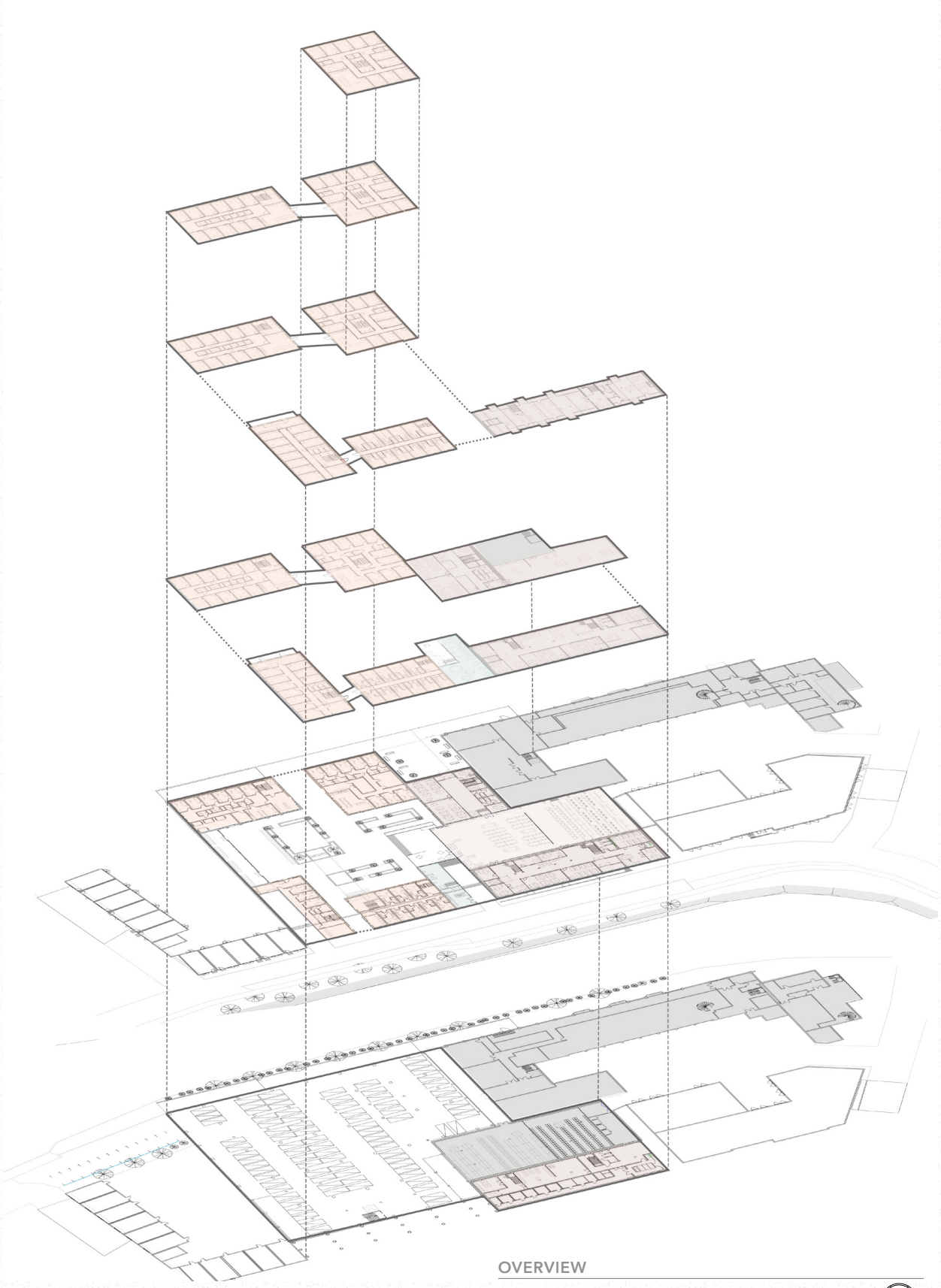


FOURTH FLOOR

Only housing building D has a fourth storey, eleven students can live in this house.

0 m 15 m

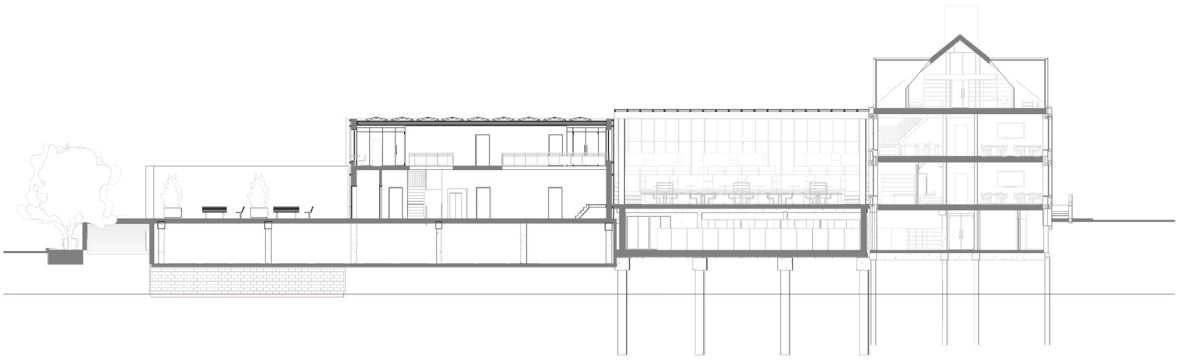
FACULTY BUILDINGS
HOUSING BUILDINGS
CAFETERIA
ERFGOED ZEELAND



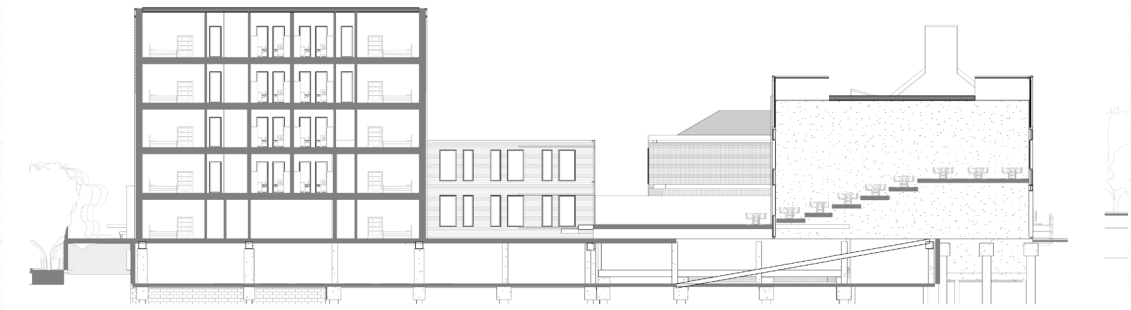
OVERVIEW

0 m 50m

FACULTY BUILDINGS
HOUSING BUILDINGS
CAFETERIA
ERFGOED ZEELAND



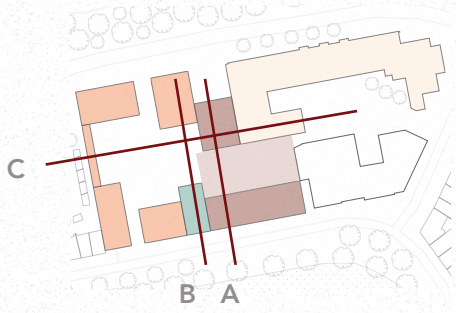
A



B

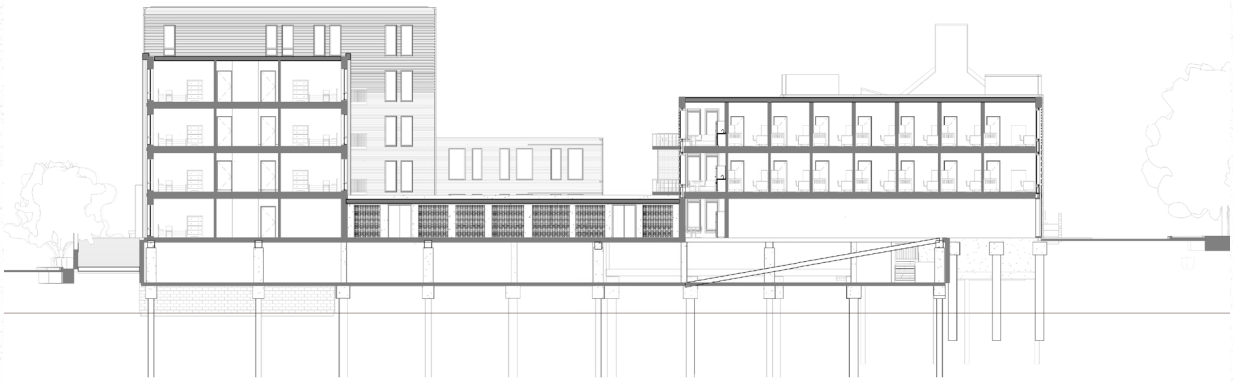


C



SECTIONS

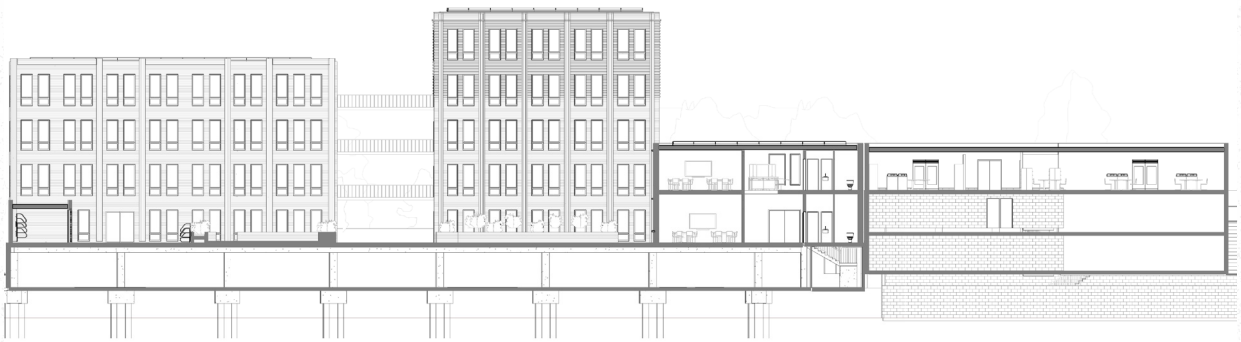
0 m 25m



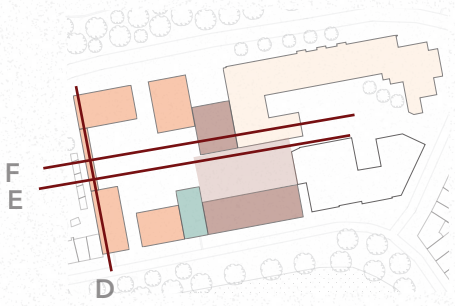
D



E

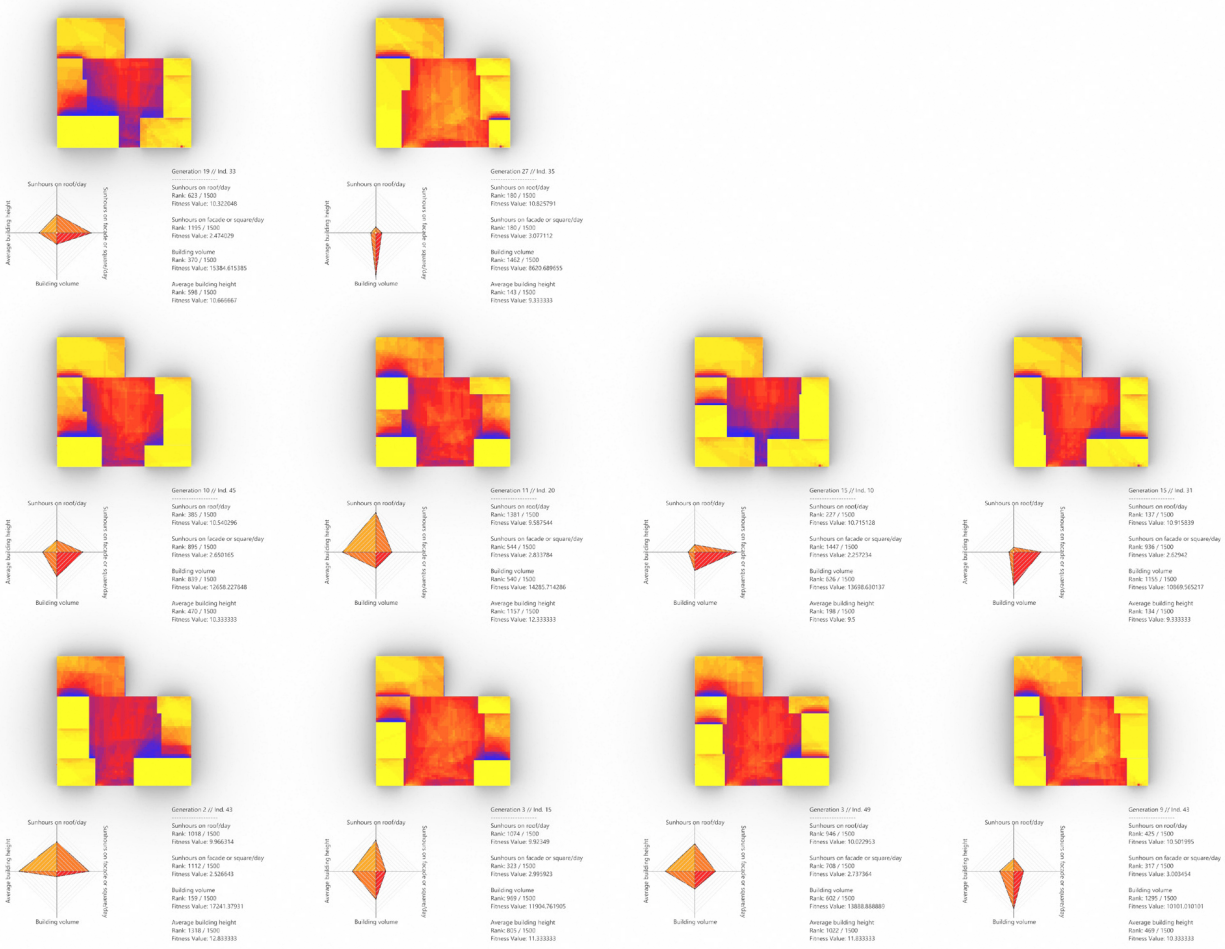


F



SECTIONS

0 m 25m

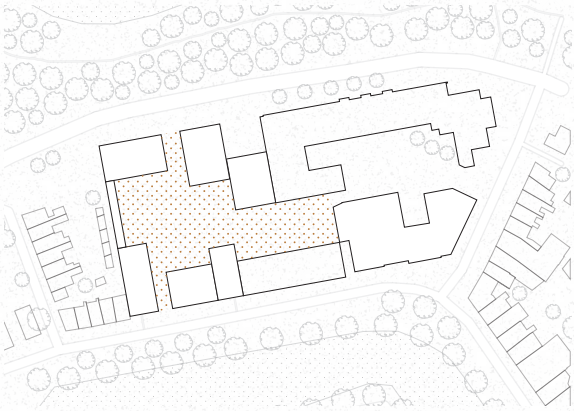


EXPLORATION OF THE SOLUTION SPACE

0 m 200 m

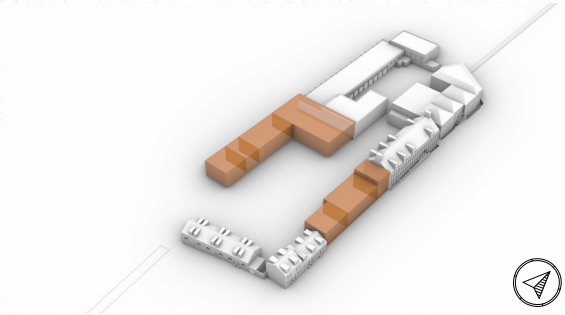
MASS OPTIMIZATION

To house all new master students of the new faculty of UCR, the vacant supermarket is demolished and student housing is built instead. A multi-objective optimization substantiates the configuration of the new housing building.

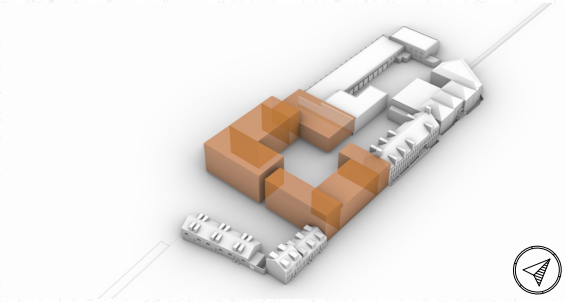


DESIGN INTENTION

0 m 100 m



MINIMUM BOUNDARIES BUILDING VOLUME



MAXIMUM BOUNDARIES BUILDING VOLUME

SITUATION

According to the design intentions, the student housing is spread over multiple buildings. In between these buildings, a new courtyard is planned. The limited size of the plot combined with the needed build volume reduce the amount of daylight which can reach the courtyard. As the courtyards shields its users from wind, daylight irradiation becomes the most important factor to ensure a pleasant climate in the new courtyard. At the same time, the new buildings will have to fit into the existing historic inner-city of Middelburg. This leads to limitations in height. Lastly, the roof of the new buildings profits from maximum sun exposure as the planned solar panels have an important role in the aim for energy neutrality.

To support the design of the student housing, a multivariate optimization has been performed on the configuration of the building blocks. The solution space is defined by a set of rules which limit the size of each building block. Their minimum and maximum boundaries are shown in the figure above.

OBJECTIVES

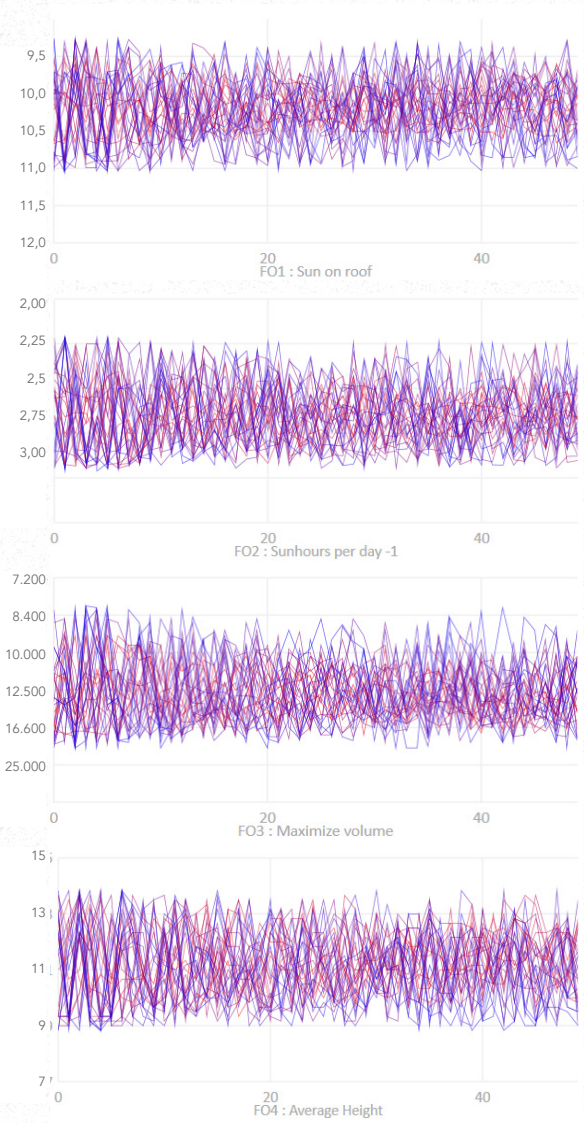
The optimization has four objectives. The first is to maximize the average amount of sun exposure on the roof of all new buildings measured per square meter and expressed in hours. The aim is to maximize the sun exposure as this maximizes the yield of solar panels. The second aim is to maximize the amount of sun exposure on the ground surface of the courtyard and on the facades of all new buildings. Similar to the previous variable, this is measured per square meter and expressed in hours. The third aim is to maximize the volume of the housing buildings, measured in cubic meters. As a larger volume counteracts the sun exposure in the courtyard, this is the core of the optimization problem. Lastly, to make sure the new buildings remain suitable for their historic context, the average height of the housing buildings is minimized.

The solar radiation calculations are made for every hour of the twenty-first of January, March and June. These days are evenly distributed over the year, therefore they provide a representative view of solar radiation throughout the year. By working with three days instead of 365 the calculation time is reduced over 99%.

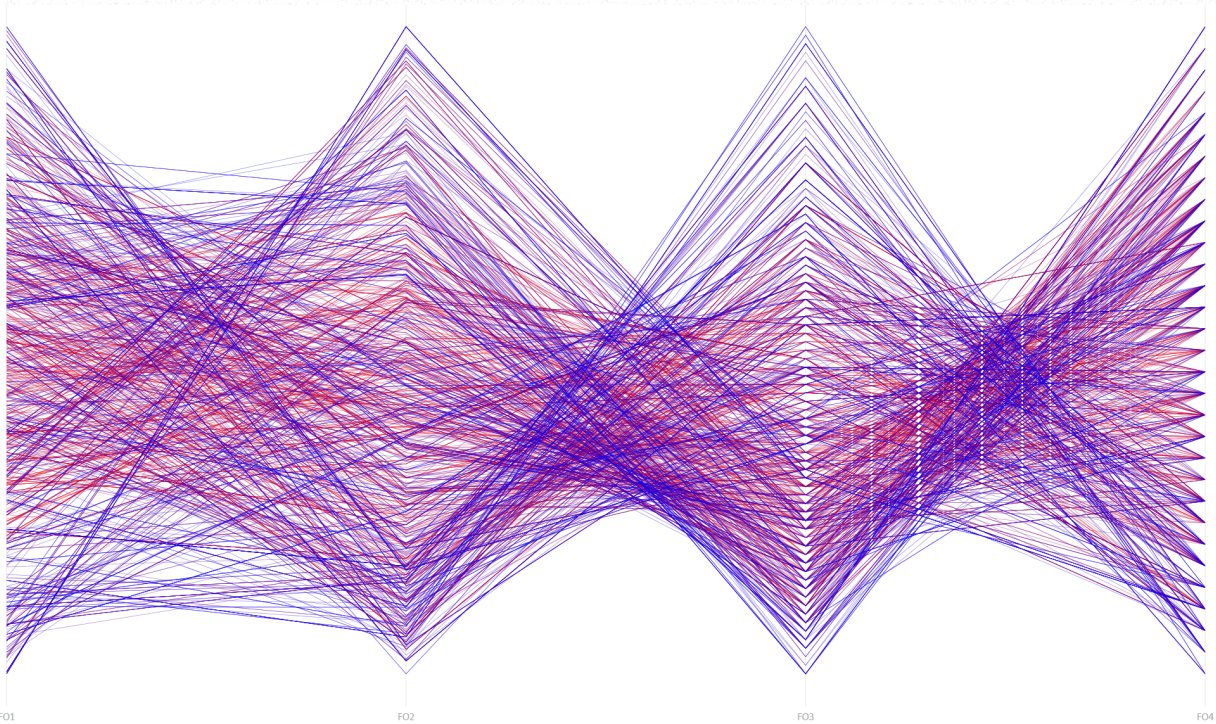
OPTIMIZATION ALGORITHM

The optimization is performed using the Wallacei plugin for Grasshopper. Wallacei is an evolutionary multi-objective optimization tool. Like any evolutionary algorithm, it aims to combine the fittest solutions of a previous generation until a set of near optimal solutions is found. This set, the so called paretho front, consist of the solutions which together approach the asymptotic utopian solution the closest. As the Wallacei solver always aims to minimize an objective, the maximization was obtained by entering the fitness values (x) as 1/x into the solver.

For this optimization a modest 30 generations of 50 solutions were analyzed, leading to a total of 1500 analyzed solutions. In the right figure the results for all four objectives are shown. Inherently to the algorithm Wallacei is based on, a low position on the graph means a better score for this objective. The parallel coordinate plot below shows all solutions as lines. Their position on the four axes shows their performance for this objective. Due to the contrasting demands of the objectives, the parallel coordinate plot has a typical zigzag shape.



FITNESS VALUES FOR EACH OBJECTIVE



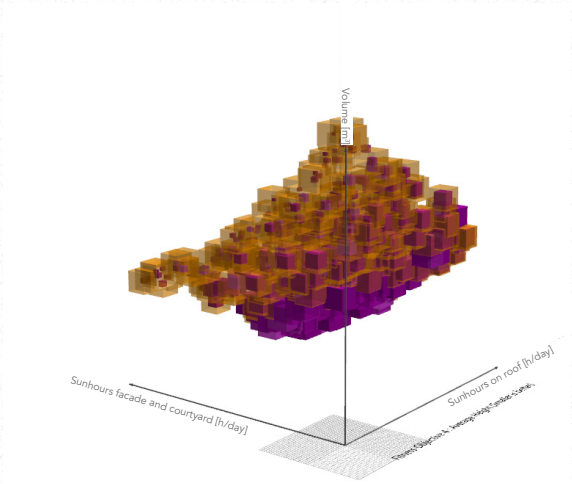
PARALLEL COORDINATE PLOT

RESULTS

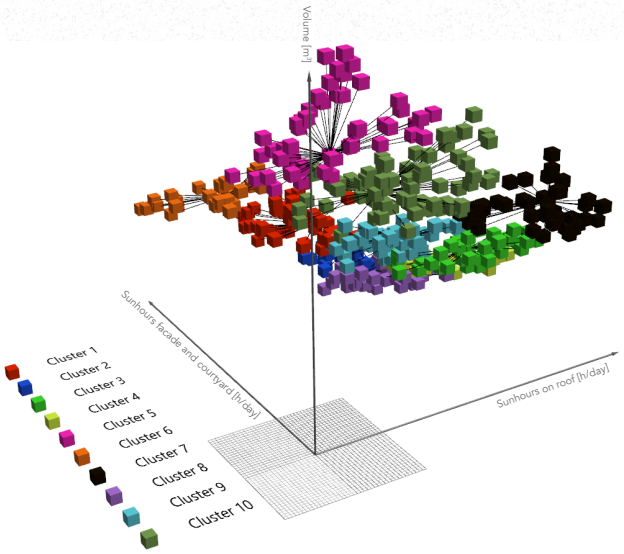
By plotting all solutions in a 4-dimensional coordinate system (the size of the block indicates the fourth objective) a clearer view on the optimal solutions is provided. The optimal solutions (the paretho front) are colored purple. Their position closer to the origin of the coordinate system indicates their approach of the (inpossible) utopian solution.

The middle of the pareto front consists of solutions which are on average the fittest for all objectives. The solutions on the ends of the paretho front are most suitable for the objective to which they are near. Which solution in the end is preferred depends on the value of each of the objectives. A solution fit for a highly valued objective might be preferred above the average fittest solution.

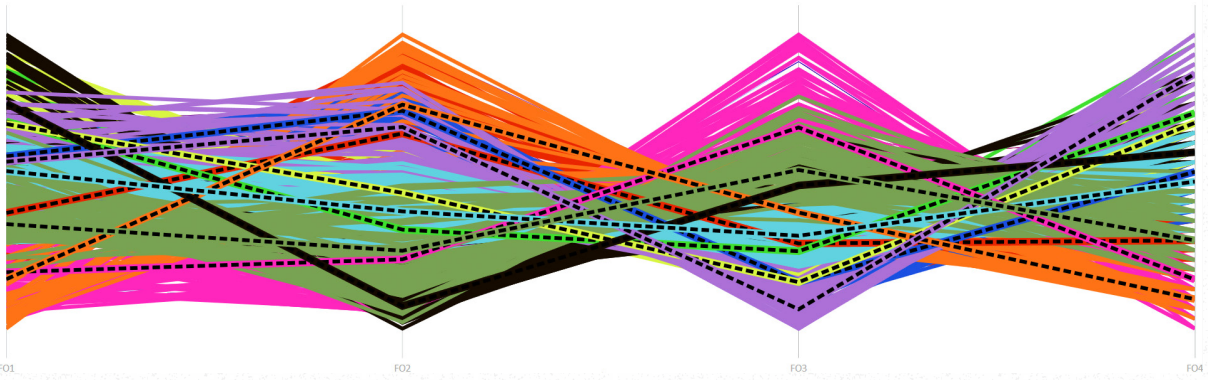
By clustering the paretho front solutions, a clear overview is obtained. Solutions with similar performance are clustered. Thereby a cluster represents a 'type' of solutions. Both the coordinate system as the parallel coordinate plot show how the fitness of different clusters. To understand the bandwidth of the solution space. I've exported the middle solution, and its fitness chart, of each cluster. The results are shown on the next page.



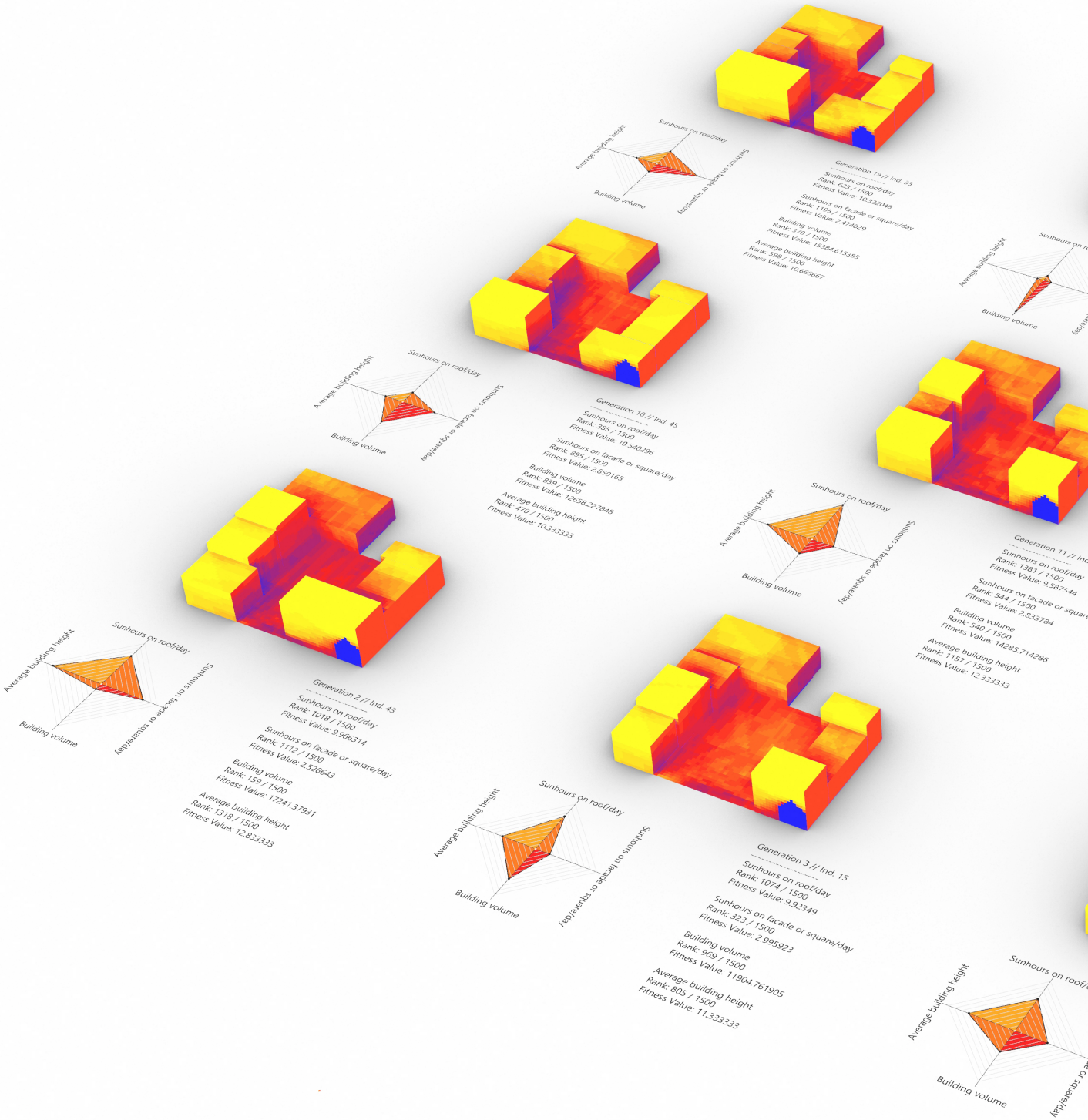
COORDINATE SYSTEM OF SC LUTION SPACE



CLUSTERED COORDINATE SYSTEM

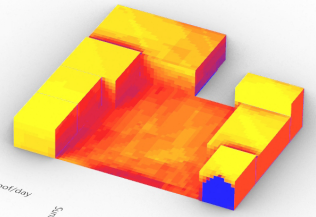


CLUSTERED PARALLEL COORDINATE PLOT



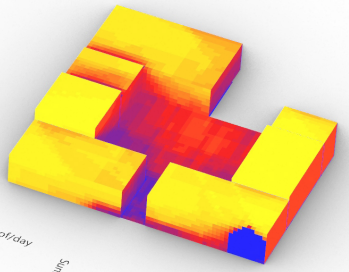
SOLUTION SPECTRUM

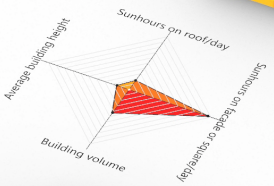
By comparing the fitness values of contrasting solutions the spectrum of fitness becomes clear. The solution in the bottom left corner has almost twice the build volume of the solution at the top right, while its solar radiation in the courtyard is 16% less.



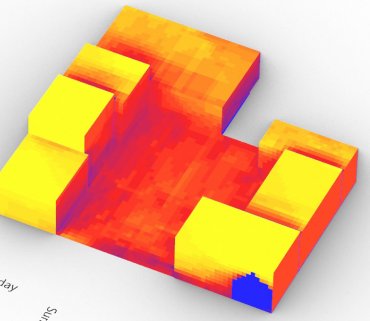
Generation 27 // Ind. 35
Sunhours on roof/day
Rank: 180 / 1500
Fitness Value: 10.825791
Sunhours on facade or square/day
Rank: 180 / 1500
Fitness Value: 3.027112
Building volume
Rank: 1462 / 1500
Fitness Value: 8620.689655
Average building height
Rank: 1441 / 1500
Fitness Value: 9.333333



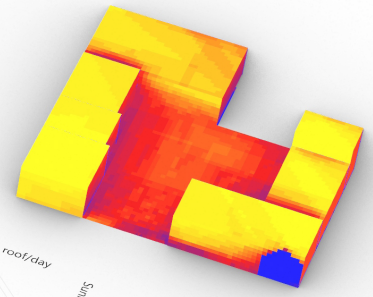


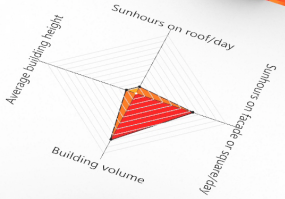


Generation 15 // Ind. 10
Sunhours on roof/day
Rank: 227 / 1500
Fitness Value: 10.715128
Sunhours on facade or square/day
Rank: 1442 / 1500
Fitness Value: 2.257234
Building volume
Rank: 626 / 1500
Fitness Value: 13698.630137
Average building height
Rank: 198 / 1500
Fitness Value: 9.5

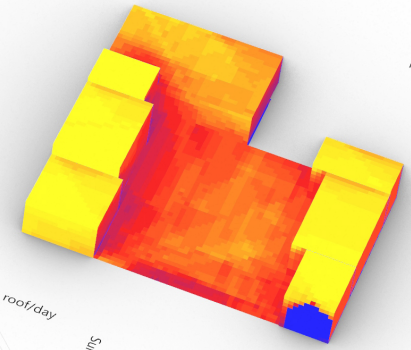


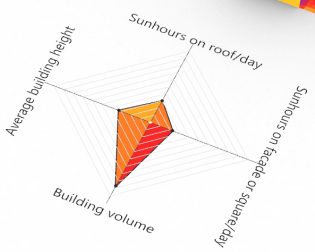
Generation 3 // Ind. 49
Sunhours on roof/day
Rank: 946 / 1500
Fitness Value: 10.022953
Sunhours on facade or square/day
Rank: 708 / 1500
Fitness Value: 2.737364
Building volume
Rank: 602 / 1500
Fitness Value: 13888.888889
Average building height
Rank: 1022 / 1500
Fitness Value: 11.833333





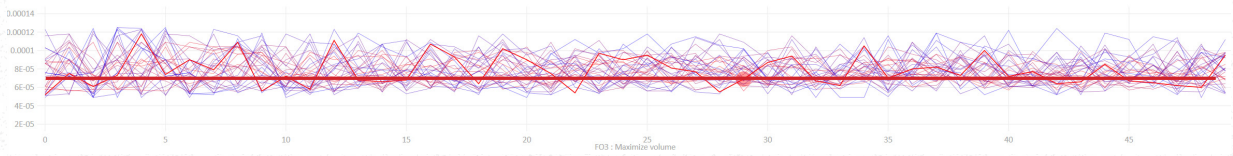
Generation 15 // Ind. 31
Sunhours on roof/day
Rank: 137 / 1500
Fitness Value: 10.915839
Sunhours on facade or square/day
Rank: 936 / 1500
Fitness Value: 2.62942
Building volume
Rank: 1155 / 1500
Fitness Value: 10869.565217
Average building height
Rank: 134 / 1500
Fitness Value: 9.333333



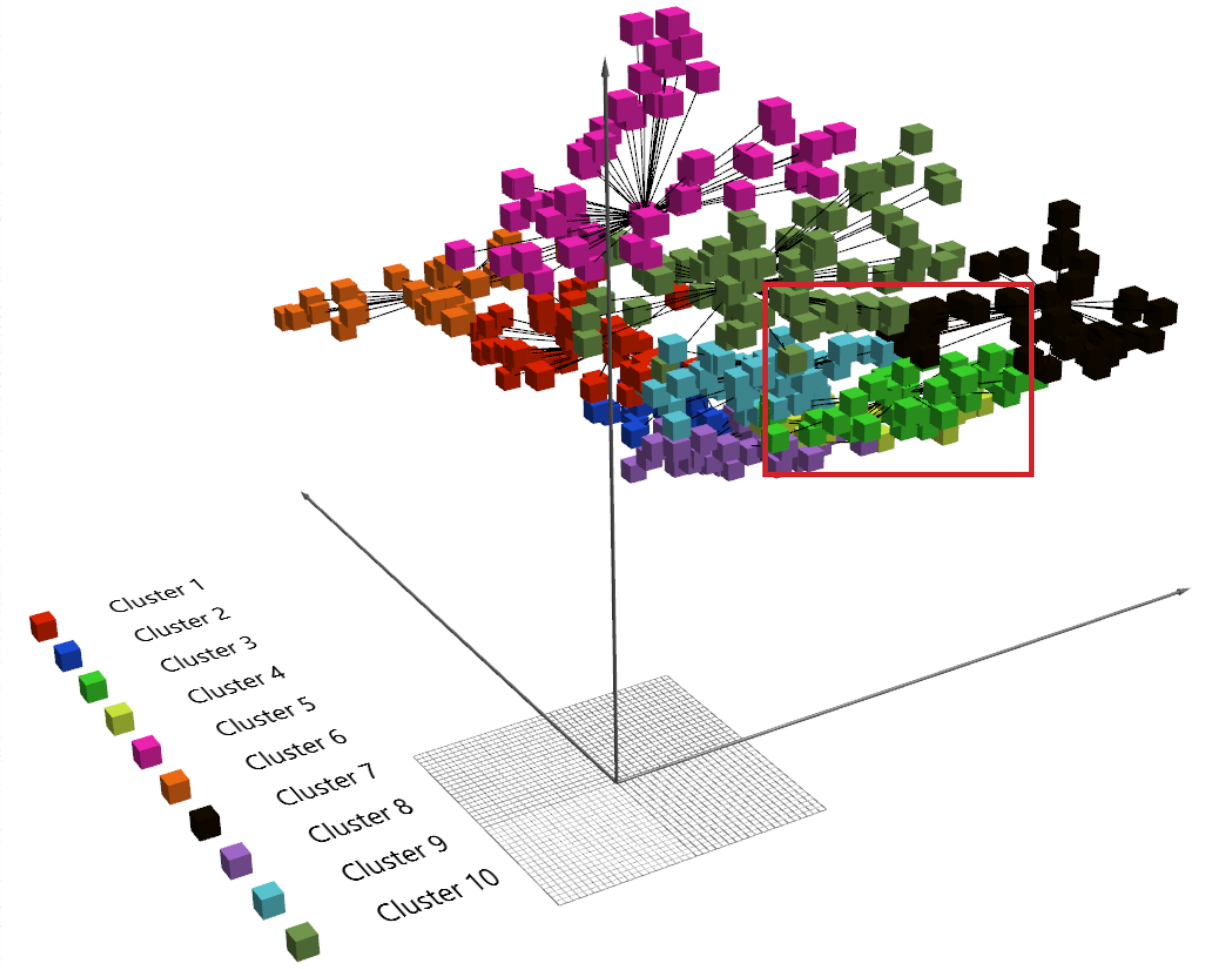


Generation 9 // Ind. 43
Sunhours on roof/day
Rank: 425 / 1500
Fitness Value: 10.501995
Sunhours on facade or square/day
Rank: 317 / 1500
Fitness Value: 3.003454
Building volume
Rank: 1295 / 1500
Fitness Value: 10101.010101
Average building height
Rank: 469 / 1500
Fitness Value: 10.333333

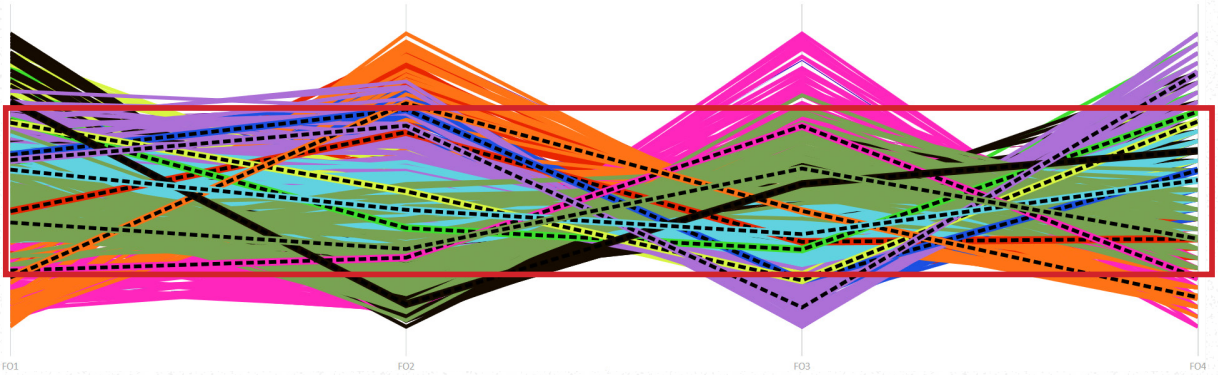




FITNESS VALUE VOLUME OPTIMIZATION



CLUSTERED COORDINATE SYSTEM



EXPLORATION OF SOLUTION SPACE

SELECTION OF PREFERED SOLUTIONS

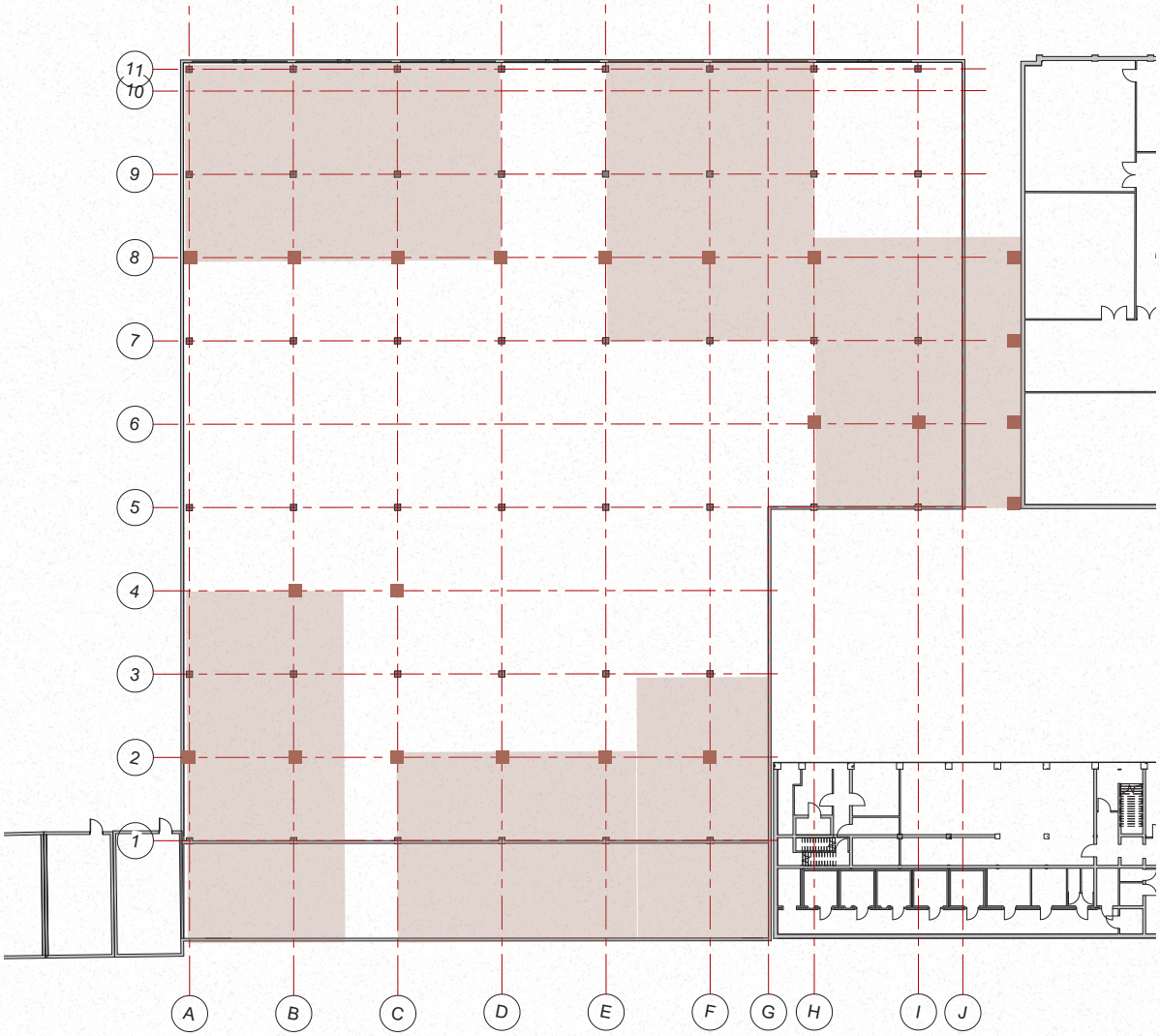
As mentioned, the preferred solution might not be in the center of the paretho front, due to different importance of the objectives. In this case the two most important objectives are the build volume and solar radiation on the courtyard. The build volume should be around 14.000 cubic meters to facilitate the program. Simultaneously the solar radiation on the courtyard should be maximized.

As becomes clear from the clustered coordinate system, the light green cluster corresponds most closely to these objectives. Its fitness for the different objectives is also indicated in the clustered parallel coordinate plot. A random selection of solutions (and their fitness diagrams) out of the light green cluster is exported and displayed in the figure below.

Most of the exported solutions have a relative large open area at the south side of the plot, leading to a lot of daylight radiation in the courtyard. These solutions can function as starting point for a configuration of the new housing buildings.



EXPORTS FROM PREFERRED CLUSTER



ADDITIONAL FOUNDATION

The planned volumes overlap to some extend with the existing load bearing structure of the parking garage. From the capacity analyses came forward that additional foundations are necessary if the desired volume is to be build. The foundation will only carry the added building volume and not interfere with the load bearing structure of the parking garage.

The existing gridlines of the parking garage provide suitable locations for extra foundation piles which can carry extra columns to support the new volume. Placing the extra foundation should allow for an addition of four floors as it halves the added load on the existing structure.

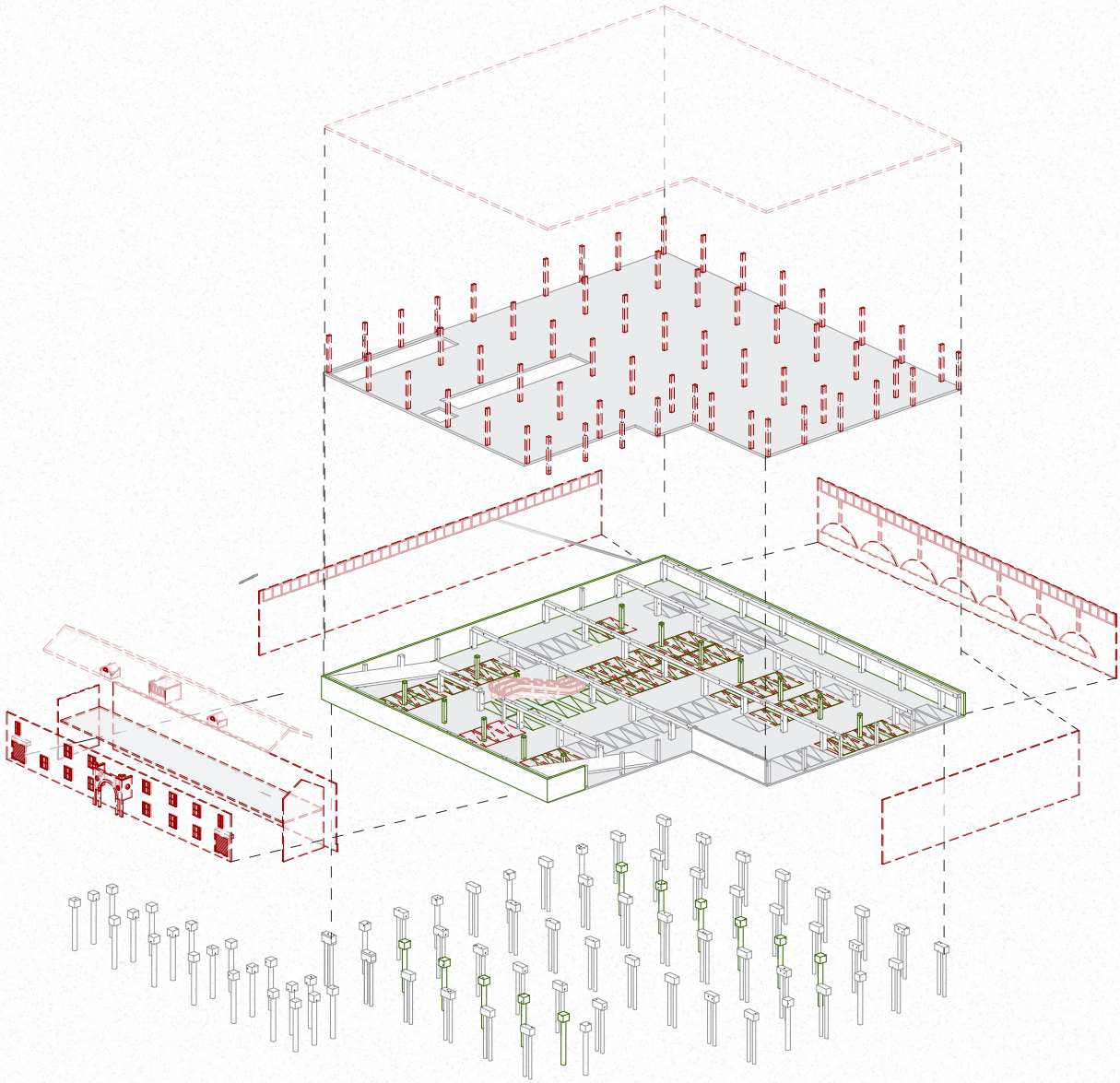
The existing floor of the supermarket will remain in place during the addition of new foundations. The new piles will be 'Steel-tube-piles' which are driven in segments by small pile-drivers. The empty steel pipes are filled with concrete afterwards The size and weight of the needed machinery are within the limits of the existing structure.

ADDITIONAL FOUNDATIONS

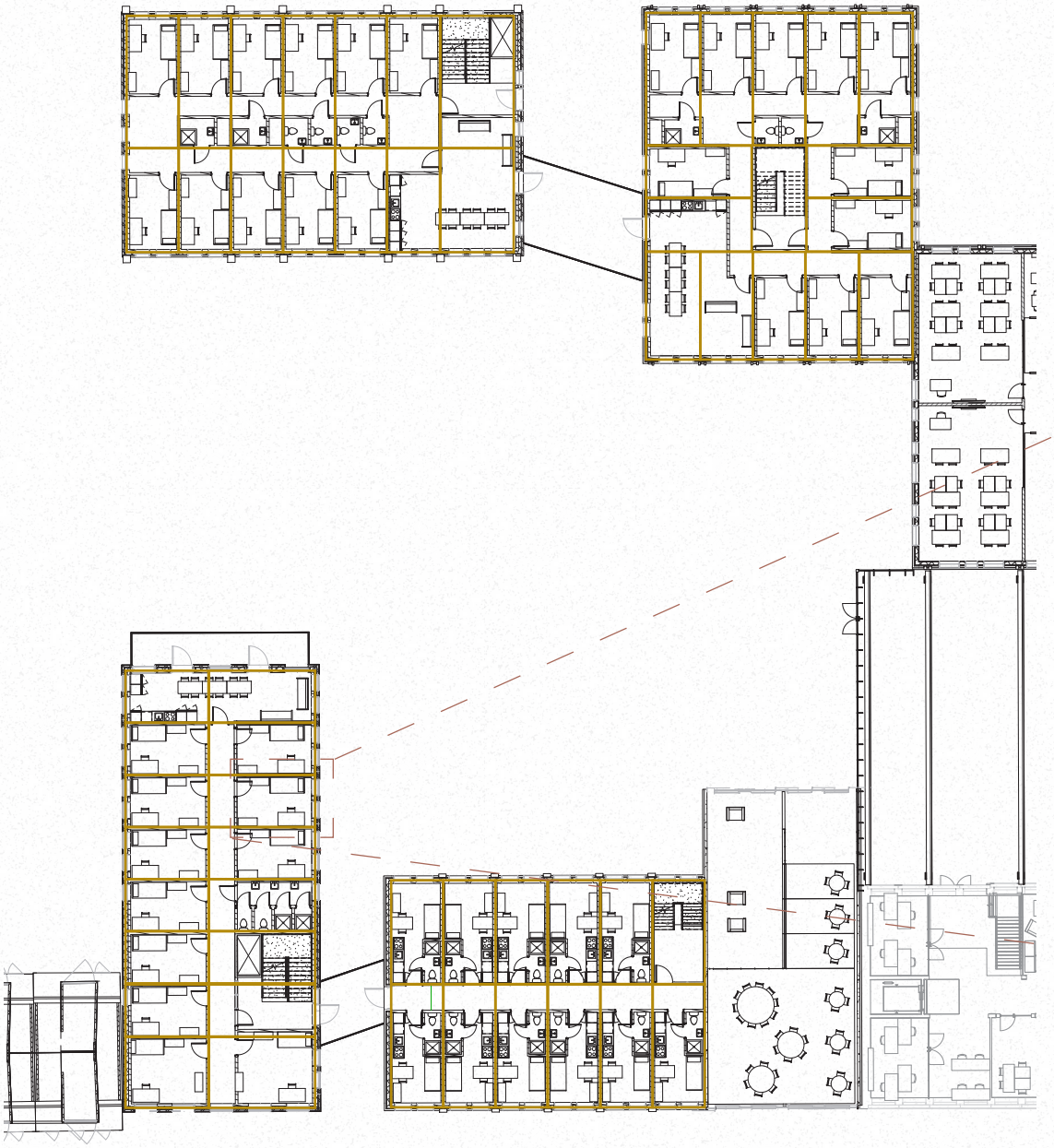
0 m — 25 m

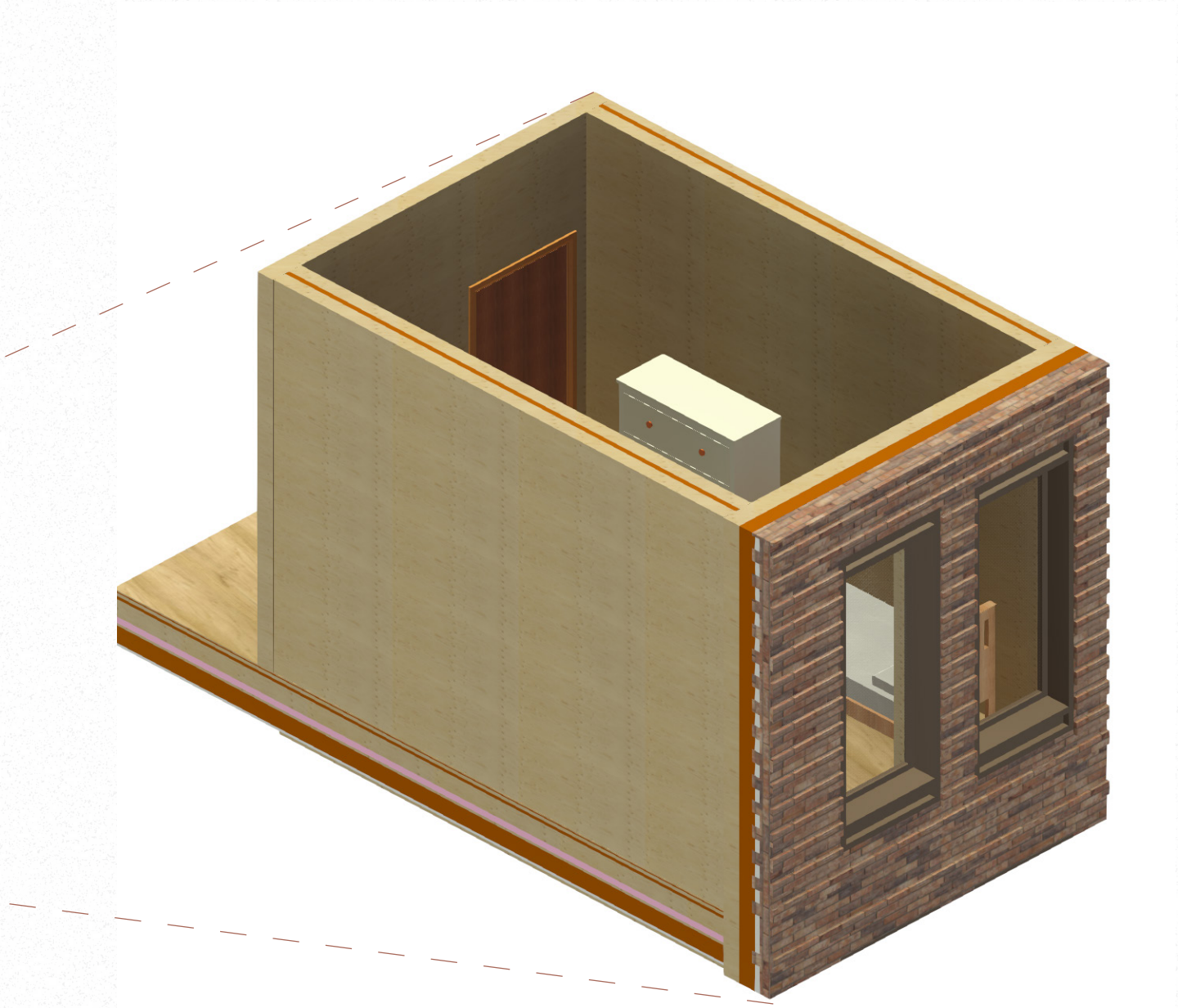


INDOOR PILE DRIVING OF STEEL TUBE PILES



PARKING PLACE CONFIGURATION
Implementing additional foundations and columns meant a new organization of the parking places. The plan above shows the original layout in red and the new layout in green.

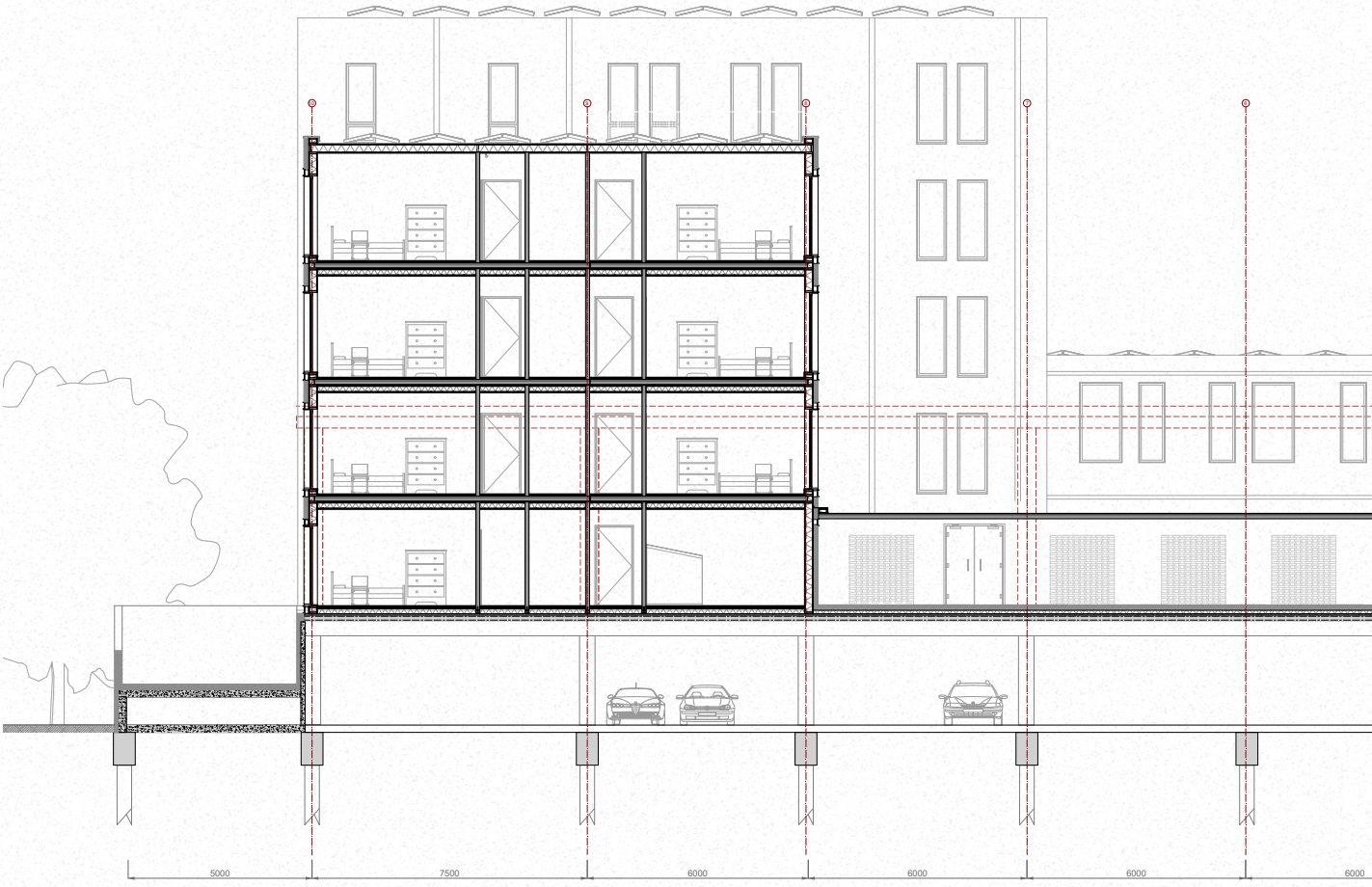




HOUSING CONSTRUCTION

On top of the existing parking garage, the houses will be constructed in wood modules. Each student room is a lightweight, prefabricated module which are stacked onsite. This allows for a low embodied energy, few mistakes and a quick building time, Furthermore they are removable and reusable somewhere else.

0 m 20 m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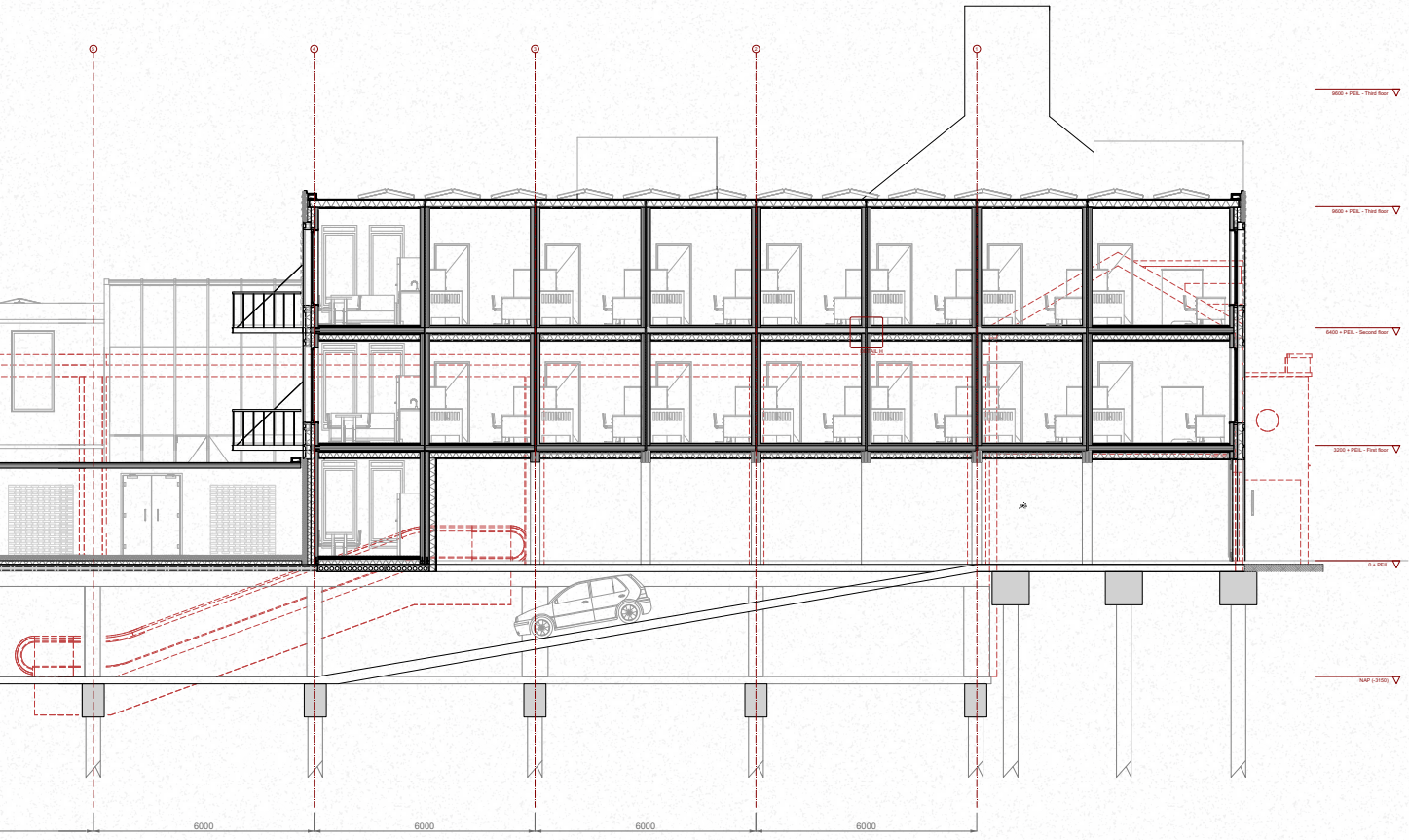
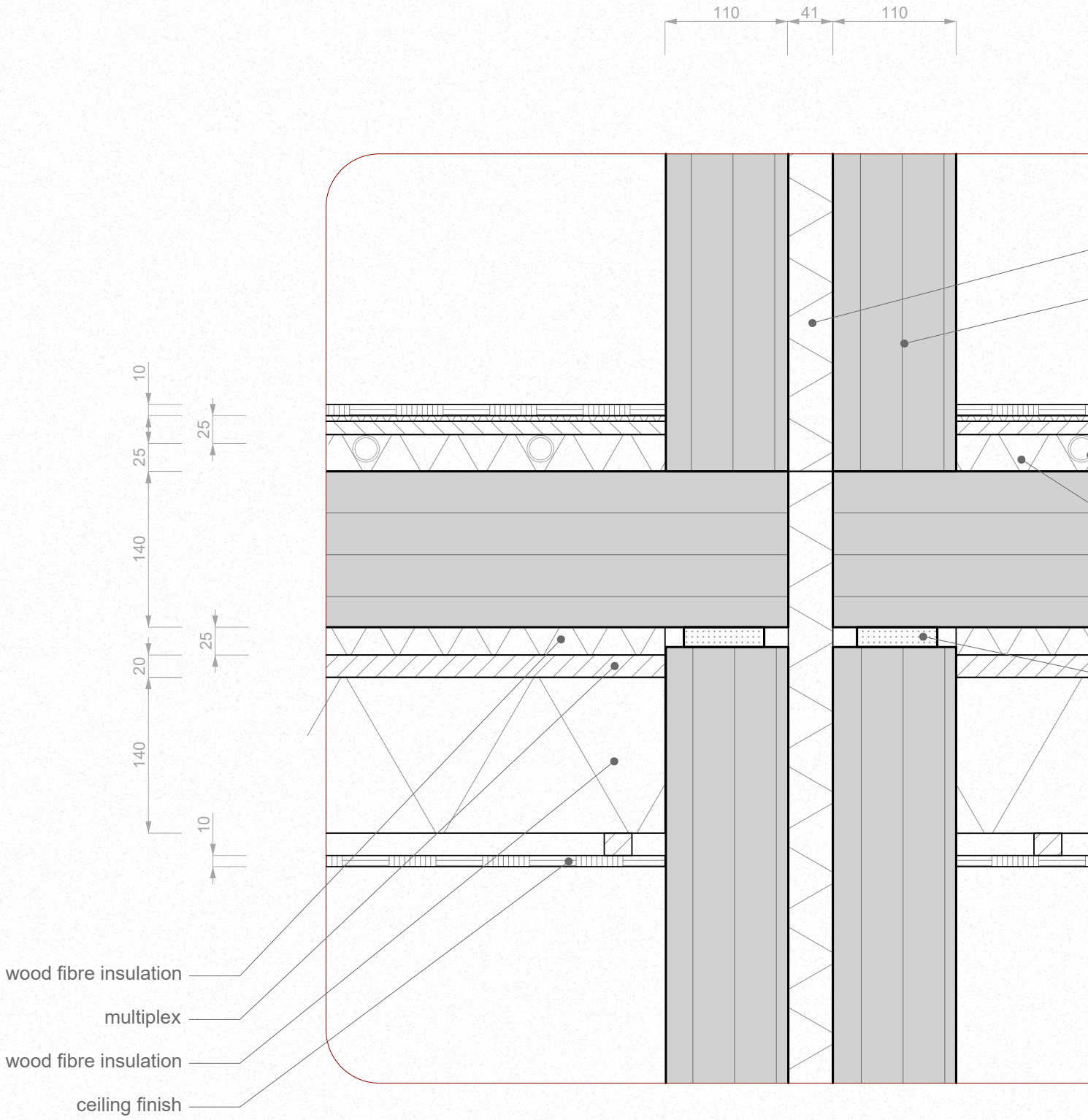
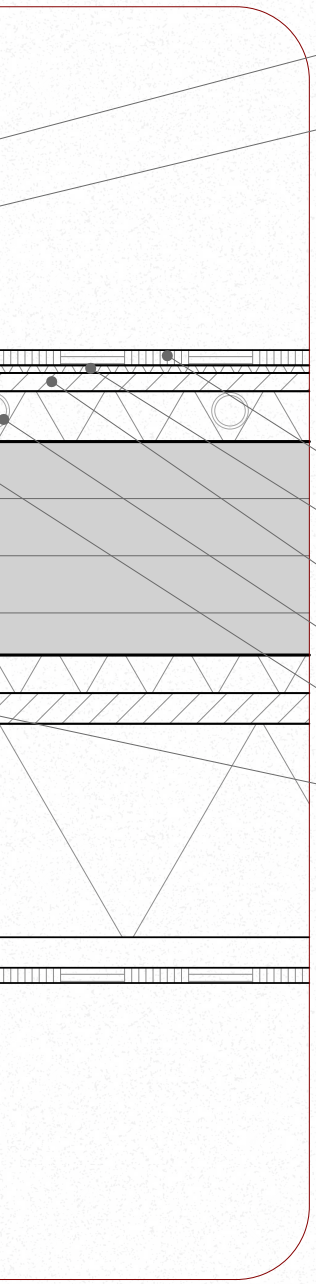


HOUSING CONSTRUCTION

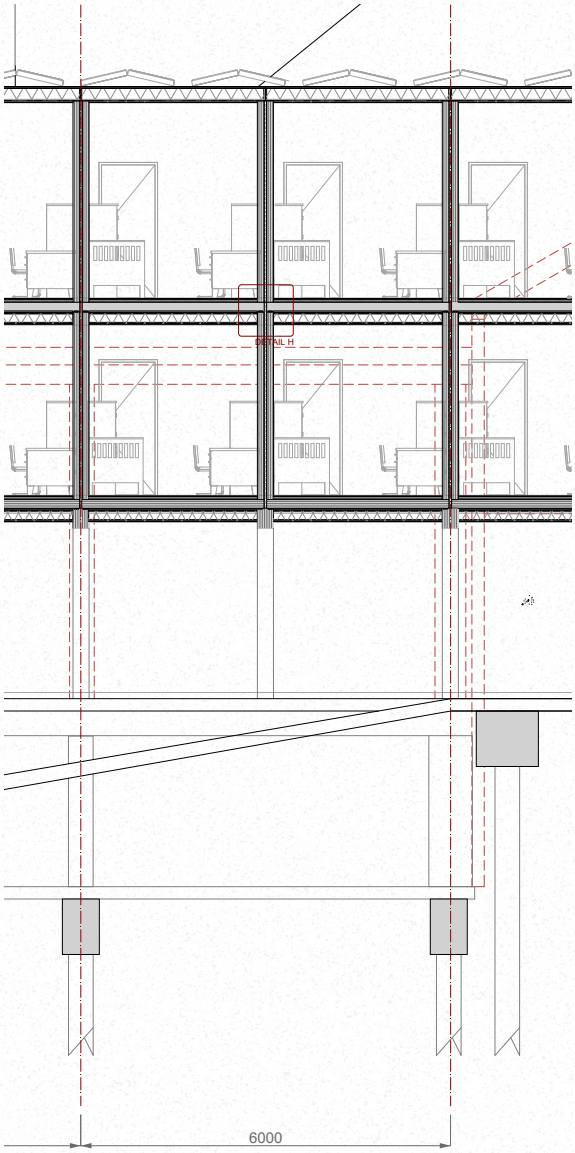
On top of the existing parking garage, the houses will be constructed in wood modules. The section shows how the modules are placed on top of the existing structure.

0 m 10 m


110
41
110
10
25
25
140
25
20
140
10
wood fibre insulation
multiplex
wood fibre insulation
ceiling finish



DETAIL H



DETAIL H 1.5

0 cm 25 cm

NEW SITUATION

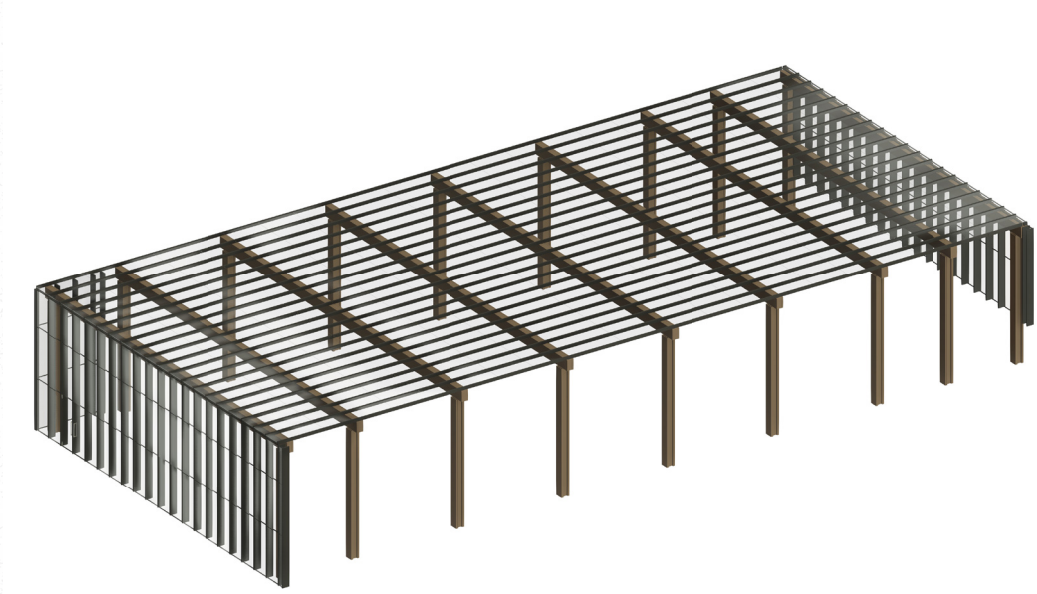
- CROSS LAMINATED TIMBER
- WOOD FIBRE INSULATION
- WOOD
- FLOOR FINISH
- PLASTERBOARD STUCCO FINISH

MAIN HALL STRUCTURE

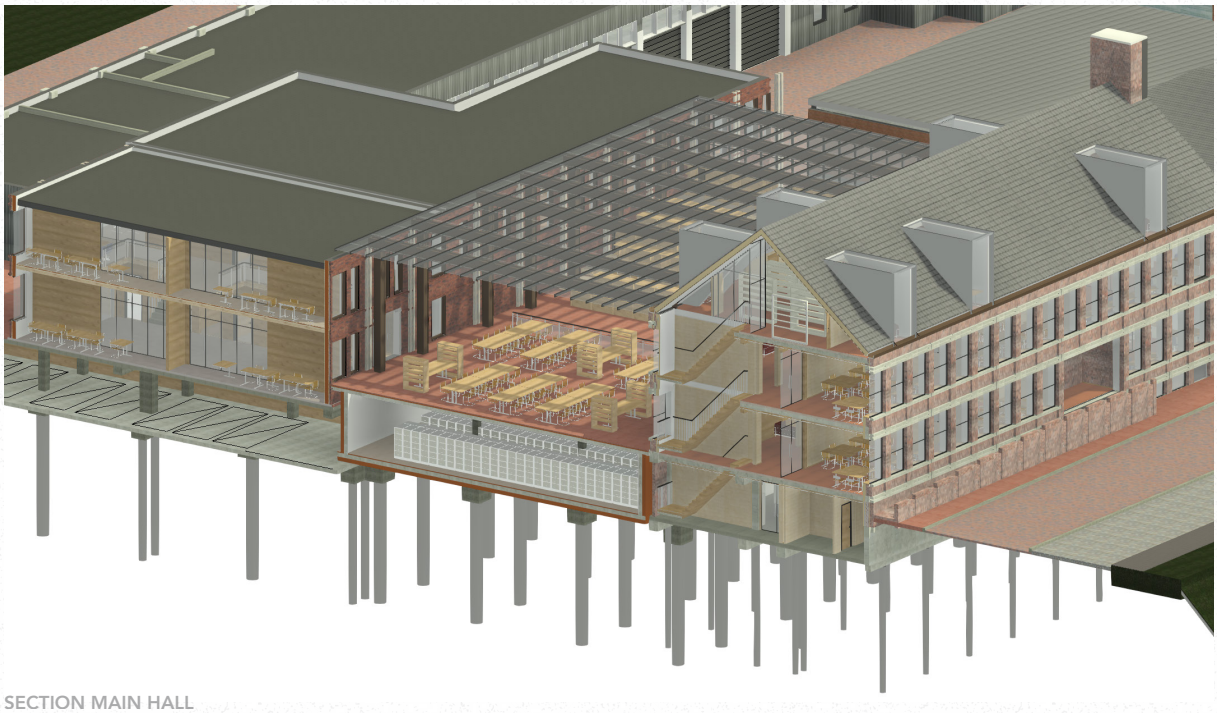
An important element of the redesign is the main hall. To create a calm appearance, ventilation and lighting are included in the load bearing structure. The glass roof is supported with 17400 mm long beams, which are supported by two columns each, one on each end. Together they create a load bearing portal which is placed, aligned with the structure of the former police station, every 3520 mm. The portals are supported by the wall of the archive which is located under the main hall. The wall guides the forces to the foundation.



DETAIL OF COMPOUND COLUMN



AXONOMETRIC VIEW ROOFSTRUCTURE



SECTION MAIN HALL

The compound beams consist of two castellated beams, 250 mm apart to allow a ventilation duct and electricity cables to run in-between them. The beams have a large influence on the appearance of the main hall. Therefore their height is calculated.

The load on each beam is modest. As there are two castellated beams per portal they share the load. Meaning they each carry 2,640 * 17,4 m of roof area.
The weight of the glass roof is estimated at 1,0 kN/m^2
The live load of a roof according to Dutch regulations is 1,0 kN/m^2

The faculty building is a public building meaning it belongs in safety class CC2 according to Dutch regulations. Therefore, partial factors of 1,2 for deadloads and 1,5 for live loads should be calculated.

The total load on the roof is then 1,0 * 1,2 + 1,0 * 1,5 = 2,7 kN/m^2
As each castellated beam carries a strip of 1,760 m of roof, the load per meter beam is 2,640 * 2,7 = 7,128 kN/m.

Based on an estimation, an IPE 360 castellated beam is chosen. The height of this beam is 600 mm. The own weight of this beam is 0,582 kN/m.
The total calculation load is 0,582 + 7,128 = 7.71 kN/m.

$$M_d = \frac{1}{8} ql^2 = \frac{1}{8} * 7{,}71 * 17{,}4^2 = 291{,}78\ kNm = 291{,}78 * 10^6\ Nmm$$

$$\sigma = \frac{297{,}78 * 10^6}{1738 * 10^3} = 167{,}89\ N/mm^2$$

$f_{m;d}$ = 235 N/mm2

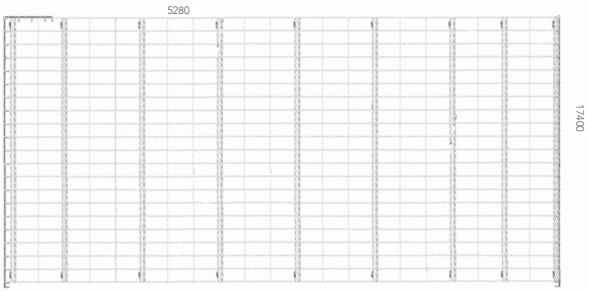
$$\frac{167{,}89}{235} = 0.71 \rightarrow \textit{The profile is strong enough}$$

The beam is more than strong enough, yet with a large span, deflection is a risk. Therefore the deflection is calculated. No partial factors are necessary in this calculation. Therefore the load is:
1,0 + 1,0 = 2,0 kN/m^2
2,0 * 2,640 = 5,280 kN/m
5,280 + 0,582 = 5,862 kN/m

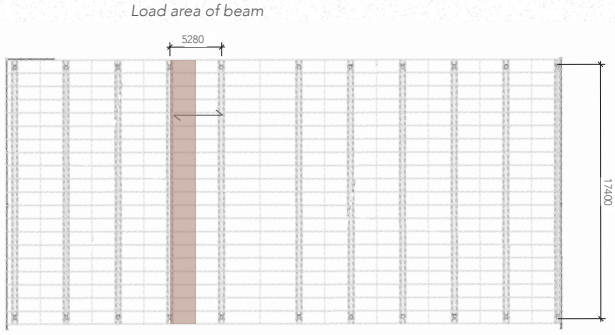
$$w = \frac{5 * q * l^4}{384 * E * I} = \frac{5 * 5{,}862 * 17400^4}{384 * 210000 * 52144 * 10^4} = 63{,}9\ mm$$

Roof beams are allowed a maximum deflection of 0,004 times the length of the span.
17400 * 0,004 = 69,6 mm allowed deflection. The total deflection is 63,9 mm. Meaning that the beam is stiff enough. A smaller profile does not suffice

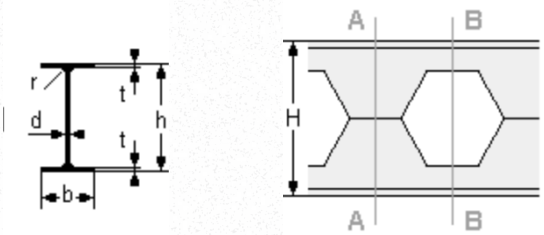
CONCLUSION
The castellated IPE 360 beam with a height of 600 mm is the most efficient option to span the main hall.



TOP VIEW ROOF



STANDARD SITUATION PLAN VIEW



BEAM DIMENSIONS
h= 360 mm
H = 600 mm
b = 170 mm
t = 12,7 mm
d = 8 mm

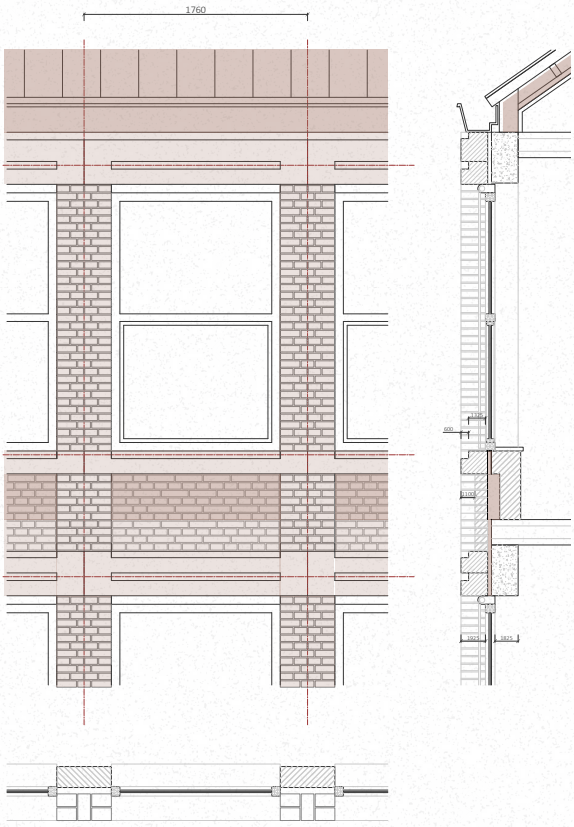
FAÇADE INSULATION

Currently the police station in Middelburg is largely uninsulated. To improve the energetic performance and thermal comfort in the building insulation is necessary. By analyzing different possibilities, a practical insulation method can be chosen.

INSULATION - CAVITY

Due to the heritage value of the façade, exterior insulation is not possible. Therefore, two options remain: insulating in the cavity of the façade, or insulating on the inside. The roof of the police station already has five centimeters of insulation and there is sufficient space to increase this.

When insulation would only be placed in the cavity, the maximum insulated area is very limited. At most places the cavity is only 40 mm making sufficient insulation impossible. Meeting current energetic demands is thereby impossible, which makes only insulating in the cavity an unsuitable approach. Combing insulation in the cavity with insulation on the inside is possible.

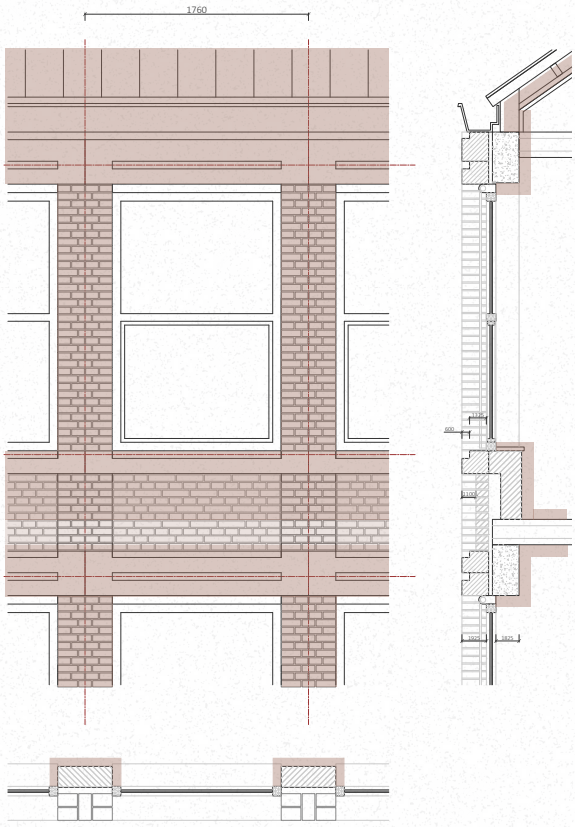


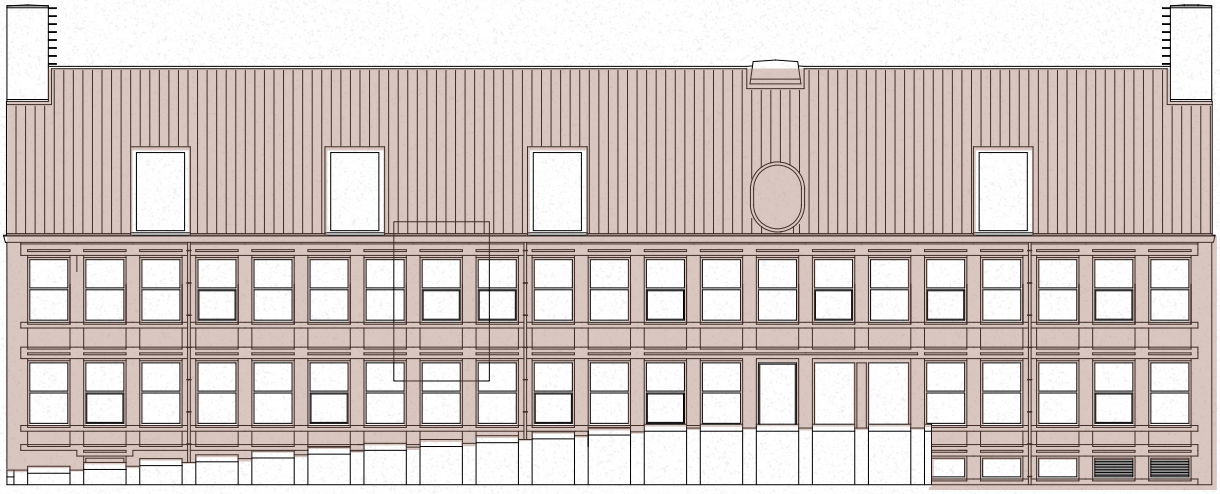


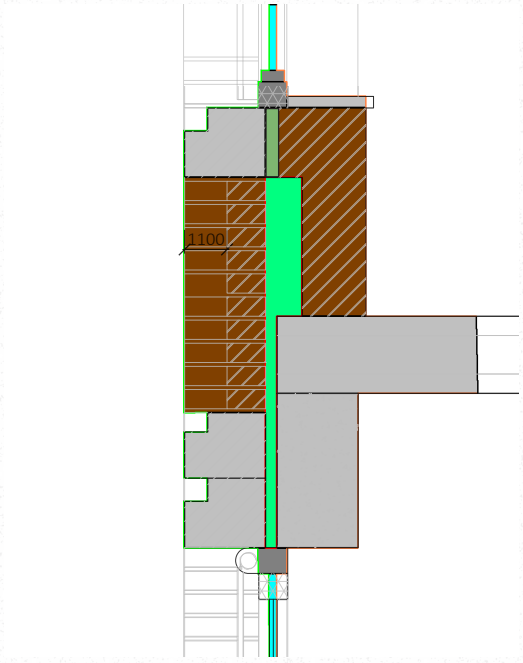
INSULATION - INSIDE

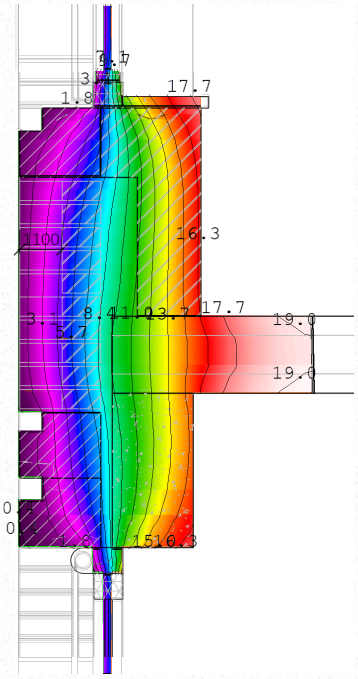
Insulating around the inside of the building allows for the entire façade to be insulated. The connection between the floor and façade result in cold bridges which are difficult to prevent. Besides, there is a risk of condensation at these points. Nevertheless, insulating on the inside seems the most suitable approach for the police station.

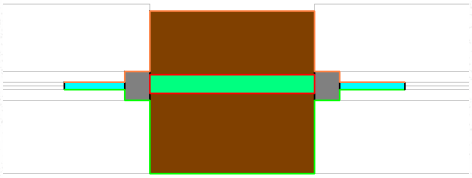
On the next page the thermal behavior of two characterizing details are analyzed with different insulating solutions.

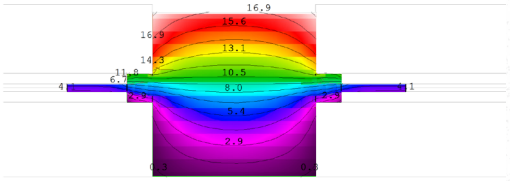








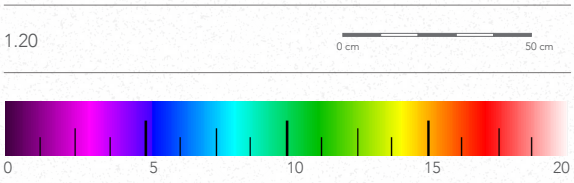


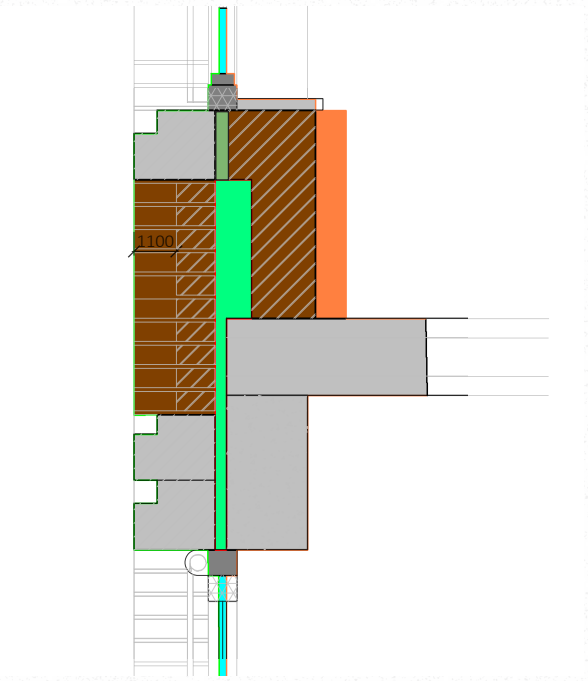


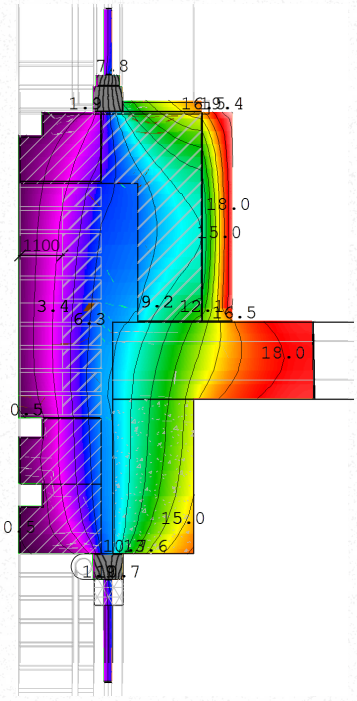
FACADE - CURRENT

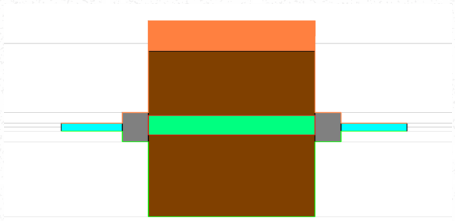
In the current and new situation no moist producing functions are located in the police station. The relative humidity is estimated at 50%. At an indoor temperature of 20 degrees Celsius this means 2340 * 0,5 = 1170 N/m^2 vapor pressure. Resulting in a dewpoint temperature of 9,3 degrees Celsius.

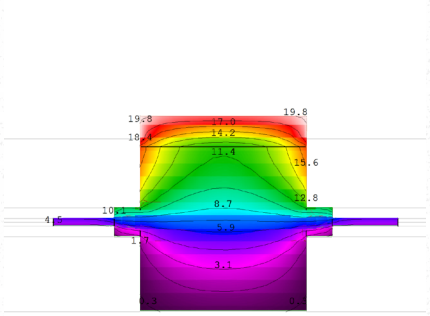
In the current situation, no insulation is present. The lowest temperatures at the surface of the construction are approximately 11 degrees Celsius. This means no condensation will develop as the surface temperature is below the dewpoint temperature.





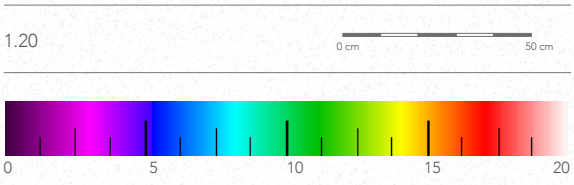


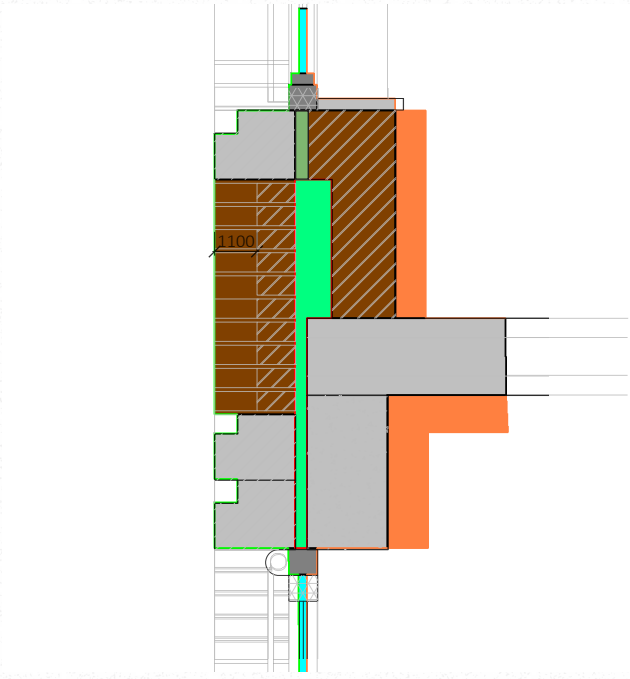


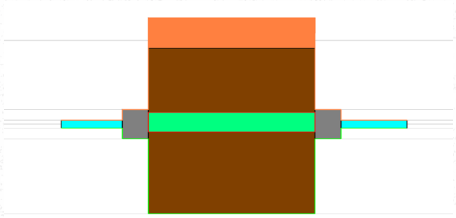


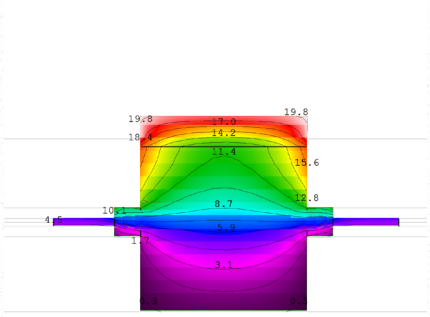
FACADE - OPTION 1

The most practical solution to improve the insulation is placing extra insulation behind the parapet. In the calculation wood fiber insulation is used with an lambda-value of 0,035. As is visible in figure X, the surface temperature is close to the dewpoint temperature at the bottom side of the concrete floor. The insulation only covers a small part of the border between in- and outside, meaning there is opportunity to improve.





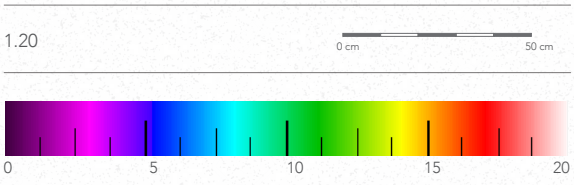


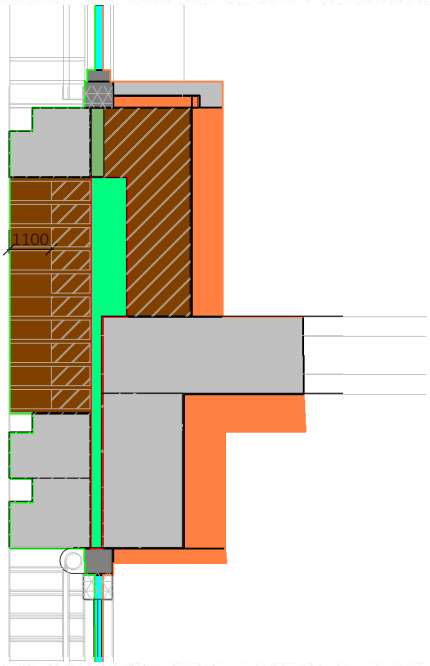


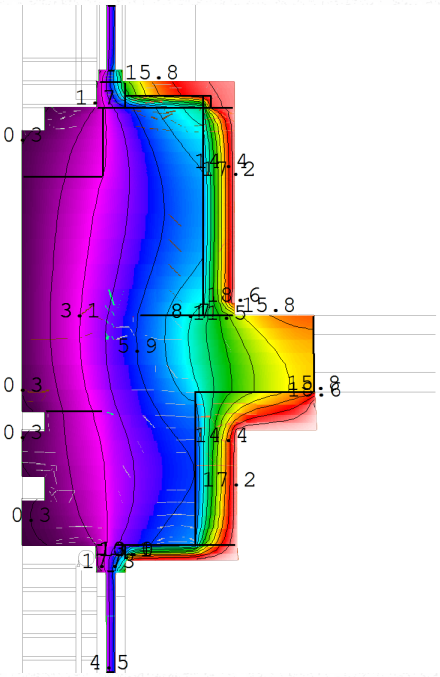
FACADE - OPTION 2

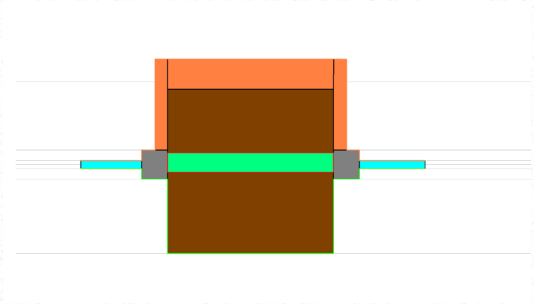
A second option is to also provide the bottom side of the concrete slab with insulation. Thereby reducing its cold bridge effect. Compared with the first option of only insulating the parapet, the insulating performance is higher (more façade area is insulated). Besides, the risk of condensation is lower, as the surface temperatures will be higher.

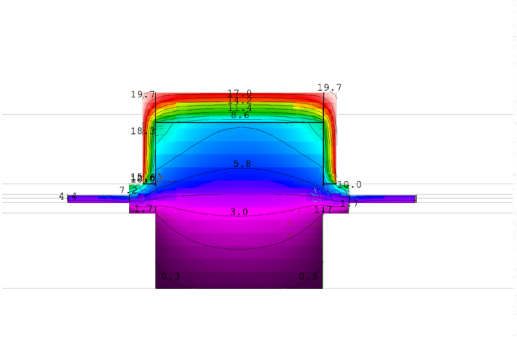
Because there will be a lowered ceiling anyways, the insulation can be easily implemented and hided from view.







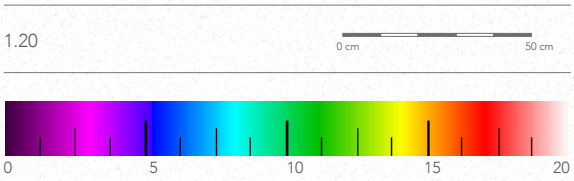


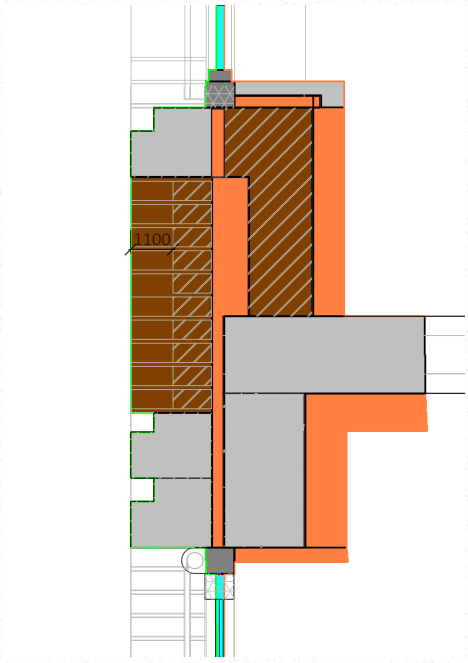


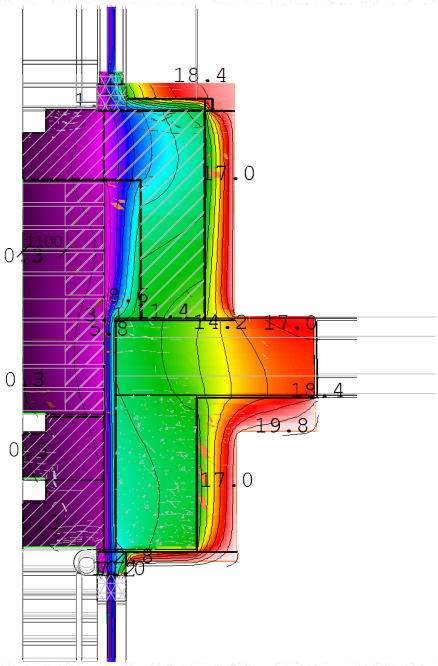
FACADE - OPTION 3

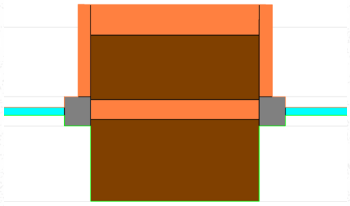
The third option requires the sides of the wall openings to be cladded with insulation as well. This reduces the cold bridges to a minimum and thereby improves the overall insulation and comfort in the building.

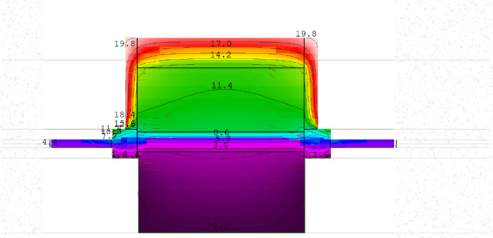
The downside of this approach are the practical difficulties in installing the insulation. Because some window frames are openable the insulation can be only approximately two centimeters thick. Because half of the window frame is hided behind insulation, this is also esthetically not the most pleasing option.







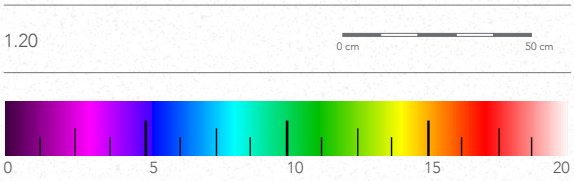




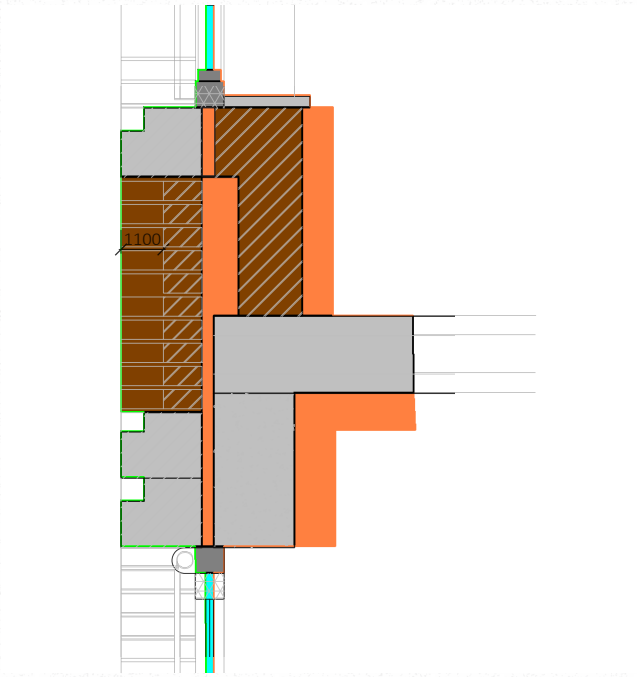
FACADE - OPTION 4

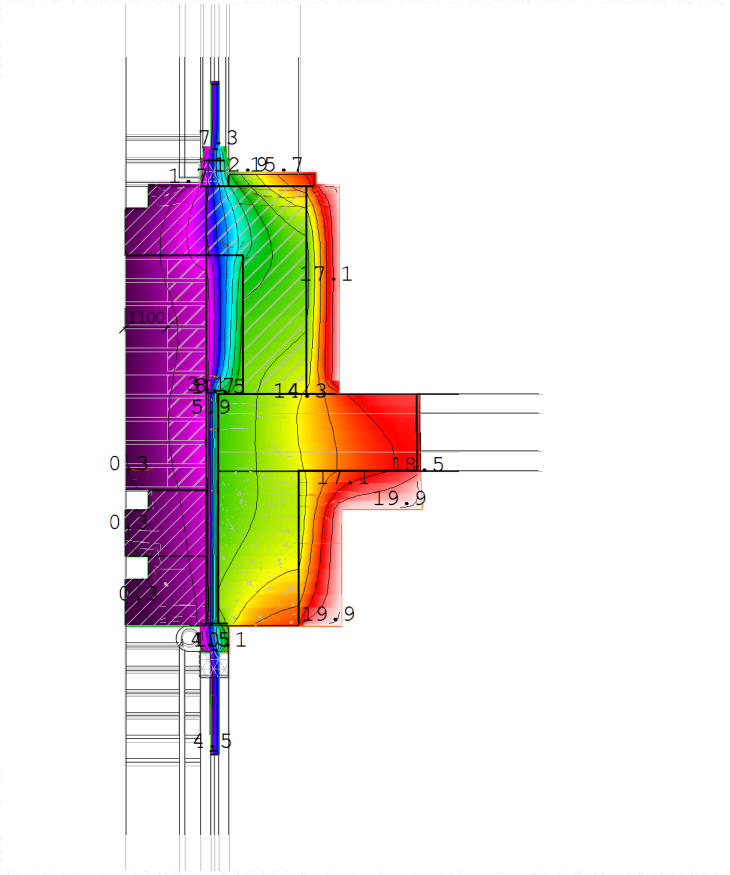
The fourth option combines the best performing interior insulation with insulation in the cavity. In this scenario the cavity is insulated with EPS bubbles which allow for some ventilation of the façade. Cavity insulation is known for its condensation risks. Fortunately, recent studies show that in most cases no damage occurs caused by condensation, even if calculations predicted otherwise.[1]

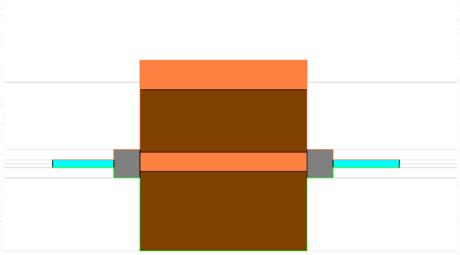
Aside from the improved R-value, cavity insulation includes a large part of the building mass within the insulated zone. This results in a more moderate indoor temperature because the building mass can act as temperature buffer.

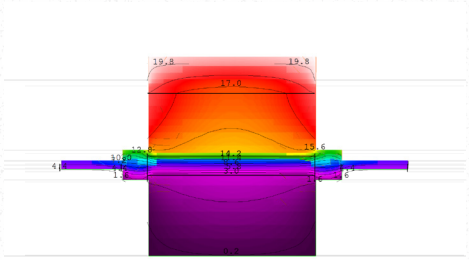


1. Zijlstra, H. Quist, W.J. Nijhuis, S., Clarke, Nicholas (2022) Final report of the research project KaDEr









FACADE - OPTION 5

The fifth option combines the second-best interior insulation with insulation of the cavity.
The overall insulation is slightly less, but this approach allows for much easier implementation. On the inside there is no risk of condensation. The EPS bubbles should allow for sufficient ventilation of the cavity to prevent any damage there.

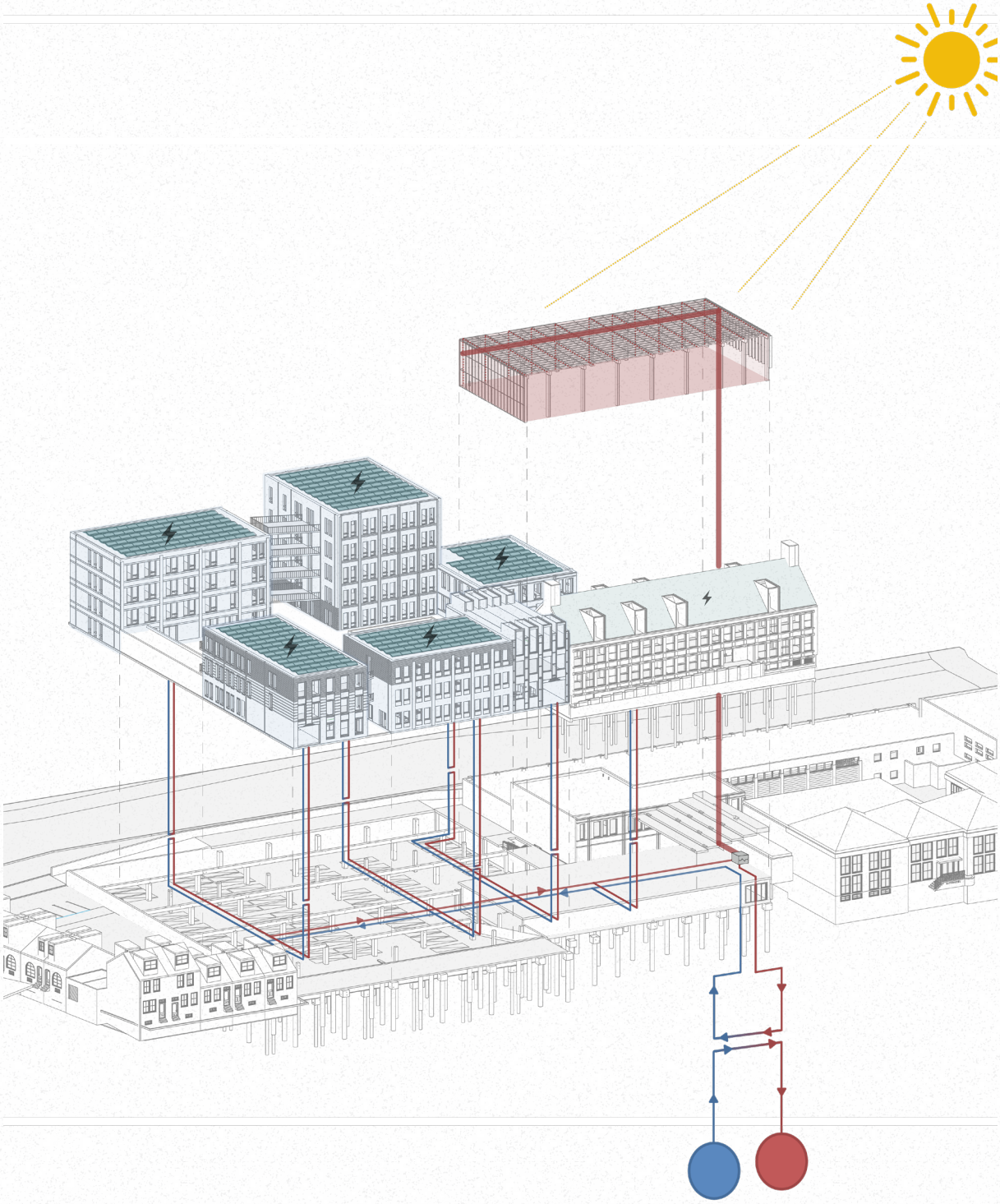
1.20

0 cm 50 cm

0 5 10 15 20

CONCLUSION

The fifth option combines a good thermal performance with a relatively simple implementation. Compared to the best insulating options, this approach has a small impact on the aesthetics off the building; no parts of the window frames are covered.
Therefore the fifth option is the chosen approach to make the police station a future proof building.



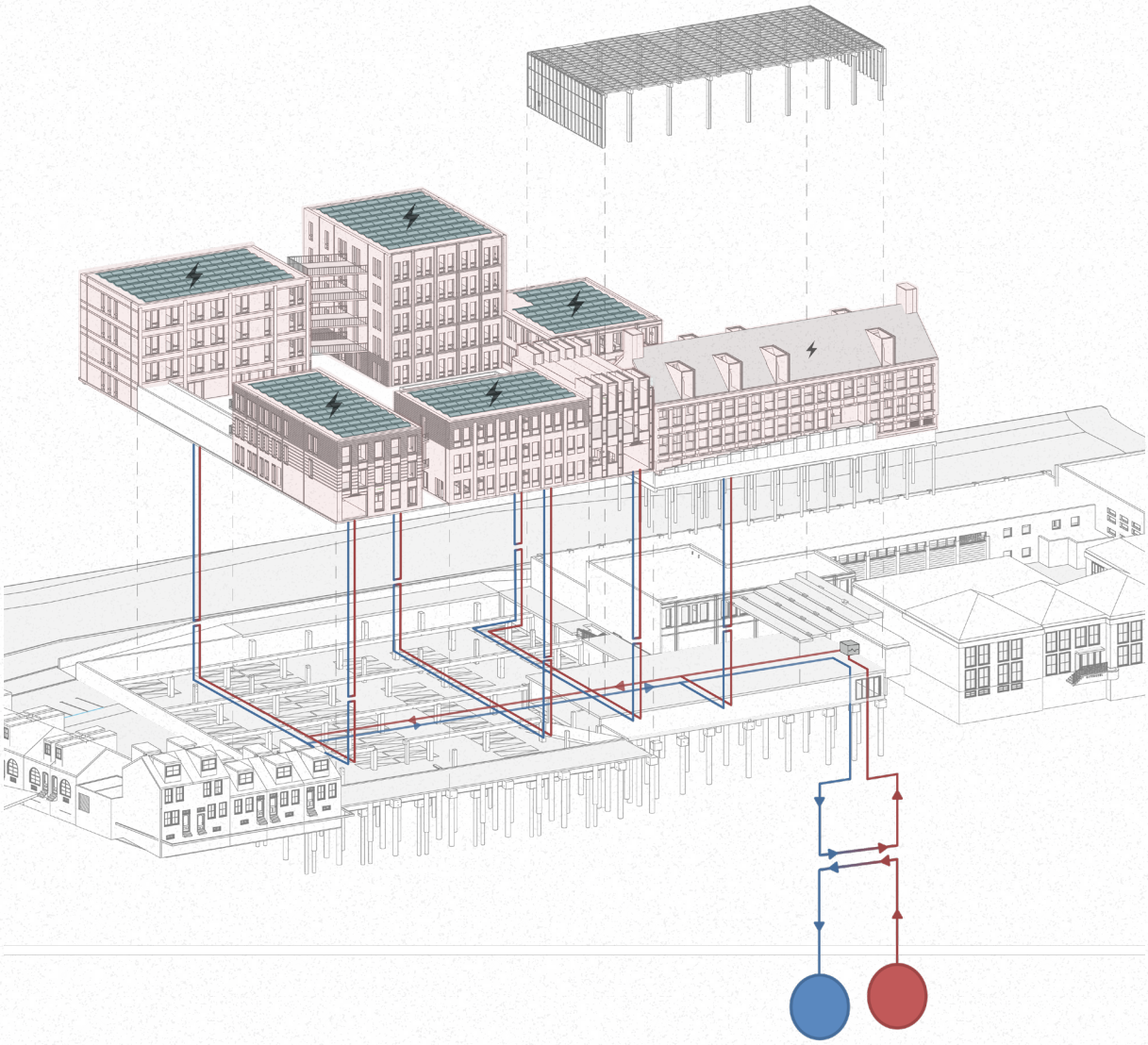
SUMMER

The entire complex shares one heatgrid. Due to the large amount of student houses, the complex needs more heat than cold. To maintain the balance of the aquifer thermal storage, the main hall acts as a greenhouse in summer. Hot air is ventilated away, the heat is stored in the aquifer. At the same time the cold water can be used to slightly cool the buildings.

ENERGY CONCEPT

0 m 50m

HIGH TEMPERATURE
LOW TEMPERATURE

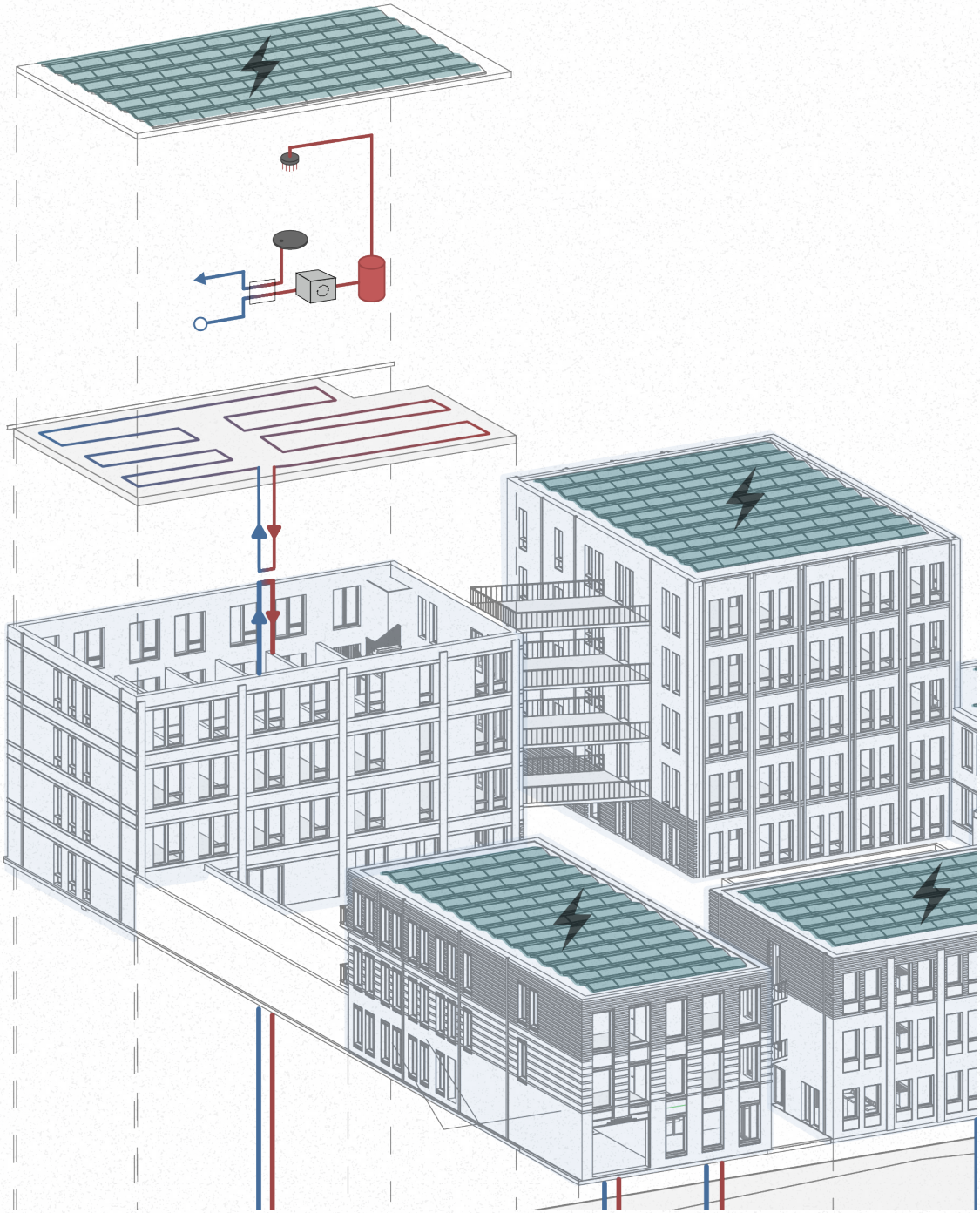


WINTER
During winter the heat from the aquifer thermal storage is used to heat up the buildings.

ENERGY CONCEPT

0 m 50m

HIGH TEMPERATURE
LOW TEMPERATURE



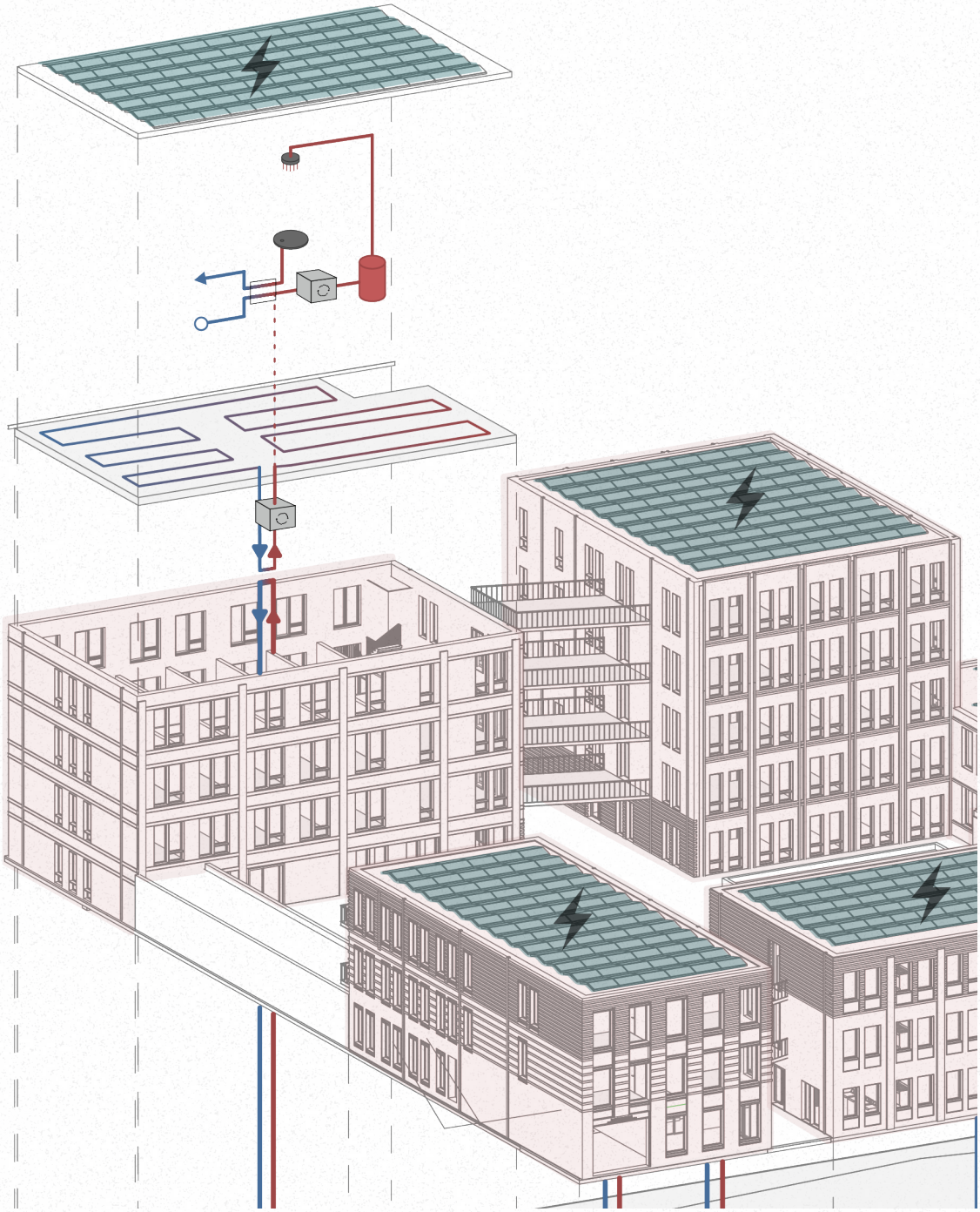
SUMMER

In summer, the cold water from the aquifer thermal storage is used to cool the buildings. The cold water is distributed through the pipes for floorheating.

ENERGY CONCEPT

0 m — 50m

HIGH TEMPERATURE
LOW TEMPERATURE



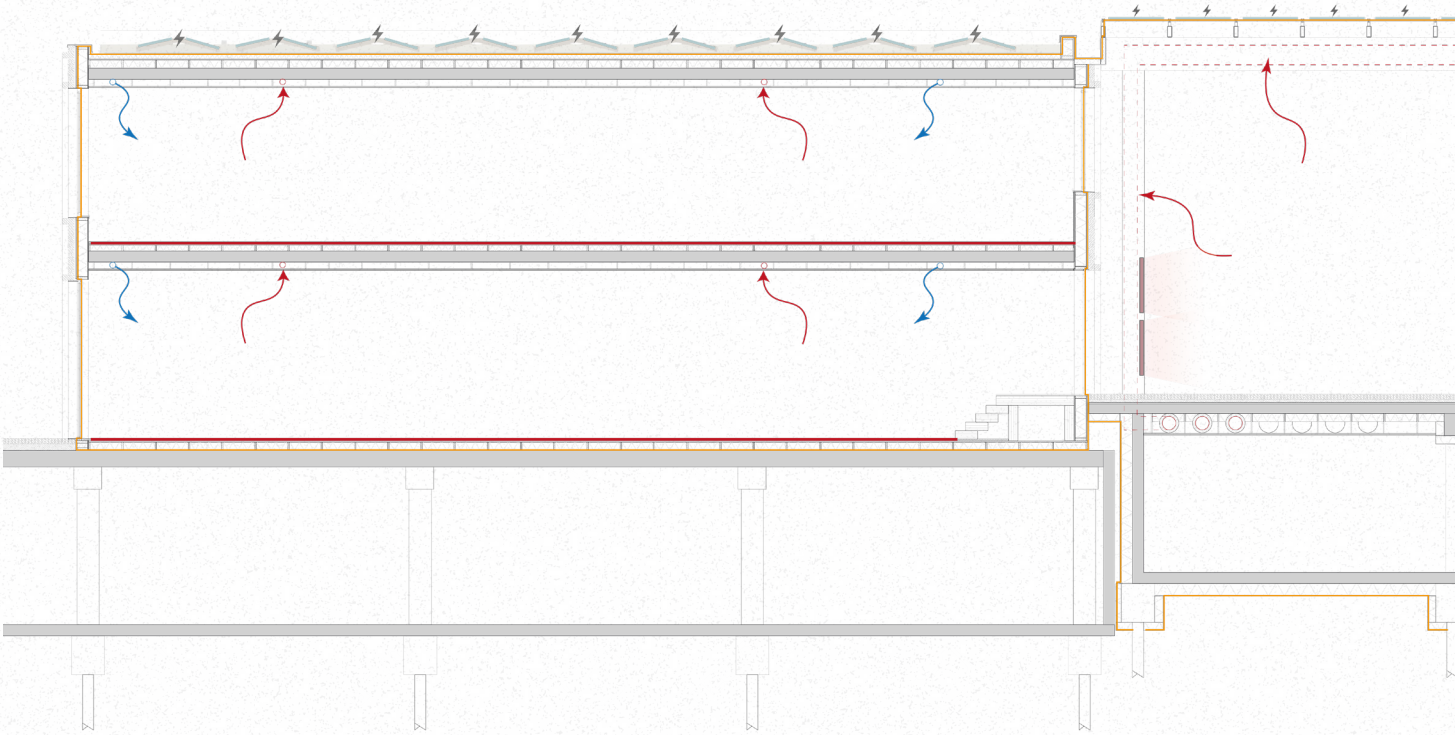
WINTER

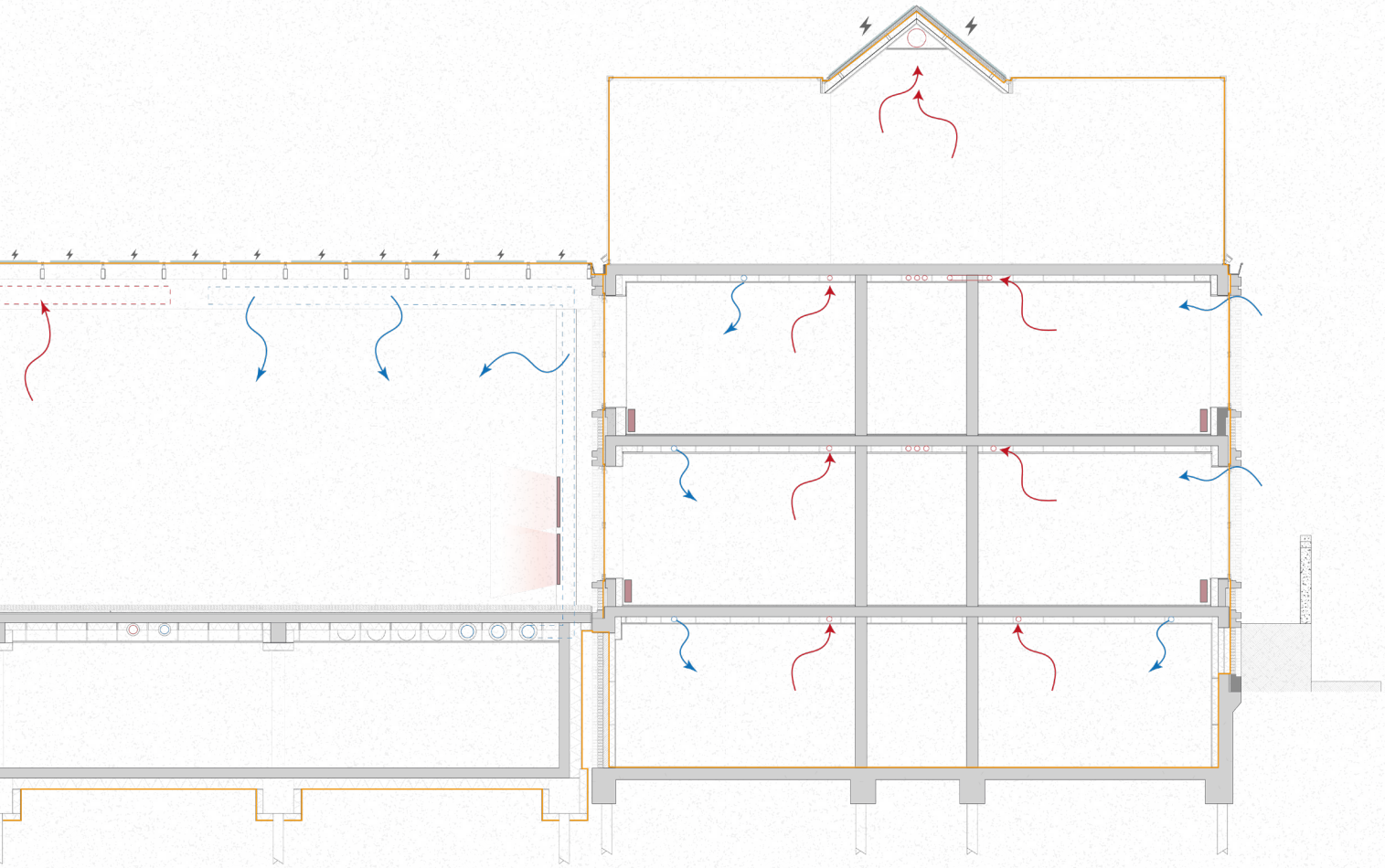
In winter the heat from the aquifer thermal storage is used as source for the heat pump of each building. The heat pump increases the temperature to 40 degrees, suitable for floor heating. A booster heat pump increases the water temperature to 60 degrees, which makes it suitable for domestic hot water.

ENERGY CONCEPT

0 m — 50m

HIGH TEMPERATURE
LOW TEMPERATURE





CLIMATE DESIGN

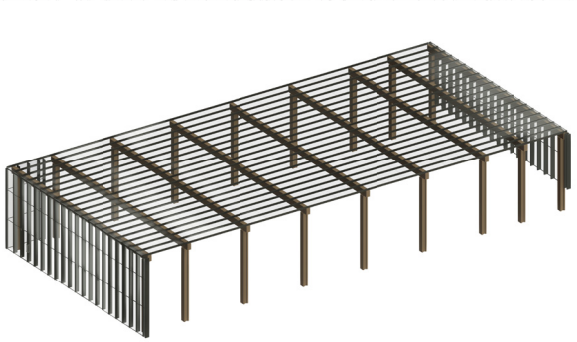
0 m — 5 m

HIGH TEMPERATURE
LOW TEMPERATURE

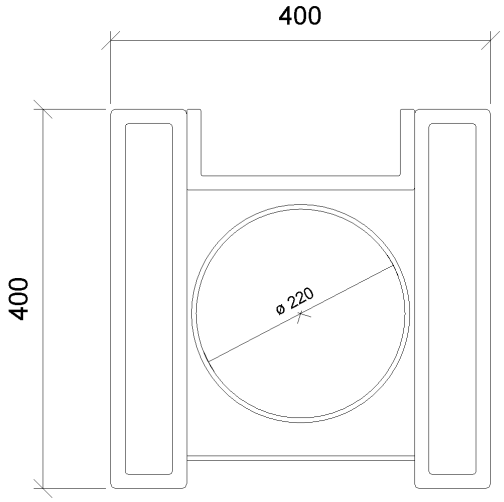
MAIN HALL VENTILATION REQUIREMENT

The ventilation in the main hall is not only important for the comfort of the users, it is also an important element within the energy concept of the entire campus. In summer the main hall acts as greenhouse. It heats up due to solar radiation, the hot air is ventilated away and stored in an aquifer thermal storage.

The maximum capacity of the main hall is approximately 200 persons. For each person 25 m^3 of fresh air is necessary each hour. Meaning the total ventilation need is 200 * 25 is 5000 m^3.
There are nine load bearing portals which have integrated ventilation. This means each portal needs a ventilation flow rate of 5000/9 = 555 m^3/hour.
555 m^3/hour equals 0,154 m^3/second. With an airspeed of 3 m/s the required duct area is 0,051 m^2. A cylindric duct with an area of 0,051m2 has a diameter of 254 mm. When square ducts are used, a 225 x 225 mm duct suffices.



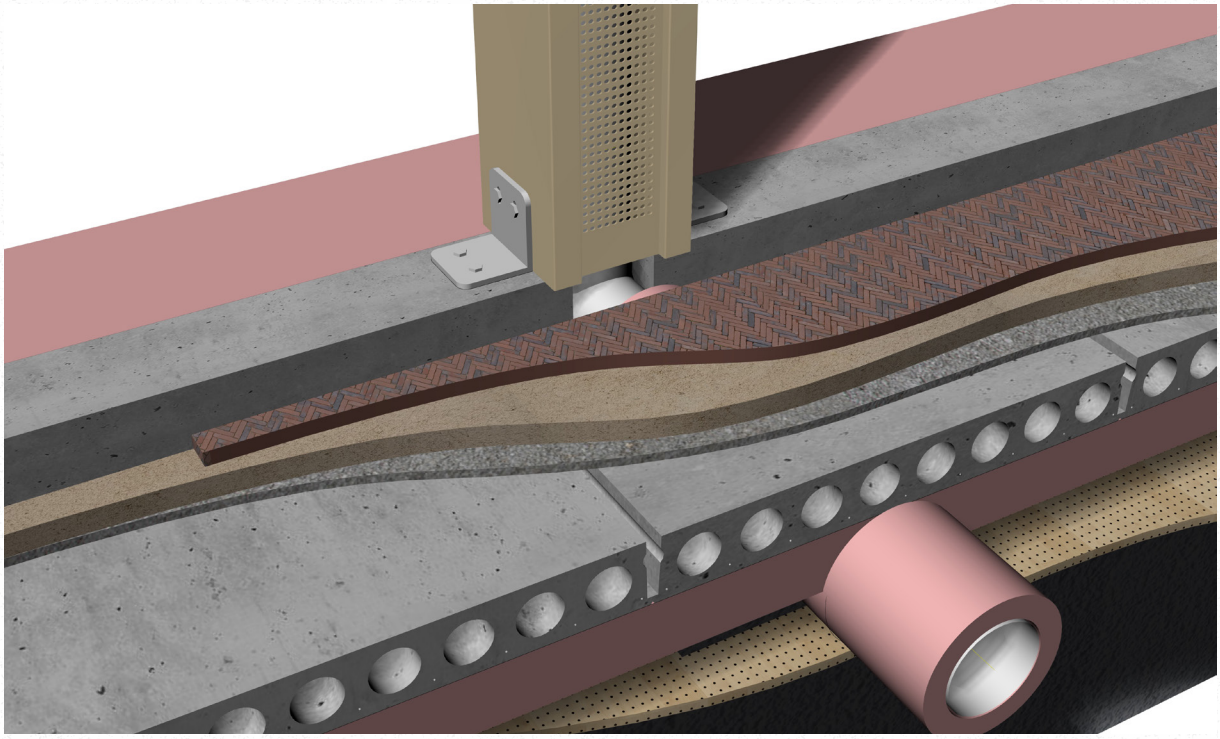
AXONOMETRIC VIEW ROOFSTRUCTURE



VENTILATION DUCT INTEGRATED IN COLUMN



VENTILATION DUCT INTEGRATED IN COLUMN



VENTILATION DUCT INTEGRATED IN COLUMN - 3D DETAIL

MAIN HALL VENTILATION HEAT CAPACITY

Next is calculated how much energy can be stored from the hot air.

At 5000 m^3/h, the ventilation flowrate is 1,38 m^3/s. With a 5 °C temperature difference between inlet temperature and extraction temperature (for example 22,5 °C extraction and 17,5 °C inlet) the heat capacity of the air amounts to:

Q_{vent} = V * pc * ΔT = 1,38 * 1200 * 5 = 8280 W
pc_{air} = 1200
8280 W = 8280 J/s = 8.28 kWh/h

Meaning that every hour a maximum of 8,28 kWh of energy can be stored in the aquifer thermal storage.

Energy can only be stored if the heat gain in the main hall is more than the heat loss. This can be calculated for summer and winter situations but to simplify the calculation an average is calculated.

With an average outdoor temperature of 10°C throughout the year and an indoor temperature of 20°C the heat loss through one square meter of glazing (U = 1,1 $W/(m^2 \cdot K)$) is
(1,1 * 1 * 10 *3600 * 24 * 365)/3600.000 = 96 kWh

On average one horizontal square meter in the Netherlands has a solar radiation of 3,6 GJ per year.[1] At a glass percentage of 85% and a G-value of 0,6 the heat entering the main hall through one square meter of glazing is 3,6 *109 * 0,85 * 0,6 /3600.000 = 480 kWh.

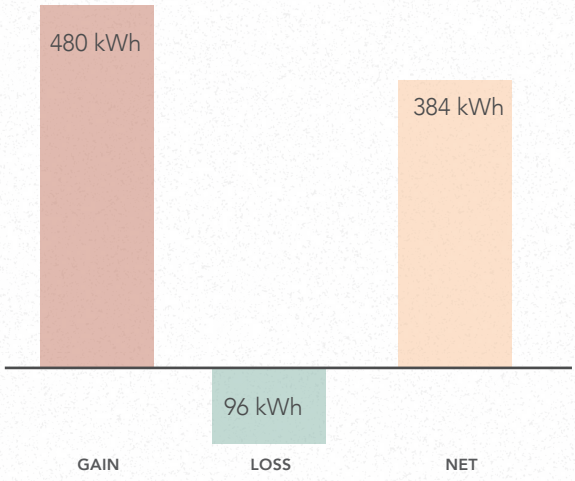
480 kWh – 96 kWh = 384 kWh of net energy entering per square meter of glazing. This means the potential of the entire hall which has an roof area of 594 m^2 is 594 * 384 = 228.096 kWh.

Based on a reference project[2], the heat demand for heating and domestic hot water of all student housing is estimated at approximately 40.000 kWh.

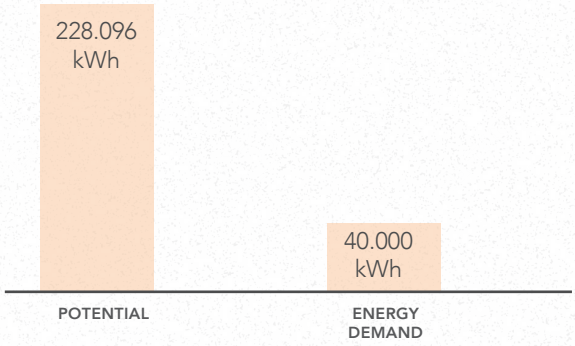
To store 40.000 kWh of energy, the ventilation system which can store 8.28 kWh/hour needs to run for 4830 hours each year. This is an average of 13 hours a day at a temperature difference between in and outlet of 5 degrees Celsius. In summer this is possible, perhaps larger temperature differences even. In winter this is probably not possible. In summer the heat gain of the main hall will be so large that natural ventilation is necessary. Therefore openable windows should be included in the design.

CONCLUSION

The main hall can gain sufficient energy to provide for all housing buildings. The challenge lies in capturing all this heat gain through mechanical ventilation and storing it in the aquifer thermal storage. By increasing the duct size and the airspeed, more heat can be stored.

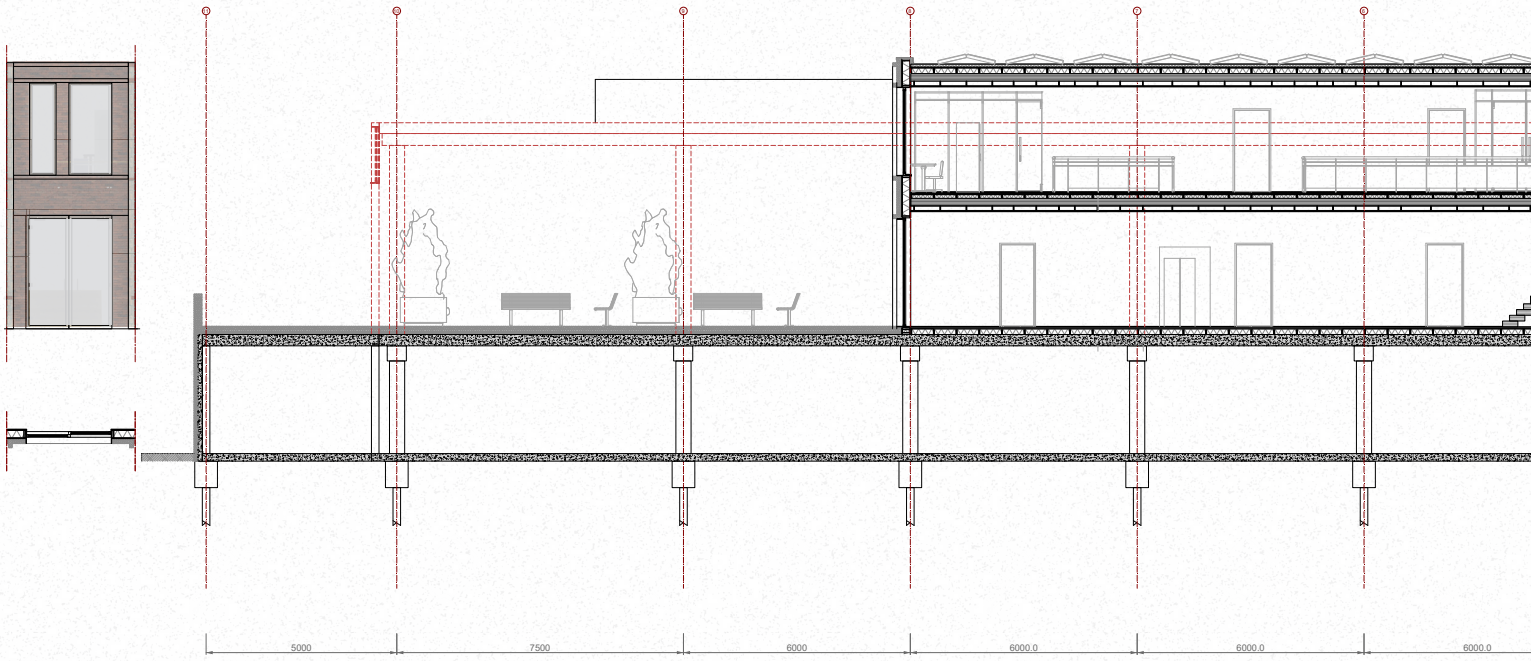


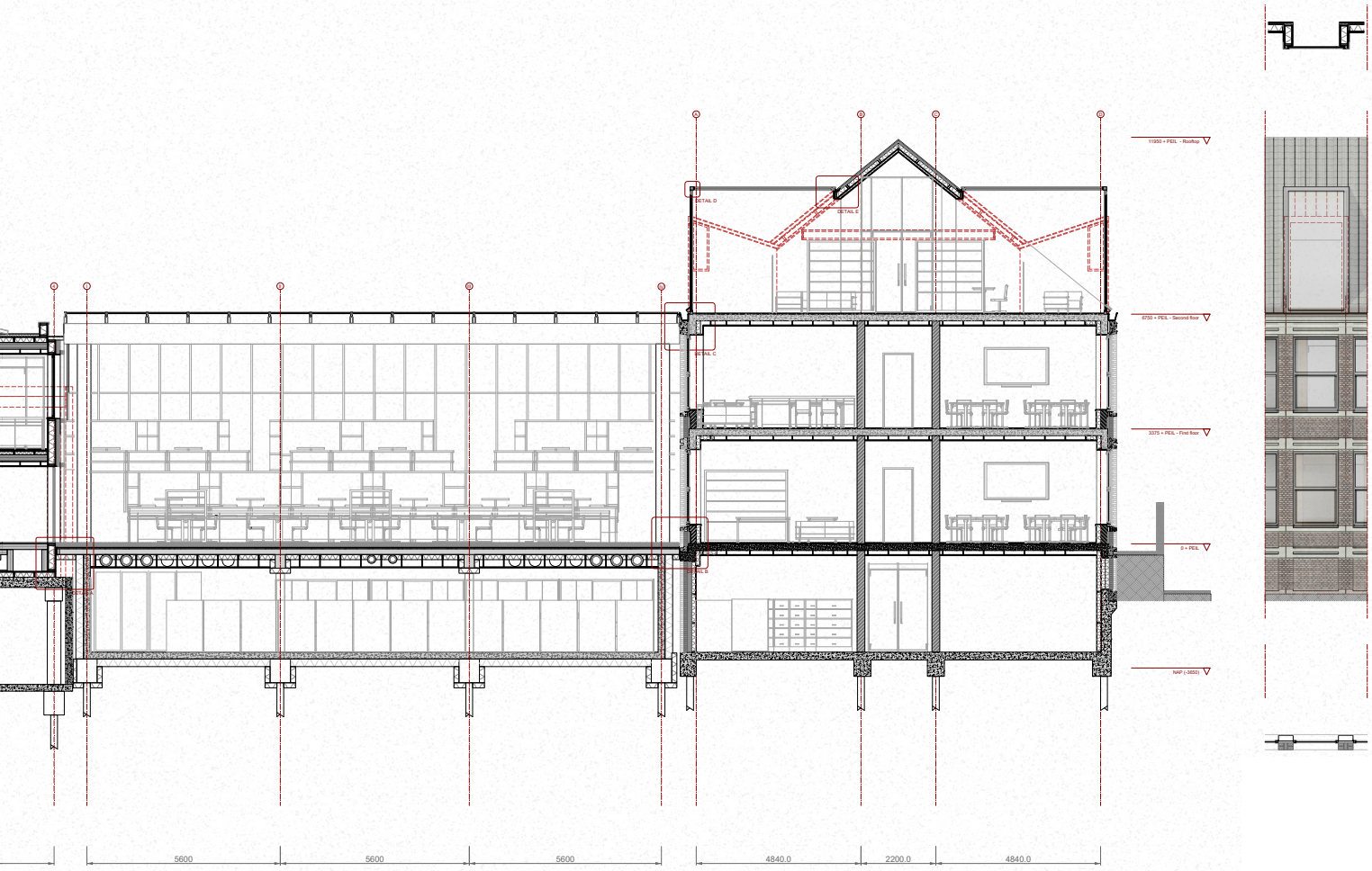
AVERAGE HEATBALANCE MAINHALL PER YEAR PER SQUARE METER



ENERGYPOTENTIAL AND ENERGY DEMAND

1. Deurloo installaties (n.d.) Jaarlijkse zon instraling Nederland
&
Van der Linden, A. (2005) Het benutten van zontoetreding via het raam. Kennisbank Bouwfysica
2. Reference project of 70 student houses in AR0132 Zero Energy Design, course by Siebe Broersma


5000
7500
6000
6000.0
6000.0
6000.0

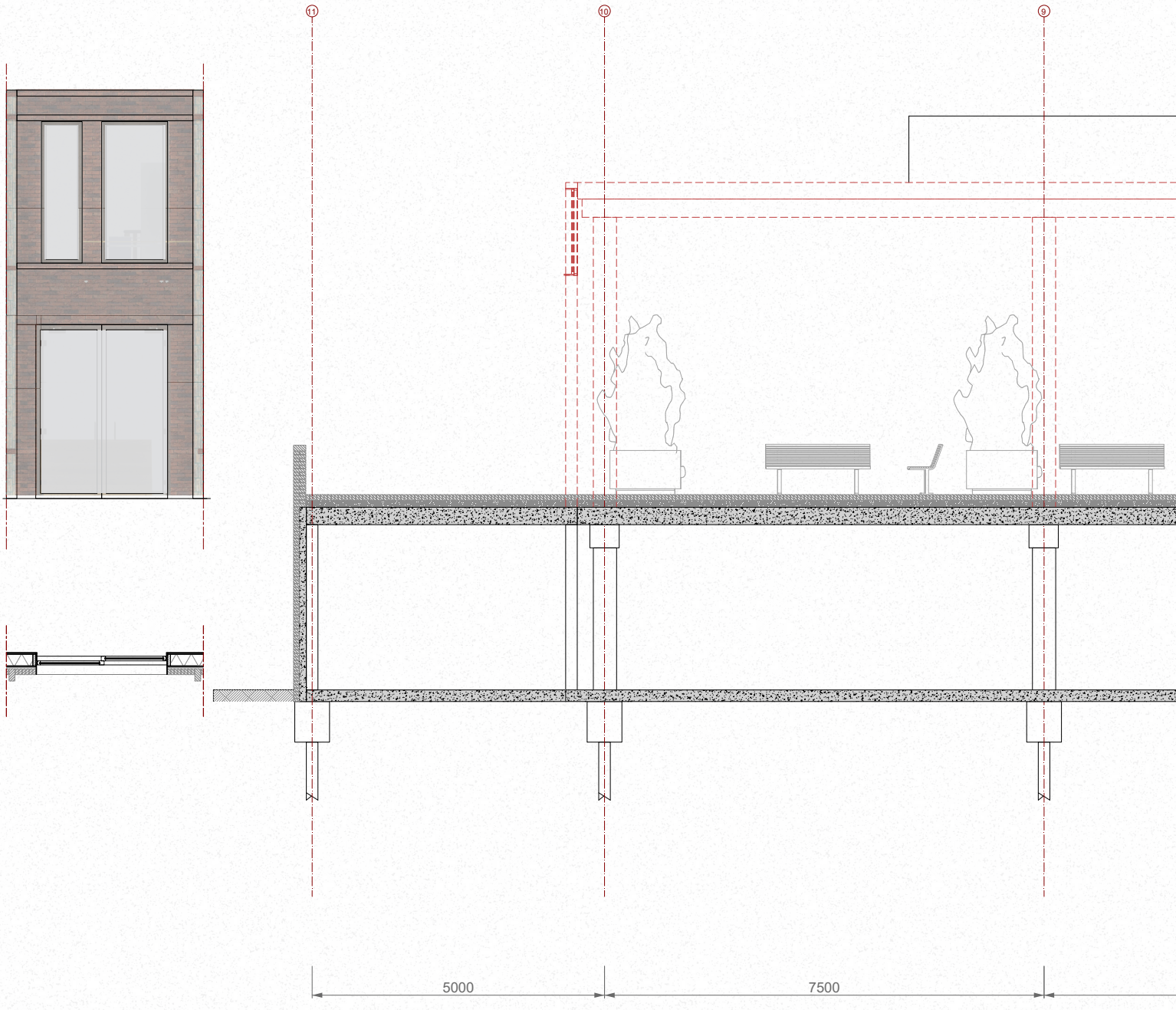


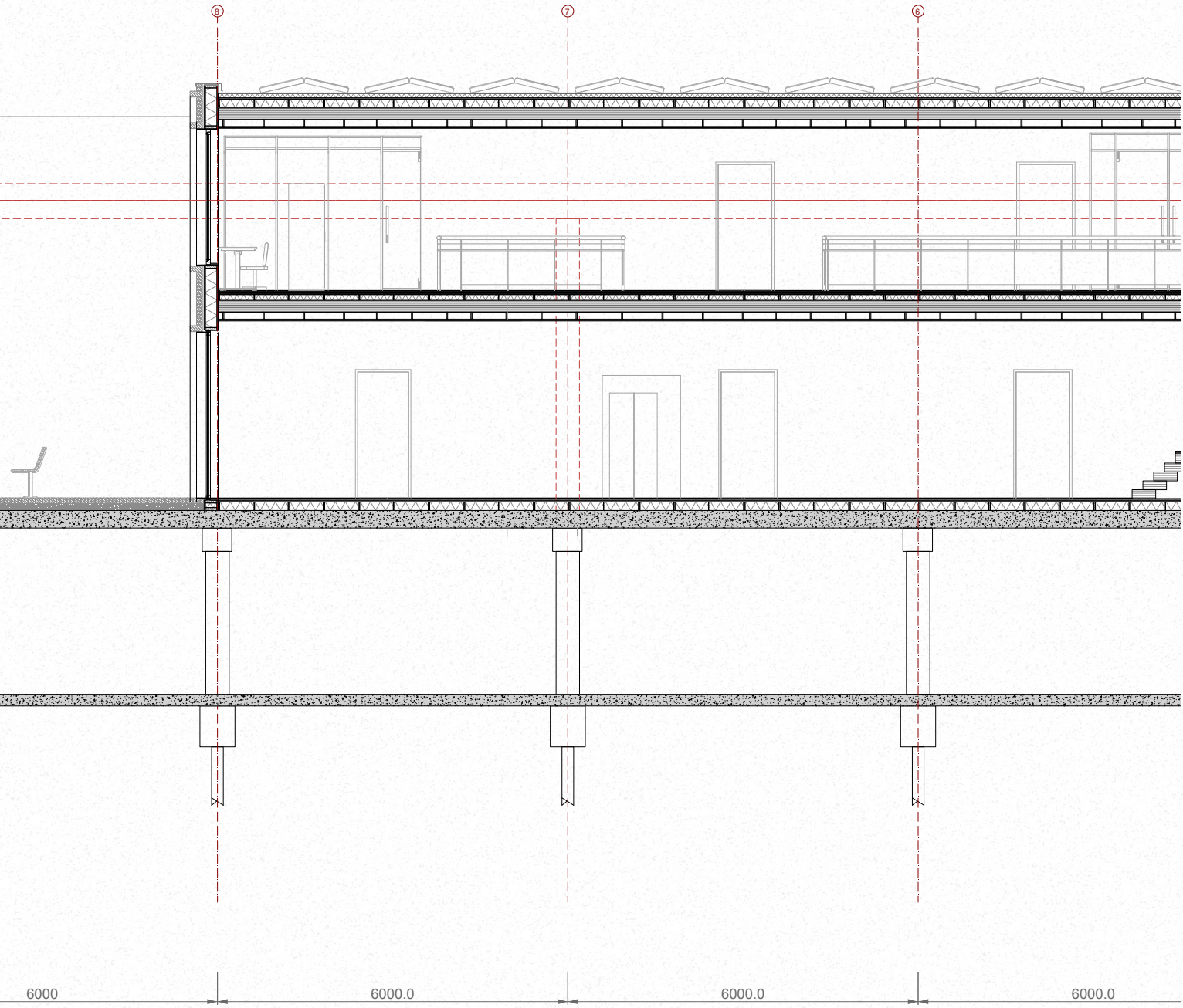
SECTION A 1.200

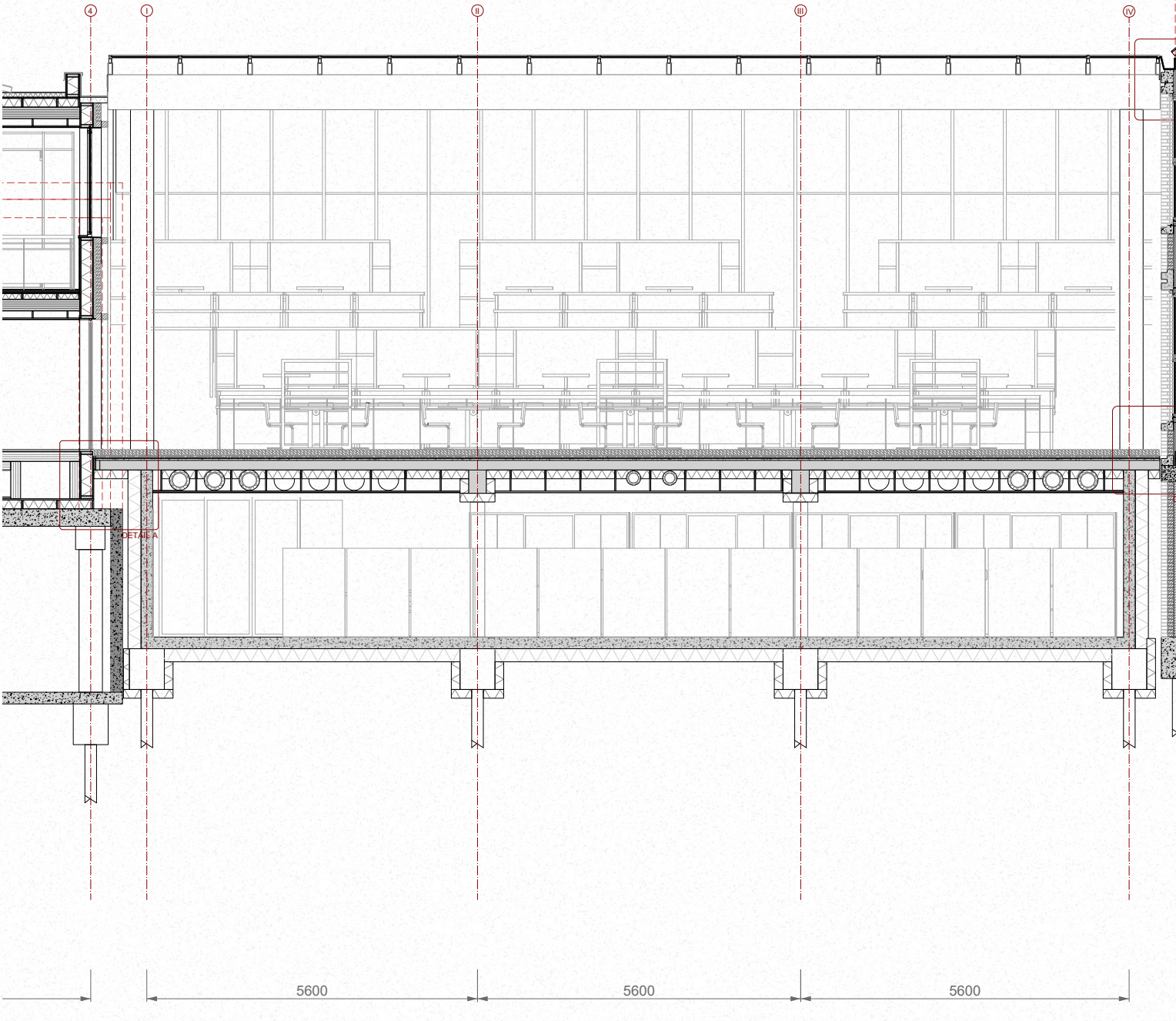
This section across the former police station, main hall and new faculty building shows the construction of the project. Details are included on the next pages.

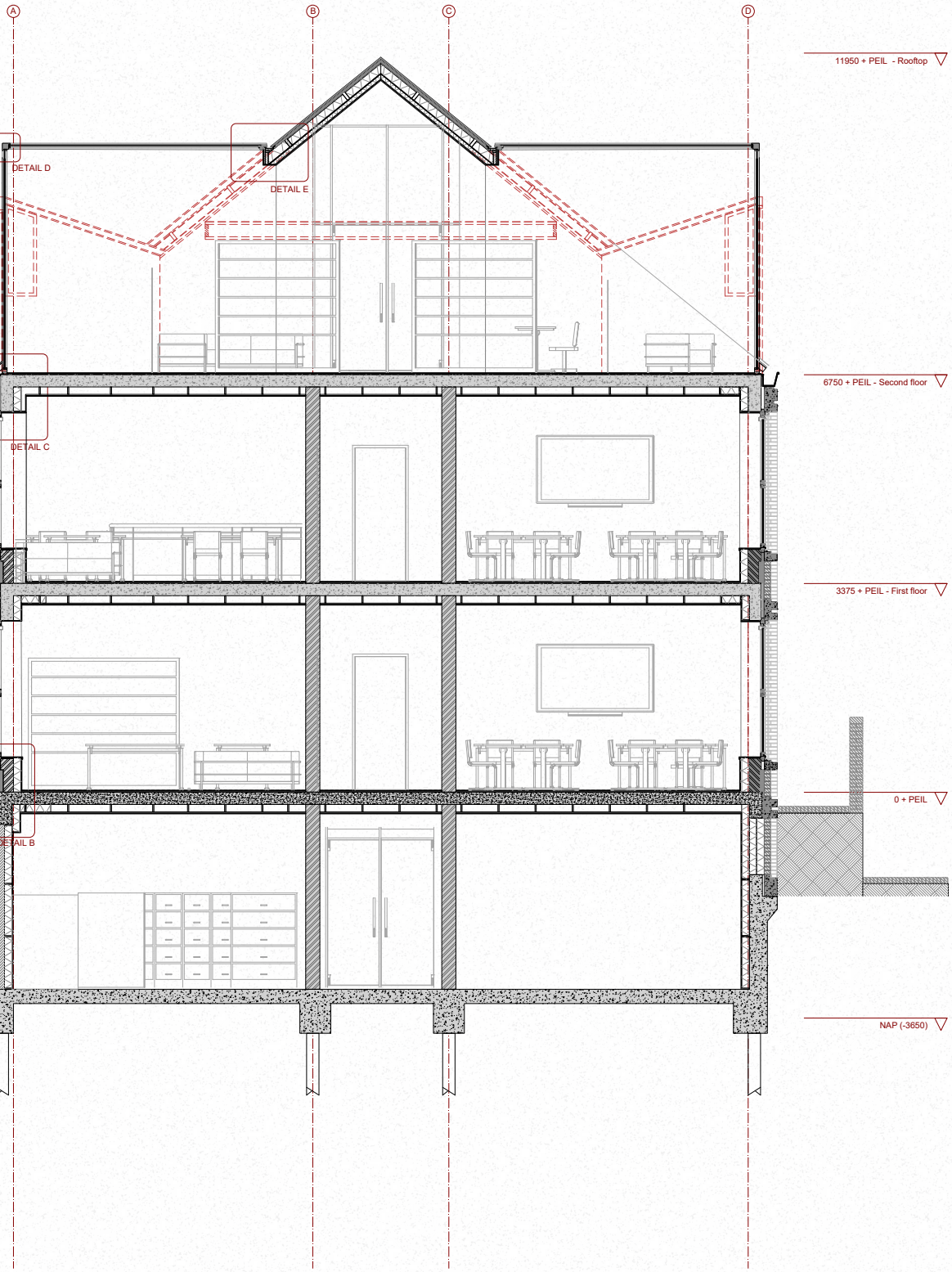
0 m 10 m

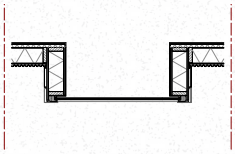
DEMOLITION
CONCRETE
MASONRY
CROSS LAMINATED TIMBER
WOOD FIBRE INSULATION
WOOD
FLOOR FINISH


11
10
9
5000
7500

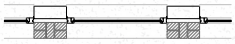

8
7
6
6000
6000.0
6000.0
6000.0

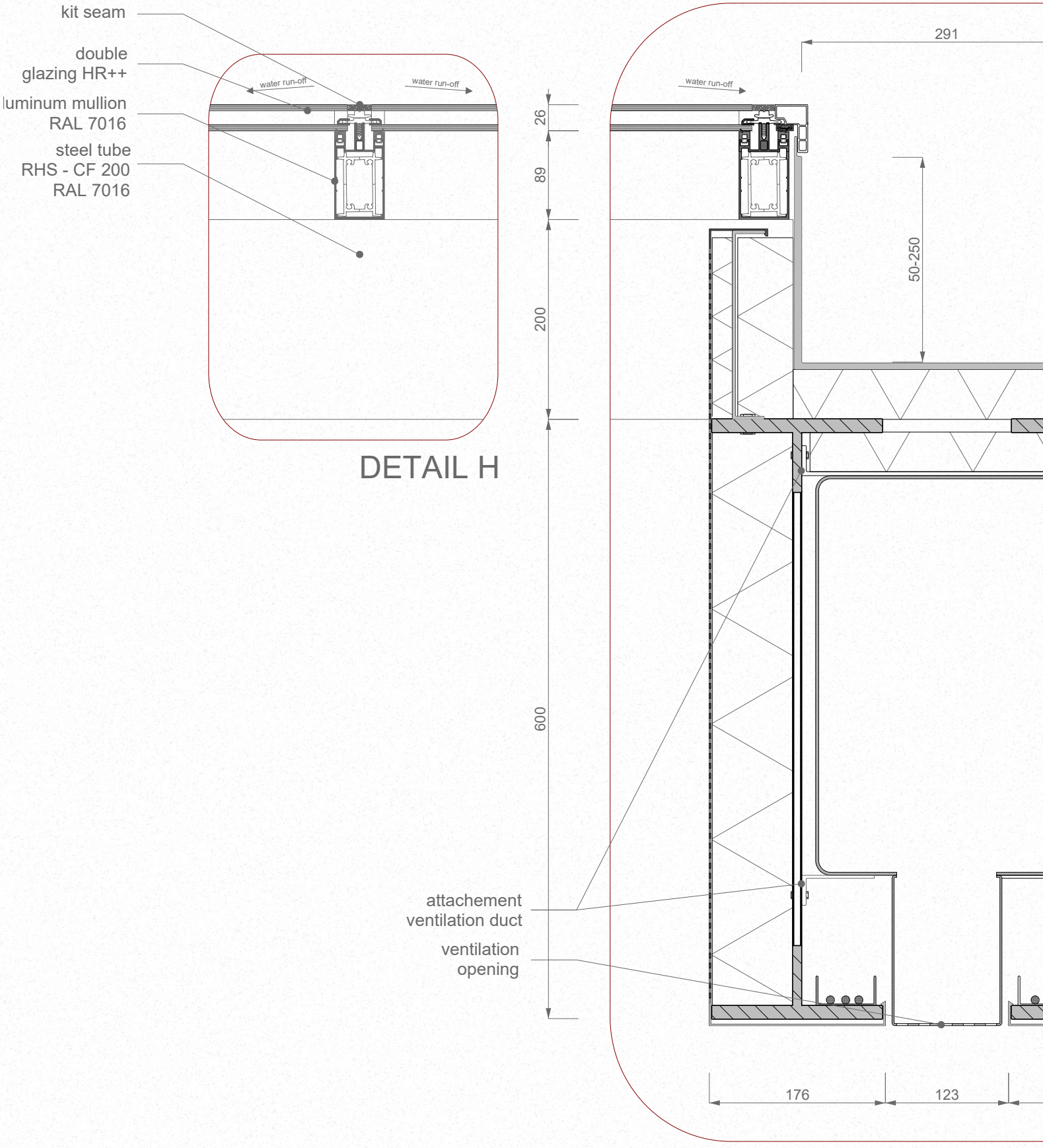

4
I
II
III
IV
DETAIL A
5600
5600
5600


A
B
C
D
DETAIL D
DETAIL E
DETAIL C
DETAIL B
11950 + PEIL - Rooftop
6750 + PEIL - Second floor
3375 + PEIL - First floor
0 + PEIL
NAP (-3650)
4840.0
2200.0
4840.0

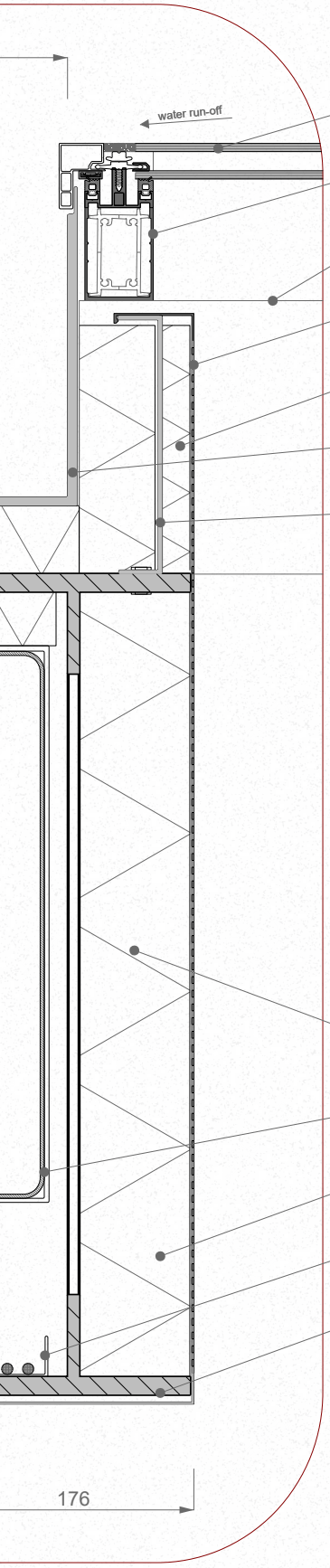







kit seam
double glazing HR++
luminum mullion RAL 7016
steel tube RHS - CF 200 RAL 7016
water run-off
water run-off
water run-off
291
26
89
200
600
50-250
attachement ventilation duct
ventilation opening
176
123

DETAIL H



double glazing HR++

aluminum mullion
RAL 7016

steel tube
RHS - CF 200

perforated aluminum
sheeting RAL 1035

acousting wood
fibre insulation

steel rain gutter
h = 50 - 250 mm

steel profile

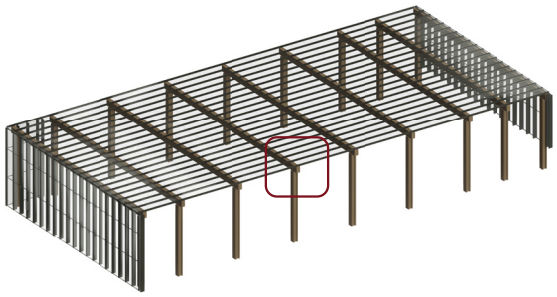
acousting wood
fibre insulation

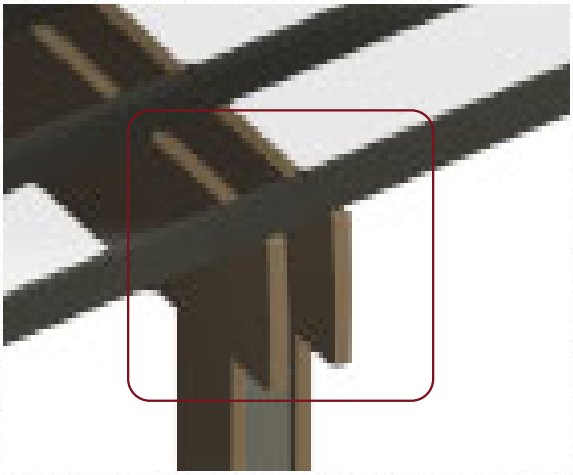
ventilation duct

acousting wood
fibre insulation

cable gutter

castellated beam
IPE 360 -> h = 600 mm





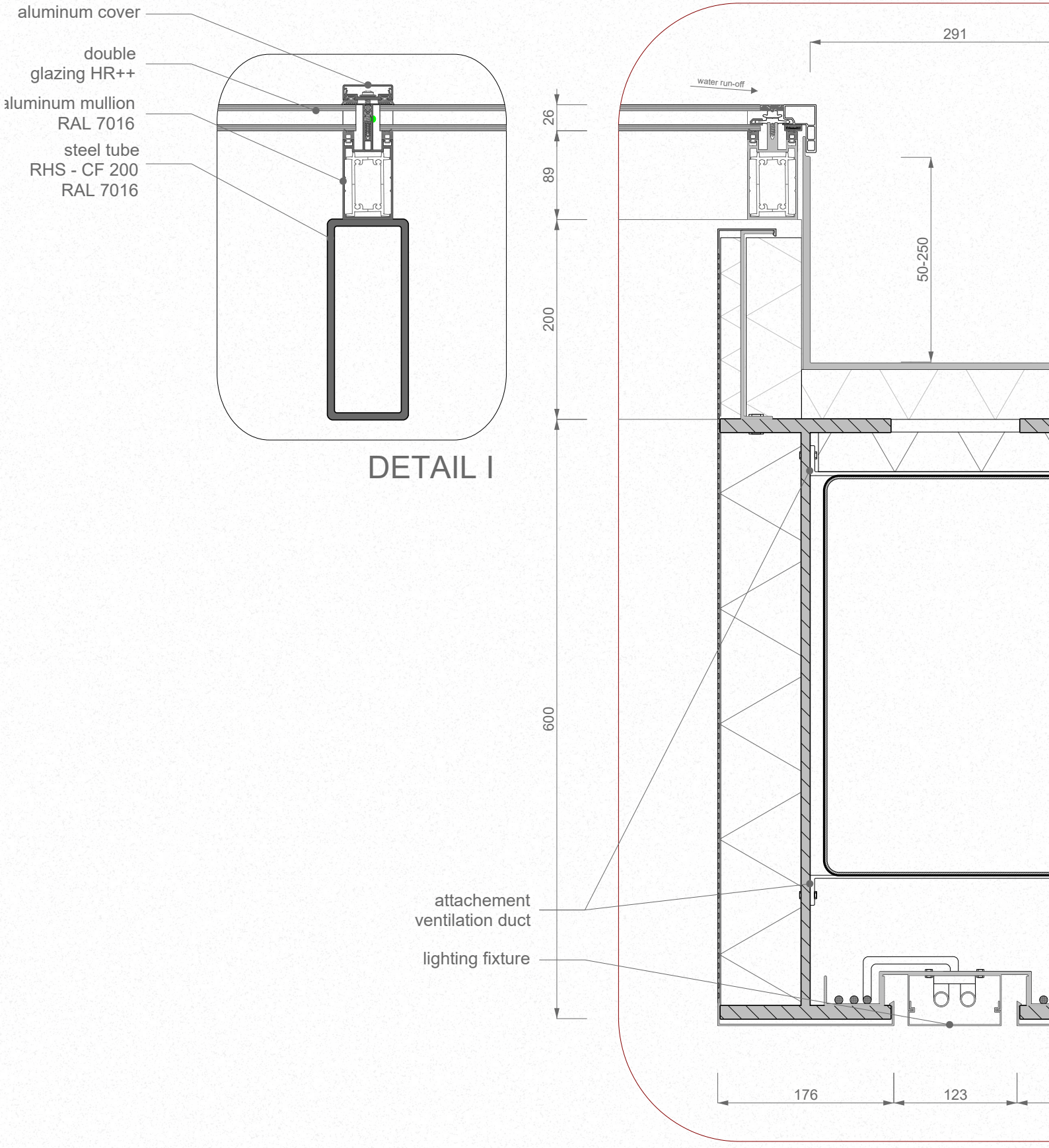
DETAIL G 1.5

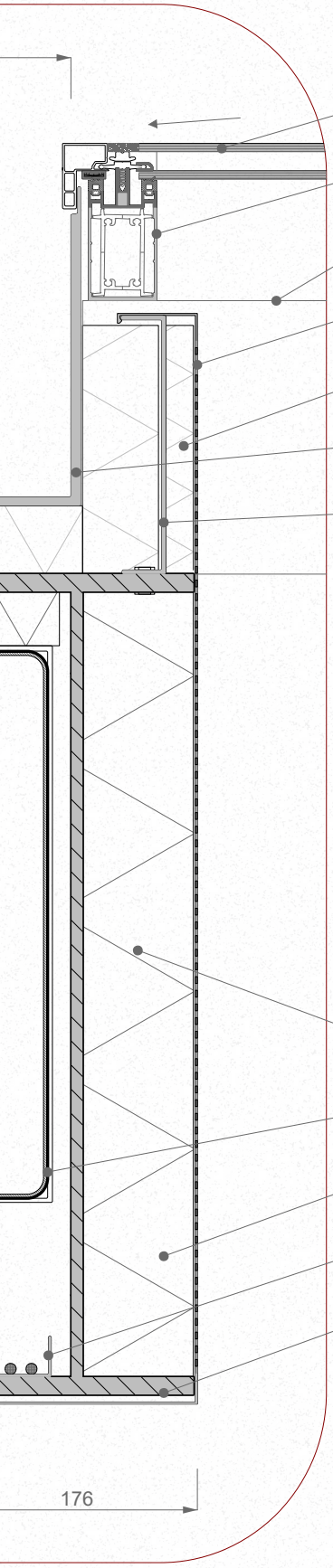
0 cm 25 cm

NEW SITUATION

- STEEL
- METAL - NON LOAD BEARING
- KIT SEAM
- WOOD FIBRE INSULATION
- WOOD
- ELECTRICITY CABLES

DETAIL G


aluminum cover
double glazing HR++
aluminum mullion RAL 7016
steel tube RHS - CF 200 RAL 7016
DETAIL I
291
water run-off
26
89
200
600
50-250
attachement ventilation duct
lighting fixture
176
123



double glazing HR++

aluminum mullion
RAL 7016

steel tube
RHS - CF 200

perforated aluminum
sheeting RAL 1035

acousting wood
fibre insulation

steel rain gutter
h = 50 - 250 mm

steel profile

acousting wood
fibre insulation

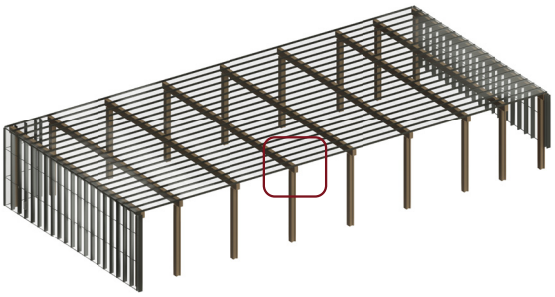
ventilation duct

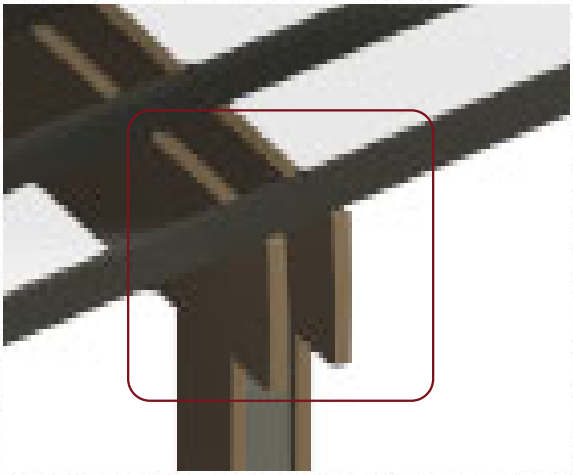
acousting wood
fibre insulation

cable gutter

castellated beam
IPE 360 -> h = 600 mm

DETAIL G`





DETAIL G' 1.5

0 cm 25 cm

NEW SITUATION

STEEL

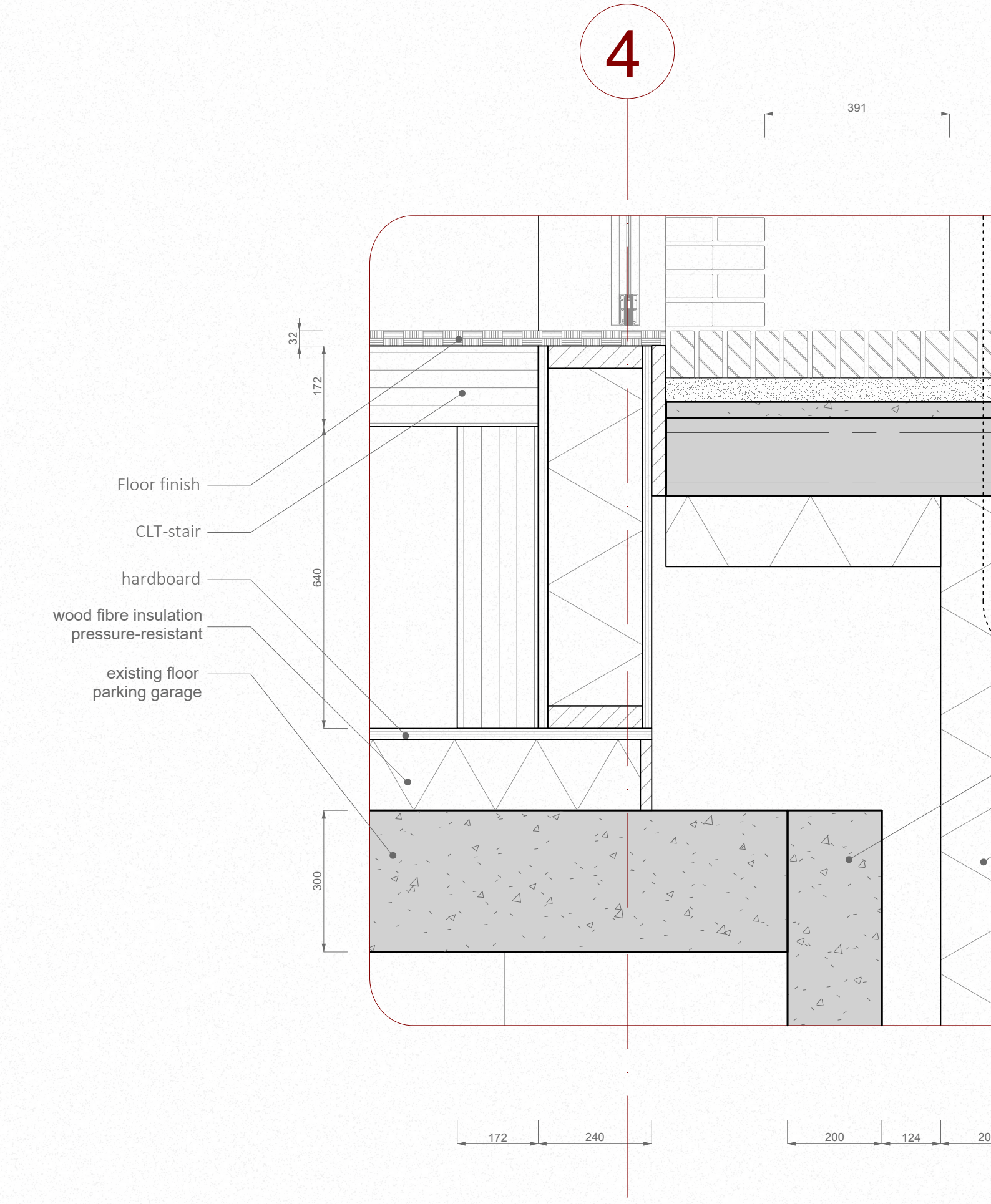
METAL - NON LOAD BEARING

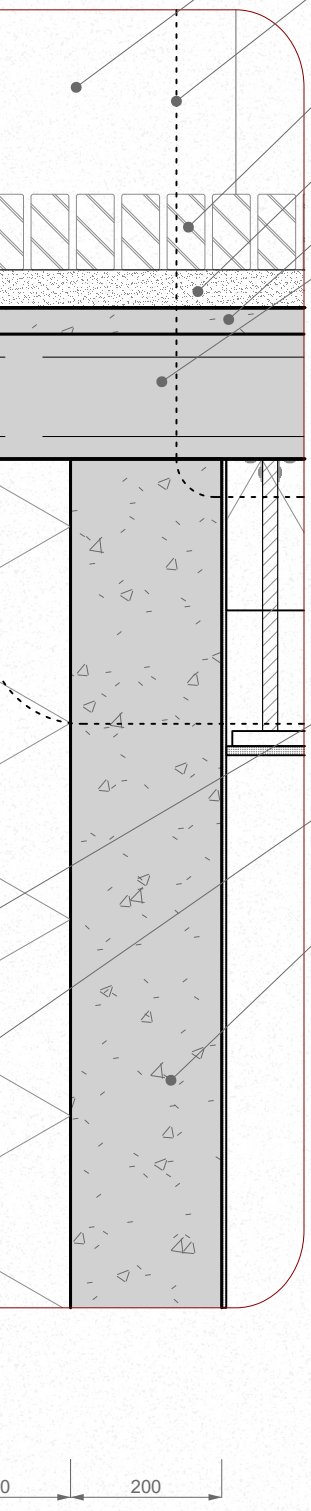
KIT SEAM

WOOD FIBRE INSULATION

WOOD

ELECTRICITY CABLES


4
391
32
172
640
300
Floor finish
CLT-stair
hardboard
wood fibre insulation
pressure-resistant
existing floor
parking garage
172
240
200
124



column main hall
roofstructure

ventilation duct
integrated in structur

red masonry
pavement

sand

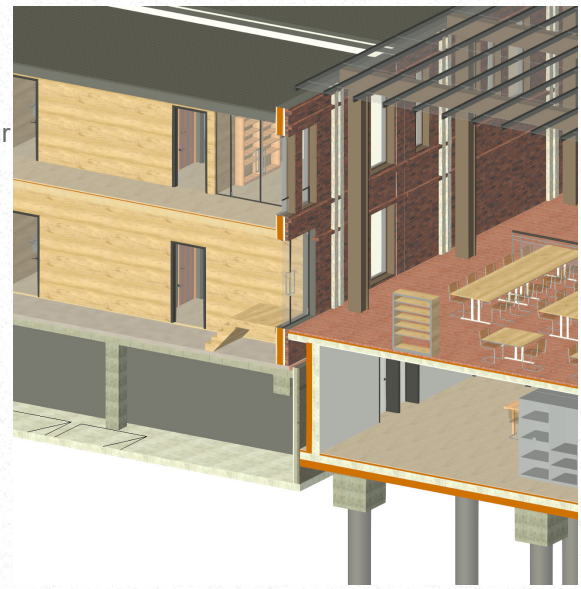
pressure layer

hollow core
slab d =160 mm

existing wall
parking garage

wood fibre insulation

wood fibre insulation
pressure-resistant



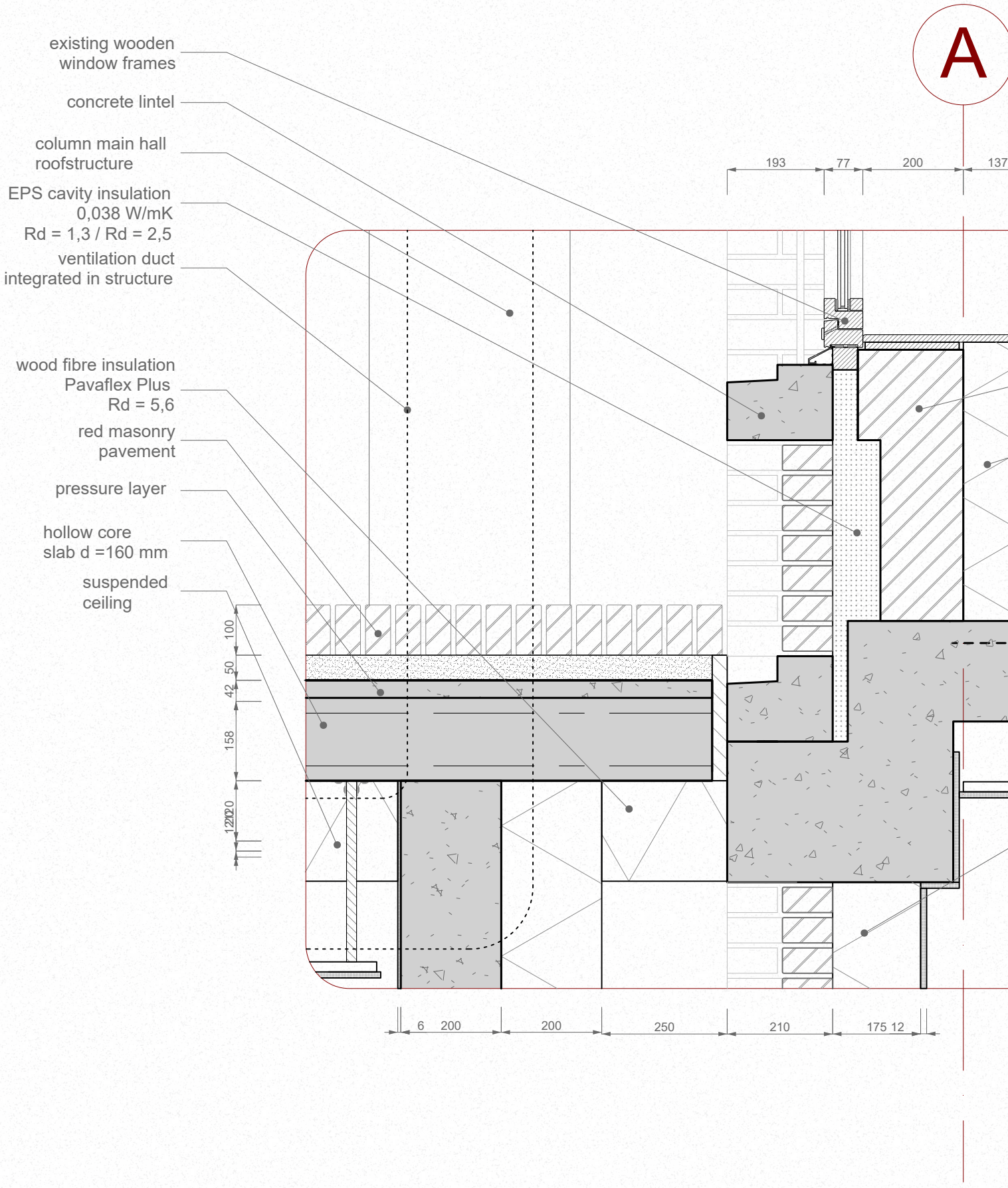


DETAIL A 1.10

0 cm 50 cm

NEW SITUATION

- CONCRETE
- MASONRY
- CROSS LAMINATED TIMBER
- WOOD FIBRE INSULATION
- WOOD
- FLOOR FINISH
- PLASTERBOARD STUCCO FINISH


A
existing wooden window frames
concrete lintel
column main hall roofstructure
EPS cavity insulation 0,038 W/mK Rd = 1,3 / Rd = 2,5
ventilation duct integrated in structure
wood fibre insulation Pavaflex Plus Rd = 5,6
red masonry pavement
pressure layer
hollow core slab d =160 mm
suspended ceiling
100
50
42
158
20
20
12
193
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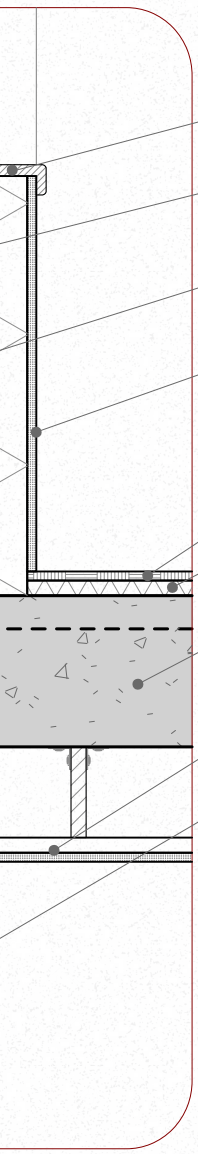
137
6
200
200
250
210
175
12



wooden window sill

existing masonry

wood fibre insulation
Pavaflex Plus
Rd = 3,47

plasterboard,
stucco finish

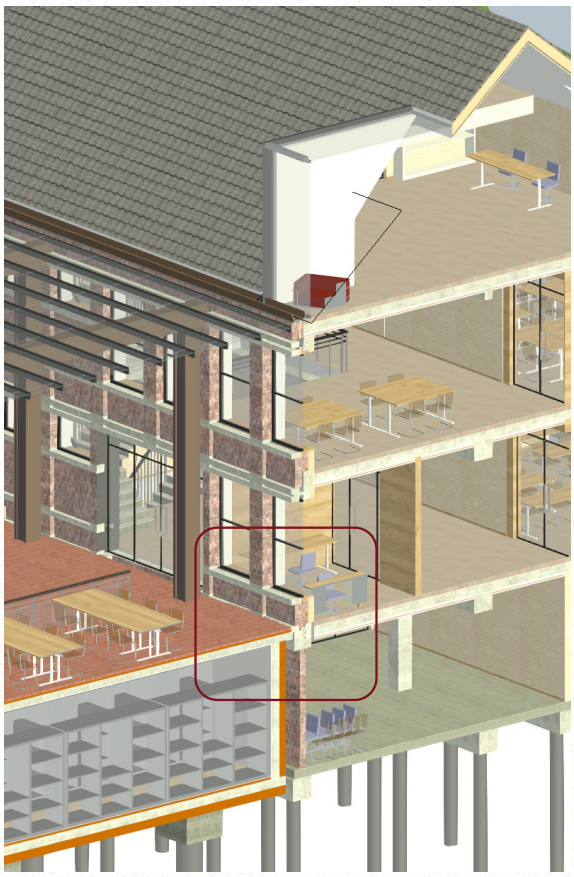
floor finish

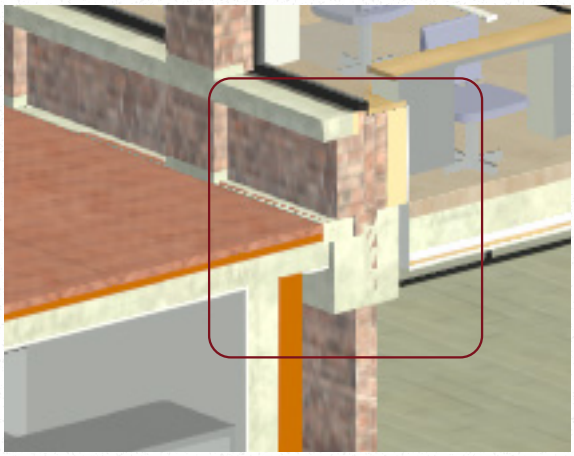
wood fibre insulation
pressure-resistant

existing DATO
floor

suspended ceiling

wood fibre insulation
Pavaflex Plus
Rd = 4,86





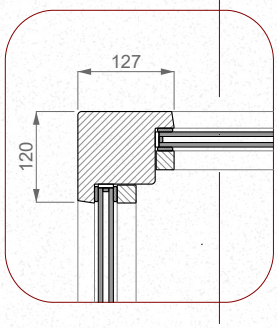
DETAIL B 1.10

0 cm 50 cm

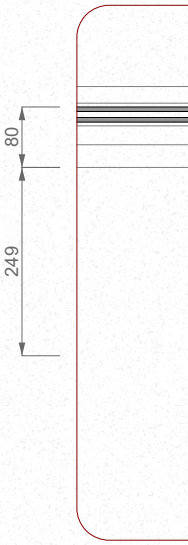
NEW SITUATION

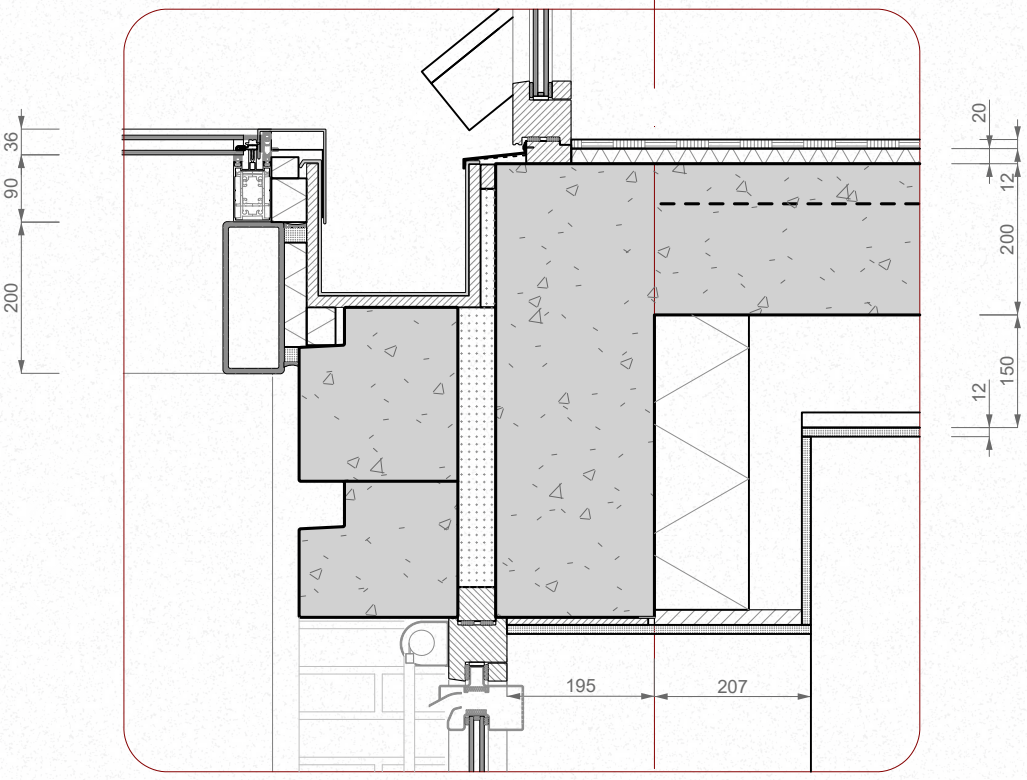
- CONCRETE
- MASONRY
- CROSS LAMINATED TIMBER
- WOOD FIBRE INSULATION
- WOOD
- FLOOR FINISH
- PLASTERBOARD STUCCO FINISH

A

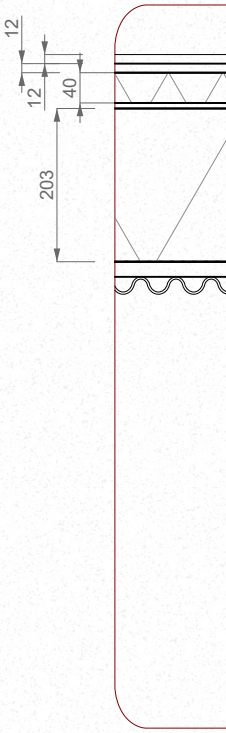


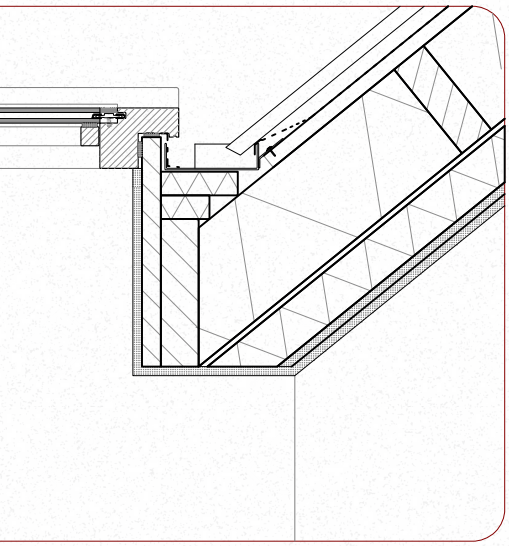
DETAIL D



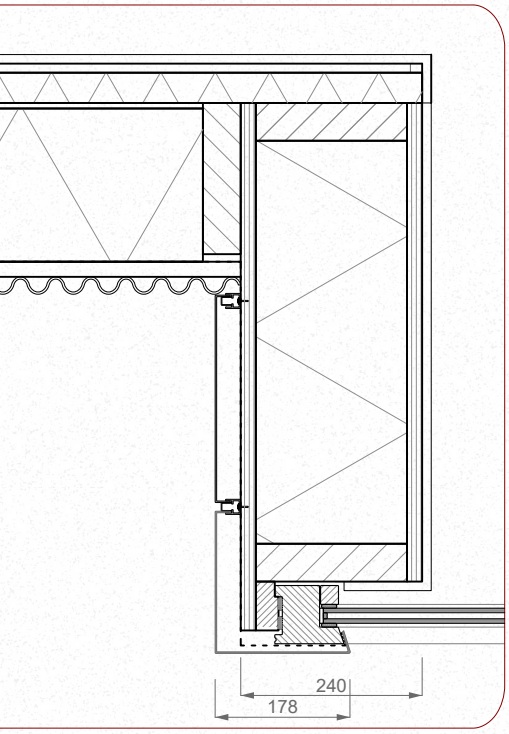


DETAIL C

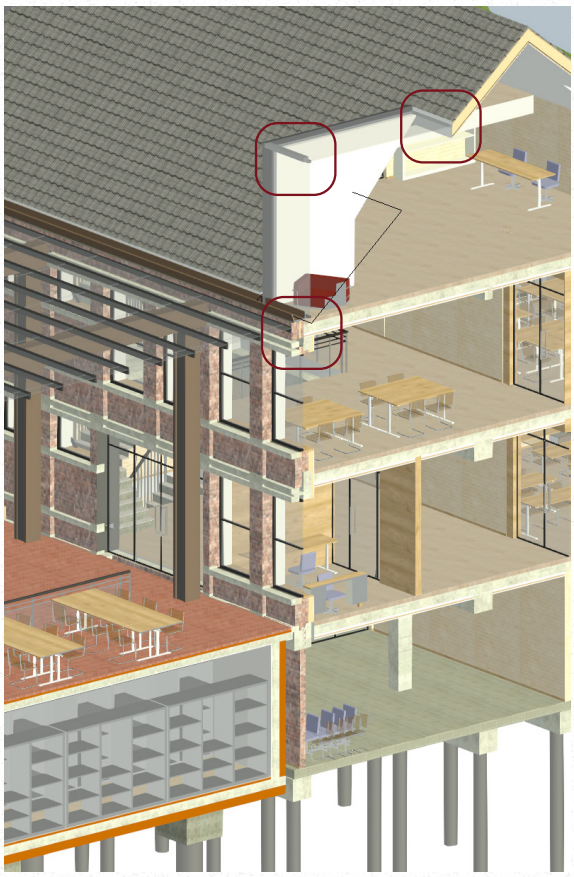


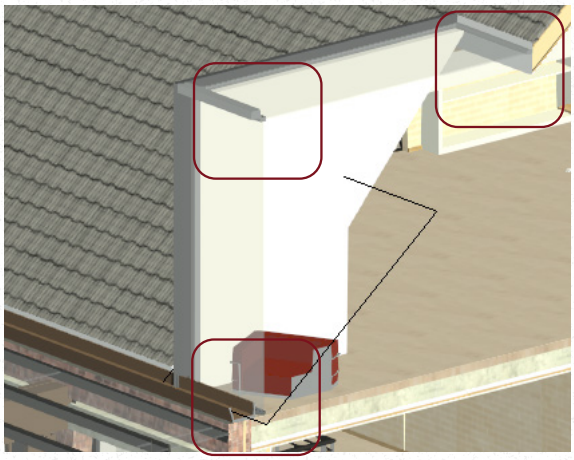


DETAIL E



DETAIL F



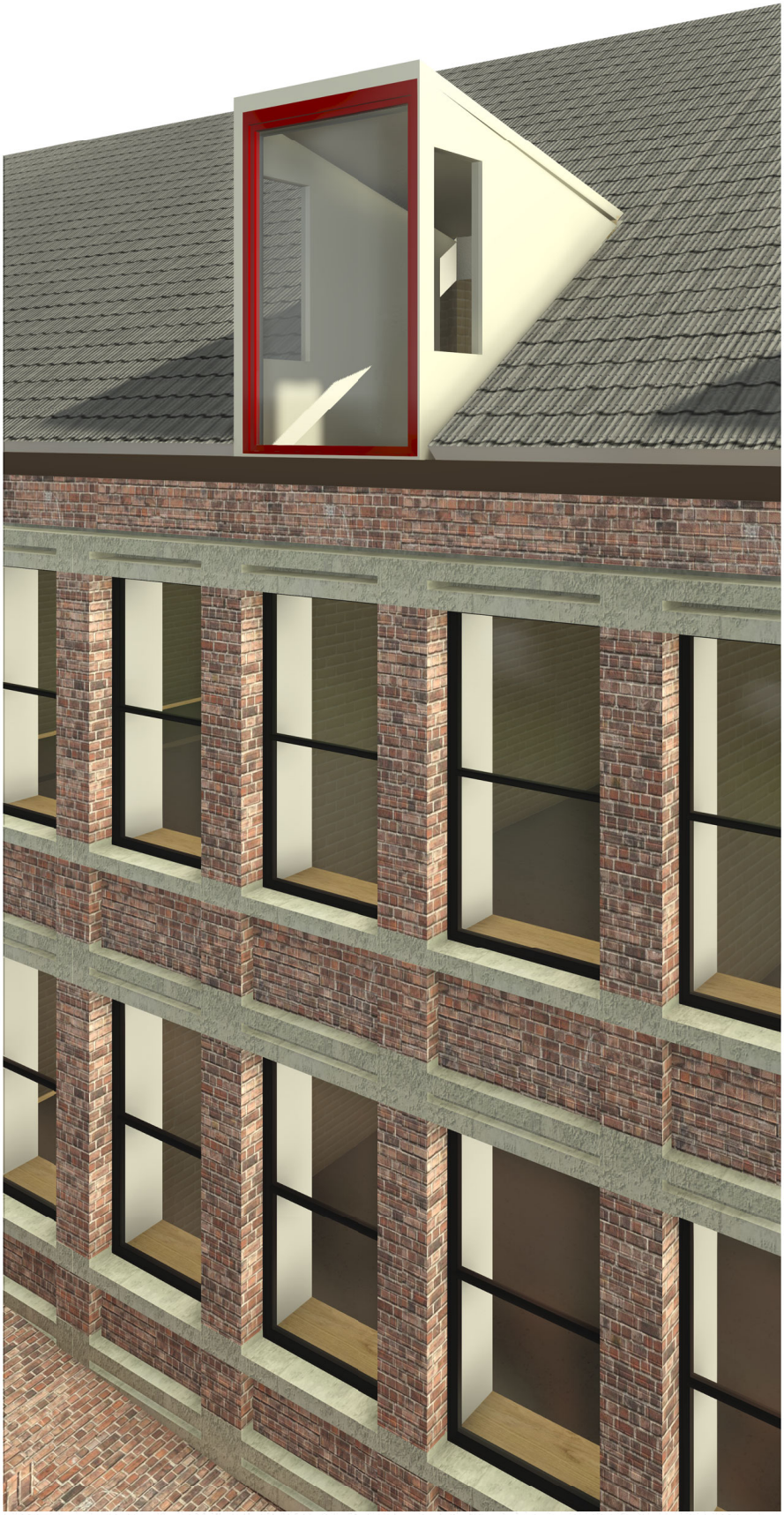


DETAIL C,D,E & F 1.10

0 m 12,5 m

NEW SITUATION

- CONCRETE
- MASONRY
- CROSS LAMINATED TIMBER
- WOOD FIBRE INSULATION
- WOOD
- FLOOR FINISH
- PLASTERBOARD STUCCO FINISH

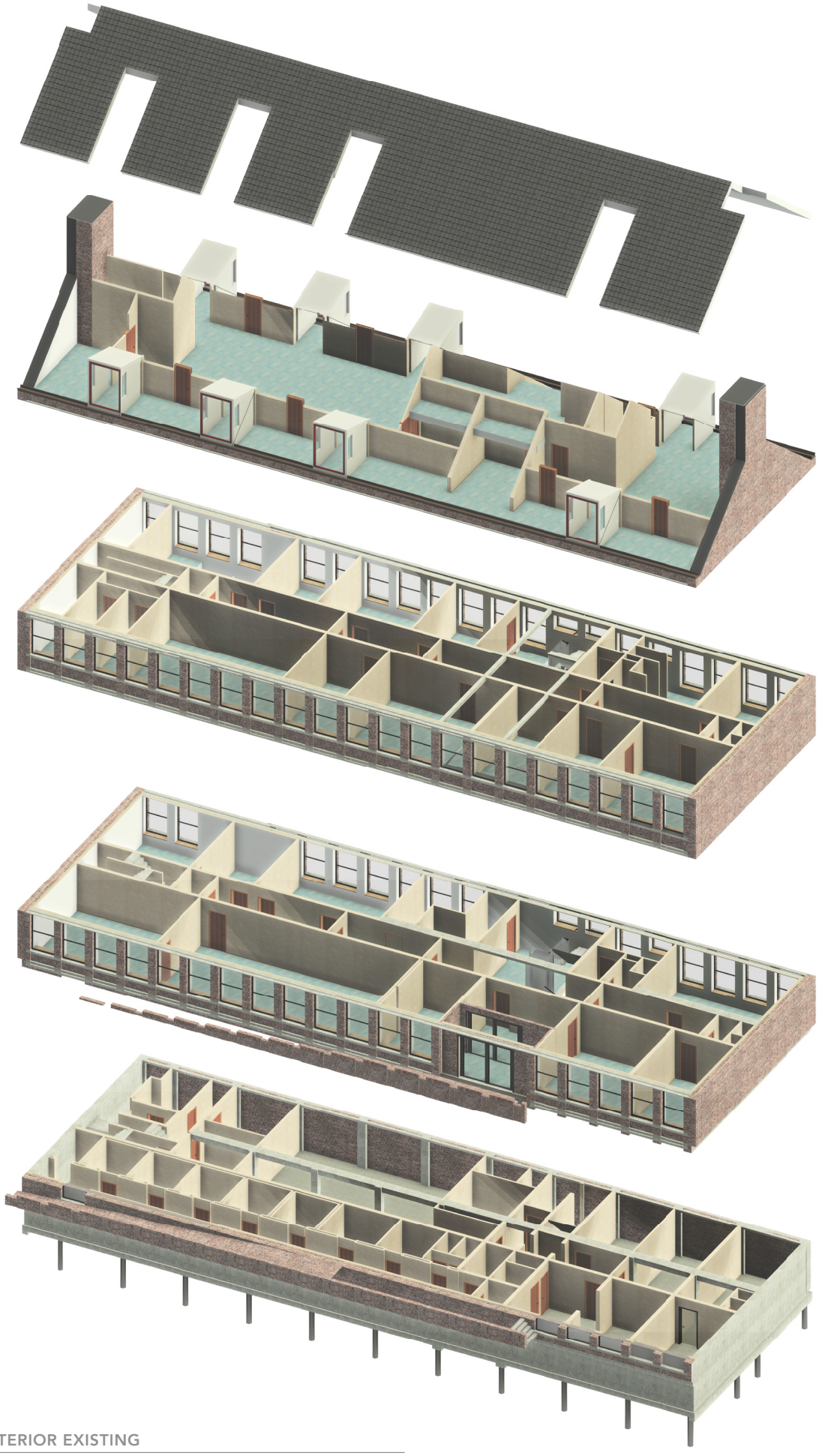


DORMER OLD SITUATION

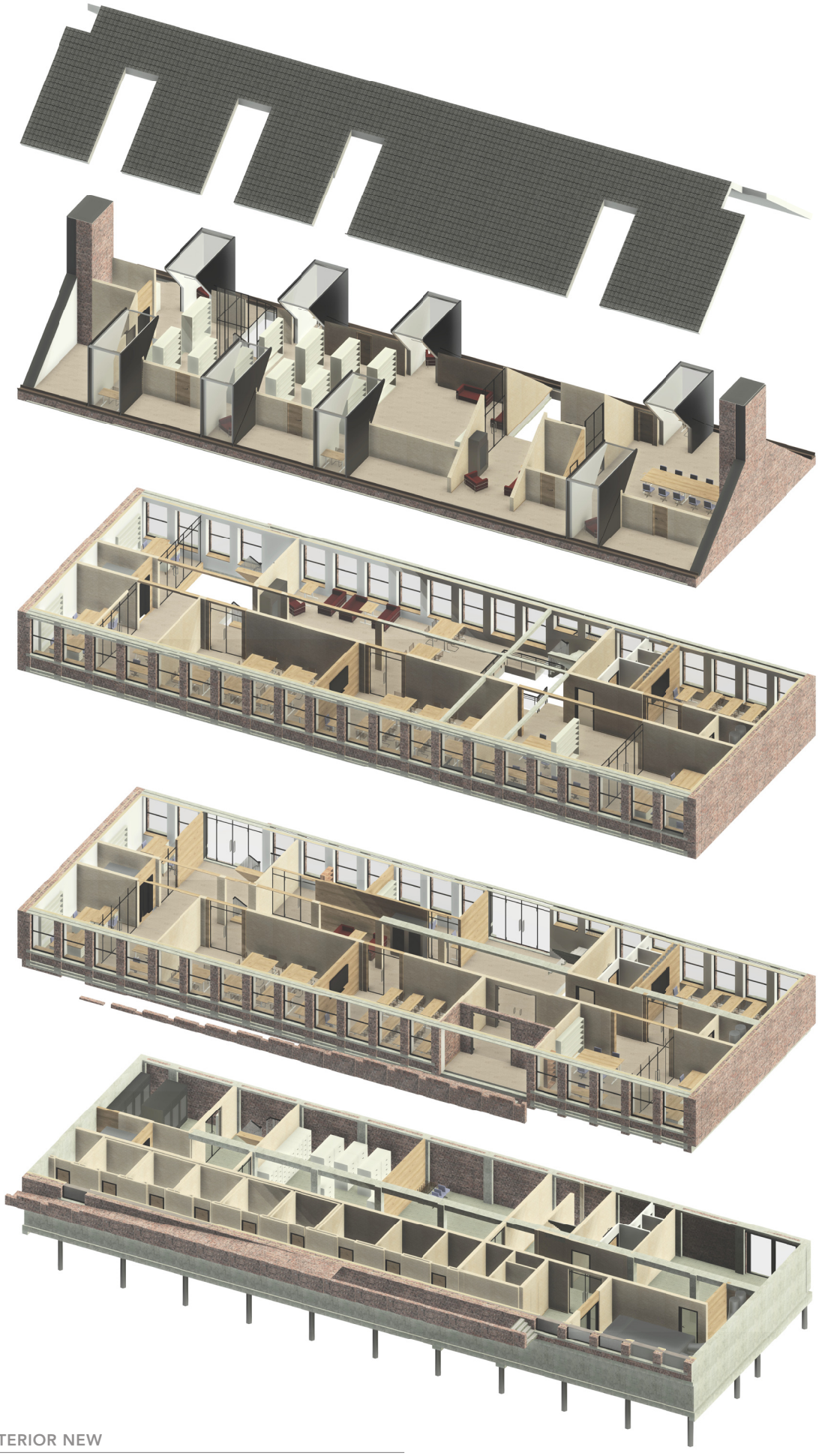


DORMER NEW SITUATION

The existing dormers of the former police station are replaced by new ones to create more unity within the entire ensemble and improve the thermal performance of the faculty building.



INTERIOR EXISTING



INTERIOR NEW



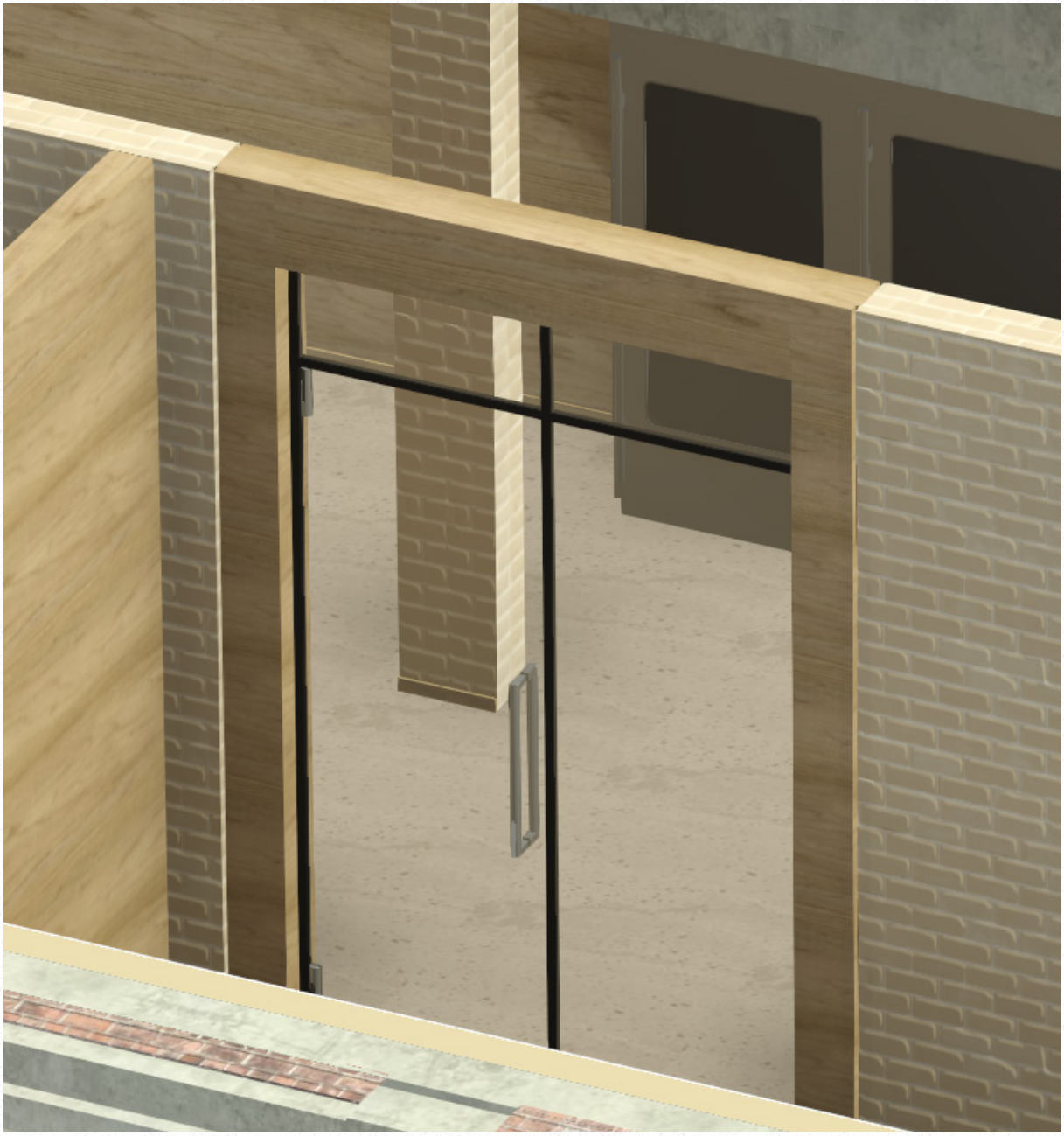
INTERIOR



INTERIOR



INTERIOR

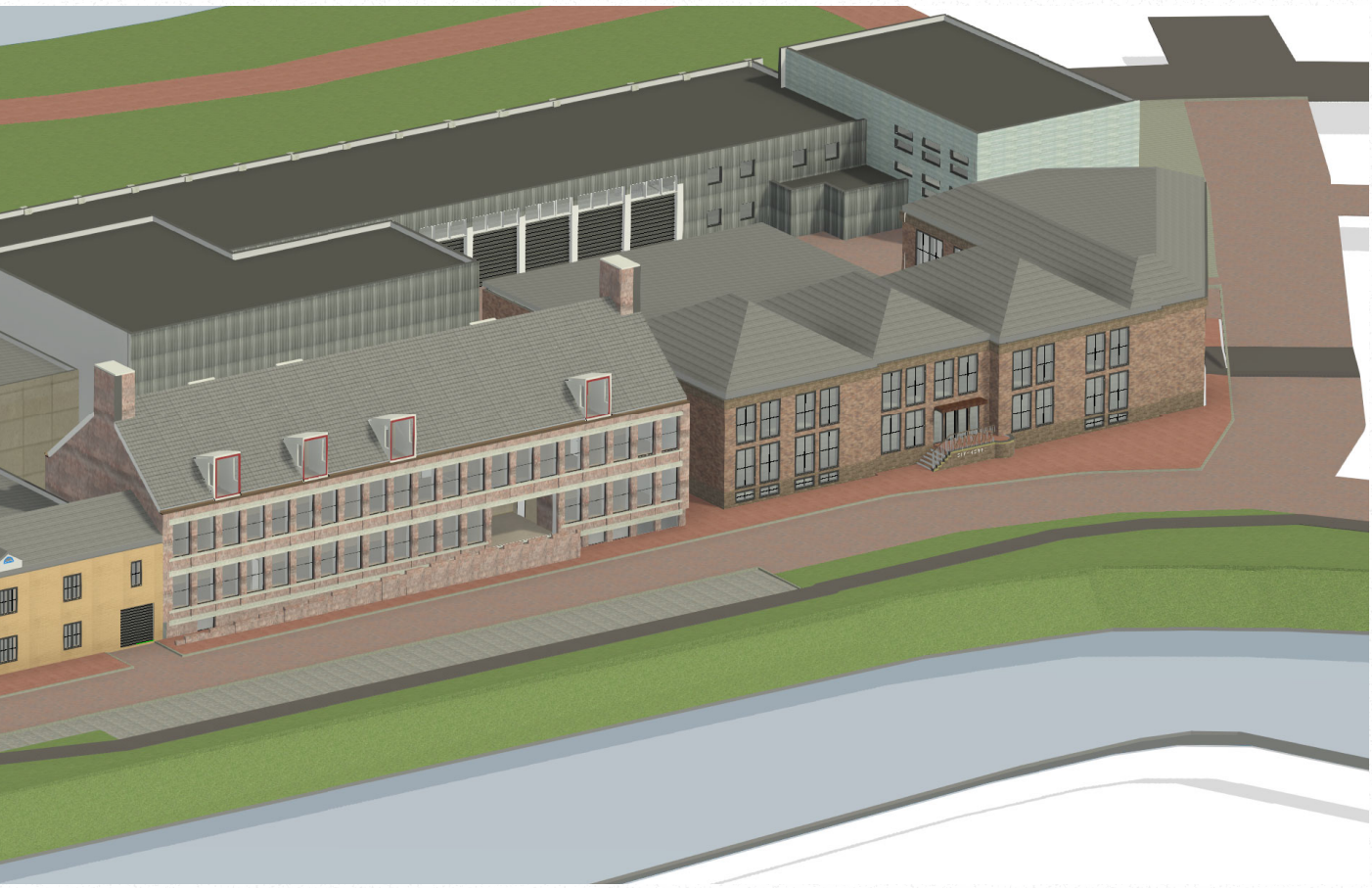


INTERIOR

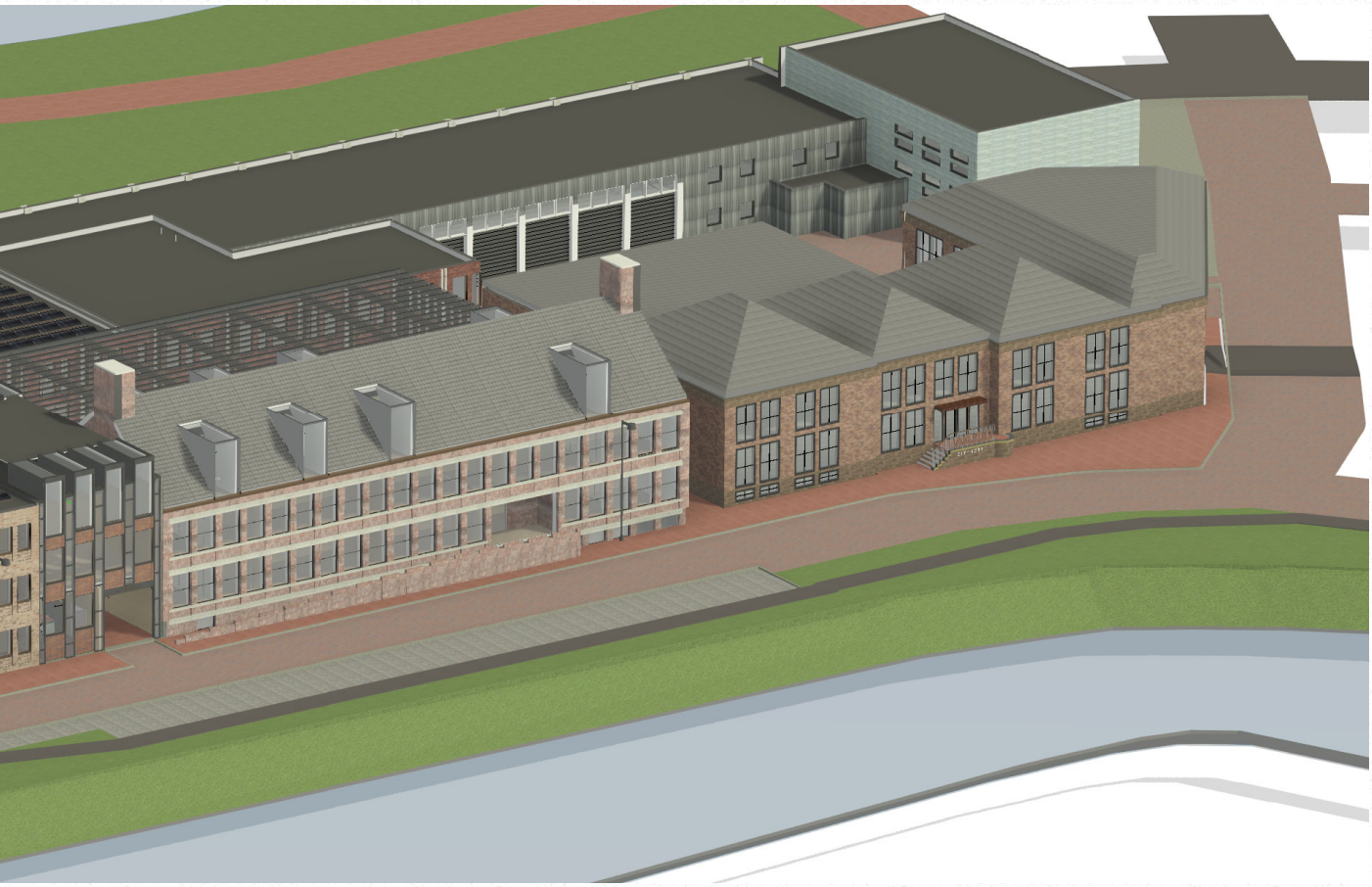
To allow for the spatial diversity and transparency which is necessary to make a state of the art faculty building, changes to the plan were inevitable. But the additions, wooden portals and aluminum glass frames are made with only two extra materials, so in line with the limited material palette of Berghoef. Therefore this heritage quality is not compromised.



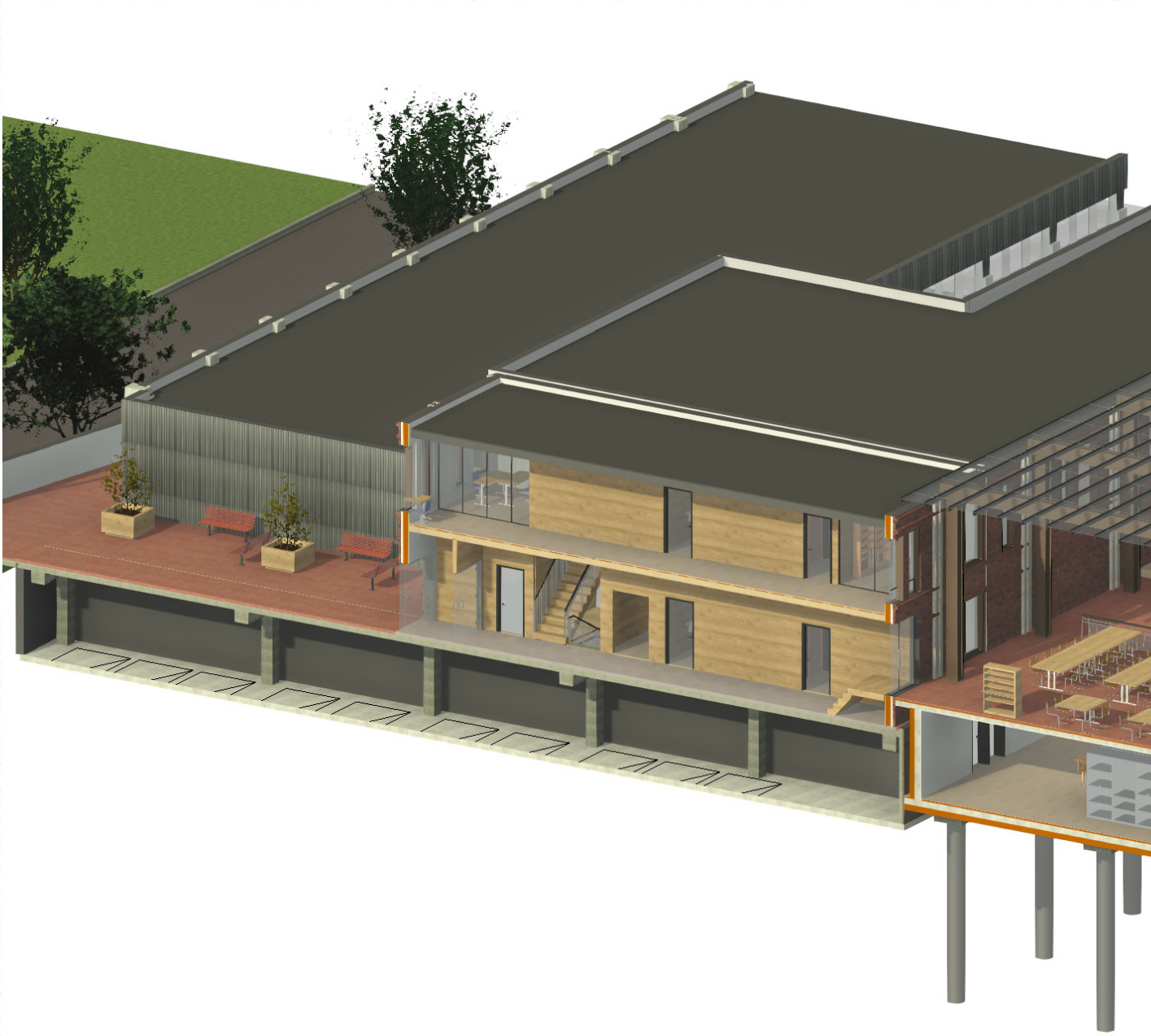




CURRENT SITUATION



NEW SITUATION



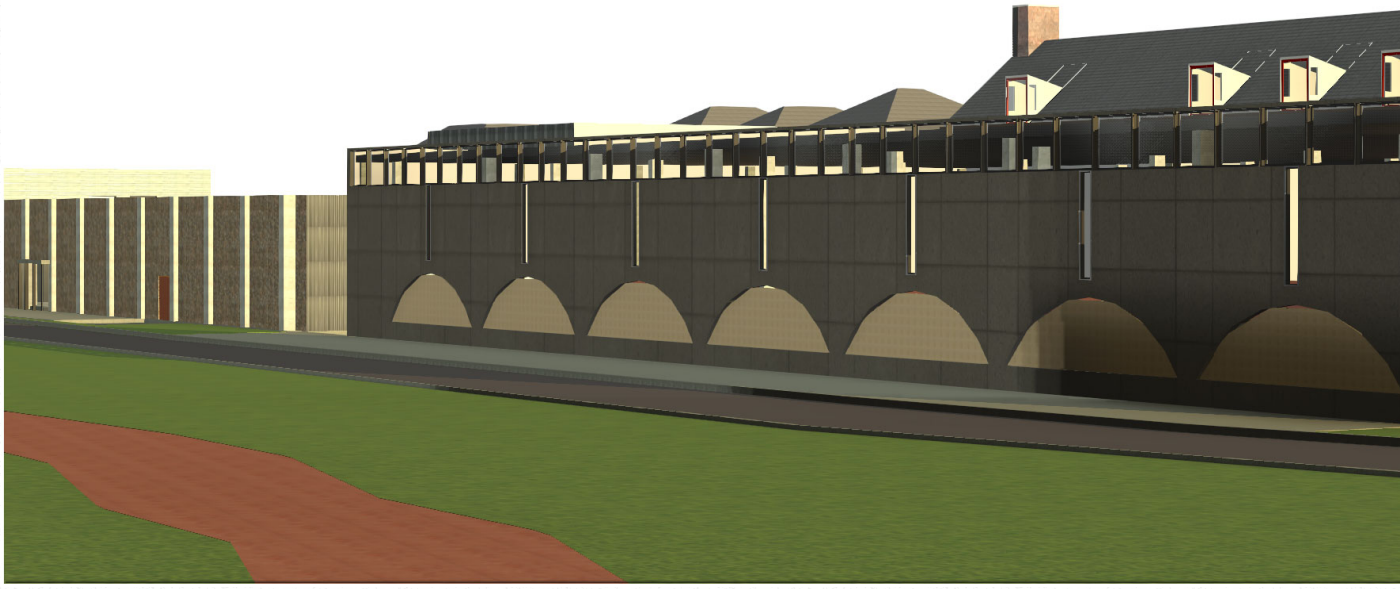


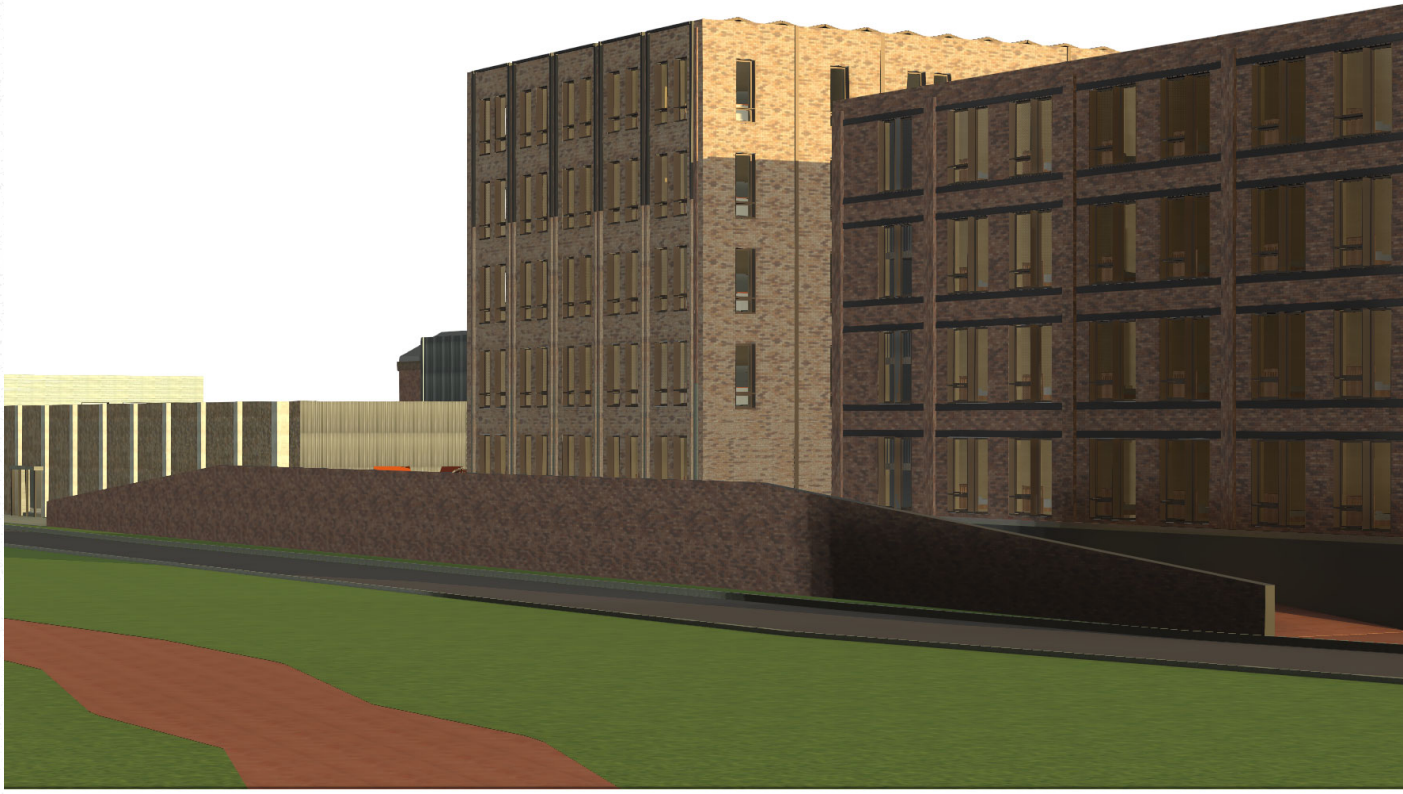
SECTION FACULTY - MAIN HALL - FACULTY

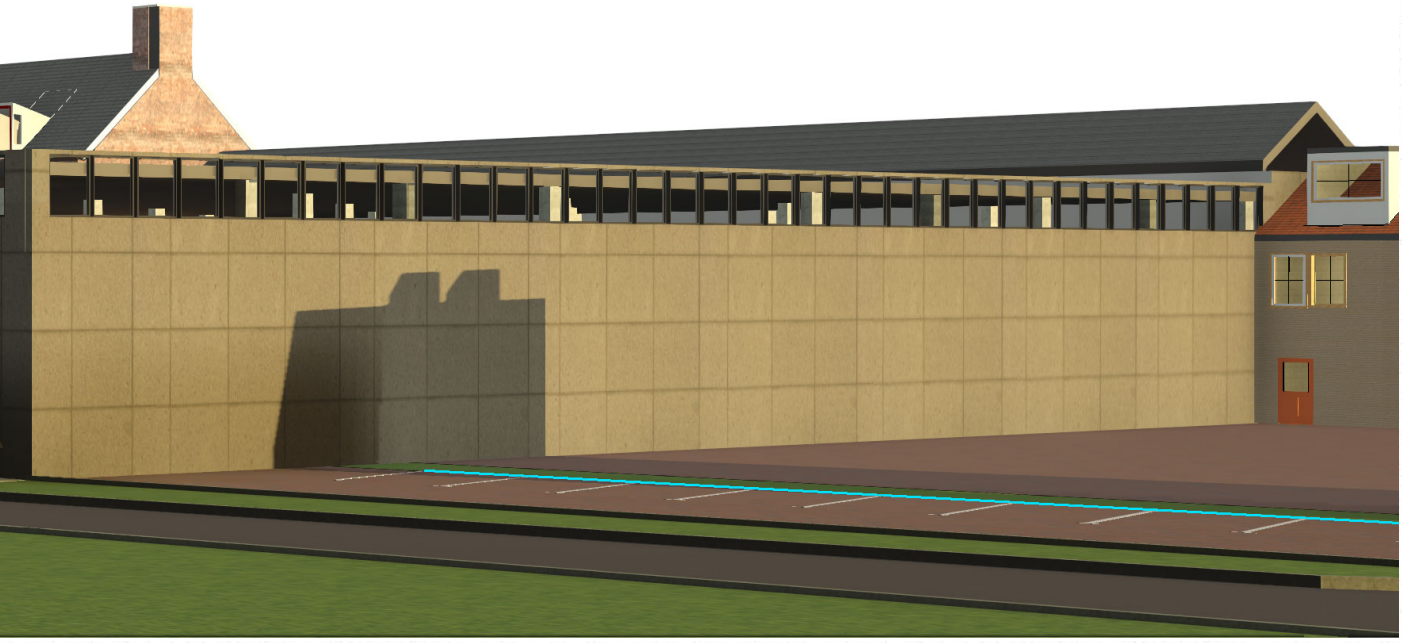




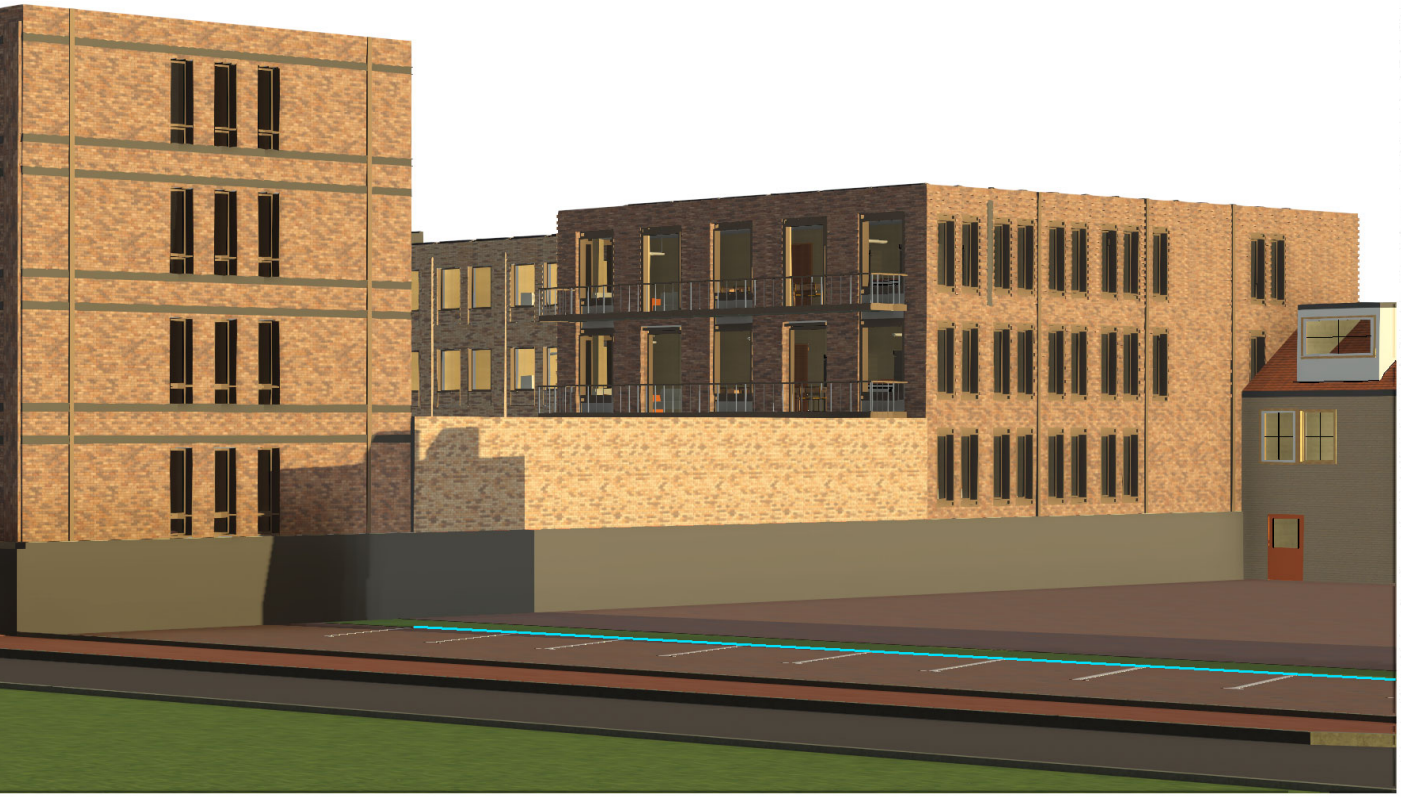
SECTION FACULTY - MAIN HALL - FACULTY







IMPRESSION WEST - CURRENT SITUATION



IMPRESSION WEST - NEW SITUATION



EAST ELEVATION



EAST ELEVATION - II



WEST ELEVATION



WEST ELEVATION - II







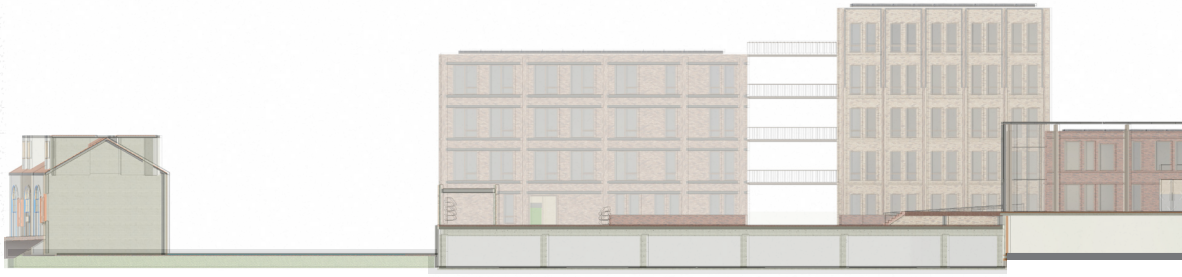


ELEVATIONS

0 m — 20 m



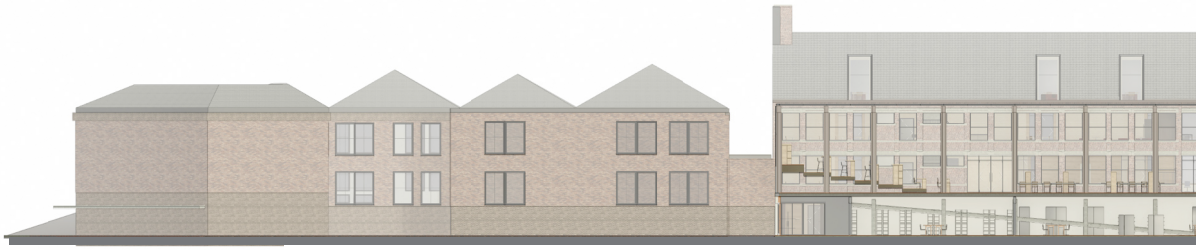
EAST ELEVATION



EAST ELEVATION - II

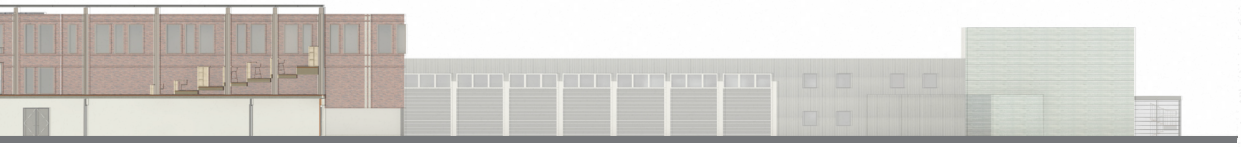


WEST ELEVATION



WEST ELEVATION - II







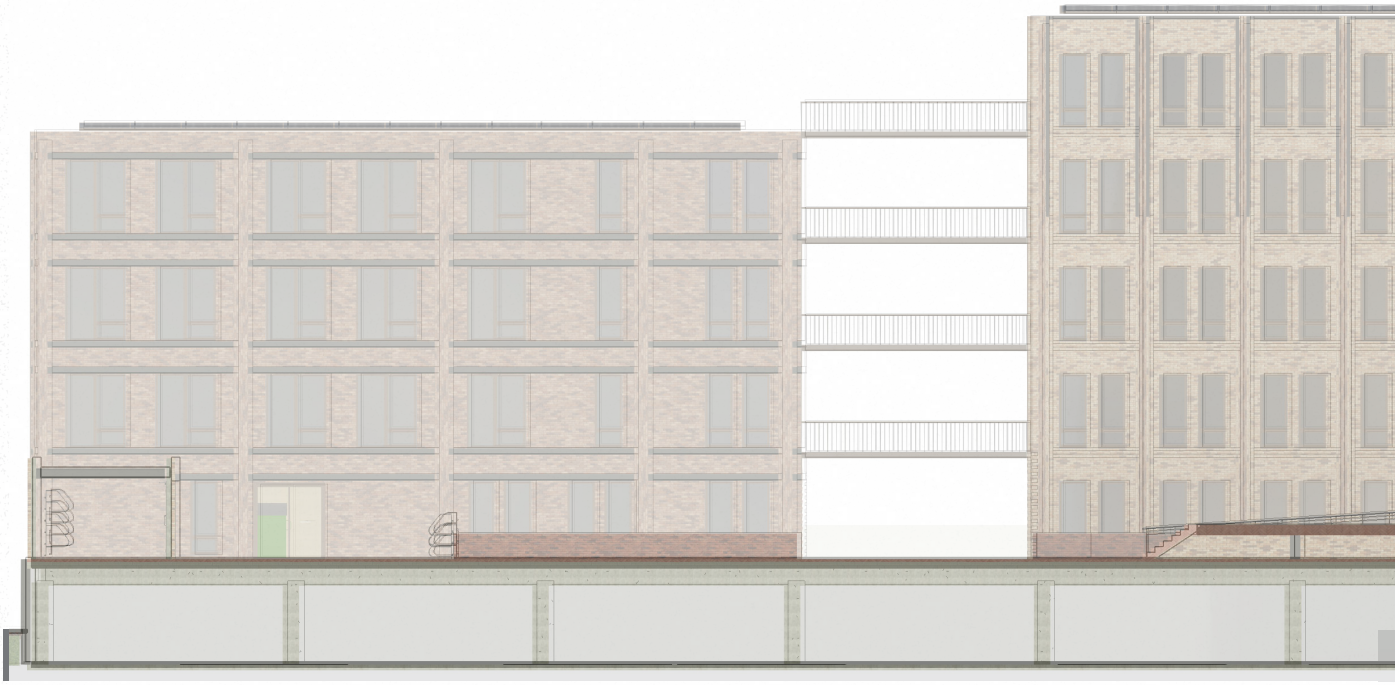


ELEVATIONS

0 m 20 m

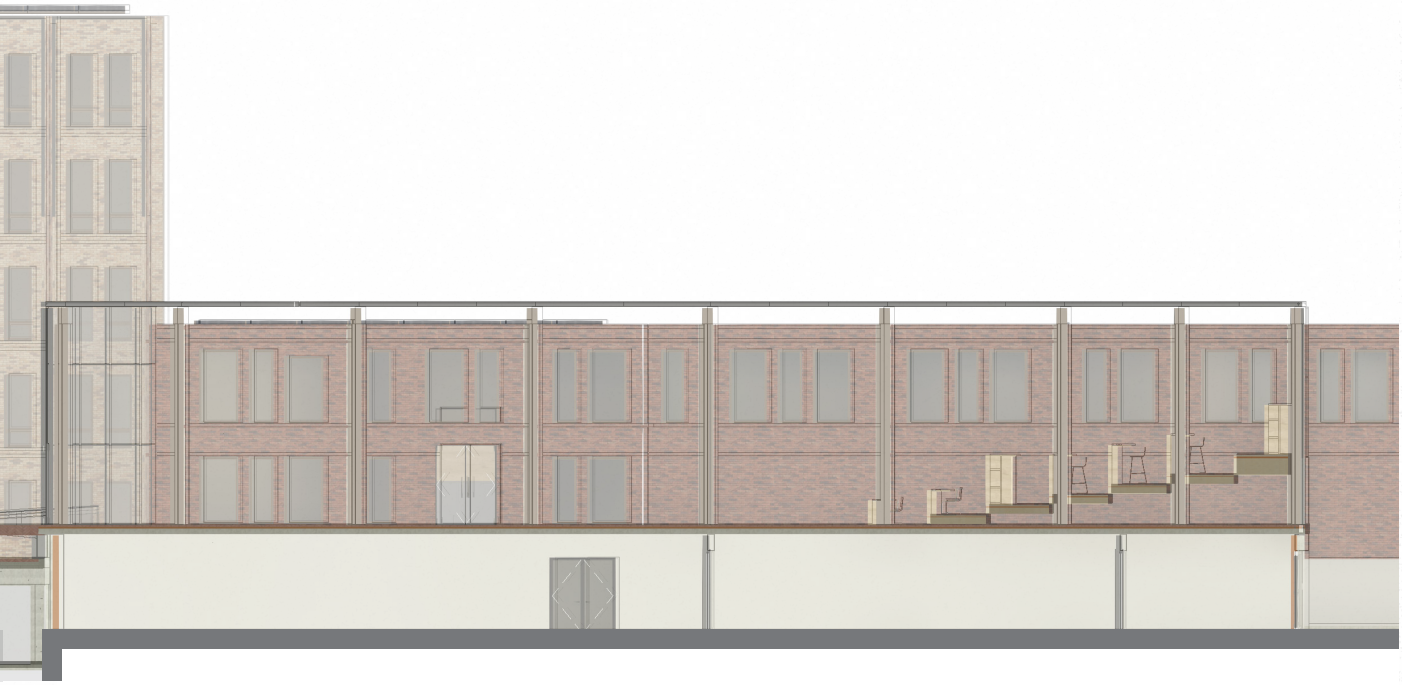


EAST ELEVATION



EAST ELEVATION - II





ELEVATIONS

0 m 10 m



WEST ELEVATION



WEST ELEVATION II





ELEVATIONS

0 m 10 m





IMPRESSION WEST - NEW SITUATION





IMPRESSION FACULTY BUILDING ENTRANCE B





IMPRESSION COURTYARD



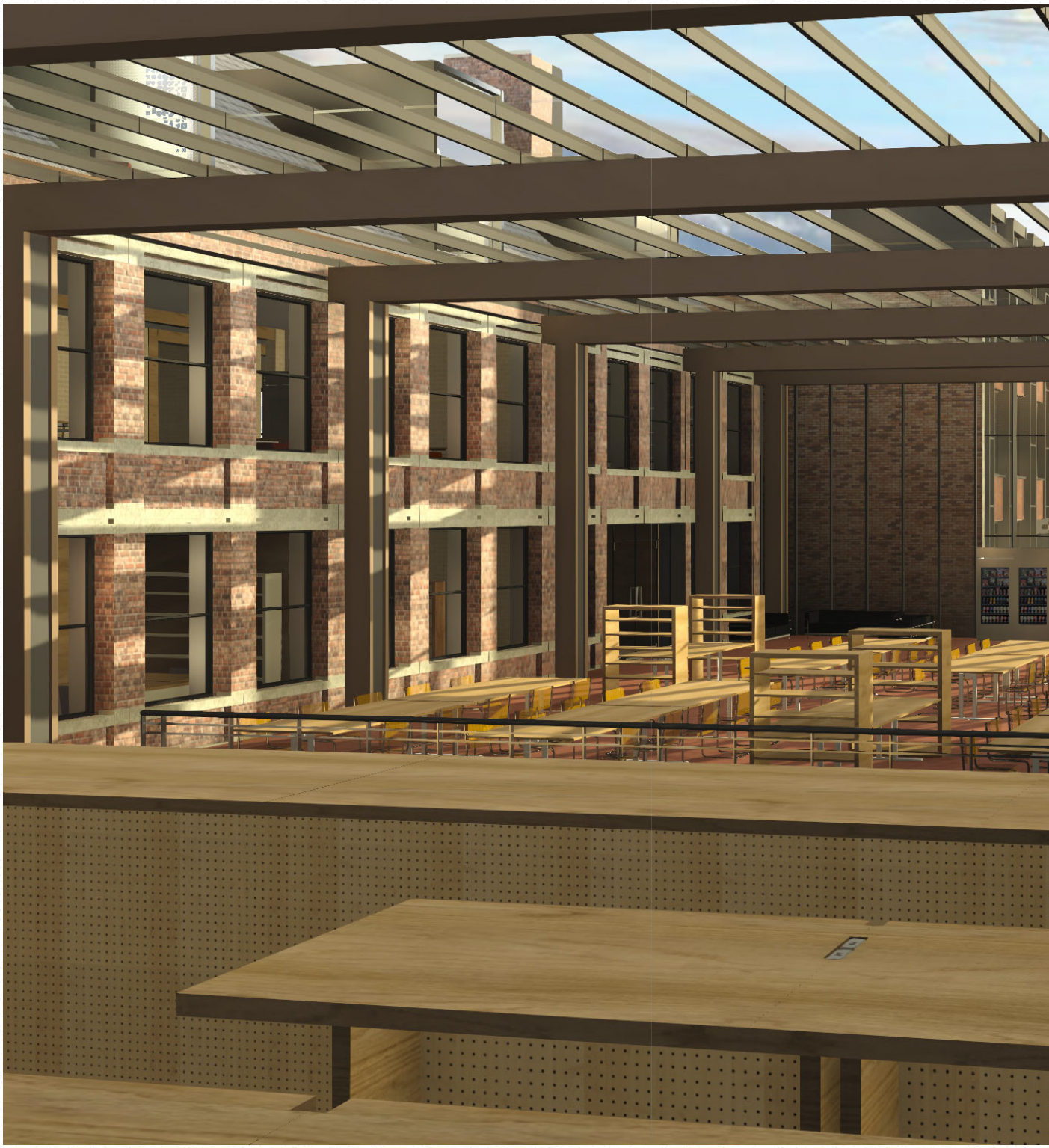


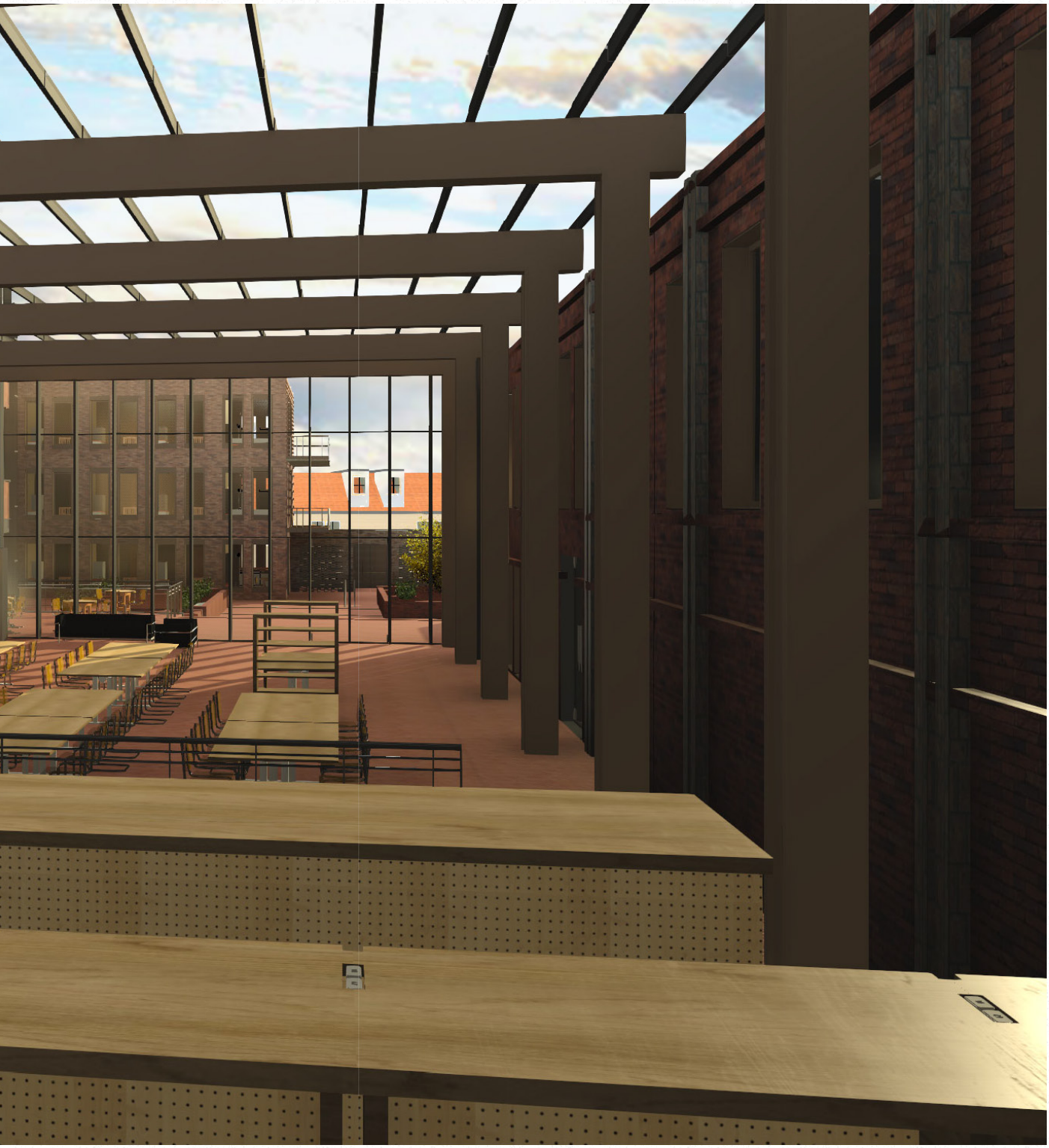
IMPRESSION COURTYARD





IMPRESSION WEST - NEW SITUATION





IMPRESSION MAIN HALL - DAY



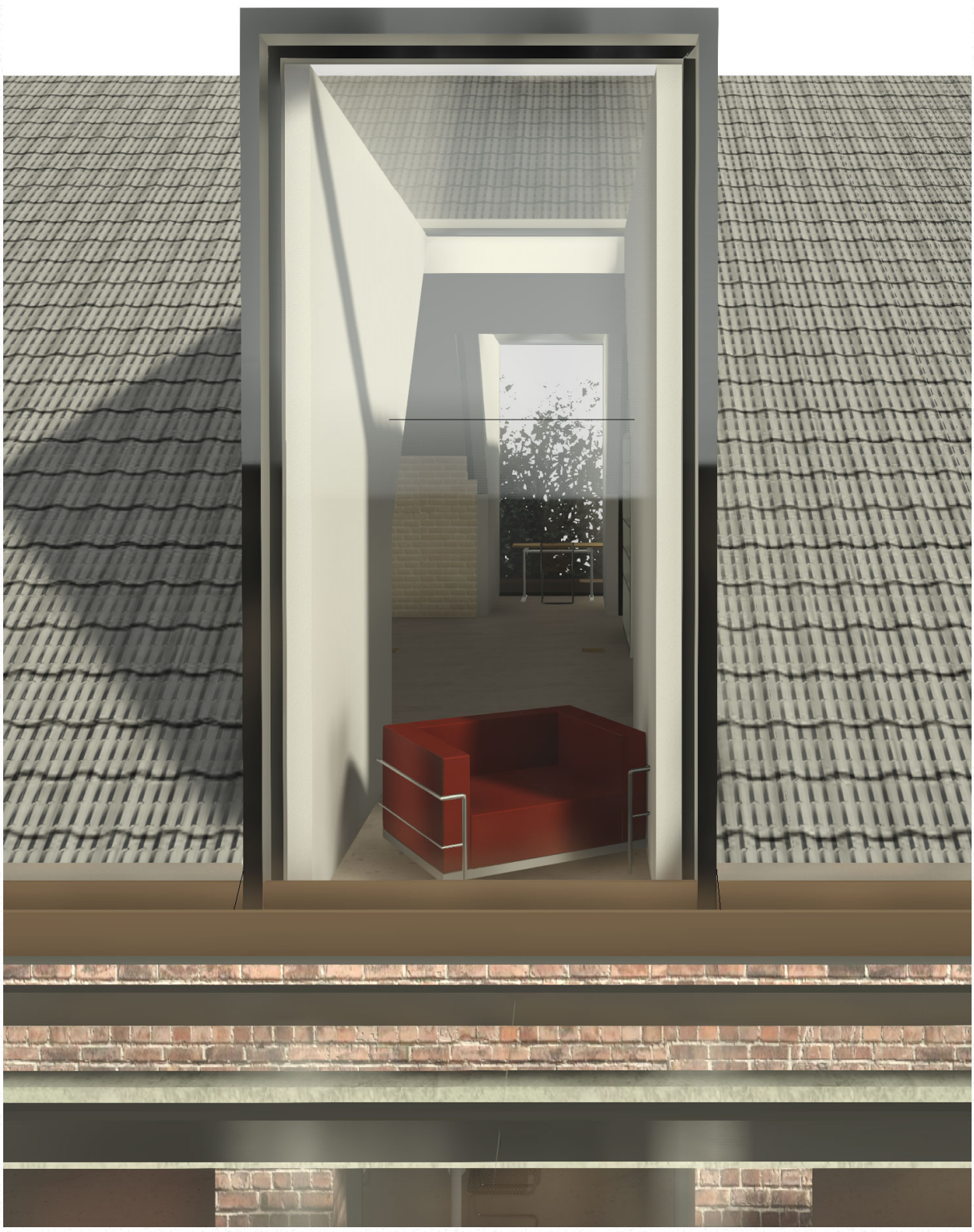


IMPRESSION MAIN HALL - EVENING





IMPRESSION MAIN HALL



IMPRESSION NEW DORMER



IMPRESSION EAST ENTRANCE COURTYARD



IMPRESSION LINTEL FORMER POLICE STATION



IMPRESSION LINTEL HOUSING B BUILDING





IMPRESSION EAST ELEVATION

PAPER

THE QUALITY OF MODEST VALUED TWENTIETH CENTURY BUILDINGS

The past year I have delved into field of built heritage in the context of my graduation project at the Vacant Heritage studio. The studio focusses on the role of vacant heritage for a more sustainable future. Within this studio, the Touch & Feel research line studies the materiality of buildings and the essential values these material attributes represent, in regard to the possibilities for adaptive reuse (Dos Santos Gonçalves, J., Meijers, L., Quist, W., Zijlstra, H., 2021). This year's subject was a selection of police stations which are to become vacant soon. To enable a new future, they are in need of a redesign.

The graduation assignment, consisting of a redesign and a related research, meant a first opportunity for me to study heritage values and redesign strategies. It also meant I had to position myself within in the large field of heritage. Taking position in a complex field like heritage or architecture in general is one of the things I found most difficult during my studies. The time given by a yearlong graduation project allowed me to at least give it a thorough try. Therefore I've written this paper not only as conclusion of my research but also as substantiation of my view on heritage assignments.

ABSTRACT

In the near future, many buildings, built in the second half of the twentieth century, reach the end of their functional lifespan. As most of them are not protected by a heritage listing, they are at risk of being replaced by new buildings, while sustainable ambitions require a sparing use of new building materials. By studying the possible heritage values of these buildings, a greater appreciation for them can emerge. This increased appreciation should lead to more redesigns in which heritage value preservation, contemporary demands and sustainable considerations are equally important.

Inventorying existing redesign strategies and analysing how these are applied on projects with ascending weights of heritage listing, led to insights in how these strategies can be applied on modest valued buildings. The unlisted status of modest valued buildings allows for larger interventions with more contrast to the original building, increasing their adaptability to new demands. Furthermore, by applying various redesign strategies for different attributes, architects can emphasize the attributes which convey most of the buildings value leading to more adaptability elsewhere. Last, the modest heritage value combined with the necessity for adaptability mean that the importance of recognizable contemporality and reversibility of interventions in modest valued buildings is low.

The research findings are applied in the redesign of the police station in Middelburg, which served as design experiment. Tracing in which specific attributes the heritage value of the building lies, enabled a redesign strategy which conserved these attributes while allowing large changes elsewhere. It resulted in a design which preserves the most essential heritage values, guaranteed a new future for the building, and prevented unnecessary new construction.

INTRODUCTION

In the upcoming years, most of the buildings built in the second half of the twentieth century reach the end of their functional lifespan. As more than three quarters of our building stock is younger then 75 years, this architectural legacy is extensive and present throughout the country (Rijksdienst voor het Cultureel Erfgoed, 2021). This reality leads to questions on the value and possible future of these twentieth century buildings.

Despite the approximately 62.000 national and 55.000 municipal monument listings in the Netherlands (Rijksdienst voor het Cultureel Erfgoed, 2022), most of these twentieth century buildings are not listed as heritage. Even though they are not listed it is not said these buildings do not carry any cultural significance. They have all been built for a specific purpose or designed with a vision in mind which reflects the developments or architectural movements of the twentieth century, meaning they must convey a certain heritage value.

To distinguish this type of 'modest valued' buildings, three criteria are formulated. Their cultural significance must not be officially recognized, meaning that they are not listed. Second, they convey at least one of the primary heritage values as described by Silva & Roders (2012, p.6) or 'deelwaarden' as defined in 'Richtlijnen bouwhistorisch onderzoek' (Rijksdienst voor Cultureel Erfgoed, 2009). Lastly their cultural significance is not irreplaceable or indispensable, which would make a listing desirable (art. 3.7 lid 1 Erfgoedwet 2021).

As more and more of these modest valued buildings lose their function, demolition threatens their future. While demolition allows the construction of a new building - which can meet contemporary demands – the current challenges in mitigating climate change require sparing use of building materials.

The conflicting interests of heritage value preservation, sparing use of building materials and meeting contemporary demands result in the question 'What to do with the stock of modest valued twentieth century buildings?' These three interests are not only relevant for modest valued buildings. They are also present in debates on the future of listed heritage. Therefore, an overview of the history and current challenges of listed heritage management are used to answer this question.

The overview shows that the future of heritage management is strongly linked with the challenge of climate change mitigation. But the real sustainable potential lies with repurposing unlisted, modest valued buildings which are demolished if we can't find appreciation for them. Their modest value allows for adaptation to current demands, while preserving cultural significance.

Consequently, the second part of this paper deals with the matter of how to create an architectural design while balancing between preservation and renewal. An inventory of existing redesign strategies and an analysis of four transformation projects aims to provide insight in the question: How to redesign the vast late-twentieth century building stock in a way that does justice to its modest cultural value while still enabling practical and sustainable future use? The found strategies are tested on the redesign of an example of a modest valued twentieth century building - the police station at Achter de Houttuinen 10 in Middelburg.

2. HERITAGE AS DRIVER OF SUSTAINABLE DEVELOPMENT

2.1 Changing views on heritage management

During the nineteen fifties and sixties, heritage management was centered around the idea of conservation and protection. Spatial developments like land consolidation and urban expansion were forces against which heritage had to be protected. The legal listing which protected the heritage, simultaneously isolated them from their ever-changing surroundings (Rijksdienst voor Cultureel Erfgoed, 2013).

From the seventies onwards, the rise of the service economy entailed the transformation of industrial cities to office districts. It resulted in an increased interest in build heritage, also to accommodate tourism and recreation. In the decade before the turn of the century, the idea that the defensive notion of heritage management was no longer sustainable gained ground. An early governmental publication - Nota Belvedere - originated from the idea that heritage preservation should be more then conservation. Instead, cultural heritage should foster place identity and add meaning to spatial development (Rijksoverheid, 1999). This new vision on heritage as driver of development is also internationally advocated, among others by ICOMOS and UNESCO (2011, 2013).

Alongside this change in heritage management, the notion of what cultural heritage is, has vastly widened in scope. Not just the exceptional but more and more the remnants of everyday life have gained interest. Besides, younger buildings and traditions are increasingly considered heritage. Furthermore, the scale of heritage items enlarged as not only buildings, but also industrial complexes and entire urban planning structures were considered heritage (Rijksdienst voor Cultureel Erfgoed, 2013). The growing extent meant increasing costs for heritage management which enhanced the need of new functions for built heritage. At the same time the rise of the leisure culture meant that the experience of heritage could translate to economic value (Kuipers & De Jonge, 2017).

According to Janssen, Luiten, Renes and Rouwendal (Rijksdienst voor Cultureel Erfgoed, 2013)' heritage management has improved its social engagement through the approach of preservation through development. In their reflection on a decade of 'Belvedere' it is stressed that this social engagement is the future for heritage. Heritage must find affiliation with new issues and continue to take part in spatial development.

2.2 The future of heritage

Perhaps the most comprehensive societal issue of the current decade is mitigation of climate change. In the building industry, a large polluter, there is a lot of interest in the transition to a more sustainable way of working. The urge for sustainability also leaves its mark on heritage management.

The current policy centres around improving the energetic performance of listed heritage buildings. To improve energy efficiency, the National government invests in study groups and education to find new energy solutions without disregarding the cultural significance of the buildings (Ministerie van Onderwijs, Cultuur en Wetenschap, 2018).

Nevertheless, the largest sustainable potential lies not in the field of listed buildings which were to be preserved anyway. It lies with the modest valued buildings which are at risk of being demolished. By repurposing these buildings, the inherent sustainability of reusing buildings and their embodied energy and materials is utilized. For these modest valued buildings, we need a shift from a defensive approach where sustainable measures are considered – in written and unwritten rules - something which should be implemented with prudence, to a way of thinking which treats heritage, sustainability and contemporary interests as equally important.

2.3 Opportunities for modest valued heritage

As stated, a sustainable potential lies with the buildings which do not seem culturally significant at first sight. In these cases, the choice for demolition is too often made. While many buildings, with a closer look, turn out to convey heritage values worth preserving. After all, the notion of heritage is widening, possibly resulting in an increased future appreciation of currently modest valued buildings.

To achieve less demolition and more redesigns, it is necessary to study our building stock closer. Because by studying, a greater appreciation of the existing can emerge, as unknown makes unloved. This does not just apply to experts in the building industry, but to the larger public as well. By increasing knowledge and awareness for the modest valued built heritage which surrounds us, the bond with these buildings can be strengthened and less demolition will take place. Hence, "the ultimate form of sustainability first and foremost lies in better observation and reflection" (Alkemade, F., 2000 p.23).

However, studying our built environment to enhance appreciation of the existing should not prohibit change. Meeting new demands also represents a value which should be balanced with the value of the existing. Especially the modest valued buildings allow for this synergy between existing and new. As their cultural significance is modest, a progressive approach can be undertaken without the loss of a lot of cultural value. Thus, they can combine heritage preservation with meeting new demands.

3. DETERMINING VALUE, FINDING APPRECIATION

The previous chapter stressed the benefits of reusing modest valued twentieth century buildings, provided that we find appreciation for them. In the next chapter, the redesign of the police station at Achter de Houttuinen 10 (Figure 1) is used as design experiment to test redesign strategies for modest valued buildings. Yet the first step in this process is to study the cultural significance of this building, determine its valuable attributes and thereby enhance appreciation for it.

3.1 Value assessment

The police station in Middelburg is part of a protected cityscape, but only valued for maintaining the original boundaries of the historic street pattern (Rijksdienst voor de monumentenzorg, 1984). Its actual cultural significance lies in its designer. The building was designed by Johannes Fake Berghoef, an influential twentieth century architect and professor at the Technische Hogeschool in Delft. Mainly due to his large oeuvre, his position as professor and his prominent role within the traditionalist's architecture movement. His clear ideas on the use of materials were often criticized during Berghoefs live (Mertens, 1982), but with the unravelling of the construct of 'Delftse school' architecture his ideas are revalued, leading Bernhard Colenbrander to call him: "The most interesting and undervalued architect of the twentieth century"(1993, p.71).

To classify Berghoefs work as straightforward traditional architecture proves too short-sighted after a closer look at his motive (Bosch-Meyer, 2016). His way of building from tradition is derived from a drive to represent society in architecture, as traditions hold the essence of (local) society. Thereby his approach differs from many of his contemporaries, for example Granpré Molière. Whereas Granpré Molière searched for a timeless appearance, Berghoef worked in dialogue with the Zeitgeist by using simplified, more contemporary, variants of traditional references (Ibelings, 1994). Later in his career, even industrialized or prefabricated building methods entered Berghoefs work (Spoormans, Zijlstra & Quist, 2018). Resulting



FIGURE 1. Berghoef, Police station, Middelburg, the Netherlands, 1967

in architecture which balances between continuity and innovation. Besides society, buildings should represent their function. Berghoef achieved this by using building shapes like halls and towers historically associated with the function of the building (Berghoef, 1947). Second, his work aims to expresses the identity of the community by including local customs or techniques and art displaying important local historic events. In the third place, Berghoefs oeuvre is characterized by straightforwardness and simplicity, both in composition and the use of unfinished materials. This uncomplicated approach aims to create beauty, without frills (Berghoef, 1934). It is most clearly visible in simple repetitive façade partitioning present in all his public buildings (Gentenaar, 2022).
The fourth character is the application of craftsmanship in the building process. This is derived from an appreciation for the local traits which are often conveyed through craftsmanship (Berghoef, 1947). It is not only present in masonry patterns, but even in custom designed railings and furniture for most of Berghoefs public buildings. Last, especially Berghoefs later works, often combine a more traditional appearance with innovative building systems or load bearing structures. It results in buildings with a masonry façade in brown and orange shades with precast concrete floors or roofs (Gentenaar, 2022).



FIGURE 2.The ANWB Office in The Haque by Berghoef combining a traditional appearance with a concrete shell structure

3.2 Locating the valuable attributes

As visualized in figure 3, several attributes of the police station in Middelburg, embody Berghoefs view on architecture. Separate, the masonry façade, with monumental traits, represents Berghoefs tradition-based design and therefore has a historic-conceptual value as defined by Silva & Roders (2012, p.6). The, at the time, innovative DATO floor system, represents a scientific value. However, the combination between a traditional façade and innovative floor is what characterizes Berghoef most. Meaning that this combination represents most historic-conceptual value. At the same time, many more buildings of Berghoef – like the office for the ANWB in The Haque- which have the same characteristic combination are present throughout the country. It means the cultural significance of the police station in Middelburg is not irreplaceable or indispensable.

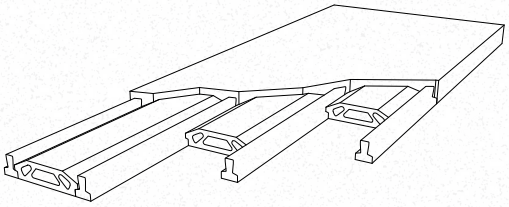


FIGURE 4. Locating the valuable attributes of the police station in Middelburg – The DATO floor system

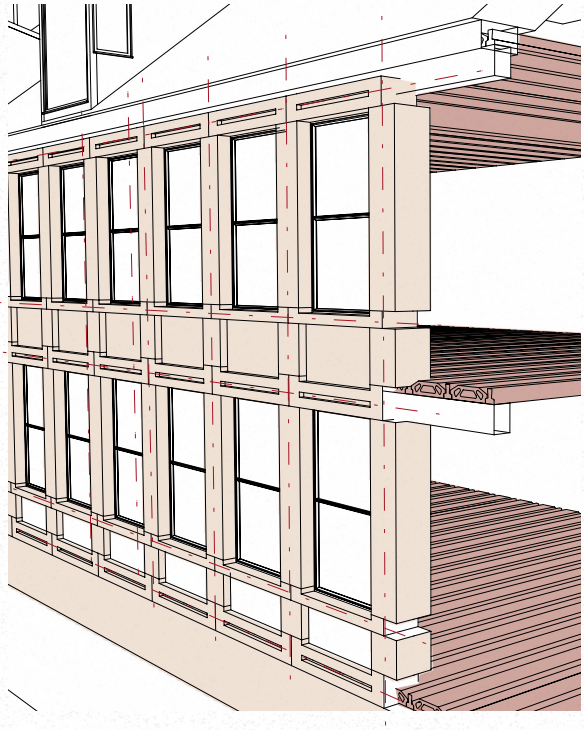


FIGURE 3. Locating the valuable attributes of the police station in Middelburg – A traditional façade composition in combination with an innovative DATO floor system

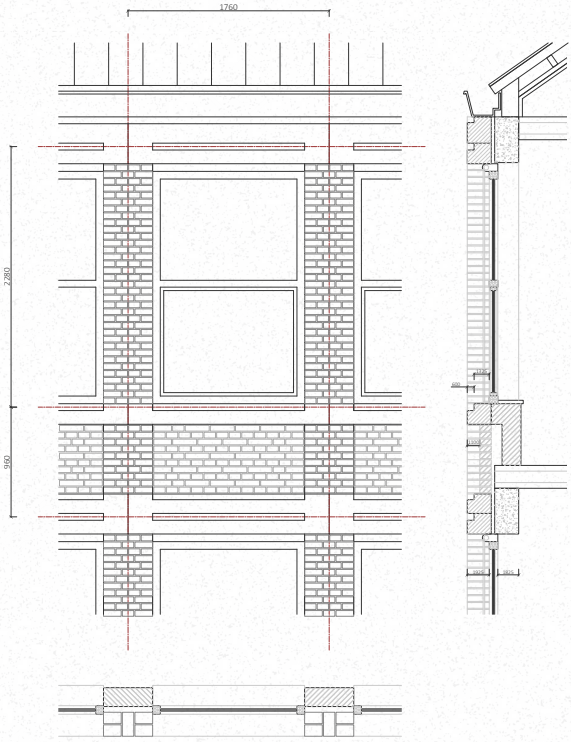


FIGURE 5. Locating the valuable attributes of the police station in Middelburg – A traditional façade composition

4. HOW TO REDESIGN MODEST VALUED BUILDINGS

Even though the police station is not listed as heritage, the value assessment shows it conveys several primary heritage values. These values are a reason to not demolish the building but to repurpose it. To allow for a new future, changes to the building are inevitable. To understand how changes can be made, without compromising the heritage value, an inventory of existing redesign strategies is made. These strategies are graft on listed heritage buildings. An analysis of four case study buildings with different weights of assigned listings (National monument, Municipal monument and unlisted) aims to provide insight in how these strategies can be applied on modest valued buildings.

4.1 Existing redesign strategies

Vandenbroucke & Janssen (2020) state that there are four ways an intervention can relate to the existing building. By creating contrast, competition with the original is avoided and thereby the original building is respected. When seeking for more rapprochement, new and old can make contact by creating similarity in a limited number of aspects. The third option, a connection, implies a relation between new and old like brother and sister. The two look alike, but clearly have an own identity. The connection can be enhanced by resembling material choices, or façade rhythm and detailing. Lastly a new addition can be a copy of the existing building.

Plevoets and Van Cleempoel made a similar classification of redesign strategies. The first strategy, translatio, comes down to restauration of the original in tangible or intangible aspects. The second step, imitatio, is a more selective restoration of historic aspects to enable a new function of the building. The third step, aemulatio, attempts to exceed the original quality. Interventions aim to strengthen existing qualities or spatial experiences.

Lastly, De Jonge (Lecture, 14 September 2021) distinguishes four categories of adapting heritage, based on how severe the alterations of the heritage object are. Ordered from conservative to progressive these are: conservation, adaptation, intervention and transformation. In this spectrum conservation means the preservation of the existing building and perhaps restoring important aspects. Adaptation and intervention are comparable but differ in the limits of acceptable change to the original building fabric and original design intentions. In case of transformation, the interventions focus on facilitating new use while preserving enough of the original to convey the buildings most essential values.

Plevoets & Van Cleempoel (2019) and Vandenbroucke & Janssen (2020) rate their strategies on a scale of resemblance to the original building. When this factor is graphed against the extent of the redesign, as mostly discussed by De Jonge (2021) a coordinate system of possible redesign options is constructed (figure 6). As both the extent and resemblance of a redesign can be positioned in this coordinate system, it provides a simplified classification.

The redesigns of the four selected Berghoef buildings are analysed and positioned within the coordinate system. As they have varying listings, comparing their positions can provide insight in the difference between redesign strategies for listed and unlisted buildings.

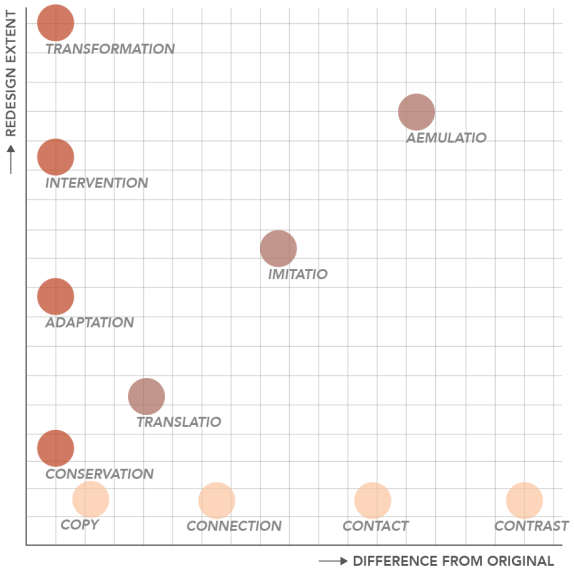


FIGURE 6.The various redesign strategies organized on a grid

4.2 Increased adaptability

From the strategy grid comes forward that a heritage listing of the buildings influences the extend of the redesign (figure 7). Both of the national monuments (The Haque and Hengelo) have endured little changes in their redesigns. New program is housed in new buildings which are positioned separate from the monument thereby allowing some contrast with the original building. The transformation of the City Hall in Aalsmeer, a municipal monument, had a slightly larger extent. Aside from repairs it also entailed a new entrance and new climate installations. The unlisted office building in Alkmaar underwent a more invasive transformation. A new storey was built on top and balconies were added to accommodate a new housing function.

It seems the greater design freedom which exists when working with unlisted buildings allows for larger interventions with more contrast to the original building. This enables function changes which are more difficult in listed heritage. It confirms the potential of modest valued buildings to meet contemporary demands.

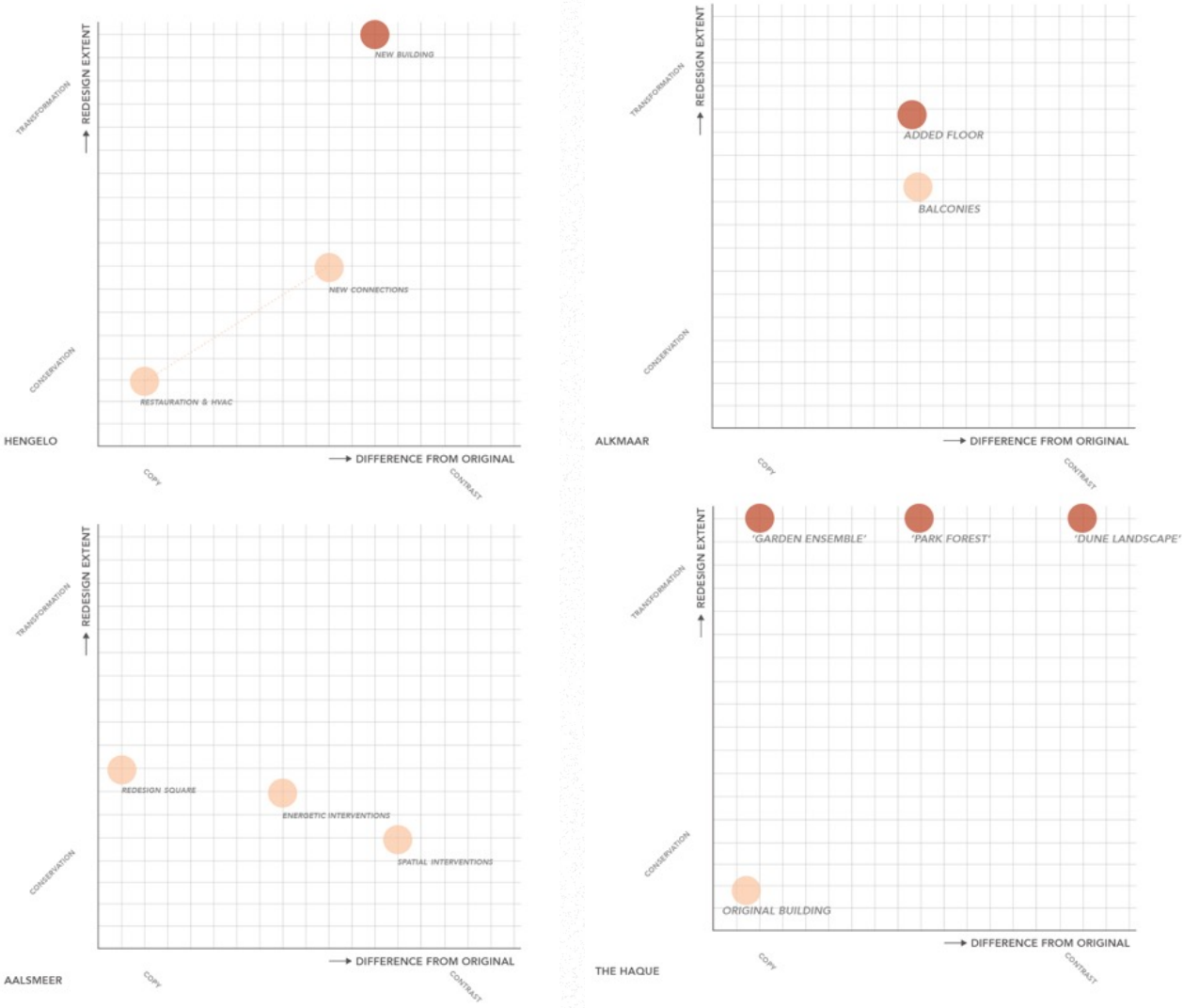


FIGURE 7. All case study transformations positioned on the strategy grid – The national monuments Hengelo (top left) and The Haque (bottom right) show little changes to the existing building.

4.3 A closer look – varying tactics

The great advantage of the strategy grid is the simplified overview it provides, simultaneously this simplification means that complexity and nuances in different strategies were unexposed. A closer look at the case studies revealed that the choice for resemblance or contrast is not just made for the new design as a whole, but also on different aspects of one design. It is most clearly visible in the additions which were made in two of the studied transformation projects.

In Alkmaar an extra storey and in Hengelo a new building next to the monuments is added. For these large additions three different strategies have been deployed. The new parts seek connection with the existing monument by resembling its material, resembling its composition or by reinterpreting its design intentions.

In case of the office in Alkmaar, the curtain wall of the added storey complies to the existing partitioning of the brick façade. The balconies on the other hand are also added later but designed in the same material as the original building. As they do not comply with the existing façade partitioning they draw focus, but the proof of their later addition is lost. The overall position on the strategy grid can therefore be specified in four positions for the material and composition for both interventions (figure 8).

The new building next to the city hall of Hengelo reinterprets the references to local characteristics of the original building by having an image of a local salt tower perforated in the façade cladding. By doing so, the redesign resembles the original design intentions while taking a more contrasting approach in the composition and material choice.

The closer look at the case studies proves that redesign strategies can differ per intervention and use multiple tactics to relate the new parts to the existing buildings. By applying various tactics for different attributes, architects can emphasize the attributes which convey most of the buildings value.

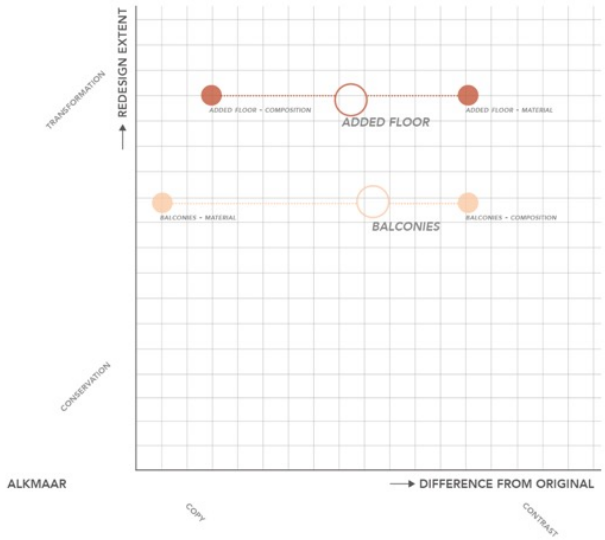


FIGURE 8. The overall redesign strategy of the office in Alkmaar, specified in separate tactics for each intervention.

4.4 Recognizable contemporality and reversibility

A reoccurring strategy found in the case studies is the aim for recognizable contemporality of the spatial interventions. New entrances, hallways and other elements which influence the spatial experience of the monument are often designed in different materials than the original building. The materials contrast with the original because they are clearly newer. Extreme contrasts were not the aim. The interventions usually distance themselves from the original building by creating actual physical distance between new and old and connecting only at a limited number of points. This also ensures that later additions can be easily undone (figure 9).

In case of smaller interventions, usually with a more technical nature, the aim for recognizable contemporality seems to drop. It resulted in a separation between the spatial and technical interventions on the strategy grid.
In the studied examples, technical installations - like ventilation ducts – are often fit in the existing or partially hidden. The proof of their later addition is hereby often lost. The concept of reversibility is often compromised in these situations.



FIGURE 9. Recognizable contemporality in the redesign of the city hall of Aalsmeer – The new entrance distances itself from the original building.

4.5 How to apply on modest valued buildings

The inventory of redesign strategies and case studies regard buildings with an ascending heritage listing. Different approaches for different weights of heritage listing led to the following recommendations for redesigning modest valued buildings.

The fact that modest valued buildings are unlisted, and their cultural significance is not irreplaceable or indispensable allows for larger interventions. This increases the adaptability to contemporary demands.

The overall redesign strategy should allow for varying relations between old and new per intervention. This enables a strategy which is conservative for the attributes which convey most of the buildings value while allowing more contrast or change for less valued parts. The case studies showed three tactics to achieve this. Out of these three, the reinterpretation of the original design intentions can enrich the transformation but requires a lot of knowledge of the building and the redesign. As modest valued buildings are usually lesser known, a relation solely based on the reinterpretation of design intentions is difficult to grasp for most viewers.
Recognizable contemporality or reversibility are appreciated concepts when dealing with listed heritage. Even so, consistently implementing these concepts is rarely done, especially regarding technical interventions. In modest valued buildings, the necessity of these concepts is questionable. Current interests might outweigh the heritage value. Besides, an effective intervention can enrich the history of the building by leaving some indelible traces. It is a dilemma strongly linked with the question what we see as the history of a building.

4.6 Application in design

From the value assessment came forward that façade and floor system are the attributes which convey the historic-conceptual value of the police station the most. The study into redesign strategies showed how various relations between old and new can be present in one redesign strategy. Consequently, the redesign of the police station in Middelburg takes as starting point the conservation of the façade and floor system while in other aspects, like the plan layout (figure 10), more contrast with the original design allows new use.

Resembling the façade composition of the police station in new additions (figure 11) creates a strong visual connection which ensures everyone can understand the relation between old and new. Due to this relation, the new additions can derive some of their identity from the police station which integrates them in their surroundings.

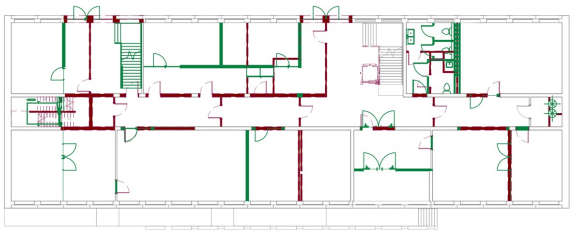


FIGURE 10. Changes to the ground floor of the police station in Middelburg



FIGURE 11. Resembling the façade composition of the police station in new additions

5. CONCLUSION

In the near future, most of the buildings built in the second half of the twentieth century reach the end of their lifespan. It leads to questions on their value and possible conservation.

Current and past heritage management shows that the notion of heritage is widening. Not just the exceptional but more and more the remnants of everyday life have gained interest. Furthermore, the sector is increasingly socially engaged and by preserving and improving heritage buildings it can contribute to the mitigation of climate change. However, the largest sustainable potential lies not with listed and therefore protected heritage. It lies with unlisted buildings, at the end of their functional lifespan, which could be appreciated for their cultural significance. By studying these modest valued buildings, an enhanced appreciation can emerge. This improved appreciation of our current building stock can lead to less demolition and more adaptive reuse.

Reusing more buildings should not lead to lesser fulfilment of contemporary requirements. Therefore, this paper aims to learn from existing redesign strategies and reason how they can be applied on modest valued buildings in a way that does justice to their modest cultural value while still enabling practical and sustainable future use. By combining a literature study, case studies and the redesign of the police station in Middelburg as design experiment, the following insights for redesigning modest valued buildings are acquired.

To start, the great quality of modest valued buildings is that they are unlisted, which allows for more severe interventions to meet new demands. Besides, principles like reversibility and the recognizable contemporality of interventions - which are generally valued in listed heritage transformations - are of lesser importance. Indelible traces of later interventions might even enrich the history of these buildings.

Second, variable relations between old and new allow for conservation of the most valuable attributes while enabling contrast/change elsewhere. As becomes clear from the redesign of the police station in Middelburg, this approach allows the preservation of heritage values while drastic interventions and additions still enable a new use of the building. The possibility of new use ensures a future for the police station, prevents demolition, and thereby contributes to mitigating climate change.

By studying the link between façade attributes and related heritage values, attempts to define a new type of modest valued heritage buildings and studying how their heritage value can remain perceivable despite necessary interventions, this research contributes to the Touch & Feel research line of the Vacant Heritage studio.

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FIGURES

1. Zeeuws Archief, Gemeente Middelburg, Afdeling Communicatie, nr. 50

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3. Image by author
4. Image by author
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9. Brandjes van Baalen architecten
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REFLECTION

The past year I have delved into field of built heritage in the context of my graduation project at the Vacant Heritage studio. The graduation assignment - a redesign of the police station in Middelburg by J.F. Berghoef and a related research - meant a year of studying heritage values and redesign strategies. Now, at the end of the year, I will reflect on the relevance of my findings and the validity of the methods I used to find them.

RELATION BETWEEN RESEARCH AND DESIGN

At the start of the year, I formulated a research plan which aimed at understanding the view on architecture of Berghoef. By understanding his view, I could understand the value of the police station which would result in design intentions and limitations. I set the scope of the research narrow to allow in depth studying of a specific subject. In short, it was a set-up where the research would inform the design.

A couple weeks prior to the end of the first semester I had a thorough understanding of the work of Berghoef and some first ideas on the redesign of the police station. It was at this moment that, in line with the advice from my tutors Joana & Wido, I started questioning what outcomes of my research would also apply on 'not-Berghoef-buildings'. If my research proofed applicable to more than the buildings of one architect, this would increase the relevance.

In the following weeks I changed the set-up of the research significantly. By formulating an underlying question, I made the research into Berghoef and the redesign of his police station a case study. The police station became an example of 'modest valued' heritage. A type of heritage which is present throughout our country; unlisted buildings which do not seem that special at first but convey some heritage values. In the new set-up, the research no longer only informed the design, the design also informs the research. By studying redesign strategies and experimenting on how to redesign this police station; a combination between research and design answers the question: "How to redesign modest valued twentieth century heritage buildings in a way that does justice to their modest cultural value while still enabling a practical future use?"

Broadening the research meant I had to position myself not only in relation to redesigns of Berghoefs buildings but in relation to a larger and more general heritage assignment. I used my research paper to substantiate my view on this. The paper starts with an overview of the history of heritage management, which shows the trend of a widening scope of heritage and more progressive reuse strategies. As well as the importance of social engagement of the heritage sector. This trend, combined with probably the most comprehensive current day challenge, climate change mitigation, resulted in a vision that heritage must find ways to contribute to a more sustainable society. However, the largest sustainable opportunities lie with repurposing unlisted, modest valued buildings which are perhaps demolished if we can't find appreciation for them. Studying these buildings can reveal their heritage value, increase appreciation and thereby lead to less demolition.

By studying existing heritage strategies and experimenting with how to apply them on modest valued buildings the researched provided several insights: A value assessment can indicate the most valuable attributes of the building. These represent the most essential heritage values of the building and benefit from a more conservative approach. At the same time, less essential attributes can be treated more progressively to enable a new use.

Looking back, I appreciate my initial research set-up for its specificity. It enabled me to thoroughly study Berghoefs work and precisely determine in what attributes of the police station its heritage value lies. Nevertheless, it would have made the relation between research and design linear. The changed set-up allowed for a stronger integration between the research and the design and increased the relevance of the findings. Furthermore, it pushed me to take position in the large field of twentieth century heritage management, instead of in the niche of Berghoef buildings.

RESEARCH METHODS AND RELEVANCE

The first part of my research, the study into Berghoefs views on architecture, required a literature study which I've supplemented with some case studies. The used literature consisted of mostly primary sources. Berghoefs personal archive (Het Nieuwe Instituut, Rotterdam, Berghoef, J.F. (Johannes Fake)) contained much lecture material, letters and articles in which he expresses his thoughts on architecture. Another important source was the dissertation of Jennifer Bosch-Meyer (2016) on the work of Berghoef. I rate both sources as reliable. I studied four buildings as case study, to discover how Berghoefs theoretical views on architecture translate into material. The chosen cases (city hall Hengelo, city hall Aalsmeer, office ANWB The Haque and office health insurance Alkmaar) are comparable in function to the police station. For each I made the same set of analytical drawings, ensuring mutual comparability.

To study different redesign strategies, I used the same four buildings. All of them have been redesigned during their lifespan. Again, I made for each case study a similar set of analytical drawings to show the relation between the existing building and later additions. To compare the different redesign strategies, I placed them on a grid. The grid is based on literature on redesign strategies (Vandenbroucke & Janssen, 2020; Plevoets and Van Cleempoel, 2019; De Jonge 2021). The X-axis positions the resemblance of the redesign with the original building on a scale from copy to contrast. The Y-axis displays the extent of the redesign. The great advantage of this grid was the simplified overview it provided. It is a useful tool to discus and relate different strategies. At the same time, the simplification meant that some of the complexity and nuances in different strategies were unexposed. Only with a closer look I found out that the choice for resemblance or contrast is not just made for the new design as a whole, but may differ between various interventions within one redesign. By applying different tactics for different attributes, the redesign can emphasize the attributes which convey most of the buildings value.

The last step in the research were the design experiments. Designing is an activity which requires constant decision making. Not all these decisions are rationally substantiated as creativity and experience are factors within the design process. It makes designing an implicit activity (Van Dooren, 2014). By selecting the most essential design decisions and writing down my line of thought, I tried to make

explicit what led me to my decisions. Even though designing is a partially subjective process, I aimed for a certain level of objectivity by supporting my design decisions with a traceable logic. I could have further objectified this process, for example by relating it to the five elements of Van Dooren (2014).

The chosen approach of identifying the possible heritage value of a building, identifying the most characteristic attributes, preserving these and allowing significant changes elsewhere is a method which can be applied in other projects as well. It is an approach which treats heritage preservation and meeting new demands as equally important. Therefore I think it is suitable in other situations as long as the building can be considered to have a modest heritage value* and there is a possible new use.
In my graduation project, the most characteristic attributes were identified by studying the reason the building has a heritage value, namely the architect. The architect's vision was studied by a literature research, supplemented with a case study research which aimed to find out how his vision materializes. Due to this focus on materiality the step towards recognizing which material attributes represent the most heritage value was small.

**To distinguish 'modest valued' buildings, I formulated three criteria. Their cultural significance must not be officially recognized, meaning that they are not listed. Second, they convey at least one of the primary heritage values as described by Silva & Roders (2012, p.6) or 'deelwaarden' as defined in 'Richtlijnen bouwhistorisch onderzoek' (Rijksdienst voor Cultureel Erfgoed, 2009). Lastly their cultural significance is not irreplaceable or indispensable, which would make a listing desirable (art. 3.7 lid 1 Erfgoedwet 2021).*

RELATION BETWEEN TOPIC, STUDIO AND MASTER PROGRAM

Twentieth century heritage buildings pose many questions to professionals in the building practice regarding the conservation of twentieth century building materials and techniques. Since the increased appreciation of young heritage started, much research has been done in this field. At this moment the National Office for Cultural Heritage (Rijksdienst voor Cultureel Erfgoed) together with museums, universities and research institutes has set up a program to further increase knowledge on twentieth century heritage and conservation. The 'Moderne bouwmaterialen en hun toepassing 1940-1990' (Modern building materials and their application 1940-1990) program focusses on history, application and properties of materials and their cultural/historical significance. (Rijksdienst voor Cultureel Erfgoed, 2021a).

Knowledge gained in the Touch & Feel research line contributes mainly to this last aspect of the RCE program, by studying material aspects of a selection of police stations built in the twentieth century. By focussing on the materiality of buildings and the essential values these material attributes represent, possibilities for adaptive reuse can be identified.
The Touch & Feel research line is part of the Vacant Heritage studio at the TU Delft which studies the role of vacant heritage for a more sustainable future.

In my graduation project I focussed on the material attributes of 'modest valued' heritage. I advocated that thorough studying of our existing building stock can increase the appreciation of these modestly valued buildings. Redesigning them leads to preservation of heritage value and prevents demolition. By handling this broad understanding of the term 'built heritage' I aim to apply sustainable heritage redesign strategies on buildings which traditionally are not considered heritage. Thereby aiming to utilize the sustainable potential of our existing building stock.

RELATIONSHIP BETWEEN THE GRADUATION PROJECT AND THE WIDER SOCIAL, PROFESSIONAL AND SCIENTIFIC FRAMEWORK

The police station in Middelburg will become vacant in the near future. The graduation project, a redesign of the station, therefore contributes to a topical heritage assignment. It should be carefully approached as the building is part of a protected city scape. Since the police is a governmental organization, it is aware of its exemplary role regarding sustainability and socially responsible real estate management. Therefore, even though the police divests the building, it is committed to enable reuse instead of demolition.

Furthermore, the research contributes to a further understanding of the oeuvre of Berghoef and his ideas, which influenced Dutch architecture especially seen his function as professor at the Technical University in Delft. The research summarizes Berghoefs views on architecture in five themes and explains how these themes are translated into material. As many buildings of his hand will soon reach the end of their lifespan, this information can be used to identify the heritage value of these buildings and their most valuable attributes.

ETHICAL ISSUES AND DILEMMAS

The aim of my research and design was to find ways to redesign 'modest valued' twentieth century heritage buildings. It resulted in a plea to study our existing building stock as this creates an increased appreciation of the existing. This increased appreciation should lead to less demolition which is beneficial for mitigating climate change. Additionally, I concluded that by studying the existing buildings, the attributes or characteristics in which its value is most present can be identified and preserved. Whereas less valued attributes should not be spared in favor of necessary changes which accommodate new use.

It is an approach which strongly relies on inspiration from the past. This entails the risk of counteracting innovation. As society constantly changes, our needs and demands from buildings also change. An approach which focusses on preserving past values is less likely to completely serve new demands. Even if the designer is aware of this risk, the limitations given by a 'tabula scripta' make it more difficult to tailor a building to the needs of its user.

The lower heritage value of modest valued buildings enables the mitigation of this issue.
As its cultural significance is modest, a progressive approach can be undertaken without the loss of a lot of cultural value. Thus, it can combine heritage preservation with meeting new demands. Nevertheless, it must be stressed that the designer should not shy from necessary interventions. In the end the buildings usability determines its lifespan.

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SUMMARY

The past year I have delved into field of built heritage in the context of my graduation project which consist of a redesign of a vacant police station and a related research. The redesign of the police station is part of a larger reorganization within the police. In 2013 the police was reorganized to form a national police force and currently they are adapting their real estate to this reorganization. As the police is dedicated to sustainable real-estate development the Atelier Politiebouwmeester has asked the Vacant Heritage studio to study the future of these buildings.

The studio focusses on the role of vacant heritage for a more sustainable future. Within this studio, the Touch & Feel research line, studies the materiality of buildings and the essential values these material attributes represent, in regard to the possibilities for adaptive reuse. With this approach in mind, I started my graduation project with a focus on the possible heritage values the police station conveyed. An extensive study into the work and influence of the architect of the police station, Berghoef, substantiated the heritage value of the police station (see '*Understanding Berghoef*'). The subsequent value assessment of the station showed which attributes of the police station most clearly convey its value.

Various building and site analysis indicated that a possible future use of the police station was education. The ambition of University College Roosevelt to expand, meant an interesting opportunity for a new life for the police station. The required program however, did not fit within the existing building. This encouraged to look beyond the initial project scope and see how the adjacent vacant supermarket could be incorporated in the design. It resulted in a plan where the redesign of the police station is a driver for the redevelopment of larger piece of city as small-scale campus.

It meant that a large part of the plan would be new buildings. To find out how to link them to the existing building of Berghoef, an inventory of existing redesign strategies, several case-studies into redesigned Berghoef buildings and many design experiments were performed. Simultaneously I explored how the police station is an example of many modest valued buildings in our country and how to redesign them for a sustainable future. The conclusion, as substantiated in the paper: '*The quality of modest valued buildings*' is that when redesigning unlisted twentieth century buildings, three factors are of equal importance: Heritage value preservation, meeting contemporary demands and sustainability. By preserving the attributes which most essentially convey the heritage value of the building, and taking more freedom to do interventions which allow a sustainable new use, this can be achieved. A side note on this conclusion is that this approach worked well for this building because the heritage attributes were the façade and floors. These are elements which are easy to preserve in case of a new use. Other attributes are perhaps more related to functionality of a building. In this case the new use has to find ways to adapt to this.

UNKNOWN MAKES UNLOVED

RECOMMENDATIONS

The title of my graduation project 'Unknown makes unloved' implies that studying our existing building stock is necessary to value it properly. Indeed, I've found that despite the police station in Middelburg was not a listed monument, it conveyed an interesting heritage value. Together with contemporary demands and sustainable ambitions, this heritage value became the driver of the project. It resulted in a project where two vacant buildings are revived, allowing new use, without compromising cultural heritage. As this was only possible through a study of the exiting building stock, I would advise all who intervene in the build environment to start with an observation of what is already there.

Currently the Besluit ruimtelijke ordening (an outcome from the Modernisering Monumentenzorg, MoMo, in 2009) requires that all zoning planes describe how the cultural-historical values present in the area and monuments present or expected in the ground have been taken into account.[1] To substantiate their policy, many municipalities make cultural-historical value maps. The maps indicate the presence of cultural heritage and can be used to inform stakeholders. In Amsterdam for example, the cultural-historic value map has an important signaling function for submitting a permit application. If a building has architectural or building-historical values, or if these are expected, a cultural-historical value assessment can be requested within the environmental permit.

More often than not, the cultural-historical value maps indicate an expected heritage value, as thorough research is unavailable. This might suffice when the nature of the zoning plan is conservative, yet when the plan is development-oriented, a comprehensive, exhaustive insight is required of the cultural-historical values within the plan area.[2]

The redevelopment of the police station in Middelburg illustrates this need. The police station was classified as low expected cultural-historic value, meaning further research into the importance of the station was not necessary.[3] However, studying the police station proved it did convey cultural significance, which became an important motive in the redevelopment.

Furthermore, the studying of the existing buildings not only meant an acknowledgement of heritage values but simultaneously ensured that the existing (load-bearing) capacity of the buildings was recognized. This was the first step in finding suitable new functions and reusing large parts of the existing buildings.

Therefore, my personal recommendation would be to legally require a cultural-historical value statement and capacity assessment for any building, as part of the permit request in case of large changes to a building. By requiring a value statement and capacity assessment, those who want to make changes to our built environment face an extra incentive to appreciate what is already there. By studying, the unknown becomes known, and gets an extra chance to be loved.

1. Besluit ruimtelijke ordening, Artikel 3.1.6 Lid 5a. https://wetten.overheid.nl/BWBR0023798/2021-07-01#Hoofdstuk3
2. Rijksdienst voor het Cultureel Erfgoed (2013) Cultuurhistorisch onderzoek in de vormgeving van de ruimtelijke ordening.
3. Gemeente Middelburg (2013) Cultuurhistorische waardenkaart