Publicizing Vacant Heritage

Combining public accessible use with elderly housing in
the Koudenhorn in Haarlem to stimulate social interaction

Design booklet

Tjeu de Gouw
P5 Presentation
28 - 06 - 2022

Colofon

Design booklet as part of the graduation report prepared for the master's degree in architecture at the Delft University of Technology

Title
Publicizing Vacant Heritage: combining public accessible use with elderly housing in the Koudenhorn in Haarlem to stimulate social interaction

Author
T.A.P. (Tjeu) de Gouw

Graduation studio
Vacant Heritage

Graduation supervisors
Lidy Meijers - Architecture
Frank Koopman - Building technology
Hielkje Zijlstra - Research

Delft University of Technology
Faculty of the Built Environment
Chair of Heritage & Architecture

June 2022

Introduction

This year's Heritage & Architecture – adapting 20th century heritage – vacant heritage- deals with police real estate. Since the establishment of the National Police in 2013, the police force in the Netherlands is facing a significant real estate challenge. During the upcoming years, around 700.000 square meters of real estate will be divested and up to 30 % of the real estate objects are in need of redevelopment. Atelier Politie Bouwmeester provided a list with a total of 10 buildings that will be divested in the future to work with during the graduation studio.

The building selected from those 10 for the individual project is the Koudenhorn building in Haarlem. The koudenhorn was designed and built by mastercarpenter Jan Smit between 1768 and 1771. The building was built as a deacon house to house the elderly and poor inhabitants of the city. Since 1971, the police is located in this building.
The complete research consists of multiple parts. The first part is a collective research into the Spatial Building Typology (SBT) of eight buildings. This research aims to discover the similarities and differences in the spatial characteristics of a group of buildings and how this influences the redesign options. The buildings are analyzed on the four scale levels of inner city, urban block, building object and building envelope. The results are collected in the second volume of the SBT book (Zijlstra et. al, 2022) and give an overview of the current situation of those buildings that serves as a basis for the re-design.

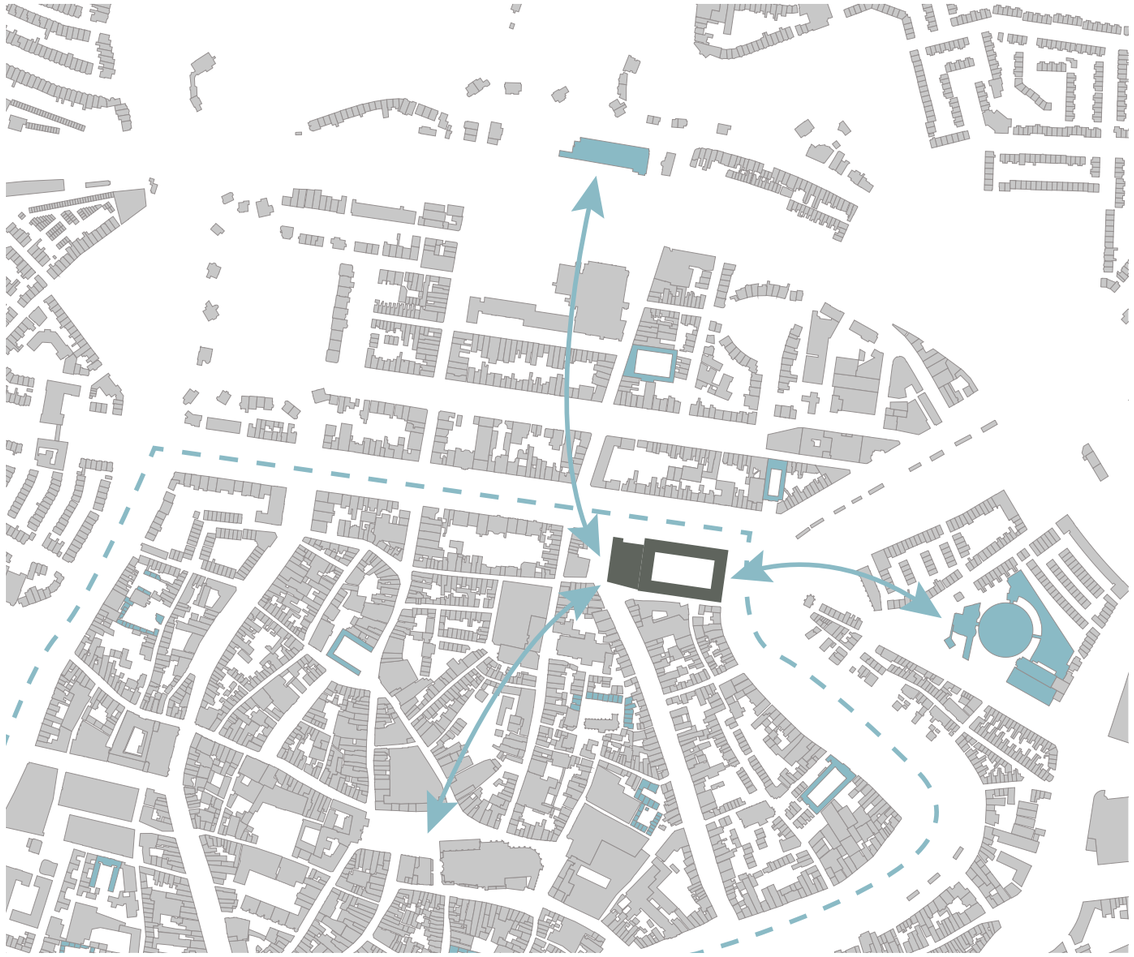
The SBT research is partly used for the building analysis of the Koudenhorn building. The building analysis is conducted together with other students working on the Koudenhorn building. The analysis elaborates on the city of Haarlem, the building in the context, the spatial layout of the building and the building technology.

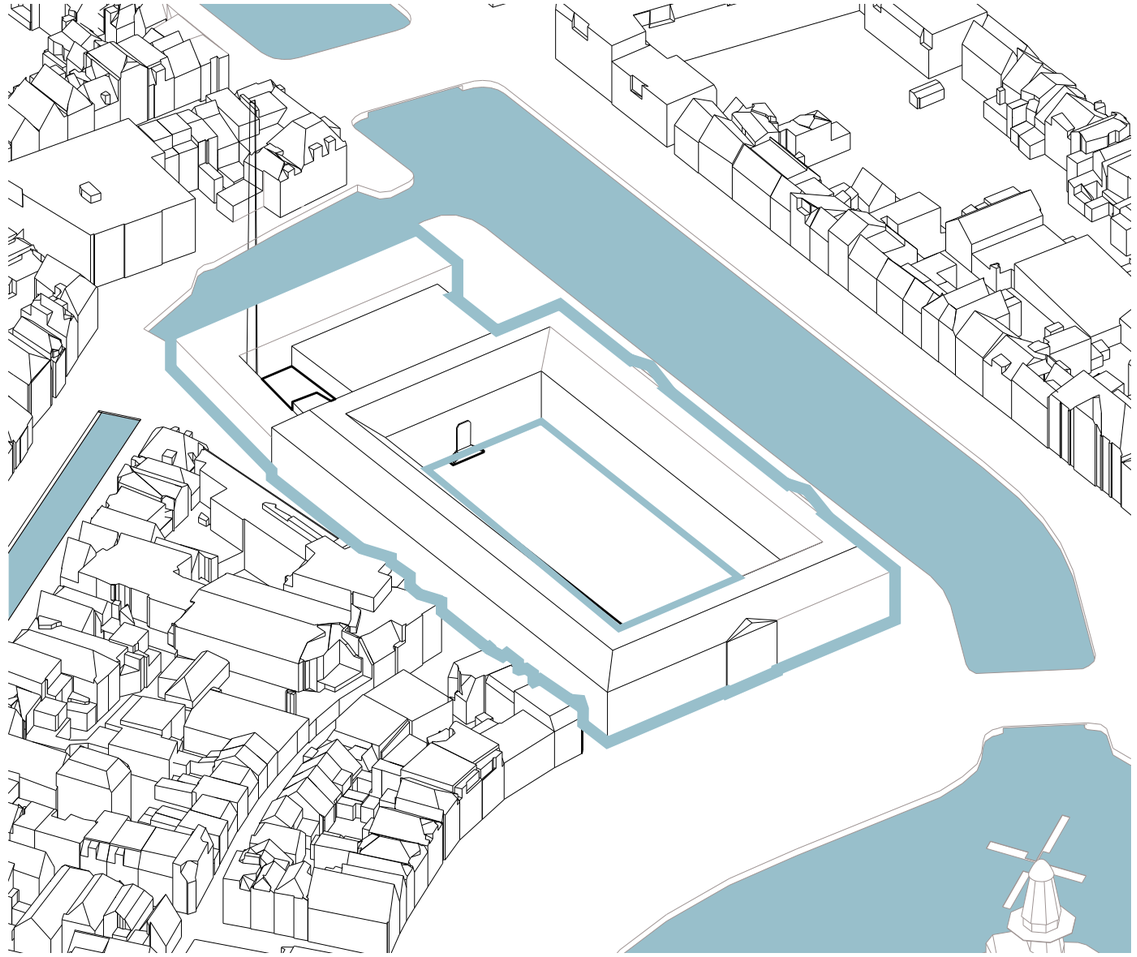
While visiting the Koudenhorn, the disconnection between the building and public space caught the attention and raised questions on how the building could work if it would have a public use. Those observations led to the topic for the individual research into the topic of public interiors and public accessible space. The aim of the research is to discover the architectural aspects that influence the public character of interior or enclosed spaces. Applying a literature study on six case studies results in an overview of strategies for eight architectural focus points that can be tested and applied during the design process.

The need for housing is still a relevant problem. Part of this problem is assigned to elderly while they often only move out of their current dwelling when they are in need for housing combined with care. However, the actual problem, which is also visible in Haarlem is a shortage of suitable elderly housing. Also elderly housing is often experienced as not appealing enough to move to before people are in need of care. This results in the following design goal:
How could the Koudenhorn in Haarlem be transformed into elderly housing that includes public accessible functions to stimulate social interaction both amongst the inhabitants of the building and with the neighborhood.

This design question is worked in a design proposal for the Koudenhorn where elderly housing is combined with public accessible and collective functions on scale levels of the urban surrounding, spatial layout of the building to the technical design of the building and interventions. Using existing features and the spatial layout of the building served as a starting point for the design together with the input from the individual research and building analysis.

Value assessment





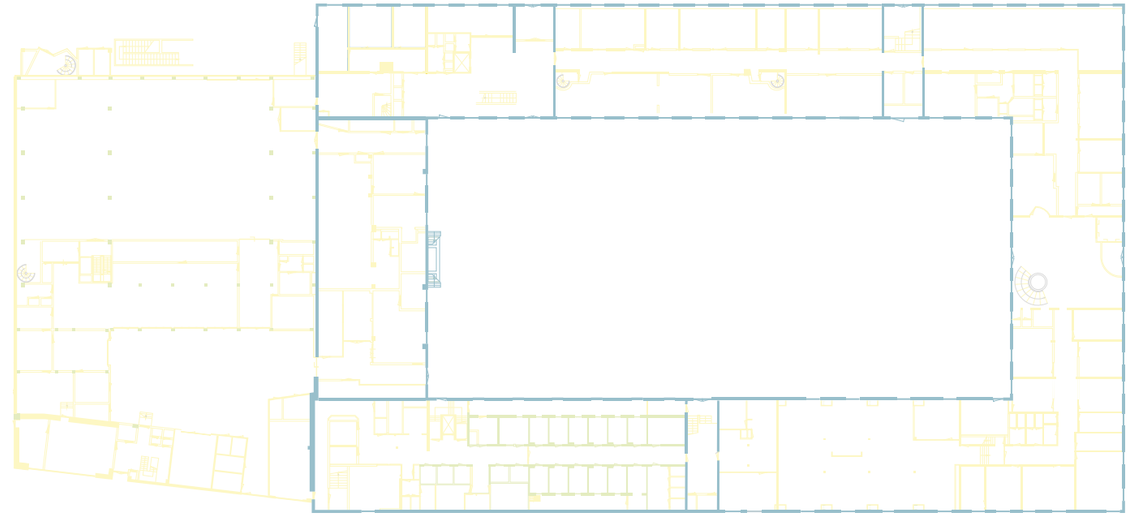
Urban context

The Koudenhorn building is located in the historic inner city of Haarlem. Due its original function as Deaconhouse, to house the elderly and poor inhabitants of the city, and its shape of a volume enclosing a courtyard, the building could be considered as a ‘Hofje’ which is a typical typology visible in Haarlem.

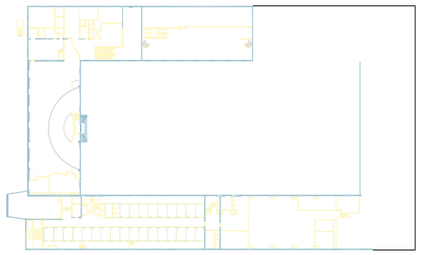
The building is located at walking distance from the train station and the inner city and located almost along one of the two main axis running between those two. The building is also located close to a bridge crossing the Spaarne, creating a possibility for a connection to the Koepelgevangenis.

Direct urban surroundings

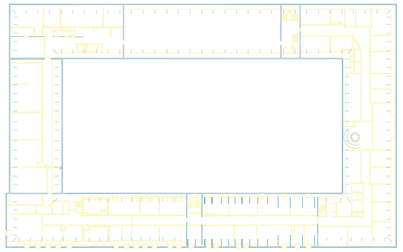
In the image of the building with the direct urban surroundings, the size of the building compared to the small parceling of the rest of the inner city of Haarlem becomes even more possible. Not only the size of the building, but also the size of the courtyard the building encloses is unique in the city not only as a courtyard but even as open space in the city. The location in the corner of the inner city and the relation with water on three sides of the building are valuable as well.



Ground floor

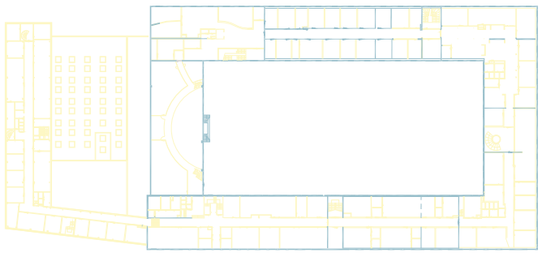


Entresol



Second floor

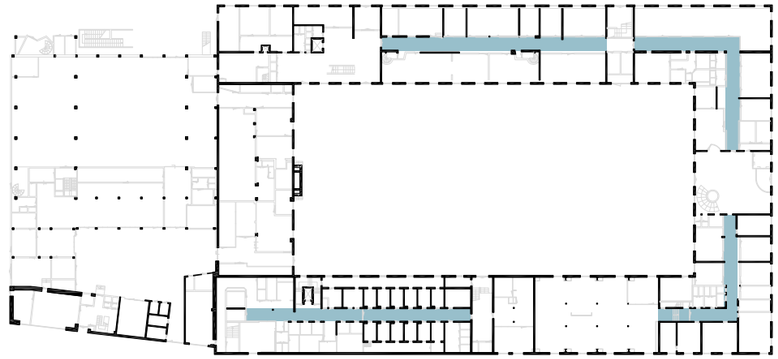
Basement



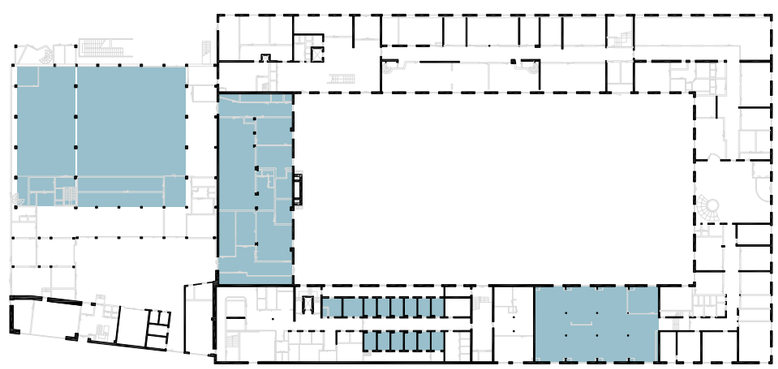
First floor

High value
Medium value
Indifferent value

Passages and entrances



Central corridor



Spatial qualities

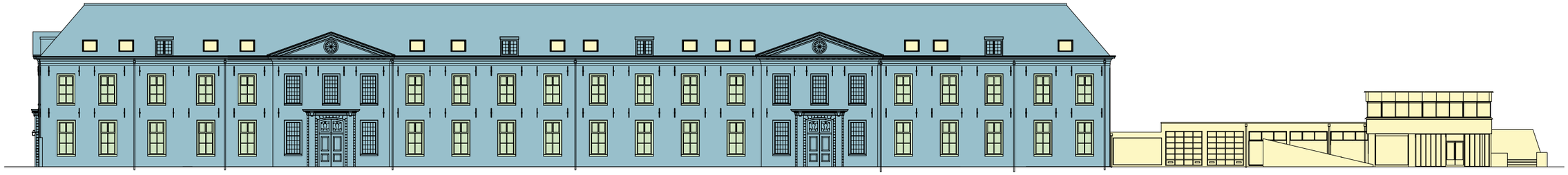
Floor plans

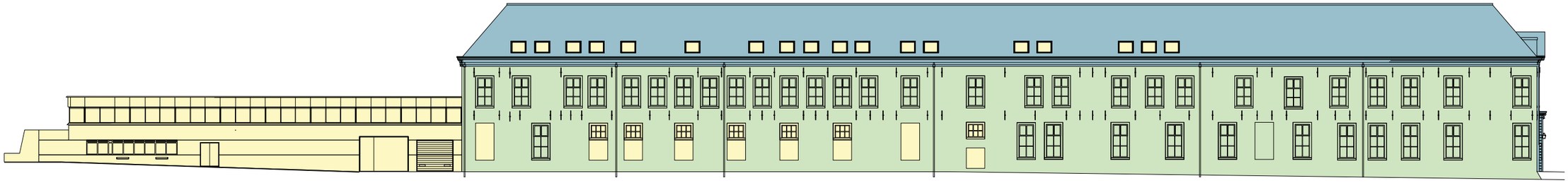
The Koudenhorn building is located in the historic inner city of Haarlem. Due its original function as Deaconhouse, to house the elderly and poor inhabitants of the city, and its shape of a volume enclosing a courtyard, the building could be considered as a ‘Hofje’ which is a typical typology visible in Haarlem.

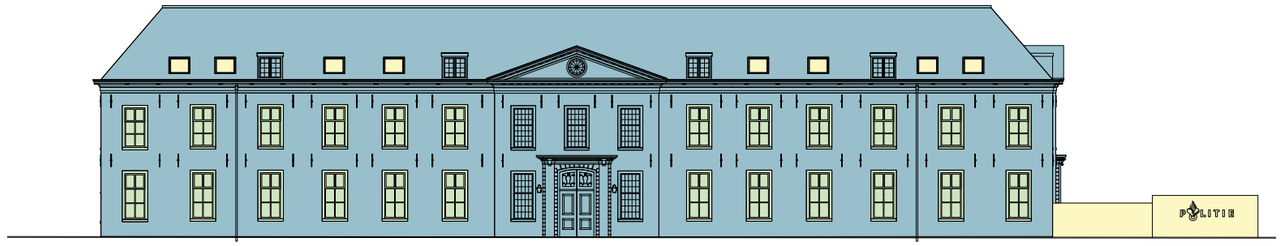
The building is located at walking distance from the train station and the inner city and located almost along one of the two main axis running between those two. The building is also located close to a bridge crossing the Spaarne, creating a possibility for a connection to the Koepelgevangenis.

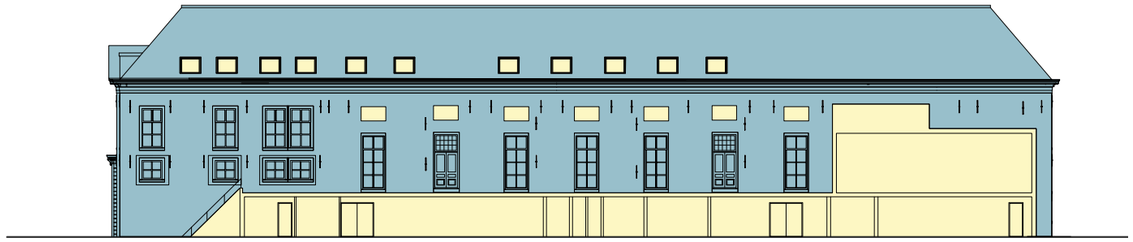
Spatial principles

Despite the changes in on the interior throughout time, some spatial principles of the original layout of the building are still visible. The multiple passages through the building and related to the monumental entrances visible on both the exterior and interior facades of the building are recognizable. Also the central corridor with spaces on both sides is still visible in the largest part of the building. After the changes some new larger spaces in the older and newer part are created and a cell block with smaller spaces, both with their own spatial qualities.





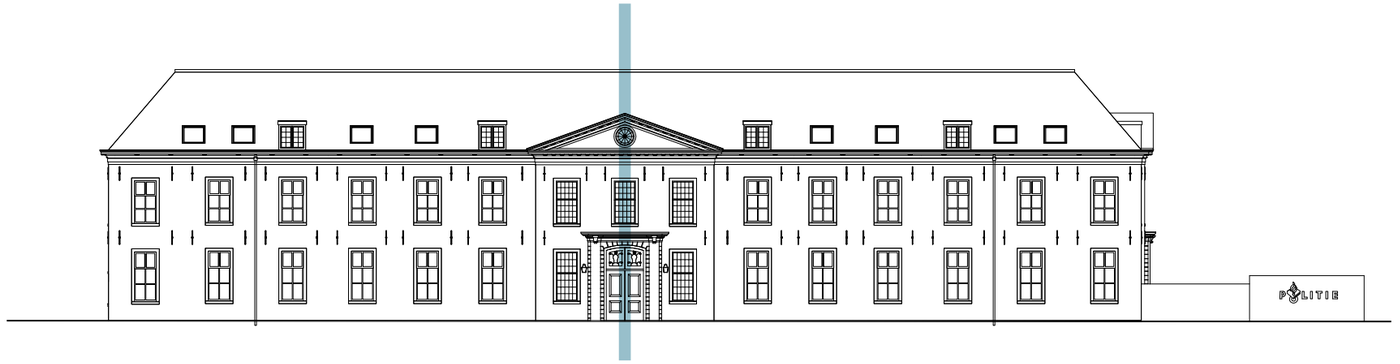


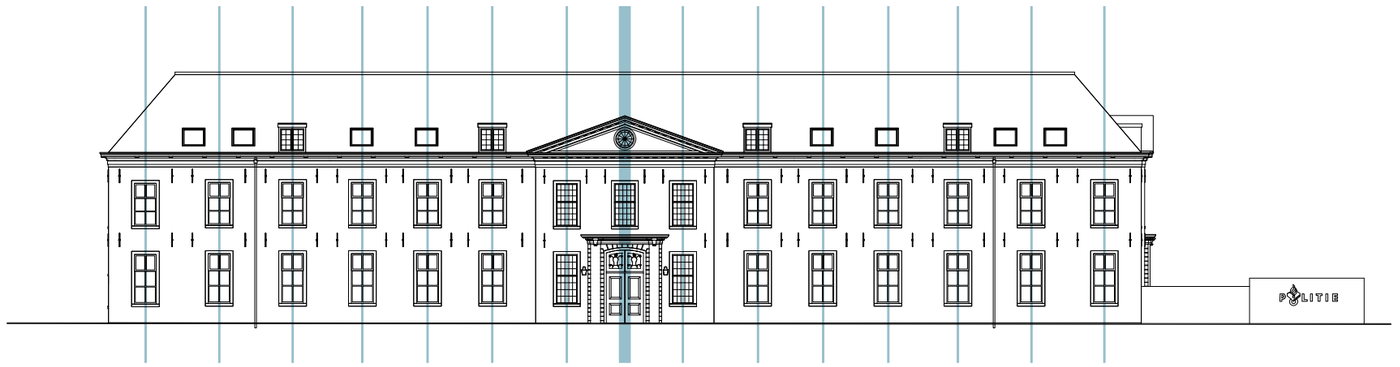


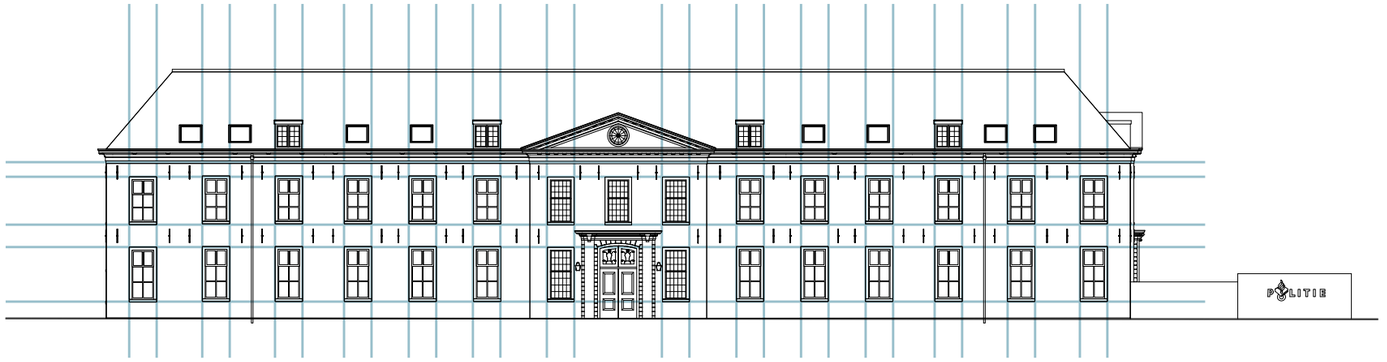
High value
Medium value
Indifferent value

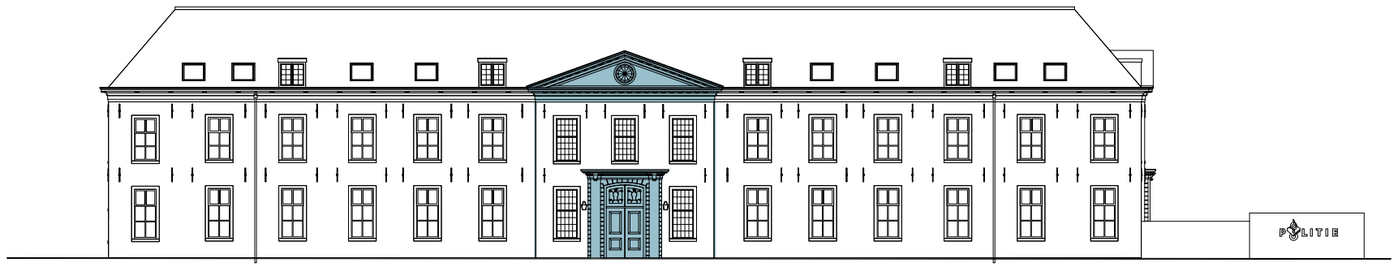
Facades

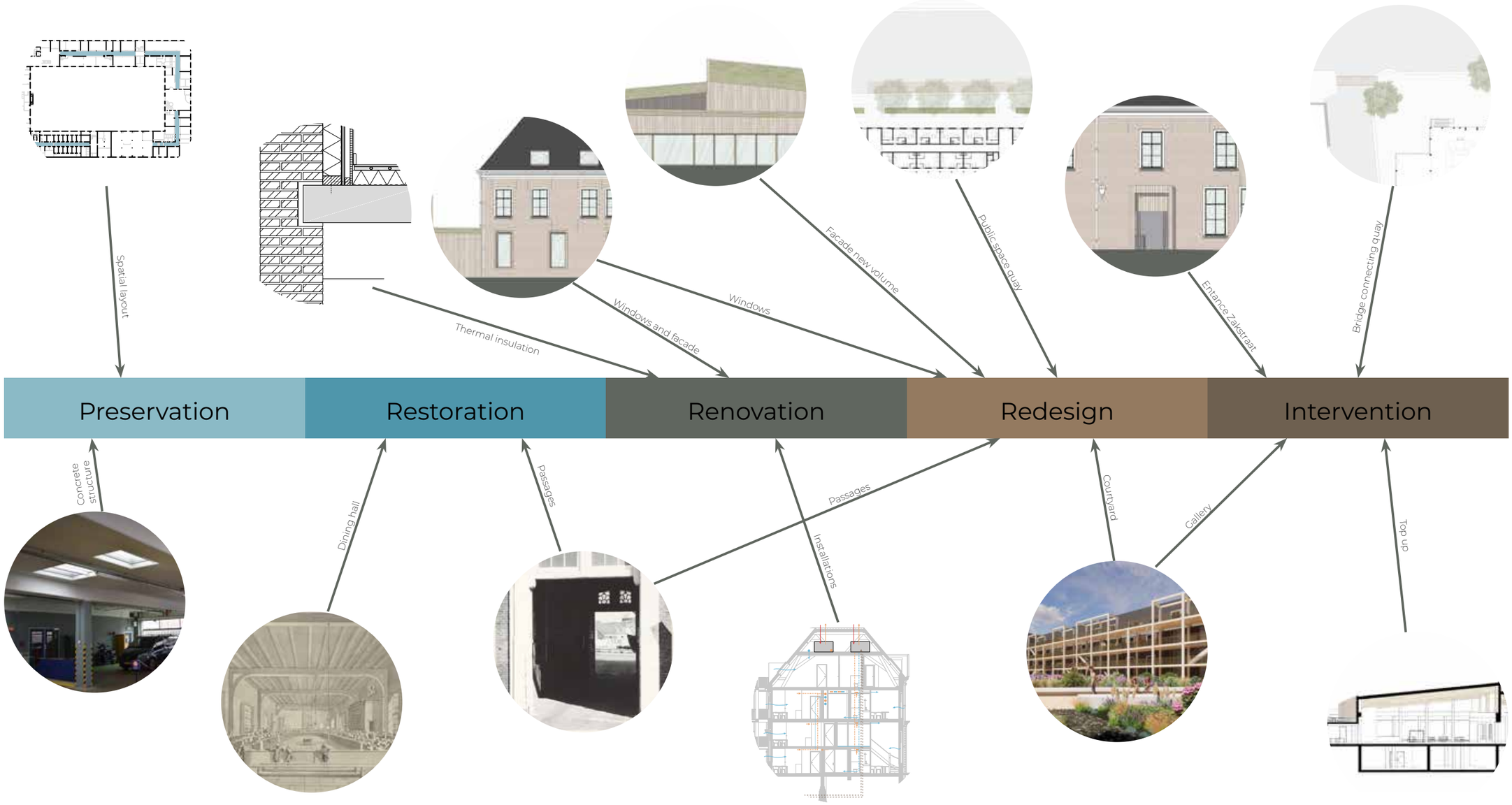
The value of the façade is mostly represented by intangible attributes. The exterior facades have a high value while they are still original despite all the changes to the building throughout the past. Changes have been made to the windows, while in the past they had a smaller rod division, and therefore those windows are not the original ones anymore. The more recently added roof windows have a low value compared to the other parts of the façade. As mentioned the value is mostly a result of intangible attributes as can be seen on the right page with the symmetry, rhythm, composition and detailing and ornamentation of the eaves and entrances. While those concept define the value of the facades, the façade of the Zakstraat has a lower overall value, while the symmetry, ornamentation and rhythm are not present in this façade. The new volume has a lower value compared to the older volume.


POLITIE


POLITIE


POLITIE

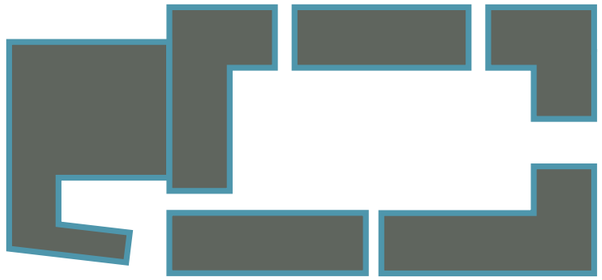

POLITIE



Heritage approach

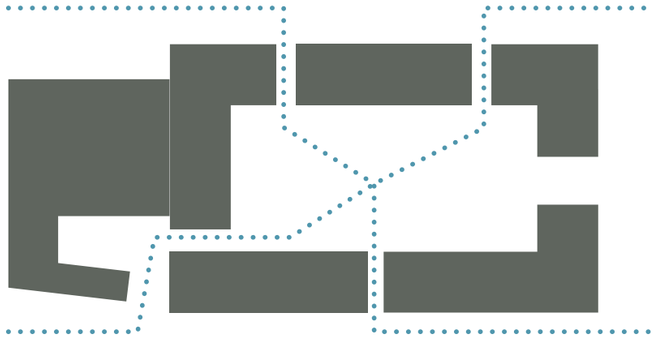
II Design goal and start points

Starting points

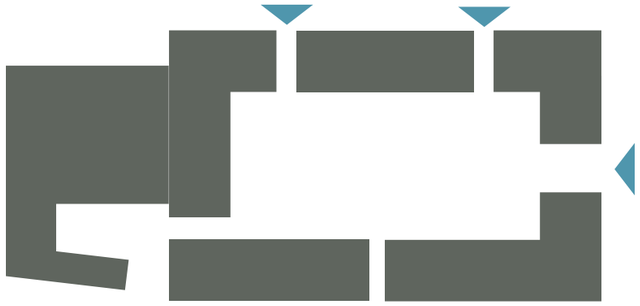


Relocation of borders and boundaries

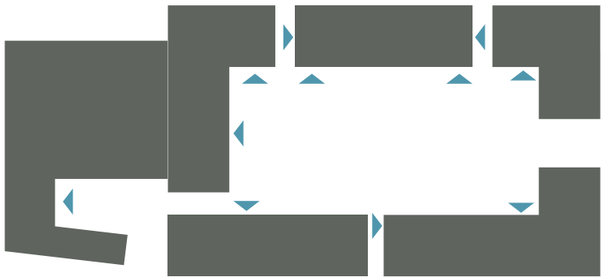
Mixing functions horizontal and vertical



Adding courtyard to pedestrian network



Using existing entrances for passages

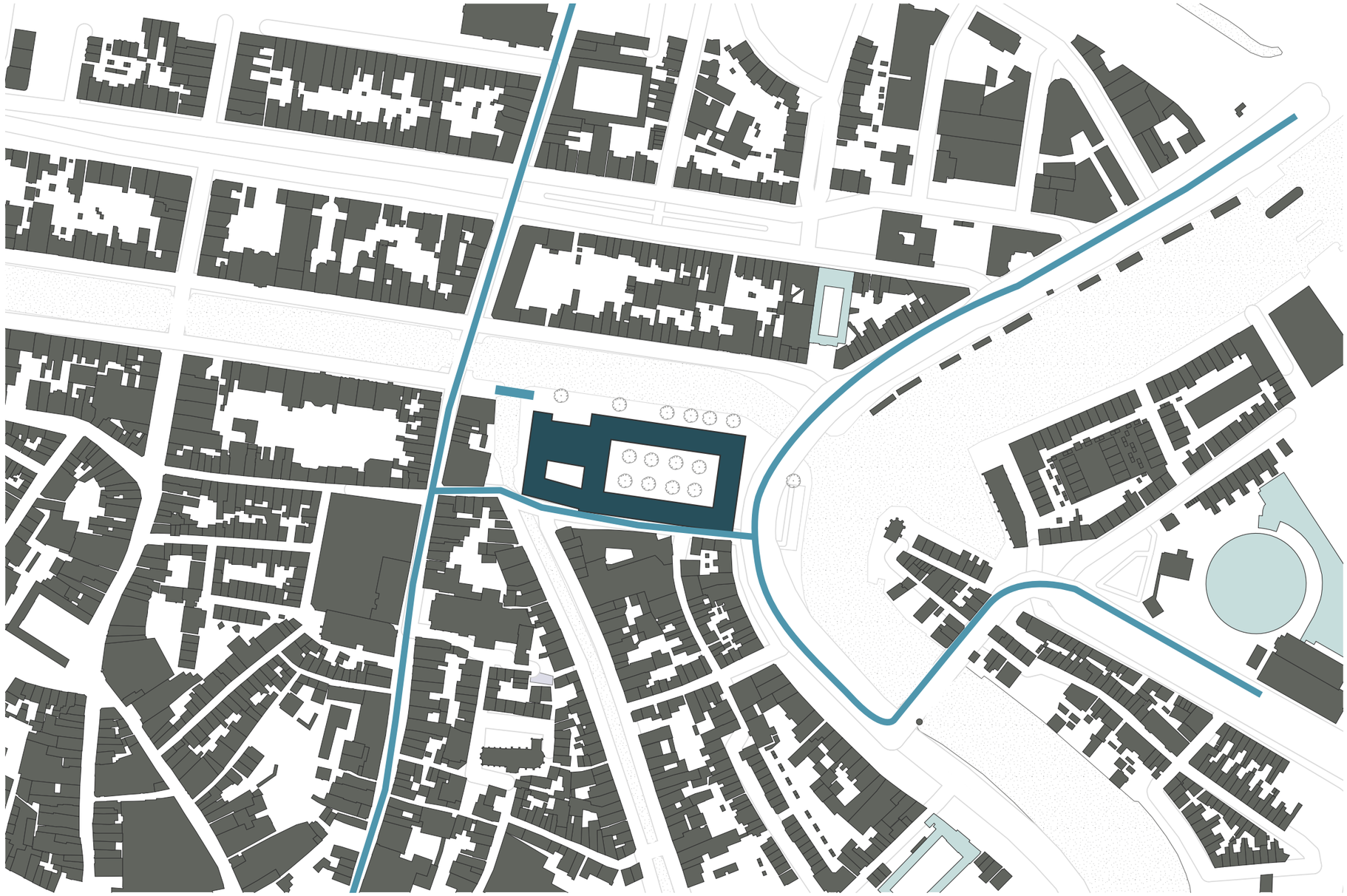


Assembling entrances around courtyard

Courtyard functioning as an atrium

Strategies from research

The strategies as conclusion from the research into the architectural elements that influence the public character of enclosed spaces, resulted into six main starting points for the redesign of the Koudenhorn. Those are; the relocation of the borders and boundaries of the building, making use of the existing entrances as passages and thereby adding the courtyard to the pedestrian network of the city of Haarlem. Assembling entrances around the courtyard and passages, so activities are assembled and people make use of the same public space, especially if the circulation space of the building is located along the courtyard facades.



The presence of people

The connection of the building with the pedestrian network in Haarlem is important for its functioning as public interior space. Other interventions do not work if the location and presence of people is not right. The Koudenhorn is a large building, covering an entire urban block, in the corner of the city center. It is located close by an important axis running from the train station to the city center. In the past a bridge connected the Jansstraat to the quay along the Nieuwe Gracht in front of the building, however is lost over time. Reestablishing this connection adds to the pedestrian network. Also interventions in the new volume could attract more people to the building as a result of its function or a more appealing aesthetic.

Woonzorgcentrum Kennemerduin. (Joop Touw)

Ouderenzorgaanbieders Kennemerland luiden noodklok over dreigend tekort ouderenhuisvesting

do 7 jan 2021, 13:15 Zorg

1 reactie

HAARLEM **De ouderenzorgaanbieders in de regio Kennemerland doen een dringende oproep aan gemeenten, woningcorporaties en financiers om gezamenlijk actie te ondernemen ter voorkoming van het dreigend tekort aan huisvesting voor ouderen die zorg nodig hebben.**

De ouderenzorgorganisaties Sint Jacob, Kennemerhart, Zorgbalans, Zorggroep Reinalda en Viva! Zorggroep hebben samen met zorgkantoor Zilveren Kruis een onderzoek laten [illegible] naar de ontwikkeling tot aan 2040 van de vraag en aanbod van woonplekken voor zorgbehoevende ouderen. U[illegible] Gupta uitgevoerde onderzoek blijkt dat de demografische ontwikkelingen in de regio zorg[illegible]ingen voor ouderen met een zware zorgvraag.

DREIGEND TEKORT OUDERENHUISVESTING Op dit r[illegible] Kennemerland gezamenlijk over 4.670 woonplekken voo[illegible] langdurige zorg. In 2040 zullen er tot 50% meer van dit [illegible] woningen voor ouderen met een zware zorgvraag zal o[illegible]

Senioren denken liever niet na over een toekomst waarin ze afhankelijker of zorgbehoevender zijn. FOTO: PixaBay

Rapport: 'Zo wil ik wonen en leven'

De uitdagingen

Om meer senioren te laten verhuizen, is het belangrijk eerst te beseffen dat ouderen niet genoeg verleid worden te verhuizen. Er zijn nog niet genoeg geschikte huizen voor hen en wat er is, is te onbekend. De vereiste nieuwbouw krijgt daarbij te weinig urgentie, evenals de promotie van deze nieuwe huizen.

Bovendien zijn de gedeelde woonbehoeftes van senioren vaak nog te onbekend bij gemeenten en projectontwikkelaars.

Verkenning wonen met zorg 2020-2040

Door *Judith Willems en Wim Faessen*

Gepubliceerd op 19 februari 2021

Fortuna 2020 beschikbaar

Met het prognosemodel Fortuna brengt ABF Research de huidige situatie en toekomstige vraag naar wonen met zorg in kaart. Het rapport Verkenning wonen met zorg 2020-2040 laat goed zien welke gevolgen de vergrijzing heeft voor de vraag naar voor ouderen geschikte woningen en de vraag naar intramurale zorg, en welke informatie daarover bij ABF beschikbaar is. Het rapport is ingestoken op nationaal niveau maar de meeste informatie is beschikbaar tot op buurtniveau en kan dus op lokaal niveau worden ingezet, bijvoorbeeld bij prestatieafspraken tussen gemeenten, corporaties en zorgaanbieders. Op de website van ABF is ook een gemeentelijke voorbeeldrapportage te vinden.

115 duizend geclusterde ouderenwoningen tot 2040 extra gevraagd door huishoudens 65+

Om vraag en aanbod voor wonen met zorg onder huishoudens 65+ op de gewone woningmarkt beter op elkaar te laten aansluiten moet het aantal geclusterde ouderenwoningen tussen 2020 en 2040 in Nederland met 115 duizend toenemen, terwijl het aantal aangepaste woningen met 94 duizend moet worden uitgebreid. Daarnaast zouden nog zo'n 268 duizend nultredenwoningen voor huishoudens 65+ moeten worden toegevoegd. Voor een belangrijk deel is deze vraag naar geschikte ouderenhuisvesting het gevolg van de verwachte toename van het aantal huishoudens met mobiliteitsbeperkingen. De vraag naar geclusterde woningen is vooral op de (sociale) huursector gericht, terwijl de vraag naar aangepaste woningen zich met name in de koopsector manifesteert.

▲ Foto ter illustratie. © ANP

Ouderen woest dat zij de schuld krijgen van woningnood

Ouderenbonden reageren als door een wesp gestoken op het bericht dat honkvaste ouderen debet zouden zijn aan de wooncrisis. „Het zijn de gemeenten die geen visie hebben."

De belangrijkste oorzaak van de woningcrisis in ons land zou de geringe doorstroming van ouderen van grote naar kleinere woningen zijn, zegt een meerderheid van gemeenten (55 procent) in antwoord op vragen van de *NOS* en de regionale omroepen. Ze zouden eengezinswoningen bezet houden.

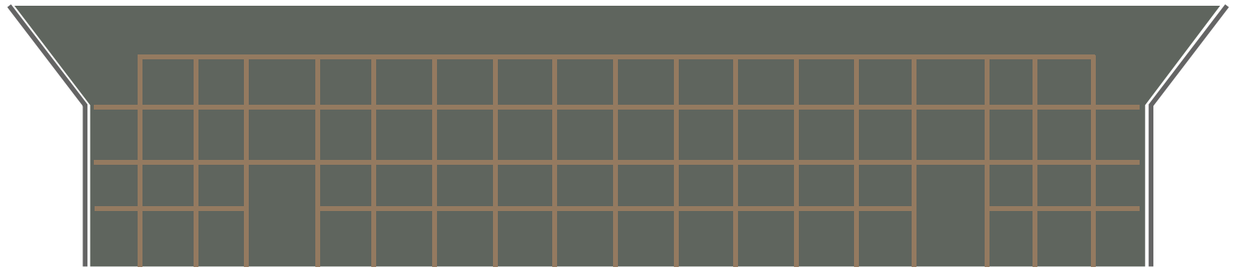
Ouderenbond ANBO reageert gepikeerd: „Gemeenten moeten de hand in eigen boezem steken. Zij hebben vaak geen visie op de veranderende demografische ontwikkelingen in ons land. Veel ouderen van wie de kinderen allang het huis uit zijn, en van wie soms de partner al overleden is, willen wel verhuizen naar een kleinere woning. Niet alleen omdat het in hun eigen belang is, maar ook omdat zij daarmee kunnen bijdragen aan de doorstroming op de woningmarkt en dus starters aan een huis kunnen helpen. Maar er zijn simpel gezegd geen geschikte woningen om naartoe te verhuizen, in hun eigen wijk, met zorg dichtbij en mogelijkheden om elkaar te ontmoeten en waar nodig te helpen."

Program

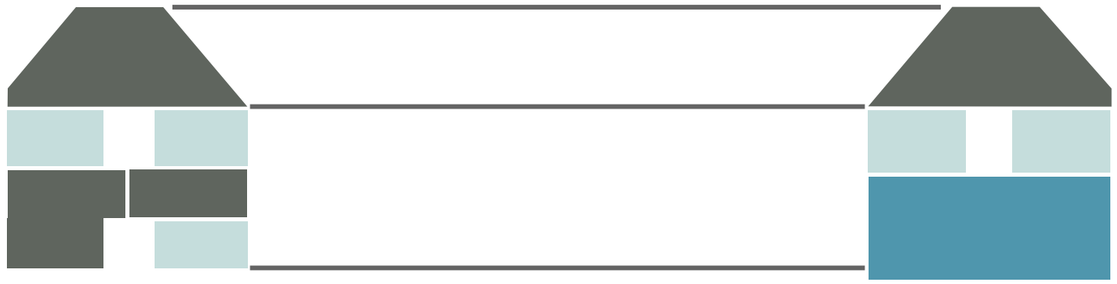
The case study analysis also provided options for an initial choice of program, with a museum as the Hermitage or a cultural use as in the Blokhuispoort. However, the need for housing is still a relevant problem. Part of this problem is assigned to elderly while they often only move out of their current dwelling when they are in need for housing combined with care. However, the actual problem, which is also visible in Haarlem is a shortage of suitable elderly housing. Also elderly housing is often experienced as not appealing enough to move to before people are in need of care. This results in the following design goal:

How could the koudenhonr in Haarlem be transformed into elderly housing that includes public accessible functions to stimulate social interaction both amongst the inhabitatns of the building and with the neighborhood.

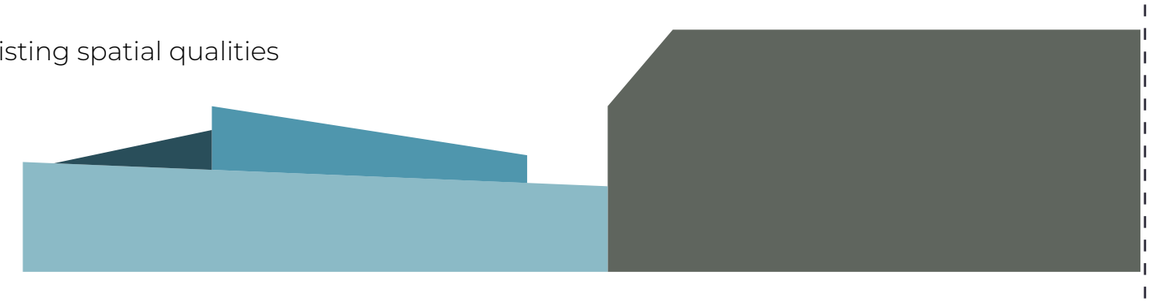
Mixing public, collective and private functions



Adding gallery to stimulate social interaction



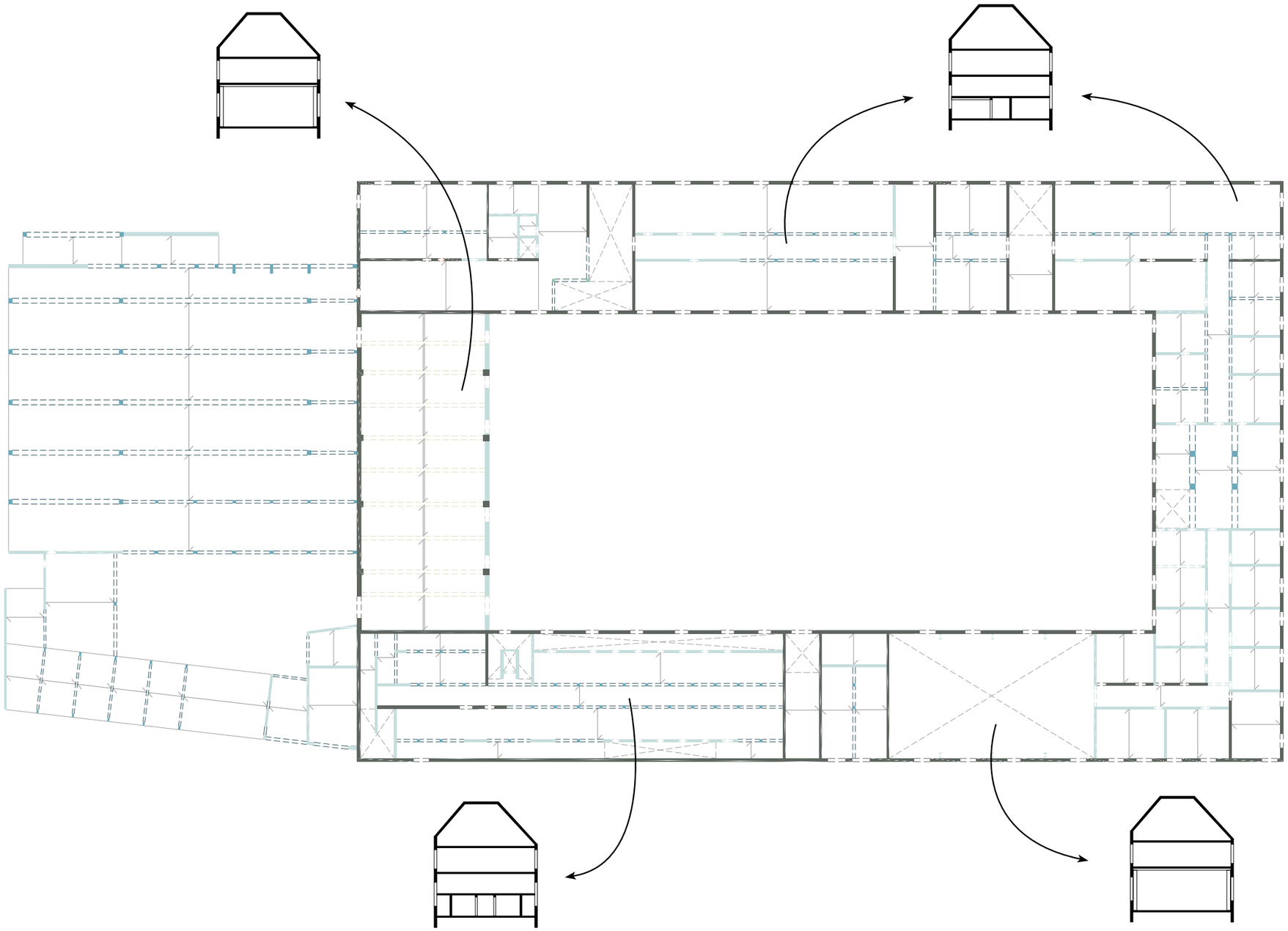
Using existing spatial qualities



Improve and open up new volume

Concepts

The design goal contains two important concepts that are related to the research and influence the design, which are the public accessibility of the building and the social interaction between people. Those concepts led to the following additional starting points for the re-design which are; mixing public, private and collective functions throughout the building. So both in a horizontal and vertical way and in a way that functions can benefit from each other. Using existing spatial qualities for the program. Larger spaces have already been created in the past, so the program and location of functions tries to uses such spaces in a beneficial way. Adding a gallery to stimulate social interaction and to pull a part of the circulation space to the courtyard side. And lastly apply interventions to the newer volume, while it allows for larger interventions to opening up this volume as a result of the value assessment.



Existing spatial qualities

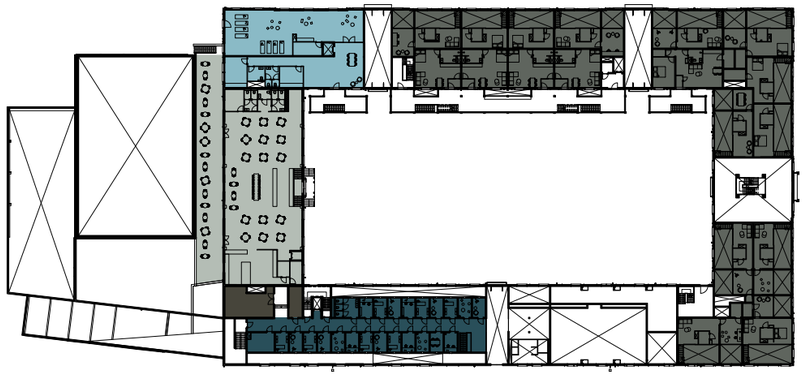
The existing spatial layout served as guidelines for the program selection and layout of the various functions in the program. The passages and central corridor of the original plan are still recognizable in the current plan despite the several changes. The loadbearing masonry walls however have been replaced by a concrete column and beam structure in the larges part of the building. Some larger spaces already existed in the building, such as the dining hall with a double height space and large portal structure. Other spaces were created later, such as the larger open space in the bottom of the plan, which has been used as sport hall for the police. The newer volume makes use of a concrete structure with large spans, creating possibilities for a new use.

Program

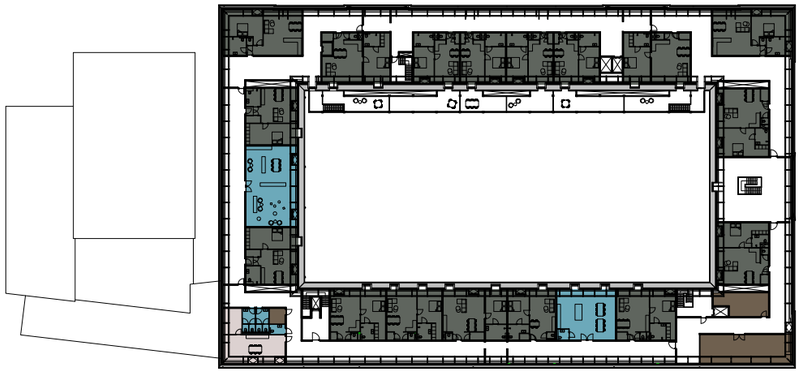
Private, collective and public functions

Within the mix of private, public and collective functions, the various types of elderly housing are the most important. Next to this, collective spaces are implemented such as a library, music studio, art studio, cooking studio and dining hall. Other functions such as health care and art studios or makerspace function both for the inhabitants of the building and the surroundings. The multifunctional volume includes the most public use of the building serving for the inhabitants of the building but also for schools, sport clubs, child care or other users in the area. Important for this function mix is that does not implement all functions that one would find in the city center, so the people of the building still have to go to the city center once in a while.

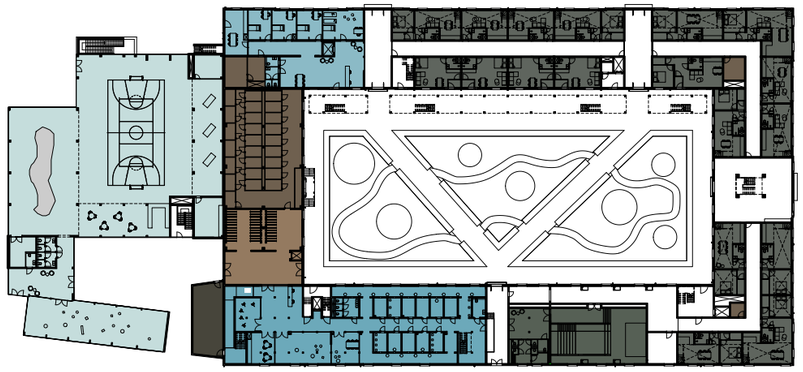
Housing
Health care
Collective
Exhibition
Auditorium
Restaurant
Multifunctional
Makerspace
Hospice
Storage
Bicycle storage
Services



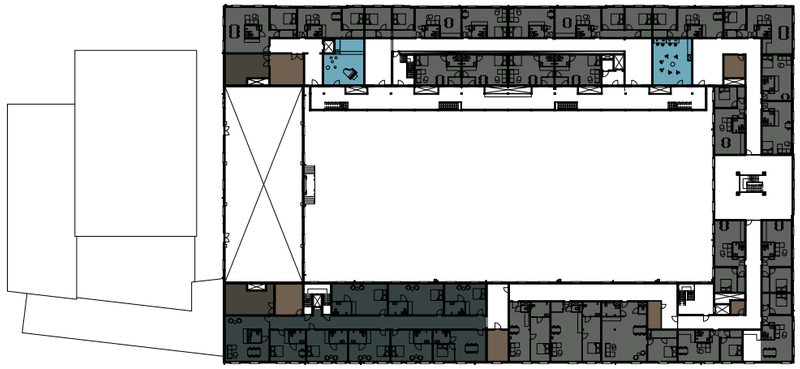
First floor



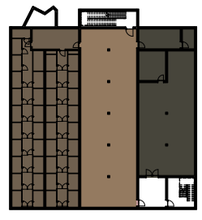
Third floor



Ground floor



Second floor



Basement

Program overview

A total of 62 apartments covers the biggest part of the program of the building. The basement will be used for storage, a bicycle storage and installation spaces. The ground floor has the most public and collective functions of all floors, mainly as a result of the multifunctional volume on the left with a multisport field, café, bouldering wall and multifunctional space. The cell block has workshop spaces and exhibition space on the ground floor. On the other side of the passage of that wing, a auditorium is located. The top left corner is used for a health care center on the ground floor with gym on the first floor level. A restaurant is located in the dining hall on the first floor and the cell block is transformed into a makerspace with ateliers and office spaces. Above the cell block on the first floor, the hospice is located with a family room, collective area, staff rooms and 6 hospice rooms. On the same floor in the wing on the side of the Nieuwe Gracht, a music and art studio are located. The second floor consists mostly of the larger wheelchair friendly apartments with a cooking studio and library. Also a staff room is located on this floor.

IV Spatial layout

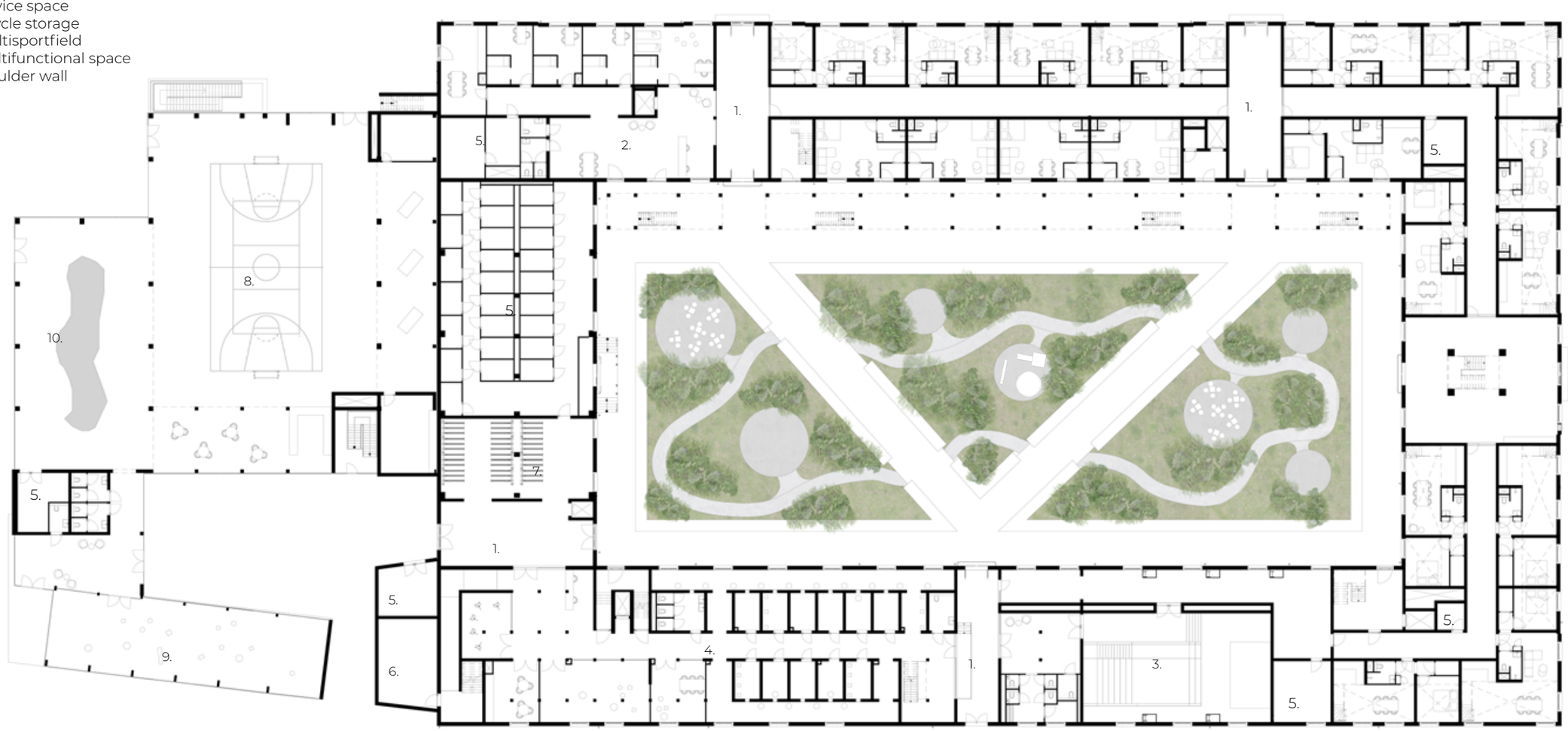
Urban context

0 50M

Site plan

The presence of people is important for the functioning of a public interior. The Koudenhorn is located nearby an important axis from the train station to the city center. To improve the accessibility to the building, the bridge that once connected this axis of the Jansstraat with the quay of the Nieuwe Gracht in front of the building is restored to add the quay to the pedestrian network. Opening up the quay for the public also means that it becomes possible to walk around the building. The public space of the quay is improved by creating new sitting spaces in the form of borders with vegetation. Those elements look similar to the border of the vegetation created in the courtyard of the building, enhancing the connection between the quay and courtyard. A jetty is added in the water that connects to the quay to further improve the quality of the public space. The material of the quay is similar to the pavement used in the city center of Haarlem to indicate the public character. Via the quay and the two passages the courtyard can be entered. The passage on the other side of the building connects the courtyard to the Zakstraat as well. Those multiple entrances create the possibility for a new route to emerge through the building and courtyard.

1. Passages
2. Health care center
3. Auditorium
4. Exhibition space
5. storage
6. service space
7. bicycle storage
8. multisportfield
9. multifunctional space
10. boulder wall

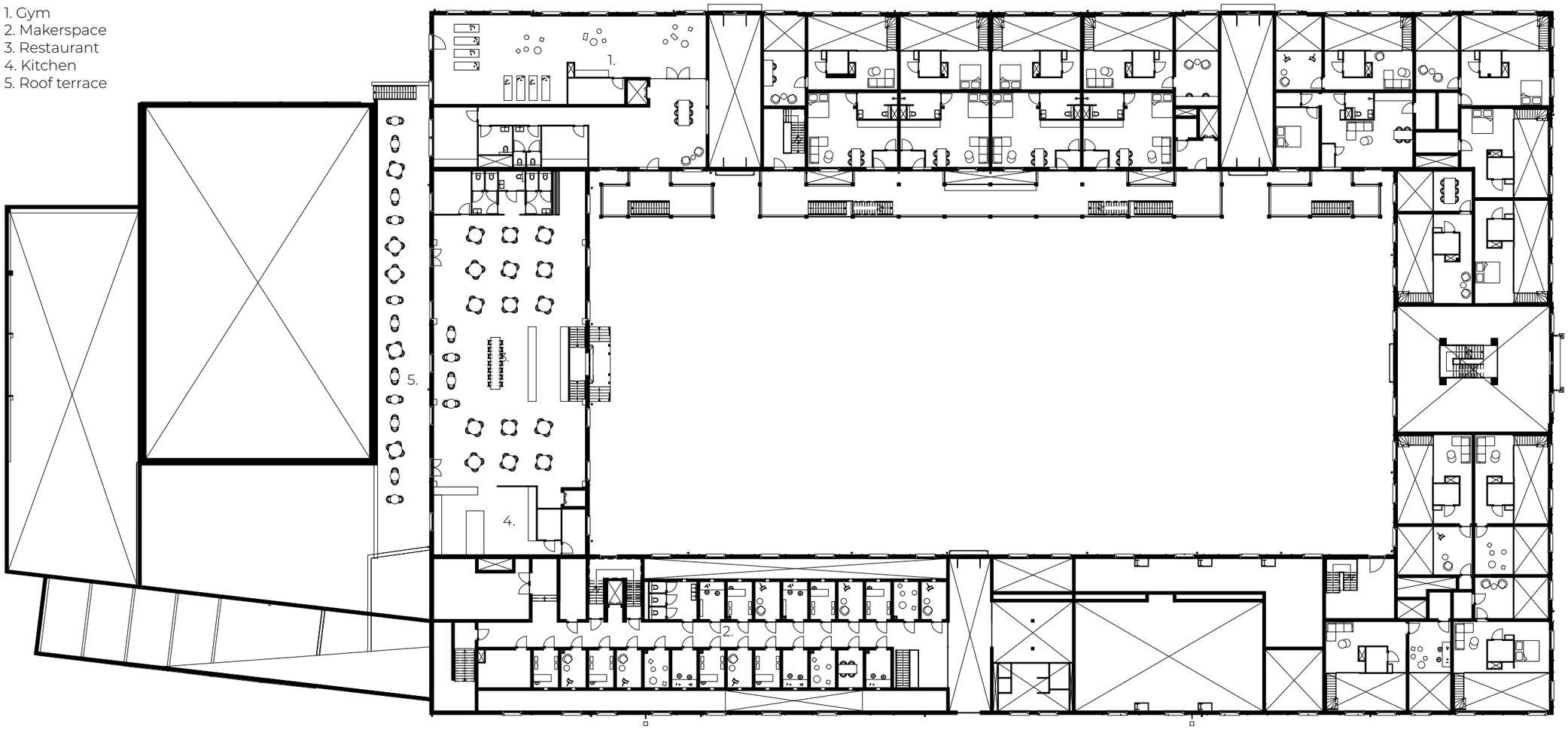


Ground floor (1:400)

The ground floor has the most public accessible functions and spaces that can be considered as part of the public interior of the building. This is mainly a result of the multifunctional volume on the left with a multisport field, café, bouldering wall and multifunctional space. This space can be used by the inhabitants of the building, but also by external users such as schools or sport clubs. During weekends or holidays, the space can function for events such as flea markets as well. The courtyard of the older volume can be accesses by a passage between this volume and the newer volume, the two passages along the Nieuwe Gracht or passage on the side of the Zakstraat. The entrances to other functions are located along those passages or courtyard. Therefore the users of multiple functions make use of the same public space which contributes to the chance for spontaneous encounters or meeting people. Also a big part of the inhabitants of the building have to enter the courtyard before they can enter a door to an elevator or staircase to get to their apartment on a higher floor. Other functions on the ground floor are a health care center with physiotherapists and doctors in the left top corner, and an auditorium in the larger open space on the side of the Zakstraat. Those spaces do not only function for the inhabitants of the building but also for the area. The cell block on the ground floor is used for workshop spaces or office spaces for businesses in the creative industries and exhibition space where people with an atelier on the floor above can exhibit their artworks.

0 20M

1. Gym
2. Makerspace
3. Restaurant
4. Kitchen
5. Roof terrace

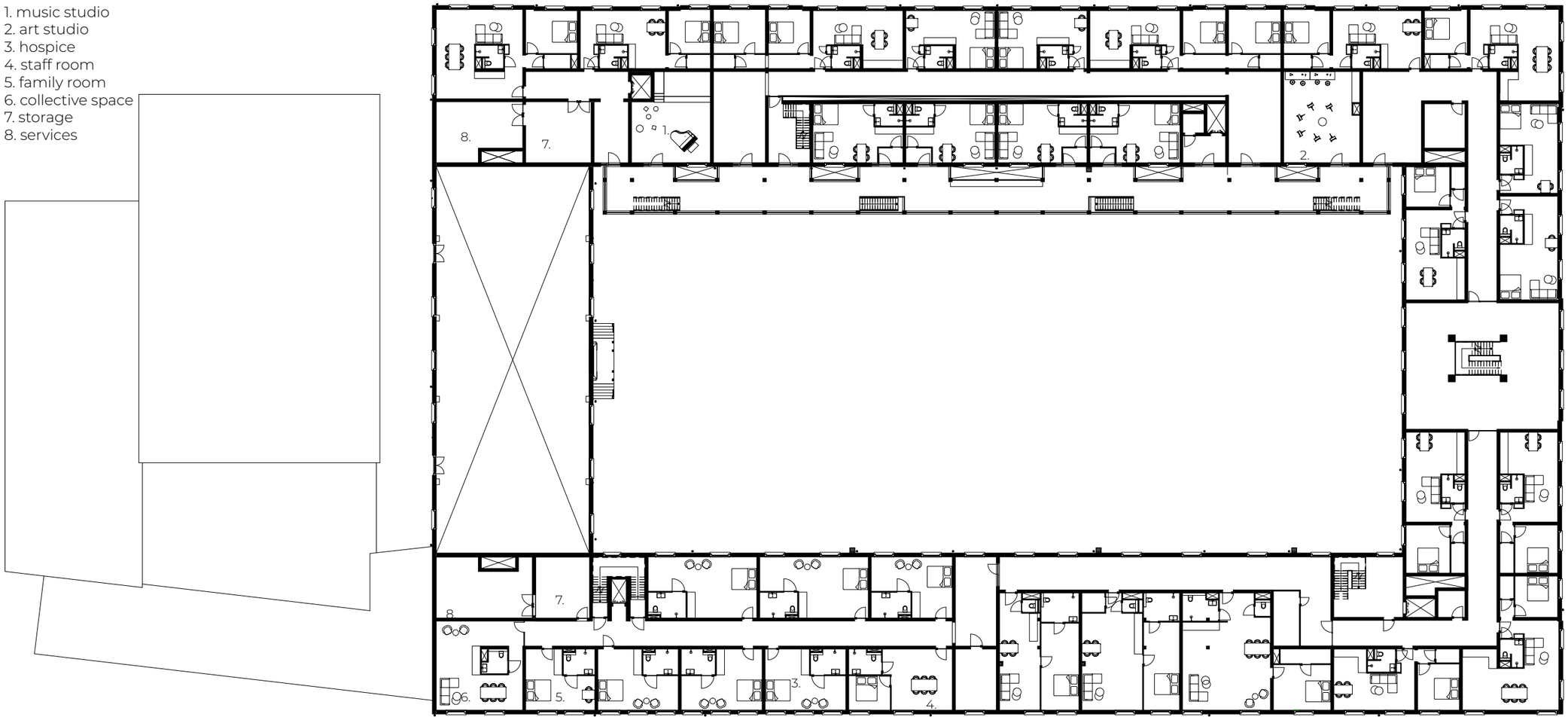


First floor (1:400)

Via the internal staircases and elevators or via the gallery in the courtyard, inhabitants and visitors can reach the first floor of the building, which is at the level of the entresol floor that has been added in a part of the building. A large part of this floor is therefore used by the higher level in the split level typology. With those split level apartments and the void along the facade, the original height of the ground floor can be experienced again along almost the entire exterior facade. On the first floor of the health care part in the left corner of the older volume, a gym is located that serves for the inhabitants of the building and the people in the surroundings. A restaurant is located in the former dining hall of the deacon house and can be entered via the steps in the courtyard. The restaurant also has a roof terrace on the roof of a part of the newer volume. In the cell block, the cells on the first floor will be used as a makerspace in which the cells can be used as office space or art studios. Also those ateliers function for the inhabitants of the building who have a creative hobby or for people from outside the building.

0 20M

1. music studio
2. art studio
3. hospice
4. staff room
5. family room
6. collective space
7. storage
8. services

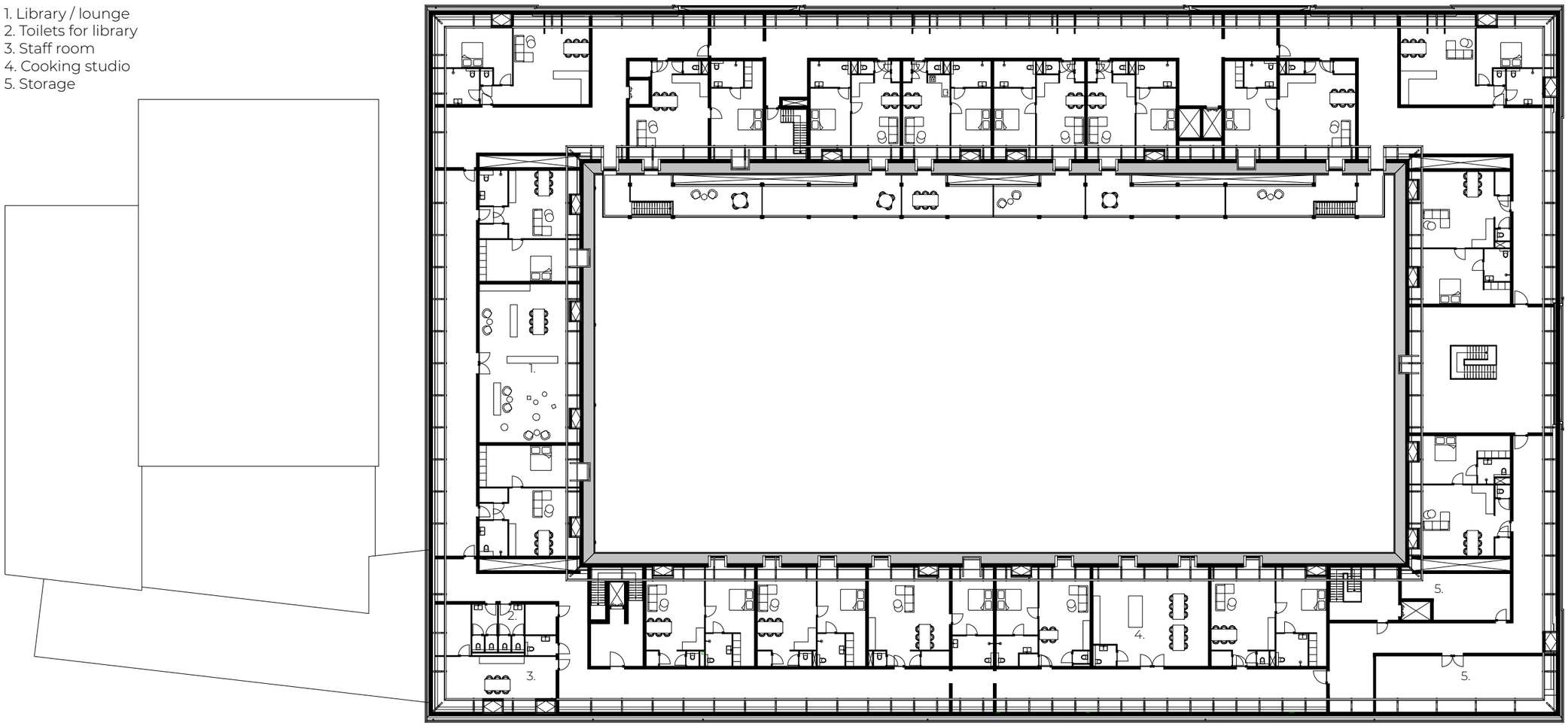


Second floor (1:400)

Above the cell block on the first floor, the hospice is located with a family room, collective area, staff rooms and 6 hospice rooms. On the same floor in the wing on the side of the Nieuwe Gracht, a music and art studio are located. The second floor consists mostly of the larger wheelchair friendly apartments with a cooking studio and library. Also a staff room is located on this floor.
Above the cell block on the second floor, the hospice is located. In this way the hospice is not located in a separate building or building part with own entrance, but becomes a part of the building. A visit to the hospice in this way can be combined with a visit to the exhibition space below for example. This enhances that even the hospice and the people in the hospice are still part of the building, the city and everyday life in cities. The hospice includes six rooms, a collective living room, a family room and spaces for staff. The spatial layout of the auditorium on the ground floor continues on this floor and creates space for three wheelchair accessible apartments next to the hospice. The biggest part of this floor is dedicated to apartments with one or two bedrooms and a couple of studio's. In the wing on the north side, two collective areas are created with a connection to the gallery. Those spaces can be used as music or art studios. Important is that a space is created where events can happen where the infill can be determined by the users. So an art or music studio is only an indication of what could happen. Those spaces can be used by the inhabitants of the building, but can also be rented out to external parties or people who want to make use of such a space.

0 20M

1. Library / lounge
2. Toilets for library
3. Staff room
4. Cooking studio
5. Storage

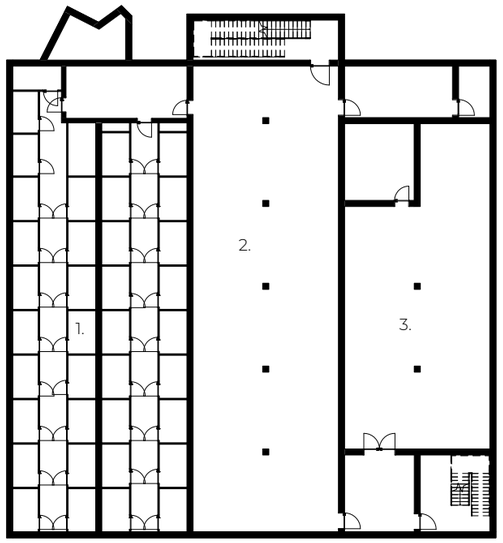


Third floor (1:400)

The third floor is the floor under roof. As a result of the wooden roof structure that spans from one façade to the other façade of a wing it allows for more freedom in the plan. Therefore the larger wheelchair accessible apartments are located on this floor and the circulation space is located on the outside of the building. A library and lounge area are created in the west wing of the older volume and a cooking studio is created in the wing on the south side. The cooking studio can be used by the inhabitants of the building in case they want to eat with a some neighbors for example or it can be used for birthday parties for the inhabitants of the building. A staff room is positioned on this floor, while the apartments on this floor are most likely to house people who are also in need for additional health care.

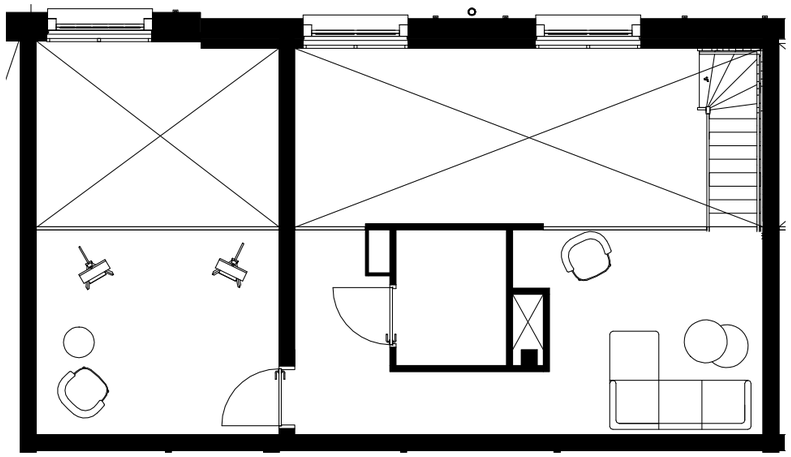
0 20M

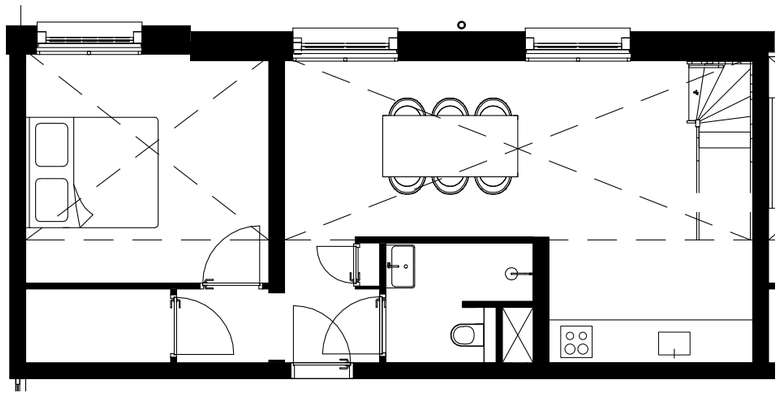
1. Storage for apartments
2. Bicycle storage
3. Services



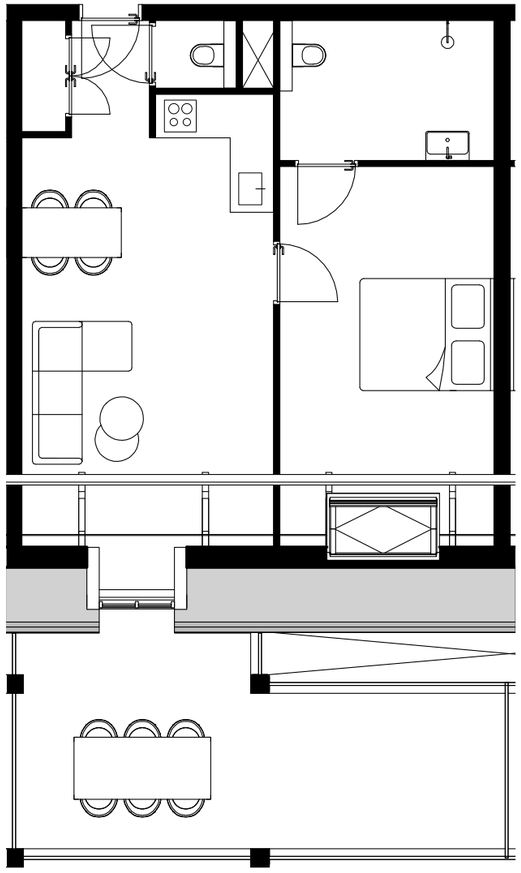
Basement (1:400)

The existing basement and main spatial layout are kept for the re-design. The existing entrance on the side of the Nieuwe Gracht with stairs and slope for bicycles is maintained as well still functions as an entrance for the new bicycle storage. A part of the basement is used as storage spaces for the apartments and part is used for installations such as the heat pump and air handling units for the multifunctional space above. A second entrance and exit is added that connects to the smaller courtyard enclosed by the multifunctional volume.

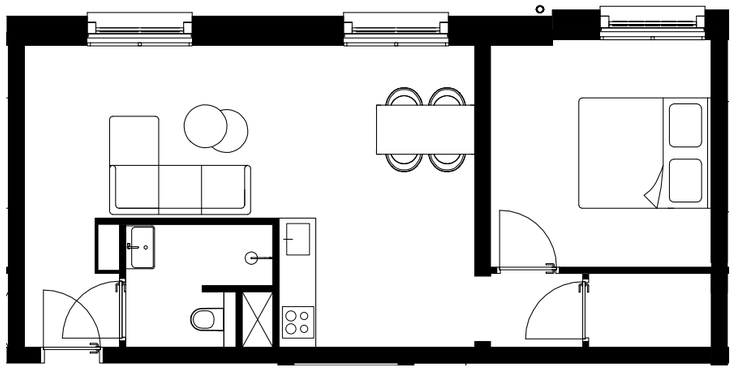




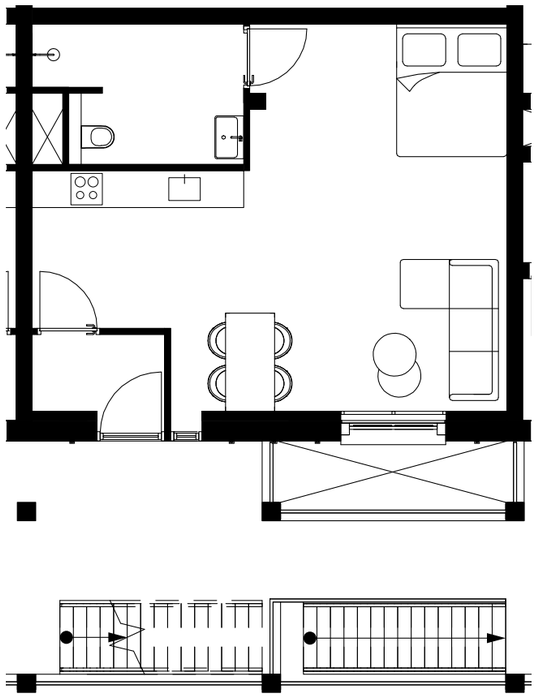
Split level
63-97 m²
13x



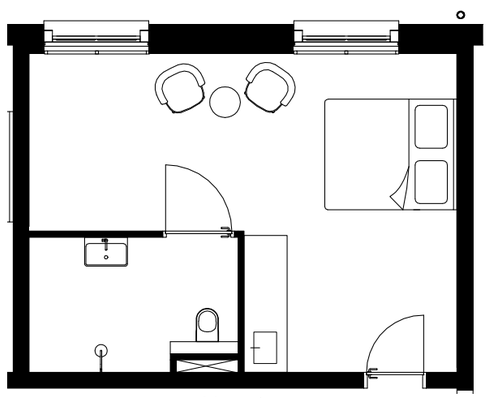
Wheelchair accessible
66-80 m²
20x



One bedroom
57 m²
13x



Studio´s
40-50 m²
16x

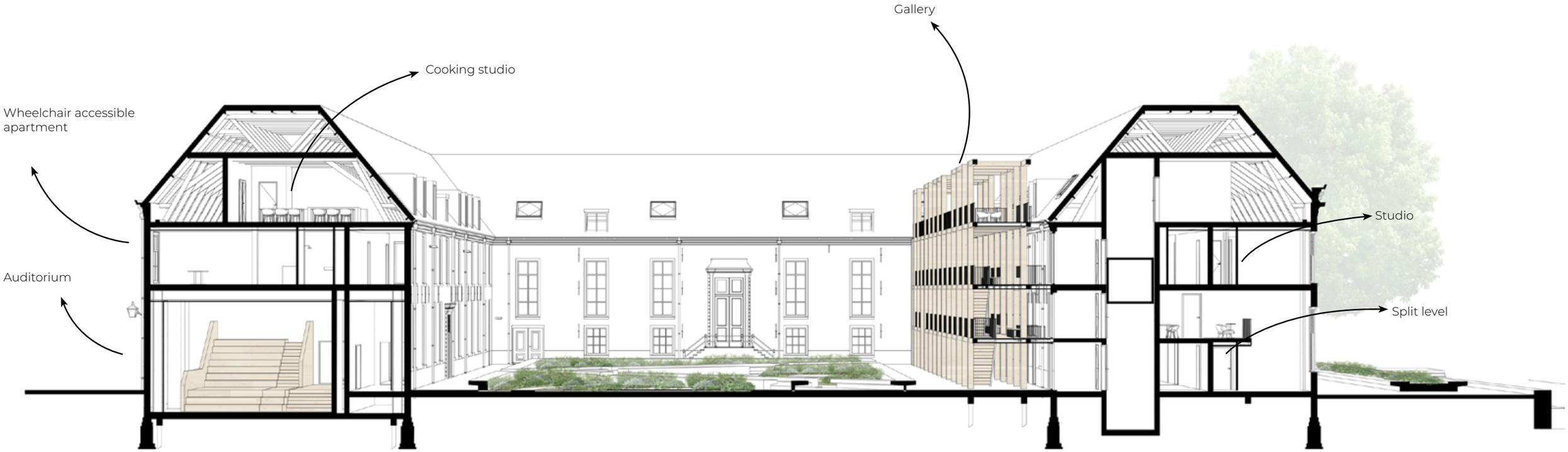


Hospice
6 rooms

A mix of apartment types for multiple target groups

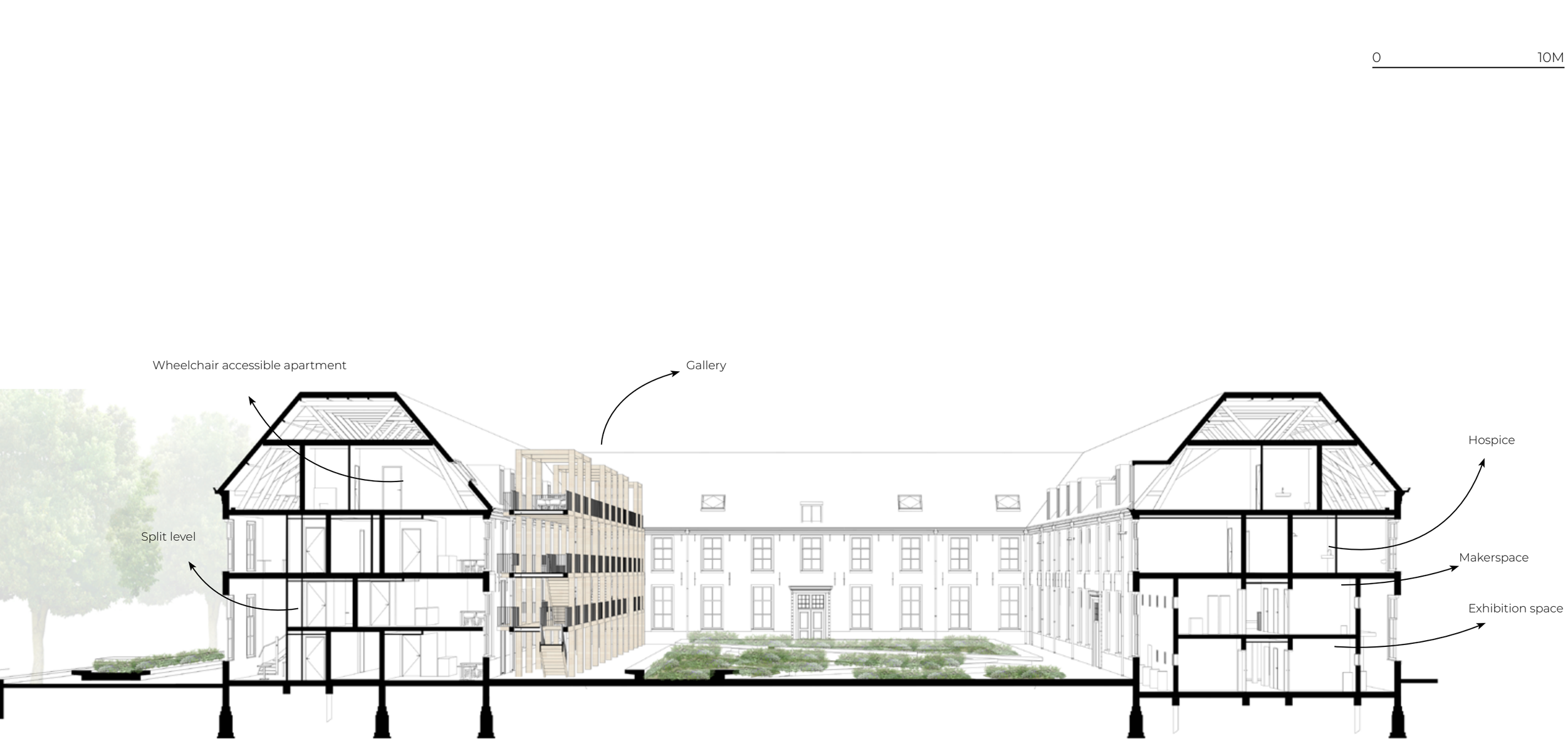
The existing spatial layout of the building served as the basis for the apartment typologies. Within the spatial structure, various typologies of elderly housing are implemented. The first typology is a split level apartment with various sizes. The apartments are two or three windows in width. This apartment type is suitable for seniors who are still able to climb the stairs, but are already looking for a smaller dwelling but still in the inner city. Also studios of around 40-50 square meters are implemented which consists of a large open space with bathroom. This could be suitable as a short stay typology or for elderly who are living on their own and like to make use of collective spaces. One or two bedroom apartments without level differences are implemented as well. The layout looks similar to the split level type, but without the entresol level and with possibilities of an additional bedroom. Larger wheelchair accessible apartments are bigger in size with a larger bathroom. Even six hospice rooms are implemented. The idea behind the variation in typologies is that people can move within the complex when they are for example in need for additional health care or need a dwelling without level differences and that they can spend their time in the building until their last days even when they are in need for extensive health care in the hospice.

0 10M



Section auditorium (1:200)

The split level dwellings are located on the outer façade of the building. In this way, the original height of the building is experienceable along almost the whole exterior façade. The biggest part of the wing along the zakstraat on the left is lower than the other parts of the building. This depth combined with the steel portal structure creates a space suitable for an auditorium. The height difference is covered by an elevated floor which is also used for ducts. The floor above the auditorium follows the same layout creating larger wheelchair accessible apartments.



Section cell block (1:200)

The cellblock with smaller spaces will be used as an exhibition space and workshop space on the ground floor and makerspace with art studios on the first floor. On the first floor of this part of the building the hospice is located. Also the second floor allowed for larger wheelchair accessible apartments due to the wooden roof structure.

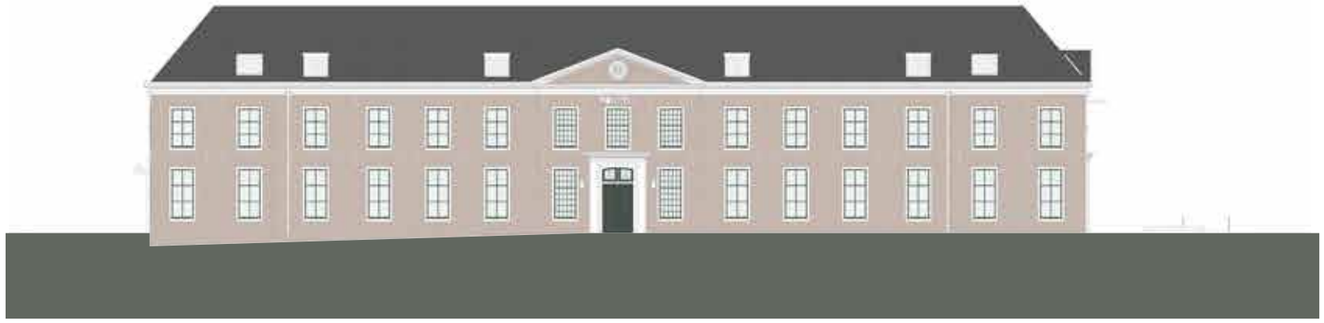
0 20M

Section restaurant and new volume (1:400)

A restaurant is located in the former dining hall of the deaconhouse that covers a double height space. The newer volume with large open space gave the opportunity for larger multifunctional volume and bouldering wall. To create even more space in this volume, part of the existing structure and roof are demolished and the structure is topped up with a CLT structure to create more height on the interior for the new function and a more appealing volume on the exterior.

0 20M

1:400



Facade Koudenhorn

Facade Nieuwe Gracht

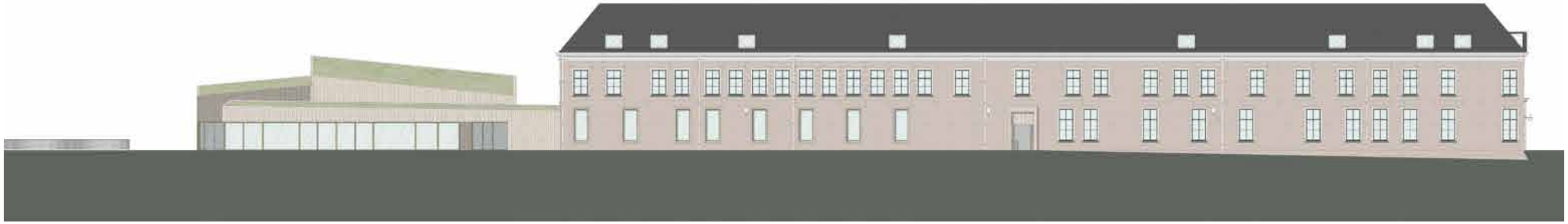
Façade Nieuwe Gracht

When approaching the building from the trains station or city center side, the newer volume is the first part of the building one sees. While this volume is located closest to the public side of the city and has lower value compared to the other parts of the building it allowed for larger interventions to make this volume the most public part of the building. To create a more appealing volume that stands out in its surrounding and thereby can attract people as well, the existing structure is topped up with a laminated larch wooden structure. The existing structure already created a large open space, however with more height, the space becomes suitable for a multisport field and for other events. The increased height also blends the volume a bit more in into the surroundings, while all other buildings are at least two floors high. The shape of the volume also refers back to the volume of the original peat house of the Koudenhorn with its sloped roofs. Also the whole façade of the volume is replaced with a larch wooden cladding with an open plinth. This open plinth is designed with large glass sliding doors. The glass creates a visual connection between the interior and exterior and allows views to the small courtyard the volume enclosed. When the weather allows for it, the sliding doors can be opened making the volume even more permeable.

0 20M

1:400

Facade Bakenessergracht



Facade Zakstraat

Façade Zakstraat

The more open plinth and volume of the newer building volume are also visible in the façade towards the Zakstraat. The volume is designed with a green roof, which adds greenery in the inner city of Haarlem. Over time the larch wood of the façade will turn grey, which fits better in the color scheme of the inner city.
As mentioned in the observations that led to the topic for the individual research, part of the windows of façade facing the Zakstraat were filled in with masonry in relation to the function of the police for this part of the building. While in the design, the space behind this part of the façade will be used as exhibition space and workshop area, and thereby has a public accessible use, the windows are opened up again. This ensures for visual connections from outside to the exhibition space. To enhance the public character of this part of the building the new windows are designed in a similar language as the façade of the newer volume with a wooden border and windows placed slightly more inwards. This creates a place for people to rest and look inside for a while. Next to this, a new entrance is created on this façade to create a new passage between the courtyard and Zakstraat. On the courtyard side, an entrance was already present, but on this façade a new one had to be created. This entrance also uses the similar design language as the newer volume and windows but also refers to the other entrance portals with wooden doors but in a less ornamented way. The similar design language is again used to enhance the public character of this part of the building, while this passage connects to the entrances of the exhibition and workshop space on one side and the auditorium on the other side. The interventions over the whole façade create a transition from public to private resembling the character of the functions on the interior.

0 20M

1:400

Facade courtyard Koudenhorn

Facade courtyard Bakenessergracht

Facade courtyard Zakstraat

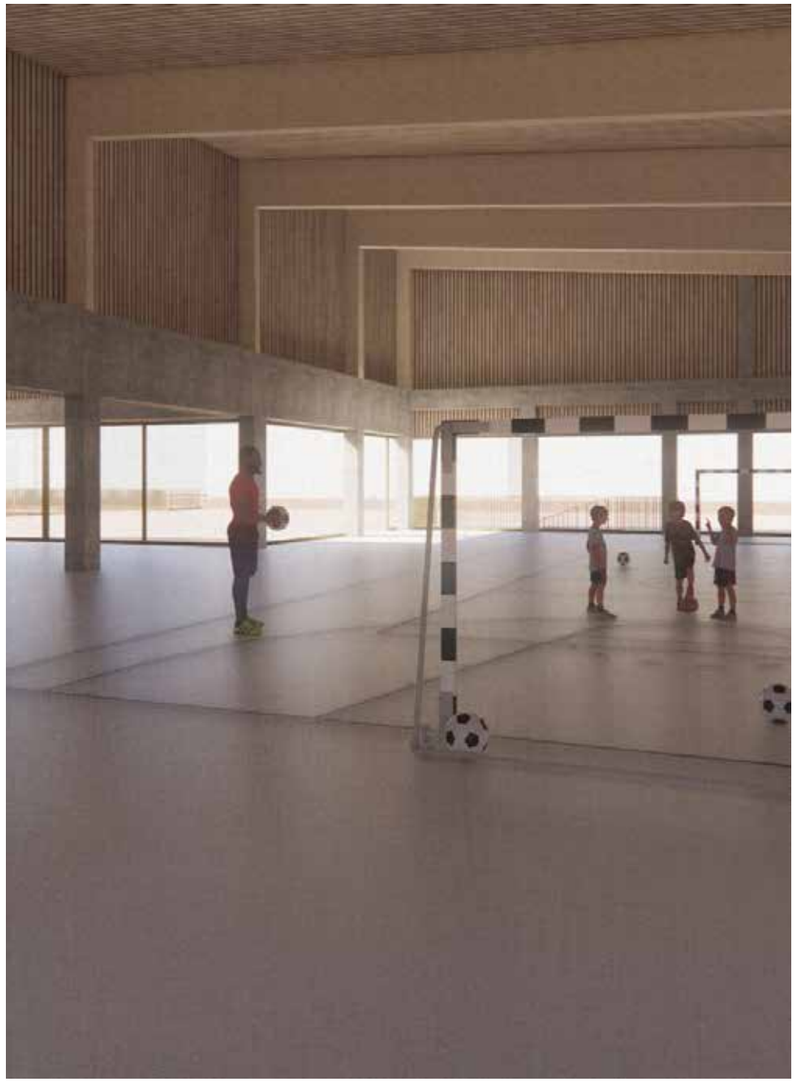
Facade courtyard Nieuwe Gracht

Façade Nieuwe Gracht courtyard with gallery

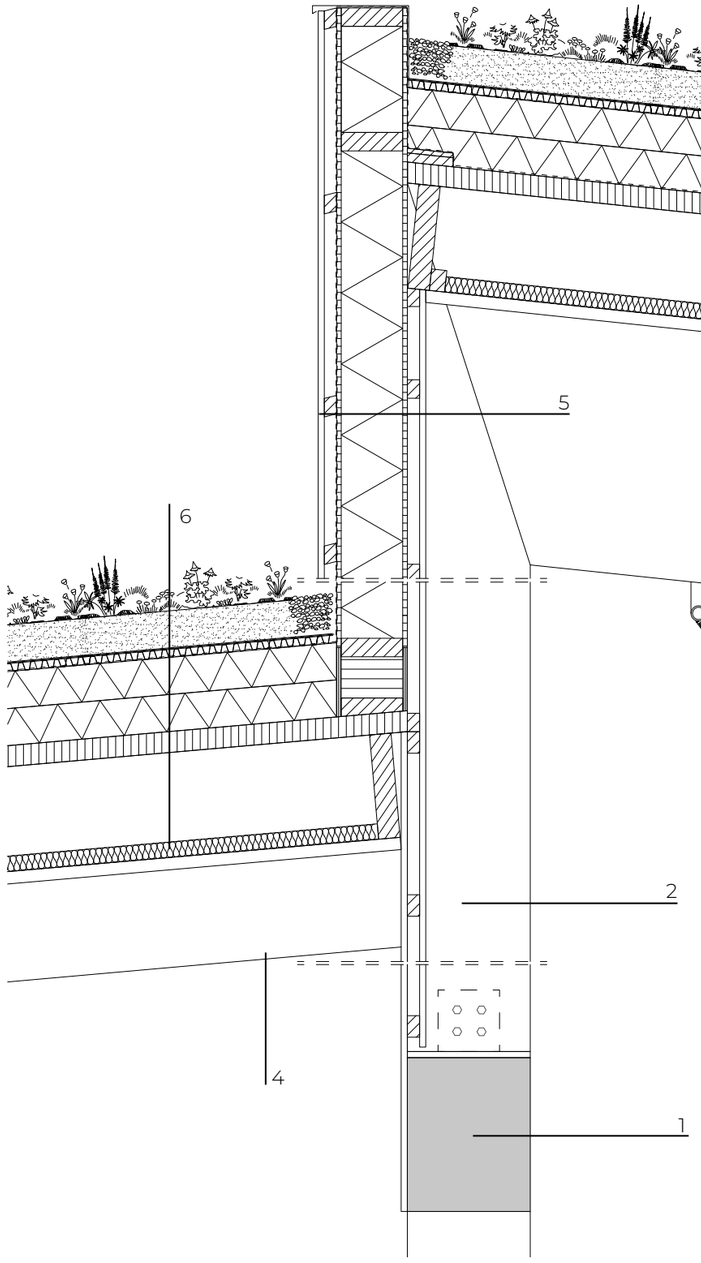
On the interior side of the building, the facades facing the courtyard, interventions are made to one of the facades. The gallery is added to the façade of the wing along the Nieuwe Gracht and therefore connections have to be made between the interior of the building and the gallery on all floor levels of the building. Those doors are placed in the existing openings of the façade where possible. However to make new doors on the ground floor and entresol level, the openings of existing windows have to be enlarged vertically. New dormers are placed on the roof within the same rhythm and composition as the existing and new windows. Creating those new entrances affects the monumental façade of the building. However the new entrances are designed within the same rhythm and symmetry of the existing building. Also the gallery follows the same rhythm, symmetry and composition of the façade and windows.

V Spaces

Impression mulitfunctional volume seen from small courtyard



Impression of interior of multifunctional volume with topped up structure



Detail of topped up structure with new facade and green roof

Fragment new volume 1:20

1
Existing concrete structure

2
Laminated larch column 400x200 mm

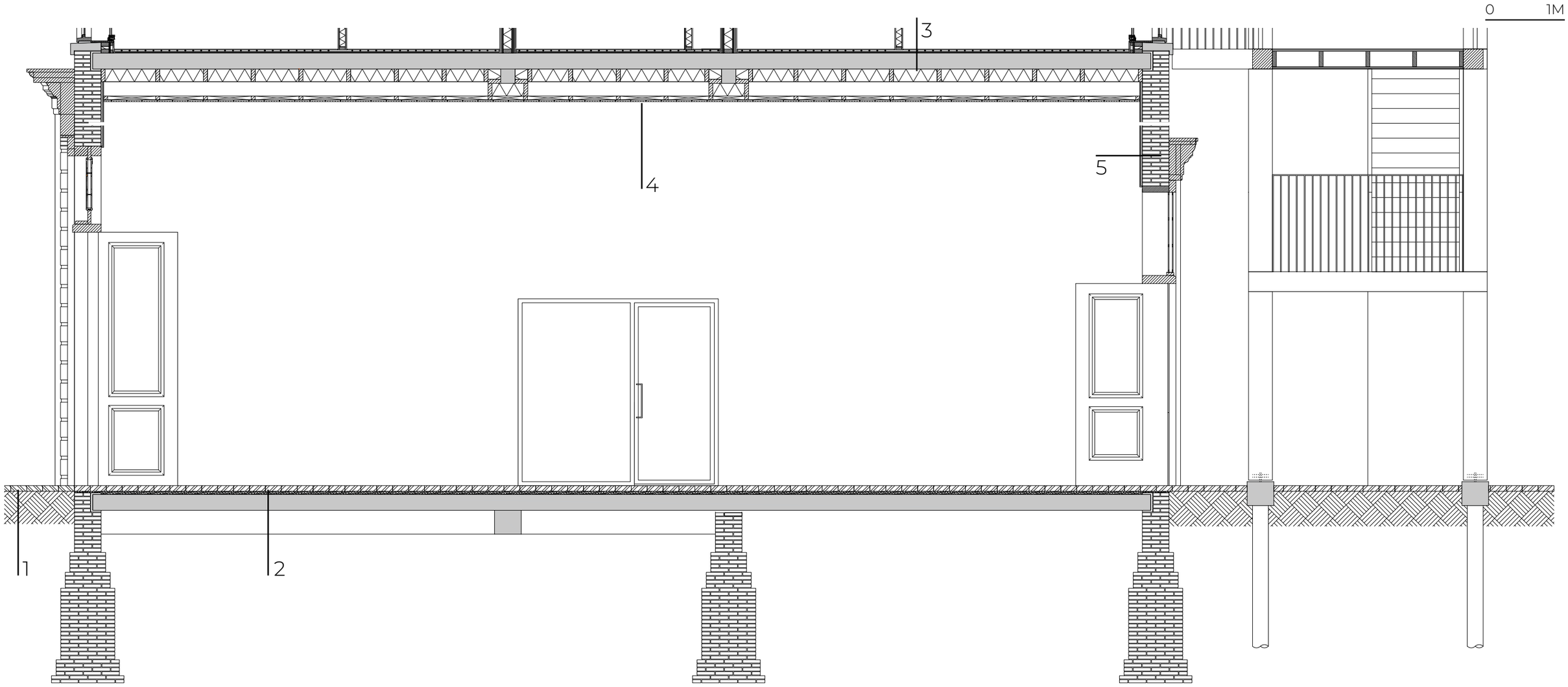
3
Laminated larch beam 1200x200 mm

4
Laminated larch beam 700x200

5 Wall
- Larch wood cladding 100x20 mm
- Ventialted cavity between 40 mm battens
- Moisture diffusing facade membrane
- Rockwool insulation between 200 mm wooden stud frame
- OSB 15 mm
- Wooden battens 40 mm
- 100 x 20 larch wood cladding

6 Roof
- Extensive vegetation roof
- Substrate 120 mm
- Filer sheet SF
- Floradrain FD 25-E
- Protection Mat SSM 45
- Root barrier
- Two layer bituminous sheeting
- Insulation 2x120 mm
- Vapour barrier
- Plywood 68 mm
- Laminated wood substructure 340 mm
- Acoustic mineral fiber 50 mm
- Still acoustics groove 24-W wooden batten ceiling

Impression of quay with improved public space and jetty



Connecting the public interior

The passages are spaces that are still recognizable in the current layout of the building but find their origin in the original spatial layout of the building. Currently the spaces are part of the interior and not in use as actual passages anymore. In the design the courtyard of the Koudenhorn building can be accessed via multiple passages. One of those passages is located between the smaller courtyard of the newer volume and the courtyard. Two entrances are located in the wing along the Nieuwe Gracht and make use of the existing entrance portals. By opening up the existing doors and creating the passages the boundary of the building changes. A new border is created while a different pavement is used than on the Nieuwe Gracht. Creating those entrances means that an interior space becomes an exterior space and therefore the floor above the passage is insulated below and the walls of the passage are insulated on the interior side.
The passages itself work as visual connection between the public space around the building and the public interior space of the courtyard. Next to this, visual connections are created between the passages and other, mainly public accessible functions, such as in the case of the impression the visual connection between the passage and the health care facilities with large windows on the right. Creating those connections already creates and indication of the public accessible spaces in the building and helps navigating in the building.

Fragment passage 1:50

1
Red bricks Nieuwe Gracht similar to city center of Haarlem

2
- Yellow bricks 70 mm
- Sand layer 40 mm
- Existing concrete floor 200 mm

3 Floor
- PVC floor finish 8 mm
- Fermacell floorplates 2x9 mm with milled floor-heating tubes + 2mm leveling compound
- XPS insulation 10 mm
- Fiberboard 10 mm
- Existing concrete floor 200 mm
- Mineral wool 160 mm (R=4,57) in wooden stud frame

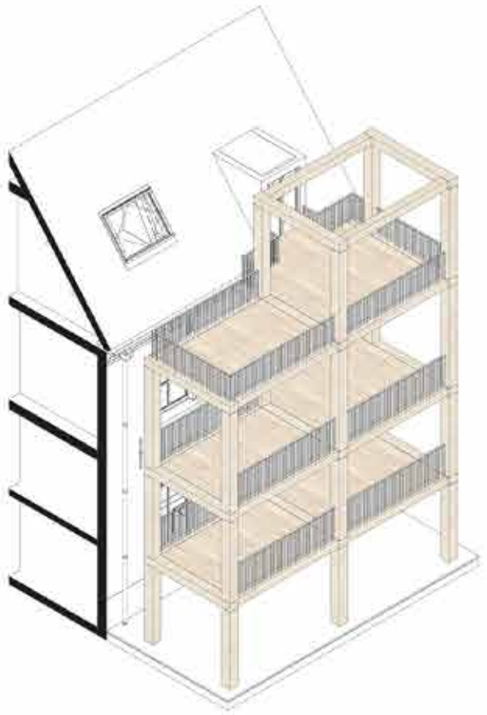
4 Ceiling
Wooden stud frame 50 mm
Still acoustics groove 24-W wooden batten ceiling

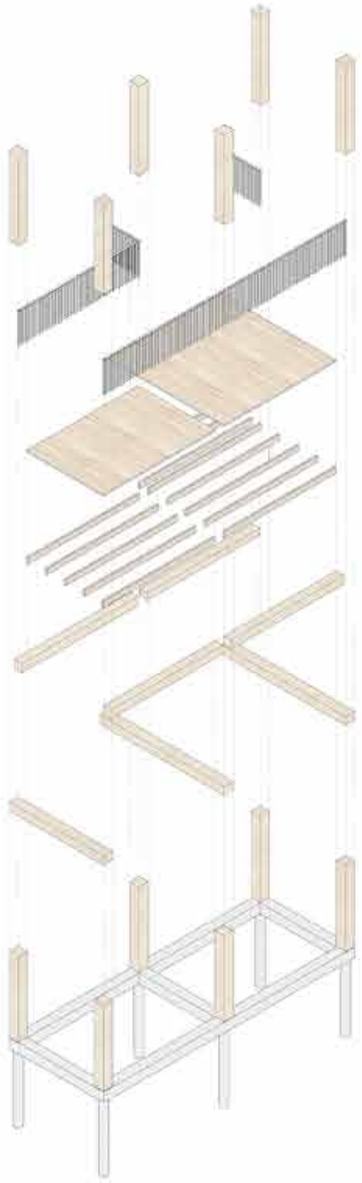
5 Wall
- Existing masonry wall 335 mm
- Wooden stud frame
- Gypsum plate 12.5 mm
- Concrete look plaster 4 mm

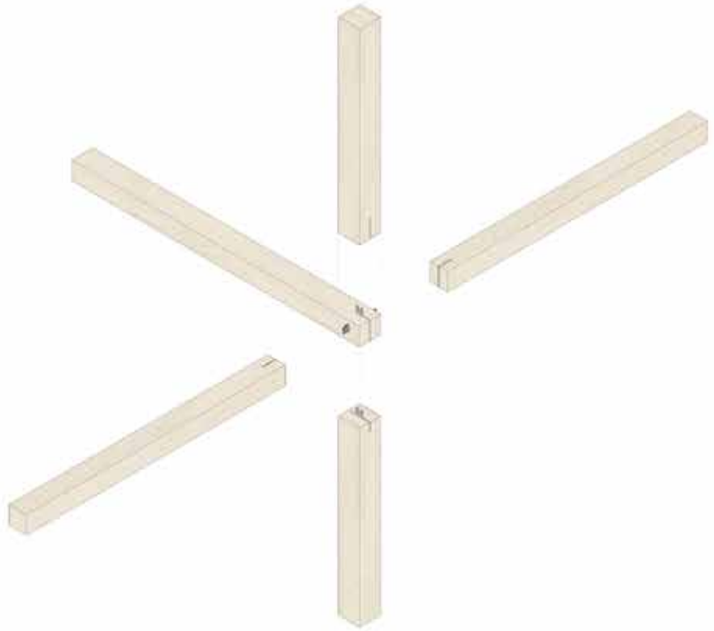
Impression of passage connecting the quay to the courtyard

Impression of courtyard with gallery

Impression of gallery and its use







Construction

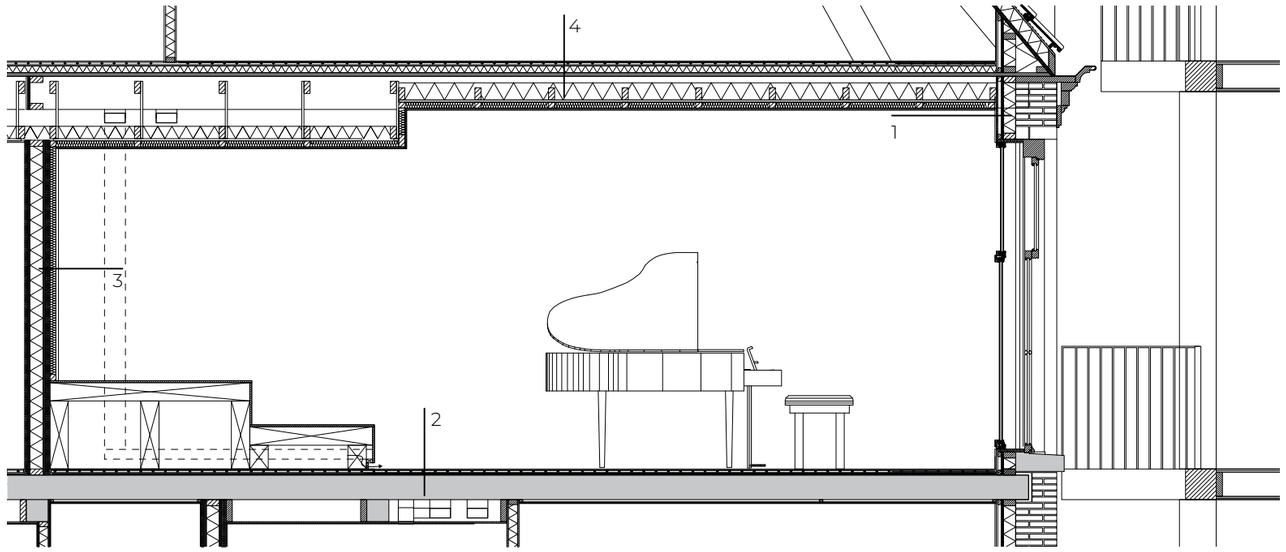
The gallery is not only added to the building to improve the circulation. It is mainly added to create opportunities for social interaction between the inhabitants of the building. By creating the gallery in the courtyard, the circulation space is pulled towards the courtyard, making it functioning as an atrium for the building. People have to walk through the courtyard to reach the stairs of the gallery and also on each floor they walk around the stairs to get up another level. The gallery also creates additional visual connections while otherwise people would only walk through the central corridor in the building. The gallery is large enough that people can use it as a place of encounters and meeting people, have a chat, or even claim a part of the gallery in front of their apartment to put their own flowers or a bench or table to sit.

The gallery is constructed out of laminated larch wood. The structure is placed disconnected from the building on its own foundation. However to create the connection between the interior and exterior the beams and floors have to extend towards the existing façade. To create this structure and connections in all directions, the Suteki wood system with carbon steel connections is used.

Impression of split level apartment

Impression wheelchair accessible apartment

0 1M



Fragment collective space 1:50

1 Exterior wall
- Existing masonry wall 335 mm
- PIR insulation 100 mm (R=4,5) in wooden stud frame
- Vapor barrier layer 1 mm
- OSB 18 mm
- Cavity for electricity 28 mm
- Gypsum plate 12.5 mm
- Plaster 5 mm

2 Floor
- Stucco 5 mm
- Gypsum plate 12.5 mm
- Wooden stud frame in between existing wooden beams with insulation 140 mm
- Existing wooden floor
- XPS 55 mm
- Woodfibre board 10 mm
- Fermacell floor plates 2x9 mm with milled floorheating tubes + 2 mm leveling compound
- PVC floor finish 8 mm with PU rubber underlay 2 mm

3 Interior party wall
- Stucco 5 mm
- Waterproof gypsum plate 2 x 12.5
- OSB 18 mm
- Mineral wool insulation 106 mm in wooden frame
- OSB 18 mm
- Gypsum plate 12.5 mm on acoustic strip
- Gypsum plate 2 x 12.5 mm
- Sound absorbing insulation in wooden stud frame 50 mm
- Still acoustics groove 24-W wooden batten panel

4 Floor
- Acoustic plaster finish
- Acoustic plasterboard 15 mm
- Sound absorbing insulation 50 mm
- Mineral wool insulation between and over wooden frame 100 mm
- Existing wooden floor
- XPS 50 mm
- Woodfibre board 10 mm
- Fermacell floor plates 2x9 mm with milled floorheating tubes + 2mm leveling compound
- PVC floor finish 8 mm with PU rubber underlayer 2 mm

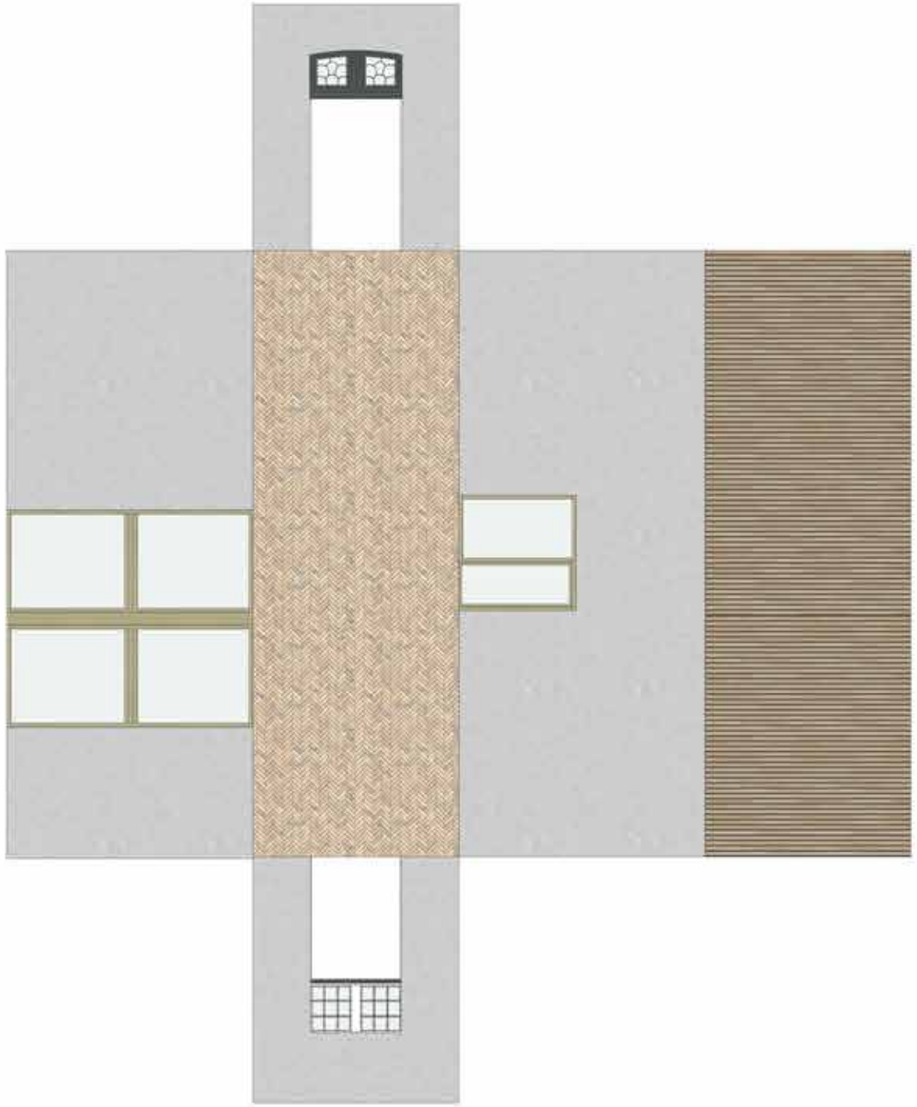
Creating possibilities for encounter

Multiple collective spaces are located throughout the building. In the program those are defined as a music studio, art studio, cooking studio and library and lounge space. Important for such collective spaces in the building is that the inhabitants can give their own interpretation to these spaces or use them in a way they want. Therefore it is important to create a space that could function in multiple ways. The image shows a music studio, however the space itself only has a element where people can sit. Such an element already creates possibilities for people to sit, meet and give meaning to a space. Those collective spaces are created in a similar way as the apartments, but an additional layer of sound insulation is added to walls and ceiling. The walls and floors will have a wooden finish to enhance the connection with the wooden gallery just in front of the spaces and thereby indicating the public accessibility of those spaces.

Impression of collective space as music studio

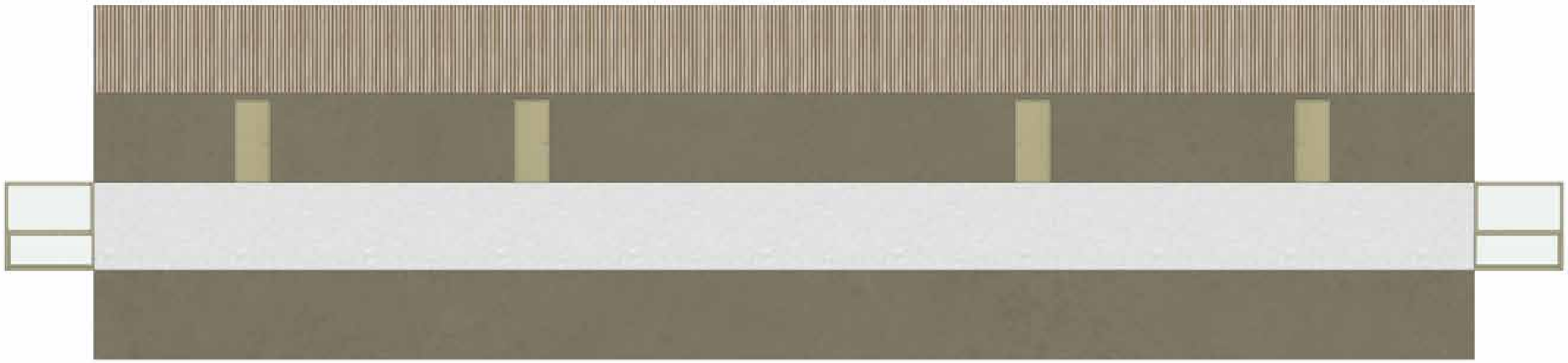
Impression of coocking studio

Impression of lounge



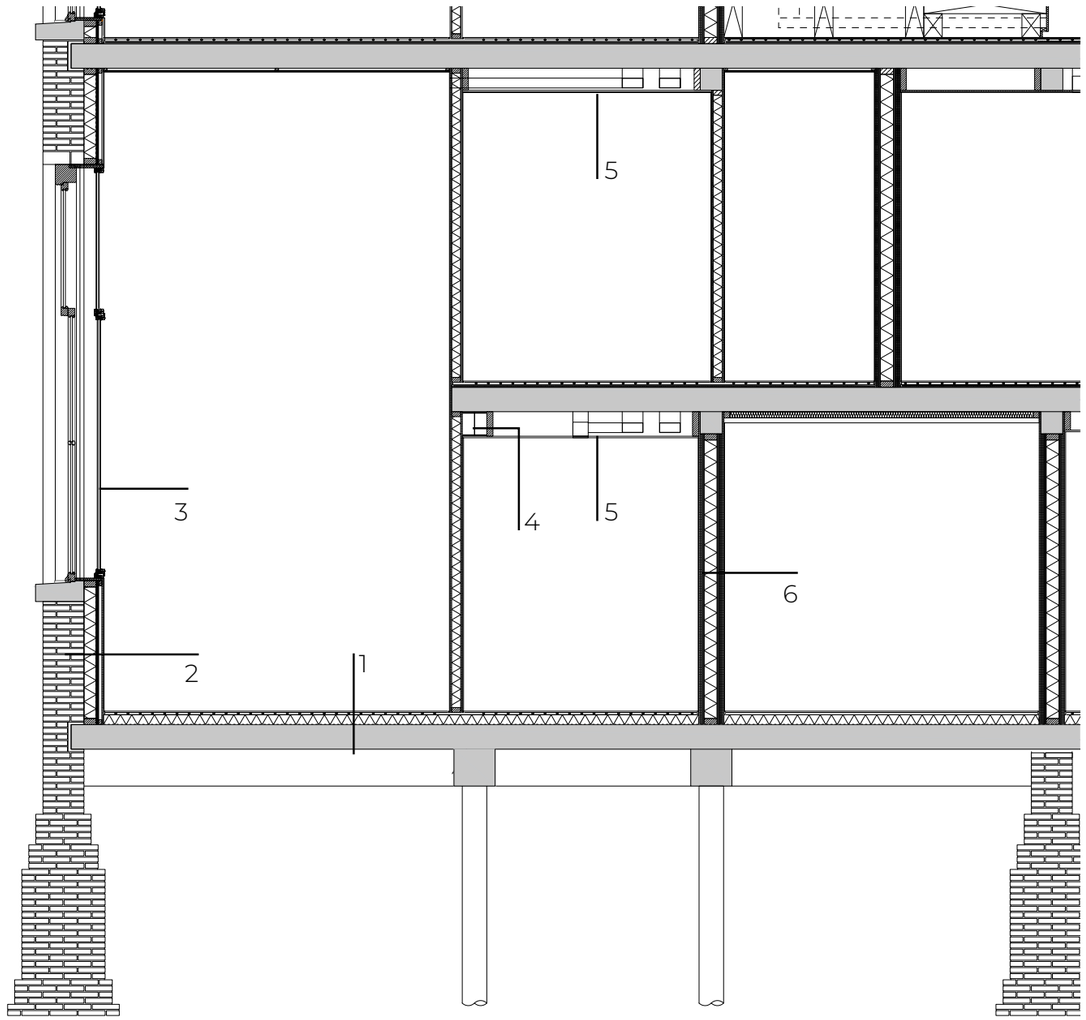
Materialization

The materialization of spaces influences the public feeling of the spaces. The harder appearance and feeling of a meterial the more public the material feels. So tiles, natural stone and brick pavement have a more public feeling than polished concrete, wooden floor finishes and carpets of which the last one feels the most private. With materials it is also possible to indicate borders and boundaries of spaces. In the design the material of the passages differs from the material used on the quay of the Nieuwe Gracht. Despite the open passages this still indicates the border of the building. The public accessible spaces have a terrazzo floor finish with concrete plastered walls and a wooden ceiling. A polished concrete floor finish with ‘leemstuc’ wall finish is used for the corridors to the apartments. The collective spaces have a wooden floor and wall finish, creating a connection to the gallery,



VI Building technology

0 1M



Fragment split level apartment 1:50

1 Floor
- Existing concrete floor 200 mm
- Vapor barrier layer 1 mm
- PIR insulation 80 mm (R=3,63)
- Fermacell floor plates 2x9 mm with milled floorheating tubes + 2 mm leveling compound
- PVC floor finish 8 mm

2 Exterior wall
- Existing masonry wall 335 mm
- PIR insulation 100 mm (R=4,5) in wooden stud frame
- Vapor barrier layer 1 mm
- OSB 18 mm
- Cavity for electricity 28 mm
- Gypsum plate 12.5 mm
- Stucco 5 mm

3
HR++ glazing in SL-38 aluminum window profile

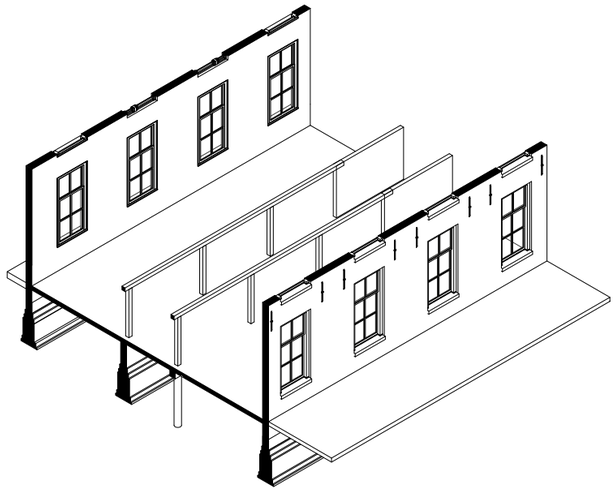
4
HEB-200

5
Ventilation ducts in apartments 170 x 80 mm > ø 80 mm

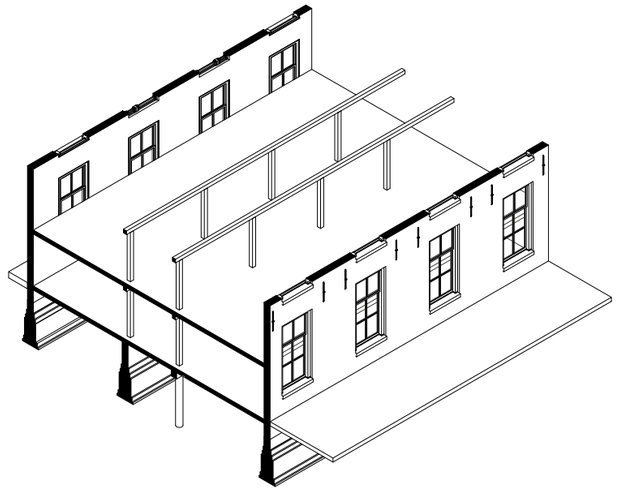
6 Party wall firebreak
- Bathroom tile finish 10 mm
- Waterproof gypsum plate 2 x 12.5
- OSB 18 mm
- Mineral wool insulation 106 mm in wooden frame
- OSB 18 mm
- Gypsum plate 12.5 mm on acoustic strip
- Gypsum plate 2 x 12.5 mm
- Leemstuc finish

Split level apartments

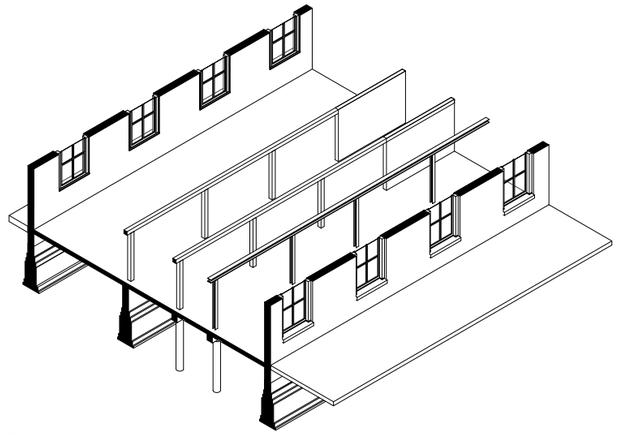
The added entresol level in the building served as reasoning to create split level apartments. However, to create this typology, a part of the existing entresol floor needs to be demolished. This first image on the right page shows the structure of a part of the ground floor with a small part with masonry walls and a concrete column and beam structure for the biggest part. On top an entresol floor is created with a similar structure for the floor above. To create the split level dwelling a new foundation and steel structure are added to support the entresol floor. The core with bathroom kitchen and shaft for ducts is placed below the entresol floor with lowered ceiling to hide the structure. The other other column is positioned within the partywall between two dwellings. The core continues on top of the entresol floor covering the columns on this floor. To improve the indoor climate in the dwellings, the floor and walls are insulated and secondary windows are placed behind the existing windows.



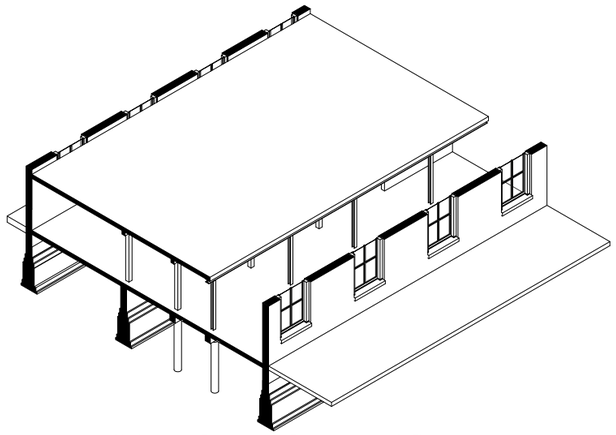
1. Existing structure ground floor



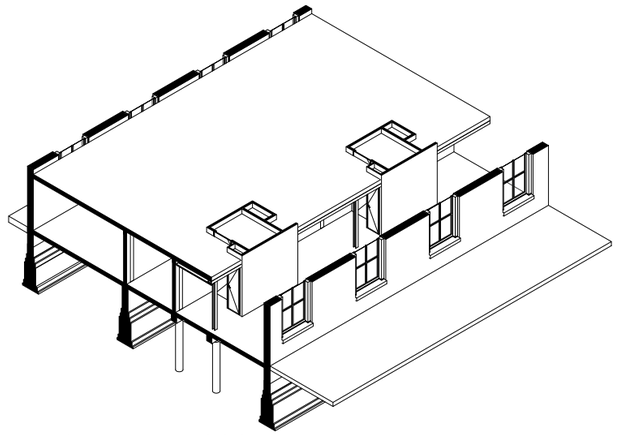
2. Existing structure entresol level



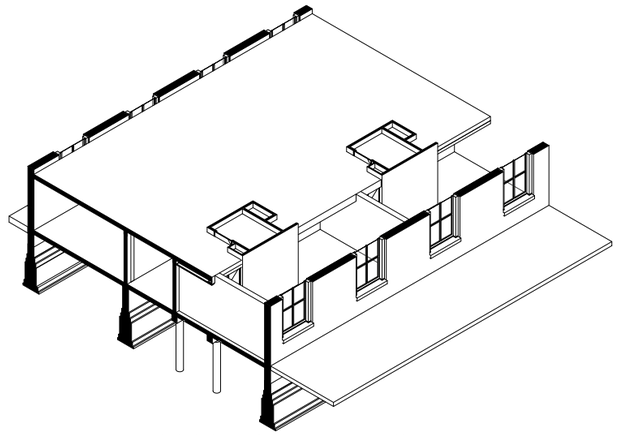
3. New foundation and steel structure



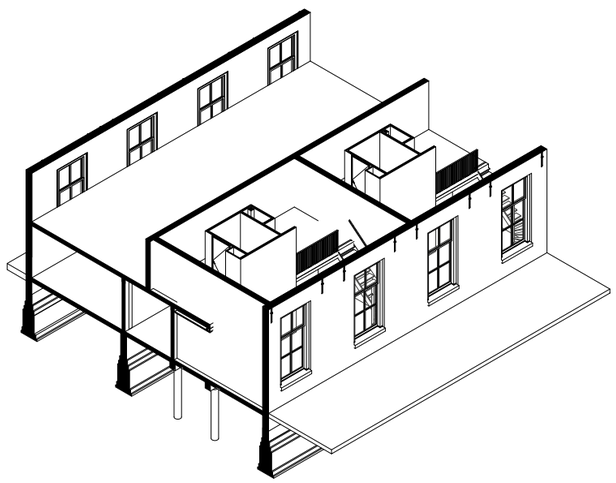
4. Demolition of part of entresol floor



5. Using core to hide structure

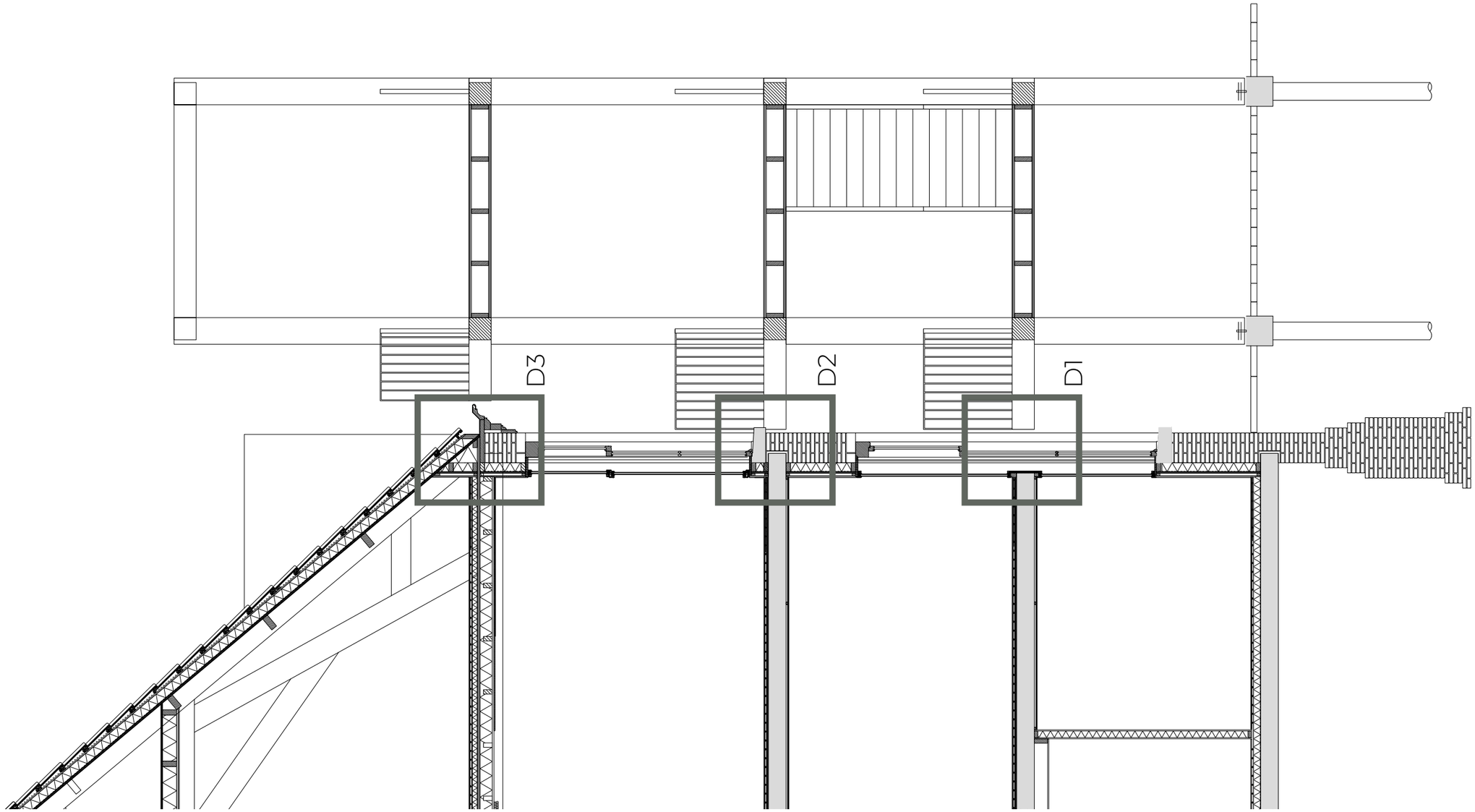


6. Structure hidden in party wall

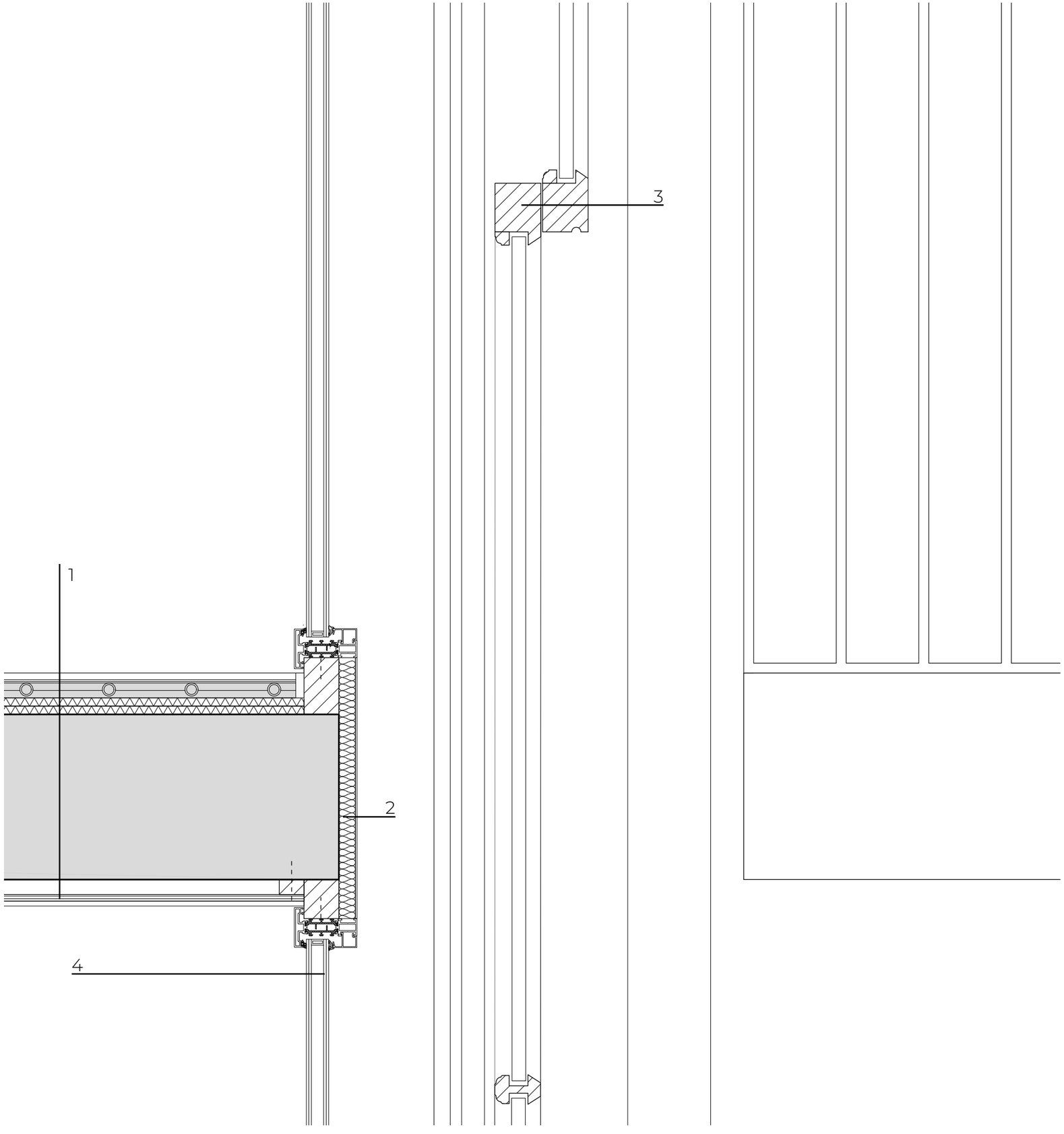


7. Continuing core on entresol level

0 1M



F1 | Facade fragment (1:50)



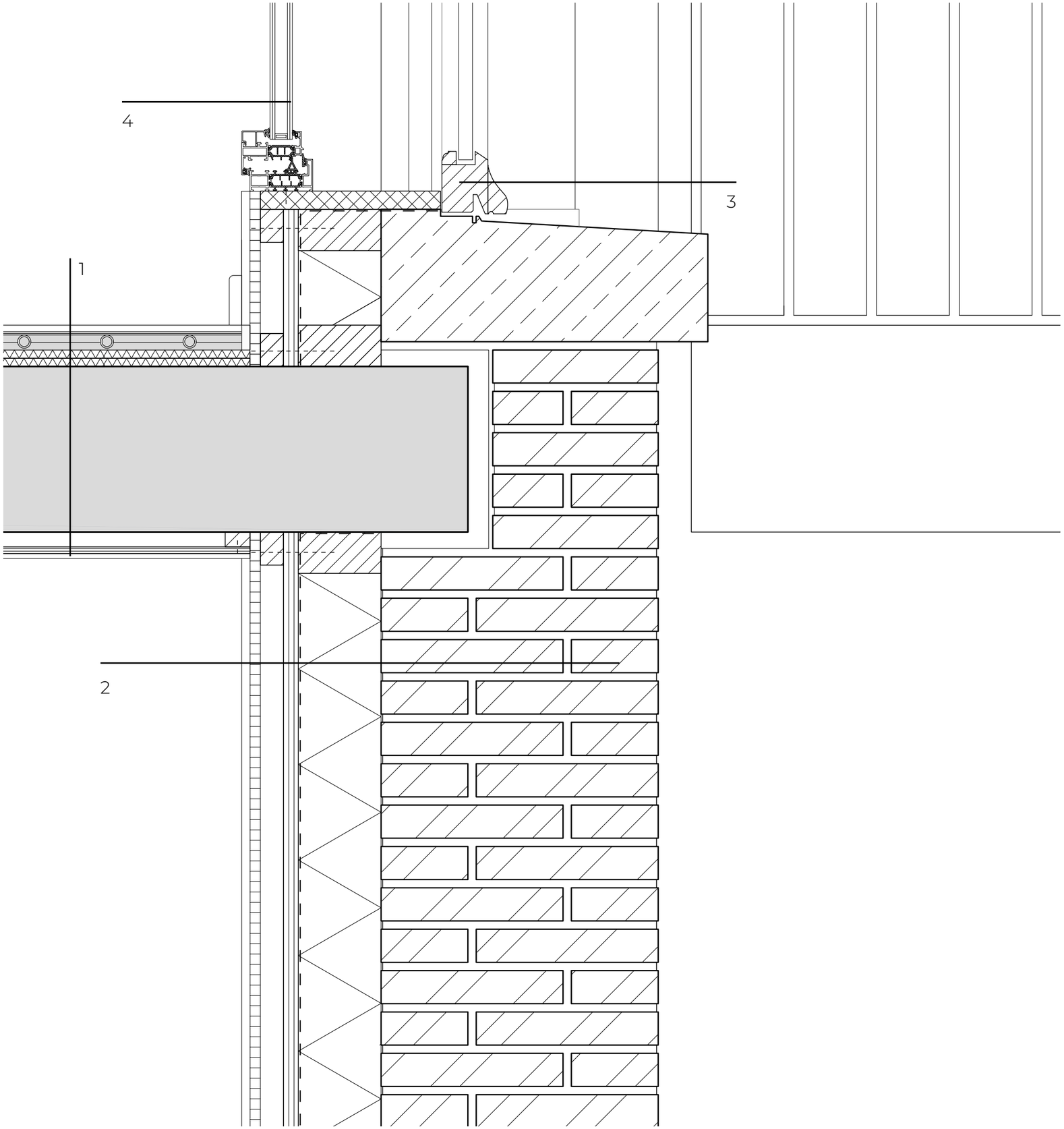
1 Floor
- Stucco finish
- Plasterboard on wooden structure
- Existing concrete floor 200 mm
- Woodfibre board 10 mm
- XPS insulation 10 mm
- Fermacell floor plates 2x9 mm with milled floorheating tubes + 2 mm leveling compound
- PVC floor finish 8 mm with PU rubber underlay 2 mm

2
Sandwich panel 20 mm with 2 mm aluminum in same color as window frames

3
Existing window

4
Fixed secondary window with fireproof glazing

D1 | Vertical detail | connection entresol floor - window (1:5)



0 100MM

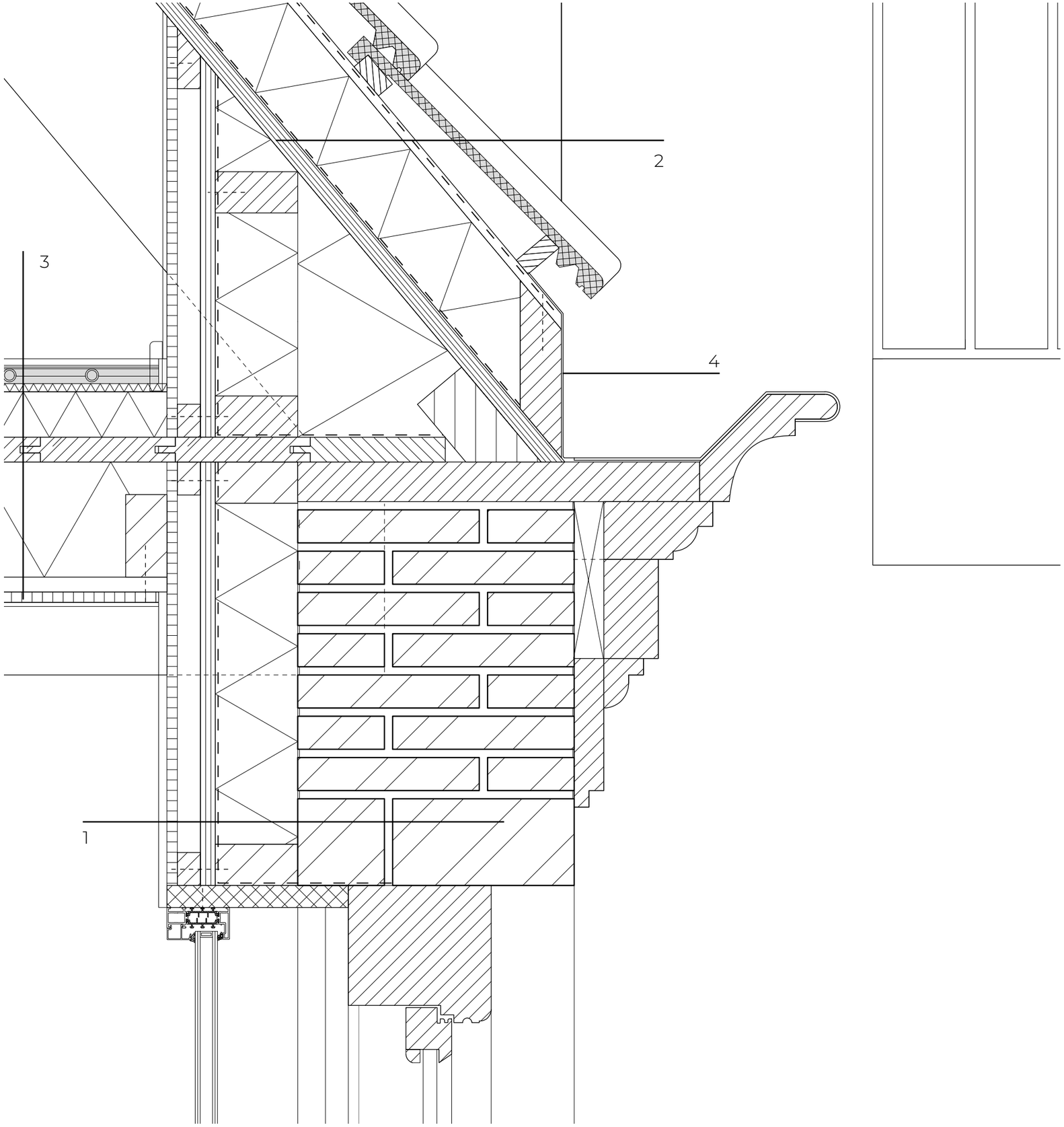
1 Floor
- Stucco finish
- Plasterboard on wooden structure
- Existing concrete floor 200 mm
- Woodfibre board 10 mm
- XPS insulation 10 mm
- Fermacell floor plates 2x9 mm with milled floorheating tubes + 2 mm leveling compound
- PVC floor finish 8 mm with PU rubber underlay 2 mm

2 Wall
- Existing masonry wall 335 mm
- PIR insulation 100 mm (R=4,5) in wooden stud frame
- Vapor barrier layer 1 mm
- OSB 18 mm
- Cavity for electricity 28 mm
- Gypsum plate 12.5 mm
- Plaster 5 mm

3
Existing window

4
Aluminum secondary openable window

D2 | Vertical detail | connection façade - first floor (1:5)



0 100MM

1 Wall
- Existing masonry wall 335 mm
- PIR insulation 100 mm (R=4,5) in wooden stud frame
- Vapor barrier layer 1 mm
- OSB 18 mm
- Cavity for electricity 28 mm
- Gypsum plate 12.5 mm
- Plaster 5 mm

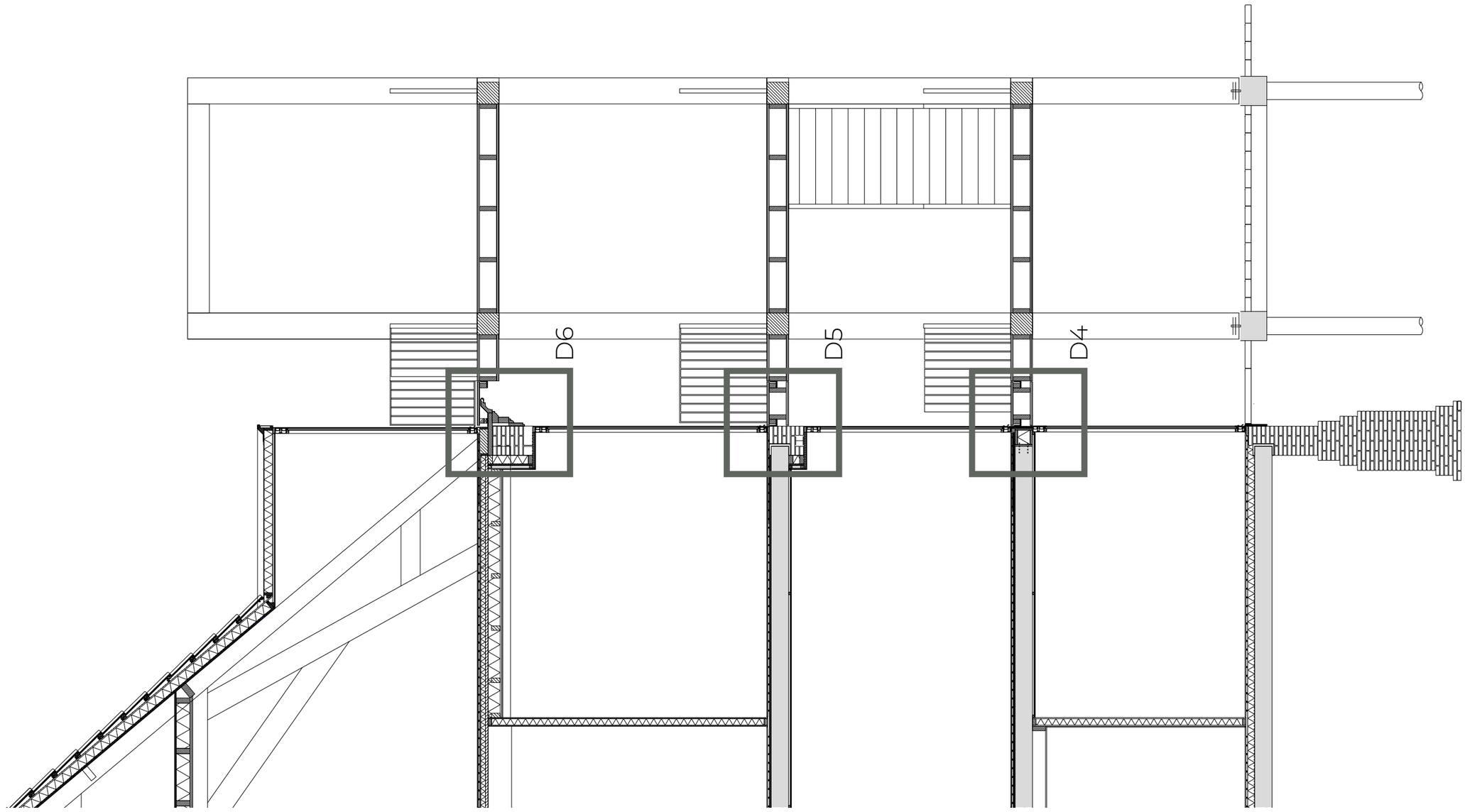
2 Roof
- Existing wooden roof structure
- Existing wooden roof decking
- Vapour barrier layer
- PIR insulation 100 mm (R=4,54)
- Vapour permeable layer
- Existing rooftiles

3 Floor
- Stucco 5 mm
- Gypsum plate 12.5 mm
- Wooden stud frame in between existing wooden beams with insulation 140 mm
- Existing wooden floor
- XPS 55 mm
- Woodfibre board 10 mm
- Fermacell floor plates 2x9 mm with milled floorheating tubes + 2 mm leveling compound
- PVC floor finish 8 mm with PU rubber underlay 2 mm

4
Zinc cover

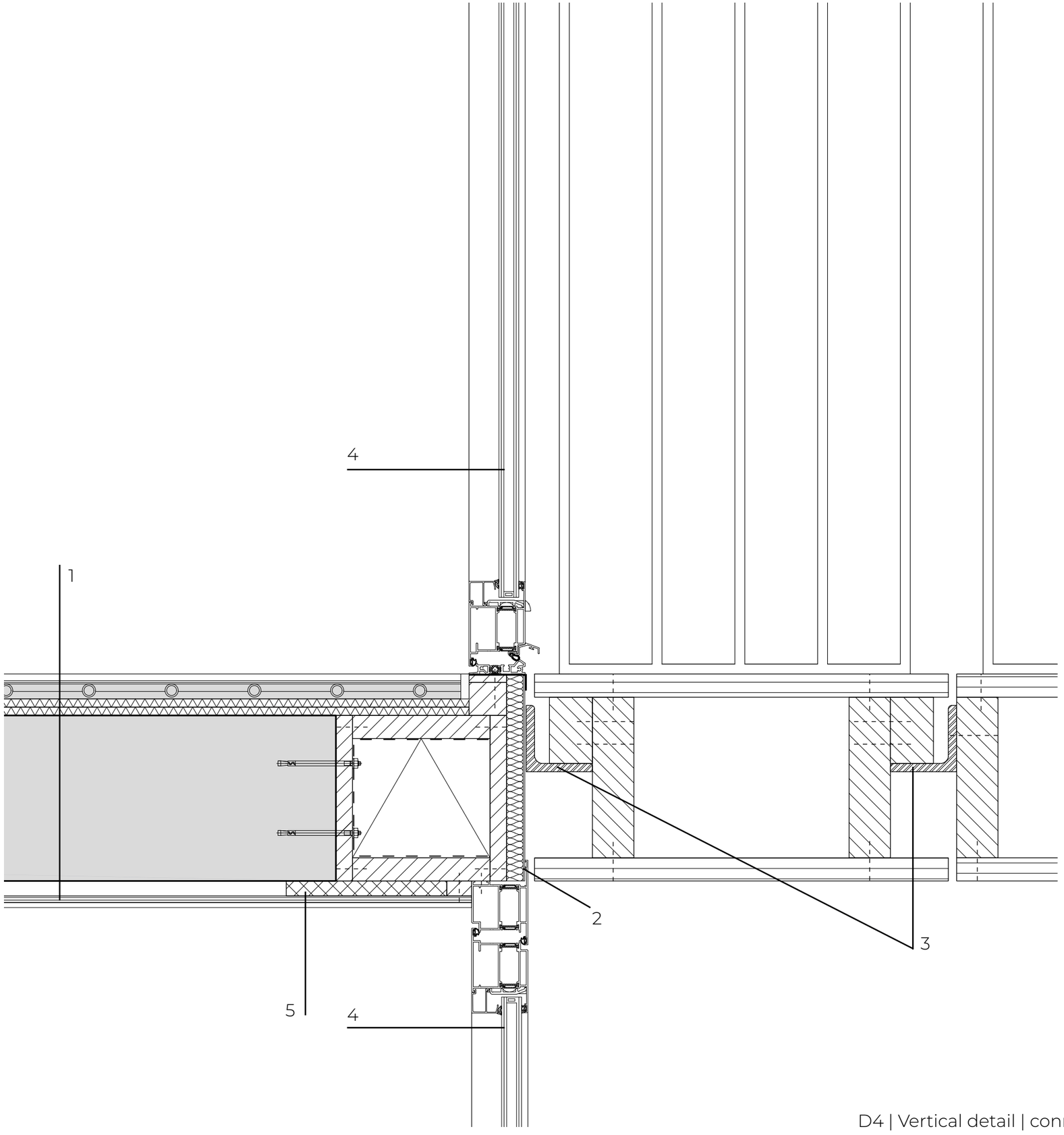
D3 | Vertical detail | connection second floor - façade - roof (1:5)

0 1M



F2 | Facade fragment (1:50)

0 100MM



1 Floor
- Stucco finish
- Plasterboard on wooden structure
- Existing concrete floor 200 mm
- Woodfibre board 10 mm
- XPS insulation 10 mm
- Fermacell floor plates 2x9 mm with milled floorheating tubes + 2 mm leveling compound
- PVC floor finish 8 mm with PU rubber underlay 2 mm

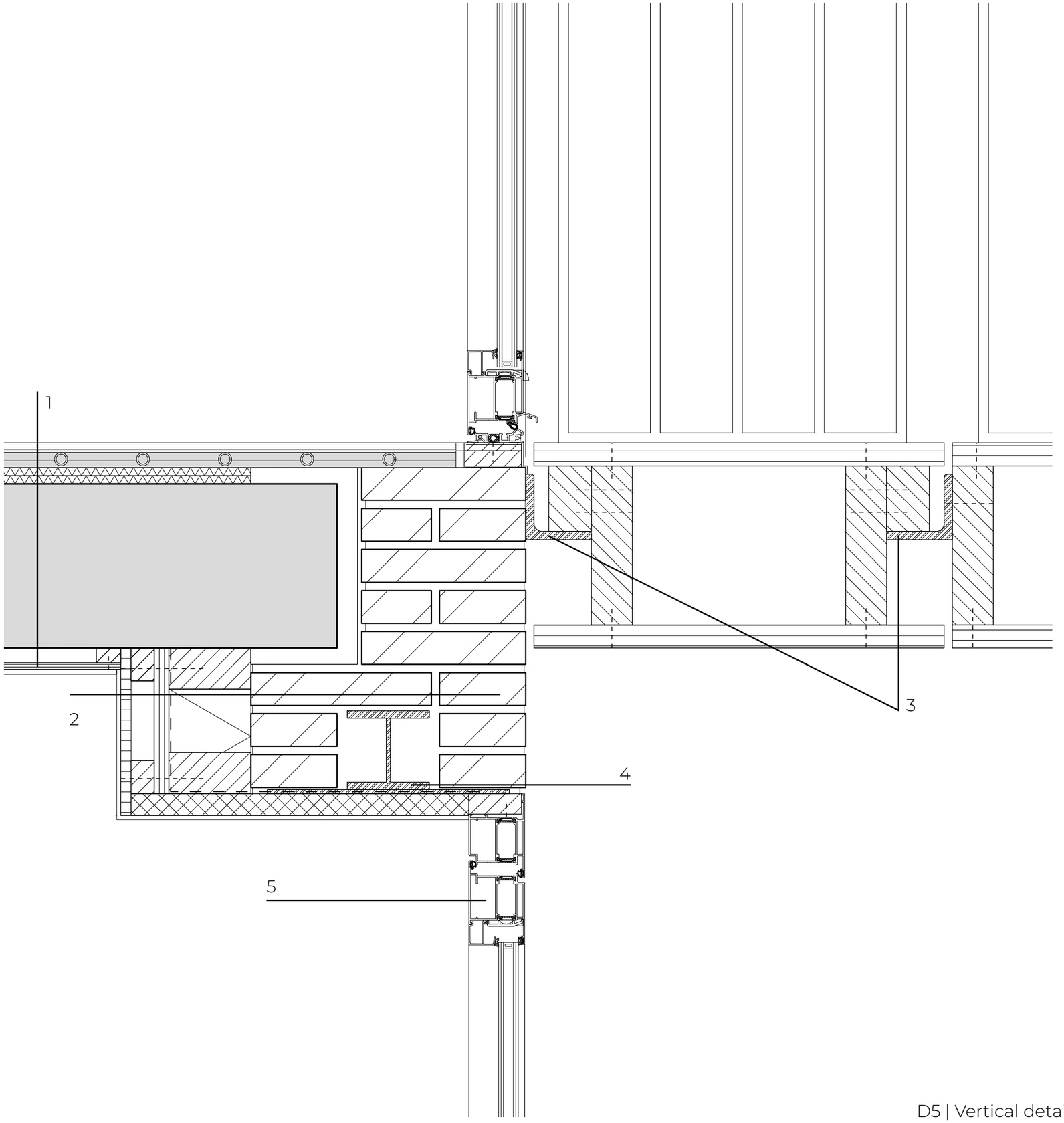
2
Sandwich panel 20 mm with 2 mm aluminum in same color as window frames

3
80 x 80 x 10 mm steel L profile

4
Aluminum doors, self closing for firesafety

5
Promatect 200 fireproof board

D4 | Vertical detail | connection gallery - entresol floor with new openings in facade (1:5)



0 100MM

1 Floor
- Stucco finish
- Plasterboard on wooden structure
- Existing concrete floor 200 mm
- Woodfibre board 10 mm
- XPS insulation 10 mm
- Fermacell floor plates 2x9 mm with milled floorheating tubes + 2 mm leveling compound
- PVC floor finish 8 mm with PU rubber underlay 2 mm

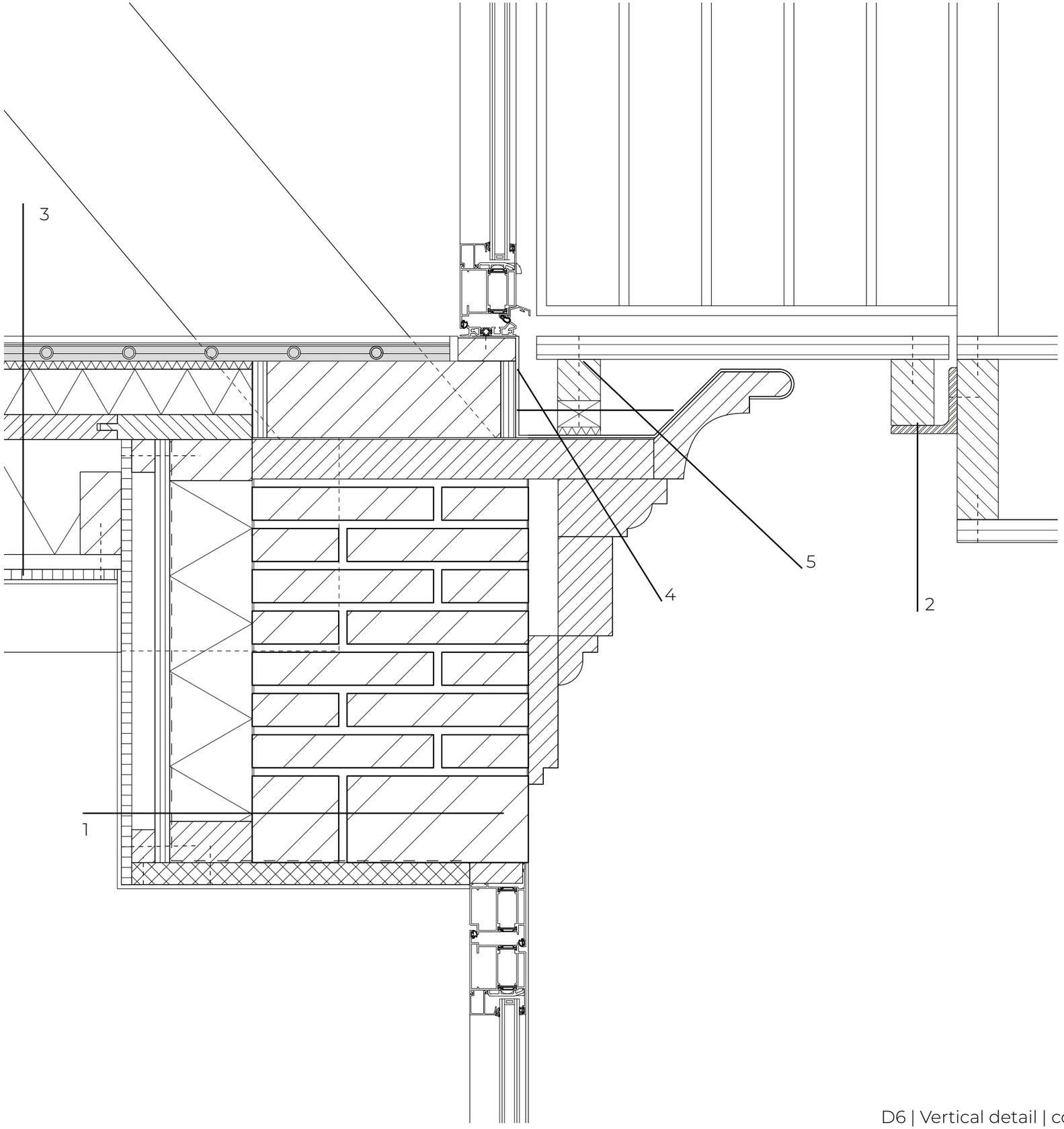
2 Wall
- Existing masonry wall 335 mm
- PIR insulation 100 mm (R=4,5) in wooden stud frame
- Vapor barrier layer 1 mm
- OSB 18 mm
- Cavity for electricity 28 mm
- Gypsum plate 12.5 mm
- Plaster 5 mm

3
80 x 80 x 10 mm steel L profile

4
Steel plate welded to HEA 100 to enlarge opening

5
Aluminum doors, self closing for firesafety

D5 | Vertical detail | connection gallery to first floor with new windowframes (1:5)



0 100MM

1 Wall
- Existing masonry wall 335 mm
- PIR insulation 100 mm (R=4,5) in wooden stud frame
- Vapor barrier layer 1 mm
- OSB 18 mm
- Cavity for electricity 28 mm
- Gypsum plate 12.5 mm
- Plaster 5 mm

2
80 x 80 x 10 mm steel L profile

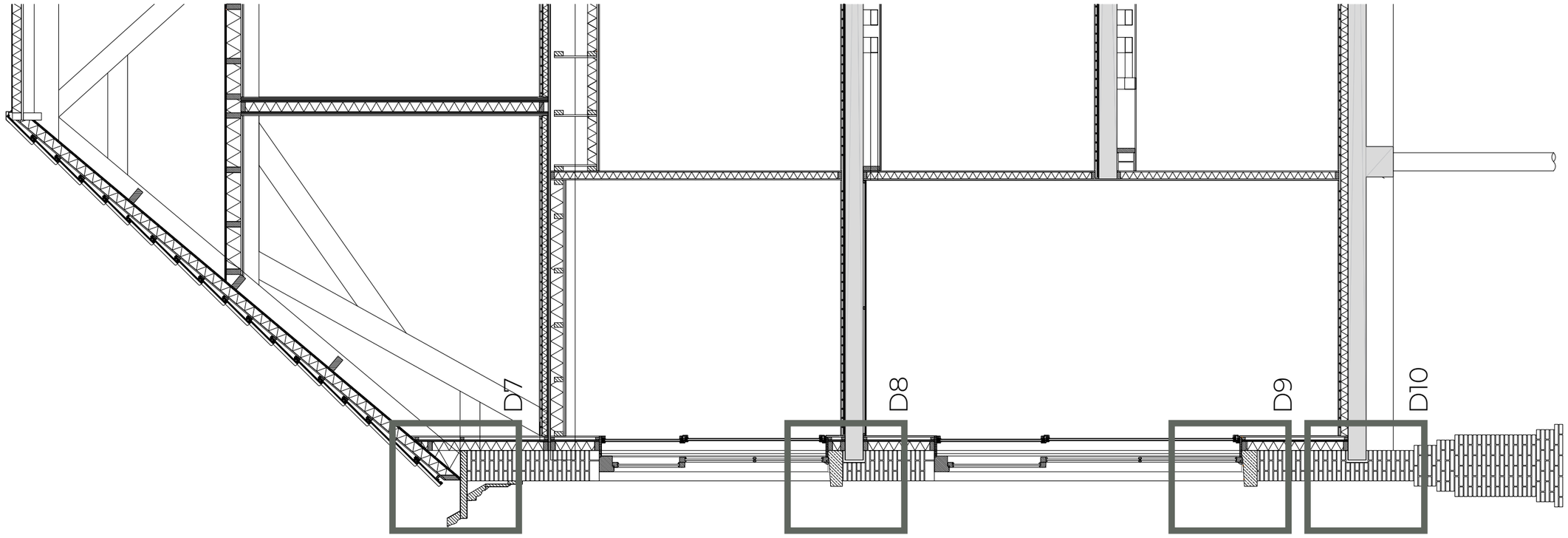
3 Floor
- Stucco 5 mm
- Gypsum plate 12.5 mm
- Wooden stud frame in between existing wooden beams with insulation 140 mm
- Existing wooden floor
- XPS 55 mm
- Woodfibre board 10 mm
- Fermacell floor plates 2x9 mm with milled floorheating tubes + 2 mm leveling compound
- PVC floor finish 8 mm with PU rubber underlay 2 mm

4
Zinc cover

5
Wooden chock in gutter to create connection with gallery

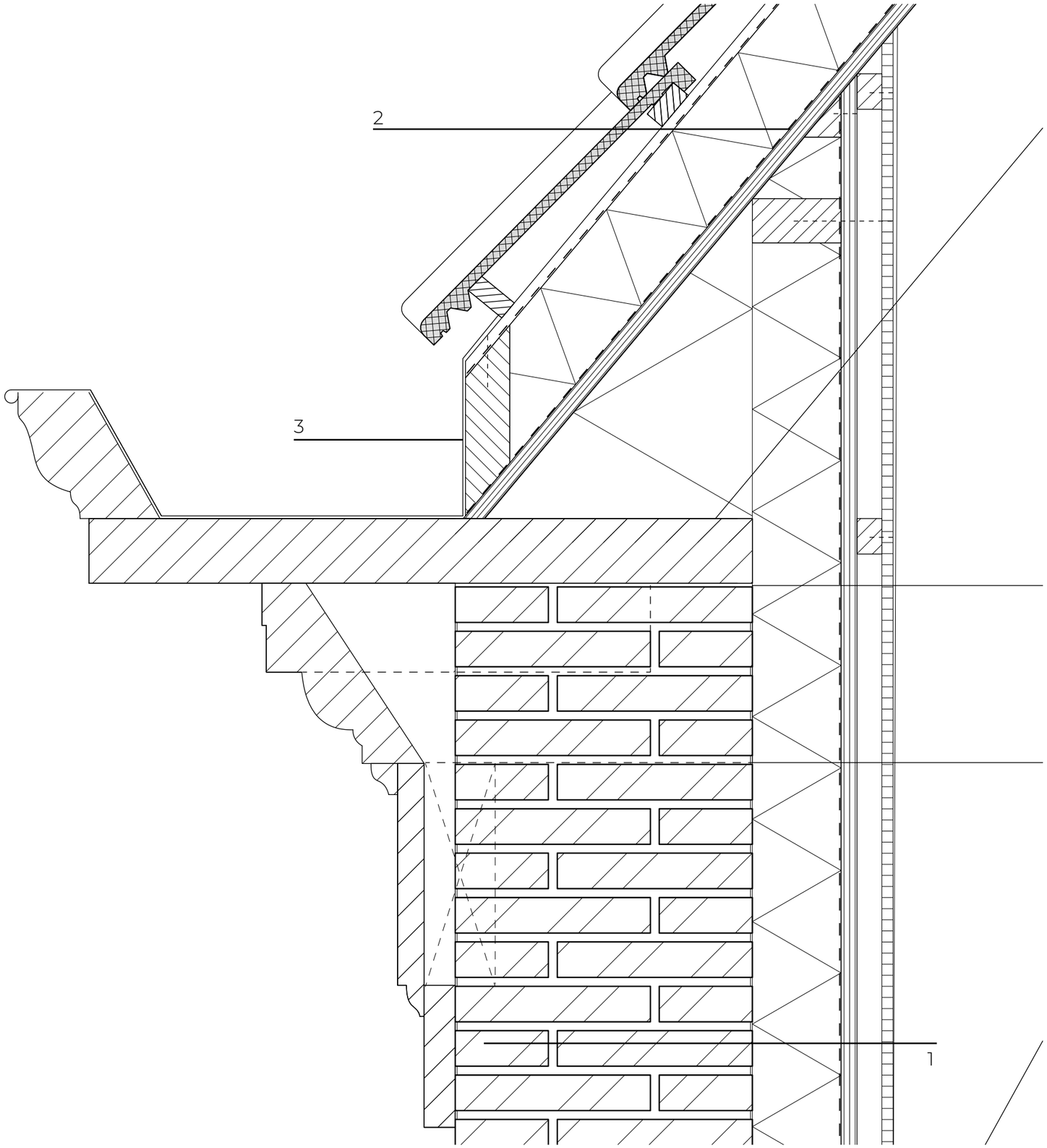
D6 | Vertical detail | connection gallery - second floor over gutter with new dormer (1:5)

0 1M



F3 | Facade fragment (1:50)

0 100MM



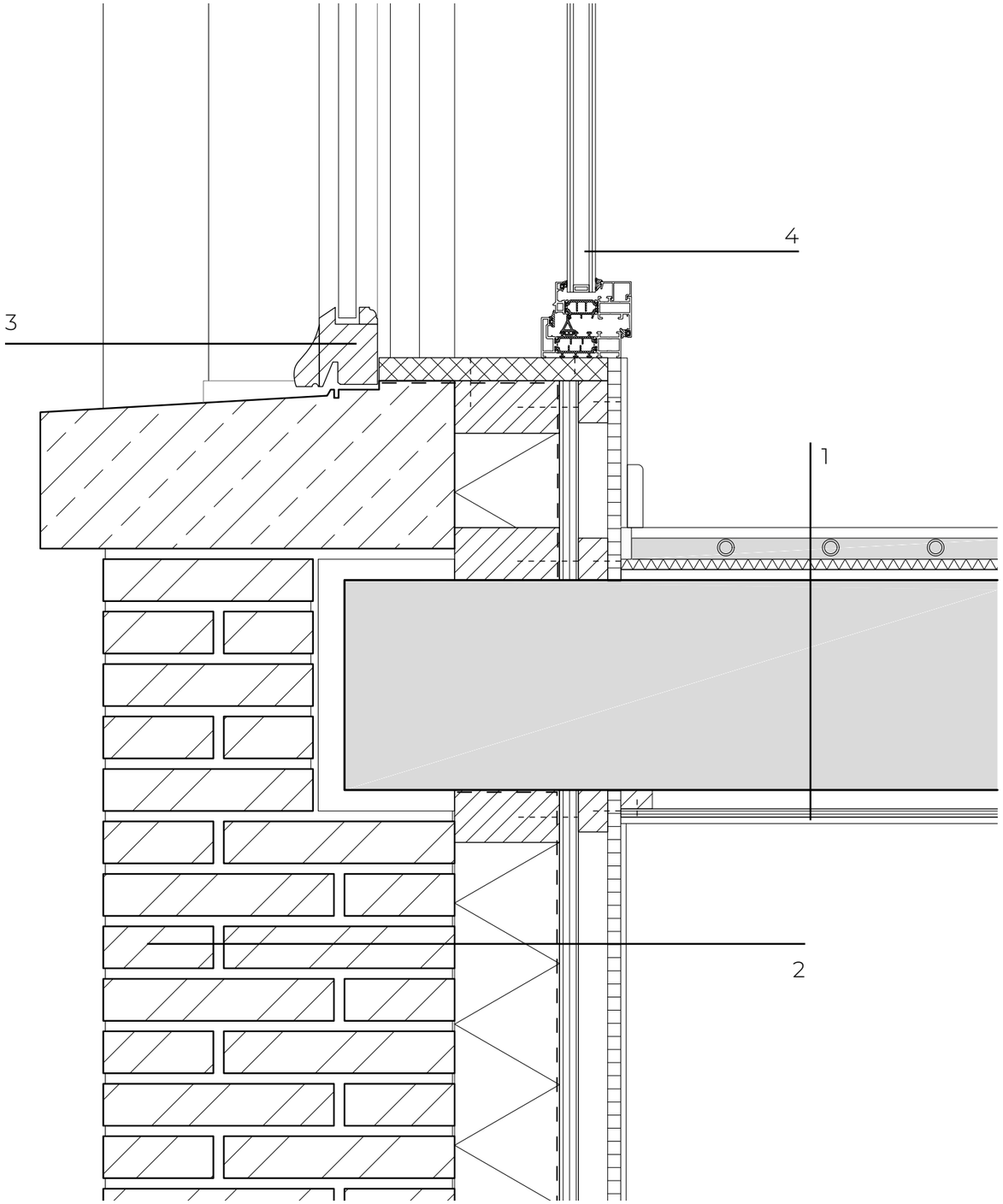
1 Wall
- Existing masonry wall 335 mm
- PIR insulation 100 mm (R=4,5) in wooden stud frame
- Vapor barrier layer 1 mm
- OSB 18 mm
- Cavity for electricity 28 mm
- Gypsum plate 12.5 mm
- Plaster 5 mm

2 Roof
- Existing wooden roof structure
- Existing wooden roof decking
- Vapour barrier layer
- PIR insulation 100 mm (R=4,54)
- Vapour permeable layer
- Existing rooftiles

3
Zinc cover

D7 | Vertical detail | connection eave - gutter - insulated roof (1:5)

0 100MM



1 Floor
- Stucco finish
- Plasterboard on wooden structure
- Existing concrete floor 200 mm
- Woodfibre board 10 mm
- XPS insulation 10 mm
- Fermacell floor plates 2x9 mm with milled floorheating tubes + 2 mm leveling compound
- PVC floor finish 8 mm with PU rubber underlay 2 mm

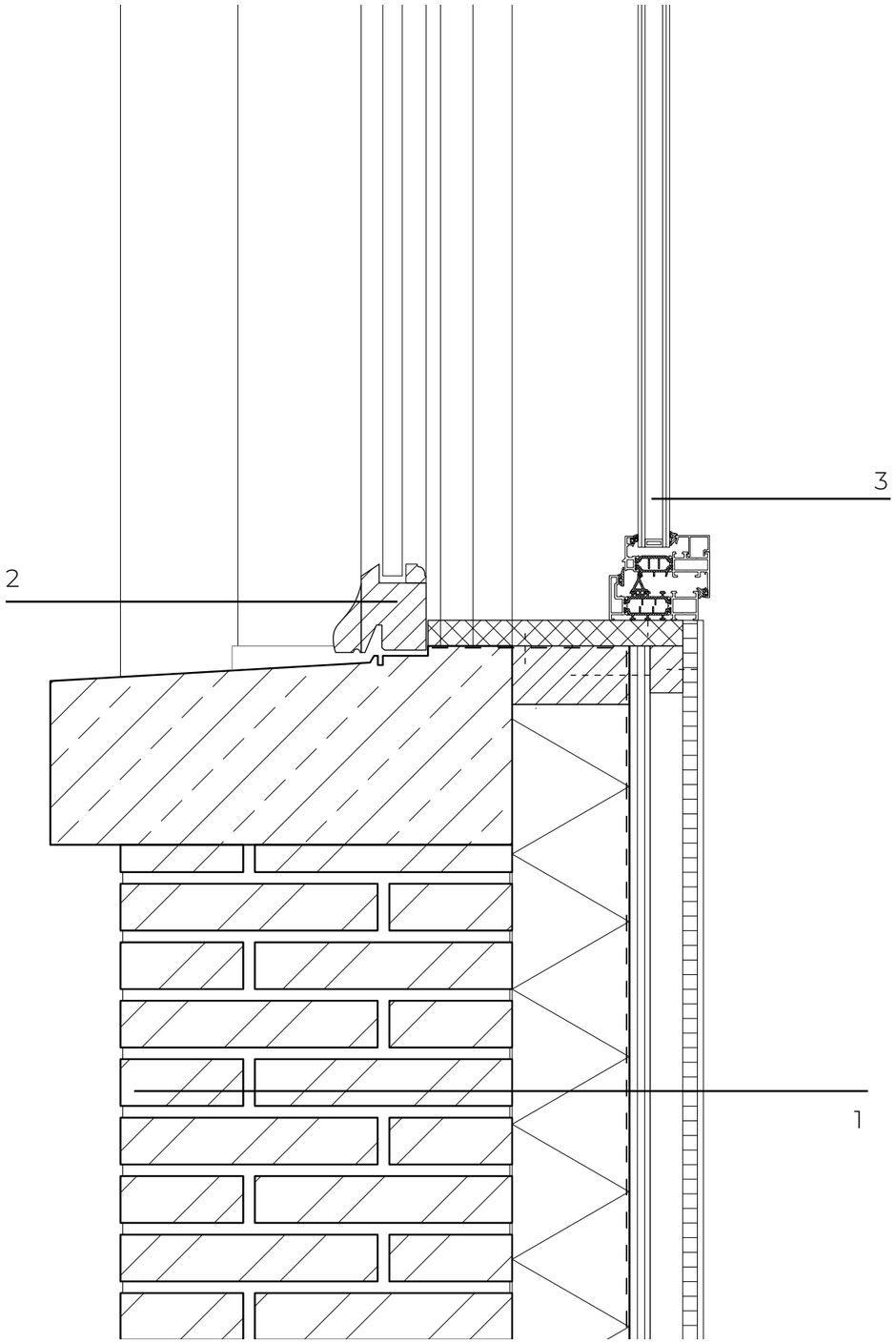
2 Wall
- Existing masonry wall 335 mm
- PIR insulation 100 mm (R=4,5) in wooden stud frame
- Vapor barrier layer 1 mm
- OSB 18 mm
- Cavity for electricity 28 mm
- Gypsum plate 12.5 mm
- Plaster 5 mm

3
Existing window

4
Fixed secondary window with fireproof glazing

D8 | Vertical detail | connection façade - first floor (1:5)

0 100MM



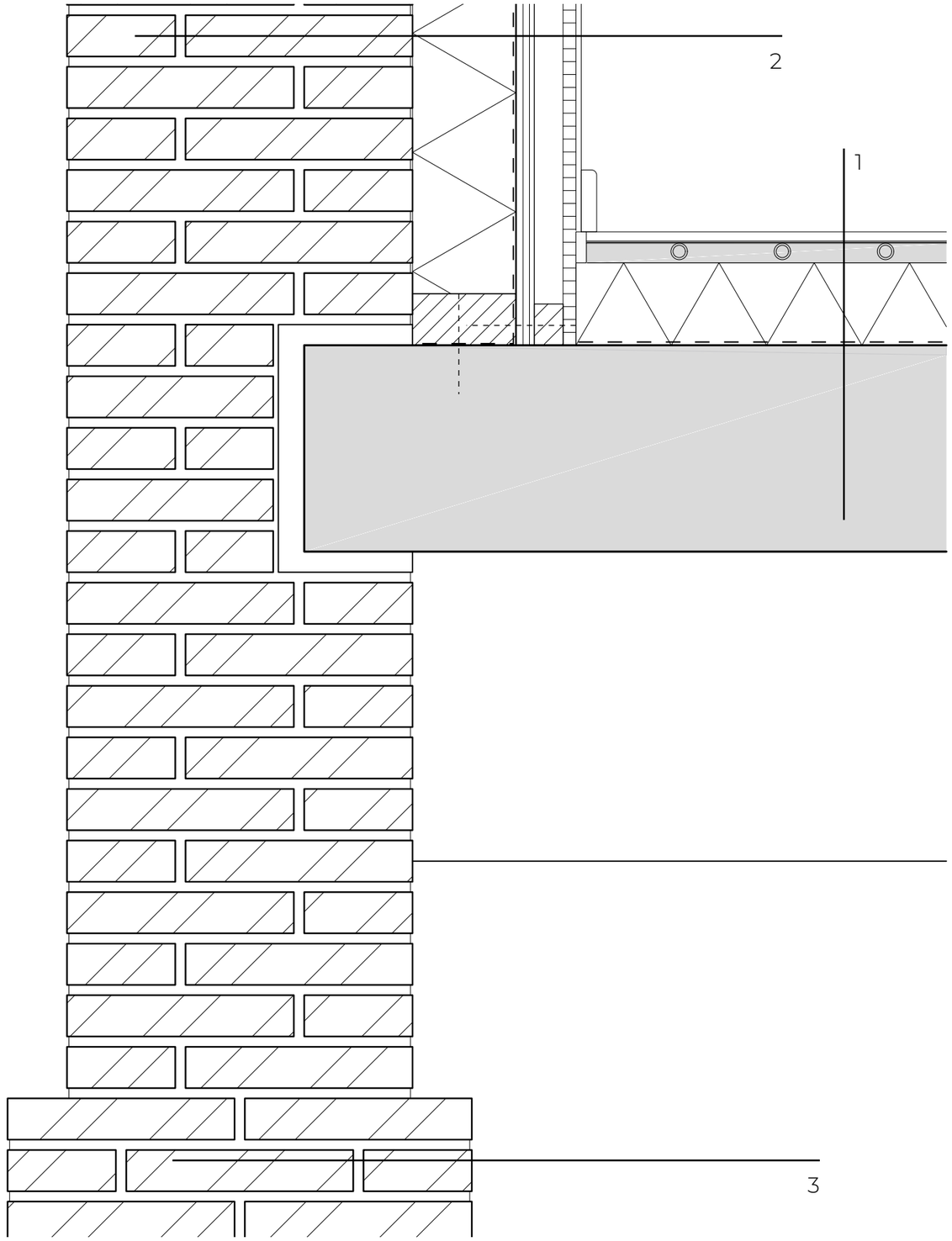
1 Wall
- Existing masonry wall 335 mm
- PIR insulation 100 mm (R=4,5) in wooden stud frame
- Vapor barrier layer 1 mm
- OSB 18 mm
- Cavity for electricity 28 mm
- Gypsum plate 12.5 mm
- Plaster 5 mm

2
Existing window

3
Fixed secondary window with fireproof glazing

D9 | Vertical detail | - Façade with added insulation and secondary window (1:5)

0 100MM



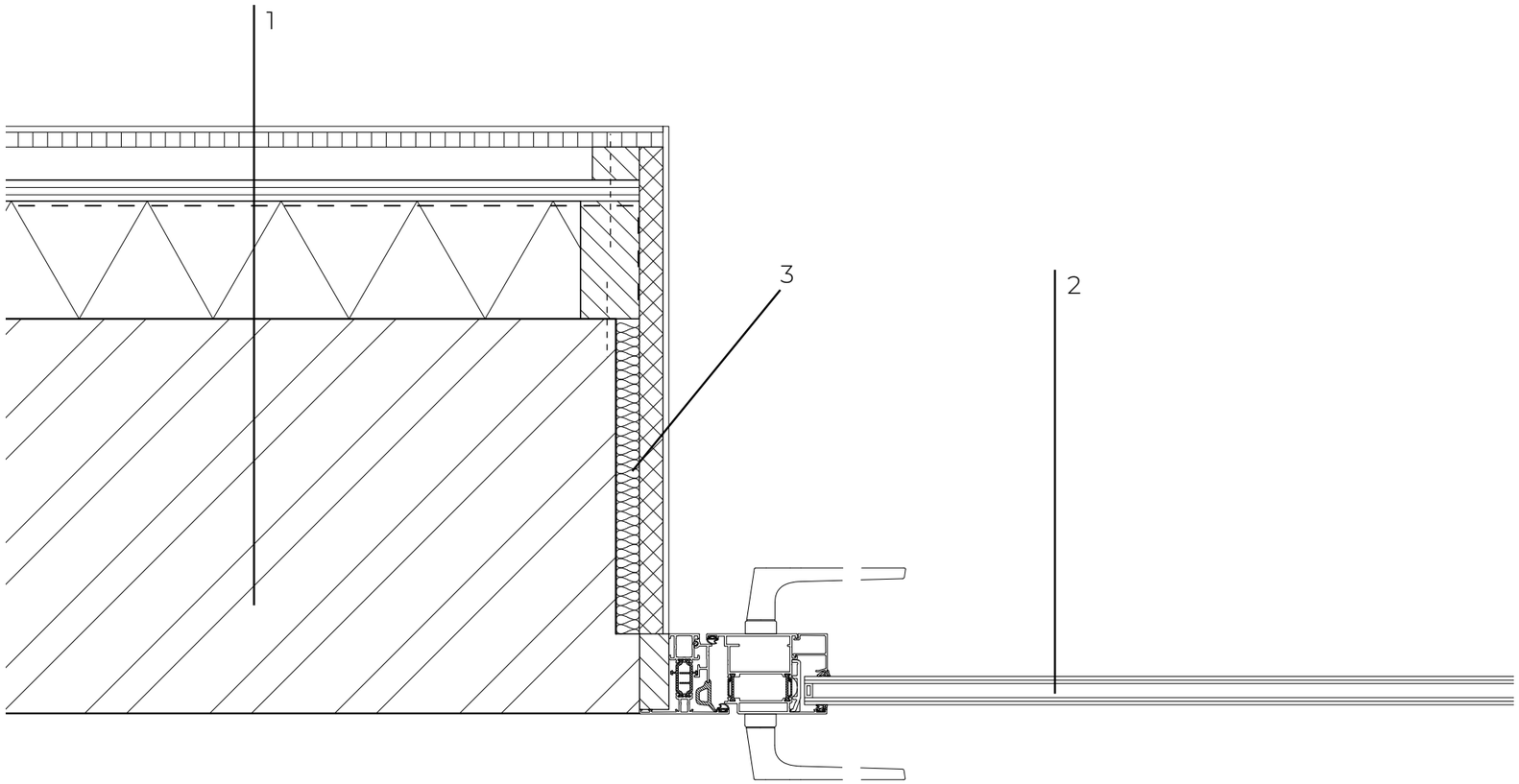
1 Floor
- Existing concrete floor 200 mm
- Vapor barrier layer 1 mm
- PIR insulation 80 mm (R=3,63)
- Fermacell floor plates 2x9 mm with milled floorheating tubes + 2 mm leveling compound
- PVC floor finish 8 mm

2 Wall
- Existing masonry wall 335 mm
- PIR insulation 100 mm (R=4,5) in wooden stud frame
- Vapor barrier layer 1 mm
- OSB 18 mm
- Cavity for electricity 28 mm
- Gypsum plate 12.5 mm
- Plaster 5 mm

3
Existing masonry foundation

D10 | Vertical detail | Insulation added to existing façade and ground floor (1:5)

0 100MM



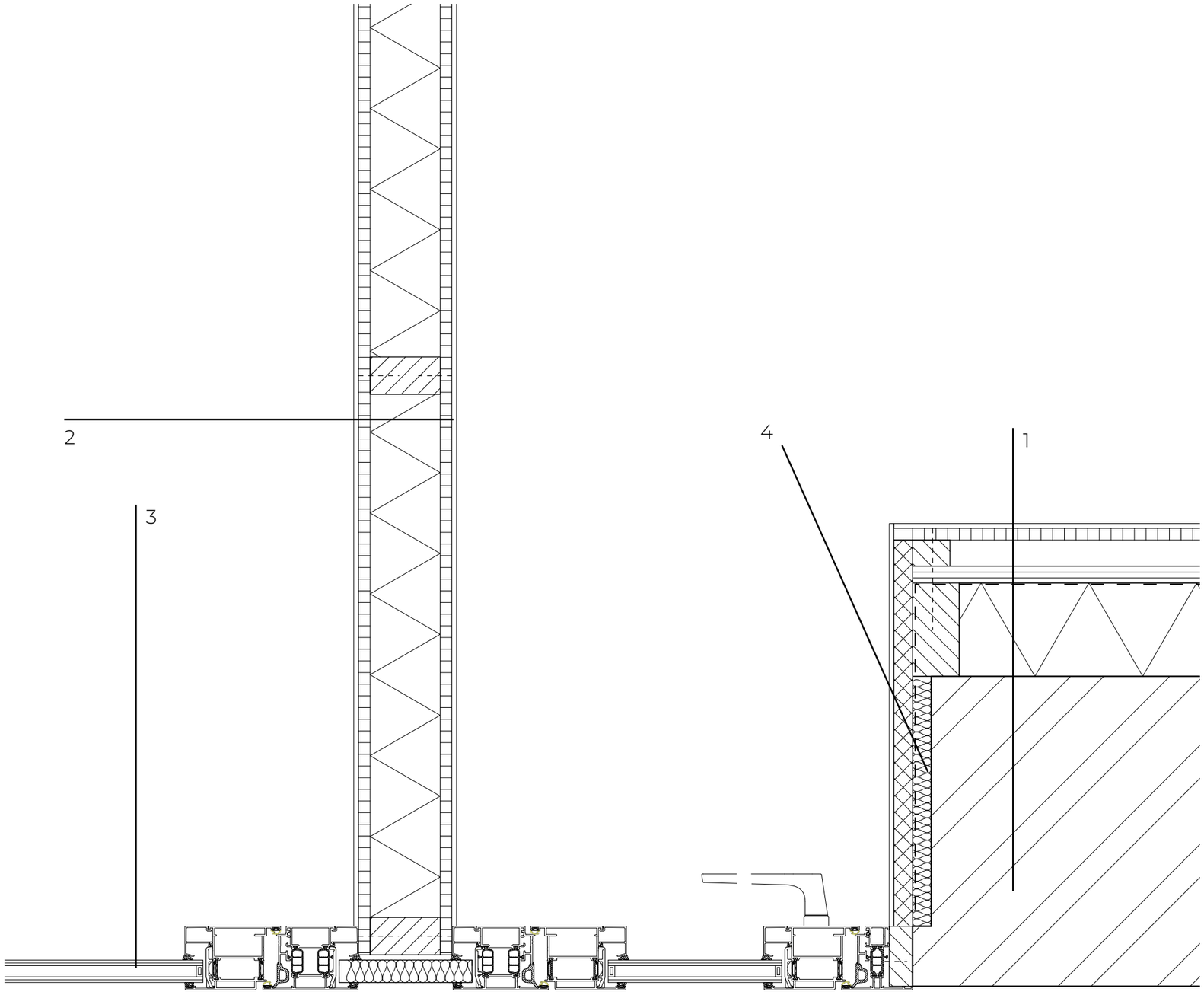
1 Wall
- Existing masonry wall 335 mm
- PIR insulation 100 mm (R=4,5) in wooden stud frame
- Vapor barrier layer 1 mm
- OSB 18 mm
- Cavity for electricity 28 mm
- Gypsum plate 12.5 mm
- Plaster 5 mm

2
Aluminum doors, self closing for firesafety

3
Roofmate insulation 20 mm

D11 | Horizontal detail | new aluminum window frame in existing wall - party wall (1:5)

0 100MM



1 Wall
- Existing masonry wall 335 mm
- PIR insulation 100 mm (R=4,5) in wooden stud frame
- Vapor barrier layer 1 mm
- OSB 18 mm
- Cavity for electricity 28 mm
- Gypsum plate 12.5 mm
- Plaster 5 mm

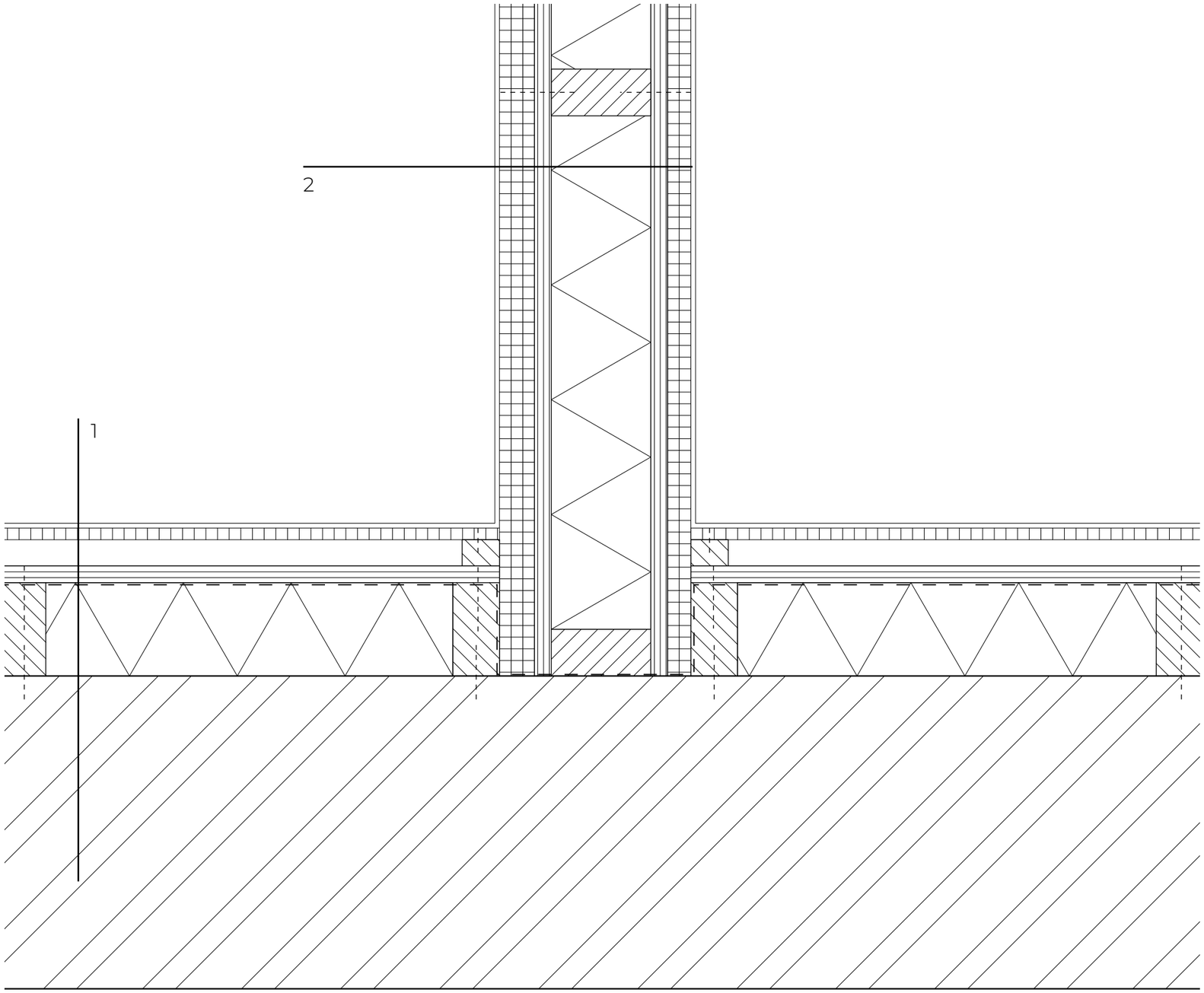
2 Interior wall
- Plaster 5 mm
- Gypsum plate 12,5 mm
- Insulation in wooden stud frame 75 mm
- Gypsum plate 12,5 mm
- Plaster 5 mm

3
Aluminum doors, self closing for firesafety

3
Roofmate insulation 20 mm

D12 | Horizontal detail - new aluminum window and door frame (1:5)

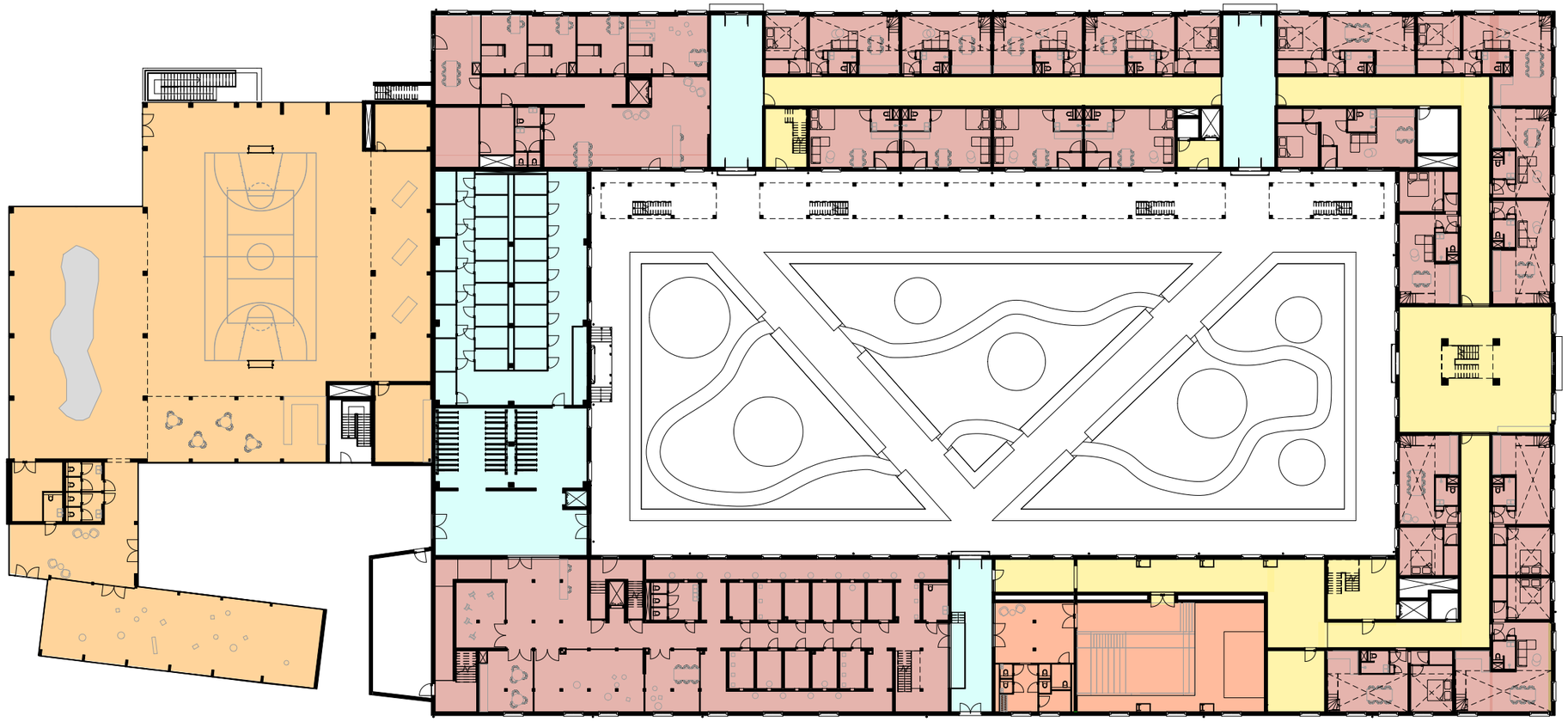
0 100MM



1 Wall
- Existing masonry wall 335 mm
- PIR insulation 100 mm (R=4,5) in wooden stud frame
- Vapor barrier layer 1 mm
- OSB 18 mm
- Cavity for electricity 28 mm
- Gypsum plate 12.5 mm
- Plaster 5 mm

2 Party wall firebreak
- Bathroom tile finish 10 mm
- Waterproof gypsum plate 2 x 12.5
- OSB 18 mm
- Mineral wool insulation 106 mm in wooden frame
- OSB 18 mm
- Gypsum plate 12.5 mm on acoustic strip
- Gypsum plate 2 x 12.5 mm
- Leemstuc finish

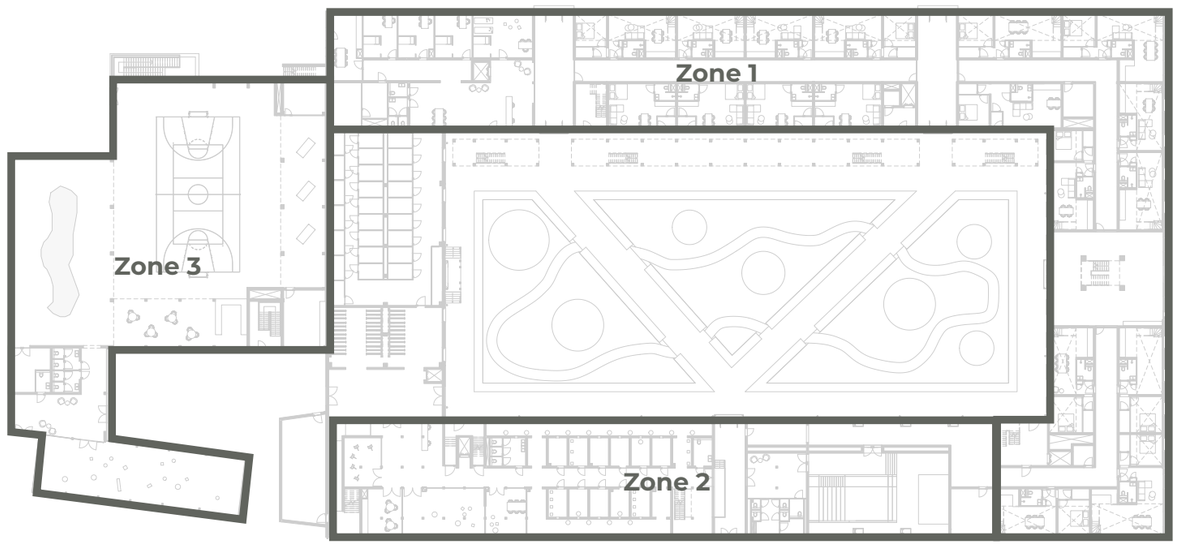
D13 | Horizontal detail | connection facade with added insulation - party wall (1:5)



Housing constant heating/cooling during the day
Auditorium; occasionally heated
Multifunctional spaces; temperature dependent on activity or space
Circulation space heated by residual heat
Exterior climate

Desired interior climate

The various functions throughout the building have various heating demands. The dwellings need to have a constant heat during the whole day, while other functions like the exhibition space, the multifunctional volume and auditorium will only be used during the day. The auditorium will even be used occasionally so only needs to be heated during specific moments. The multifunctional volume has heating demands depending on the area in the building and the activity for which it will be used. For activities related to sport another climate is desired than for a flea market for example. Also the volume includes a small café area in which another temperature is desired than in the rest of the volume during sports activities. The hallways have a lower temperature than the other parts of the building and are heated by the residual heat of the apartments.



Zone 1:

- Insulation of original facade on interior
- Insulation of existing roof on exterior
- Secondary window frames with HR++ Glazing (openable)
- New aluminum windows and doors with HR++ glazing

Heating:
- LTV floor heating and cooling
- Pre-heated / pre-cooled ventilation

Ventilation:
- Mechanical ventilation system with sensors and openable windows

Zone 2:

- Insulation of original facade on interior
- Insulation of existing roof on exterior
- Secondary window frames with HR++ Glazing (openable)
- New aluminum windows and doors with HR++ glazing

Heating:
- LTV floor heating and cooling
- Air heating via pre heated ventilation system
- Radiators (LTV) if not sufficient

Ventilation:
Mechanical ventilation system

Zone 3:

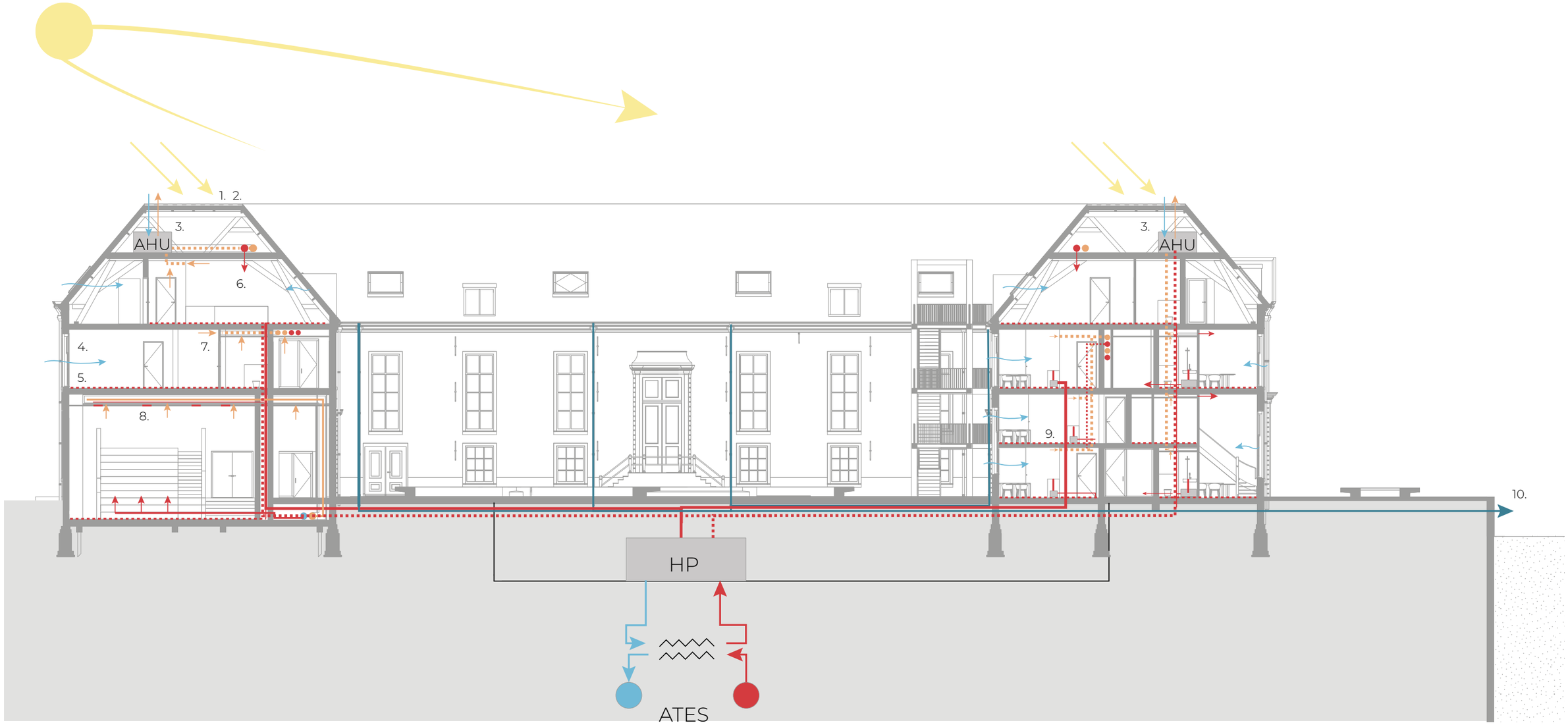
- Insulation of original facade on interior
- Insulation of existing roof on exterior
- Secondary window frames with HR++ Glazing (openable)
- New aluminum windows and doors with HR++ glazing

Heating:
- Infrared heating panels

Ventilation:
Mechanical ventilation system

Climate zones

Due to the multiple demands for interior climate, the climate design is separated into three zones. The first one for the dwellings, in which constant heating or cooling is desired during the day, makes use of floor heating and colling and a hybrid ventilation with a mechanical ventilation system with sensors and openable windows. Zone two for the auditorium and exhibition and atelier space in the cell block requires more heat than only the floor heating. Therefore the air of the ventilation system will be pre-heated so it can be used for heating the space as well. This requires larger dimension ventilation ducts, if it turns out that the ducts become to big for the space, radiators can be used as alternative heating. The third zone is the multifunctional volume that will make use of a mechanical ventilation system and infrared panels for heating. With such panels it is possible to vary the temperature in various areas of a single space and it can be adjusted depending on the activities happening in the spaces.

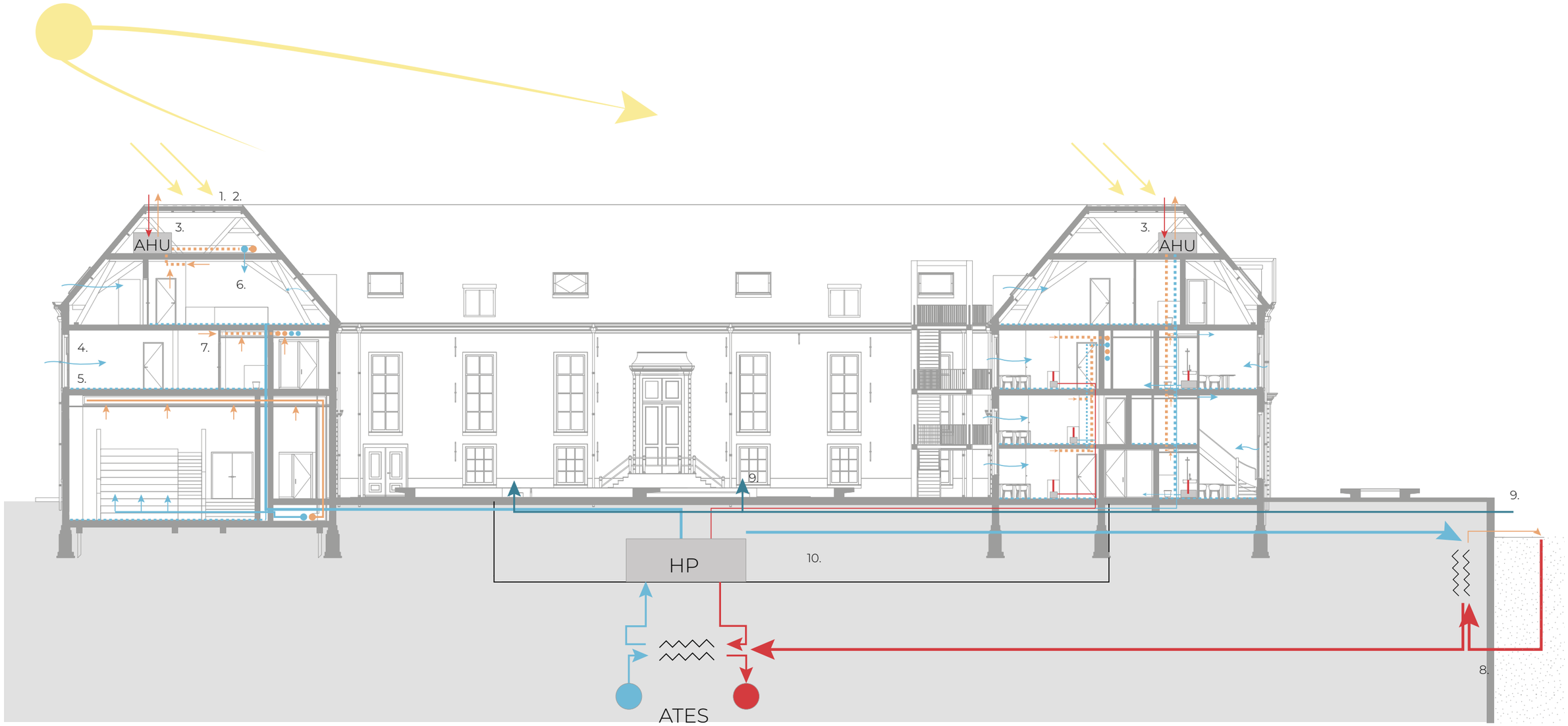


Winter situation

To make the various climate demands possible a ATES (aquifer thermal energy storage or WKO in Dutch) will be used in combination with a heat pump. The heat pump increases the temperature of the water stored in the ATES to the desired heat for the low temperature floor heating. The heat will also be used to pre-heat the blown in air of the mechanical ventilation system in all the climate zones. The air handling units (LBK) will also make use of a heat recovery system, so a part of the heat of the exhaust air will be used the pre-heat the incoming air. Within each apartment, the low temperature warm water will be heated even more with a boiler for the warm tap water for the kitchen and bathroom.

1. PVT panels on flat part of roof for electricity AHU and HP and heating water for WKO
2. Thermal insulated roof
3. Air Handling Units with heat recovery system (WTW) in attic
4. Secondary window frames with HR++ glazing, openable
5. Floor heating (LTV)
6. Hybrid mechanical ventilation
7. Air extraction in bathroom and kitchen
8. Optional infrared panels in auditorium as additional heating
9. Boiler in dwelling for hot tap water
10. Rain water directed to Nieuwe Gracht

Floor heating
HTV heating
Pre-heated air
Exhaust air



Summer situation

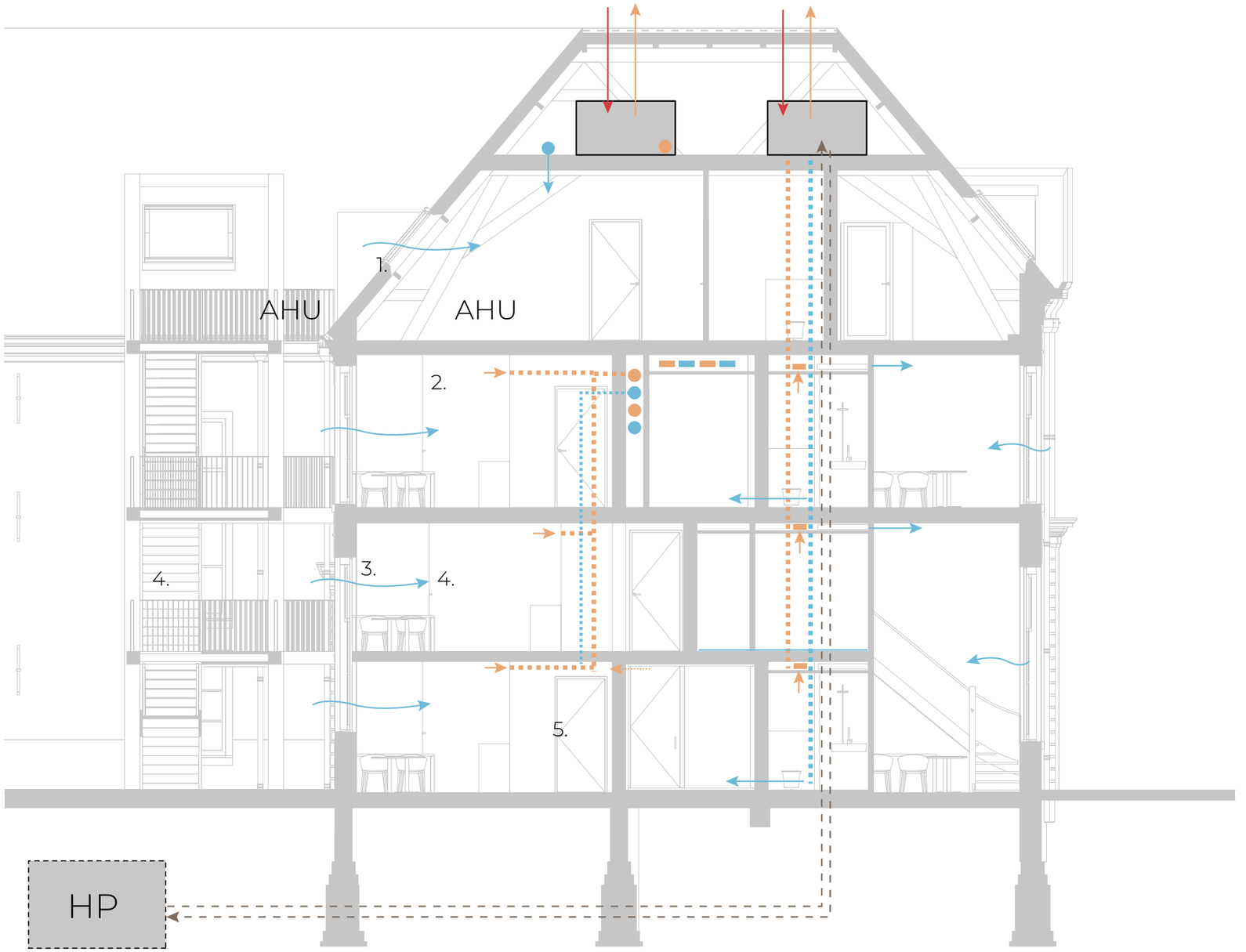
During the summer, the system works the other way around and the cold source of the ATES will be used for floor cooling in all parts of the building and to cool the incoming air of the mechanical ventilation system. The heat of the exhaust air will be recovered and used to heat water that will be stored in the ATES again. Next to this PVT panels are added on the flat parts of the roof of the main building. Those panels provide energy for the heat pump, boilers and infrared panels in the multifunctional volume. Next to energy, those panels also heat water that also will be used to fill the warm storage of the ATES. Additionally, heat from the water surface of the Nieuwe Gracht will be extracted with a heat exchanger to store in the ATES as well that then will be used again during the winter situation.

1. PVT panels on flat part of roof for electricity AHU and HP and heating water for WKO
2. Thermal insulated roof
3. Air Handling Units with heat recovery system (WTW) in attic
4. Secondary window frames with HR++ glazing, openable
5. Floor cooling
6. Hybrid mechanical ventilation
7. Air extraction in bathroom and kitchen
8. Extracting heat from surface water of Nieuwe Gracht for WKO
9. Water from Nieuwe Gracht for irrigation of courtyard
10. Heatpump located in basement newer volume

Floor cooling

Pre-cooled air

Exhaust air



Ventilation

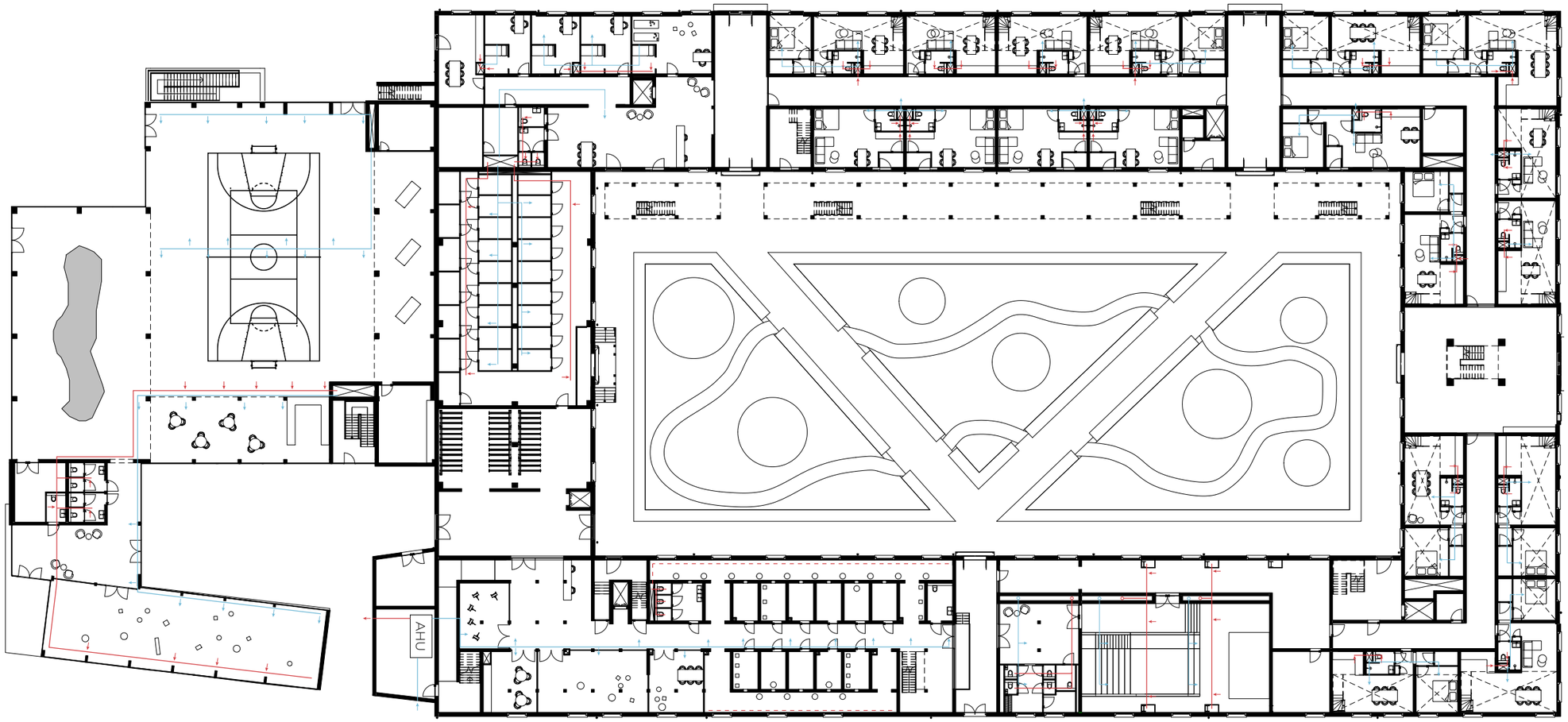
While the entresol floor is maintained in the re-design, the space to solve the ventilation ducts is limited in the biggest part of the building. Therefore, the ventilation is mainly solved in a vertical way by including a shaft in the wet cores of the various apartment typologies. On the first floor and attic it is possible to work horizontally with larger ducts. Air handling units will be placed on the attic and ducts connect to the shafts in the apartments located on the outer side of the building. Via larger shafts in the corner ducts go down to the first floor, than horizontally via lowered ceilings and double walls into the shafts of the apartments on the inner side of the building. Within the apartments, the air is extracted in the bathroom, toilet and kitchen and blown in in other spaces as living room and bedroom via ducts in lowered ceilings. The incoming air will be pre-heated or pre-cooled depending on time of the year and the heat of the extracted air will be recovered to pre-heat the incoming air or will be transferred to water to fill the ATES.

1. AHU with heat recovery system in attic
2. Vertical ducts via shafts in dwellings
3. Horizontal ducts on 1st floor in lowered ceiling or second wall
4. Extract air in bathroom and kitchen, ducts hidden in lowered ceiling
5. Air inlet dwellings, ducts hidden in lowered ceiling

Pre-heated or -cooled air

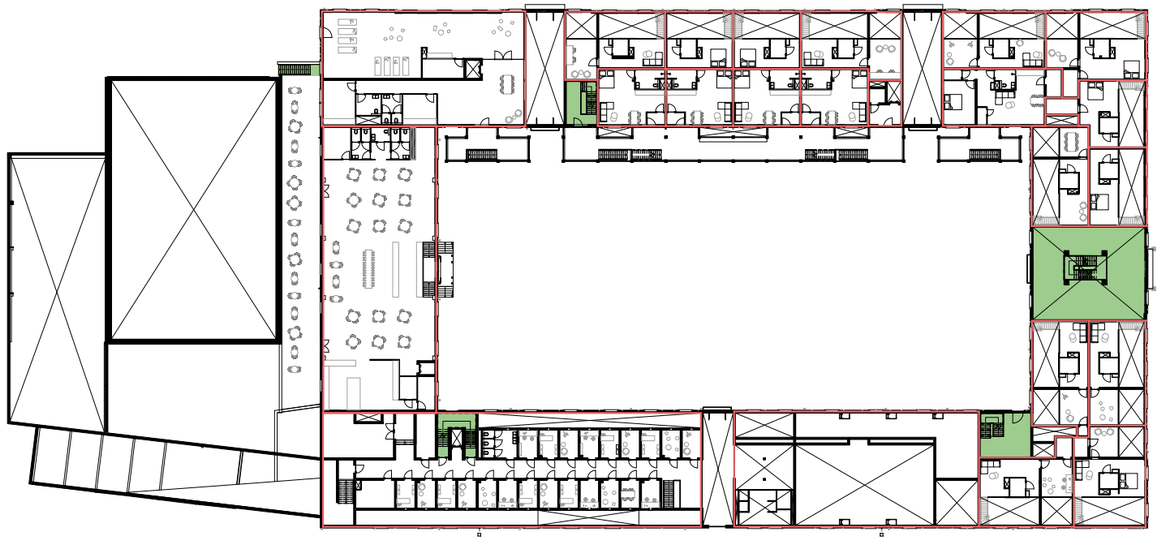
Exhaust air

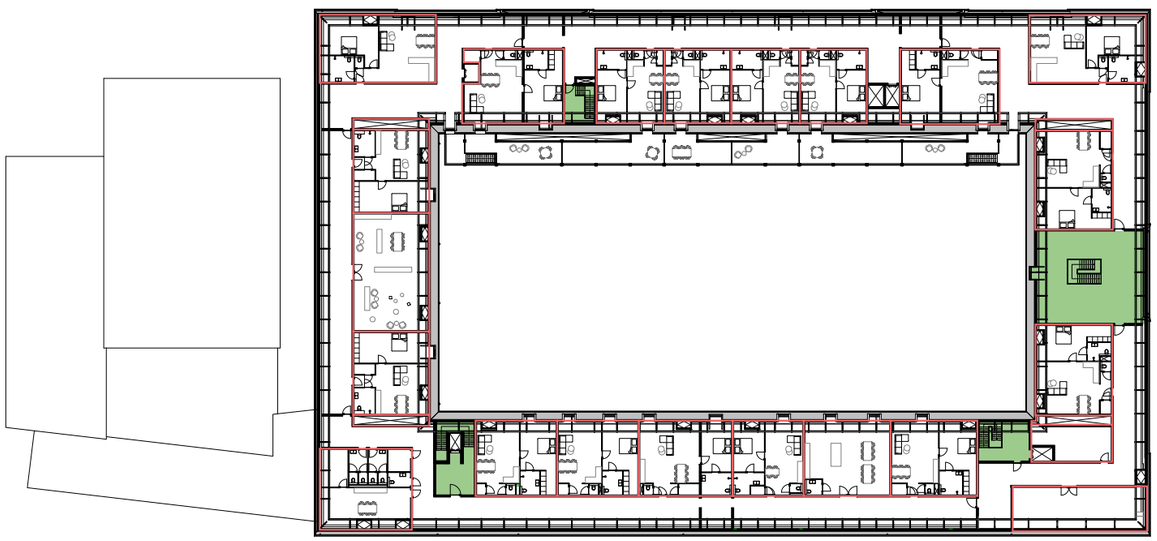
Heat exchanger system (run around coil)

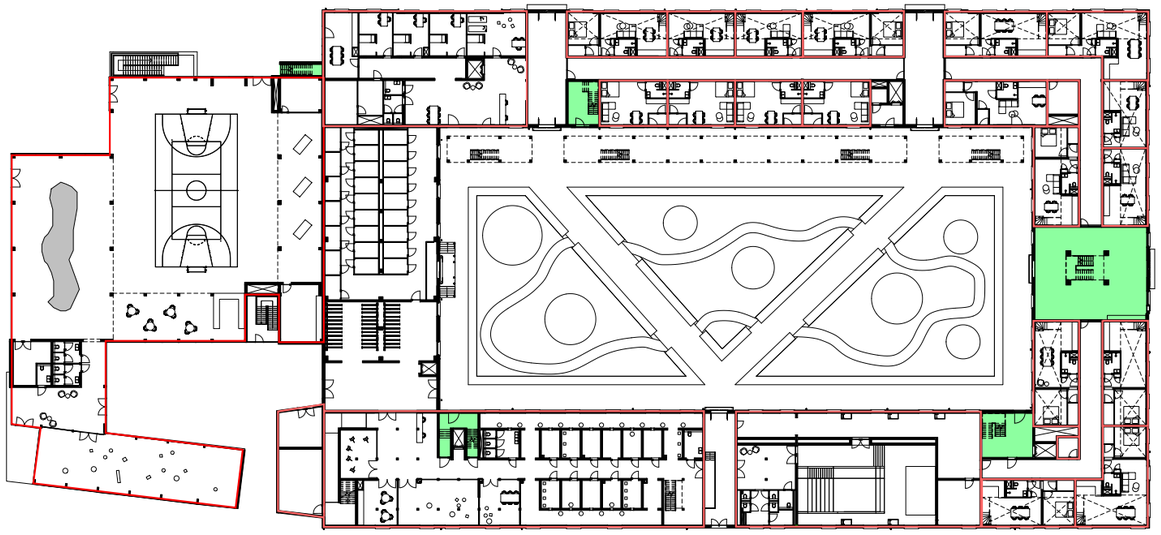


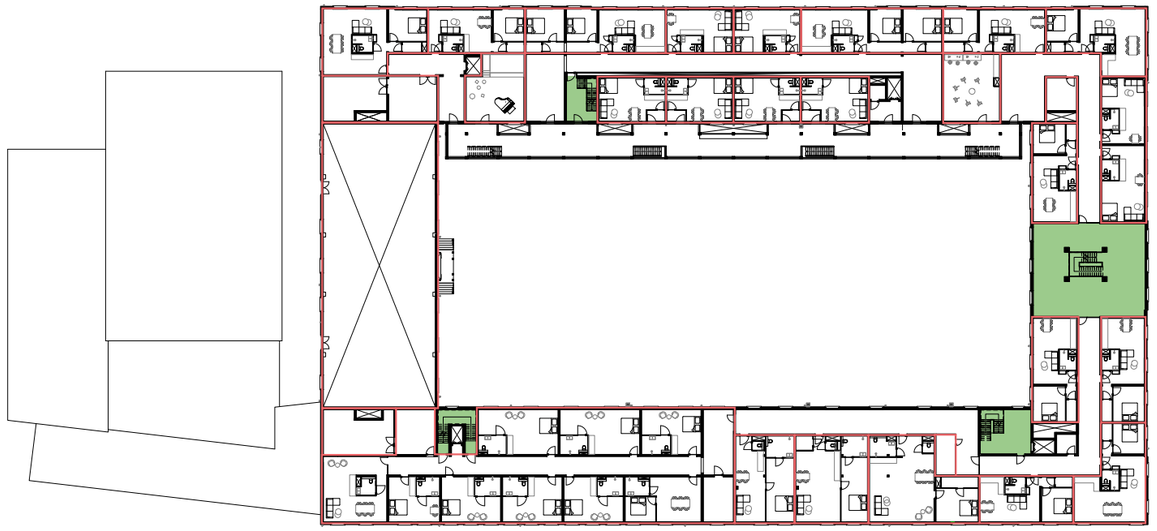
Air in
Air out

For a large part of the building with apartments, the ventilation system is mainly solved in a vertical way. However for other functions in the building some exceptions are visible. The ventilation ducts for the multifunctional volume run through the space and connect to air handling units placed in the basement. Those air handling units need a connection with the exterior with the use of a ‘koekoek’. A double wall is used to get ducts form the shaft in the corner of the building to the auditorium. Within the auditorium, the seating element is used for the incoming air and air will be extracted via the lowered ceiling and ducts in between the large steel beams. In the restaurant, air will be blown in via double ceilings in the kitchen and toilet block that connect to two shafts in the corner of the building. The cell block has a slightly higher free height, so there the ventilation can be solved vertically with extraction in the higher spaces along the facades and air blowing in via ducts in the central corridor.









Fire compartments

Within an apartment building, each individual apartment needs to be a separate fire compartment. Therefore all party walls between apartments, or with other functions need to be fireproof. The cell block with ateliers and exhibition, the restaurant and the health care facilities are all individual fire compartments as well. While all apartments are fire compartments, the corridor needs to be an extra protected emergency route, which also means that the closets connecting to the corridor need to be designed with fire proof walls too. Another exception is the hospice on the second floor, which is also one fire compartment. The passages and through the building make sure that people can flee in 2 directions when a central corridor is used. Staircases and exits to the gallery are located within 30 meters from the apartments. Another exception is the multifunctional volume. The total floor area is larger than the 1000 square meter of a fire compartment. Therefore the multifunctional volume is a so called large fire compartment and uses a sprinkler installation.