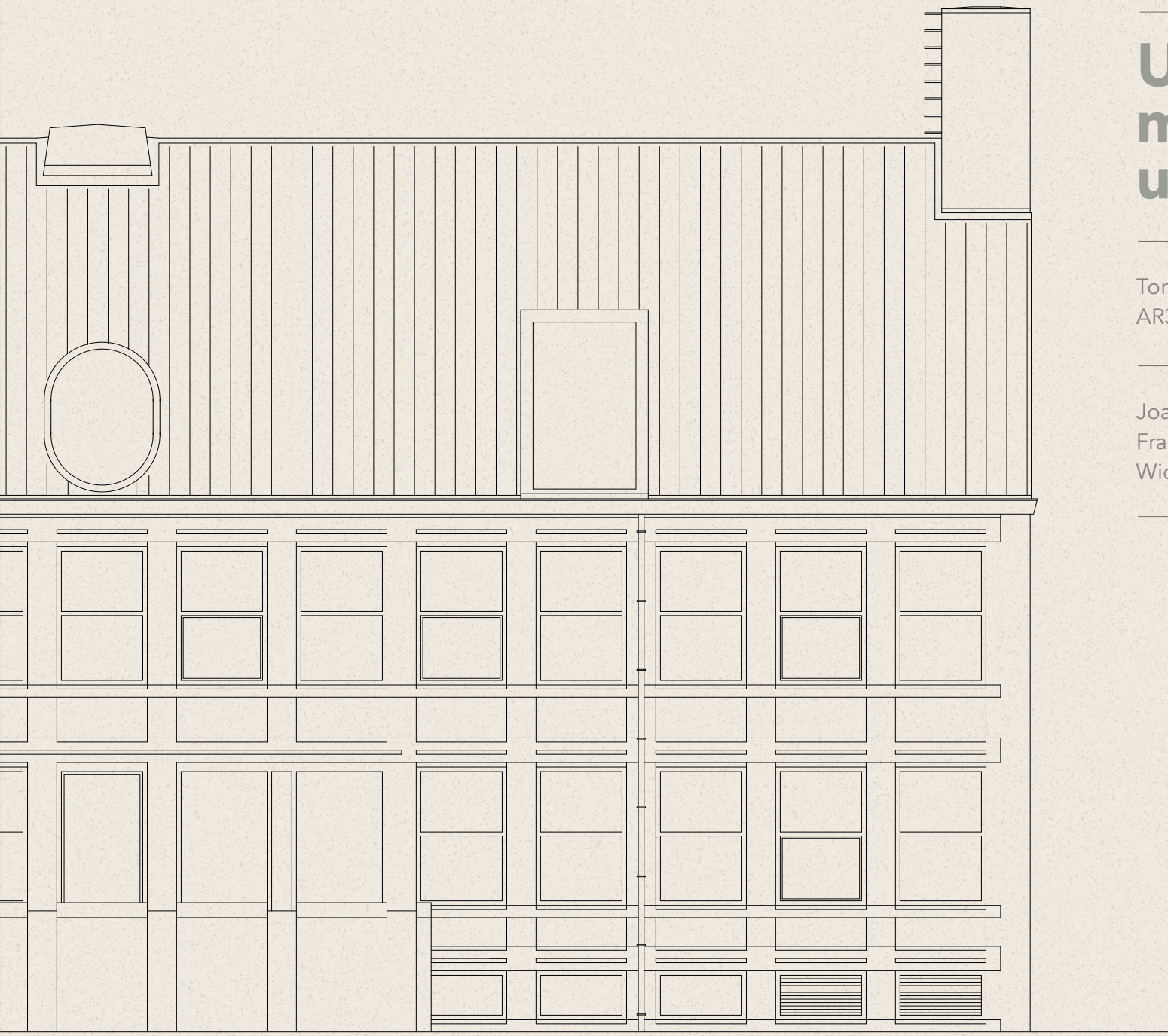




Unknown makes unloved

Tom Gentenaar | 4691180
AR3AH105 | Vacant Heritage

Joana Dos Santos Gonçalves
Frank Koopman
Wido Quist

P5 PRESENTATION



- REORGANISATION POLICE
REAL ESTATE
- DIVEST 700.000 m²
- REDESIGN ASSIGNMENT

POLICE STATION 1969

SOURCES

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



MIDDELBURG

0 m 250 m



EXPANSION

SOURCES

- Rijksdienst voor de Monumentenzorg (1984) Toelichting aanwijzing stadsgezicht Middelburg als beschermd stadsgezicht. p.9



WOODTRADE ALBERTS



SOURCES

- Zeeuws Archief, Zeeuws Genootschap, Zelandia Illustrata, deel II, nr 795



Woodtrade Alberts 1873 - 1958



Fire station & Hardware store 1962



Police station 1969



Office building ~ 1970



Extension to office building ~ 1990



Extension SZEC 2003



SITE HISTORY

0 m 125 m



SOURCES

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



MONUMENTS

0 m 250 m

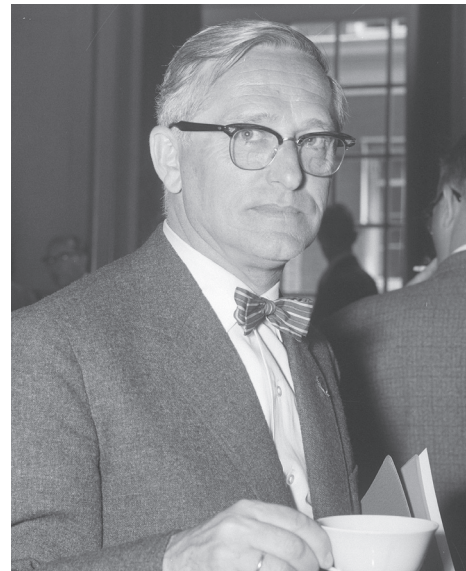
- NATIONAL MONUMENT
- MUNICIPAL MONUMENT
- PROTECTED CITY SCAPE

SOURCES

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



Police station under construction.
Zeeuws Archief



J.F. Berghoef, Nationaal Archief



CIAM 1959, Het Nieuwe Instituut

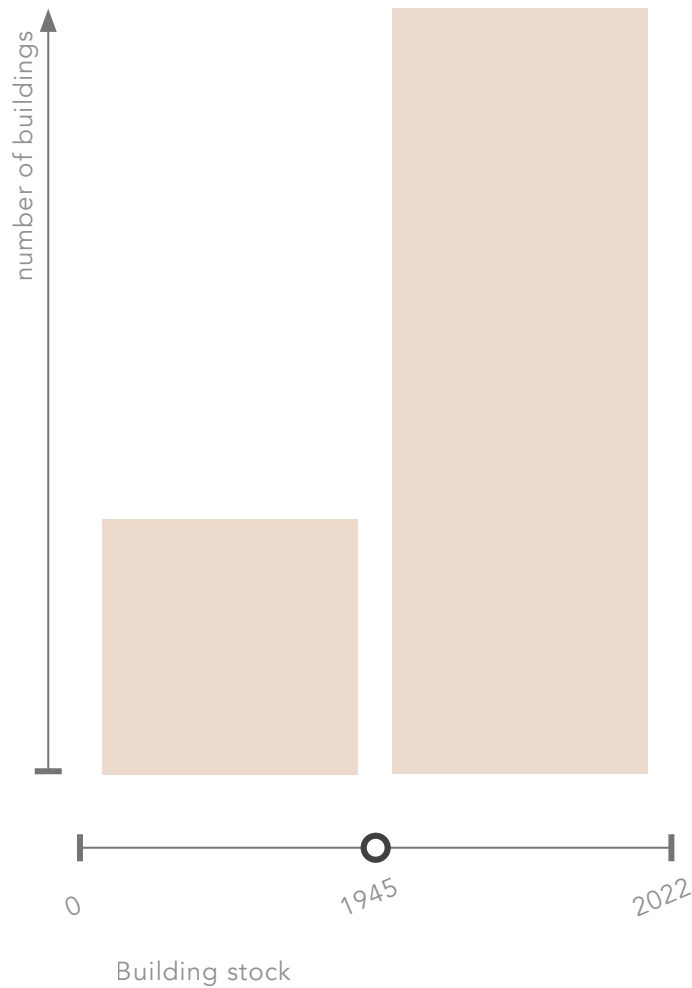
J.F. Berghoef

- Protagonist traditionalist movement
- Modernists are dominant movement in architectural historiography
- Simplified version of architectural history^{1&2}
- Complex web of sub movements and personal signatures²
- Innovative building methods

- 1. Colenbrander, B., & Kirkpatrick, J. (1993). Style : standard and signature in dutch architecture of the nineteenth and twentieth centuries. NAI.
- 2. Bosch-Meyer, J. (2016). Nicht für die ewigkeit: Der architekt Johannes Fake Berghoef (1903-1994) zwischen kontinuierität und erneuerung. University of Groningen

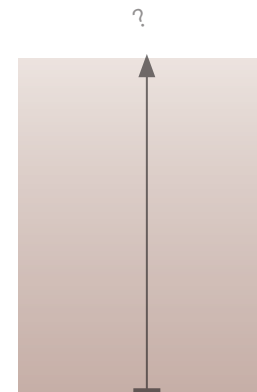
SOURCES

- Zeeuws Archief, Historisch-Topografische Atlas Middelburg (HTAM), A-1368I
- Nationaal Archief, Fotocollectie Anefo Reportage. 912-6618
- Het Nieuwe Instituut, Rotterdam, Congres Team 10 in Otterlo



Listed monuments

SOCIAL SPIRITUAL EMOTIONAL (IND.) EMOTIONAL (COL.) ALLEGORICAL	ECONOMIC USE NON-USE ENTERTAINMENT ALLEGORICAL
POLITICAL EDUCATIONAL MANAGEMENT ENTERTAINMENT SYMBOLIC	HISTORIC EDUCATIONAL HISTORIC-ARTISTIC HISTORIC- CONCEPTUAL
AESTHETICAL ARTISTIC NOTABLE CONCEPTUAL	SCIENTIFIC WORKMANSHIP TECHNOLOGICAL CONCEPTUAL
AGE WORKMANSHIP EXISTENTIAL MATURITY	ECOLOGICAL SPIRITUAL ESSENTIAL EXISTENTIAL



MODEST VALUED BUILDINGS

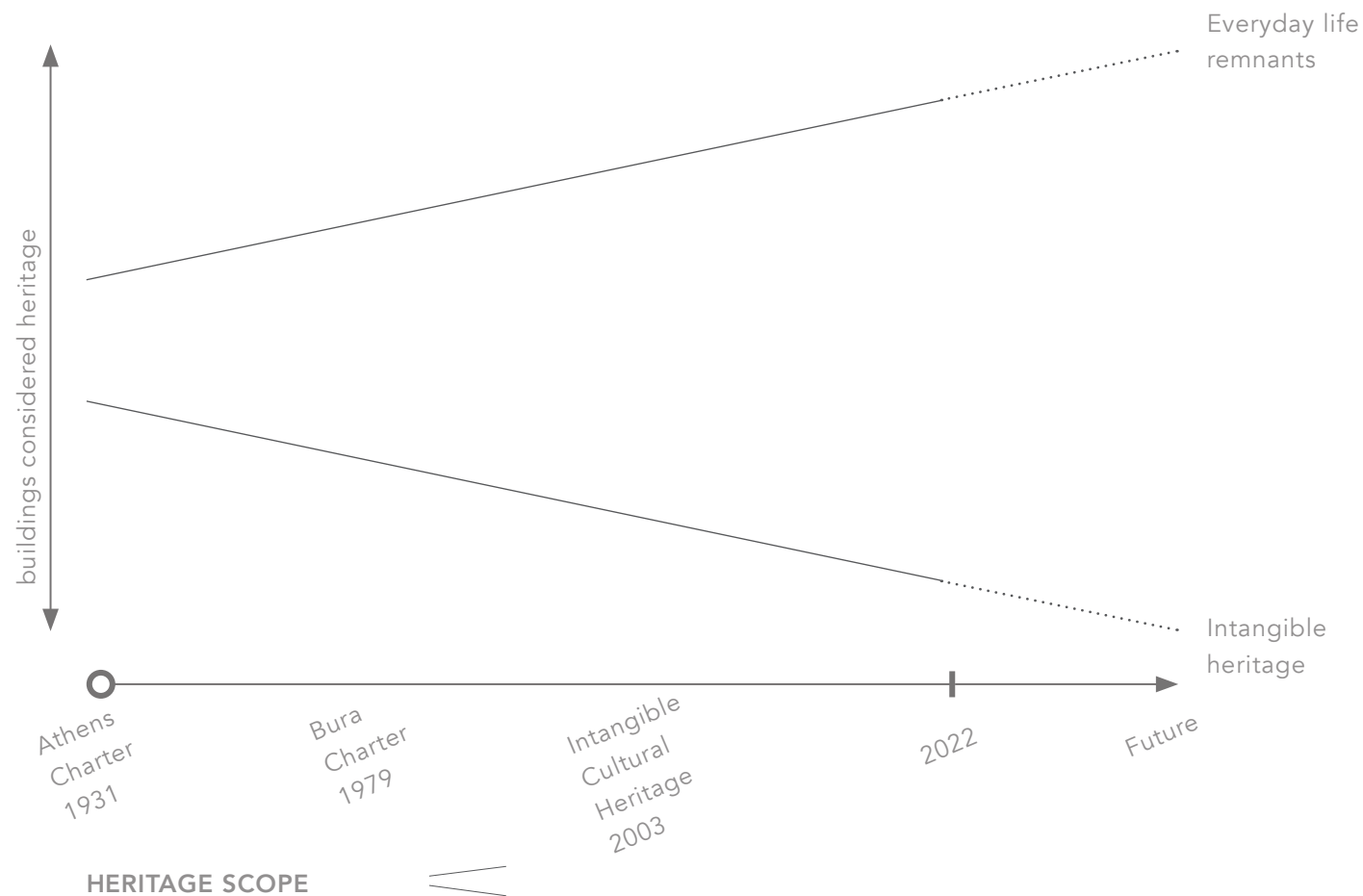
- 75% building stock younger than 77 years
- Not listed ≠ no value

Modest valued if:

- Unlisted
- Heritage value as described by Silva & Roders (2012, p.6)
- Not irreplaceable or indispensable

SOURCES

- Rijksdienst voor cultureel erfgoed (2021) Programma Erfgoed van de 20e eeuw.
- Rijksdienst voor het Cultureel Erfgoed (2022) De Erfgoedmonitor
- Silva, A., & Roders, A. (2012). Cultural heritage management and heritage (impact) assessments. Proceedings of the Joint CIB W, 70, W092.

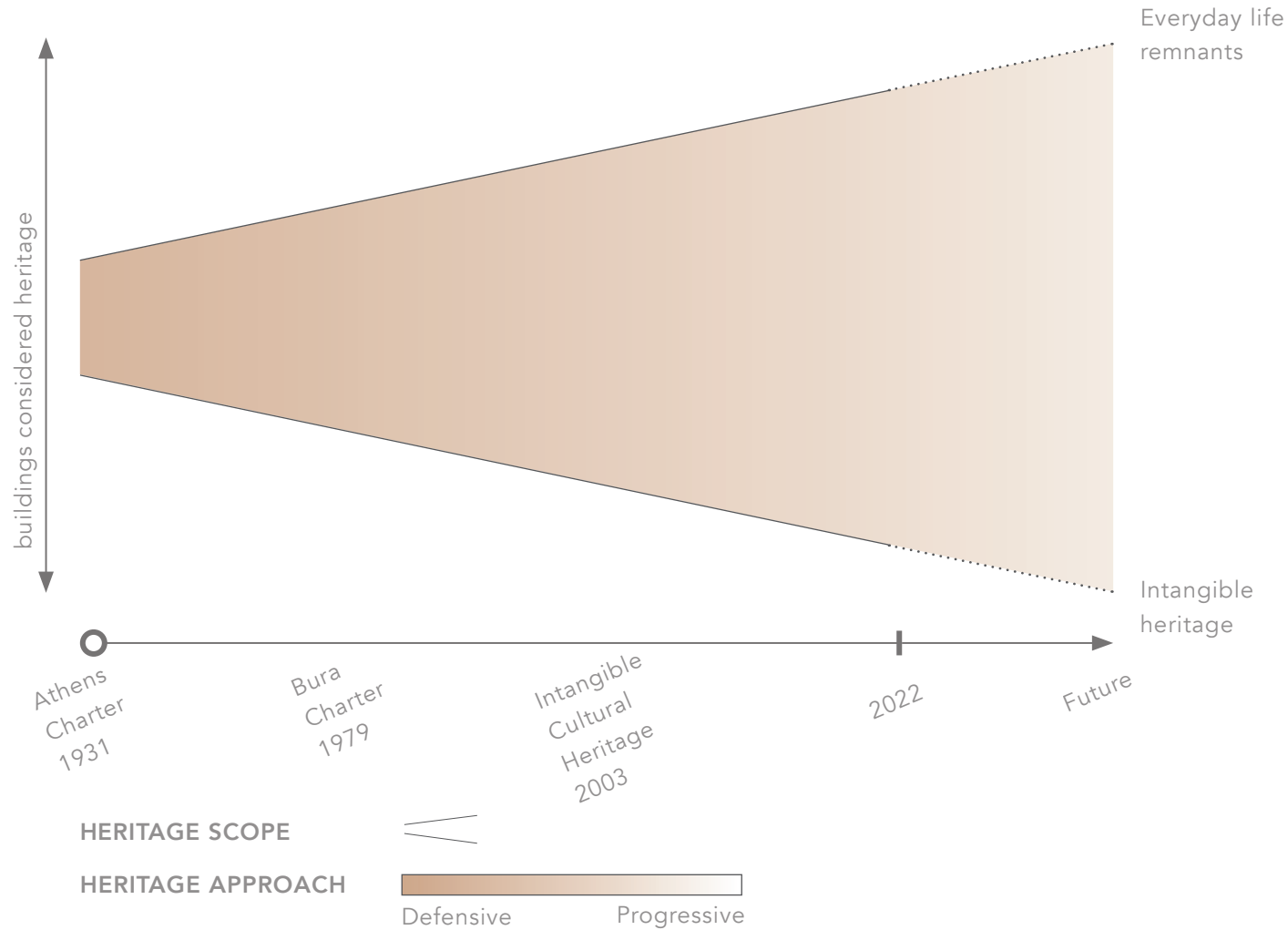


HERITAGE SCOPE

- Widening scope of heritage

SOURCES

- Rijksdienst voor het Cultureel Erfgoed (2013) Oude sporen in een nieuwe eeuw; de uitdaging na Belvedere.
- Gonçalves, J., Mateus, R., Silvestre, J. D., & Roders, A. P. (2020). Contributions to a revised definition of sustainable conservation.

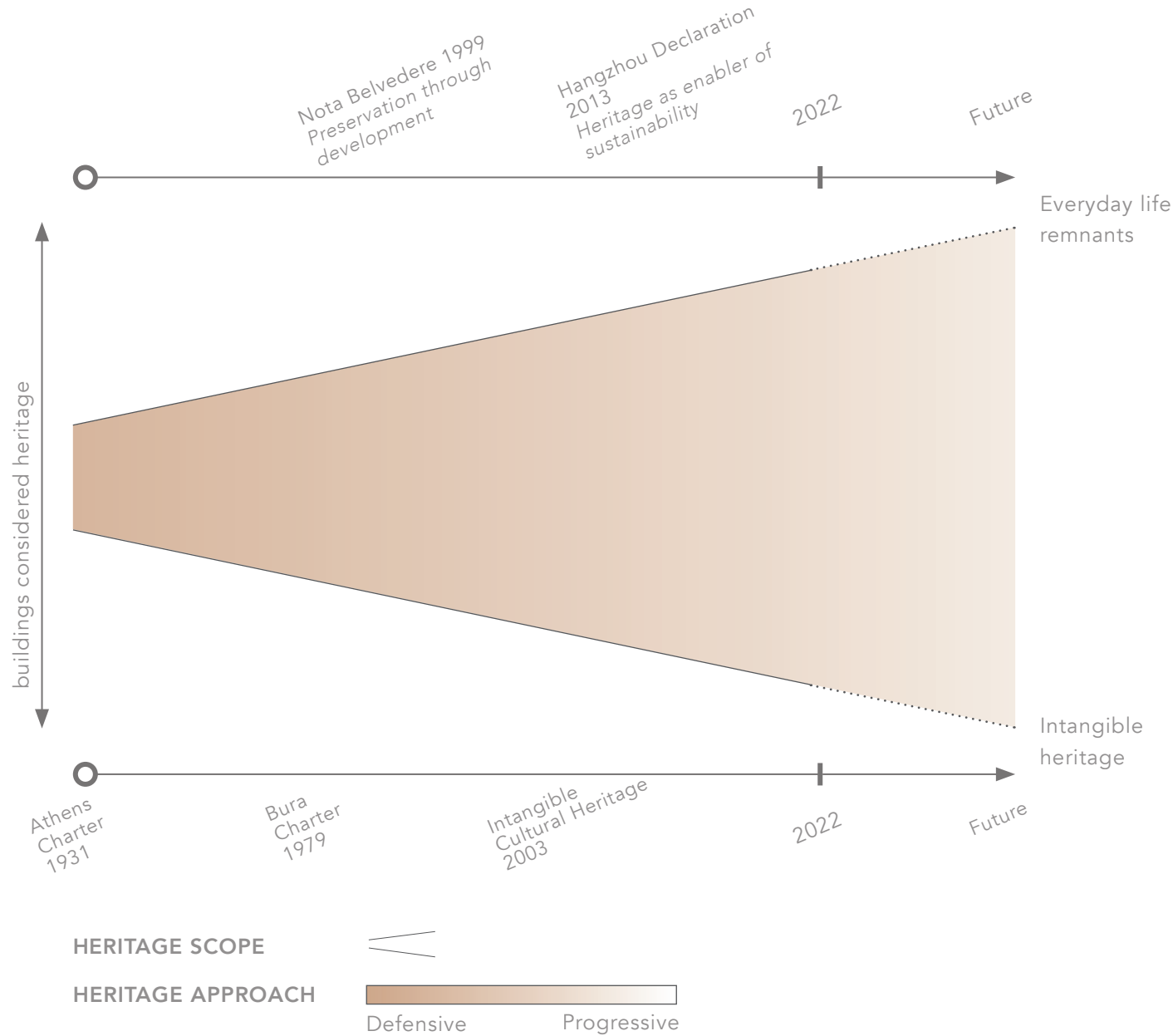


HERITAGE SCOPE

- Widening scope of heritage
- Protection -> Preservation through development

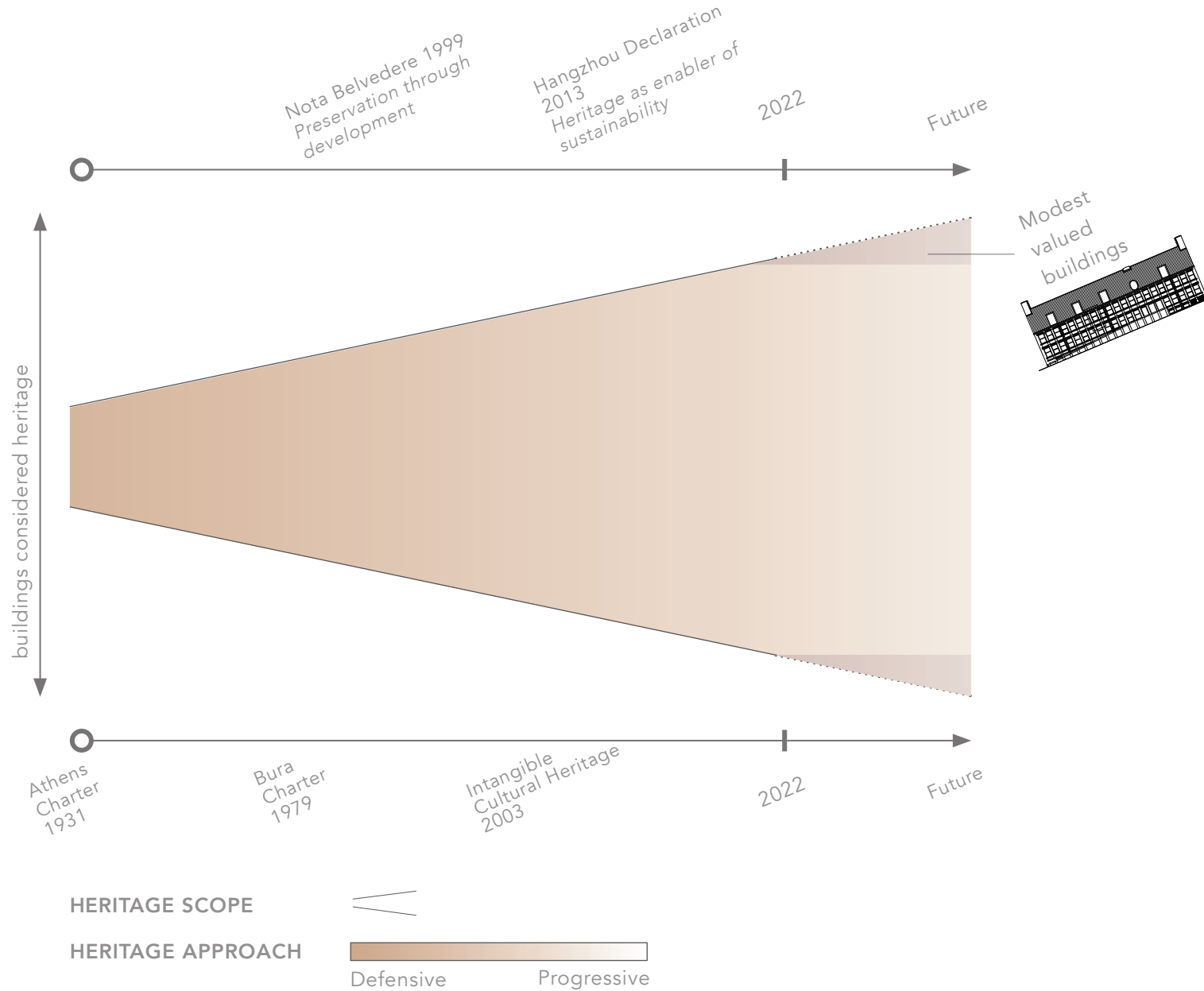
SOURCES

- Rijksdienst voor het Cultureel Erfgoed (2013) Oude sporen in een nieuwe eeuw; de uitdaging na Belvedere.
- Gonçalves, J., Mateus, R., Silvestre, J. D., & Roders, A. P. (2020). Contributions to a revised definition of sustainable conservation.



SOURCES

- Rijksdienst voor het Cultureel Erfgoed (2013) Oude sporen in een nieuwe eeuw; de uitdaging na Belvedere.
- Gonçalves, J., Mateus, R., Silvestre, J. D., & Roders, A. P. (2020). Contributions to a revised definition of sustainable conservation.



HERITAGE SCOPE

- Widening scope of heritage
- Protection -> Preservation through development
- Social engagement

SOURCES

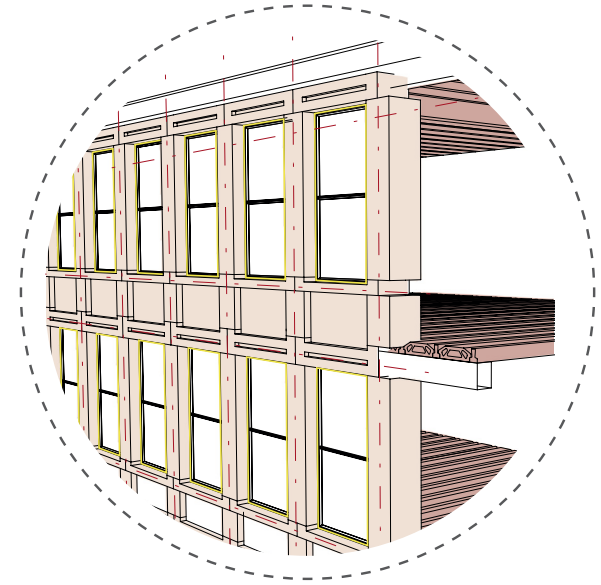
- Rijksdienst voor het Cultureel Erfgoed (2013) Oude sporen in een nieuwe eeuw; de uitdaging na Belvedere.
- Gonçalves, J., Mateus, R., Silvestre, J. D., & Roders, A. P. (2020). Contributions to a revised definition of sustainable conservation.



MEETING NEW DEMANDS



SUSTAINABILITY



HERITAGE VALUE PRESERVATION

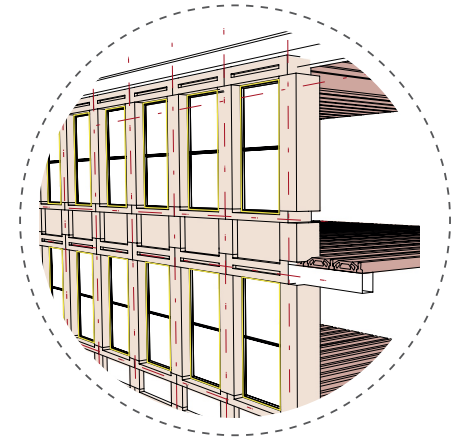
How to redesign the vast late-twentieth century building stock in a way that does justice to its modest cultural value while still enabling a practical and sustainable future use?



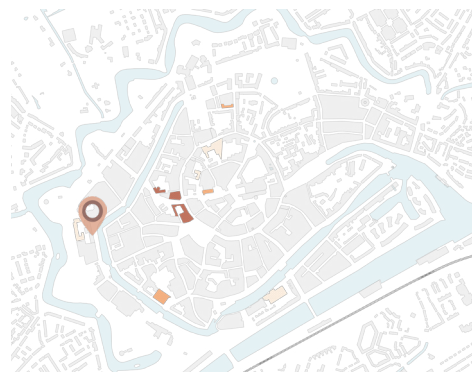
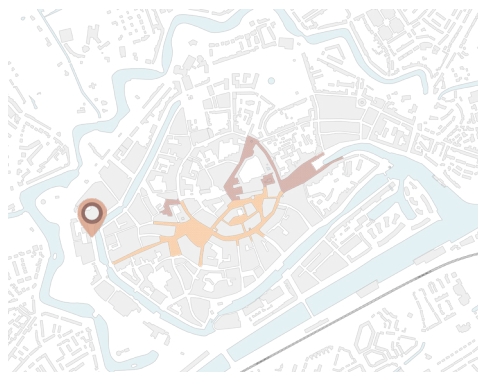
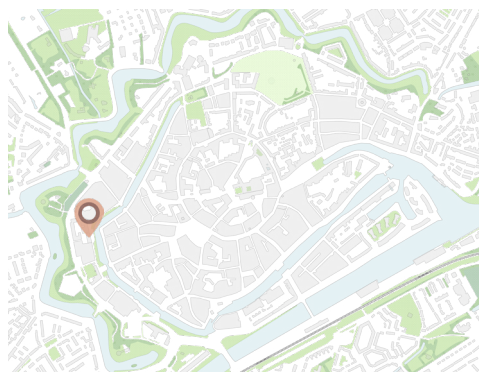
MEETING NEW DEMANDS



SUSTAINABILITY



HERITAGE VALUE PRESERVATION



SITE ANALYSIS

0 m

500 m



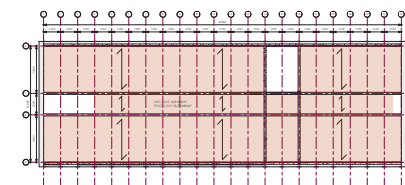
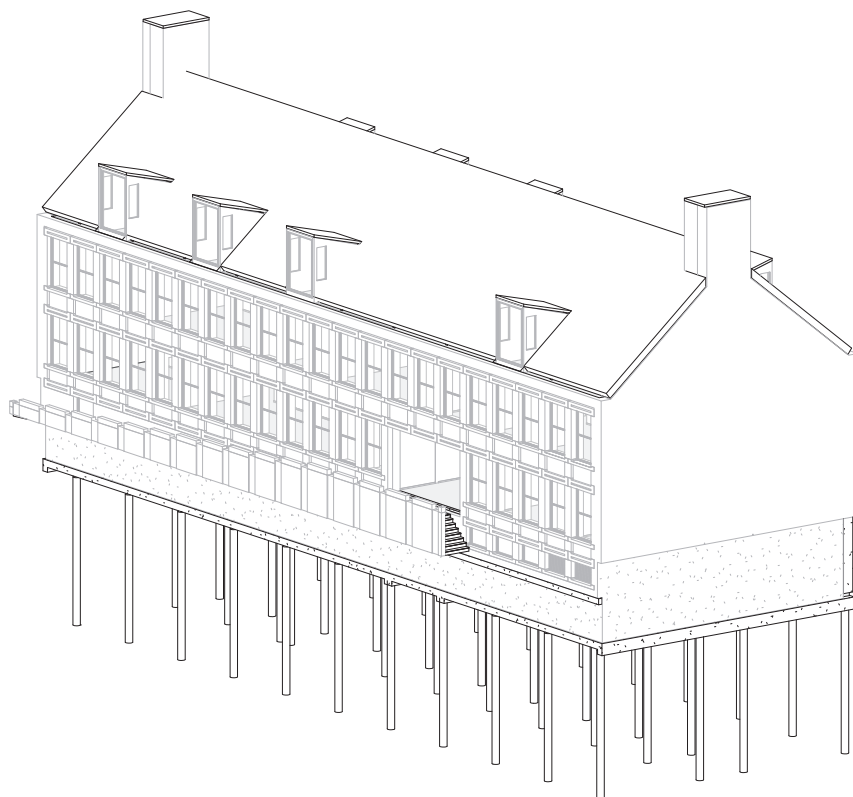


FIGURE 3. LOAD PLAN SECOND FLOOR

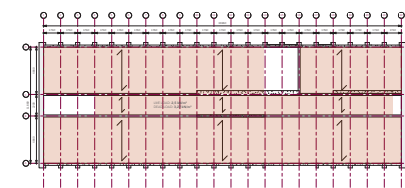


FIGURE 4. LOAD PLAN FIRST FLOOR



BUILDING ANALYSIS



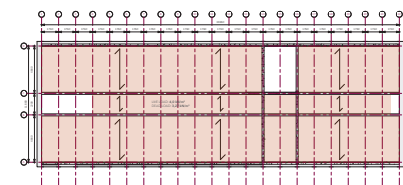
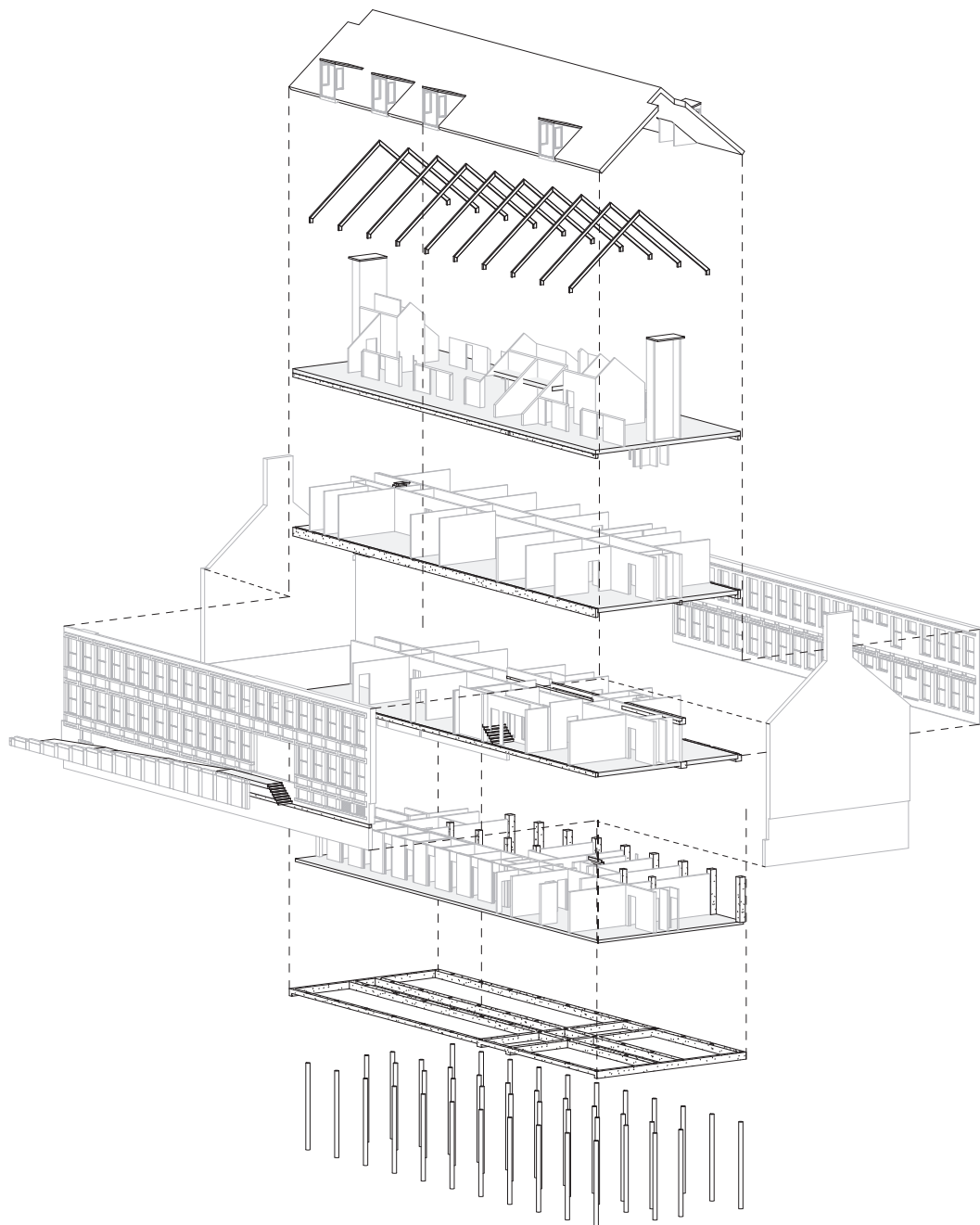


FIGURE 3. LOAD PLAN SECOND FLOOR

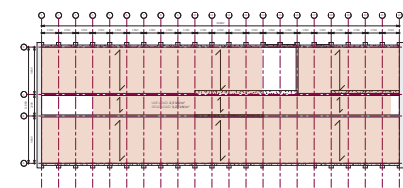


FIGURE 4. LOAD PLAN FIRST FLOOR



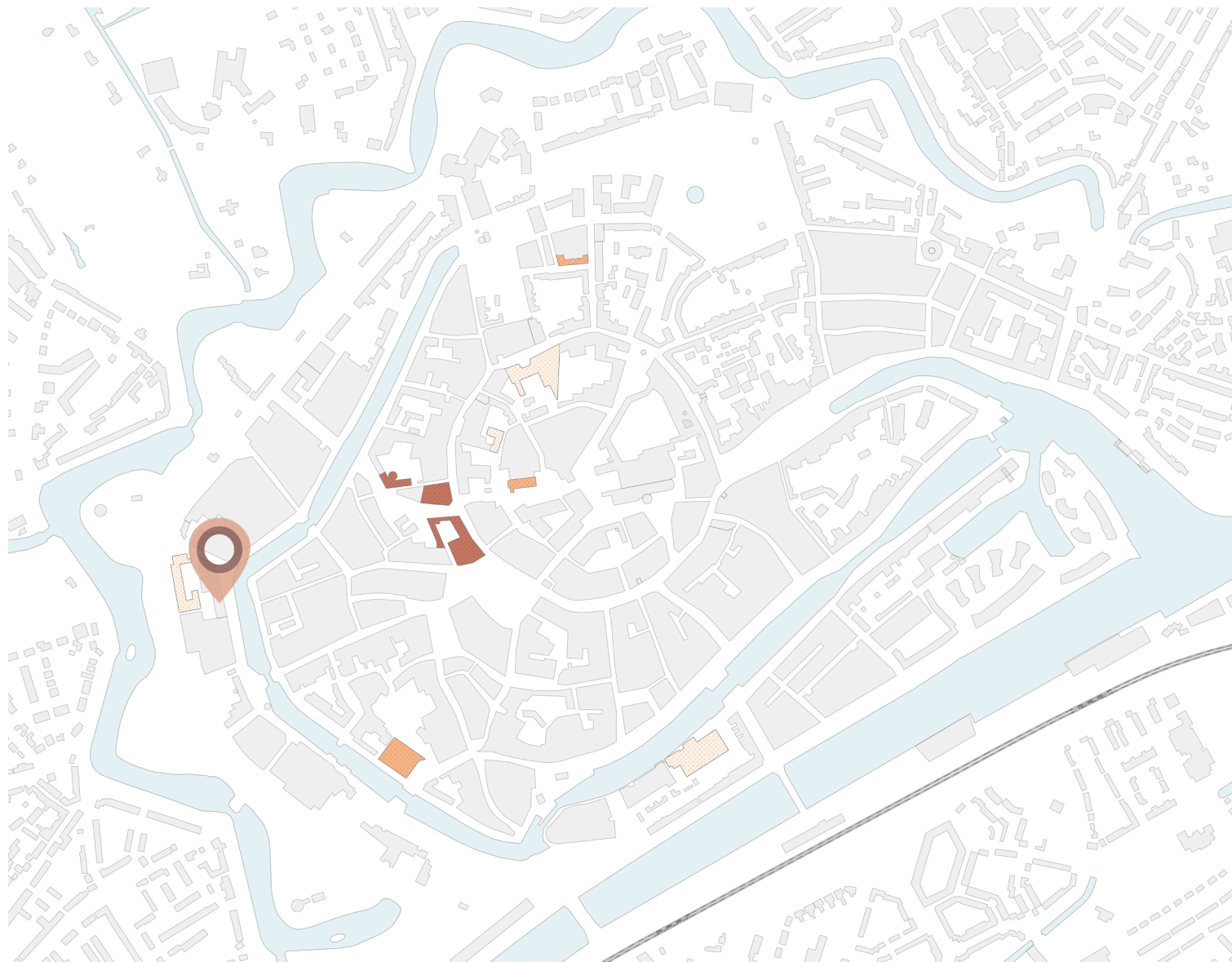
BUILDING ANALYSIS





University College principles

- Small scale
- Community based
- Individual supervision
- Liberal Arts and Sciences
- Ideal environment for intellectual performance



University College Roosevelt

0 m 250 m



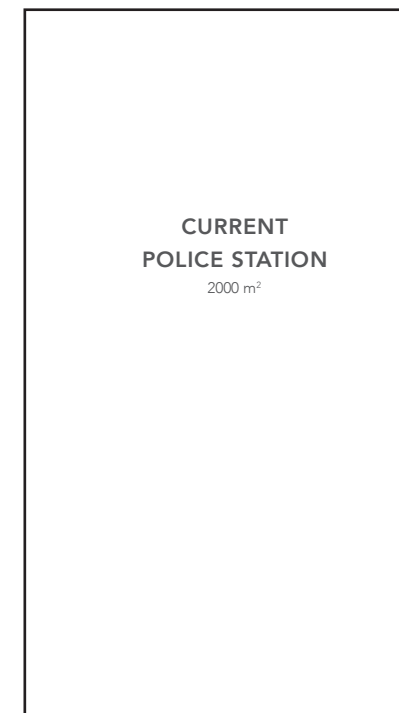
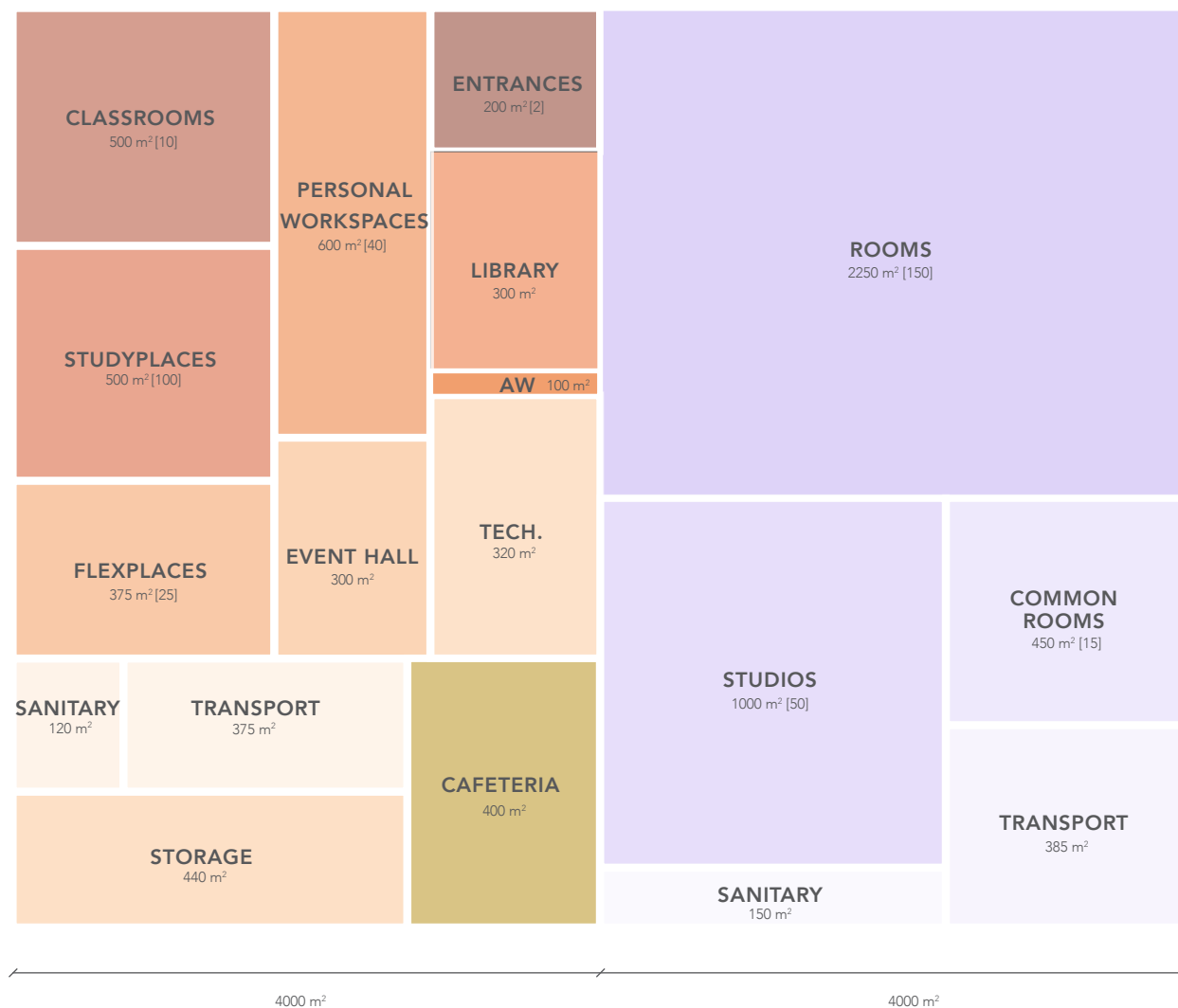
- FACULTY BUILDINGS
- STUDENT HOUSING
- EXTERNAL FACILITIES

SOURCES

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



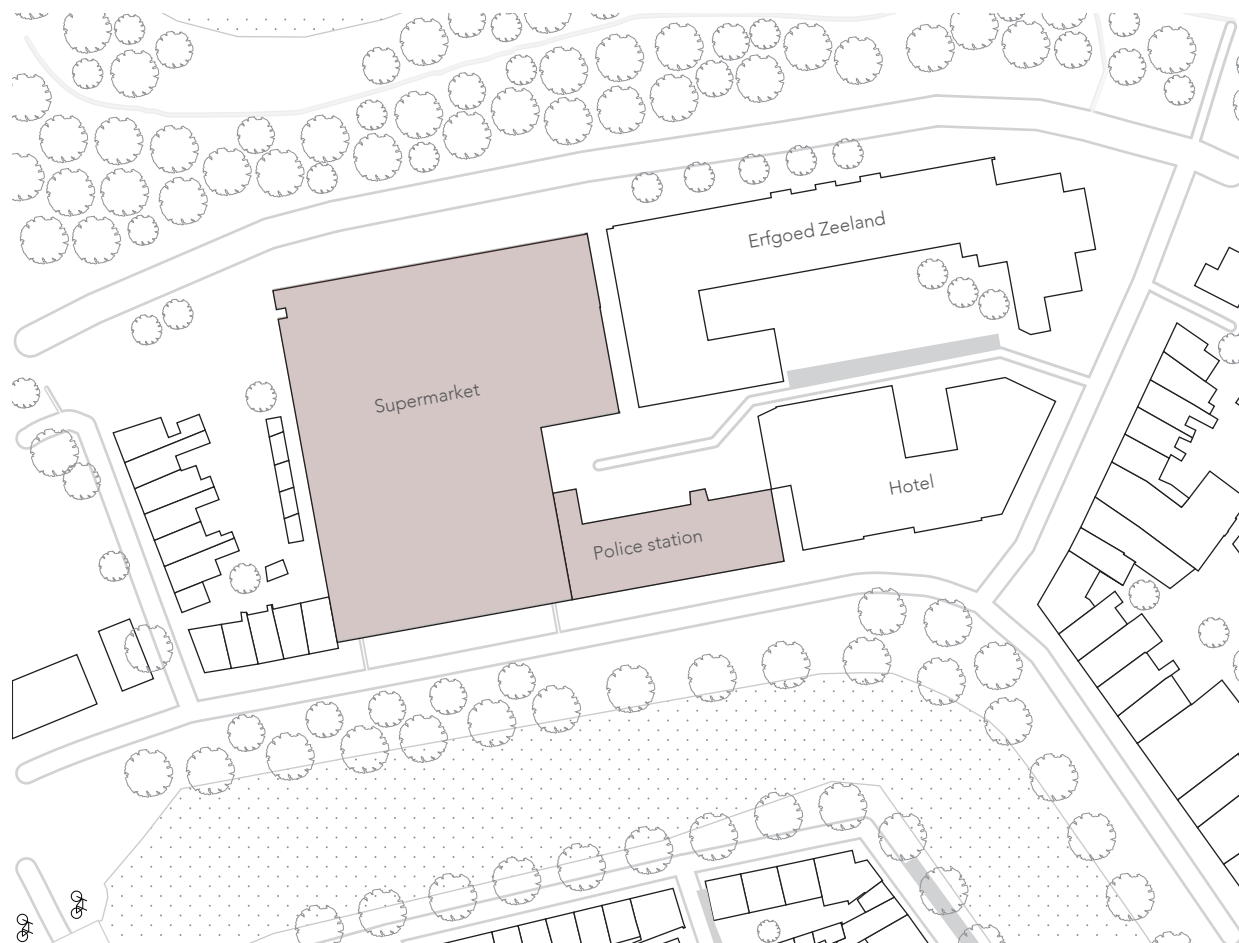
CONTEMPORARY DEMANDS



Average: 16 m²
UCR: 20 m²

PROGRAMME

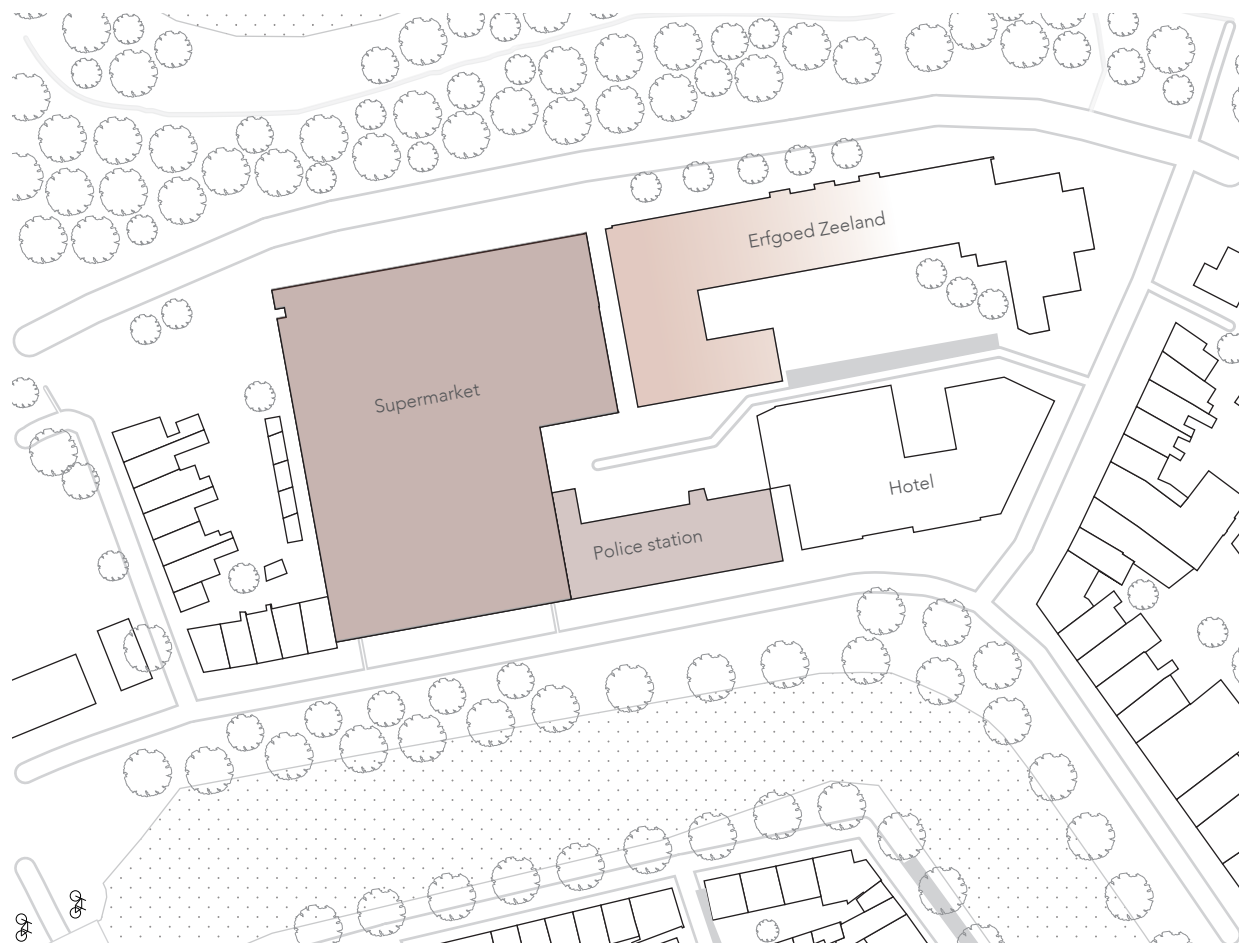
- EDUCATION
- HOUSING
- CAFETERIA



PROJECT SCOPE



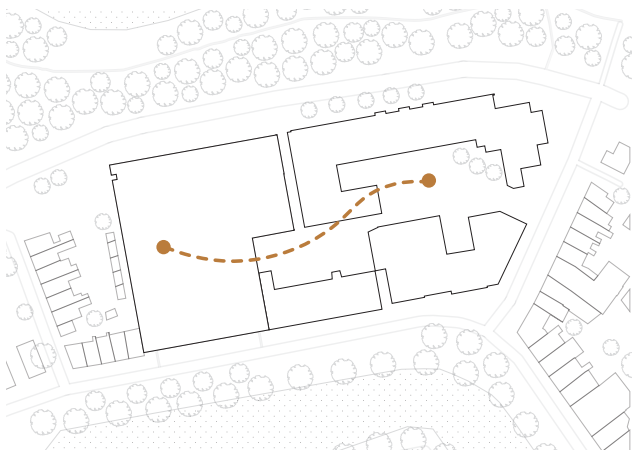
INVOLVED BUILDINGS



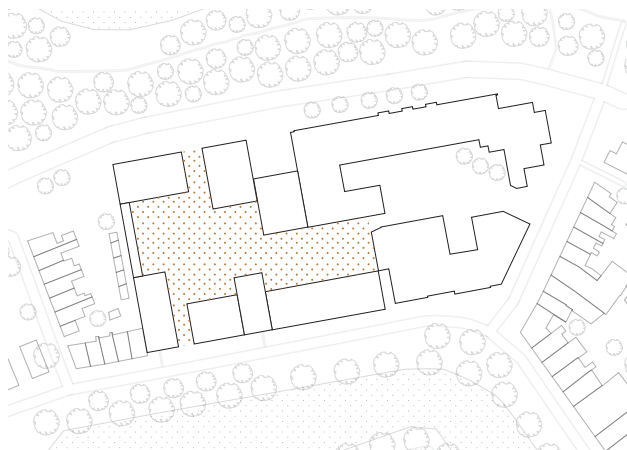
PROJECT SCOPE



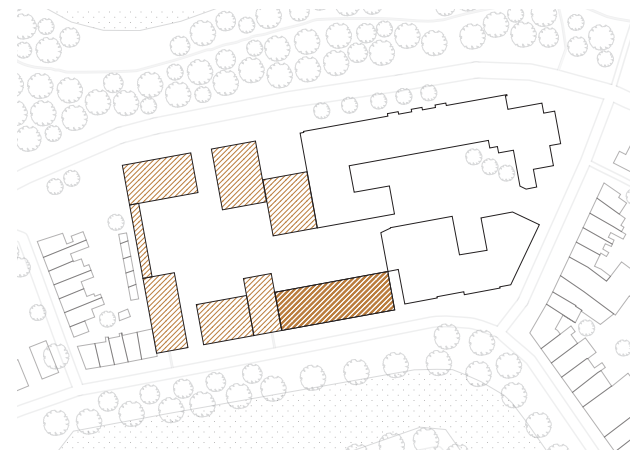
INVOLVED BUILDINGS



Add value by creating meaningful interrelations in the city block



A small scale inner-city campus

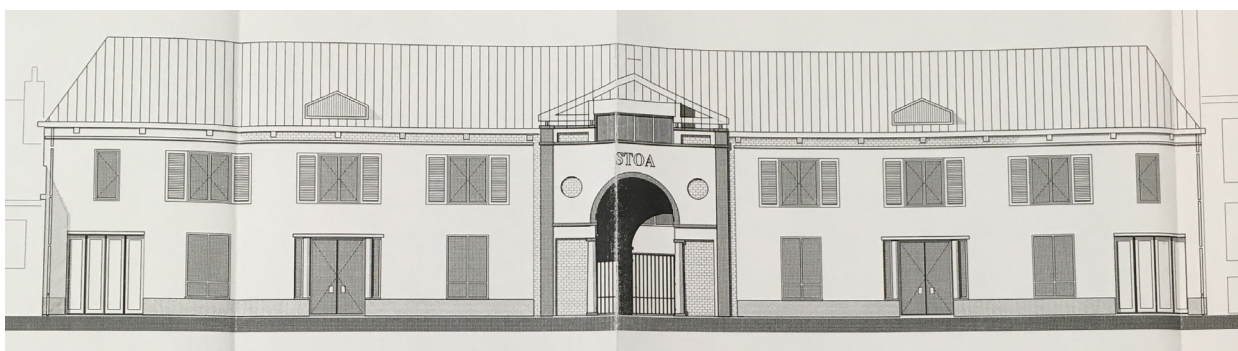
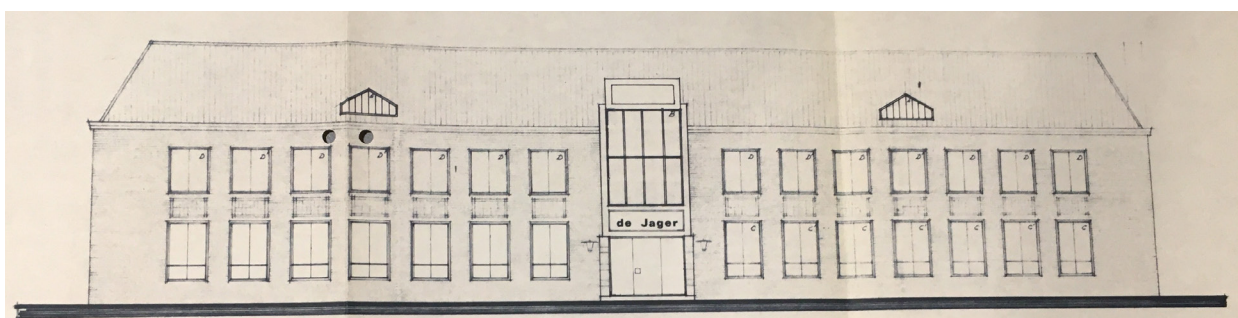


A recognizable ensemble

DESIGN INTENTIONS



- CONNECT
- NEW COURTYARD
- /// CONTEMPORARY ENSEMBLE



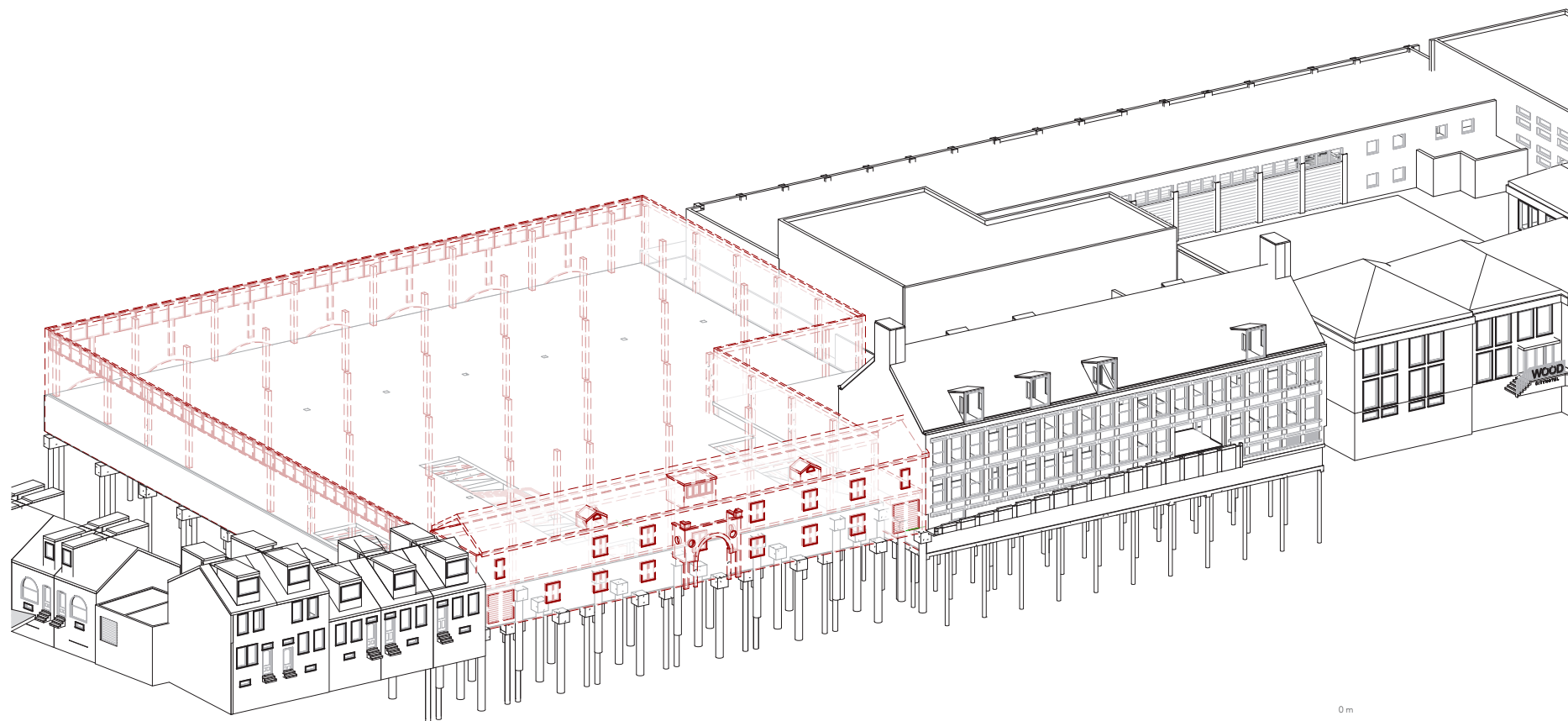
Value assessment

- Foodstuffs wholesaler Maljers
- City architect H.Mooibroek
- Renovation by Rothuizen & t'Hooft
- Vinium investments/ De Jonge architects
- Criticism of beauty committee
- Profit maximization
- Conflicts and lawsuits
- Vacant

Achter de Houttuinen 12-18

0m 5m



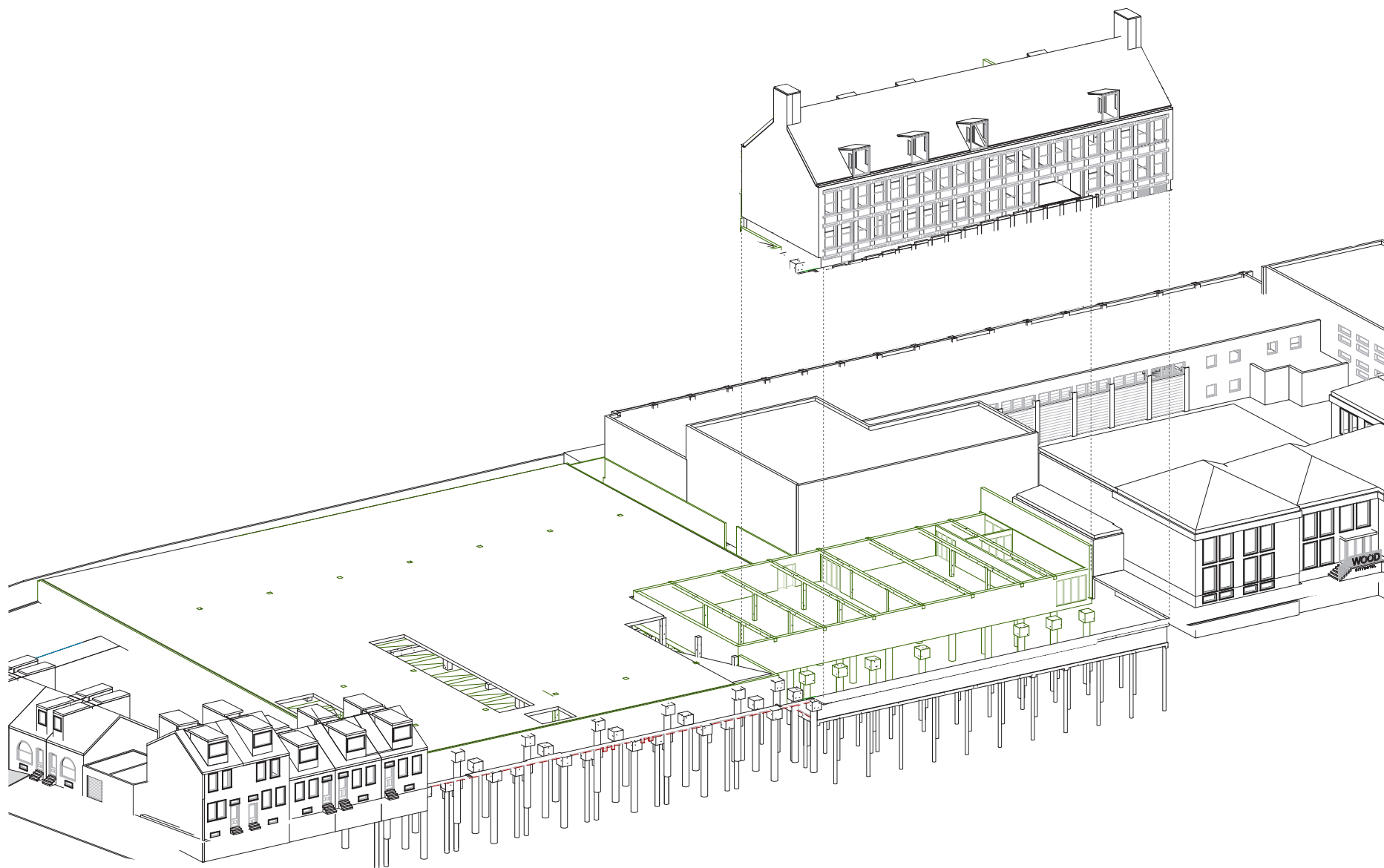


0 m

BUILDING PROCESS

~12,5 m

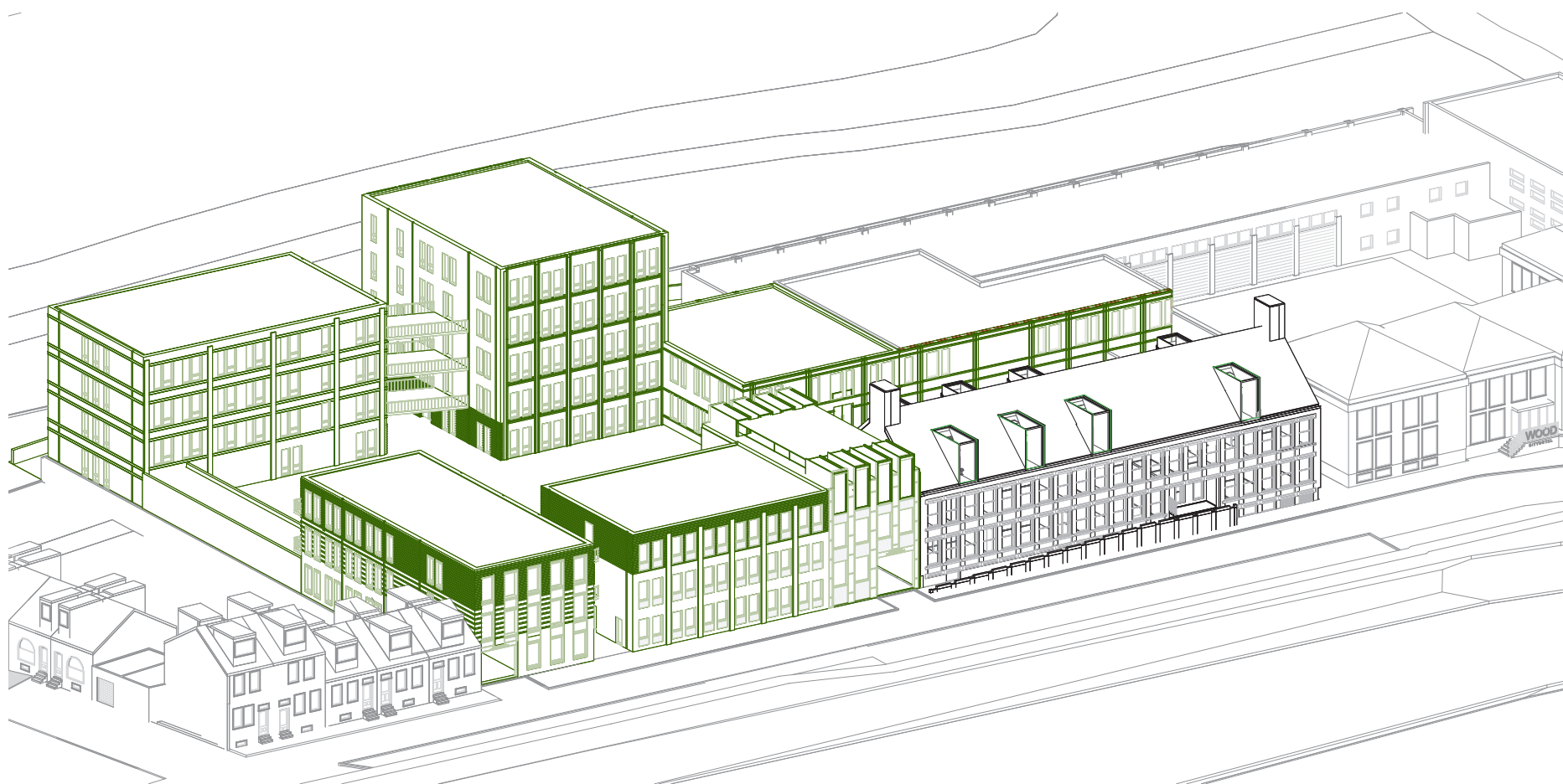




BUILDING PROCESS

0 m ~12,5 m

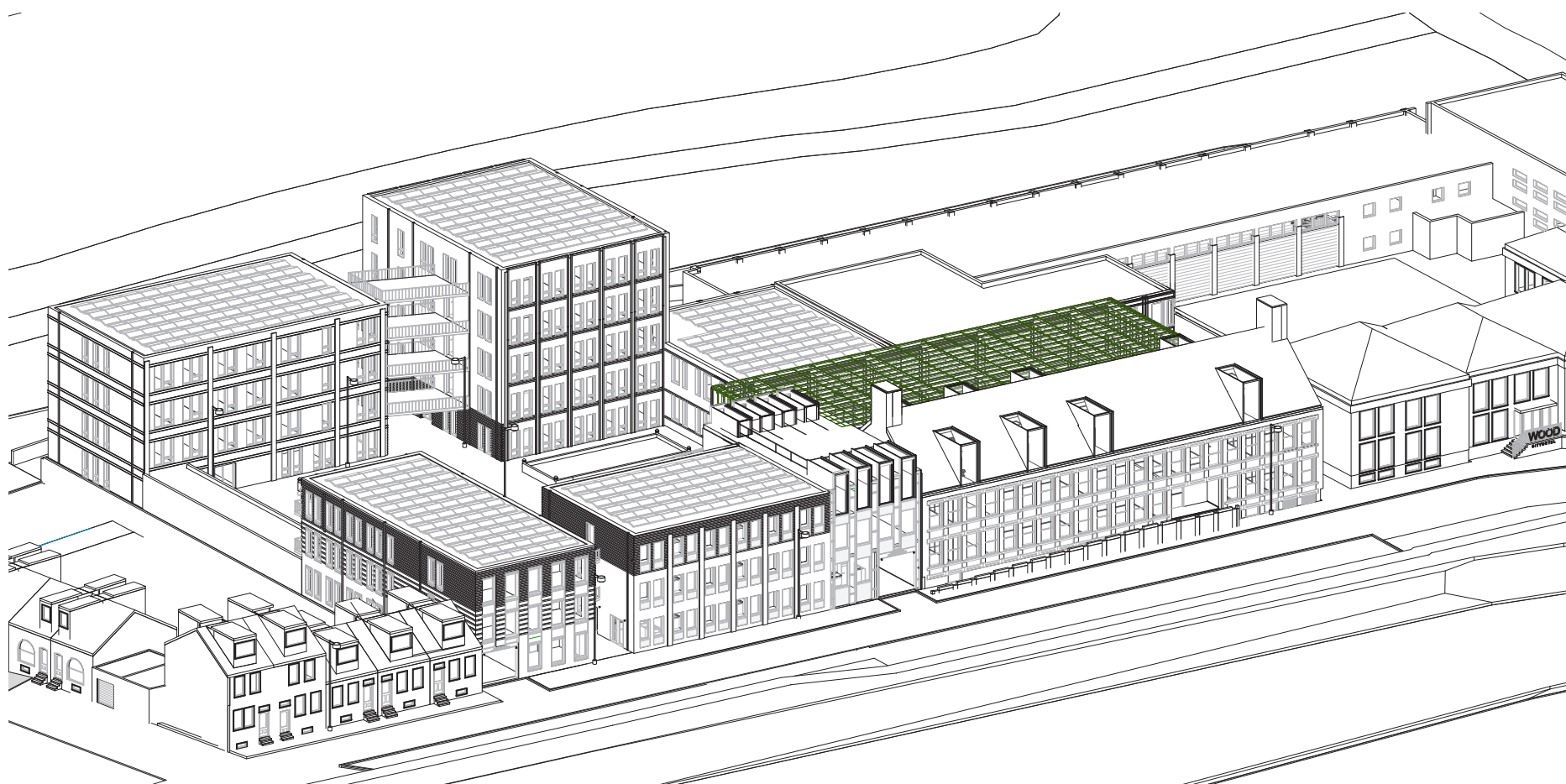




BUILDING PROCESS

0 m ~12,5 m





BUILDING PROCESS

0 m ~12,5 m





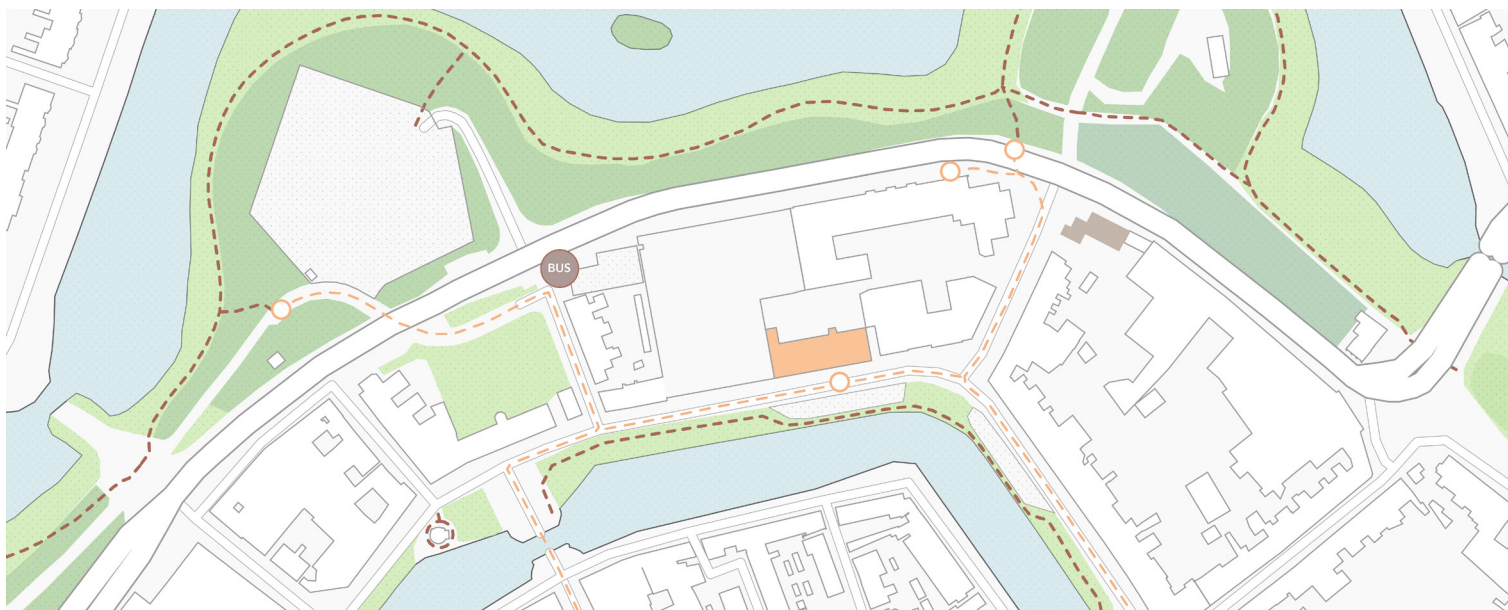
BUILDING PROCESS

0 m ~12,5 m

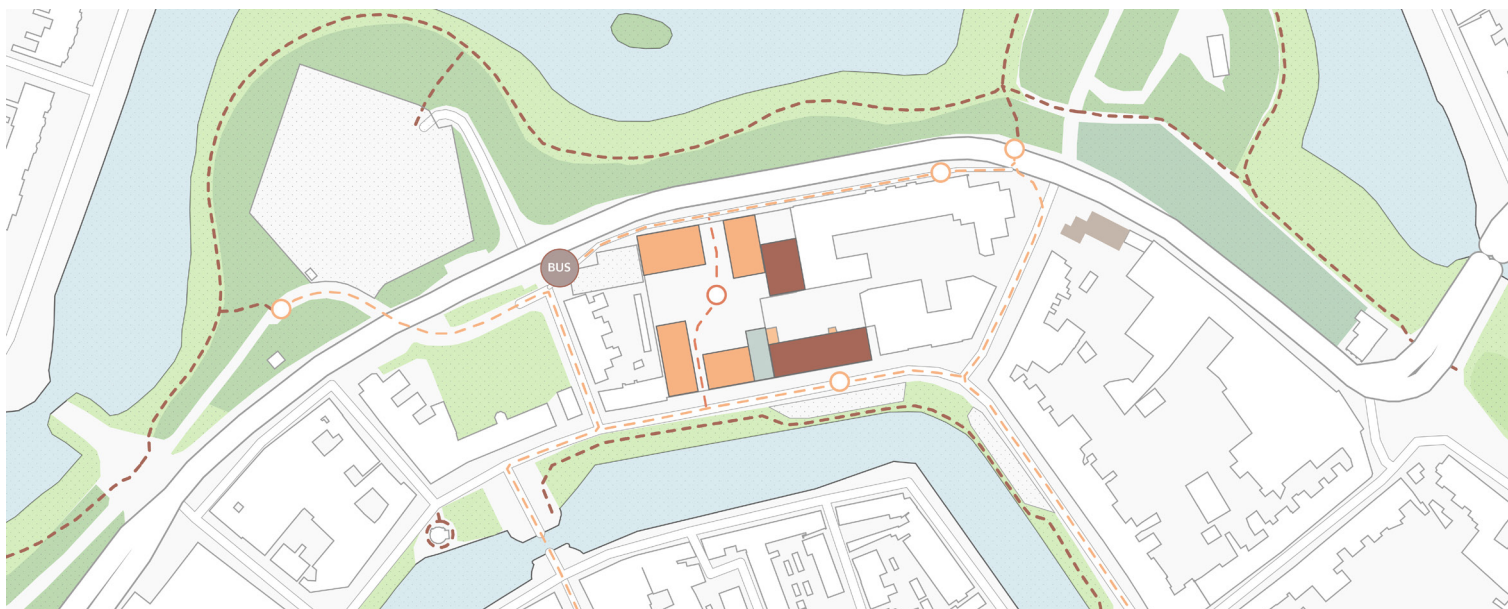
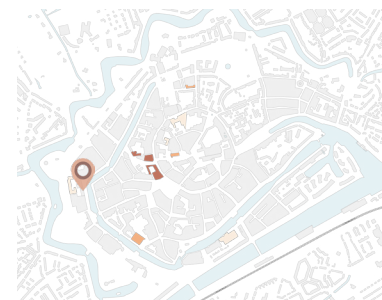




ROUTING



CURRENT SITUATION



NEW SITUATION



SITE





ROUTING



0 m 250 m

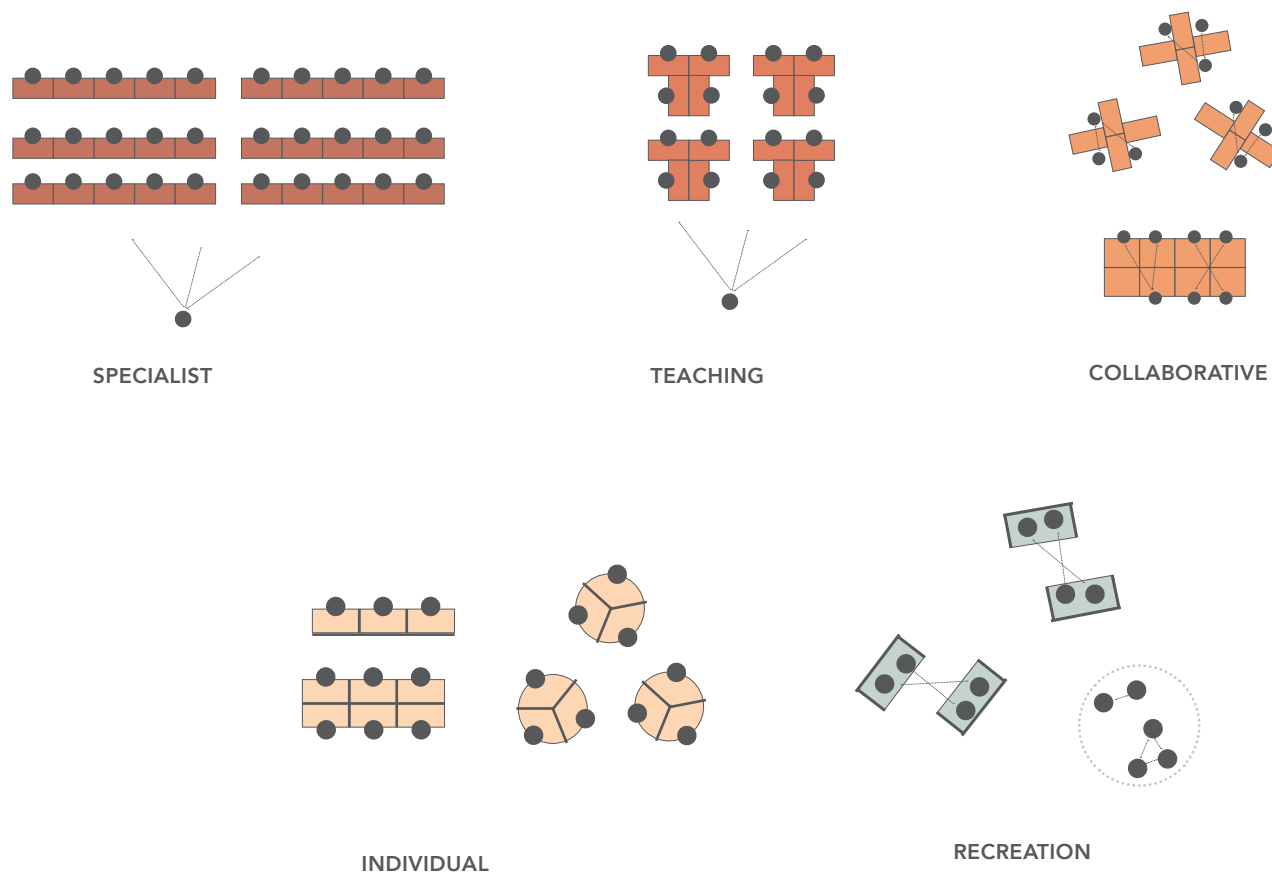


ROUTING

0 m 20 m

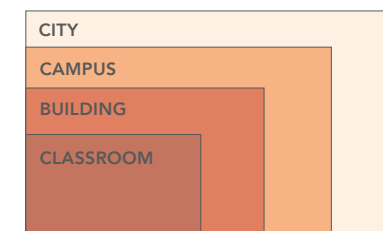


- MAIN ROUTE
- SUBROUTE
- ▶ ENTRANCE



FACULTY DESIGN

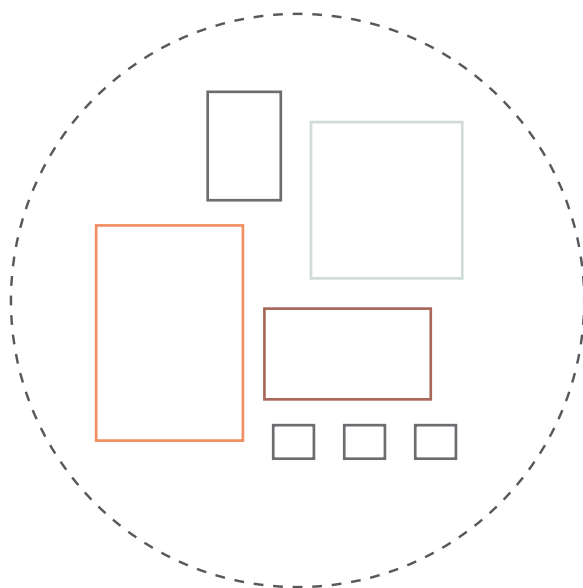
- Studying as lifestyle
- Learning landscape
- 5 Key activities



- SPECIALIST
- TEACHING
- COLLABORATIVE
- PERSONAL
- RECREATION

SOURCES

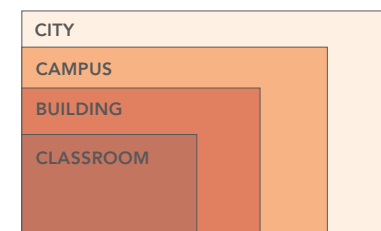
- RIBA Enterprises, & Higher Education Design Quality Forum sponsoring body. (2016). Future campus: design quality in university buildings. (I. Taylor, Ed.). RIBA Publishing



SPATIAL DIVERSITY

FACULTY DESIGN

- Studying as lifestyle
- Learning landscape
- 5 Key activities

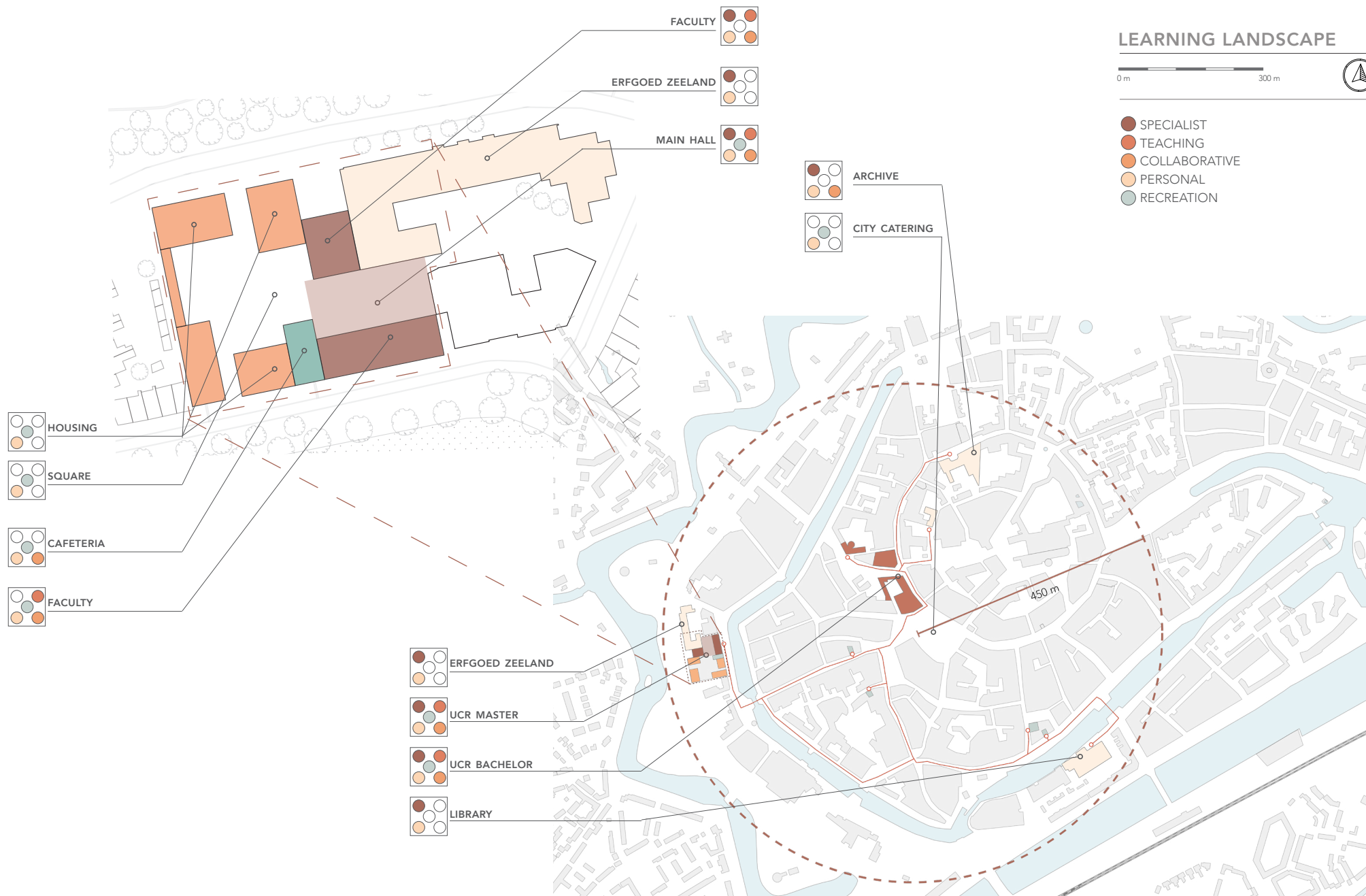


- SPECIALIST
- TEACHING
- COLLABORATIVE
- PERSONAL
- RECREATION

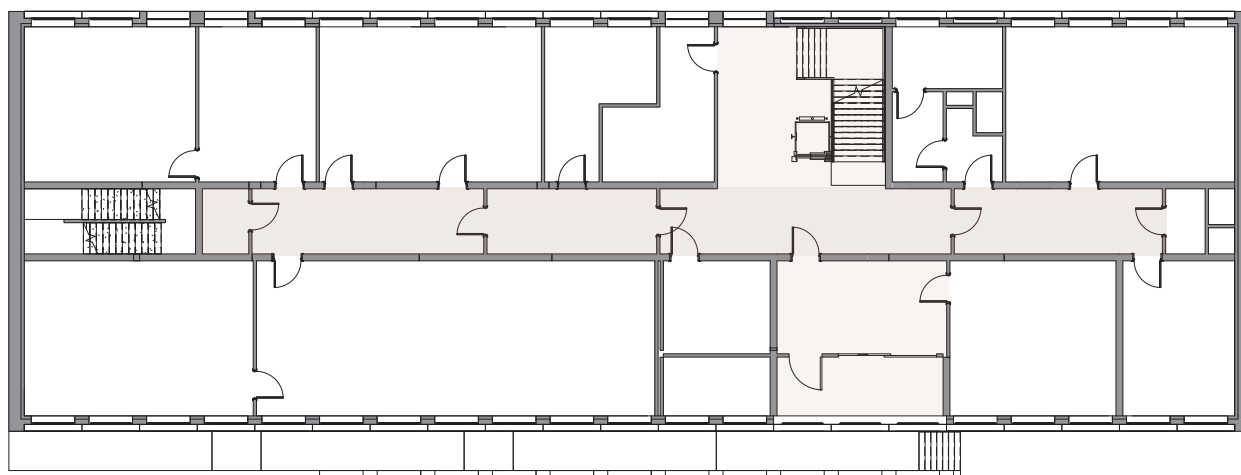
SOURCES

- RIBA Enterprises, & Higher Education Design Quality Forum sponsoring body. (2016). Future campus: design quality in university buildings. (I. Taylor, Ed.). RIBA Publishing





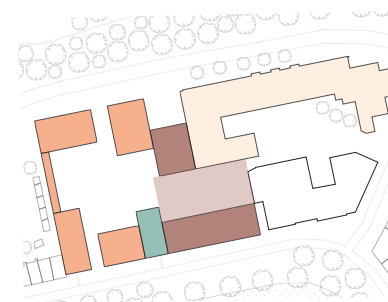




OLD SITUATION



NEW SITUATION



GROUND FLOOR

0 m 5 m



HALLWAY
CONTINUOUS SPACE

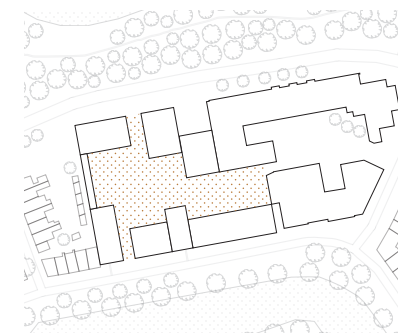


GROUND FLOOR

0 m 12,5 m



- FACULTY BUILDINGS
- HOUSING BUILDINGS
- CAFETERIA
- ERFGOED ZEELAND

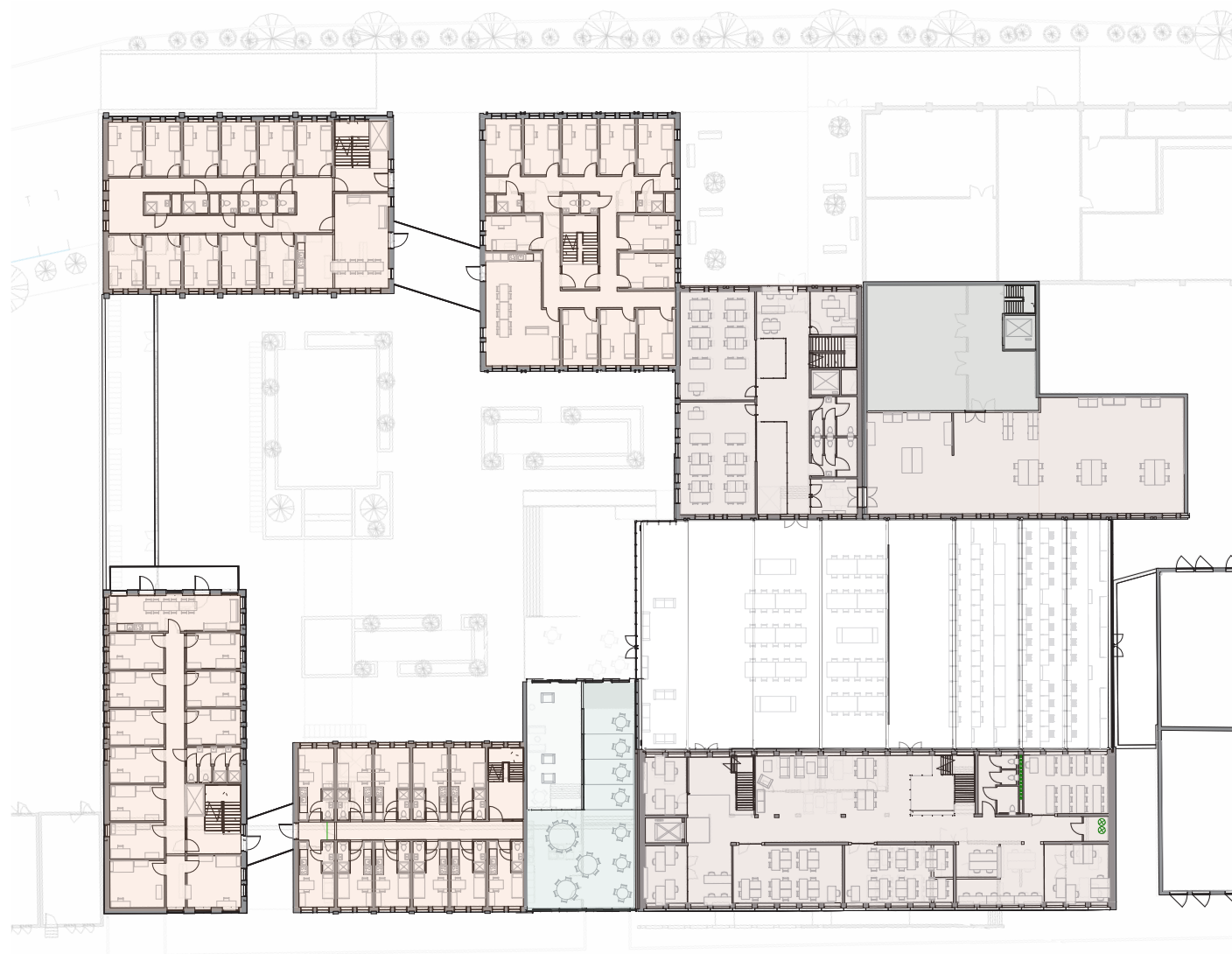




MAIN HALL - WORKSPACE



MAIN HALL - LECTURE

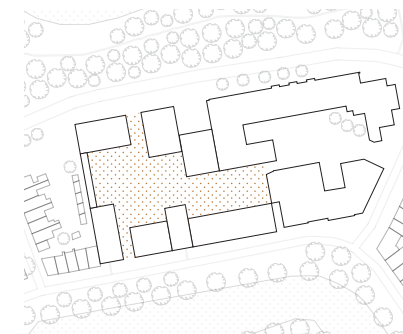


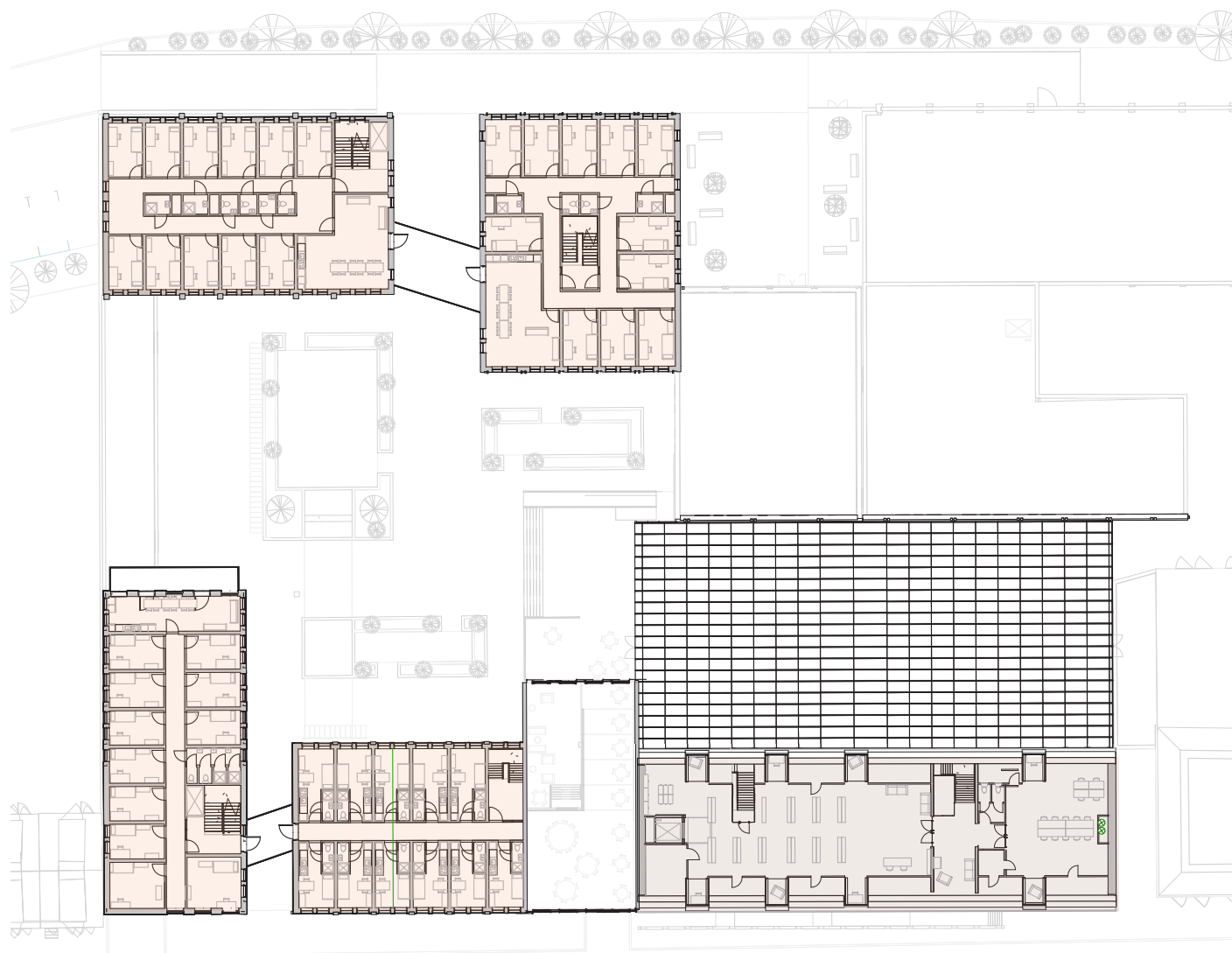
FIRST FLOOR

0 m 12,5 m



- FACULTY BUILDINGS
- HOUSING BUILDINGS
- CAFETERIA
- ERFGOOD ZEELAND



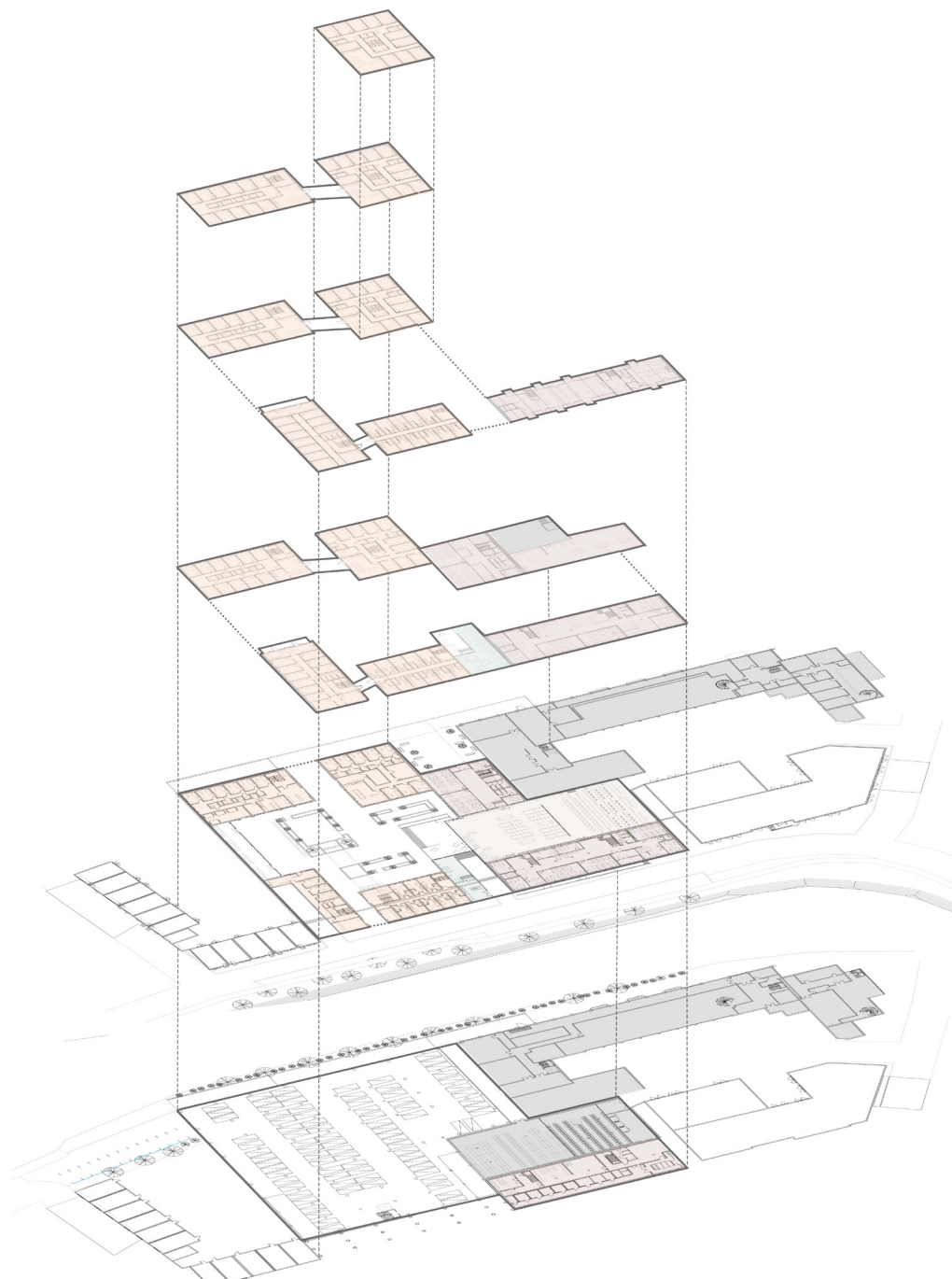


SECOND FLOOR

0 m 12,5 m



- FACULTY BUILDINGS
- HOUSING BUILDINGS
- CAFETERIA
- ERFGOED ZEELAND



OVERVIEW

0 m 12,5 m



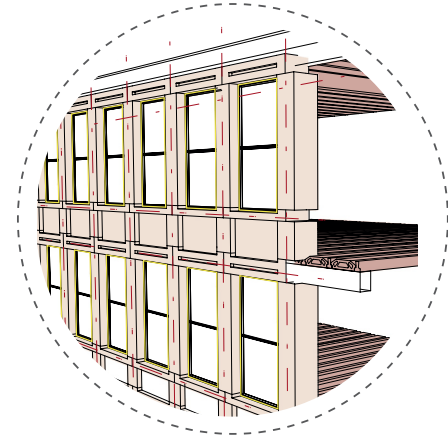
- FACULTY BUILDINGS
- HOUSING BUILDINGS
- CAFETERIA
- ERFGOED ZEELAND



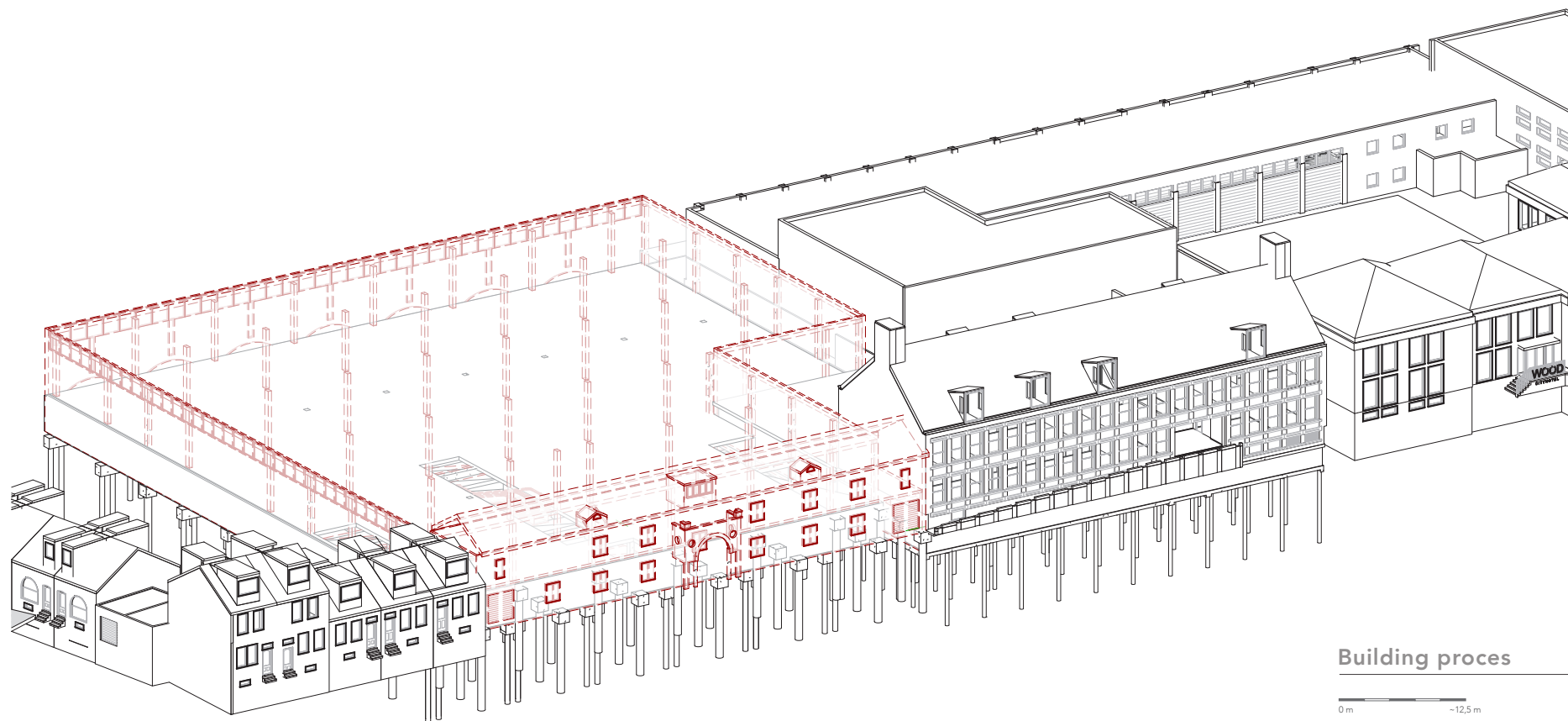
MEETING NEW DEMANDS



SUSTAINABILITY



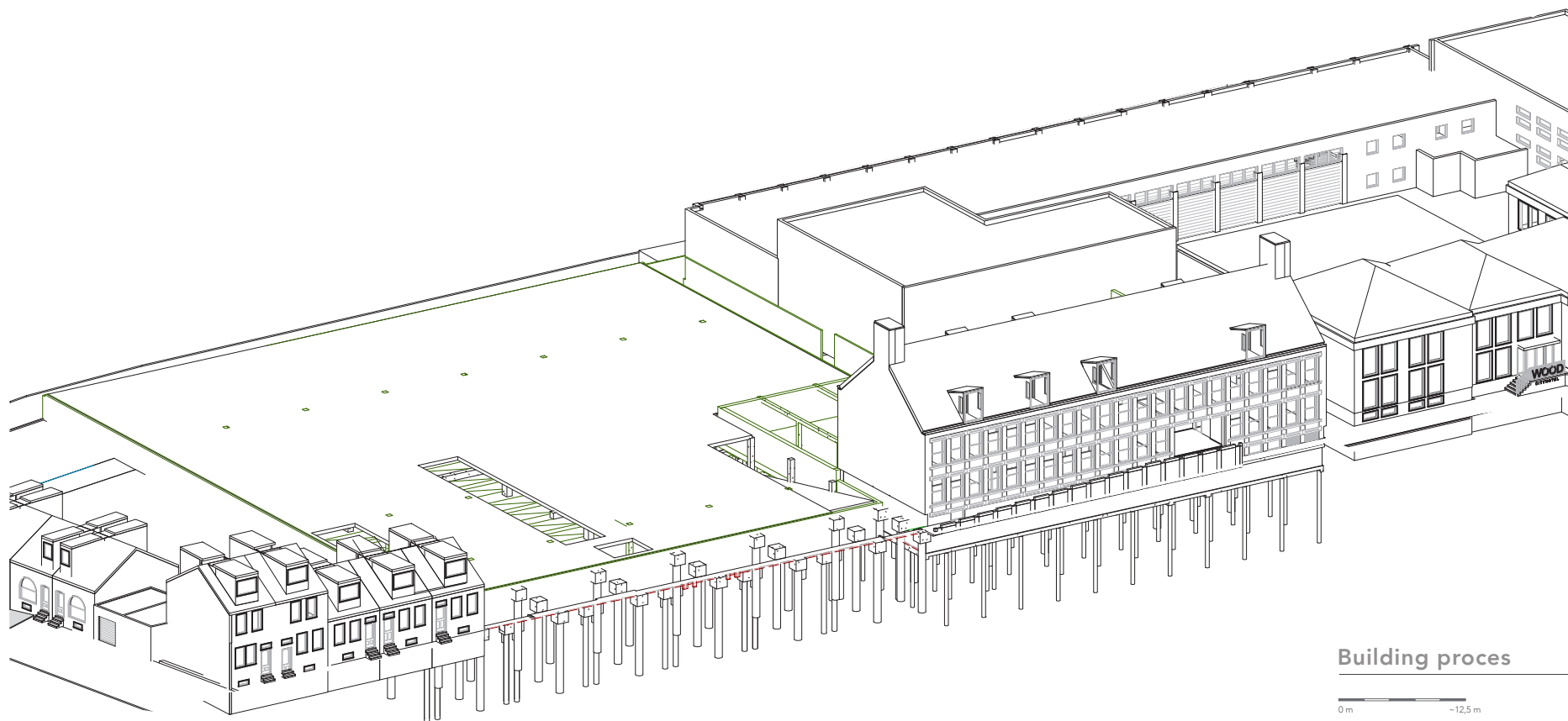
HERITAGE VALUE PRESERVATION



Building proces

0 m ~12,5 m

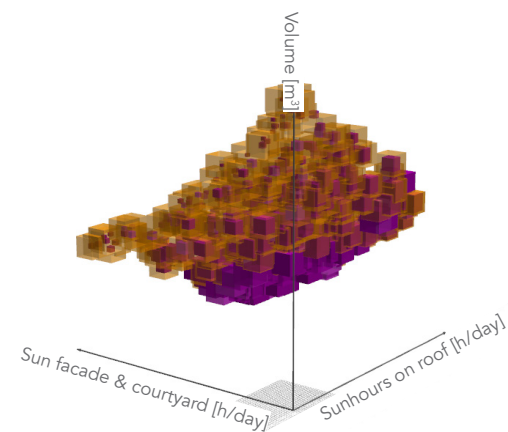
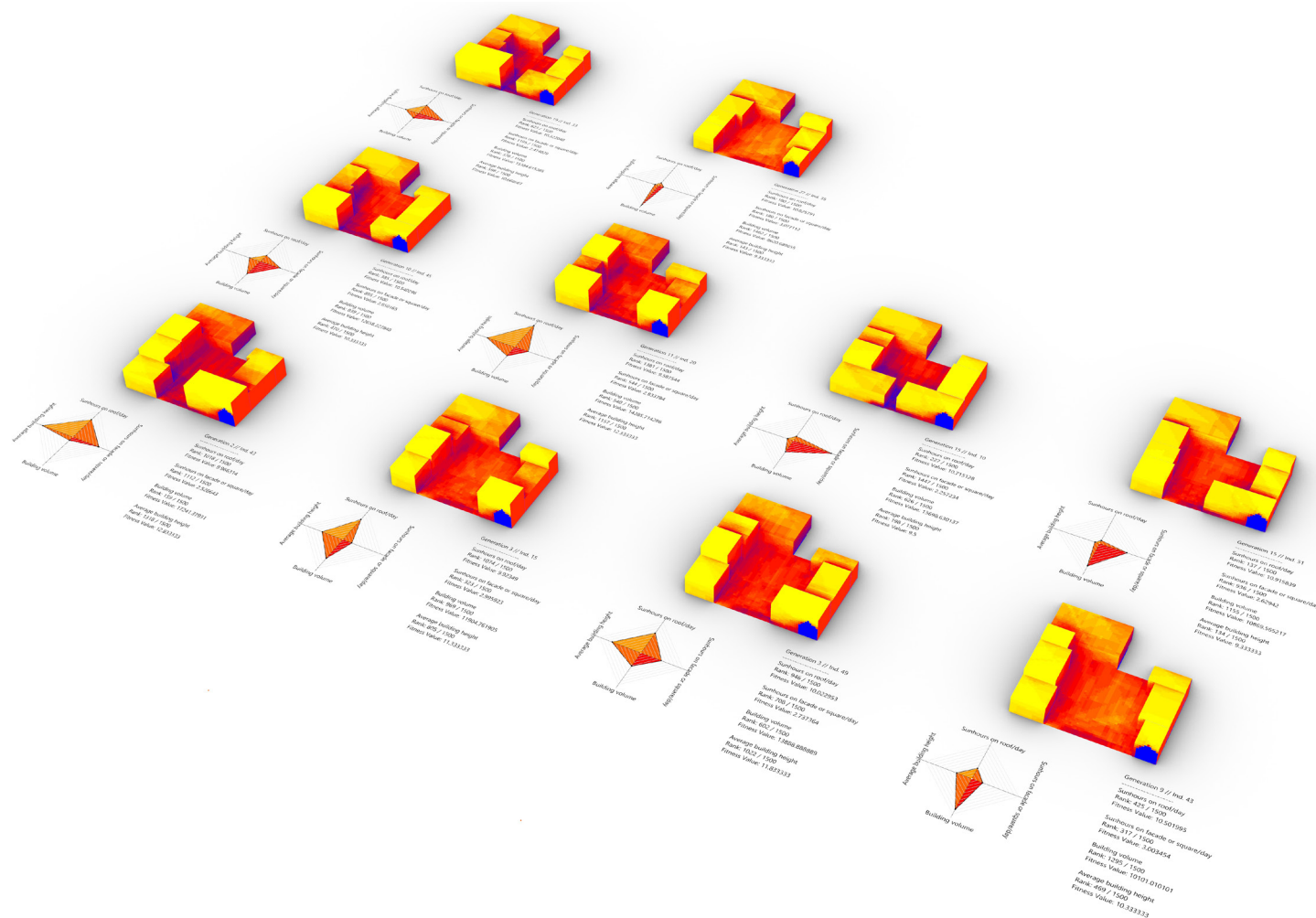




Building proces

0 m ~12,5 m



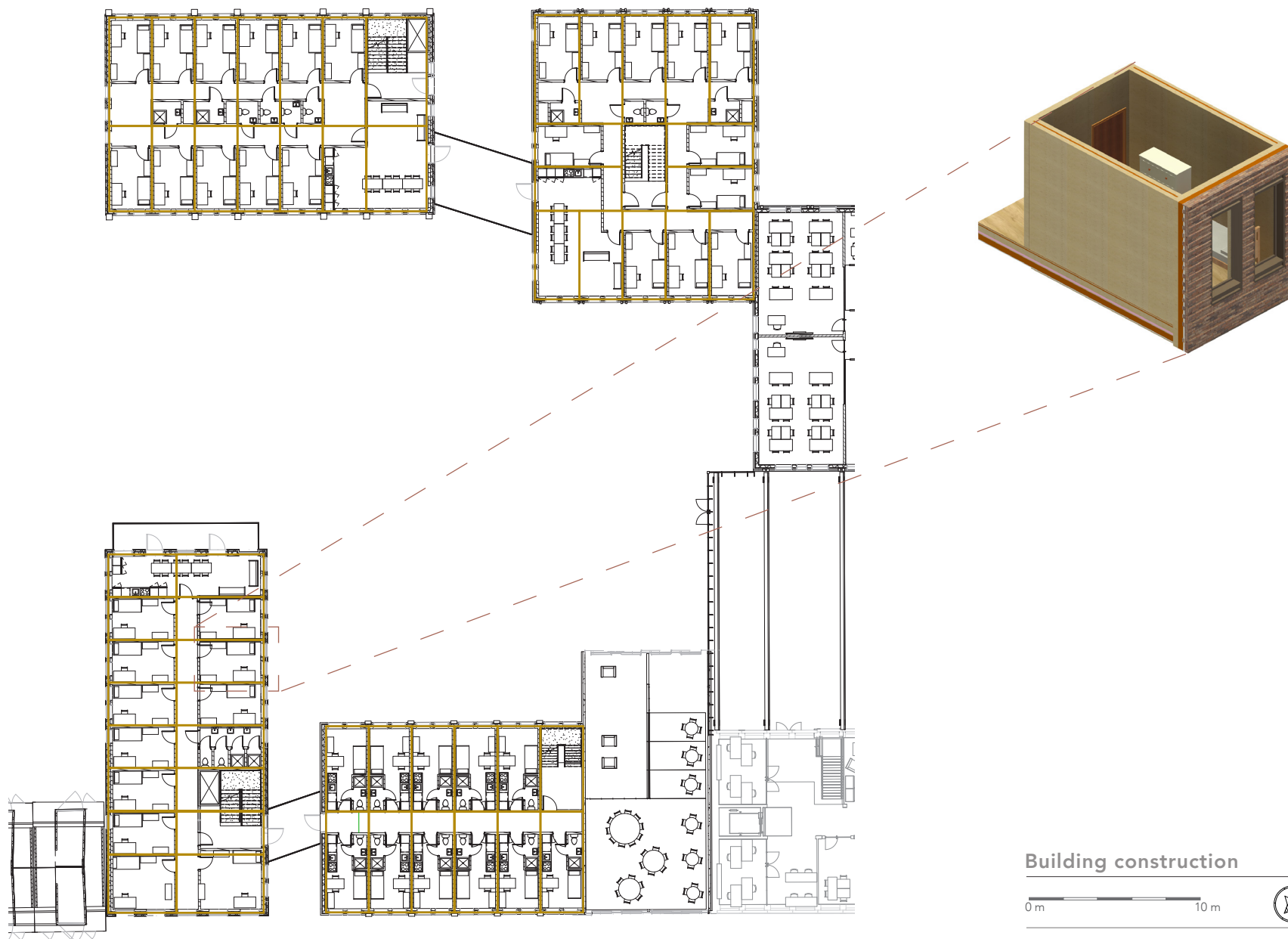


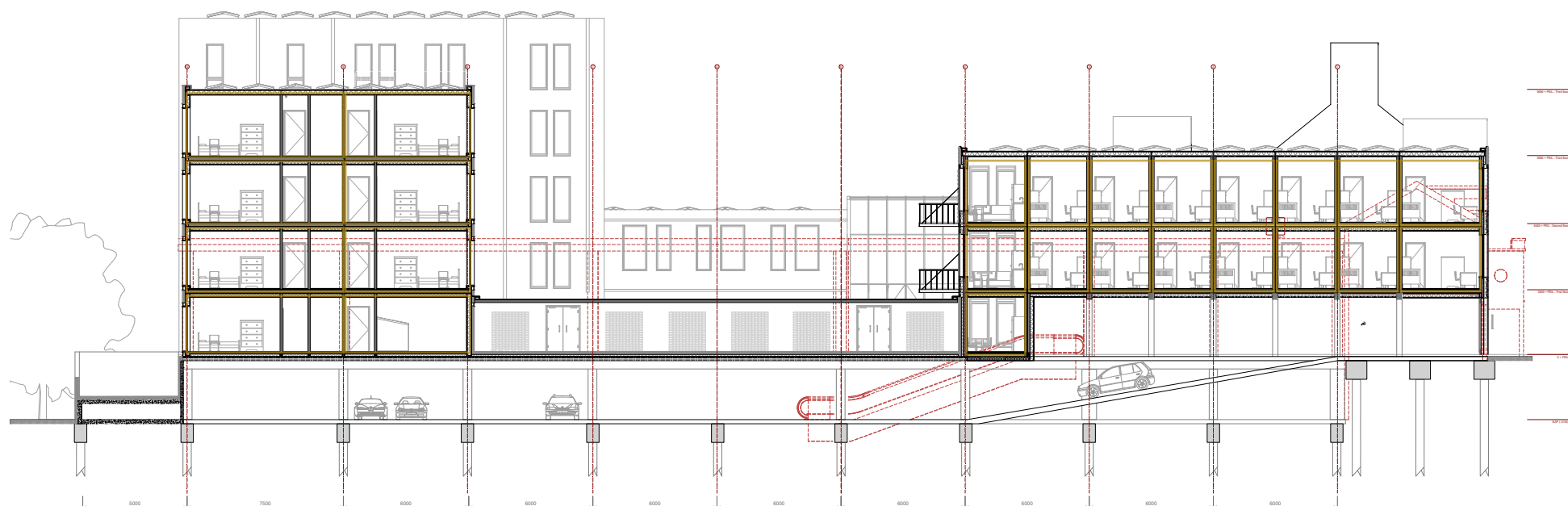
COORDINATE SYSTEM OF SOLUTION SPACE

Building volume optimization

- Max. sun on roof
- Max. sun on courtyard and facades
- Max. volume
- Min. building height



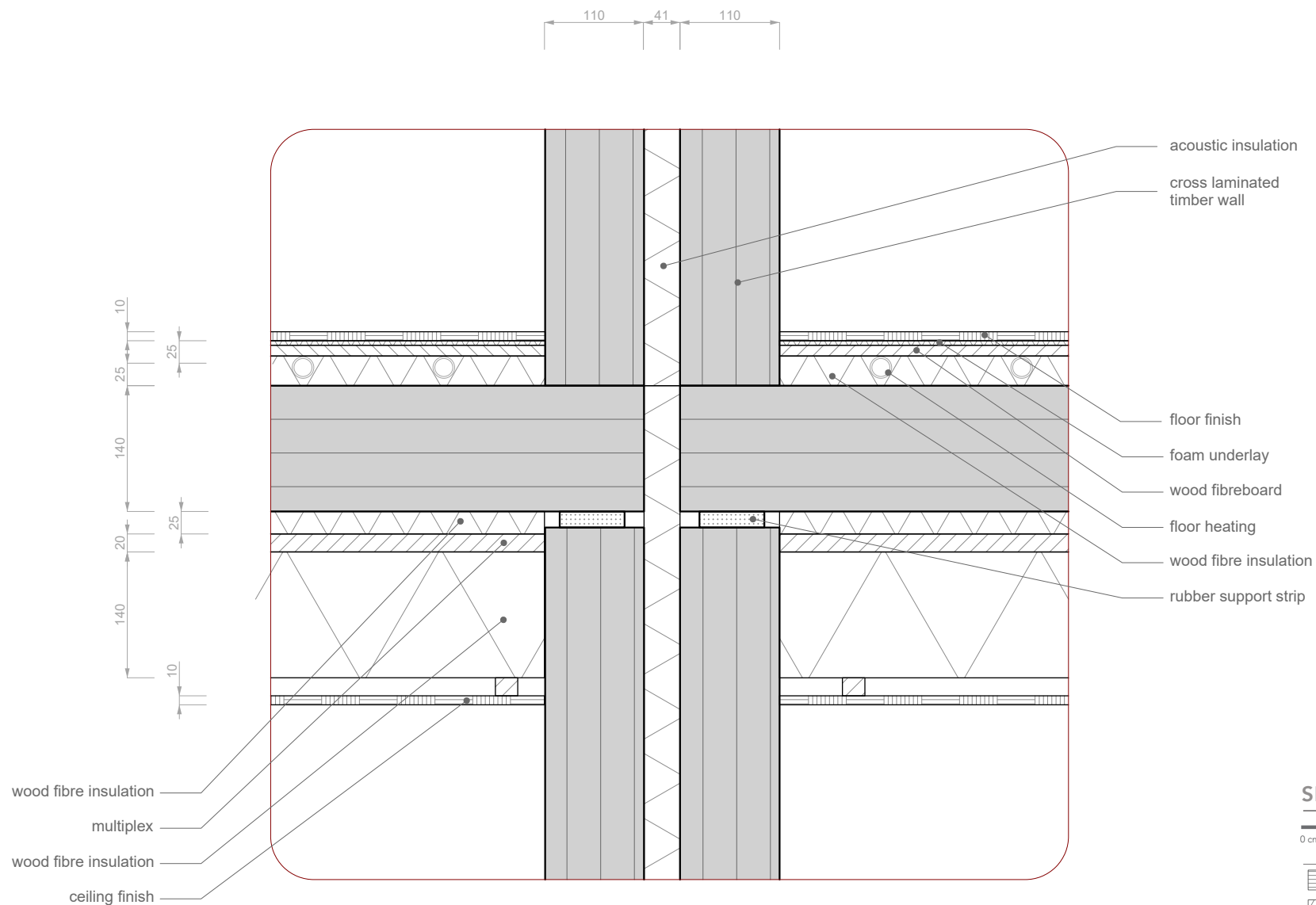




SECTION HOUSING

0 cm 12,5 m

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

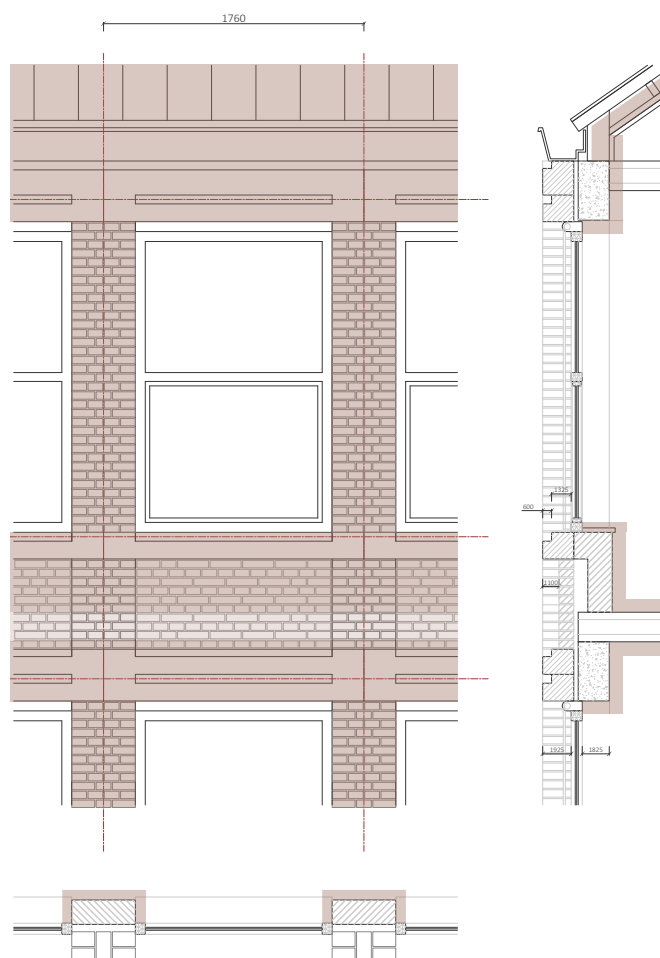
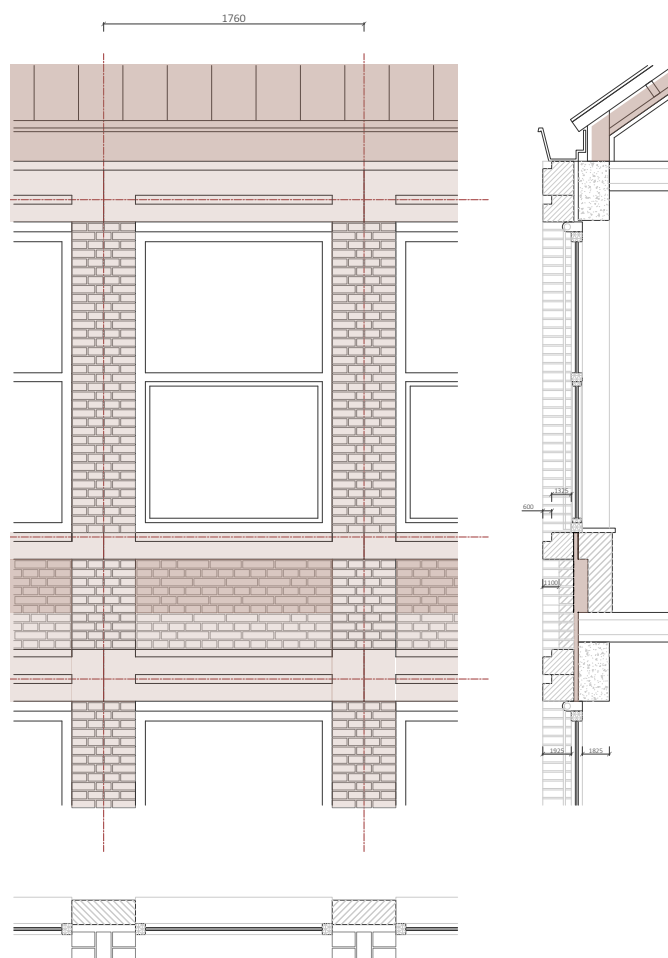


DETAIL H

SECTION HOUSING

0 cm 25 cm

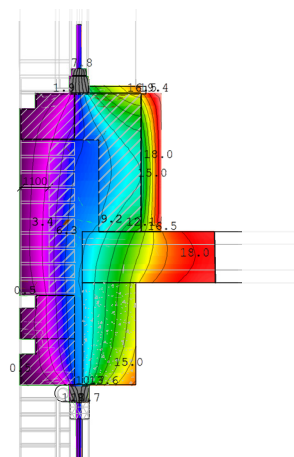
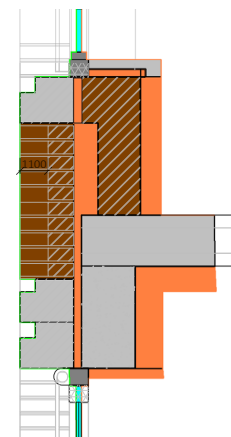
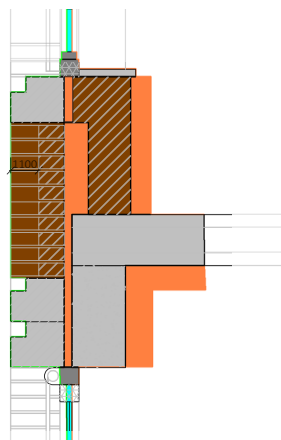
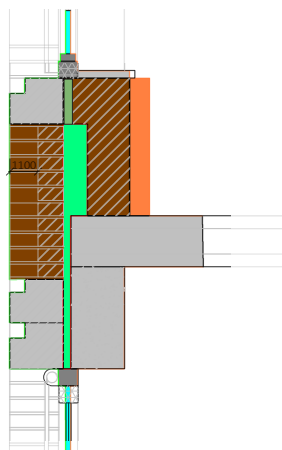




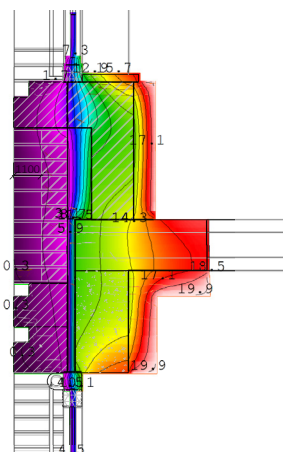
INSULATION

0 m 1,50 m

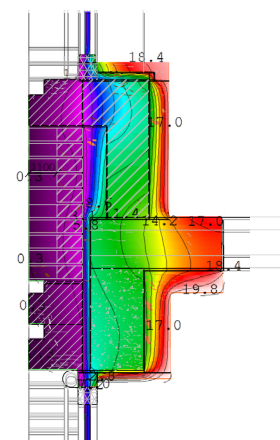
INSULATION



Heritage ++
Sustainability -



Heritage +
Sustainability +

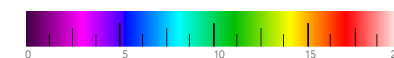


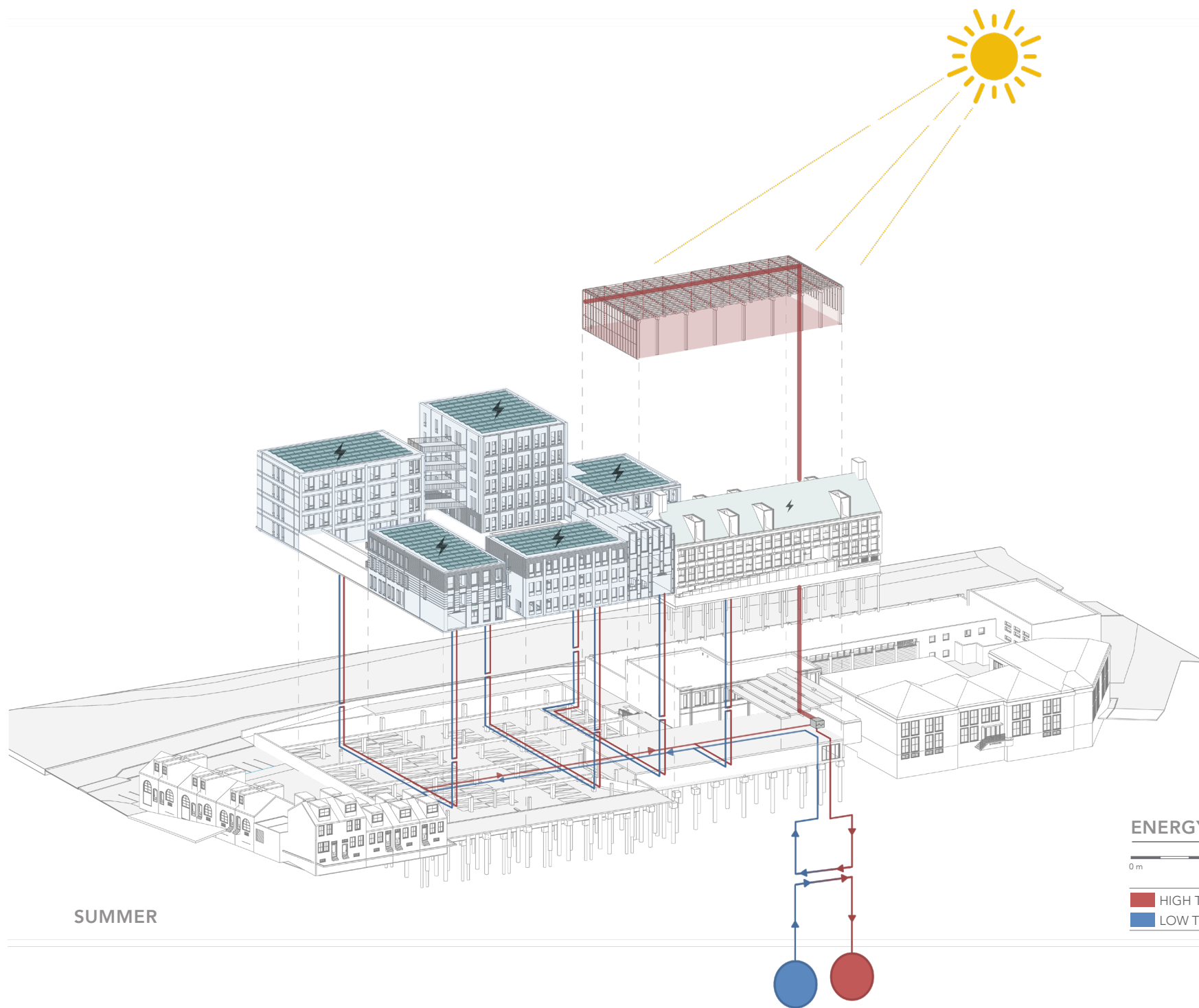
Heritage --
Sustainability ++

INSULATION

0 m 1,50 m

INSULATION





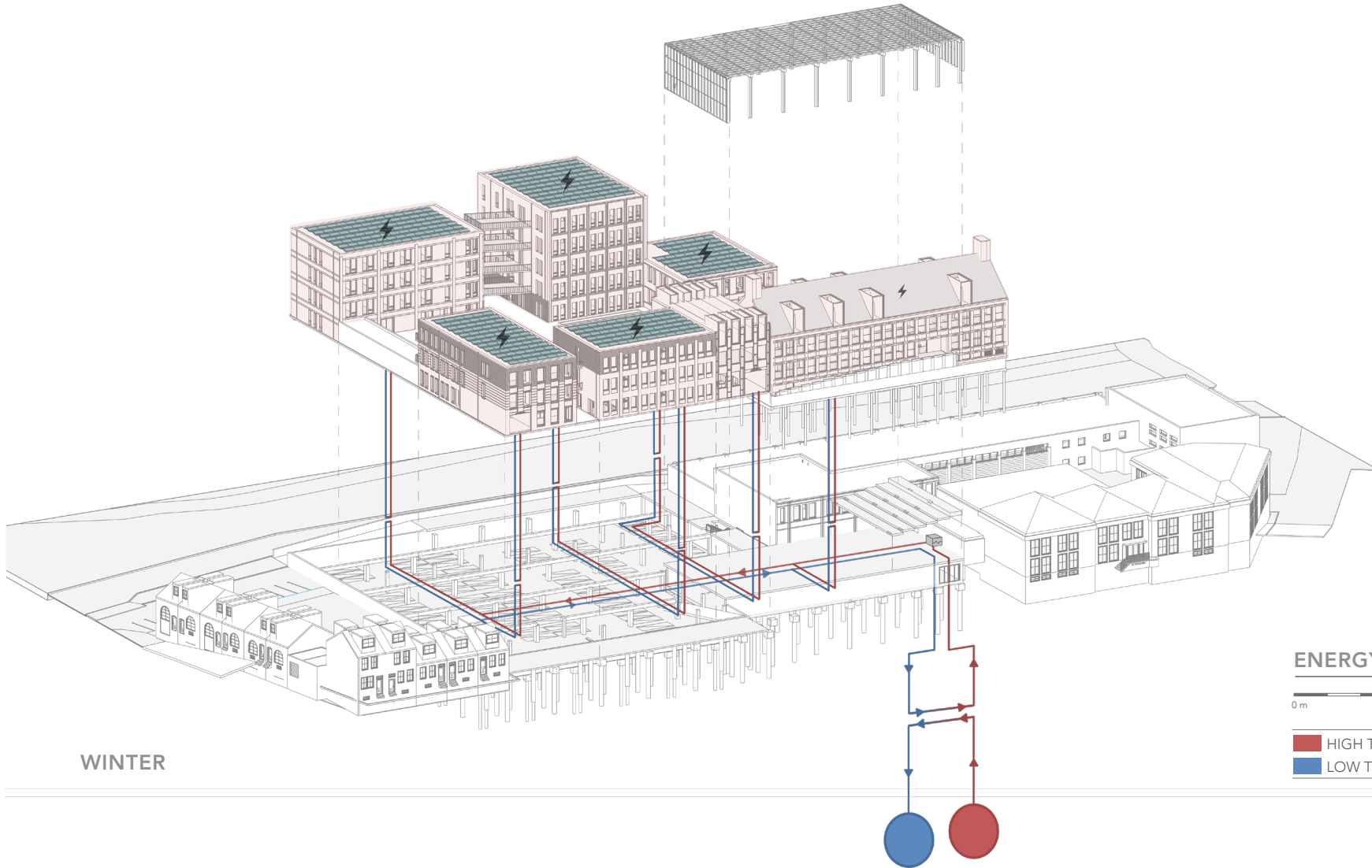
SUMMER

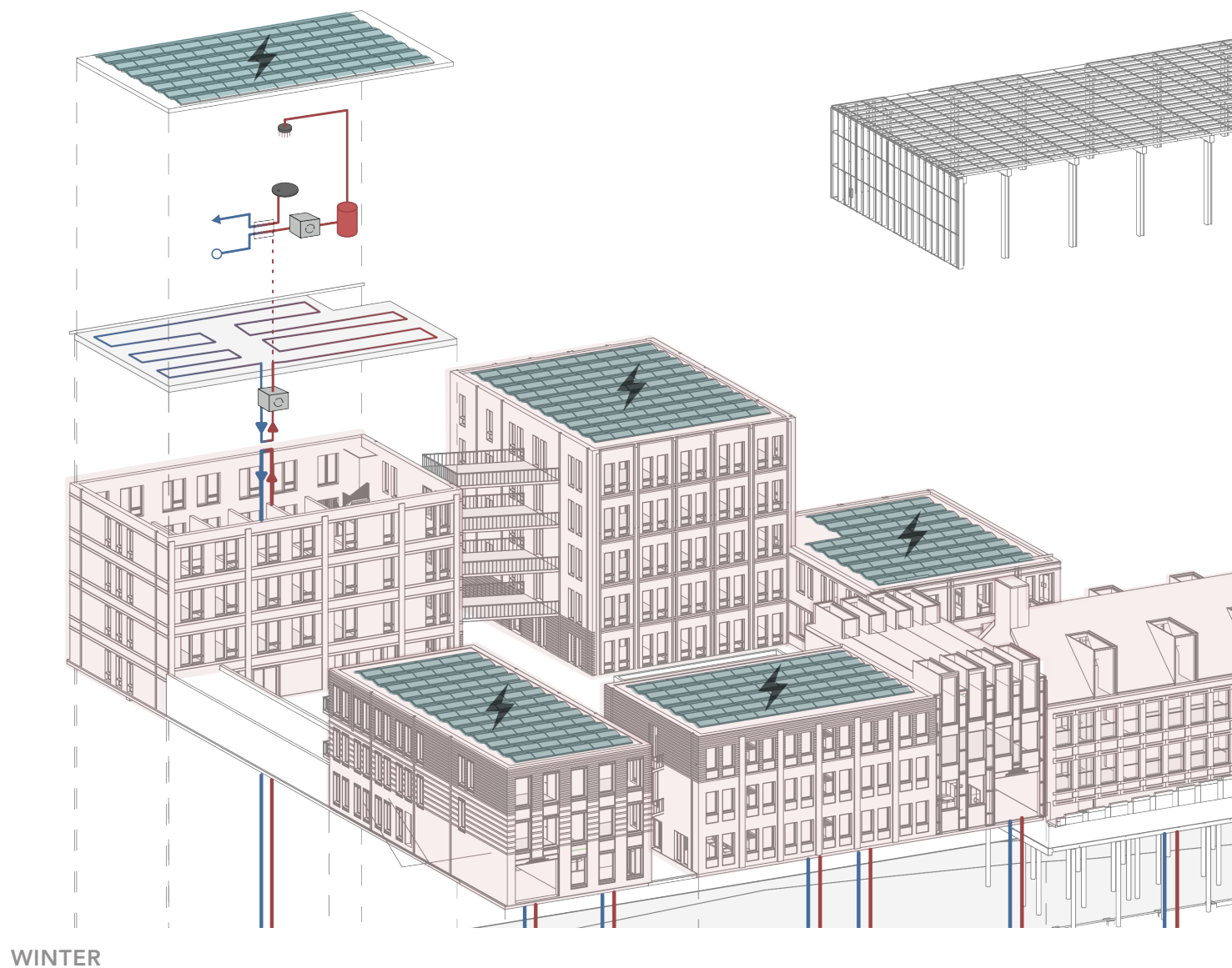
ENERGY CONCEPT

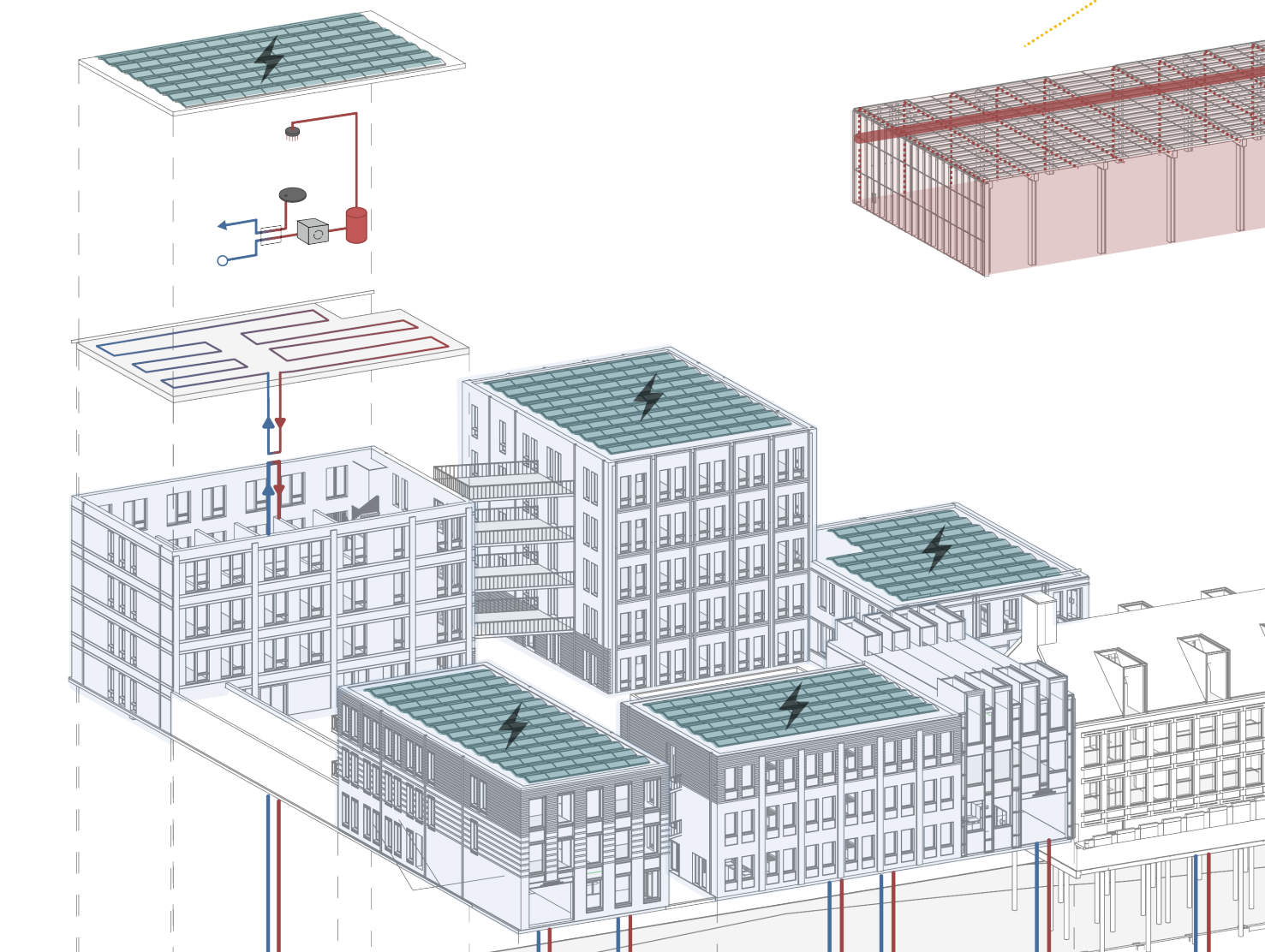
0 m 25 m



■ HIGH TEMPERATURE
■ LOW TEMPERATURE







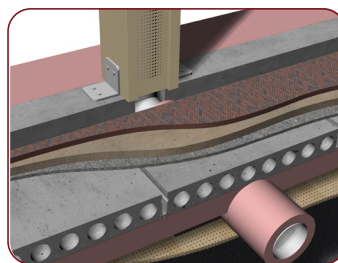
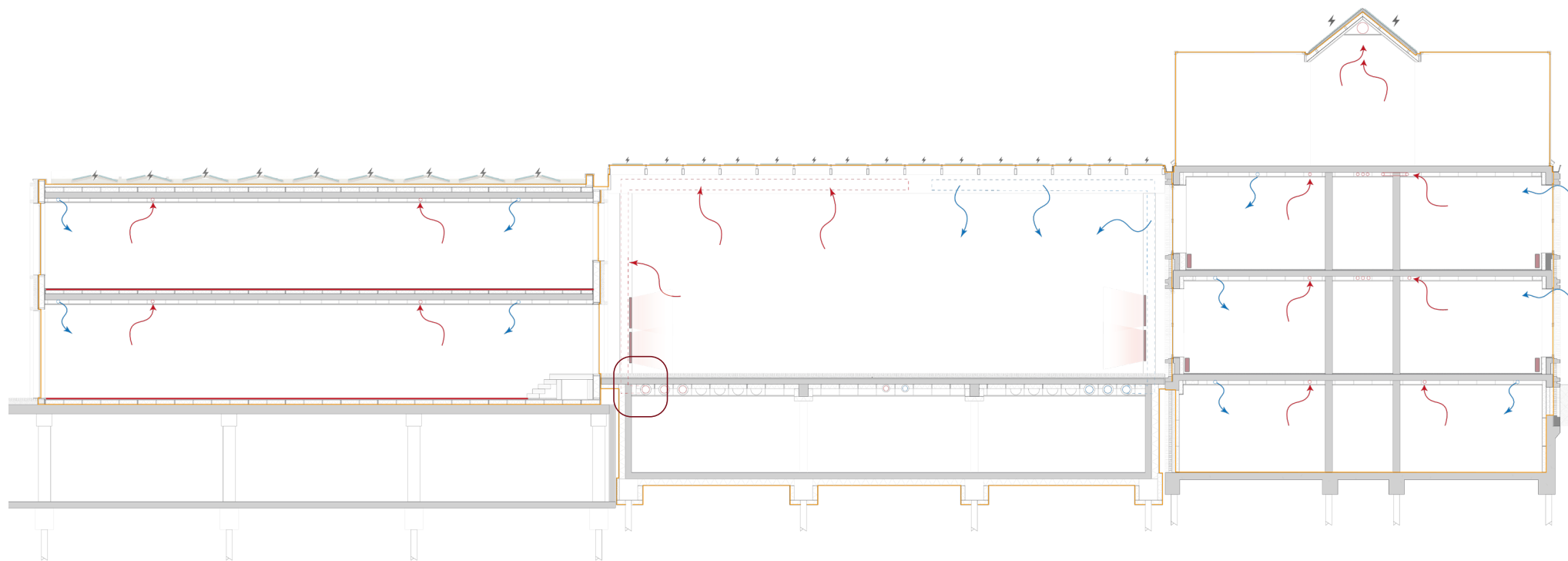
SUMMER

ENERGY CONCEPT

15 m

HIGH TEMPERATURE
LOW TEMPERATURE





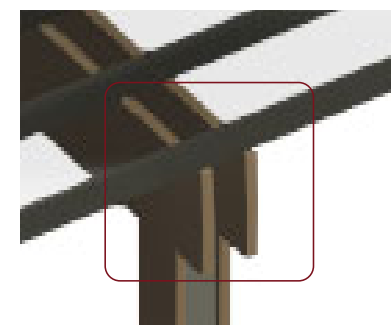
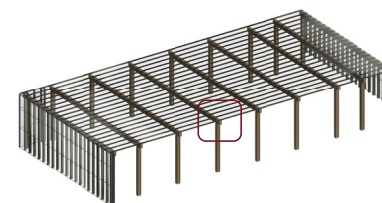
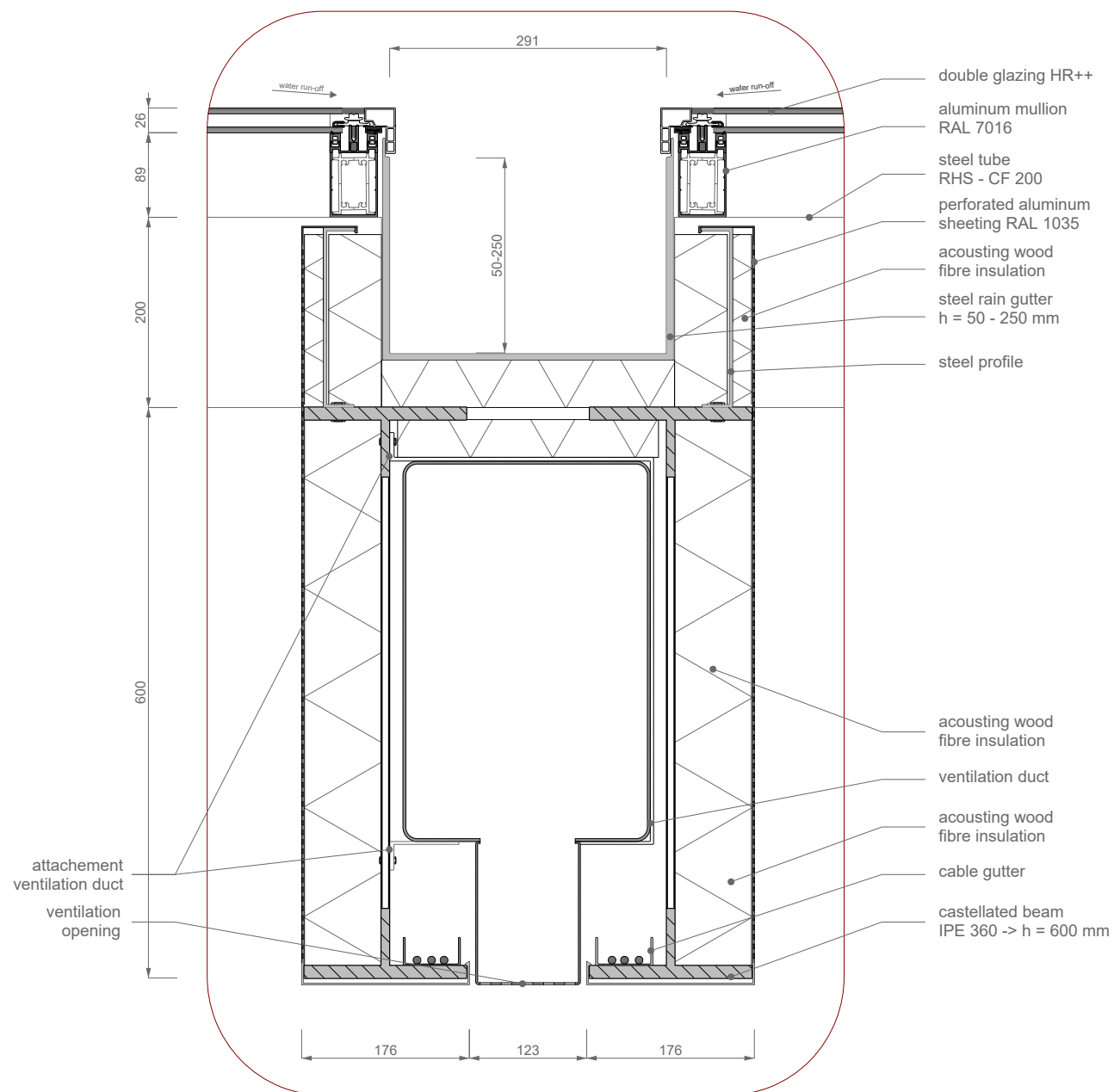
VENTILATION DUCT INTEGRATED IN COLUMN - 3D DETAIL

CLIMATE DESIGN

0 m 5 m

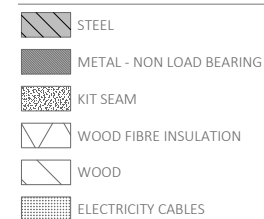


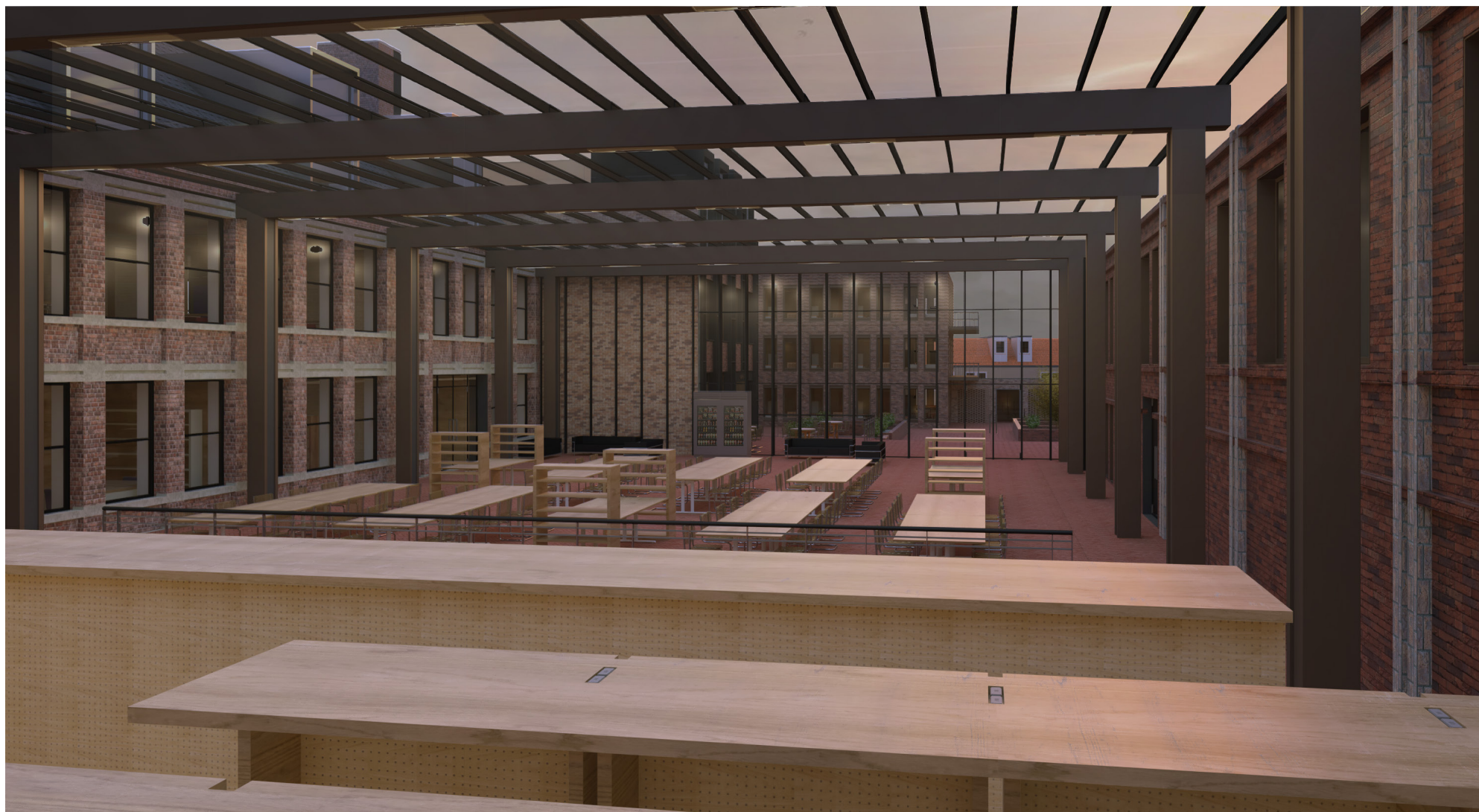
■ HIGH TEMPERATURE
■ LOW TEMPERATURE



DETAIL STRUCTURE

0 cm 25 cm





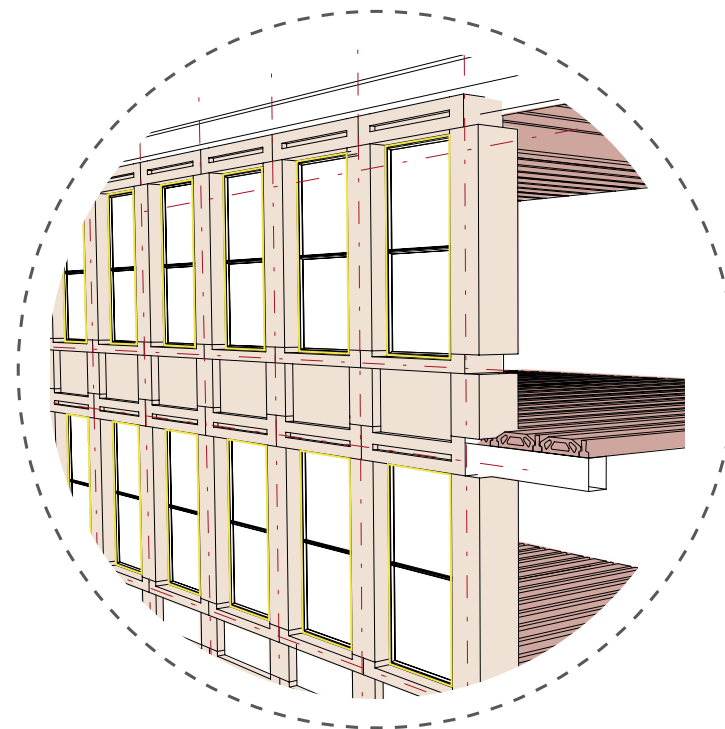
MAIN HALL



MEETING NEW DEMANDS



SUSTAINABILITY



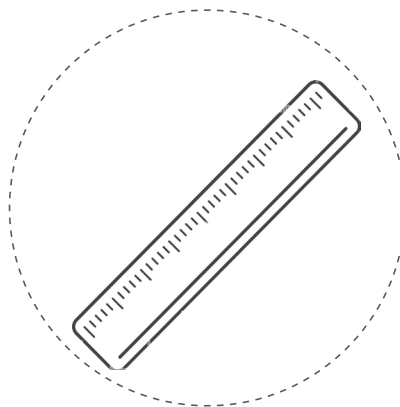
HERITAGE VALUE PRESERVATION



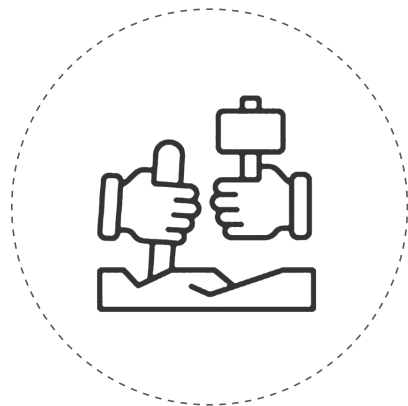
Historic elements



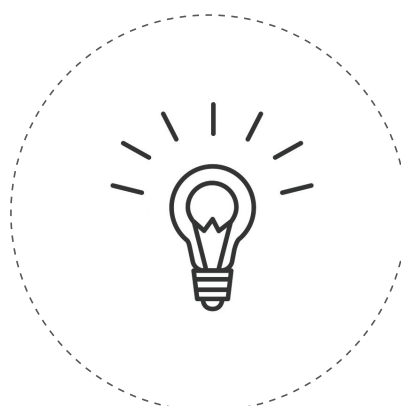
Community
representation



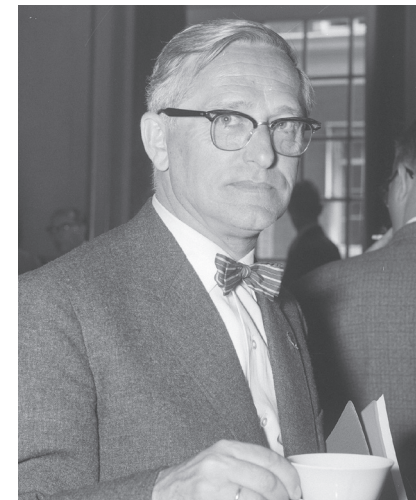
Simplicity



Craftsmanship

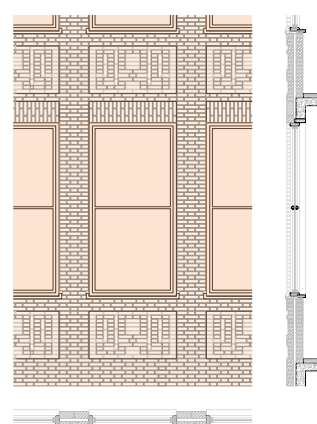
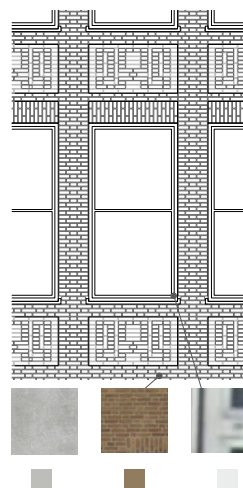
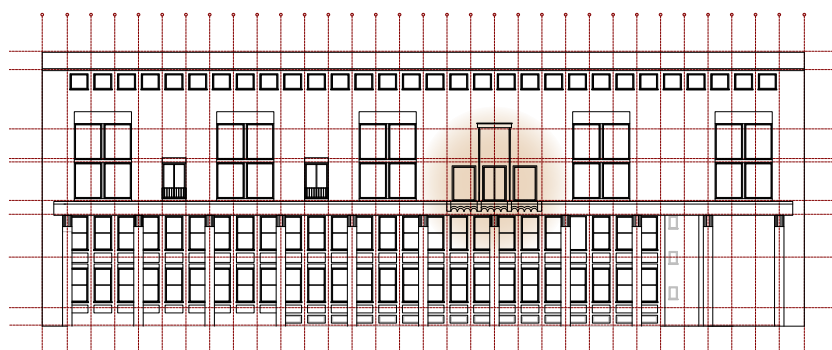
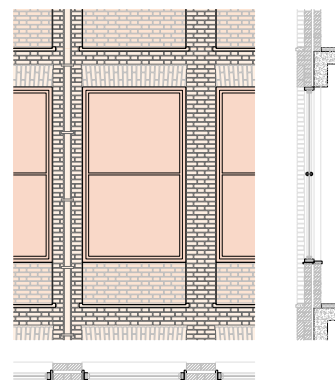
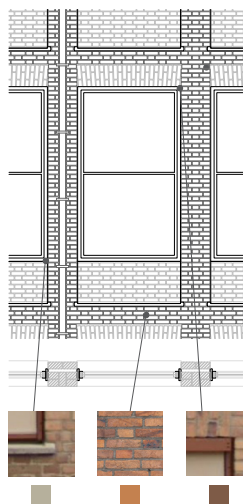
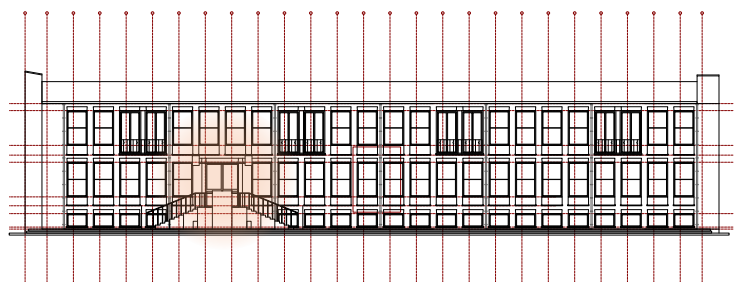


Innovation



J.F. Berghoef, Nationaal Archief

BERGHOEF

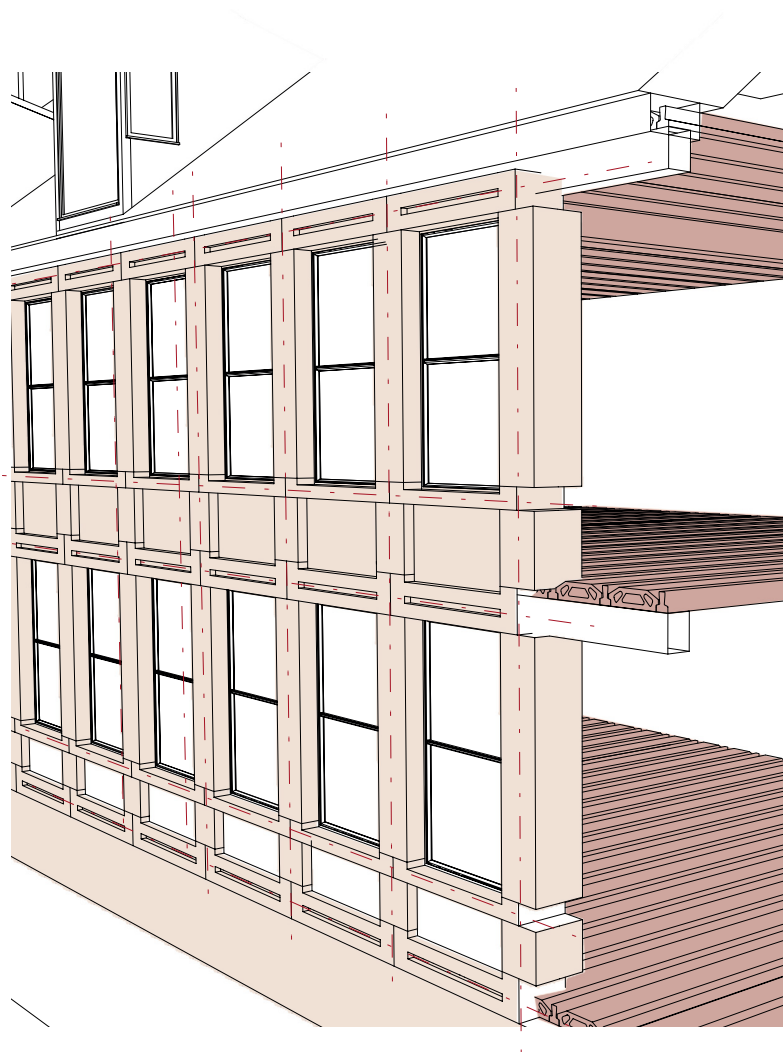


City hall Hengelo

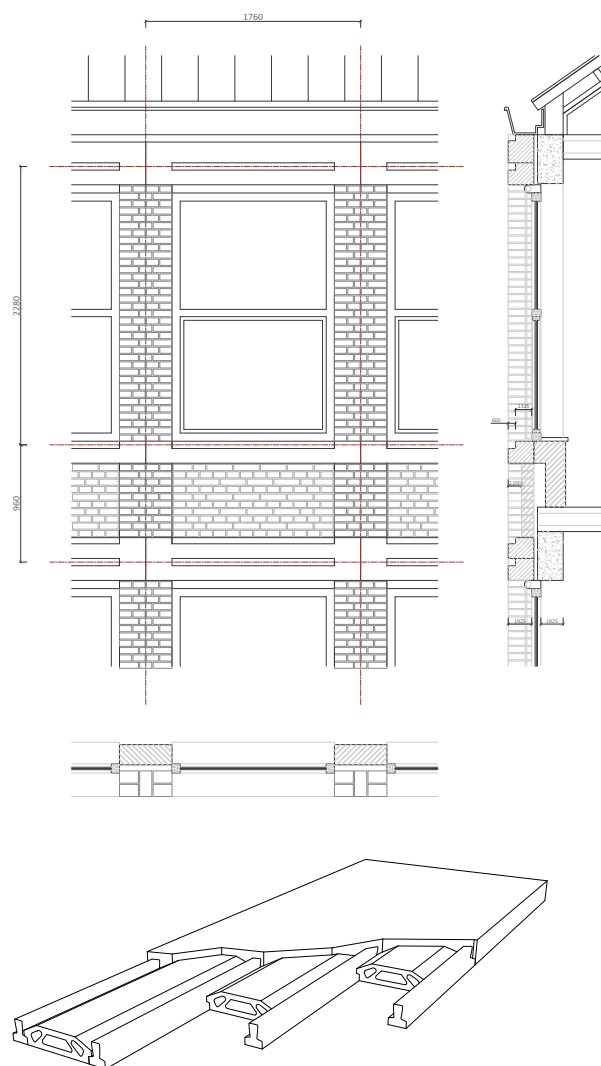
CASE STUDY ANALYSES

0 m 10 m Elevations
0 m 2,5 m Fragments

FACADE DEPTH
FACADE DEPTH



VALUE ASSESSMENT

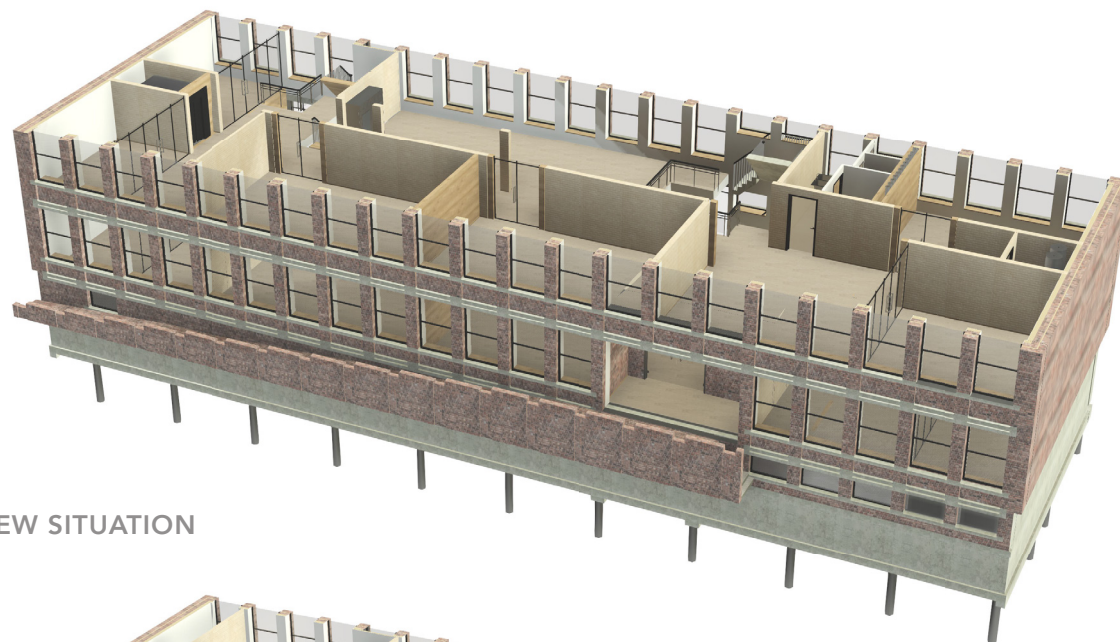


DATO FLOOR

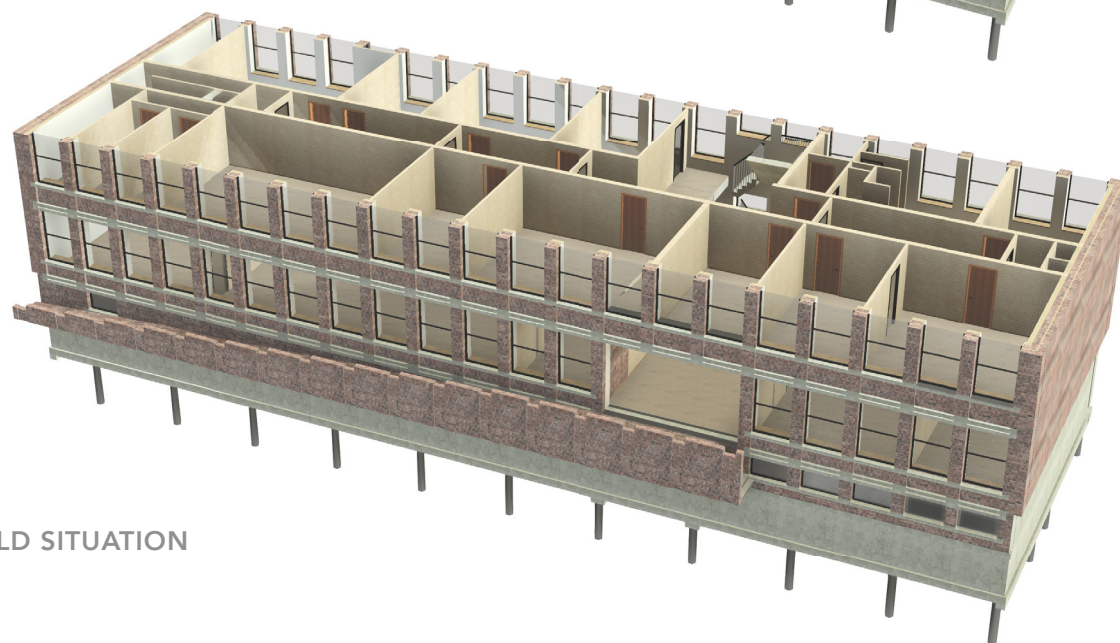


J.F. Berghoef, Nationaal Archief

BERGHOEF



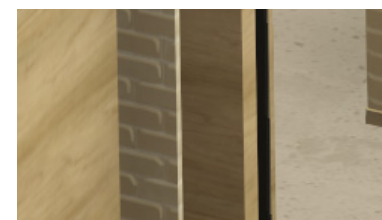
NEW SITUATION



OLD SITUATION

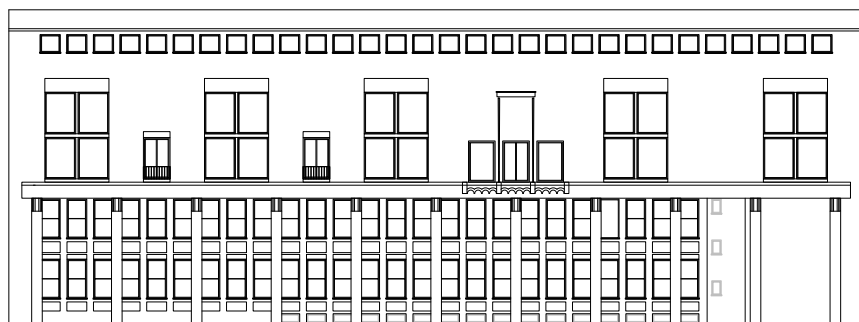


NEW SITUATION



DETAIL - MODEL

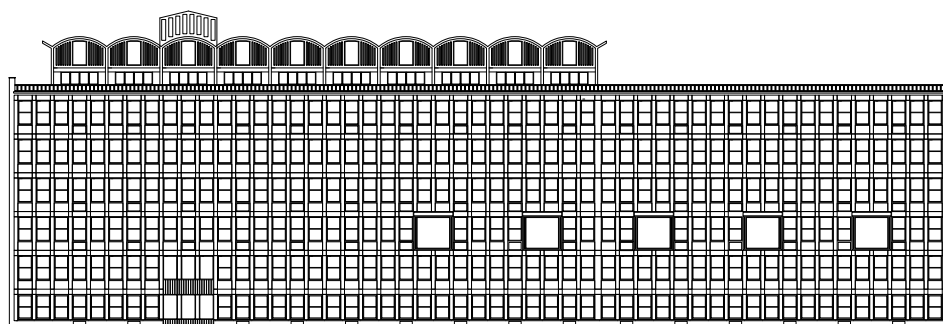
INTERIOR



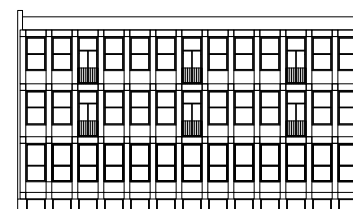
City hall Hengelo



City hall Aalsmeer



ANWB Office The Hague



Health insurance office Alkmaar

CASE STUDY BUILDINGS

0 m 10 m Elevations
0 m 20 m Elevation The Hague



COLOR



TEXTURE

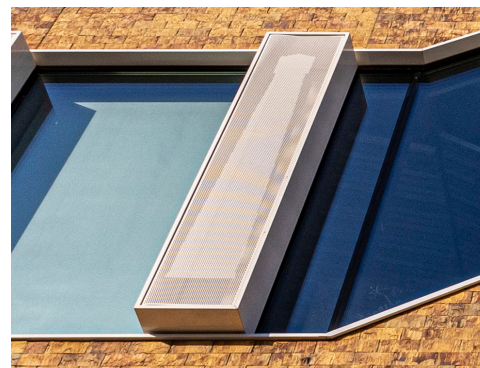
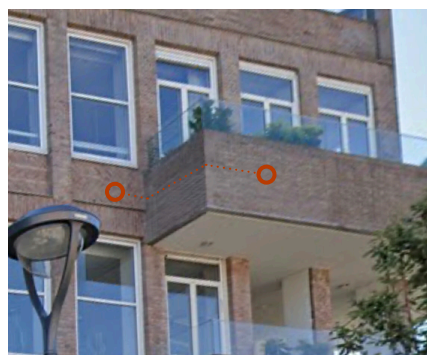
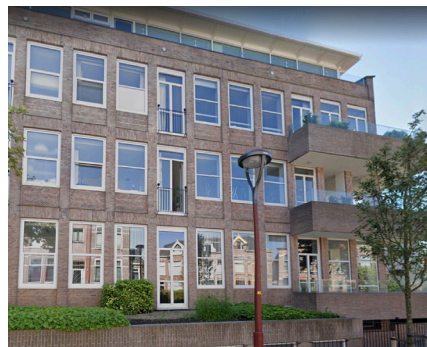


COMPOSITION



Research conclusions

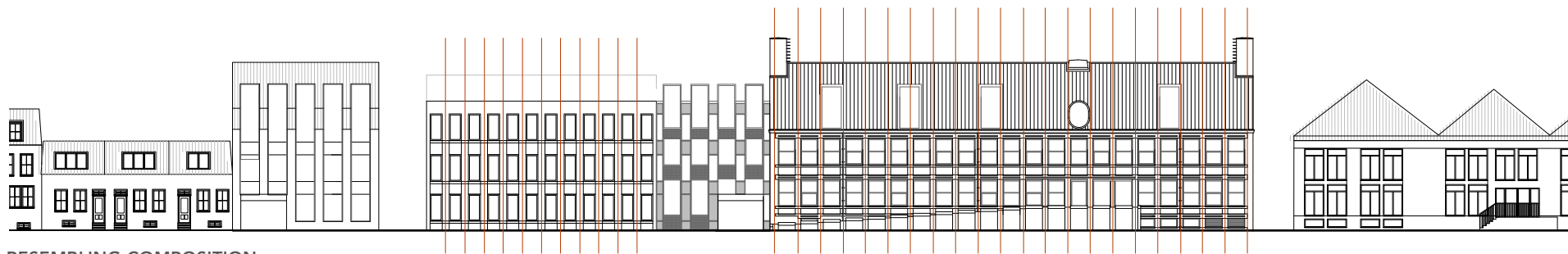
- Three ways to link:
- Resembling composition
- Resembling material
- Resembling design intentions



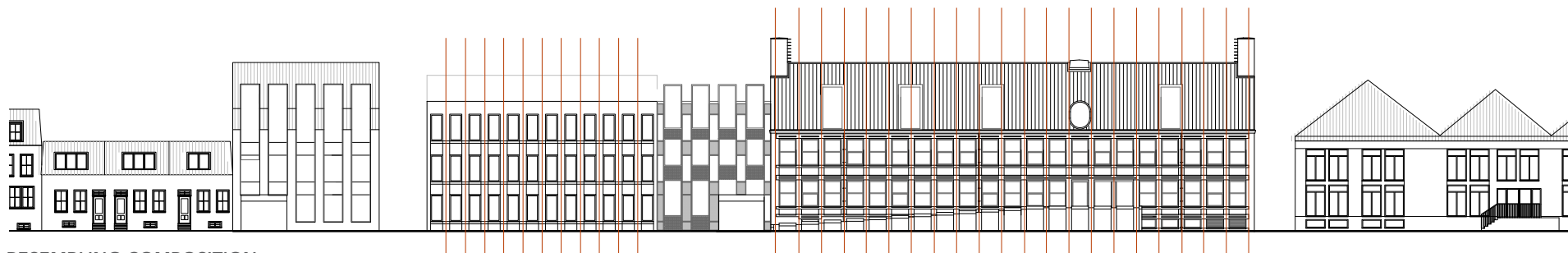
COMPOSITION RESEMBLANCE

MATERIAL RESEMBLANCE

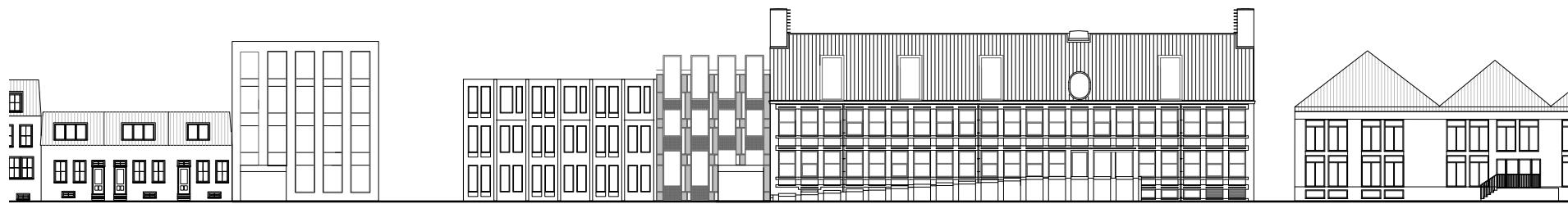
DESIGN INTENTION RESEMBLANCE



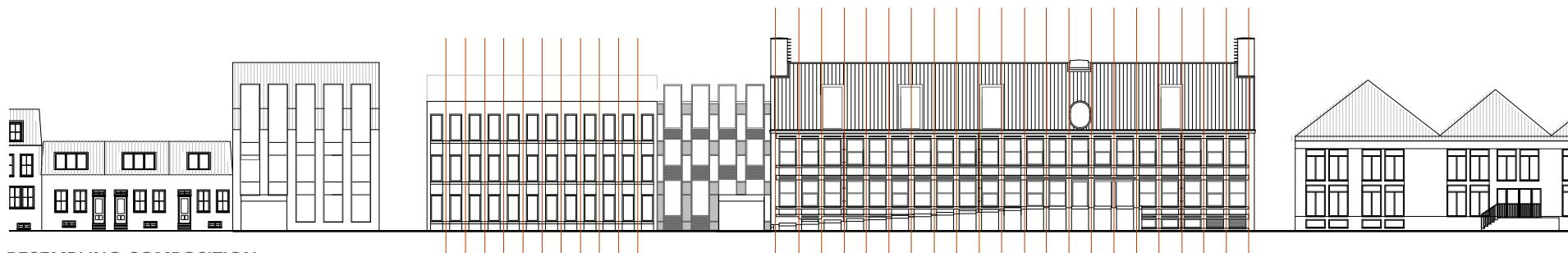
RESEMBLING COMPOSITION



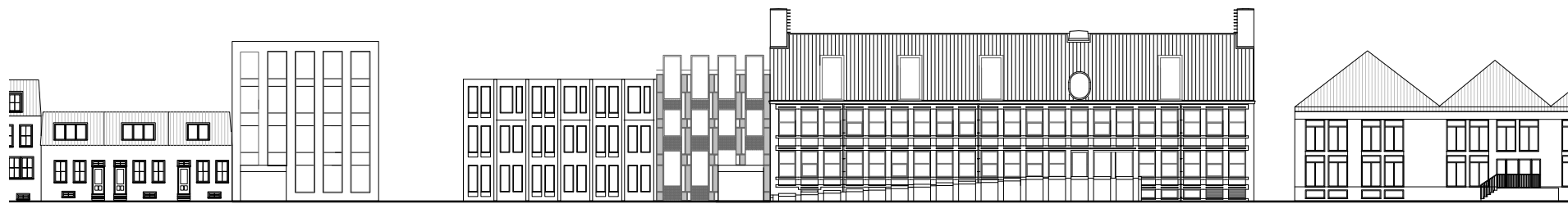
RESEMBLING COMPOSITION



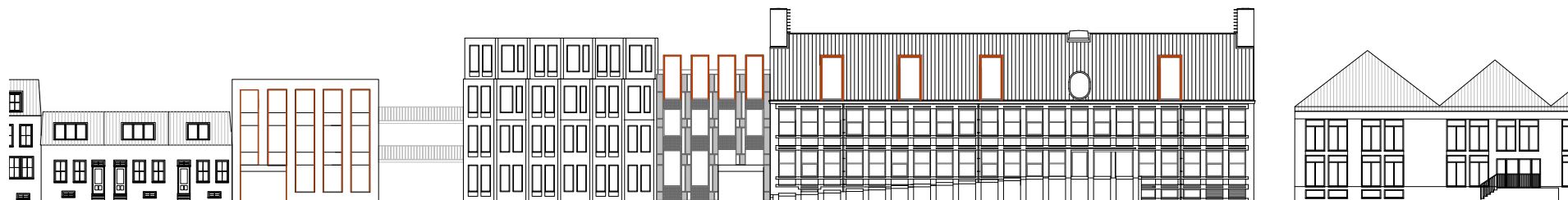
ADJUSTING MODULE WITH



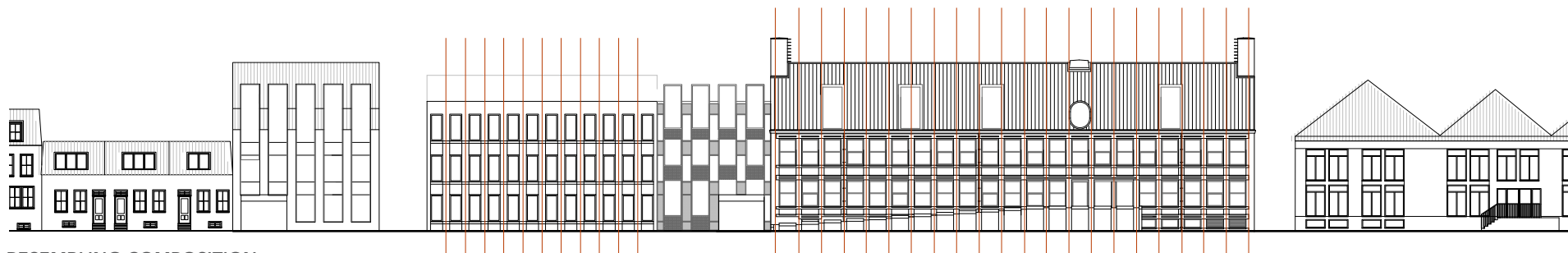
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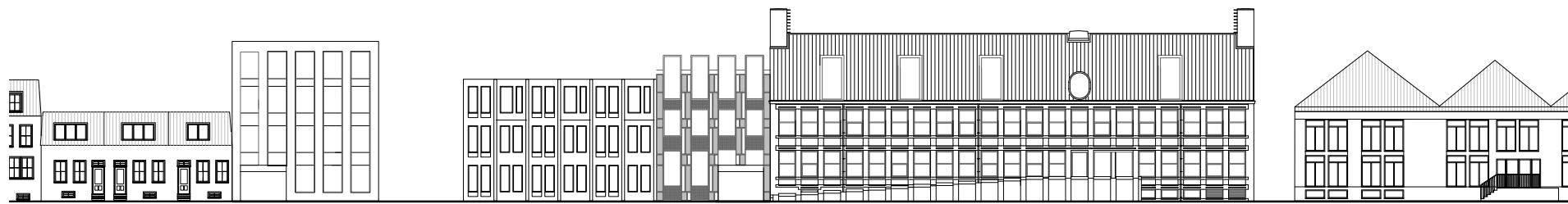
ADJUSTING MODULE WITH



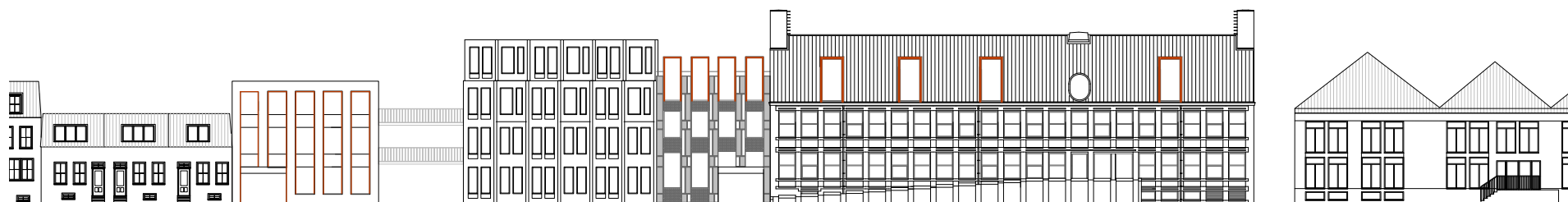
RELATING DESIGN ELEMENTS



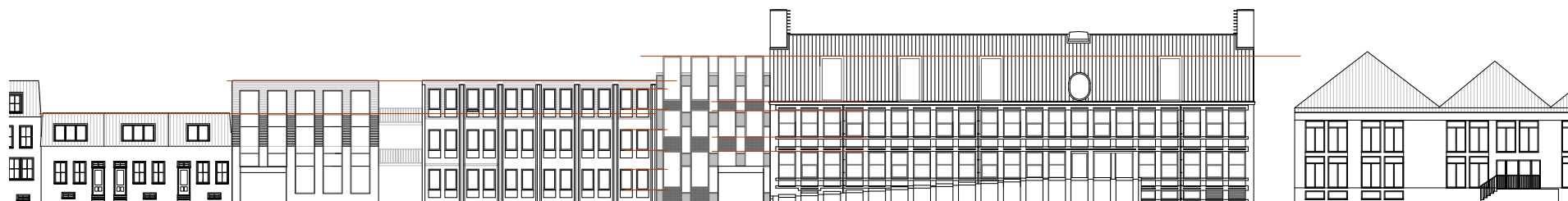
RESEMBLING COMPOSITION



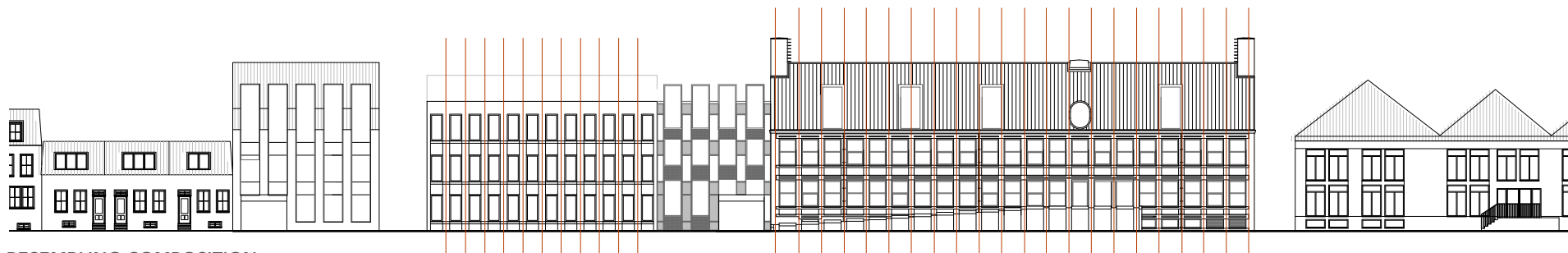
ADJUSTING MODULE WITH



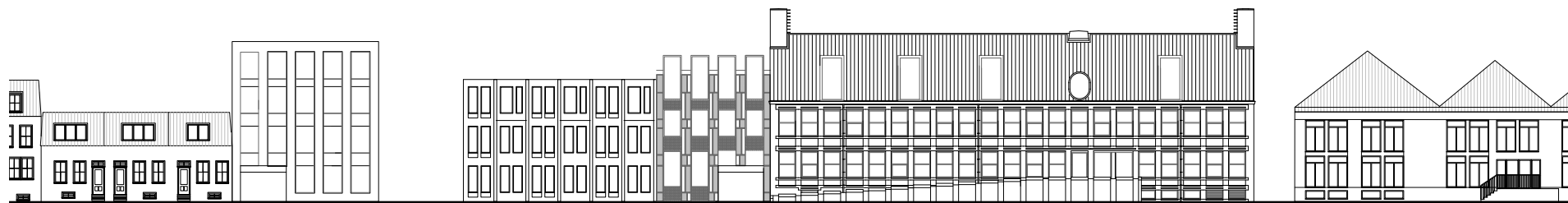
RELATING DESIGN ELEMENTS



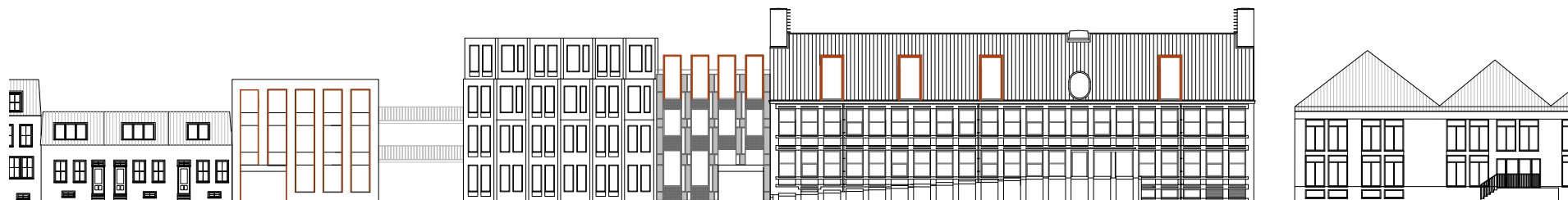
MATCHING BUILDING AND WINDOW HEIGHTS



RESEMBLING COMPOSITION



ADJUSTING MODULE WITH



RELATING DESIGN ELEMENTS



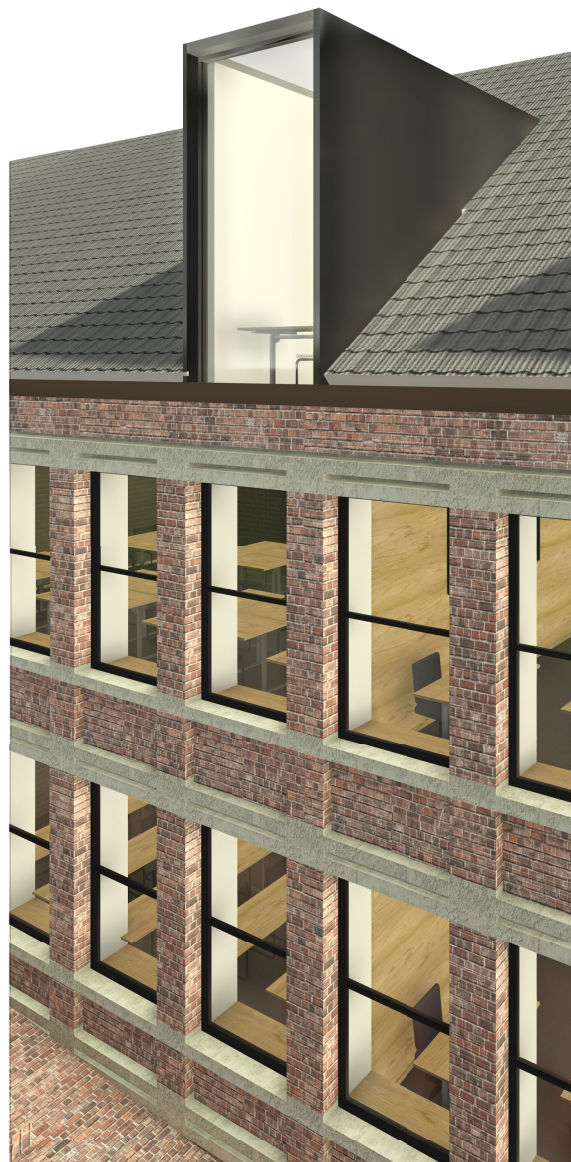
MATCHING BUILDING AND WINDOW HEIGHTS



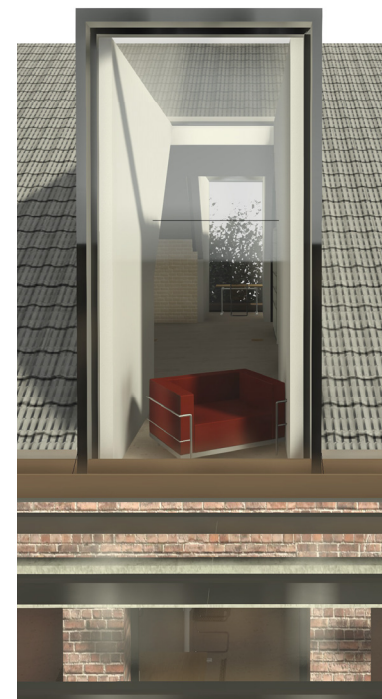
EAST FACADE



EXISTING



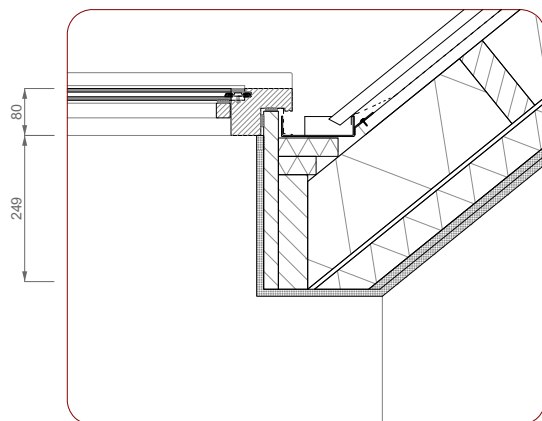
NEW



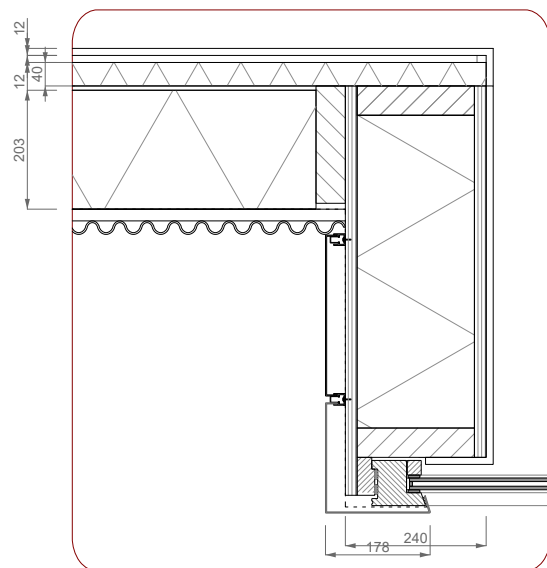
NEW

DORMERS

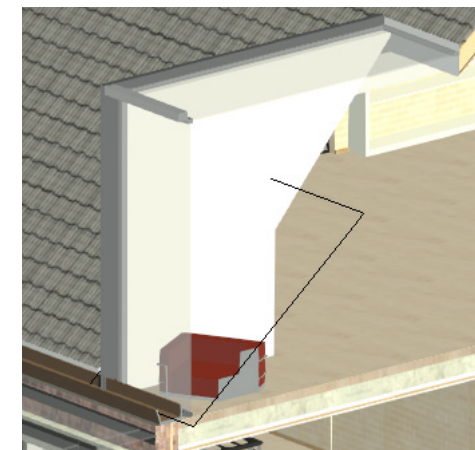
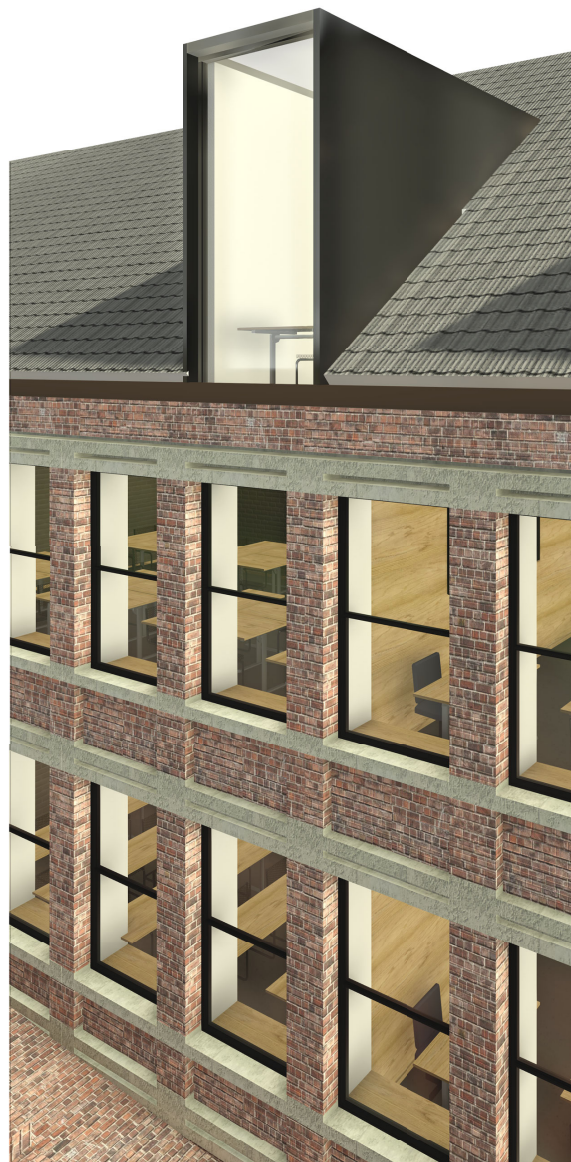




DETAIL E



DETAIL F



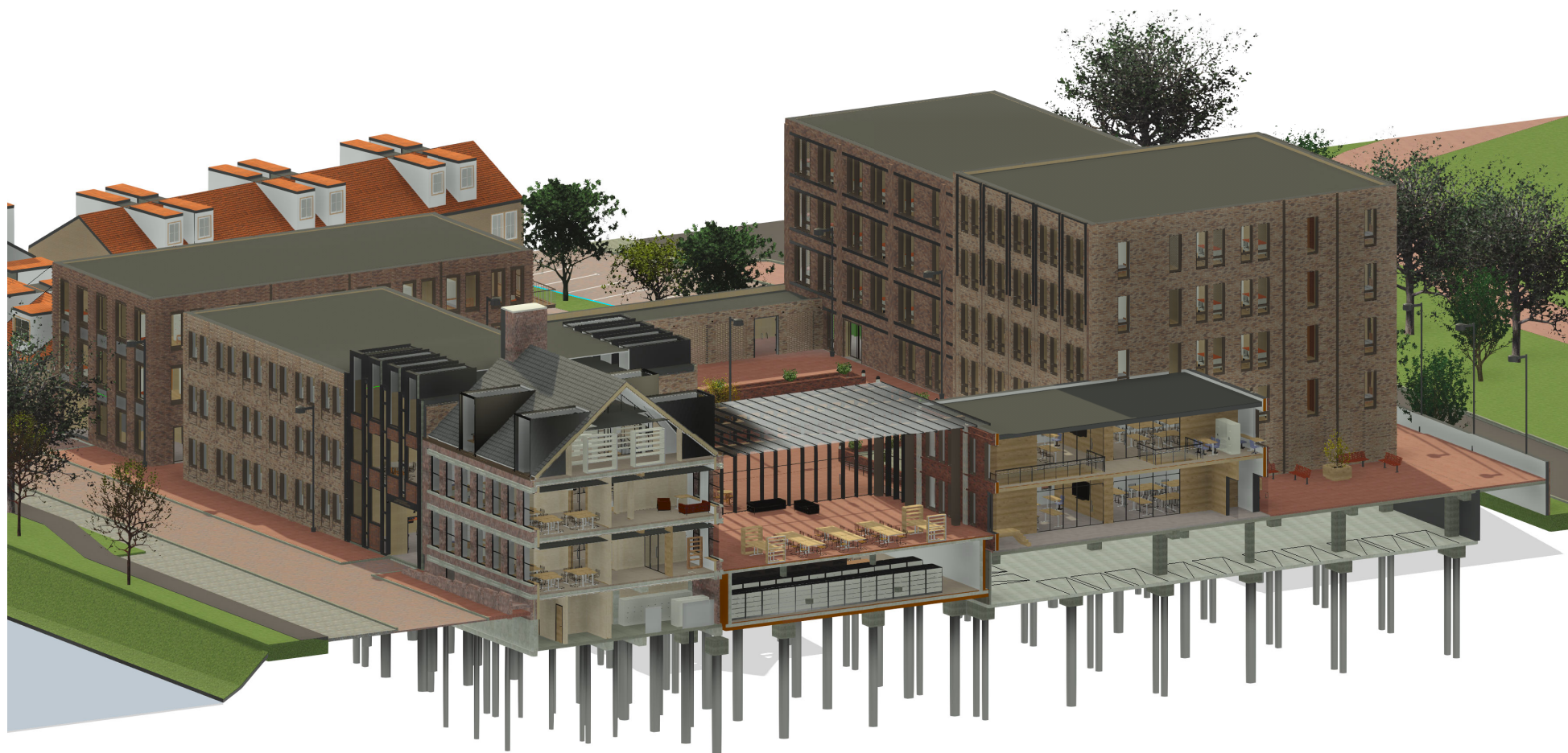
DORMERS





DETAILING





BACKSIDE



COURTYARD



APPROACH

- Preserve attributes which convey heritage value most clearly
- Take freedom to make changes to allow new use

DISCUSSION

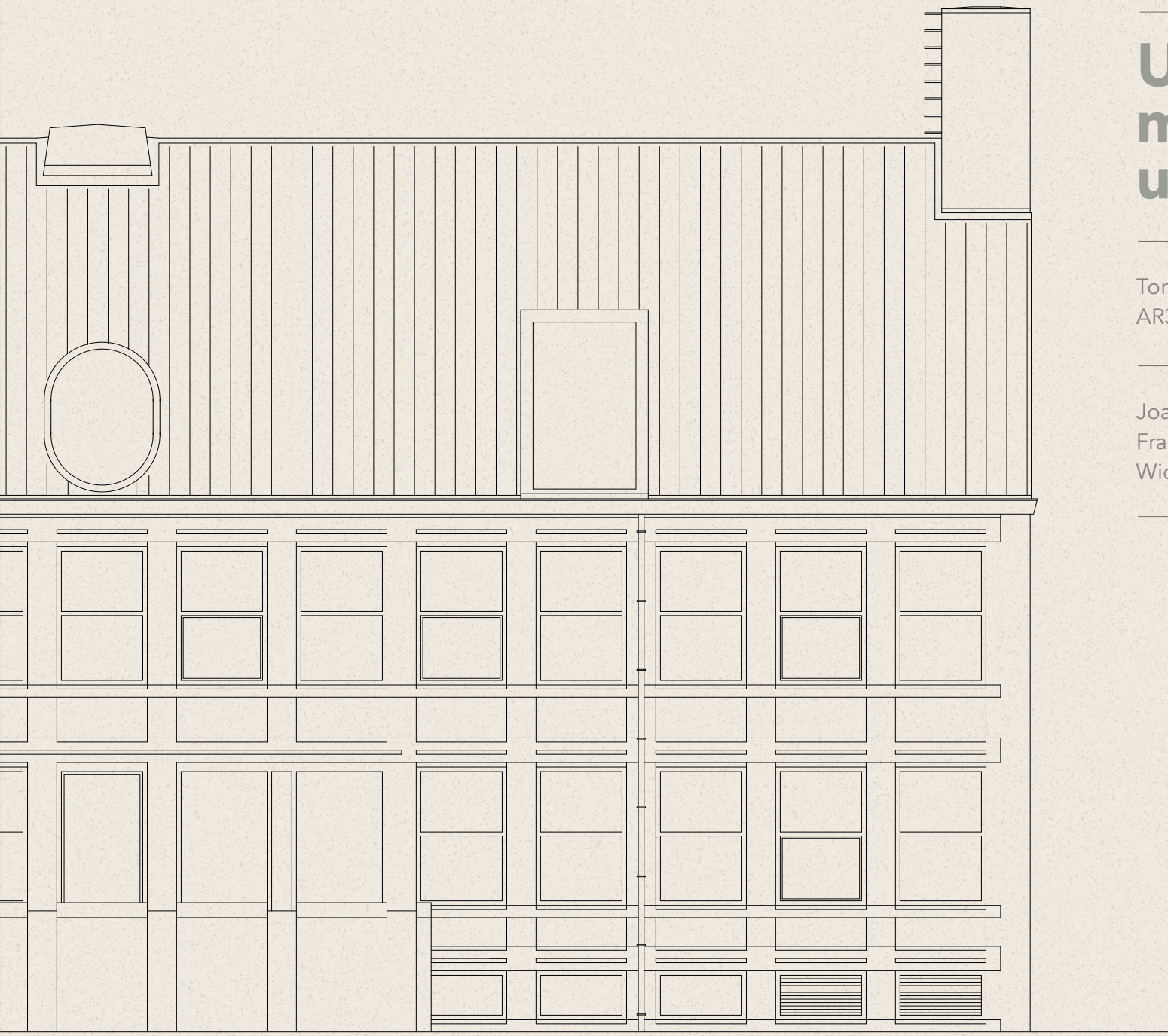
- Attributes more related to use

RECOMMENDATION

- Require a cultural-historical value statement and capacity assessment for any building before granting building permit

Unknown
makes
unloved





Unknown makes unloved

Tom Gentenaar | 4691180
AR3AH105 | Vacant Heritage

Joana Dos Santos Gonçalves
Frank Koopman
Wido Quist

P5 PRESENTATION





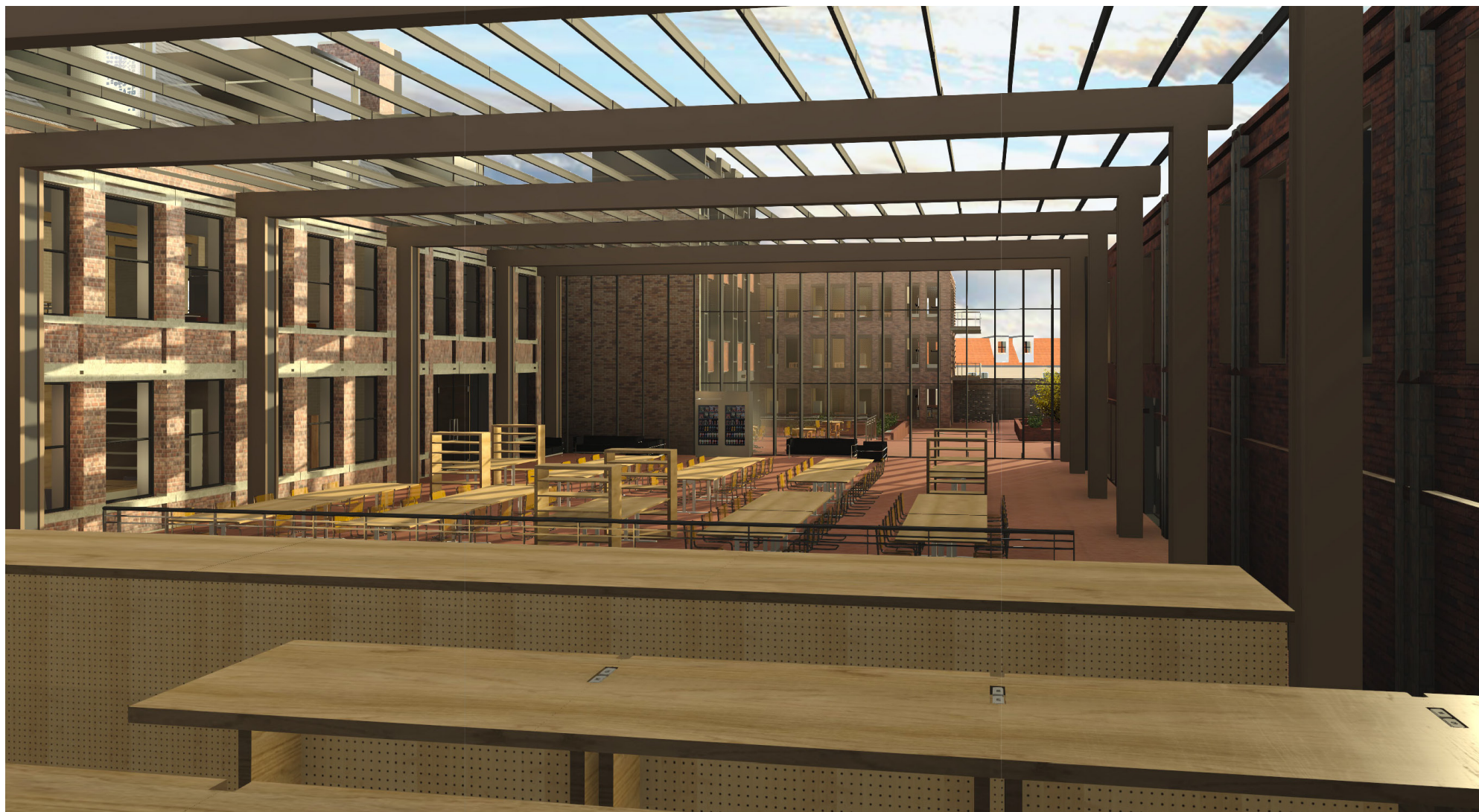
WEST ENTRANCE



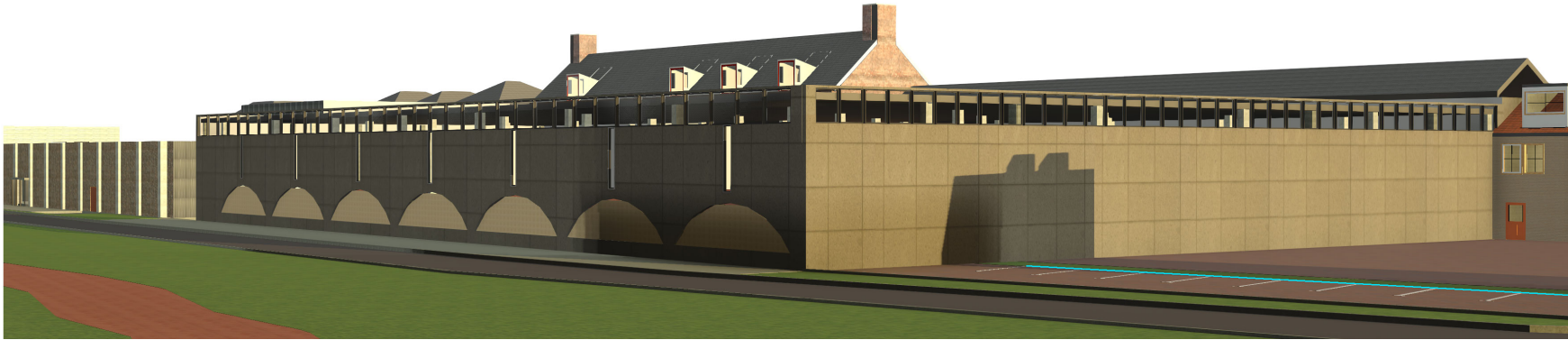
COURTYARD



COURTYARD



MAIN HALL



CURRENT SITUATION



NEW SITUATION

WEST ELEVATION



ORIGINAL DESIGN



CURRENT SITUATION



ALL WALLS REMOVED

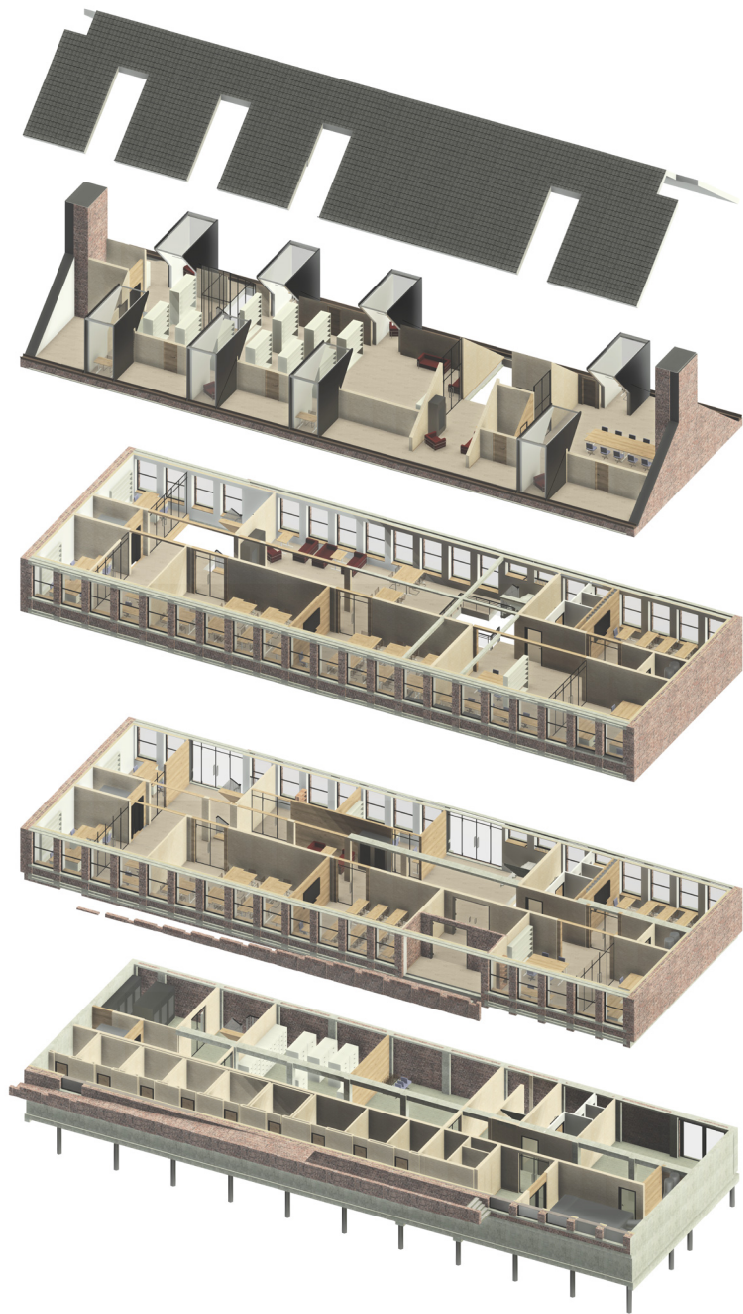
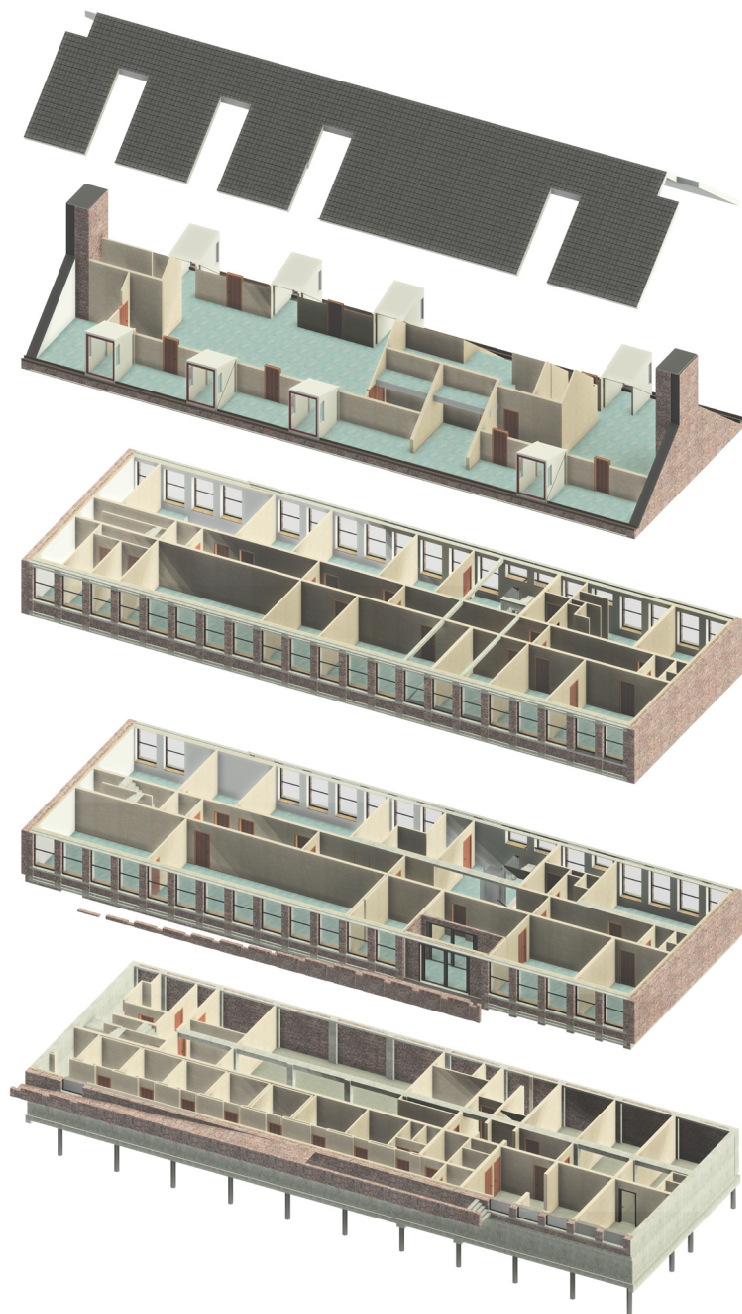


GLASS WALLS



SHORTENED HALLWAY

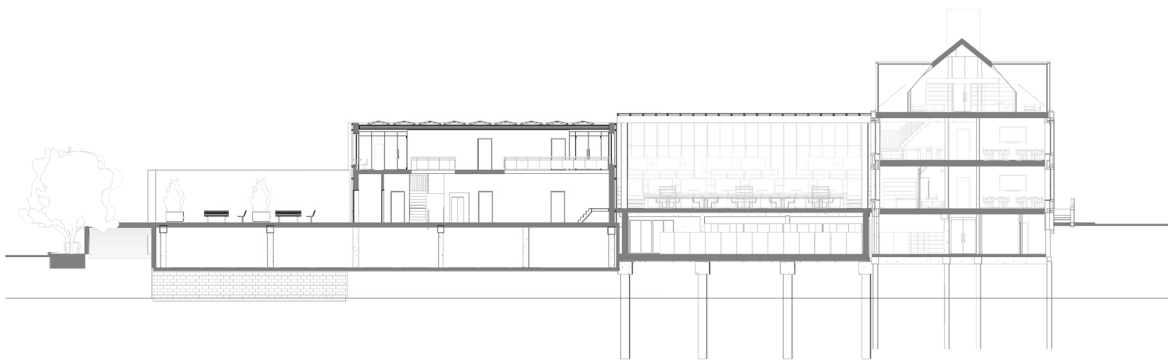
DESIGN EXPERIMENT HALL



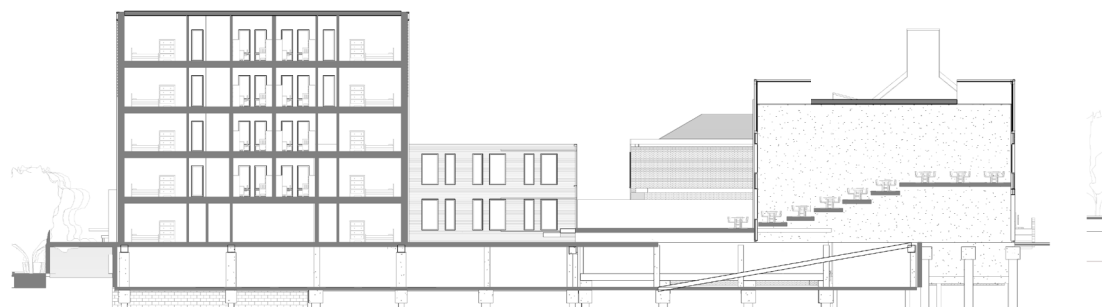




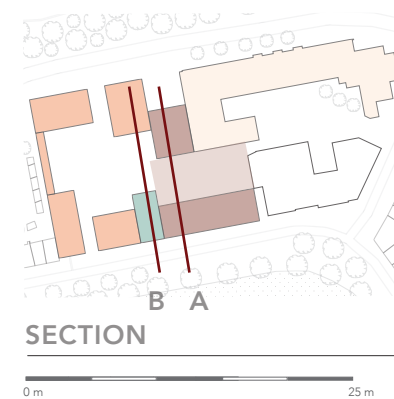




A

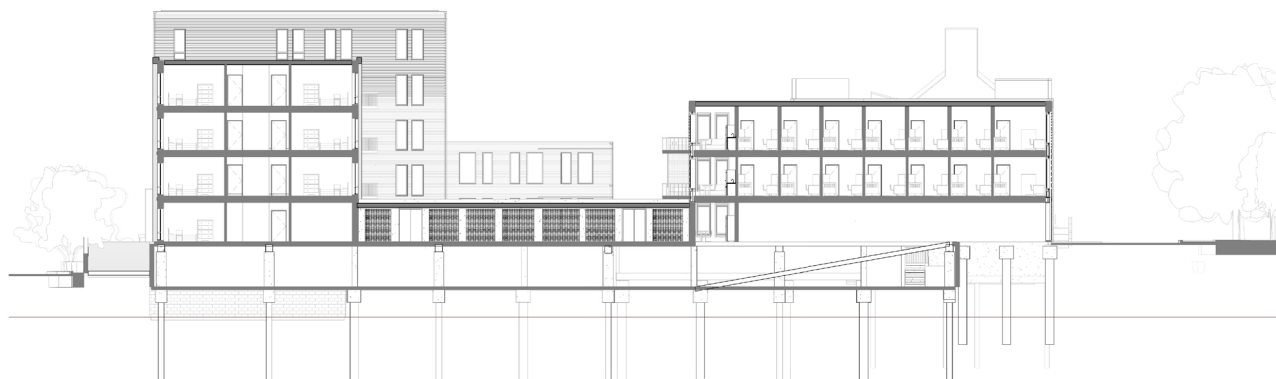


B





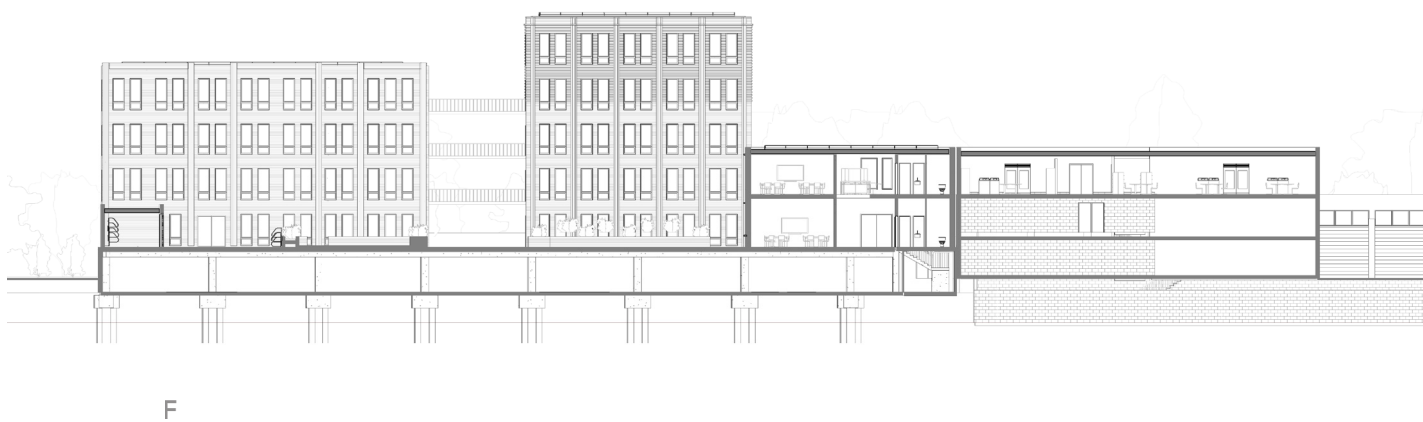
C

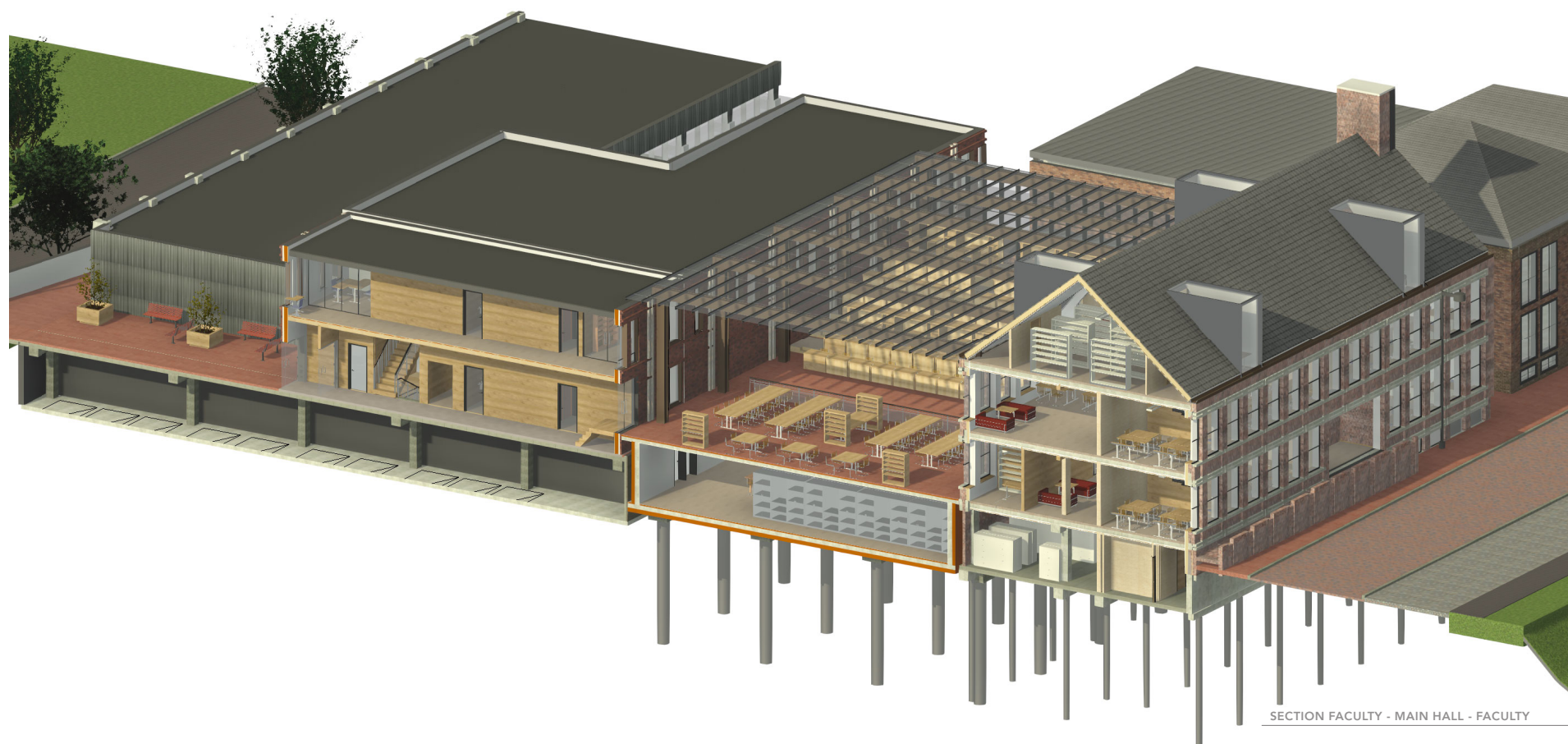


D



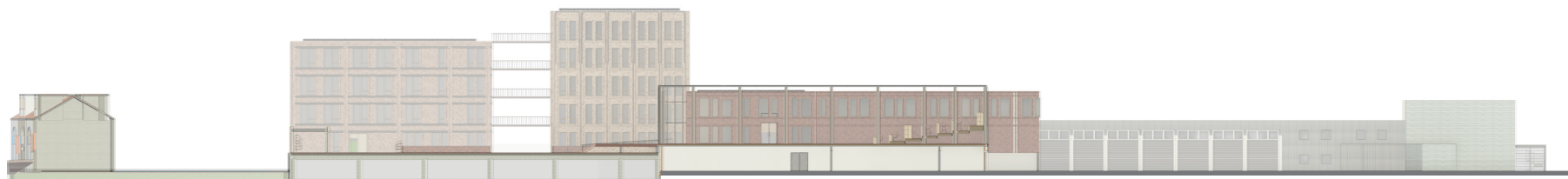
SECTION







EAST ELEVATION



EAST ELEVATION - II



WEST ELEVATION



WEST ELEVATION - II



EAST ELEVATION



EAST ELEVATION - II

ELEVATIONS

0 m 10 m



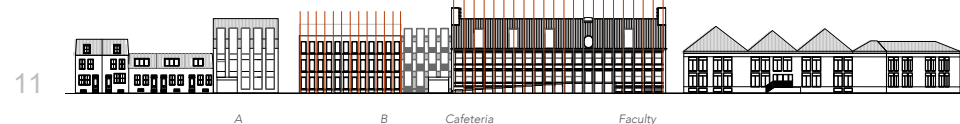
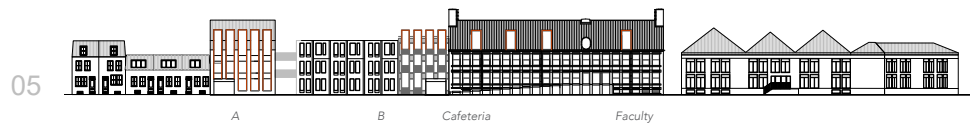
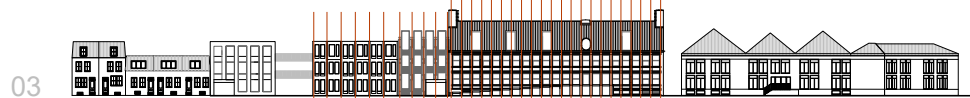
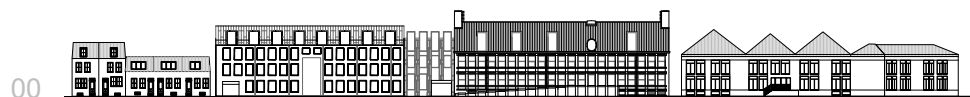
WEST ELEVATION



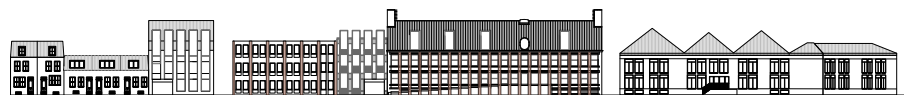
WEST ELEVATION II

ELEVATIONS

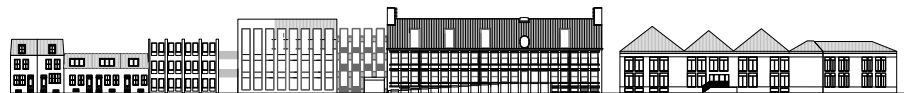
0 m 10 m



12



13



14



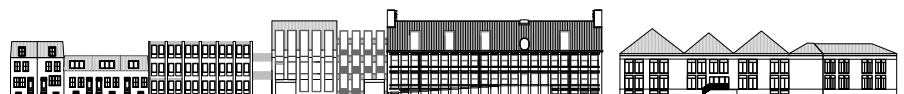
15



16



17



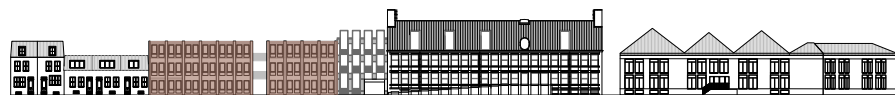
A

B

Cafeteria

Faculty

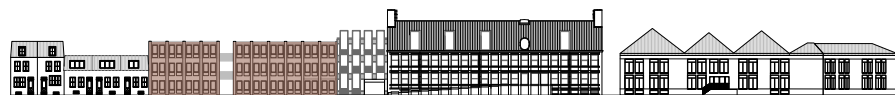
18



19



20



21



22



23



A

B

Cafeteria

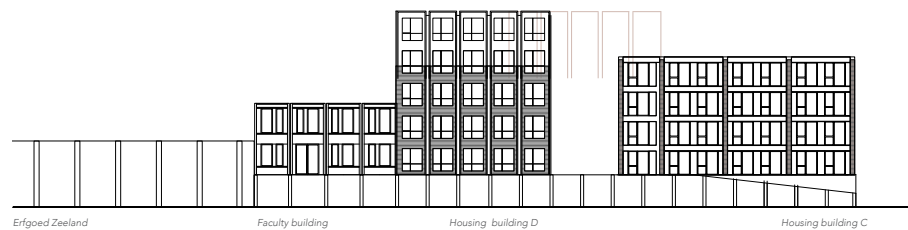
Faculty



07



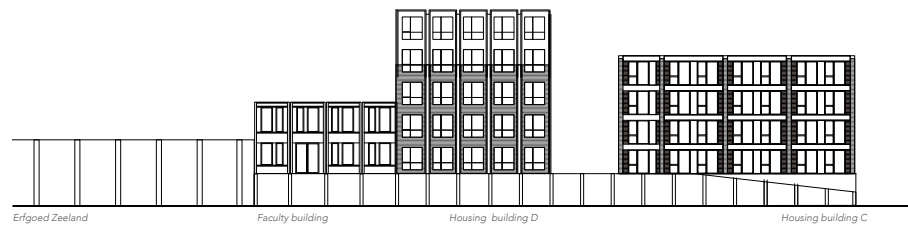
10



08



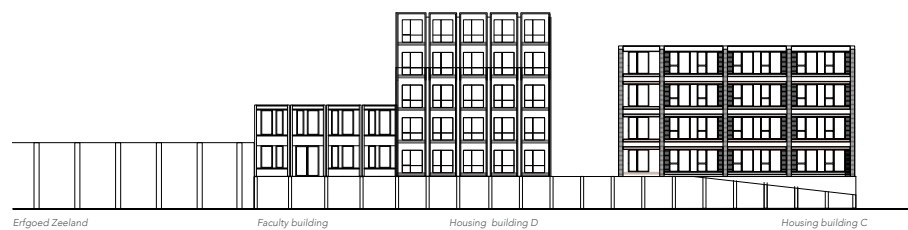
11



09



12





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 continuously 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 multidisciplinary 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 accommodate 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	40	600 [~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) 'the traditional approach at UCR requires personal offices for full-time staffmembers. Part-time staff can use flexible workplaces.
Flexible workplaces	25	375 [~15]	
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 together. 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	

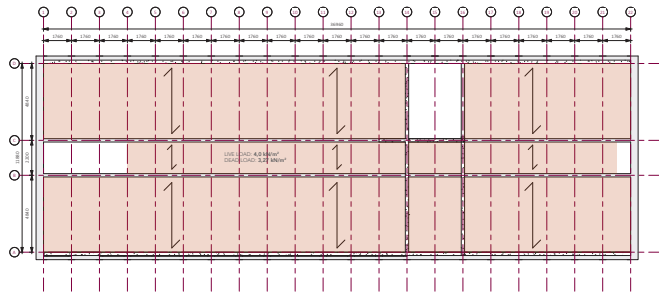


FIGURE 3. LOAD PLAN SECOND FLOOR

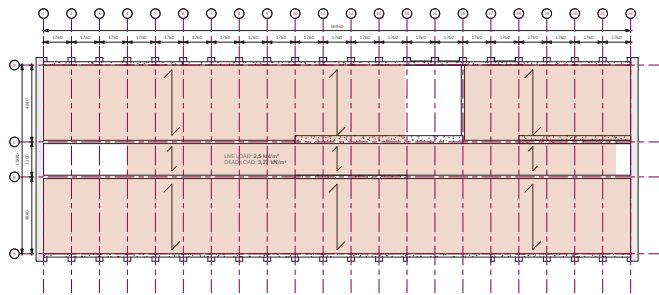
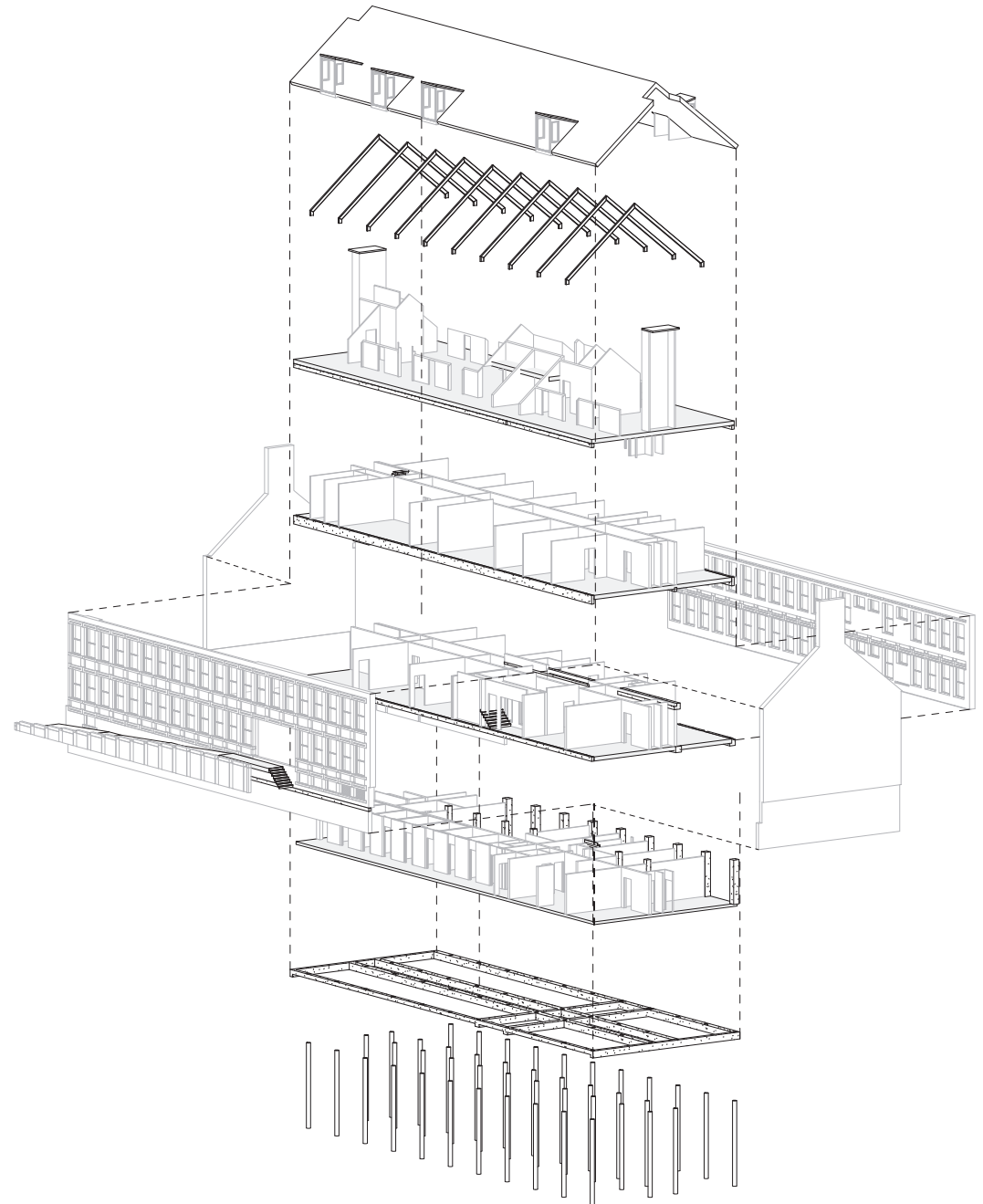
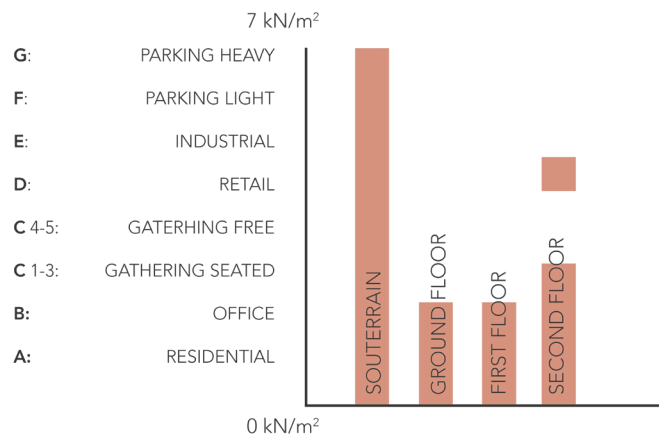
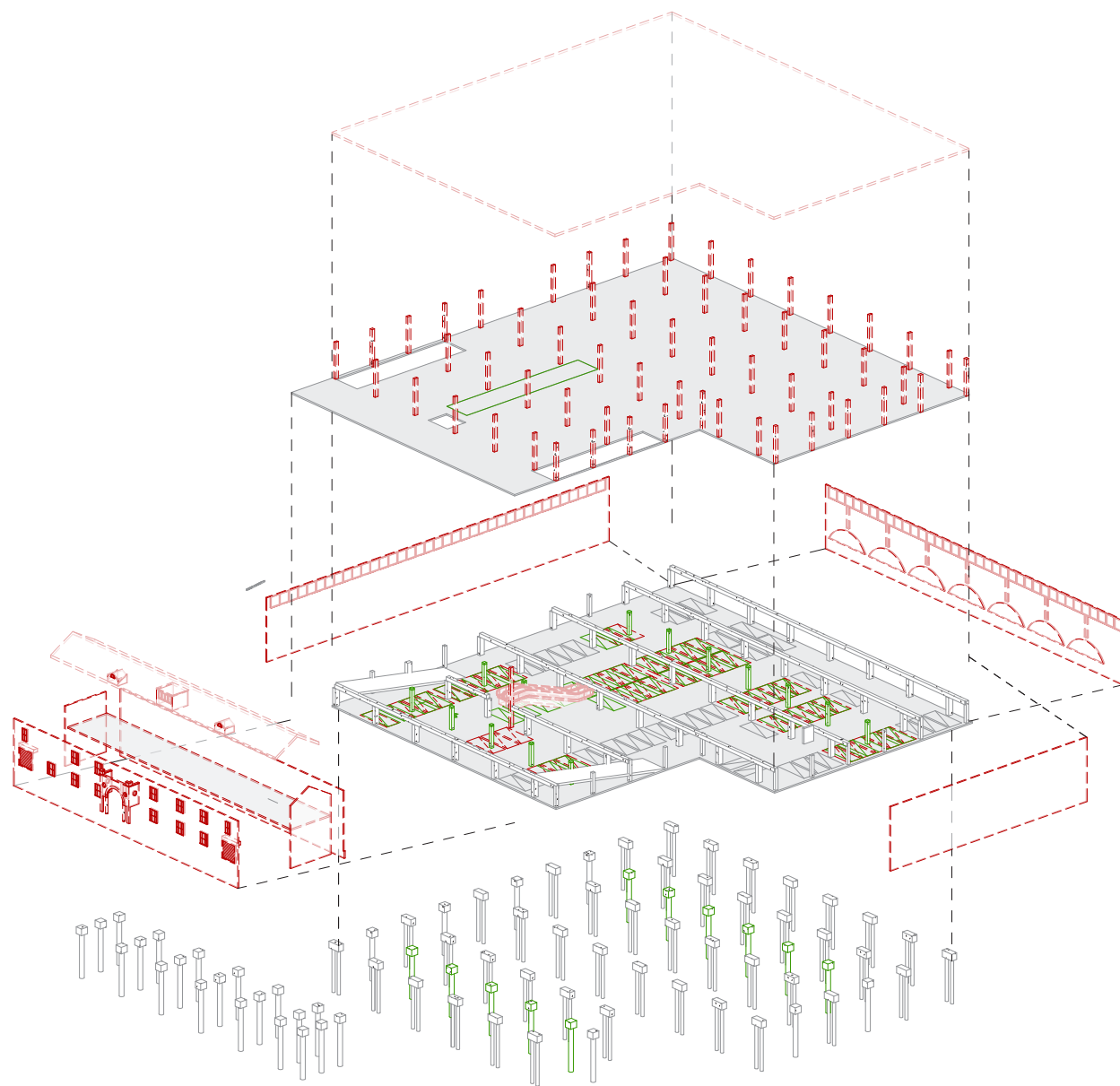


FIGURE 4. LOAD PLAN FIRST FLOOR

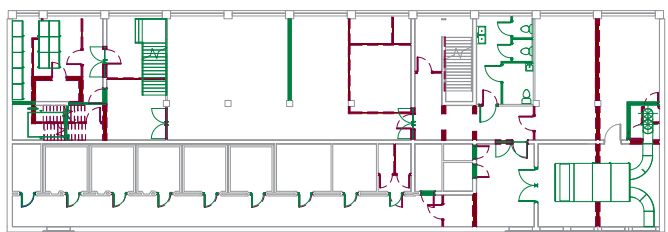
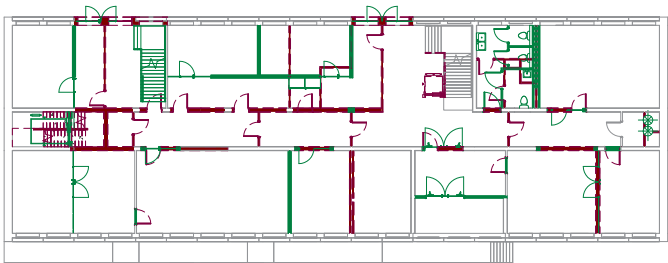
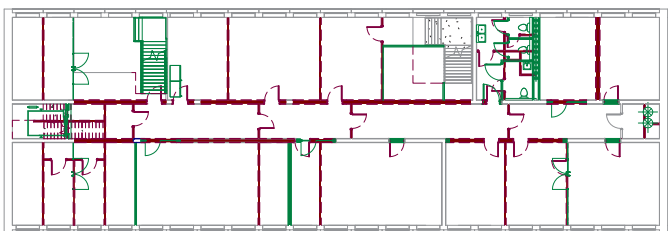
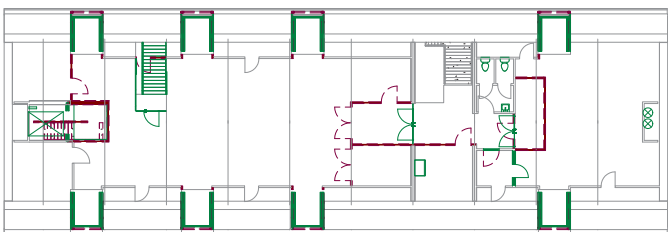


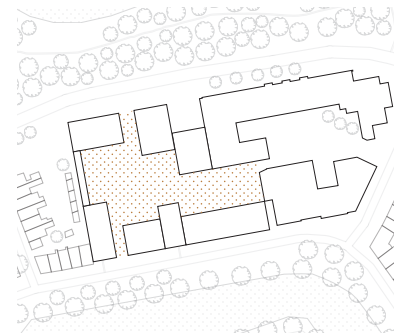
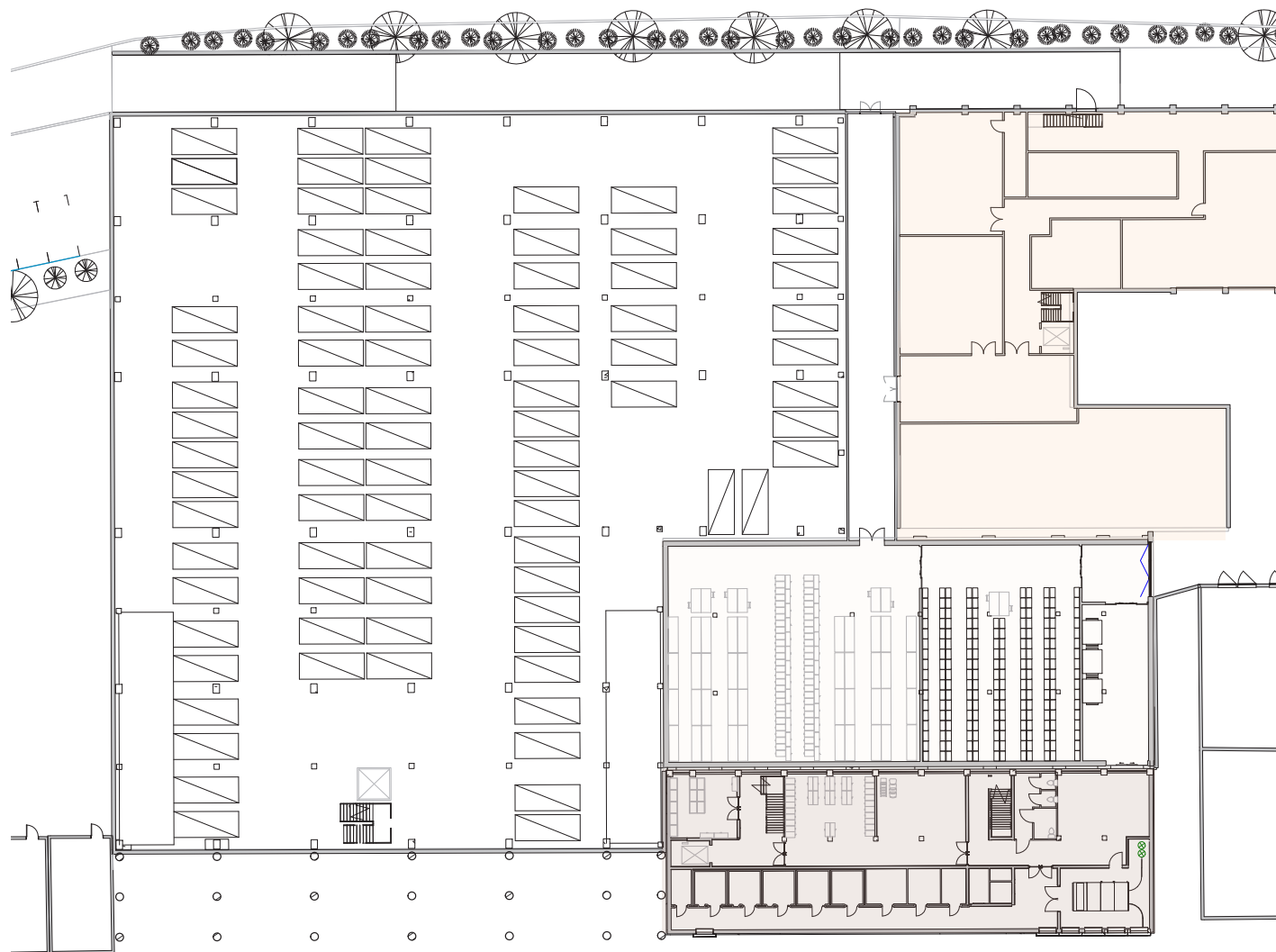


EXPLODED AXONOMETRIC

Achter de Houttuinen 12-18







SOUTERRAIN

0 m 12,5 m



- FACULTY BUILDINGS
- HOUSING BUILDINGS
- CAFETERIA
- ERFGOED ZEELAND

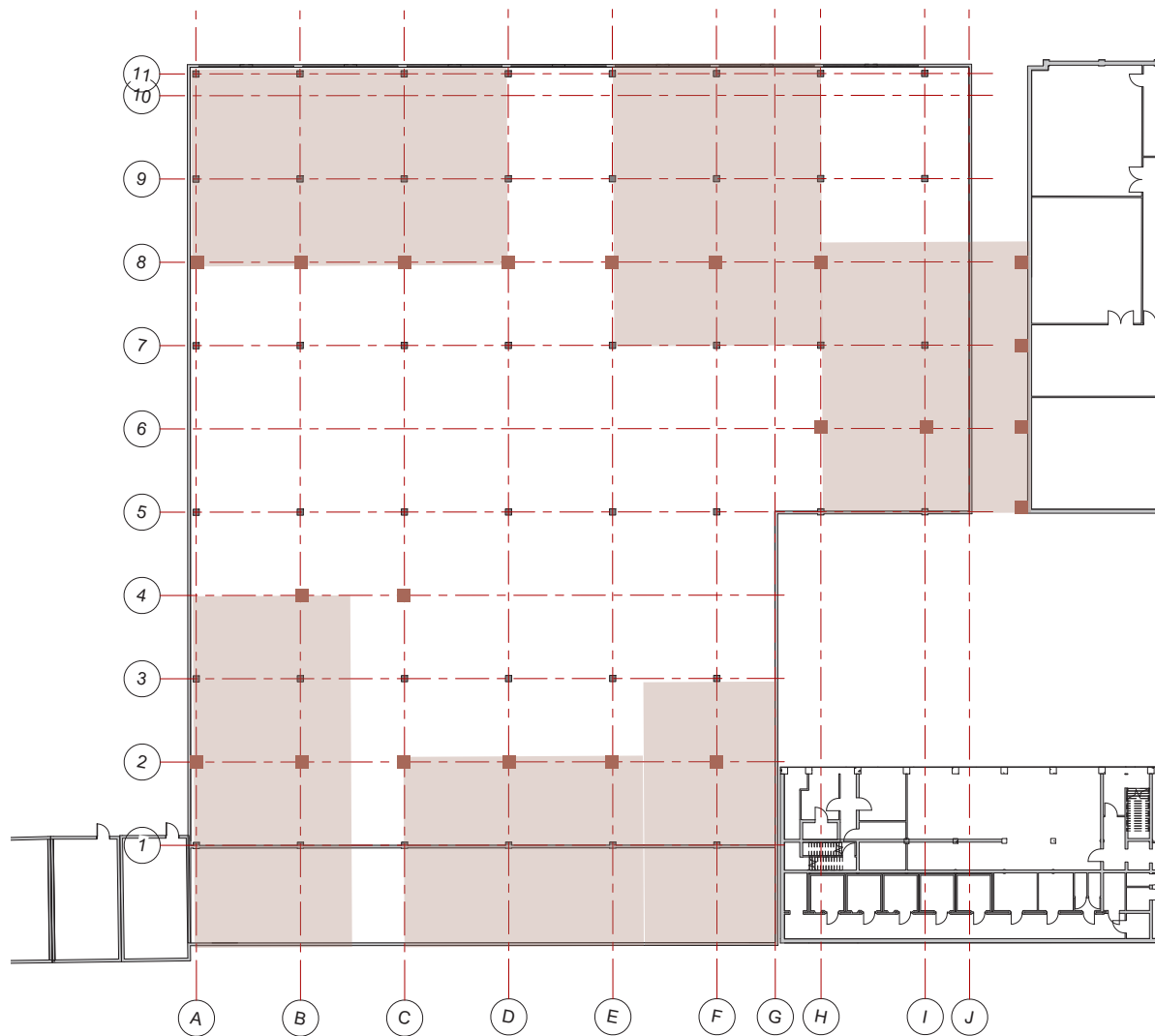


FIGURE X. ADDITIONAL FOUNDATIONS

0 m 25 m



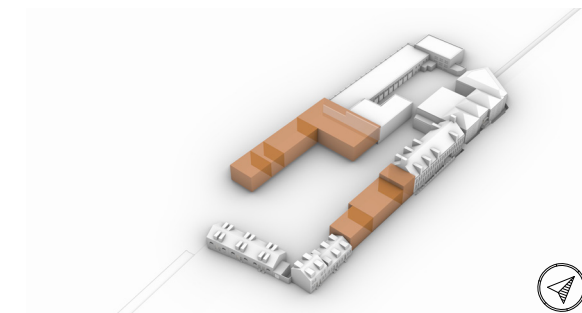
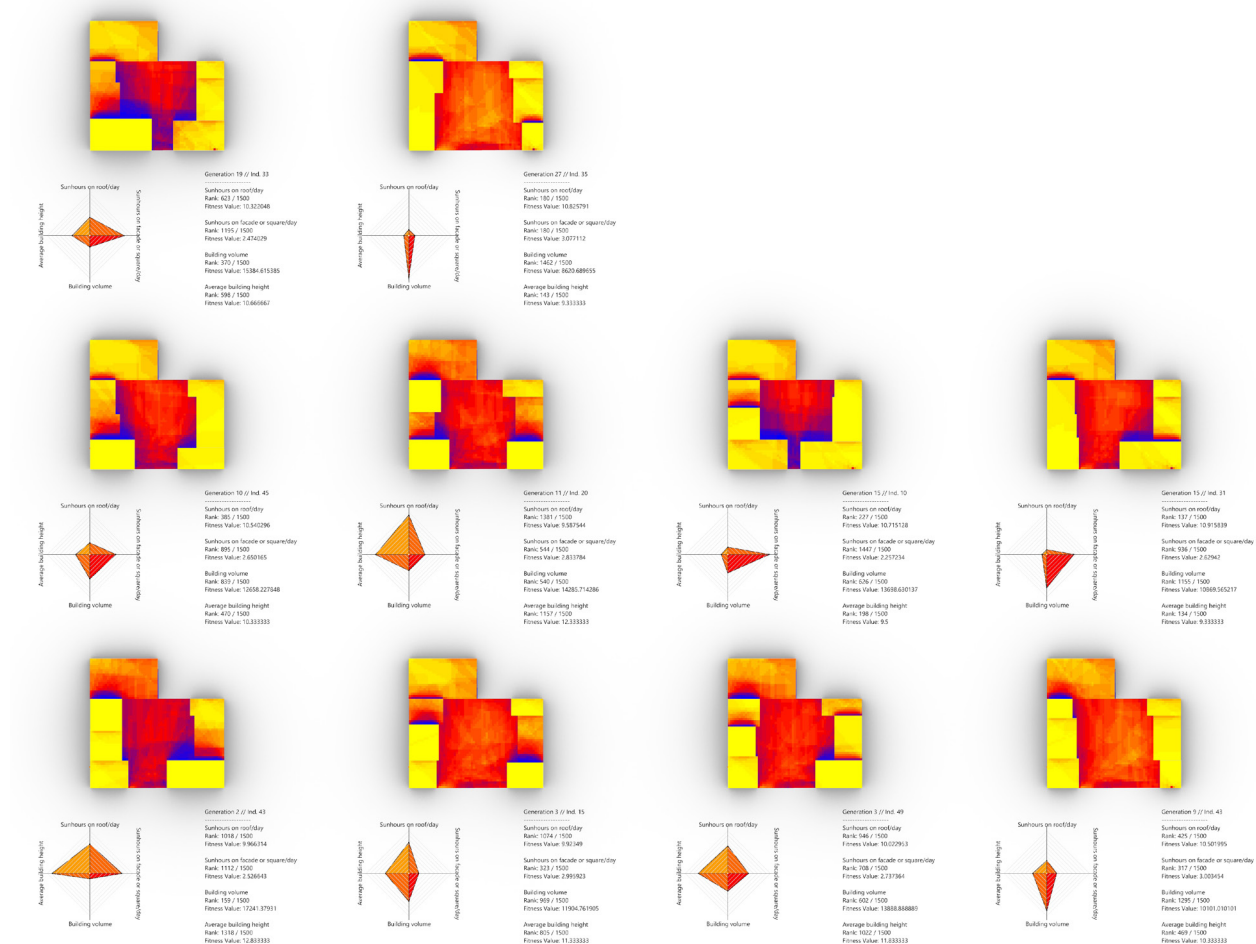


FIGURE X. MINIMUM BOUNDARIES BUILDING VOLUME

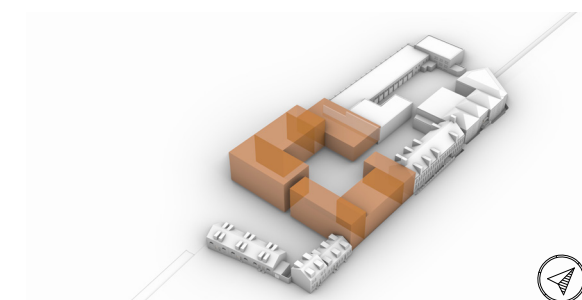


FIGURE X. MAXIMUM BOUNDARIES BUILDING VOLUME

FIGURE X. EXPLORATION OF THE SOLUTION SPACE

0 m 200 m



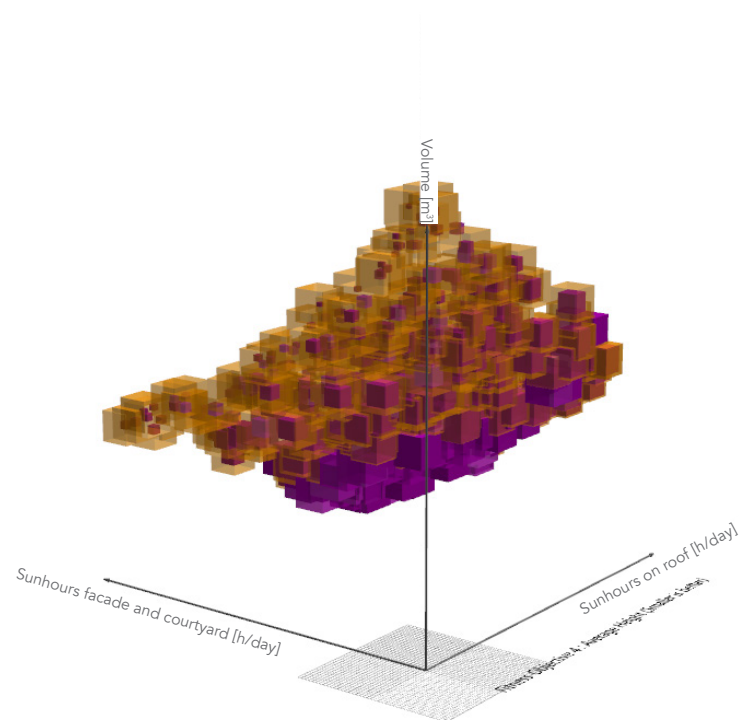


FIGURE X. COORDINATE SYSTEM OF SOLUTION SPACE

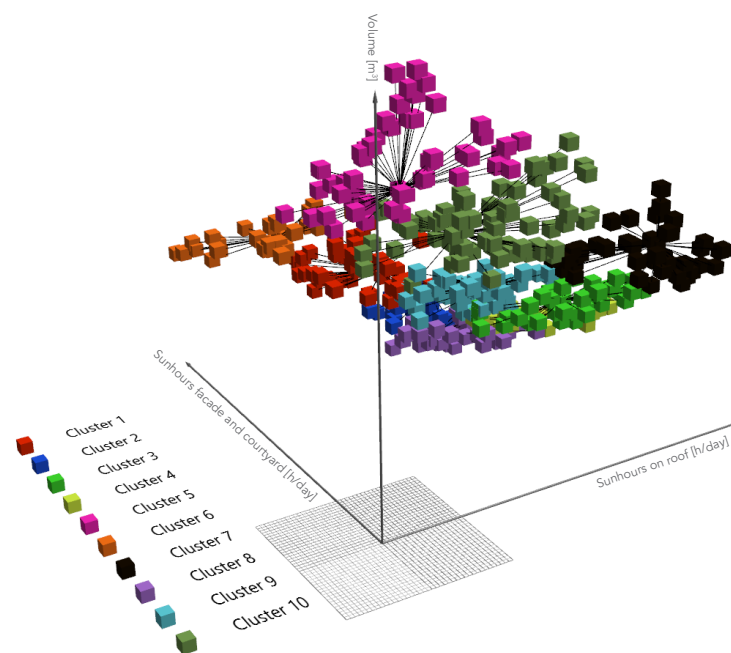


FIGURE X. CLUSTERED COORDINATE SYSTEM

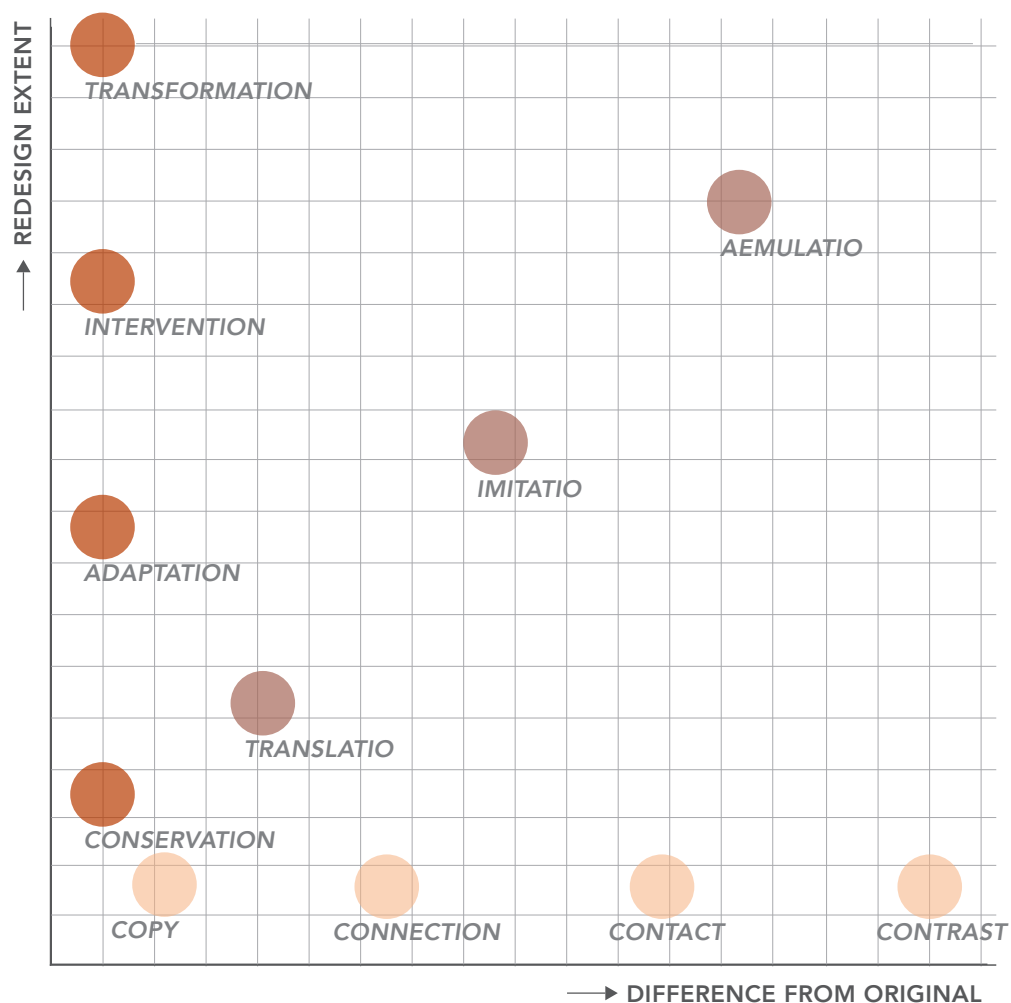


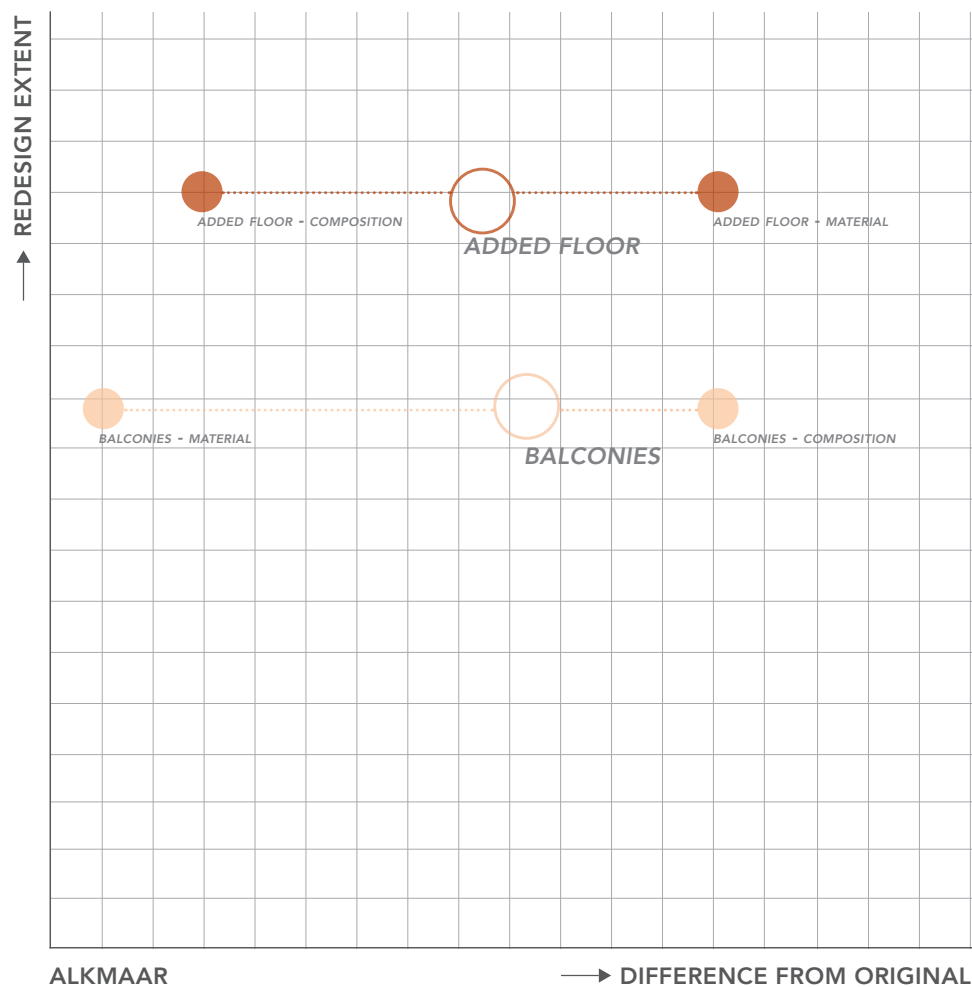
FIGURE X. STRATEGY GRID

REDESIGN STRATEGIES

- NEW BUILDINGS
- EXISTING BUILDINGS

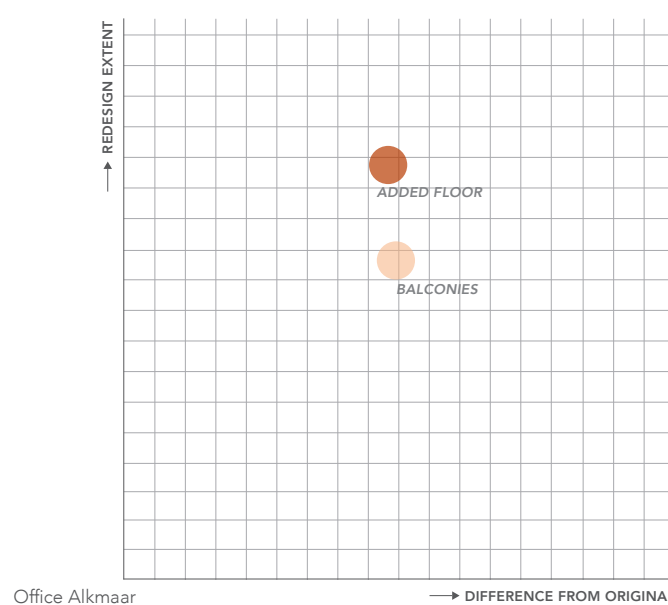
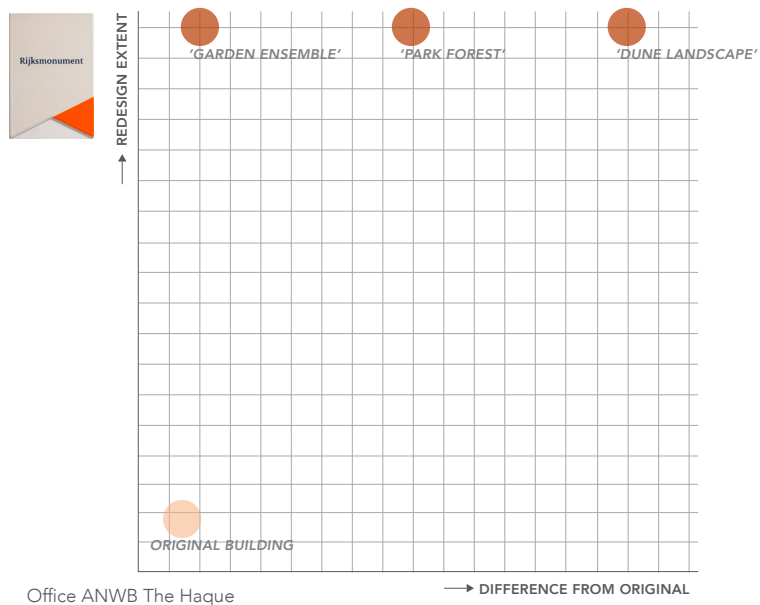
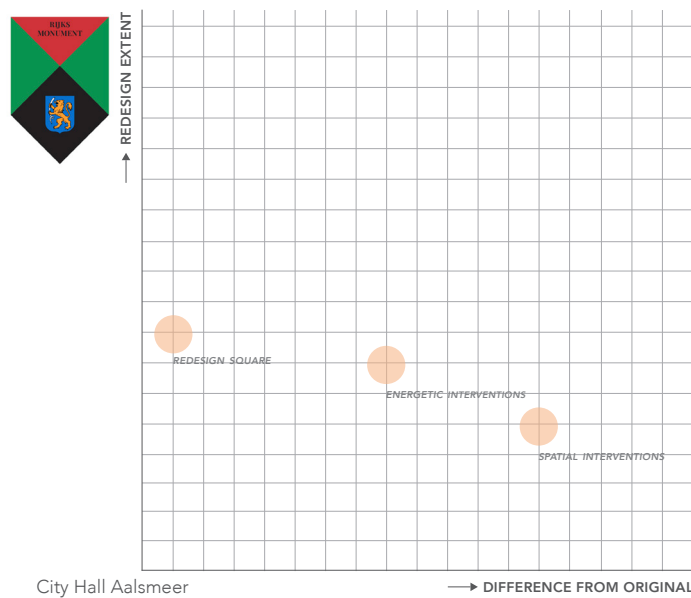
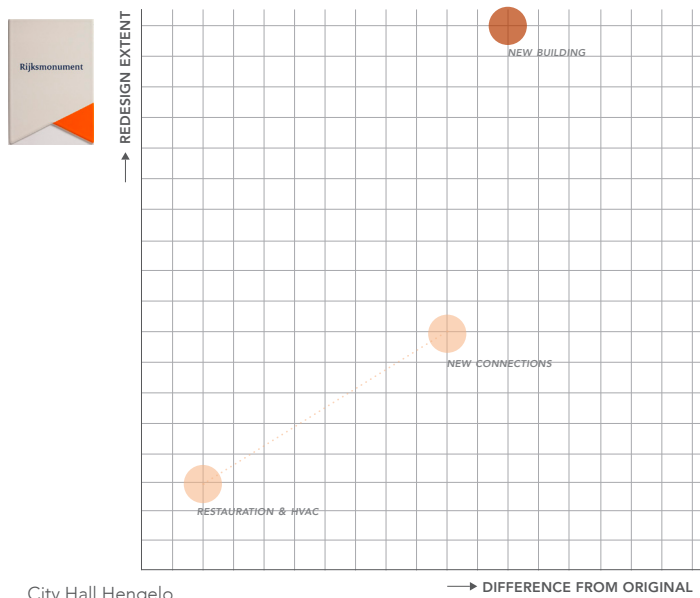
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REDESIGN STRATEGIES

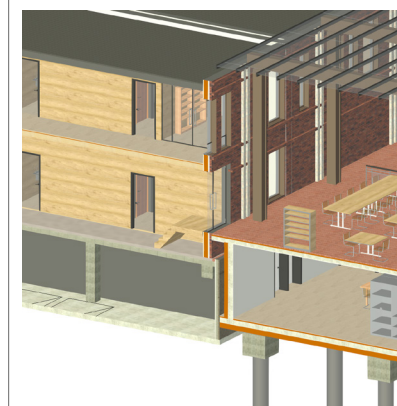
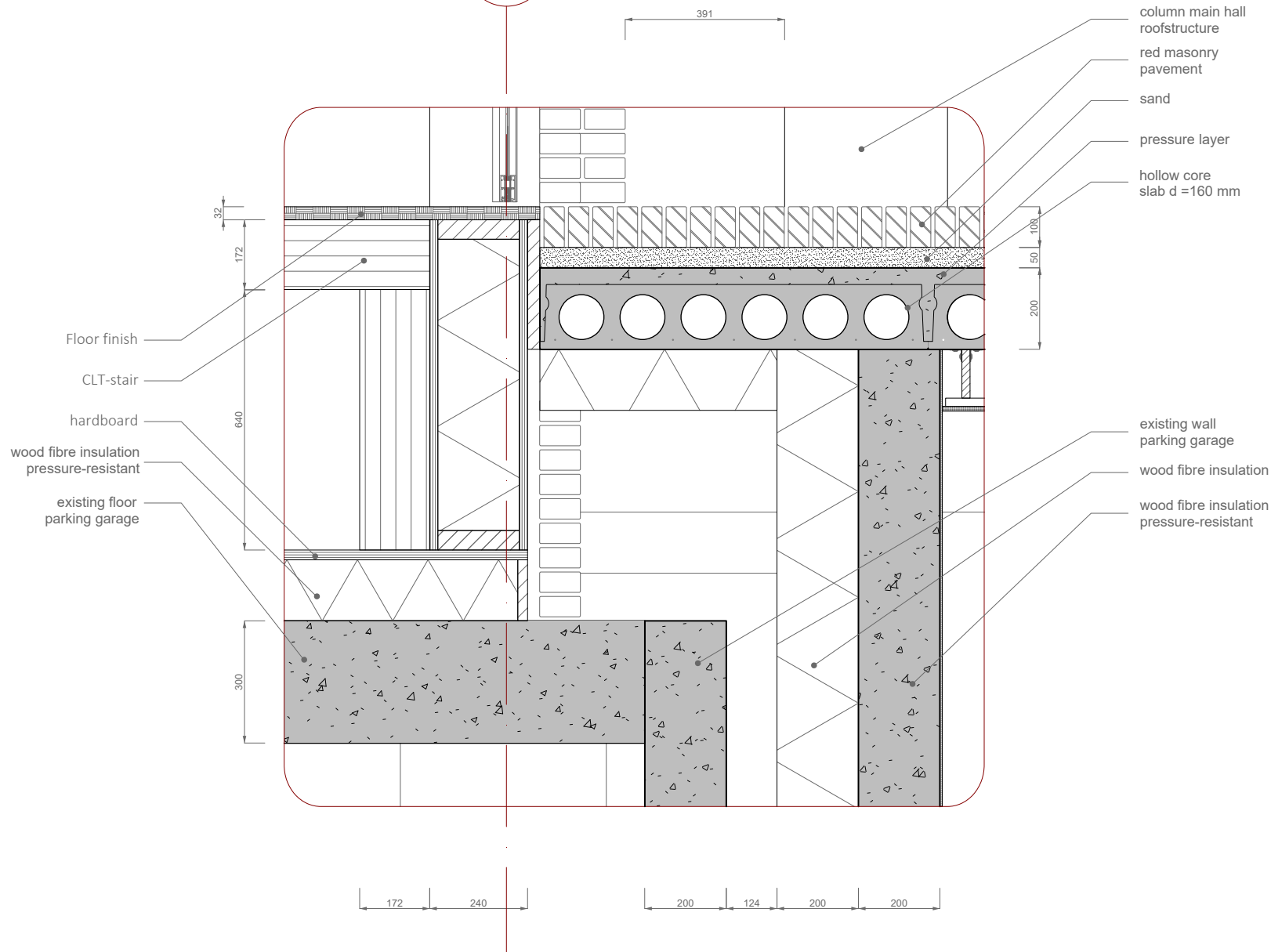
- NEW BUILDINGS
- EXISTING BUILDINGS



REDESIGN STRATEGIES

- NEW BUILDINGS
- EXISTING BUILDINGS

4



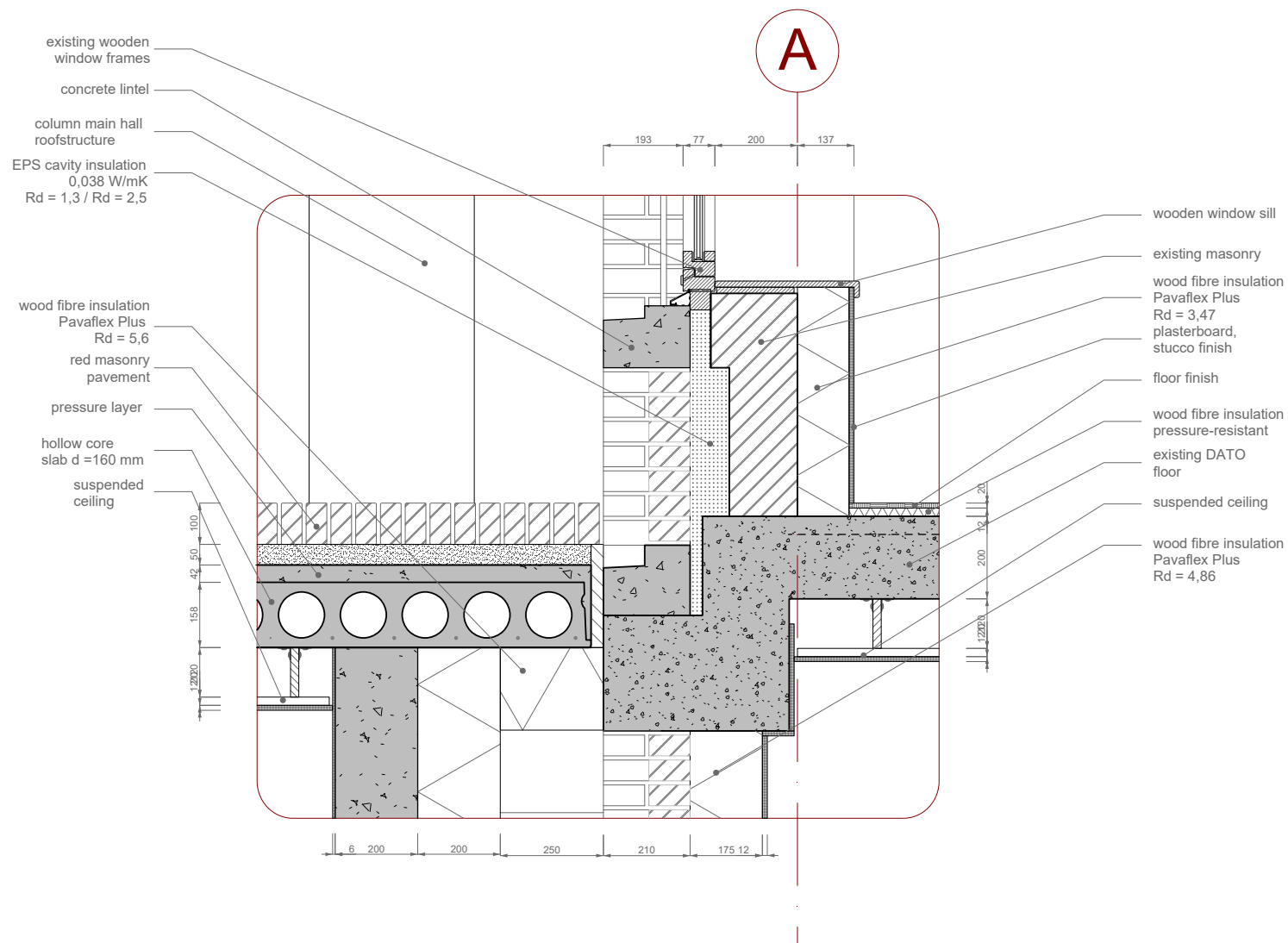
ACHTER DE HOUTTUINEN 10-18

DETAIL: A

PHASE: NEW SITUATION

SCALE: 1:10

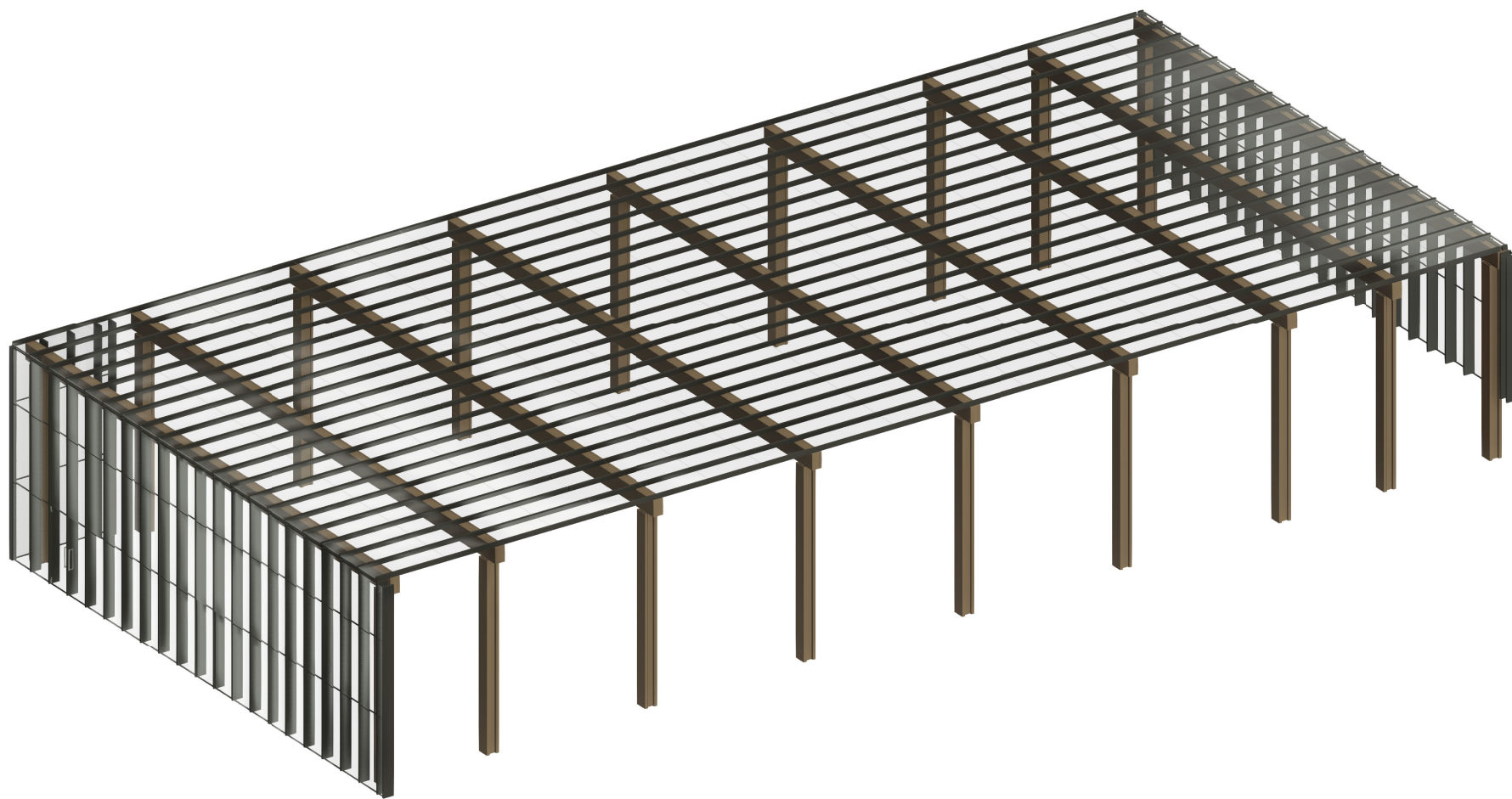
	CONCRETE
	MASONRY
	CROSS LAMINATED TIMBER
	WOOD FIBRE INSULATION
	WOOD
	FLOOR FINISH



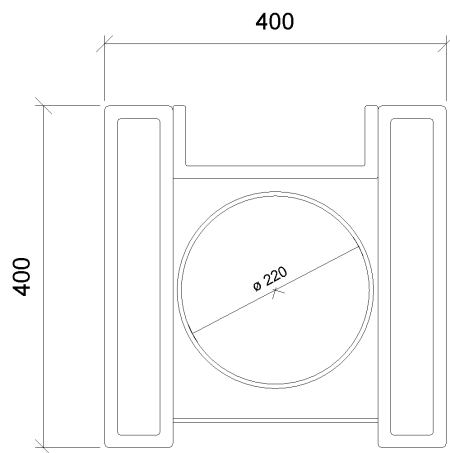
DETAIL MAIN HALL

0 cm 25 cm

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



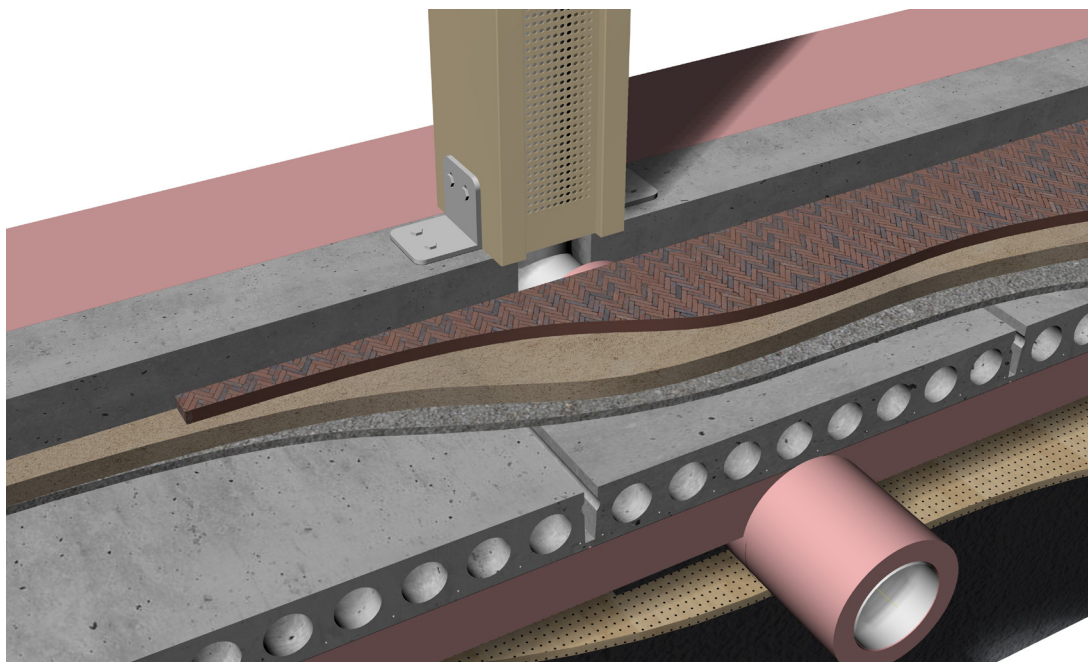
AXONOMETRIC VIEW ROOFSTRUCTURE



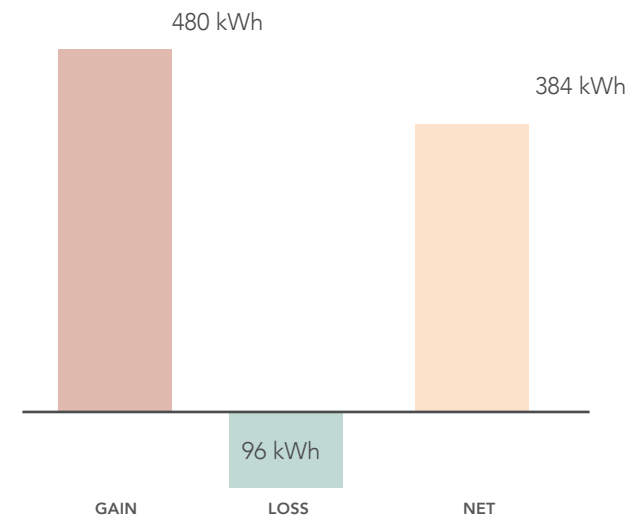
VENTILATION DUCT INTEGRATED IN COLUMN



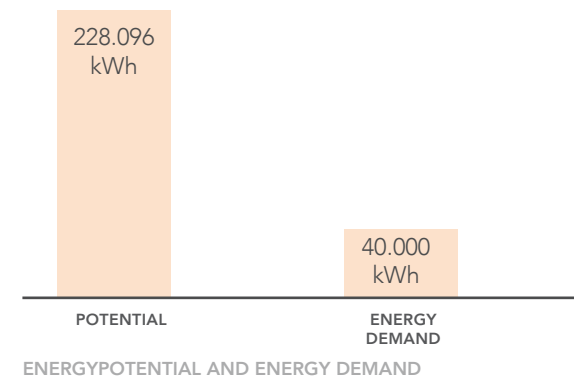
VENTILATION DUCT INTEGRATED IN COLUMN



VENTILATION DUCT INTEGRATED IN COLUMN - 3D DETAIL



AVERAGE HEATBALANCE MAINHALL PER YEAR PER SQUARE METER



ENERGYPOTENTIAL AND ENERGY DEMAND