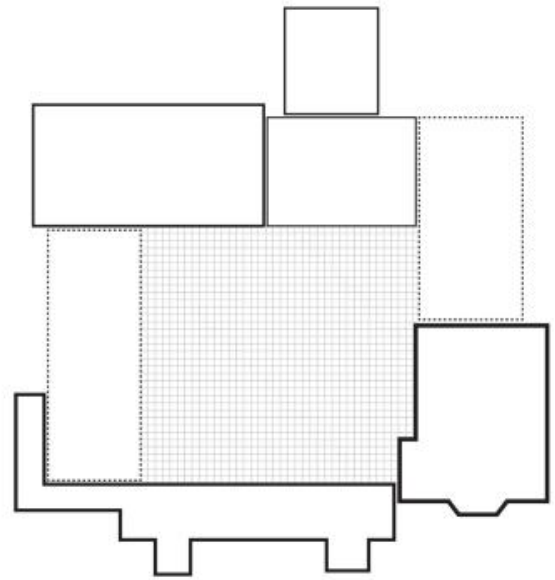
TU Delft, Architectural Engineering
Graduation Studio 19

Architecture: Mauro Parravicini
Building Technology: Paddy Tomesen
Research: Jan Jongert
Examiner: Leo van den Burg



Ockenburgh Community Hotel

Duong Vu Hong | P5 | 5th of July 2018

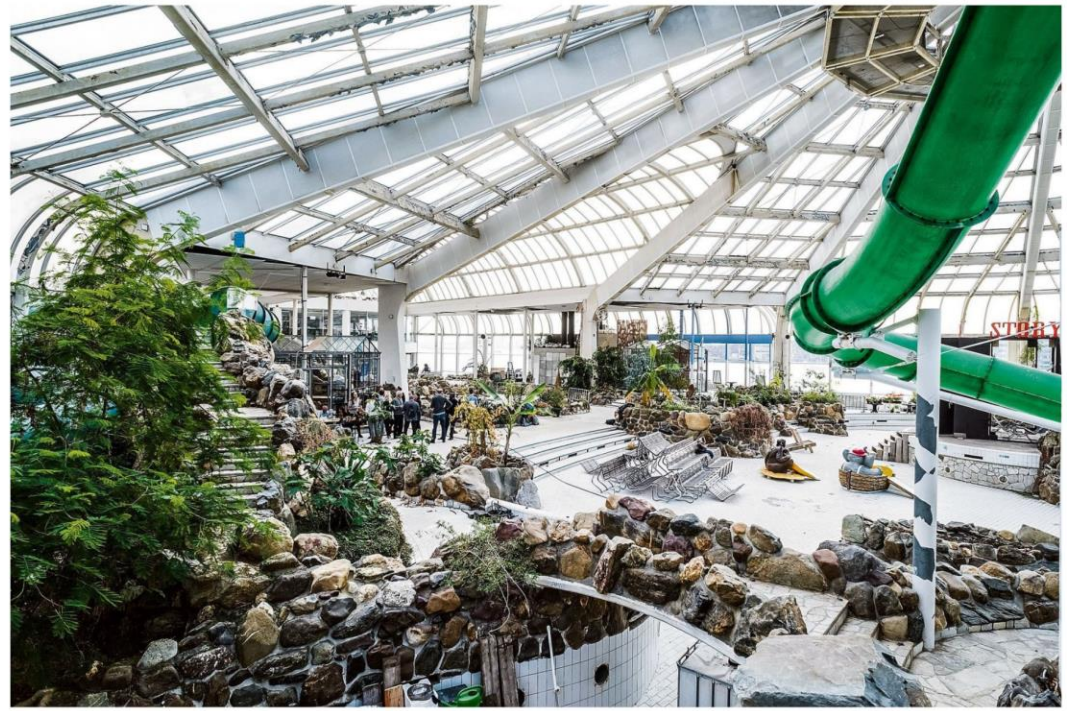
01 PRE-PROCESS


Design and
Enginnering
Construction
Use
Demolition/
Deconstruction

Tropicana in 1988

Tropicana in 2015

images from: https://www.ad.nl/rotterdam/tropicana-wordt-weer-het-zwemparadijs-van-rotterdam
https://froot.nl/posttype/froot/zo-ziet-het-gesloten-rotterdamse-zwemparadijs-tropicana-er-nu-uit/



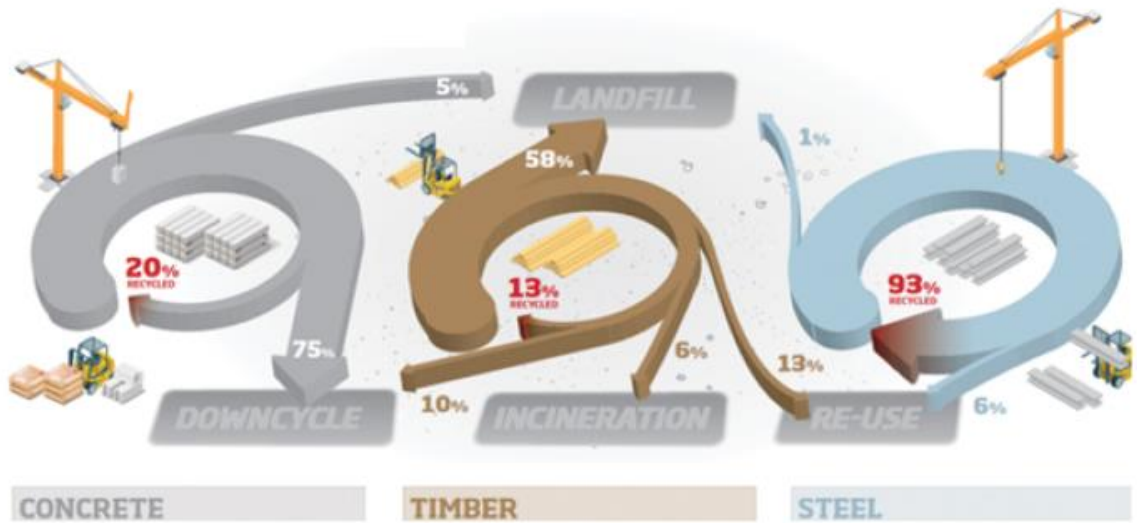
Tropicana / BlueCity in 2018

image from: http://www.bluecity.nl


SUMITOMO
DANGER
ASBESTOS REMOVAL IN PROGRESS
1300
Dial 000 in case of an emergency
EMERGENCY ASSEMBLY POINT
DANGER
NO ENTRY
AUTHORISED PERSONNEL ONLY
FIRST AID
GROUP
NSW
Call 13 77 88

END - OF - LIFE SCENARIOS

What happens to a building's structural components once it is demolished?



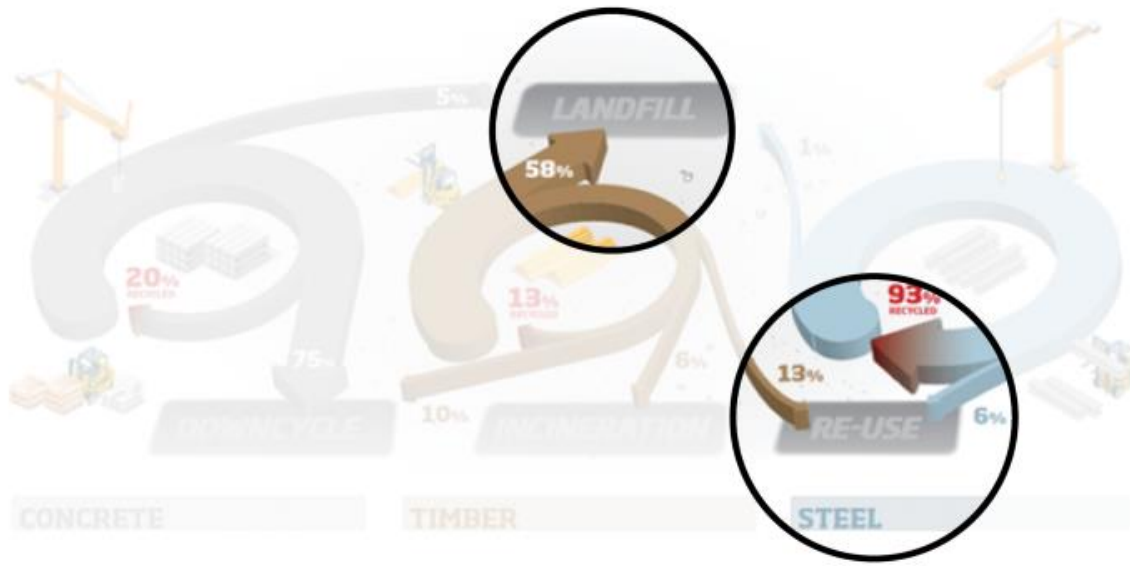
Concrete, timber and steel constitute currently **90%** of all building materials.

Steel itself generates 50% of embodied energy in the building industry.

END - OF - LIFE SCENARIOS

What happens to a building's structural components once it is demolished?

REUSE to REDUCE WASTE

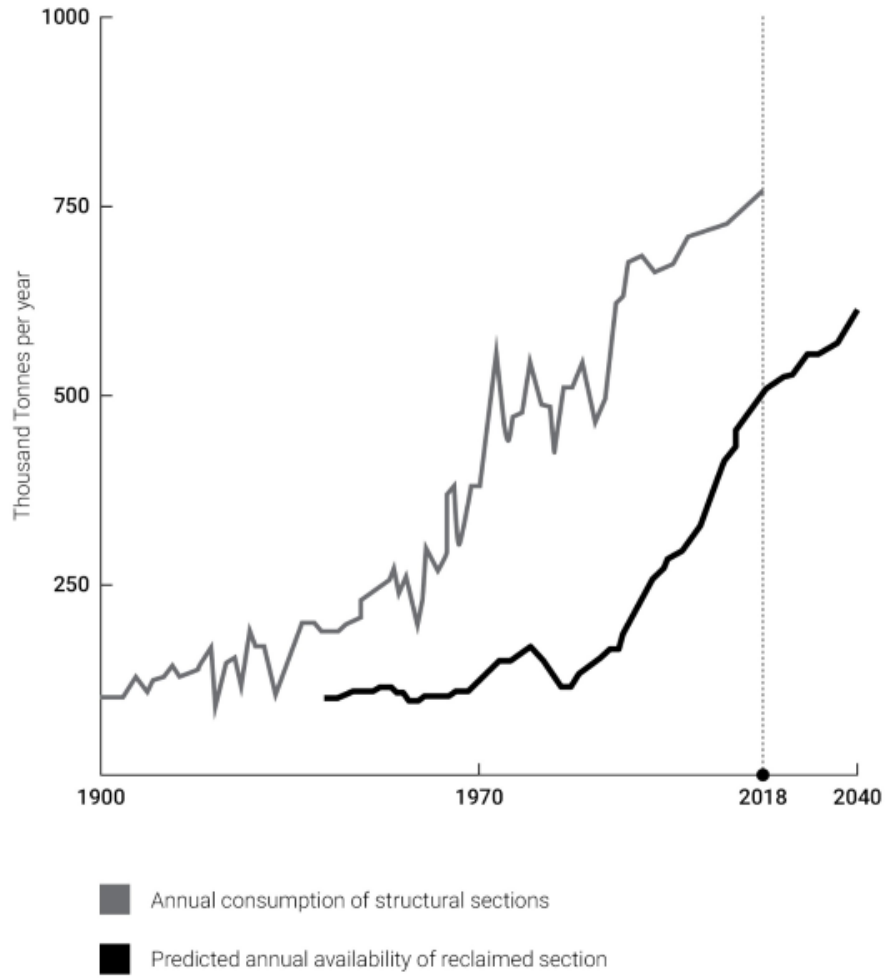


REUSE to SAVE ENERGY

steelconstruction.info/Cost_planning

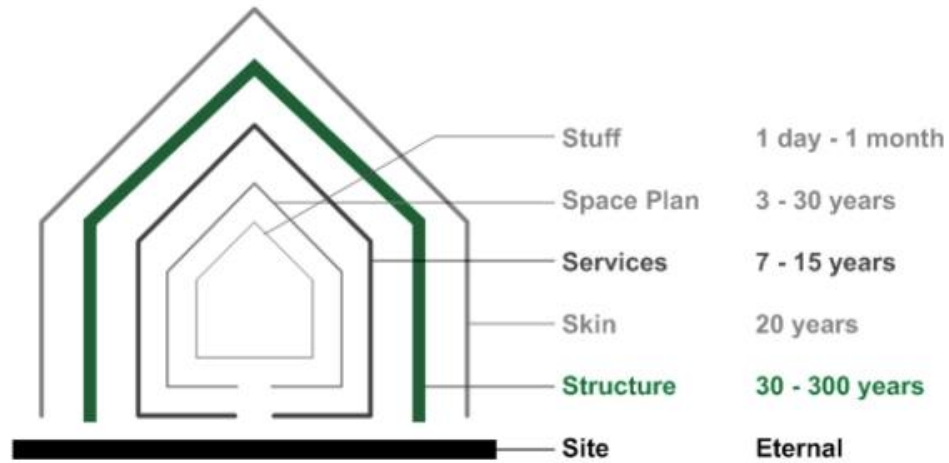
FORECAST OF AVAILABLE RECLAIMED STEEL

the Netherlands



worldsteel.org and Allwood, J., Cullen, J. and Carruth, M. (2012). Sustainable materials. Cambridge: UIT Cambridge, own drawing

BUILDING COMPONENTS LIFE-SPAN



Stewart Brand's 6 S's from *How Buildings Learn*

Stewart Brand's 6 S's from How Buildings Learn

02 THE BACKGROUND

VAN KLINGEREN YOUTH HOSTEL

Ockenburgh, the Hague

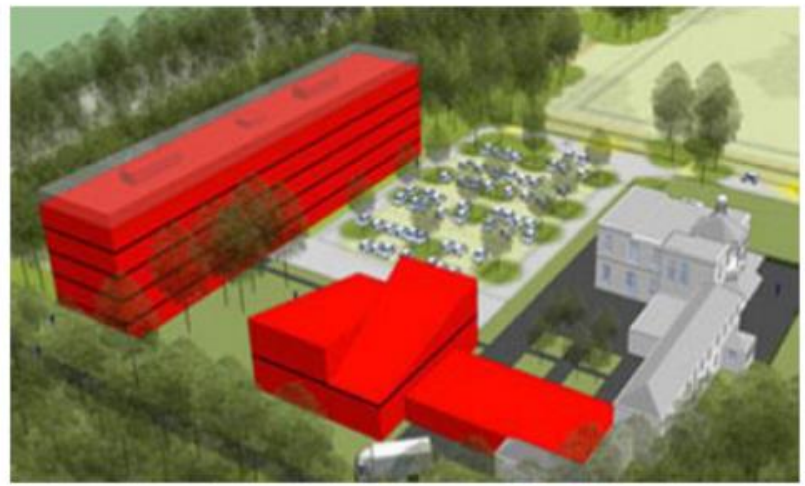
VAN KLINGEREN YOUTH HOSTEL

Deconstruction in 2009

NEW CONFERENCE HOTEL

2011 - 2018

Initial proposal
Architect unknown
2011



Counter proposal
Studio Leon Thier Architects
2012

?

2018 - future

van Klingeren Youth Hostel - timeline

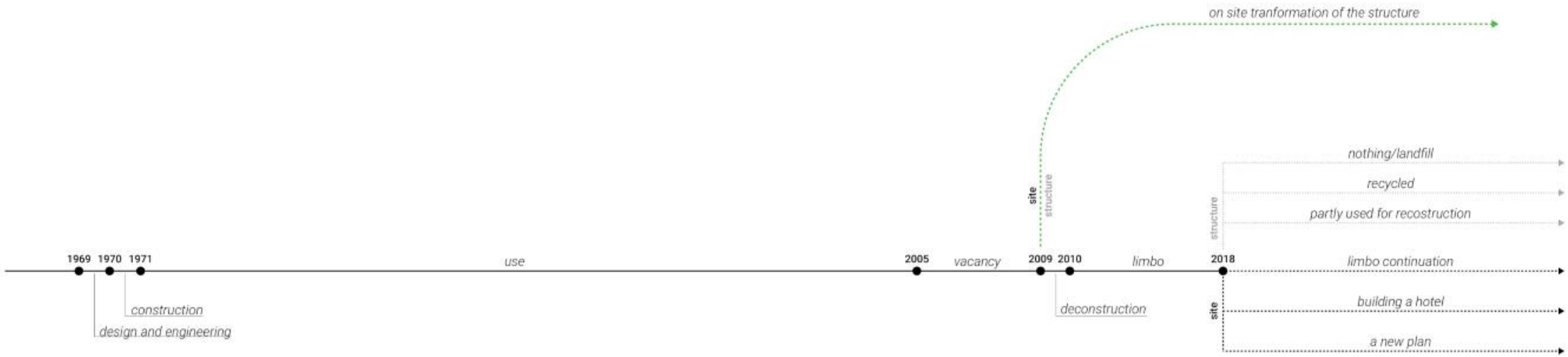
Ockenburg, den Haag
1971

Building vacancy and
slow degradation
2005-2009

The building was slowly disas-
sembled in 2010 over the course
of six months.

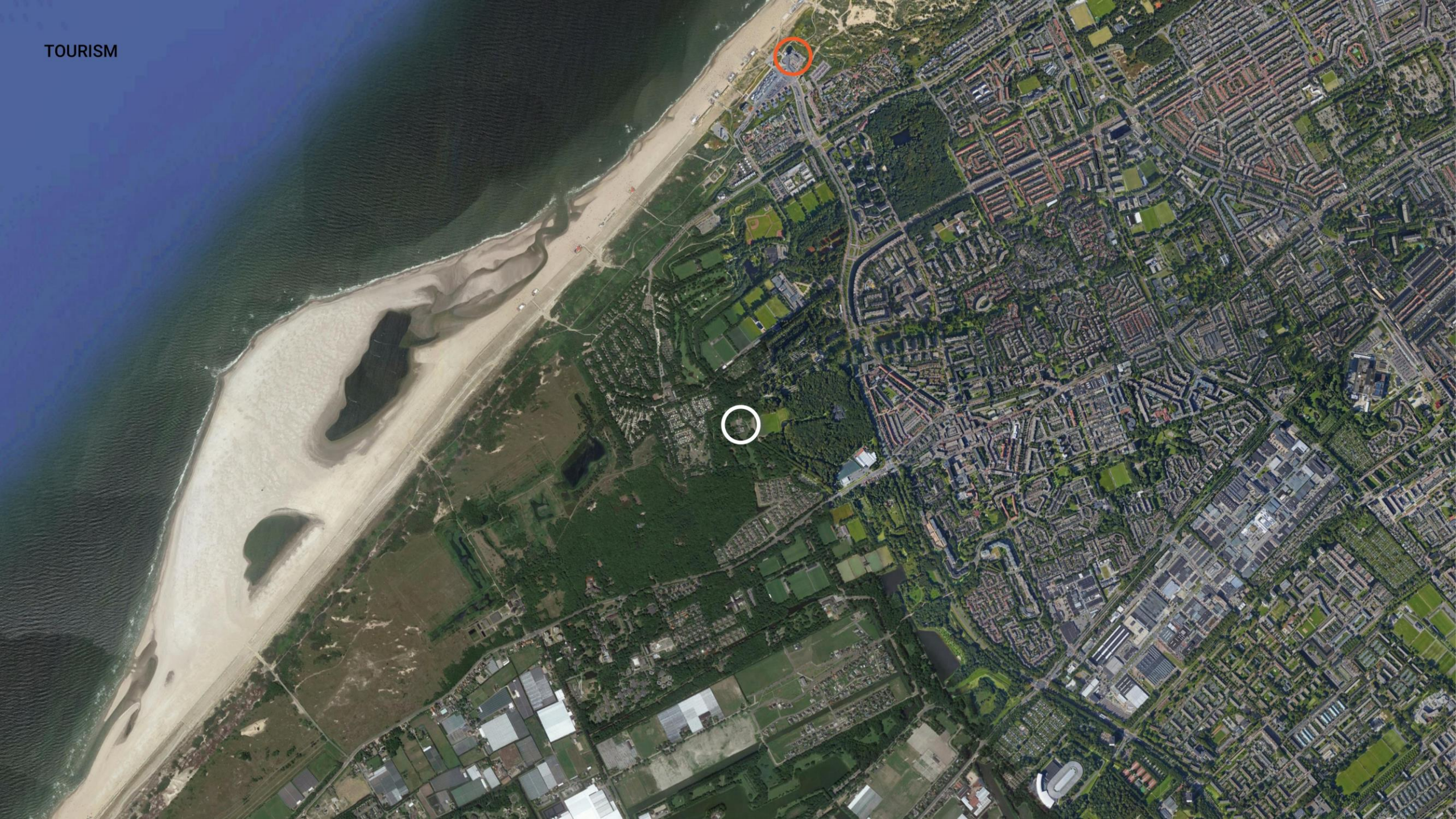
Transportation
to Pijnacker
2010

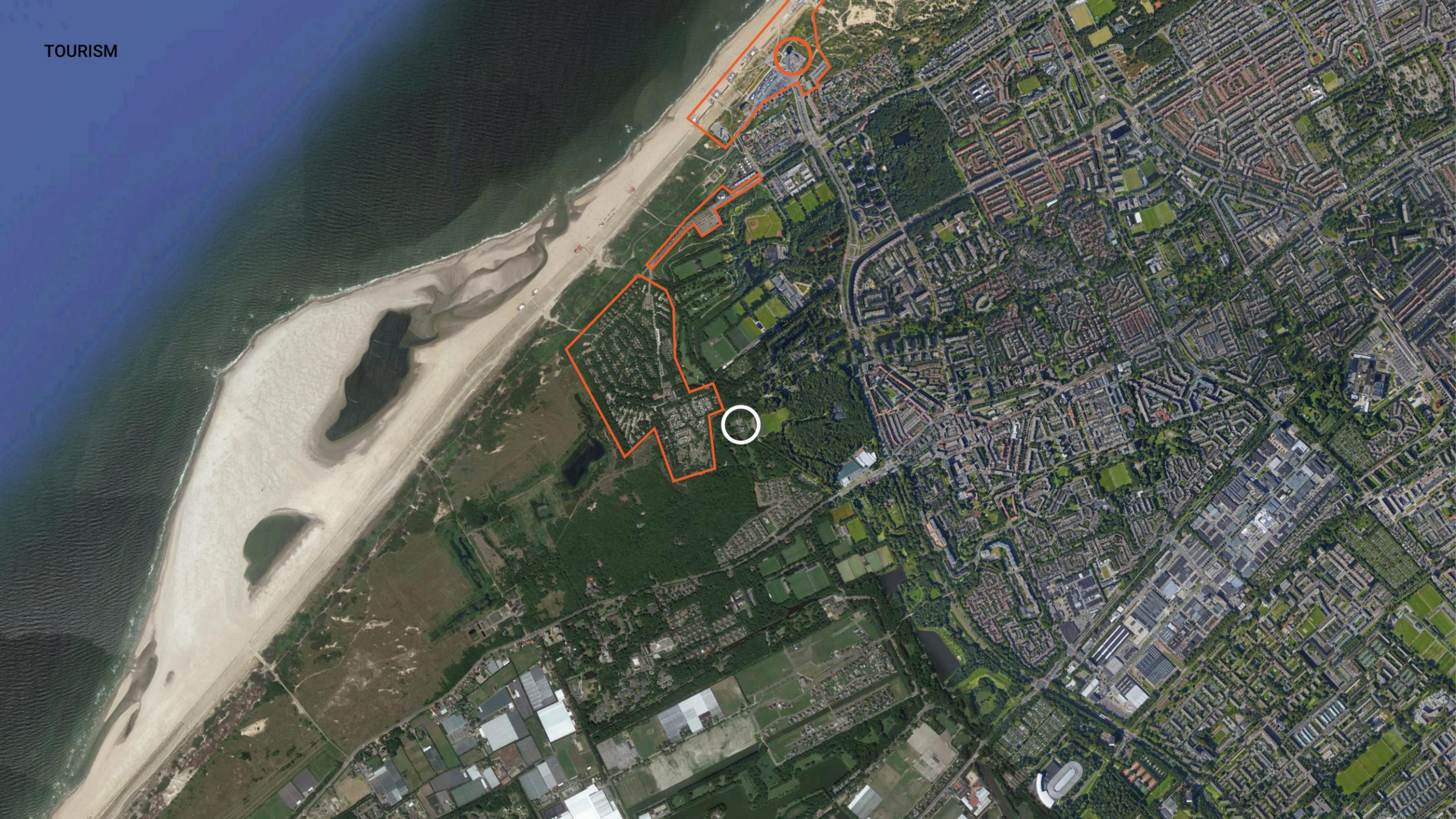
Stocking
2010 - now

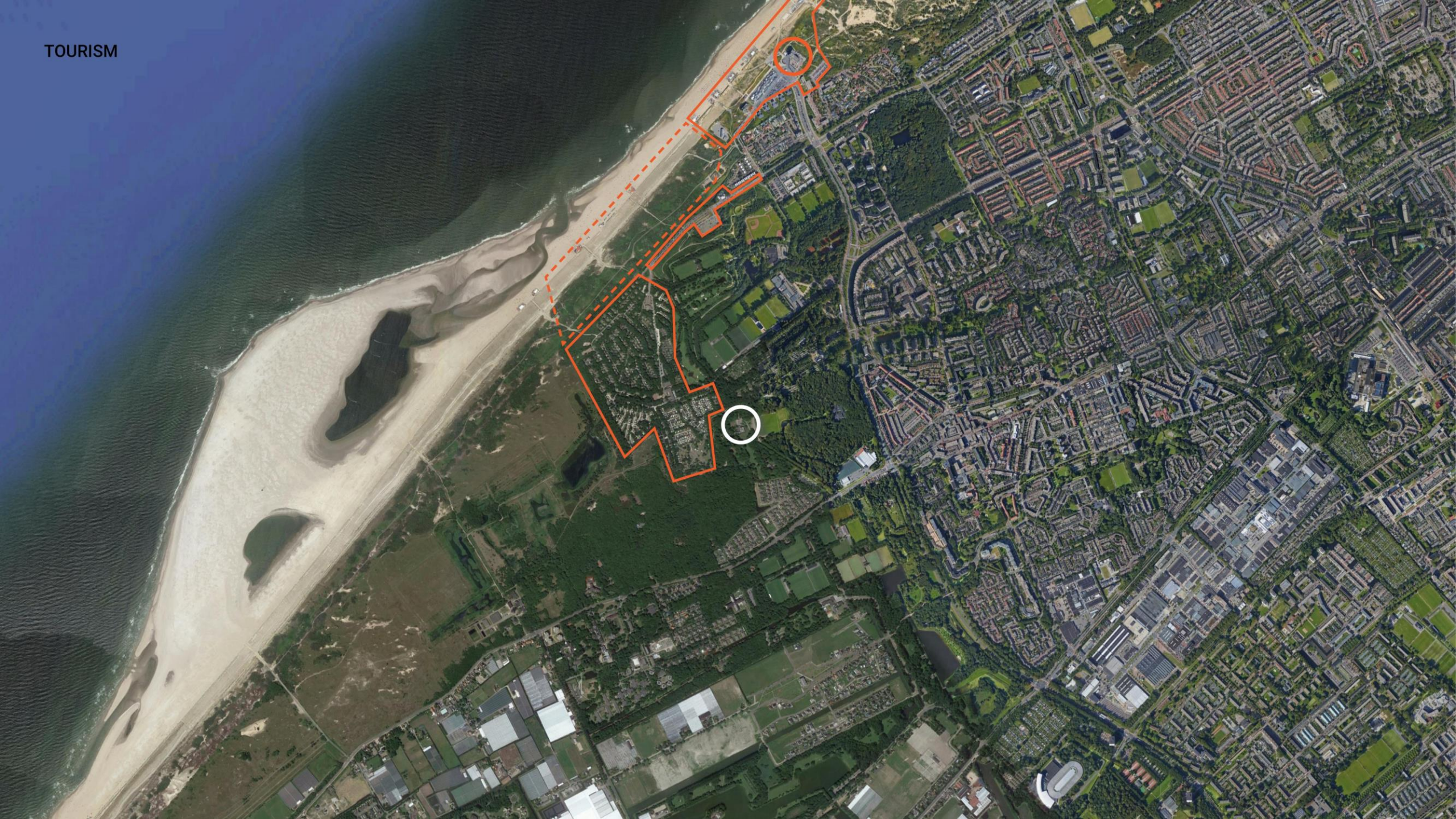


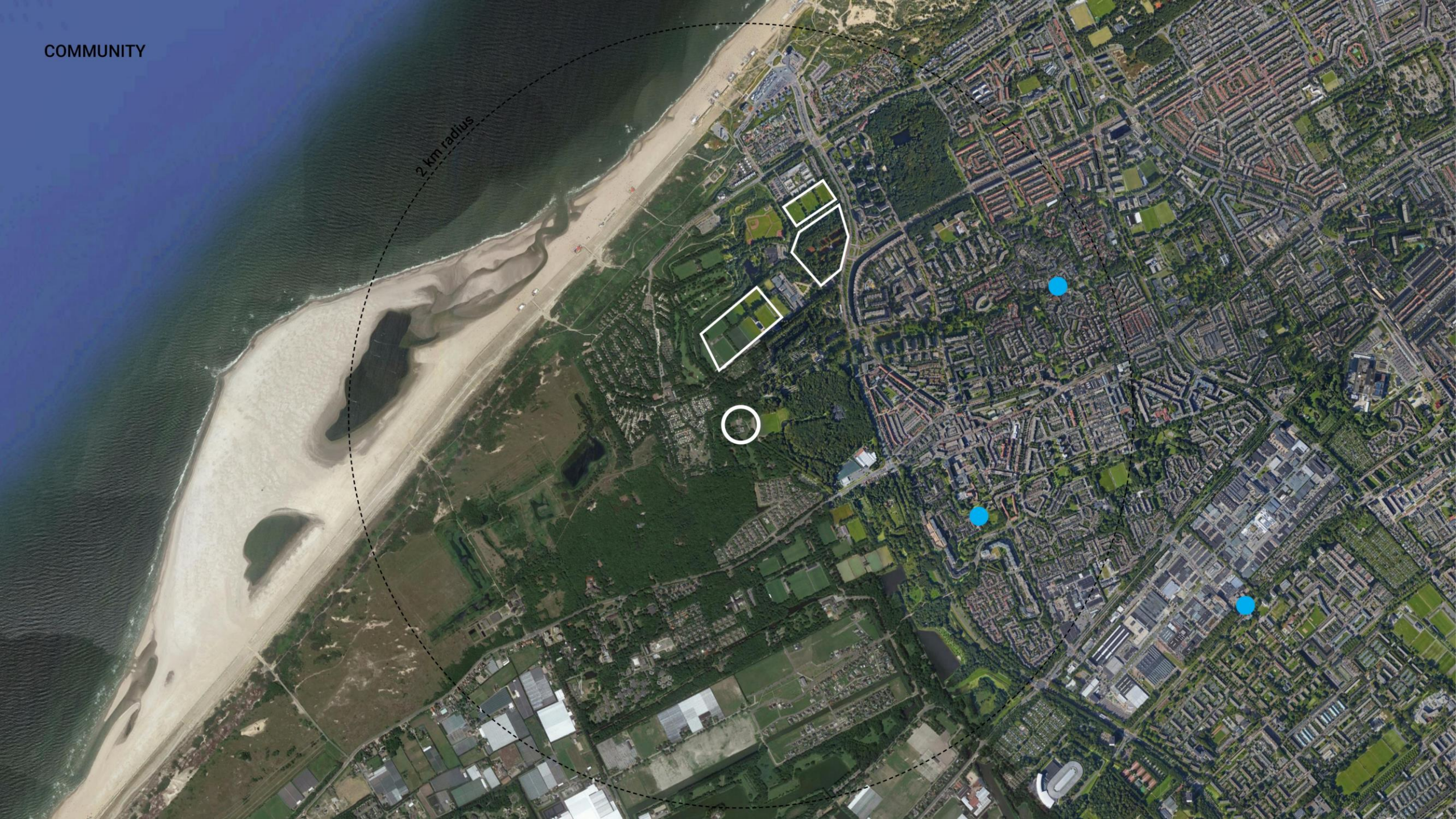
03 CONTEXT

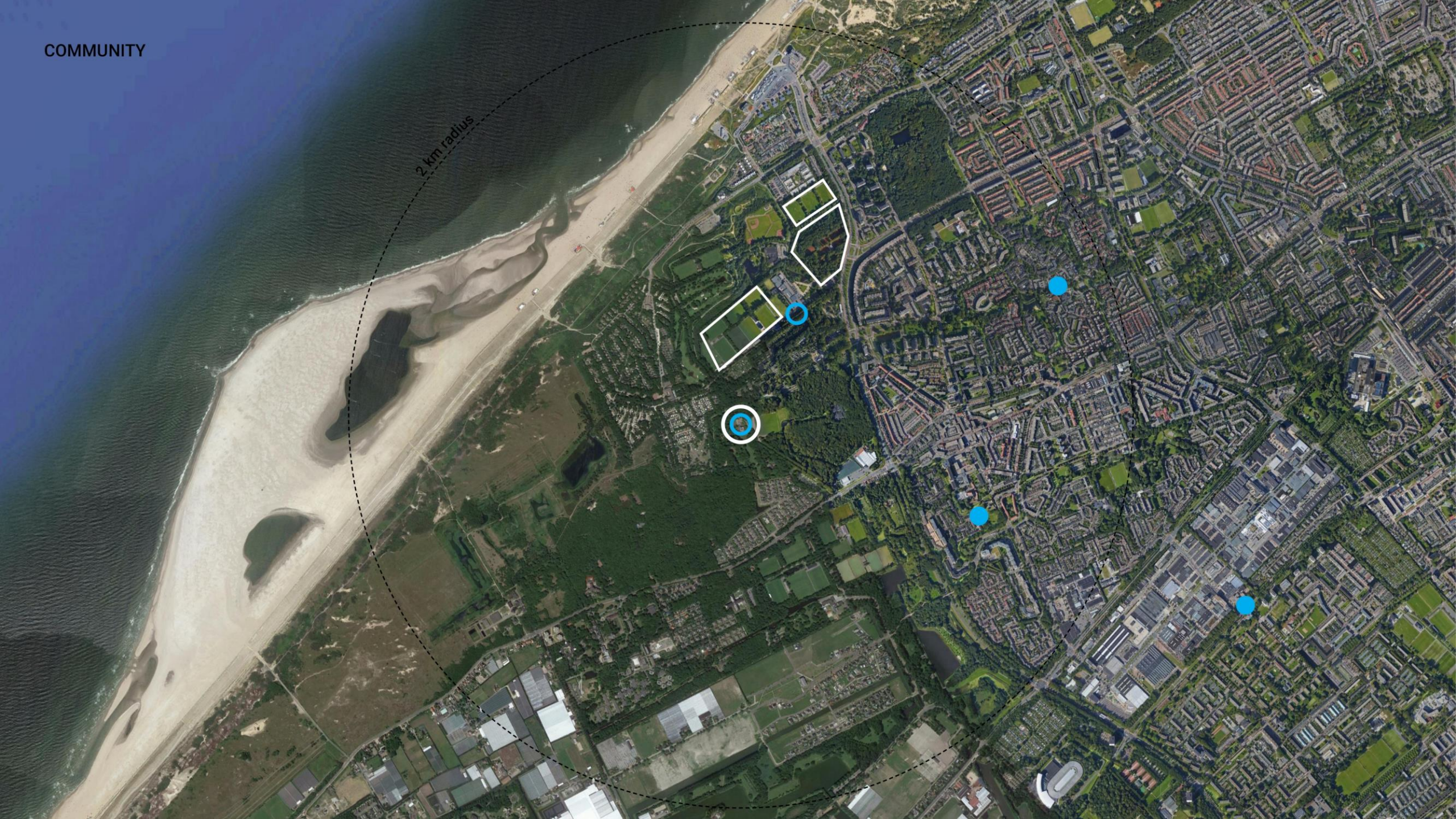

LOCATION
Den Haag
Centraal
the site


TOURISM


TOURISM


TOURISM


COMMUNITY
2 km radius


COMMUNITY
2 km radius

STICHTING TOT BEHOUD VAN DE
HISTORISCHE BUITENPLAATS
OCKENBURGH

Some of organized activities:

- open stage
- OCK run
- culture evenings
- Monument Day
- Day of the Villa
- Christmas Market
- monthly local market
- open air concerts
- literacy evening
- Light Party
- Skating
- Summer Ock
- Garden Day
- Summer picnics
- Irish Evening

HOME AWAY FROM HOME
The Hungry Mind
COMMUNITY & ACTIVITY CENTRE

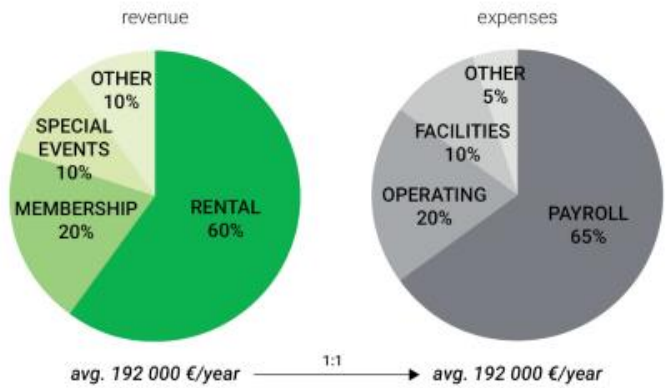
The Hungry Mind is a home away from home for internationally minded people. We are a non-profit community centre, providing a variety of activities and events for adults and children, and a warm welcome to everyone who walks into our clubhouse. All ages and nationalities are very welcome in our cozy clubhouse.

VAN KLINGEREN - MIXED-USE CENTRE KARREGAT IN EINDHOVEN

This experimental scheme brings together a shopping centre, schools, a gymnasium, a library, a community centre and a medical centre literally under one roof. Its informal arrangement without thresholds and partitions steps off from a systematic, standardized configuration: stable steel parasols each atop an open column, in-between which are lattice girders overlaid with timber joists. This horizontal plane is kept independent of facades and partitions. This product of bilateral decision-making has since been altered and largely boarded up.

http://www.architectureguide.nl/project/list_projects_of_architect/arc_id/708/prj_id/813

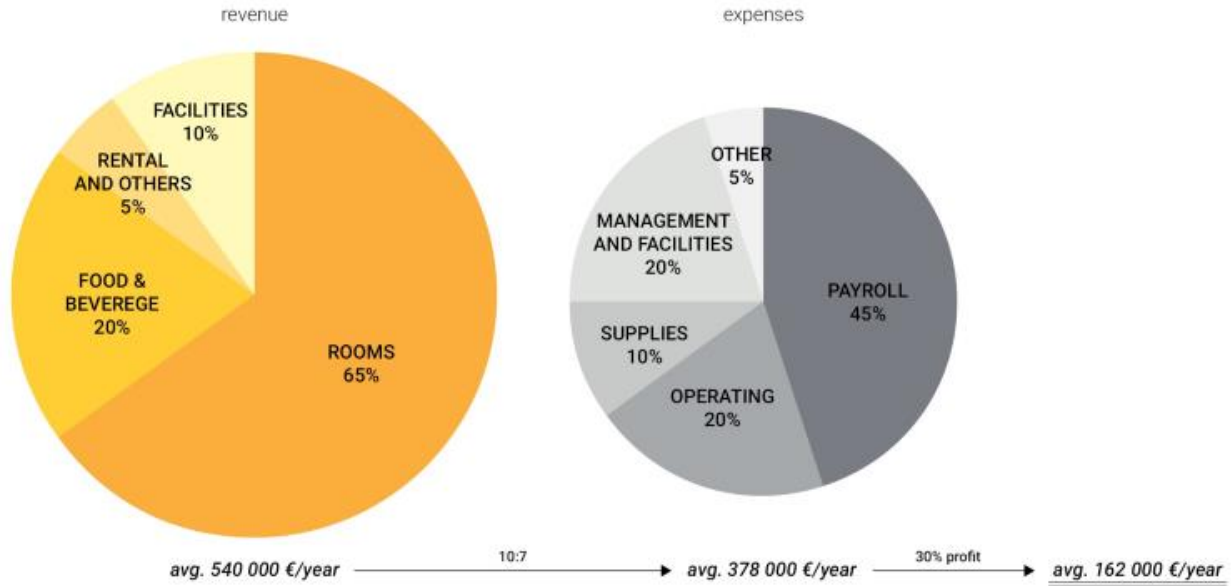
COMMUNITY AS YOUR HOST



COMMUNITY CENTER

governmental

medium size - about 500 members
with avg. membership fee of 75 €/year
2500m² - 3000m²

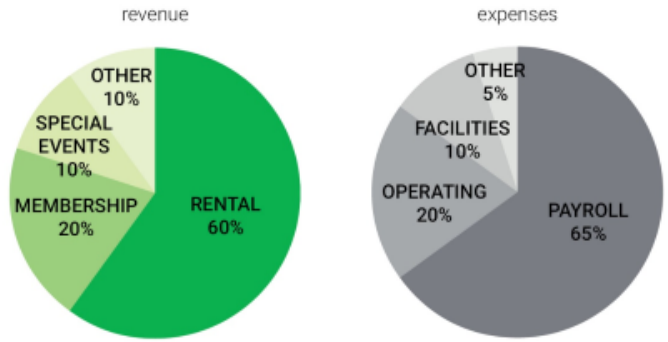


HOTEL

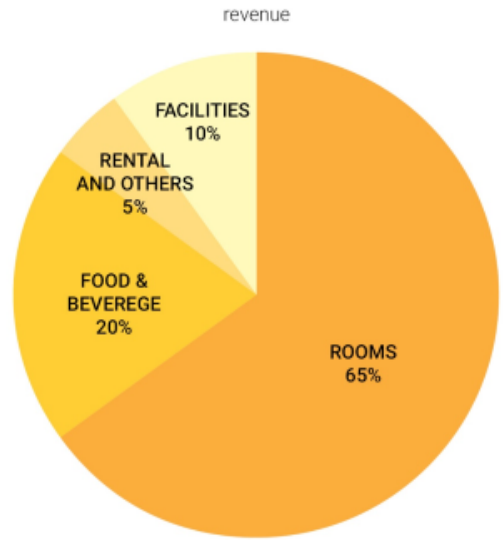
private

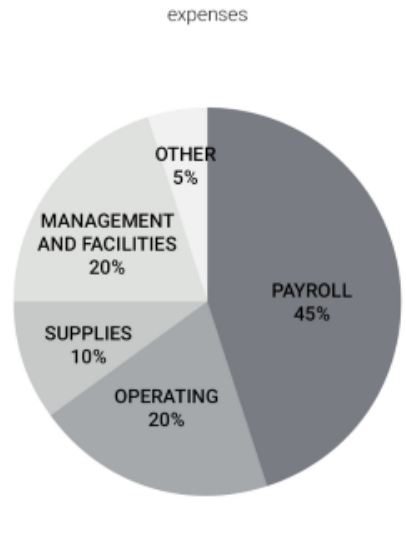
small middle-class hotel with
about 20 rooms for avg. 70 €/night
avg. occupancy rate: 75%
1500m² - 2000m²

https://www.statista.com/statistics/616731/average-room-rate-of-three-four-five-star-hotels-netherlands/
https://www.hospitalitynet.org/news/4028286.html



avg. 192 000 €/year → 1:1 → *avg. 192 000 €/year*





avg. 540 000 €/year → 10:7 → *avg. 378 000 €/year* → 30% profit → *avg. 162 000 €/year*

COMMUNITY CENTER

governmental

medium size - about 500 members
with avg. membership fee of 75 €/year
2500m² - 3000m²

HOTEL

private

small middle-class hotel with
about 20 rooms for avg. 70 €/night
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https://www.hospitalitynet.org/news/4028286.html

04 PROGRAM & TYPOLOGY STUDY

LOCALS

COMMUNITY CENTER

FOOD & DRINKS
cafe
dinning
common kitchen

KNOWLEDGE & SKILLS
classrooms
library

SPORT & RECREATION
sport facilities
game room
playground

ART, CULTURE & MUSIC
event space
exhibition space
stage/theater

OTHER
community garden,
outdoor space for eg. local
market, sport events, concerts..

GUESTS

HOTEL

FOOD & DRINKS
bar
restaurant
lounge

KNOWLEDGE & SKILLS
conference space
meeting rooms

SPORT & RECREATION
spa/pool/sauna
gym

ART, CULTURE & MUSIC
a city

OTHER
hotel rooms, hotel lobby,
hotel facilities

LOCALS & GUESTS

COMMUNITY HOTEL

FOOD & DRINKS

cafe
dinning
common kitchen

bar
restaurant
lounge

KNOWLEDGE & SKILLS

classrooms
library

conference space
meeting rooms

SPORT & RECREATION

sport facilities
game room
playground

spa/pool/sauna
gym

ART, CULTURE & MUSIC

event space
exhibition space
stage/theater

OTHER

community garden, outdoor space for eg. local market, sport events, concerts..

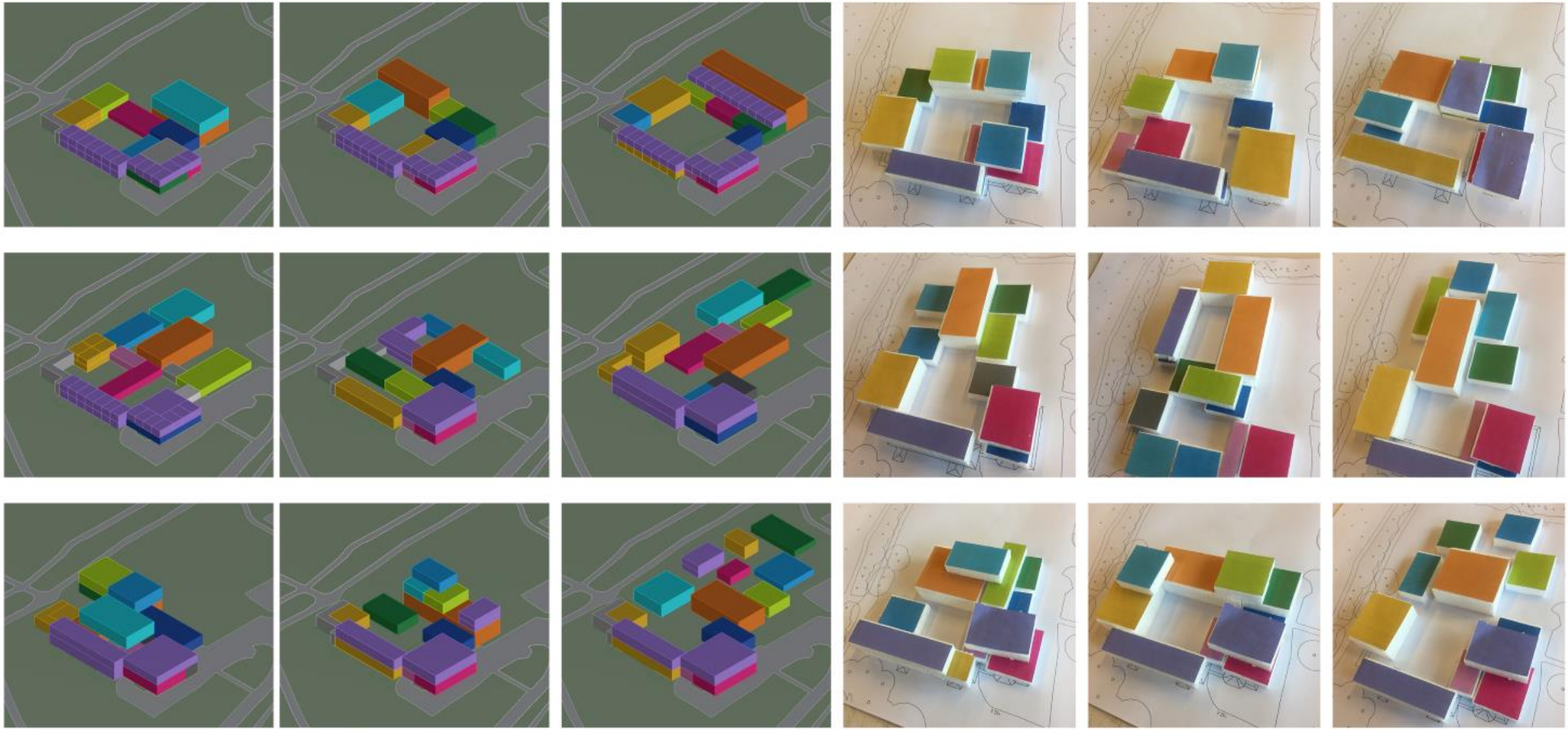
hotel rooms, hotel lobby, hotel facilities

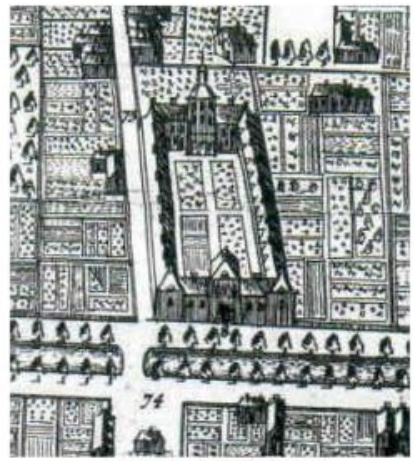
PROGRAM DEFINING

General program bar

PROGRAM DEFINING

Studies





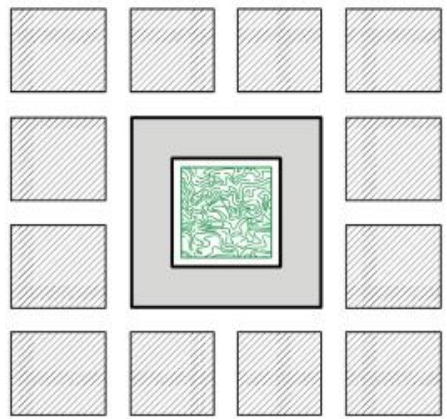
Hofje van Nieuwkoop, the Hague, 1657

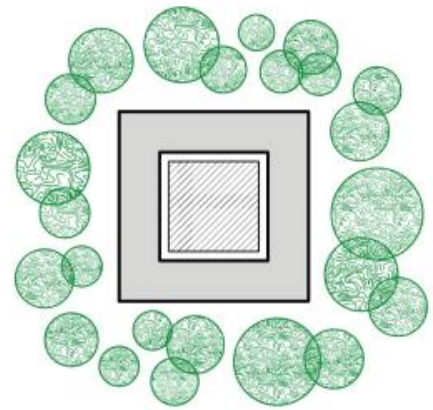
A hofje is a Dutch word for a courtyard with almshouses around it. They have existed since the Middle Ages.

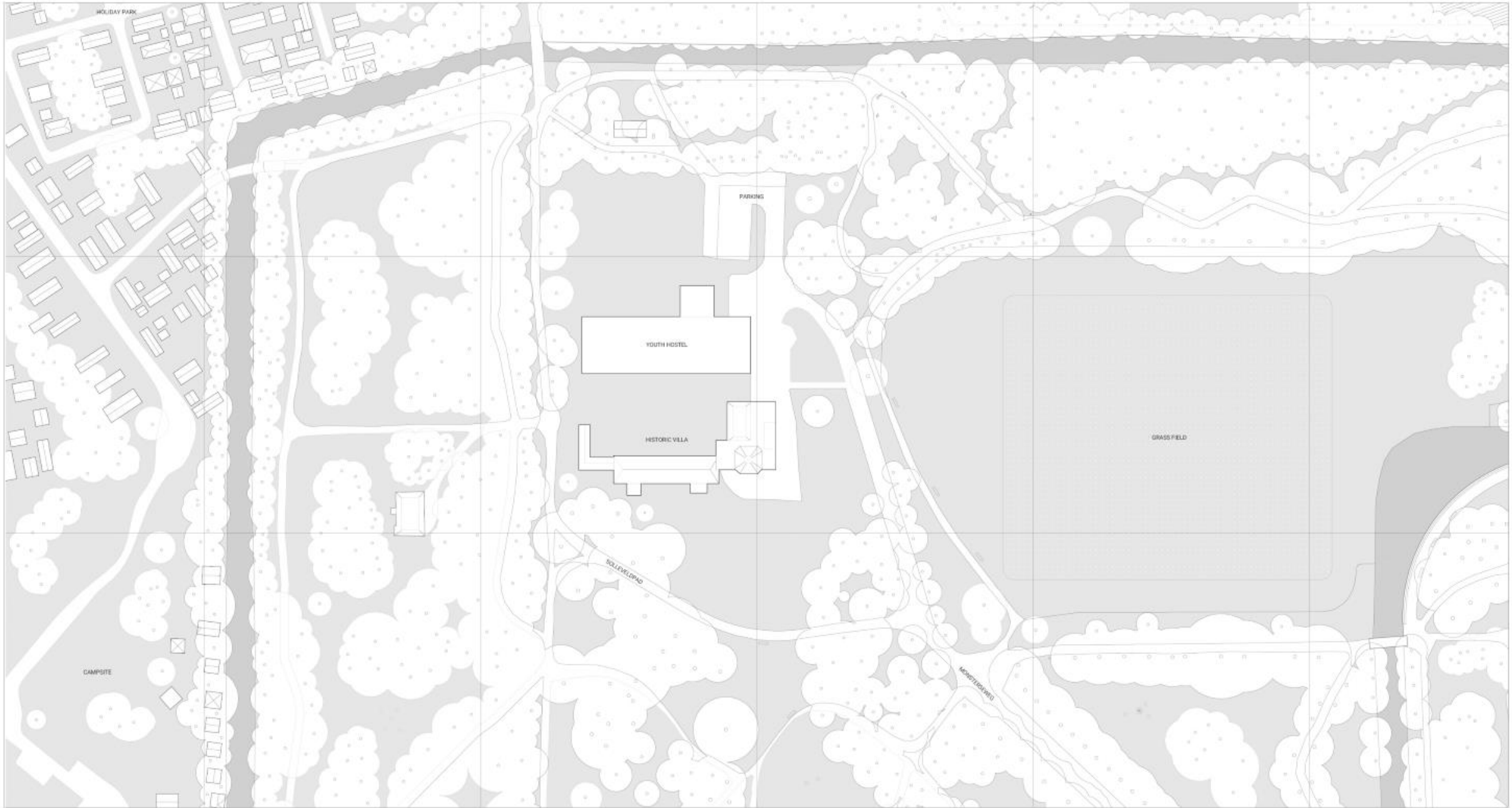
A hofje provided housing for elderly people (mostly women). They were privately funded, and served as a form of social security. In the Netherlands there are still a number of hofjes in use.

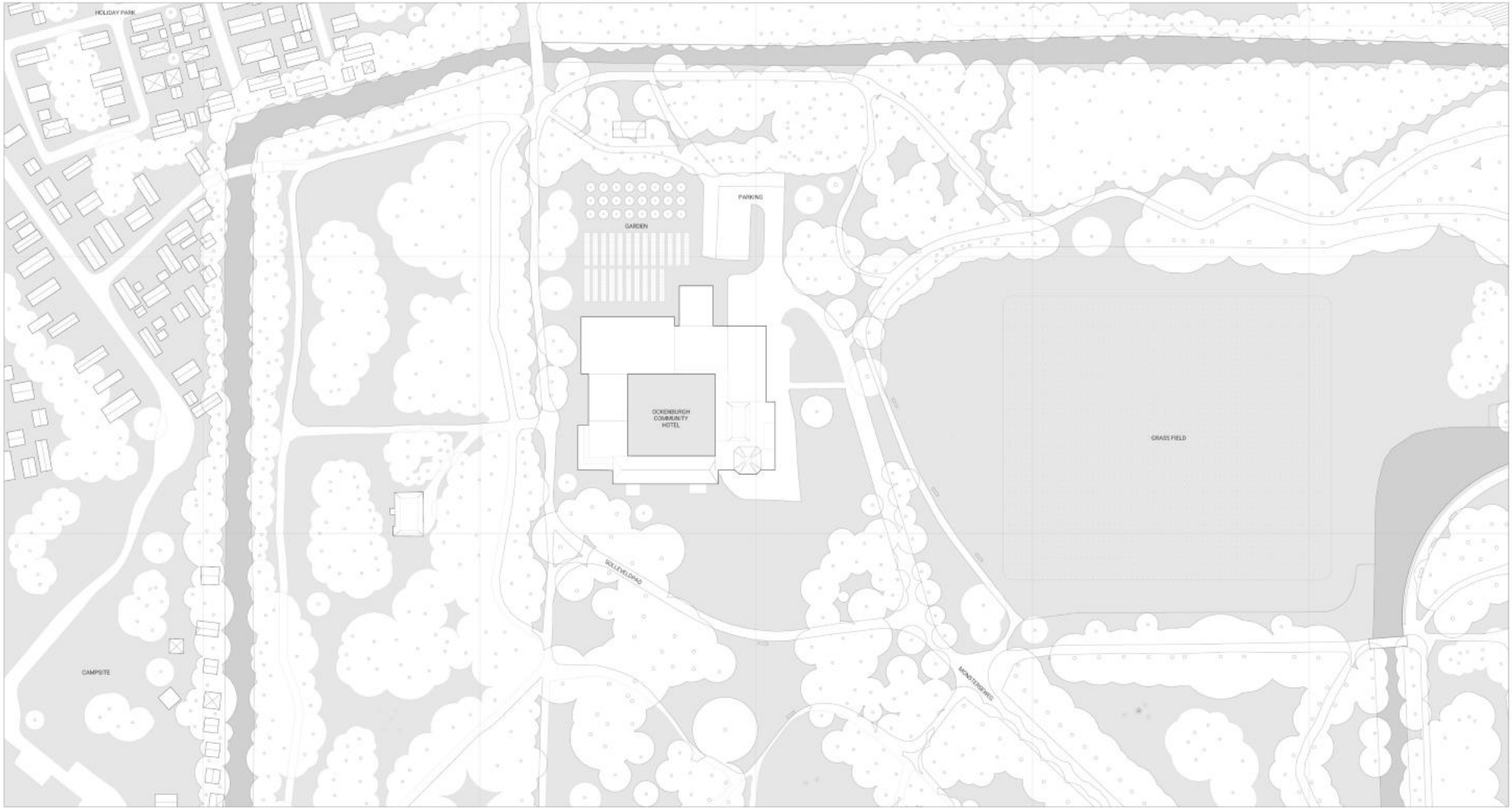
Hofjes are usually built in a U-shape with a yard or garden in the middle, and a gate as entrance.

Hofje van Nieuwkoop, the Hague, 1657

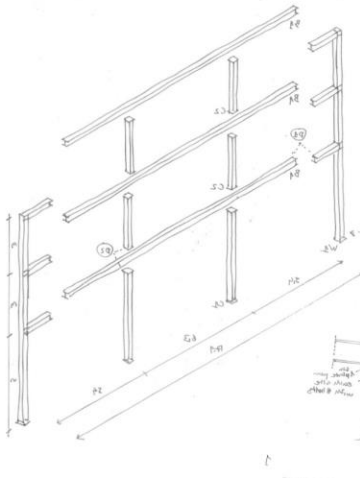


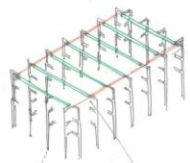


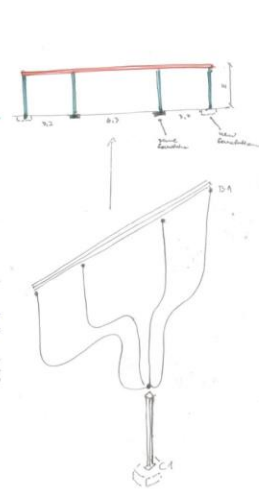

HOLIDAY PARK
PARKING
YOUTH HOSTEL
HISTORIC VILLA
GRASS FIELD
VOLLEYVELDPAD
CAMPSITE
0
10
50
100

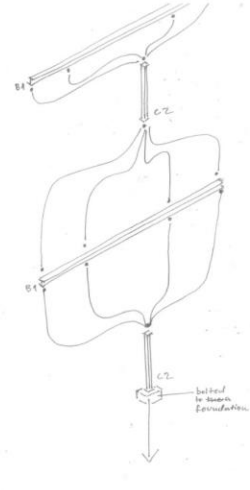

HOLIDAY PARK
PARKING
GARDEN
OCKENBURGH
COMMUNITY
HOTEL
GRASS FIELD
WOLLEVELDPAD
MONSTERSEWEG
CAMPSITE
0
10
50
100

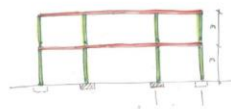
05 STRUCTURAL TRANSFORMATION

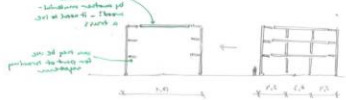


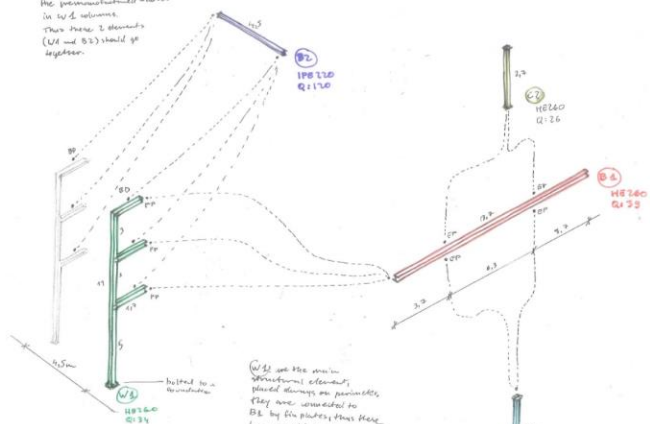


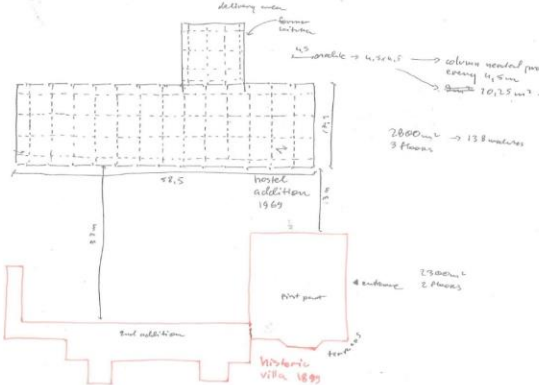


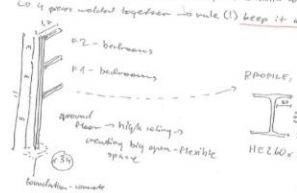


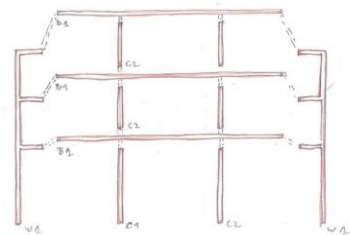


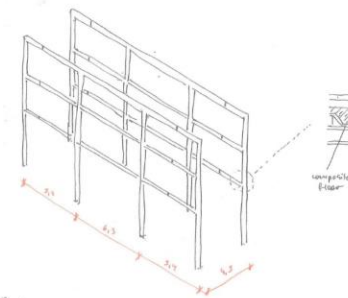


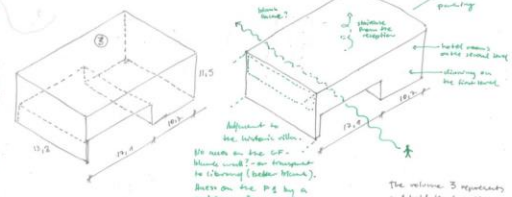


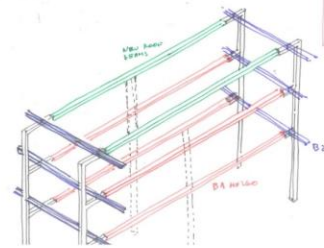


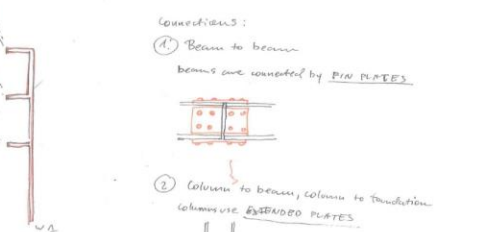


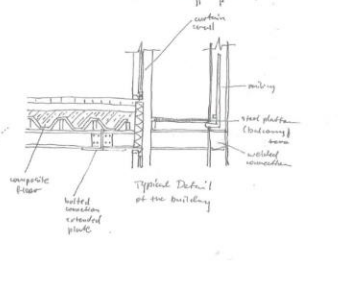


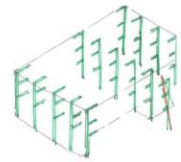






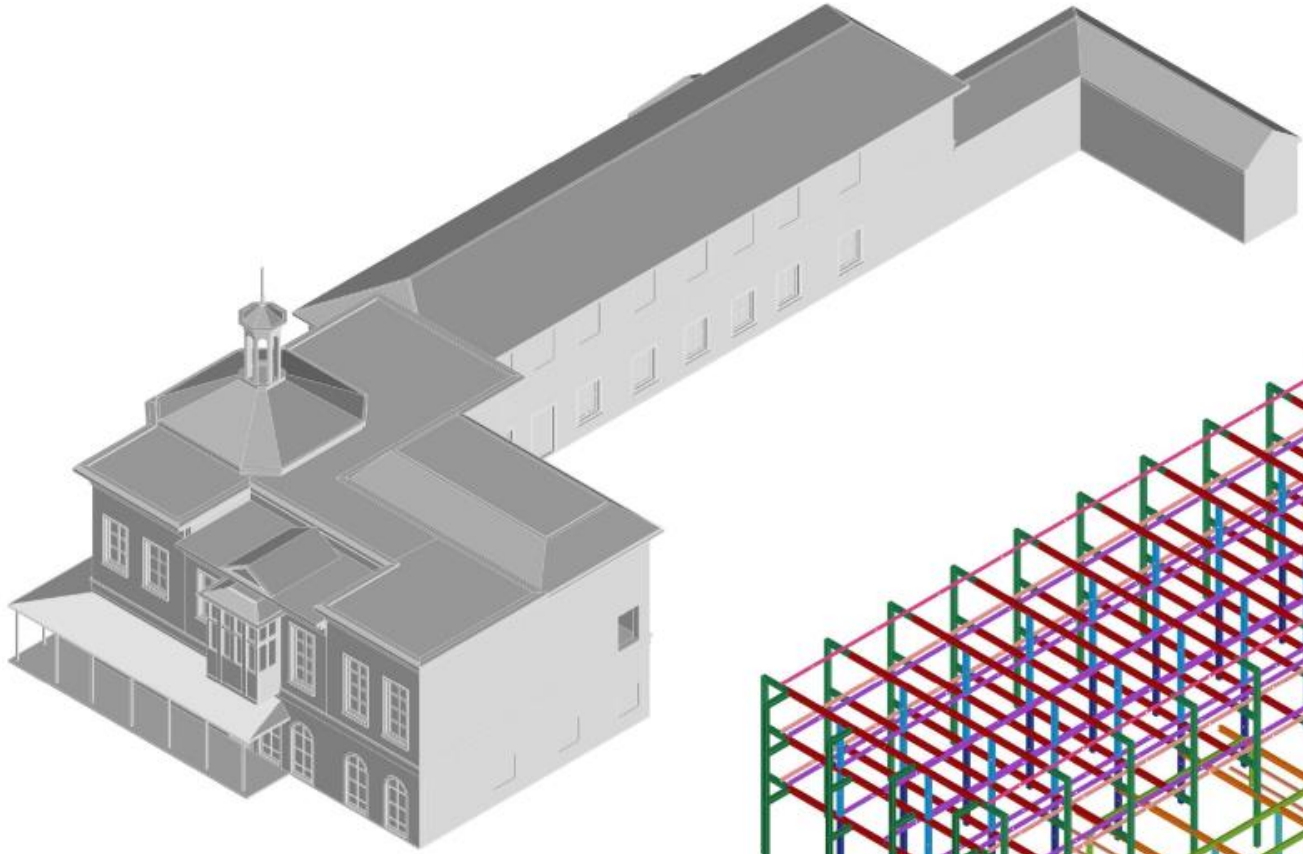


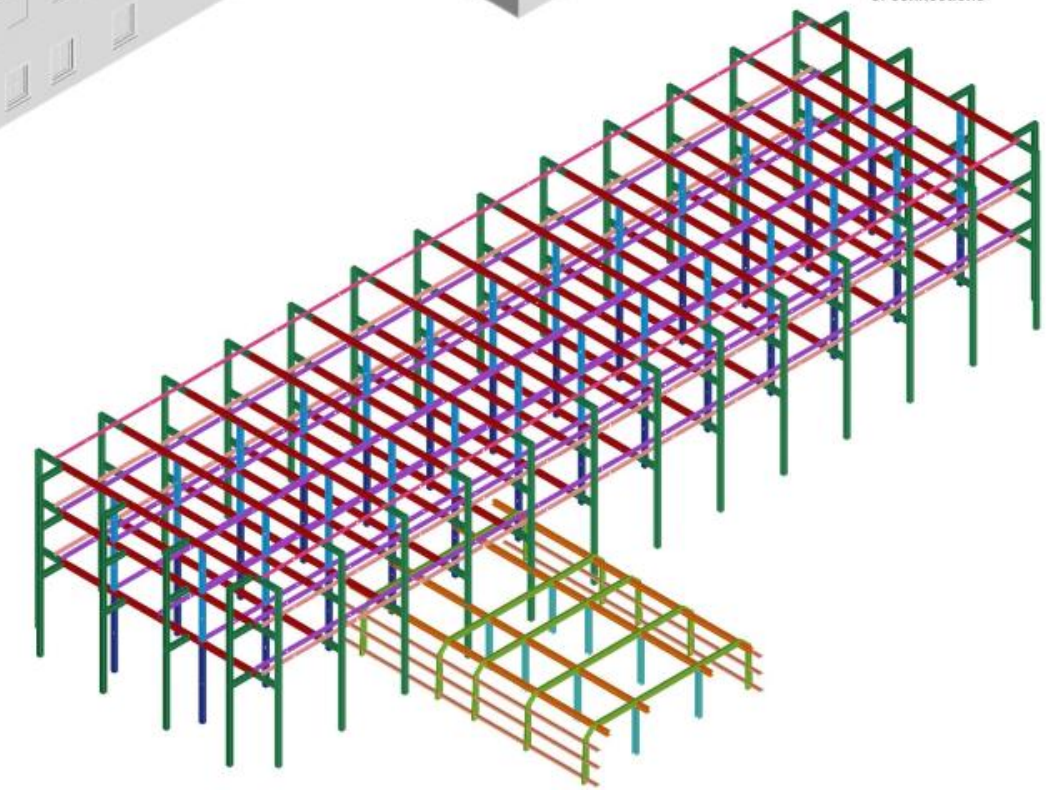


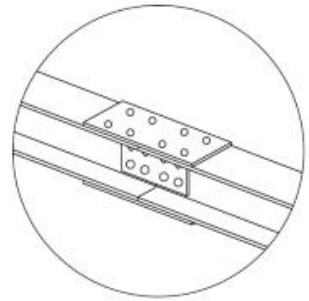


ORIGINAL CONFIGURATION

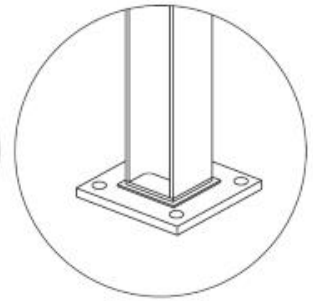
1971 - 2009







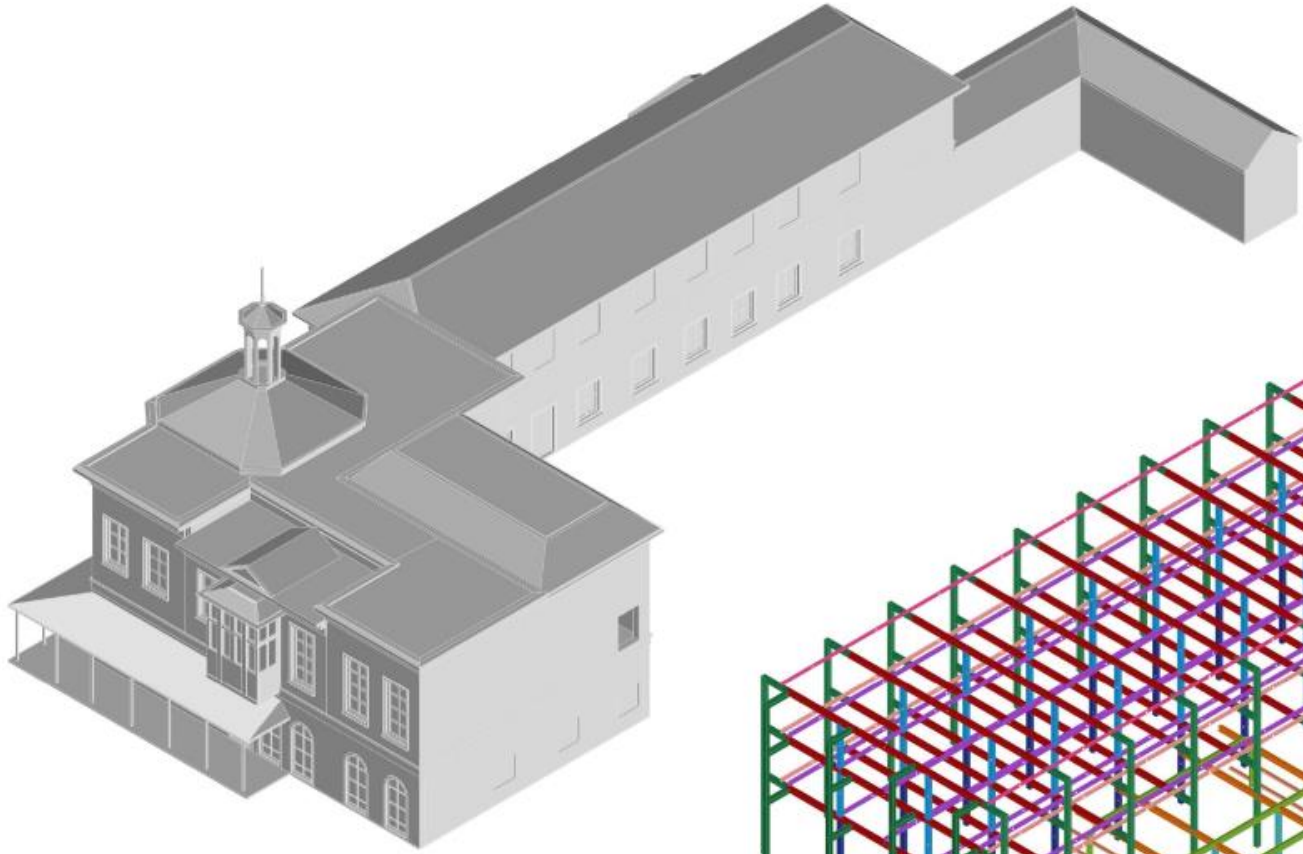
using the same types
of connections

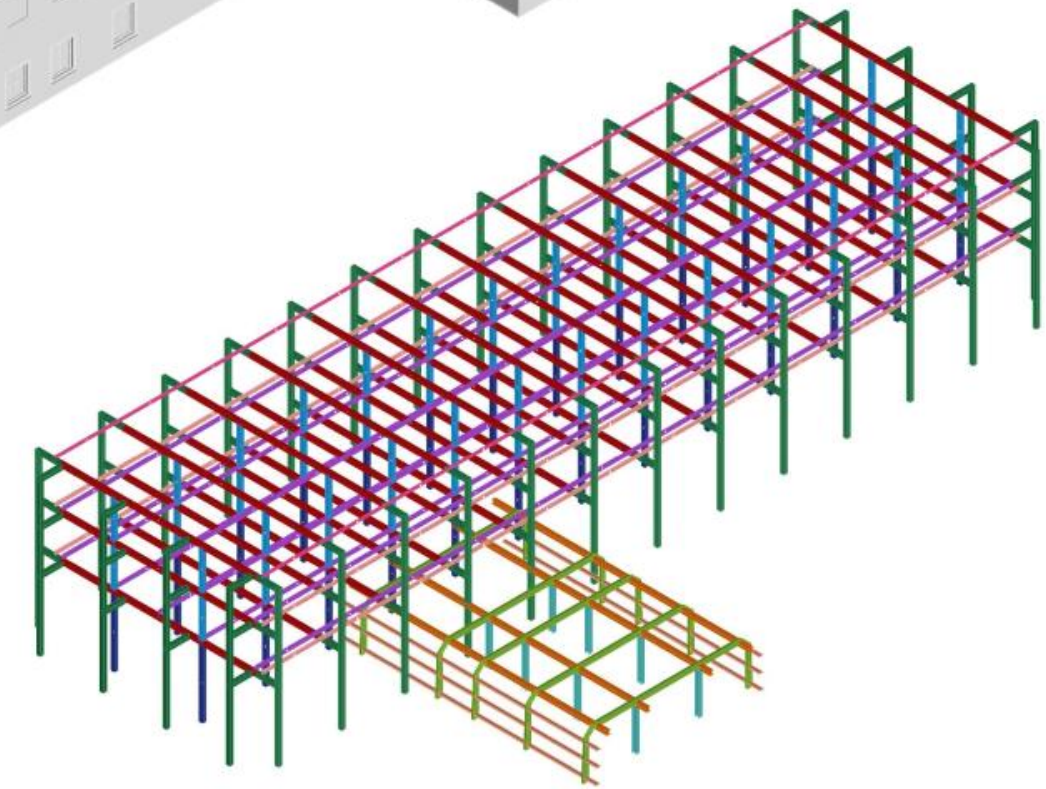


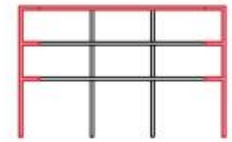
possibly using
the old foundations

ORIGINAL CONFIGURATION

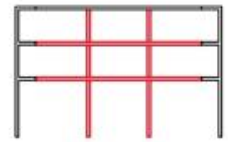
1971 - 2009



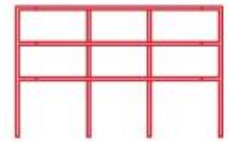




taking outer elements

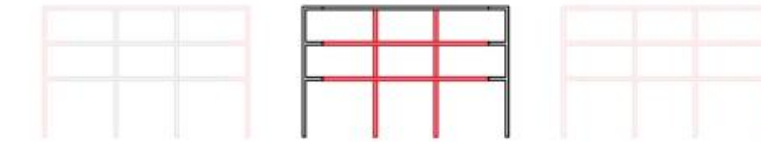


taking inner elements



taking all

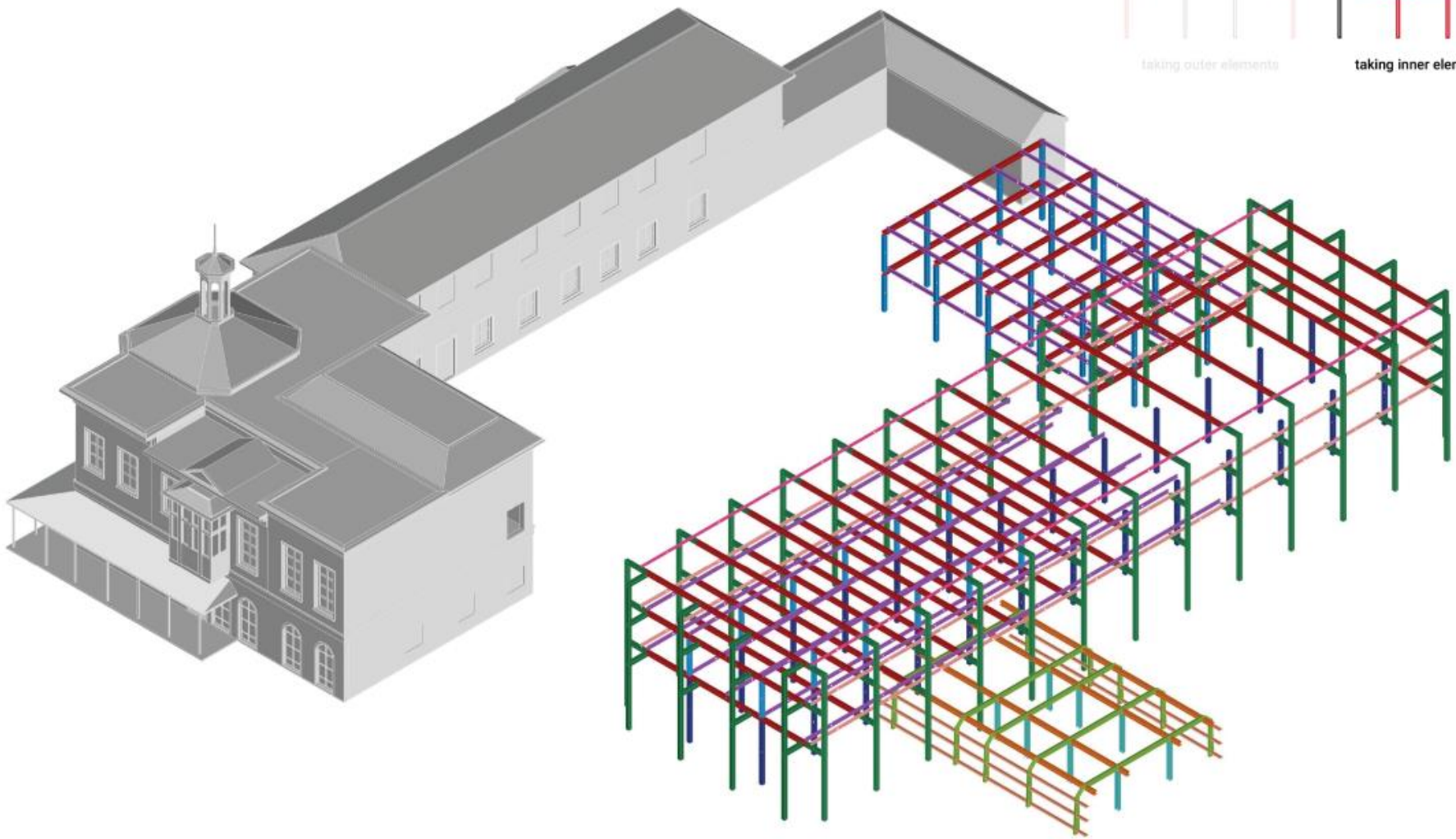
STEP 1
Creating West Wing



taking outer elements

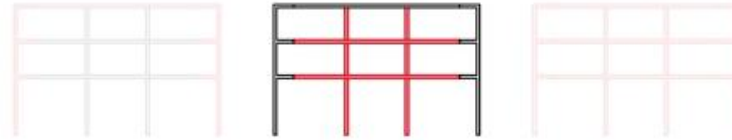
taking inner elements

taking all



STEP 2

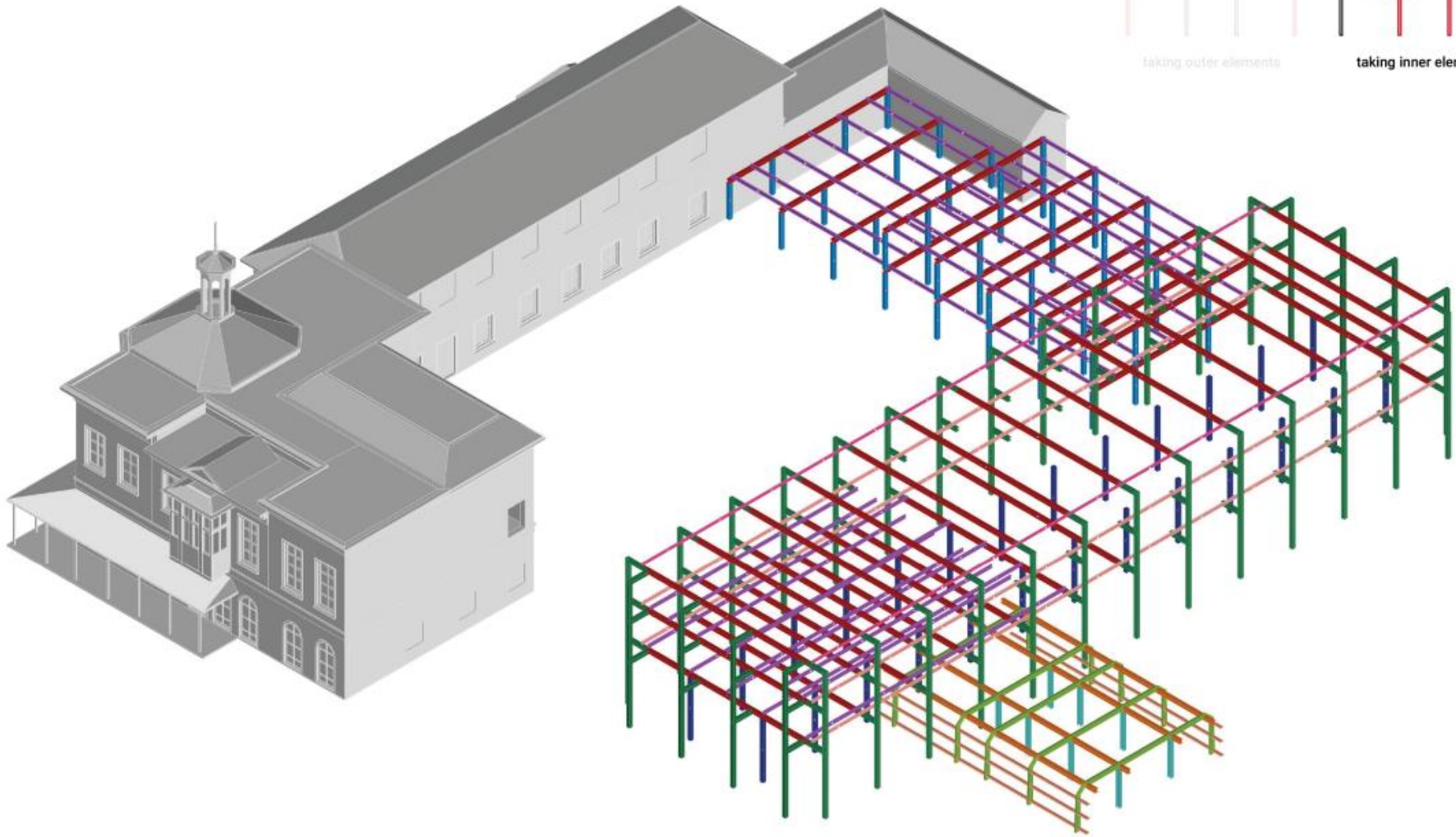
Enclosing with existing the building



taking outer elements

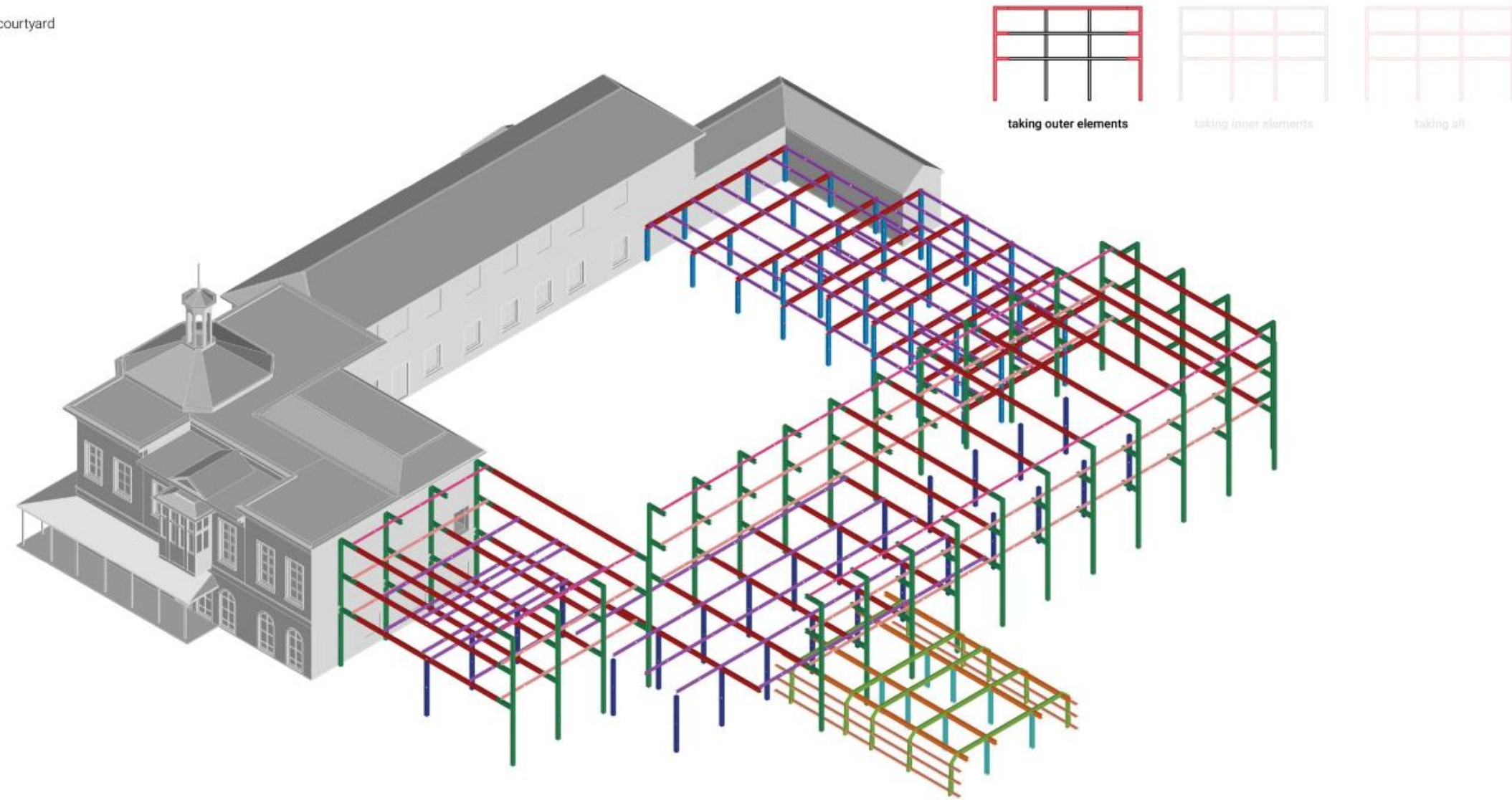
taking inner elements

taking all



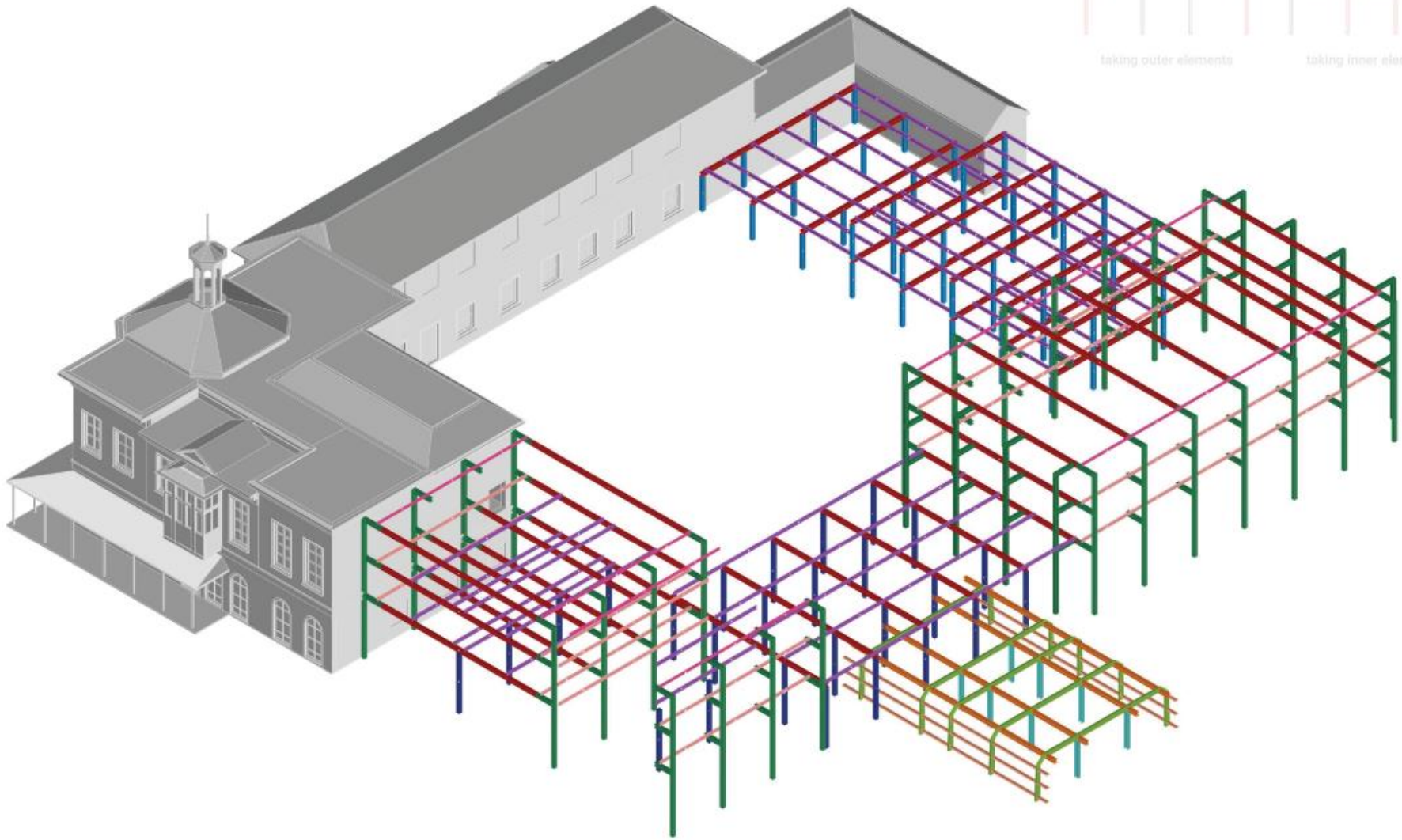
STEP 3

Creating East Wing - forming the courtyard



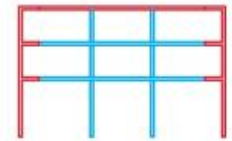
STEP 4

Adjusting the structure to create space continuity

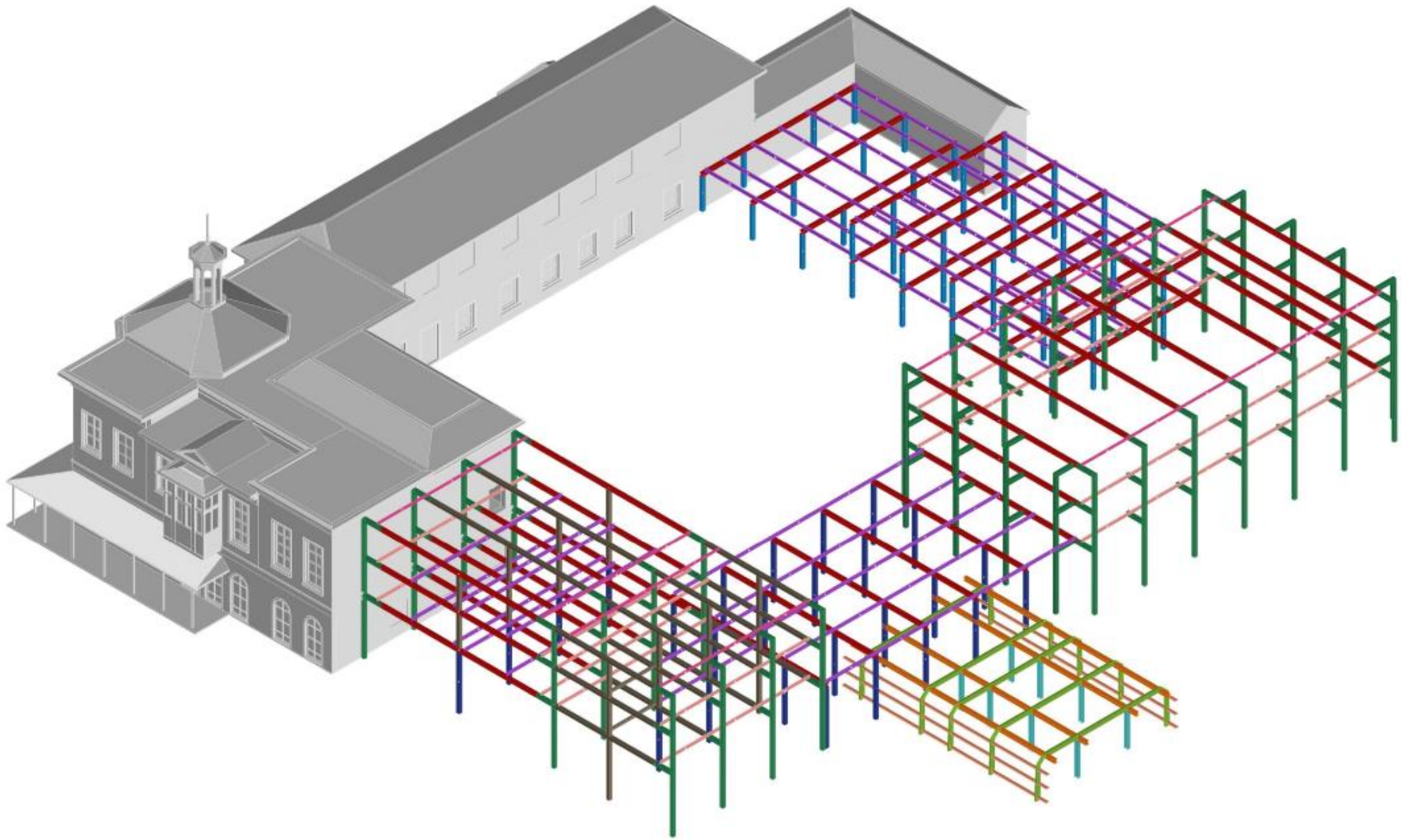


STEP 5

Complete the structure with timber elements

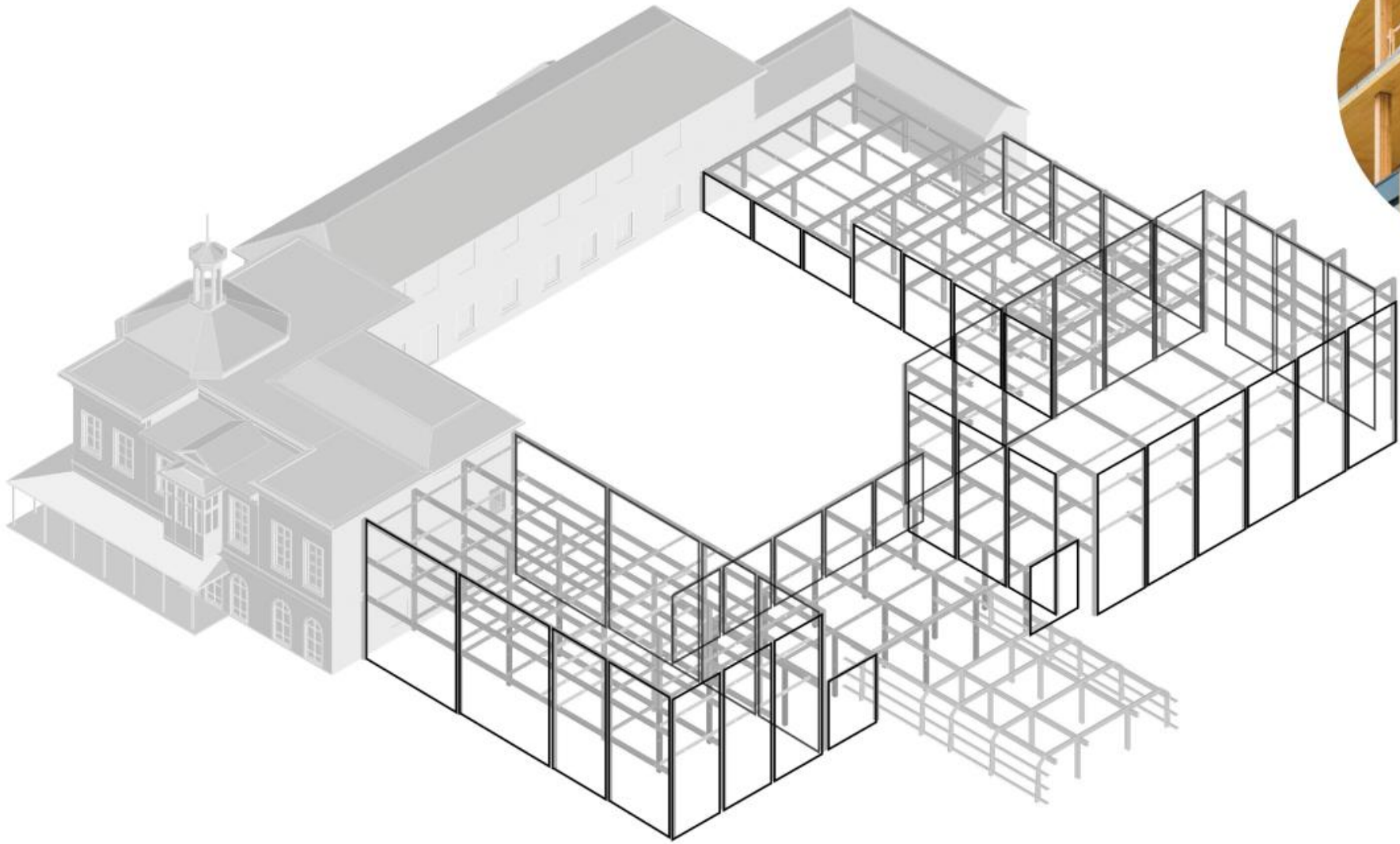


adding new elements



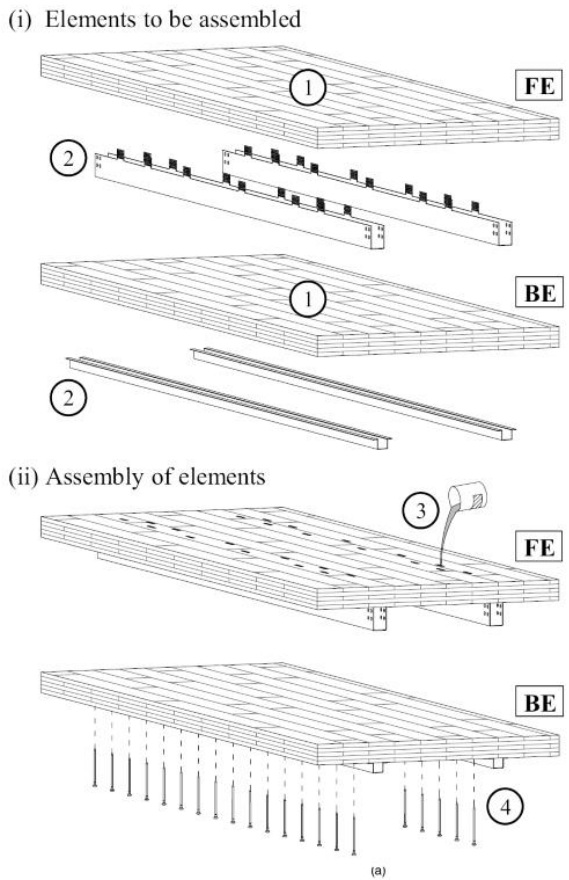
STEP 6

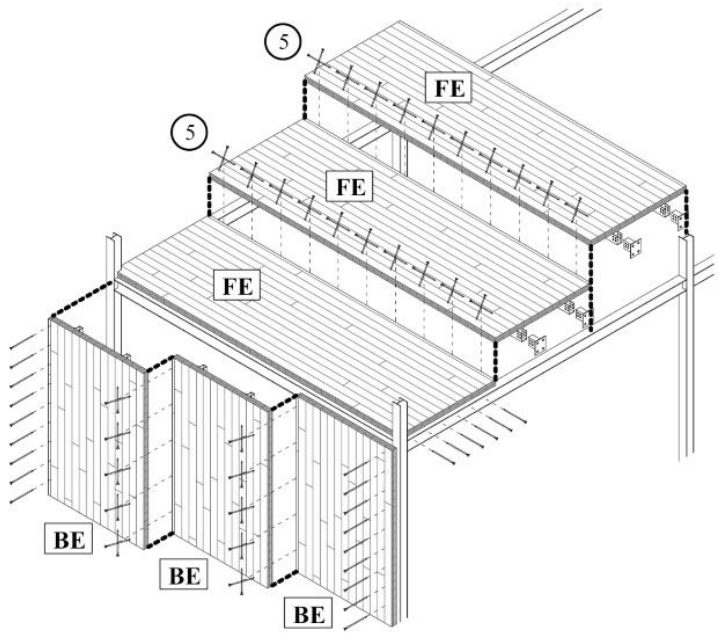
Stabilizing the structure by clt facade panels

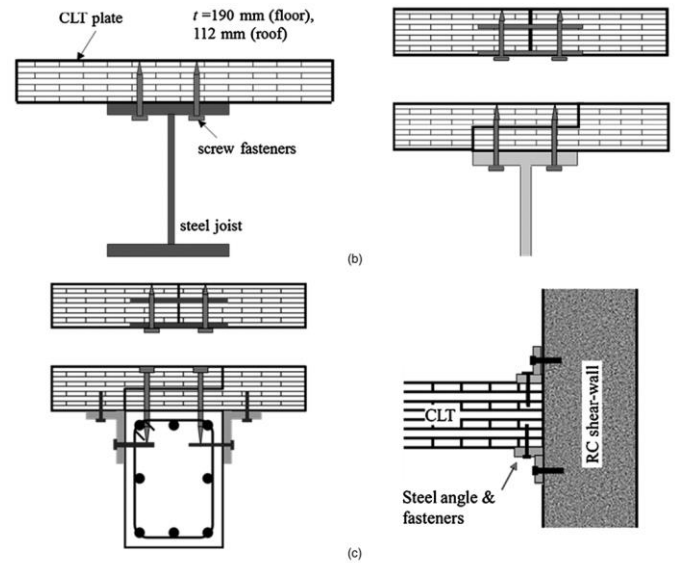


STEP 6

Stabilizing the structure by clt facade panels

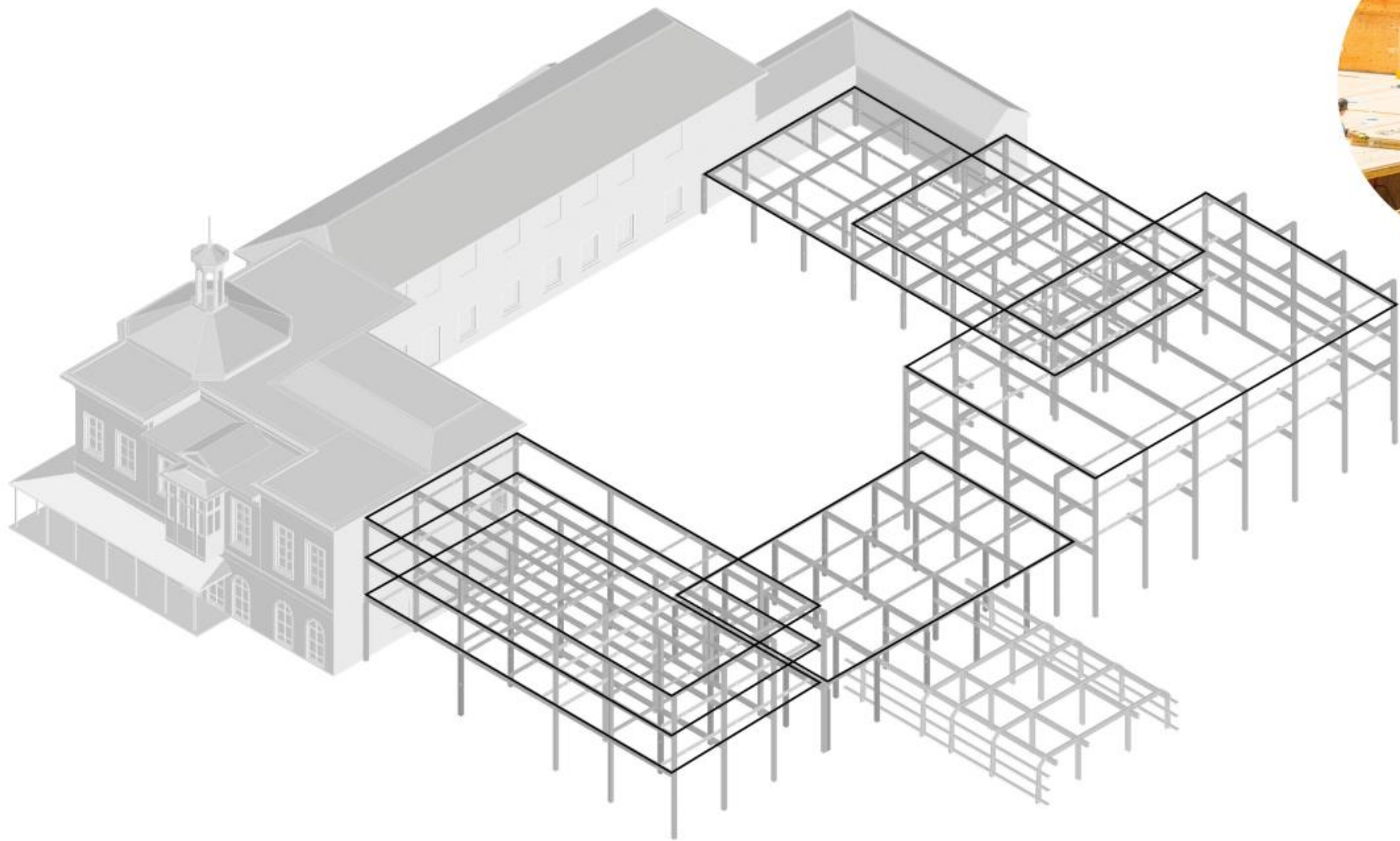


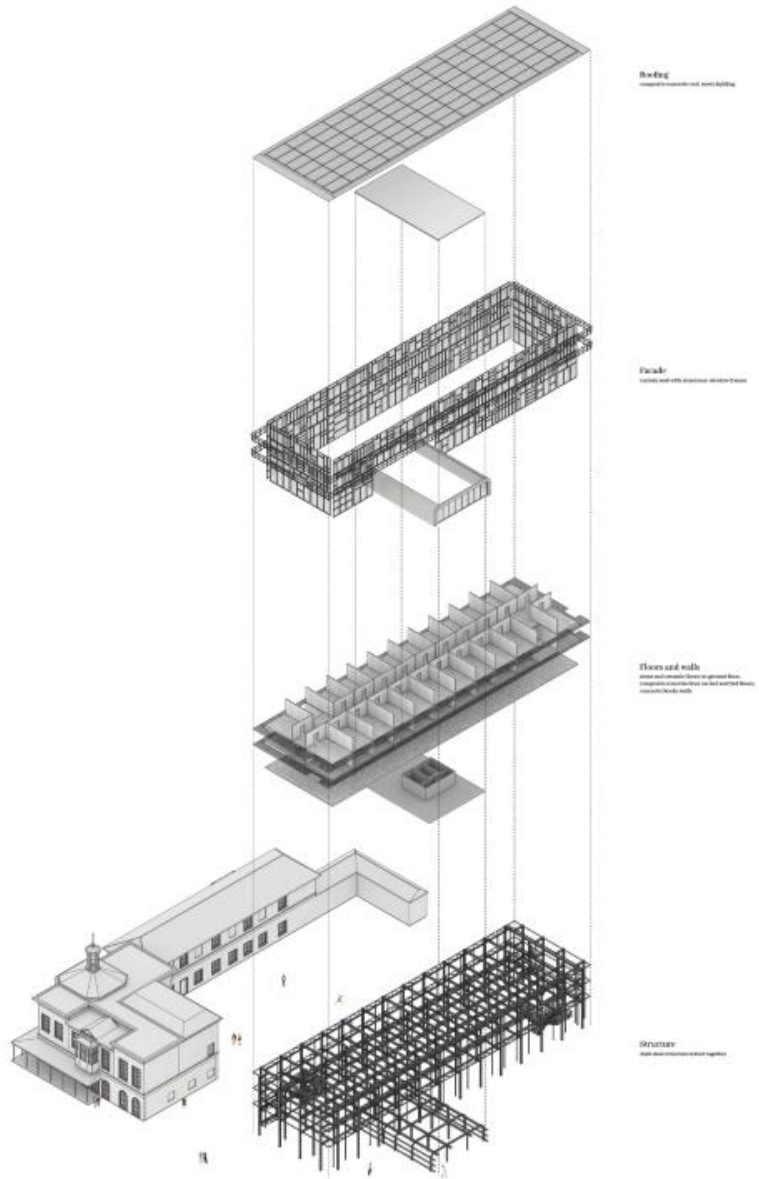




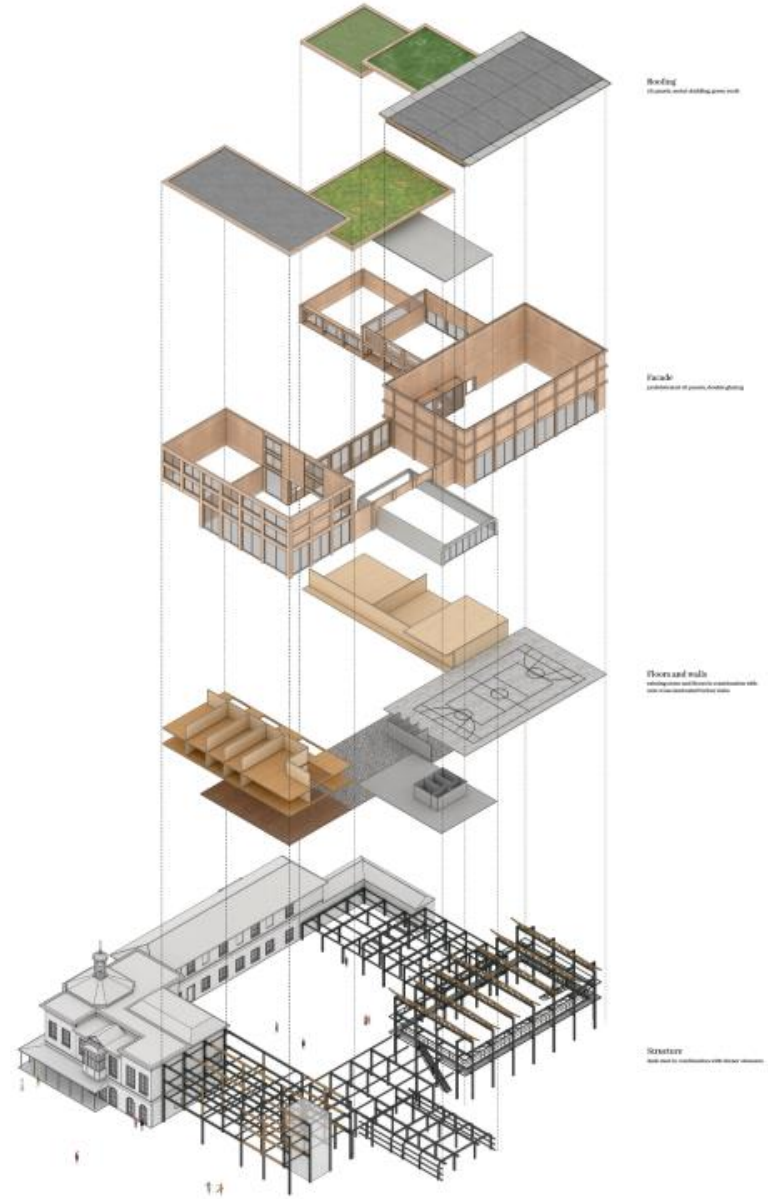
STEP 7

Stabilizing the structure by clt floor panels



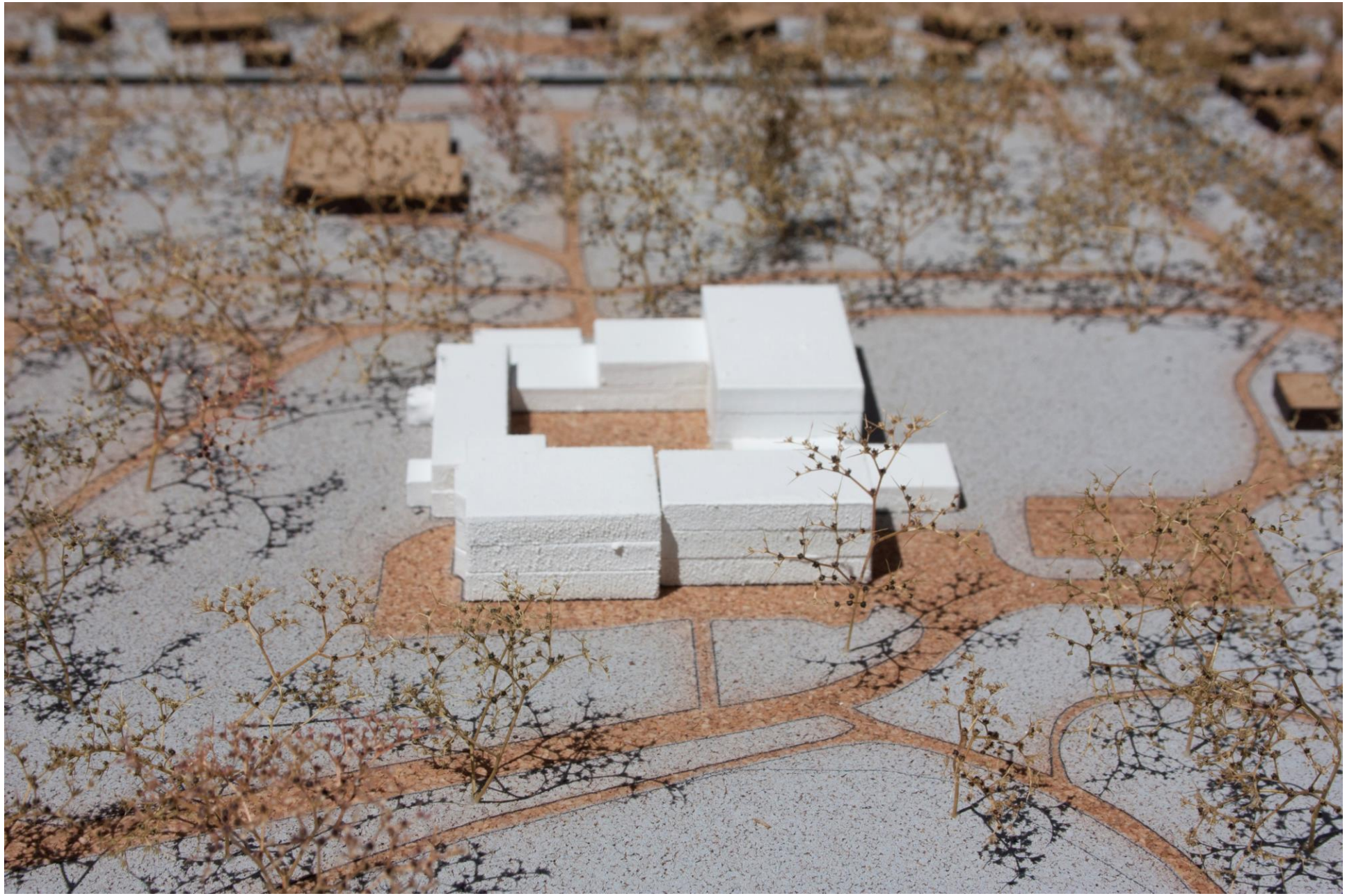


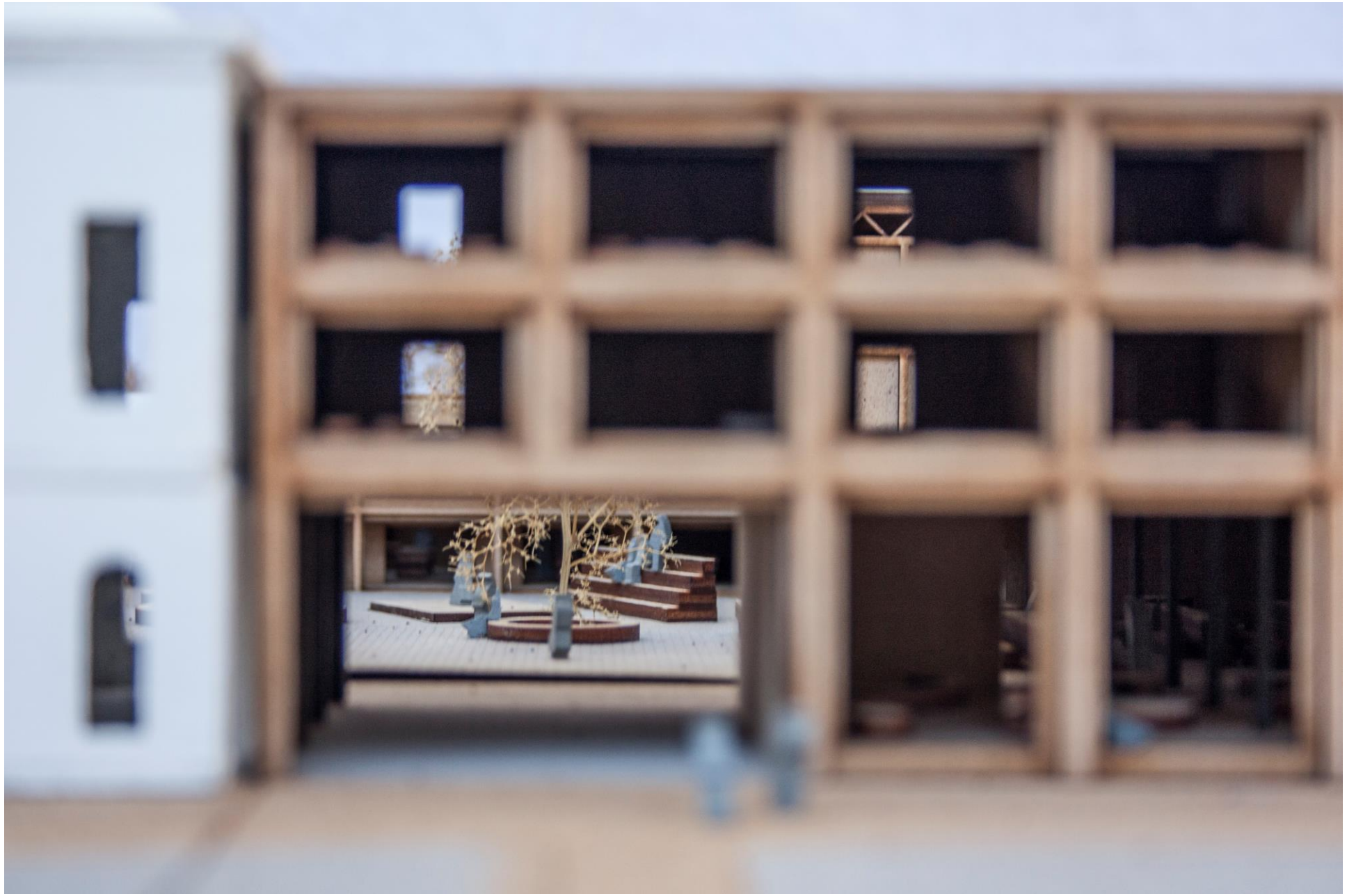
Ockenburgh Youth Hostel
situation from 1971 to 2065



Ockenburgh Community Hotel
proposed transformation

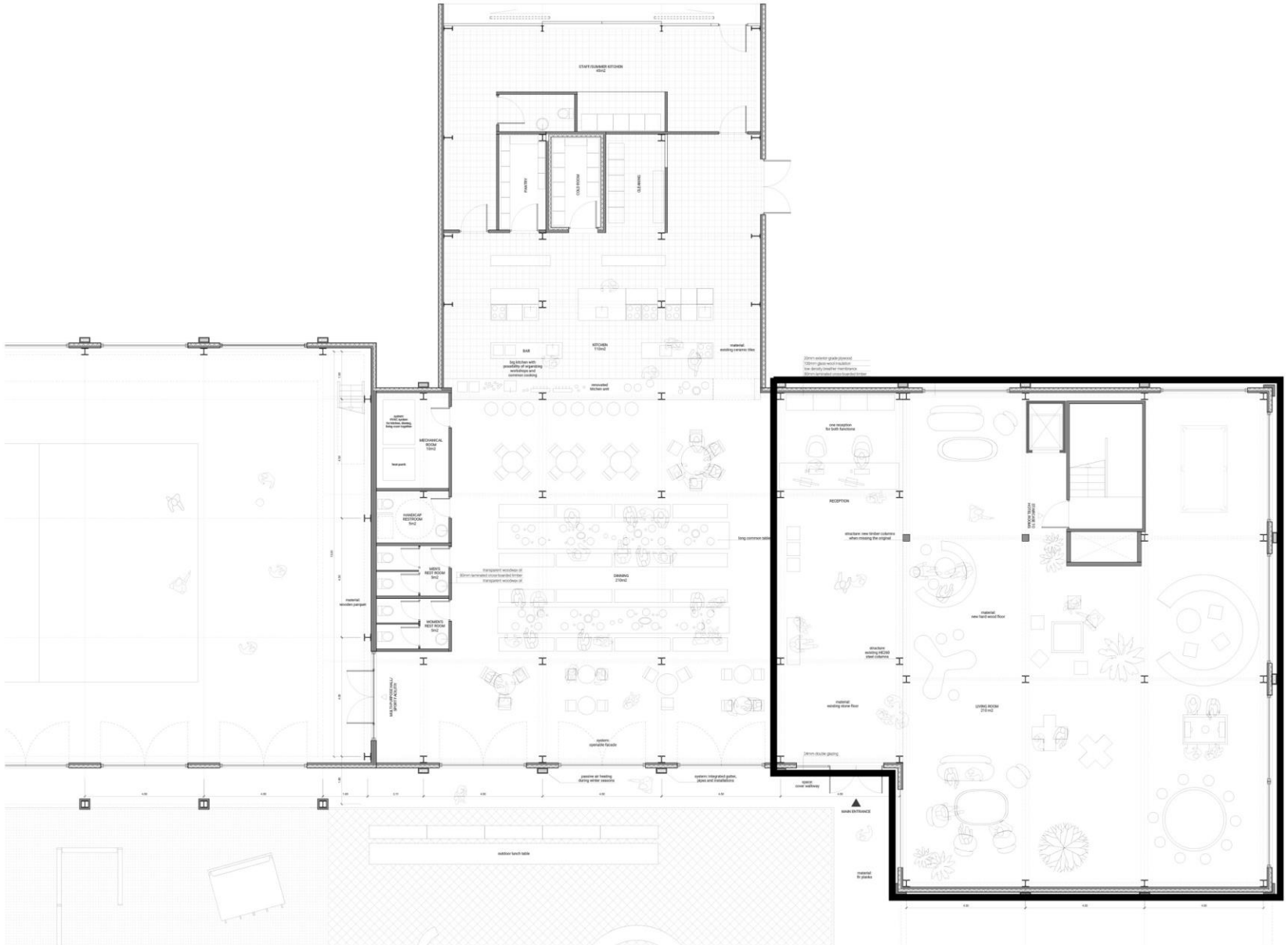
06 ARCHITECTURAL DESIGN

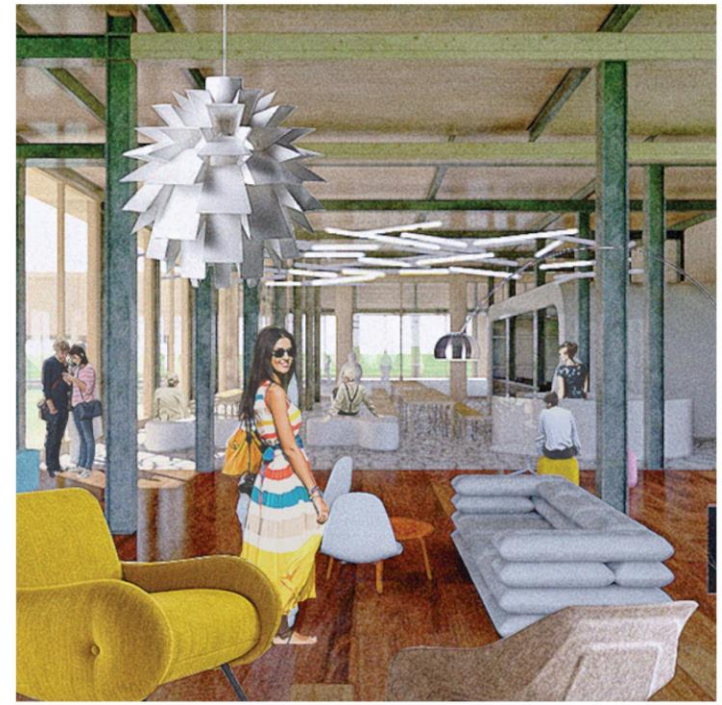


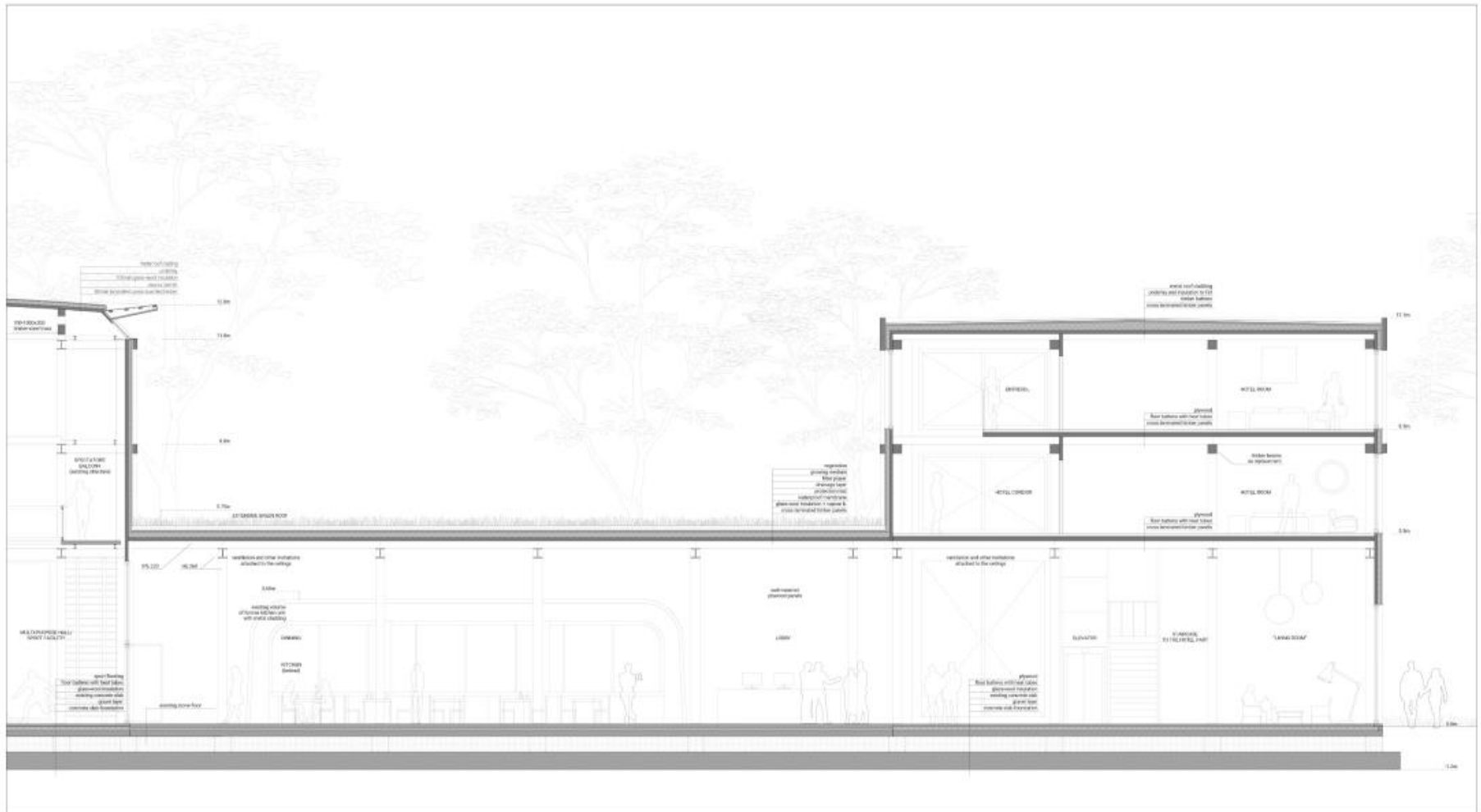


ENTRANCE

LOBBY AND “LIVING ROOM”



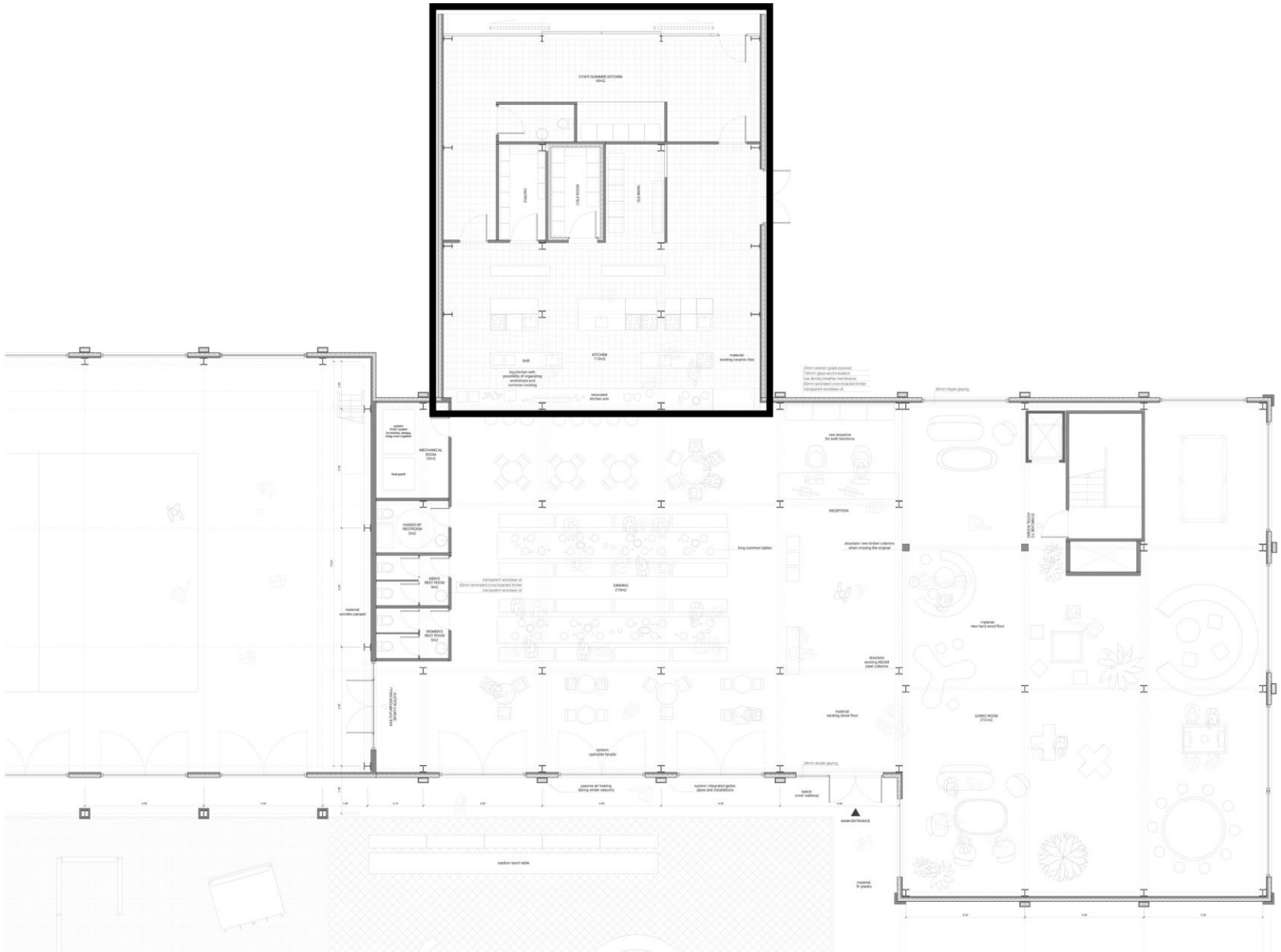




DINNING


STAFF/SUMMER KITCHEN
45m2
PANTRY
COLD ROOM
CLEANING
BAR
KITCHEN
110m2
material:
existing ceramic tiles
MECHANICAL
ROOM
10m2
HANDICAP
RESTROOM
5m2
MEN'S
REST ROOM
5m2
WOMEN'S
REST ROOM
5m2
DINNING
210m2
long common tables
RECEPTION
structure: new timber columns
where missing the original
material:
new hard wood floor
structure:
existing HEB30
steel columns
material:
existing stone floor
LIVING ROOM
210 m2
MAIN ENTRANCE
outdoor lunch table
material:
fir planks

BAR & KITCHEN


STAFF/SUMMER KITCHEN
PANTRY
COLD ROOM
CLEANING
BAR
KITCHEN
material: existing ceramic tiles
big kitchen with possibility of organizing workshops and common cooking
renovated kitchen unit
MECHANICAL ROOM
HANDICAP RESTROOM
MENS REST ROOM
WOMENS REST ROOM
material: wooden parquet
transparent windows or
timber terminated cross-bracketed timber
DINING
270m2
long common tables
one reception for both functions
RECEPTION
structure: new timber columns when missing the original
material: new hard wood floor
material: existing stone floor
structure existing HEB30 steel columns
LIVING ROOM
210 m2
system: operable facade
passive air heating during winter seasons
system: integrated gutter, pipes and installations
space cover walkway
MAIN ENTRANCE
outdoor lunch table
material: fir planks

SPORT/EVENT HALL

Closed environment for living space

This two-part feature is about covered structures, one in Holland, one in Japan. Neither are buildings in the accepted sense of the word, but rather enclosed areas within which people may create their own environment. Architecturally, the structures are part of a movement towards greater flexibility. Their effect on industrial design could be profound, writes **Corin Hughes-Stanton.** For when the fundamental concept of the situation in which products, furniture and fittings are to be used alters, the conception of these items themselves must inevitably be reconsidered.

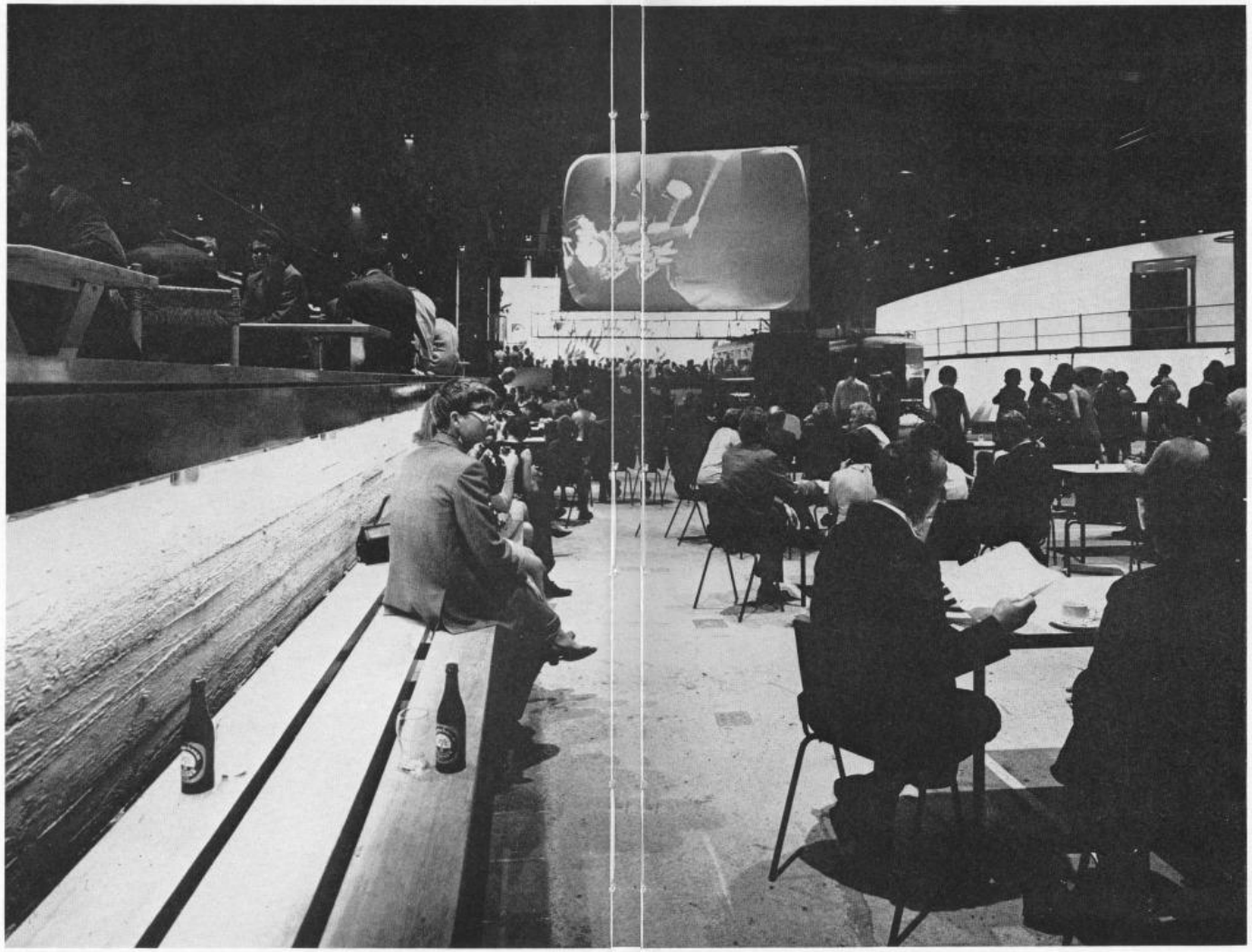
1 Dronten Agora, Dutch community centre

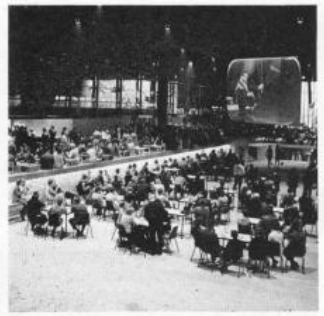
The town centre, or Agora, at Dronten appears at first sight to be unfinished. This is exactly as it is supposed to be: it is finished as an unfinished structure. Yet inside this covered place – it is not a building in the accepted sense – there is a strength of character which comes directly from the social and design concepts of its creator, the Dutch engineer, F. van Klingeren. He says, "For me architecture is not to make a building but to make a tool with which people can work."

Dronten is a new town in the middle of a bleak, desolate polder reclaimed from the Zuyder Zee only 12 years ago. Its present population of 10,000 is expected to double by the year 2000, so Van Klingeren was asked to design a town centre to meet the needs of a fast-growing number of people. Instead of making a box full of mini boxes designed for predetermined activities, he decided on an all-purpose covered place situated alongside an open space; around this space shops, banks, post office etc, may or may not be built. He says, "Much of our present provisions for dwelling and recreation, but also for creation and work, will be out-of-date in the year 2000." So, in his design of the glass-walled Agora, he has followed the precept that "to build for the future means leaving a great deal *unbuilt*."

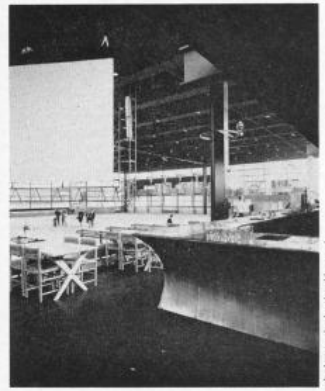
It is not entirely unfortunate that the Agora is not as unfinished as Van Klingeren would have liked. A scheme for the built services within the structure, which he showed the local council to give it an idea of how the Agora *could* be used, was in fact so much liked that they built it into the project. Van Klingeren has still managed to realise his main concepts: "We made it imperfect in order to invite everybody to bring his ideas into the Agora."

Now, when it has been in use for a year, he rightly says, "We learned that the most different groups in all society appreciated this imperfect box as a possibility to realise their suppressed intentions." It is a great

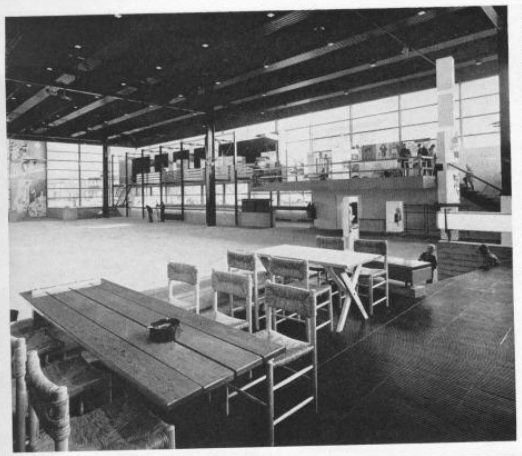




The Dronten Agora is the covered community centre of a town built in the middle of a Dutch polder only reclaimed from the Zuyder Zee in 1957. Designed by F. van Klingeren, it is planned for a rapidly increasing population with possibly entirely different leisure and business activities by the year 2000. Van Klingeren has deliberately not designed a completed building: the people of Dronten may use it, change it or add to it as they think best. The café terrace, left and above, looks towards the communal television/film screen and the enclosed theatre. The bowling alley, below, at the other end of the café, has open-plan "committee rooms" above it.



photographs by Jan Versnel



A wide range of activities, both organised and unorganised, can take place in the Agora. It is a place where it is as natural to participate as to watch. There are no barriers between different areas: although the fixtures are as simple as possible, more equipment can be added, or taken away again, at a later date. Already Dutch design students are working on future projects for it. During a play interval, below, *theatregoers can come out onto the terrace to watch whatever happens to be going on.*

round the country on the screen.

In this polder town Van Klingeren has brought people into the theatre, the cinema and to concerts by their own volition in a way which has hardly ever been achieved before. It is a remarkable experience to see up to 3,000 people – farmers, shop assistants, and factory workers – bringing their own camp stools and sitting in the Agora outside the packed-out theatre to listen to a concert.

The simple theatre can be used in the round, and with either an arena stage or a proscenium arch. There are chairs for old people but the seating is concrete with cushioned backs. It is not a relaxing place. If the people of Dronten go to the theatre they must take part in the theatre. It is part of real life. Its walls only reach halfway up the Agora, so sound travels out of it, and performances are also monitored visually to the exterior, by closed-circuit tv. People in the Agora can therefore hear and see what is going on in the theatre for free, and in practice, it is drawing them inside. Naturally the noise outside can intrude on the performance, if this happens someone inside has to come out and tell them to be quiet. This, too, deliberately involves everybody with everybody else.

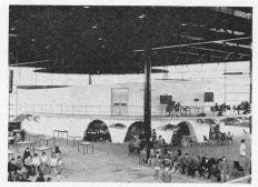
The form of the Agora is as simple as possible. "Cut everything down," Van Klingeren says, "ask why, why, why and nothing remains." For the committee rooms he decided to leave the ceilings off. Having done that, he next removed the internal walls to the corridor, and then saw that the dividing walls were unnecessary.

The Drontener Agora is important for itself and for suggesting guidelines within which people, including designers and manufacturers of products, will have to work. It is an imposed concept based on a precisely defined social attitude, and it is also a step towards forcing design concepts away from preconceived attitudes.

At Dronten, Van Klingeren has revealed peoples' hidden requirements: the protestant clergyman who wants a church like it, the Roman Catholic priest who wants a church like it, the theatre director who wants a theatre like it, the salesman who wants a market like it.

In his design of the Agora, Van Klingeren has realised Allen Ginsberg's cry "In mass culture there will be no distance between arts and human life."

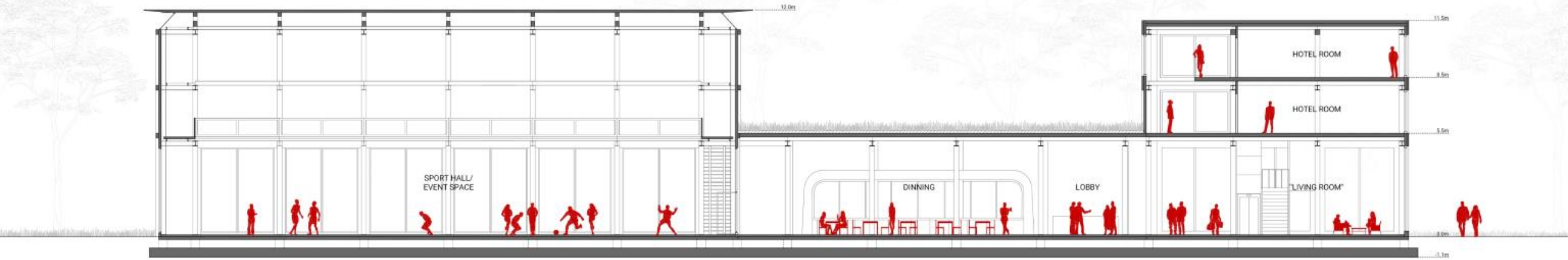
Hardly anybody living in Dronten is not drawn at some time to the Agora. When it is used in the morning for the market, above, *the café is crowded with housewives. Although under cover, stallholders still put up awnings. The restaurant,* below, *is slightly back from the café terrace, deliberately giving more privacy.*



The theatre can be laid out in five different ways, in the round, proscenium-arch stage, apron stage, for film shows and for fashion shows; according to seating arrangements it holds from 350 to 700 people. It is used for brass bands and orchestras, opera, theatre, and prize-giving days. The walls do not reach the roof of the Agora, so that people in the rest of the building can share the performance; if there is too much noise outside people have to be asked to be quiet.

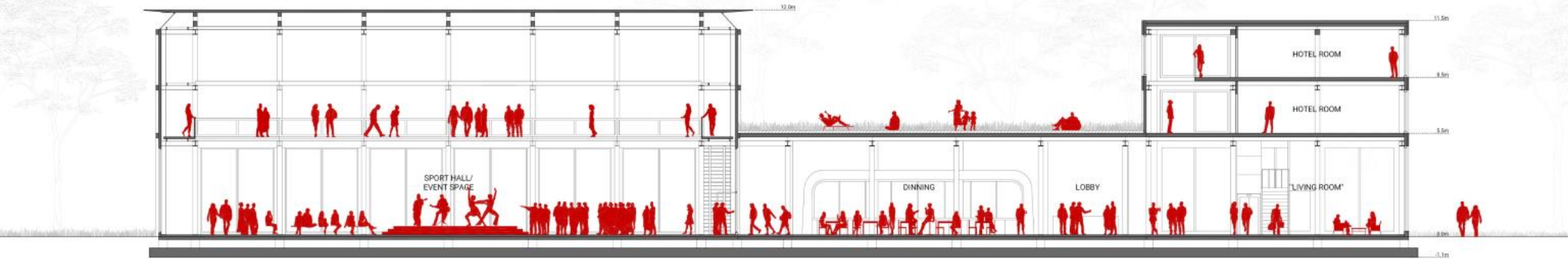
SPORT/EVENT HALL

Sport program



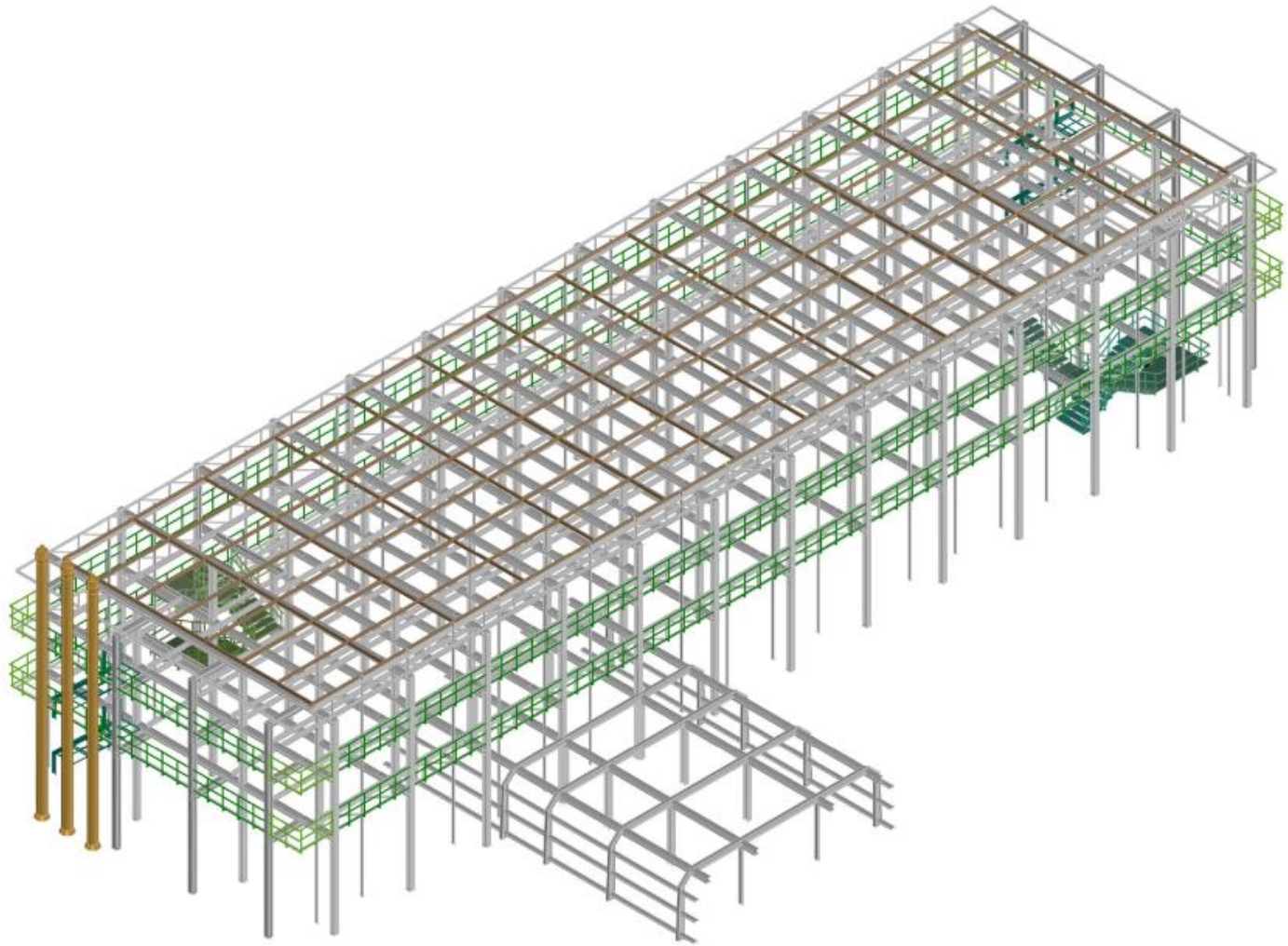
SPORT/EVENT HALL

Event program

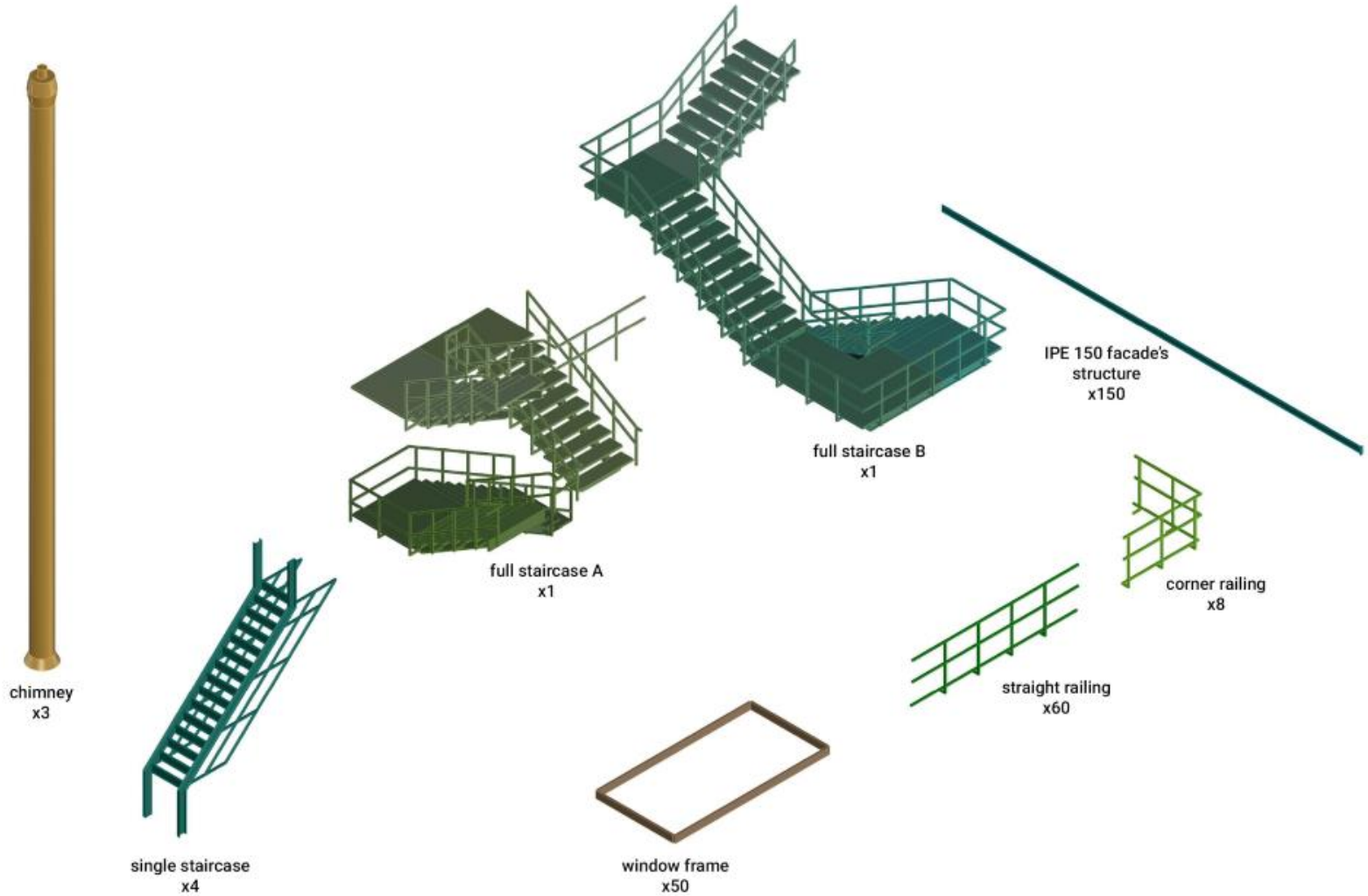


WORKSHOP AND EVENT SPACE

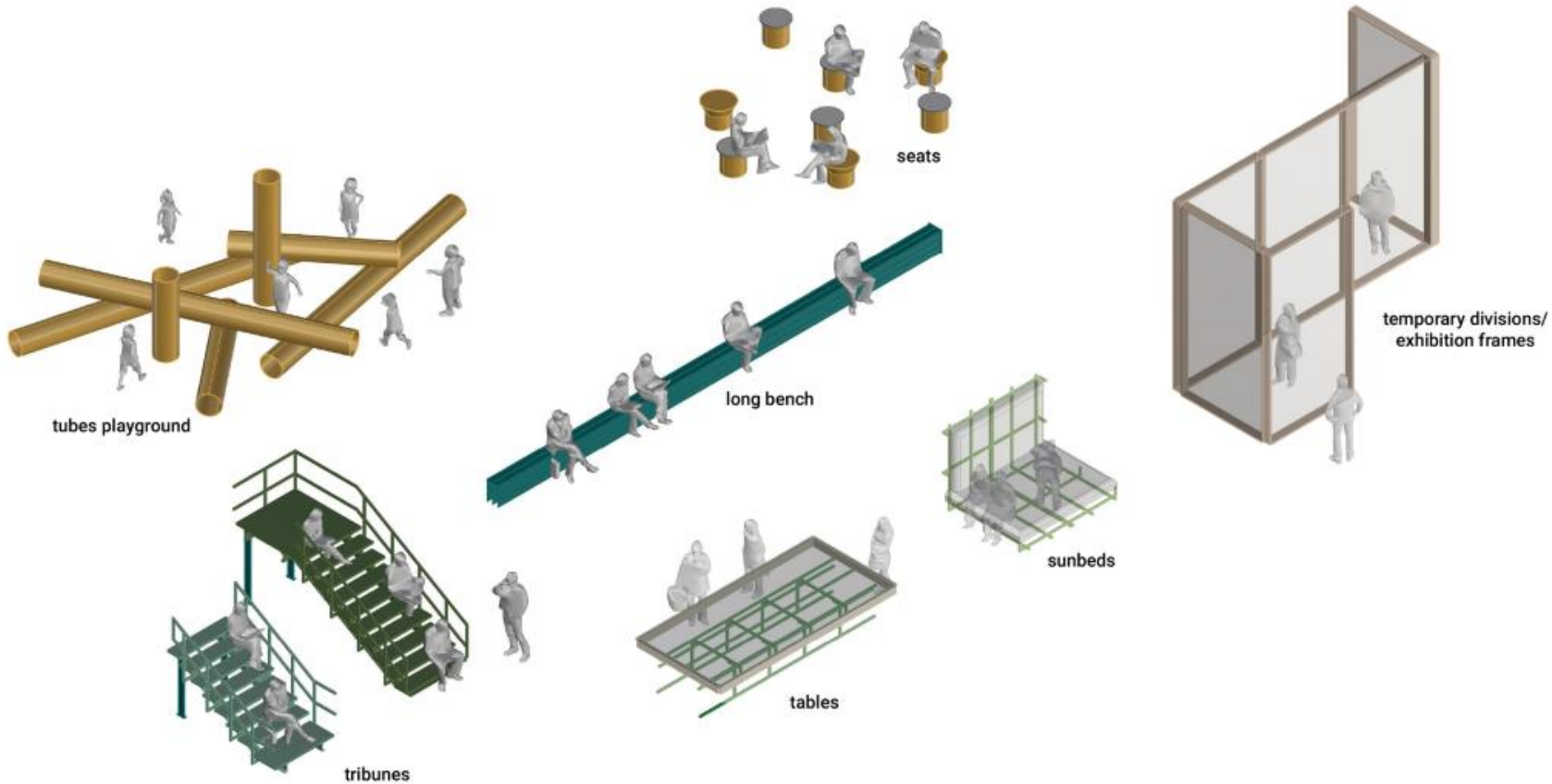
NON-STRUCTURAL ELEMENTS OF THE BUILDING

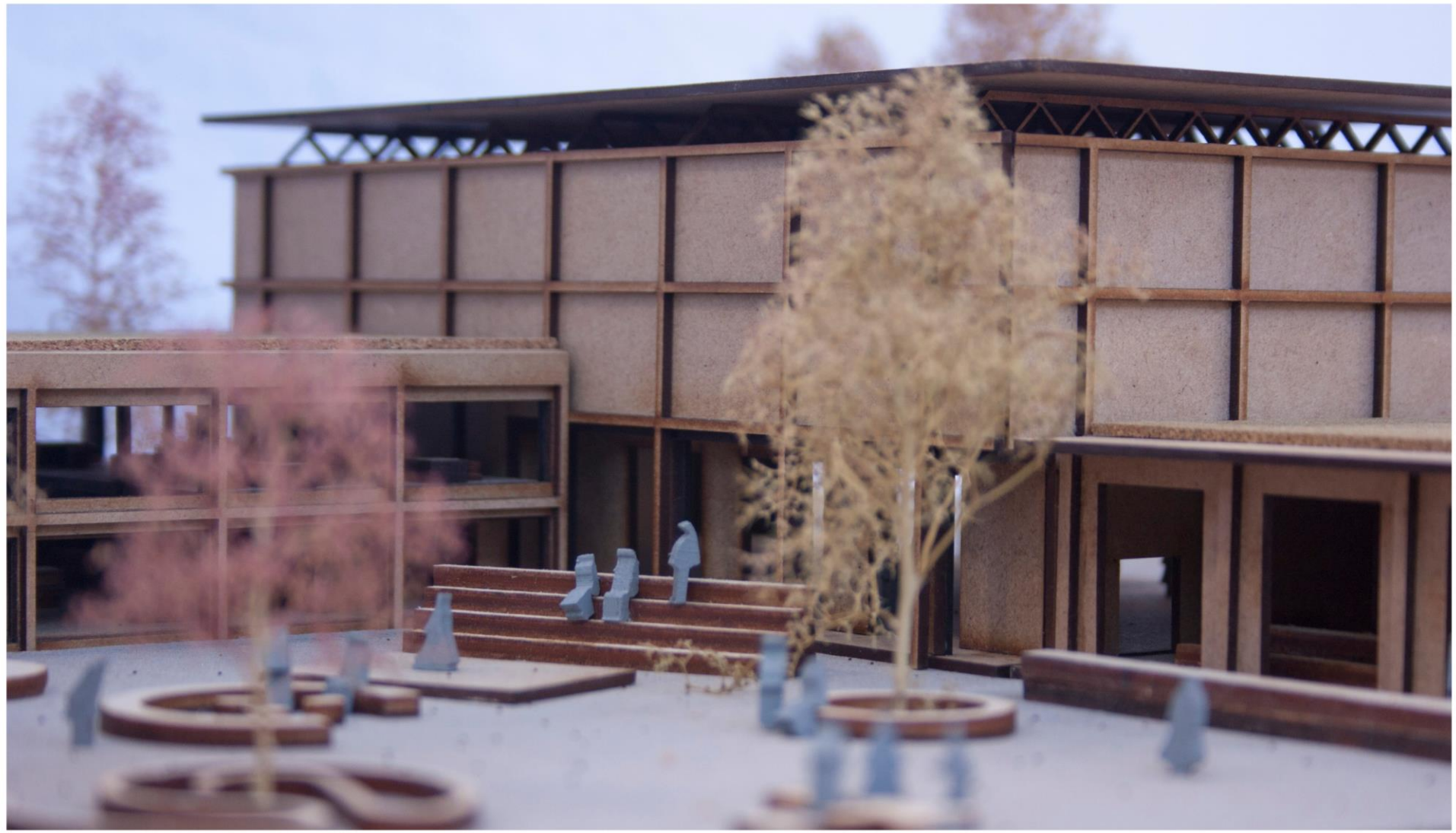


NON-STRUCTURAL ELEMENTS OF THE BUILDING

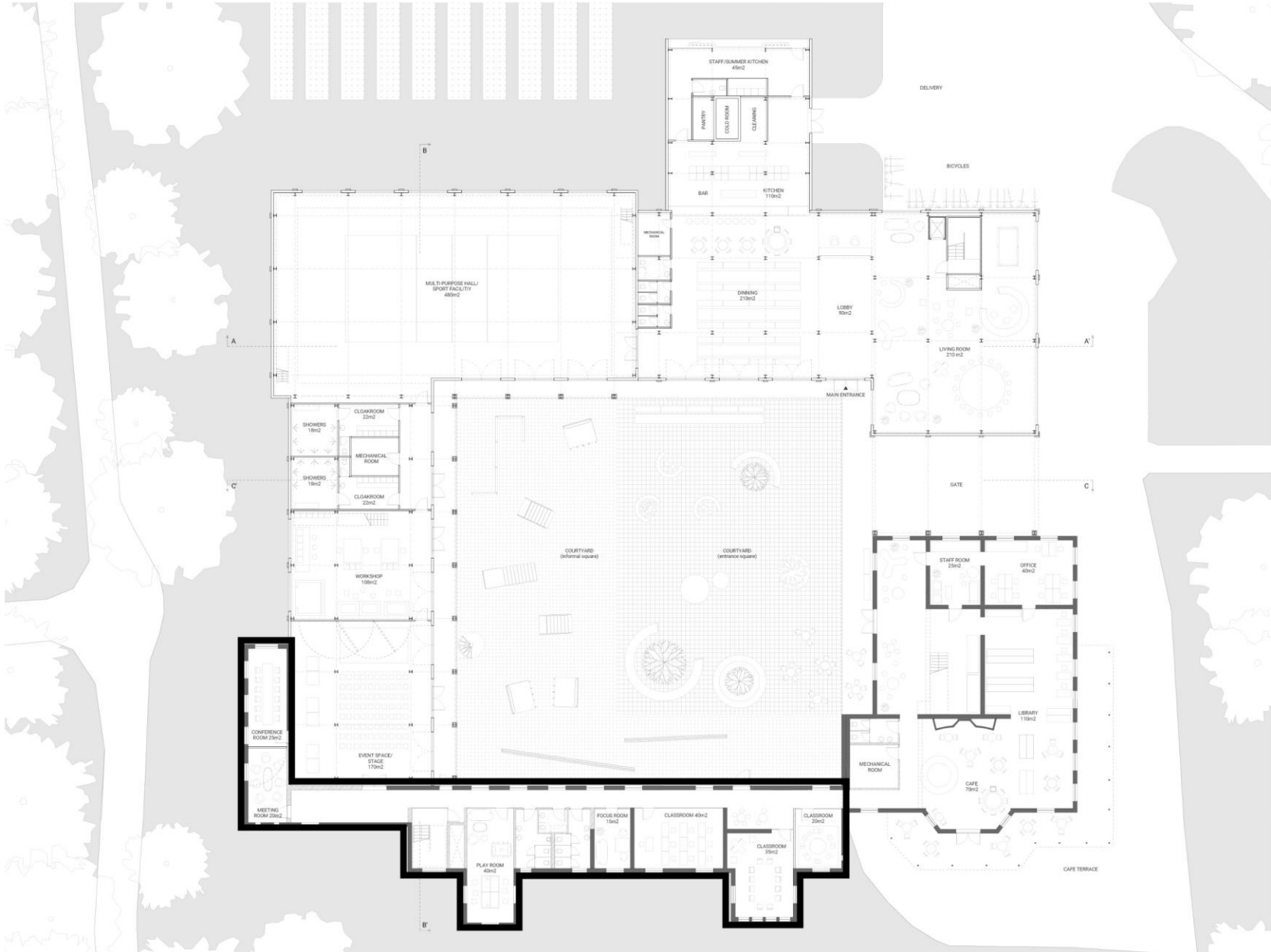


NON-STRUCTURAL ELEMENTS OF THE BUILDING

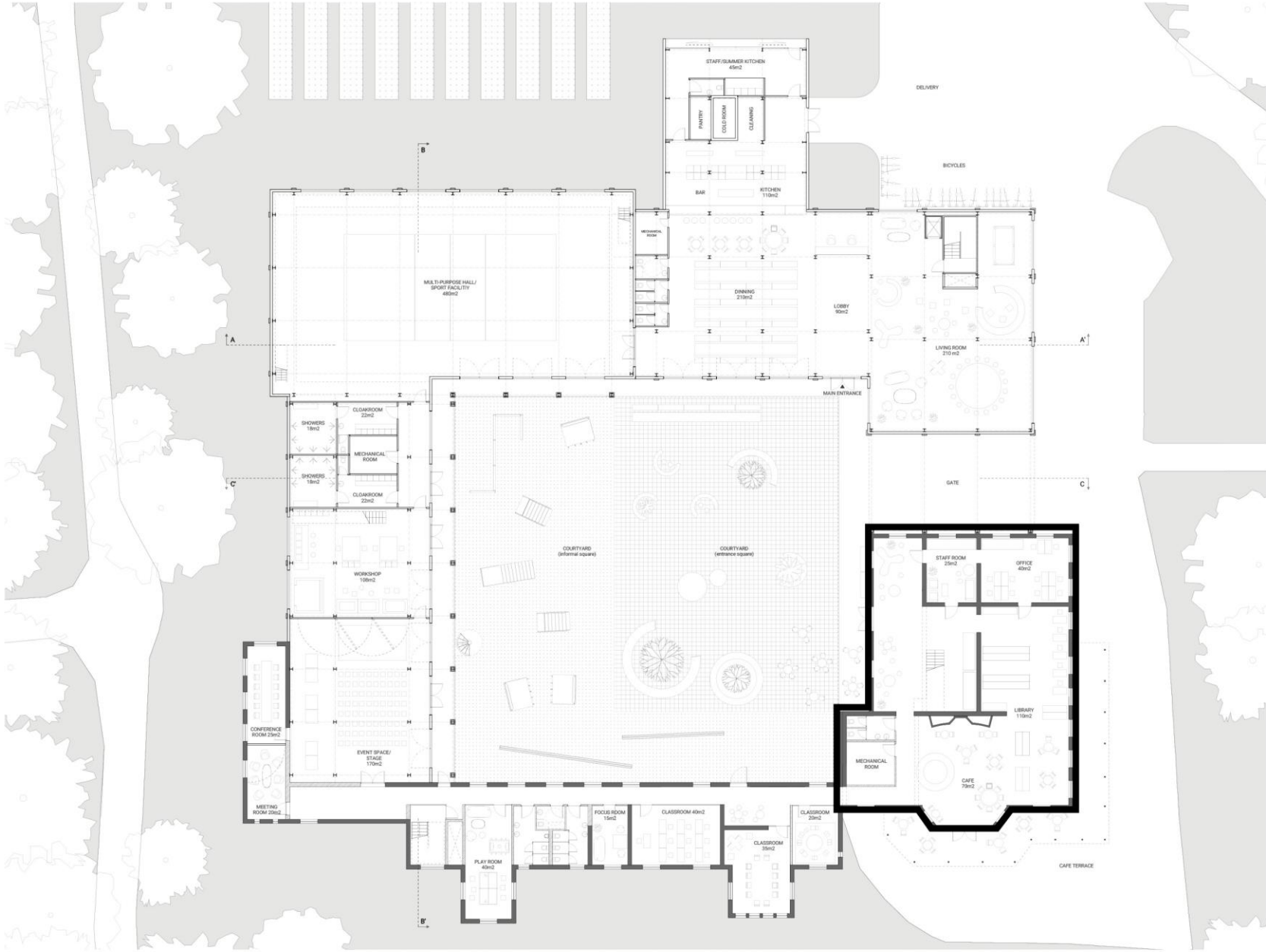




CLASSROOMS AND MEETING ROOMS

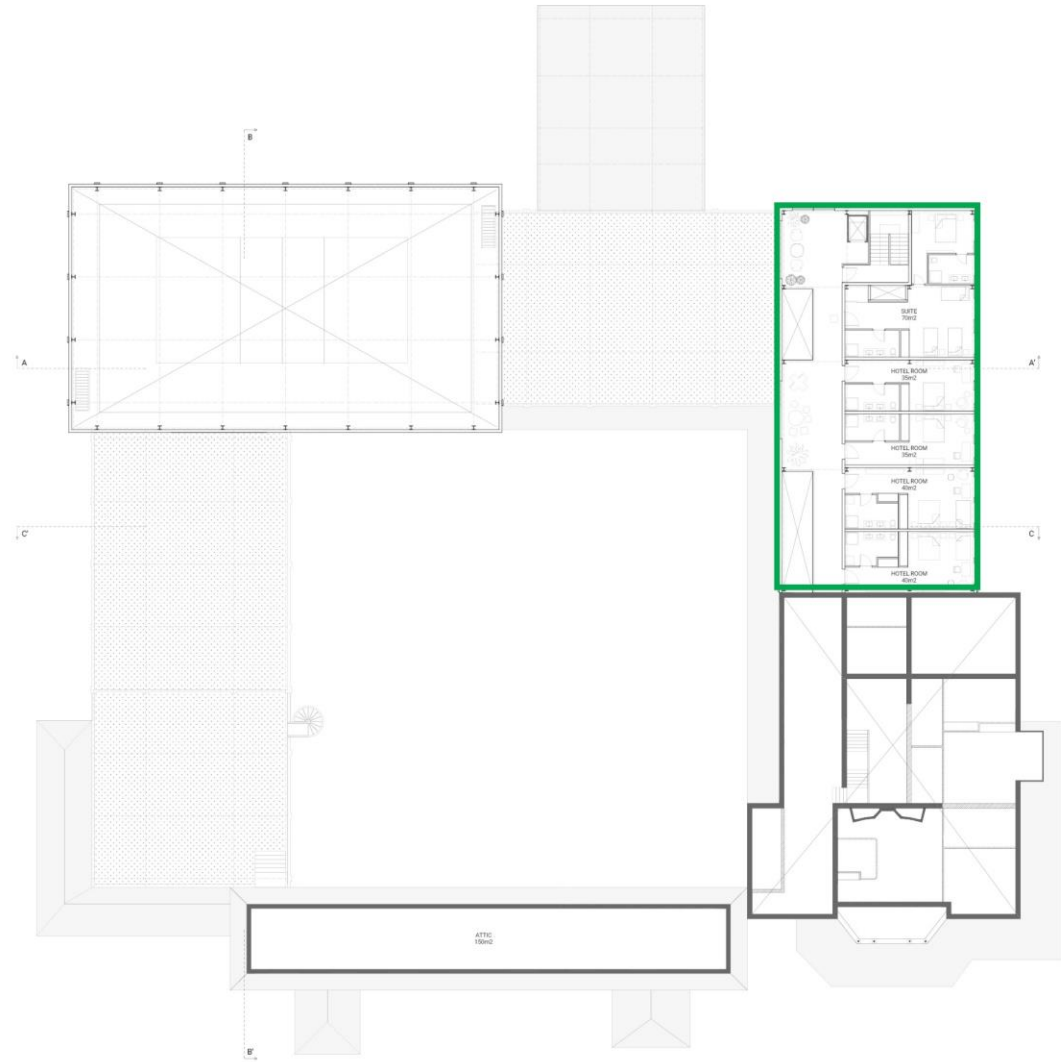


CAFE, LIBRARY AND ADMINISTRATION



SECOND FLOOR

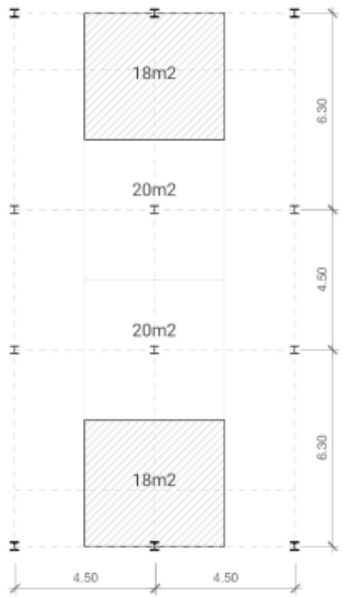
THIRD FLOOR



07 STRUCTURAL DESIGN

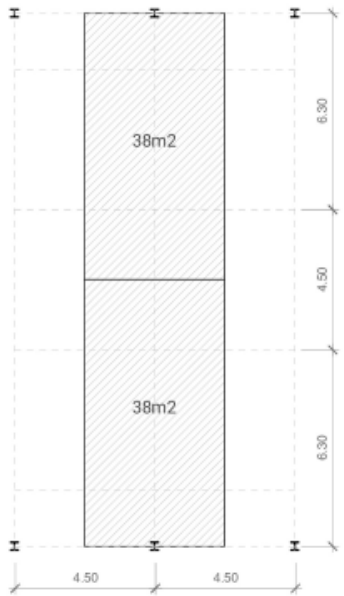
STRUCTURE ANALYSIS

Strengthen the beam



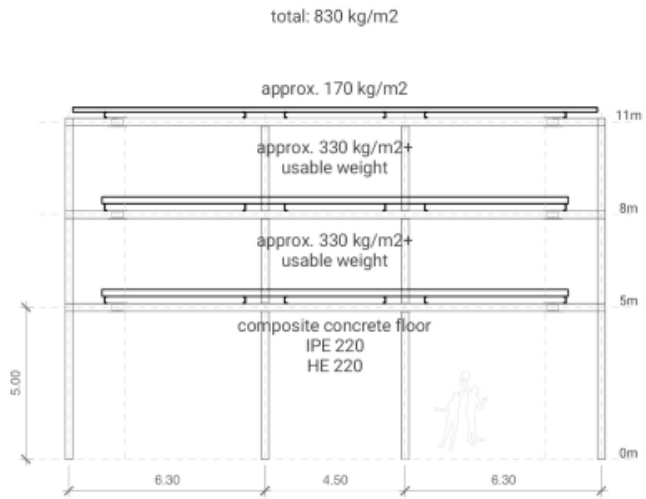
x3

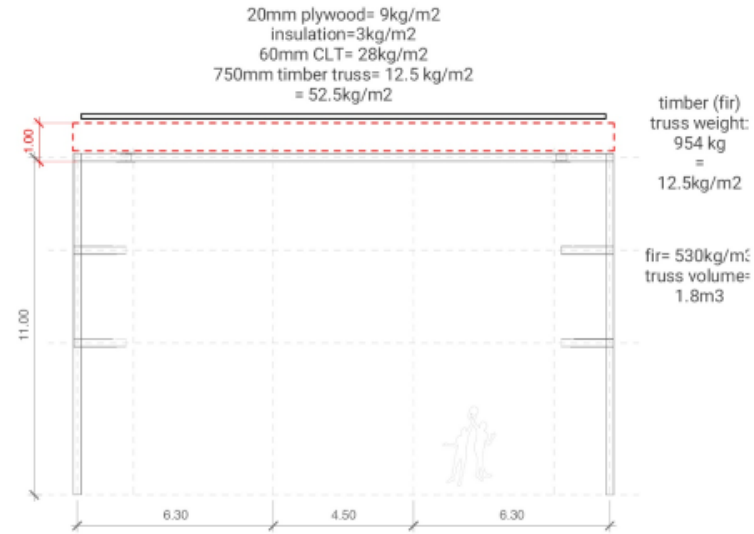
18mx830kg/m2
=
15 000 kg
+ usable weight



x1

38mx52.5kg/m2
=
2000 kg



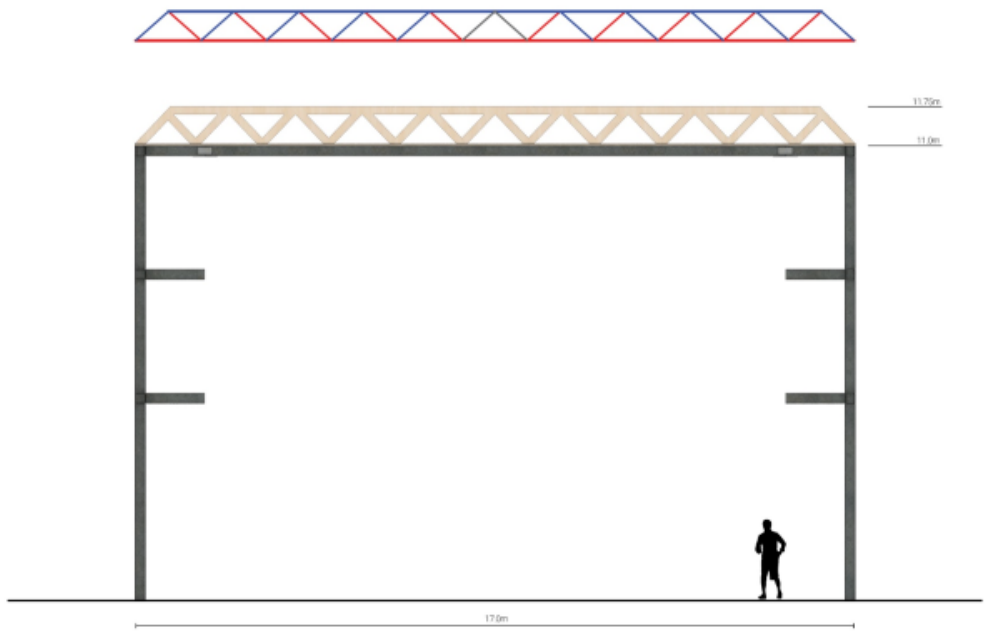


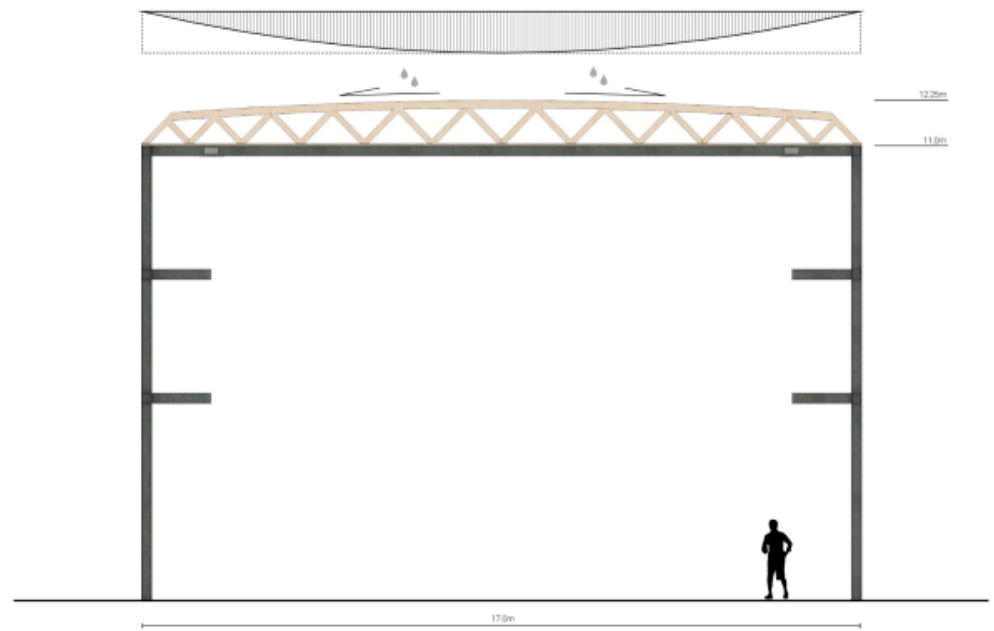
HYBRID TRUSS

Physical model studies

HYBRID TRUSS

Concept diagrams

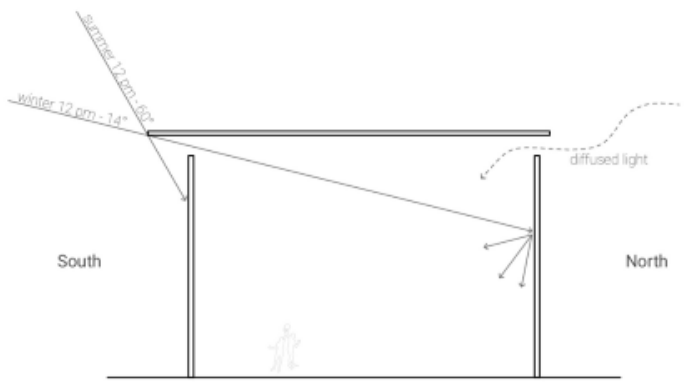


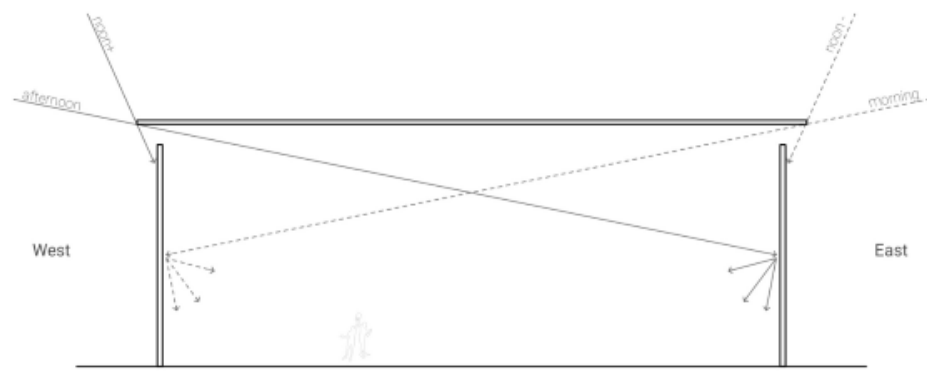


ROOF PRINCIPLES

REGULAR

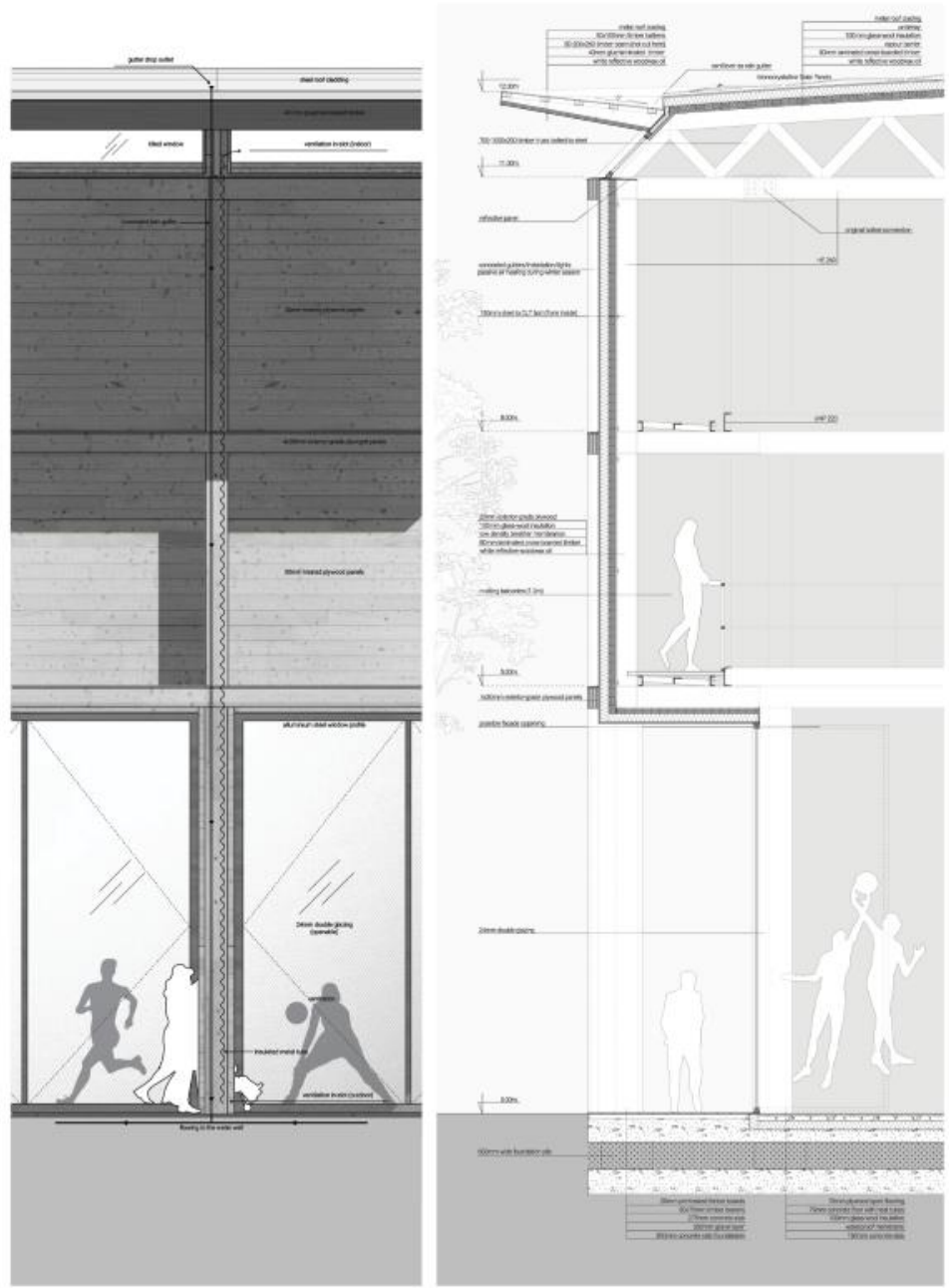
IRREGULAR





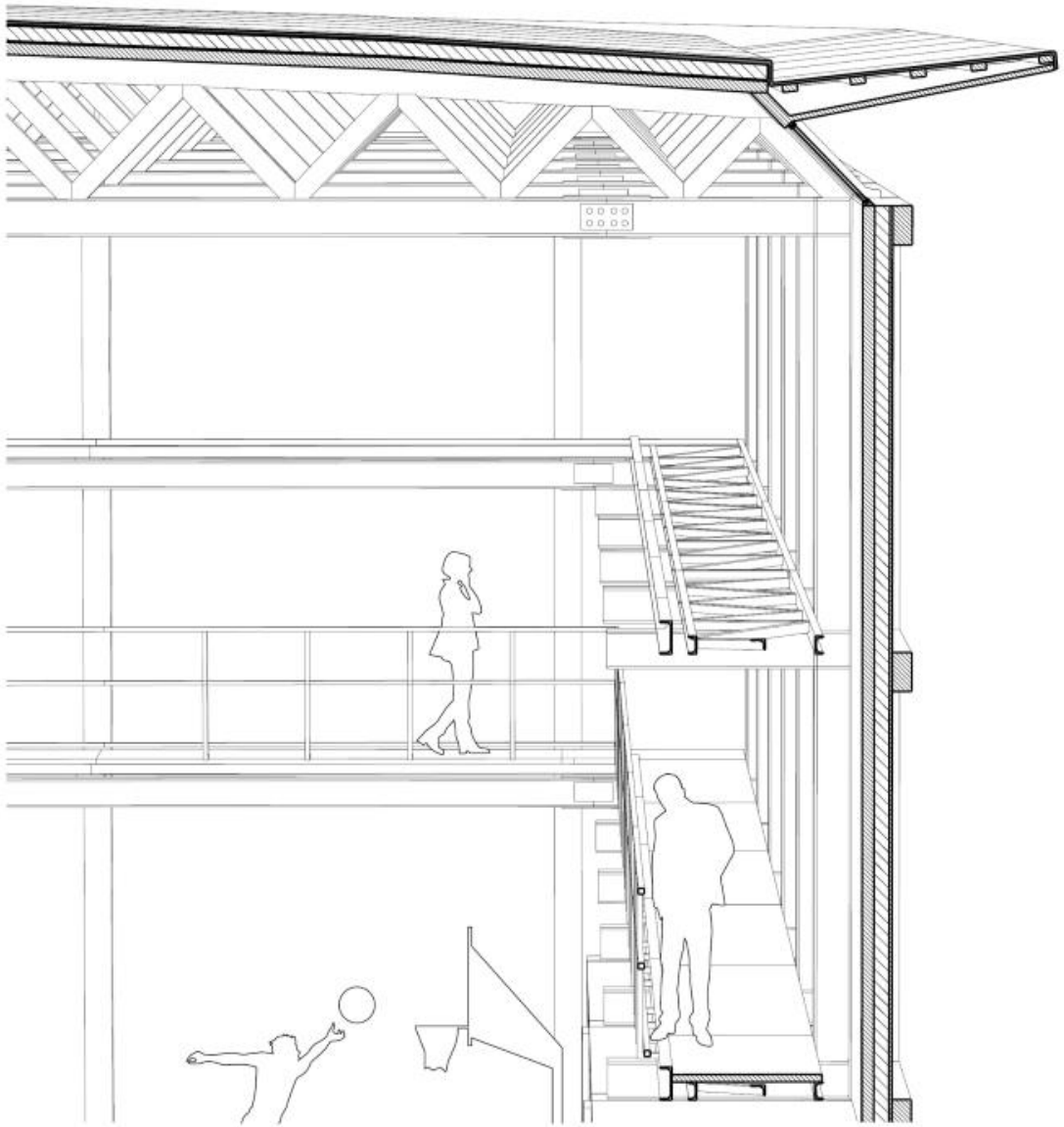
FAÇADE FRAGMENT

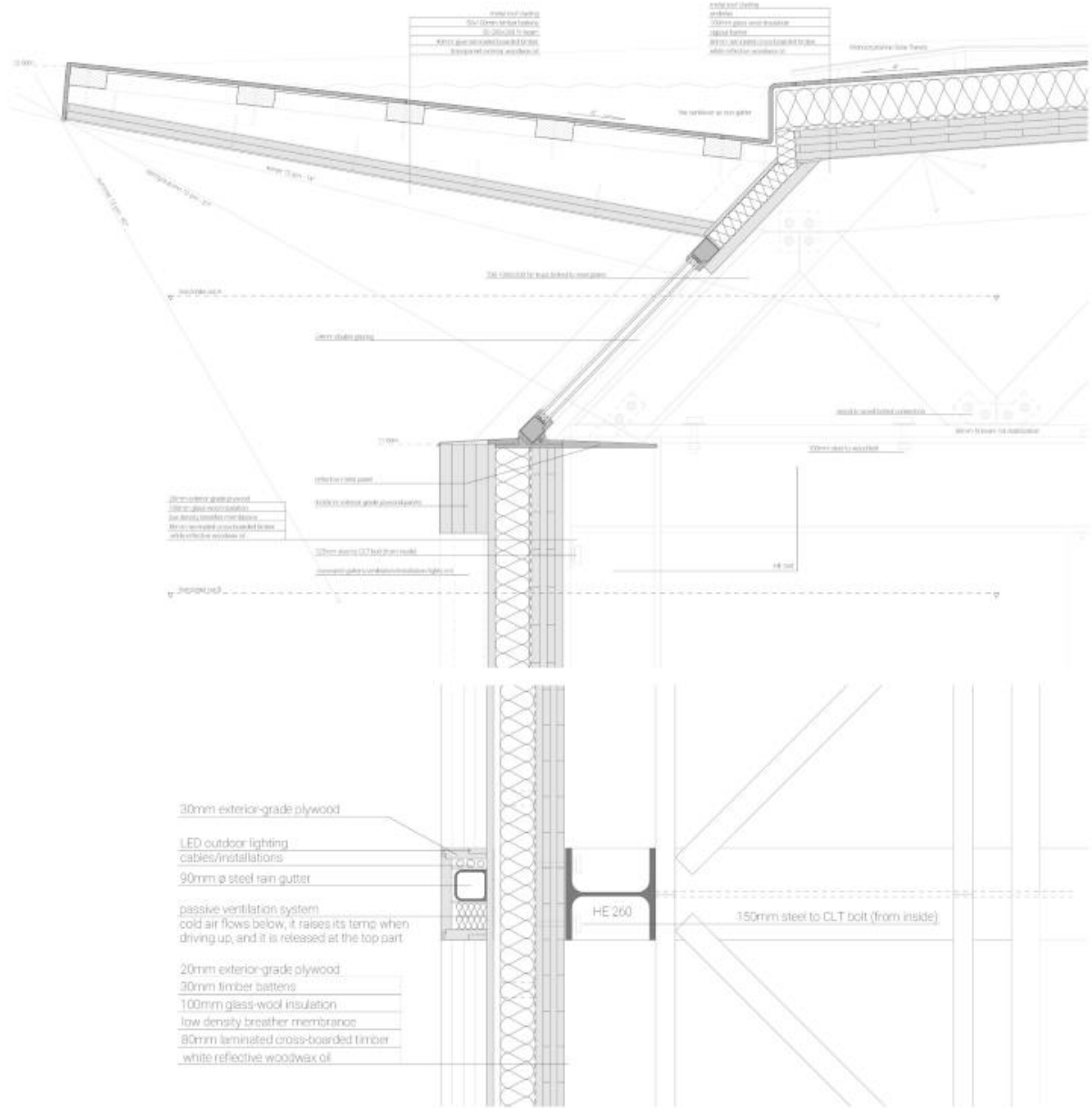
Elevation view and vertical cross-cut



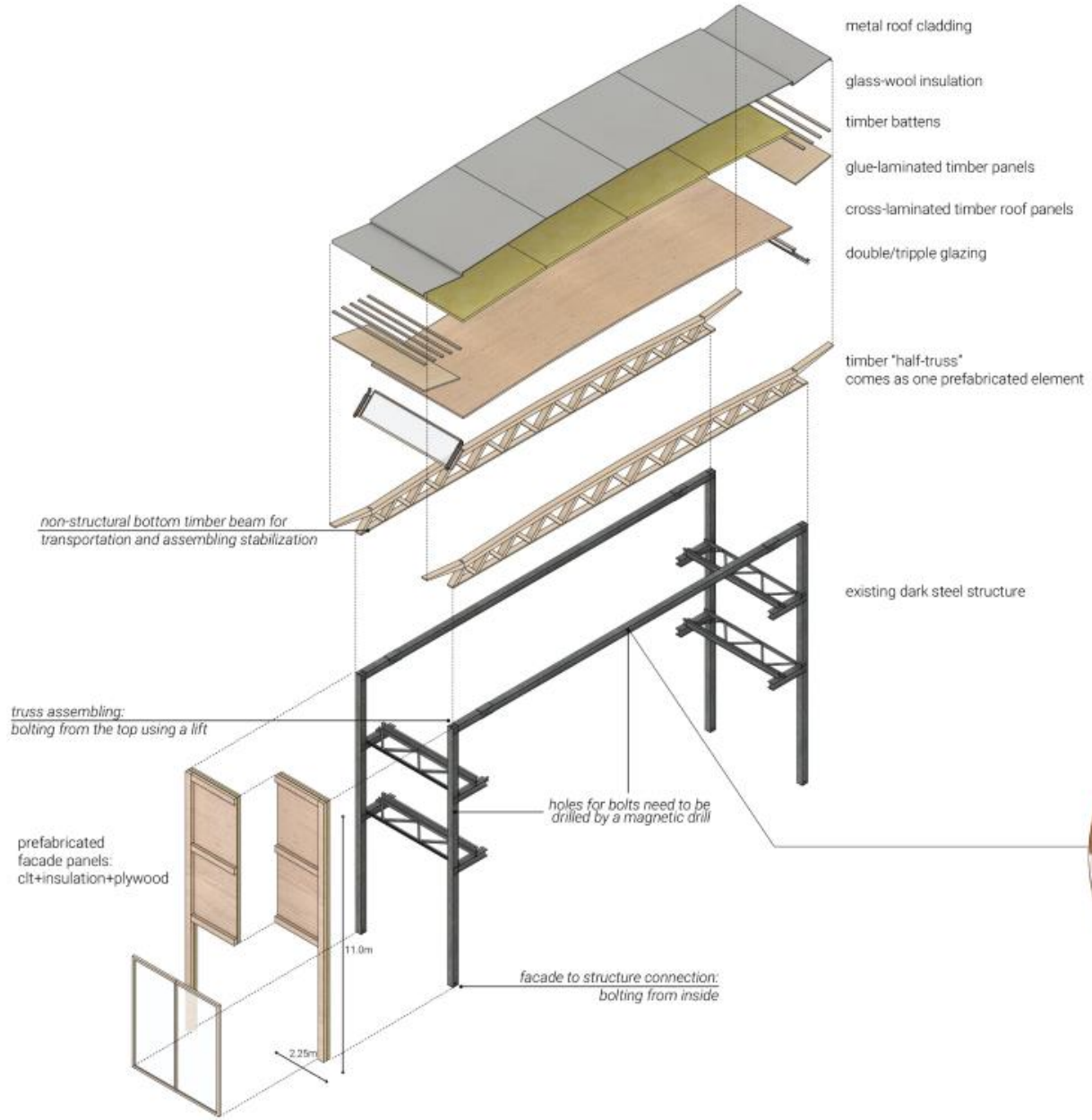
DETAILS

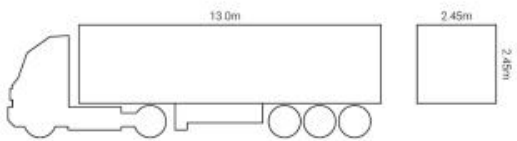
Wall-roof connection of the sport/event hall





ASSEMBLING


metal roof cladding
glass-wool insulation
timber battens
glue-laminated timber panels
cross-laminated timber roof panels
double/tripple glazing
timber "half-truss"
comes as one prefabricated element
non-structural bottom timber beam for
transportation and assembling stabilization
existing dark steel structure
truss assembling:
bolting from the top using a lift
holes for bolts need to be
drilled by a magnetic drill
prefabricated
facade panels:
clt+insulation+plywood
11.0m
2.25m
facade to structure connection:
bolting from inside


13.0m
2.45m
2.45m

08 FACADE DESIGN

FACADE DESIGN

Principles

passive ventilation

rainfall distribution

sun shading

integrated installations

FACADE DESIGN

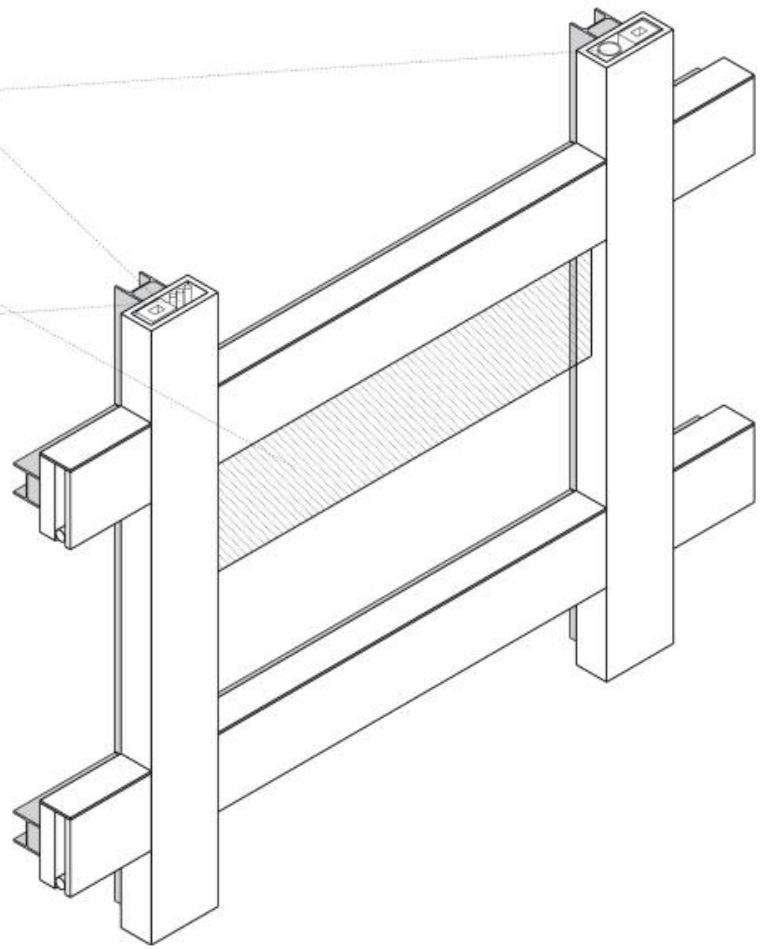
Integration

passive ventilation

rainfall distribution

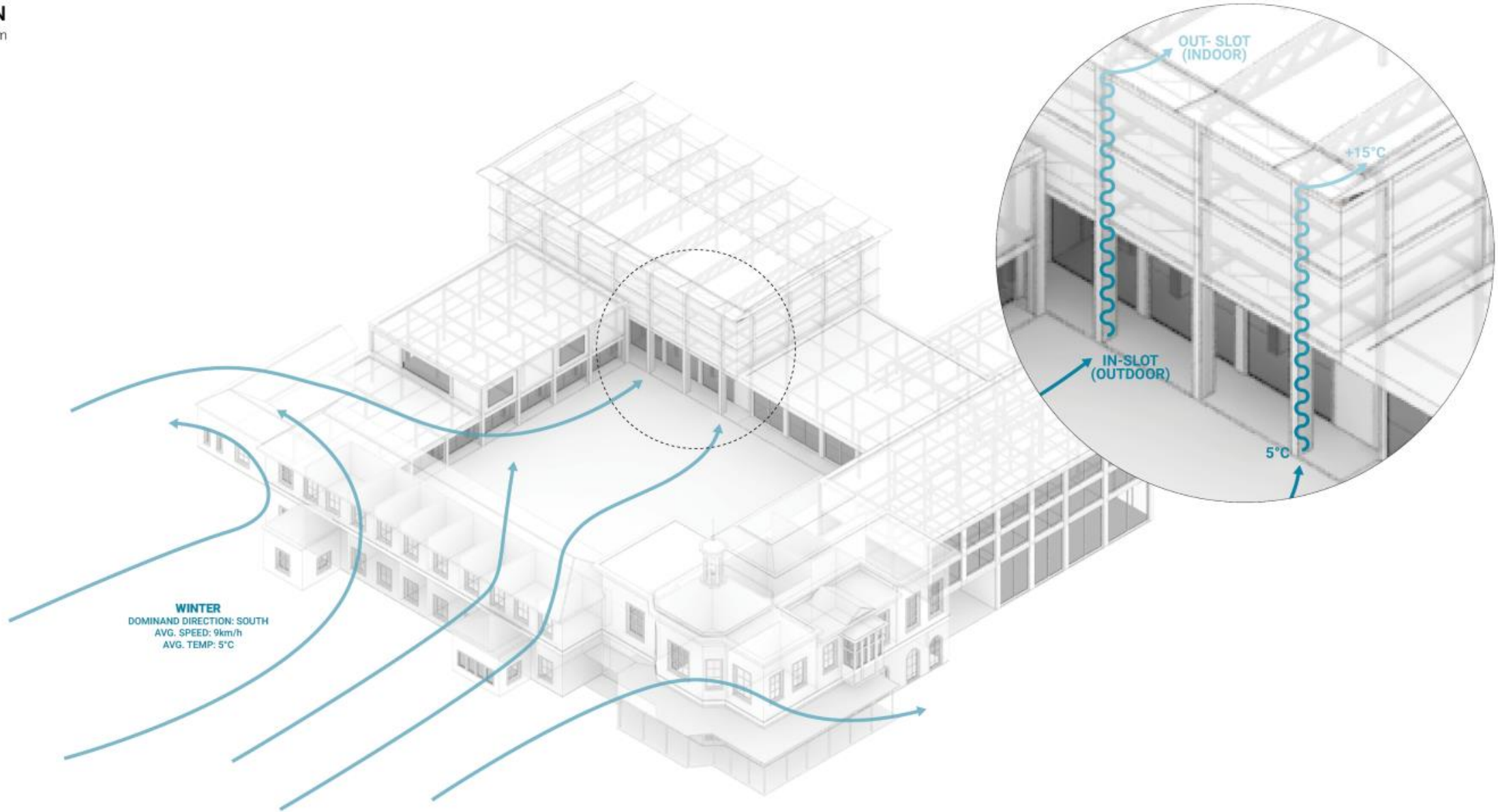
sun shading

integrated installations



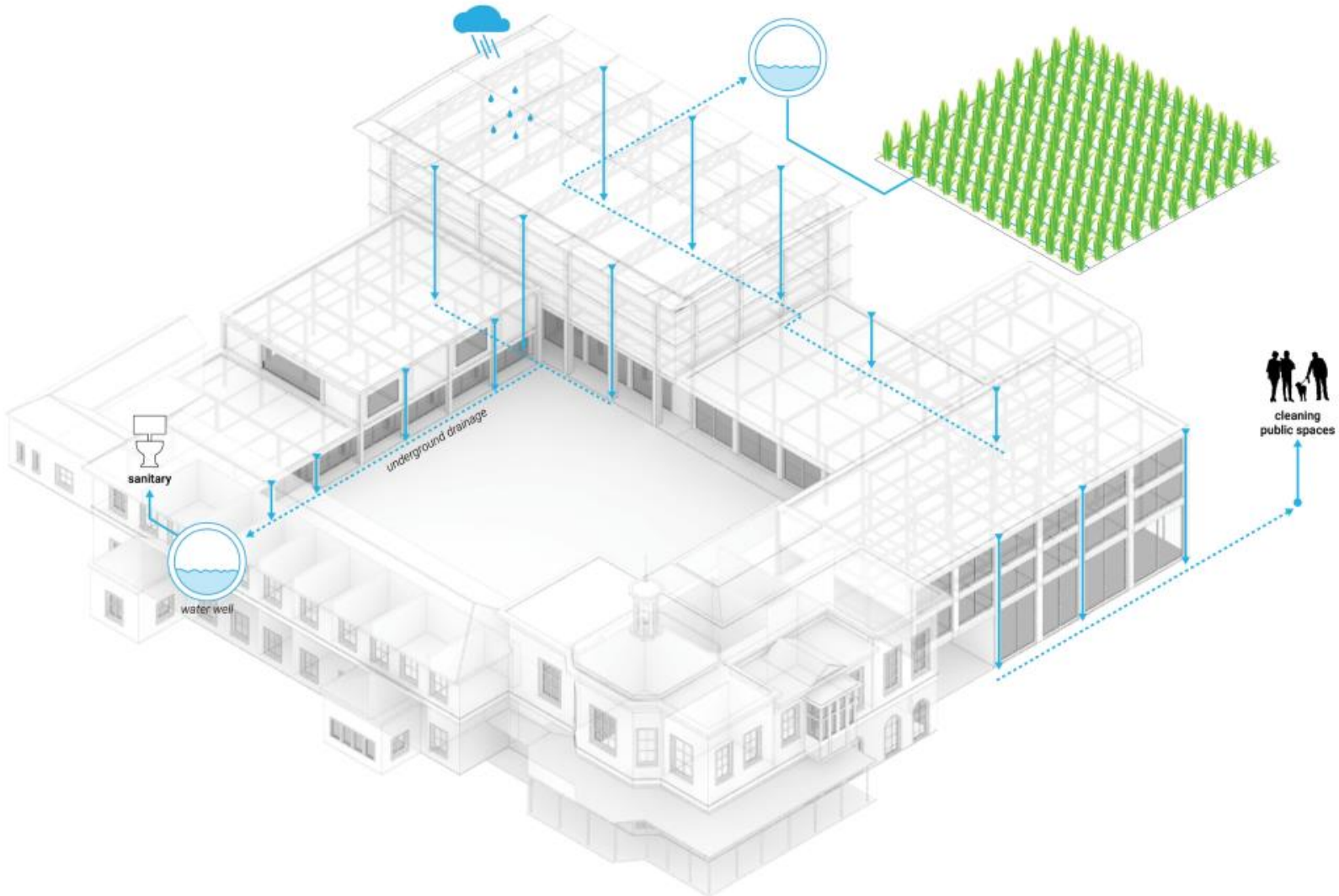
FACADE DESIGN

Passive ventilation system



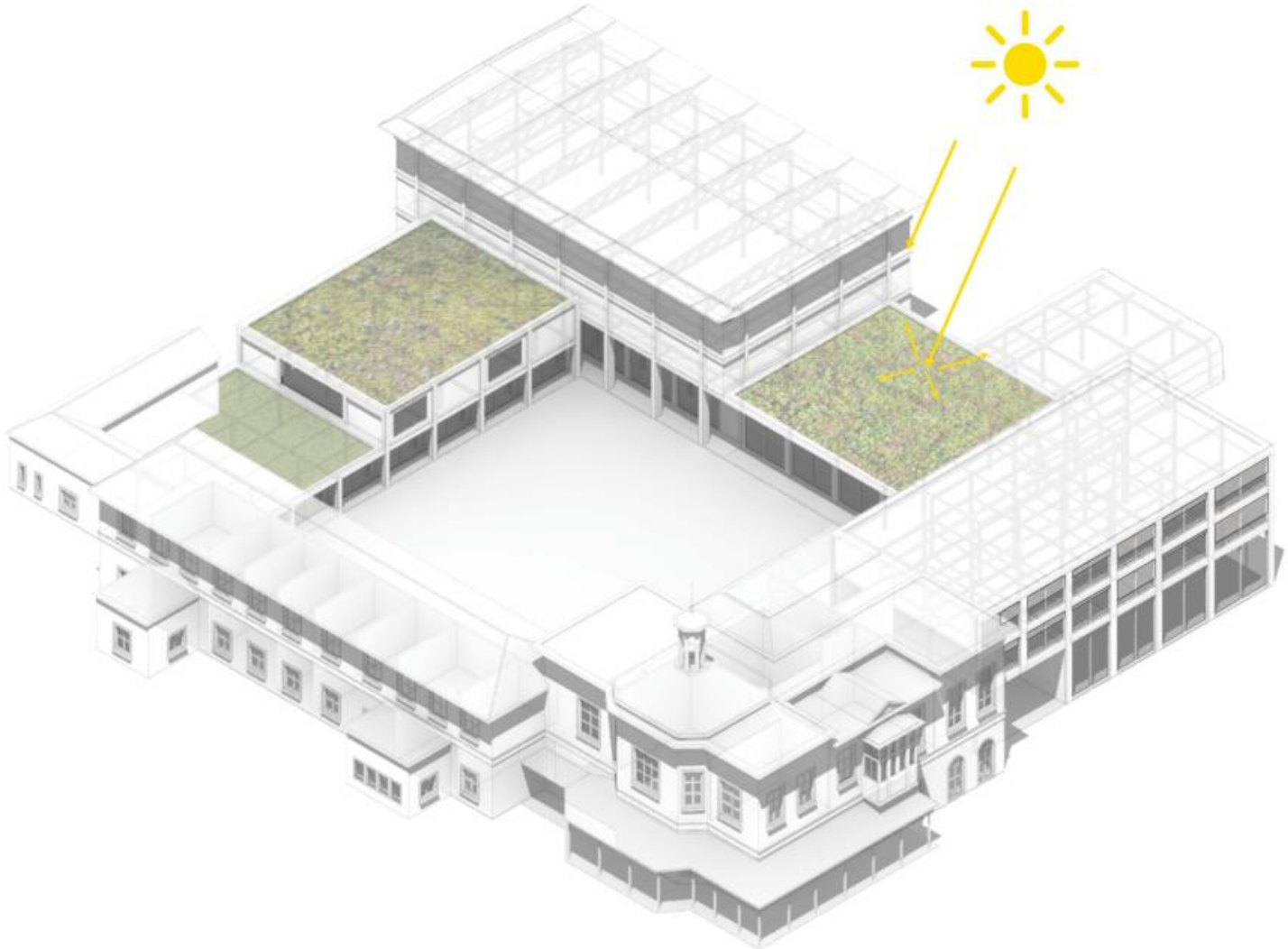
FACADE DESIGN

Water management

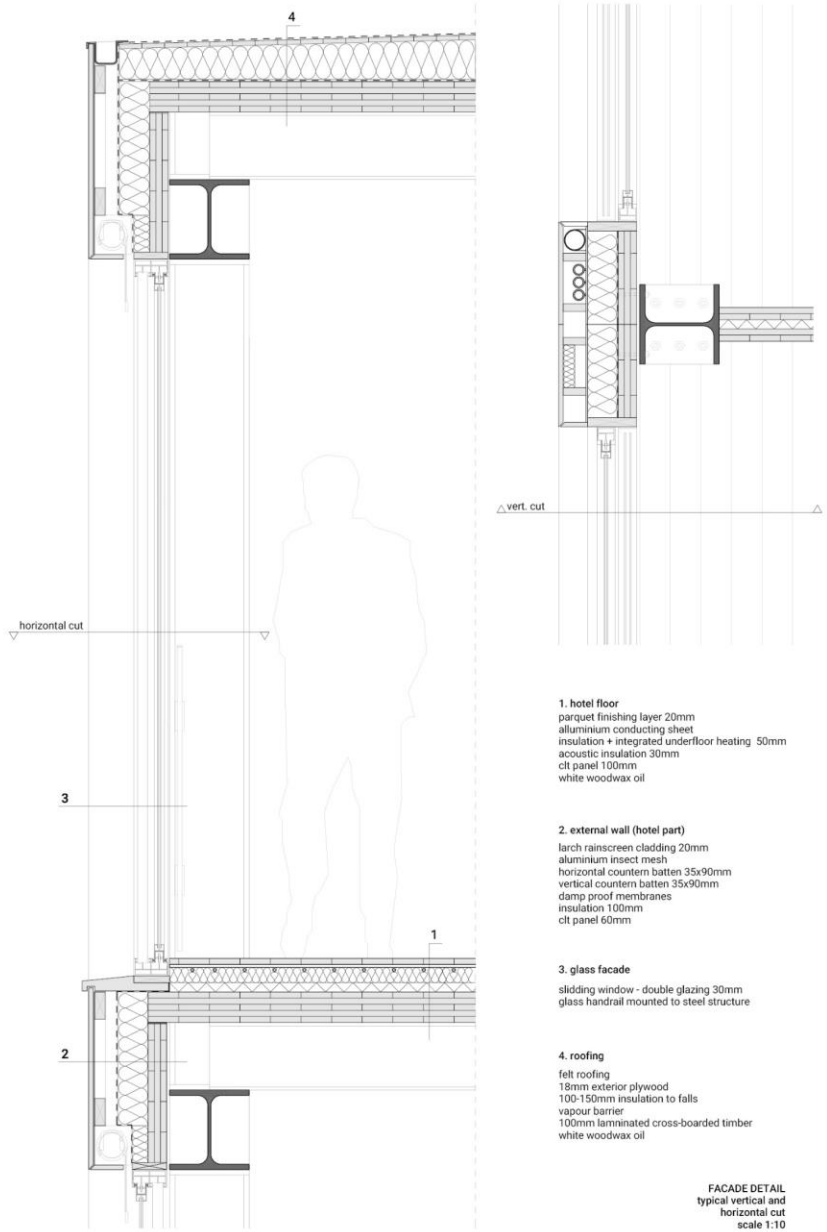


FACADE DESIGN

Shading system



DETAIL



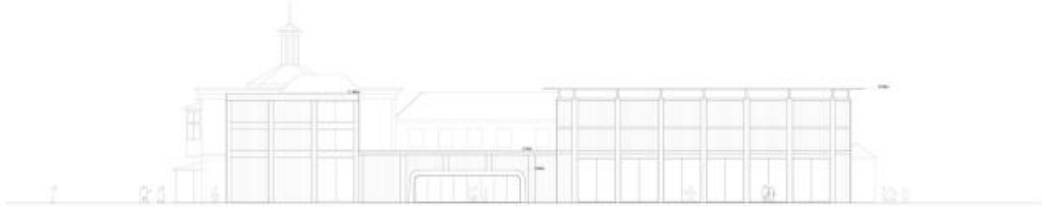
1. hotel floor
parquet finishing layer 20mm
alluminium conducting sheet
insulation + integrated underfloor heating 50mm
acoustic insulation 30mm
clt panel 100mm
white woodwax oil

2. external wall (hotel part)
larch rainscreen cladding 20mm
aluminium insect mesh
horizontal countern batten 35x90mm
vertical countern batten 35x90mm
damp proof membranes
insulation 100mm
clt panel 60mm

3. glass facade
slidding window - double glazing 30mm
glass handrail mounted to steel structure

4. roofing
felt roofing
18mm exterior plywood
100-150mm insulation to falls
vapour barrier
100mm lamninated cross-boarded timber
white woodwax oil

FACADE DETAIL
typical vertical and horizontal cut
scale 1:10



North

South

East

West

9 AM

12 PM

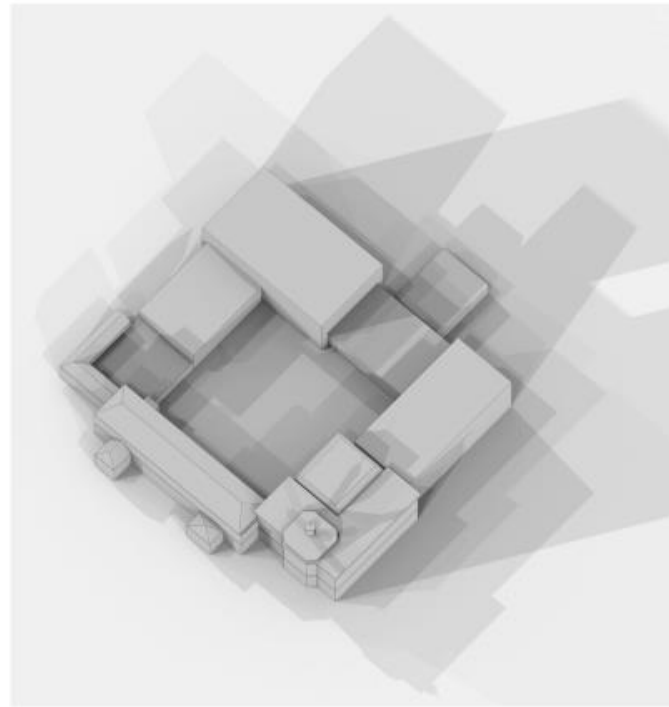
3 PM

6 PM

June 21th

March 21th / September 21th

December 21th




S


W


N


E

REFLECTION

waste in
demolition

generic problem

reuse

instead of

recycle

on-site

instead of

off-site

wide context

steel

in combination with

clt

Ockenburgh site

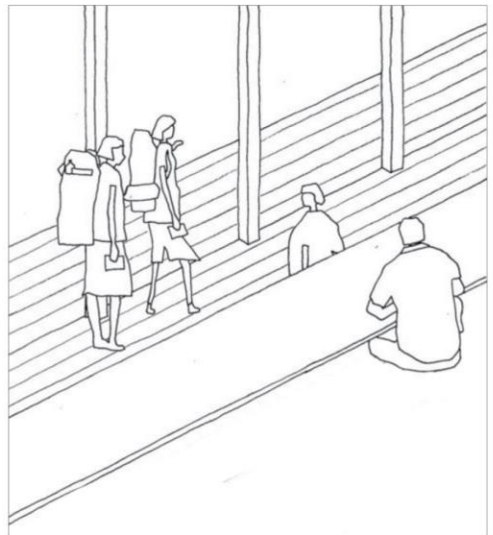
local community

in combination with

sustainable tourism

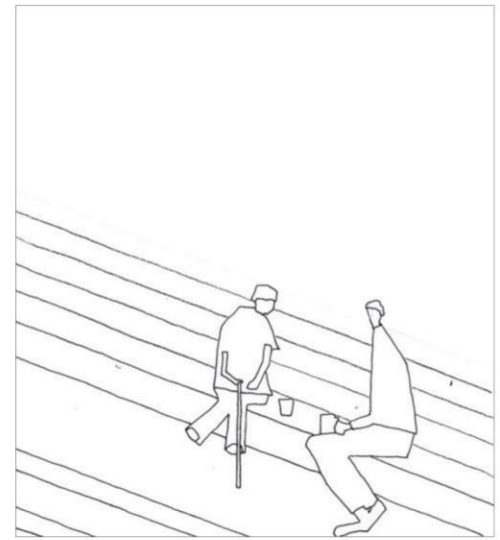
Ockenburgh
Community Hotel

specific proposal



Afrernoon: Guests arrive and meet local community

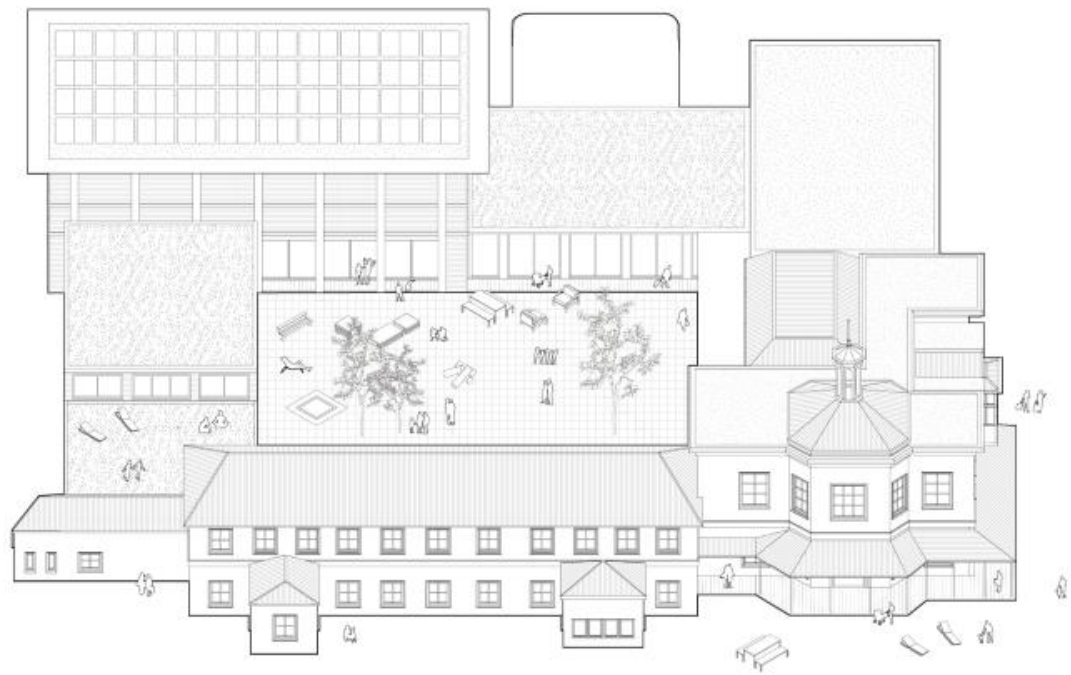
Evening: New friends share a meal at the communal table



Next Morning: Coffee discussing what to see in the neighborhood

TU Delft, Architectural Engineering
Graduation Studio 19

Architecture: Mauro Parravicini
Building Technology: Paddy Tomesen
Research: Jan Jongert
Examiner: Leo van den Burg



Ockenburgh Community Hotel

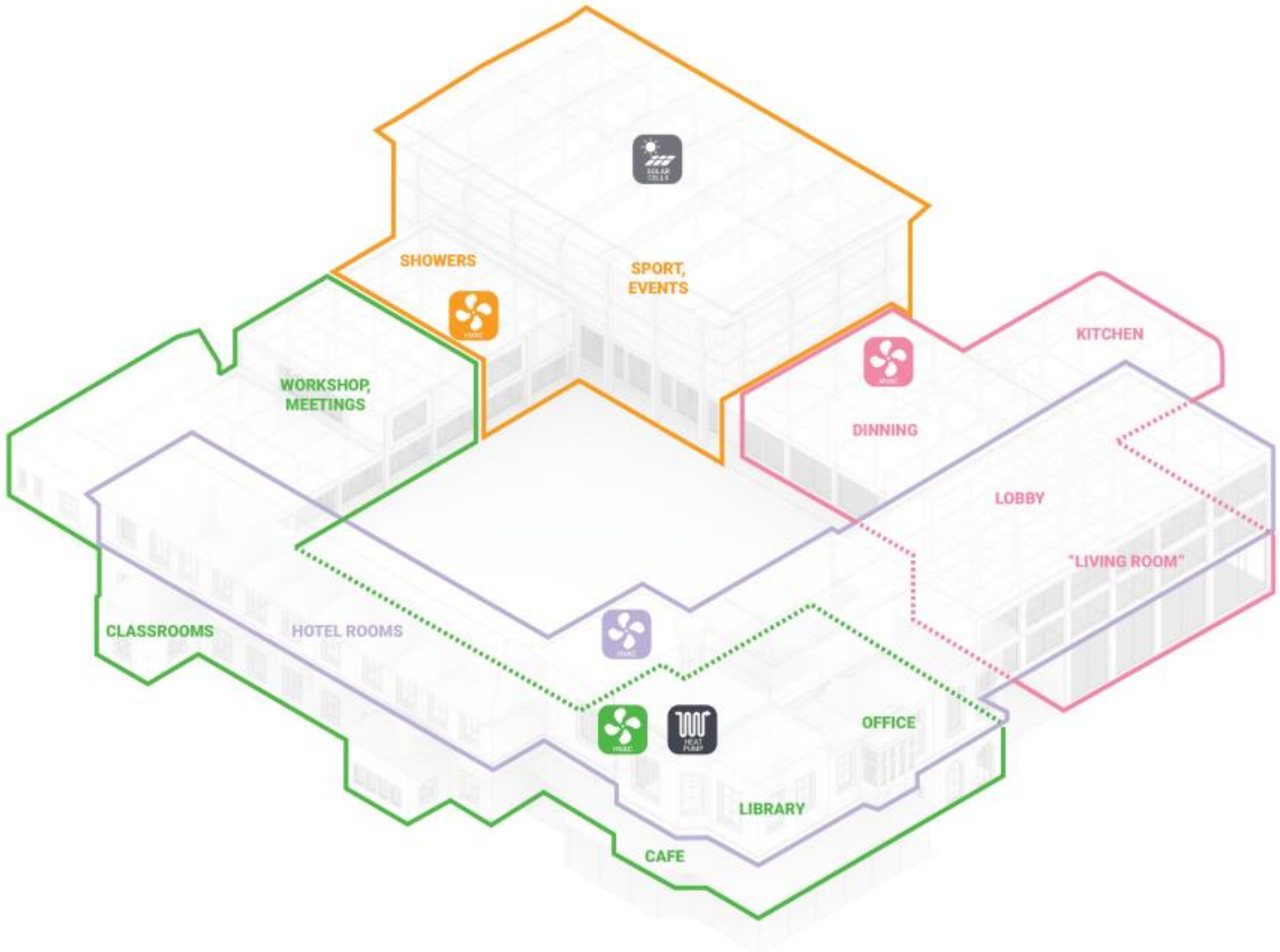
Duong Vu Hong | P5 | 5th of July 2018

APPENDIX

CLIMATE DESIGN

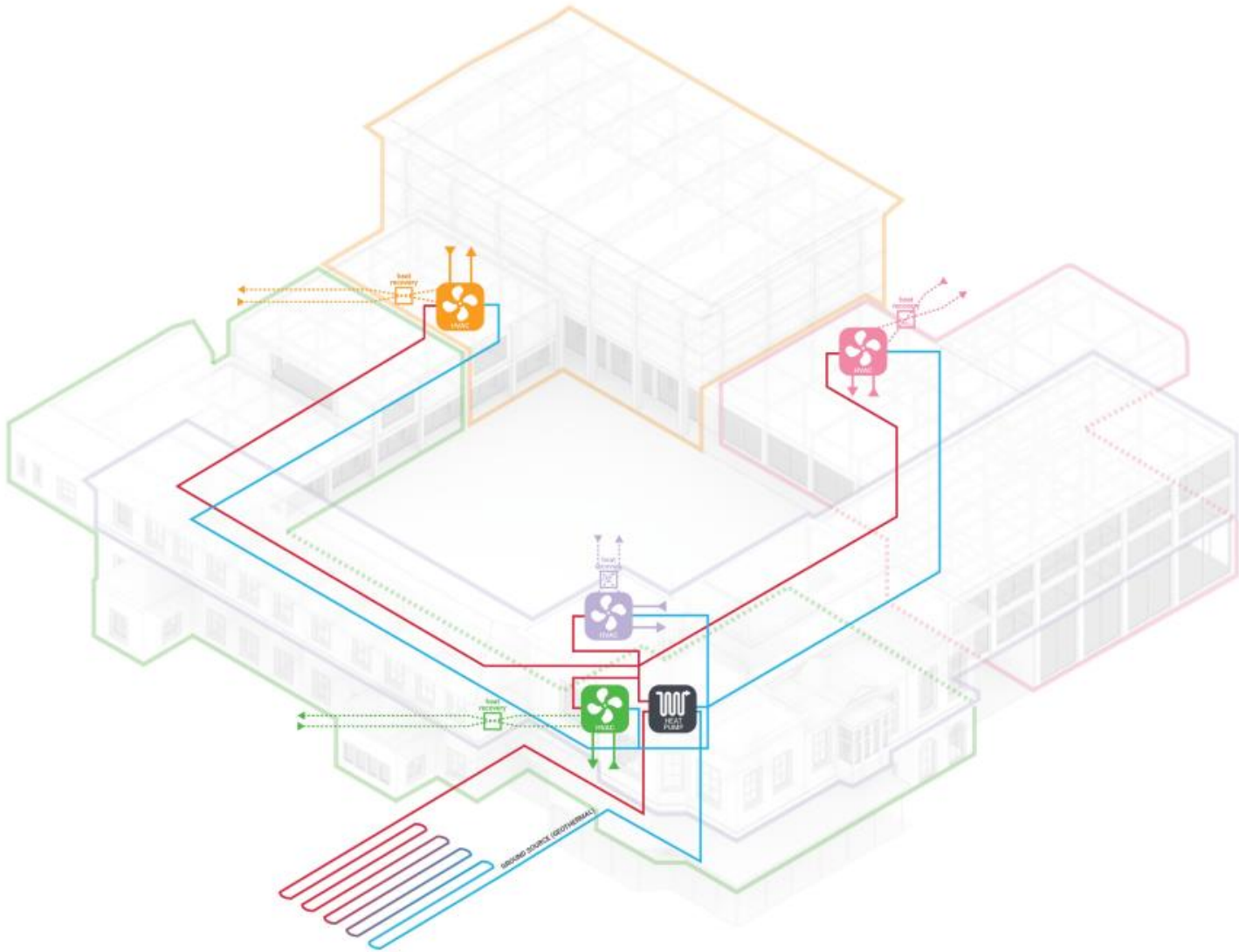
ACTIVE STRATEGY

Mechanical systems



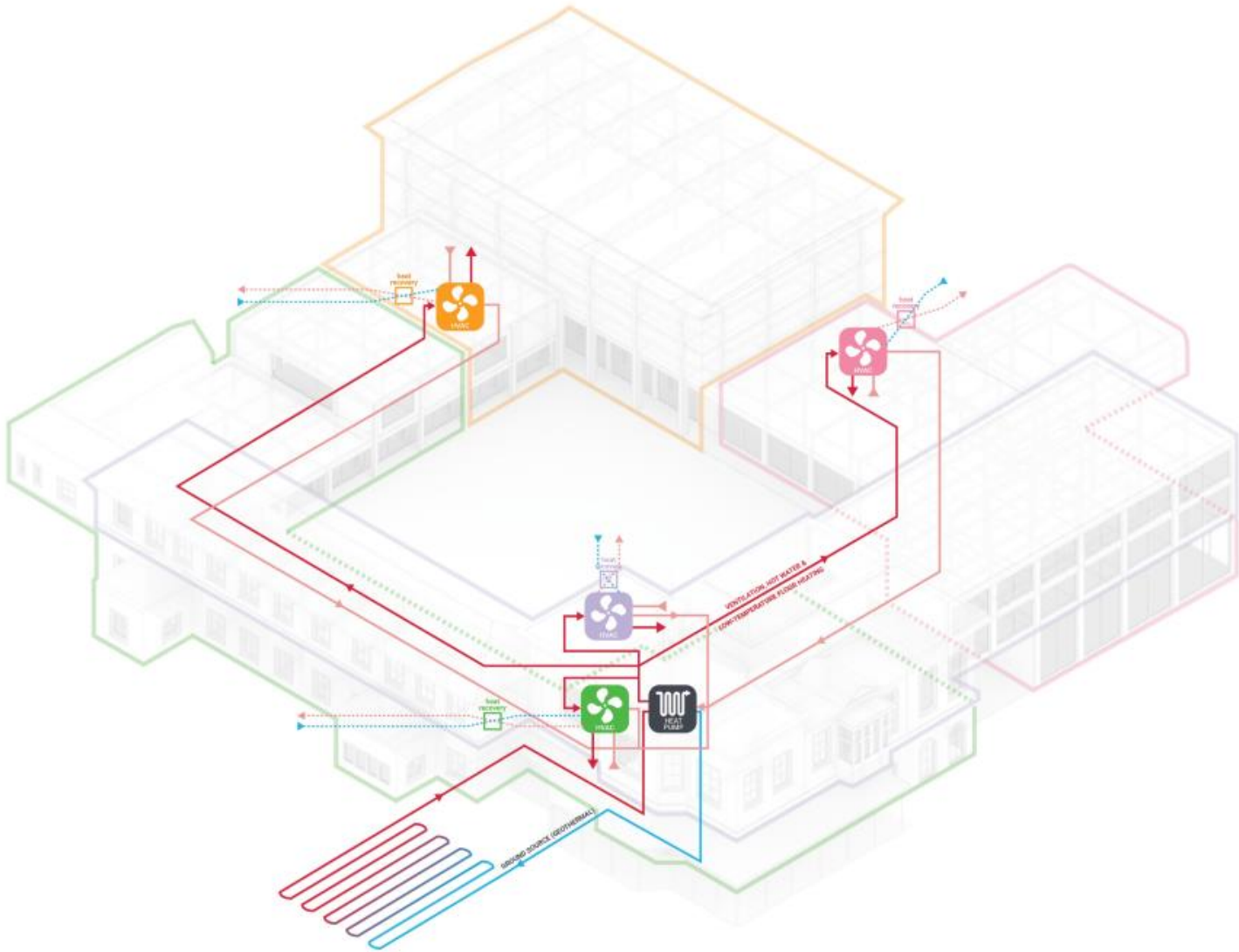
ACTIVE STRATEGY

Mechanical systems



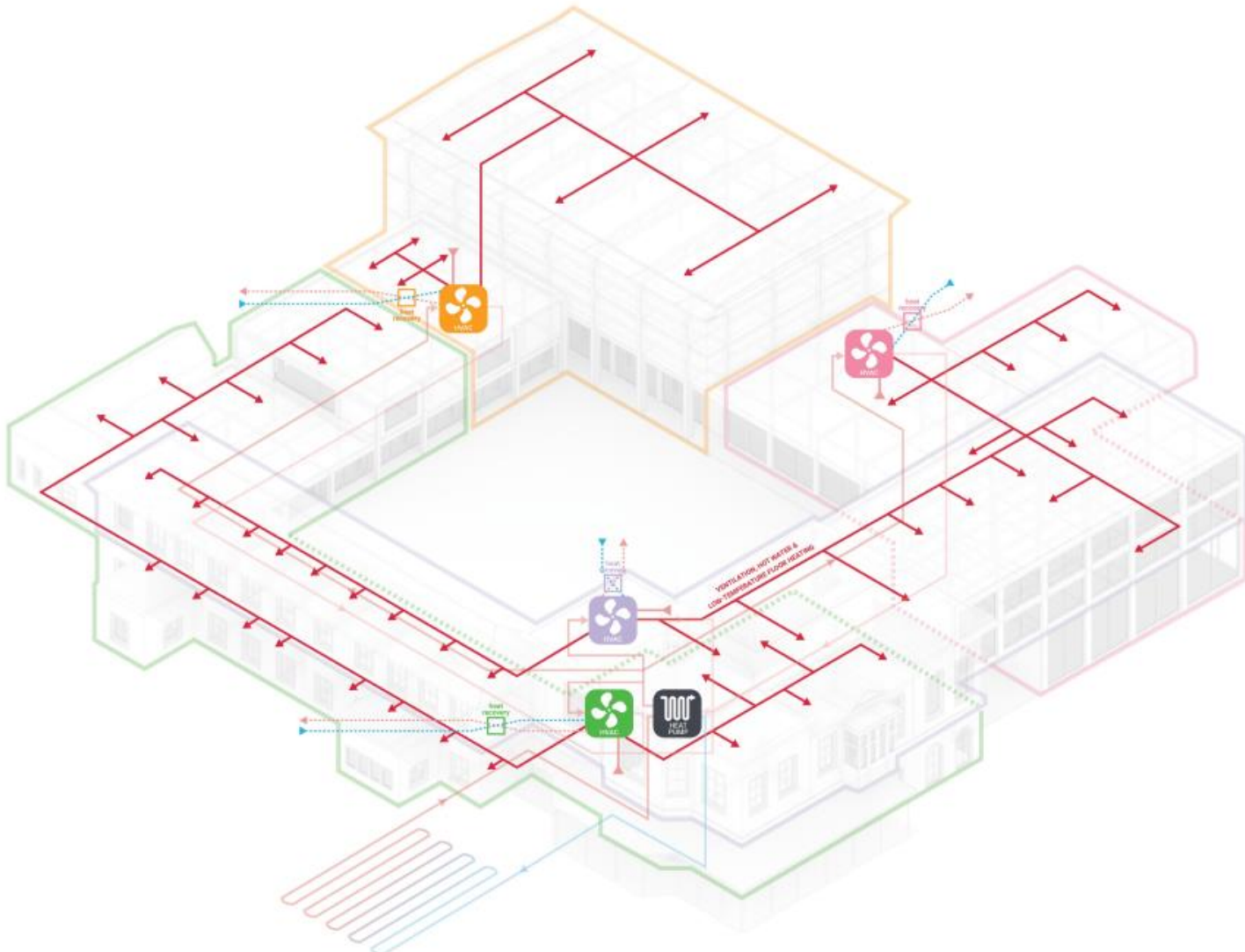
ACTIVE STRATEGY

Winter time



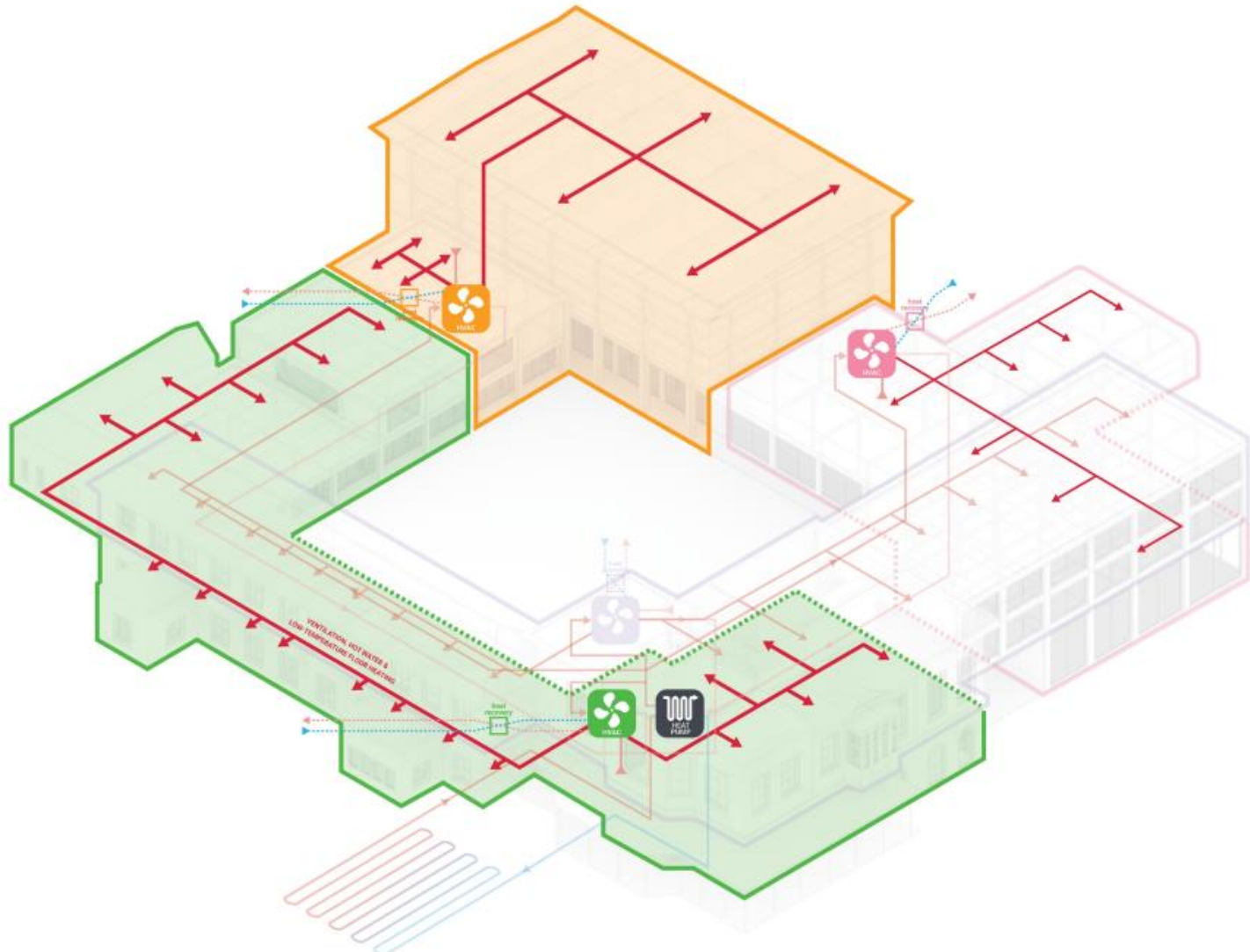
ACTIVE STRATEGY

Winter time



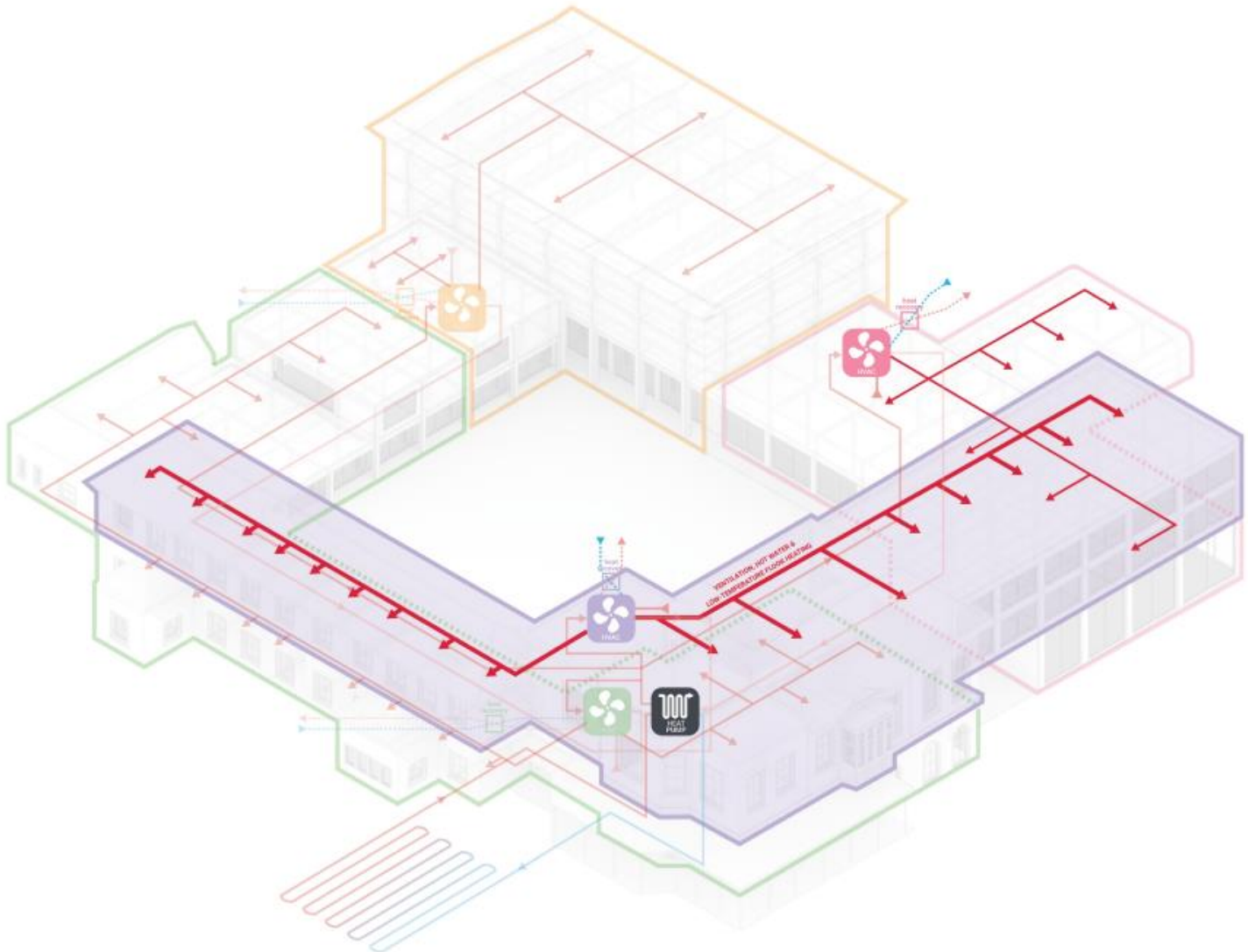
ACTIVE STRATEGY

Winter time - heat exchanging



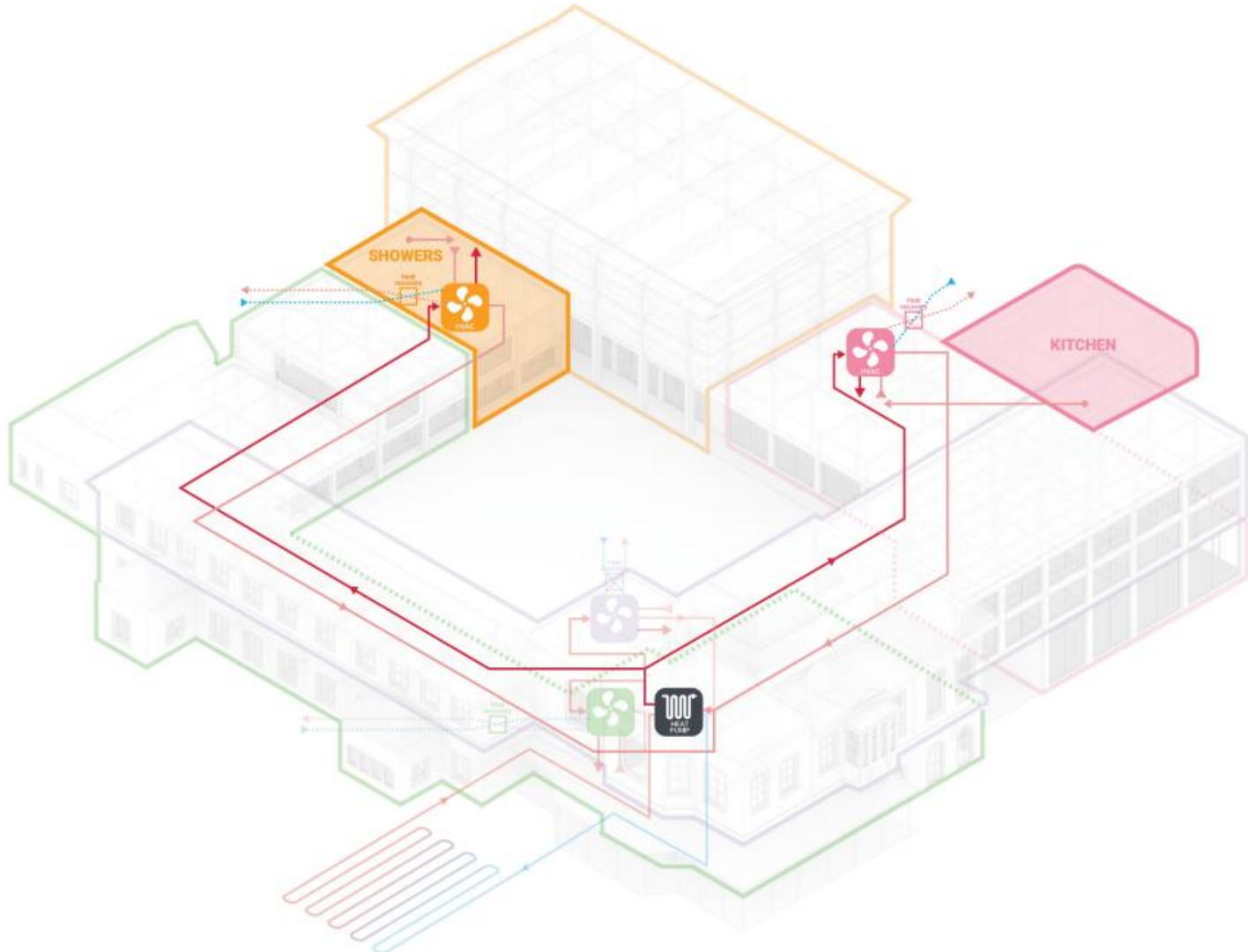
ACTIVE STRATEGY

Winter time - heat exchanging



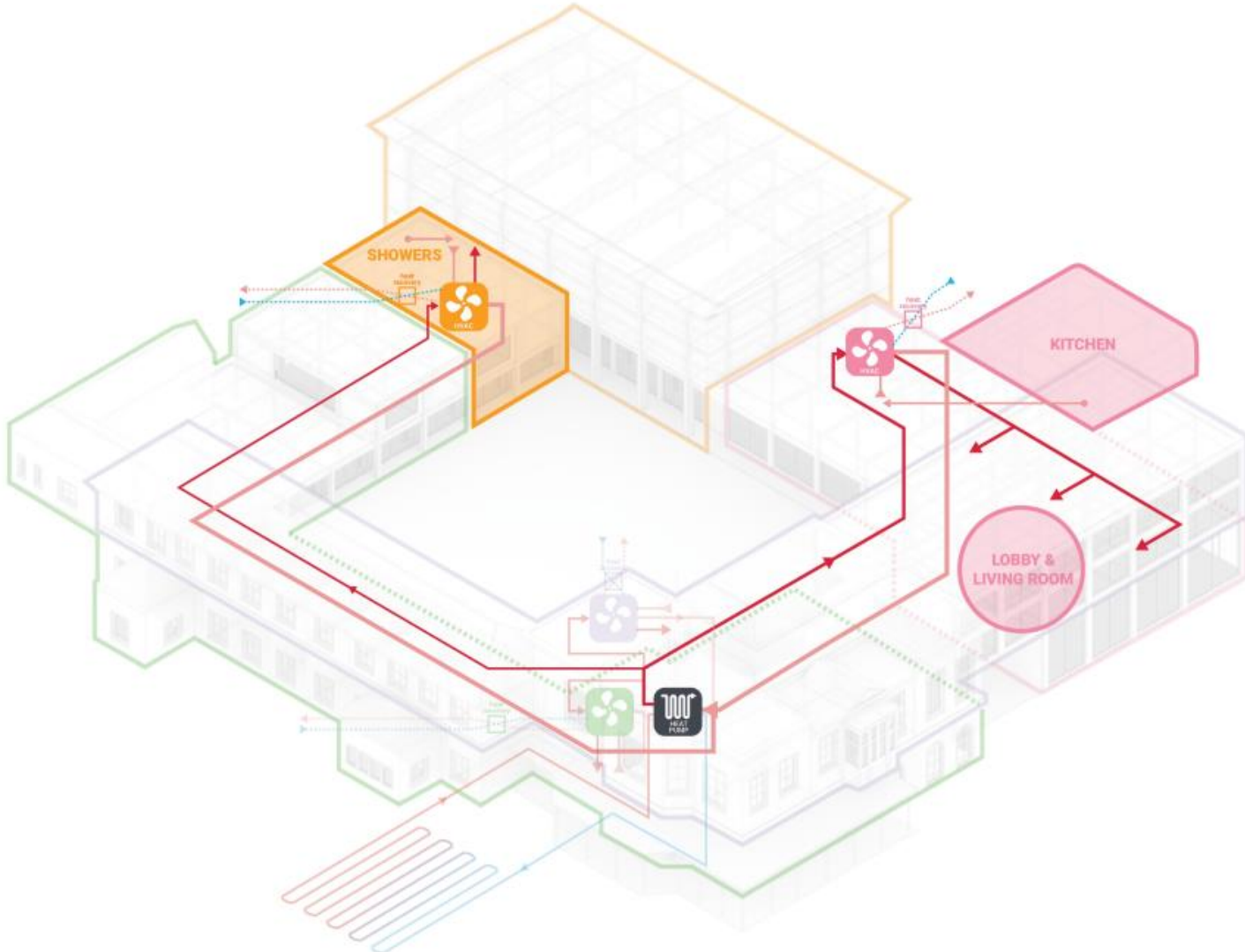
ACTIVE STRATEGY

Winter time - heat exchanging



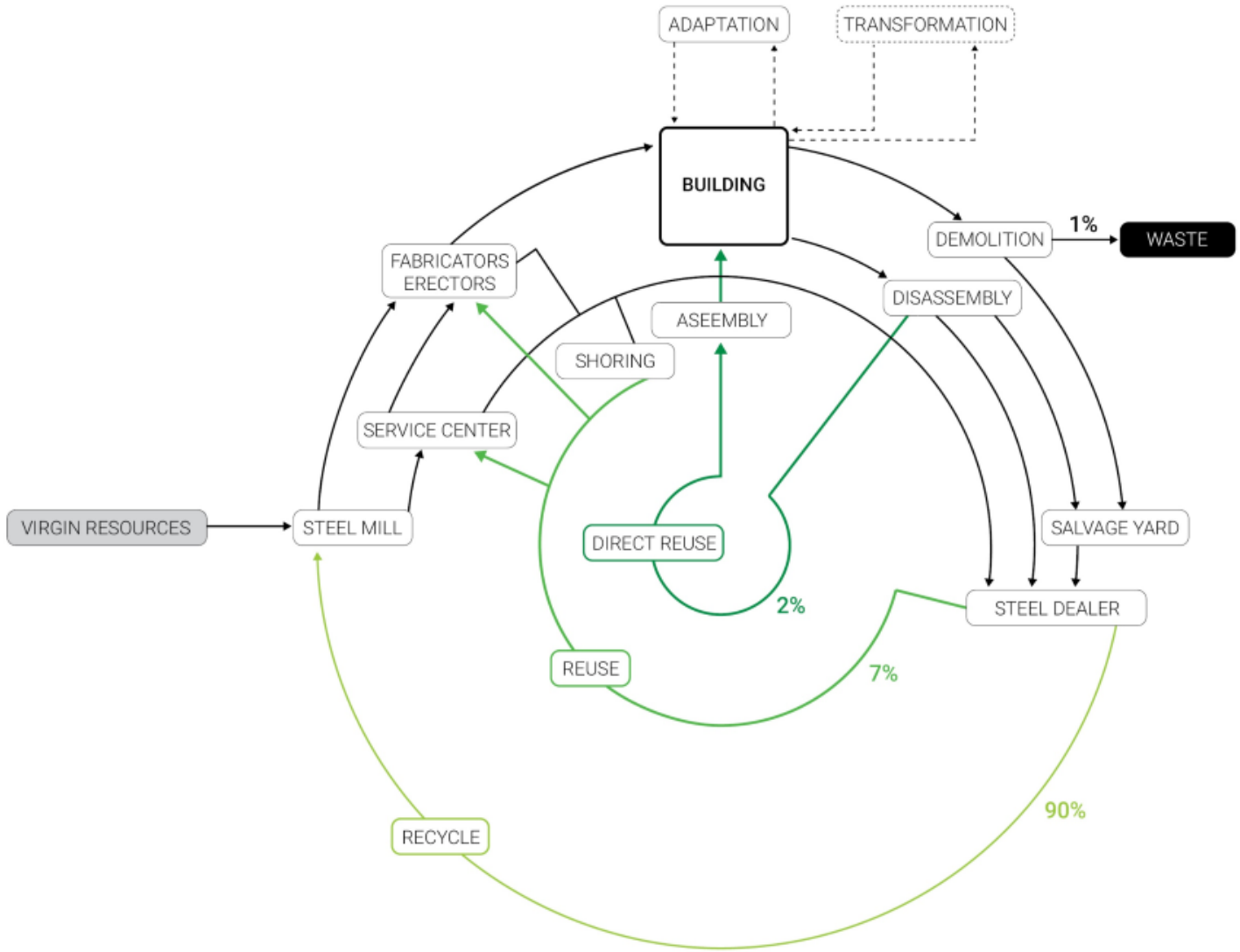
ACTIVE STRATEGY

Winter time - heat exchanging



RESEARCH

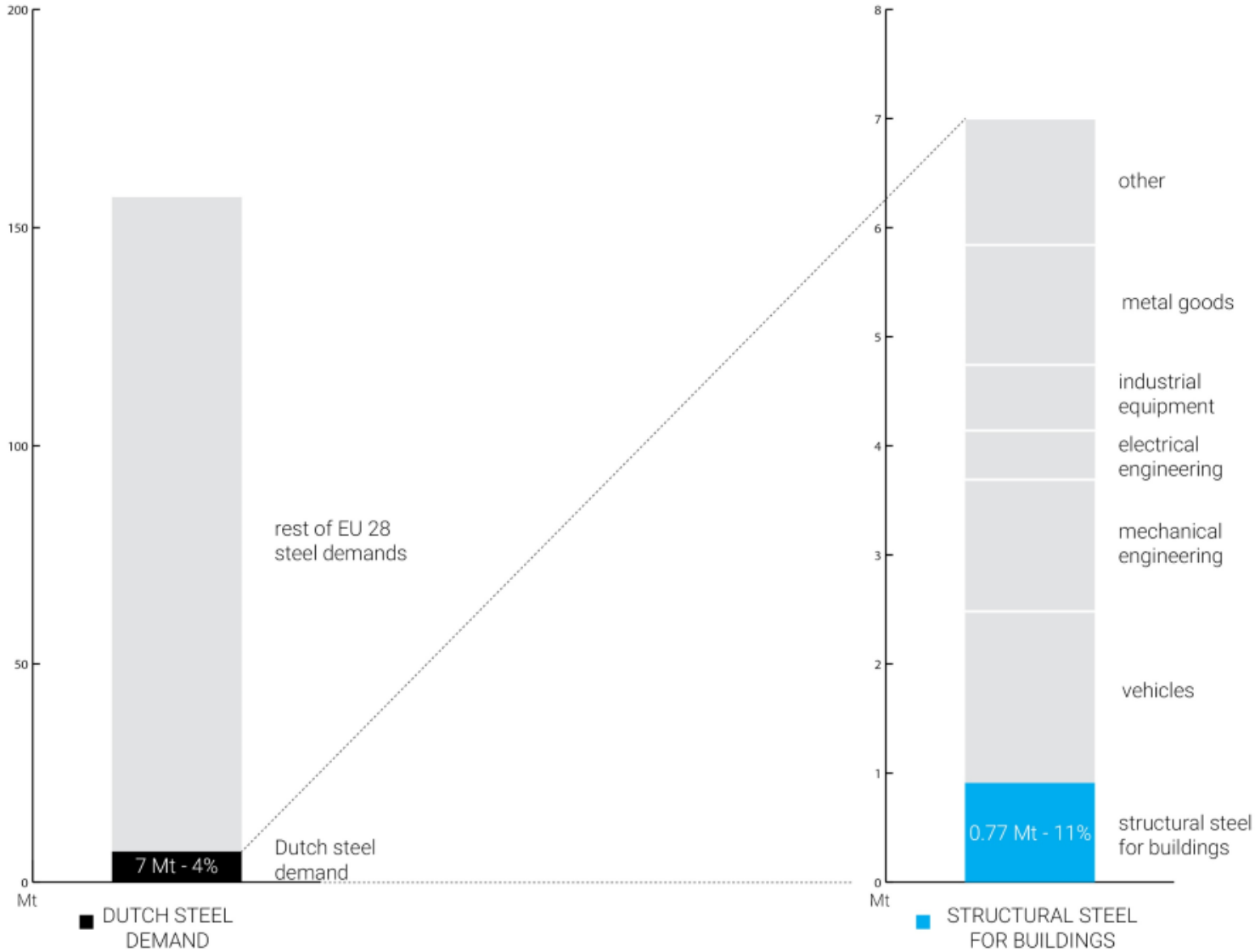
STRUCTURAL STEEL STREAM



sustainable level

STRUCTURAL STEEL

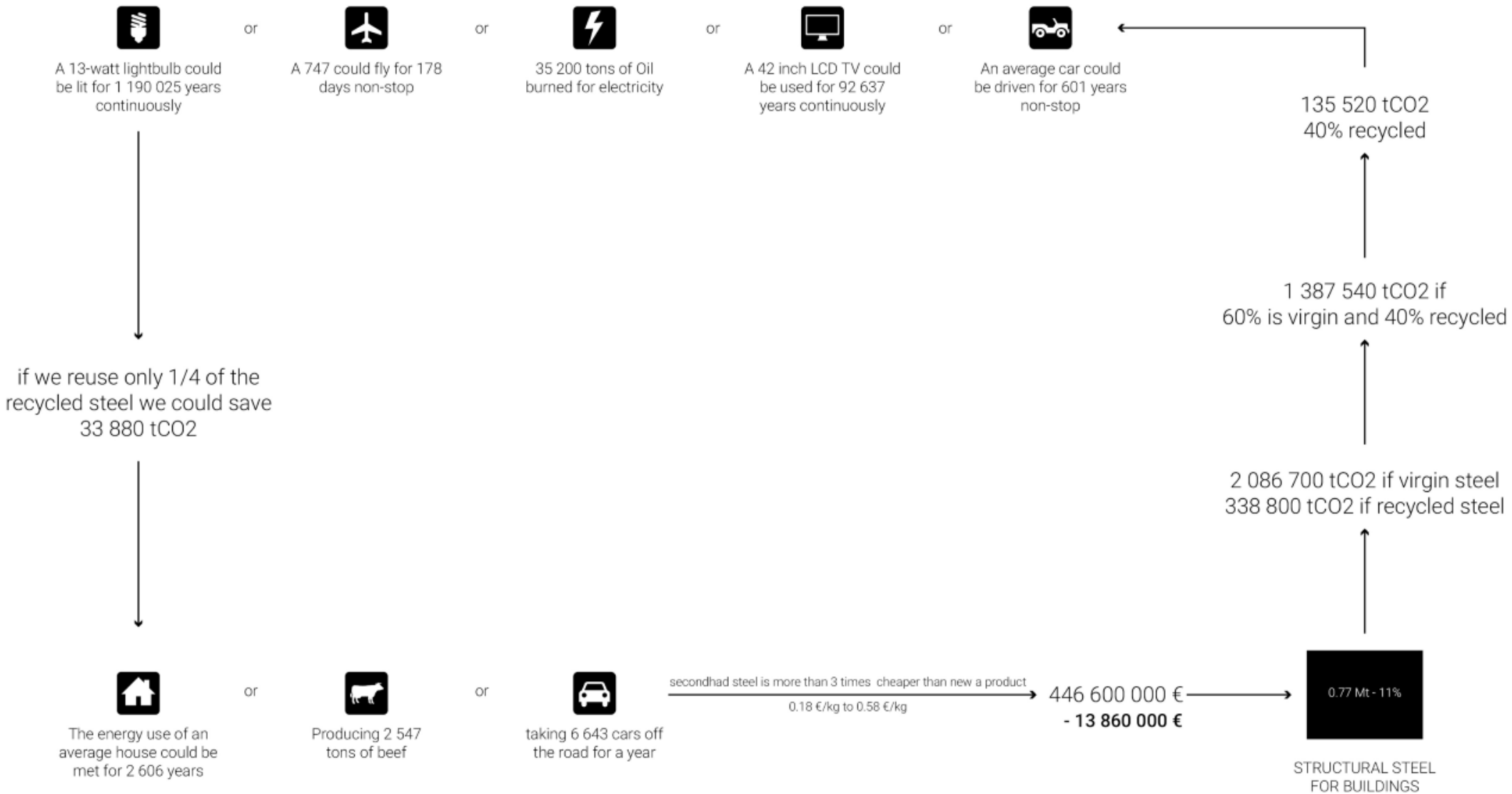
the Netherlands



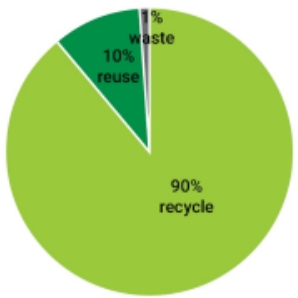
Mt = millions tonnes

source: worldsteel.org and Allwood, J., Cullen, J. and Carruth, M. (2012). Sustainable materials. Cambridge: UIT Cambridge, own drawing

REUSE & RECYCLE - ENVIRONMENTAL IMPACT CALCULATION

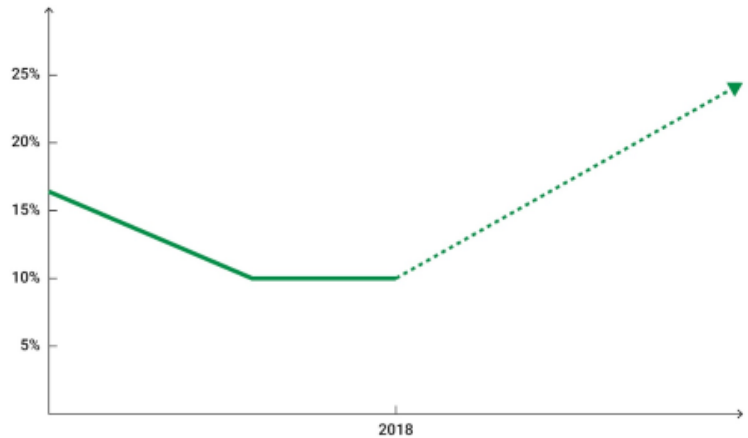


EMBODIED ENERGY vs ENERGY USE

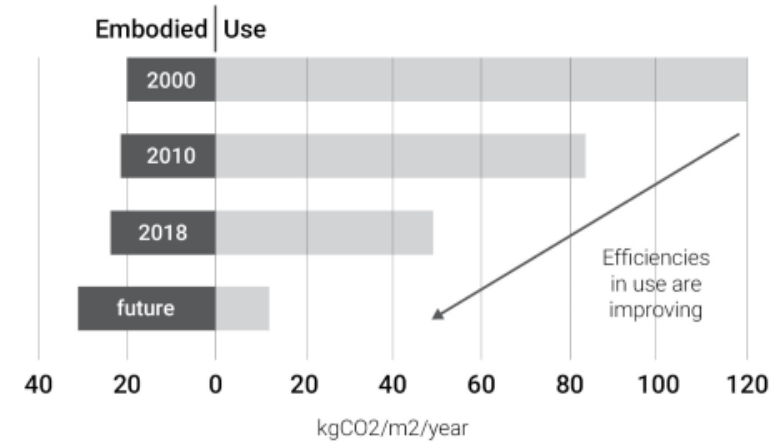


Current end of life scenario for structural steel

Generally, **90% is recycled** back to steel mills. About **10% is reused** (mainly portal frame system, industrial building, warehouses). It is estimated that only **less than 1% of the material goes to landfill**, the part which is difficult and not profitable to extract from the demolition. This statistic does not include in-situ reuse and adaptive reuse.



The predictions are that reasonable potential of increasing reuse sector of steel structural component. Some sources suggest even the raise from **10%** to **20%**, that would be achievable if the market improves in a way which fosters this scenario. In the past, the steel reuse percentage was higher, and there is no reason not to do it again.



The balance between energy use and embodied energy is changing

With the current improvements in building heating, ventilation and insulation, the average annual energy consumption will significantly decrease. This fact combining with shorter **building lifespan estimated on 20-25 years** will cause that the embodied energy of the building component will have more impact on the total use of energy during the whole building lifecycle.

Allwood, J., Cullen, J. and Carruth, M. (2012). Sustainable materials. Cambridge: UIT Cambridge, own drawing

LIMITATIONS OF STEEL STRUCTURAL REUSE

High value of scrap
Currently, even the value of scrap steel on the market is very high, and it is estimated to grow. This fact discouraged steel components to be reused. The reason is that the value of the scrap steel is directly linked with the cost of new steel since steel can be almost 100% recycled without losing any properties. Therefore salvage yards and demolition contractors can ask about high prices for steel which goes directly to mills to be recycled.

Difficult, costly and time-consumed to deconstruction
To extract steel from demolition building in a careful way creates extra costs and problems. Even when connections are bolted the deconstruction occurs mainly in term of larger components, in any other case connections are cut using torch cutting or scissor shears. It is estimated by Rotor deconstruction takes about 4 times longer than demolition, and it is 2-3 times more expensive.

Pre-engineered building
It seems to be generally accepted that steel reuse at this moment has place only at the pre-engineered industry-warehouse, industrial and agricultural use. These structures are in most cases base on Portal Frame system, they are easy to construct and deconstruct, thus they are resold as a whole structural system for re-erection at another location.

Trend for customized construction
Currently, we can observe a growing popularity of customization approach, this shift from standardization of steel structure towards customized design will make future reuse more difficult since might be generally challenging to integrate old components to new buildings.

Inventory
Designer, engineers and builders are more confident with the way they work with a standard steel inventory, when they know in advance what type, profile, size and amount are available for them. There is no widely supply platform will available in a reliable way for designers. Therefore, they have to look for alternative approaches which will involve more improvisation and flexible design in order to fit availability of the reclaimed steel market at the time.

Storage insecurity
Another major issue is coordination difficulty, steel need to be available at certain time and place, which often is not a case, it creates delays in the construction process. At the early stages of the project, the design team needs to identify specific reclaimed components they want to integrate into the new project.

Liability
One of the main limitation is the issue of component liability and insurance. The problem of how to establish steel structural characteristic of particular reclaimed components can be difficult to solve without knowing the period of manufacture and steel origin.

Lack of motivation
Without the true involvement of client, contractor and design team, there will not be a change to overcome before mentioned limitations. Some aspect such as heritage and cultural value, sustainable certifications might make the motivation stronger.

STEEL REUSE MODELS COMPARISON

	Existing reuse models	*Certification*	*Design*	*Time and management*	*Energy use*	*Waste*	*Adaptibility*
2.33	**1. DIRECT EXCHANGE** Steel sections or modules are sold for reuse without an intermediary.	●● Testing and certification required unless beams are downgraded or buyers trust sellers.	●● Material pre-ordered or design drawn up with a flexible specification in order to increase likelihood or finding suitable stock.	●● Buyer is tied to seller's project schedule possibility of delay.	●●● Energy is used for one way transportation and integration with new structure.	●● Waste depends on needs and requirements of a new construction. Material from elements which don't fit go to recycling process.	●●● Depends on an integration with a new structure.
2.16	**2. STOCKHOLDER** Sections, steel frames or modules are brought, remediated and stocked until a demand presents itself.	● Testing and certification required unless beams are downgraded. May only accept standard products.	●● Material pre-ordered or design drawn up with a flexible specification in order to increase likelihood or finding suitable stock.	●● Delays can be avoided as stock is supplemented with new material if necessary in order to guarantee supply.	●● Energy is used for transportation, assembling and potentially maintaining	●●● Material is stocked and waits for resseling, there will be a part which does not match to the market needs.	●●● Depends on an integration with a new structure.
2.86	**3. SCRAP MANUFACTURING** The steel is bought, cut to regular sizes and sold for reuse.	●●●● Material properties known. No additional testing. Sold for non-critical parts.	●●●●● Unaffected as irregular offal is cut into standard sizes.	●● Delays can be avoided as stock is supplemented with new material if necessary in order to guarantee supply.	● Energy is used for disassembling transportation, cutting and assembling.	● All joints and specific parts are wasted (recycled), only generic sections are reused.	●●●● The outputs are standard steel profiles, the only limitation lies on lenghts of elements.
4.16	**4. IN-SITU REUSE** An obsolete building is bought and either adapted, or decosntructed so that components can be reused.	●●●● Reduced need for testing: possible access to engineering drawings, current loads know.	●●●●● Adaptive design based on known materials purchased up front. Possibility to reuse entirely building system.	●●●●● Single client manages deconstruction, design and construction. Timing naturally aligned.	●●●●● Almost non energy is used if the building is adapted.	●●●●● There should be literally no waste of the structural components.	● Restricted to a former stucture and building layout.
3.83	▶ **5. RELOCATION** A steel structure is dismatled is dismantled and re-erected elsewhere.	●●●● Reduced need for testing: same configuration, same loads.	●●●●● No significant need of designng.	●●●● Buyer is tied to seller's project schedule possibility of delay.	●●●● Energy is used for disassembling transportation and reassembling.	●●●●● No waste if all elements are reused.	● Restricted to a former stucture and building layout.
3.50	▶ **6. TRANSFORMATION** Structure relocation and rearrangement in order to fulfil new functional needs.	●●● New connections might need testes and certifications.	●●● Need of designing new joints, but also new spatial layout.	●●● Possible delays, counting, testing and certificating. Additional structural design required.	●●●● Energy is used for disassembling transportation and assembling.	●●●● The aim is to reuse possible all steel, but there might be a minor amount of unsuitable elements.	●●●● Structural transformation allows more space flexibility in order to match new needs.
	nonreusable approach						
3.00	▶ **7. BUILD BY NEW** Building the same volume and structure configuration using new steel.	●●●●● Using new steel and possible new structural profiles, therefore no need of extra testing.	●●●● Need of updating with the current steel profiles and types of connection. New calculations.	●●●●● Regular building process unrelated to the old structure.	● Additional energy is required for new steel production and manufacturing.	●● All old steel will be probably melted and recycled.	● Restricted to a former volume a spatial organization.

▶ Scenarios for van Klingeren's Youth Hostel

Jos van Boxtel

Real Estate Developer at Stebru

- "The ambition is to realize the entire investment until the end of 2021, although the final decision about rebuilding the hostel is not made yet. We still consider several options [including building it by new steel]"

- "Yes, the reuse of the steel, in this case, will be more costly for us than using a new steel, due to different processes involved in the operations, such as insurances, legislations, storage, testing or cleaning the corrosion. It is also true that if not this specific case of the van Klingeren building, which still has significant heritage value, we would not take on this challenge."

- "The former hostel will be just 10% of the whole investment, but it is considered to be the most important piece because it might create a unique identity of this place. The function of the new volume is not decided yet, but it probably will be either hotel or housing with public functions on the ground floor."

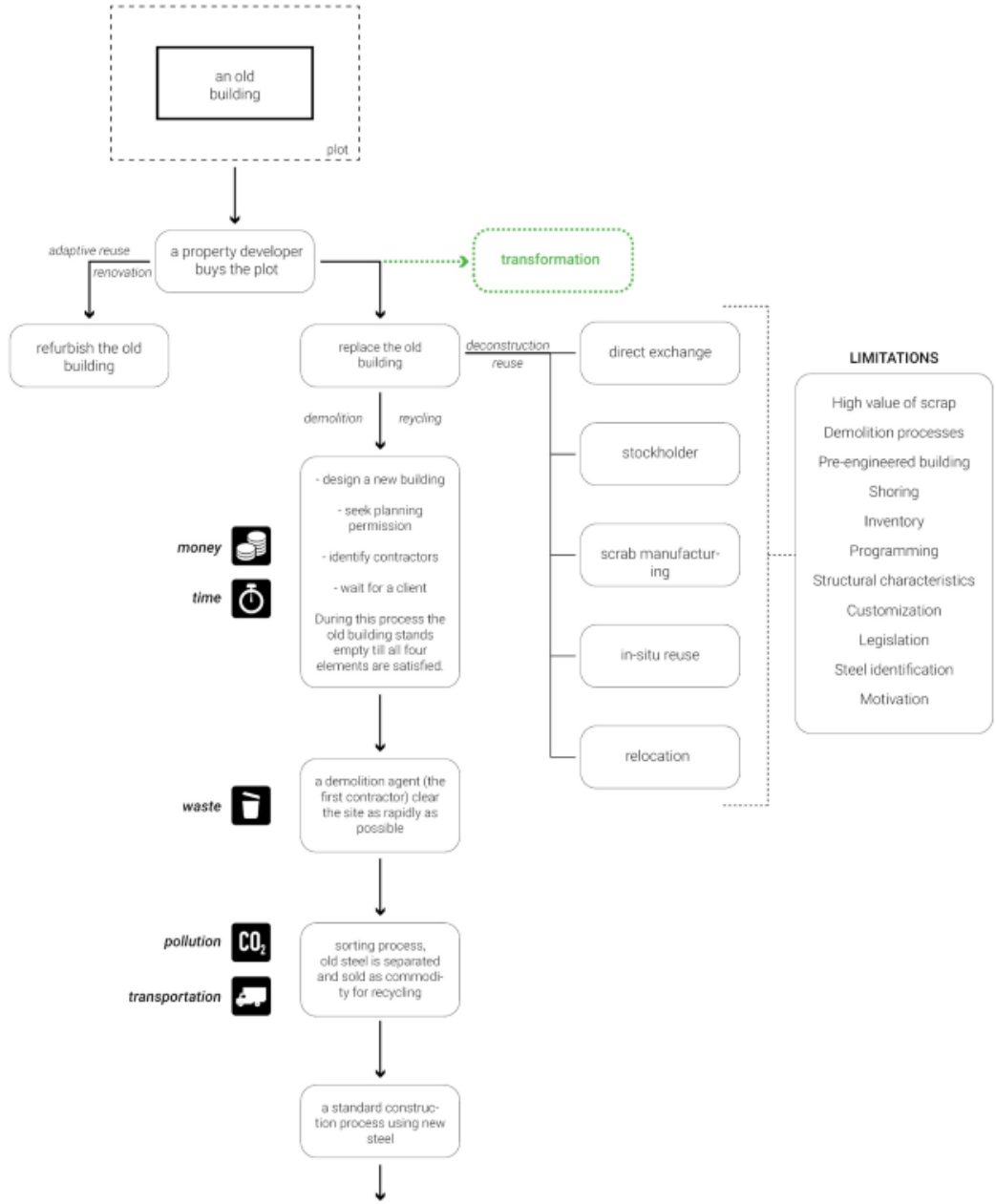
Leon Thier

Architect and director at Studio Leon Thier

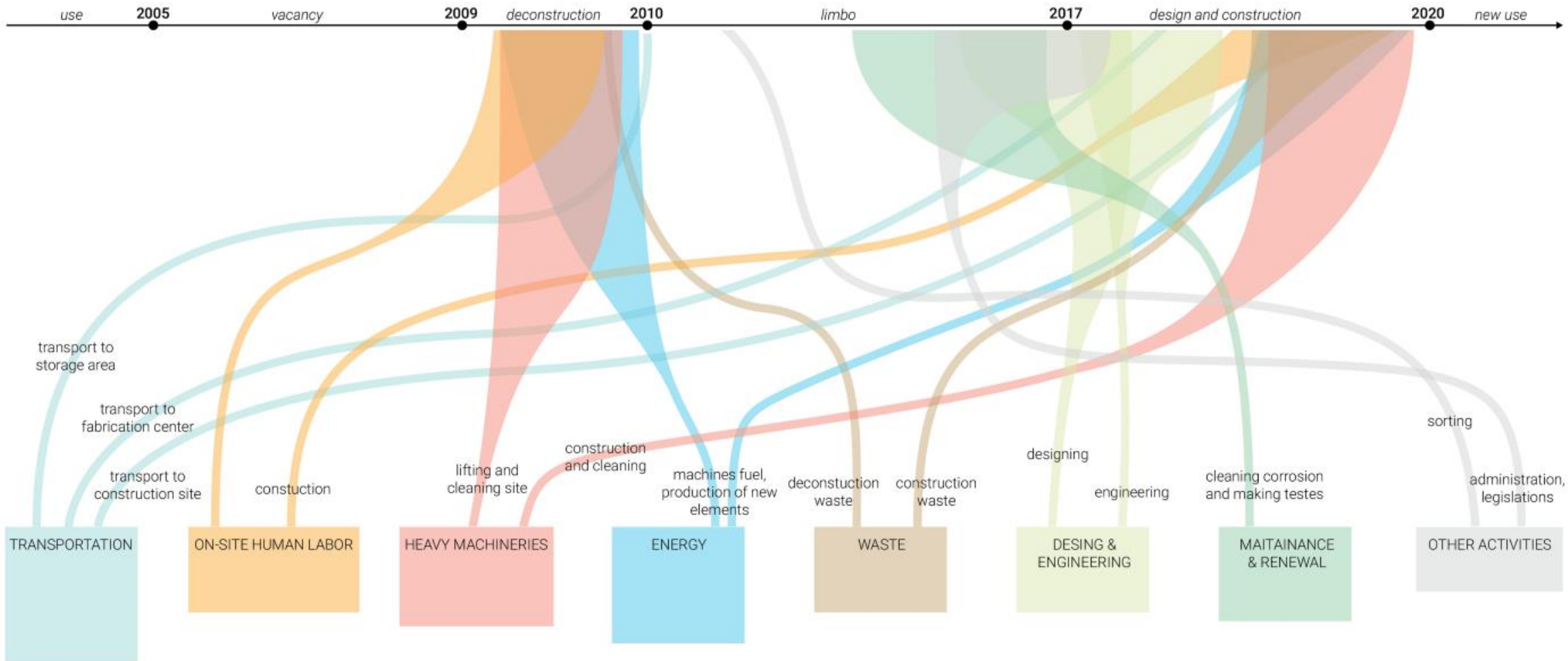
- "The initiative of hostel reconstruction comes from the municipality of the Hague. They were looking for an investor and architect with a good idea where to locate the building, and how to transform it. That was the time when we came in."

- "I personally think that the Ockenburgh rescue attempt is a big heart for architecture. We study the possibilities of that unique building. First, we proposed to create the Medialab in another location, but now we are working integrating the building into a new development the port of the Binckhorst [the Hague]"

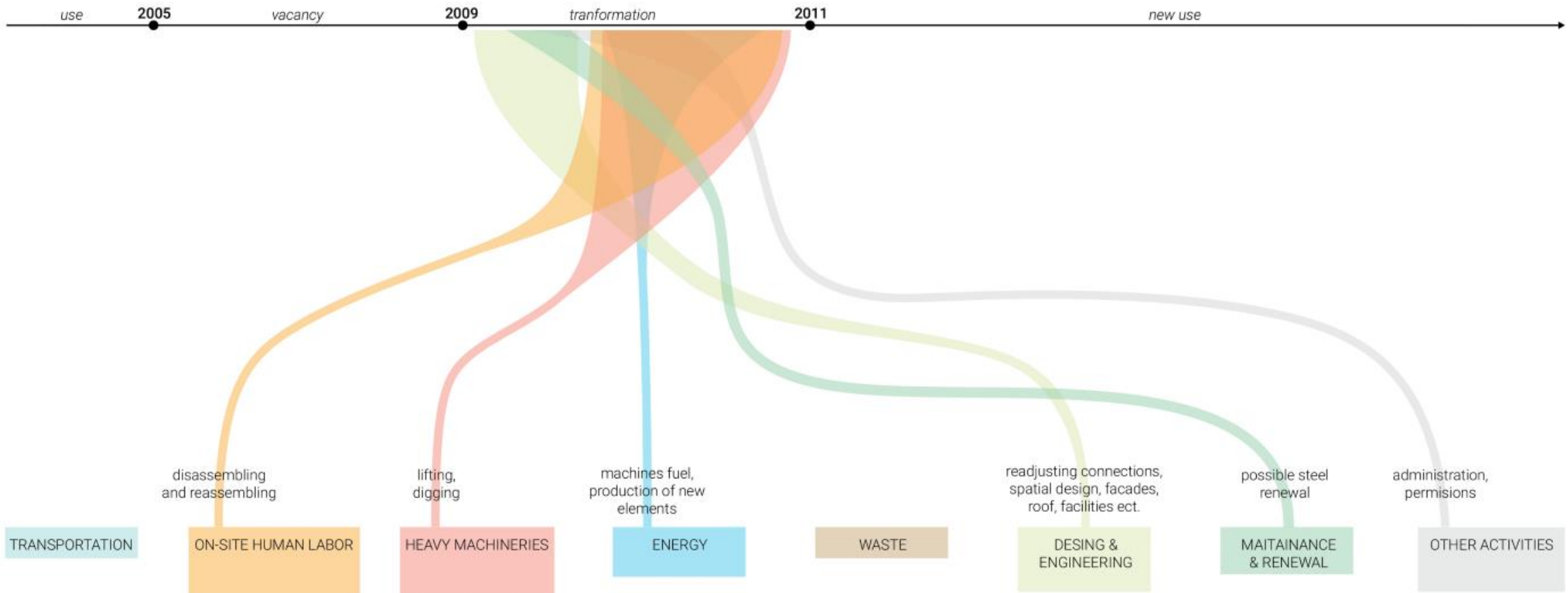
- "Unfortunately, the project fell a bit silent. The building is still stored in parts at a shipyard in Pijnacker and is waiting for better times. Perhaps the crisis thinking will soon be over and there will be again a chance to revitalize the project. It would be the biggest move of a building in years in the Netherlands ... "


an old building
plot
a property developer buys the plot
adaptive reuse
renovation
transformation
refurbish the old building
replace the old building
deconstruction
reuse
direct exchange
stockholder
scrab manufactur-ing
in-situ reuse
relocation
demolition
recycling
- design a new building
- seek planning permission
- identify contractors
- wait for a client
During this process the old building stands empty till all four elements are satisfied.
money
time
a demolition agent (the first contractor) clear the site as rapidly as possible
waste
sorting process, old steel is separated and sold as commodi-ty for recycling
pollution
CO2
transportation
a standard construc-tion process using new steel
LIMITATIONS
High value of scrap
Demolition processes
Pre-engineered building
Shoring
Inventory
Programming
Structural characteristics
Customization
Legislation
Steel identification
Motivation

van Klingeren Youth Hostel - current situation

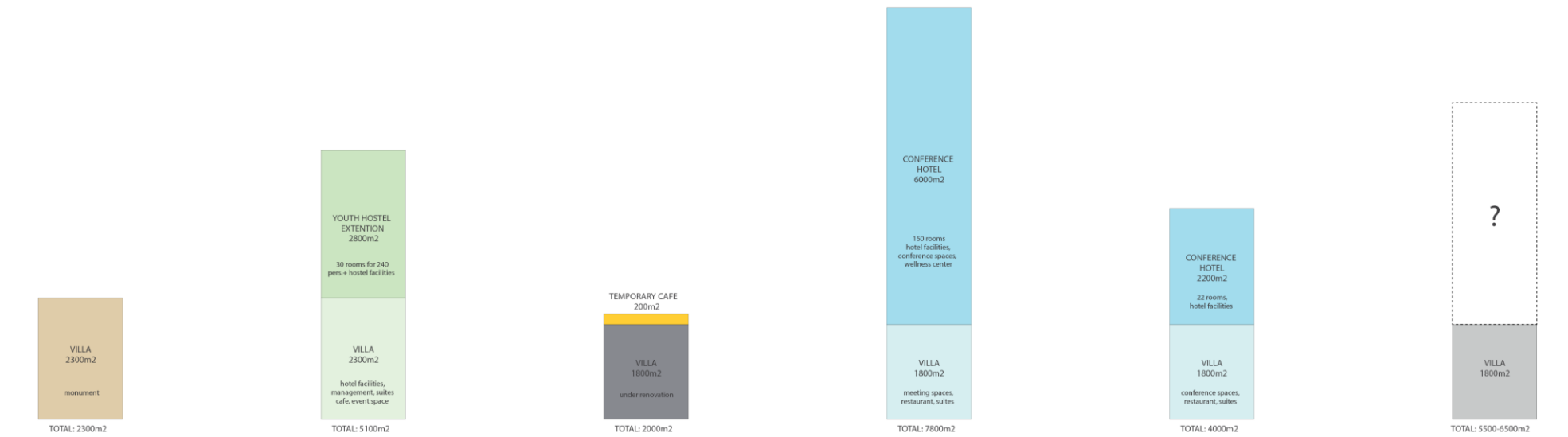


van Klingeren Youth Hostel - alternative scenario



CURRENT STATE

PROGRAM TIMELINE



PAST
1889 - 1968

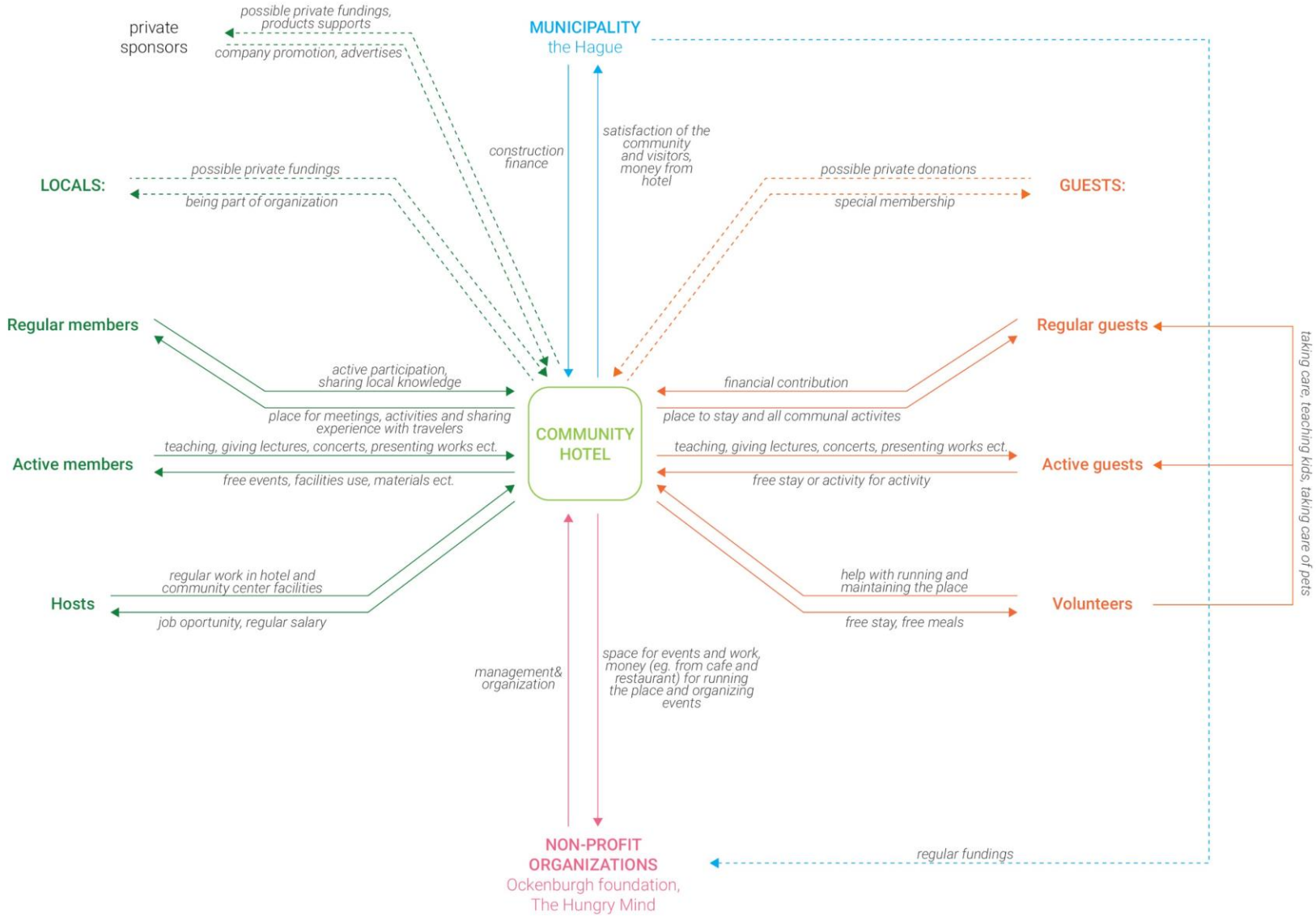
HOSTEL PERIOD
1969 - 2005

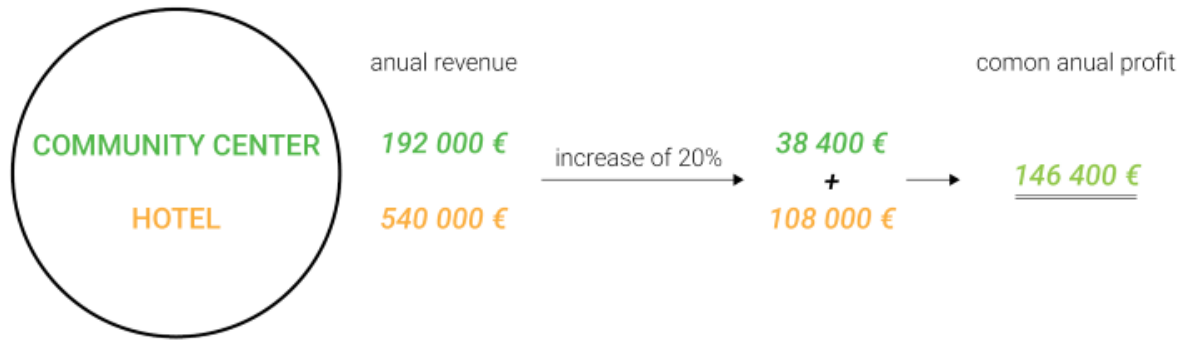
PRESENT
2018

AMBITION
2012

VERIFICATION
2020

ALTERNATIVE


private sponsors
possible private fundings, products supports
company promotion, advertises
MUNICIPALITY
the Hague
construction finance
satisfaction of the community and visitors, money from hotel
LOCALS:
possible private fundings
being part of organization
possible private donations
special membership
GUESTS:
Regular members
active participation, sharing local knowledge
place for meetings, activities and sharing experience with travelers
financial contribution
place to stay and all communal activites
Regular guests
Active members
teaching, giving lectures, concerts, presenting works ect.
free events, facilities use, materials ect.
COMMUNITY HOTEL
teaching, giving lectures, concerts, presenting works ect.
free stay or activity for activity
Active guests
Hosts
regular work in hotel and community center facilities
job oportunity, regular salary
help with running and maintaining the place
free stay, free meals
Volunteers
taking care, teaching kids, taking care of pets
management& organization
space for events and work, money (eg. from cafe and restaurant) for running the place and organizing events
NON-PROFIT ORGANIZATIONS
Ockenburgh foundation, The Hungry Mind
regular fundings



est. total profit for 20 years — *(162 000 €/year + 146 400 €/year) x 20 years = 308 400 €/year x 20 years = 6 168 000 €*

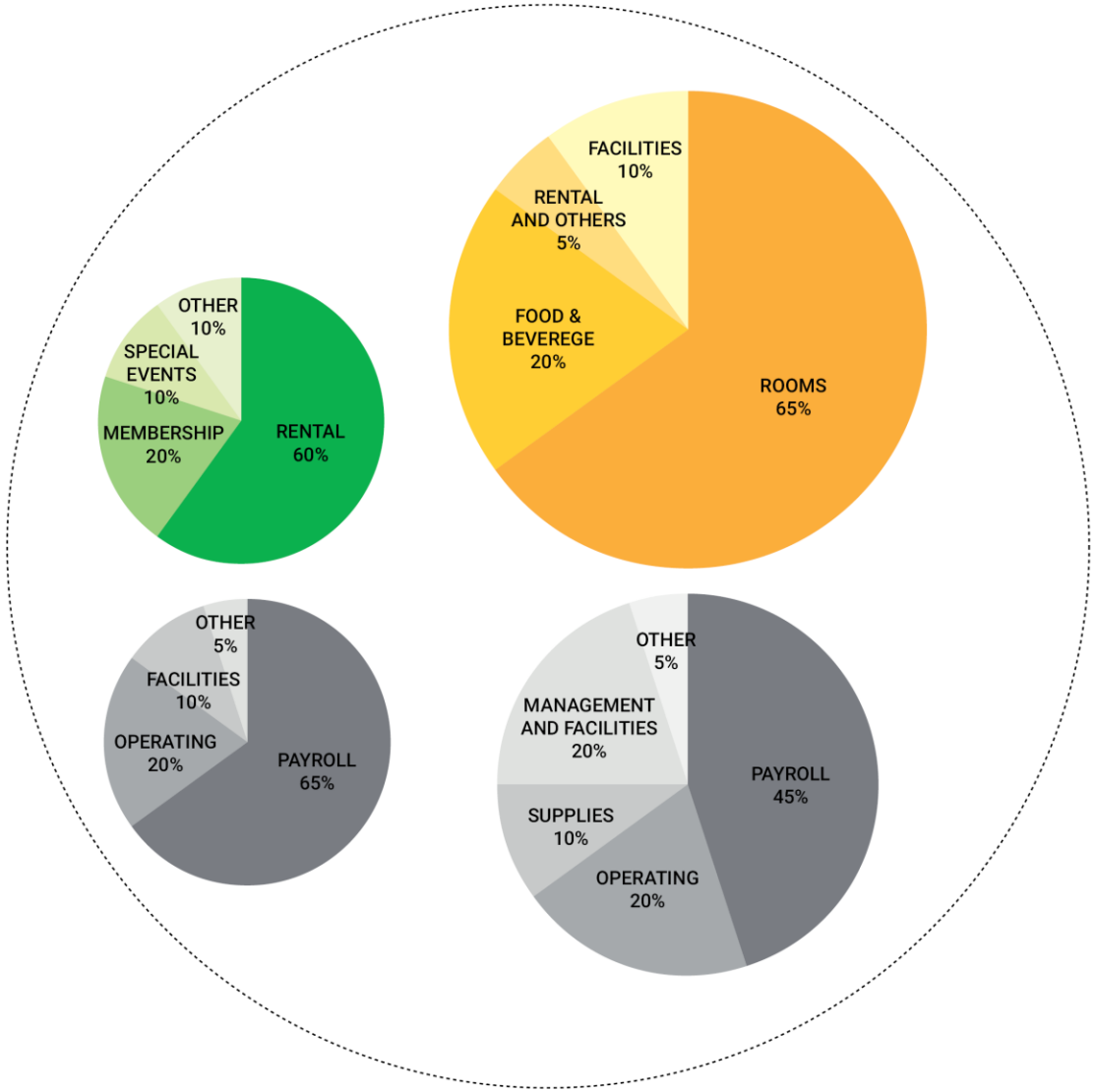
est. building and investment cost — *800€/m² x 4000m² = 3 200 000 €*

est. pay off period — *3 200 000 € / 308 400 €/year = 10.5 years*

est. actual profit for 20 years — *6 168 000 € - 3 200 000 € = 2 968 000 €*

	avg. anual individual profit
COMMUNITY CENTER	*0 €*
HOTEL	*162 000 €*

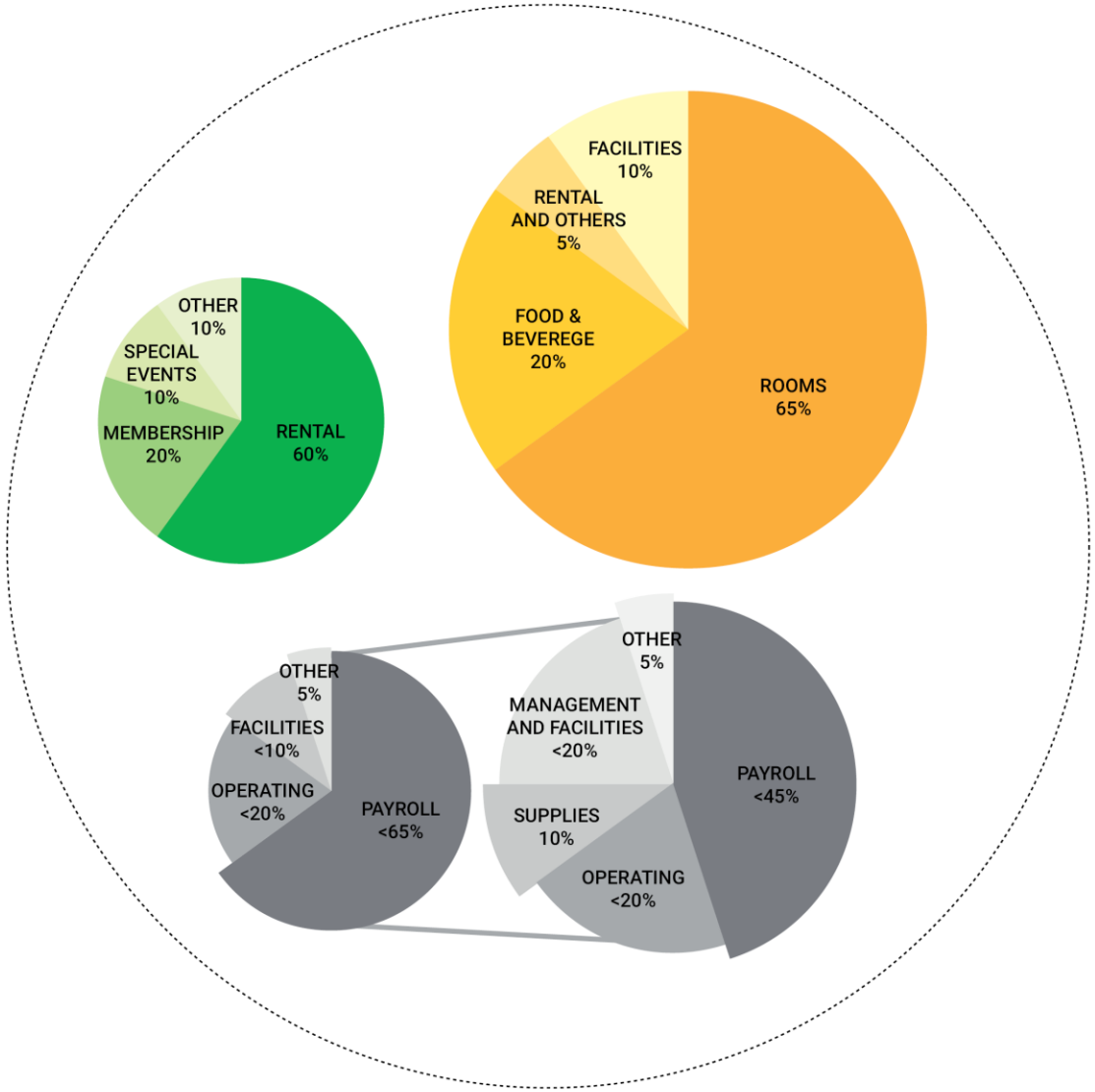
https://www.buildingsguide.com/faq/what-average-commercial-building-cost-square-foot/
http://www.investinganswers.com/financial-dictionary/ratio-analysis/revenue-available-room-revpar-807



COMMUNITY HOTEL

governmental

medium size: 4000m^2 - 5000m^2
number of membership: 500
number of hotel rooms: 20



COMMUNITY HOTEL

governmental

medium size: 4000m^2 - 5000m^2
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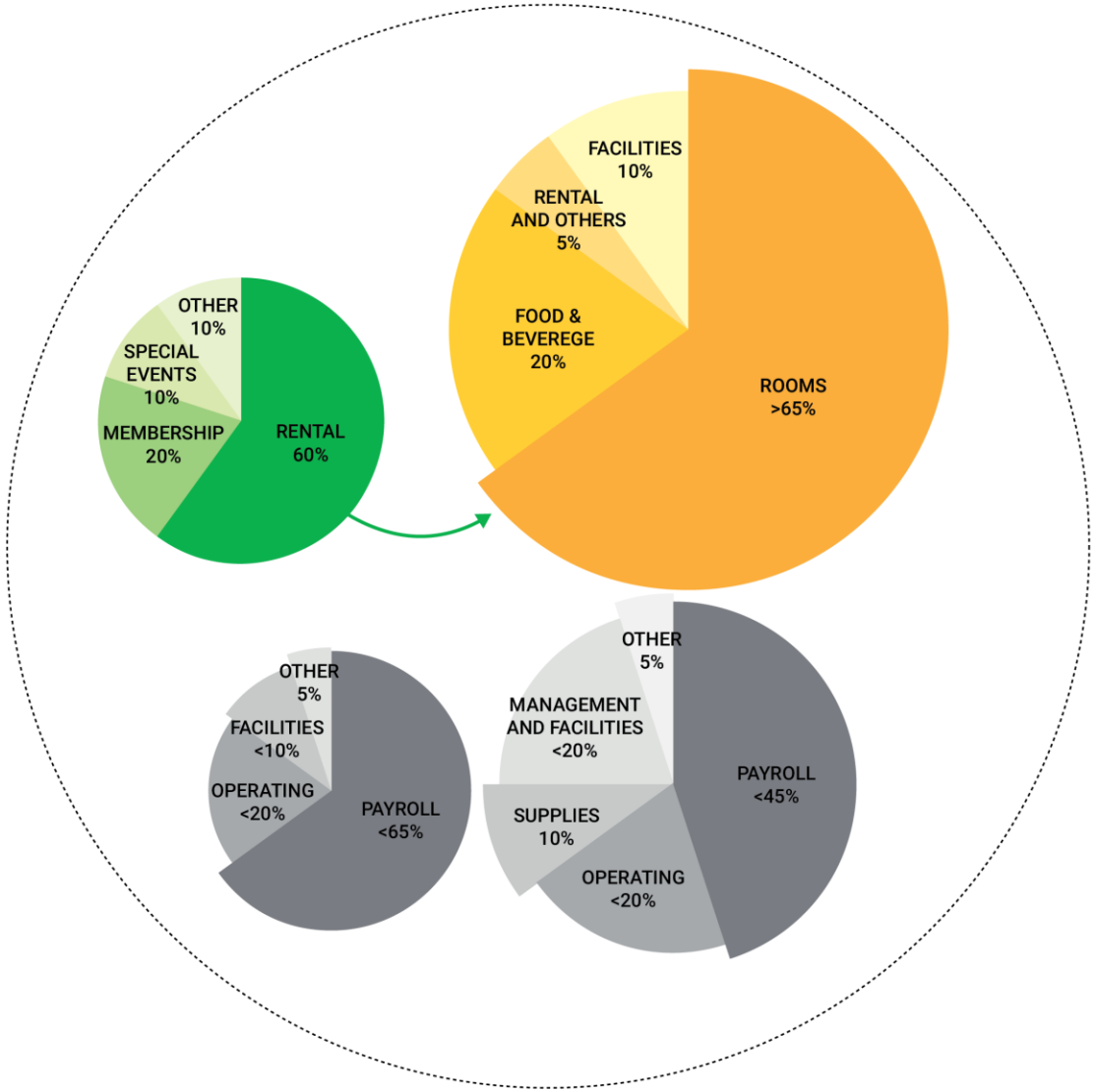
1. Merged expenses

- sharing spaces and incorporating flows of materials lower general operating expenses



COMMUNITY HOTEL

governmental

medium size: 4000m^2 - 5000m^2
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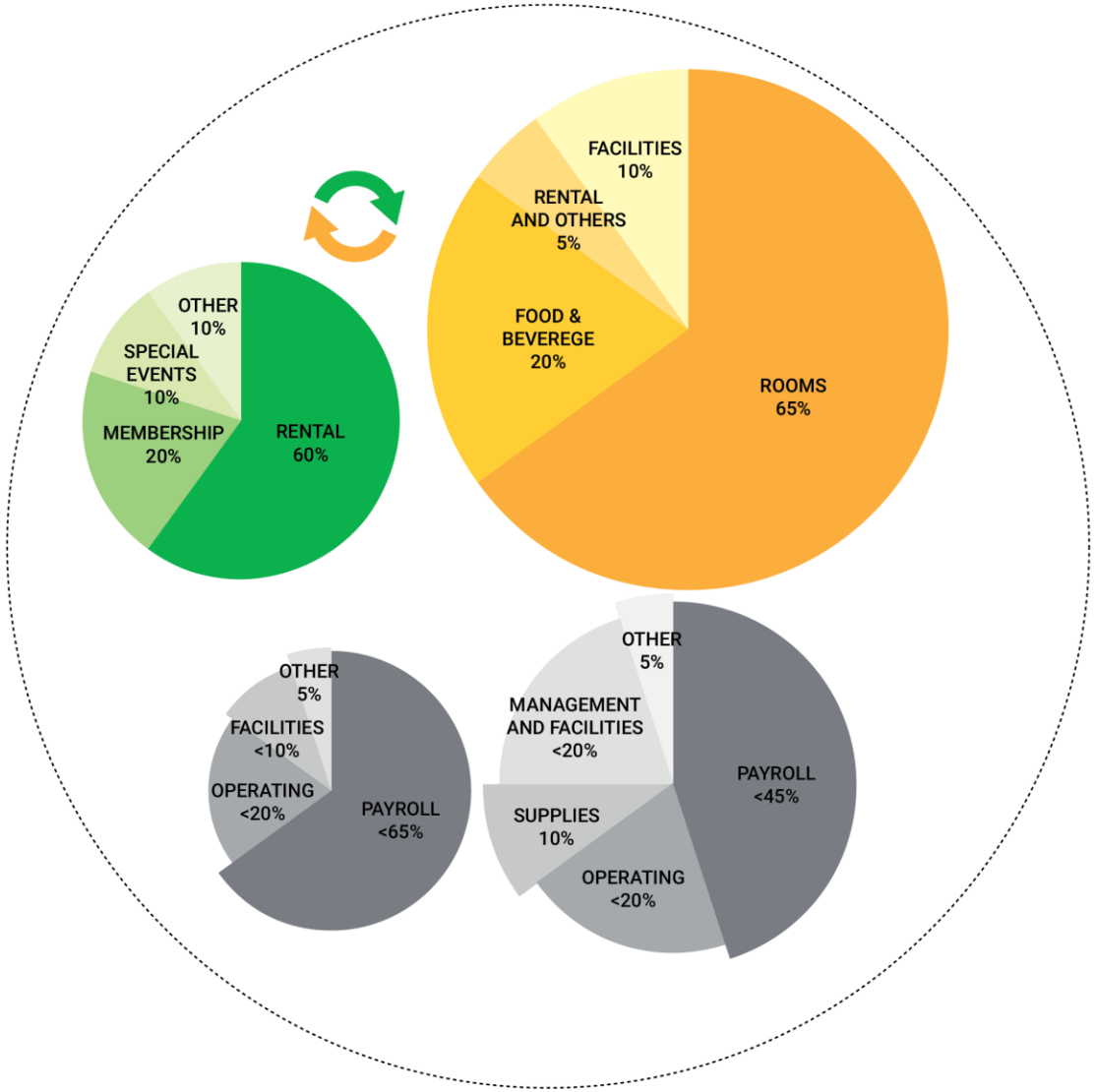
number of hotel rooms: 20

1. Merged expenses

- sharing spaces and incorporating flows of materials lower general operating expenses

2. Shared occupancy

- to increase the occupancy rate (avg. 75%) hotel rooms can temporary rented during off-season for:
• reduced last-minute price for locals
• reduced price or for free for volunters
• longer term renting (up to 3 months)
- guests can also rent/use community center's spaces such as classrooms, sporthall, event space, workshops ect. when there is no occupancy



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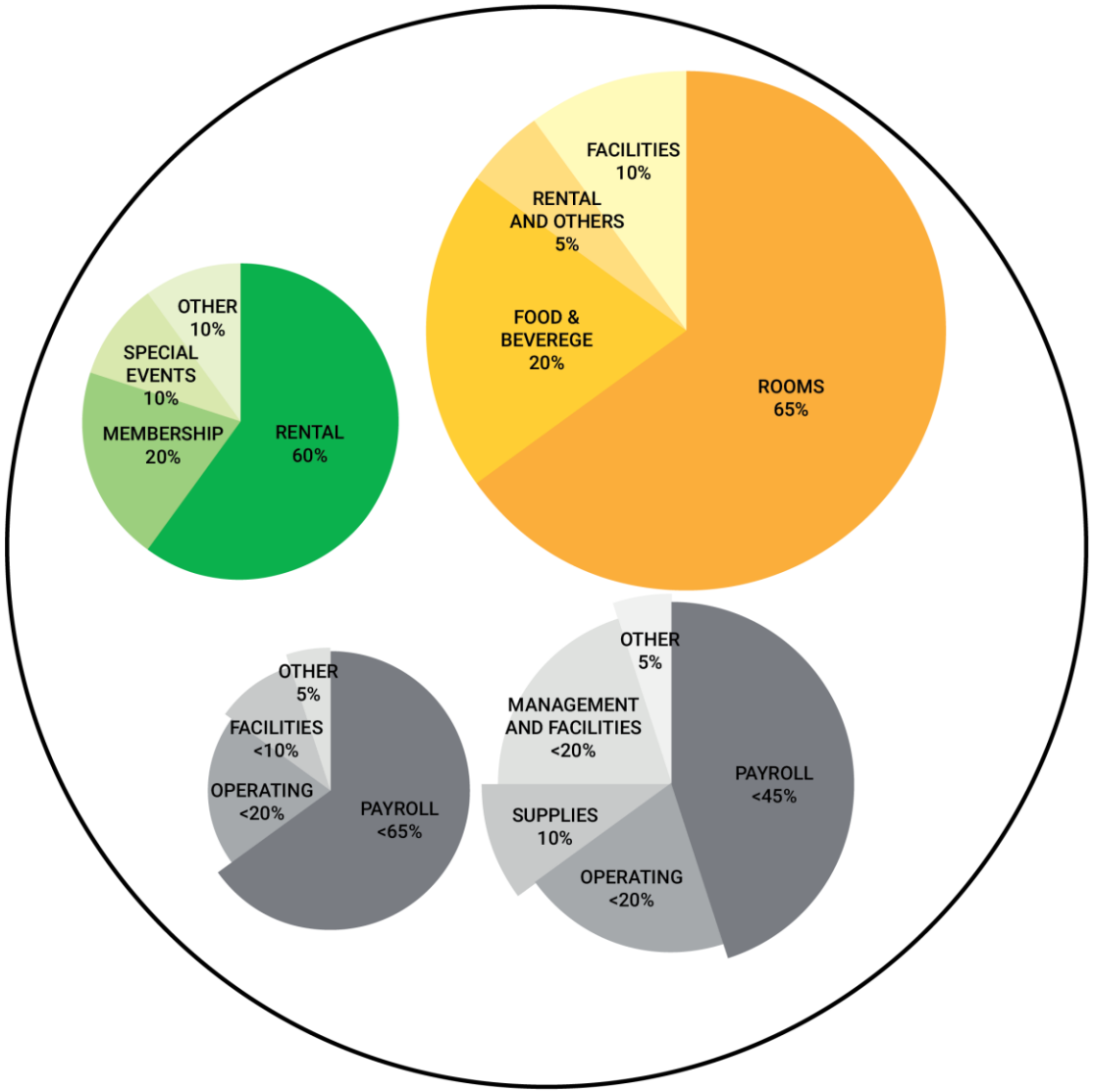
3. Increased facilities and events revenue

- both group could use all facilities
- guest might participate to local events and activities
- additionally, money stay local:
  • new working places
  • local products and services



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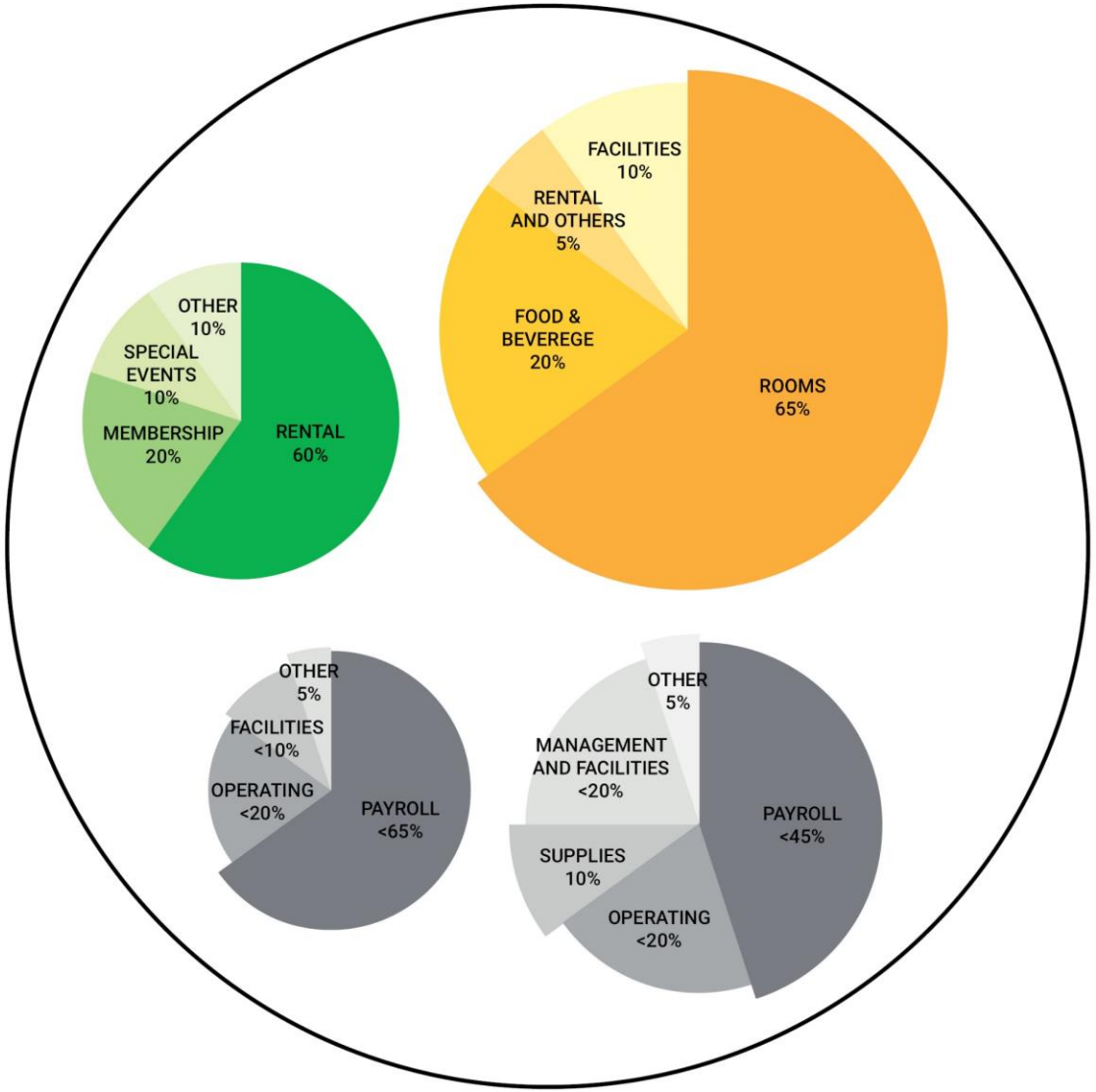
4. Knowledge, skills and culture exchange

- integrating both locals and guests creates a situation where intangible values can be also shared
- better understanding and aknowledment of eachother



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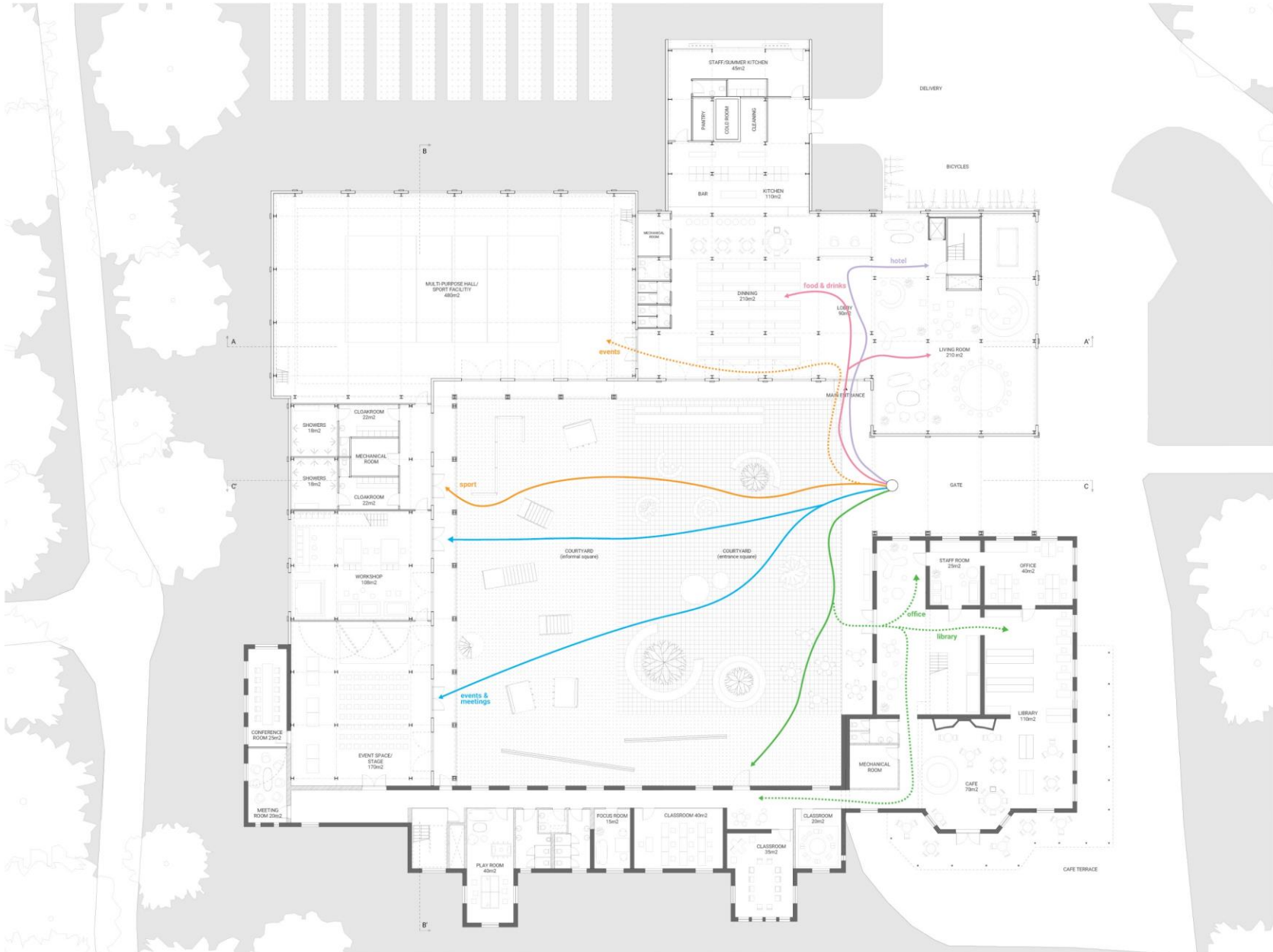
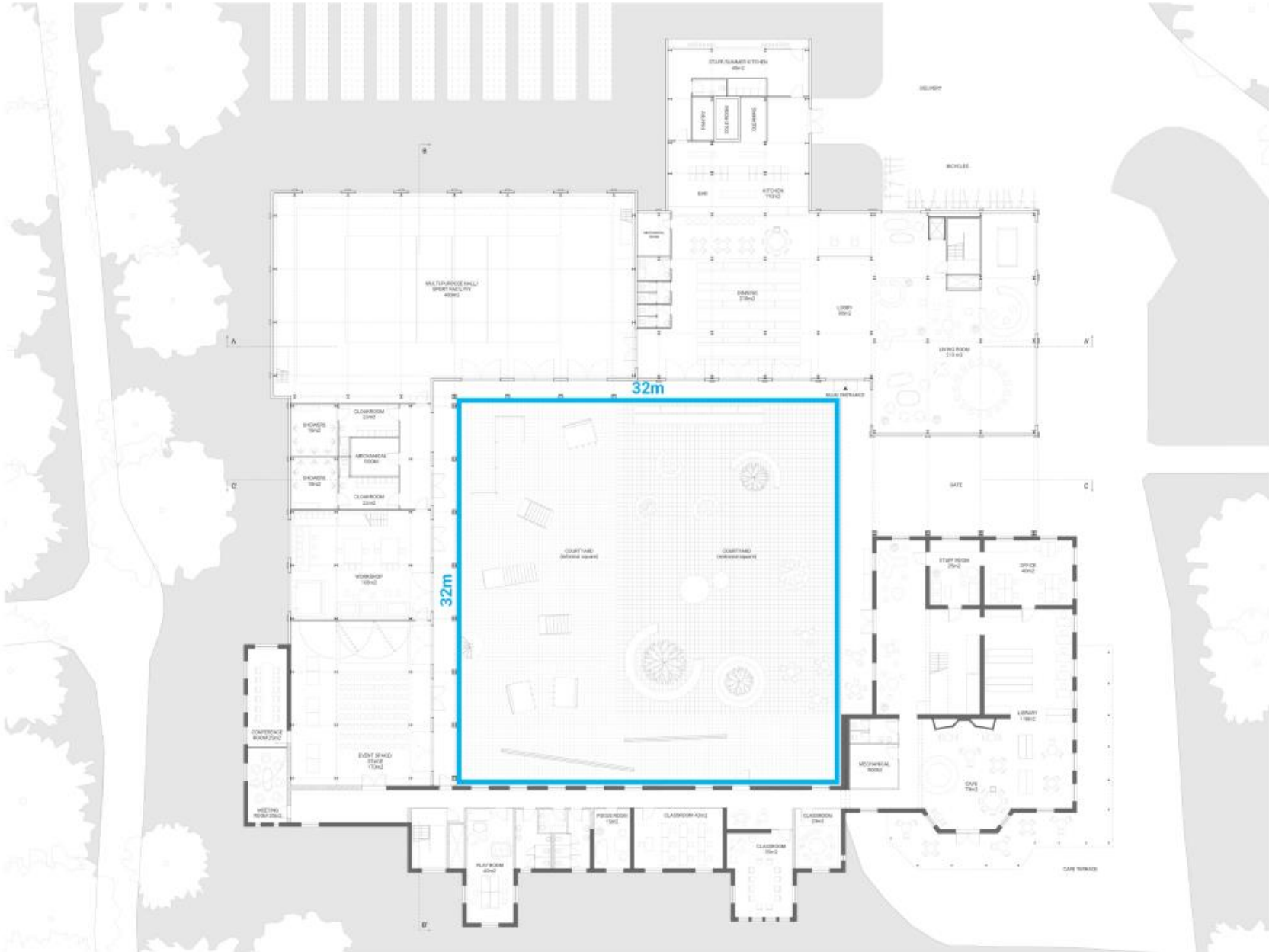
DRAWINGS

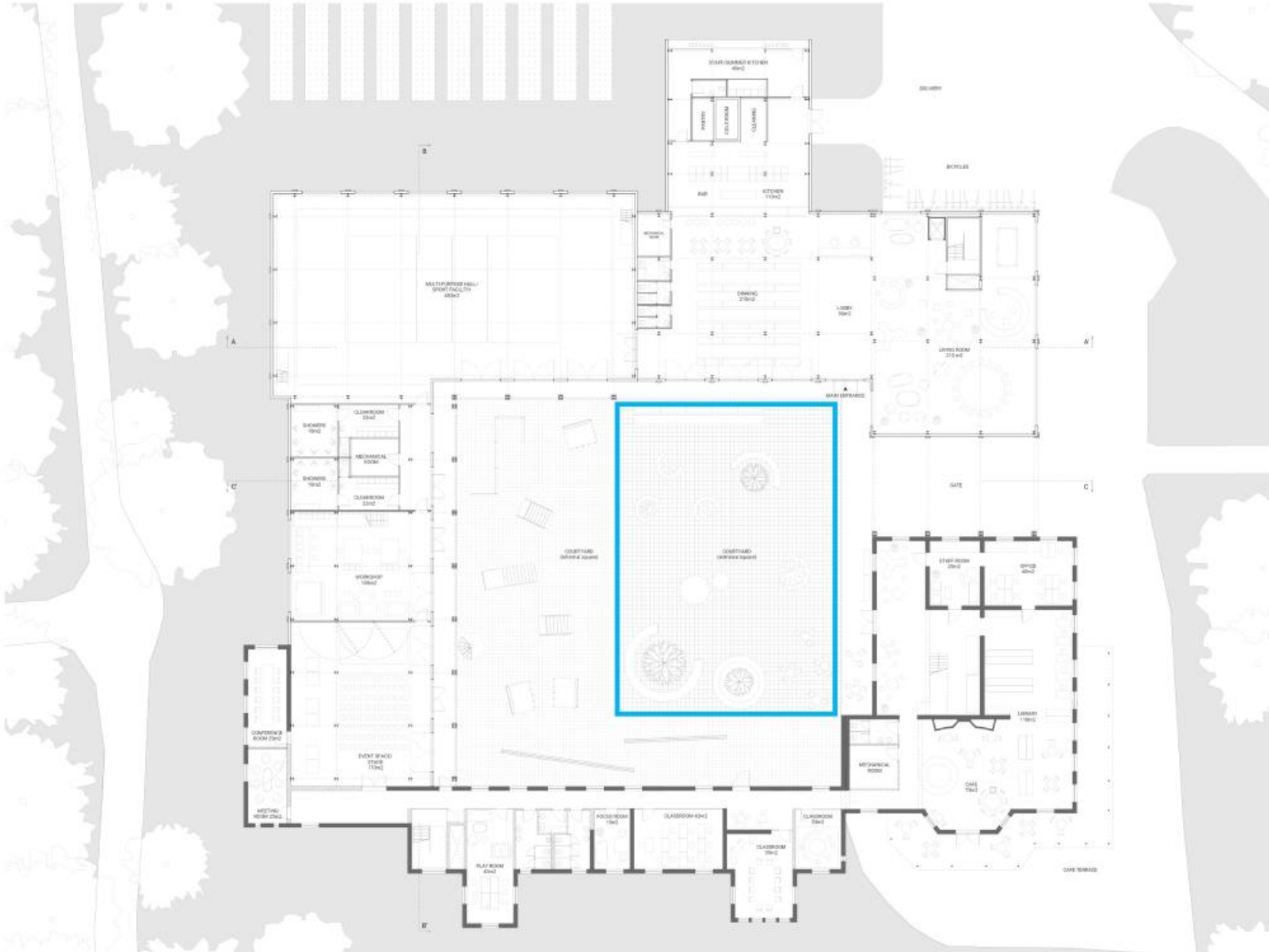
COURTYARD


STAFF/SUMMER KITCHEN
45m2
PANTRY
COLD ROOM
CLEANING
DELIVERY
BICYCLES
BAR
KITCHEN
110m2
MECHANICAL ROOM
MULTI-PURPOSE HALL/
SPORT FACILITY
480m2
DINNING
210m2
LOBBY
90m2
hotel
food & drinks
events
LIVING ROOM
210 m2
MAIN ENTRANCE
CLOAKROOM
22m2
SHOWERS
18m2
MECHANICAL
ROOM
SHOWERS
18m2
CLOAKROOM
22m2
sport
GATE
COURTYARD
(informal square)
COURTYARD
(entrance square)
WORKSHOP
108m2
STAFF ROOM
25m2
OFFICE
40m2
office
library
events &
meetings
CONFERENCE
ROOM 25m2
EVENT SPACE/
STAGE
170m2
LIBRARY
110m2
MECHANICAL
ROOM
CAFE
78m2
MEETING
ROOM 20m2
PLAY ROOM
40m2
FOCUS ROOM
15m2
CLASSROOM 40m2
CLASSROOM
35m2
CLASSROOM
20m2
CAFE TERRACE
A
A'
B
B'
C
C'

COURTYARD



COURTYARD


STAFF/SUMMER KITCHEN
PANTRY
COLD ROOM
CLEANING
DELIVERY
BICYCLES
BAR
KITCHEN
MULTI-PURPOSE HALL / SPORT FACILITY
DINING
LOBBY
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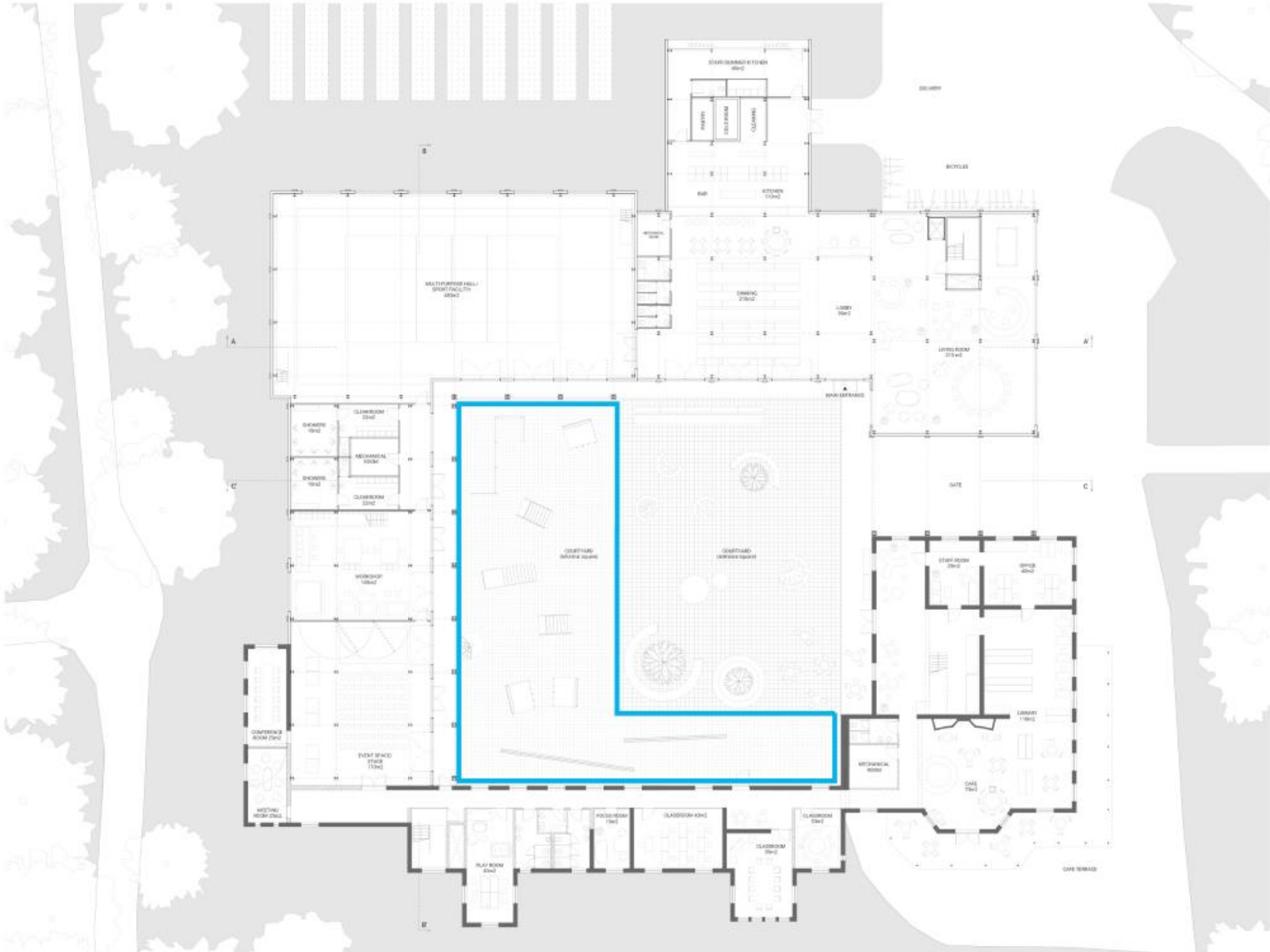
MAIN ENTRANCE
GATE
CLOAKROOM
SHOWERS
MECHANICAL
COURTYARD
WORKSHOP
STAFF ROOM
OFFICE
LIBRARY
CAFE
CONFERENCE ROOM
EVENT SPACE/ STAGE
MEETING ROOM
MECHANICAL
PLAY ROOM
CLASSROOM
CAFE TERRACE

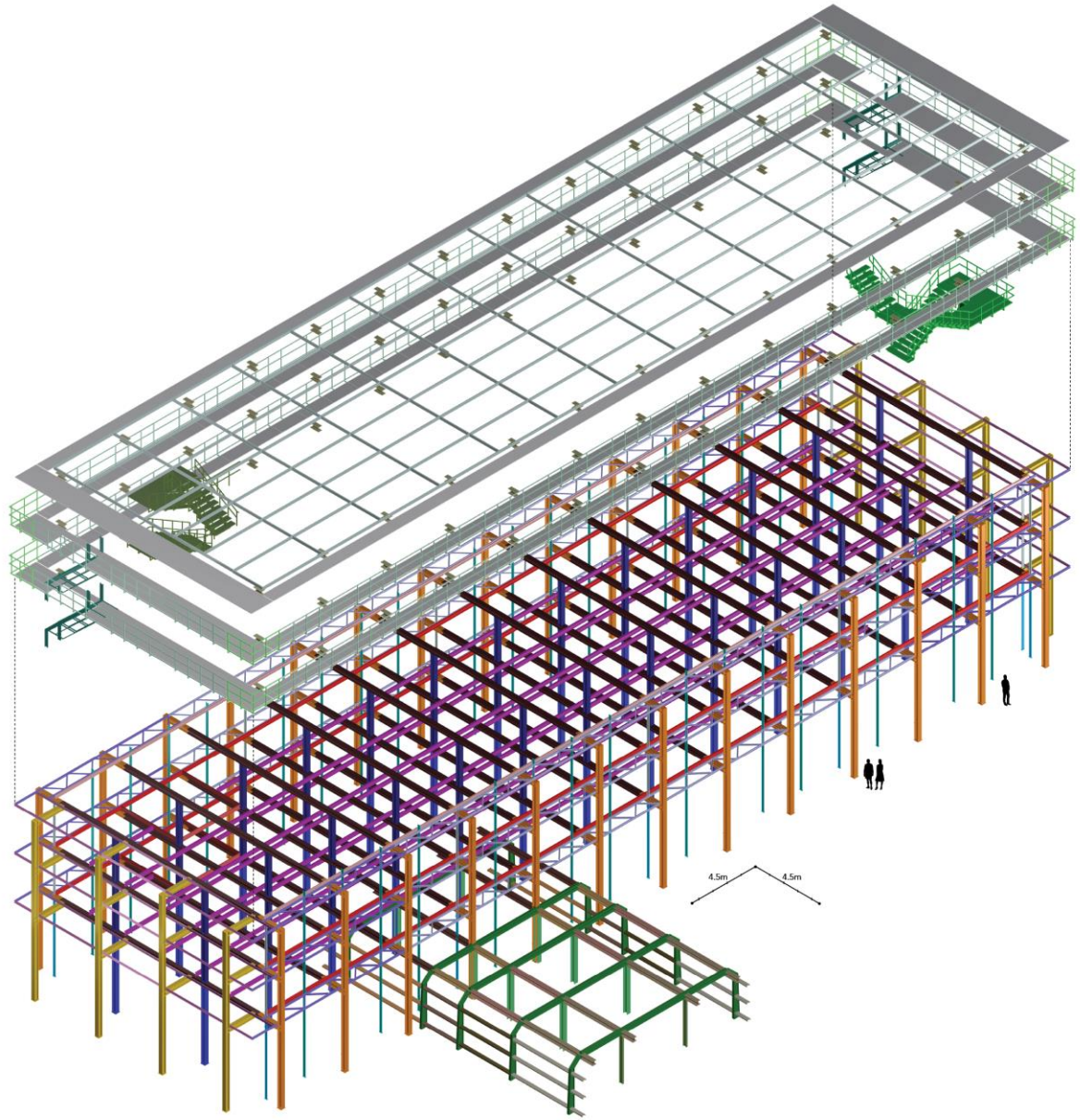
COURTYARD




SPORT
COMPETITION
FARMER'S
MARKET
MUSIC
EVENT
OUTDOOR
CLASSES

VAN KLINGEREN YOUTH HOSTEL

Structure analysis



BEAMS

ID	PROFILE	LENGTH	QUANTITY	COLOR
B1	HE260	13980	39	
B2	UNP220	4050	4	
B3	UNP220	4240	2	
B4	UNP220	4500	48	
B5	UNP180	4500	24	
B6	UNP120	4500	12	
B7	UNP120	6115	24	
B8	IPE220	4500	114	
B9	UNP120+L70	9000	24	
B10	UNP120+L70	10915	12	
B11	HE260	7040	4	
B12	HE260	5040	4	
B13	HE260	3700	4	
B14	HE260	2560	4	
B15	UNP220	7040	6	
B16	UNP220	5040	6	
B17	UNP220	3700	6	
B18	UNP220	2560	6	

COLUMNS

ID	PROFILE	LENGTH	QUANTITY	COLOR
C1	HE260	2720	52	
C2	HE260	4730	26	
C3	IPE150	11330	32	
C4	IPE150	2720	24	
C5	IPE150	4730	12	
C6				
C7				

SPECIAL

ID	PROFILE	DIMESIONS	QUANTITY	COLOR
S1	HE260	10940x1690	26	
S2	HE260	10940x2100	8	
S3	-	-	5	

NONSTRUCTURAL

STAIRS

ID	PROFILE	LENGHT	QUANTITY	COLOR
S1			4	
S2A			1	
S2B			1	
S2C			1	
S3A			1	
S3B			1	
S3C			1	
S3D			1	

FLOORS

ID	PROFILE	LENGHT	QUANTITY	COLOR
F1	790x30	1800	120	
F2	790x30	350	8	
F3	1510X30	1880	36	

RAILING

ID	PROFILE	DIMESIONS	QUANTITY	COLOR
R1	40x40	4490x1245	60	
R2	40x40	corner piece	4	

MULLIONS

ID	PROFILE	LENGHT	QUANTITY	COLOR
M1	175x50	4195	4	
M2	175x51	2085	28	
M3	175x52	2110	70	
M4	175x53	4120	78	
M5	175x54	4170	22	

ROOF

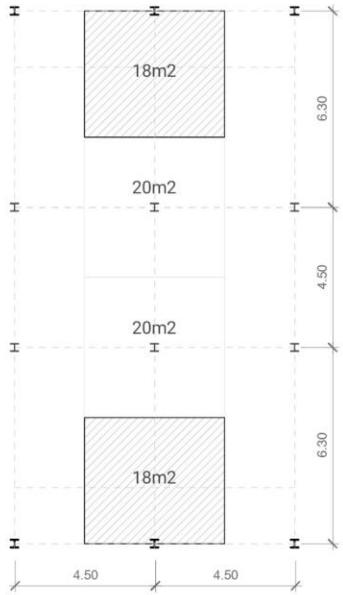
ID	PROFILE	LENGHT	QUANTITY	COLOR
O1	2060x30	4120	91	

PLATES

ID	PROFILE	LENGHT	QUANTITY	COLOR
P1	260x15	600	156	
P2	180x15	360	156	

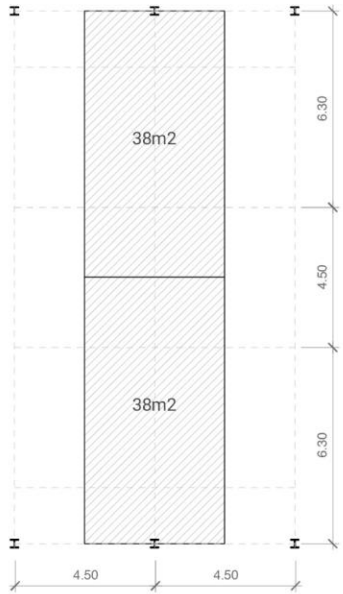
STRUCTURE ANALYSIS

Buckling load



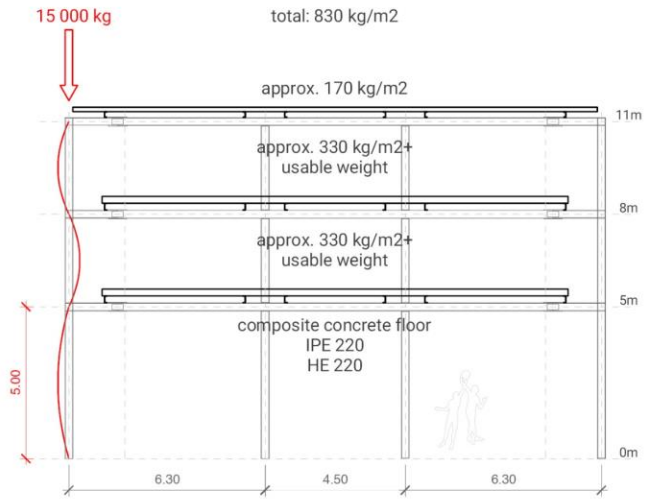
x3

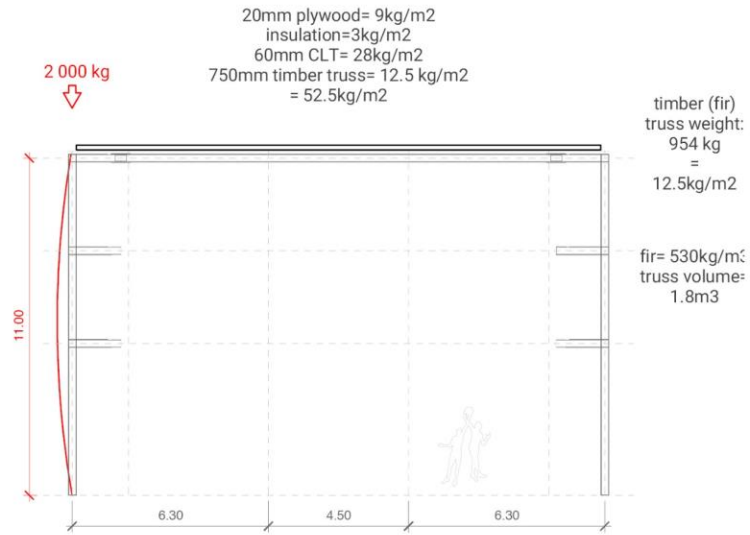
18mx830kg/m2
=
15 000 kg
+ usable weight



x1

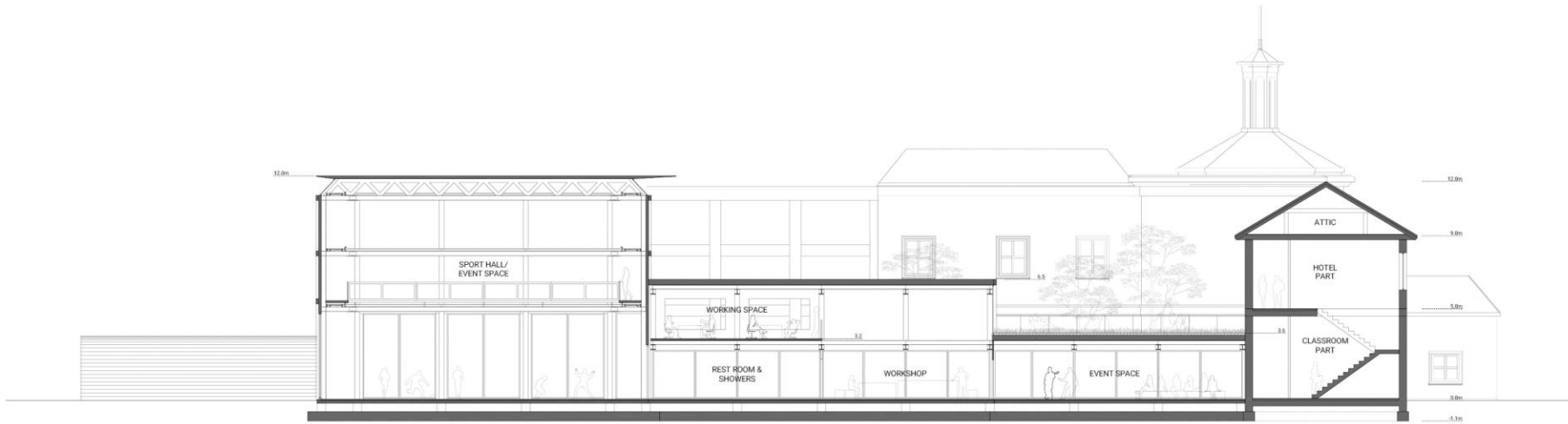
38mx52.5kg/m2
=
2000 kg

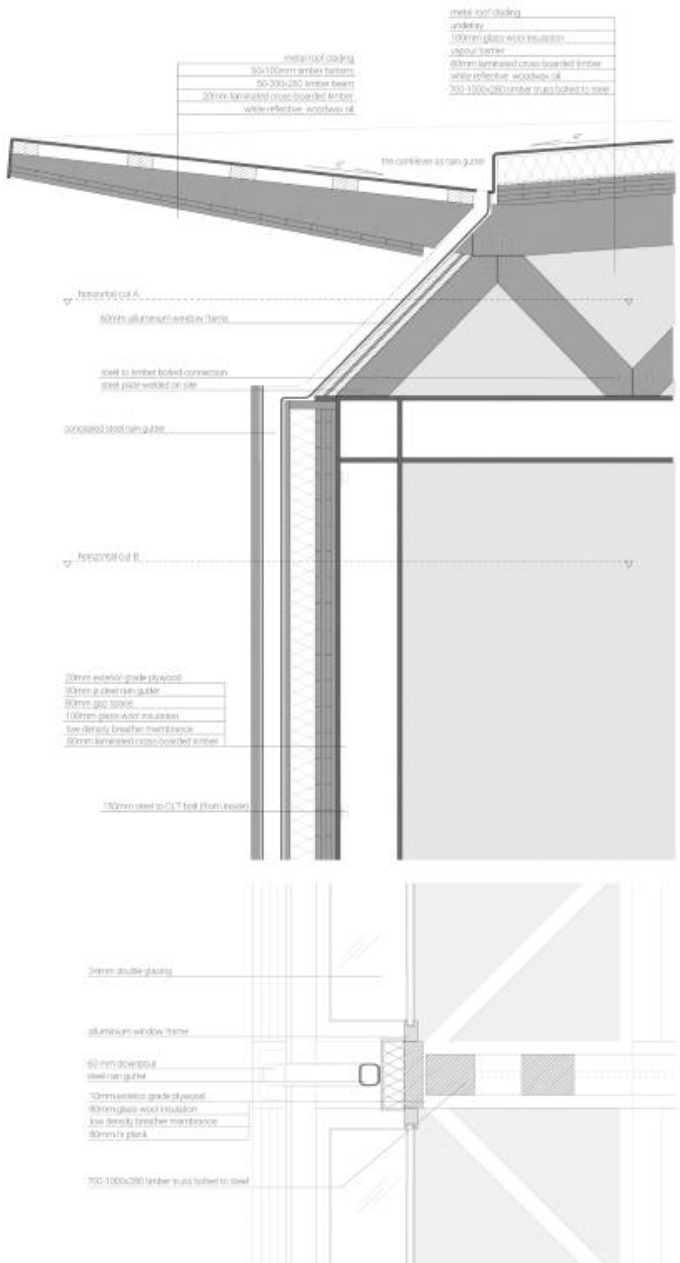


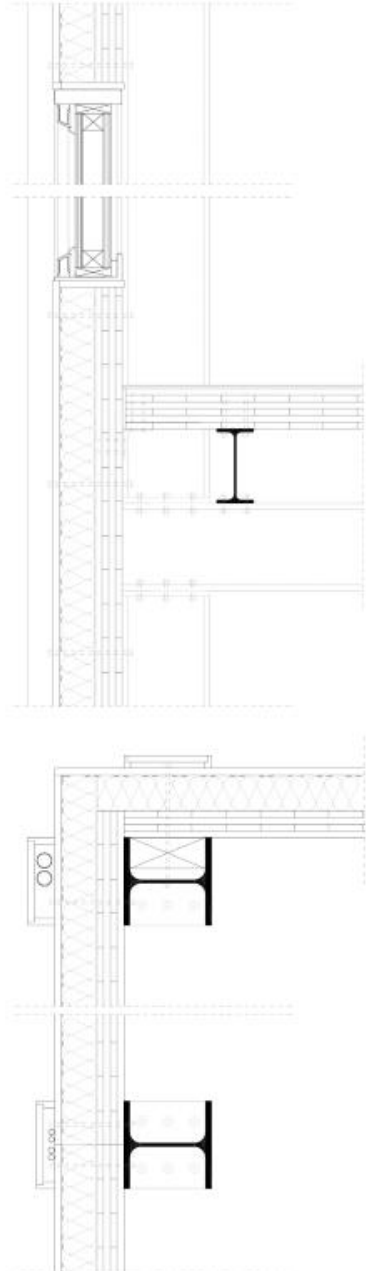


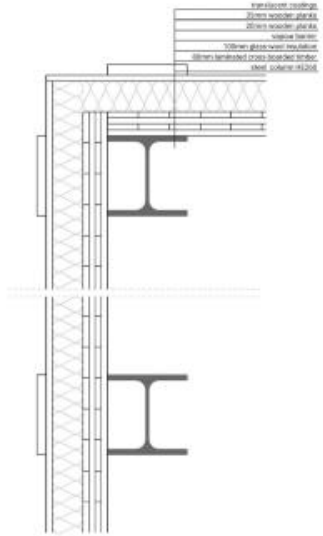

HOTEL ROOM
HOTEL ROOM
11.5m
8.5m
5.5m
WORKING SPACE
REST ROOM &
SHOWERS
6.5m
3.3m
0.0m
-1.1m

SECTION B-B’

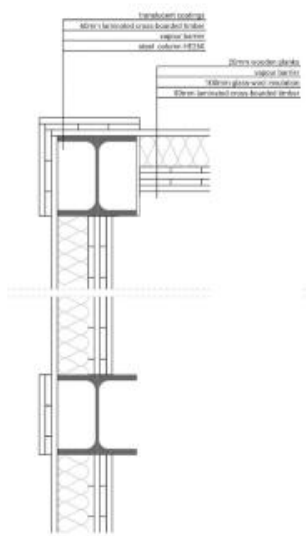

12.0m
SPORT HALL/
EVENT SPACE
WORKING SPACE
REST ROOM &
SHOWERS
WORKSHOP
EVENT SPACE
ATTIC
HOTEL
PART
CLASSROOM
PART
12.0m
9.0m
5.0m
0.0m
-1.1m



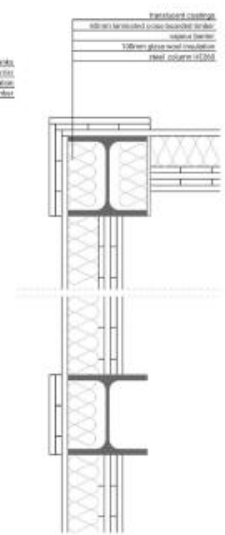




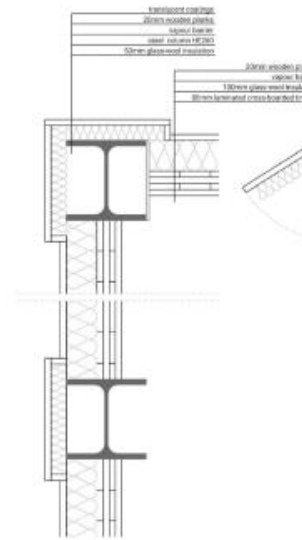
Detail_1:10
Facade fragment: hor. cut
Op1 - walls outside + extra plank



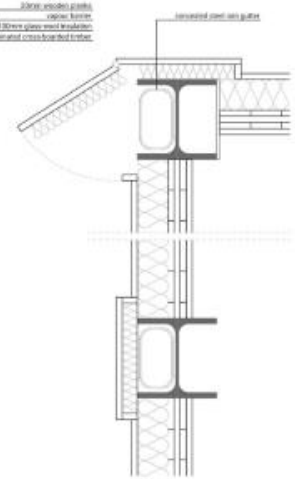
Detail_1:10
Facade fragment: hor. cut
Op2 - walls inbetween + CLT as insulation



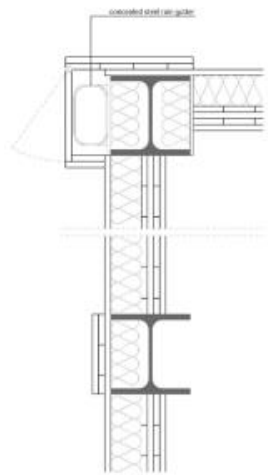
Detail_1:10
Facade fragment: hor. cut
Op3 - walls inbetween
glass wool as insulation
(inside the columns)



Detail_1:10
Facade fragment: hor. cut
Op4 - walls inbetween
glass wool as insulation
(infront of the columns)



Detail_1:10
Facade fragment: hor. cut
Gutter Option 1 - inside
wall inbetween +
glass-wool as insulation
(infront of the columns)



Detail_1:10
Facade fragment: hor. cut
Gutter Option 2 - outside
walls inbetween
glass-wool as insulation
(inside the columns)