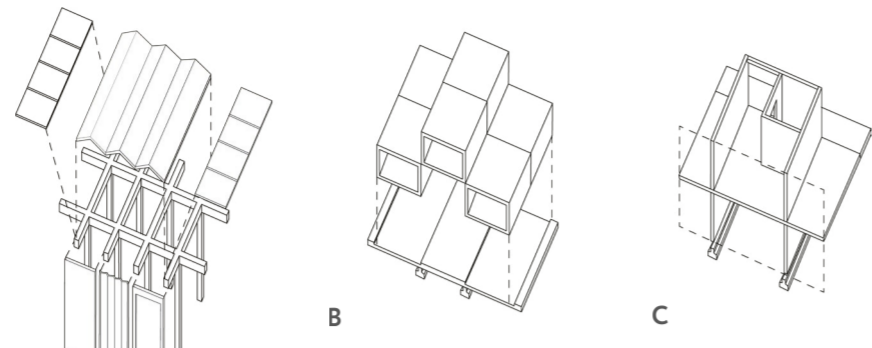
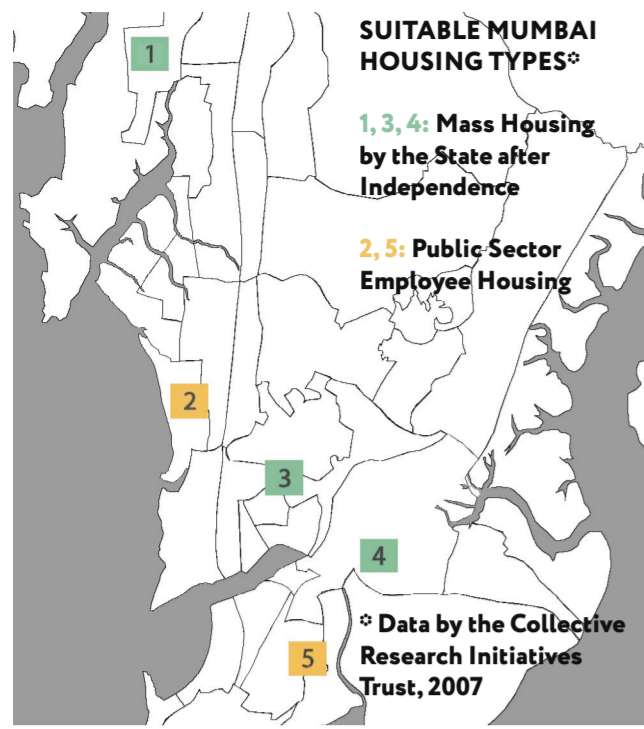


SAVOUR THE LIGHT

2-level CLT Living Modules for the Rooftops of Mumbai's Mass Industrial Housing



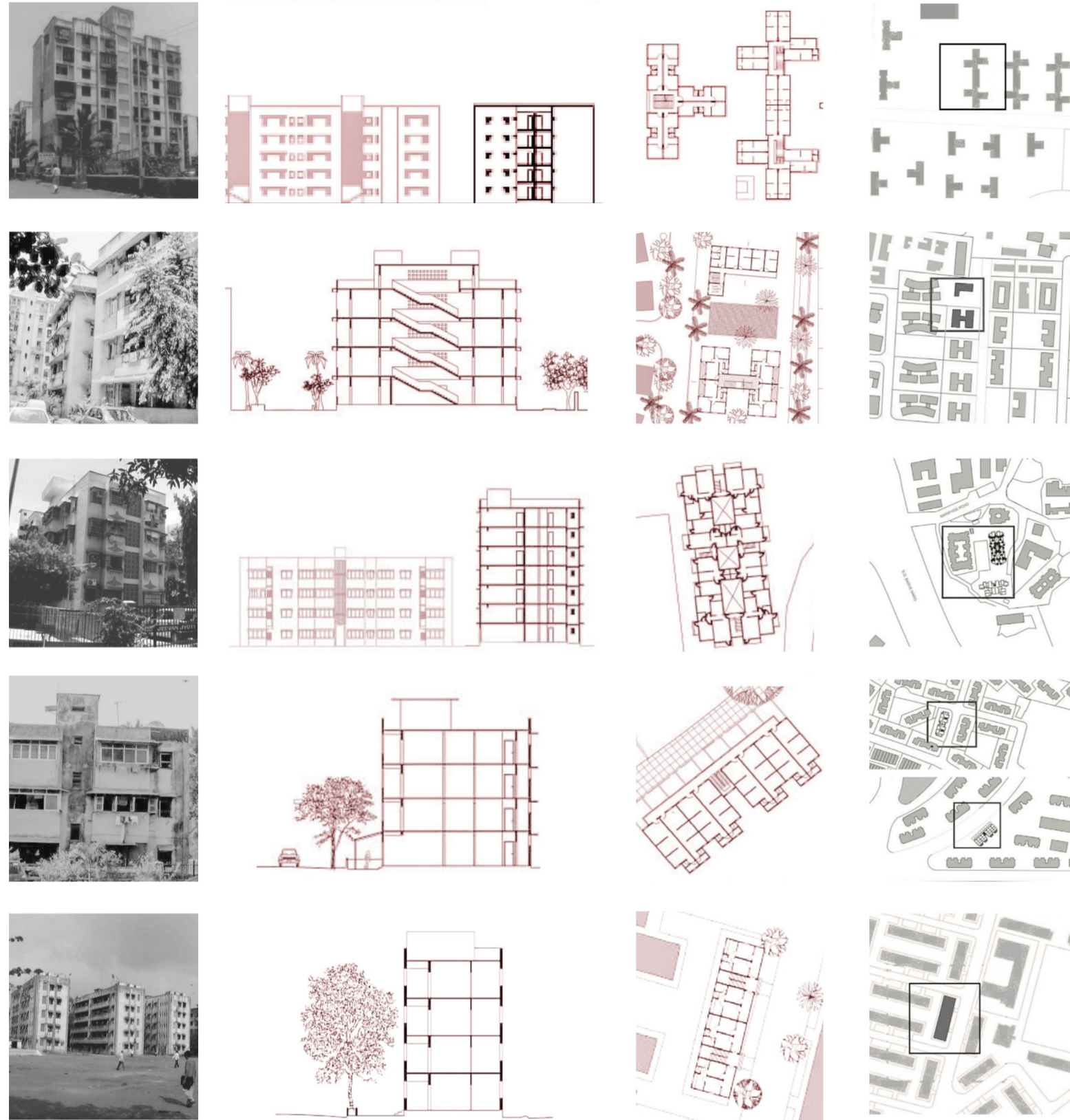
CURRENT MASS HOUSING CONSTRUCTION SYSTEMS
A - Component System, B - Panel Blocks, C - Monolithic Blocks
All these systems can bear certain additional load on the rooftop. Thus, timber rooftop extensions of such housing blocks are possible.

Even in high urban density, one can enjoy pure Light! Housing in India requires new solutions, with new materials and great comfort. We propose to enhance environment of the existing diverse urban housing, by adding 2-level CLT rooftop extensions.

Having analysed current construction methods, we highlighted three existing housing block constructions, which can bear additional load on the rooftop. Thus, we have considered five types of existing housing blocks in Mumbai, suitable for rooftop extensions.



MUMBAI HOUSING TYPES, SUITABLE FOR ROOFTOP EXTENSIONS * Data by CRIT, 2007



HOUSING TYPE 1 SAHYADRI COLONY

Mass Housing by the State after Independence
Average rooftop: 380 m²
Av. N^o of flats: 30/60

HOUSING TYPE 2 RESERVE BANK COLONY

Public Sector Employee Housing
Average rooftop: 140 m²
Average N^o of flats: 12

HOUSING TYPE 3 KALINA APARTMENTS

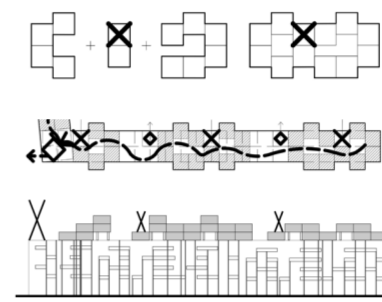
Mass Housing by the State after Independence
Average rooftop: 440 m²
Average N^o of flats: 32

HOUSING TYPE 4 DN NAGAR COLONY

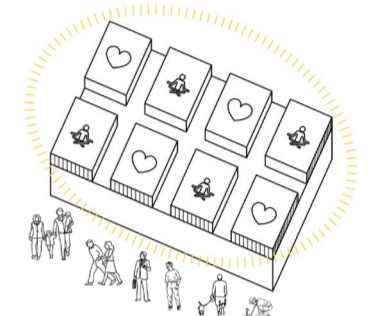
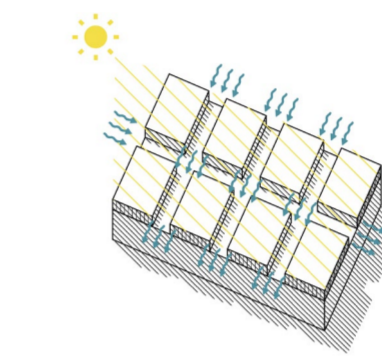
Mass Housing by the State after Independence
Average rooftop: 220 m²
Average N^o of flats: 12

HOUSING TYPE 5 PORT TRUST COLONY

Public Sector Employee Housing
Average rooftop: 240 m²
Average N^o of flats: 16



We address enjoyable high-density urban living, with new optimal daylight patterns. We propose Rooftop CLT Living Modules, which form cost-effective communities on existing urban dwellings, with balanced lighting in private and public spaces. The proposal attracts diverse consumers, provides new compact residence and increases livability of the existing housing plots. It adds social and economic value to the city. Our innovative Daylight Pattern forms a pleasurable game of light and shade in the rooftop dwellings, enhancing psychological comfort. It is an attempt to unite modern research findings and ancient Vaastu principles.



We propose a system of 2-level CLT Living Modules on top of existing housing blocks, with modern standards of insulation and ventilation.

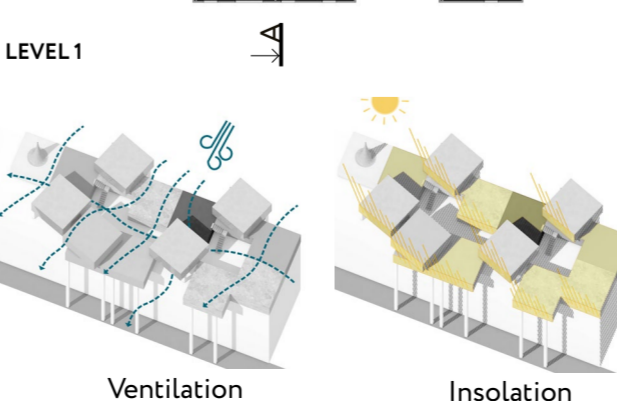
Our system also has an innovative daylight pattern, for the psychological comfort of residents in high-density urban living.

Our model is based on Urban Behaviour Research and Architectural Theory. Passing through a combination of light and shade in public and private spaces, a person feels 'enlightened'.



SOLUTION COST-EFFECTIVENESS

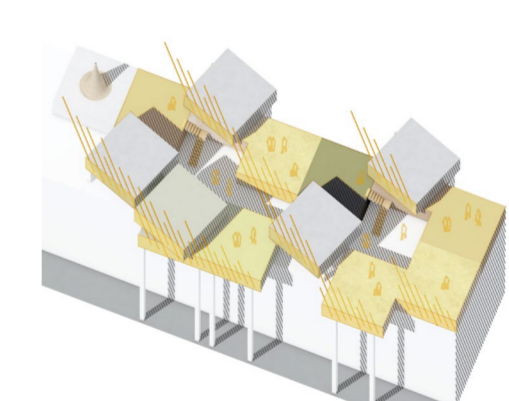
	TYPE 1	TYPE 2	TYPE 3	TYPE 4
MODULES NUMBER:	10	10	10	10
LIVING SPACE:	540m ²	486m ²	468m ²	486m ²
ROOFTOP FOOTPRINT:	198m ²	234m ²	234m ²	198m ²
PUBLIC SPACES:	198m ²	162m ²	162m ²	198m ²
FLOOR AREA:	432m ²	432m ²	432m ²	432m ²



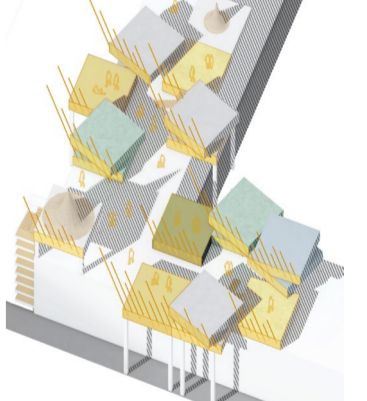
Ventilation

Insolation

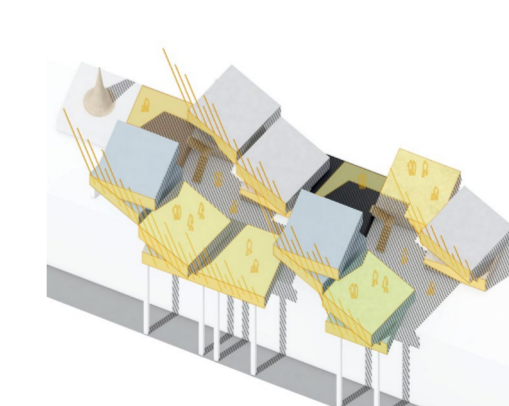
ROOFTOP HOUSING CLT EXTENSIONS



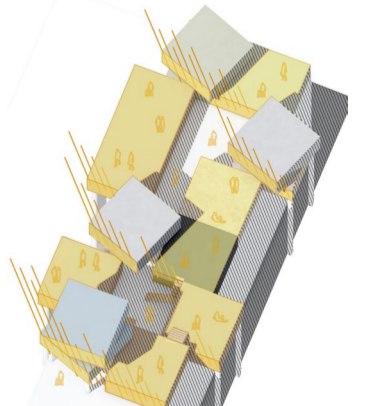
ROOFTOP COMMUNITY TYPE 1



ROOFTOP COMMUNITY TYPE 3



ROOFTOP COMMUNITY TYPE 2



ROOFTOP COMMUNITY TYPE 4

CLT LIVING MODULES BENEFITS

- + REUSE EMPTY ROOFTOP SPACE
- + ADD COMPACT LIVING SPACE
- + GATHER DIVERSE COMMUNITY
- + DISTRIBUTE COMFORTABLE DAYLIGHT PATTERNS
- + USE EXISTING INFRASTRUCTURE
- + ADD COMMUNITY PUBLIC SPACE
- + DIVERSIFY URBAN SKYLINE AND STREET LEVEL

CLT LIVING MODULES LIVABILITY

- + DIVERSE ROOFTOP APARTMENTS
- + SAFE ROOFTOP PUBLIC SPACES FOR ALL RESIDENTS
- + ADDITIONAL BALCONIES FOR EXISTING FLATS
- + STREET-LEVEL PARKLETS BETWEEN THE BEARING COLUMNS



CLT LIVING MODULES REPLICABILITY

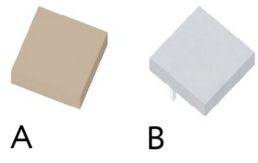
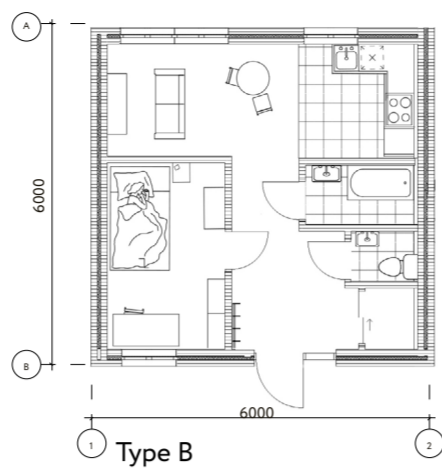
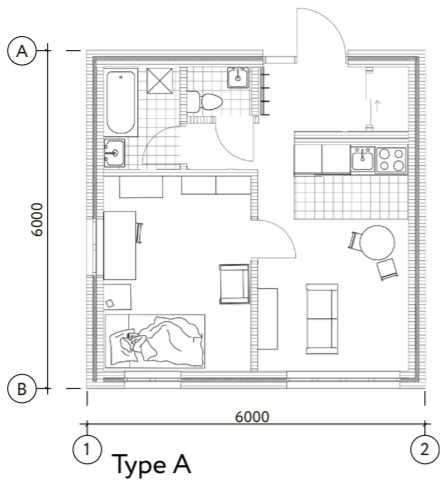
- + ADJUSTABLE TO ANY ROOFTOP
- + COMMON FOR MUMBAI'S INDUSTRIAL HOUSING BLOCKS

CLT LIVING MODULES IMPLEMENTABILITY

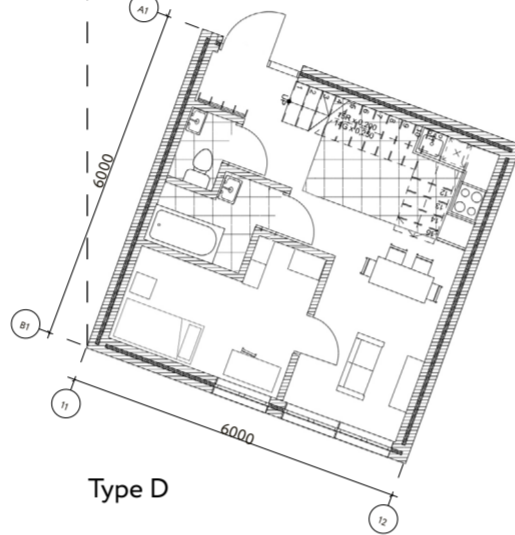
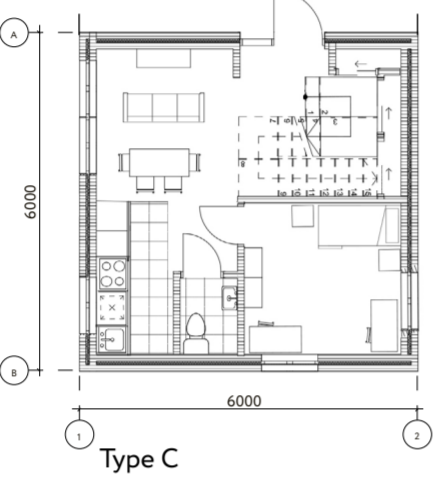
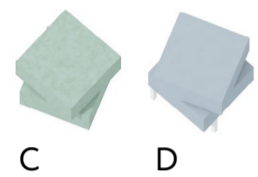
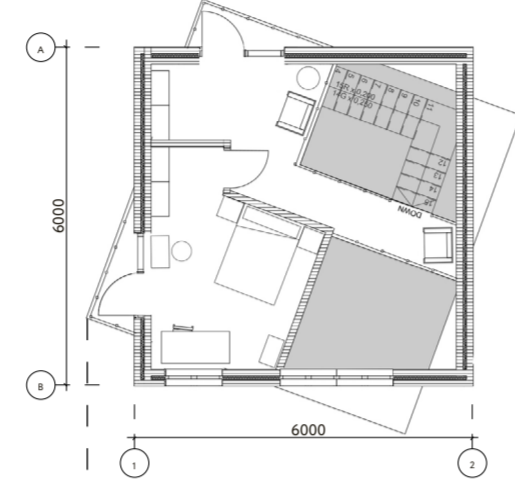
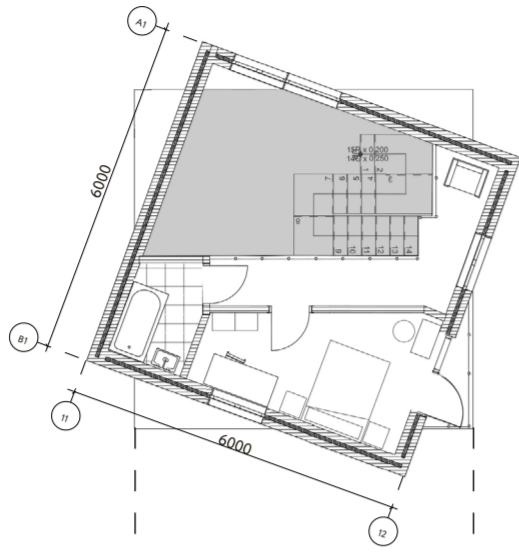
- + SUSTAINABLE TIMBER STRUCTURE
- + LIGHT IMPRINT ON EXISTING BUILDING

Modular apartments layouts

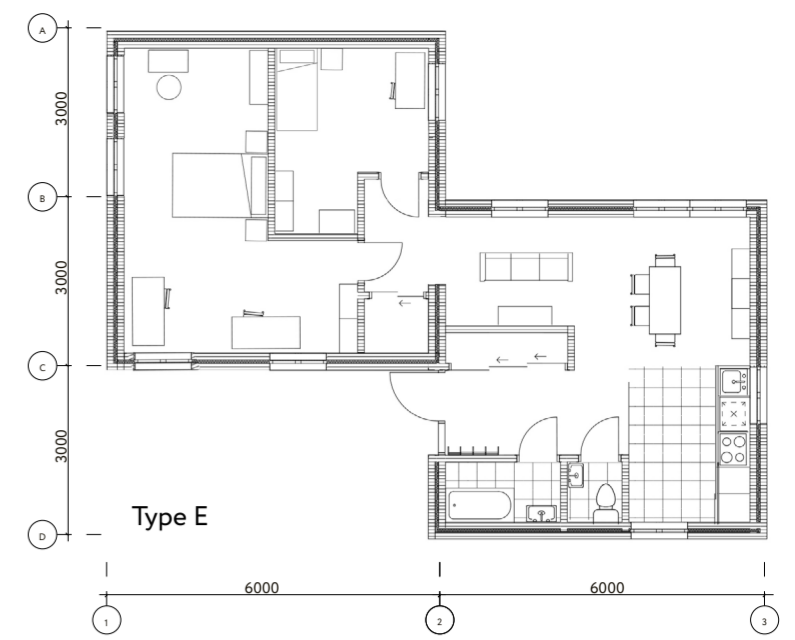
BASIC LIVING MODULES (A,B)
FOR:
 + STUDENTS
 + BUSINESS PEOPLE
 + SINGLE DWELLERS
 + TOURISTS
 + YOUNG COUPLES



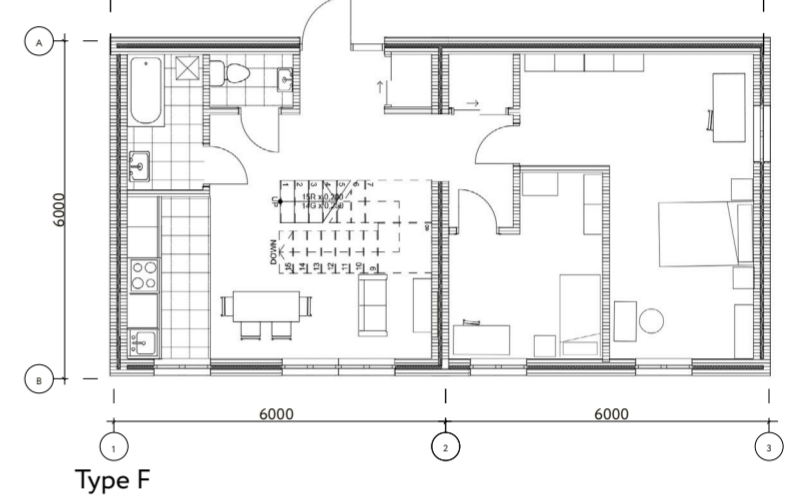
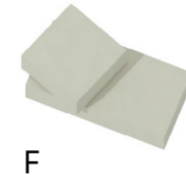
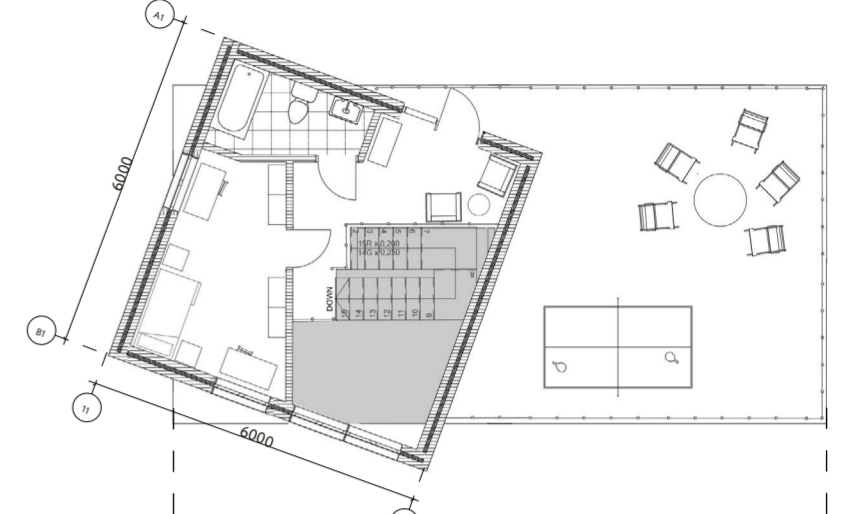
BASIC DOUBLE-HEIGHT LIVING MODULES (C,D)
FOR:
 + YOUNG COUPLES
 (+WORK-FROM-HOME)
 + RETIRED COUPLES
 + HOME+WORKSHOP FOR ENTREPRENEUR COUPLES (LAYOUT REORGANISED)



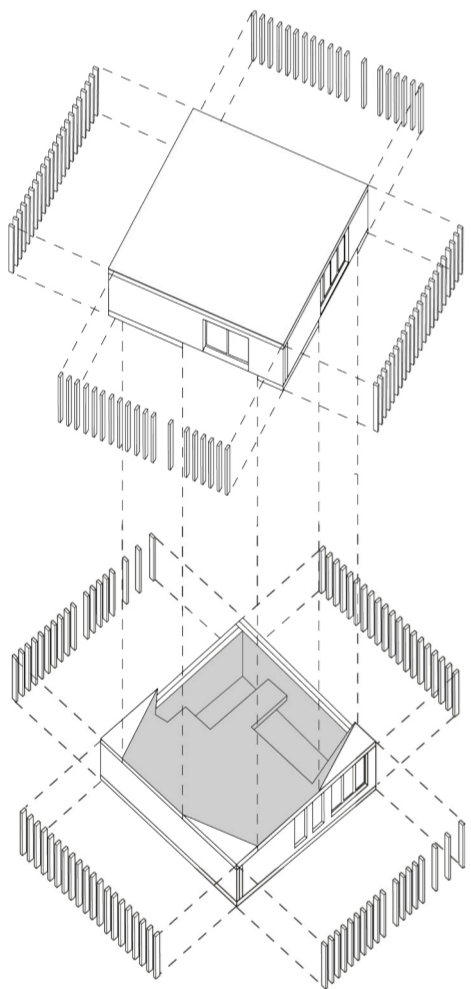
COMPLEX LIVING MODULE (E)
FOR:
 + EXTENDED FAMILIES
 (+WORK-FROM-HOME)
 + HOME+WORKSHOP FOR ENTREPRENEUR COUPLES (LAYOUT REORGANISED)



COMPLEX DOUBLE-HEIGHT LIVING MODULE (F)
FOR:
 + EXTENDED FAMILIES
 (+WORK-FROM-HOME)
 + CO-LIVING APARTMENT



Modular apartments structure



Rooftop Living Modules have flexible space programmes for diverse consumers. If a rotated Module is placed upon another, a 'spinned' double-height living space appears inside, as well as entresols and balconies. This reflects an idea of 'Space Dance' in ancient Indian dwelling architecture.

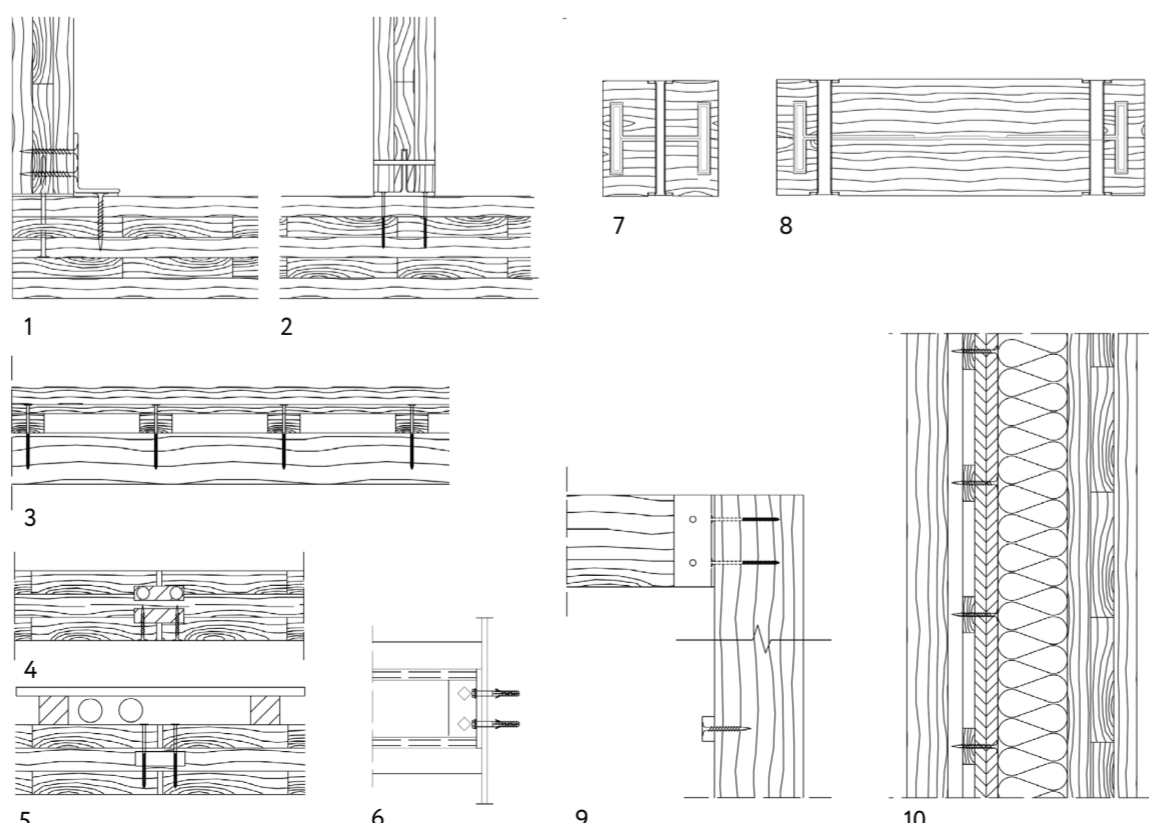
Rooftop Living Modules have CLT structure and timber finishing, which has a warm texture, pleasant for the eyes. Thus, they reduce CO2 emissions and have a light imprint on the existing building.

The Modules provide extra public spaces on the rooftop, like bike and pram storages and small businesses, held by the dwellers. Rooftop public spaces are accessible for all residents. The new bearing columns for some modules (CLT with a beam mandrel), which go from the rooftop down to the street level, also support additional balconies, increasing the living space of the existing flats. In between these columns, there are parklets on the street level, which enhance the pedestrian environment.



Facade

Construction details



- 1, 2 - living module slabs and walls joints
- 3 - rooftop timber covering
- 4 - living module wall fragment with embedded wiring
- 5 - living module floor fragment with embedded tubes
- 6 - balcony cross-beam anchorage
- 7 - CLT column with I-beam mandrel
- 8 - CLT pylon with I-beam mandrel
- 9 - balcony frame joint
- 10 - detailed facade section



Section A-A