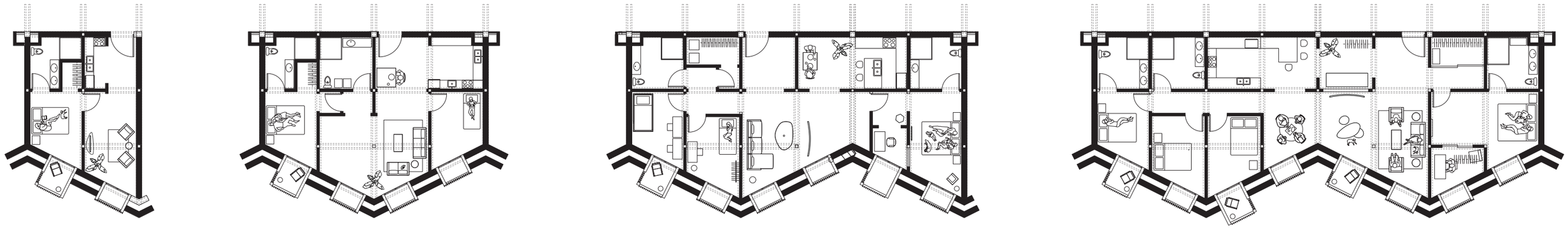
ROOM TYPOLOGIES



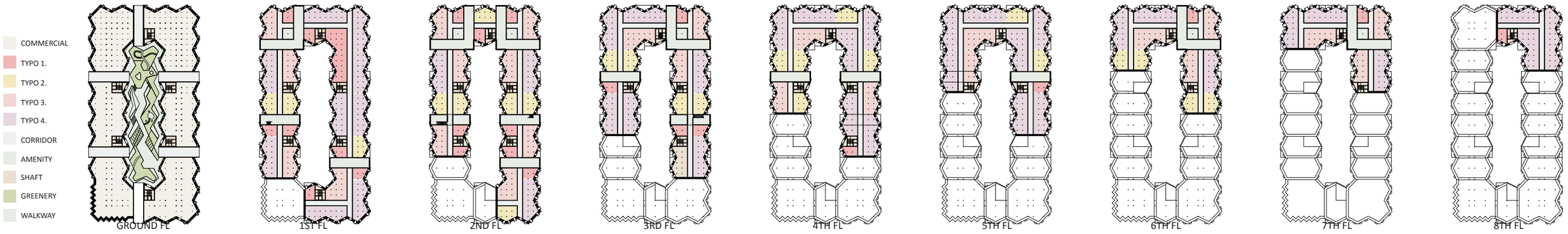
TYPOLOGY 1.
45 m^2
ONE - BEDROOM: 1B 1B

TYPOLOGY 2.
90 m^2
TWO - BEDROOM: 2B 2B

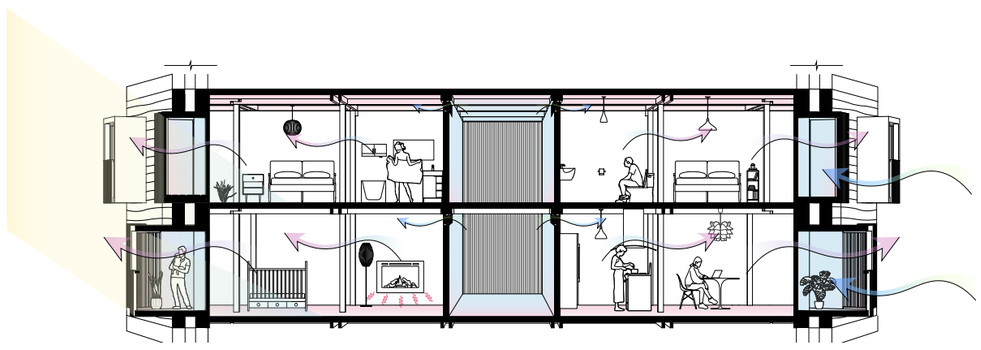
TYPOLOGY 3.
135 m^2
Three - Bedroom: 3B 2B

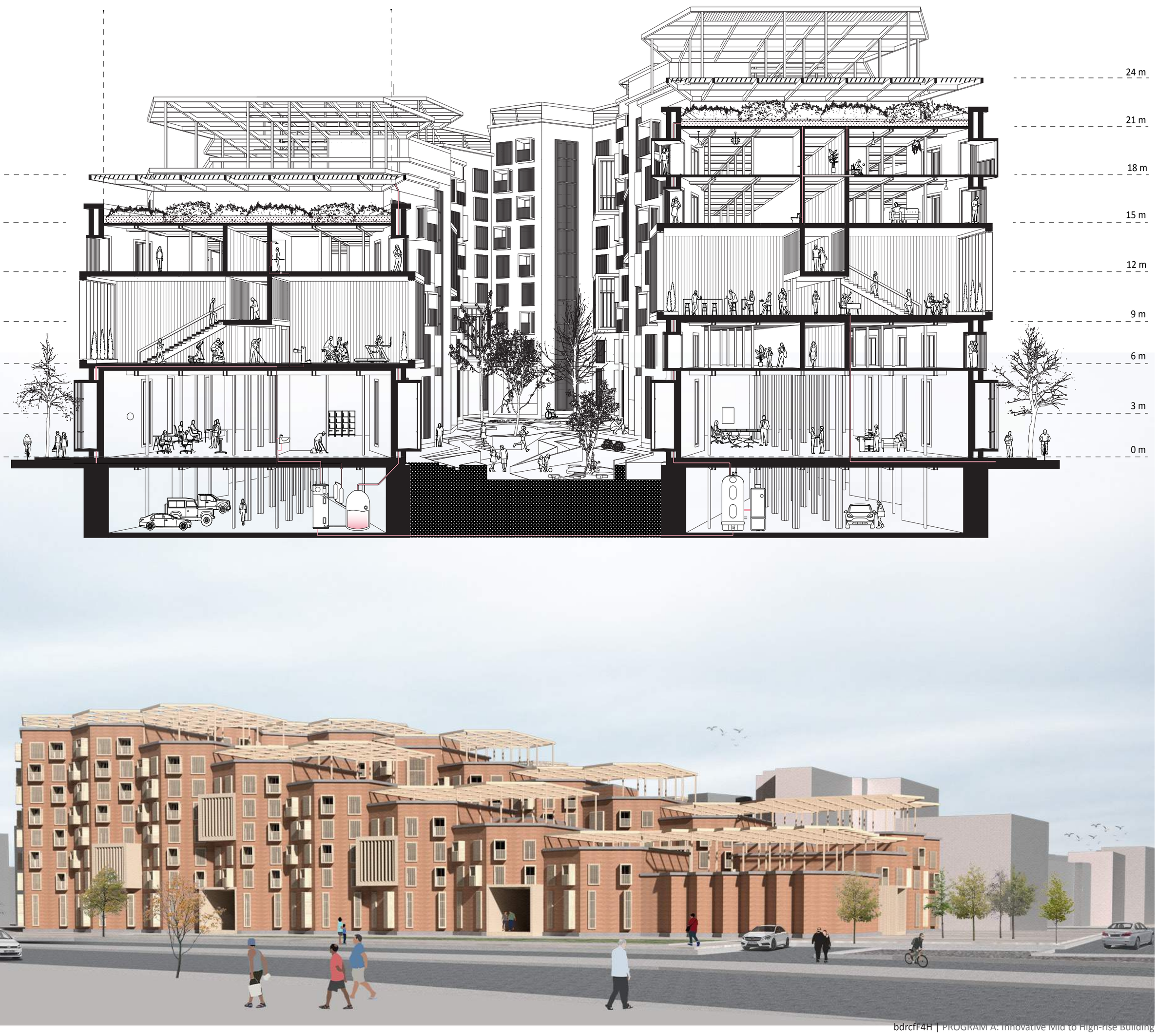
TYPOLOGY 4.
180 - 225 m^2
Four - Bedroom: 4B 3B

FLOOR PLANS



ROOM THERMODYNAMIC PERFORMANCE



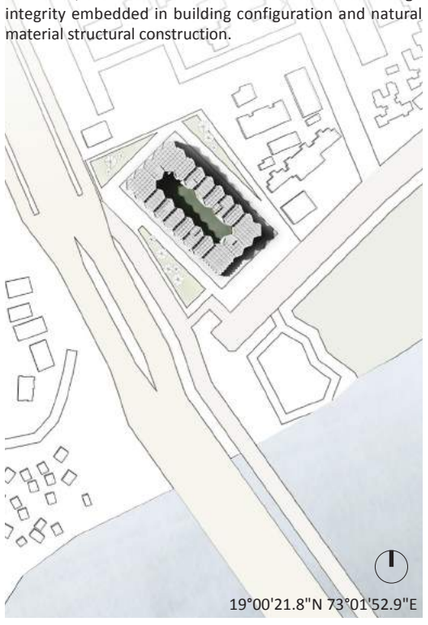


TERRA PERMEABLE

INTRODUCTION

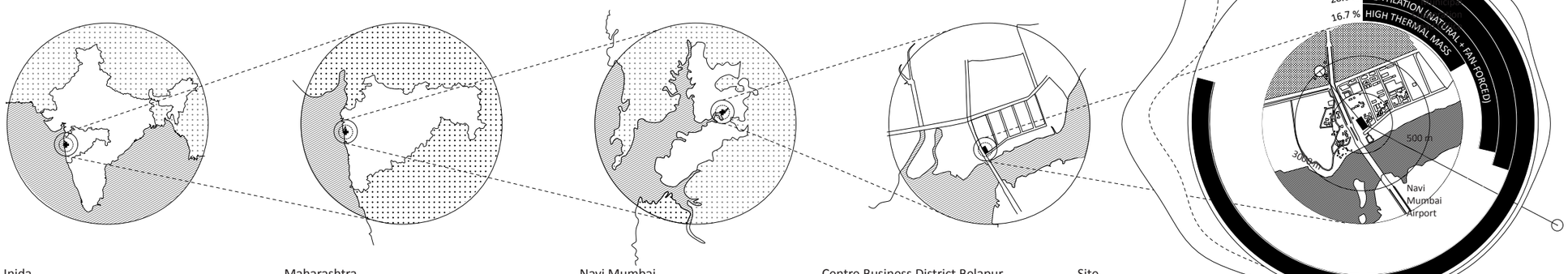
Named Terra Permeable, this project attempts to design transformative housing as an urban initiative with extending knowledge in the vernacular and modern construction in rammed earth and cross-laminated timber (CLT). With an economically-productive and ecologically-efficient perspective, Terra Permeable aims to maximize the performance between the innovative structure and local thermodynamics in a practical and holistic way.

According to the site climate analysis, sun shading, indoor dehumidification, and cooling strategies are strongly in need to maintain habitable comfort. Attempting to moderate the micro-climate within the design without simply treating those requirements with technical auxiliaries, the innovation in Terra Permeable is the design integrity embedded in building configuration and natural material structural construction.



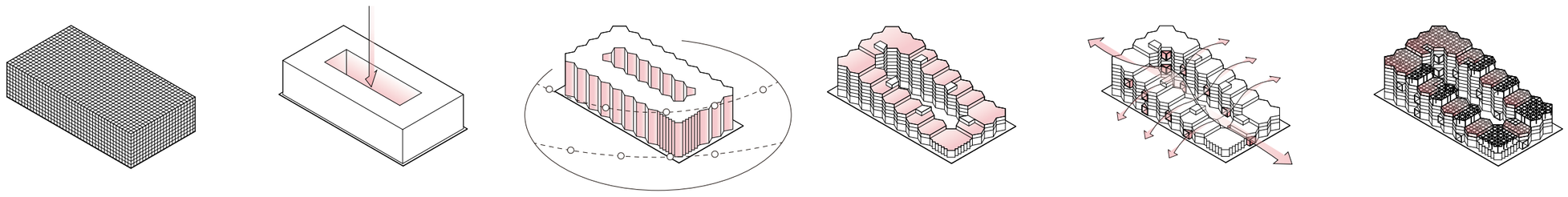
SITE CONTEXT

Navi Mumbai, as the largest planned city in the world, was originally designed to mitigate the overpopulation issue in Mumbai. Throughout decades, the development of this city could not keep pace with the rapidly growing population. Thoughtfully sustainable approaches and ecological building strategies have been compromised and substituted with the rapid assembly of concrete mass. This project aims to reclaim a perspective on evolving ecological urban housing design that is responsive to this underlying stressful and problematic urban situation. Our site is located at the waterfront of Panvel Creek in Navi Mumbai, expecting to highlight the social potentials aroused by adjacent engaging corporate agents, Municipal Headquarter, and the upcoming Navi Mumbai airport, and envisaging the future prospective visions of the flow of population and investment.

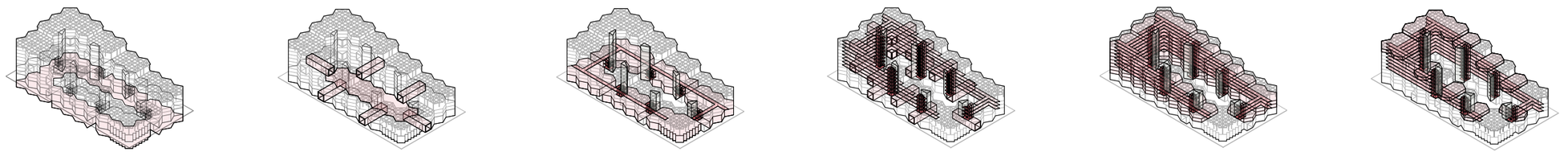


Inida | Maharashtra | Navi Mumbai | Centre Business District Belapur | Site

EVOLUTION + PROGRAMS

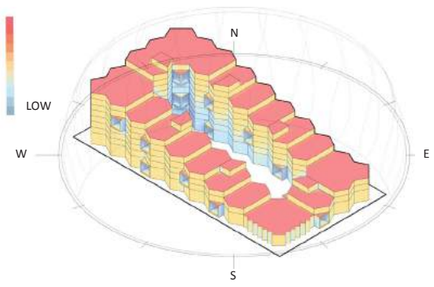


Sizing + Griding | Introducing Central Courtyard | Adjusting Facade Orientation | Maximizing Solar Gain | ENHANCING BUILDING POROSITY | CONFIGURING ROOF UTILIZATION



Parking | Courtyard | Commercial | Residential | Amenity Space | Green House + Green Roof

SOLAR GAINS



The building is built up with a double-layered rammed earth facade (stabilized and prefabricated), CLT internal structure, and poured earth foundation.

The meandering double facade prevent the excessive indoor humidity and reduce the heat transmission rate up to 50%. Besides, it offers extra stability and stabilizes the load-bearing performance of the high-rise rammed earth construction without a buttress.

Descending apertures from top to bottom facilitate thicker mass at the base, allowing lighter structure as it goes high to maintain robust structural integrity. During the construction, 2 cm (0.02 meter) terra-cotta erosion checks are placed at every 0.6 meters to prevent the earth's surface from weathering.

Following a structural grid of 6 meters, two sizes of light-weight columns (0.3 m and 0.15 m) are placed intermediately at an interval of 6 meters, and parallel beams go on the top along with the CLT slabs. Specifically, all amenity spaces has the double-height void which allows the continuous airflow through the building. In order to have an open space without columns, double-height CLT walls transfer the load to allow the large span to happen.

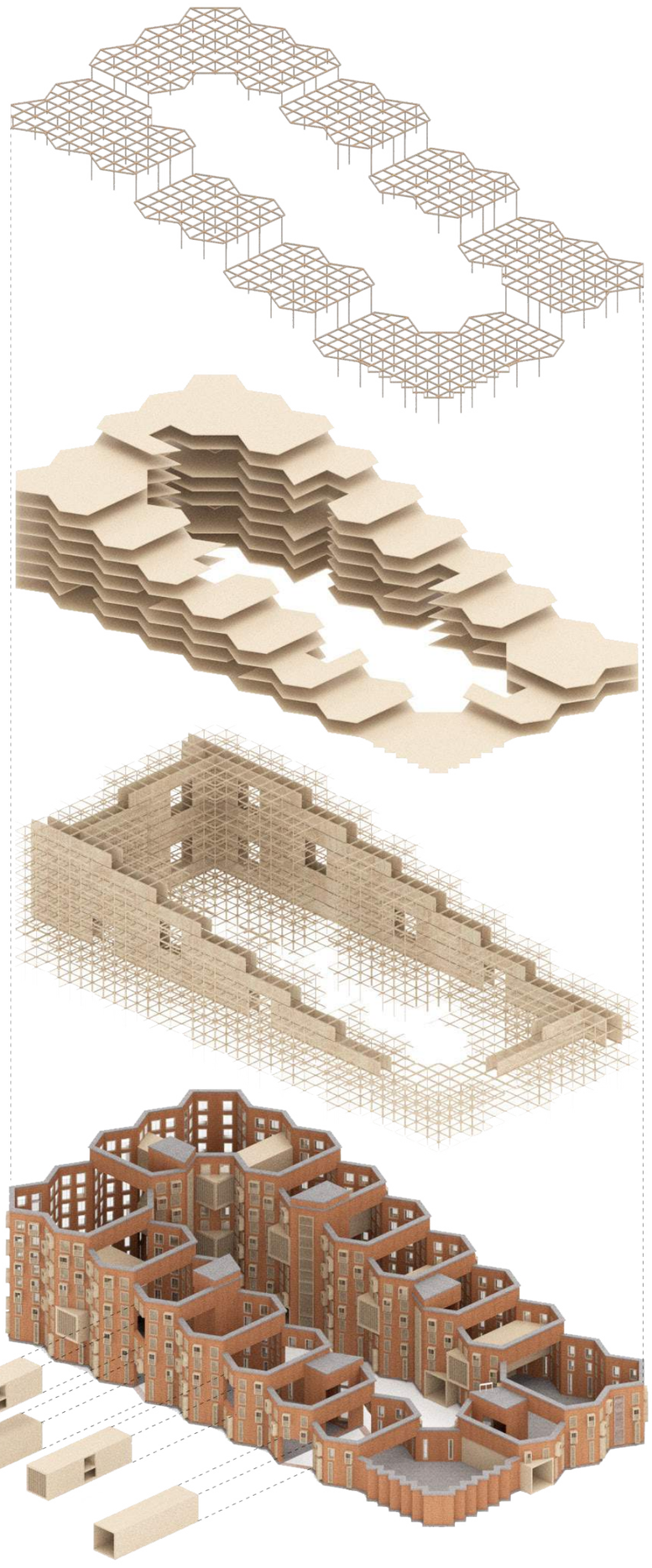
STRUCTURES

Timber Shading
Pergola

CLT Slabs

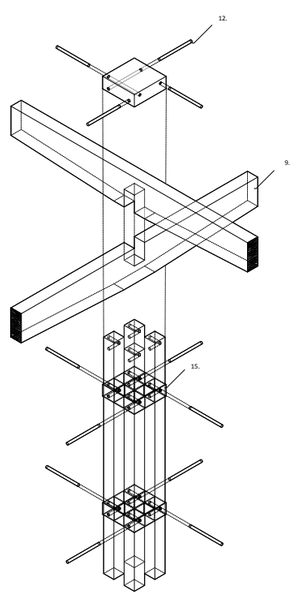
CLT Structure
(CLT Columns, GLT

Load Bearing
Rammed Earth Walls

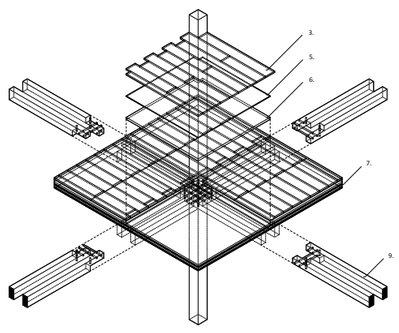


ASSEMBLY DETAILS

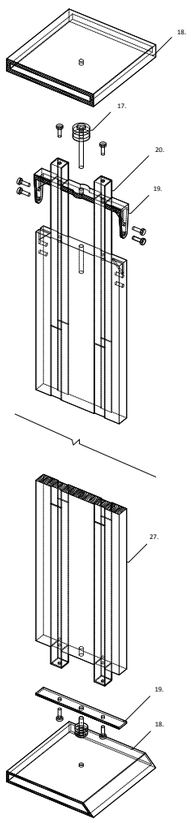
Roof Column + Beam Connection



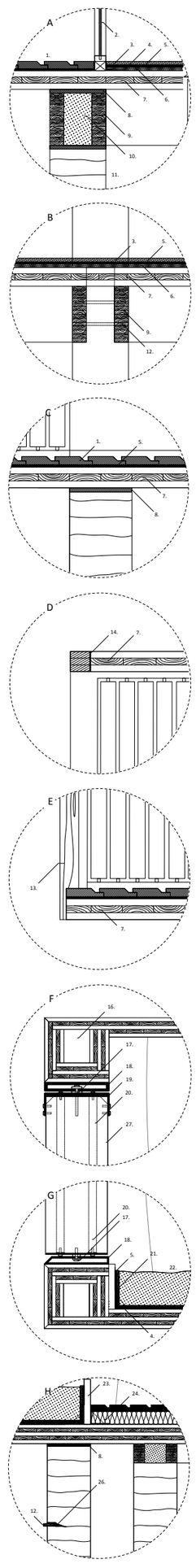
CLT Column + Beam + Slab Structure



Amenity Space GLT Ventilation Louver



CONSTRUCTION DETAILS



DETAILS LEGEND

1. Robonia Wood Flooring (40 mm)
2. Doubly Glazed Unit (10 mm)
3. Laminated Wooden Flooring (20 mm)
4. Water Isolation Bracket Corner (Typ.)
5. Waterproof Membrane (10 mm)
6. Knauf Brío Insulation (20 mm)
7. CLT Decking (100 mm)
8. Wooden Spacer (20 mm)
9. GLT Beam (75mm)
10. Sand Filling (150 mm)
11. Pre-fabricated Rammed Earth Wall
12. Wood Dowel (15 mm)
13. Timber Frame Railing (90 mm)
14. Heat Treated Wood Surface (Yaki Sugi)
15. M.S Steel Joint (5 mm)
16. CLT Beam (150 mm)
17. Ball Bearing Pivot Pin
18. Aluminum Track
19. Aluminum Pivot Bracket
20. Industrial Ratchet Strip (60 mm)
21. Root Barrier (10 mm)
22. Growing Media (20 - 25 mm)
23. Wooden Planter (50 mm)
24. Acoustic Insulation (100 mm)
25. Terracoda Erosion Check (20 mm x 80 mm)
26. Clay Mortar
27. GLT Louver Fin (480 mm)

RESIDENTIAL (3 m) + AMENITY (6 m) FACADE DETAILS