TwoUp

Decoding Timber Towers

The Urbanarium has inspired designers to pioneer affordable, low-carbon mass timber buildings that harness modular, prefabricated methods - transforming challenges into opportunities to fight climate change and redefine housing.

The Problem

High-rise buildings today rely on carbon-intensive concrete and steel, which are costly to construct and maintain. Inflexible designs limit adaptability, locking in embodied emissions for decades. Current ownership models often prioritize short-term sales over long-term stewardship, discouraging the use of sustainable materials, shared amenities, and adaptable layouts that are essential for reducing cost, carbon, and environmental impact.

An emphasis on efficiency over quality of life has produced isolating, single aspect units, deep corridors, and minimal outdoor space. Fixed layouts restrict resident agency and future adaptability, while a lack of shared spaces weakens community, disconnecting buildings from nature and the public realm.

The Solution

TwoUp envisions a living future rooted in nature: a mass timber superstructure with panelized light-wood, adapable, double-aspect, double-height subspaces designed for versatility, ventilation, and daylighting. A structural grid accommodates both residential and future commercial uses, allowing the building to evolve as community needs change. Proposed co-housing and rent-to-own units can adapt over time — shifting from open, airy live/work spaces to two-storey homes, or even commercial suites — cultivating a biogenic community with long-term resilience.

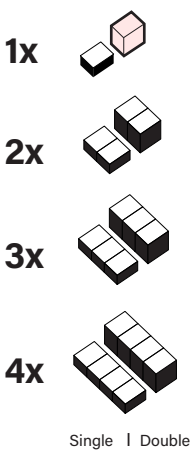
Through simple, repeatable forms, vibrantly composed to shape inviting spaces in-between, we can weave vertical villages - places where movement and gathering foster connection. In doing so, we nurture healthy communities while tackling the challenges of affordability and climate change.

Project Data

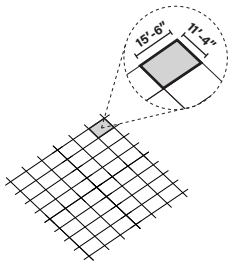
Site Area	Project Area	Floor Space Ratio
◇ 36,600 SF	◇ 146,766 SF	◇ 4.0

Occupancy ■ Residential **95%** (100% Capability) □ Commercial **5%** (100% Capability)	# of 2-Storey Flex Units **80** ⌂	Saleable **86,697 SF**
	Number of Storeys **18** ▤	Levels Below-Grade **00**
Site Coverage ◇ **39%**	$ Cost **431/ft2**	Efficiency ◇ **81%**

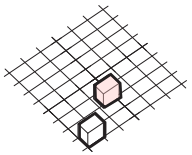
Step 01
Panelized Modules For Living



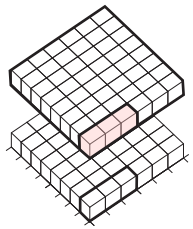
A **Living grid**
Standardized 15'-6" x 11'-4" grid to accommodate flexible living spaces and future commercial uses.



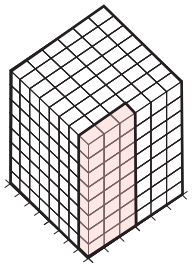
B **Panelized modules**
A double-height volumetric framework that allows 175 sq.ft panelized modules to stack.

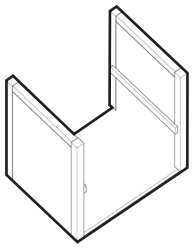


C **Baseline floor plate**
Panelized modules stacked and assembled in baseline 6,500 sq.ft tower floor plate sizes.

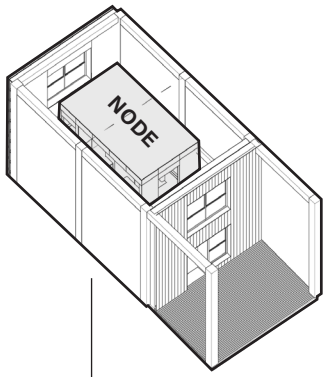


D **Baseline density & efficiency**
Floor plates replicated on all floors for max. efficiency.

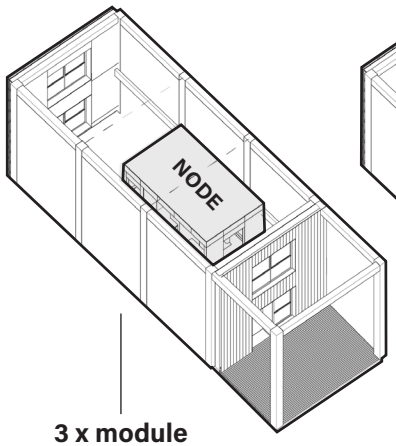




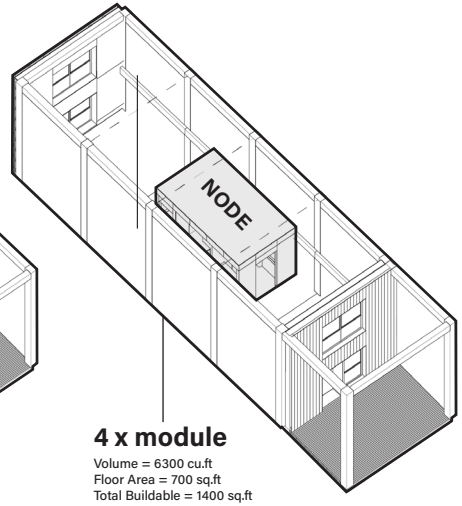
1 x module
Volume = 1575 cu.ft
Floor Area = 175 sq.ft
Total Buildable = 350 sq.ft



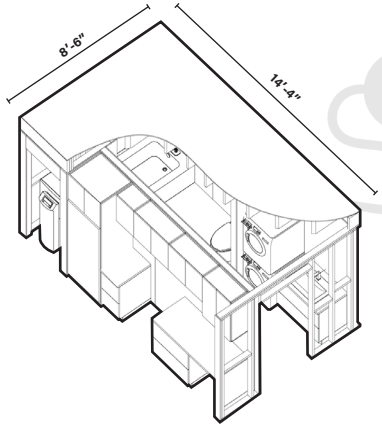
2 x module
Volume = 3150 cu.ft
Floor Area = 350 sq.ft
Total Buildable = 700 sq. ft



3 x module
Volume = 4725 cu.ft
Floor Area = 525 sq.ft
Total Buildable = 1050 sq.ft



4 x module
Volume = 6300 cu.ft
Floor Area = 700 sq.ft
Total Buildable = 1400 sq.ft

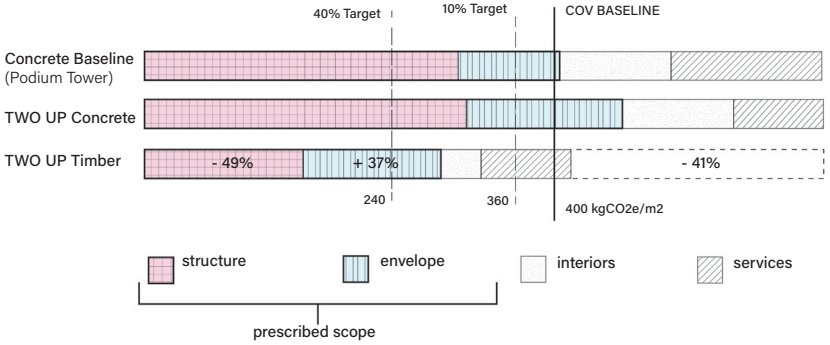


The 'NODE'
PLUG-IN

Volume = 1080 cu.ft
Total Buildable = 120 sq.ft

$+/- 410 per sq.ft

Municipal Carbon Targets



Resilient Frameworks

The simple grid can unlock the potential for high-density development without rigidity. Its clarity enables efficient stacking and repetition, while a two-storey framework can introduce vertical flexibility to shift between residential and commercial programs. This approach balances density with adaptability, ensuring buildings can evolve as urban needs change — from maximizing housing supply to accommodating future workspace or shared uses. Rather than prescribing fixed outcomes, the system offers a scalable, resilient strategy for intensification that remains open to long-term transformation.

Deconstructing 'The Baseline'

Converting a typical base-case concrete high-rise to mass timber using a simple grid could reduce embodied carbon by 20%, but this approach does not fully address climate resilience or social sustainability. What if the building were broken into smaller, stacked volumes with generous outdoor circulation that encourages social interaction and provides better access to outdoor spaces? Such circulation could support dual-aspect units, offering natural ventilation and daylighting, improving resilience to climate events like power outages while reducing reliance on mechanical systems.

Meeting the City of Vancouver's 10% embodied carbon reduction target—and aiming for 40% by 2030—required a rigorous, holistic approach. While our massing strategy offered key social benefits, it increased the envelope area, partially offsetting the carbon savings from switching to mass timber. To counter this, we prioritized low-carbon assemblies and targeted reductions across the structure, envelope, interiors, and building services.

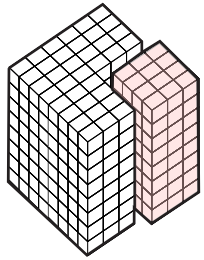
Recognizing that structure and envelope alone don't capture the full picture, we adopted a broader life cycle lens, including service life and interior systems, which can have equally significant carbon impacts.

Our double-height circulation strategy cut circulation material use by 50% per floor. We reinvested this into generous, social corridors, and by placing them on the exterior, we reduced conditioned space by 20%, improving passive performance.

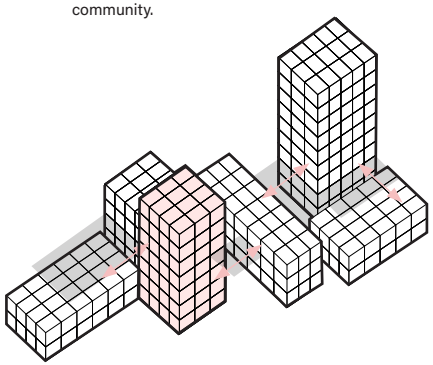
TWO UP Timber
41% less whole life carbon

Step 02
Human-Scale Communities

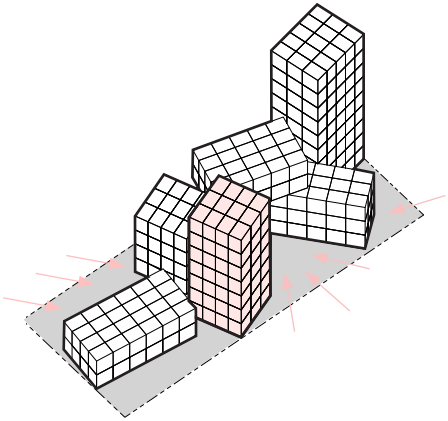
E **Dissect**
B. The massing is broken down into smaller volumes, offering dual-aspect floor plates that maximize daylight, ventilation, and views. Simplicity of form ensures construction efficiency, while the composition can create a more human-scaled rhythm.



F **Re-Arrange**
C. By redistributing and pulling apart the building volumes, pockets of 'negative' space emerge — outdoor rooms and circulation zones that invite neighbors to pause, connect, and build relationships, fostering a friendlier, more connected community.



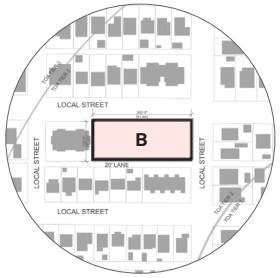
G **Place**
D. Volumes are angled to invite the community in, enhance streetscape vibrancy, and optimize unit performance by improving aspect, privacy, and airflow.



01 Wetlands
02 Events Hub
03 Community Garden
04 Bathhouse Sky Garden

Overall Building Axo & Circulation

Site B



- Located in TOA Tier 2
- Within 5 minute walk of rapid transit, shops, services and greenspace.
- Large block-end assembly of sixe 50' x 122' lots.
- North-facing peoperty fronting onto local residential street with lane access at the rear.

Amenities

Neighbourhood
1 x Street Plaza
1 x Cafe
1 x Event Space
1 x Bathhouse
1 x Childcare

Roof Top Amenity
10,774.67 SF

Essentials
1 x Bike Amenity
1 x Flex Space
1 x Work Space
1 x Community Kitchen

City Farming
# of Grow Boxes 12

Bike Stalls **350**

Gathering Space
28,362.9 SF

Vertical Village Size
144-200 Ppl


Events Hub


Mid-Block Courtyard and Plaza


Laneway Plaza

Development Scenario

Rent-to-own: Rent-to-own and co-housing – Rent-to-own helps tenants build toward ownership, while co-housing fosters shared, socially connected living with collaborative spaces and resources.

Commercial and community spaces: Shops, services, childcare, and shared amenities like a community kitchen, rooftop garden, and flexible workspaces support both rent-to-own and co-housing models, strengthening social connections and community ties.

Loose Fit, Long Life

Carbon & Cost Reduction Rational

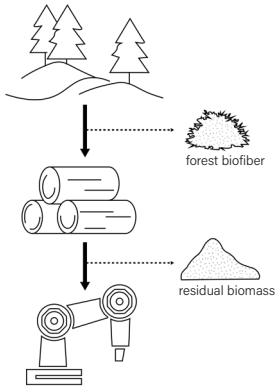
The most sustainable building is the one that already exists, the next most sustainable building is the one that will stay in use for a long time ensuring its materials remain in use. The best way to do that is to make it the space adaptable to change.

Building Elements with different service lives can be easily disassembled from one another Building as inventory - giving materials identity and value for re-use. Building and un-building - building sheathing, structure (longest lasting layer - 150 years) remains and can be adapted for commercial or residential uses.

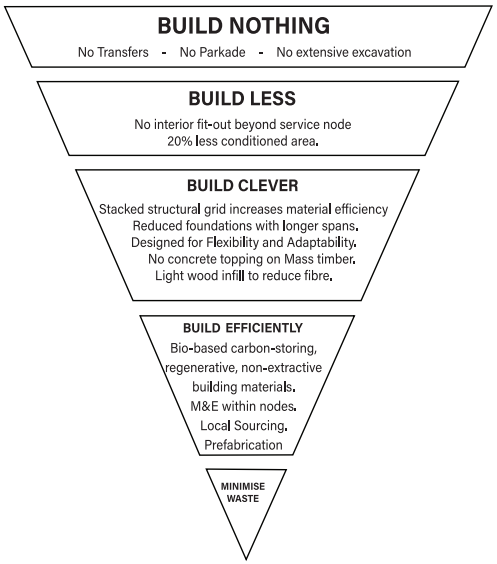
Tree-to-Trade

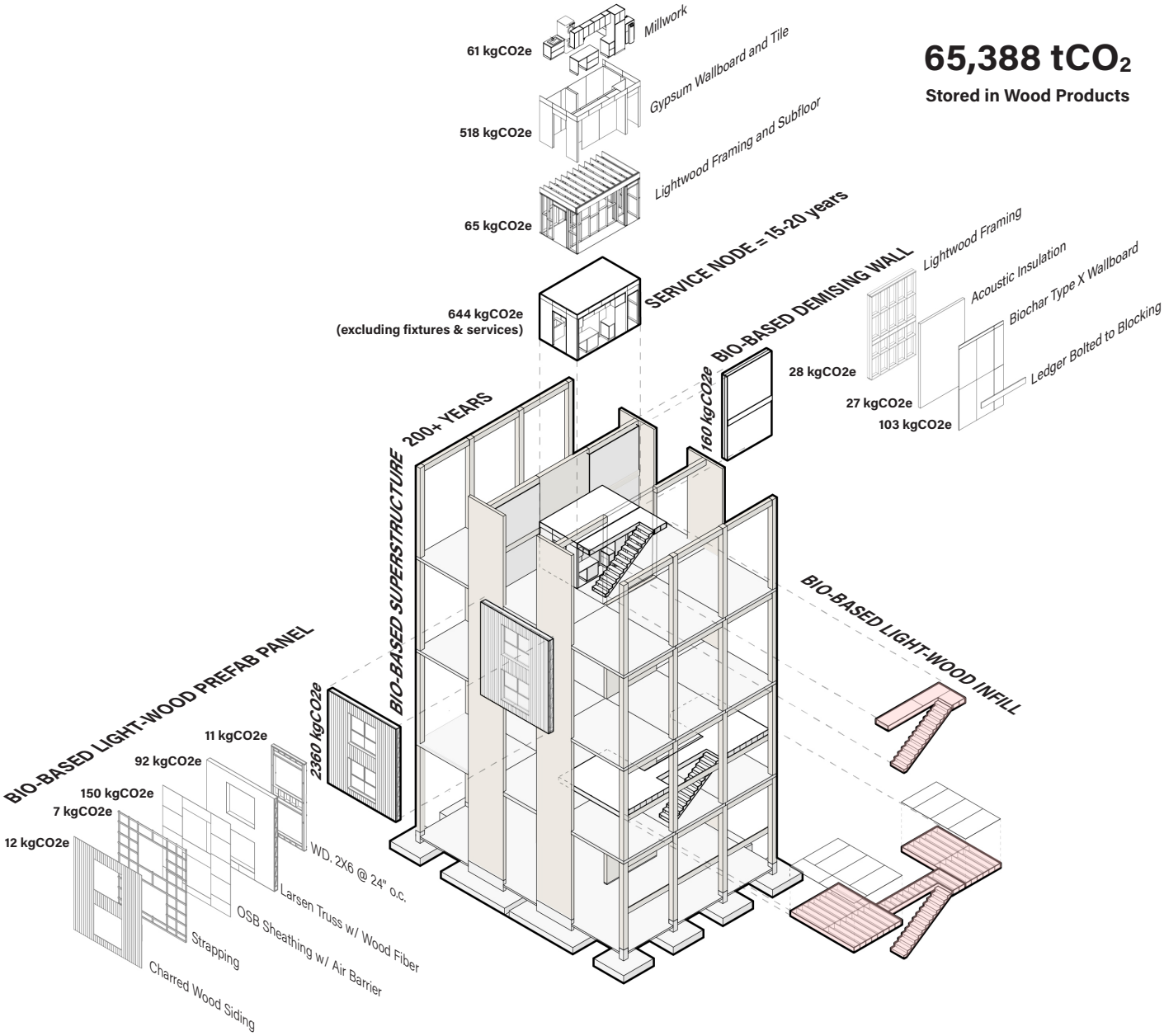
This approach shapes the design and construction by embedding regenerative materials and ensuring that every part of the tree is valued. From structure to finish, and even through the reuse of by-products, we are demonstrating how sustainable forestry can generate high-performance architecture while minimizing waste.

This process not only reduces carbon and celebrates renewable resources but also strengthens the trade industry—showcasing how regenerative practices can drive innovation, economic growth, and ecological resilience.



Hierachy of Net Zero Design

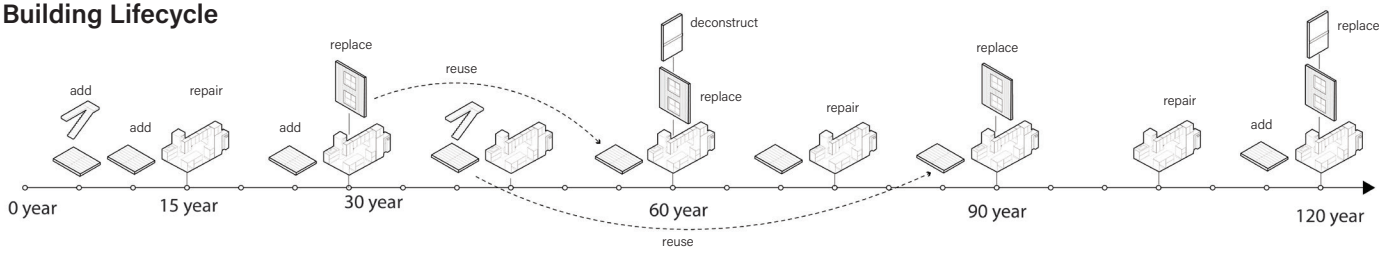




65,388 tCO_2

Stored in Wood Products

Building Lifecycle



Unlocking the Potential for Mass Timber

Decoding Timber Towers

To fully realize the benefits of timber high-rises, several existing barriers must be addressed. A framework that advances sustainable design - including a change to FSR rules, greater allowable timber exposure, single-stair strategies, stricter carbon limits, and expanded performance-based fire and bio-based material approvals - can better support the growth of the industry.

- **Flexible density tools for FSR calculations –** Vancouver zoning currently counts exterior circulation as FSR, which limits open-air design. Allowing these areas to be excluded, and calculating FSR based on potential floor area while valuing usable exterior space, could unlock greater creativity and efficiency.
- **Material Usage and Compatibility** - Supporting Mass Timber higher buildings that combine light wood framing with mass timber requires updates to current code requirements. Mass timber could provide primary load-bearing capacity, while light wood framing could support non-structural partitions, façade elements, and interior finishes.
- **Safety through innovation** – Single-stair strategies and performance-based approvals for bio-based materials need to be more aligned with global best practices.
- **Climate accountability** – Stricter embodied carbon limits and encouragement of regional sourcing to strengthen local economies and reduce transport impacts.

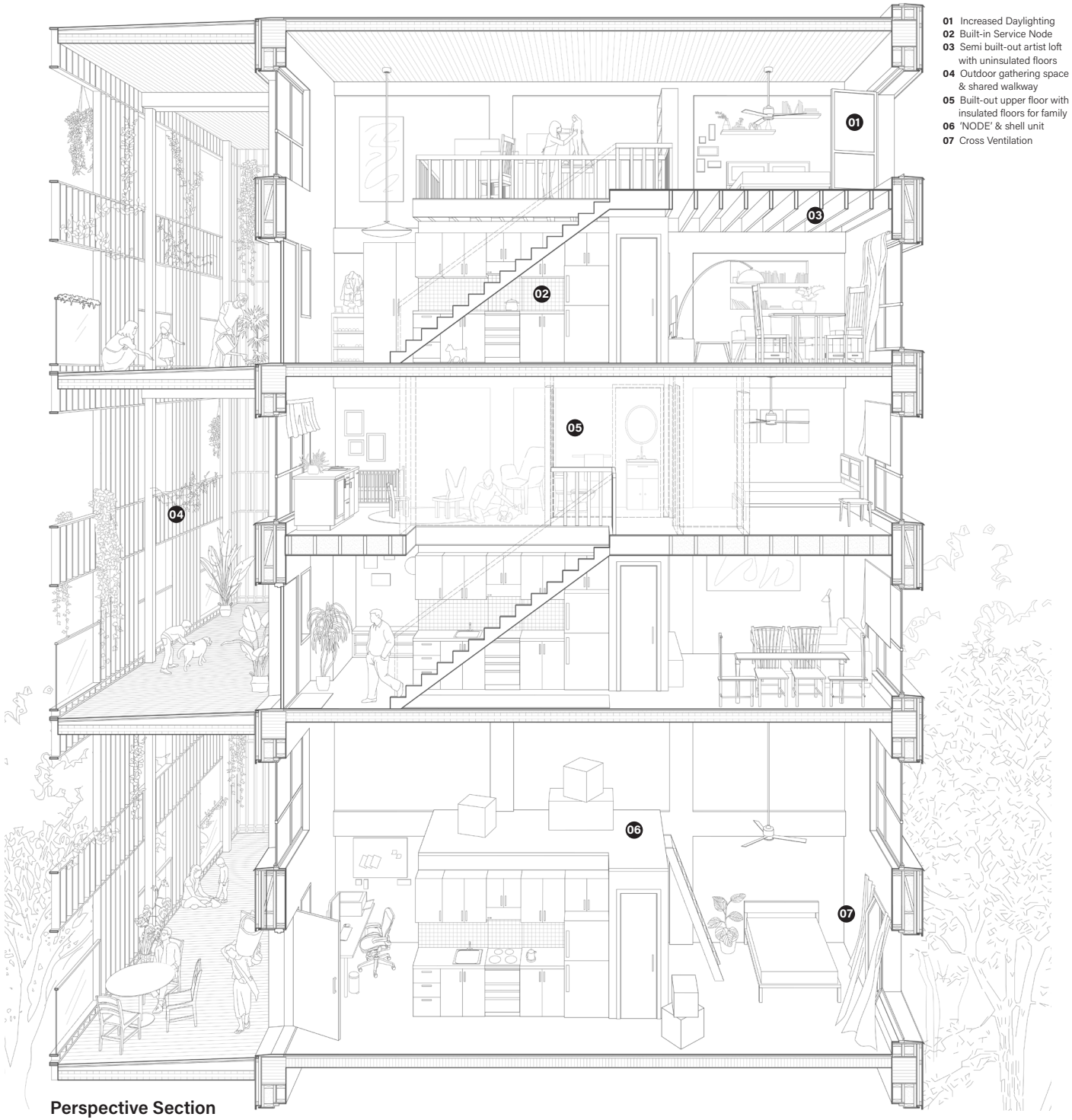
Level 05 Plan

Level 01 Plan

01 East Lobby and Bike Amenity
02 Street Plaza and Courtyard Gardens
03 Wetlands
04 West Lobby
05 Cafe
06 Services/ Loading
07 Exterior Walkways/Gathering
08 Double-Height Lofts
09 Public Rooftop Gardens
10 Circulation Stairs

Skyline View

Rooftops and Bathhouse



01 Increased Daylighting
02 Built-in Service Node
03 Semi built-out artist loft with uninsulated floors
04 Outdoor gathering space & shared walkway
05 Built-out upper floor with insulated floors for family
06 'NODE' & shell unit
07 Cross Ventilation

Perspective Section

Rooftop Gardens

Exterior Walkways

Connecting People and Space

Dual-Flow Community

This community fosters sociability through circulation and visual connections that also serve as gathering spaces. Arranged as micro-villages or community plateaus, it cultivates a biogenic sense of place. Dual-aspect units maximize daylight and airflow, promoting comfort, well-being, and a stronger connection between people and their environment.

The Model Ahead

TwoUp reimagines high-density living as adaptable, resilient, and community-focused. Replacing rigid, carbon-intensive structures with flexible mass timber superstructures, it incorporates light-wood frame prefabricated double-aspect homes and thoughtfully designed shared spaces, maximizing the efficiencies of mass timber fabrication and minimizing waste. This vision integrates sustainability, affordability, and well-being, creating vertical villages that evolve with residents' lives while reducing environmental impact.