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JUNE 2025

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HOME TO FORK

scale food security

DOUGLAS FIR RAFTERS
Used for durability and lower cost than oak or robinia.

ECOCOCON STRAW PANELS
Lightweight panels with pine structural frame and compacted straw infill for maximum biodegradability and insulation. Straw is a carbon sequestering material that is a by-product of wheat crop.

LVL RING BEAM
Engineered wood used in limited applications where necessary. LVL is used to evenly distribute load of first floor straw panels.

PIER AND BEAM FOUNDATION
Uses less concrete and steel rebar than traditional foundation. Lighter weight better suited for polder soil conditions. Beam resting on concrete made of oak for durability and lower cost compared to robinia.

WATTLE AND DAUB WALL
Used for various sections of integrated greenhouse for high thermal mass. Prevents overheating during summer and radiates heat during winter. Made with douglas fir frame, hazel weave, and mixture of earth and straw infill.

COMPRESSED EARTH BLOCK WALL
High thermal mass wall in the center of the house. Blocks created with compressed mixture of unfired clay and sand. Can be composted.

ROBINIA RETAINING WALL
Robinia lumber creates steps for access and stepped greywater filter system on front end. Robinia chosen for durability, rot-resistance, and ability to be mulched at the end of lifespan. Lightweight compared to concrete.

INVERTED ROOF
Oak used for frame of integrated greenhouse for durability and length of lumber. Timber joints are reinforced with robinia dowels. Steel tension rods are used for resisting lateral forces.

OAK TIMBER FRAME
Oak used for frame of integrated greenhouse for its durability and length of lumber. Timber joints are reinforced with robinia dowels. Steel tension rods are used for resisting lateral forces.

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exploded axon

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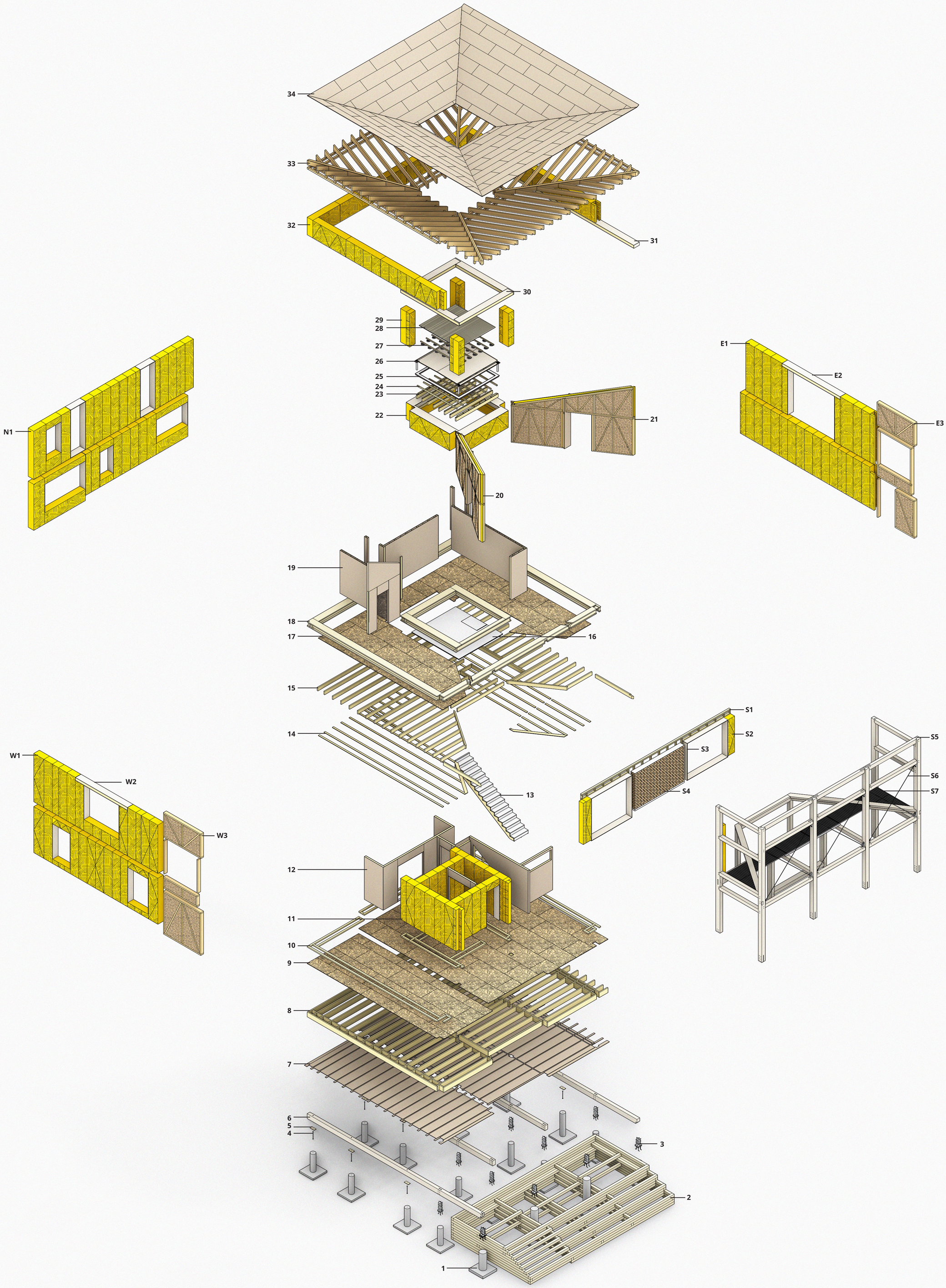

1. concrete pier and footing l-shaped steel rebar
2. robinia retaining wall with stepped greywater filter beds
3. steel knife plate joint with l-shaped anchors and bolts
4. steel anchor bolt
5. robinia shim
6. oak beam
7. dhf vapor permeable sheathing panel
8. pine joist (ground floor)
9. osb panel subfloor (ground floor)
10. pine weight distribution ring
11. ecococon straw panel
12. ground floor interior wall, pine studs with dhf sheathing
13. pine frame stairs with oak finish
14. pine ceiling batten
15. pine joist (first floor)
16. osb subfloor with oak floor and trapdoor (first floor)
17. osb panel subfloor (first floor)
18. laminated veneer lumber weight distribution ring
19. first floor interior wall, pine studs with dhf sheathing
20. wattle and daub wall made of douglas fir frame, hazel wattle, clay daub
21. wattle and daub wall made of douglas fir frame, hazel wattle, clay daub
22. ecococon straw panel
23. pine joist (terrace)
24. pine firring strip
25. steel gutter with pebble filter
26. plywood subfloor with waterproof membrane
27. plastic decking pedestal with robinia joist
28. robinia decking
29. ecococon straw panel
30. laminated veneer lumber and plywood box element
31. laminated veneer lumber and plywood box element
32. ecococon straw panel
33. douglas fir rafter
34. dhf vapor permeable roof sheathing panel

N1. ecococon straw panel
E1. ecococon straw panel
E2. laminated veneer lumber header
E3. wattle and daub wall made of douglas fir frame, hazel wattle, clay daub

S1. pine stud wall
S2. ecococon straw panel
S3. plywood rough opening
S4. compressed earth block wall
S5. oak timber column
S6. steel tension rod
S7. steel walkway
W1. ecococon straw panel
W2. laminated veneer lumber header
W3. wattle and daub wall made of douglas fir frame, hazel wattle, clay daub

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structure

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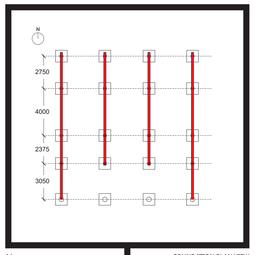
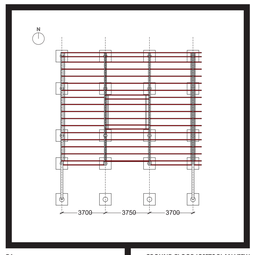
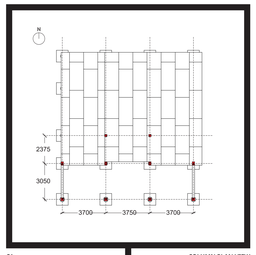


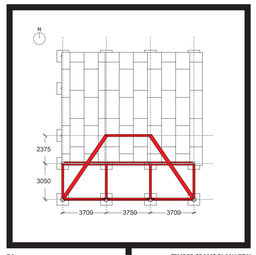
A1 FOUNDATION PLAN VIEW



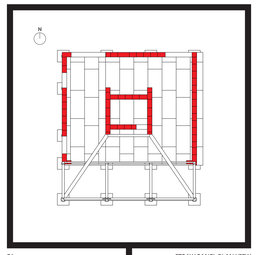
B1 GROUND FLOOR JOISTS PLAN VIEW



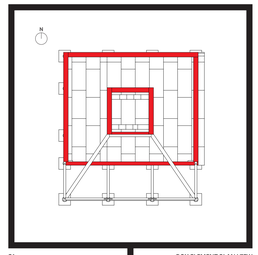
C1 COLUMN PLAN VIEW



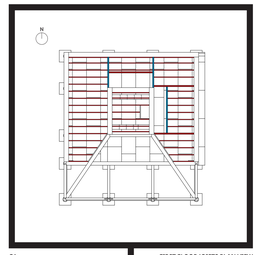
D1 TIMBER FRAME PLAN VIEW



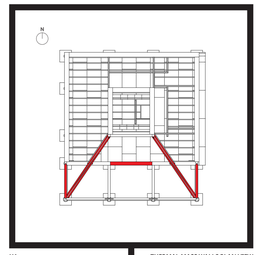
E1 STRAW PANEL PLAN VIEW



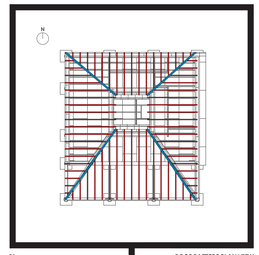
F1 BOX ELEMENT PLAN VIEW



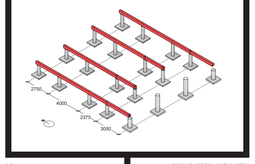
G1 FIRST FLOOR JOISTS PLAN VIEW



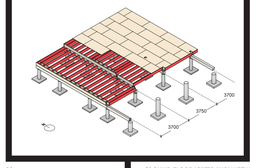
H1 THERMAL MASS WALLS PLAN VIEW



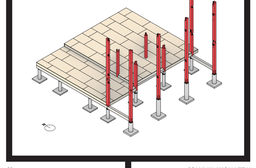
I1 ROOF RAFTERS PLAN VIEW



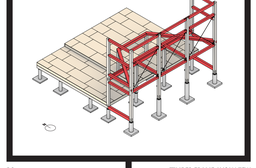
A2 FOUNDATION AXON VIEW



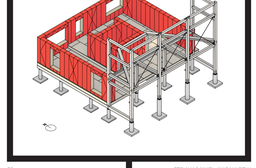
B2 GROUND FLOOR JOISTS AXON VIEW



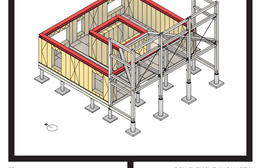
C2 COLUMN AXON VIEW



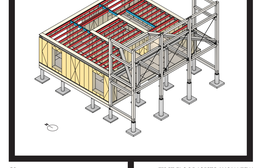
D2 TIMBER FRAME AXON VIEW



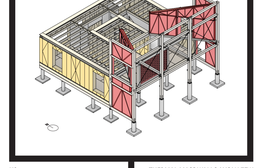
E2 STRAW PANEL AXON VIEW



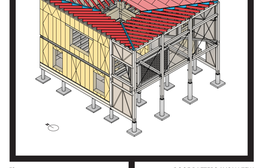
F2 BOX ELEMENT AXON VIEW



G2 FIRST FLOOR JOISTS AXON VIEW



H2 THERMAL MASS WALLS AXON VIEW



I2 ROOF RAFTERS AXON VIEW

Pier and beam foundation uses less concrete and steel rebar than traditional foundation. Lighter weight is better suited for polder soil conditions. L-shaped rebars reinforce concrete. Beam is made of oak for durability. Robinia shims are placed between oak beams and concrete piers. Beams are held in place with steel anchor bolts.

A3 FOUNDATION TEXT

Pine floor joists are placed on top of oak beams. Spaced 600 mm on center with 3700 mm spans. 1200 x 2400 x 21 mm plywood panels are placed on top of the pine joists.

B3 GROUND FLOOR JOISTS FLOOR TEXT

Vertical oak columns are used for integrated greenhouse secton of the house. Knife plate anchored in concrete pier is bolted to oak beam and oak column to resist tilting of columns.

C3 COLUMN TEXT

Oak blocks secured using robinia dowels create joint between beams and columns for added strength and stability. Timber to timber connections are made using wood joints instead of steel for easier demountability and reduced embodied energy.

D3 TIMBER FRAME TEXT

Straw determined to have lowest embodied energy and good insulation properties among biodegradable materials. Panels made with pine frames and straw infill are used for walls and structure. Design was made following construction manual of Ecococon straw panels.

E3 STRAW PANEL TEXT

Ring beam between ground and first floor is made with laminated veneer lumber for uniform distribution of weight. Floor joists rest on ring beam. Out edges are insulated with hempwool. Engineered wood is not biodegradable and is thus used for limited applications when necessary.

F3 BOX ELEMENT TEXT

Double floor joists used for openings in first floor. Openings are made for double height spaces and stairwell openings.

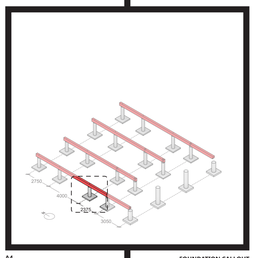
G3 DOUBLE JOISTS TEXT

Two types of high thermal mass walls are used for the integrated greenhouse. Compressed earth block wall is used on ground floor due to superior thermal mass. Wattle and daub walls made of douglas fir frame, hazel wattle, and clay daub is used for upper floors due to relatively lighter weight.

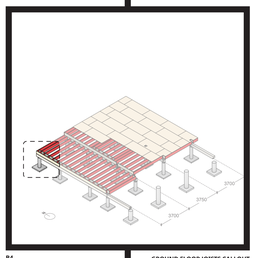
H3 THERMAL MASS WALLS TEXT

Douglas fir is used for inverted roof rafters. Spacing is made at 625 mm on center to account for dimensions of standard DHF vapor-permeable boards. Boards are nailed into place. Careful calculations are necessary for roof design due to irregular shape.

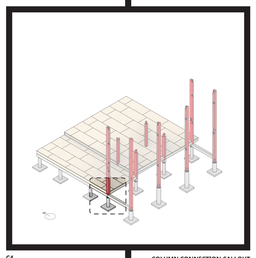
I3 ROOF RAFTERS TEXT



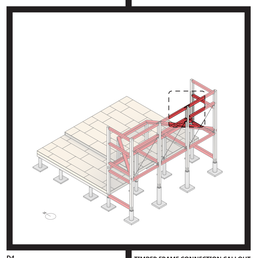
A4 FOUNDATION CALLOUT



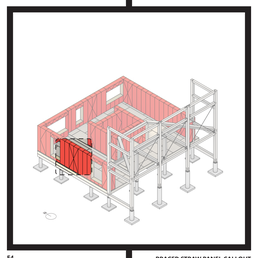
B4 GROUND FLOOR JOISTS CALLOUT



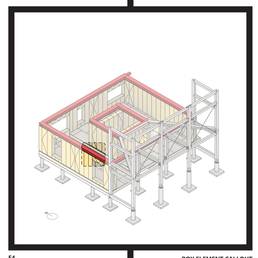
C4 COLUMN CONNECTION CALLOUT



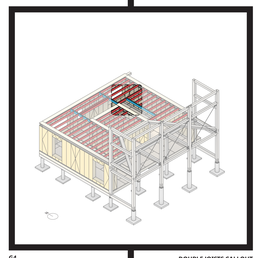
D4 TIMBER FRAME CONNECTION CALLOUT



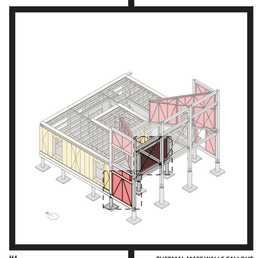
E4 BRACED STRAW PANEL CALLOUT



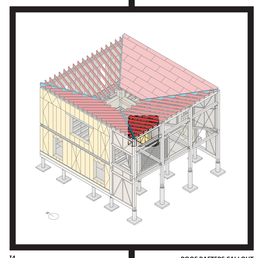
F4 BOX ELEMENT CALLOUT



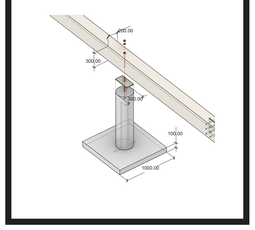
G4 DOUBLE JOISTS CALLOUT



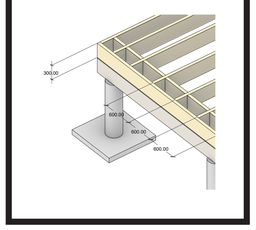
H4 THERMAL MASS WALLS CALLOUT



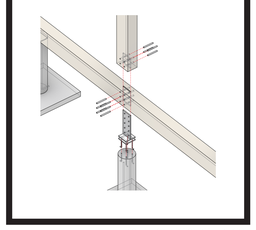
I4 ROOF RAFTERS CALLOUT



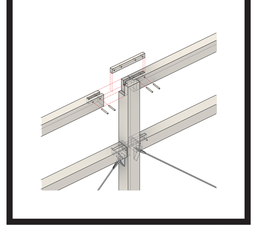
A5 FOUNDATION DETAIL DIAGRAM



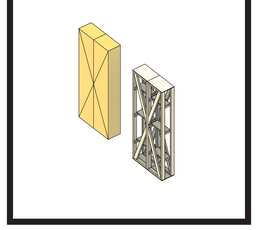
B5 GROUND FLOOR JOISTS DETAIL DIAGRAM



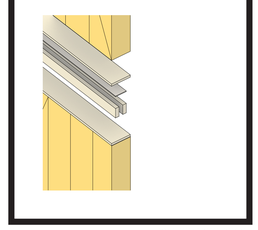
C5 COLUMN CONNECTION DETAIL DIAGRAM



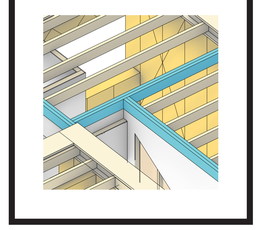
D5 TIMBER FRAME CONNECTION DETAIL DIAGRAM



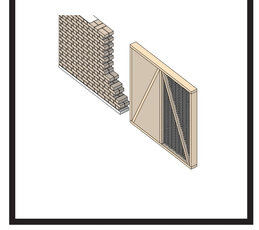
E5 BRACED STRAW PANEL DETAIL DIAGRAM



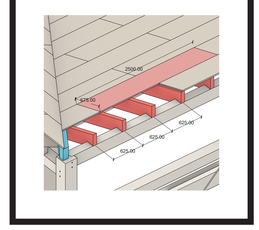
F5 BOX ELEMENT DETAIL DIAGRAM



G5 DOUBLE JOIST DETAILS DIAGRAM



H5 CEB WALL & WATTLE AND DAUB WALL DETAIL DIAGRAM



I5 ROOF RAFTERS DETAIL DIAGRAM

detail

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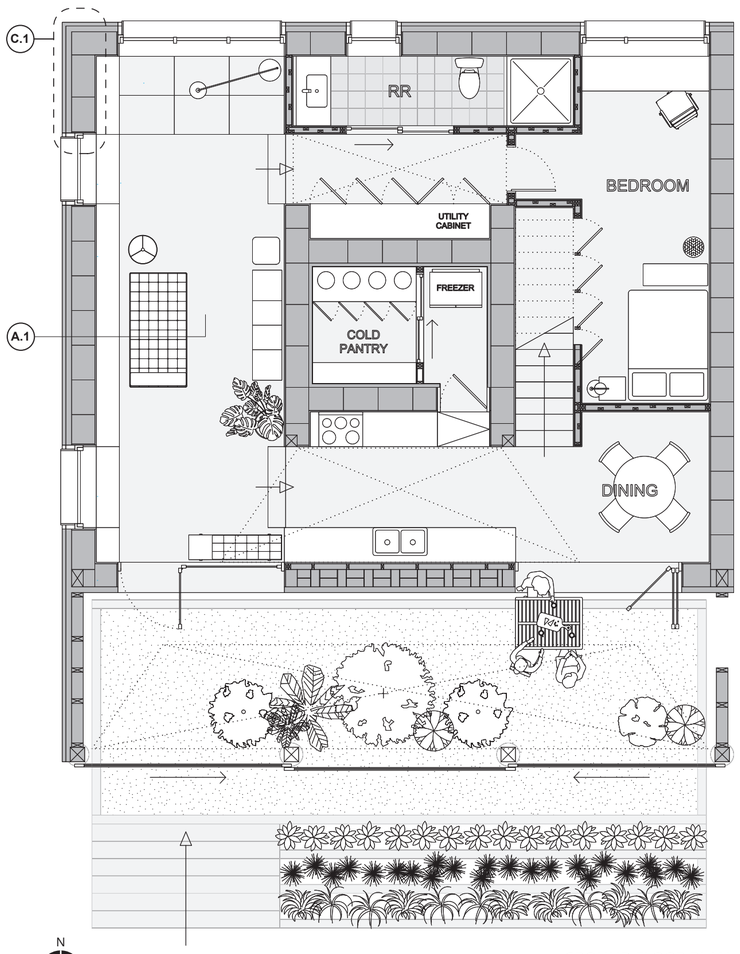
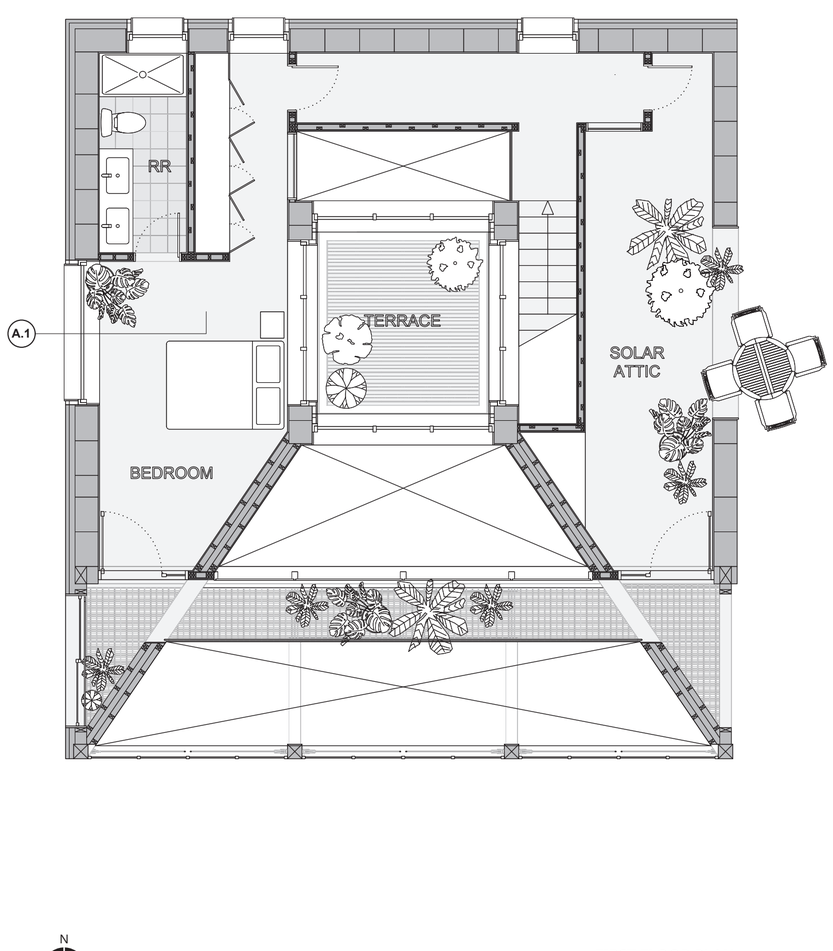
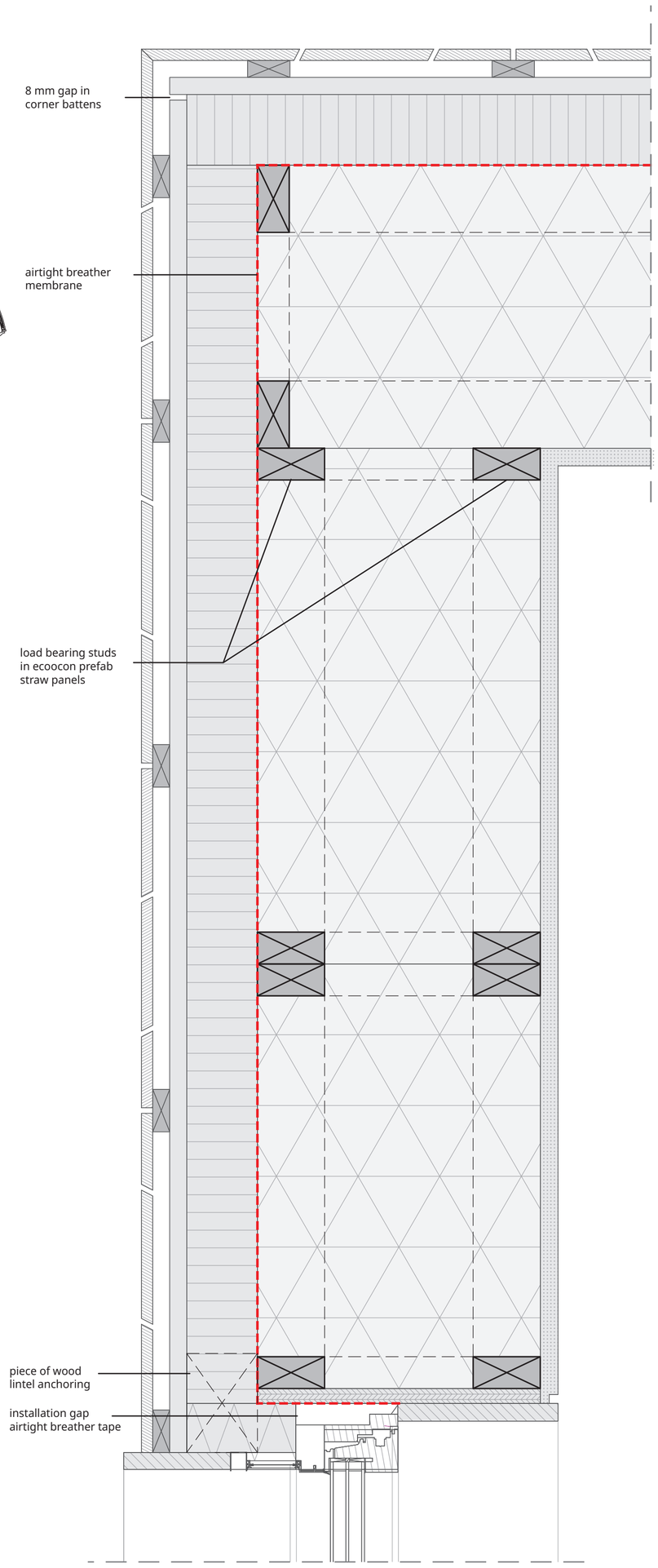


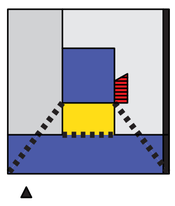
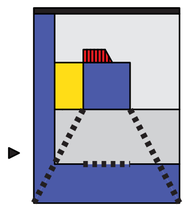
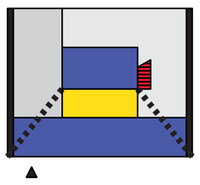
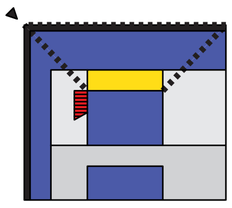
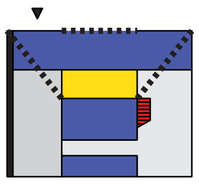
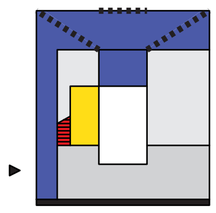
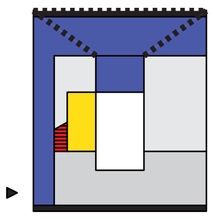
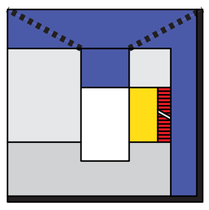
GROUND FLOOR PLAN
SCALE: 1:100



FIRST FLOOR PLAN
SCALE: 1:100



C.1 HORIZONTAL SECTION DETAIL
SCALE: 1:5

Ownership Houses (CSML)	**Position 1. (P1)**	 CSML.P1.T1	 CSML.P1.T2	 CSML.P1.T3	 CSML.P1.T4
	Position 2. (P2)	 CSML.P2.T1	 CSML.P2.T2	 CSML.P2.T3	 CSML.P2.T4

Tenure Model (RS, RSA, CSML)

Program of unit depends on the tenure model. Rental student housing units are grouped into "blocks" of six units. Rental studios and apartments units are grouped into blocks of three to four units. Co-ownership units are independent, and the number of rooms is inter-changeable with the size of the solar attic.

Position #. (P1, P2)

Position refers to a change of orientation of the unit within the cluster. This is either a directional change of the entryway or the adjacent block.

Type 1. (T1)

Type 1. blocks have a single adjacent block either to the east or the west. *All plans can be flipped on the vertical axis.

Type 2. (T2)

Type 2. blocks have a single adjacent block either to the north or the south. *All plans can be flipped on the vertical axis.

Type 3. (T3)

Type 3. blocks have double adjacent blocks either to the north and south or the east and west. *All plans can be flipped on the vertical axis.

Type 4. (T4)

Type 4. blocks have double adjacent blocks on a corner. *All plans can be flipped on the vertical axis.

N
0 5 10
greenhouse/terrace
egress
kitchen
adjacent wall
wattle & daub wall

CLUSTER MODULATION

hypothetical cluster

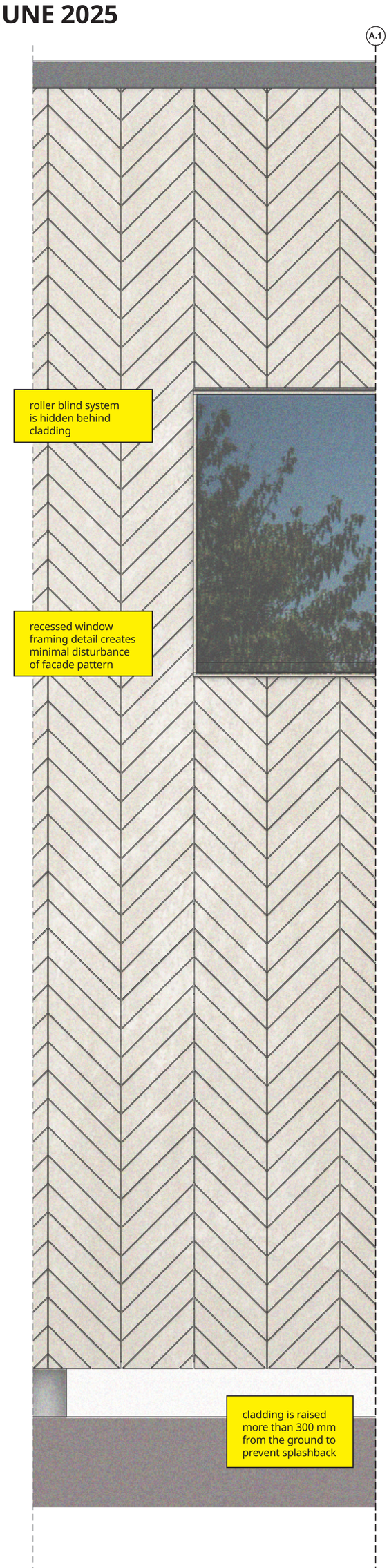
Each ten-household cluster is organized around a shared central space that functions as both a social and productive core. The kitchens of individual dwellings are oriented toward this communal center, fostering a visual and spatial connection between domestic food preparation and collective life. In several homes, small integrated greenhouses are positioned adjacent to the kitchens, allowing residents to grow herbs, leafy greens, and other fresh produce year-round. This proximity between cultivation and consumption reinforces the "home to fork" proposal at the architectural scale. The cluster layout follows a flexible matrix that allows for multiple combinations of orientation, enabling each dwelling to respond to solar gain, prevailing winds, and privacy needs while maintaining its relationship to the collective center. This adaptable framework ensures that regardless of a home's position within the cluster, it remains physically and socially linked to shared activities such as cooking, dining, and seasonal food processing.

HYPOTHETICAL CLUSTER FORMATION

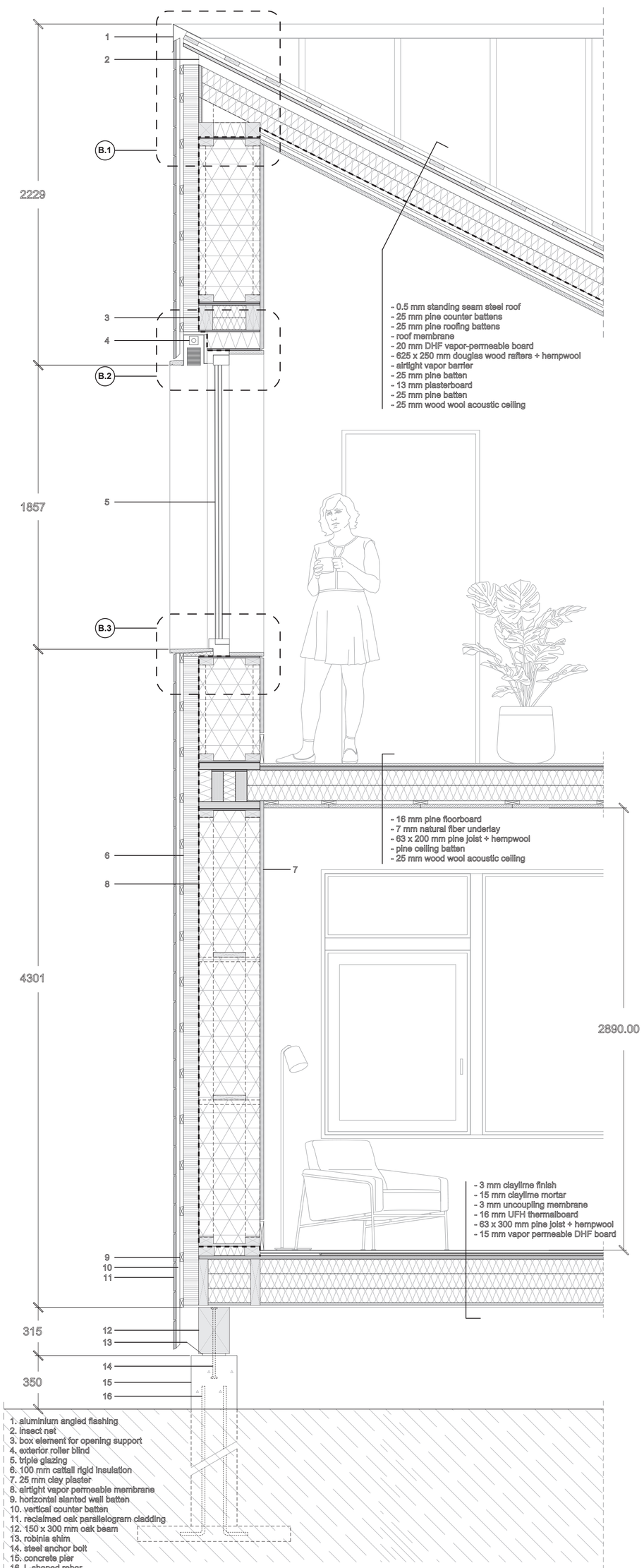
TU DELFT/
MSc AUBS/
ARCHITECTURE
TRACK/
AR3AD100
ADVANCED
HOUSING
DESIGN/
P5/
JUNE 2025

vertical

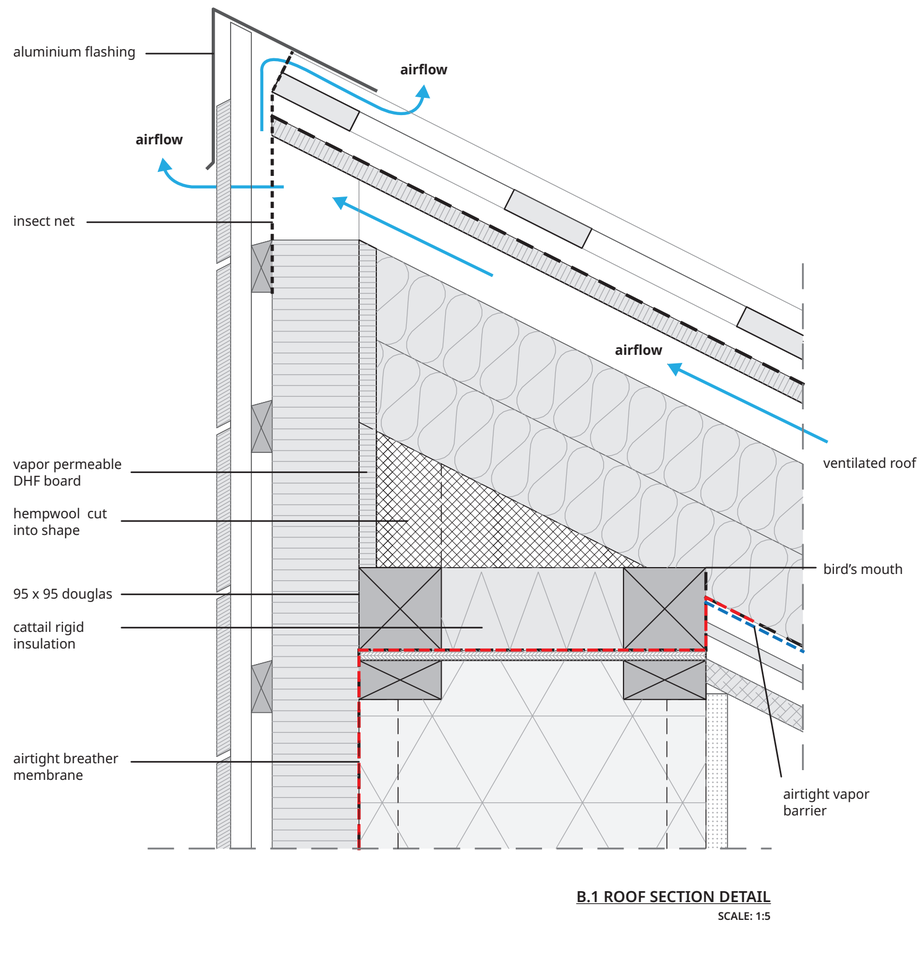
YUHYUN OH/
5921813



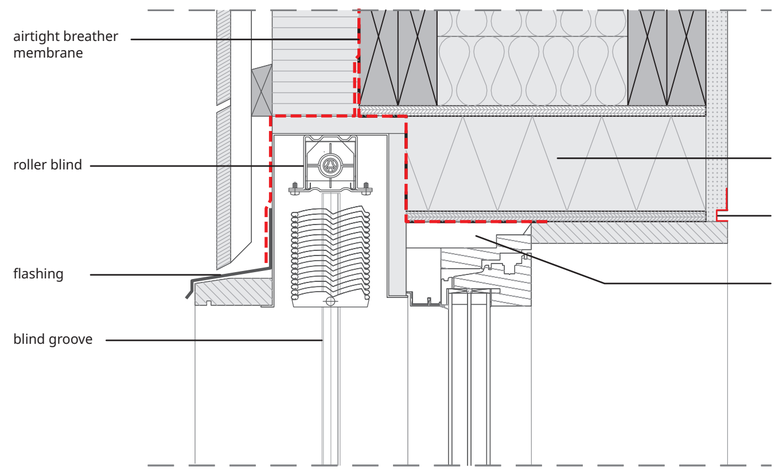
WEST-FACING FACADE ELEVATION
SCALE: 1:20



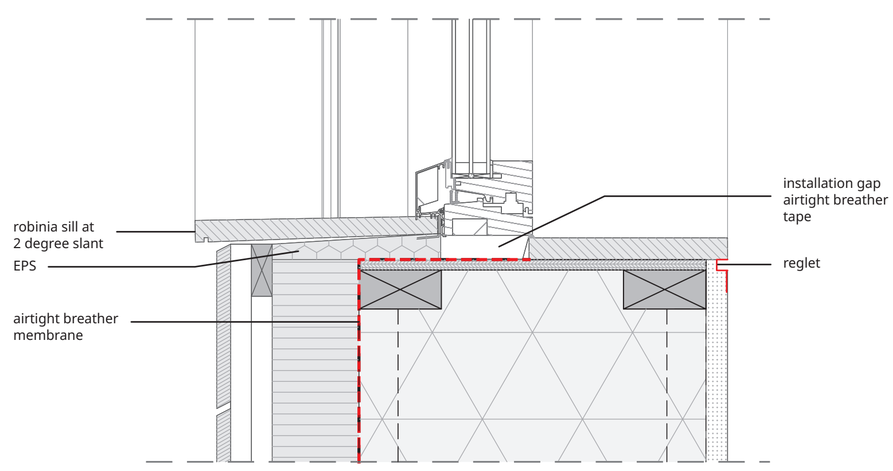
A.1 CROSS SECTION OF FACADE AND STRUCTURE
SCALE: 1:20



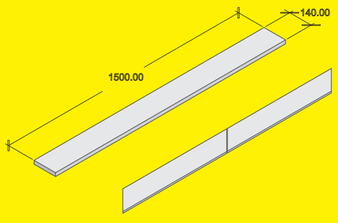
B.1 ROOF SECTION DETAIL
SCALE: 1:5



B.2 WINDOW TOP AND BLIND SECTION DETAIL
SCALE: 1:5



B.3 WINDOW BOTTOM SECTION DETAIL
SCALE: 1:5



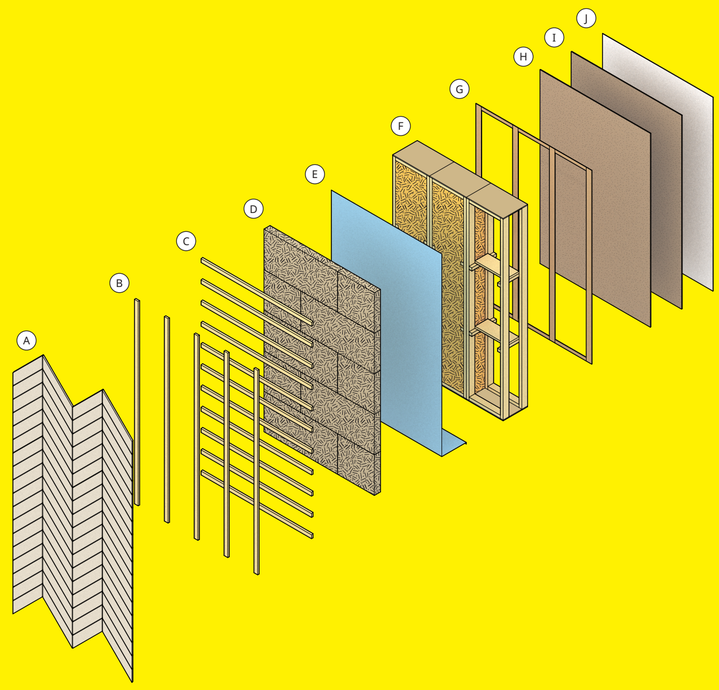
Reclaimed oak floor panels

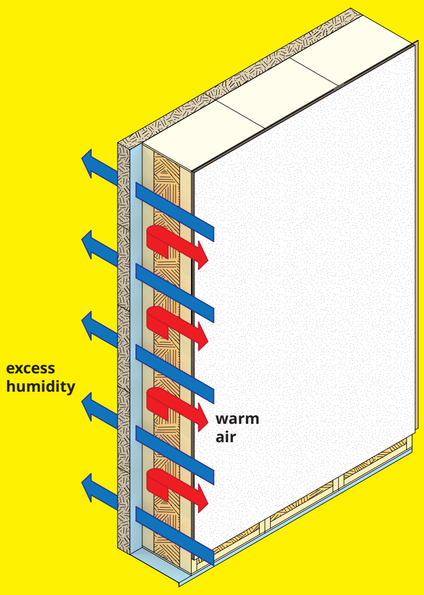
Exterior cladding is fashioned into a herringbone pattern for shorter reclaimed wood panels. Old oak panels from barns and floor panels is sourced through reclaimed wood distributor.

Common floor panel dimenions come in 1500 x 140 x 22 mm pieces. 3 mm is planed off every side to compensate for natural wear. Each panel is then cut at 20 degrees on its length to create a parallelogram profile. Three cuts are made at 45 degrees to create two equally sized panels.

Pieces are then finished with cold-pressed linseed oil for improved durability. Expected lifespan is 20 years. Natural patina provides character.

At end of life cycle, panels can be chipped to used as mulch for water retention in soil or repurposed into raised planters.





- Humidity passes through construction by difference of temperature and always from warm to cold side

- Airtight vapor-permeable membrane allows humidity to leave while maintaining airlock

- All materials in wall construction are vapor-permeable

A. 16 mm oak exterior cladding
B. 24 mm vertical counter batten
C. 24 mm horizontal slanted batten
D. 100 mm cattail rigid insulation
E. 0.2 mm vapor permeable membrane
F. 400 mm straw panel
G. 5 mm wood fiber board strips
H. 10 mm base coat clay plaster
I. 10 mm base coat clay plaster
J. 5 mm fine clay plaster