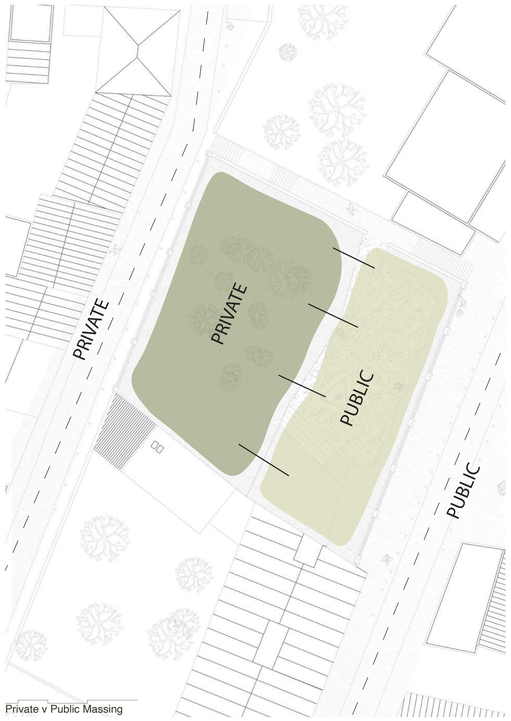
Collective.24

SEDA Krystyna Johnson Award

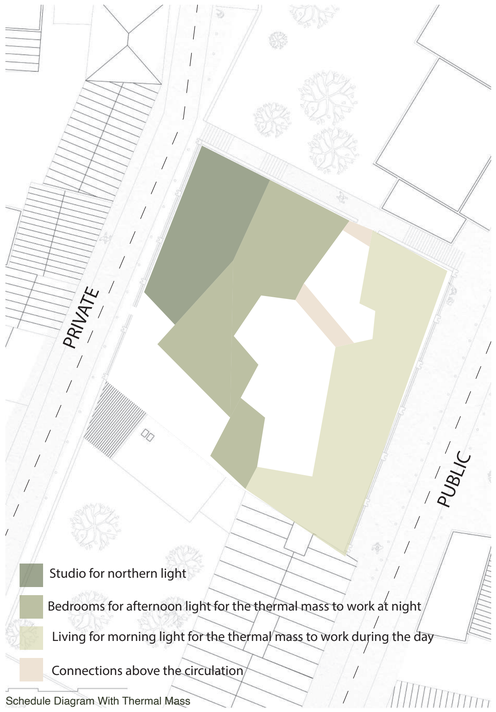
- solar oriented
- low embodied carbon
- social / co-living aspects
- private v public
- sculptural courtyard for circulation

Rona Bisset _ University of Edinburgh

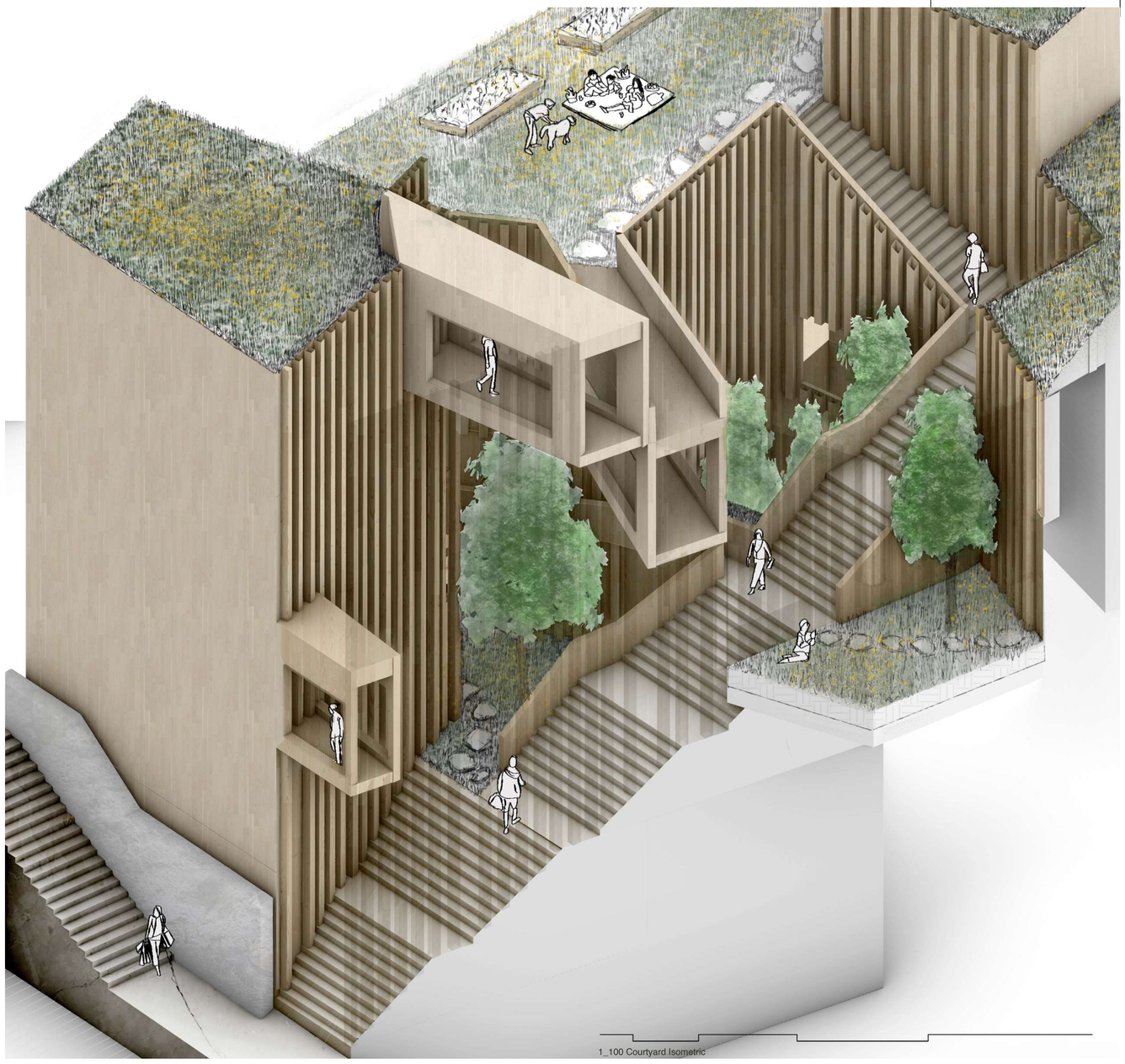
Paris, Belleville, Petites Rigoles Garden _ Artist Residence Proposal



Private v Public Massing



Schedule Diagram With Thermal Mass



1_100 Courtyard Isometric

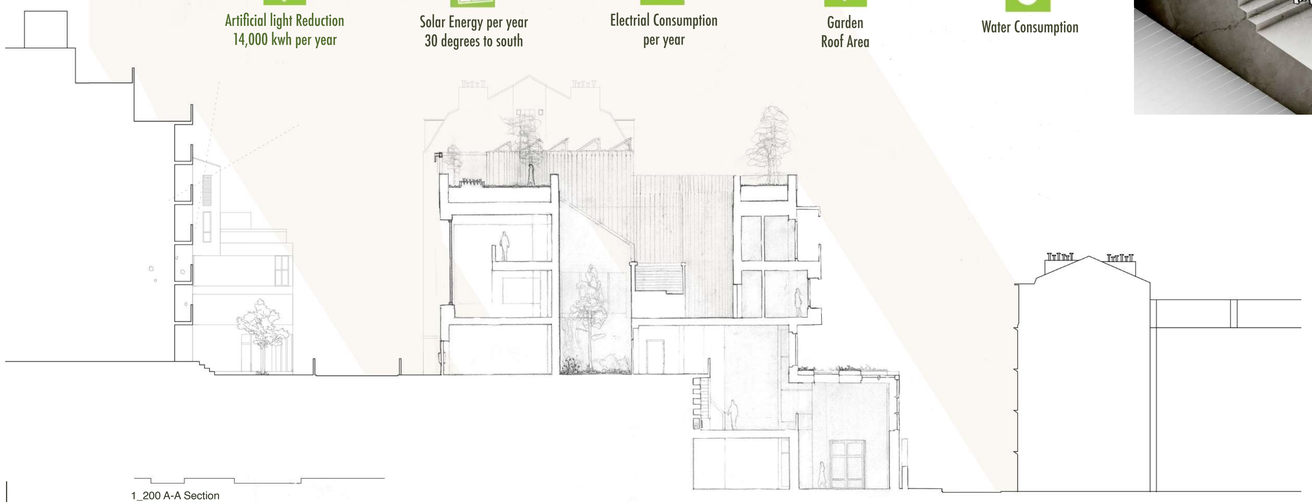
70.8%
Artificial light Reduction
14,000 kwh per year

24,150 kwh
Solar Energy per year
30 degrees to south

23,100 kwh
Electrial Consumption
per year

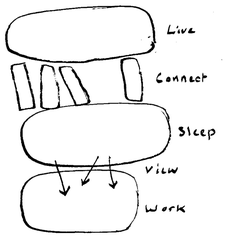
90%
Garden
Roof Area

250, 822 Gallons
Water Consumption



1_200 A-A Section

Collective .24 is the 24th collective within Ateliers d'Artistes de Belleville; the proposal offers a social base for the artists within Belleville. My proposal creates a space to observe, create and connect with like-minded individuals. The building's main concept is the split between private and public, with a sculptural courtyard for circulation leading to a rooftop garden. The art studios lay on the private side of the building, with workshops for fine art, photography, and painting. The building's goal is carbon neutral, with different passive techniques and Cross Laminated Timber used to achieve this. The proposal uses the sun to its advantage by reducing thermal energy. Offsets allow light through but reduce the heat in the summer, while in Winter allows the maximum heat and sunlight through. Ventilation is added when the CLT needs to release unneeded heat; the windows can be open and allow air to cross-ventilate through the spaces to vents.



Parti Diagram

SOCIAL ASPECTS

Paris has an agreement to low emissions, so it has created the idea of the 15-minute city, which states that shops, education, leisure and green space should be accessible to everyone within a 15-minute walking radius. The proposal sits within this and helps reach the new agreement by having all aspects in one building; this allows for a higher quality of life for the residents and the community. The proposal uses the light for social factors as in the mornings; it allows the residents to get ready for the day and then use the studios throughout the day, which have constant northern light from the skylights. At night the lack of natural light within each apartment's social areas emphasises people going out in the community and socialising within the 15-minute perimeter.

Social Context of 15-Minute City


1_50 Model


1_200 Model


1_500 Massing Model


1_200 Model


1_200 Model

1_100 Ground Floor Plan, aceess from Rue de l'Ermitage

SOLAR ORIENTATION

Sun Path Diagram

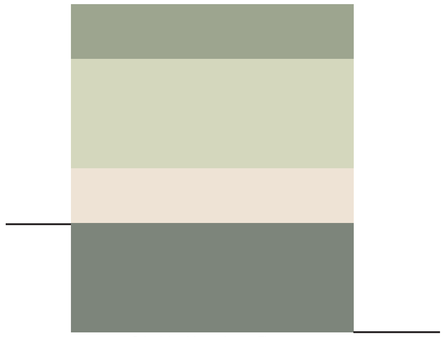
- **passive solar + ventilation systems**
- **CLT thermal mass benefits**
- **massing boundaries**

Winter Solstice - 21/12 - 10am - 14.5'

Summer Solstice - 21/06 - 10am - 57'

Winter Solstice - 21/12 - 4pm - 12.9'

Summer Solstice - 21/06 - 4pm - 36'



Schedule of Areas Across Floors

Communal
shared by residents
- Vegtable Patch
- Garden Cafe

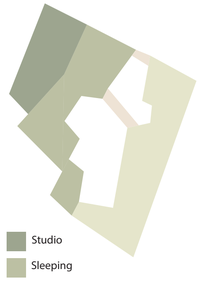
Residential
apartment spaces
- Bedrooms
- Kitchen
- Study Space
- Living

Social
for interactions
- Lobby
- Common Room
- Resturant
- Shop
- Tree Garden

Collective
for the artist
- Workshops
- Artist Space
- Photo Studio
- Offices
- Computer Lab

1_200 First Floor

The start of creating the sustainable design is understanding the light and how it diffuses around the site; this initially organised the rooms so the thermal mass could work effectively. From the site analysis, the conscient theme was public and private; this divide was clear within the site visit. This translated to initial massing diagrams and models, creating a boundary for my design to grow. Private and public helped separate the bedrooms to the living areas through the top floors, then from the social to the studio areas. The connection then passes through the main courtyard to allow for movement through the co-living apartments.



- Studio
- Sleeping
- Living
- Connections

Schedule Diagram

- 2-8pm Light
- 4-11am Light
- Continuous North Light

Light Diagram

- Stable Heat 12am-10am
- Stable Heat 2pm-9pm
- Continuous Stable heat

Thermal Mass Heat Diagram

EMBODIED CARBON

Agroforestry and reforestation activities help to transform the current unsustainable agricultural practices, with many benefits for nature & local farmers; less use of pesticides & fertilizers, less erosion, more biodiversity, CO2 offset, better health.

16,793,140 kg CO2 Compensated

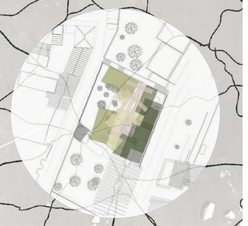
Alnus

Cordata

CO2 offset
240kg

Agroforestry - Venix Region

SITE A - PARIS

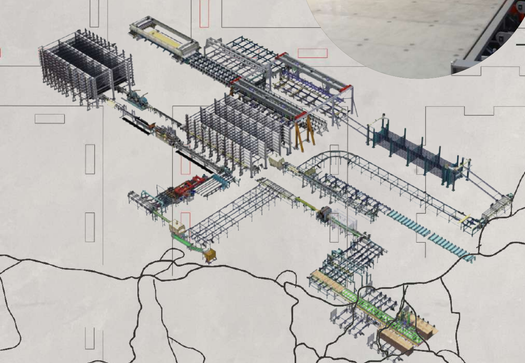


197.96 kg of CO2

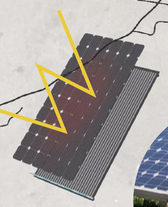
165.64 kg of CO2

CLT Plant - Sainte Florence

- Up to 16 m x 3,6 m x 0,36 m panel size
- Production capacity up to 70.000 m³/year
- 100 m³ Shift production
- Highly flexibility of the production



DualSun Hybrid Solar Panels Marseille



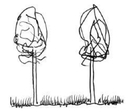
Ethical: DualSun is strongly committed to making its hybrid solar panels environmentally friendly.

Recyclable: DualSun carefully selects all manufacturing materials. As a result, the SPRING solar panel is nearly 95% recyclable!

Durable: the SPRING solar panel returns the energy needed for its manufacture in only 1 to 3 years. Its lifespan exceeds 30 years.

Carbon Travel

Product Stage



Agroforestry
- reduces emissions
- improves ecosystems

Transport
- Local Sawmill 150km away
- 15.7kg of C02

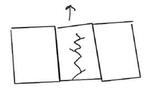
Manufacturing
- By-products for BioMass
- little waste as automated controls

Construction Process

Transport
- 197.96kg of CO2

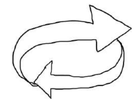
Construction
- reduction in labour
- easy and quick

Use Stage



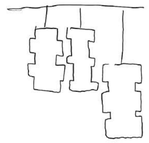
Repair
- hand sanded and fixed
- damaged sections are cut out and replaced

End of Life



Recycled
- 1/3 of CLT

Biomass
- 2/3 of CLT



Re-use
- does not release 50% of emboddied carbon
- installation for social and community spaces

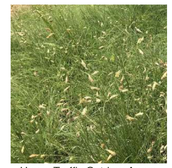
- **400kg/co2 transportation costs**
- **local alnus cordata trees offset carbon by 240kg/co2 each**
- **hygroscopic properties**
- **negative operative carbon**

Material Palette

Heavyweight Structure
Pine CLT

Window Offsets
Red Water Based Dye

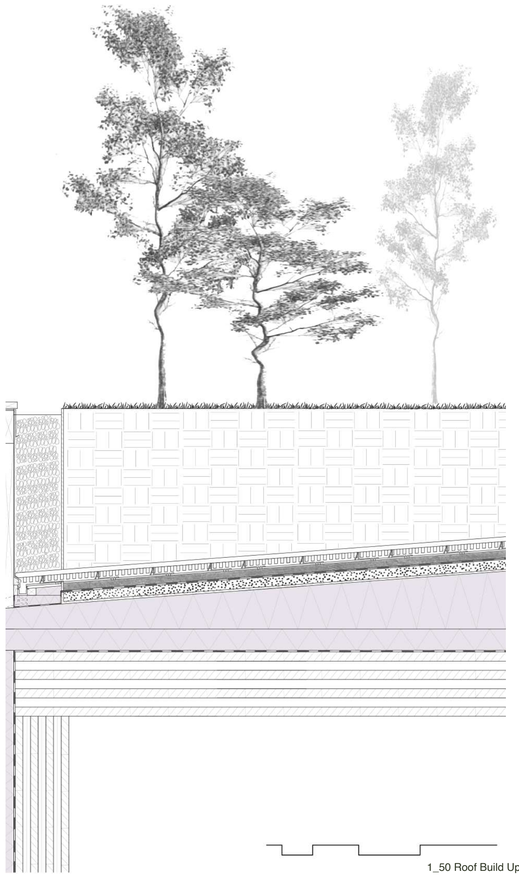
Cladding
Accoya Timber



Heavy Traffic Outdoor Areas
Buffalo Grass

The carbon from the transportation for this design is approximately 400kg/CO2. There is only one CLT factory in France, which is 300 miles from Paris; using this manufacturer eliminates the carbon for air miles. The trees are planted in a sustainable, natural process called agroforestry, transforming the local ecosystem, and lowering CO2 emissions with each tree offsetting 240kg/CO2 meaning two trees offset the whole transportation. Using the site environment to my advantage has reduced the amount of artificial light and thermal heating by 70.8%. This also proves that my design is carbon negative as the solar energy gain is 1000kwh a year, more than the consumption needed. Looking at each stage gives a better indicator of embodied carbon and the distribution after use; it indicates, too, that if we repair and the residents look after the apartments, we also reduce the carbon as there is no need to knock down and keep rebuilding. The CLT is also hygroscopic, creating a healthier atmosphere by releasing hormones to reduce stress and improve the emotional state.

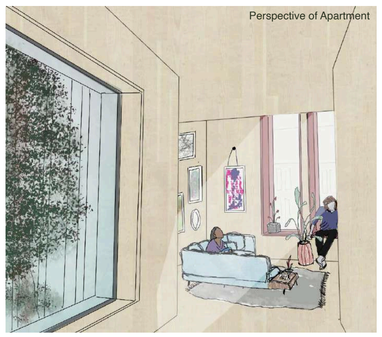
DETAILS



Roof Build-Up
- 1000mm Loamy Soil
- 30mm Filter Layer
- 50mm Drainge layer
- Stainless Steel Support Bracket
- 10mm Protection Layer
- 50mm Root Barrier
- 10mm Waterproofing Membrane
- 50mm Screed to Falls
- 15mm Retaining Wall
- 140mm x 2 Layer Polystrene Insulation
- 10mm Vapour Control Layer
- 420mm 7Ply CLT

1_50 Roof Build Up

U-Value of Roof INSIDE	name of building material	CONDUCTIVITY K value of material W/mK	RESISTIVITY R value of material mK/W	thickness of material /m	RESISTANCE R value of element/m² K/W
surface resistance on internal face					0.10
building material 1	420mm Cross Laminated Timber	0.130	7.692	0.420	3.23
building material 2	280mm Polyurethane Insulation	0.035	28.571	0.280	8.00
building material 3	15mm Steel Sheet	16.300	0.061	0.015	0.00
building material 4	50mm Screed to Falls	0.800	1.250	0.050	0.06
building material 5	10mm Waterproofing Membrane				0.00
building material 6	50mm Polypropylene Root Barrier	0.100	10.000	0.050	0.50
building material 7	10mm Polyurethane Protection Layer	0.035	28.571	0.010	0.29
building material 8	50mm Drainage Layer	0.400	2.500	0.050	0.13
building material 9	30mm Polypropylene Filter Fabric	0.100	10.000	0.030	0.30
building material 10	1000mm Soil Substrate	1.000	1.000	1.000	1.00
surface resistance on external face					0.04
OUTSIDE					
If internal cavity enter surface resistance here					
U value through building element	**in W/m²K**				**0.07**



Perspective of Apartment

Perspective of Studio

1_50 Section Detail of Windows at June Solstice 15-00

- **7 layers of water permeability**
- **1.9m thick roof**
- **0.07w/m^2k roof u-value**
- **Delayed drainage system to prevent urban sewage overfill**

The roof build-up contains 7 layers of water permeability, keeping the structure as watertight as possible and not allowing for chemical corrosion. The CLT is thicker than the normal roof construction for the intensive roof, so unique pieces would have to be created for this structure. The drainage is key, too; for this type of roof, the flow of water had to be delayed stopping the strain on urban sewage systems and allowing the water to spread to the planters evenly. French building regulations suggest different U values for different climatic regions. Paris is in the climatic region H1; thus, the maximum U value for a roof system in Paris is 0.19 W/m^2K. The U value calculated for our proposed roof construction is significantly below this upper limit at 0.07 W/m^2K. This is due to the incredibly thick soil substrate with insulative properties and thick polyurethane insulation.

1_50 Section Interior Detail