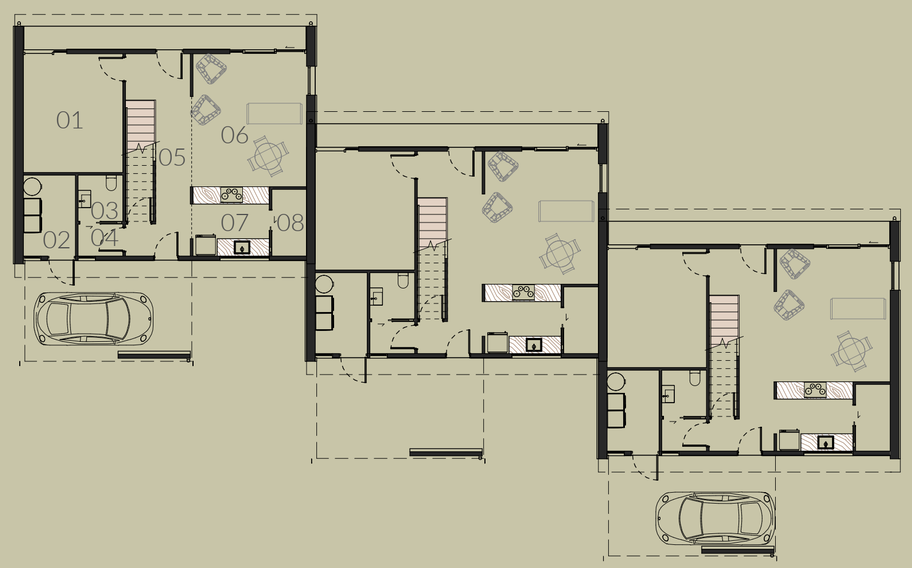
SIX RIVERS

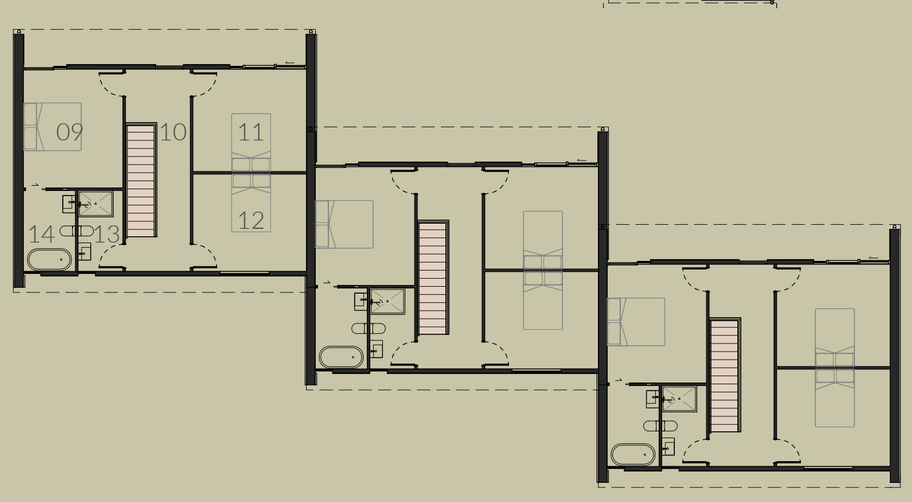
AN ECO-SYSTEM OF PEOPLE IN COMMUNITY

ARCH.ENG.BUILD 2023

GROUND FLOOR PLANS



FIRST FLOOR PLANS



PROJECT DESCRIPTION

SIX RIVERS is a community village collective of families who have come together to dwell in the Hutt Region of Wellington. The Intent of the project is to provide housing to these families which responds to the social, cultural, & ecological context in a holistic design outcome. The buildings utilise prefabricated mass timber & lightweight timber construction methodologies, increasing efficiency of construction through modularity & standardisation.

The material selection is lightweight, robust, & affordable palette of corrugated aluminium & thermally modified pinus radiata cladding.

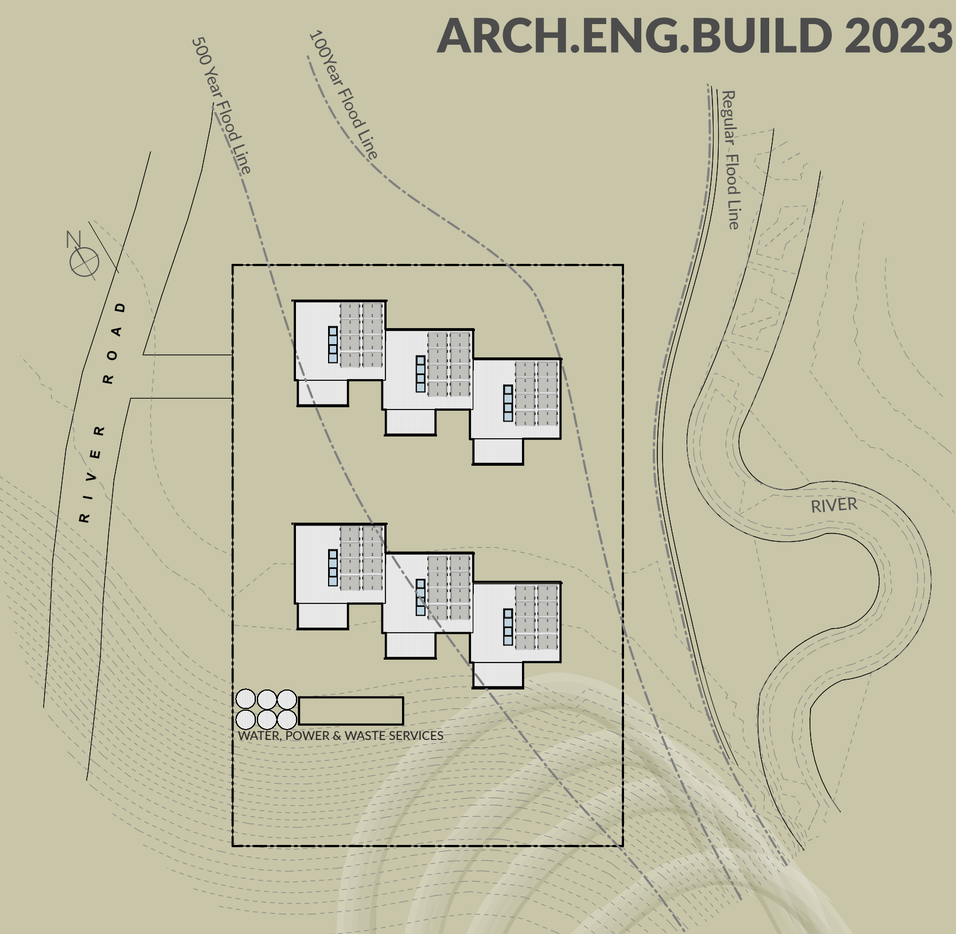
The thermal envelope is extremely high performing with wall build ups at R3, roof at R6.98, & Slab at 2.39. It is also intended that through passive hosue building practices the enevelpope will be airtight & employ a ducted HVAC system to ensure a temperate, dry interior environment. This will reduce operational heating & cooling cost for the families.

Site-wide systems for stormwarter retention, waste treatment, power generation & storage are also supplied meaning the community is self-sustainable.

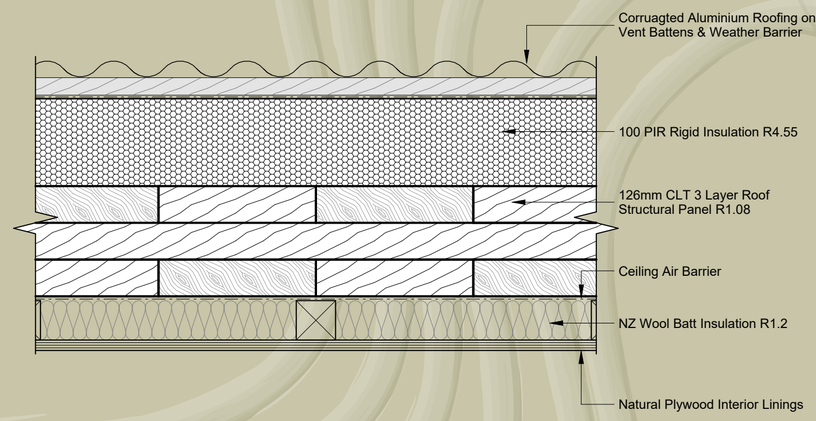
Aleksandr Bakharovskii
Andrea Tang
Mila Makasini

ACCOMMODATION SCHEDULE

#	SPACE	AREA
01	FLEXIBLE SPACE	14 m²
02	PLANT + LAUNDRY	5 m²
03	WC	2 m²
04	LOBBY	2 m²
05	STAIR & ENTRY	16 m²
06	LIVING & DINING	18 m²
07	KICTHEN	6 m²
08	STORE	3 m²
09	MASTER BED	14 m²
10	STAIR & PASSAGE	16 m²
11	BED 1	14 m²
12	BED 2	13 m²
13	BATHROOM	4 m²
14	ENSUITE	5 m²

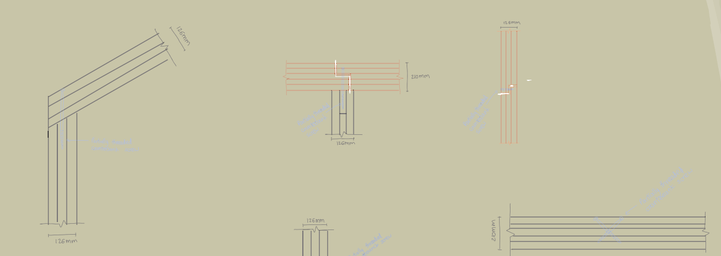


SITE PLAN

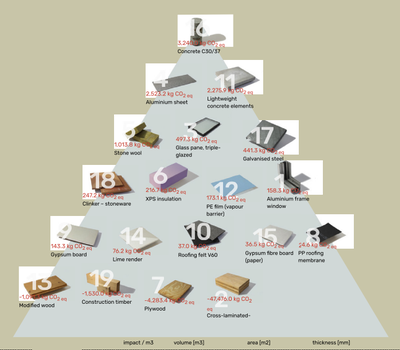


TYPICAL CONSTRUCTION DETAIL

STRUCTURAL DESIGN



EMBODIED ENERGY + CO_2



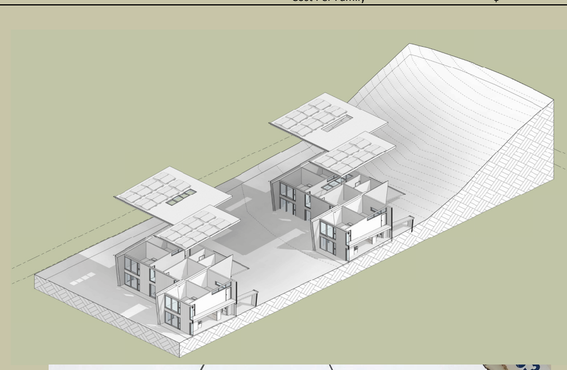
	material	impact / m3	volume [m3]	area [m2]	thickness [mm]	result
1	Aluminium frame window	ter 1172.7 kg CO2eq/m3	0.14 m3	3 m2	45 mm	158.3 kg CO_2 eq/m3
2	Cross-laminated-timber CLT	-664.0 kg CO2eq/m3	71.50 m3	286 m2	250 mm	-47,476.0 kg CO_2 eq/m3
3	Glass pane, triple-glazed	ter 415.6 kg CO2eq/m3	1.20 m3	33.24 m2	36 mm	497.3 kg CO_2 eq
4	Aluminium sheet	28242.0 kg CO2eq/m3	0.09 m3	162.44 m2	.55 mm	2,523.2 kg CO_2 eq
5	Stone wool	70.4 kg CO2eq/m3	14.40 m3	160 m2	90 mm	1,013.8 kg CO_2 eq
6	XPS insulation	96.3 kg CO2eq/m3	2.25 m3	75 m2	30 mm	216.7 kg CO_2 eq
7	Plywood	-649.0 kg CO2eq/m3	6.60 m3	550 m2	12 mm	-4,283.4 kg CO_2 eq
8	PP roofing membrane	271.5 kg CO2eq/m3	0.09 m3	90.77 m2	1 mm	24.6 kg CO_2 eq
9	Gypsum board	169.6 kg CO2eq/m3	0.84 m3	65 m2	13 mm	143.3 kg CO_2 eq
10	Roofing felt V60	407.8 kg CO2eq/m3	0.09 m3	90.77 m2	1 mm	37.0 kg CO_2 eq
11	Lightweight concrete elements	202.3 kg CO2eq/m3	11.25 m3	75 m2	150 mm	2,275.9 kg CO_2 eq
12	PE film (vapour barrier)	266.3 kg CO2eq/m3	0.65 m3	650 m2	1 mm	173.1 kg CO_2 eq
13	Modified wood	-519.0 kg CO2eq/m3	2.10 m3	84.11 m2	25 mm	-1,091.3 kg CO_2 eq
14	Lime render	190.6 kg CO2eq/m3	0.40 m3	40 m2	10 mm	76.2 kg CO_2 eq
15	Gypsum fibre board (paper)	91.2 kg CO2eq/m3	0.40 m3	40 m2	10 mm	36.5 kg CO_2 eq
16	Concrete C30/37	288.0 kg CO2eq/m3	11.25 m3	75 m2	150 mm	3,240.0 kg CO_2 eq
17	Galvanised steel	22923.1 kg CO2eq/m3	0.02 m3	35 m2	.55 mm	441.3 kg CO_2 eq
18	Clinker – stoneware	618.0 kg CO2eq/m3	0.40 m3	40 m2	10 mm	247.2 kg CO_2 eq
19	Construction timber	-680.0 kg CO2eq/m3	2.25 m3	25 m2	90 mm	-1,530.0 kg CO_2 eq
						-43,276.3 kg CO_2 eq/m3

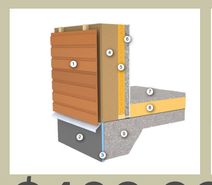
Bldg Element	Quantity (m2 or Kg)	Embodied Carbon kg CO2/qty	Carbon Value kg CO2
3100 - Concrete Slab	75.68	461.81	34,947.93
3300 - CLT Wall Panels	131.77	0.93	122.55
3300 - CLT Floor & Roof	155.32	0.93	144.45
4100 - Ply Rigid Barrier	281.00	0.86	241.66
4100 - Bldg Wrap	281.02	0.62	174.23
4200 - Aluminium Wall Cladding	71.67	33	2,365.11
4200 - Timber Cladding (Abodo)	84.11	0.53	44.58
4300 - Aluminium Roof Cladding	90.77	33	2,995.41
Carbon Per House	41,035.92 KG		437,647.57
Overall Carbon	**246,215.51 KG CO2**		**2,625,885.44**

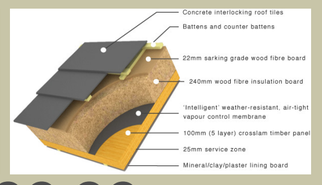
230Tonnes CO_2
Typical Embodied Carbon of an Average NZ House in 90 Life Span

CONSTRUCTION

Element	Area/Qty	Cost	Overall Cost
Land Cost			$ 100,000.00
Build Per Home / Family		139 $ 2,600.00	$ 361,400.00
Landscpaing & Site	Prov. Allowance		$ 80,000.00
Solar & Water & Recycling	Prov. Allowance		$ 65,000.00
		Total Project Cost	$ 2,413,400.00
		Cost Per Family	$ 402,233.33







$402,233.33
Approximate Build Cost per family.
Whole Project cost $2.43Million