

STREET ELEVATION
1:100

REAR ELEVATION
1:100

INNOVATION

INNOVATION IN FOUNDATION DESIGN

MINIMAL SITE EXCAVATION WITH ONLY TOPSOIL OF BUILDING FOOTPRINT AND SHALLOW SHINGLE TRENCHES REMOVED

STEEL RAFT FOUNDATION SITS ON SHALLOW SHINGLE BED

ALL EXTERNAL DECKING AND ACCESS RAMP SIT ON PAVING SLAB FOUNDATIONS

THIS INNOVATION IN FOUNDATION DESIGN EQUATES TO A 60% SAVING IN MATERIAL AND LABOUR COSTS

BUILDING IS CONSTRUCTED ON SITE TO INCREASE THE POTENTIAL INVOLVEMENT OF SELF-BUILDER CLIENT

MATERIALS CAN ALL BE LIFTED USING MAN POWER SO NO EXPENSIVE LIFTING MACHINERY IS NEEDED

PROGRAMME

GENEROUS FOUR PERSON HOUSE OF 90m²

GROUND FLOOR INCLUDES KITCHEN, DINING ROOM AND LIVING ROOM

WOOD STOVE IN LIVING ROOM IS ABLE TO HEAT WHOLE HOUSE DUE TO A SUPER INSULATED AND AIRTIGHT BUILDING FABRIC

STORAGE SPACE, WHICH HAS DEDICATED SPACE PROVIDED ON BOTH FLOORS, IS KEY TO HIDING AWAY THE CLUTTER OF EVERYDAY LIVING

MASTER BEDROOM BOASTS TWO WALK-IN WARDROBES AND A BALCONY

THE TWO SINGLE ROOMS ARE EASILY LARGE ENOUGH TO ACCOMMODATE DOUBLE BEDS IN THE FUTURE

FAMILY SHOWER ROOM IS SPACIOUS, NATURALLY LIT AND PROMOTES WATER EFFICIENCY

DESIGN

ELEVATIONS REFLECT THE BUILDING'S PASSIVE CREDENTIALS

NORTH FACADE HAS SMALLER OPENINGS AND HOUSES SERVANT SPACES

SOUTH FACADE HOUSES LIVING SPACES AND WINDOWS ARE THEREFORE LARGER TO INCREASE SOLAR GAIN

TWO CONTRASTING EXTERNAL FINISHES CREATE WELL BALANCED FACADE COMPOSITIONS

NATURAL LIME RENDER ON HEMPLIME INSULATION AND LARCH RAINSCREEN CLADDING ENSURE WATERPROOF VAPOUR PERMEABLE FINISH

CLOUR SCHEME ADDS VIBRANCY TO THE STREET SCENE

ALL BUILDING REGULATIONS ARE SATISFIED

SUSTAINABILITY

A HEALTHY BUILDING WHICH IS FREE FROM TOXIC EMISSIONS

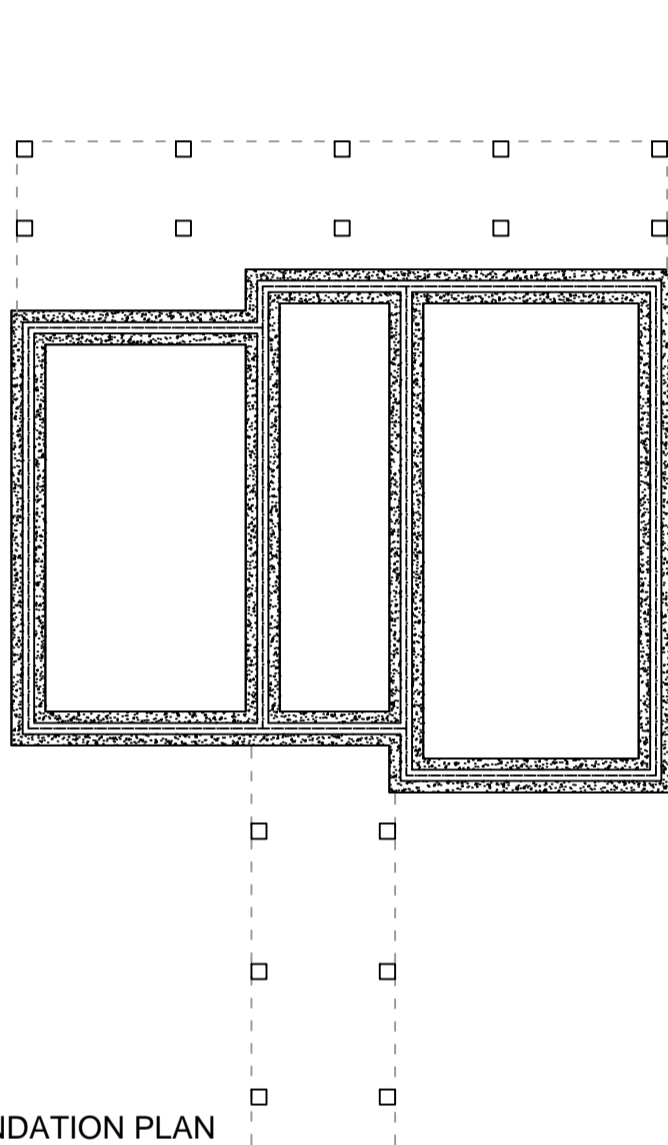
AIRTIGHTNESS AND SUPERINSULATION TO KEEP DRAUGHTS OUT AND HEAT IN

VAPOUR PERMEABLE CONSTRUCTION USING NATURAL MATERIALS WHICH ALLOW MOISTURE TO PASS THROUGH THE BUILDING FABRIC

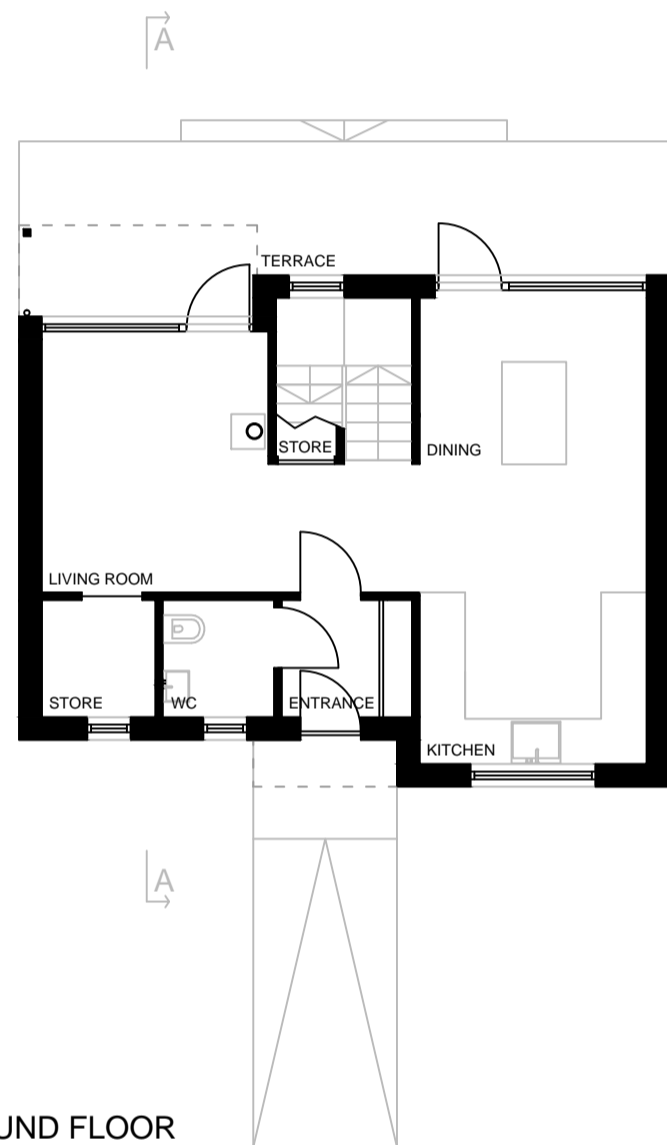
SOURCING LOW CARBON NATURAL MATERIALS LOCALLY

OPTIONAL ADDITIONS TO THE STANDARD BUILDING PACKAGE INCLUDE PHOTOVOLTAICS, SOLAR HOT WATER AND RAINWATER RECYCLING

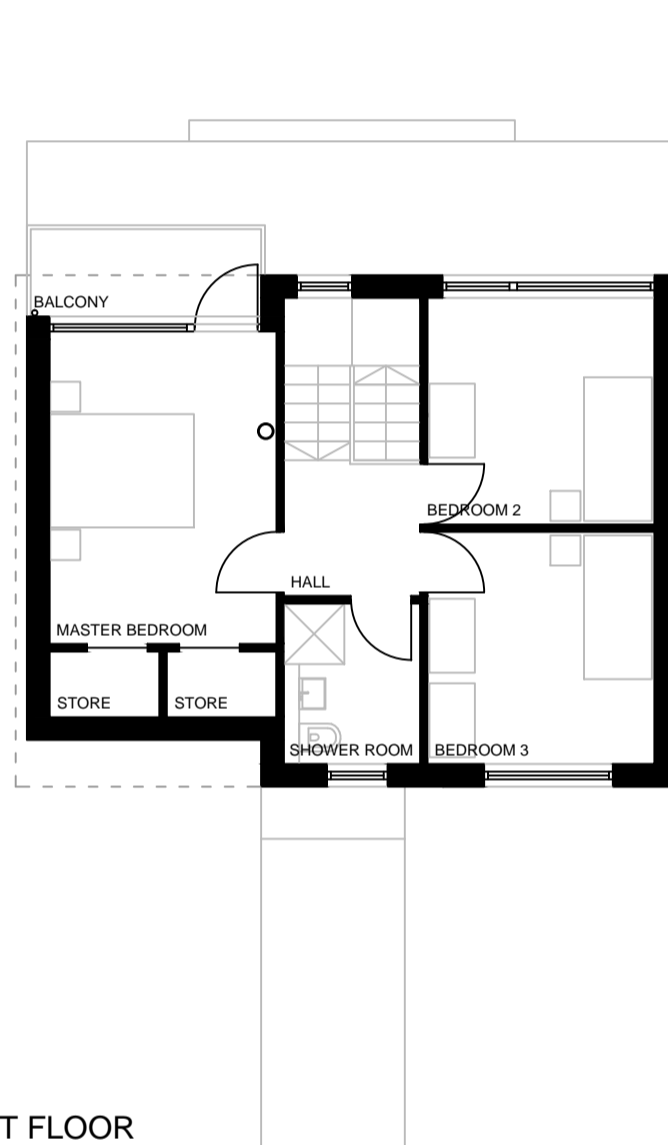
ALL SUCH SERVICES CAN BE HOUSED ON THE ROOF AND CONCEALED BY THE PARAPET, AVOIDING ISSUES OF UNSIGHTLY BOLT-ON TECHNOLOGIES



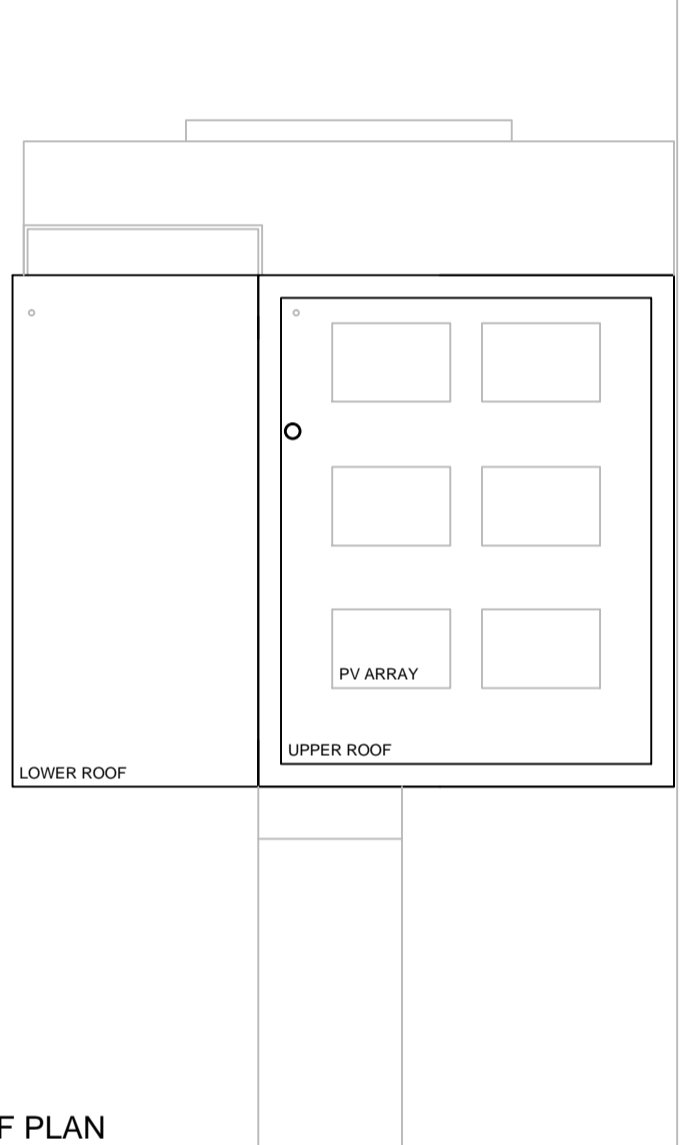
FOUNDATION PLAN
1:100



GROUND FLOOR



FIRST FLOOR



ROOF PLAN

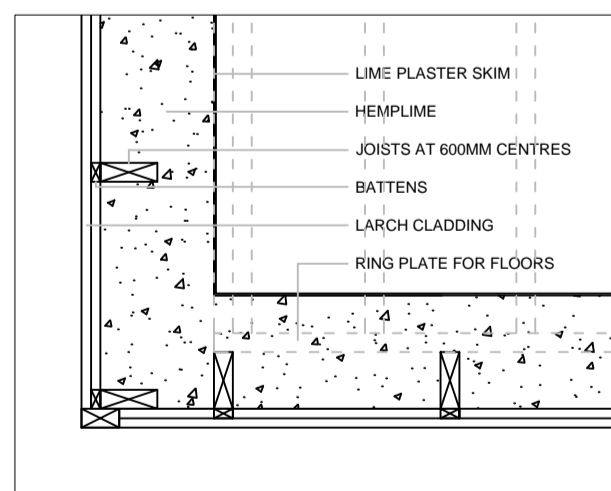
PAVEMENT

PARKING

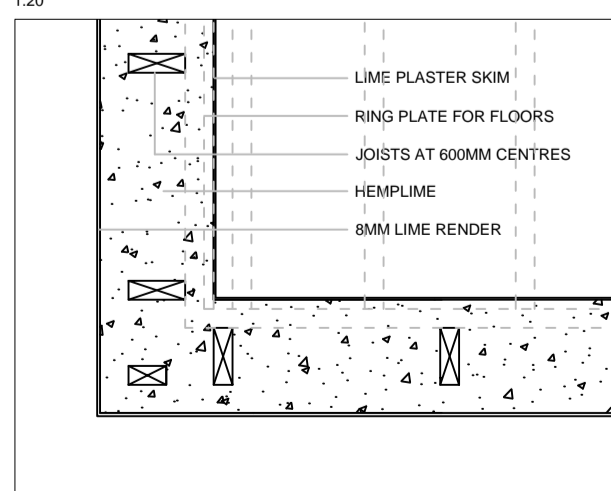
ROAD

RAFT HOUSE

HIGHLY SUSTAINABLE FOUR PERSON MODERN HOUSE FOR UNDER £50,000

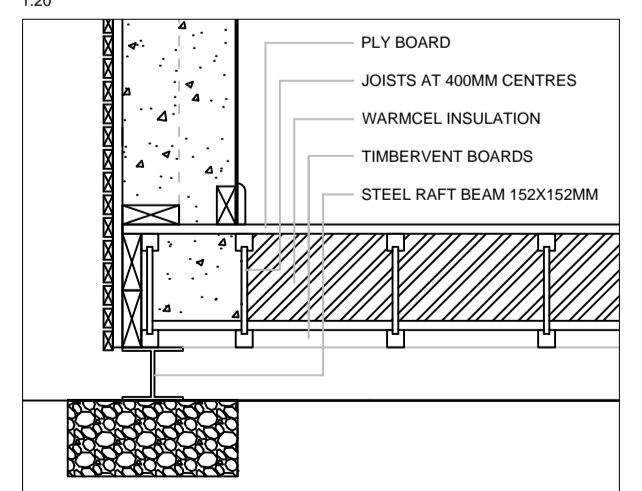
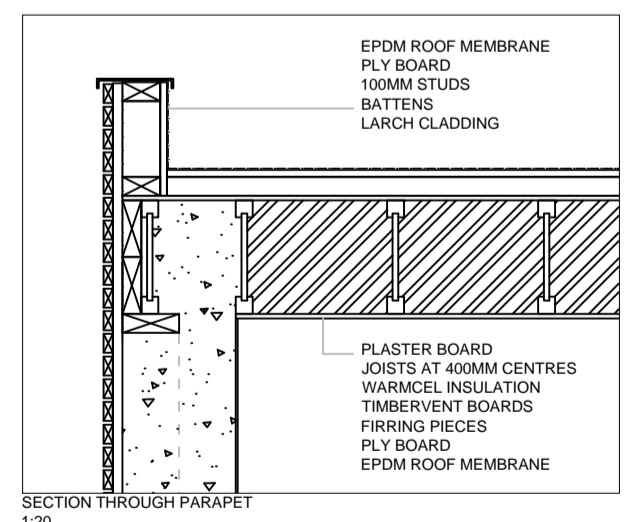


HEMPLIME WITH EXTERNAL LARCH RAIN SCREEN
1:20



HEMPLIME WITH EXTERNAL RENDER
1:20

SECTION A-A
1:50



SECTION THROUGH FOUNDATION
1:20

Cost Report - Raft House

A Quantity Surveyor was consulted for all cost analysis for which direct supplier quotes were not attained.

Works Package	Construction Element	Materials	Labour	Total
Works Package 1	Set up, Clearance, Demolitions	£ 2,000	£ 800	£ 2,800
Works Package 2	Foundations (<i>up to DPC</i>)	£ 980	£ 520	£ 1,500
Works Package 3	Ground Floor Slab or Suspended Floor	£ 1,724	£ 653	£ 2,377
Works Package 4	Drainage & Service Trenchwork	£ 300	£ 400	£ 700
Works Package 5	Specialist Building System	£ 2,010	£ 1,550	£ 3,560
Works Package 6	External & Internal Walls	£ 5,829	£ 2,980	£ 8,809
Works Package 7	Intermediate Floor Zone (if applicable)	£ 1,097	£ 515	£ 1,612
Works Package 8	Fireplace & Chimney (if applicable)	£ 1,440	£ 400	£ 1,840
Works Package 9	Roof Structure, Insulation & Covering	£ 4,092	£ 893	£ 4,985
Works Package 10	Joinery (<i>Windows, doors, stairs, skirtings</i>)	£ 9,153	£ 4,135	£ 13,288
Works Package 11	Specialist Products (<i>eg; Eco products</i>)	£ 150	£ 250	£ 400
Works Package 12	Electrical Installation	£ 1,100	£ 1,600	£ 2,700
Works Package 13	Plumbing Installation	£ 350	£ 600	£ 950
Works Package 14	Heating Installation	£ 0	£ 0	£ 0
Works Package 15	Plastering (<i>or dry-lining</i>)	£ 85	£ 1,945	£ 2,030
Works Package 16	Kitchen and Utility Units (+ <i>appliances</i>)	£ 1,420	£ 0	£ 1,420
Works Package 17	Decorations & Wall Ceramics	£ 330	£ 0	£ 330
Works Package 18	Floor Finishes	£ 365	£ 245	£ 610
	TOTAL	£ 32,425	£ 17,486	£ 49,911

WP1 - Set up, Clearance, Demolitions

As this building effectively does not have foundations, but instead sits on a raft bedded on stabilised ground, there is a very low amount of site preparation needed. An area 1m wider than the building footprint is stripped of its top soil. This top soil is spread over the rest of the site.

Item	Area/size	Unit Cost	Materials	Labour	Total
site strip (spread over site)	55m ²				£550
scaffolding over 2 floors	30m run	£15/m ²			£2,250

WP2 - Foundations (up to DPC)

This is the truly innovative aspect of this design as the building rests on a steel raft which sits on stabilised ground. We have used this concept for a visitor centre in a woodland setting, where the building sits on an oak raft. Concrete rafts are also fairly common. Essentially excavation is 1/5 that of standard concrete foundations and the quantity of materials and labour required is greatly reduced. The equivalent concrete foundations for this project would cost 3 times as much.

Item	Area/size	Unit Cost	Materials	Labour	Total
trenches for gravel bed	3.85m ³			£120	£120
gravel bed	3.85m ³		£150		£150
steel raft foundation (152 by 152)	40m		£830	£400	£1,230

WP3 - Suspended Floor

Sustainability always takes precedence. Warmcel insulation has been specified for the floor.

Item	Area/size	Unit Cost	Materials	Labour	Total
timber suspended floor (300m deep JJI joists at 600 centres)	150m	£3.30/m	£495	£150	£645
insulation - Warmcel	12m3	£24/m2	£200	£88	£288
plyboard 18mm T&G	45m2	£8.50/m2	£380	£75	£455
12mm Timbervent below	45m2	£16/sheet	£340	£75	£415
front and rear decking plus ramp - edge beam (150x50 timber section)	31m	£2.80/m	£87	£135	£222
front and rear decking plus ramp - joists(100x50 timber section)	30m	£1.40/m	£42	£130	£172
front and rear decking plus ramp - floor finish - timber sections	23m2	£0.65/m	£180		£180

WP4 - Drainage & Service Trenchwork

Item	Area/size	Unit Cost	Materials	Labour	Total
drainage - soak away	1m3				£420
service trenchwork (750mm deep)	6m	£45/m			£280

WP5 - Specialist Building System

Above the foundations the structure is also innovative. Experience has shown that self builders can construct timber frames more cheaply than buying kits.

Item	Area/size	Unit Cost	Materials	Labour	Total
timber frame external walls (150x50 studwork at 600 centres)	250m	£2.80/m	£700	£600	£1,300
timber frame internal walls (100x50 wall plates and studwork at 600 centres)	190m	£1.40/m	£265	£450	£715
timber frame first floor (200x50 joists at 400 centres)	150m	£3.30/m	£495	£300	£795
timber frame roof (300x50 joists at 600 centres)	100m	£5.50/m	£550	£200	£750

WP6 - External & Internal Walls

Again for the external walls an environmentally friendly material takes precedence over the cheapest option. Hemp-lime is a great material for mediating between internal and external conditions. It creates an airtight but vapour permeable envelope which both eliminates the risk of internal condensation and provides a great thermal mass. It is also possible for unskilled workmen, including the self builder themselves to apply the hemplime under supervision with minimal training.

Item	Area/size	Unit Cost	Materials	Labour	Total
External walls					
hemp-Lime (self build)	35m3	£105/m3	£3,675	£0.00	£3,675
external render	70.7m2	£6.60/m2	£400	£2,000	£2,400
battens (50x25 tile battens)	200m	£0.42/m2	£84		£84.00
external timber rain screen	79m2	£13/m	£1,030	£600	£1,630
Internal walls					
plaster boarding	160m2	£1.50/m2	£240	£300	£540
Warmcel insulation	8m3	£24/m2	£400	£80	£480

WP7 - Intermediate Floor Zone (First Floor)

The first floor is hung from the timber frame to make casting the hemp much more simple.

Item	Area/size	Unit Cost	Materials	Labour	Total
first floor ply T&G	45m ²	£8.50/m ²	£380	£75	£455
Warmcel insulation	4.5m ³	£24/m ²	£300	£60	£360
ground floor ceiling plasterboard	45m ²	£1.50/m ²	£240	£120	£360
balcony post (120x120)	3m	£11/m ³	£33	£30	£63
balcony joists (100x50)	12m	£1.40/m	£45	£180	£225
balcony boards	3.8m ²	£0.65/m	£24		£24
balcony balustrade	5m	£25/m	£75	£50	£125

WP8 - Fireplace & Chimney

A 5Kw wood burning stove is provided in the living room which is used to heat the whole house.

Item	Area/size	Unit Cost	Materials	Labour	Total
wood burning stove	5Kw		£500		£500
hearth (12mm steel)	0.7m ²		£120		£120
twin walled flue	5m		£820	£400	£1,220

WP9 - Roof Structure, Insulation & Covering

Design is important and this contemporary dwelling has a flat roof with state of the art recyclable polymer roofing membrane to achieve crisp edges and thin roof lines.

Item	Area/size	Unit Cost	Materials	Labour	Total
integrated polymer flat roof membrane	59m ²	£53/m ²	£2,800	£325	£3,125
ply to receive roof covering	59m ²	£7.50/m ²	£442	£150	£592
firing pieces (50x50 timber sections)	100m	£0.80/m ²	£80	£75	£155
Timbervent boarding	45m ²	£16/sheet	£340	£75	£415
roof Warmcel insulation	12m ³	£24/m ²	£200	£88	£288
foil backed plasterboard	45m ²	£2.10/m ²	£95	£120	£215
hopper and downpipe (galv steel)	5m		£135	£60	£195

WP10 - Joinery (Windows, doors, stairs, skirtings...)

Item	Area/size	Unit Cost	Materials	Labour	Total
joinery - doors internal	9 doors	£30/unit	£270	£675	£945
linings/architraves	for 10 units	£36/unit	£360	£270	£630
joinery - doors external	1 door	£150/unit	£150	£100	£250
ironmongery - doors	for 10 units	Varies	£23	£540	£563
joinery - windows	all windows	Varies	£6,600	£1,700	£8,300
joinery - window linings (200x27 timber sections)	53m	£4.8/m	£255	£150	£405
joinery - stairs			£1,300	£400	£1,700
joinery - skirting	122m	£1.60/m	£195	£300	£495

WP11 - Specialist Products

Although not included in the price of the standard dwelling, there are optional bolt-on sustainable technologies. Space is provided on the upper flat roof for installation of PV, Solar Hot water and Rainwater Recycling, all hidden by the perimeter parapet so as to not detract from the building design. Included in the standard building package is extraction vents from the kitchen and WCs.

Item	Area/size	Unit Cost	Materials	Labour	Total
mechanical ventilation	3 extracts				£400

WP12 - Electrical Installation

Item	Area/size	Unit Cost	Materials	Labour	Total
electrical installation			£1,100	£1,600	£2,700

WP13 - Plumbing Installation

Item	Area/size	Unit Cost	Materials	Labour	Total
bathrooms - sanitary ware, taps, wastes			£350	£600	£950

WP14 - Heating Installation

Due to the low heating demand of such a well insulated and airtight building, the heating is all provided by the wood burning stove and thus no other heating system is required.

WP15 - Plastering

Item	Area/size	Unit Cost	Materials	Labour	Total
skim	330		£85	£1,950	£2,030

WP16 - Kitchen and Utility Units

Item	Area/size	Unit Cost	Materials	Labour	Total
kitchen and utility fittings			£1,420		£1,420

WP17 - Decorations & Wall Ceramics

Item	Area/size	Unit Cost	Materials	Labour	Total
wall ceramics	4	£20/m2	£80		£80
painting			£250		£250

WP18 - Floor Finishes

Item	Area/size	Unit Cost	Materials	Labour	Total
floor finishes - lino	8.5	£40/m2	£95	£245	£340
floor finishes - sealer for ply	90	£3/m2	£270		£270