**GROUND FLOOR** 

Kitchen / Dining

The house is designed to offer a number of

open plan or separate living room

kitchen off the garden as shown.

Ground floor shower and utility room

usually only found in larger houses. Space

for a washing machine, waste bins and sink.

2 double bedrooms or 1 double & 2

kitchen facing the street with living

room opening off the back garden or

possible layouts

singles

4.1 x 3.7m

pregola for shading to prevent overheating

Utility / WC

Incorporates Lifetime Homes standards to make homes more convenient for all including people with permanent or temporary disabilities as well as making access easier for pushchairs and so on.

Good standard of built in storage including at mezzanine level which is more accessible than a traditional loft.

U = 0.146 W/m2K

150 dia concrete stool cast in plastic pot

Bituthene DPC on

sleeping/study gallery 2.9 x 2.1m 6.9 sq m storage 2.9 x 0.7m 2.0 sq m

1st floor open to the underside of the roof provides a mezzanine off one of the

- bedrooms accessible by ladder. increases the usable area without
- adding significantly to the cost
- creates a spacious feel to the rooms makes it much easier to achieve an airtight envelope.

rooflight for daylight & ventilation to prevenet mezzanine bedroom 1 bedroom 2

SCALE 1:75 =

The eaves level is reduced to 1.8m above first floor level to reduce the built volume and cost and this lends an intimate feel to the bedrooms.

SECTION

The stair is designed to be easy for selfbuilders to construct. The treads are supported on hangars from above which enables the whole stair to be constructed by simply screwing timber together at right angles. Similarly, the kitchen is constructed of open plywood carcasses fitted with prefabricated drawer kits so that the whole kitchen can be assembled by self-builders.

The roof is designed to be fully selfbuildable. The PVC membrane is heat welded and has proved straightforward to carry out. The membrane is protected by soil seeded with grass and wild flowers which costs almost nothing and which moderates surface water runoff and creates new wildlife habitats. ROOF U = 0.167 W/m2K40 dia shingle grass seed on 70mm soil on PVC membrane on non woven polypropylene underlay on 22 fibreboard on 200 x 38 joists @ 600 c/c gutter of 12 ply on 100 x 50 s/w framing 12 OSB with taped joints with with 50 x 50 s/w fillets and 225 x 32 fs/w fascia with aluminium trim The superstructure is stick-built on site as prefabrication is expensive and requires a crane. The frame is a balloon frame with full height studs from ground to eaves. The 15 x 44 s/w skirting INTERMEDIATE FLOOR 1st floor is supported on a horizontal timber fixed to the face of the OSB structural sheathing which creates an airtight and vapour resistant layer to prevent Route for services condensation. The OSB layer is continuous U = 0.152and eliminates the complicated junction with the floor which is difficult to make airtight in the more usual platform frame construction used in the UK. 22 chipboard on 253 x 72 'Posijoists' or similar The intermediate floor is formed with open 50 mineral wool insulation web joists which accommodate the 15 plasterboard ventilation ducts required for whole house ventilation systems and other services through the open webs. This floor void is 22 TG4 chipboard with glued joints on linked to the service voids in the external 250 x 38 s/w joists @ 600 c/c with walls and allows all the services to be run mineral wool insulation without having to cut into the structure. 22 fibreboard underlining **GROUND FLOOR** 

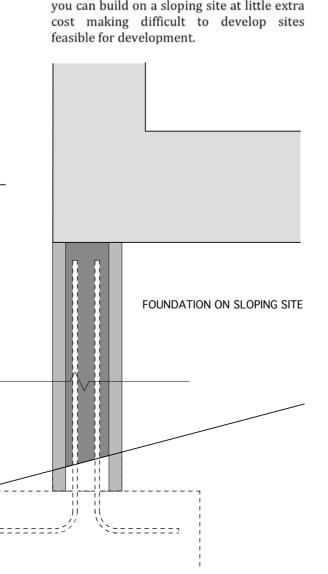
A timber suspended ground floor deck is supported on 150mm high concrete blocks cast in a plastic bucket. In the case of a sloping site, the floor is supported on a concrete drainpipe filled with concrete with reinforcement bars which has proved easy for self-builders to construct. In this way you can build on a sloping site at little extra cost making difficult to develop sites feasible for development.

A conventional pitched roof is shown which lends a conventional appearance which will be preferred in many situations.

The roof finish is shown as a green roof which looks good and is self-buildable and economic to construct. A conventional tiled roof can be provided if the context demands but tiles would have to be fixed by a roofer at additional cost.

A fat roof can be provided as an alternative which has a number of advantages; it is simpler to build, easier to re-plan rooms below and easier to extend.

A range of lightweight 'dry' cladding materials can be used to suit the budget and the context. Timber in a number of configurations, horizontal, vertical, boardon-board etc. is the cheapest, cladding panels are expensive but require no maintenance as are brick slips on a backing or tile hanging.



cheap. It is self-buildable and significantly reduces the need for digging and concrete.

500mm

The substructure is reduced to 4 mass

concrete pads 600 in diameter and 900

deep cast in holes made with a post-hole

auger. This has proved quick, easy and

**SECTION** 

cladding on

22 fibreboard on

mineral wool insulation

50 x 25 battens @ 600 c/c on

12 OSB with taped joints with 38 x 50 battens with 15 plasterboard.

 $184 \times 38 \text{ s/w}$  studs @ 600 c/c with

This proposal is for high performance, self-build homes at a cost that makes them truly affordable; a 2 bedroom Passivhaus for £45,000.

Costs are reduced principally by maximizing self-build labour input but also by keeping the design and construction simple.

The construction is based on simple tried and tested timber frame construction which has been shown to be straightforward to build by people without previous building experience. The design of the foundations and the frame are refined to reduce costs, improve performance and increase the ease of construction.

Reducing costs creates an opportunity to make houses affordable but also to increase quality and standards to Passivhaus levels appropriate for the 21st century which will radically reduce climate change emissions and resident's fuel bills.

The house has an annual heating demand of 15 kWh/m2 per annum as determined using the Passive House PHPP software. This compares to around 80kWh/m2 per annum for a Building Regulations compliant house. A solar hot water system will provide around half the annual hot water demand reducing energy consumption still further.

Timber construction has an inherently low environmental impact & reducing costs emphasises the use of natural materials used in a natural state which also tends to reduce environmental impacts. The house incorporates low water use fittings and other low environmental impact measures including a green roof which moderates surface water runoff and creates new wildlife habitats.

The house is designed so that it can be built in a terraced or semi-detached layout which is important so that overall costs can be significantly reduced. A terraced house requires half the land which accounts for around half the overall cost and so the overall cost is reduced by around 25%.

The design is conventional in layout and appearance with a pitched roof and choice of finishes to make it generally acceptable to potential self-builders, neighbours, local councillors, funders and others.

The front and back walls and the internal partitions do not carry any structural loads so that the construction is adaptable and extendable. All mechanical and electrical services are incorporated within the intermediate floor and service voids in the external walls so that they are easily accessible and capable of modification and upgrading if necessary.

Works Package	Construction Element	IV	laterials		Labour		Total
Works Package 1	Set up, Clearance, Demolitions	£	1,000.00	£	1,000.00	£	2,000.00
Works Package 2	Foundations (up to DPC)	£	1,358.00	£	-	£	1,358.00
Works Package 3	Ground Floor Slab or Suspended Floor	£	1,510.00	£	-	£	1,510.00
Works Package 4	Drainage & Service Trenchwork	£	500.00	£	-	£	500.00
Works Package 5	Specialist Building System (eg timber frame, SIPs, etc if applicable)	£	-	£	-	£	-
Works Package 6	External & Internal Walls	£	5,246.00	£	3,020.00	£	8,266.00
Works Package 7	Intermediate Floor Zone (if applicable)	£	1,800.00	£		£	1,800.00
Works Package 8	Fireplace & Chimney (if applicable)	£	-	£	-	£	-
Works Package 9	Roof Structure, Insulation & Covering	£	4,789.00	£	-	£	4,789.00
Works Package 10	Joinery (Windows, doors, stairs, skirtings)	£	8,880.00	£	-	£	8,880.00
Works Package 11	Specialist Products (eg; Eco products)	£	4,000.00	£		£	4,000.00
Works Package 12	Electrical Installation	£	4,100.00	£	300.00	£	4,400.00
Works Package 13	Plumbing Installation	£	1,450.00	£	-	£	1,450.00
Works Package 14	Heating Installation	£	2,500.00	£		£	2,500.00
Works Package 15	Plastering (or dry-lining)	£	1,267.00	£	-	£	1,267.00
Works Package 16	Kitchen and Utility Units (+ appliances)	£	950.00	£	-	£	950.00
Works Package 17	Decorations & Wall Ceramics	£	708.00	£	-	£	708.00
Works Package 18	Floor Finishes	£	550.00	£	-	£	550.00
	TOTAL	£	40,608.00	£	4,320.00	£	44,928.00

Detailed costs have been produced by quantity surveyor Gordon Hutchinson based on rates from recent projects plus Spon's House Improvement Price Book all checked against Wickes.co.uk also suppliers for specific items eg MVHR.

Costs assume a terraced house. A semi-detached house adds an additional £2,550; extra roof overhangs £200 and £2,350 cladding and a detached house adds £5,100.

## GORDON HUTCHINSON CHARTERED QUANTITY SURVEYORS

Item	Description	Quant	Ra	ite		Total	Cost/m2	%
	•		Lab. Mat. £ £	Plant £	Total £	£	£	Total
	APPROXIMATE GROSS FLOOR AREA ASSESSED	Total						
	GROUND FLOOR	37 m2						
	FIRST FLOOR	37 m2						
	MEZZANINE	8 m2	_					
	TOTAL	82 m2	_					
0	DEMOLITIONS AND ALTERATIONS							
	Assume cleared site: No Allowance TOTAL: DEMOLITIONS AND ALTERATIONS				_	0	0.00	0.00
1A	SUBSTRUCTURE							
	Reduced level excavation							
	Excavate 150mm topsoil [Note Assumed no paved surfaces] Remove excavated material from site	7 m3 7 m3	0.00	28.57 35.71	28.57 35.71	200 250		
	Pad foundation	7 1113	0.00	33.71	55.71	250		
	Excavate pad foundation: 600 Dia x 900	8 no	0.00	25.00	25.00	200		
	Earthwork support: Assumed not required: Self Build risk	14 m2	0.00	0.00	0.00	0		
	Remove excavated material from site	2 m3	0.00	62.50	62.50	125		
	Concrete pad foundation	2 m3	90.00	100.00	190.00	380		
	Oversite lean-mix blinding: 50mm	45 m2	4.50	Incl.	4.50	203		
	Suspended floor	_						
	Concrete stool: 150 dia. x 150 high on and including bituthene DPC	8 no	10.00		10.00	80		
	Structural timber joist: 47 x 250 @ 600 c/c	66 m	4.50		4.50 9.00	297		
	Structural timber joist: Pair 47 x 250 at perimeters Sundry timberwork and fixings	27 m	9.00		10%	243 62		
	Fibreboard underlining: 22mm	42 m2	7.00		7.00	294		
	Mineral wool insulation: 250mm between joists	40 m2	6.00		6.00	240		
	Chipboard decking: 22mm T&G and glued	42 m2	7.00		7.00	294		
	Additional Substructure Work: Provisional Sum				10% E	xcl.		
	TOTAL: SUBSTRUCTURE				_	2,868	34.97	6.38
2A	FRAME NOT APPLICABLE				_	0	0.00	0.00
2B	UPPER FLOORS							
	Proprietary "Posijoist" joist: 72 x 253 @ 600 c/c with masonry joist hangers Note: Measured over stair voids to include framing. Same detail allowed for Mezzanine floor	84 m	15.00		15.00	1,260		
	Sundry timberwork and fixings				10%	126		
	Mineral wool insulation: 50 mm	46 m2	2.00		2.00	92		
	Chipboard decking: 22mm TOTAL: UPPER FLOORS	46 m2	7.00		7.00	322 1,800	21.95	4.01
2C	ROOF STRUCTURE							
	Structural timber joist: 38 x 200 @ 600 c/c	91 m	4.50		4.50	410		
	Structural timber blocking 38 x 200 to perimeter	18 m	4.50		4.50	81		
	Sundry timberwork and fixings				10%	49		
	OSB lining: 12mm	48 m2	5.00		5.00	240		
	Mineral wool insulation: 200 mm	44 m2	5.00		5.00	220		
	Fibreboard decking: 25mm	48 m2	8.00		8.00	384		
	Gutter detail comprising $50 \times 100$ softwood framing with $50 \times 50$ fillets 12mm plywood lined with $32 \times 225$ fascia	11 m	20.00		20.00	220		
	Oversailing eaves detail: 500 wide [Note required over Party Wall] FINISH	21 m	20.00		20.00 E	excl.		
	Green Roof comprising non-woven polypropylene underlay, PVC membrane, 70mm topsoil and grass seeding	63 m2	20.00	9.52	29.52	1,860		
	Membrane continued into gutter 600 girth with aluminium trim	11 m	Incl.		0.00	0		
	Shingle gutter filling: 40mm pebbles	11 m	5.00		5.00	55		
	Verge with Green Roof edge restraint	21 m	20.00		20.00	420		
	Velux roof window: 800 x 1000 RAINWATER INSTALLATION	2 no	350.00		350.00	700		
	Note: Gutters within roofing							
	Outlet	2 no	20.00		20.00	40		
	Pipe	10 m	7.00		7.00	70		
	Connection to drain TOTAL: ROOF	2 no	20.00		20.00	40 4,789	58.40	10.66
2D	STAIRS					_		
	Timber staircase: Simple components for self-build: Allow	1 Item	500.00		500.00	500		
	Mezzanine access ladder: Allow	1 Item	200.00		200.00	200		
	Mezzanine balustrading TOTAL: STAIRS	3 m	50.00		50.00	150 850	10.37	1.89
2E/F	EXTERNAL WALLS/WINDOWS AND EXTERNAL DOORS STRUCTURE							
	Structural timber base plate: 47 x 184	17 m	3.50		3.50	60		
	Structural timber stud: 47 x 184 @ 600 c/c	200 m	3.50		3.50	700		
	Note: Measured over window openings to include formation							

Item	Description	Quant		Rate			Total	Cost/m2	%
			Lab. £	Mat. F	lant £	Total £	£	£	Total
	Structural timber head plate: 47 x 184	21 m		3.50		3.50	74		
	Sundry timberwork and fixings	21		0.00		10%	83		
	Mineral wool insulation: 184 mm between studs	72 m2		5.00		5.00	360		
	Fibreboard lining: 22mm to outer face	85 m2		7.00		7.00	595		
	OSB lining: 12mm to inner face ENVELOPE	85 m2		5.00		5.00	425		
	Total Area: Split Timber cladding on and including 50 x25 battens @ 600 c/c: Front and rear	151 m2 33 m2	=	0.00 50.00		0.00 50.00	0 1,650		
	elevations Timber cladding on and including 50 x25 battens @ 600 c/c: Side elevations	94 m2		50.00		50.00 E	vol		
	[Note can be omitted if Terrace]								
	Cladding panel: Front and rear elevations	6 m2		50.00		50.00	300		
	Triple glazed windows and external doors: Certified to Passivhaus	18 m2 151 m2	-	300.00		300.00	5,400		
	Aluminium window sill	9 m	-	20.00		20.00	180		
	External door threshold	2 m		25.00		25.00	50		
	External porch: Allow	1 Item		500.00		500.00	500		
	TOTAL: EXTERNAL WALLS/WINDOWS AND EXTERNAL DOORS					_	10,376	126.54	23.10
2G	INTERNAL WALLS AND PARTITIONS Timber stud partitions comprising								
	Structural timber base plate: 38 x 75	26 m		1.50		1.50	39		
	Structural timber stud: 38 x 75 @ 600 c/c	178 m		1.50		1.50	267		
	Note: Measured over door openings to include formation								
	Structural timber head plate: 38 x 75	33 m		1.50		1.50	50		
	Sundry timberwork and fixings	62 2		2.00		10%	36		
	Mineral wool insulation between studs: 75mm  Plasterboard lining: 15mm with taped edges and jointing	63 m2 140 m2		3.00 3.00		3.00 3.00	189 420		
	TOTAL: INTERNAL WALLS AND PARTITIONS	140 1112		3.00		3.00	1,000	12.20	2.23
2H	INTERNAL DOORS								
	Doors, frames and ironmongery; Decoration: Single door TOTAL: INTERNAL DOORS	7 no 7 no	_	200.00		200.00	1,400 1,400	17.07	3.12
	TOTAL: SUPERSTRUCTURE		-			_	20,215	246.52	44.99
						_	20,213	240.52	44.55
3A	WALL FINISHES Backing								
	Perimeter wall: Plasterboard lining: 15mm on and including 50x38 battens @ 600	103 m2		8.00		8.00	824		
	c/c with mineral wool insulation								
	Internal plasterboard walls: See Section 2G	132 m2 235 m2	-	0.00		0.00	0		
	<u>Finish</u>		_						
	Emulsion painted finish	225 m2		1.00		1.00	225		
	Ceramic tiling: 3 courses 150 x 150 tiles around bath and kitchen and utility worktops. Allow 3m2 tiling around Utility shower	10 m2	_	40.00		40.00	400		
	Window opening details:	235 m2	-						
	Head: Painted plasterboard lining on battens with insulation	11 m		5.00		5.00	55		
	Jamb: Painted plasterboard lining on battens with insulation	26 m		5.00		5.00	130		
	Sill: Softwood window board with painted finish	9 m		10.00		10.00	90		
	TOTAL: WALL FINISHES					_	1,724	21.02	3.84
3B	FLOOR FINISHES Sub-Floor								
	Chipboard sub-floor: See Sections 0 and 2B	79 m2		0.00		0.00	0		
	Staircase: See Section 2D	3 m2 82 m2	-	0.00		0.00	0		
	<u>Finish</u>		-						
	Linoleum to kitchen area, utility and bathroom	22 m2 53 m2		25.00		25.00	550		
	Chipboard surface unfinished Staircase: See Section 2D	53 m2 3 m2		0.00 0.00		0.00	0		
	Internal walls, Ducts etc	4 m2		0.00		0.00	0		
	mornal mails, Basto sto	82 m2	-	0.00		0.00	·		
	Skirting: 15x 44 softwood painted	90 m	-	4.00		4.00	360		
	External door threshold	2 m		25.00		25.00	50		
	TOTAL: FLOOR FINISHES					_	960	11.71	2.14
3C	CEILING FINISHES								
	Backing Ground Floor and under Mezzanine: Plasterboard soffit: 15mm	41 m2		3.00		3.00	123		
	First Floor: Plasterboard soffit: 12mm	35 m2		2.50		2.50	88		
	Stair void [Ground]	2 m2		0.00		0.00	0		
	Internal walls, Ducts etc	4 m2	_	0.00		0.00	0		
	Managed on plan Fisher for plants are fifty over Fig.	82 m2	-	0.50		0.50			
	Measured on plan: Extra for sloping soffits over First  Finish	7 m2		2.50		2.50	18		
	Emulsion painted finish	76 m2		1.00		1.00	76		
	Stair void [Ground]	2 m2		0.00		0.00	0		
	Internal walls, Ducts etc	4 m2 82 m2	_	0.00		0.00	0		
		OZ IIIZ	-						

Item	Description	Quant		Ra	te		Total	Cost/m2	%
			Lab. £	Mat. £	Plant £	Total £	£	£	Total
	Measured on plan: Extra for sloping soffits over First	7 m2		1.00		1.00	7		
	Rooflight lining: 800 x 1,000 x 200 deep	1 no		30.00		30.00	30		
	TOTAL: CEILING FINISHES					-	341	4.16	0.76
	TOTAL: INTERNAL FINISHES					-	3,025	36.89	6.73
4A	FITTINGS AND FURNISHINGS								
G03	Kitchen / Dining: Self build units: Laminate on 40 Chipboard worktops on 15 ply carcasses and doors. PVC drawer kits: Built in sink. Allow	1 Item		700.00		700.00	700		
G04	Utility / WC14/09/2013 : Self build units: Laminate on 40 Chipboard worktops on 15 ply carcasses and doors. PVC drawer kits. Built in sink. 15 ply ducts: Allow	1 Item		200.00		200.00	200		
F06	Bathroom: 15 Ply ducts: Allow	1 Item		50.00		50.00	50		
	TOTAL: FITTINGS AND FURNISHINGS					-	950	11.59	2.11
5A	SANITARY APPLIANCES	1 Item		400.00		400.00	400		
G04 F06	Utility / WC; WC; Shower fitting Bathroom: Bath, WC, WHB	1 Item		550.00		550.00	550		
	TOTAL: SANITARY APPLIANCES					-	950	11.59	2.11
5C-G	MECHANICAL SERVICES								
	Hot and cold water supplies  Waste plumbing	1 Item 1 Item		300.00 200.00		300.00 200.00	300 200		
	Minimum output combination gas balanced flue boilers serving 6 no small radiators	1 Item		2,500		2,500	2,500		
	Solar hot water installation	1 Item		1,500		1,500	1,500		
	Heat recovery ventilation system TOTAL: MECHANICAL SERVICES	1 Item		2,500		2,500	2,500 7,000	85.37	15.58
						-	1,000	00.01	10.00
5H, L	ELECTRICAL SERVICES Lighting and power supplies by Self-Builder: Allow/m2 GFA	82 m2		50.00		50.00	4,100		
	Testing by Certified Electrician TOTAL: ELECTRICAL SERVICES	1 Item	300.00	0.00		300.00	300 4,400	53.66	9.79
						-	4,400	55.00	9.79
5J	LIFT AND CONVEYOR INSTALLATIONS NOT APPLICABLE					-	0	0.00	0.00
5N	BUILDER'S WORK IN CONNECTION WITH SERVICES								
	Allowance for all general BWIC services and attendances on specialist Sub Contractors: By Self Builder: Allow sundry material in other sections	1 Item		0.00		0.00	0		
	TOTAL: BUILDER'S WORK IN CONNECTION WITH SERVICES					-	0	0.00	0.00
	TOTAL: SERVICES					-	12,350	150.61	27.49
						-	,		
6A	SITE WORKS  No Site Works allowed						0		
	Pergola to Rear Elevation TOTAL: SITE WORKS					<u> </u>	Excl,	0.00	0.00
						-		0.00	0.00
6B	DRAINAGE Drain connection to site manhole: Allow	1 Item		500.00		500.00	500		
	Connection to local authority sewer					1	Excl.	0.40	4 44
	TOTAL: DRAINAGE					-	500	6.10	1.11
6C	EXTERNAL SERVICES  Water, Gas and Electric mains: Assume services provided as part of Self-Build	1 Item		0.00		0.00	0		
	initiative/future fuel consumption					-			
	TOTAL: EXTERNAL SERVICES					-	0	0.00	0.00
	TOTAL: EXTERNAL WORKS					-	500	6.10	1.11
	SUB-TOTAL						39,907	486.68	88.83
7	<u>ON-COSTS</u>								
7A	PRELIMINARIES								
	No Main Contractor: Allow for site facilities, small tools and plant, insurances, Professional inspections etc.	1 Item	1,000	0.00	1,000	2,000	2,000		
	Scaffolding: Allow/m2 External Wall Area	151 m2	20.00			_	3,020		
	TOTAL: PRELIMINARIES					-	5,020	61.22	11.17
7B	OVERHEADS AND PROFIT NOT APPLICABLE					-	0	0.00	0.00
70						-		3.00	2.00
7C	CONTINGENCIES Allowance for contingencies					10%	Excluded	0.00	0.00
	TOTAL: ON-COSTS					-	5,020	61.22	11.17
	TOTAL: CONSTRUCTION AT CURRENT COST 3RD QUARTER 2013					-	£44,927	£547.90	100.00
	. S E. GONOTING THE GONNERT GOOT SIND QUANTER 2013					=	£77,0£1	20-1.00	100.00