

ruralZED™
THE ZERO CARBON
HOUSE IS READY



ruralZED™ - what's included

Full Specification

FOUNDATIONS

Pile cap foundation package

A tailor-made proprietary GGBS piling solution can be provided for any site in the UK and this will include both the design and the installation of all the components required to connect the timber frame to their piling system. This is both quick and cost effective to install. A geothermal system can also be incorporated within the concrete piles. An allowance has been made within the quoted kit cost for this service, but it will vary from site and can only be finalised once the appropriate survey has been conducted.

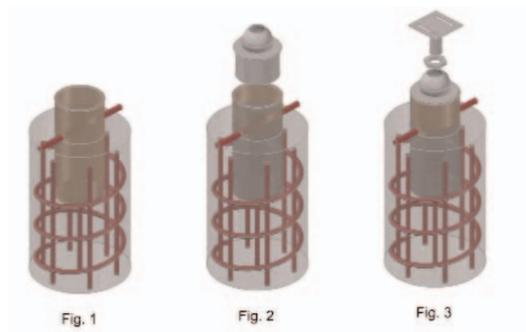


Fig. 1

Fig. 2

Fig. 3

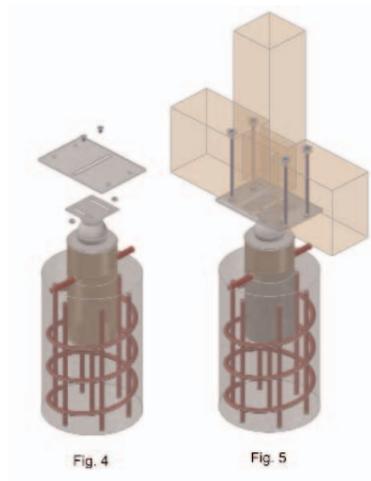


Fig. 4

Fig. 5

FRAME

Glulam timber frame package

- GLUED LAMINATED TIMBER for primary structural frame members to BS 5268." Standard: To BS EN 386 and BS EN 390, with glued end joints to BS 5268-2, clause 3.4.
- The timber used is free from active attack by insects or fungi and can come in Douglas fir for visible applications or larch or douglas fir or red pine otherwise.
- Strength class to BS EN 338: GL24h throughout minimum.
- Finished lamination thickness: 44 mm maximum.
- " Adhesive type: To BS EN 301 and capable of withstanding climactic conditions specified in BS EN 386 for service class 2.
- " Moisture content of each lamination to be the same, max. 15%.
- " Treatment: Organic solvent impregnation to NBS section Z12 and British Wood Preserving and Damp-proofing Association Commodity Specification C8, Service life: 60 years.
- " Works applied finish: To suit Architects requirements.

Steel cross- bracing

Carbon steel tie rod cross bracing.



Prototype frame for Upton, Northampton



ENVELOPE

Cement board

12mm boards are used as encapsulation boards to the ground floor, positioned underneath insulation.

38 mm boards are used as the ceiling finish to the top floor in the standard cost option.

Cement bonded particleboards are produced by pressing a mixture of wooden particles, portland cement and hydration additives. The surface is smooth; the colour is cement-like grey. Considering its strength, stability in moisture, weatherproofness, frost and mould resistance, This is better than chipboards or plasterboards.



Cetris board ceiling, Upton, Northampton

Ibstock terracotta floor bricks

The Coolvault terracotta blocks have been designed specifically for the rural ZED kit, as an alternative ceiling finish. They are designed with special 'ears' which lap over the horizontal beams, therefore requiring no additional fixing. There is scope within the bricks for service wiring and their weight provides substantial thermal mass. Coolvault terracotta blocks are prefinished on both the top and the underside to provide ready and attractive terracotta floor and ceiling finish.



Ibstock floor bricks at Eco Build Show House

Mineral Wool Insulation

Used in our ground floor (350mm), first floor ceiling (300mm), roof and walls (300mm).

Excellent performance as well as durability.



Insulation in ground floor at Upton, Northampton

Airtight Membrane

This is installed around the entire cubic frame of the house to form an airtight box. Cut outs are then made where the openings lie and the membrane folded back into the structure, ready for windows, doors, the roof and external skin of the building to be installed.

The membrane is installed between the internal face of the rigid insulation panels and the horizontal wall timber wall rails, with the 'shiny' reflective side facing outwards into an airspace / wall cavity. The membrane is lapped against the rails with a timber coverplate forming a compression joint.

There is a 25mm cavity adjacent to the membrane, and behind the cladding.



The 'air tight box' at Upton, Northampton

Insect mesh and Vermin mesh

The eaves vents are provided to limit condensation risk. Expanded stainless steel is used over roof vents and to close the cavities behind the external cladding to exclude birds and insects. It is readily adaptable to various eaves details. It is light weight and easy to handle on site. Available in a 75mm x 30m coil.

A heavy duty grade 316 stainless steel 1.6 weld mesh is also provided as a skirt to base of the building to exclude vermin from the undercroft of the building.

Ibstock terracotta cladding tile option

Ibstock, one of our consortium members, have worked in conjunction with ZED factory to design a product specifically for Rural ZED. The product is a large scale (500mm long), cladding tile which is designed to clip straight onto the tertiary timbers on the main frame. This eliminates the need for any additional fixings and hence reduces cost, labour time and energy. The tiles are thermally massive and also very durable. They can be grouted at the junctions to create a sturdy, water-tight cladding system. This product is under development and will be available soon



Render System & Sheathing Board

We use an asbestos-free calcium silicate board that provides outstanding dimensional stability and class 0 fire rating. It is located on the external walls of the building, below the timber weatherboarding and is also used as a structural backing for the proprietary external render system.



Heat-treated Cladding

21mm x 142mm Tapered Cladding. Used as external finish on North, West and East facades.

The wood material is heated to a temperature of at least 180 degrees Celsius while it is protected with steam. As a result of the treatment, its wood colour darkens. It is more stable than normal wood in conditions of changing humidity and its thermal insulation properties are improved. The high heat treatment also makes the wood resistant to decay.

In certain boundary conditions additional treatment may be required to achieve highest fire rating. This will be determined on a project basis. This additional cost is excluded from the standard package.



Timber cladding at Upton, Northampton

Fire-resistant Party Walls

Fire resistant board is used between our party walls. It comprises gypsum plasterboard with glass fibre and other additives in the core.

Its purpose is to give increased fire protection to the party wall.



Secondary and tertiary timber structure

These include the secondary horizontal timber rails, the tertiary horizontal and vertical rails onto which the external cladding is mounted and all other timber ledgers and sections. They also include all window reveals (heat-treated to match cladding timber).

All timber will be vac vac treated, which means it has been impregnated with timber preservative under rigidly controlled conditions in a double vacuum/low pressure plant (Vac-Vac plant). It is a waterborne timber preservative formulation having fungicidal and insecticidal properties.



FINISHES

Windows and doors

These include the internal windows and doors to the sun space.

The timber used is high quality heartwood timber meaning a long lasting lifespan. It is laminated to stop twisting and warping and is treated with fungicides and factory finished with water-based paint to prolong products longevity.

Door and window sets are compliant with Secure By Design security standards. All glazing to be low E, argon filled double glazed.



Windows forming sunspace at Upton, Northampton

Concrete wall planks

A thermally-efficient alternative to domestic plasterboard which are manufactured from 50% recycled aggregate. Ground Granulated Blastfurnace Slag (GGBS) is introduced to the PFA / cement mix, reducing the quantity of cement required by up to 2/3rds reducing the embodied CO2 of the thermally massive lining panels which are used on internal walls. They come pre-finished with concrete sealant.



Concrete wall planks at Upton, Northampton

Concrete floor pavers & grout

Thermally massive pavers to internal floors (both downstairs and upstairs). These use over 75 per cent of recycled materials, the mix includes Cornish granite, copper slag for decorative effect, (a bi-product of the power industry), china clay stent used as an aggregate, (a waste product of the china clay industry), cement from an energy conscious supplier and recycled water. The application of local aggregates reduces road haulage to a minimum. Its exposed Cornish granite aggregates give a textured black fleck, granite-like finish, resulting in a product with strong aesthetic appeal at an affordable price. The floor pavers come pre finished with 2 coats concrete sealant. Tile adhesive and wide joint grout supplied for 10mm joints.



Timber Decking and balustrade

Pre waxed 144 x 44 Douglas Fir timber planks will form the flooring and the balustrade for the sunspace balcony.



Recycled Gypsum Board

This is a high-performance multi-purpose building board that when installed combines the properties of solid blockwork with the speed and flexibility of conventional drywall techniques. It is produced using ordinary materials in an extraordinary way. Raw gypsum, cellulose fibres from recycled paper and water are combined to form a homogeneous mass, which is then formed into a dense sheet material. After curing, the large format boards are cut to size.'

It is supplied to line the bathrooms and kitchens, providing a surface ready to receive tiling, decoration and any wall fittings.

Plasterboard and other timber finishes

The Rural ZED kit includes all materials necessary to make up the internal partition walls. This includes the horizontal and vertical timber stud work and the plasterboard finish. Timber skirting boards are also included as well as all architraves, coverplates and door linings.

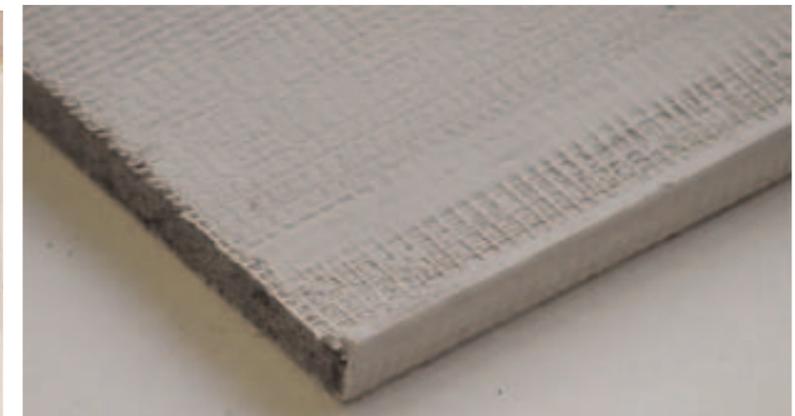
Location of internal partitions are adaptable depending on the clients individual requirement.



Glass-reinforced Cement Board

This is used in the downstairs WC and Upstairs Bathroom. It is a glass fibre reinforced cement board for use as a tile backer in wet and humid areas. It does not rot or warp.

It comes in panels of 570x 870 and is 38mm thick and replaces the floor pavers in these areas. Once tiled on the smooth side of the board, the finished floor level will be the same as that of the paved floor.



Plywood and Bonded Screed

21mm plywood provides structural sheathing and forms the base of the floor. This will rest on 38mm pretreated battens on the cement board ceiling, or directly on the coolvault terracotta block ceiling.

A 18mm site applied cementitious screed is to be unbonded to the ply in preparation to receive the concrete pavers.

Internal Joinery and Door furniture

Modern factory painted FD20 flush timber doors will be supplied as standard. Panelled or veneer laminated doors can be supplied as an optional upgrade.

Upon request, chrome lever mortice latch ironmongery can be supplied for the internal doors. Bathrooms to have turn buckle.

32mm thick softwood door linings and 70mm twice pencil rounded architraves are supplied for site fixing and decoration.

Once rounded softwood skirtings will be provided for site fixing and decoration



Awning*

A proprietary 'fall arm' external roller blind is provided in all south facing houses with sunspaces. These provide effective solar shading to the sunspace to prevent solar gain in the summer months. The pivoting fall arm allows the angle of the blind to be adjusted and does not obstruct the view from the interior.

Motorised blinds are supplied as standard and a choice of colours is available to select from.



ROOF

Gang nail roof trusses

The kit includes a package of 15 timber roof trusses, which are prefabricated off site and then lifted onto the horizontal plywood base. Ancillary items and metalwork are also included in the kit.

Structural timber insulated panel system

This proprietary roofing system maximises the use of roof space as living area and is used in some of our housetypes.



Ply roof deck

21mm WBP ply forms the structural sheathing and lower lining of the roof structure upon which the roof insulation sits (depending on roof design).

Ventilation holes will be required to be drilled on site through the roof ply to allow the breather membrane to breathe.



Clay tile roof

The standard RuralZED package allows for a clay roof tile.



Aluminium standing seam roof option & accessories

The proprietary roof system comprises metal sheeting which is roll formed in the factory from continuous strip coil. After positioning on the building, Aluminium panels are mechanically seamed together onto secret fix clips to give an integral roof covering that has no joints or end laps.

The PV and solar thermal can be clip fixed to the standing seams without penetrating the roof. The addition of renewables to the roof is simple allow for easy upgrades.

Also included are the ancillary roof metal work including upstand and roof edge flashings, copings, roof ridge covers and seam clips for the fitting of retention battens for the sedum roof.



Green (sedum) roof

As an option particularly for sites requiring additional code points for diversity, a sedum roof can be supplied for the north facing roof. The kit comprises of a pre-grown sedum mat combined with a sedum plug and hydroplant, where young plants are hand planted and cuttings spread. 30% of the roof will be covered in the sedum mat and 70% with plug planting with a native wildflower seed mix. The latter takes 9-12 months to grow.

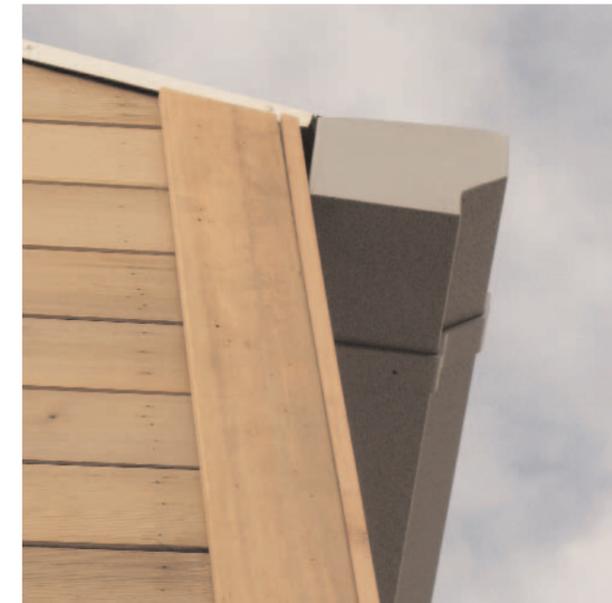
The combination of these two types of planting provides enough diversity for the green roof to meet the code for sustainable homes. Due to the pitch of the roof, substrate retention measures in the form of cross battens are be fitted. These battens are supplied and fitted to seam clips supplied and fitted by the roofing contractor prior to final fitting of any edge details.

This sits on an EDPM roof finish.



Aluminium rainwater goods

Pressed aluminium square section gutters and aluminium downpipes will be supplied for site installation to connect to the rainwater harvesting system.



KITCHEN AND BATHROOM

WC, Sink, Bath

The ruralZED kit includes a full bathroom package. The suite of appliances are compliant with the water usage requirements to meet Code 6 of the CFSH of 80 l/p/day. The sanitary kit is for the upstairs bathroom and downstairs WC and includes the following items:

- 1) 2 no. (wall-hung) WCs - ultra-efficient 4 litre concealed cistern with duel flush including all fixtures and fittings necessary for installation.
- 2) 2 no. Basin 360 x 470 with bolt attachment.
- 3) 1 no. small bath. Bath panels included.



Bathroom and kitchen accessories

Basin mixers typically use 12 litres per minute but water flow can be reduced by the introduction of aerators or spray fittings -(An example could be Tapmagic available @ 2.0 l/pm and 2.5 l/pm).

Basin Traps are also supplied along with over bath brassware such as a thermostatic bath shower mixer. A shower set for the bath mixer is supplied and uses 6 litres per minute. Other items such as robe hooks, toilet roll holders and bath legs can also be included in the kit at request.



AAA Kitchen White goods

Class A energy efficient kitchen white goods are supplied as standard. High efficiency appliances are essential to minimise the electrical demand.

Included are an extractor fan, a washing machine, 245L fridge freezer, and a 9 place setting dishwasher.



Oven and hob

Class A energy efficient hobs are also provided.

A built-in induction hob is provided as standard.

Induction cookers are faster and more energy-efficient than traditional cooktops. An induction cooker uses induction heating for cooking. A conducting pot is placed above an induction coil for the heating process to take place. This form of flameless cooking has an edge over conventional gas flame and electric cookers as it provides rapid heating, vastly improved thermal efficiency, greater heat consistency, plus the same or greater degree of controllability as gas.



Kitchen fit-out

The ruralZED kitchen can be adapted to suit the budget. The two alternatives we are currently offering are:

A kitchen built on 18mm particle board cabinets with a 40mm post formed worktop is supplied as standard. Options are available for the frontals colour, worktop finish and handle design.



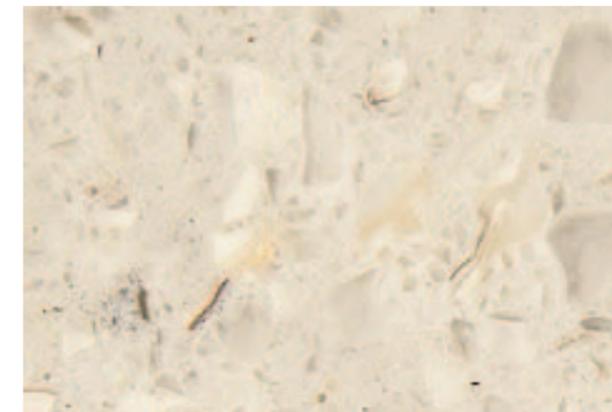
Splashbacks

Tiles for the shower enclosure, basin and kitchen splashbacks are not included as standard to allow for client choice and enable local sourcing.

An upgrade option is available to use a recycled glass splash back.

The splashbacks are made from 95% recycled glass bottles and recycled plastics which would have gone to landfill sites, so as well as being aesthetically pleasing, it's also great for the environment.

Bottles are washed and sorted by colour then smashed into tiny glass chips. The chips are bound together with a solvent-free resin and poured into a bespoke mould.



SERVICES

Wind Cowl and PET heat exchanger

Supplied by our consortium ZEDfabric, The ZEDfabric Wind Cowl passive heat recovery ventilation system supplies and extracts air to maintain good indoor air quality whilst minimising heat loss. The ZEDfabric wind cowl works like an active ventilation system in that it has dedicated inlet and outlet ducts and a heat recovery system, but instead of using electrical fans to drive the air flow it uses the wind to create both positive pressure at the inlet and negative pressure at the outlet ensuring a throughput of air for no electrical input. In low wind conditions it will continue to produce reasonable ventilation levels through stack effect. The heat recovery system is 70% efficient. At an average windspeed of 4m/s in London, depending on the external temperature, the flow rate of the Wind Cowl is between 50-70 litres per second. At an average wind speed of 4m/s in London, depending on the external temperature, the flow rate of the Wind Cowl is between 50-70 litres per second.



Ductwork

Each Wind Cowl and heat exchanger is connected via a manifold to a series of up to 8 rigid 125 diameter ducts. A condensate drain will need to be routed from each unit to the nearest trap.

White circular terminal wall grills will be provided for each supply and extract terminal.



180W Photovoltaic panels

Photovoltaic solar panels (supplied by consortium ZED Fabric) convert sunlight into useful electricity. ZEDfabric supplies high quality monocrystalline silicon cell PV panels in 180W to Rural ZED. The laminated cells are mounted in an anodised Aluminium frame. On the rear of the module is a waterproof junction box with connection cables.

6 no. 180W PV panels are provided as standard to a Code level 5 house.

20 no. 180W PV panels are provided as standard to a Code level 6 house.

The PV panels are fitted to the roof via the unistrut galvanised steel proprietary fixings supplied, which clip to the standing seams.



ZED Fabric 3.6KW Grid Tie Inverter

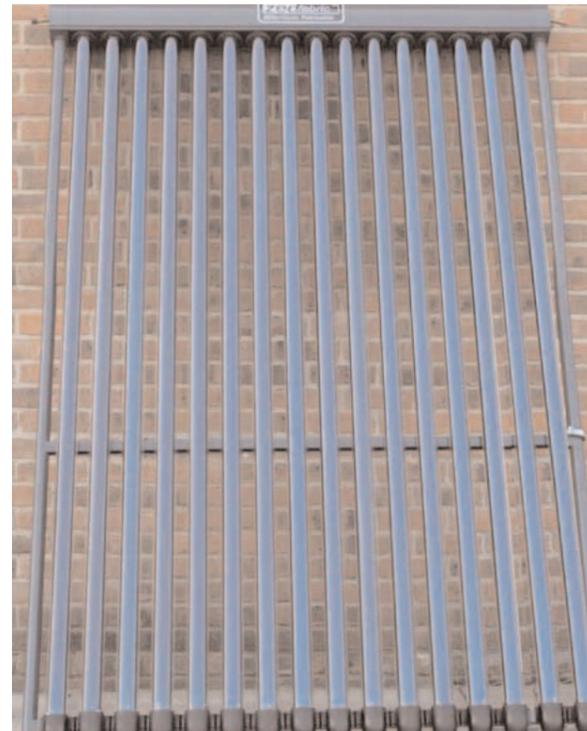
ZEDfabric supplies inverters to convert the DC current generated by solar panels into AC power and sell energy back to the national grid. Features include:

- 1.DSP controller
- 2.Using the fifth generation IPM from Mitsubishi company as the power component
- 3.MPPT (Maximum Power Point Tracking) technology
- 4.High efficiency up to 95%
- 5.Perfect protect functions include anti islanding
- 6.In accordance with IEEE929-2000,UL1741
- 7.Quick and easy installation
- 8.A LCD display for monitoring all system information
9. Can set the operation parameters via LCD and keys
- 10.CE certificate



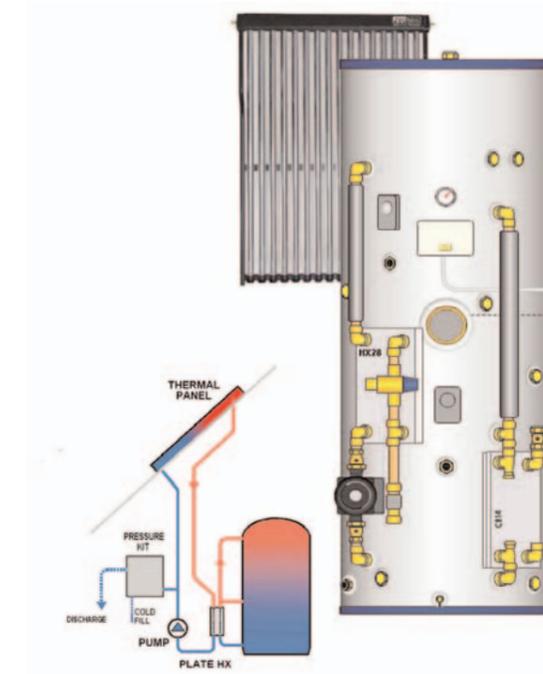
Solar Thermal collectors

ZEDfabric supply the Solar Thermal Collectors which use sunlight to heat water. Evacuated tubes have been developed particularly for northern climates where outdoor air temperatures are low. The evacuated tubes contain a collector pipe, which heats up in sunlight. A glycol-water antifreeze mixture flowing in the pipe is plumbed to a hot water cylinder heat exchanger. The collector pipe is enclosed in a double walled glass tube just like a thermos flask to minimise heat loss. The solar thermal tubes are fitted to the roof via the unistrut galvanised steel proprietary fixings supplied. A package of 2 thermal solar collectors are supplied.



ZEDfabric thermal store

ZED Fabric supply heat stores to harvest the hot water provided by the solar panels. Since you cannot export excess heat back to the grid as you can with excess electricity, a hot water tank or (to use the correct term) thermal store is as important as electrical batteries are to an off-grid house or electric car. The art is to have a store that is always cold enough to provide somewhere to store any solar heat available, yet be hot enough to provide hot water from the taps and space heating if required. The provision of a thermal store allows the boiler to run only when it is efficient to do so whilst making sure there is always a source of heat for the heat main.



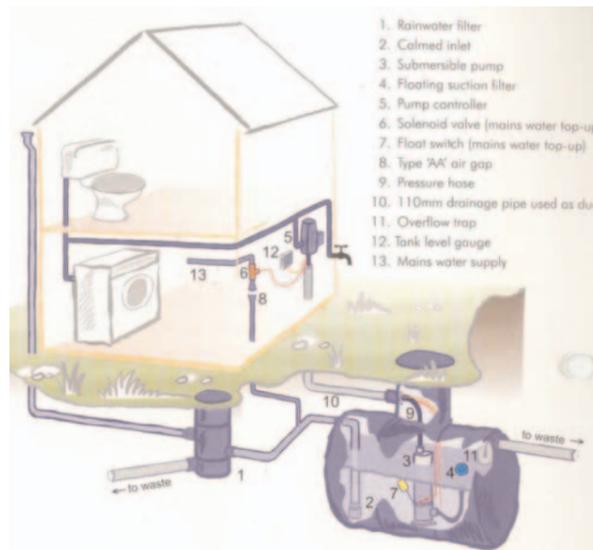
Rain water harvesting kit

A rainwater harvesting kit is supplied. It comprises a 3500L GRP tank, floating suction filters and pumps.

Pipe connections, electrical requirements and works to install the storage tank are not included in the supply price.

Collecting and using rainwater from the roof can reduce mains water consumption by up to 50% and will also reduce the amount of water discharged into the storm water system.

The kit supplied provides pressurised clean water suitable for non potable uses such as flushing, clothes washing and garden irrigation.



Wood Pellet Boiler

When there is not enough sun to heat the water in the solar panels, a small back-boiler integrated within a wood pellet-fuelled cooking range is used. This provides hot water in the winter months. The range is identical to a farmhouse kitchen and has an optional combustion chamber for logs, providing the best possible range of fuel-economy and convenience. The pellet stove has an automatic timer and can be set to provide hot water as desired. By using wood for both fuelling hot plates and an oven, significant reductions in electric demand can be achieved.



Electrical Services

Low-energy LED light fittings compliant with the Code For Sustainable Homes will be provided for installation.

All cabling and installation costs are excluded.

Specifications and drawings will be provided for the lighting, power, telecommunications and fire detection systems. The supply and installation of these packages by a qualified electrician is excluded from the supply cost.

The connection and installation of the photovoltaic package supplied is excluded.

Mechanical Services

Specifications and drawings will be provided for the mechanical services systems.

The windcowl, ductwork, solar thermal collectors, thermal store, boiler and rainwater harvesting tank, pumps and filters will be supplied. The connection and installation costs of these packages is excluded.

EXTERNAL WORKS

Underground services

Utility services connection fees and costs to connect to the perimeter of the building are excluded from the standard price. Any works to resolve site abnormalities in preparation for the construction are also excluded from the package cost.

No service connections are provided beyond the underside of the ground floor of the building in the standard cost. Construction of all underground service connections are to be undertaken prior to the main build.

Landscaping

No external landscaping works is included with the standard RuralZED package.

There is an option for a complete organic grow-your-own veg package sourced from the horticultural research station at Ryton, now branded Garden Organic. This can provide up to 20% of an enthusiastic households fruit and veg needs. With an allotment this can be increased to 50%.

CONSUMABLES

Structural Fixings

All screws required for the fixing of the main frame and finishes and envelope will be provided as part of the standard package for those undertaking a self-build RuralZED.

These include:

50, 100, and 150mm spax screws for the structural frame.
250 and 350mm timberloc screws for the decking.
40mm plasterboard screws for the lining.
Countersunk stainless steel screws for the cladding.



Fillers and sealants

Fillers will be provided for those undertaking a self-build RuralZED for the site application to joints and penetrations. Careful attention to ensure all joints and penetrations are properly sealed is essential to achieve the designed airtightness.

The following will be provided:

Low modulus gunned mastic sealant for the external sealing of all abutments.

Decorators mate to seal corners and joints of the internal finishes.
Expanding foam to ensure an airtight seal at external window and door joints and all services penetrations.

Wood wax

The main frame will be supplied prefinished with 2 coats of OS wax. The timber floor cover plates will be supplied pre finished with a coat of hard OS wax oil for additional durability.

OS wax will be supplied for the site application of 2 coats to all exposed secondary woodwork.

OS wax is water repellent, dirt repellent and highly durable. Because they are based on natural oils and waxes they are microporous, allowing wood to breathe. It does not contain biocides or preservatives and are safe for use on children's toys.

