

PART SEVENTEEN
BUILDING ANALYSIS
Low Carbon Building Strategies



Building Analysis

Low Carbon Building Strategies
Construction

We choose materials and construction techniques with the least embodied energy, create the least waste, and use locally grown or manufactured materials to embody our buildings with an appropriate sense of place. We also design our buildings to very high insulating and air-tightness standards to ensure long-term sustainability.

WINDOWS - U-VALUE 0.8 W/M²K (INC. FRAME)

Triple glazed, triple sealed Argon filled timber framed & insulated “Passivhaus” certified windows & doors to be specified throughout.



MULTIFOIL INSULATION

Actis multifoil insulation internally and externally to enhance the thermal performance and performs airtightness & vapour barrier roles.



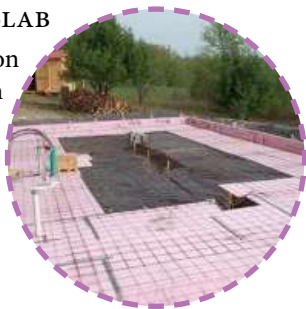
UPPER WALLS - 0.07 W/M²K

300mm Structurally Insulated Panels to be clad on-site.



GROUND FLOOR SLAB

High levels of insulation around & beneath a 70% cement replacement ‘eco’ concrete reinforced slab.



INTENSIVE GREEN & BLUE HYBRID ROOF

The combined intensive green and blue roof provides many passive benefits, such as higher thermal insulation, protection and extension of the roof life span, reduction in internal and external ambient noises, enhanced biodiversity, habitat creation, water storage (storm-water management) and controlled water release that can then be used within the building as part of the drainage/water treatment system. This hybrid roof also increases the solar panel efficiency due to the reduced roof temperatures (Biosolar Roof).



PHOTOVOLTAIC PANELS

The proposal includes installing nine mono-crystalline silicon AIKO N-Type Solar Panels with an output of 5.07kWp. Through a geographical analysis, the yearly PV energy production will be 4770.15kWh.



CLT ROOF - 0.1 W/M²K

Prefabricated CLT slab roofing system will be unloaded and assembled on-site from the construction access route. CLT offers an environmentally friendly and lightweight yet strong alternative to a concrete slab. This solid engineered wood panel has superior acoustic and thermal performance and is also fast and easy to install, generating almost no waste on-site.



HELICAL PILES

Helical Piles provide a less-invasive, more environmentally friendly, cheaper and quicker alternative to traditional foundations. Installation is vibration-free, with no excess spoil to remove and no curing period needed, so load tests can be immediately undertaken following installation. No concrete or grout is required to minimise mess, waste, and equipment on-site. At the end of its life, it can also be easily removed via reversal of the installation process and can therefore be recycled, unlike concrete.



LOWER WALLS - 0.10 W/M²K

THERMALITE AIRCRETE HI-STRENGTH 7

The walls will be constructed from the Thermalite blockwork to guarantee excellent thermal insulation, acoustic insulation, fire resistance and light for quick, economical construction. It is also manufactured from up to 80% pulverised fuel ash, a waste product from UK power stations, and the process waste is crushed and recycled into the next mix.



OUTLINE SPECIFICATION:

Treatable Floor Area	= 443 m²
Airtightness	= 0.6 AC/HR @ 50Pa
Upper Wall u-value	= 0.07 W/m²K
Lower Wall u-value	= 0.10 W/m²K
Roof u-value	= 0.10 W/m²K
Floor u-value	= 0.10 W/m²K
Triple Glazed Windows	= < 0.8 W/m²K
Glazed Area	= 81 m²
Glazed Area Facing Due South	= 52.8 m² (65%)
General Occupancy	= 4
Shading From Trees Etc	= Negligible
Passive solar potential	= Moderate

DD Architects

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Plumpton Pit Stop,
Ditchling Road,
Plumpton
BN7 3AF

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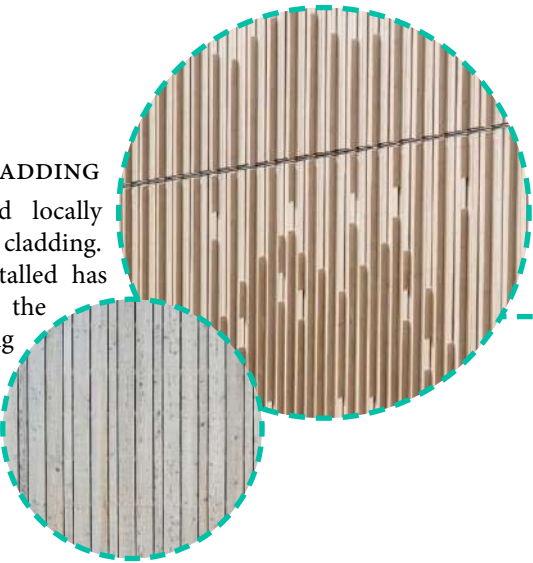
Materials

OTHER TECHNOLOGY

- Heat recovery Ventilation System
- Immersun unit (diverting excess PV energy (2 x 3kW to immersion)
- Actis multifoil insulation also provides airtightness & Vapour control
- 3x13.5kWh Tesla Powerwall 2 battery storage system
- A series of innovative AIKO N-Type Photovoltaics that individually provide up to 615Wp.
- Vphase Voltage Optimisation
- Low Energy LED lighting throughout
- Extensive Building Physics & Lifestyle Monitoring
- Building designed to meet Passivhaus credentials (Highly Insulated) and to be a high-performance building.
- Biosolar Roof which maximises solar energy generation as green roof preserves ambient rooftop temperatures, keeping the modules at optimal output. The cooling effect increases panel output by up to 5%.

VERTICAL TIMBER CLADDING

Naturally weathered and locally sourced sweet chestnut cladding. The cladding system installed has been designed to mimic the bark on the surrounding woodland.



TTE TURF GRID - DRIVEWAY

An 'ecological' driveway grid that has an innovative construction principle which protects the ecosystem and integrates it into the site. Safeguarding the ground life and ecology of the site. It protects the soil against post-compression, the ground remains breathable, and it protects the groundwater from pollutants. It also provides root protection for old trees in the area and new plantings.



SHIRASU KABE PLASTER (INTERNAL)

Shirasu-Kabe is a 100% eco-friendly material made from volcanic soil (Shirasu) in Japan with unique air purifying, humidity-conditioning, and deodorizing properties unattainable with any man-made substance. It is proven to purify the air in the room where it is applied. It's also proven to control humidity, extracting indoor humidity when levels are high and releasing it when the air is dry. It also keeps spaces comfortable, reducing energy consumption by requiring less air conditioning or heating.



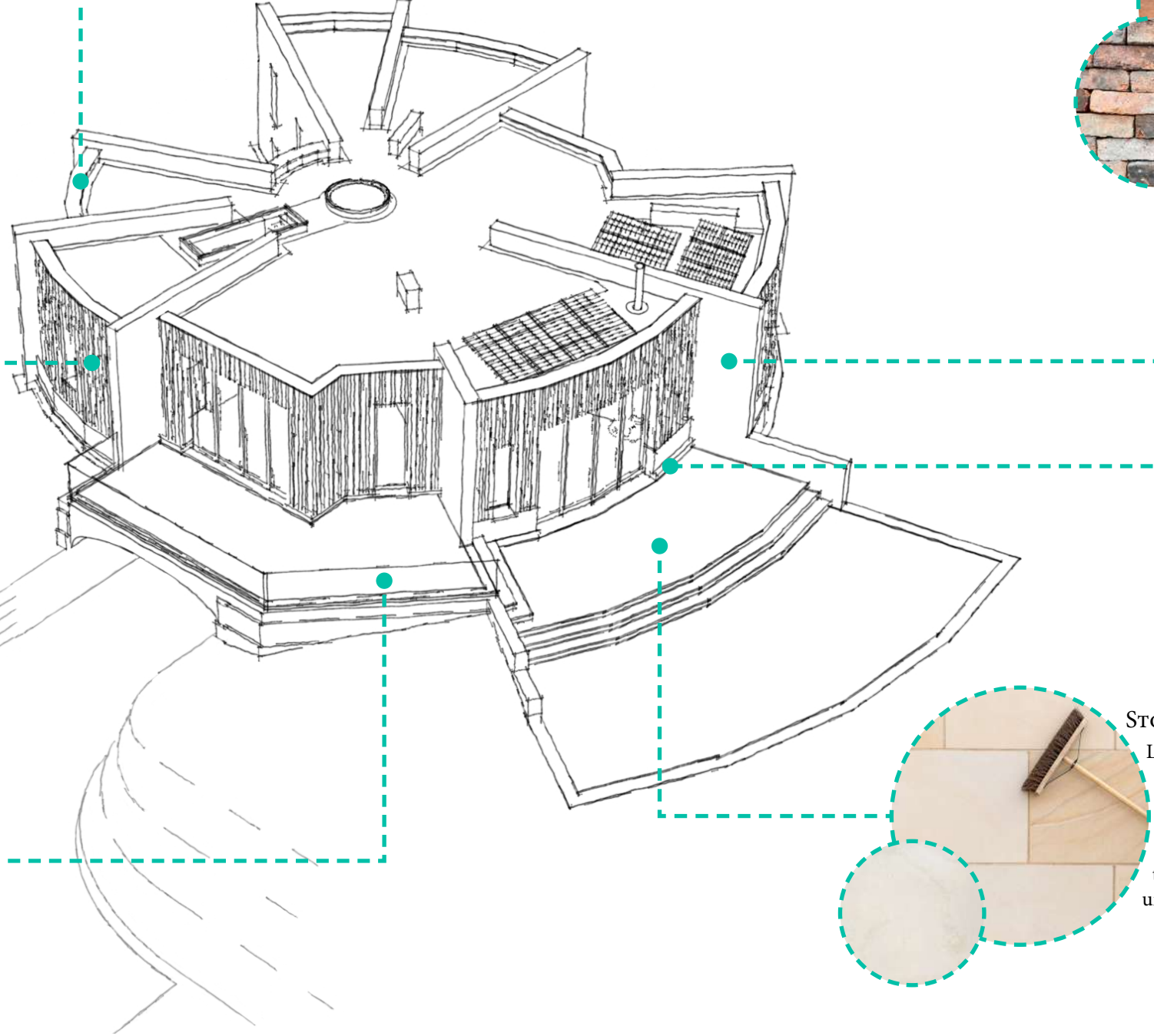
FRAMELESS GLASS RAILING

A frameless glass railing is proposed around the decking to harmoniously merge the interior and with exterior.



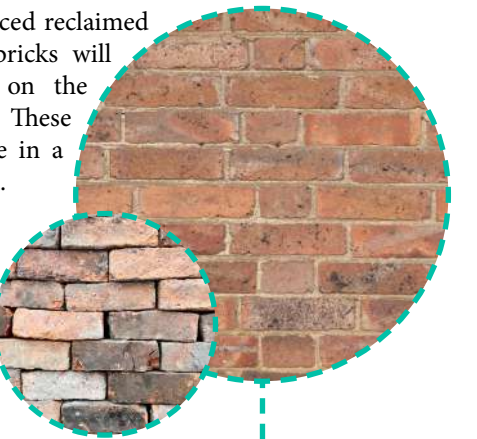
TIMBER PARAPET COPING

This will be accoya-treated timber, an ultra-high-performance, sustainable wood that can be in constant contact with water.



RECLAIMED BRICK WALL

Locally sourced reclaimed handmade bricks will be utilised on the 'crack walls'. These walls will be in a Sussex Bond.



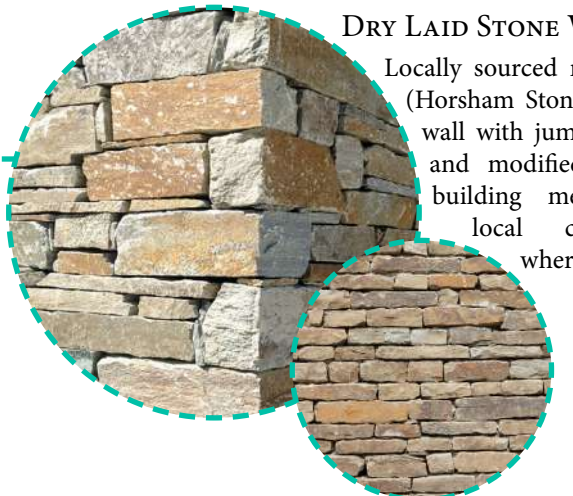
CORTEN STEEL

Corten steel is allowed to rust in order to form a protective coating. The main entrance features a corten steel door and surround (See rendered photos). The drainage around the border also features a corten steel retaining wall.



DRY LAID STONE WALL

Locally sourced natural stone (Horsham Stone). Dry laid wall with jumpers. Hybrid and modified traditional building method using local craftsmanship wherever possible.



STONE FLOORING

Locally sourced natural limestone (Lambs Port Regent) will be placed on the terrace and entrance areas. Internally the matching stone will border the rooms and will have the underfloor heating positioned underneath it.



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