Visualisation: Rendered visualisation image (by David Schnabel) showing the western elevation as viewed from the pond, with the restored Mill House and music barn in the background.

7.0 Design Proposal

7.1 Design Overview

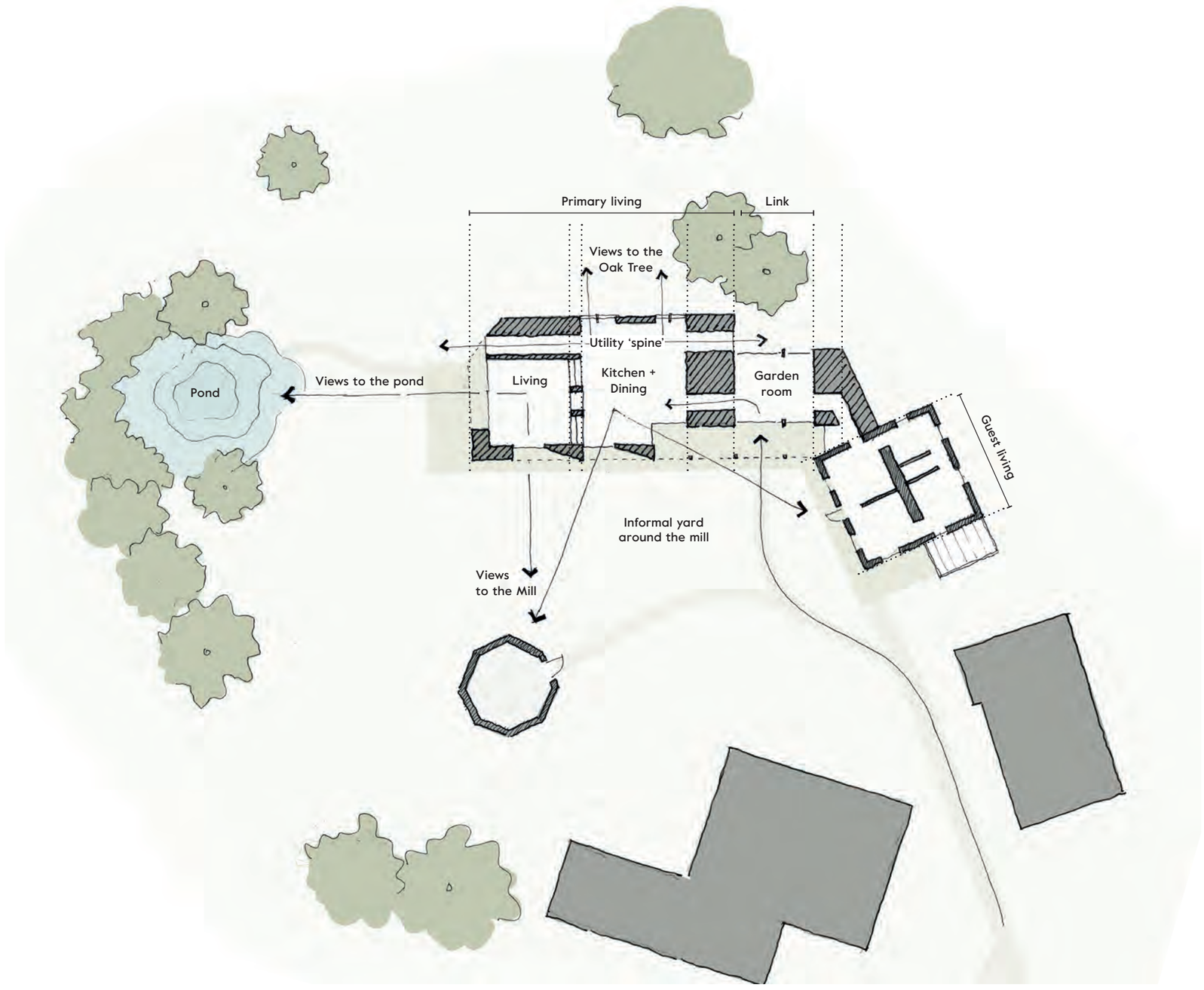
The design for a self-build replacement house on the Mill House site responds fully to the client's requirements. The proposal replaces parts of the existing Mill House which are no longer fit for purpose, and are of little architectural merit, with a carefully conceived extension building to the restored Mill House cottage. The new extension re-establishes the Mill House as a modern day, sustainable, and efficient home, which is sensitive to the surrounding landscape, while taking better advantage of it's unique setting.

The arrangement of solid and void throughout the plan seeks to echo the various scales of the mini-settlement already established on the site; with each volume organised around the Mill base, creating an informal yard at the centre of the site.

The proposed block plan can be split into two programmatic halves; guest living in the restored Mill House, and primary living in the self-build extension. The halves are linked together by a glazed garden room to maintain a visual connection along the historic ley line, up towards the oak tree. The rotation of the extension block orients primary views south into the informal yard / meadow, and west towards the pond.

The spatial layout plays on the traditional model with the bedrooms at first floor taking advantage of views to the surrounding meadows and Suffolk Downs, and an open plan living/kitchen/dining at the heart of the family home on ground floor. The ground floor of the restored Mill House provides secondary reception spaces and support utility.

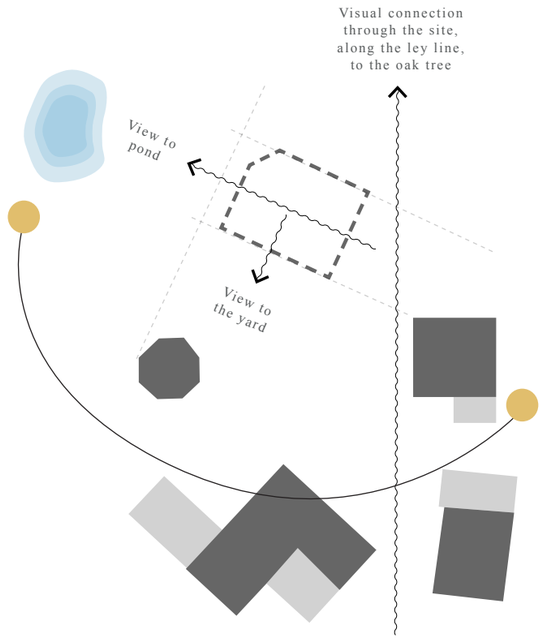
The building is required to be a flexible and sustainable home fit for 21st century living. The external appearance of the building is to be contemporary and contextual - considering appropriate form, materiality and fenestration that are sensitive to site and location.

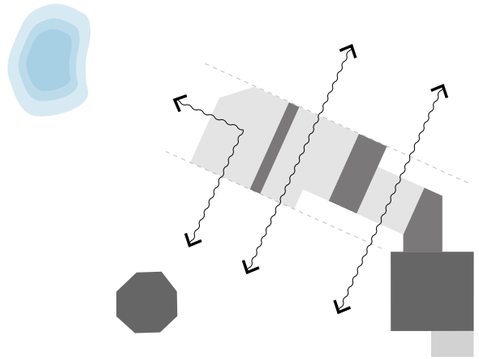


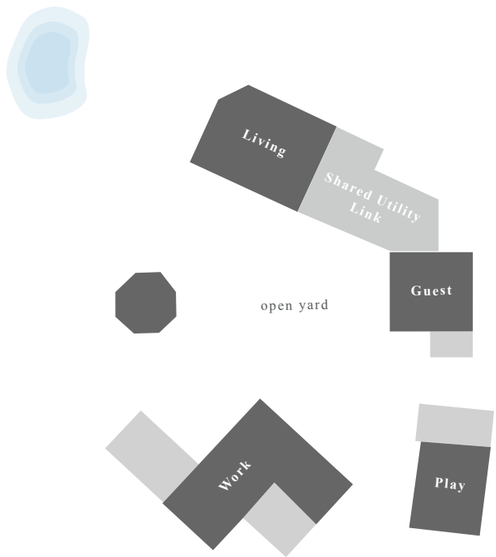
Above: Proposal plan concept diagram

7.2 Site Response - Figure Ground Concept

The cluster of buildings on the Mill House site have been established as an adhoc ‘mini-settlement’. The proposal looks to position new mass on the site to celebrate moments of openness and moments of contraction.







7.2.1 Orientation and Views

The new extension is oriented to celebrate the main view towards the pond through the house from the point of arrival, and to optimise solar orientation. A glazed link has been introduced on the historic ley line to ensure a visual connection through the site, up to the oak tree.

7.2.2 Solid and Void Massing Around the Mill

The positioning and alternating orientations of the buildings in the cluster creates an interesting spatiality between the solid and the void. The new solid massings have been positioned to create diagonal views and links to the key spaces across the site. The solid represents the back-of-house spaces, and the void represents the main living spaces which celebrate the key views and natural light.

7.2.3 Primary and Subservient Buildings

Within the ‘mini-settlement’ are established ‘primary’ buildings, each one with a ‘subservient’ extension / addition. The new primary extension is linked to the Mill House by a structure with a reduced modest mass, creating a clear hierarchy of primary structures on the site. The positioning of the alternating frontages creates a sense of a ‘yard’ enclosure around the mill.

Above: Figure ground analysis of the site response & proposal.

7.3 Form

A series of key moves have been made to ensure that the building sits sensitively in it's rural countryside context and in harmony with the buildings already on the site, in particular the restored Mill House:

• The scheme seeks to reduce the perceived scale on the building by removing the dominating 20th century wings from the Mill House and then breaking down the proposal form into a series of distinct yet interconnected volumes in the landscape.

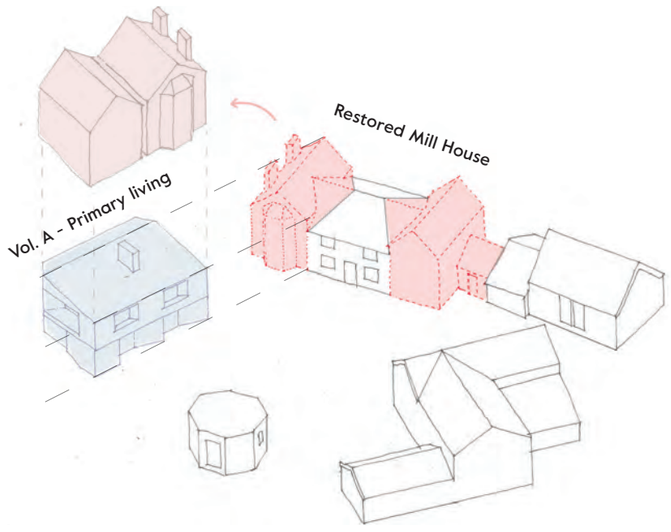
• The scale of the new primary accommodation volume echoes that of the scale and height of the existing wings (to be demolished) on the Mill House. This new primary volume is put at distance from the Mill House to be more sensitive to the restored cottage.

• The two main living accommodation volumes are linked by a single storey volume which contains shared pantry and utility spaces, and a glazed garden room on the historic ley line.

• The levels throughout the building 'step' with the existing site topography to ensure that the building sits sensitively; and is embedded within the landscape.

• The orientation of the proposal seeks to best capture daylight throughout the day into key living spaces. Whilst the deep openings, overhangs and shutters to the south facing glazing seek to reduce solar-gain and overheating in the summer months.

• The linking volume is lightweight in appearance, reducing the overall perceived mass of combined proposal.



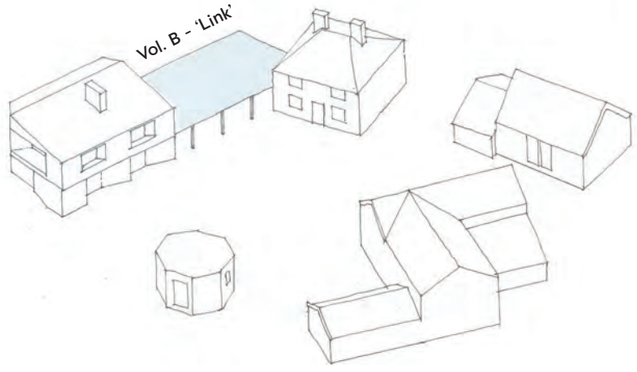
Above: Sketches showing the scale of the new primary accommodation in relation to the demolished Mill House wings.

7.4 Scale & Height

The proposed dwelling is of a similar scale to the existing Mill House in it's present day condition. The new primary volume matches the eaves and ridge height established on the Mill House northern wing extension.

The wing extensions have a combined footprint of 83.45m^2. The new primary volume has a footprint of 91.98m^2 (not including the linking volume) - a 10% increase in footprint. This slight increase is to meet the client's briefing requirements, current building standards, and to allow for passive design techniques (i.e. thick external walls with deep openings for solar shading).

Including the linking volume, there is a net gain of 78m^2 across the site, compared to the site in present day. However, when the client took ownership of the site there was a further 114m^2 of outbuildings which they then removed (see section 3.3). Compared to the massing on site historically, the proposal is a new loss of 36m^2. The net gain in site area is further offset by the value of reducing the mass immediately surrounding the Mill House, allowing it to be re-established in its original scale and volume as a primary structure on the site. The linking volume allows the building form to be modest and reduced where it meets the restored historic cottage.



7.5 Visual Impact

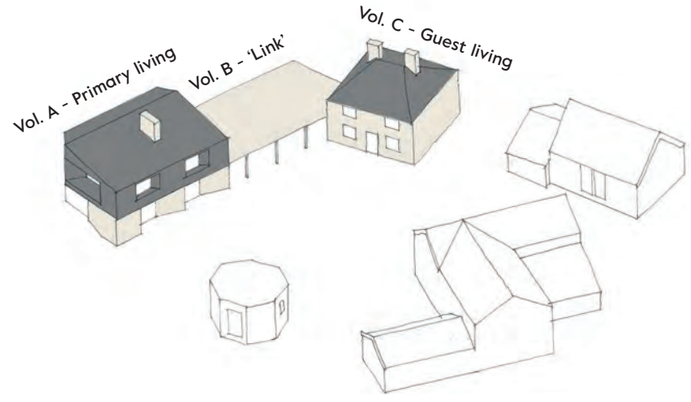
The Mill House site has had numerous iterations of outbuildings situated around the original Mill House and mill base over time. From historic photographs, it can be concluded that the proposed scheme sits on the site of previous outbuildings.

Of central importance to the scheme development has been ensuring an appropriate treatment to the Mill House, to reduce the harm caused and to celebrate the significant structure in its former glory.

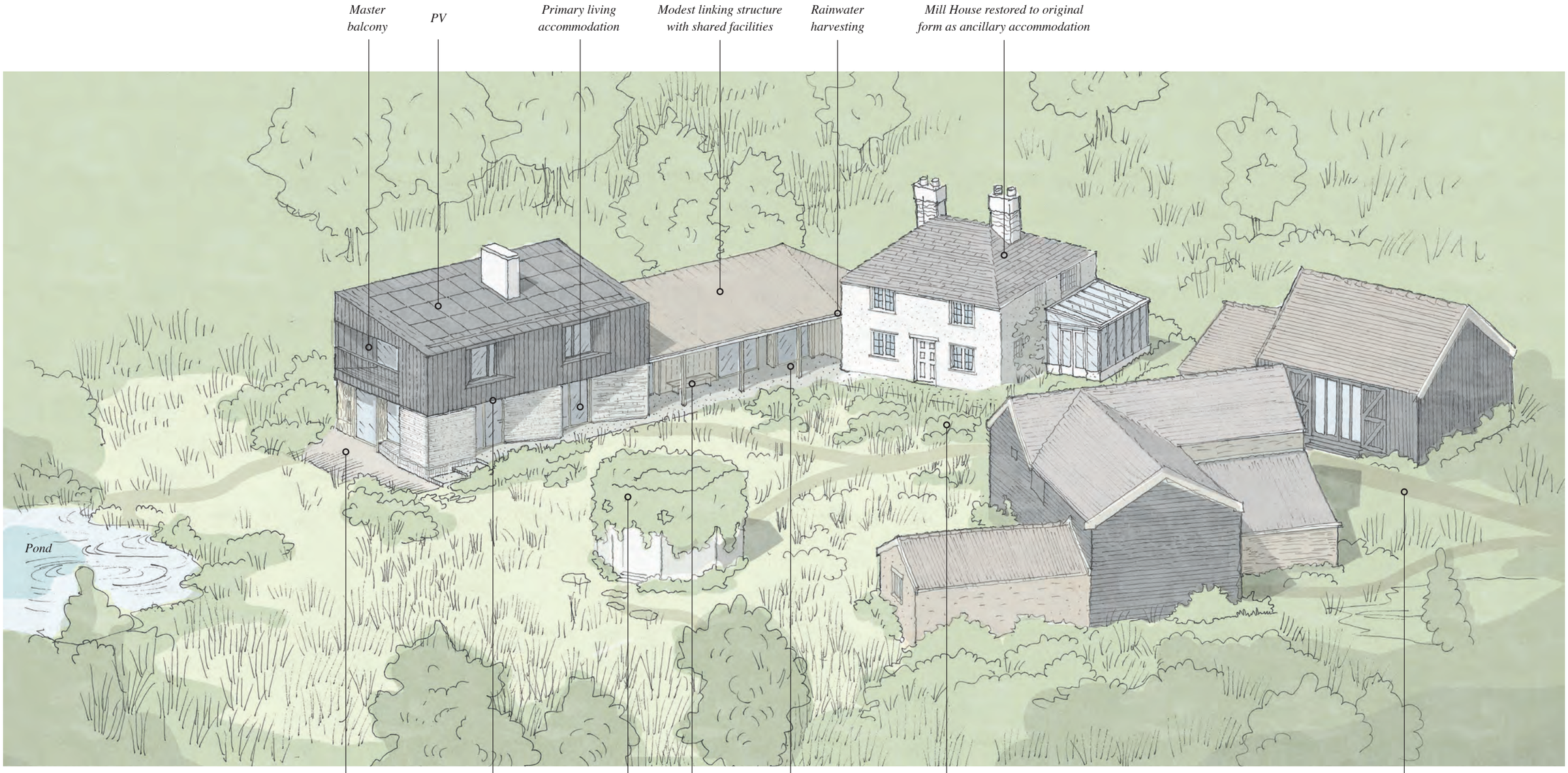
Due to the site's remote location on the outskirts of Laxfield, with dense vegetation and trees to the sites perimeter, it is assumed that the site cannot be seen from Laxfield village, meaning there is minimal to no visual impact to surrounding sites.

The Mill House site is surrounded on nearly all sides by land also in the client's ownership. There is one residential neighbour to the north-east of the site, which is accessed off a different private track off Goram's Mill Lane. The views to and from this neighbour will be heavily obscured by the existing trees, planting and landscaping.

The proposal will result in a beautifully finished, sensitive, sustainable, and energy-efficient house that takes full advantage of its unique site, while being respectful of the immediate and wider setting, sitting harmoniously amongst the existing outbuildings, landscape, and wider rural grounds and meadows.



7.6 Proposal - Sketch Axonometric



Above: Aerial view of proposed massing

7.7 'Approach' Sketch Visuals

7.7.1 Approach from site entrance

7.7.2 Approach from the pond

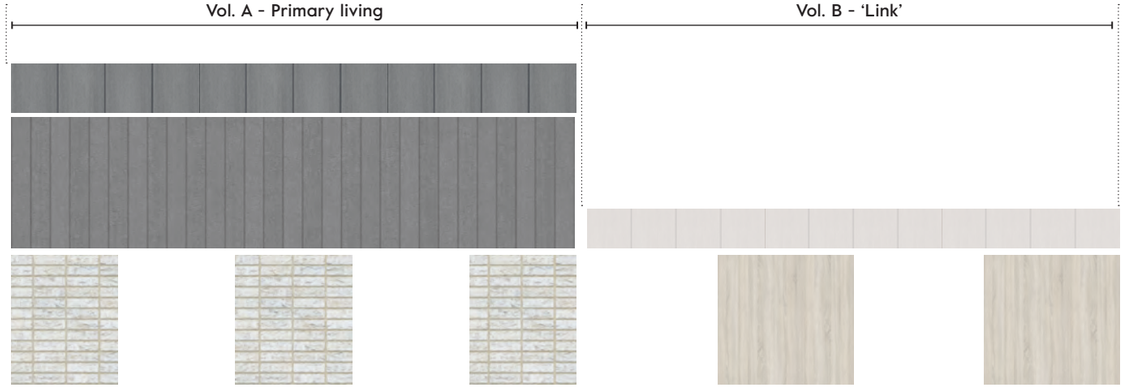
7.7.3 Approach from the back garden / oak tree, looking through the garden room

Above: Sketch visuals of approaches to the extended and restored Mill House.

7.8 Exterior Materials

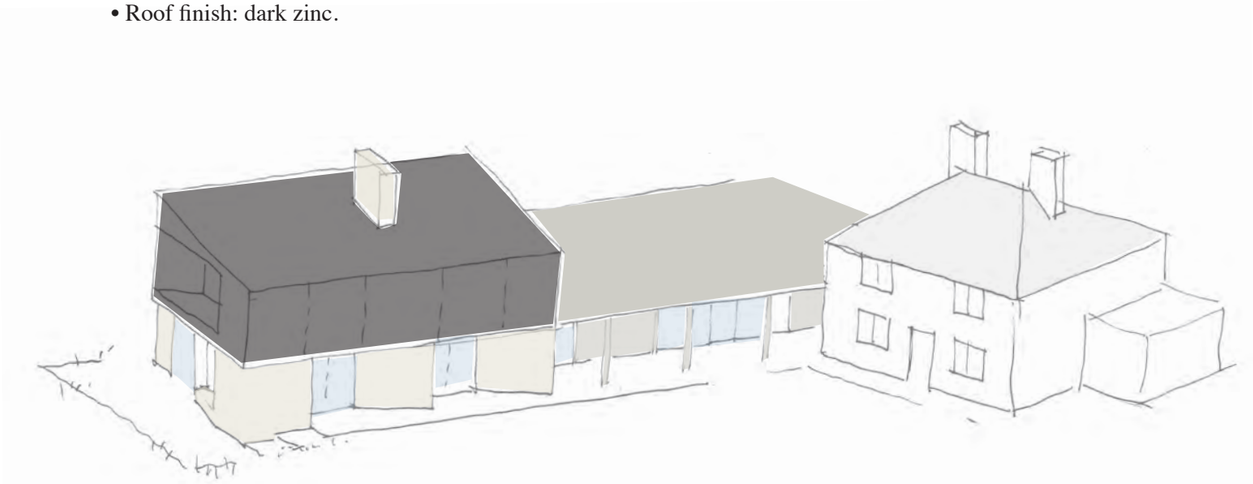
The materiality of the building is contextual, elegant and robust. By referencing the material palette already established on the site the proposal is deeply contextual. As per the existing buildings on the site, each new 'volume' will have its own homogeneous material palette, whilst also responding to the modernity of the proposal. In-keeping with the site materials, the primary materials proposed for the building are a combination of brick and timber.

Site References:



Volume A proposed materials;
- Lower external walls: reclaimed bricks;
- Upper external walls: blackened timber;
- All windows & doors: timber;
- Roof finish: dark zinc.

Volume B proposed materials;
- Lower external walls: timber cladding;
- All windows & doors: timber;
- Roof finish: light zinc.



Above: Site photographs showing material references
Right: Materiality studies for the self-build extension with material references

7.9 Landscape & Ecology

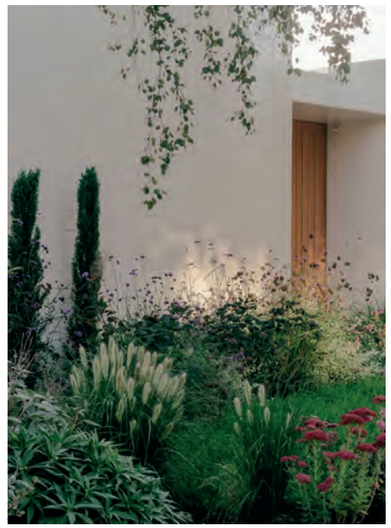
The Mill House site in its current state is a wonderfully wild and rural site with dense hedgerows and vegetation along the site boundaries and an abundance of established trees, including goat willow trees, plum trees, and an oak tree. There is a large pond to the north-east of the site.

The client is extremely keen that the site remains wild, and that the proposal sits harmoniously within the wild landscape. For this reason, hard landscaping has been reduced or eliminated wherever possible. See precedent images (shown right) as wild landscape examples.

The massing of the building steps with the site's topography, meaning minimal site excavation will be required during construction, thus further reducing the harm to the environment.

Other key landscaping principles are as follows;
• Emphasise the naturalistic and harmonious wild garden within its rural setting;
• To retain and enhance the existing vegetation;
• To maintain the wild landscape as a garden surrounding the house;
• Prioritise soft landscaping over hard landscaping;
• Where hard landscaping is used, it should be fully permeable;
• Use local materials or recycled demolition materials used wherever possible;
• A grass & loose gravel track as the main access route to the house;
• The flat green roof to the rear to encourage biodiversity potential and wildlife habitat;
• The proposal will drain to the existing on site below ground drainage system.
• Visually link the house with the open garden.

A full site Ecological Appraisal survey (PEA), Great Crested Newt eDNA survey, and Bat Survey have been conducted by ROAVR Group. Please refer to ecology documentation within the planning application for details.



Above: Landscape precedents

7.10 Transport & Parking

The proposed dwelling will benefit from the existing rail transport connections (from stations in Diss and Halesworth) By car, the site is well connected to several main roads (see section 2.1 of this report). The site is located approximately 1km from the high street in Laxfield. The nearest town is Halesworth at 14km away.

The site is solely accessed by a single lane private track, which connects to Goram's Mill Lane and then onto Bickers Hill Road. The track accesses only the two sites under the clients ownership, Mill House and Mill Orchard, and therefore there is no change to the current site access requirements.

The proposal provides parking spaces in their existing position on the private the shared track. The car park can fit a minimum of three parking spaces. The parking is provided at the top of the private road, off Goram's Mill Lane and so provides security to all three parking spaces on site.

7.11 Access Statement

This access statement outlines the accessibility considerations incorporated into the design at this stage. Further to the transport and parking considerations set out in section 7.10 on this page, the proposed dwelling has been designed with access for all in mind, and the key provisions are as follows:

• Convenient vehicular access via grass track within close proximity of the main (sheltered) entrance door to the house;
• The pathway leading to the main entrance is wide, level, and constructed with slip-resistant materials;
• Pedestrian access in the location of the existing site access;
• Secondary pedestrian access to the rear garden using existing access point to allow convenient access to and from the meadows under the client's ownership to the north and east of the Mill House site;
• The internal layout of the home is designed to provide ample space for manoeuvrability, allowing individuals to move freely between rooms. Wide and generous circulation with integrated seating on both ground and first floors, with all doorways and corridors widened to meet accessibility standards.

The proposal is dedicated to providing an inclusive and accessible environment and aim to ensure that individuals of all abilities can enjoy equal access and a comfortable living experience.

7.12 Refuse & Recycling

This waste and refuse statement outlines the provisions and considerations made in the design of the property to effectively manage waste and refuse. We aim to promote sustainable practices, minimize environmental impact, and comply with local waste management regulations.
• The property is designed with designated waste storage areas to ensure proper separation and containment of different waste streams. The waste is located conveniently close to the utility entrance.
• Adequate space is provided to accommodate bins of appropriate sizes for general waste and recycling. The proposal has space for min. 2 bins (assumed 1 x recycling, 1 x general waste).

7.13 Sustainability

The proposal reflects the client and design team's aspiration to deliver a highly sustainable home, sensitive and respectful to its natural setting, and responsive to existing and future environmental challenges.

Natural Buildings System's ADEPT construction system has been developed as an affordable alternative to mainstream, carbon intensive building methods, combining advanced bio-composites with digital tools, to make healthy, adaptable homes.

The proposed scheme will demonstrate the system and through it, the potential for buildings to remove more carbon from the atmosphere than it takes to make them, as well as delivering improved energy efficiency, thermal comfort and indoor air quality.

The retrofit and extension of Mill House would also evidence a rigorous approach to sustainable development, where decisions to renovate, remove or replace existing structures are informed by a detailed Life Cycle Assessment (LCA), weighing up-front embodied carbon impacts against future operational carbon savings.

Measuring Sustainability

- Construction stage greenhouse gas (GHG) emissions are assessed with reference to EN15978:2011 life cycle stages A1-A5 (extraction of raw materials, processing / manufacturing, transport to site and onsite assembly and construction).
- Conventional masonry cavity wall construction embodies a net 355.84kg CO2e/m2 of gross internal floor area (GIA), and even the best performing timber-framed solutions embody 316.48kg CO2e/m2. Over 90% of new houses in the UK are built this way.
- The carbon footprint of each of these houses is on average +31.28 tonnes CO2e when accounting for biogenic carbon captured in the timber elements.
- The redevelopment of Mill House uses reclaimed masonry, timber and industrial hemp as the principal construction materials, which if assessed with the same methodology gives a net negative carbon footprint of 227.99kg CO2e/m2, or minus 50.61 tonnes CO2e for the new-build elements of the scheme.
- Operational stage GHG emissions are assessed using Energy Use Intensity (EUI) metrics as described below.
- A post-occupancy LCA and ongoing energy use monitoring will be undertaken to compare predicted and actual performance.

Energy Use

- The energy strategy includes a commitment to reduce EUI in line with LETI's 2020 Climate Emergency Design Guide, with the emphasis on fabric efficiency so that energy demand is reduced, and operational carbon impacts minimised. Accordingly, the renovated house and new build extension will target an EUI range of between 35Kwh/m2/annum to 60Kwh/m2/annum.
- Building fabric performance for the new build elements will be in line with Passivhaus design standards, subject to balancing operational carbon savings against up-front embodied carbon, to optimise and reduce total whole life cycle carbon.
- The existing Mill House has an EPC rating of F, well below minimum standards, with difficult to insulate solid masonry walls. By removing the 20th century wings, the reduced form factor of the remaining cottage will require significantly less energy to maintain comfortable indoor temperatures. Breathable natural fibre insulation and insulating lime plasters will form part of a conservation led retrofit, allowing the renovated cottage to meet EnerPHit passivhaus standards, and an overall EPC rating of A.
- The specification of roof-top PV, battery storage and smart meter controls, together with ASHP heating with heat recovery ventilation means that the completed house will produce more energy than it uses as well as providing a renewable supply for EV charging.

Climate Resilience

- Summer overheating is avoided by the combined effect of a low decrement factor thermal envelope, together with deep solar shading and shutters on the south elevation to limit solar gain in the summer, while benefiting from passive solar energy in the winter.
- The proposed massing, openings and internal layouts allow abundant daylight and sunlight levels with passive cooling and natural ventilation via clerestory windows.

Water Use

- A grey water recycling system is specified, saving approximately 70 litres of water per person per day. A waste-water heat recovery system will reduce energy use.
- Rainwater harvesting in the form of above ground water butts (avoiding high embodied carbon impacts of below ground tanks) is intended for garden irrigation.

Air Quality

- Both the new build elements and renovated cottage will have a breathable thermal envelope, improving indoor air quality by eliminating the risk of condensation and black mould. HempSil insulation has been shown in tests to maintain relative humidity at around 55%, which is ideal for the health of occupants and the building itself.

Regenerative Materials

- The ADEPT system uses industrial hemp as an insulation material, the cultivation of which has been shown to enhance biodiversity, improve soil quality and increase subsequent food crop yields. Hemp is also one of nature's most efficient methods of capturing carbon from the atmosphere, sequestering 11 – 14 tCo2e pa per hectare (as compared to commercial forestry, which averages 4tCo2e pa per hectare).

Material Efficiency

- The system is designed to eliminate construction waste by the use of standardised, repeated components. Local production of the manufactured 'kit of parts' reduces transport miles, embodied carbon and site assembly time.
- Structural cassettes are made from OSB, which is itself manufactured from the waste streams of timber production (using the upper part of the tree that can't be processed into lumber)

Image below: Natural Building Systems live project

- Primary structural elements are made from laminated veneer lumber (LVL) beams.
- In conventional construction the superstructure of a building accounts for 30 - 35% of total up-front embodied emissions. In contrast, timber structural materials have a net negative carbon impact when accounting for biogenic carbon sequestration.
- In line with guidance published in the Royal Institute of Chartered Surveyors (RICS) Whole Life Carbon Assessment for the Built Environment, biogenic carbon benefits can be accounted for in an EN15978 LCA if the timber is sustainably sourced (i.e., FSC or PEFC certified) and designed for end-of-life disassembly and re-use.

Circular Economy

- ADEPT cassettes are individually demountable, allowing adaptation during the life of a building as well as end of life disassembly. Each cassette contains a digital material passport with manufacturing details and carbon tracking data. All timber products are FSC certified.
- The use of sustainably sourced timber with an innovative circular economy, manufactured construction system, ensures that biogenic carbon stored in the materials is not re-released into the atmosphere beyond the life of the building.

Substructure

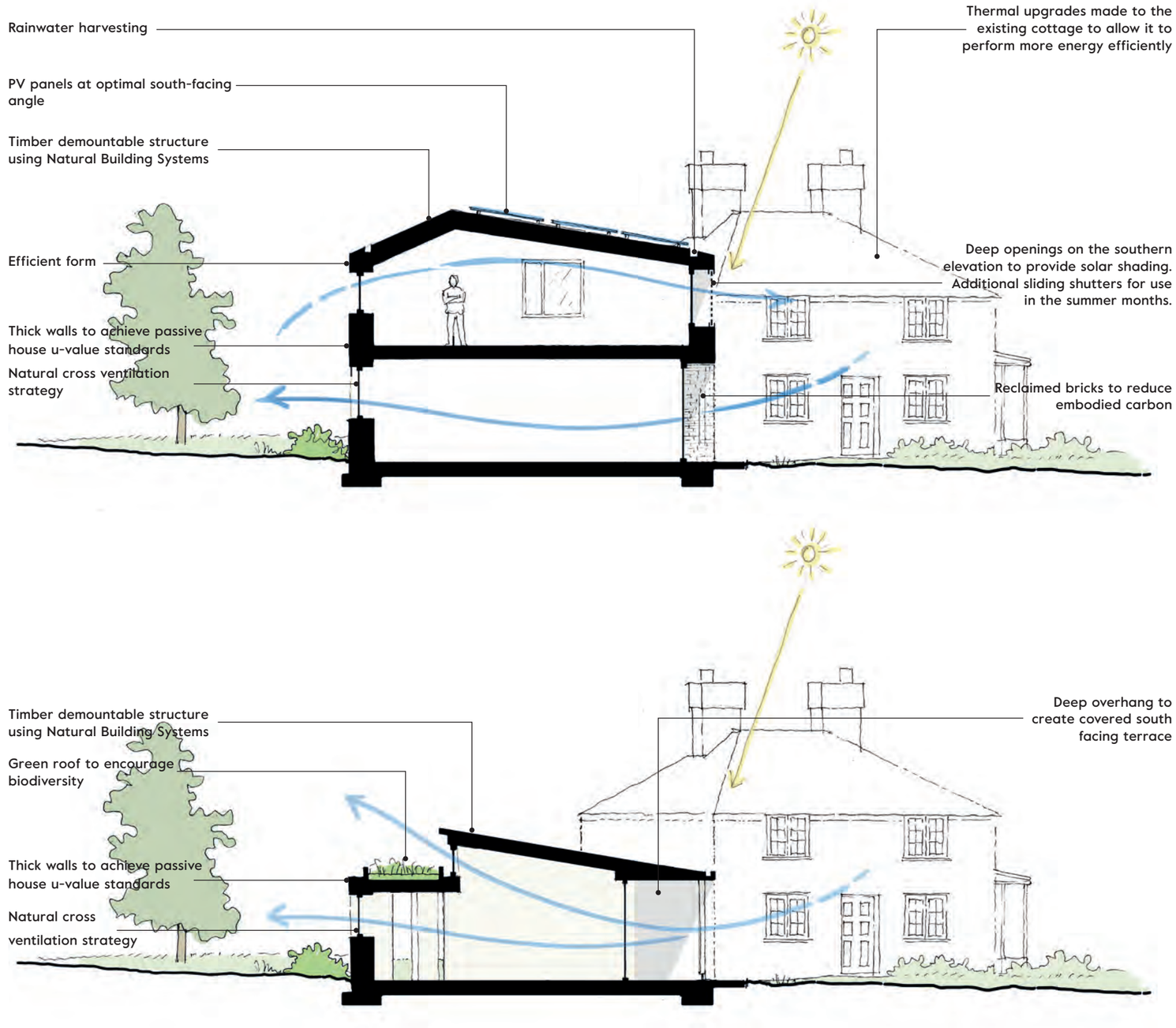
- A lightweight superstructure reduces the depth of foundations, with compacted rubble reclaimed from the site or a low carbon geopolymer concrete specified instead of Portland cement concrete.

Demolition

- Construction waste arising from the demolition of the 20th century wings will be minimised by the re-use of materials and the implementation of a Site Waste Management Plan (SWMP). Masonry and timber will be used in the new build elements and other materials carefully disassembled for re-use elsewhere.

Noise and vibration

- Noise and vibration during demolition will be minimised by using manual hand tools to dismantle and disassemble the existing wings, for re-use and re-cycling. Construction stage noise is reduced by virtue of the off-site manufacture and rapid assembly of the ADEPT system.

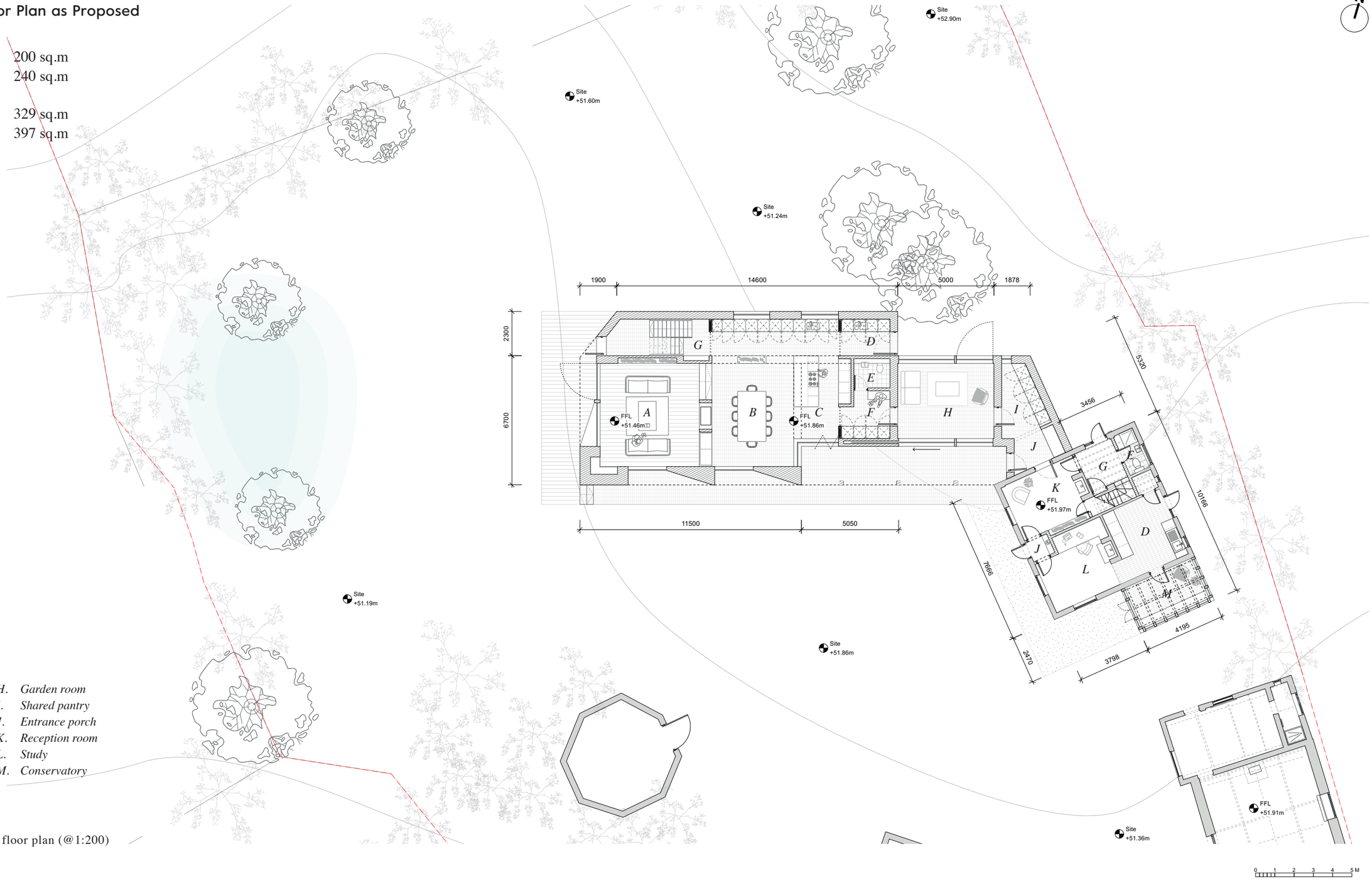


Above, right: Sketched showing the proposal sustainability strategy

7.14 Ground Floor Plan as Proposed

Ground Floor GIA: 200 sq.m
Ground Floor GEA: 240 sq.m

Total Building GIA: 329 sq.m
Total Building GEA: 397 sq.m



Key

A.	*Living room*	*H.*	*Garden room*
B.	*Dining room*	*I.*	*Shared pantry*
C.	*Kitchen*	*J.*	*Entrance porch*
D.	*Utility*	*K.*	*Reception room*
E.	*Bathroom*	*L.*	*Study*
F.	*Boot room*	*M.*	*Conservatory*
G.	*Circulation*		

Above: Proposed ground floor plan (@1:200)