



Material Palette Composition

- **Hybrid Timber-Steel**
Hybrid timber + steel • Structure
- **Brick Load-Bearing Walls**
Solid brick masonry • Structure
- **Precast Concrete Floor Planks**
Precast hollow-core planks • Structure
- **Hemp-Lime Wall**
Cast-in-place hemp-lime • External Envelope
- **Charred Timber Cladding**
Charred FSC timber boards • External Envelope
- **Fibre Cement Panels**
Fibre cement rainscreen panels • External Envelope
- **Timber Window Frame**
Timber alu-clad • Window
- **Aluminium Standing Seam Roof**
Prefinished aluminium standing seam — select RAL colour — RAL 7045 Telegrey 1 (#91969a) • Roof
- **Sheep's Wool Insulation**
Natural wool batts • Insulation

PALETTE INSIGHT:

This configuration represents a Bio-based / Hybrid Palette. It prioritizes bio-based materials for high carbon storage. See Page 2 for critical hotspots.

Strategic Overview

PRODUCTION IMPACT

● **Medium**

A1-A3 Manufacturing

CIRCULARITY

● **High**

Reuse Potential

BIOGENIC CARBON

● **High**

Storage Potential

Project Strengths

- + Bio-based Core: Significant use of renewable materials (timber/natural fibres) actively stores carbon.
- + Design for Reuse: Mechanical fixings in key layers allow for future disassembly.

Project Watch-outs

- ! Production Spikes: Key structural or cladding elements rely on energy-intensive manufacturing.

Priority Specification Notes

MATERIAL	RISK / DRIVER	RECOMMENDED ACTION
Precast Concrete Floor Planks	High production energy intensity	Target high recycled content (>30%) or low-carbon fuel mfg.
Fibre Cement Panels	High production energy intensity	Target high recycled content (>30%) or low-carbon fuel mfg.
Aluminium Standing Seam Roof	High production energy intensity	Target high recycled content (>30%) or low-carbon fuel mfg.

Material Comparison Dashboard

Estimated Embodied Carbon Distribution (Top 5 Contributors)



Element Summary (Grouped by Element)

Material	Embodied (A1-A3)		Lifespan	Replacements	Rating
Structure					
	Hybrid Timber-Steel	1.8 <div><div></div></div>	60 yrs	1x	<div></div>
	Brick Load-Bearing Walls	3.3 <div><div></div></div>	60 yrs	1x	<div></div>
	Precast Concrete Floor Planks Enclosure	3.7 <div><div></div></div>	60 yrs	1x	<div></div>
Envelope	Hemp-Lime Wall	1.4 <div><div></div></div>	60 yrs	1x	<div></div>
	Charred Timber Cladding	3.5 <div><div></div></div>	40 yrs	2x	<div></div>
	Fibre Cement Panels	4.7 <div><div></div></div>	40 yrs	2x	<div></div>
	Timber Window Frame	3.5 <div><div></div></div>	30 yrs	2x	<div></div>
	Aluminium Standing Seam Roof	7.5 <div><div></div></div>	40 yrs	2x	<div></div>
	Sheep's Wool Insulation	1.4 <div><div></div></div>	60 yrs	1x	<div></div>

Technical Integration & Feasibility

DELIVERY COMPLEXITY	<div></div>	High - Multiple specialist interfaces
SUPPLY CHAIN RISK	<div></div>	High - Long lead times likely
RELATIVE COST	<div></div>	High - Premium material cost bands

INTEGRATION OPPORTUNITIES

- + Thermal mass materials combined with natural insulation support passive temperature regulation
- + Multiple timber elements maximize biogenic carbon storage and reduce embodied carbon
- + Bio-based material palette stores carbon and reduces reliance on high-embodied alternatives

SYSTEM CONFLICTS

- ! External timber cladding requires ongoing maintenance to prevent weathering

Questions for your Design Team (RIBA Stage 3)

- FIRE CONSULTANT: Review reaction-to-fire classification for exposed timber elements.
- ACOUSTICS: Verify mass density of floors for airborne sound insulation (if CLT).
- STRUCTURAL ENGINEER: Verify primary frame capacity for heavy cladding loads.
- FACADE ENGINEER: Review g-values to mitigate solar gain/overheating in south-facing zones.
- M&E CONSULTANT: Confirm Vapour Control Layer (VCL) position to prevent interstitial condensation.

Design Direction

Recommendations are proportional to early-stage impact drivers and should be revisited once quantities and specifications are known.

● REPLACE

Prioritise hempcrete, rammed earth, or mass timber in envelope

Bio-based materials store carbon rather than emit it

Driver: #1 embodied contributor + 2 replacements + high circularity

● SPECIFY

Replace frameless glazing with modular demountable system

Enables future reuse and reduces lifetime impact (1 glazing element)

Driver: #5 embodied contributor + 2 replacements + high circularity

● *High priority*

● *Medium priority*

● *Low priority*

Compliance Readiness Summary (UK)

Compliance readiness = whether standard supplier evidence (environmental product declarations, certificates, recycled-content declarations) is likely to be available at this stage. Concept-stage view: highlights real risk items, evidence priorities, and what can safely wait.

At concept stage, most materials require standard evidence rather than presenting unique compliance risks.

1) Real risks

No red-flag compliance risks identified at concept stage.

2) Evidence to prioritise next

This is typical at concept stage and does not indicate non-compliance.

- Code 1: 9 materials flagged
- Code 2: 9 materials flagged
- Code 3: 9 materials flagged

3) Can safely wait (concept stage)

Defer supplier-specific certificates and test reports to detailed specification.

Out of scope at concept stage: supplier test reports, product-level verification of claims, construction-phase method statements, commissioning evidence.

Badge key (used on material pages):

1. EPD (EN 15804 / ISO 14025)
Required for all primary structure and envelope systems
2. Recycled content declaration
Critical for steel, concrete, polymers
3. Design for disassembly / reversible fixings
Relevant to finishes and secondary systems
4. Chain of custody certification (FSC/PEFC)
Required for all timber products
5. Biodiversity assessment (landscape only)
Required for all landscape elements

Material Details

Hybrid Timber-Steel

[structure]



1 2 3 4

In this palette: Hybrid timber + steel with moderate embodied impact, driven by manufacturing.

DESIGN ACTIONS:
- Review product evidence for the highest-impact lifecycle stages

Carbon rank: #7 of 9 | Lifespan: 60 yrs | Confidence: 89%

Brick Load-Bearing...

[structure]



1 2 3 4

In this palette: Solid brick masonry with high embodied impact, driven by high energy intensity required for kiln-firing clay bricks.

DESIGN ACTIONS:
- Review product evidence for the highest-impact lifecycle stages

Carbon rank: #6 of 9 | Lifespan: 60 yrs | Confidence: 89%

Material Details

Precast Concrete Flo...

1 2 3 4

[structure]



In this palette: Precast hollow-core planks with high embodied impact, driven by carbon-intensive cement production and energy-heavy factory casting.

DESIGN ACTIONS:
- Review product evidence for the highest-impact lifecycle stages



Carbon rank: #3 of 9 | Lifespan: 60 yrs | Confidence: 89%

Hemp-Lime Wall

1 2 3 4

[external]



In this palette: Cast-in-place hemp-lime with low embodied impact, driven by manufacturing.

DESIGN ACTIONS:
- Review product evidence for the highest-impact lifecycle stages



Carbon rank: #8 of 9 | Lifespan: 60 yrs | Confidence: 89%

Material Details

Charred Timber Clad...

1 2 3 4

[external]



In this palette: Charred FSC timber boards with moderate embodied impact, driven by repeat replacement.

DESIGN ACTIONS:
- Review product evidence for the highest-impact lifecycle stages



Carbon rank: #4 of 9 | Lifespan: 40 yrs | Confidence: 89%

Fibre Cement Panels

1 2 3 4

[external]



In this palette: Fibre cement rainscreen panels with high embodied impact, driven by energy required for autoclaving and curing cementitious components and repeat replacement.

DESIGN ACTIONS:
- Review product evidence for the highest-impact lifecycle stages



Carbon rank: #2 of 9 | Lifespan: 40 yrs | Confidence: 89%

Material Details

Timber Window Frame

1 2 3 4

[window]



In this palette: Timber alu-clad with moderate embodied impact, driven by repeat replacement.

DESIGN ACTIONS:
- Review product evidence for the highest-impact lifecycle stages



Carbon rank: #5 of 9 | Lifespan: 30 yrs | Confidence: 89%

Aluminium Standing...

1 2 3 4

[roof]



In this palette: Prefinished aluminium standing seam — select RAL colour — RAL 7045 Telegrey 1 (#91969a) with high embodied impact, driven by extremely high electricity demand for smelting and factory finishing and repeat replacement.

DESIGN ACTIONS:
- Review product evidence for the highest-impact lifecycle stages



Carbon rank: #1 of 9 | Lifespan: 40 yrs | Confidence: 71%

Material Details

Sheep's Wool Insulat...

[insulation]



1 2 3 4

In this palette: Natural wool batts with low embodied impact, driven by manufacturing.

DESIGN ACTIONS:

- Review product evidence for the highest-impact lifecycle stages

Carbon rank: #9 of 9 | Lifespan: 60 yrs | Confidence: 89%

Glossary

RIBA Stage 3: Developed design stage in the UK work stages.

Environmental product declaration: Standardised product life-cycle data sheet (often called an EPD).

FSC / PEFC: Timber chain-of-custody certification schemes.

EN 15804 / ISO 14025: Standards that define how environmental product declarations are produced.

EOL: End of life (what happens when a material is removed or disposed).

Conf.: Confidence in data quality.

SuDS: Sustainable drainage systems.

AI: Artificial intelligence used to draft early-stage insights.

RAW / MFG / TRN / INS / USE / MNT / EOL: Lifecycle stages: RAW = raw material acquisition (cradle), MFG = production processes, TRN = distribution impacts, INS = construction/assembly effects, USE = operational impacts during service life, MNT = upkeep over life, EOL = disposal or recycling stages.

Impact scores: Scores are relative (1–5) and intended for comparative early-stage design decision-making, not as a substitute for EPD-based carbon calculations.

Important: AI-generated content requires professional verification. All sustainability insights, lifecycle assessments, and recommendations should be validated by qualified professionals before use in design decisions or client communications.

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