

Birch Business Park, Rochdale Materials Efficiency Plan



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Context

The construction industry accounts for approximately 55% of the total annual material use and buildings contribute 50% of total emissions of CO₂-eq. They are also responsible for 30% of total UK water use and 35% of arising waste.

The breakdown of global industrial carbon emissions shows that 55% comes from the manufacturing and processing of five stock materials: steel (25%), cement (19%), paper (4%), plastic and aluminium (3%).

Building standards and institutional requirements are often based on standardised, tried and tested design solutions which can result in significant over specification of elements and hence material use. Some of this is to allow for future flexibility in use that will never in reality be used, and more is the result of conservative evaluation of risk.

Therefore, optimising material use in the context of a specific project is one of the key resource efficiency goals for any sustainability strategy. This can be achieved through careful consideration of current and future project demands to maximise the efficient use of materials, waste prevention and reduction, minimal damage to the environment and reduced depletion of natural resources.

Engaging with materials efficiency can add value by:

- + Reducing costs as a result of a reduction of material use in building design
- + Reducing embodied carbon and contributing towards any Net Zero Carbon Construction targets
- + Encouraging reuse of existing materials
- + Encouraging use of materials with higher levels of recycled content
- + Improving understanding and performance of alternative design and construction methods that may result in lower material usage and waste levels

Aims & objectives

To set requirements that inform decisions throughout the design and construction of the project to avoid unnecessary materials use arising from over specification without compromising structural stability, durability, or the service life of the building.

This document shall set out a clear framework to guide material efficiency activities throughout the design and construction of the project. The report sets out project specific aims, objectives, targets, performance indicators, opportunities, constraints, and responsibilities to guide material efficiency activities at each RIBA stage.

Methodology

To inform the Materials Efficiency Plan a review has been held with the Client's agent and Architectural design team during RIBA Stage 1 to assess the site, the likely project scale, and the client's functional and aesthetic requirements.

BS 8895-1: 2013 Designing for materials efficiency in building projects – Part 1: Code of practice for Strategic Definition and Preparation and Brief recommendations have been considered.

The document is structured to present the project specific target key performance indicators (KPIs) opportunities and constraints, before providing stage specific guidance detailing actions and responsibilities to guide material efficiency activities.

This plan should be reviewed by all relevant parties within the design and construction team with any relevant stage specific actions completed or considerations made. The design team shall develop and report on the implementation of materials efficiency as stage 3 developed design, and stage 4 technical design.

The contractor shall report on the implementation of materials efficiency during stage 5 construction and at handover shall report actual material efficiencies achieved against the target KPIs within this document.

The process of design for materials efficiency should involve a continuous process to identify, investigate and implement opportunities for materials optimisation in terms of reducing material requirements, potential for wastage and increasing recycled content. The emphasis on each of the steps of the process will vary throughout design and construction as highlighted in **bold** throughout.

Examples of potential strategies and measures for materials optimisation are provided in Appendix A and suggested further resources of information in Appendix B. An example reporting template is also provided in Appendix C to facilitate logging of progress against all of the identified strategies and measures for materials efficiency throughout the project.

Stage 1 - Preparation and brief targets, opportunities & constraints

Project target KPIs

Upfront embodied carbon ≤ 550 kg.CO₂e/m² GIA

Upfront embodied carbon (A1-5) excluding sequestration of carbon from timber products to meet industry good practice.

Project specific opportunities

- + Development team ambition for achieving good levels of sustainability
- + Level site

Project specific constraints

- + Restrictions on positioning of structures due to existing habitats and ecology.
- + End users may not be known

Stage 2 - Concept design actions

- + Workshop to be held with design team to identify opportunities to reduce or optimise materials use through design, specification, construction methods etc.
- + Workshop Minutes including agreed materials efficiency strategies and measures identified for architects, structural engineer and building services engineers.
- + Provide any stage 2 design documentation demonstrating any early implementation of strategies and measures discussed at the workshop.

Stage 3 - Developed design actions

- + Design team to investigate strategies and measures identified in stage 2 workshop and implement where appropriate.
- + Report on any deviations or additional actions to the stage 2 workshop strategies and measures.
- + Provide any stage 3 design documentation demonstrating implementation of strategies and measures discussed at the workshop.

Stage 4 - Technical design actions

- + Design team to implement strategies and measures identified and investigated in previous stages.
- + Report on any deviations or additional actions.
- + Provide any stage 4 design documentation demonstrating implementation of strategies and measures discussed at the workshop.

Stage 5 - Construction actions

- + Principal contractor to identify and investigate any additional actions for materials efficiency to meet project target KPIs.
- + Principal contractor to implement strategies and measures identified and investigated throughout design.
- + Principle contractor to keep an accurate record of all materials procured and construction waste generated throughout the project up to handover
- + Report on any deviations or additional actions identified.
- + Provide any stage 5 documentation demonstrating implementation of the materials efficiency strategies and measures identified.

Stage 6 - Handover and close out actions

- + Principal contractor to provide records of construction waste and materials procured throughout the project up to handover.

Appendix A Materials efficiency strategies & measures

Are there existing buildings onsite that can be retained?
 Are there existing materials on site that can be re-used?
 Can the design, form and layout be simplified without compromising the design concept?
 Can the design be coordinated to avoid or minimise excess cutting and jointing of materials that generate waste?
 Is the building designed to standard material dimensions?
 Can the range of materials required be standardised to encourage reuse of offcuts?
 Is there repetition and coordination of the design, to reduce the number of variables and allow for operational refinement (e.g. reusing formwork)?
 Increasing the utilisation factor of structural members
 Removing redundant materials from the design
 Making use of recycled or reclaimed materials
 Using prefabricated elements where appropriate to reduce material waste
 Consider using an 'exposed thermal mass' design strategy to reduce finishes
 Avoiding over-specification of predicted loads
 Using lightweight structural design strategies
 Making use of bespoke structural elements where this will reduce overall material use
 'Rationalisation' of structural elements
 Optimising the foundation design for embodied environmental impact.

Appendix B Additional guidance

BS 8895-1: 2013 Designing for materials efficiency in building projects – Part 1: Code of practice for strategic definition and preparation and brief

BS 8895-2: 2015 Designing for materials efficiency in building projects – Part 2: Code of practice for concept and developed design.

BS 8895-3: 2019 Designing for materials efficiency in building projects – Part 3: Code of practice for technical design

LETI Embodied Carbon Primer

Appendix C Example reporting template

RIBA stage:	2	3	4	5
Responsibility e.g. Arch / Struct / MEP	materials optimisations measures/strategies identified	outcome of investigations on measure/strategies inc. deviations or additional actions	update on implementation of measures/strategies* inc. deviations or additional actions	update on implementation of measures/strategies* inc. deviations or additional actions

*Provide references to documentary evidence to demonstrate implementation where appropriate



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