

Accelerating Material Reuse in Construction with Materials Passports

Dr Ana Rute Costa, Rachel Hoolahan | February 2024

Introduction

The construction industry is one of the most resource intensive industries, being responsible for enormous quantities of waste generation, and **nearly 40% of global energy-related CO2 emissions**. Since 80% of buildings that will exist in 2050 have already been built, it is imperative that we make the most of the materials already in existence.

Materials Passports can act as economic actors through circular value retention and optimisation, generate new job opportunities and businesses focused on reuse, repair, recertification, remanufacture, repurposing and recycling. Materials passports enable the reclamation of materials and facilitate

material reuse, not only **for existing buildings but also for new builds**.

Similar to Digital Product Passport of the construction industry, currently being developed by the European Commission, materials passports need to have standardisations and specifications to ensure interoperability, security and acceptance by all stakeholders. Furthermore, materials passports should align with international standards to ensure compatibility and acceptance on a global scale. This policy paper provides guidance and templates to facilitate immediate and comprehensive adoption of materials passporting in the construction industry.

We propose that from 2025 onwards, every construction project should have materials passports as a key deliverable.

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Read the full Materials Passports Policy Paper [available here](#)

UK Policy Context

The UK Government has an ambitious and legally binding target to meet net zero emissions by 2050, and has set out policies to decarbonise all sectors of the UK economy. **Construction is a cross-departmental issue with different government bodies playing a role in setting standards**. We would like to engage with the following key bodies and departments, because:

•The **Construction Leadership Council (CLC)**, and its **Green Construction Board (GCB)** – to support the implementation of the Routemap for Zero Avoidable Waste in Construction published in 2021, that contains detailed plans for construction material recycling.

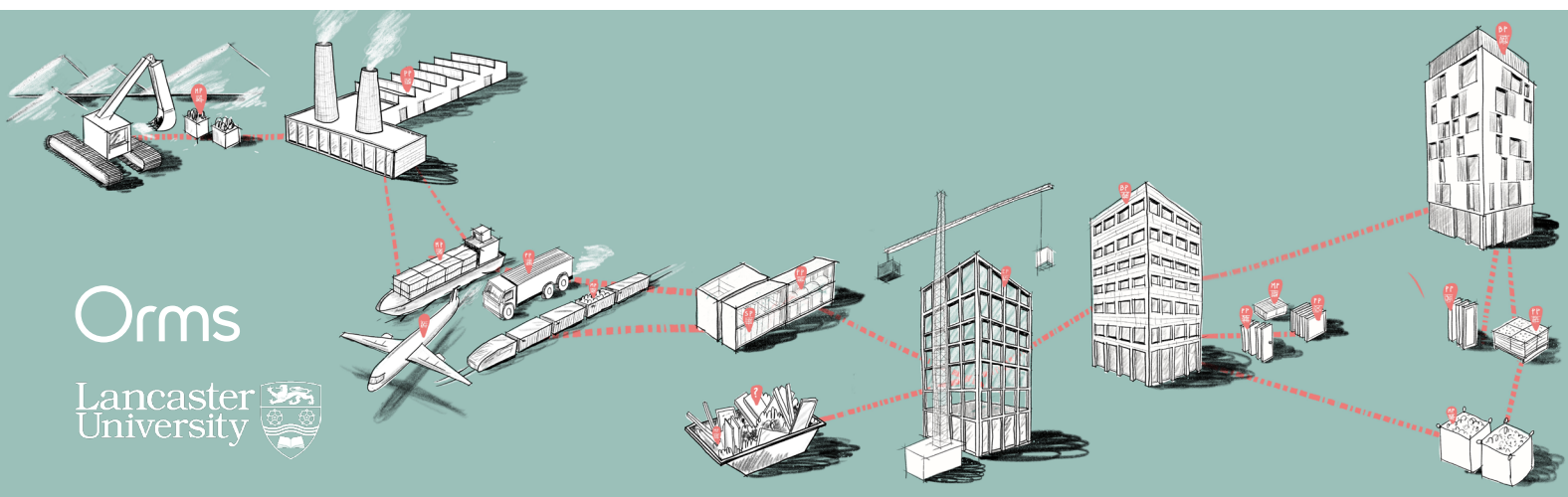
•The **Department for Environment, Food and Rural Affairs (DEFRA)**, to address the Waste Prevention Programme, encourage local authorities to promote sustainable resource in construction and support the implementation of the Environment Act 2021.

•The **Infrastructure & Projects Authority (IPA)**, to support the Transforming Infrastructure Performance (TIP) programme and help to reduce carbon emissions during construction, operation and decommissioning of assets.

•The **Office for Product Safety & Standards (OPSS)** to support the regulation of Construction Products and address the construction product safety 2022-25 strategy.

This research provides clear recommendations on how to use materials passports to:

- **accelerate material reuse in construction,**
- **promote deconstruction over demolition,**
- **increase reused materials into the supply chain,**
- **reduce construction and demolition waste (CDW)**
- **increase end of life value in the built environment and**
- **reduce the need for raw materials and environmental impact.**



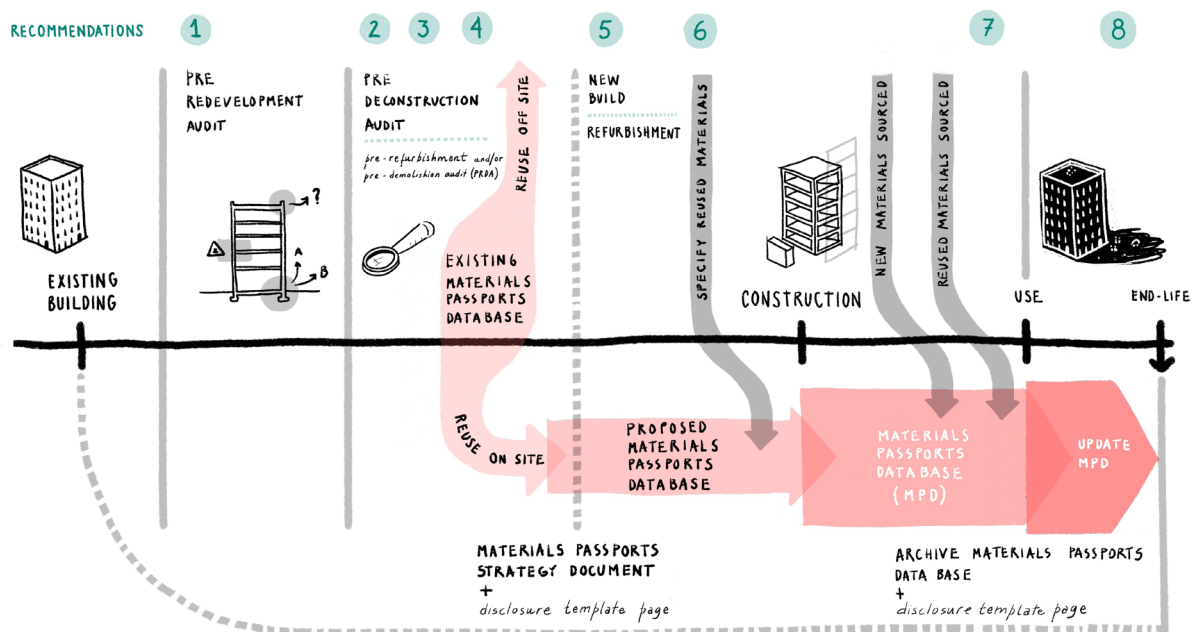


Figure 1 | Implementation of Materials Passports Recommendations

Policy Recommendations

1 | Complete a Pre-Redevelopment Audit

Where an asset exists on the site, it is recommended that a **Pre-Redevelopment Audit** is carried out by clients and design teams at the earliest available opportunity. This would enable the evaluation of potential for refurbishment.

2 | Complete a Pre-Demolition or Pre-Refurbishment Audit

The Pre-Redevelopment Audit should be followed by a **Pre-Demolition** or **Pre-Refurbishment Audit** as appropriate.

3 | Prepare a Circular Economy Strategy

For all buildings, a **Circular Economy Strategy** should be developed. Where undertaken, it should explain the outcomes of the audits and describe the design approaches that have been developed.

4 | Gather and submit metric data

For all buildings, the metrics contained within the **GLA Circular Economy Statement Template** should be prepared and reported to the local authority at planning application stage and post-completion as a demonstrator of exemplary performance.

5 | Develop and implement a Materials Passports strategy

For all buildings, the development and implementation of a **Materials Passports Strategy** would be considered a demonstration of exemplary performance. This strategy can be applied to both the deconstruction and construction process. The creation of a **Materials Passports Database** for new materials contained within the development is expected. The creation of a **Basic Materials Passports Database** for existing materials to improve material reuse during deconstruction and construction is encouraged.

6 | Incorporate reused materials

Where an existing asset is present, stakeholders should make every effort to **incorporate materials arising from the deconstruction** into the new development. On all projects, reused materials should be sourced in lieu of purchasing new wherever possible. Teams should prepare **flexible material specifications** to enable adjustments at the procurement phase, facilitate reuse and reduce waste. A simple version of the **Materials Passports Database** (Basic Materials Passports) should be created to

record the information available at each stage of the project.

7 | Prepare a Deconstruction Plan

For all buildings, as part of the Building Passport, a **Deconstruction Plan** should be created to demonstrate exemplary performance. For existing buildings, the deconstruction plan should be informed by the **Pre-Redevelopment** and **Pre-Demolition** or **Pre-Refurbishment Audit** and by the **Basic Materials Passports database**. For a proposed development, the Deconstruction Plan should be developed during the design process and be informed by the Materials Passports database.

8 | Support for local authorities to implement the proposed recommendations

Provide **additional resources** to support the implementation of the recommendations, and enable **upskilling** to support a local authority in developing competency within the planning department or other enforcing authority is critical.

Work with us

Dr Ana Rute Costa, Lancaster University, is an academic, chartered architect and certified Passivhaus Designer, **fostering the creation of dynamic links and knowledge exchange between academia and industry**. Her research focuses on accelerating material reuse in construction through materials passports, reducing whole life carbon and enabling a circular economy.

Rachel Hoolahan, Orms Architects, joined Orms as an architect, but her work now **focuses on sustainability and in particular translating research into meaningful change on projects**. She currently co-leads the practice's sustainability consultancy, supporting architectural projects, teaching, and participating in industry research groups.

Contact Dr Ana Rute Costa at a.costa@lancaster.ac.uk and Rachel Hoolahan at rholahan@orms.co.uk if you would like to learn more about their research and practice expertise, invite them to speak at your event, or collaborate with them to address Net Zero Targets and promote a circular economy in the construction sector.