



FULL CIRCLE, FULL POTENTIAL

British Land's Approach to the Circular Economy

Full Circle, Full Potential
British Land's Approach to the Circular Economy
A British Land guide, produced in collaboration with GXN

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01

THE CIRCULAR ECONOMY

WHAT IS IT?

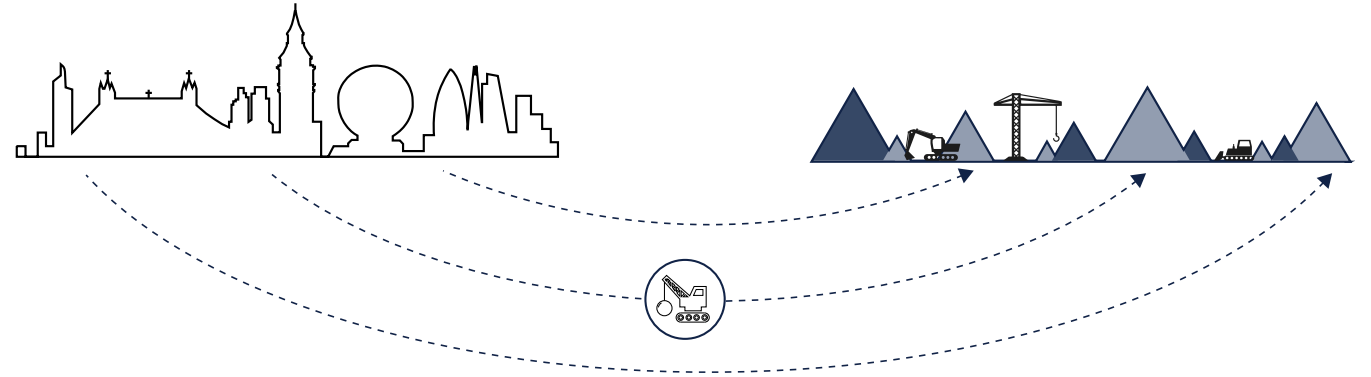
In our current economy we extract materials from the earth, make things out of them, and eventually discard them as waste. This is a process which has a significant injurious impact on the planet, drives climate change, biodiversity loss, waste and pollution. This take-make-dispose model is known as a Linear Economy.

The Circular Economy, in contrast, aims to stop waste being produced by keeping materials in use for as long as possible. This results in a decoupling of economic activity from the consumption of finite resources and tackles multiple global challenges at once.

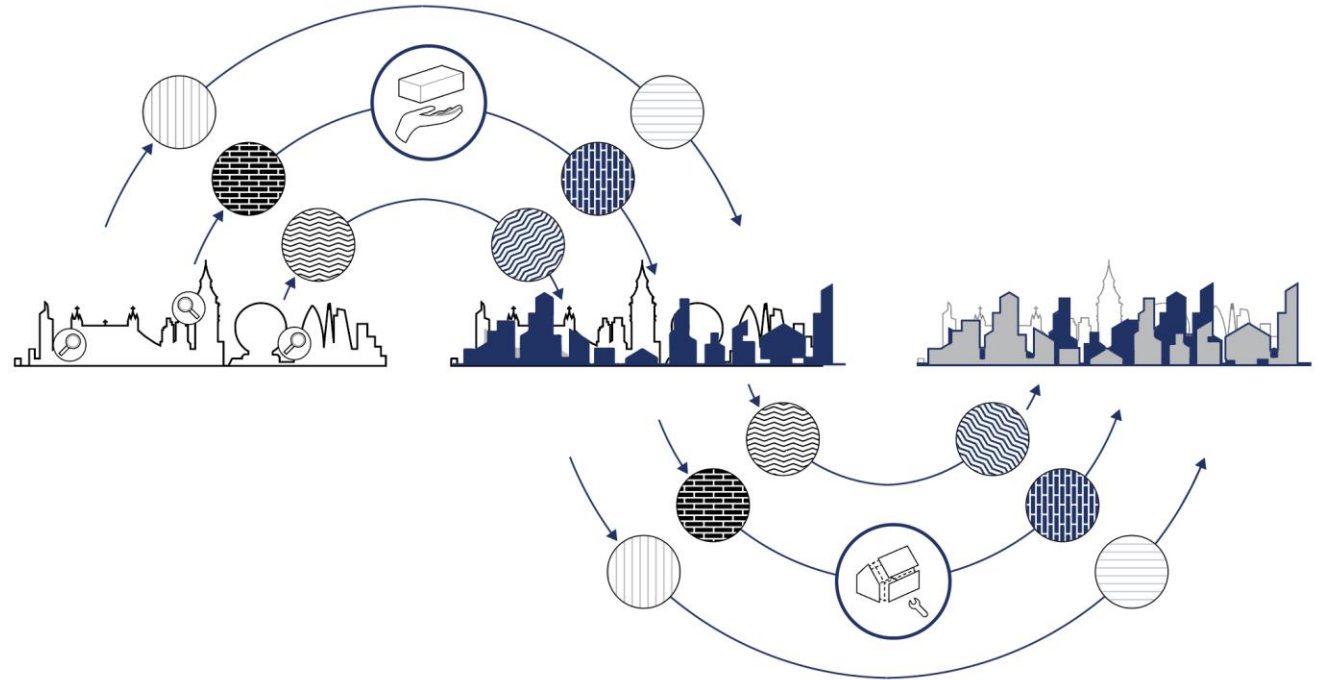
Circular construction is an approach to design and manufacturing which targets the minimisation of waste and raw material demand through material reuse, repair, refurbishment, remanufacturing, and recycling. In construction, a circular approach can include:

- (i) reuse of an existing asset through redevelopment
- (ii) designing a new building for prolonged lifespan through adaptability and/or its eventual disassembly and the recoverability of its materials, and
- (iii) designing out waste from the construction process.

Each of these approaches are crucial to minimise the need for new materials in construction, and reduce waste now and in the future.



LINEAR CONSTRUCTION



CIRCULAR CONSTRUCTION

WHY IS IT IMPORTANT?

Construction and demolition waste currently makes up approximately 62% of the total waste produced in the UK. This equates to almost 138 million tonnes of material.

Buildings are incredibly material intensive. Average London buildings consist of ca. 1.5 tonnes/m² of material, according to data collected by the GLA, but the reality is likely to be higher.

Commercial buildings are renewed on increasingly short timeframes, even though many of the materials in such buildings have a much longer functional lifespan. Fit outs may be even worse, with recent lease lengths for central London offices approaching five years. As a result, the construction industry produces a large amount of waste which contributes to climate change when the waste is being disposed, and when new resources are extracted for the materials used as replacements.

We have made significant progress in diverting waste from landfill. But, except for metals which are generally recycled, most construction and demolition waste is downcycled resulting in a loss of value.

British Land will deliver 4.5 million square feet by the end of the decade - requiring ca. 638,000 tonnes of construction materials. Adapting circular economy principles in our projects is crucial to ensuring these materials won't deplete the world's resources, or go to waste in the future.

62%

OF TOTAL UK WASTE

138m

TONNES OF
CONSTRUCTION AND
DEMOLITION WASTE

WHY IS IT IMPORTANT?

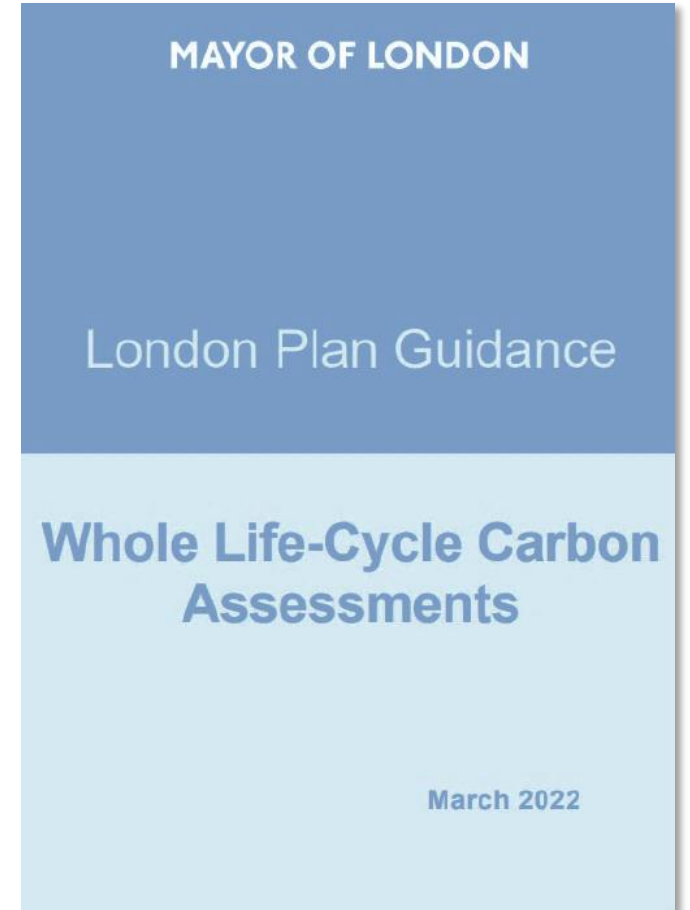
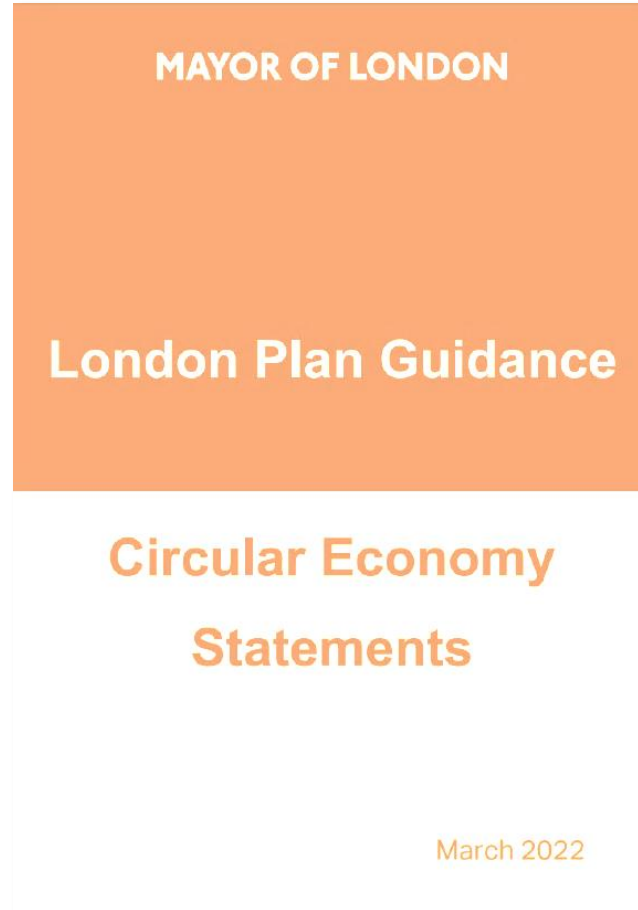
In addition to playing a significant role in achieving British Land's sustainability goals, Circular Economy Statements are now required by the Greater London Authority (GLA) for all major developments since March 2022.

The Circular Economy Statement comes hand in hand with the Whole Life-Cycle Carbon Assessment requirements which set aspirational targets for different building typologies. To achieve these aspirational targets, we need to be applying circular economy strategies.

These requirements ask project teams, from an early stage, to prioritise reducing material use in projects through reuse and recycling. It asks teams to outline a circular economy strategy for the project, considering both materials going into the building, and the potential for them to come out from the building while maintaining their value in the future.

Part of the requirements is a Bill of Materials to be produced for both demolition projects and new design proposals. This is an overview of the materials that go into the project, their quantities, expected life spans, and intended "end of life" scenarios.

This information is crucial to enable reuse and recycling of materials as part of the circular economy. **We see a great potential to build on these requirements, and produce useful Material Passports of buildings which contain the necessary information to enable our materials / products to participate as part of the circular economy.**



HOW DOES IT FIT INTO OUR LOW CARBON FUTURE?

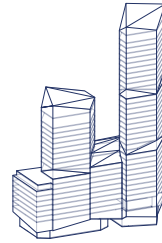
[In our pathway to net zero](#), we commit to the following:

- Reducing embodied carbon emissions in our office developments by 50% by 2030 (to below 500 kgCO₂e/m² for upfront embodied carbon and below 275 kgCO₂e/m² for in-use embodied carbon)
- Reducing operational carbon emissions across the portfolio by 75% and increasing energy efficiency by 25% by 2030
- Offsetting residual carbon emissions using our internal transition vehicle.

To achieve these goals, we apply a systematic approach. This includes our approach to circular economy and materials which is:

- Prioritising re-use of existing structures / materials
- Designing for longevity, flexibility, disassembly, deconstruction, and end of life recoverability
- Increasing the use of reused or recycled materials
- Using low carbon materials wherever practical.

Alongside are examples of embodied carbon savings we have achieved on recent projects by applying circular economy approaches. The examples are based on office typologies, but the principles are applicable across all our asset types.

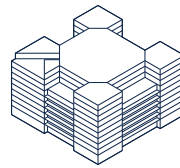


2 Finsbury Avenue

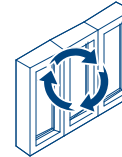


Reused raised access floor

385tCO₂ saved

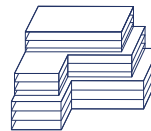


1 Triton Square



Reused facade panels

2,400tCO₂ saved



1 Broadgate



Reused structural steel

238tCO₂ saved

[1] Approx. 9,500m² RAF recovered, EDP used S-P-02797

[2] Savings taken from UKGBC Insights on how circular economy principles can impact carbon and value

[3] 140 tonnes repurposed, ECF taken from recommended value in IStructE HTCEC v2

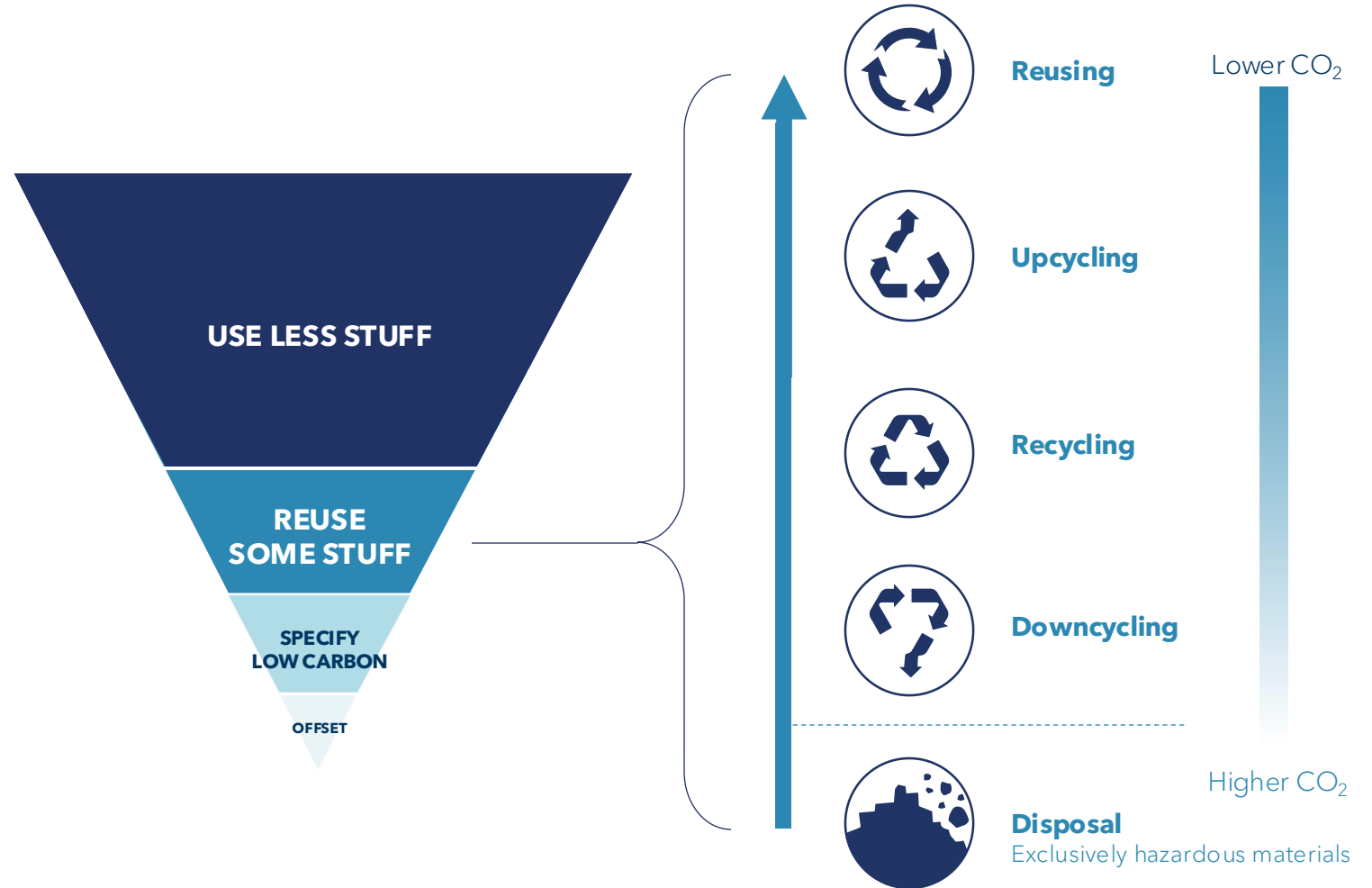
HIERARCHY OF LOW CARBON DESIGN

We recognise that, almost no matter the project, there will be waste arisings from the strip out, refurbishment, deconstruction, or demolition.

These arisings form part of our bigger picture thinking with regards to carbon and the circular economy. **It is clear that these are inextricably linked, and that there is no low carbon future without a circular economy.**

Whatever these arisings, consideration should be given to finding the best routes for these products or materials. That is aiming to **keep elements as high up the hierarchy as possible, with downcycling (and disposal to landfill) as a last resort.** In the best cases, this results in both a carbon and resource saving.

But sometimes this process will be at odds with low carbon performance. E.g. it may cost more carbon to transform a material into a wall cladding than purchasing a new cladding material (though the question of what happens to this discarded material remains). This should be considered within the context of the project's specific circular economy and carbon ambitions.



CIRCULAR CONSTRUCTION

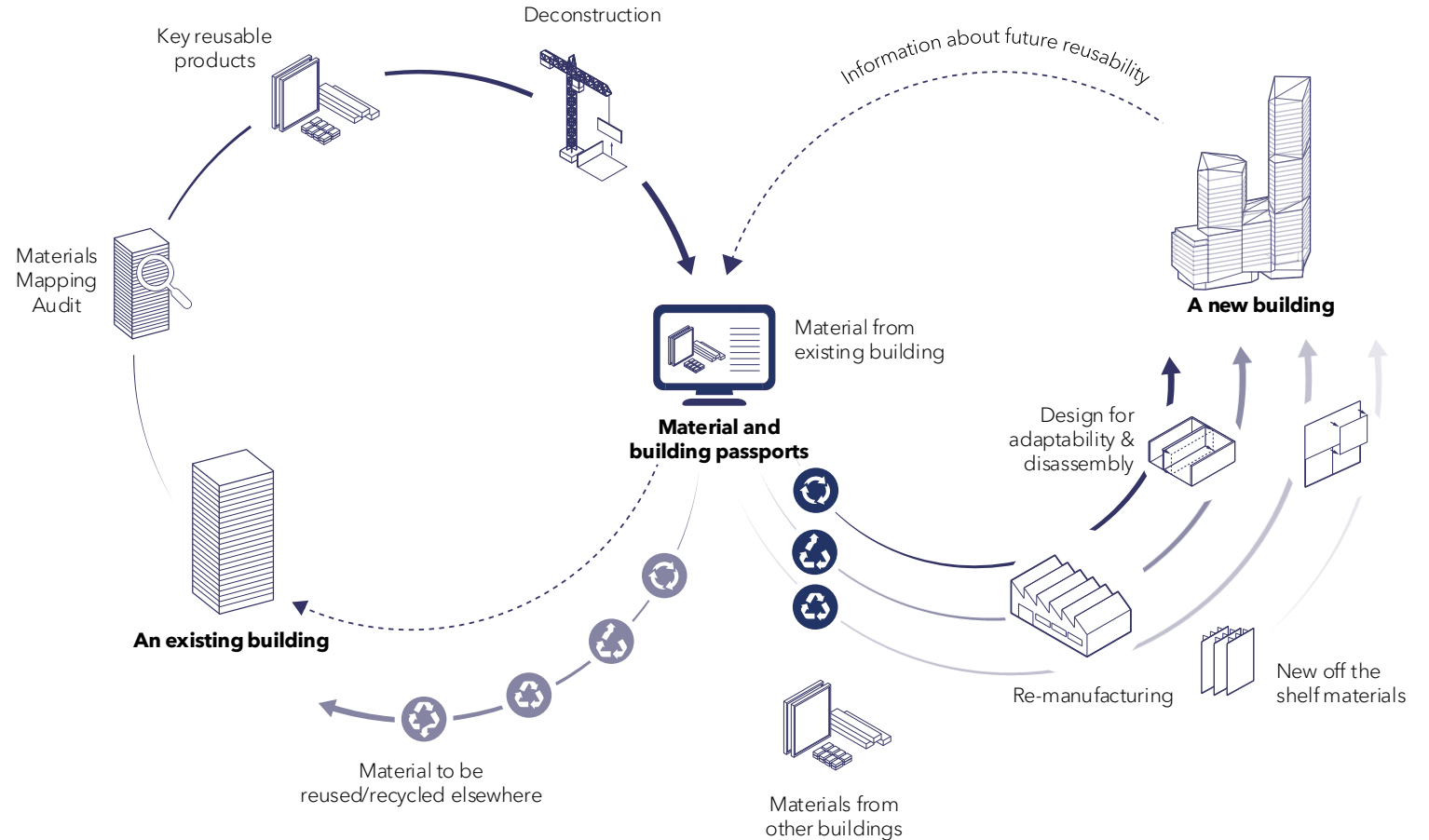
Circular construction is about maximising the lifespan of buildings, their components and materials through:

- Transformation of existing building
- Optimised reuse, upcycling and recycling of existing materials by considering buildings as “material banks”
- Designing new buildings and refurbishment in a way that makes future transformation and reuse of materials easier.

A key component to circular construction is **Material Passports and building passports** which contain information about what materials are in buildings, and their potential for reuse, upcycling and recycling at the end of life of the material / building.

For existing buildings, they assist in material mapping of key reusable materials which can be harvested in the deconstruction and the information for the project team to design with these reused or upcycled materials. It also assists determining the potential for recycling and downcycling routes.

Material passports should always be produced for new projects. By doing so, and using circular strategies such as design for adaptability and design for disassembly (and crucially reusability), the Material Passports produced become even more valuable as the materials in the new building are intentionally designed to be reused in the future, with the information required to do so recorded at the time of design. This creates a closed loop of circular construction where new buildings are designed to be transformed and reused in the future to maximise the lifespan of the buildings themselves, and their materials.



02

KEY DEFINITIONS

CIRCULAR ECONOMY

Circular Construction

Circular construction aims to close building material loops by reusing, sharing, leasing, repairing, refurbishing, upcycling or recycling. It is about considering how to maximise the lifespan and reusability of entire buildings or materials at the very start of the design process.

Pre-Redevelopment Audit

A **Pre-Redevelopment Audit** is a tool for understanding whether existing buildings, structures and materials can be retained, refurbished, or incorporated into the new development.

The analysis should be carried out early on (at pre-application stage) and should inform the design.

Required for GLA referable projects with existing buildings on site.

Materials Mapping Audit (Pre-Demolition Audit)

A **Materials Mapping Audit** (also known as a Pre-Demolition Audit) is a detailed inventory of the materials in the building that will need to be managed upon demolition.

It should include the key components and materials present in the existing buildings, with an estimate of the quantities, associated embodied carbon and their potential end of life scenario in the waste hierarchy (see next page).

Required for BREEAM and GLA referable projects with existing buildings on site.

Design for Disassembly

Approach to the design of a product or constructed asset that **facilitates disassembly at the end of its useful life**, in such a way that enables materials and/or components to be reused, recycled, recovered for energy (ideally put to other beneficial use) or, in some other way, diverted from the waste stream.

Adapted from ISO 20887:2020

Design for Adaptability

A design's ability to be **changed or modified to make suitable for a particular purpose**. Adaptability might refer to a quality of building systems, structure, solutions, products, components. Adaptability in buildings can be achieved through application of certain design strategies such as 'versatility', 'convertibility' and 'expandability'.

Adapted from ISO 20887:2020

WASTE HIERARCHY



Direct reuse of materials and products with **little or no loss of value** and minor interventions to the material. This entails checking, cleaning, repairing, and refurbishing whole items or parts.

When considering reuse, we examine options for reuse within a new scheme as well as reuse, resale or donation for off-site reuse.



The **transformation or remanufacturing of (otherwise) waste products and materials** into products and materials of higher quality and/or value.

The aim is to reduce demand for extracting raw materials from the earth, by converting what would become waste into useful and valuable products and materials.



Conversion of a material or product into **something of equal or similar value or quality** to the original material.

It gives a material another life within the same supply chain, which can repeat indefinitely. For example, building glass being recycled into new building glass.



Often considered within the “Recycling” pathway, but in practical terms, entails the opposite of “Upcycling”: the transformation of products and materials into **products and materials of lower quality and/or value.**

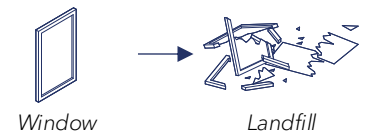
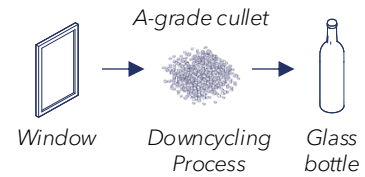
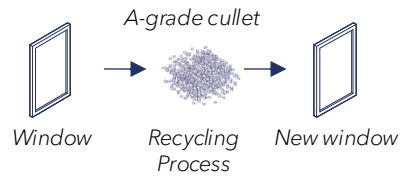
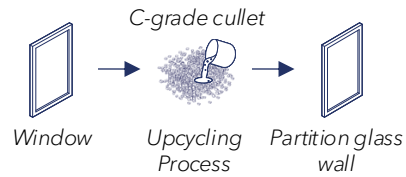
This is the least preferable option in the waste hierarchy, but can still be better than standard practice for certain products.



Disposal includes both landfill and incineration. It should be the **destination only for true waste:** materials or products which cannot technically or practically be reused, upcycled, recycled or downcycled.

In the UK hazardous waste is governed by strict regulations, and will often be sent to landfill by law.

WASTE HIERARCHY - EXAMPLES AND TYPICAL END OF LIFE



Recommended end of life for materials:

- Steel
- RAF
- Furniture
- Carpet tiles

- Contaminated cullet
- Timber studwork
- Ductwork
- Broken brick or stone

- Steel
- Aluminium
- Glass
- Bricks

- Concrete
- Coloured glass
- Timber
- Concrete

- Contaminated materials
- Chipboard
- Bonded insulation

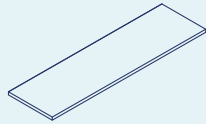
MATERIAL PASSPORTS

WHAT WE MEAN

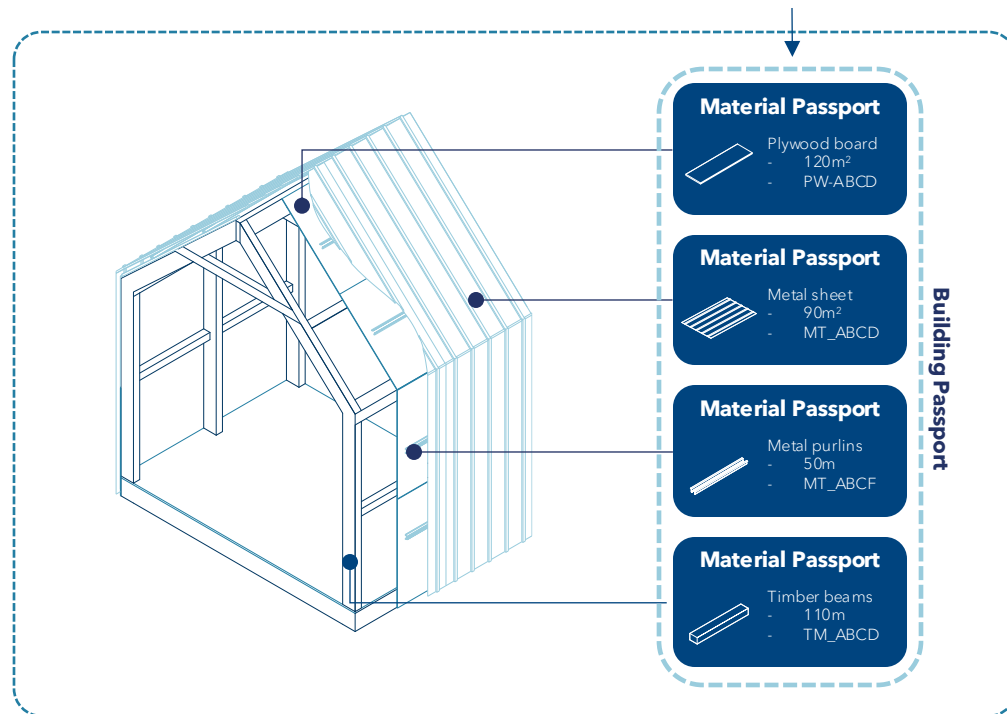
A Material Passport **collects and organises** data describing pre-defined characteristics of the materials that are included in products or buildings, thereby enabling efficient **re-use, recycling and recovery.**

MATERIAL PASSPORTS

Indicative Material Passport Information



- Type of material(s)
- Quantity
- Dimensions
- Manufacturer
- End of life
- Assembly/disassembly notes
- EPD information
- Certifications
- Location
- etc.



Environmental Product Declaration

An Environmental Product Declaration (EPD) is a document which transparently communicates **the environmental performance or impact of any product or material over its lifetime**. It can be used to provide necessary information as part of a Material Passport.

Material Passport

A Material Passport **collects and organises data**, describing pre-defined characteristics of the materials that are included in products or buildings, thereby enabling more efficient **reuse, recycling and recovery**. It can be produced for existing or new buildings.

Building Passport

A building passport is a **collection of Material Passports that make up an entire building**. The building passport can indicate collated data for the building, or allow for individual materials and components to be identified.

Digital Twin

A digital twin is a **digital representation of an intended or existing building**, that serves as an effectively indistinguishable digital counterpart. Digital twins may contain the building's Material Passports, but it will also contain a lot more information necessary for operations and maintenance.

03

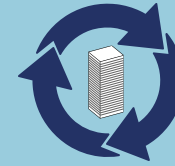
BRITISH LAND'S APPROACH & TOOLS

OUR TARGETS AND COMMITMENTS

A circular economy moves away from take-make-waste and towards a model where resources retain value and use is extended. The Circular Economy challenges supply chains to explore creative reuse of materials in second lives and beyond via reprocessing and remanufacturing with zero waste. We support innovation to discover uses for 'unwanted resources' on and off site, both within and outside of our sectors.

Our projects should all develop a **Circular Economy Strategy**, including:

- All projects with existing buildings on site to undertake a **Pre-Redevelopment Audit** to determine feasibility of reuse and adaptability.
- All projects proposing demolition to produce a **Materials Mapping Audit** (Pre-Demolition Audit) of existing materials following our British Land Demolition Material Tracker.
- All projects to produce a **Reuse Strategy** outlining the opportunities to reuse or upcycle elements from existing buildings or other donor buildings
- All projects should **optimise design for circularity** including longevity, flexibility, adaptability, disassembly, deconstruction and end of life recoverability
- All projects should develop **materials passports** for materials with potential for future reuse, based on our British Land Material Passport Protocol capturing basic data useful for future reuse or recycling of all materials, and detailed data for the largest packages with high reuse potential.



CIRCULAR ECONOMY STRATEGY

British Land encourages all projects to develop a Circular Economy Strategy from the outset. If the project is GLA referable, the strategy should align to the latest GLA Circular Economy Statement Guidance.

EXISTING BUILDING ON SITE

ALL PROJECTS



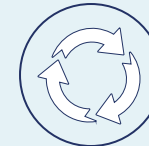
PRE-REDEVELOPMENT AUDIT

In new projects with an existing building, a Pre-Redevelopment Audit should be conducted at Stage 1 to determine the potential to reuse and adapt what is already there.



MATERIALS MAPPING AUDIT

If whole or partial demolition is to take place, a Materials Mapping Audit should be conducted in Stage 1 to determine the optimal end of life routes for the existing materials.



REUSE STRATEGY

A Reuse Strategy should be developed from the outset to determine how the new building can incorporate reused and upcycled materials from the existing building or other donor buildings.



CIRCULAR DESIGN

From the project outset circular design principles such as building in layers, design for disassembly and design for adaptability should be incorporated in the design.



MATERIAL PASSPORTS

Post-construction a Material Passport shall be produced to capture the materials used in the building and detailed information about the key reusable materials for the future.

KEY ACTIONS & RESPONSIBILITIES



Strategic Definition, Preparation & Brief



Concept Design



Developed Design & Technical Design



Construction, Handover & Close Out



In Use (typically beyond shell & core scope)

Process

Analyse existing building and review opportunities for reusing materials from buildings on site and/or from British Land portfolio
Sustainability Consultant and Architect

Identify key circular design strategies suitable for the project, and develop catalogue of reuse and upcycling opportunities (from existing building or elsewhere) ²
Sustainability Consultant with input from wider design team

Identify key reusable materials for Material Passports
Sustainability Consultant and Architect with input from wider design team

Identify and define a metric and target for future circularity
Sustainability Consultant

Review alignment cost plan with carbon and circular economy strategies
Sustainability and Cost Consultant

Early engagement with Contractors and supply chain on Circular Economy strategy and material reuse and upcycling opportunities
Sustainability Consultant with input from wider design team

Continue exploring design-driven circular opportunities
Sustainability Consultant

Test Material Passport requirements and data protocols with Contractor
Sustainability Consultant and Contractor

Embed circular economy performance targets within tender documentation
Sustainability Consultant

Work with Contractor to implement Circular Economy strategy selected reuse and upcycling opportunities
Sustainability Consultant with input from wider design team

Circular Economy Strategy to feed into updated Site Waste Management Plan and Resource Management Plan
Contractor

Implement Material Passports data collection for key reusable materials
Contractor to prepare and quality assure submissions for review by Sustainability Consultant

Work with Contractor to develop deconstruction plans and drawings as necessary
Contractor with input from wider design team

Engage tenants to opt in on a circular fit out strategy including Material Passports
British Land Sustainability and Leasing Teams

Seek opportunities for material reuse, upcycling, recycling, and the like associated with fit out turnover and ongoing maintenance
Fit out Sustainability Consultant

Update British Land Sustainability Manager when replacing materials
Fit out Contractor with input from fit out Sustainability Consultant

Deliverables and Reporting

Pre-Redevelopment Audit
Sustainability Consultant and Architect ⁶

Materials Mapping Audit (incl. Demolition Material Tracker)
British Land to appoint based on project needs ¹

Brief requirements for key reusable materials and Material Passports
Sustainability Consultant with input from wider design team

Project specific CE vision for waste, reuse and Material Passport targets to be included in British Land sustainability tracker
Sustainability Consultant with input from wider design team ⁶

Circular Economy Strategy Report incl. overview of reuse and upcycling opportunities and potential risks/costs
Sustainability Consultant, Architect, Cost Consultant, with input from wider design team ⁶

GLA Circular Economy Statement ³
Sustainability Consultant

Circular Economy targets to be included in British Land sustainability tracker
Sustainability Consultant with input from wider design team

Updated Circular Economy Strategy and targets (revisited with Contractors)
Sustainability Consultant, Architect, and Contractor ⁶

Circular Economy and Deconstruction Employer's Requirements ⁴
PM with input from Sustainability Consultant and Cost Consultant

Deconstruction Tender Template ³
Prepared by Sustainability Consultant with input from Cost Consultant, and completed by Demolition Contractor

Material Passport Employer's Requirements
PM with input from Sustainability Consultant and Cost Consultant

GLA Circular Economy Statement updates prior to construction submission ³
Sustainability Consultant

Completed, interim British Land Material Passport Protocol following completion of key packages (e.g. concrete, cladding, etc.)
Contractor to prepare and quality assure submissions for review by Sustainability Consultant

As-built Building Material Passport ⁵ at practical completion
Contractor to prepare and quality assure submissions for review by Sustainability Consultant

Circular Economy lessons learnt report and post-completion report
Sustainability Consultant and Contractor ⁶

GLA Circular Economy Statement post completion updates ³
Contractor

Outline strategy for circular fit outs and retrofits
Fit out Sustainability Consultant with input from British Land and PM

Completed British Land Material Passport Protocol
Fit out Contractor to prepare and quality assure submissions for review by fit out Sustainability Consultant and British Land

Updates to existing Material Passports (changes from shell & core and/or material replacement)
Fit out Contractor to prepare and quality assure submissions for review by fit out Sustainability Consultant and British Land

Notes:

- ¹ Material Mapping Audits can be undertaken by several parties (Contractors, Sustainability Consultants, Engineers, or specialist third parties). British Land should appoint based on the specific needs of the project.
- ² At a minimum, outline approach to reuse/upcycling, design for adaptability and design for disassembly (reusability)
- ³ If applicable
- ⁴ Demolition Contract or and Main Contract or as applicable
- ⁵ Collated Material Passports, see pg. 31
- ⁶ All strategic documents to be reviewed by British Land

RESPONSIBILITIES MATRIX



**Strategic Definition,
Preparation & Brief**



Concept Design



**Developed Design &
Technical Design**



**Construction,
Handover & Close Out**



In Use
(typically beyond shell & core scope)

Role	Strategic Definition, Preparation & Brief (0-1)				Concept Design (2)			Developed Design & Technical Design (3-4)					Construction, Handover & Close Out (5-6)				In Use (7)		
	Pre-Redevelopment Audit	Materials Mapping Audit	Material Passport Brief Requirements	Project CE Vision	CE Strategy	GLA CE Statement	CE Targets in BL Tracker	Updated CE Strategy	CE & Deconstruction ERs	Deconstruction Tender Template	Material Passport ERs	GLA CE Statement Updates	Material Passport Protocols (interim)	Building Passport (as-built)	CE Lessons Learnt	GLA CE Statement Updates	Outline Fit Out Strategy	Material Passport Protocols	Updates to Existing Material Passports
British Land	●	1		●	●	●		●			●				●	●	●	●	●
Project Manager			●	●	●	●		●	●	●	●			●			●		
Architect	●		●	●	●			●											
Sustainability Consultant	●		●	●	●	●	●	●	●	●	●	●	●	●	●	●			
Cost Consultant					●				●	●	●								
Wider Design Team			●	●	●		●												
Contractor								●		●		●	●	●	●				
Fit Out Sustainability Consultant																	●	●	●
Fit Out Contractor																		●	●

Notes: 1 Material Mapping Audits can be undertaken by several parties (Contractors, Sustainability Consultants, Engineers, or specialist third parties). British Land should appoint based on the specific needs of the project.

OVERVIEW OF TOOLS

To assist our project teams to deliver on our ambitions, we have developed a set of tools for analysis and reporting. Project teams are strongly encouraged to use these tools and adapt them as according to their specific project requirements.


The tools are under constant development and will be updated as required based on project feedback.

ALL PROJECTS




CIRCULAR ECONOMY STRATEGY

EXISTING BUILDING ON SITE

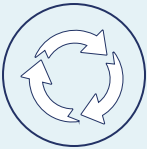


PRE-REDEVELOPMENT AUDIT

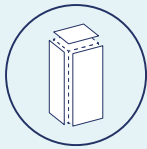


MATERIALS MAPPING AUDIT


ALL PROJECTS



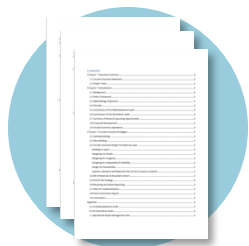
REUSE STRATEGY



CIRCULAR DESIGN



MATERIAL PASSPORTS



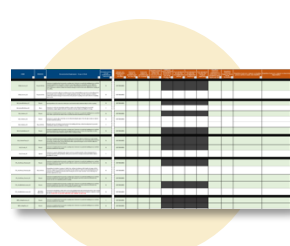
CIRCULAR ECONOMY STATEMENT TEMPLATE

Template that may be used to produce circular economy reports / statements.



DEMOLITION MATERIAL TRACKER

Produced as part of Materials Mapping Audit, and updated throughout to track existing materials and end of life routes.



DECONSTRUCTION TENDER TEMPLATE

Produced as part of Demolition Contractor tender return to provide feedback on end of life scenarios for deconstruction materials.



CE & DECONSTRUCTION REQUIREMENTS X2

Sample clauses for Demolition and Main Contractors tenders, setting out deconstruction and circular economy reporting requirements.



MATERIAL PASSPORT PROTOCOL

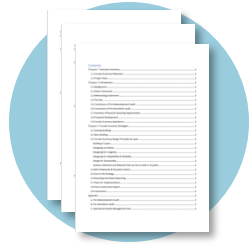
Spreadsheet to be used for tracking base data of all materials, and circular and product data for key reusable materials.



MATERIAL PASSPORT REQUIREMENTS

Sample clauses for Main Contractor tender setting out Material Passport requirements.

CIRCULAR ECONOMY STATEMENT TEMPLATE



What is it

Our template for Circular Economy Statements is a tool which can be used to complete a Circular Economy Strategy for projects, covering the necessary aspects of our sustainability brief, as well as ensuring compliance with the GLA Circular Economy Statement requirements (applicable to referable schemes only).

The template is voluntary to use and should be adapted to project specifics. The approach should be agreed with the BL Sustainably Manager. It encourages project teams to address key circular economy topics and outline strategies for each of them to be tracked throughout the project.

Who is it for

The template can be used by Sustainability Consultants to establish and report the circular economy strategy for the project.

If the project is GLA referable, the template can also be used as the Circular Economy Statement Report for planning submission.

When should it be used

Throughout the entire design process with key milestones in:

- Stage 1
- Planning Application
- Stage 4(prior to construction)
- Stage 6 (within 2 months post-completion).

DEMOLITION MATERIAL TRACKER



What is it

This template is used as part of the Materials Mapping Audit (previously Pre-Demolition Audit) to record the available materials in an existing building and determine and track their best end of life scenarios.

It assists in creating an overview of potential materials for reuse and upcycling within our portfolio. It also forms part of mandatory reporting for GLA referable projects, and offers an opportunity to track potential waste streams throughout the project lifecycle.

Who is it for

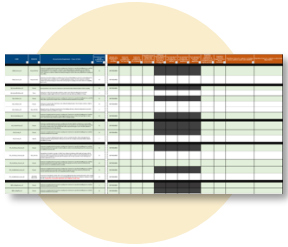
The Demolition Material Tracker should be filled in by the consultant appointed to conduct the initial Materials Mapping Audit, and later updated by the Demolition Contractor.

It can be used by the design team to identify potential reuse and upcycling opportunities, and by the project team to keep track of waste streams.

When should it be used

The template should be part of the initial Materials Mapping Audit in RIBA Stage 1, and updated throughout the stages. A final version should be produced shortly prior to demolition, and an “as-demolished” update following deconstruction including the final destinations of the respective waste streams.

DECONSTRUCTION TENDER TEMPLATE



What is it

The Deconstruction Tender Template is used as part of the demolition tender process. It details potential end of life scenarios for material arisings from the Materials Mapping Audit, and collates feedback, in a structured way, from Demolition Contractors with regards to feasibility, cost, programme, risk, practicality, etc.

The Deconstruction Tender Template should outline potential end of life scenarios of available materials discussed by the project team. Items which are expected to form part of a base tender offer should be highlighted in green for tendering Contractors, with the other optional routes indicated to garner Contractor feedback.

Who is it for

The base content of the Deconstruction Tender Template should be established by the Sustainability Consultant early in RIBA Stage 3 (or at an appropriate time ahead of the demolition tender).

The Deconstruction Tender Template should form part of the Demolition Contractor tender documents where they will be expected to input their feedback and commentary for consideration by the design team. It can then be used by the project team to make informed decisions of suitable end of life scenarios.

When should it be used

As part of demolition Contractor tender.

EMPLOYER'S REQUIREMENTS: CIRCULAR ECONOMY & DECONSTRUCTION (DEMOLITION)



What is it

Our proforma Employer's Requirements for Circular Economy and Deconstruction is intended to ensure that the relevant scope and clauses are included in the contract documents for Demolition Contractors.

This is key to securing our ambitions in contract, and it should be used as a starting point and adapted to suit project specific requirements.

The requirements include Demolition Contractor responsibilities for completing the Materials Mapping Audit and inputting into the Demolition Material Tracker, the Deconstruction Tender Template, as well as fulfilling any circular economy related scope in accordance with our sustainability brief requirement, and specific GLA referable planning-related items.

Who is it for

The template is to be used by project teams in developing the tender and contract documentation for Demolition Contractors.

When should it be used

As part of Demolition Contractor tender.

EMPLOYER'S REQUIREMENTS: CIRCULAR ECONOMY & DECONSTRUCTION (MAIN CONTRACTOR)



What is it

Our proforma Employer's Requirements for Circular Economy and Deconstruction is intended to ensure that the relevant scope and clauses are included in the contract documents for Main Contractors.

This is key to securing our ambitions in contract, and it should be used as a starting point and adapted to suit project specific requirements.

The requirements include Main Contractor responsibilities for fulfilling any circular economy related scope in accordance with our sustainability brief requirement, and specific GLA referable planning-related items.

Who is it for

The template is to be used by the project team in developing the contract documentation for the Main Contractor.

When should it be used

As part of the Main Contractor tender.

MATERIAL PASSPORT PROTOCOL



What is it

Our template to collect and organise data as part of the Material Passport for projects. **This is a mandatory template to allow us to collate Material Passports and aggregate them across the portfolio.**

The template is spreadsheet based. It includes both base data and product specific data to be collected depending on key reusable materials of the project. **Its content should be adapted for project specific purposes.**

The template can be filled in manually or extracted from Building Information Models (BIM), and is intended to be source and platform agnostic.

Who is it for

The template should be completed by the Main Contractor (and Sub-contractors). Once completed it should be returned to the project team for review and upload to suitable platform / storage, to be agreed with the British Land Sustainability Manager.

When should it be used

In RIBA Stages 5 & 6 during construction and a final version post-completion.

It is strongly encouraged that interim Passports are prepared by the Main Contractor early in RIBA Stage 5 to optimise the data collection process.

EMPLOYER'S REQUIREMENTS: MATERIAL PASSPORTS



What is it

Our proforma Employer's Requirements for Material Passports is intended to ensure that the relevant scope and clauses are included in the contract documents for Main Contractors.

This is key to securing our ambitions in contract, and it should be used as a starting point and adapted to suit project specific requirements.

The requirements detail the Contractor responsibilities for collecting and completing the Material Passport protocol.

Who is it for

The template is to be used by the project team in developing the contract documentation for the Main Contractor.

When should it be used

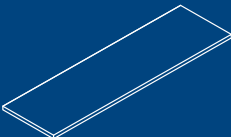
As part of the Main Contractor tender.

04

MATERIAL PASSPORTS - A DEEP DIVE

WHAT IS A MATERIAL PASSPORT?

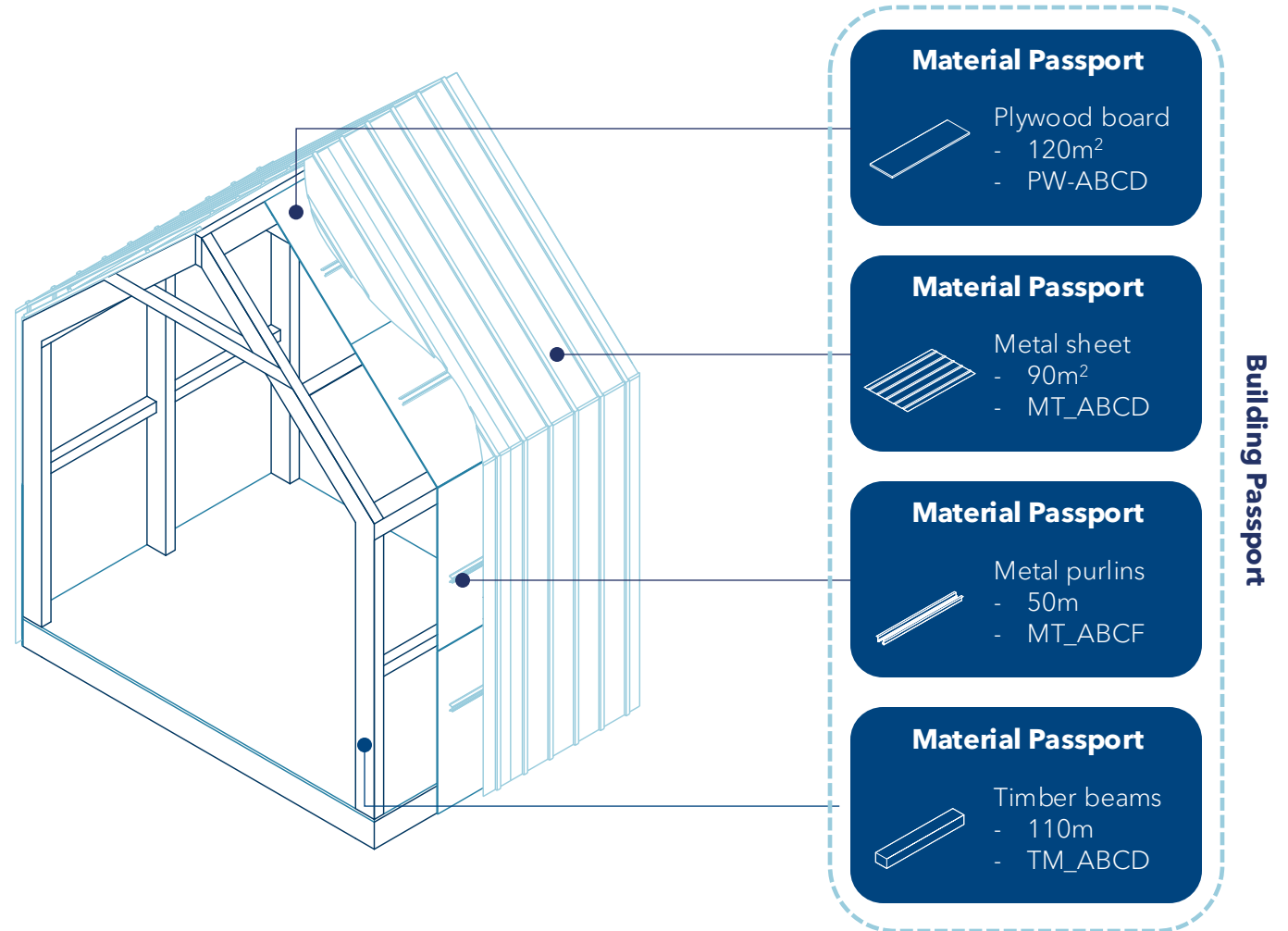
Indicative Material Passport



- Type of material
- Quantity
- Dimensions
- Manufacturer
- Assembly/disassembly notes
- EPD Information
- Certifications
- ...

As identified in Key Definitions, British Land's definition for a Material Passport is a collection of organised data describing pre-defined characteristics of the materials that are included in products or buildings, to facilitate more efficient reuse, upcycling, recycling and recovery. **Key for us is that collection of this data improves future reuse and /or recycling potential.**

A building will consist of multiple materials and products, hence have multiple Material Passports related to it. A collection of Material Passports for all materials and products of a buildings can be described as a building passport.

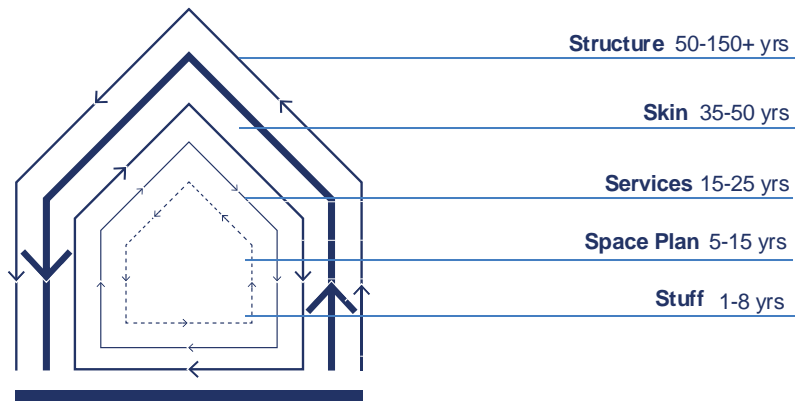


WHY IS IT USEFUL?

Collecting and consolidating information about materials in a project is useful to get an overview of the possible end of life scenarios. **The value to us is in how these data may facilitate carbon, cost, and/or material savings in future projects.**

Very few materials in buildings are used until their technical end of life. Often, they are replaced due to changing tenants, performance requirements, market drivers, or fashion. Clearly different elements will have different technical lifespans, and this impacts the lifespans of the materials associated with each element. **We use a “building in layers” approach to ensure that temporal changes in one layer don’t impact another.**

Generating Material Passports makes it easier to access information about the materials in a building, without having to first deconstruct it or conduct complex and costly investigations.



Overview of materials in a portfolio, and possibly future demands

Easier to locate suitable materials for reuse and speedier processes to do so

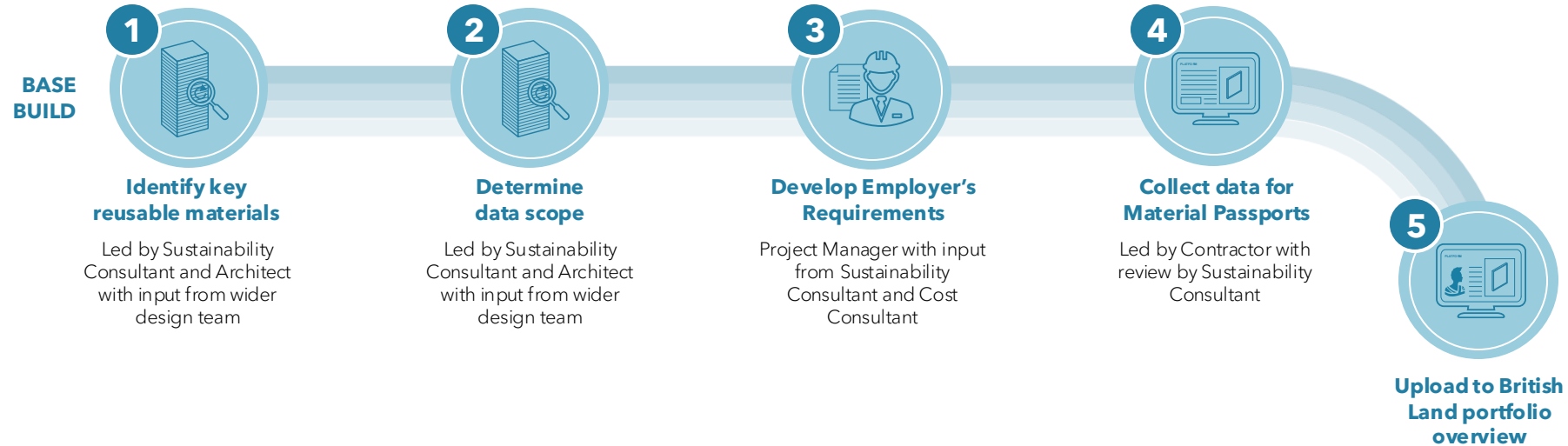
Carbon, cost, and waste savings in future projects

CREATING A NEW MATERIAL PASSPORT

The journey to creating new Material Passports starts in RIBA Stage 3.

1. The project team should determine what are the project's "key reusable materials"
2. The Sustainability Consultant and Architect should outline the data scope for baseline data and key reusable materials
3. Employer's Requirements for Material Passports should be included as part of a Contractor tender
4. During construction, Material Passport data should start being collected in British Land's Material Passport protocol. Post-construction, all relevant Material Passports should be collated as a Building Passport (in British Land's Material Passport Protocol)
5. The Building Passport (collated Material Passports) should be uploaded to a platform to be agreed with the British Land's Sustainability Manager.

PROCESS FOR GENERATING BASE BUILD MATERIAL PASSPORTS





IDENTIFY KEY REUSABLE MATERIALS

Each project team should determine which materials or products should be considered “key reusable materials” at the end of life of the building. These materials should have a more extensive data scope (see following step) to increase the potential for them to be reused, recycled or recovered in the future. Project teams should collect baseline data for all other materials. The full list of materials should align with the Bill of Materials for the Life Cycle Analysis.

We have conducted a scan of typical materials which have immediate reuse potential and value for the company, these are listed alongside. **Amongst these are highlighted materials for which British Land Material Passport Protocols are available.** Project teams are encouraged to explore other key reusable materials, and develop protocols to suit. Baseline data should be collected for all materials.

Who

The key reusable materials should be identified by the **Sustainability Consultant** in collaboration with the wider design team and British Land.

When

Identification of key reusable materials should be undertaken in RIBA Stage 3. Earlier discussions should consider the approach to design for disassembly and adaptability to enable efficient reuse and recovery in the future.

	MATERIAL/PRODUCT	BUILDING LAYER	LIFESPAN
	Raised access floor	Space	5-15 years
	Ceiling tiles	Space	
	Glazing (partition)	Space	
	Partition wall systems	Space	
	Fan coil units	Services	
	Terminal units	Services	
	Light fittings	Services	20+ years
	Glazing (facade)	Skin	
	Aluminium (facade)	Skin	40+ years
	Steel sections	Structure	
	CLT slabs	Structure	



DETERMINE DATA SCOPE

Each project team should determine the scope of data to be collected for different types of materials in British Land's Material Passport Protocol. British Land has developed minimum baseline data, and more extensive product specific data for key reusable materials (Additional Resources).

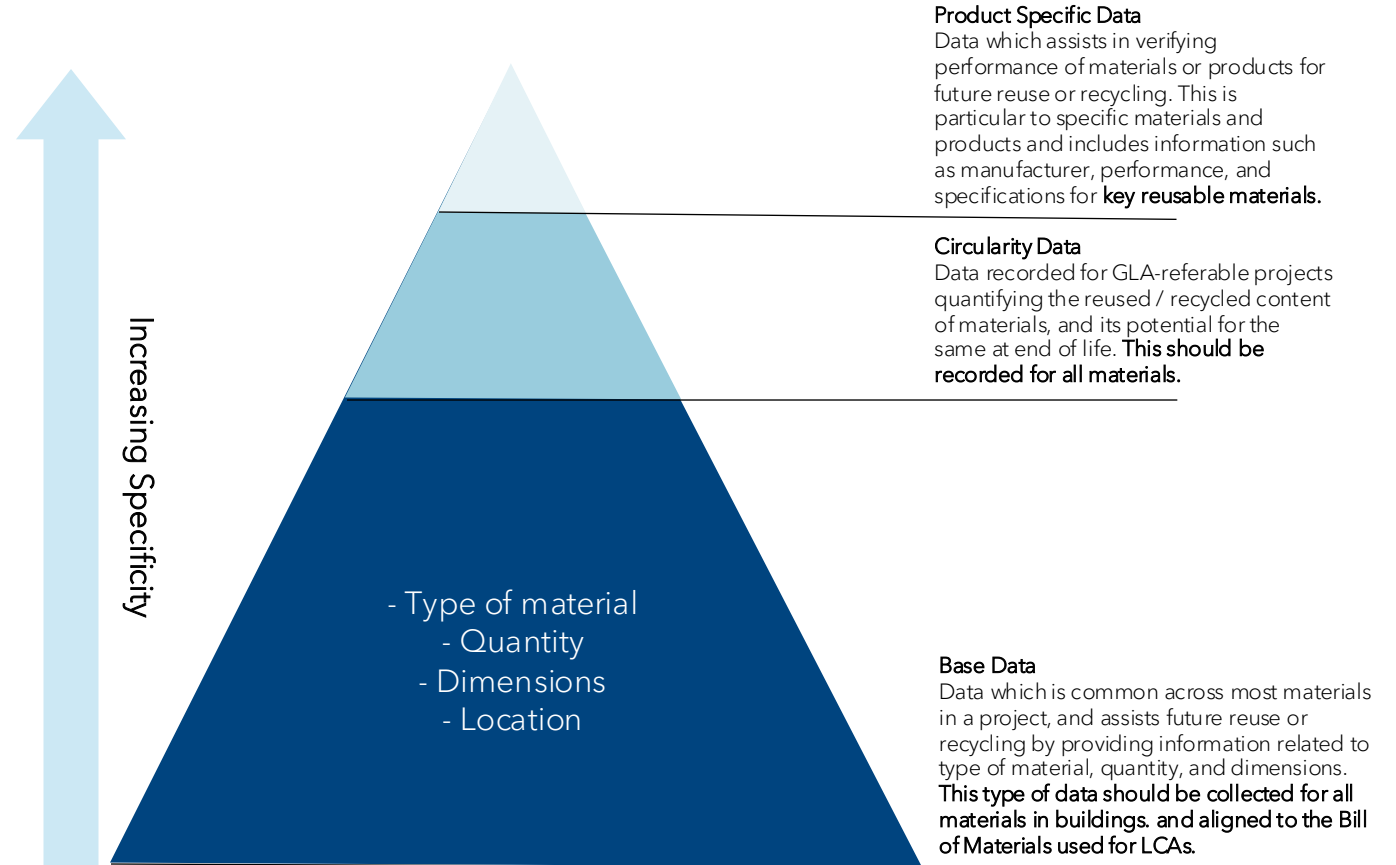
If the project team decides on a key reusable material which does not yet have a British Land Protocol - this should be created as part of this step.

Who

The data scope should be outlined by the Sustainability Consultant in collaboration with British Land. If a new protocol needs to be created this should also be prepared by the Sustainability Consultant with input from the wider design team.

When

Identification of data scope for different materials should be concluded prior to issuing Contractor tender documentation. The full scope will be included in the Employer's Requirements for Material Passports.





DEVELOP EMPLOYER'S REQUIREMENTS

To successfully capture the necessary data for different materials it is crucial that the scope to create Material Passports is secured in contract.

British Land has created a template for these Employer's Requirements to cover the minimum content for an effective Material Passport scope. The requirements should clearly outline:

- What data should be collected for which materials / products
- Delivery format (currently the British Land Material Passport Protocol spreadsheet tool).

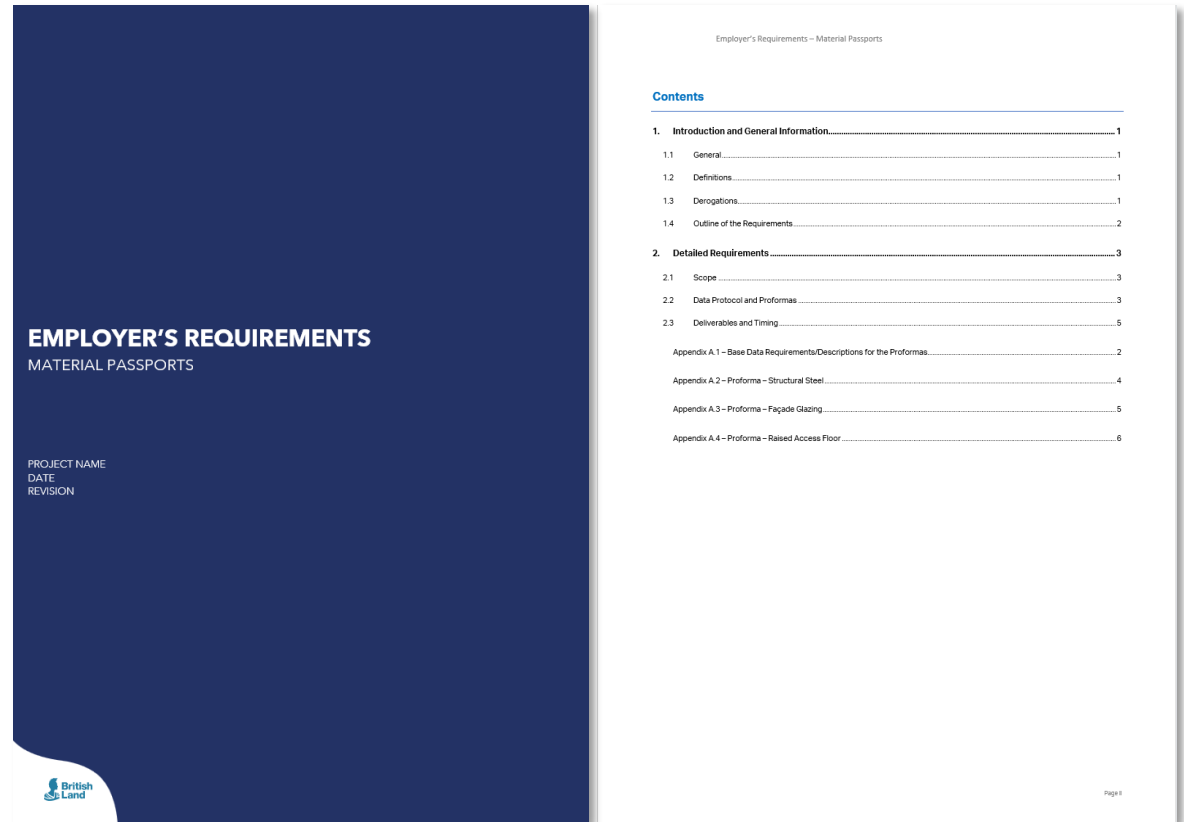
The process should be aligned with the request for information through 'Asset Information Requirements' that feeds into the O&M / FM data platform.

Who

The Material Passport Employer's Requirements should be produced by the Sustainability Consultant in liaison with British Land including the Facilitates Management team.

When

The Material Passport Employer's Requirements should form part of the Main Contractor tender package.





EXTRACTING DATA

We recognise that there are multiple ways to extract data from project documentation, and store it for future use. Each project will need to determine its preferred approach which is likely to differ by construction package.

Data is generally collected from:

- Drawings
- Excel schedules
- As-built models (IFC, Revit, or other formats)
- Specifications, EPDs, certifications and other documents.

To ensure there is consistency between the data collected for our projects, a Material Passport Protocol has been created for use by all projects. The protocol is platform agnostic, and the data can (later) be uploaded to a preferred platform, should we, or individual project teams, decide to utilise one.

Who

Data should be sourced and input into to the British Land Material Passport Protocol spreadsheet tool by the Main Contractor. The Main Contractor may choose to designate certain packages to Sub-contractors, however they are responsible for the data being collected, collated, reviewed, and returned to the Sustainability Consultant for review.

When

Data should be extracted during construction* with the final, collated spreadsheet (Building Passport) submitted at practical completion.



BASE DATA

IDENTIFIER	Project name Guid (Global Unique Identifier) UniClass Code RICS Category Level Material Description Practical Completion Year	2 Finsbury Avenue 5b3def77-38dd-49ad-97fd-5a_20_20_75_35 2.1 Superstructure - Frame 04 Metals Steel 2029
DIMENSION	Height (mm) Width (mm) Depth/Thickness (mm)	417.2mm 181.9mm 10.9mm
QUANTITY	Number of components Length (m) Area (m ²) Net Mass (kg) Volume (m ³)	1 6m n/a 511.8kg 0.07m ³
CARBON	Embodied Carbon [A1-A3] (kgCO ₂ /kg) Total GWP (kgCO ₂ e) Source of Carbon factor	2.5kgCO ₂ e/kg 1.280kgCO ₂ e ICE v2
CIRCULARITY	Design Life % Reused Content (by mass) % Recycled Content (by mass) % Reusable Content (by mass) % Recyclable Content (by mass)	60 years 0 30% 100% 100%



EXCEL SCHEDULES



BIM MODELS



DRAWINGS



EPDs,
CERTIFICATES, etc.

British Land Material Passport Protocol Spreadsheet

LOCATION				PROJECT DATA					IDENTIFIER			
Project name	RICS Location	Level	Class	Height (mm)	Width (mm)	Depth (mm)	Material Code	Number of components	Length (m)	Area (m ²)	Net Mass (kg)	Volume (m ³)

*It is strongly encouraged that interim Passports are prepared by the Contractor early in construction to optimise the data collection process.



SUBMIT MP PROTOCOL TO BRITISH LAND

Once the British Land Material Passport Protocol has been completed and reviewed post construction, it should be submitted to the British Land for storage.

The Protocol has been developed to be platform agnostic at this time. This means it should work with the existing platforms to ensure a smooth transition if one of these becomes a pre-eminent option for future Material Passport storage.

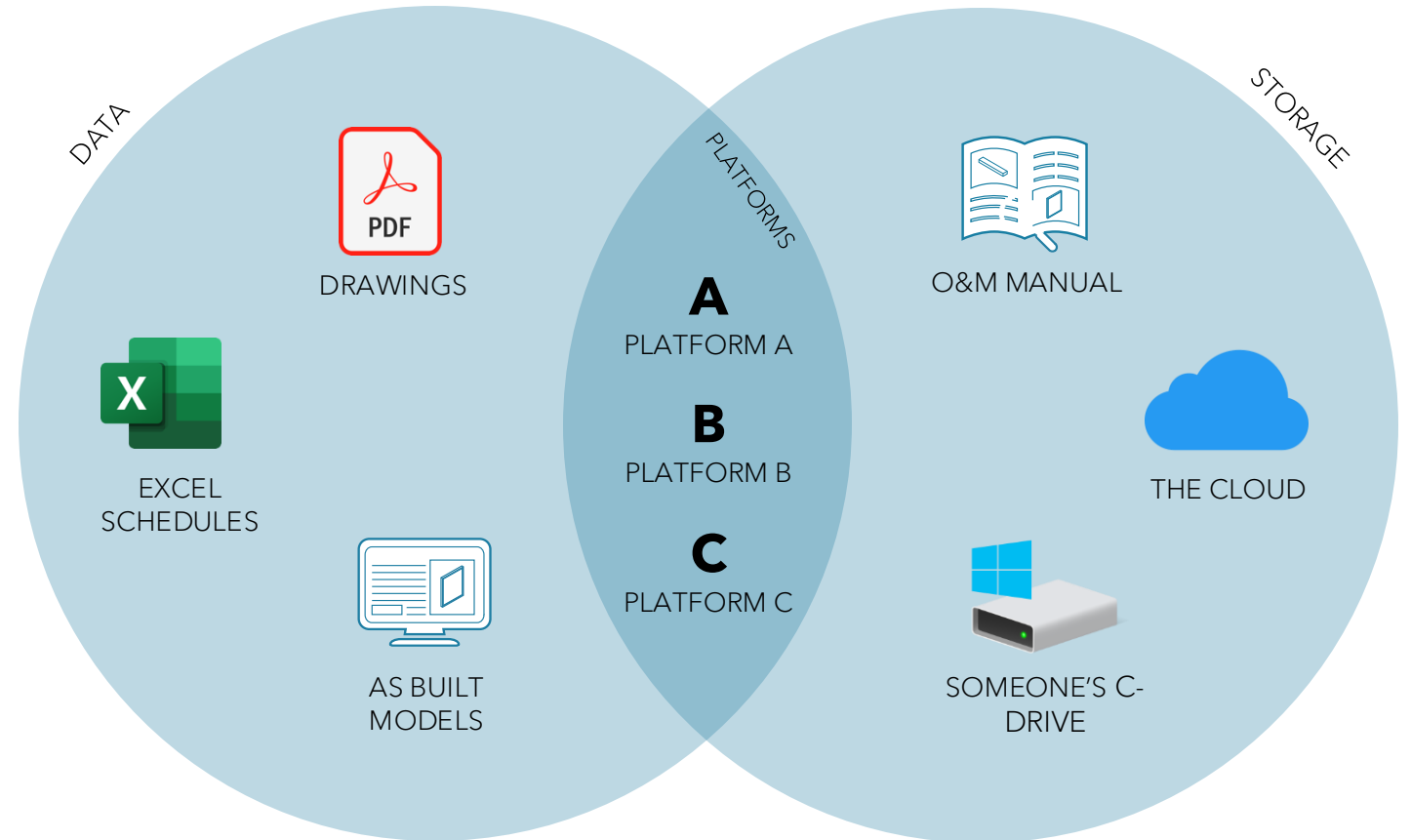
Some projects might want to choose a proprietary Material Passport platform to assist in the collation, organisation and storing data. This is encouraged to test these platforms, but until Material Passports are more established in the UK market, the completed British Land Material Passport Protocol shall be submitted as an Excel file regardless of whether a proprietary platform is used.

Who

The Main Contractor is responsible for submitting a collated Material Passport Protocol to the Sustainability Consultant and British Land for storage.

When

The final protocol should be submitted no later than two months post practical completion.



WHERE DO FIT OUTS FIT IN?

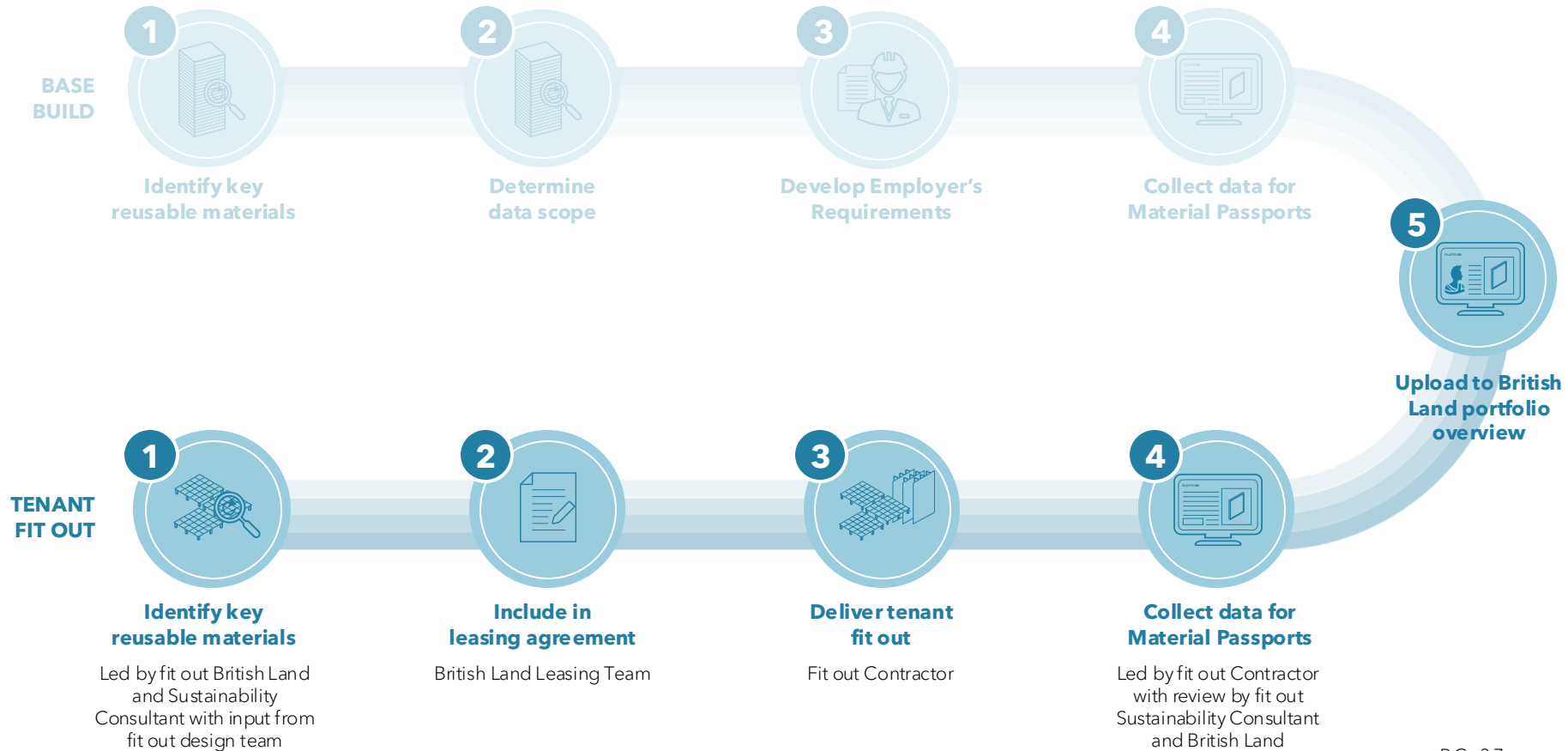
With recent tenant leases for central London offices approaching five years, materials from fit outs are quickly becoming a significant proportion of the waste produced over a building's lifespan.

We believe there is a great opportunity to collaborate with tenants to avoid this wasteful behaviour by introducing Material Passports for tenant fit outs, in addition to the base build.

These agreements must be developed on a case-by-case basis in collaboration with tenants and the British Land Leasing Team. It could enable materials from one tenant to be reused by another within the British Land portfolio, saving carbon, money, materials, and time.

Key reusable materials from fit outs are typically partition walls (glass and plasterboard), light fittings, MEP, furniture, and others.

PROCESS FOR GENERATING FIT OUT MATERIAL PASSPORTS



05

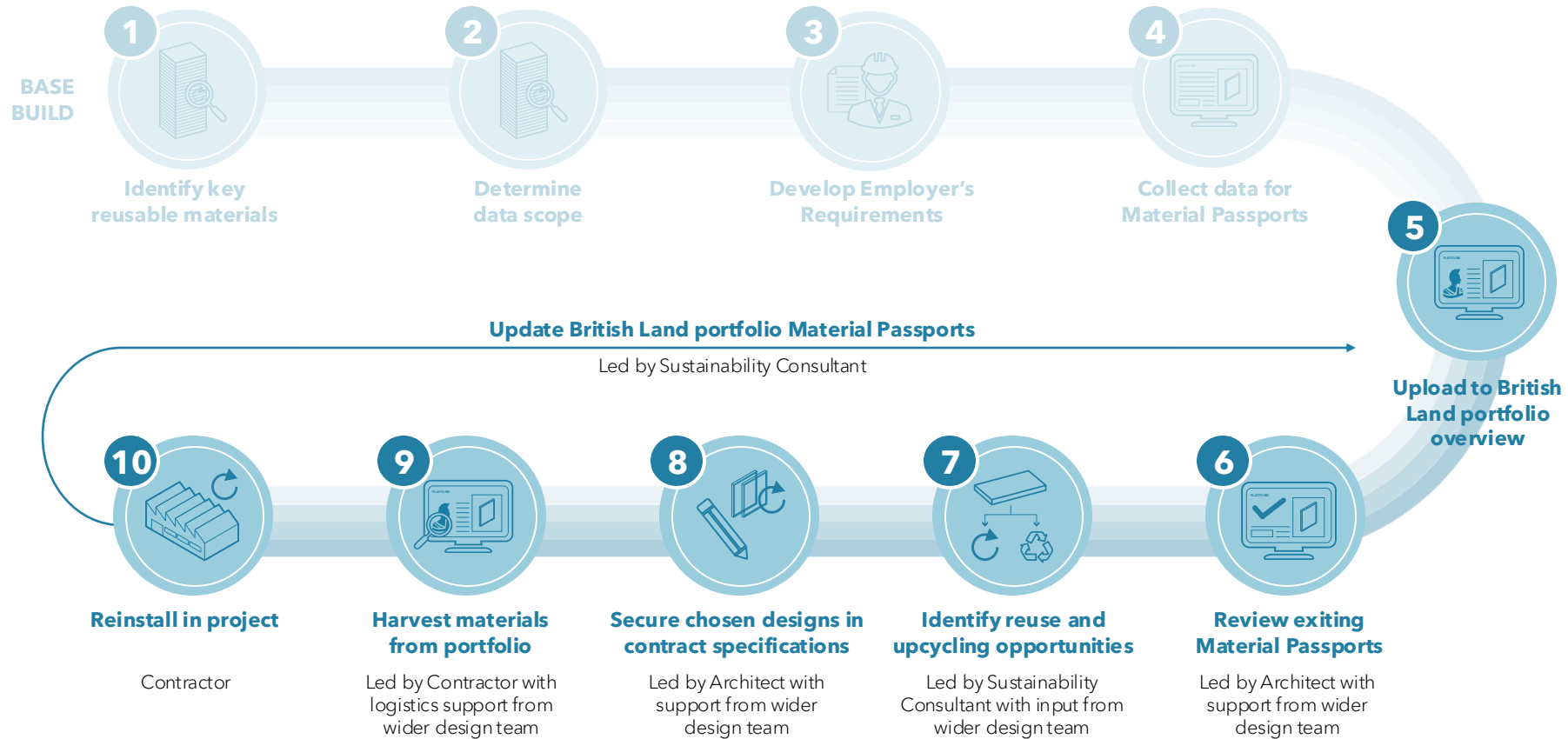
USING MATERIAL PASSPORTS

USING AN EXISTING MATERIAL PASSPORT

The use of existing Material Passports starts earlier in the design process, in RIBA Stage 1. The process sketched alongside will need to be adapted depending on the specific demands necessitated by the reused or repurposed materials.

6. Project teams should review British Land's portfolio of available Material Passports prior to starting design
7. The design team should investigate reuse and upcycling opportunities based on these existing Material Passports, this may involve creative and pioneering design solutions
8. Chosen designs are integrated in drawing sets for tender and construction
9. The Contractor should collect materials from the identified projects, or from British Land's storage locations
10. The Contractor should lead on repurposing and recertifying the identified materials for reuse, and later reinstall in the project.

PROCESS FOR USING EXISTING MATERIAL PASSPORTS

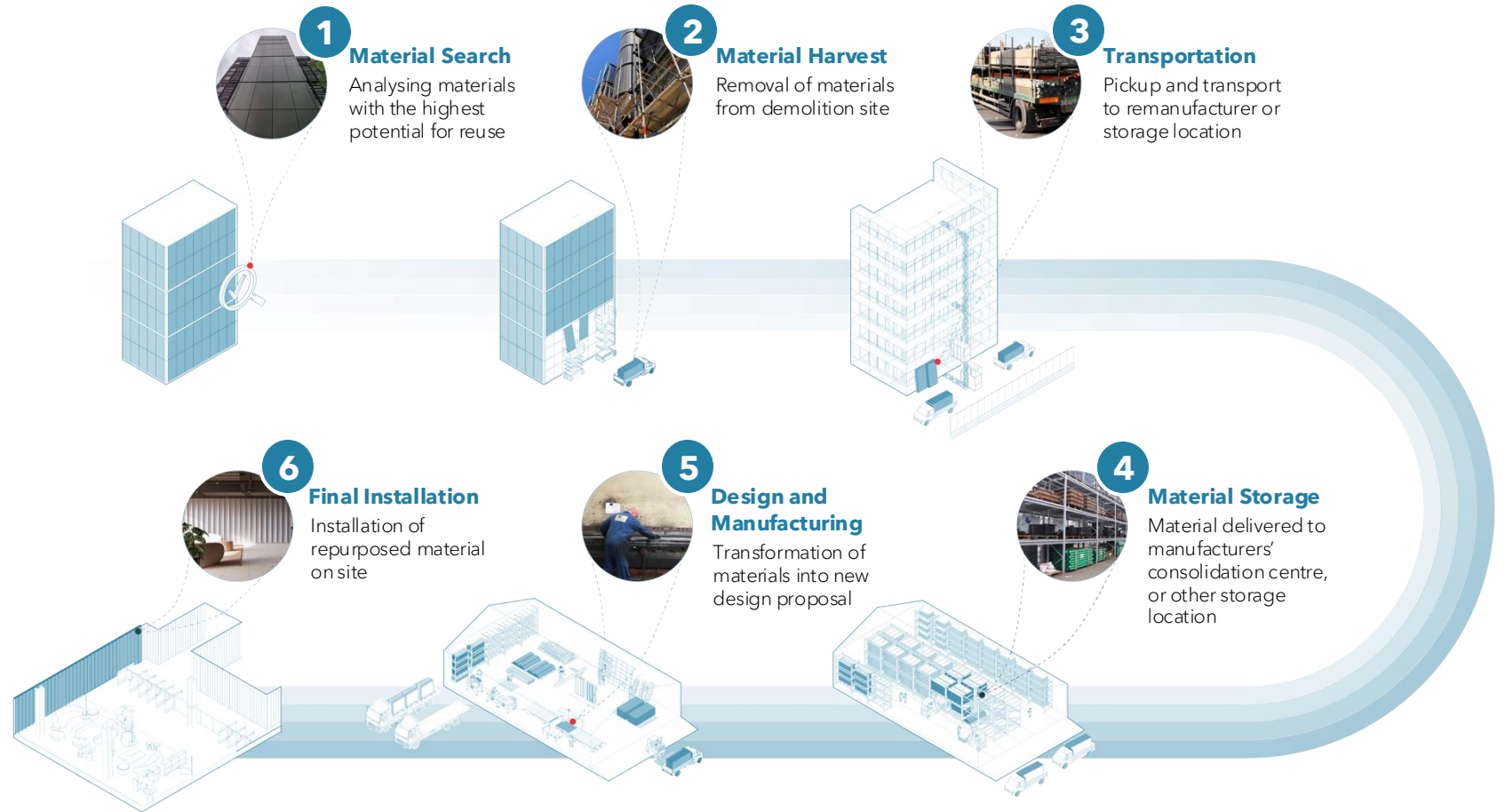


CASE STUDY: MATERIAL HARVEST AT 2FA

Our experience with 3XN GXN at 2 Finsbury Avenue is an example of creating a basic Material Passport for an existing building, and harvesting materials for reuse in a new project.

This was our first project where the project team mapped the materials of the existing building in a Pre-Demolition Audit, investigated the potential for reuse and upcycling, and integrated the upcycling opportunities in the interior design of the development.

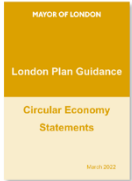
By rolling out Material Passports at scale across the portfolio, the aim is to make this process more efficient and effective. Eventually having a wider overview of the available materials across the portfolio will help improve the probability of implementing such opportunities on other schemes and more often.



06

ADDITIONAL RESOURCES

BRITISH LAND DATA PROTOCOL



For all materials - can build on requirements from GLA for CE Statement and WLCA

BASE DATA

IDENTIFIER	Project name Guid (Global Unique Identifier) UniClass Code RICS Category Level Material Description Practical Completion Year	2 Finsbury Avenue 5b3def77-38dd-49ad-97fd Ss_20_20_75_35 2.1 Superstructure - Frame 04 Metals Steel 2029
DIMENSION	Height (mm) Width (mm) Depth/Thickness (mm)	417.2mm 181.9mm 10.9mm
QUANTITY	Number of components Length (m) Area (m ²) Net Mass (kg) Volume (m ³)	1 6m n/a 511.8kg 0.07m ³
CARBON	Embodied Carbon [A1-A3] (kgCO ₂ /kg) Total GWP (kgCO ₂ e) Source of Carbon factor	2.5kgCO ₂ e/kg 1,280kgCO ₂ e ICE v2
CIRCULARITY	Design Life % Reused Content (by mass) % Recycled Content (by mass) % Reusable Content (by mass) % Recyclable Content (by mass)	60 years 0 30% 100% 100%

An example of our protocol for base data is shown on this page. This data is the minimum data required to be collected for all materials. It relates to:

- Being able to identify the material in the building or portfolio
- Understanding the dimensions of the available materials
- Understanding the quantity available.

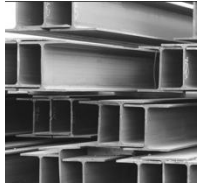
All of these are key data to analyse the scope and potential for future reuse.

In addition, there is base data related to carbon and circularity which may be useful for future reporting, and to make a future business case for reuse. These data are also required by the GLA as part of planning and are highlighted in yellow. These shall be collected by GLA referable projects at a minimum.

Baseline Data - can generally be extracted from BIM

GLA CE Statement Required Data - can be populated from carbon analysis or EPDs

BRITISH LAND DATA PROTOCOL



For specific products with high reusability / recycling potential

PRODUCT SPECIFIC - STRUCTURAL STEEL

PRODUCT INFORMATION	Supplier/Sub-contractor Manufacturer Profile Grade Finish Fire coating	WHL British Steel UB 406 x 178 x 85 S355J0 I101B-TU-M FX2003
----------------------------	---	---

NOTES

Where the material originates from - to enable follow up on performance
 Original manufacturer
 To find key data in the future
 Steel grade is the most important information to determine future potential for reuse
 Type of finish is important as certain types (such as galvanised) cannot be reused or recycled
 -

An example of our product specific protocol for steel sections is shown on this page. Steel is a highly reusable and recyclable material. However, it can be complex and costly to deconstruct which adds risk to a project (though this is quickly changing), unless certainty can be provided on the likelihood of the steel being reused after extraction.

Certain product specific information regarding steel can assist in providing greater confidence of its future reusability. It is beneficial to understand the manufacturer, the grade, any coatings and its accessibility.

Other product specific data may be added in future.

Product Specific Data - generally requires enrichment from Sub-contractor

BRITISH LAND DATA PROTOCOL



For specific products with high reusability / recycling potential

PRODUCT SPECIFIC - GLASS

PRODUCT INFORMATION	Supplier/Sub-contractor Manufacturer Glass Type Reference from Specification Glazing Unit Treatments Glazing Unit Performance (U-Value) Glazing Unit Performance (g-Value) Glazing Unit Performance (VLT)	FCH Saint Gobain GL06 Double Ceramic frit / filmed / back painted / body tinted 1 0.374 72.3%
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NOTES

Where the material originates from - to enable follow up on performance
 Original manufacturer
 To find data sheets and certifications in the future
 Single, Double or Triple glazing unit
 Type of treatment is of importance as certain types (such as ceramic frit) makes recycling difficult

Will inform potential for direct reuse
 Will inform potential for direct reuse
 Will inform potential for direct reuse

An example of our product specific protocol for facade glazing is shown on this page. Facade glazing is currently not commonly reused or recycled in the UK market. However, there is a growing interest in enabling recycling of facade glazing to new flat glass, as it results in significant raw material and carbon reductions.

Product specific data is helpful to facilitate this, and to accelerate the future assessment of potential reuse or recycling.

Other product specific data may be added in future.

■ Product Specific Data - generally requires enrichment from Sub-contractor

BRITISH LAND DATA PROTOCOL



For specific products with high reusability / recycling potential

PRODUCT SPECIFIC - ALUMINIUM

PRODUCT INFORMATION	Supplier/Sub-contractor Manufacturer Facade Type Reference from Specification Alloy Finish Colour	FCH Hydro EWS04 EN AW-6063 T6 PPC RAL9001
----------------------------	--	--

NOTES

Where the material originates from - to enable follow up on performance
Original manufacturer
To find data sheets and certifications in the future

Alloy type will determine high-value recycling routes
Type of finish may impact reusability / recyclability
-

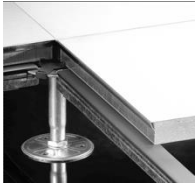
An example of our product specific protocol for facade aluminium profiles is shown on this page. Aluminium profiles are highly recyclable, but need high-value recycling needs to be ensured by keeping high quality alloys separated.

Product specific data is helpful to facilitate this, and to accelerate the future assessment of potential reuse or recycling.

Other product specific data may be added in future.

Product Specific Data - generally requires enrichment from Sub-contractor

BRITISH LAND DATA PROTOCOL



For specific products with high reusability / recycling potential

PRODUCT SPECIFIC - RAISED ACCESS FLOOR

PRODUCT INFORMATION	Supplier/Sub-contractor Manufacturer Product Code/Model Grade Type of Cover	ABC Kingspan RMG600 PSA medium Carpet
----------------------------	---	---

NOTES

Where the material originates from - to enable follow up on performance
 Original manufacturer
 To find data sheets and certifications in the future
 Panel grade are important to determine suitability for future use
 Type of cover will indicate if there is a likelihood of the panels being damaged (e.g. nailed timber floor)

An example of our product specific protocol for raised access (RAF) floors is shown on this page. RAF has become a commonly reused product in the UK market over the last number of years. They are often collected and sent to specialist resellers to get recertified with a new warranty.

To accelerate the process of recertification, and estimating how much of RAF which can be reused, the product specific information as listed is beneficial. The type of cover can be difficult to collect as it is often specified by the tenant. Because of the big impact this might have on future reuse, it should be collected once a tenant has completed their fit out.

Other product specific data may be added in future.

Product Specific Data - generally requires enrichment from Sub-contractor

FURTHER READING

CIRCULAR ECONOMY GUIDANCE

GLA - DESIGN FOR A CIRCULAR ECONOMY PRIMER

https://www.london.gov.uk/sites/default/files/design_for_a_circular_economy_web.pdf

GLA - CIRCULAR ECONOMY STATEMENT GUIDANCE

https://www.london.gov.uk/sites/default/files/circular_economy_statements_lpg_0.pdf

UKGBC - CIRCULAR ECONOMY

<https://ukgbc.org/our-work/topics/circular-economy/>

REUSE TOOLKIT - MATERIAL SHEETS

<https://vb.nweurope.eu/projects/project-search/fcrbe-facilitating-the-circulation-of-reclaimed-building-elements-in-northwestern-europe/news/reuse-toolkit-material-sheets/>

ISTRUCTE - CIRCULAR PARTNERSHIPS DATABASE

<https://www.istructe.org/resources/climate-emergency/circular-partnerships-database/>

